2015-2016 Dodge Challenger

DESCRIPTION

DESCRIPTION

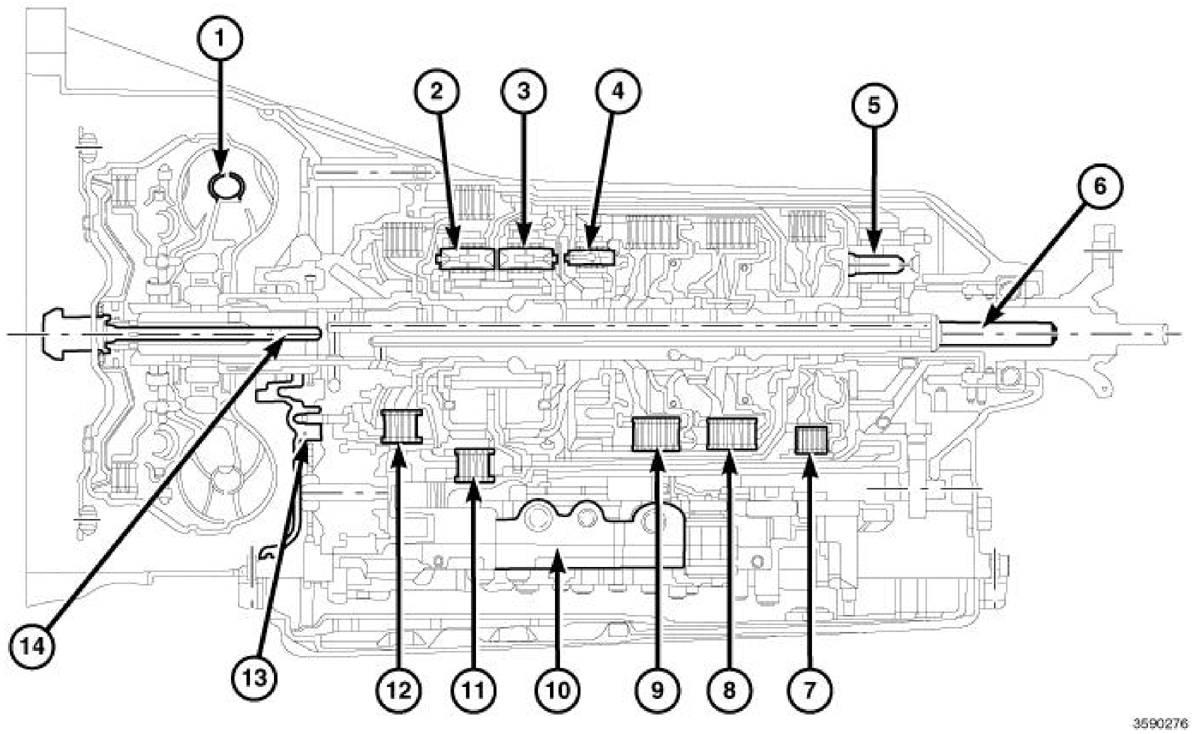


Fig. 1: 8HP70 Automatic Transmission
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER
2 -P1 PLANETARY
3 - P2 PLANETARY
4 - P3 PLANETARY
5 - P4 PLANETARY
6 - OUTPUT SHAFT
7 - D CLUTCH
8 - C CLUTCH
9 - E CLUTCH
10 - VALVE BODY
11 - B CLUTCH
12 - A CLUTCH
13 - OIL PUMP
14 - INPUT SHAFT

CAUTION: A unique transmission fluid has been developed for this transmission. This

fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .

The transmission case is a single-piece unit. The starter pocket, cooler line fittings, and manual park release lever are located on the driver's side of the case. The electrical connector and oil fill plug are located on the passenger side of the case. The transmission uses a flanged output shaft connection.

OPERATION

OPERATION

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .

The 8HP70 is an electronic eight-speed automatic transmission. The Transmission Control Module Assembly (TCMA), which is integrated into the valve body, provides fully synchronized clutch-to-clutch shifting through four planetary gear sets. The TCMA includes a mounting plate that holds the Transmission Control Module (TCM) and a molded wiring harness for connection to various transmission sensors and solenoids. The valve body assembly contains all the sensors and solenoids required for operation, completely inside the transmission. Eight speeds allow the engine to maintain its optimal rpm range, increasing fuel economy and performance.

Transmission control is performed by the TCM based on hard-wired and CAN bus signals from sensors and modules. The TCM receives driveability data from the Powertrain Control Module (PCM) and other modules over the CAN-C bus. It also receives shift lever position information from the electronic shifter over a dedicated transmission CAN bus. The TCM processes this input data and controls operation of the torque converter clutch, park lock system, solenoid valves, and pressure regulating valve.

The input and output speed sensors are Hall-effect sensors that measure shaft rotational speed. The input speed sensor is located at the top, near the center, of the of the TCMA and reads input shaft speed from the magnetic ring on the P2 carrier. The output speed sensor is located at the back of the TCMA and reads output shaft speed from the P4 carrier

FILTER SERVICE The 8HP70 has a conventional fluid sump design, however, the filter is integrated into the oil pan resulting in a lower profile for improved vehicle packaging. The oil pan gasket is reusable providing it is not damaged during removal.

FLUID CHECK AND FILL A fluid fill tube and indicator are not provided. All work is performed under the vehicle while raised on a hoist. In the event of a transmission shift quality concern, a fluid leak, or in conjunction with a transmission repair, the transmission fluid level must be validated and topped off as necessary. The procedure involves the use of a scan tool to monitor transmission fluid temperature. Specific service procedures are necessary to check and fill the transmission with fluid. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

CLUTCHES

The 8HP70 transmission uses two multi-plate holding clutches (A and B) and three multi-plate driving (rotating) clutches (C, D, and E). Gear shifts from one - eight and eight - one are synchronous shifts, meaning one of the clutches must continue to transmit torque at lower pressure until the other clutch is able to accept the

input torque.

Clutches A and B are holding clutches. Clutch A is applied by hydraulic pressure and released by a return spring, similar to the driving clutches. Clutch B operation is unique because it has fluid chambers on both sides of the apply piston, and therefore it is applied and released hydraulically. Regulation of fluid pressure on each side of the piston allows precise positioning of clutch B for apply, release, and controlled slip conditions.

Clutches C, D, and E operate in a similar manner. Regulated pressure is available at the clutch C shift solenoid and the clutch valve. When the shift solenoid is de-energized, fluid flows through the shift solenoid and applies pressure to the clutch valve. During the shift, pressure moves the clutch valve, which begins to apply the clutch. Pressure from the holding valve regulates the opening of the clutch valve, softening the shift. Above a set threshold, the holding valve seats and allows the clutch valve to open completely.

EMERGENCY RUNNING FUNCTION - LIMP IN MODE

In the event of a complete transmission electrical failure (loss of power to the TCM), the transmission enters default limp-in mode. When the TCM loses power, all solenoids are de-energized. Maximum pressure locks the transmission in 6th gear, and a diagnostic trouble code (DTC) is stored in memory. If the vehicle is in a forward gear range when the fault occurs, the transmission defaults to 6th gear.

If the vehicle is in park, reverse, or neutral, or if the engine is turned off when the fault occurs, the transmission will remain in park because the park lock release system cannot release the parking pawl. No hydraulic pressure is supplied to the driving clutches. In this situation, the manual park release lever must be used to disengage the park pawl.

The limp-in function remains active until the DTC is rectified or the stored DTC is erased with the appropriate scan tool.

OIL PUMP OPERATION

The oil pump is located just behind the torque converter, between the pump housing and cover assemblies. The torque converter drives the pump assembly using a chain and sprockets. The oil pump is a double-stroke vane pump. The pump has dual chambers, two inlet and two outlet ports, allowing it to produce the fluid volume necessary for all operating conditions. The pump draws fluid through a filter and pressurizes the fluid as the pump rotates. After the fluid is pressurized, it exits the pump through two exhaust ports that feed the system pressure valve. The system pressure valve maintains fluid pressure and allows excess pressure to be returned to the pump. This reduces cavitation and noise. A slipping clutch can often be determined by comparing which internal units are applied in the various gear ranges. The Clutch Application chart provides a basis for analyzing road test results.

SOLENOID APPLICATION

GEAR	PARK	A	B	C	D	E	TCC	LPS
P	OFF	ON	TP	OFF	OFF	OFF	OFF	OFF
N	ON	ON	TP	OFF	OFF	OFF	OFF	OFF
R	ON	ON	ON	OFF	ON	OFF	OFF	Ā±
1	ON	ON	ON	ON	OFF	OFF	Ā±	Ā±
2	ON	ON	ON	OFF	OFF	ON	Ā±	Ā±
3	ON	OFF	ON	ON	OFF	ON	Ā±	Ā±

GEAR	PARK	A	B	C	D	E	TCC	LPS
4	ON	OFF	ON	OFF	ON	ON	Ā±	Ā±
5	ON	OFF	ON	ON	ON	OFF	Ā±	Ā±
6	ON	OFF	OFF	ON	ON	ON	Ā±	Ā±
7	ON	ON	OFF	ON	ON	OFF	Ā±	Ā±
8	ON	ON	OFF	OFF	ON	ON	Ā±	Ā±

TP= Touch Point Pressure

Ā± = Variable Actuation

POWERFLOW COMPONENTS

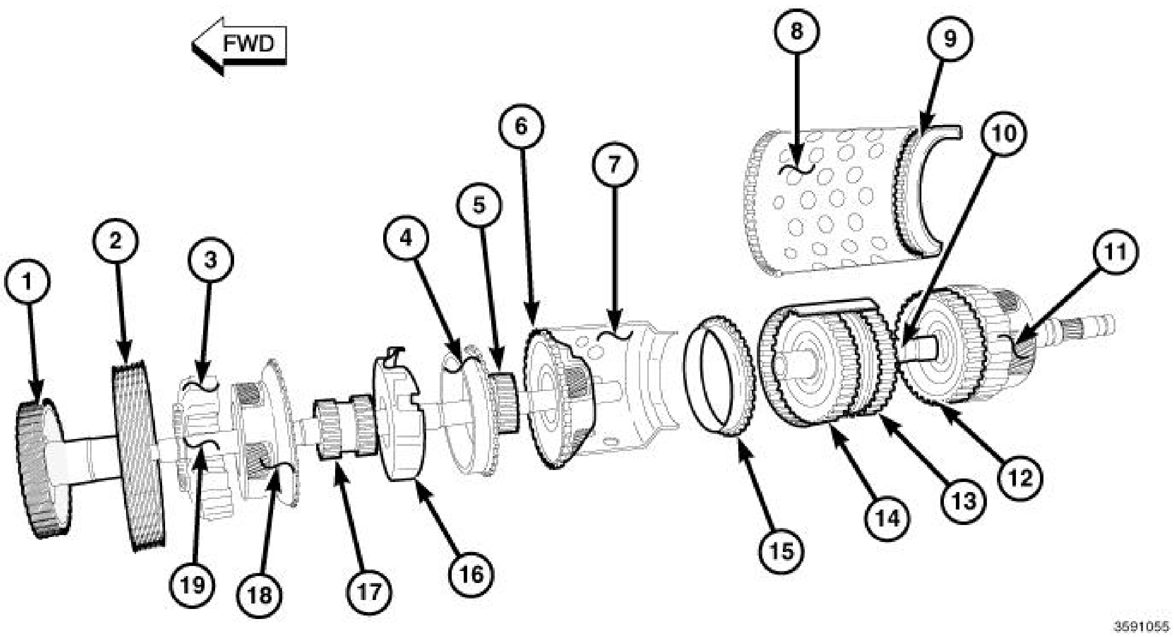


Fig. 2: Powerflow Components
Courtesy of CHRYSLER GROUP, LLC

1- A CLUTCH
2 - B CLUTCH
3 - P1 ANNULUS (PARTIAL CUTAWAY)
4 - P2 ANNULUS
5 - P3 SUN GEAR
6 - P3 CARRIER
7 - D CLUTCH DRUM (PARTIAL CUTAWAY)
8 - P4 ANNULUS DRUM (PARTIAL CUTAWAY)
9 - P4 ANNULUS (PARTIAL CUTAWAY)
10 - P4 SUN GEAR/D CLUTCH RETAINER (PARTIAL CUTAWAY)
11 - P4 CARRIER
12 - D CLUTCH
13 - C CLUTCH

14 - E CLUTCH	
15 - P3 ANNULUS	
16 - P2 CARRIER	
17 - P1/P2 SUN GEAR	
18 - P1 CARRIER	
19 - INPUT SHAFT	
Ā	

Use this POWER FLOW COMPONENTS graphic and chart to identify the individual components of the specific gear powerflow explanations below:

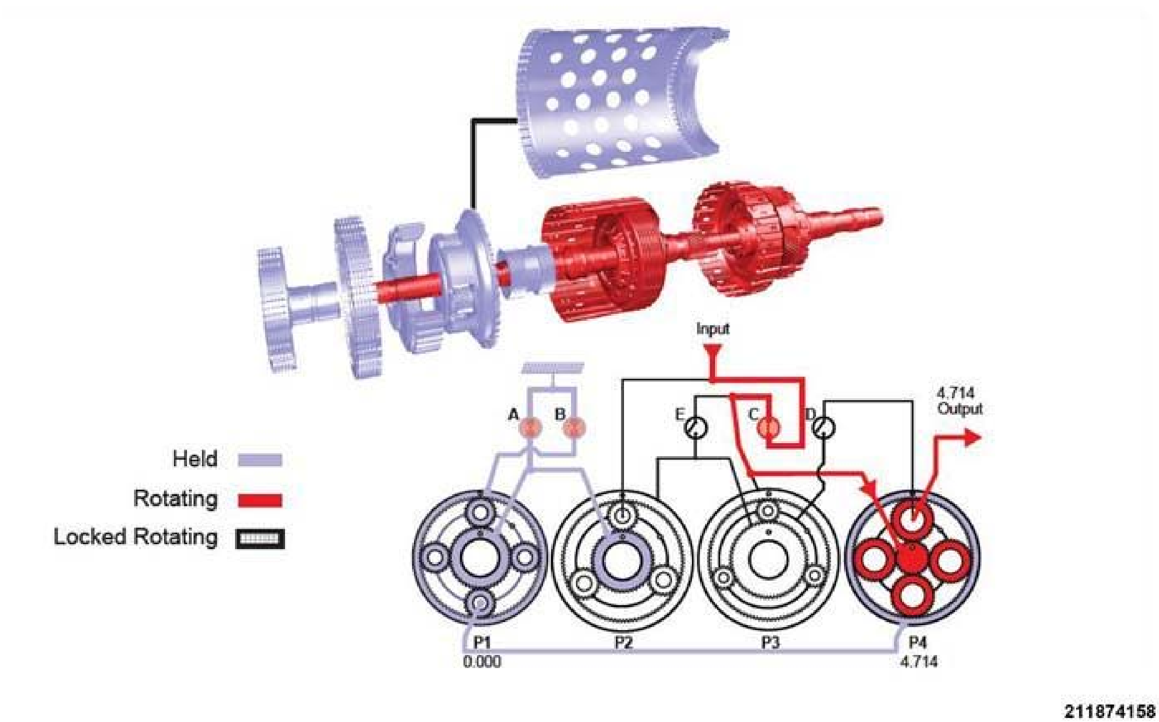


Fig. 3: Powerflow In First Gear
Courtesy of CHRYSLER GROUP, LLC

FIRST GEAR POWERFLOW

Clutch A (1) holds the P1/P2 sun gear (17) and clutch B (2) holds the P1 annulus (3). Because two members of the same gear set are held, the entire P1 gear set is stationary. The stationary P1 carrier (18) is connected to the P4 annulus (9), locking the annulus. The input shaft (19) drives the C clutch (13), and the C clutch (13) drives the P4 sun gear (10). The P4 sun gear (10) drives the P4 carrier (11), whose pinions walk around the held P4 annulus (9).

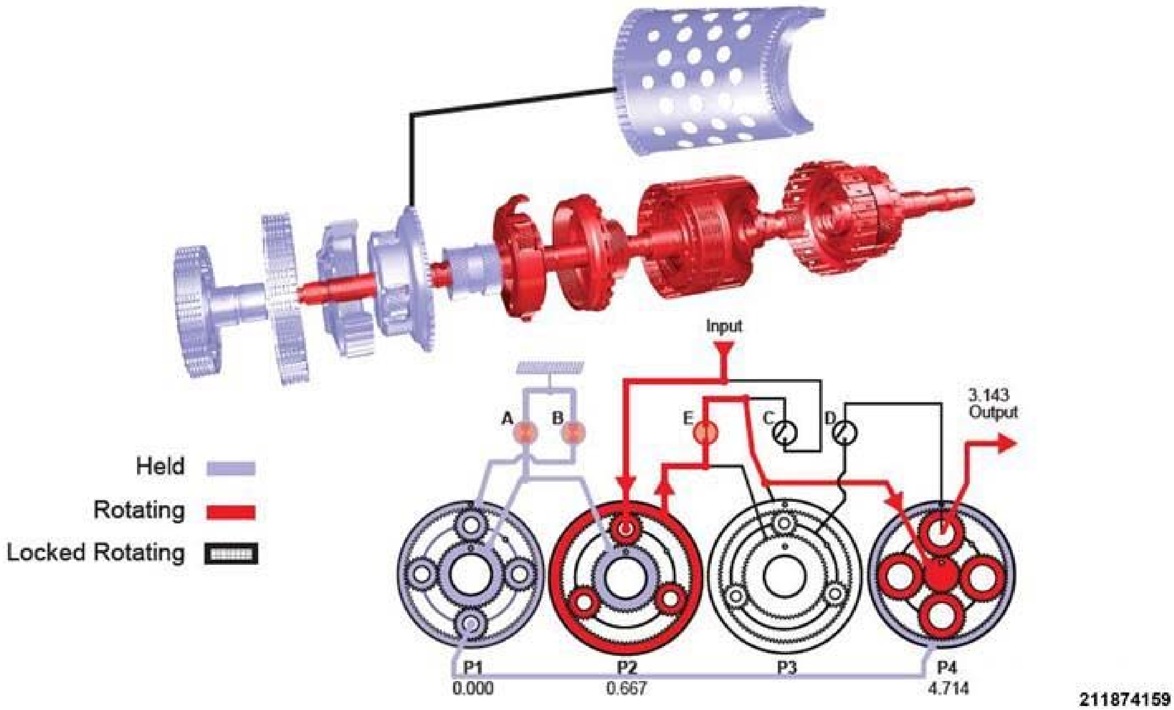
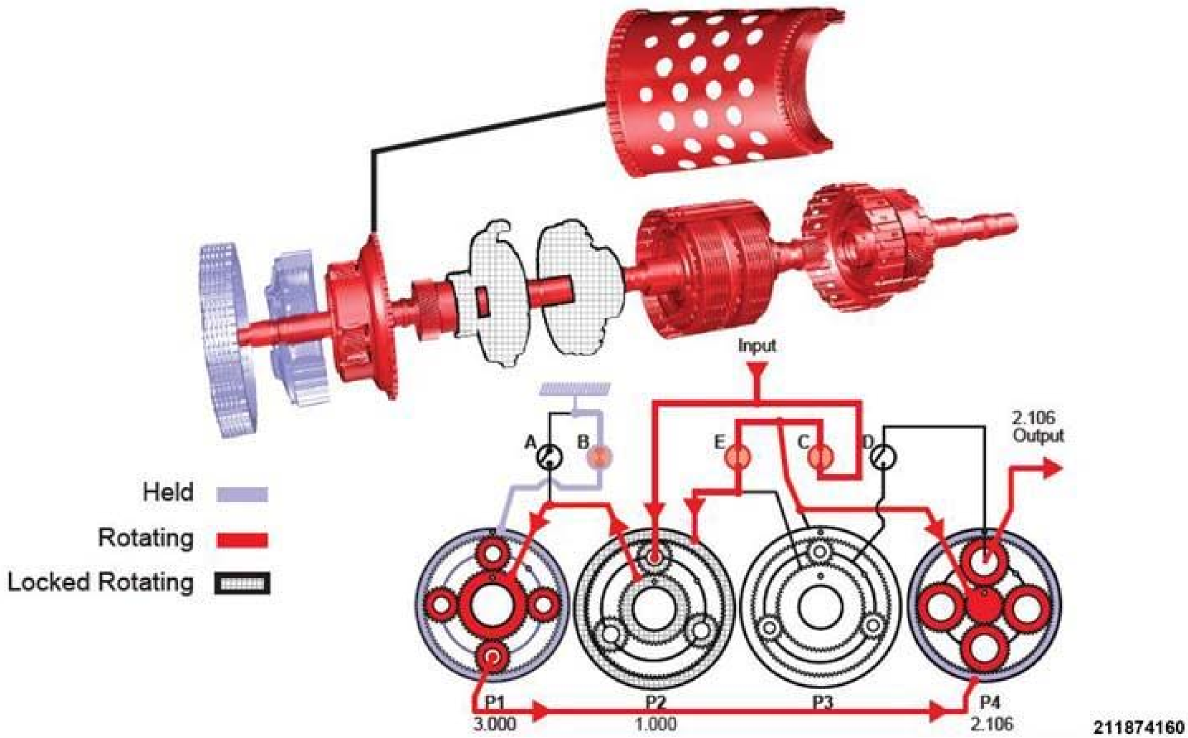


Fig. 4: Powerflow In Second Gear
Courtesy of CHRYSLER GROUP, LLC

SECOND GEAR POWERFLOW

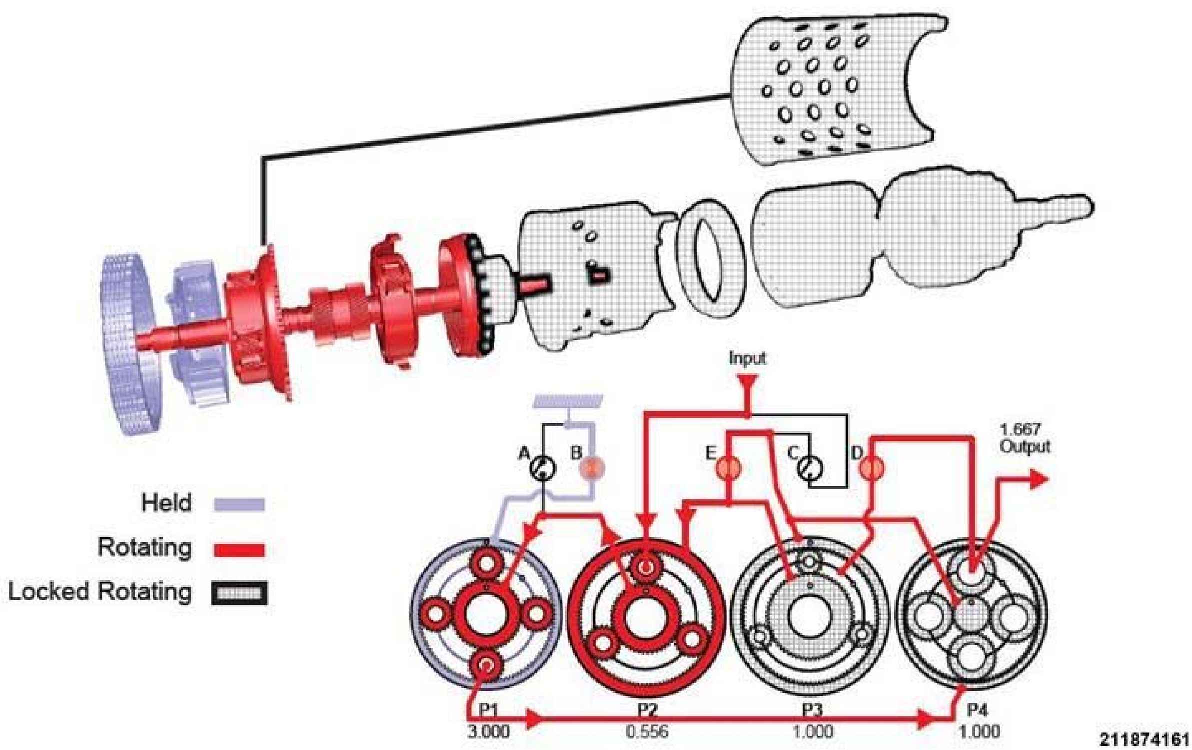
Clutch A (1) holds the P1/P2 sun gear (17) and clutch B (2) holds the P1 annulus (3). As with 1st gear, the entire P1 gear set is stationary. The stationary P1 carrier (18) is connected to the P4 annulus (9), locking the annulus. The input shaft (19) drives the P2 carrier (16). The P2 carrier (16) drives the P2 annulus (4). The P2 annulus (4) drives the E clutch (14) through the P3 sun gear (5) connection. The E clutch (14) then drives the P4 sun gear (10). The P4 sun gear (10) drives the P4 carrier (11), whose pinions walk around the held P4 annulus (9).



[Fig. 5: Powerflow In Third Gear](#)
Courtesy of CHRYSLER GROUP, LLC

THIRD GEAR POWERFLOW

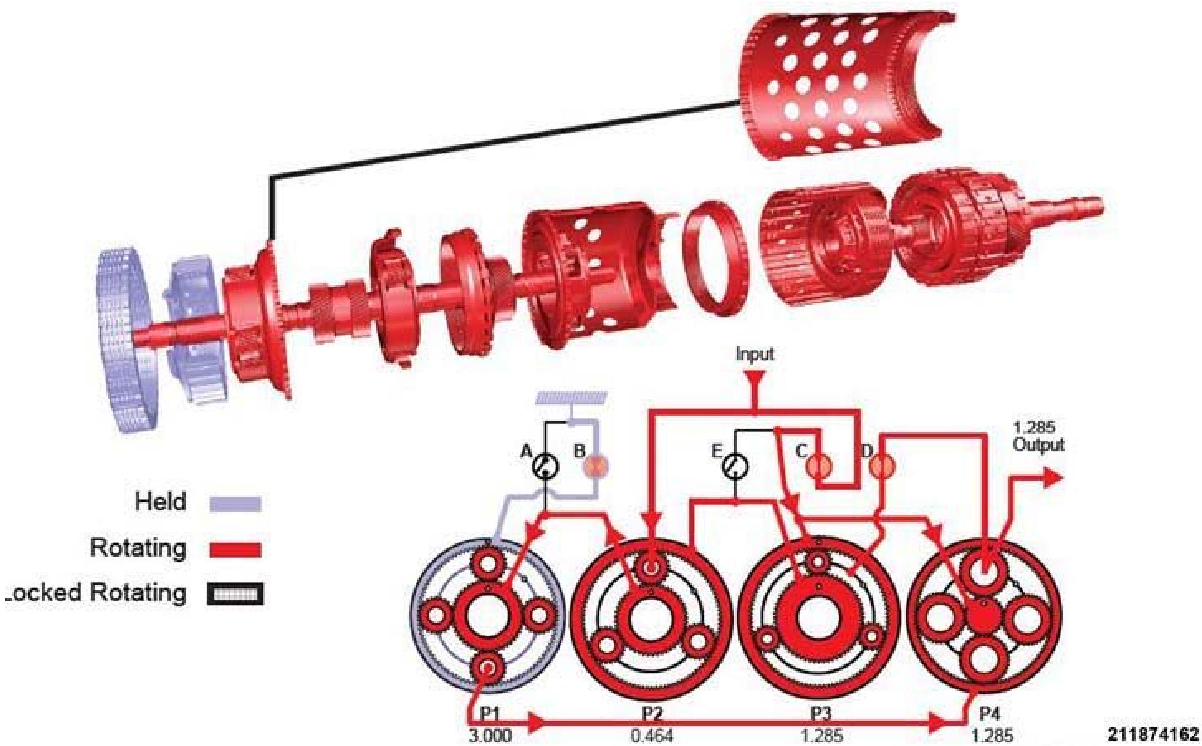
Clutch B (2) holds the P1 (3) annulus. The input shaft (19) drives the C clutch (12), which drives the P4 annulus (9). The C clutch (12) also drives the E clutch (14), which drives the P2 annulus (4). Because the P2 carrier (16) and the P2 annulus (4) are both driven at input shaft speed, the P2 gear set is locked at input shaft speed. The P1/P2 sun gear (17) drives the P1 carrier (18), and the P1 carrier drives the P4 annulus (9).



[Fig. 6: Powerflow In Fourth Gear](#)
Courtesy of CHRYSLER GROUP, LLC

FOURTH GEAR POWERFLOW

Clutch B (2) holds the P1 annulus (3). With the E (14) and D (12) clutches applied, all components of the P3 and P4 gear sets are locked together to rotate at the same speed. The input shaft (19) drives the P2 carrier (16) which drives the P1/P2 sun gear (17). The P1/P2 sun gear drives the P1 carrier (18). The P1 carrier drives the P4 gear set through the P4 annulus (9).



[Fig. 7: Powerflow In Fifth Gear](#)
Courtesy of CHRYSLER GROUP, LLC

FIFTH GEAR POWERFLOW

Clutch B (2) holds the P1 annulus (3). The input shaft (19) always drives the P2 carrier (16). Because the C clutch (13) is applied, the P3 annulus (15) and P4 sun gear (10) are also driven at input shaft speed. The D clutch (12) is applied to connect the P3 carrier (6) with the P4 carrier (11). The P2 carrier (16) drives the P1/P2 sun gear (17), which drives the P1 carrier (18). The P1 carrier walks around the held P1 annulus (3) and drives the P4 annulus (9). Gear reduction is achieved between the P4 sun gear (10) rotating at input shaft speed and the P4 annulus (9) rotating at a reduced speed.

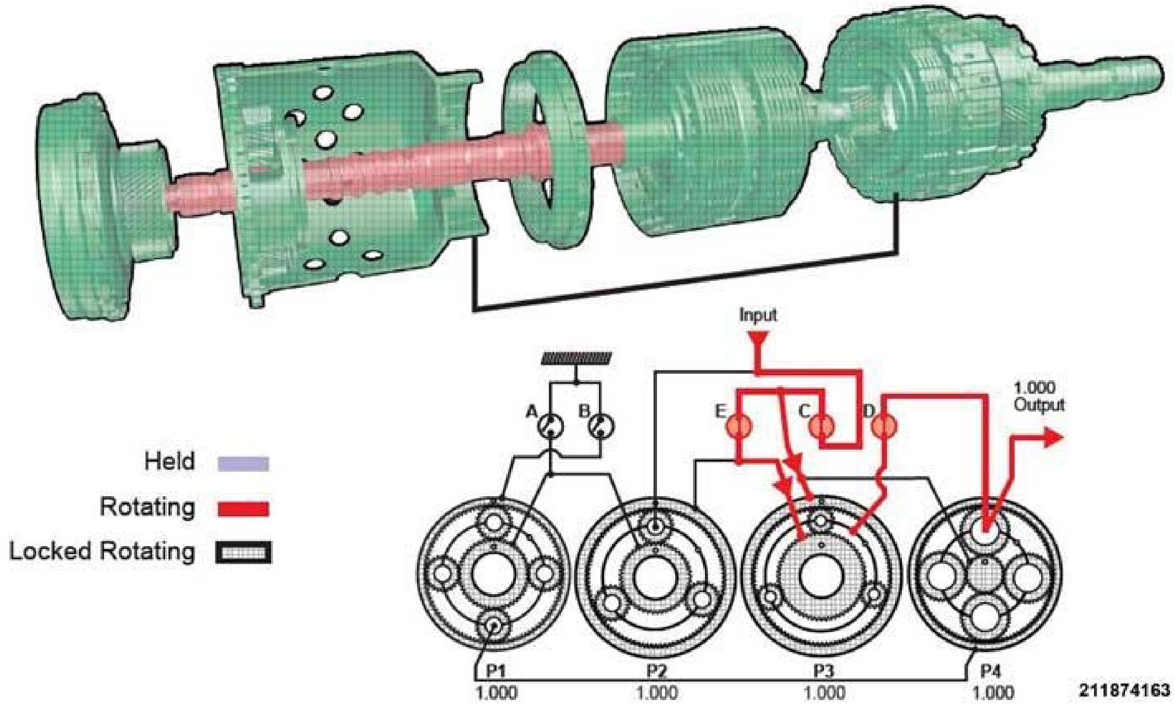


Fig. 8: Powerflow In Sixth Gear
Courtesy of CHRYSLER GROUP, LLC

SIXTH GEAR POWERFLOW

Clutch C (13) drives the P3 annulus (15) at input shaft speed and E clutch (14) drives the P3 sun gear (5) at input shaft speed. Because two components of the same gear set are driven at the same speed, the entire gear set is locked in rotation. The D clutch (12) connects the P3 carrier (6) to the P4 carrier (11) and the output shaft.

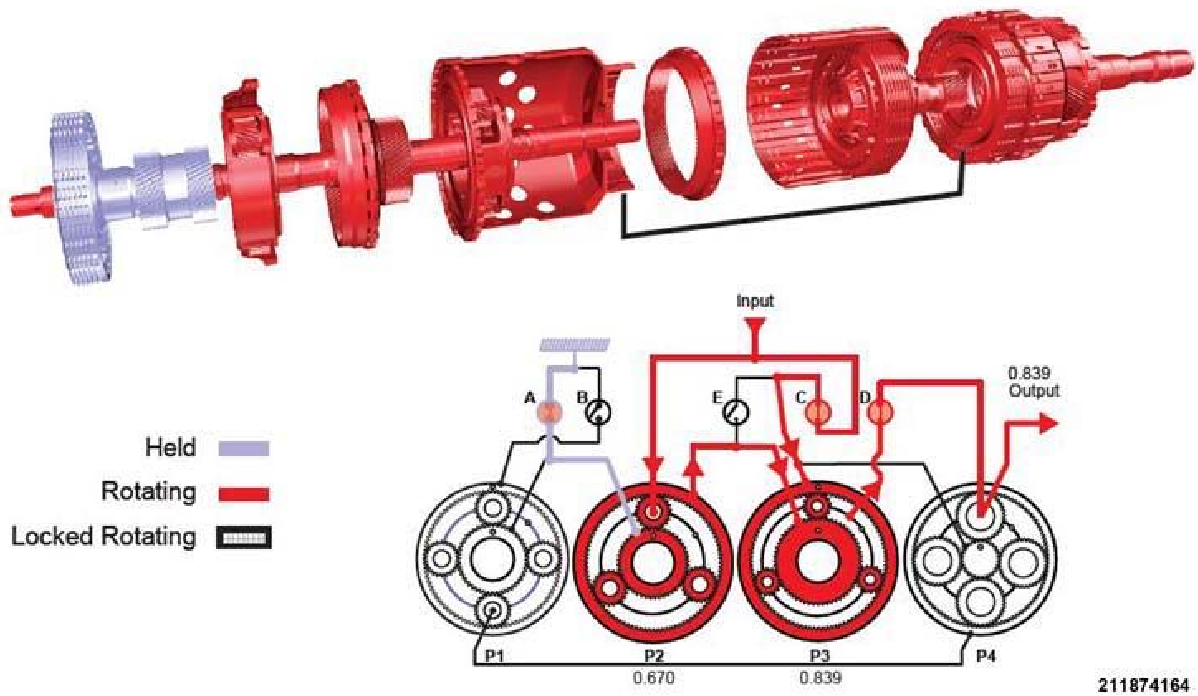


Fig. 9: Powerflow In Seventh Gear
Courtesy of CHRYSLER GROUP, LLC

SEVENTH GEAR POWERFLOW

Clutch A (1) holds the P1/P2 sun gear (17) stationary. The input shaft drives the P2 carrier which drives the P2 annulus, increasing the speed of the P3 sun gear (5) and creating overdrive. The C clutch (13) drives the P3 annulus (15) at input shaft speed. The P3 sun gear (5) spins at a faster speed than the P3 annulus (15) and the P3 carrier (6) is the output of the gear set. This results in a reduction that offsets the overdrive of the P2 gear set. The D clutch (12) connects the P3 carrier (6) to the P4 carrier (11) and the output shaft.

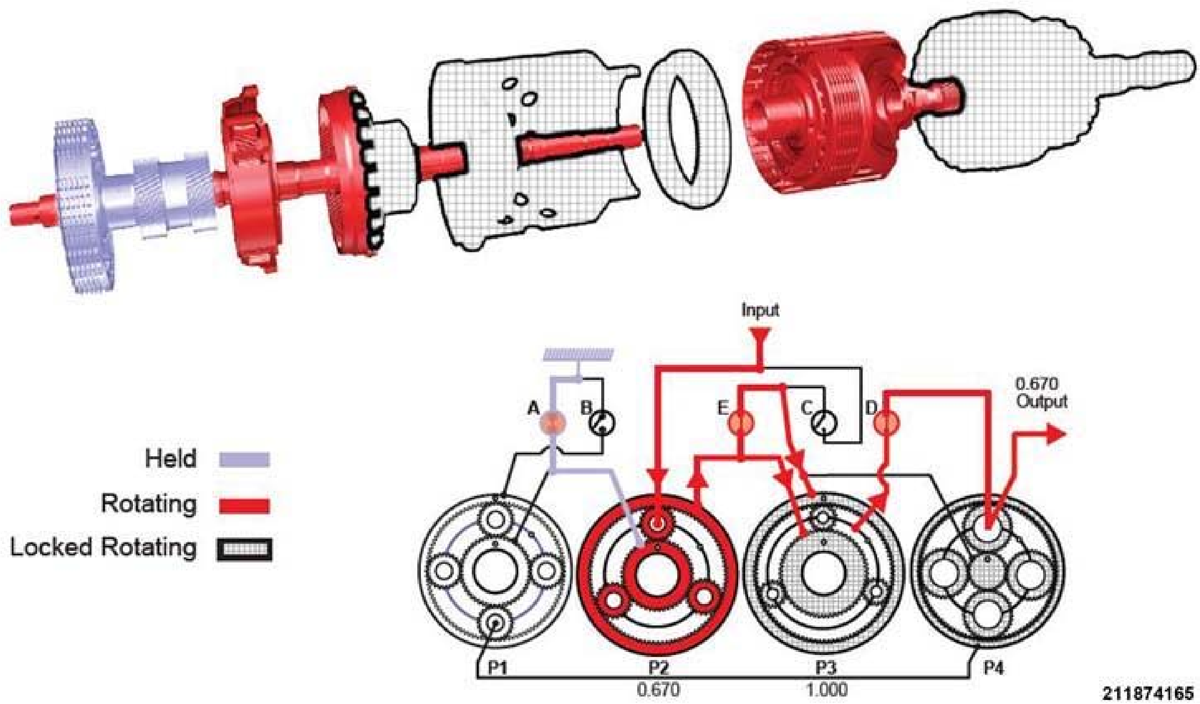


Fig. 10: Powerflow In Eighth Gear
Courtesy of CHRYSLER GROUP, LLC

EIGHTH GEAR POWERFLOW

Clutch A (1) holds the P1/P2 sun gear (17) stationary. As with 7th gear, the P2 gear set creates an overdrive ratio. However, the E clutch (14) is now applied, which locks together the P3 gear set and eliminates any torque multiplication from the P3 gear set. The overdrive created by P2 is transferred by the D clutch (7) to the output shaft.

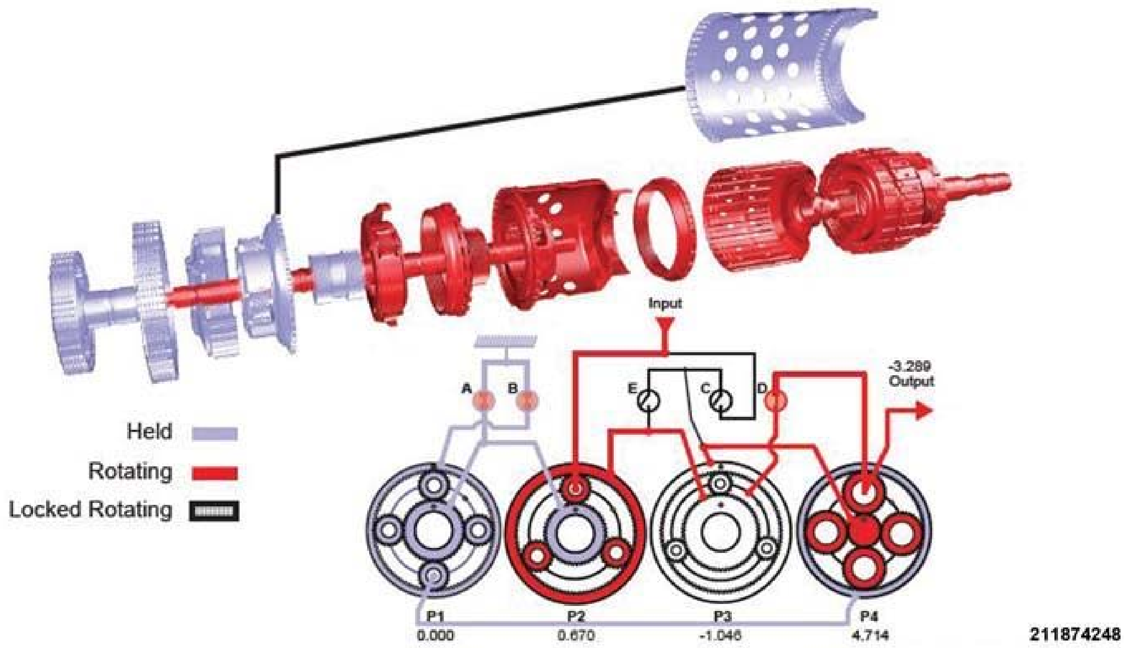


Fig. 11: Powerflow In Reverse Gear
Courtesy of CHRYSLER GROUP, LLC

REVERSE GEAR POWERFLOW

Clutches A (1) and B (2) hold the P1 gear set to hold the P1/P2 sun gear (17). The input shaft drives the P2 carrier, which produces an overdrive ratio from the P2 gear set, driving the P3 sun gear (5) in engine direction. The P3 carrier (6) is connected to the output shaft by the D clutch (12). This holds the carrier, reversing the direction and multiplying torque. The P3 annulus (15) is connected to the P4 sun gear (10), which drives the P4 gear set opposite of engine direction and multiplies torque again.

DIAGNOSIS AND TESTING

CLUTCH AIR PRESSURE TESTS

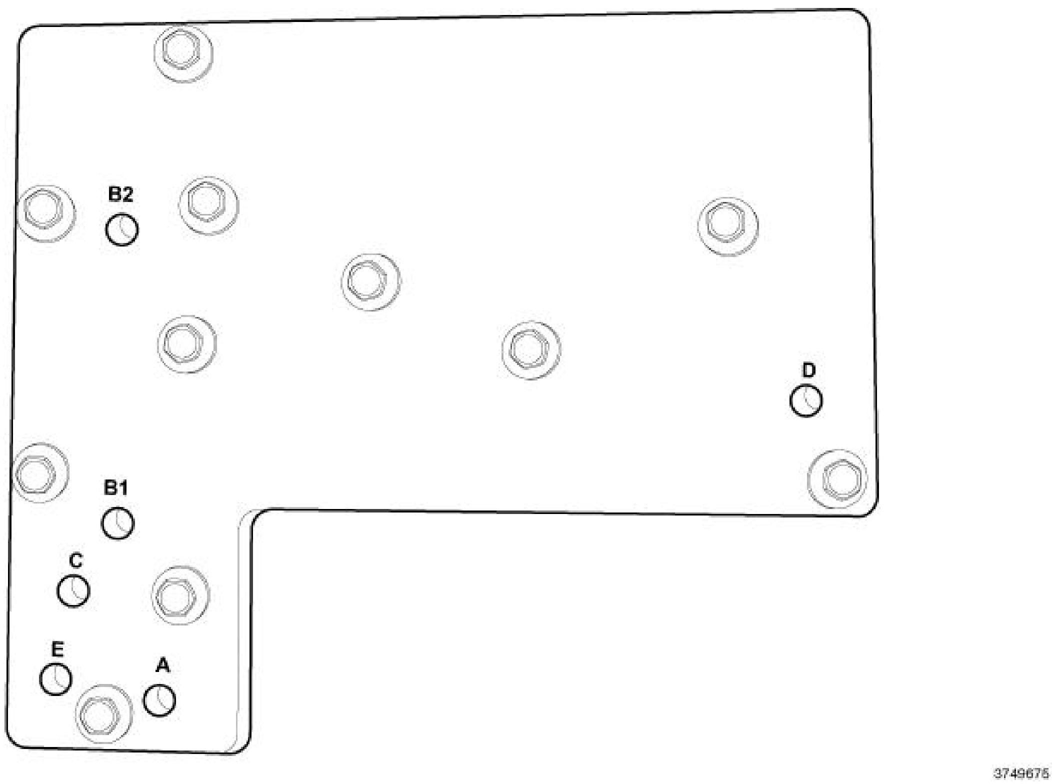


Fig. 12: Clutch Pressure Test Passages
Courtesy of CHRYSLER GROUP, LLC

Inoperative clutches can be located using a series of tests by substituting air pressure for fluid pressure using (special tool #10383, Plate, Clutch Pressure Test).

The clutches may be tested by applying air pressure to their respective passages. The valve body must be removed. To make air pressure tests, proceed as follows:

NOTE: **The compressed air supply must be free of all dirt and moisture. Use a pressure of 5-8 bar (73-116 psi).**

Remove the valve body. Refer to **VALVE BODY, REMOVAL** for 8HP45/845RE. Refer to **VALVE BODY, REMOVAL** if equipped with an 8HP70. Install (special tool #10383, Plate, Clutch Pressure Test) and tighten bolts to 6 N.m (50 in. lbs.). When testing is finished, install valve body. Refer to **VALVE BODY, INSTALLATION** for 8HP45/845RE or, refer to **VALVE BODY, INSTALLATION** if equipped with an 8HP70. Fill the transmission. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** for 8HP45/845RE or refer to **FLUID AND FILTER, STANDARD PROCEDURE** if equipped with an 8HP70.

NOTE: **If any clutch does not appear to be functioning with the air, add some 8HP transmission fluid and try the test again. Some circuits will not operate without fluid.**

A CLUTCH

Apply air pressure to the feed hole located on the test plate marked **A** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

B CLUTCH FUNCTION

Apply air pressure to the feed hole located on the test plate marked **B1** , listen for an audible thud. The piston should not return to its starting position when the air pressure is removed. If air pressure is applied to the B2 circuit, the B1 should return. An audible hiss may be heard when testing this clutch as the seal is designed to allow fluid/air to pass.

C CLUTCH

Apply air pressure to the feed hole located on the test plate marked **C** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

D CLUTCH

Apply air pressure to the feed hole located on the test plate marked **D** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

E CLUTCH

Apply air pressure to the feed hole located on the test plate marked **E** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

DIAGNOSIS AND TESTING - AUTOMATIC TRANSMISSION - GENERAL CONDITIONS

CAUTION: Before attempting any repair on an automatic transmission, check for Diagnostic Trouble Codes with the appropriate scan tool.

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see **VEHICLE QUICK REFERENCE** **.**

Transmission malfunctions may be caused by these general conditions:

- Poor engine performance.
- Improper adjustments.
- Hydraulic malfunctions.
- Mechanical malfunctions.
- Electronic malfunctions.

Diagnosis of these problems should always begin by checking the easily accessible variables: fluid level, fluid condition, and transmission fault codes using the appropriate scan tool. Then perform a road test to determine if the problem has been corrected or if more diagnosis is necessary.

DIAGNOSIS AND TESTING - PRELIMINARY

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see **VEHICLE QUICK REFERENCE** **.**

Two basic procedures are required. One procedure for vehicles that are drivable and an alternate procedure for

disabled vehicles (will not back up or move forward).

VEHICLE IS DRIVABLE

1. Check for transmission fault codes using the appropriate scan tool.
2. Road test and note how transmission upshifts, downshifts, and engages.
3. Check fluid level and condition.

VEHICLE IS DISABLED

1. Check for transmission fault codes using the appropriate scan tool.
2. Check for cracked, leaking cooler lines.
3. Check fluid level and condition.
4. With the transmission in the Park position, attempt to rotate drive shaft(s) to ensure transmission output shaft coupler/flange is secure.
5. Raise and support vehicle on safety stands, start engine with transmission in the Park position and allow to idle for several minutes, shift transmission into gear, and note following:
    a. If propeller shaft turns but wheels do not, problem is with differential or axle shafts.
    b. If propeller shaft does not turn and transmission is noisy, stop engine. Remove oil pan, and check for debris. If pan is clear, remove transmission and check for damaged driveplate, converter, oil pump, or input shaft.
6. Check the TCMA, Wiring, Valve body, and Solenoids (Utilize fault codes to diagnose if available).

DIAGNOSIS AND TESTING - ROAD TESTING

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .

Before road testing, be sure the fluid level has been checked and adjusted if necessary. Verify that all diagnostic trouble codes have been resolved.

Observe engine performance during the road test. A poorly tuned engine will not allow accurate analysis of transmission operation.

Operate the transmission in all gear ranges. Check for shift variations and engine flare which indicates slippage. Note if shifts are harsh, spongy, delayed, early, or if part throttle downshifts are sensitive.

Slippage indicated by engine flare, usually means clutch, overrunning clutch, or line pressure problems.

A slipping clutch can often be determined by comparing which internal units are applied in the various gear ranges. The Clutch Application chart provides a basis for analyzing road test results.

CLUTCH APPLICATION

GEAR	A	B	C	D	E	RATIO
1	X	X	X	Ā	Ā	4.69: 1
2	X	X	Ā	Ā	X	3.13: 1

GEAR	A	B	C	D	E	RATIO
3	Ā	X	X	Ā	X	2.10: 1
4	Ā	X	Ā	X	X	1.67: 1
5	Ā	X	X	X	Ā	1.29: 1
6	Ā	Ā	X	X	X	1.0: 1
7	X	Ā	X	X	Ā	.84: 1
8	X	Ā	Ā	X	X	.67: 1
N	Ā	Ā	Ā	Ā	Ā	N/A
R	X	X	Ā	X	Ā	3.3: 1

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Crossmember Bolt	68	50	-	Ā
Transmission Mount Bolt	61	45	-	Ā
Engine to Transmission Bolt	45	33	-	Ā
Manual Park Release Cable Bolt	20	15	-	Ā
Manual Park Release Lever Shaft Nut	15	-	133	Ā
Manual Park Release Lever Nut	10	-	89	Ā
Transmission Drain Plug	9	-	80	Ā
Transmission Fill Plug	35	26	-	Ā
Transmission Oil Pan Bolt	10	-	89	Ā
Transmission Oil Pump Assembly To Case Bolt	Refer to **PUMP, TRANSMISSION OIL, INSTALLATION**.			X
Transmission Oil Pump Housing To Cover Bolt	Refer to **PUMP, TRANSMISSION OIL, ASSEMBLY**.			Ā
Output Speed Sensor Bolt	8	-	71	Ā
Park Pawl Lock Rod Guide Plate Bolt	10	-	89	Ā
Park Pawl Shaft Plug	35	26	-	Ā
Shifter Assembly Bolts	7	-	65	Ā
Torque Converter to Flex Plate Bolt	37	27	-	Ā
Transmission to Engine bolt	45	33	-	Ā
Transmission Mount to Adapter	31	23	-	Ā
Valve Body Bolt	6	-	53	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

CLUTCH SPECIFICATIONS

CLUTCH SPECIFICATIONS TABLE

Clutch	Condition	Minimum	Normal	Maximum
A	NEW	1.41 mm	1.555 mm	1.7 mm
		0.056 in	0.061 in	0.067 in
	AFTER OPERATION	1.41 mm	1.655 mm	1.9 mm
		0.056 in	0.065 in	0.075 in
Ā				
B	NEW	1.52 mm	1.725 mm	1.93 mm
		0.060 in	0.068 in	0.076 in
	AFTER OPERATION	1.52 mm	1.825 mm	2.13 mm
		0.060 in	0.072 in	0.084 in
Ā				
C	NEW	1.62 mm	1.815 mm	2.01 mm
		0.064 in	0.071 in	0.079 in
	AFTER OPERATION	1.62 mm	1.935 mm	2.25 mm
		0.064 in	0.076 in	0.089 in
Ā				
D	NEW	1.37 mm	1.515 mm	1.66 mm
		0.054 in	0.060 in	0.065 in
	AFTER OPERATION	1.37 mm	1.615 mm	1.86 mm
		0.054 in	0.064 in	0.073 in
Ā				
E	NEW	1.62 mm	1.815 mm	2.01 mm
		0.064 in	0.071 in	0.079 in
	AFTER OPERATION	1.62 mm	1.935 mm	2.25 mm
		0.064 in	0.076 in	0.089 in
Ā				

CLUTCH A SELECTABLE SNAP RINGS

CLUTCH A SELECTABLE SNAP RINGS TABLE

3.2 mm	0.125 in.
3.0 mm	0.118 in.
2.8 mm	0.110 in.
2.6 mm	0.102 in.
2.4 mm	0.0944 in.
2.2 mm	0.0866 in.

CLUTCH B SELECTABLE BACKING PLATES

CLUTCH B SELECTABLE BACKING PLATES TABLE

6.0 mm	.236 in.
5.8 mm	.228 in.

5.6 mm	.220 in.
5.4 mm	.212 in.
5.2 mm	.204 in.
5.0 mm	.196 in.
4.8 mm	.188 in.

CLUTCH C AND E SELECTABLE BACKING PLATES

CLUTCH C AND E SELECTABLE BACKING PLATES TABLE

4.8 mm	0.188 in.
4.5 mm	0.177 in.
4.2 mm	0.165 in.
3.9 mm	0.153 in.
3.6 mm	0.141 in.
3.3 mm	0.129 in.
3.0 mm	0.118 in.

CLUTCH D SELECTABLE SNAP RINGS

CLUTCH D SELECTABLE SNAP RINGS TABLE

3.0 mm	0.118 in.
2.8 mm	0.110 in.
2.6 mm	0.102 in.
2.4 mm	0.0944 in.
2.2 mm	0.0866 in.
2.0 mm	0.0787 in.
1.8 mm	0.0708 in.
1.6 mm	0.0629 in.

STANDARD PROCEDURE

A-CLUTCH MEASUREMENT

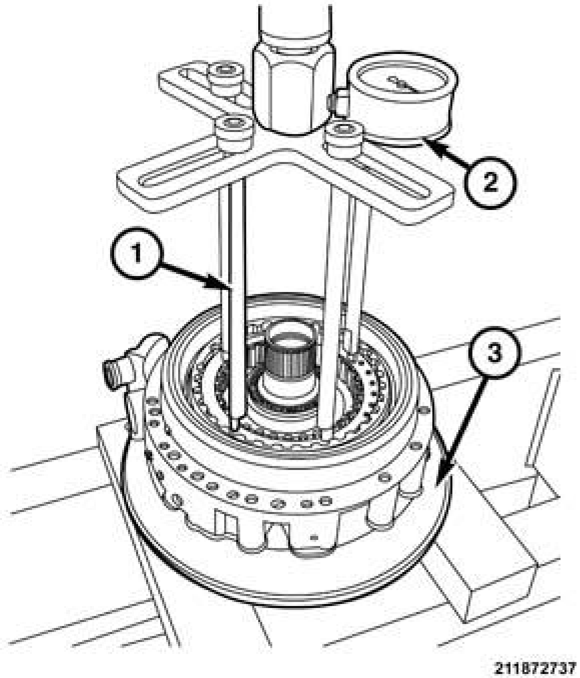


Fig. 13: Adapter & Pressing Tool
Courtesy of CHRYSLER GROUP, LLC

1. Using (special tool #10428, Adapter, Pressing Tool) (1) and (special tool #10429, Gauge, Force) (2) Place the A-clutch/oil pump assembly in a suitable arbor press.
2. Apply 200 N (45 lbs.) of force to the A-clutch backing plate to compress the wave plate.

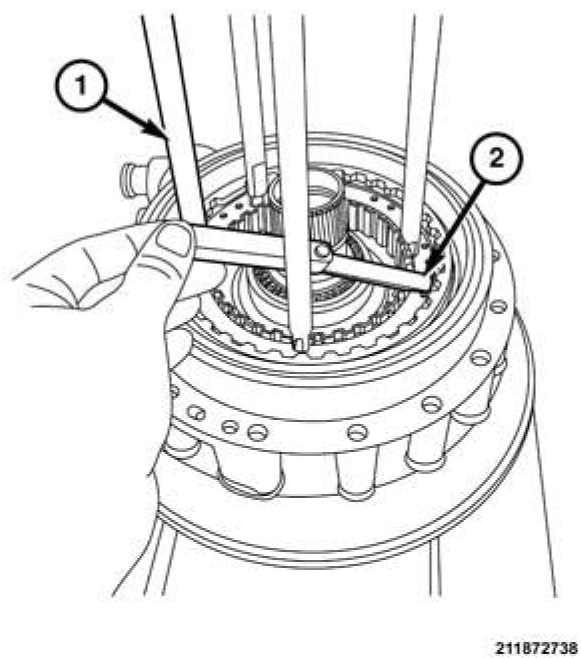


Fig. 14: Measuring Gap Between A-Clutch Backing Plate & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

3. With a suitable feeler gauge (2) measure the gap between the A-clutch backing plate and the snap ring.

4. Refer to CLUTCH A SELECTABLE SNAP RINGS for specs. If clearance is not within specification, a thinner or thicker selectable snap ring can be installed for proper clearance.

B-CLUTCH MEASUREMENT

When the B-clutch is replaced, the proper selectable shim must be installed to achieve specified clearance.

Measurement (special tool #8901A, Pressing Tool), (special tool #10429, Gauge, Force).

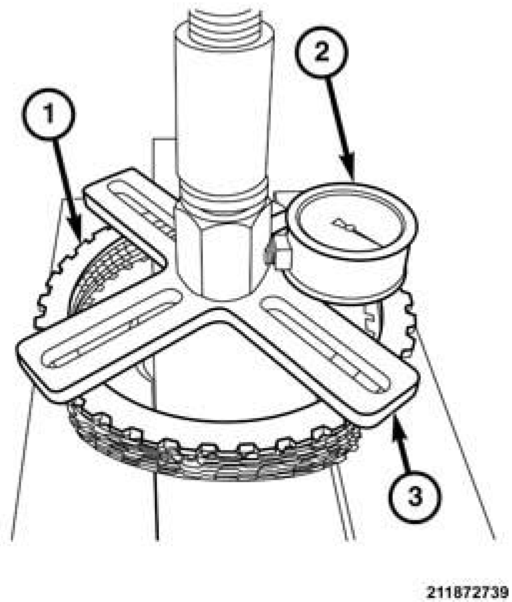


Fig. 15: Pressing Tool
Courtesy of CHRYSLER GROUP, LLC

1. Place the B-clutch, with the wave plate on top, on a suitable arbor press.
2. Position tools (special tool #8901A, Pressing Tool) (3) (using just the cross bar) (3) and (special tool #10429, Gauge, Force) (2) on top of the B-clutch wave plate (1) and under the press ram.

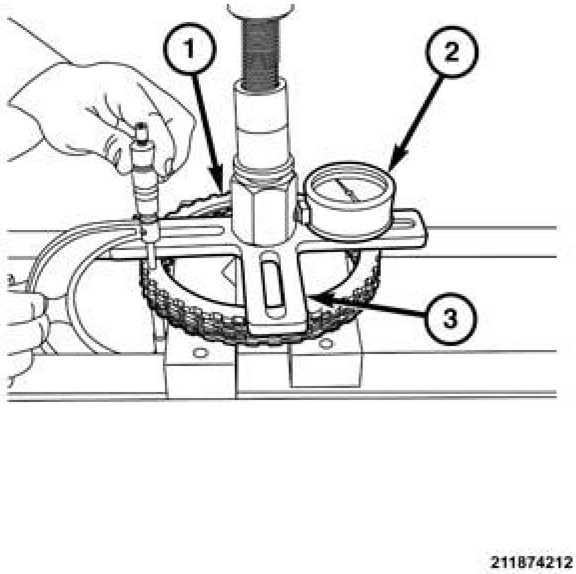


Fig. 16: Gauge, Pressing Tool & B-Clutch
Courtesy of CHRYSLER GROUP, LLC

3. Apply 500 N (112 lbs.) of downward force on the B-clutch to compress the wave plate.
4. Using a suitable micrometer, measure the thickness of the compressed B-clutch (3). **Record the measurement as (A)** to calculate the B-clutch clearance in order to determine the correct selectable shim thickness.

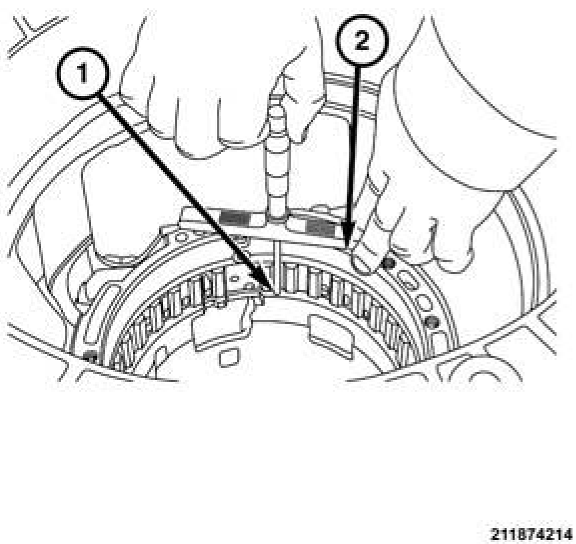


Fig. 17: Transmission Oil Pump & B-Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

5. With a suitable depth micrometer, place it at the mounting surface of the transmission oil pump (2) and measure to the base of the B-clutch retainer on the case (1). This measurement should be 61.05 mm. **Record the measurement as (B)** to calculate the B-clutch clearance in order to determine the correct selectable shim thickness.

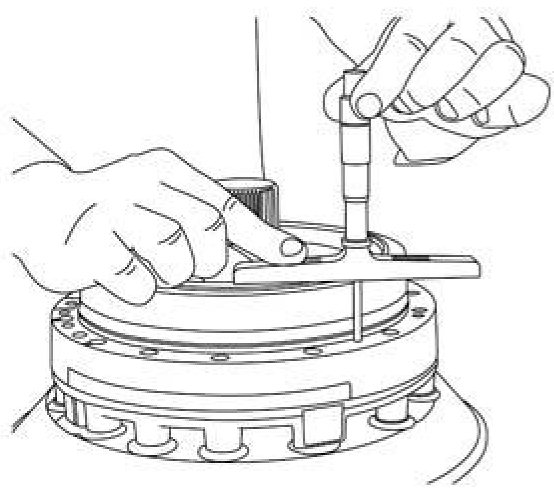


Fig. 18: Measuring B-Clutch Piston Using Depth Micrometer
Courtesy of CHRYSLER GROUP, LLC

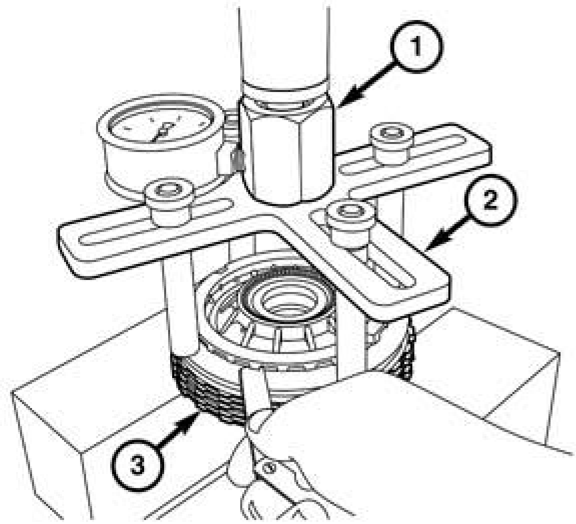
6. Using a suitable depth micrometer, measure the B-clutch piston.
7. Measure between the fluid pump sealing surface and the bottom of the straight edge. **Record the measurement as (C)** to calculate the B-clutch clearance in order to determine the correct selectable shim thickness.

Calculation

Take the case depth (B) subtract (C) subtract (A) remainder is the clearance of the B-clutch. If the clearance is not within specification a thinner or thicker reaction plate can be installed to achieve proper clearance.

C-CLUTCH MEASUREMENT

1. Using (special tool #8901A, Pressing Tool) (2) and (special tool #10429, Gauge, Force) (1) place the C-clutch (3) in a suitable arbor press (with the backing plate facing up).
2. Apply 200 N (45 lbs.) of force to the C-clutch to compress the wave plate.
3. With a suitable feeler gauge, measure the gap between the C-clutch backing plate and the C-clutch retainer.
4. Refer to **CLUTCH C AND E SELECTABLE BACKING PLATES** for specs. If clearance is not within specification a thinner or thicker selectable backing plate can be installed to achieve proper clearance.



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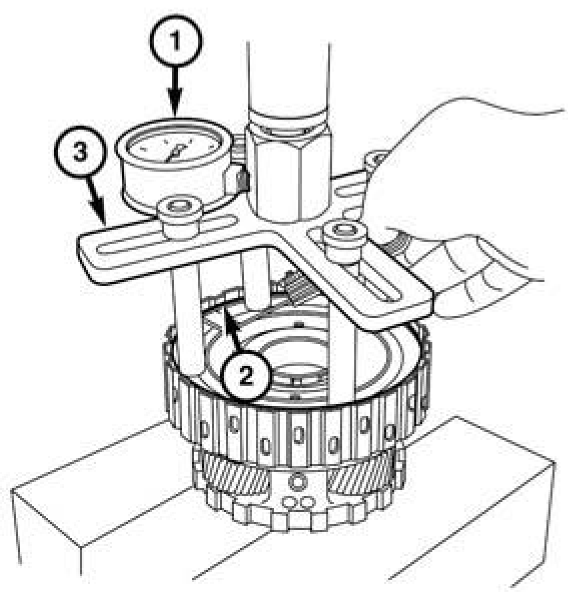
[Fig. 19: Measuring Gap Between C-Clutch Backing Plate & C-Clutch Retainer](#)
Courtesy of CHRYSLER GROUP, LLC

D-CLUTCH MEASUREMENT



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[Fig. 20: Measuring Gap Between D-Clutch Backing Plate & D-Clutch Retainer](#)
Courtesy of CHRYSLER GROUP, LLC

1. Using (special tool #8901A, Pressing Tool) (3) and (special tool #10429, Gauge, Force) (1) place the D-clutch in a suitable arbor press.
2. Apply 200 N (45 lbs.) of force to the D-clutch backing plate to compress the wave plate.

3. With a suitable feeler gauge (2), measure the gap between the C-clutch backing plate and the C-clutch retainer.
4. Refer to **CLUTCH D SELECTABLE SNAP RINGS** for specs. If clearance is not within specification a thinner or thicker selectable snap ring can be Installed to achieve proper clearance.

E-CLUTCH MEASUREMENT

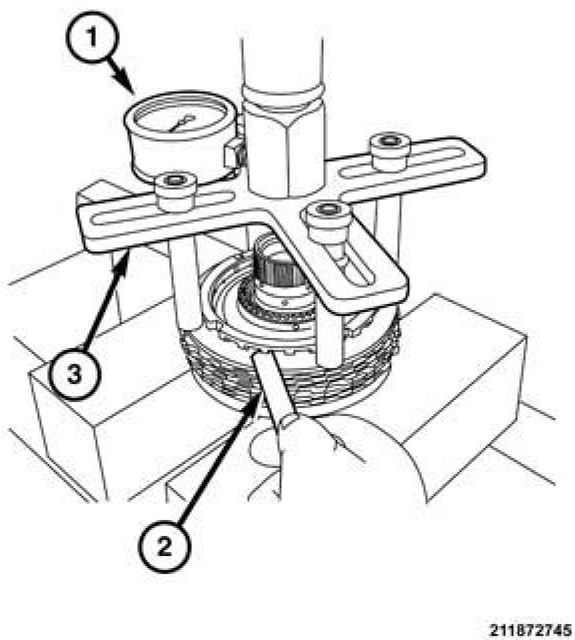


Fig. 21: Measuring Gap Between Backing Plate & Retainer Of E-Clutch
Courtesy of CHRYSLER GROUP, LLC

1. Place the E-clutch in a suitable arbor press.
2. Using (special tool #10429, Gauge, Force) (1) and (special tool #8901A, Pressing Tool) (3) apply 200 N (45 lbs.) to the backing plate of the E-clutch.
3. Using a set of feeler gauges (2), measure the gap between the backing plate and the retainer of the E-clutch.
4. Refer to **CLUTCH C AND E SELECTABLE BACKING PLATES** for specifications. If clearance is not within specifications, a thinner or thicker selectable backing plate can be installed to achieve proper clearance.

REMOVAL

REMOVAL

1. Put transmission in neutral.
2. Disconnect and isolate the negative battery cable.
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Disconnect the right and left bank up stream oxygen sensors.
5. Remove the drive shaft. Refer to **REMOVAL** .

6. Remove the starter. Refer to **STARTER, REMOVAL** .

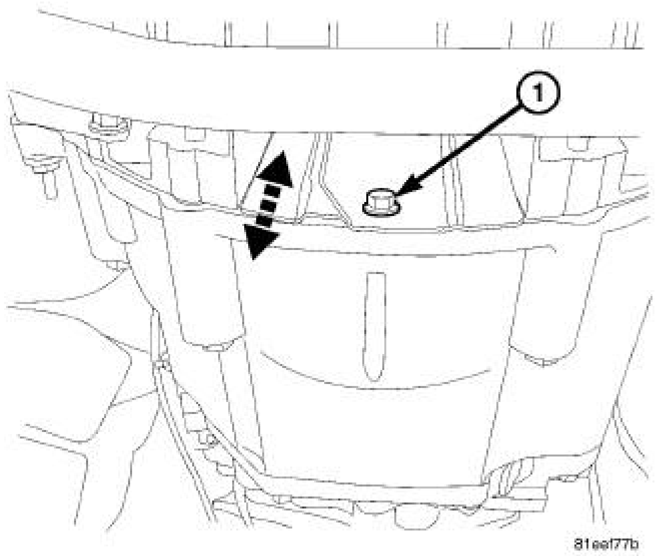


Fig. 22: Inspection Cover
Courtesy of CHRYSLER GROUP, LLC

7. Remove the inspection cover bolt and the inspection cover.

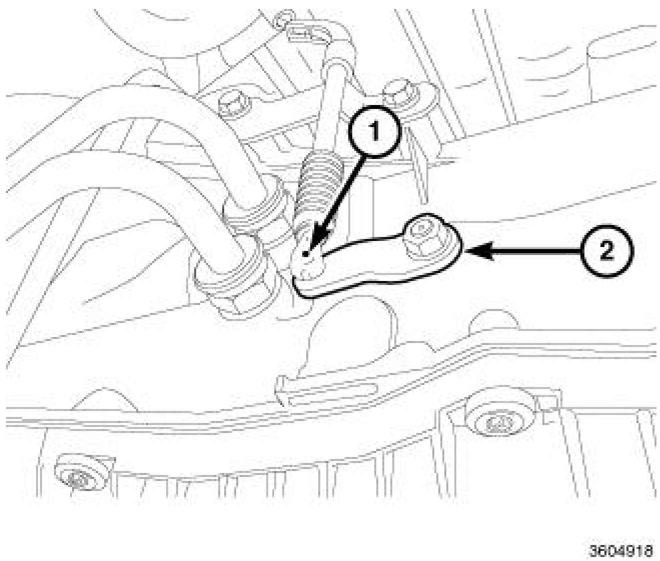


Fig. 23: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the Manual Park Release (MPR) cable (1) from the MPR lever (2).

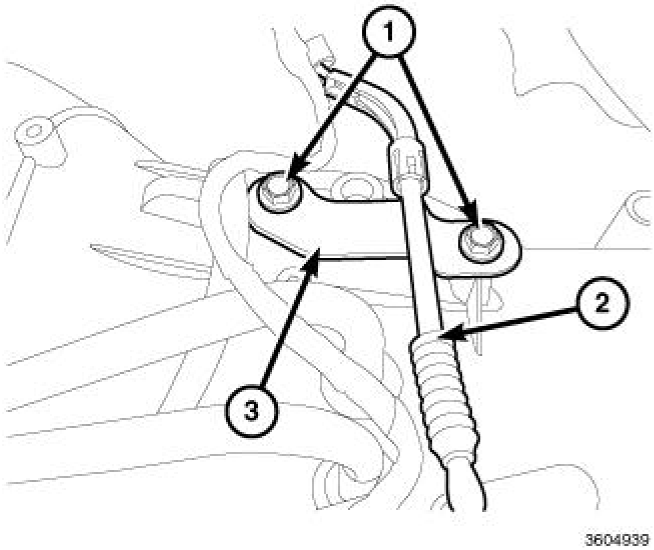


Fig. 24: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

9. Remove the bolts (1) from the MPR cable bracket (3) and position the MPR bracket/cable (2, 3) aside.

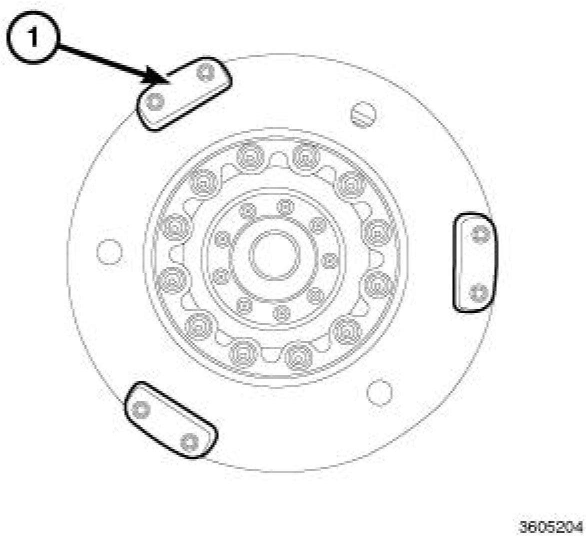


Fig. 25: Two Bolts
Courtesy of CHRYSLER GROUP, LLC

10. The torque converter is attached with three sets of two bolts (1) 120Ā° apart as shown.

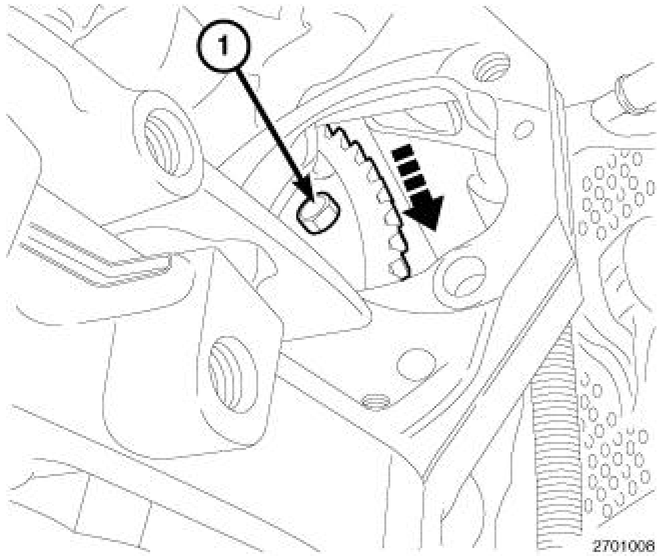


Fig. 26: Torque Converter Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Rotate the crankshaft in a clockwise direction for access, and through the starter opening, remove the six torque converter bolts (1).

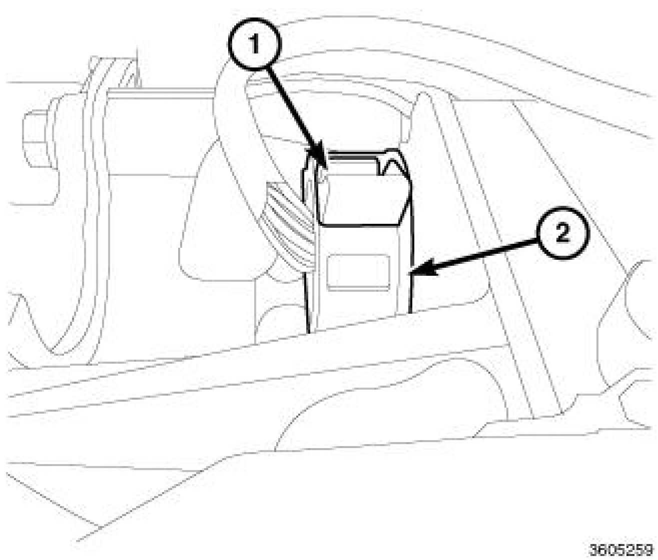


Fig. 27: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

12. Turn the locking mechanism lock (1) of the adapter plug connector (2) counter-clockwise to release the lock.

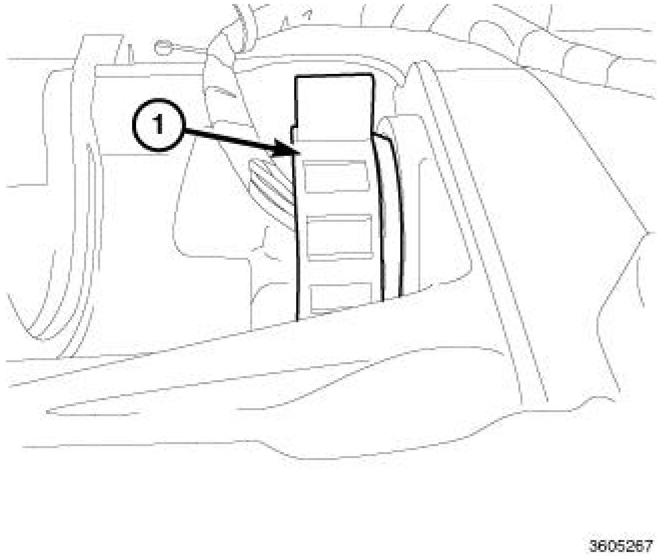


Fig. 28: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

13. Remove the adapter plug connector (1) from the transmission.

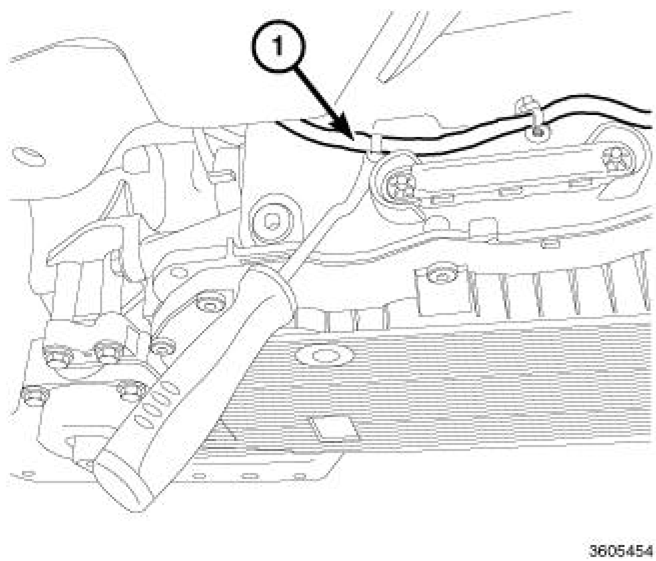
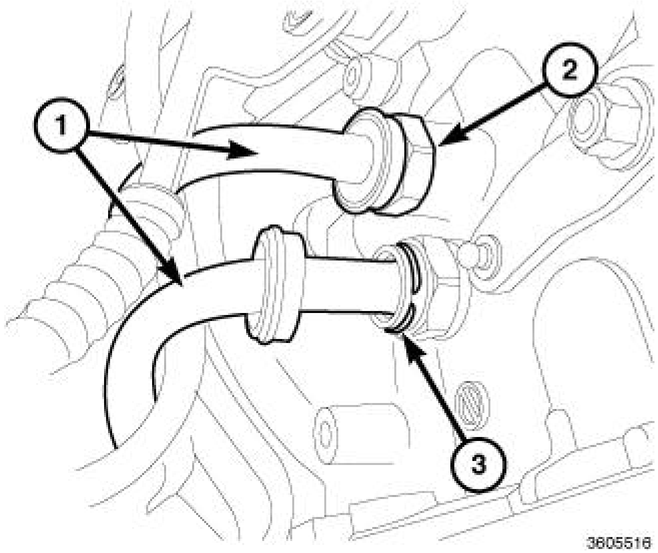


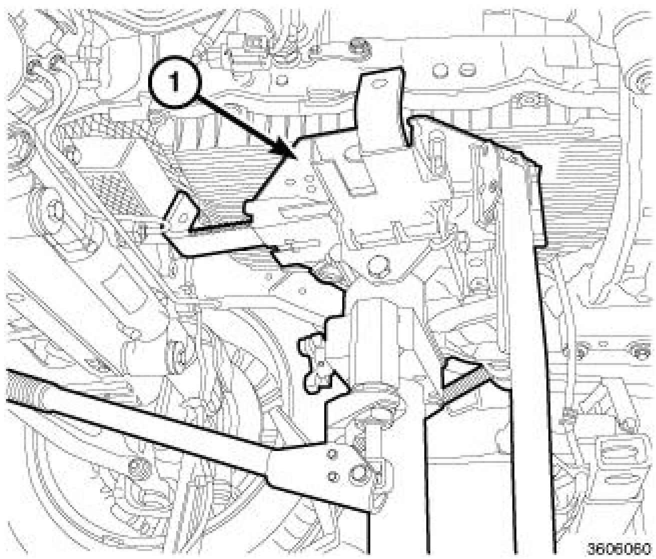
Fig. 29: Wiring Harness
Courtesy of CHRYSLER GROUP, LLC

14. Disconnect the wiring harness (1) from the transmission.



[Fig. 30: Transmission Fluid Cooler Lines, Clips & Fittings]
Courtesy of CHRYSLER GROUP, LLC

15. Disconnect the transmission fluid cooler lines (1) at the fittings (2) by removing the clips (3).



[Fig. 31: Service Jack]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When supporting or lifting the transmission at the oil pan the weight of the transmission must be distributed evenly on the lifting fixture. Failure to do so could damage the oil pan and transmission.

16. Raise the transmission slightly with a transmission jack (1) to relieve load on the crossmember.

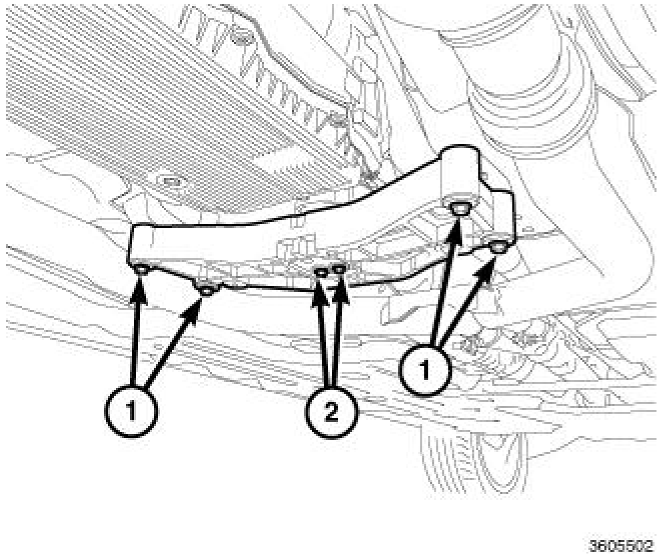


Fig. 32: Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Remove the crossmember bolts (1) and remove the crossmember.
18. Remove the rear support and isolator bolts (2) and remove the rear support and isolator.

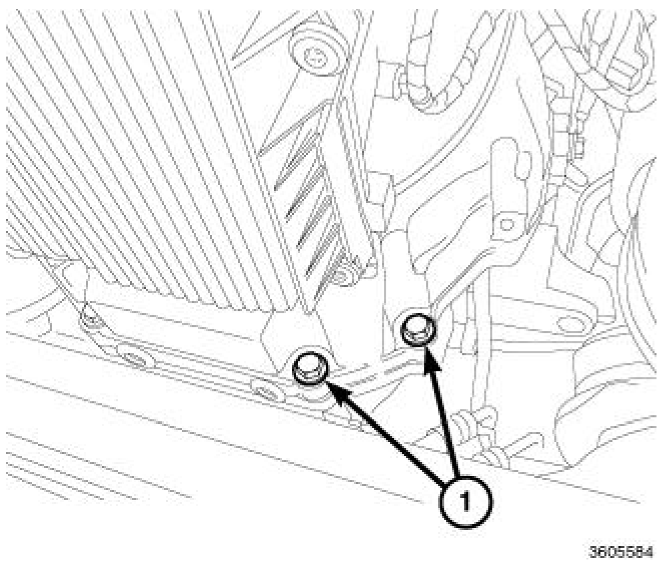


Fig. 33: Bell Housing Bolts (RH)
Courtesy of CHRYSLER GROUP, LLC

19. Remove the transmission to engine bolts (1) on the Right Hand (RH) side.

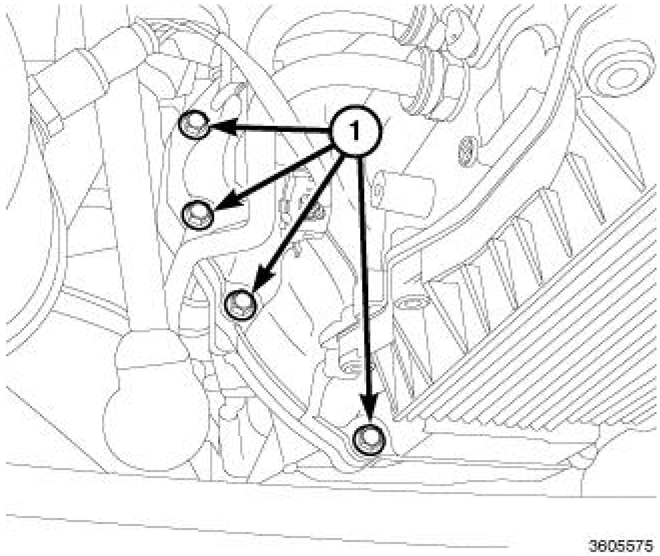


Fig. 34: Bell Housing Bolts (LH)
Courtesy of CHRYSLER GROUP, LLC

20. Remove the transmission to engine bolts (1) on the Left Hand (LH) side.

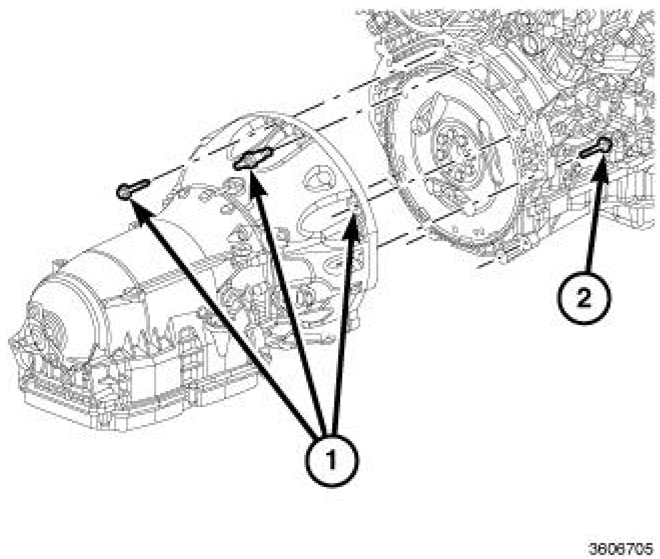


Fig. 35: Remaining Bell Housing Bolts (RWD Shown: AWD Similar)
Courtesy of CHRYSLER GROUP, LLC

21. Remove the remaining transmission to engine bolts (1, 2).
22. Hold the torque converter in place during transmission removal.
23. Lower the transmission and remove the assembly from the vehicle.

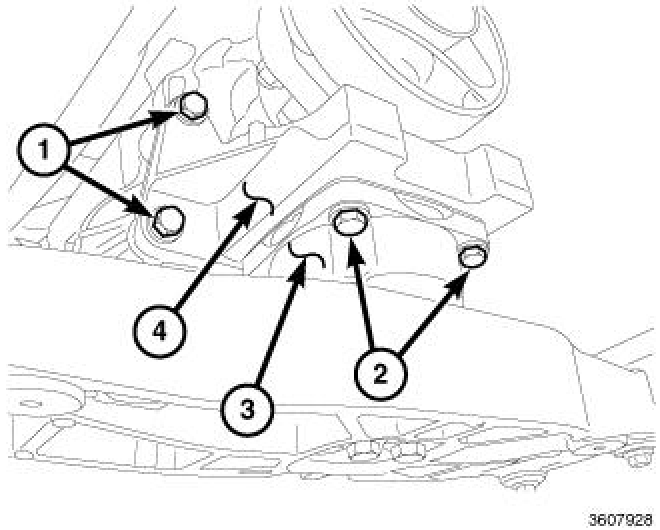


Fig. 36: Transmission Mount Bolts & Transmission Mount
Courtesy of CHRYSLER GROUP, LLC

24. Remove the transmission mount bolts (2) and the transmission mount (3).
25. Remove the four adapter bracket bolts (1) and the adapter bracket (4).

DISASSEMBLY

DISASSEMBLY

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.**

NOTE: **If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TCM Adaptation Procedure. Refer to MODULE, TRANSMISSION CONTROL, MODULE PROGRAMMING .**

NOTE: **Tag all clutch pack assemblies, as they are removed, for reassembly identification.**

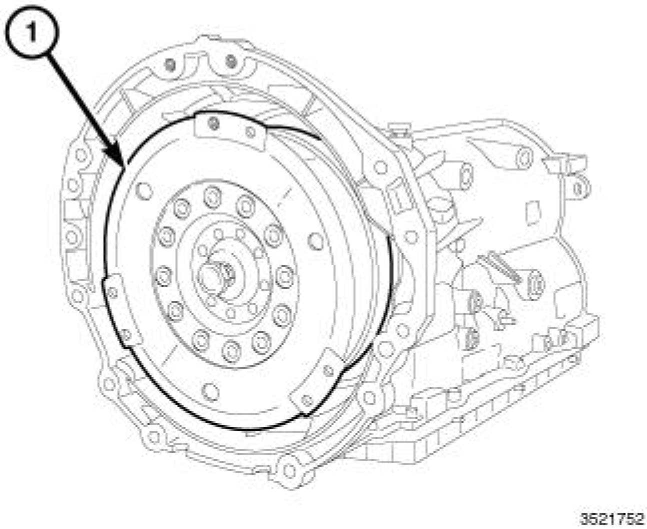


Fig. 37: Torque Converter
Courtesy of CHRYSLER GROUP, LLC

1. Remove the torque converter (1).

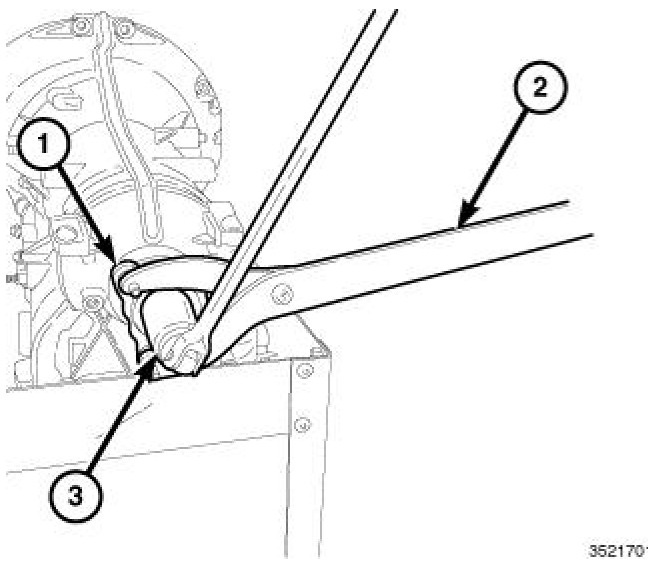


Fig. 38: Flange, Flange Holder & Socket
Courtesy of CHRYSLER GROUP, LLC

2. Using a suitable punch, remove the staking from the propeller shaft flange nut, and loosen the nut about 1 thread using a 34 mm 12 point socket (3) and (special tool #C-3281, Holder, Flange) (2) to hold the flange (1).

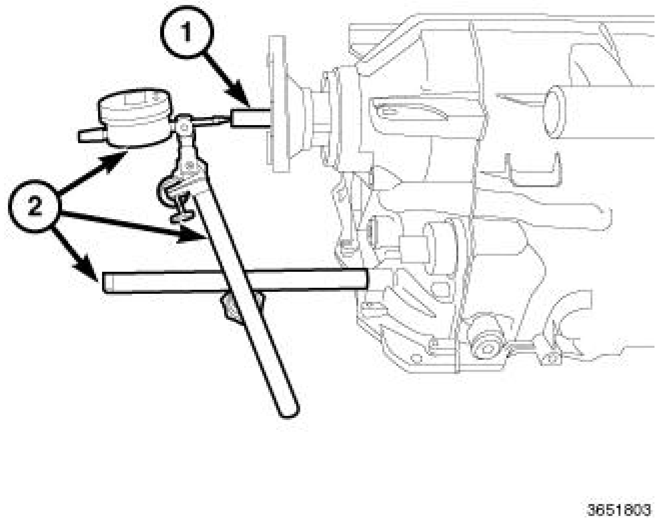


Fig. 39: Measuring End Play
Courtesy of CHRYSLER GROUP, LLC

NOTE: **End play specification is between 0.11 - 0.42 mm (0.0043 - 0.0165 in.). If end play is outside this range, a different selectable end play shim must be used during assembly.**

3. Measure the output shaft (1) end play as follows:
   a. Attach a dial indicator (2) and position the plunger against the end of the output shaft (1).
   b. Zero the dial indicator (2).
   c. Move the output shaft (1) in and out, and record the maximum travel for assembly reference.

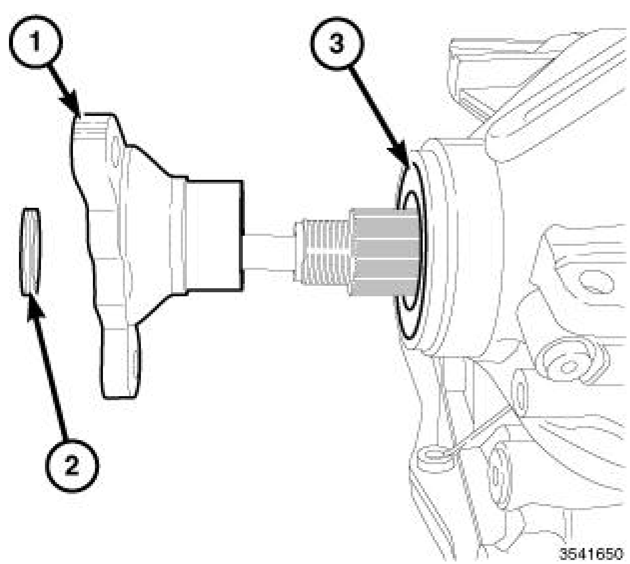


Fig. 40: Propeller Shaft Flange, Rear Dust Seal & Rear Oil Seal
Courtesy of CHRYSLER GROUP, LLC

4. Finish removing the propeller shaft flange nut.
5. Remove the propeller shaft flange (1).
6. Remove the transmission rear dust seal (2).

7. Remove the transmission rear oil seal (3) with a suitable slide hammer and screw.
8. Remove the transmission output shaft washer.

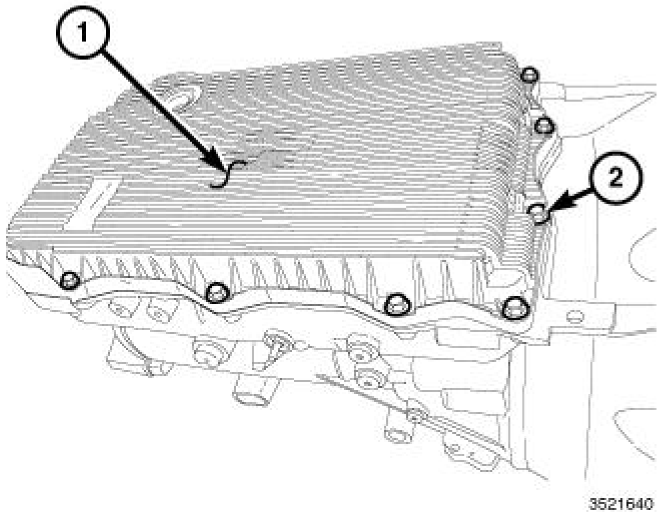


Fig. 41: Thirteen Oil Pan Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Remove the thirteen oil pan retaining bolts (2).

NOTE: **Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.**

10. Carefully detach the oil pan (1) and gasket.

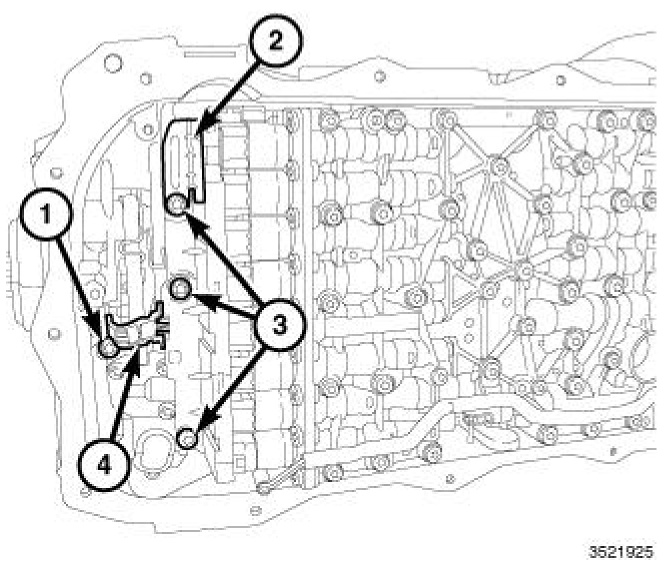
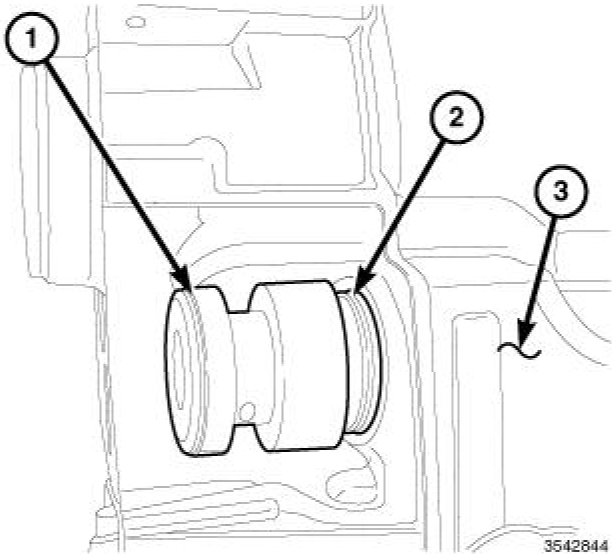


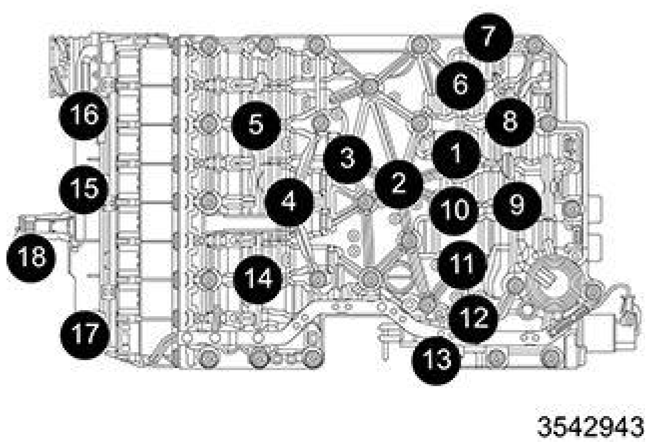
Fig. 42: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Remove the valve body assembly end retainer bolts (3).
12. Lift the electrical connector lock (2) to release the internal harness end from inside the transmission for valve body assembly removal.
13. Remove the sensor retaining bolt (1) and pull the sensor (4) loose from the case.



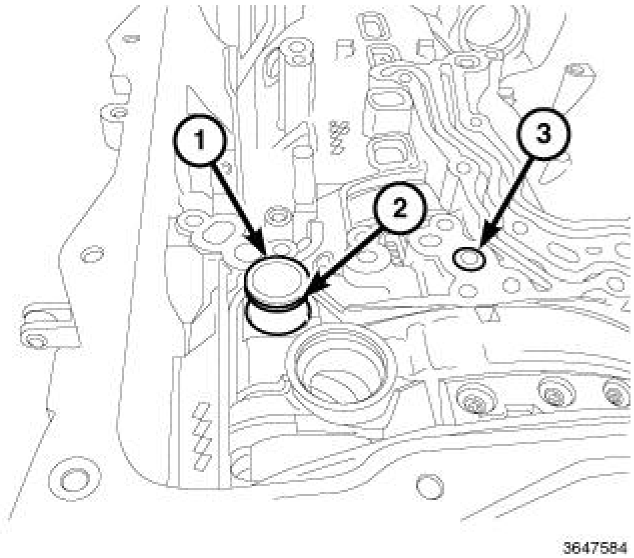
[Fig. 43: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case]
Courtesy of CHRYSLER GROUP, LLC

14. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully pull the electrical harness insulator (2) straight out from the transmission case (3).



[Fig. 44: Valve Body Bolts Loosening And Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

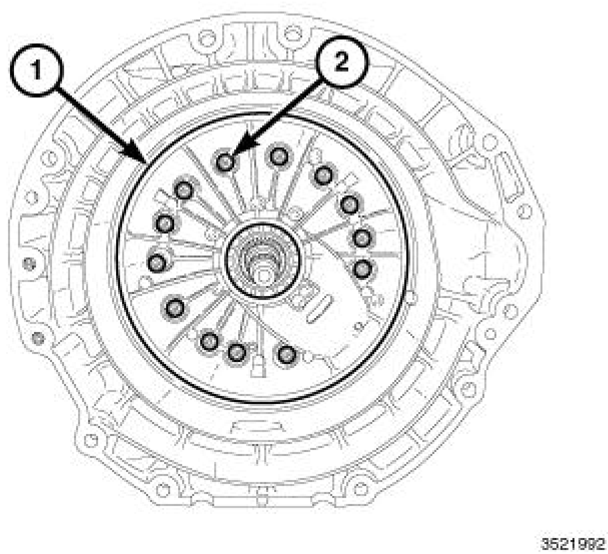
15. Remove valve body assembly retaining bolts 1-14 (15-18 are already removed).
16. Carefully lift the valve body assembly from the transmission.



[Fig. 45: Fluid Port, Two O-Rings, Compression Seal](#)
Courtesy of CHRYSLER GROUP, LLC

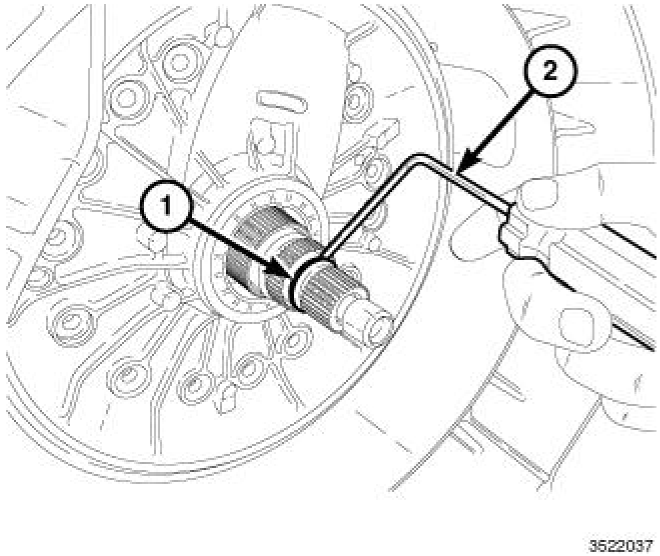
NOTE: **The fluid port (1) may be in the transmission or the valve body assembly.**

17. Pull the fluid port (1) from the transmission or valve body assembly.
18. Remove the two O-rings (2).
19. Remove the compression seal (3) from the transmission.



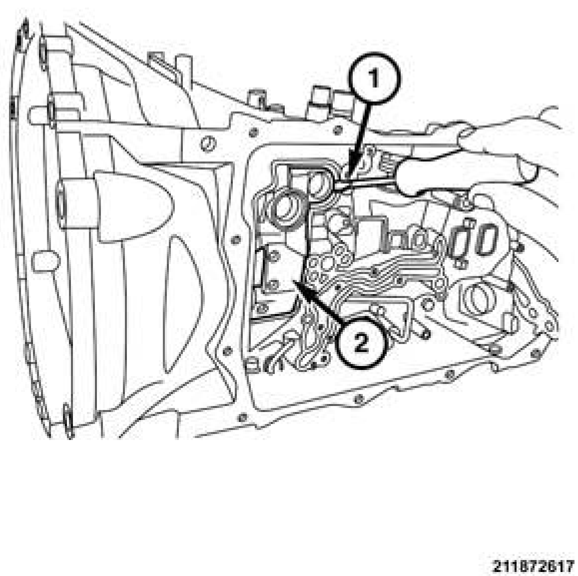
[Fig. 46: Thirteen Oil Pump Housing Retaining Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

20. Remove the thirteen oil pump housing retaining bolts (2).



[Fig. 47: Input Shaft O-Ring & Small Pick](#)
Courtesy of CHRYSLER GROUP, LLC

21. Remove the input shaft O-ring (1) using a small pick (2) or equivalent.



[Fig. 48: Prying Oil Pump Housing Away From Case](#)
Courtesy of CHRYSLER GROUP, LLC

22. Carefully pry the oil pump housing (1) away from the case (2) with a small flat blade screwdriver or equivalent through the case opening.
23. From the front of the transmission, remove the oil pump housing.

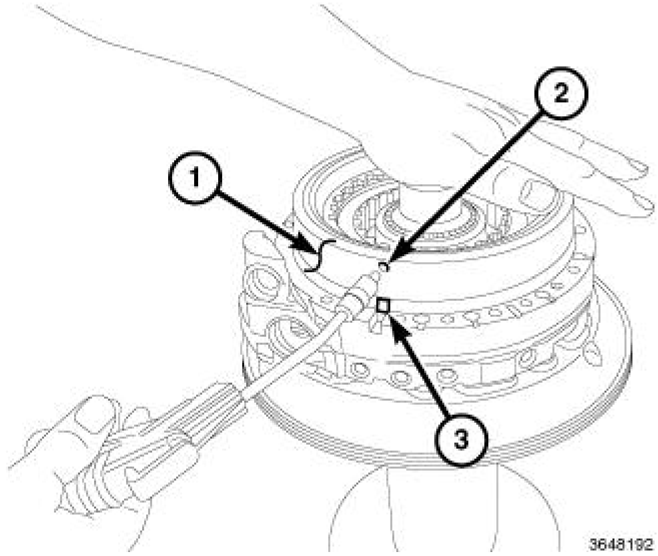


Fig. 49: B-Piston, Hole & B-Piston Alignment Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply air pressure slowly because oil may spray when B-piston releases from the assembly.**

24. With one hand above B-piston (1), carefully apply air pressure into the hole (2) directly above the B-piston alignment tab (3) to remove B-piston (1) from the assembly.

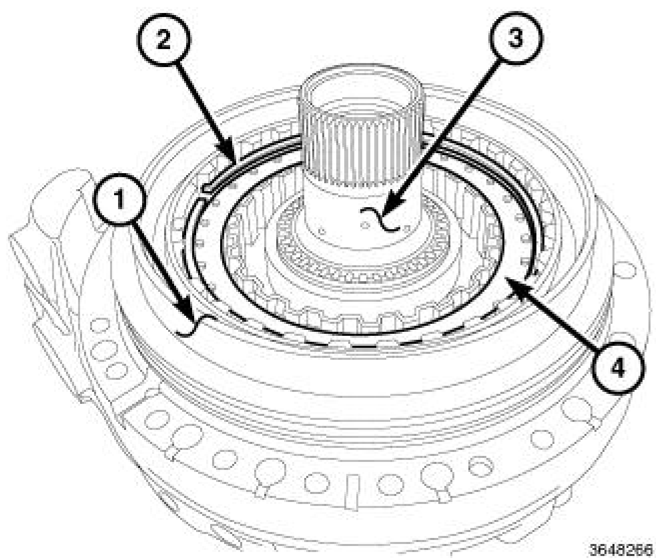


Fig. 50: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

25. Remove the outer ring (1) (under B-piston).
26. Remove the snap ring (2).
27. Remove the clutches and spacers (4).
28. Remove the hub (3).

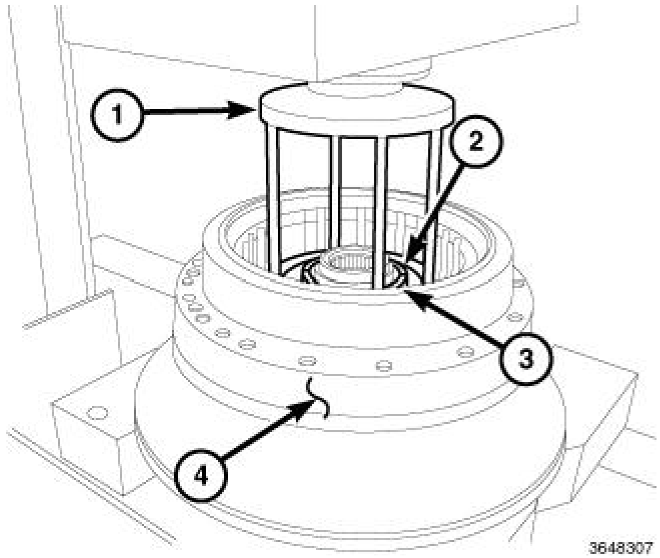


Fig. 51: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

29. Position the oil pump housing assembly (4) in a suitable arbor press.
30. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and remove the two halves of the split retainer ring (2, 3).

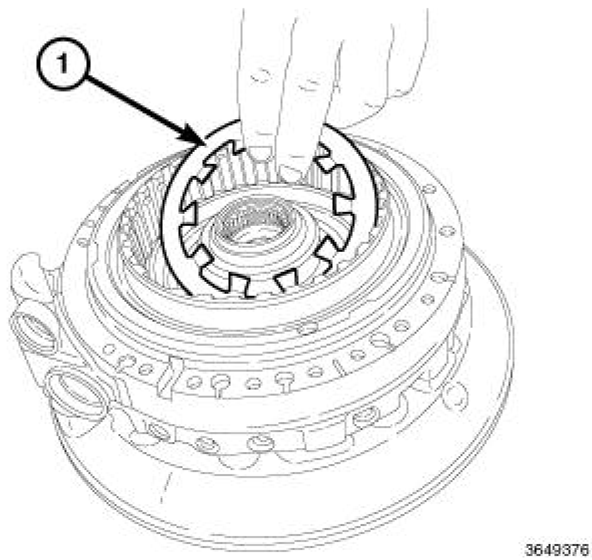
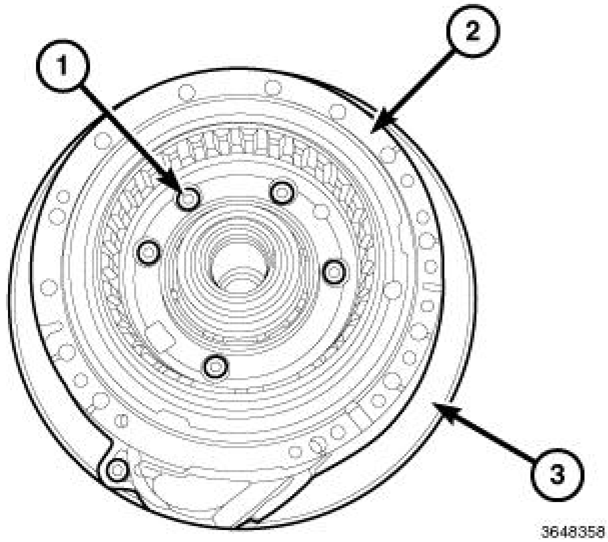


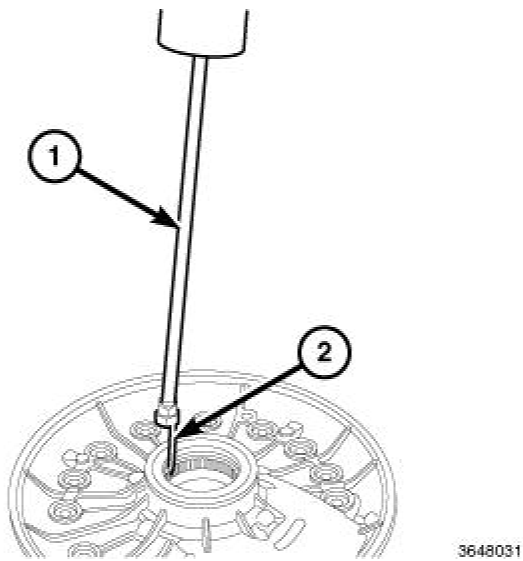
Fig. 52: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

31. Remove the piston retaining ring and piston below it.



[Fig. 53: Six Bolts, Oil Pump Housing & Oil Pump Cover]
Courtesy of CHRYSLER GROUP, LLC

32. Remove the six bolts (1) and separate the oil pump housing (2) from the oil pump cover (3).



[Fig. 54: Seal Remover & Slide Hammer]
Courtesy of CHRYSLER GROUP, LLC

33. Using (special tool #9667, Remover, Seal) (2) and (special tool #C-3752, Slide Hammers) (1), remove the oil seal from the front pump cover.
34. Remove the outer lip seal from the front pump cover.

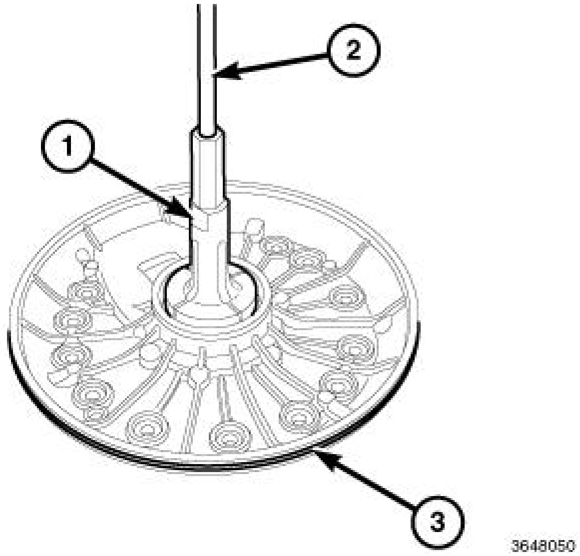


Fig. 55: Remover, Bearing Cup & Slide Hammers
Courtesy of CHRYSLER GROUP, LLC

35. Remove the snap ring.
36. Using (special tool #6787A, Remover, Bearing Cup) (1) and (special tool #C-3752, Slide Hammers) (2) remove the needle bearing from the front cover (3).
37. Remove the snap ring.
38. Using (special tool #9585, Remover, Bearing Cup) and (special tool #C-637, Slide Hammer, Universal) remove the needle bearing.

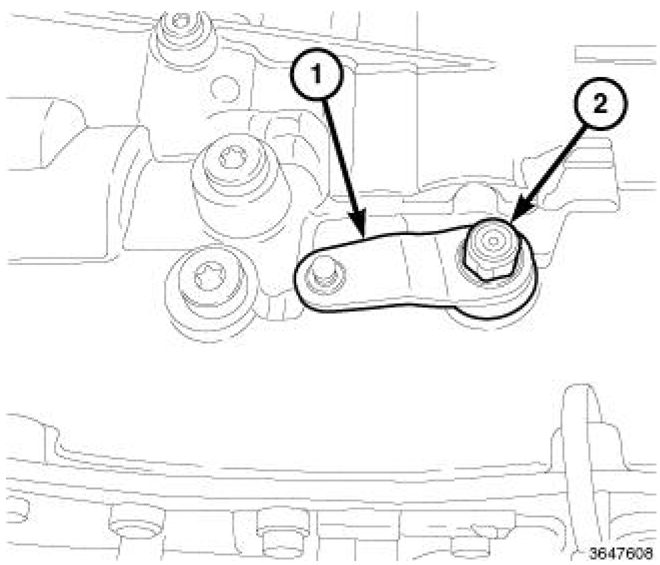


Fig. 56: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

39. Remove the Manual Park Release (MPR) lever retaining nut (2) and remove the lever (1).

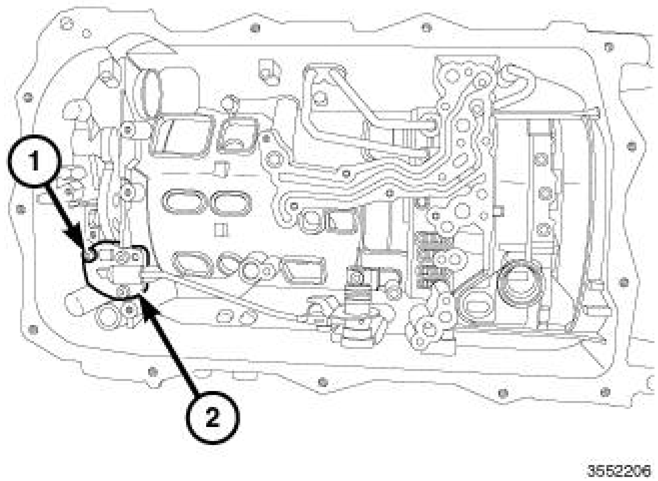


Fig. 57: Three Park Pawl Lock Rod Guide Plate Retaining Screws & Plate
Courtesy of CHRYSLER GROUP, LLC

40. Remove the three park pawl lock rod guide plate retaining screws (1) and remove the plate (2).

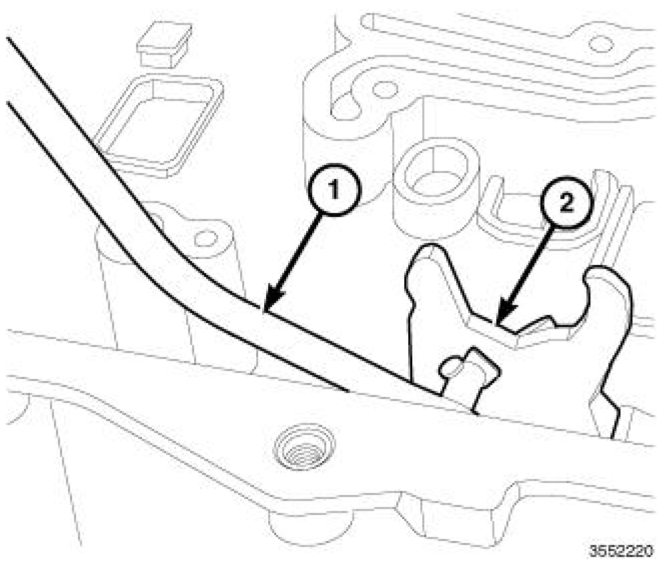


Fig. 58: Park Pawl Lock Rod & Fork
Courtesy of CHRYSLER GROUP, LLC

41. Remove the park pawl lock rod (1) from the fork (2).

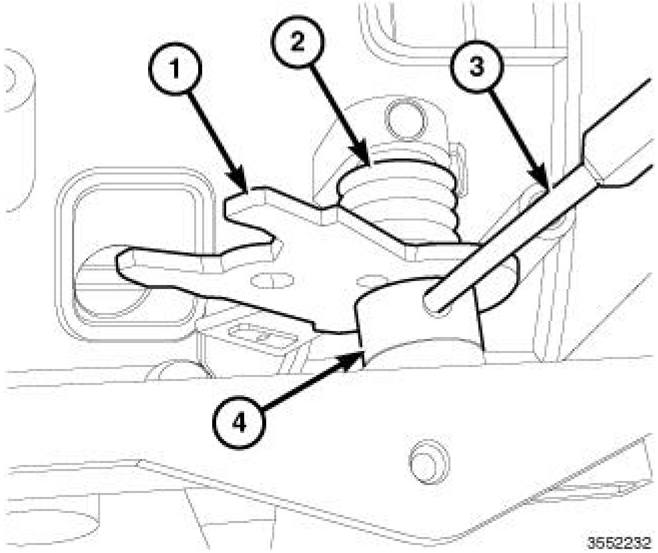


Fig. 59: Selector Shaft, Suitable Pin Punch, Spring & Fork
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Pay attention to the spring position for installation.**

42. Remove the roll pin from the MPR shaft (4) using a suitable pin punch (3).
43. Remove the shaft (4), spring (2) and fork (1) from the case.
44. Remove the MPR shaft seal using a small screwdriver or equivalent.

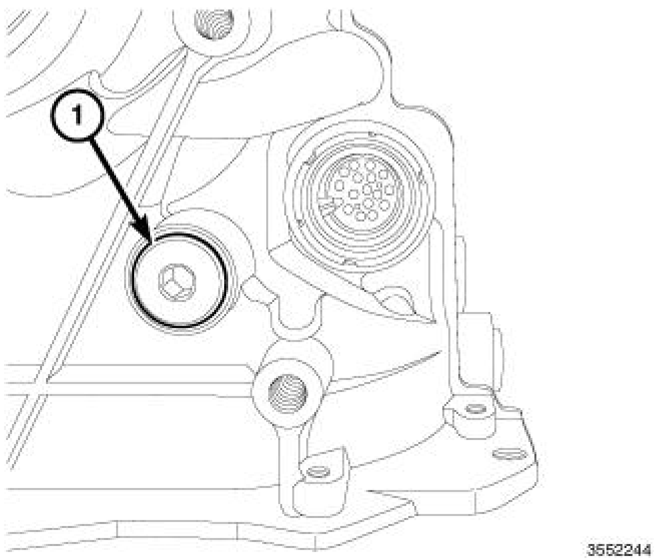


Fig. 60: Park Pawl Shaft Plug
Courtesy of CHRYSLER GROUP, LLC

45. Remove the park pawl shaft plug (1) from the rear of the case.

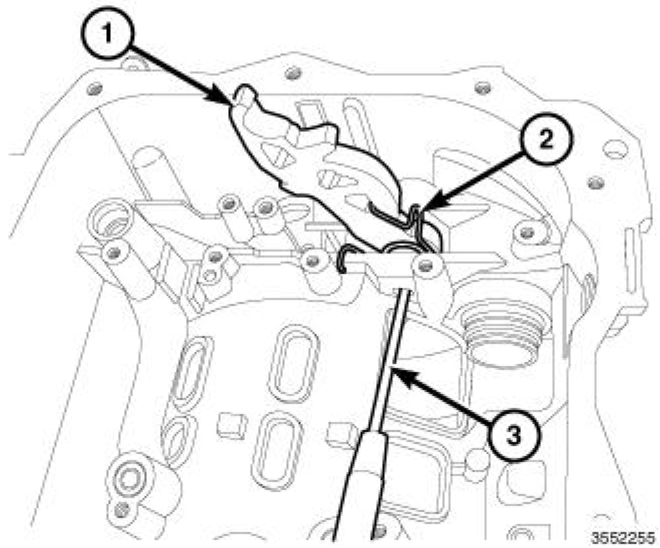


Fig. 61: Removing/Installing Park Pawl Shaft Using A Suitable Pin Punch, Park Pawl And Spring
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Pay attention to the spring position for installation.**

46. Remove the park pawl shaft using a suitable pin punch (3), remove the park pawl (1) and spring (2).

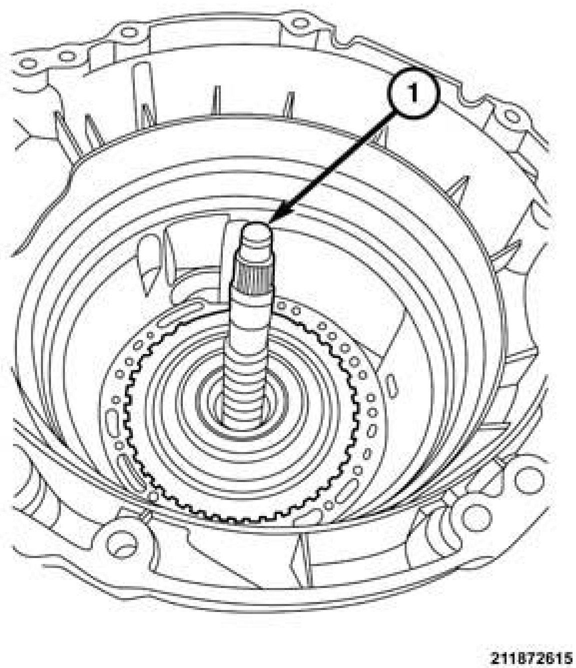


Fig. 62: Park Pawl
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The transmission must be in the upright position to remove the assembly to avoid damage to the drums.**

47. Remove the input/output shaft and P4 annulus drum assembly (1) from the case.

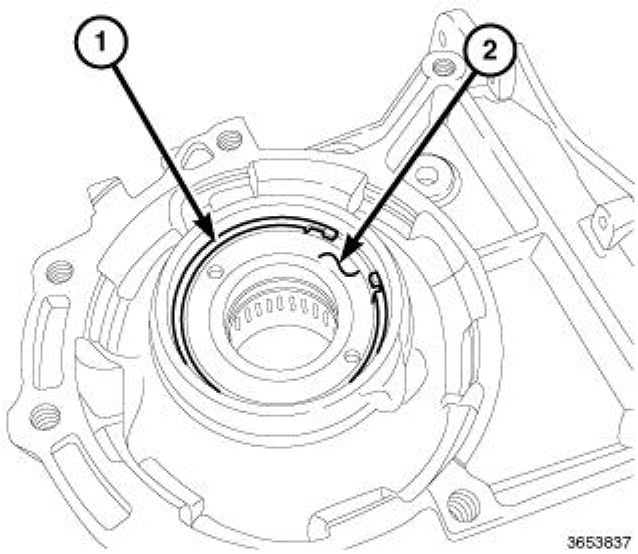


Fig. 63: Outer Bearing Snap Ring & Outer Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

48. Remove the outer bearing snap ring (1), and the outer ball bearing.

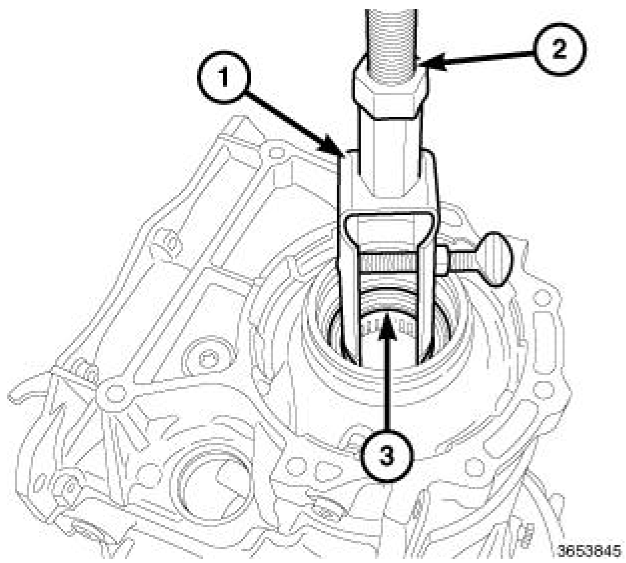
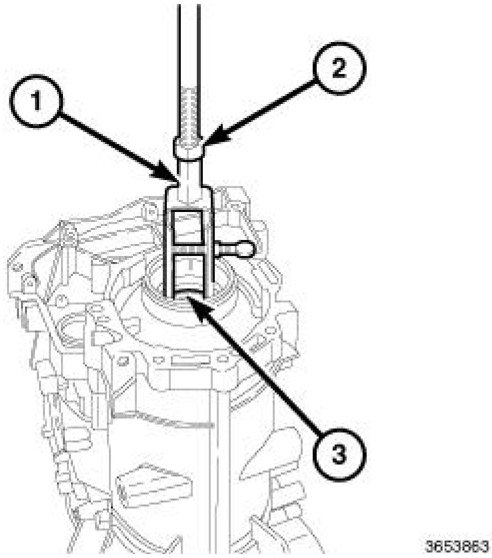


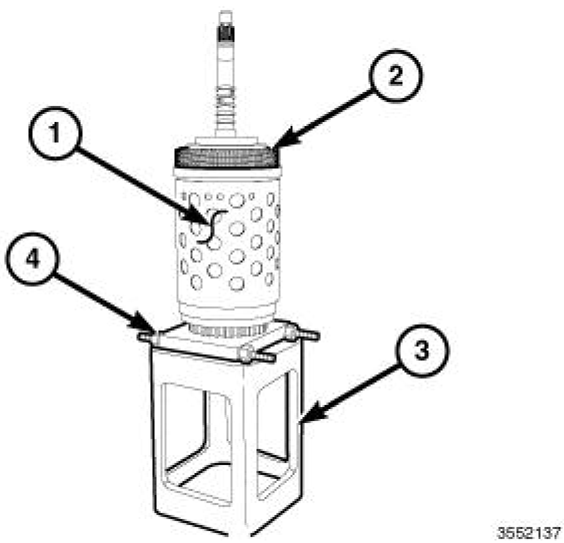
Fig. 64: Bearing Cup, Slide Hammer, Universal & Oil Dam
Courtesy of CHRYSLER GROUP, LLC

49. Remove the oil dam snap ring.
50. Using (special tool #9664, Remover, Bearing Cup) (1) and (special tool #C-637, Slide Hammer, Universal) (2), remove the oil dam (3).



[Fig. 65: Bearing Cup, Slide Hammer & Inner Needle Bearing]
Courtesy of CHRYSLER GROUP, LLC

51. Remove the output shaft inner needle bearing snap ring.
52. Using (special tool #9664, Remover, Bearing Cup) (1) and (special tool #C-637, Slide Hammer, Universal) (2), remove the inner needle bearing (3).



[Fig. 66: P4 Annulus Drum Assembly, Press Fixture Assembly & Bearing/Gear Splitter]
Courtesy of CHRYSLER GROUP, LLC

53. Position the input/output shaft and P4 annulus drum assembly (1) on (special tool #8925-3, Assembly, Press Fixture) (3) and (special tool #1130, Splitter, Bearing/Gear) (4).
54. Remove the clutch pack (2).

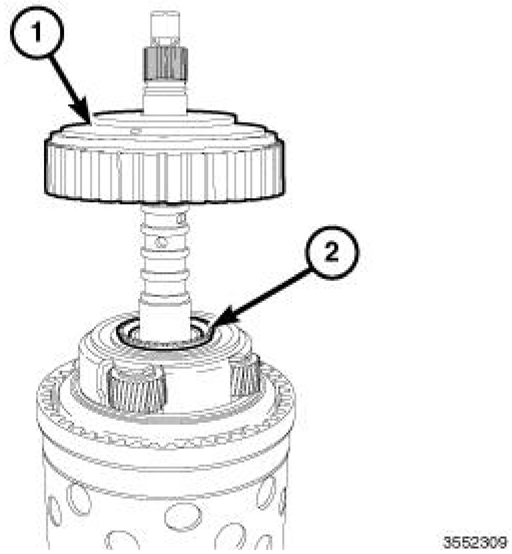


Fig. 67: P1 Annulus/B-Clutch Hub Assembly, Needle Bearing And Holding Plate
Courtesy of CHRYSLER GROUP, LLC

55. Remove the O-ring and 5 squared O-rings.
56. Remove the P1 annulus/B clutch hub assembly (1) from the P4 annulus drum.

NOTE: **The washer may stick to the bottom of the P1 annulus/B clutch hub assembly (1).**

57. Remove the selectable shim from the P1 annulus/B clutch hub.
58. Remove the needle bearing and holding plate (2) from the P1 planetary carrier.

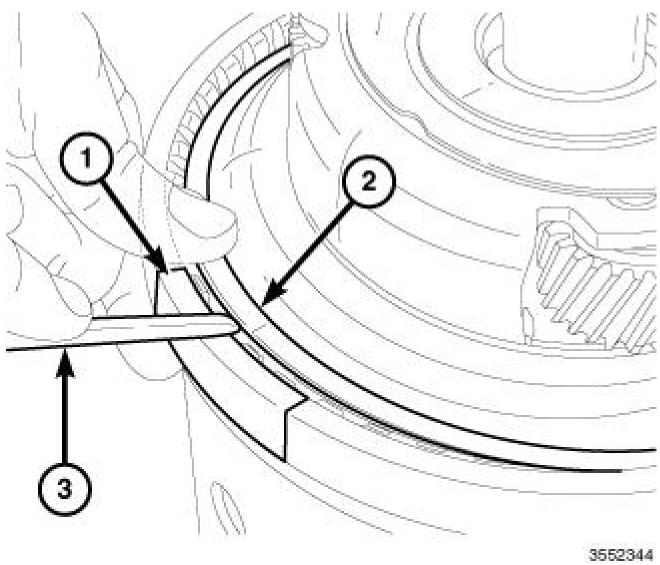


Fig. 68: Tool & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The (special tool #10378, Rings, Support) are three pieces intended to be used in multiple locations around the drum.**

59. Position the (special tool #10378, Rings, Support) (1) on the P4 annulus drum assembly to protect the

drum.

NOTE: **Pry the snap ring from the opposite side of the snap ring openings to release.**

NOTE: **When the snap ring is removed the internal clutch drum may drop slightly.**

60. Using a suitable tool (3), release the snap ring (2) by prying in and up from the opposite side of the snap ring openings.

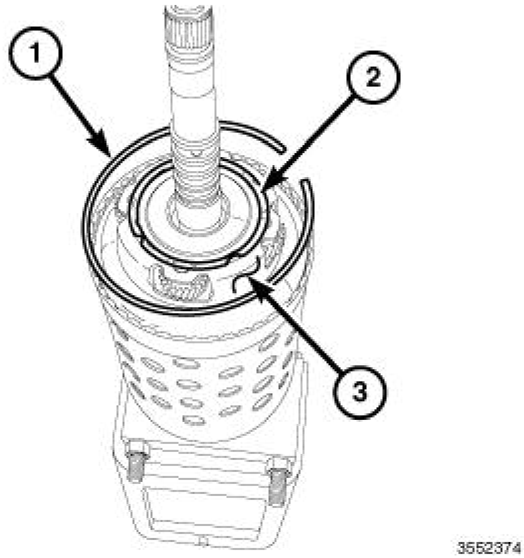


Fig. 69: Snap Ring & P1 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

61. Remove the P1 planetary carrier (3).

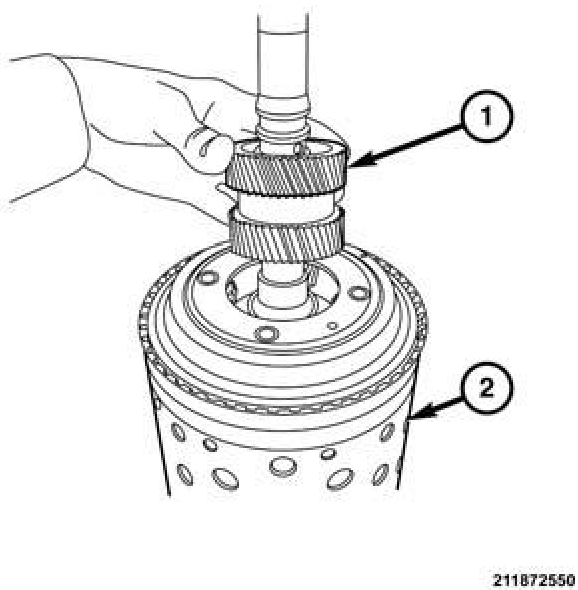


Fig. 70: Sun Gear & Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

62. Remove P1/P2 (1) sun gear from the bottom of the P1 planetary carrier.

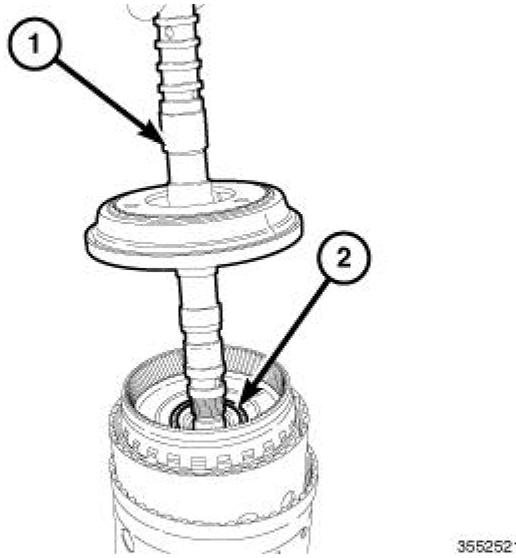


Fig. 71: P2 Planetary Carrier & Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

63. Remove the input shaft with P2 planetary carrier (1) from the drum assembly.
64. Remove the needle bearing (2) and washer.

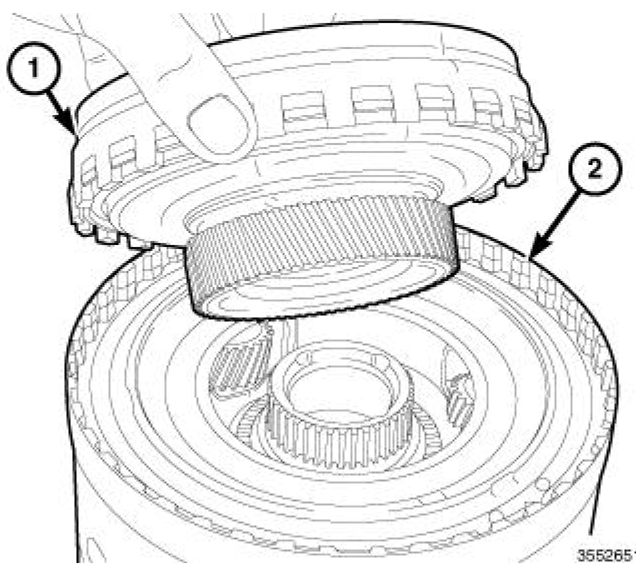


Fig. 72: P2 Annulus/P3 Sun Gear & Drum Assembly
Courtesy of CHRYSLER GROUP, LLC

65. Remove the P2 annulus/P3 sun gear (1) from the drum assembly (2).

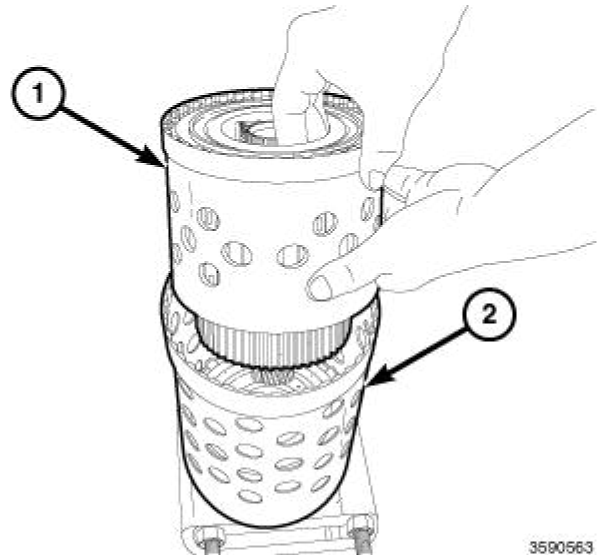


Fig. 73: D-Clutch Drum & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

66. Remove the D clutch drum (1) from the P4 annulus drum (2).

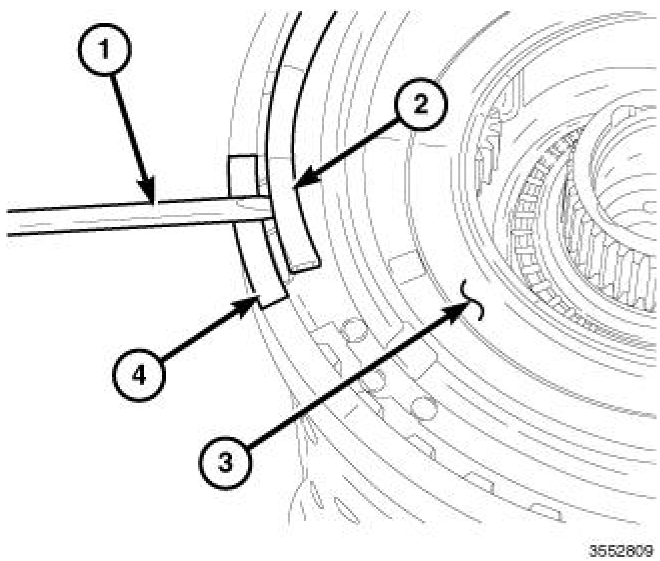


Fig. 74: Support Rings, Tool & P3 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The (special tool #10378, Rings, Support) are three pieces intended to be used in multiple locations around the drum.**

67. Position the (special tool #10378, Rings, Support) (4) on the P4 annulus drum assembly to protect the drum.
68. Using a suitable tool (1), release and remove the snap ring (2).
69. Remove the P3 planetary carrier (3).
70. Remove the needle bearing from the planetary carrier.

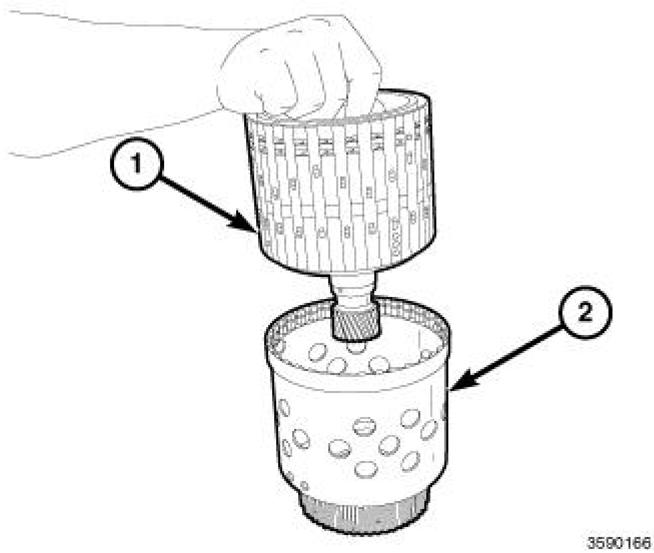


Fig. 75: P4 Sun Gear/C/E Clutch Retainer & D-Clutch Drum
Courtesy of CHRYSLER GROUP, LLC

71. Remove the P4 sun gear/C/E clutch retainer (1) from the D clutch drum (2).

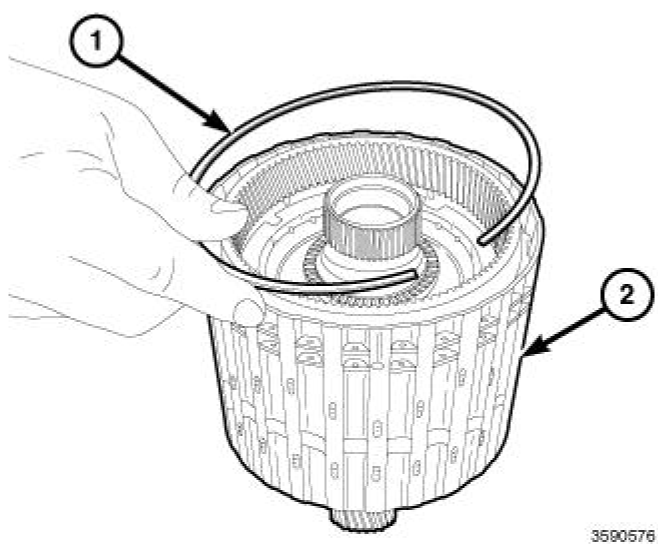


Fig. 76: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

72. Remove the snap ring (1) from the P4 sun gear/C/E clutch retainer (2).

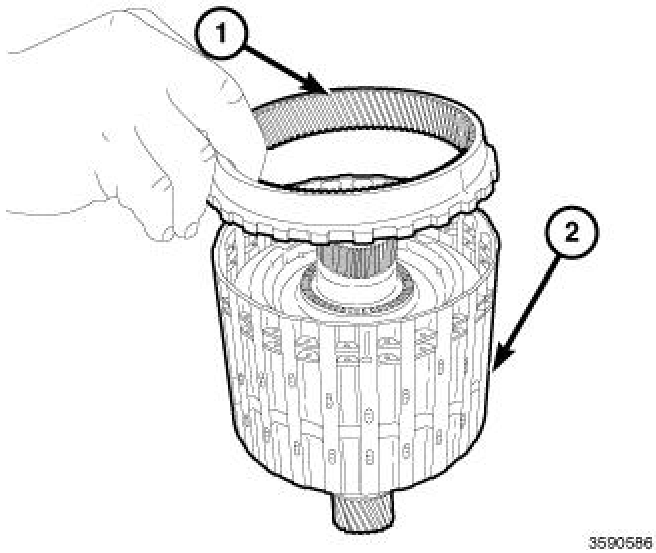


Fig. 77: P3 Annulus & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

73. Remove the P3 annulus (1) from the P4 sun gear/C/E clutch retainer (2).

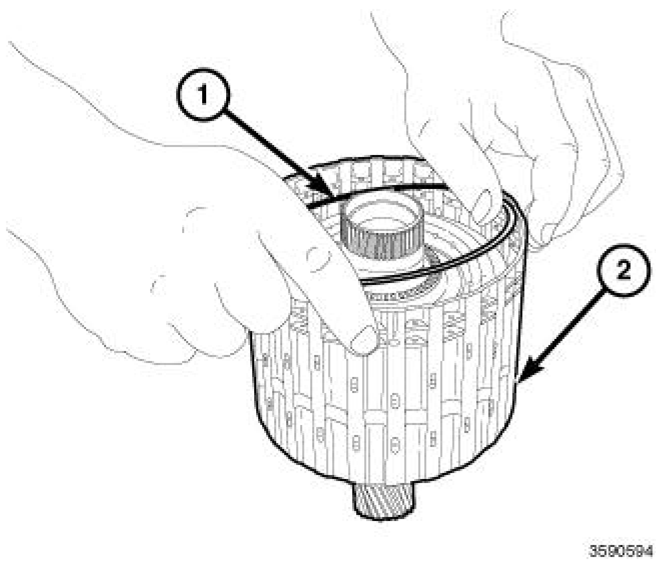
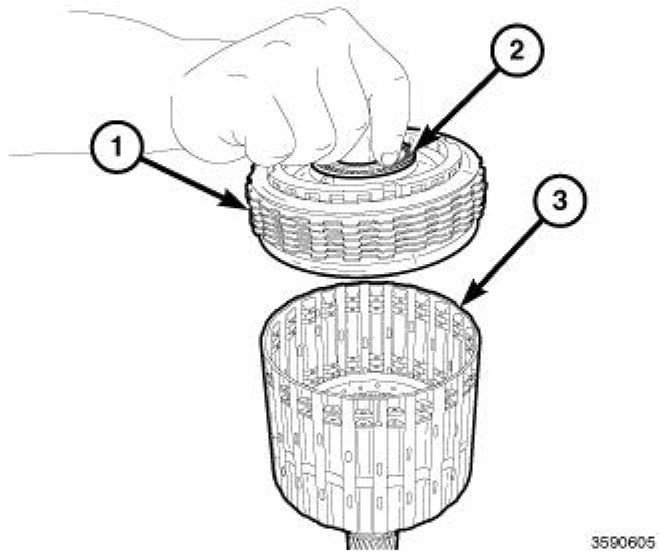


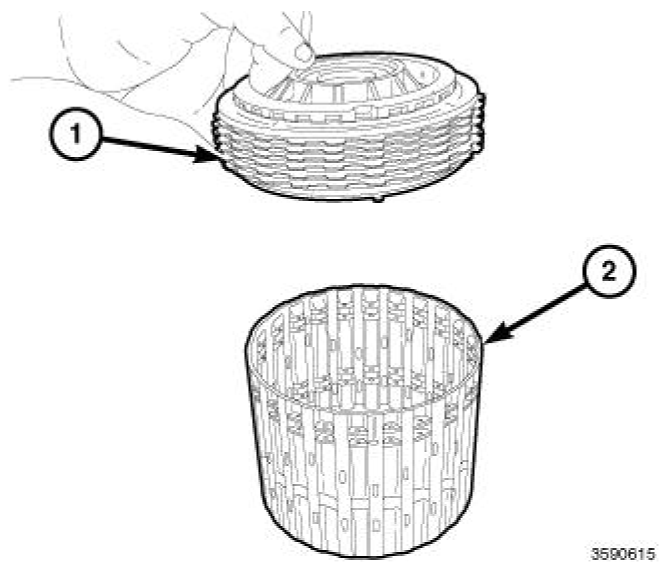
Fig. 78: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

74. Remove the snap ring (1) from the P4 sun gear/C/E clutch retainer (2).



[Fig. 79: E-Clutch & P4 Sun Gear/C/E Clutch Retainer](#)
Courtesy of CHRYSLER GROUP, LLC

75. Remove the E clutch (1) from the P4 sun gear/C/E clutch retainer (3).
76. Remove the needle bearing (2) from the E clutch (1).



[Fig. 80: C-Clutch & P4 Sun Gear/C/E Clutch Retainer](#)
Courtesy of CHRYSLER GROUP, LLC

77. Remove the C clutch (1) from the P4 sun gear/C/E clutch retainer (2).
78. Remove the bearing from top and bottom of C clutch (1).

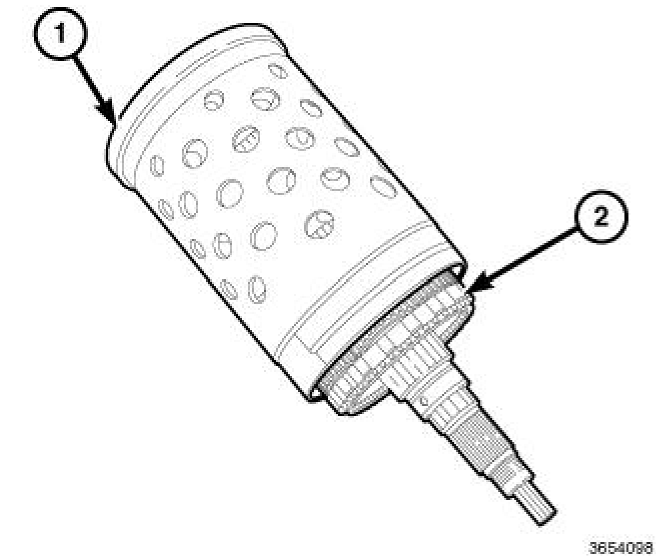


Fig. 81: P4 Planetary Carrier/Output Shaft & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

79. Remove the P4 planetary carrier/output shaft (2) from the P4 annulus drum (1).

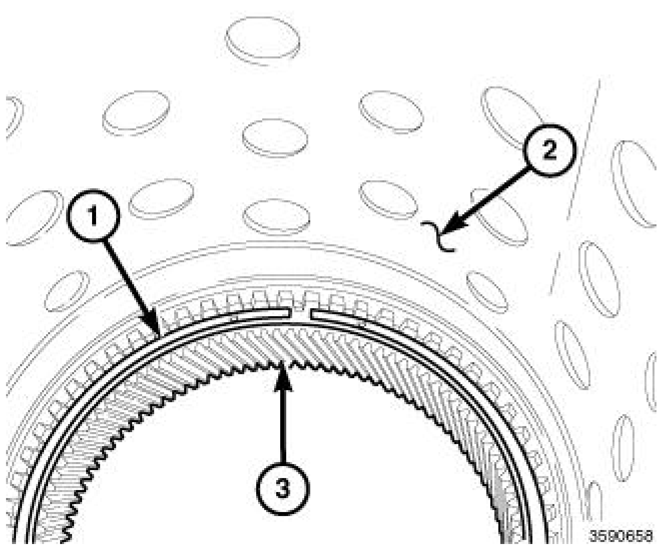


Fig. 82: Snap Ring & P4 Annulus Drum & P4 Annulus
Courtesy of CHRYSLER GROUP, LLC

80. Remove the snap ring (1) from the P4 annulus drum (2).
81. Remove the P4 annulus (3) from the P4 annulus drum (2).

CLEANING

CLEANING

CAUTION: **A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .**

The use of crocus cloth is permissible where necessary, providing it is used carefully. When used on shafts, or valves, use extreme care to avoid rounding off sharp edges. Sharp edges are vital as they prevent foreign matter from getting between the valve and valve bore.

Do not reuse oil seals, seal rings, or O-rings during overhaul. Replace these parts as a matter of course. Also do not reuse snap rings or E-clips that are bent or distorted. Replace these parts as well.

Lubricate transmission parts with the appropriate automatic transmission fluid only during overhaul and assembly.

NOTE: **Do not use shop towels or rags to dry the case (or any other transmission component) unless they are made from lint-free materials. Lint will stick to case surfaces and transmission components and circulate throughout the transmission after assembly. A sufficient quantity of lint can block fluid passages and interfere with valve body operation.**

Flush the case bores and fluid passages thoroughly with approved transmission fluid. Dry the case and all fluid passages with compressed air. Be sure that all fluid passages are clear.

INSPECTION

INSPECTION

Inspect the case for cracks, porous spots, worn bores, or damaged threads. Damaged threads can be repaired with HelicoilÂ® thread inserts. However, the case will have to be replaced if it exhibits any type of damage or wear.

ASSEMBLY

ASSEMBLY

CAUTION: **A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .**

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.**

NOTE: **If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TCM Adaptation Procedure. Refer to MODULE, TRANSMISSION CONTROL, MODULE PROGRAMMING .**

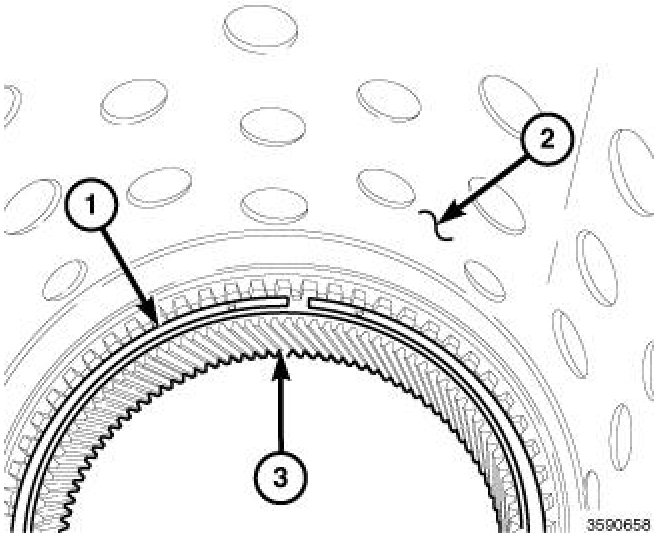


Fig. 83: Snap Ring & P4 Annulus Drum & P4 Annulus
Courtesy of CHRYSLER GROUP, LLC

1. Insert the P4 annulus (3) into the P4 annulus drum (2).
2. Install the snap ring (1) into the P4 annulus drum (2).

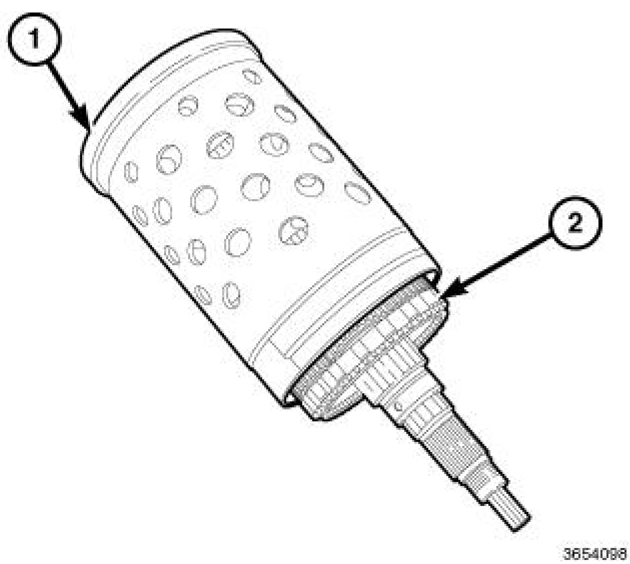
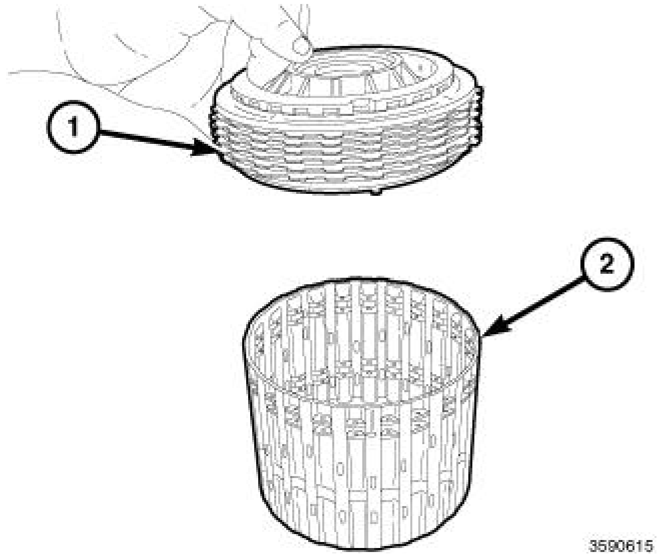


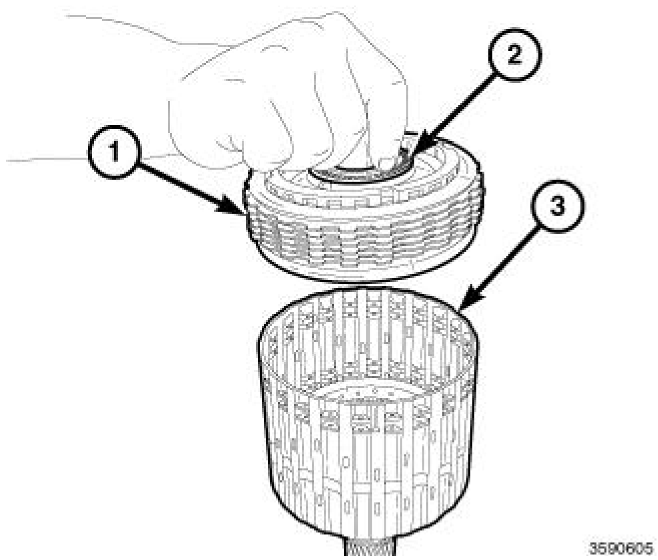
Fig. 84: P4 Planetary Carrier/Output Shaft & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

3. Install the P4 planetary carrier\output shaft (2) into the P4 annulus drum (1).



[Fig. 85: C-Clutch & P4 Sun Gear/C/E Clutch Retainer]
Courtesy of CHRYSLER GROUP, LLC

4. Position the bearings on the top and the bottom of C clutch (1).
5. Install the C clutch (1) into the P4 sun gear/C/E clutch retainer (2).



[Fig. 86: E-Clutch & P4 Sun Gear/C/E Clutch Retainer]
Courtesy of CHRYSLER GROUP, LLC

6. Install the needle bearing (2) onto the E clutch (1).
7. Install the E clutch (1) into the P4 sun gear/C/E clutch retainer (3).

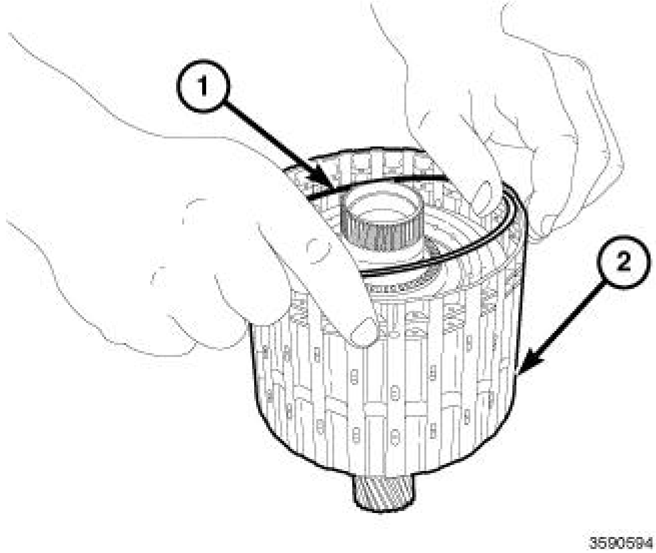


Fig. 87: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

8. Install the snap ring (1) into the P4 sun gear/C/E clutch retainer (2).

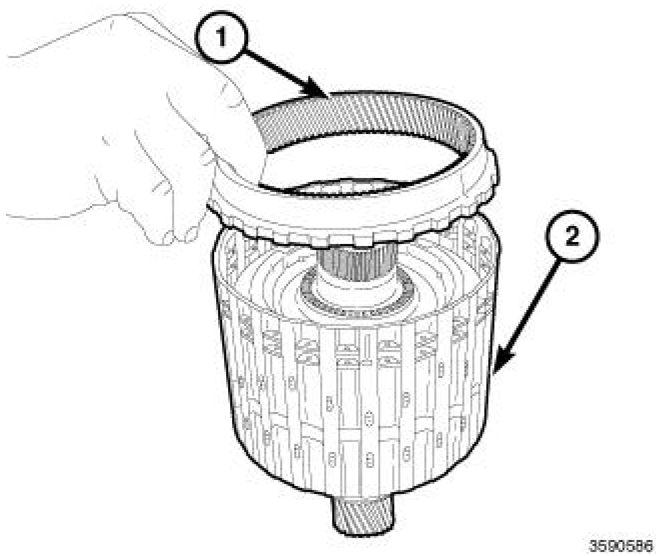


Fig. 88: P3 Annulus & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

9. Install the P3 annulus (1) into the P4 sun gear/C/E clutch retainer (2).

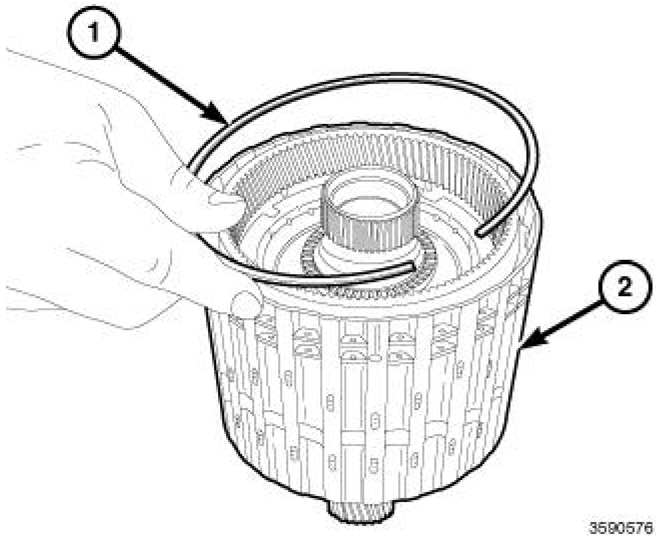


Fig. 89: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

10. Install the snap ring (1) into the P4 sun gear/C/E clutch retainer (2).

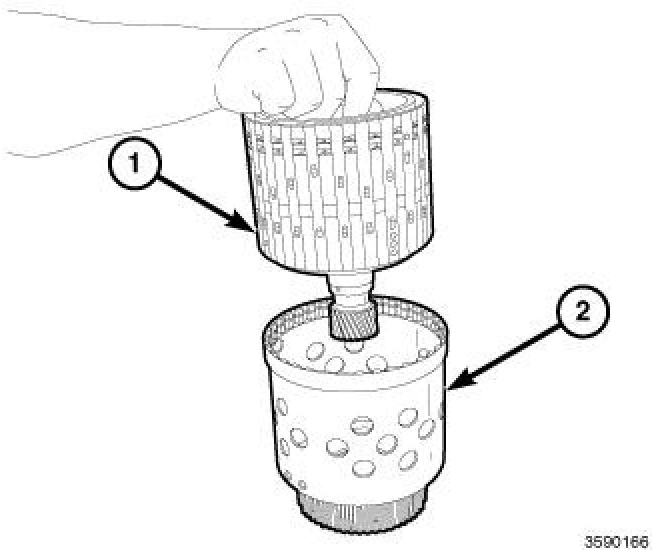


Fig. 90: P4 Sun Gear/C/E Clutch Retainer & D-Clutch Drum
Courtesy of CHRYSLER GROUP, LLC

11. Install the P4 sun gear/C/E clutch retainer (1) into the D clutch drum (2).

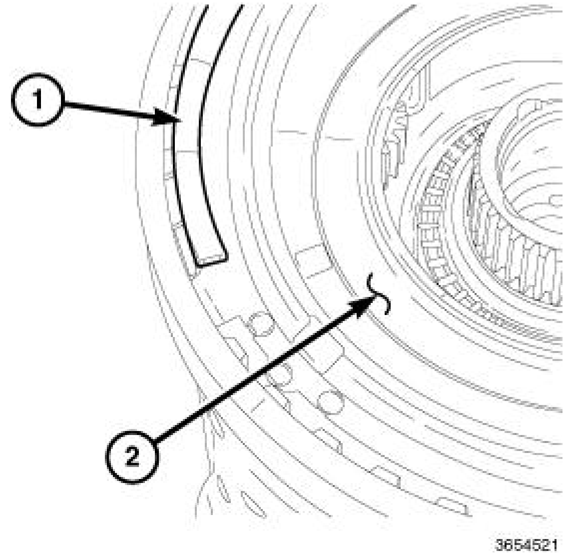


Fig. 91: P3 Planetary Carrier & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

12. Install the needle bearing onto the planetary carrier.
13. Install the P3 planetary carrier (2) in the D clutch drum.
14. Install the snap ring (1).

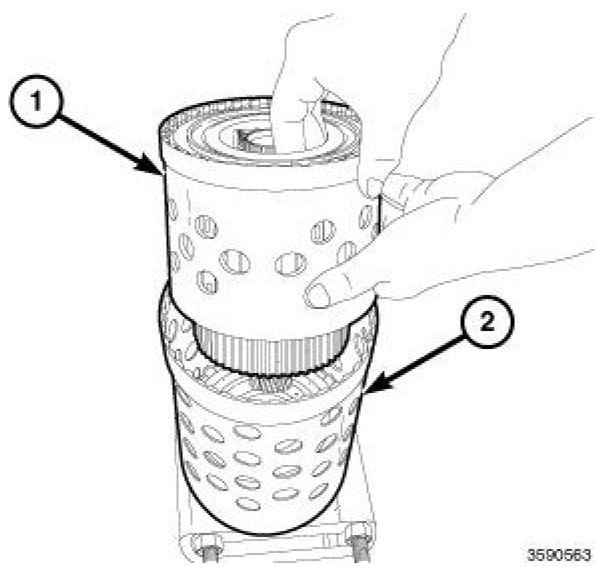


Fig. 92: D-Clutch Drum & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

15. Install the D clutch drum (1) into the P4 annulus drum (2).

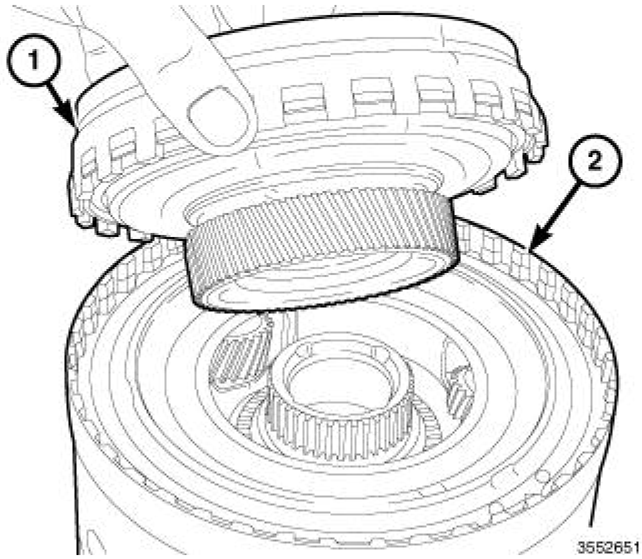


Fig. 93: P2 Annulus/P3 Sun Gear & Drum Assembly
Courtesy of CHRYSLER GROUP, LLC

16. Install the P2 annulus\P3 sun gear (1) onto the drum assembly (2).

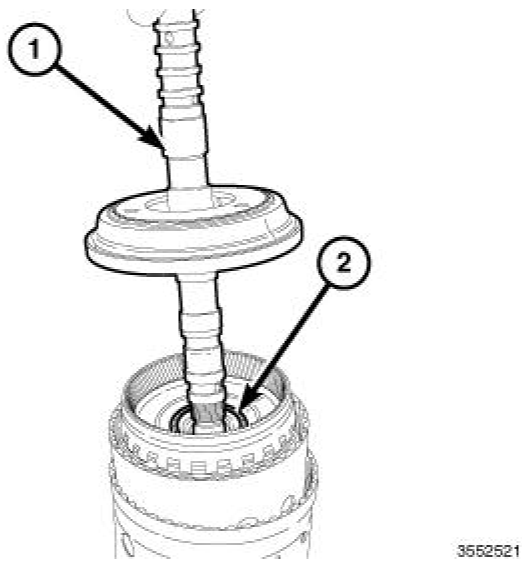


Fig. 94: P2 Planetary Carrier & Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

17. Install the needle bearing (2) and washer.
18. Install the input shaft with P2 planetary carrier (1) into the drum assembly.

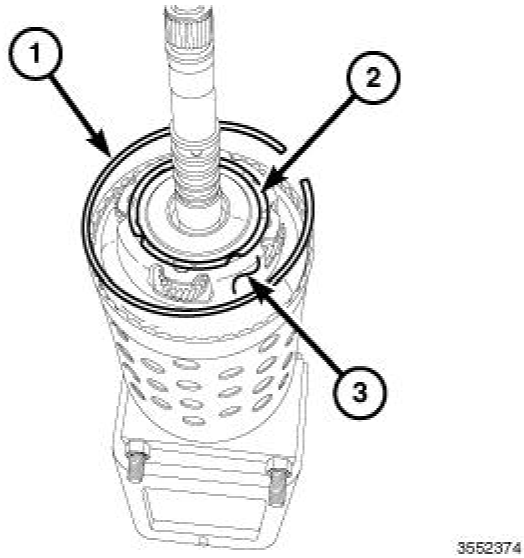


Fig. 95: Snap Ring & P1 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

19. Install P1/P2 sun gear into the bottom of the P1 planetary carrier (3).
20. Install the P1 planetary carrier (3).
21. Install the snap ring (1).

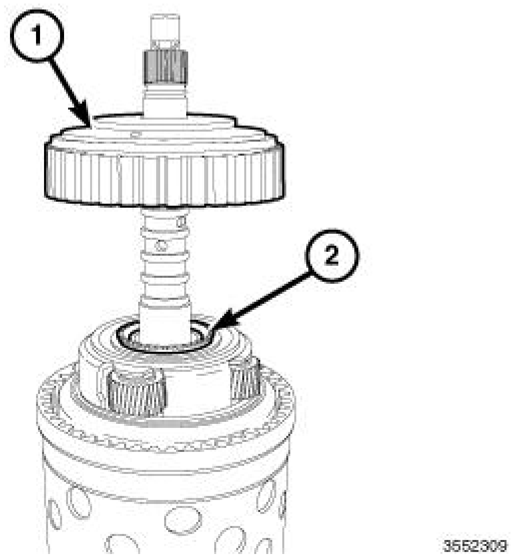
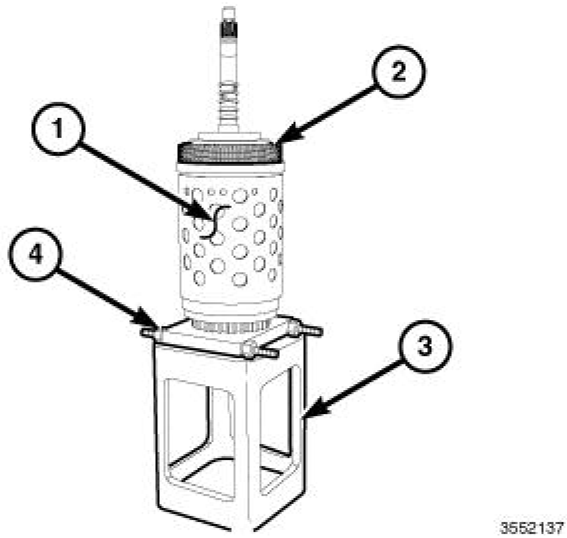


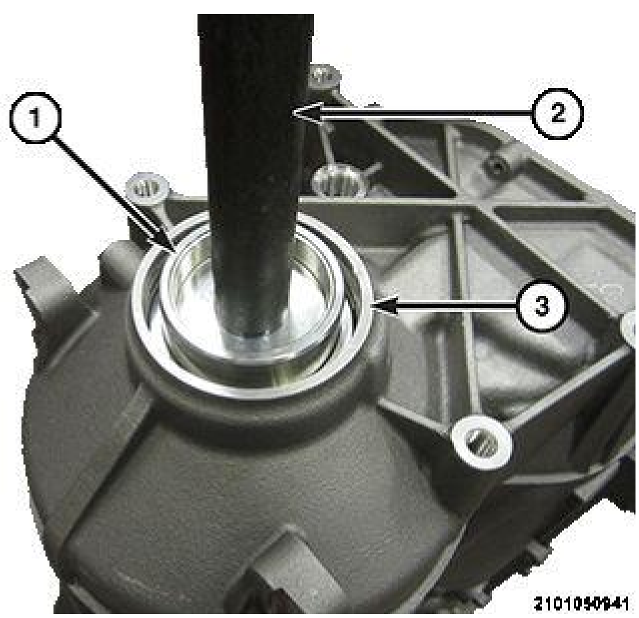
Fig. 96: P1 Annulus/B-Clutch Hub Assembly, Needle Bearing And Holding Plate
Courtesy of CHRYSLER GROUP, LLC

22. Install the needle bearing and holding plate (2) onto the P1 planetary carrier.
23. Install the selectable shim to the P1 annulus/B clutch hub.
24. Install the P1 annulus\B clutch hub assembly (1) onto the P4 annulus drum.
25. Install the O-ring and five squared O-rings.



[Fig. 97: P4 Annulus Drum Assembly, Press Fixture Assembly & Bearing/Gear Splitter]
Courtesy of CHRYSLER GROUP, LLC

26. Install the clutch pack (2).



[Fig. 98: Installing Output Shaft Inner Needle Bearing & Oil Dam]
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The (special tool #10373A, Installer, Output Needle Bearing/Rear Oil Dam) (1) is a combination tool that is reversed to install the oil dam and output shaft inner needle bearing. For use to install the output shaft inner needle bearing, use the thick walled side of the tool against the bearing.**

27. Using (special tool #10373A, Installer, Output Needle Bearing/Rear Oil Dam) (1) and (special tool #C-4171, Driver Handle, Universal) (2), install the output shaft inner needle bearing.
28. Install the snap ring.

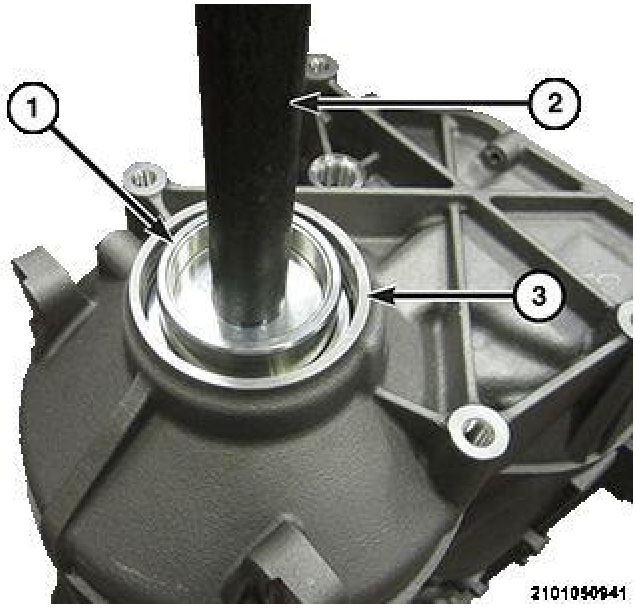


Fig. 99: Installing Output Shaft Inner Needle Bearing & Oil Dam
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The (special tool #10373A, Installer, Output Needle Bearing/Rear Oil Dam) (1) is a combination tool that is reversed to install the oil dam and output shaft inner needle bearing. For use to install the oil dam, use the thin walled side of the tool against the oil dam.**

29. Using (special tool #10373A, Installer, Output Needle Bearing/Rear Oil Dam) (1) and (special tool #C-4171, Driver Handle, Universal) (2), install the oil dam.
30. Install the snap ring.

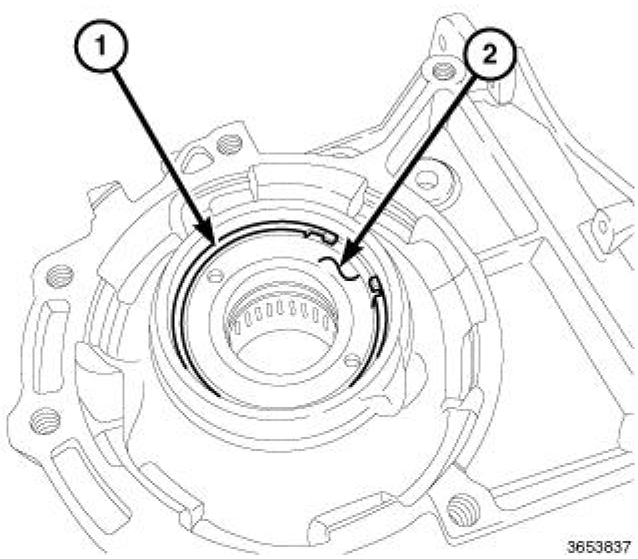


Fig. 100: Outer Bearing Snap Ring & Outer Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE: **AWD shown, RWD similar.**

31. Install the ball bearing.
32. Install the snap ring (1).

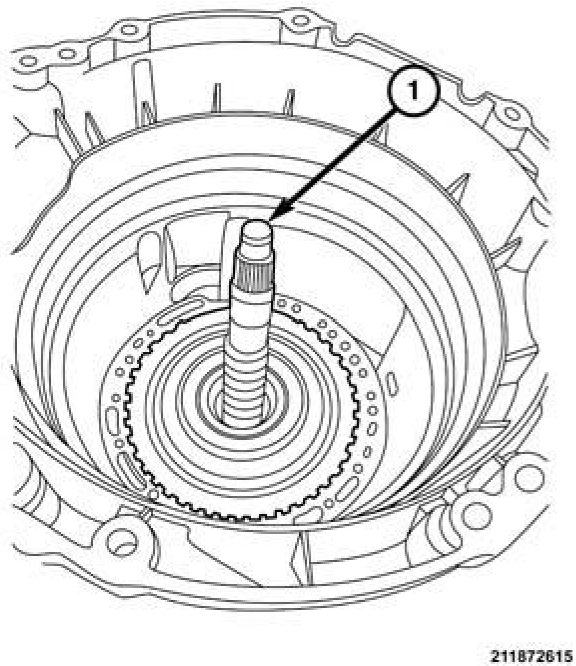


Fig. 101: Park Pawl
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The transmission must be in a upright position when the input/output shaft and the P4 annulus drum assembly (1) is installed.**

33. Install the input/output shaft and P4 annulus drum assembly (1) into the case.

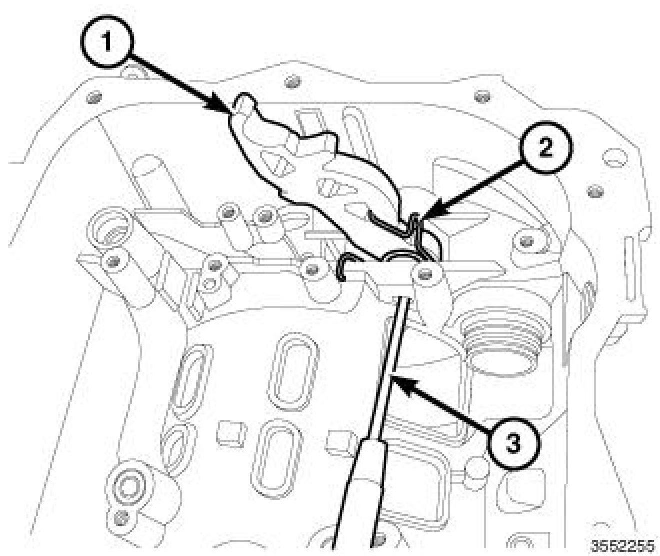


Fig. 102: Removing/Installing Park Pawl Shaft Using A Suitable Pin Punch, Park Pawl And Spring
Courtesy of CHRYSLER GROUP, LLC

34. From outside the transmission case, install the park pawl shaft and install the park pawl (1) and spring

(2).

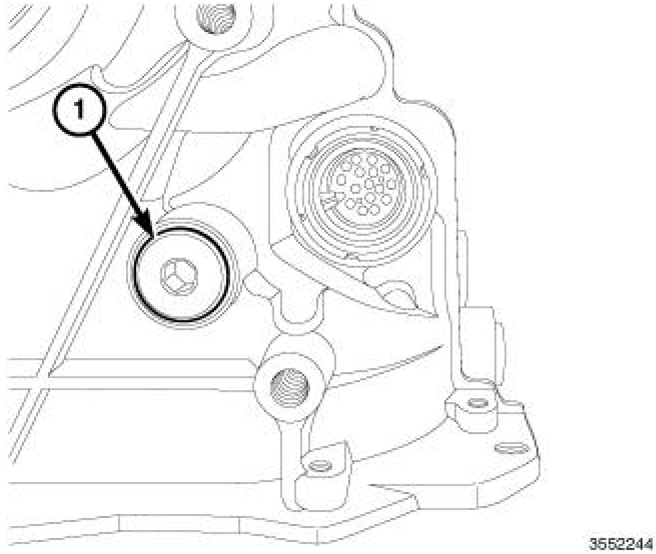


Fig. 103: Park Pawl Shaft Plug
Courtesy of CHRYSLER GROUP, LLC

35. Install the park pawl shaft plug (1) into the rear of the case and tighten to the proper **SPECIFICATIONS**.

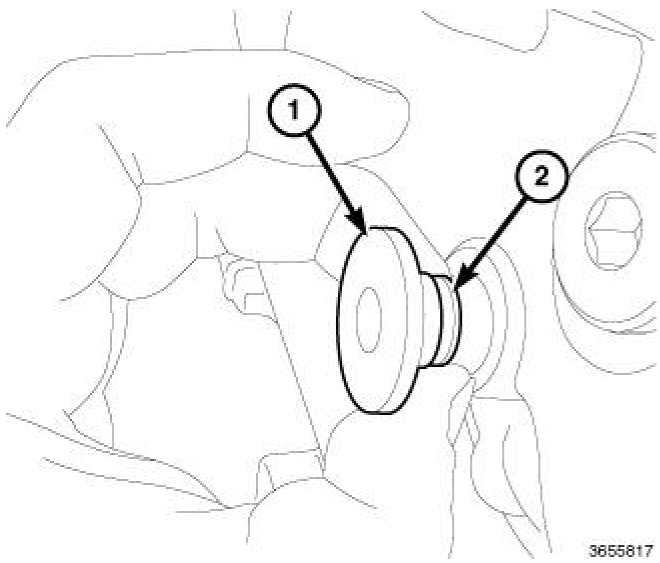


Fig. 104: Spacer & Selector Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

36. Using (special tool #6936, Spacer) (1), install the Manual Park Release (MPR) shaft seal (2).

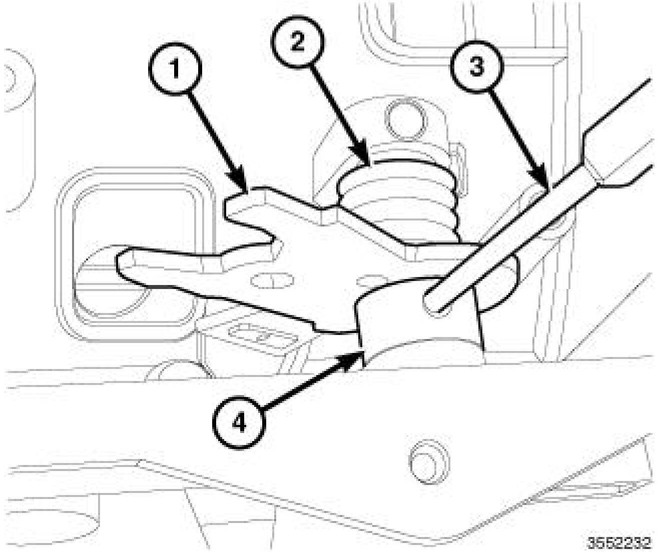


Fig. 105: Selector Shaft, Suitable Pin Punch, Spring & Fork
Courtesy of CHRYSLER GROUP, LLC

37. Install the shaft (4), spring (2), and fork (1) into the case.
38. Install the roll pin into the MPR shaft (4) using a suitable pin punch (3).

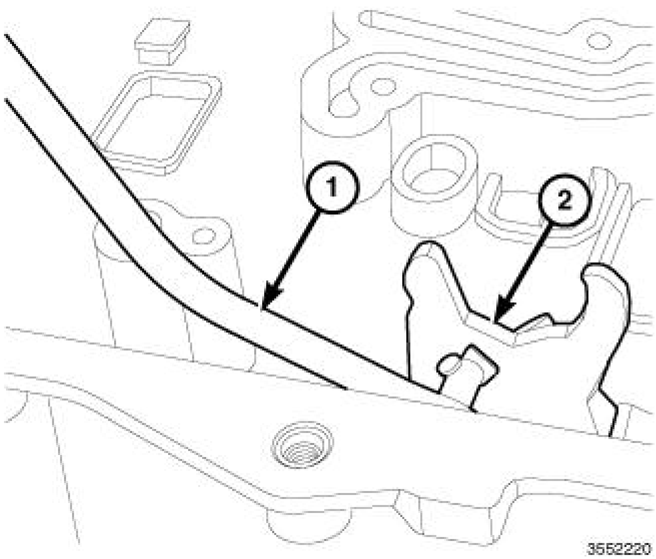


Fig. 106: Park Pawl Lock Rod & Fork
Courtesy of CHRYSLER GROUP, LLC

39. Install the park pawl lock rod (1) onto the fork (2).

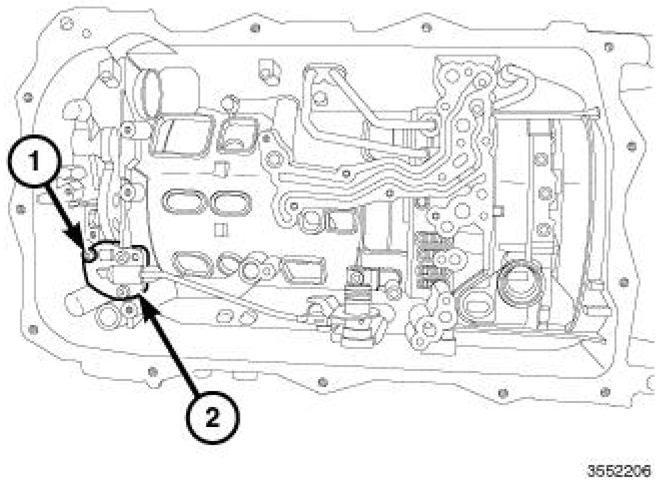


Fig. 107: Three Park Pawl Lock Rod Guide Plate Retaining Screws & Plate
Courtesy of CHRYSLER GROUP, LLC

40. Position the park pawl lock rod guide plate (2), install the three park pawl lock rod guide plate retaining screws (1) and tighten to the proper **SPECIFICATIONS**.

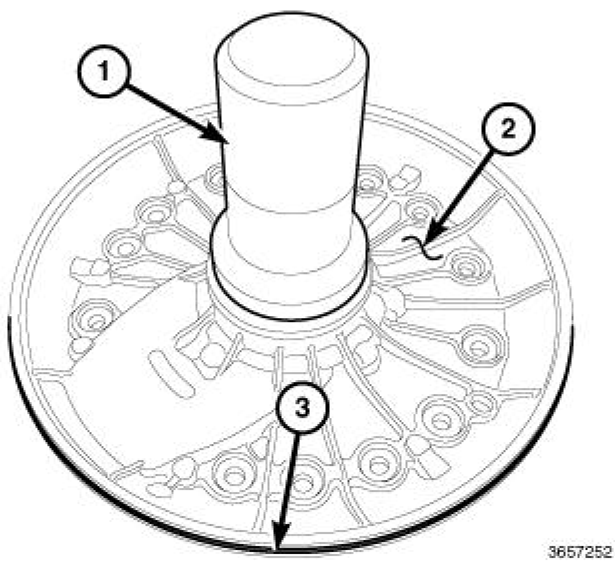


Fig. 108: Oil Pump Cover Lip Seal & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

41. Install the oil pump cover lip seal (3) on the oil pump cover (2).

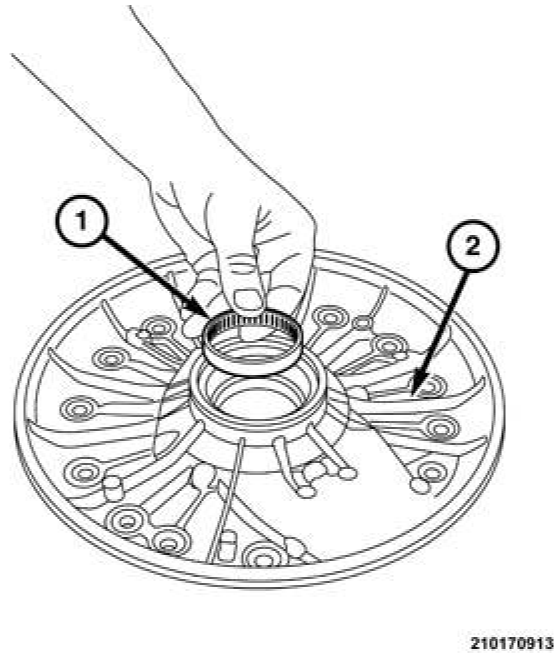


Fig. 109: Oil Pump Needle Bearing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

42. If removed, install a **NEW** oil pump needle bearing using (special tool #10376, Installer, Input Shaft Needle Bearing)and (special tool #C-4171, Driver Handle, Universal).

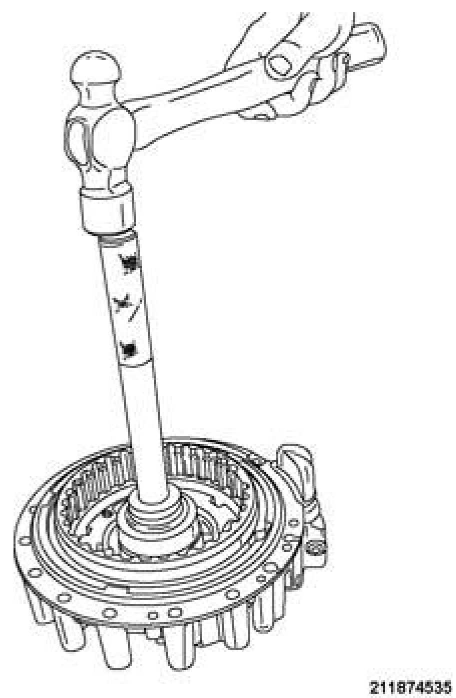


Fig. 110: Installing Oil Pump Housing Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

43. If removed, install the inner oil pump needle bearing using (special tool #10382, Installer, Oil Pump Housing Needle Bearing) and (special tool #C-4171, Driver Handle, Universal)
44. Using (special tool #10375, Installer, Oil Pump Cover Oil Seal) (1), install the input shaft seal in the oil

pump cover (2).

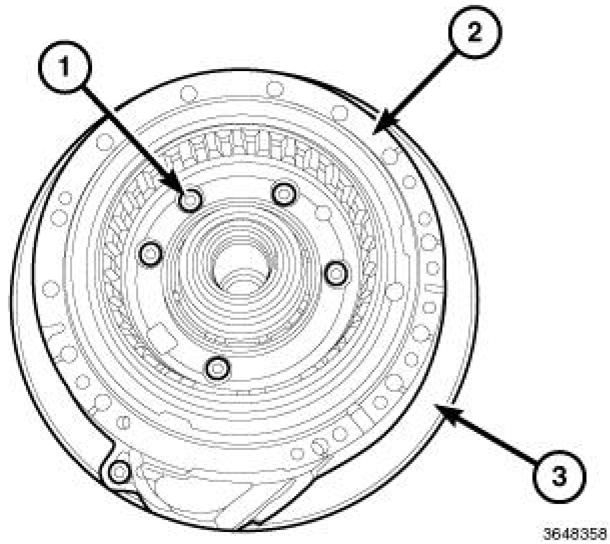


Fig. 111: Six Bolts, Oil Pump Housing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

45. Position the oil pump housing (2) and oil pump cover (3) together.
46. Install the five bolts (1) and tighten to the proper **SPECIFICATIONS**.

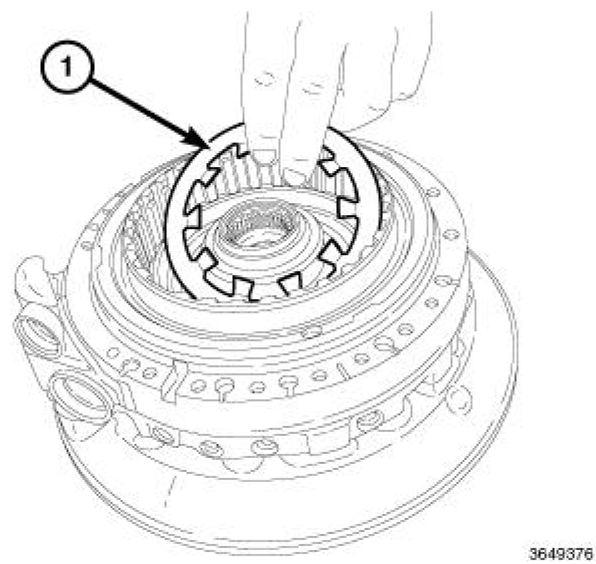
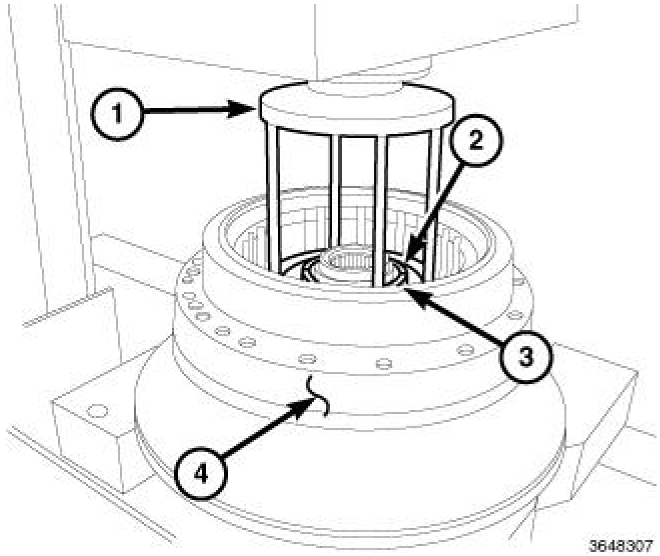


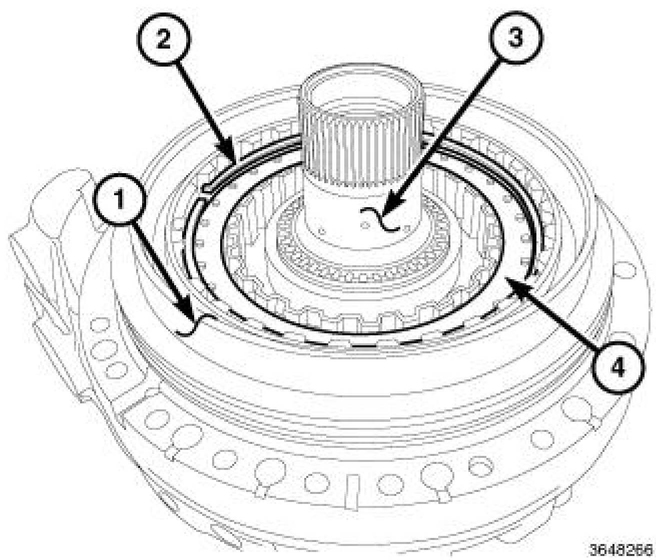
Fig. 112: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

47. Insert the piston and the retaining ring (1) into the housing.



[Fig. 113: Oil Pump Housing Assembly]
Courtesy of CHRYSLER GROUP, LLC

48. Position the oil pump housing assembly (4) in a suitable arbor press.
49. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and install the two halves of the split retainer ring (2).



[Fig. 114: Outer Ring, Snap Ring, Hub & Spacers]
Courtesy of CHRYSLER GROUP, LLC

50. Install the hub (3).
51. Install the clutches and spacers (4).
52. Install the snap ring (2).
53. Install the outer ring (1) (below B-piston).

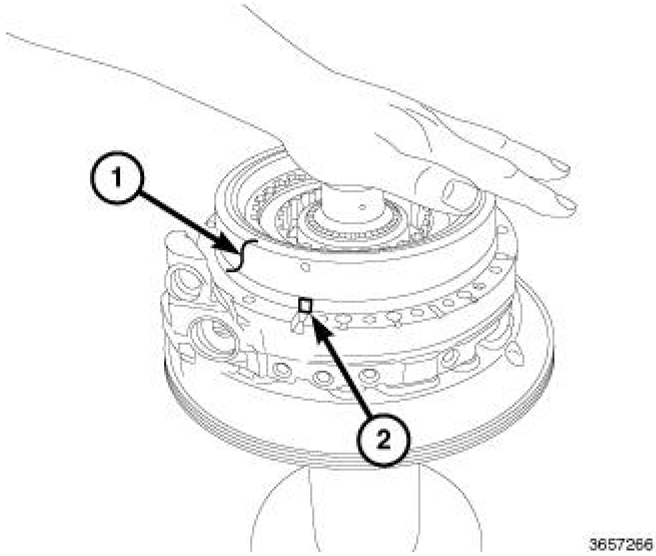


Fig. 115: B-Piston Alignment Tab & B-Piston
Courtesy of CHRYSLER GROUP, LLC

54. Position the B-piston alignment tab (2) above the notch and install B-piston (1) on the assembly.

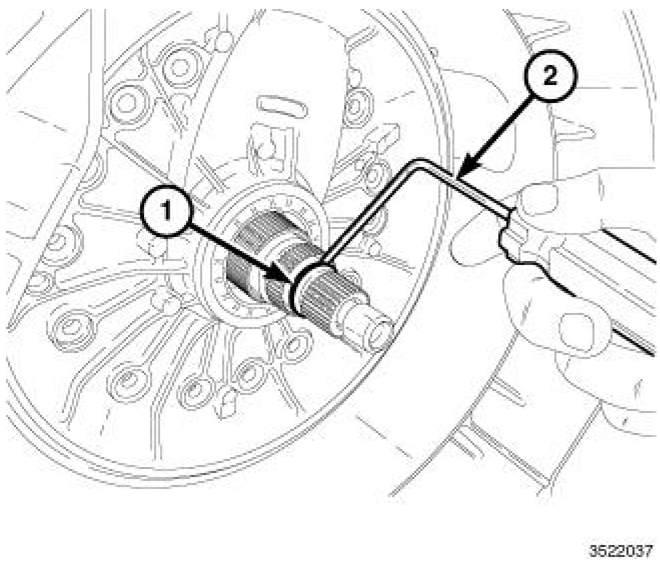
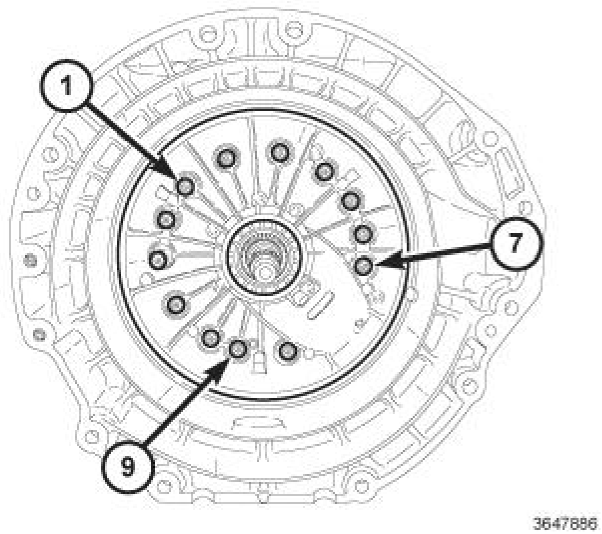


Fig. 116: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

55. Carefully position the oil pump housing assembly into the case, firmly press the oil pump into place before drawing it in with the bolts.

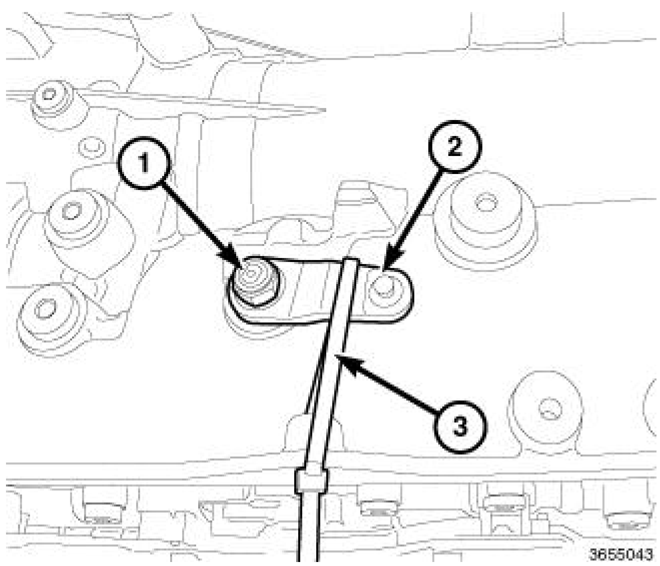
NOTE: **Check the transmission end play before installing the new oil pump bolts, in case adjustment is needed.**

56. Install the **NEW** input shaft O-ring.



[Fig. 117: Pre Tighten Bolts One, Seven And Nine](#)
Courtesy of CHRYSLER GROUP, LLC

57. Install the thirteen oil pump cover retaining bolts and tighten the oil pump cover as follows:
    a. In order to seat the oil pump cover properly, pre tighten bolts one, seven and nine to 6 N.m (53 in. lb.).
    b. Working in a clockwise pattern, beginning with number one, tighten to 10 N.m (89 in. lb.).
    c. Working in a clockwise pattern, beginning with number one, tighten an additional 90Â°.



[Fig. 118: Manual Park Release Lever, Nut & Tie Strap](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The MPR lever (2) can be reversed to release tension and ease the installation of the valve body assembly.**

58. Temporarily install the MPR lever (2) to release tension on the shift fork as follows:
    a. Install the MPR lever (2) 180 degrees offset from its original position.
    b. Install the nut (1) and hand tighten.

c. Turn the MPR lever (2) and using a tie strap (3), secure the lever (2) into position so the park release fork is in the same position as it was before valve body assembly removal.

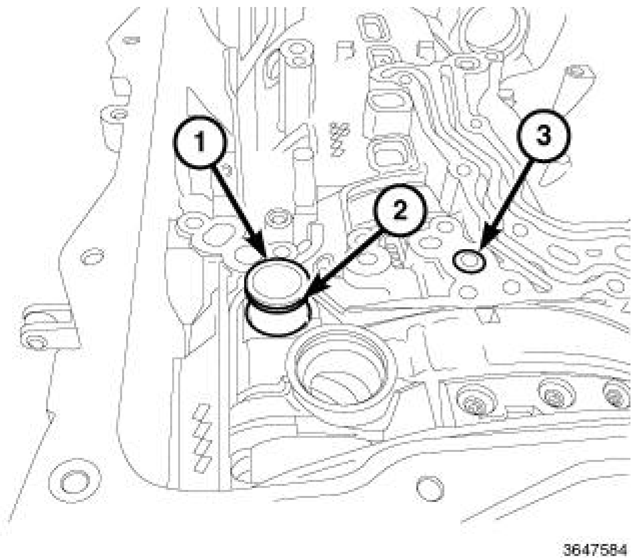


Fig. 119: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

59. Install a new compression seal (3) into the transmission case.
60. Install the fluid port (1) with **NEW** O-rings to the transmission case.

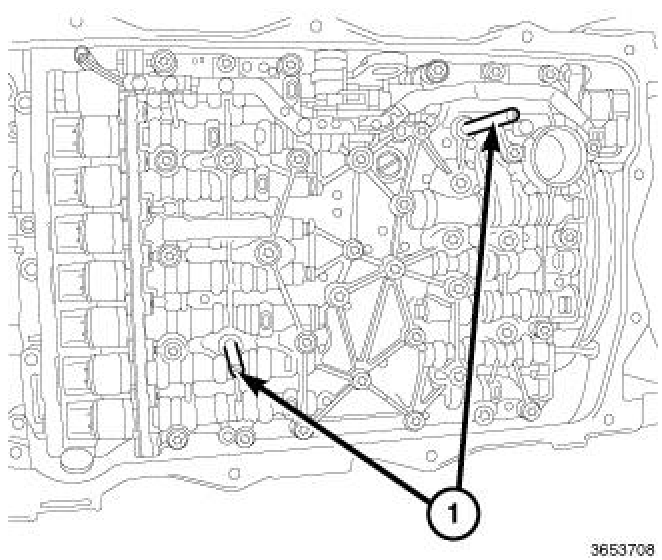


Fig. 120: Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

61. Install the (special tool #10379, Pins, Valve Body Alignment) (1) in the transmission case as guides for the valve body assembly.

NOTE: Make sure the shift fork lines up properly.

62. Using the valve body alignment pins (1) to guide, position the valve body assembly to the transmission.

NOTE: **After several bolts have been hand tightened, remove the guide pins (1).**

63. Install the fourteen valve body assembly retaining bolts and hand tighten.

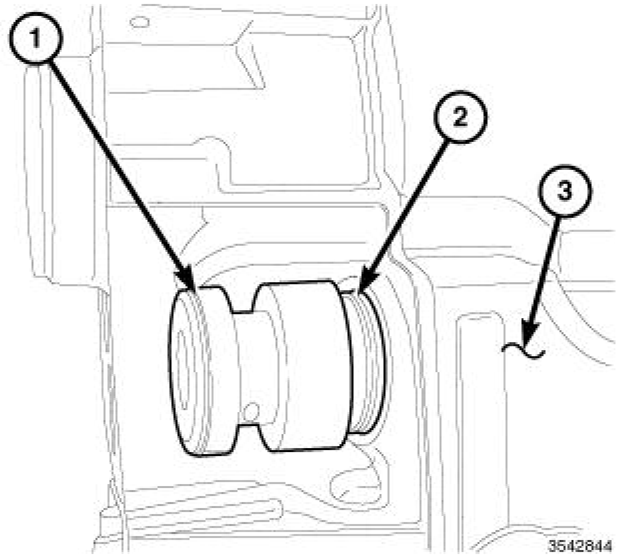


Fig. 121: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

64. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully install the electrical harness insulator (2) into the transmission case (3).

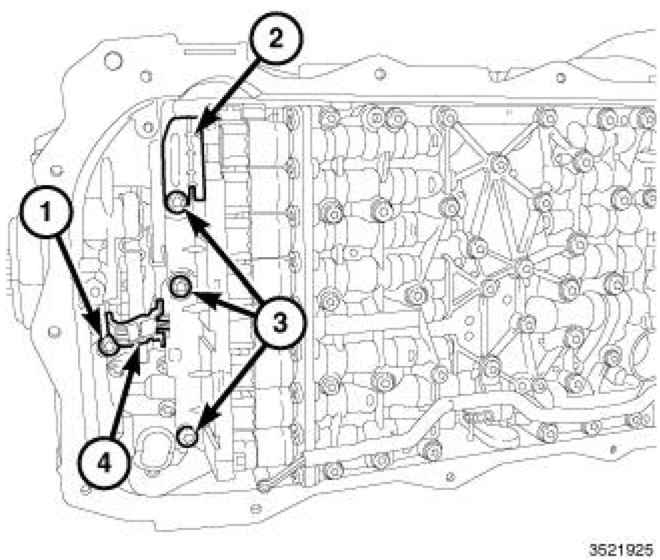
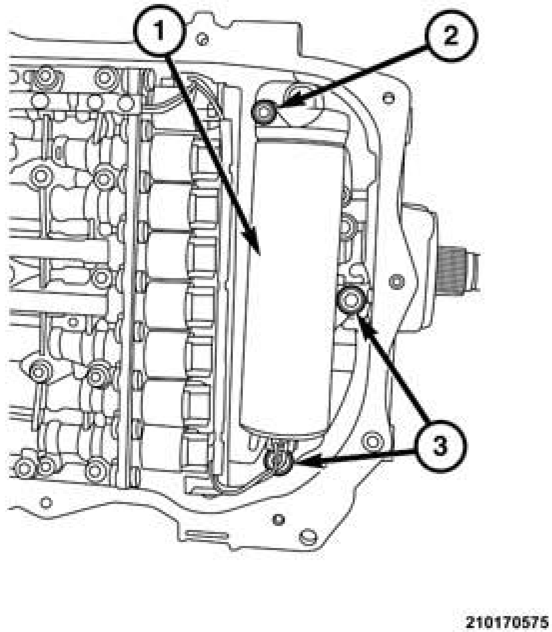


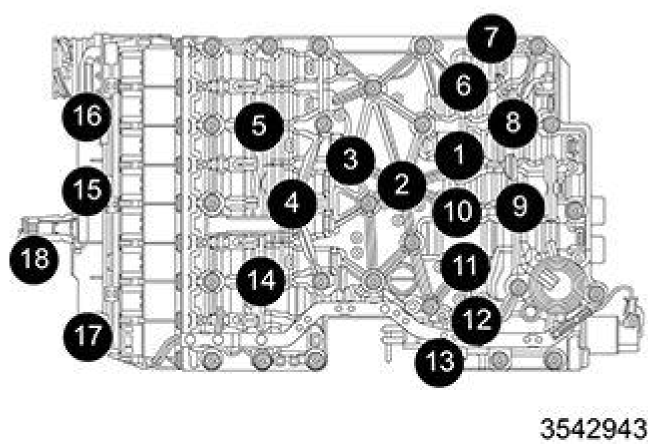
Fig. 122: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

65. Install the sensor (4) and the sensor retaining bolt (1) and hand tighten.
66. Latch the electrical connector insulator lock (2) by pushing in.



[Fig. 123: Hydraulic Impulse Storage Unit & Bolts]
Courtesy of CHRYSLER GROUP, LLC

67. If equipped, install the Hydraulic Impulse Storage Unit (H.I.S.).
68. Tighten the bolts (2 and 3) to the proper **SPECIFICATIONS**.
69. Install the valve body assembly end retainer bolts (3) and hand tighten.



[Fig. 124: Valve Body Bolts Loosening And Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

70. Tighten the valve body assembly retaining bolts 1-18 in the sequence shown to the proper **SPECIFICATIONS**.

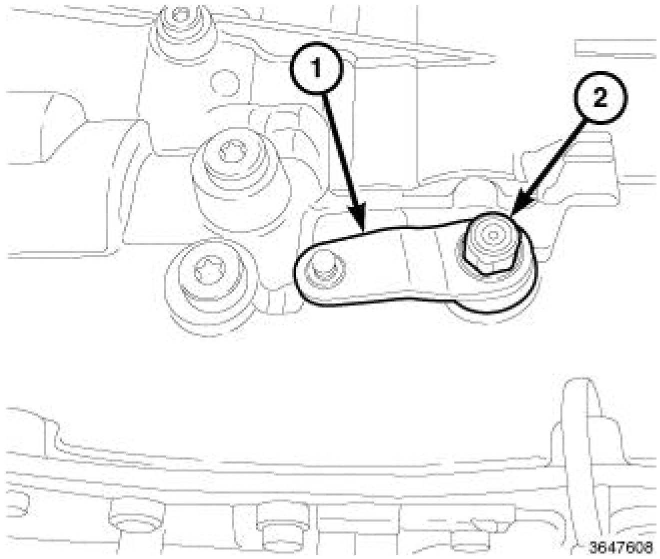


Fig. 125: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

71. Remove the tie strap and return the MPR lever (1) to the original position.
72. Install the nut (2) and tighten to the proper **SPECIFICATIONS**.

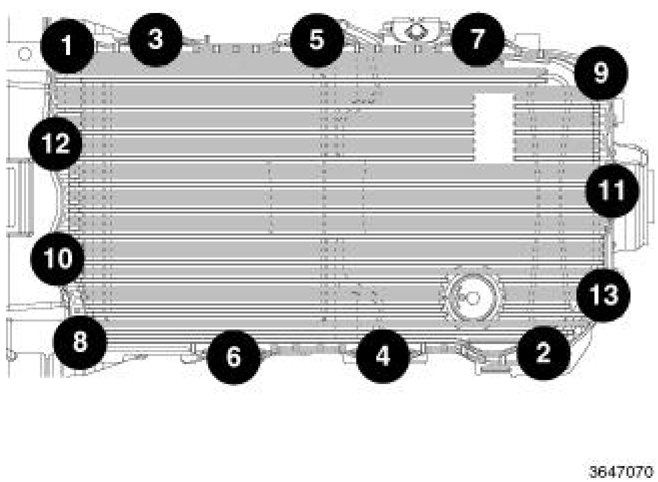
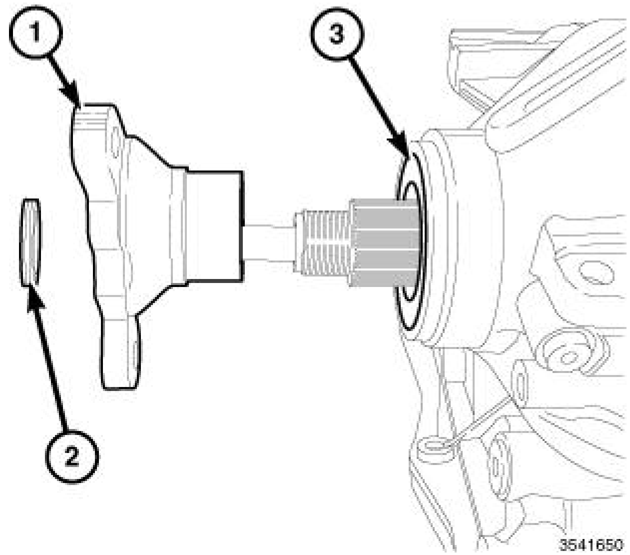


Fig. 126: Oil Pan Retaining Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

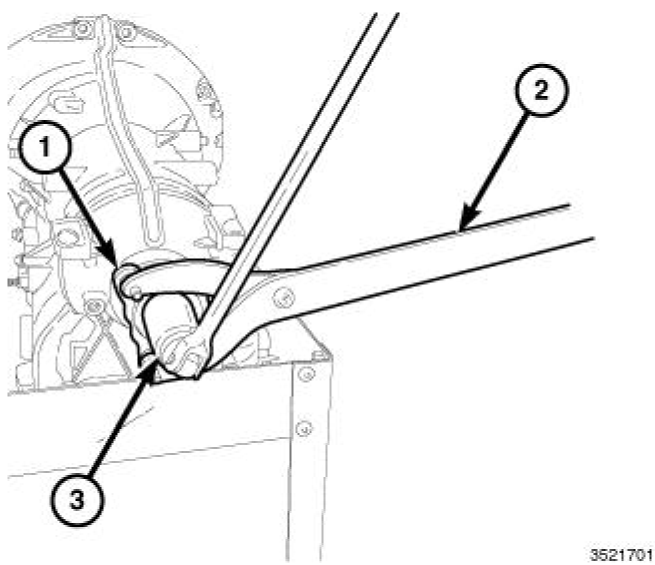
73. Position the oil pan and gasket.
74. Install the thirteen oil pan retaining bolts and using the sequence shown and tighten to the proper **SPECIFICATIONS**.
75. Install the transmission output shaft washer.

CAUTION: The seal must be installed flush with the case. Driving the seal deeper could damage the seal causing a leak.



[Fig. 127: Propeller Shaft Flange, Rear Dust Seal & Rear Oil Seal]
Courtesy of CHRYSLER GROUP, LLC

76. Position the new output shaft seal (3) over the output shaft and against the transmission case.
77. Using (special tool #8481, Installer, Gear) install the output shaft seal.
78. Install the transmission rear dust seal (2).
79. Install the drive shaft flange (1).



[Fig. 128: Flange, Flange Holder & Socket]
Courtesy of CHRYSLER GROUP, LLC

80. Install the **NEW** drive shaft flange nut and washer using a 34 mm 12 point socket (3) and (special tool #C-3281, Holder, Flange) (2) to hold the flange (1). Tighten to the proper SPECIFICATIONS.
81. Stake the nut.

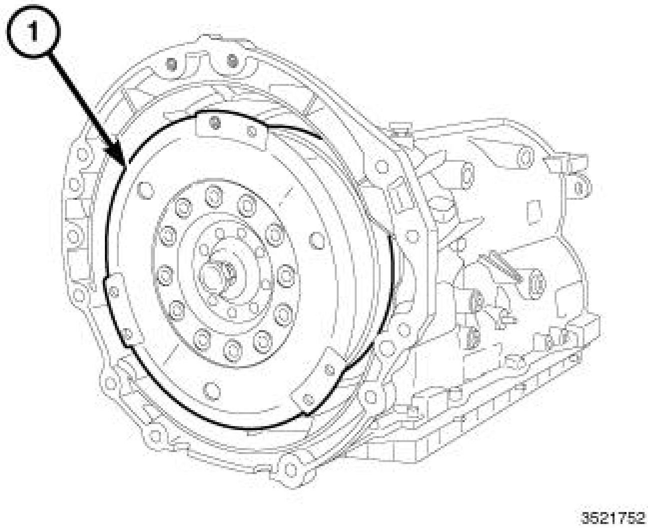


Fig. 129: Torque Converter
Courtesy of CHRYSLER GROUP, LLC

82. Install the torque converter (1). Refer to **TORQUE CONVERTER, INSTALLATION**.
83. Before installing the transmission in the vehicle, pre-fill the transmission as outlined in FILL TRANSMISSION AFTER SERVICE. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

INSTALLATION

INSTALLATION

CAUTION:	**When supporting or lifting the transmission at the oil pan the weight of the transmission must be distributed evenly on the lifting fixture. Failure to do so could damage the oil pan and transmission.**

NOTE:	**Make sure that the transmission dowel pins are seated in engine block and protrude far enough to hold transmission in alignment.**

NOTE:	**If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TRANSMISSION VERIFICATION TEST. Refer to STANDARD PROCEDURE .**

1. Install the torque converter. Refer to **TORQUE CONVERTER, INSTALLATION**.

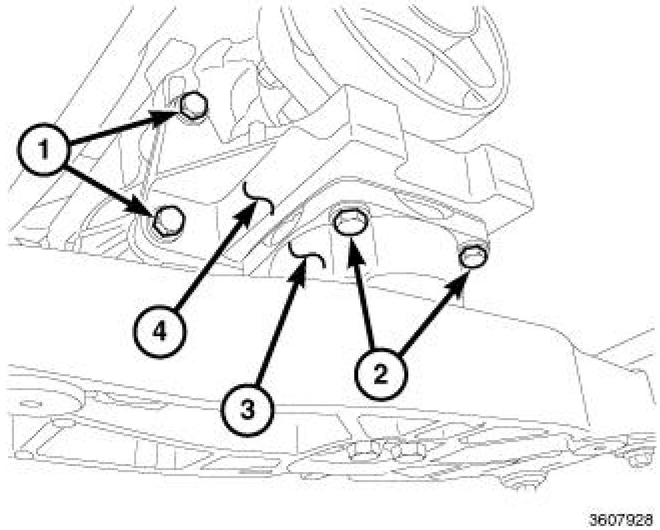


Fig. 130: Transmission Mount Bolts & Transmission Mount
Courtesy of CHRYSLER GROUP, LLC

2. Position the adapter bracket (4) in place, install the adapter bracket bolts (1) and tighten to the proper **SPECIFICATIONS**.
3. Position the transmission mount (3) in place, install the transmission mount bolts (2) and tighten to the proper **SPECIFICATIONS**.

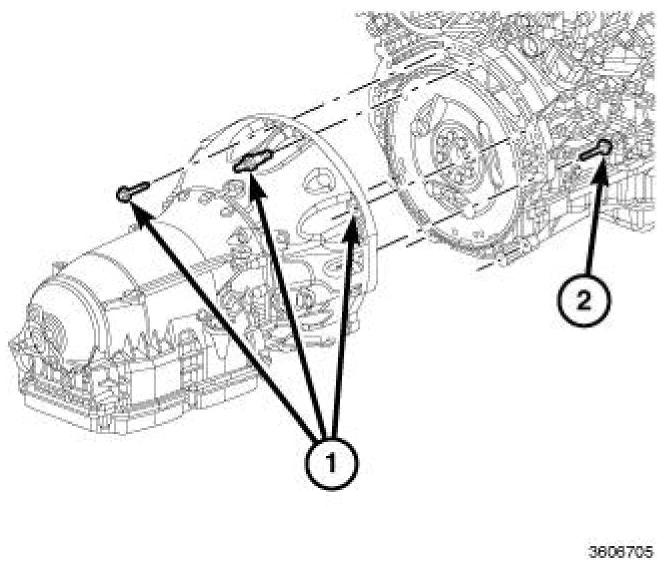


Fig. 131: Remaining Bell Housing Bolts (RWD Shown: AWD Similar)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Hold torque converter in place during transmission installation.**

4. Position the transmission to the vehicle.
5. Install the upper transmission to engine bolts (1, 2). Do not tighten at this time.

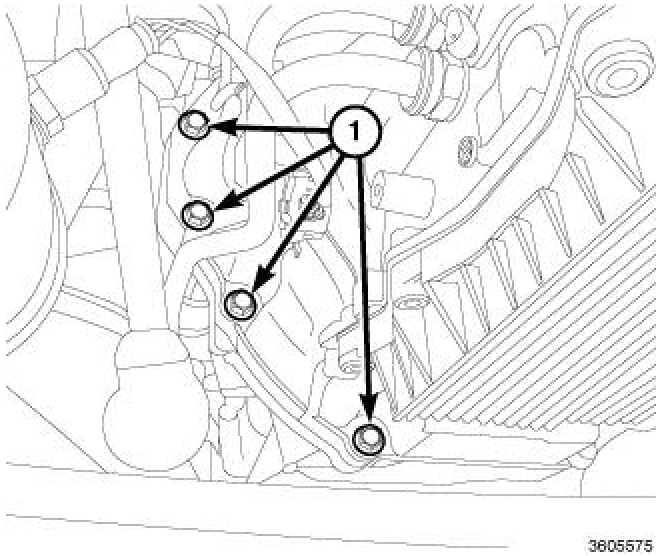


Fig. 132: Bell Housing Bolts (LH)
Courtesy of CHRYSLER GROUP, LLC

6. Install the Left Hand (LH) transmission to engine bolts (1). Do not tighten at this time.

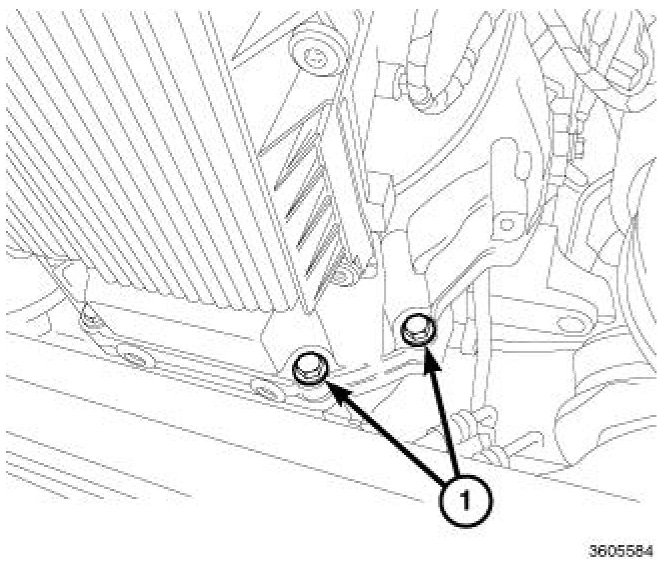


Fig. 133: Bell Housing Bolts (RH)
Courtesy of CHRYSLER GROUP, LLC

7. Install the Right Hand (RH) transmission to engine bolts (1). Tighten all the transmission to engine bolts to the proper **SPECIFICATIONS**.

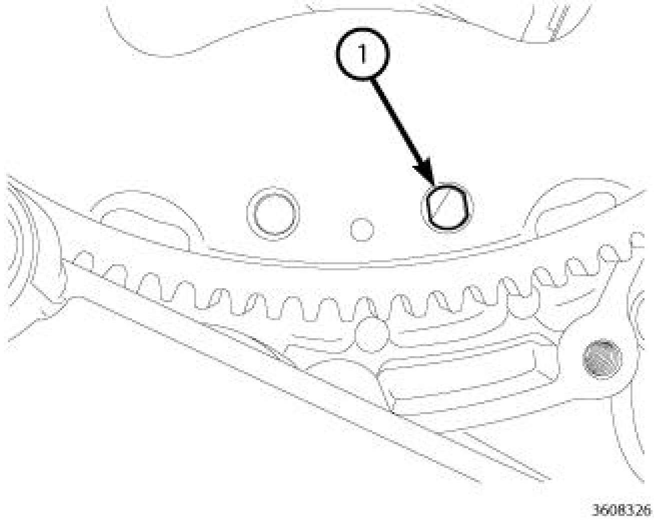


Fig. 134: Alignment Hole
Courtesy of CHRYSLER GROUP, LLC

8. Rotate crankshaft in clockwise direction to line up the alignment hole (1) in the flex plate, then start the first bolt.

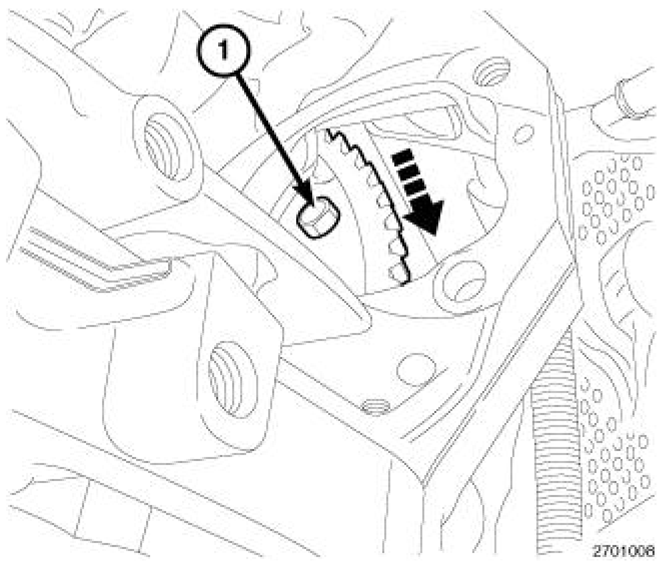
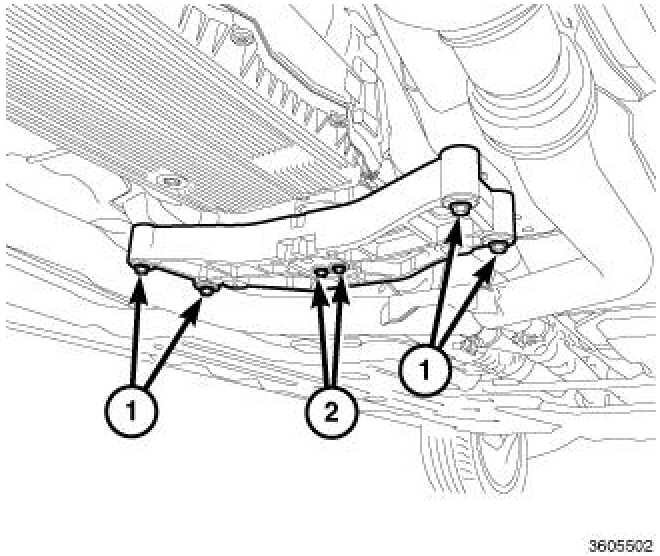


Fig. 135: Torque Converter Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Rotate the crankshaft clockwise until the torque converter bolts (1) are accessible. There are three sets of two bolts 120Â° apart. Install the remaining torque converter bolts and tighten to the proper **SPECIFICATIONS**.



[Fig. 136: Crossmember & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

10. Position the crossmember in place and install the crossmember bolts (1) and tighten to the proper **SPECIFICATIONS**.
11. Install the transmission mount bolts (2) and tighten to the proper **SPECIFICATIONS**.

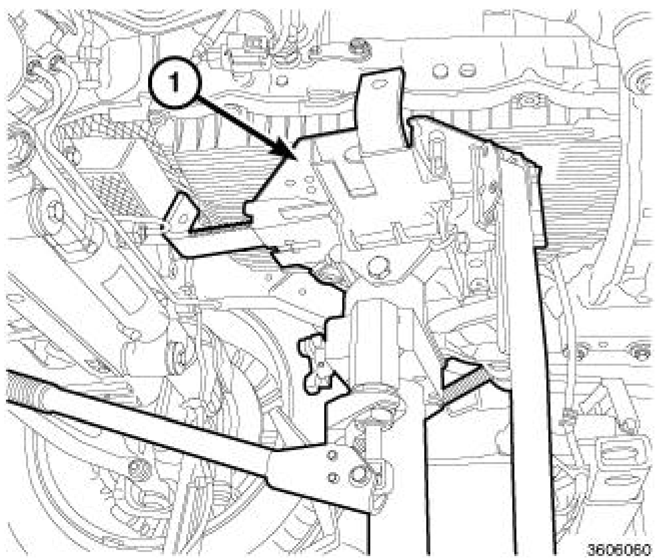


Fig. 137: Service Jack
Courtesy of CHRYSLER GROUP, LLC

12. Remove the transmission jack (1).

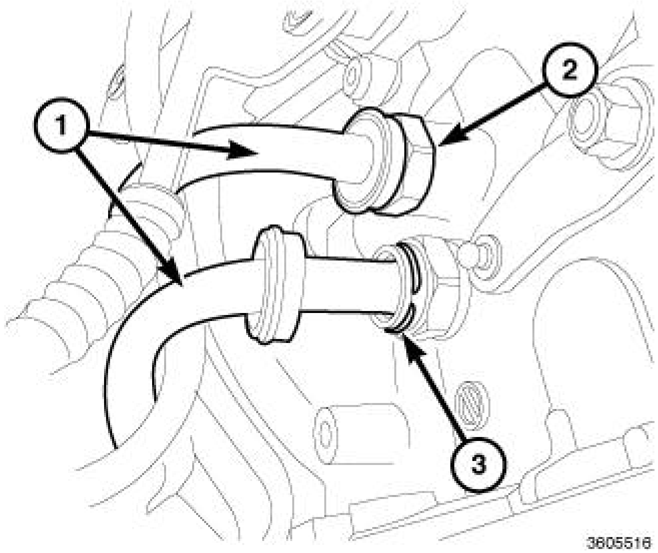


Fig. 138: Transmission Fluid Cooler Lines, Clips & Fittings
Courtesy of CHRYSLER GROUP, LLC

13. Connect transmission fluid cooler lines (1) to the transmission fittings (2) and install the clips (3).

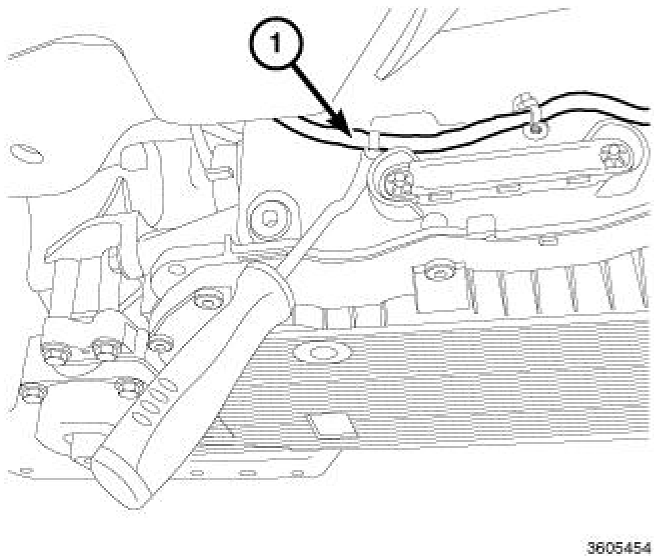


Fig. 139: Wiring Harness
Courtesy of CHRYSLER GROUP, LLC

14. Connect the wiring harness (1) push pins to the transmission.

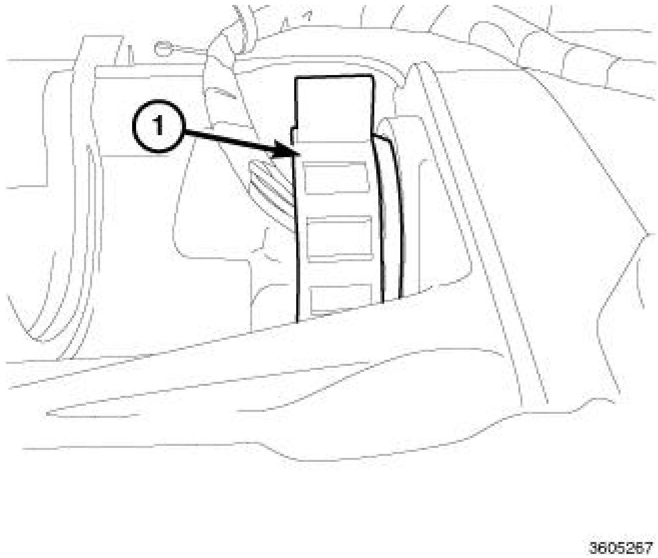


Fig. 140: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

15. Connect the transmission wire harness connector (1) to the transmission.

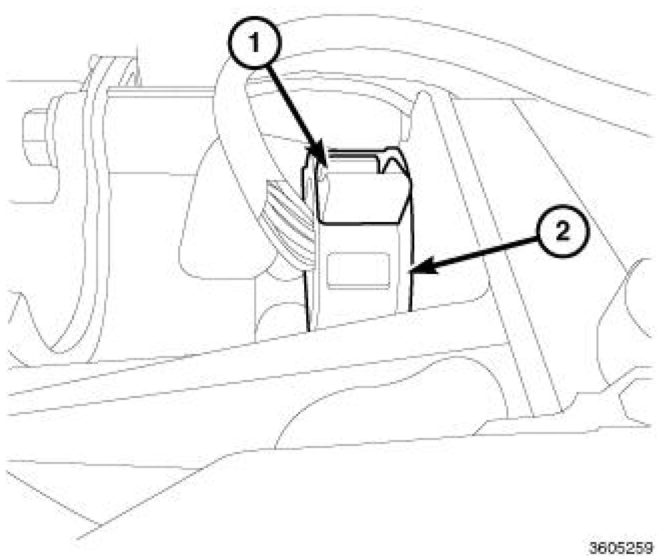


Fig. 141: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

16. Turn the locking mechanism lock (1) of the transmission wire harness connector (2) clockwise to secure.

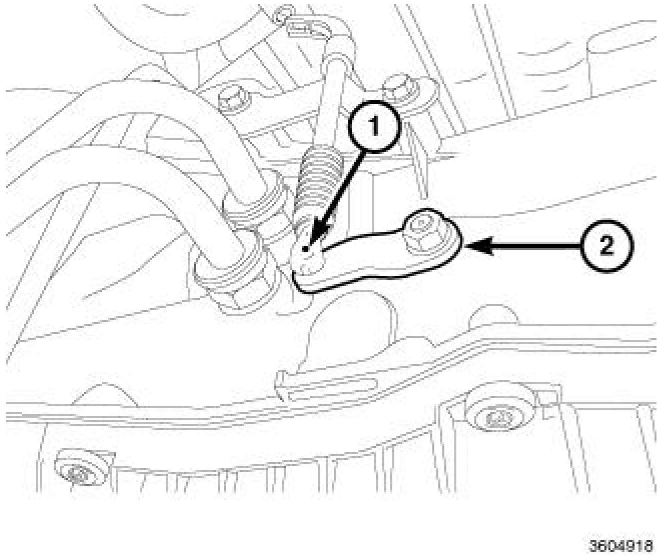


Fig. 142: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

17. Connect the parking pawl release cable (1) to the lever (2).

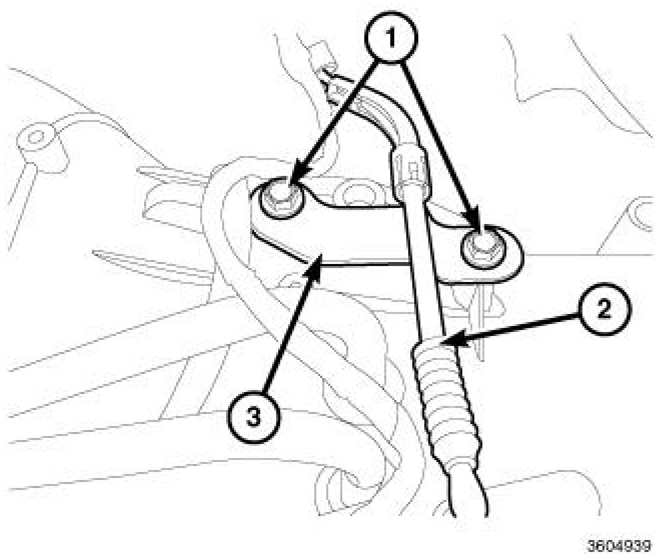


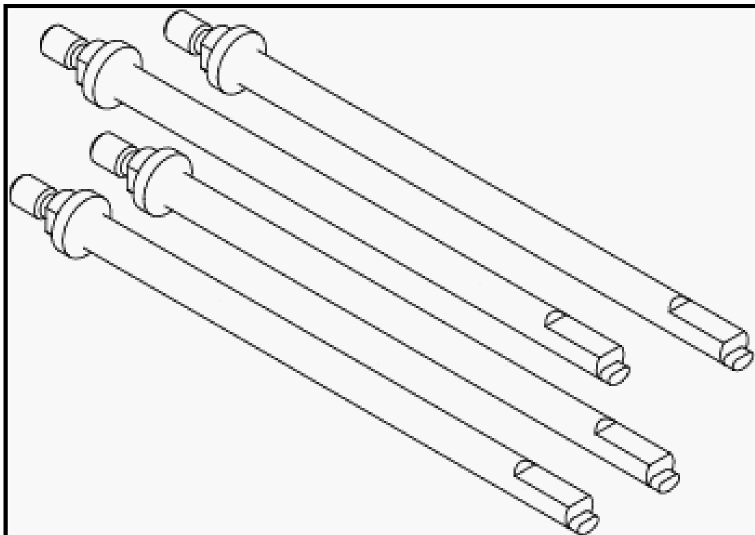
Fig. 143: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

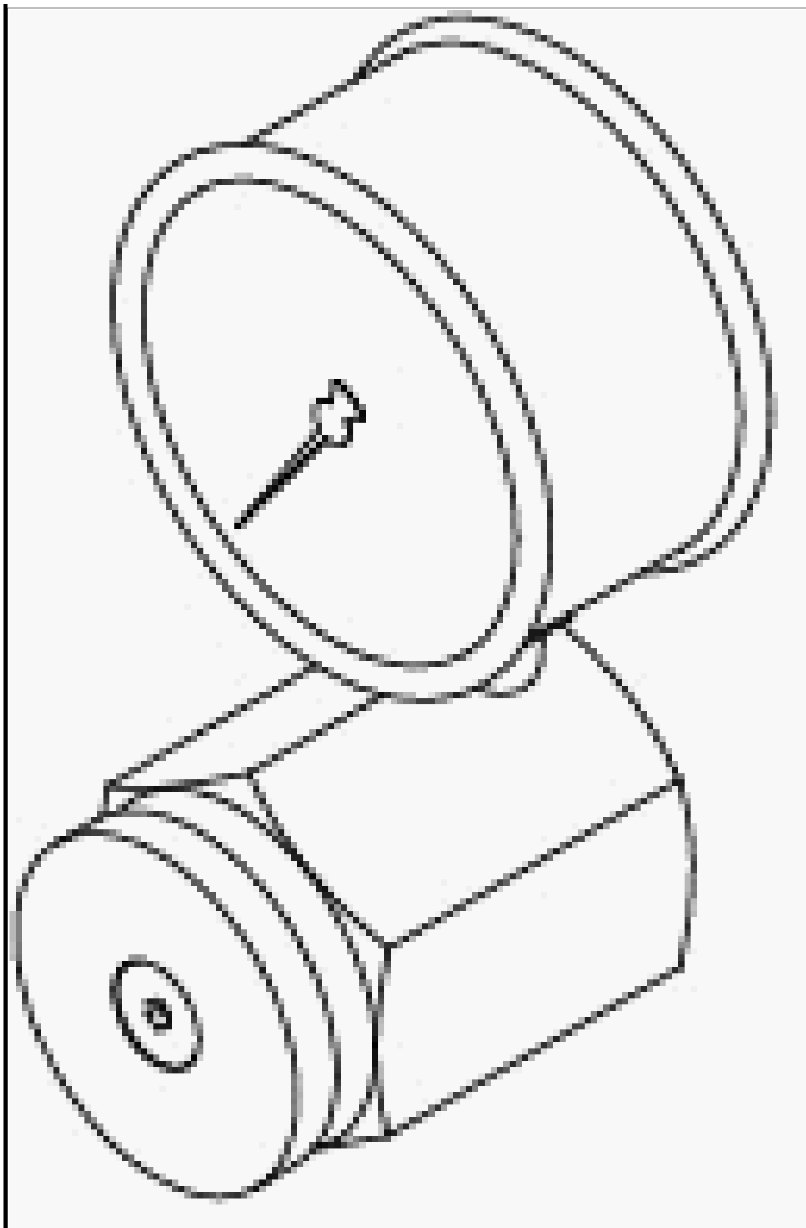
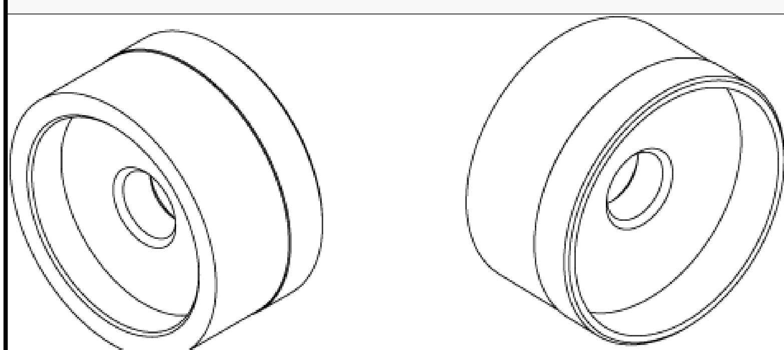
18. Position the manual park release cable bracket/cable (2, 3), install the bolts (1) and tighten to the proper **SPECIFICATIONS**.
19. Install the starter. Refer to **STARTER, INSTALLATION** .
20. Install the drive shaft. Refer to **INSTALLATION** .
21. Install the exhaust. Refer to **RESONATOR, EXHAUST, INSTALLATION** .
22. Connect the right and left bank up stream oxygen sensors.
23. Connect the negative battery cable.
24. Perform the STANDARD PROCEDURE - TRANSMISSION FILL AFTER SERVICE. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

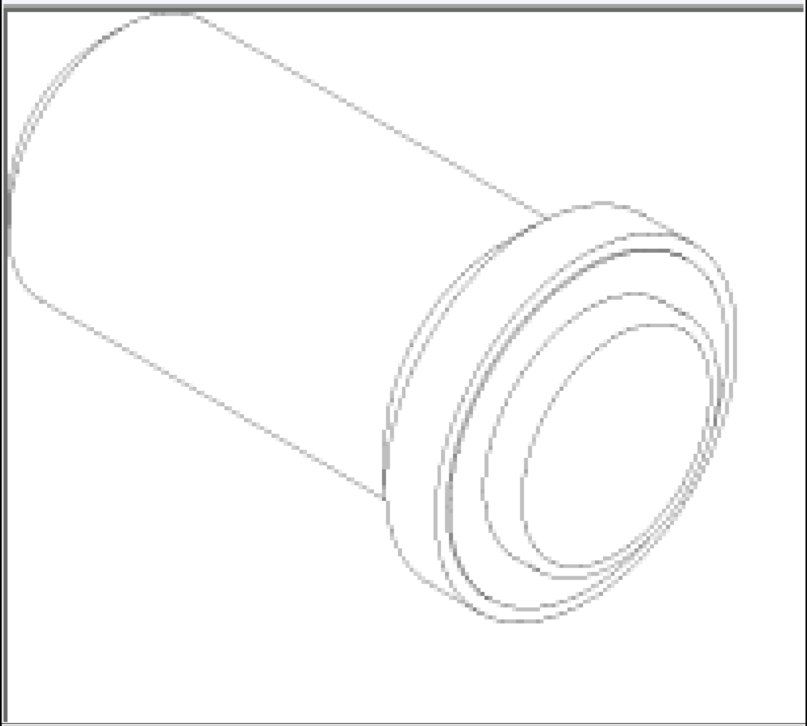
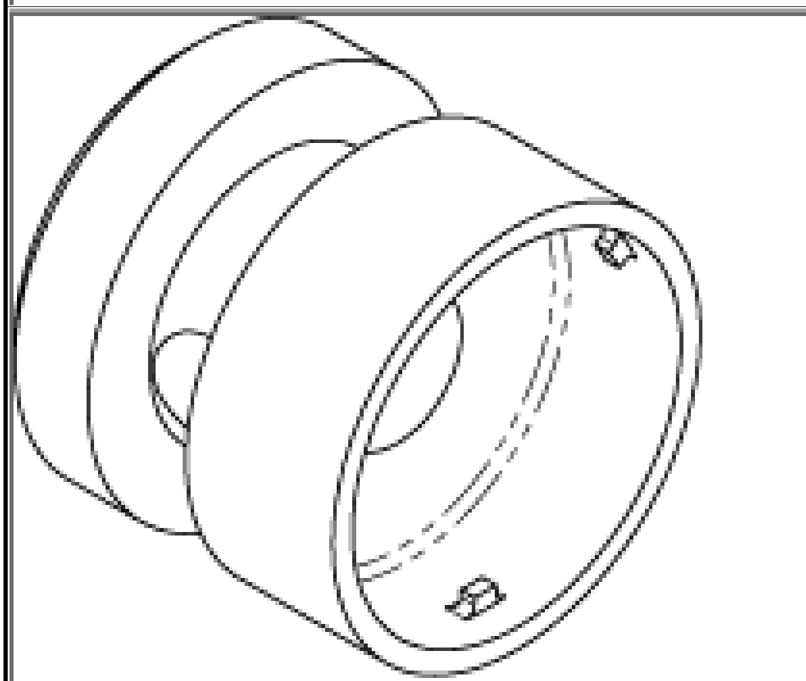
25. If the valve body is replaced, program the Transmission Control Module (TCM). Refer to **MODULE, TRANSMISSION CONTROL, MODULE PROGRAMMING** .
26. Perform the TRANSMISSION VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

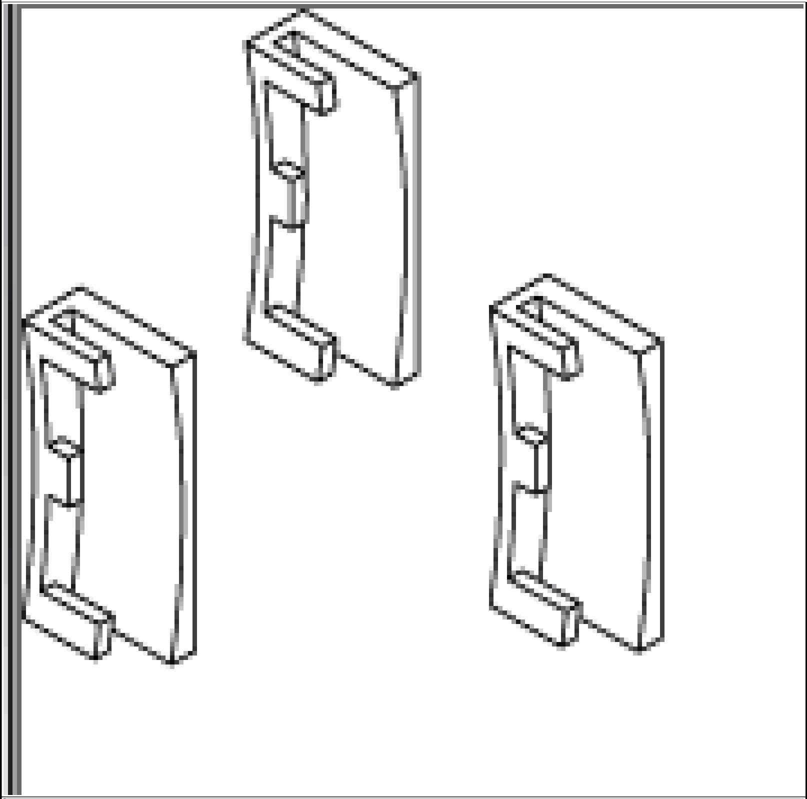
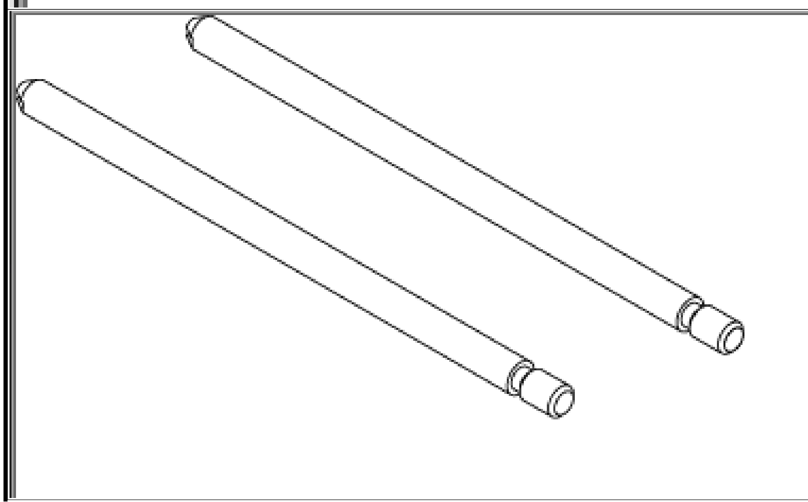
SPECIAL TOOLS

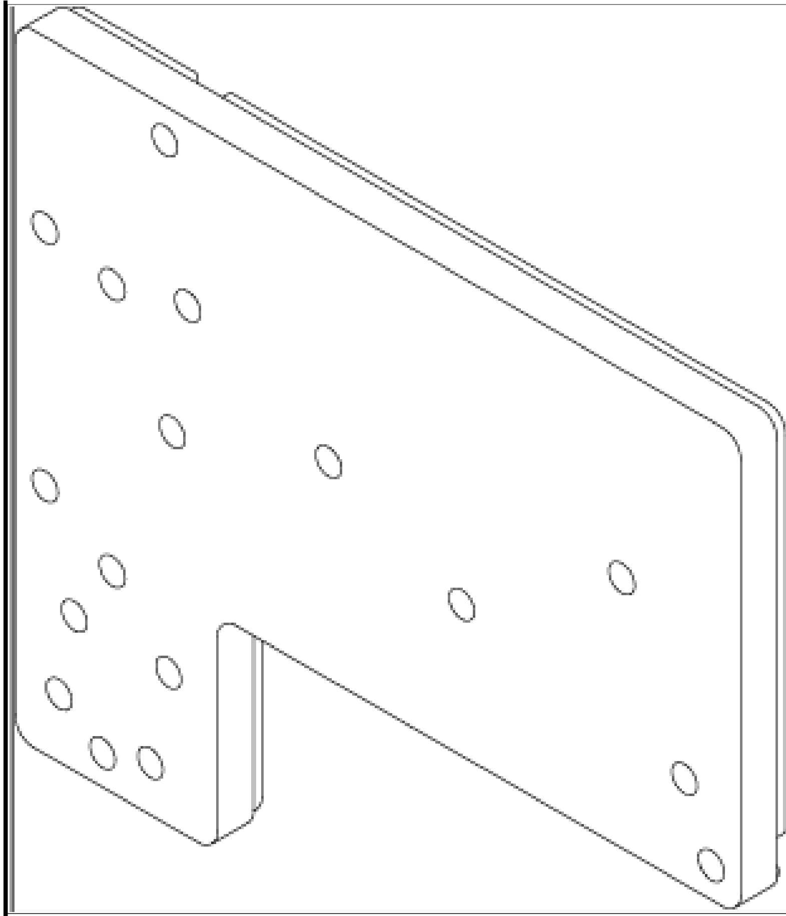
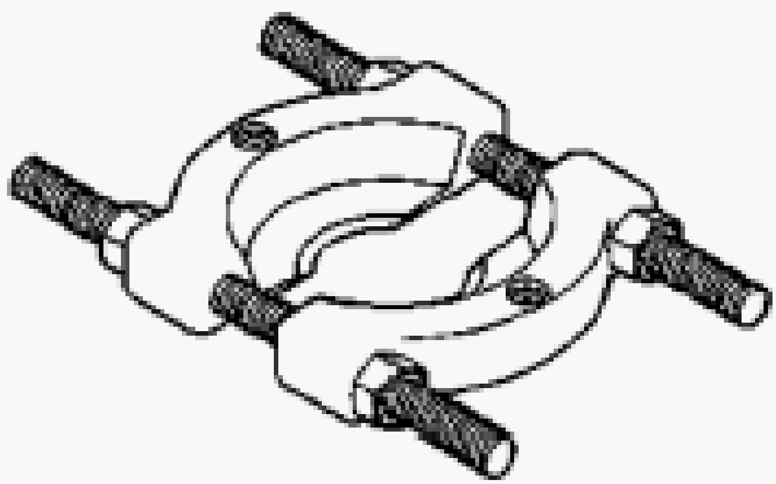
SPECIAL TOOLS

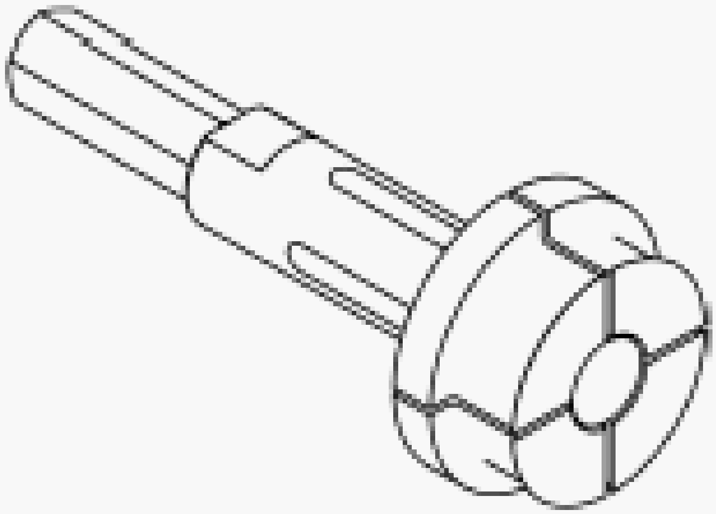
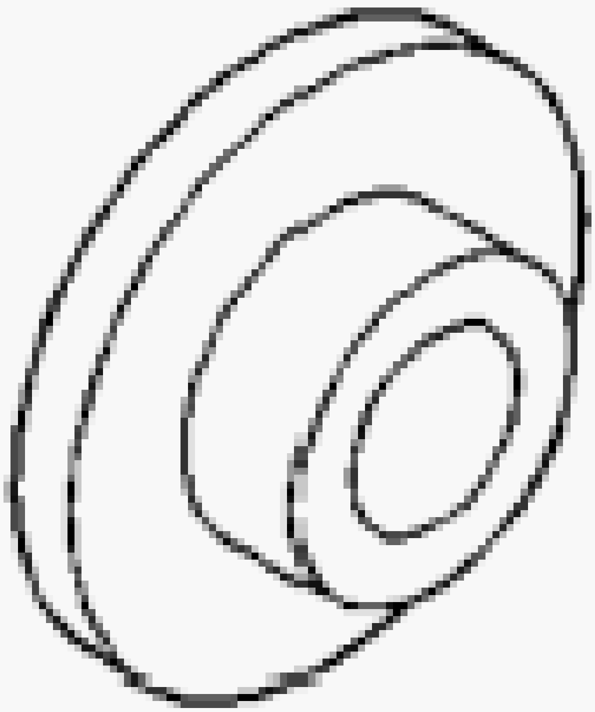
	10428 - Adapter, Pressing Tool (Originally Shipped In Kit Number(s).)

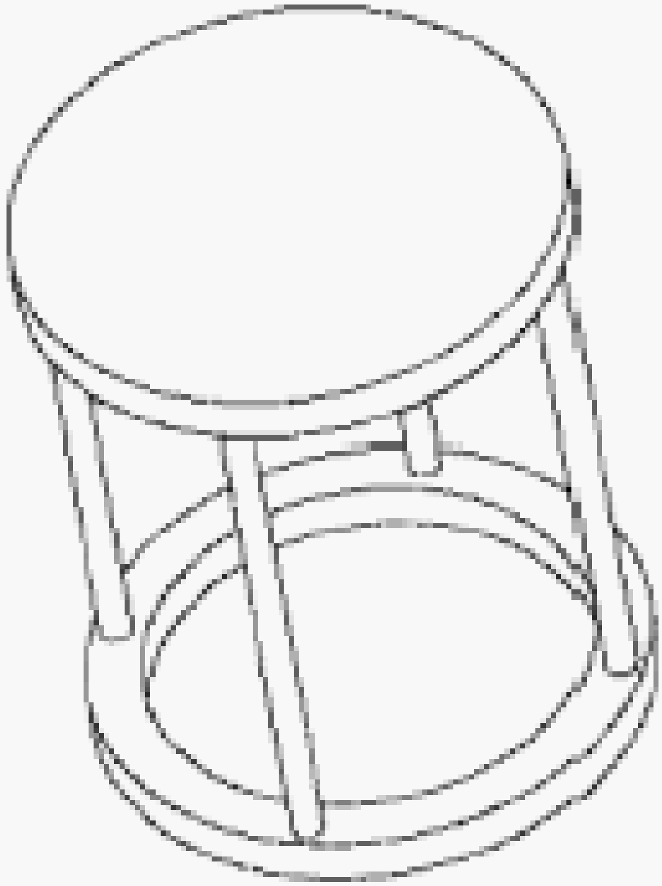
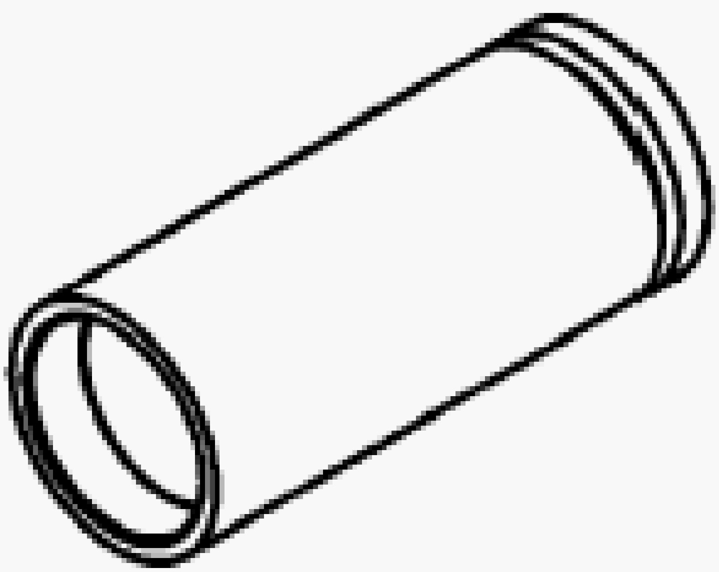
	10429 - Gauge, Force (Originally Shipped In Kit Number(s) 10419.)
	10373A - Installer, Output Needle Bearing/Rear Oil Dam (Originally Shipped In Kit Number(s) 10394A.)

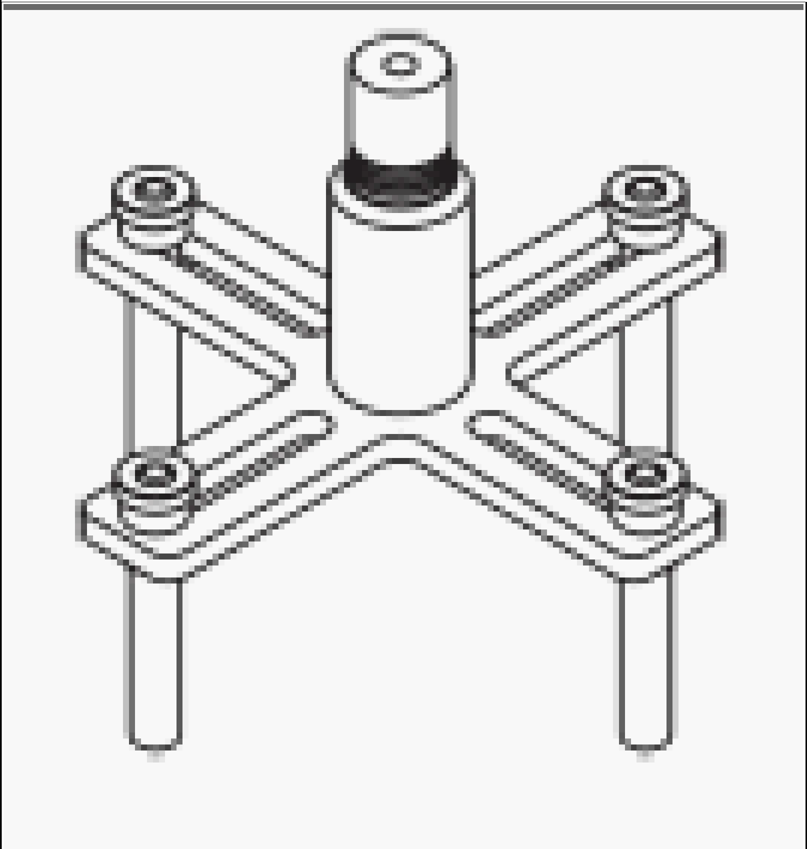
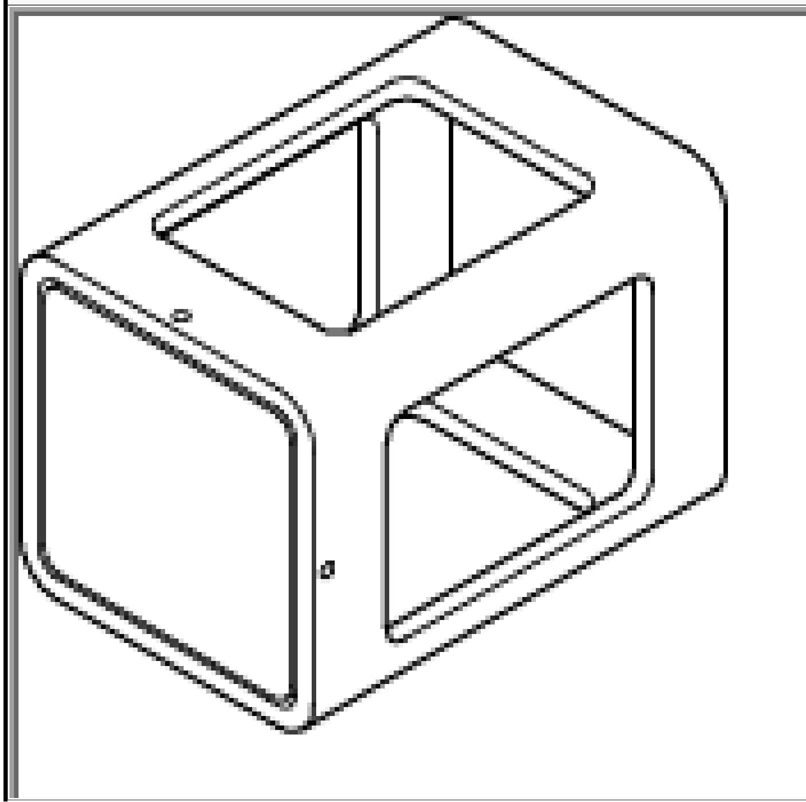
	10375 - Installer, Oil Pump Cover Oil Seal
	10377 - Remover/Installer, Guide Sleeve

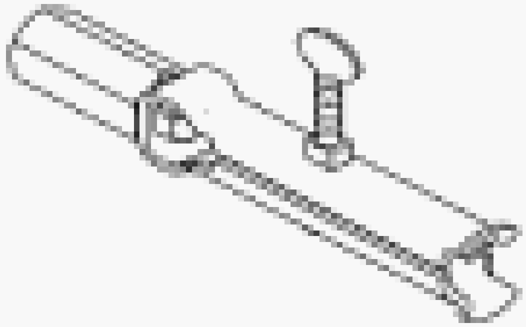
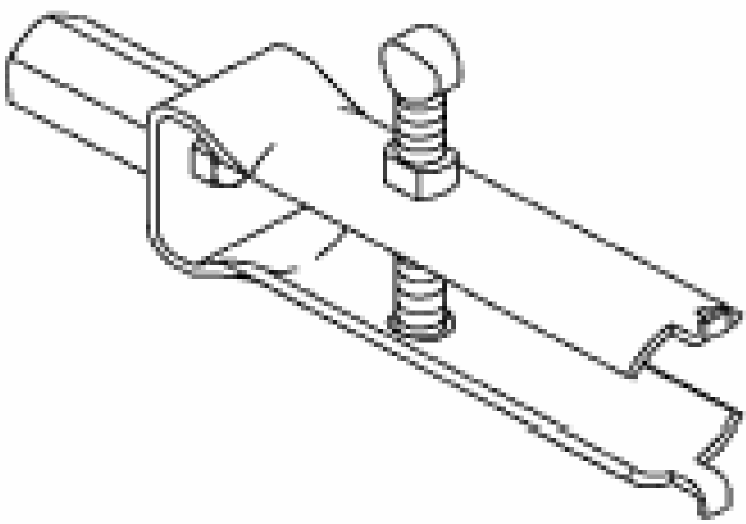
	10378 - Rings, Support
	10379 - Pins, Valve Body Alignment

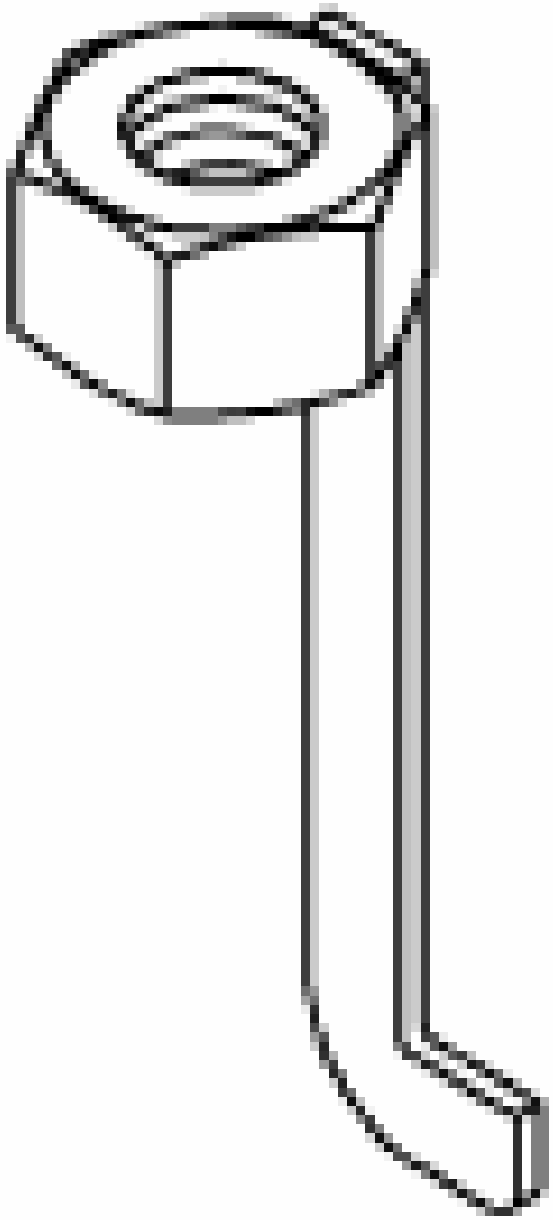
	10383 - Plate, Clutch Pressure Test
	1130 - Splitter, Bearing/Gear (Originally Shipped In Kit Number(s) 6745, 6947, 6949, 9202, 9202A-CAN, 9202CC, 9299.)

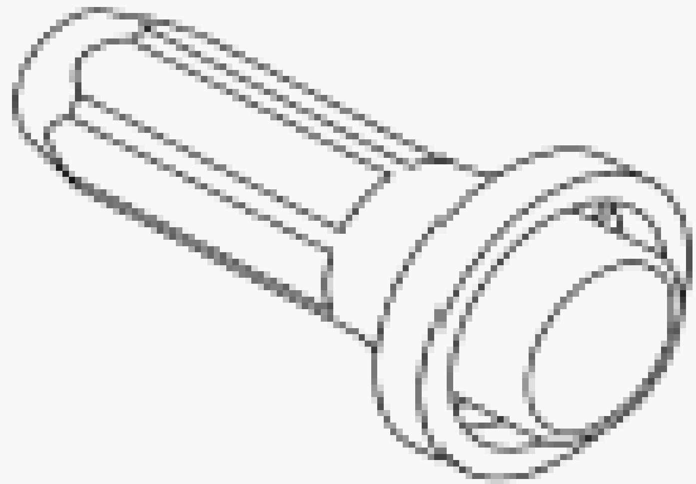
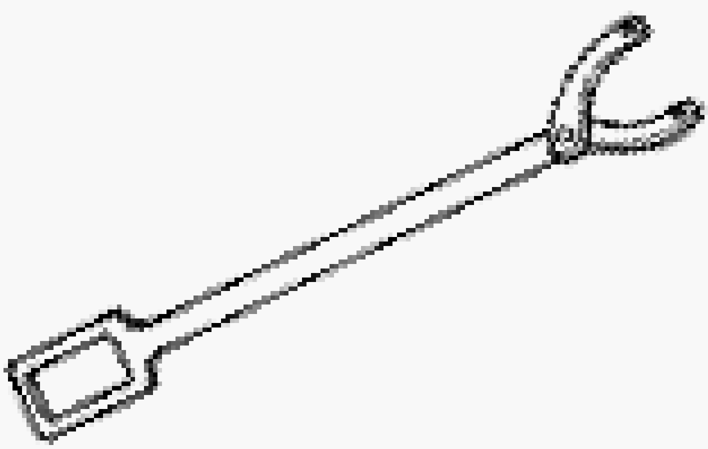
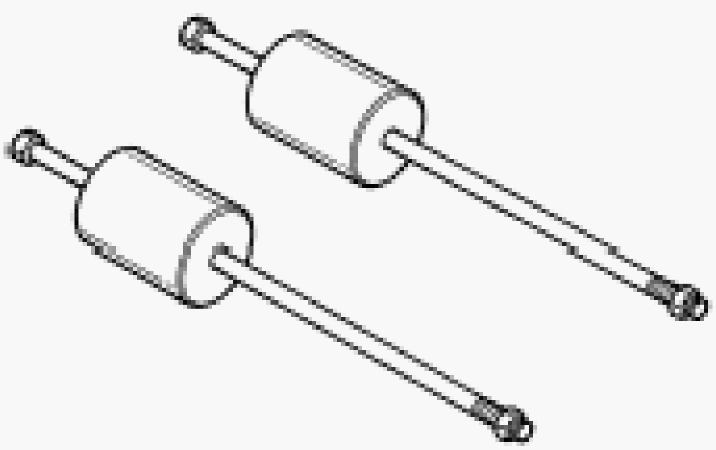
	6787A - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 6784, 6809.)
	6936 - Spacer (Originally Shipped In Kit Number(s) 6945, 6946, 6947, 6948.)

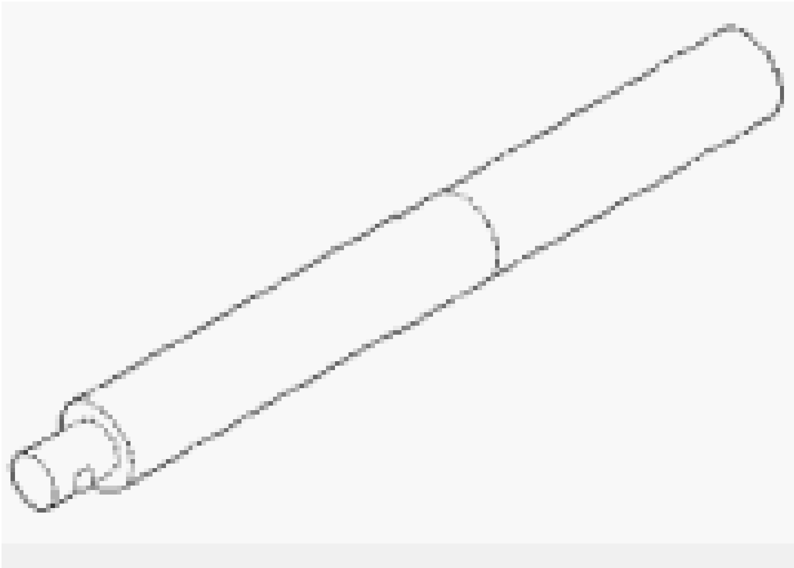
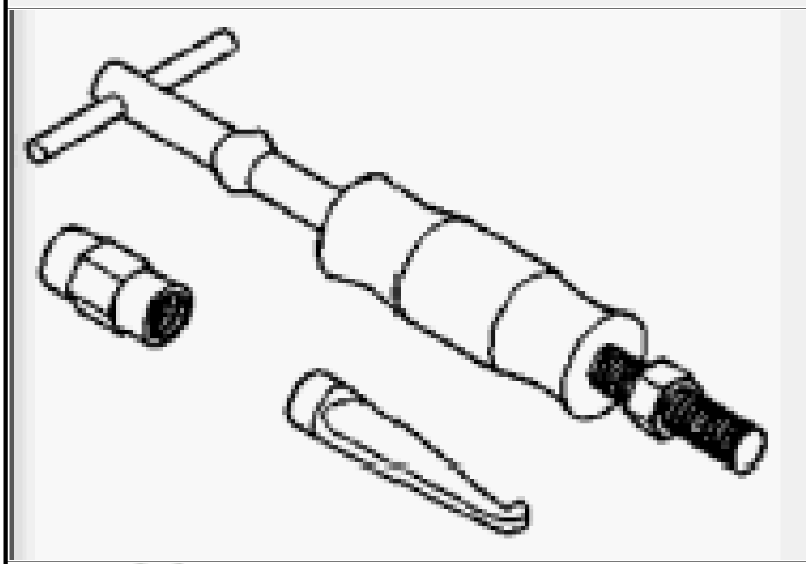
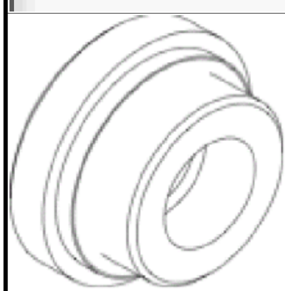
	8285 - Compressor, Spring (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.)
	8481 - Installer, Gear (Originally Shipped In Kit Number(s) 8708, 8708CC.)

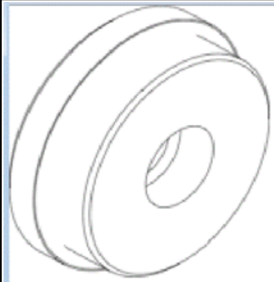
	8901A - Pressing Tool (Originally Shipped In Kit Number(s) 8901A.)
	8925-3 - Assembly, Press Fixture (Originally Shipped In Kit Number(s) 8998, 8998CC.)

	9585 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 9691.)
	9664 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 9675, 9685, 9695.)

	9667 - Remover, Seal (Originally Shipped In Kit Number(s) 9691.)

	9677 - Installer, Seal (Originally Shipped In Kit Number(s) 9675, 9685, 9695.)
	C-3281 - Holder, Flange (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)
	C-3752 - Slide Hammers (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202-CAN, 9202CC.)

	C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)
	C-637 - Slide Hammer, Universal (Originally Shipped In Kit Number(s) 9202.)
	10382 - Installer, Oil Pump Housing Needle Bearing (Originally Shipped In Kit Number(s) 10394A, 10394-UPD.)

	10376 - Installer, Input Shaft Needle Bearing (Originally Shipped In Kit Number(s) 10394A, 10394-UPD.)

CABLE, MANUAL PARK RELEASE

OPERATION

OPERATION

The 8HP utilizes a fully electronic shifter mechanism with no physical connections to the transmission such as shifter linkage or cables. Due to this design the park function of the transmission is performed using electronic inputs and hydraulic pressure to hold to parking pawl lever in the disengaged position while moving. Once in park this hydraulic pressure is reduced which allows the lever to engage the parking pawl which in turn keeps the vehicle from rolling forward or rearward.

Should the vehicle or any component of the E-Shifter lose power or communication the parking pawl will be engaged and the vehicle cannot be moved. To move the vehicle there is a manual park release mechanism that will allow first responders to disengage the parking pawl and allow the vehicle to be moved further facilitating vehicle recovery such as towing or moving the vehicle to allow jump starting.

REMOVAL

MPR CABLE

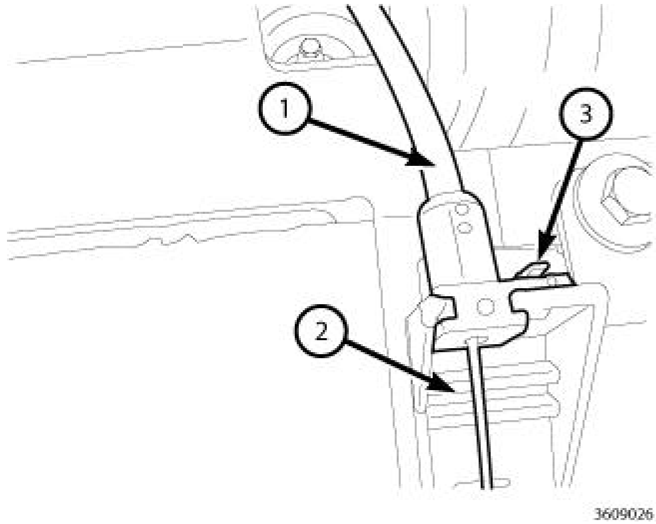


Fig. 144: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Apply the parking brake.
3. Remove the Manual Park Release (MPR) lever cover.
4. Disconnect the MPR cable (1) from the housing (2), while holding the release tab (3) open.
5. Disconnect the MPR cable from the lever.
6. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

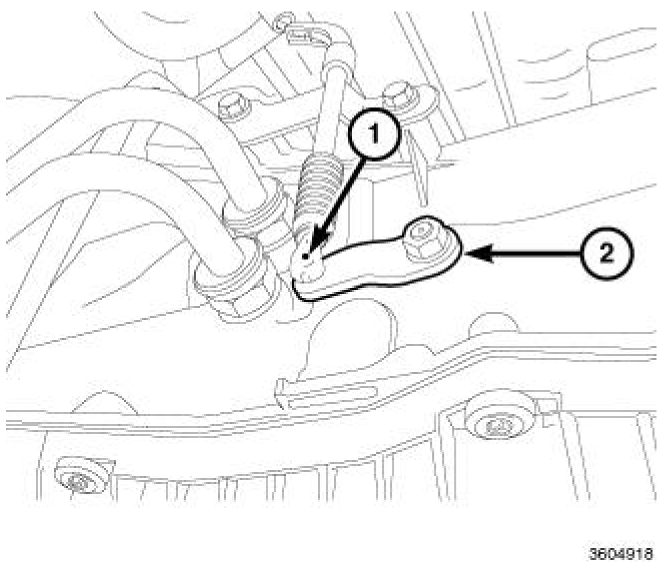


Fig. 145: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the MPR cable (1) from the MPR lever (2).

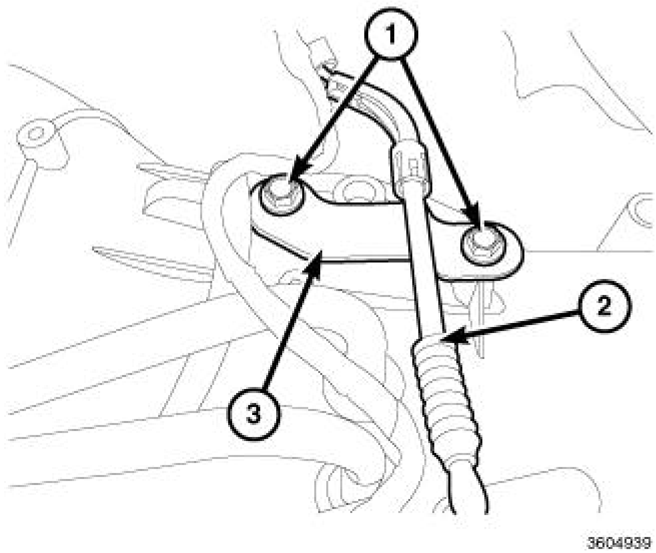


Fig. 146: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

8. Remove the MPR cable bracket bolts (1) and remove the MPR cable (2) from the vehicle.

INSTALLATION

MPR CABLE

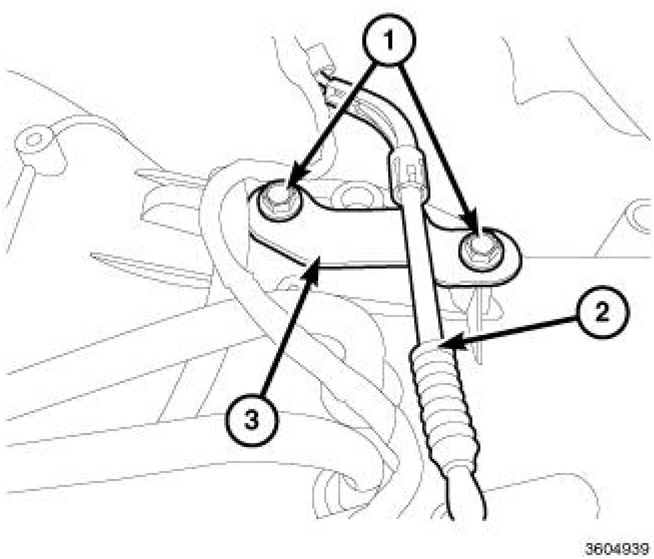


Fig. 147: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

1. Install the Manual Park Release (MPR) cable (2) in the vehicle. Install the MPR cable bracket bolts (1) and tighten to the proper SPECIFICATIONS.

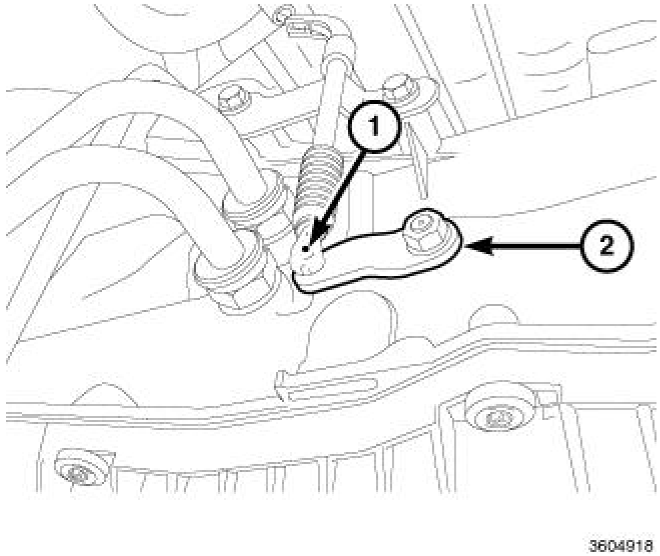


Fig. 148: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

2. Connect the MPR cable (1) to the MPR lever (2).
3. Lower the vehicle.

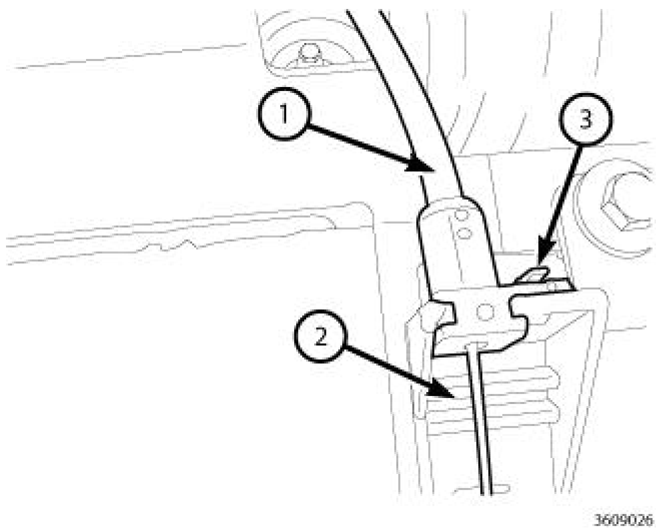


Fig. 149: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

4. Connect the MPR cable (2) to the MPR lever.
5. Connect the MPR cable (1) to the housing.
6. Install the MPR cover.
7. Connect the negative battery cable.

CLUTCH, A

DISASSEMBLY

DISASSEMBLY

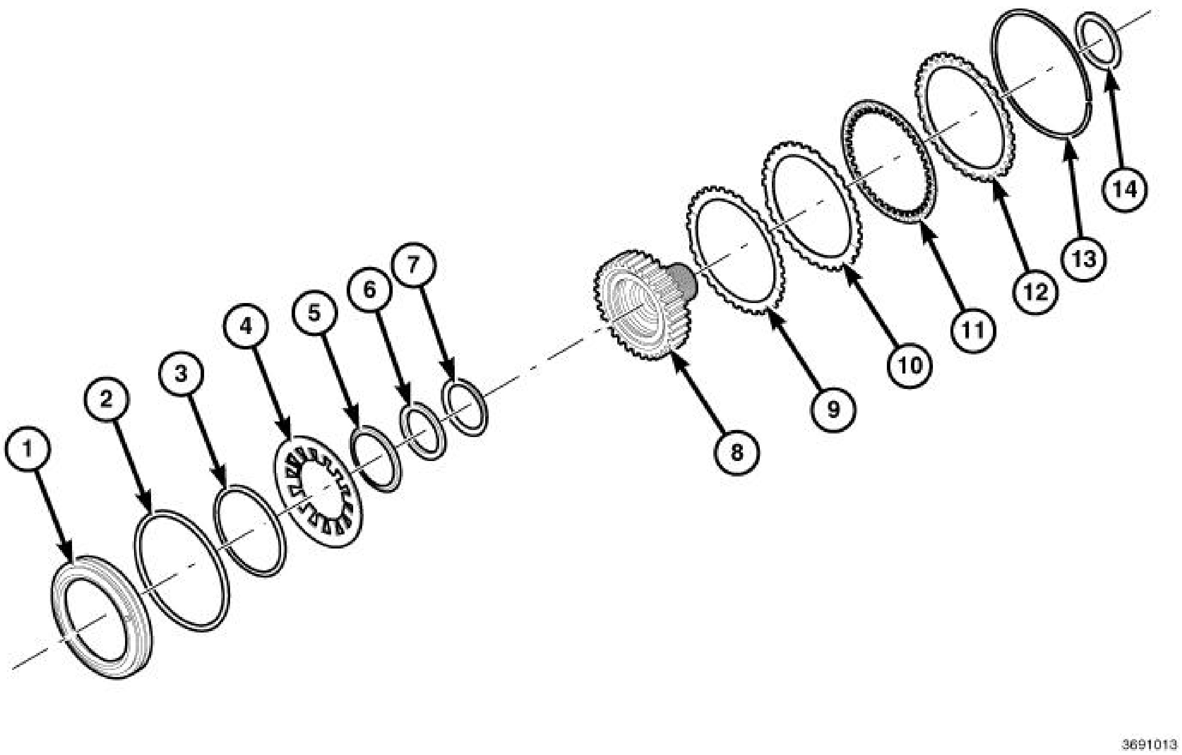
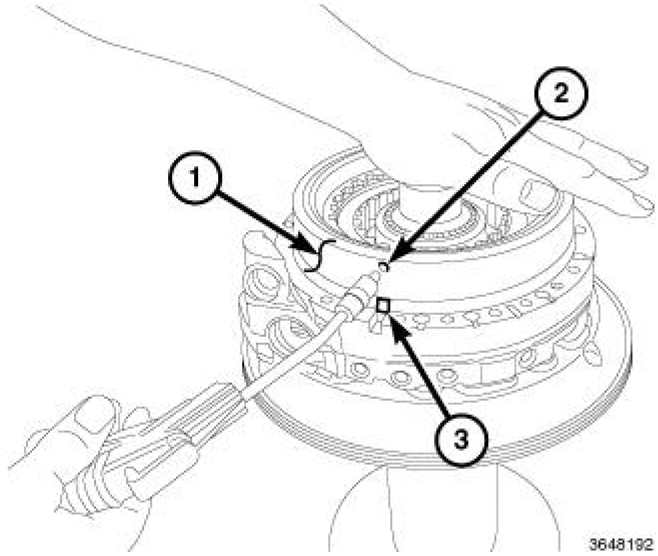


Fig. 150: Exploded View Of A Clutch
Courtesy of CHRYSLER GROUP, LLC

1 - A CLUTCH PISTON
2 - LIP SEAL
3 - LIP SEAL
4 - RETURN SPRING
5 - RING
6 - BEARING
7 - WASHER
8 - SUN GEAR
9 - WAVE SPRING
10 - SEPARATOR PLATE
11 - FRICTION PLATES
12 - END PLATE
13 - SNAP RING
14 - SELECTABLE SHIM

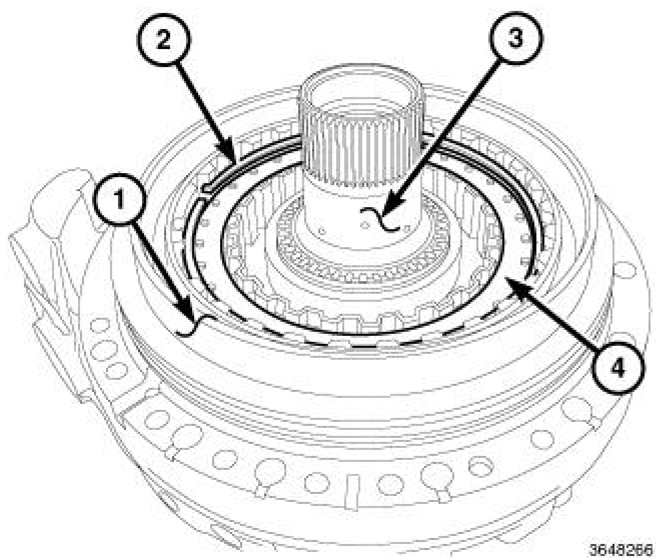
1. Remove the oil pump from the transmission case. Refer to **PUMP, TRANSMISSION OIL, REMOVAL**.



[Fig. 151: B-Piston, Hole & B-Piston Alignment Tab](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply air pressure slowly, oil may spray when B-piston releases from the assembly.**

2. With one hand above B-piston (1), carefully apply air pressure into the hole directly above the B-piston alignment tab (3) to remove B-piston (2) from the assembly.



[Fig. 152: Outer Ring, Snap Ring, Hub & Spacers](#)
Courtesy of CHRYSLER GROUP, LLC

3. Remove the outer ring (1) (inside B-piston).
4. Remove the snap ring (2).
5. Remove the clutches and spacers (4).
6. Remove the hub (3).

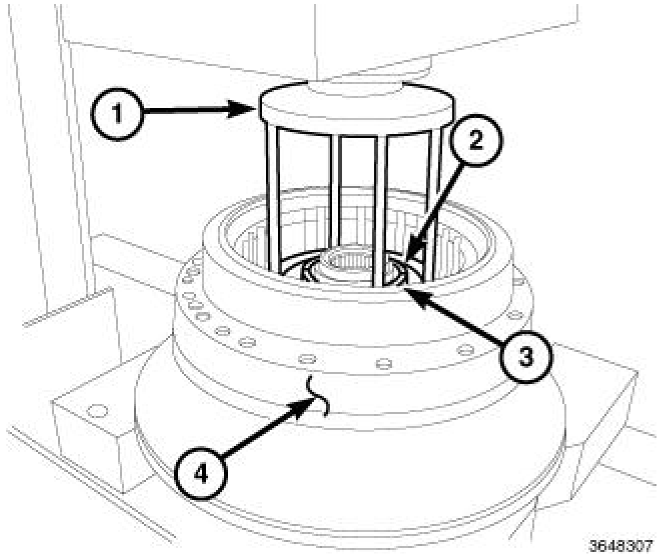


Fig. 153: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

7. Position the oil pump housing assembly (4) in a suitable press.
8. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer to remove tension on the split retaining ring (2), and remove the two halves of the retaining ring (2).

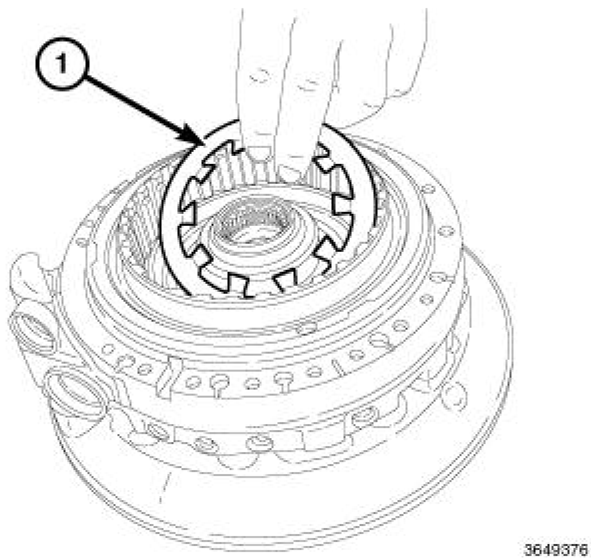


Fig. 154: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

9. Remove the piston retainer and plate.

ASSEMBLY

ASSEMBLY

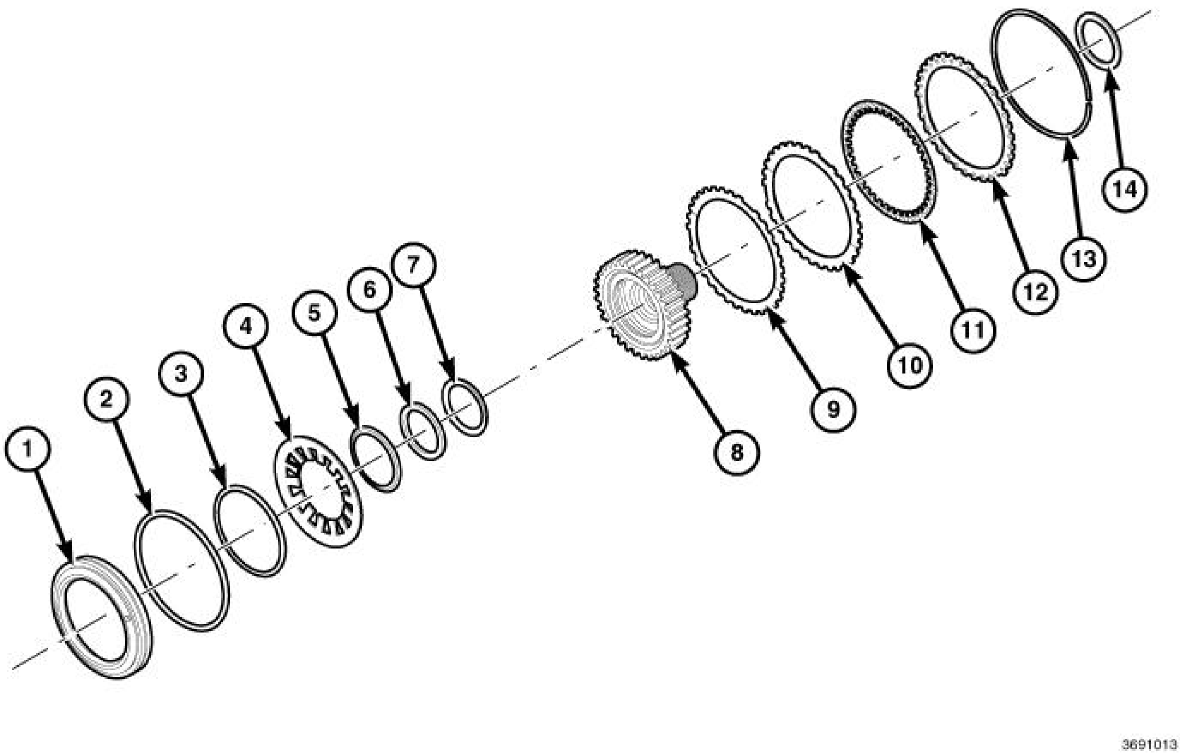


Fig. 155: Exploded View Of A Clutch
Courtesy of CHRYSLER GROUP, LLC

1 - A CLUTCH PISTON
2 - LIP SEAL
3 - LIP SEAL
4 - RETURN SPRING
5 - RING
6 - BEARING
7 - WASHER
8 - SUN GEAR
9 - WAVE SPRING
10 - SEPARATOR PLATE
11 - FRICTION PLATES
12 - END PLATE
13 - SNAP RING
14 - SELECTABLE SHIM

NOTE: **If clutch discs are being replaced, soak in 8HP trans fluid before assembly.**

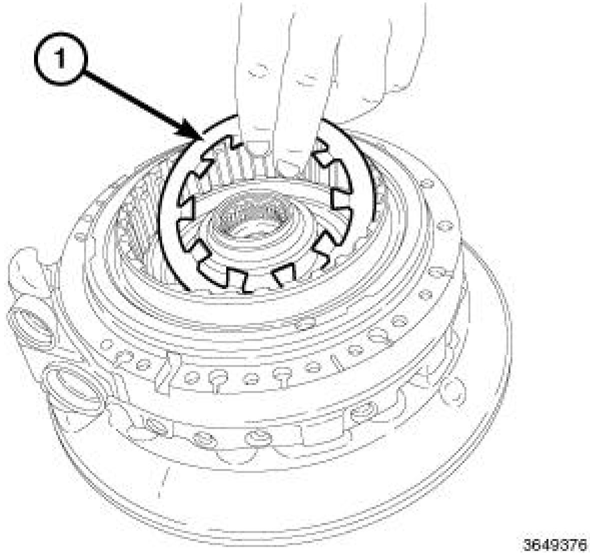


Fig. 156: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

1. Insert the piston and the retaining ring (1) into the housing.

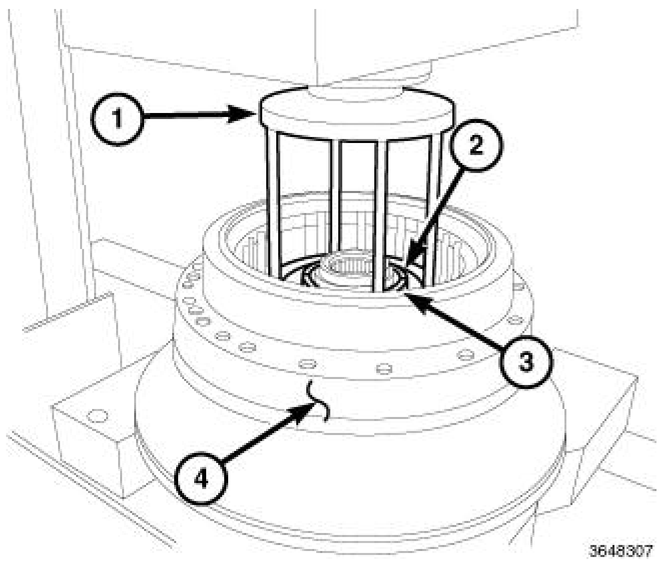
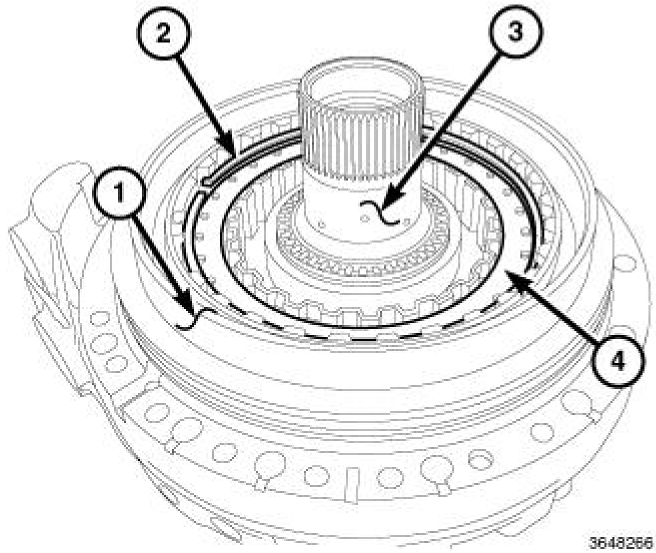


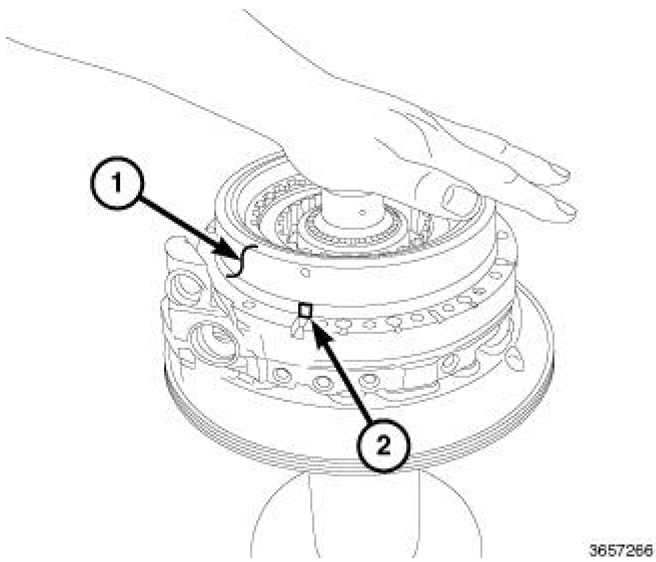
Fig. 157: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

2. Position the oil pump housing assembly (4) in a suitable arbor press.
3. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and install the two halves of the split retainer ring (2).



[Fig. 158: Outer Ring, Snap Ring, Hub & Spacers](#)
Courtesy of CHRYSLER GROUP, LLC

4. Install the hub (3).
5. Install the clutches and spacers (4).
6. Install the snap ring (2).
7. Install the outer ring (1) (below B-piston).



[Fig. 159: B-Piston Alignment Tab & B-Piston](#)
Courtesy of CHRYSLER GROUP, LLC

8. Position the B-piston alignment tab (2) above the notch and install B-piston (1) on the assembly.
9. Install the transmission oil pump. Refer to **PUMP, TRANSMISSION OIL, INSTALLATION**.

CLUTCH, B

DISASSEMBLY

CLUTCH B DISASSEMBLY

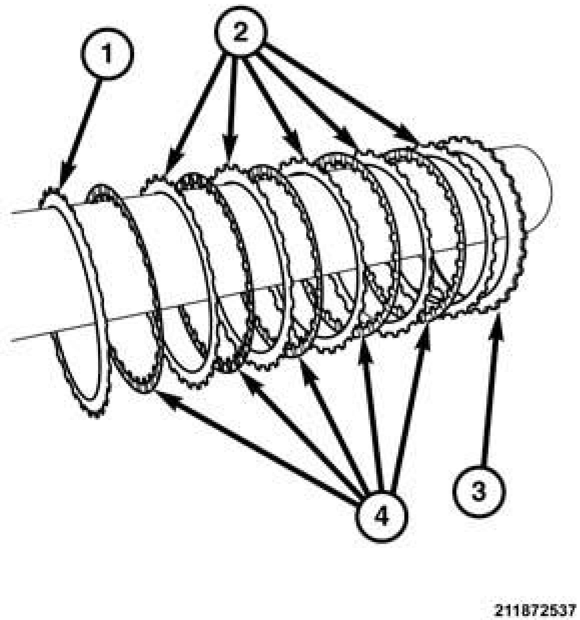


Fig. 160: Wave, Steel, Backing & Friction Plates
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate
2. Steel plate
3. Backing plate
4. Friction plate

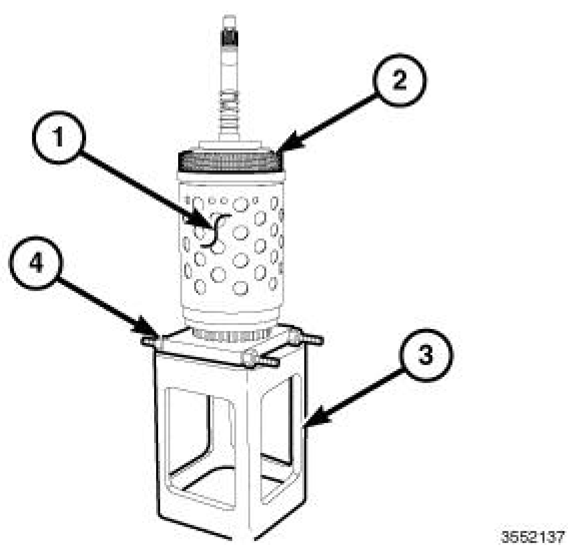
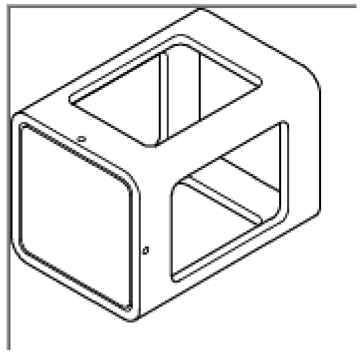
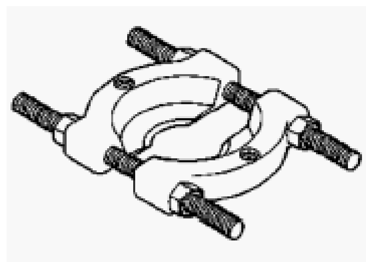


Fig. 161: P4 Annulus Drum Assembly, Press Fixture Assembly & Bearing/Gear Splitter
Courtesy of CHRYSLER GROUP, LLC

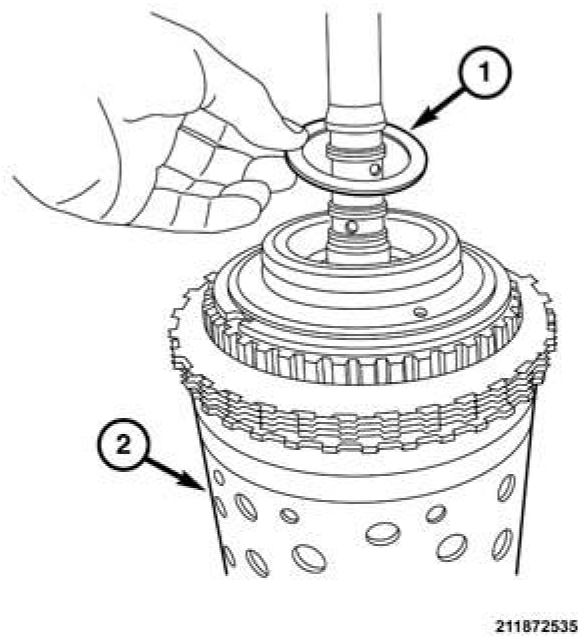
1. Position the input/output shaft and the P4 annulus drum assembly (1) on Assembly, Press Fixture 8925-3 (special tool #8925-3, Assembly, Press Fixture) and Splitter, Bearing/Gear 1130 (special tool #1130, Splitter, Bearing/Gear).



[Fig. 162: Press Fixture](#)
Courtesy of CHRYSLER GROUP, LLC



[Fig. 163: Splitter, Bearing/Gear](#)
Courtesy of CHRYSLER GROUP, LLC



[Fig. 164: Annulus Assembly & Shim](#)
Courtesy of CHRYSLER GROUP, LLC

2. Remove the selectable shim (1).

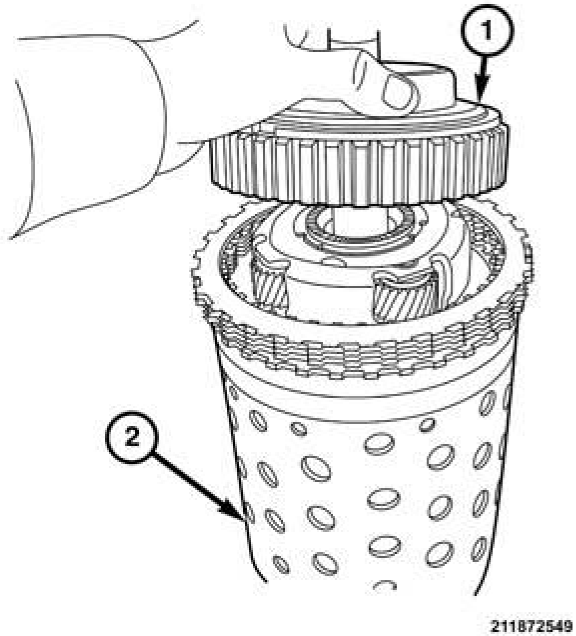


Fig. 165: Annulus Assembly & Gear
Courtesy of CHRYSLER GROUP, LLC

3. Remove the P1 (1) annulus from the assembly.

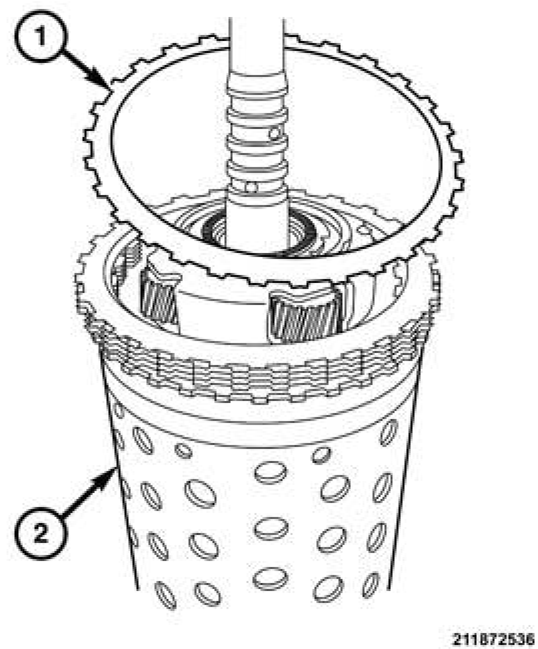
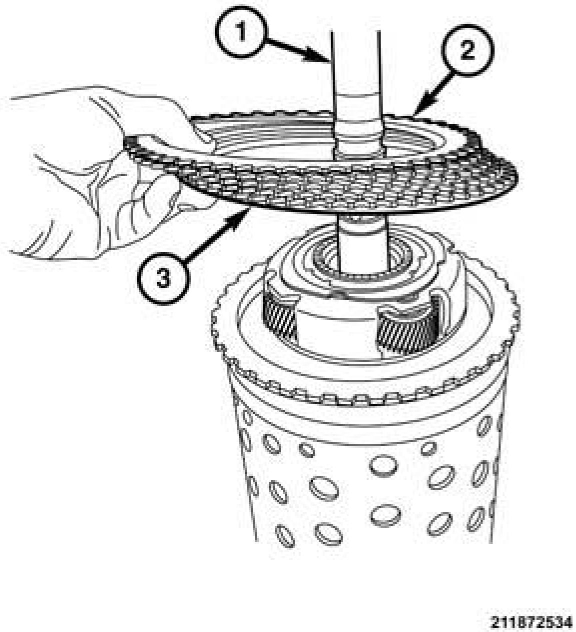


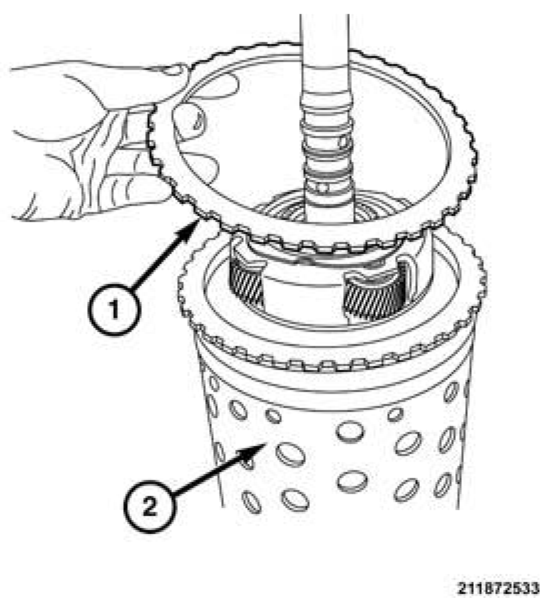
Fig. 166: Annulus Assembly & B-Clutch Wave Plate
Courtesy of CHRYSLER GROUP, LLC

4. Remove the B-clutch wave plate (1).



[Fig. 167: Friction & Steel Plates](#)
Courtesy of CHRYSLER GROUP, LLC

5. Remove the friction and steel plates (2).



[Fig. 168: Backing Plate & Annulus Assembly](#)
Courtesy of CHRYSLER GROUP, LLC

6. Remove the backing plate (1) from the assembly (2).

ASSEMBLY

CLUTCH B ASSEMBLY

1. Wave plate	
2. Steel plate	
3. Backing plate	
4. Friction plate	

NOTE: **If clutch discs are being replaced, soak in 8HP trans fluid before assembly.**

1. Position the input/output and the P4 annulus drum assembly on (special tool #8925-3, Assembly, Press Fixture) and (special tool #1130, Splitter, Bearing/Gear).

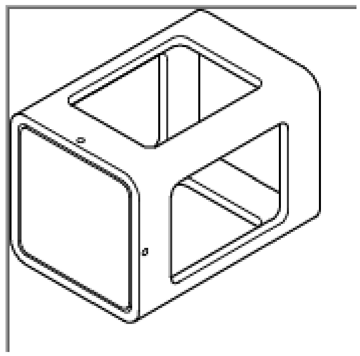


Fig. 169: Press Fixture
Courtesy of CHRYSLER GROUP, LLC

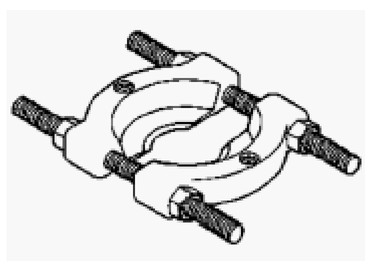
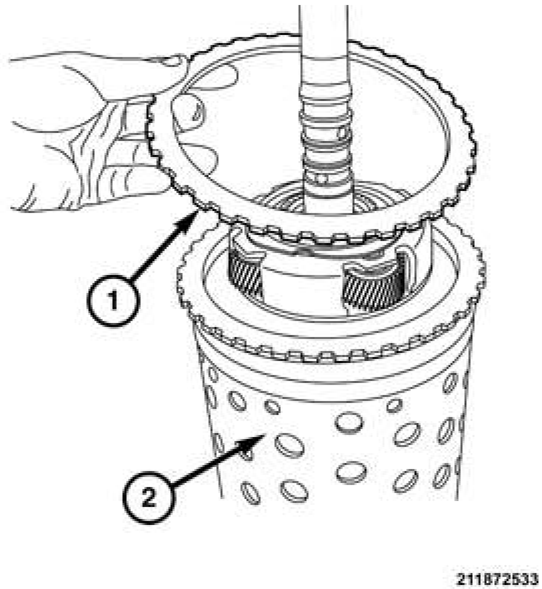
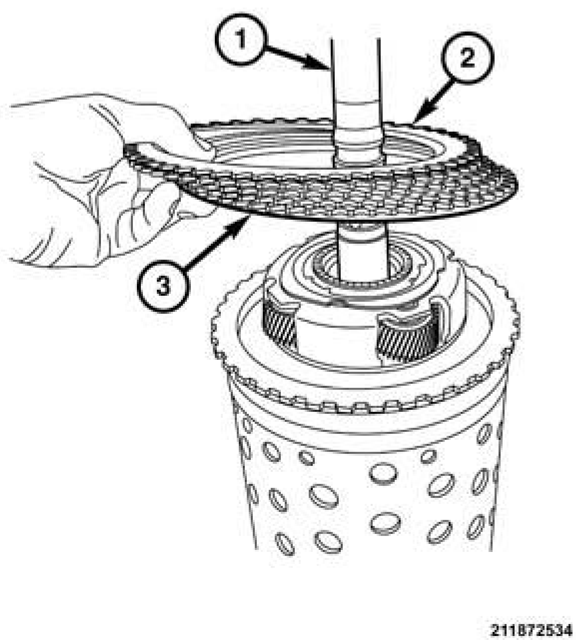


Fig. 170: Splitter, Bearing/Gear
Courtesy of CHRYSLER GROUP, LLC



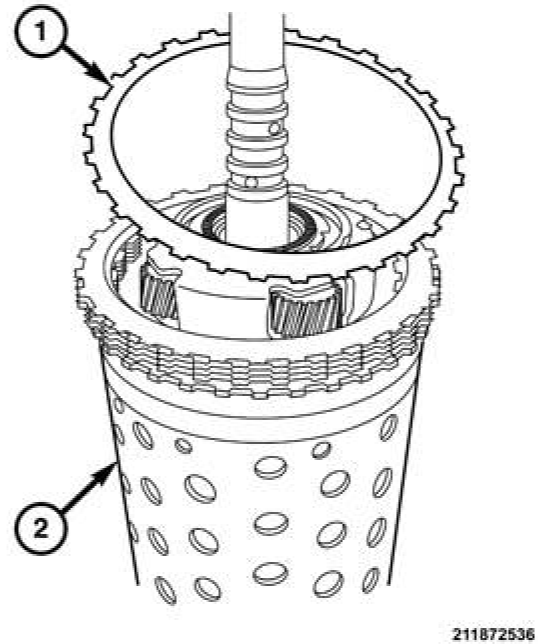
[Fig. 171: Backing Plate & Annulus Assembly](#)
Courtesy of CHRYSLER GROUP, LLC

2. Install the backing plate (1) onto the input/output shaft.



[Fig. 172: Friction & Steel Plates](#)
Courtesy of CHRYSLER GROUP, LLC

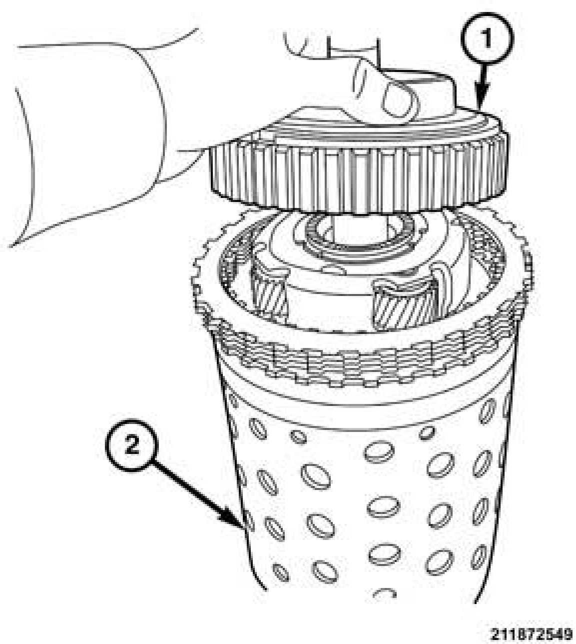
3. Install the friction and steel plates (2).



[Fig. 173: Annulus Assembly & B-Clutch Wave Plate]

Courtesy of CHRYSLER GROUP, LLC

4. Install the B-clutch wave plate (1).



[Fig. 174: Annulus Assembly & Gear]

Courtesy of CHRYSLER GROUP, LLC

5. Install the P1 annulus onto the input/output shaft (1).

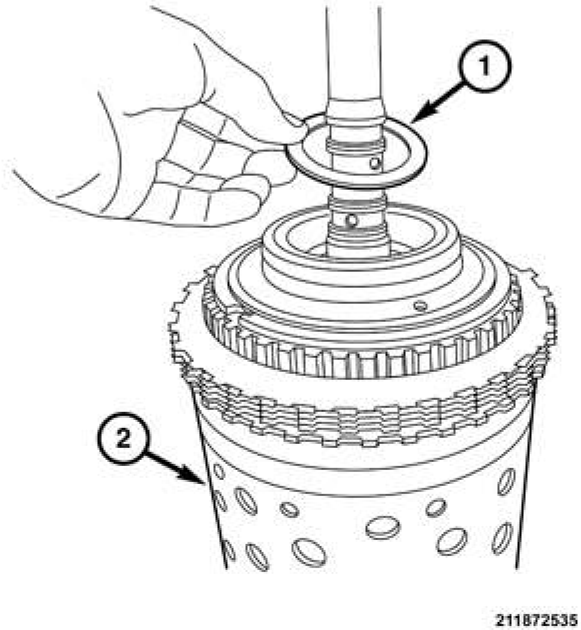


Fig. 175: Annulus Assembly & Shim
Courtesy of CHRYSLER GROUP, LLC

6. Install the correct selectable shim (1) onto the P1 annulus.

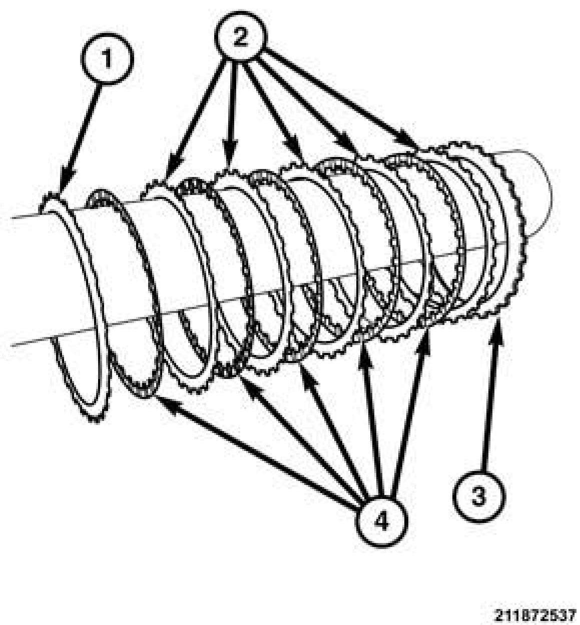


Fig. 176: Wave, Steel, Backing & Friction Plates
Courtesy of CHRYSLER GROUP, LLC

CLUTCH, C

DISASSEMBLY

CLUTCH C DISASSEMBLY

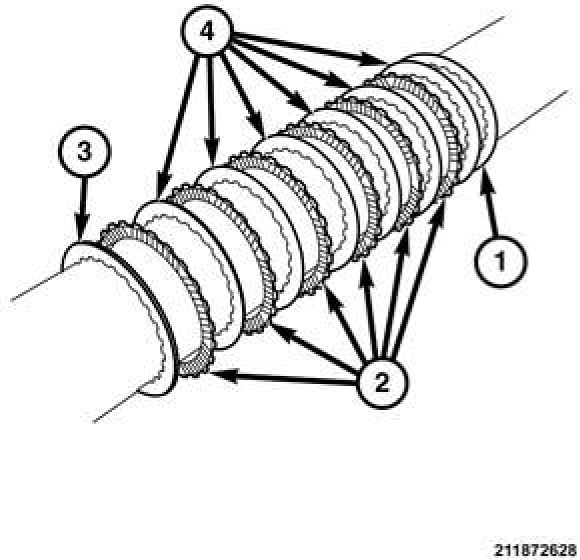


Fig. 177: Wave, Friction, Backing & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate	
2. Friction plate	
3. Backing plate	
4. Steel plate	

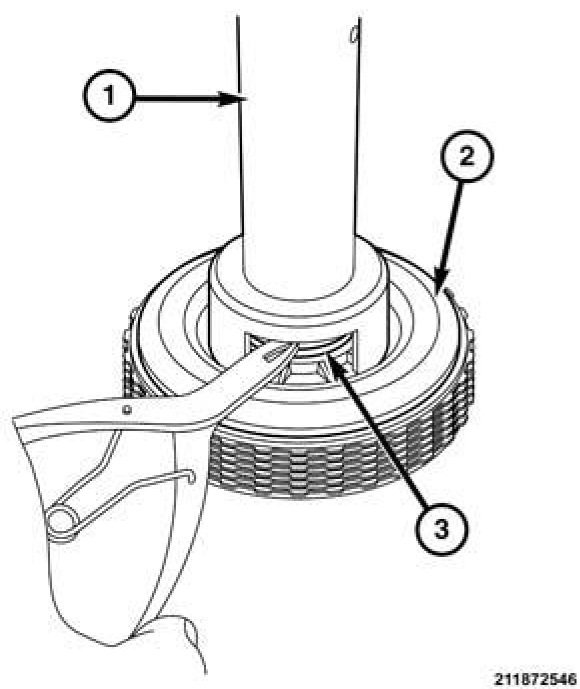


Fig. 178: Special Tool, C-Clutch & Snap Ring

Courtesy of CHRYSLER GROUP, LLC

1. Place the C-clutch (2) in a suitable press.
2. Using special tool 8680 (1) compress the C-clutch (2) enough to remove the snap ring (3).
3. Remove the snap ring (3).

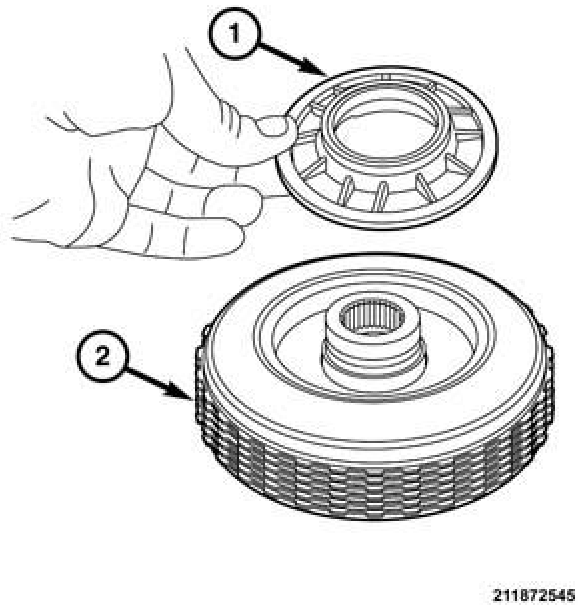


Fig. 179: C-Clutch & Retainer
Courtesy of CHRYSLER GROUP, LLC

4. Remove the C-clutch retainer (1).

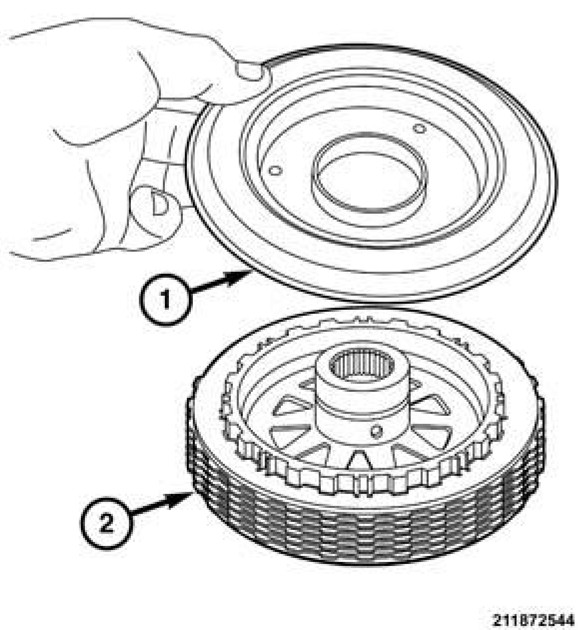


Fig. 180: Friction Plates & Retainer
Courtesy of CHRYSLER GROUP, LLC

5. Remove the C-clutch piston (1).

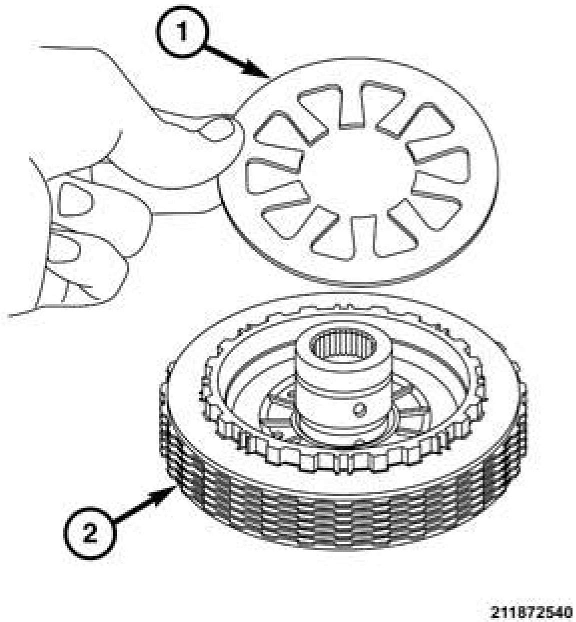


Fig. 181: Friction Plates & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

6. Remove the belleville spring (1).

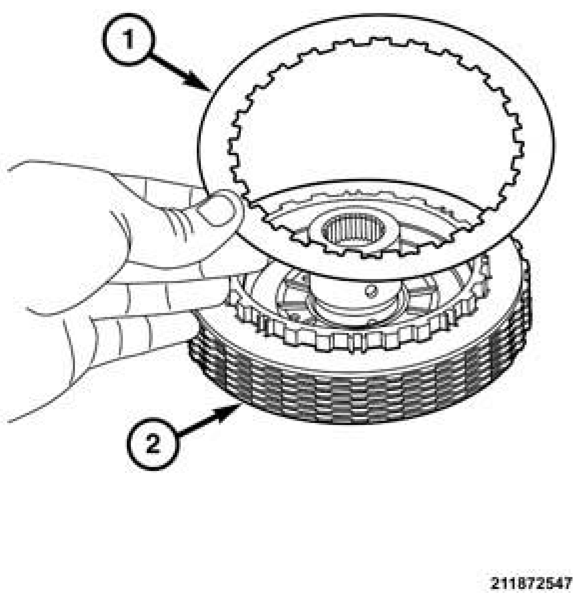


Fig. 182: Wave Plate
Courtesy of CHRYSLER GROUP, LLC

7. Remove the wave plate (1).

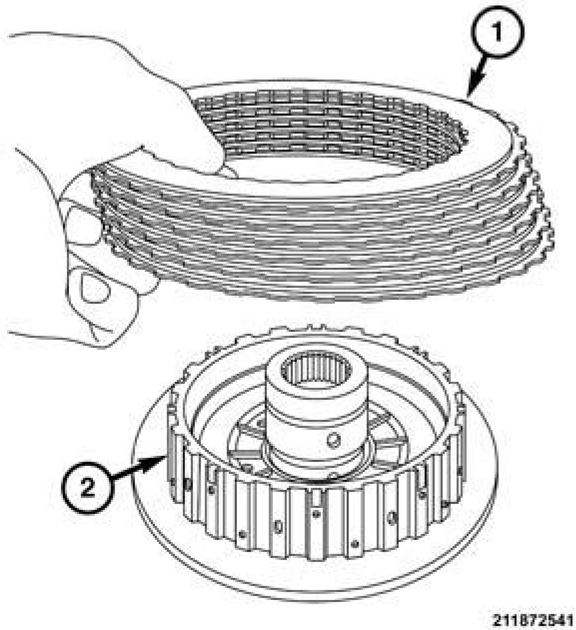


Fig. 183: Friction & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

8. Remove the 6 friction and steel plates (1).

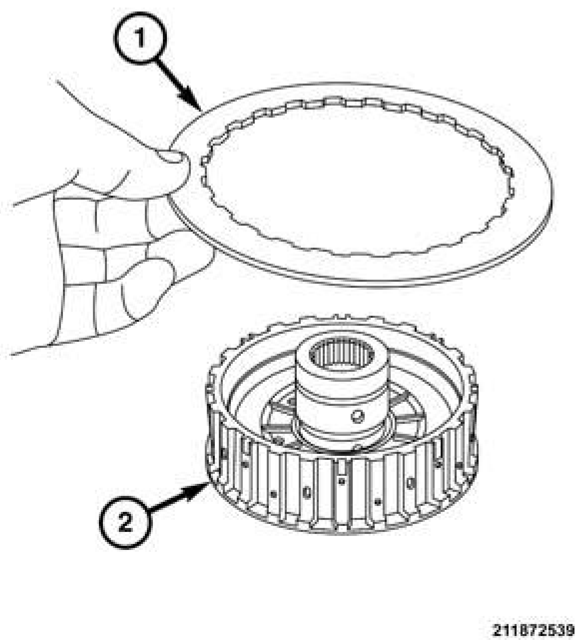


Fig. 184: Backing Plate
Courtesy of CHRYSLER GROUP, LLC

9. Remove the backing plate (1).

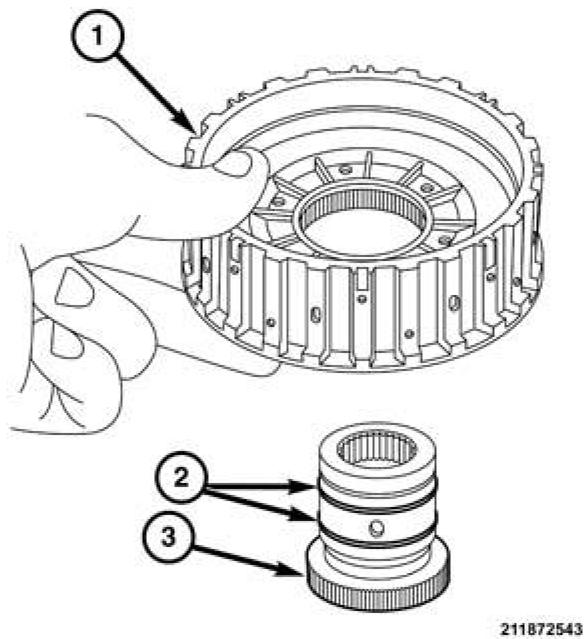


Fig. 185: Clutch Hub, C-Clutch Shaft & O-Rings
Courtesy of CHRYSLER GROUP, LLC

10. Separate the clutch shaft (3) from the clutch hub (1).
11. Remove two O-rings from the C-clutch shaft (2).

ASSEMBLY

CLUTCH C ASSEMBLY

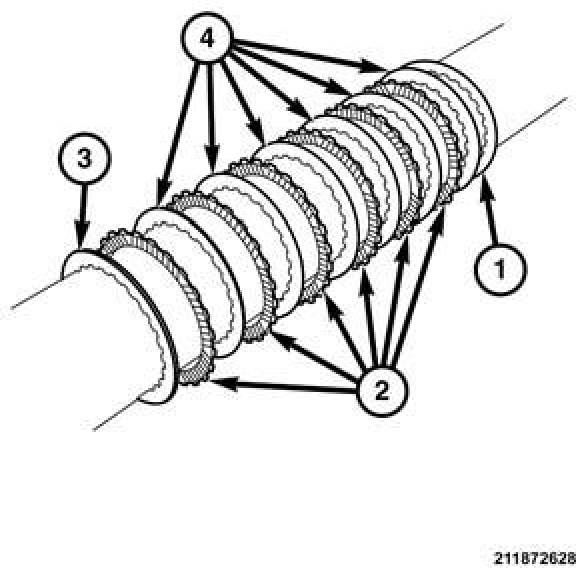


Fig. 186: Wave, Friction, Backing & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate	
2. Friction plate	
3. Backing plate	
4. Steel plate	

NOTE: **If clutch discs are being replaced, soak in 8HP trans fluid before assembly.**

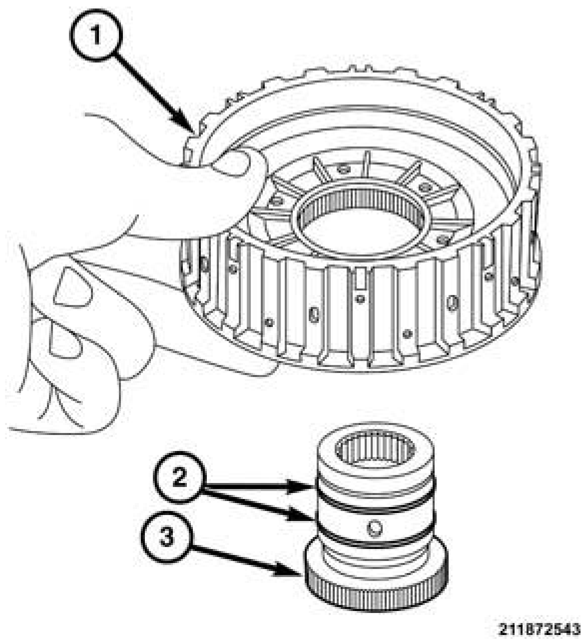


Fig. 187: Clutch Hub, C-Clutch Shaft & O-Rings
Courtesy of CHRYSLER GROUP, LLC

1. Replace the C-clutch seals (2).
2. Install C-clutch hub (1) onto the C-clutch shaft (3).

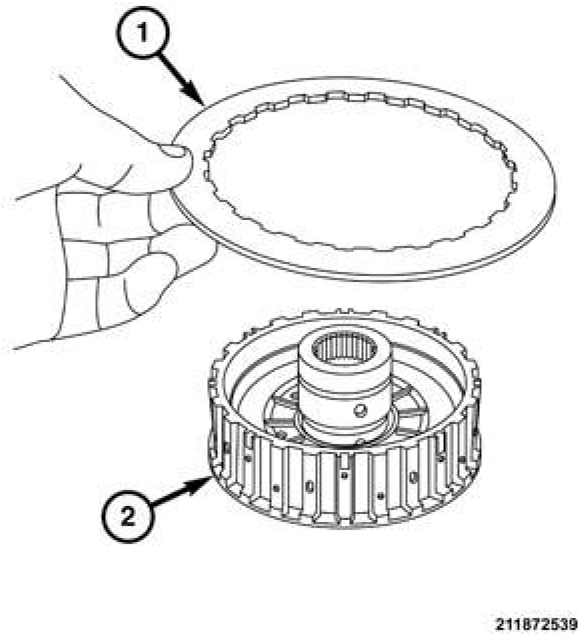


Fig. 188: Backing Plate
Courtesy of CHRYSLER GROUP, LLC

3. Install the backing plate (1).

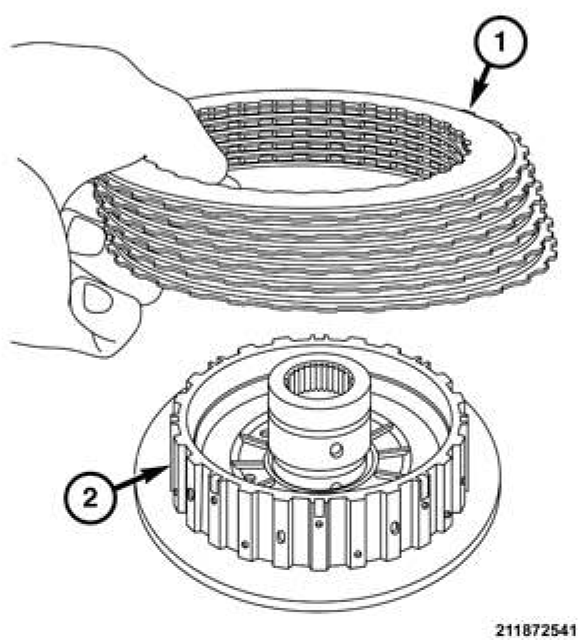


Fig. 189: Friction & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

4. Install 6 friction and steel clutch plates (1).

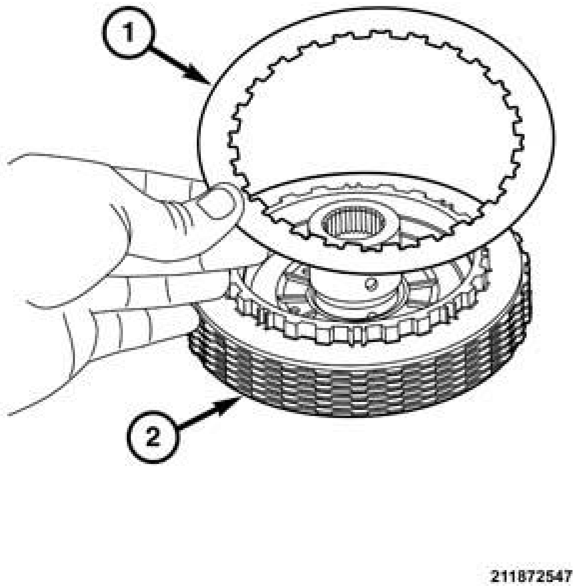


Fig. 190: Wave Plate
Courtesy of CHRYSLER GROUP, LLC

5. Install the wave plate (1).

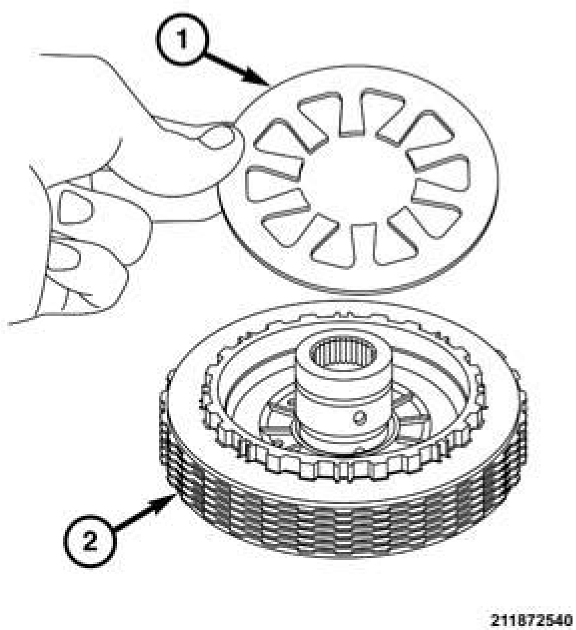


Fig. 191: Friction Plates & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

6. Install the belleville spring (1).

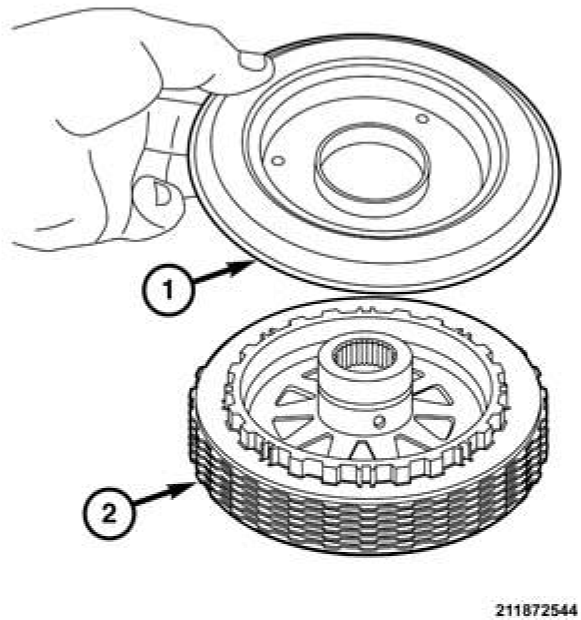


Fig. 192: Friction Plates & Retainer
Courtesy of CHRYSLER GROUP, LLC

7. Install the C-clutch piston (1).

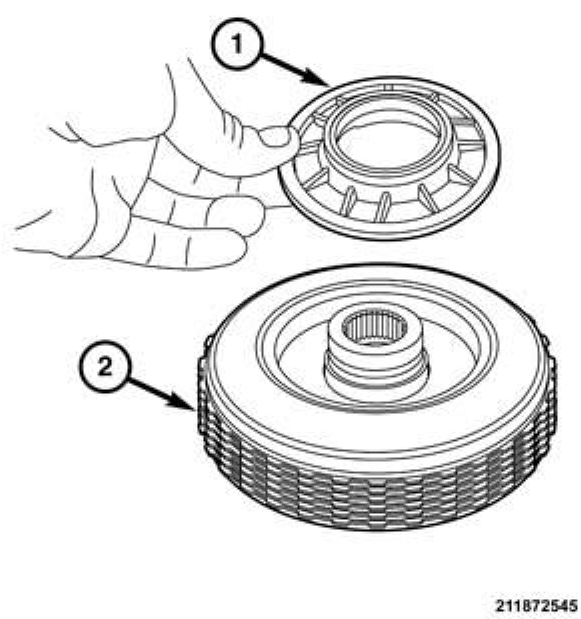


Fig. 193: C-Clutch & Retainer
Courtesy of CHRYSLER GROUP, LLC

8. Install the C-clutch retainer (1).

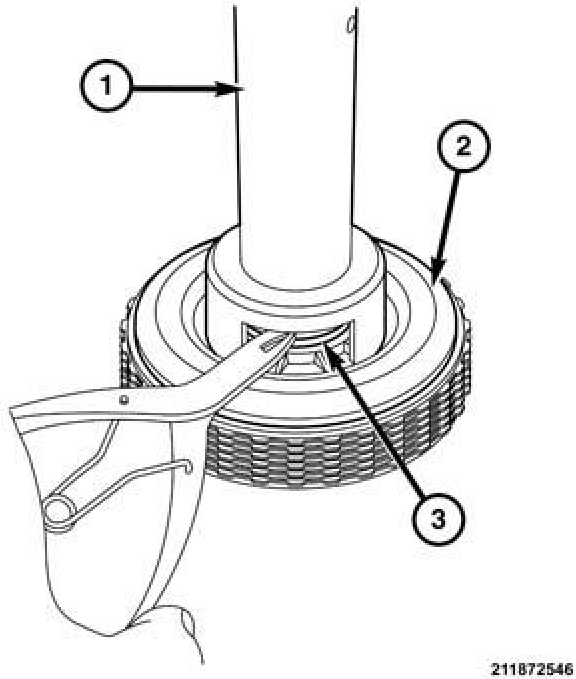


Fig. 194: Special Tool, C-Clutch & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

9. Place the C-clutch (2) in a suitable press.
10. Using special tool 8680 (1) compress the clutch enough to install the snap ring (3).
11. Install the snap ring (3).
12. Using (special tool #8901A, Pressing Tool) and (special tool #10429, Gauge, Force) measure the C-clutch clearance. Refer to **C-CLUTCH MEASUREMENT** for specifications.

CLUTCH, D

DISASSEMBLY

CLUTCH D DISASSEMBLY

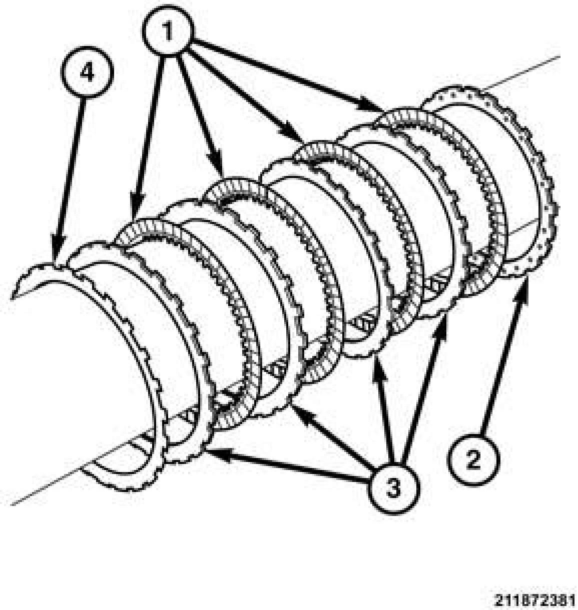


Fig. 195: Friction, Backing & Wave Plates
Courtesy of CHRYSLER GROUP, LLC

1. Friction plate	
2. Backing plate	
3. Backing plate	
4. Wave plate	

1. Place the D-clutch (3) in a suitable arbor press (1).
2. Using (special tool #8901A, Pressing Tool) (4) to compress the oil baffle (2) enough the clear the locking tabs.

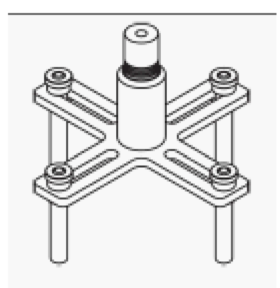


Fig. 196: Cross Bar Tool
Courtesy of CHRYSLER GROUP, LLC

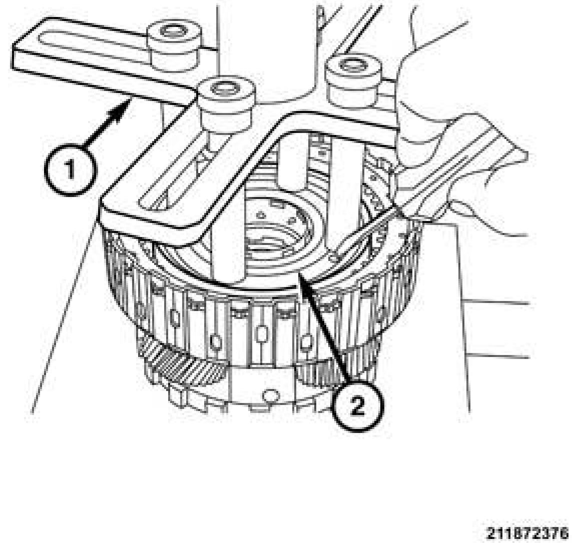


Fig. 197: Oil Baffle & Tabs
Courtesy of CHRYSLER GROUP, LLC

3. Rotate the oil baffle (2) slightly until the tabs on the hub are clear of the baffle.

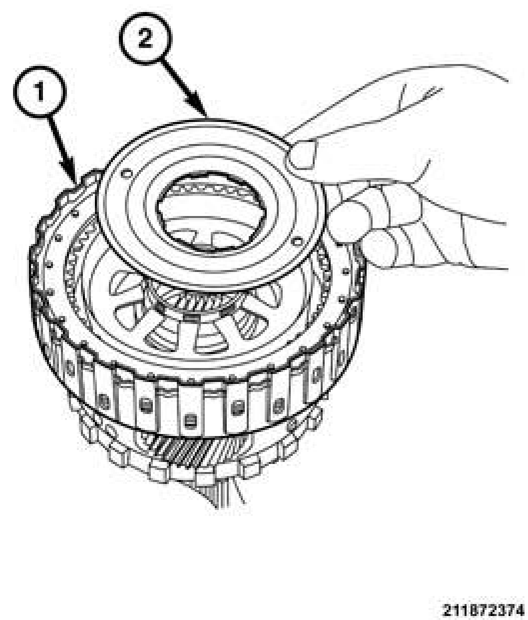


Fig. 198: Hub & Oil Baffle
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil baffle (2).

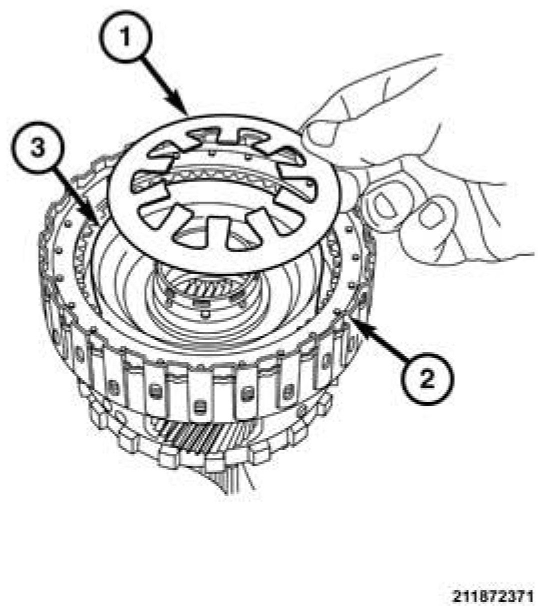


Fig. 199: Hub, Oil Baffle & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

5. Remove the belleville spring (1).

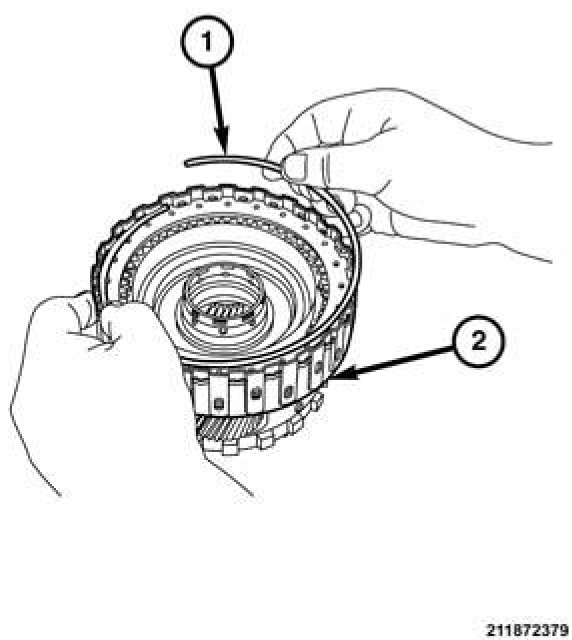
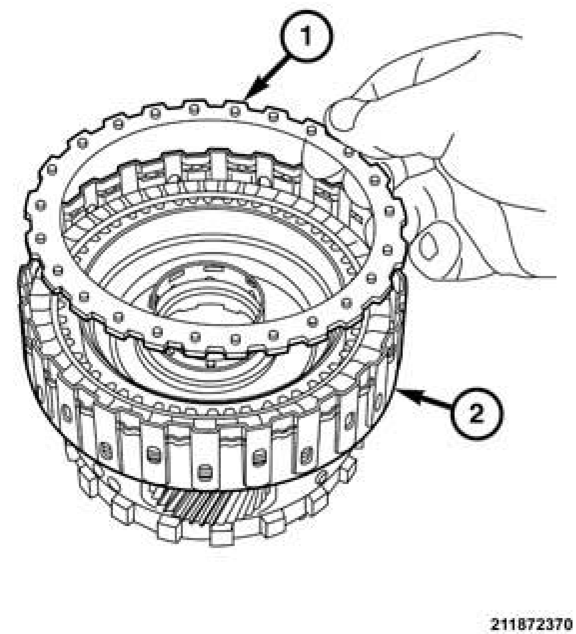


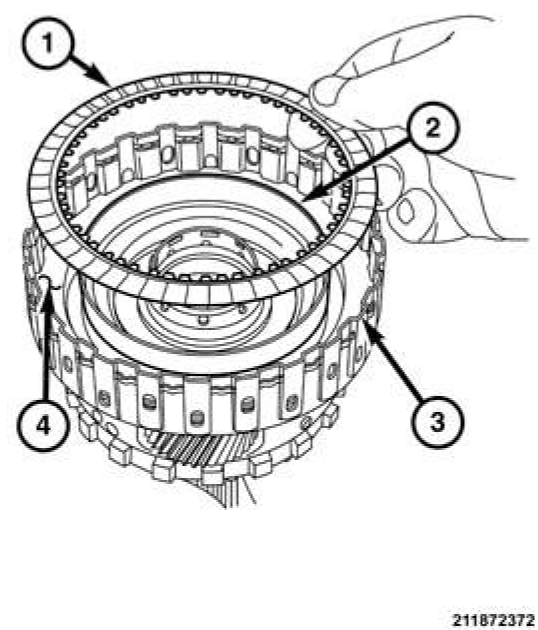
Fig. 200: Oil Baffle & Spring
Courtesy of CHRYSLER GROUP, LLC

6. Remove the selective snap ring (1).



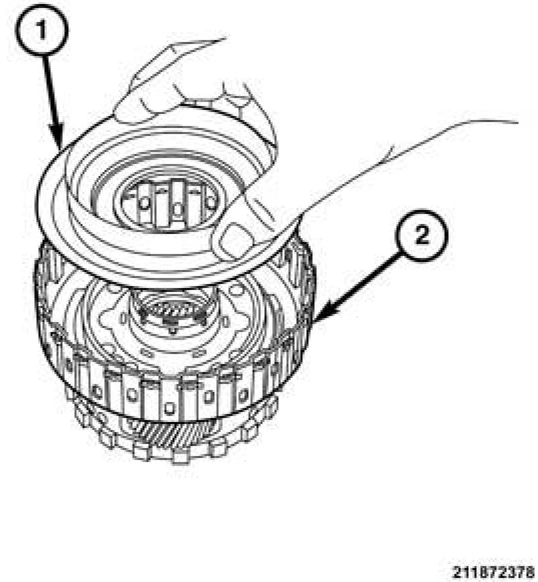
[Fig. 201: Oil Baffle & D-Clutch Backing Plate]
Courtesy of CHRYSLER GROUP, LLC

7. Remove the D-Clutch backing plate (1).



[Fig. 202: Oil Baffle, D-Clutch, Friction & Steels]
Courtesy of CHRYSLER GROUP, LLC

8. Remove the D-Clutch (3) frictions and steels (1), paying attention to the orientation.



[**Fig. 203: D-Clutch & Piston**]
Courtesy of CHRYSLER GROUP, LLC

9. Remove the D-Clutch (2) piston (1).

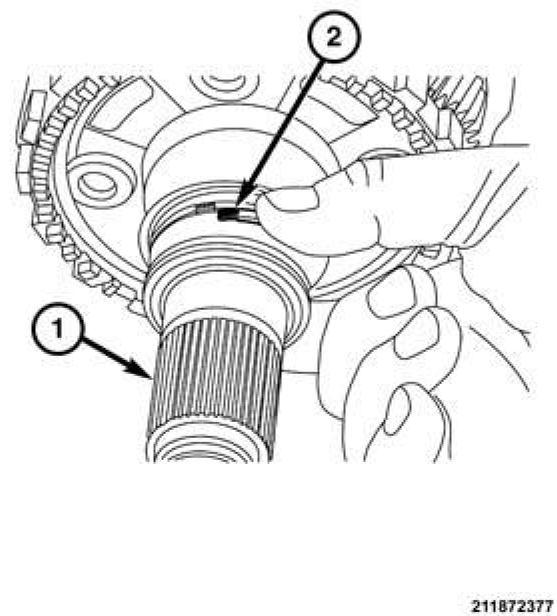


Fig. 204: D-Clutch Carrier Seal Rings
Courtesy of CHRYSLER GROUP, LLC

10. Remove the D-Clutch carrier seal rings (2).

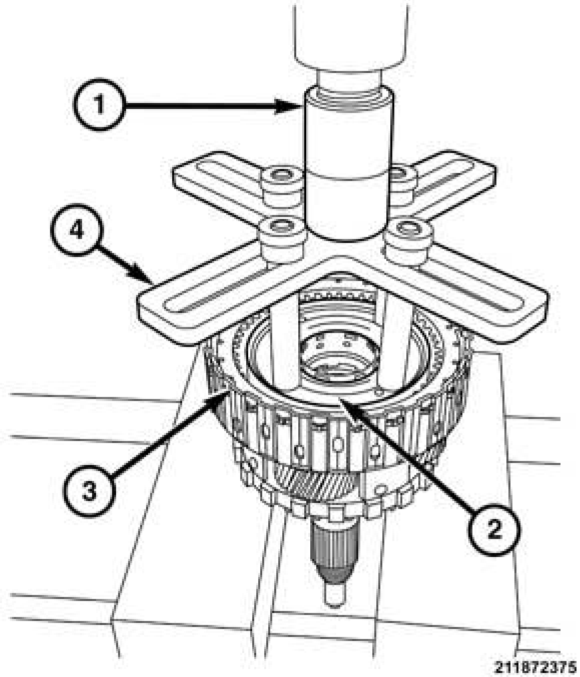


Fig. 205: D-Clutch & Arbor Press
Courtesy of CHRYSLER GROUP, LLC

ASSEMBLY

CLUTCH D ASSEMBLY

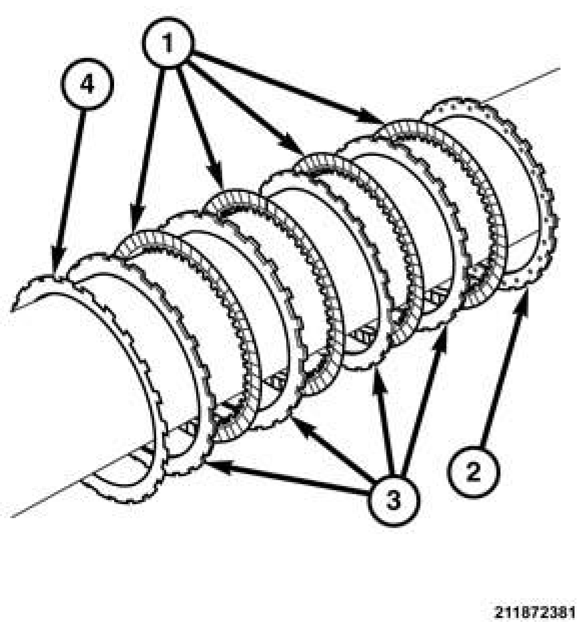


Fig. 206: Friction, Backing & Wave Plates
Courtesy of CHRYSLER GROUP, LLC

1. Friction plate
2. Backing plate

3. Steel plate
4. Wave plate

NOTE: **If clutch discs are being replaced, soak them in 8HP trans fluid before assembly.**

1. Install D-Clutch carrier seal rings (2).
2. Place the D-Clutch in a suitable arbor press.

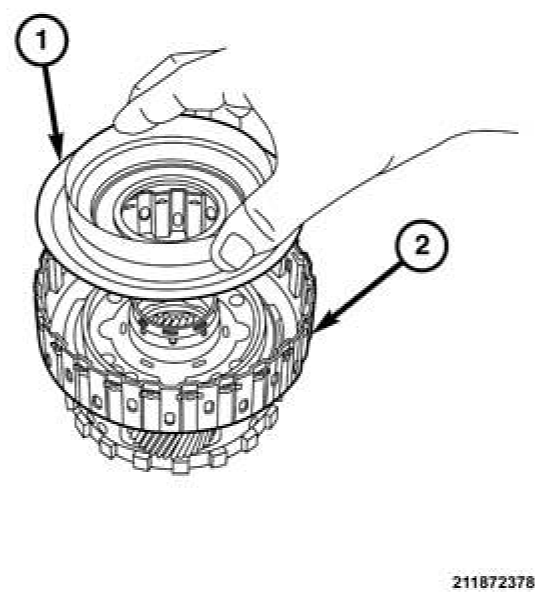


Fig. 207: D-Clutch & Piston
Courtesy of CHRYSLER GROUP, LLC

3. Coat the O-rings with 8HP fluid on the D-Clutch (2) piston (1) and install the piston (1) onto the carrier.

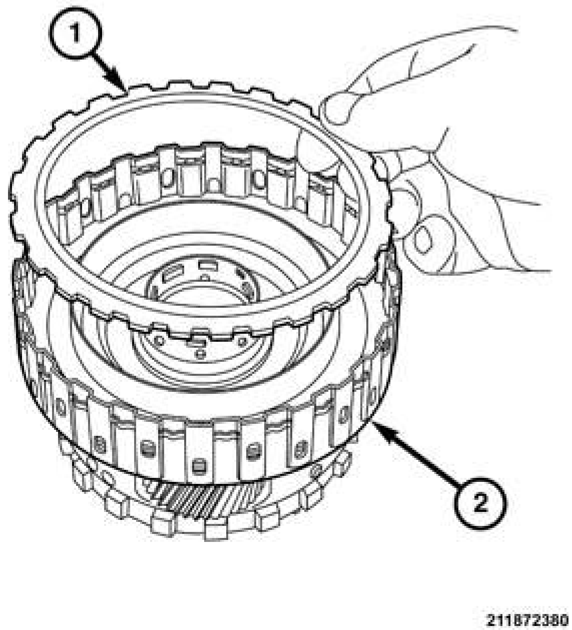


Fig. 208: D-Clutch & Wave Plate
Courtesy of CHRYSLER GROUP, LLC

4. Install the wave plate (1) into the carrier first.

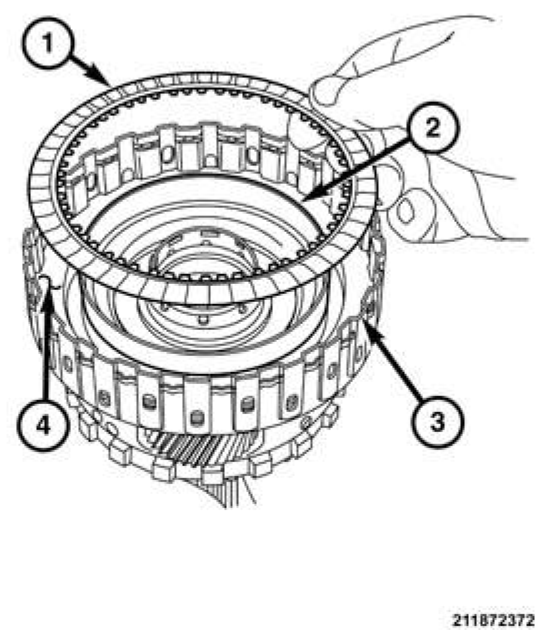


Fig. 209: Oil Baffle, D-Clutch, Friction & Steels
Courtesy of CHRYSLER GROUP, LLC

5. Install the frictions and steels (1) into the carrier (3).

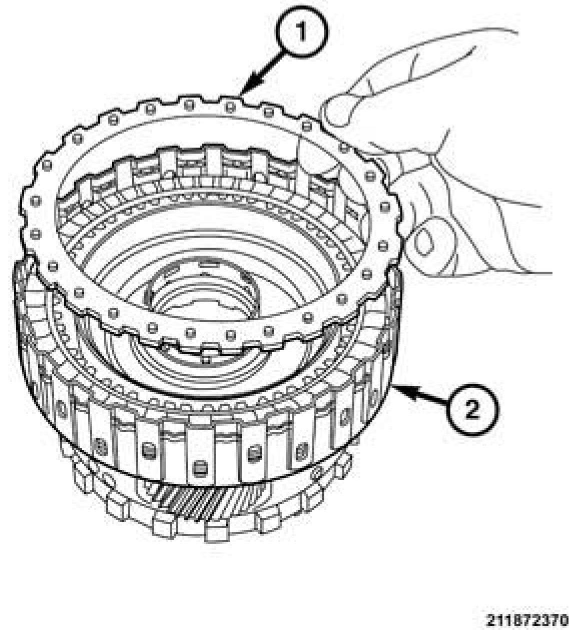


Fig. 210: Oil Baffle & D-Clutch Backing Plate
Courtesy of CHRYSLER GROUP, LLC

6. Install the backing plate (1) last onto the carrier.

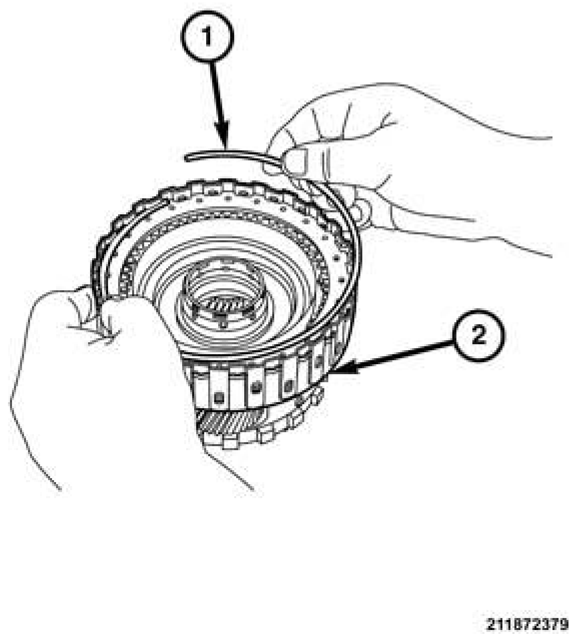


Fig. 211: Oil Baffle & Spring
Courtesy of CHRYSLER GROUP, LLC

7. Install the proper selective snap ring (1) onto the D-Clutch carrier (2).

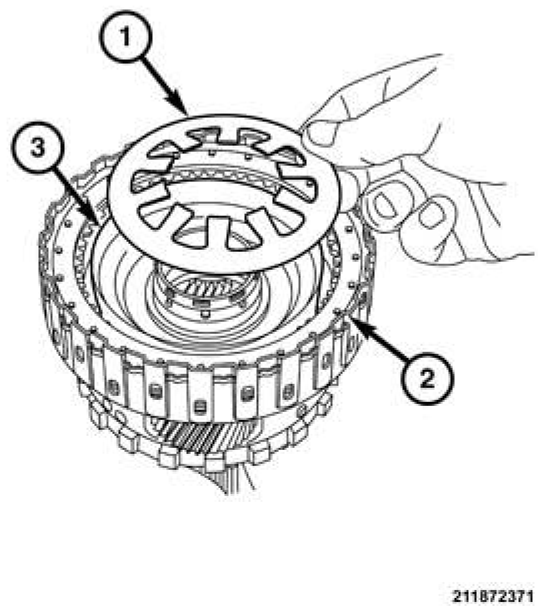


Fig. 212: Hub, Oil Baffle & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

8. Install the belleville spring (1).

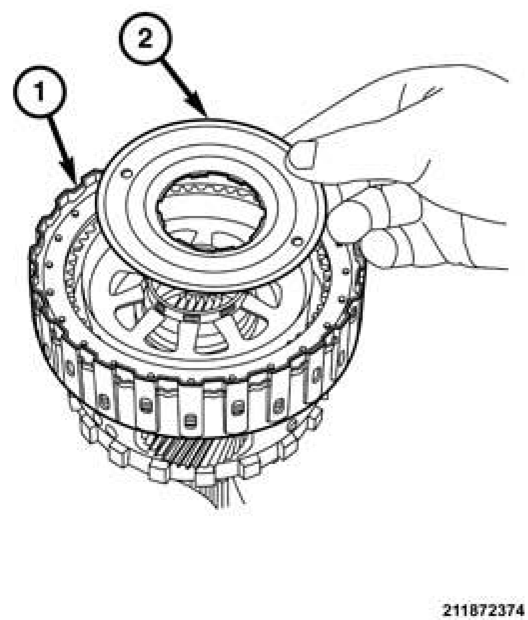


Fig. 213: Hub & Oil Baffle
Courtesy of CHRYSLER GROUP, LLC

9. Place the oil baffle (2) onto the hub of the D-clutch carrier (1).

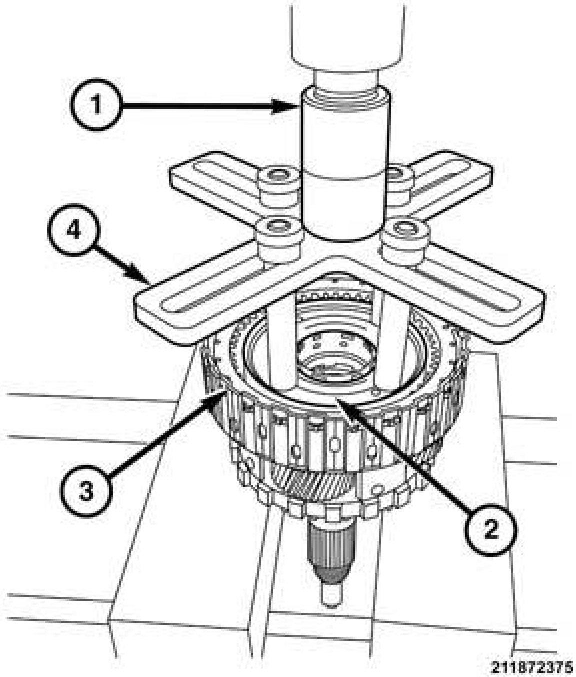


Fig. 214: D-Clutch & Arbor Press
Courtesy of CHRYSLER GROUP, LLC

10. Line up the locking tabs on the D-Clutch hub and the oil baffle (2).

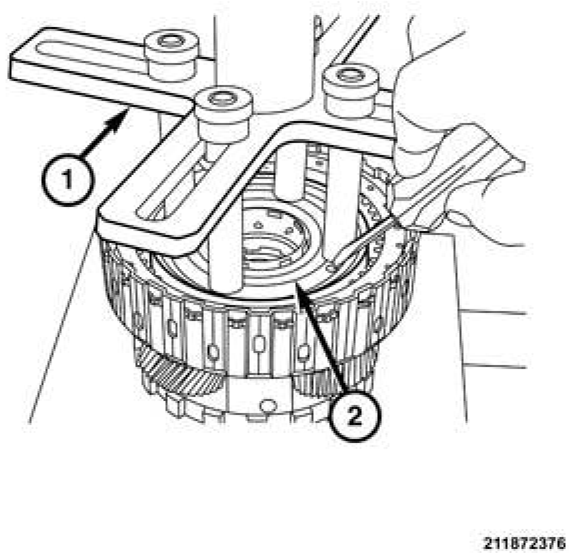
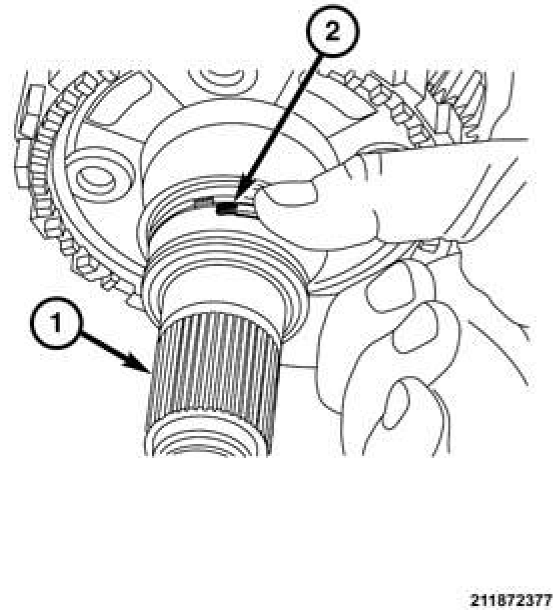


Fig. 215: Oil Baffle & Tabs
Courtesy of CHRYSLER GROUP, LLC

11. Compress the oil baffle (2) enough to clear the lock tabs, and rotate the baffle to the locked position.
12. Release the arbor press.

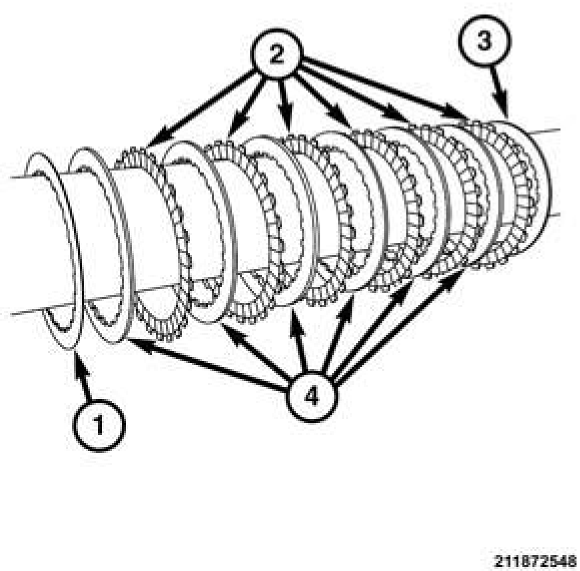


[Fig. 216: D-Clutch Carrier Seal Rings](#)
Courtesy of CHRYSLER GROUP, LLC

CLUTCH, E

DISASSEMBLY

CLUTCH E DISASSEMBLY



[Fig. 217: Wave, Friction, Backing & Steel Plates](#)
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate
2. Friction plate
3. Backing plate
4. Steel plate

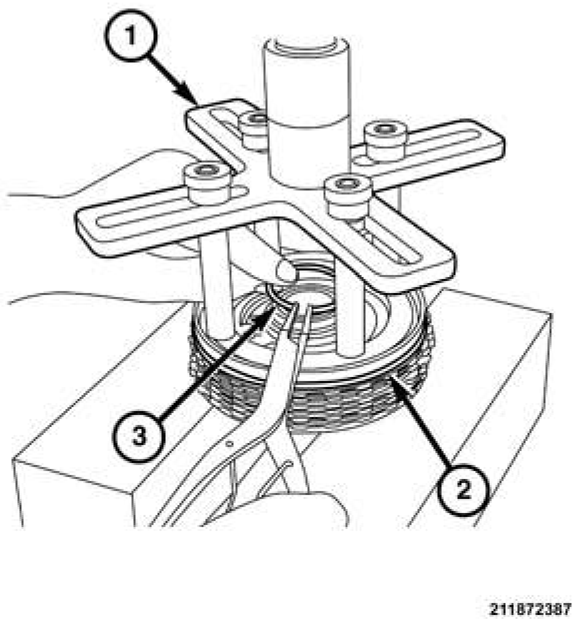


Fig. 218: E-Clutch & Pressing Tool
Courtesy of CHRYSLER GROUP, LLC

1. Place E-clutch (2) in a suitable press.
2. Using Pressing Tool 8901A (special tool #8901A, Pressing Tool) (1) compress the E-clutch piston enough to remove the snap ring (3).

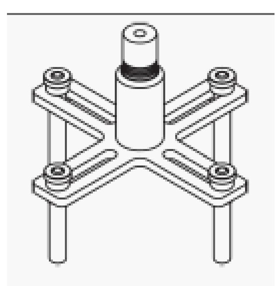


Fig. 219: Cross Bar Tool
Courtesy of CHRYSLER GROUP, LLC

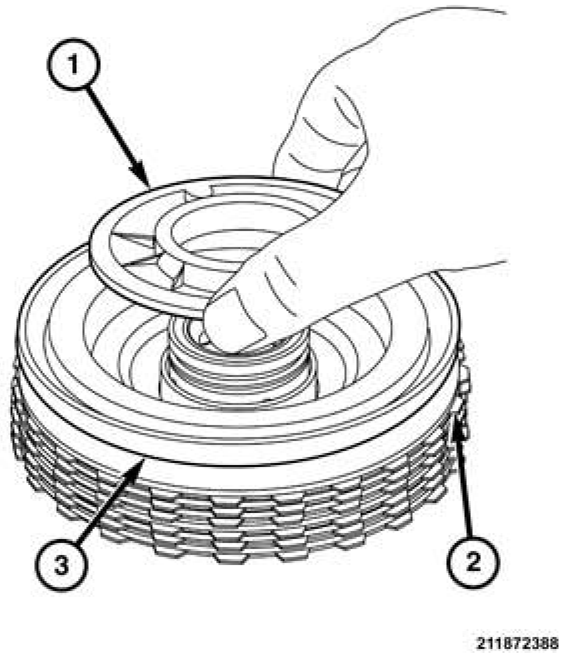


Fig. 220: E-Clutch Piston Support
Courtesy of CHRYSLER GROUP, LLC

3. Remove the E-clutch piston support (1).

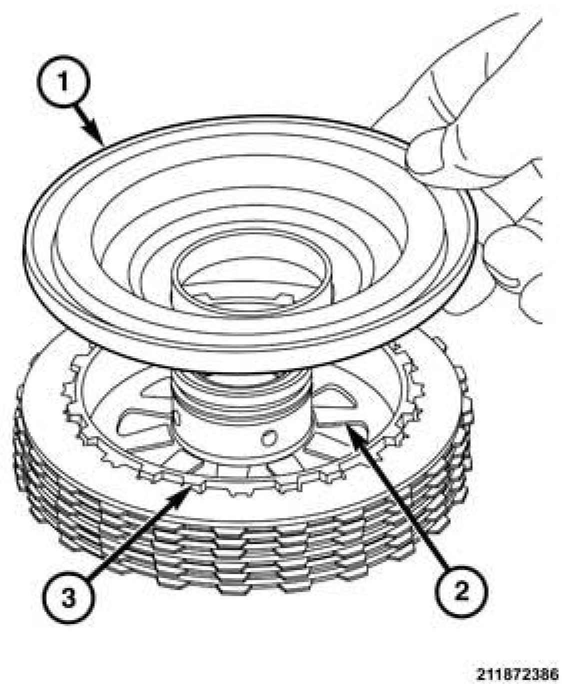


Fig. 221: E-Clutch Piston Support
Courtesy of CHRYSLER GROUP, LLC

4. Remove the E-clutch piston (1).

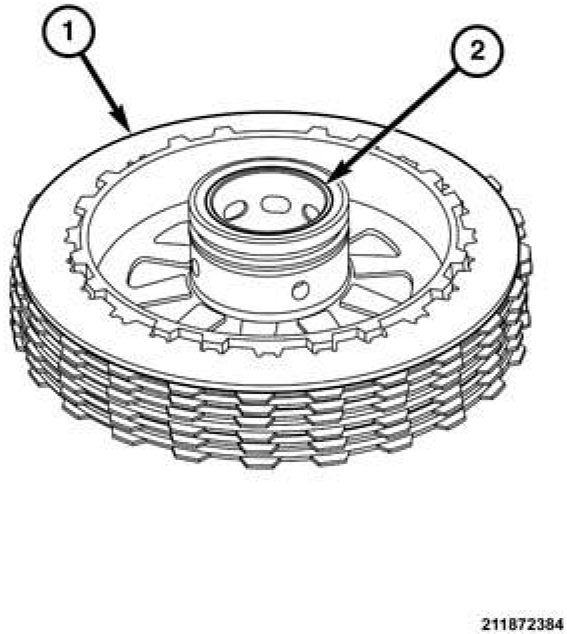


Fig. 222: E-Clutch Wave Washer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Pay attention to the orientation of the plates.

5. Remove the wave washer (1), frictions and steels.

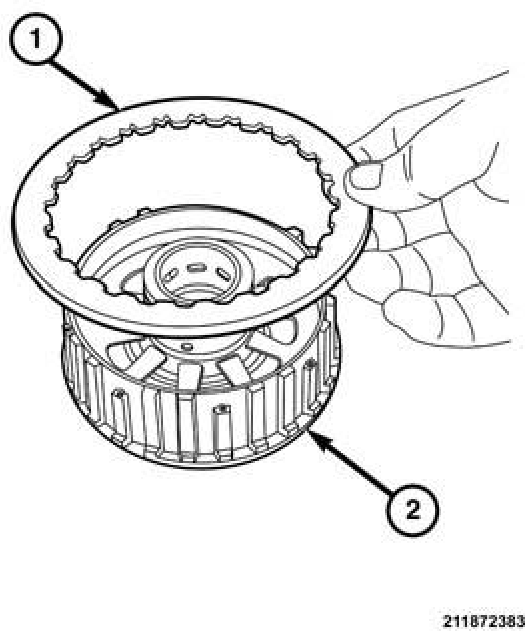


Fig. 223: E-Clutch Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

6. Remove the thrust plate (1) last.

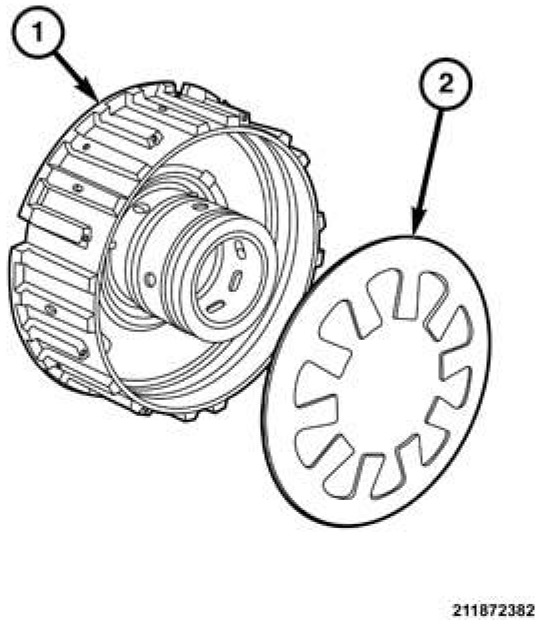


Fig. 224: Belleville Spring & E-Clutch Hub
Courtesy of CHRYSLER GROUP, LLC

7. Remove the belleville spring (2) from the E-clutch hub (1).

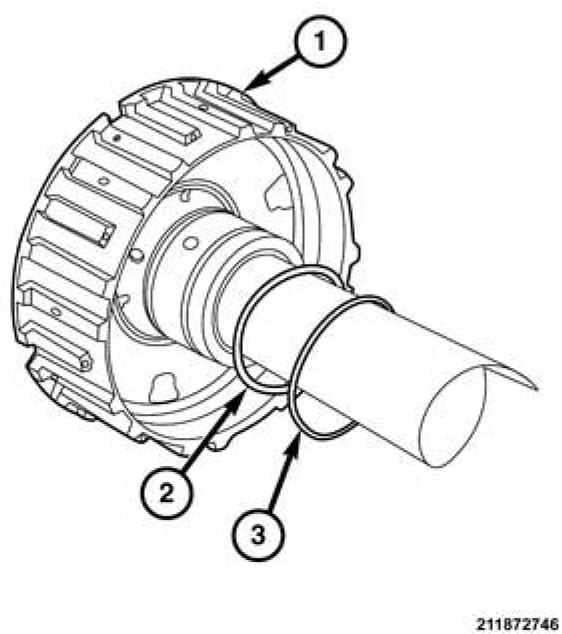


Fig. 225: E-Clutch, Seal & O-Ring
Courtesy of CHRYSLER GROUP, LLC

8. Remove the E-clutch (1) seal (2) and O-ring (3).

ASSEMBLY

CLUTCH E ASSEMBLY

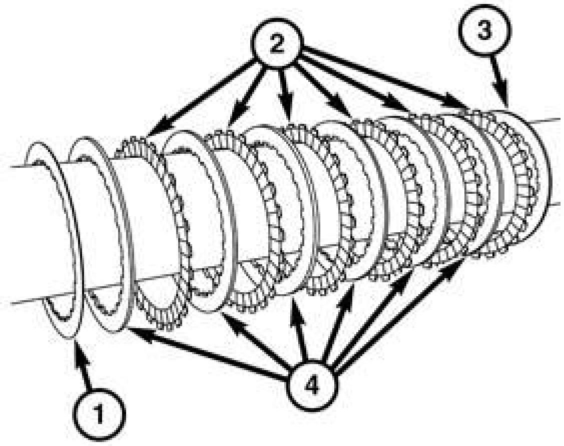


Fig. 226: Wave, Friction, Backing & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate
2. Friction plate
3. Backing plate
4. Steel plate

NOTE: **If clutch discs are being replaced, soak in 8HP trans fluid before assembly.**

1. Install the E-clutch (1) seal (2) and O-ring (3).

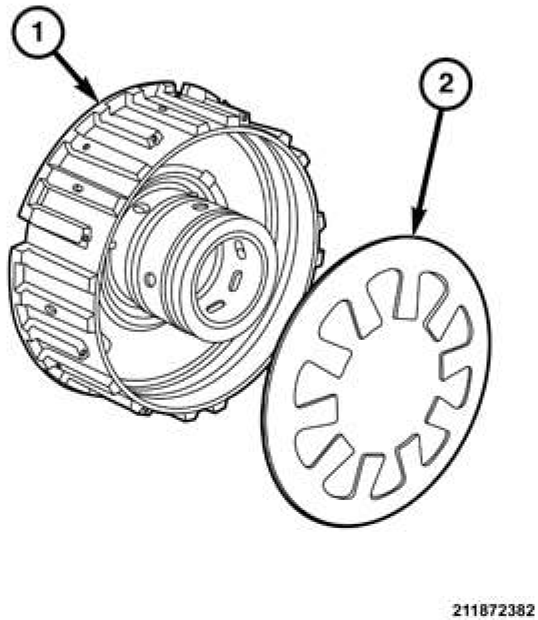


Fig. 227: Belleville Spring & E-Clutch Hub
Courtesy of CHRYSLER GROUP, LLC

2. Install the belleville (2) spring into the E-clutch hub (1).

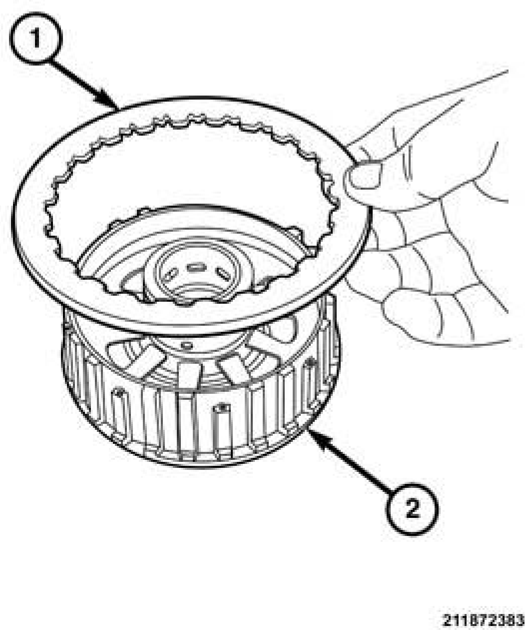


Fig. 228: E-Clutch Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

3. Install the clutch pack thrust plate (1).

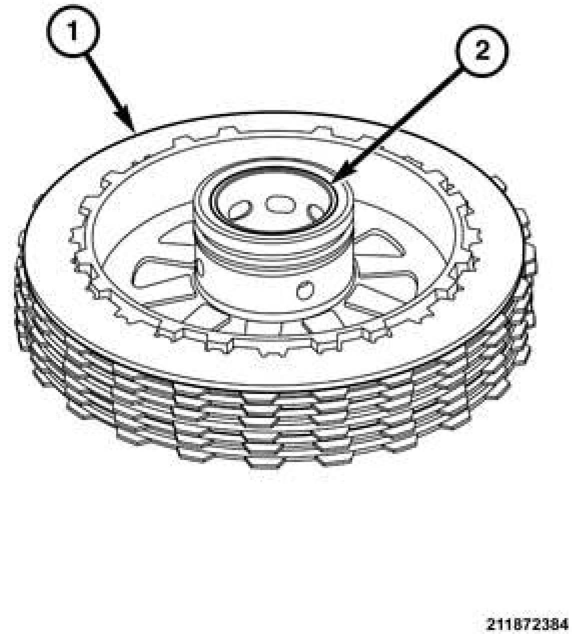


Fig. 229: E-Clutch Wave Washer
Courtesy of CHRYSLER GROUP, LLC

4. Install the clutch pack frictions and steels (1).

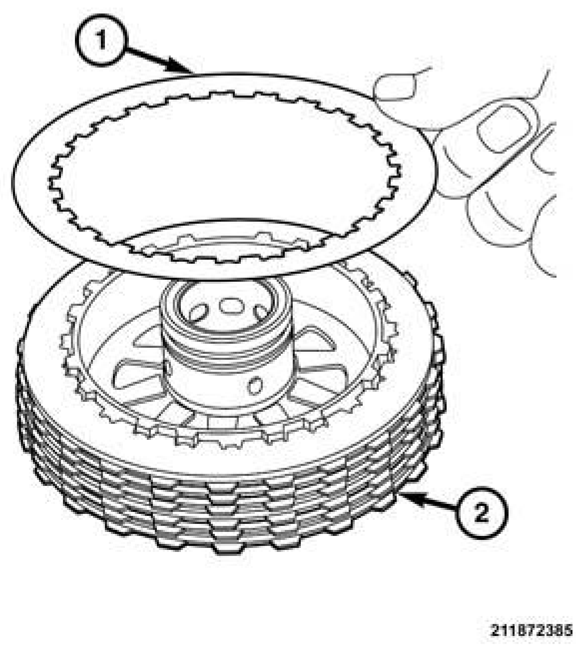


Fig. 230: E-Clutch Wave Washer
Courtesy of CHRYSLER GROUP, LLC

5. Install the wave washer (1) last.

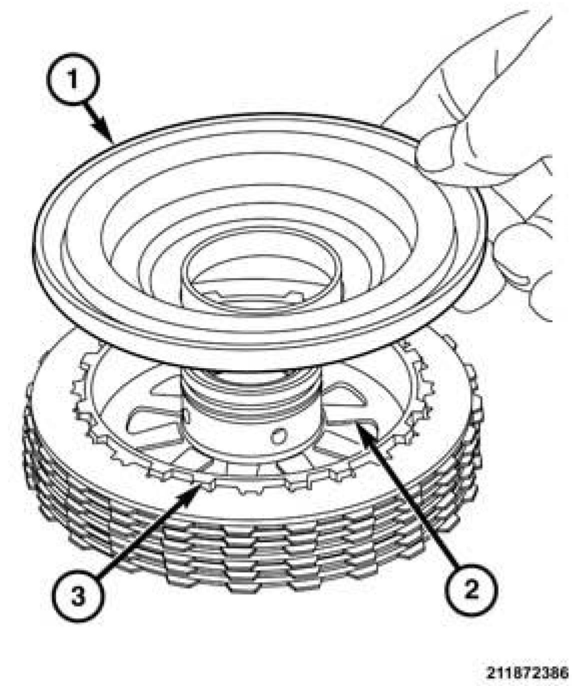


Fig. 231: E-Clutch Piston Support
Courtesy of CHRYSLER GROUP, LLC

6. Install the E-clutch piston (1) onto the hub.

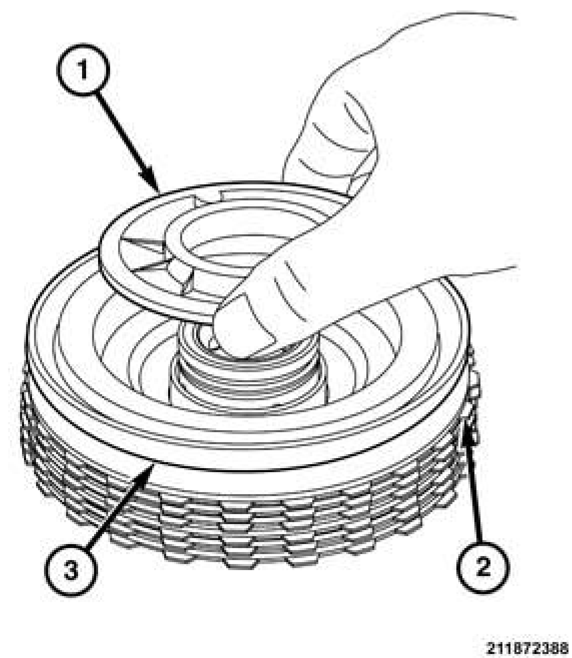
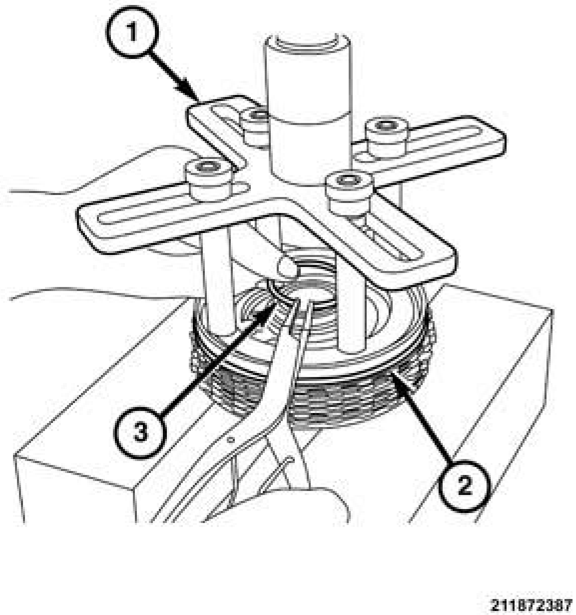


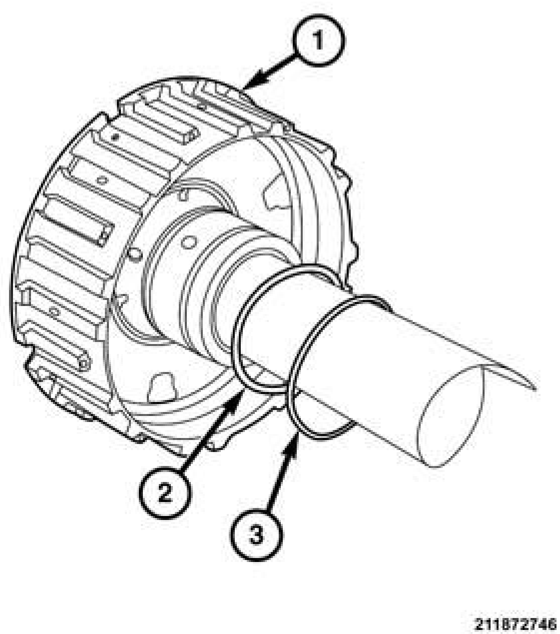
Fig. 232: E-Clutch Piston Support
Courtesy of CHRYSLER GROUP, LLC

7. Install the E-clutch piston support (1).



[Fig. 233: E-Clutch & Pressing Tool]
Courtesy of CHRYSLER GROUP, LLC

8. Place the E-clutch in a suitable arbor press.
9. Using Pressing Tool 8901A (special tool #8901A, Pressing Tool) compress the E-clutch enough to install the snap ring.



[Fig. 234: E-Clutch, Seal & O-Ring]
Courtesy of CHRYSLER GROUP, LLC

FLUID AND FILTER

DESCRIPTION

DESCRIPTION

FILTER SERVICE

The 8HP has a conventional fluid sump design, however, the filter is integrated into the oil pan resulting in a lower profile for improved vehicle packaging. The oil pan gasket is reusable providing it is not damaged during removal.

STANDARD PROCEDURE

STANDARD PROCEDURE - CHECK OIL LEVEL

To properly check and fill the transmission, perform the following procedure:

WARNING: **There is a risk of accident from vehicle moving when the engine is running. Secure vehicle to prevent it from moving. There is a risk of injury from contusions and burns if you insert your hands into the engine when it is running. Do not touch hot or rotating parts. Wear properly fitted work clothes.**

CAUTION: **A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .**

NOTE: **Oil dye is not required to find leaks in the 8HP transmission. The oil dye can cause shift quality issues and is not recommended. The 8HP fluid has illuminance that is visible under a black light.**

1. Raise and support the vehicle **on a level hoist** . Refer to **HOISTING, STANDARD PROCEDURE** .
2. Start the engine. The engine must continue to run for the entire test.
3. Using a scan tool or the vehicle information center, verify that the transmission fluid temperature is below 30Ā°C (86Ā°F).
4. Remove the transmission fill plug from the right rear of the transmission case.
5. Add transmission fluid until it trickles from the fill opening.
6. Install the transmission fill plug and tighten to the proper **SPECIFICATIONS**.
7. Lower the vehicle for access to inside of the vehicle, leaving the tires at least 8 inches off the ground.
8. With the brakes applied, place the transmission in Reverse and hold for 5 seconds.
9. Place the transmission in Drive and hold for 5 seconds.
10. Release the brakes, slowly accelerate to 2nd gear and hold for 5 seconds.
11. Apply the brakes and place the transmission in Neutral.
12. Raise the engine speed to 2000 RPM for 5 seconds.
13. Return the engine to idle and place the transmission in Park.

NOTE: **A full transmission will have fluid at the fill hole with the transmission between 30Ā°C (86Ā°F) and 50Ā°C (122Ā°F). Do not over fill.**

14. Remove the transmission fill plug and allow excess fluid to drain from fill hole or add fluid as necessary.
15. Install the transmission fill plug and tighten to the proper **SPECIFICATIONS**.
16. Using a scan tool, clear any DTCs.

STANDARD PROCEDURE - TRANSMISSION FILL AFTER SERVICE

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .

To properly fill the transmission after an in vehicle service or overhaul, perform the following procedure:

NOTE: If the transmission cooler was replaced, add an additional 0.7L (0.72 qts) of transmission fluid.

1. **If the transmission was overhauled** , prior to installing in the vehicle, tip the transmission on it side, remove the oil fill plug on the right rear side of the case and install 9L (9.5 qts) of transmission fluid. Install the fill plug. After installing the transmission, perform the CHECK OIL LEVEL procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
2. **If an in vehicle service was performed** , raise and support the vehicle **on a level hoist** , and perform the CHECK OIL LEVEL procedure. Refer to **HOISTING, STANDARD PROCEDURE** and **FLUID AND FILTER, STANDARD PROCEDURE**.

STANDARD PROCEDURE - FLUID/FILTER SERVICE

NOTE: The oil pan and filter are an integrated assembly that cannot be serviced separately.

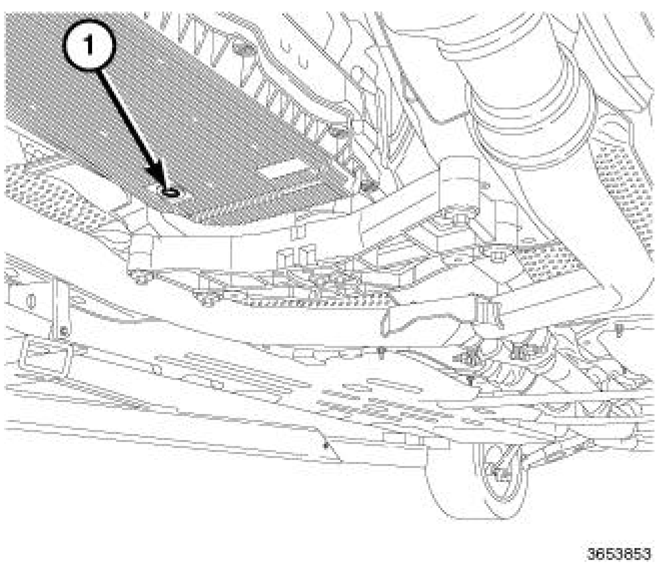


Fig. 235: Transmission Oil Pan Plug
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the transmission oil pan plug (1) and drain the transmission fluid.

NOTE: **Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.**

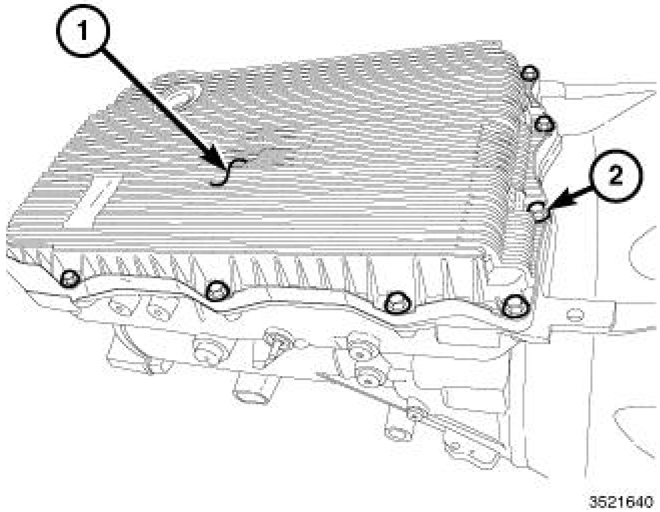


Fig. 236: Thirteen Oil Pan Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the 13 oil pan retaining bolts (2).
4. Remove the oil pan (1) and gasket. If the pan is being removed for contamination concerns discard the pan.
5. Install the **NEW** oil pan (1) and gasket.

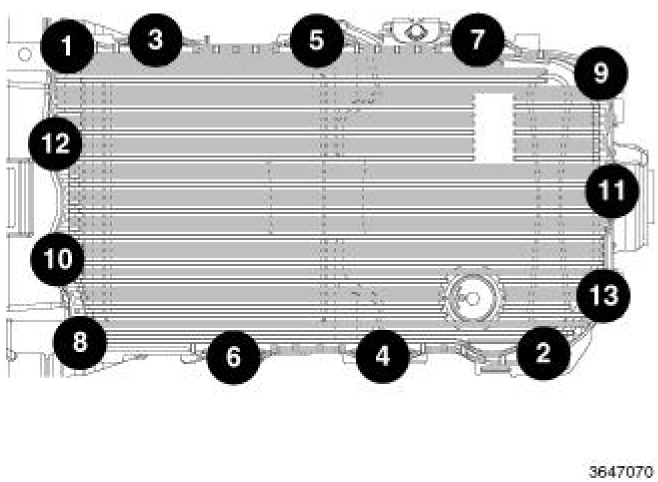


Fig. 237: Oil Pan Retaining Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

6. Install the 13 oil pan retaining bolts in the sequence shown and tighten to 10 N.m (89 in. lbs.).

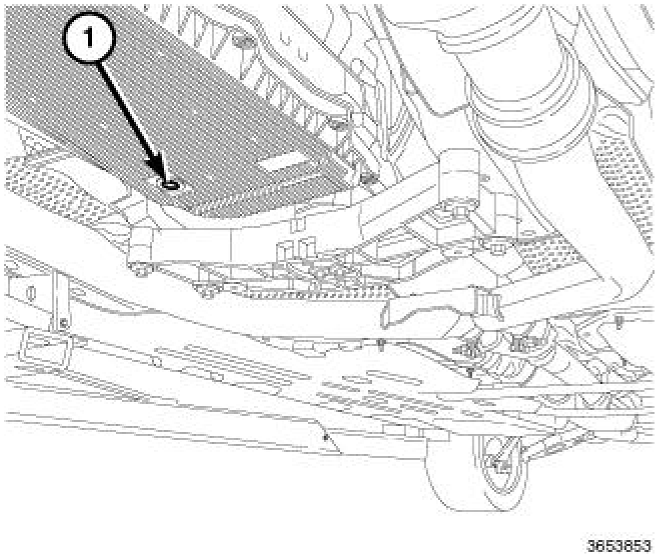


Fig. 238: Transmission Oil Pan Plug
Courtesy of CHRYSLER GROUP, LLC

7. Verify the transmission oil pan plug (1) is installed.
8. Inspect and adjust the fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
9. Lower the vehicle.

LEVER, MANUAL PARK RELEASE

REMOVAL

REMOVAL

1. Remove the shifter bezel storage bin liner.
2. Remove the Manual Park Release (MPR) lever bolts.

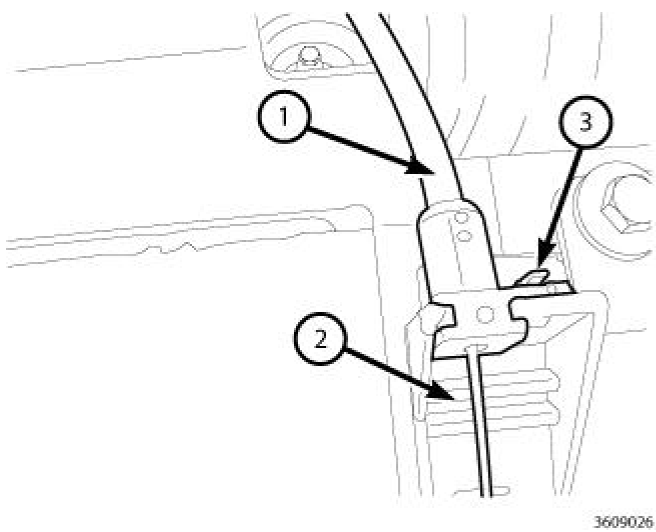


Fig. 239: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the MPR cable (1) from the housing (2), while holding the release tab (3) open.
4. Remove the MPR cable (1) from the MPR lever and remove the MPR lever from the vehicle.

INSTALLATION

INSTALLATION

1. Connect the Manual Park Release (MPR) cable to the MPR lever.
2. Install the MPR lever bolts and tighten to the proper **SPECIFICATIONS** .

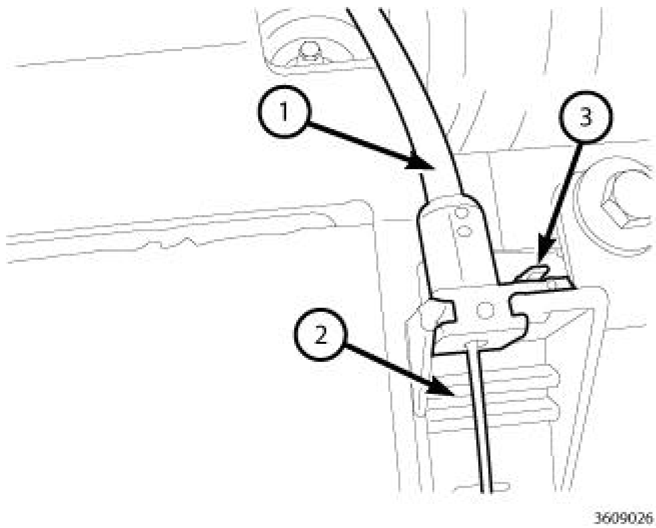


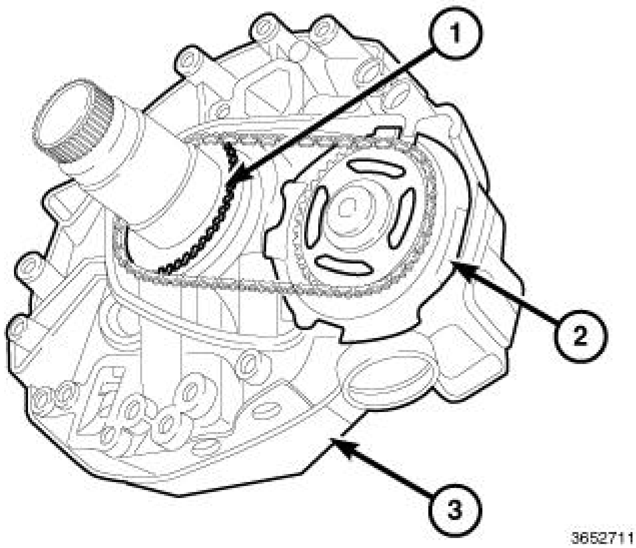
Fig. 240: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

3. Connect the MPR cable (1) to the housing (2) and make sure the locking tab (3) is locked.
4. Install the shifter bezel storage bin liner.

PUMP, TRANSMISSION OIL

DESCRIPTION

DESCRIPTION

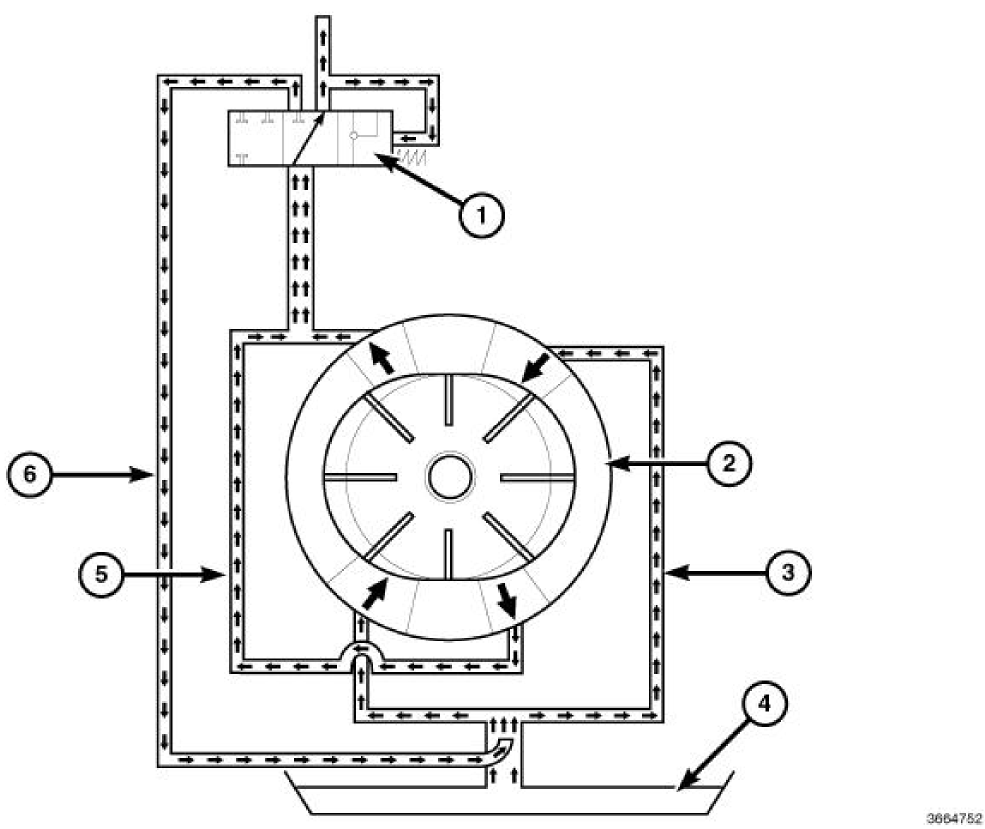


[Fig. 241: Transmission Oil Pump, Chain And Sprocket & Oil Pump Housing]
Courtesy of CHRYSLER GROUP, LLC

The transmission oil pump (2) is driven by a chain and sprocket (1). The oil pump is located just behind the torque converter, inside of the pump housing (3). The pump is a double-stroke vane pump. The pump has dual chambers, two inlet and two outlet ports. The pump provides necessary lubrication and cooling throughout all phases of transmission operation.

OPERATION

OPERATION



[Fig. 242: Transmission Oil Pump Flow Diagram]

Courtesy of CHRYSLER GROUP, LLC

1- SYSTEM PRESSURE VALVE	4 - SUMP
2 - PUMP	5 - PRESSURE PIPE
3 - INTAKE PIPE	6 - RETURN OF REDUNDANT OIL

The transmission oil pump is driven by a chain and sprocket. The oil pump has two intake ports and two exhaust ports. The pump draws fluid through a filter and pressurizes the fluid as the pump rotates. After the fluid is pressurized, it exits the pump through two exhaust ports that feed the system pressure valve. The system pressure valve maintains fluid pressure and allows excess pressure to return to the pump. This reduces cavitation and noise.

REMOVAL

REMOVAL

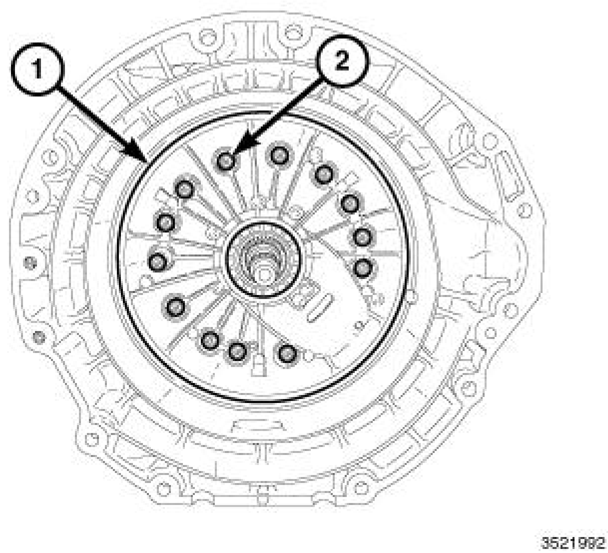


Fig. 243: Thirteen Oil Pump Housing Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transmission. Refer to **REMOVAL**.
2. Remove the valve body. Refer to **VALVE BODY, REMOVAL**.
3. Remove the thirteen oil pump assembly to case bolts (2).

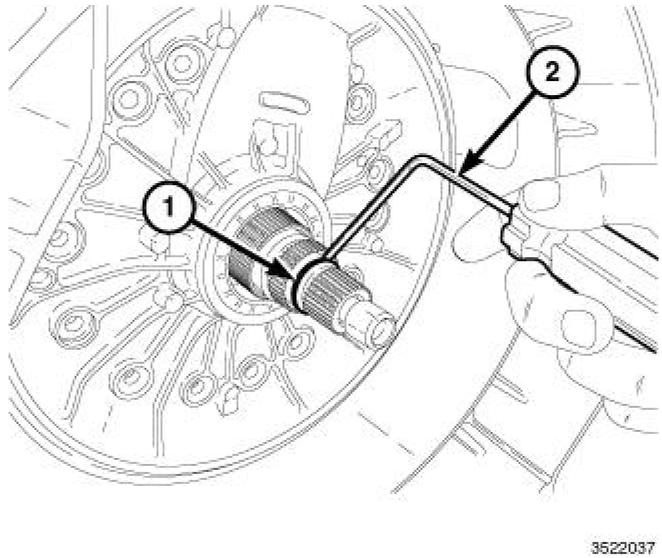


Fig. 244: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

4. Remove the input shaft O-ring (1) using a small pick (2) or equivalent.

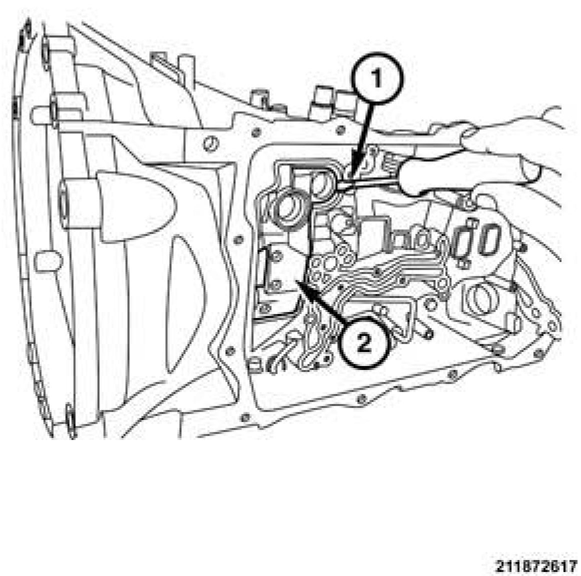
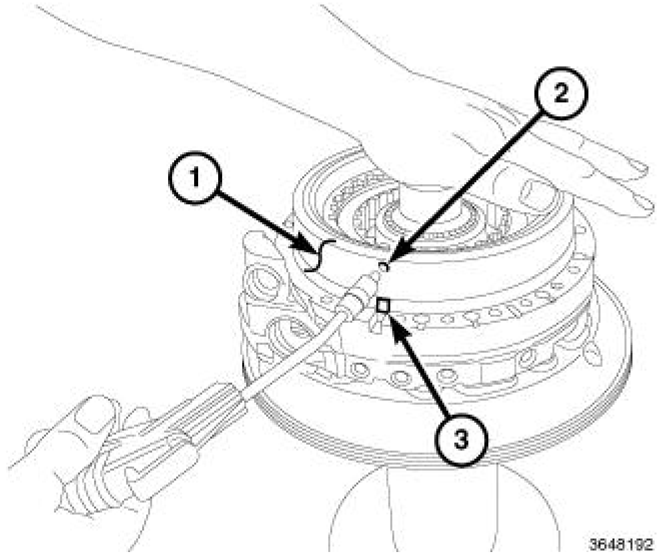


Fig. 245: Prying Oil Pump Housing Away From Case
Courtesy of CHRYSLER GROUP, LLC

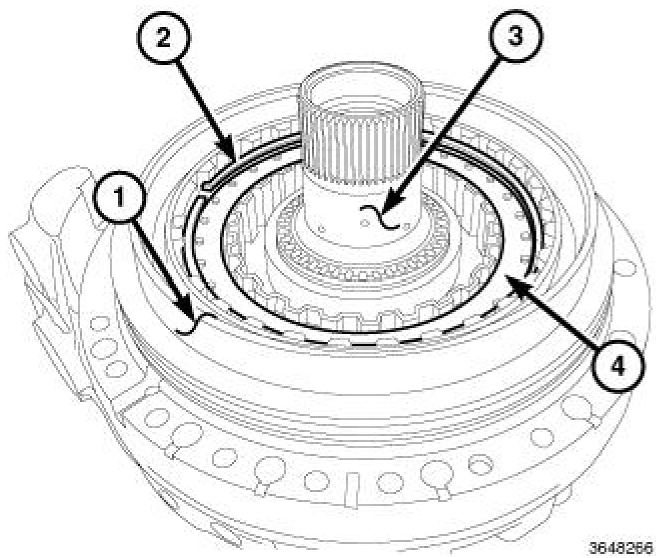
5. Carefully pry the oil pump housing (1) away from the case (2) with a small flat blade screwdriver or equivalent through the case opening.
6. From the front of the transmission, remove the oil pump housing.



[Fig. 246: B-Piston, Hole & B-Piston Alignment Tab](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply air pressure slowly, oil may spray when B-piston releases from the assembly.**

7. With one hand above B-piston (1), carefully apply air pressure into the hole directly above the B-piston alignment tab (3) to remove B-piston (2) from the assembly.



[Fig. 247: Outer Ring, Snap Ring, Hub & Spacers](#)
Courtesy of CHRYSLER GROUP, LLC

8. Remove the outer ring (1) (inside B-piston).
9. Remove the snap ring (2).
10. Remove the clutches and spacers (4).
11. Remove the hub (3).

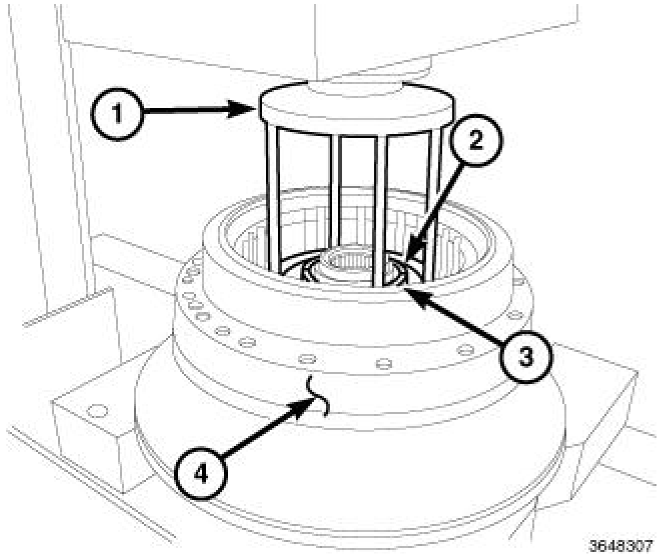


Fig. 248: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

12. Position the oil pump housing assembly (4) in a suitable press.
13. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer to remove tension on the split retaining ring (2), and remove the two halves of the retaining ring (2).

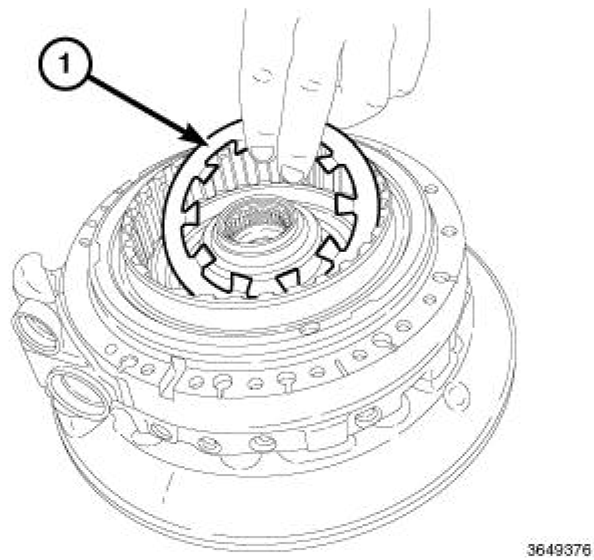


Fig. 249: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

14. Remove the piston retainer and plate.

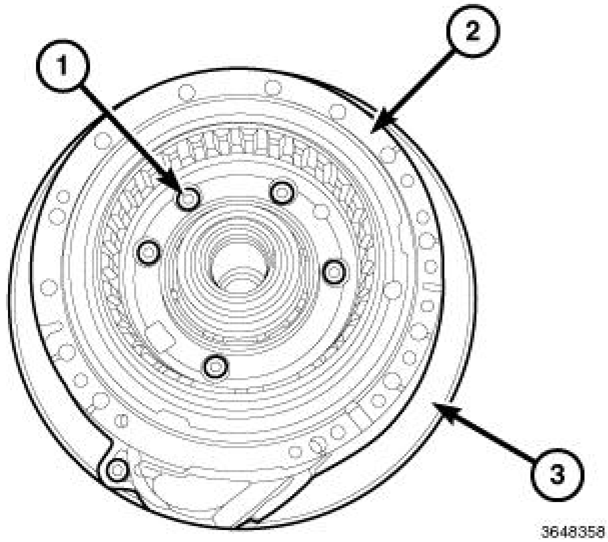


Fig. 250: Six Bolts, Oil Pump Housing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

15. Remove the five bolts (1) and separate the oil pump housing (2) from the front oil pump cover (3).

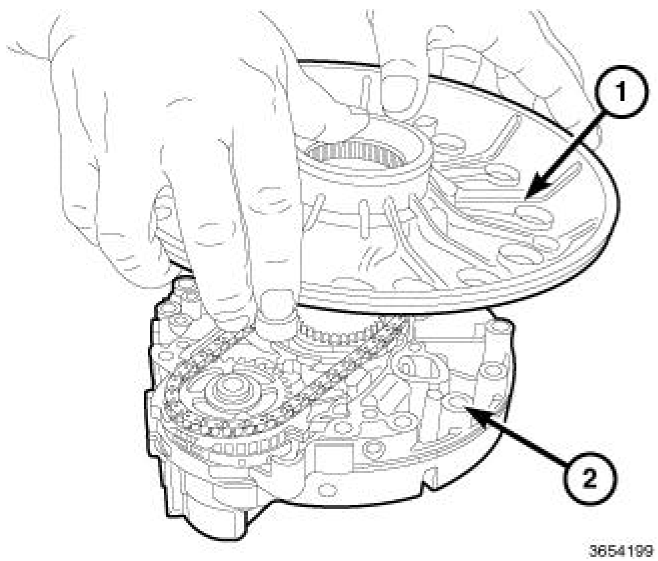


Fig. 251: Front Cover & Oil Pump Housing
Courtesy of CHRYSLER GROUP, LLC

16. Separate the front cover (1) from the oil pump housing (2).

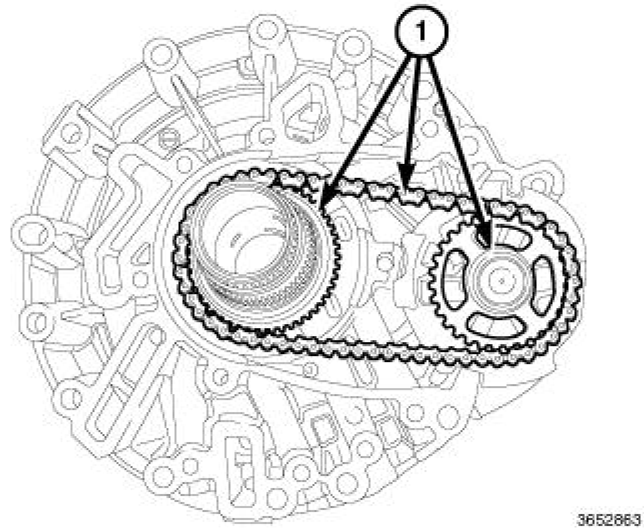


Fig. 252: Drive Sprocket, Chain And Pump Body
Courtesy of CHRYSLER GROUP, LLC

17. Remove the drive sprocket, chain and pump body (1) as an assembly.
18. Remove and discard all O-rings.

DISASSEMBLY

DISASSEMBLY

1. Remove the oil supply from the transmission case. Refer to **PUMP, TRANSMISSION OIL, REMOVAL**.

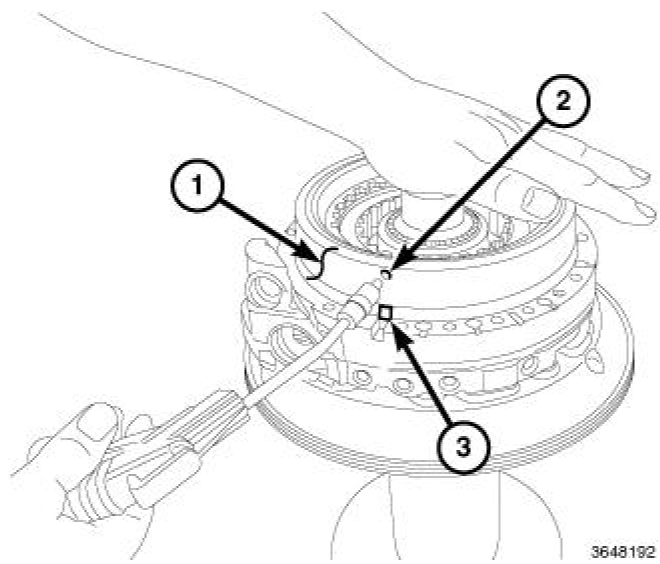


Fig. 253: B-Piston, Hole & B-Piston Alignment Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply air pressure slowly, oil may spray when B-piston releases from the assembly.**

2. With one hand above B-piston (1), carefully apply air pressure into the hole directly above the B-piston

alignment tab (3) to remove B-piston (2) from the assembly.

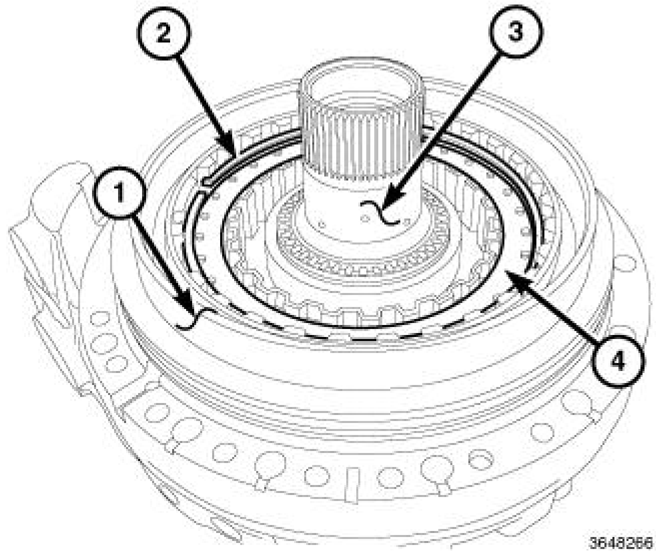


Fig. 254: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

3. Remove the outer ring (1) (inside B-piston).
4. Remove the snap ring (2).
5. Remove the clutches and spacers (4).
6. Remove the hub (3).

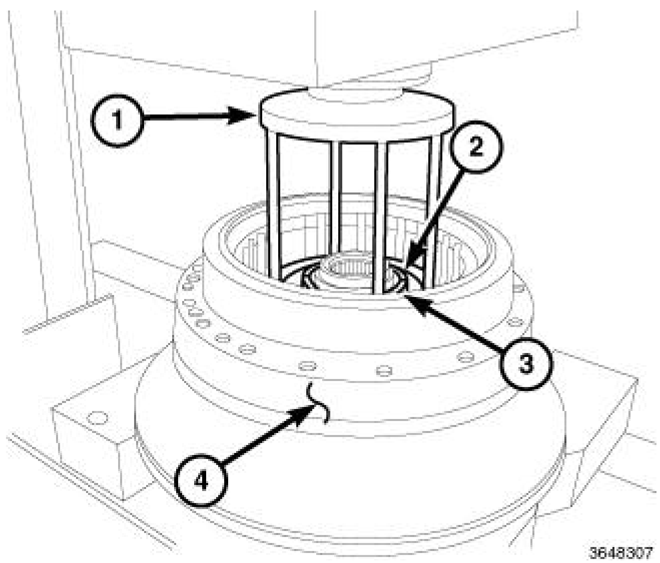


Fig. 255: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

7. Position the oil pump housing assembly (4) in a suitable press.
8. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer to remove tension on the split retaining ring (2), and remove the two halves of the retaining ring (2).

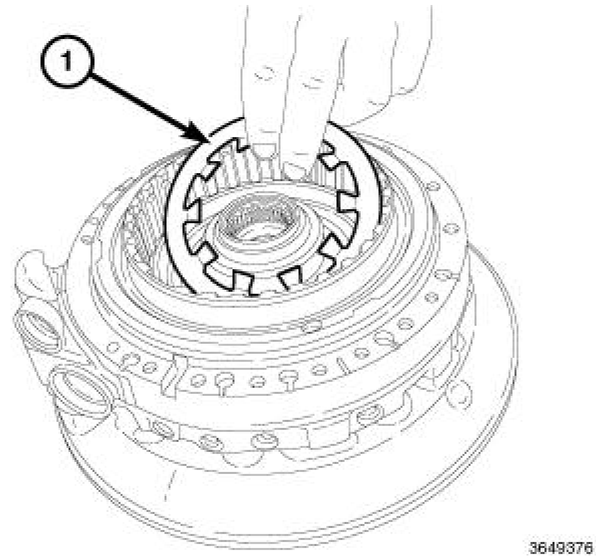


Fig. 256: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

9. Remove the piston retainer and plate.

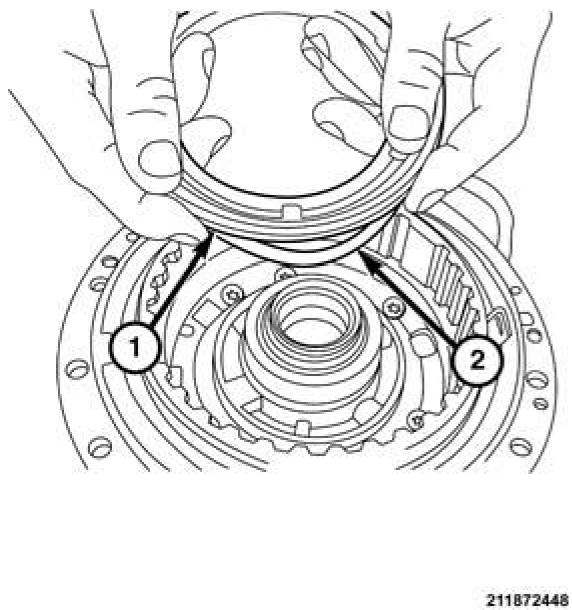


Fig. 257: A-Piston & Seal
Courtesy of CHRYSLER GROUP, LLC

10. Remove the A-piston (1) and seal (2) from the oil pump.

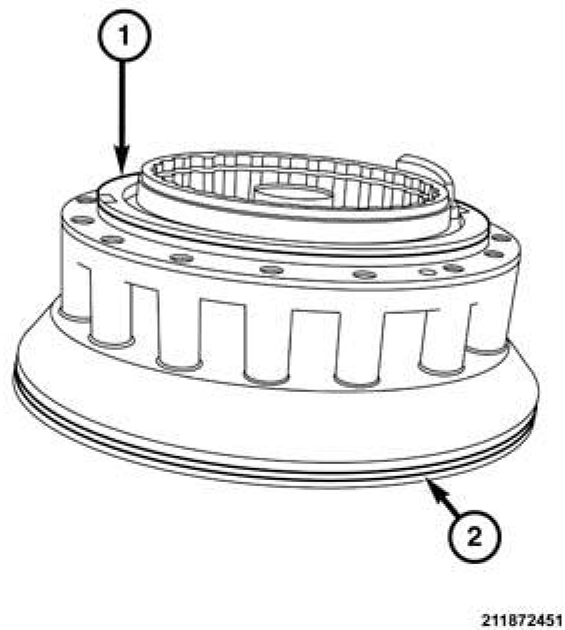


Fig. 258: Inner & Outer Oil Pump O-Rings
Courtesy of CHRYSLER GROUP, LLC

11. Remove the inner (1) and outer (2) oil pump O-rings.

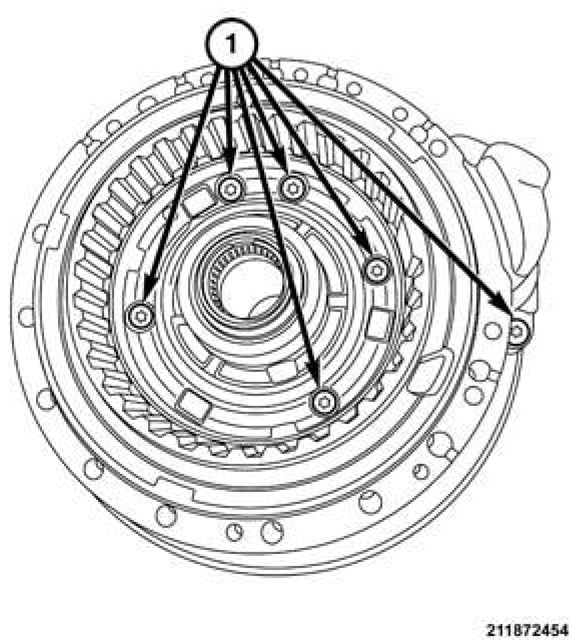


Fig. 259: Oil Pump Torx(R) Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove the six TorxÃ® bolts (1) from the oil pump.

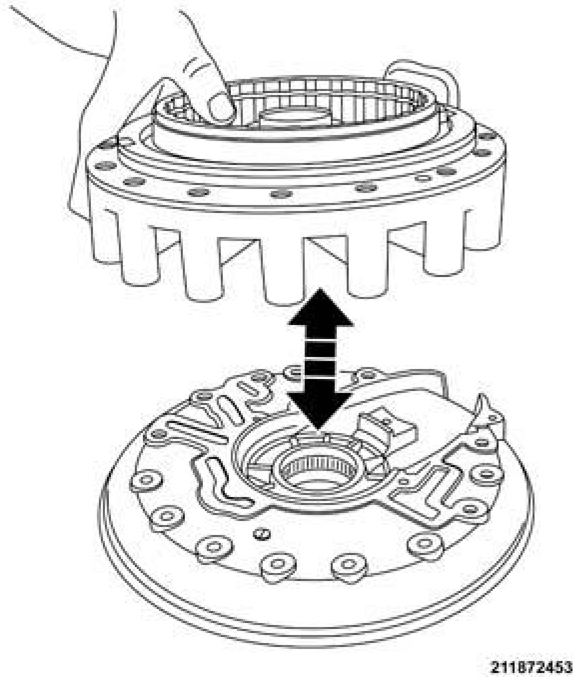


Fig. 260: Two Halves Of Oil Pump
Courtesy of CHRYSLER GROUP, LLC

13. Separate the two halves of the oil pump, by pushing on the hub.

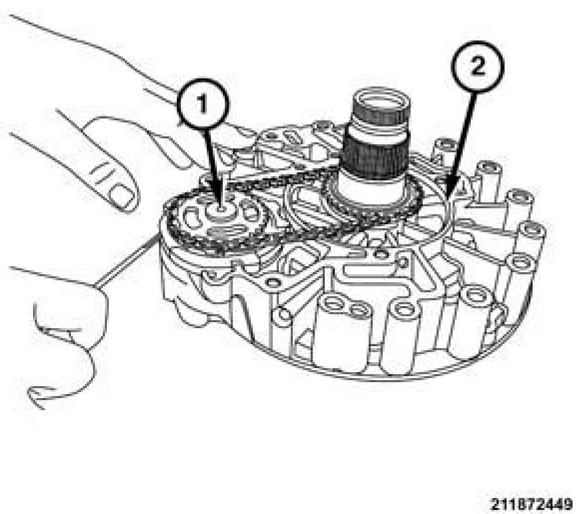


Fig. 261: Prying Up On Oil Pump & Separating It From The Housing
Courtesy of CHRYSLER GROUP, LLC

14. Carefully pry up on the oil pump (1), separating it from the housing (2).

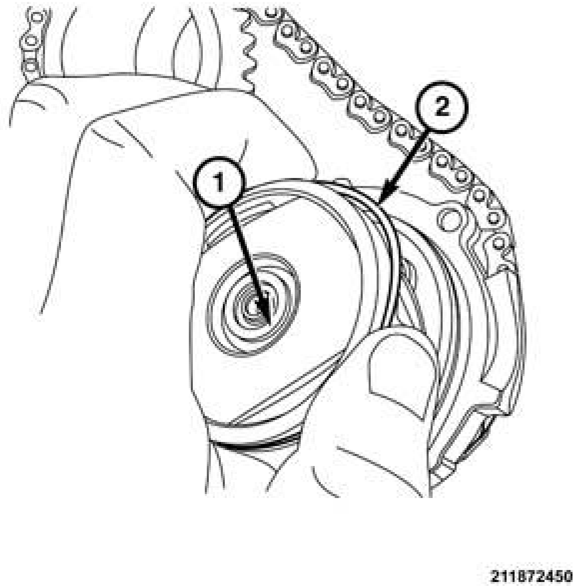


Fig. 262: Oil Pump Housing & O-Ring
Courtesy of CHRYSLER GROUP, LLC

15. Remove the oil pump O-ring (2).

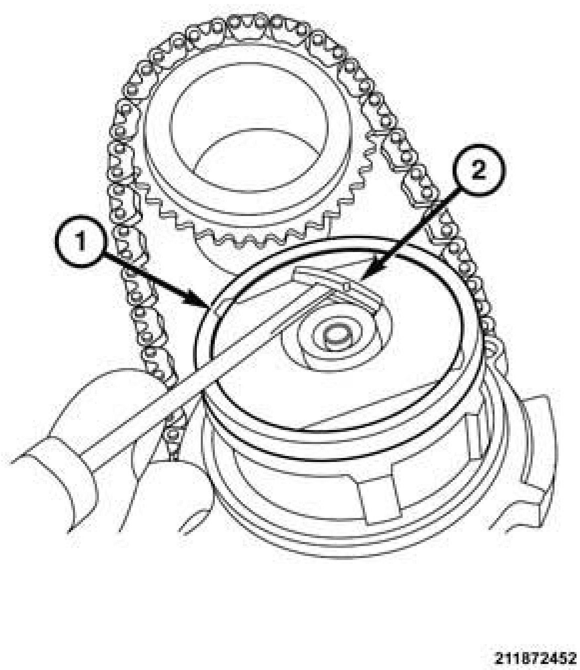


Fig. 263: Removing Oil Pump O-Ring
Courtesy of CHRYSLER GROUP, LLC

16. Remove the oil pump seal (2).

ASSEMBLY

TRANSMISSION OIL PUMP

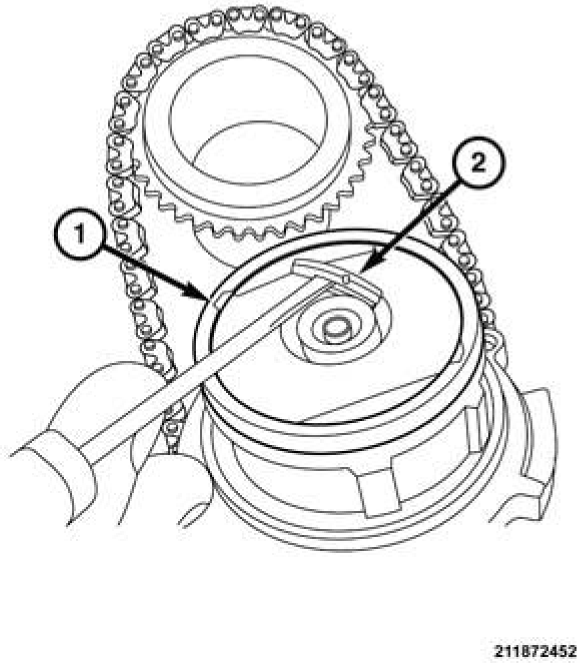


Fig. 264: Removing Oil Pump O-Ring
Courtesy of CHRYSLER GROUP, LLC

1. Install the transmission oil pump seal (2).

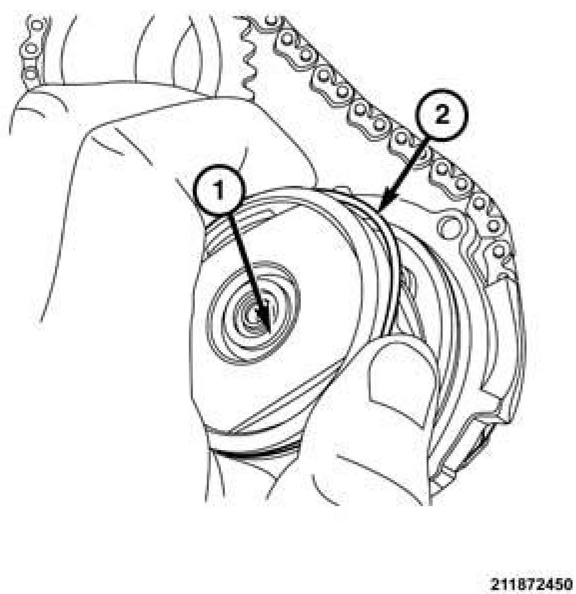


Fig. 265: Oil Pump Housing & O-Ring
Courtesy of CHRYSLER GROUP, LLC

2. Install the transmission oil pump O-ring (2).
3. Carefully seat the transmission oil pump into the housing, make sure the pump is seated properly.

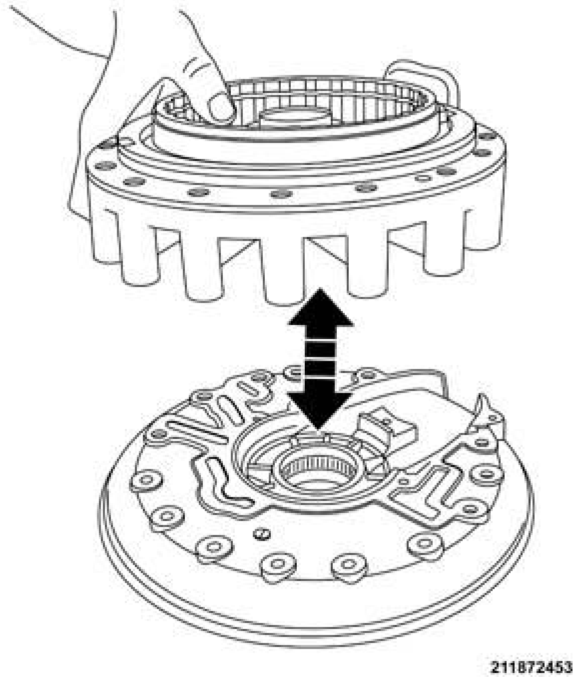


Fig. 266: Two Halves Of Oil Pump
Courtesy of CHRYSLER GROUP, LLC

4. Install the two transmission oil pump housing halves together.

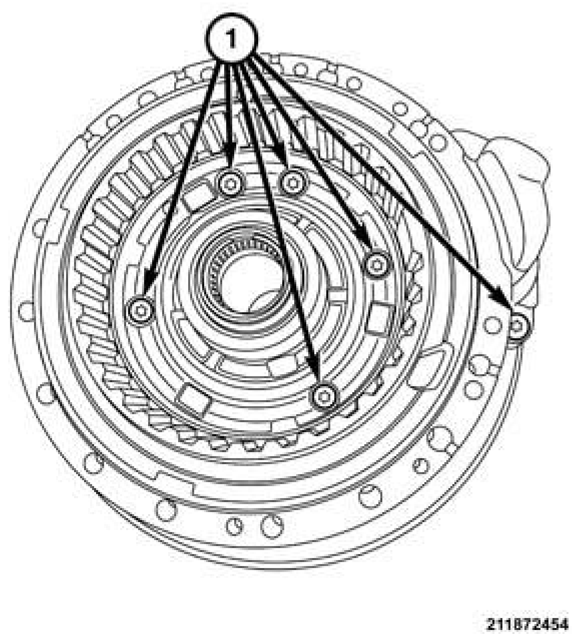


Fig. 267: Oil Pump Torx(R) Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install six

NEW

transmission oil pump housing TorxÂ® bolts (1).

6. Tighten the bolts to 5 N.m (44 in. lbs). plus 45Â°.

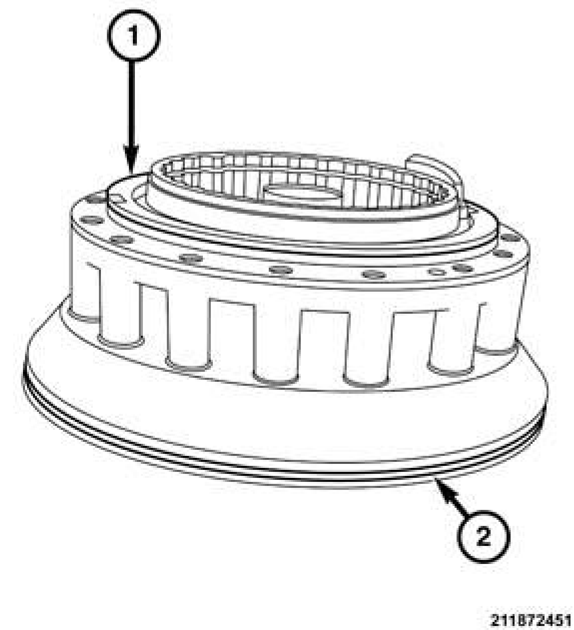


Fig. 268: Inner & Outer Oil Pump O-Rings
Courtesy of CHRYSLER GROUP, LLC

7. Replace the inner and outer transmission oil pump housing O-rings (1).

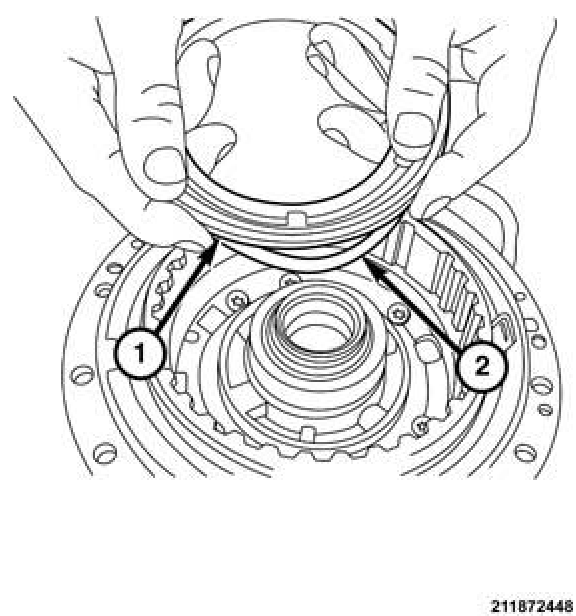


Fig. 269: A-Piston & Seal
Courtesy of CHRYSLER GROUP, LLC

8. Replace the A- piston seal (2) and install the A-piston (1).

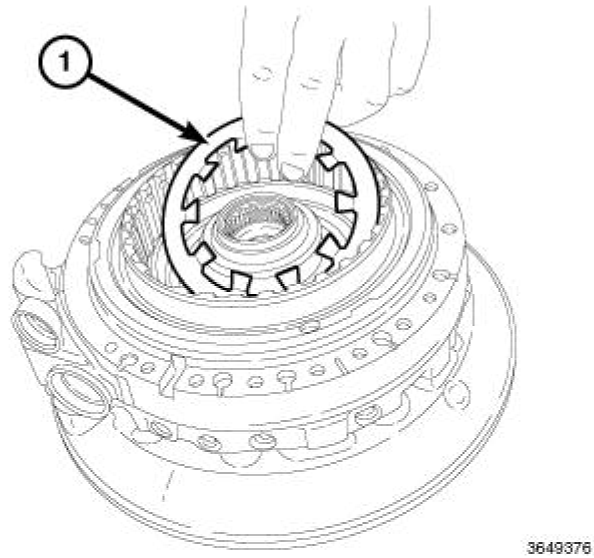


Fig. 270: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

9. Install the belleville spring (1).

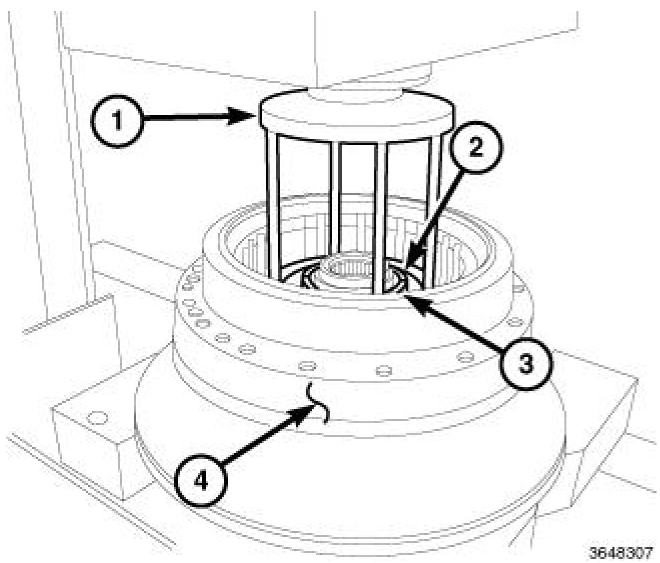
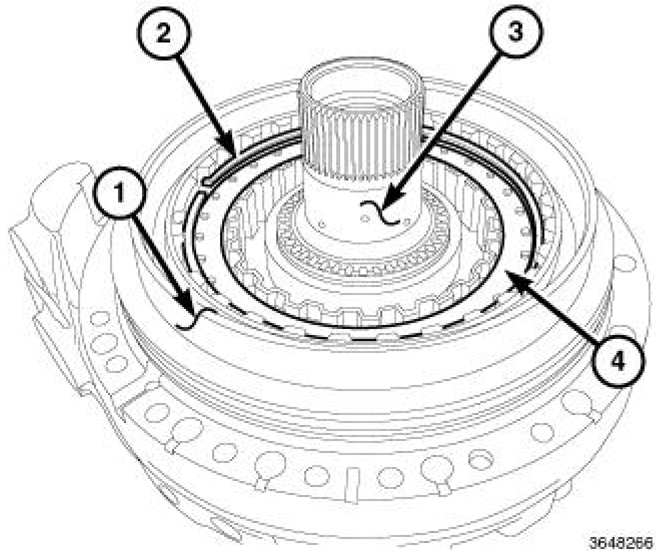


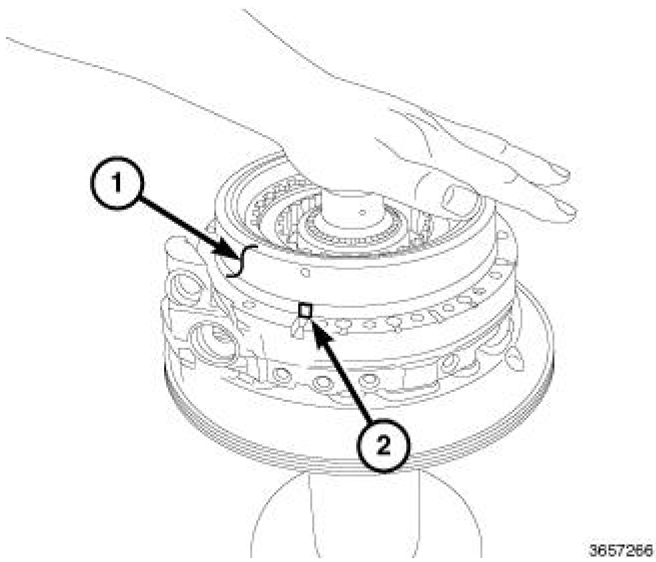
Fig. 271: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

10. Position the transmission oil pump housing assembly (4) in a suitable arbor press.
11. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and install the two halves of the split retainer ring (2).



[Fig. 272: Outer Ring, Snap Ring, Hub & Spacers](#)
Courtesy of CHRYSLER GROUP, LLC

12. Install the hub (3).
13. Install the clutches and spacers (4).
14. Install the snap ring (2).
15. Install the outer ring (1) (below B-piston).



[Fig. 273: B-Piston Alignment Tab & B-Piston](#)
Courtesy of CHRYSLER GROUP, LLC

16. Position the B-piston alignment tab (2) above the notch and install B-piston (1) on the assembly.
17. Install the transmission oil pump. Refer to **PUMP, TRANSMISSION OIL, INSTALLATION** .

INSTALLATION

INSTALLATION

NOTE: **If oil pump was disassembled, replace all O-rings.**

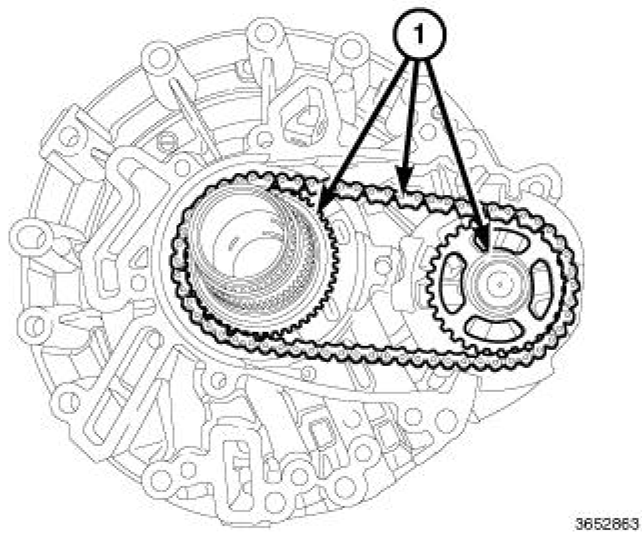


Fig. 274: Drive Sprocket, Chain And Pump Body
Courtesy of CHRYSLER GROUP, LLC

1. Install the drive sprocket, chain and pump body (1) as an assembly into the oil pump housing.

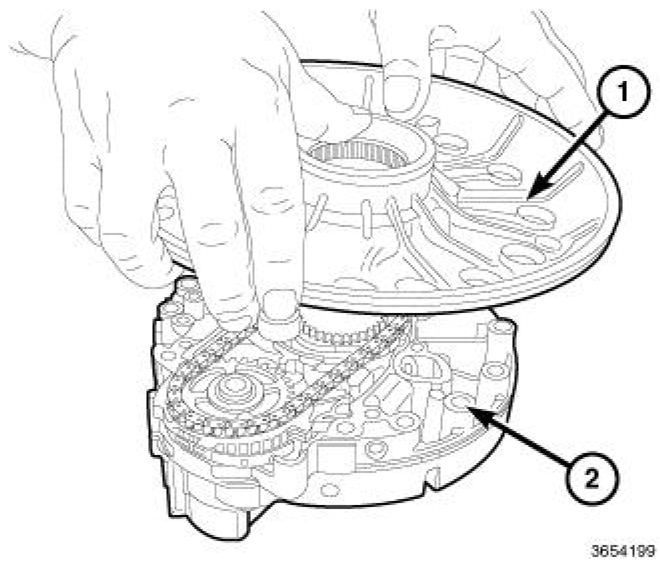
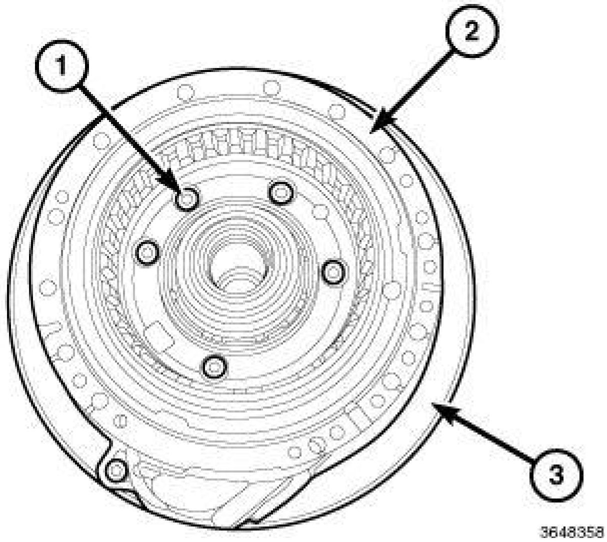


Fig. 275: Front Cover & Oil Pump Housing
Courtesy of CHRYSLER GROUP, LLC

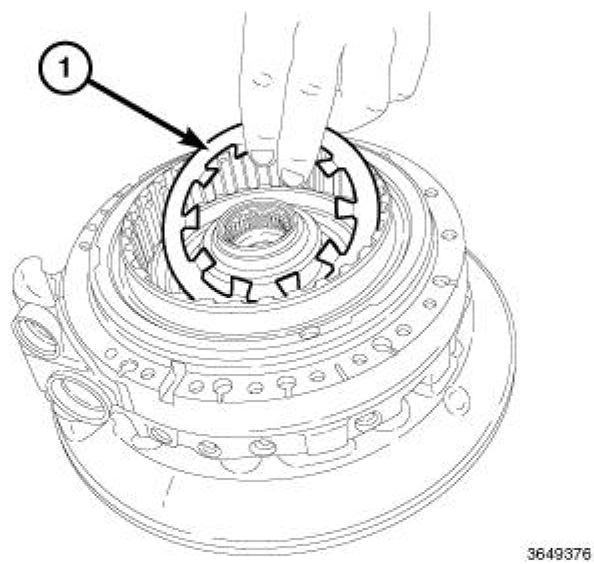
2. Set the pump cover (1) onto the oil pump housing (2).



[Fig. 276: Oil Pump Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

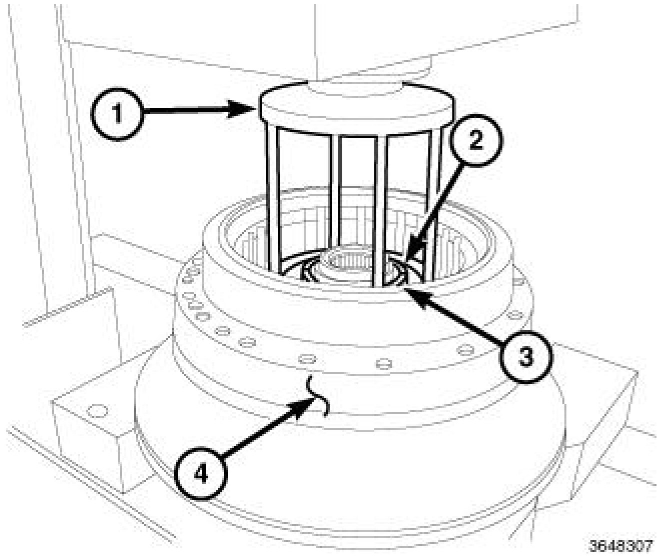
NOTE: The oil pump bolts under the A-clutch must be replaced.

3. Install the **NEW** six bolts (1) and tighten to 5 N.m (44 in. lbs.) plus 45Â°.



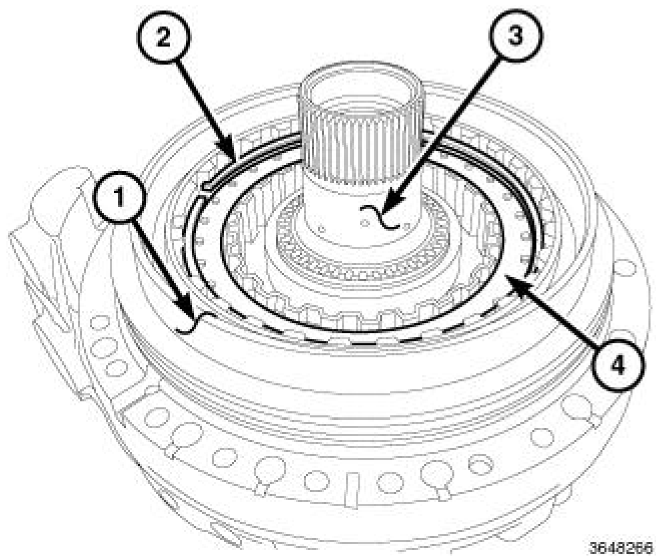
[Fig. 277: Piston Retaining Ring And Piston](#)
Courtesy of CHRYSLER GROUP, LLC

4. Install the piston plate and the piston retainer.



[Fig. 278: Oil Pump Housing Assembly]
Courtesy of CHRYSLER GROUP, LLC

5. Position the oil pump housing assembly (4) in a suitable arbor press.
6. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer and install the two halves of the retaining ring (2).



[Fig. 279: Outer Ring, Snap Ring, Hub & Spacers]
Courtesy of CHRYSLER GROUP, LLC

7. Install the hub (3).
8. Install the clutches and spacers (4).
9. Install the snap ring (2).
10. Install the outer ring (1) (inside B-piston).
11. Install the B-piston.

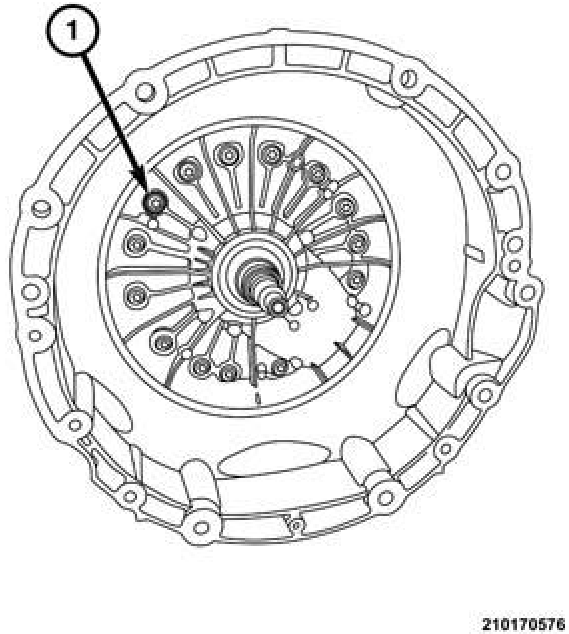


Fig. 280: Oil Pump Assembly To Case Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Firmly press the oil pump in place hand before drawing it in with bolts.

12. Install the 14 **new** oil pump cover retaining bolts (2) and tighten the oil pump cover as follows:
    a. In order to seat the oil pump cover properly, pre tighten bolts one, seven and nine to 6 N.m (53 in. lb.).
    b. Working in a clockwise pattern, beginning with number one, tighten to 10 N.m (89 in. lb.).
    c. Working in a clockwise pattern, beginning with number one, tighten an additional 90Â°.

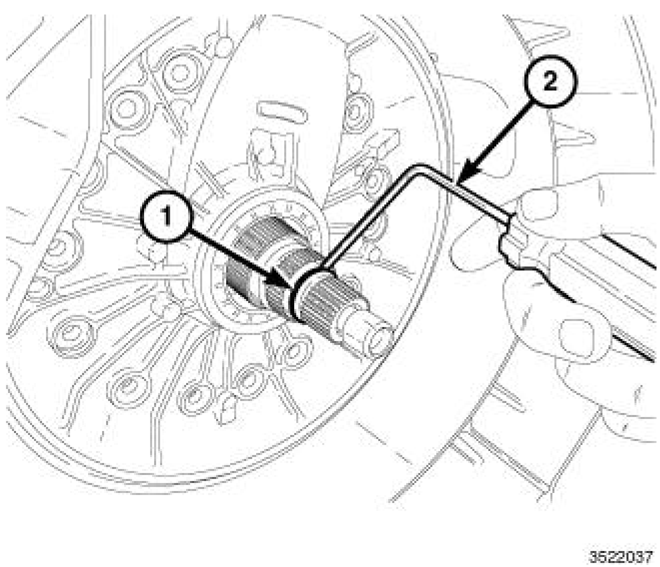


Fig. 281: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

13. Install the **new** input shaft O-ring (1).
14. Install the valve body. Refer to **VALVE BODY, INSTALLATION**.
15. Install the transmission. Refer to **INSTALLATION**.

SEAL, OUTPUT SHAFT

REMOVAL

OUTPUT SHAFT SEAL

CAUTION: Do not allow the propeller shaft to hang from the vehicle unsupported. Damage may occur to the joint, boot, and center bearing from over-angulation.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

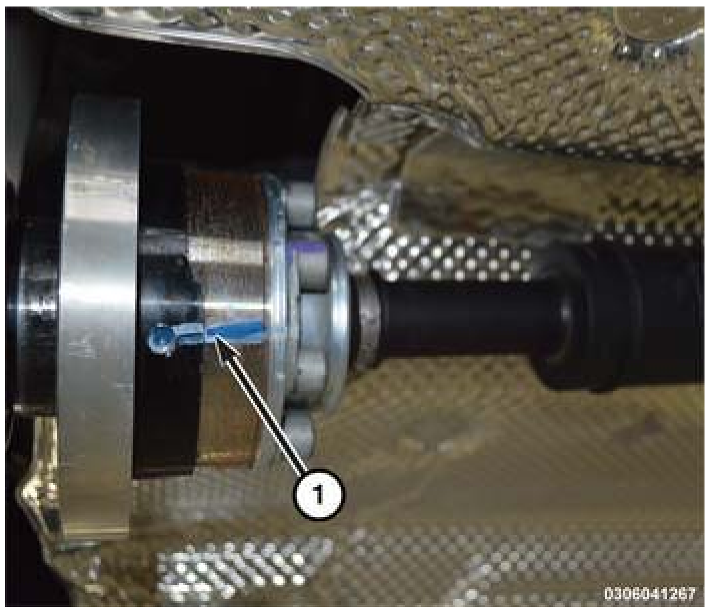


Fig. 282: Alignment Index Marks
Courtesy of CHRYSLER GROUP, LLC

2. Apply alignment index mark (1) to the transmission flange.

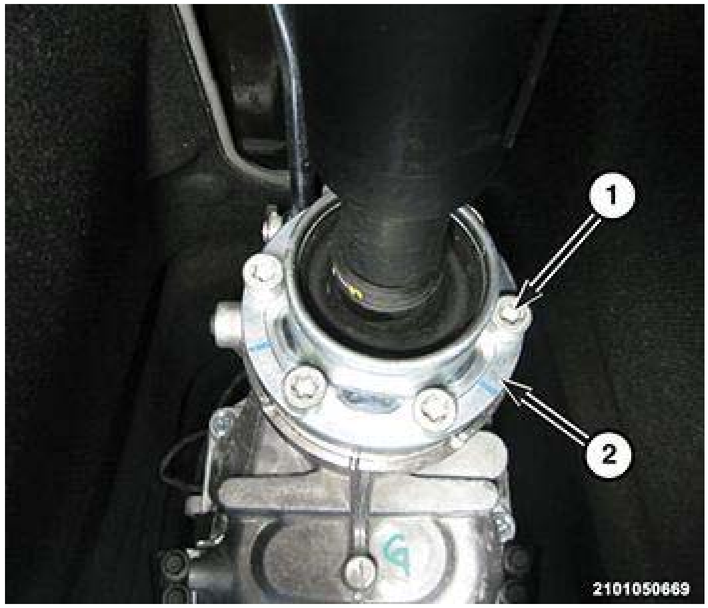


Fig. 283: Bolts And Washers & Transmission Flange
Courtesy of CHRYSLER GROUP, LLC

3. Remove the drive shaft bolts to transmission flange and position aside the drive shaft. Secure the drive shaft with a strap or equivalent.

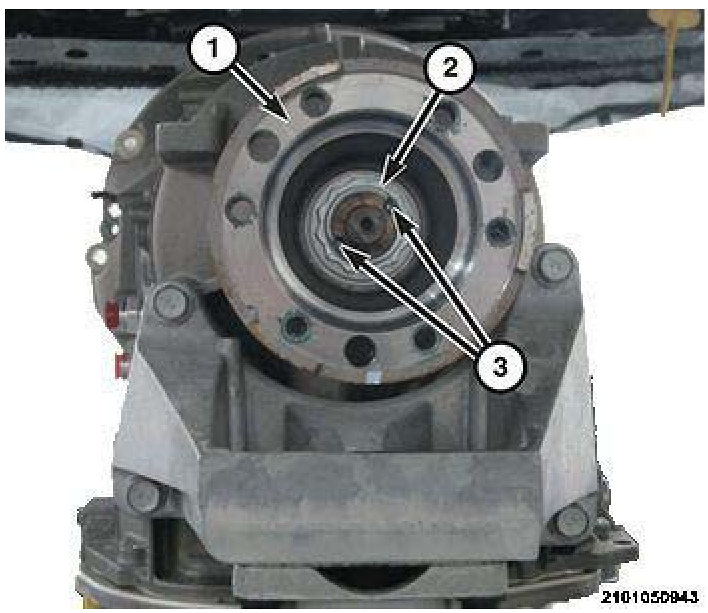


Fig. 284: Drive Shaft Flange, Nut & Staking Area
Courtesy of CHRYSLER GROUP, LLC

4. Using a suitable punch, remove the staking (3) from the drive shaft nut (2).
5. Remove the drive shaft flange nut (2) using a 34 mm 12 point socket (3) and (special tool #C-3281, Holder, Flange) (2) to hold the flange (1).
6. Remove the flange and flange dust seal.
7. Remove the output shaft seal with suitable screw and slide hammer.

INSTALLATION

OUTPUT SHAFT SEAL

CAUTION: The seal must be installed flush with the case. Driving the seal deeper could damage the seal causing a leak.

1. Position the new output shaft seal over the output shaft and against the transmission case.
2. Using (special tool #9677, Installer, Seal) install the output shaft seal.
3. Verify that the transmission is in PARK in order to prepare for the installation of the output shaft nut.

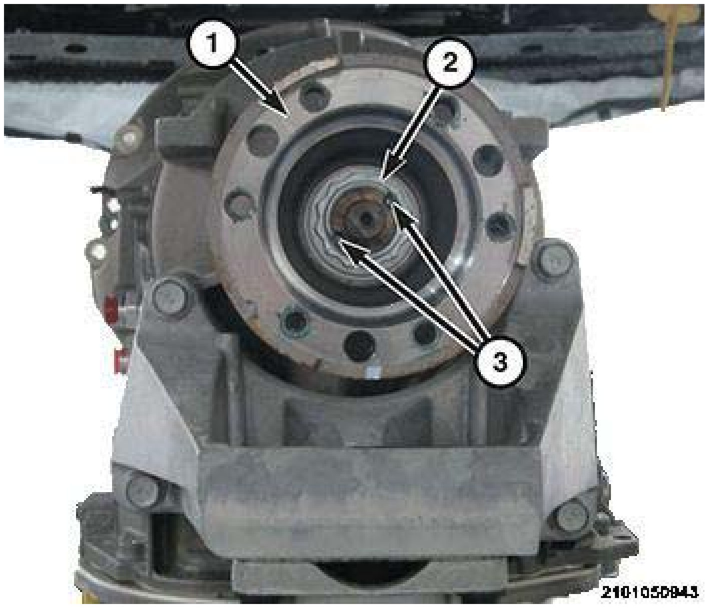


Fig. 285: Drive Shaft Flange, Nut & Staking Area
Courtesy of CHRYSLER GROUP, LLC

4. Install the drive shaft flange (1) onto the output shaft and install a **NEW** flange nut (2). Tighten the nut, with a 34 mm 12 point socket, to the proper **SPECIFICATIONS**.
5. Stake (3) the nut.
6. Install the drive shaft. Refer to **INSTALLATION** .
7. Perform the CHECK OIL LEVEL procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** or **FLUID AND FILTER, STANDARD PROCEDURE**.

SEAL, TORQUE CONVERTER HUB

REMOVAL

REMOVAL

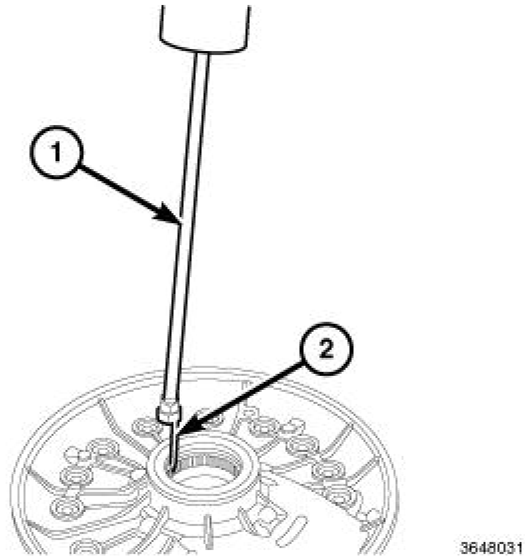


Fig. 286: Seal Remover & Slide Hammer
Courtesy of CHRYSLER GROUP, LLC

1. Remove the torque converter. Refer to **TORQUE CONVERTER, REMOVAL**.
2. Using (special tool #9667, Remover, Seal) and (special tool #C-3752, Slide Hammers) remove the torque converter hub seal.

INSTALLATION

INSTALLATION

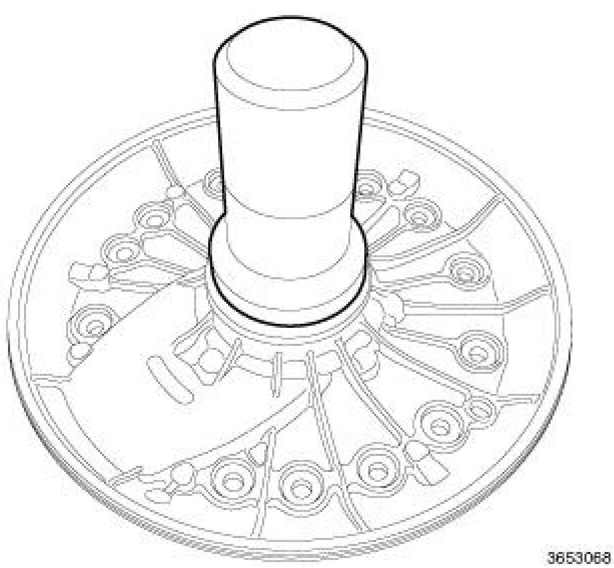


Fig. 287: Oil Pump Cover Oil Seal
Courtesy of CHRYSLER GROUP, LLC

1. Position the torque converter hub seal over the input shaft and against the transmission oil pump cover.
2. Using (special tool #10375, Installer, Oil Pump Cover Oil Seal) install a new torque converter hub seal.
3. Install the torque converter. Refer to **TORQUE CONVERTER, INSTALLATION**.

SENSOR, SPEED

DESCRIPTION

DESCRIPTION

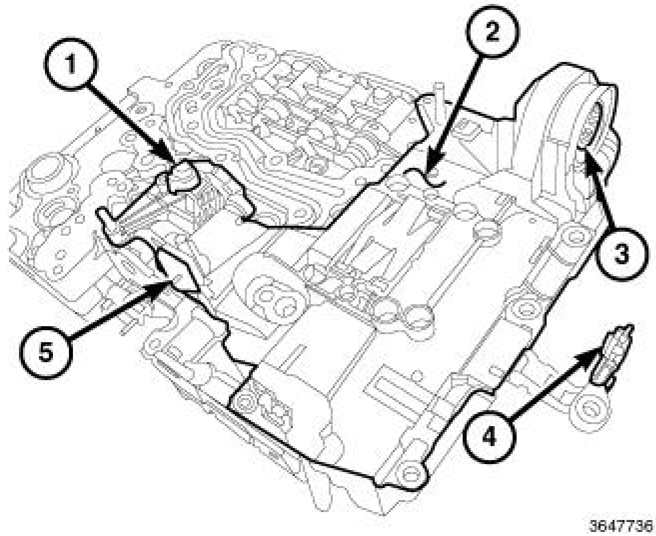


Fig. 288: Input Speed Sensor, Output Speed Sensor, Tcm (Includes Transmission Temperature Sensor) & Park Position Sensor
Courtesy of CHRYSLER GROUP, LLC

1 - Input Speed Sensor
2 - TCM (Includes Transmission Temperature Sensor)
3 - External Wire Harness Connector
4 - Output Speed Sensor
5 - Park Position Sensor
Ā

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.**

The input speed sensor (1) and the output speed sensor (4) are integrated components of the TCMA and not serviced individually.

OPERATION

OPERATION

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.**

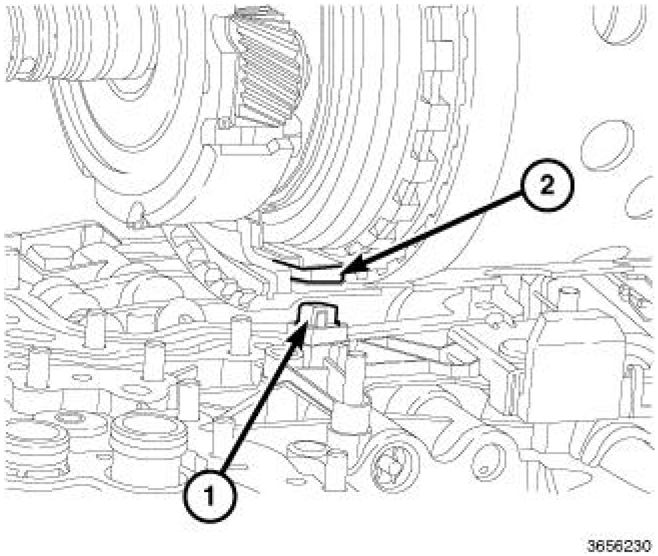


Fig. 289: ISS & Magnetic Ring
Courtesy of CHRYSLER GROUP, LLC

The input speed sensor (ISS) and output speed sensor (OSS) are Hall-effect sensors that measure shaft rotational speed. The ISS (1) is located at the front of the TCMA and reads input shaft speed from the magnetic ring (2) on the P2 carrier.

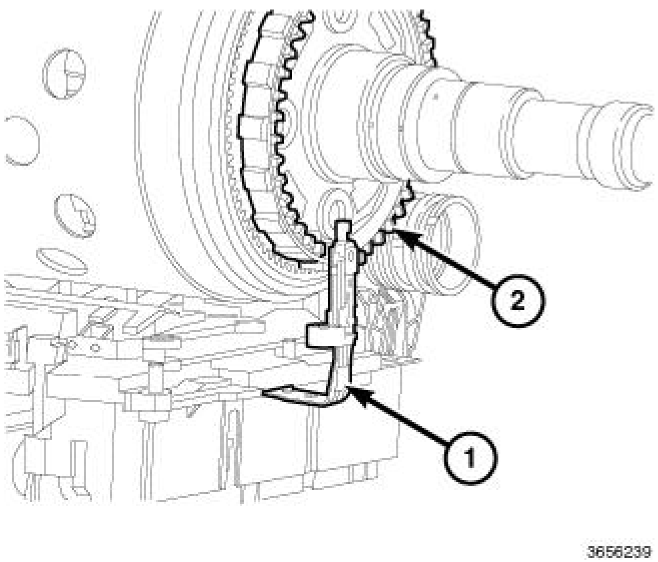


Fig. 290: OSS & P4 Carrier
Courtesy of CHRYSLER GROUP, LLC

The OSS (1) is located at the back of the TCMA and reads output shaft speed from the P4 carrier (2).

SHIFTER, TRANSMISSION

DESCRIPTION

FLOOR SHIFT

The Electronic Shifter (E-Shifter) is an electronic switch/module floor mounted device, using CAN messaging to communicate driver requests for transmission gear changes without a mechanical connection.

PADDLE SHIFT

Some vehicles may be equipped with optional paddle shift. For more information on paddle shift, refer to **SWITCH, REMOTE RADIO, DESCRIPTION** .

OPERATION

FLOOR SHIFT

The E-Shifter:

- communicates with the Transmission Control Module (TCM) via a Controller Area Network (CAN).
- incorporates a solenoid that allows the lever to be locked for purposes of Brake Transmission Shift Interlock (BTSI) function.
- lever-lock function is controlled electronically by the TCM via CAN message, and mechanically by the release trigger on the knob.
- indicates the selected/non-selected gears provided via illumination of PRNDM+- characters on knob.
- lever-position feedback is provided via mechanical detents, which also keep the lever in the desired position.
- communicates driver requests for transmission gear changes without a mechanical connection.
- is comprised of an upper knob and a lower base, which can be serviced separately.
- on some models, may have steering wheel-mounted paddle shifters available. Refer to **SWITCH, REMOTE RADIO, DESCRIPTION** .

The Electronic Shifter (E-Shifter) offers (P, R, N, D, M) modes of function.

The M selection (manual mode) is engaged by moving the shift-lever sideways to M. Requests to up/down shift are achieved by moving the lever fore/aft once in the manual position.

PADDLE SHIFT

Some vehicles may be equipped with optional steering wheel paddle shifters.

The steering wheel paddle shifters may be enabled or disabled in the default drive mode. The vehicle will start in default mode unless it is in valet mode.

To enable the steering wheel paddle shifters, press the **ON** button on the touchscreen.

To disable the steering wheel paddle shifters, press the **OFF** button on the touchscreen.

Fig. 291: Paddle Shifter Enable/Disable Screen
Courtesy of CHRYSLER GROUP, LLC

For additional information, refer to **SWITCH, REMOTE RADIO, OPERATION** .

STANDARD PROCEDURE

MANUAL PARK RELEASE DISENGAGE

The Manual Park Release (MPR) lever is used for putting the transmission in neutral anytime the vehicle needs to be moved with the engine off in neutral. This is achieved by a cable attached to the transmission park pawl. When the cable is pulled, the transmission is put into neutral, and when the cable is released, the transmission is back into park.

WARNING: **Always secure your vehicle by fully applying the parking brake, before activating the Manual Park Release. Activating the Manual Park Release will allow your vehicle to roll away if it is not secured by the parking brake or by proper connection to a tow vehicle. Activating the Manual Park Release on an unsecured vehicle could lead to serious injury or death for those in or around the vehicle.**

NOTE: **Apply the parking brake.**

Fig. 292: Manual Park Release Lever Access Panel
Courtesy of CHRYSLER GROUP, LLC

1. Remove the Manual Park Release (MPR) lever access panel (1).

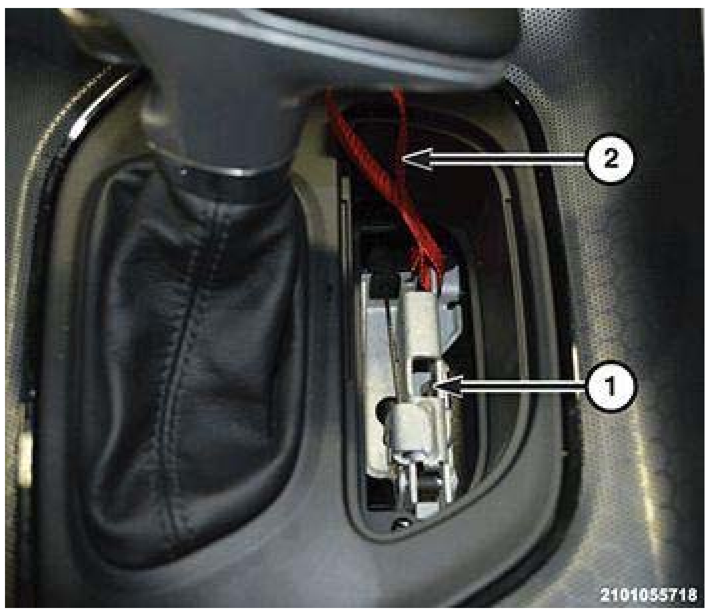


Fig. 293: Locking Tab & Tether
Courtesy of CHRYSLER GROUP, LLC

2. Release the locking tab (1) with a screw driver or equivalent and pull the tether (2).
3. While holding the locking tab (1) to the right, pull the tether (2) up and rearward, until it locks in place in the vertical position. The transmission is now out of park, and the vehicle can be moved.

MANUAL PARK RELEASE ENGAGE

Fig. 294: Releasing Locking Tab
Courtesy of CHRYSLER GROUP, LLC

1. Push the Manual Park Release (MPR) lever rearward, and use a small screwdriver or equivalent to release the locking tab (1).

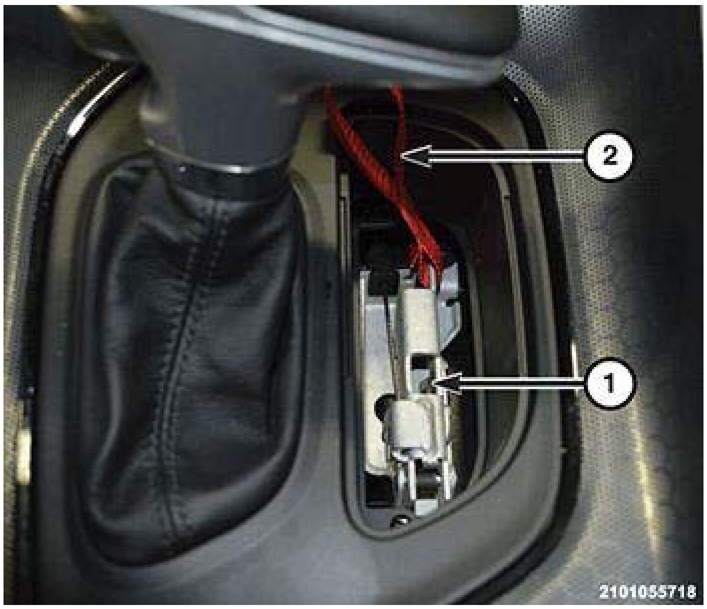


Fig. 295: Locking Tab & Tether
Courtesy of CHRYSLER GROUP, LLC

2. Allow the MPR lever to return to the engaged position.
3. Make sure that the locking tab (1) is in position, gently pull on the tether (2) to confirm the lever is locked.

Fig. 296: Manual Park Release Lever Access Panel
Courtesy of CHRYSLER GROUP, LLC

4. Install the MPR lever access panel.

REMOVAL

REMOVAL

1. Apply the parking brake.
2. Using a trim stick or equivalent, carefully release the retaining clips and lift the shifter bezel.

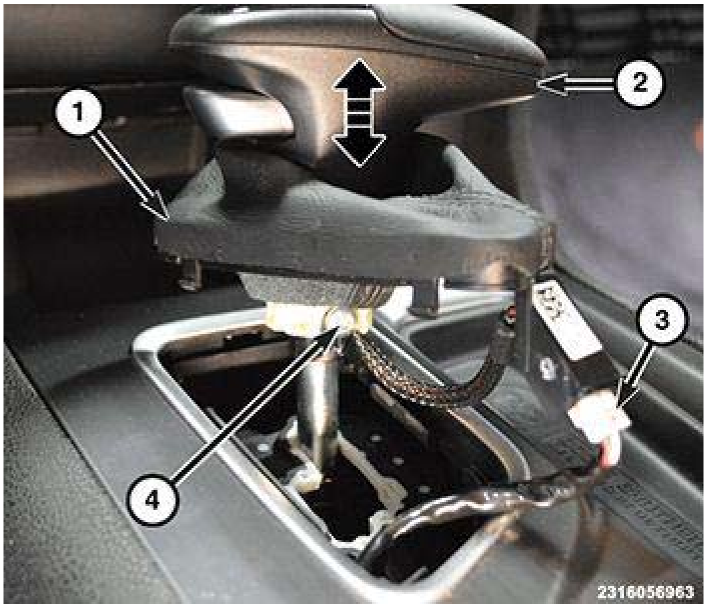


Fig. 297: Shifter Bezel, Knob, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

3. Unplug the wire harness connector (3) between the knob and lower base.

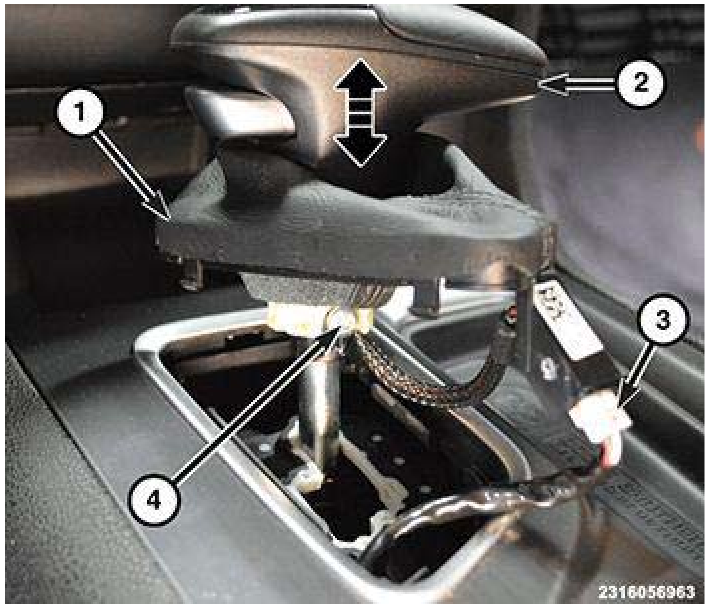


Fig. 298: Shifter Bezel, Knob, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

4. Remove the shifter knob screw (4) and remove the shifter knob (2) and shifter bezel (1).

Fig. 299: Bezel Panel & Trim Stick
Courtesy of CHRYSLER GROUP, LLC

5. Using a trim stick (2) or equivalent, starting at the rear of the console bezel panel (1), carefully release the retaining clip and lift the console bezel panel. Disconnect the wire harness connectors and remove the console bezel panel.

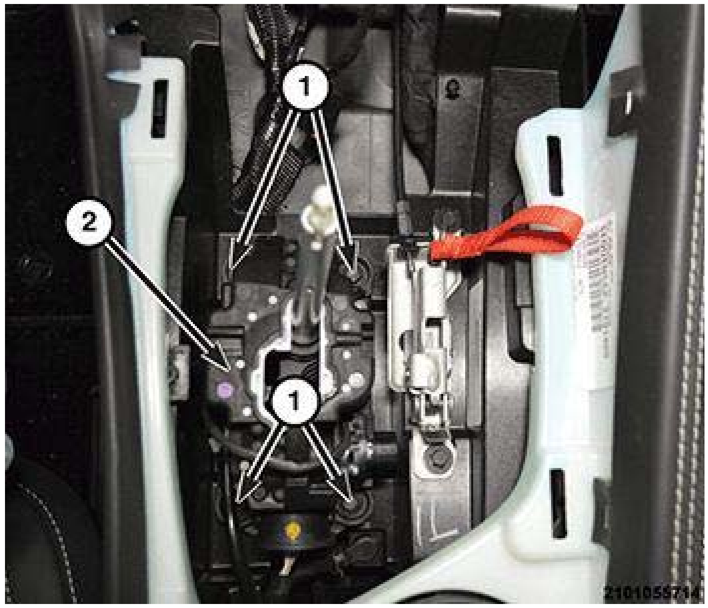


Fig. 300: Shifter Assembly & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the shifter bolts (1) and lift the shifter assembly (2) up enough to allow access to the shifter wire harness connector.

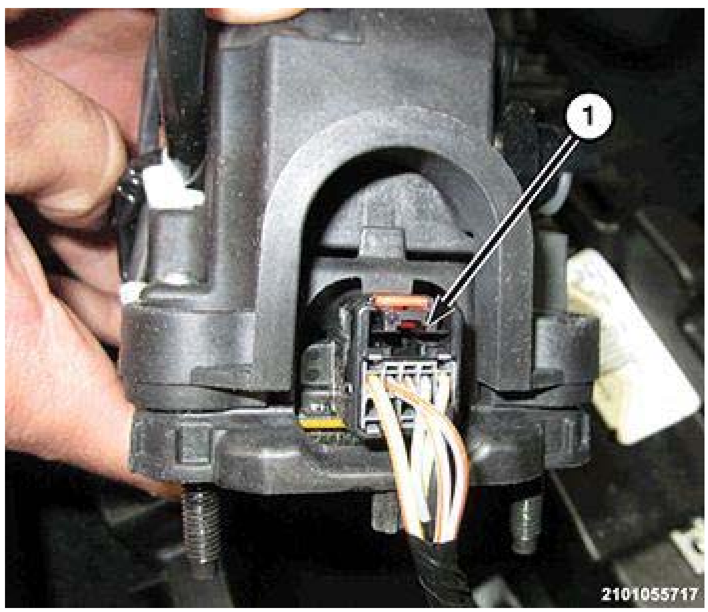


Fig. 301: Shifter Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the shifter wire harness connector (1).
8. Remove the shifter from the vehicle.

INSTALLATION

INSTALLATION

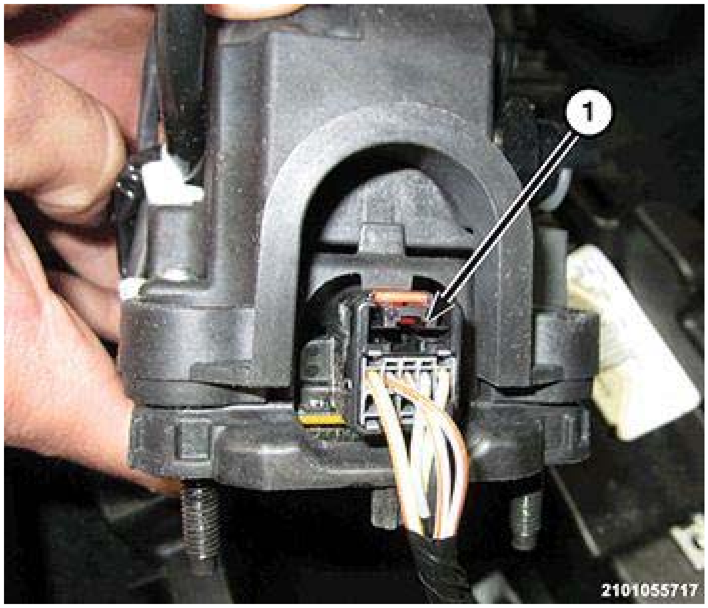


Fig. 302: Shifter Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Position the shifter assembly in place and connect the shifter wire harness connector (1).

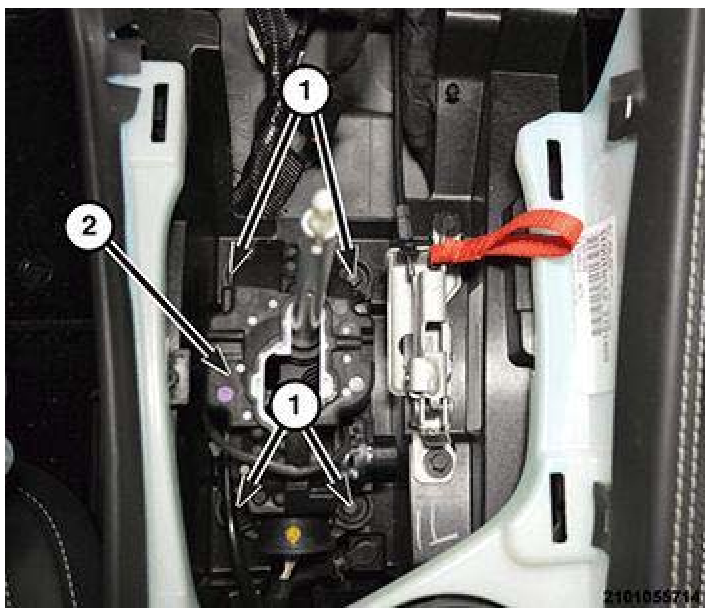


Fig. 303: Shifter Assembly & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the shifter bolts (1) and tighten to the proper **SPECIFICATIONS** .

Fig. 304: Bezel Panel & Trim Stick
Courtesy of CHRYSLER GROUP, LLC

3. Install the shifter bezel panel (1).

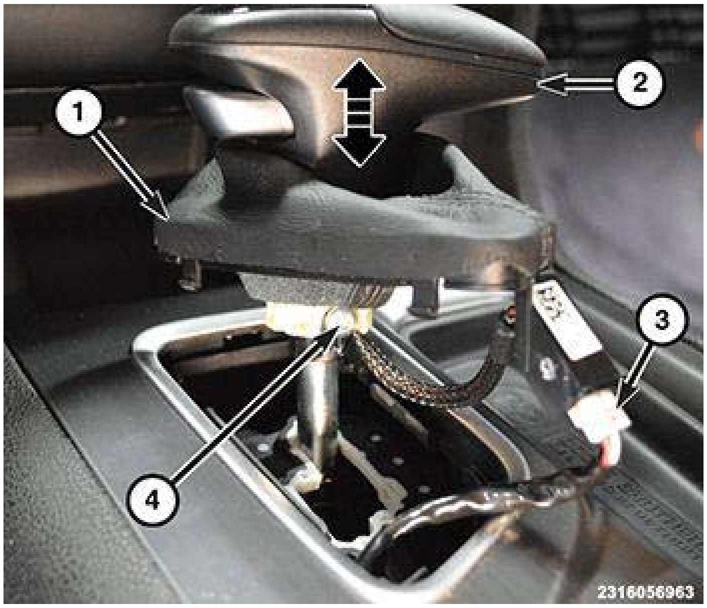


Fig. 305: Shifter Bezel, Knob, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

4. Install the shifter knob (2) and bezel (1).
5. Install the shifter knob screw (4).
6. Connect the shifter wire harness connector (3).

SOLENOID, TRANSMISSION

DESCRIPTION

DESCRIPTION

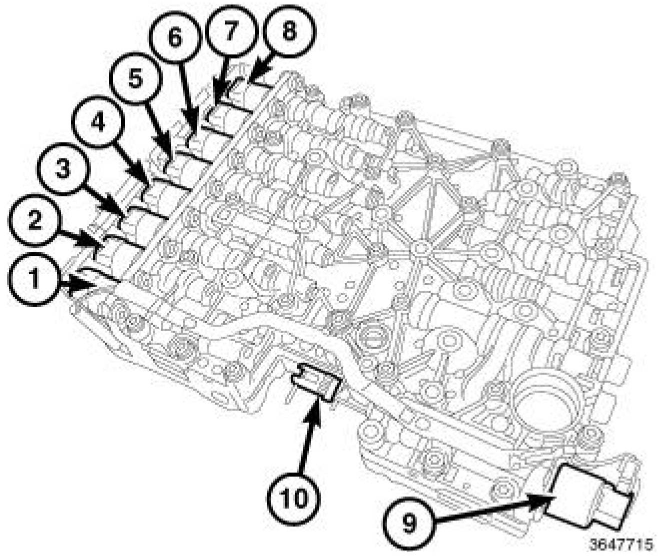


Fig. 306: Solenoid A D E C & Park Release Mechanical Valve
Courtesy of CHRYSLER GROUP, LLC

1 - Solenoid A
2- Solenoid D
3 - Solenoid B
4 - Solenoid E
5 - Solenoid C
6 - TCC Solenoid
7 - Line Pressure Solenoid
8 - Park Release Solenoid
9 - Park Hold Mechanical Solenoid
10 - Park Release Mechanical Valve

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The solenoids are integrated into the Transmission Control Module Assembly (TCMA) of the 8HP transmission and are not replaceable individually.

OPERATION

OPERATION

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The TCM will actuate the valves via solenoids based on the position of the shifter, transmission fluid temperature, engine operating conditions, traction conditions, and driver demands. During a shift, the TCM will actuate the solenoids to match the gear ranges to the optimal torque range of the engine based on the position of the accelerator pedal, shifter, and vehicle speed as determined by the PCM based on input from the Vehicle Speed Sensor (VSS) and ABS module.

TORQUE CONVERTER

DESCRIPTION

DESCRIPTION

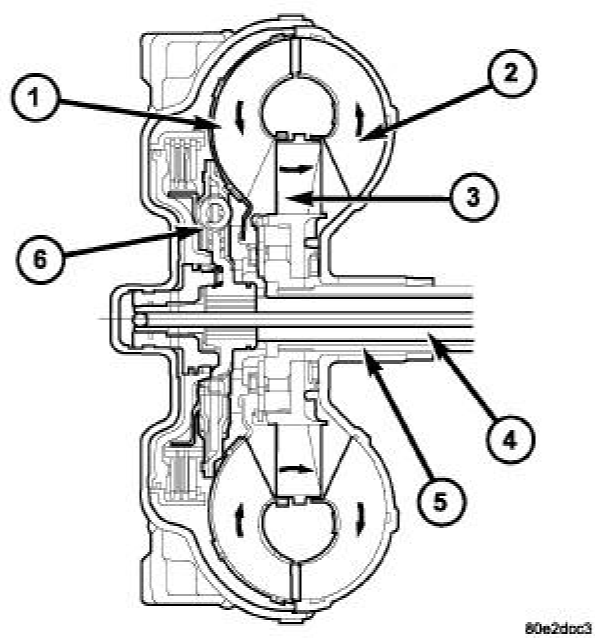


Fig. 307: Torque Converter
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - TURBINE DAMPER

CAUTION: The torque converter must be replaced if a transmission failure resulted in large amounts of metal or fiber contamination in the fluid.

The torque converter is a hydraulic device that couples the engine crankshaft to the transmission. The torque converter consists of an outer shell with an internal turbine (1), a stator (3), an overrunning clutch, an impeller (2), and an electronically applied converter clutch. The converter clutch provides reduced engine speed and greater fuel economy when engaged. Clutch engagement also provides reduced transmission fluid temperatures. The converter clutch engages in third through fifth gears. The torque converter hub drives the transmission oil

(fluid) pump.

A turbine damper (6) has been added for some applications to help improve vehicle noise, vibration, and harshness (NVH) characteristics.

The torque converter is a sealed, welded unit that is not repairable and is serviced as an assembly.

IMPELLER

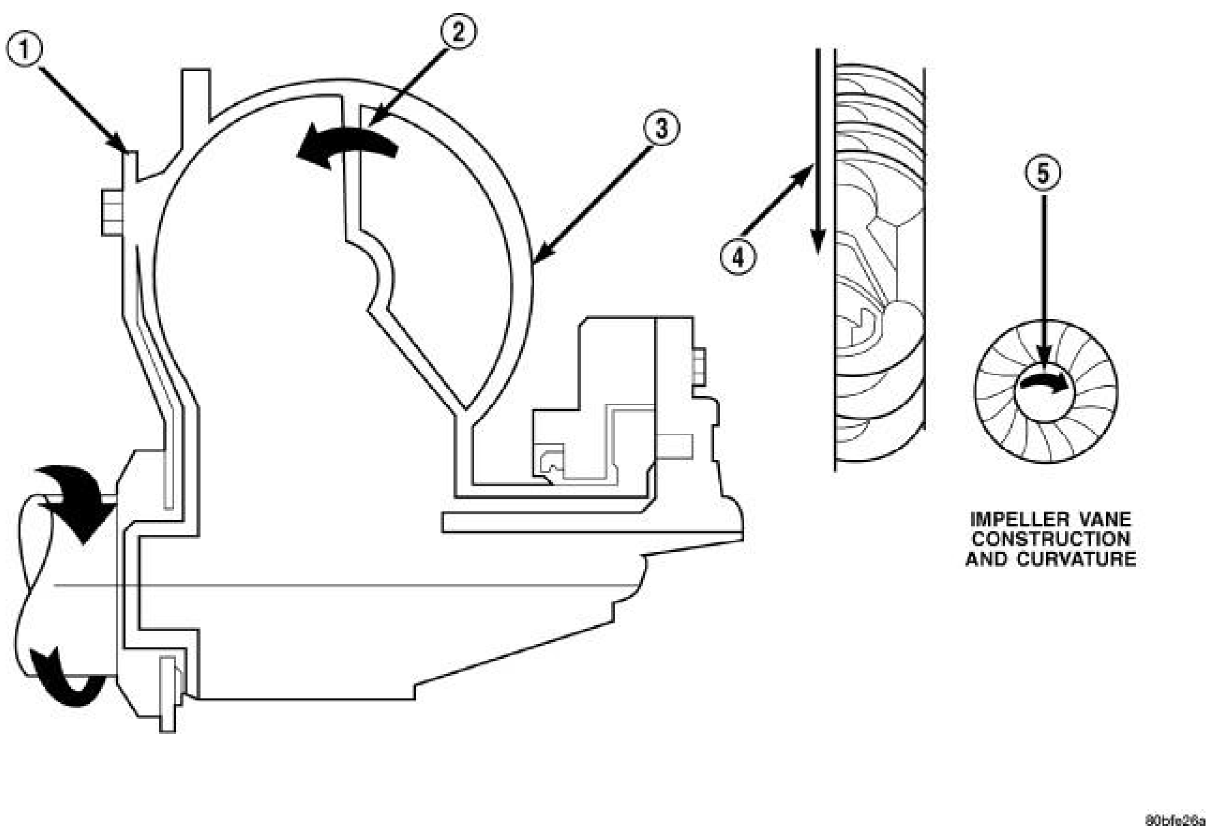
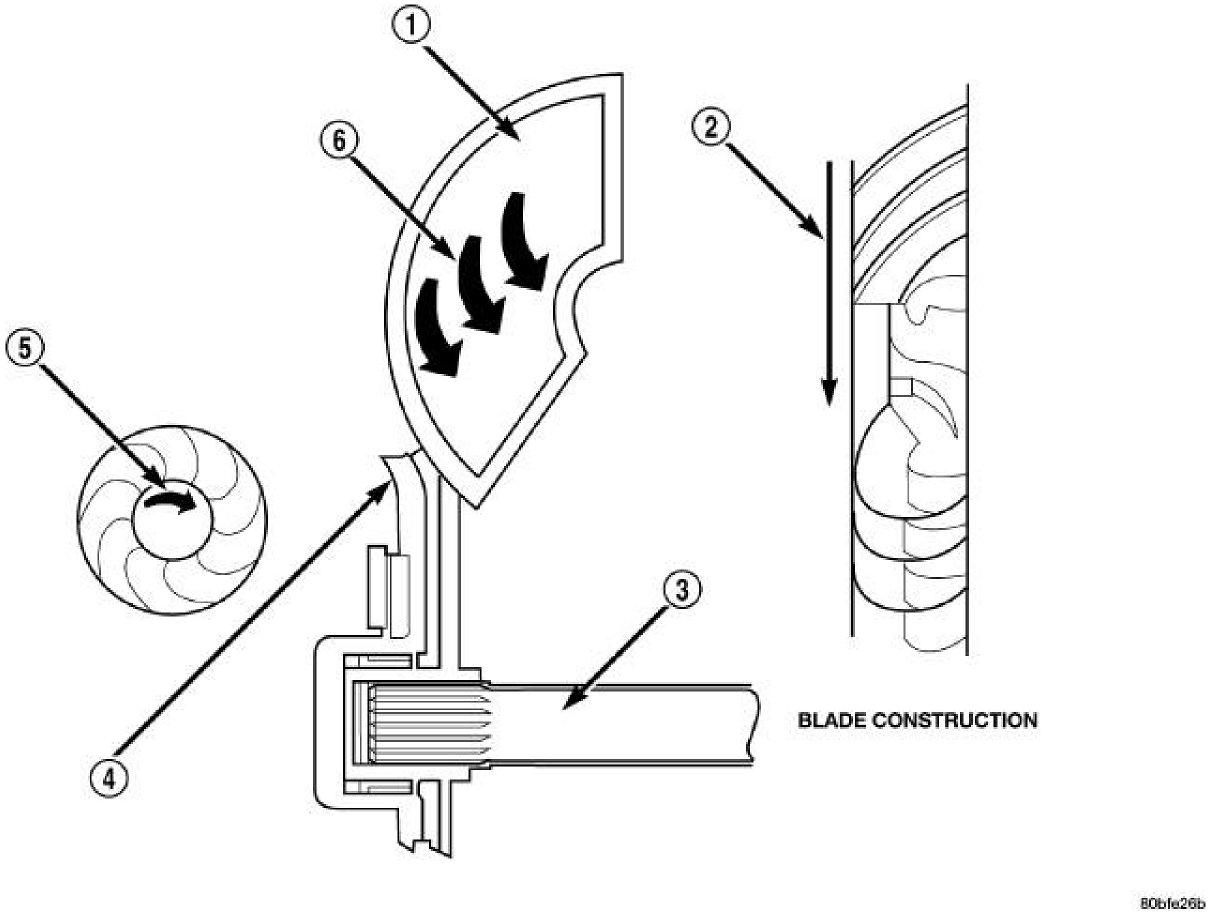


Fig. 308: Identifying Impeller
Courtesy of CHRYSLER GROUP, LLC

1 - ENGINE FLEXPLATE
2 - OIL FLOW FROM IMPELLER SECTION INTO TURBINE SECTION
3 - IMPELLER VANES AND COVER ARE INTEGRAL
4 - ENGINE ROTATION
5 - ENGINE ROTATION

The impeller (3) is an integral part of the converter housing. The impeller consists of curved blades placed radially along the inside of the housing on the transmission side of the converter. As the converter housing is rotated by the engine, so is the impeller, because they are one and the same and are the driving members of the system.

TURBINE



[Fig. 309: Identifying Turbine](#)
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE VANE
2 - ENGINE ROTATION
3 - INPUT SHAFT
4 - PORTION OF TORQUE CONVERTER COVER
5 - ENGINE ROTATION
6 - OIL FLOW WITHIN TURBINE SECTION

The turbine (1) is the output, or driven, member of the converter. The turbine is mounted within the housing opposite the impeller, but is not attached to the housing. The input shaft is inserted through the center of the impeller and splined into the turbine. The design of the turbine is similar to the impeller, except the blades of the turbine are curved in the opposite direction.

STATOR

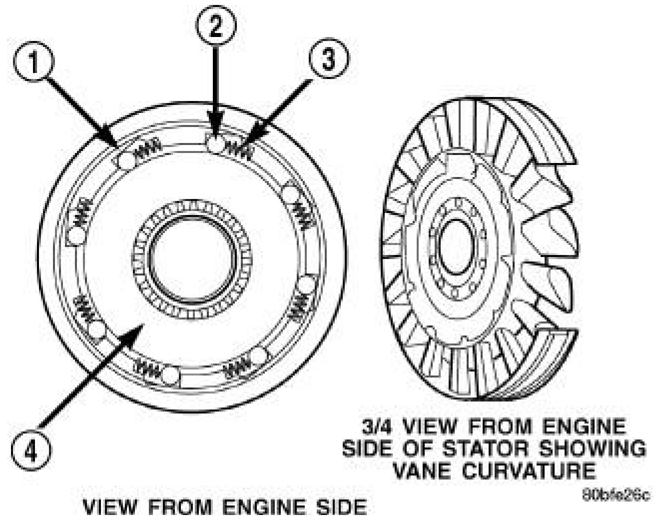


Fig. 310: Identifying Over-Running Clutch
Courtesy of CHRYSLER GROUP, LLC

1 - CAM (OUTER RACE)
2 - ROLLER
3 - SPRING
4 - INNER RACE

The stator assembly (1-4) is mounted on a stationary shaft which is an integral part of the oil pump.

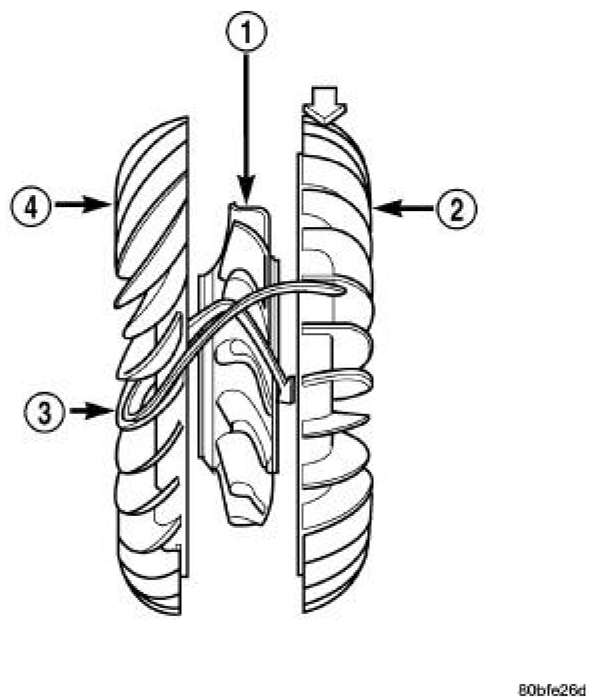


Fig. 311: Identifying Stator Components
Courtesy of CHRYSLER GROUP, LLC

1 - STATOR
2 - IMPELLER
3 - FLUID FLOW

4 - TURBINE

The stator (1) is located between the impeller (2) and turbine (4) within the torque converter case. The stator contains a freewheeling clutch, which allows the stator to rotate only in a clockwise direction. When the stator is locked against the freewheeling clutch, the torque multiplication feature of the torque converter is operational.

TORQUE CONVERTER CLUTCH (TCC)

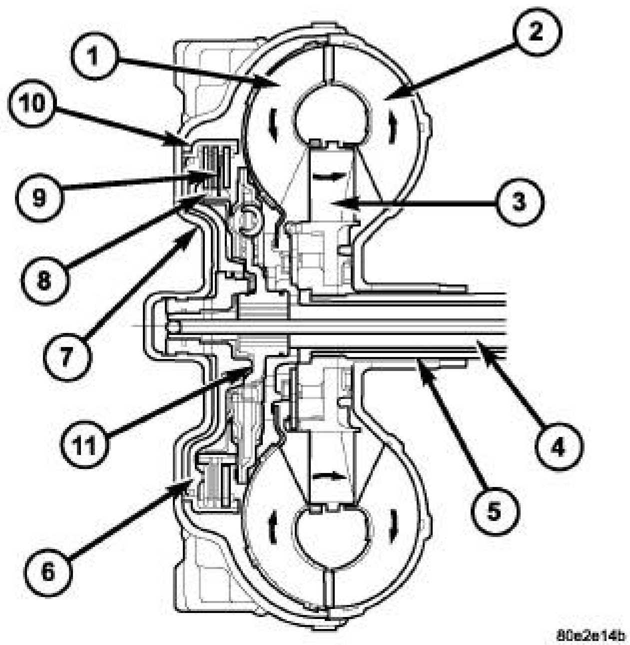


Fig. 312: Identifying Torque Converter Components
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - PISTON
7 - COVER SHELL
8 - INTERNALLY TOOTHED DISC CARRIER
9 - CLUTCH PLATE SET
10 - EXTERNALLY TOOTHED DISC CARRIER
11 - TURBINE DAMPER

The TCC (9) was installed to improve the efficiency of the torque converter that is lost to the slippage of the fluid coupling. Although the fluid coupling provides smooth, shock-free power transfer, it is natural for all fluid couplings to slip. If the impeller and turbine were mechanically locked together, a zero slippage condition could be obtained. A hydraulic piston with friction material was added to the turbine assembly to provide this mechanical lock-up.

In order to reduce heat build-up in the transmission and buffer the powertrain against torsional vibrations, the TCM can duty cycle the torque converter lock-up solenoid to achieve a smooth application of the torque converter clutch. This function, referred to as Electronically Modulated Converter Clutch (EMCC) can occur at various times depending on the following variables:

- Shift lever position
- Current gear range
- Transmission fluid temperature
- Engine coolant temperature
- Input speed
- Throttle angle
- Engine speed

OPERATION

OPERATION

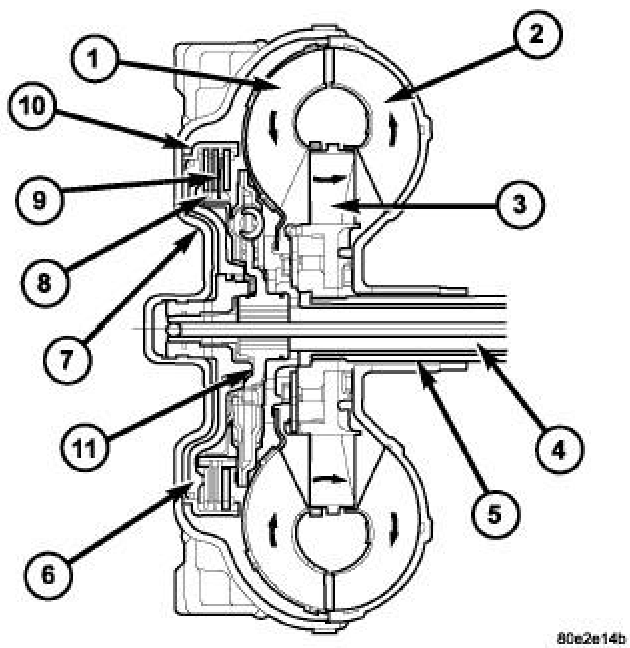


Fig. 313: Identifying Torque Converter Components
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE	
2 - IMPELLER	
3 - STATOR	
4 - INPUT SHAFT	
5 - STATOR SHAFT	
6 - PISTON	
7 - COVER SHELL	
8 - INTERNALLY TOOTHED DISC CARRIER	

9 - CLUTCH PLATE SET	
10 - EXTERNALLY TOOTHED DISC CARRIER	
11 - TURBINE DAMPER	

The torque converter housing has a unique shape to incorporate the torque converter clutch and flex plate connection. The torque converter uses the typical turbine, impeller and stator assemblies found in a standard torque converter assembly. The torque converter drives the pump through the splines on the inside of the hub. The torque converter uses a multi-disc torque converter clutch system that improves the durability and the holding pressure in the lock-up circuit. The torque converter incorporates a turbine dampening system. This system suppresses torsional vibrations from the engine to ensure optimal shift quality and reduce noise and vibration concerns.

TCC RELEASE When the TCC is open, the TCC piston is pushed to its default position by torque converter chamber pressure. The torque converter switch valve (SV-TC) provides pressure for torque converter operation which has been regulated by the converter pressure regulating valve (TC-V). After exiting the torque converter, fluid moves into the cooling and lubrication circuits. The converter pressure retention valve (TCH1-V) ensures the torque converter pressure is a minimum of 0.35 bar (5 psi) when the TCC is open.

TCC APPLY When the TCC solenoid is energized, fluid is directed to the torque converter switch valve (SV-TC) and TCC lockup valve (TCC-V). The TCC lockup valve directs fluid to the TCC and torque converter chamber. The torque converter switch valve directs fluid exiting the converter chamber to a secondary pressure retention valve (TCH2-V) which is calibrated to retain 1.0 bar (14.5 psi) of pressure in the converter. The torque converter switch valve also directs line pressure to the cooler and lubrication circuit.

TURBINE

When the fluid that was put into motion by the impeller blades strikes the blades of the turbine, some of the energy and rotational force is transferred into the turbine and the input shaft. This causes both of them (turbine and input shaft) to rotate in a clockwise direction following the impeller. As the fluid is leaving the trailing edges of the turbine's blades it continues in a "hindering" direction back toward the impeller. If the fluid is not redirected before it strikes the impeller, it will strike the impeller in such a direction that it would tend to slow it down.

STATOR

Torque multiplication is achieved by locking the stator's over-running clutch to its shaft. Under stall conditions (the turbine is stationary), the oil leaving the turbine blades strikes the face of the stator blades and tries to rotate them in a counterclockwise direction. When this happens the over-running clutch of the stator locks and holds the stator from rotating. With the stator locked, the oil strikes the stator blades and is redirected into a "helping" direction before it enters the impeller. This circulation of oil from impeller to turbine, turbine to stator, and stator to impeller, can produce a maximum torque multiplication of about 2.0:1. As the turbine begins to match the speed of the impeller, the fluid that was hitting the stator in such as way as to cause it to lock-up is no longer doing so. In this condition of operation, the stator begins to free wheel and the converter acts as a fluid coupling

TORQUE CONVERTER CLUTCH (TCC)

In a standard torque converter, the impeller (2) and turbine are rotating at about the same speed and the stator (3) is freewheeling, providing no torque multiplication. By applying the turbines piston and friction material (9) a total converter engagement can be obtained. The result of this engagement is a direct 1:1 mechanical link

between the engine and the transmission.

HYDRO-MECHANICAL AND ELECTRICAL

The Torque Converter Clutch (TCC) is engaged and released by the Transmission Control Module Assembly (TCMA). The TCC can be engaged and controlled in any forward gear from 1 through 8. In addition, the 8HP transmission incorporates a neutral idle control (NIC) function. Instead of the engine continuing to drive the converter when the vehicle comes to rest, the converter is partially disconnected from the driveline so only a slight residual load remains. Decoupling of the torque converter during NIC is accomplished by allowing clutch B to slip.

REMOVAL

REMOVAL

1. Remove the transmission from the vehicle. Refer to **REMOVAL**.
2. Place a suitable drain pan under the torque converter housing end of the transmission.

CAUTION: Verify that transmission is secure on the lifting device or work surface, the center of gravity of the transmission will shift when the torque converter is removed creating an unstable condition. The torque converter is a heavy unit. Use caution when separating the torque converter from the transmission.

3. Pull the torque converter forward until the center hub clears the oil pump seal.
4. Separate the torque converter from the transmission.

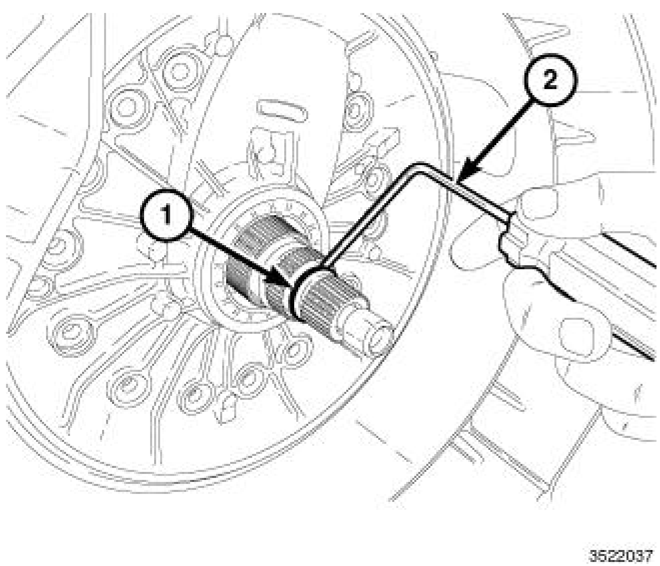


Fig. 314: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

5. Check the input shaft O-ring (1) for damage, replace if necessary.

INSTALLATION

INSTALLATION

NOTE: **Check the torque converter hub for sharp edges, burrs, scratches, or nicks. Polish the hub with 320/400 grit paper or crocus cloth if necessary. The hub must be smooth to avoid damaging the pump seal at installation.**

1. Lubricate the oil pump seal lip with transmission fluid.

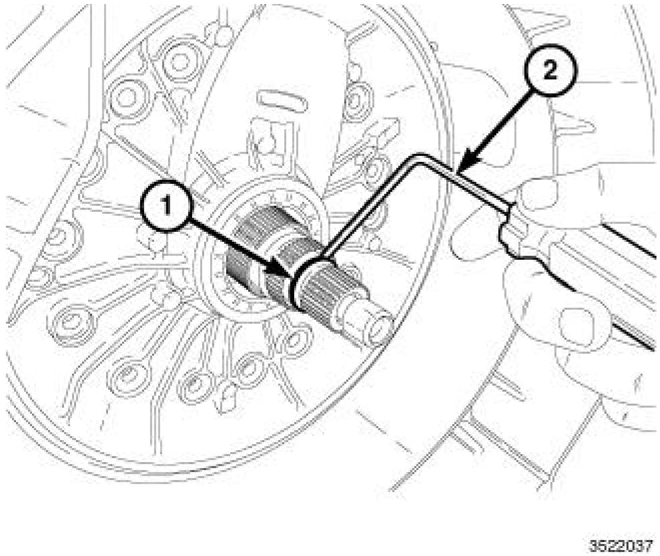


Fig. 315: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

2. Check the input shaft O-ring (1) for any damage. Replace if necessary.
3. Place the torque converter in position on the transmission.

CAUTION: **Do not damage oil pump seal or converter hub while inserting torque converter into the front of the transmission.**

4. Align the torque converter to the oil pump seal opening.
5. Insert the torque converter hub into the oil pump drive gear.
6. While pushing the torque converter inward, rotate the torque converter until the torque converter is fully seated into the oil pump drive gear.

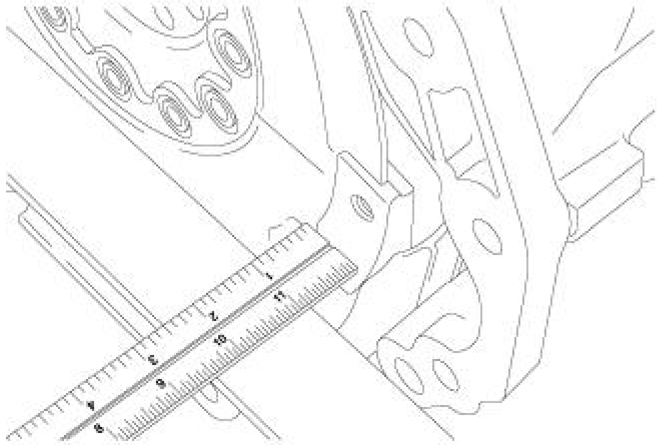


Fig. 316: Straightedge
Courtesy of CHRYSLER GROUP, LLC

7. Check the torque converter seating with a scale and straightedge. The surface of the torque converter lugs should be at least 19 mm (3/4 in.) to the rear of the straightedge when the torque converter is fully seated.
8. If necessary, temporarily secure the torque converter with a C-clamp attached to the torque converter housing.
9. Install the transmission in the vehicle. Refer to **INSTALLATION**.
10. Perform the TRANSMISSION FILL AFTER SERVICE procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

VALVE BODY

DESCRIPTION

DESCRIPTION

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The valve body includes the Transmission Control Module (TCM), all solenoids and sensors, and can be referred to as the Transmission Control Module Assembly (TCMA). The TCM is attached to the valve body between the transmission case and the valve body. If any component of the valve body **including the TCM** sensors or solenoids need replaced, the complete TCMA (valve body) must be replaced. For replacement of the TCMA (valve body), refer to **VALVE BODY, REMOVAL**.

OPERATION

8-SPEED TCM OPERATION

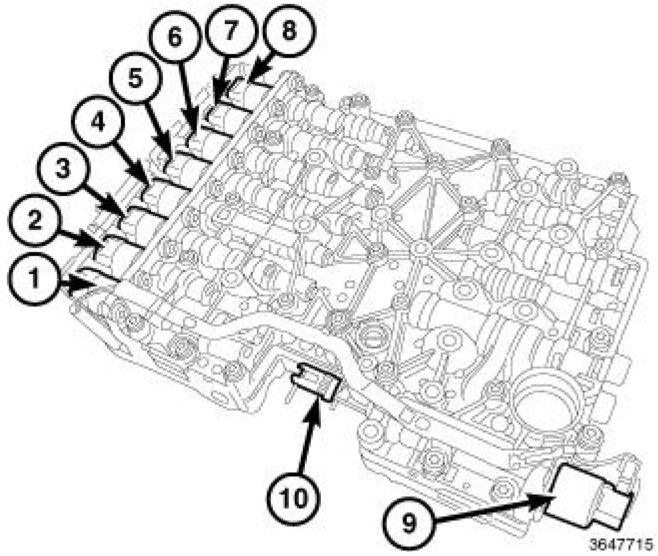


Fig. 317: Solenoid A D E C & Park Release Mechanical Valve
Courtesy of CHRYSLER GROUP, LLC

1 - Solenoid A
2- Solenoid D
3 - Solenoid B
4 - Solenoid E
5 - Solenoid C
6 - TCC Solenoid
7 - Line Pressure Solenoid
8 - Park Release Solenoid
9 - Park Hold Mechanical Solenoid
10 - Park Release Mechanical Valve

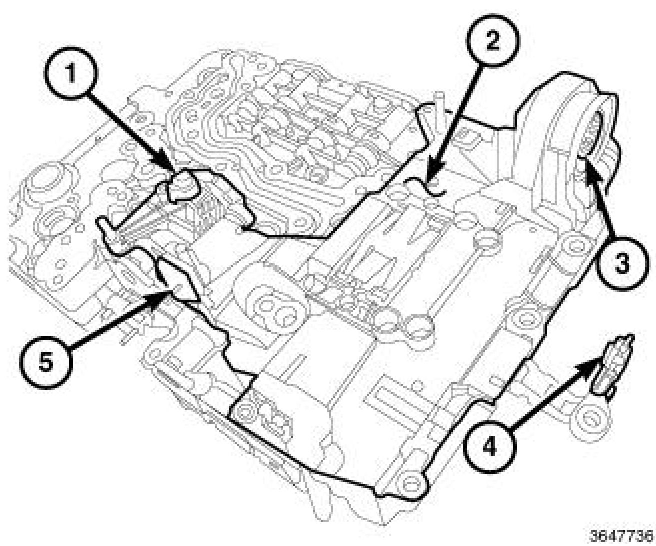


Fig. 318: Input Speed Sensor, Output Speed Sensor, Tcm (Includes Transmission Temperature Sensor) & Park Position Sensor
Courtesy of CHRYSLER GROUP, LLC

1 - Input Speed Sensor
2 - TCM (Includes Transmission Temperature Sensor)
3 - External Wire Harness Connector
4 - Output Speed Sensor
5 - Park Position Sensor

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The valve body, which includes the Transmission Control Module (TCM), controls the delivery and pressure of transmission fluid. The TCM is integrated into the valve body. The TCM regulates the amount of hydraulic pressure used to engage the clutches and the Torque Converter Clutch (TCC), in addition to directing hydraulic pressure to engage or release any given clutch for any given required gear. The TCM will actuate the valves via solenoids based on the position of the shifter, transmission fluid temperature, engine operating conditions, traction conditions and driver demands. During a shift, the TCM will actuate the solenoids to match the gear ranges to the optimal torque range of the engine based on the position of the accelerator pedal, shifter and vehicle speed as determined by the PCM based on input from the Vehicle Speed Sensor (VSS) and ABS module. Due to the complexity of the 8HP45 transmission control system, always refer to the appropriate transmission electrical/electronic Diagnostics & Testing article when attempting to diagnose transmission problems.

If the Transmission Control Module Assembly (TCMA) is replaced, it **must** be programmed and a drive learn needs to be performed before returning the vehicle to the customer. Refer to **STANDARD PROCEDURE** for programming and drive learn procedures .

REMOVAL

REMOVAL 8HP70

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Drain the transmission fluid into a clean container. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

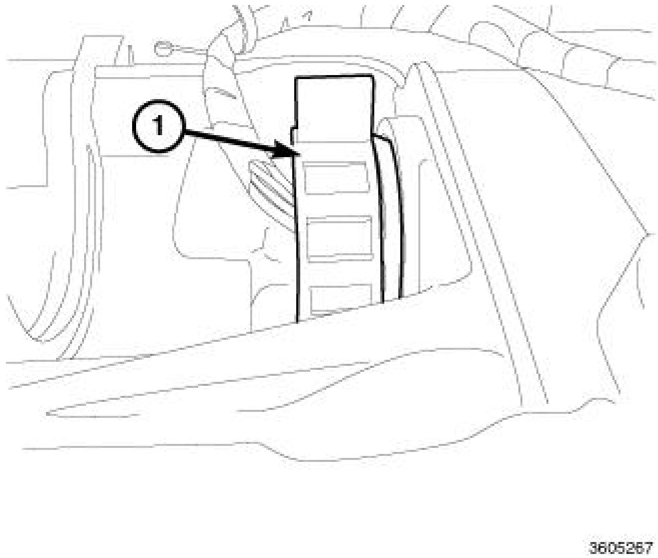


Fig. 319: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

3. Turn the locking mechanism lock (1) of the transmission harness connector counter-clockwise and disconnect the connector from the transmission.

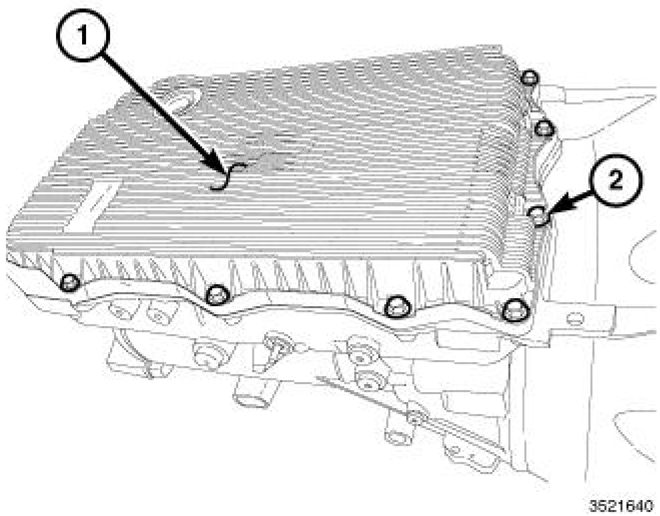
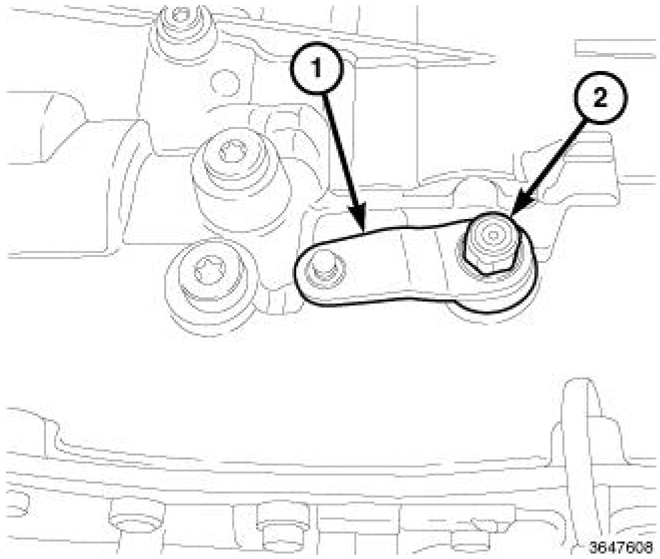


Fig. 320: Thirteen Oil Pan Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.**

4. Remove the thirteen oil pan retaining bolts (2).
5. Carefully detach the oil pan (1) and gasket.



[Fig. 321: Manual Park Release Lever Retaining Nut & Lever](#)
Courtesy of CHRYSLER GROUP, LLC

6. Remove the Manual Park Release (MPR) lever retaining nut (2) and remove the lever (1).
7. Reinstall the MPR lever 180 degrees offset. Using a tie strap, secure the lever into position so the park release fork remains in the same position for installation of the valve body assembly.

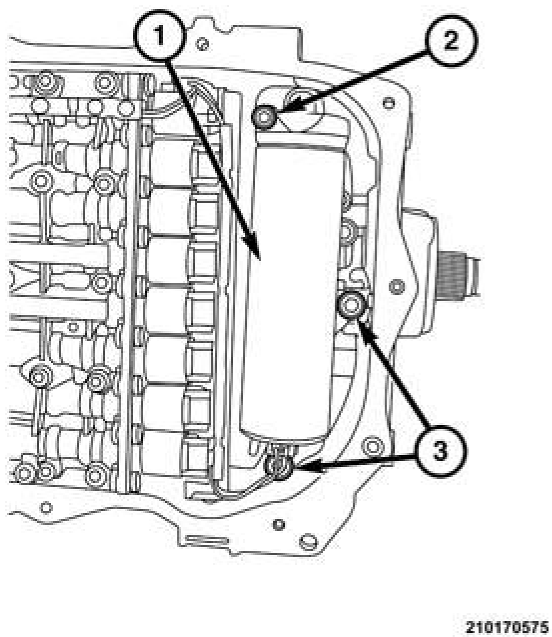


Fig. 322: Hydraulic Impulse Storage Unit & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. If equipped, disconnect the Hydraulic Impulse Oil Storage (HIS) connector.
9. If equipped, remove three HIS bolts (2 and 3) and the accumulator (1).

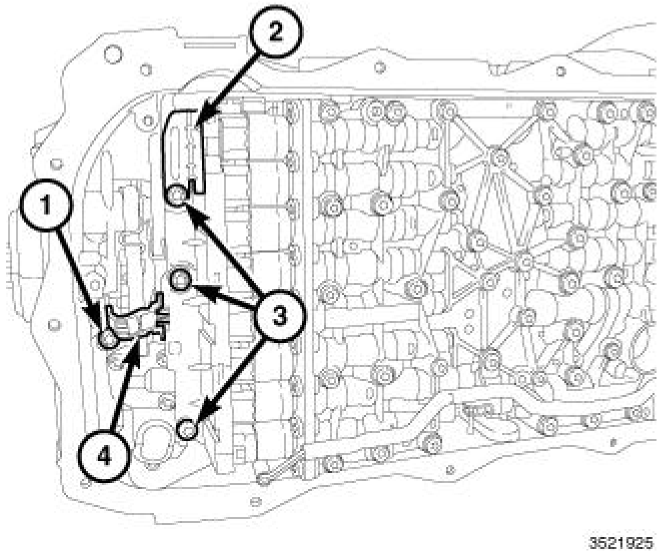


Fig. 323: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Remove the valve body assembly end retainer bolts (3).
11. Lift the electrical connector lock (2) to release the internal harness end from inside the transmission for valve body assembly removal.
12. Remove the Output Speed Sensor (OSS) retaining bolt (1) and pull the OSS sensor (4) loose from the case.

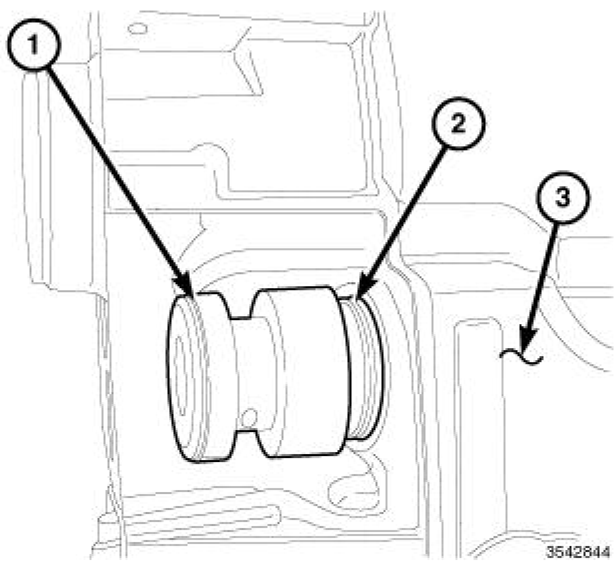
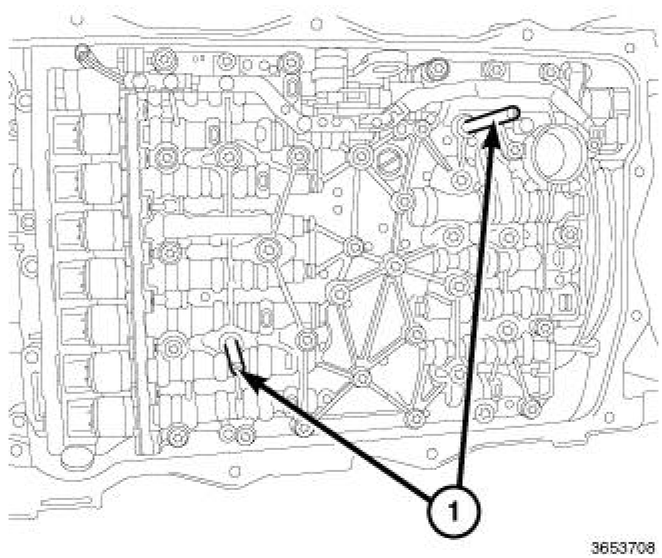


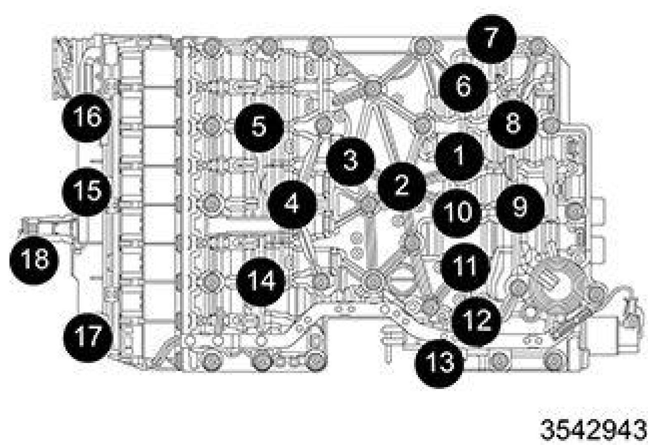
Fig. 324: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

13. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully pull the electrical harness insulator (2) straight out from the transmission case (3).



[Fig. 325: Valve Body Alignment Pins]()
Courtesy of CHRYSLER GROUP, LLC

14. Remove two bolts and hand install (special tool #10379, Pins, Valve Body Alignment) (1).
15. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while removing the remaining fasteners.



[Fig. 326: Valve Body Bolts Loosening And Tightening Sequence]()
Courtesy of CHRYSLER GROUP, LLC

16. Remove remaining valve body assembly retaining bolts.
17. Carefully lower the valve body assembly from the transmission.

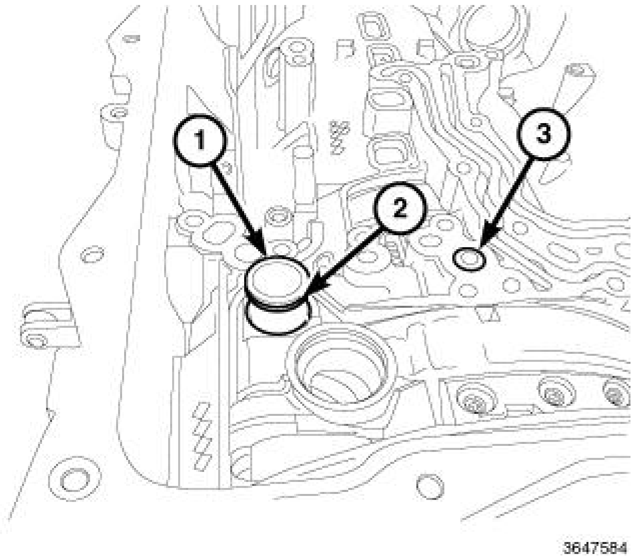


Fig. 327: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The fluid port may remain in the valve body upon removal, remove and discard the O-rings.**

18. Remove the fluid transfer port (1) from the transmission.
19. Remove and discard the O-ring (2) and seal (3).

INSTALLATION

INSTALLATION 8HP70

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.**

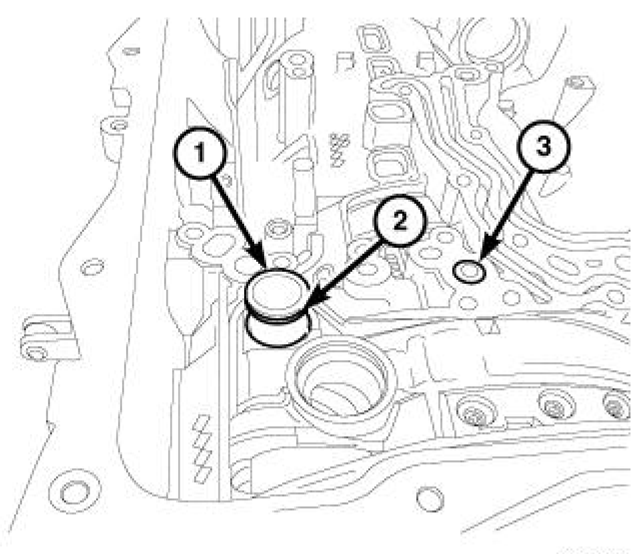


Fig. 328: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install the fluid port (1) with **NEW** O-rings (2) and seal (3) to the valve body.

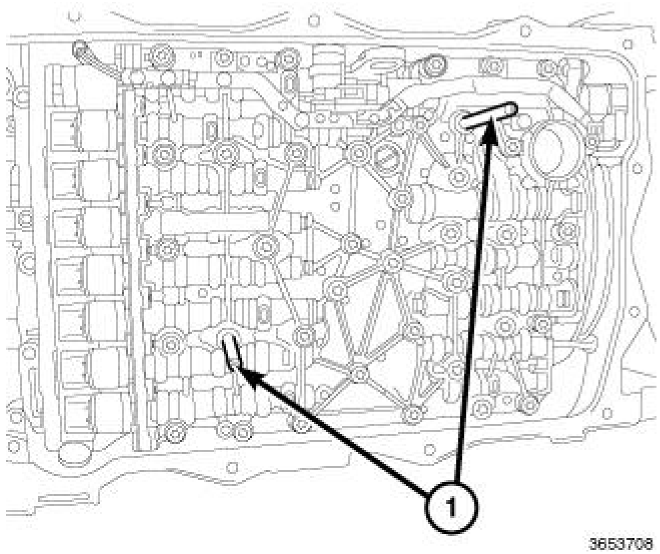


Fig. 329: Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

2. Install the valve body assembly to the transmission using the previously installed (1) (special tool #10379, Pins, Valve Body Alignment) as a guide.
3. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while installing the remaining fasteners.

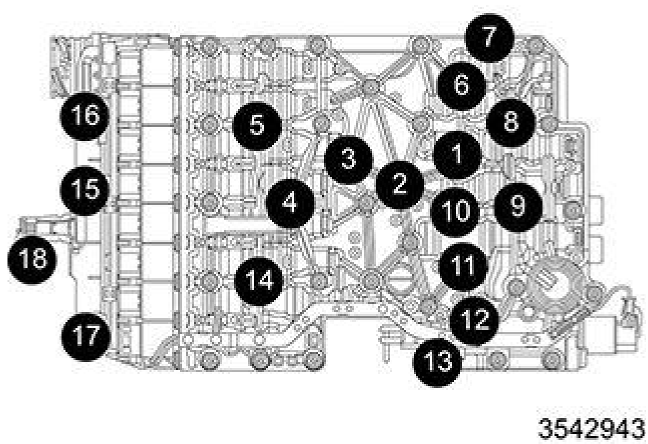


Fig. 330: Valve Body Bolts Loosening And Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Install the valve body assembly retaining bolts not including 16-18 and hand tighten.
5. Remove the pins and install the remaining bolts.

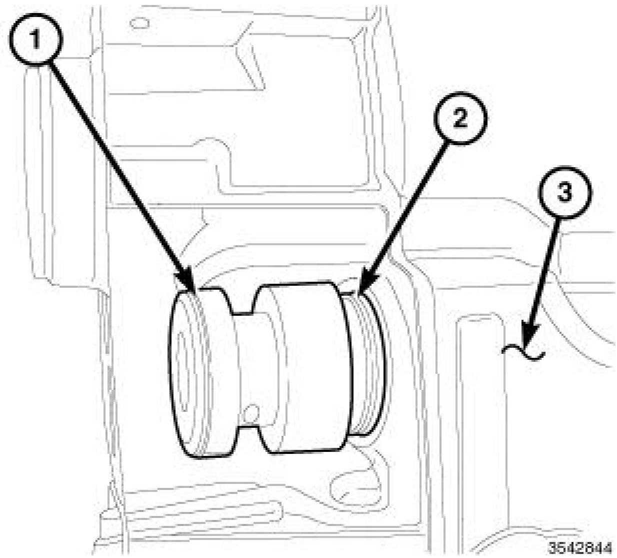


Fig. 331: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

6. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully install the electrical harness insulator (2) to the transmission case (3).

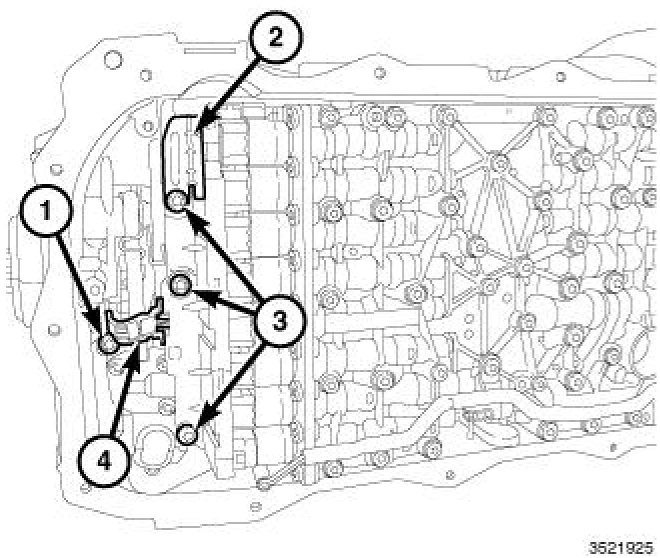


Fig. 332: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Lock the electrical connector lock (2) to the internal harness end.
8. Install the Output Speed Sensor (OSS) (4) to the case install the retaining bolt (1) and tighten to the proper **SPECIFICATIONS**.

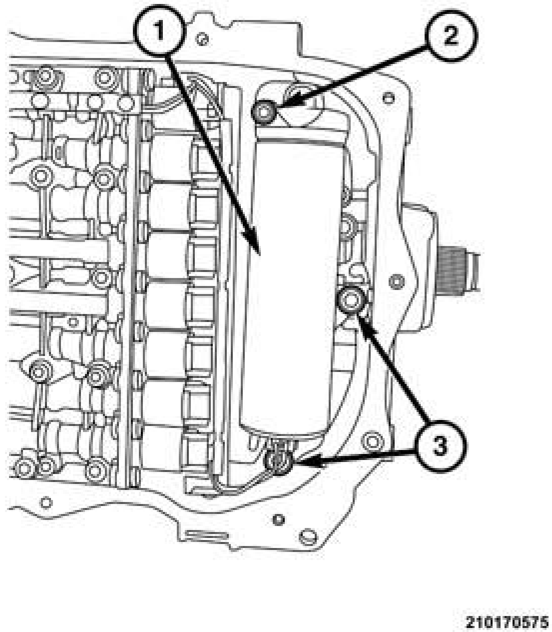


Fig. 333: Hydraulic Impulse Storage Unit & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. If equipped, install the Hydraulic Impulse Oil Storage (HIS) accumulator (1).
10. Tighten the bolts (2 and 3) to the proper **SPECIFICATIONS**.
11. Connect the HIS electrical connector.
12. Install the valve body assembly end retainer bolts (3) and hand tighten.

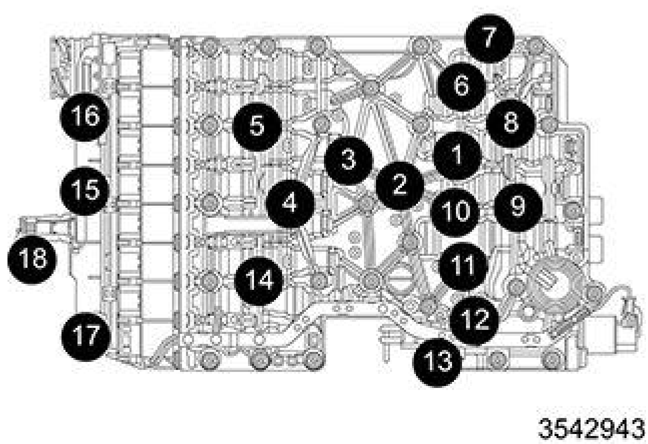


Fig. 334: Valve Body Bolts Loosening And Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

13. Tighten the valve body fasteners to the proper in the sequence shown. Refer to **SPECIFICATIONS**.

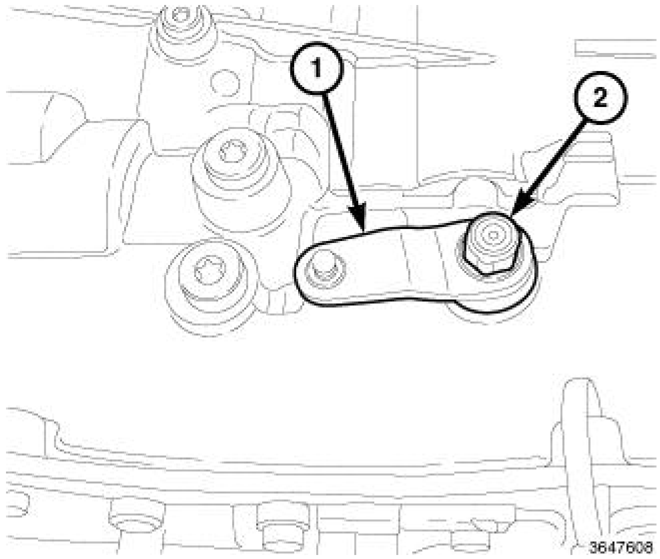


Fig. 335: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

14. Remove the tie strap and return the Manual Park Release (MPR) lever (1) to the original position, tighten the fastener (2) to the proper **SPECIFICATIONS**.

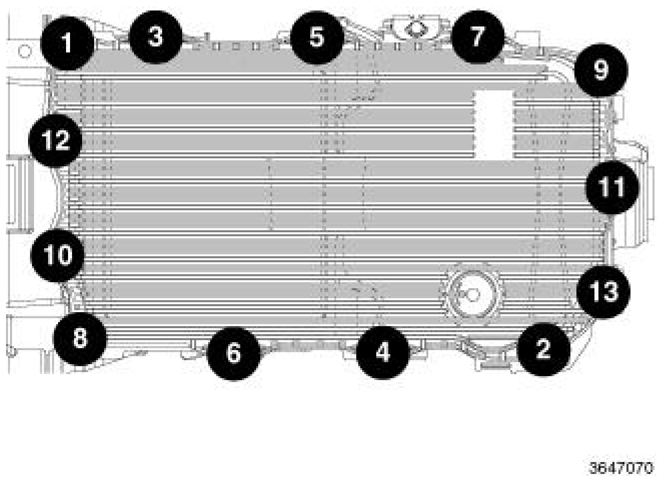


Fig. 336: Oil Pan Retaining Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

15. Install the oil pan and gasket.
16. Install the thirteen oil pan retaining bolts and tighten the fasteners to the proper in the sequence shown **SPECIFICATIONS**.

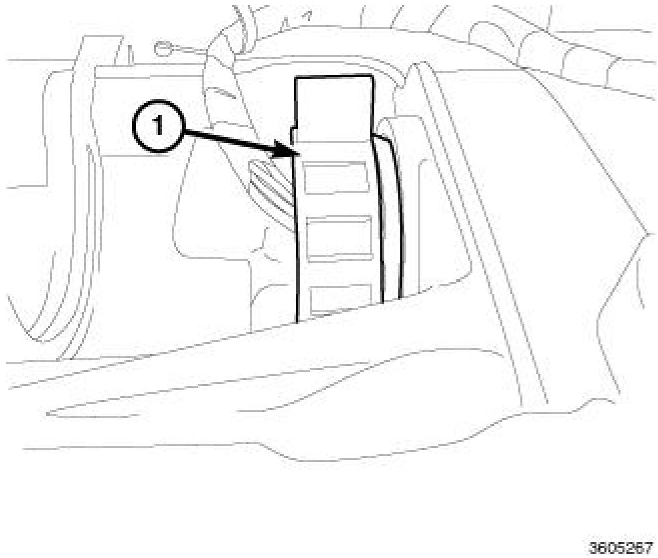


Fig. 337: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

17. Connect the transmission wire harness connector (1).

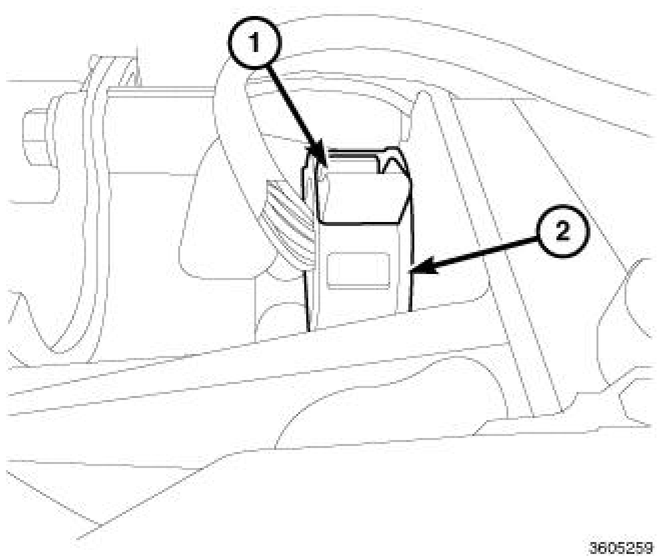


Fig. 338: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

18. Turn the locking mechanism (1) of the transmission wire harness connector (2) clockwise to lock it in place.
19. If the valve body is replaced, program the TCM. Refer to **MODULE, TRANSMISSION CONTROL, MODULE PROGRAMMING** .
20. Perform the TRANSMISSION FILL AFTER SERVICE procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
21. Perform the TRANSMISSION VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

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DESCRIPTION

DESCRIPTION

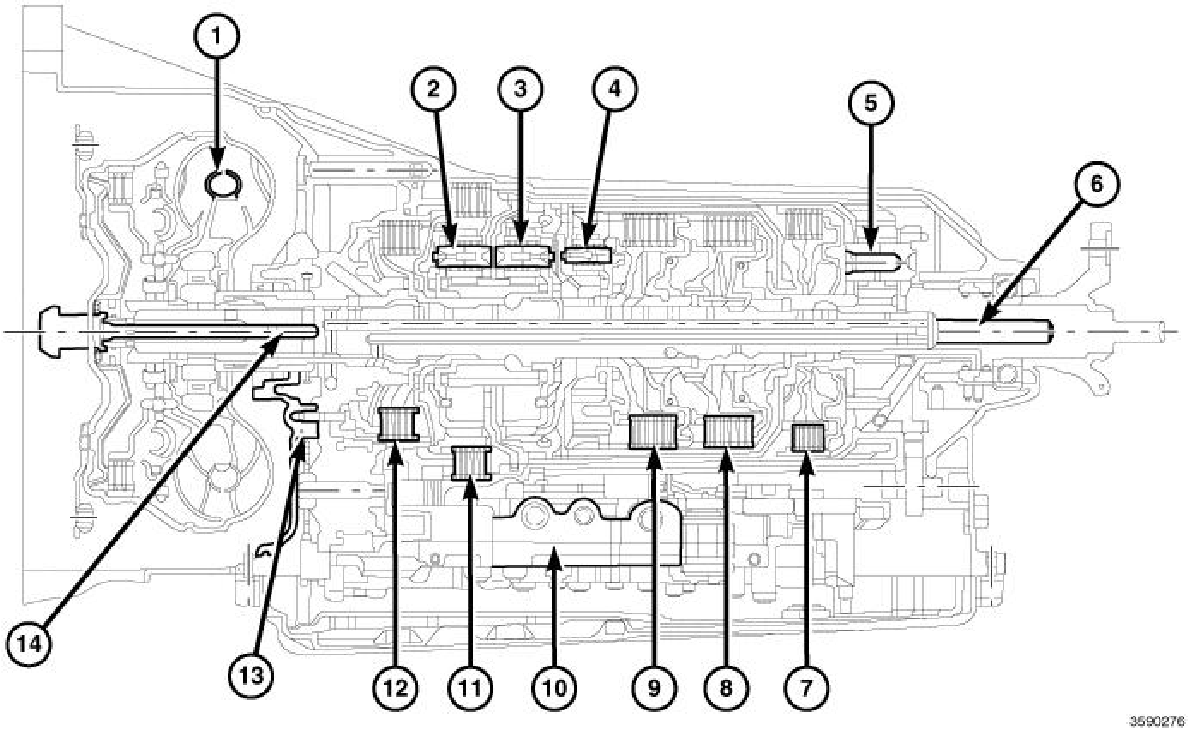


Fig. 1: 8HP Series Automatic Transmission
Courtesy of CHRYSLER GROUP, LLC

1 - TORQUE CONVERTER
2 -P1 PLANETARY
3 - P2 PLANETARY
4 - P3 PLANETARY
5 - P4 PLANETARY
6 - OUTPUT SHAFT
7 - D CLUTCH
8 - C CLUTCH
9 - E CLUTCH
10 - VALVE BODY
11 - B CLUTCH
12 - A CLUTCH
13 - OIL PUMP
14 - INPUT SHAFT

CAUTION: A unique transmission fluid has been developed for this transmission. This

fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .

The transmission case is a single-piece unit. The starter pocket, cooler line fittings, and manual park release lever are located on the driver's side of the case. The electrical connector and oil fill plug are located on the passenger side of the case. The transmission uses a flanged output shaft connection.

OPERATION

OPERATION

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .

The 8HP90 is an electronic eight-speed automatic transmission. The Transmission Control Module Assembly (TCMA), which is integrated into the valve body, provides fully synchronized clutch-to-clutch shifting through four planetary gear sets. The TCMA includes a mounting plate that holds the Transmission Control Module (TCM) and a molded wiring harness for connection to various transmission sensors and solenoids. The valve body assembly contains all the sensors and solenoids required for operation, completely inside the transmission. Eight speeds allow the engine to maintain its optimal rpm range, increasing fuel economy and performance.

Transmission control is performed by the TCM based on hard-wired and Controller Area Network (CAN) bus signals from sensors and modules. The TCM receives driveability data from the Powertrain Control Module (PCM) and other modules over the CAN-C bus. It also receives shift lever position information from the electronic shifter over a dedicated transmission CAN bus. The TCM processes this input data and controls operation of the torque converter clutch, park lock system, solenoid valves, and pressure regulating valve.

The input and output speed sensors are Hall-effect sensors that measure shaft rotational speed. The input speed sensor is located at the top, near the center, of the TCMA and reads input shaft speed from the magnetic ring on the P2 carrier. The output speed sensor is located at the back of the TCMA and reads output shaft speed from the P4 carrier

FILTER SERVICE The 8HP90 has a conventional fluid sump design, the filter is separate from the oil pan and can be replaced independently of the oil pan. The oil pan gasket is reusable providing it is not damaged during removal.

FLUID CHECK AND FILL A fluid fill tube and indicator are not provided. All work is performed under the vehicle while raised on a hoist. In the event of a transmission shift quality concern, a fluid leak, or in conjunction with a transmission repair, the transmission fluid level must be validated and topped off as necessary. The procedure involves the use of a scan tool to monitor transmission fluid temperature. Specific service procedures are necessary to check and fill the transmission with fluid. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - PRELIMINARY

CAUTION: A unique transmission fluid has been developed for this transmission. This

fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .

Two basic procedures are required. One procedure for vehicles that are drivable and an alternate procedure for disabled vehicles (will not back up or move forward).

VEHICLE IS DRIVABLE

1. Check for transmission fault codes using the appropriate scan tool.
2. Road test and note how transmission upshifts, downshifts, and engages.
3. Check fluid level and condition.

VEHICLE IS DISABLED

1. Check for transmission fault codes using the appropriate scan tool.
2. Check for cracked, leaking cooler lines.
3. Check fluid level and condition.
4. With the transmission in the Park position, attempt to rotate drive shaft(s) to ensure transmission output shaft coupler/flange is secure.
5. Raise and support vehicle on safety stands, start engine with transmission in the Park position and allow to idle for several minutes, shift transmission into gear, and note following:
   a. If propeller shaft turns but wheels do not, problem is with differential or axle shafts.
   b. If propeller shaft does not turn and transmission is noisy, stop engine. Remove oil pan, and check for debris. If pan is clear, remove transmission and check for damaged driveplate, converter, oil pump, or input shaft.
6. Check the TCMA, Wiring, Valve body, and Solenoids (Utilize fault codes to diagnose if available).

DIAGNOSIS AND TESTING - ROAD TESTING

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .

Before road testing, be sure the fluid level has been checked and adjusted if necessary. Verify that all diagnostic trouble codes have been resolved.

Verify that all diagnostic trouble codes have been resolved.

Observe engine performance during the road test. A poorly tuned engine will not allow accurate analysis of transmission operation.

Operate the transmission in all gear ranges. Check for shift variations and engine flare which indicates slippage. Note if shifts are harsh, spongy, delayed, early, or if part throttle downshifts are sensitive.

Slippage indicated by engine flare, usually means clutch, overrunning clutch, or line pressure problems.

A slipping clutch can often be determined by comparing which internal units are applied in the various gear ranges. The Clutch Application chart provides a basis for analyzing road test results.

CLUTCH APPLICATION

GEAR	A	B	C	D	E	RATIO
1	X	X	X	Ā	Ā	4.69: 1
2	X	X	Ā	Ā	X	3.13: 1
3	Ā	X	X	Ā	X	2.10: 1
4	Ā	X	Ā	X	X	1.67: 1
5	Ā	X	X	X	Ā	1.29: 1
6	Ā	Ā	X	X	X	1.0: 1
7	X	Ā	X	X	Ā	.84: 1
8	X	Ā	Ā	X	X	.67: 1
N	Ā	Ā	Ā	Ā	Ā	N/A
R	X	X	Ā	X	Ā	3.3: 1

DIAGNOSIS AND TESTING - AUTOMATIC TRANSMISSION - GENERAL CONDITIONS

CAUTION: Before attempting any repair on an automatic transmission, check for Diagnostic Trouble Codes with the appropriate scan tool.

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .

Transmission malfunctions may be caused by these general conditions:

- Poor engine performance.
- Improper adjustments.
- Hydraulic malfunctions.
- Mechanical malfunctions.
- Electronic malfunctions.

Diagnosis of these problems should always begin by checking the easily accessible variables: fluid level, fluid condition, and transmission fault codes using the appropriate scan tool. Then perform a road test to determine if the problem has been corrected or if more diagnosis is necessary.

CLUTCH AIR PRESSURE TESTS

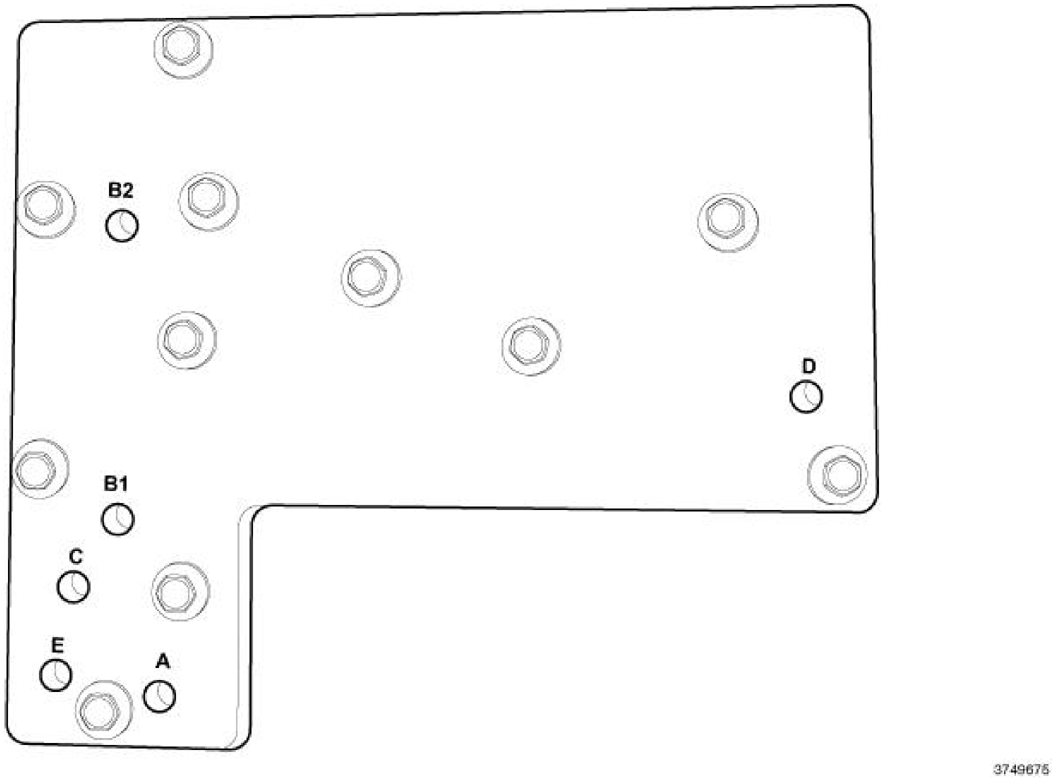


Fig. 2: Clutch Pressure Test Passages
Courtesy of CHRYSLER GROUP, LLC

Inoperative clutches can be located using a series of tests by substituting air pressure for fluid pressure using (special tool #10383, Plate, Clutch Pressure Test).

The clutches may be tested by applying air pressure to their respective passages. The valve body must be removed. To make air pressure tests, proceed as follows:

NOTE:	**The compressed air supply must be free of all dirt and moisture. Use a pressure of 5-8 bar (73-116 psi).**

Remove the valve body. Refer to **VALVE BODY, REMOVAL**. Install (special tool #10383, Plate, Clutch Pressure Test) and tighten bolts to 6 N.m (50 in. lbs.). When testing is finished install valve body. Refer to **VALVE BODY, INSTALLATION**. Fill the transmission. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

NOTE:	**If any clutch does not appear to be functioning with the air, add some 8HP transmission fluid and try the test again. Some circuits will not operate without fluid.**

A CLUTCH

Apply air pressure to the feed hole located on the test plate marked **A** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

B CLUTCH FUNCTION

Apply air pressure to the feed hole located on the test plate marked **B1** , listen for an audible thud. The piston should not return to its starting position when the air pressure is removed. If air pressure is applied to the B2 circuit, the B1 should return. An audible hiss may be heard when testing this clutch as the seal is designed to allow fluid/air to pass.

C CLUTCH

Apply air pressure to the feed hole located on the test plate marked **C** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

D CLUTCH

Apply air pressure to the feed hole located on the test plate marked **D** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

E CLUTCH

Apply air pressure to the feed hole located on the test plate marked **E** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

STANDARD PROCEDURE

A-CLUTCH MEASUREMENT

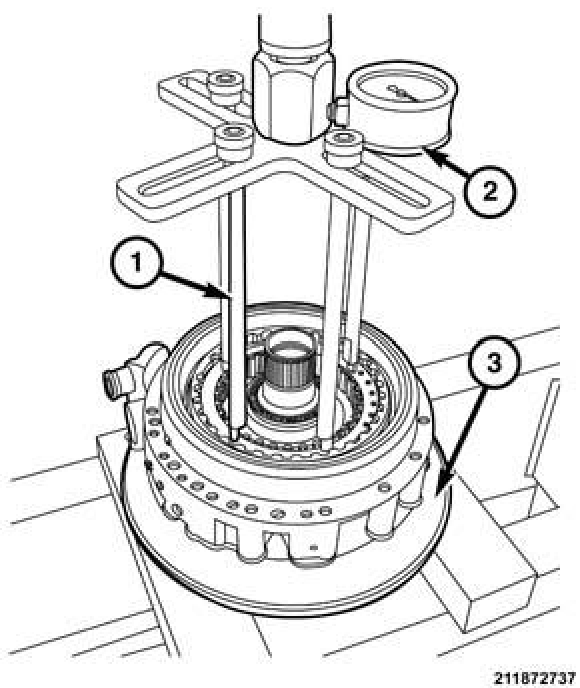


Fig. 3: Adapter & Pressing Tool
Courtesy of CHRYSLER GROUP, LLC

1. Using (special tool #10428, Adapter, Pressing Tool) (1) and (special tool #10429, Gauge, Force) (2) Place the A-clutch/oil pump assembly in a suitable arbor press.
2. Apply 200 N (45 lbs.) of force to the A-clutch backing plate to compress the wave plate.

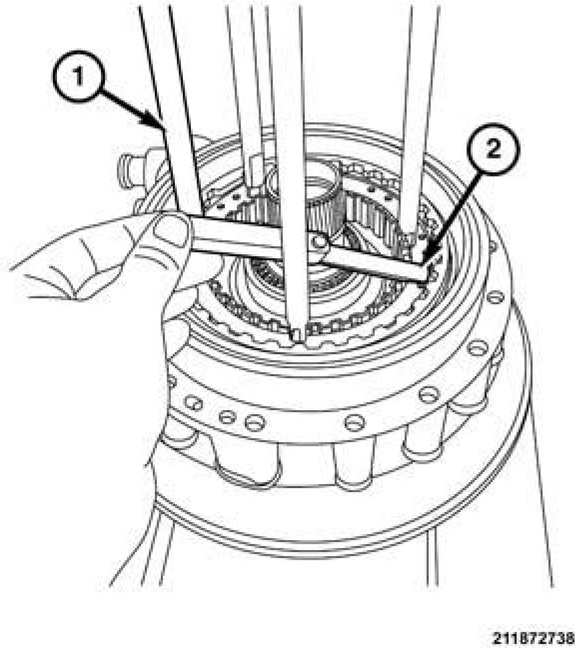


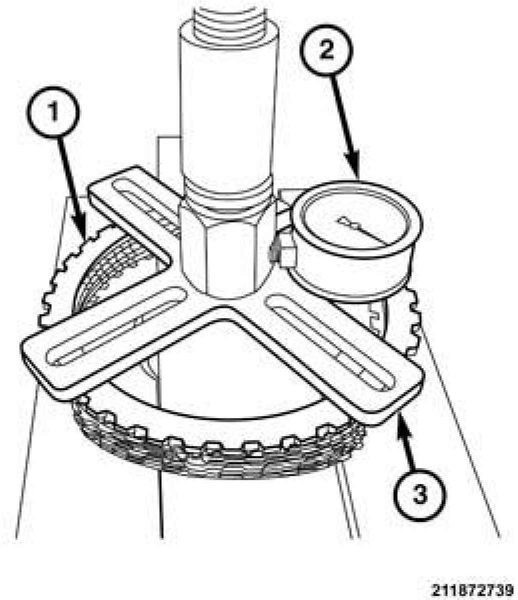
Fig. 4: Measuring Gap Between A-Clutch Backing Plate & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

3. With a suitable feeler gauge (2) measure the gap between the A-clutch backing plate and the snap ring.
4. Refer to **CLUTCH A SELECTABLE SNAP RINGS TABLE** for specs. If clearance is not within specification, a thinner or thicker selectable snap ring can be installed for proper clearance.

B-CLUTCH MEASUREMENT

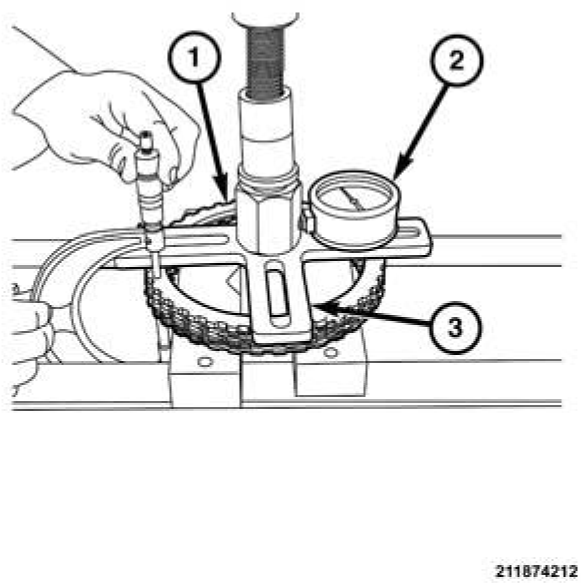
When the B-clutch is replaced, the proper selectable shim must be installed to achieve specified clearance.

Measurement (special tool #8901A, Pressing Tool), (special tool #10429, Gauge, Force)



[**Fig. 5: Pressing Tool**]
Courtesy of CHRYSLER GROUP, LLC

1. Place the B-clutch, with the wave plate on top, on a suitable arbor press.
2. Position tools (special tool #8901A, Pressing Tool) (3) (using just the cross bar) (3) and (special tool #10429, Gauge, Force) (2) on top of the B-clutch wave plate (1) and under the press ram.



[**Fig. 6: Gauge, Pressing Tool & B-Clutch**]
Courtesy of CHRYSLER GROUP, LLC

3. Apply 500 N (112 lbs.) of downward force on the B-clutch to compress the wave plate.

4. Using a suitable micrometer, measure the thickness of the compressed B-clutch (3). **Record the measurement as (A)** to calculate the B-clutch clearance in order to determine the correct selectable shim thickness.

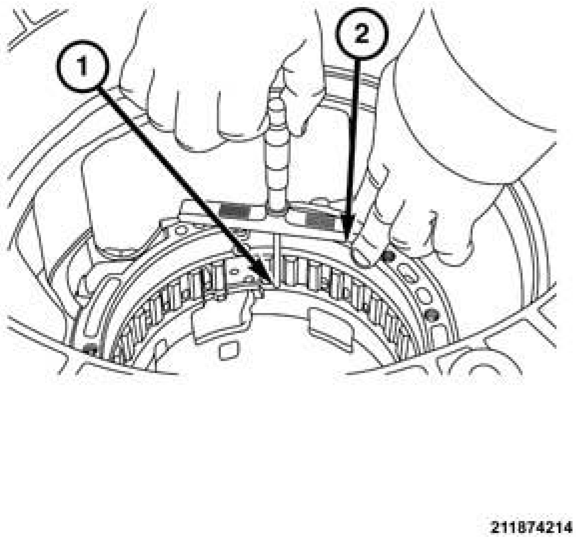


Fig. 7: Transmission Oil Pump & B-Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

5. With a suitable depth micrometer, place it at the mounting surface of the transmission oil pump (2) and measure to the base of the B-clutch retainer on the case (1). This measurement should be 61.05 mm. **Record the measurement as (B)** to calculate the B-clutch clearance in order to determine the correct selectable shim thickness.

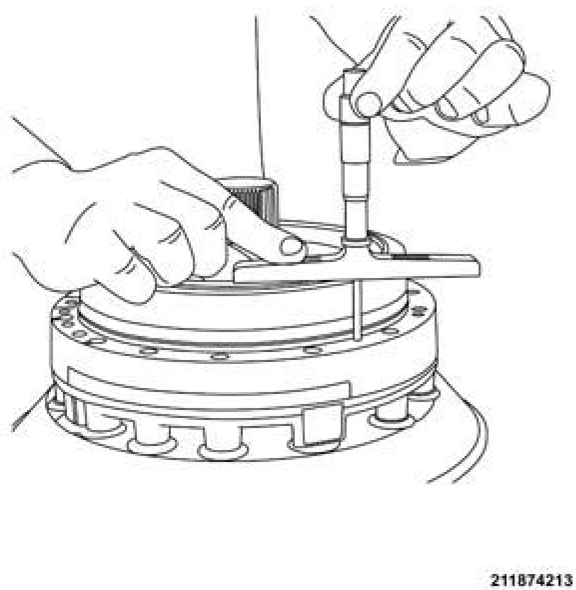


Fig. 8: Measuring B-Clutch Piston Using Depth Micrometer
Courtesy of CHRYSLER GROUP, LLC

6. Using a suitable depth micrometer, measure the B-clutch piston.
7. Measure between the fluid pump sealing surface and the bottom of the straight edge. **Record the measurement as (C)** to calculate the B-clutch clearance in order to determine the correct selectable shim thickness.

Calculation

Take the case depth (B) subtract (C) subtract (A) remainder is the clearance of the B-clutch. If the clearance is not within specification a thinner or thicker reaction plate can be installed to achieve proper clearance.

C-CLUTCH MEASUREMENT

1. Using (special tool #8901A, Pressing Tool) (2) and (special tool #10429, Gauge, Force) (1) place the C-clutch (3) in a suitable arbor press (with the backing plate facing up).
2. Apply 200 N (45 lbs.) of force to the C-clutch to compress the wave plate.
3. With a suitable feeler gauge, measure the gap between the C-clutch backing plate and the C-clutch retainer.
4. Refer to **CLUTCH C AND E SELECTABLE BACKING PLATES TABLE** for specs. If clearance is not within specification a thinner or thicker selectable backing plate can be installed to achieve proper clearance.

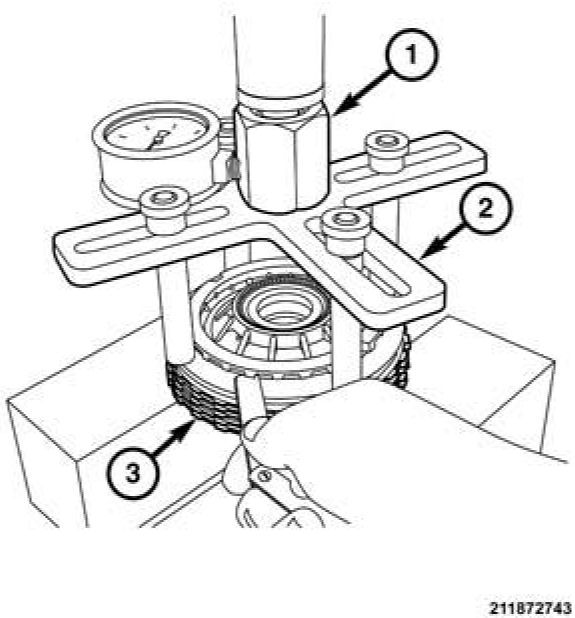
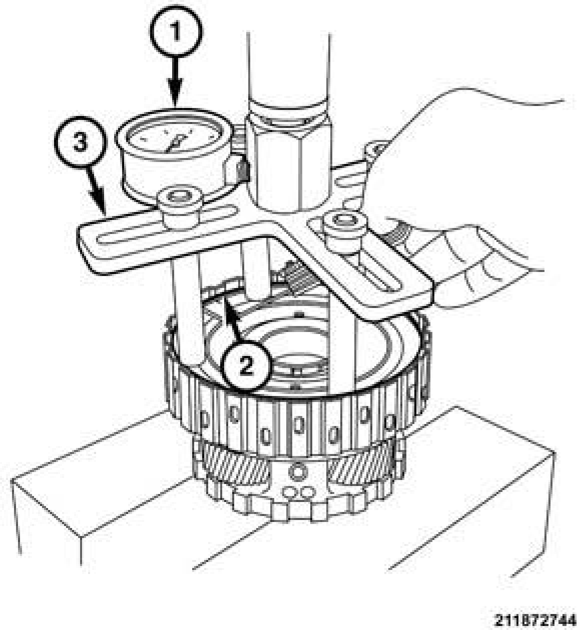


Fig. 9: Measuring Gap Between C-Clutch Backing Plate & C-Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

D-CLUTCH MEASUREMENT



[Fig. 10: Measuring Gap Between D-Clutch Backing Plate & D-Clutch Retainer](#)
Courtesy of CHRYSLER GROUP, LLC

1. Using (special tool #8901A, Pressing Tool) (3) and (special tool #10429, Gauge, Force) (1) place the D-clutch in a suitable arbor press.
2. Apply 200 N (45 lbs.) of force to the D-clutch backing plate to compress the wave plate.
3. With a suitable feeler gauge (2), measure the gap between the C-clutch backing plate and the C-clutch retainer.
4. Refer to **CLUTCH D SELECTABLE SNAP RINGS TABLE** for specs. If clearance is not within specification a thinner or thicker selectable snap ring can be Installed to achieve proper clearance.

E-CLUTCH MEASUREMENT

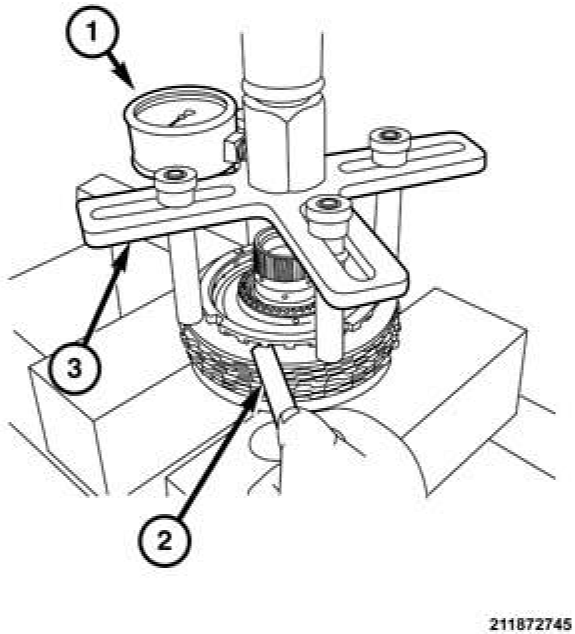


Fig. 11: Measuring Gap Between Backing Plate & Retainer Of E-Clutch
Courtesy of CHRYSLER GROUP, LLC

1. Place the E-clutch in a suitable arbor press.
2. Using (special tool #10429, Gauge, Force) (1) and (special tool #8901A, Pressing Tool) (3) apply 200 N (45 lbs.) to the backing plate of the E-clutch.
3. Using a set of feeler gauges (2), measure the gap between the backing plate and the retainer of the E-clutch.
4. Refer to **CLUTCH C AND E SELECTABLE BACKING PLATES TABLE** for specifications. If clearance is not within specifications, a thinner or thicker selectable backing plate can be installed to achieve proper clearance.

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Crossmember Bolt	68	50	-	Ā
Transmission Insulator Bolt	61	45	-	Ā
Engine to Transmission Bolt	45	33	-	Ā
Manual Park Release Cable Bolt	20	15	-	Ā
Manual Park Release Lever Shaft Nut	15	-	133	Ā
Manual Park Release Lever Bolt	10	-	89	Ā
Transmission Drain Plug	9	-	80	Ā
Transmission Fill Plug	35	26	-	Ā

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Transmission Oil Pan Bolt	Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.			Ā
Transmission Oil Pump Assembly To Case Bolt	Refer to **PUMP, TRANSMISSION OIL, INSTALLATION**.			X
Transmission Oil Pump Housing To Cover Bolt	Refer to **PUMP, TRANSMISSION OIL, INSTALLATION**.			Ā
Output Speed Sensor Bolt	8	-	71	Ā
Park Pawl Lock Rod Guide Plate Bolt	10	-	89	Ā
Park Pawl Shaft Plug	35	26	-	Ā
Shifter Assembly Bolts	7	-	65	Ā
Torque Converter to Flex Plate Bolt	37	27	-	Ā
Transmission to Engine Bolt	45	33	-	Ā
Transmission to Engine Studbolt	45	33	-	Ā
Transmission Mount to Adapter	31	23	-	Ā
Valve Body Bolt	Refer to **VALVE BODY, INSTALLATION**.			Ā
Transmission Output Flange Nut	60	44	-	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

CLUTCH SPECIFICATIONS

CLUTCH SPECIFICATIONS

Clutch	Condition	Minimum	Normal	Maximum
A	NEW	1.41 mm	1.555 mm	1.7 mm
		0.056 in	0.061 in	0.067 in
	AFTER OPERATION	1.41 mm	1.655 mm	1.9 mm
		0.056 in	0.065 in	0.075 in
Ā				
B	NEW	1.52 mm	1.725 mm	1.93 mm
		0.060 in	0.068 in	0.076 in
	AFTER OPERATION	1.52 mm	1.825 mm	2.13 mm
		0.060 in	0.072 in	0.084 in
Ā				
C	NEW	1.62 mm	1.815 mm	2.01 mm
		0.064 in	0.071 in	0.079 in
	AFTER OPERATION	1.62 mm	1.935 mm	2.25 mm
		0.064 in	0.076 in	0.089 in
Ā				
D	NEW	1.37 mm	1.515 mm	1.66 mm
		0.054 in	0.060 in	0.065 in

Clutch	Condition	Minimum	Normal	Maximum
	AFTER OPERATION	1.37 mm	1.615 mm	1.86 mm
		0.054 in	0.064 in	0.073 in
Ā				
E	NEW	1.62 mm	1.815 mm	2.01 mm
		0.064 in	0.071 in	0.079 in
	AFTER OPERATION	1.62 mm	1.935 mm	2.25 mm
		0.064 in	0.076 in	0.089 in
Ā				

CLUTCH A SELECTABLE SNAP RINGS

CLUTCH A SELECTABLE SNAP RINGS TABLE

3.2 mm	0.125 in.
3.0 mm	0.118 in.
2.8 mm	0.110 in.
2.6 mm	0.102 in.
2.4 mm	0.0944 in.
2.2 mm	0.0866 in.

CLUTCH B SELECTABLE BACKING PLATES

CLUTCH B SELECTABLE BACKING PLATES TABLE

6.0 mm	.236 in.
5.8 mm	.228 in.
5.6 mm	.220 in.
5.4 mm	.212 in.
5.2 mm	.204 in.
5.0 mm	.196 in.
4.8 mm	.188 in.

CLUTCH C AND E SELECTABLE BACKING PLATES

CLUTCH C AND E SELECTABLE BACKING PLATES TABLE

4.8 mm	0.188 in.
4.5 mm	0.177 in.
4.2 mm	0.165 in.
3.9 mm	0.153 in.
3.6 mm	0.141 in.
3.3 mm	0.129 in.
3.0 mm	0.118 in.

CLUTCH D SELECTABLE SNAP RINGS

CLUTCH D SELECTABLE SNAP RINGS TABLE

3.0 mm	0.118 in.
2.8 mm	0.110 in.
2.6 mm	0.102 in.
2.4 mm	0.0944 in.
2.2 mm	0.0866 in.
2.0 mm	0.0787 in.
1.8 mm	0.0708 in.
1.6 mm	0.0629 in.

REMOVAL

TRANSMISSION

1. Put transmission in neutral.
2. Disconnect and isolate the negative battery cable.
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Remove the drive shaft. Refer to **REMOVAL** .
5. Remove the starter. Refer to **STARTER, REMOVAL** .

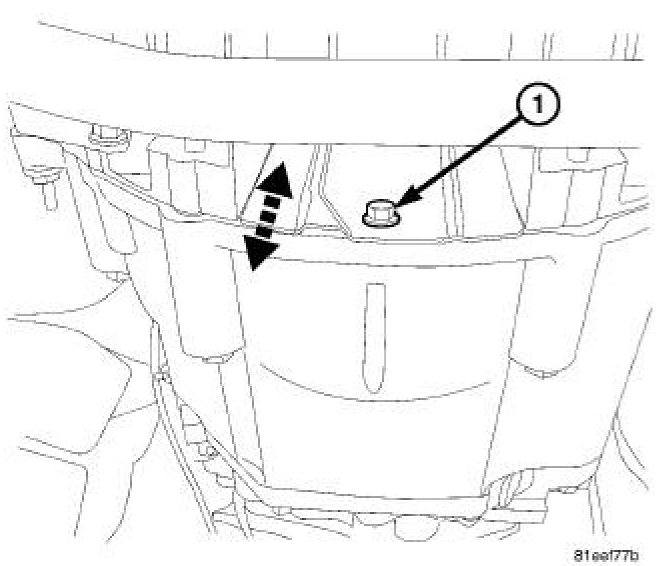


Fig. 12: Inspection Cover
Courtesy of CHRYSLER GROUP, LLC

6. Remove the inspection cover bolt (1) and the inspection cover.

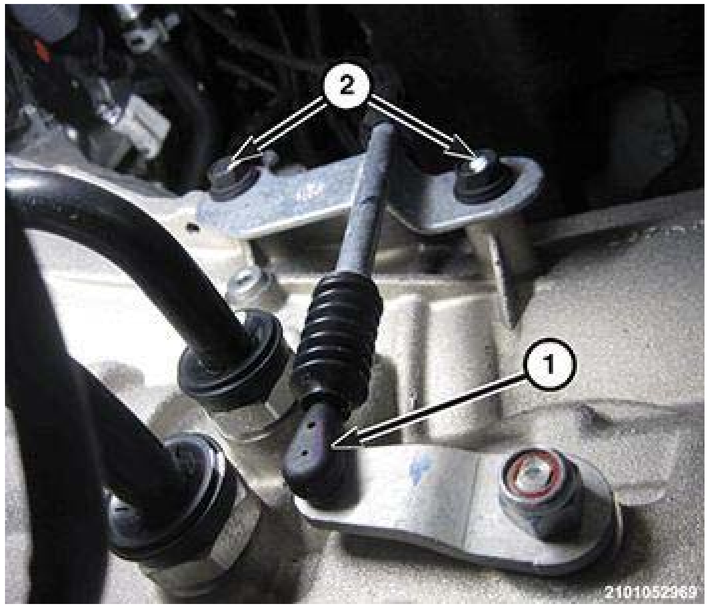


Fig. 13: Manual Park Release Cable & Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the Manual Park Release (MPR) cable (1) from the MPR lever, remove the MPR cable bracket bolts (2) and position aside.

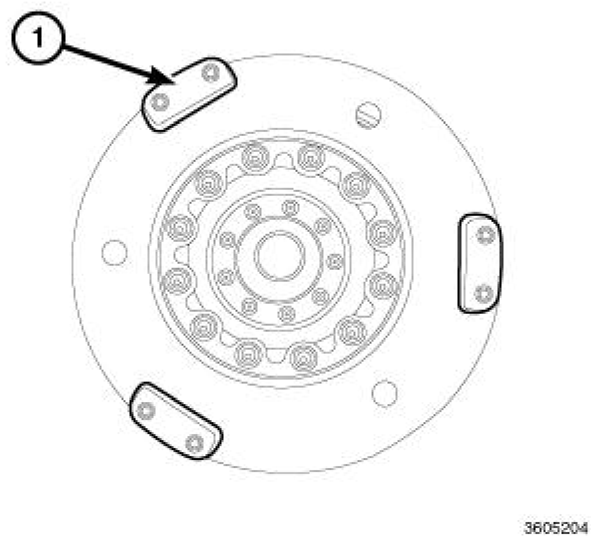


Fig. 14: Two Bolts
Courtesy of CHRYSLER GROUP, LLC

8. The torque converter is attached with three sets of two bolts (1) 120Ā° apart as shown.

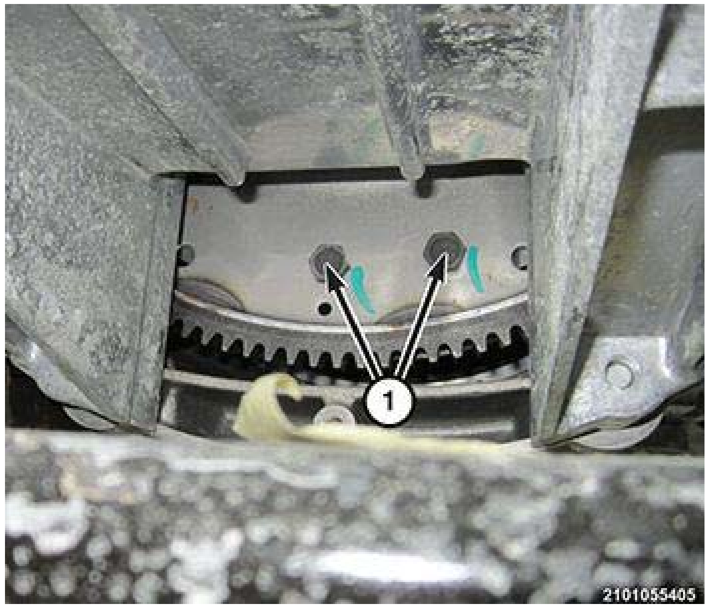


Fig. 15: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Rotate the crankshaft in a clockwise direction and remove the six torque converter bolts (1).

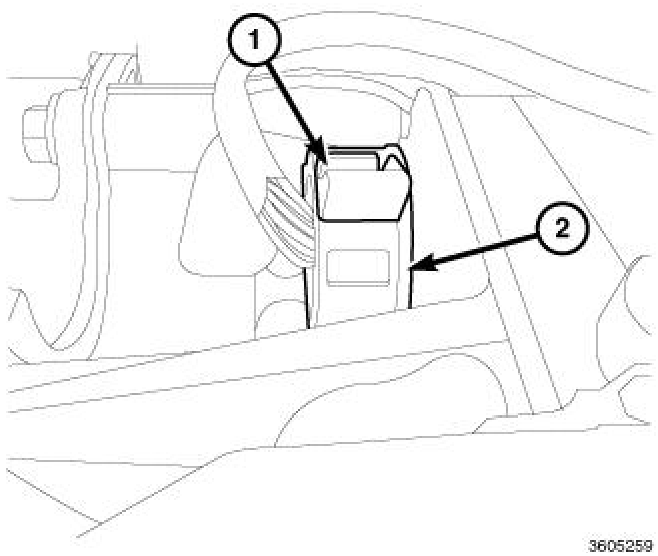
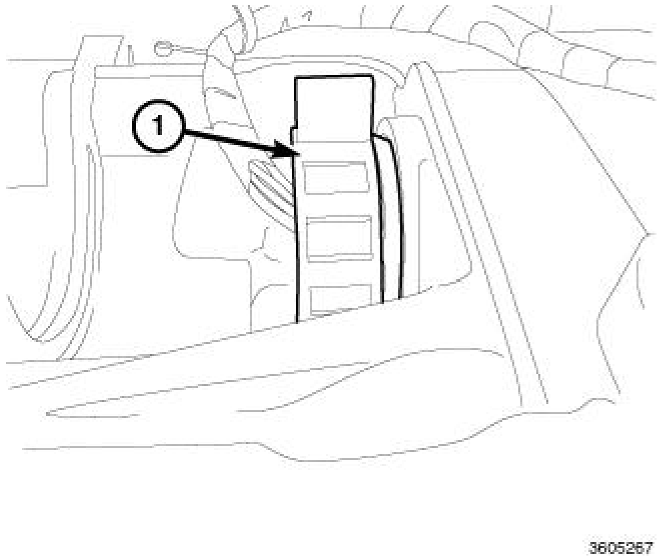


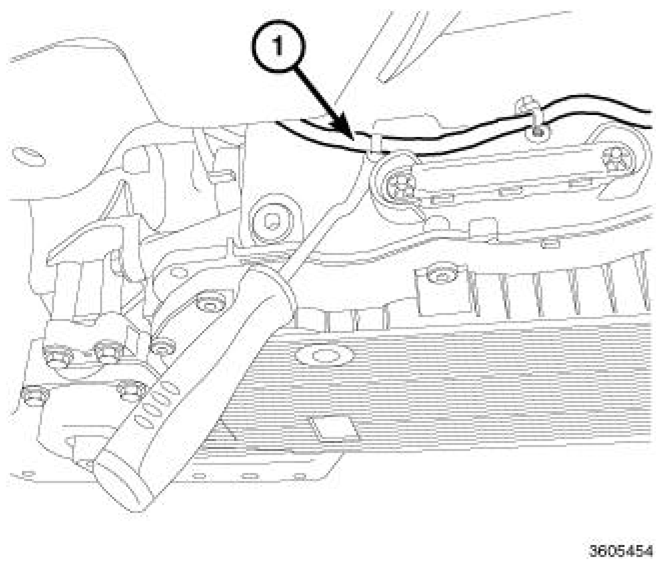
Fig. 16: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

10. Turn the locking mechanism lock (1) of the adapter plug connector (2) counter-clockwise to release the lock.



[Fig. 17: Adapter Plug Connector]
Courtesy of CHRYSLER GROUP, LLC

11. Remove the adapter plug connector (1) from the transmission.



[Fig. 18: Wiring Harness]
Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the wiring harness (1) from the transmission.

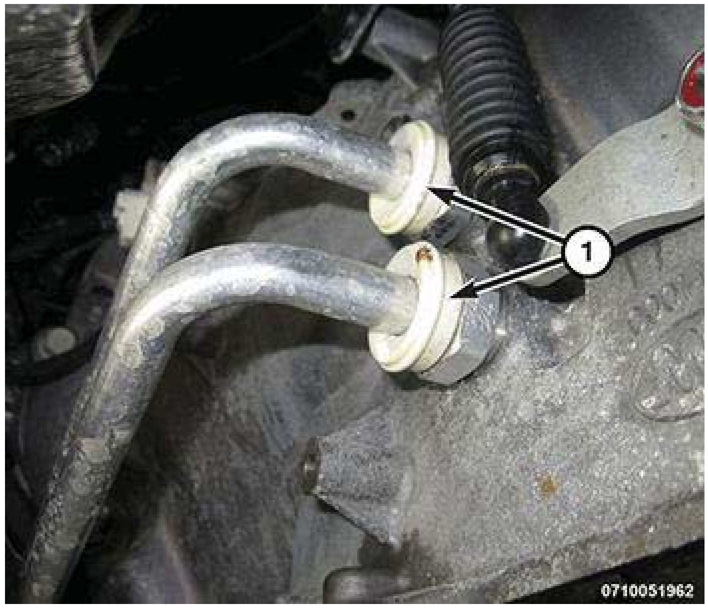


Fig. 19: Transmission Fluid Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

13. Disconnect the transmission fluid cooler lines (1) from the transmission and cap the transmission cooler lines. (Refer to **STANDARD PROCEDURE**).

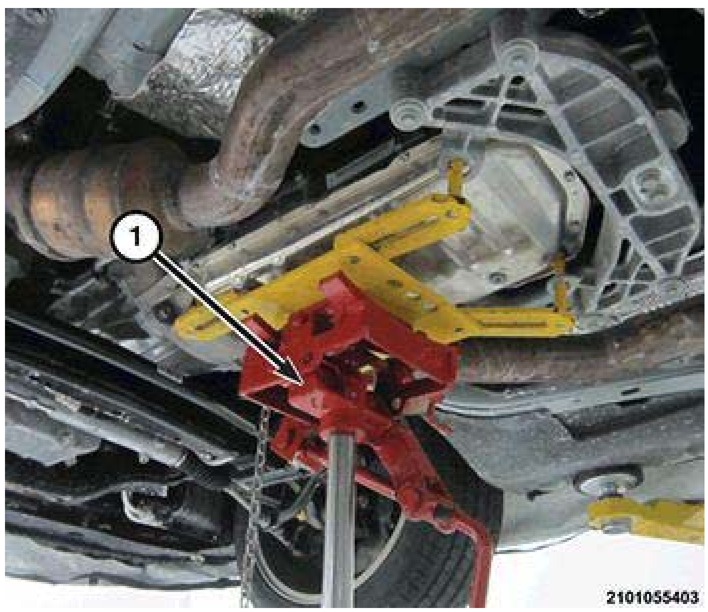
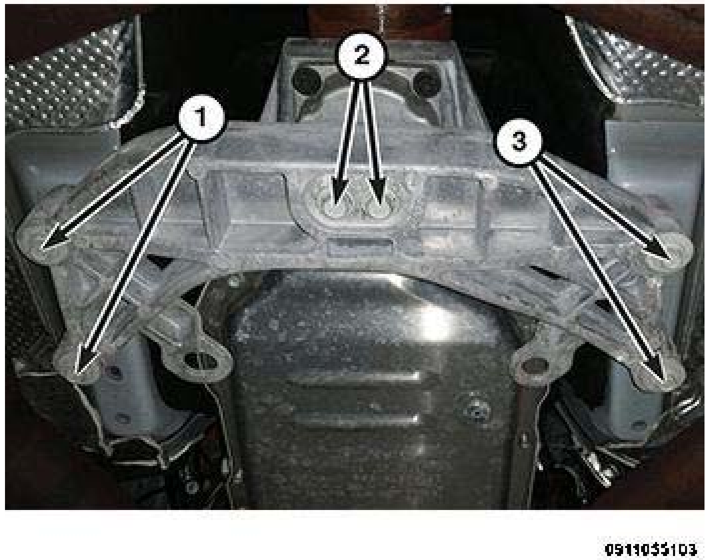


Fig. 20: Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

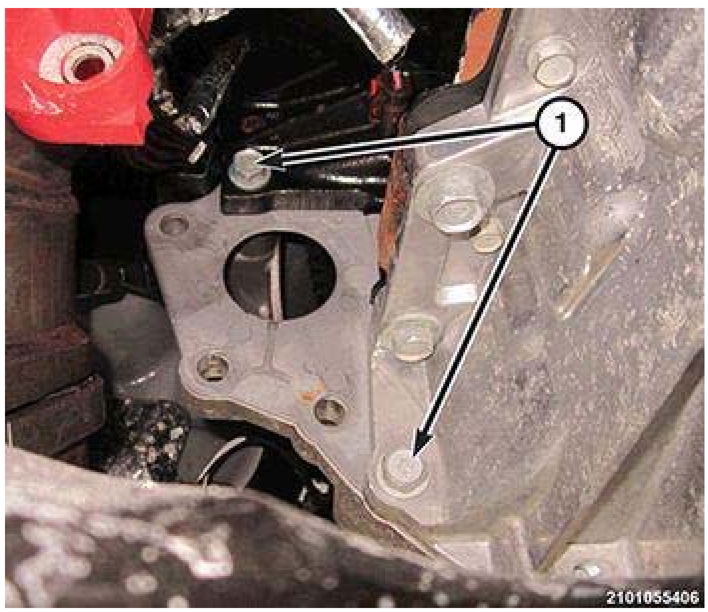
CAUTION: When supporting or lifting the transmission at the oil pan the weight of the transmission must be distributed evenly on the lifting fixture. Failure to do so could damage the oil pan and transmission.

14. Raise the transmission slightly with a transmission jack (1) to relieve load on the crossmember.



[Fig. 21: Rear Support Isolator And Crossmember Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

15. Remove the rear support isolator bolts (2), the crossmember bolts (1 and 3) and remove the crossmember.



[Fig. 22: Right Transmission To Engine Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

16. Remove the Right Hand (RH) transmission to engine bolts (1).

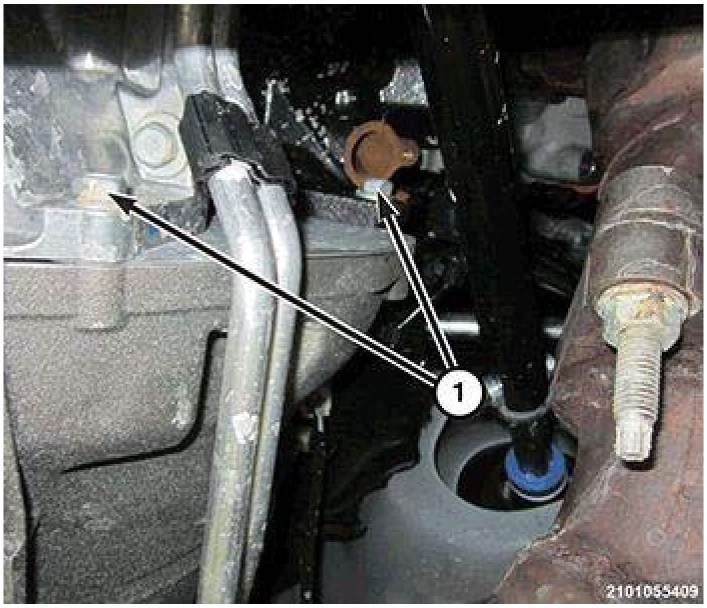


Fig. 23: Left Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Remove the Left Hand (LH) transmission to engine bolts (1).

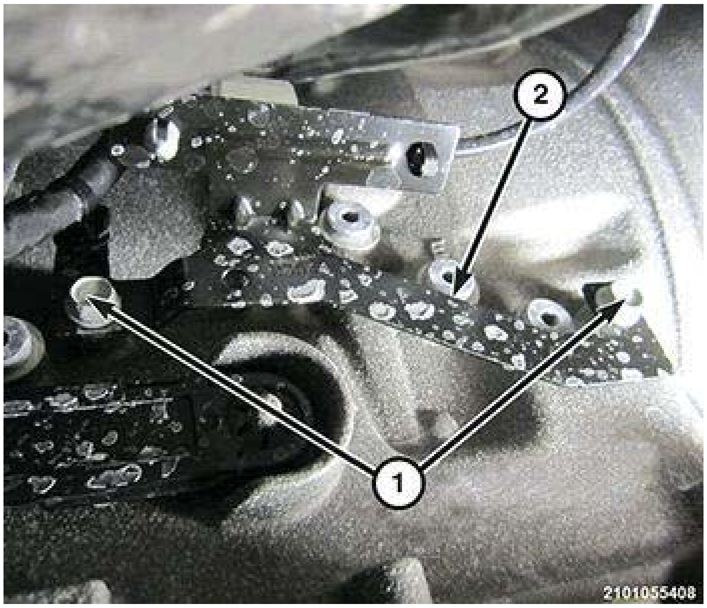
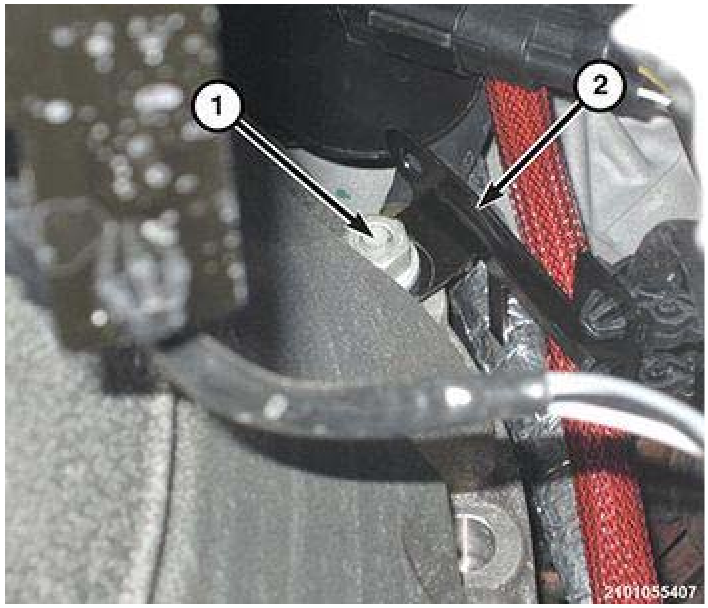


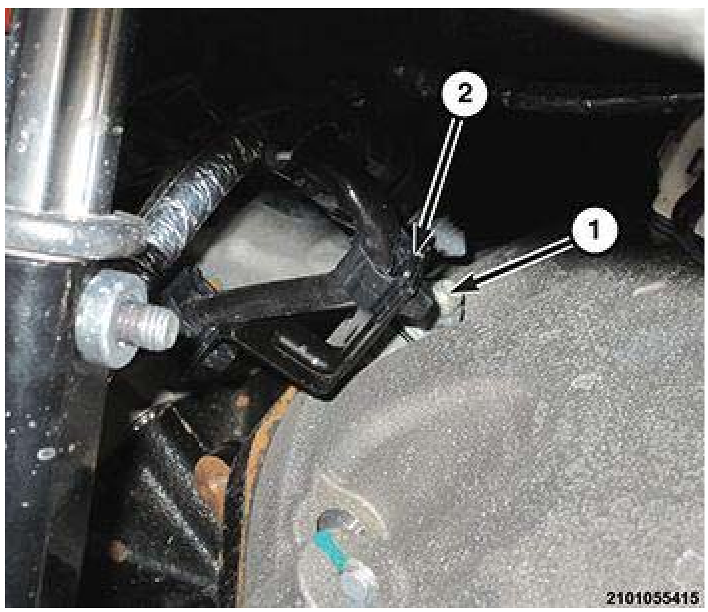
Fig. 24: Wiring Harness Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

18. Remove the wiring harness bracket bolts (1) and position aside the wiring harness bracket (2).



[**Fig. 25: Right Wiring Harness Bracket & Nut**]
Courtesy of CHRYSLER GROUP, LLC

19. Remove the RH wiring harness bracket nut (1) and position aside the wiring harness bracket (2).



[**Fig. 26: Left Wiring Harness Bracket & Nut**]
Courtesy of CHRYSLER GROUP, LLC

20. Remove the LH wiring harness bracket nut (1) and position aside the wiring harness bracket (2).

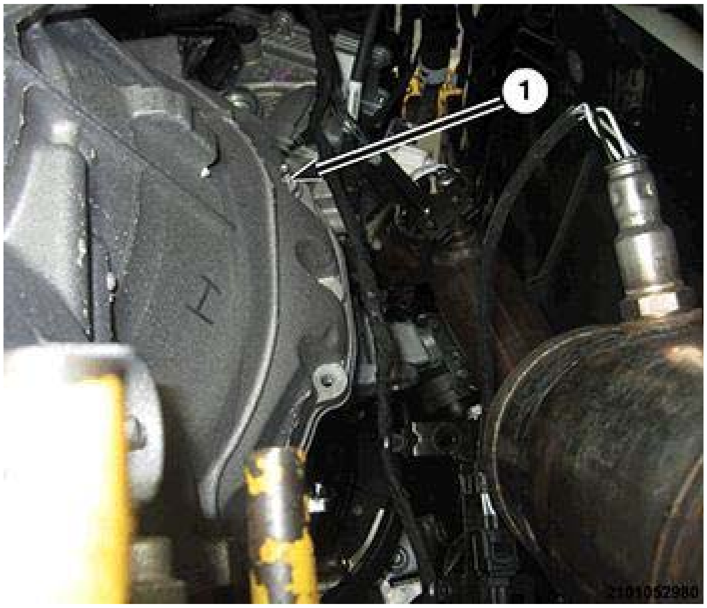


Fig. 27: Transmission To Engine Studbolt
Courtesy of CHRYSLER GROUP, LLC

21. Remove the RH and LH transmission to engine studbolts (1).

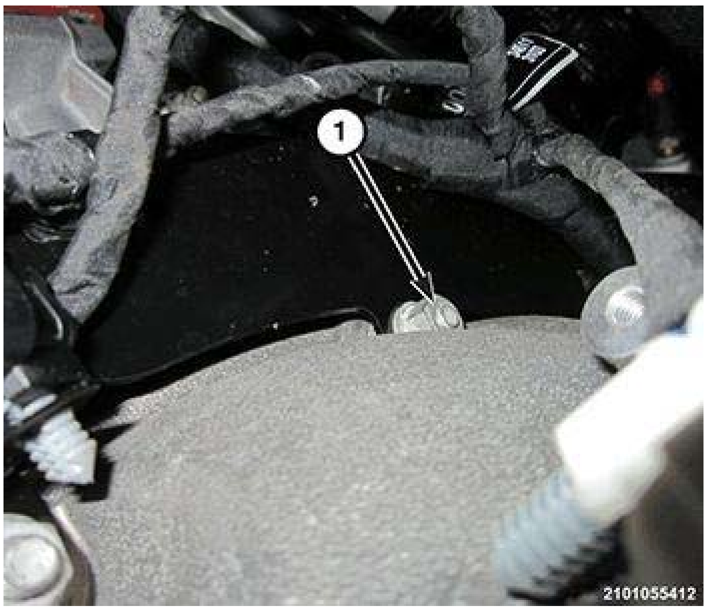


Fig. 28: Left Wiring Harness Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

22. Remove the LH wiring harness bracket nut (1).

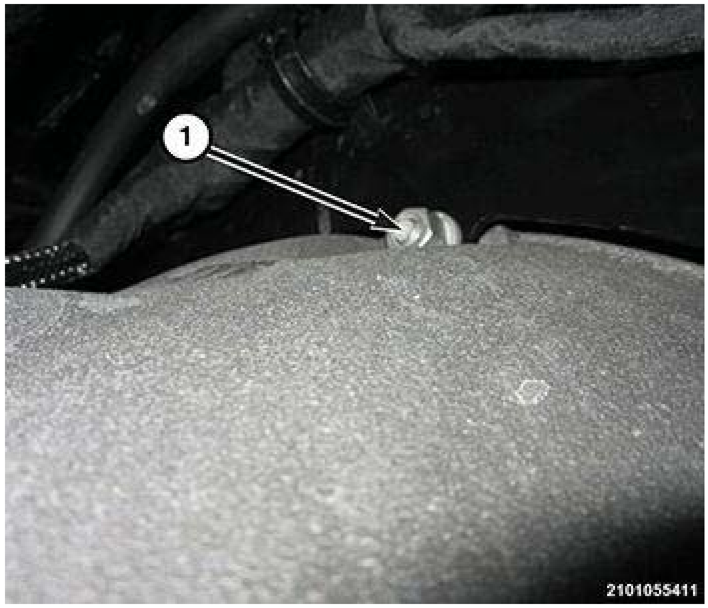


Fig. 29: Right Wiring Harness Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

23. Remove the RH wiring harness bracket nut (1).

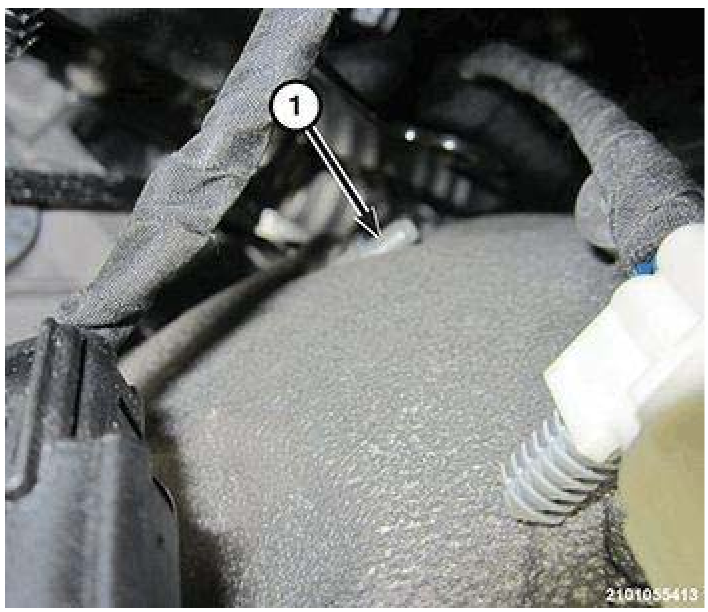


Fig. 30: Left Transmission To Engine Studbolt
Courtesy of CHRYSLER GROUP, LLC

24. Remove the LH transmission to engine studbolt (1).

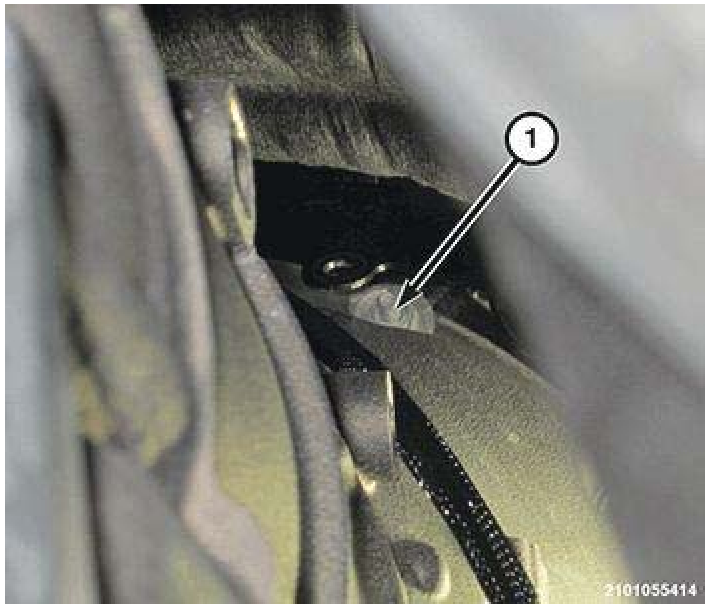


Fig. 31: Right Transmission To Engine Studbolt
Courtesy of CHRYSLER GROUP, LLC

25. Remove the RH transmission to engine studbolt (1).

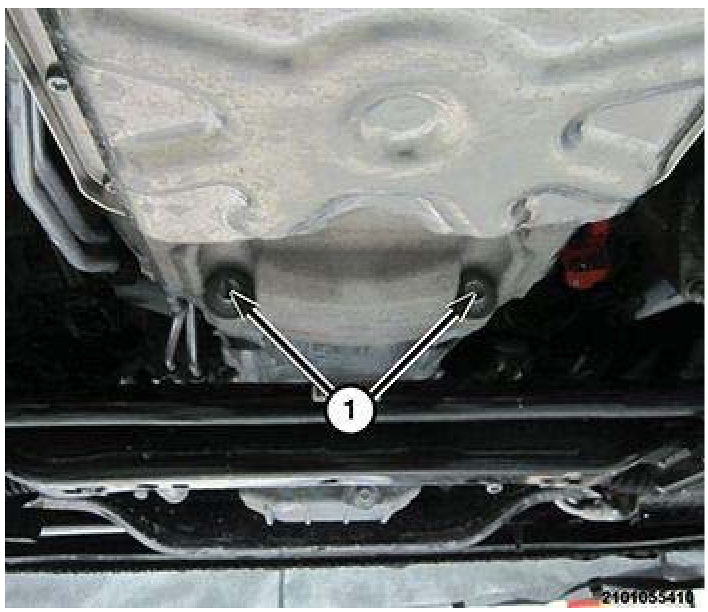
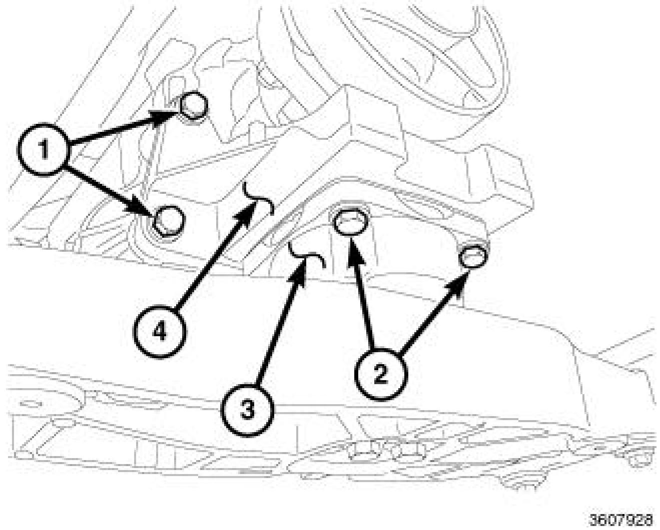


Fig. 32: Bottom Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

26. Remove the bottom two transmission to engine bolts (1).
27. Hold the torque converter in place during transmission removal.
28. Lower the transmission and remove the assembly from the vehicle.



[Fig. 33: Transmission Mount Bolts & Transmission Mount]

Courtesy of CHRYSLER GROUP, LLC

29. Remove the transmission mount bolts (2) and the transmission mount (3).
30. Remove the four adapter bracket bolts (1) and the adapter bracket (4).

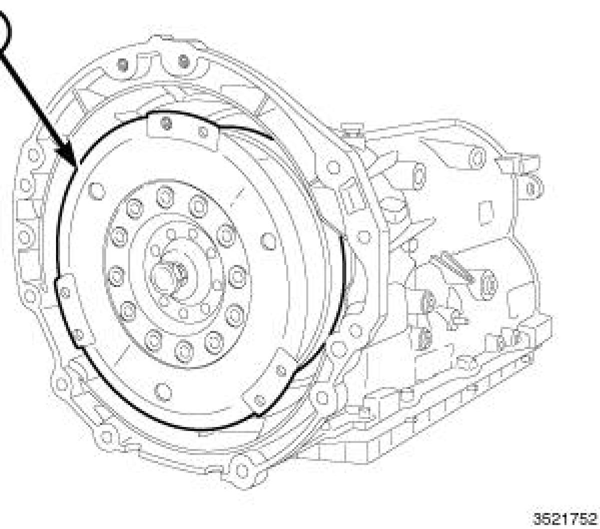
DISASSEMBLY

DISASSEMBLY

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.**

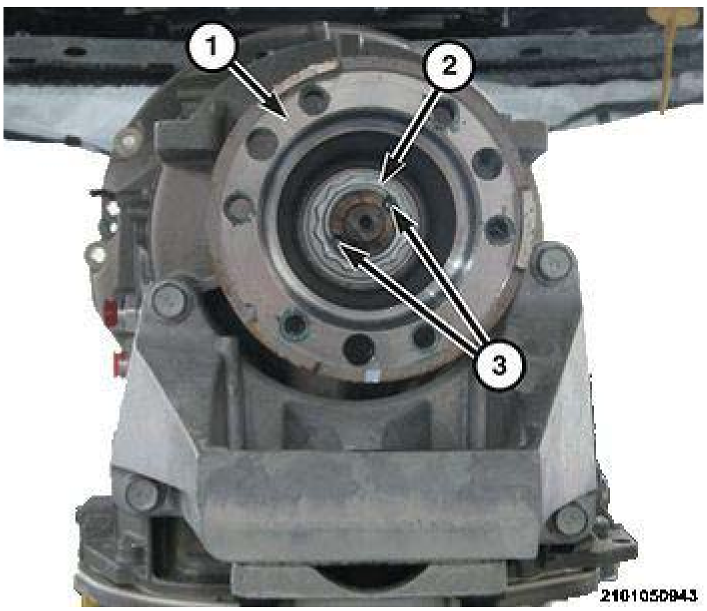
NOTE: **If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TCM Adaptation Procedure. Refer to STANDARD PROCEDURE .**

NOTE: **Tag all clutch pack assemblies, as they are removed, for reassembly identification.**



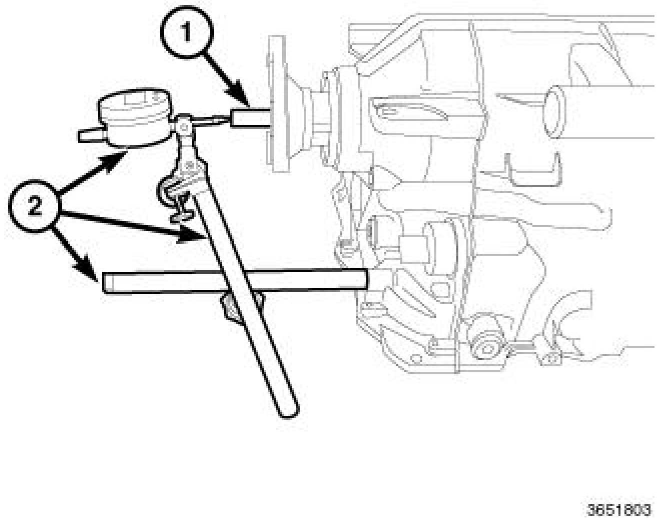
[Fig. 34: Torque Converter]
Courtesy of CHRYSLER GROUP, LLC

1. Remove the torque converter (1).



[Fig. 35: Drive Shaft Flange, Nut & Staking Area]
Courtesy of CHRYSLER GROUP, LLC

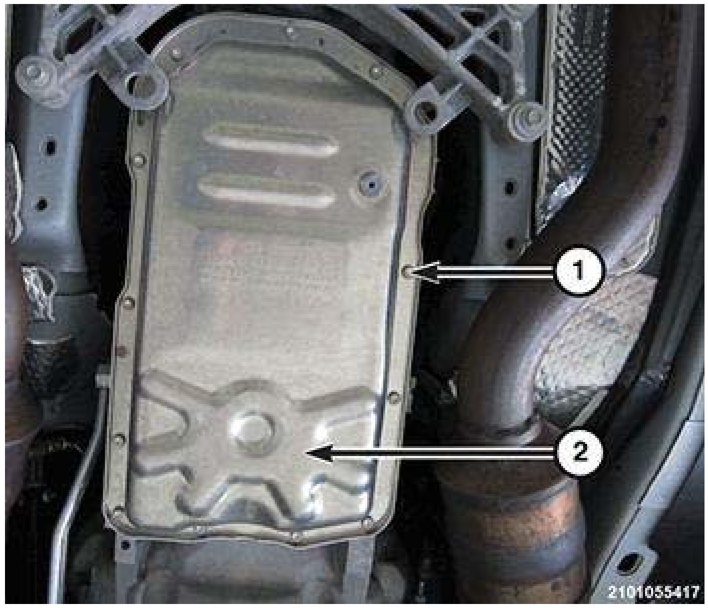
2. Using a suitable punch, remove the staking (3) from the transmission output flange nut (2).
3. Using (special tool #C-3281, Holder, Flange) loosen the transmission output flange nut (2) about 1 thread using a 34 mm 12 point socket.



[Fig. 36: Measuring End Play]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **End play specification is between 0.11 - 0.42 mm (0.0043 - 0.0165 in.). If end play is outside this range, a different selectable end play shim must be used during assembly.**

4. Measure the output shaft (1) end play as follows:
    a. Attach a dial indicator (2) and position the plunger against the end of the output shaft (1).
    b. Zero the dial indicator (2).
    c. Move the output shaft (1) in and out, and record the maximum travel for assembly reference.
5. Finish removing the transmission output flange nut.
6. Remove the transmission output flange.
7. Remove the transmission rear dust seal.
8. Remove the transmission rear output shaft seal with a suitable slide hammer and screw.
9. Remove the transmission output shaft washer.

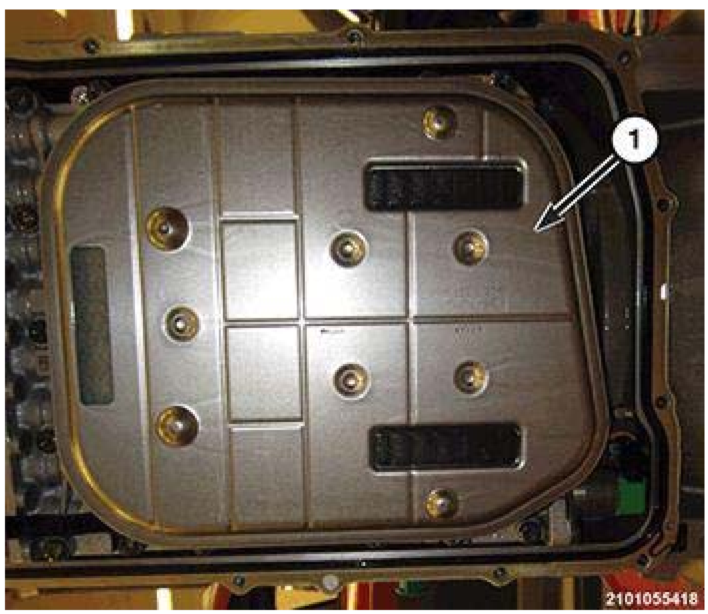


[Fig. 37: Transmission Oil Pan & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

10. Remove the 13 transmission oil pan bolts (1).

NOTE: **Inspect the gasket for reuse. If the gasket is cut or torn, replace the gasket.**

11. Remove the transmission oil pan (2) and gasket.



[Fig. 38: Transmission Oil Filter](#)
Courtesy of CHRYSLER GROUP, LLC

12. Remove the transmission oil filter (1).

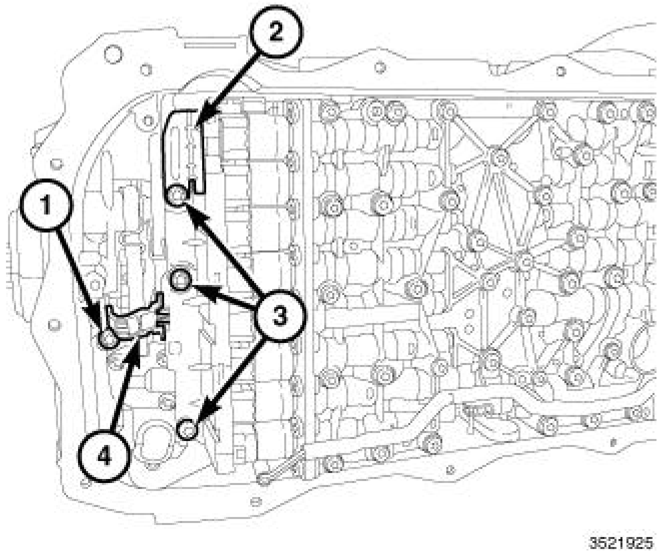


Fig. 39: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Remove the valve body assembly end bolts (3).
14. Lift the electrical connector lock (2) to release the internal harness end from inside the transmission for valve body assembly removal.
15. Remove the sensor bolt (1) and pull the sensor (4) loose from the case.

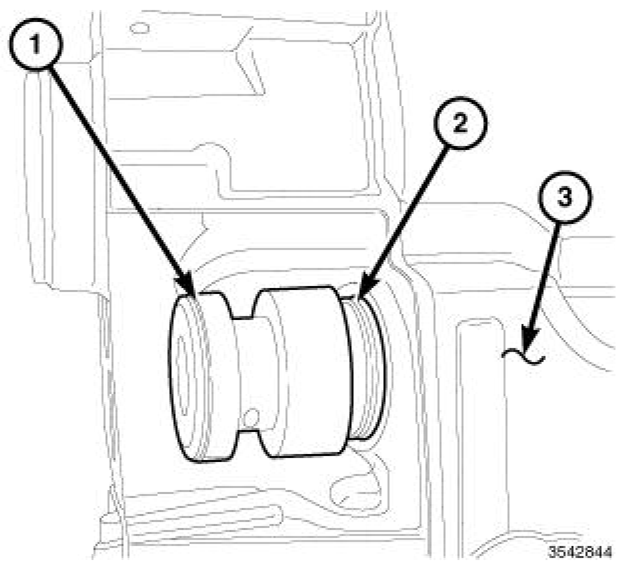
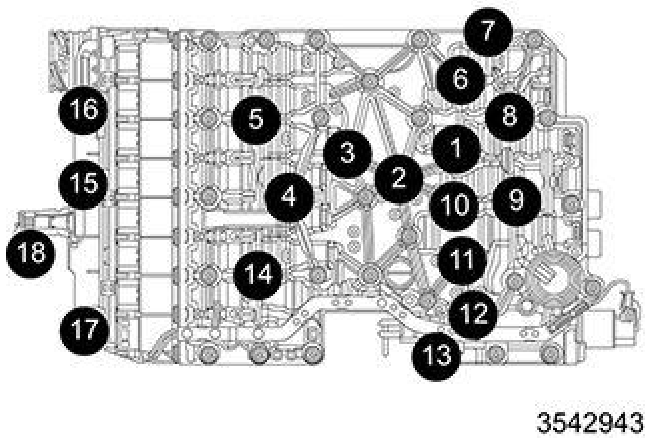


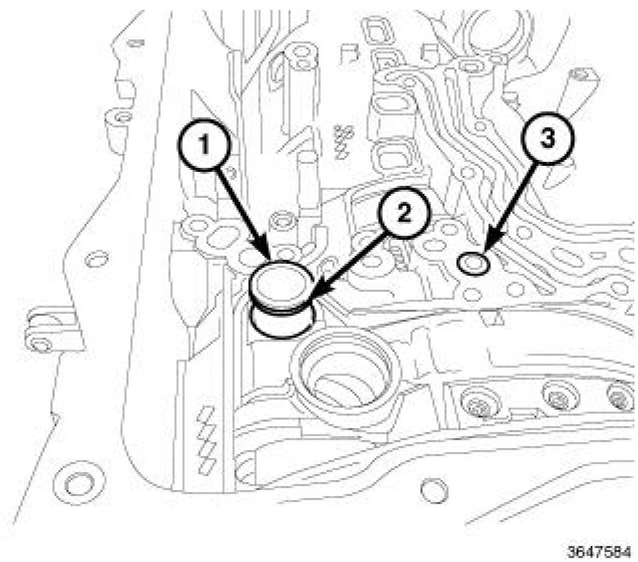
Fig. 40: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

16. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully pull the electrical harness insulator (2) straight out from the transmission case (3).



[Fig. 41: Valve Body Bolts Loosening And Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

17. Remove valve body assembly bolts 1-14 (15-18 are already removed).
18. Remove the valve body assembly from the transmission.



[Fig. 42: Fluid Port, Two O-Rings, Compression Seal]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The fluid port (1) may be in the transmission or the valve body assembly.**

19. Pull the fluid port (1) from the transmission or valve body assembly.
20. Remove the two O-rings (2).
21. Remove the compression seal (3) from the transmission.

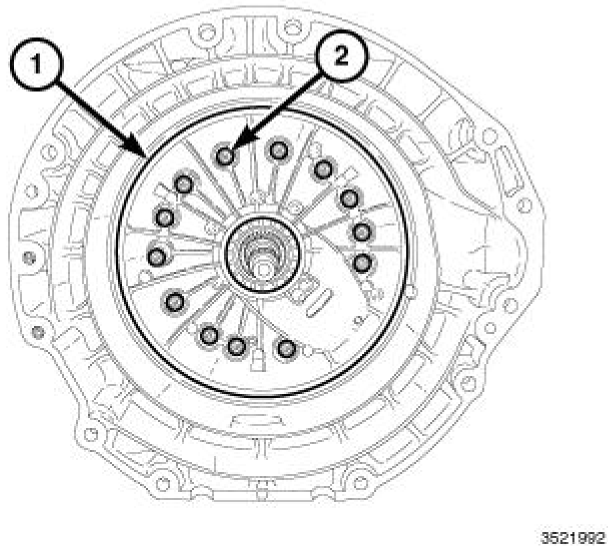


Fig. 43: Thirteen Oil Pump Housing Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

22. Remove the 13 oil pump housing bolts (2).

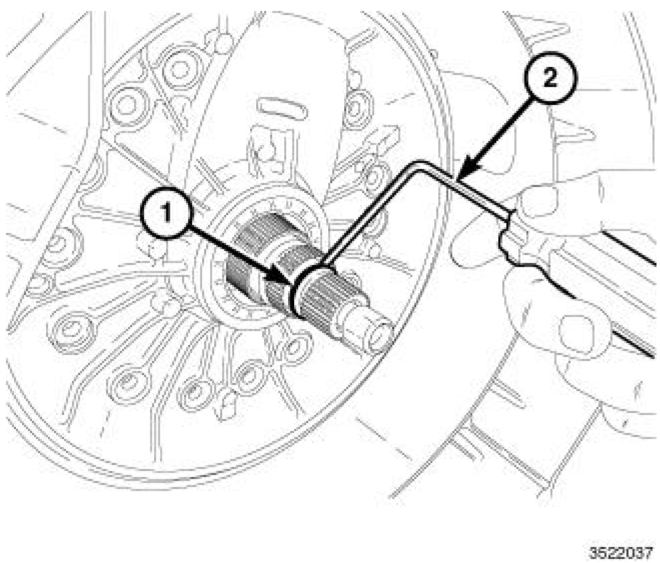


Fig. 44: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

23. Remove the input shaft O-ring (1) using a small pick (2) or equivalent.

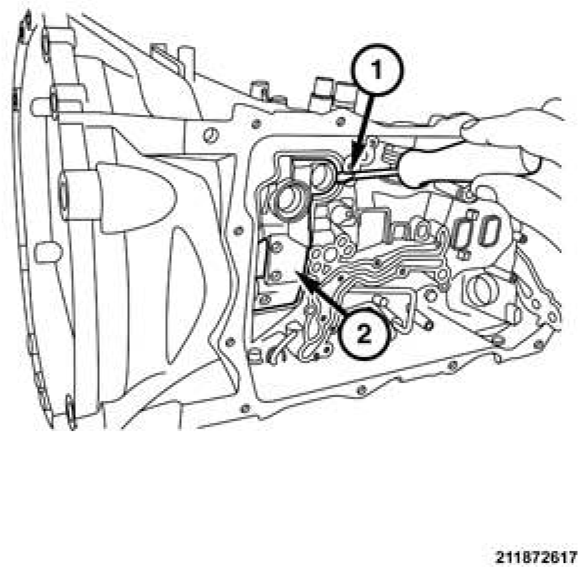


Fig. 45: Prying Oil Pump Housing Away From Case
Courtesy of CHRYSLER GROUP, LLC

24. Pry the oil pump housing (1) away from the case (2) with a small flat blade screwdriver or equivalent through the case opening.
25. From the front of the transmission, remove the oil pump housing.

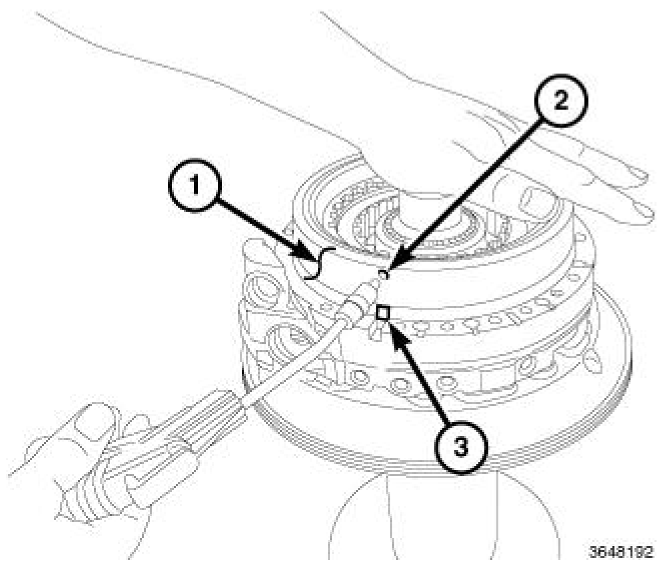


Fig. 46: B-Piston, Hole & B-Piston Alignment Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply air pressure slowly because oil may spray when B-piston releases from the assembly.**

26. With one hand above B-piston (1), carefully apply air pressure into the hole (2) directly above the B-piston alignment tab (3) to remove B-piston (1) from the assembly.

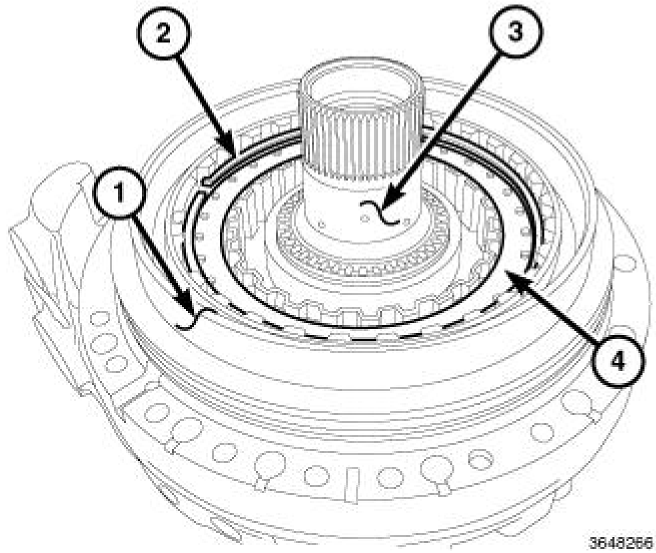


Fig. 47: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

27. Remove the outer ring (1) (under B-piston).
28. Remove the snap ring (2).
29. Remove the clutches and spacers (4).
30. Remove the hub (3).

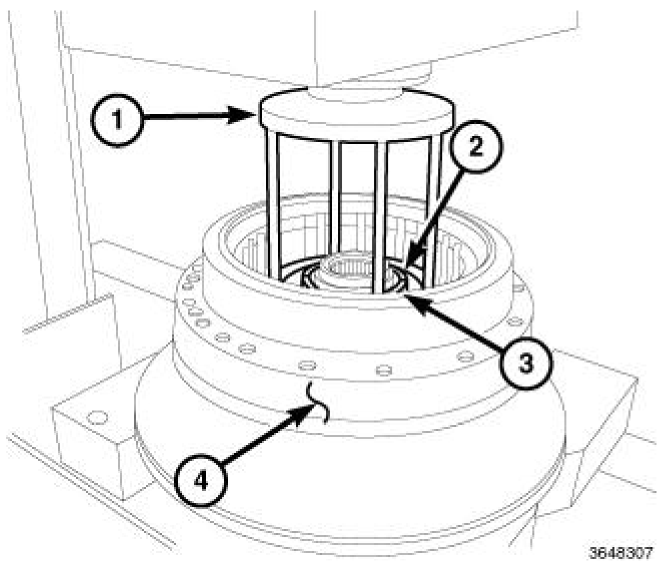


Fig. 48: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

31. Position the oil pump housing assembly (4) in a suitable arbor press.
32. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and remove the two halves of the split retainer ring (2, 3).

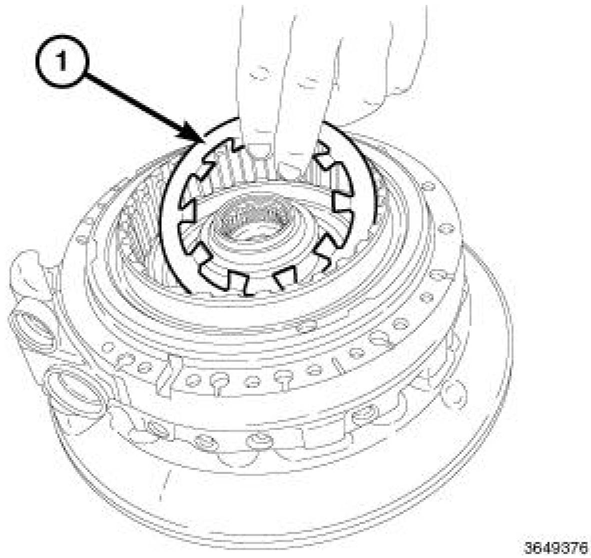


Fig. 49: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

33. Remove the piston retaining ring and piston below it.

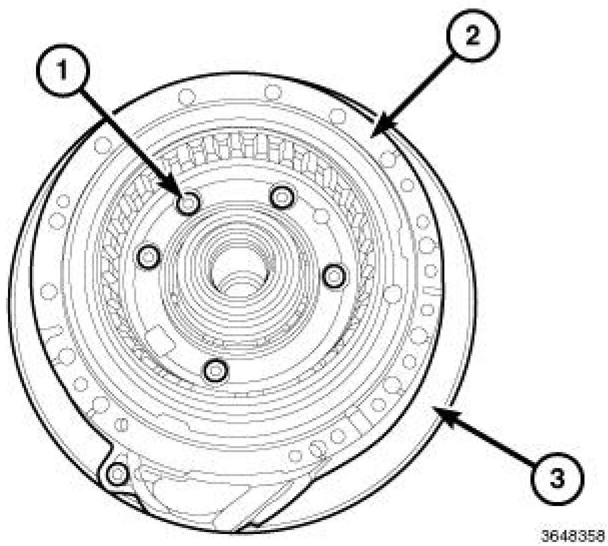


Fig. 50: Six Bolts, Oil Pump Housing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

34. Remove the six bolts (1) and separate the oil pump housing (2) from the oil pump cover (3).

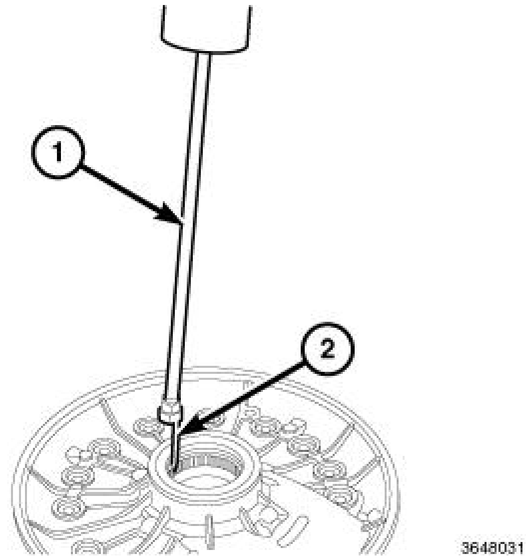


Fig. 51: Seal Remover & Slide Hammer
Courtesy of CHRYSLER GROUP, LLC

35. Using (special tool #9667, Remover, Seal) (2) and (special tool #C-3752, Slide Hammers) (1), remove the oil seal from the front pump cover.
36. Remove the outer lip seal from the front pump cover.

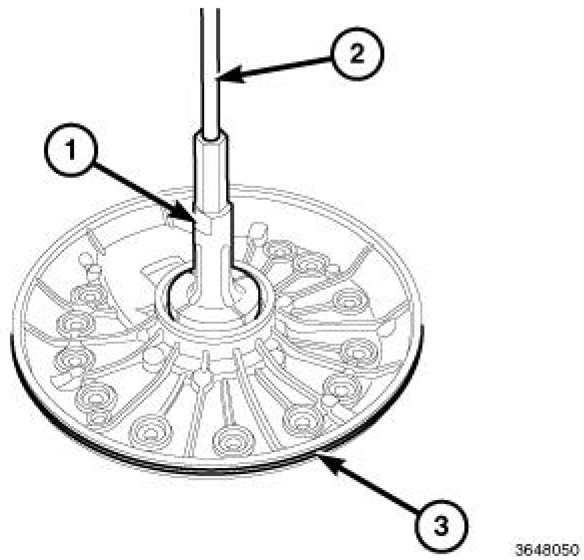


Fig. 52: Remover, Bearing Cup & Slide Hammers
Courtesy of CHRYSLER GROUP, LLC

37. Remove the snap ring.
38. Using (special tool #6787A, Remover, Bearing Cup) (1) and (special tool #C-3752, Slide Hammers) (2) remove the needle bearing from the front cover (3).
39. Remove the snap ring.
40. Using (special tool #9585, Remover, Bearing Cup) and (special tool #C-637, Slide Hammer, Universal) remove the needle bearing.

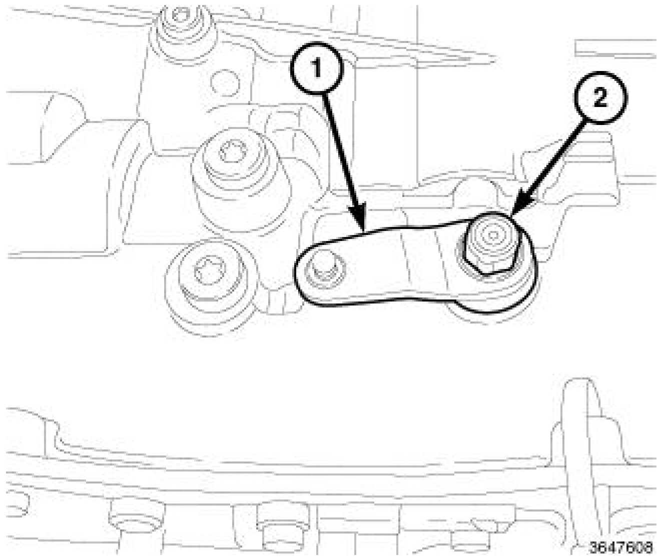


Fig. 53: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

41. Remove the Manual Park Release (MPR) lever retaining nut (2) and remove the lever (1).

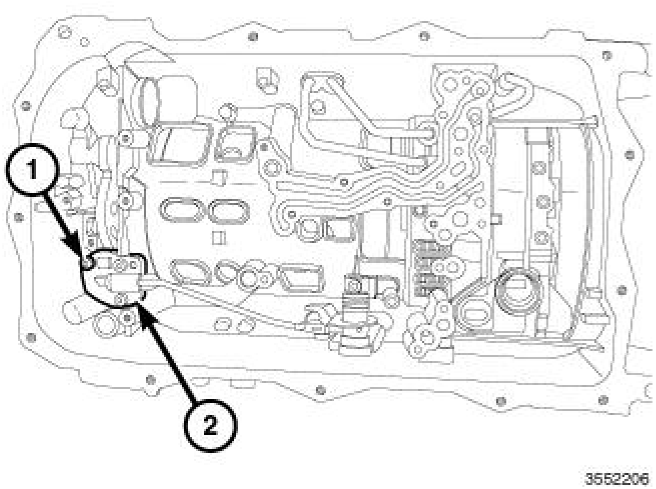


Fig. 54: Three Park Pawl Lock Rod Guide Plate Retaining Screws & Plate
Courtesy of CHRYSLER GROUP, LLC

42. Remove the three park pawl lock rod guide plate retaining screws (1) and remove the plate (2).

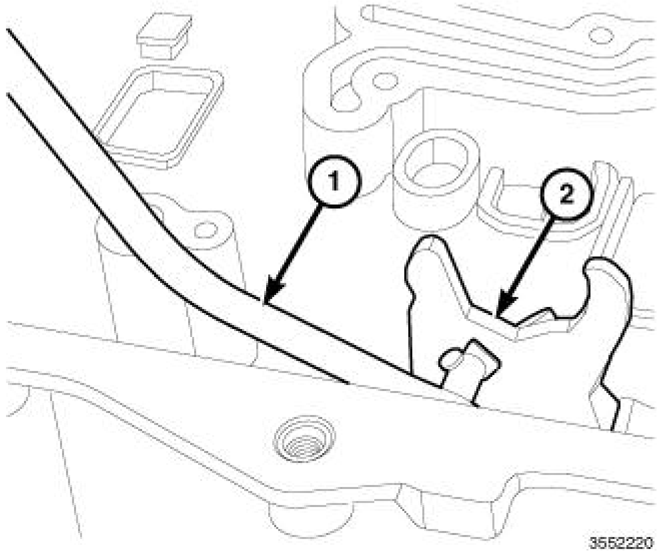


Fig. 55: Park Pawl Lock Rod & Fork
Courtesy of CHRYSLER GROUP, LLC

43. Remove the park pawl lock rod (1) from the fork (2).

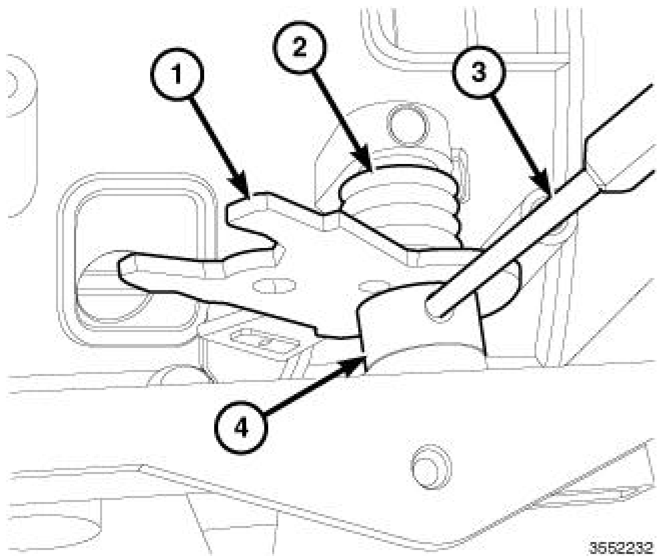


Fig. 56: Selector Shaft, Suitable Pin Punch, Spring & Fork
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Pay attention to the spring position for installation.**

44. Remove the roll pin from the MPR shaft (4) using a suitable pin punch (3).
45. Remove the shaft (4), spring (2) and fork (1) from the case.
46. Remove the MPR shaft seal using a small screwdriver or equivalent.

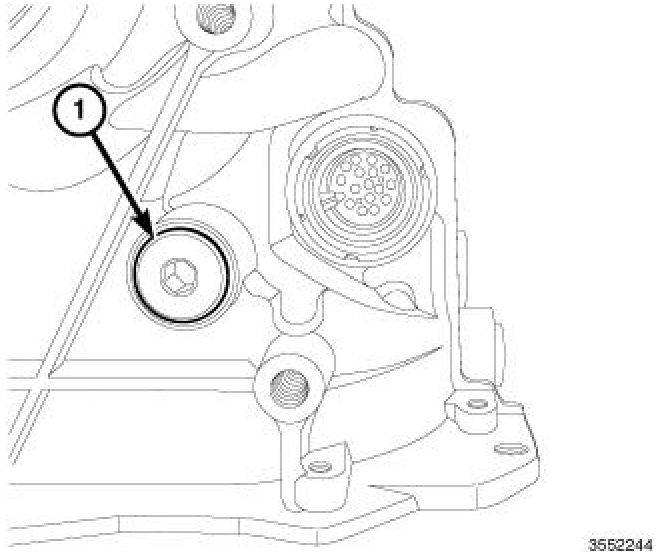


Fig. 57: Park Pawl Shaft Plug
Courtesy of CHRYSLER GROUP, LLC

47. Remove the park pawl shaft plug (1) from the rear of the case.

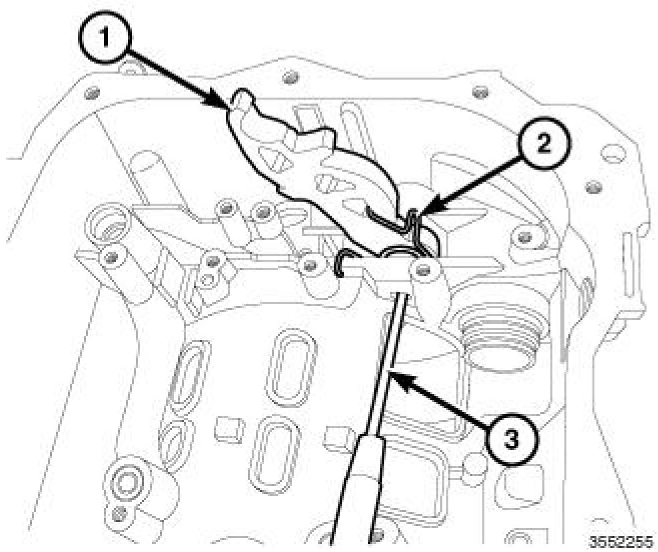


Fig. 58: Removing/Installing Park Pawl Shaft Using A Suitable Pin Punch, Park Pawl And Spring
Courtesy of CHRYSLER GROUP, LLC

NOTE: Pay attention to the spring position for installation.

48. Remove the park pawl shaft using a suitable pin punch (3), remove the park pawl (1) and spring (2).

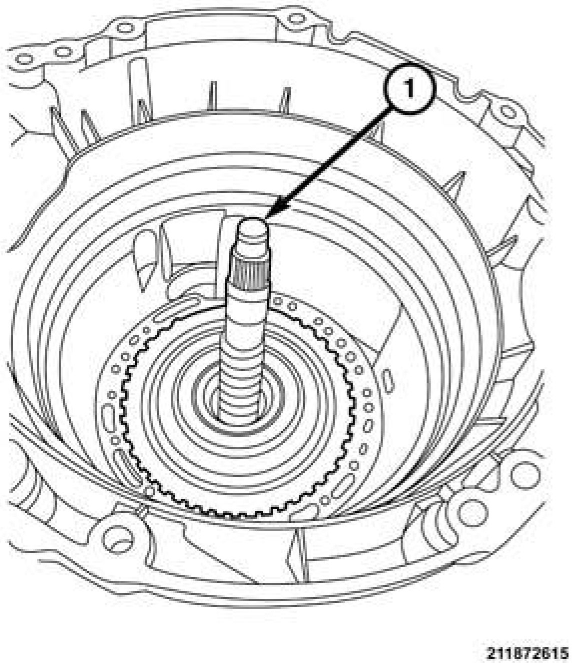


Fig. 59: Park Pawl
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The transmission must be in the upright position to remove the assembly to avoid damage to the drums.**

49. Remove the input/output shaft and P4 annulus drum assembly (1) from the case.

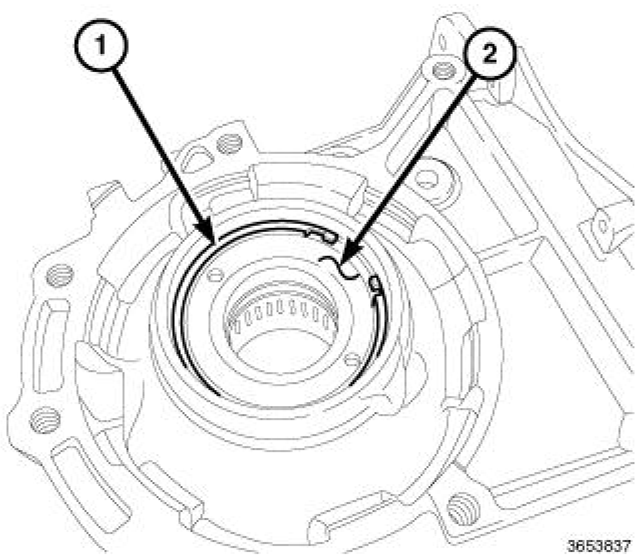


Fig. 60: Outer Bearing Snap Ring & Outer Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

50. Remove the outer bearing snap ring (1), and the outer ball bearing.

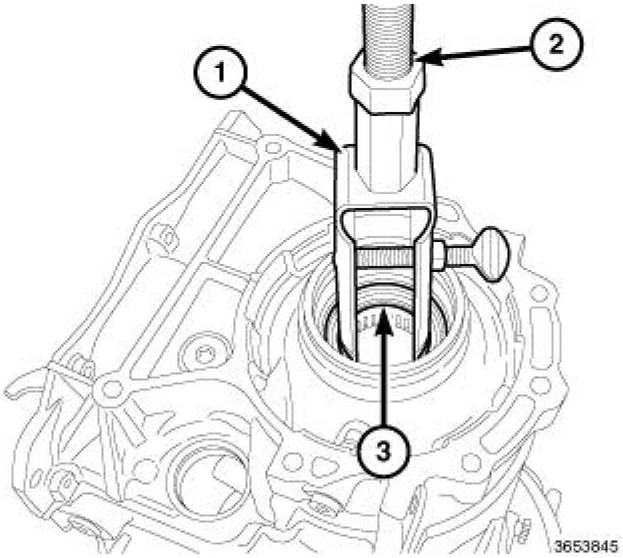


Fig. 61: Bearing Cup, Slide Hammer, Universal & Oil Dam
Courtesy of CHRYSLER GROUP, LLC

51. Remove the oil dam snap ring.
52. Using (special tool #9664, Remover, Bearing Cup) (1) and (special tool #C-637, Slide Hammer, Universal) (2), remove the oil dam (3).

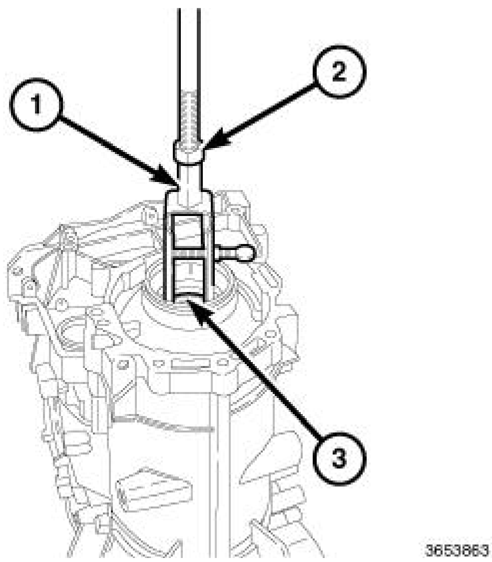


Fig. 62: Bearing Cup, Slide Hammer & Inner Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

53. Remove the output shaft inner needle bearing snap ring.
54. Using (special tool #9664, Remover, Bearing Cup) (1) and (special tool #C-637, Slide Hammer, Universal) (2), remove the inner needle bearing (3).

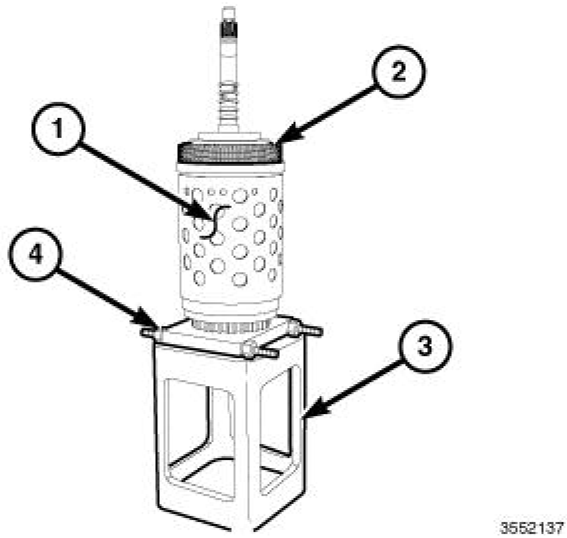


Fig. 63: P4 Annulus Drum Assembly, Press Fixture Assembly & Bearing/Gear Splitter
Courtesy of CHRYSLER GROUP, LLC

55. Position the input/output shaft and P4 annulus drum assembly (1) on (special tool #8925-3, Assembly, Press Fixture) (3) and (special tool #1130, Splitter, Bearing/Gear) (4).
56. Remove the clutch pack (2).

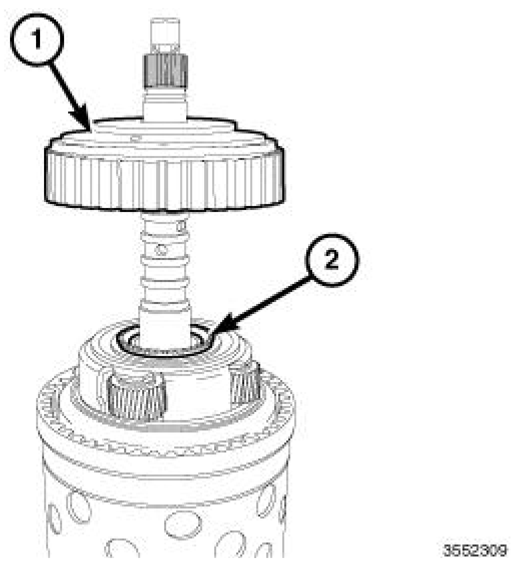


Fig. 64: P1 Annulus/B-Clutch Hub Assembly, Needle Bearing And Holding Plate
Courtesy of CHRYSLER GROUP, LLC

57. Remove the O-ring and 5 squared O-rings.
58. Remove the P1 annulus/B clutch hub assembly (1) from the P4 annulus drum.

NOTE: **The washer may stick to the bottom of the P1 annulus/B clutch hub assembly (1).**

59. Remove the selectable shim from the P1 annulus/B clutch hub.
60. Remove the needle bearing and holding plate (2) from the P1 planetary carrier.

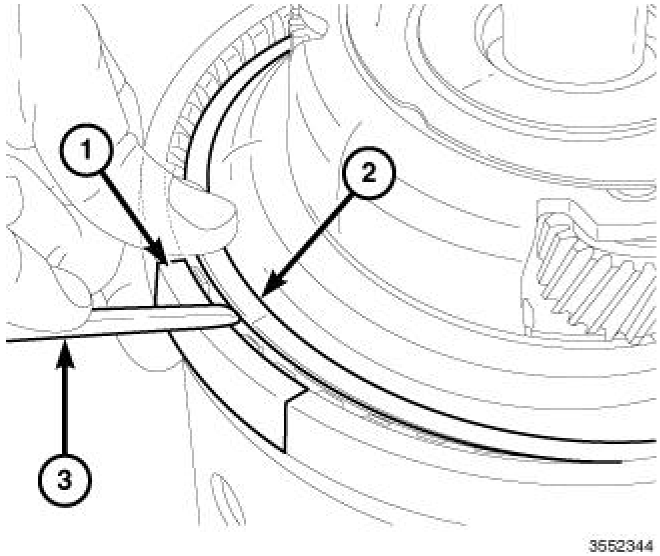


Fig. 65: Tool & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The (special tool #10378, Rings, Support) are three pieces intended to be used in multiple locations around the drum.**

61. Position the (special tool #10378, Rings, Support) (1) on the P4 annulus drum assembly to protect the drum.

NOTE: **Pry the snap ring from the opposite side of the snap ring openings to release.**

NOTE: **When the snap ring is removed the internal clutch drum may drop slightly.**

62. Using a suitable tool (3), release the snap ring (2) by prying in and up from the opposite side of the snap ring openings.

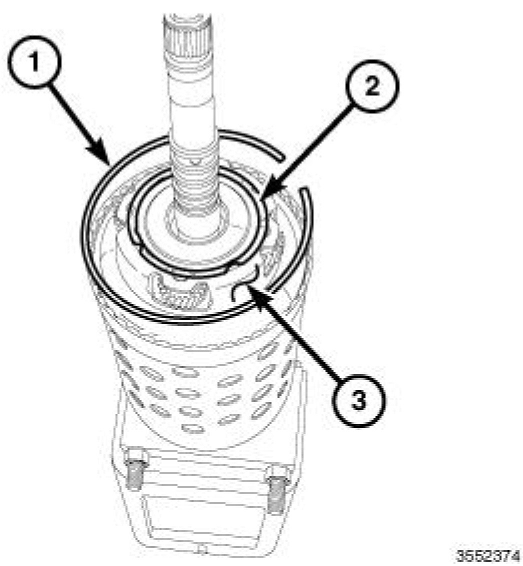
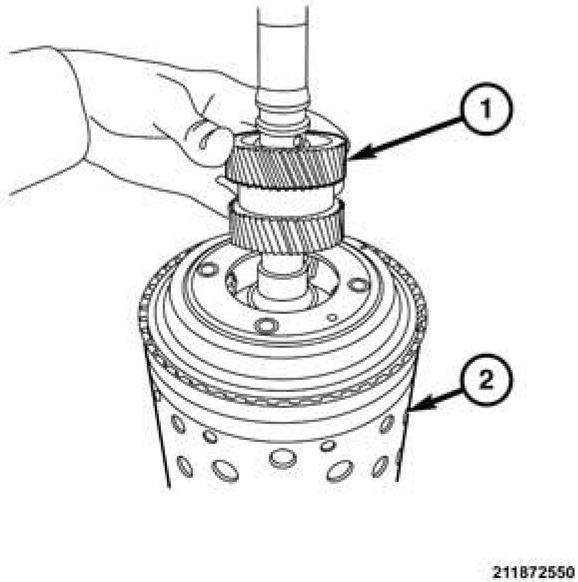


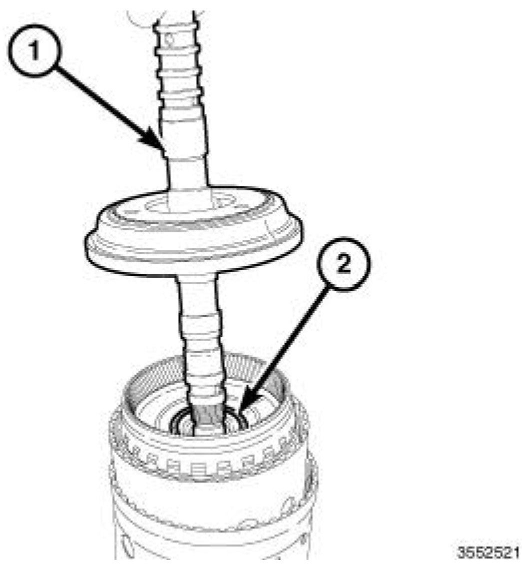
Fig. 66: Snap Ring & P1 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

63. Remove the P1 planetary carrier (3).



[Fig. 67: Sun Gear & Needle Bearing](#)
Courtesy of CHRYSLER GROUP, LLC

64. Remove P1/P2 (1) sun gear from the bottom of the P1 planetary carrier.



[Fig. 68: P2 Planetary Carrier & Needle Bearing](#)
Courtesy of CHRYSLER GROUP, LLC

65. Remove the input shaft with P2 planetary carrier (1) from the drum assembly.

66. Remove the needle bearing (2) and washer.

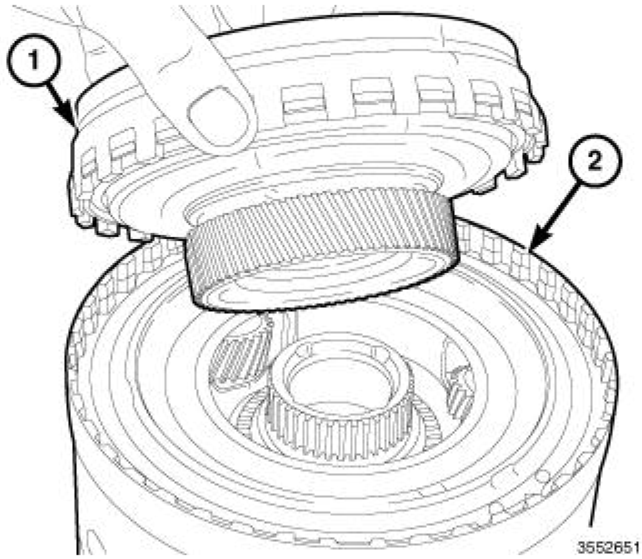


Fig. 69: P2 Annulus/P3 Sun Gear & Drum Assembly
Courtesy of CHRYSLER GROUP, LLC

67. Remove the P2 annulus/P3 sun gear (1) from the drum assembly (2).

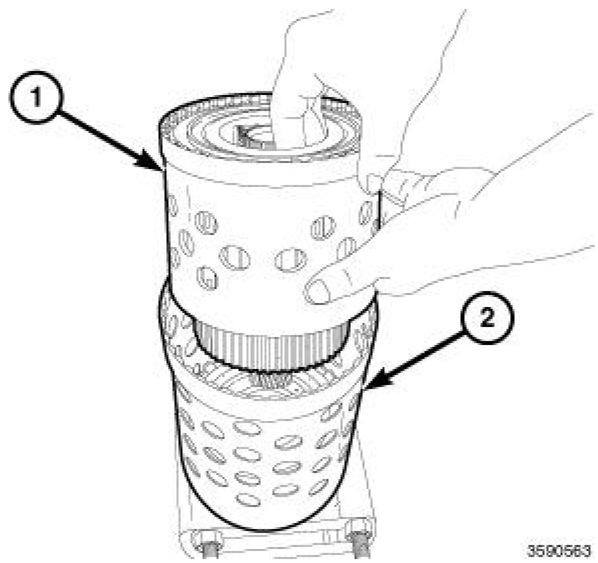


Fig. 70: D-Clutch Drum & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

68. Remove the D clutch drum (1) from the P4 annulus drum (2).

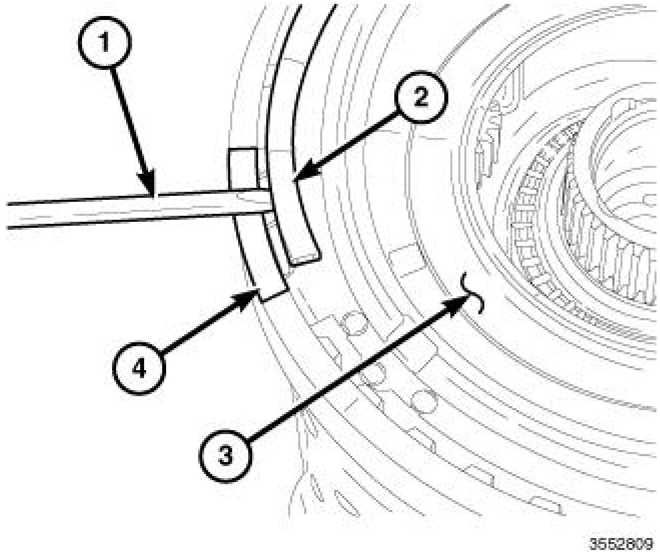


Fig. 71: Support Rings, Tool & P3 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The (special tool #10378, Rings, Support) are three pieces intended to be used in multiple locations around the drum.**

69. Position the (special tool #10378, Rings, Support) (4) on the P4 annulus drum assembly to protect the drum.
70. Using a suitable tool (1), release and remove the snap ring (2).
71. Remove the P3 planetary carrier (3).
72. Remove the needle bearing from the planetary carrier.

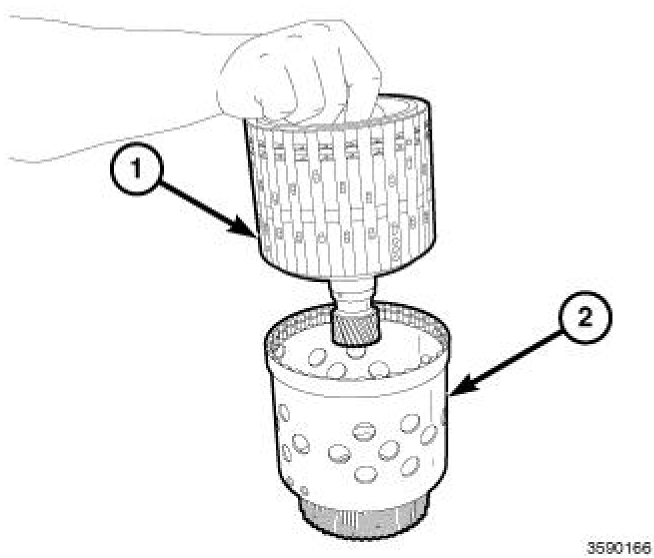
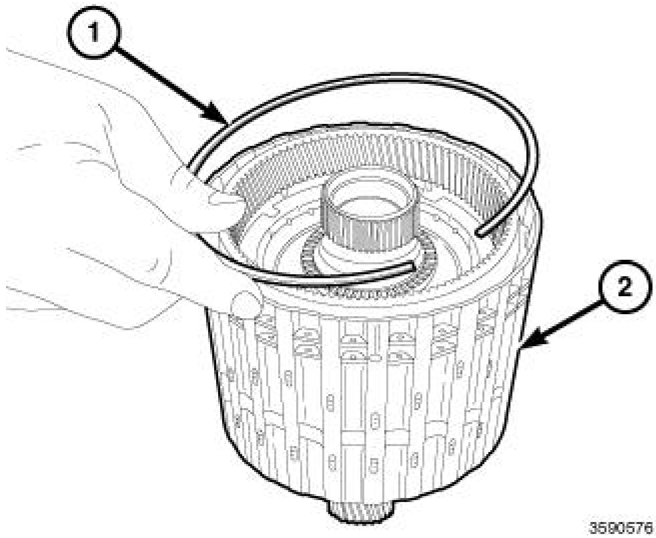


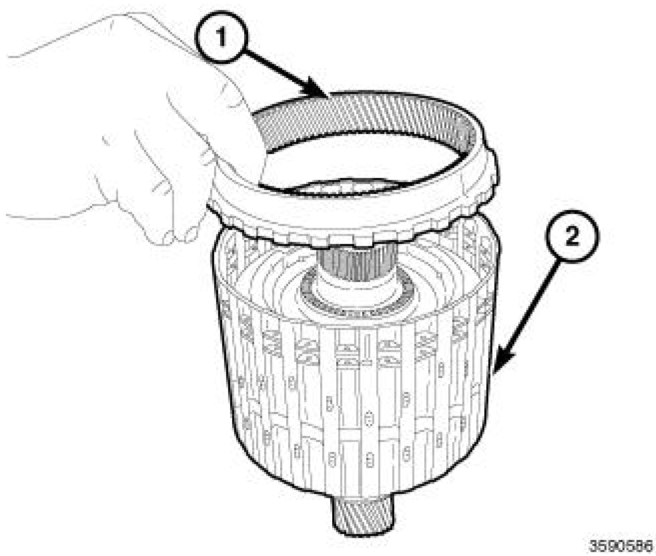
Fig. 72: P4 Sun Gear/C/E Clutch Retainer & D-Clutch Drum
Courtesy of CHRYSLER GROUP, LLC

73. Remove the P4 sun gear/C/E clutch retainer (1) from the D clutch drum (2).



[Fig. 73: Snap Ring & P4 Sun Gear/C/E Clutch Retainer](#)
Courtesy of CHRYSLER GROUP, LLC

74. Remove the snap ring (1) from the P4 sun gear/C/E clutch retainer (2).



[Fig. 74: P3 Annulus & P4 Sun Gear/C/E Clutch Retainer](#)
Courtesy of CHRYSLER GROUP, LLC

75. Remove the P3 annulus (1) from the P4 sun gear/C/E clutch retainer (2).

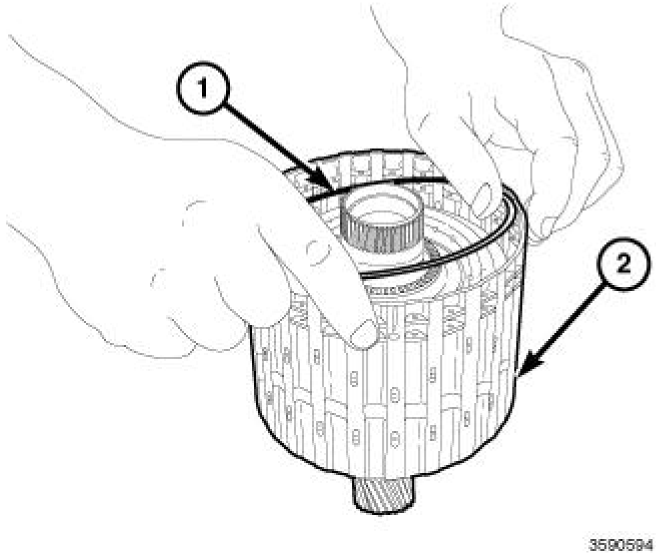


Fig. 75: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

76. Remove the snap ring (1) from the P4 sun gear/C/E clutch retainer (2).

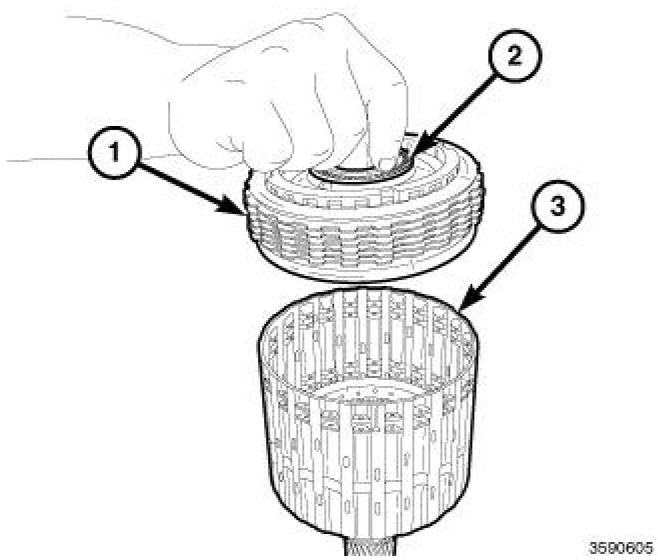
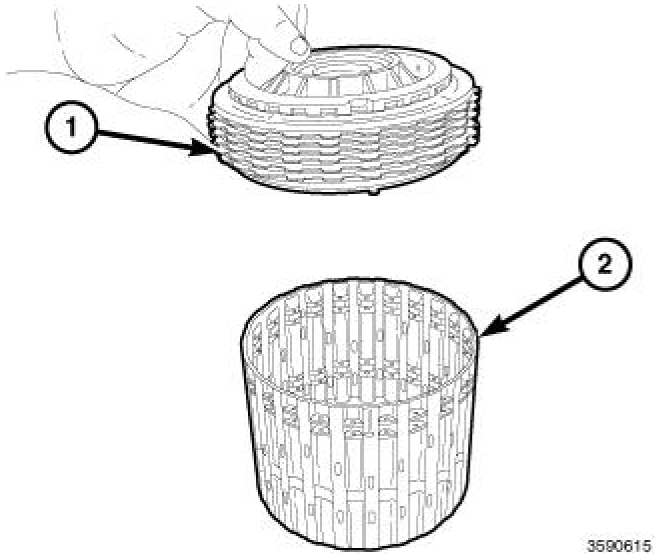


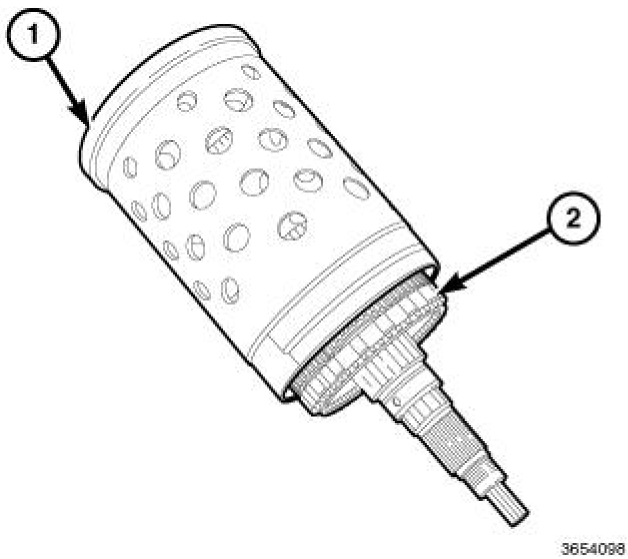
Fig. 76: E-Clutch & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

77. Remove the E clutch (1) from the P4 sun gear/C/E clutch retainer (3).
78. Remove the needle bearing (2) from the E clutch (1).



[Fig. 77: C-Clutch & P4 Sun Gear/C/E Clutch Retainer]
Courtesy of CHRYSLER GROUP, LLC

79. Remove the C clutch (1) from the P4 sun gear/C/E clutch retainer (2).
80. Remove the bearing from top and bottom of C clutch (1).



[Fig. 78: P4 Planetary Carrier/Output Shaft & P4 Annulus Drum]
Courtesy of CHRYSLER GROUP, LLC

81. Remove the P4 planetary carrier/output shaft (2) from the P4 annulus drum (1).

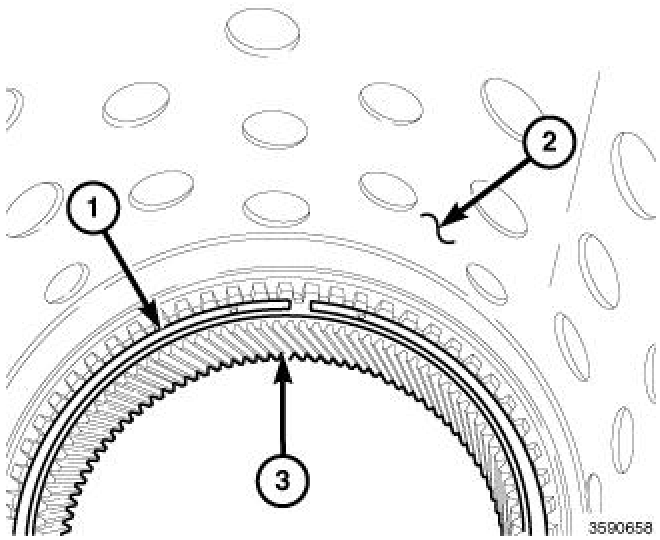


Fig. 79: Snap Ring & P4 Annulus Drum & P4 Annulus
Courtesy of CHRYSLER GROUP, LLC

82. Remove the snap ring (1) from the P4 annulus drum (2).
83. Remove the P4 annulus (3) from the P4 annulus drum (2).

CLEANING

CLEANING

CAUTION: **A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .**

The use of crocus cloth is permissible where necessary, providing it is used carefully. When used on shafts, or valves, use extreme care to avoid rounding off sharp edges. Sharp edges are vital as they prevent foreign matter from getting between the valve and valve bore.

Do not reuse oil seals, seal rings, or O-rings during overhaul. Replace these parts as a matter of course. Also do not reuse snap rings or E-clips that are bent or distorted. Replace these parts as well.

Lubricate transmission parts with the appropriate automatic transmission fluid only during overhaul and assembly.

NOTE: **Do not use shop towels or rags to dry the case (or any other transmission component) unless they are made from lint-free materials. Lint will stick to case surfaces and transmission components and circulate throughout the transmission after assembly. A sufficient quantity of lint can block fluid passages and interfere with valve body operation.**

Flush the case bores and fluid passages thoroughly with approved transmission fluid. Dry the case and all fluid passages with compressed air. Be sure that all fluid passages are clear.

INSPECTION

INSPECTION

Inspect the case for cracks, porous spots, worn bores, or damaged threads. Damaged threads can be repaired with HelicoilÃ® thread inserts. However, the case will have to be replaced if it exhibits any type of damage or wear.

ASSEMBLY

ASSEMBLY

CAUTION: **A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .**

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.**

NOTE: **If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TCM Adaptation Procedure. Refer to STANDARD PROCEDURE .**

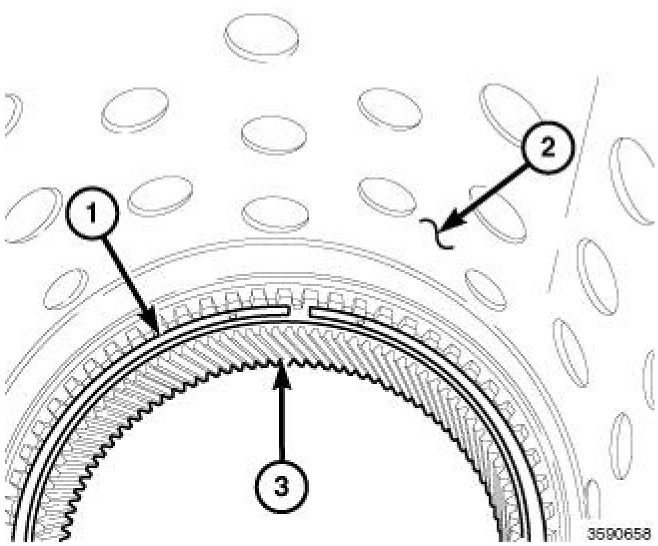


Fig. 80: Snap Ring & P4 Annulus Drum & P4 Annulus
Courtesy of CHRYSLER GROUP, LLC

1. Insert the P4 annulus (3) into the P4 annulus drum (2).
2. Install the snap ring (1) into the P4 annulus drum (2).

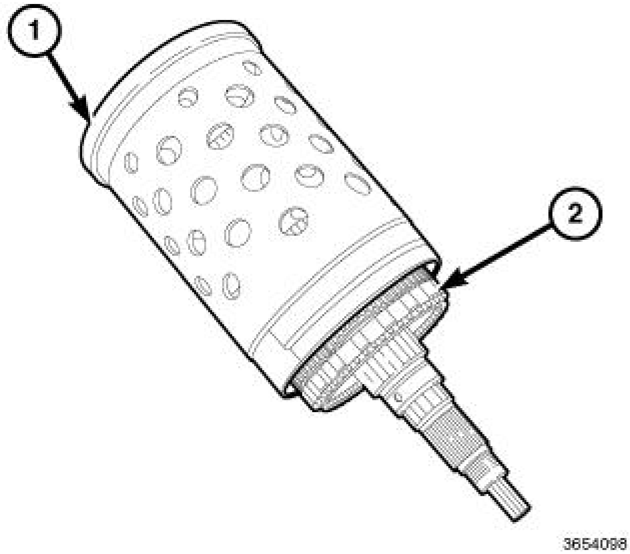


Fig. 81: P4 Planetary Carrier/Output Shaft & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

3. Install the P4 planetary carrier\output shaft (2) into the P4 annulus drum (1).

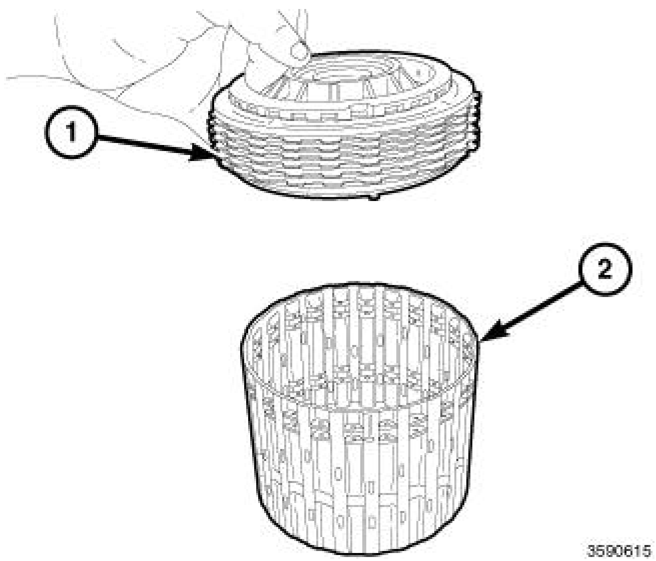
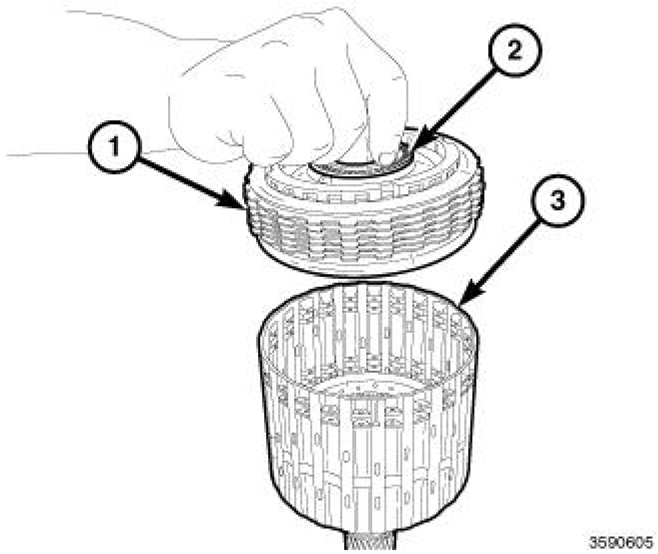


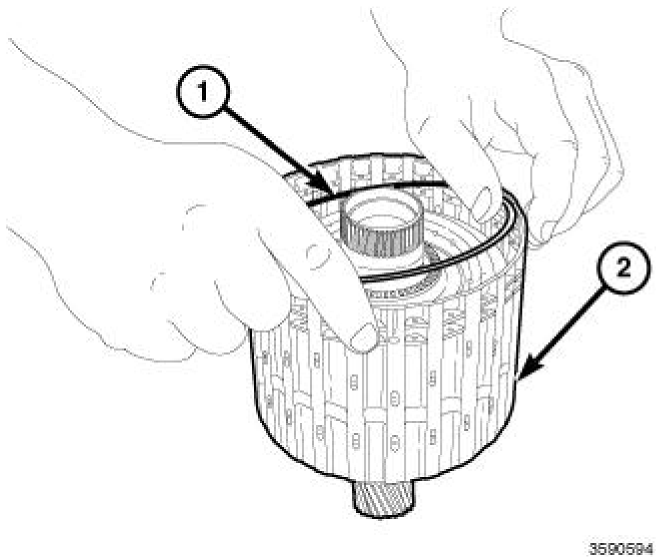
Fig. 82: C-Clutch & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

4. Position the bearings on the top and the bottom of C clutch (1).
5. Install the C clutch (1) into the P4 sun gear/C/E clutch retainer (2).



[Fig. 83: E-Clutch & P4 Sun Gear/C/E Clutch Retainer](#)
Courtesy of CHRYSLER GROUP, LLC

6. Install the needle bearing (2) onto the E clutch (1).
7. Install the E clutch (1) into the P4 sun gear/C/E clutch retainer (3).



[Fig. 84: Snap Ring & P4 Sun Gear/C/E Clutch Retainer](#)
Courtesy of CHRYSLER GROUP, LLC

8. Install the snap ring (1) into the P4 sun gear/C/E clutch retainer (2).

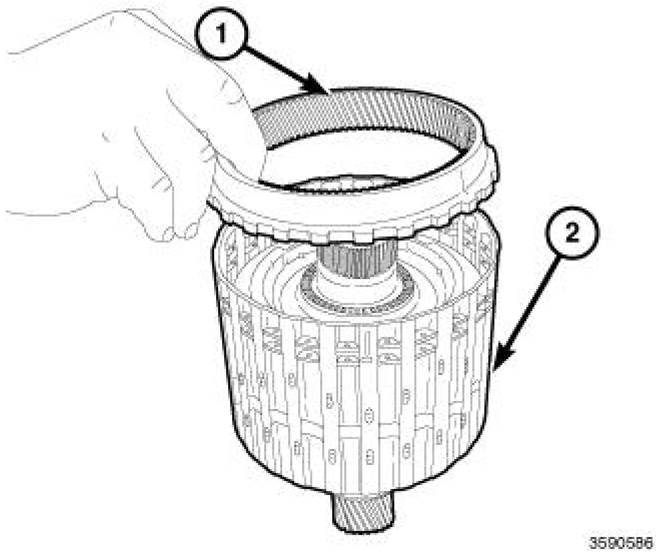


Fig. 85: P3 Annulus & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

9. Install the P3 annulus (1) into the P4 sun gear/C/E clutch retainer (2).

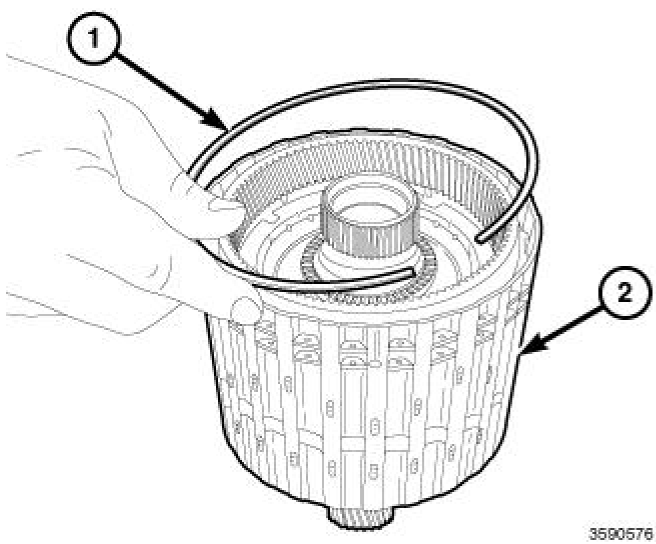


Fig. 86: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

10. Install the snap ring (1) into the P4 sun gear/C/E clutch retainer (2).

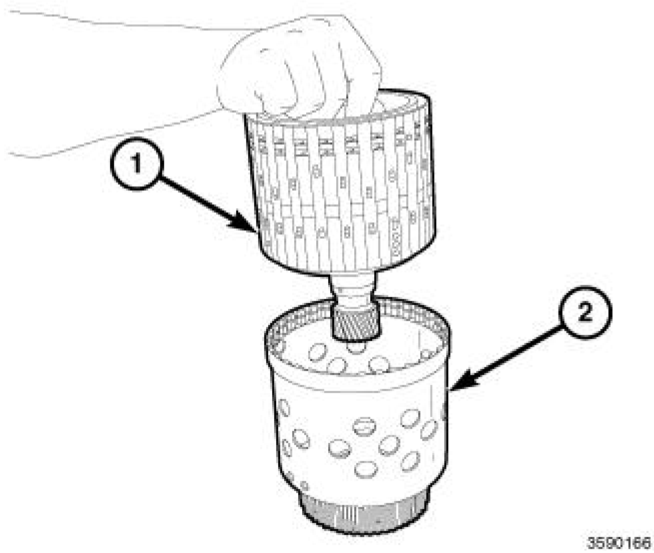


Fig. 87: P4 Sun Gear/C/E Clutch Retainer & D-Clutch Drum
Courtesy of CHRYSLER GROUP, LLC

11. Install the P4 sun gear/C/E clutch retainer (1) into the D clutch drum (2).

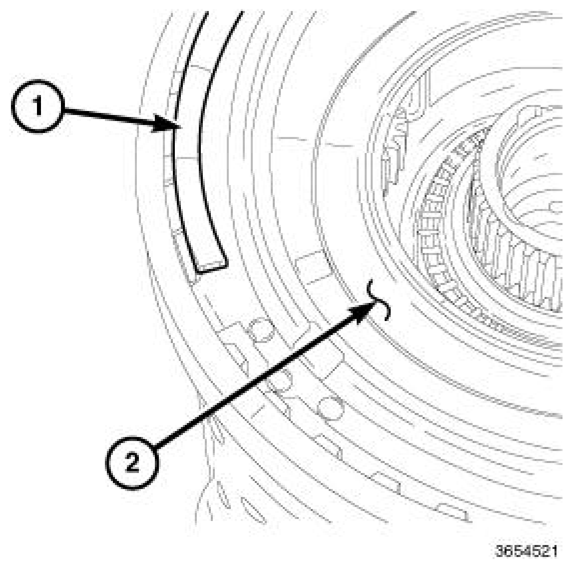


Fig. 88: P3 Planetary Carrier & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

12. Install the needle bearing onto the planetary carrier.
13. Install the P3 planetary carrier (2) in the D clutch drum.
14. Install the snap ring (1).

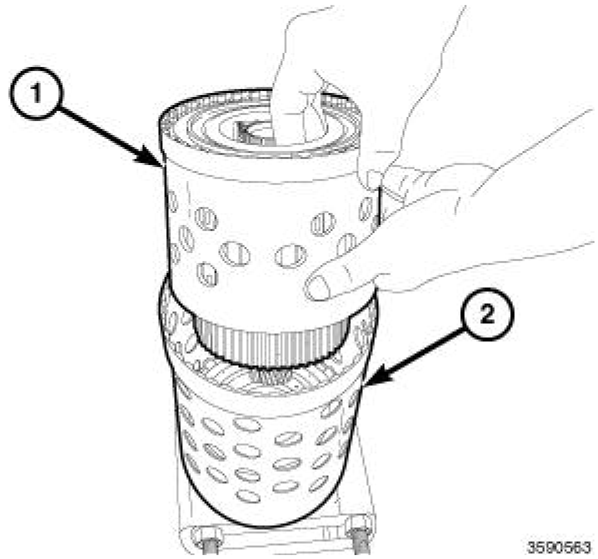


Fig. 89: D-Clutch Drum & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

15. Install the D clutch drum (1) into the P4 annulus drum (2).

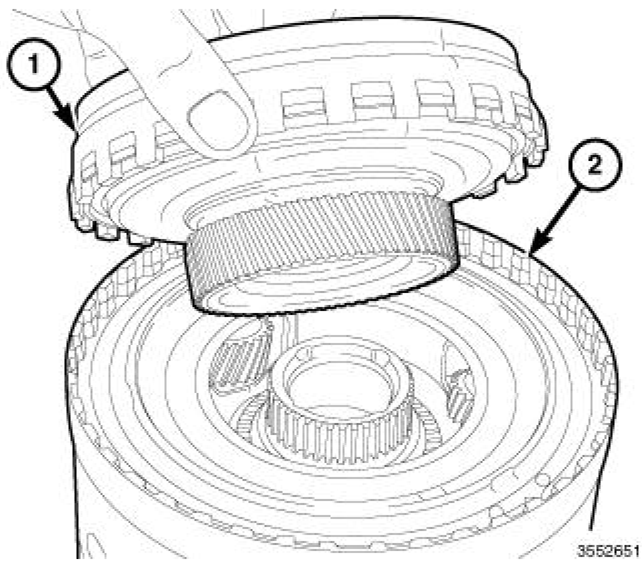


Fig. 90: P2 Annulus/P3 Sun Gear & Drum Assembly
Courtesy of CHRYSLER GROUP, LLC

16. Install the P2 annulus\P3 sun gear (1) onto the drum assembly (2).

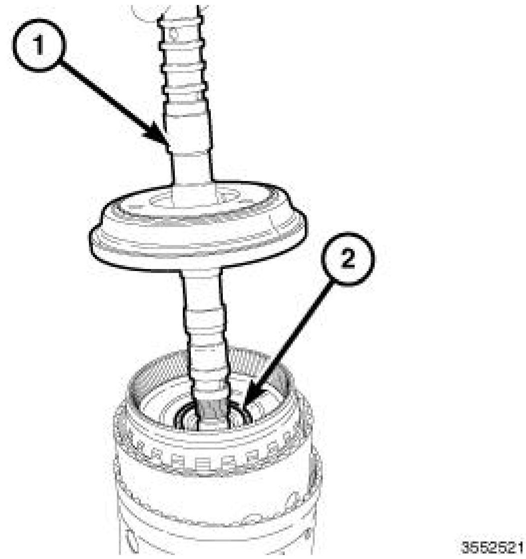


Fig. 91: P2 Planetary Carrier & Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

17. Install the needle bearing (2) and washer.
18. Install the input shaft with P2 planetary carrier (1) into the drum assembly.

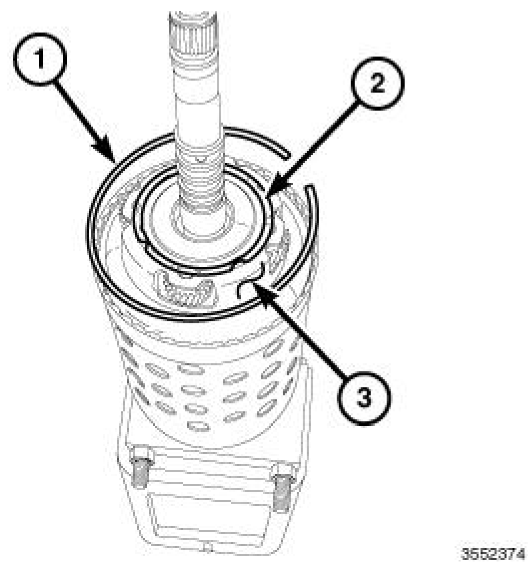


Fig. 92: Snap Ring & P1 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

19. Install P1/P2 sun gear into the bottom of the P1 planetary carrier (3).
20. Install the P1 planetary carrier (3).
21. Install the snap ring (1).

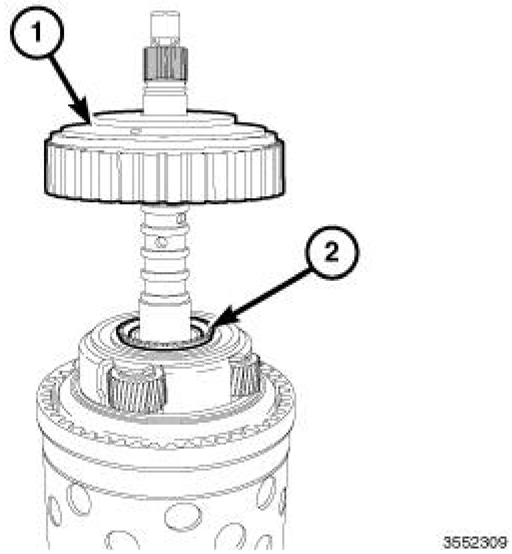


Fig. 93: P1 Annulus/B-Clutch Hub Assembly, Needle Bearing And Holding Plate
Courtesy of CHRYSLER GROUP, LLC

22. Install the needle bearing and holding plate (2) onto the P1 planetary carrier.
23. Install the selectable shim to the P1 annulus/B clutch hub.
24. Install the P1 annulus\B clutch hub assembly (1) onto the P4 annulus drum.
25. Install the O-ring and five squared O-rings.

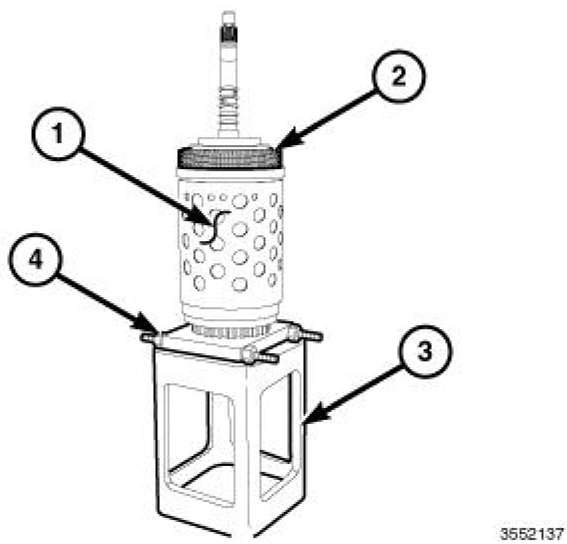
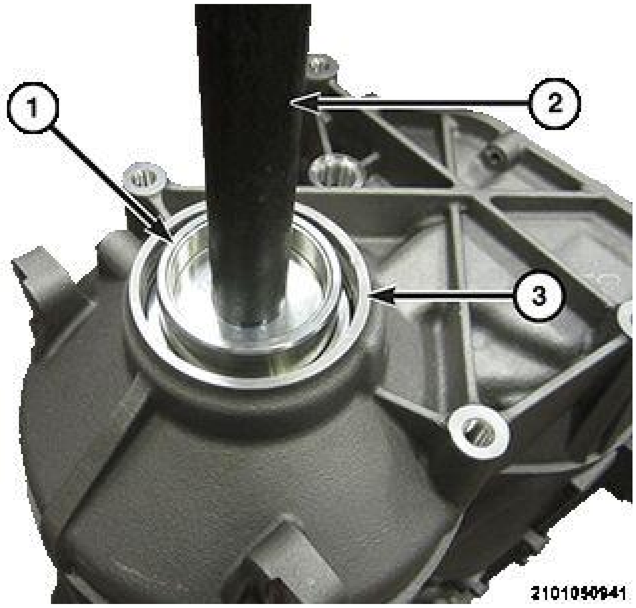


Fig. 94: P4 Annulus Drum Assembly, Press Fixture Assembly & Bearing/Gear Splitter
Courtesy of CHRYSLER GROUP, LLC

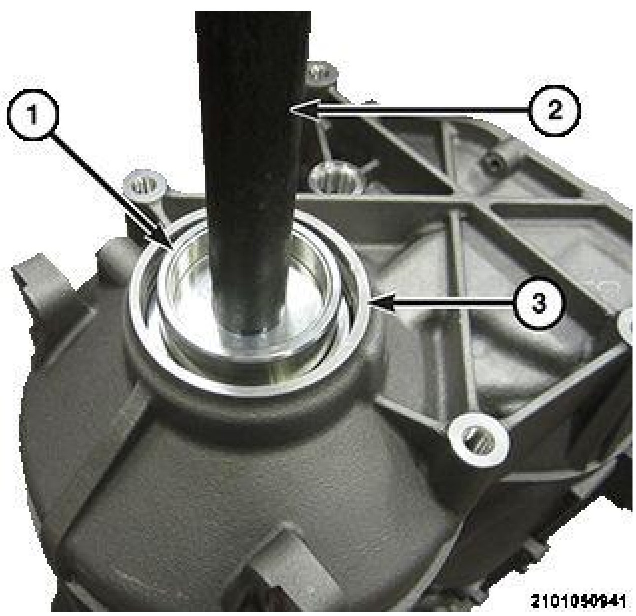
26. Install the clutch pack (2).



[Fig. 95: Installing Output Shaft Inner Needle Bearing & Oil Dam]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The (special tool #10373A, Installer, Output Needle Bearing/Rear Oil Dam) (1) is a combination tool that is reversed to install the oil dam and output shaft inner needle bearing. For use to install the output shaft inner needle bearing, use the thick walled side of the tool against the bearing.**

27. Using (special tool #10373A, Installer, Output Needle Bearing/Rear Oil Dam) (1) and (special tool #C-4171, Driver Handle, Universal) (2), install the output shaft inner needle bearing.
28. Install the snap ring.



[Fig. 96: Installing Output Shaft Inner Needle Bearing & Oil Dam]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The (special tool #10373A, Installer, Output Needle Bearing/Rear Oil Dam)**

(1) is a combination tool that is reversed to install the oil dam and output shaft inner needle bearing. For use to install the oil dam, use the thin walled side of the tool against the oil dam.

29. Using (special tool #10373A, Installer, Output Needle Bearing/Rear Oil Dam) (1) and (special tool #C-4171, Driver Handle, Universal) (2), install the oil dam.
30. Install the snap ring.

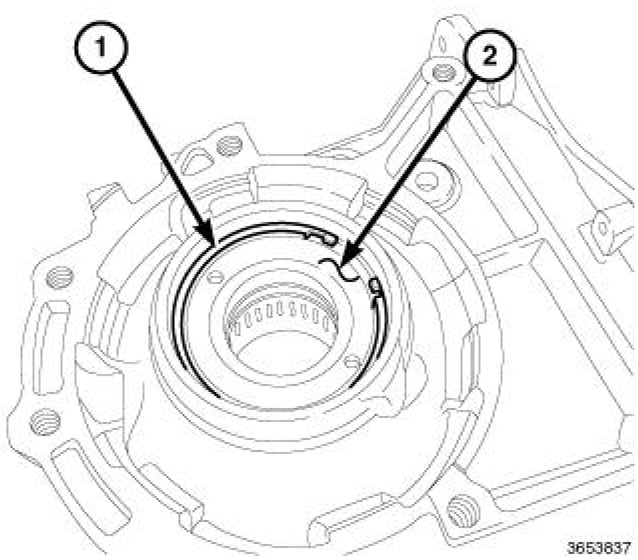


Fig. 97: Outer Bearing Snap Ring & Outer Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE: **AWD shown, RWD similar.**

31. Install the ball bearing.
32. Install the snap ring (1).

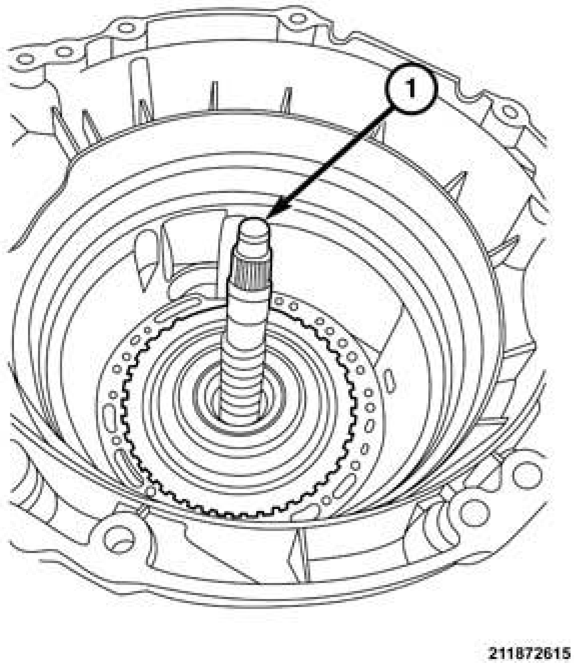


Fig. 98: Park Pawl
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The transmission must be in a upright position when the input/output shaft and the P4 annulus drum assembly (1) is installed.**

33. Install the input/output shaft and P4 annulus drum assembly (1) into the case.

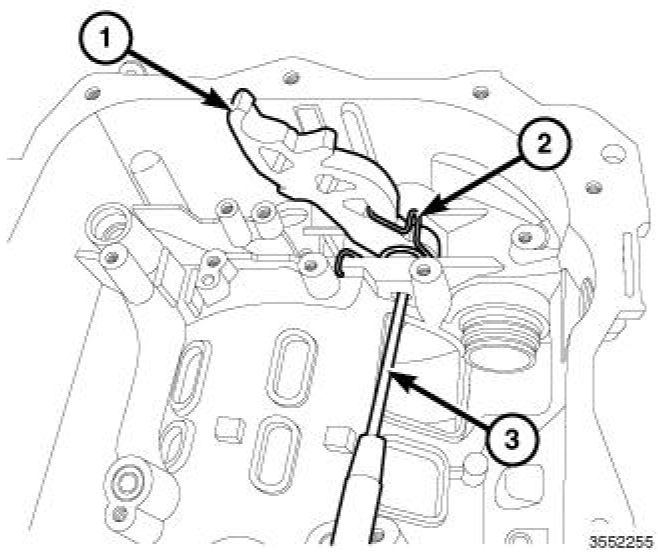


Fig. 99: Removing/Installing Park Pawl Shaft Using A Suitable Pin Punch, Park Pawl And Spring
Courtesy of CHRYSLER GROUP, LLC

34. From outside the transmission case, install the park pawl shaft and install the park pawl (1) and spring (2).

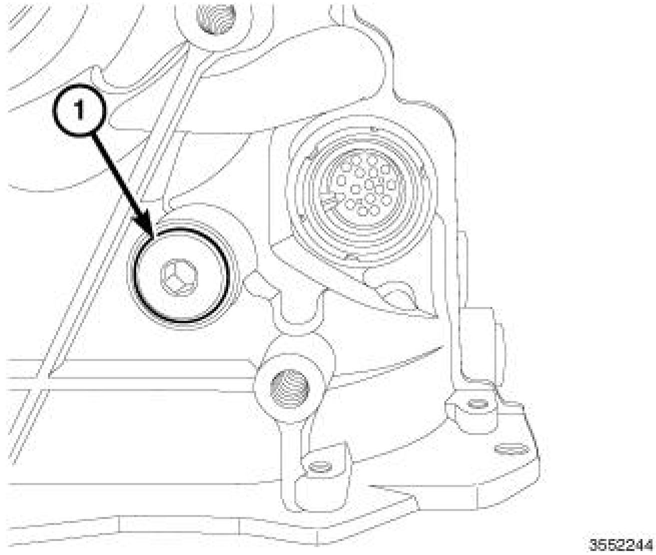


Fig. 100: Park Pawl Shaft Plug
Courtesy of CHRYSLER GROUP, LLC

35. Install the park pawl shaft plug (1) into the rear of the case and tighten to the proper **SPECIFICATIONS**
.

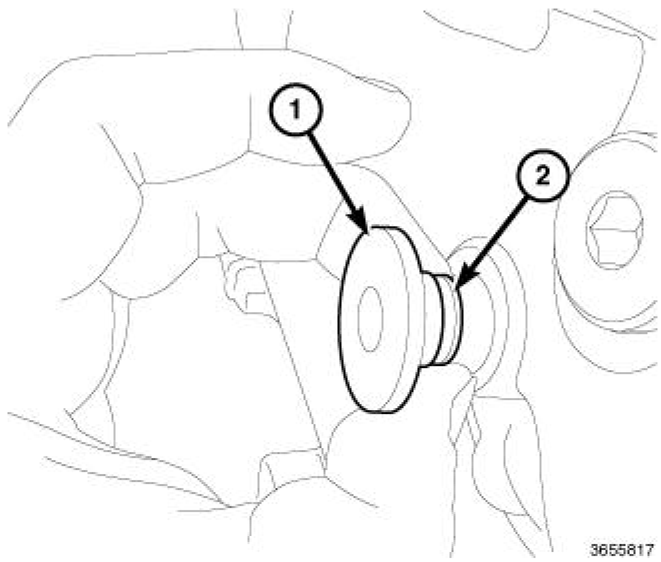


Fig. 101: Spacer & Selector Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

36. Using (special tool #6936, Spacer) (1), install the Manual Park Release (MPR) shaft seal (2).

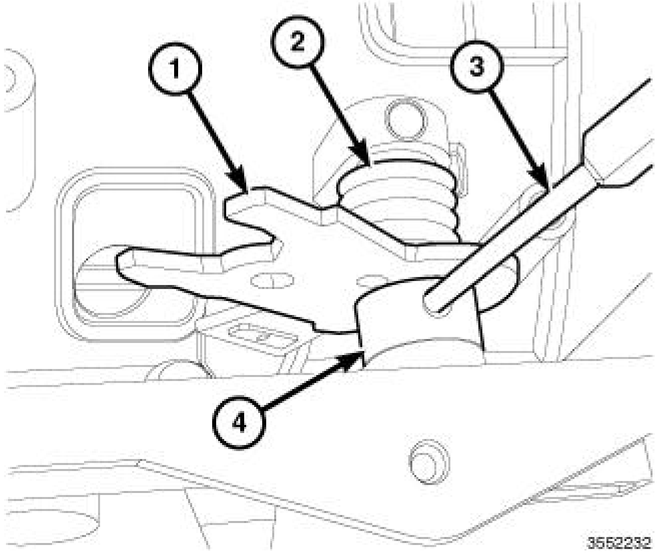


Fig. 102: Selector Shaft, Suitable Pin Punch, Spring & Fork
Courtesy of CHRYSLER GROUP, LLC

37. Install the shaft (4), spring (2), and fork (1) into the case.
38. Install the roll pin into the MPR shaft (4) using a suitable pin punch (3).

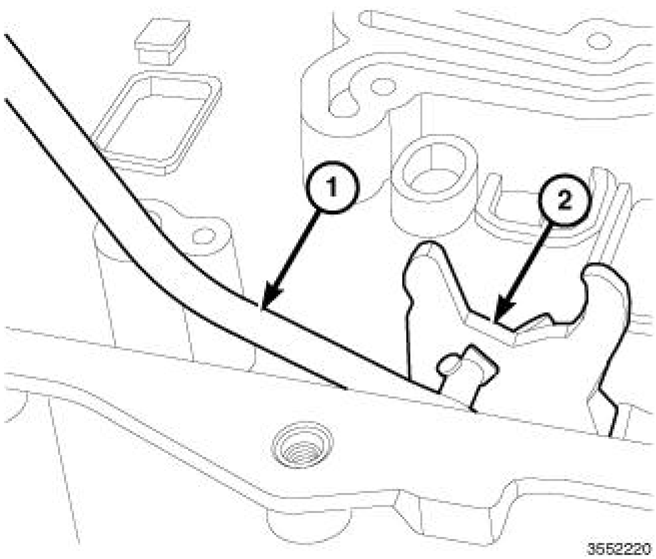
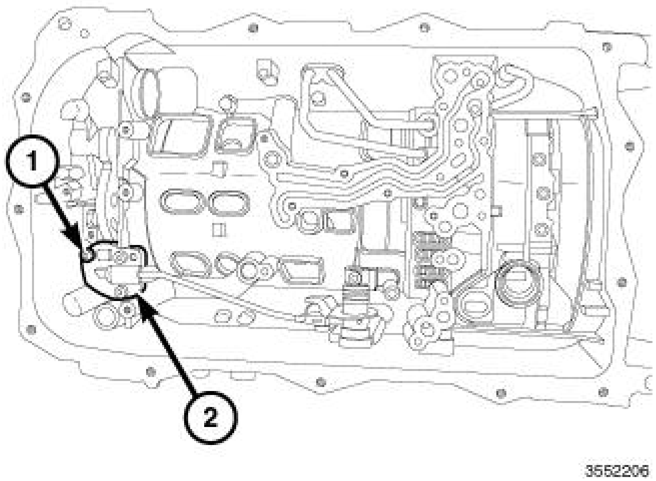


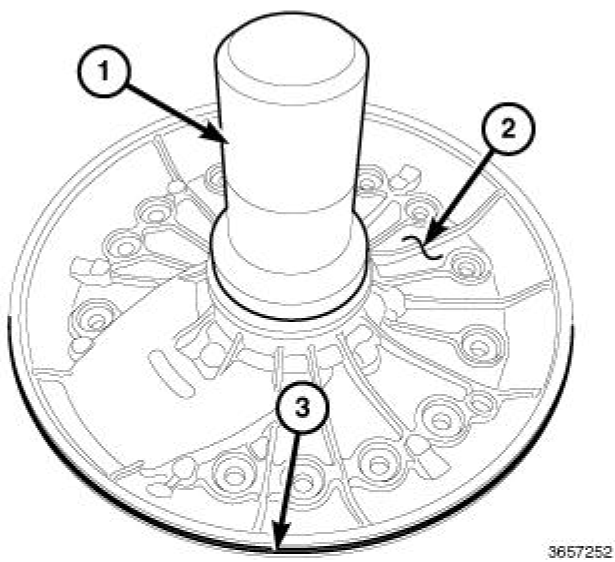
Fig. 103: Park Pawl Lock Rod & Fork
Courtesy of CHRYSLER GROUP, LLC

39. Install the park pawl lock rod (1) onto the fork (2).



[Fig. 104: Three Park Pawl Lock Rod Guide Plate Retaining Screws & Plate](#)
Courtesy of CHRYSLER GROUP, LLC

40. Position the park pawl lock rod guide plate (2), install the three park pawl lock rod guide plate retaining screws (1) and tighten to the proper **SPECIFICATIONS**.



[Fig. 105: Oil Pump Cover Lip Seal & Oil Pump Cover](#)
Courtesy of CHRYSLER GROUP, LLC

41. Install the oil pump cover lip seal (3) on the oil pump cover (2).

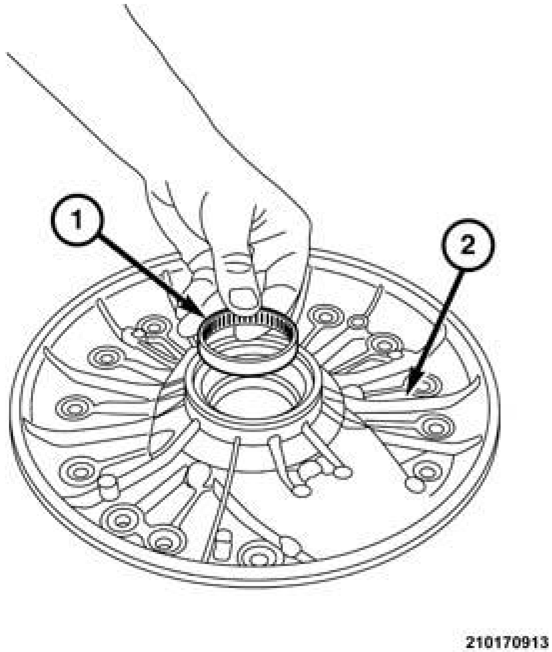


Fig. 106: Oil Pump Needle Bearing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

42. If removed, install a **NEW** oil pump needle bearing using (special tool #10376, Installer, Input Shaft Needle Bearing)and (special tool #C-4171, Driver Handle, Universal).

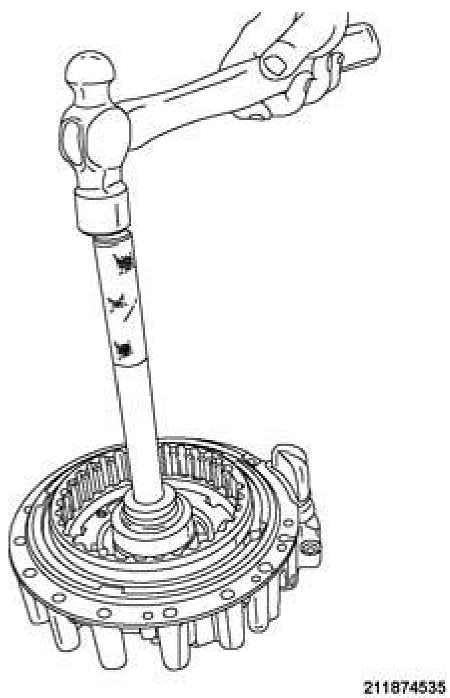


Fig. 107: Installing Oil Pump Housing Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

43. If removed, install the inner oil pump needle bearing using (special tool #10382, Installer, Oil Pump Housing Needle Bearing)and (special tool #C-4171, Driver Handle, Universal)
44. Using (special tool #10375, Installer, Oil Pump Cover Oil Seal) (1), install the input shaft seal in the oil

pump cover (2).

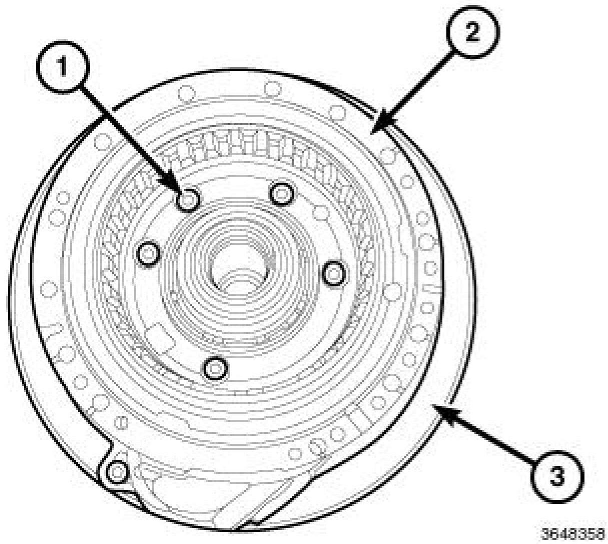


Fig. 108: Six Bolts, Oil Pump Housing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

45. Position the oil pump housing (2) and oil pump cover (3) together.
46. Install the five bolts (1) and tighten to the proper **SPECIFICATIONS**.

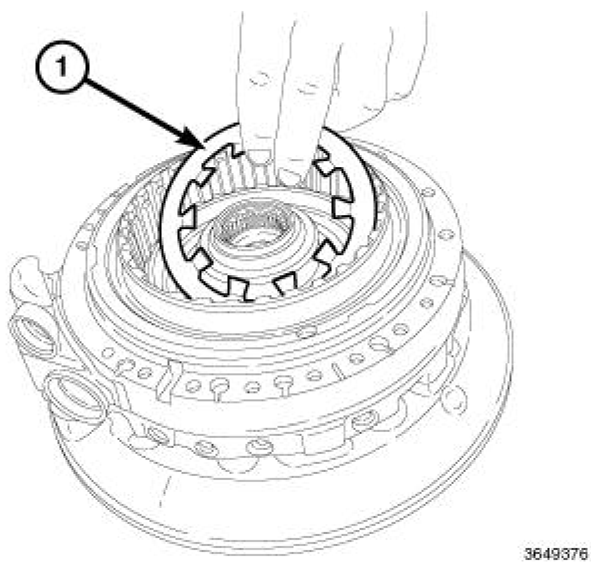


Fig. 109: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

47. Insert the piston and the retaining ring (1) into the housing.

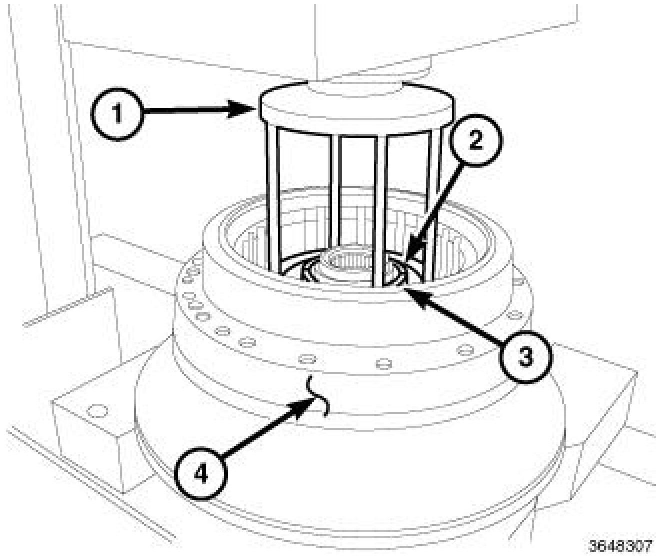


Fig. 110: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

48. Position the oil pump housing assembly (4) in a suitable arbor press.
49. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and install the two halves of the split retainer ring (2).

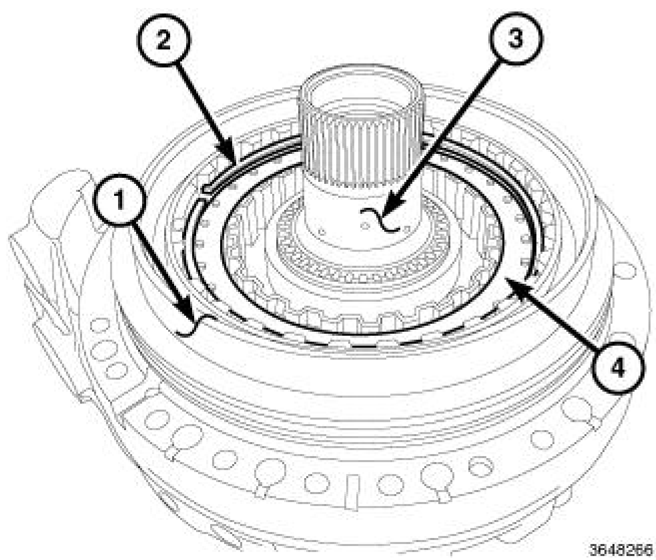


Fig. 111: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

50. Install the hub (3).
51. Install the clutches and spacers (4).
52. Install the snap ring (2).
53. Install the outer ring (1) (below B-piston).

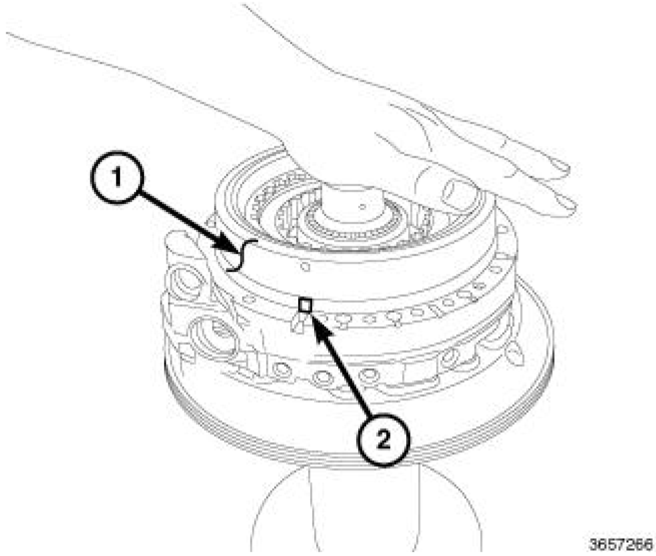


Fig. 112: B-Piston Alignment Tab & B-Piston
Courtesy of CHRYSLER GROUP, LLC

54. Position the B-piston alignment tab (2) above the notch and install B-piston (1) on the assembly.

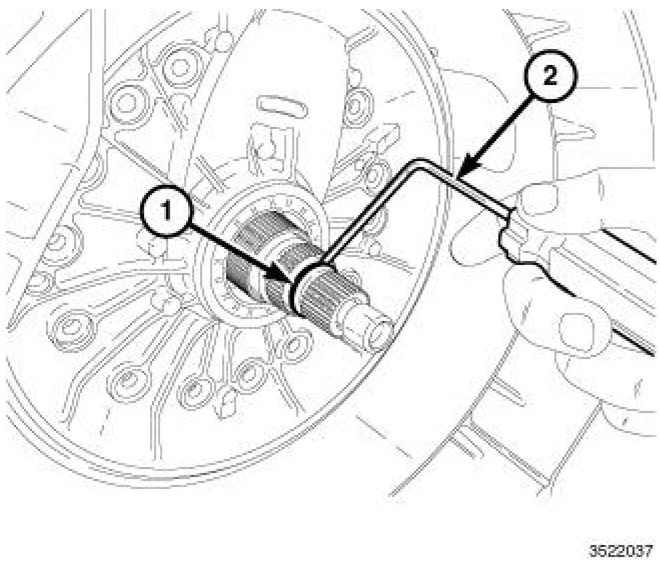


Fig. 113: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

55. Carefully position the oil pump housing assembly into the case, firmly press the oil pump into place before drawing it in with the bolts.

NOTE: **Check the transmission end play before installing the new oil pump bolts, in case adjustment is needed.**

56. Install the **NEW** input shaft O-ring.

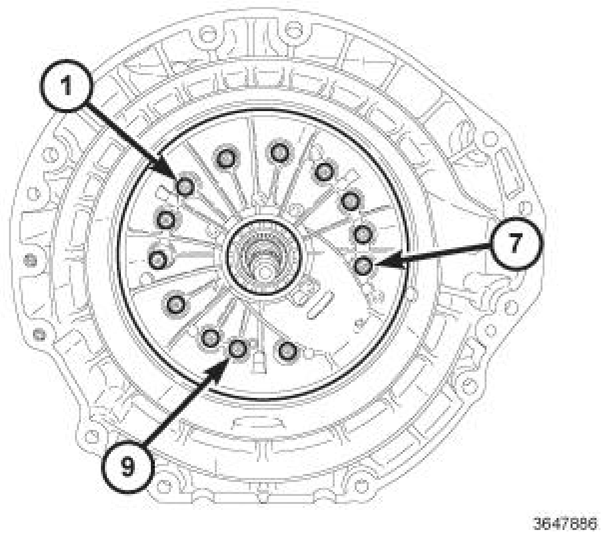


Fig. 114: Pre Tighten Bolts One, Seven And Nine
Courtesy of CHRYSLER GROUP, LLC

57. Install the thirteen oil pump cover retaining bolts and tighten the oil pump cover as follows:
    a. In order to seat the oil pump cover properly, pre tighten bolts one, seven and nine to 6 N.m (53 in. lb.).
    b. Working in a clockwise pattern, beginning with number one, tighten to 10 N.m (89 in. lb.).
    c. Working in a clockwise pattern, beginning with number one, tighten an additional 90Â°.

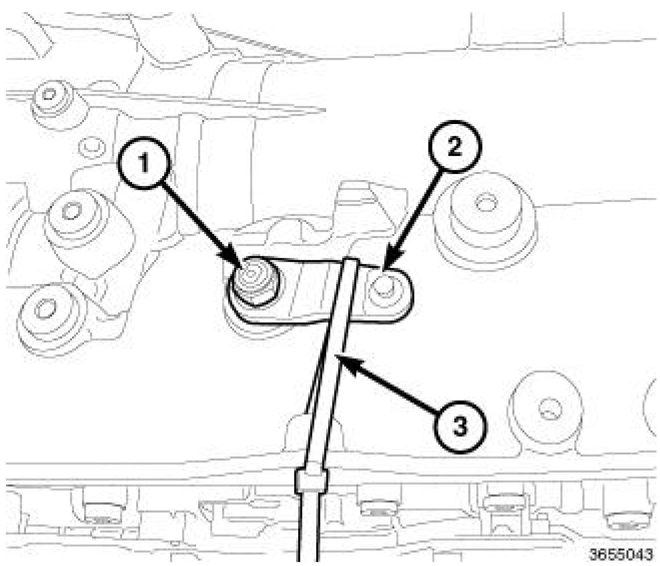


Fig. 115: Manual Park Release Lever, Nut & Tie Strap
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The MPR lever (2) can be reversed to release tension and ease the installation of the valve body assembly.**

58. Temporarily install the MPR lever (2) to release tension on the shift fork as follows:
    a. Install the MPR lever (2) 180 degrees offset from its original position.
    b. Install the nut (1) and hand tighten.

c. Turn the MPR lever (2) and using a tie strap (3), secure the lever (2) into position so the park release fork is in the same position as it was before valve body assembly removal.

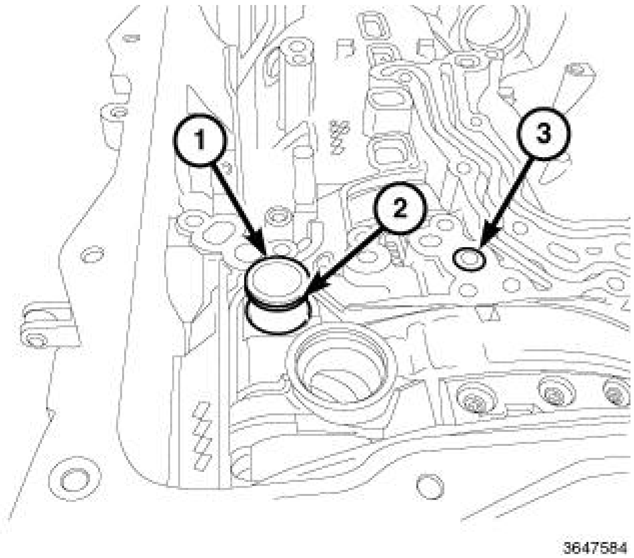


Fig. 116: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

59. Install a new compression seal (3) into the transmission case.
60. Install the fluid port (1) with **NEW** O-rings to the transmission case.

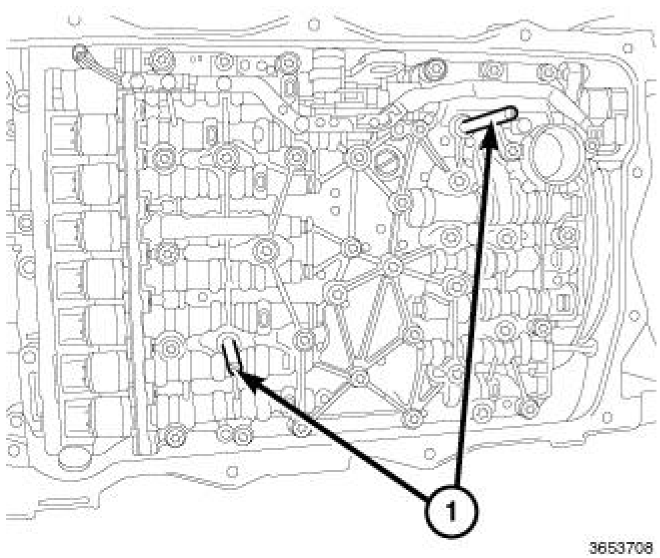


Fig. 117: Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

61. Install the (special tool #10379, Pins, Valve Body Alignment) (1) in the transmission case as guides for the valve body assembly.

NOTE: **Make sure the shift fork lines up properly.**

62. Using the valve body alignment pins (1) to guide, position the valve body assembly to the transmission.

NOTE: **After several bolts have been hand tightened, remove the guide pins (1).**

63. Install the fourteen valve body assembly retaining bolts and hand tighten.

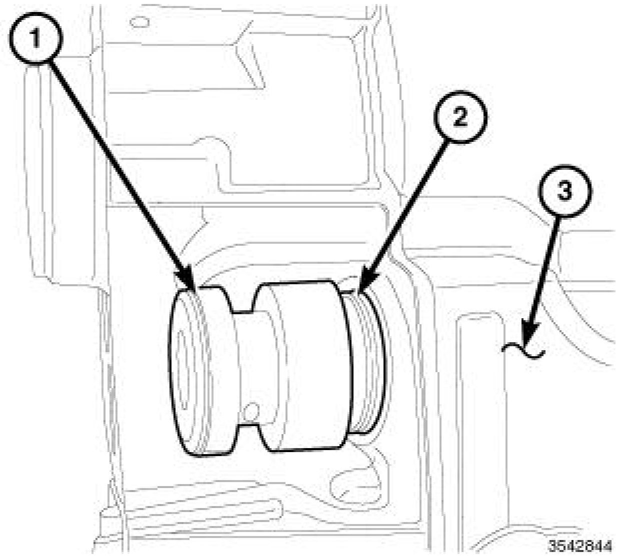


Fig. 118: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

64. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully install the electrical harness insulator (2) into the transmission case (3).

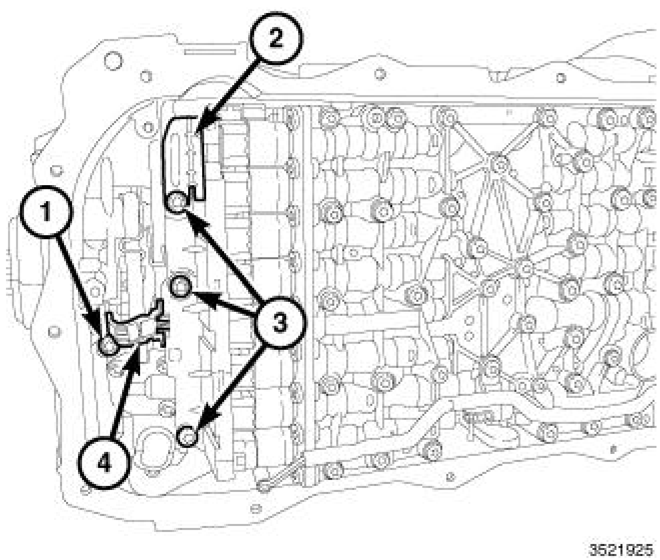


Fig. 119: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

65. Install the sensor (4) and the sensor bolt (1) and hand tighten.
66. Latch the electrical connector insulator lock (2) by pushing in.

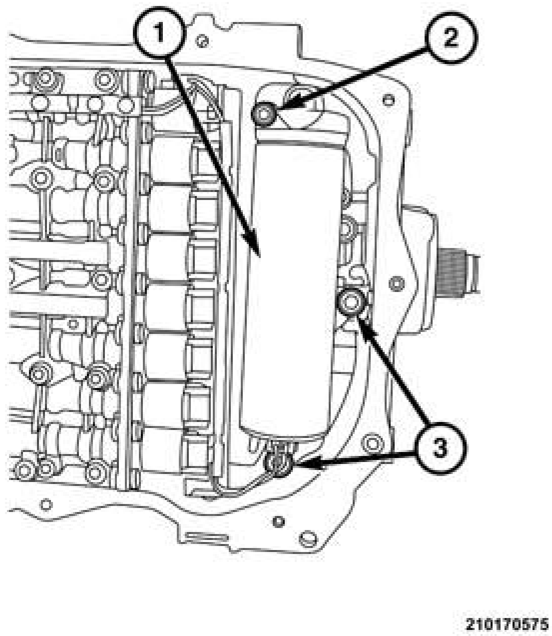


Fig. 120: Hydraulic Impulse Storage Unit & Bolts
Courtesy of CHRYSLER GROUP, LLC

67. If equipped, install the Hydraulic Impulse Storage Unit (H.I.S.).
68. Tighten the bolts (2 and 3) to the proper **SPECIFICATIONS**.
69. Install the valve body assembly end bolts (3) and hand tighten.

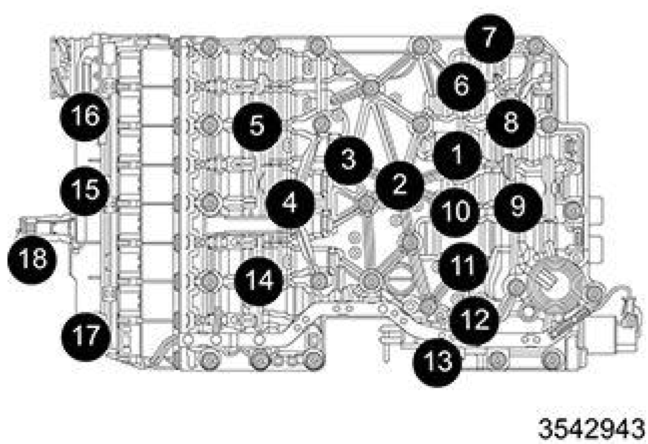
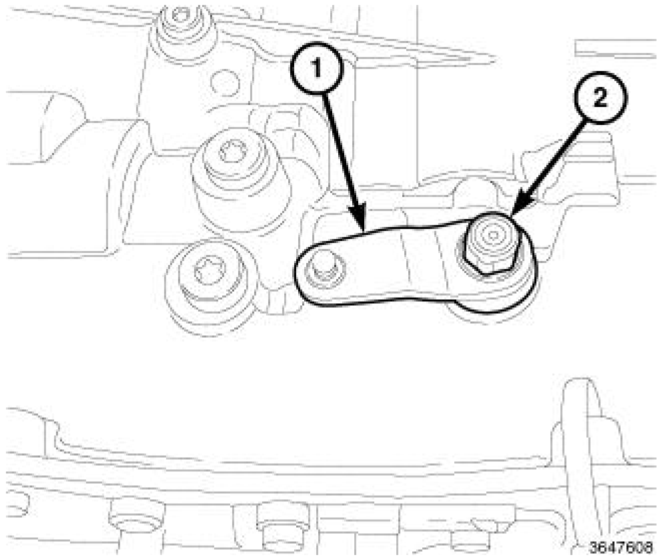


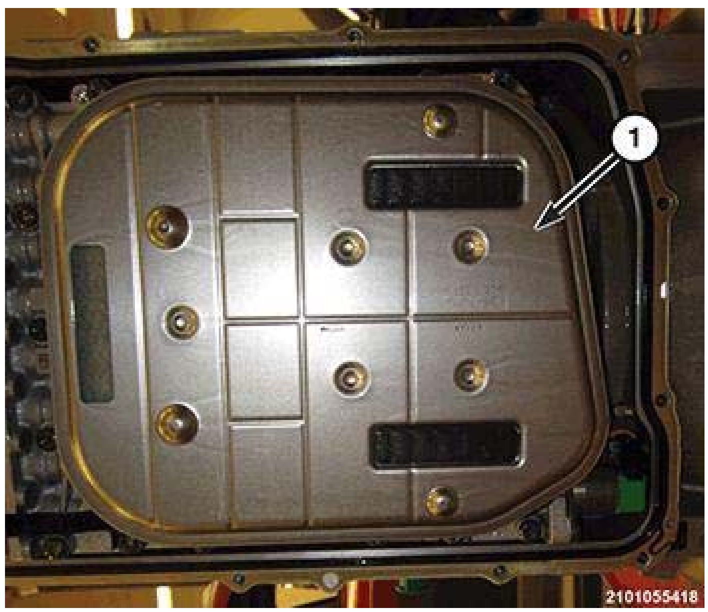
Fig. 121: Valve Body Bolts Loosening And Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

70. Tighten the valve body assembly retaining bolts 1-18 in the sequence shown to 6 Nm (53 in.-lbs.).



[Fig. 122: Manual Park Release Lever Retaining Nut & Lever](#)
Courtesy of CHRYSLER GROUP, LLC

71. Remove the tie strap and return the Manual Park Release (MPR) lever (1) to the original position.
72. Install the MPR lever nut (2) and tighten to the proper **SPECIFICATIONS**.



[Fig. 123: Transmission Oil Filter](#)
Courtesy of CHRYSLER GROUP, LLC

73. Install the **NEW** transmission oil filter (1).

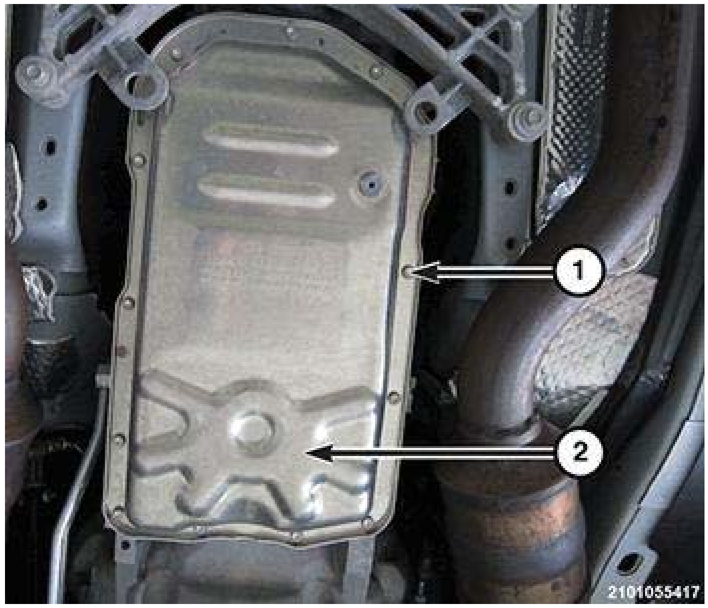


Fig. 124: Transmission Oil Pan & Bolts
Courtesy of CHRYSLER GROUP, LLC

74. Install the 13 transmission oil pan bolts and tighten to 10 N.m (89 in. lbs.) in a crisscross pattern.

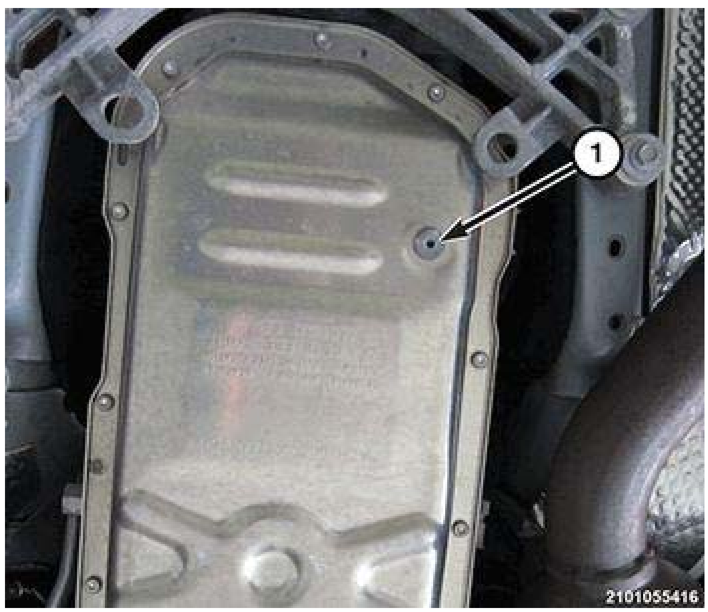


Fig. 125: Transmission Oil Pan Plug
Courtesy of CHRYSLER GROUP, LLC

75. Verify the transmission oil pan plug (1) is installed.

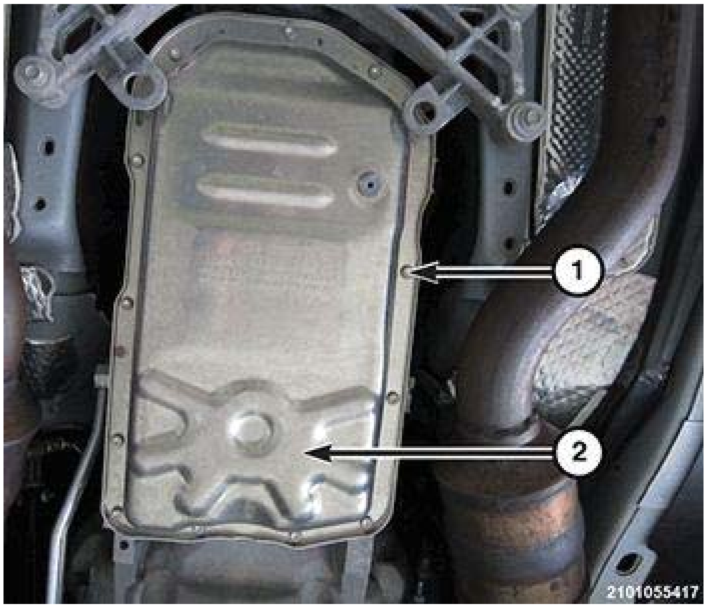


Fig. 126: Transmission Oil Pan & Bolts
Courtesy of CHRYSLER GROUP, LLC

76. Position the oil pan (2) and gasket.
77. Install the 13 transmission oil pan bolts (1) using crisscross pattern and tighten to 10 Nm (89 in.-lbs.).
78. Install the transmission output shaft washer.

CAUTION: The seal must be installed flush with the case. Driving the seal deeper could damage the seal causing a leak.

79. Position the new output shaft seal over the output shaft and against the transmission case.
80. Using (special tool #8481, Installer, Gear) install the output shaft seal.
81. Install the transmission rear dust seal.

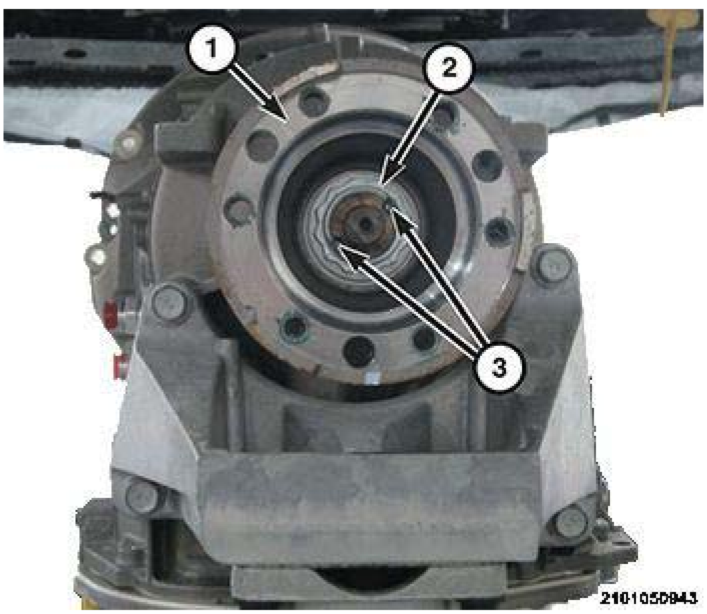


Fig. 127: Drive Shaft Flange, Nut & Staking Area

Courtesy of CHRYSLER GROUP, LLC

82. Install the drive shaft flange (1).
83. Install the **NEW** transmission output flange nut (2) and washer using a 34 mm 12 point socket and (special tool #C-3281, Holder, Flange) (2). Tighten to the proper **SPECIFICATIONS**.
84. Stake (3) the transmission output flange nut.

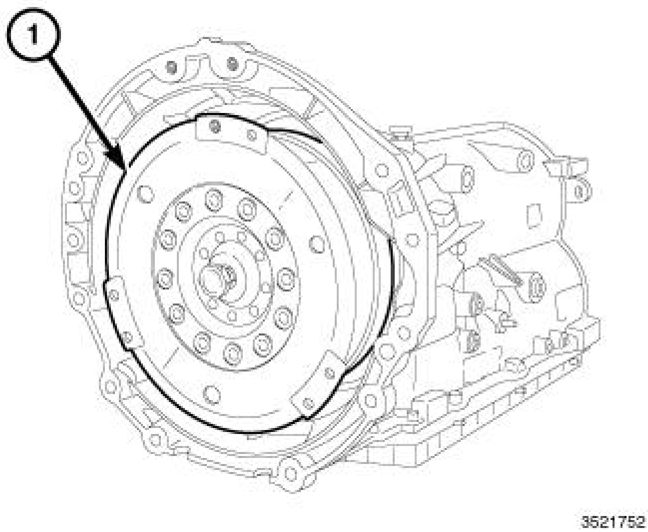


Fig. 128: Torque Converter
Courtesy of CHRYSLER GROUP, LLC

85. Install the torque converter (1). Refer to **TORQUE CONVERTER, INSTALLATION**.
86. Before installing the transmission in the vehicle, pre-fill the transmission as outlined in FILL TRANSMISSION AFTER SERVICE. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

INSTALLATION

INSTALLATION

CAUTION: **When supporting or lifting the transmission at the oil pan the weight of the transmission must be distributed evenly on the lifting fixture. Failure to do so could damage the oil pan and transmission.**

NOTE: **Make sure that the transmission dowel pins are seated in engine block and protrude far enough to hold transmission in alignment.**

1. Install the torque converter. Refer to **TORQUE CONVERTER, INSTALLATION**.
2. If removed, install the rear transmission mount isolator. Refer to **INSULATOR, ENGINE MOUNT, REAR, INSTALLATION** .

NOTE: **Hold torque converter in place during transmission installation.**

3. Position the transmission in the vehicle.

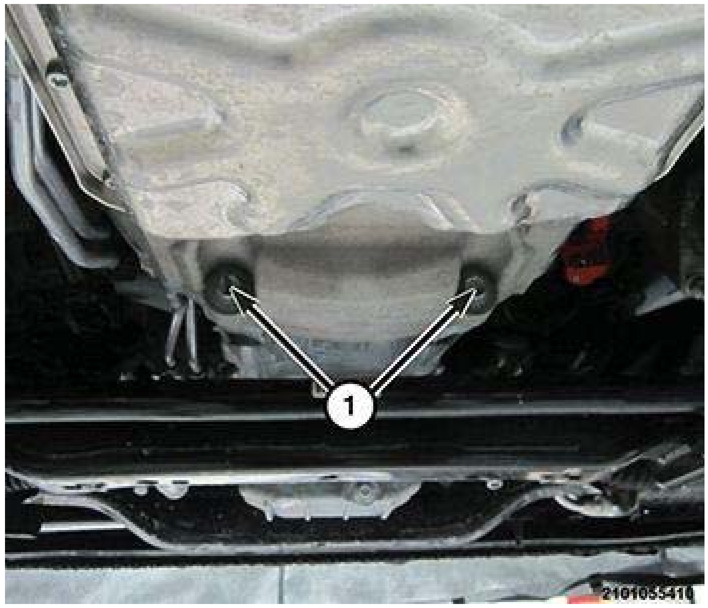


Fig. 129: Bottom Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the bottom two transmission to engine bolts (1).

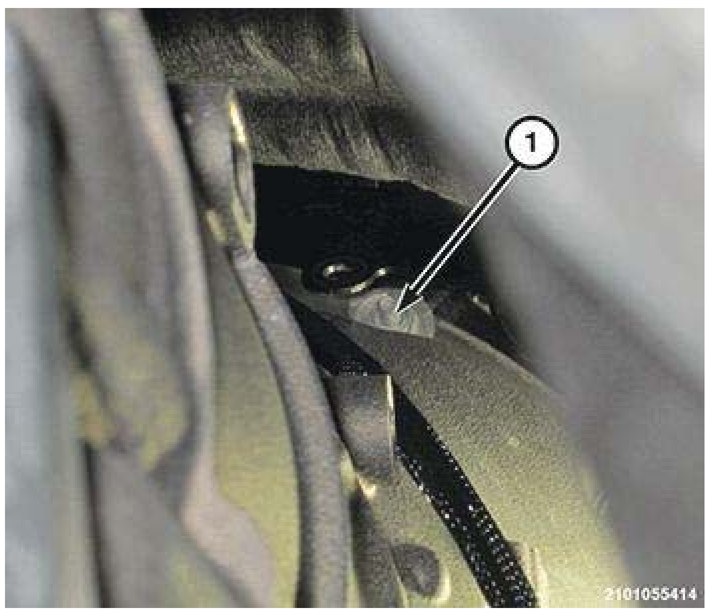


Fig. 130: Right Transmission To Engine Studbolt
Courtesy of CHRYSLER GROUP, LLC

5. Install the LH transmission to engine studbolt (1).

Fig. 131: Left Transmission To Engine Studbolt
Courtesy of CHRYSLER GROUP, LLC

6. Install the RH transmission to engine studbolt (1).

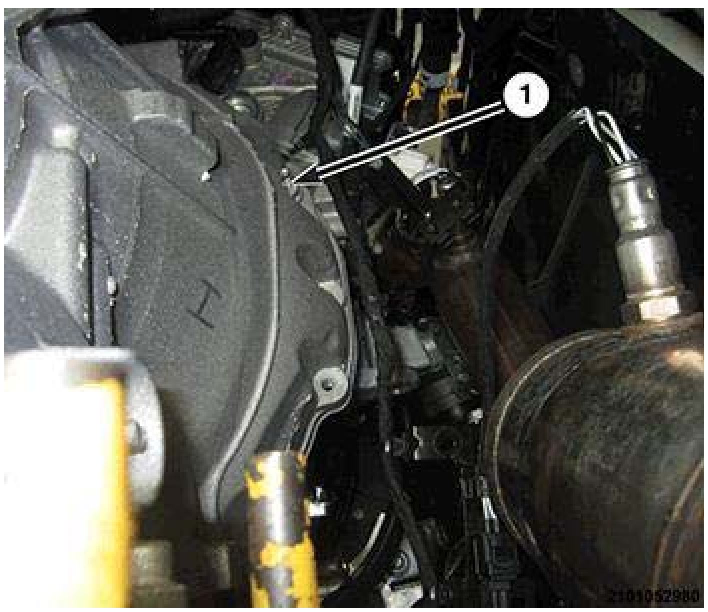


Fig. 132: Transmission To Engine Studbolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **RH shown, LH similar.**

7. Install the RH and LH transmission to engine studbolts (1).

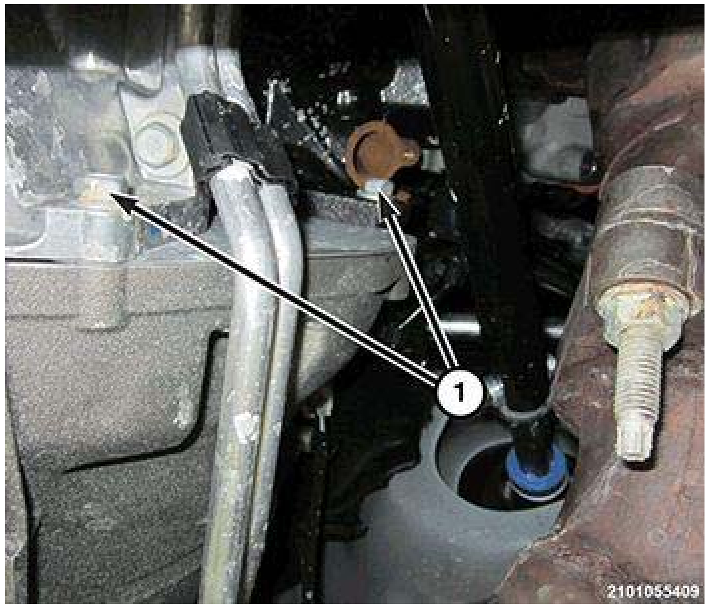


Fig. 133: Left Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install the Left Hand (LH) transmission to engine bolts (1).

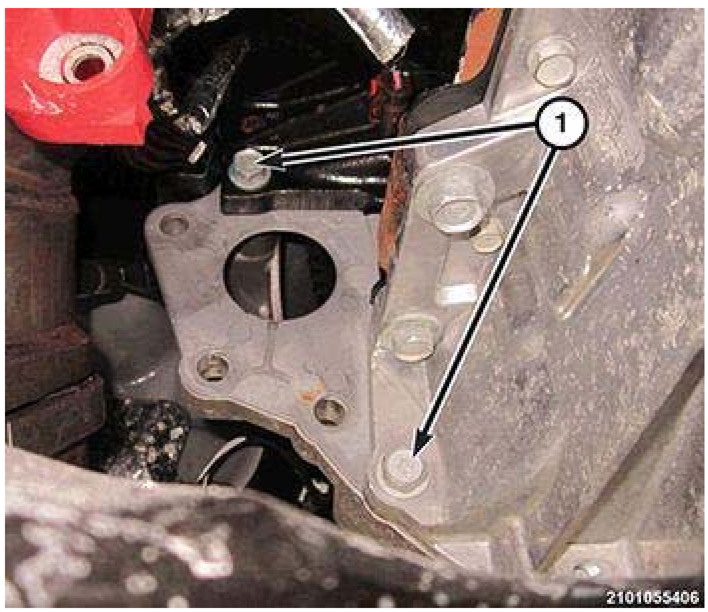


Fig. 134: Right Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Install the Right Hand (RH) transmission to engine bolts (1).
10. Tighten all the transmission to engine bolts to the proper **SPECIFICATIONS**.

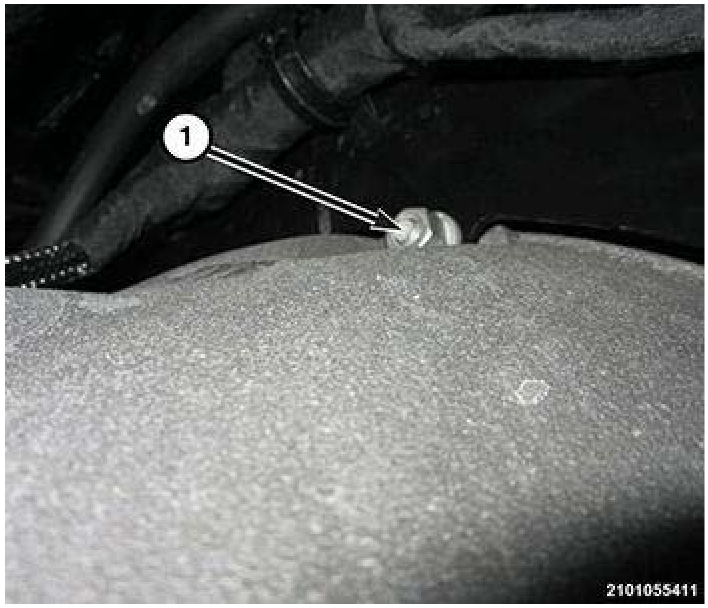


Fig. 135: Right Wiring Harness Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

11. Install the RH wiring harness bracket nut (1) and tighten to the proper **SPECIFICATIONS**.

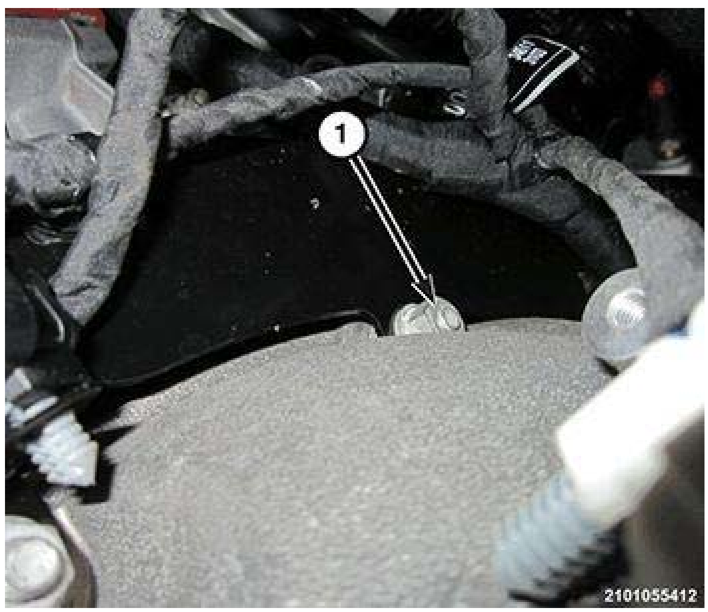


Fig. 136: Left Wiring Harness Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

12. Install the LH wiring harness bracket nut (1) and tighten to the proper **SPECIFICATIONS**.

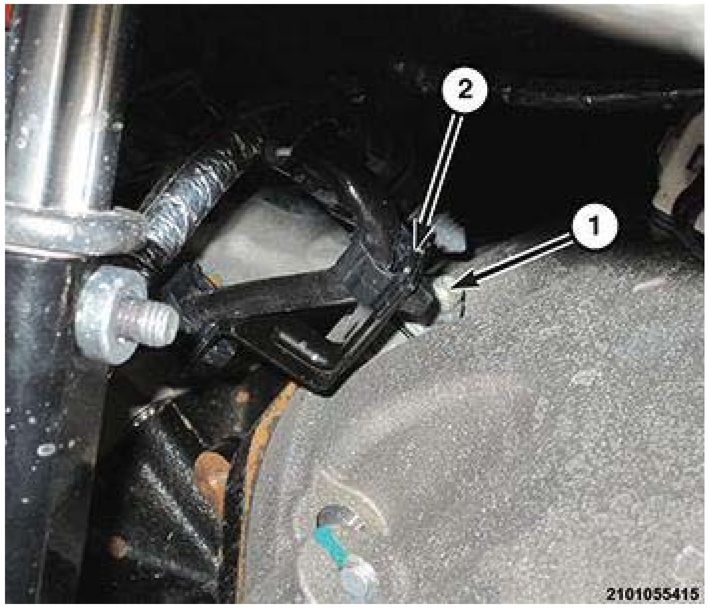


Fig. 137: Left Wiring Harness Bracket & Nut
Courtesy of CHRYSLER GROUP, LLC

13. Install the LH wiring harness bracket (2), the wiring harness bracket nut (1) and tighten to the proper **SPECIFICATIONS**.

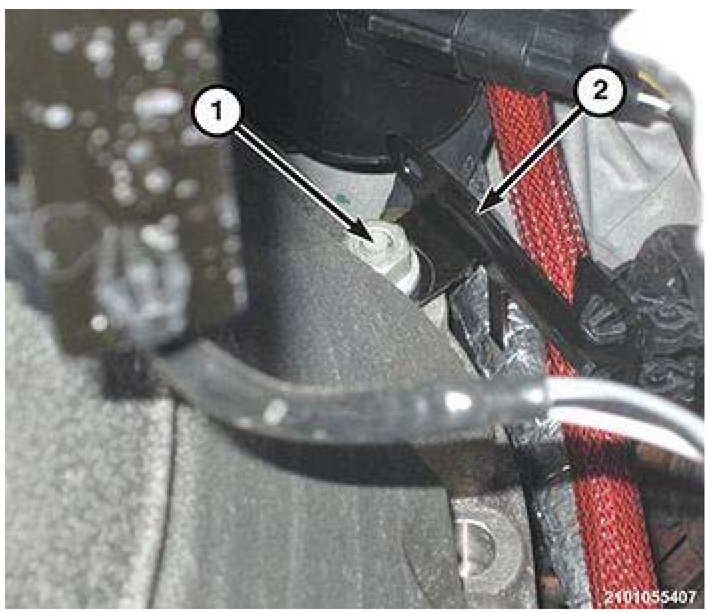
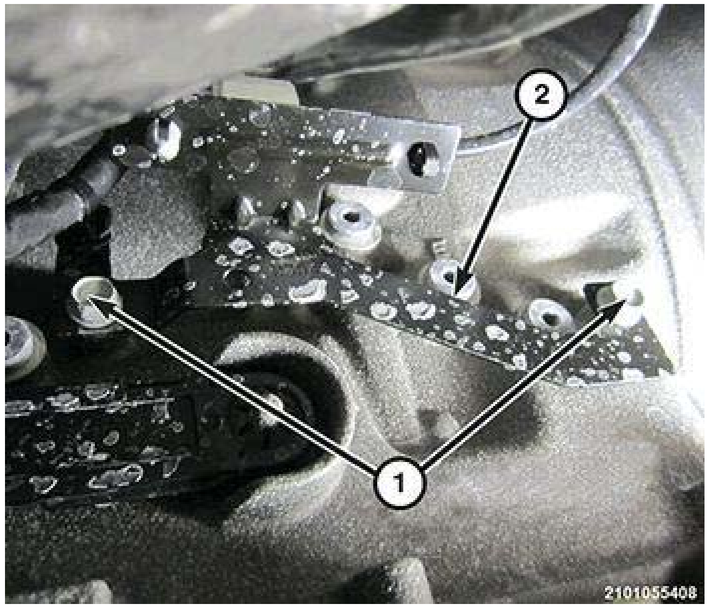


Fig. 138: Right Wiring Harness Bracket & Nut
Courtesy of CHRYSLER GROUP, LLC

14. Install the RH wiring harness bracket (2), the wiring harness bracket nut (1) and tighten to the proper **SPECIFICATIONS**.



[**Fig. 139: Wiring Harness Bracket & Bolts**]
Courtesy of CHRYSLER GROUP, LLC

15. Install the wiring harness bracket (2), the wiring harness bracket bolts (1) and tighten to the proper **SPECIFICATIONS**.

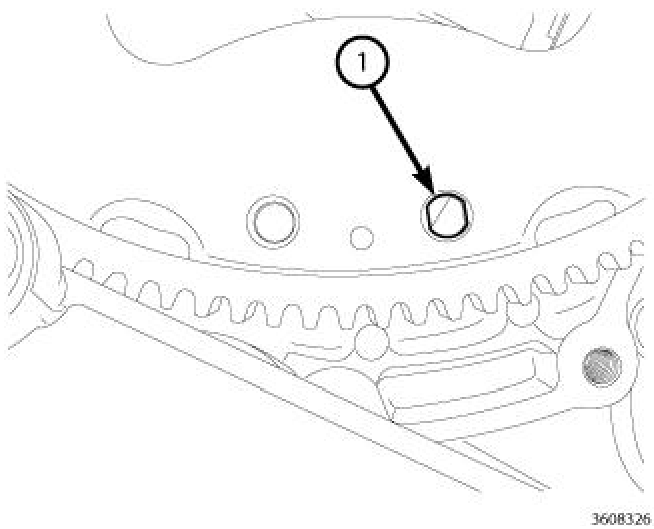


Fig. 140: Alignment Hole
Courtesy of CHRYSLER GROUP, LLC

16. Rotate crankshaft in clockwise direction to line up the alignment hole (1) in the flex plate, then start the first bolt.

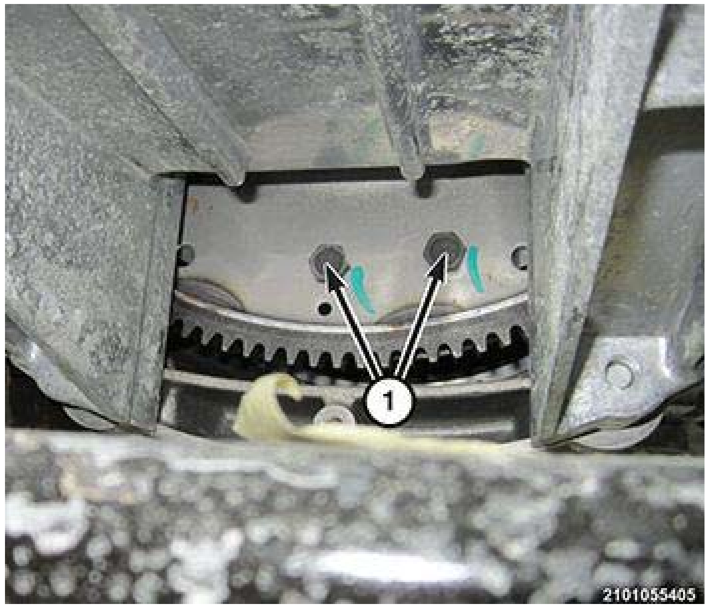


Fig. 141: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Rotate the crankshaft clockwise until the torque converter bolts (1) are accessible. There are three sets of two bolts 120Â° apart. Install the remaining torque converter bolts and tighten to the proper **SPECIFICATIONS**.

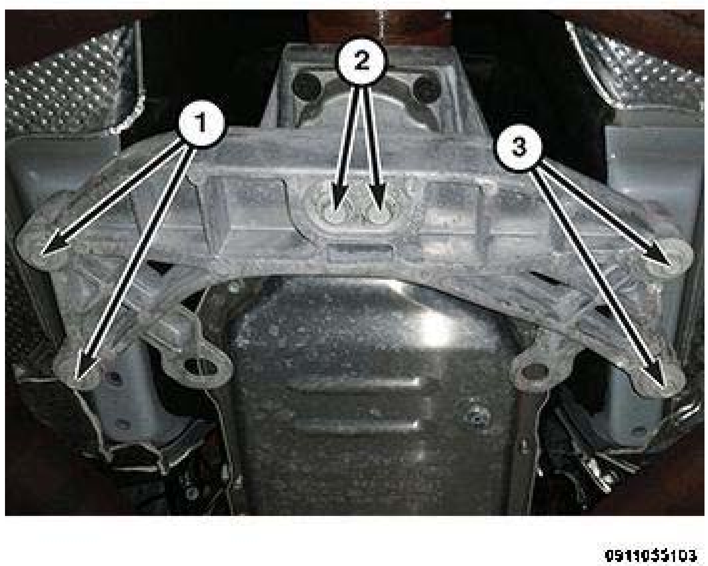


Fig. 142: Rear Support Isolator And Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

18. Position the crossmember in place and install the crossmember bolts (1 and 3) and tighten to the proper **SPECIFICATIONS**.
19. Install the rear support isolator bolts (2) and tighten to the proper **SPECIFICATIONS**.

Fig. 143: Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

20. Remove the transmission jack (1).

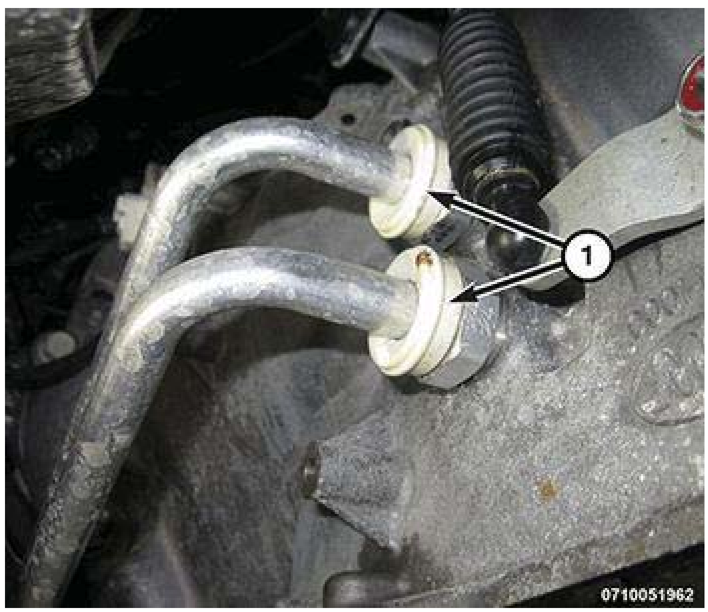
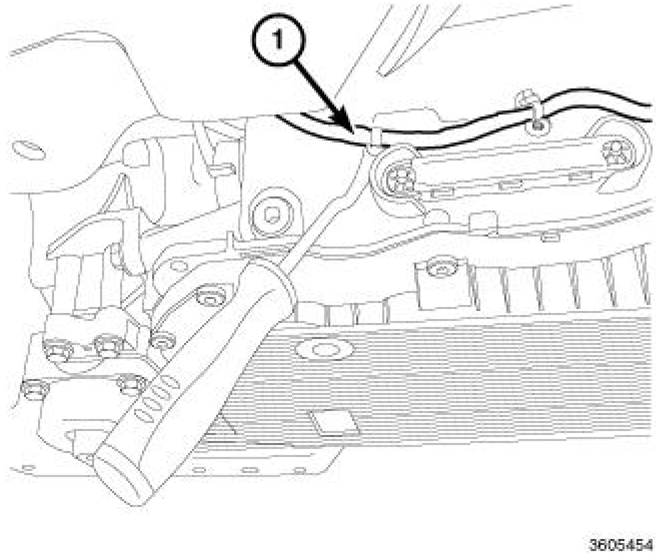


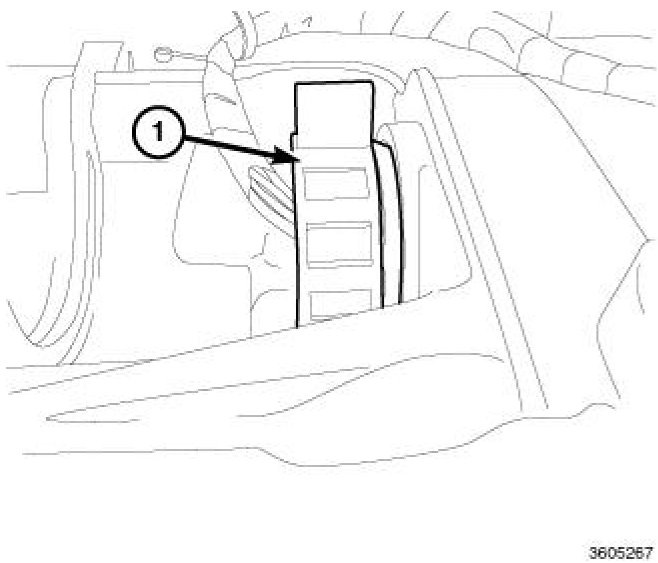
Fig. 144: Transmission Fluid Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

21. Connect transmission fluid cooler lines (1) to the transmission fittings (2) and install the clips (3).



[Fig. 145: Wiring Harness](#)
Courtesy of CHRYSLER GROUP, LLC

22. Connect the wiring harness (1) push pins to the transmission.



[Fig. 146: Adapter Plug Connector](#)
Courtesy of CHRYSLER GROUP, LLC

23. Connect the transmission wire harness connector (1) to the transmission.

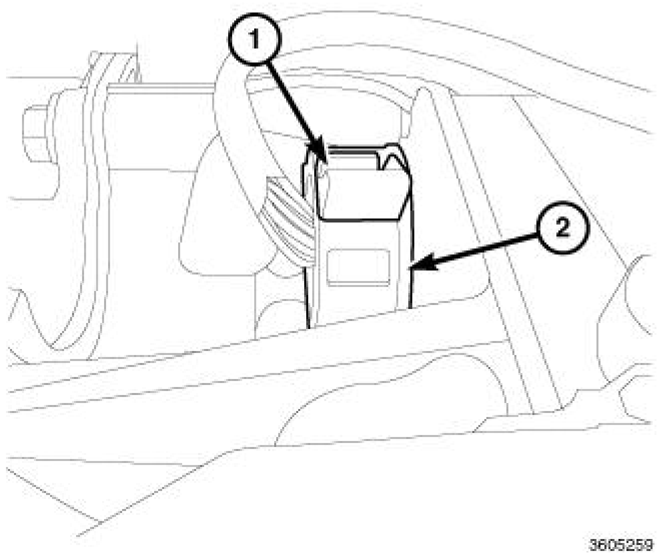


Fig. 147: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

24. Turn the locking mechanism lock (1) of the transmission wire harness connector (2) clockwise to secure.

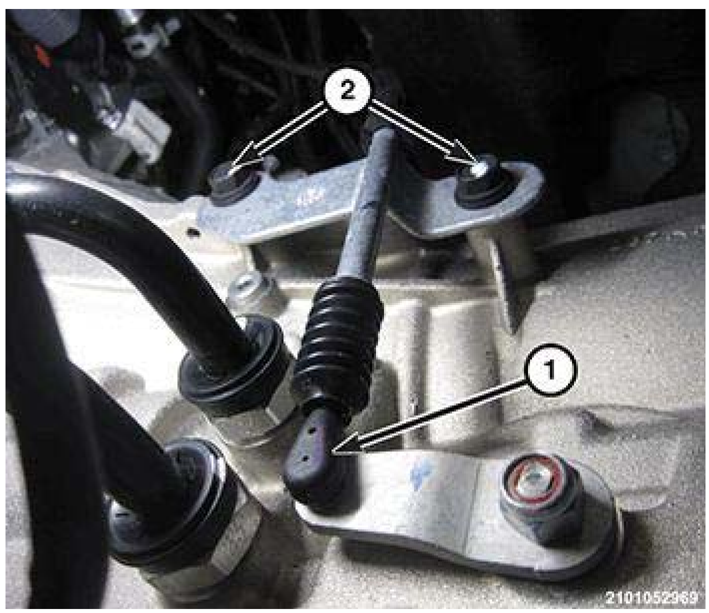


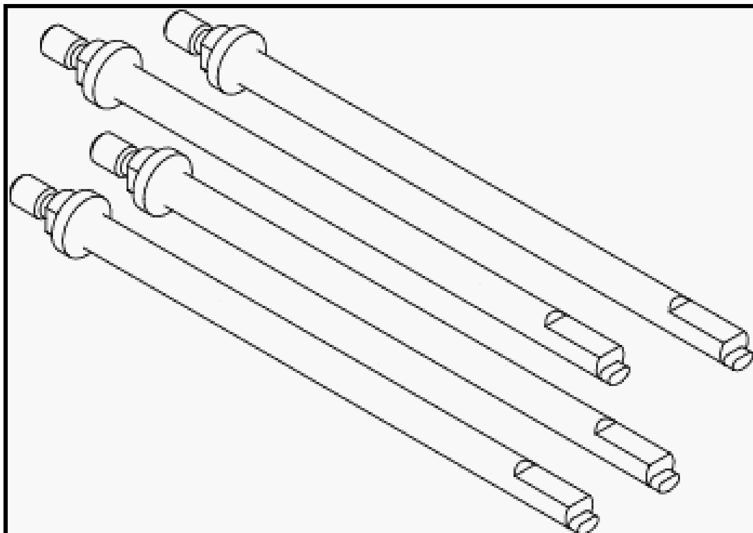
Fig. 148: Manual Park Release Cable & Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

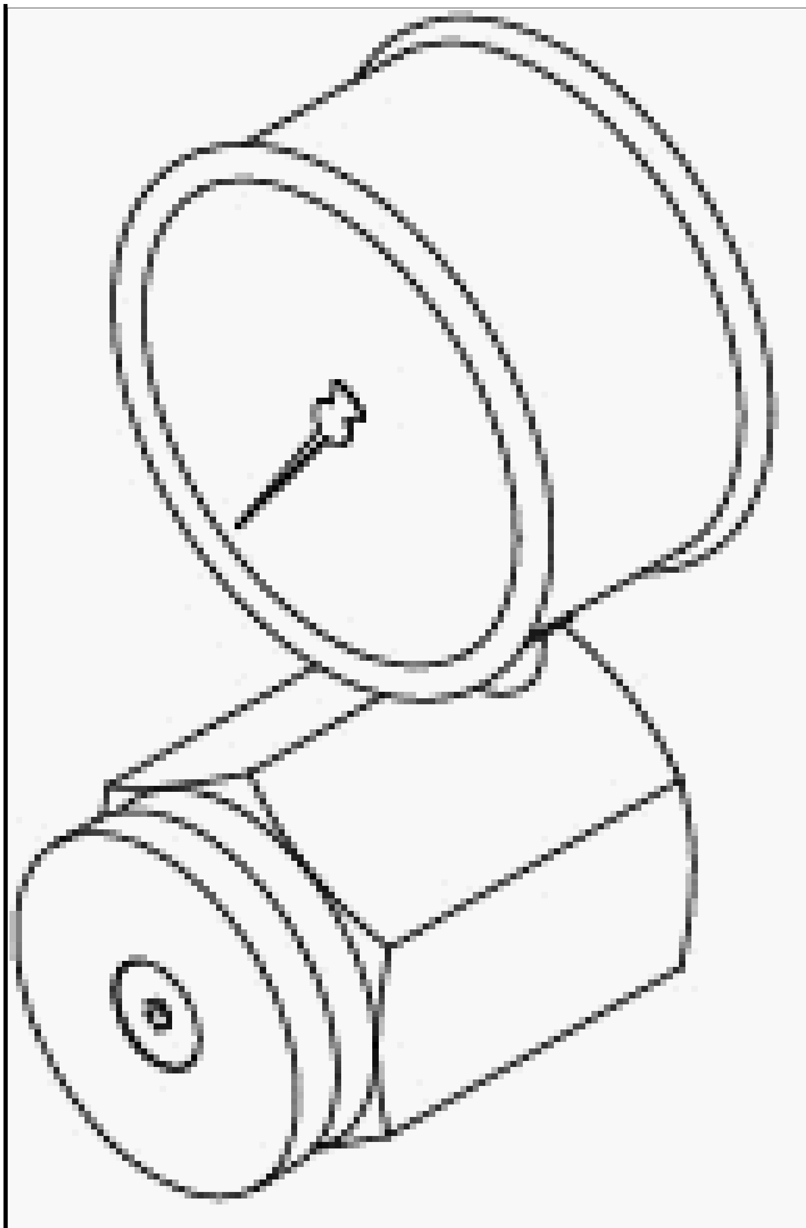
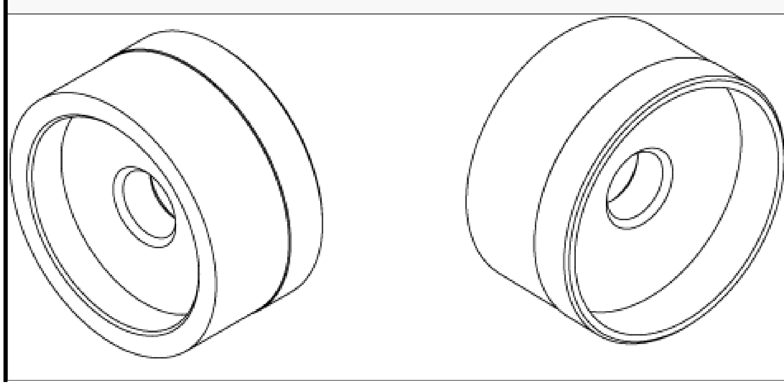
25. Position the MPR cable bracket/cable, install the bolts (2) and tighten to the proper **SPECIFICATIONS**.
26. Install the MPR cable (1) on the MPR lever.
27. Install the starter. Refer to **STARTER, INSTALLATION** .
28. Install the drive shaft. Refer to **INSTALLATION** .
29. Install the exhaust. Refer to **RESONATOR, EXHAUST, INSTALLATION** .
30. Connect the right and left bank up stream oxygen sensors.
31. Connect the negative battery cable.
32. Perform the STANDARD PROCEDURE - TRANSMISSION FILL AFTER SERVICE. Refer to **FLUID**

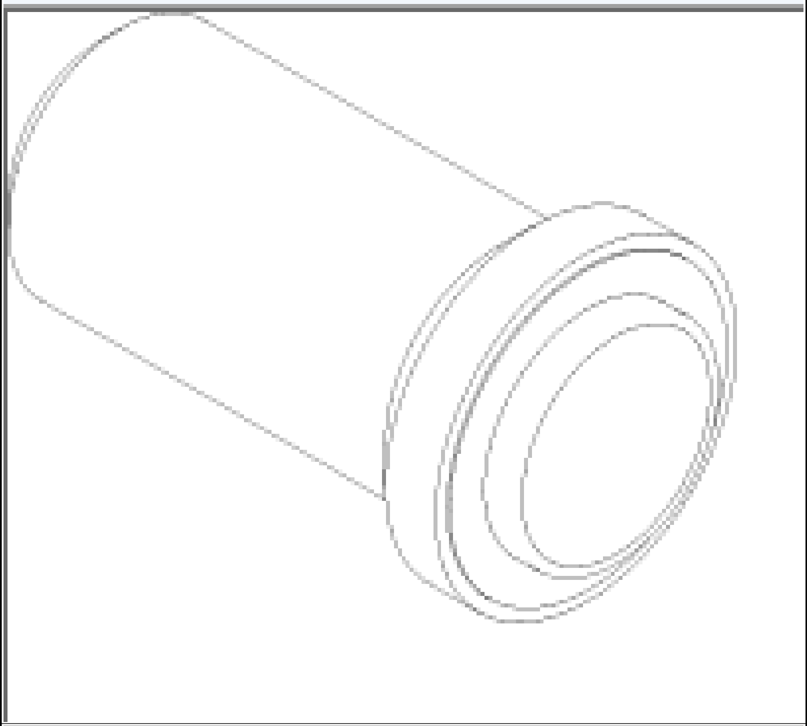
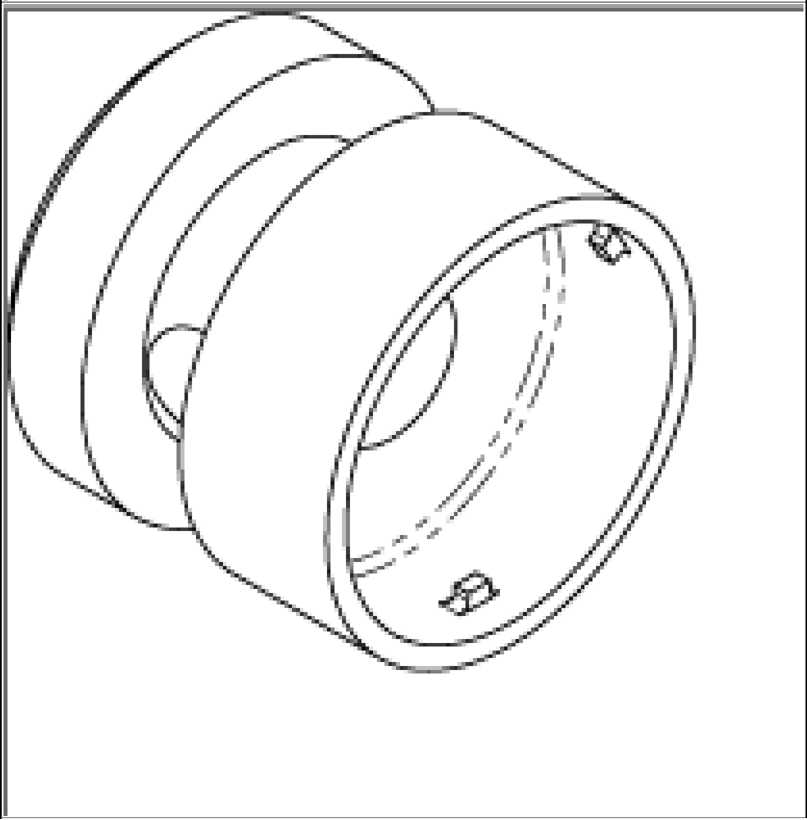
AND FILTER, STANDARD PROCEDURE.

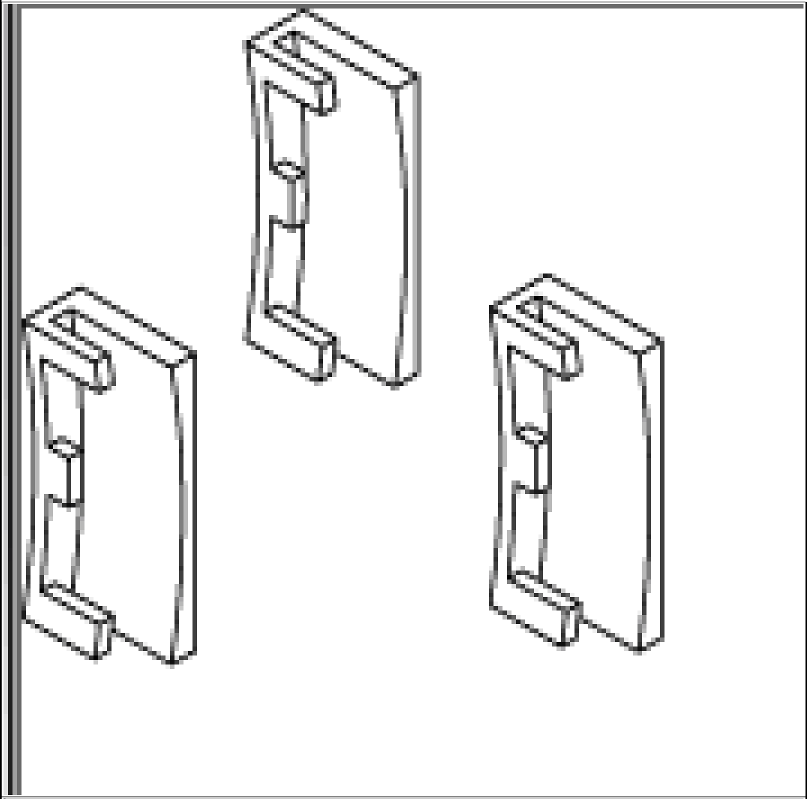
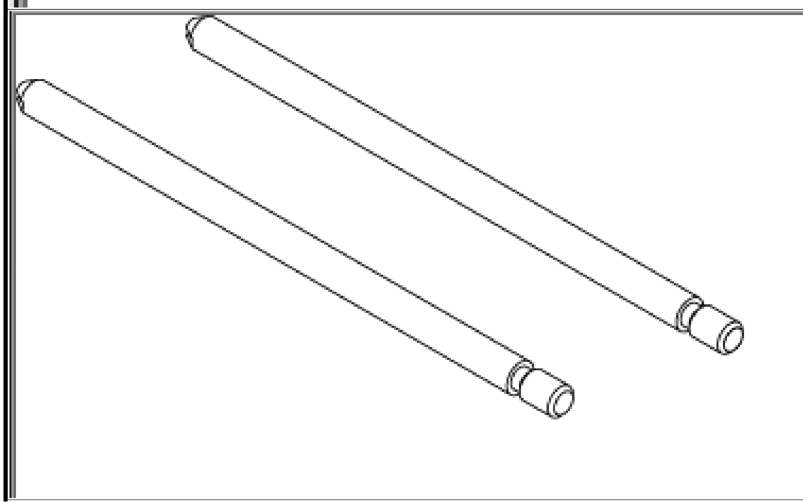
SPECIAL TOOLS

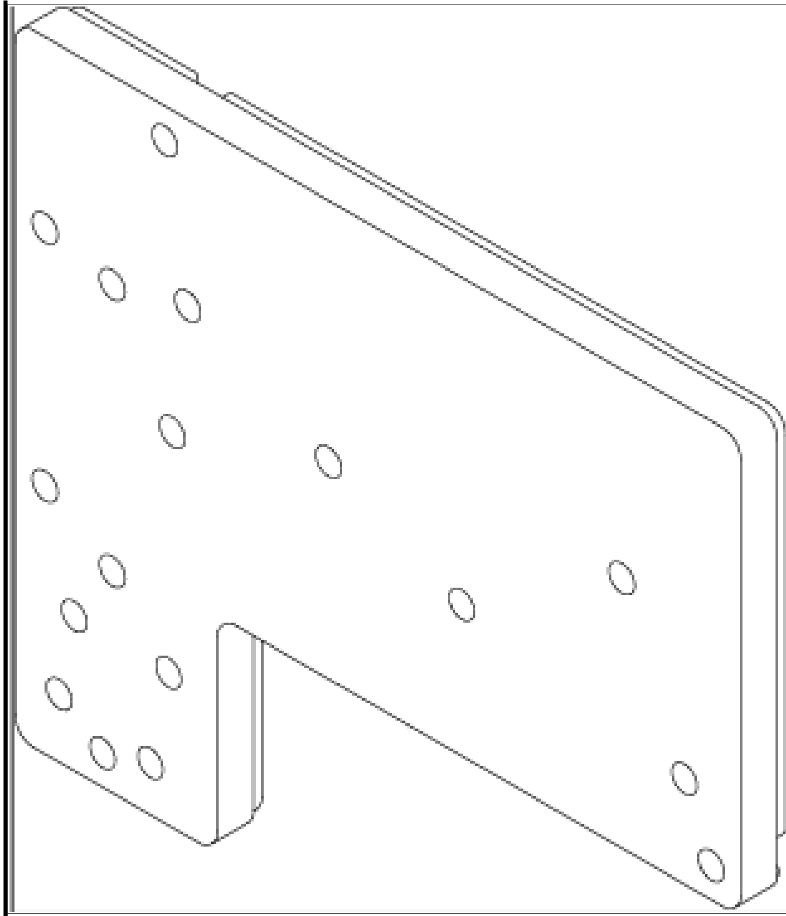
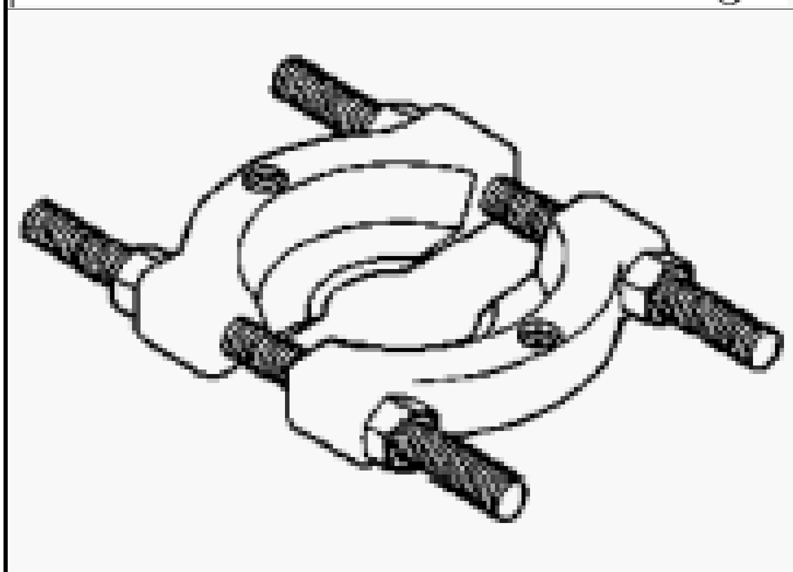
SPECIAL TOOLS

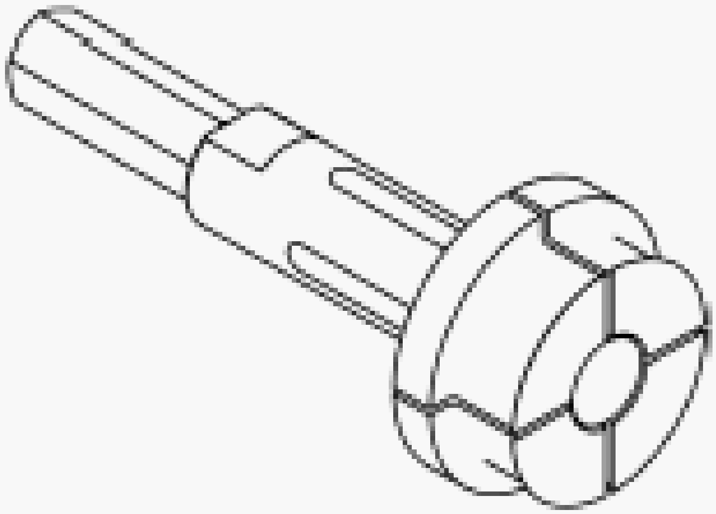
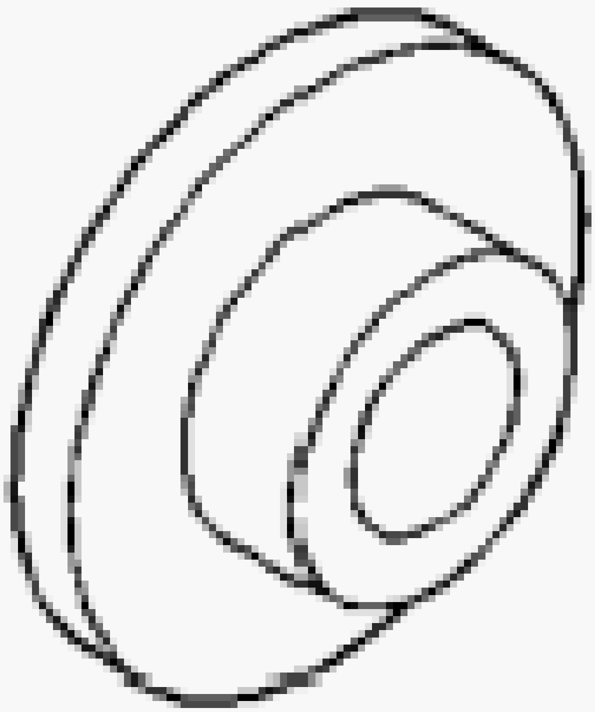
	10428 - Adapter, Pressing Tool (Originally Shipped In Kit Number(s).)

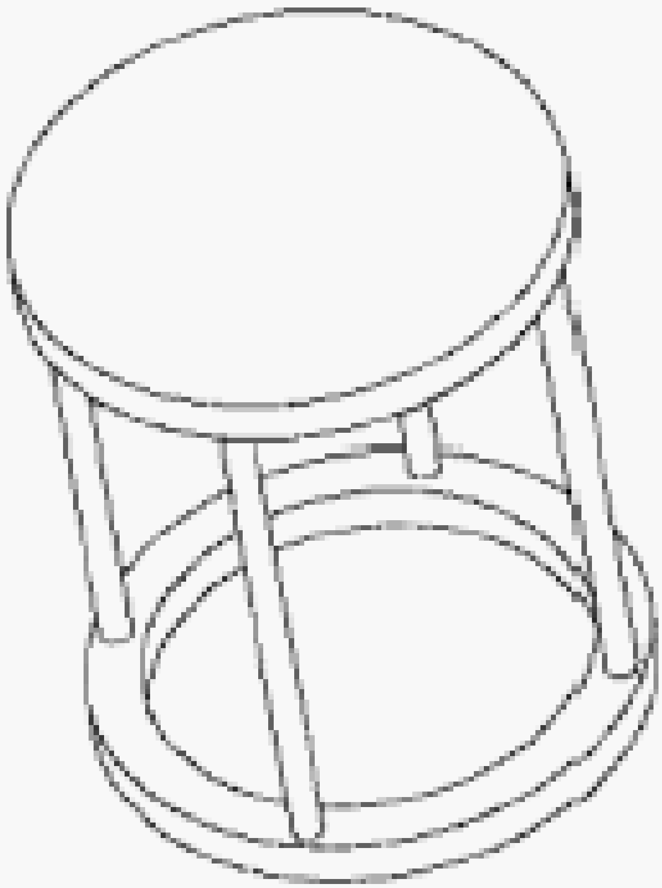
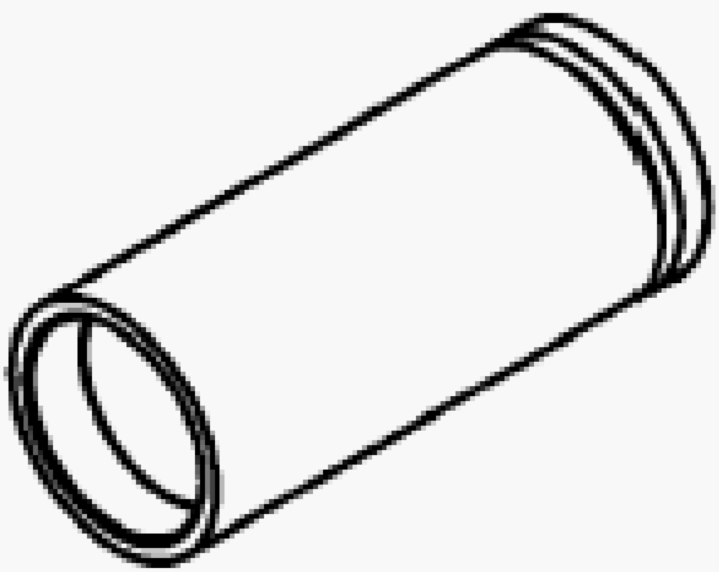
	10429 - Gauge, Force (Originally Shipped In Kit Number(s) 10419.)
	10373A - Installer, Output Needle Bearing/Rear Oil Dam (Originally Shipped In Kit Number(s) 10394A.)

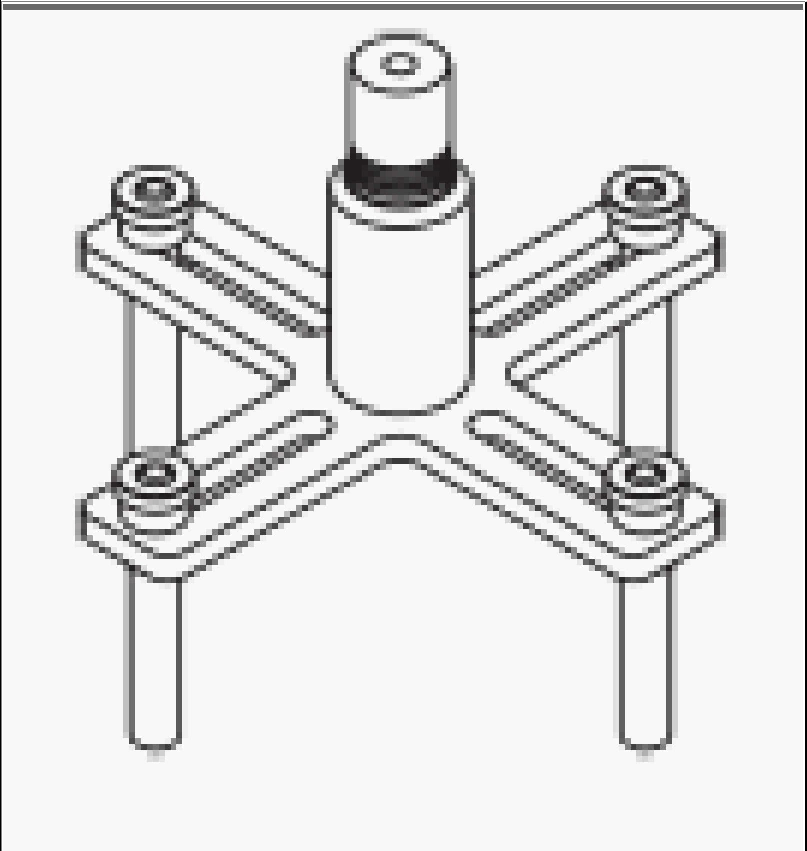
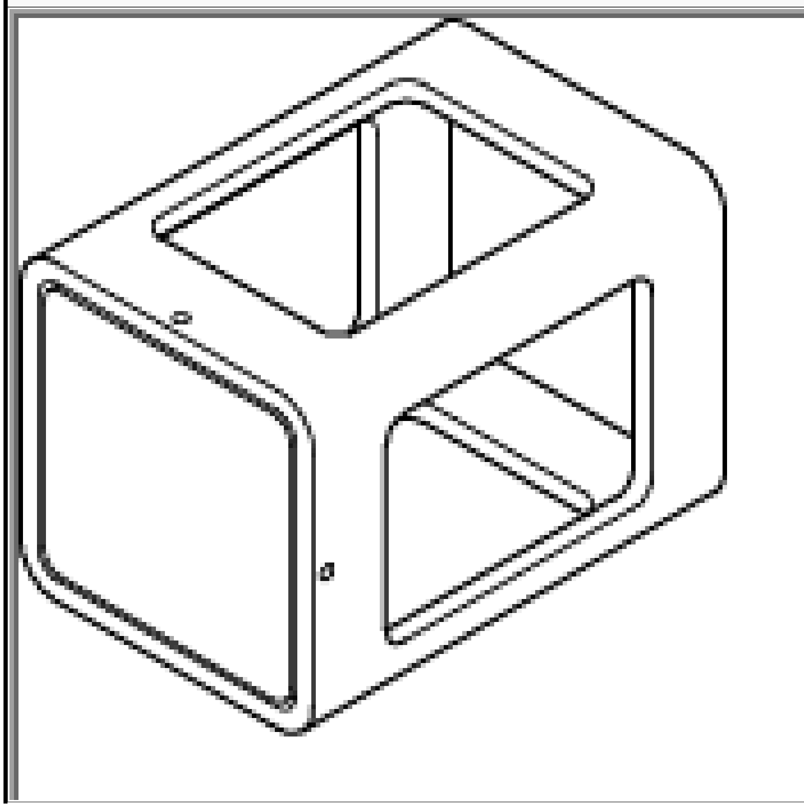
	10375 - Installer, Oil Pump Cover Oil Seal
	10377 - Remover/Installer, Guide Sleeve

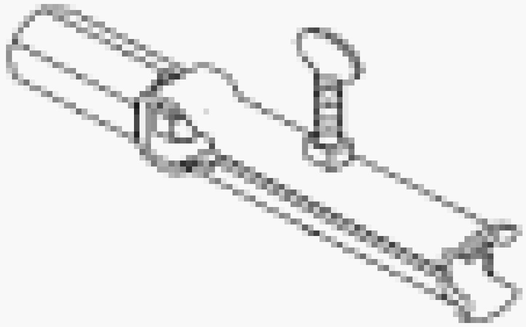
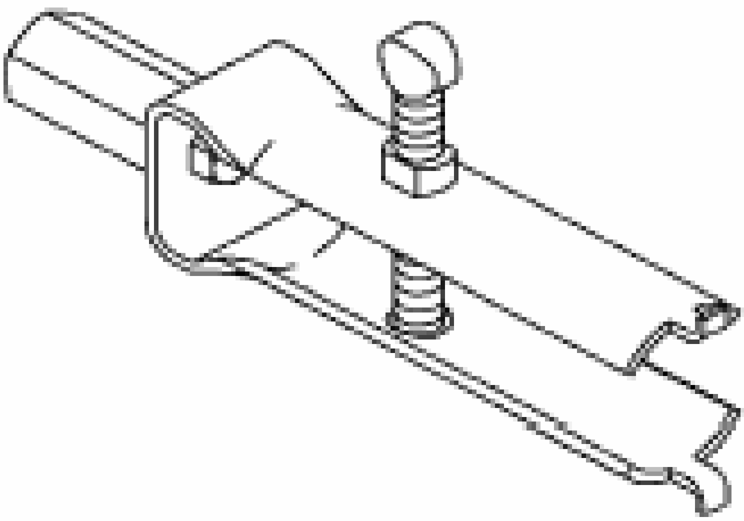
	10378 - Rings, Support
	10379 - Pins, Valve Body Alignment

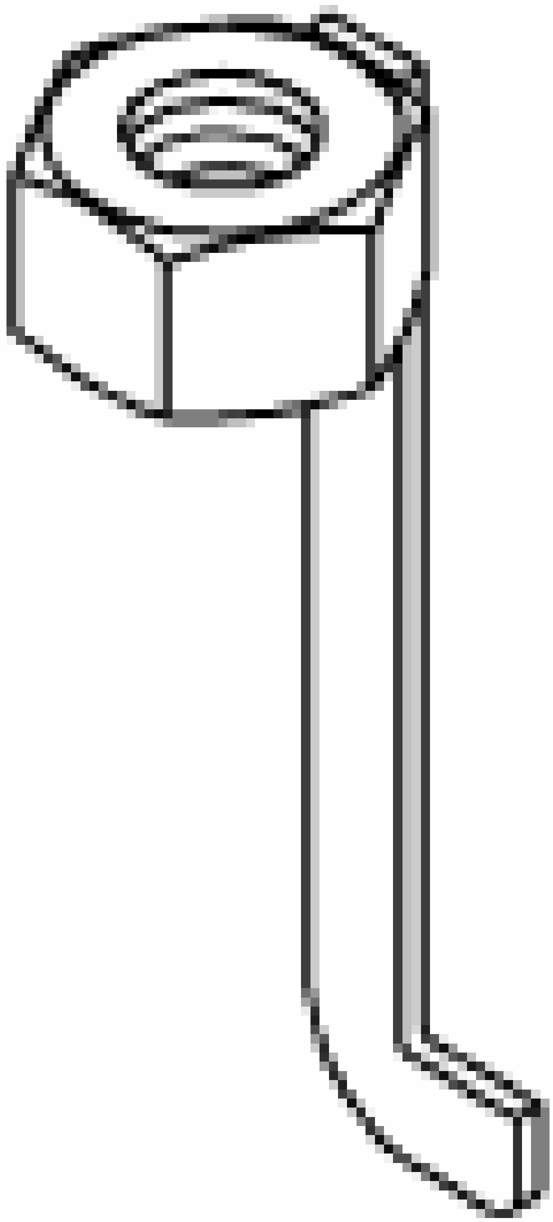
	10383 - Plate, Clutch Pressure Test
	1130 - Splitter, Bearing/Gear (Originally Shipped In Kit Number(s) 6745, 6947, 6949, 9202, 9202A-CAN, 9202CC, 9299.)

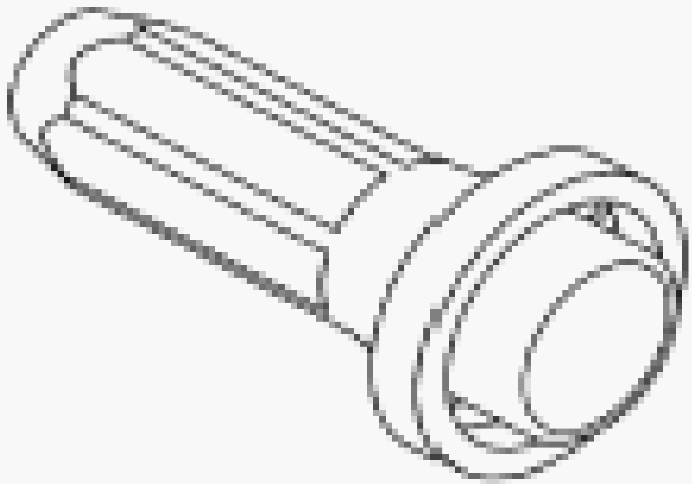
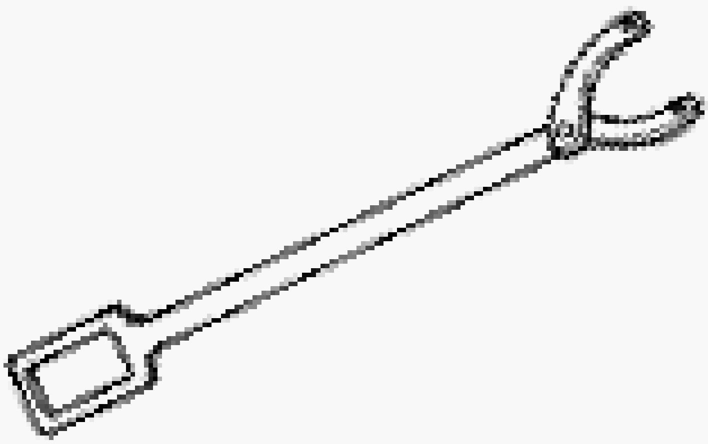
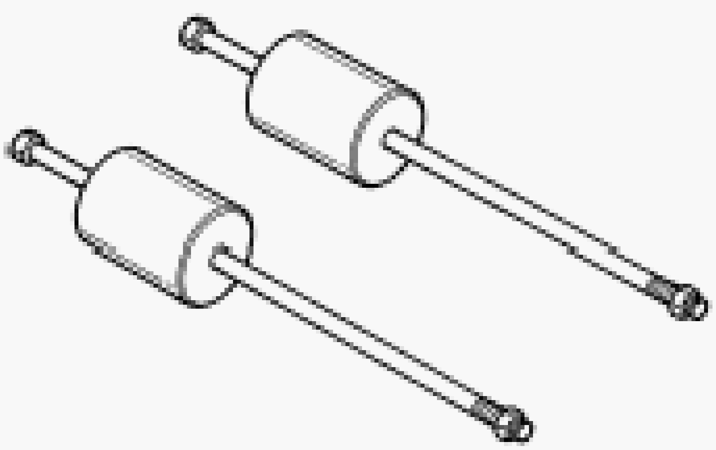
	6787A - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 6784, 6809.)
	6936 - Spacer (Originally Shipped In Kit Number(s) 6945, 6946, 6947, 6948.)

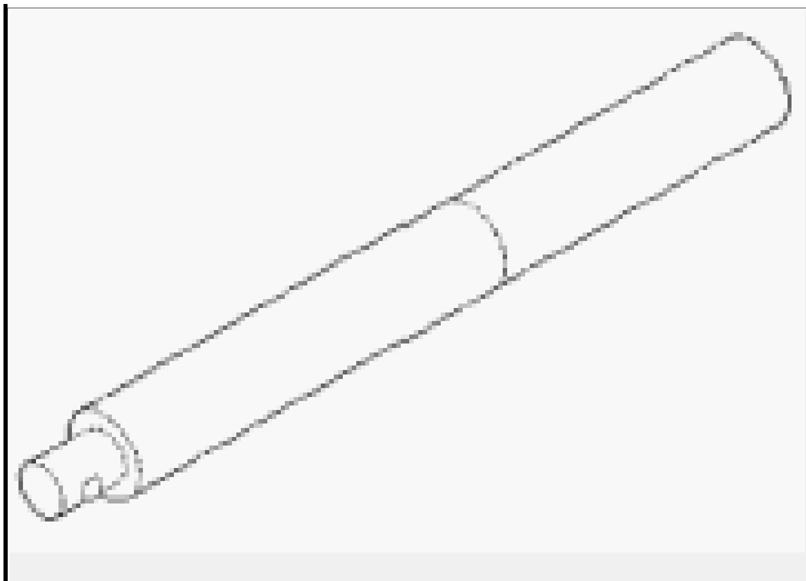
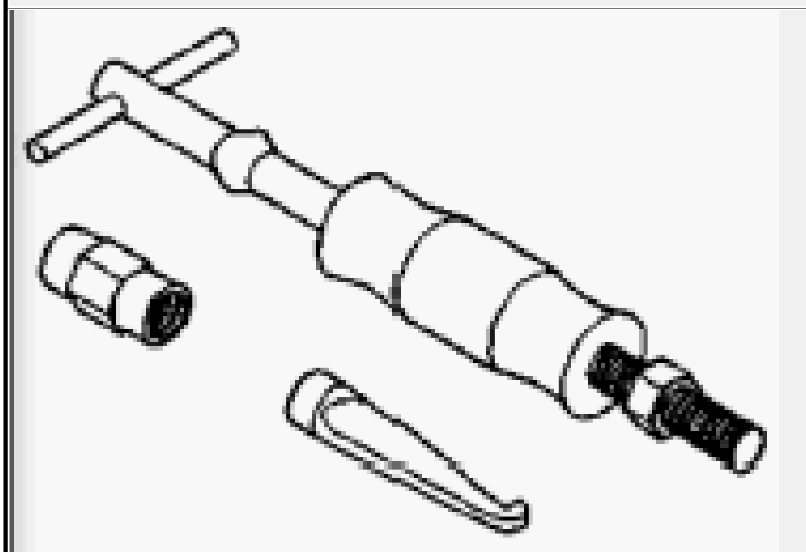
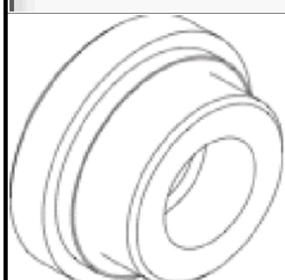
	8285 - Compressor, Spring (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.)
	8481 - Installer, Gear (Originally Shipped In Kit Number(s) 8708, 8708CC.)

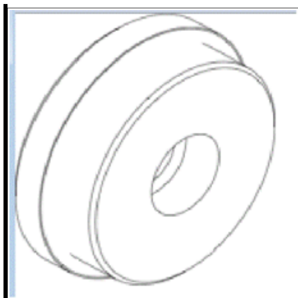
	8901A - Pressing Tool (Originally Shipped In Kit Number(s) 8901A.)
	8925-3 - Assembly, Press Fixture (Originally Shipped In Kit Number(s) 8998, 8998CC.)

	9585 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 9691.)
	9664 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 9675, 9685, 9695.)

	9667 - Remover, Seal (Originally Shipped In Kit Number(s) 9691.)

	9677 - Installer, Seal (Originally Shipped In Kit Number(s) 9675, 9685, 9695.)
	C-3281 - Holder, Flange (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)
	C-3752 - Slide Hammers (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202-CAN, 9202CC.)

	C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)
	C-637 - Slide Hammer, Universal (Originally Shipped In Kit Number(s) 9202.)
	10382 - Installer, Oil Pump Housing Needle Bearing (Originally Shipped In Kit Number(s) 10394A, 10394-UPD.)

	10376 - Installer, Input Shaft Needle Bearing (Originally Shipped In Kit Number(s) 10394A, 10394-UPD.)

CABLE, MANUAL PARK RELEASE

OPERATION

OPERATION

The 8HP utilizes a fully electronic shifter mechanism with no physical connections to the transmission such as shifter linkage or cables. Due to this design the park function of the transmission is performed using electronic inputs and hydraulic pressure to hold to parking pawl lever in the disengaged position while moving. Once in park this hydraulic pressure is reduced which allows the lever to engage the parking pawl which in turn keeps the vehicle from rolling forward or rearward.

Should the vehicle or any component of the E-Shifter lose power or communication the parking pawl will be engaged and the vehicle cannot be moved. To move the vehicle there is a manual park release mechanism that will allow first responders to disengage the parking pawl and allow the vehicle to be moved further facilitating vehicle recovery such as towing or moving the vehicle to allow jump starting.

REMOVAL

MPR CABLE

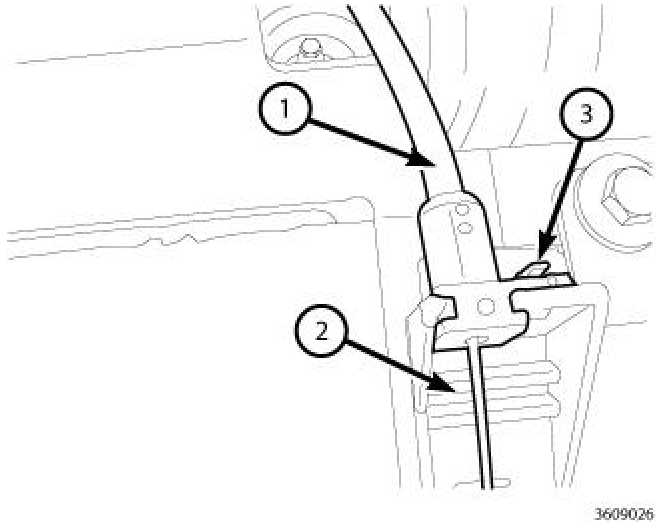


Fig. 149: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Apply the parking brake.
3. Remove the Manual Park Release (MPR) lever cover.
4. Disconnect the MPR cable (1) from the housing (2), while holding the release tab (3) open.
5. Disconnect the MPR cable from the lever.
6. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

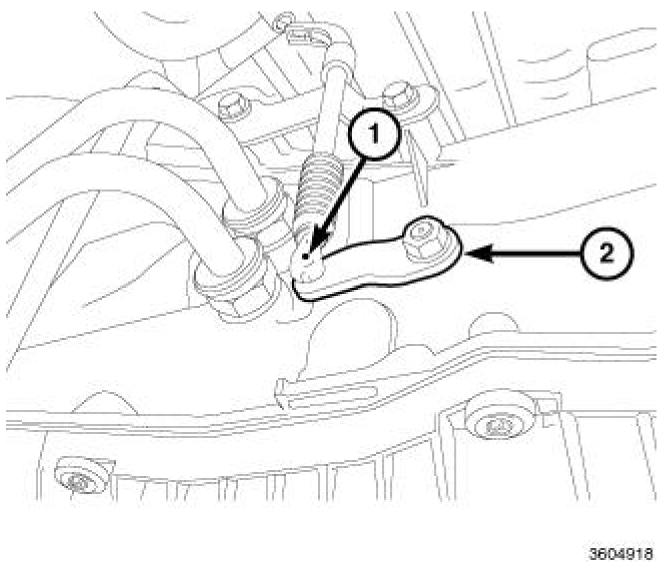


Fig. 150: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the MPR cable (1) from the MPR lever (2).

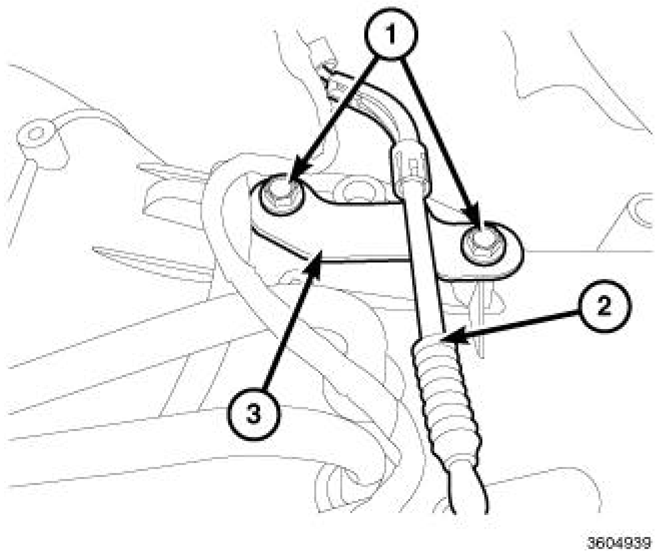


Fig. 151: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

8. Remove the MPR cable bracket bolts (1) and remove the MPR cable (2) from the vehicle.

INSTALLATION

MPR CABLE

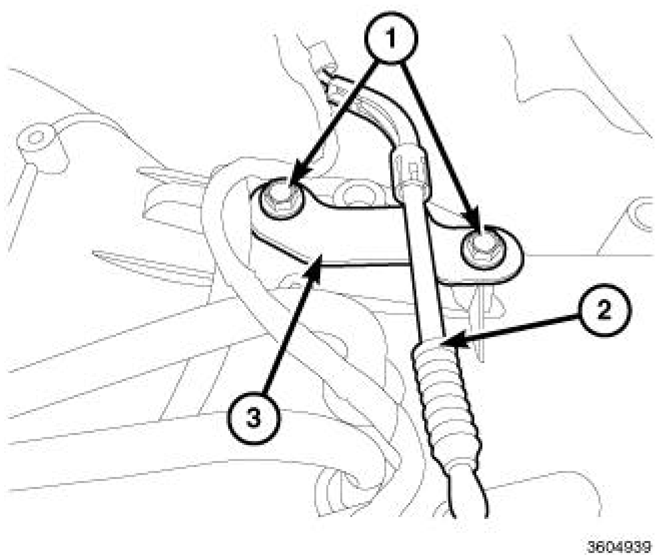


Fig. 152: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

1. Install the Manual Park Release (MPR) cable (2) in the vehicle. Install the MPR cable bracket bolts (1) and tighten to the proper SPECIFICATIONS .

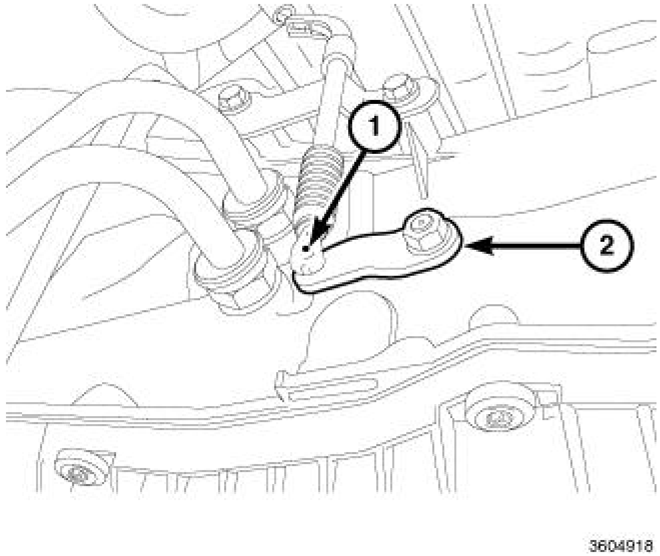


Fig. 153: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

2. Connect the MPR cable (1) to the MPR lever (2).
3. Lower the vehicle.

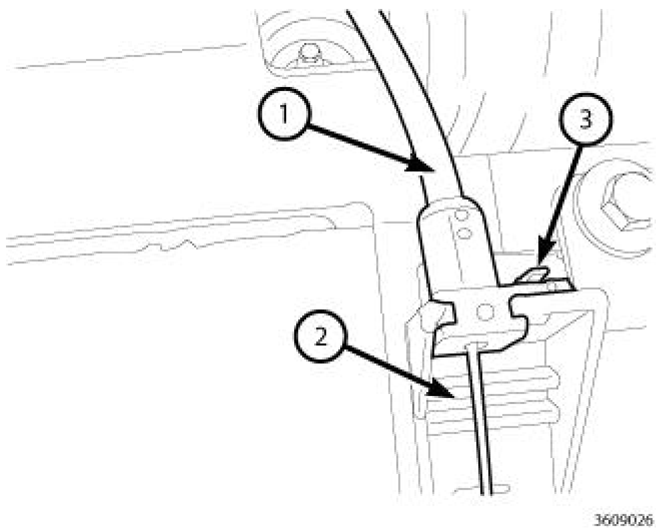


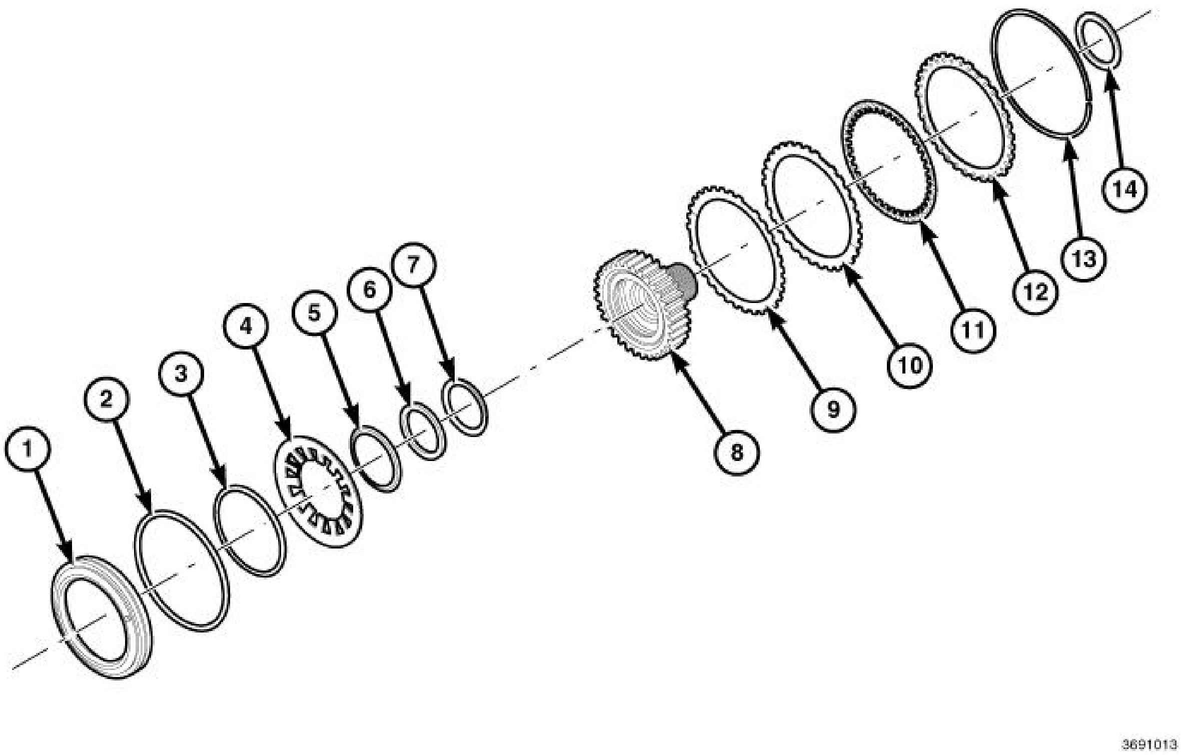
Fig. 154: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

4. Connect the MPR cable (2) to the MPR lever.
5. Connect the MPR cable (1) to the housing.
6. Install the MPR cover.
7. Connect the negative battery cable.

CLUTCH, A

DISASSEMBLY

DISASSEMBLY



[Fig. 155: Exploded View Of A Clutch]
Courtesy of CHRYSLER GROUP, LLC

1 - A CLUTCH PISTON
2 - LIP SEAL
3 - LIP SEAL
4 - RETURN SPRING
5 - RING
6 - BEARING
7 - WASHER
8 - SUN GEAR
9 - WAVE SPRING
10 - SEPARATOR PLATE
11 - FRICTION PLATES
12 - END PLATE
13 - SNAP RING
14 - SELECTABLE SHIM

1. Remove the oil pump from the transmission case. Refer to **PUMP, TRANSMISSION OIL, REMOVAL**.

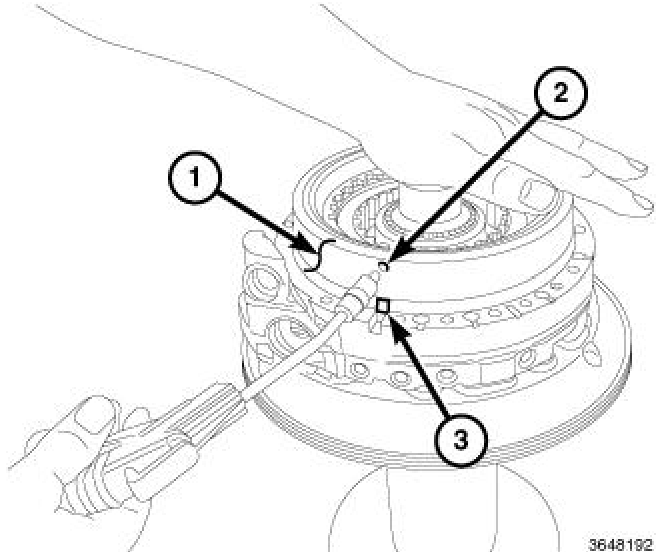


Fig. 156: B-Piston, Hole & B-Piston Alignment Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply air pressure slowly, oil may spray when B-piston releases from the assembly.**

2. With one hand above B-piston (1), carefully apply air pressure into the hole directly above the B-piston alignment tab (3) to remove B-piston (2) from the assembly.

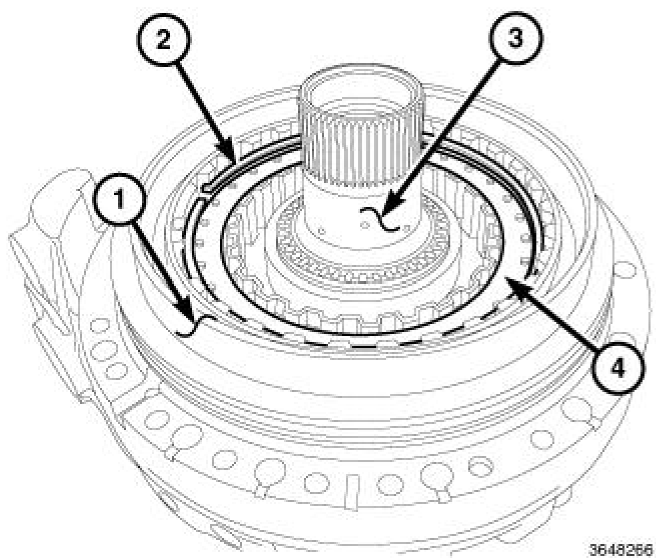


Fig. 157: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

3. Remove the outer ring (1) (inside B-piston).
4. Remove the snap ring (2).
5. Remove the clutches and spacers (4).
6. Remove the hub (3).

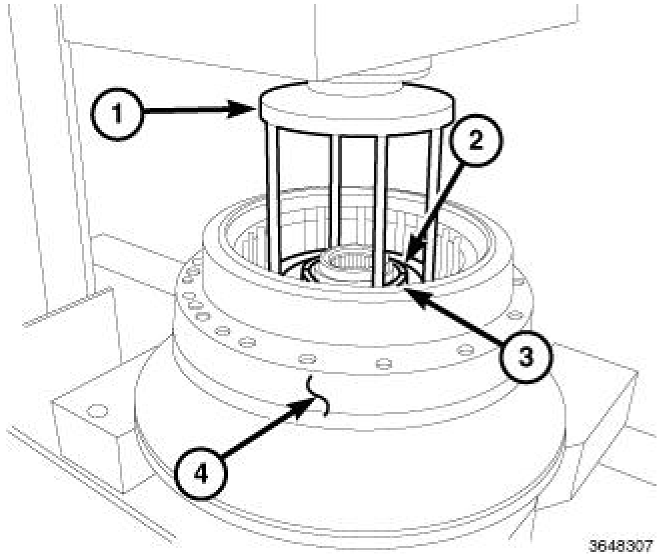


Fig. 158: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

7. Position the oil pump housing assembly (4) in a suitable press.
8. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer to remove tension on the split retaining ring (2), and remove the two halves of the retaining ring (2).

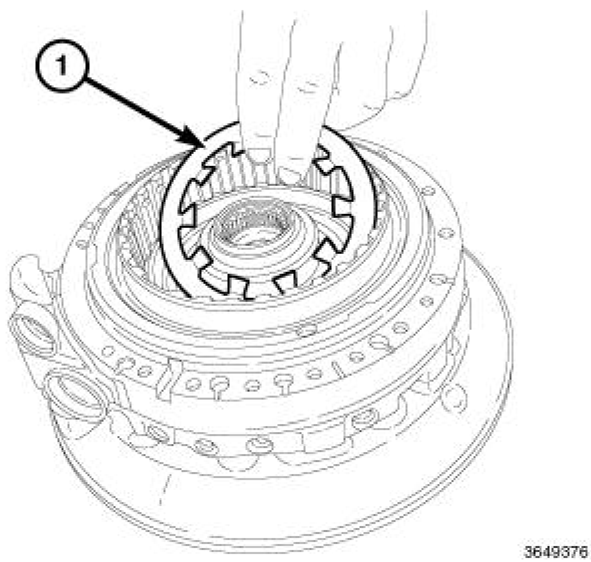


Fig. 159: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

9. Remove the piston retainer and plate.

ASSEMBLY

ASSEMBLY

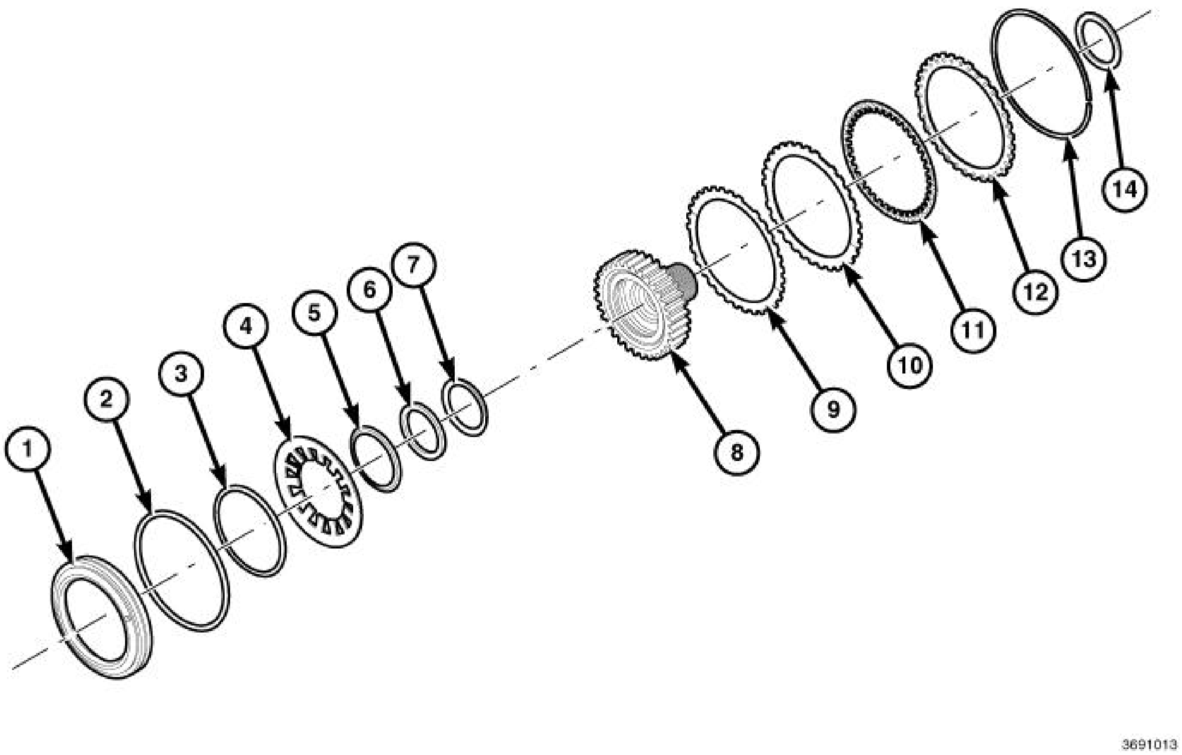


Fig. 160: Exploded View Of A Clutch
Courtesy of CHRYSLER GROUP, LLC

1 - A CLUTCH PISTON
2 - LIP SEAL
3 - LIP SEAL
4 - RETURN SPRING
5 - RING
6 - BEARING
7 - WASHER
8 - SUN GEAR
9 - WAVE SPRING
10 - SEPARATOR PLATE
11 - FRICTION PLATES
12 - END PLATE
13 - SNAP RING
14 - SELECTABLE SHIM

NOTE: **If clutch discs are being replaced, soak in 8HP trans fluid before assembly.**

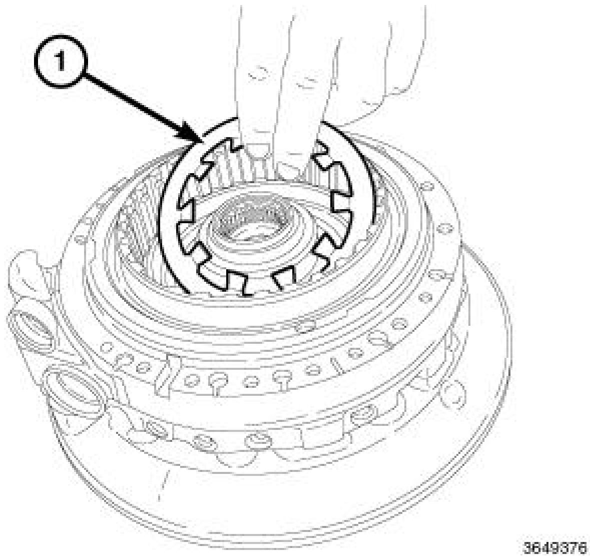


Fig. 161: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

1. Insert the piston and the retaining ring (1) into the housing.

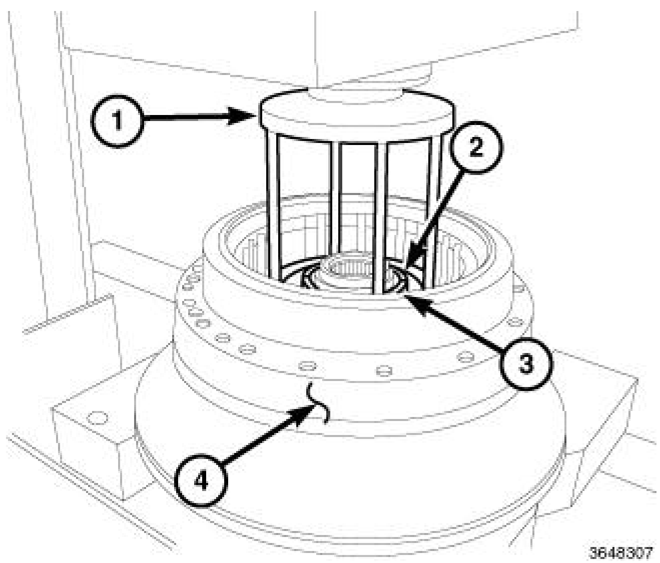


Fig. 162: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

2. Position the oil pump housing assembly (4) in a suitable arbor press.
3. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and install the two halves of the split retainer ring (2).

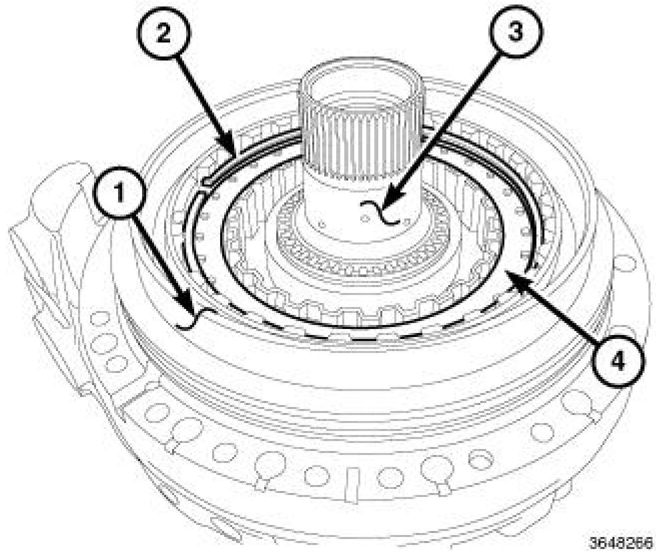


Fig. 163: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

4. Install the hub (3).
5. Install the clutches and spacers (4).
6. Install the snap ring (2).
7. Install the outer ring (1) (below B-piston).

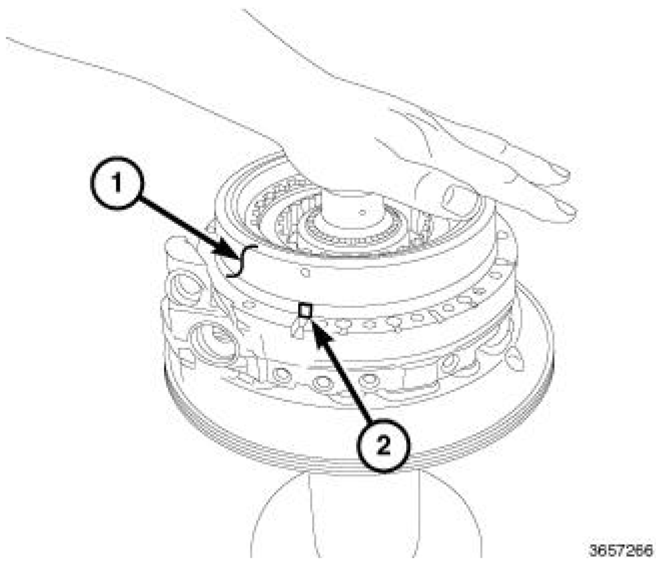


Fig. 164: B-Piston Alignment Tab & B-Piston
Courtesy of CHRYSLER GROUP, LLC

8. Position the B-piston alignment tab (2) above the notch and install B-piston (1) on the assembly.
9. Install the transmission oil pump. Refer to **PUMP, TRANSMISSION OIL, INSTALLATION**.

CLUTCH, B

DISASSEMBLY

CLUTCH B DISASSEMBLY

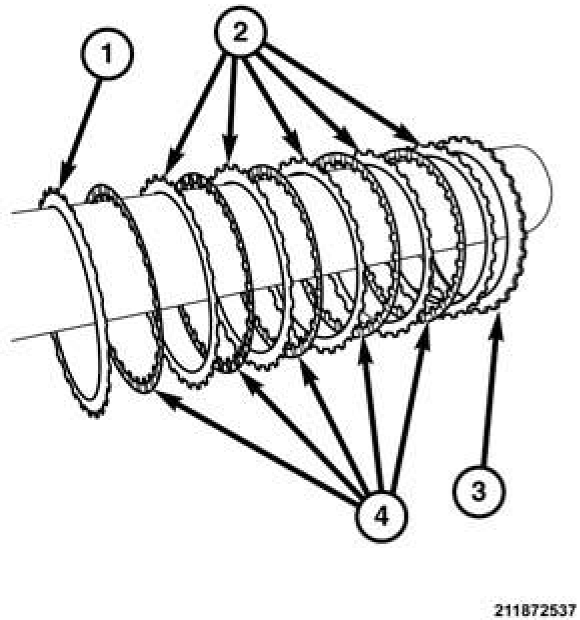


Fig. 165: Wave, Steel, Backing & Friction Plates
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate
2. Steel plate
3. Backing plate
4. Friction plate

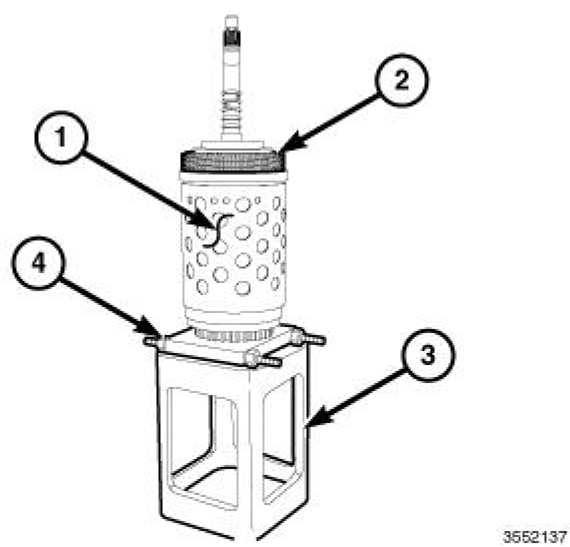
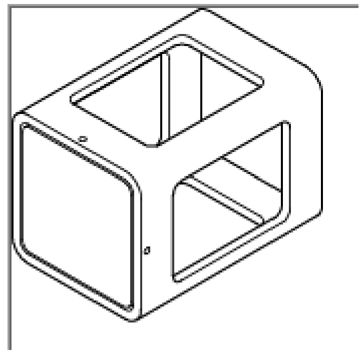
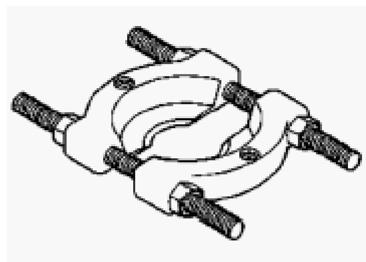


Fig. 166: P4 Annulus Drum Assembly, Press Fixture Assembly & Bearing/Gear Splitter
Courtesy of CHRYSLER GROUP, LLC

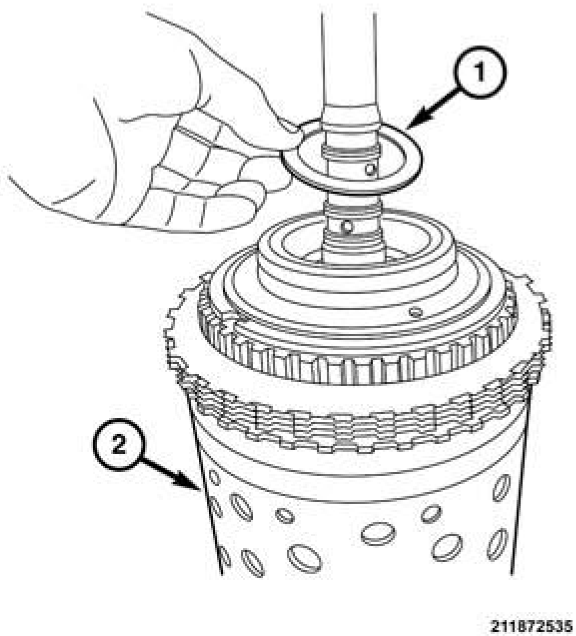
1. Position the input/output shaft and the P4 annulus drum assembly (1) on Assembly, Press Fixture 8925-3 (special tool #8925-3, Assembly, Press Fixture) and Splitter, Bearing/Gear 1130 (special tool #1130, Splitter, Bearing/Gear).



[Fig. 167: Press Fixture](#)
Courtesy of CHRYSLER GROUP, LLC



[Fig. 168: Splitter, Bearing/Gear](#)
Courtesy of CHRYSLER GROUP, LLC



[Fig. 169: Annulus Assembly & Shim](#)
Courtesy of CHRYSLER GROUP, LLC

2. Remove the selectable shim (1).

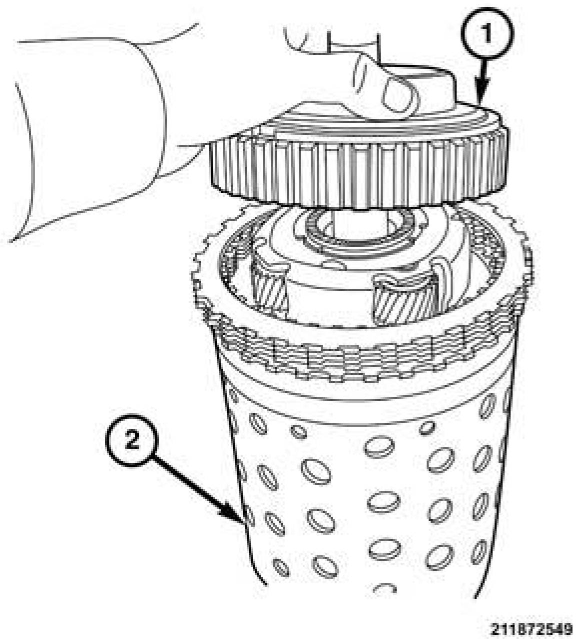


Fig. 170: Annulus Assembly & Gear
Courtesy of CHRYSLER GROUP, LLC

3. Remove the P1 (1) annulus from the assembly.

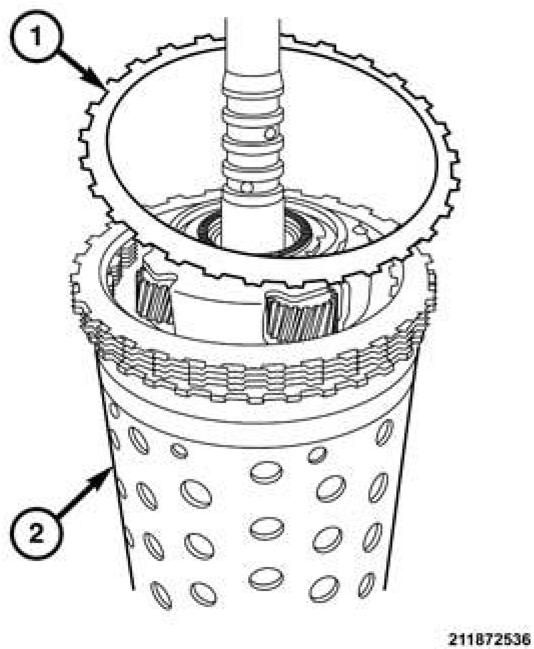
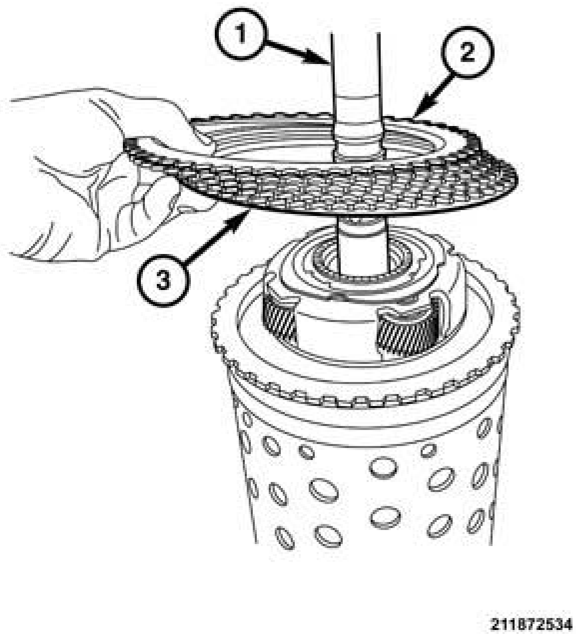


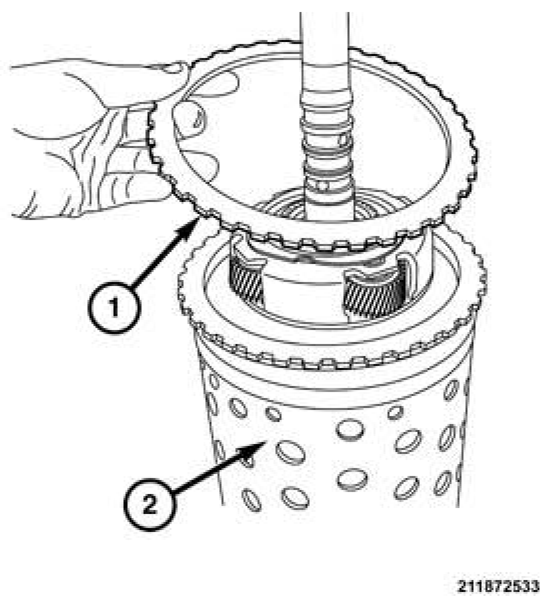
Fig. 171: Annulus Assembly & B-Clutch Wave Plate
Courtesy of CHRYSLER GROUP, LLC

4. Remove the B-clutch wave plate (1).



[Fig. 172: Friction & Steel Plates](#)
Courtesy of CHRYSLER GROUP, LLC

5. Remove the friction and steel plates (2).



[Fig. 173: Backing Plate & Annulus Assembly](#)
Courtesy of CHRYSLER GROUP, LLC

6. Remove the backing plate (1) from the assembly (2).

ASSEMBLY

CLUTCH B ASSEMBLY

1. Wave plate
2. Steel plate
3. Backing plate
4. Friction plate

NOTE: **If clutch discs are being replaced, soak in 8HP trans fluid before assembly.**

1. Position the input/output and the P4 annulus drum assembly on (special tool #8925-3, Assembly, Press Fixture) and (special tool #1130, Splitter, Bearing/Gear).

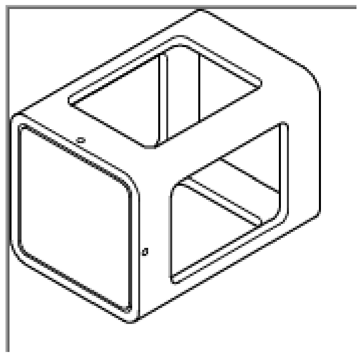


Fig. 174: Press Fixture
Courtesy of CHRYSLER GROUP, LLC

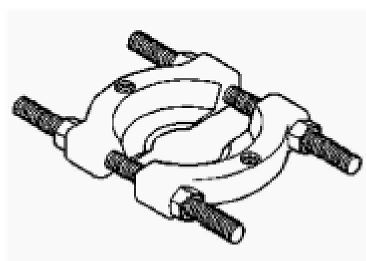
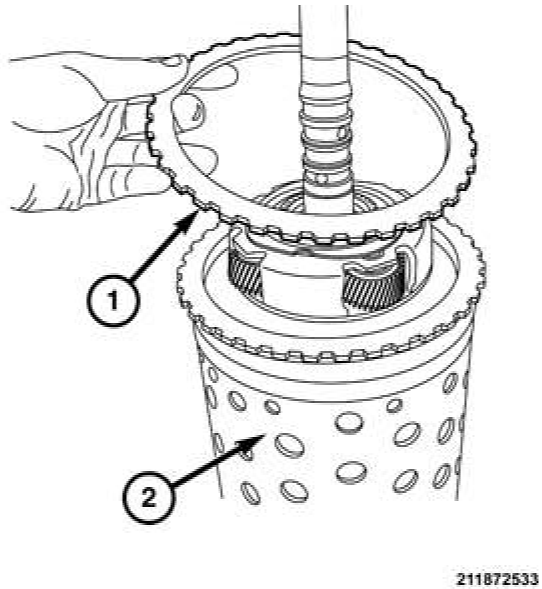
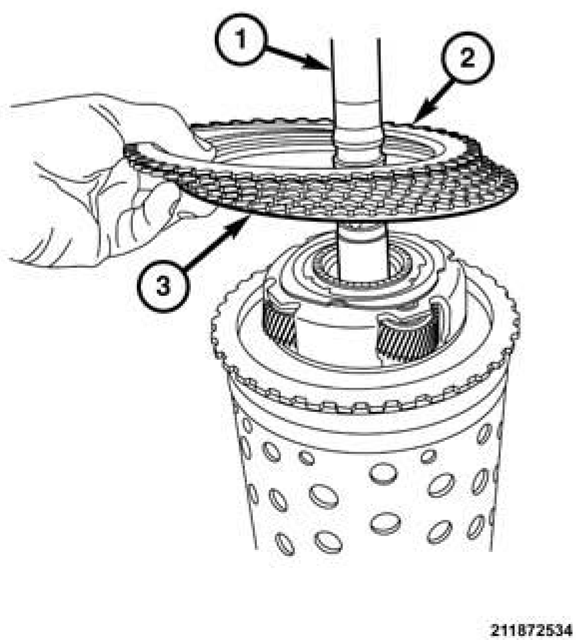


Fig. 175: Splitter, Bearing/Gear
Courtesy of CHRYSLER GROUP, LLC



[Fig. 176: Backing Plate & Annulus Assembly]
Courtesy of CHRYSLER GROUP, LLC

2. Install the backing plate (1) onto the input/output shaft.



[Fig. 177: Friction & Steel Plates]
Courtesy of CHRYSLER GROUP, LLC

3. Install the friction and steel plates (2).

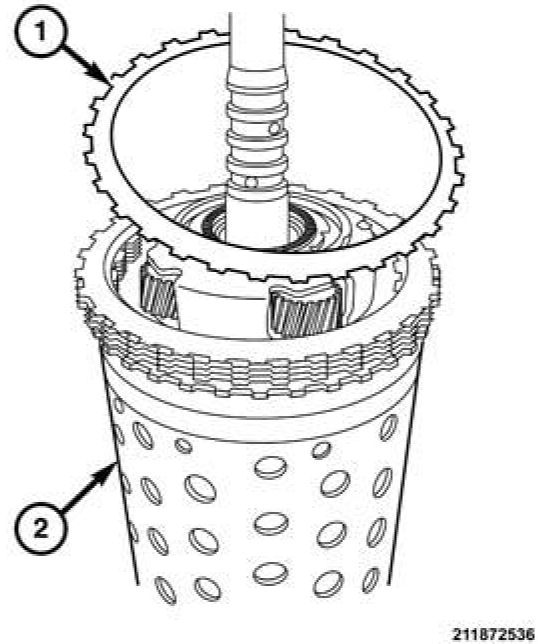


Fig. 178: Annulus Assembly & B-Clutch Wave Plate
Courtesy of CHRYSLER GROUP, LLC

4. Install the B-clutch wave plate (1).

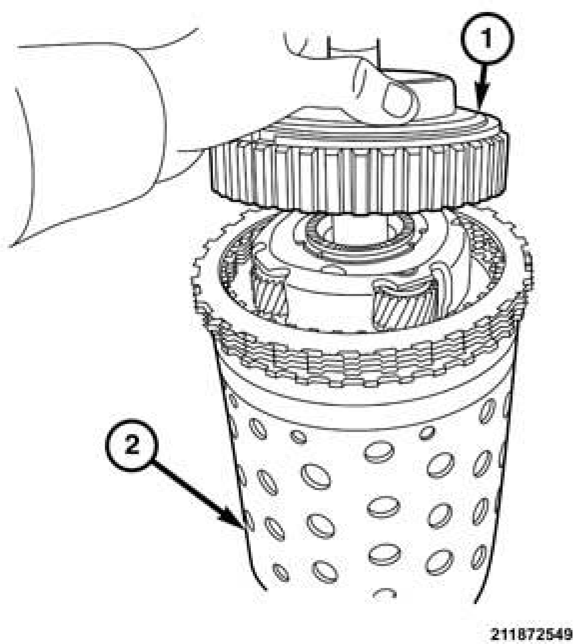


Fig. 179: Annulus Assembly & Gear
Courtesy of CHRYSLER GROUP, LLC

5. Install the P1 annulus onto the input/output shaft (1).

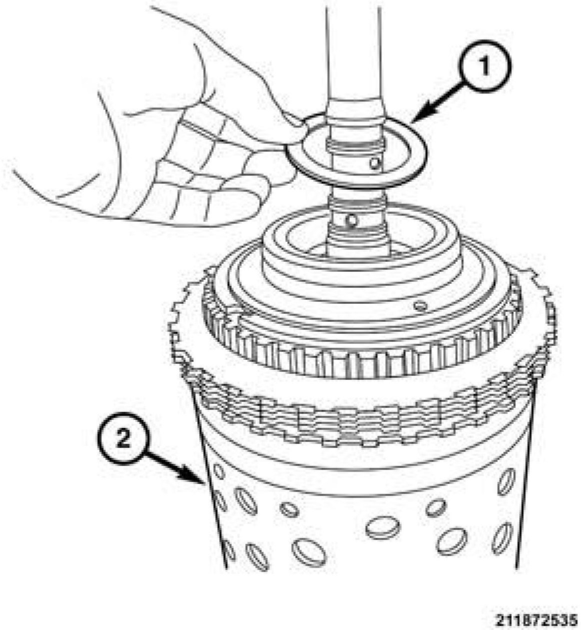


Fig. 180: Annulus Assembly & Shim
Courtesy of CHRYSLER GROUP, LLC

6. Install the correct selectable shim (1) onto the P1 annulus.

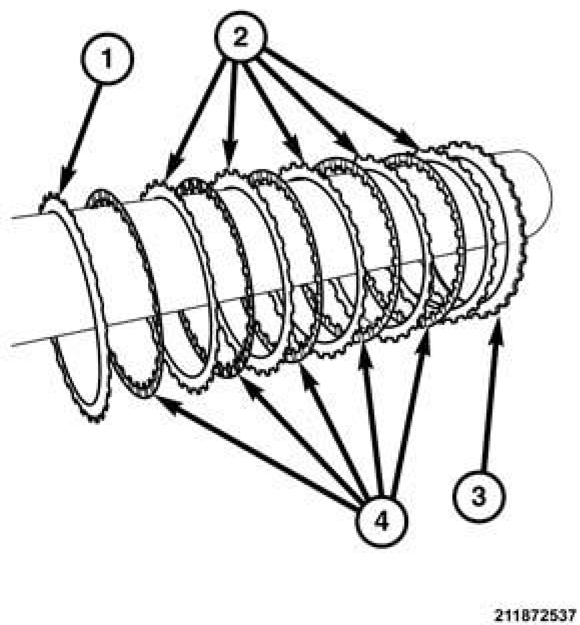


Fig. 181: Wave, Steel, Backing & Friction Plates
Courtesy of CHRYSLER GROUP, LLC

CLUTCH, C

DISASSEMBLY

CLUTCH C DISASSEMBLY

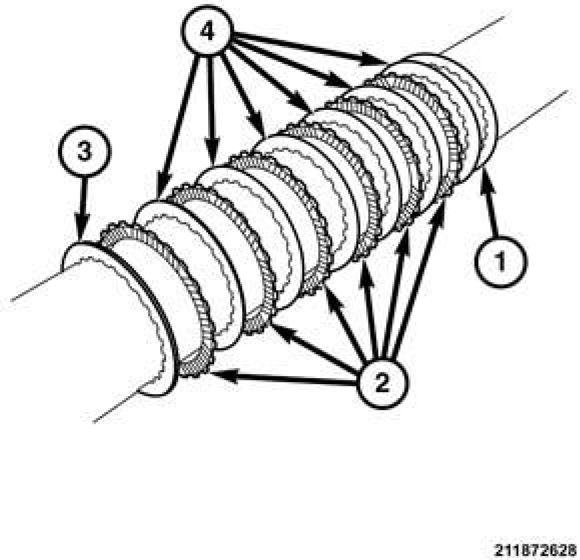


Fig. 182: Wave, Friction, Backing & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

1.	Wave plate
2.	Friction plate
3.	Backing plate
4.	Steel plate

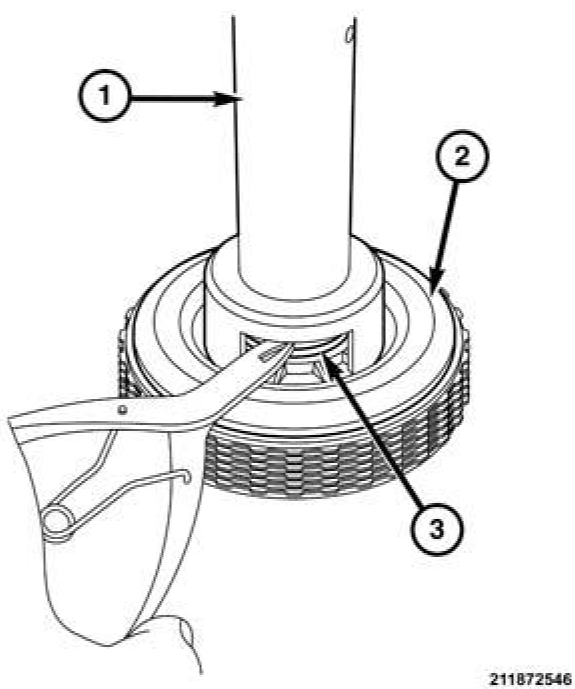


Fig. 183: Special Tool, C-Clutch & Snap Ring

Courtesy of CHRYSLER GROUP, LLC

1. Place the C-clutch (2) in a suitable press.
2. Using special tool 8680 (1) compress the C-clutch (2) enough to remove the snap ring (3).
3. Remove the snap ring (3).

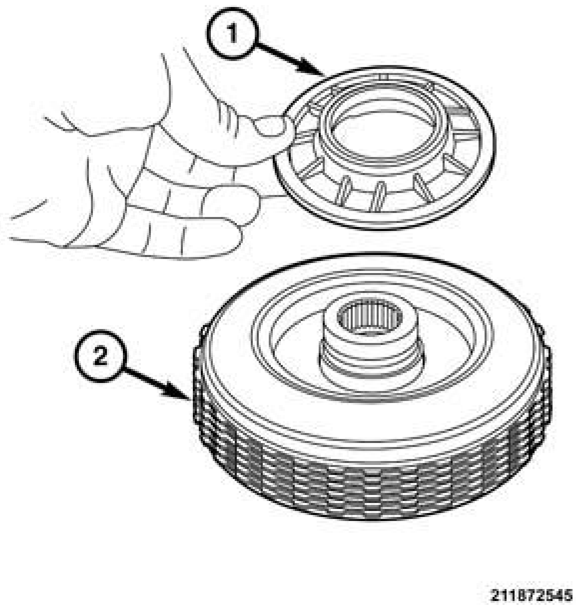


Fig. 184: C-Clutch & Retainer
Courtesy of CHRYSLER GROUP, LLC

4. Remove the C-clutch retainer (1).

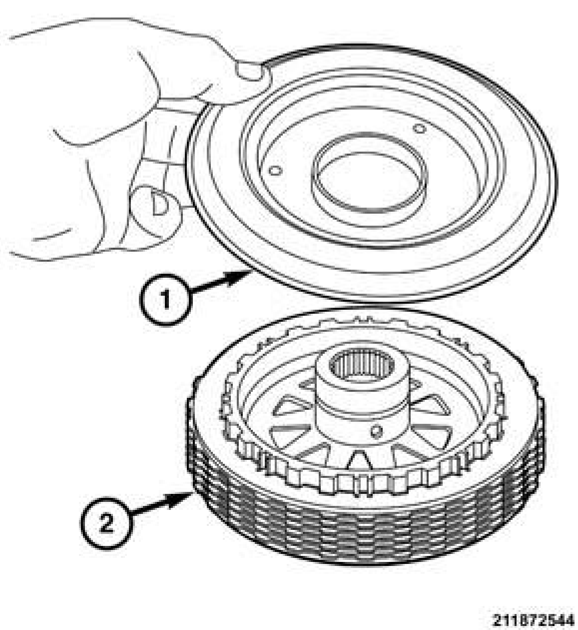


Fig. 185: Friction Plates & Retainer
Courtesy of CHRYSLER GROUP, LLC

5. Remove the C-clutch piston (1).

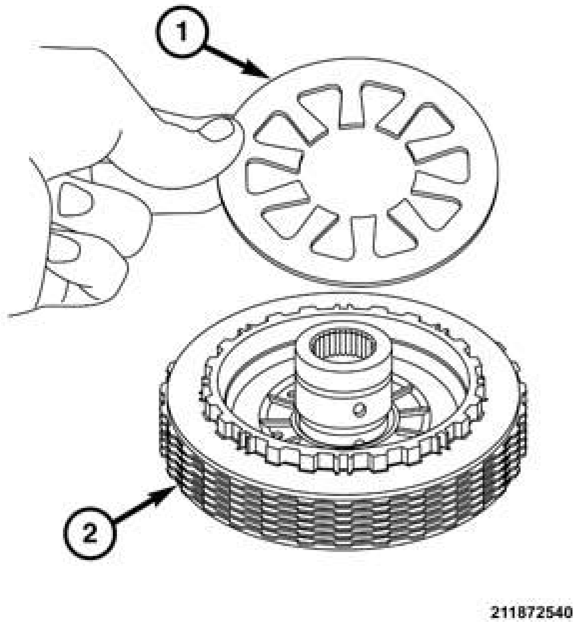


Fig. 186: Friction Plates & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

6. Remove the belleville spring (1).

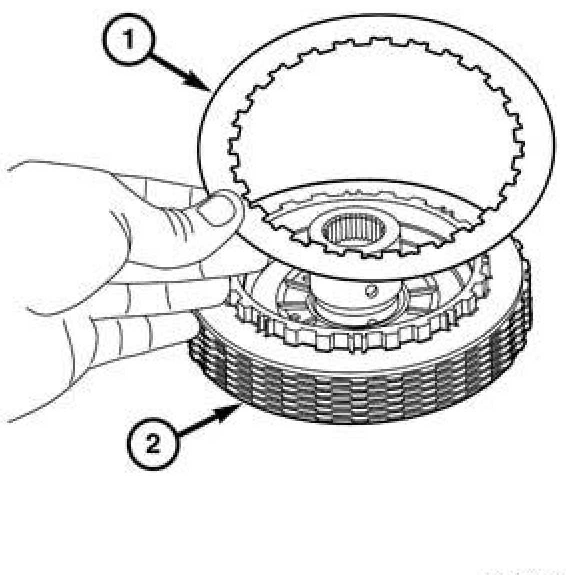


Fig. 187: Wave Plate
Courtesy of CHRYSLER GROUP, LLC

7. Remove the wave plate (1).

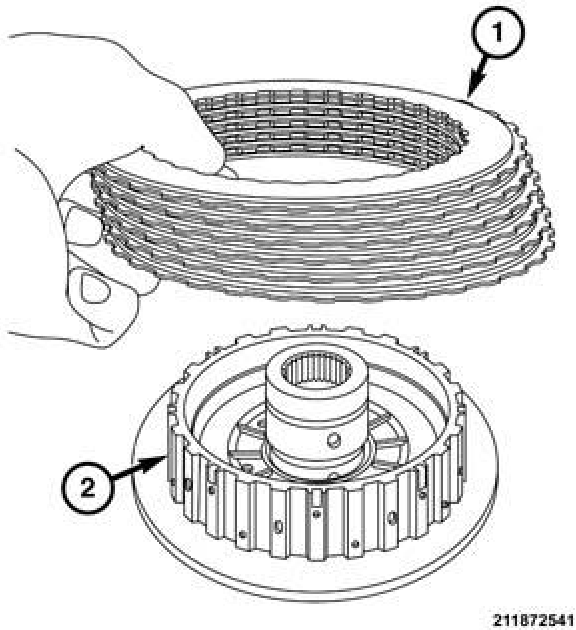


Fig. 188: Friction & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

8. Remove the 6 friction and steel plates (1).

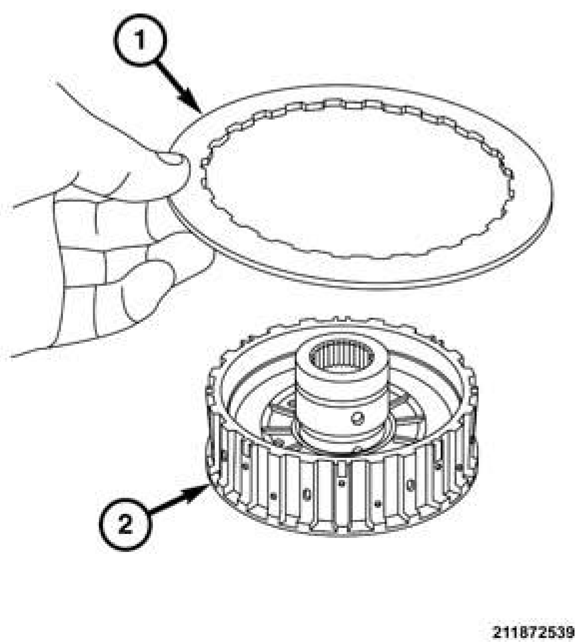
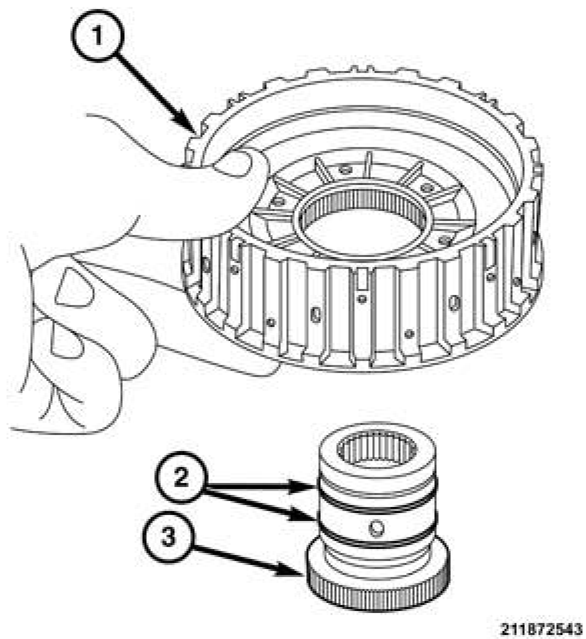


Fig. 189: Backing Plate
Courtesy of CHRYSLER GROUP, LLC

9. Remove the backing plate (1).

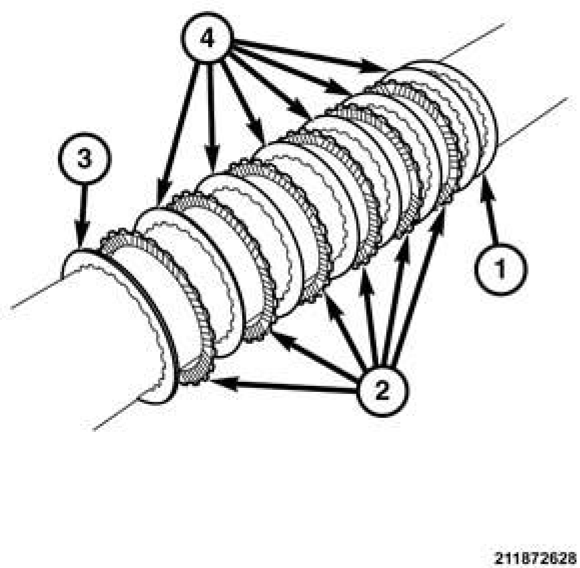


[Fig. 190: Clutch Hub, C-Clutch Shaft & O-Rings](#)
Courtesy of CHRYSLER GROUP, LLC

10. Separate the clutch shaft (3) from the clutch hub (1).
11. Remove two O-rings from the C-clutch shaft (2).

ASSEMBLY

CLUTCH C ASSEMBLY



[Fig. 191: Wave, Friction, Backing & Steel Plates](#)
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate	
2. Friction plate	
3. Backing plate	
4. Steel plate	

NOTE: **If clutch discs are being replaced, soak in 8HP trans fluid before assembly.**

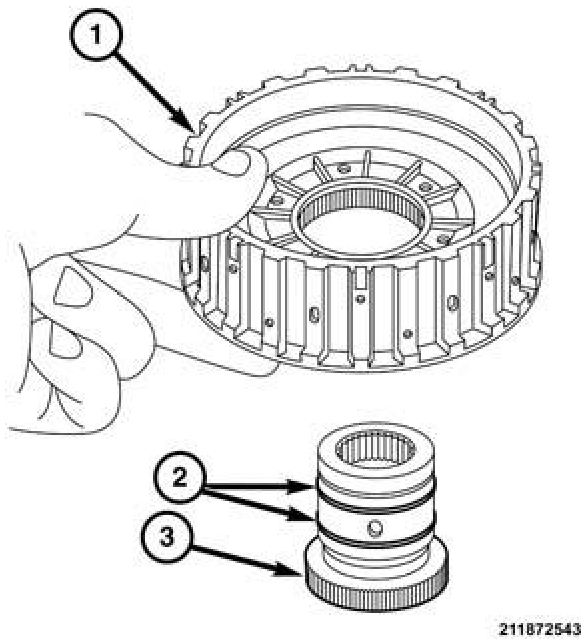


Fig. 192: Clutch Hub, C-Clutch Shaft & O-Rings
Courtesy of CHRYSLER GROUP, LLC

1. Replace the C-clutch seals (2).
2. Install C-clutch hub (1) onto the C-clutch shaft (3).

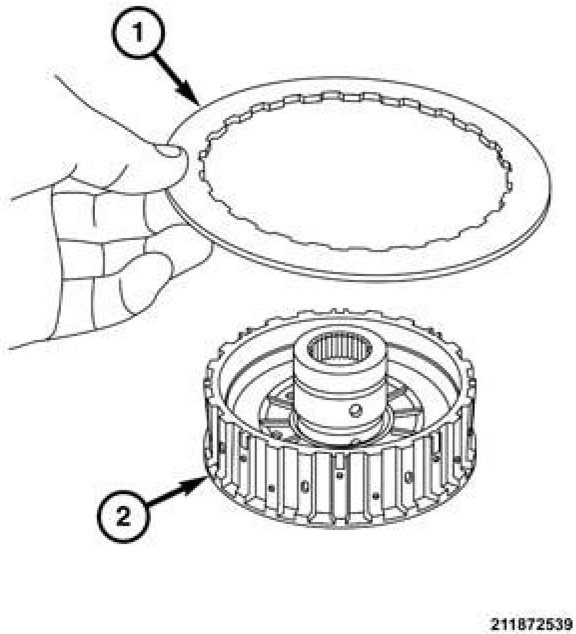


Fig. 193: Backing Plate
Courtesy of CHRYSLER GROUP, LLC

3. Install the backing plate (1).

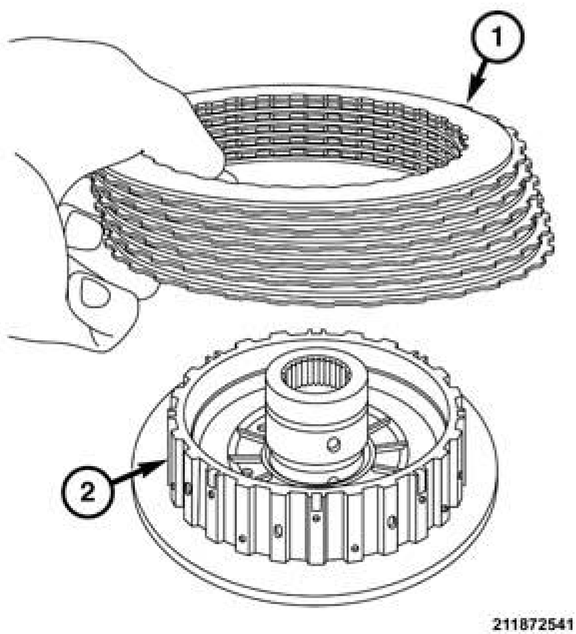


Fig. 194: Friction & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

4. Install 6 friction and steel clutch plates (1).

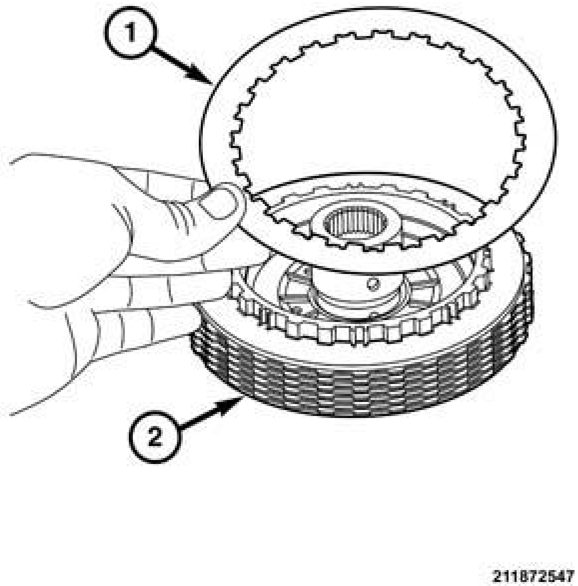


Fig. 195: Wave Plate
Courtesy of CHRYSLER GROUP, LLC

5. Install the wave plate (1).

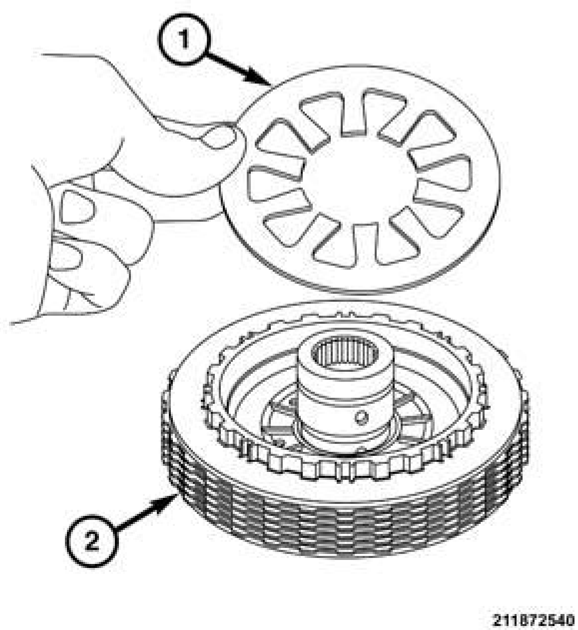


Fig. 196: Friction Plates & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

6. Install the belleville spring (1).

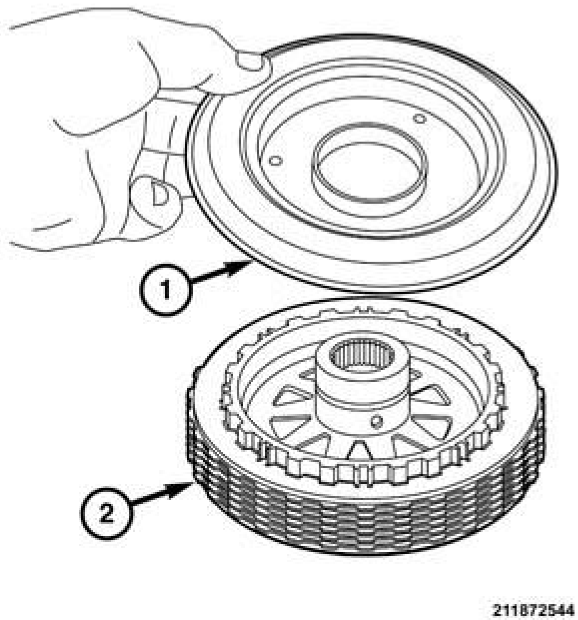


Fig. 197: Friction Plates & Retainer
Courtesy of CHRYSLER GROUP, LLC

7. Install the C-clutch piston (1).

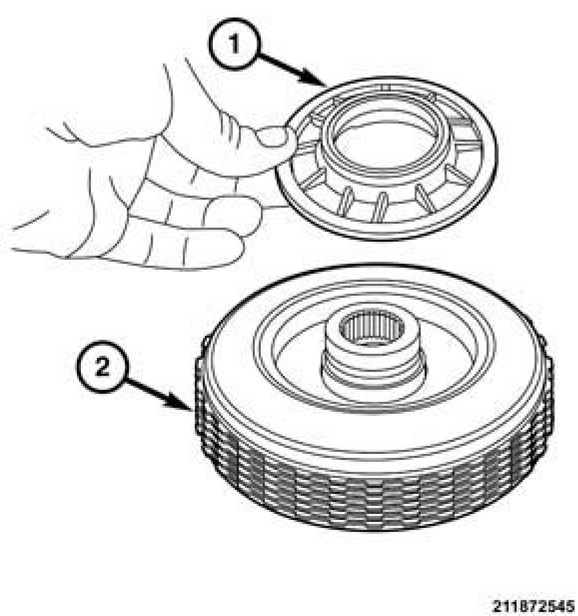


Fig. 198: C-Clutch & Retainer
Courtesy of CHRYSLER GROUP, LLC

8. Install the C-clutch retainer (1).

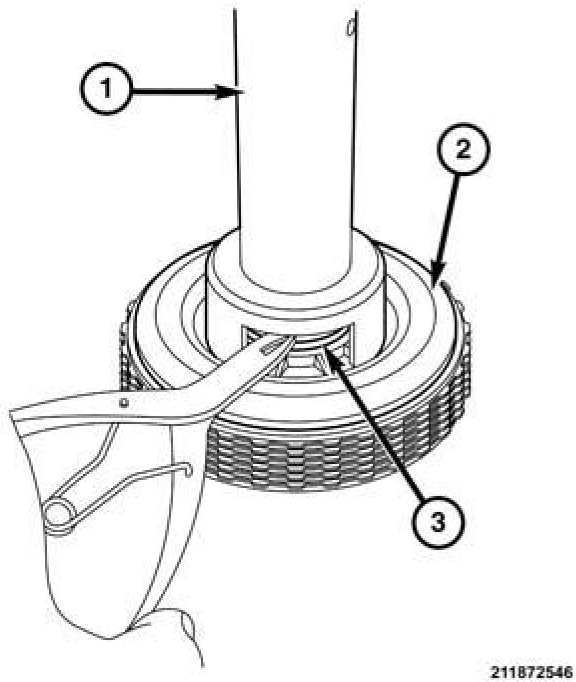


Fig. 199: Special Tool, C-Clutch & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

9. Place the C-clutch (2) in a suitable press.
10. Using special tool 8680 (1) compress the clutch enough to install the snap ring (3).
11. Install the snap ring (3).
12. Using (special tool #8901A, Pressing Tool) and (special tool #10429, Gauge, Force) measure the C-clutch clearance. Refer to **CLUTCH C AND E SELECTABLE BACKING PLATES TABLE** for speccifications.

CLUTCH, D

DISASSEMBLY

CLUTCH D DISASSEMBLY

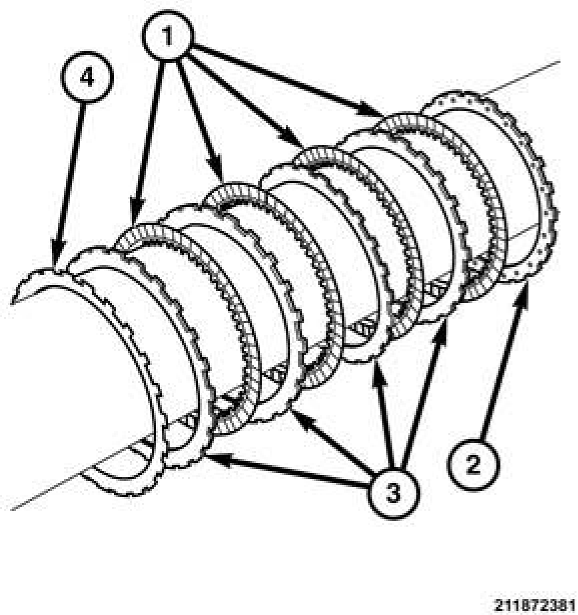


Fig. 200: Friction, Backing & Wave Plates
Courtesy of CHRYSLER GROUP, LLC

1. Friction plate
2. Backing plate
3. Backing plate
4. Wave plate

1. Place the D-clutch (3) in a suitable arbor press (1).
2. Using (special tool #8901A, Pressing Tool) (4) to compress the oil baffle (2) enough the clear the locking tabs.

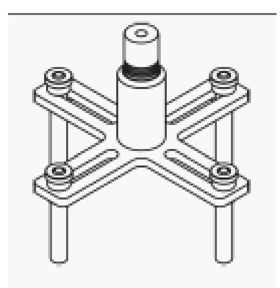


Fig. 201: Cross Bar Tool
Courtesy of CHRYSLER GROUP, LLC

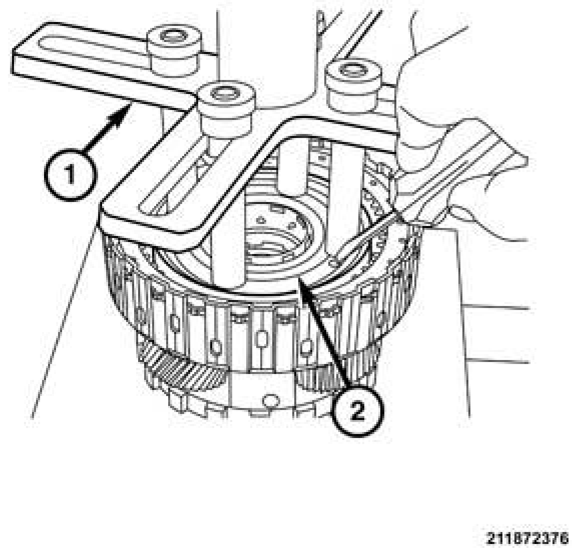


Fig. 202: Oil Baffle & Tabs
Courtesy of CHRYSLER GROUP, LLC

3. Rotate the oil baffle (2) slightly until the tabs on the hub are clear of the baffle.

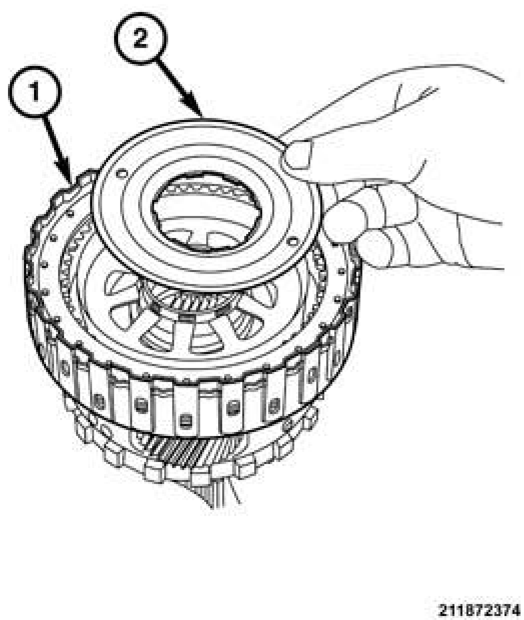


Fig. 203: Hub & Oil Baffle
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil baffle (2).

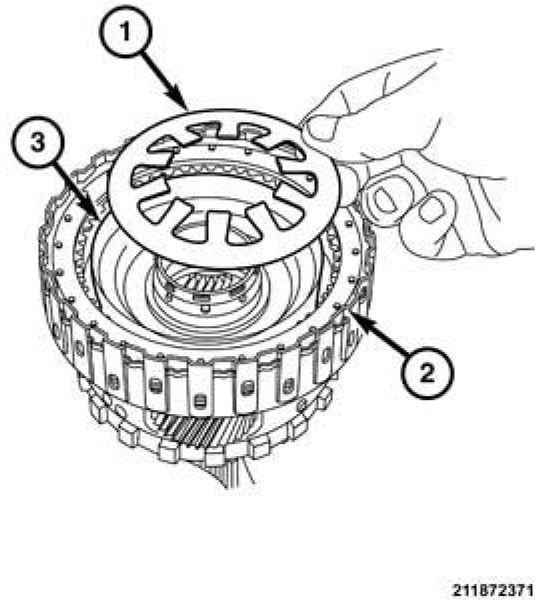


Fig. 204: Hub, Oil Baffle & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

5. Remove the belleville spring (1).

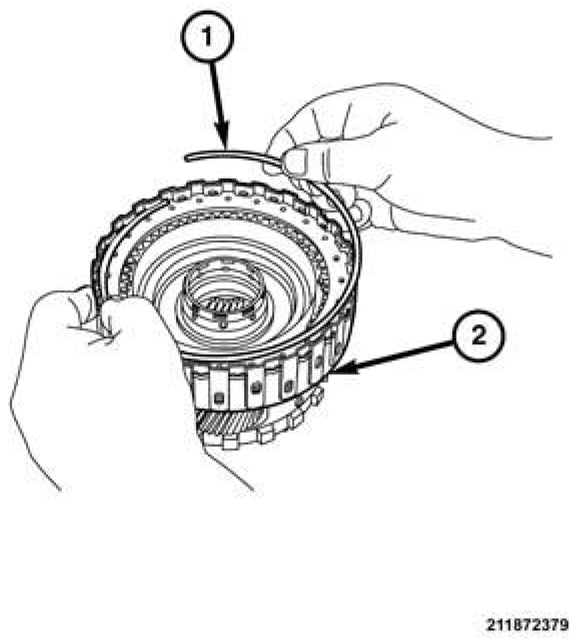


Fig. 205: Oil Baffle & Spring
Courtesy of CHRYSLER GROUP, LLC

6. Remove the selective snap ring (1).

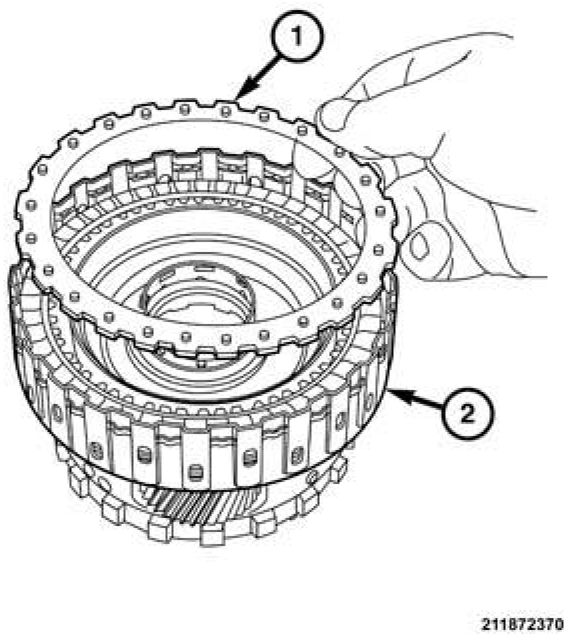


Fig. 206: Oil Baffle & D-Clutch Backing Plate
Courtesy of CHRYSLER GROUP, LLC

7. Remove the D-Clutch backing plate (1).

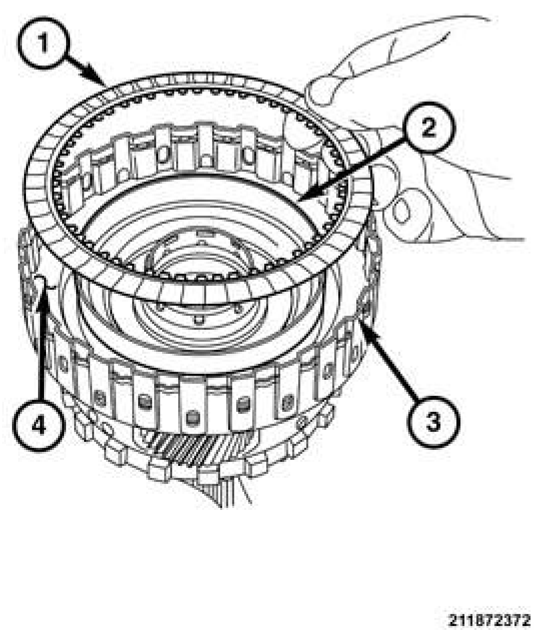
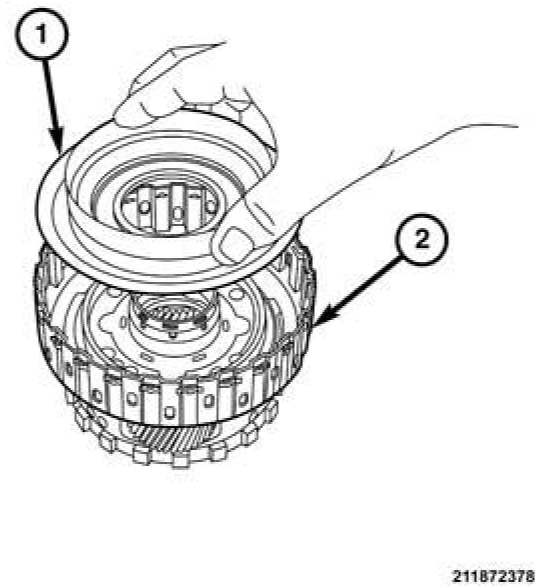


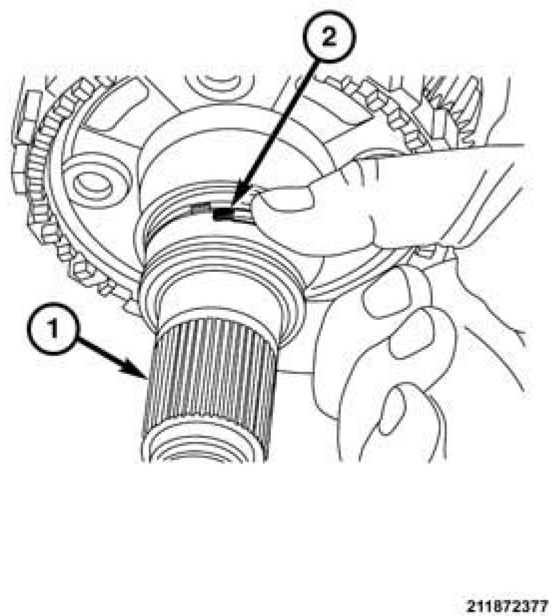
Fig. 207: Oil Baffle, D-Clutch, Friction & Steels
Courtesy of CHRYSLER GROUP, LLC

8. Remove the D-Clutch (3) frictions and steels (1), paying attention to the orientation.



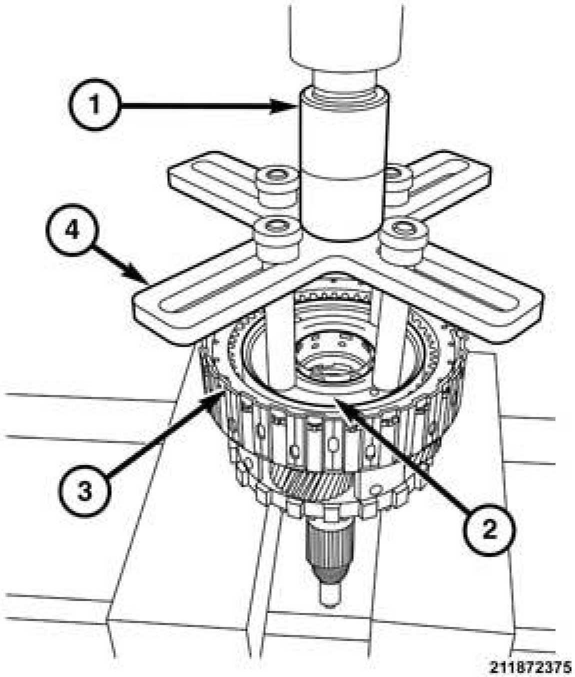
[Fig. 208: D-Clutch & Piston](#)
Courtesy of CHRYSLER GROUP, LLC

9. Remove the D-Clutch (2) piston (1).



[Fig. 209: D-Clutch Carrier Seal Rings](#)
Courtesy of CHRYSLER GROUP, LLC

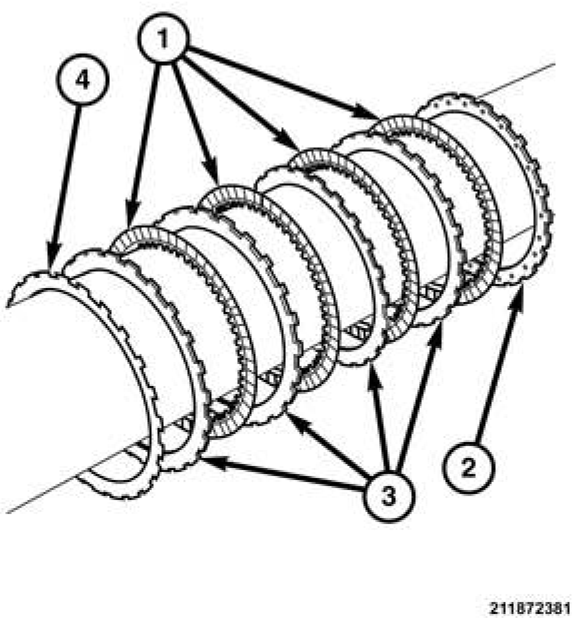
10. Remove the D-Clutch carrier seal rings (2).



[Fig. 210: D-Clutch & Arbor Press](#)
Courtesy of CHRYSLER GROUP, LLC

ASSEMBLY

CLUTCH D ASSEMBLY



[Fig. 211: Friction, Backing & Wave Plates](#)
Courtesy of CHRYSLER GROUP, LLC

1. Friction plate
2. Backing plate

3. Steel plate	
4. Wave plate	

NOTE: **If clutch discs are being replaced, soak them in 8HP trans fluid before assembly.**

1. Install D-Clutch carrier seal rings (2).
2. Place the D-Clutch in a suitable arbor press.

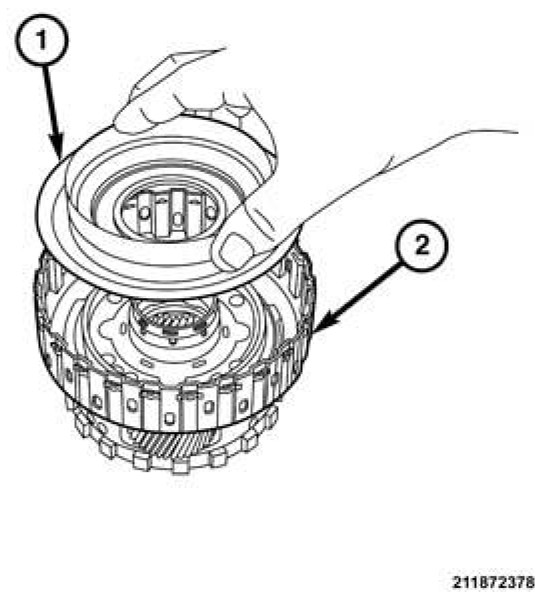
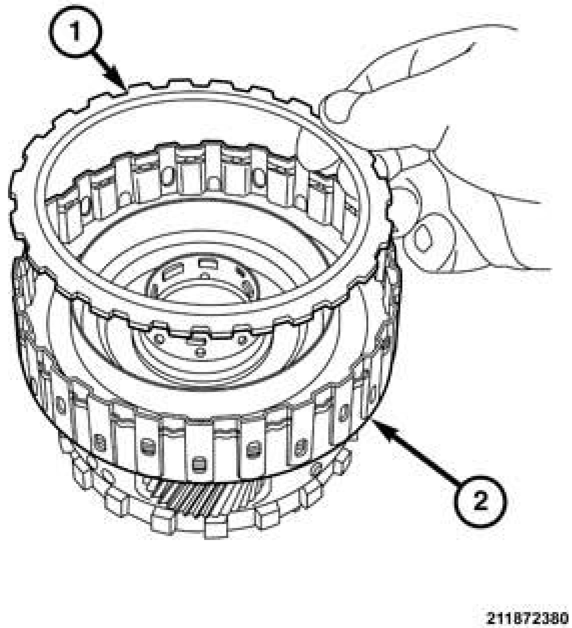


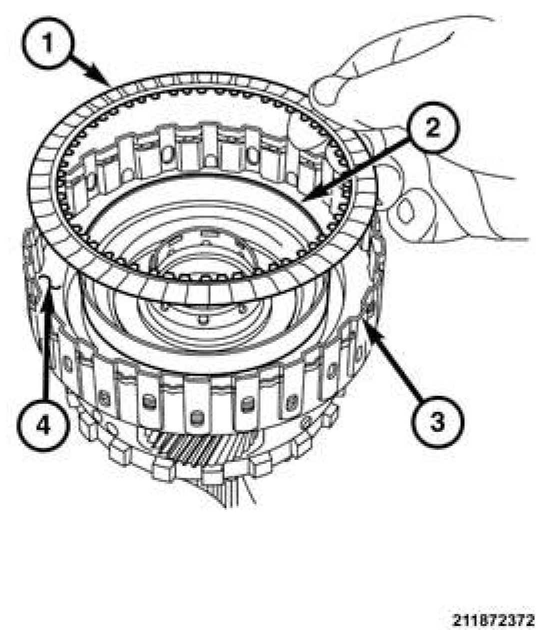
Fig. 212: D-Clutch & Piston
Courtesy of CHRYSLER GROUP, LLC

3. Coat the O-rings with 8HP fluid on the D-Clutch (2) piston (1) and install the piston (1) onto the carrier.



[Fig. 213: D-Clutch & Wave Plate](#)
Courtesy of CHRYSLER GROUP, LLC

4. Install the wave plate (1) into the carrier first.



[Fig. 214: Oil Baffle, D-Clutch, Friction & Steels](#)
Courtesy of CHRYSLER GROUP, LLC

5. Install the frictions and steels (1) into the carrier (3).

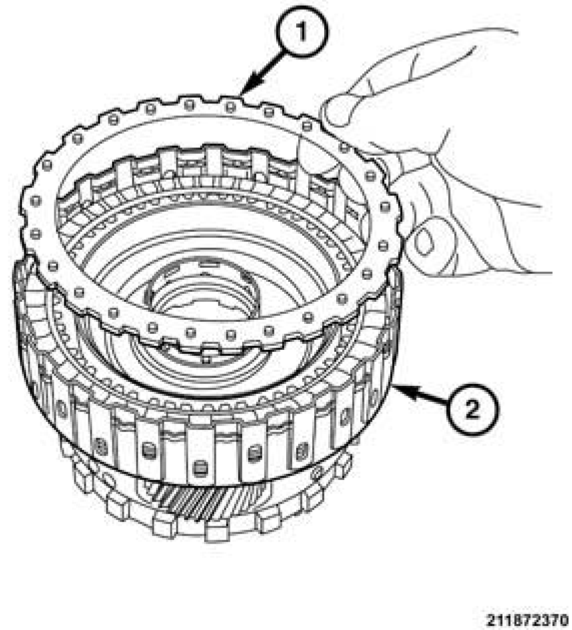


Fig. 215: Oil Baffle & D-Clutch Backing Plate
Courtesy of CHRYSLER GROUP, LLC

6. Install the backing plate (1) last onto the carrier.

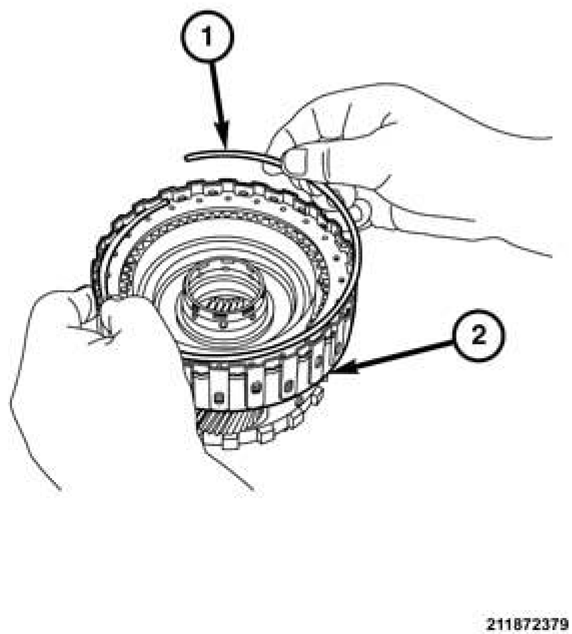


Fig. 216: Oil Baffle & Spring
Courtesy of CHRYSLER GROUP, LLC

7. Install the proper selective snap ring (1) onto the D-Clutch carrier (2).

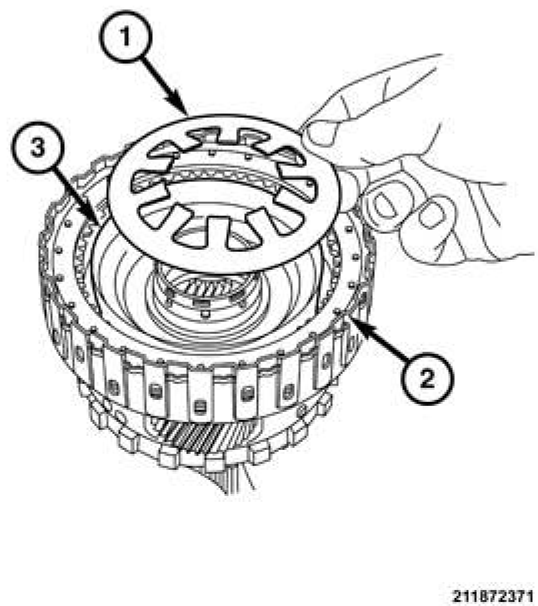


Fig. 217: Hub, Oil Baffle & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

8. Install the belleville spring (1).

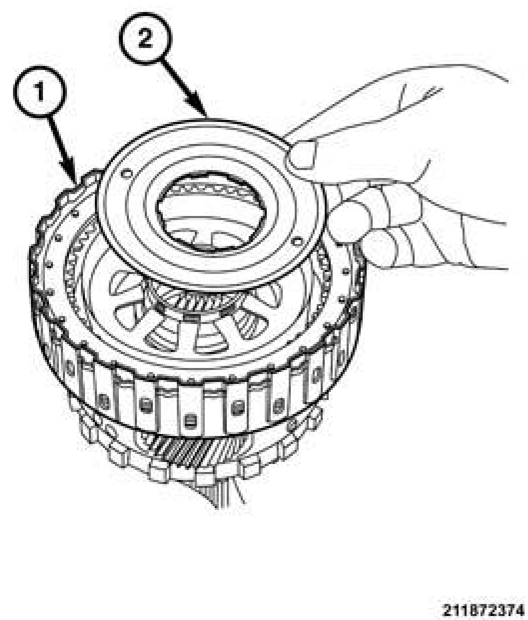


Fig. 218: Hub & Oil Baffle
Courtesy of CHRYSLER GROUP, LLC

9. Place the oil baffle (2) onto the hub of the D-clutch carrier (1).

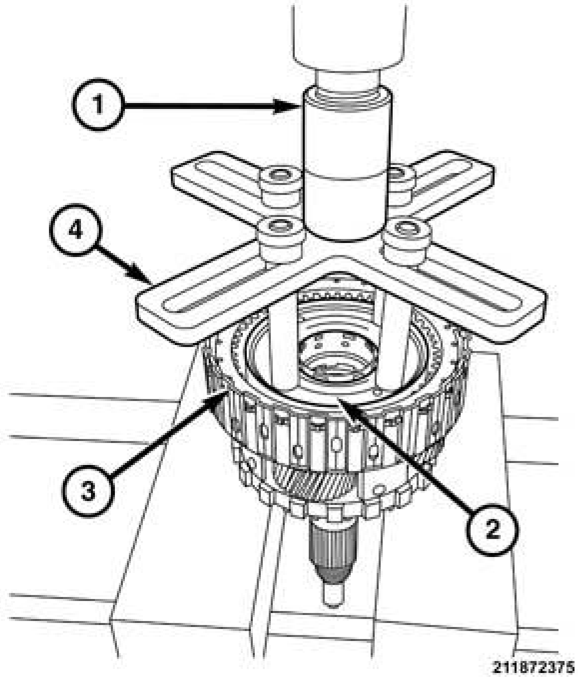


Fig. 219: D-Clutch & Arbor Press
Courtesy of CHRYSLER GROUP, LLC

10. Line up the locking tabs on the D-Clutch hub and the oil baffle (2).

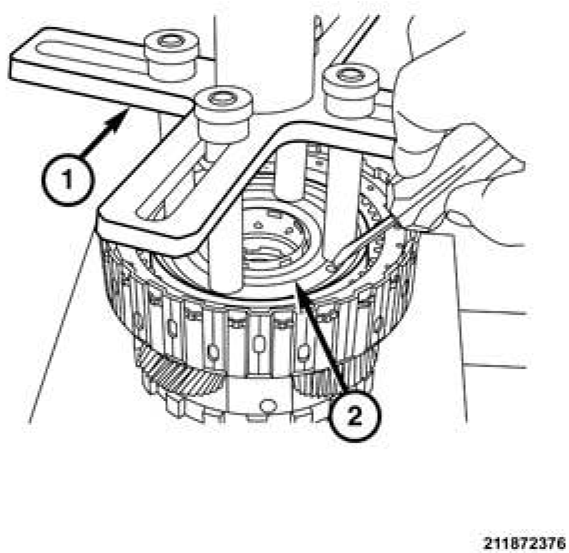


Fig. 220: Oil Baffle & Tabs
Courtesy of CHRYSLER GROUP, LLC

11. Compress the oil baffle (2) enough to clear the lock tabs, and rotate the baffle to the locked position.
12. Release the arbor press.

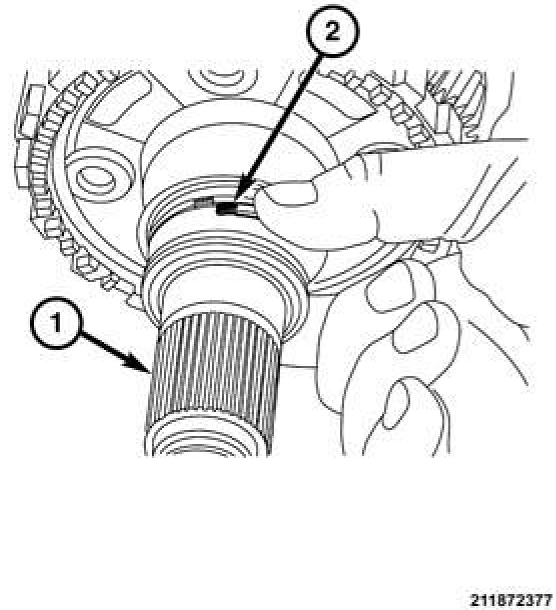


Fig. 221: D-Clutch Carrier Seal Rings
Courtesy of CHRYSLER GROUP, LLC

CLUTCH, E

DISASSEMBLY

CLUTCH E DISASSEMBLY

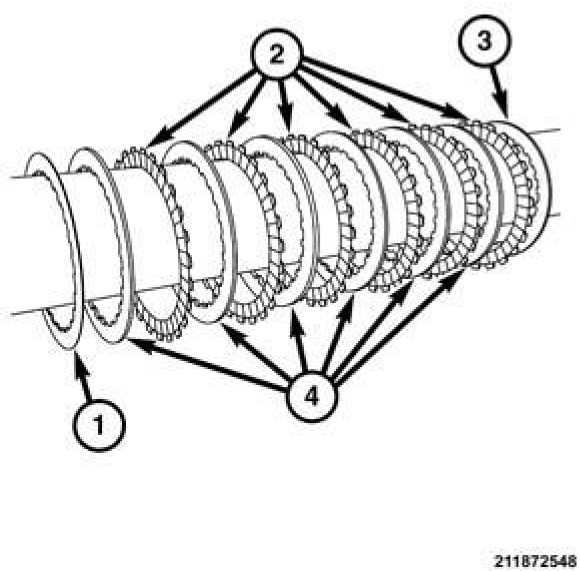


Fig. 222: Wave, Friction, Backing & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate	
2. Friction plate	
3. Backing plate	
4. Steel plate	

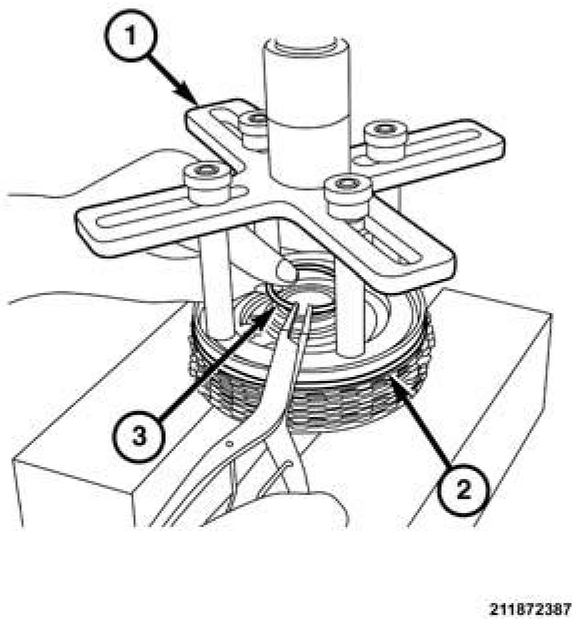


Fig. 223: E-Clutch & Pressing Tool
Courtesy of CHRYSLER GROUP, LLC

1. Place E-clutch (2) in a suitable press.
2. Using Pressing Tool 8901A (special tool #8901A, Pressing Tool) (1) compress the E-clutch piston enough to remove the snap ring (3).

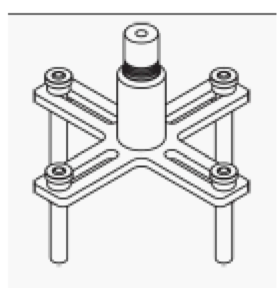


Fig. 224: Cross Bar Tool
Courtesy of CHRYSLER GROUP, LLC

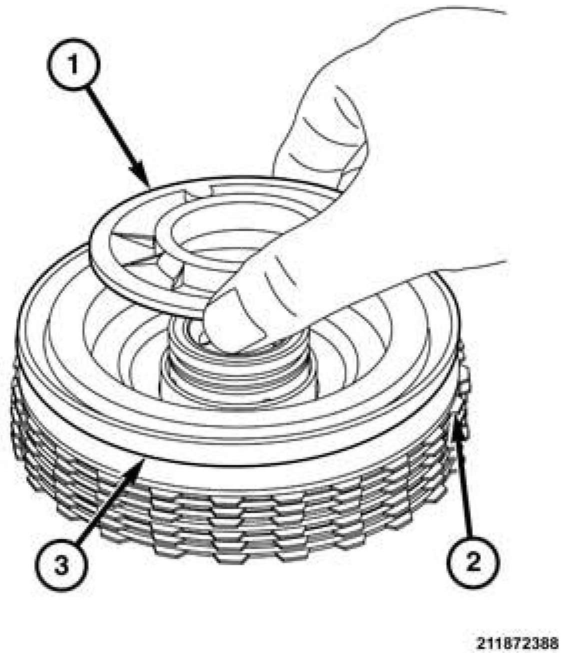


Fig. 225: E-Clutch Piston Support
Courtesy of CHRYSLER GROUP, LLC

3. Remove the E-clutch piston support (1).

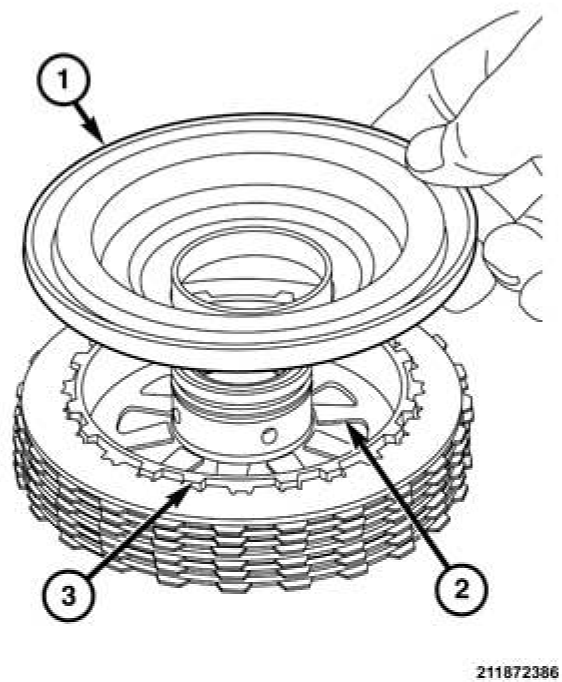


Fig. 226: E-Clutch Piston Support
Courtesy of CHRYSLER GROUP, LLC

4. Remove the E-clutch piston (1).

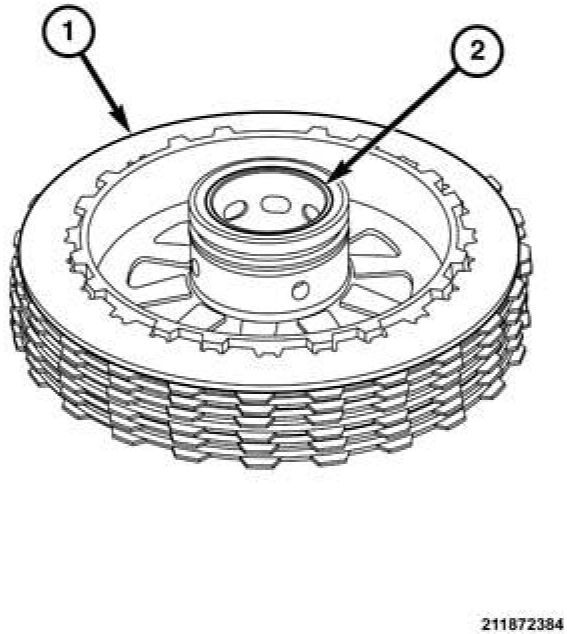


Fig. 227: E-Clutch Wave Washer
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Pay attention to the orientation of the plates.**

5. Remove the wave washer (1), frictions and steels.

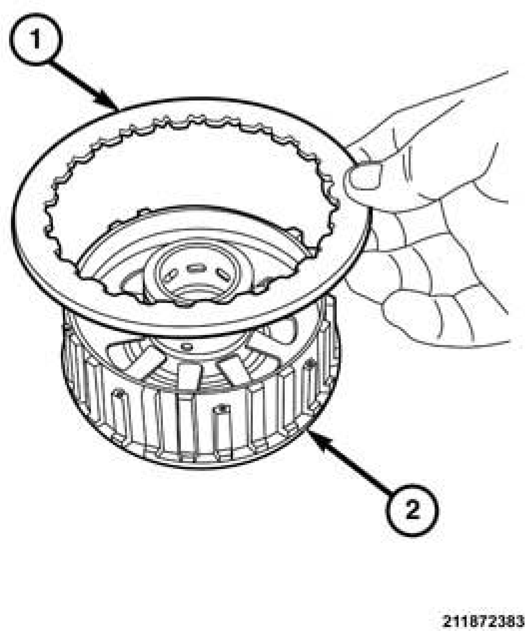


Fig. 228: E-Clutch Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

6. Remove the thrust plate (1) last.

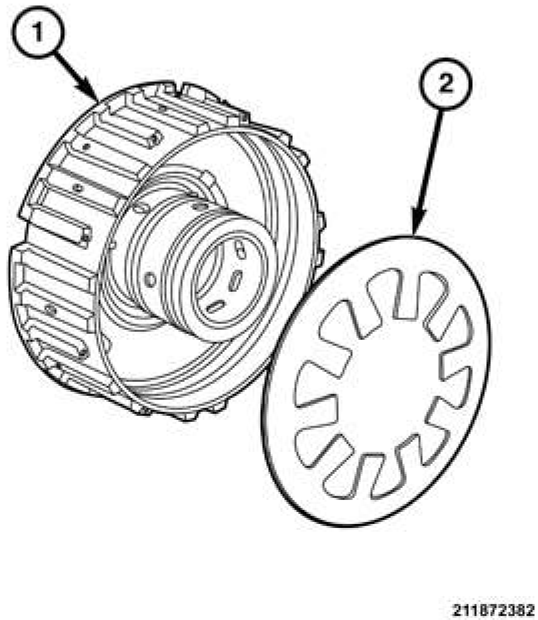


Fig. 229: Belleville Spring & E-Clutch Hub
Courtesy of CHRYSLER GROUP, LLC

7. Remove the belleville spring (2) from the E-clutch hub (1).

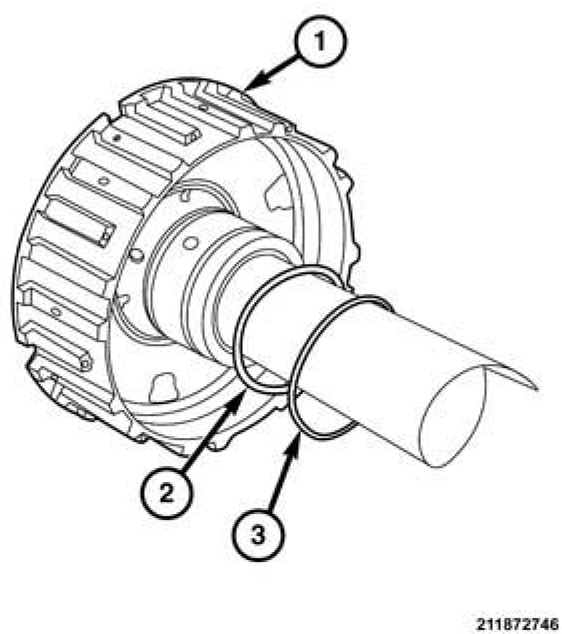


Fig. 230: E-Clutch, Seal & O-Ring
Courtesy of CHRYSLER GROUP, LLC

8. Remove the E-clutch (1) seal (2) and O-ring (3).

ASSEMBLY

CLUTCH E ASSEMBLY

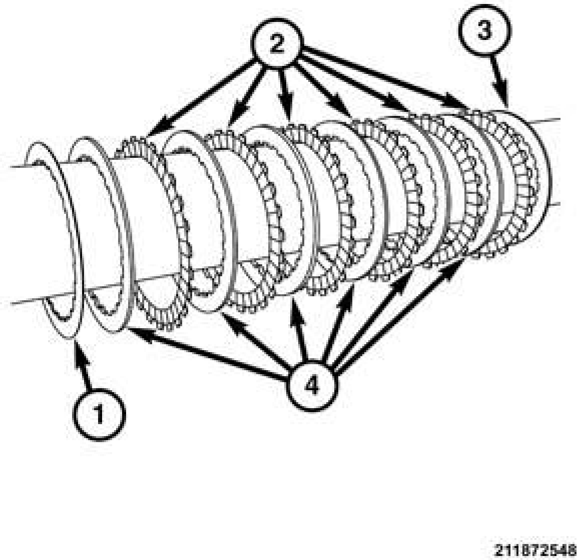


Fig. 231: Wave, Friction, Backing & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate
2. Friction plate
3. Backing plate
4. Steel plate

NOTE: **If clutch discs are being replaced, soak in 8HP trans fluid before assembly.**

1. Install the E-clutch (1) seal (2) and O-ring (3).

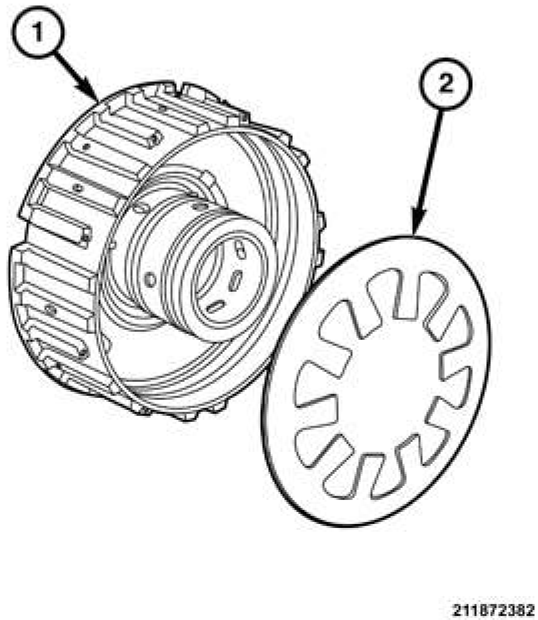


Fig. 232: Belleville Spring & E-Clutch Hub
Courtesy of CHRYSLER GROUP, LLC

2. Install the belleville (2) spring into the E-clutch hub (1).

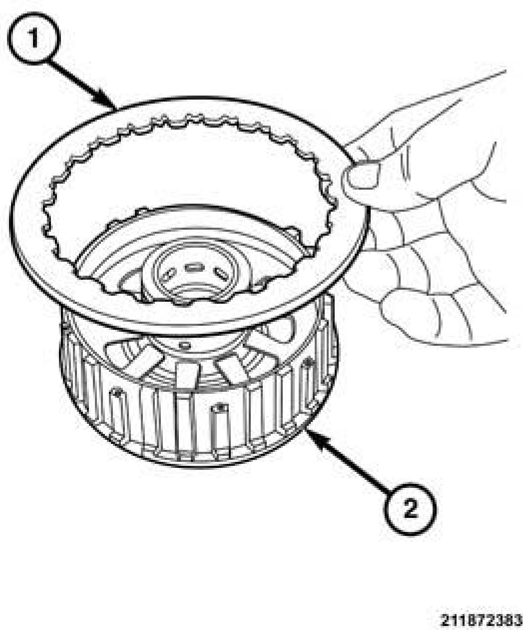
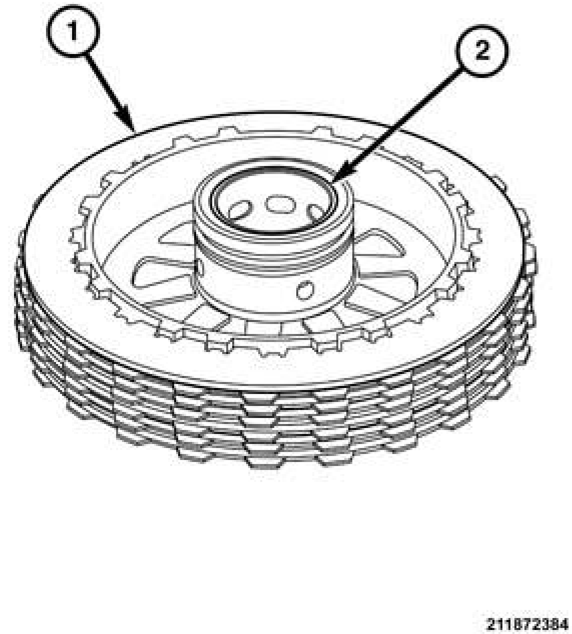


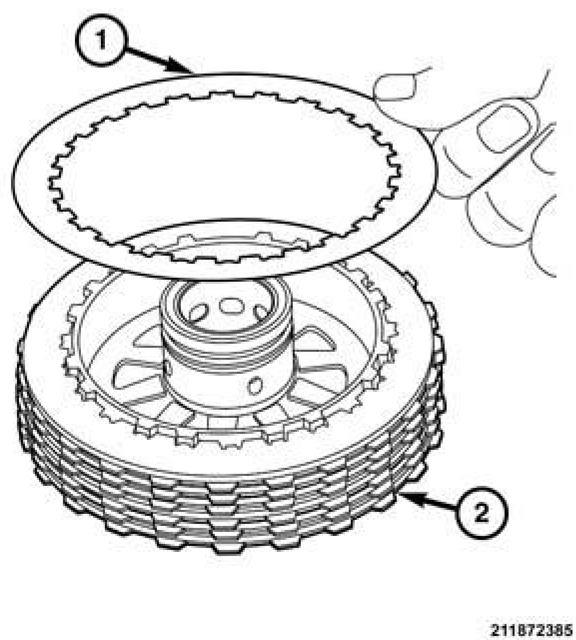
Fig. 233: E-Clutch Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

3. Install the clutch pack thrust plate (1).



[Fig. 234: E-Clutch Wave Washer](#)
Courtesy of CHRYSLER GROUP, LLC

4. Install the clutch pack frictions and steels (1).



[Fig. 235: E-Clutch Wave Washer](#)
Courtesy of CHRYSLER GROUP, LLC

5. Install the wave washer (1) last.

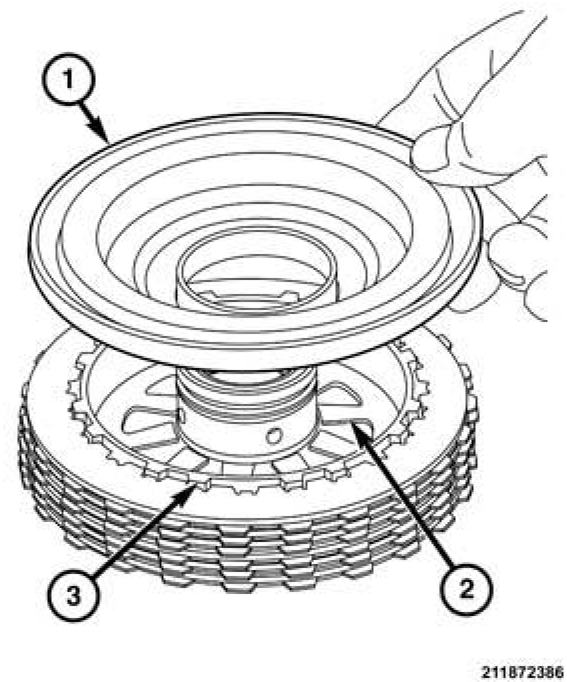


Fig. 236: E-Clutch Piston Support
Courtesy of CHRYSLER GROUP, LLC

6. Install the E-clutch piston (1) onto the hub.

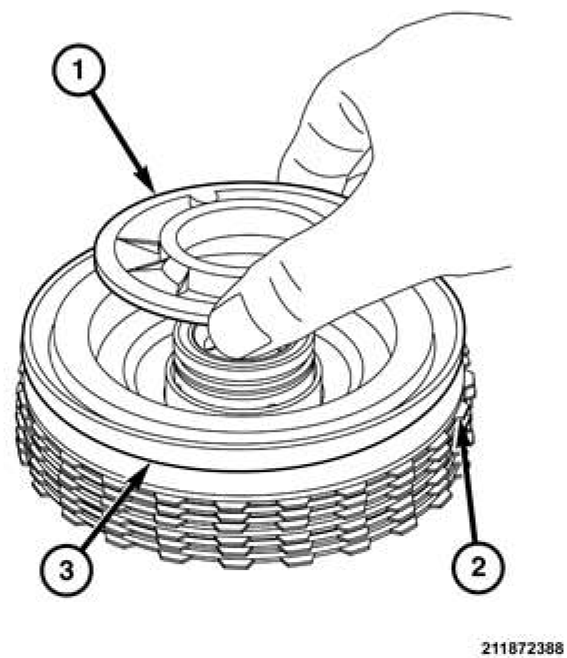
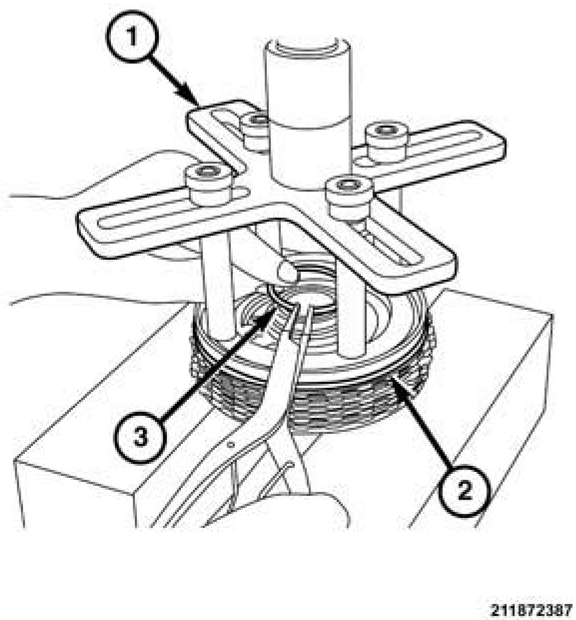


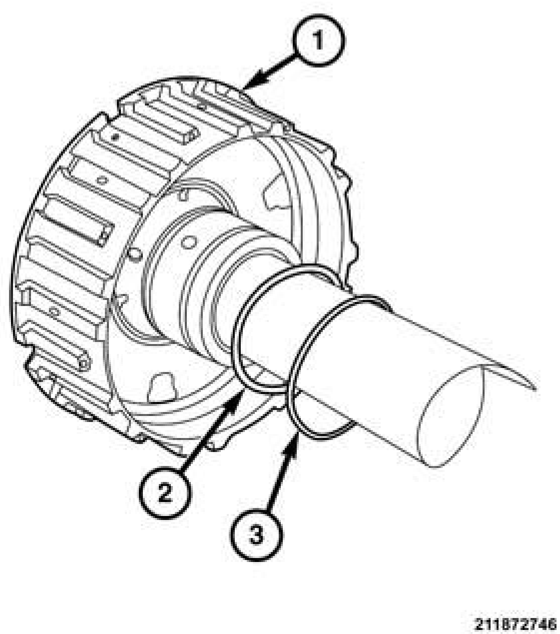
Fig. 237: E-Clutch Piston Support
Courtesy of CHRYSLER GROUP, LLC

7. Install the E-clutch piston support (1).



[Fig. 238: E-Clutch & Pressing Tool](#)
Courtesy of CHRYSLER GROUP, LLC

8. Place the E-clutch in a suitable arbor press.
9. Using Pressing Tool 8901A (special tool #8901A, Pressing Tool) compress the E-clutch enough to install the snap ring.



[Fig. 239: E-Clutch, Seal & O-Ring](#)
Courtesy of CHRYSLER GROUP, LLC

FLUID AND FILTER

DESCRIPTION

DESCRIPTION

FILTER SERVICE

The 8HP90 has a conventional fluid sump design and the filter is serviced separately from the oil pan. The oil pan gasket is reusable providing it is not damaged during removal. Oil dye is not required to find leaks in the 8HP transmission. The oil dye can cause shift quality issues and is not recommended. The fluid has illuminance that is visible under a black light.

STANDARD PROCEDURE

STANDARD PROCEDURE - CHECK OIL LEVEL

To properly check and fill the transmission, perform the following procedure:

WARNING: **There is a risk of accident from vehicle moving when the engine is running. Secure vehicle to prevent it from moving. There is a risk of injury from contusions and burns if you insert your hands into the engine when it is running. Do not touch hot or rotating parts. Wear properly fitted work clothes.**

CAUTION: **A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .**

NOTE: **Oil dye is not required to find leaks in the 8HP transmission. The oil dye can cause shift quality issues and is not recommended. The 8HP fluid has illuminance that is visible under a black light.**

1. Raise and support the vehicle **on a level hoist** . Refer to **HOISTING, STANDARD PROCEDURE** .
2. Start the engine. The engine must continue to run for the entire test.
3. Using a scan tool or the vehicle information center, verify that the transmission fluid temperature is below 30Ā°C (86Ā°F).
4. Remove the transmission fill plug from the right rear of the transmission case.
5. Add transmission fluid until it trickles from the fill opening.
6. Install the transmission fill plug and tighten to the proper **SPECIFICATIONS** .
7. Lower the vehicle for access to inside of the vehicle, leaving the tires at least 8 inches off the ground.
8. With the brakes applied, place the transmission in Reverse and hold for 5 seconds.
9. Place the transmission in Drive and hold for 5 seconds.
10. Release the brakes, slowly accelerate to 2nd gear and hold for 5 seconds.
11. Apply the brakes and place the transmission in Neutral.
12. Raise the engine speed to 2000 RPM for 5 seconds.
13. Return the engine to idle and place the transmission in Park.

NOTE: **A full transmission will have fluid at the fill hole with the transmission between 30Ā°C (86Ā°F) and 50Ā°C (122Ā°F). Do not over fill.**

14. Remove the transmission fill plug and allow excess fluid to drain from fill hole or add fluid as necessary.
15. Install the transmission fill plug and tighten to the proper **SPECIFICATIONS** .
16. Using a scan tool, clear any DTCs.

STANDARD PROCEDURE - TRANSMISSION FILL AFTER SERVICE

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see VEHICLE QUICK REFERENCE .

To properly fill the transmission after an in vehicle service or overhaul, perform the following procedure:

NOTE: If the transmission cooler was replaced, add an additional 0.7L (0.72 qts) of transmission fluid.

1. **If the transmission was overhauled** , prior to installing in the vehicle, tip the transmission on it side, remove the oil fill plug on the right rear side of the case and install 9L (9.5 qts) of transmission fluid. Install the fill plug. After installing the transmission, perform the CHECK OIL LEVEL procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
2. **If an in vehicle service was performed** , raise and support the vehicle **on a level hoist** , refer to **HOISTING, STANDARD PROCEDURE** . Refer to **FLUID AND FILTER, STANDARD PROCEDURE** and perform the CHECK OIL LEVEL procedure.

STANDARD PROCEDURE - FILTER SERVICE

REMOVAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

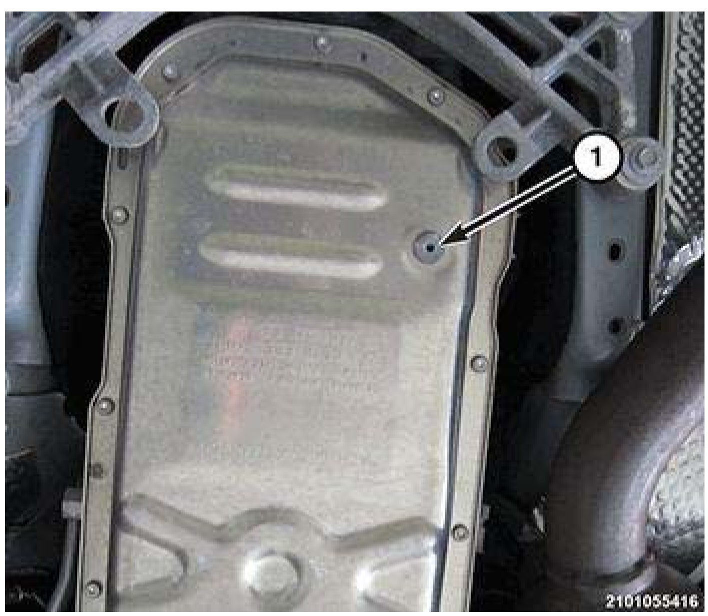


Fig. 240: Transmission Oil Pan Plug
Courtesy of CHRYSLER GROUP, LLC

2. Remove the transmission oil pan plug (1) and drain the transmission fluid.

NOTE: **Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.**

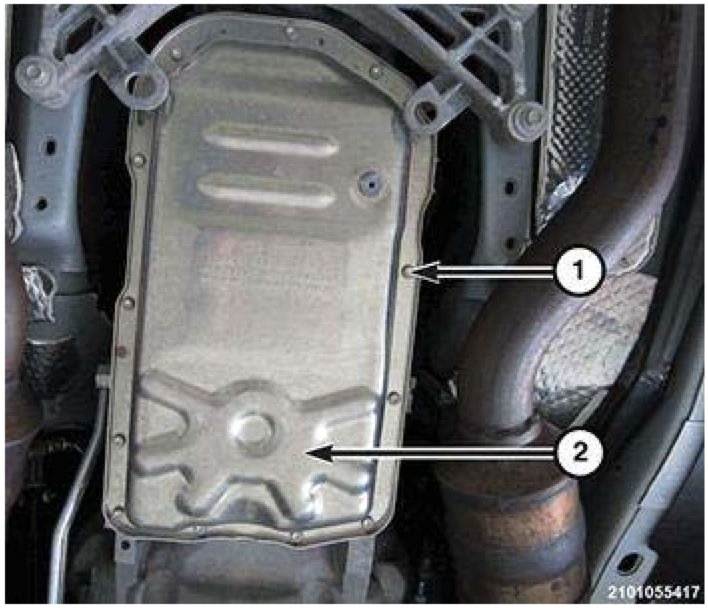


Fig. 241: Transmission Oil Pan & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the 13 oil pan retaining bolts (2).
4. Remove the oil pan (1) and gasket.

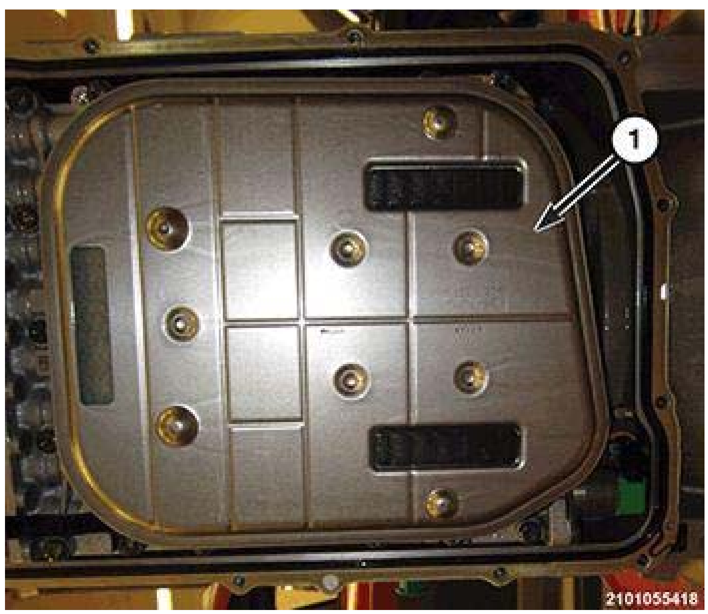
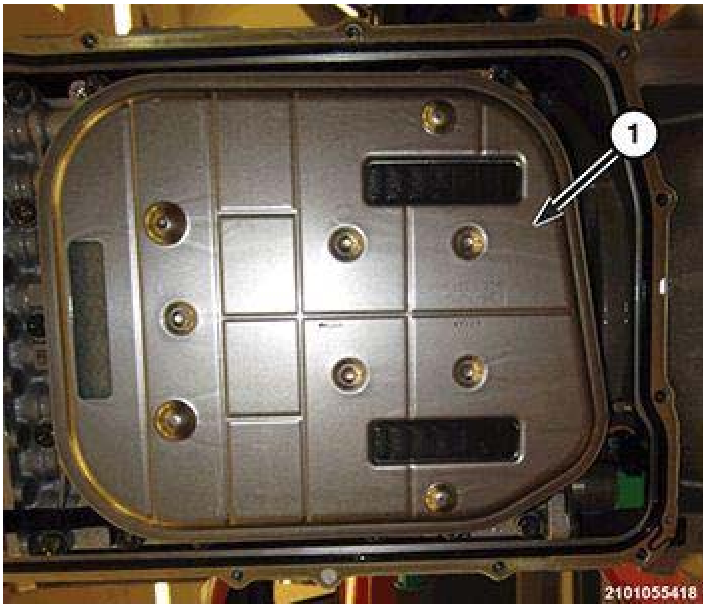


Fig. 242: Transmission Oil Filter
Courtesy of CHRYSLER GROUP, LLC

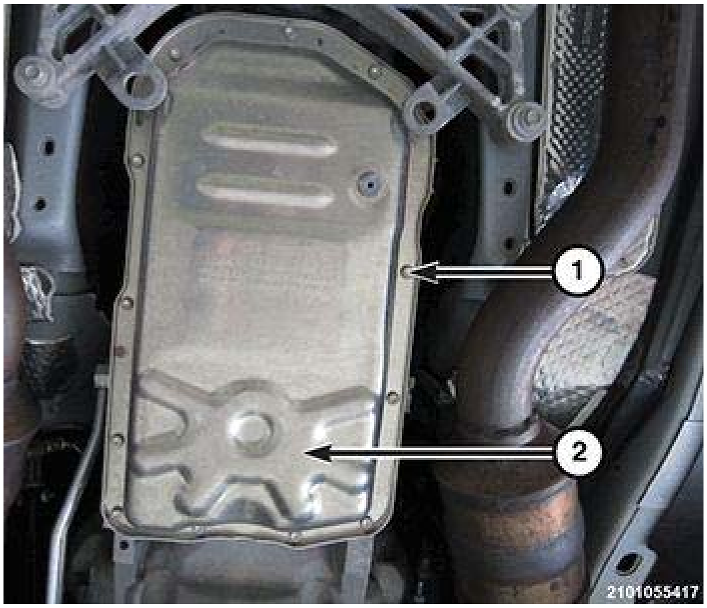
5. Remove the transmission oil filter (1).

INSTALLATION



[Fig. 243: Transmission Oil Filter]
Courtesy of CHRYSLER GROUP, LLC

1. Install the **NEW** transmission oil filter (1).



[Fig. 244: Transmission Oil Pan & Bolts]
Courtesy of CHRYSLER GROUP, LLC

2. Install the 13 oil pan retaining bolts and tighten to 10 N.m (89 in. lbs.) in a crisscross pattern.

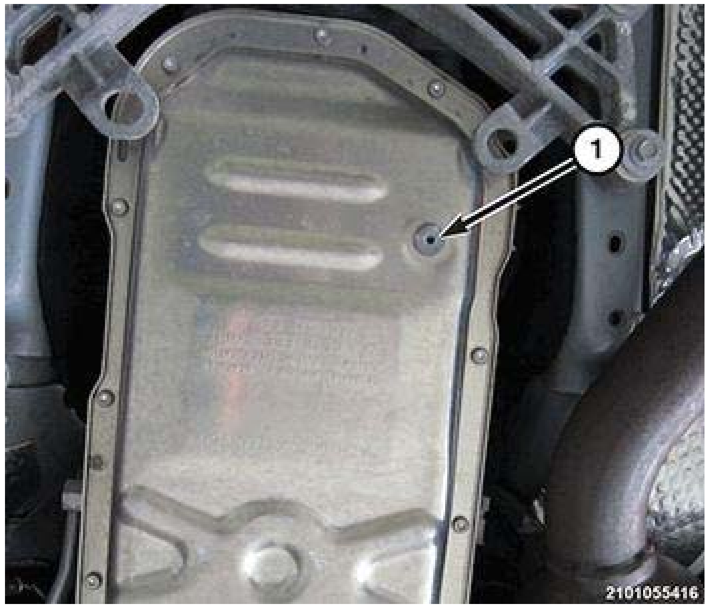


Fig. 245: Transmission Oil Pan Plug
Courtesy of CHRYSLER GROUP, LLC

3. Verify the transmission oil pan plug (1) is installed.
4. Inspect and adjust the fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

LEVER, MANUAL PARK RELEASE

REMOVAL

REMOVAL

1. Remove the shifter bezel storage bin liner.
2. Remove the Manual Park Release (MPR) lever bolts.

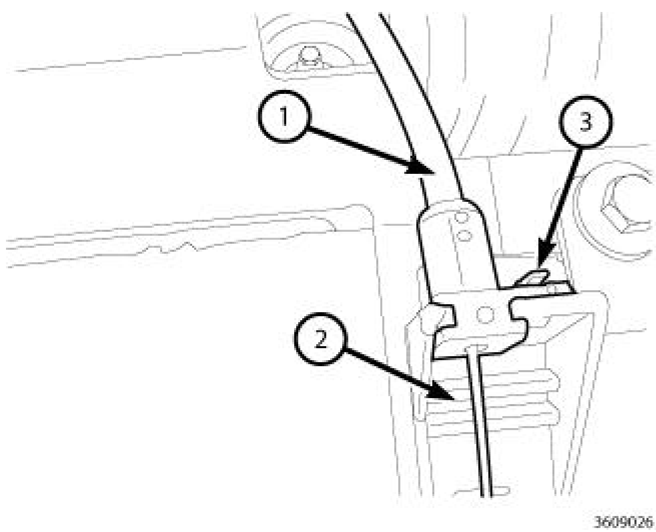


Fig. 246: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the MPR cable (1) from the housing (2), while holding the release tab (3) open.
4. Remove the MPR cable (1) from the MPR lever and remove the MPR lever from the vehicle.

INSTALLATION

INSTALLATION

1. Connect the Manual Park Release (MPR) cable to the MPR lever.
2. Install the MPR lever bolts and tighten to the proper **SPECIFICATIONS** .

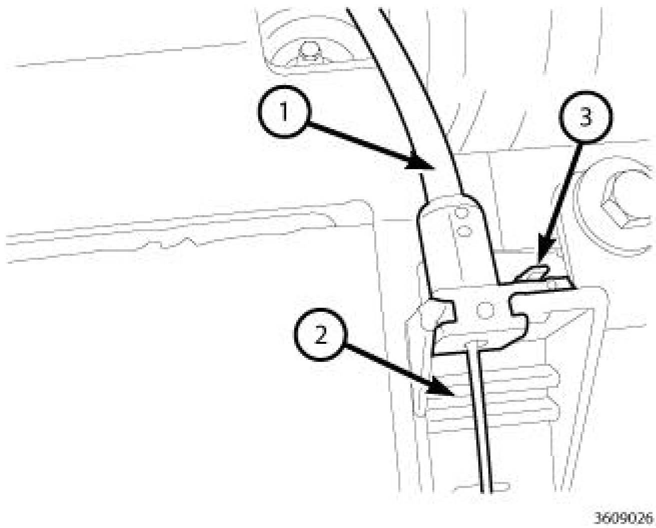


Fig. 247: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

3. Connect the MPR cable (1) to the housing (2) and make sure the locking tab (3) is locked.
4. Install the shifter bezel storage bin liner.

PUMP, TRANSMISSION OIL

DESCRIPTION

DESCRIPTION

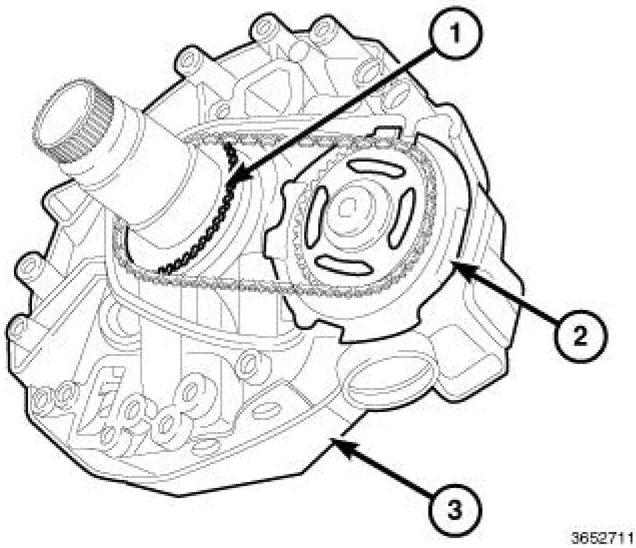


Fig. 248: Transmission Oil Pump, Chain And Sprocket & Oil Pump Housing
Courtesy of CHRYSLER GROUP, LLC

The transmission oil pump (2) is driven by a chain and sprocket (1). The oil pump is located just behind the torque converter, inside of the pump housing (3). The pump is a double-stroke vane pump. The pump has dual chambers, two inlet and two outlet ports. The pump provides necessary lubrication and cooling throughout all phases of transmission operation.

OPERATION

OPERATION

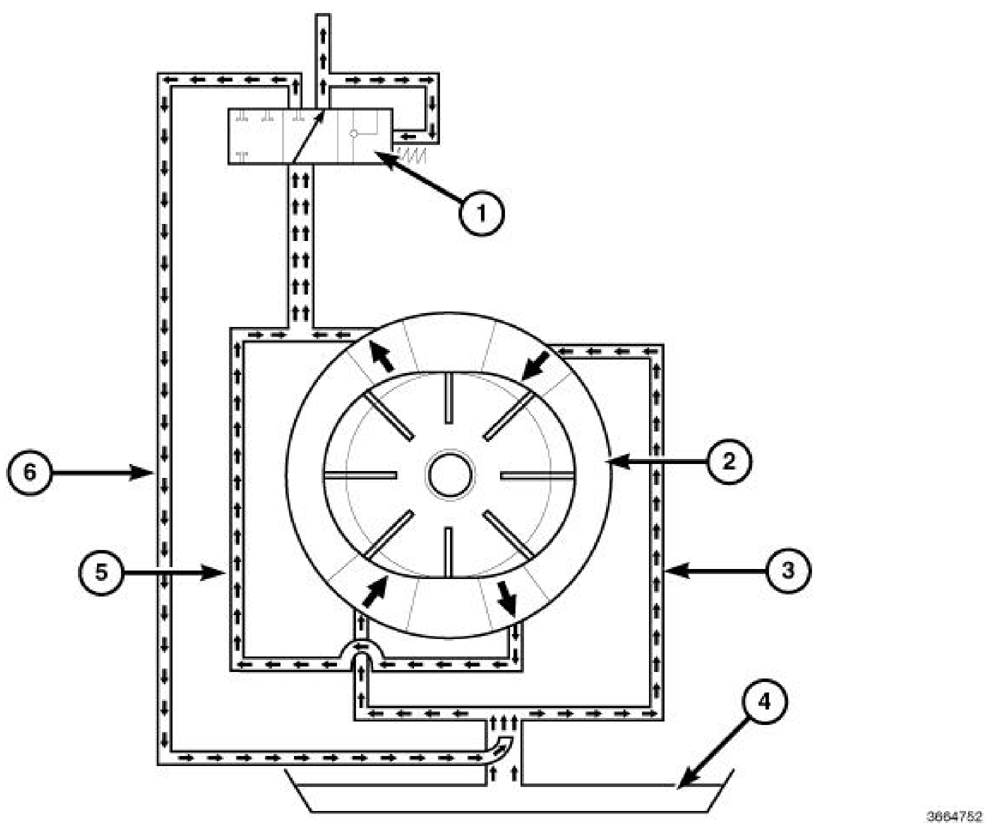


Fig. 249: Transmission Oil Pump Flow Diagram

Courtesy of CHRYSLER GROUP, LLC

1- SYSTEM PRESSURE VALVE	4 - SUMP
2 - PUMP	5 - PRESSURE PIPE
3 - INTAKE PIPE	6 - RETURN OF REDUNDANT OIL

The transmission oil pump is driven by a chain and sprocket. The oil pump has two intake ports and two exhaust ports. The pump draws fluid through a filter and pressurizes the fluid as the pump rotates. After the fluid is pressurized, it exits the pump through two exhaust ports that feed the system pressure valve. The system pressure valve maintains fluid pressure and allows excess pressure to return to the pump. This reduces cavitation and noise.

REMOVAL

REMOVAL

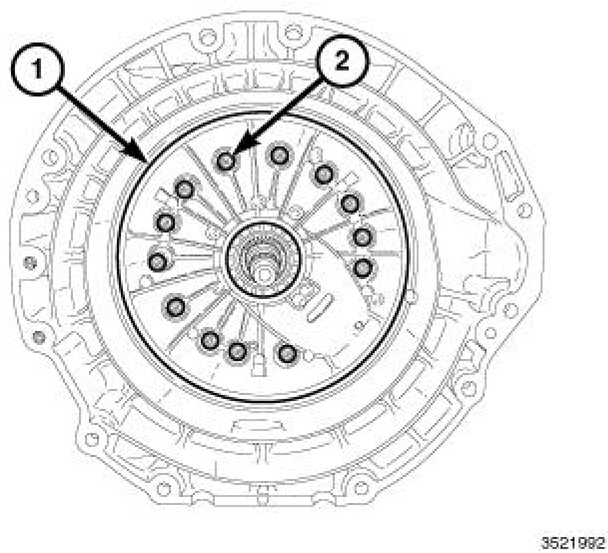
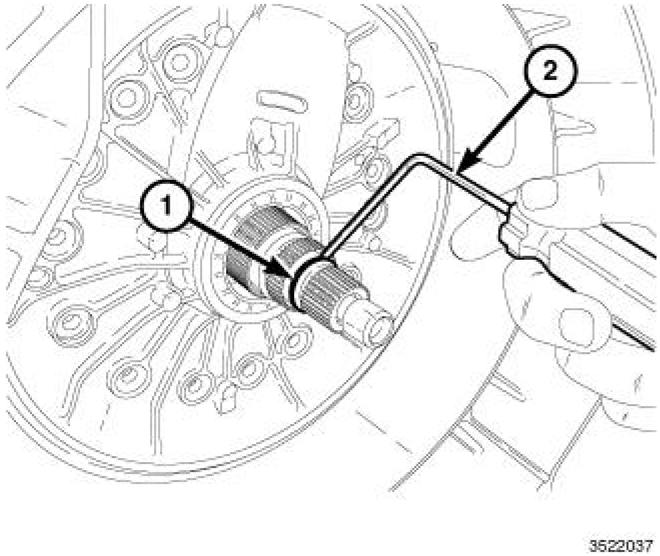


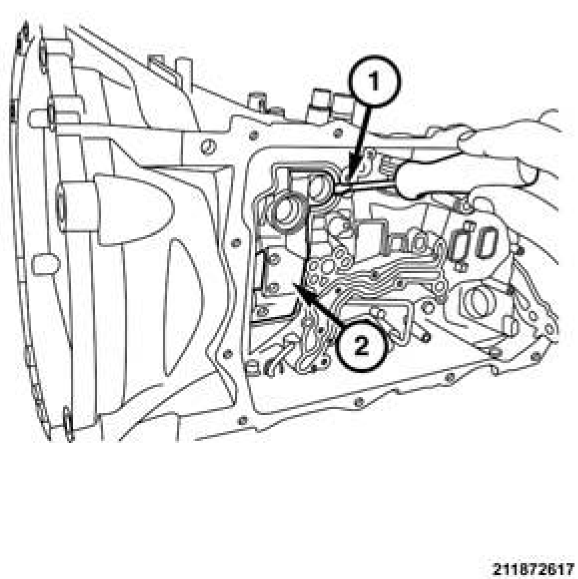
Fig. 250: Thirteen Oil Pump Housing Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transmission. Refer to **REMOVAL**.
2. Remove the valve body. Refer to **VALVE BODY, REMOVAL**.
3. Remove the 13 transmission oil pump assembly to case bolts (2).



[Fig. 251: Input Shaft O-Ring & Small Pick](#)
Courtesy of CHRYSLER GROUP, LLC

4. Remove the input shaft O-ring (1) using a small pick (2) or equivalent.



[Fig. 252: Prying Oil Pump Housing Away From Case](#)
Courtesy of CHRYSLER GROUP, LLC

5. Carefully pry the transmission oil pump housing (1) away from the case (2) with a small flat blade screwdriver or equivalent through the case opening.
6. From the front of the transmission, remove the transmission oil pump housing.

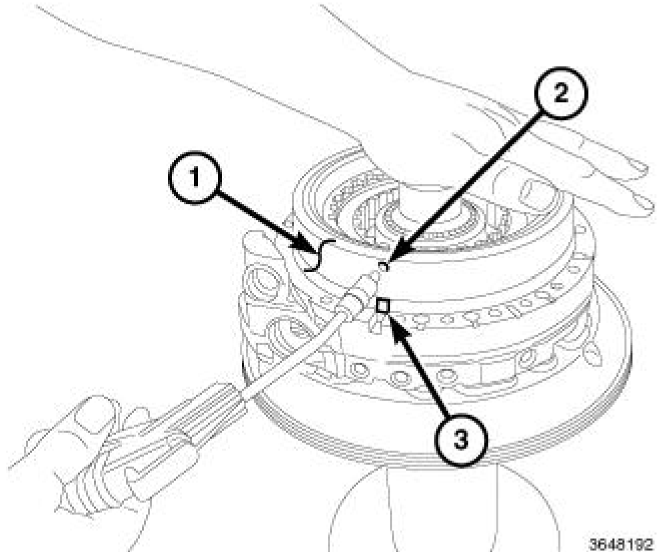


Fig. 253: B-Piston, Hole & B-Piston Alignment Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply air pressure slowly, oil may spray when B-piston releases from the assembly.**

7. With one hand above B-piston (1), carefully apply air pressure into the hole directly above the B-piston alignment tab (3) to remove B-piston (2) from the assembly.

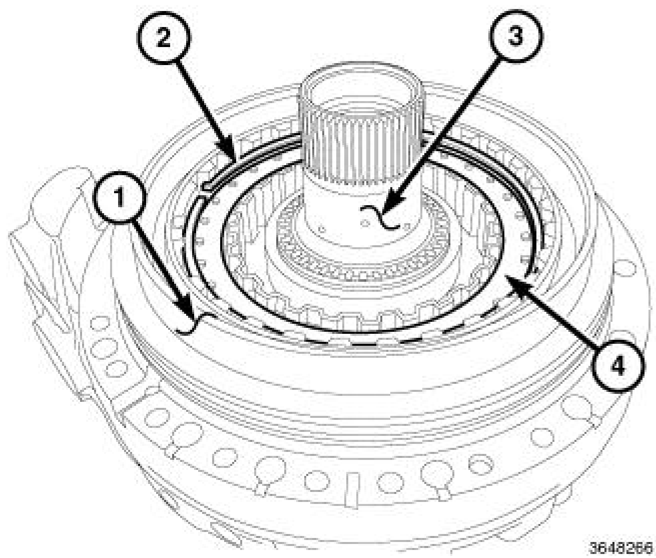


Fig. 254: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

8. Remove the outer ring (1) (inside B-piston).
9. Remove the snap ring (2).
10. Remove the clutches and spacers (4).
11. Remove the hub (3).

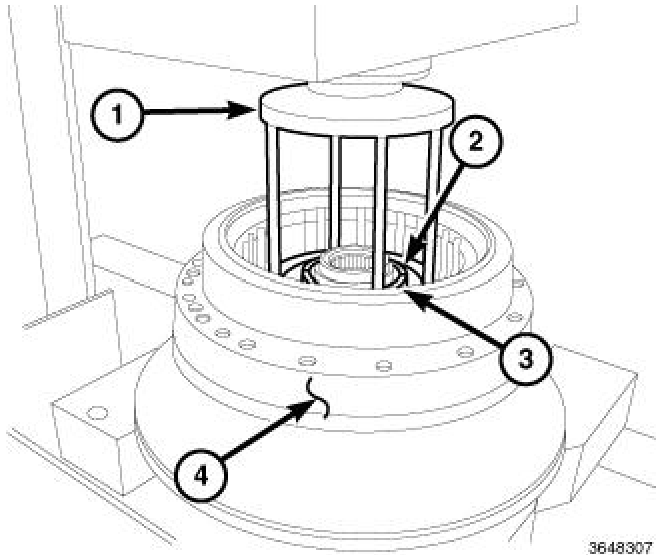


Fig. 255: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

12. Position the transmission oil pump housing assembly (4) in a suitable press.
13. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer to remove tension on the split retaining ring (2), and remove the two halves of the retaining ring (2).

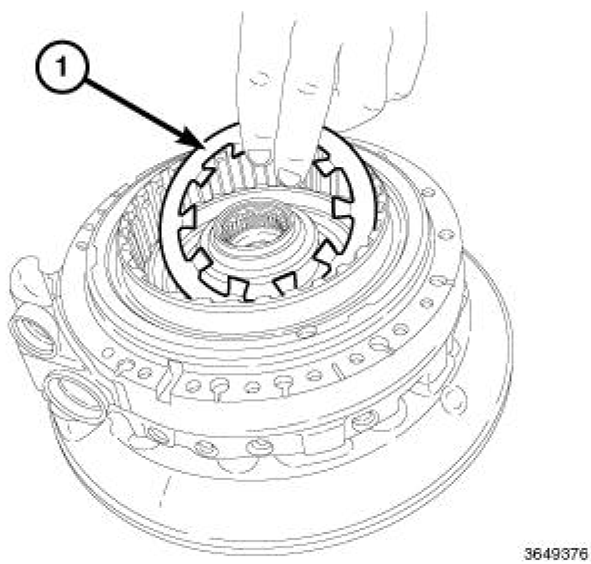
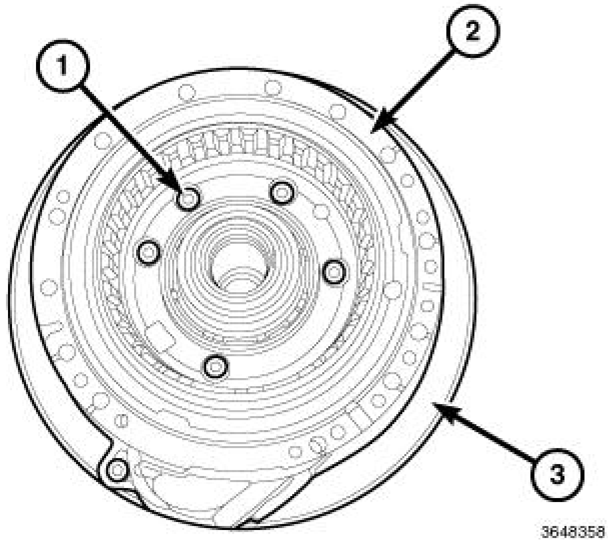


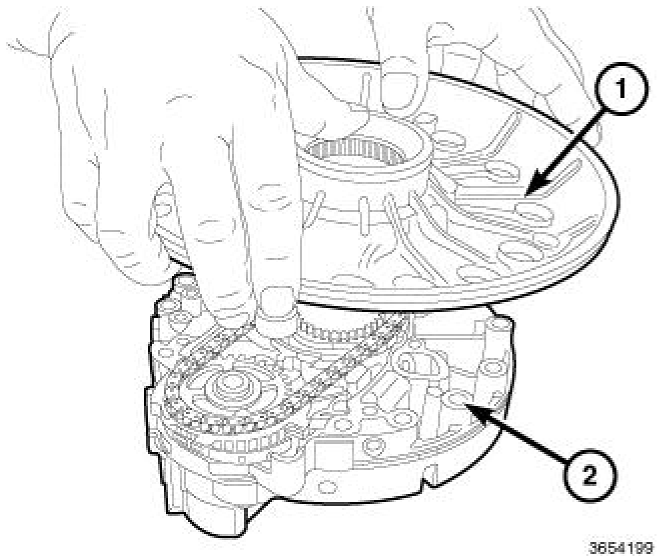
Fig. 256: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

14. Remove the piston retainer and plate.



[**Fig. 257: Six Bolts, Oil Pump Housing & Oil Pump Cover**]
Courtesy of CHRYSLER GROUP, LLC

15. Remove the five bolts (1) and separate the transmission oil pump housing (2) from the front transmission oil pump cover (3).



[**Fig. 258: Front Cover & Oil Pump Housing**]
Courtesy of CHRYSLER GROUP, LLC

16. Separate the front cover (1) from the transmission oil pump housing (2).

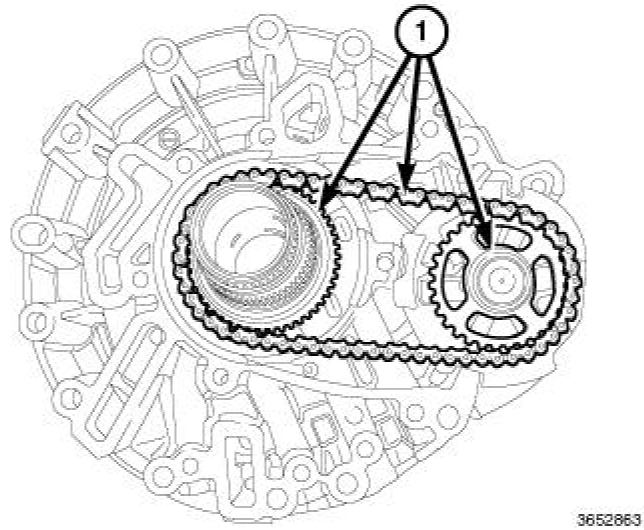


Fig. 259: Drive Sprocket, Chain And Pump Body
Courtesy of CHRYSLER GROUP, LLC

17. Remove the drive sprocket, chain and pump body (1) as an assembly.
18. Remove and discard all O-rings.

DISASSEMBLY

TRANSMISSION OIL PUMP

1. Remove the transmission oil pump from the transmission. Refer to **PUMP, TRANSMISSION OIL, REMOVAL**.

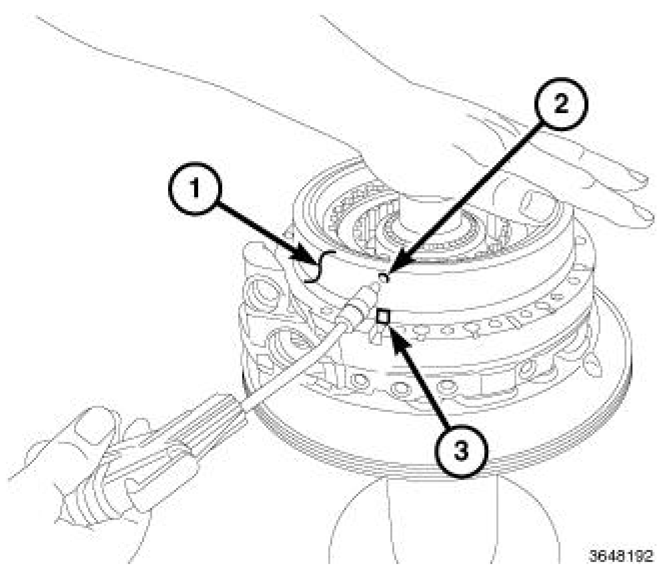


Fig. 260: B-Piston, Hole & B-Piston Alignment Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply air pressure slowly, oil may spray when B-piston releases from the assembly.**

2. With one hand above B-piston (1), carefully apply air pressure into the hole directly above the B-piston

alignment tab (3) to remove B-piston (2) from the assembly.

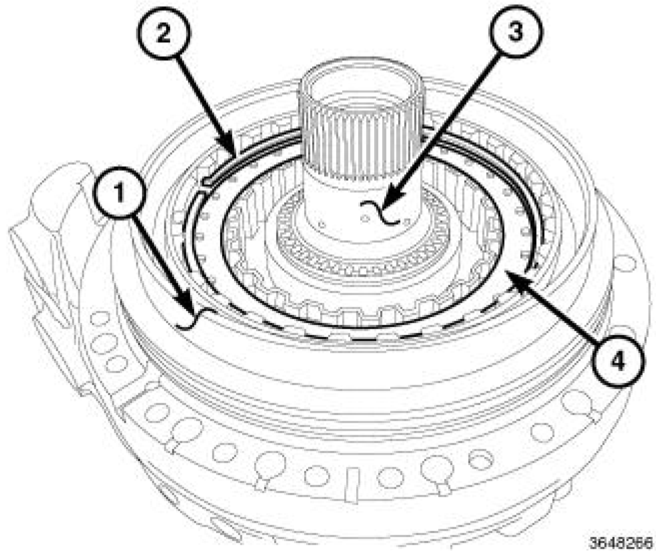


Fig. 261: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

3. Remove the outer ring (1) (inside B-piston).
4. Remove the snap ring (2).
5. Remove the clutches and spacers (4).
6. Remove the hub (3).

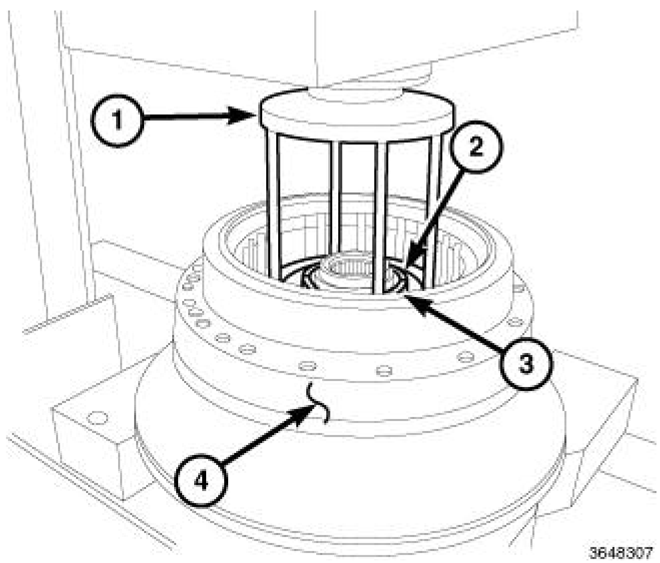


Fig. 262: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

7. Position the transmission oil pump housing assembly (4) in a suitable press.
8. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer to remove tension on the split retaining ring (2), and remove the two halves of the retaining ring (2).

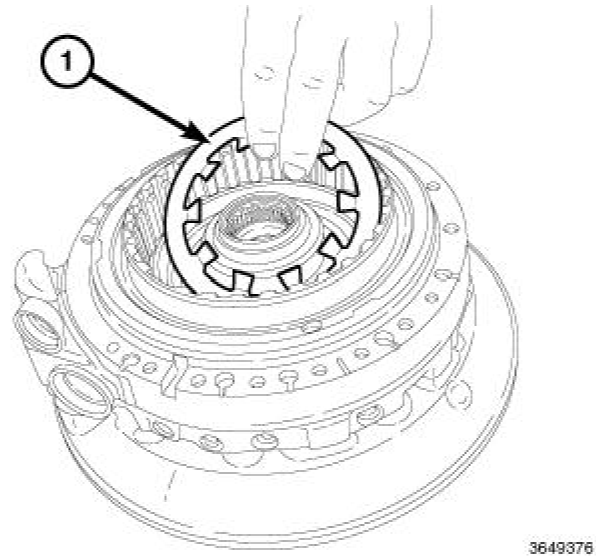


Fig. 263: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

9. Remove the piston retainer and plate.

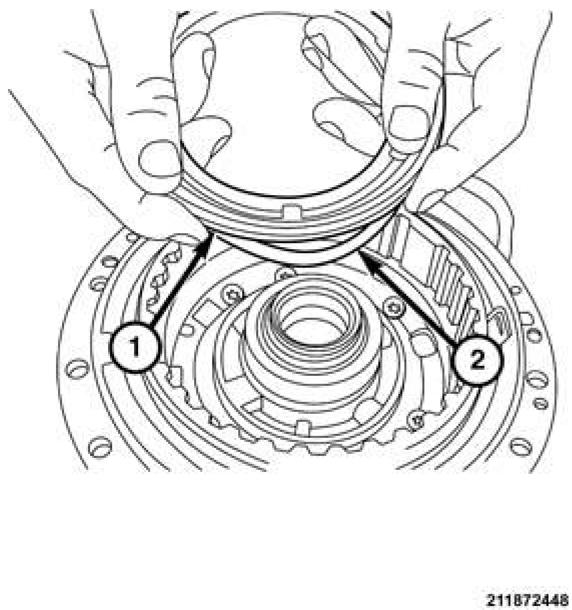


Fig. 264: A-Piston & Seal
Courtesy of CHRYSLER GROUP, LLC

10. Remove the A-piston (1) and seal (2) from the transmission oil pump.

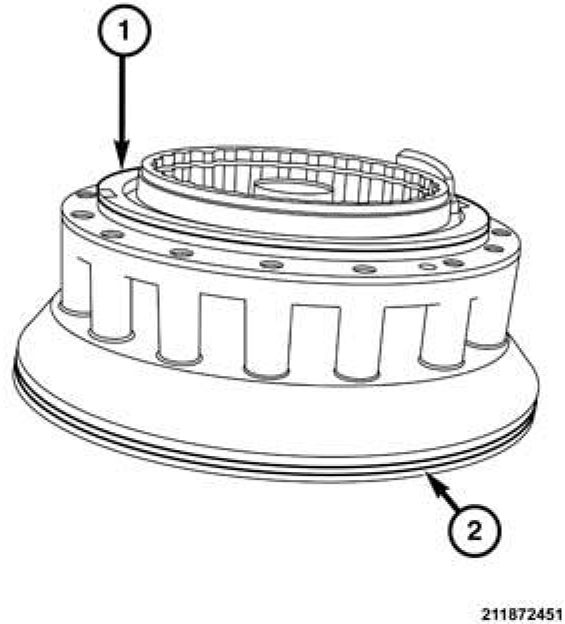


Fig. 265: Inner & Outer Oil Pump O-Rings
Courtesy of CHRYSLER GROUP, LLC

11. Remove the inner (1) and outer (2) transmission oil pump O-rings.

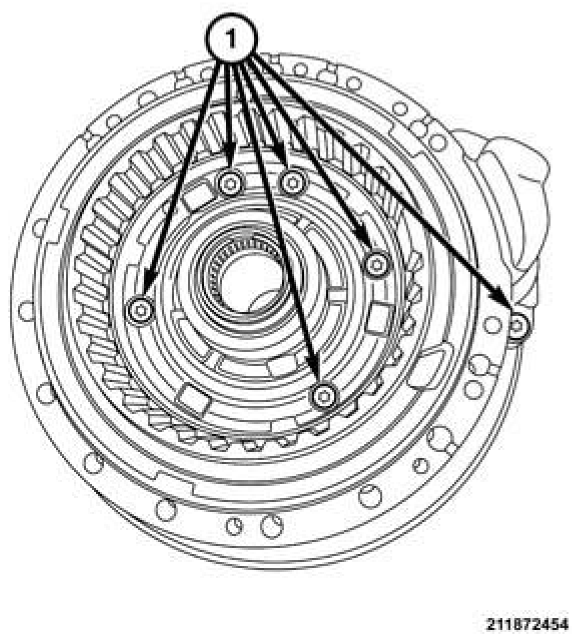


Fig. 266: Oil Pump Torx(R) Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove the six TorxÂ® bolts (1) from the transmission oil pump.

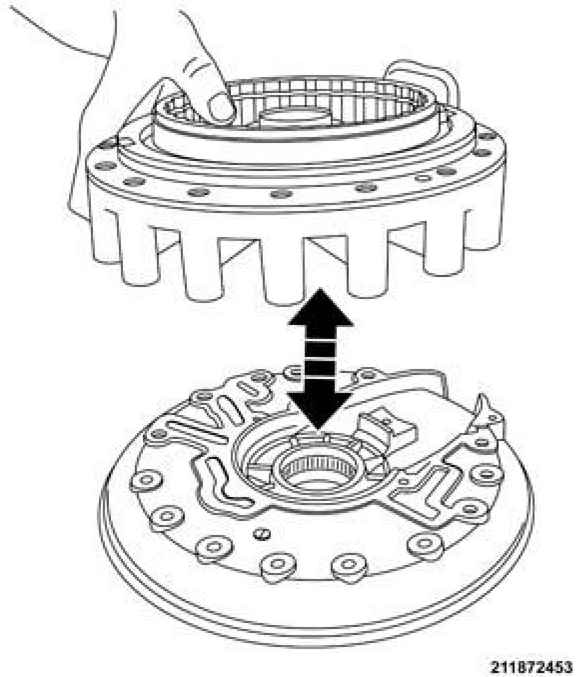


Fig. 267: Two Halves Of Oil Pump
Courtesy of CHRYSLER GROUP, LLC

13. Separate the two halves of the transmission oil pump, by pushing on the hub.

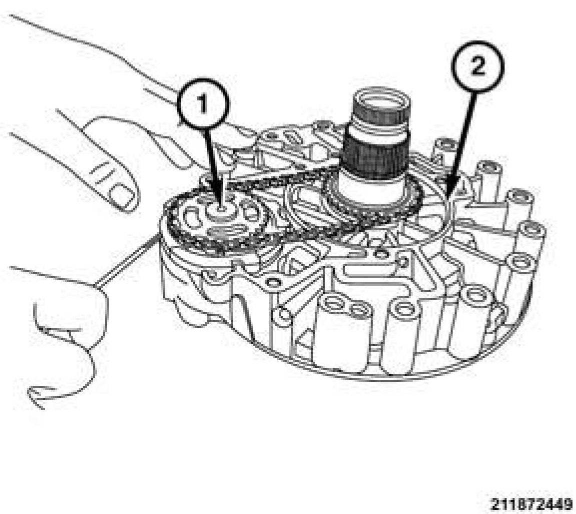


Fig. 268: Prying Up On Oil Pump & Separating It From The Housing
Courtesy of CHRYSLER GROUP, LLC

14. Carefully pry up on the transmission oil pump (1), separating it from the housing (2).

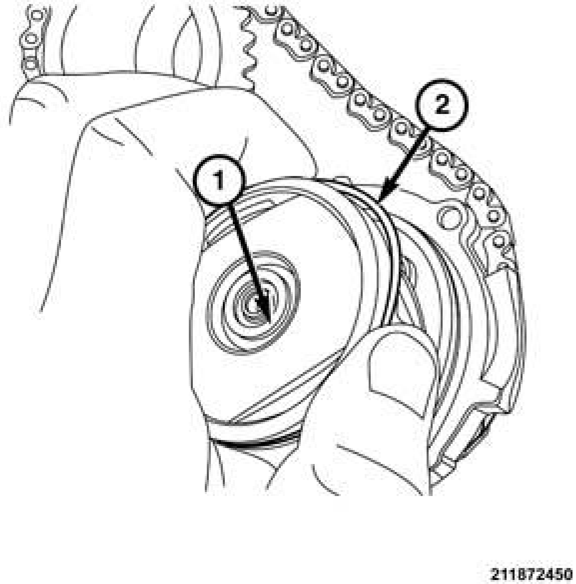


Fig. 269: Oil Pump Housing & O-Ring
Courtesy of CHRYSLER GROUP, LLC

15. Remove the transmission oil pump O-ring (2).

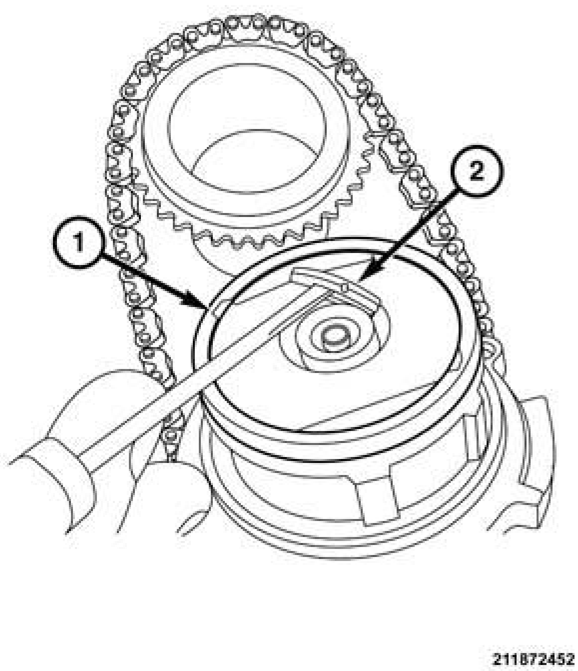


Fig. 270: Removing Oil Pump O-Ring
Courtesy of CHRYSLER GROUP, LLC

16. Remove the transmission oil pump seal (2).

ASSEMBLY

TRANSMISSION OIL PUMP

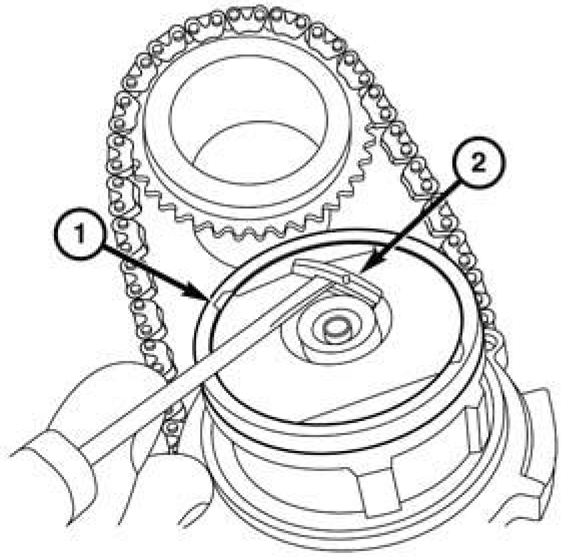


Fig. 271: Removing Oil Pump O-Ring
Courtesy of CHRYSLER GROUP, LLC

1. Install the transmission oil pump seal (2).

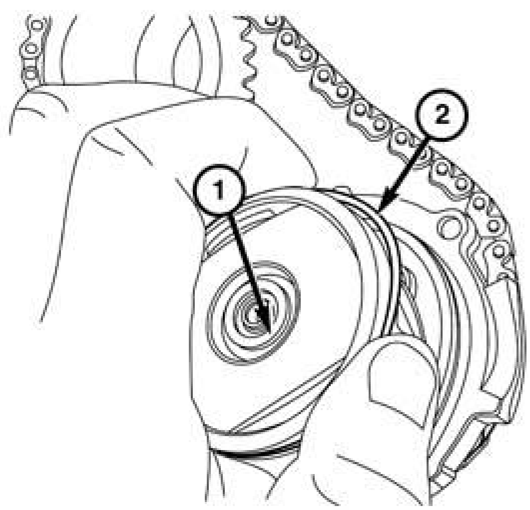


Fig. 272: Oil Pump Housing & O-Ring
Courtesy of CHRYSLER GROUP, LLC

2. Install the transmission oil pump O-ring (2).
3. Carefully seat the transmission oil pump into the housing, make sure the pump is seated properly.

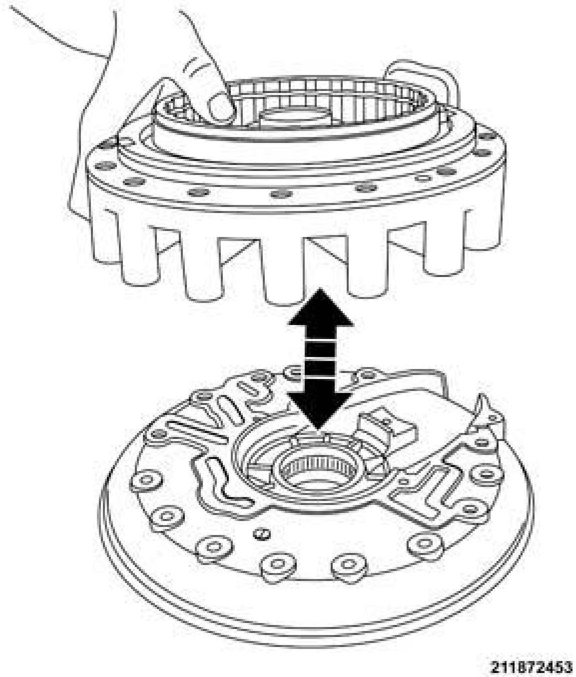


Fig. 273: Two Halves Of Oil Pump
Courtesy of CHRYSLER GROUP, LLC

4. Install the two transmission oil pump housing halves together.

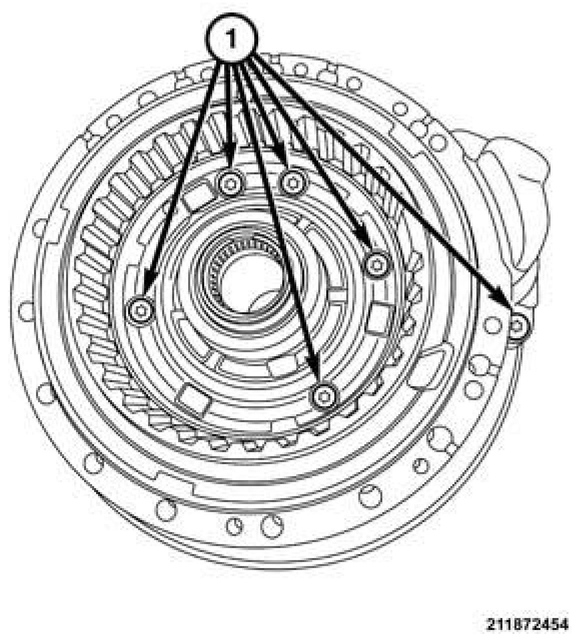


Fig. 274: Oil Pump Torx(R) Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install six

NEW

transmission oil pump housing TorxĀ® bolts (1).

6. Tighten the bolts to 5 N.m (44 in. lbs). plus 45Ā°.

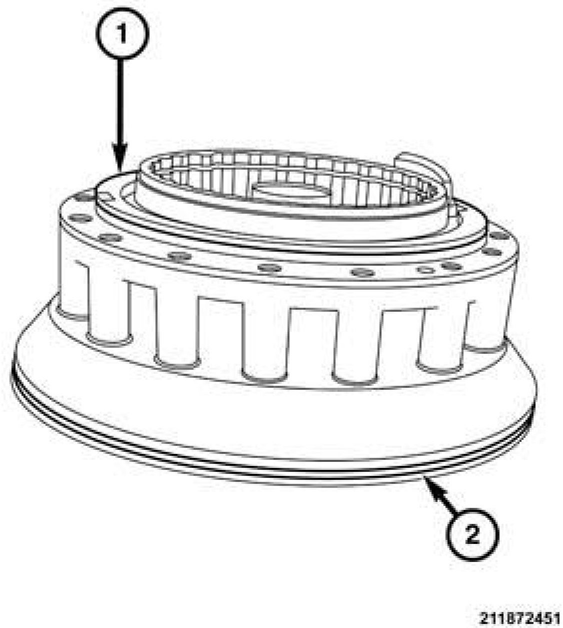


Fig. 275: Inner & Outer Oil Pump O-Rings
Courtesy of CHRYSLER GROUP, LLC

7. Replace the inner and outer transmission oil pump housing O-rings (1).

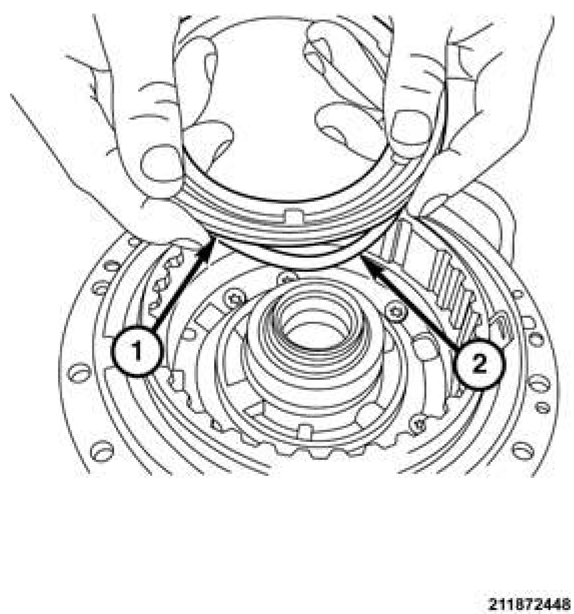


Fig. 276: A-Piston & Seal
Courtesy of CHRYSLER GROUP, LLC

8. Replace the A- piston seal (2) and install the A-piston (1).

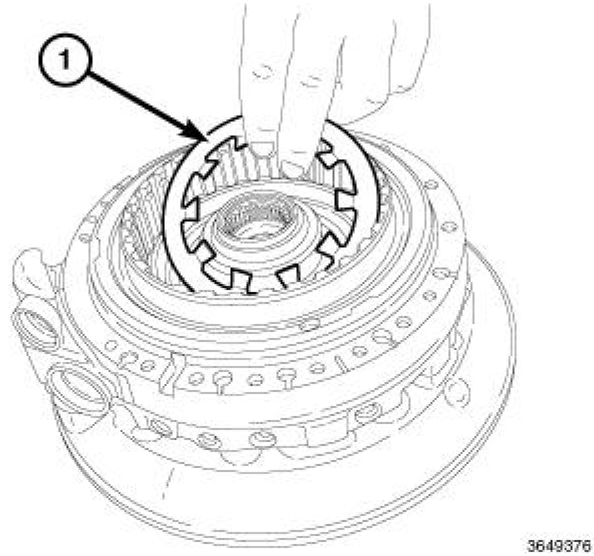


Fig. 277: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

9. Install the belleville spring (1).

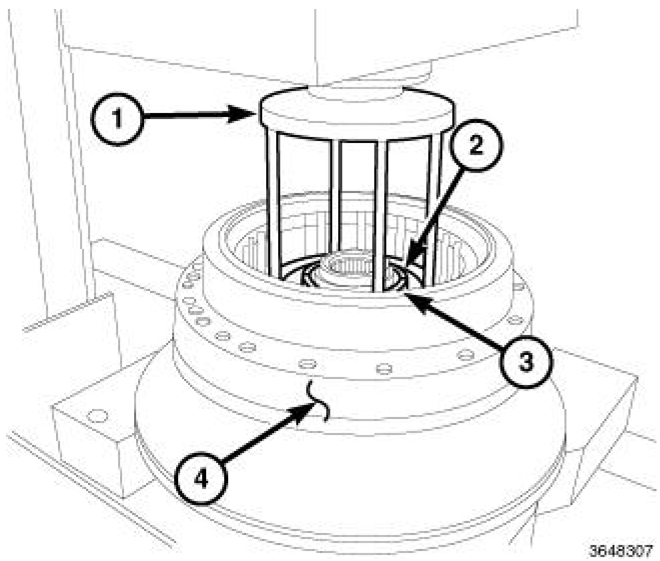


Fig. 278: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

10. Position the transmission oil pump housing assembly (4) in a suitable arbor press.
11. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and install the two halves of the split retainer ring (2).

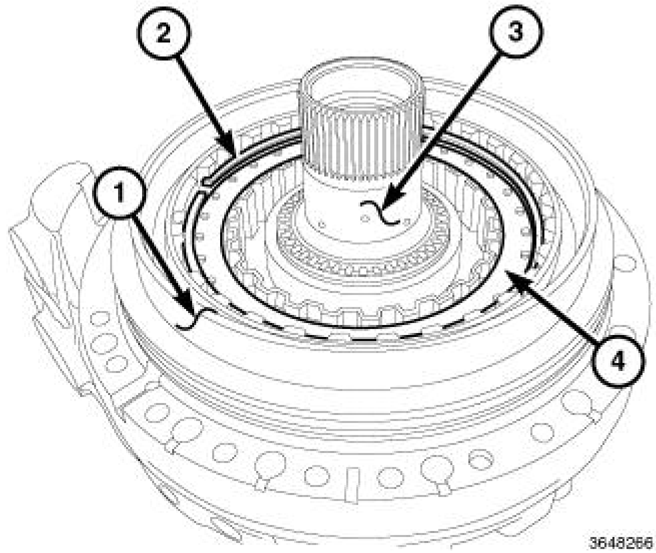


Fig. 279: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

12. Install the hub (3).
13. Install the clutches and spacers (4).
14. Install the snap ring (2).
15. Install the outer ring (1) (below B-piston).

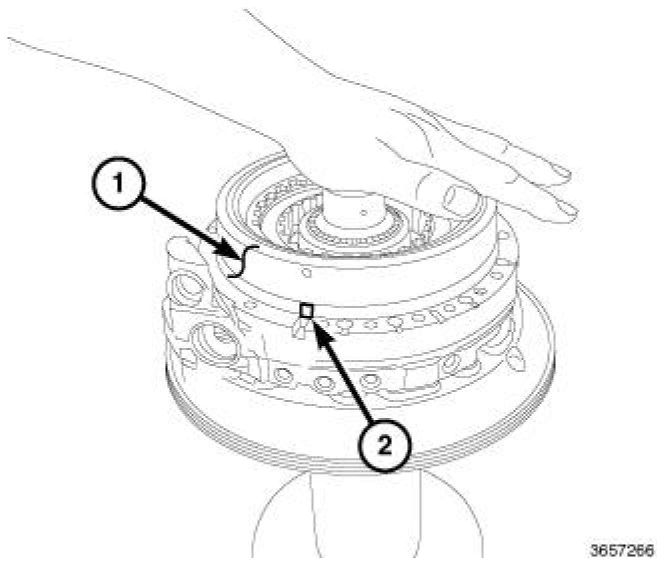


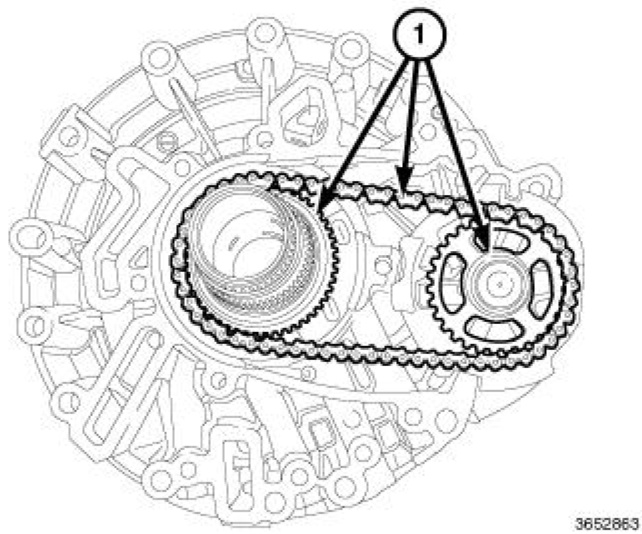
Fig. 280: B-Piston Alignment Tab & B-Piston
Courtesy of CHRYSLER GROUP, LLC

16. Position the B-piston alignment tab (2) above the notch and install B-piston (1) on the assembly.
17. Install the transmission oil pump. Refer to **PUMP, TRANSMISSION OIL, INSTALLATION**.

INSTALLATION

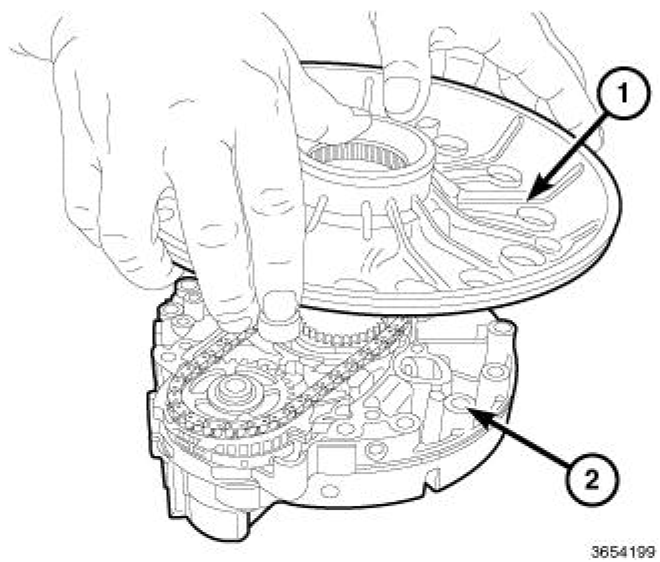
INSTALLATION

NOTE: **If the transmission oil pump was disassembled, replace all O-rings.**



[Fig. 281: Drive Sprocket, Chain And Pump Body]()
Courtesy of CHRYSLER GROUP, LLC

1. Install the drive sprocket, chain and pump body (1) as an assembly into the transmission oil pump housing.



[Fig. 282: Front Cover & Oil Pump Housing]()
Courtesy of CHRYSLER GROUP, LLC

2. Set the pump cover (1) onto the transmission oil pump housing (2).

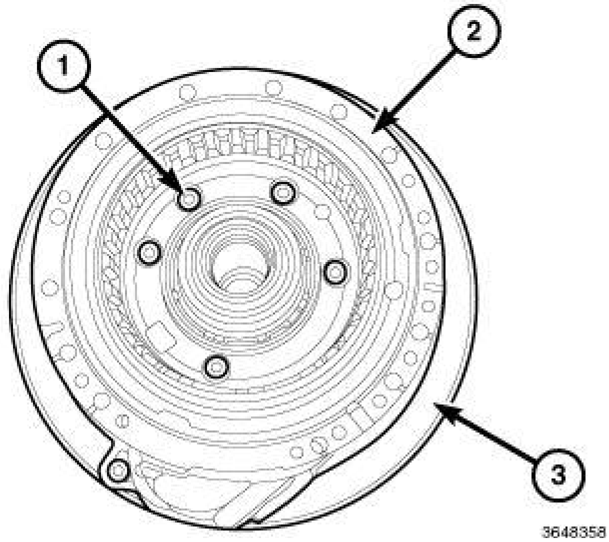


Fig. 283: Oil Pump Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The transmission oil pump bolts under the A-clutch must be replaced.

3. Install the **NEW** six bolts (1) and tighten to 5 N.m (44 in. lbs.) plus 45Â°.

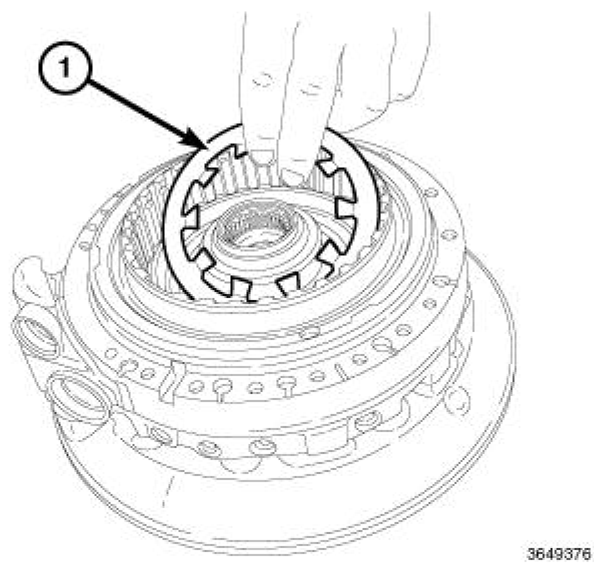


Fig. 284: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

4. Install the piston plate and the piston retainer.

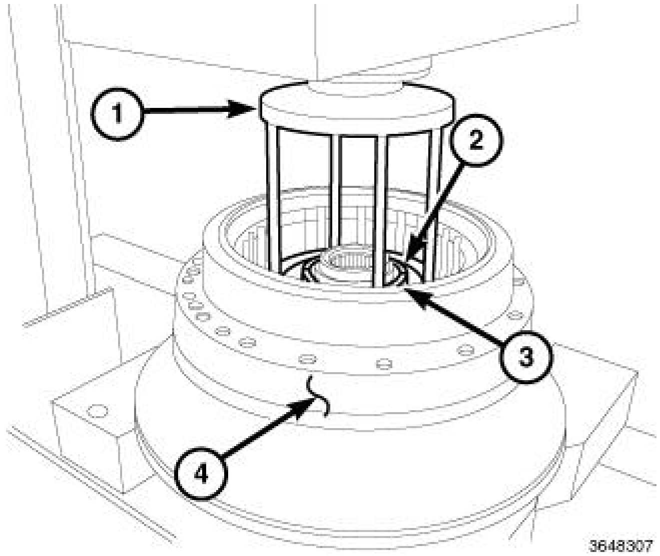


Fig. 285: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Position the transmission oil pump housing assembly (4) in a suitable arbor press.
6. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer and install the two halves of the retaining ring (2).

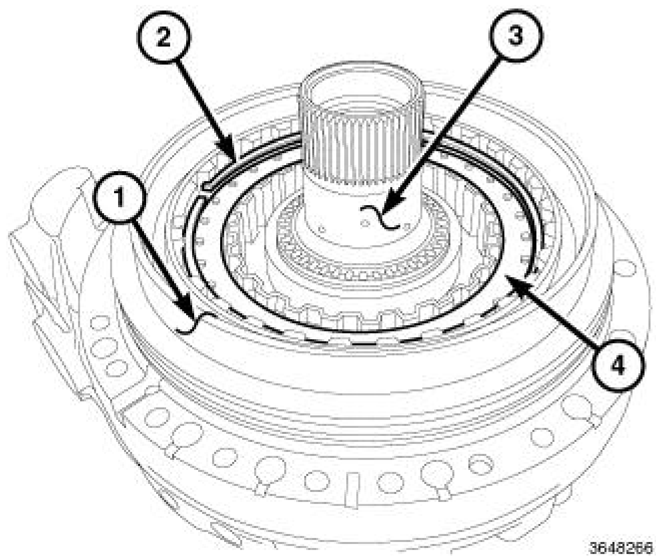
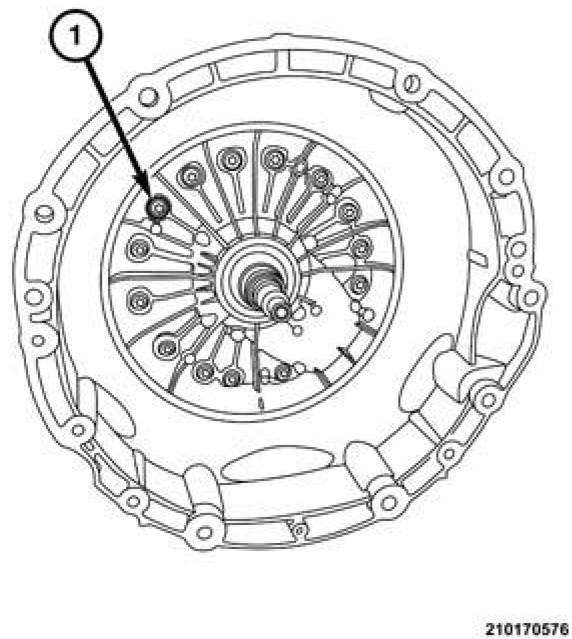


Fig. 286: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

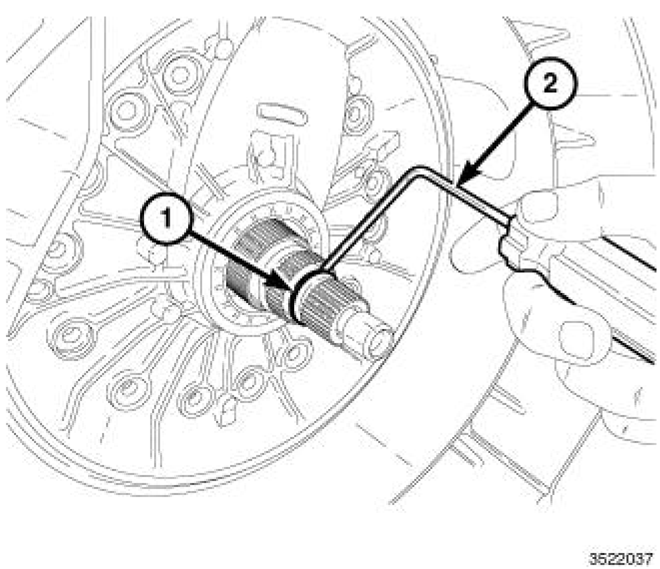
7. Install the hub (3).
8. Install the clutches and spacers (4).
9. Install the snap ring (2).
10. Install the outer ring (1) (inside B-piston).
11. Install the B-piston.



[Fig. 287: Oil Pump Assembly To Case Bolts]
Courtesy of CHRYSLER GROUP, LLC

NOTE: Firmly press the transmission oil pump in place hand before drawing it in with bolts.

12. Install the 14 **new** transmission oil pump cover retaining bolts (2) and tighten the oil pump cover as follows:
    a. In order to seat the transmission oil pump cover properly, pre tighten bolts one, seven and nine to 6 N.m (53 in. lb.).
    b. Working in a clockwise pattern, beginning with number one, tighten to 10 N.m (89 in. lb.).
    c. Working in a clockwise pattern, beginning with number one, tighten an additional 90Â°.



[Fig. 288: Input Shaft O-Ring & Small Pick]

Courtesy of CHRYSLER GROUP, LLC

13. Install the **new** input shaft O-ring (1).
14. Install the valve body. Refer to **VALVE BODY, INSTALLATION**.
15. Install the transmission. Refer to **INSTALLATION**.

SEAL, OUTPUT SHAFT

REMOVAL

OUTPUT SHAFT SEAL

CAUTION: Do not allow the propeller shaft to hang from the vehicle unsupported. Damage may occur to the joint, boot, and center bearing from over-angulation.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

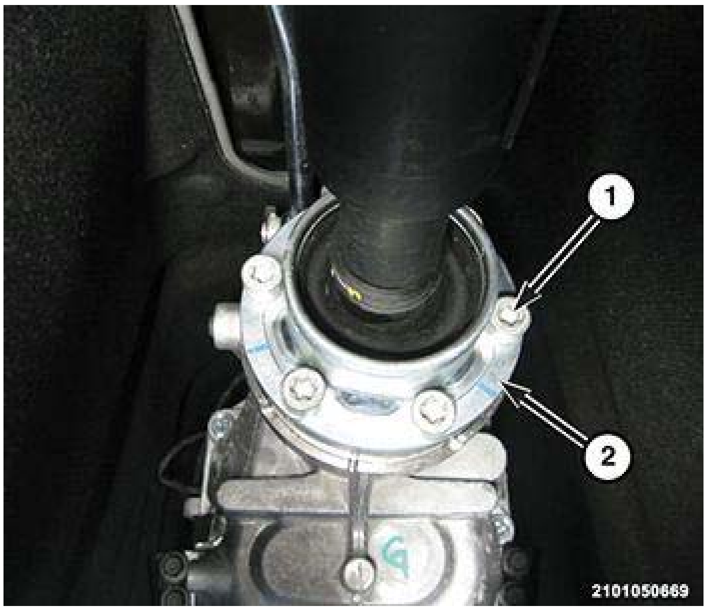


Fig. 289: Bolts And Washers & Transmission Flange
Courtesy of CHRYSLER GROUP, LLC

2. Remove the drive shaft bolts (1) and washers (2) to transmission output flange and position aside the drive shaft. Secure the drive shaft with a strap or equivalent.

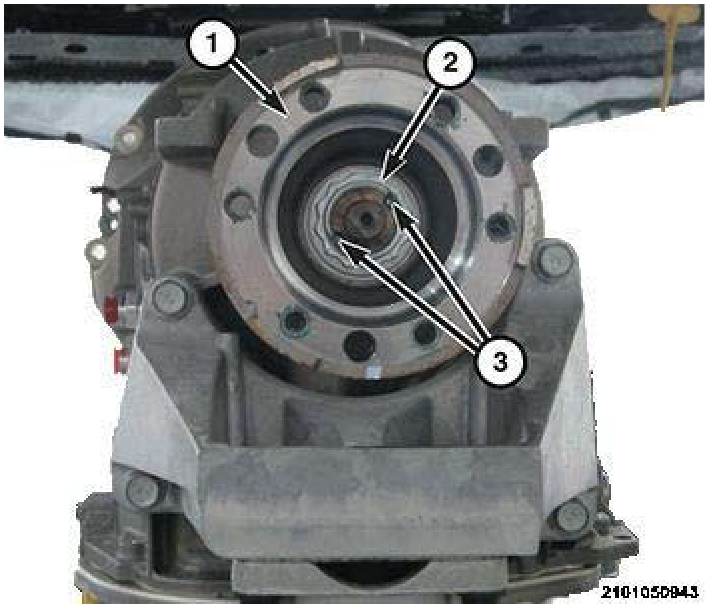


Fig. 290: Drive Shaft Flange, Nut & Staking Area
Courtesy of CHRYSLER GROUP, LLC

3. Using a suitable punch, remove the staking (3) from the transmission output flange nut (2).
4. Using (special tool #C-3281, Holder, Flange) (2) and a 34 mm 12 point socket, remove the transmission output flange nut (2).
5. Remove the transmission output flange (1) and transmission output shaft dust seal.
6. Remove the transmission output shaft seal with suitable screw and slide hammer.

INSTALLATION

OUTPUT SHAFT SEAL

CAUTION: The seal must be installed flush with the case. Driving the seal deeper could damage the seal causing a leak.

1. Position the new transmission output shaft seal over the transmission output shaft and against the transmission case.
2. Using (special tool #9677, Installer, Seal) install the transmission output shaft seal.
3. Verify that the transmission is in PARK,

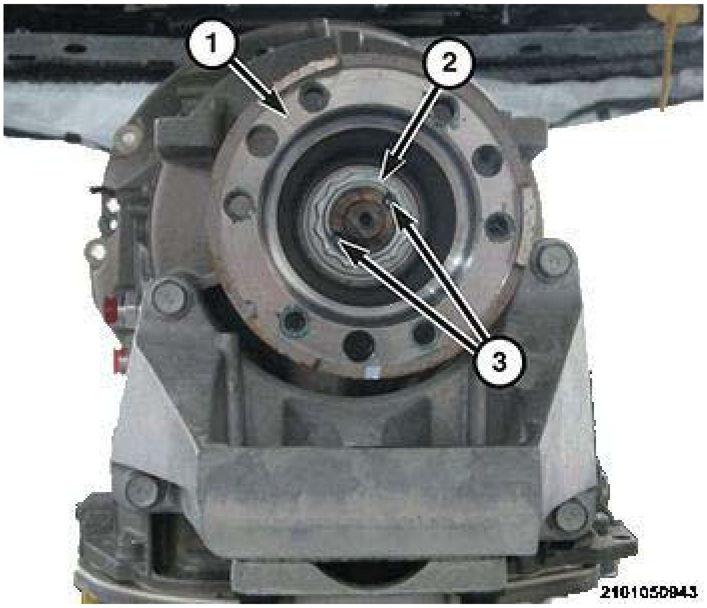


Fig. 291: Drive Shaft Flange, Nut & Staking Area
Courtesy of CHRYSLER GROUP, LLC

4. Install the transmission output shaft flange (1) onto the transmission output shaft and install a **NEW** transmission output flange nut (2). Tighten the transmission output flange nut, with a 34 mm 12 point socket, to the proper **SPECIFICATIONS** .
5. Stake (3) the transmission output flange nut.
6. Position the drive shaft in place on the transmission output flange.

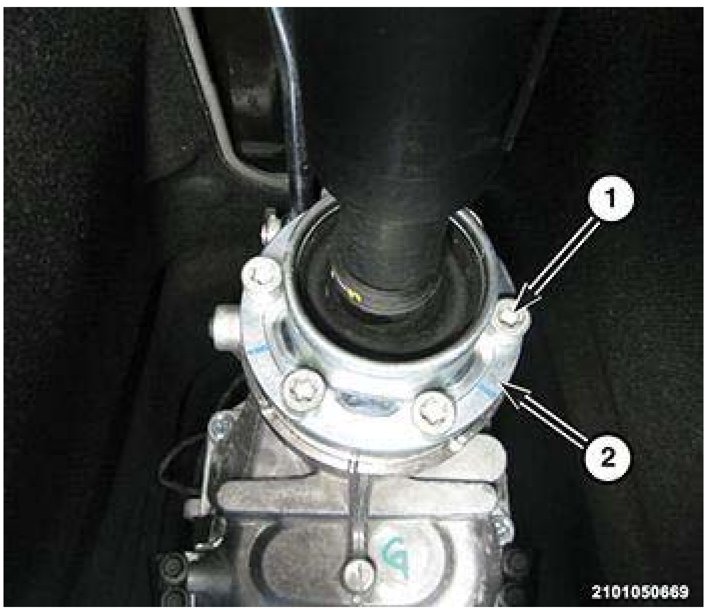


Fig. 292: Bolts And Washers & Transmission Flange
Courtesy of CHRYSLER GROUP, LLC

7. Install the drive shaft washers (2) and bolts (1) and tighten to the **SPECIFICATIONS** .
8. Check the transmission fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

SEAL, TORQUE CONVERTER HUB

REMOVAL

TORQUE CONVERTER HUB SEAL

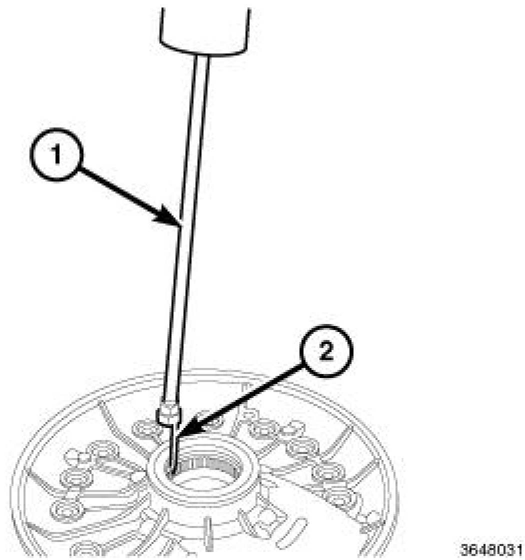


Fig. 293: Seal Remover & Slide Hammer
Courtesy of CHRYSLER GROUP, LLC

1. Remove the torque converter. Refer to **TORQUE CONVERTER, REMOVAL**.
2. Using (special tool #9667, Remover, Seal) and (special tool #C-3752, Slide Hammers) remove the torque converter hub seal.

INSTALLATION

TORQUE CONVERTER HUB SEAL

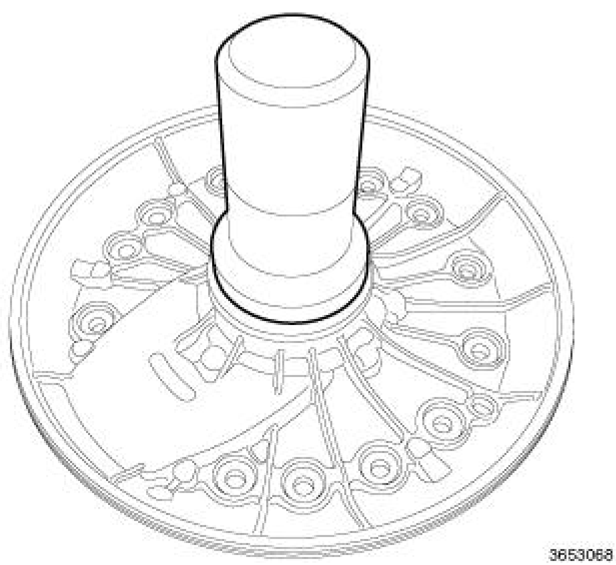


Fig. 294: Oil Pump Cover Oil Seal
Courtesy of CHRYSLER GROUP, LLC

1. Position the torque converter hub seal over the input shaft and against the transmission oil pump cover.
2. Using (special tool #10375, Installer, Oil Pump Cover Oil Seal) install a new torque converter hub seal.

3. Install the torque converter. Refer to **TORQUE CONVERTER, INSTALLATION**.

SHIFTER, TRANSMISSION

DESCRIPTION

FLOOR SHIFT

The Electronic Shifter (E-Shifter) is an electronic switch/module floor mounted device, using CAN messaging to communicate driver requests for transmission gear changes without a mechanical connection.

PADDLE SHIFT

Some vehicles may be equipped with optional paddle shift. For more information on paddle shift. Refer to **SWITCH, REMOTE RADIO, DESCRIPTION** .

OPERATION

FLOOR SHIFT

The E-Shifter:

- communicates with the Transmission Control Module (TCM) via a Controller Area Network (CAN).
- incorporates a solenoid that allows the lever to be locked for purposes of Brake Transmission Shift Interlock (BTSI) function.
- lever-lock function is controlled electronically by the TCM via CAN message, and mechanically by the release trigger on the knob.
- indicates the selected/non-selected gears provided via illumination of PRNDM+- characters on knob.
- lever-position feedback is provided via mechanical detents, which also keep the lever in the desired position.
- communicates driver requests for transmission gear changes without a mechanical connection.
- is comprised of an upper knob and a lower base, which can be serviced separately.
- on some models, may have steering wheel-mounted paddle shifters available. Refer to **SWITCH, REMOTE RADIO, DESCRIPTION** .

The Electronic Shifter (E-Shifter) offers (P, R, N, D, M) modes of function.

The M selection (manual mode) is engaged by moving the shift-lever sideways to M. Requests to up/down shift are achieved by moving the lever fore/aft once in the manual position.

PADDLE SHIFTERS

Some vehicles may be equipped with optional steering wheel paddle shifters.

The steering wheel paddle shifters may be enabled or disabled in the default drive mode. The vehicle will start in default mode unless it is in valet mode.

To enable the steering wheel paddle shifters, press the **ON** button on the touchscreen.

To disable the steering wheel paddle shifters, press the **OFF** button on the touchscreen.

Fig. 295: Paddle Shifter Enable/Disable Screen
Courtesy of CHRYSLER GROUP, LLC

For additional information, refer to **SWITCH, REMOTE RADIO, OPERATION** .

STANDARD PROCEDURE

MPR DISENGAGE

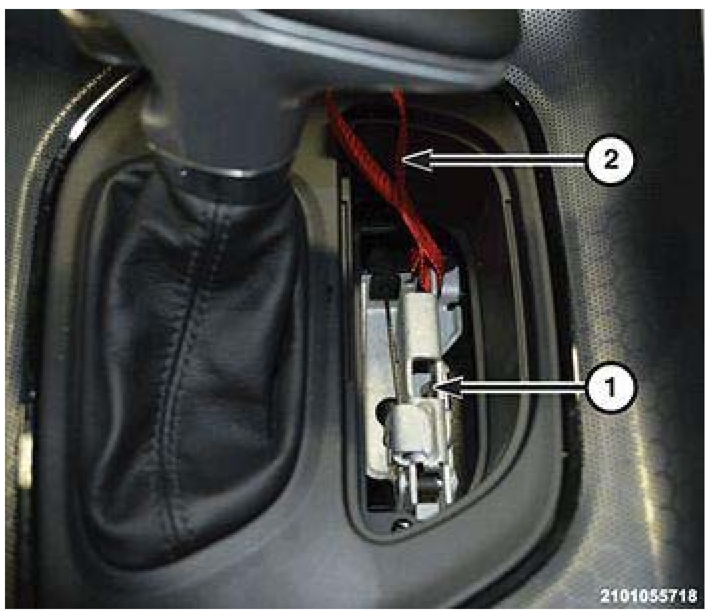
The Manual Park Release (MPR) lever is used for putting the transmission in neutral anytime the vehicle needs to be moved with the engine off in neutral. This is achieved by a cable attached to the transmission park pawl. When the cable is pulled, the transmission is put into neutral, and when the cable is released, the transmission is back into park.

WARNING: **Always secure your vehicle by fully applying the parking brake, before activating the Manual Park Release. Activating the Manual Park Release will allow your vehicle to roll away if it is not secured by the parking brake or by proper connection to a tow vehicle. Activating the Manual Park Release on an unsecured vehicle could lead to serious injury or death for those in or around the vehicle.**

NOTE: **Apply the parking brake.**

[Fig. 296: Manual Park Release Lever Access Panel]
Courtesy of CHRYSLER GROUP, LLC

1. Remove the Manual Park Release (MPR) lever access panel (1).



[Fig. 297: Locking Tab & Tether]
Courtesy of CHRYSLER GROUP, LLC

2. Release the locking tab (1) with a screw driver or equivalent and pull the tether (2).
3. While holding the locking tab (1) to the right, pull the tether (2) up and rearward, until it locks in place in the vertical position. The transmission is now out of park, and the vehicle can be moved.

MPR ENGAGE

Fig. 298: Releasing Locking Tab
Courtesy of CHRYSLER GROUP, LLC

1. Push the Manual Park Release (MPR) lever rearward, and use a small screwdriver or equivalent to release the locking tab (1).

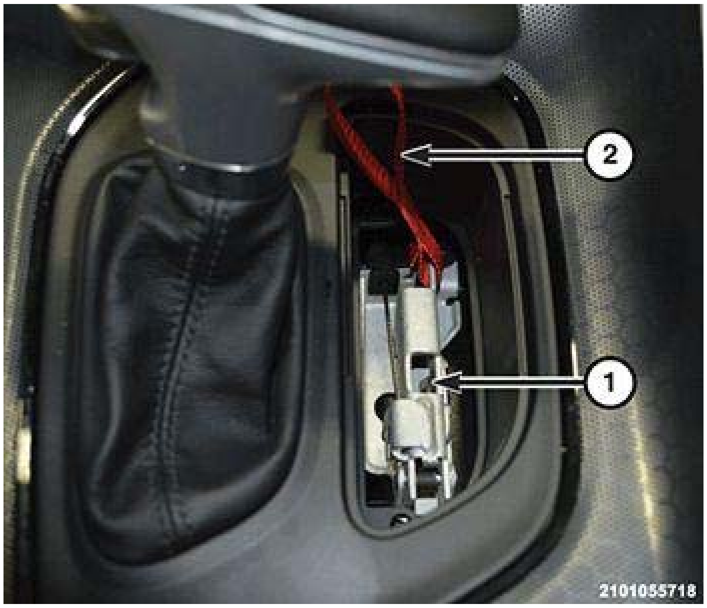


Fig. 299: Locking Tab & Tether
Courtesy of CHRYSLER GROUP, LLC

2. Allow the MPR lever to return to the engaged position.
3. Make sure that the locking tab (1) is in position, gently pull on the tether (2) to confirm the lever is locked.

[Fig. 300: Manual Park Release Lever Access Panel]
Courtesy of CHRYSLER GROUP, LLC

4. Install the MPR lever access panel.

REMOVAL

SHIFTER

WARNING: Always secure your vehicle by fully applying the parking brake, before activating the Manual Park Release. Activating the Manual Park Release will allow your vehicle to roll away if it is not secured by the parking brake or by proper connection to a tow vehicle. Activating the Manual Park Release on an unsecured vehicle could lead to serious injury or death for those in or around the vehicle.

1. Apply the parking brake.

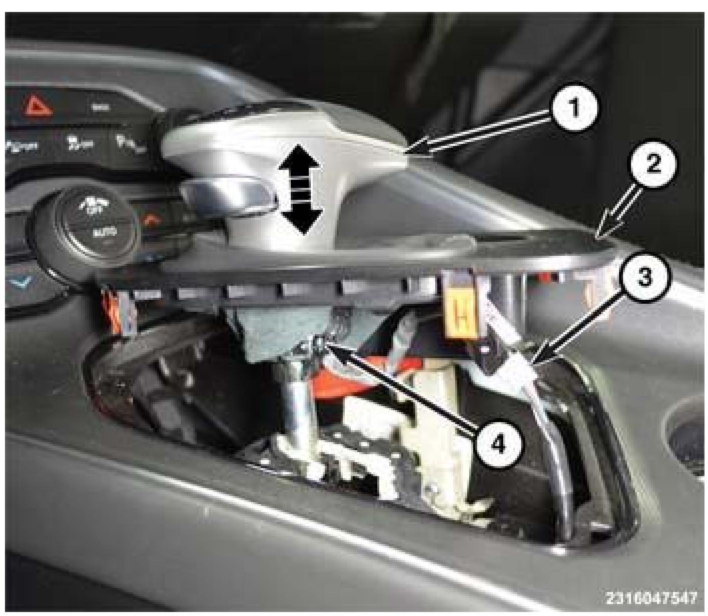


Fig. 301: Automatic Shifter
Courtesy of CHRYSLER GROUP, LLC

2. Using a trim stick or equivalent, carefully release the retaining clips and lift the shifter bezel (2).
3. Unplug the wire harness connector (3) between the knob and lower base.
4. Remove the shifter knob screw (4) and remove the shifter knob and shifter bezel (2).

Fig. 302: Removing/Install Console Bezel Panel
Courtesy of CHRYSLER GROUP, LLC

5. Using a trim stick or equivalent, starting at the rear of the console bezel panel, carefully release the retaining clip and lift the console bezel panel (1). Disconnect the wire harness connectors and remove the console bezel panel.

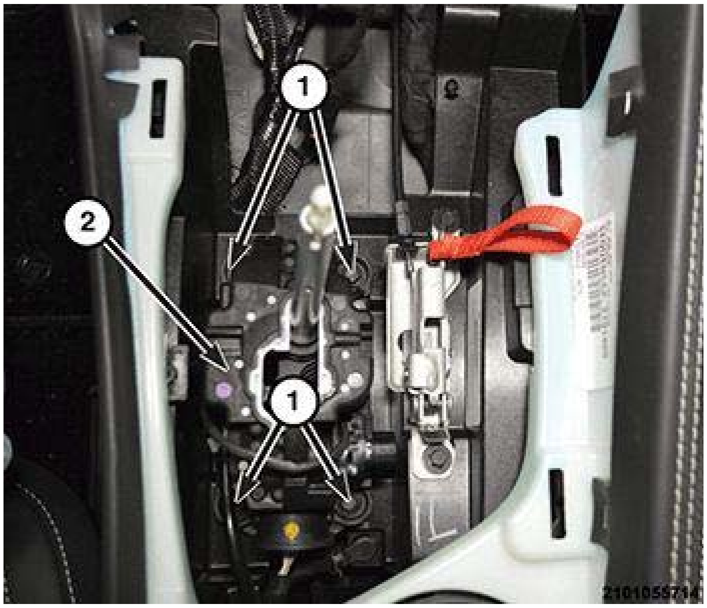


Fig. 303: Shifter Assembly & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the shifter bolts (1) and lift the shifter assembly (2) up enough to allow access to the shifter wire harness connector.

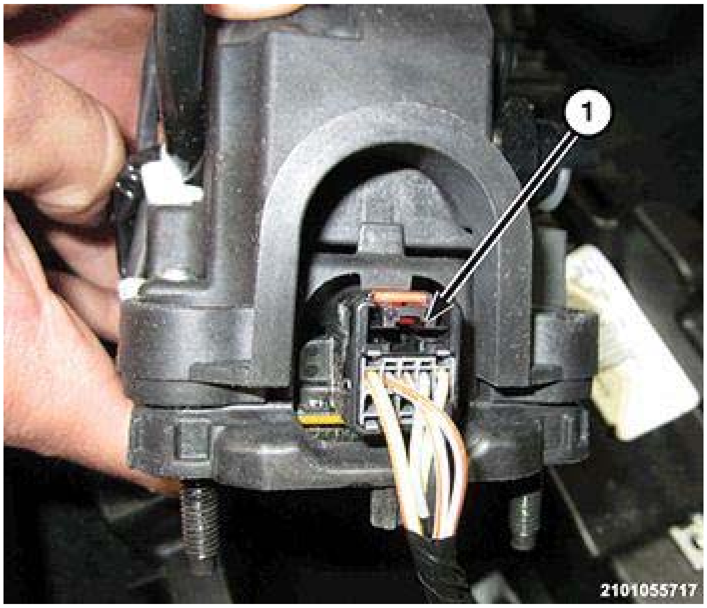


Fig. 304: Shifter Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the shifter wire harness connector (1).
8. Remove the shifter from the vehicle.

INSTALLATION

SHIFTER

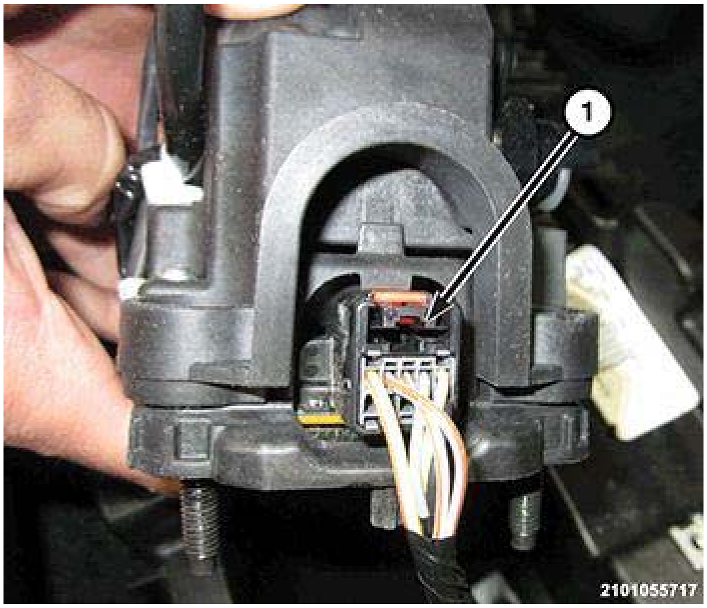


Fig. 305: Shifter Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Connect the wire harness connector (1) prior to installing the shifter to the vehicle.

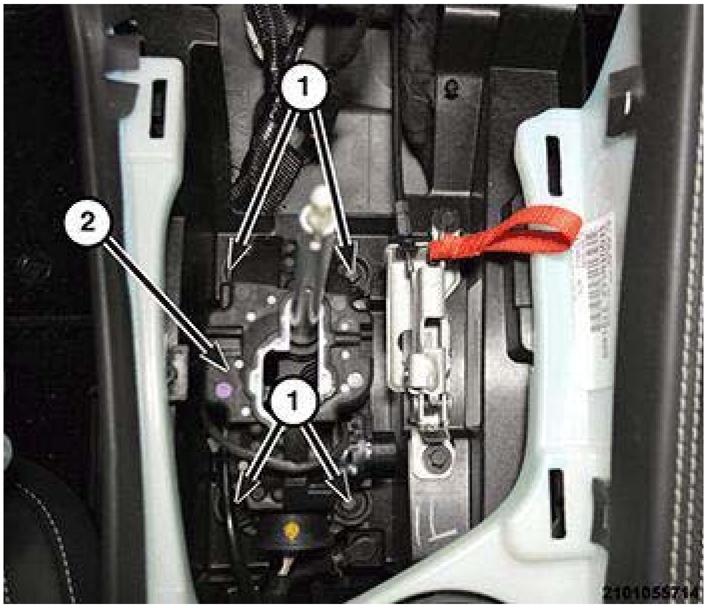


Fig. 306: Shifter Assembly & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the shifter (2) and shifter bolts (1), tighten to the proper (**TORQUE SPECIFICATIONS**).

Fig. 307: Removing/Install Console Bezel Panel
Courtesy of CHRYSLER GROUP, LLC

3. Connect the wire harness connectors and install the console bezel panel (1).

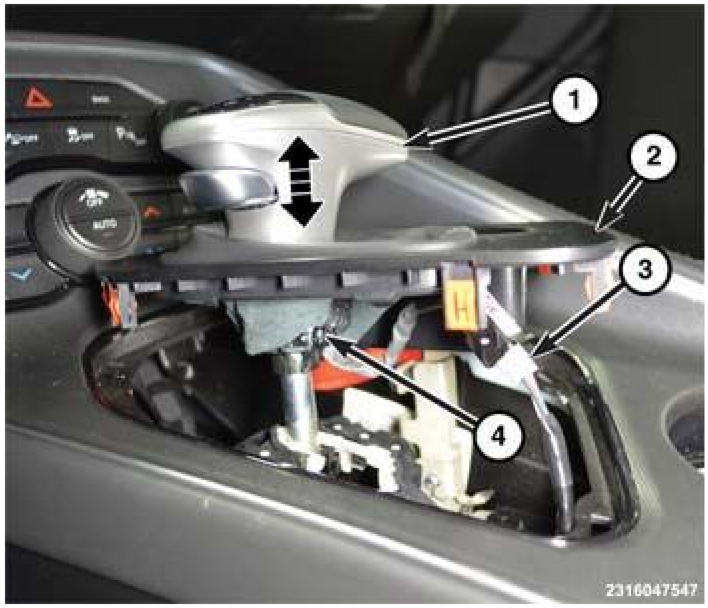


Fig. 308: Automatic Shifter
Courtesy of CHRYSLER GROUP, LLC

4. Install the shifter knob (1) and install the shifter knob screw (4). Tighten the screw securely.
5. Connect the wire harness connector (3).
6. Position the shifter bezel (2) in place and engage the retaining clips.

SOLENOID, TRANSMISSION

DESCRIPTION

DESCRIPTION

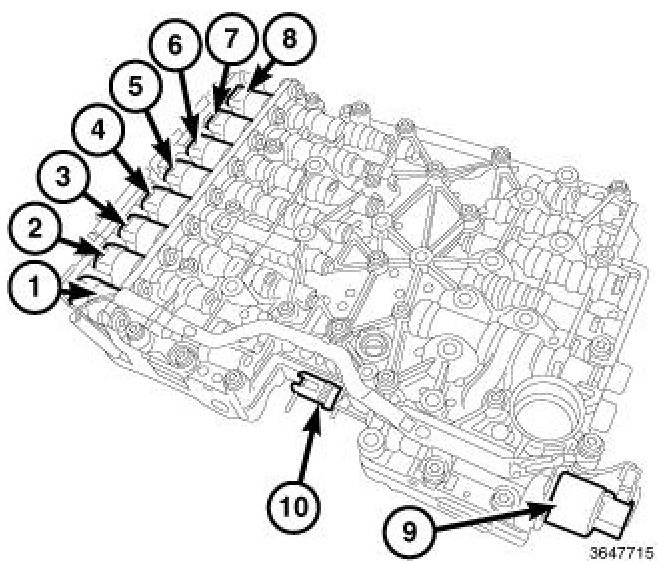


Fig. 309: Solenoid A D E C & Park Release Mechanical Valve
Courtesy of CHRYSLER GROUP, LLC

1 - Solenoid A
2- Solenoid D

3 - Solenoid B
4 - Solenoid E
5 - Solenoid C
6 - TCC Solenoid
7 - Line Pressure Solenoid
8 - Park Release Solenoid
9 - Park Hold Mechanical Solenoid
10 - Park Release Mechanical Valve

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The solenoids are integrated into the Transmission Control Module Assembly (TCMA) of the 8HP transmission and are not replaceable individually.

OPERATION

OPERATION

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The TCM will actuate the valves via solenoids based on the position of the shifter, transmission fluid temperature, engine operating conditions, traction conditions, and driver demands. During a shift, the TCM will actuate the solenoids to match the gear ranges to the optimal torque range of the engine based on the position of the accelerator pedal, shifter, and vehicle speed as determined by the PCM based on input from the Vehicle Speed Sensor (VSS) and ABS module.

SENSOR, SPEED

DESCRIPTION

DESCRIPTION

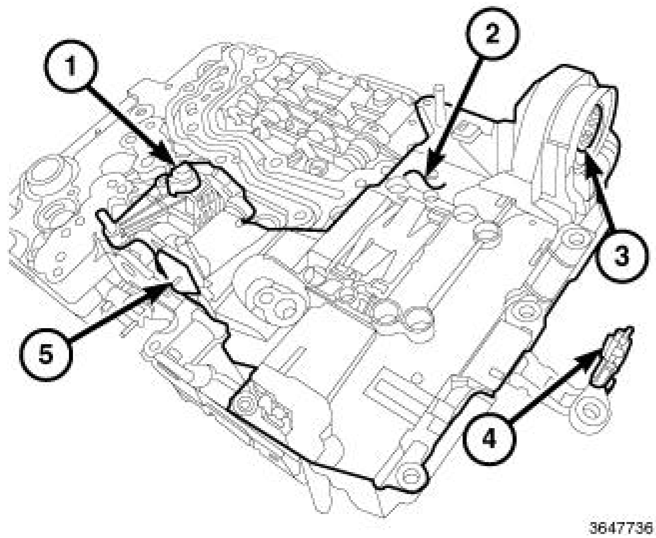


Fig. 310: Input Speed Sensor, Output Speed Sensor, TCM (Includes Transmission Temperature Sensor) & Park Position Sensor

Courtesy of CHRYSLER GROUP, LLC

1 - Input Speed Sensor
2 - TCM (Includes Transmission Temperature Sensor)
3 - External Wire Harness Connector
4 - Output Speed Sensor
5 - Park Position Sensor
Ā

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.**

The input speed sensor (1) and the output speed sensor (4) are integrated components of the TCMA and not serviced individually.

OPERATION

OPERATION

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.**

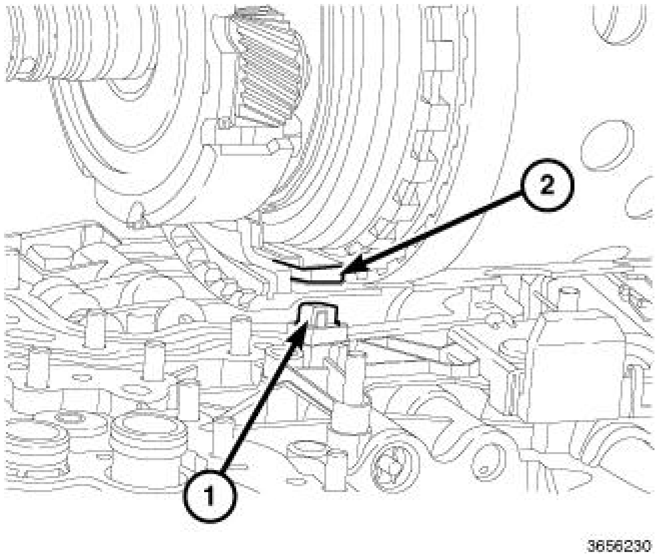


Fig. 311: ISS & Magnetic Ring
Courtesy of CHRYSLER GROUP, LLC

The input speed sensor (ISS) and output speed sensor (OSS) are Hall-effect sensors that measure shaft rotational speed. The ISS (1) is located at the front of the TCMA and reads input shaft speed from the magnetic ring (2) on the P2 carrier.

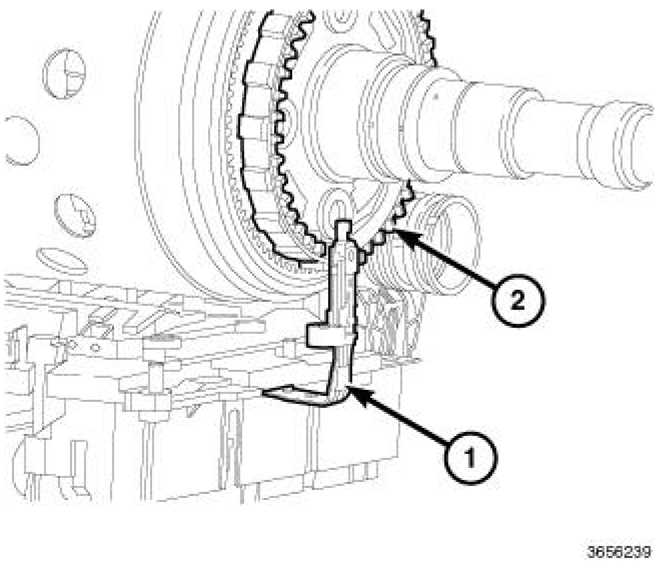


Fig. 312: OSS & P4 Carrier
Courtesy of CHRYSLER GROUP, LLC

The OSS (1) is located at the back of the TCMA and reads output shaft speed from the P4 carrier (2).

TORQUE CONVERTER

DESCRIPTION

DESCRIPTION

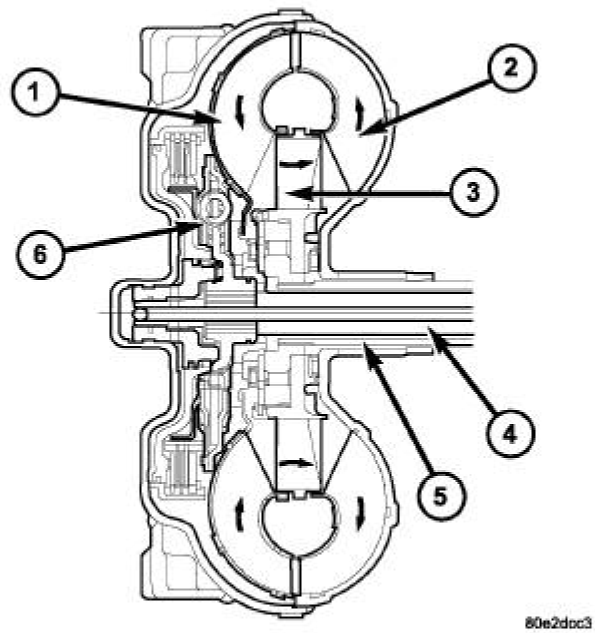


Fig. 313: Torque Converter
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - TURBINE DAMPER

CAUTION: The torque converter must be replaced if a transmission failure resulted in large amounts of metal or fiber contamination in the fluid.

The torque converter is a hydraulic device that couples the engine crankshaft to the transmission. The torque converter consists of an outer shell with an internal turbine (1), a stator (3), an overrunning clutch, an impeller (2), and an electronically applied converter clutch. The converter clutch provides reduced engine speed and greater fuel economy when engaged. Clutch engagement also provides reduced transmission fluid temperatures. The converter clutch engages in third through fifth gears. The torque converter hub drives the transmission oil (fluid) pump.

A turbine damper (6) has been added for some applications to help improve vehicle noise, vibration, and harshness (NVH) characteristics.

The torque converter is a sealed, welded unit that is not repairable and is serviced as an assembly.

IMPELLER

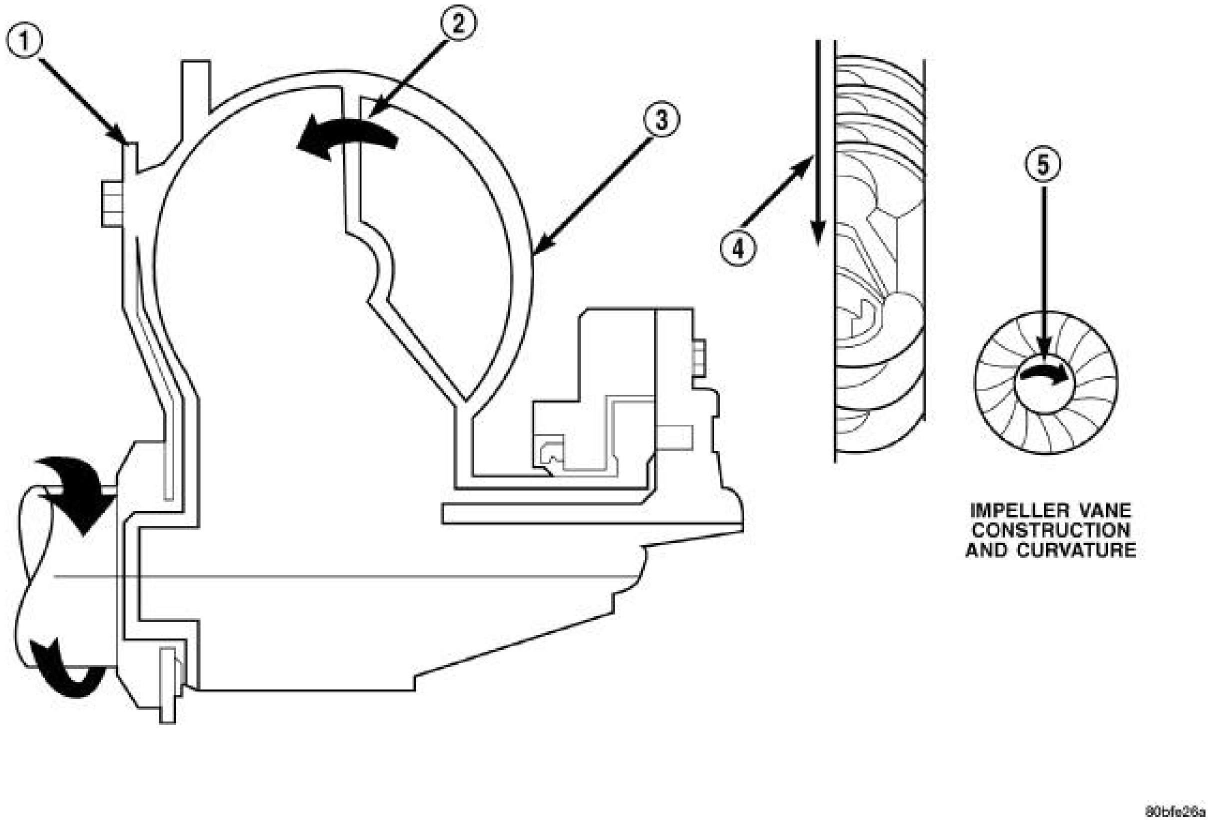


Fig. 314: Identifying Impeller
Courtesy of CHRYSLER GROUP, LLC

1 - ENGINE FLEXPLATE
2 - OIL FLOW FROM IMPELLER SECTION INTO TURBINE SECTION
3 - IMPELLER VANES AND COVER ARE INTEGRAL
4 - ENGINE ROTATION
5 - ENGINE ROTATION

The impeller (3) is an integral part of the converter housing. The impeller consists of curved blades placed radially along the inside of the housing on the transmission side of the converter. As the converter housing is rotated by the engine, so is the impeller, because they are one and the same and are the driving members of the system.

TURBINE

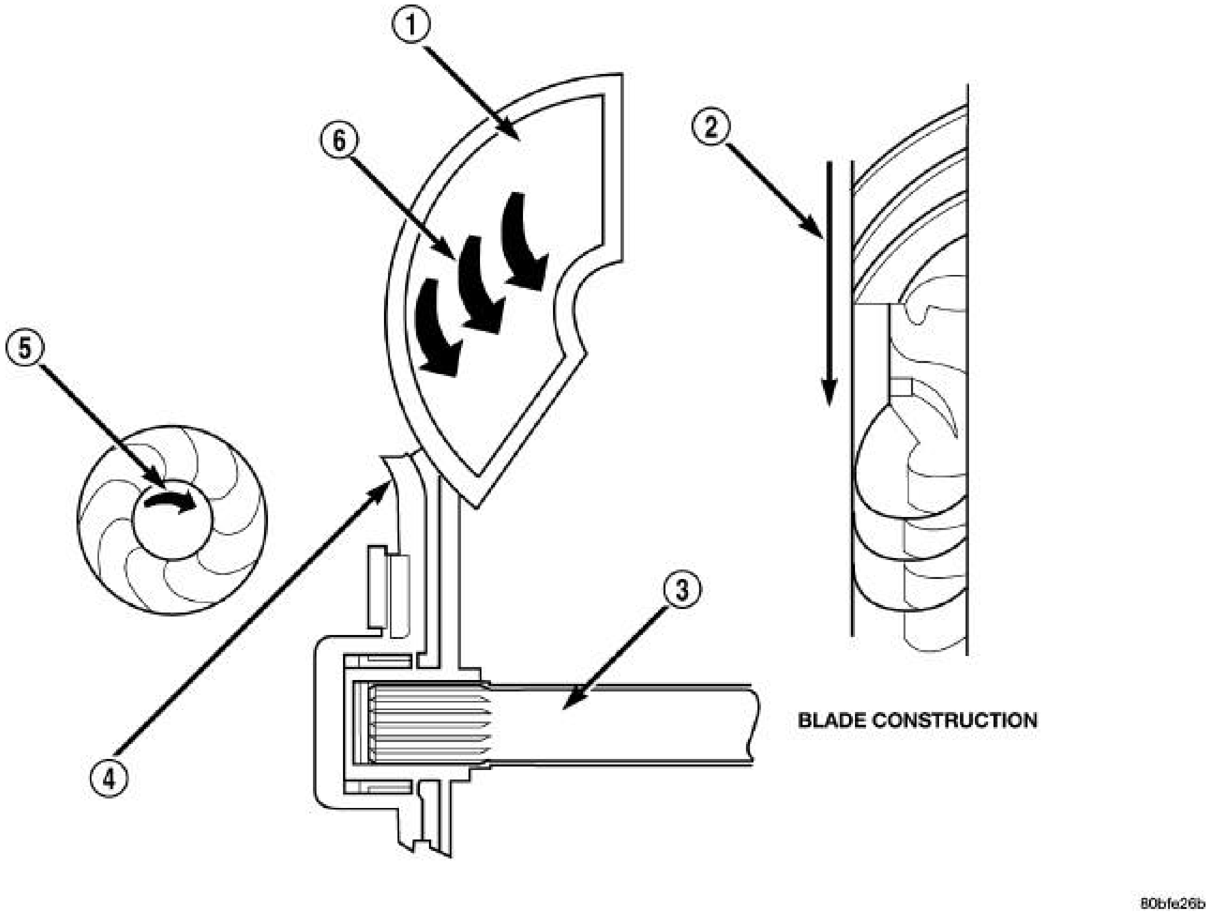


Fig. 315: Identifying Turbine
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE VANE
2 - ENGINE ROTATION
3 - INPUT SHAFT
4 - PORTION OF TORQUE CONVERTER COVER
5 - ENGINE ROTATION
6 - OIL FLOW WITHIN TURBINE SECTION

The turbine (1) is the output, or driven, member of the converter. The turbine is mounted within the housing opposite the impeller, but is not attached to the housing. The input shaft is inserted through the center of the impeller and splined into the turbine. The design of the turbine is similar to the impeller, except the blades of the turbine are curved in the opposite direction.

STATOR

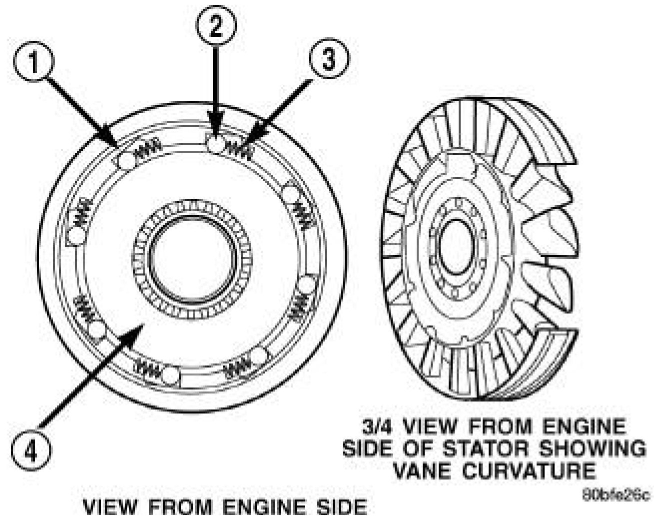


Fig. 316: Identifying Over-Running Clutch
Courtesy of CHRYSLER GROUP, LLC

1 - CAM (OUTER RACE)
2 - ROLLER
3 - SPRING
4 - INNER RACE

The stator assembly (1-4) is mounted on a stationary shaft which is an integral part of the oil pump.

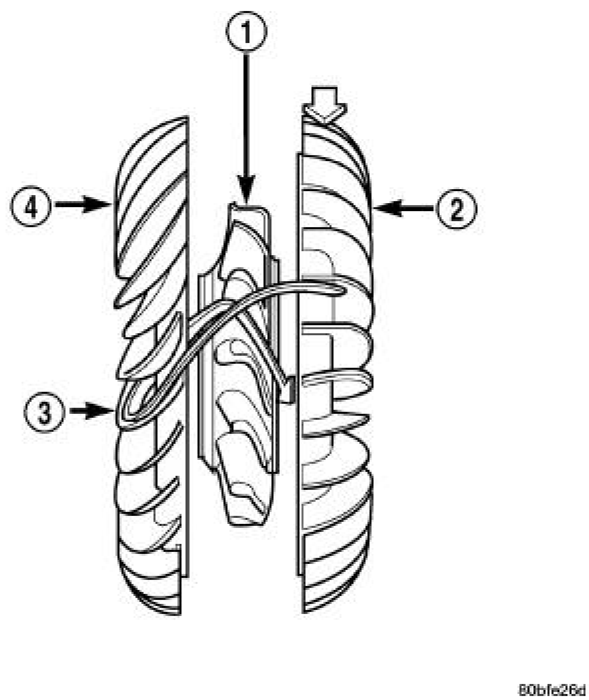


Fig. 317: Identifying Stator Components
Courtesy of CHRYSLER GROUP, LLC

1 - STATOR
2 - IMPELLER
3 - FLUID FLOW

4 - TURBINE

The stator (1) is located between the impeller (2) and turbine (4) within the torque converter case. The stator contains a freewheeling clutch, which allows the stator to rotate only in a clockwise direction. When the stator is locked against the freewheeling clutch, the torque multiplication feature of the torque converter is operational.

TORQUE CONVERTER CLUTCH (TCC)

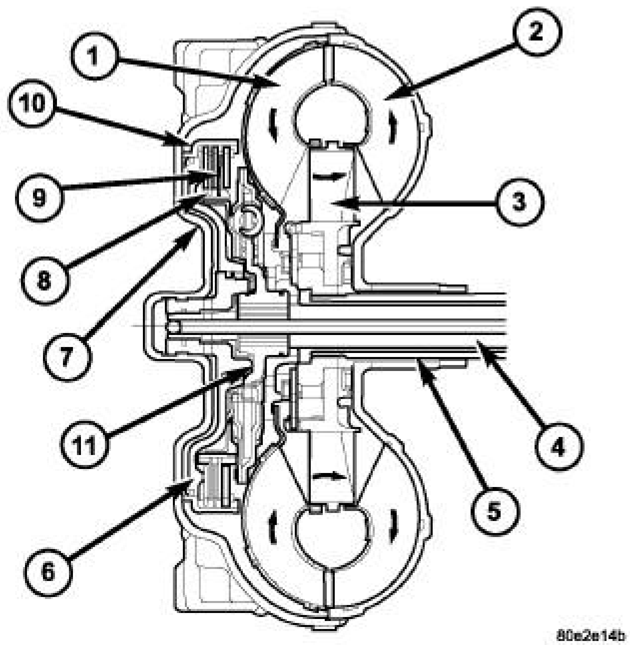


Fig. 318: Identifying Torque Converter Components
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - PISTON
7 - COVER SHELL
8 - INTERNALLY TOOTHED DISC CARRIER
9 - CLUTCH PLATE SET
10 - EXTERNALLY TOOTHED DISC CARRIER
11 - TURBINE DAMPER

The TCC (9) was installed to improve the efficiency of the torque converter that is lost to the slippage of the fluid coupling. Although the fluid coupling provides smooth, shock-free power transfer, it is natural for all fluid couplings to slip. If the impeller and turbine were mechanically locked together, a zero slippage condition could be obtained. A hydraulic piston with friction material was added to the turbine assembly to provide this mechanical lock-up.

In order to reduce heat build-up in the transmission and buffer the powertrain against torsional vibrations, the TCM can duty cycle the torque converter lock-up solenoid to achieve a smooth application of the torque converter clutch. This function, referred to as Electronically Modulated Converter Clutch (EMCC) can occur at various times depending on the following variables:

- Shift lever position
- Current gear range
- Transmission fluid temperature
- Engine coolant temperature
- Input speed
- Throttle angle
- Engine speed

OPERATION

OPERATION

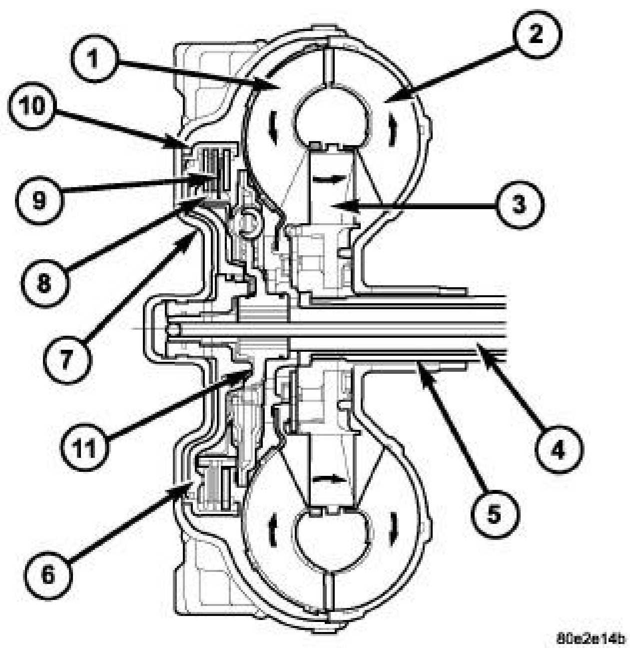


Fig. 319: Identifying Torque Converter Components
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - PISTON
7 - COVER SHELL
8 - INTERNALLY TOOTHED DISC CARRIER

9 - CLUTCH PLATE SET	
10 - EXTERNALLY TOOTHED DISC CARRIER	
11 - TURBINE DAMPER	

The torque converter housing has a unique shape to incorporate the torque converter clutch and flex plate connection. The torque converter uses the typical turbine, impeller and stator assemblies found in a standard torque converter assembly. The torque converter drives the pump through the splines on the inside of the hub. The torque converter uses a multi-disc torque converter clutch system that improves the durability and the holding pressure in the lock-up circuit. The torque converter incorporates a turbine dampening system. This system suppresses torsional vibrations from the engine to ensure optimal shift quality and reduce noise and vibration concerns.

TCC RELEASE When the TCC is open, the TCC piston is pushed to its default position by torque converter chamber pressure. The torque converter switch valve (SV-TC) provides pressure for torque converter operation which has been regulated by the converter pressure regulating valve (TC-V). After exiting the torque converter, fluid moves into the cooling and lubrication circuits. The converter pressure retention valve (TCH1-V) ensures the torque converter pressure is a minimum of 0.35 bar (5 psi) when the TCC is open.

TCC APPLY When the TCC solenoid is energized, fluid is directed to the torque converter switch valve (SV-TC) and TCC lockup valve (TCC-V). The TCC lockup valve directs fluid to the TCC and torque converter chamber. The torque converter switch valve directs fluid exiting the converter chamber to a secondary pressure retention valve (TCH2-V) which is calibrated to retain 1.0 bar (14.5 psi) of pressure in the converter. The torque converter switch valve also directs line pressure to the cooler and lubrication circuit.

TURBINE

When the fluid that was put into motion by the impeller blades strikes the blades of the turbine, some of the energy and rotational force is transferred into the turbine and the input shaft. This causes both of them (turbine and input shaft) to rotate in a clockwise direction following the impeller. As the fluid is leaving the trailing edges of the turbine's blades it continues in a "hindering" direction back toward the impeller. If the fluid is not redirected before it strikes the impeller, it will strike the impeller in such a direction that it would tend to slow it down.

STATOR

Torque multiplication is achieved by locking the stator's over-running clutch to its shaft. Under stall conditions (the turbine is stationary), the oil leaving the turbine blades strikes the face of the stator blades and tries to rotate them in a counterclockwise direction. When this happens the over-running clutch of the stator locks and holds the stator from rotating. With the stator locked, the oil strikes the stator blades and is redirected into a "helping" direction before it enters the impeller. This circulation of oil from impeller to turbine, turbine to stator, and stator to impeller, can produce a maximum torque multiplication of about 2.0:1. As the turbine begins to match the speed of the impeller, the fluid that was hitting the stator in such as way as to cause it to lock-up is no longer doing so. In this condition of operation, the stator begins to free wheel and the converter acts as a fluid coupling

TORQUE CONVERTER CLUTCH (TCC)

In a standard torque converter, the impeller (2) and turbine are rotating at about the same speed and the stator (3) is freewheeling, providing no torque multiplication. By applying the turbines piston and friction material (9) a total converter engagement can be obtained. The result of this engagement is a direct 1:1 mechanical link

between the engine and the transmission.

HYDRO-MECHANICAL AND ELECTRICAL

The Torque Converter Clutch (TCC) is engaged and released by the Transmission Control Module Assembly (TCMA). The TCC can be engaged and controlled in any forward gear from 1 through 8. In addition, the 8HP transmission incorporates a neutral idle control (NIC) function. Instead of the engine continuing to drive the converter when the vehicle comes to rest, the converter is partially disconnected from the driveline so only a slight residual load remains. Decoupling of the torque converter during NIC is accomplished by allowing clutch B to slip.

REMOVAL

REMOVAL

1. Remove the transmission from the vehicle. Refer to **REMOVAL**.
2. Place a suitable drain pan under the torque converter housing end of the transmission.

CAUTION: Verify that transmission is secure on the lifting device or work surface, the center of gravity of the transmission will shift when the torque converter is removed creating an unstable condition. The torque converter is a heavy unit. Use caution when separating the torque converter from the transmission.

3. Pull the torque converter forward until the center hub clears the oil pump seal.
4. Separate the torque converter from the transmission.

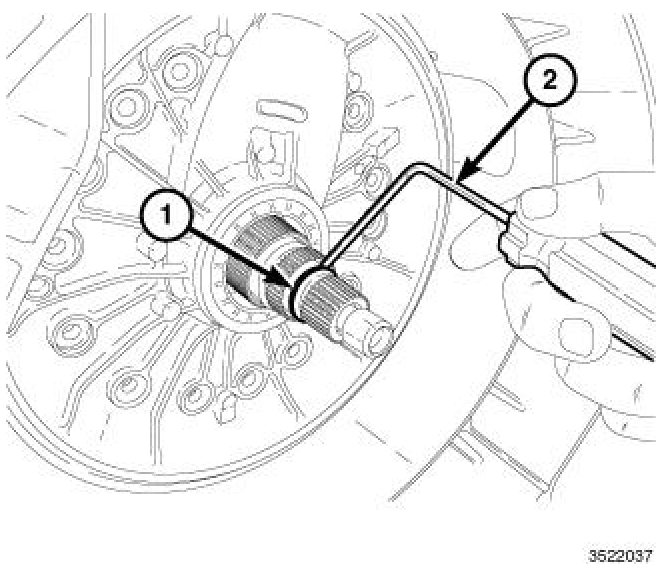


Fig. 320: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

5. Check the input shaft O-ring (1) for damage, replace if necessary.

INSTALLATION

INSTALLATION

NOTE: Check the torque converter hub for sharp edges, burrs, scratches, or nicks. Polish the hub with 320/400 grit paper or crocus cloth if necessary. The hub must be smooth to avoid damaging the pump seal at installation.

1. Lubricate the oil pump seal lip with transmission fluid.

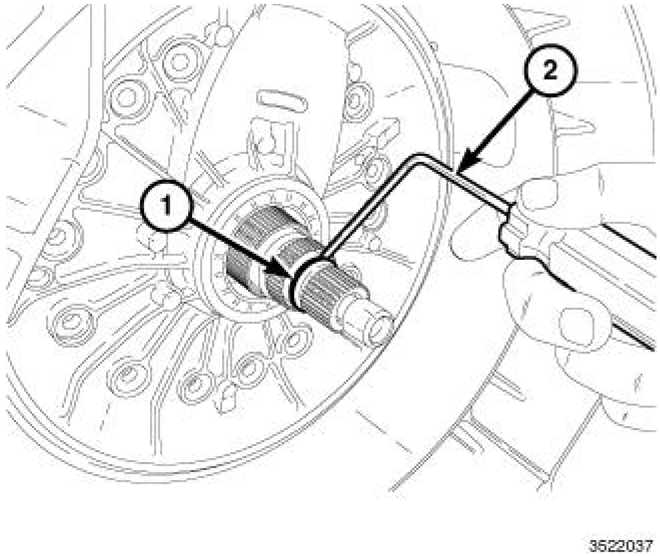


Fig. 321: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

2. Check the input shaft O-ring (1) for any damage. Replace if necessary.
3. Place the torque converter in position on the transmission.

CAUTION: Do not damage oil pump seal or converter hub while inserting torque converter into the front of the transmission.

4. Align the torque converter to the oil pump seal opening.
5. Insert the torque converter hub into the oil pump drive gear.
6. While pushing the torque converter inward, rotate the torque converter until the torque converter is fully seated into the oil pump drive gear.

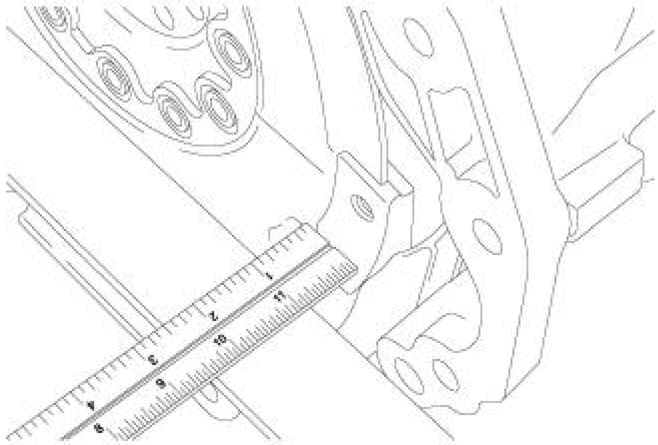


Fig. 322: Straightedge
Courtesy of CHRYSLER GROUP, LLC

7. Check the torque converter seating with a scale and straightedge. The surface of the torque converter lugs should be at least 19 mm (3/4 in.) to the rear of the straightedge when the torque converter is fully seated.
8. If necessary, temporarily secure the torque converter with a C-clamp attached to the torque converter housing.
9. Install the transmission. Refer to **INSTALLATION**.
10. Perform the TRANSMISSION FILL AFTER SERVICE procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

VALVE BODY

DESCRIPTION

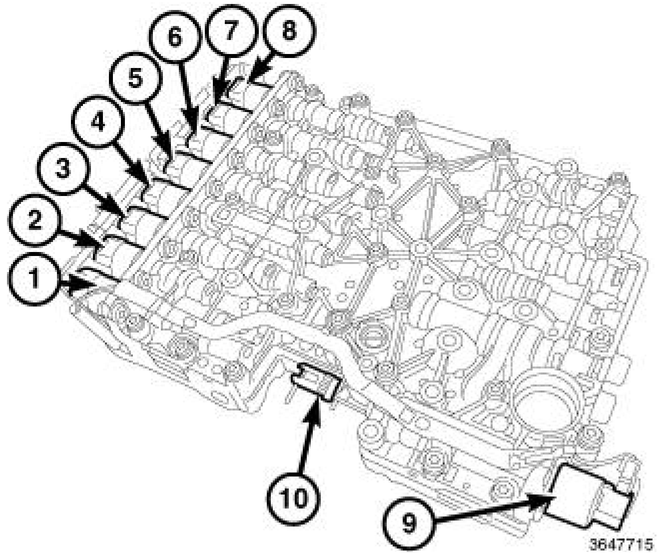
DESCRIPTION

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The valve body includes the Transmission Control Module (TCM), all solenoids and sensors, and can be referred to as the Transmission Control Module Assembly (TCMA). The TCM is attached to the valve body between the transmission case and the valve body. If any component of the valve body **including the TCM** sensors or solenoids need replaced, the complete TCMA (valve body) must be replaced. For replacement of the TCMA (valve body), refer to **VALVE BODY, REMOVAL**.

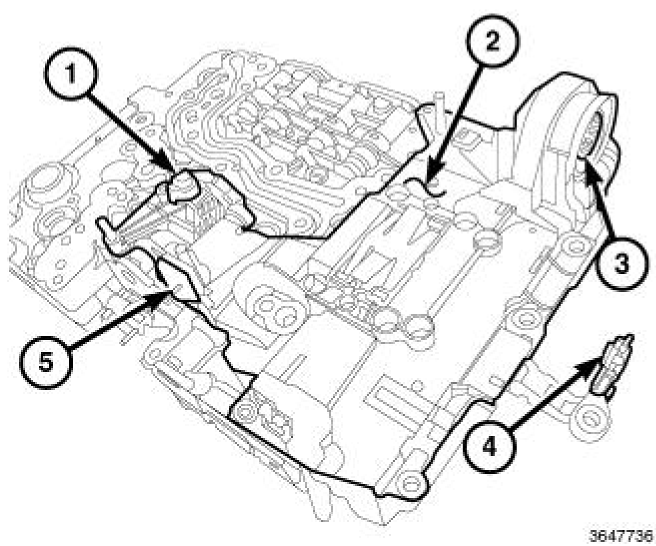
OPERATION

OPERATION



[Fig. 323: Solenoid A D E C & Park Release Mechanical Valve]
Courtesy of CHRYSLER GROUP, LLC

1 - Solenoid A
2- Solenoid D
3 - Solenoid B
4 - Solenoid E
5 - Solenoid C
6 - TCC Solenoid
7 - Line Pressure Solenoid
8 - Park Release Solenoid
9 - Park Hold Mechanical Solenoid
10 - Park Release Mechanical Valve



[Fig. 324: Input Speed Sensor, Output Speed Sensor, TCM (Includes Transmission Temperature Sensor) & Park Position Sensor]
Courtesy of CHRYSLER GROUP, LLC

1 - Input Speed Sensor
2 - TCM (Includes Transmission Temperature Sensor)
3 - External Wire Harness Connector
4 - Output Speed Sensor
5 - Park Position Sensor

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The valve body, which includes the Transmission Control Module (TCM), controls the delivery and pressure of transmission fluid. The TCM is integrated into the valve body. The TCM regulates the amount of hydraulic pressure used to engage the clutches and the Torque Converter Clutch (TCC), in addition to directing hydraulic pressure to engage or release any given clutch for any given required gear. The TCM will actuate the valves via solenoids based on the position of the shifter, transmission fluid temperature, engine operating conditions, traction conditions and driver demands. During a shift, the TCM will actuate the solenoids to match the gear ranges to the optimal torque range of the engine based on the position of the accelerator pedal, shifter and vehicle speed as determined by the Powertrain Control Module (PCM) based on input from the Vehicle Speed Sensor (VSS) and Anti-lock Brake System (ABS) module. Due to the complexity of the 8HP transmission control system, always refer to the appropriate transmission electrical/electronic Diagnostics & Testing article when attempting to diagnose transmission problems.

If the Transmission Control Module Assembly (TCMA) is replaced, it **must** be programmed and a drive learn needs to be performed before returning the vehicle to the customer. Refer to **STANDARD PROCEDURE** for programming and drive learn procedures .

REMOVAL

REMOVAL 8HP90

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Drain the transmission fluid into a clean container. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

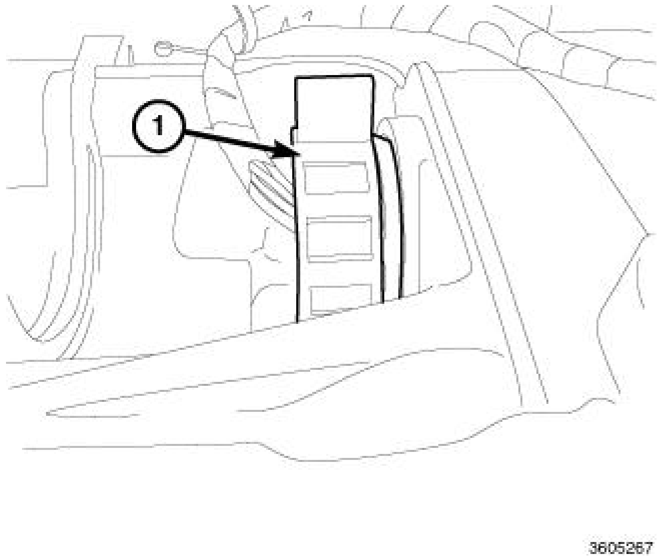


Fig. 325: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

3. Turn the locking mechanism lock (1) of the transmission wire harness connector counter-clockwise and disconnect the wire harness from the transmission.

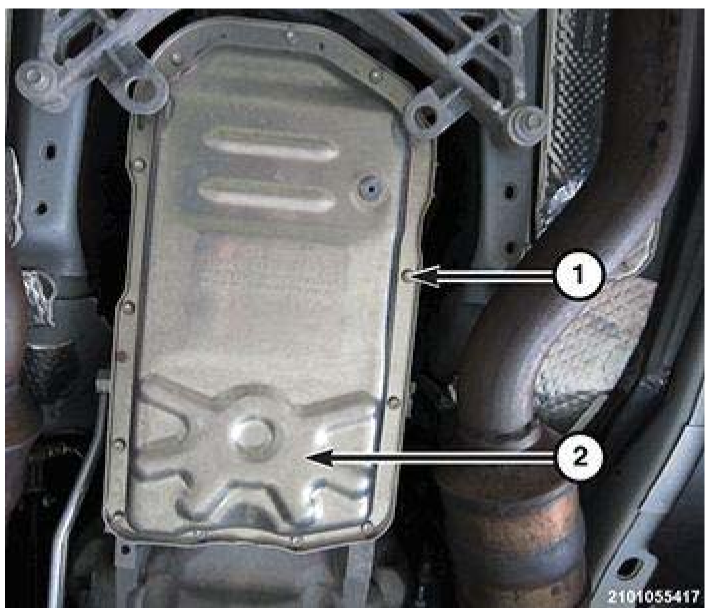
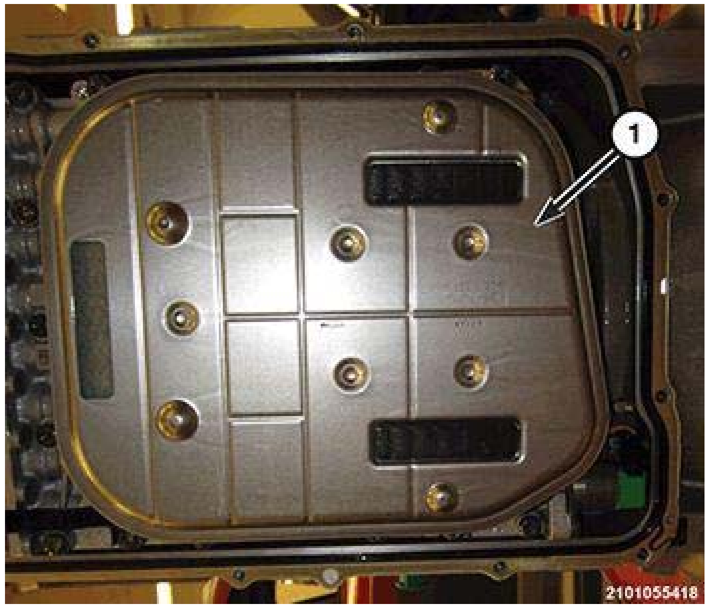


Fig. 326: Transmission Oil Pan & Bolts
Courtesy of CHRYSLER GROUP, LLC

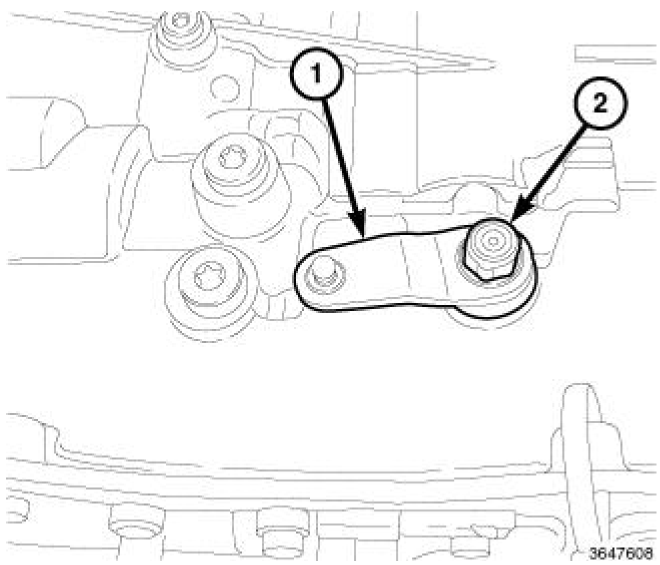
NOTE: **Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.**

4. Remove the transmission oil pan bolts (1).
5. Remove the transmission oil pan (2) and gasket.



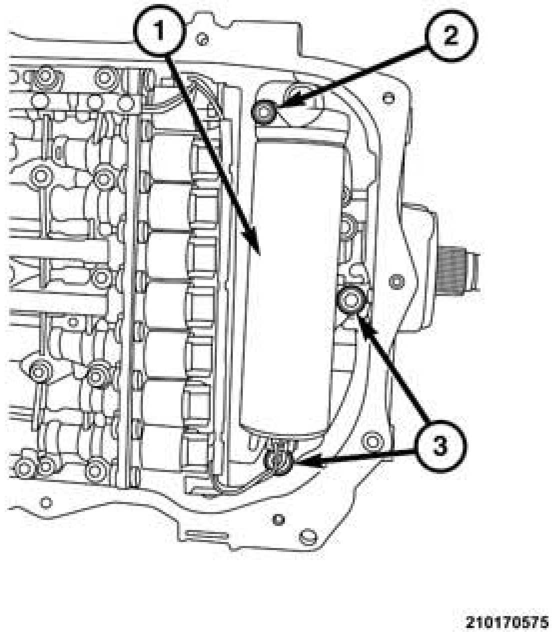
[**Fig. 327: Transmission Oil Filter**]
Courtesy of CHRYSLER GROUP, LLC

6. Remove the transmission oil filter (1).



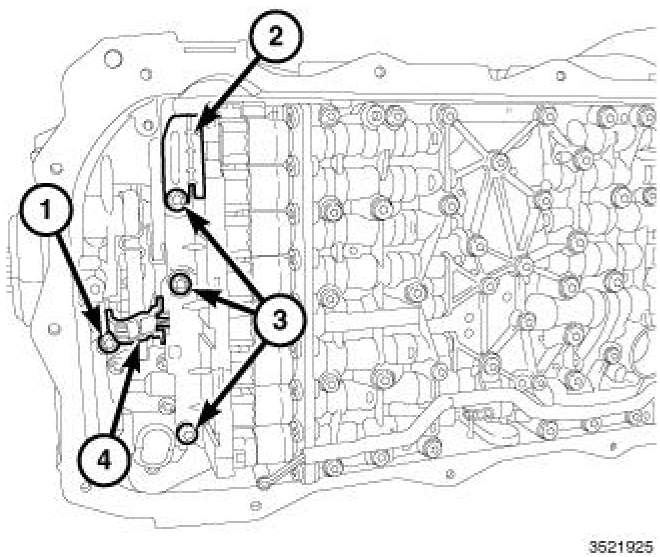
[**Fig. 328: Manual Park Release Lever Retaining Nut & Lever**]
Courtesy of CHRYSLER GROUP, LLC

7. Remove the Manual Park Release (MPR) lever nut (2) and remove the MPR lever (1).
8. Reinstall the MPR lever 180 degrees offset. Using a tie strap, secure the lever into position so the park release fork remains in the same position for installation of the valve body assembly.



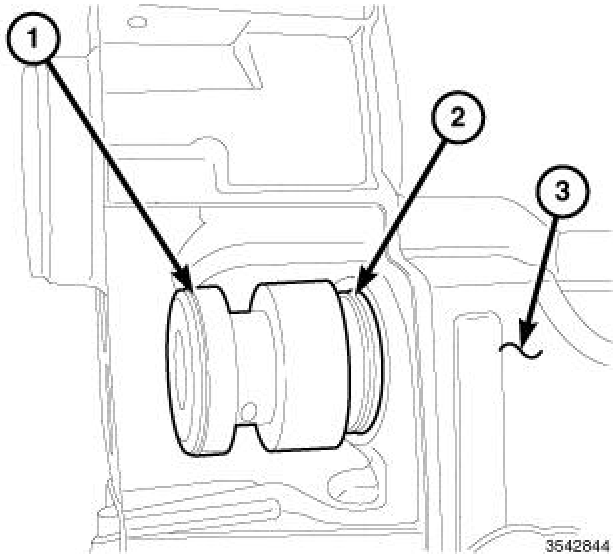
[Fig. 329: Hydraulic Impulse Storage Unit & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

9. If equipped, disconnect the Hydraulic Impulse Oil Storage (HIS) connector.
10. If equipped, remove three HIS bolts (2 and 3) and the accumulator (1).



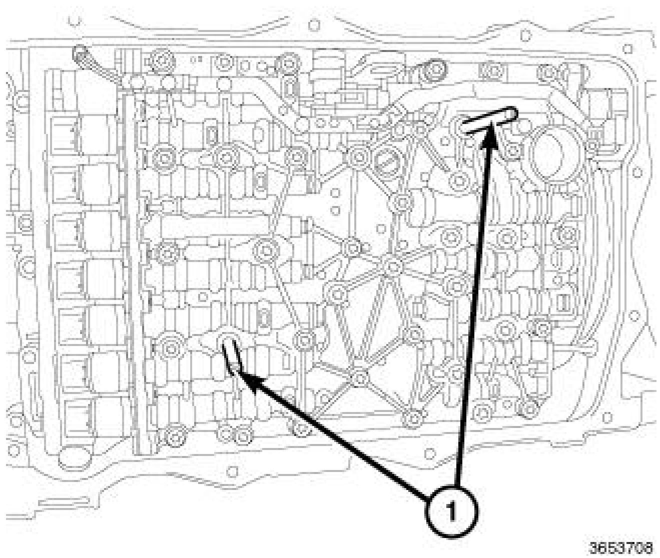
[Fig. 330: Valve Body Assembly End Retainer Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

11. Remove the valve body assembly end bolts (3).
12. Lift the wire harness connector lock (2).
13. Remove the speed sensor bolt (1) and pull the speed sensor (4) loose from the case.



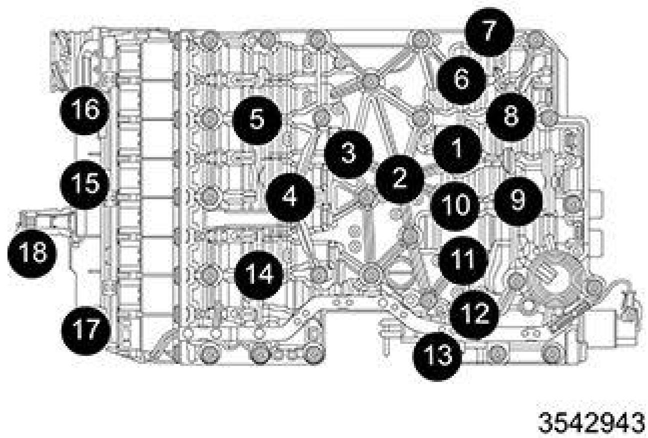
[Fig. 331: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case]
Courtesy of CHRYSLER GROUP, LLC

14. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully pull the electrical harness insulator (2) straight out from the transmission case (3).



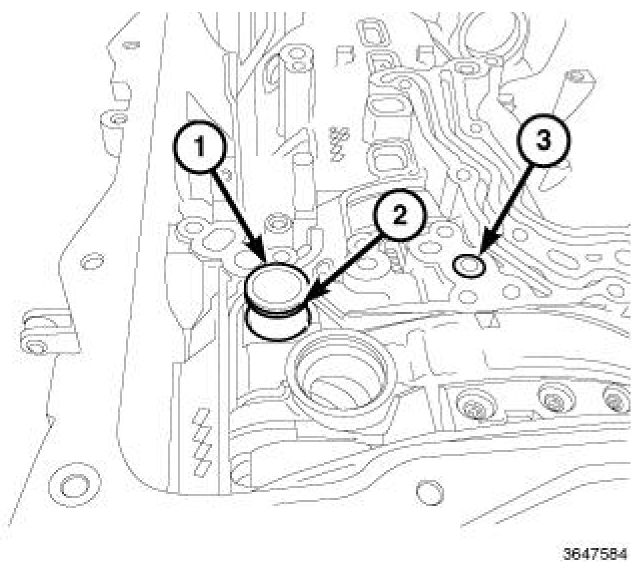
[Fig. 332: Valve Body Alignment Pins]
Courtesy of CHRYSLER GROUP, LLC

15. Remove two bolts and hand install (special tool #10379, Pins, Valve Body Alignment) (1).
16. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while removing the remaining fasteners.



[Fig. 333: Valve Body Bolts Loosening And Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

17. Remove remaining valve body assembly bolts.
18. Remove the valve body assembly from the transmission.



[Fig. 334: Fluid Port, Two O-Rings, Compression Seal](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The fluid port may remain in the valve body upon removal, remove and discard the O-rings.**

19. Remove the fluid transfer port (1) from the transmission.
20. Remove and discard the O-ring (2) and seal (3).

INSTALLATION

INSTALLATION 8HP90

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD).**

Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

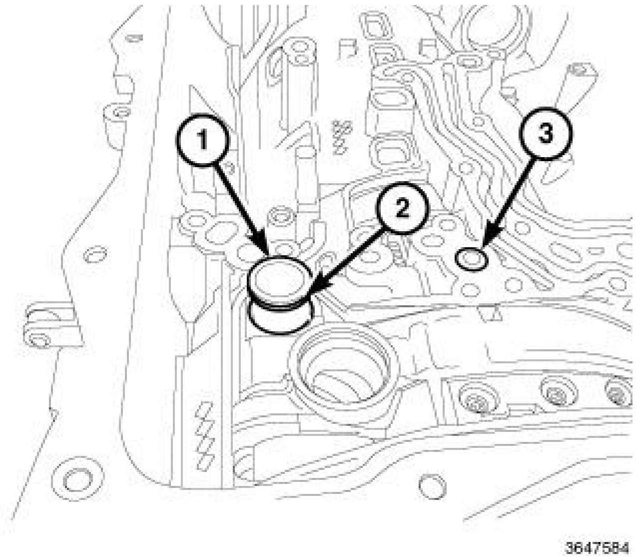


Fig. 335: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install the fluid port (1) with **NEW** O-rings (2) and seal (3) to the valve body.

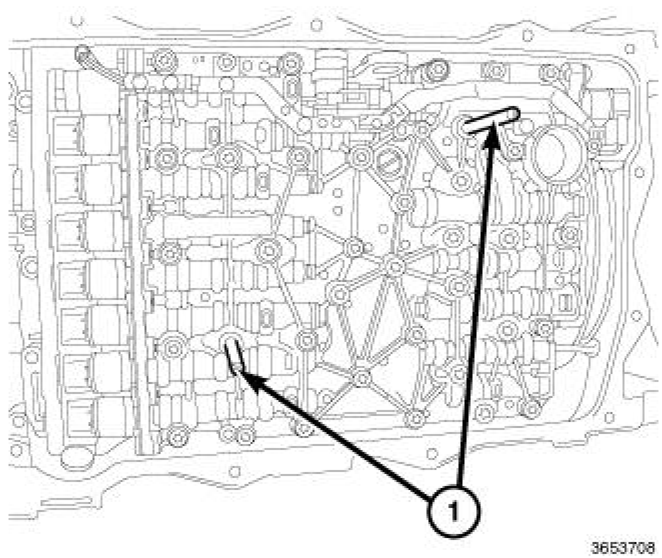
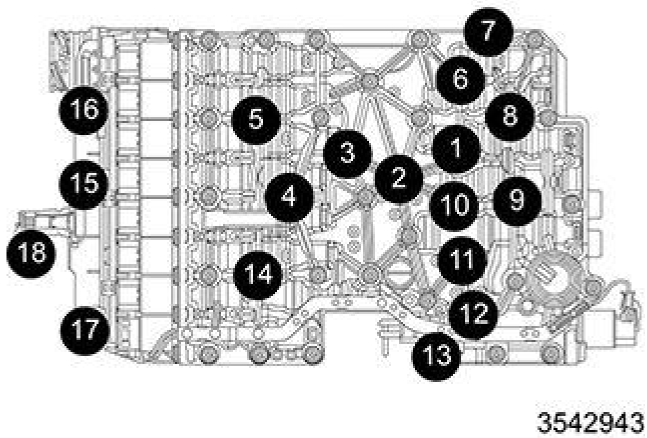


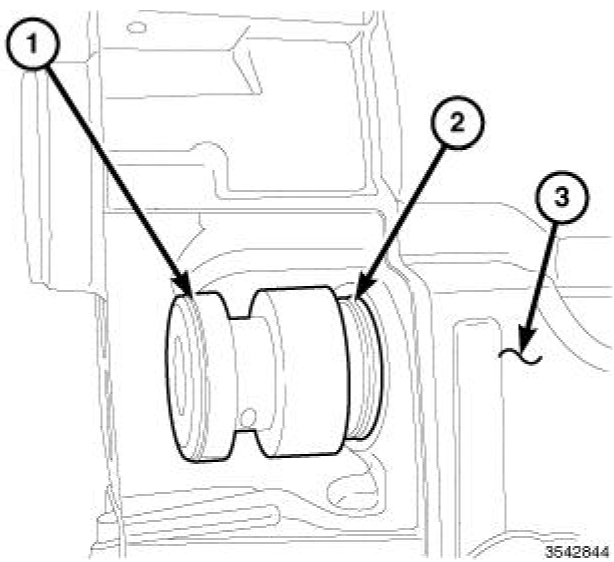
Fig. 336: Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

2. Install the valve body assembly to the transmission using the previously installed (1) (special tool #10379, Pins, Valve Body Alignment) as a guide.
3. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while installing the remaining fasteners.



[Fig. 337: Valve Body Bolts Loosening And Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

4. Install the valve body assembly bolts not including 16-18 and hand tighten.
5. Remove the pins and install the remaining bolts.



[Fig. 338: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case]
Courtesy of CHRYSLER GROUP, LLC

6. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully install the electrical harness insulator (2) to the transmission case (3).

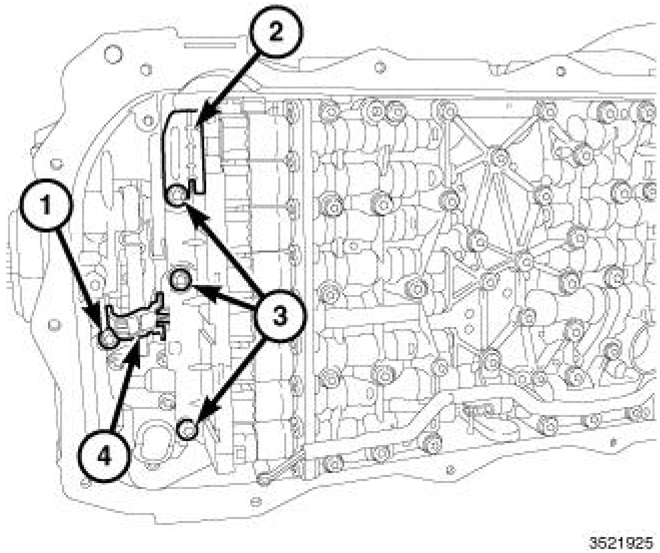


Fig. 339: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Lock the electrical connector lock (2) to the internal harness end.
8. Install the speed sensor (4) to the case install the speed sensor bolt (1) and tighten to the proper **SPECIFICATIONS** .

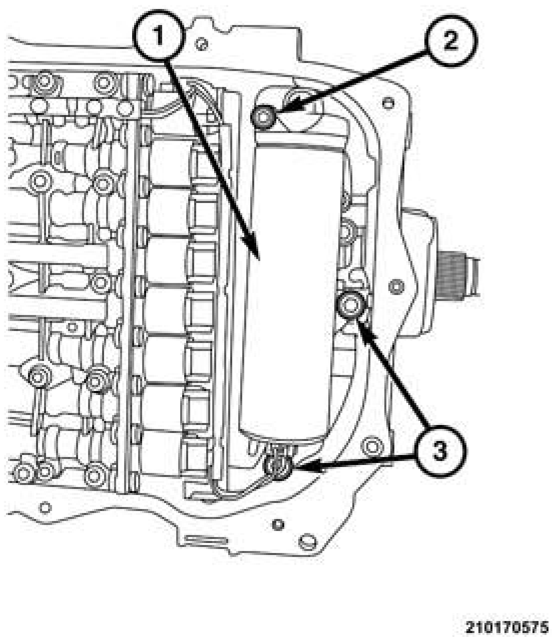


Fig. 340: Hydraulic Impulse Storage Unit & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. If equipped, install the Hydraulic Impulse Oil Storage (HIS) accumulator (1).
10. Tighten the bolts (2 and 3) to the proper **SPECIFICATIONS** .
11. Connect the HIS wire harness connector.
12. Install the valve body assembly end bolts (3) and hand tighten.

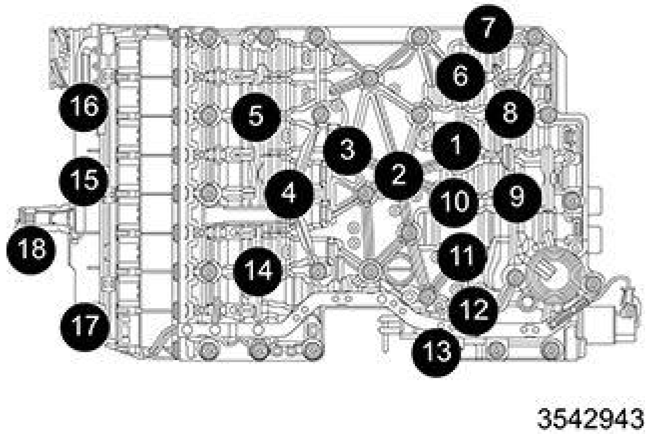


Fig. 341: Valve Body Bolts Loosening And Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

13. Tighten the valve body bolts in the sequence shown to 6 Nm (53 in.-lbs.).

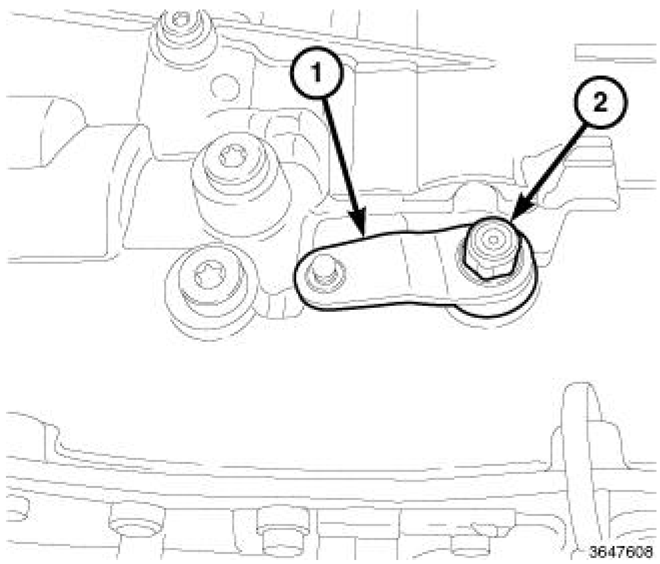


Fig. 342: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

14. Remove the tie strap and return the Manual Park Release (MPR) lever (1) to the original position, tighten the MPR lever nut (2) to the proper **SPECIFICATIONS** .

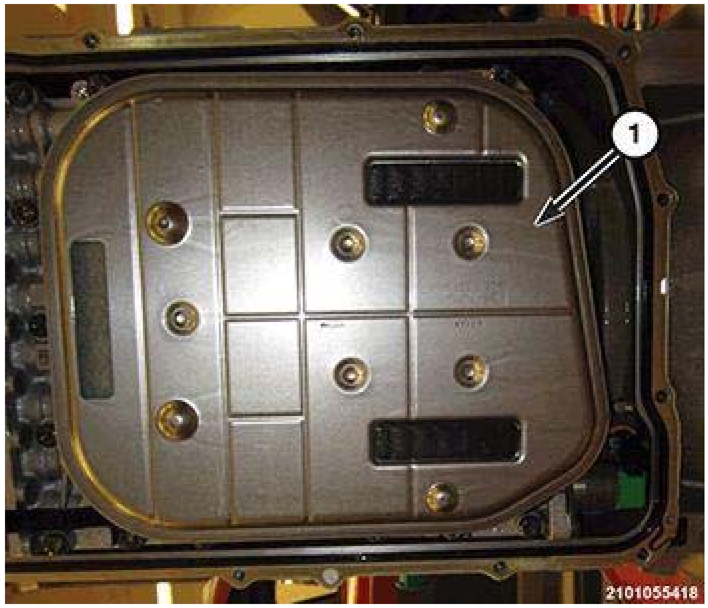


Fig. 343: Transmission Oil Filter
Courtesy of CHRYSLER GROUP, LLC

15. Install the transmission oil filter (1).

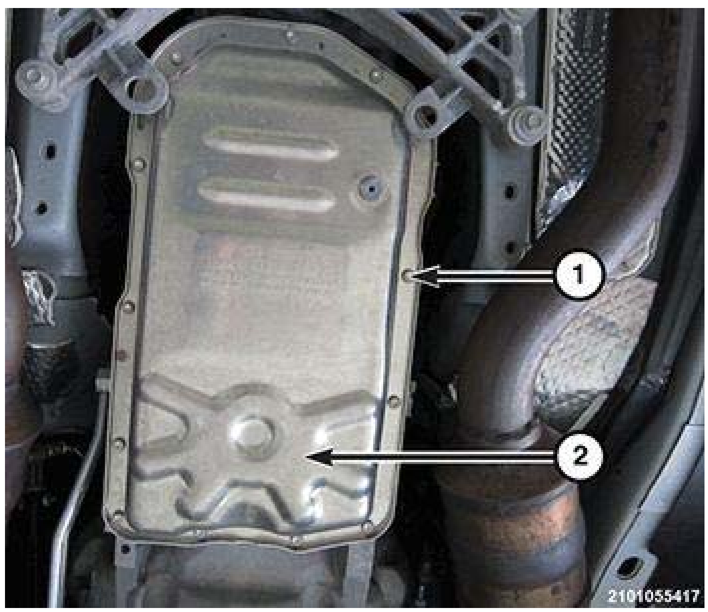
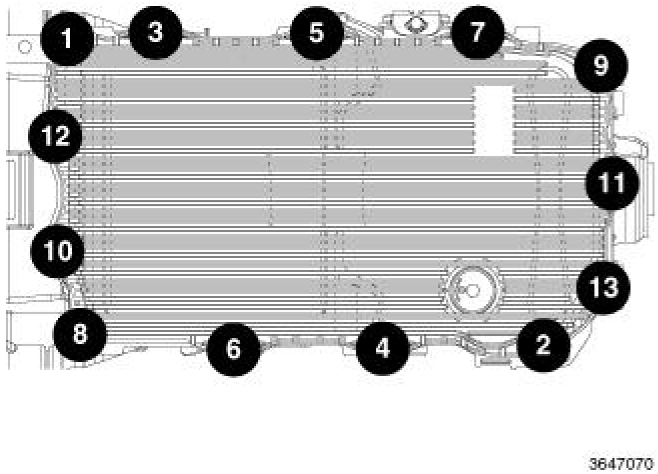


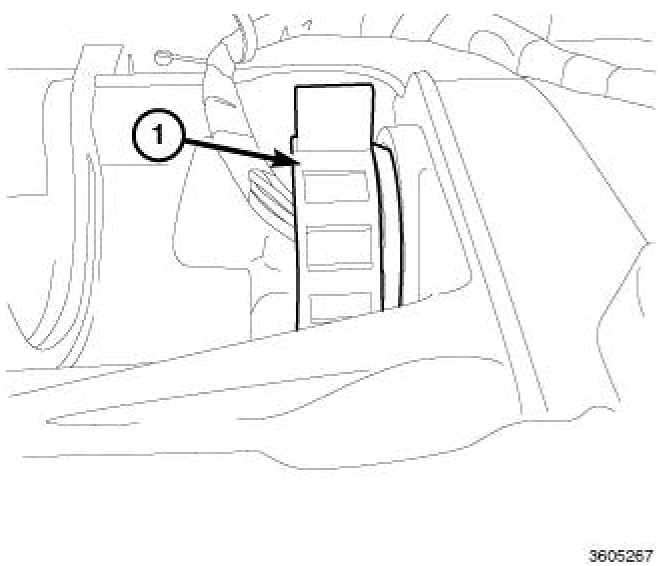
Fig. 344: Transmission Oil Pan & Bolts
Courtesy of CHRYSLER GROUP, LLC

16. Install the transmission oil pan gasket, the oil pan (2) and the bolts (1).



[Fig. 345: Oil Pan Retaining Bolts Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

17. Tighten the transmission oil pan bolts to 10 Nm (89 in.-lbs.) in the sequence shown.



[Fig. 346: Adapter Plug Connector]
Courtesy of CHRYSLER GROUP, LLC

18. Connect the transmission wire harness connector (1).

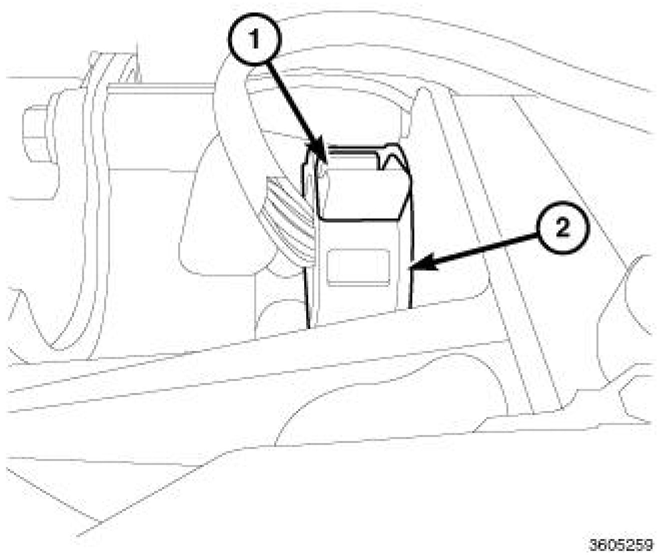


Fig. 347: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

19. Turn the locking mechanism (1) of the transmission wire harness connector clockwise to lock it in place.
20. If the valve body is replaced, program the TCM. Refer to **STANDARD PROCEDURE** .
21. Perform the TRANSMISSION FILL AFTER SERVICE procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
22. Perform the TRANSMISSION VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

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Article GUID: A00735869

BARTEC TPMS RESET PROCEDURE (W/ 315 MHz SENSOR)

Chrysler2

BARTEC TPMS RESET PROCEDURE (W/ 315 MHZ SENSOR)

Drive Relearn

1. Inflate Tires to placard.
2. Activate sensors to verify ALL sensors are working.
3. Drive for up to 20 minutes above 15 mph. Process complete when TPMS Light goes off.

NOTE: **For best results, use highway driving to complete relearn.**

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Article GUID: A00860094

DESCRIPTION

DESCRIPTION

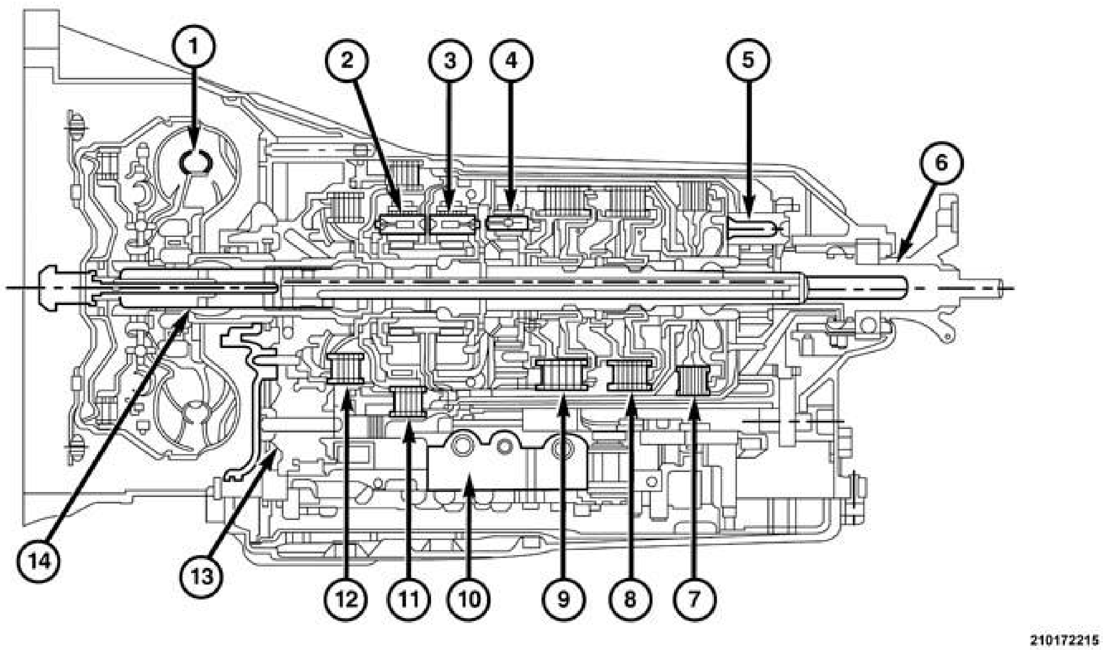


Fig. 1: 8HP45/845RE Automatic Transmission
Courtesy of CHRYSLER GROUP, LLC

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid, see FLUIDS, LUBRICANTS AND GENUINE PARTS located in owners manual.

The transmission case is a single-piece unit. The starter pocket, cooler line fittings, and manual park release lever are located on the driver's side of the case. The electrical connector and oil fill plug are located on the passenger side of the case. This transmission uses a flanged output shaft connection.

OPERATION

OPERATION

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid see, FLUIDS, LUBRICANTS AND GENUINE PARTS located in owners manual.

The 8HP45/845RE is an electronic eight-speed automatic transmission.

- The Transmission Control Module Assembly (TCMA), which is integrated into the valve body, provides fully synchronized clutch-to-clutch shifting through four planetary gear sets.
- The TCMA includes a mounting plate that holds the Transmission Control Module (TCM) and a molded wiring harness for connection to various transmission sensors and solenoids.
- The valve body assembly contains all the sensors and solenoids required for operation, completely inside the transmission. Eight speeds allow the engine to maintain its optimal RPM range, increasing fuel economy and performance.
- Transmission control is performed by the TCM based on hard-wired and CAN bus signals from sensors and modules.
- The TCM receives driveability data from the Powertrain Control Module (PCM) and other modules over the CAN-C bus.
- It also receives shift lever position information from the electronic shifter over a dedicated transmission CAN bus.
- The TCM processes this input data and controls operation of the torque converter clutch, park lock system, solenoid valves, and pressure regulating valve.
- The input and output speed sensors are Hall-effect sensors that measure shaft rotational speed.
- The input speed sensor is located at the top, near the center, of the of the TCMA and reads input shaft speed from the magnetic ring on the P2 carrier.
- The output speed sensor is located at the back of the TCMA and reads output shaft speed from the P4 carrier

FILTER SERVICE The 8HP45/845RE has a conventional fluid sump design, however, the filter is integrated into the oil pan resulting in a lower profile for improved vehicle packaging. The oil pan gasket is reusable providing it is not damaged during removal.

FLUID CHECK AND FILL A fluid fill tube and indicator are not provided. All work is performed under the vehicle while raised on a hoist. In the event of a transmission shift quality concern, a fluid leak, or in conjunction with a transmission repair, the transmission fluid level must be validated and topped off as necessary. The procedure involves the use of a scan tool to monitor transmission fluid temperature. Specific service procedures are necessary to check and fill the transmission with fluid. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

CLUTCHES

The 8HP45 transmission uses two multi-plate holding clutches (A and B) and three multi-plate driving (rotating) clutches (C, D, and E). Gear shifts from one - eight and eight - one are synchronous shifts, meaning one of the clutches must continue to transmit torque at lower pressure until the other clutch is able to accept the input torque.

Clutches A and B are holding clutches. Clutch A is applied by hydraulic pressure and released by a return spring, similar to the driving clutches. Clutch B operation is unique because it has fluid chambers on both sides of the apply piston, and therefore it is applied and released hydraulically. Regulation of fluid pressure on each side of the piston allows precise positioning of clutch B for apply, release, and controlled slip conditions.

Clutches C, D, and E operate in a similar manner. Regulated pressure is available at the clutch C shift solenoid and the clutch valve. When the shift solenoid is de-energized, fluid flows through the shift solenoid and applies pressure to the clutch valve. During the shift, pressure moves the clutch valve, which begins to apply the clutch.

Pressure from the holding valve regulates the opening of the clutch valve, softening the shift. Above a set threshold, the holding valve seats and allows the clutch valve to open completely.

EMERGENCY RUNNING FUNCTION - LIMP IN MODE

In the event of a complete transmission electrical failure (loss of power to the TCM), the transmission enters default limp-in mode. When the TCM loses power, all solenoids are de-energized. Maximum pressure locks the transmission in 6th gear, and a diagnostic trouble code (DTC) is stored in memory. If the vehicle is in a forward gear range when the fault occurs, the transmission defaults to 6th gear.

If the vehicle is in park, reverse, or neutral, or if the engine is turned off when the fault occurs, the transmission will remain in park because the park lock release system cannot release the parking pawl. No hydraulic pressure is supplied to the driving clutches. In this situation, the manual park release lever must be used to disengage the park pawl.

The limp-in function remains active until the DTC is rectified or the stored DTC is erased with the appropriate scan tool.

OIL PUMP OPERATION

The oil pump is located just behind the torque converter, between the pump housing and cover assemblies. The torque converter drives the pump assembly using a chain and sprockets. The oil pump is a double-stroke vane pump. The pump has dual chambers, two inlet and two outlet ports, allowing it to produce the fluid volume necessary for all operating conditions. The pump draws fluid through a filter and pressurizes the fluid as the pump rotates. After the fluid is pressurized, it exits the pump through two exhaust ports that feed the system pressure valve. The system pressure valve maintains fluid pressure and allows excess pressure to be returned to the pump. This reduces cavitation and noise. A slipping clutch can often be determined by comparing which internal units are applied in the various gear ranges. The SOLENOID APPLICATION chart provides a basis for analyzing road test results.

SOLENOID APPLICATION

GEAR	PARK	A	B	C	D	E	TCC	LPS
P	OFF	ON	TP	OFF	OFF	OFF	OFF	OFF
N	ON	ON	TP	OFF	OFF	OFF	OFF	OFF
R	ON	ON	ON	OFF	ON	OFF	OFF	Ā±
1	ON	ON	ON	ON	OFF	OFF	Ā±	Ā±
2	ON	ON	ON	OFF	OFF	ON	Ā±	Ā±
3	ON	OFF	ON	ON	OFF	ON	Ā±	Ā±
4	ON	OFF	ON	OFF	ON	ON	Ā±	Ā±
5	ON	OFF	ON	ON	ON	OFF	Ā±	Ā±
6	ON	OFF	OFF	ON	ON	ON	Ā±	Ā±
7	ON	ON	OFF	ON	ON	OFF	Ā±	Ā±
8	ON	ON	OFF	OFF	ON	ON	Ā±	Ā±

TP= Touch Point Pressure

Ā± = Variable Actuation

POWERFLOW COMPONENTS

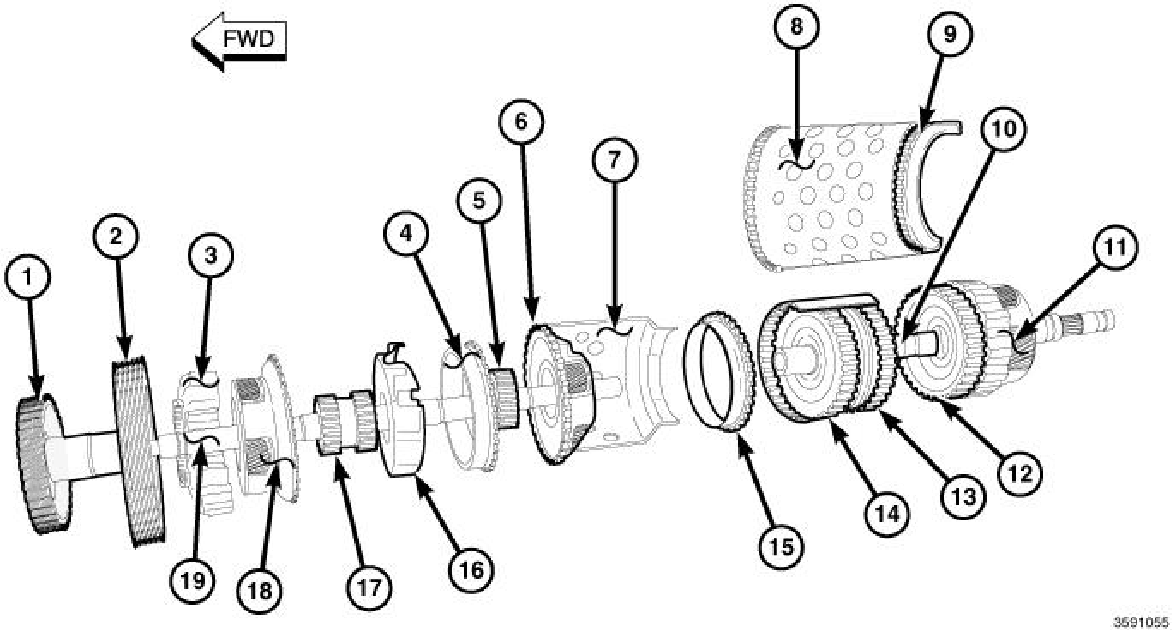


Fig. 2: Powerflow Components
Courtesy of CHRYSLER GROUP, LLC

1- A CLUTCH
2 - B CLUTCH
3 - P1 ANNULUS (PARTIAL CUTAWAY)
4 - P2 ANNULUS
5 - P3 SUN GEAR
6 - P3 CARRIER
7 - D CLUTCH DRUM (PARTIAL CUTAWAY)
8 - P4 ANNULUS DRUM (PARTIAL CUTAWAY)
9 - P4 ANNULUS (PARTIAL CUTAWAY)
10 - P4 SUN GEAR/D CLUTCH RETAINER (PARTIAL CUTAWAY)
11 - P4 CARRIER
12 - D CLUTCH
13 - C CLUTCH
14 - E CLUTCH
15 - P3 ANNULUS
16 - P2 CARRIER
17 - P1/P2 SUN GEAR
18 - P1 CARRIER
19 - INPUT SHAFT

Use this POWER FLOW COMPONENTS graphic and chart to identify the individual components of the specific gear powerflow explanations below:

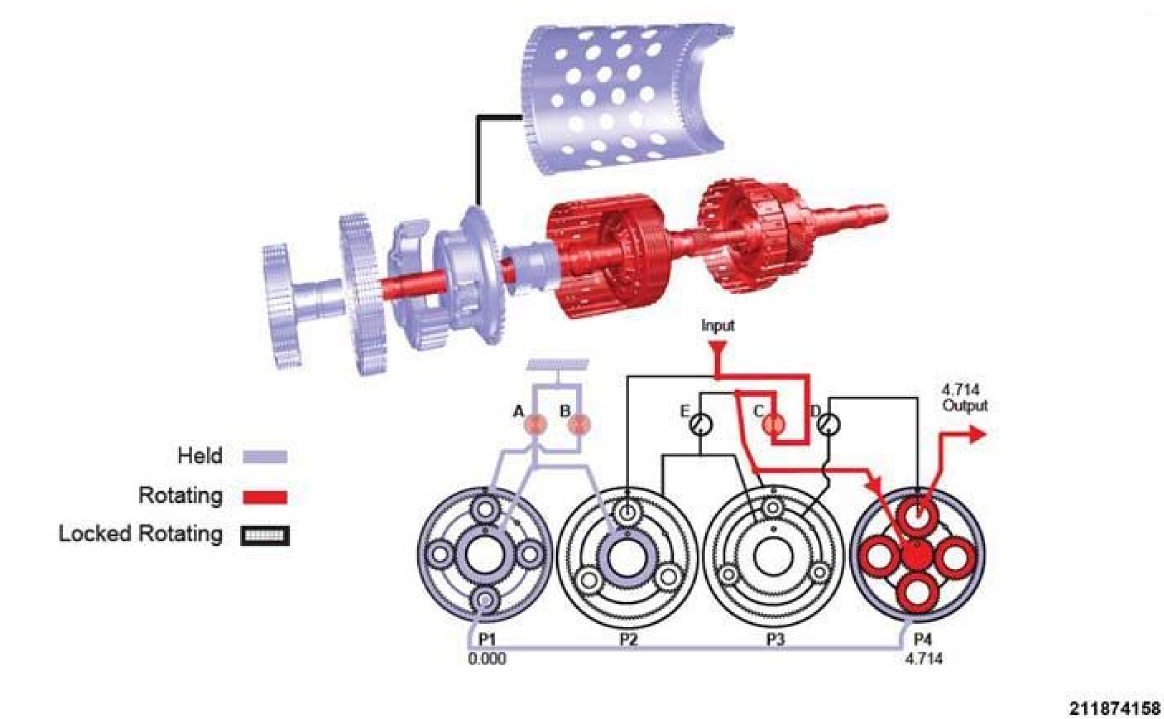


Fig. 3: Powerflow In First Gear
Courtesy of CHRYSLER GROUP, LLC

FIRST GEAR POWERFLOW

Clutch A (1) holds the P1/P2 sun gear (17) and clutch B (2) holds the P1 annulus (3). Because two members of the same gear set are held, the entire P1 gear set is stationary. The stationary P1 carrier (18) is connected to the P4 annulus (9), locking the annulus. The input shaft (19) drives the C clutch (13), and the C clutch (13) drives the P4 sun gear (10). The P4 sun gear (10) drives the P4 carrier (11), whose pinions walk around the held P4 annulus (9).

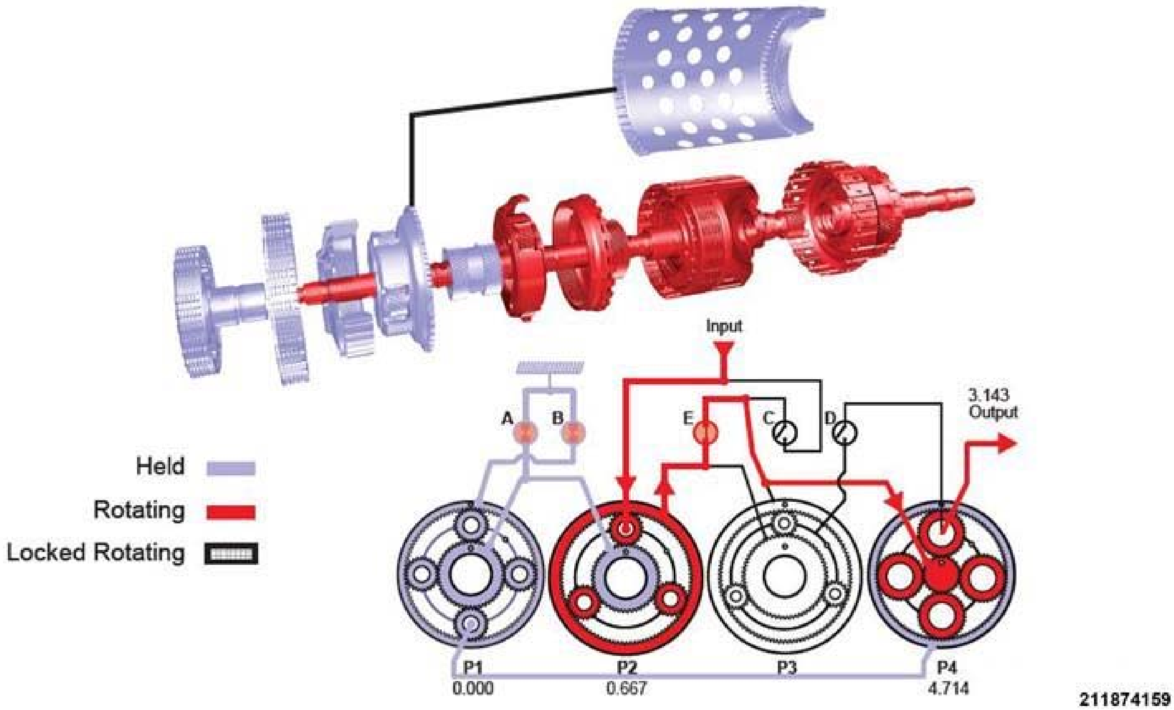
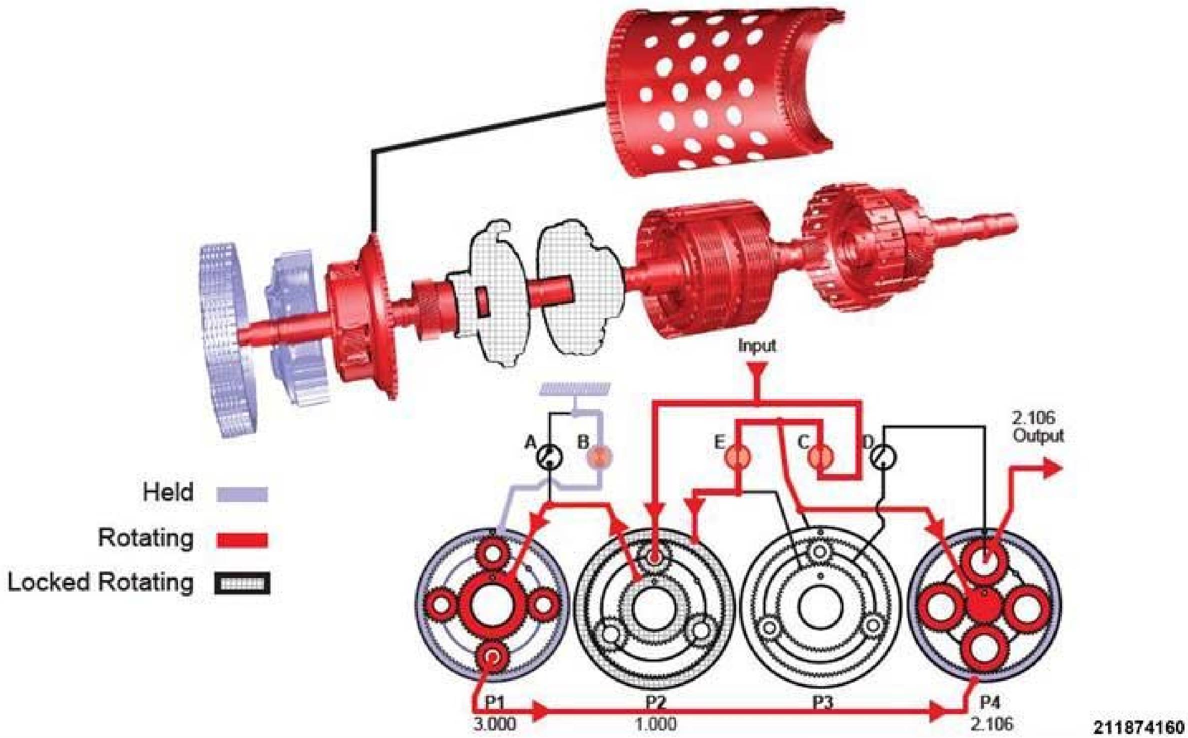


Fig. 4: Powerflow In Second Gear
Courtesy of CHRYSLER GROUP, LLC

SECOND GEAR POWERFLOW

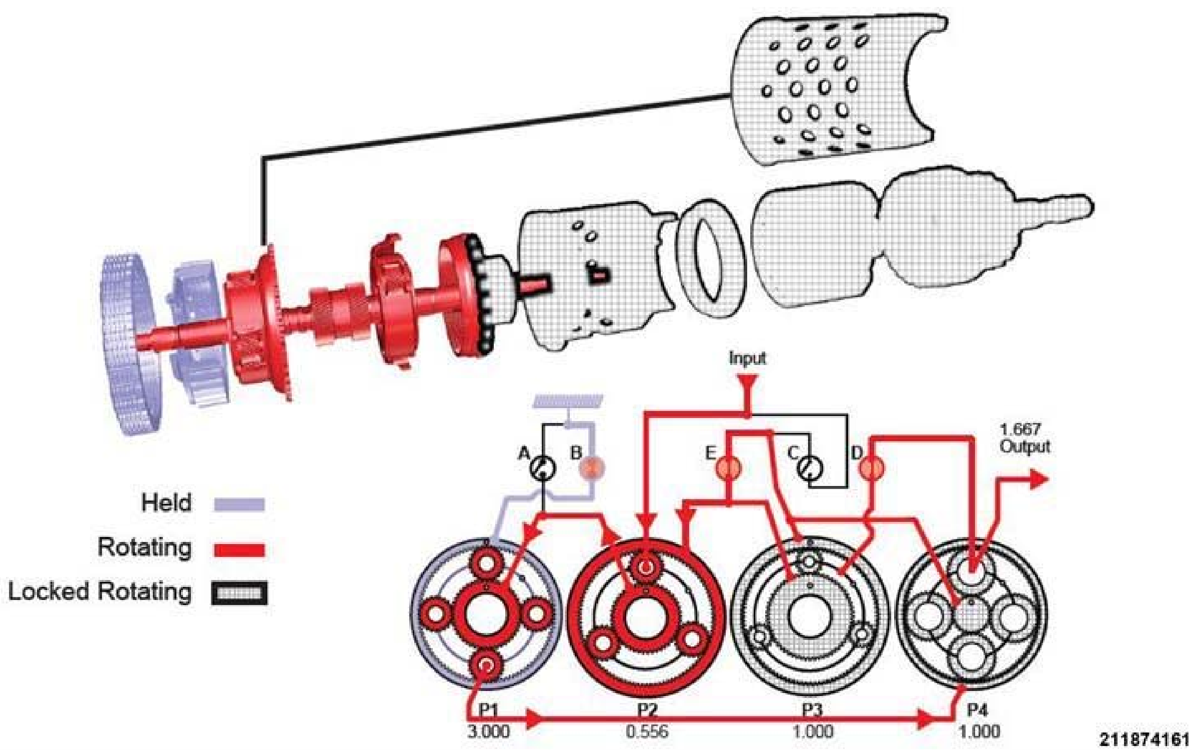
Clutch A (1) holds the P1/P2 sun gear (17) and clutch B (2) holds the P1 annulus (3). As with 1st gear, the entire P1 gear set is stationary. The stationary P1 carrier (18) is connected to the P4 annulus (9), locking the annulus. The input shaft (19) drives the P2 carrier (16). The P2 carrier (16) drives the P2 annulus (4). The P2 annulus (4) drives the E clutch (14) through the P3 sun gear (5) connection. The E clutch (14) then drives the P4 sun gear (10). The P4 sun gear (10) drives the P4 carrier (11), whose pinions walk around the held P4 annulus (9).



[**Fig. 5: Powerflow In Third Gear**]
Courtesy of CHRYSLER GROUP, LLC

THIRD GEAR POWERFLOW

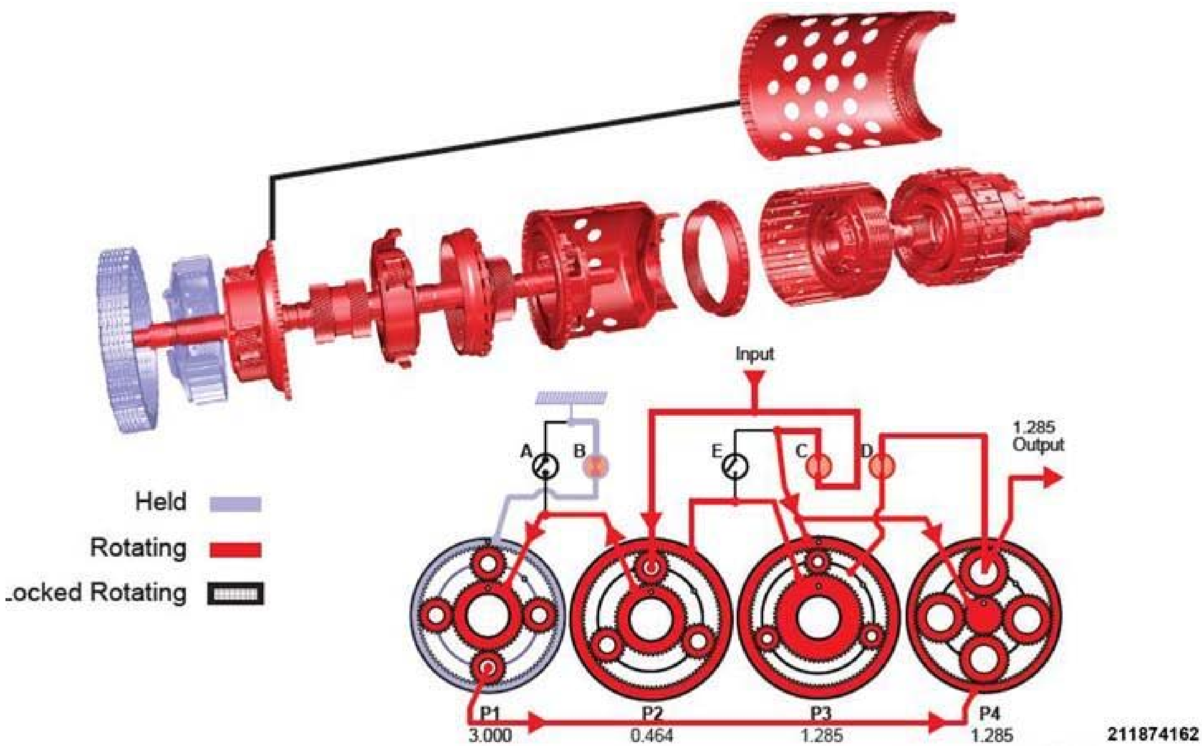
Clutch B (2) holds the P1 (3) annulus. The input shaft (19) drives the C clutch (12), which drives the P4 annulus (9). The C clutch (12) also drives the E clutch (14), which drives the P2 annulus (4). Because the P2 carrier (16) and the P2 annulus (4) are both driven at input shaft speed, the P2 gear set is locked at input shaft speed. The P1/P2 sun gear (17) drives the P1 carrier (18), and the P1 carrier drives the P4 annulus (9).



[Fig. 6: Powerflow In Fourth Gear](#)
Courtesy of CHRYSLER GROUP, LLC

FOURTH GEAR POWERFLOW

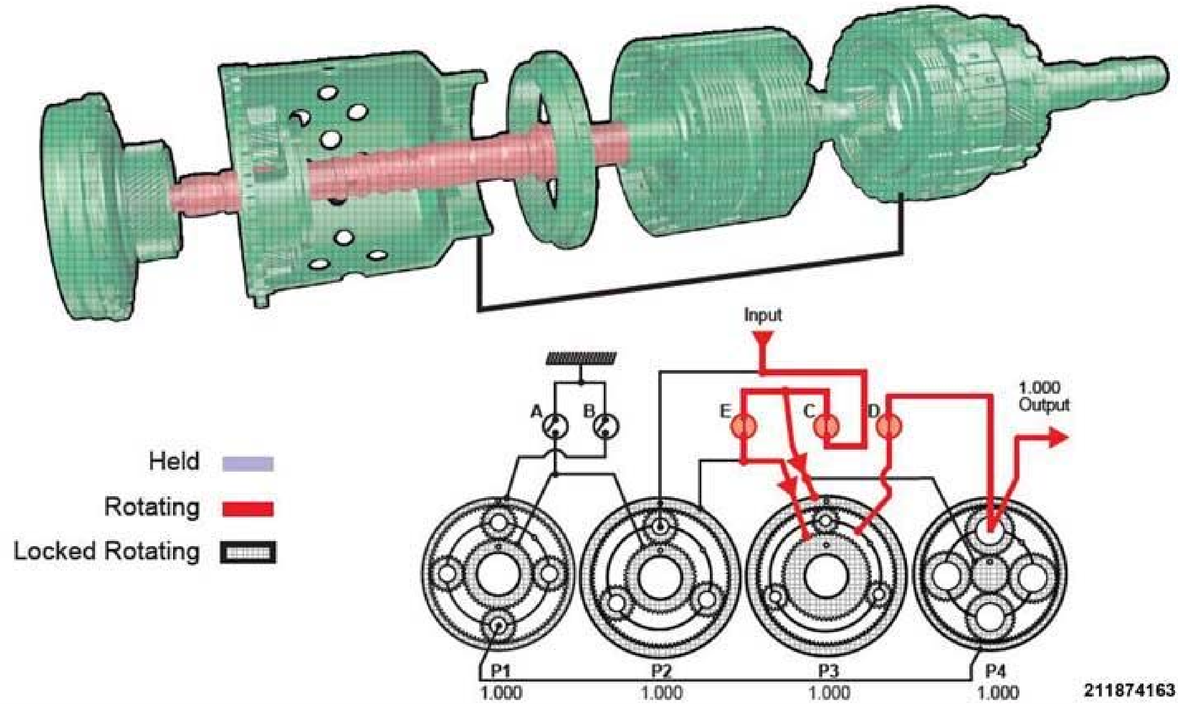
Clutch B (2) holds the P1 annulus (3). With the E (14) and D (12) clutches applied, all components of the P3 and P4 gear sets are locked together to rotate at the same speed. The input shaft (19) drives the P2 carrier (16) which drives the P1/P2 sun gear (17). The P1/P2 sun gear drives the P1 carrier (18). The P1 carrier drives the P4 gear set through the P4 annulus (9).



[Fig. 7: Powerflow In Fifth Gear](#)
Courtesy of CHRYSLER GROUP, LLC

FIFTH GEAR POWERFLOW

Clutch B (2) holds the P1 annulus (3). The input shaft (19) always drives the P2 carrier (16). Because the C clutch (13) is applied, the P3 annulus (15) and P4 sun gear (10) are also driven at input shaft speed. The D clutch (12) is applied to connect the P3 carrier (6) with the P4 carrier (11). The P2 carrier (16) drives the P1/P2 sun gear (17), which drives the P1 carrier (18). The P1 carrier walks around the held P1 annulus (3) and drives the P4 annulus (9). Gear reduction is achieved between the P4 sun gear (10) rotating at input shaft speed and the P4 annulus (9) rotating at a reduced speed.



[Fig. 8: Powerflow In Sixth Gear](#)
Courtesy of CHRYSLER GROUP, LLC

SIXTH GEAR POWERFLOW

Clutch C (13) drives the P3 annulus (15) at input shaft speed and E clutch (14) drives the P3 sun gear (5) at input shaft speed. Because two components of the same gear set are driven at the same speed, the entire gear set is locked in rotation. The D clutch (12) connects the P3 carrier (6) to the P4 carrier (11) and the output shaft.

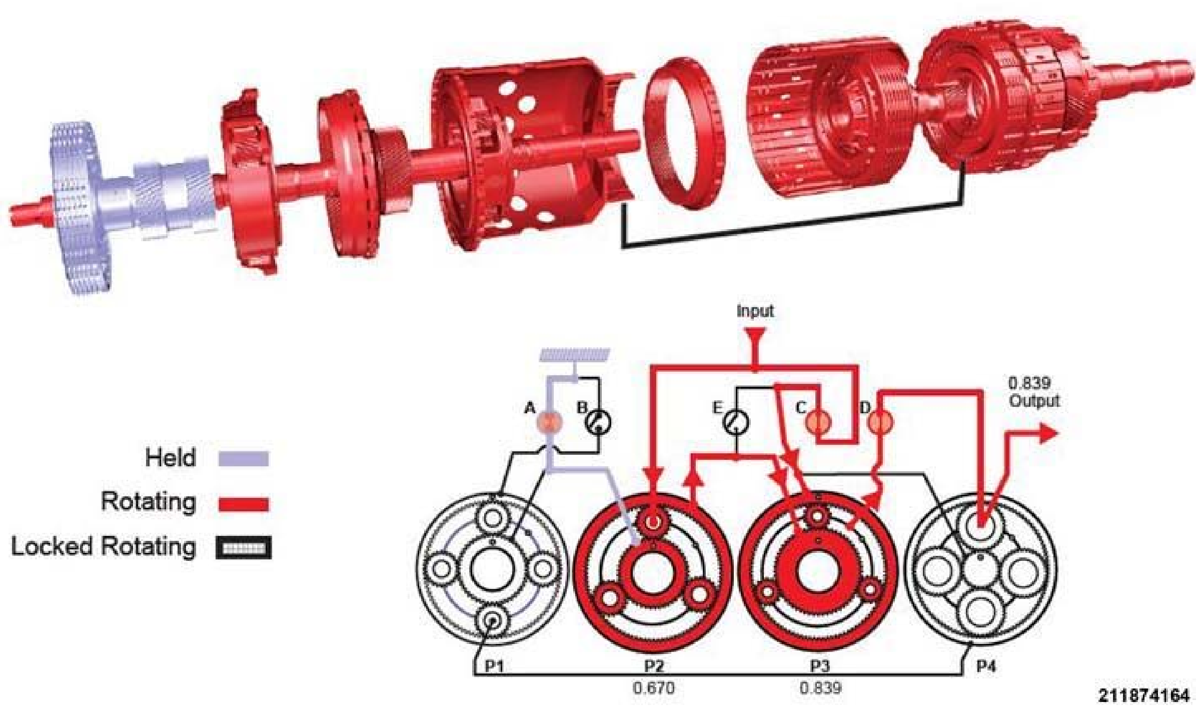


Fig. 9: Powerflow In Seventh Gear
Courtesy of CHRYSLER GROUP, LLC

SEVENTH GEAR POWERFLOW

Clutch A (1) holds the P1/P2 sun gear (17) stationary. The input shaft drives the P2 carrier which drives the P2 annulus, increasing the speed of the P3 sun gear (5) and creating overdrive. The C clutch (13) drives the P3 annulus (15) at input shaft speed. The P3 sun gear (5) spins at a faster speed than the P3 annulus (15) and the P3 carrier (6) is the output of the gear set. This results in a reduction that offsets the overdrive of the P2 gear set. The D clutch (12) connects the P3 carrier (6) to the P4 carrier (11) and the output shaft.

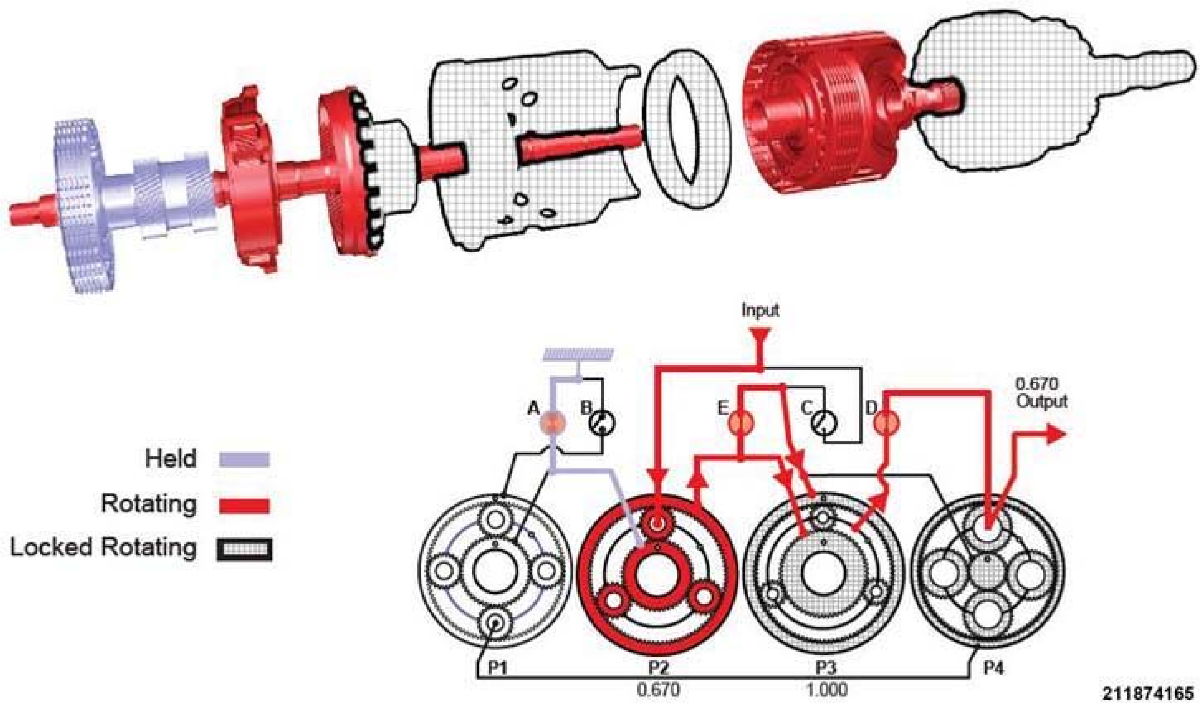


Fig. 10: Powerflow In Eighth Gear
Courtesy of CHRYSLER GROUP, LLC

EIGHTH GEAR POWERFLOW

Clutch A (1) holds the P1/P2 sun gear (17) stationary. As with 7th gear, the P2 gear set creates an overdrive ratio. However, the E clutch (14) is now applied, which locks together the P3 gear set and eliminates any torque multiplication from the P3 gear set. The overdrive created by P2 is transferred by the D clutch (7) to the output shaft.

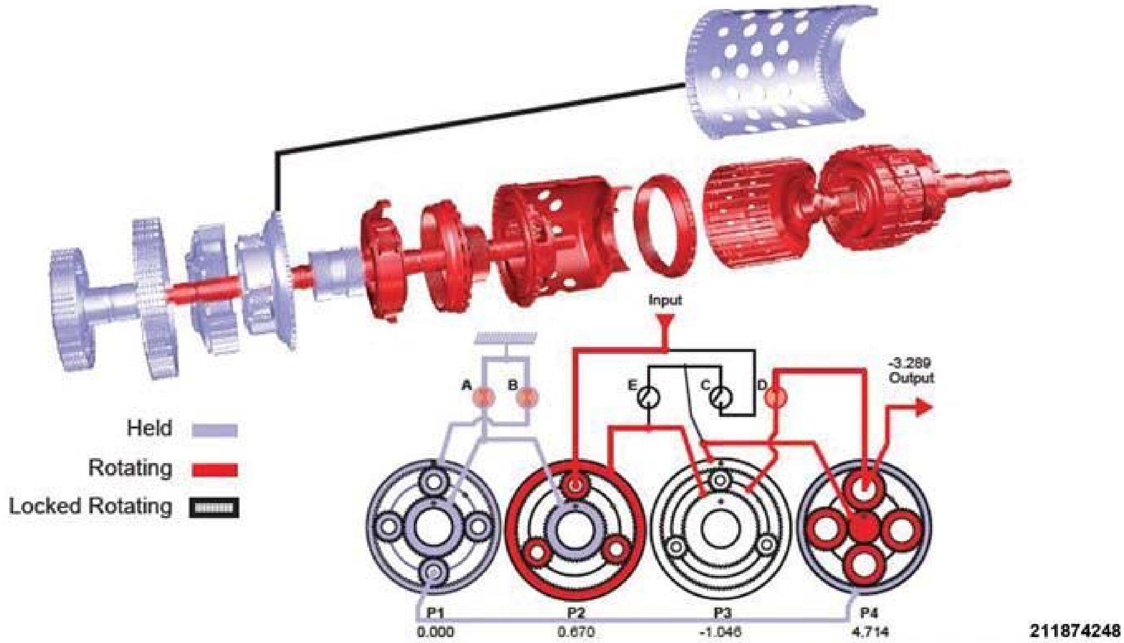


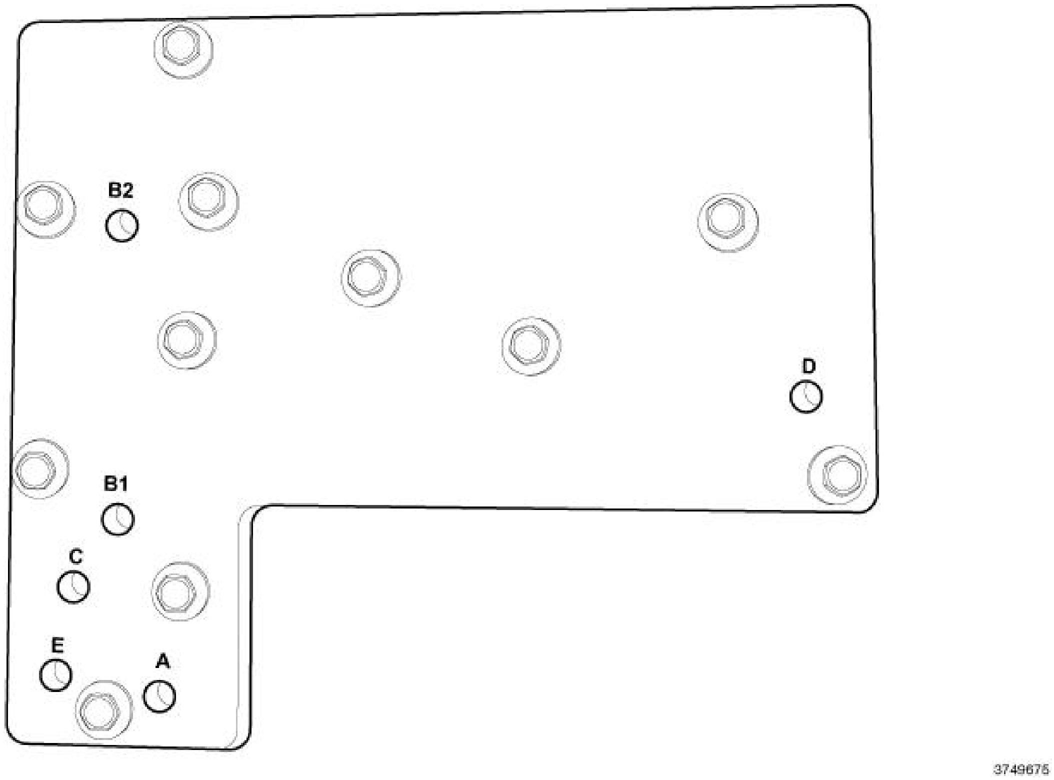
Fig. 11: Powerflow In Reverse Gear
Courtesy of CHRYSLER GROUP, LLC

REVERSE GEAR POWERFLOW

Clutches A (1) and B (2) hold the P1 gear set to hold the P1/P2 sun gear (17). The input shaft drives the P2 carrier, which produces an overdrive ratio from the P2 gear set, driving the P3 sun gear (5) in engine direction. The P3 carrier (6) is connected to the output shaft by the D clutch (12). This holds the carrier, reversing the direction and multiplying torque. The P3 annulus (15) is connected to the P4 sun gear (10), which drives the P4 gear set opposite of engine direction and multiplies torque again.

DIAGNOSIS AND TESTING

CLUTCH AIR PRESSURE TESTS



[Fig. 12: Clutch Pressure Test Passages]
Courtesy of CHRYSLER GROUP, LLC

Inoperative clutches can be located using a series of tests by substituting air pressure for fluid pressure using (special tool #10383, Plate, Clutch Pressure Test).

The clutches may be tested by applying air pressure to their respective passages. The valve body must be removed. To make air pressure tests, proceed as follows:

NOTE: **The compressed air supply must be free of all dirt and moisture. Use a pressure of 5-8 bar (73-116 psi).**

Remove the valve body. For 8HP45/845RE, refer to **VALVE BODY, REMOVAL**. Install (special tool #10383, Plate, Clutch Pressure Test) and tighten bolts to 6 N.m (50 in. lbs.). When testing is finished, install valve body. For 8HP45/845RE, refer to **VALVE BODY, INSTALLATION**. Then refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

NOTE: **If any clutch does not appear to be functioning with the air, add some 8HP transmission fluid and try the test again. Some circuits will not operate without fluid.**

A CLUTCH

Apply air pressure to the feed hole located on the test plate marked **A** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

B CLUTCH FUNCTION

Apply air pressure to the feed hole located on the test plate marked **B1** , listen for an audible thud. The piston should not return to its starting position when the air pressure is removed. If air pressure is applied to the B2 circuit, the B1 should return. An audible hiss may be heard when testing this clutch as the seal is designed to allow fluid/air to pass.

C CLUTCH

Apply air pressure to the feed hole located on the test plate marked **C** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

D CLUTCH

Apply air pressure to the feed hole located on the test plate marked **D** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

E CLUTCH

Apply air pressure to the feed hole located on the test plate marked **E** , listen for an audible thud. The piston should return to its starting position when the air pressure is removed.

DIAGNOSIS AND TESTING - AUTOMATIC TRANSMISSION - GENERAL CONDITIONS

CAUTION: Before attempting any repair on an automatic transmission, check for Diagnostic Trouble Codes with the appropriate scan tool.

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid, see FLUIDS, LUBRICANTS AND GENUINE PARTS located in owners manual.

Transmission malfunctions may be caused by these general conditions:

- Poor engine performance.
- Improper adjustments.
- Hydraulic malfunctions.
- Mechanical malfunctions.
- Electronic malfunctions.

Diagnosis of these problems should always begin by checking the easily accessible variables: fluid level, fluid condition, and transmission fault codes using the appropriate scan tool. Then perform a road test to determine if the problem has been corrected or if more diagnosis is necessary.

DIAGNOSIS AND TESTING - PRELIMINARY

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid, see FLUIDS, LUBRICANTS AND GENUINE PARTS located in owners manual.

Two basic procedures are required. One procedure for vehicles that are drivable and an alternate procedure for disabled vehicles (will not back up or move forward).

VEHICLE IS DRIVEABLE

1. Check for transmission fault codes using the appropriate scan tool.
2. Road test and note how transmission upshifts, downshifts, and engages.
3. Check fluid level and condition.

VEHICLE IS DISABLED

1. Check for transmission fault codes using the appropriate scan tool.
2. Check for cracked, leaking cooler lines.
3. Check fluid level and condition.
4. With the transmission in the Park position, attempt to rotate drive shaft(s) to ensure transmission output shaft coupler/flange is secure.
5. Raise and support vehicle on safety stands, start engine with transmission in the Park position and allow to idle for several minutes, shift transmission into gear, and note following:
    a. If propeller shaft turns but wheels do not, problem is with differential or axle shafts.
    b. If propeller shaft does not turn and transmission is noisy, stop engine. Remove oil pan, and check for debris. If pan is clear, remove transmission and check for damaged driveplate, converter, oil pump, or input shaft.
6. Check the TCMA, Wiring, Valve body, and Solenoids (Utilize fault codes to diagnose if available).

DIAGNOSIS AND TESTING - ROAD TESTING

CAUTION: A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid, see FLUIDS, LUBRICANTS AND GENUINE PARTS.

Before road testing, be sure the fluid level has been checked and adjusted if necessary. Verify that all diagnostic trouble codes have been resolved.

Observe engine performance during the road test. A poorly tuned engine will not allow accurate analysis of transmission operation.

Operate the transmission in all gear ranges. Check for shift variations and engine flare which indicates slippage. Note if shifts are harsh, spongy, delayed, early, or if part throttle downshifts are sensitive.

Slippage indicated by engine flare, usually means clutch, overrunning clutch, or line pressure problems.

A slipping clutch can often be determined by comparing which internal units are applied in the various gear ranges. The CLUTCH APPLICATION chart provides a basis for analyzing road test results.

CLUTCH APPLICATION

GEAR	A	B	C	D	E	RATIO

GEAR	A	B	C	D	E	RATIO
1	X	X	X	-	-	4.69: 1
2	X	X	-	-	X	3.13: 1
3	-	X	X	-	X	2.10: 1
4	-	X	-	X	X	1.67: 1
5	-	X	X	X	-	1.29: 1
6	-	-	X	X	X	1.0: 1
7	X	-	X	X	-	.84: 1
8	X	-	-	X	X	.67: 1
N	-	-	-	-	-	N/A
R	X	X	-	X	-	3.3: 1

STANDARD PROCEDURE

CLUTCH A MEASUREMENT

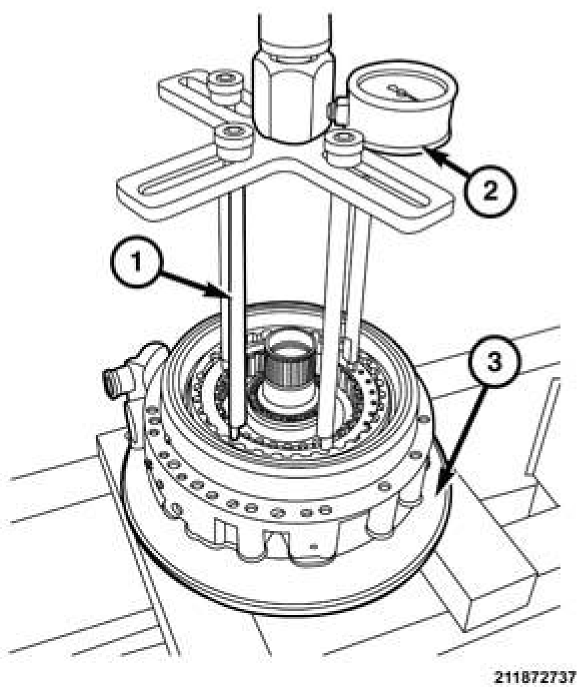


Fig. 13: Adapter & Pressing Tool
Courtesy of CHRYSLER GROUP, LLC

1. Using (special tool #10428, Adapter, Pressing Tool) (1) and (special tool #10429, Gauge, Force) (2) Place the clutch A/oil pump assembly in a suitable arbor press.
2. Apply 200 N (45 lbs.) of force to the clutch A backing plate to compress the wave plate.

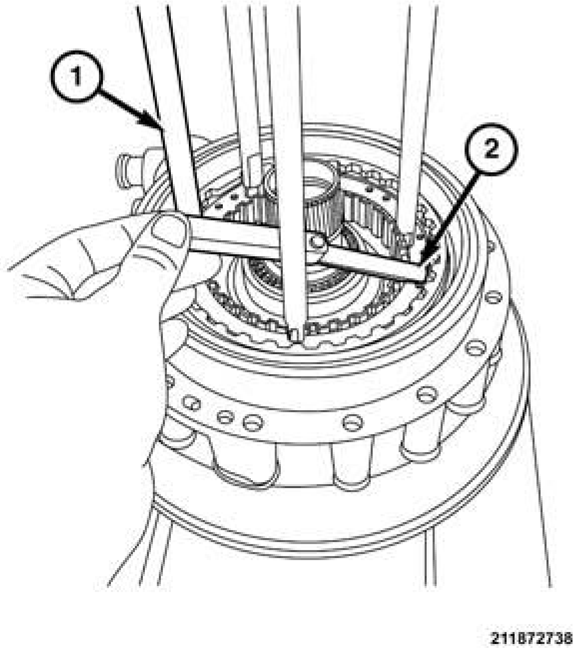


Fig. 14: Measuring Gap Between A-Clutch Backing Plate & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

3. With a suitable feeler gauge (2) measure the gap between the clutch A backing plate and the snap ring.
4. Refer to the CLUTCH CLEARANCE TABLE for specs. If clearance is not within specification, a thinner or thicker selectable snap ring can be installed for proper clearance.

CLUTCH B MEASUREMENT

When the B-clutch is replaced, the proper selectable shim must be installed to achieve specified clearance.

Measurement: (special tool #8901A, Pressing Tool), (special tool #10429, Gauge, Force)

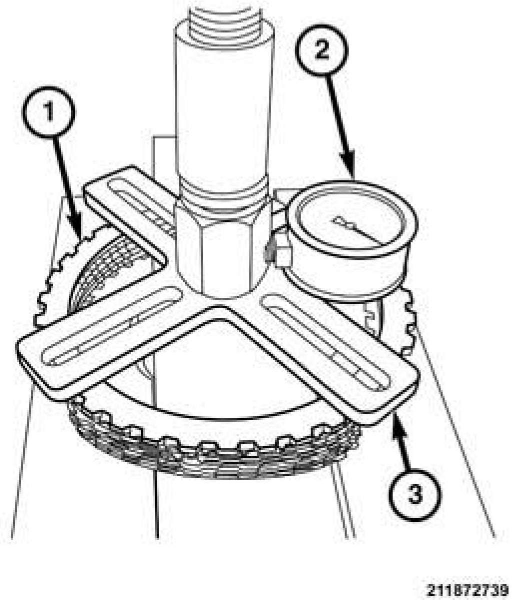


Fig. 15: Pressing Tool
Courtesy of CHRYSLER GROUP, LLC

1. Place the clutch B, with the wave plate on top, on a suitable arbor press.
2. Position tools (special tool #8901A, Pressing Tool) (3) (using just the cross bar) (3) and (special tool #10429, Gauge, Force) (2) on top of the B-clutch wave plate (1) and under the press ram.

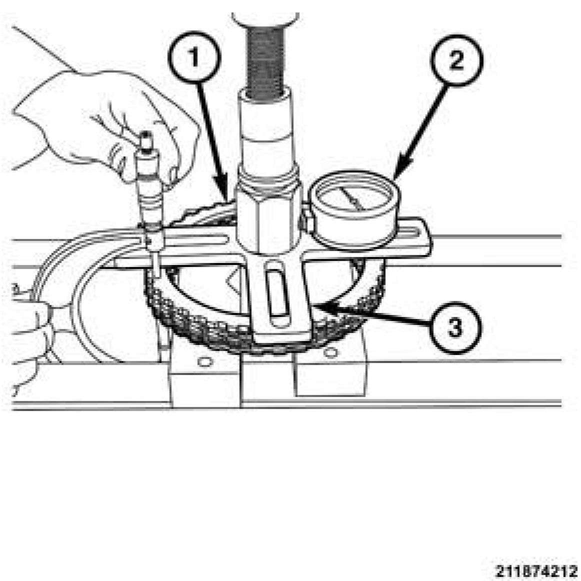


Fig. 16: Gauge, Pressing Tool & B-Clutch
Courtesy of CHRYSLER GROUP, LLC

3. Apply 500 N (112 lbs.) of downward force on clutch B to compress the wave plate.

4. Using a suitable micrometer, measure the thickness of the compressed clutch B (3). **Record the measurement as (A)** to calculate the clutch B clearance in order to determine the correct selectable shim thickness.

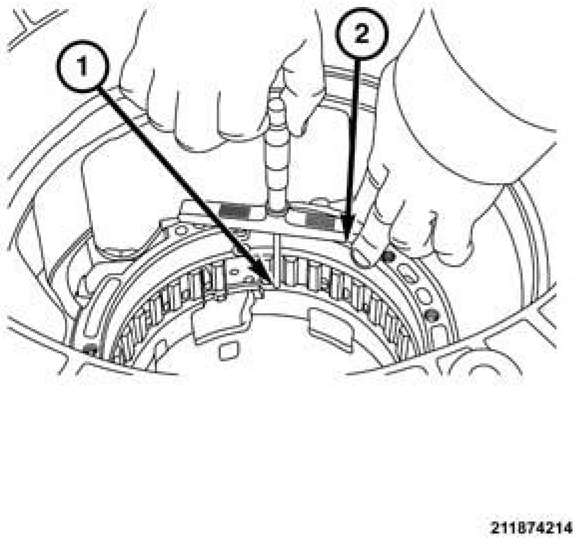


Fig. 17: Transmission Oil Pump & B-Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

5. With a suitable depth micrometer, place it at the mounting surface of the transmission oil pump (2) and measure to the base of the B-clutch retainer on the case (1). This measurement should be 61.05 mm. **Record the measurement as (B)** to calculate the clutch B clearance in order to determine the correct selectable shim thickness.

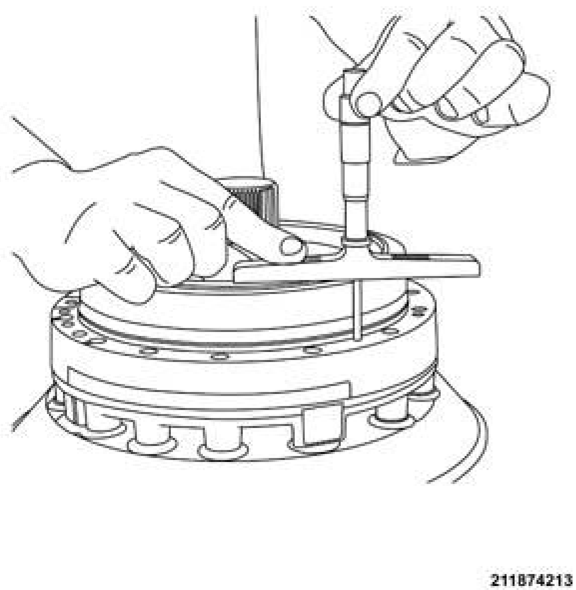


Fig. 18: Measuring B-Clutch Piston Using Depth Micrometer
Courtesy of CHRYSLER GROUP, LLC

6. Using a suitable depth micrometer, measure the clutch B piston.
7. Measure between the fluid pump sealing surface and the bottom of the straight edge. **Record the measurement as (C)** to calculate the clutch B clearance in order to determine the correct selectable shim thickness.

Calculation

Take the case depth (B) subtract (C) subtract (A) remainder is the clearance of the clutch B. If the clearance is not within specification a thinner or thicker reaction plate can be installed to achieve proper clearance.

CLUTCH C MEASUREMENT

1. Using (special tool #8901A, Pressing Tool) (2) and (special tool #10429, Gauge, Force) (1) place clutch C (3) in a suitable arbor press (with the backing plate facing up).
2. Apply 200 N (45 lbs.) of force to clutch C to compress the wave plate.
3. With a suitable feeler gauge, measure the gap between clutch C backing plate and clutch C retainer.
4. Refer to CLUTCH CLEARANCE TABLE for specs. If clearance is not within specification a thinner or thicker selectable backing plate can be installed to achieve proper clearance.

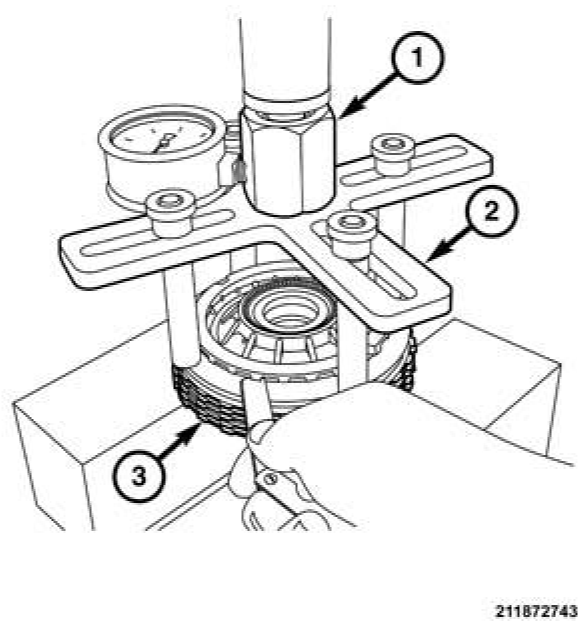


Fig. 19: Measuring Gap Between C-Clutch Backing Plate & C-Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

CLUTCH D MEASUREMENT

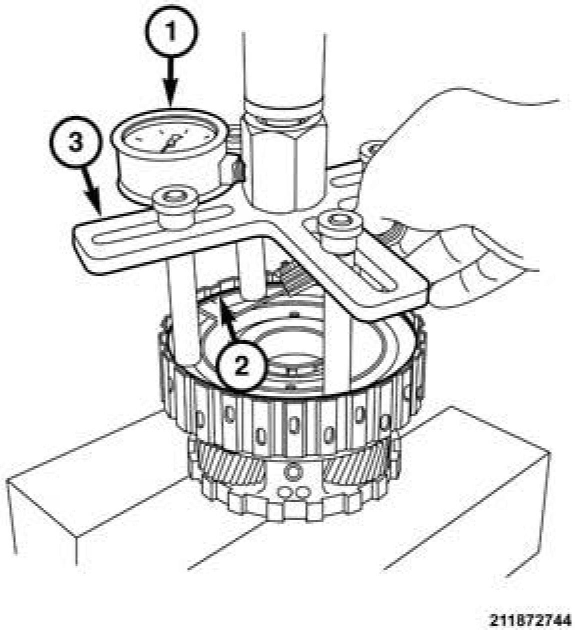


Fig. 20: Measuring Gap Between D-Clutch Backing Plate & D-Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

1. Using (special tool #8901A, Pressing Tool) (3) and (special tool #10429, Gauge, Force) (1) place clutch D in a suitable arbor press.
2. Apply 200 N (45 lbs.) of force to clutch D backing plate to compress the wave plate.
3. With a suitable feeler gauge (2), measure the gap between clutch D backing plate and clutch D retainer.
4. Refer to CLUTCH CLEARANCE TABLE for specs. If clearance is not within specification a thinner or thicker selectable snap ring can be Installed to achieve proper clearance.

CLUTCH E MEASUREMENT

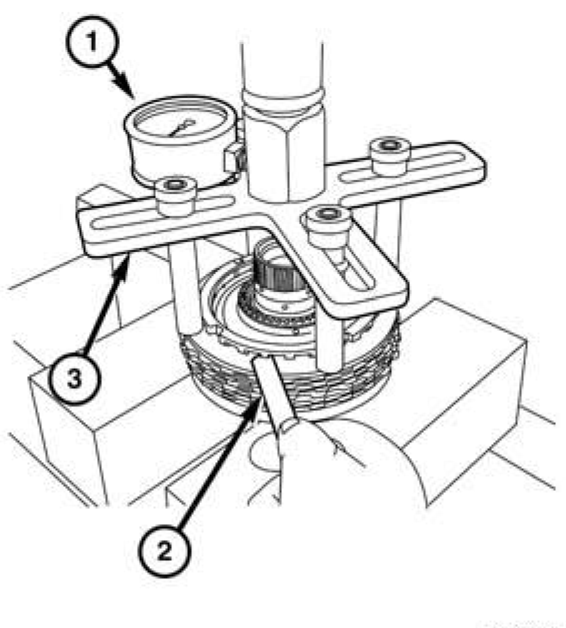


Fig. 21: Measuring Gap Between Backing Plate & Retainer Of E-Clutch
Courtesy of CHRYSLER GROUP, LLC

1. Place clutch E in a suitable arbor press.
2. Using (special tool #10429, Gauge, Force) (1) and (special tool #8901A, Pressing Tool) (3) apply 200 N (45 lbs.) to the backing plate of clutch E.
3. Using a set of feeler gauges (2), measure the gap between the backing plate and the retainer of clutch E.
4. Refer to the CLUTCH MEASUREMENTS TABLE for specifications. If clearance is not within specifications, a thinner or thicker selectable backing plate can be installed to achieve proper clearance.

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Crossmember Bolt	65	48	-	-
Transmission Mount Bolt	61	45	-	-
Inspection Cover Bolt	12	-	106	-
Transmission to Engine Bolt	55	41	-	-
Manual Park Release Cable Bolt	20	15	-	-
Manual Park Release Lever Nut	15	-	133	Ā
Manual Park Release Lever Assembly Bolt	10	-	89	-
Transmission Oil Pan Drain Plug	9	-	80	-
Transmission Oil fill Plug	35	26	-	-
Transmission Oil Pan Bolt	10	-	89	-
Oil Pump Assembly To Case Bolt	Refer to **PUMP, TRANSMISSION OIL, INSTALLATION**.			X
Oil Pump Housing To Cover Bolt	Refer to **PUMP, TRANSMISSION OIL, ASSEMBLY**.			-
Output Speed Sensor Bolt	8	-	71	-
Park Pawl Lock Rod Guide Plate Bolt	10	-	89	-
Park Pawl Shaft Plug	35	26	-	-
Shifter Assembly Bolts	11	-	97	-
Torque Converter to Flex Plate Bolt	37	27	-	-
Transmission Mount to Adapter Bolt	31	23	-	-
Valve Body Bolt	6	-	53	-
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

CLUTCH SPECIFICATIONS

Clutch	Condition	Minimum	Normal	Maximum
A	NEW	1.41 mm	1.555 mm	1.7 mm
		0.056 in	0.061 in	0.067 in
	AFTER OPERATION	1.41 mm	1.655 mm	1.9 mm
		0.056 in	0.065 in	0.075 in
B	NEW	1.52 mm	1.725 mm	1.93 mm
		0.060 in	0.068 in	0.076 in
	AFTER OPERATION	1.52 mm	1.825 mm	2.13 mm
		0.060 in	0.072 in	0.084 in
C	NEW	1.62 mm	1.815 mm	2.01 mm
		0.064 in	0.071 in	0.079 in
	AFTER OPERATION	1.62 mm	1.935 mm	2.25 mm
		0.064 in	0.076 in	0.089 in
D	NEW	1.37 mm	1.515 mm	1.66 mm
		0.054 in	0.060 in	0.065 in
	AFTER OPERATION	1.37 mm	1.615 mm	1.86 mm
		0.054 in	0.064 in	0.073 in
E	NEW	1.62 mm	1.815 mm	2.01 mm
		0.064 in	0.071 in	0.079 in
	AFTER OPERATION	1.62 mm	1.935 mm	2.25 mm
		0.064 in	0.076 in	0.089 in

CLUTCH A SELECTABLE SNAP RINGS

3.2 mm	0.125 in.
3.0 mm	0.118 in.
2.8 mm	0.110 in.
2.6 mm	0.102 in.
2.4 mm	0.0944 in.
2.2 mm	0.0866 in.

CLUTCH B SELECTABLE BACKING PLATES

6.0 mm	.236 in.
5.8 mm	.228 in.
5.6 mm	.220 in.
5.4 mm	.212 in.
5.2 mm	.204 in.
5.0 mm	.196 in.
4.8 mm	.188 in.

CLUTCH C AND E SELECTABLE BACKING PLATES

4.8 mm	0.188 in.

4.5 mm	0.177 in.
4.2 mm	0.165 in.
3.9 mm	0.153 in.
3.6 mm	0.141 in.
3.3 mm	0.129 in.
3.0 mm	0.118 in.

CLUTCH D SELECTABLE SNAP RINGS

3.0 mm	0.118 in.
2.8 mm	0.110 in.
2.6 mm	0.102 in.
2.4 mm	0.0944 in.
2.2 mm	0.0866 in.
2.0 mm	0.0787 in.
1.8 mm	0.0708 in.
1.6 mm	0.0629 in.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

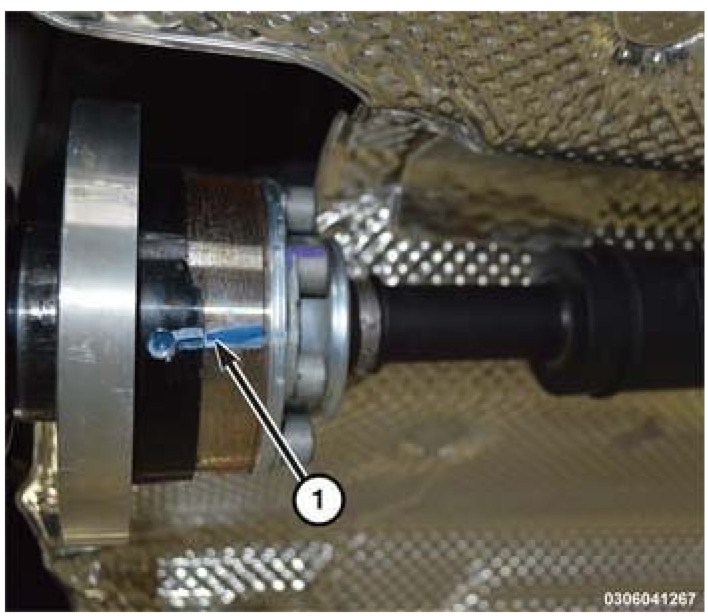
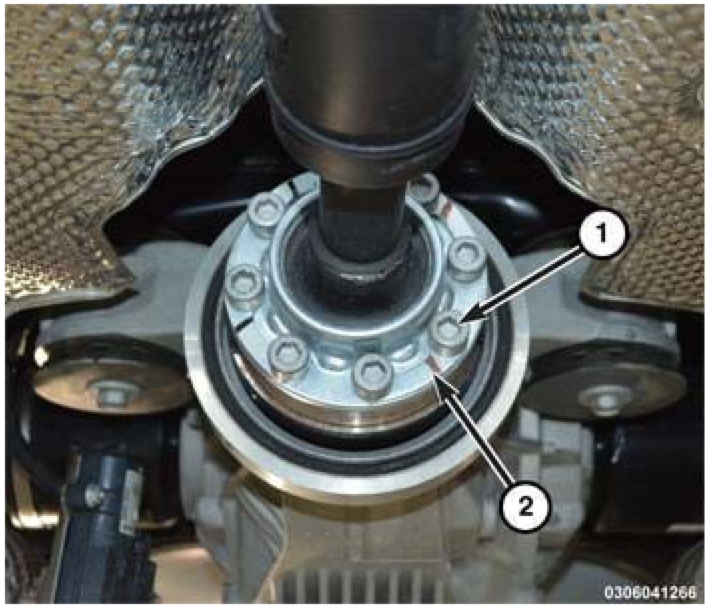


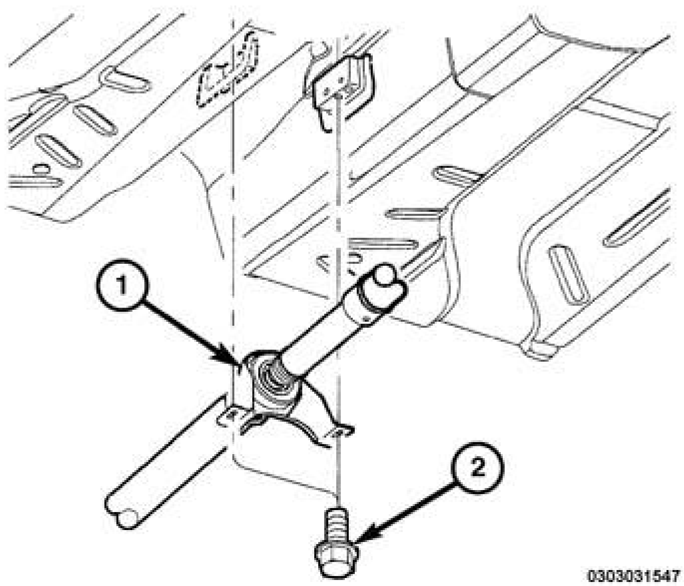
Fig. 22: Alignment Index Marks
Courtesy of CHRYSLER GROUP, LLC

3. Apply alignment index marks (1) on the transmission and axle flanges.



[**Fig. 23: Drive Shaft To Axle Flange Bolts & Washers**]
Courtesy of CHRYSLER GROUP, LLC

4. Remove the drive shaft to rear axle flange bolts and washers.



[**Fig. 24: Identifying Center Bearing & Mounting Bolts**]
Courtesy of CHRYSLER GROUP, LLC

5. Remove the drive shaft center bearing to body bolts.

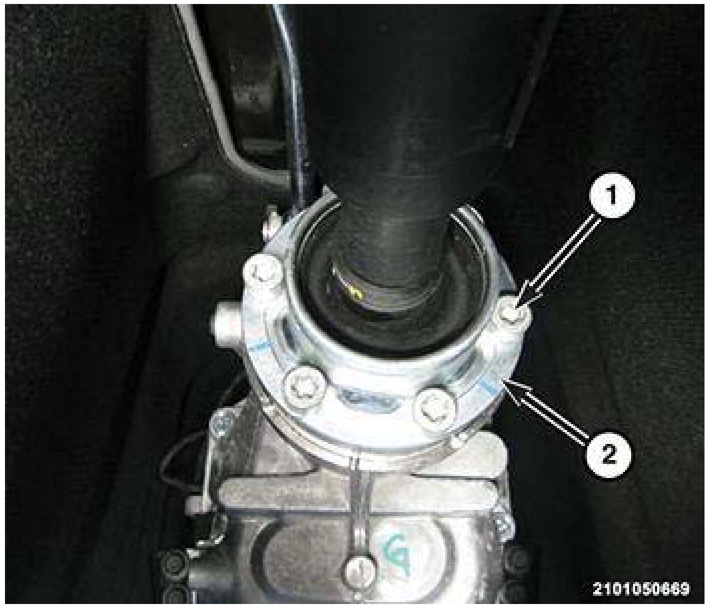


Fig. 25: Bolts And Washers & Transmission Flange
Courtesy of CHRYSLER GROUP, LLC

6. Remove the drive shaft to transmission flange bolts and washers.

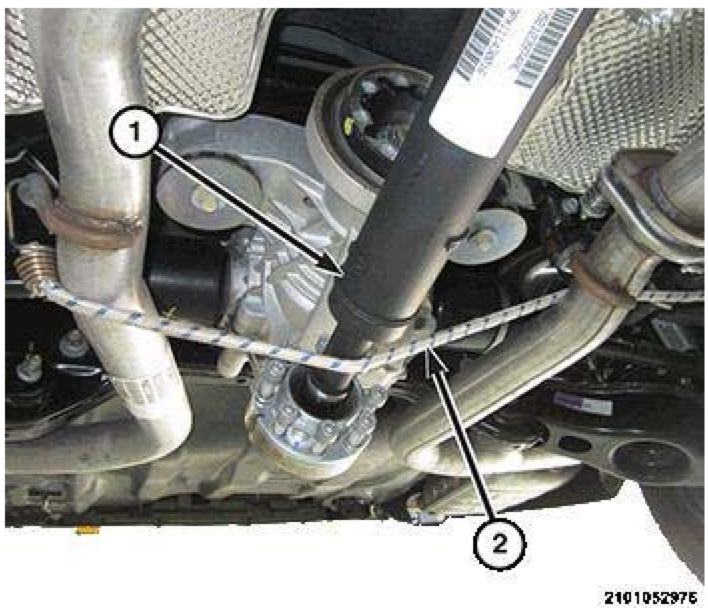


Fig. 26: Supporting Drive Shaft With Strap
Courtesy of CHRYSLER GROUP, LLC

7. Position aside the drive shaft (1) and support (2).
8. Remove the lower intermediate shaft. Refer to **SHAFT, INTERMEDIATE, LOWER, REMOVAL** .
9. Remove the starter. Refer to **STARTER, REMOVAL** .

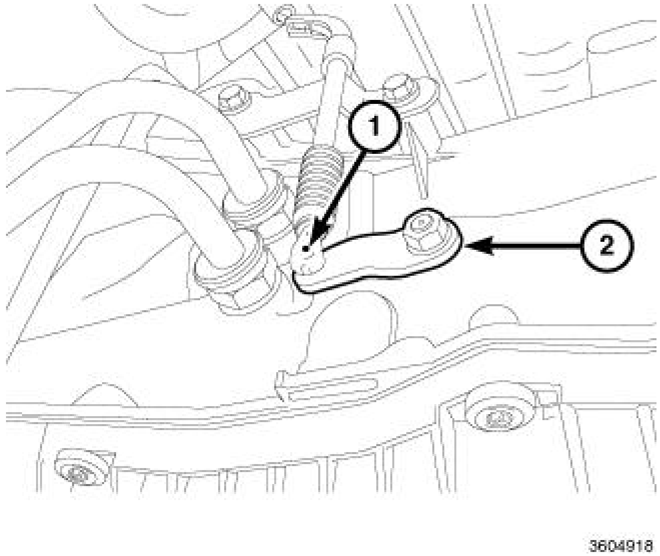


Fig. 27: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

10. Disconnect the Manual Park Release (MPR) cable (1) from the MPR lever (2).

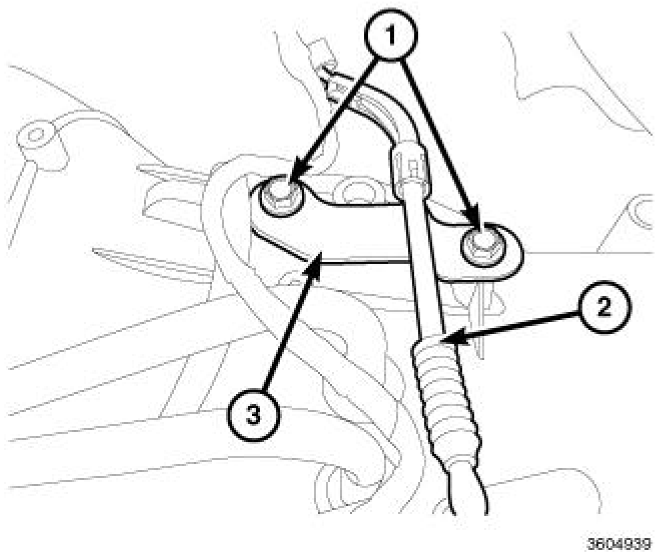
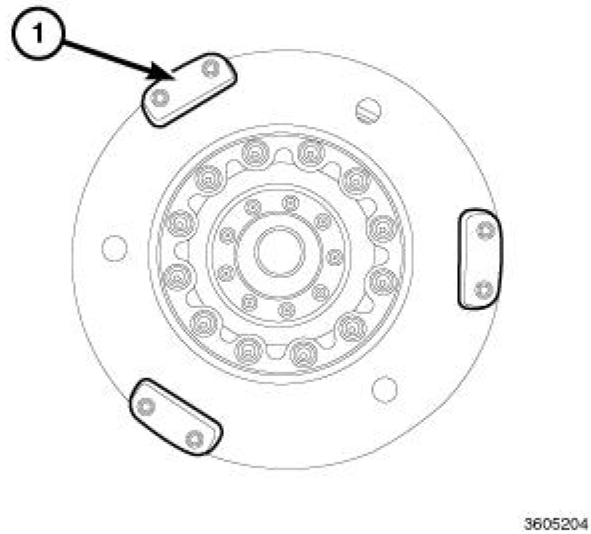


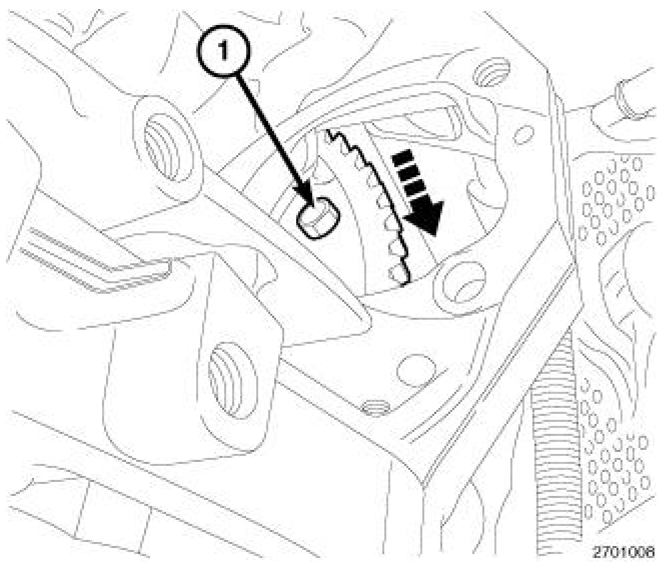
Fig. 28: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

11. Remove the bolts (1) from the MPR cable bracket (3) and position the MPR bracket/cable (2, 3) aside.



[Fig. 29: Converter Attachment Bolts (3 Sets Of 2)](#)
Courtesy of CHRYSLER GROUP, LLC

12. The torque converter is attached with three sets of two bolts (1) 120Â° apart as shown in illustration.



[Fig. 30: Torque Converter Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

13. Rotate the crankshaft in a clockwise direction for access, and through the starter opening, remove the six torque converter bolts (1).

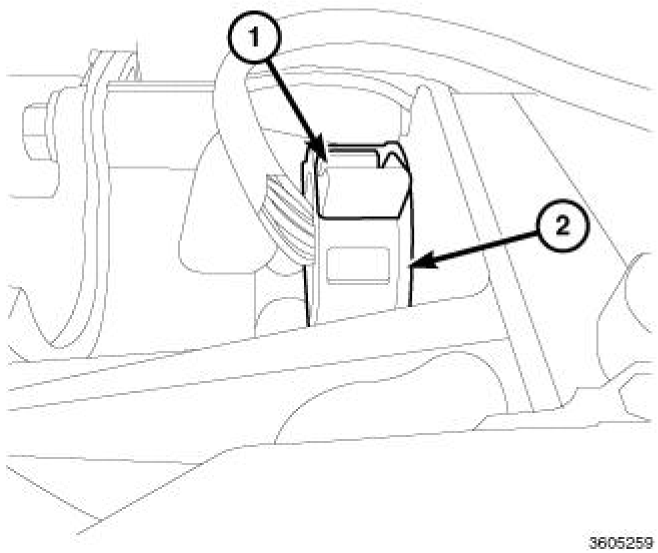


Fig. 31: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

14. Turn the locking mechanism lock (1) of the transmission wire harness connector (2) counterclockwise to release the lock.

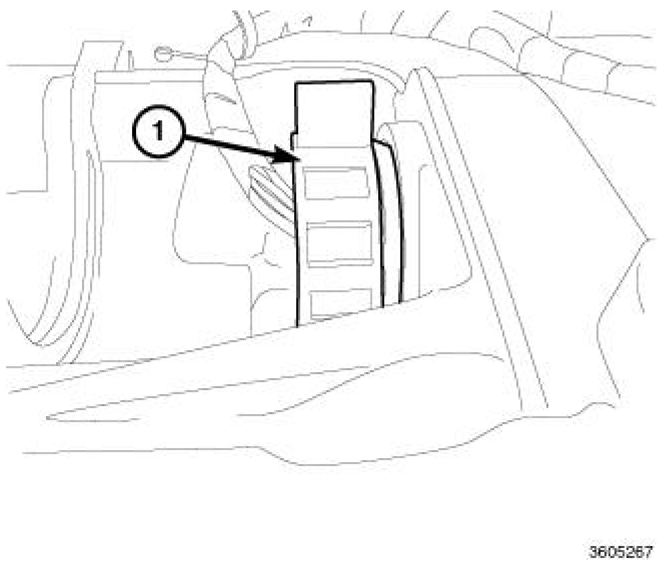
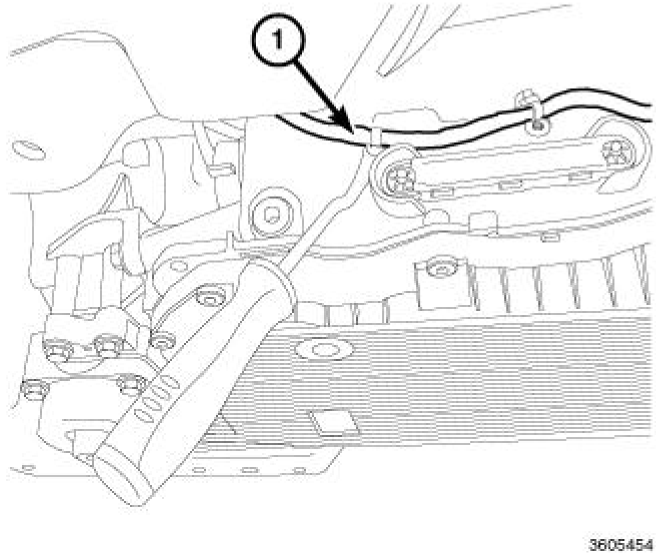


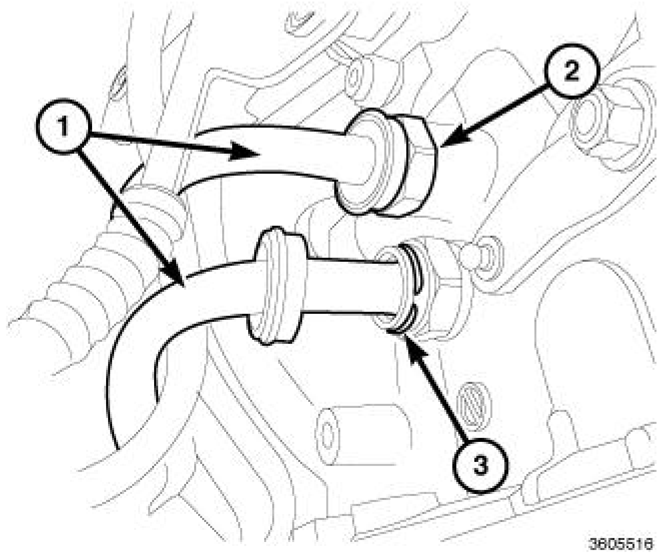
Fig. 32: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

15. Remove the transmission wire harness connector (1).



[Fig. 33: Wiring Harness](#)
Courtesy of CHRYSLER GROUP, LLC

16. Disconnect the wiring harness (1) from the transmission.



[Fig. 34: Transmission Fluid Cooler Lines, Clips & Fittings](#)
Courtesy of CHRYSLER GROUP, LLC

17. Disconnect the transmission fluid cooler lines (1) at the fittings (2) by removing the clips (3). Refer to **TRANSMISSION, STANDARD PROCEDURE** .

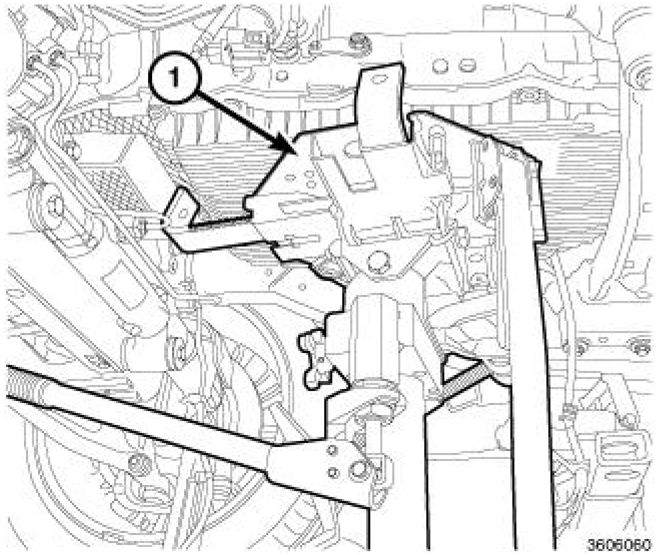


Fig. 35: Service Jack
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When supporting or lifting the transmission at the oil pan the weight of the transmission must be distributed evenly on the lifting fixture. Failure to do so could damage the oil pan and transmission.

18. Raise the transmission slightly with a transmission jack (1) to relieve load on the crossmember.

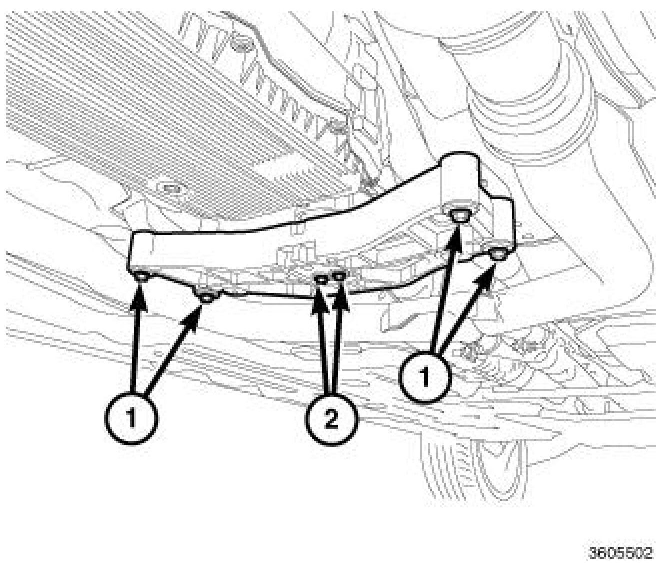


Fig. 36: Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

19. Remove the crossmember bolts (1), the transmission mount bolts (2) and remove the crossmember.

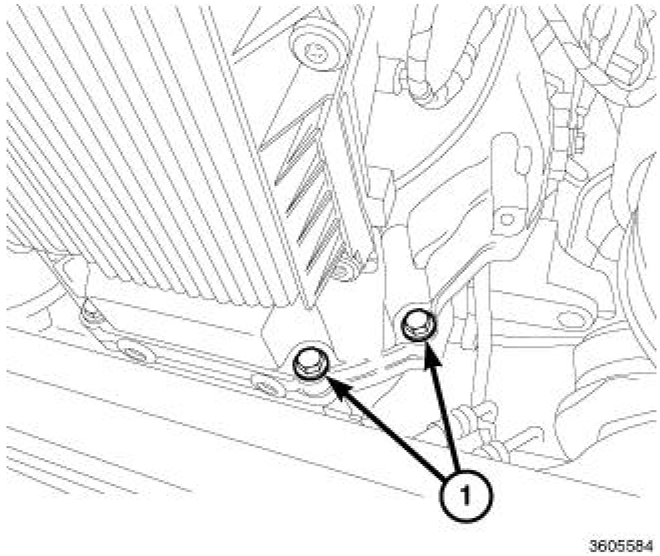


Fig. 37: Bell Housing Bolts (RH)
Courtesy of CHRYSLER GROUP, LLC

20. Remove the Right Hand (RH) transmission to engine bolts (1).

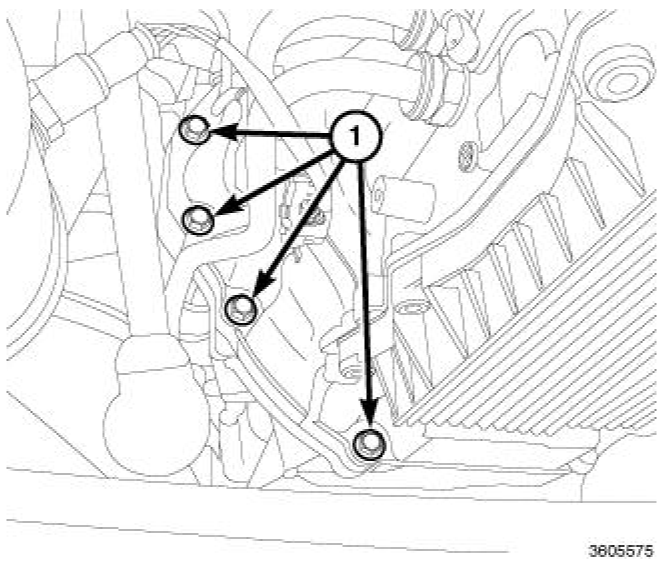
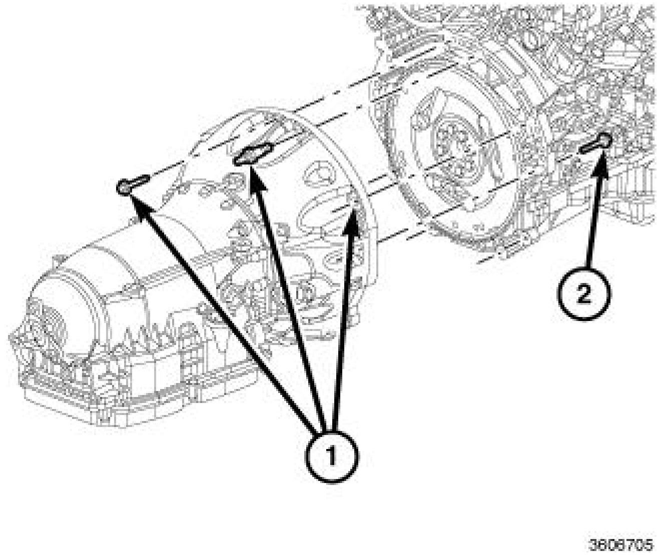


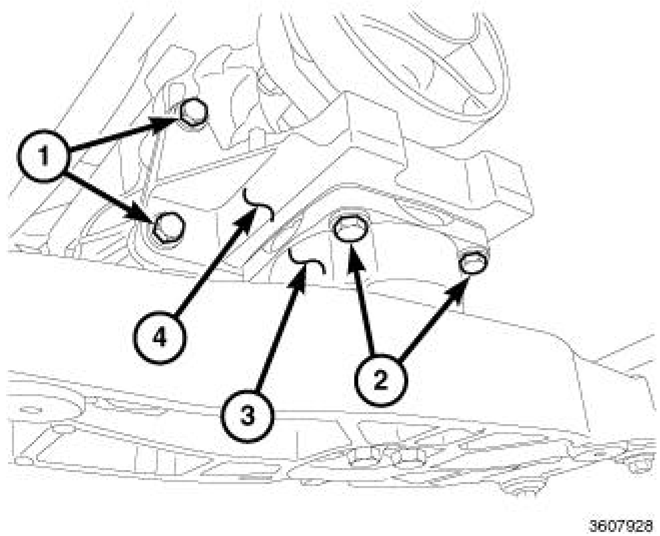
Fig. 38: Bell Housing Bolts (LH)
Courtesy of CHRYSLER GROUP, LLC

21. Remove the Left Hand (LH) transmission to engine bolts (1).



[Fig. 39: Upper Transmission To Engine Bolts]
Courtesy of CHRYSLER GROUP, LLC

22. Remove the remaining transmission to engine bolts (1, 2).
23. Hold the torque converter in place during transmission removal.
24. Lower the transmission and remove the transmission from the vehicle.



[Fig. 40: Transmission Mount Bolts & Transmission Mount]
Courtesy of CHRYSLER GROUP, LLC

25. Remove the four transmission mount bolts (2) and the transmission mount (3).
26. Remove the four adapter bracket bolts (1) and the adapter bracket (4).

DISASSEMBLY

DISASSEMBLY

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module

Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

NOTE: **If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TCM Adaptation Procedure. Refer to MODULE, TRANSMISSION CONTROL, MODULE PROGRAMMING .**

NOTE: **Tag all clutch pack assemblies, as they are removed, for reassembly identification.**

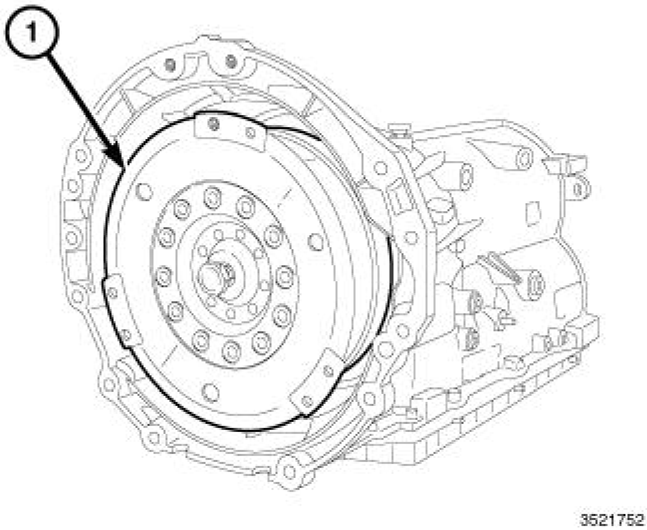


Fig. 41: Torque Converter
Courtesy of CHRYSLER GROUP, LLC

1. Remove the torque converter (1).

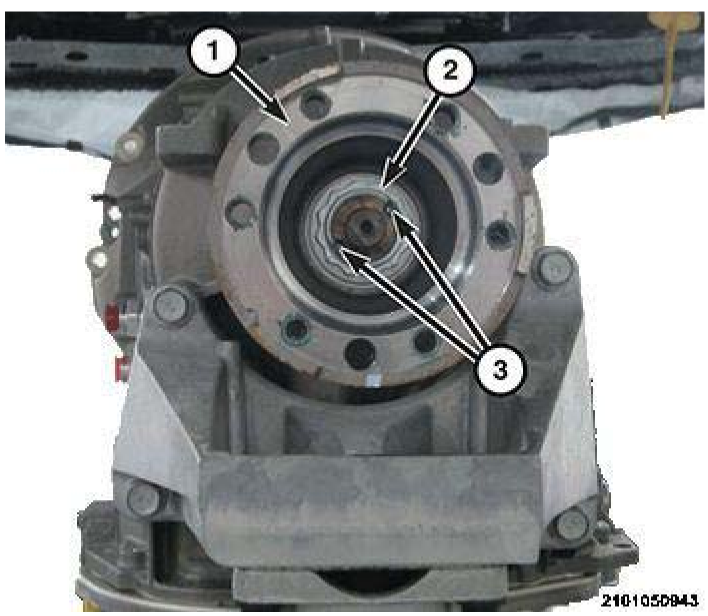


Fig. 42: Drive Shaft Flange, Nut & Staking Area

Courtesy of CHRYSLER GROUP, LLC

2. Using a suitable punch, remove the staking (3) from the drive shaft flange nut (2).

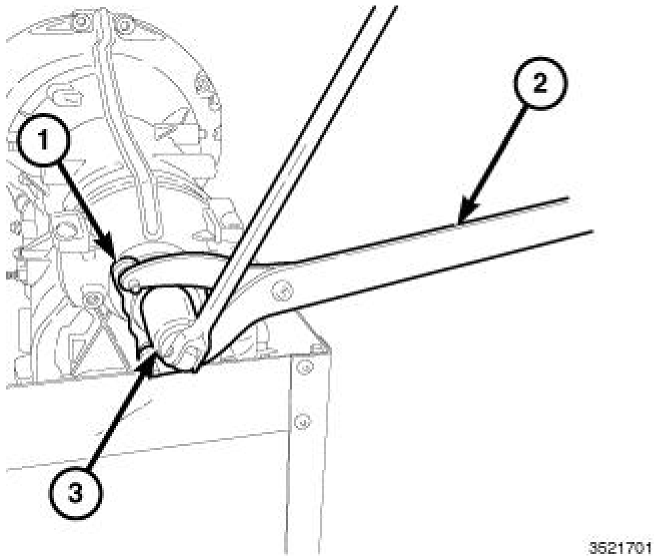


Fig. 43: Flange, Flange Holder & Socket
Courtesy of CHRYSLER GROUP, LLC

3. Loosen the nut about 1 thread using a 34 mm 12 point socket (3) and (special tool #C-3281, Holder, Flange) (2) to hold the flange (1).

NOTE:	**End play specification is between 0.11 - 0.42 mm (0.0043 - 0.0165 in.). If end play is outside this range, a different selectable end play shim must be used during assembly.**

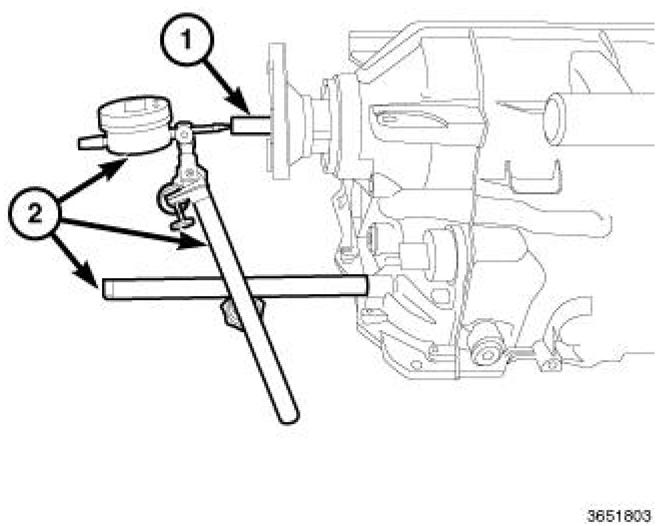
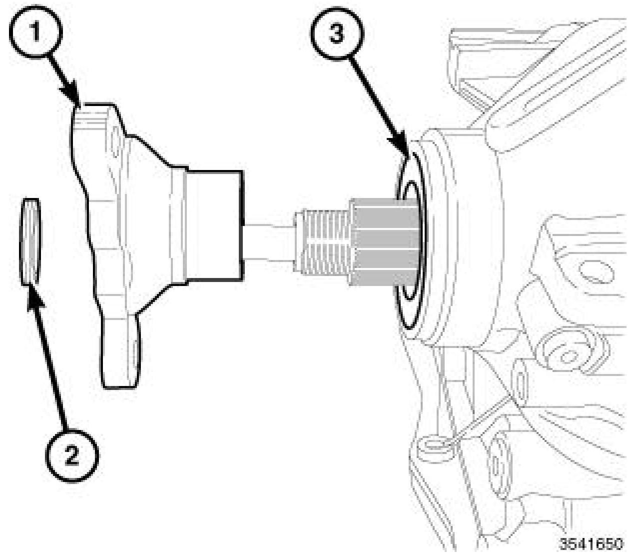


Fig. 44: Measuring End Play
Courtesy of CHRYSLER GROUP, LLC

4. Measure the output shaft (1) end play as follows:
    a. Attach a dial indicator (2) and position the plunger against the end of the output shaft (1).

b. Zero the dial indicator (2).

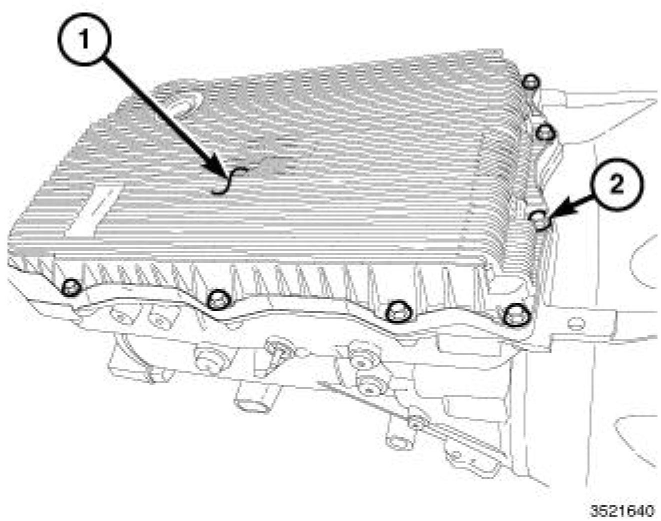
c. Move the output shaft (1) in and out, and record the maximum travel for assembly reference.



[Fig. 45: Propeller Shaft Flange, Rear Dust Seal & Rear Oil Seal]

Courtesy of CHRYSLER GROUP, LLC

5. Finish removing the drive shaft flange nut.
6. Remove the drive shaft flange (1).
7. Remove the transmission rear dust seal (2).
8. Remove the transmission rear oil seal (3) with a suitable slide hammer and screw.
9. Remove the transmission output shaft washer.



[Fig. 46: Thirteen Oil Pan Retaining Bolts]

Courtesy of CHRYSLER GROUP, LLC

10. Remove the thirteen oil pan retaining bolts (2).

NOTE: **Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.**

11. Carefully detach the oil pan (1) and gasket.

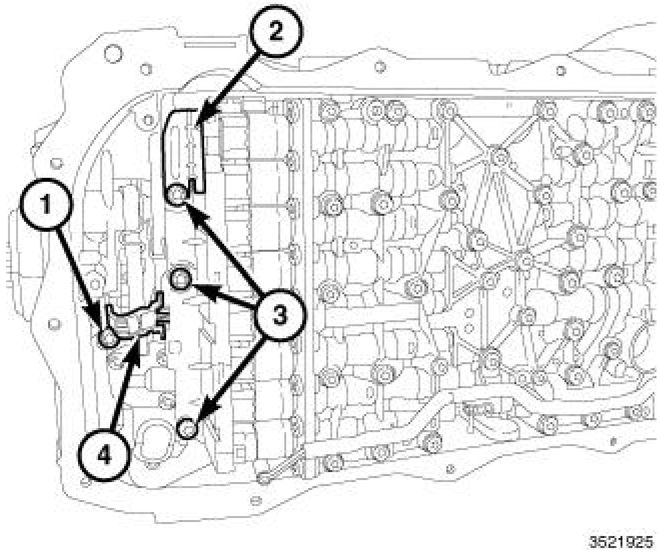


Fig. 47: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove the valve body assembly end retainer bolts (3).
13. Lift the electrical connector lock (2) to release the internal harness end from inside the transmission for valve body assembly removal.
14. Remove the sensor retaining bolt (1) and pull the sensor (4) loose from the case.

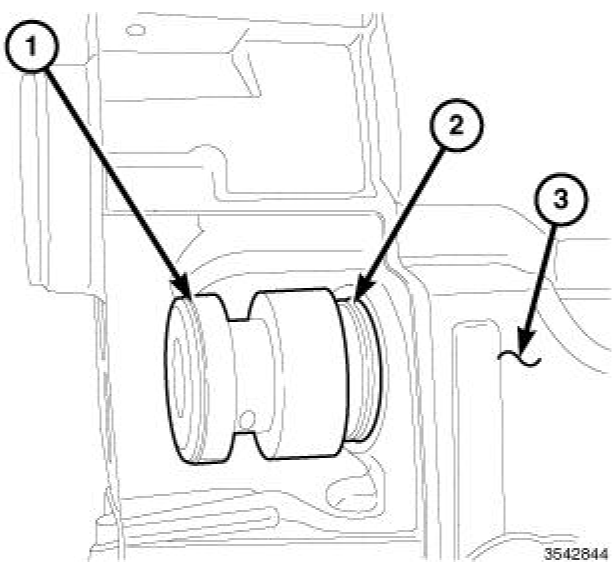


Fig. 48: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

15. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully pull the electrical harness insulator (2) straight out from the transmission case (3).

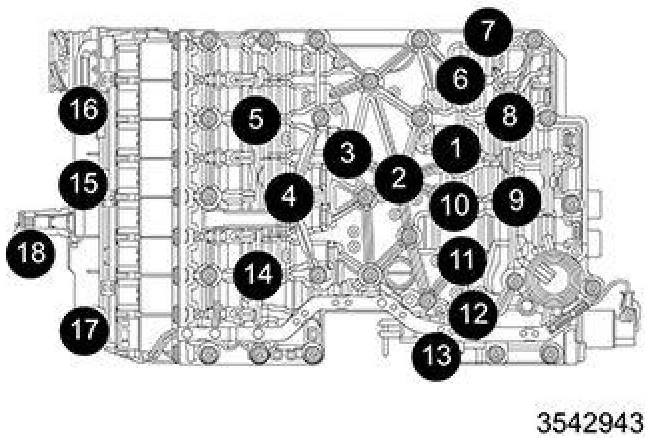


Fig. 49: Valve Body Bolts Loosening And Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

16. Remove the valve body assembly retaining bolts 1-14 (15-18 are already removed).
17. Carefully lift the valve body assembly from the transmission.

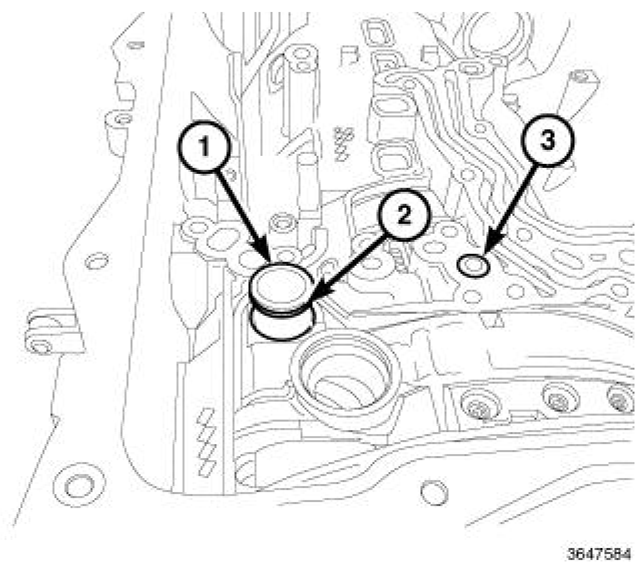


Fig. 50: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The fluid port (1) may be in the transmission or the valve body assembly.**

18. Pull the fluid port (1) from the transmission or valve body assembly.
19. Remove the two O-rings (2).
20. Remove the compression seal (3) from the transmission.

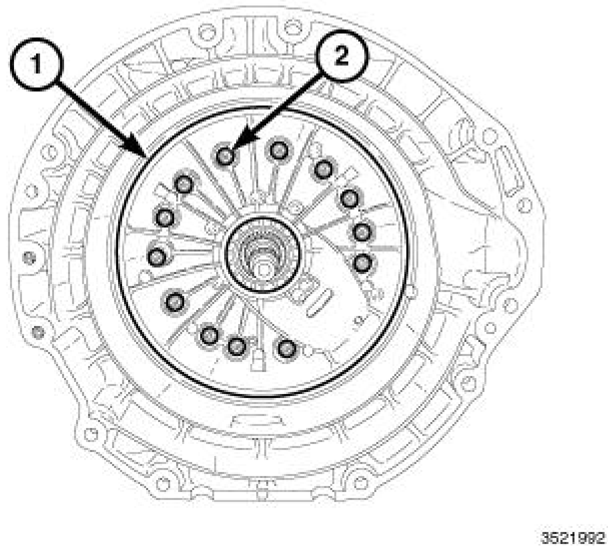


Fig. 51: Thirteen Oil Pump Housing Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

21. Remove the thirteen oil pump housing retaining bolts (2).

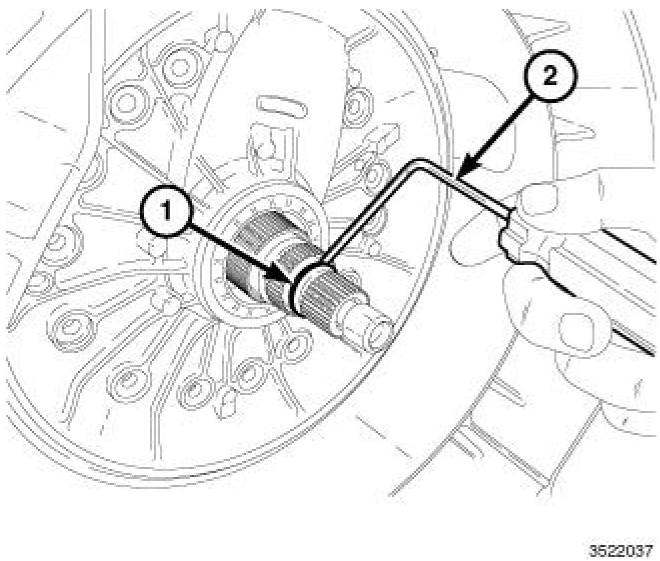


Fig. 52: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

22. Remove the input shaft O-ring (1) using a small pick (2) or equivalent.

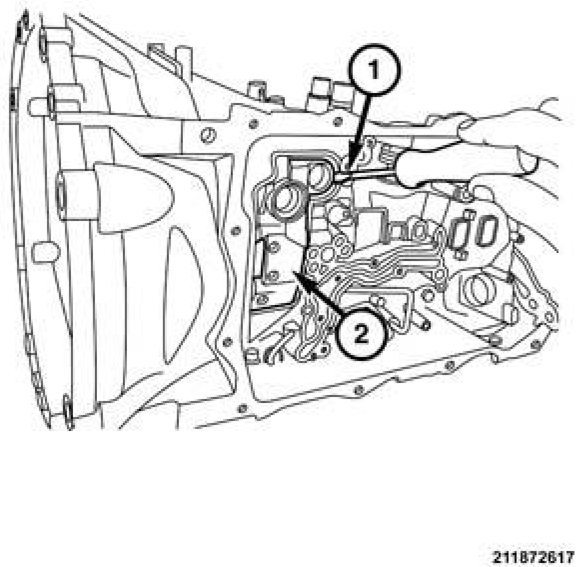


Fig. 53: Prying Oil Pump Housing Away From Case
Courtesy of CHRYSLER GROUP, LLC

23. Carefully pry the oil pump housing (1) away from the case (2) with a small flat blade screwdriver or equivalent through the case opening.
24. From the front of the transmission, remove the oil pump housing.

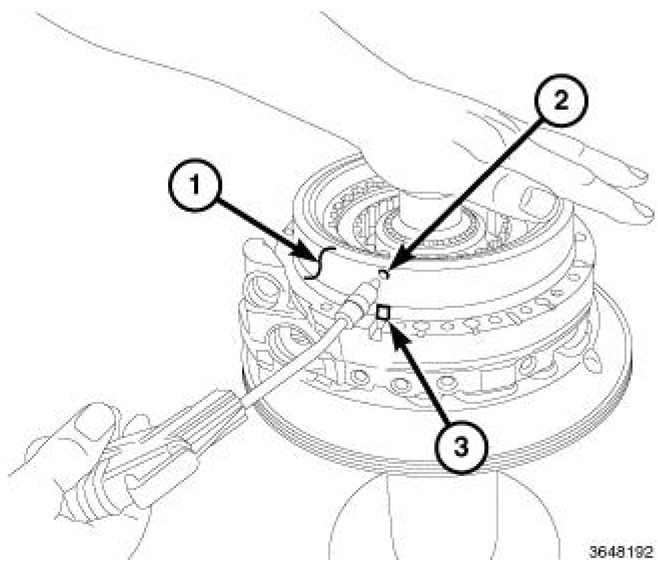


Fig. 54: B-Piston, Hole & B-Piston Alignment Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply air pressure slowly because oil may spray when the B-piston releases from the assembly.**

25. With one hand above the B-piston (1), carefully apply air pressure into the hole (2) directly above the B-piston alignment tab (3) to remove the B-piston (1) from the assembly.

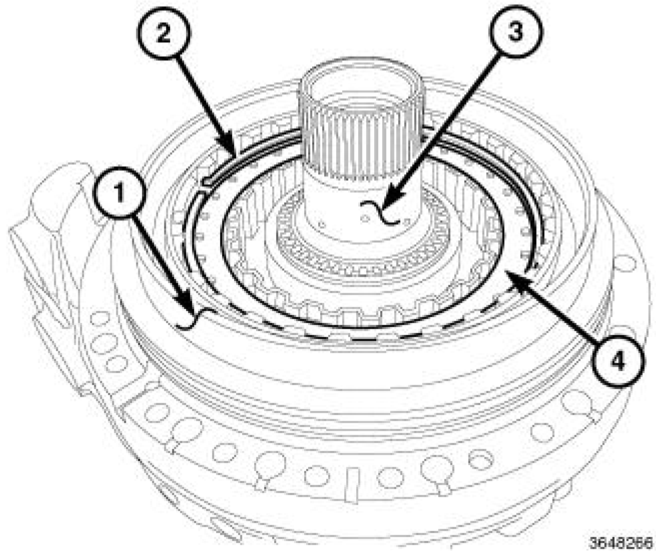


Fig. 55: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

26. Remove the outer ring (1) (under B-piston).
27. Remove the snap ring (2).
28. Remove the clutches and spacers (4).
29. Remove the hub (3).

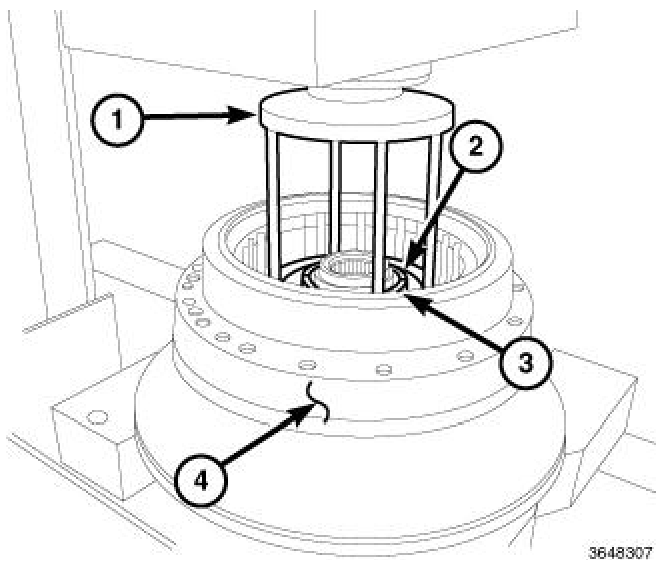


Fig. 56: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

30. Position the oil pump housing assembly (4) in a suitable arbor press.
31. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and remove the two halves of the split retainer ring (2, 3).

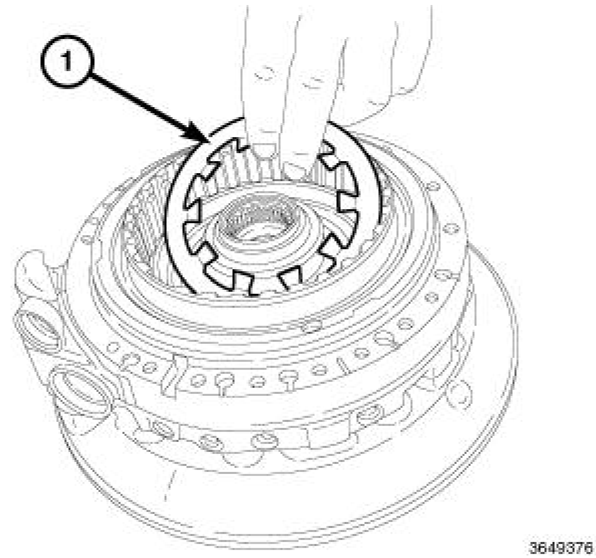


Fig. 57: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

32. Remove the piston retaining ring and piston below it.

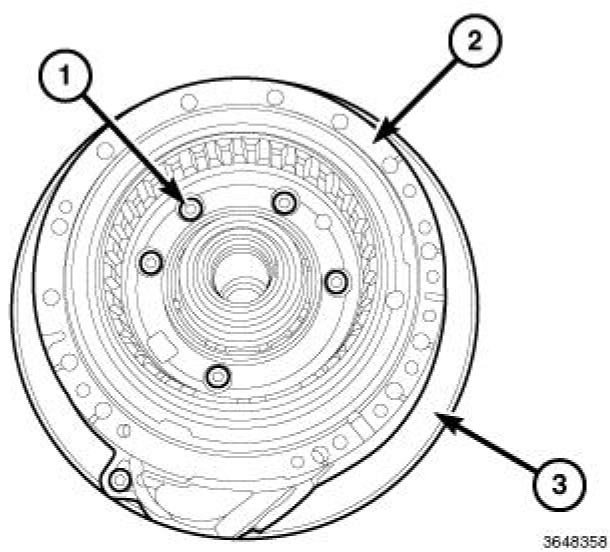


Fig. 58: Six Bolts, Oil Pump Housing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

33. Remove the six bolts (1) and separate the oil pump housing (2) from the oil pump cover (3).

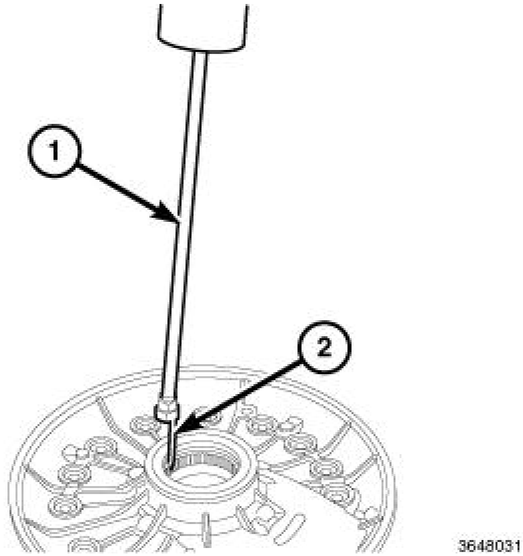


Fig. 59: Seal Remover & Slide Hammer
Courtesy of CHRYSLER GROUP, LLC

34. Using (special tool #9667, Remover, Seal) (2) and (special tool #C-3752, Slide Hammers) (1), remove the oil seal from the front pump cover.
35. Remove the outer lip seal from the front pump cover.

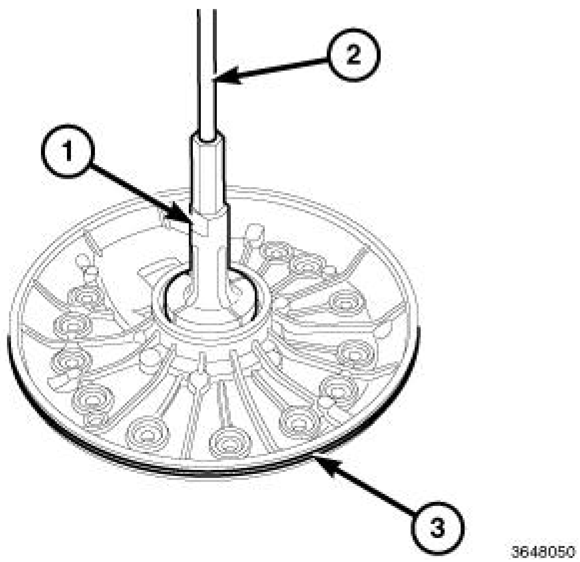


Fig. 60: Remover, Bearing Cup & Slide Hammers
Courtesy of CHRYSLER GROUP, LLC

36. Remove the snap ring.
37. Using (special tool #6787A, Remover, Bearing Cup) (1) and (special tool #C-3752, Slide Hammers) (2) remove the needle bearing from the front cover (3).
38. Remove the snap ring.
39. Using (special tool #9585, Remover, Bearing Cup) and (special tool #C-637, Slide Hammer, Universal) remove the needle bearing.

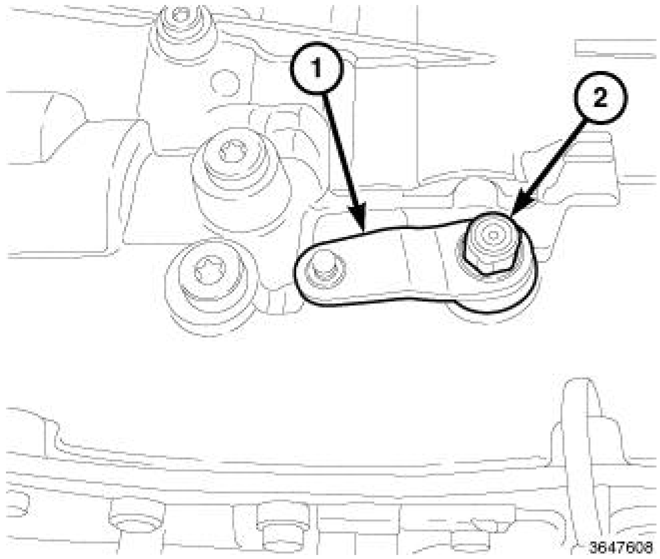


Fig. 61: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

40. Remove the Manual Park Release (MPR) lever retaining nut (2) and remove the lever (1).

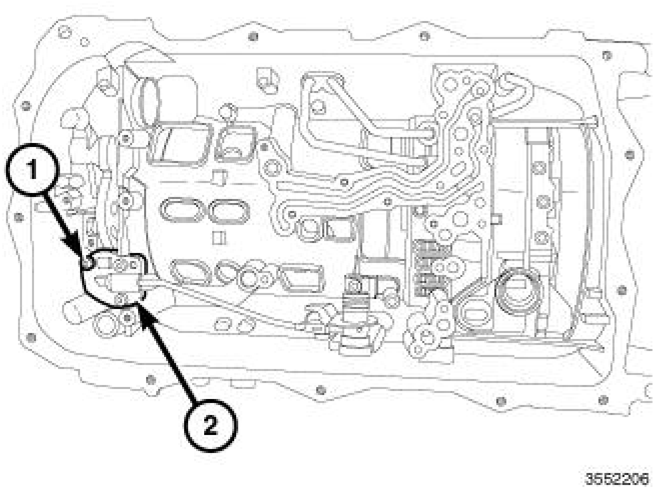


Fig. 62: Three Park Pawl Lock Rod Guide Plate Retaining Screws & Plate
Courtesy of CHRYSLER GROUP, LLC

41. Remove the three park pawl lock rod guide plate retaining screws (1) and remove the plate (2).

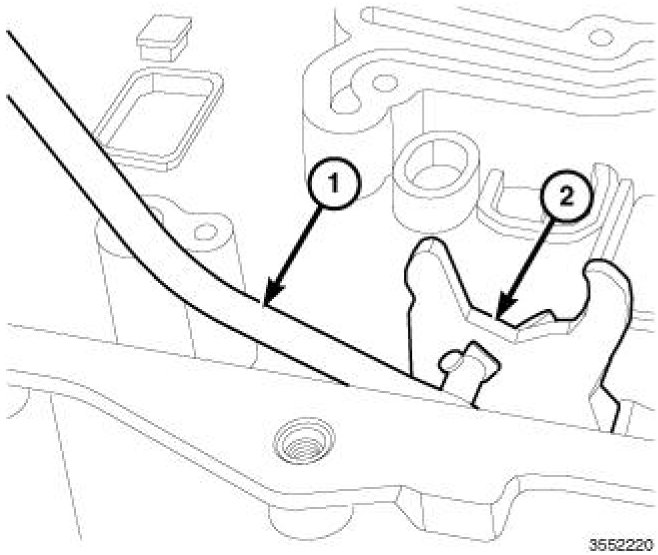


Fig. 63: Park Pawl Lock Rod & Fork
Courtesy of CHRYSLER GROUP, LLC

42. Remove the park pawl lock rod (1) from the fork (2).

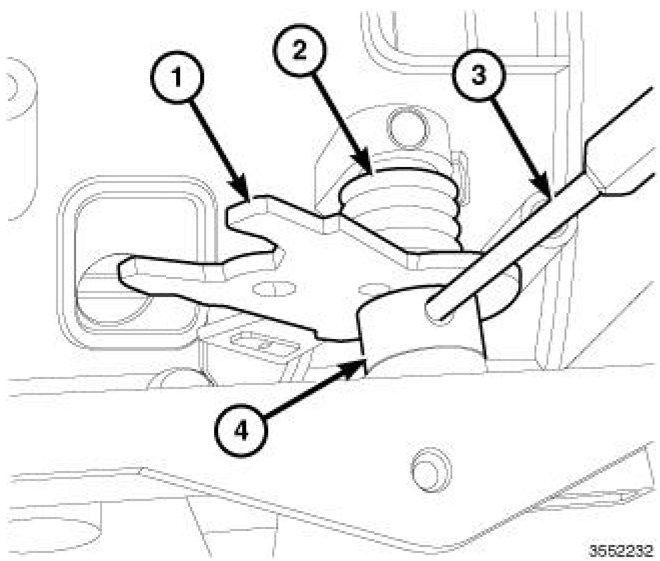


Fig. 64: Selector Shaft, Suitable Pin Punch, Spring & Fork
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Pay attention to the spring position for installation.**

43. Remove the roll pin from the MPR shaft (4) using a suitable pin punch (3).
44. Remove the shaft (4), spring (2) and fork (1) from the case.
45. Remove the MPR shaft seal using a small screwdriver or equivalent.

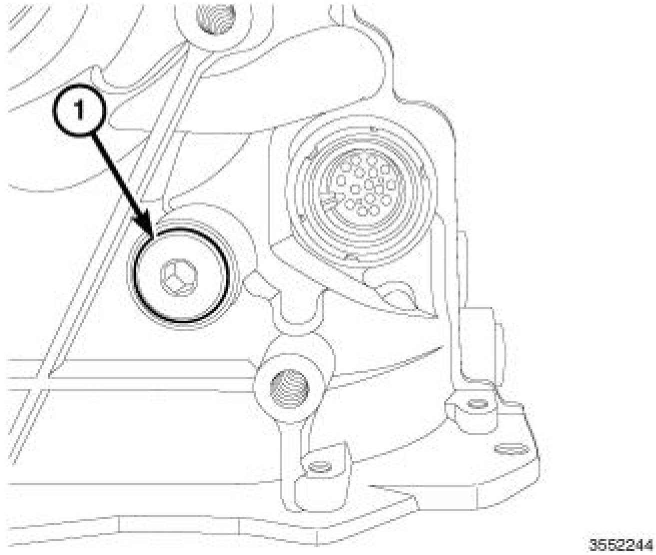


Fig. 65: Park Pawl Shaft Plug
Courtesy of CHRYSLER GROUP, LLC

46. Remove the park pawl shaft plug (1) from the rear of the case.

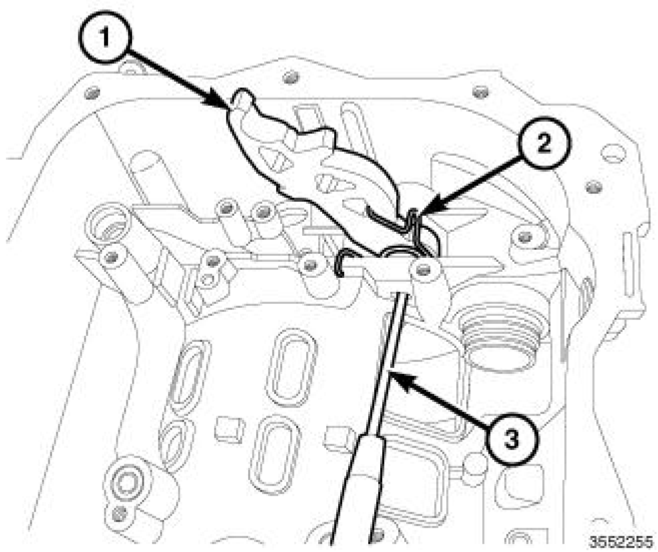
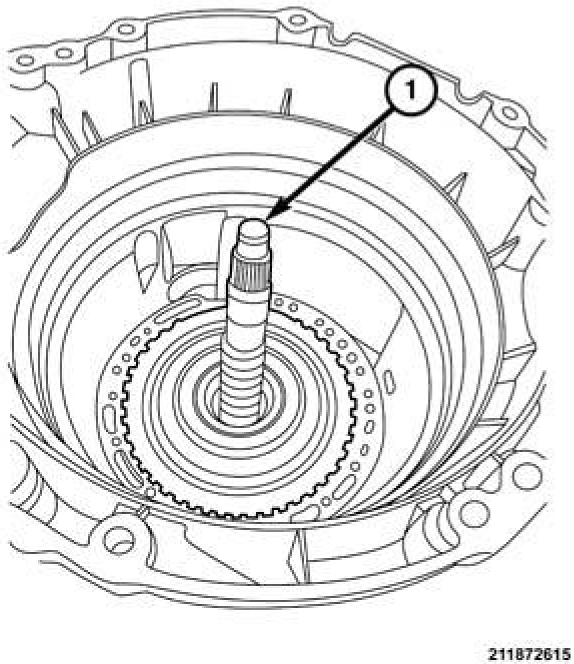


Fig. 66: Removing/Installing Park Pawl Shaft Using A Suitable Pin Punch, Park Pawl And Spring
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Pay attention to the spring position for installation.**

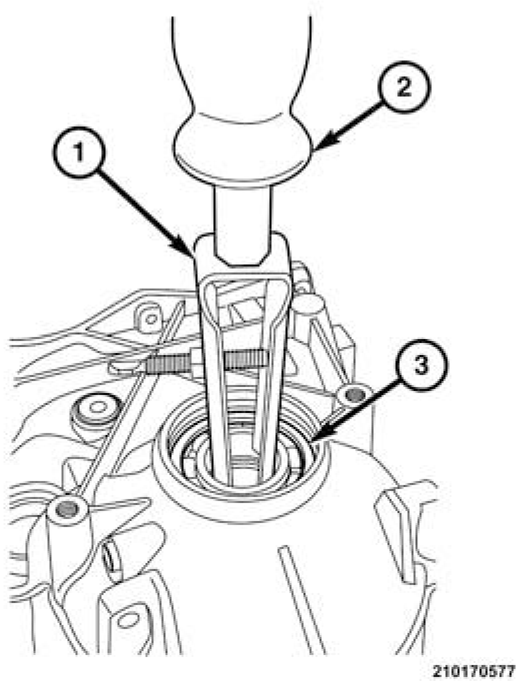
47. Remove the park pawl shaft using a suitable pin punch (3), remove the park pawl (1) and spring (2).



[Fig. 67: Input/Output Shaft & P4 Annulus Drum Assembly](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The transmission must be in the upright position to remove the assembly to avoid damage to the drums.**

48. Remove the input/output shaft and P4 annulus drum assembly (1) from the case.



[Fig. 68: Removing Outer Ball Bearing Using Special Tools](#)
Courtesy of CHRYSLER GROUP, LLC

49. Remove the outer bearing snap ring, and the outer ball bearing (3) using (special tool #9664, Remover, Bearing Cup) (1) and (special tool #C-637, Slide Hammer, Universal) (2).

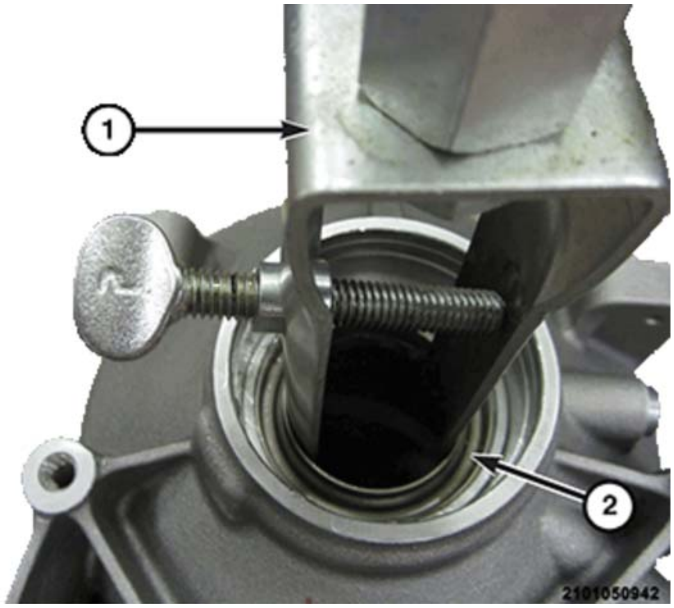


Fig. 69: Removing Oil Dam Using Special Tools
Courtesy of CHRYSLER GROUP, LLC

50. Remove the oil dam snap ring.
51. Using (special tool #9664, Remover, Bearing Cup) (1) and (special tool #C-637, Slide Hammer, Universal), remove the oil dam (2).

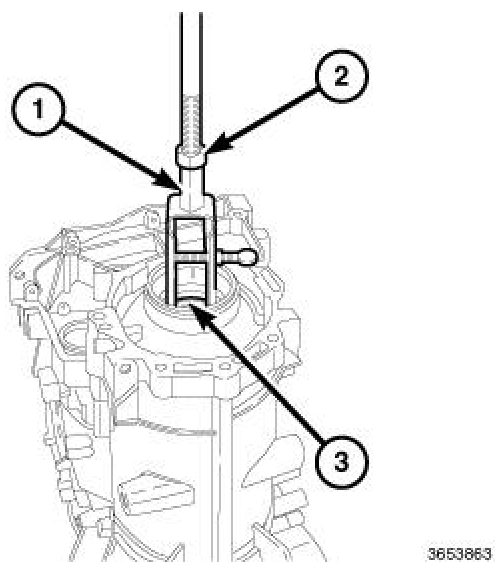


Fig. 70: Bearing Cup, Slide Hammer & Inner Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE: **AWD shown in illustration, RWD similar.**

52. Remove the output shaft inner needle bearing snap ring.
53. Using (special tool #9664, Remover, Bearing Cup) (1) and (special tool #C-637, Slide Hammer,

Universal) (2), remove the inner needle bearing (3).

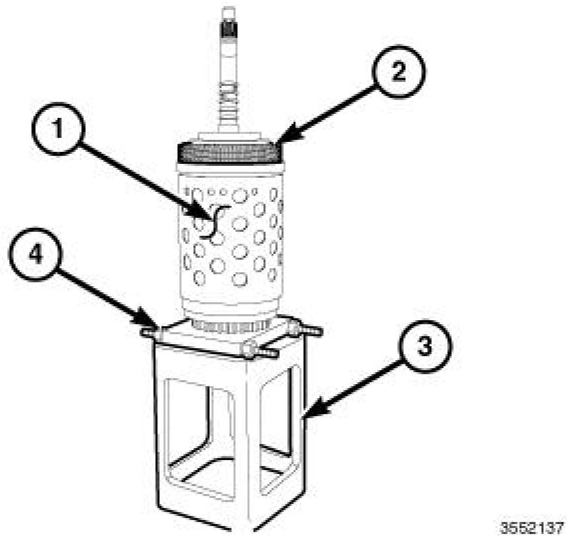


Fig. 71: P4 Annulus Drum Assembly, Press Fixture Assembly & Bearing/Gear Splitter
Courtesy of CHRYSLER GROUP, LLC

54. Position the input/output shaft and P4 annulus drum assembly (1) on (special tool #8925-3, Assembly, Press Fixture) (3) and (special tool #1130, Splitter, Bearing/Gear) (4).
55. Remove the clutch pack (2).

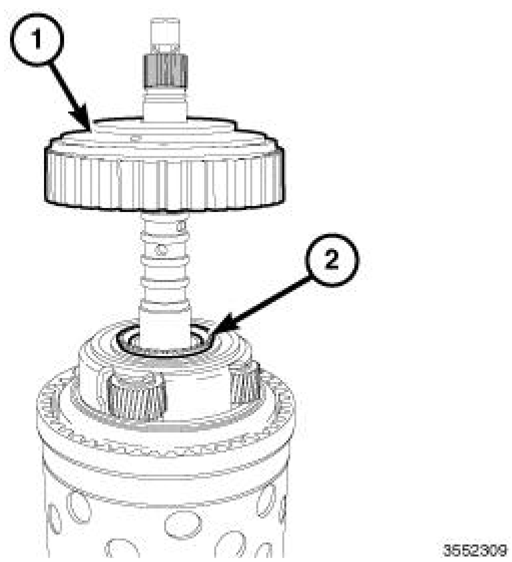


Fig. 72: P1 Annulus/B-Clutch Hub Assembly, Needle Bearing And Holding Plate
Courtesy of CHRYSLER GROUP, LLC

56. Remove the O-ring and 5 squared O-rings.
57. Remove the P1 annulus/B clutch hub assembly (1) from the P4 annulus drum.

NOTE: **The washer may stick to the bottom of the P1 annulus/B clutch hub assembly (1).**

58. Remove the selectable shim from the P1 annulus/B clutch hub.

59. Remove the needle bearing and holding plate (2) from the P1 planetary carrier.

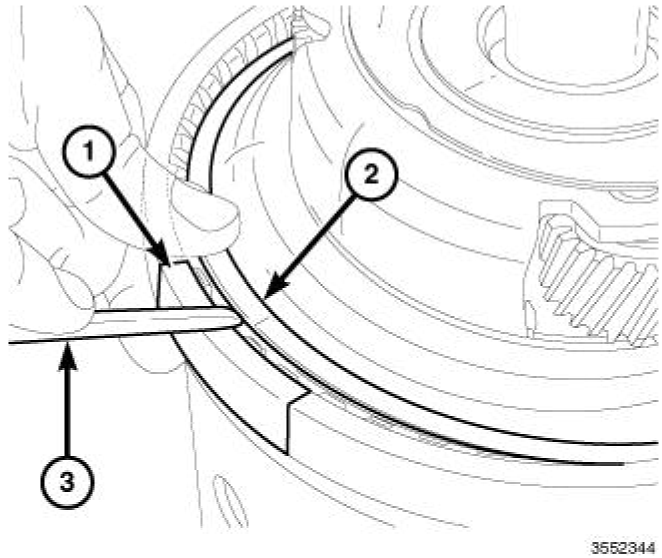


Fig. 73: Tool & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The (special tool #10378, Rings, Support) are three pieces intended to be used in multiple locations around the drum.**

60. Position the (special tool #10378, Rings, Support) (1) on the P4 annulus drum assembly to protect the drum.

NOTE: **Pry the snap ring from the opposite side of the snap ring openings to release.**

NOTE: **When the snap ring is removed the internal clutch drum may drop slightly.**

61. Using a suitable tool (3), release the snap ring (2) by prying in and up from the opposite side of the snap ring openings.

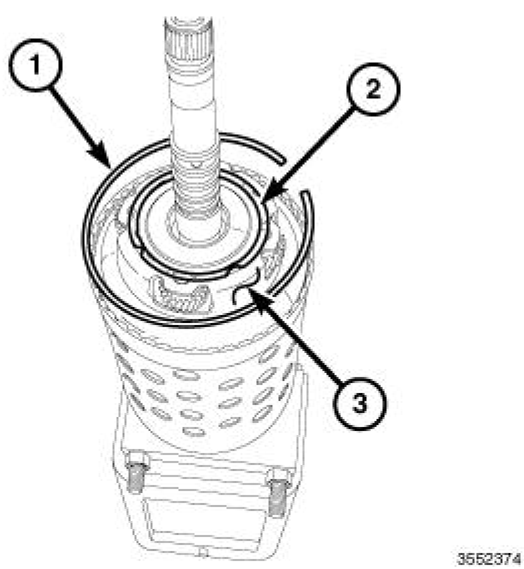


Fig. 74: Snap Ring & P1 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

62. Remove the P1 planetary carrier (3).

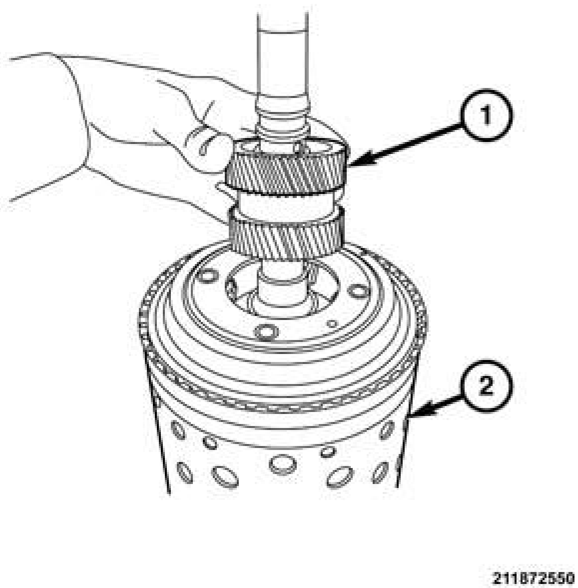


Fig. 75: P1/P2 Sun Gear & P1 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

63. Remove P1/P2 (1) sun gear from the bottom of the P1 planetary carrier.

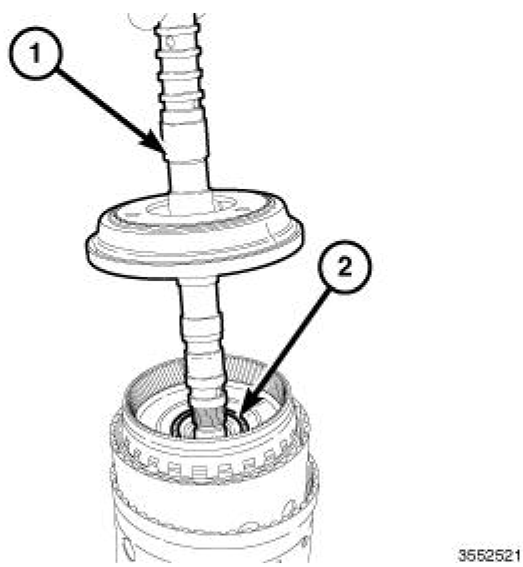
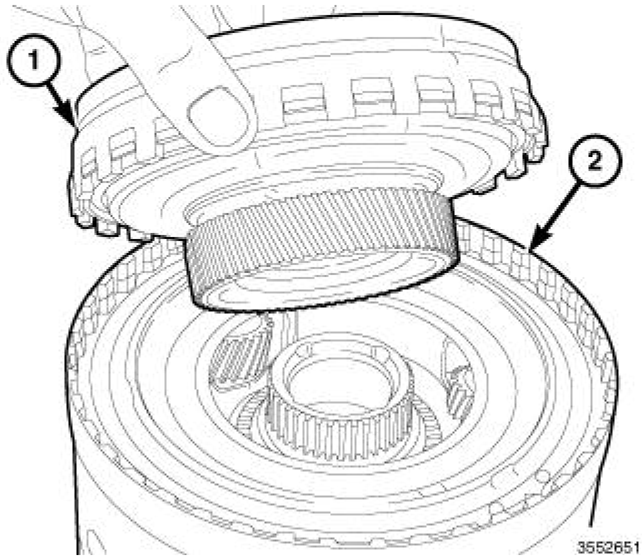


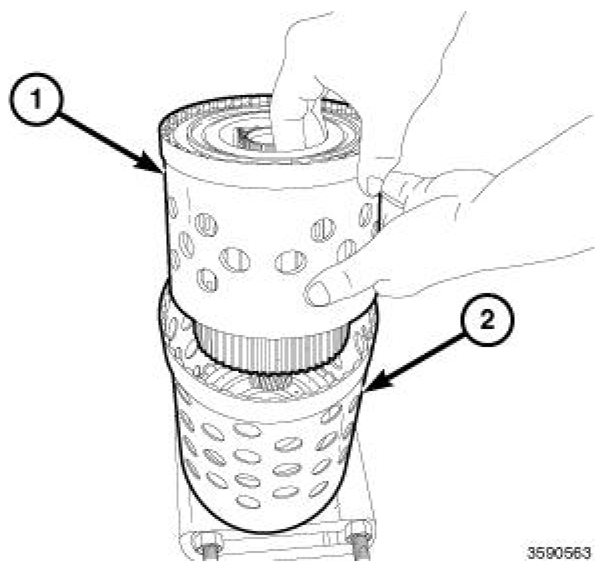
Fig. 76: P2 Planetary Carrier & Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

64. Remove the input shaft with P2 planetary carrier (1) from the drum assembly.
65. Remove the needle bearing (2) and washer.



[Fig. 77: P2 Annulus/P3 Sun Gear & Drum Assembly]
Courtesy of CHRYSLER GROUP, LLC

66. Remove the P2 annulus/P3 sun gear (1) from the drum assembly (2).



[Fig. 78: D-Clutch Drum & P4 Annulus Drum]
Courtesy of CHRYSLER GROUP, LLC

67. Remove the D clutch drum (1) from the P4 annulus drum (2).

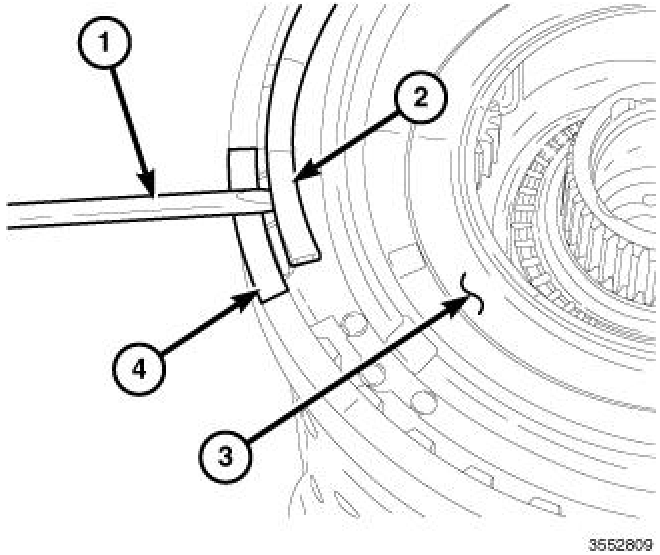


Fig. 79: Support Rings, Tool & P3 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The (special tool #10378, Rings, Support) are three pieces intended to be used in multiple locations around the drum.**

68. Position the (special tool #10378, Rings, Support) (4) on the P4 annulus drum assembly to protect the drum.
69. Using a suitable tool (1), release and remove the snap ring (2).
70. Remove the P3 planetary carrier (3).
71. Remove the needle bearing from the planetary carrier.

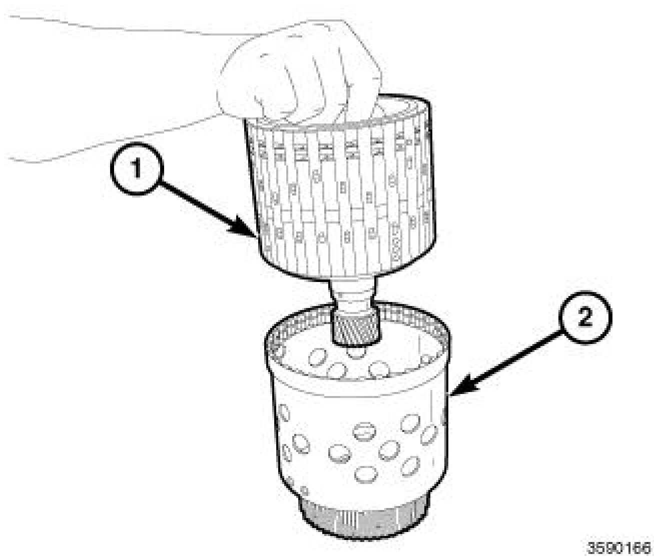


Fig. 80: P4 Sun Gear/C/E Clutch Retainer & D-Clutch Drum
Courtesy of CHRYSLER GROUP, LLC

72. Remove the P4 sun gear/C/E clutch retainer (1) from the D clutch drum (2).

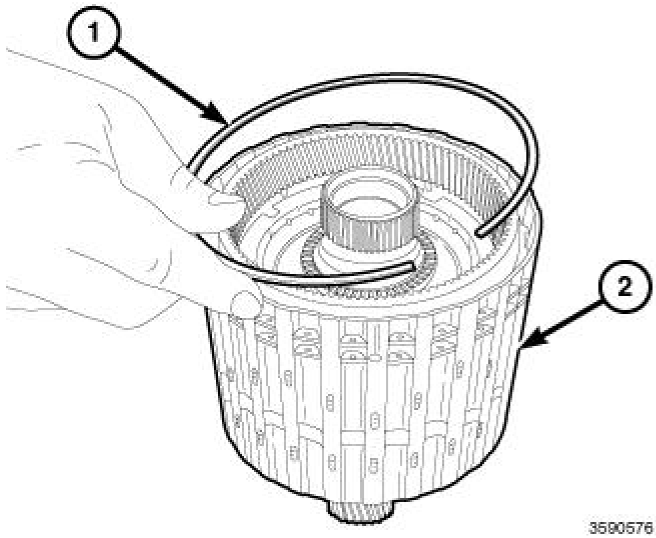


Fig. 81: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

73. Remove the snap ring (1) from the P4 sun gear/C/E clutch retainer (2).

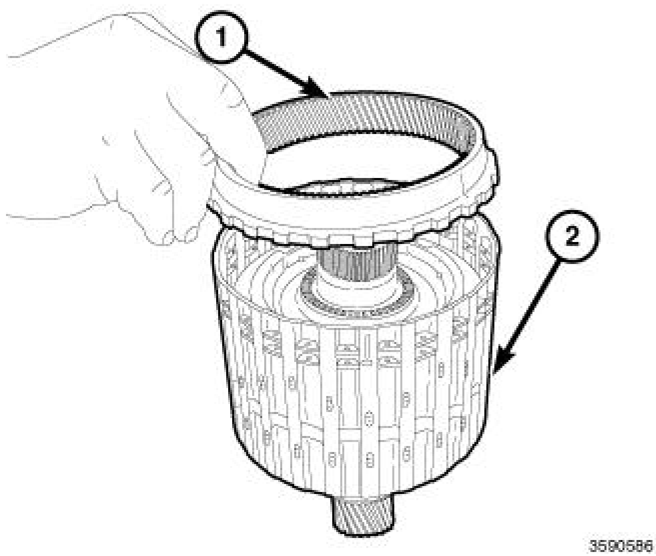


Fig. 82: P3 Annulus & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

74. Remove the P3 annulus (1) from the P4 sun gear/C/E clutch retainer (2).

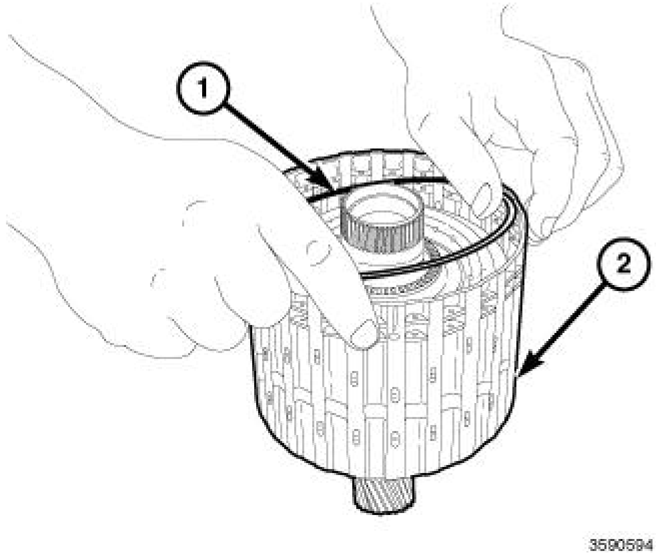


Fig. 83: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

75. Remove the snap ring (1) from the P4 sun gear/C/E clutch retainer (2).

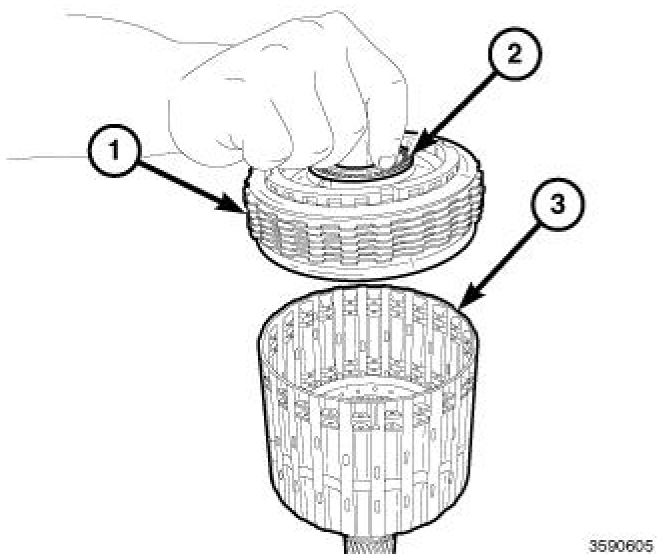


Fig. 84: E-Clutch & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

76. Remove the E clutch (1) from the P4 sun gear/C/E clutch retainer (3).
77. Remove the needle bearing (2) from the E clutch (1).

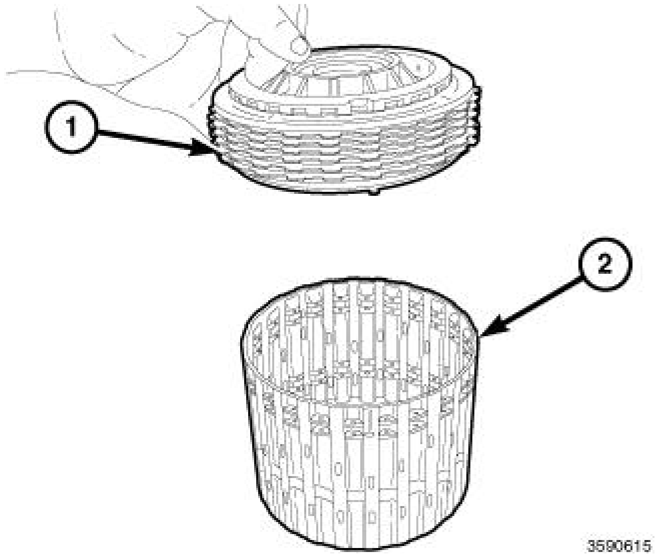


Fig. 85: C-Clutch & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

78. Remove the C clutch (1) from the P4 sun gear/C/E clutch retainer (2).
79. Remove the bearing from top and bottom of C clutch (1).

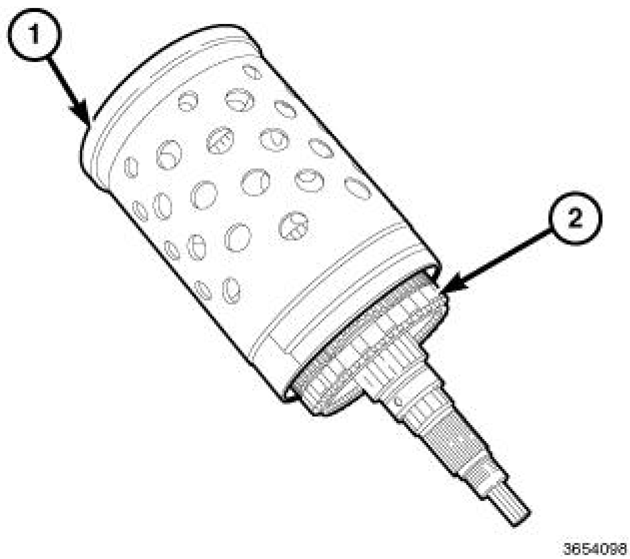


Fig. 86: P4 Planetary Carrier/Output Shaft & P4 Annulus Drum
Courtesy of CHRYSLER GROUP, LLC

80. Remove the P4 planetary carrier/output shaft (2) from the P4 annulus drum (1).

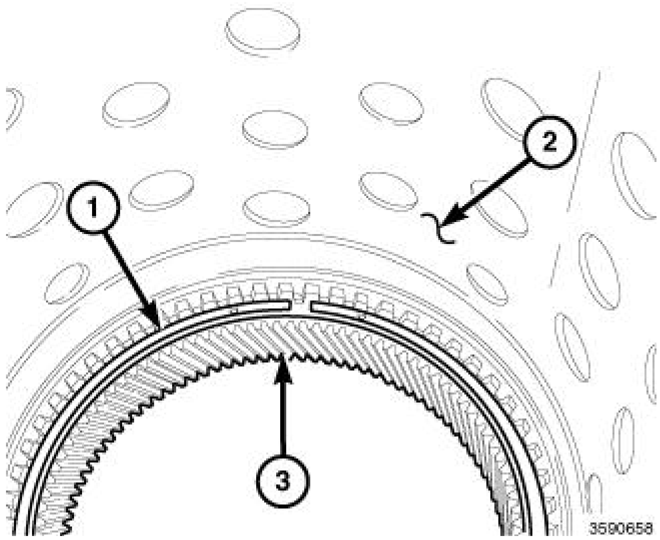


Fig. 87: Snap Ring & P4 Annulus Drum & P4 Annulus
Courtesy of CHRYSLER GROUP, LLC

81. Remove the snap ring (1) from the P4 annulus drum (2).
82. Remove the P4 annulus (3) from the P4 annulus drum (2).

CLEANING

CLEANING

CAUTION: **A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid, see FLUIDS, LUBRICANTS AND GENUINE PARTS located in owners manual.**

The use of crocus cloth is permissible where necessary, providing it is used carefully. When used on shafts, or valves, use extreme care to avoid rounding off sharp edges. Sharp edges are vital as they prevent foreign matter from getting between the valve and valve bore.

Do not reuse oil seals, seal rings, or O-rings during overhaul. Replace these parts as a matter of course. Also do not reuse snap rings or E-clips that are bent or distorted. Replace these parts as well.

Lubricate transmission parts with the appropriate automatic transmission fluid only during overhaul and assembly.

NOTE: **Do not use shop towels or rags to dry the case (or any other transmission component) unless they are made from lint-free materials. Lint will stick to case surfaces and transmission components and circulate throughout the transmission after assembly. A sufficient quantity of lint can block fluid passages and interfere with valve body operation.**

Flush the case bores and fluid passages thoroughly with approved transmission fluid. Dry the case and all fluid passages with compressed air. Be sure that all fluid passages are clear.

INSPECTION

INSPECTION

Inspect the case for cracks, porous spots, worn bores, or damaged threads. Damaged threads can be repaired with HelicoilÂ® thread inserts. However, the case will have to be replaced if it exhibits any type of damage or wear.

ASSEMBLY

ASSEMBLY

CAUTION:	**A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid, see FLUIDS, LUBRICANTS AND GENUINE PARTS located in owners manual.**
CAUTION:	**The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.**
NOTE:	**If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TCM Adaptation Procedure. Refer to MODULE, TRANSMISSION CONTROL, MODULE PROGRAMMING .**

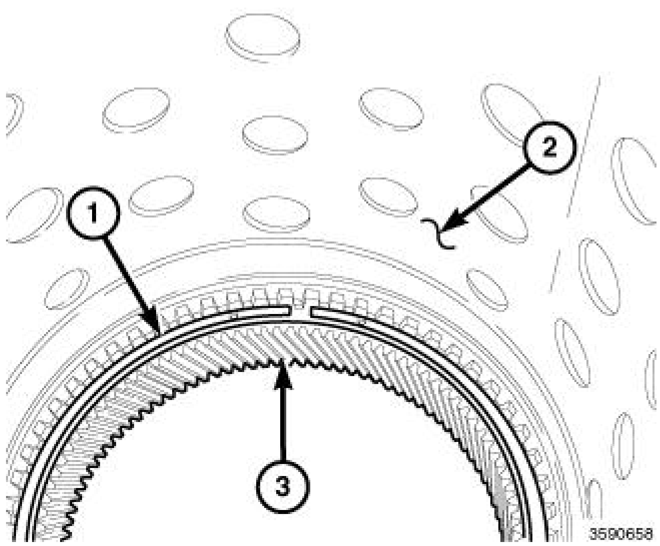
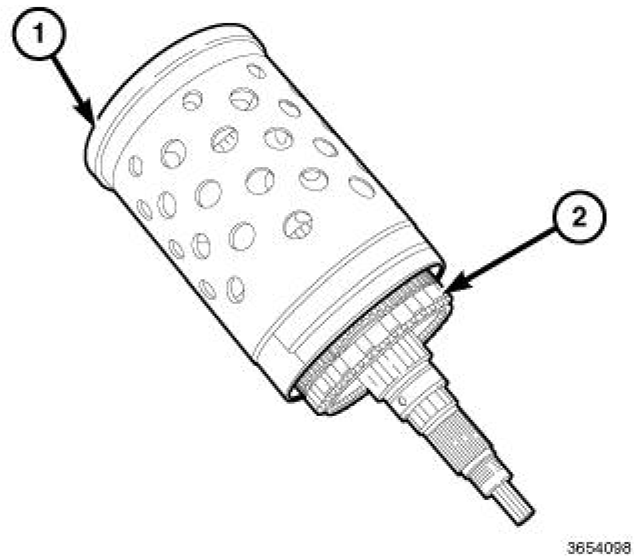


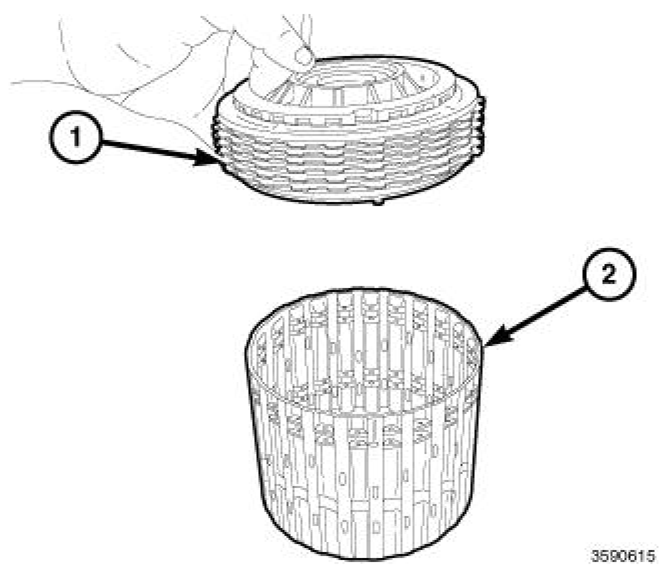
Fig. 88: Snap Ring & P4 Annulus Drum & P4 Annulus
Courtesy of CHRYSLER GROUP, LLC

1. Insert the P4 annulus (3) into the P4 annulus drum (2).
2. Install the snap ring (1) into the P4 annulus drum (2).



[Fig. 89: P4 Planetary Carrier/Output Shaft & P4 Annulus Drum]
Courtesy of CHRYSLER GROUP, LLC

3. Install the P4 planetary carrier\output shaft (2) into the P4 annulus drum (1).



[Fig. 90: C-Clutch & P4 Sun Gear/C/E Clutch Retainer]
Courtesy of CHRYSLER GROUP, LLC

4. Position the bearings on the top and the bottom of C clutch (1).
5. Install the C clutch (1) into the P4 sun gear/C/E clutch retainer (2).

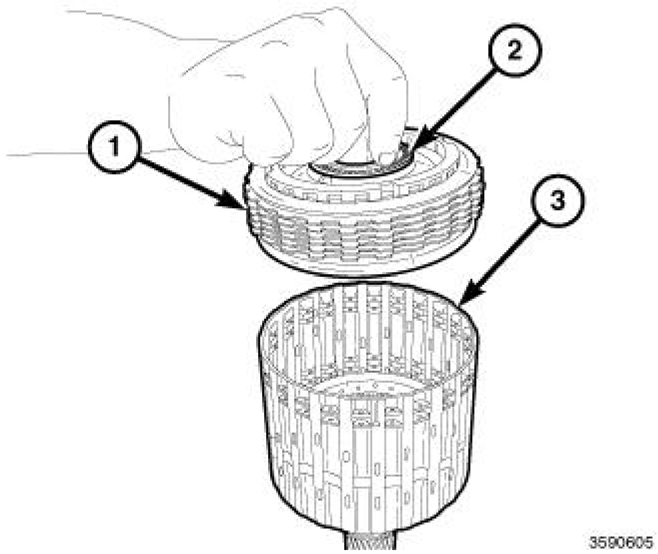


Fig. 91: E-Clutch & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

6. Install the needle bearing (2) onto the E clutch (1).
7. Install the E clutch (1) into the P4 sun gear/C/E clutch retainer (3).

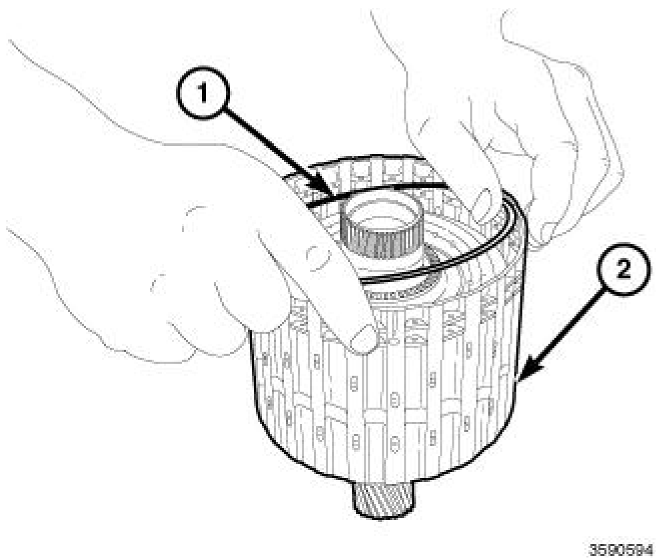


Fig. 92: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

8. Install the snap ring (1) into the P4 sun gear/C/E clutch retainer (2).

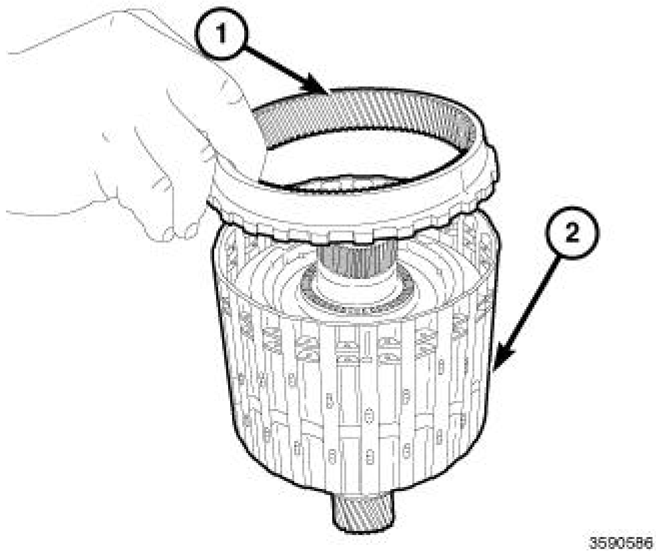


Fig. 93: P3 Annulus & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

9. Install the P3 annulus (1) into the P4 sun gear/C/E clutch retainer (2).

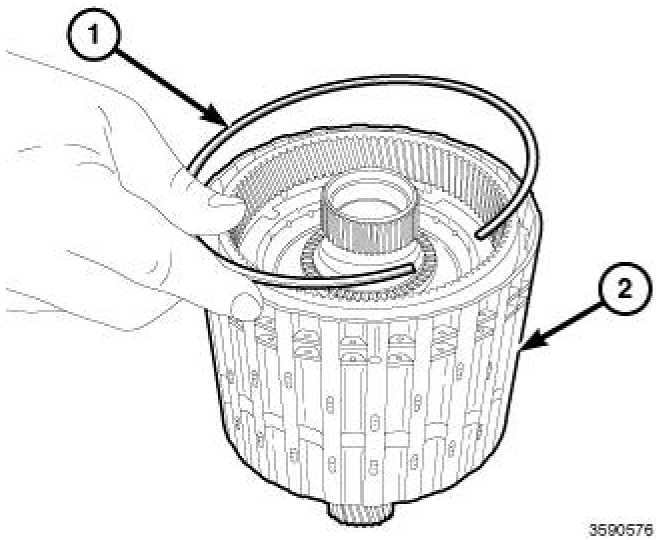


Fig. 94: Snap Ring & P4 Sun Gear/C/E Clutch Retainer
Courtesy of CHRYSLER GROUP, LLC

10. Install the snap ring (1) into the P4 sun gear/C/E clutch retainer (2).

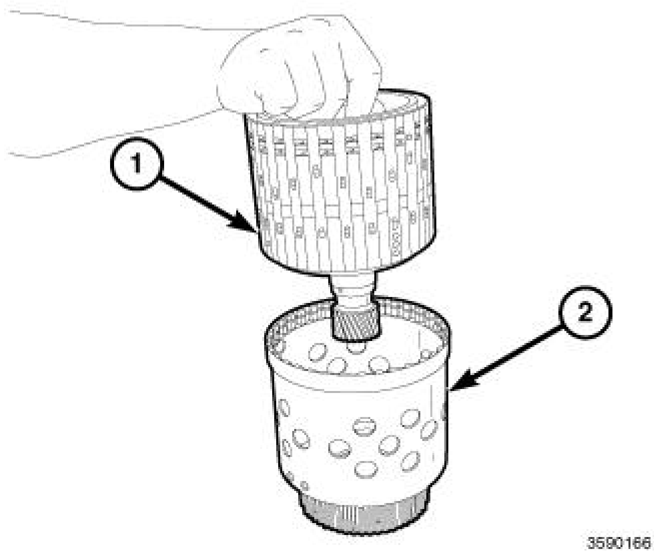


Fig. 95: P4 Sun Gear/C/E Clutch Retainer & D-Clutch Drum
Courtesy of CHRYSLER GROUP, LLC

11. Install the P4 sun gear/C/E clutch retainer (1) into the D clutch drum (2).

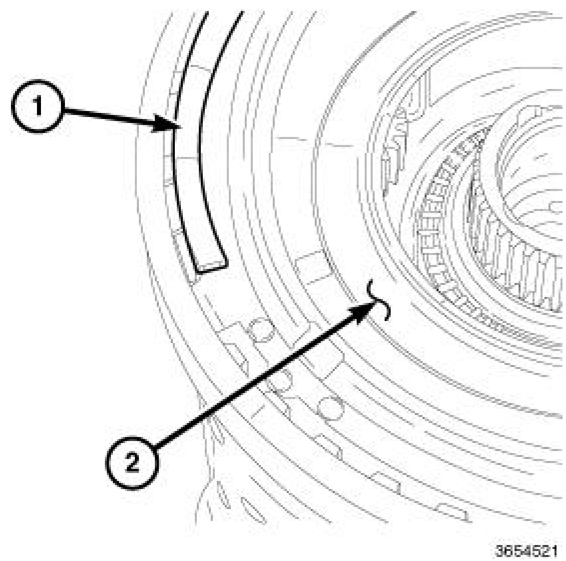
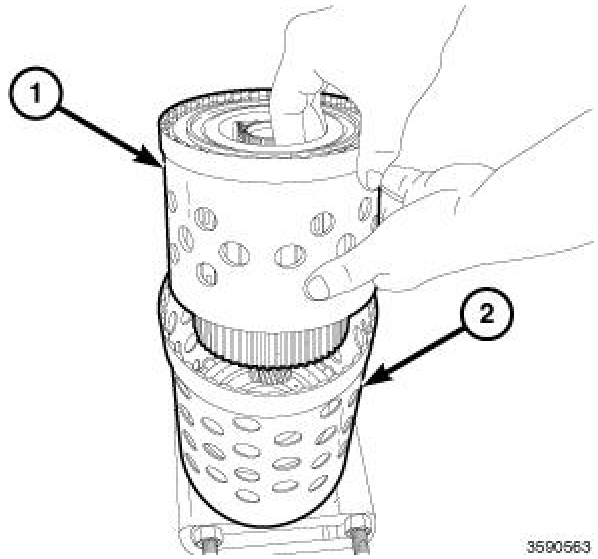


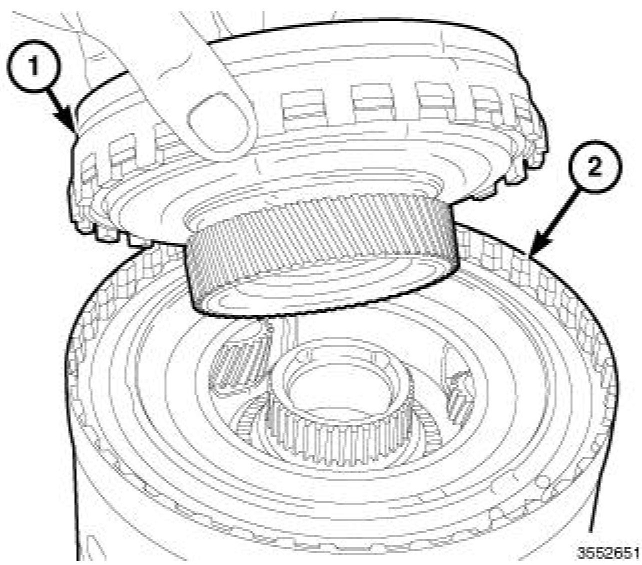
Fig. 96: P3 Planetary Carrier & Snap Ring
Courtesy of CHRYSLER GROUP, LLC

12. Install the needle bearing onto the planetary carrier.
13. Install the P3 planetary carrier (2) in the D clutch drum.
14. Install the snap ring (1).



[Fig. 97: D-Clutch Drum & P4 Annulus Drum]
Courtesy of CHRYSLER GROUP, LLC

15. Install the D clutch drum (1) into the P4 annulus drum (2).



[Fig. 98: P2 Annulus/P3 Sun Gear & Drum Assembly]
Courtesy of CHRYSLER GROUP, LLC

16. Install the P2 annulus\P3 sun gear (1) onto the drum assembly (2).

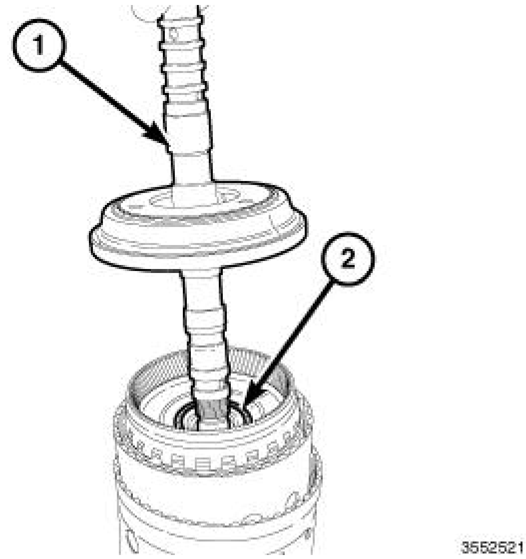


Fig. 99: P2 Planetary Carrier & Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

17. Install the needle bearing (2) and washer.
18. Install the input shaft with P2 planetary carrier (1) into the drum assembly.

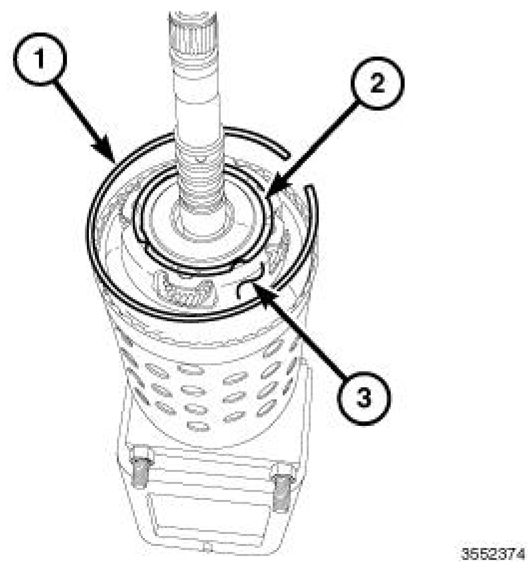


Fig. 100: Snap Ring & P1 Planetary Carrier
Courtesy of CHRYSLER GROUP, LLC

19. Install P1/P2 sun gear into the bottom of the P1 planetary carrier (3).
20. Install the P1 planetary carrier (3).
21. Install the snap ring (1).

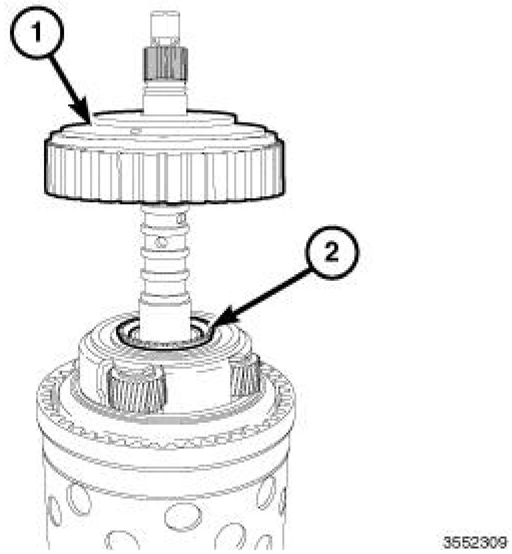


Fig. 101: P1 Annulus/B-Clutch Hub Assembly, Needle Bearing And Holding Plate
Courtesy of CHRYSLER GROUP, LLC

22. Install the needle bearing and holding plate (2) onto the P1 planetary carrier.
23. Install the selectable shim to the P1 annulus/B clutch hub.
24. Install the P1 annulus\B clutch hub assembly (1) onto the P4 annulus drum.
25. Install the O-ring and five squared O-rings.

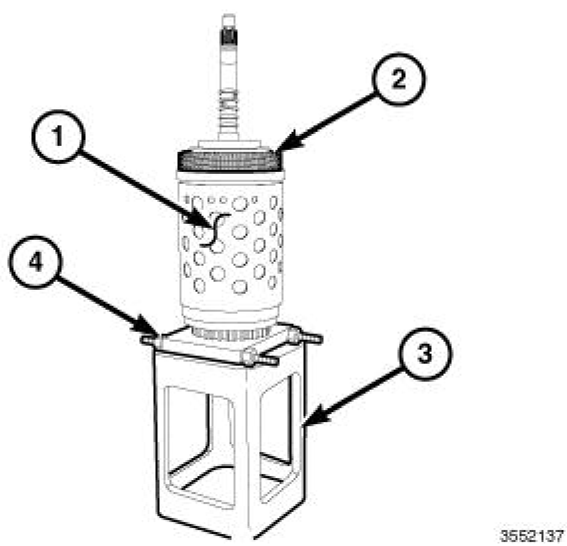


Fig. 102: P4 Annulus Drum Assembly, Press Fixture Assembly & Bearing/Gear Splitter
Courtesy of CHRYSLER GROUP, LLC

26. Install the clutch pack (2).

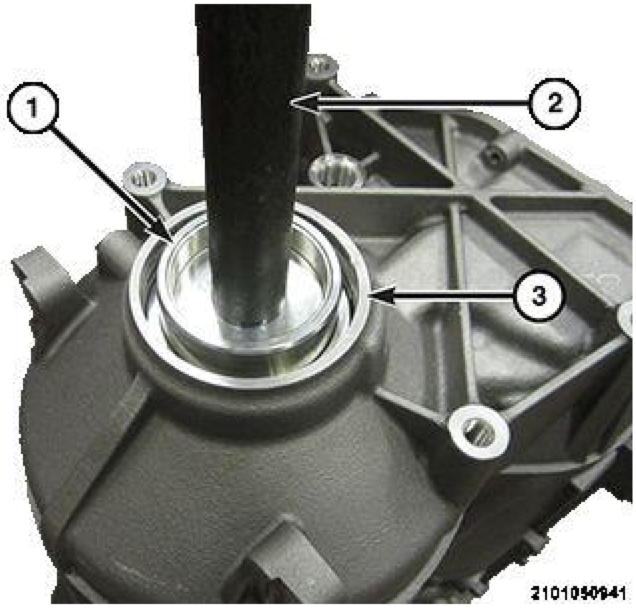


Fig. 103: Installing Output Shaft Inner Needle Bearing & Oil Dam
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The (special tool #10373A, Installer, Output Needle Bearing/Rear Oil Dam) (1) is a combination tool that is reversed to install the oil dam and output shaft inner needle bearing. For use to install the output shaft inner needle bearing, use the thick walled side of the tool against the bearing.**

27. Using (special tool #10373A, Installer, Output Needle Bearing/Rear Oil Dam) (1) and (special tool #C-4171, Driver Handle, Universal) (2), install the output shaft inner needle bearing.
28. Install the snap ring.

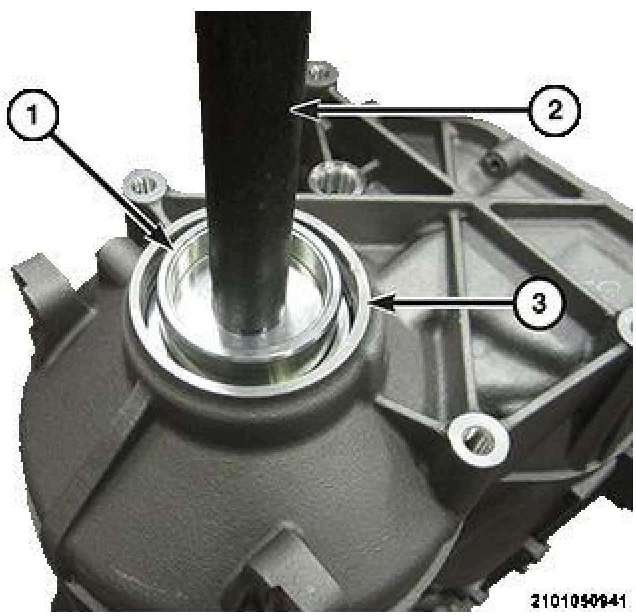


Fig. 104: Installing Output Shaft Inner Needle Bearing & Oil Dam
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The (special tool #10373A, Installer, Output Needle Bearing/Rear Oil Dam)**

(1) is a combination tool that is reversed to install the oil dam and output shaft inner needle bearing. For use to install the oil dam, use the thin walled side of the tool against the oil dam.

29. Using (special tool #10373A, Installer, Output Needle Bearing/Rear Oil Dam) (1) and (special tool #C-4171, Driver Handle, Universal) (2), install the oil dam.
30. Install the snap ring.

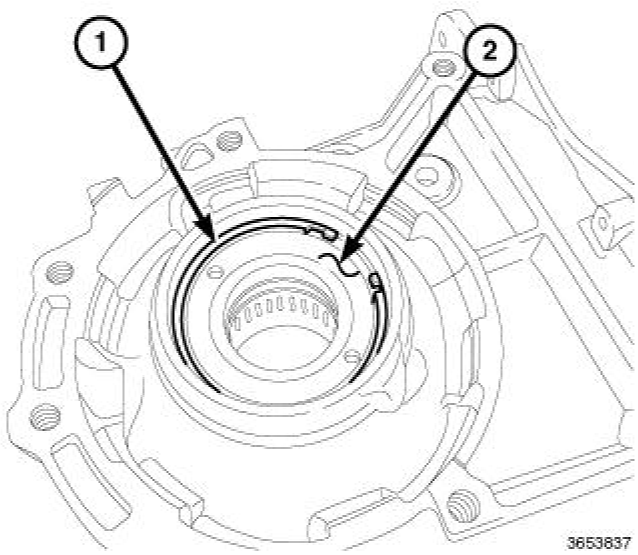


Fig. 105: Outer Bearing Snap Ring & Outer Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE: **AWD shown in illustration, RWD similar.**

31. Install the ball bearing.
32. Install the snap ring (1).

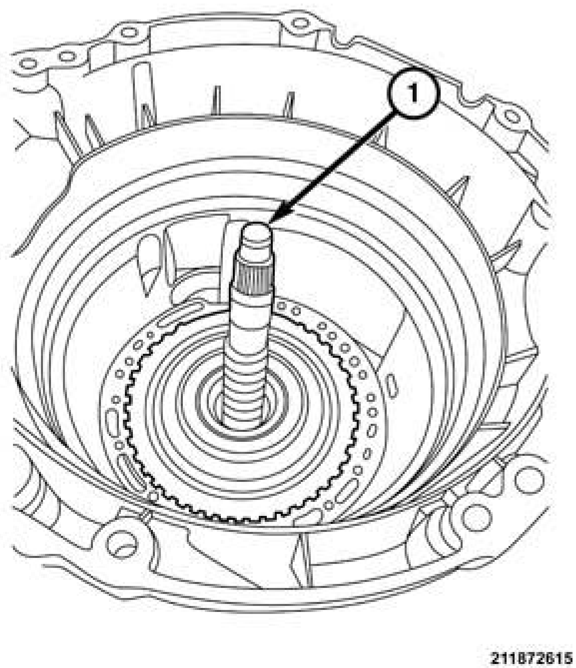


Fig. 106: Input/Output Shaft & P4 Annulus Drum Assembly
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The transmission must be in a upright position when the input/output shaft and the P4 annulus drum assembly (1) is installed.**

33. Install the input/output shaft and P4 annulus drum assembly (1) into the case.

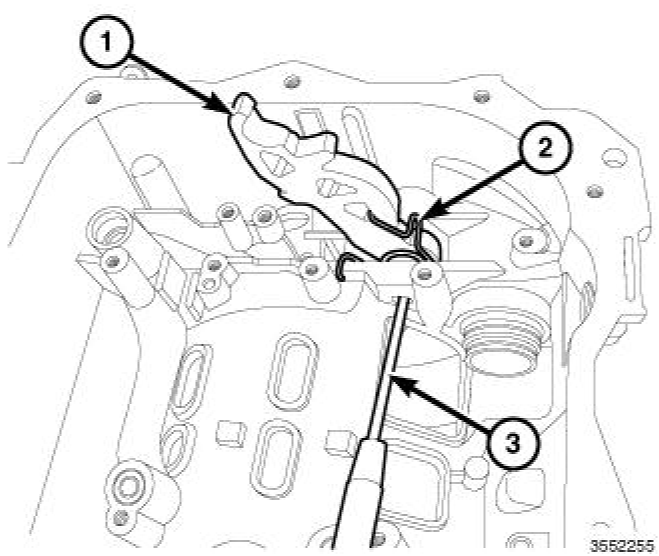


Fig. 107: Removing/Installing Park Pawl Shaft Using A Suitable Pin Punch, Park Pawl And Spring
Courtesy of CHRYSLER GROUP, LLC

34. From outside the transmission case, install the park pawl shaft and install the park pawl (1) and spring (2).

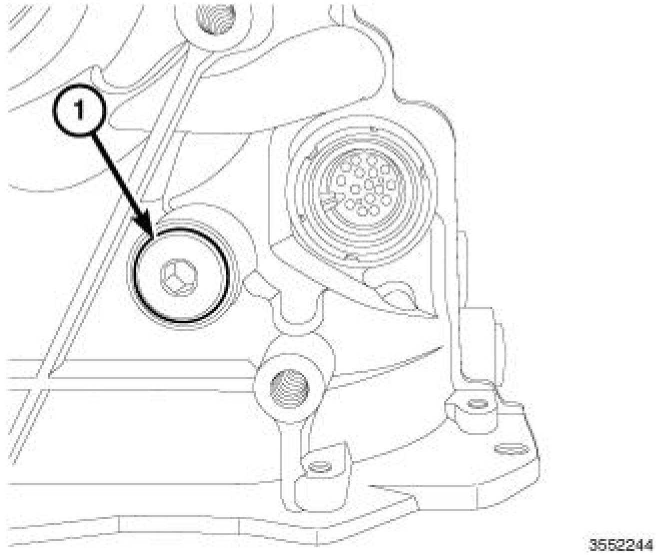


Fig. 108: Park Pawl Shaft Plug
Courtesy of CHRYSLER GROUP, LLC

35. Install the park pawl shaft plug (1) into the rear of the case and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

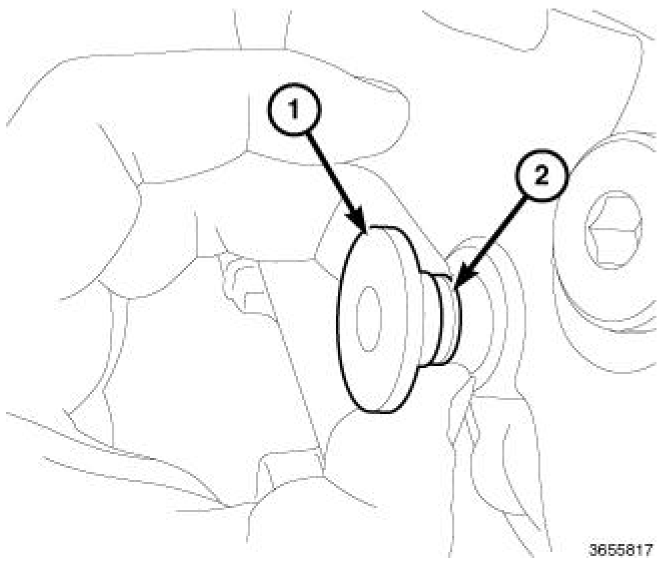


Fig. 109: Spacer & Selector Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

36. Using (special tool #6936, Spacer) (1), install the Manual Park Release (MPR) shaft seal (2).

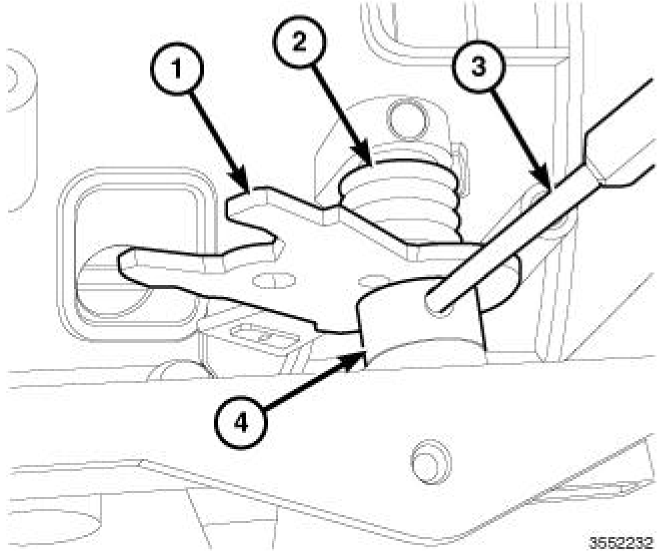


Fig. 110: Selector Shaft, Suitable Pin Punch, Spring & Fork
Courtesy of CHRYSLER GROUP, LLC

37. Install the shaft (4), spring (2), and fork (1) into the case.
38. Install the roll pin into the MPR shaft (4) using a suitable pin punch (3).

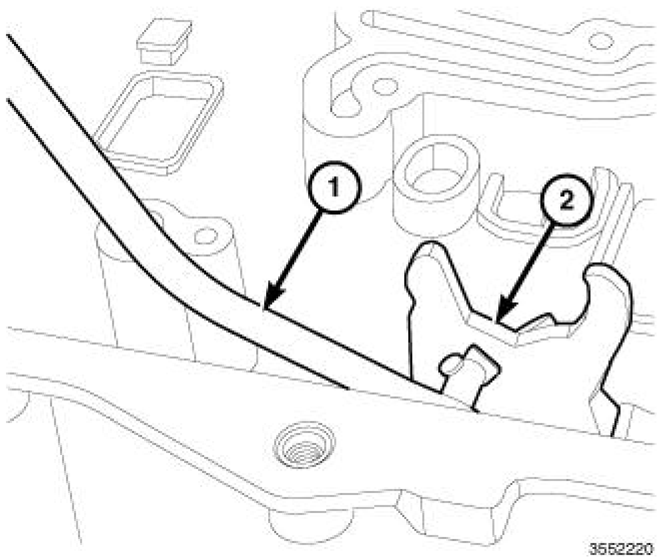


Fig. 111: Park Pawl Lock Rod & Fork
Courtesy of CHRYSLER GROUP, LLC

39. Install the park pawl lock rod (1) onto the fork (2).

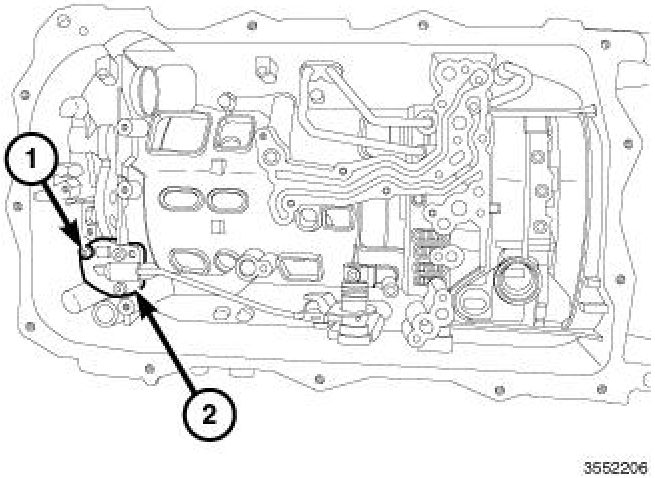


Fig. 112: Three Park Pawl Lock Rod Guide Plate Retaining Screws & Plate
Courtesy of CHRYSLER GROUP, LLC

40. Position the park pawl lock rod guide plate (2), install the three park pawl lock rod guide plate retaining screws (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

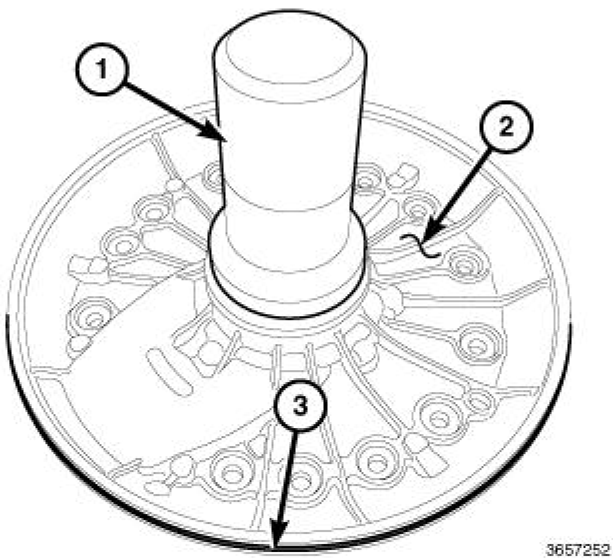


Fig. 113: Oil Pump Cover Lip Seal & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

41. Install the oil pump cover lip seal (3) on the oil pump cover (2).

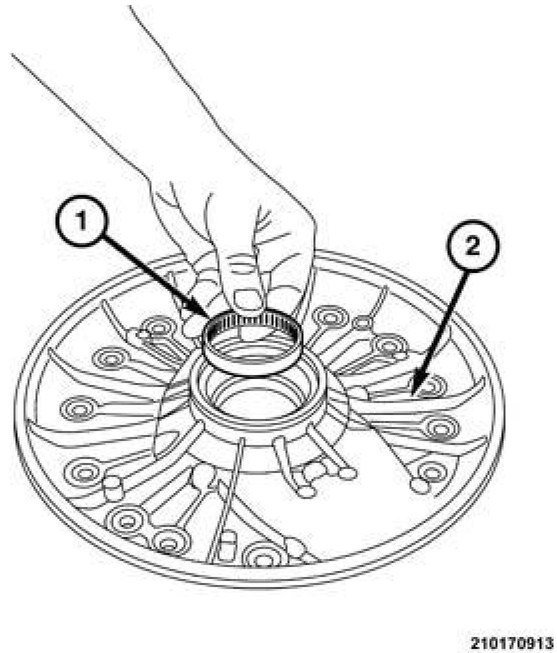


Fig. 114: Oil Pump Needle Bearing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

42. If removed, install a **NEW** oil pump needle bearing using (special tool #10376, Installer, Input Shaft Needle Bearing) and (special tool #C-4171, Driver Handle, Universal).

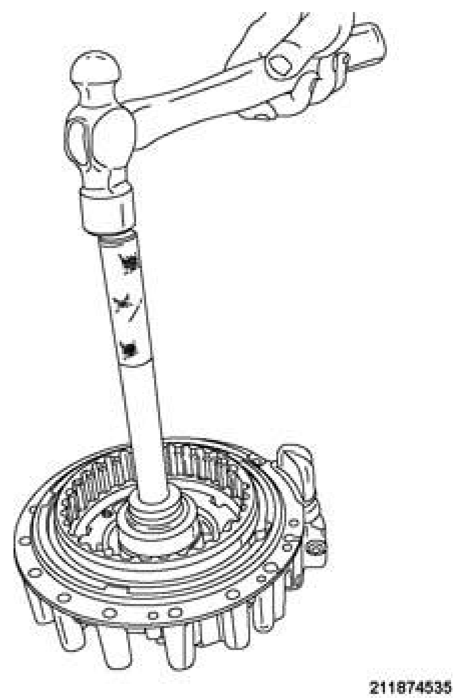


Fig. 115: Installing Oil Pump Housing Needle Bearing
Courtesy of CHRYSLER GROUP, LLC

43. If removed, install the inner oil pump needle bearing using (special tool #10382, Installer, Oil Pump Housing Needle Bearing)and (special tool #C-4171, Driver Handle, Universal)
44. Using (special tool #10375, Installer, Oil Pump Cover Oil Seal) (1), install the input shaft seal in the oil

pump cover (2).

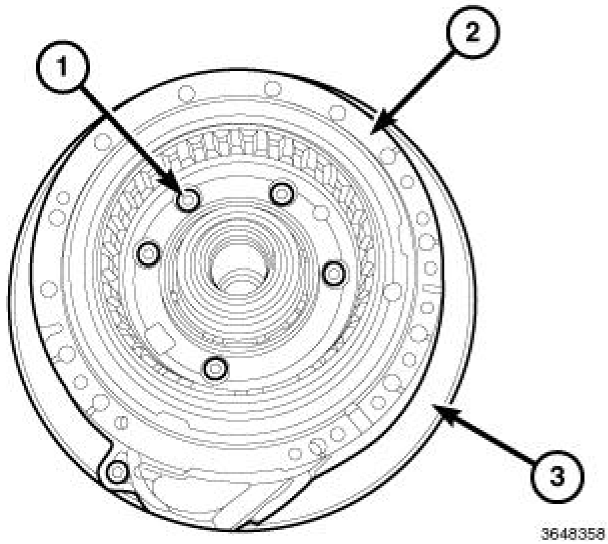


Fig. 116: Six Bolts, Oil Pump Housing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

45. Position the oil pump housing (2) and oil pump cover (3) together.
46. Install the five bolts (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

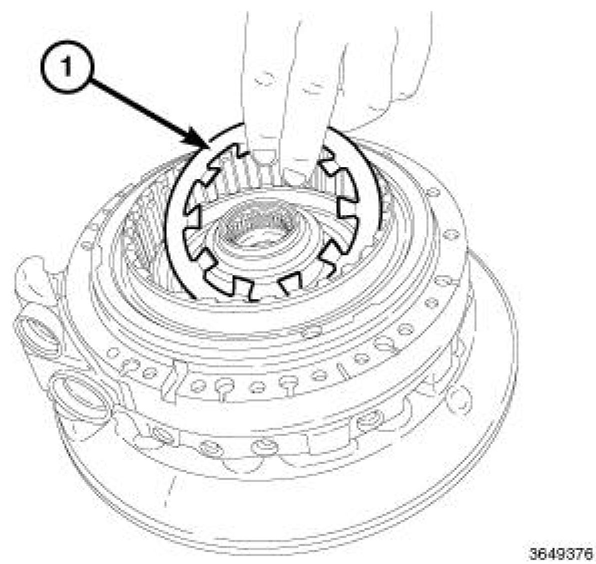


Fig. 117: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

47. Insert the piston and the retaining ring (1) into the housing.

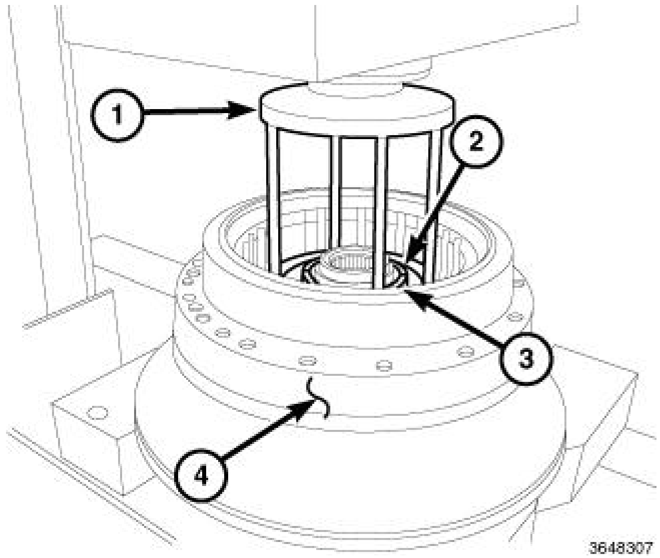


Fig. 118: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

48. Position the oil pump housing assembly (4) in a suitable arbor press.
49. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and install the two halves of the split retainer ring (2).

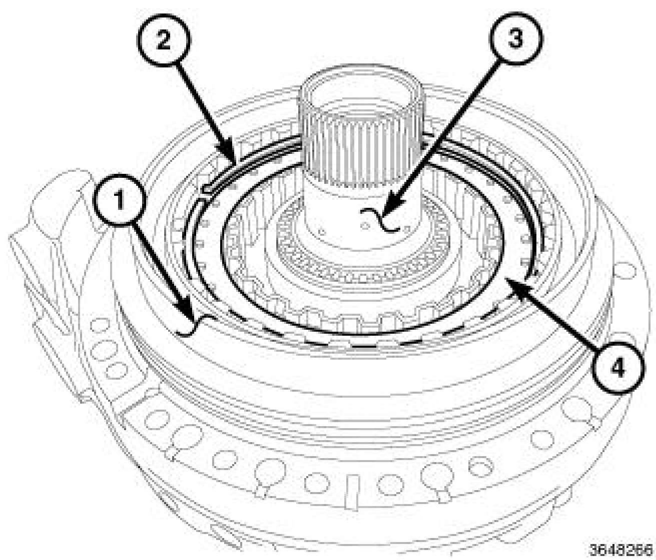
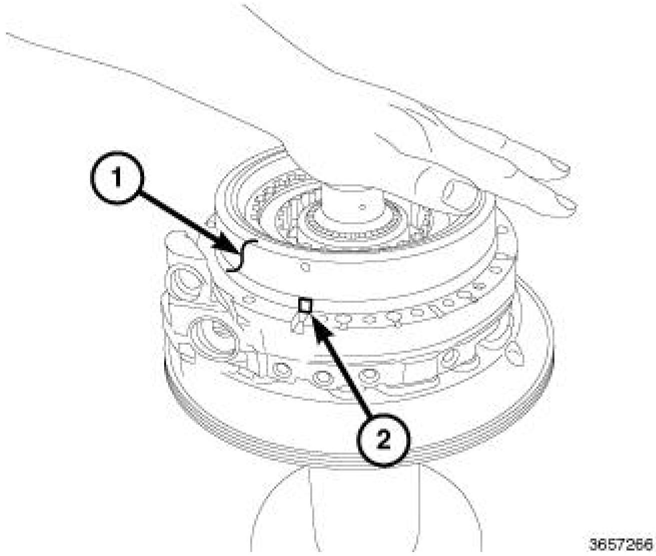


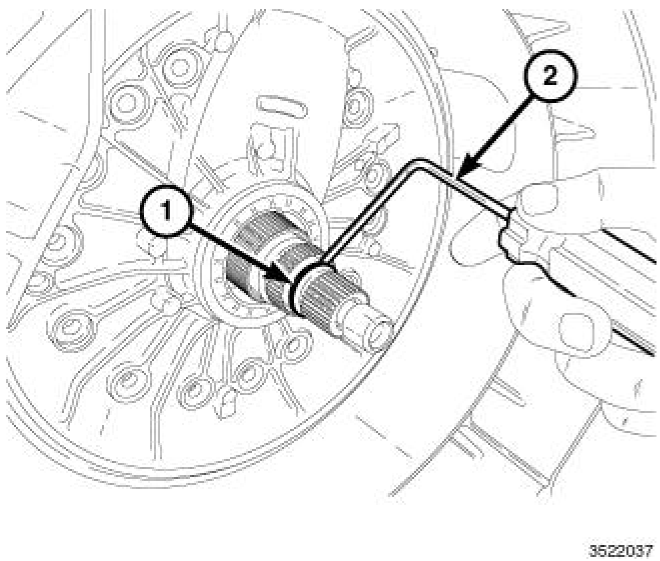
Fig. 119: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

50. Install the hub (3).
51. Install the clutches and spacers (4).
52. Install the snap ring (2).
53. Install the outer ring (1) (below B-piston).



[Fig. 120: B-Piston Alignment Tab & B-Piston](#)
Courtesy of CHRYSLER GROUP, LLC

54. Position the B-piston alignment tab (2) above the notch and install B-piston (1) on the assembly.

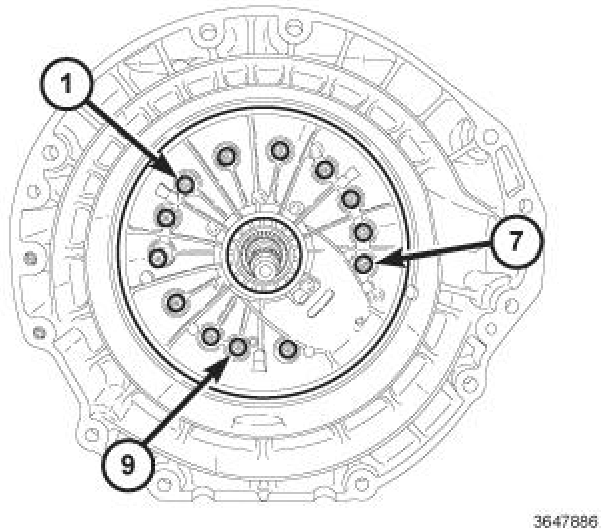


[Fig. 121: Input Shaft O-Ring & Small Pick](#)
Courtesy of CHRYSLER GROUP, LLC

55. Carefully position the oil pump housing assembly into the case, firmly press the oil pump into place before drawing it in with the bolts.

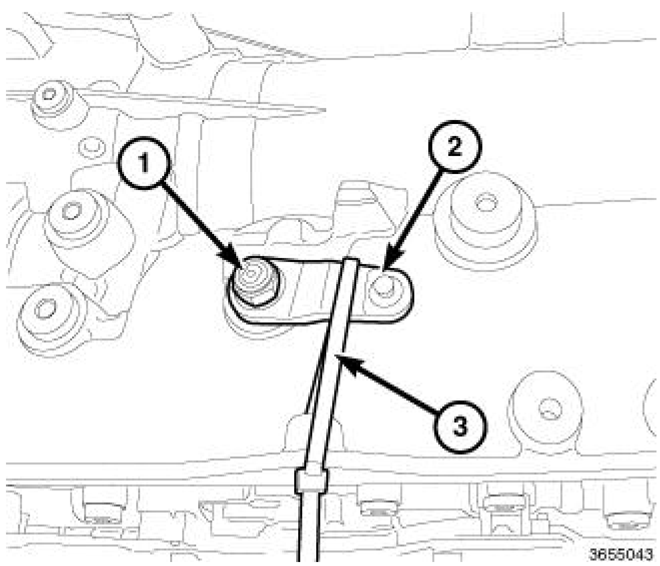
NOTE: **Check the transmission end play before installing the NEW oil pump bolts, in case adjustment is needed.**

56. Install the **NEW** input shaft O-ring.



[Fig. 122: Pre Tighten Bolts One, Seven And Nine](#)
Courtesy of CHRYSLER GROUP, LLC

57. Install the thirteen oil pump cover retaining bolts and tighten the oil pump cover as follows:
    a. In order to seat the oil pump cover properly, pre tighten bolts one, seven and nine to 6 N.m (53 in. lb.).
    b. Working in a clockwise pattern, beginning with number one, tighten to 10 N.m (89 in. lb.).
    c. Working in a clockwise pattern, beginning with number one, tighten an additional 90Â°.



[Fig. 123: Manual Park Release Lever, Nut & Tie Strap](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The MPR lever (2) can be reversed to release tension and ease the installation of the valve body assembly.**

58. Temporarily install the MPR lever (2) to release tension on the shift fork as follows:
    a. Install the MPR lever (2) 180 degrees offset from its original position.
    b. Install the nut (1) and hand tighten.

c. Turn the MPR lever (2) and using a tie strap (3), secure the lever (2) into position so the park release fork is in the same position as it was before valve body assembly removal.

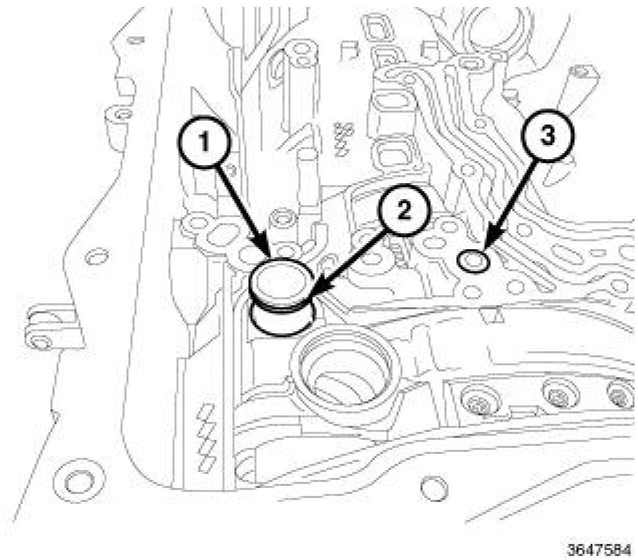


Fig. 124: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

59. Install a **NEW** compression seal (3) into the transmission case.
60. Install the fluid port (1) with **NEW** O-rings to the transmission case.

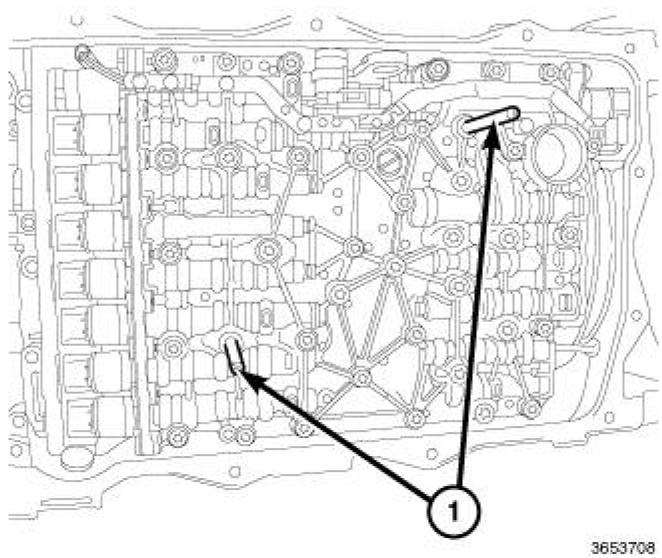


Fig. 125: Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

61. Install the (special tool #10379, Pins, Valve Body Alignment) (1) in the transmission case as guides for the valve body assembly.

NOTE: **Make sure the shift fork lines up properly.**

62. Using the valve body alignment pins (1) to guide, position the valve body assembly to the transmission.

NOTE: After several bolts have been hand tightened, remove the guide pins (1).

63. Install the fourteen valve body assembly retaining bolts and hand tighten.

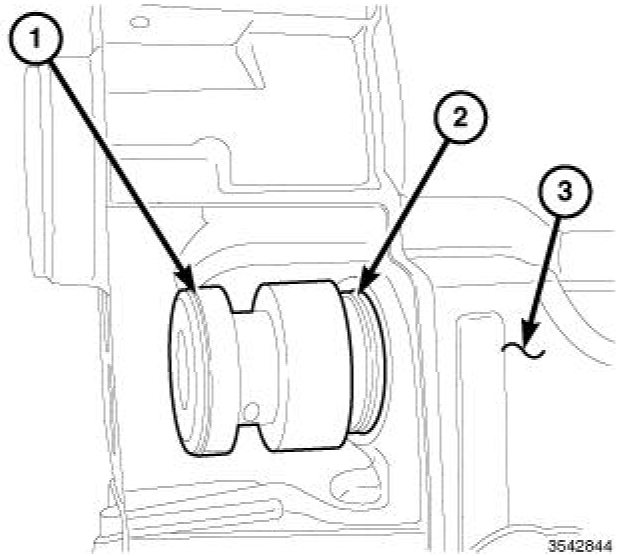


Fig. 126: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

64. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully install the electrical harness insulator (2) into the transmission case (3).

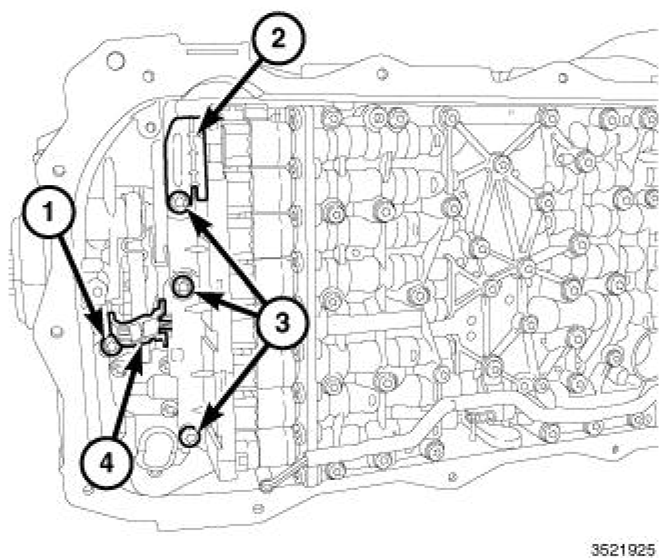


Fig. 127: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

65. Install the sensor (4) and the sensor retaining bolt (1) and hand tighten.
66. Latch the electrical connector insulator lock (2) by pushing in.

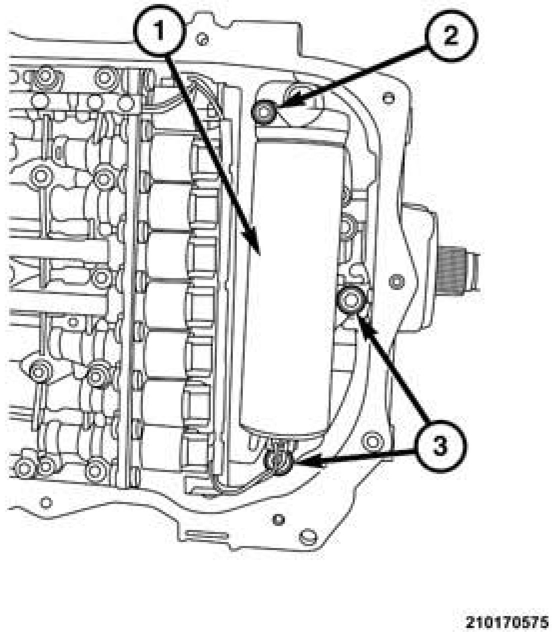


Fig. 128: Hydraulic Impulse Storage Unit & Bolts
Courtesy of CHRYSLER GROUP, LLC

67. If equipped, install the Hydraulic Impulse Storage Unit (H.I.S.).
68. Tighten the bolts (2 and 3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
69. Install the valve body assembly end retainer bolts (3) and hand tighten.

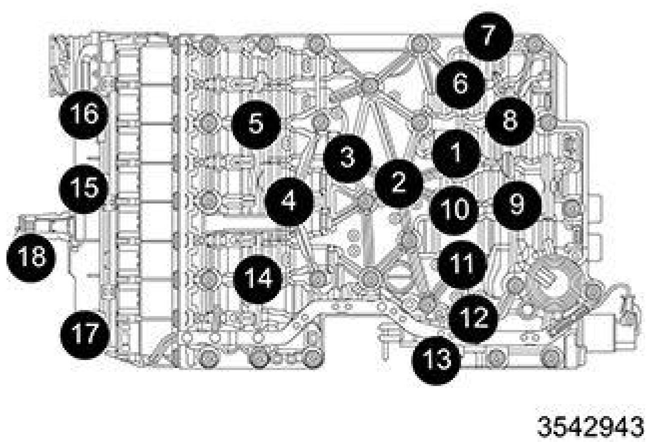
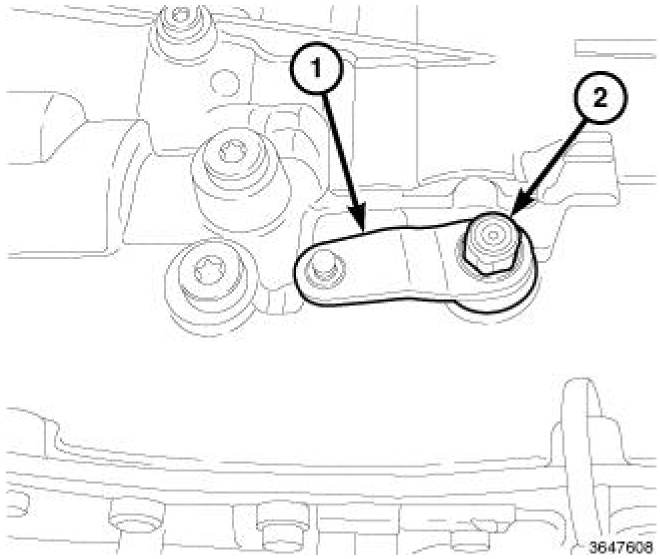


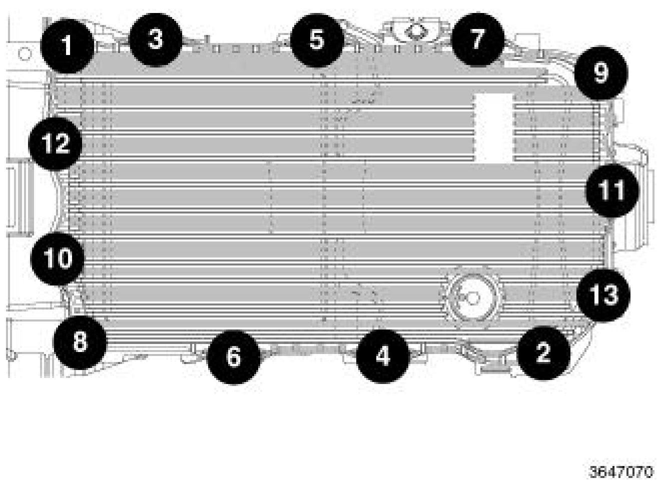
Fig. 129: Valve Body Bolts Loosening And Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

70. Tighten the valve body assembly retaining bolts 1-18 in the sequence shown in illustration to 6 N.m (53 in. lb.).



[Fig. 130: Manual Park Release Lever Retaining Nut & Lever](#)
Courtesy of CHRYSLER GROUP, LLC

71. Remove the tie strap and return the MPR lever (1) to the original position.
72. Install the nut (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 131: Oil Pan Retaining Bolts Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

73. Position the oil pan and gasket.
74. Install the thirteen oil pan retaining bolts and using the sequence shown in illustration and tighten to 10 N.m (89 in. lb.).
75. Install the transmission output shaft washer.

CAUTION: The seal must be installed flush with the case. Driving the seal deeper could damage the seal causing a leak.

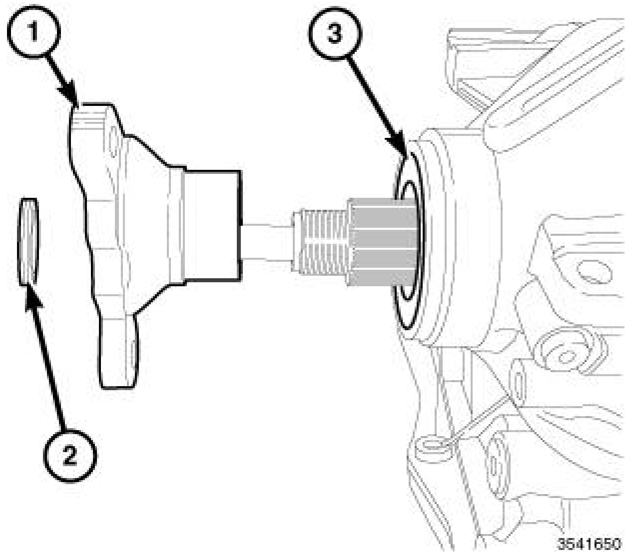


Fig. 132: Propeller Shaft Flange, Rear Dust Seal & Rear Oil Seal
Courtesy of CHRYSLER GROUP, LLC

76. Position the **NEW** output shaft seal (3) over the output shaft and against the transmission case.
77. Using (special tool #8481, Installer, Gear) install the output shaft seal.
78. Install the transmission rear dust seal (2).
79. Install the drive shaft flange (1).

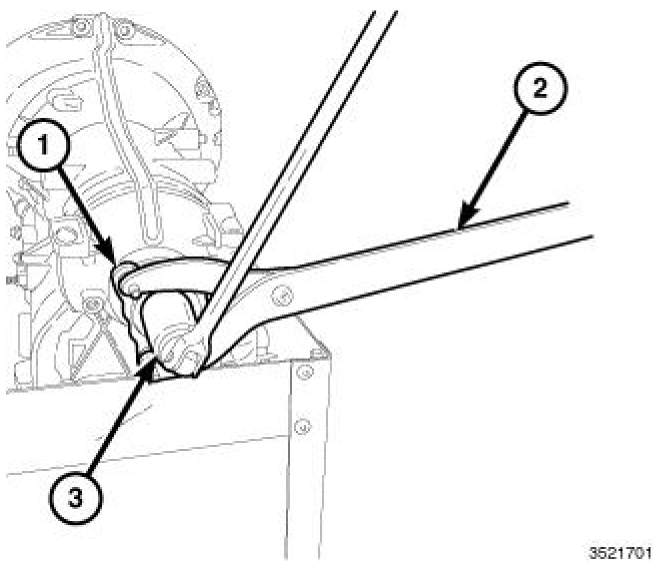


Fig. 133: Flange, Flange Holder & Socket
Courtesy of CHRYSLER GROUP, LLC

80. Install the **NEW** drive shaft flange nut and washer using a 34 mm 12 point socket (3) and (special tool #C-3281, Holder, Flange) (2) to hold the flange (1). Tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.
81. Stake the nut.

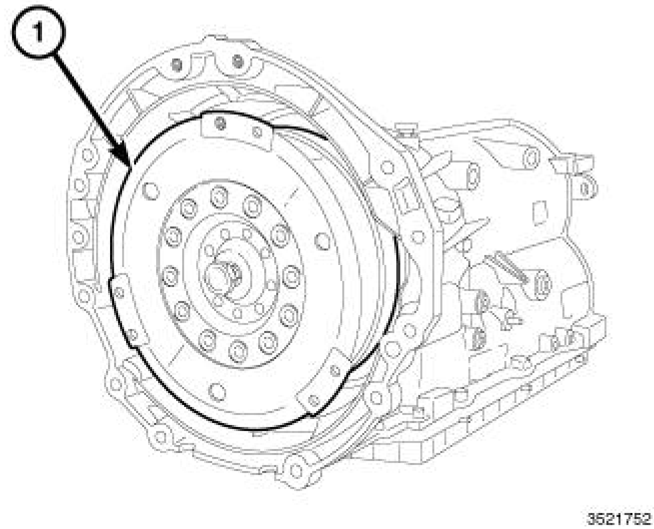


Fig. 134: Torque Converter
Courtesy of CHRYSLER GROUP, LLC

82. Install the torque converter (1). Refer to **TORQUE CONVERTER, INSTALLATION**.
83. Before installing the transmission in the vehicle, pre-fill the transmission as outlined in FILL TRANSMISSION AFTER SERVICE. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

INSTALLATION

INSTALLATION

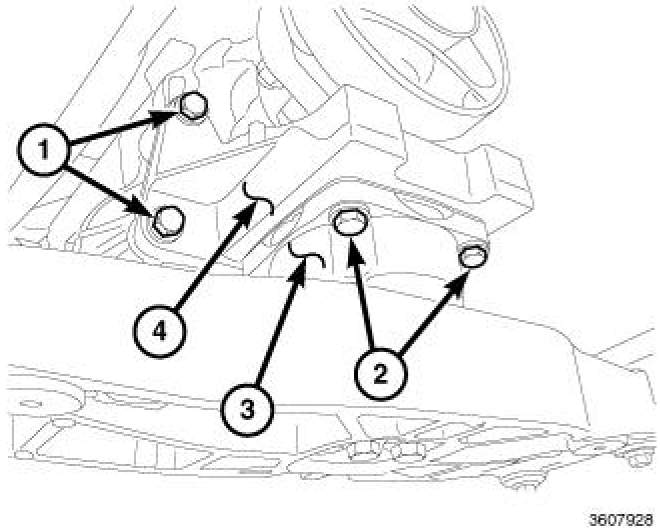
CAUTION: **When supporting or lifting the transmission at the oil pan the weight of the transmission must be distributed evenly on the lifting fixture. Failure to do so could damage the oil pan and transmission.**

NOTE: **Make sure that the transmission dowel pins are seated in engine block and protrude far enough to hold transmission in alignment.**

NOTE: **If the transmission is being reconditioned (clutch/seal replacement) or replaced, it is necessary to perform the TRANSMISSION VERIFICATION TEST**

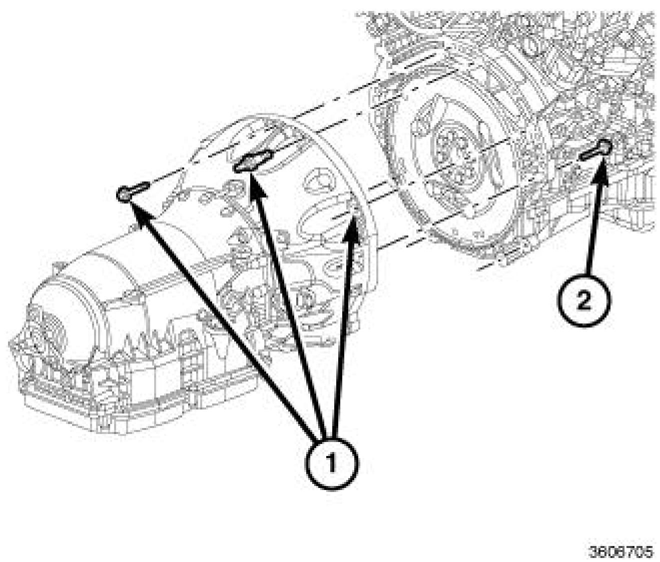
Refer to TRANSMISSION VERIFICATION TEST .

1. Install the torque converter. Refer to **TORQUE CONVERTER, INSTALLATION**.



[Fig. 135: Transmission Mount Bolts & Transmission Mount]
Courtesy of CHRYSLER GROUP, LLC

2. Position the adapter bracket (4) in place, install the adapter bracket bolts (1) and tighten to the proper specification. Refer to **SPECIFICATIONS**.
3. Position the transmission mount (3) in place, install the transmission mount bolts (2) and tighten to the proper specification. Refer to **SPECIFICATIONS**.



[Fig. 136: Upper Transmission To Engine Bolts]
Courtesy of CHRYSLER GROUP, LLC

NOTE: Hold torque converter in place during transmission installation.

4. Position the transmission to the vehicle.
5. Install the upper transmission to engine bolts (1, 2). Do not tighten at this time.

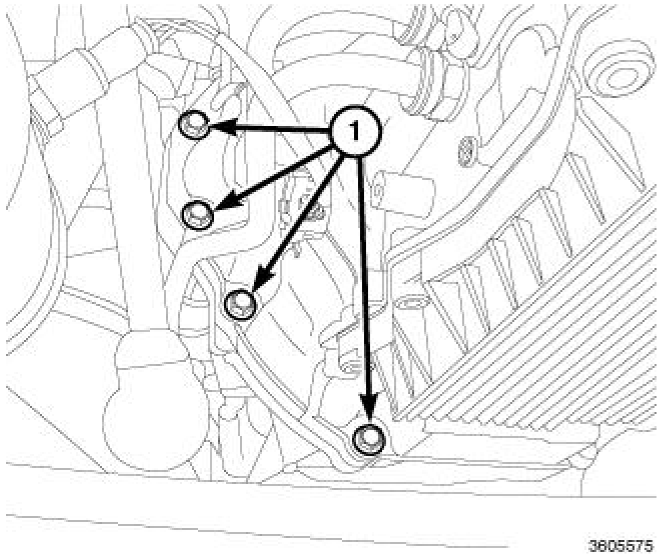


Fig. 137: Bell Housing Bolts (LH)
Courtesy of CHRYSLER GROUP, LLC

6. Install the Left Hand (LH) transmission to engine bolts (1). Do not tighten at this time.

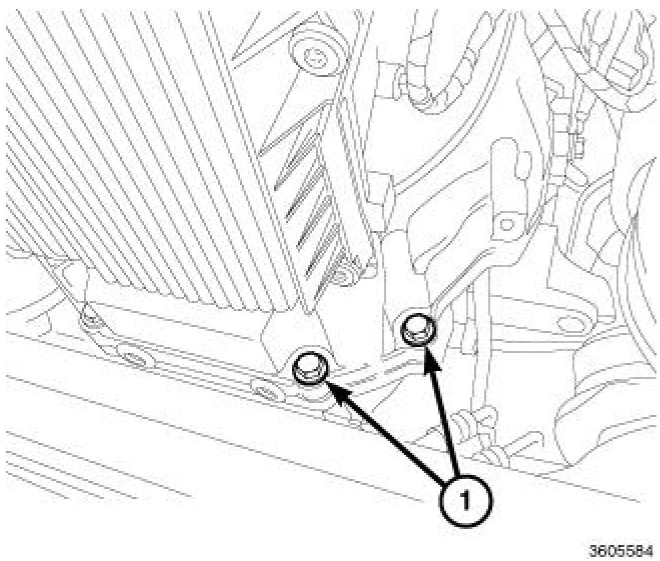


Fig. 138: Bell Housing Bolts (RH)
Courtesy of CHRYSLER GROUP, LLC

7. Install the Right Hand (RH) transmission to engine bolts (1). Tighten all the transmission to engine bolts to the proper specification. Refer to **SPECIFICATIONS**.

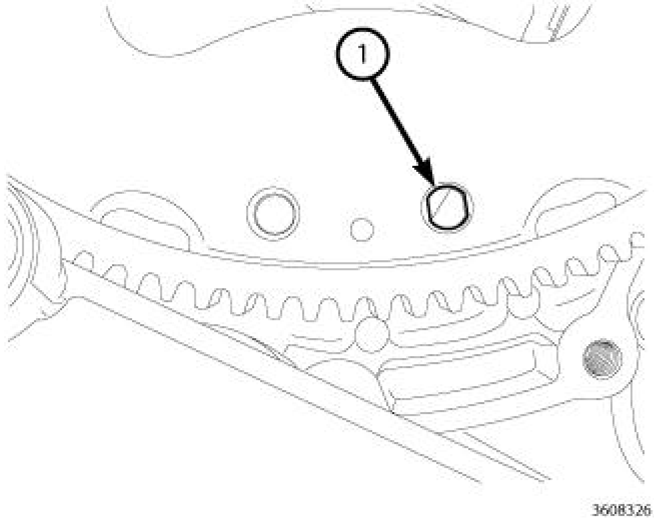


Fig. 139: Alignment Hole
Courtesy of CHRYSLER GROUP, LLC

8. Rotate crankshaft in clockwise direction to line up the alignment hole (1) in the flex plate, then start the first bolt.

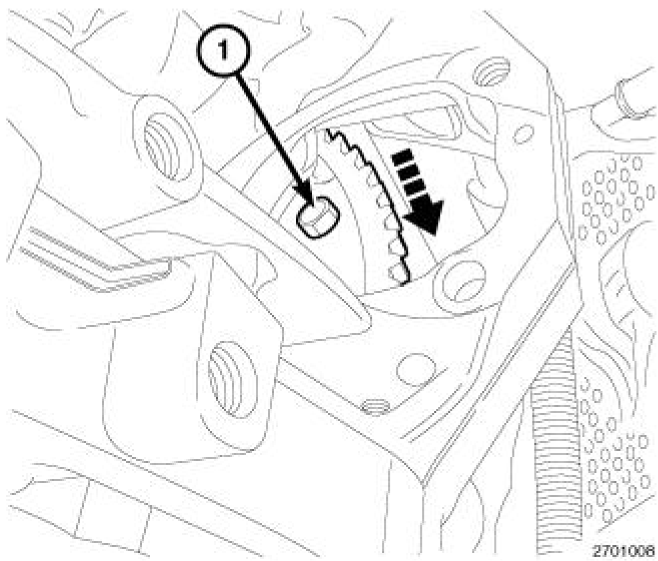


Fig. 140: Torque Converter Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Rotate the crankshaft clockwise until the torque converter bolts (1) are accessible. There are three sets of two bolts 120Â° apart. Install the remaining torque converter bolts and tighten to the proper specification. Refer to **SPECIFICATIONS**.

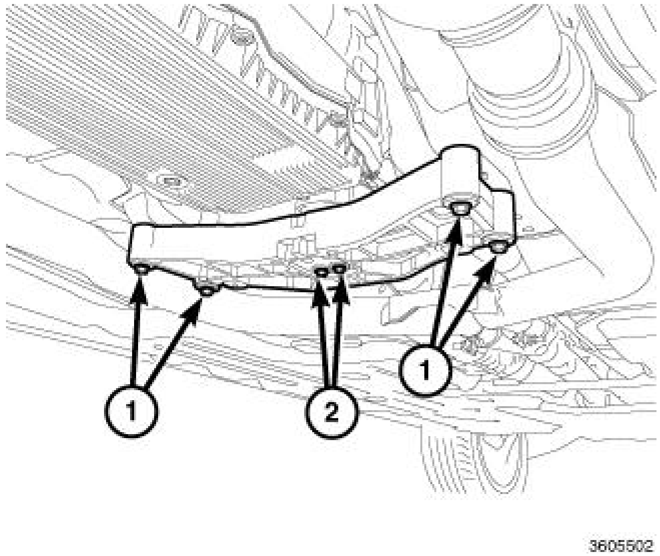


Fig. 141: Crossmember & Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Position the crossmember in place and install the crossmember bolts (1) and tighten to the proper specification. Refer to **SPECIFICATIONS**.
11. Install the transmission mount bolts (2) and tighten to the proper specification. Refer to **SPECIFICATIONS**.

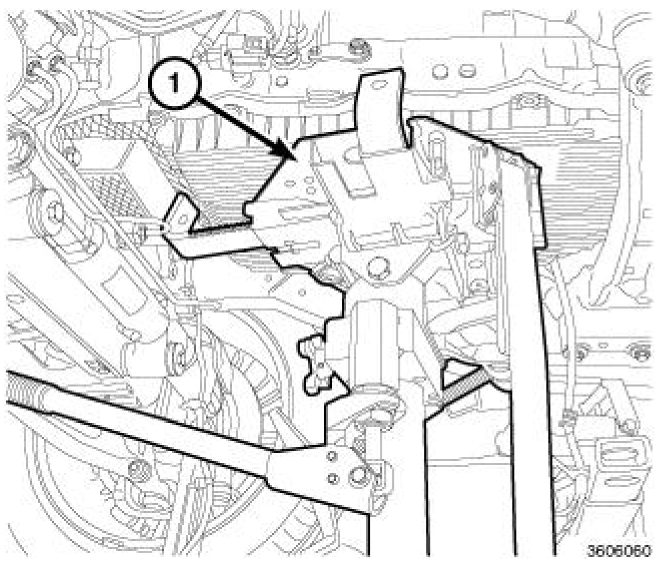


Fig. 142: Service Jack
Courtesy of CHRYSLER GROUP, LLC

12. Remove the transmission jack (1).

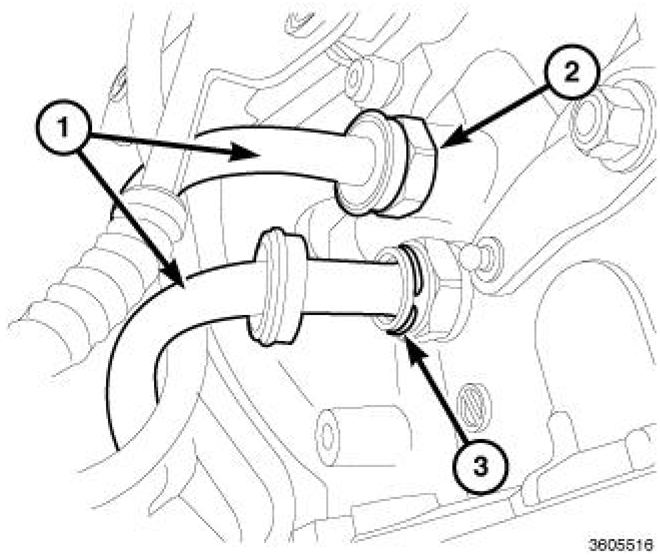


Fig. 143: Transmission Fluid Cooler Lines, Clips & Fittings
Courtesy of CHRYSLER GROUP, LLC

13. Connect transmission fluid cooler lines (1) to the transmission fittings (2) and install the clips (3).

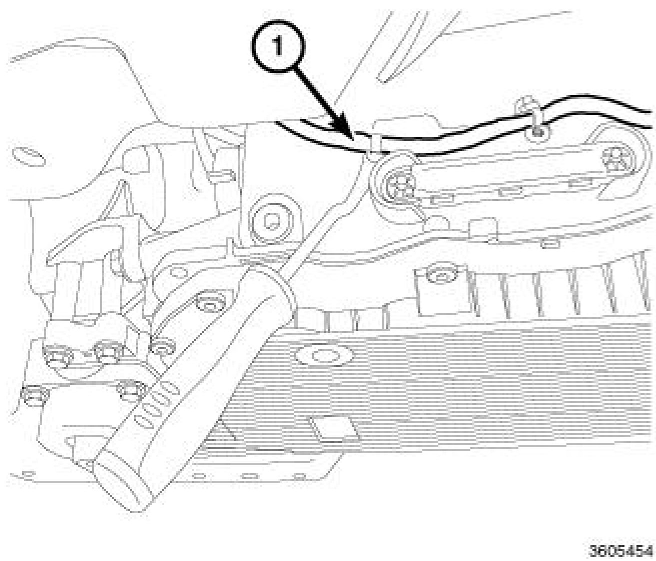


Fig. 144: Wiring Harness
Courtesy of CHRYSLER GROUP, LLC

14. Connect the wiring harness (1) push pins to the transmission.

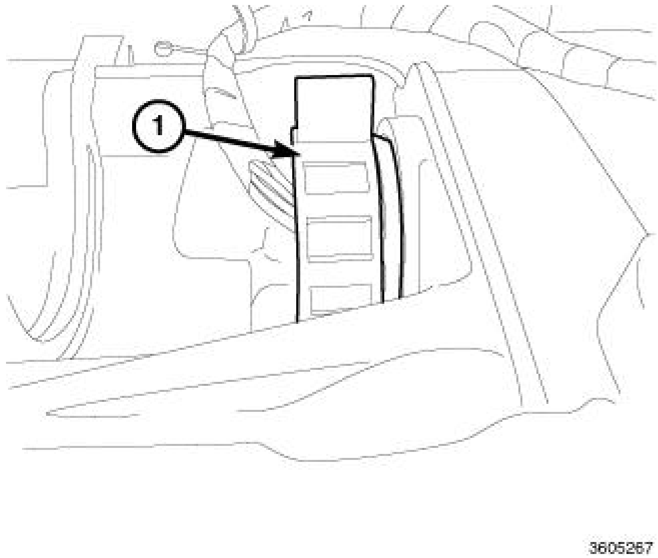


Fig. 145: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

15. Connect the transmission wire harness connector (1) to the transmission.

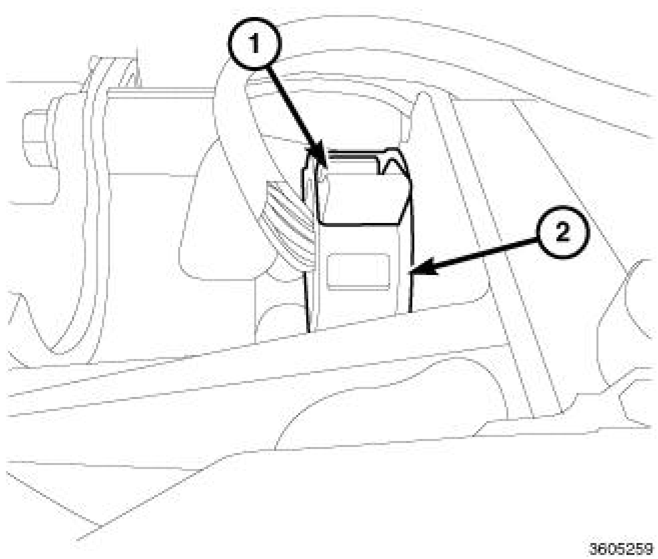


Fig. 146: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

16. Turn the locking mechanism lock (1) of the transmission wire harness connector (2) clockwise to secure.

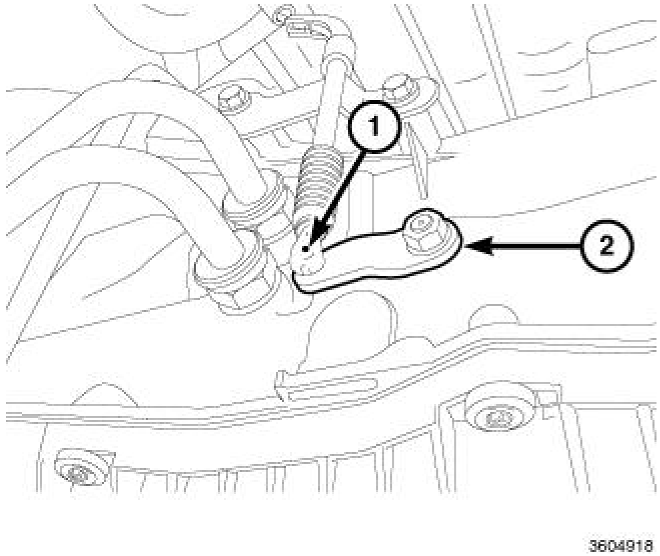


Fig. 147: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

17. Connect the parking pawl release cable (1) to the lever (2).

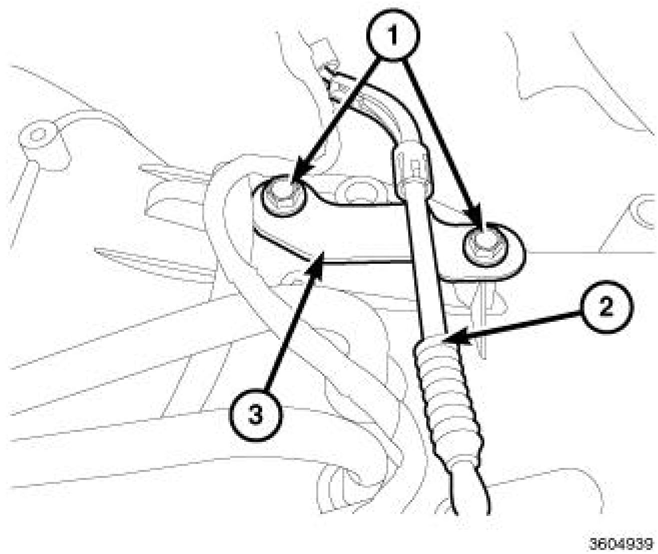


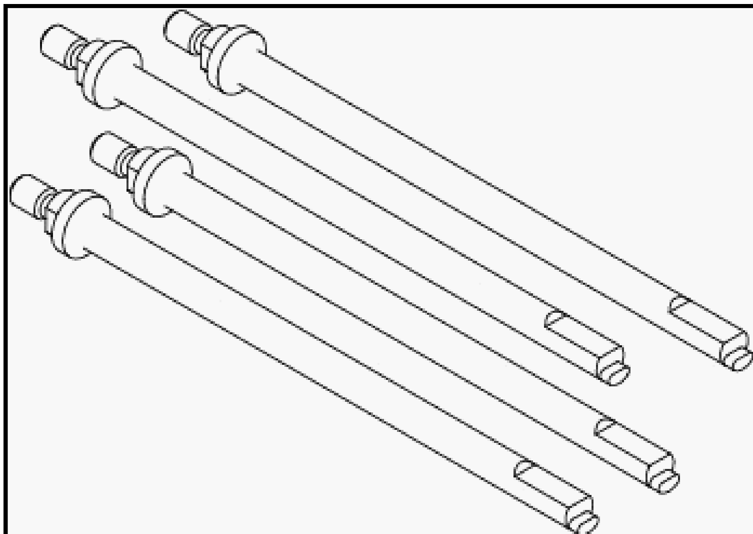
Fig. 148: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

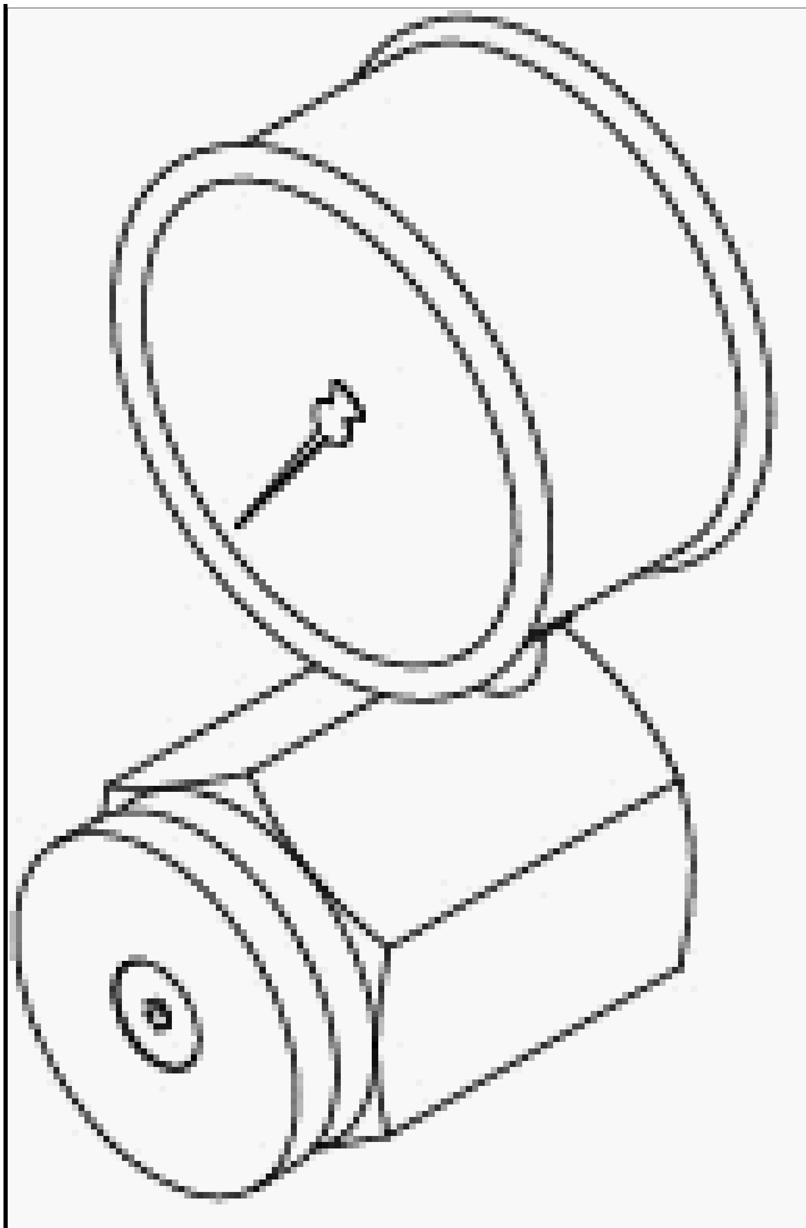
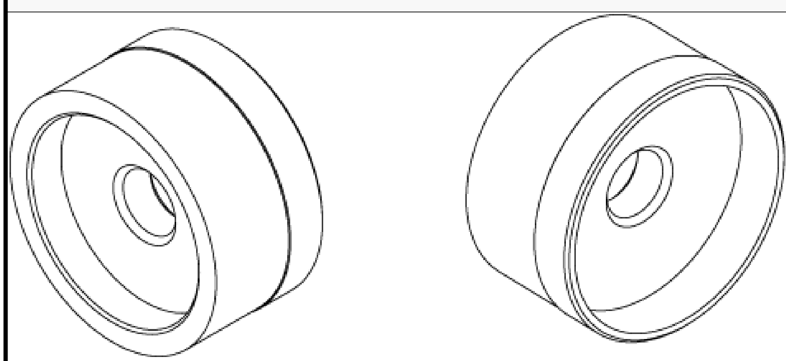
18. Position the manual park release cable bracket/cable (2, 3), install the bolts (1) and tighten to the proper specification. Refer to **SPECIFICATIONS**.
19. Install the starter. Refer to **STARTER, INSTALLATION** .
20. Install the drive shaft. Refer to **INSTALLATION** .
21. Install the exhaust. Refer to **RESONATOR, EXHAUST, INSTALLATION** .
22. Connect the right and left bank up stream oxygen sensors.
23. Connect the negative battery cable.
24. Perform the STANDARD PROCEDURE - TRANSMISSION FILL AFTER SERVICE. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

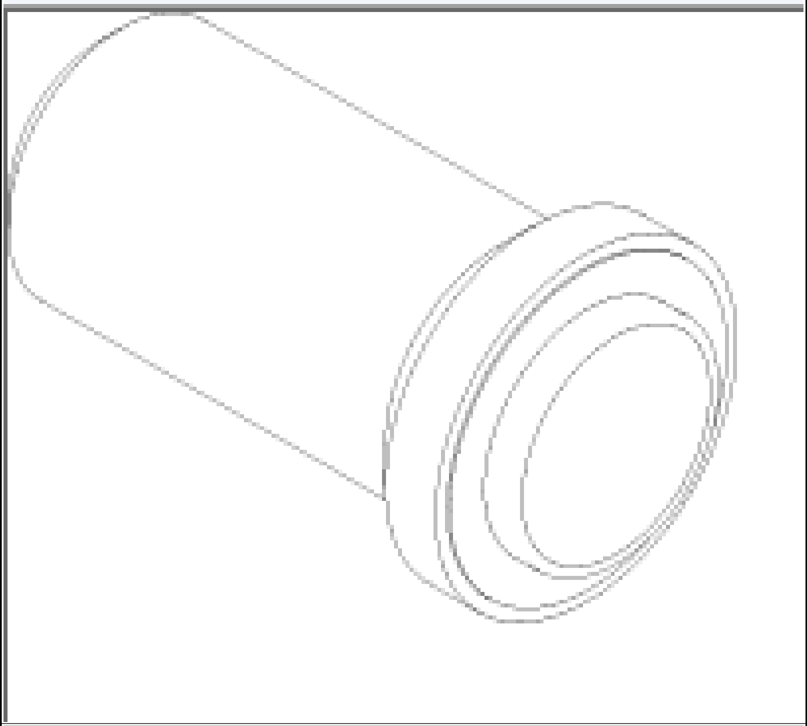
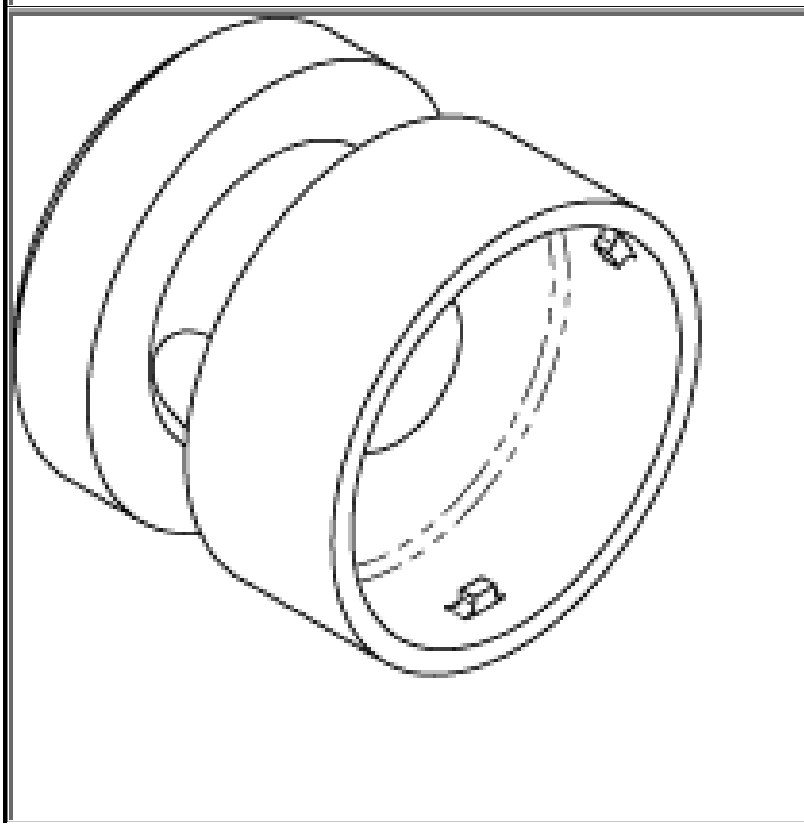
25. If the valve body is replaced, program the Transmission Control Module (TCM). Refer to **MODULE, TRANSMISSION CONTROL, MODULE PROGRAMMING** .
26. Perform the TRANSMISSION VERIFICATION TEST. Refer to **TRANSMISSION VERIFICATION TEST** .

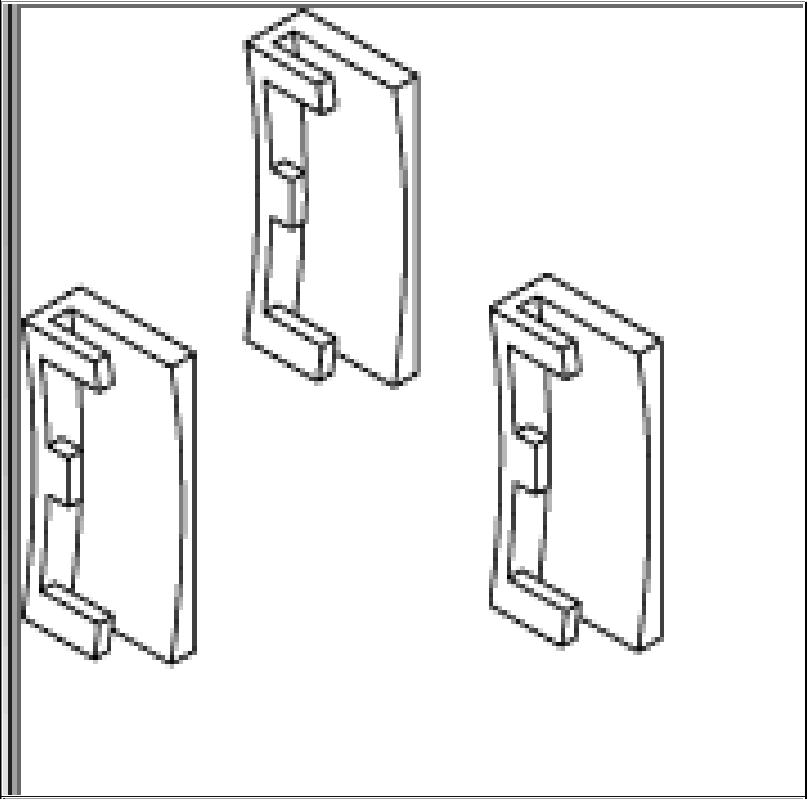
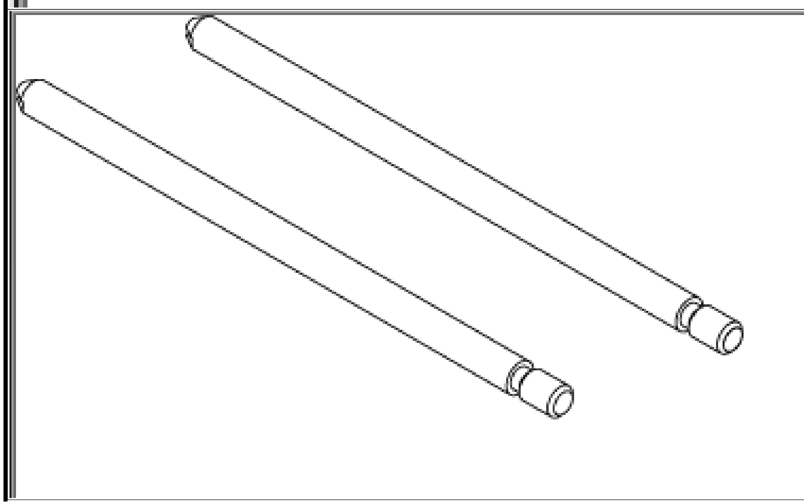
SPECIAL TOOLS

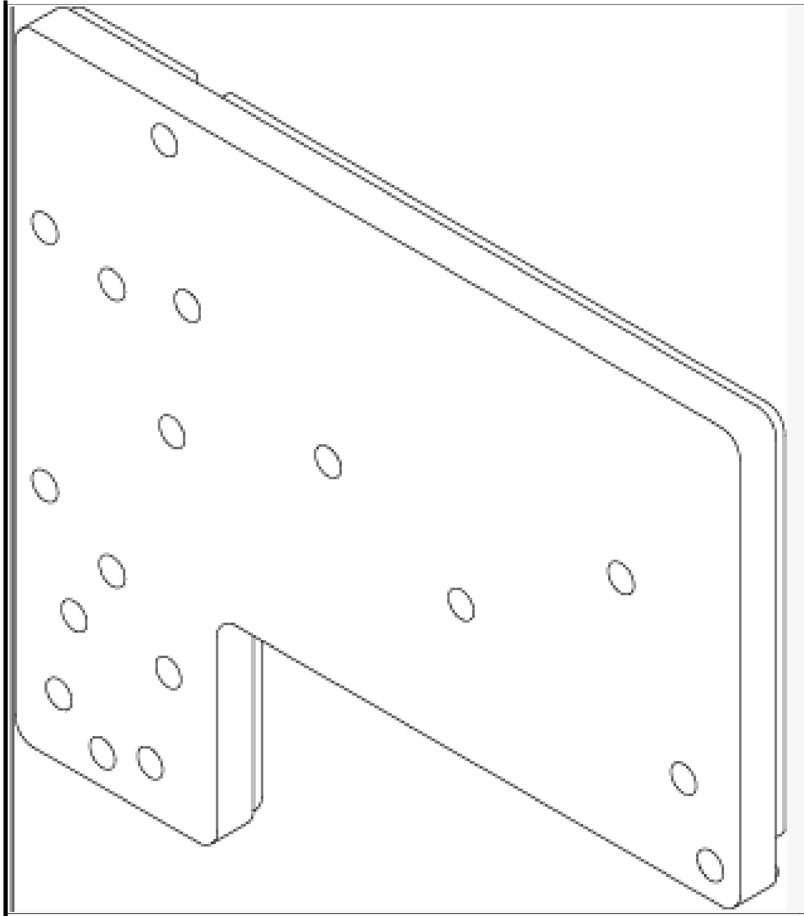
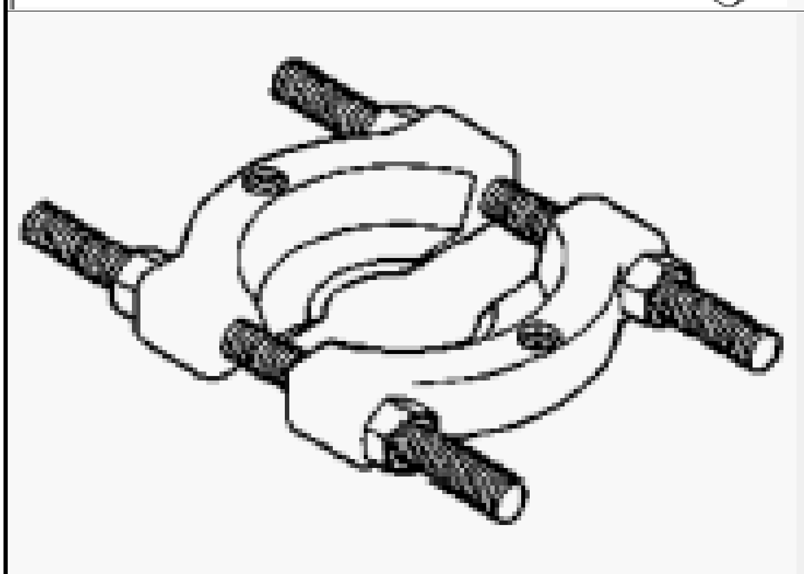
SPECIAL TOOLS

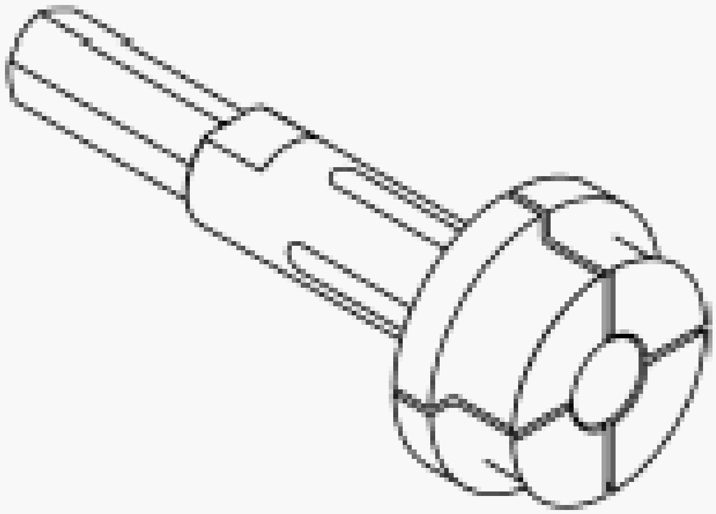
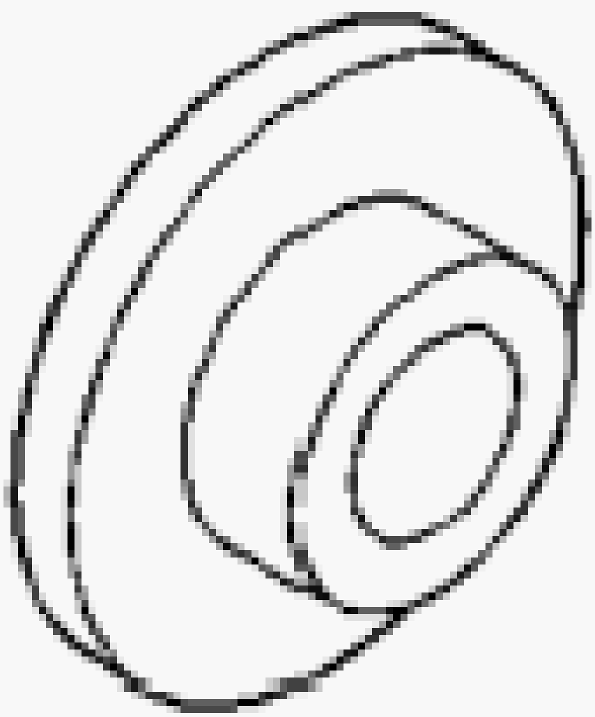
	10428 - Adapter, Pressing Tool (Originally Shipped In Kit Number(s).)

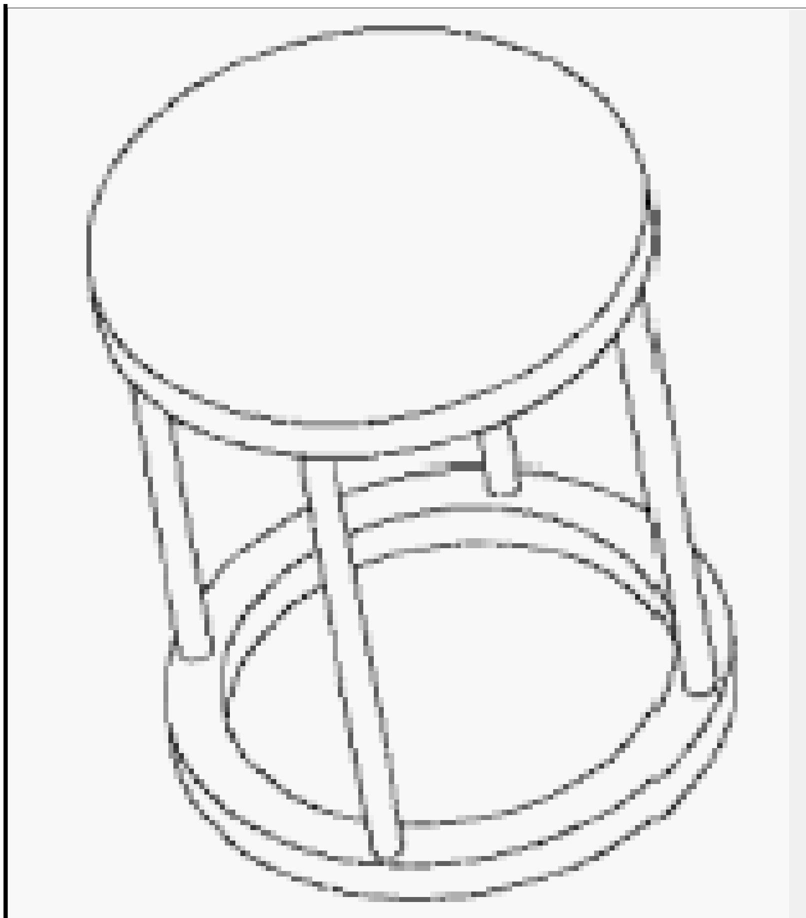
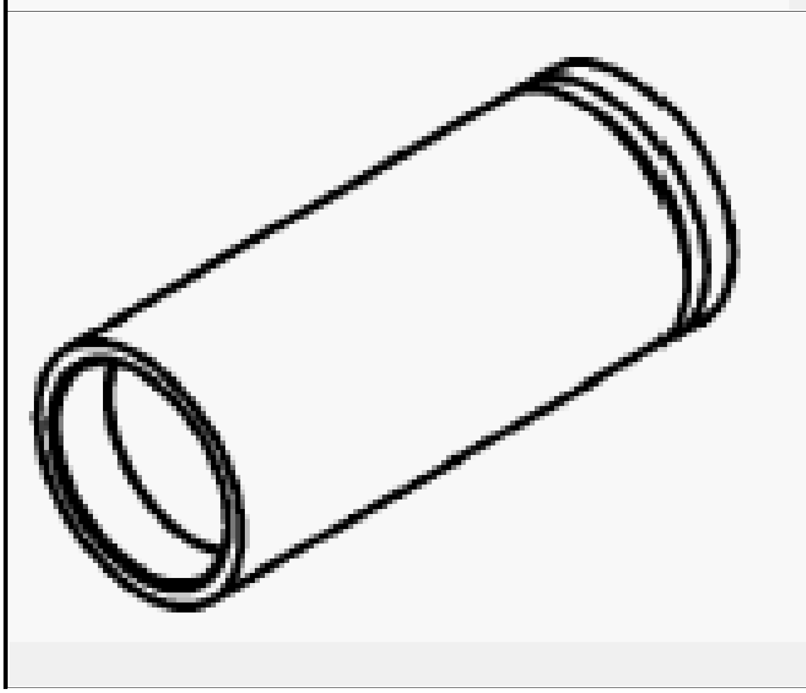
	10429 - Gauge, Force (Originally Shipped In Kit Number(s) 10419.)
	10373A - Installer, Output Needle Bearing/Rear Oil Dam (Originally Shipped In Kit Number(s) 10394A.)

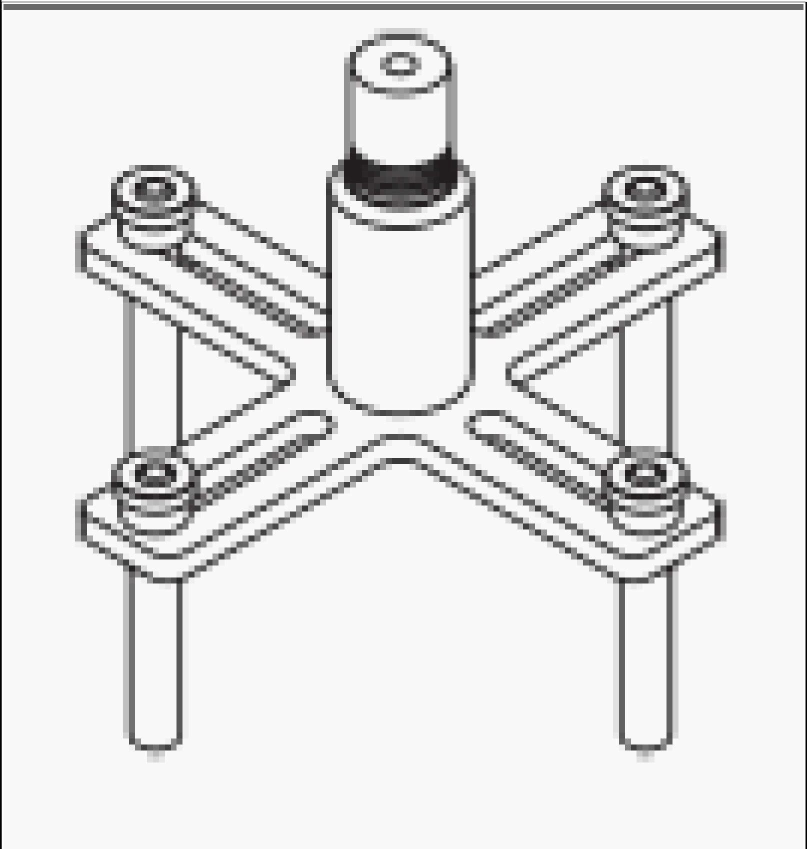
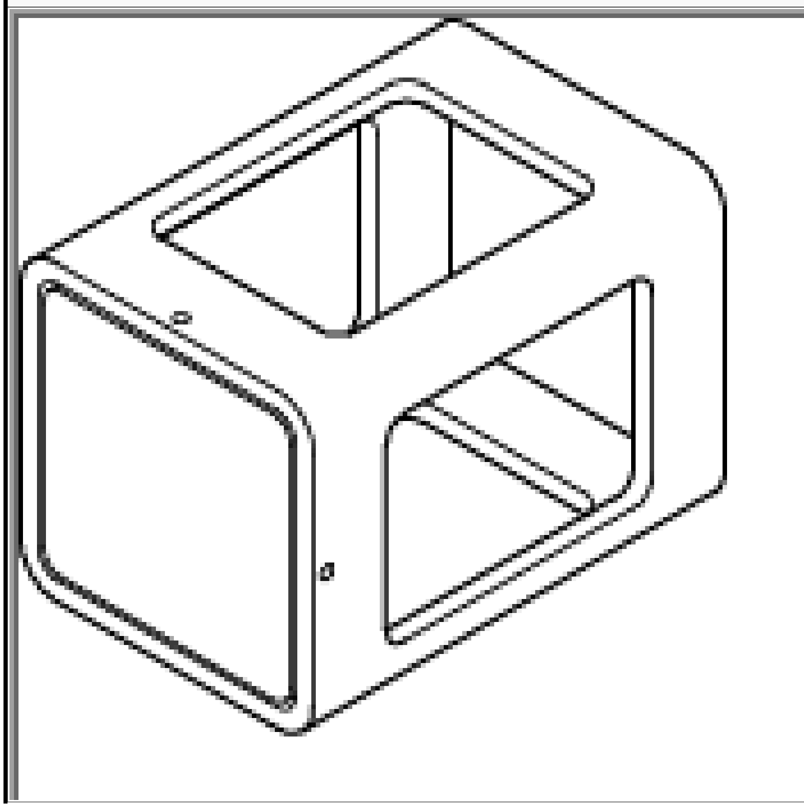
	10375 - Installer, Oil Pump Cover Oil Seal
	10377 - Remover/Installer, Guide Sleeve

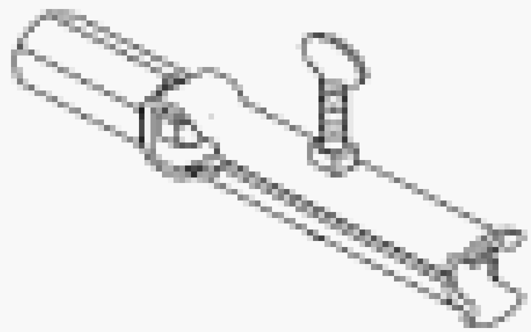
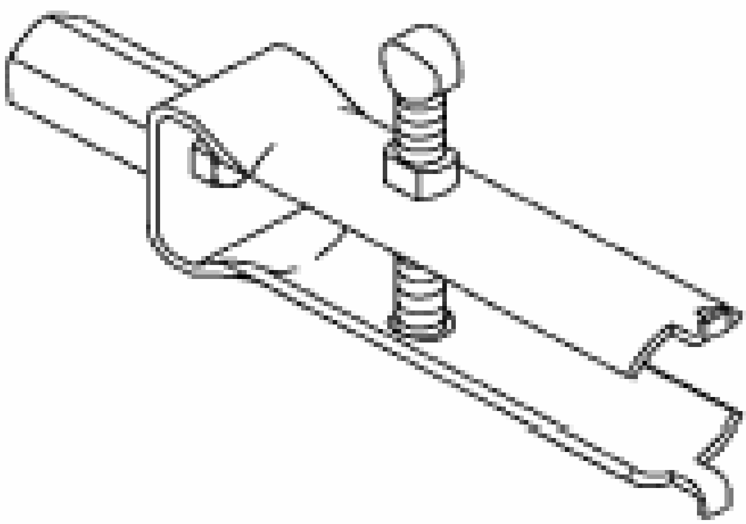
	10378 - Rings, Support
	10379 - Pins, Valve Body Alignment

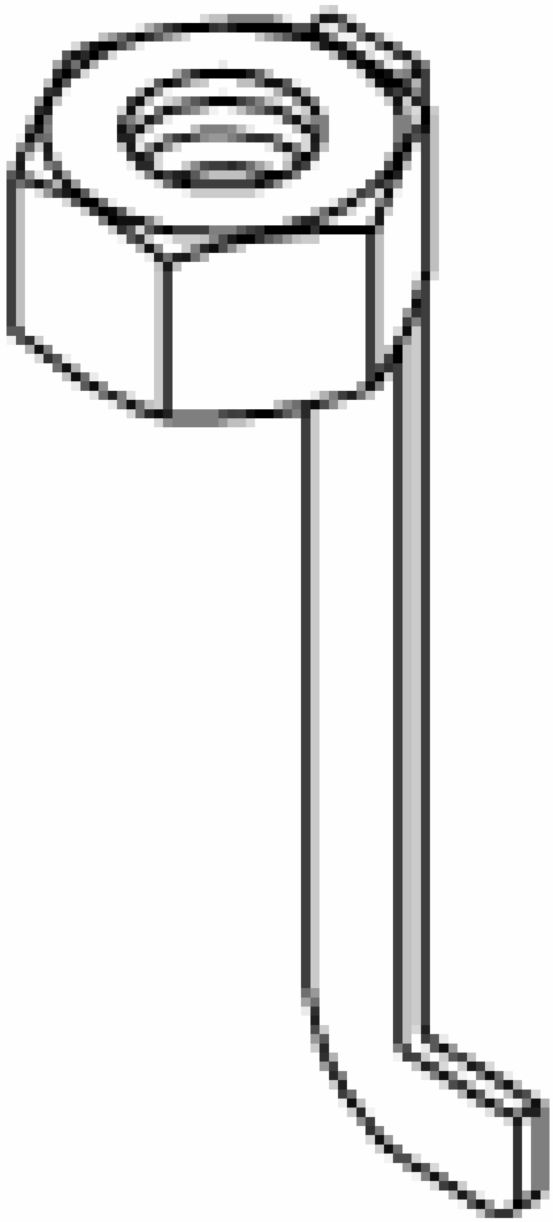
	10383 - Plate, Clutch Pressure Test
	1130 - Splitter, Bearing/Gear (Originally Shipped In Kit Number(s) 6745, 6947, 6949, 9202, 9202A-CAN, 9202CC, 9299.)

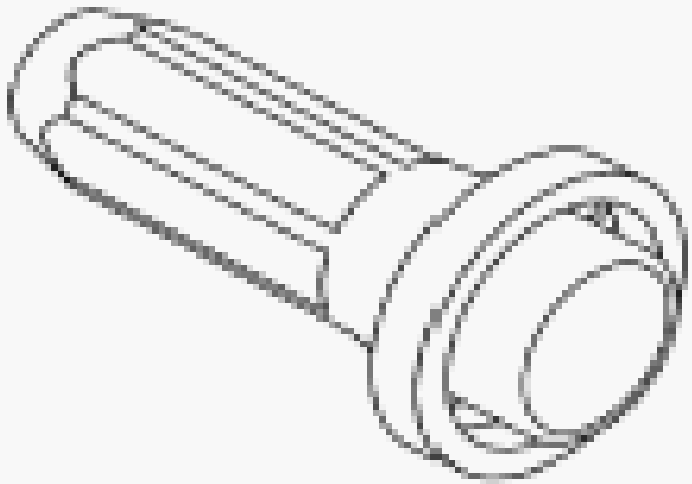
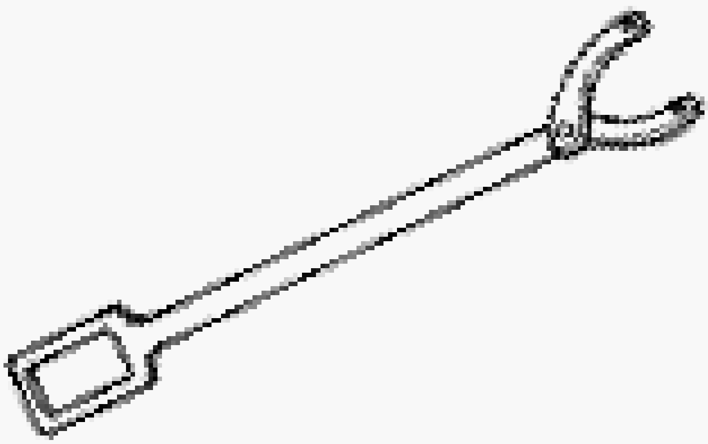
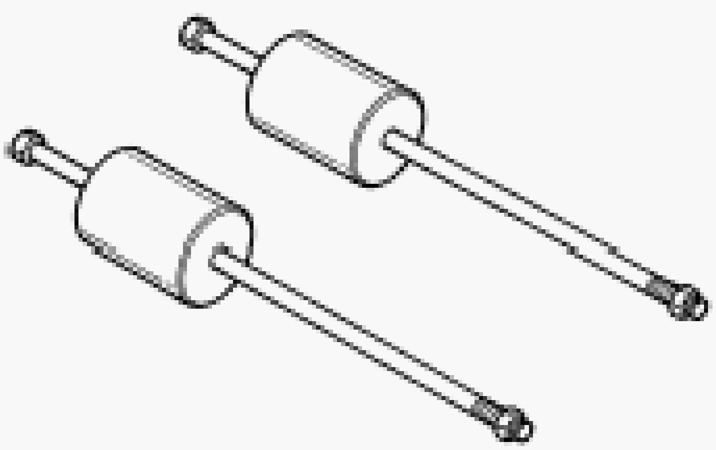
	6787A - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 6784, 6809.)
	6936 - Spacer (Originally Shipped In Kit Number(s) 6945, 6946, 6947, 6948.)

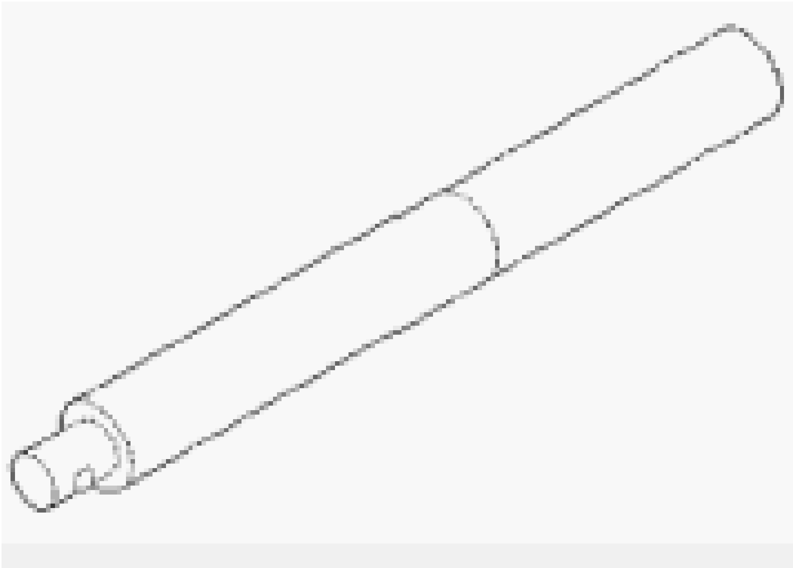
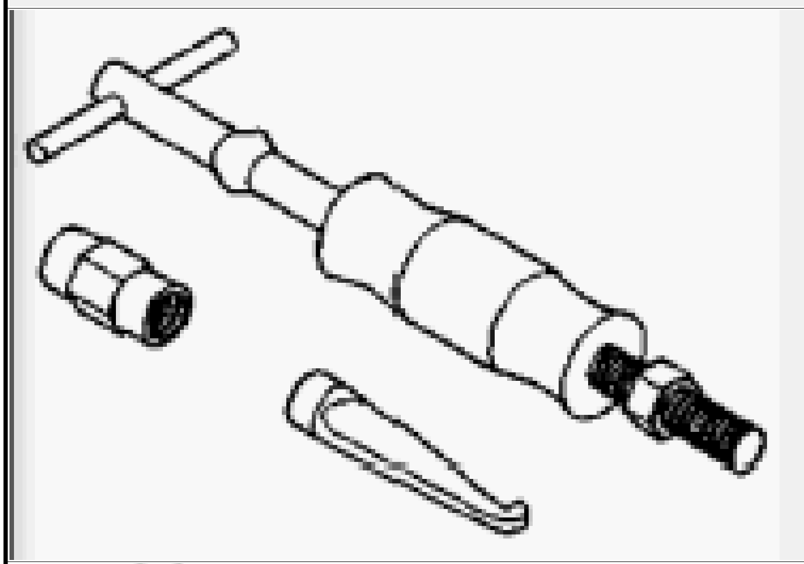
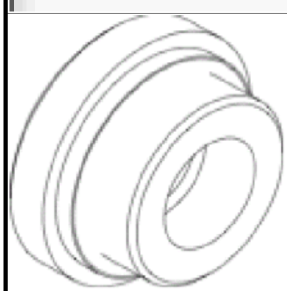
	8285 - Compressor, Spring (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.)
	8481 - Installer, Gear (Originally Shipped In Kit Number(s) 8708, 8708CC.)

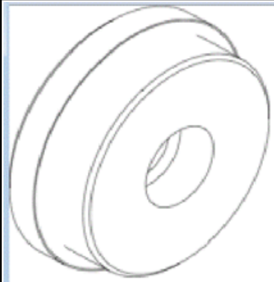
	8901A - Pressing Tool (Originally Shipped In Kit Number(s) 8901A.)
	8925-3 - Assembly, Press Fixture (Originally Shipped In Kit Number(s) 8998, 8998CC.)

	9585 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 9691.)
	9664 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 9675, 9685, 9695.)

	9667 - Remover, Seal (Originally Shipped In Kit Number(s) 9691.)

	9677 - Installer, Seal (Originally Shipped In Kit Number(s) 9675, 9685, 9695.)
	C-3281 - Holder, Flange (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)
	C-3752 - Slide Hammers (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202-CAN, 9202CC.)

	C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)
	C-637 - Slide Hammer, Universal (Originally Shipped In Kit Number(s) 9202.)
	10382 - Installer, Oil Pump Housing Needle Bearing (Originally Shipped In Kit Number(s) 10394A, 10394-UPD.)

	10376 - Installer, Input Shaft Needle Bearing (Originally Shipped In Kit Number(s) 10394A, 10394-UPD.)

CABLE, MANUAL PARK RELEASE

OPERATION

OPERATION

The 8HP utilizes a fully electronic shifter mechanism with no physical connections to the transmission such as shifter linkage or cables. Due to this design the park function of the transmission is performed using electronic inputs and hydraulic pressure to hold to parking pawl lever in the disengaged position while moving. Once in park this hydraulic pressure is reduced which allows the lever to engage the parking pawl which in turn keeps the vehicle from rolling forward or rearward.

Should the vehicle or any component of the E-Shifter lose power or communication the parking pawl will be engaged and the vehicle cannot be moved. To move the vehicle there is a manual park release mechanism that will allow first responders to disengage the parking pawl and allow the vehicle to be moved further facilitating vehicle recovery such as towing or moving the vehicle to allow jump starting.

REMOVAL

MANUAL PARK RELEASE CABLE

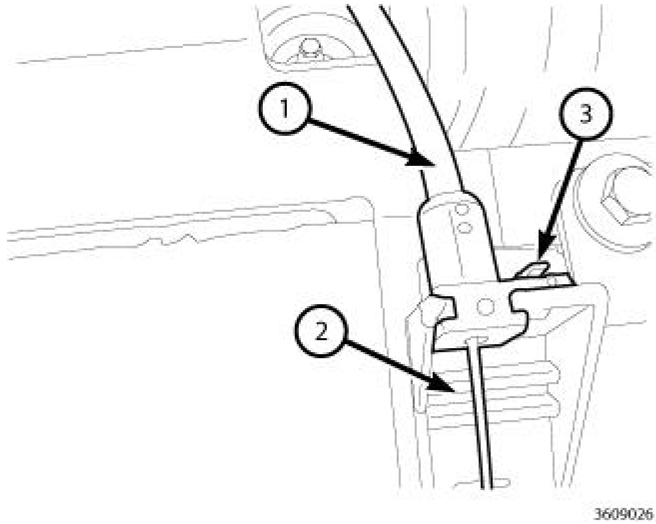


Fig. 149: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Apply the parking brake.
3. Remove the Manual Park Release (MPR) lever cover.
4. Disconnect the MPR cable (1) from the housing (2), while holding the release tab (3) open.
5. Disconnect the MPR cable from the lever.
6. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

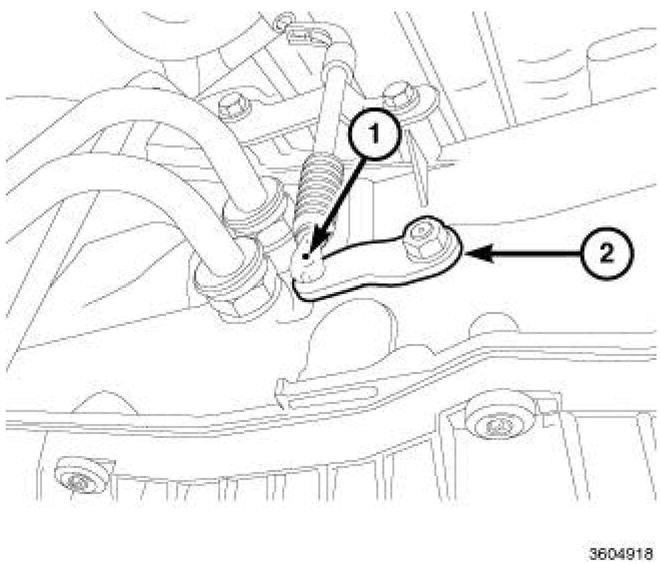


Fig. 150: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the MPR cable (1) from the MPR lever (2).

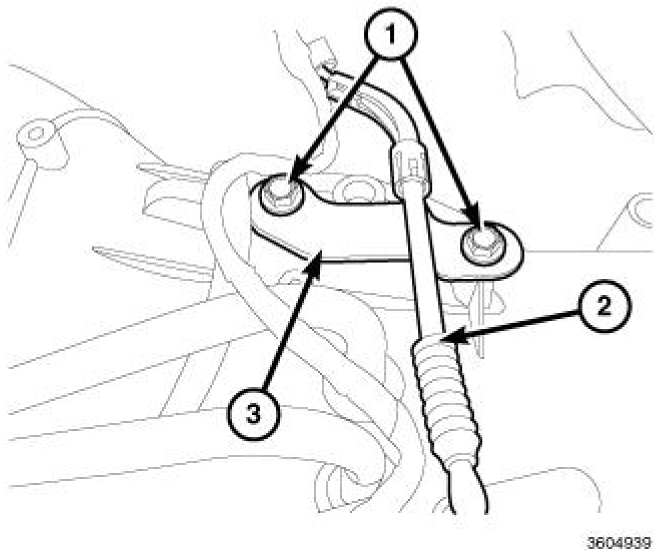


Fig. 151: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

8. Remove the MPR cable bracket bolts (1) and remove the MPR cable (2) from the vehicle.

INSTALLATION

MANUAL PARK RELEASE CABLE

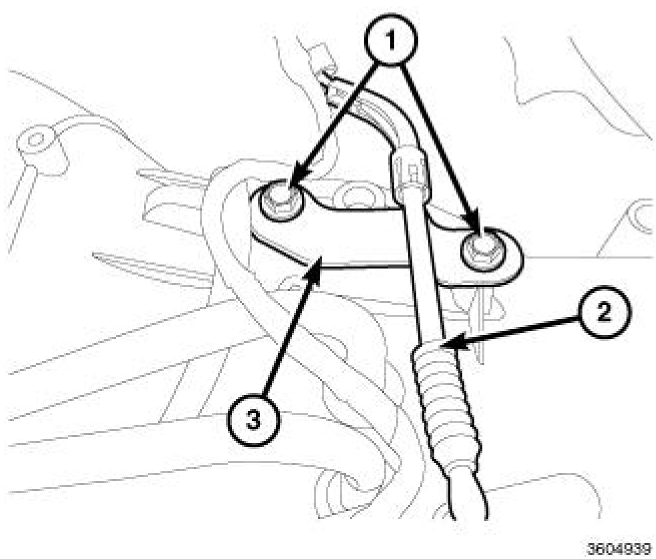


Fig. 152: Bolts, Manual Park Release Cable Bracket & Bracket/Cable
Courtesy of CHRYSLER GROUP, LLC

1. Install the Manual Park Release (MPR) cable (2) in the vehicle. Install the MPR cable bracket bolts (1) and tighten to the proper specification. Refer to SPECIFICATIONS.

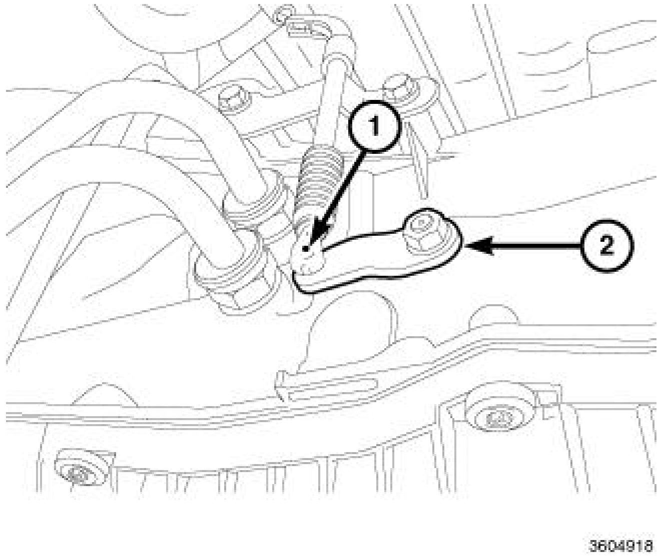


Fig. 153: Manual Park Release Cable & Lever
Courtesy of CHRYSLER GROUP, LLC

2. Connect the MPR cable (1) to the MPR lever (2).
3. Lower the vehicle.

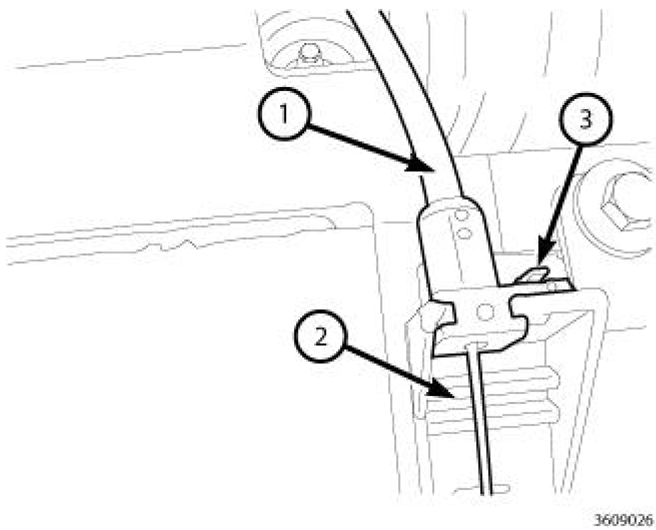


Fig. 154: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

4. Connect the MPR cable (2) to the MPR lever.
5. Connect the MPR cable (1) to the housing.
6. Install the MPR cover.
7. Connect the negative battery cable.

CLUTCH, A

DISASSEMBLY

CLUTCH A DISASSEMBLY

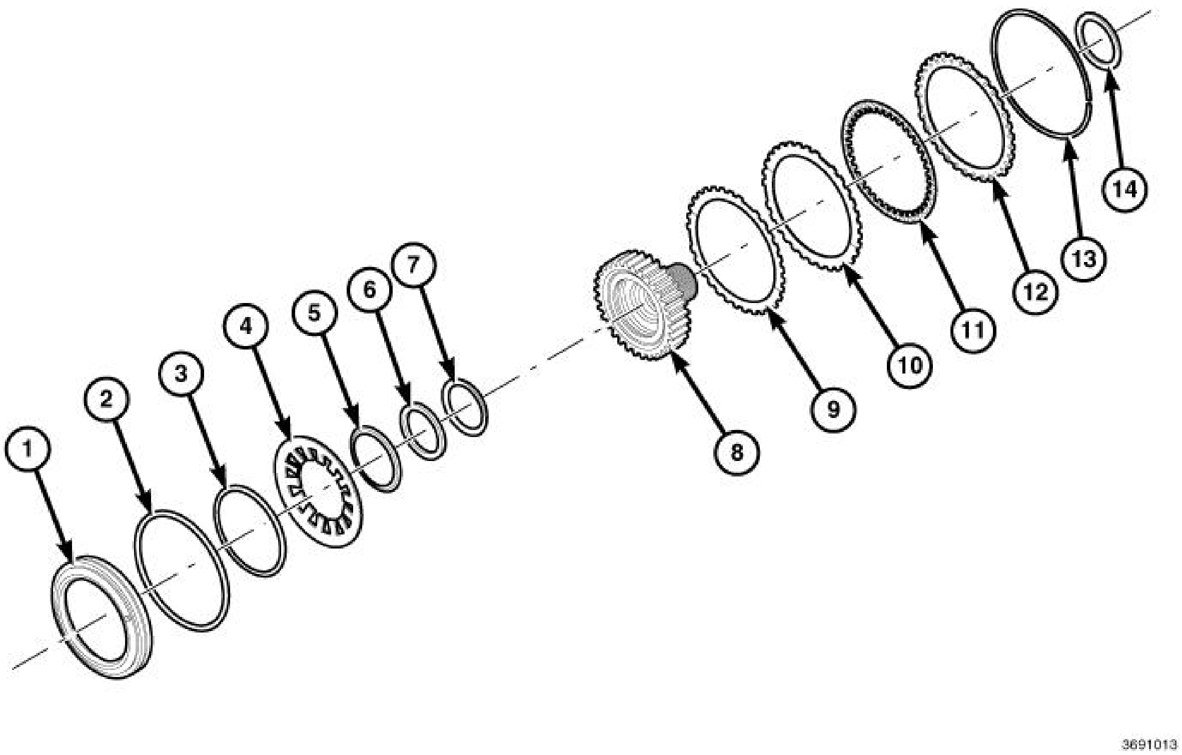


Fig. 155: Exploded View Of A Clutch
Courtesy of CHRYSLER GROUP, LLC

1 - A CLUTCH PISTON
2 - LIP SEAL
3 - LIP SEAL
4 - RETURN SPRING
5 - RING
6 - BEARING
7 - WASHER
8 - SUN GEAR
9 - WAVE SPRING
10 - SEPARATOR PLATE
11 - FRICTION PLATES
12 - END PLATE
13 - SNAP RING
14 - SELECTABLE SHIM

1. Remove the oil supply from the transmission case. Refer to **PUMP, TRANSMISSION OIL, REMOVAL**.

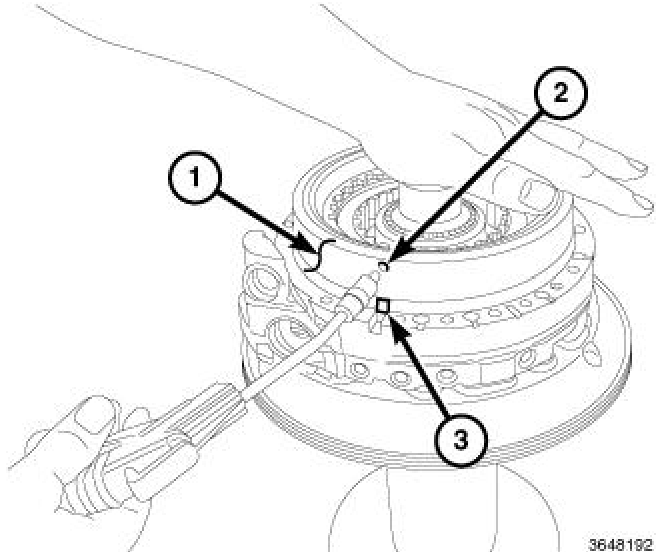


Fig. 156: B-Piston, Hole & B-Piston Alignment Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply air pressure slowly, oil may spray when B-piston releases from the assembly.**

2. With one hand above B-piston (1), carefully apply air pressure into the hole directly above the B-piston alignment tab (3) to remove B-piston (2) from the assembly.

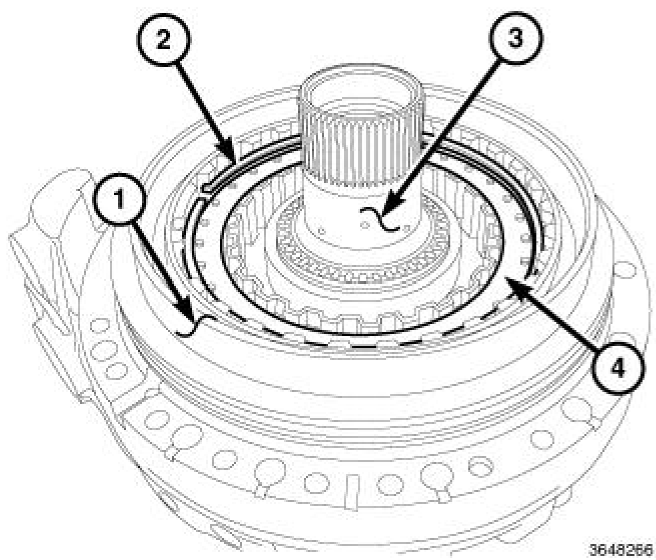


Fig. 157: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

3. Remove the outer ring (1) (inside B-piston).
4. Remove the snap ring (2).
5. Remove the clutches and spacers (4).
6. Remove the hub (3).

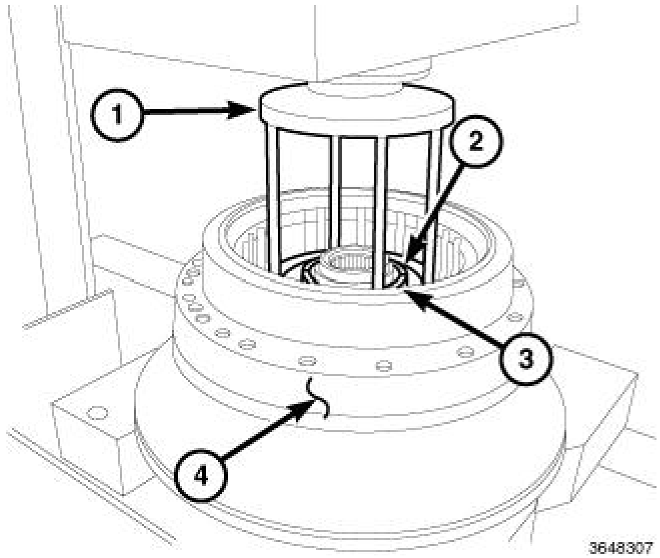


Fig. 158: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

7. Position the oil pump housing assembly (4) in a suitable press.
8. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer to remove tension on the split retaining ring (2), and remove the two halves of the retaining ring (2).

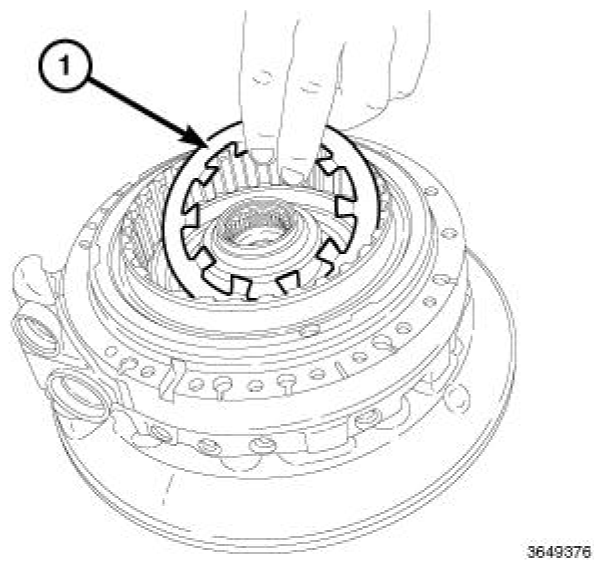


Fig. 159: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

9. Remove the piston retainer and plate.

ASSEMBLY

CLUTCH A ASSEMBLY

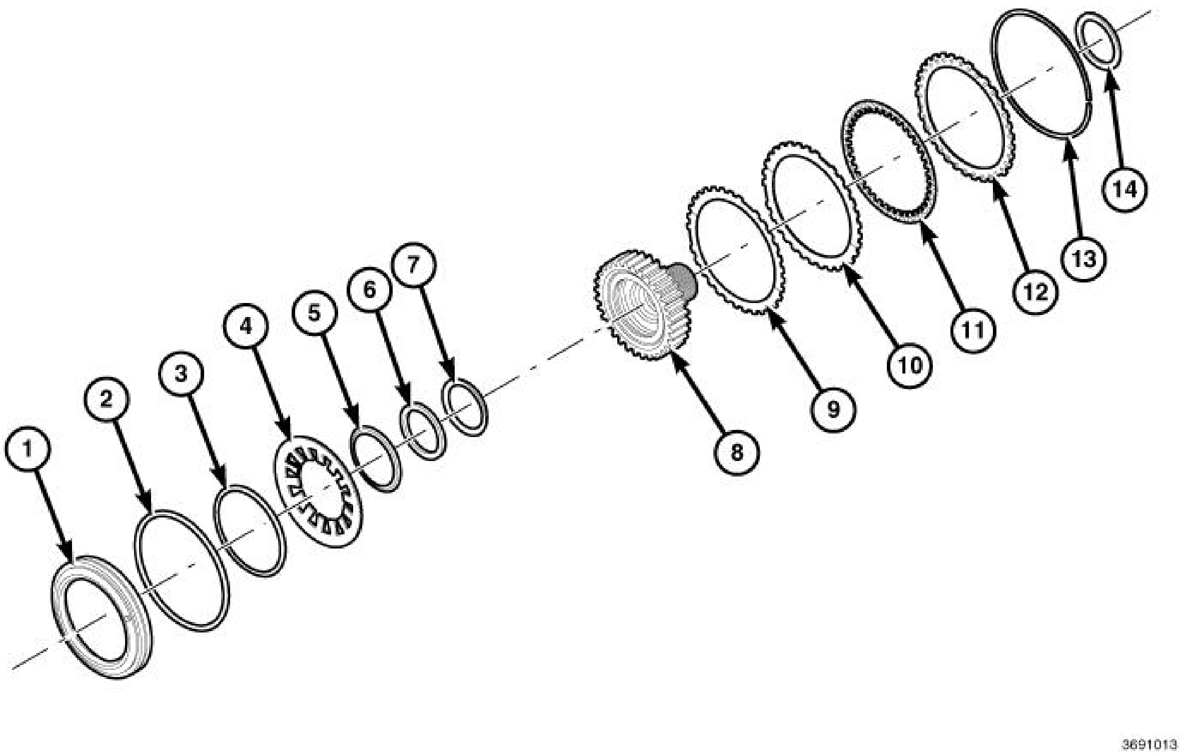


Fig. 160: Exploded View Of A Clutch
Courtesy of CHRYSLER GROUP, LLC

1 - A CLUTCH PISTON
2 - LIP SEAL
3 - LIP SEAL
4 - RETURN SPRING
5 - RING
6 - BEARING
7 - WASHER
8 - SUN GEAR
9 - WAVE SPRING
10 - SEPARATOR PLATE
11 - FRICTION PLATES
12 - END PLATE
13 - SNAP RING
14 - SELECTABLE SHIM

NOTE: **If clutch discs are being replaced, soak in 8HP trans fluid before assembly.**

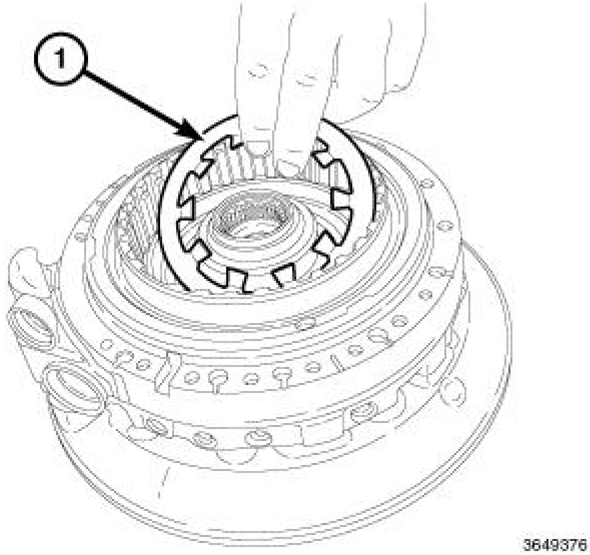


Fig. 161: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

1. Insert the piston and the retaining ring (1) into the housing.

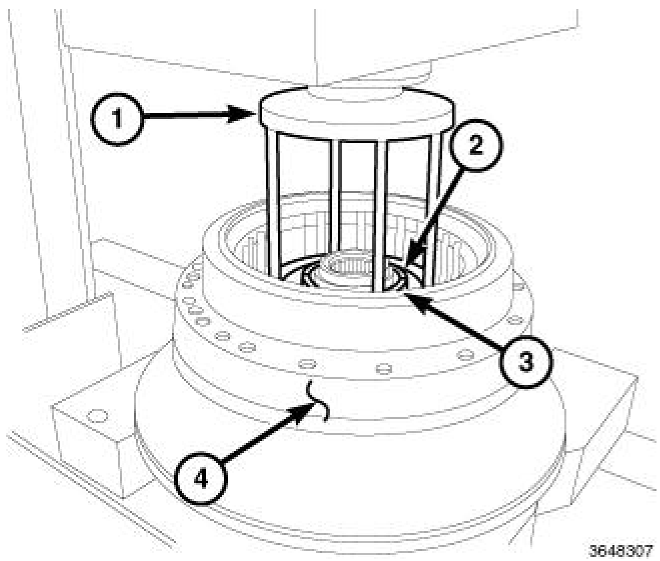


Fig. 162: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

2. Position the oil pump housing assembly (4) in a suitable arbor press.
3. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and install the two halves of the split retainer ring (2).

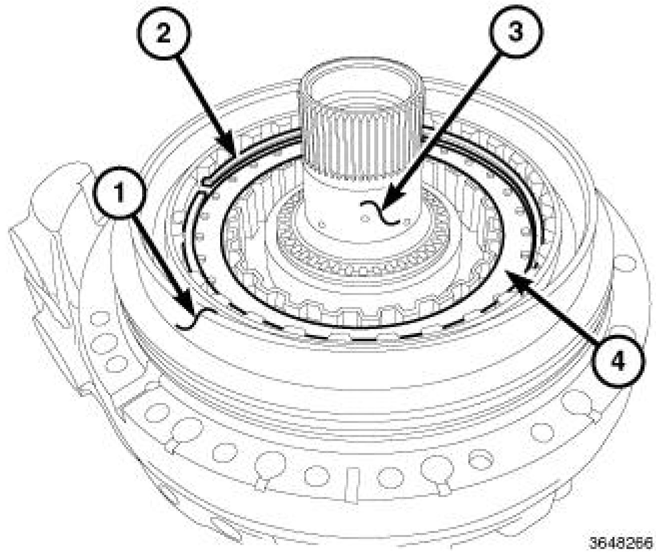


Fig. 163: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

4. Install the hub (3).
5. Install the clutches and spacers (4).
6. Install the snap ring (2).
7. Install the outer ring (1) (below B-piston).

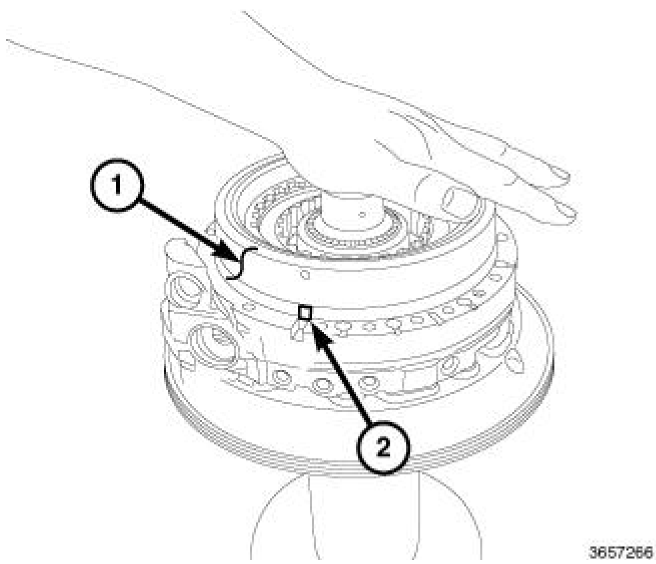


Fig. 164: B-Piston Alignment Tab & B-Piston
Courtesy of CHRYSLER GROUP, LLC

8. Position the B-piston alignment tab (2) above the notch and install B-piston (1) on the assembly.
9. Install the transmission oil pump. Refer to **PUMP, TRANSMISSION OIL, INSTALLATION**.

CLUTCH, B

DISASSEMBLY

CLUTCH B DISASSEMBLY

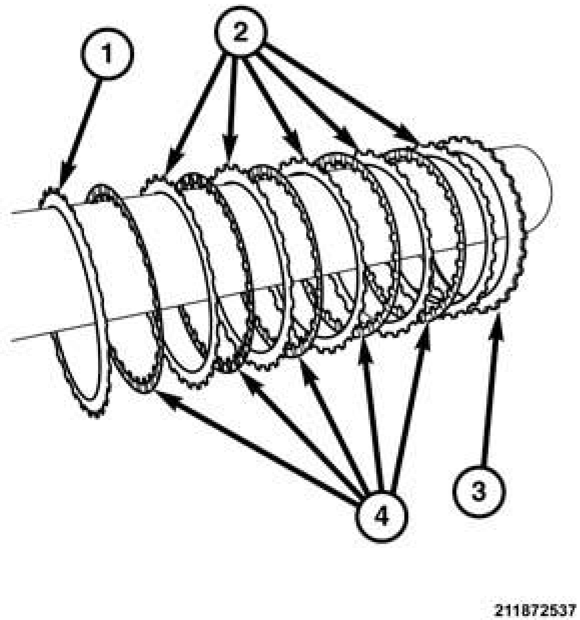


Fig. 165: Wave, Steel, Backing & Friction Plates
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate
2. Steel plate
3. Backing plate
4. Friction plate

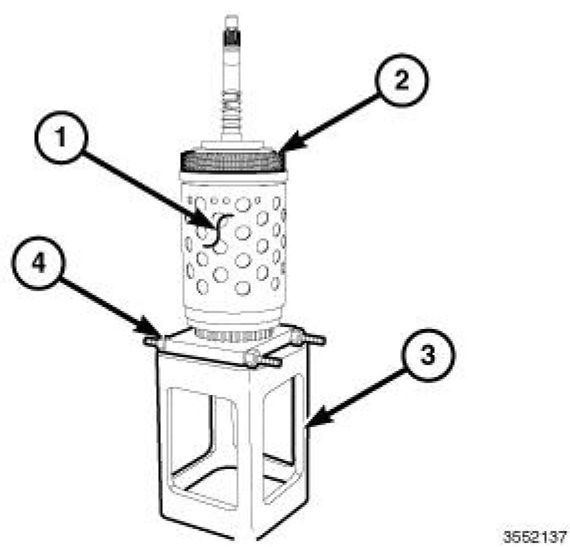


Fig. 166: P4 Annulus Drum Assembly, Press Fixture Assembly & Bearing/Gear Splitter
Courtesy of CHRYSLER GROUP, LLC

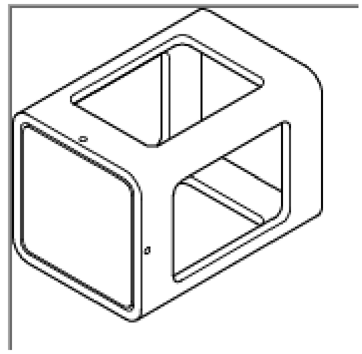


Fig. 167: Press Fixture
Courtesy of CHRYSLER GROUP, LLC

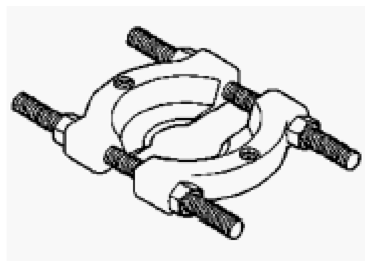


Fig. 168: Splitter, Bearing/Gear
Courtesy of CHRYSLER GROUP, LLC

1. Position the input/output shaft and the P4 annulus drum assembly (1) on Assembly, Press Fixture 8925-3 (special tool #8925-3, Assembly, Press Fixture) and Splitter, Bearing/Gear 1130 (special tool #1130, Splitter, Bearing/Gear).

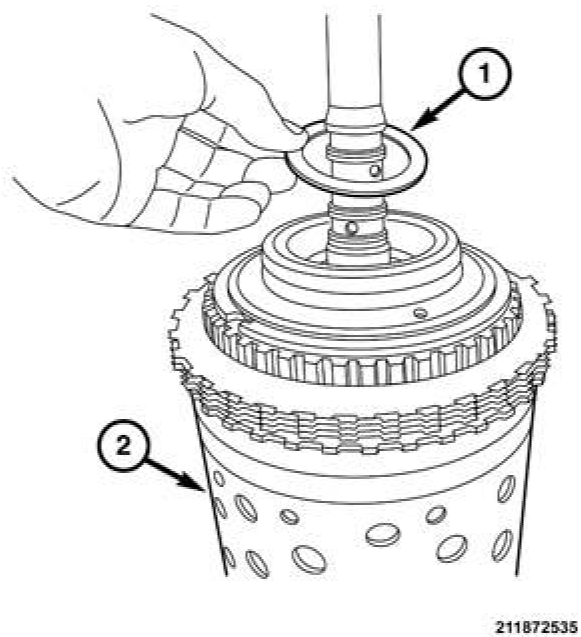


Fig. 169: Annulus Assembly & Shim
Courtesy of CHRYSLER GROUP, LLC

2. Remove the selectable shim (1).

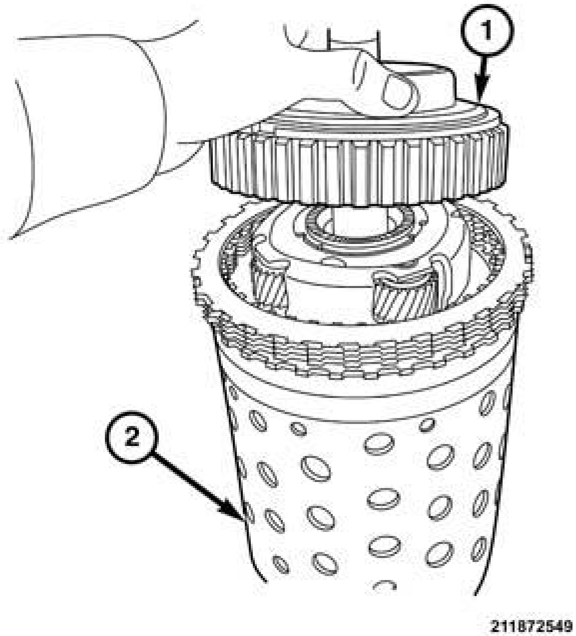


Fig. 170: Annulus Assembly & Gear
Courtesy of CHRYSLER GROUP, LLC

3. Remove the P1 (1) annulus from the assembly.

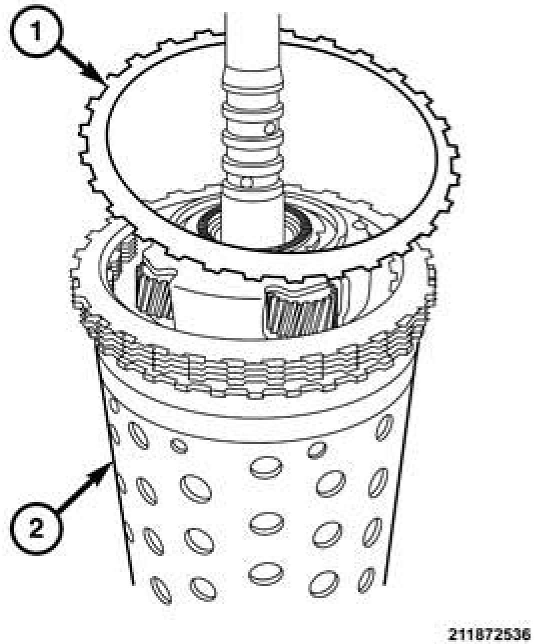


Fig. 171: Annulus Assembly & B-Clutch Wave Plate
Courtesy of CHRYSLER GROUP, LLC

4. Remove the B-clutch wave plate (1).

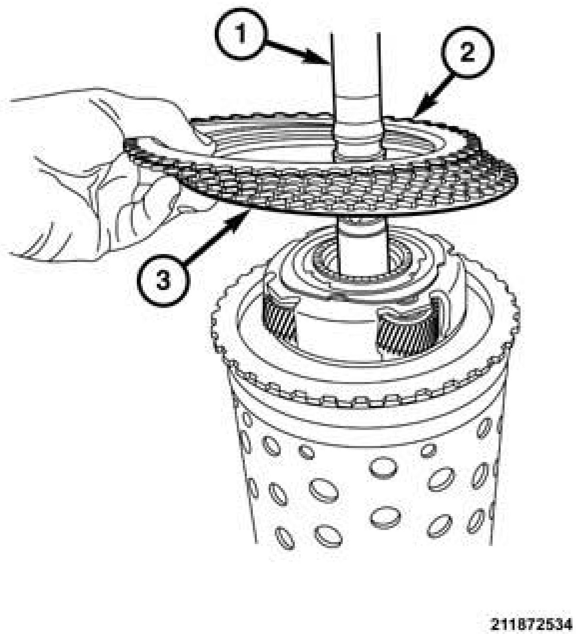


Fig. 172: Friction & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

5. Remove the friction and steel plates (2).

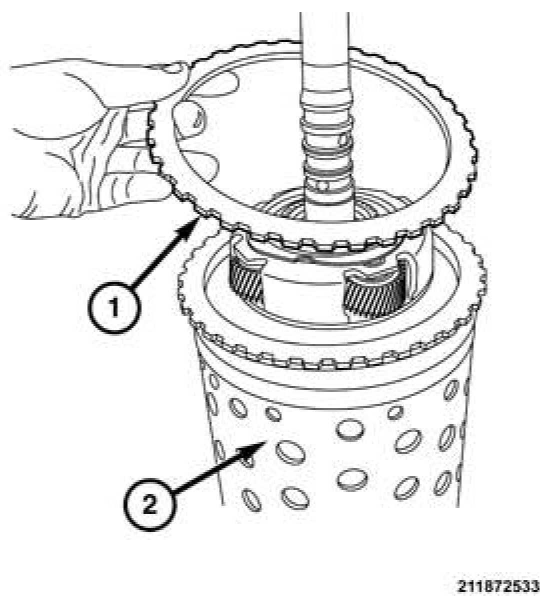


Fig. 173: Backing Plate & Annulus Assembly
Courtesy of CHRYSLER GROUP, LLC

6. Remove the backing plate (1) from the assembly (2).

ASSEMBLY

CLUTCH B ASSEMBLY

1. Wave plate
2. Steel plate
3. Backing plate
4. Friction plate

NOTE: **If clutch discs are being replaced, soak in 8HP trans fluid before assembly.**

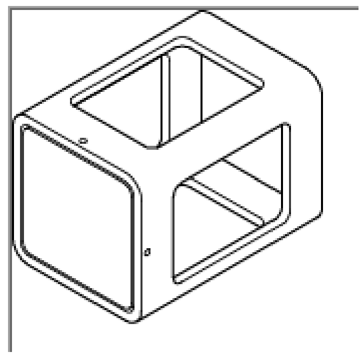


Fig. 174: Press Fixture
Courtesy of CHRYSLER GROUP, LLC

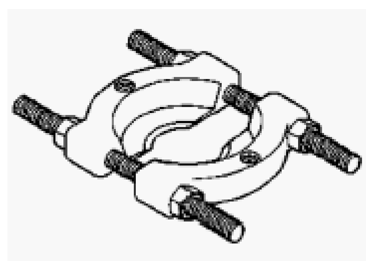


Fig. 175: Splitter, Bearing/Gear
Courtesy of CHRYSLER GROUP, LLC

1. Position the input/output and the P4 annulus drum assembly on (special tool #8925-3, Assembly, Press Fixture) and (special tool #1130, Splitter, Bearing/Gear).

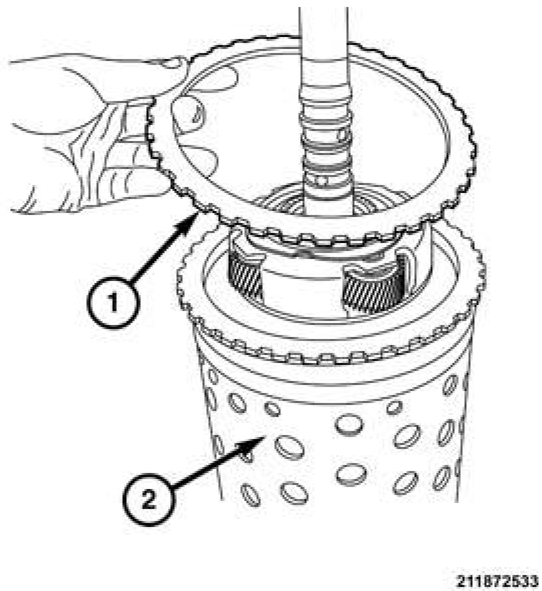


Fig. 176: Backing Plate & Annulus Assembly
Courtesy of CHRYSLER GROUP, LLC

2. Install the backing plate (1) onto the input/output shaft.

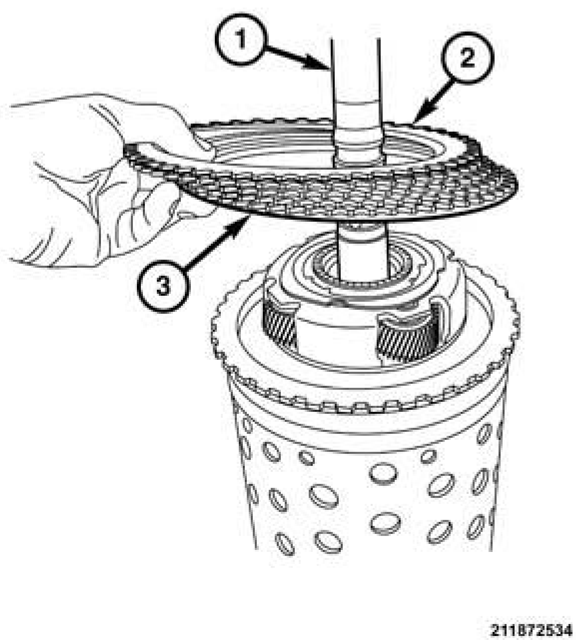


Fig. 177: Friction & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

3. Install the friction and steel plates (2).

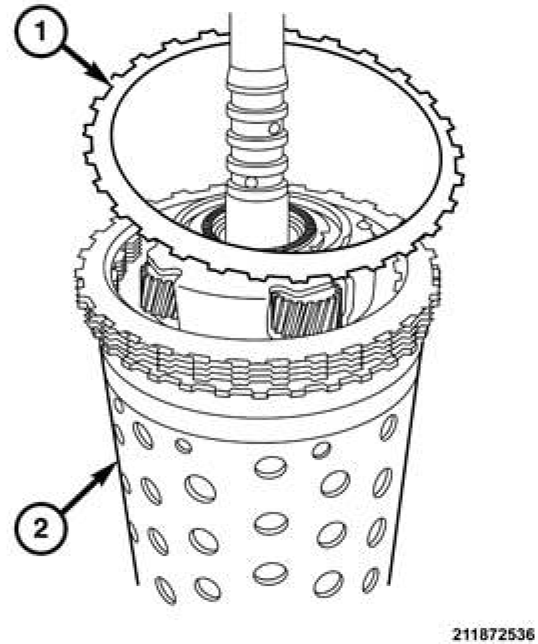


Fig. 178: Annulus Assembly & B-Clutch Wave Plate
Courtesy of CHRYSLER GROUP, LLC

4. Install the B-clutch wave plate (1).

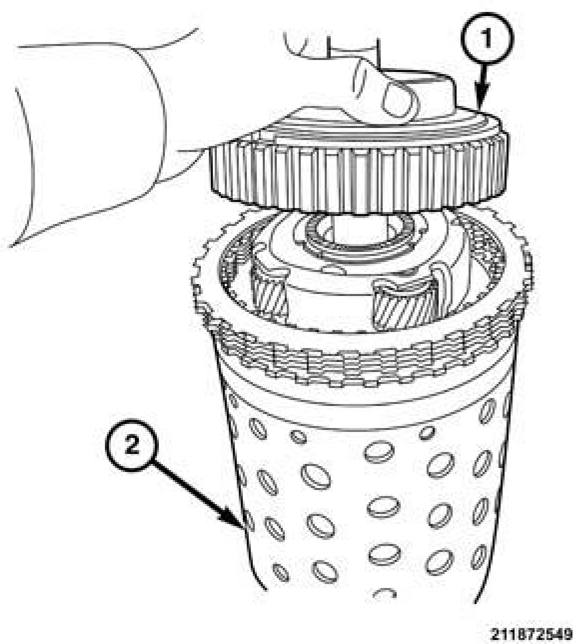


Fig. 179: Annulus Assembly & Gear
Courtesy of CHRYSLER GROUP, LLC

5. Install the P1 annulus onto the input/output shaft (1).

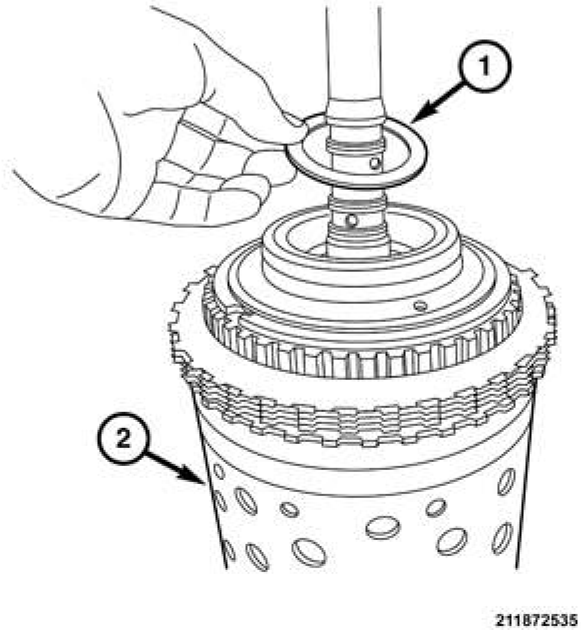


Fig. 180: Annulus Assembly & Shim
Courtesy of CHRYSLER GROUP, LLC

6. Install the correct selectable shim (1) onto the P1 annulus.

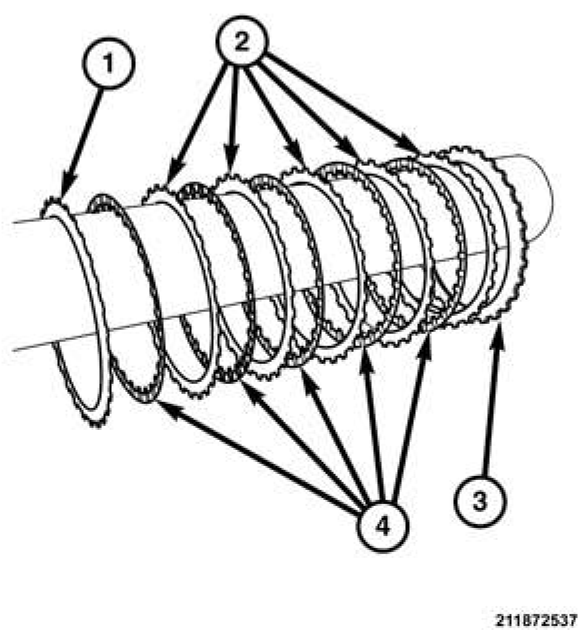


Fig. 181: Wave, Steel, Backing & Friction Plates
Courtesy of CHRYSLER GROUP, LLC

CLUTCH, C

DISASSEMBLY

CLUTCH C DISASSEMBLY

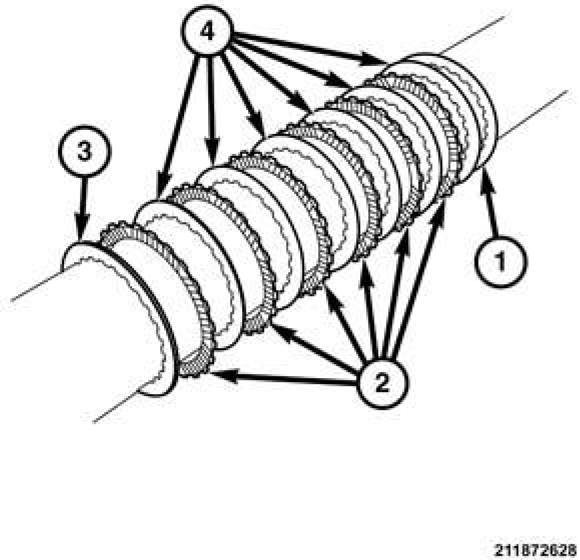


Fig. 182: Wave, Friction, Backing & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

1.	Wave plate
2.	Friction plate
3.	Backing plate
4.	Steel plate

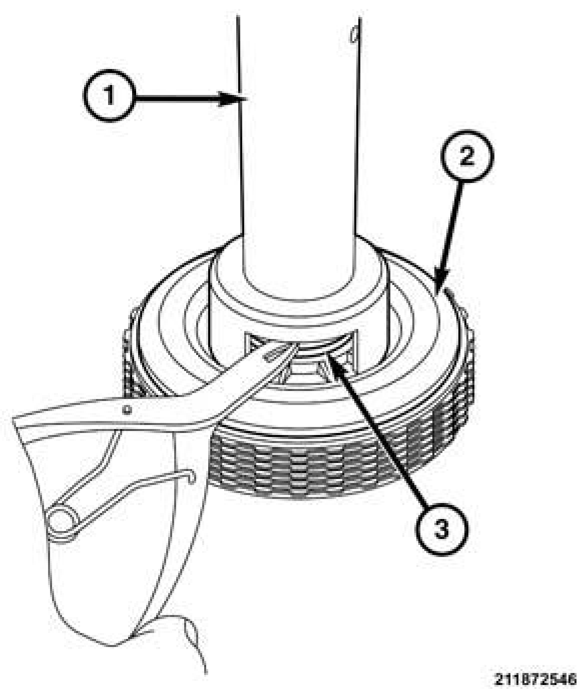


Fig. 183: Special Tool, C-Clutch & Snap Ring

Courtesy of CHRYSLER GROUP, LLC

1. Place the C-clutch (2) in a suitable press.
2. Using special tool 8680 (1) compress the C-clutch (2) enough to remove the snap ring (3).
3. Remove the snap ring (3).

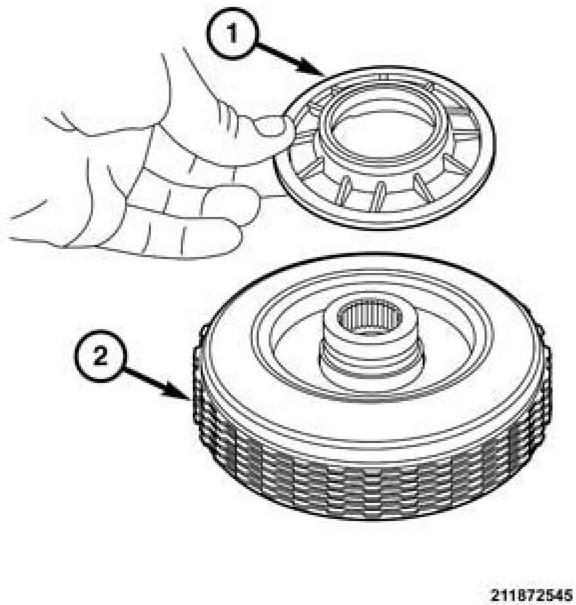


Fig. 184: C-Clutch & Retainer
Courtesy of CHRYSLER GROUP, LLC

4. Remove the C-clutch retainer (1).

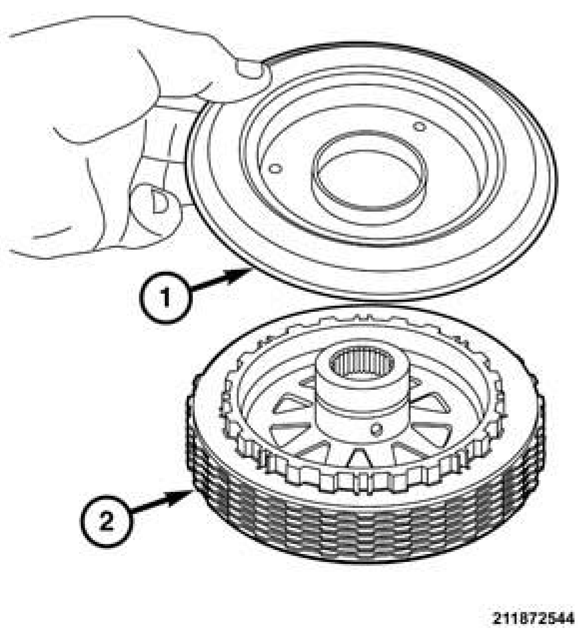


Fig. 185: Friction Plates & Retainer
Courtesy of CHRYSLER GROUP, LLC

5. Remove the C-clutch piston (1).

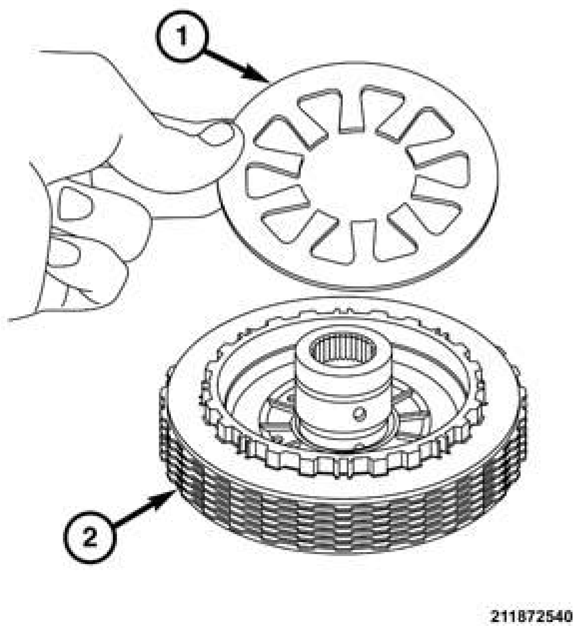


Fig. 186: Friction Plates & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

6. Remove the Belleville spring (1).

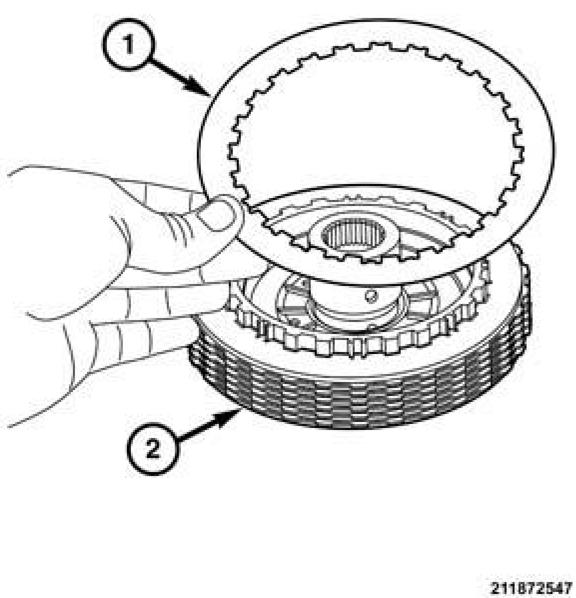


Fig. 187: Wave Plate
Courtesy of CHRYSLER GROUP, LLC

7. Remove the wave plate (1).

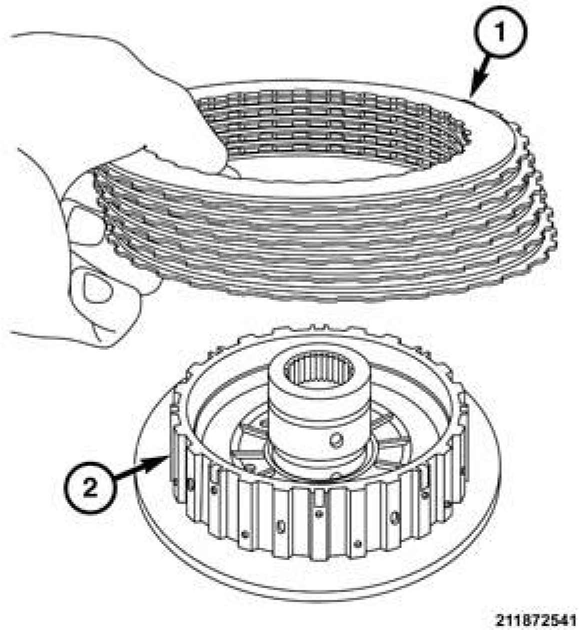


Fig. 188: Friction & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

8. Remove the 6 friction and steel plates (1).

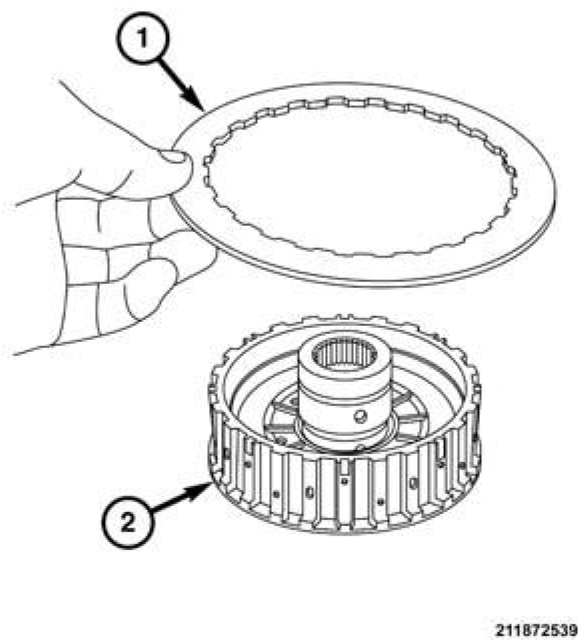


Fig. 189: Backing Plate
Courtesy of CHRYSLER GROUP, LLC

9. Remove the backing plate (1).

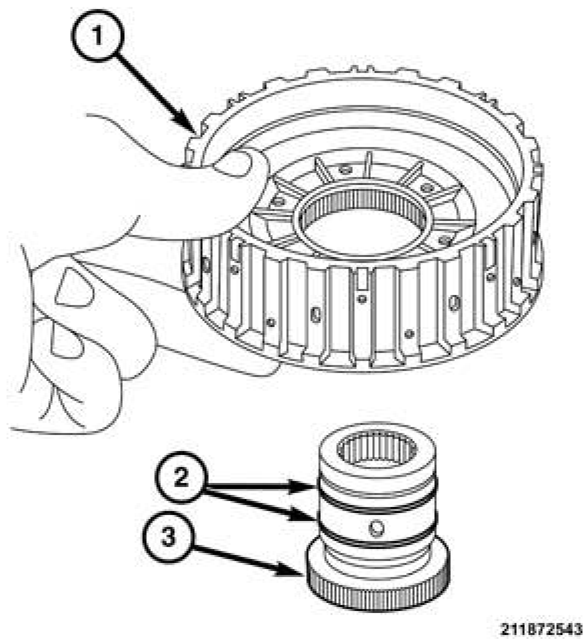


Fig. 190: Clutch Hub, C-Clutch Shaft & O-Rings
Courtesy of CHRYSLER GROUP, LLC

10. Separate the clutch shaft (3) from the clutch hub (1).
11. Remove two O-rings from the C-clutch shaft (2).

ASSEMBLY

CLUTCH C ASSEMBLY

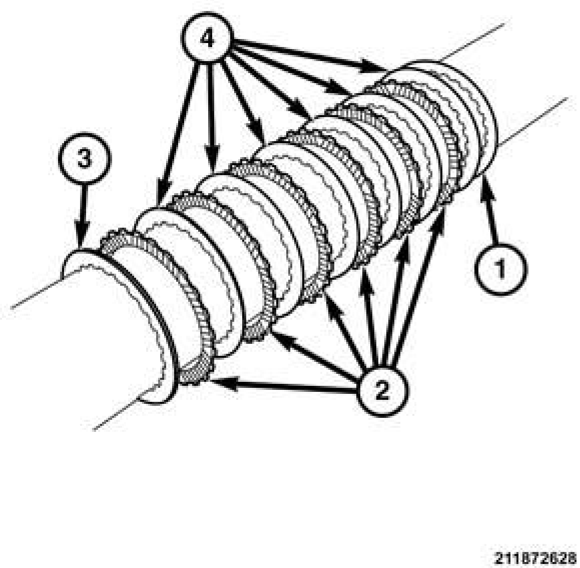


Fig. 191: Wave, Friction, Backing & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate	
2. Friction plate	
3. Backing plate	
4. Steel plate	

NOTE: **If clutch discs are being replaced, soak in 8HP trans fluid before assembly.**

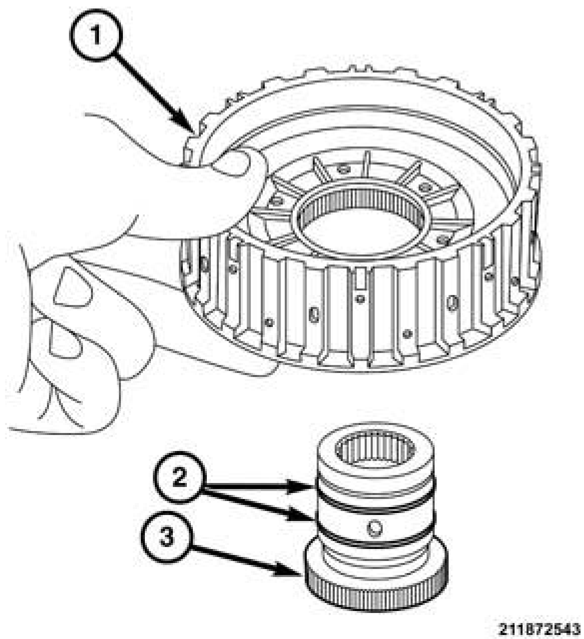
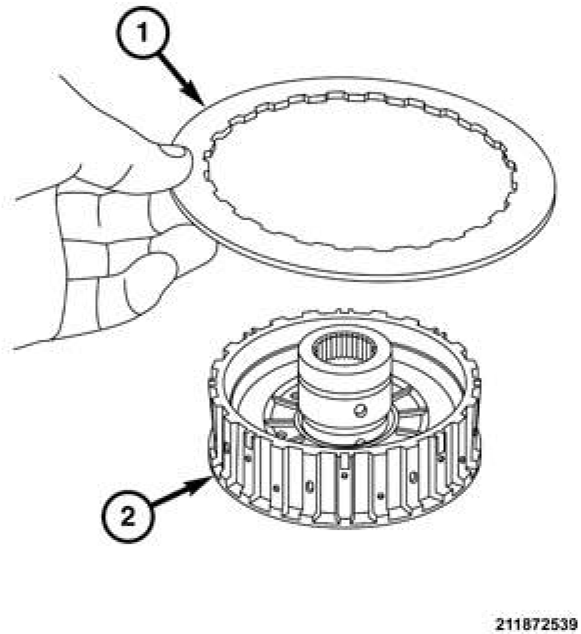


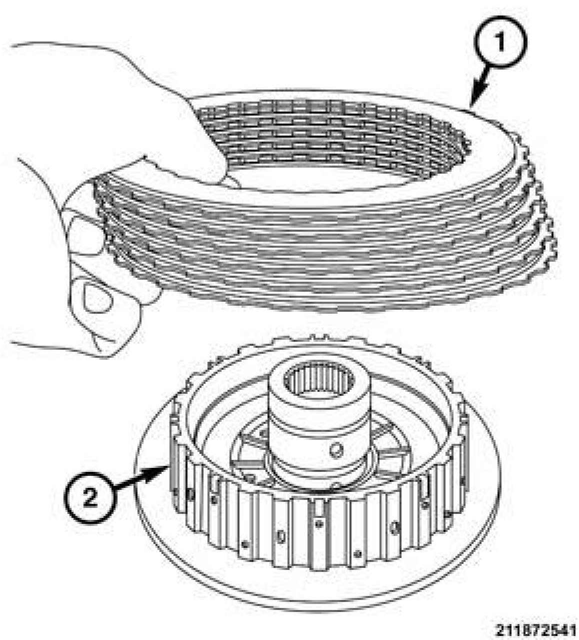
Fig. 192: Clutch Hub, C-Clutch Shaft & O-Rings
Courtesy of CHRYSLER GROUP, LLC

1. Replace the C-clutch seals (2).
2. Install C-clutch hub (1) onto the C-clutch shaft (3).



[Fig. 193: Backing Plate]
Courtesy of CHRYSLER GROUP, LLC

3. Install the backing plate (1).



[Fig. 194: Friction & Steel Plates]
Courtesy of CHRYSLER GROUP, LLC

4. Install 6 friction and steel clutch plates (1).

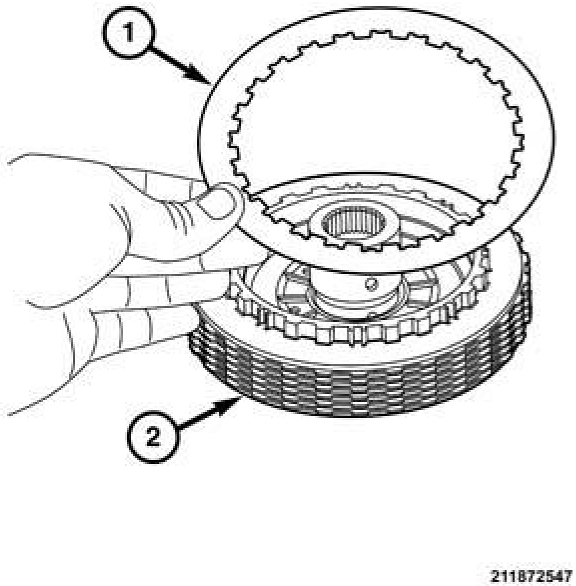


Fig. 195: Wave Plate
Courtesy of CHRYSLER GROUP, LLC

5. Install the wave plate (1).

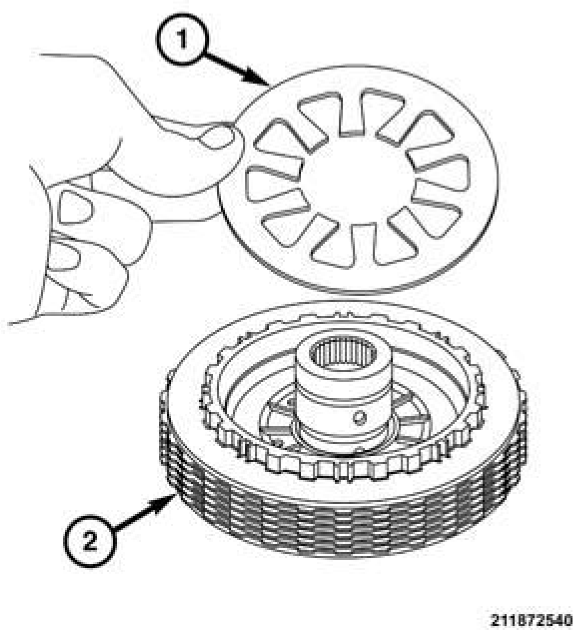


Fig. 196: Friction Plates & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

6. Install the Belleville spring (1).

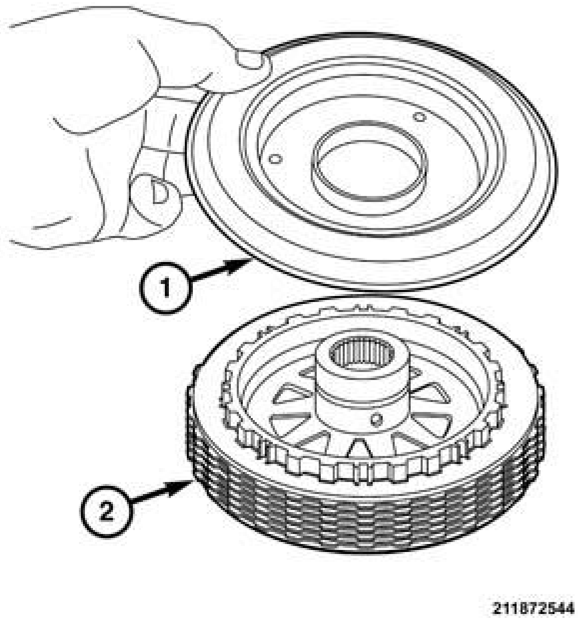


Fig. 197: Friction Plates & Retainer
Courtesy of CHRYSLER GROUP, LLC

7. Install the C-clutch piston (1).

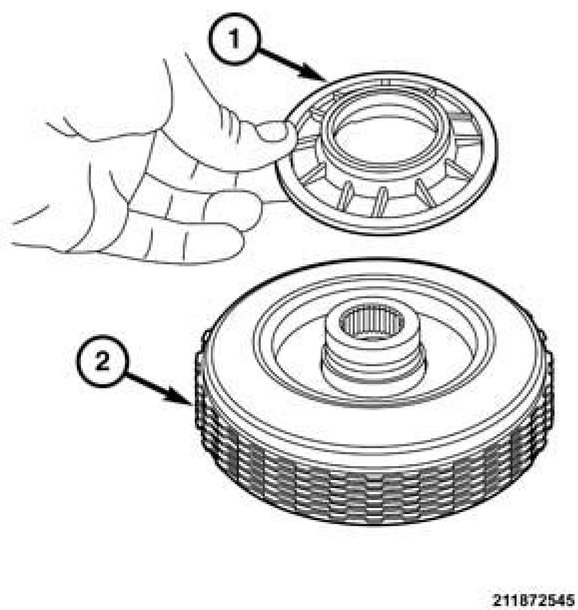
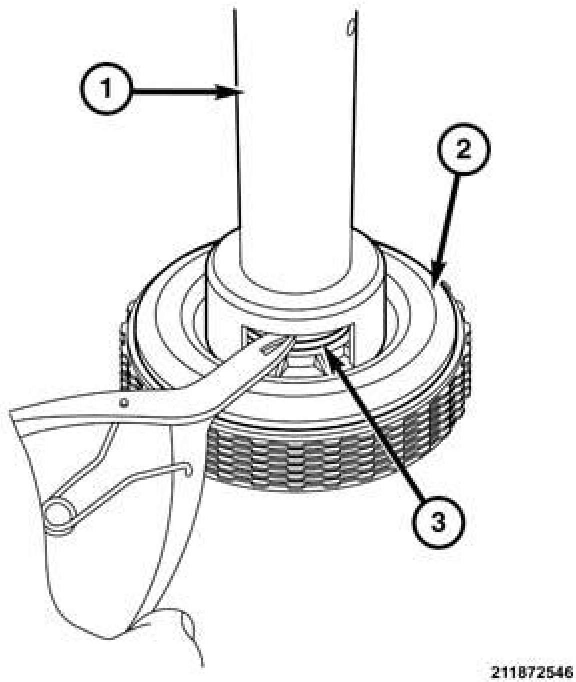


Fig. 198: C-Clutch & Retainer
Courtesy of CHRYSLER GROUP, LLC

8. Install the C-clutch retainer (1).



[**Fig. 199: Special Tool, C-Clutch & Snap Ring**]
Courtesy of CHRYSLER GROUP, LLC

9. Place the C-clutch (2) in a suitable press.
10. Using special tool 8680 (1) compress the clutch enough to install the snap ring (3).
11. Install the snap ring (3).
12. Using (special tool #8901A, Pressing Tool) and (special tool #10429, Gauge, Force) measure the C-clutch clearance, Refer to CLUTCH CLEARANCE CHART for specifications.

CLUTCH, D

DISASSEMBLY

CLUTCH D DISASSEMBLY

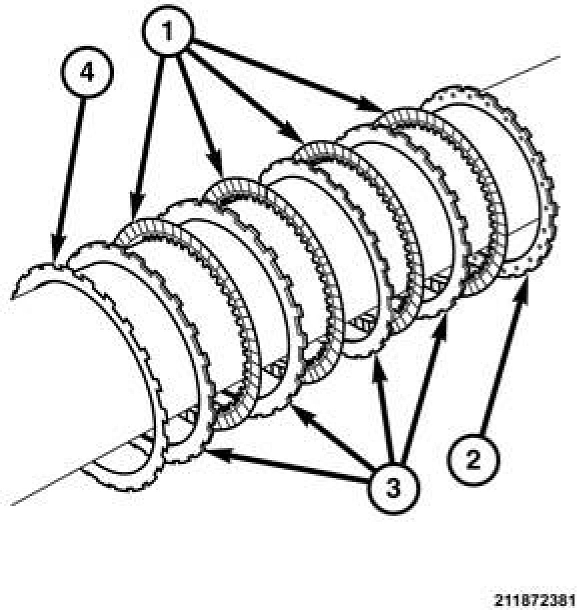


Fig. 200: Friction, Backing & Wave Plates
Courtesy of CHRYSLER GROUP, LLC

1. Friction plate	
2. Backing plate	
3. Backing plate	
4. Wave plate	

1. Place the D-clutch (3) in a suitable arbor press (1).
2. Using (special tool #8901A, Pressing Tool) (4) to compress the oil baffle (2) enough the clear the locking tabs.

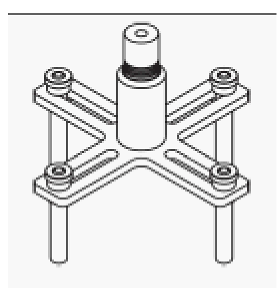


Fig. 201: Cross Bar Tool
Courtesy of CHRYSLER GROUP, LLC

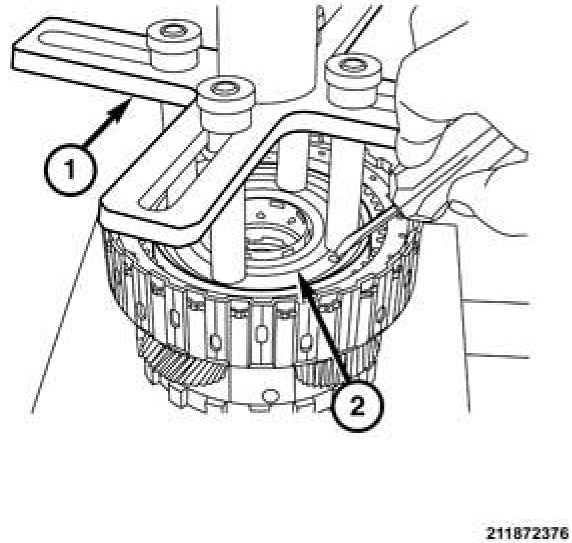


Fig. 202: Oil Baffle & Tabs
Courtesy of CHRYSLER GROUP, LLC

3. Rotate the oil baffle (2) slightly until the tabs on the hub are clear of the baffle.

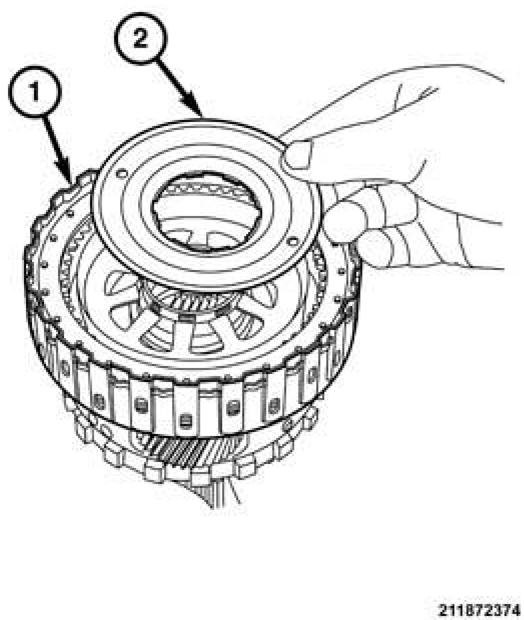


Fig. 203: Hub & Oil Baffle
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil baffle (2).

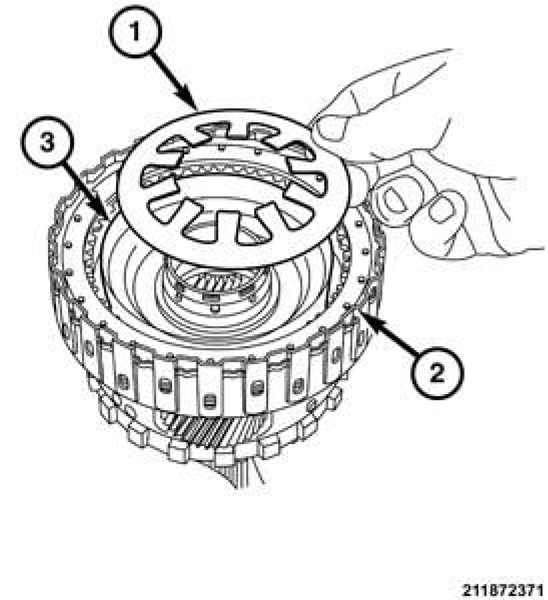


Fig. 204: Hub, Oil Baffle & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

5. Remove the Belleville spring (1).

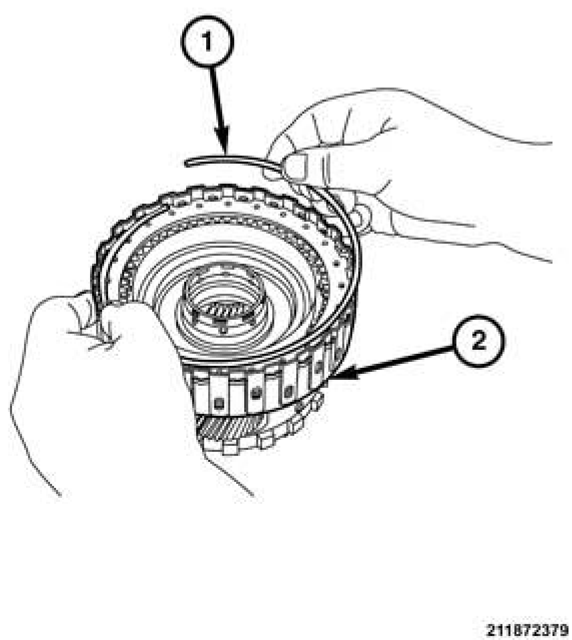
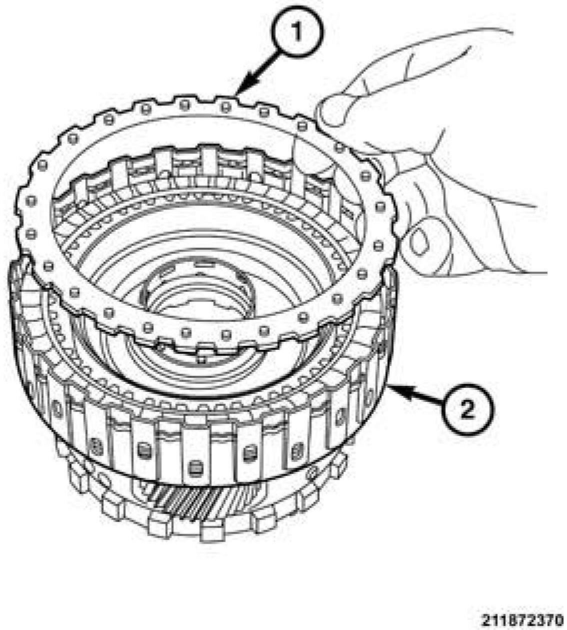


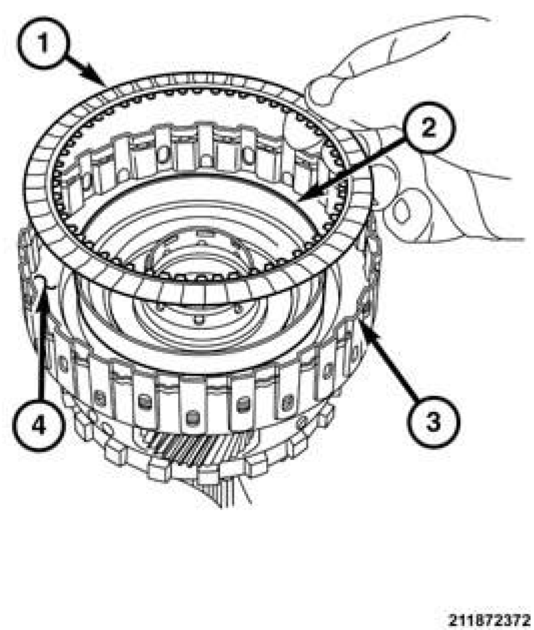
Fig. 205: Oil Baffle & Spring
Courtesy of CHRYSLER GROUP, LLC

6. Remove the selective snap ring (1).



[Fig. 206: Oil Baffle & D-Clutch Backing Plate]
Courtesy of CHRYSLER GROUP, LLC

7. Remove the D-Clutch backing plate (1).



[Fig. 207: Oil Baffle, D-Clutch, Friction & Steels]
Courtesy of CHRYSLER GROUP, LLC

8. Remove the D-Clutch (3) frictions and steels (1), paying attention to the orientation.

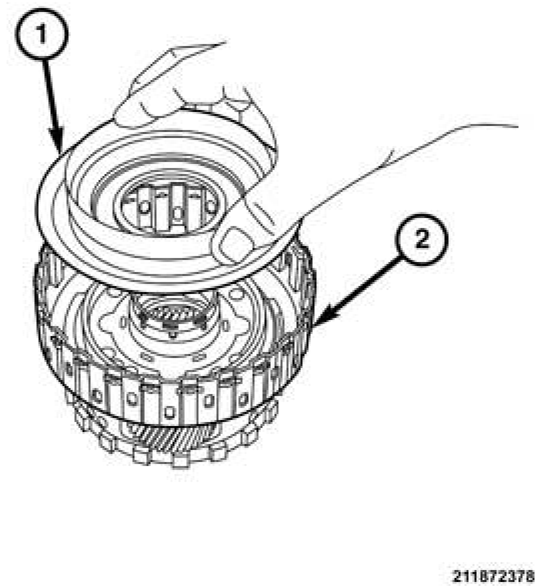


Fig. 208: D-Clutch & Piston
Courtesy of CHRYSLER GROUP, LLC

9. Remove the D-Clutch (2) piston (1).

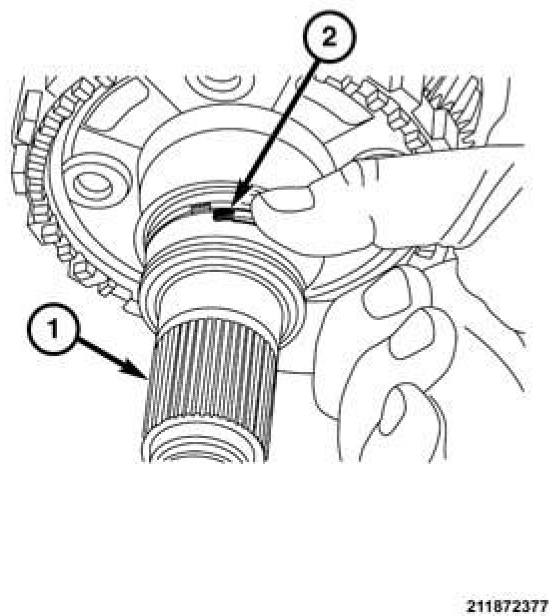


Fig. 209: D-Clutch Carrier Seal Rings
Courtesy of CHRYSLER GROUP, LLC

10. Remove the D-Clutch carrier seal rings (2).

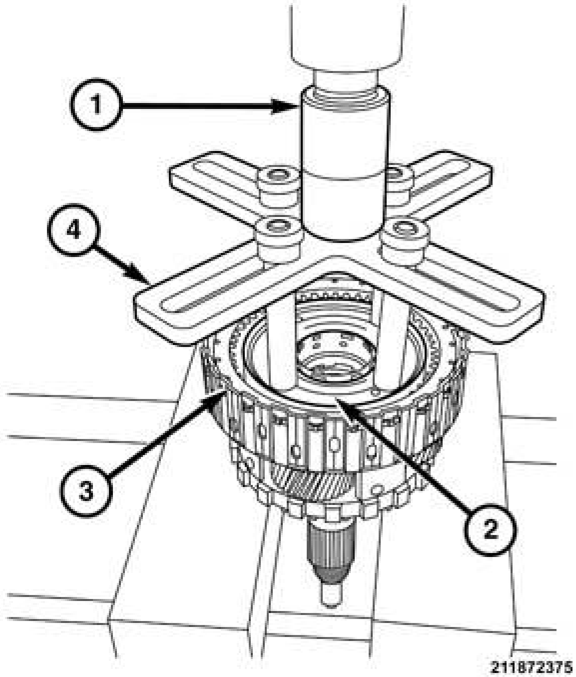


Fig. 210: D-Clutch & Arbor Press
Courtesy of CHRYSLER GROUP, LLC

ASSEMBLY

CLUTCH D ASSEMBLY

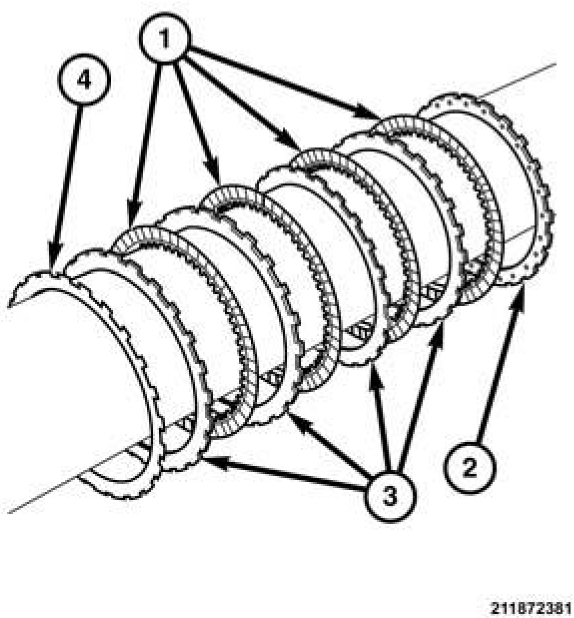


Fig. 211: Friction, Backing & Wave Plates
Courtesy of CHRYSLER GROUP, LLC

1. Friction plate
2. Backing plate

3. Steel plate	
4. Wave plate	

NOTE: **If clutch discs are being replaced, soak them in 8HP trans fluid before assembly.**

1. Install D-Clutch carrier seal rings (2).
2. Place the D-Clutch in a suitable arbor press.

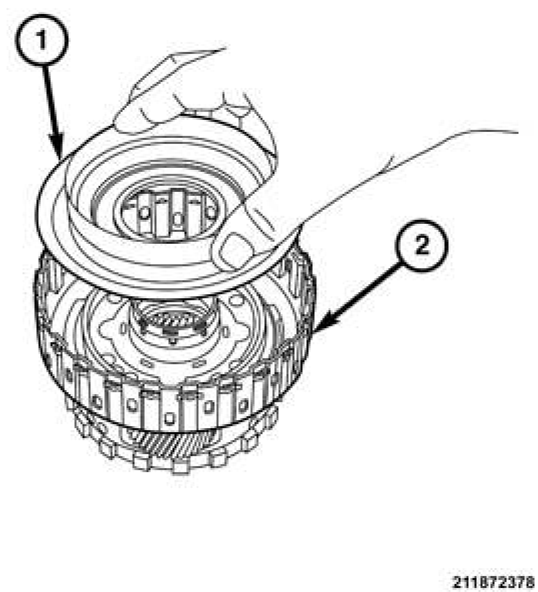


Fig. 212: D-Clutch & Piston
Courtesy of CHRYSLER GROUP, LLC

3. Coat the O-rings with 8HP fluid on the D-Clutch (2) piston (1) and install the piston (1) onto the carrier.

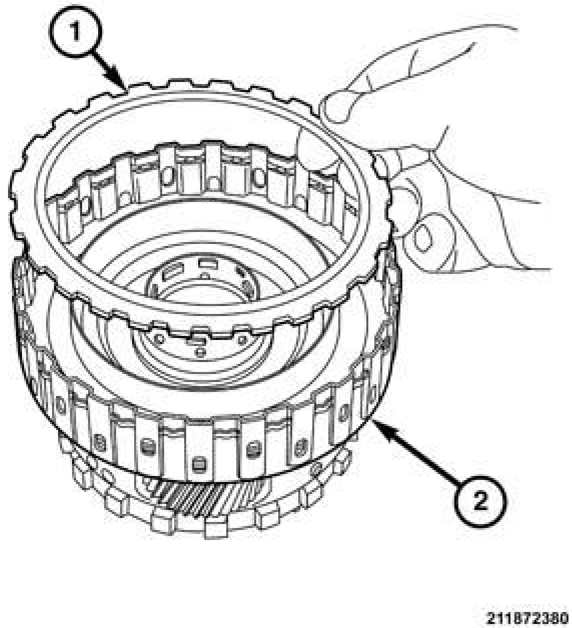


Fig. 213: D-Clutch & Wave Plate
Courtesy of CHRYSLER GROUP, LLC

4. Install the wave plate (1) into the carrier first.

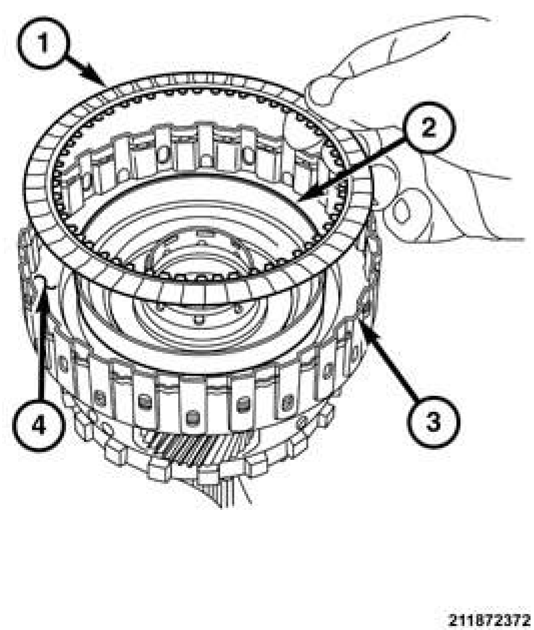
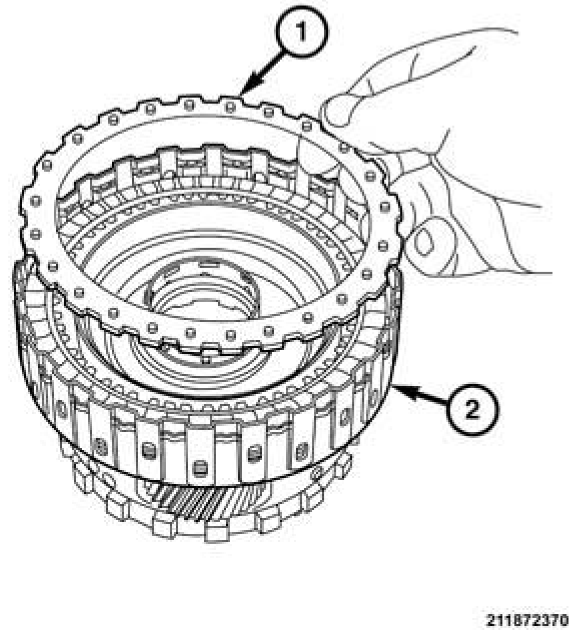


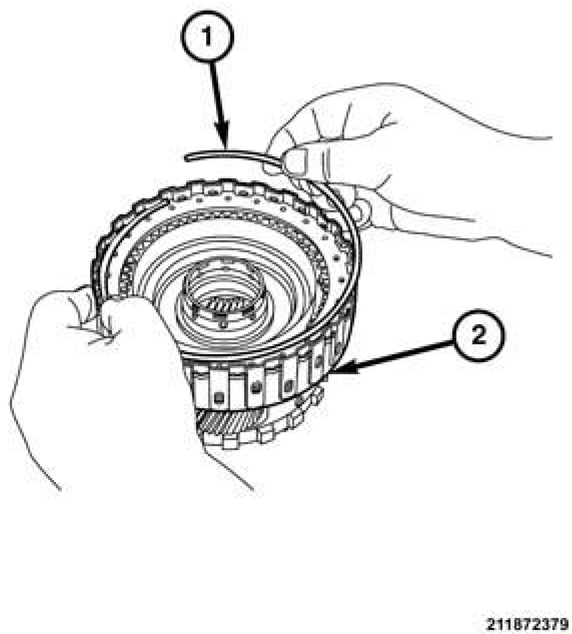
Fig. 214: Oil Baffle, D-Clutch, Friction & Steels
Courtesy of CHRYSLER GROUP, LLC

5. Install the frictions and steels (1) into the carrier (3).



[Fig. 215: Oil Baffle & D-Clutch Backing Plate]
Courtesy of CHRYSLER GROUP, LLC

6. Install the backing plate (1) last onto the carrier.



[Fig. 216: Oil Baffle & Spring]
Courtesy of CHRYSLER GROUP, LLC

7. Install the proper selective snap ring (1) onto the D-Clutch carrier (2).

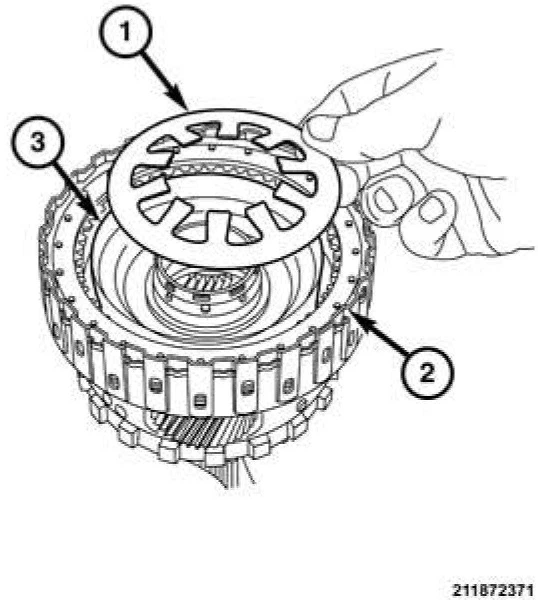


Fig. 217: Hub, Oil Baffle & Belleville Spring
Courtesy of CHRYSLER GROUP, LLC

8. Install the Belleville spring (1).

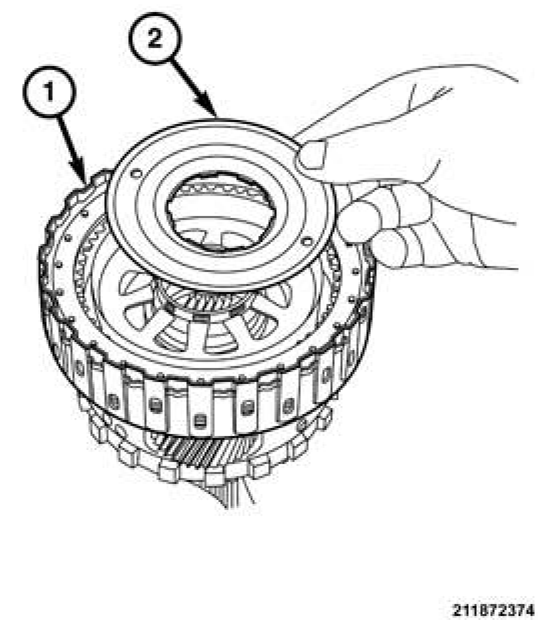


Fig. 218: Hub & Oil Baffle
Courtesy of CHRYSLER GROUP, LLC

9. Place the oil baffle (2) onto the hub of the D-clutch carrier (1).

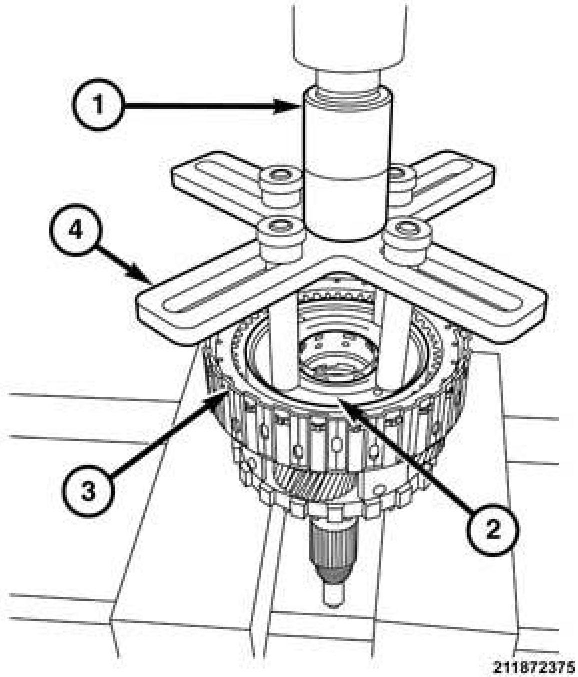


Fig. 219: D-Clutch & Arbor Press
Courtesy of CHRYSLER GROUP, LLC

10. Line up the locking tabs on the D-Clutch hub and the oil baffle (2).

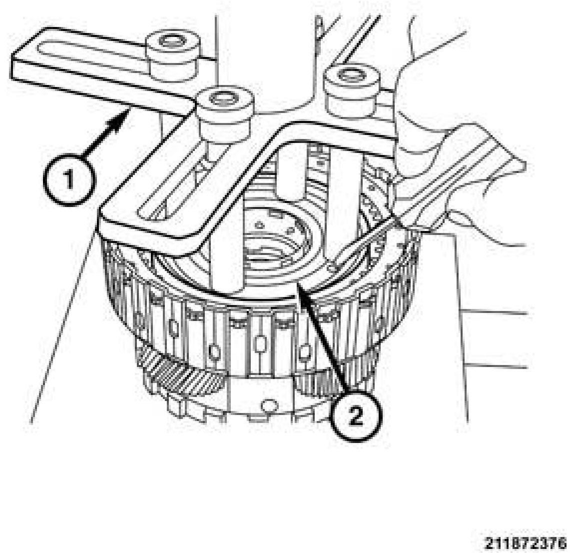


Fig. 220: Oil Baffle & Tabs
Courtesy of CHRYSLER GROUP, LLC

11. Compress the oil baffle (2) enough to clear the lock tabs, and rotate the baffle to the locked position.
12. Release the arbor press.

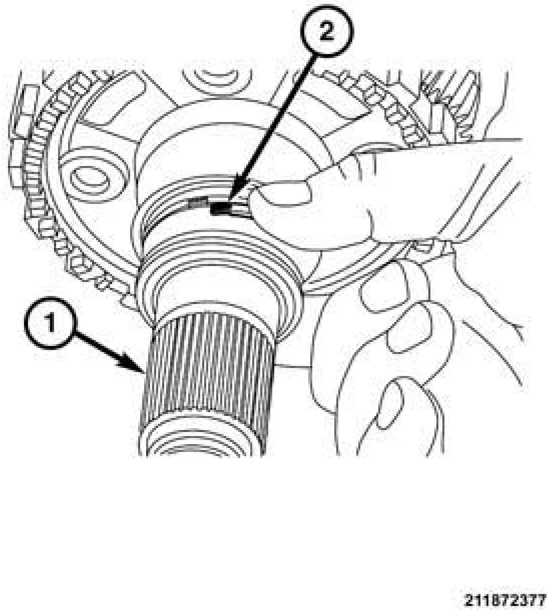


Fig. 221: D-Clutch Carrier Seal Rings
Courtesy of CHRYSLER GROUP, LLC

CLUTCH, E

DISASSEMBLY

CLUTCH E DISASSEMBLY

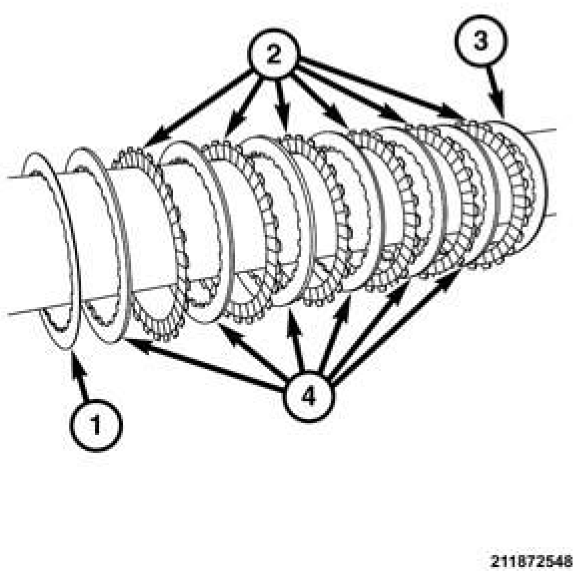


Fig. 222: Wave, Friction, Backing & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate
2. Friction plate
3. Backing plate
4. Steel plate

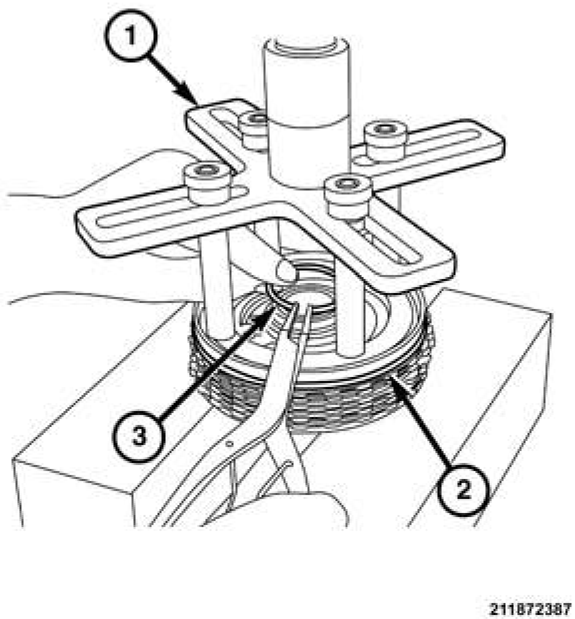


Fig. 223: E-Clutch & Pressing Tool
Courtesy of CHRYSLER GROUP, LLC

1. Place E-clutch (2) in a suitable press.
2. Using Pressing Tool 8901A (special tool #8901A, Pressing Tool) (1) compress the E-clutch piston enough to remove the snap ring (3).

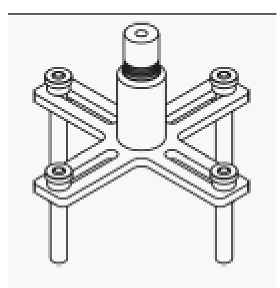
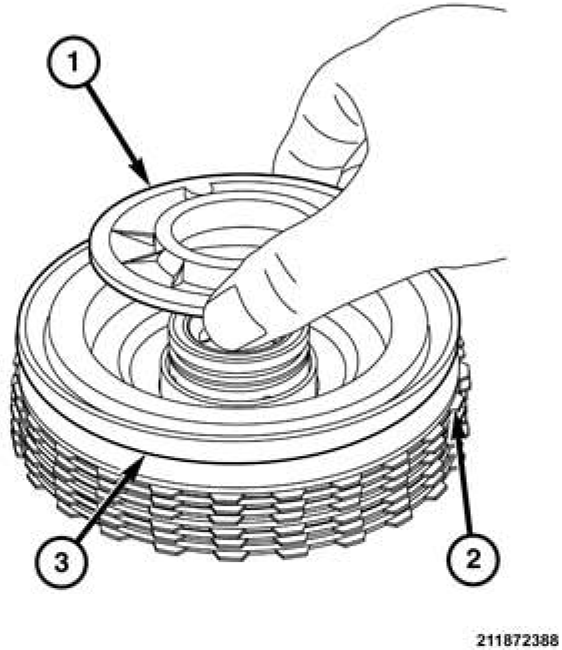
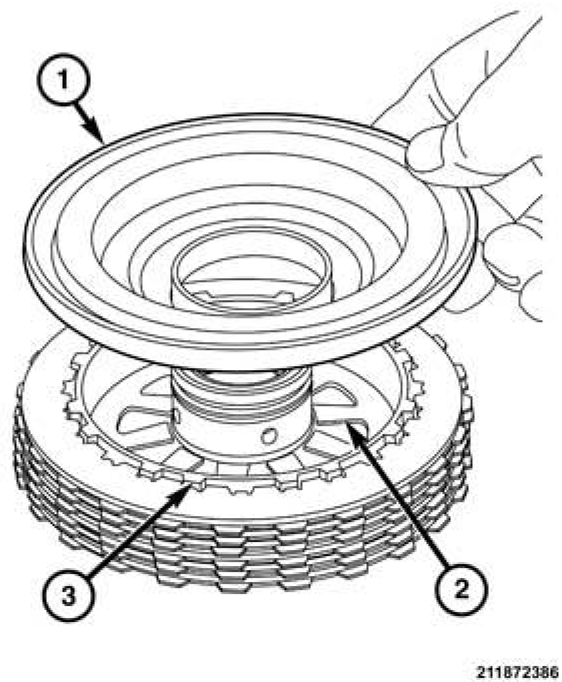


Fig. 224: Cross Bar Tool
Courtesy of CHRYSLER GROUP, LLC



[**Fig. 225: E-Clutch Piston Support**]
Courtesy of CHRYSLER GROUP, LLC

3. Remove the E-clutch piston support (1).



[**Fig. 226: E-Clutch Piston**]
Courtesy of CHRYSLER GROUP, LLC

4. Remove the E-clutch piston (1).

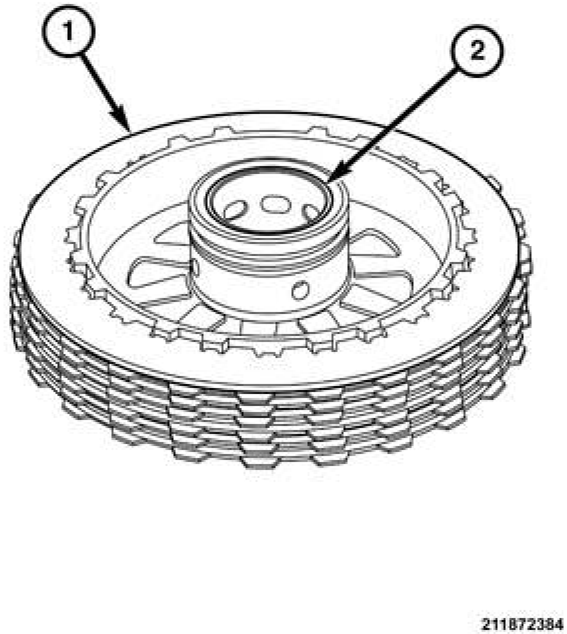


Fig. 227: E-Clutch Wave Washer
Courtesy of CHRYSLER GROUP, LLC

NOTE: Pay attention to the orientation of the plates.

5. Remove the wave washer (1), frictions and steels.

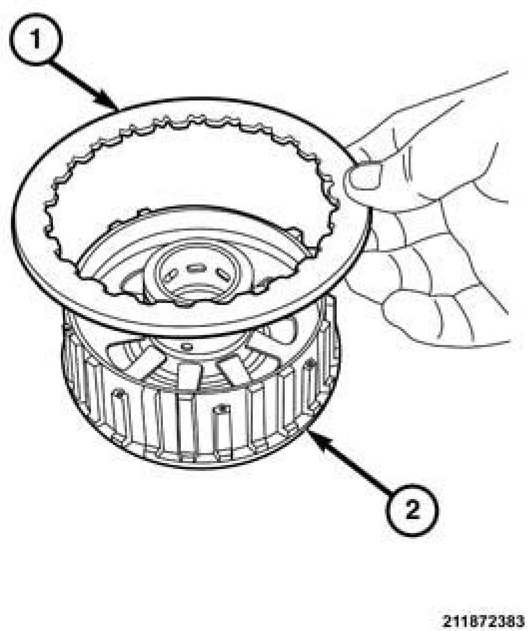
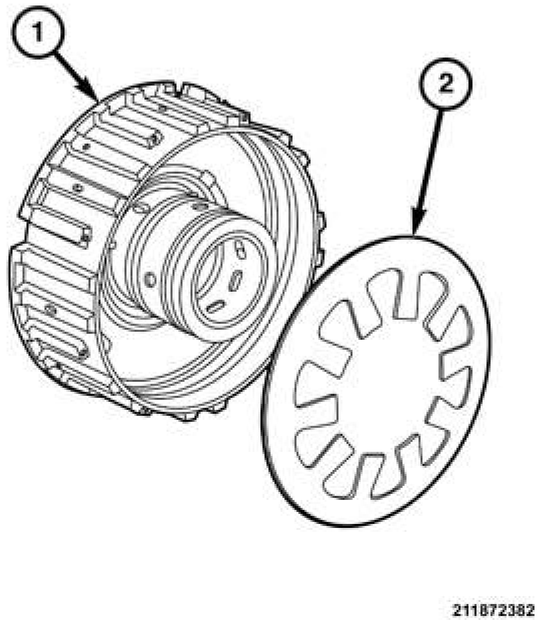


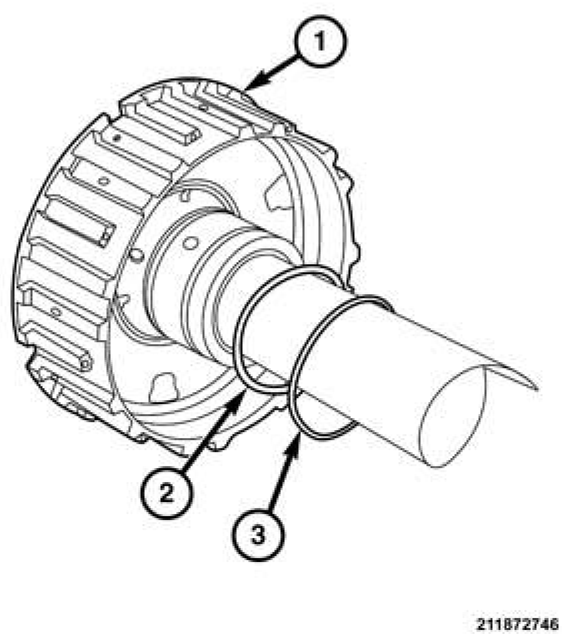
Fig. 228: E-Clutch Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

6. Remove the thrust plate (1) last.



[Fig. 229: Belleville Spring & E-Clutch Hub](#)
Courtesy of CHRYSLER GROUP, LLC

7. Remove the Belleville spring (2) from the E-clutch hub (1).



[Fig. 230: E-Clutch, Seal & O-Ring](#)
Courtesy of CHRYSLER GROUP, LLC

8. Remove the E-clutch (1) seal (2) and O-ring (3).

ASSEMBLY

CLUTCH E ASSEMBLY

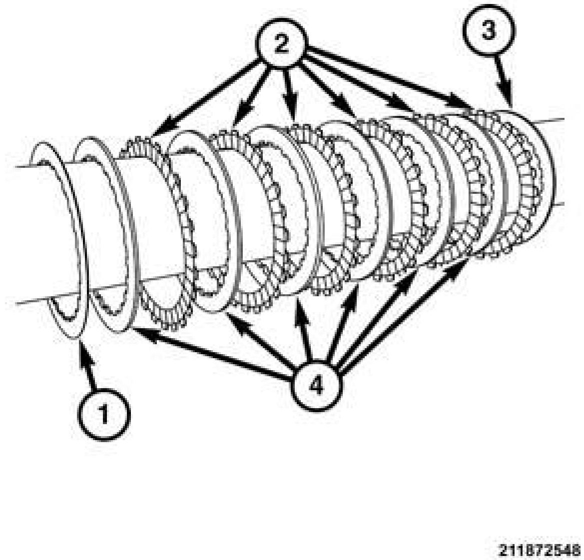


Fig. 231: Wave, Friction, Backing & Steel Plates
Courtesy of CHRYSLER GROUP, LLC

1. Wave plate
2. Friction plate
3. Backing plate
4. Steel plate

NOTE: **If clutch discs are being replaced, soak in 8HP trans fluid before assembly.**

1. Install the E-clutch (1) seal (2) and O-ring (3).

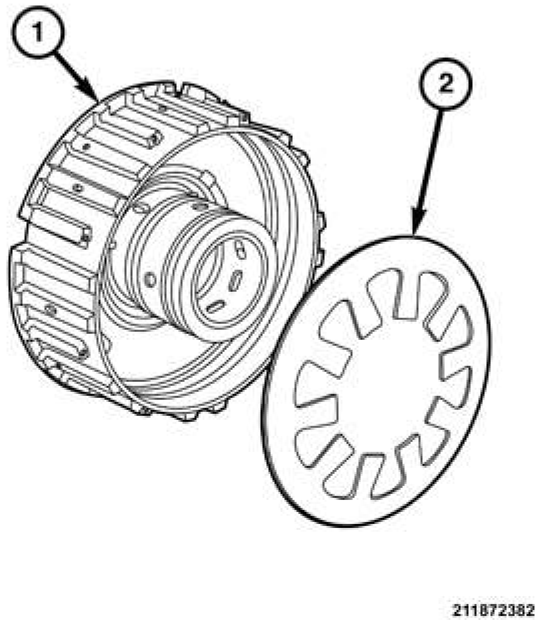


Fig. 232: Belleville Spring & E-Clutch Hub
Courtesy of CHRYSLER GROUP, LLC

2. Install the Belleville (2) spring into the E-clutch hub (1).

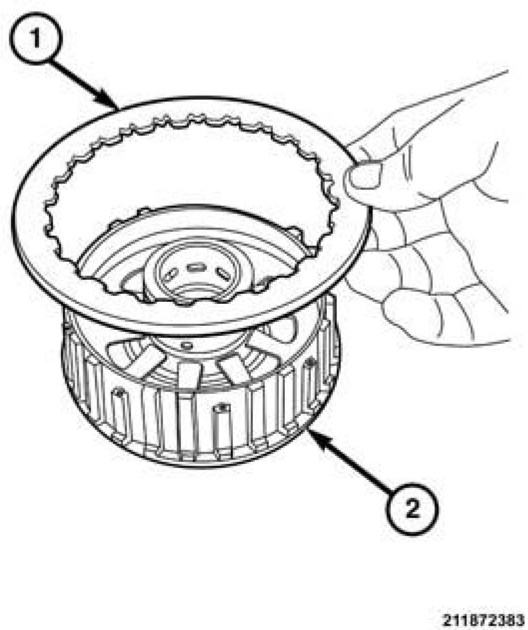


Fig. 233: E-Clutch Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

3. Install the clutch pack thrust plate (1).

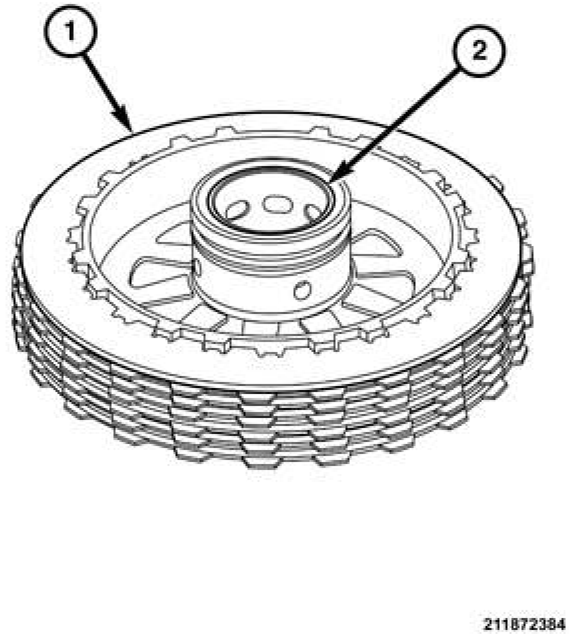


Fig. 234: E-Clutch Wave Washer
Courtesy of CHRYSLER GROUP, LLC

4. Install the clutch pack frictions and steels (1).

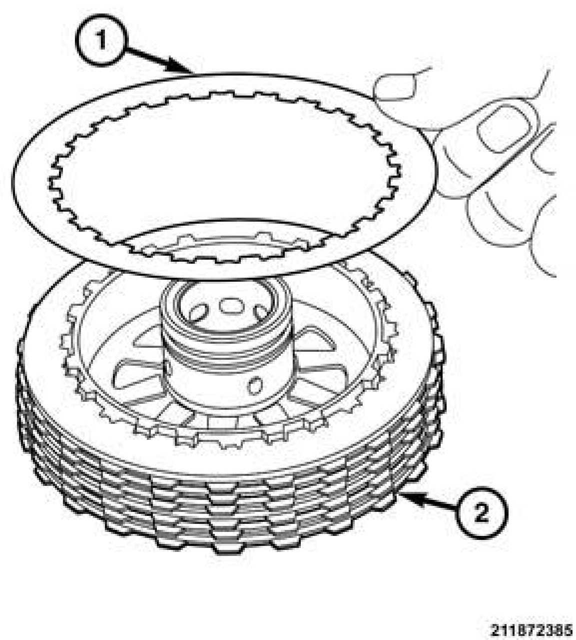


Fig. 235: E-Clutch Wave Washer
Courtesy of CHRYSLER GROUP, LLC

5. Install the wave washer (1) last.

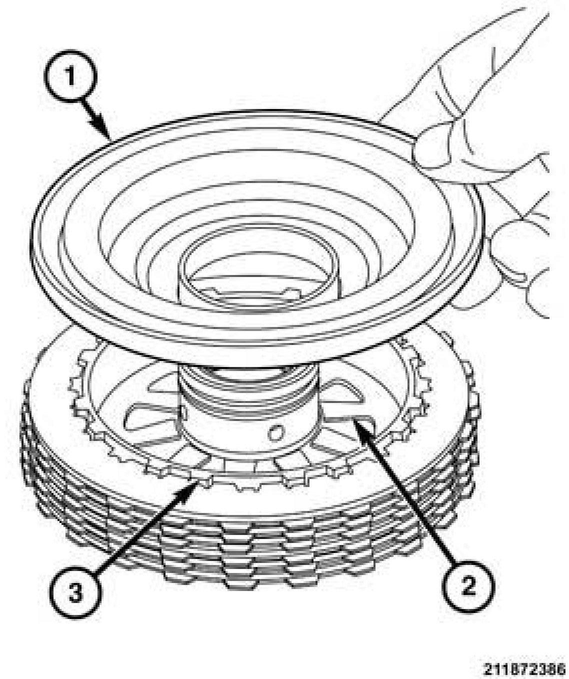


Fig. 236: E-Clutch Piston
Courtesy of CHRYSLER GROUP, LLC

6. Install the E-clutch piston (1) onto the hub.

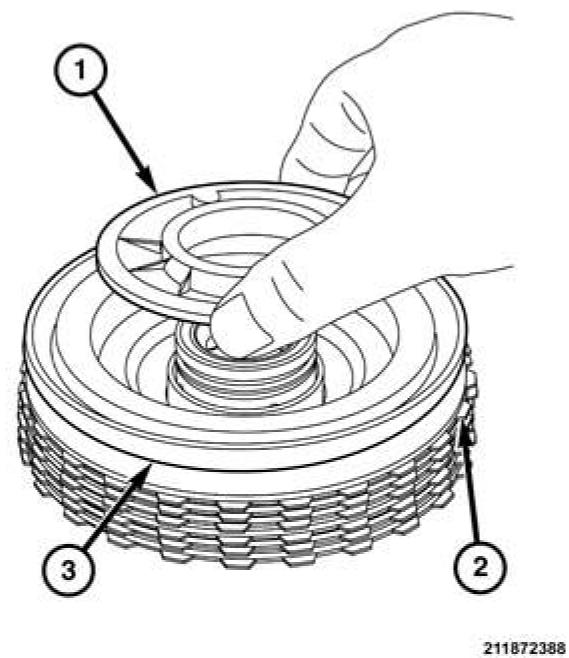


Fig. 237: E-Clutch Piston Support
Courtesy of CHRYSLER GROUP, LLC

7. Install the E-clutch piston support (1).

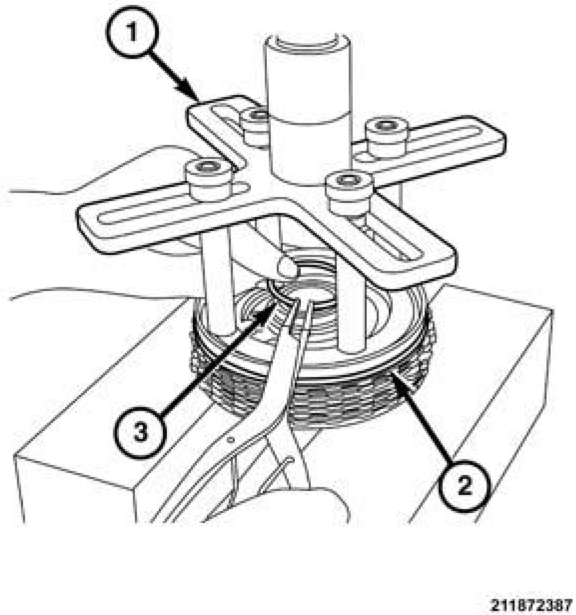


Fig. 238: E-Clutch & Pressing Tool
Courtesy of CHRYSLER GROUP, LLC

8. Place the E-clutch in a suitable arbor press.
9. Using Pressing Tool 8901A (special tool #8901A, Pressing Tool) compress the E-clutch enough to install the snap ring.

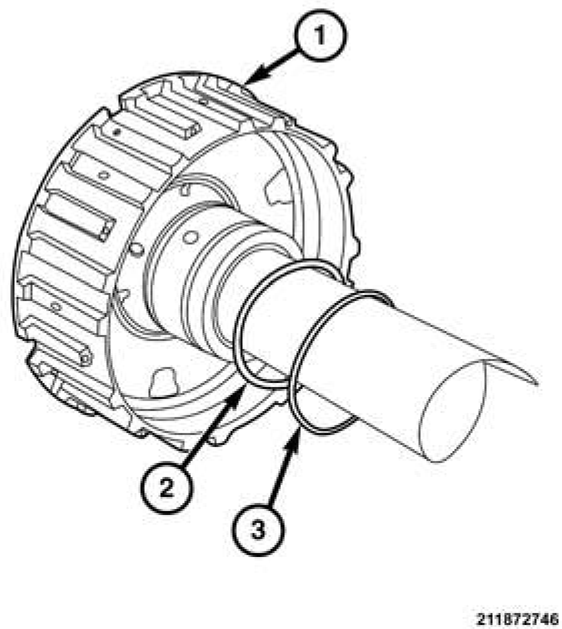


Fig. 239: E-Clutch, Seal & O-Ring
Courtesy of CHRYSLER GROUP, LLC

FLUID AND FILTER

DESCRIPTION

DESCRIPTION

FILTER SERVICE

The 8HP has a conventional fluid sump design, however, the filter is integrated into the oil pan resulting in a lower profile for improved vehicle packaging. The oil pan gasket is reusable providing it is not damaged during removal.

STANDARD PROCEDURE

STANDARD PROCEDURE - CHECK OIL LEVEL

To properly check and fill the transmission, perform the following procedure:

WARNING: **There is a risk of accident from vehicle moving when the engine is running. Secure vehicle to prevent it from moving. There is a risk of injury from contusions and burns if you insert your hands into the engine when it is running. Do not touch hot or rotating parts. Wear properly fitted work clothes.**

CAUTION: **A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid, see FLUIDS, LUBRICANTS AND GENUINE PARTS located in owners manual.**

NOTE: **Oil dye is not required to find leaks in the 8HP transmission. The oil dye can cause shift quality issues and is not recommended. The 8HP fluid has illuminance that is visible under a black light.**

1. Raise and support the vehicle **on a level hoist** . Refer to **HOISTING, STANDARD PROCEDURE** .
2. Start the engine. The engine must continue to run for the entire test.
3. Using a scan tool or the vehicle information center, verify that the transmission fluid temperature is below 30Â°C (86Â°F).
4. Remove the transmission fill plug from the right rear of the transmission case.
5. Add transmission fluid until it trickles from the fill opening.
6. Install the transmission fill plug and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
7. Lower the vehicle for access to inside of the vehicle, leaving the tires at least 8 inches off the ground.
8. With the brakes applied, place the transmission in Reverse and hold for 5 seconds.
9. Place the transmission in Drive and hold for 5 seconds.
10. Release the brakes, slowly accelerate to 2nd gear and hold for 5 seconds.
11. Apply the brakes and place the transmission in Neutral.
12. Raise the engine speed to 2000 RPM for 5 seconds.
13. Return the engine to idle and place the transmission in Park.

NOTE: **A full transmission will have fluid at the fill hole with the transmission**

between 30Ā°C (86Ā°F) and 50Ā°C (122Ā°F). Do not over fill.

14. Remove the transmission fill plug and allow excess fluid to drain from fill hole or add fluid as necessary.
15. Install the transmission fill plug and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
16. Using a scan tool, clear any DTCs.

STANDARD PROCEDURE - TRANSMISSION FILL AFTER SERVICE

CAUTION: **A unique transmission fluid has been developed for this transmission. This fluid is NOT compatible with ATF+4 or any other current Chrysler transmission fluid. For specifics about this unique fluid, see FLUIDS, LUBRICANTS AND GENUINE PARTS located in owners manual.**

NOTE: **Tracer dye is not required to find leaks in the 8HP45 transmission.**

Tracer dye cannot be used in 8HP45 transmissions, poor shift quality will result.

The 8HP45 fluid has illuminance that is visible under a black light.

To Properly Fill The Transmission After An In Vehicle Service Or Overhaul, Perform The Following Procedure:

- If only the transmission cooler was replaced, add 0.7L (0.72 qt.) of transmission fluid.
- **If the transmission was overhauled (torque converter empty)** , prior to installing it in the vehicle, tip the transmission on its side, remove the oil fill plug on the right rear side of the case and install 9L (9.5 qts) of transmission fluid. Install the fill plug. After installing the transmission, perform the CHECK OIL LEVEL procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
- **If an in vehicle service was performed** , raise the vehicle on a suitable hoist with the vehicle level in all planes. Refer to **HOISTING, STANDARD PROCEDURE** . With the engine off, remove the fill plug and fill until fluid starts flowing back out of the fill hole (approximately 4 quarts). Start the engine and with the transmission still **COLD** add fluid until fluid starts flowing back out of the fill hole. Install Fill Plug and then perform the CHECK OIL LEVEL procedure Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

STANDARD PROCEDURE - FLUID/FILTER SERVICE

NOTE: **Oil dye is not required to find leaks in the 8HP45 transmission. The oil dye can cause shift quality issues and is not recommended. The 8HP45 fluid has illuminance that is visible under a black light.**

NOTE: **The oil pan and filter are an integrated assembly that cannot be serviced separately.**

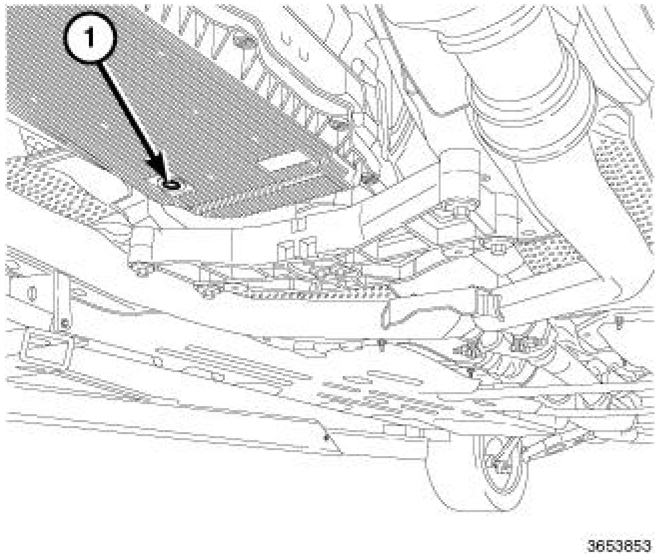


Fig. 240: Transmission Oil Pan Plug
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the transmission drain plug and allow the transmission to drain.

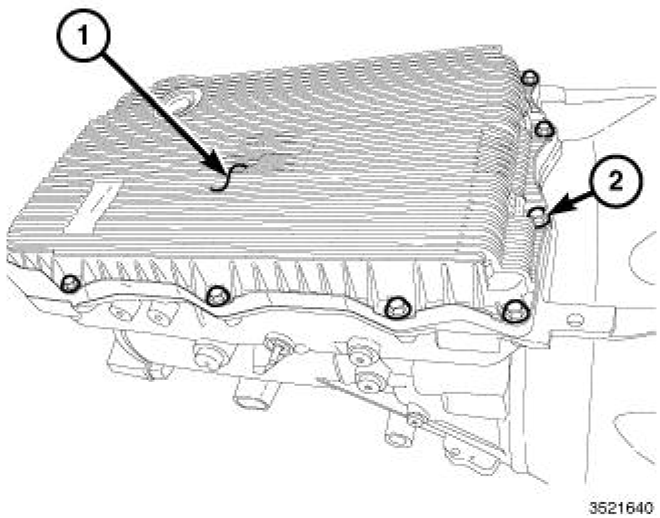
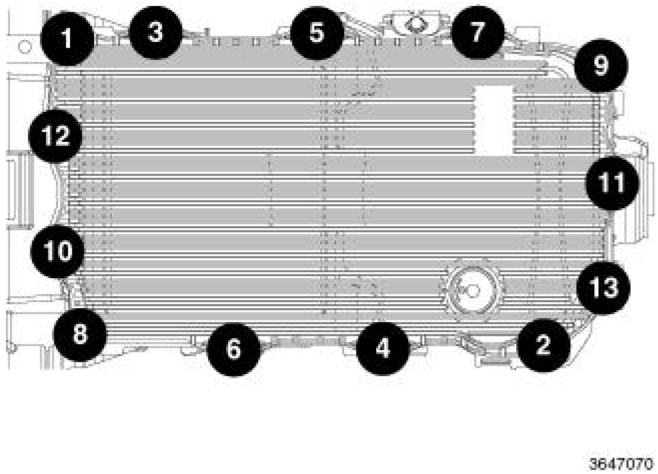


Fig. 241: Thirteen Oil Pan Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

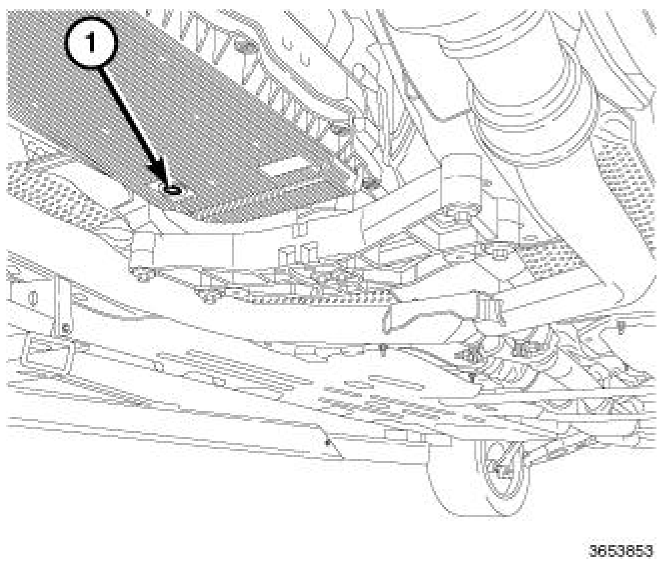
NOTE: Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.

3. Remove the 13 transmission oil pan bolts (2).
4. Remove the transmission oil pan (1) and gasket. If the transmission oil pan is being removed for contamination concerns discard the pan.
5. Install the **NEW** transmission oil pan (1) and gasket.



[Fig. 242: Oil Pan Retaining Bolts Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

6. Install the 13 transmission oil pan bolts and tighten to 10 N.m (89 in. lbs.) using the sequence given.



[Fig. 243: Transmission Oil Pan Plug]
Courtesy of CHRYSLER GROUP, LLC

7. Inspect and adjust the fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
8. Lower the vehicle.

LEVER, MANUAL PARK RELEASE

REMOVAL

REMOVAL

1. Remove the shifter bezel storage bin liner.
2. Remove the Manual Park Release (MPR) lever bolts.

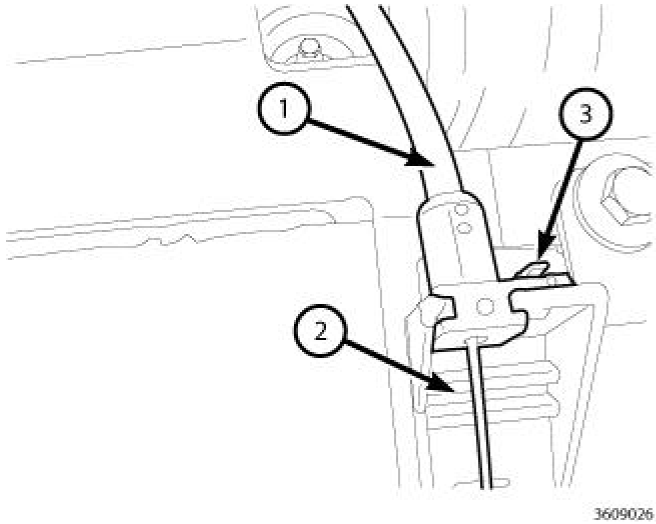


Fig. 244: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the MPR cable (1) from the housing (2), while holding the release tab (3) open.
4. Remove the MPR cable (1) from the MPR lever and remove the MPR lever from the vehicle.

INSTALLATION

INSTALLATION

1. Connect the Manual Park Release (MPR) cable to the MPR lever.
2. Install the MPR lever bolts and tighten to the proper specification. Refer to **SPECIFICATIONS**.

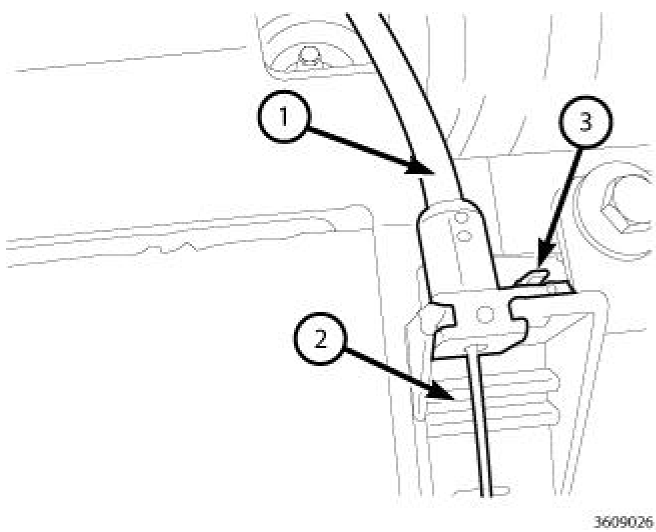


Fig. 245: Cable, Housing & Release Tab
Courtesy of CHRYSLER GROUP, LLC

3. Connect the MPR cable (1) to the housing (2) and make sure the locking tab (3) is locked.
4. Install the shifter bezel storage bin liner.

PUMP, TRANSMISSION OIL

DESCRIPTION

DESCRIPTION

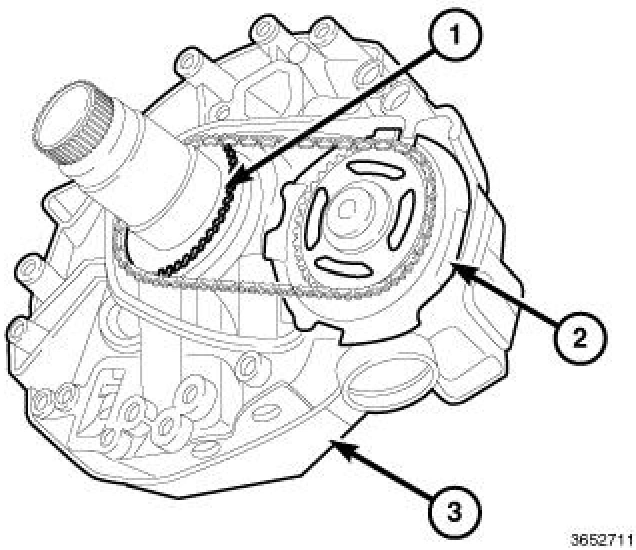


Fig. 246: Transmission Oil Pump, Chain And Sprocket & Oil Pump Housing
Courtesy of CHRYSLER GROUP, LLC

The transmission oil pump (2) is driven by a chain and sprocket (1). The oil pump is located just behind the torque converter, inside of the pump housing (3). The pump is a double-stroke vane pump. The pump has dual chambers, two inlet and two outlet ports. The pump provides necessary lubrication and cooling throughout all phases of transmission operation.

OPERATION

OPERATION

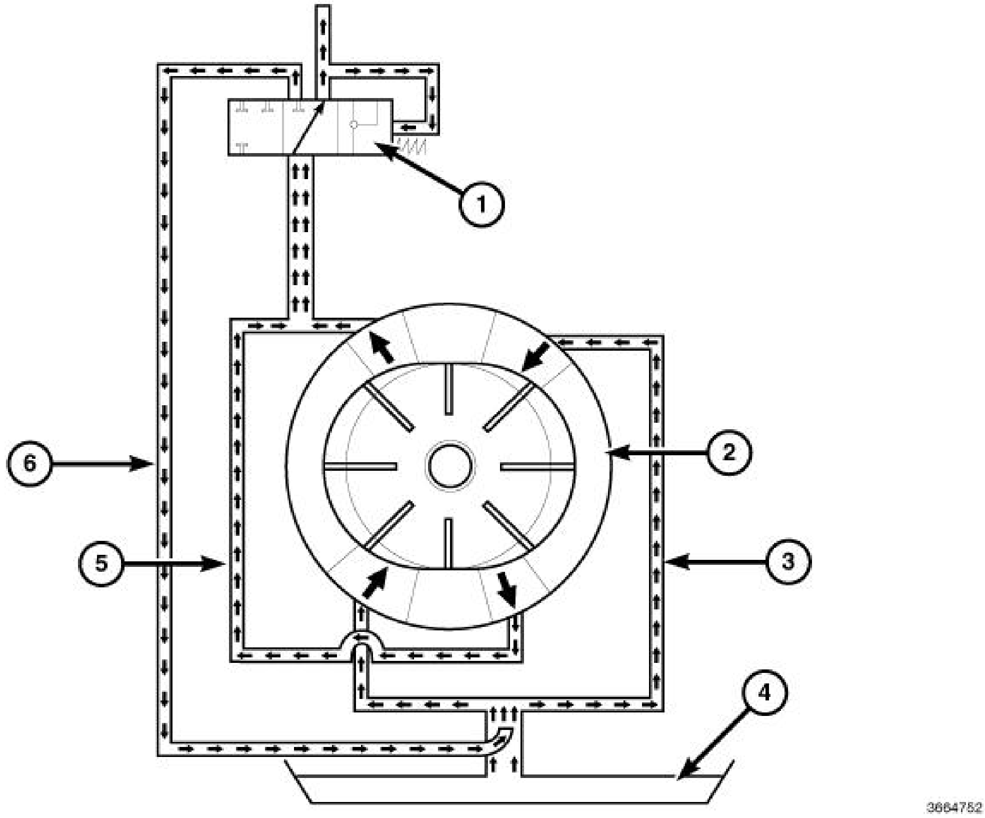


Fig. 247: Transmission Oil Pump Flow Diagram
Courtesy of CHRYSLER GROUP, LLC

1- SYSTEM PRESSURE VALVE	4 - SUMP
2 - PUMP	5 - PRESSURE PIPE
3 - INTAKE PIPE	6 - RETURN OF REDUNDANT OIL

The transmission oil pump is driven by a chain and sprocket. The oil pump has two intake ports and two exhaust ports. The pump draws fluid through a filter and pressurizes the fluid as the pump rotates. After the fluid is pressurized, it exits the pump through two exhaust ports that feed the system pressure valve. The system pressure valve maintains fluid pressure and allows excess pressure to return to the pump. This reduces cavitation and noise.

REMOVAL

TRANSMISSION OIL PUMP

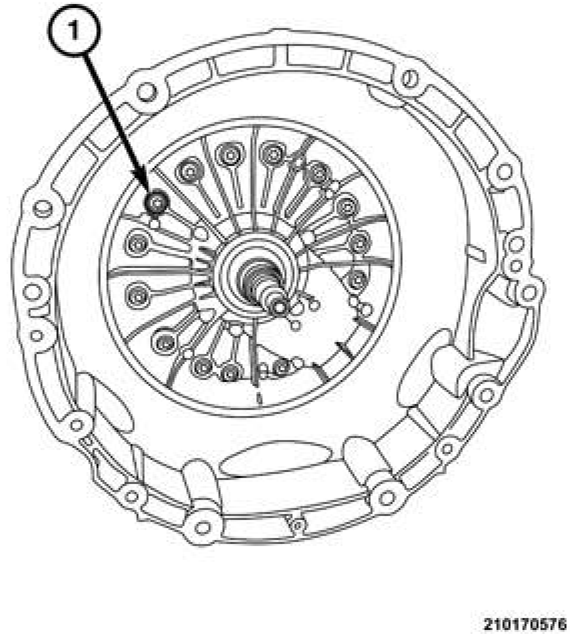


Fig. 248: Oil Pump Assembly To Case Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transmission. Refer to **REMOVAL**.
2. Remove the valve body. Refer to **VALVE BODY, REMOVAL**.
3. Remove the 13 oil pump assembly to case bolts (1).

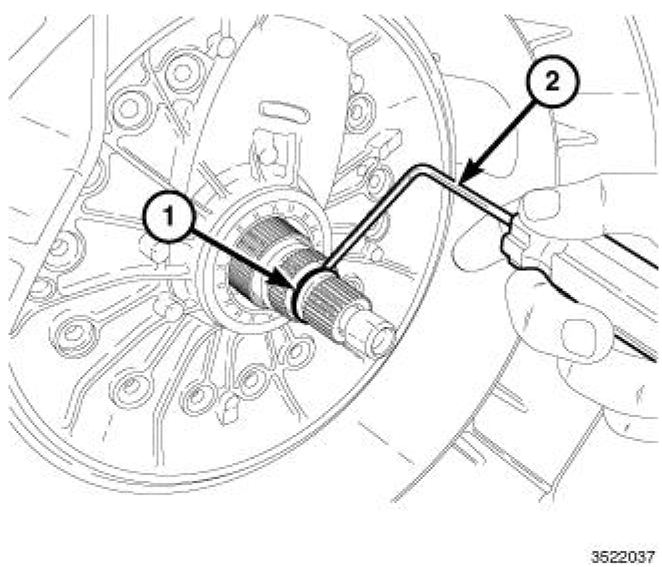


Fig. 249: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

4. Remove the input shaft O-ring (1) using a small pick (2) or equivalent and discard.

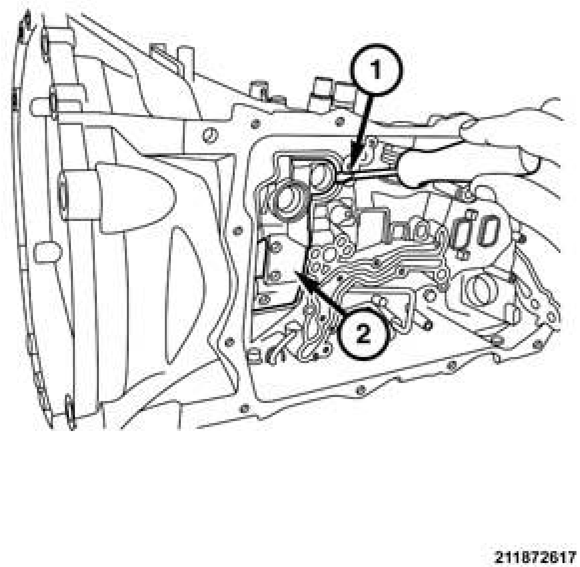


Fig. 250: Prying Oil Pump Housing Away From Case
Courtesy of CHRYSLER GROUP, LLC

5. Carefully pry the oil pump housing (1) away from the case (2) with a small flat blade screwdriver or equivalent through the case opening.
6. From the front of the transmission, remove the oil pump housing.

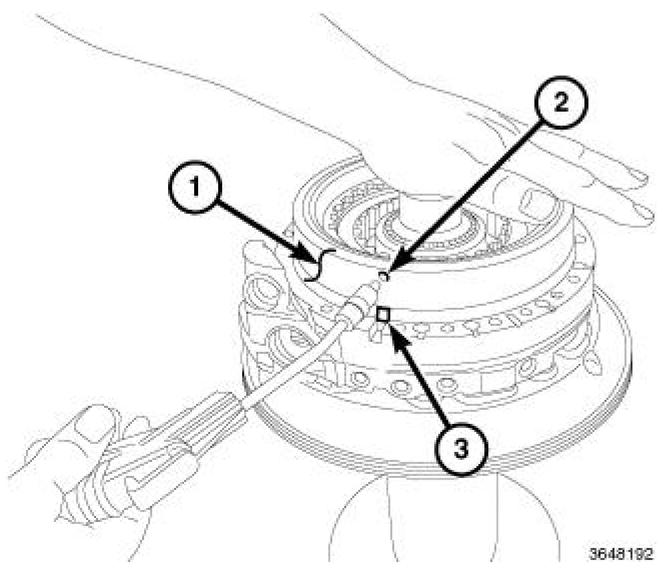
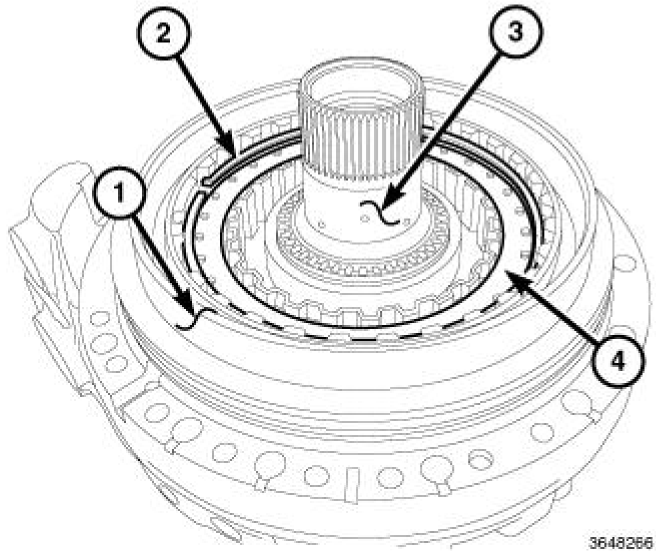


Fig. 251: B-Piston, Hole & B-Piston Alignment Tab
Courtesy of CHRYSLER GROUP, LLC

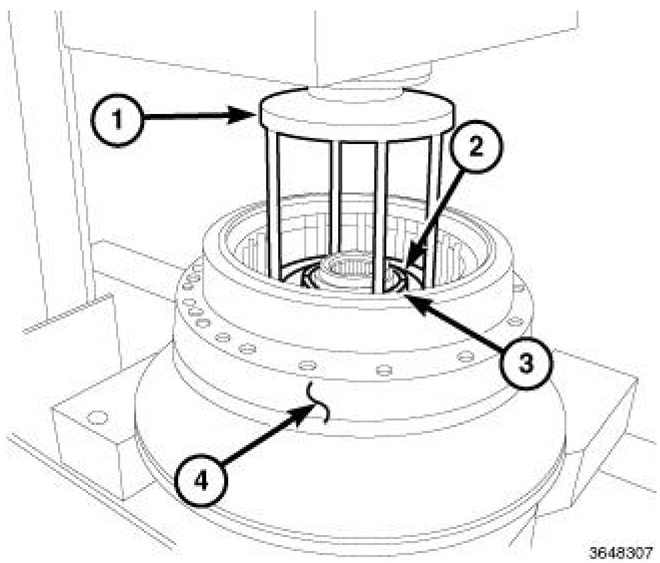
NOTE: **Apply air pressure slowly, oil may spray when B-piston releases from the assembly.**

7. With one hand above B-piston (1), carefully apply air pressure into the hole directly above the B-piston alignment tab (3) to remove B-piston (2) from the assembly.



[Fig. 252: Outer Ring, Snap Ring, Hub & Spacers](#)
Courtesy of CHRYSLER GROUP, LLC

8. Remove the outer ring (1) (inside B-piston).
9. Remove the snap ring (2).
10. Remove the clutches and spacers (4).
11. Remove the hub (3).



[Fig. 253: Oil Pump Housing Assembly](#)
Courtesy of CHRYSLER GROUP, LLC

12. Position the oil pump housing assembly (4) in a suitable press.
13. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer to remove tension on the split retaining ring (2), and remove the two halves of the retaining ring (2).

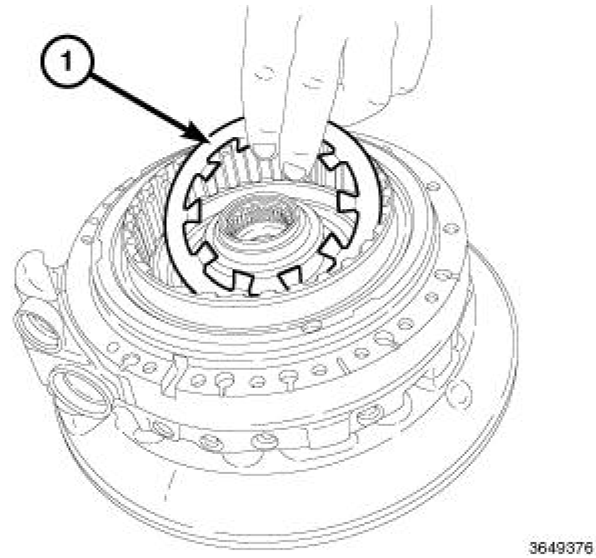


Fig. 254: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

14. Remove the piston retainer and plate.

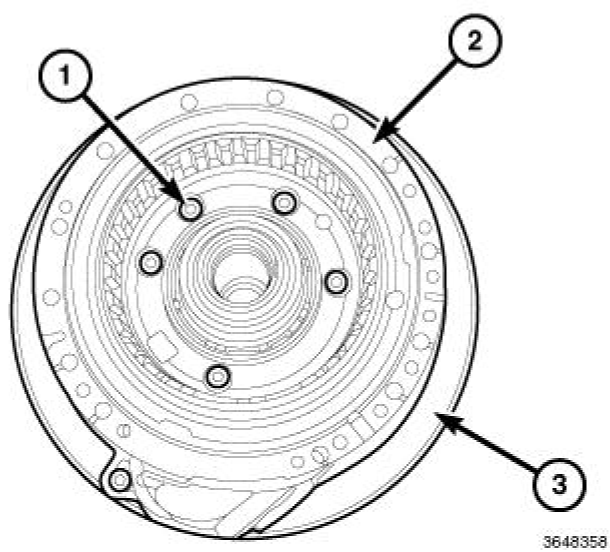


Fig. 255: Six Bolts, Oil Pump Housing & Oil Pump Cover
Courtesy of CHRYSLER GROUP, LLC

15. Remove the six bolts (1) and separate the oil pump housing (2) from the front oil pump cover (3).

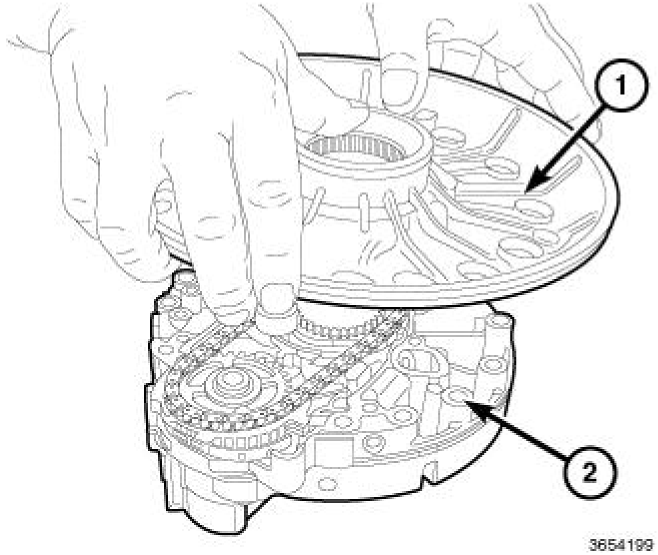


Fig. 256: Front Cover & Oil Pump Housing
Courtesy of CHRYSLER GROUP, LLC

16. Separate the front cover (1) from the oil pump housing (2).

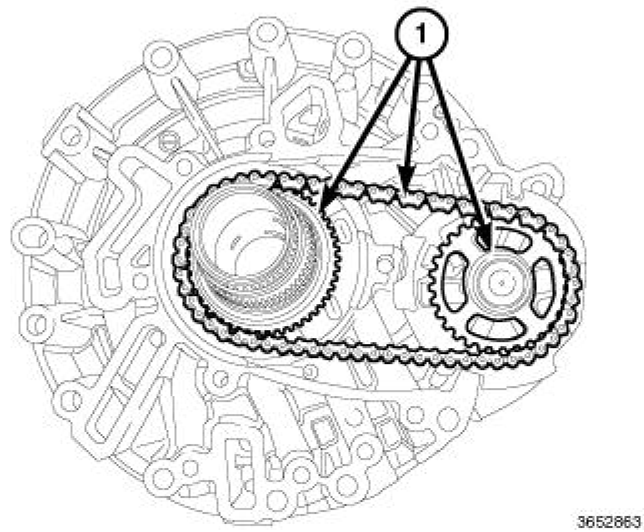


Fig. 257: Drive Sprocket, Chain And Pump Body
Courtesy of CHRYSLER GROUP, LLC

17. Remove the drive sprocket, chain and pump body (1) as an assembly.
18. Remove and discard all O-rings.

DISASSEMBLY

TRANSMISSION OIL PUMP

1. Remove the transmission oil pump. Refer to **PUMP, TRANSMISSION OIL, REMOVAL**.

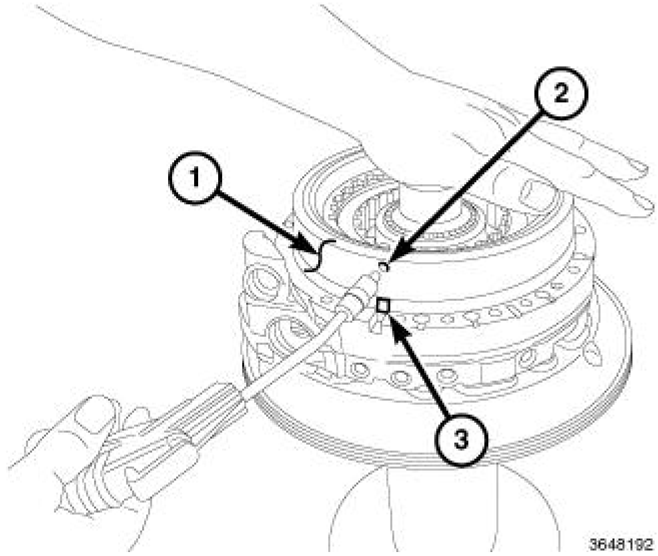


Fig. 258: B-Piston, Hole & B-Piston Alignment Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply air pressure slowly, oil may spray when B-piston releases from the assembly.**

2. With one hand above B-piston (1), carefully apply air pressure into the hole directly above the B-piston alignment tab (3) to remove B-piston (2) from the assembly.

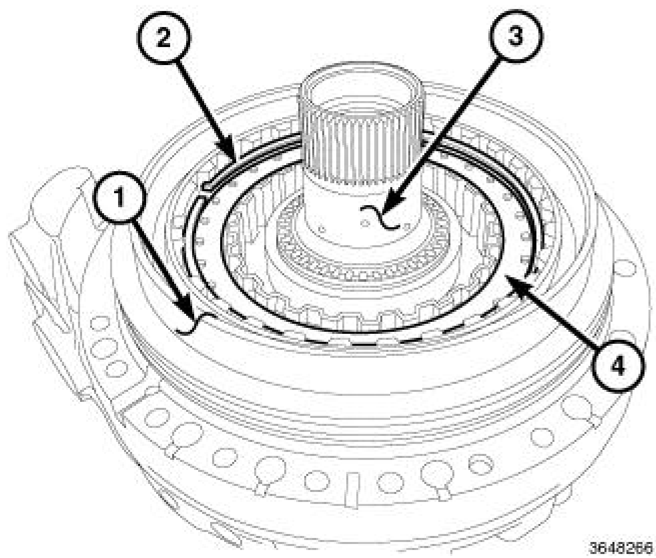


Fig. 259: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

3. Remove the outer ring (1) (inside B-piston).
4. Remove the snap ring (2).
5. Remove the clutches and spacers (4).
6. Remove the hub (3).

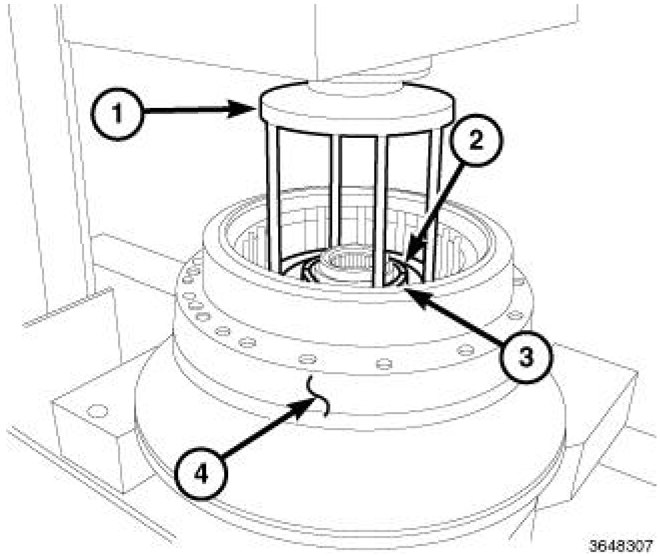


Fig. 260: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

7. Position the oil pump housing assembly (4) in a suitable press.
8. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer to remove tension on the split retaining ring (2), and remove the two halves of the retaining ring (2).

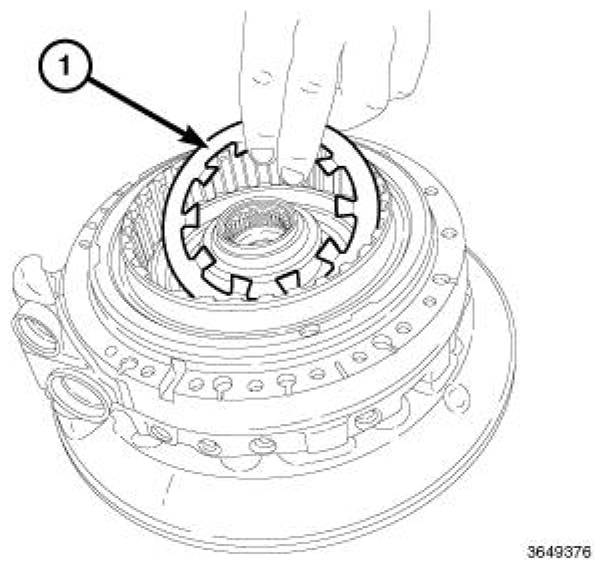


Fig. 261: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

9. Remove the piston retainer and plate.

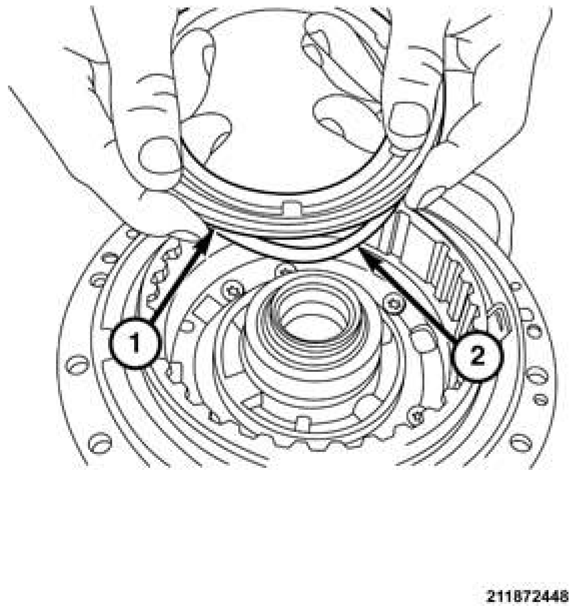


Fig. 262: A-Piston & Seal
Courtesy of CHRYSLER GROUP, LLC

10. Remove the A-piston (1) and seal (2) from the oil pump.

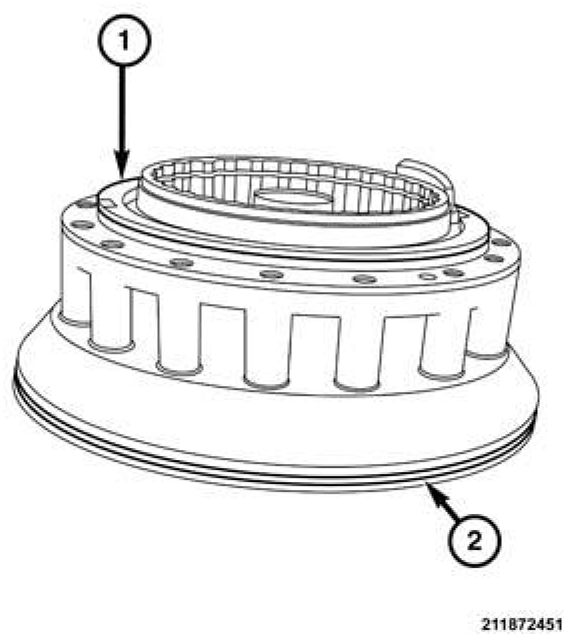


Fig. 263: Inner & Outer Oil Pump O-Rings
Courtesy of CHRYSLER GROUP, LLC

11. Remove the inner (1) and outer (2) oil pump O-rings.

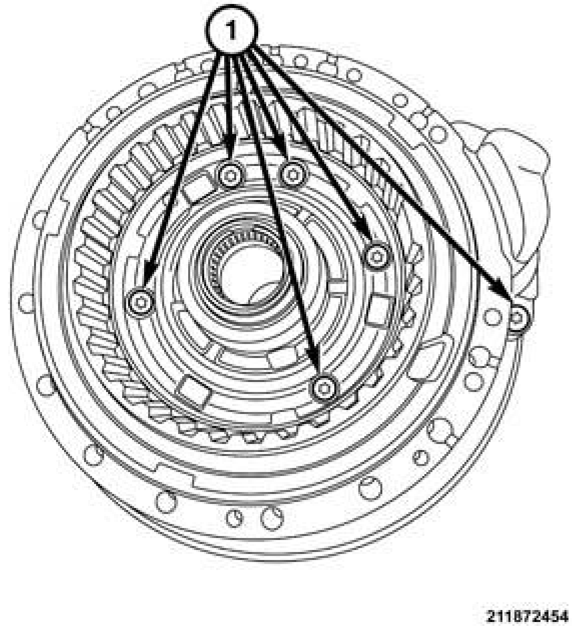


Fig. 264: Oil Pump TorxÂ® Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove the six TorxÂ® bolts (1) from the oil pump.

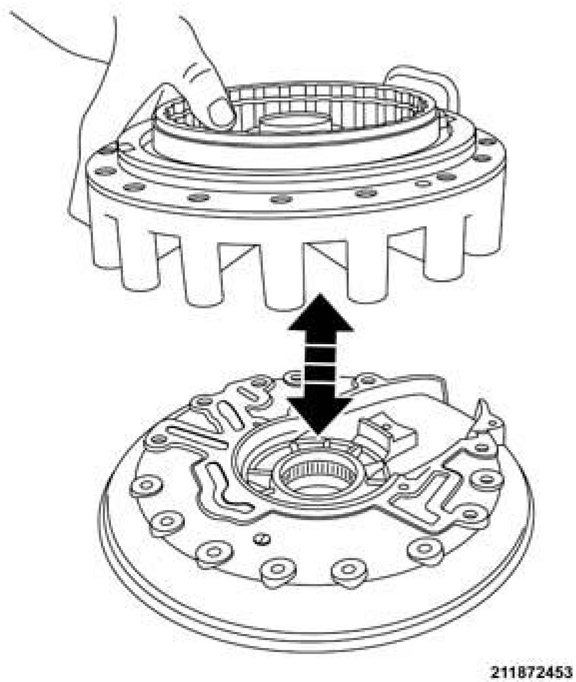


Fig. 265: Two Halves Of Oil Pump
Courtesy of CHRYSLER GROUP, LLC

13. Separate the two halves of the oil pump, by pushing on the hub.

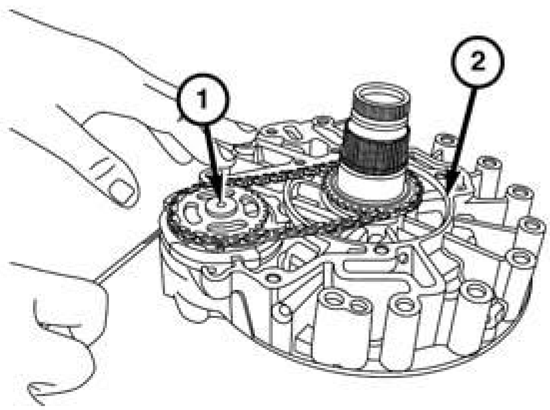


Fig. 266: Prying Up On Oil Pump & Separating It From The Housing
Courtesy of CHRYSLER GROUP, LLC

14. Carefully pry up on the oil pump (1), separating it from the housing (2).

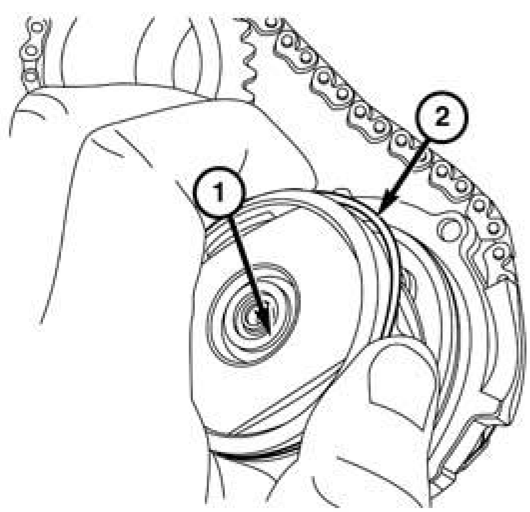


Fig. 267: Oil Pump Housing & O-Ring
Courtesy of CHRYSLER GROUP, LLC

15. Remove the oil pump O-ring (2).

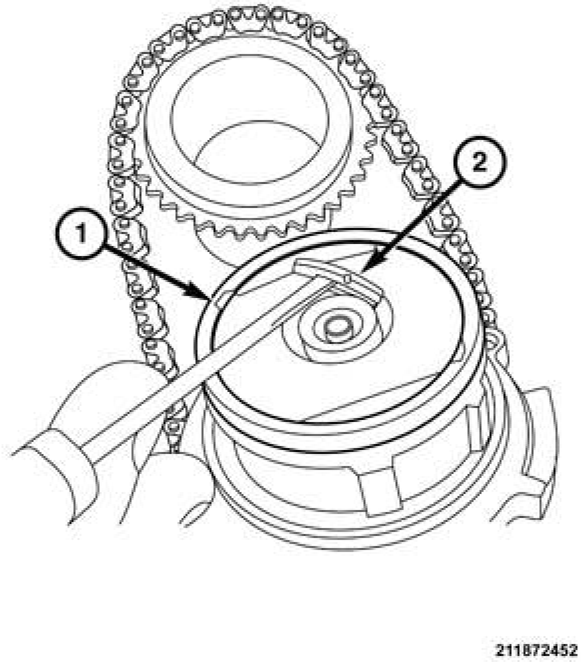


Fig. 268: Oil Pump Seal
Courtesy of CHRYSLER GROUP, LLC

16. Remove the oil pump seal (2).

ASSEMBLY

TRANSMISSION OIL PUMP

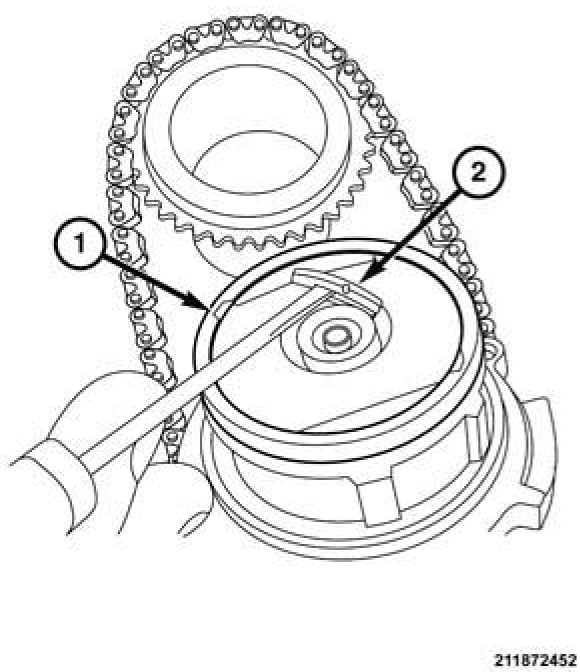


Fig. 269: Oil Pump Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install the transmission oil pump seal (2).

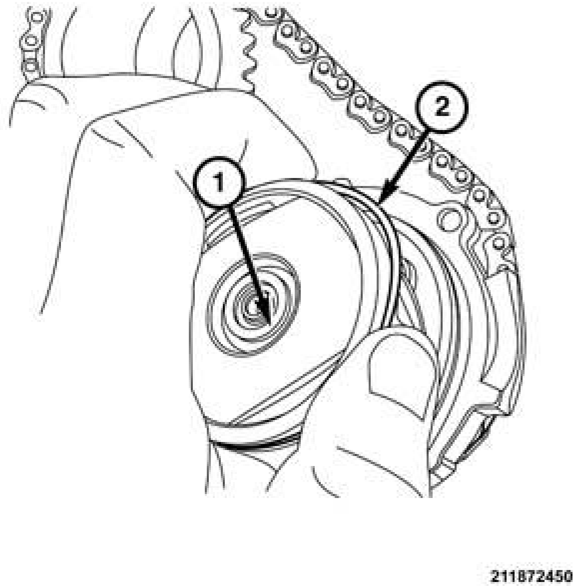


Fig. 270: Oil Pump Housing & O-Ring
Courtesy of CHRYSLER GROUP, LLC

2. Install the transmission oil pump O-ring (2).
3. Carefully seat the transmission oil pump into the housing, make sure the pump is seated properly.

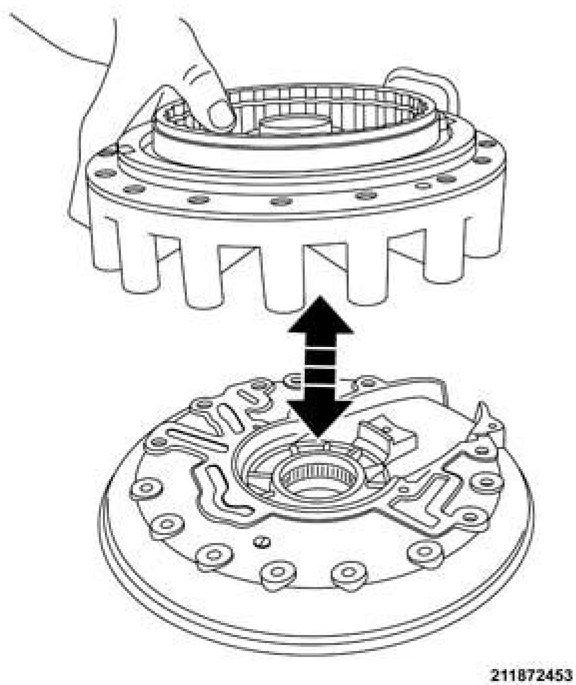


Fig. 271: Two Halves Of Oil Pump
Courtesy of CHRYSLER GROUP, LLC

4. Install the two transmission oil pump housing halves together.

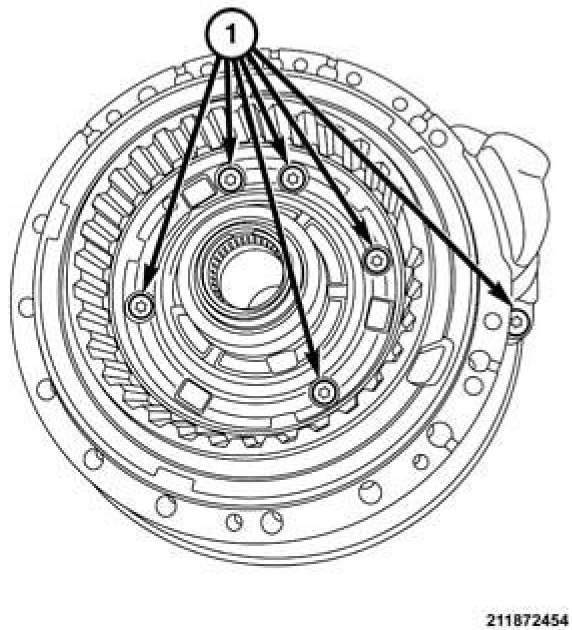


Fig. 272: Oil Pump TorxĀ® Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install six **NEW** transmission oil pump housing TorxĀ® bolts (1).
6. Tighten the bolts to 5 N.m (44 in. lbs). plus 45Ā°.

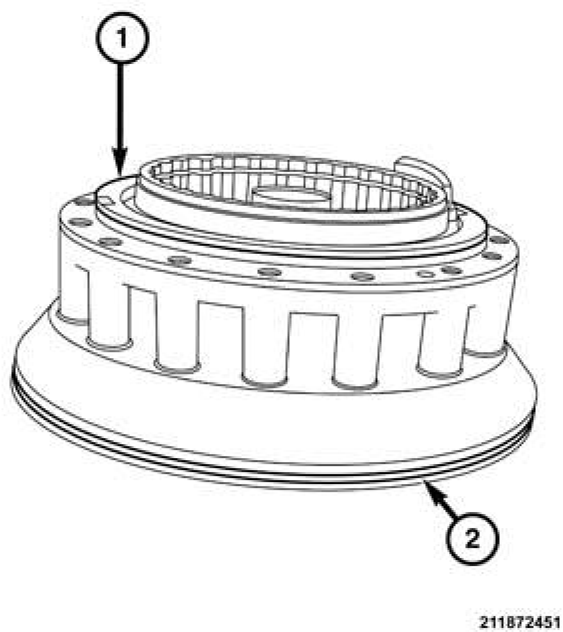
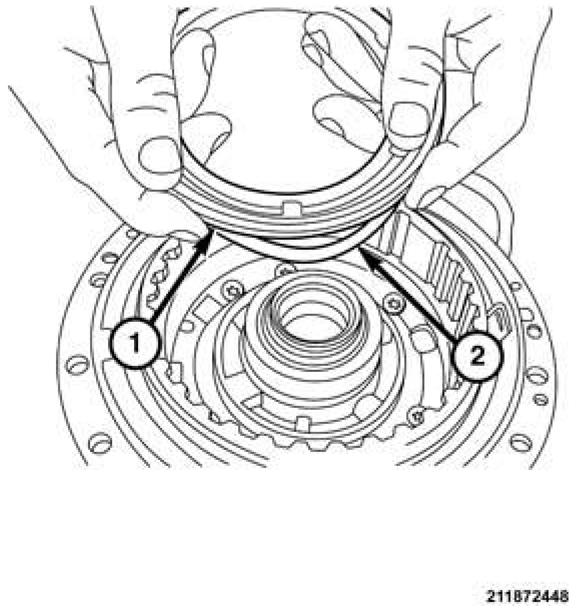


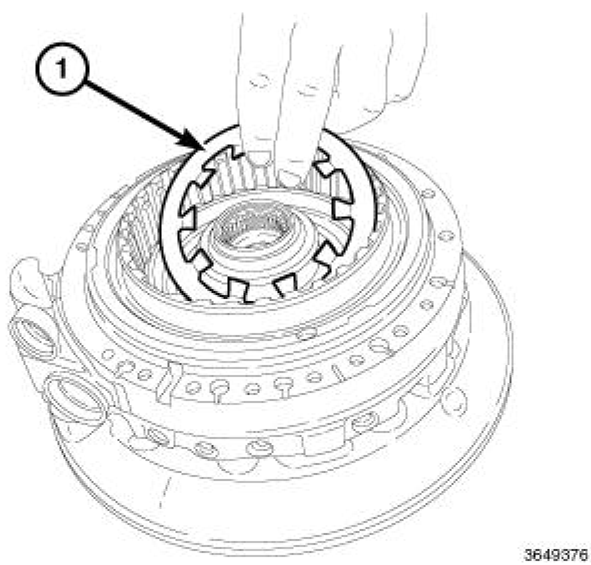
Fig. 273: Inner & Outer Oil Pump O-Rings
Courtesy of CHRYSLER GROUP, LLC

7. Replace the inner and outer transmission oil pump housing O-rings (1).



[Fig. 274: A-Piston & Seal](#)
Courtesy of CHRYSLER GROUP, LLC

8. Replace the A- piston seal (2) and install the A-piston (1).



[Fig. 275: Piston Retaining Ring And Piston](#)
Courtesy of CHRYSLER GROUP, LLC

9. Install the Belleville spring (1).

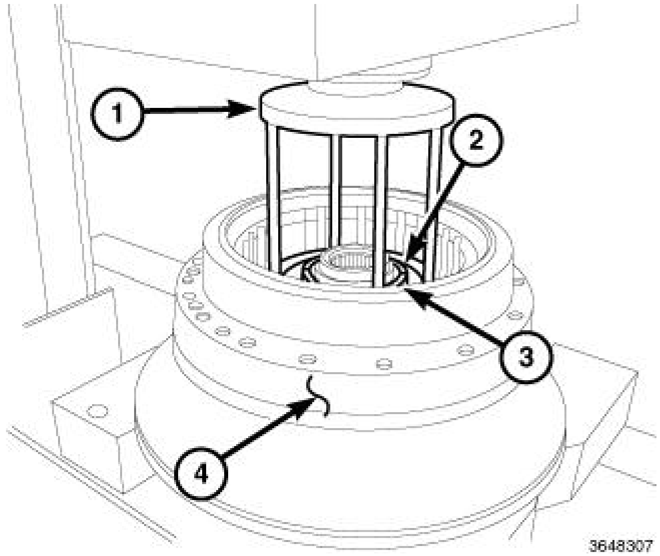


Fig. 276: Oil Pump Housing Assembly
Courtesy of CHRYSLER GROUP, LLC

10. Position the transmission oil pump housing assembly (4) in a suitable arbor press.
11. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retaining ring to remove tension, and install the two halves of the split retainer ring (2).

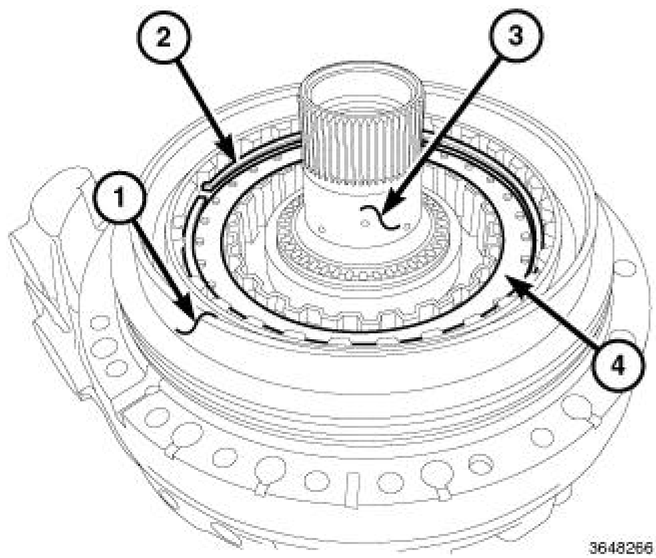


Fig. 277: Outer Ring, Snap Ring, Hub & Spacers
Courtesy of CHRYSLER GROUP, LLC

12. Install the hub (3).
13. Install the clutches and spacers (4).
14. Install the snap ring (2).
15. Install the outer ring (1) (below B-piston).

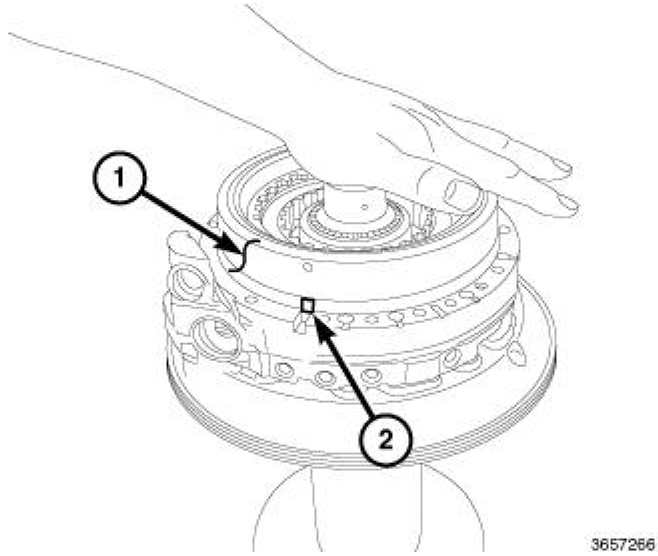


Fig. 278: B-Piston Alignment Tab & B-Piston
Courtesy of CHRYSLER GROUP, LLC

16. Position the B-piston alignment tab (2) above the notch and install B-piston (1) on the assembly.
17. Install the transmission oil pump. Refer to **PUMP, TRANSMISSION OIL, INSTALLATION**.

INSTALLATION

TRANSMISSION OIL PUMP

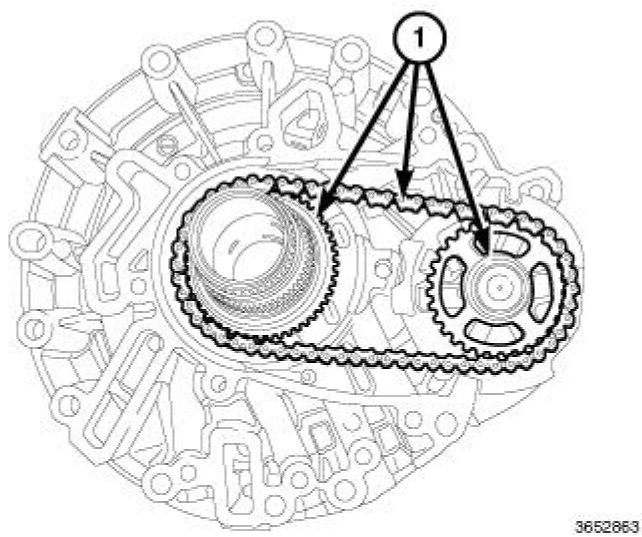


Fig. 279: Drive Sprocket, Chain And Pump Body
Courtesy of CHRYSLER GROUP, LLC

1. Install the drive sprocket, chain and pump body (1) as an assembly into the oil pump housing.

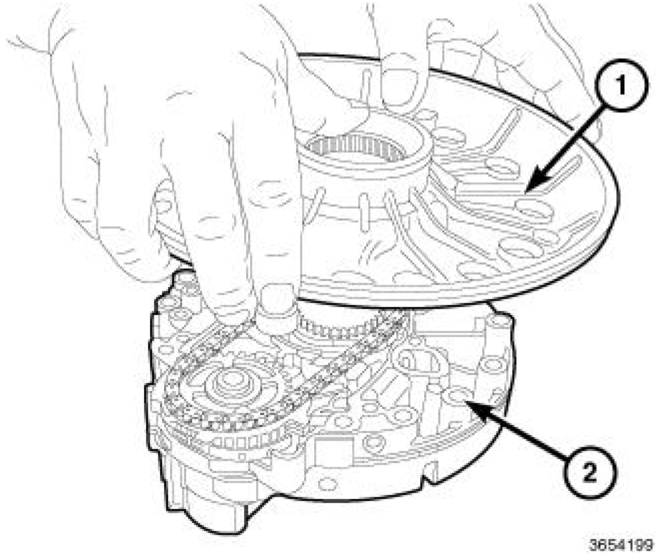


Fig. 280: Front Cover & Oil Pump Housing
Courtesy of CHRYSLER GROUP, LLC

2. Set the transmission oil pump cover (1) onto the transmission oil pump housing (2), install the five transmission oil pump housing to cover bolts and tighten to 5 N.m (44 in. lbs.) plus 45Ā°.

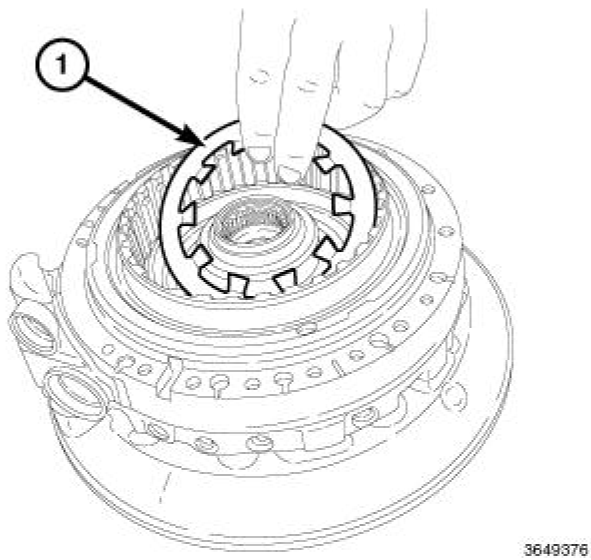
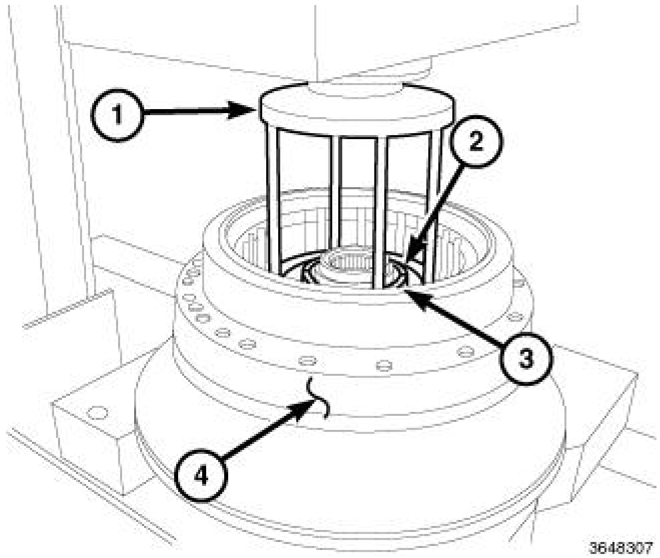


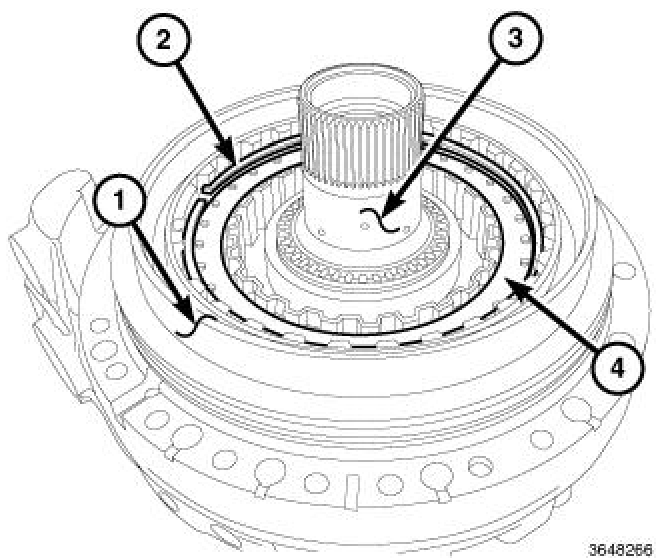
Fig. 281: Piston Retaining Ring And Piston
Courtesy of CHRYSLER GROUP, LLC

3. Install the piston plate and the piston retainer.



[Fig. 282: Oil Pump Housing Assembly]
Courtesy of CHRYSLER GROUP, LLC

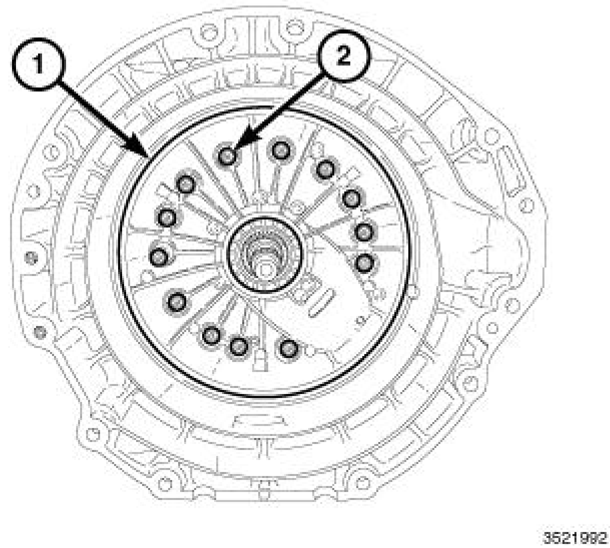
4. Position the transmission oil pump housing assembly (4) in a suitable arbor press.
5. Using (special tool #8285, Compressor, Spring) (1), press on the fingers of the piston retainer and install the two halves of the retaining ring (2).



[Fig. 283: Outer Ring, Snap Ring, Hub & Spacers]
Courtesy of CHRYSLER GROUP, LLC

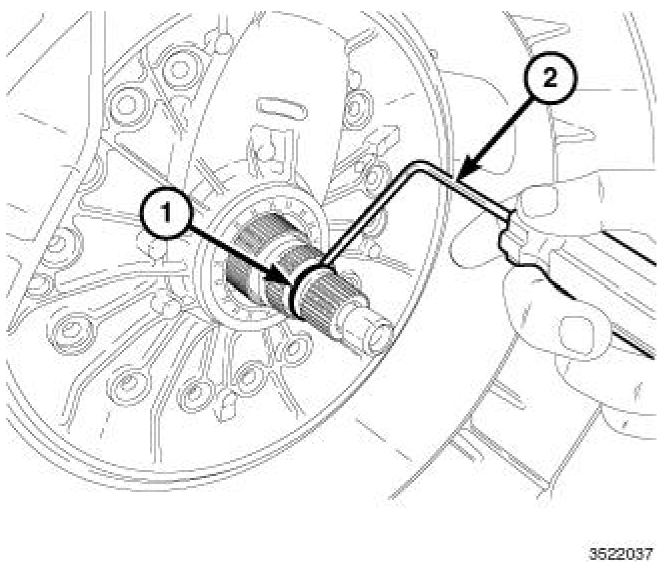
6. Install the hub (3).
7. Install the clutches and spacers (4).
8. Install the snap ring (2).
9. Install the outer ring (1) (inside B-piston).
10. Install the B-piston.

NOTE: **Firmly press the transmission oil pump in place by hand before drawing it in with bolts.**



[Fig. 284: Thirteen Oil Pump Housing Retaining Bolts]
Courtesy of CHRYSLER GROUP, LLC

11. Install the 13 **NEW** transmission oil pump housing cover bolts (2) and tighten the transmission oil pump cover as follows:
    a. In order to seat the transmission oil pump housing cover properly, pre-tighten bolts one, seven and nine to 6 N.m (53 in. lb.).
    b. Working in a clockwise pattern, beginning with number one, tighten to 10 N.m (89 in. lb.).
    c. Working in a clockwise pattern, beginning with number one, tighten an additional 90Â°.



[Fig. 285: Input Shaft O-Ring & Small Pick]
Courtesy of CHRYSLER GROUP, LLC

12. Install the **NEW** input shaft O-ring (1).
13. Install the valve body. Refer to **VALVE BODY, INSTALLATION**.
14. Install the transmission. Refer to **INSTALLATION**.

SEAL, OUTPUT SHAFT

REMOVAL

OUTPUT SHAFT SEAL

CAUTION: Do not allow the propeller shaft to hang from the vehicle unsupported. Damage may occur to the joint, boot, and center bearing from over-angulation.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

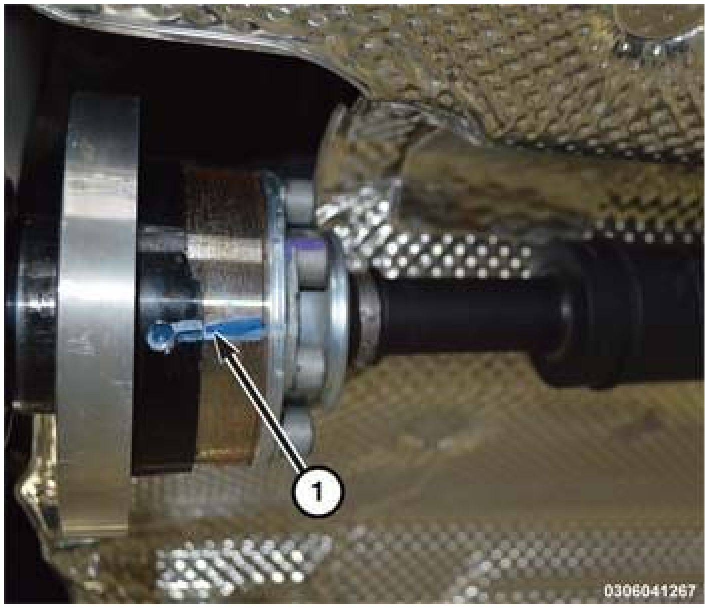


Fig. 286: Alignment Index Marks
Courtesy of CHRYSLER GROUP, LLC

2. Apply alignment index mark (1) to the transmission flange.

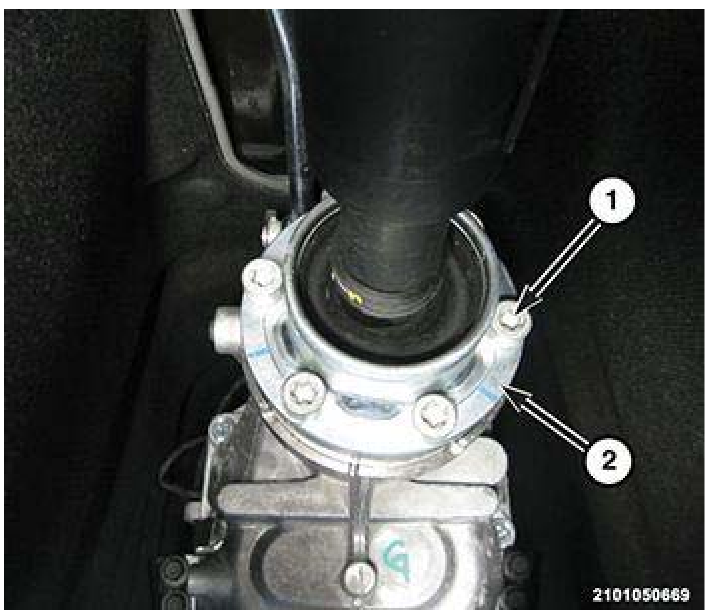


Fig. 287: Bolts And Washers & Transmission Flange
Courtesy of CHRYSLER GROUP, LLC

3. Remove the drive shaft bolts to transmission flange and position aside the drive shaft. Secure the drive shaft with a strap or equivalent.

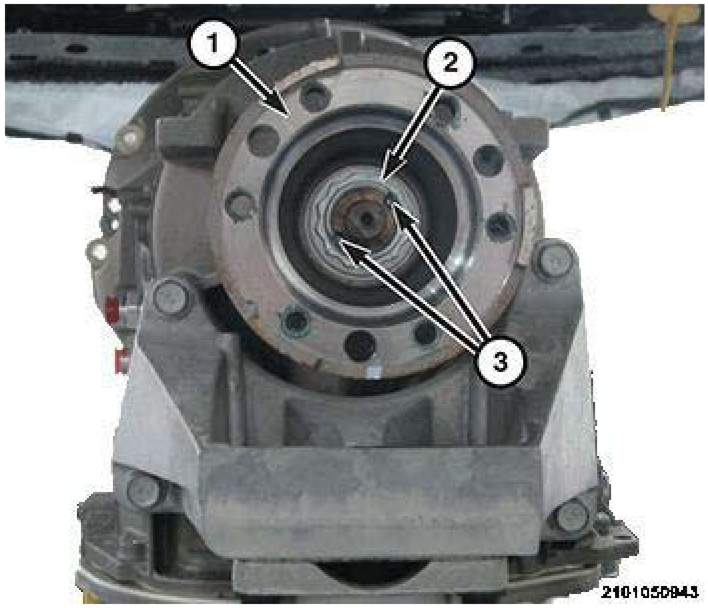


Fig. 288: Drive Shaft Flange, Nut & Staking Area
Courtesy of CHRYSLER GROUP, LLC

4. Using a suitable punch, remove the staking (3) from the drive shaft nut (2).
5. Remove the drive shaft flange nut (2) using a 34 mm 12 point socket (3) and (special tool #C-3281, Holder, Flange) (2) to hold the flange (1).
6. Remove the flange and flange dust seal.
7. Remove the output shaft seal with suitable screw and slide hammer.

INSTALLATION

OUTPUT SHAFT SEAL

CAUTION: The seal must be installed flush with the case. Driving the seal deeper could damage the seal causing a leak.

1. Position the new output shaft seal over the output shaft and against the transmission case.
2. Using (special tool #9677, Installer, Seal) install the output shaft seal.
3. Verify that the transmission is in PARK in order to prepare for the installation of the output shaft nut.

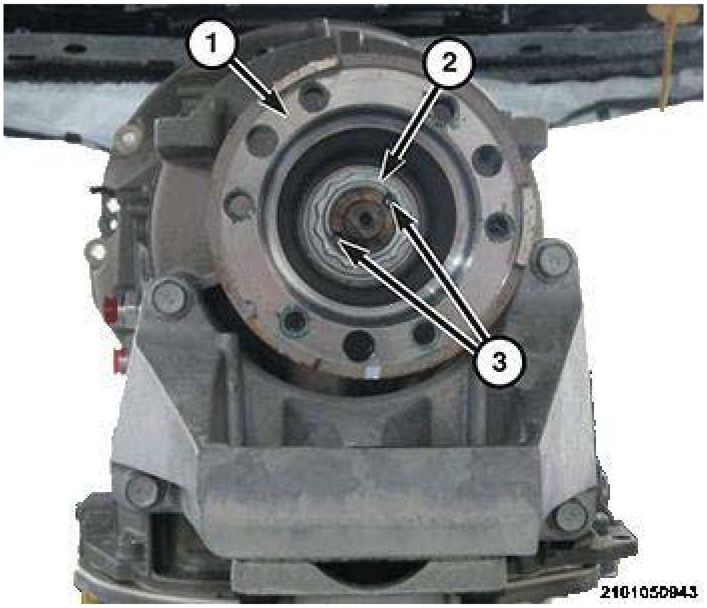


Fig. 289: Drive Shaft Flange, Nut & Staking Area
Courtesy of CHRYSLER GROUP, LLC

4. Install the drive shaft flange (1) onto the output shaft and install a **NEW** flange nut (2). Tighten the nut, with a 34 mm 12 point socket, to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
5. Stake (3) the nut.
6. Install the drive shaft. Refer to **INSTALLATION** .
7. Perform the CHECK OIL LEVEL procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

SEAL, TORQUE CONVERTER HUB

REMOVAL

TORQUE CONVERTER HUB SEAL

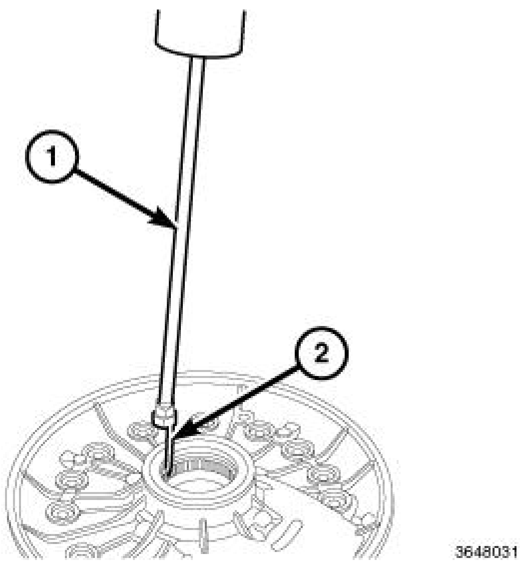


Fig. 290: Seal Remover & Slide Hammer

Courtesy of CHRYSLER GROUP, LLC

1. Remove the torque converter. Refer to **TORQUE CONVERTER, REMOVAL**.
2. Using (special tool #9667, Remover, Seal) and (special tool #C-3752, Slide Hammers) remove the torque converter hub seal.

INSTALLATION

TORQUE CONVERTER HUB SEAL

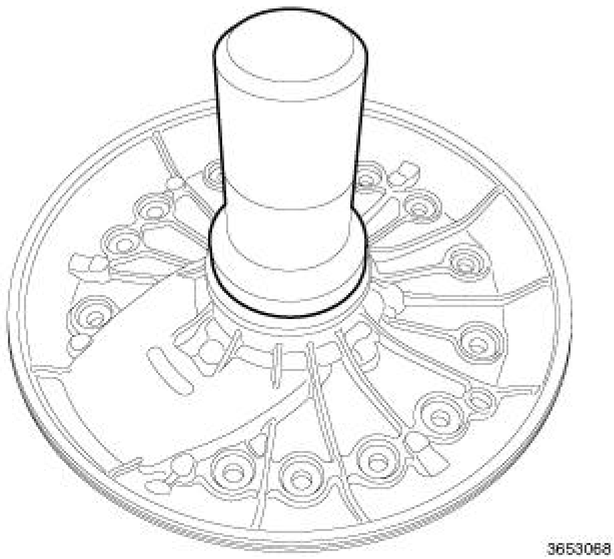


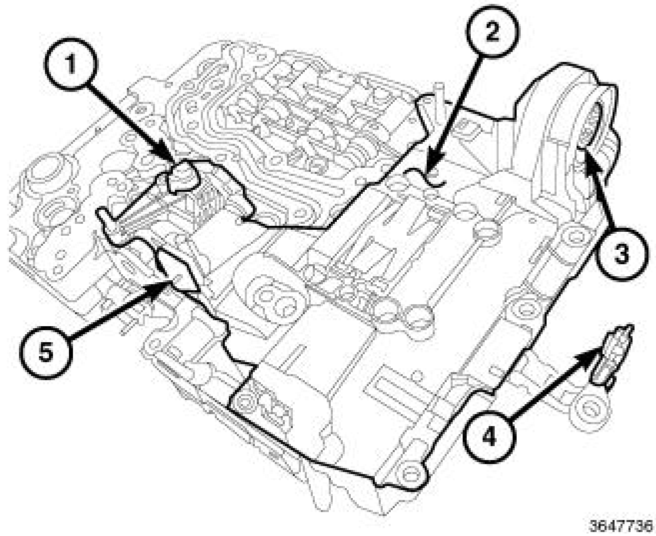
Fig. 291: Oil Pump Cover Oil Seal
Courtesy of CHRYSLER GROUP, LLC

1. Position the torque converter hub seal over the input shaft and against the transmission oil pump cover.
2. Using (special tool #10375, Installer, Oil Pump Cover Oil Seal) install a new torque converter hub seal.
3. Install the torque converter. Refer to **TORQUE CONVERTER, INSTALLATION**.

SENSOR, SPEED

DESCRIPTION

DESCRIPTION



[Fig. 292: Input Speed Sensor, Output Speed Sensor, TCM (Includes Transmission Temperature Sensor) & Park Position Sensor]
Courtesy of CHRYSLER GROUP, LLC

1 - Input Speed Sensor
2 - TCM (Includes Transmission Temperature Sensor)
3 - External Wire Harness Connector
4 - Output Speed Sensor
5 - Park Position Sensor

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The input speed sensor (1) and the output speed sensor (4) are integrated components of the TCMA and not serviced individually.

OPERATION

OPERATION

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

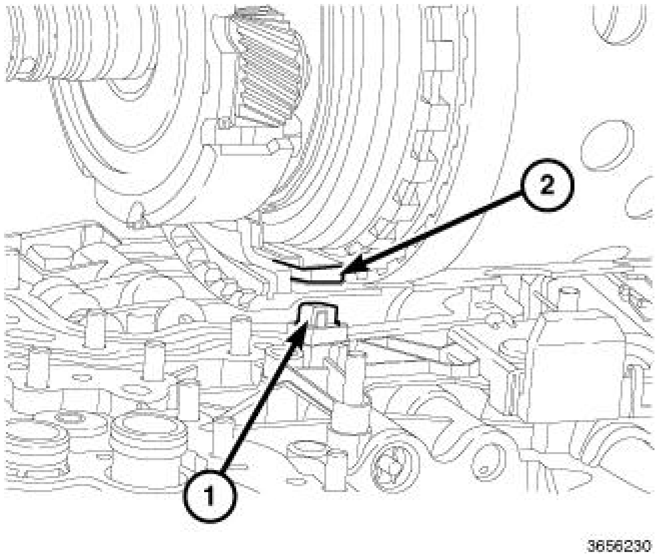


Fig. 293: ISS & Magnetic Ring
Courtesy of CHRYSLER GROUP, LLC

The input speed sensor (ISS) and output speed sensor (OSS) are Hall-effect sensors that measure shaft rotational speed. The ISS (1) is located at the front of the TCMA and reads input shaft speed from the magnetic ring (2) on the P2 carrier.

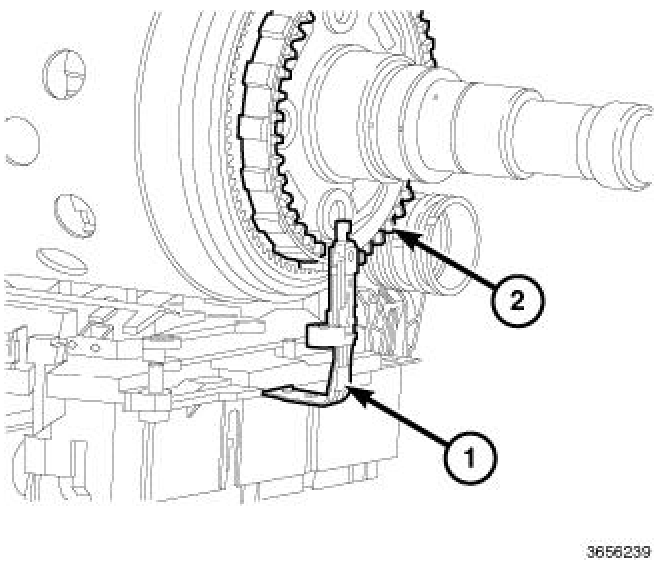


Fig. 294: OSS & P4 Carrier
Courtesy of CHRYSLER GROUP, LLC

The OSS (1) is located at the back of the TCMA and reads output shaft speed from the P4 carrier (2).

SHIFTER, TRANSMISSION

DESCRIPTION

FLOOR SHIFT

The Electronic Shifter (E-Shifter) is an electronic switch/module floor mounted device, using CAN messaging to communicate driver requests for transmission gear changes without a mechanical connection.

PADDLE SHIFT

Some vehicles may be equipped with optional paddle shift. For more information on paddle shift. Refer to **SWITCH, REMOTE RADIO, DESCRIPTION** .

OPERATION

FLOOR SHIFT

The E-Shifter:

- communicates with the Transmission Control Module (TCM) via a Controller Area Network (CAN).
- incorporates a solenoid that allows the lever to be locked for purposes of Brake Transmission Shift Interlock (BTSI) function.
- lever-lock function is controlled electronically by the TCM via CAN message, and mechanically by the release trigger on the knob.
- indicates the selected/non-selected gears provided via illumination of PRNDM+- characters on knob.
- lever-position feedback is provided via mechanical detents, which also keep the lever in the desired position.
- communicates driver requests for transmission gear changes without a mechanical connection.
- is comprised of an upper knob and a lower base, which can be serviced separately.
- on some models, may have steering wheel-mounted paddle shifters available. Refer to **SWITCH, REMOTE RADIO, DESCRIPTION** .

The Electronic Shifter (E-Shifter) offers (P, R, N, D, M) modes of function.

The M selection (manual mode) is engaged by moving the shift-lever sideways to M. Requests to up/down shift are achieved by moving the lever fore/aft once in the manual position.

PADDLE SHIFT

Some vehicles may be equipped with optional steering wheel paddle shifters.

The steering wheel paddle shifters may be enabled or disabled in the default drive mode. The vehicle will start in default mode unless it is in valet mode.

To enable the steering wheel paddle shifters, press the **ON** button on the touchscreen.

To disable the steering wheel paddle shifters, press the **OFF** button on the touchscreen.

Fig. 295: Paddle Shifter Enable/Disable Screen
Courtesy of CHRYSLER GROUP, LLC

For additional information, refer to **SWITCH, REMOTE RADIO, OPERATION** .

STANDARD PROCEDURES

MANUAL PARK RELEASE DISENGAGE

The Manual Park Release (MPR) lever is used for putting the transmission in neutral anytime the vehicle needs to be moved with the engine off in neutral. This is achieved by a cable attached to the transmission park pawl. When the cable is pulled, the transmission is put into neutral, and when the cable is released, the transmission is back into park.

WARNING: **Always secure your vehicle by fully applying the parking brake, before activating the Manual Park Release. Activating the Manual Park Release will allow your vehicle to roll away if it is not secured by the parking brake or by proper connection to a tow vehicle. Activating the Manual Park Release on an unsecured vehicle could lead to serious injury or death for those in or around the vehicle.**

NOTE: **Apply the parking brake.**

Fig. 296: Manual Park Release Lever Access Panel
Courtesy of CHRYSLER GROUP, LLC

1. Remove the Manual Park Release (MPR) lever access panel (1).

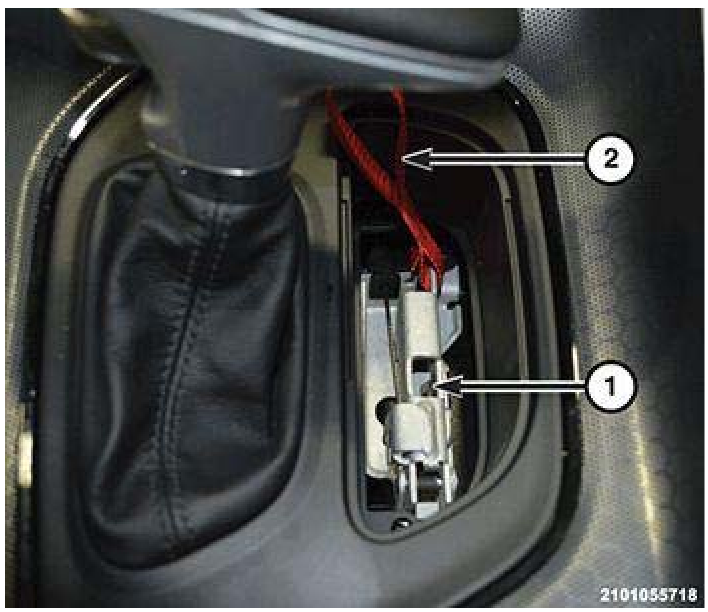


Fig. 297: Locking Tab & Tether
Courtesy of CHRYSLER GROUP, LLC

2. Release the locking tab (1) with a screw driver or equivalent and pull the tether (2).
3. While holding the locking tab (1) to the right, pull the tether (2) up and rearward, until it locks in place in the vertical position. The transmission is now out of park, and the vehicle can be moved.

MANUAL PARK RELEASE ENGAGE

Fig. 298: Releasing Locking Tab
Courtesy of CHRYSLER GROUP, LLC

1. Push the Manual Park Release (MPR) lever rearward, and use a small screwdriver or equivalent to release the locking tab (1).

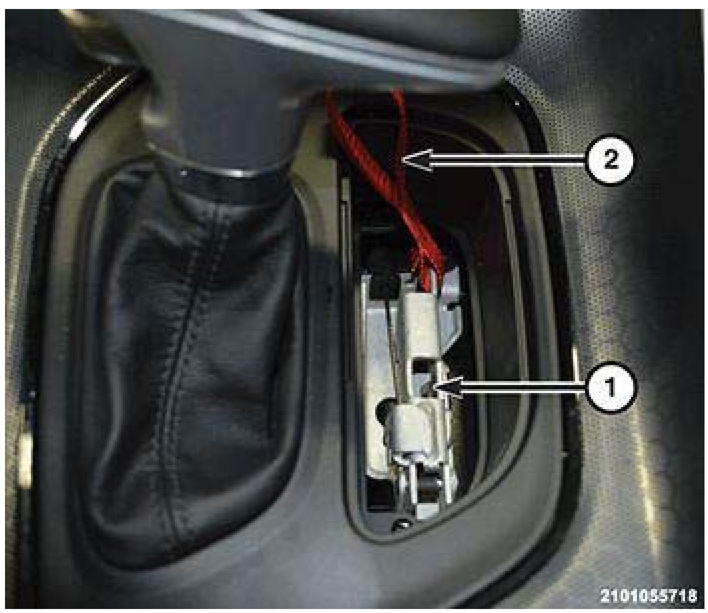


Fig. 299: Locking Tab & Tether
Courtesy of CHRYSLER GROUP, LLC

2. Allow the MPR lever to return to the engaged position.
3. Make sure that the locking tab (1) is in position, gently pull on the tether (2) to confirm the lever is locked.

Fig. 300: Manual Park Release Lever Access Panel
Courtesy of CHRYSLER GROUP, LLC

4. Install the MPR lever access panel.

REMOVAL

SHIFTER

WARNING: **Always secure your vehicle by fully applying the parking brake, before activating the Manual Park Release. Activating the Manual Park Release will allow your vehicle to roll away if it is not secured by the parking brake or by proper connection to a tow vehicle. Activating the Manual Park Release on an unsecured vehicle could lead to serious injury or death for those in or around the vehicle.**

1. Apply the parking brake.

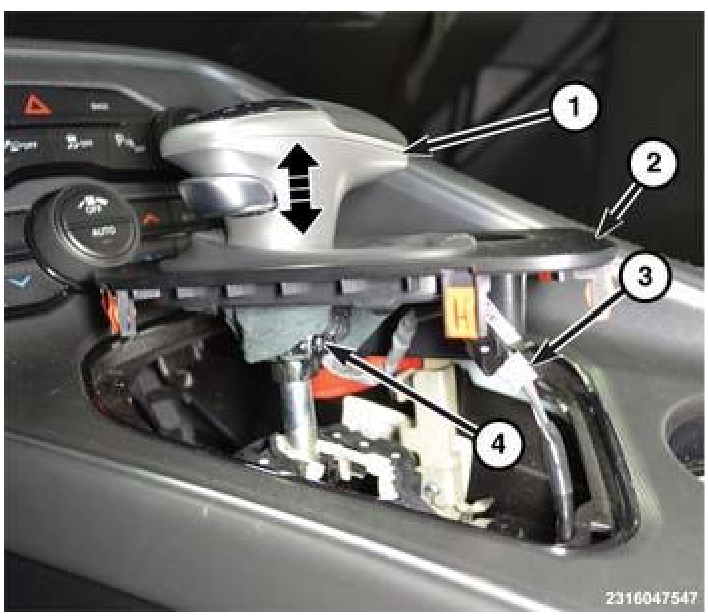


Fig. 301: Automatic Shifter
Courtesy of CHRYSLER GROUP, LLC

2. Using a trim stick or equivalent, carefully release the retaining clips and lift the shifter bezel (2).
3. Unplug the wire harness connector (3) from the shifter bezel.
4. Remove the shifter knob screw (4) and remove the shifter knob (1) and shifter bezel (2).

Fig. 302: Removing/Install Console Bezel Panel
Courtesy of CHRYSLER GROUP, LLC

5. Using a trim stick or equivalent, starting at the rear of the console bezel panel, carefully release the retaining clip and lift the console bezel panel (1).

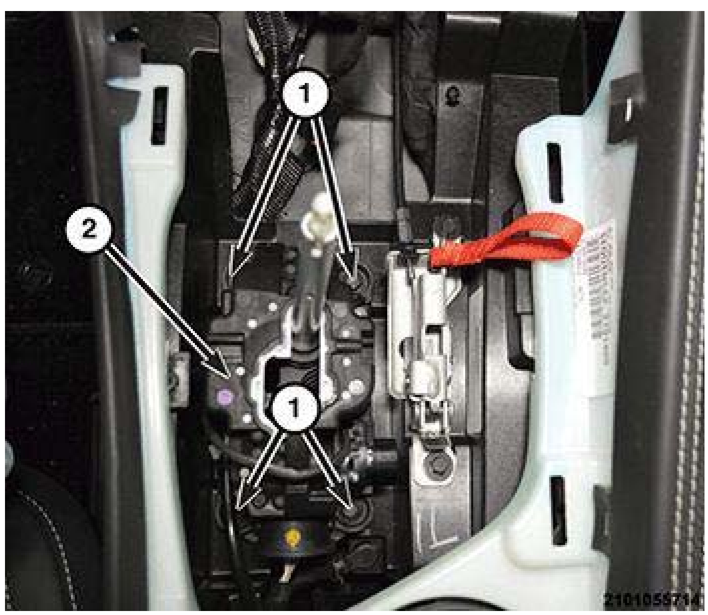


Fig. 303: Shifter Assembly & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the wire harness connectors and remove the console bezel panel.
7. Remove the shifter bolts (1) and lift the shifter assembly (2) up enough to allow access to the Electronic Shift Module (ESM) wire harness connector.

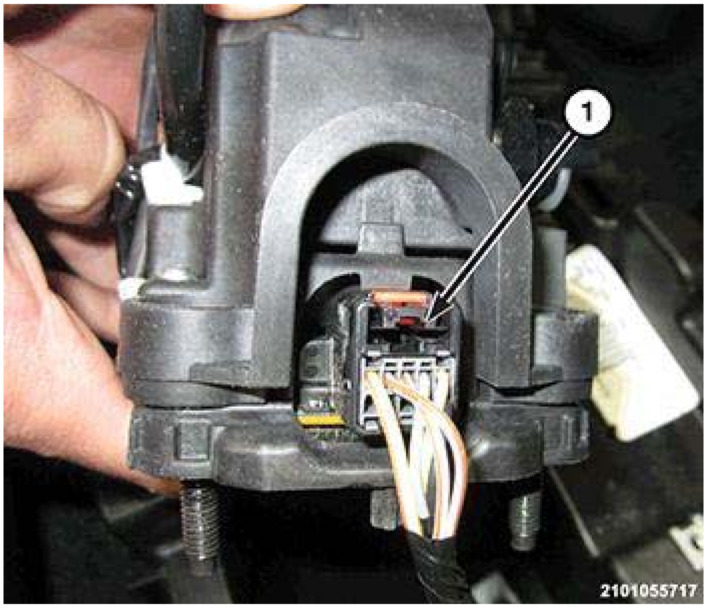


Fig. 304: Shifter Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the ESM wire harness connector (1).
9. Remove the shifter assembly from the vehicle.

INSTALLATION

SHIFTER

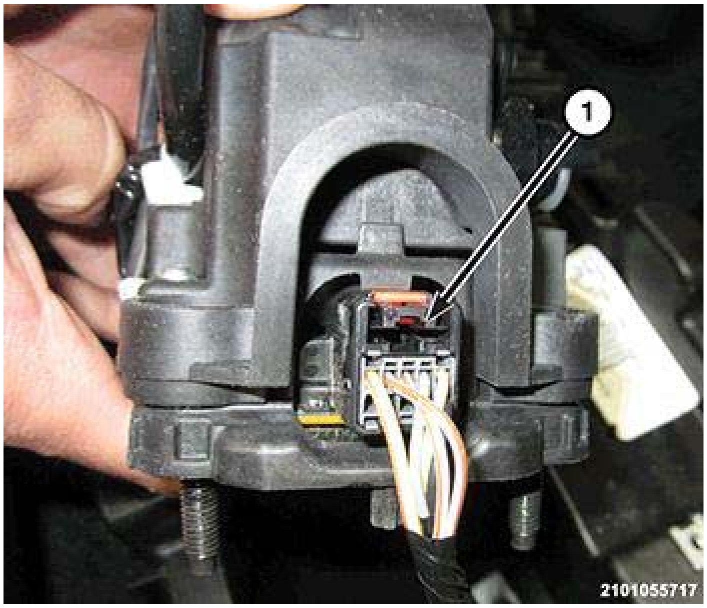


Fig. 305: Shifter Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Connect the Electronic Shift Module (ESM) wire harness connector (1).

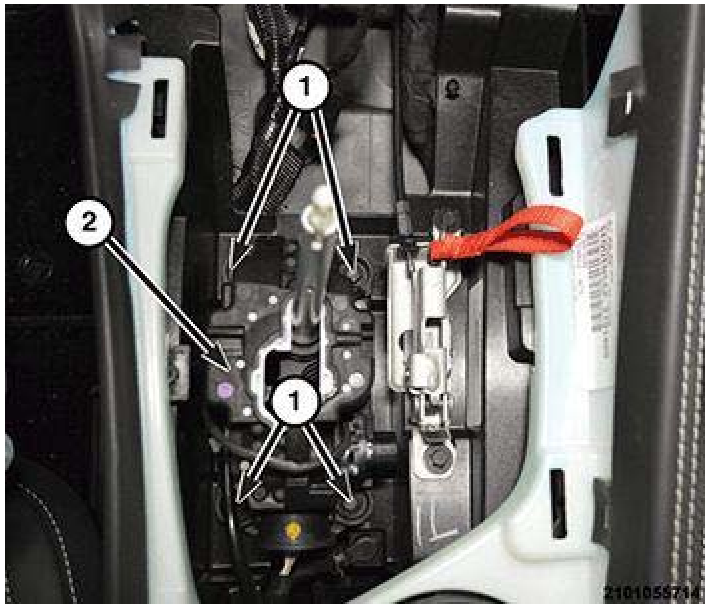


Fig. 306: Shifter Assembly & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the ESM (2) and shifter bolts (1) and tighten to the proper torque specifications.

Fig. 307: Removing/Install Console Bezel Panel
Courtesy of CHRYSLER GROUP, LLC

3. Connect the wire harness connectors and install the console bezel panel (1).

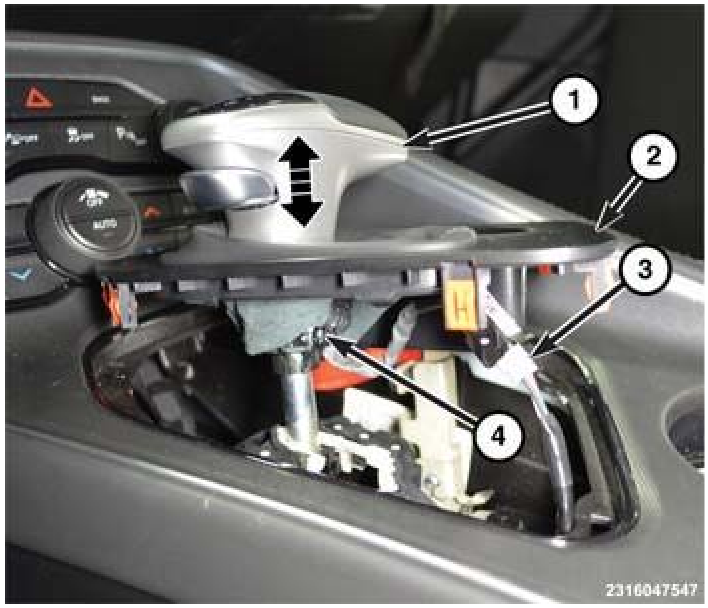


Fig. 308: Automatic Shifter
Courtesy of CHRYSLER GROUP, LLC

4. Position the shifter bezel (2) in place and engage the retaining clips.
5. Install the shifter knob (1) and install the shifter knob screw (4). Tighten the screw securely.
6. Connect the wire harness connector (3).

SOLENOID, TRANSMISSION

DESCRIPTION

DESCRIPTION

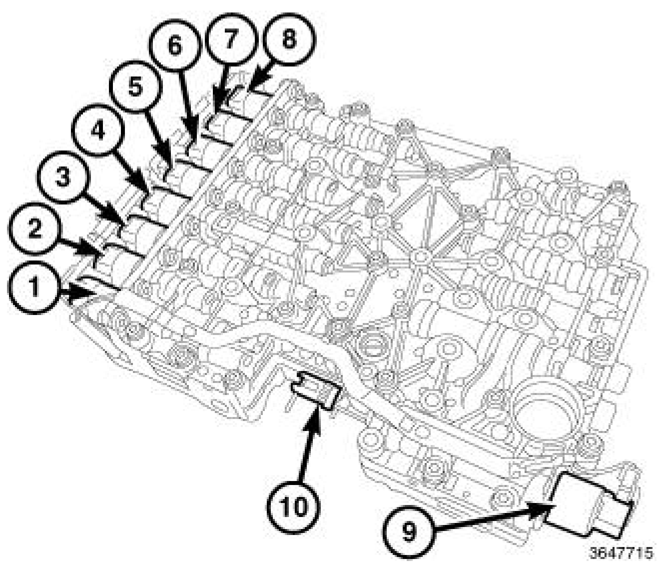


Fig. 309: Solenoid A D E C & Park Release Mechanical Valve
Courtesy of CHRYSLER GROUP, LLC

1 - Solenoid A
2- Solenoid D

3 - Solenoid B
4 - Solenoid E
5 - Solenoid C
6 - TCC Solenoid
7 - Line Pressure Solenoid
8 - Park Release Solenoid
9 - Park Hold Mechanical Solenoid
10 - Park Release Mechanical Valve

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The solenoids are integrated into the Transmission Control Module Assembly (TCMA) of the 8HP transmission and are not replaceable individually.

OPERATION

OPERATION

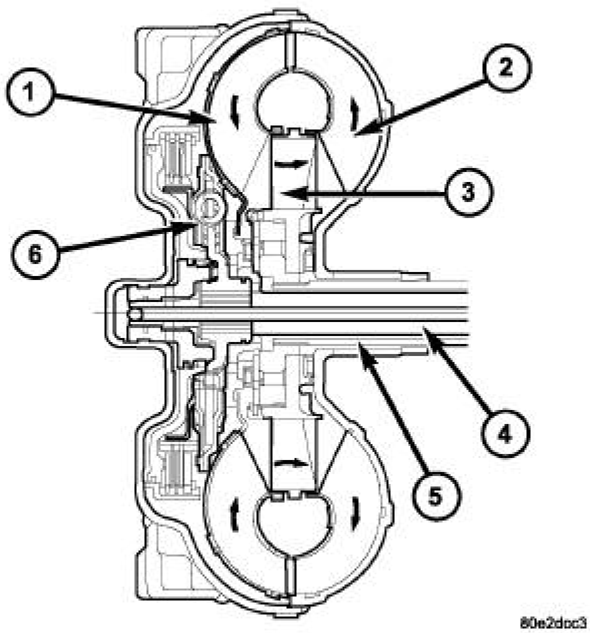
CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The TCM will actuate the valves via solenoids based on the position of the shifter, transmission fluid temperature, engine operating conditions, traction conditions, and driver demands. During a shift, the TCM will actuate the solenoids to match the gear ranges to the optimal torque range of the engine based on the position of the accelerator pedal, shifter, and vehicle speed as determined by the PCM based on input from the Vehicle Speed Sensor (VSS) and ABS module.

TORQUE CONVERTER

DESCRIPTION

DESCRIPTION



[Fig. 310: Torque Converter]
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - TURBINE DAMPER

CAUTION: The torque converter must be replaced if a transmission failure resulted in large amounts of metal or fiber contamination in the fluid.

The torque converter is a hydraulic device that couples the engine crankshaft to the transmission. The torque converter consists of an outer shell with an internal turbine (1), a stator (3), an overrunning clutch, an impeller (2), and an electronically applied converter clutch. The converter clutch provides reduced engine speed and greater fuel economy when engaged. Clutch engagement also provides reduced transmission fluid temperatures. The converter clutch engages in third through fifth gears. The torque converter hub drives the transmission oil (fluid) pump.

A turbine damper (6) has been added for some applications to help improve vehicle noise, vibration, and harshness (NVH) characteristics.

The torque converter is a sealed, welded unit that is not repairable and is serviced as an assembly.

IMPELLER

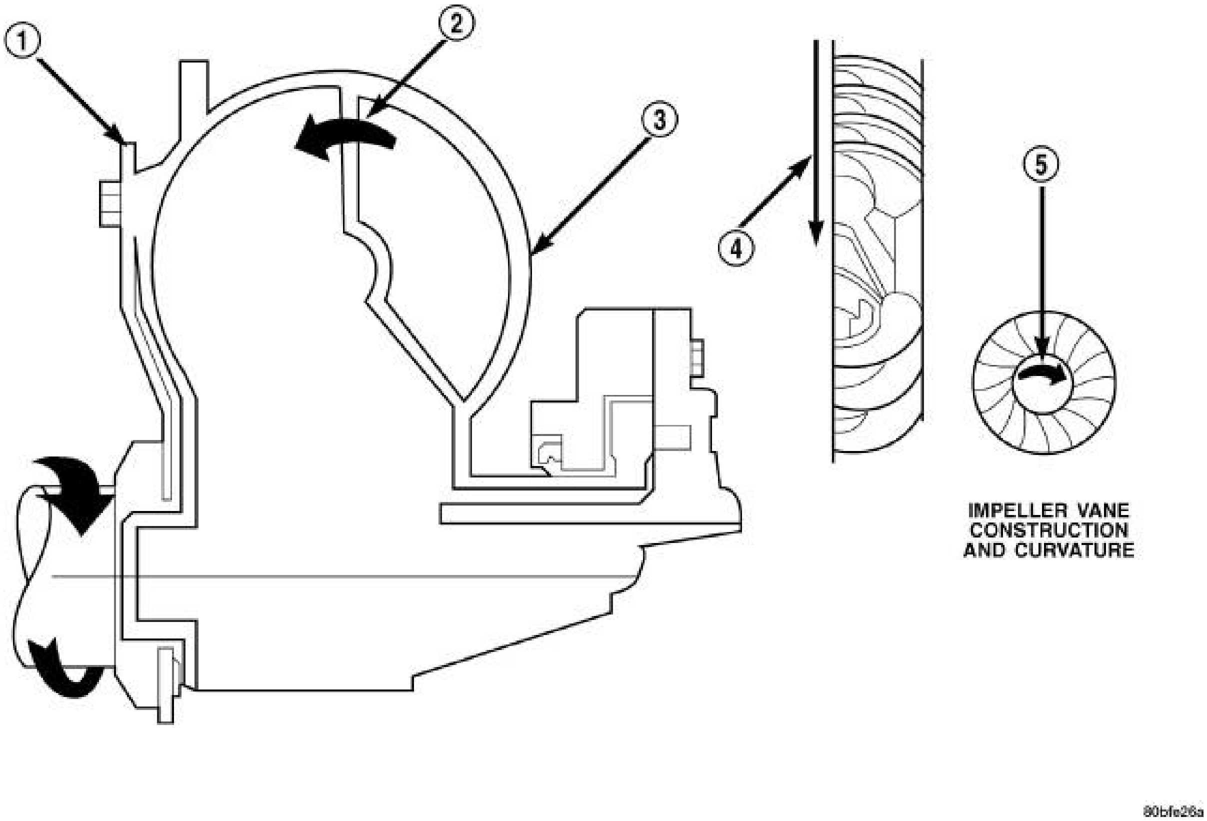


Fig. 311: Identifying Impeller
Courtesy of CHRYSLER GROUP, LLC

1 - ENGINE FLEXPLATE
2 - OIL FLOW FROM IMPELLER SECTION INTO TURBINE SECTION
3 - IMPELLER VANES AND COVER ARE INTEGRAL
4 - ENGINE ROTATION
5 - ENGINE ROTATION

The impeller (3) is an integral part of the converter housing. The impeller consists of curved blades placed radially along the inside of the housing on the transmission side of the converter. As the converter housing is rotated by the engine, so is the impeller, because they are one and the same and are the driving members of the system.

TURBINE

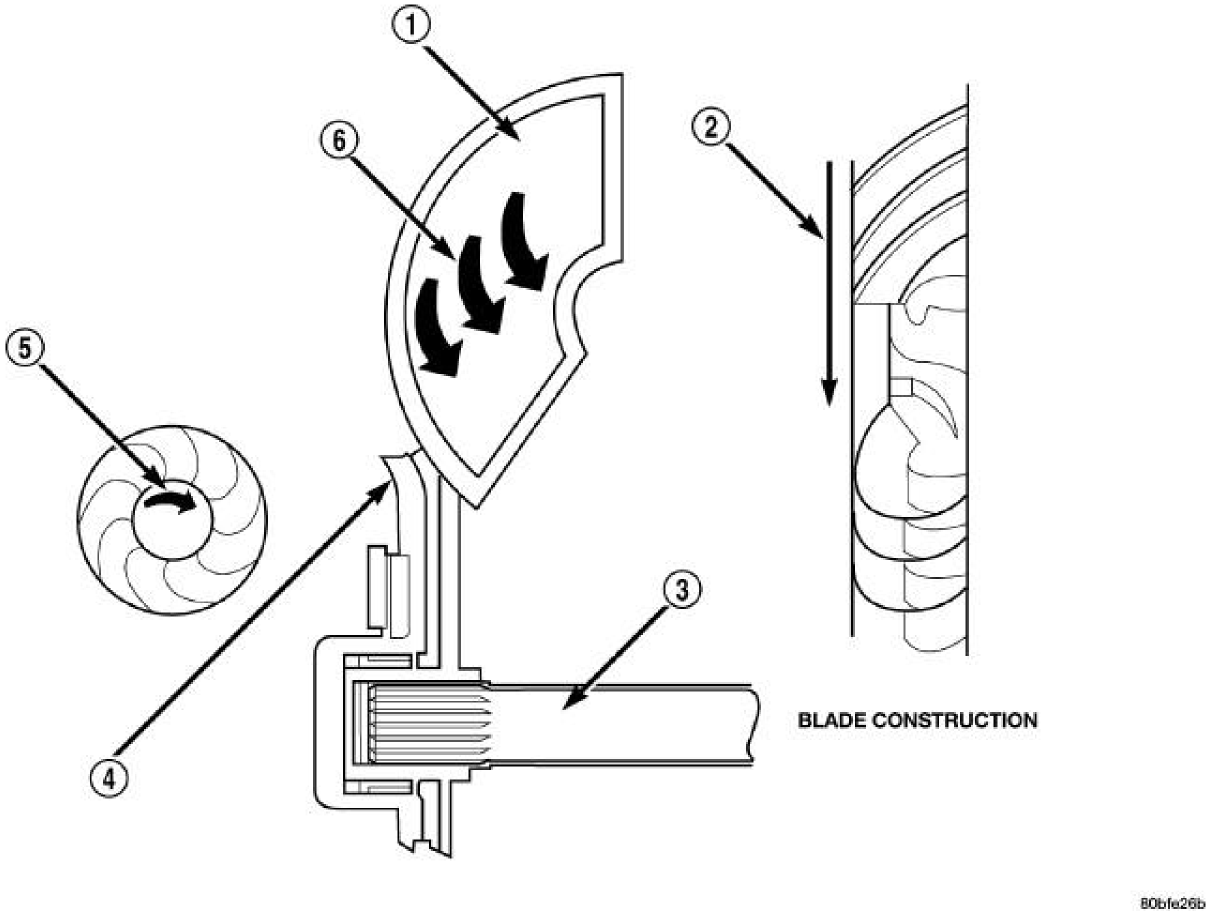


Fig. 312: Identifying Turbine
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE VANE
2 - ENGINE ROTATION
3 - INPUT SHAFT
4 - PORTION OF TORQUE CONVERTER COVER
5 - ENGINE ROTATION
6 - OIL FLOW WITHIN TURBINE SECTION

The turbine (1) is the output, or driven, member of the converter. The turbine is mounted within the housing opposite the impeller, but is not attached to the housing. The input shaft is inserted through the center of the impeller and splined into the turbine. The design of the turbine is similar to the impeller, except the blades of the turbine are curved in the opposite direction.

STATOR

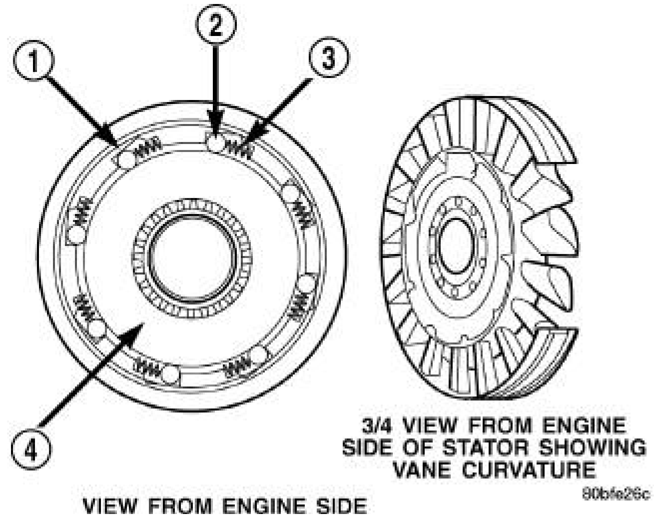


Fig. 313: Stator Components
Courtesy of CHRYSLER GROUP, LLC

1 - CAM (OUTER RACE)
2 - ROLLER
3 - SPRING
4 - INNER RACE

The stator assembly (1-4) is mounted on a stationary shaft which is an integral part of the oil pump.

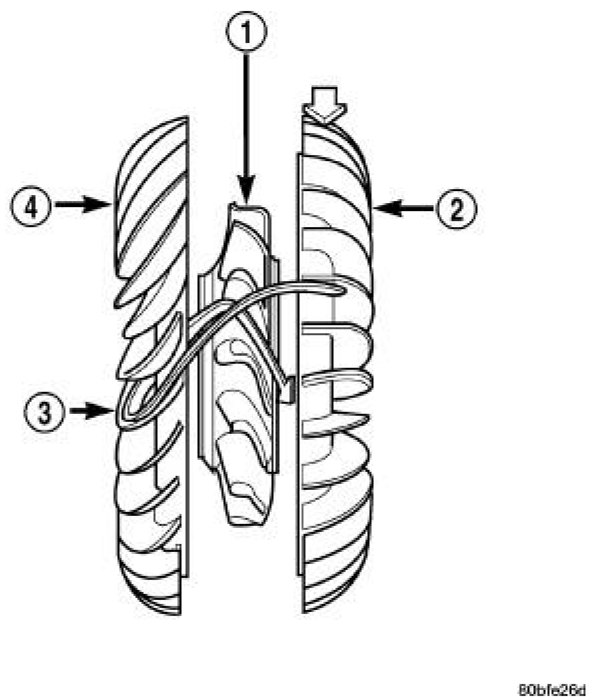


Fig. 314: Stator, Impeller, Fluid Flow & Turbine
Courtesy of CHRYSLER GROUP, LLC

1 - STATOR
2 - IMPELLER
3 - FLUID FLOW

4 - TURBINE

The stator (1) is located between the impeller (2) and turbine (4) within the torque converter case. The stator contains a freewheeling clutch, which allows the stator to rotate only in a clockwise direction. When the stator is locked against the freewheeling clutch, the torque multiplication feature of the torque converter is operational.

TORQUE CONVERTER CLUTCH (TCC)

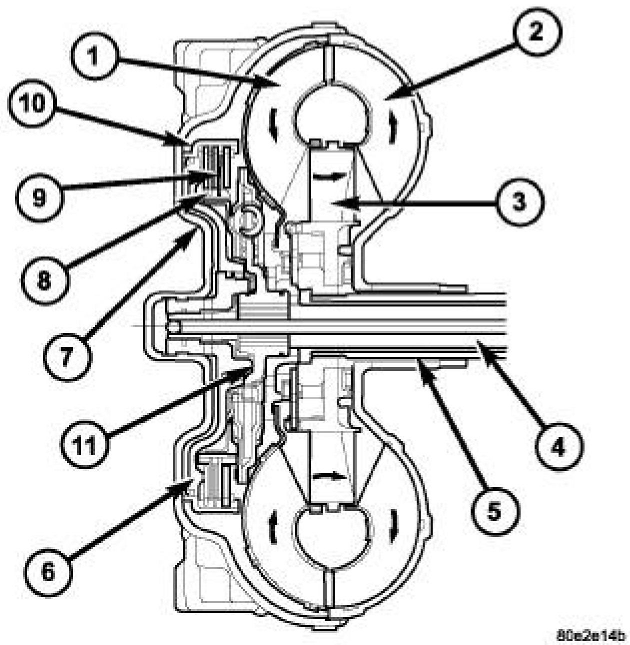


Fig. 315: Identifying Torque Converter Components
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - PISTON
7 - COVER SHELL
8 - INTERNALLY TOOTHED DISC CARRIER
9 - CLUTCH PLATE SET
10 - EXTERNALLY TOOTHED DISC CARRIER
11 - TURBINE DAMPER

The TCC (9) was installed to improve the efficiency of the torque converter that is lost to the slippage of the fluid coupling. Although the fluid coupling provides smooth, shock-free power transfer, it is natural for all fluid couplings to slip. If the impeller and turbine were mechanically locked together, a zero slippage condition could be obtained. A hydraulic piston with friction material was added to the turbine assembly to provide this mechanical lock-up.

In order to reduce heat build-up in the transmission and buffer the powertrain against torsional vibrations, the TCM can duty cycle the torque converter lock-up solenoid to achieve a smooth application of the torque converter clutch. This function, referred to as Electronically Modulated Converter Clutch (EMCC) can occur at various times depending on the following variables:

- Shift lever position
- Current gear range
- Transmission fluid temperature
- Engine coolant temperature
- Input speed
- Throttle angle
- Engine speed

OPERATION

OPERATION

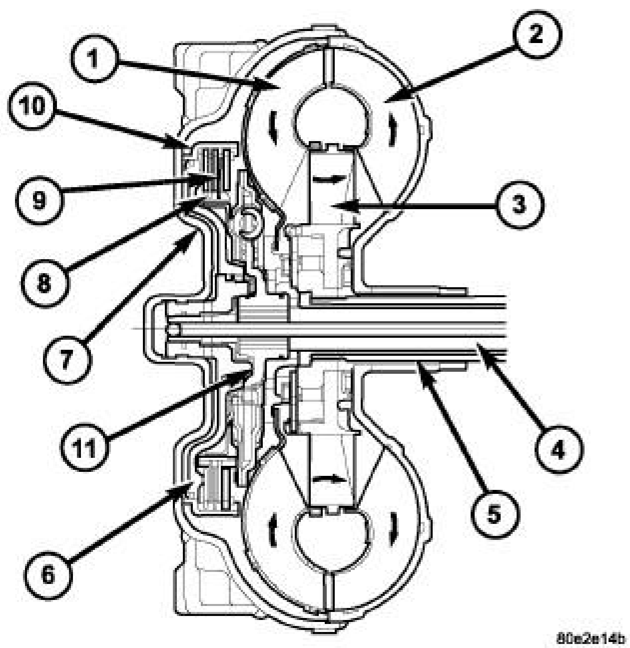


Fig. 316: Identifying Torque Converter Components
Courtesy of CHRYSLER GROUP, LLC

1 - TURBINE
2 - IMPELLER
3 - STATOR
4 - INPUT SHAFT
5 - STATOR SHAFT
6 - PISTON
7 - COVER SHELL
8 - INTERNALLY TOOTHED DISC CARRIER

9 - CLUTCH PLATE SET
10 - EXTERNALLY TOOTHED DISC CARRIER
11 - TURBINE DAMPER

The torque converter housing has a unique shape to incorporate the torque converter clutch and flex plate connection. The torque converter uses the typical turbine, impeller and stator assemblies found in a standard torque converter assembly. The torque converter drives the pump through the splines on the inside of the hub. The torque converter uses a multi-disc torque converter clutch system that improves the durability and the holding pressure in the lock-up circuit. The torque converter incorporates a turbine dampening system. This system suppresses torsional vibrations from the engine to ensure optimal shift quality and reduce noise and vibration concerns.

TCC RELEASE When the TCC is open, the TCC piston is pushed to its default position by torque converter chamber pressure. The torque converter switch valve (SV-TC) provides pressure for torque converter operation which has been regulated by the converter pressure regulating valve (TC-V). After exiting the torque converter, fluid moves into the cooling and lubrication circuits. The converter pressure retention valve (TCH1-V) ensures the torque converter pressure is a minimum of 0.35 bar (5 psi) when the TCC is open.

TCC APPLY When the TCC solenoid is energized, fluid is directed to the torque converter switch valve (SV-TC) and TCC lockup valve (TCC-V). The TCC lockup valve directs fluid to the TCC and torque converter chamber. The torque converter switch valve directs fluid exiting the converter chamber to a secondary pressure retention valve (TCH2-V) which is calibrated to retain 1.0 bar (14.5 psi) of pressure in the converter. The torque converter switch valve also directs line pressure to the cooler and lubrication circuit.

TURBINE

When the fluid that was put into motion by the impeller blades strikes the blades of the turbine, some of the energy and rotational force is transferred into the turbine and the input shaft. This causes both of them (turbine and input shaft) to rotate in a clockwise direction following the impeller. As the fluid is leaving the trailing edges of the turbine's blades it continues in a "hindering" direction back toward the impeller. If the fluid is not redirected before it strikes the impeller, it will strike the impeller in such a direction that it would tend to slow it down.

STATOR

Torque multiplication is achieved by locking the stator's overrunning clutch to its shaft. Under stall conditions (the turbine is stationary), the oil leaving the turbine blades strikes the face of the stator blades and tries to rotate them in a counterclockwise direction. When this happens the overrunning clutch of the stator locks and holds the stator from rotating. With the stator locked, the oil strikes the stator blades and is redirected into a "helping" direction before it enters the impeller. This circulation of oil from impeller to turbine, turbine to stator, and stator to impeller, can produce a maximum torque multiplication of about 2.0:1. As the turbine begins to match the speed of the impeller, the fluid that was hitting the stator in such as way as to cause it to lock-up is no longer doing so. In this condition of operation, the stator begins to free wheel and the converter acts as a fluid coupling

TORQUE CONVERTER CLUTCH (TCC)

In a standard torque converter, the impeller (2) and turbine are rotating at about the same speed and the stator (3) is freewheeling, providing no torque multiplication. By applying the turbines piston and friction material (9) a total converter engagement can be obtained. The result of this engagement is a direct 1:1 mechanical link

between the engine and the transmission.

HYDRO-MECHANICAL AND ELECTRICAL

The Torque Converter Clutch (TCC) is engaged and released by the Transmission Control Module Assembly (TCMA). The TCC can be engaged and controlled in any forward gear from 1 through 8. In addition, the 8HP transmission incorporates a neutral idle control (NIC) function. Instead of the engine continuing to drive the converter when the vehicle comes to rest, the converter is partially disconnected from the driveline so only a slight residual load remains. Decoupling of the torque converter during NIC is accomplished by allowing clutch B to slip.

REMOVAL

TORQUE CONVERTER

1. Remove the transmission from the vehicle. Refer to **REMOVAL**.
2. Place a suitable drain pan under the torque converter housing end of the transmission.

CAUTION: Verify that transmission is secure on the lifting device or work surface, the center of gravity of the transmission will shift when the torque converter is removed creating an unstable condition. The torque converter is a heavy unit. Use caution when separating the torque converter from the transmission.

3. Pull the torque converter forward until the center hub clears the oil pump seal.
4. Separate the torque converter from the transmission.

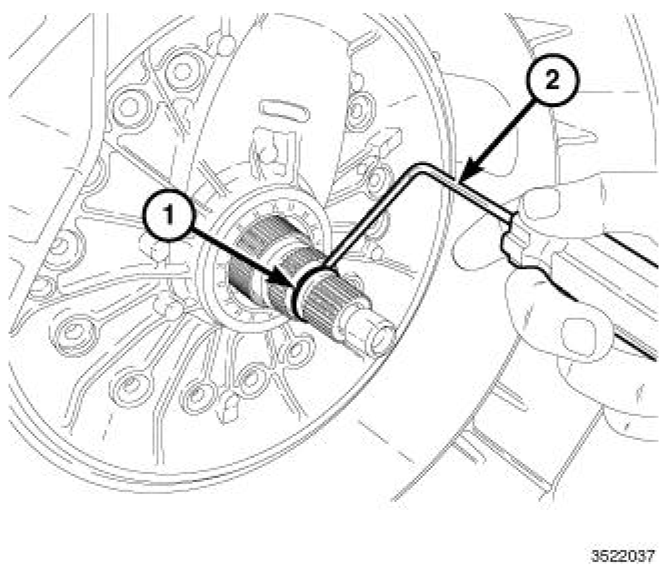


Fig. 317: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

5. Check the input shaft O-ring (1) for damage, replace if necessary.

INSTALLATION

TORQUE CONVERTER

NOTE: **Check the torque converter hub for sharp edges, burrs, scratches, or nicks. Polish the hub with 320/400 grit paper or crocus cloth if necessary. The hub must be smooth to avoid damaging the pump seal at installation.**

1. Lubricate the oil pump seal lip with transmission fluid.

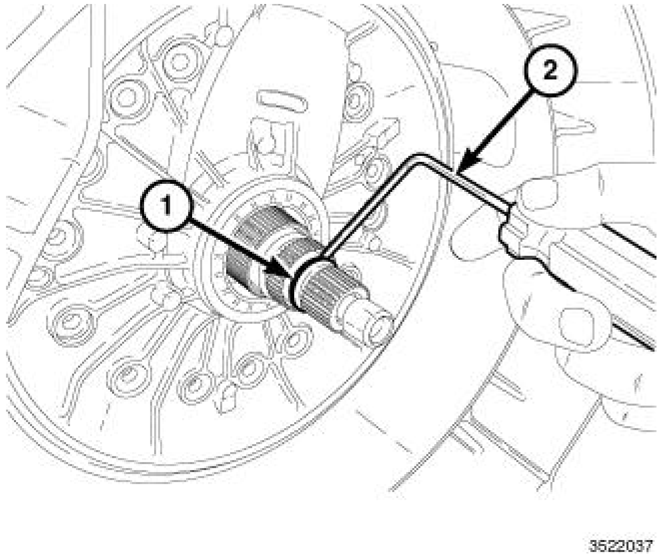


Fig. 318: Input Shaft O-Ring & Small Pick
Courtesy of CHRYSLER GROUP, LLC

2. Check the input shaft O-ring (1) for any damage. Replace if necessary.
3. Place the torque converter in position on the transmission.

CAUTION: **Do not damage oil pump seal or converter hub while inserting torque converter into the front of the transmission.**

4. Align the torque converter to the oil pump seal opening.
5. Insert the torque converter hub into the oil pump drive gear.
6. While pushing the torque converter inward, rotate the torque converter until the torque converter is fully seated into the oil pump drive gear.

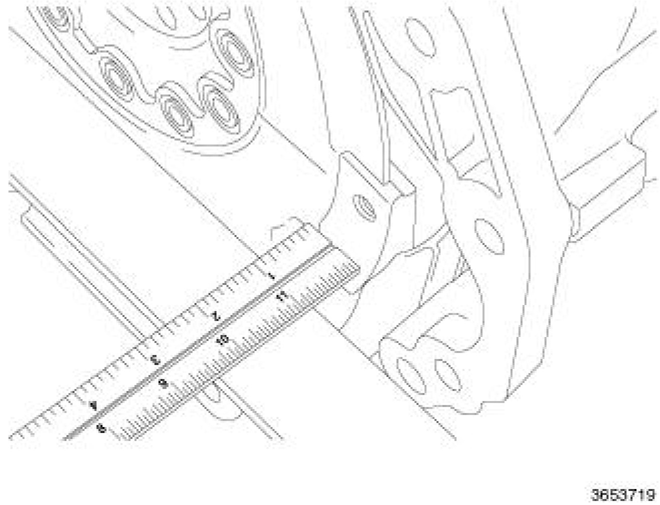


Fig. 319: Checking Torque Converter Seating
Courtesy of CHRYSLER GROUP, LLC

7. Check the torque converter seating with a scale and straightedge. The surface of the torque converter lugs should be at least 19 mm (3/4 in.) to the rear of the straightedge when the torque converter is fully seated.
8. If necessary, temporarily secure the torque converter with a C-clamp attached to the torque converter housing.
9. Install the transmission in the vehicle. Refer to **INSTALLATION**.
10. Perform the TRANSMISSION FILL AFTER SERVICE procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

VALVE BODY

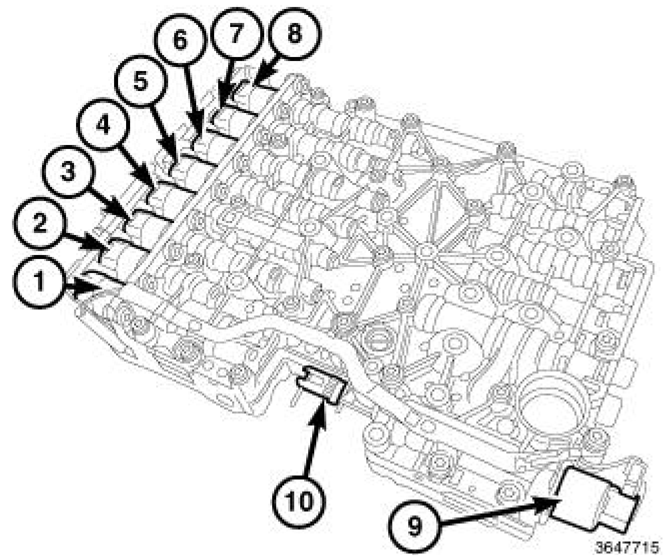
DESCRIPTION

DESCRIPTION

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The valve body includes the Transmission Control Module (TCM), all solenoids and sensors, and can be referred to as the Transmission Control Module Assembly (TCMA). The TCM is attached to the valve body between the transmission case and the valve body. If any component of the valve body **including the TCM** sensors or solenoids need replaced, the complete TCMA (valve body) must be replaced. For replacement of the TCMA (valve body). Refer to **VALVE BODY, REMOVAL**. Components of the valve body and TCM are as follows:

VALVE BODY

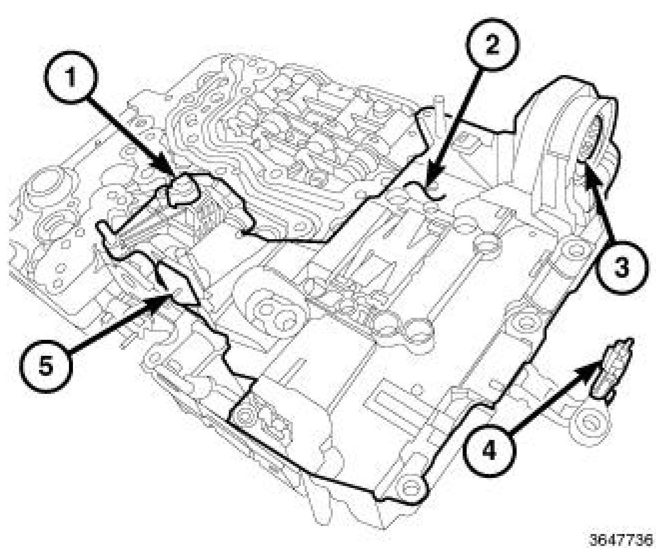


[Fig. 320: Solenoid A D E C & Park Release Mechanical Valve]
Courtesy of CHRYSLER GROUP, LLC

1 - Solenoid A
2- Solenoid D
3 - Solenoid B
4 - Solenoid E
5 - Solenoid C
6 - TCC Solenoid
7 - Line Pressure Solenoid
8 - Park Release Solenoid
9 - Park Hold Mechanical Solenoid
10 - Park Release Mechanical Valve

This view of the TCMA is the bottom side showing the solenoids as listed. None of these components can be serviced separately.

TRANSMISSION CONTROL MODULE (TCM)



[Fig. 321: Input Speed Sensor, Output Speed Sensor, TCM (Includes Transmission Temperature Sensor) & Park Position Sensor]

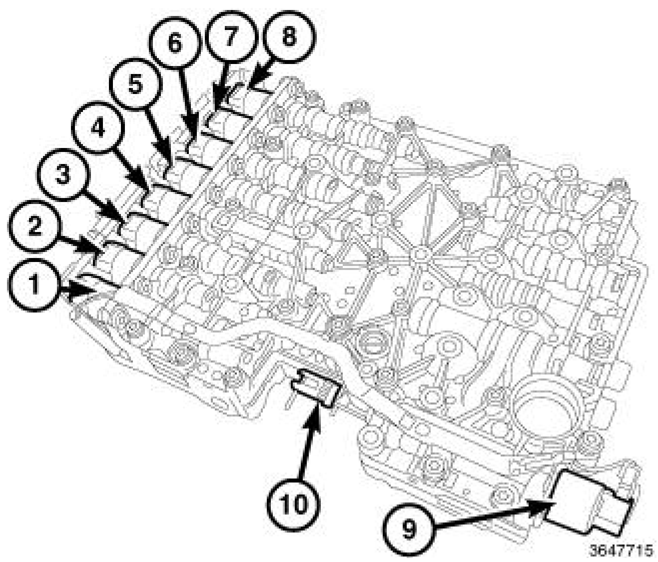
Courtesy of CHRYSLER GROUP, LLC

1 - Input Speed Sensor
2 - TCM (Includes Transmission Temperature Sensor)
3 - External Wire Harness Connector
4 - Output Speed Sensor
5 - Park Position Sensor

This view of the TCMA is between the between the transmission case and the valve body showing the TCM and sensors as listed. None of these components can be serviced separately.

OPERATION

8-SPEED TCM OPERATION



[Fig. 322: Solenoid A D E C & Park Release Mechanical Valve]

Courtesy of CHRYSLER GROUP, LLC

1 - Solenoid A
2- Solenoid D
3 - Solenoid B
4 - Solenoid E
5 - Solenoid C
6 - TCC Solenoid
7 - Line Pressure Solenoid
8 - Park Release Solenoid
9 - Park Hold Mechanical Solenoid
10 - Park Release Mechanical Valve

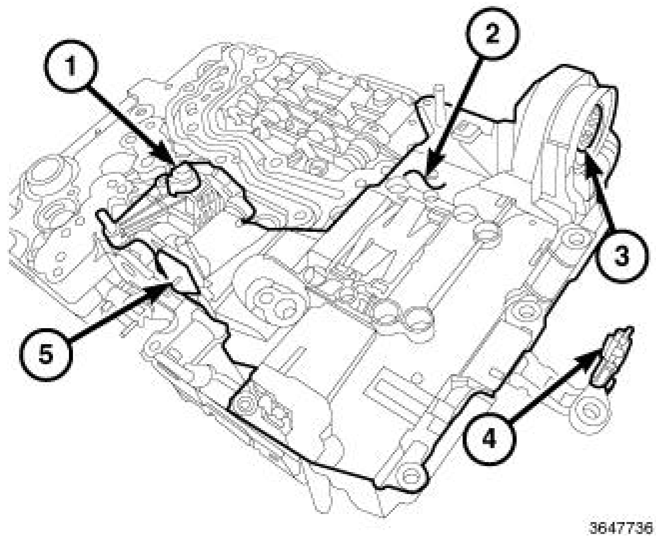


Fig. 323: Input Speed Sensor, Output Speed Sensor, TCM (Includes Transmission Temperature Sensor) & Park Position Sensor
Courtesy of CHRYSLER GROUP, LLC

1 - Input Speed Sensor
2 - TCM (Includes Transmission Temperature Sensor)
3 - External Wire Harness Connector
4 - Output Speed Sensor
5 - Park Position Sensor

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The valve body, which includes the Transmission Control Module (TCM), controls the delivery and pressure of transmission fluid. The TCM is integrated into the valve body. The TCM regulates the amount of hydraulic pressure used to engage the clutches and the Torque Converter Clutch (TCC), in addition to directing hydraulic pressure to engage or release any given clutch for any given required gear. The TCM will actuate the valves via solenoids based on the position of the shifter, transmission fluid temperature, engine operating conditions, traction conditions and driver demands. During a shift, the TCM will actuate the solenoids to match the gear ranges to the optimal torque range of the engine based on the position of the accelerator pedal, shifter and vehicle speed as determined by the PCM based on input from the Vehicle Speed Sensor (VSS) and ABS module. Due to the complexity of the 8HP45 transmission control system, always refer to the appropriate Transmission Electrical Diagnostics article when attempting to diagnose transmission problems.

If the Transmission Control Module Assembly (TCMA) is replaced, it **must** be programmed and a drive learn needs to be performed before returning the vehicle to the customer. For programming and drive learn procedures, refer to **TRANSMISSION CONTROL MODULE (TCM) ADAPTATION - 8HP45/845RE /8HP70/8HP90** .

REMOVAL

VALVE BODY

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Drain the transmission fluid into a clean container. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.

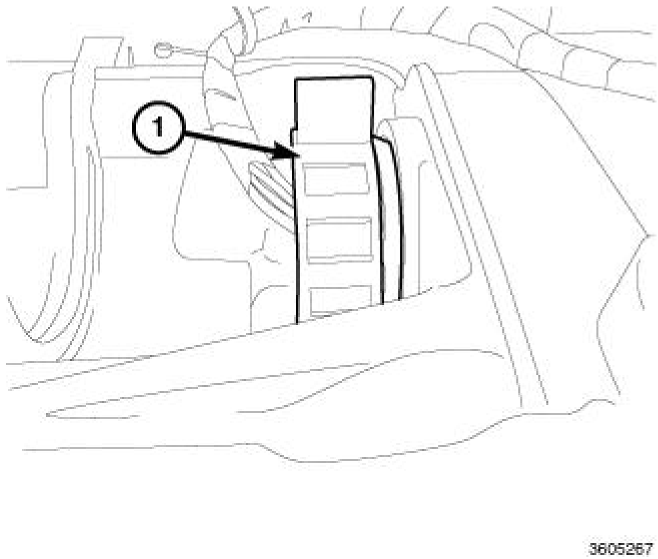


Fig. 324: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

3. Turn the locking mechanism lock (1) of the transmission harness connector counterclockwise and disconnect the connector from the transmission.

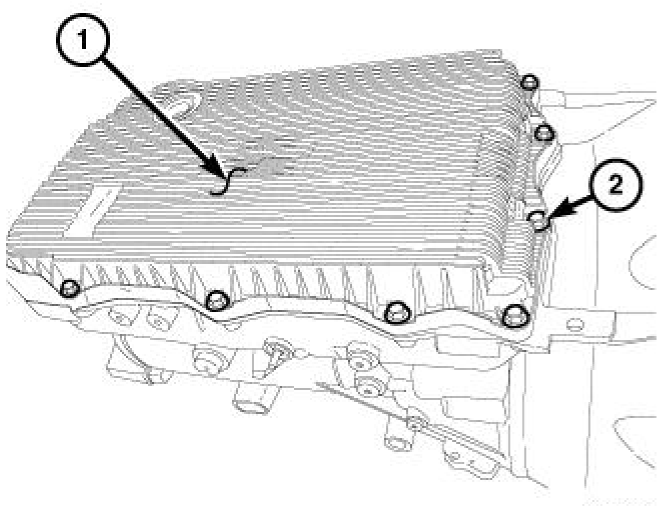


Fig. 325: Thirteen Oil Pan Retaining Bolts

Courtesy of CHRYSLER GROUP, LLC

NOTE: **Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.**

4. Remove the thirteen transmission oil pan bolts (2).
5. Carefully detach the transmission oil pan (1) and gasket.

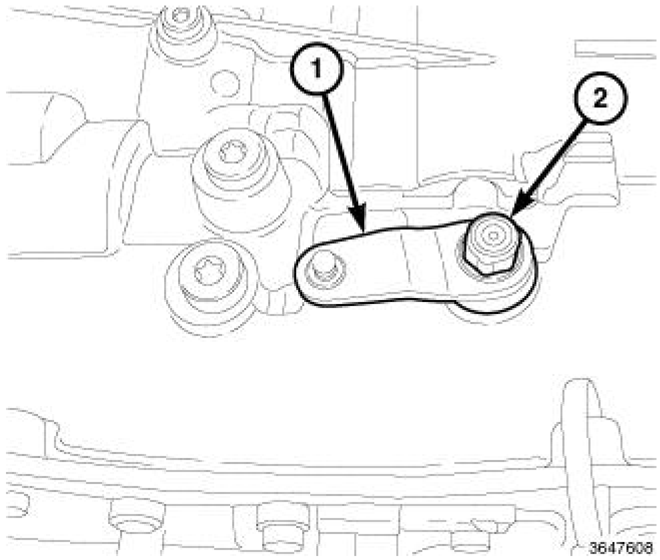


Fig. 326: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

6. Remove the Manual Park Release (MPR) lever retaining nut (2) and remove the lever (1).
7. Reinstall the MPR lever 180 degrees offset. Using a tie strap, secure the lever into position so the park release fork remains in the same position for installation of the valve body assembly.

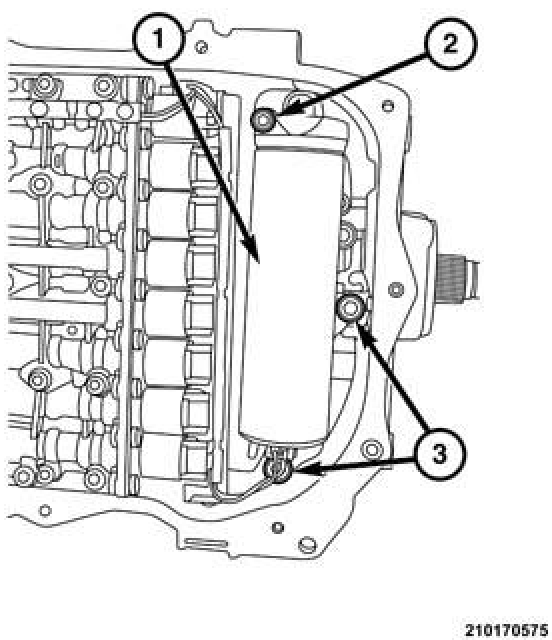


Fig. 327: Hydraulic Impulse Storage Unit & Bolts

Courtesy of CHRYSLER GROUP, LLC

8. If equipped, disconnect the Hydraulic Impulse Oil Storage (HIS) connector.
9. If equipped, remove three HIS bolts (2 and 3) and the accumulator (1).

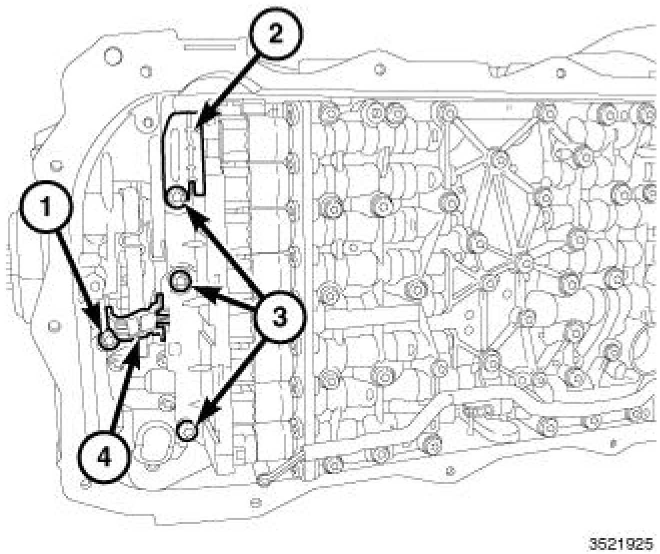


Fig. 328: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Remove the valve body assembly end retainer bolts (3).
11. Lift the electrical connector lock (2) to release the internal harness end from inside the transmission for valve body assembly removal.
12. Remove the Output Shaft Speed (OSS) sensor retaining bolt (1) and pull the OSS sensor (4) loose from the case.

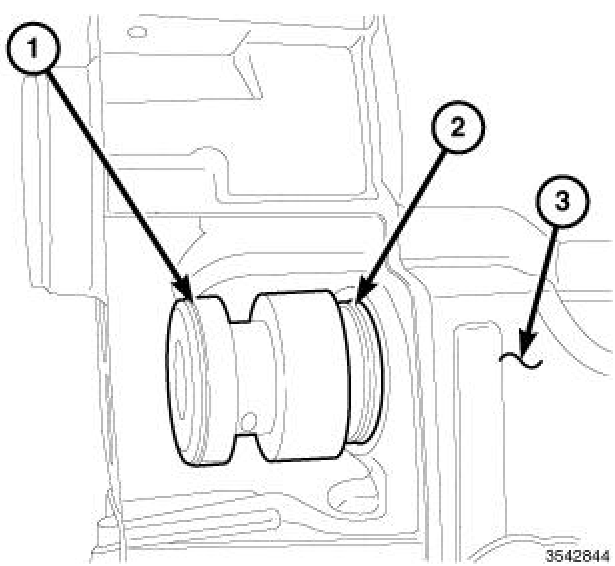
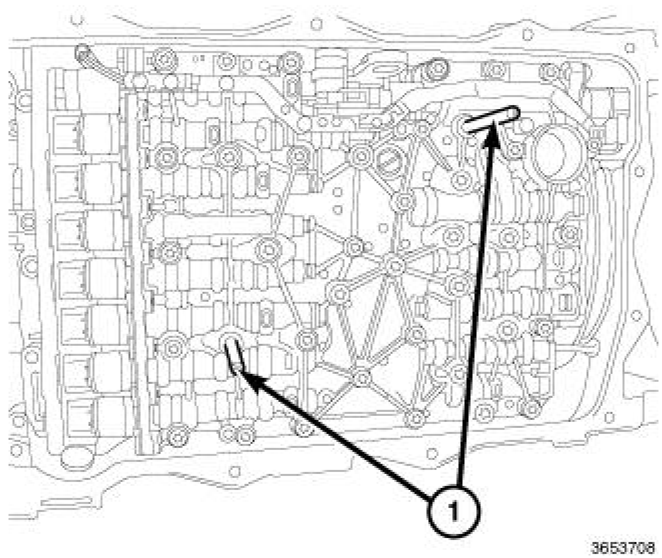


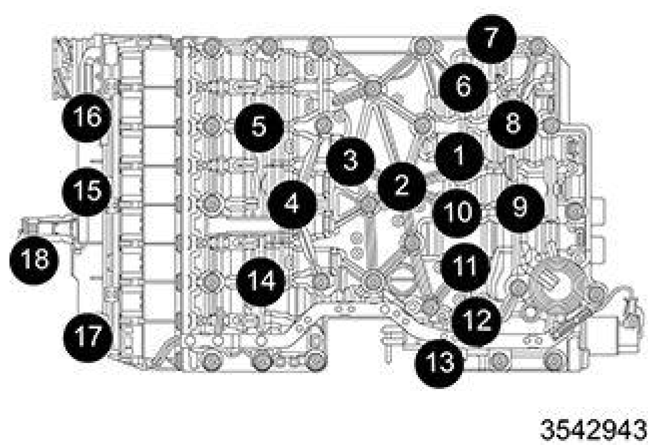
Fig. 329: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

13. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully pull the electrical harness insulator (2) straight out from the transmission case (3).



[Fig. 330: Valve Body Alignment Pins](#)
Courtesy of CHRYSLER GROUP, LLC

14. Remove two bolts and hand install (special tool #10379, Pins, Valve Body Alignment) (1).
15. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while removing the remaining fasteners.



[Fig. 331: Valve Body Bolts Loosening And Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

16. Remove remaining valve body bolts.
17. Carefully lower the valve body assembly from the transmission.

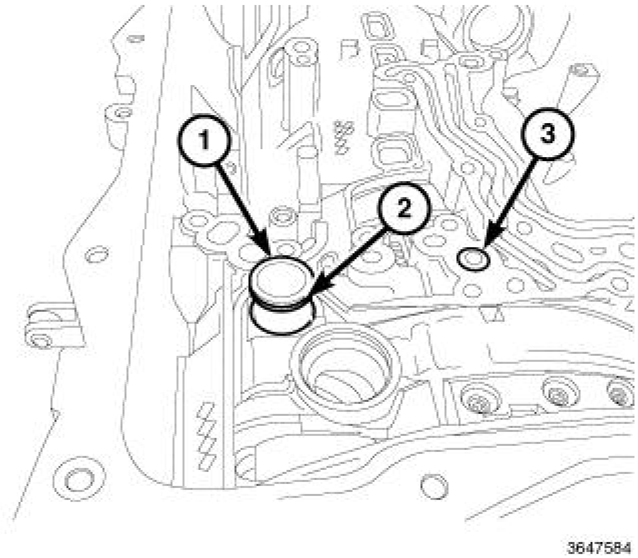


Fig. 332: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The fluid port may remain in the valve body upon removal, remove and discard the O-rings.**

18. Remove the fluid transfer port (1) from the transmission.
19. Remove and discard the O-ring (2) and seal (3).

INSTALLATION

VALVE BODY

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.**

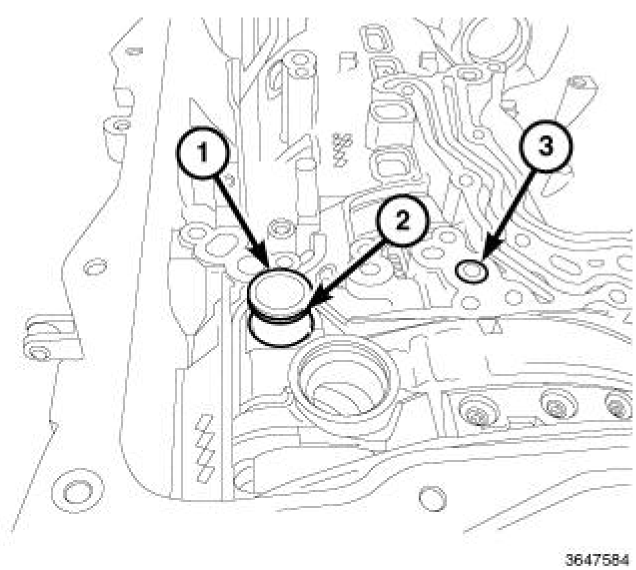


Fig. 333: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install the fluid port (1) with **NEW** O-rings (2) and seal (3) on the valve body.

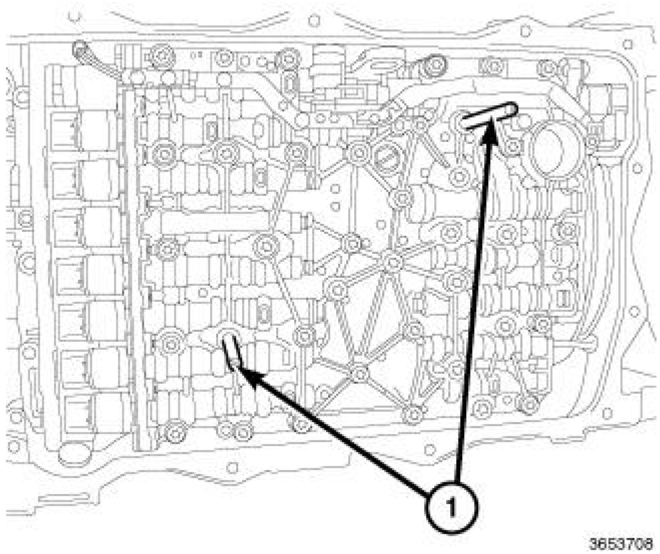


Fig. 334: Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

2. Install the valve body assembly on the transmission using the previously installed (special tool #10379, Pins, Valve Body Alignment) (1) as a guide.
3. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while installing the valve body bolts.

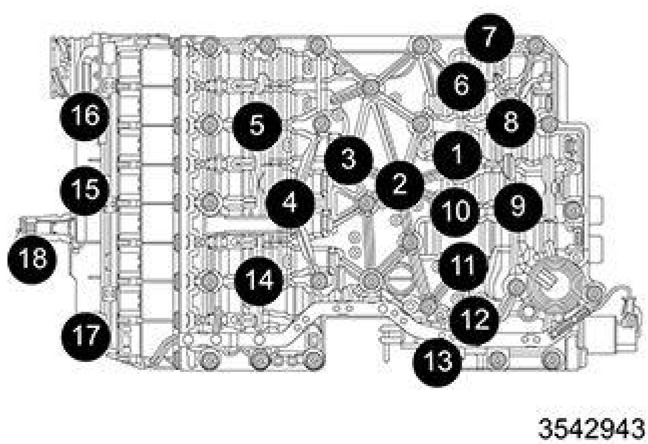
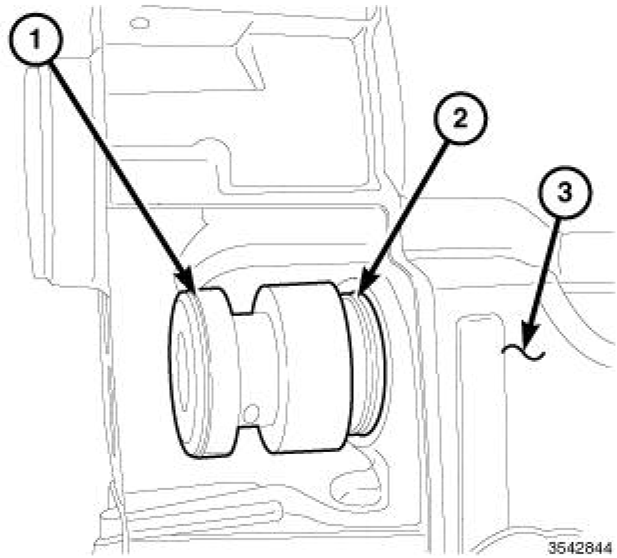


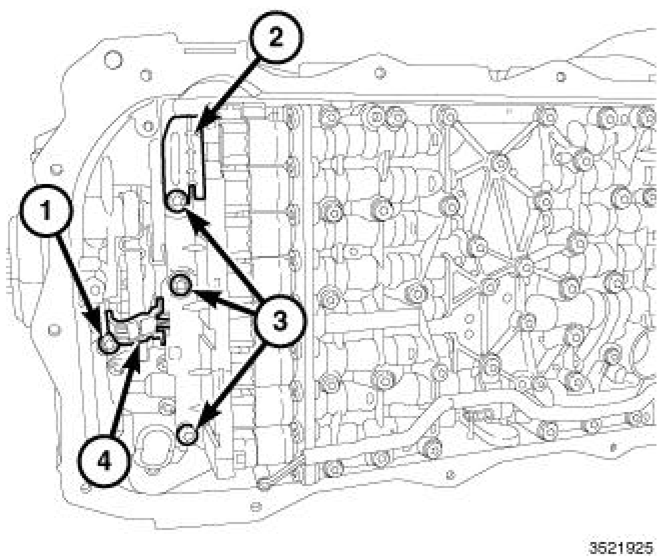
Fig. 335: Valve Body Bolts Loosening And Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Install the valve body bolts not including 16-18 and hand tighten.
5. Remove the pins and install the remaining bolts.



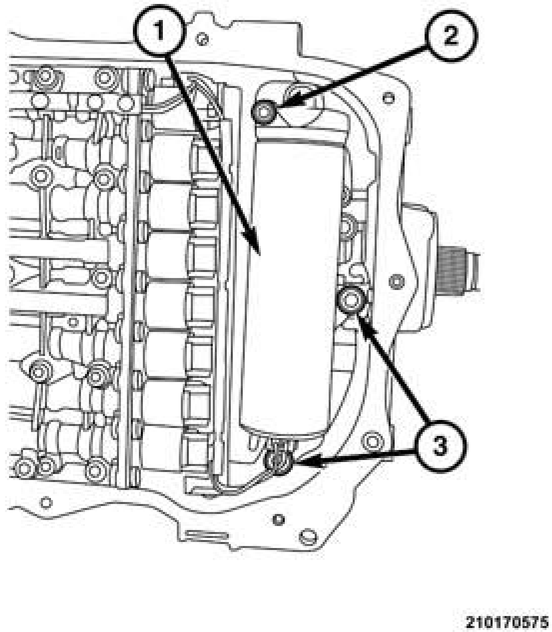
[Fig. 336: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case]
Courtesy of CHRYSLER GROUP, LLC

6. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully install the electrical harness insulator (2) to the transmission case (3).



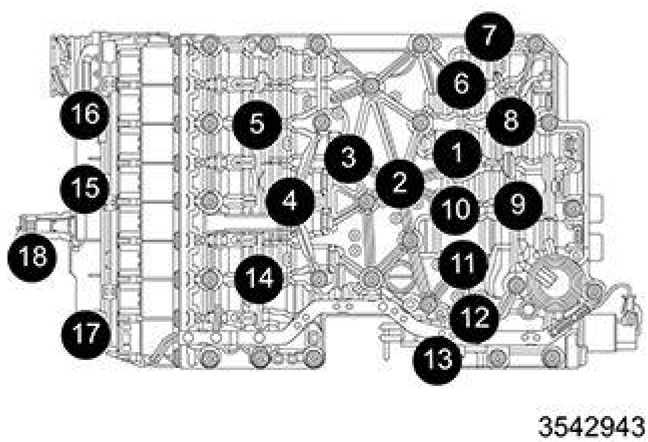
[Fig. 337: Valve Body Assembly End Retainer Bolts]
Courtesy of CHRYSLER GROUP, LLC

7. Install and lock the electrical connector lock (2) to the internal harness end.
8. Install the Output Shaft Speed (OSS) sensor (4) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 338: Hydraulic Impulse Storage Unit & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

9. If equipped, install the Hydraulic Impulse Oil Storage (HIS) accumulator (1).
10. Tighten the bolts (2 and 3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
11. Connect the HIS electrical connector.
12. Install the valve body bolts (3) and hand tighten.



[Fig. 339: Valve Body Bolts Loosening And Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

13. Tighten the valve body bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

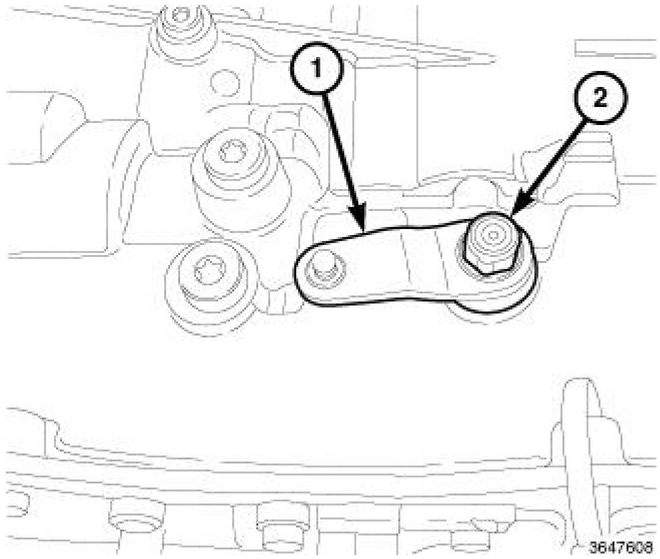


Fig. 340: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

14. Remove the tie strap and return the Manual Park Release (MPR) lever (1) to the original position. Tighten the MPR bolt (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

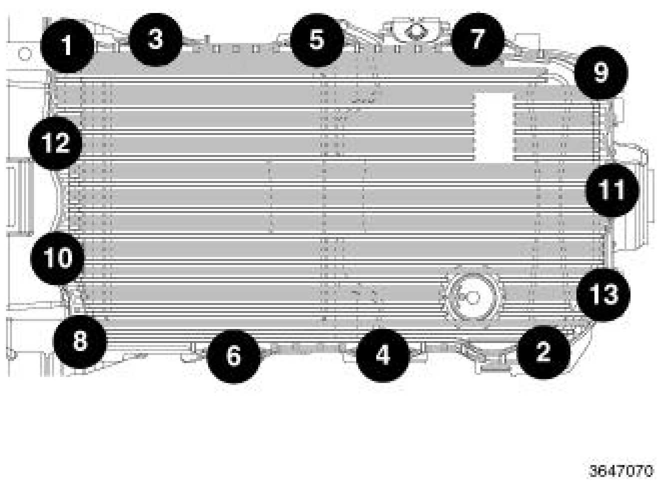


Fig. 341: Oil Pan Retaining Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

15. Install the transmission oil pan and gasket.
16. Install the thirteen transmission oil pan bolts and tighten the to the proper specification using the sequence given. Refer to **TORQUE SPECIFICATIONS**.

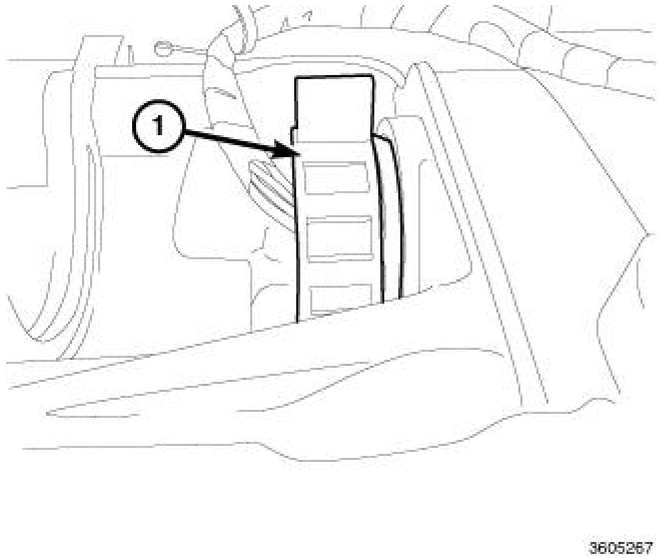


Fig. 342: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

17. Connect the transmission wire harness connector (1).

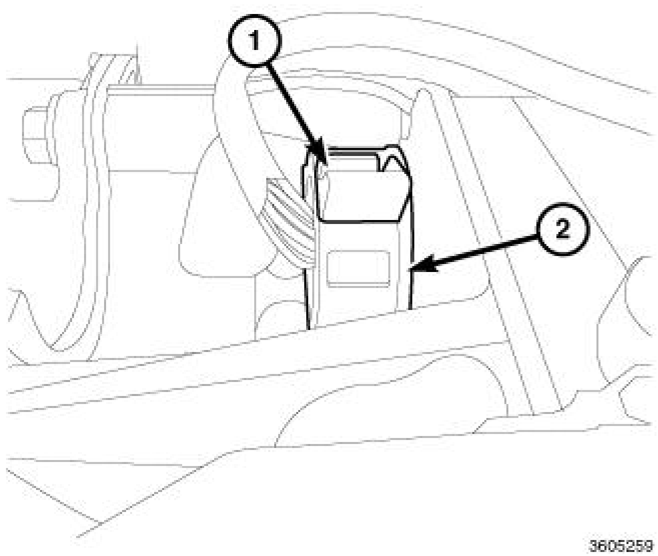


Fig. 343: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

18. Turn the locking mechanism (1) of the transmission wire harness connector (2) clockwise to lock it in place.
19. If the valve body is replaced, program the Transmission Control Module (TCM). Refer to **MODULE, TRANSMISSION CONTROL, MODULE PROGRAMMING** .
20. Perform the TRANSMISSION FILL AFTER SERVICE procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE**.
21. Perform the TRANSMISSION VERIFICATION TEST. Refer to **TRANSMISSION VERIFICATION TEST** .

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GENERAL INFORMATION

Commonly Used Abbreviations

* PLEASE READ THIS FIRST *

NOTE: **This article is intended for general information purposes only. This information may not apply to all makes and models. Not all abbreviations are covered as manufacturers add new ones every day.**

"A"

A

Amperes

ABS

Anti-Lock Brakes

ABRS

Air Bag Restraint System

AC

Alternating Current

A/C

Air Conditioning

ACCS

A/C Cycling Switch

ACCUM

Accumulator

ACCY

Accessory

ACT

Air Charge Temperature Sensor

ADJ

Adjust or Adjustable

ADV

Advance

AFS

Airflow Sensor

AI

Air Injection

AIR or A.I.R.

Air Injection Reactor

AIS

Air Injection System

Alt.

Alternator or Altitude

Amp./amp/amps

Ampere

ASCS

Air Suction Control Solenoid

ASD

Auto Shutdown

ASDM

Air Bag System Diagnostic Module

ASV

Air Suction Valve

A/T

Automatic Transmission/Transaxle

ATC

Automatic Temperature Control

ATDC

After Top Dead Center

ATF

Automatic Transmission Fluid

ATS

Air Temperature Sensor

Aux.

Auxiliary

Avg.

Average

AXOD

Automatic Transaxle Overdrive (Ford Models Only)

"B"

BAC

By-Pass Air Control

BAP

Barometric Absolute Pressure Sensor

BARO

Barometric

Batt.

Battery

Bbl.

Barrel (Example: 4-Bbl.)

BCM

Body Control Module

BHP

Brake Horsepower

BMAP

Barometric and Manifold Absolute Pressure Sensor

BOO

Brake On-Off Switch

B/P

Backpressure

BPS

Barometric Pressure Sensor

BPT

Backpressure Transducer

BTDC

Before Top Dead Center

BTSI

Brake Transmission Shift Interlock

BTU

British Thermal Unit

BVSV

Bimetallic Vacuum Switching Valve

"C"

Ā° C

Celsius (Degrees)

Calif.

California

CANP

Canister Purge

CARB

California Air Resources Board

CAT

Catalytic Converter

CB

Circuit Breaker

CBD

Closed Bowl Distributor

cc

cubic centimeter

CCC

Close Coupled Catalyst

CCC

Computer Command Control

CCD

Computer Controlled Dwell

CCOT

Cycling Clutch Orifice Tube

CCW

Counterclockwise

CDI

Capacitor Discharge Ignition

CEC

Computerized Engine Control

CID

Cubic Inch Displacement

cm

Centimeter

CMP

Camshaft Position Sensor

CO

Carbon Monoxide

CO_2

Carbon Dioxide

Cont.

Continued

CONV

Convertible

CP

Canister Purge

CKP

Crankshaft Position Sensor

CTS

Coolant Temperature Sensor

Cu. In.

Cubic Inch

CVC

Constant Vacuum Control

CV

Check Valve or Constant Velocity

CW

Clockwise

CYL or Cyl.

Cylinder

C^3 I

Computer Controlled Coil Ignition

C^4

Computer Controlled Catalytic Converter

"D"

"D"

Drive

DC

Direct Current Or Discharge

DDD

Dual Diaphragm Distributor

Def.

Defrost

Defog.

Defogger

DERM

Diagnostic Energy Reserve Module

DFI

Digital Fuel Injection

Diag.

Diagnostic

DTC

Diagnostic Trouble Code

DIC

Driver Information Center

DIS

Distributorless Ignition System

DIST

Distribution

DLC

Data Link Connector

DOC

Diesel Oxidation Catalyst

DOHC

Double Overhead Cam

DOT

Department of Transportation

DPF

Diesel Particulate Filter

DRB-II

Diagnostic Readout Box

DVOM

Digital Volt-Ohmmeter

"E"

EACV

Electric Air Control Valve

EATX

Electronic Automatic Transaxle

EBCM

Electronic Brake Control Module

EBL

Electronic Back Light

ECM

Engine Control Module

ECT

Engine Coolant Temperature Sensor

EDIS

Electronic Distributorless Ignition System

EEC

Electronic Engine Control

EECS

Evaporative Emission Control System

EEPROM

Electronically Erasable PROM

EFE

Early Fuel Evaporation

EGO

Exhaust Gas Oxygen Sensor

EGR

Exhaust Gas Recirculation

EOT

Engine Oil Temperature

ESA

Electronic Spark Advance

ESC

Electronic Spark Control

EST

Electronic Spark Timing

EVAP

Fuel Evaporative System

EVIC

Electronic Vehicle Information Center

EVP

EGR Valve Position Sensor

EWMA

Exponentially Weighted Moving Average (MODE 6)

Exc.

Except

"F"

Ā° F

Fahrenheit (Degrees)

F/B

Fuse Block

Fed.

Federal

FI

Fuel Injection

FICU

Fuel Injection Control Unit

FIPL

Fuel Injector Pump Lever

FLI

Fuel Level Indicator

FPR-VSV

Fuel Pressure Regulator Vacuum Switching Valve

Ft. Lbs.

Foot Pounds

FWD

Front Wheel Drive

"G"

g

grams

Gals.

gallons

GND or GRND

Ground

"H"

HAC

High Altitude Compensation

HC

Hydrocarbons

H/D

Heavy Duty

HO2S

Heated Exhaust Gas Oxygen Sensor

Hg

Mercury

Hgt.

Height

HLDT

Headlight

HO

High Output

HO2S

Heated Oxygen Sensor

HP

High Performance

HSC

High Swirl Combustion

HSO

High Specific Output

HTR

Heater

Hz

Hertz (Cycles Per Second)

"I"

IAC

Idle Air Control

IACV

Idle Air Control Valve

IAT

Intake Air Temperature

IC

Integrated Circuit

ID

Identification

I.D.

Inside Diameter

IFS

Independant Front Suspension

IFS

Inertia Fuel Shutoff (Ford)

Ign.

Ignition

IMRC

Intake Manifold Runner Control

In.

Inches

INCH Lbs.

Inch Pounds

in. Hg

Inches of Mercury

Inj.

Injector

IP

Instrument Panel

IRS

Independant Rear Suspension

ISC

Idle Speed Control

IVD

Interactive Vehicle Dynamics (Ford)

IVSV

Idle Vacuum Switching Valve

"J"

J/B

Junction Block

"K"

KAPWR

Keep Alive Power

k/ohms

kilo-ohms (1000 ohms)

kg

Kilograms (weight)

kg/cm^2

Kilograms Per Square Centimeter

KM/H

Kilometers Per Hour

KOEO

Key On, Engine Off

KOER

Key On, Engine Running

KS

Knock Sensor

kW

Kilowatt

kV

Kilovolt

"L"

L

Liter

lbs. (Lbs. when used in table)

Pounds

LCD

Liquid Crystal Display

L/D

Light Duty

LDP

Leak Detection Pump (Part of EVAP system.)

LED

Light Emitting Diode

LH

Left Hand

"M"

mA

Milliamps

MA or MAF

Mass Airflow

MAFS

Mass Airflow Sensor

MAP

Manifold Absolute Pressure

MAT

Manifold Air Temperature

Mem.

Memory

MEM-CAL

Memory Calibration Chip

mfd.

Microfarads

MFI

Multiport Fuel Injection

MICU

Multiplex Integrated Control Unit (Acura/Honda)

MIL

Malfunction Indicator Light

MPI

Multi-Point (Fuel) Injection

mm

Millimeters

MPH

Miles Per Hour

mV

Millivolts

"N"

NA

Not Available

NAC

NOx Adsorber Catalyst

NCA

No Color Available (Wiring Diagrams)

NGS

New Generation Star

N.m

Newton Meter

No.

Number

Nos.

Numbers

NOx

Oxides of Nitrogen

"O"

O_2

Oxygen

OBD

On-Board Diagnostics

OC

Oxidation Catalyst

OD

Overdrive

O.D.

Outside Diameter

OHC

Overhead Camshaft

OSS

Output Speed Sensor

O/S

Oversize

oz.

Ounce

ozs.

Ounces

"P"

"P"

Park

P/C

Printed Circuit

PCM

Powertrain Control Module

PCS

Purge Control Solenoid

PC-SOL

Purge Control Solenoid

PCV

Positive Crankcase Ventilation

PFI

Port Fuel Injection

PGM-FI

Programmed Fuel Injection

PID

Parameter Identification

PIP

Profile Ignition Pick-up

PNP

Park Neutral Position Switch

P/N

Park/Neutral

PRNDL

Park Reverse Neutral Drive Low

PROM

Programmable Read-Only Memory

psi

Pounds Per Square Inch

P/S

Power Steering

PSPS

Power Steering Pressure Switch

PTC

Positive Temperature Coefficient

PTO

Power Take-Off

Pts.

Pints

Pwr.

Power

"Q"

Qts.

Quarts

"R"

RABS

Rear Anti-Lock Brake System

RECIRC

Recirculation

RH

Right Hand

RPM

Revolutions Per Minute

RWAL

Rear Wheel Anti-Lock Brake

RWD

Rear Wheel Drive

"S"

SAS

Steering Angle Sensor

SBC

Single Bed Converter

SBEC

Single Board Engine Controller

SDARS

Satellite Digital Audio Radio Service

SES

Service Engine Soon

SFI

Sequential (Port) Fuel Injection

SIL

Shift Indicator Light

SIR

Supplemental Inflatable Restraint

SOHC

Single Overhead Cam

SOL or Sol.

Solenoid

SPFI

Sequential Port Fuel Injection

SPK

Spark Control

SPOUT

Spark Output

SRI

Service Reminder Indicator

SRS

Supplemental Restraint System (Air Bag)

STAR

Self-Test Automatic Readout

STO

Self-Test Output

SUB-O_2

Sub Oxygen Sensor

Sw.

Switch

Sys.

System

"T"

TAB

Thermactor Air By-Pass

TAC

Throttle Actuator Module

TAD

Thermactor Air Diverter

TBC

Body Control Module (General Motors)

TBI

Throttle Body Injection

TCC

Torque Converter Clutch

TDC

Top Dead Center

Temp.

Temperature

TFI

Thick Film Ignition

THERMAC

Thermostatic Air Cleaner

TPM

Tire Pressure Monitor

TPMS

Tire Pressure Monitor System

TPS

Throttle Position Sensor/Switch

TS

Temperature Sensor

TV

Thermovalve

TWC

Three-Way Catalyst

"V"

V

Valve

Vac.

Vacuum

VAF

Vane Airflow

VAPS

Variable Assist Power Steering

VCC

Viscous Converter Clutch

VCRM

Variable Control Relay Module

VIN

Vehicle Identification Number

VM

Vacuum Modulator

Volt.

Voltage

VOM

Volt-Ohmmeter (Analog)

VRV

Vacuum Regulator Valve

VSS

Vehicle Speed Sensor

VSV

Vacuum Switching Valve

"W"

W/

With

W/O

Without

WAC

Wide Open Throttle A/C Switch

WOT

Wide Open Throttle

.

Article GUID: A00002370

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
B222F-00	FLASH WRITE PERFORMANCE
C0063-9A	YAW RATE SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
C008E-00	ECU INTERNAL PERFORMANCE
C1240-00	STEERING ANGLE SENSOR ANGLE OVERTRAVEL PERFORMANCE
C127A-00	ESP DID NOT RESPOND TO DECELERATION REQUEST
C14A3-00	XBW RULE VIOLATION
C14A4-00	SENSOR ADJUSTMENT REQUIRED
C14A5-00	SENSOR BLINDED
C15D8-00	MISMATCH TIRE SIZE
C2129-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2129-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
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C2206-00	VEHICLE CONFIGURATION MISMATCH
C2210-00	ECU OVERTEMPERATURE
C2212-00	ECU IN - PLANT MODE ACTIVE
C2223-00	ECU CONFIGURATION MISMATCH
C2225-00	PCM DISABLED ECU
C2226-00	TCM DISABLED ECU
C2227-00	ABS DISABLED ECU
P0585-00	SPEED CONTROL SWITCH 1/2 CORRELATION
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U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0151-00	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM

DTC	Description
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0423-00	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM
U0452-00	IMPLAUSIBLE DATA RECEIVED FROM RESTRAINTS CONTROL MODULE
U110A-00	LOST COMMUNICATION WITH SCM - CAN-C
U11F9-00	ENGINE DID NOT RESPOND TO ACC TORQUE REQUEST
U121E-00	LOST COMMUNICATION WITH STEERING WHEEL CRUISE CONTROL SWITCH
U1600-00	ECU APPLICATION SOFTWARE MISMATCH

DTC TROUBLESHOOTING

B222F-00-FLASH WRITE PERFORMANCE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

- Continuously with the ignition on.

SET CONDITION

- The module disables a safety controller when programming the module with new software. The safety controller stops the controller from resetting during a flash update. This Diagnostic Trouble Code (DTC) indicates that the controller has not reset.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) and Forward Collision Warning (FCW) systems will be disabled.
- Once the DTC changes from active to stored, the ACC and FCW features will return to normal operation.

POSSIBLE CAUSES

Possible Causes
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read ACC DTCs and record on the repair order.
    2. With the scan tool, erase Adaptive Cruise Control (ACC) DTCs.
    3. Cycle the ignition switch from off to on at least five times, leaving the ignition on for a minimum

of 90 seconds per cycle.

4. With the scan tool, read ACC DTCs.

   Is the DTC active?

   Yes

   - With a scan tool, program the Adaptive Cruise Control (ACC) Module with latest software version and align the ACC Module in accordance with the Service Information.
   - After the above procedure, Go To 2

   No

   - Go To 3

2. **CONTINUED ACTIVE DTC AFTER PROGRAMING**
   1. With the scan tool, read ACC DTCs.

      Does the scan tool display this DTC as active after programming?

      Yes

      - Replace and align the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL**
        .
      - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete.

3. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
   3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Check Service Bulletins for any possible causes that may apply.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

- Test complete.

C0063-9A-YAW RATE SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- A ready conflict between the ACC Module and the Electronic Stability Program (ESP) system has occurred.
- The Module receives over the CAN Bus from the Antilock Brake System (ABS) Module that the yaw rate offset of the Dynamic Sensor is beyond an allowable threshold of 4 degrees per second.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) and Forward Collision Warning (FCW) systems will be disabled.
- Once the DTC changes from active to stored, the ACC and FCW features will return to normal operation.

POSSIBLE CAUSES

Possible Causes
ANTILOCK BRAKE SYSTEM (ABS) DTCS PRESENT
ABS MODULE DYNAMIC SENSOR
ABS MODULE NOT INITIALIZED/PROGRAMED

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Test drive the vehicle.
    2. Park the vehicle on a level surface and allow to idle for a minimum of 10 seconds.
    3. With the scan tool, erase ACC DTCs.
    4. Turn the ignition off.
    5. Start the engine.
    6. With the scan tool read ACC DTCs.

Does this DTC return?

Yes

- Go To 2

No

- If the DTC can be erased without returning, no further repair is necessary, test complete.
- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

2. **ANTI-LOCK BRAKE SYSTEM**
   1. This DTC is an informational DTC detecting that there is a DTC stored in the Anti-lock Brake System (ABS) Module.

      Repair

      - Repair the ABS DTC(s). Refer to **DIAGNOSIS AND TESTING** .

      NOTE: **It may be necessary to perform the ABS Initialization routine with the scan tool to reset the vehicle configuration.**

C008E-00-ECU INTERNAL PERFORMANCE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- The Adaptive Cruise Control (ACC) Module runs a self diagnostic test to validate proper controller operation. This DTC will set if the controller has failed one or more internal test.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Start the engine.
    2. With the scan tool, read Adaptive Cruise Control (ACC) Module DTCs and record on the repair order.

       Is the DTC active?

       Yes

       - Replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
       - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 2
2. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
    3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Check Service Bulletins for any possible causes that may apply.

       Were there any problems found?

       Yes

       - Repair as necessary.
       - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Test complete.

C1240-00-STEERING ANGLE SENSOR ANGLE OVERTRAVEL PERFORMANCE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- A ready conflict with the Steering Column Control Module (SCCM) has occurred.
- The Module receives a message over the Can Bus from the Steering Column Control Module (SCCM) that the Steering Angle Sensor (SAS) steering angle offset is beyond an allowable threshold of 12 degrees.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
STEERING COLUMN CONTROL MODULE DTCS PRESENT
STEERING COLUMN CONTROL MODULE (SCCM) - STEERING ANGLE SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Adaptive Cruise Control (ACC) Module DTCs and record on the repair order.
    2. With the scan tool, erase ACC DTCs.
    3. Turn the ignition off.
    4. Start the Engine.
    5. With the scan tool, read ACC DTCs.

       Does the DTC return?

       Yes

       - Go To 2

No

- If the DTC can be erased without returning, no further repair is necessary, test complete.
- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

2. **REPAIR STEERING COLUMN CONTROL MODULE DTCS**
    1. This DTC is an informational DTC indicating that there is a DTC stored in the Steering Column Control Module (SCCM).

    Repair

    - Repair the SCCM DTC(s). Refer to **DIAGNOSIS AND TESTING** .

C127A-00-ESP DID NOT RESPOND TO DECELERATION REQUEST

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.
- ACC or Forward Collision Warning (FCW) system is enabled.

SET CONDITION

- Module detects the Antilock Brake System (ABS) Module for ESP/ESC does not brake when requested.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
ANTILOCK BRAKE SYSTEM (ABS) ESP/ESC DTCS PRESENT
CAN MESSAGE CONFLICT
VEHICLE IMPROPERLY CONFIGURED

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Test drive the vehicle.
    2. Park the vehicle on a level surface and allow to idle for a minimum of 10 seconds.
    3. With the scan tool, erase ACC DTCs.
    4. Turn the ignition off.
    5. Start the engine.
    6. Activate the ACC.
    7. With the scan tool read ACC DTCs.

    Does this DTC return?

    Yes

    - Go To 2

    No

    - If the DTC can be erased without returning, no further repair is necessary, test complete.
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
2. **ANTI-LOCK BRAKE SYSTEM**
    1. This DTC is an informational DTC detecting that there is a DTC stored in the Anti-lock Brake System (ABS) Module.

    Repair

    - Repair the ABS DTC(s). Refer to **DIAGNOSIS AND TESTING** .

    NOTE: **It may be necessary to perform the ABS Initialization routine with the scan tool to reset the vehicle configuration.**

C14A3-00-XBW RULE VIOLATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.
- ACC or Forward Collision Warning (FCW) system is enabled.

SET CONDITION

- The Module detects an sudden deceleration/acceleration induced externally or a DTC in another Module.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
DTCS IN OTHER MODULE(S)
IGNITION CYCLE
BRAKE SYSTEM FUNCTIONALITY
DRIVING CONDITIONS OR ACCIDENT OCCURRED

DIAGNOSTIC TEST

1. **CHECK FOR DTCS IN OTHER MODULES**
    1. With the scan tool, read DTCs.

       Are other modules reporting any DTCs?

       Yes

       - If DTCs are set in the PCM, TCM, or ABS, refer to those diagnostic categories first and perform the appropriate diagnostic procedure(s).

       No

       - Go To 2
2. **CHECK FOR AN ACTIVE DTC**

   NOTE: **To help in the service of the Adaptive Cruise Control (ACC) system, it is recommended to communicate with the customer to obtain the environmental conditions they were driving in when the cruise control concern took place. Heavy rain, snow, ice, and fog can cause the ACC system to become inoperative. This is considered as a normal operational reaction of the ACC system and no repair is necessary.**

    1. With the scan tool, attempt to erase Adaptive Cruise Control (ACC) DTCs.

       Can you erase this DTC?

       Yes

       - If the DTC can be erased without resetting, no further repair is necessary. Test complete.

- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

NOTE: **This DTC cannot be caused without faults elsewhere, other than deceleration/acceleration induced externally (e.g. driving in sand or accident).**

- If there are no other DTCs present, and the DTC cannot be cleared or go into a stored state, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C14A4-00-SENSOR ADJUSTMENT REQUIRED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- Module detects that it is physically misaligned for one minute.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
ADAPTIVE CRUISE CONTROL (ACC) MODULE/LENS MISALIGNED
ADAPTIVE CRUISE CONTROL (ACC) MODULE BRACKET, SECURING CLIPS BROKEN OR BENT

Possible Causes
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: A secure and unmodified mounting location is critical to the proper operation of the Adaptive Cruise Control (ACC) system.

   NOTE: To help in the service of the Adaptive Cruise Control (ACC) system, it is recommended to communicate with the customer to obtain the environmental conditions they were driving in when the cruise control concern took place. Heavy rain, snow, ice, and fog can cause the ACC system to become inoperative. This is considered as a normal operational reaction of the ACC system and no repair is necessary.

   NOTE: Vehicles that have had the suspension modified and/or an aftermarket grill installed that blocks the ACC Module can cause the ACC system to not function properly.

   1. Start the engine.
   2. With the scan tool, read ACC DTCs and record on the repair order.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Make sure the lens is free of dirt, damage, and other obstructions. Clear the DTC and verify proper operation of the ACC system.
      - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

2. **INSPECT ACC MODULE MOUNTING AND LENS ALIGNMENT**

   NOTE: Make sure the ACC Sensor lens is free from dirt and debris (mud, dirt, ice, road debris) that would compromise the function of the ACC system.

   1. Perform a thorough visual and physical inspect of the ACC Module and the mounting bracket and location.
   2. Check for:
      - Bent mounting bracket
      - Damage to the ACC Module
      - Damaged, obscured, or out of alignment lens

- ACC Module not fully seated or broken/missing securing clips

Were there any problems found?

Yes

- Repair as necessary in accordance with the Service Information.
- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Align the Adaptive Cruise Control (ACC) Module/sensor lens in accordance to the Service Information. If the alignment is correct, and the DTC continues to set, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C14A5-00-SENSOR BLINDED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- Module detects that the lens is damaged or obstructed.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
SENSOR LENS OBSTRUCTION

Possible Causes
DAMAGE SENSOR LENS OR MOUNTING LOCATION
VERTICAL MISALIGNMENT
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: **A secure and unmodified mounting location is critical to the proper operation of the Adaptive Cruise Control (ACC) system.**

NOTE: **To help in the service of the Adaptive Cruise Control (ACC) system, it is recommended to communicate with the customer to obtain the environmental conditions they were driving in when the cruise control concern took place. Heavy rain, snow, ice, and fog can cause the ACC system to become inoperative. This is considered as a normal operational reaction of the ACC system and no repair is necessary.**

NOTE: **Vehicles that have had the suspension modified and/or an aftermarket grill installed that blocks the ACC Module can cause the ACC system to not function properly.**

   1. Start the engine.
   2. Wait a minimum of one minute.
   3. With the scan tool, read ACC DTCs and record on the repair order.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Make sure the lens is free of dirt, damage, and other obstructions. If no problems are found, clear the DTC and verify proper operation of the ACC system. Test complete.
   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to STANDARD PROCEDURE.

2. **INSPECT ACC MODULE MOUNTING AND LENS ALIGNMENT**

NOTE: **Make sure the ACC Sensor lens is free from dirt and debris (mud, dirt, ice, road debris) that would compromise the function of the ACC system.**

   1. Perform a thorough visual and physical inspection of the ACC Module and the mounting bracket and location.
   2. Check for:

- Bent mounting bracket
- Damage to the ACC Module
- Damaged, obscured, or out of alignment lens
- ACC Module not fully seated or broken/missing securing clips

Were there any problems found?

Yes

- Repair as necessary in accordance with the Service Information.
- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Align the Adaptive Cruise Control (ACC) Module/sensor lens in accordance to the Service Information. If the alignment is correct, and the DTC continues to set, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C15D8-00-MISMATCH TIRE SIZE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- Module detects that the tire size on the vehicle is greater the 10% of the programed size.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
INCORRECT TIRE SIZE PROGRAMED INTO BODY CONTROL MODULE (BCM)
INCORRECT TIRE SIZE PROGRAMED INTO ANTILOCK BRAKE SYSTEM (ABS)
ANTILOCK BRAKE SYSTEM (ABS) DTCS PRESENT
WRONG TIRE SIZE INSTALLED ON VEHICLE

DIAGNOSTIC TEST

CHECK THE TIRE SIZE

1. This is an informational Diagnostic Trouble Code (DTC). The Adaptive Cruise Control (ACC) Module receives the vehicle configuration information over the Can Bus. Tire size is stored in the Body Control Module (BCM) and also in the Anti-lock Brake System (ABS) Module.

   Possible causes but not limited too:

   - Wrong tires installed on vehicle.
   - Incorrect tire size written/stored in the BCM and/or ABS.
   - ABS DTCs present.
   - Any Service Bulletins that may apply.

   Were any of the above conditions present?

   Yes

   - Repair/reprogram as necessary.
   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - With the scan tool, perform an ACC Aim Mode - Auto Alignment procedure to relearn a different tire size and to verify the Adaptive Cruise Control (ACC) Module alignment.
   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2129-16-BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

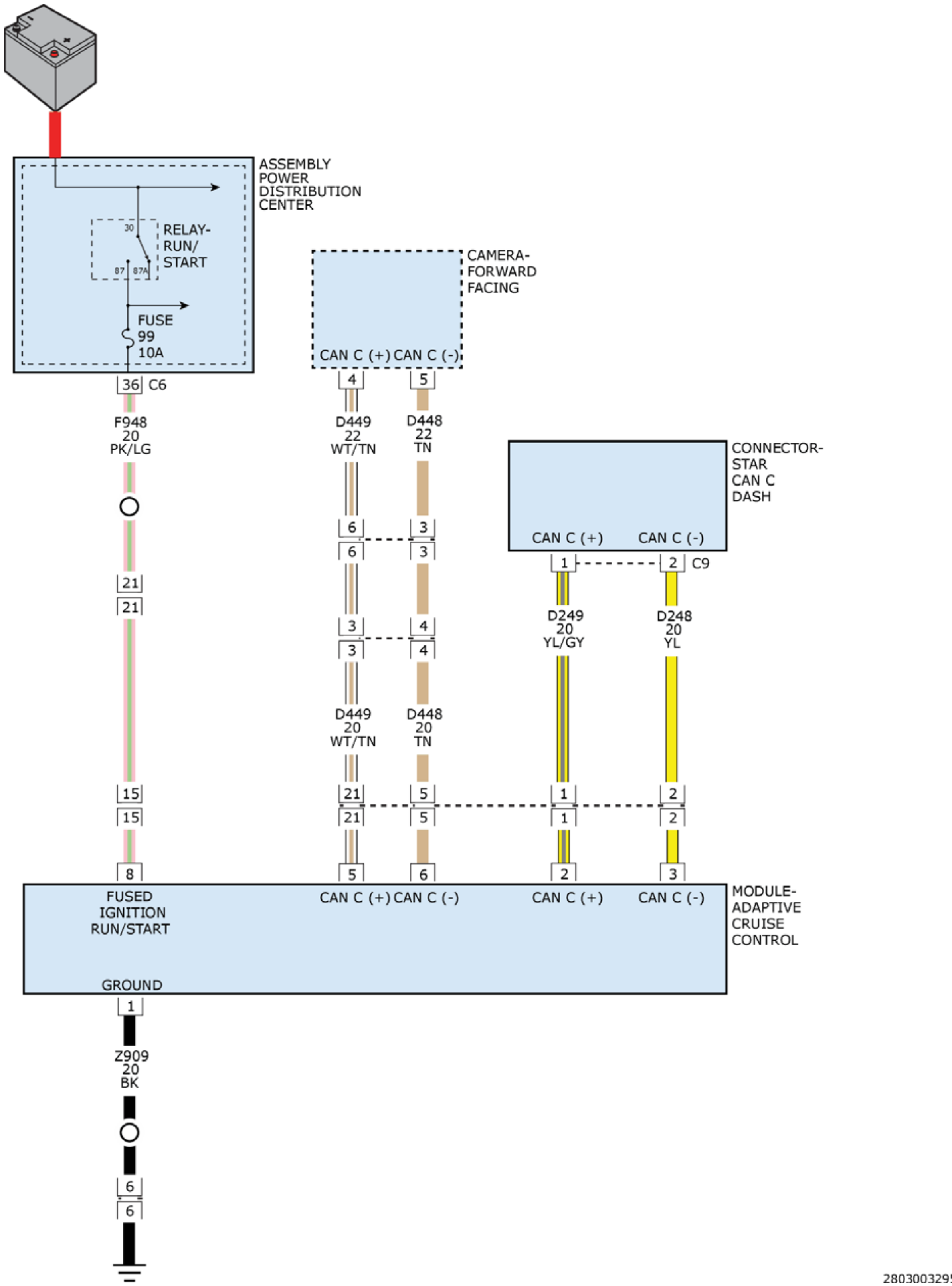

Fig. 1: Identifying Adaptive Cruise Control Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- Engine not cranking.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- The monitored voltage to the Adaptive Cruise Control (ACC) Module is below 9.0 volts.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Wipe Off Front Radar Sensor plus Graphic".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
RELATED DTCS PRESENT IN POWERTRAIN CONTROL MODULE (PCM)
LOW BATTERY VOLTAGE
FUSED IGNITION OPEN OR HIGH RESISTANCE
GROUND CIRCUIT OPEN OR HIGH RESISTANCE
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **RELATED DTCS PRESENT IN PCM**
    1. Start the engine.
    2. With the scan tool, read Powertrain Control Module (PCM) DTCs and record on the repair order.

       Are there any charging system or battery related DTCs present?

       Yes

       - Repair the PCM DTC(s). Refer to **DTC INDEX** .

       No

       - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Adaptive Cruise Control (ACC) Module DTCs and record on the repair order.

       Is the DTC active?

       Yes

- Go To 3

No

- Go To 5

3. **CHECK THE (F948) FUSED IGNITION CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Disconnect the ACC Module harness connector.
   3. Turn the ignition on.
   4. Using a 12-volt test light connected to ground, check the (F948) Fused Ignition circuit at the ACC Module harness connector.

   NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

   Does the test light illuminate brightly?

   Yes

   - Go To 4

   No

   - Repair the (F948) Fused Ignition circuit for an open or high resistance.

     NOTE: **If the fuse is open, make sure to check for a short to ground.**

   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

4. **CHECK THE (Z909) GROUND CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Using a 12-volt test light connected to 12-volts, check the ground and the (Z909) Ground circuit in the ACC harness connector.

   Does the test light illuminate brightly?

   Yes

   - Replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Repair the (Z909) Ground circuit for an open or high resistance.
   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to

STANDARD PROCEDURE.

5. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring and connectors while checking for shorted and open circuits.
    3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. With the scan tool, check for any Environmental Data to help identify the conditions in which the DTC was set.
    5. Check for any Service Bulletins that may apply.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

C2129-17-BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

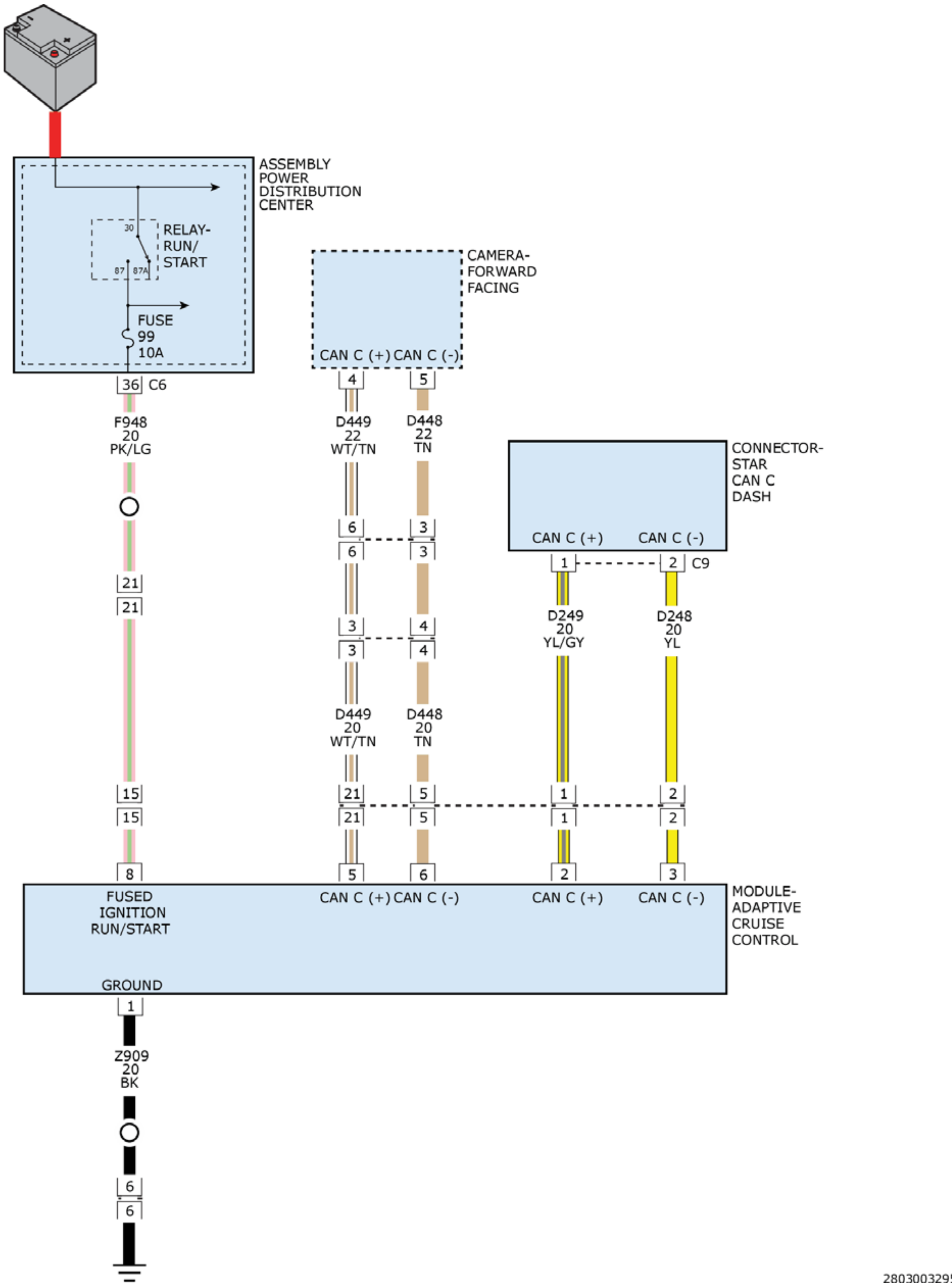

Fig. 2: Identifying Adaptive Cruise Control Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- Module detects that the voltage to the module is above 16.0 volts.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
RELATED DTC(S) PRESENT IN THE PCM
HIGH BATTERY VOLTAGE
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **RELATED DTCS PRESENT IN THE PCM**
    1. Start the Engine.
    2. With the scan tool, read Powertrain Control Module (PCM) DTCs and record on the repair order.

       Are there any charging system or battery related DTCs present in the PCM?

       Yes

       - Repair the PCM DTC(s). Refer to **DTC INDEX** .

       No

       - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read ACC Module DTCs and record on the repair order.

       Is the DTC active?

       Yes

       - Replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .

- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
    3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Check Service Bulletins for any possible causes that may apply.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

C212A-84-SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- Module receives a low charging system voltage message over the CAN Bus.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.

- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM VOLTAGE LOW
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK PCM FOR CHARGING SYSTEM DTCS**
    1. With the scan tool, read the PCM DTCs.

    Are there any charging system or battery DTCs set in the PCM?

    Yes

    - Repair the PCM DTC(s). Refer to **DTC INDEX** .

    No

    - Go To 2
2. **CHECK OTHER MODULES FOR CHARGING SYSTEM DTCS**
    1. Start the Engine.
    2. With the scan tool, read DTCs.

    Are there any other modules setting a charging system or battery related DTC?

    Yes

    - This is an indication of a charging/battery system malfunction. Check the battery/charging system in accordance with the Service Information. Refer to **DIAGNOSIS AND TESTING** .

    No

    - Go To 3
3. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read ACC DTCs.

    Is the DTC active?

    Yes

    - If no other modules are reporting any charging system under voltage DTCs, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
    3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Check Service Bulletins for any possible causes that may apply.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

C212A-85-SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.
- ACC system is enabled and engaged.

SET CONDITION

- Module receives a high charging system voltage message over the Can Bus.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM VOLTAGE HIGH
RELATED DTC(S) PRESENT IN THE PCM
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK PCM FOR CHARGING SYSTEM DTC**
    1. With the scan tool, read PCM DTCs and record on the repair order.

       Are there any charging system or battery DTCs set in the PCM?

       Yes

       - Repair the PCM DTC(s). Refer to **DTC INDEX** .

       No

       - Go To 2
2. **CHECK OTHER MODULES**
    1. Start the Engine.
    2. With the scan tool, read DTCs.

       Do any other modules display this type of DTC?

       Yes

       - This is an indication of a charging/battery system malfunction. Check the battery/charging system in accordance with the Service Information. Refer to **DIAGNOSIS AND TESTING** .

       No

       - Go To 3
3. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read ACC Module DTCs and record on the repair order.

       Is the DTC active?

       Yes

       - If no other modules are reporting any charging system or over voltage DTCs, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .

       No

- Go To 4

4. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
    3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Check Service Bulletins for any possible causes that may apply.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

C2206-00-VEHICLE CONFIGURATION MISMATCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- The vehicle configuration does not match what is stored in the ACC Module

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
VEHICLE CONFIGURATION
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

ADAPTIVE CRUISE CONTROL MODULE NOT PROPERLY CONFIGURED

1. Preform the horizontal sensor alignment procedure in accordance with the Service Information.
2. Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   Does this DTC reset?

   Yes

   - Replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test Complete.

C2210-00-ECU OVERTEMPERATURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.

SET CONDITION

- Module detects an internal temperature greater than 115Â°C (239Â°F).

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
AMBIENT TEMPERATURE TOO HIGH
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **To help in the service of the Adaptive Cruise Control (ACC) System, it is recommended speaking to the customer to find out what type of environment they were driving in when the cruise concern took place. Heavy rain, snow, ice, and fog can cause the ACC system to become unavailable. This is considered normal operation and no repair is necessary.**

   1. With the scan tool, read ACC Module DTCs and record on the repair order.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Make sure the lens is free of dirt, damage, and other obstructions and clean/repair as necessary. If no problems are found, test complete.
      - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

2. **VERIFY AMBIENT TEMPERATURE READING**

   1. With the scan tool, read PCM ambient air temperature.

      Is the ambient air temperature reading 85Ā°C (185Ā°F) or above?

      Yes

      - The Adaptive Cruise Control (ACC) Module has detected the ambient temperature above operating range. Once the temperature has decreased below 85Ā°C (185Ā°F), ACC operation will be restored.
      - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
      - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2212-00-ECU IN - PLANT MODE ACTIVE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.

SET CONDITION

- Module detects it is in the In-Plant mode.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "Front Radar Sensor Plant Mode".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
ACC MODULE IN THE IN-PLANT MODE
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

CHECK FOR AN ACTIVE DTC

1. With the scan tool, read ACC Module DTCs and record on the repair order.

   Is the DTC active?

   Yes

   - With the scan tool, perform the ACC Aim Mode Auto Alignment procedure.

     NOTE: **Performing the ACC Aim Mode Auto Alignment procedure will remove the Module from the In-Plant mode.**

   - Perform the ACC MODULE VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - No repair is necessary. Make sure the lens is free of dirt, damage, and other obstructions that would hinder the performance of the ACC imager lens. Clear the DTC and verify proper operation of the

ACC system.

C2223-00-ECU CONFIGURATION MISMATCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- Body Control Module (BCM) does not expect the Adaptive Cruise Control (ACC) module to be present.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
BODY CONTROL MODULE (BCM) NOT CONFIGURED FOR ADAPTIVE CRUISE CONTROL (ACC) MODULE
ADAPTIVE CRUISE CONTROL (ACC) MODULE NOT CONFIGURED

DIAGNOSTIC TEST

ADAPTIVE CRUISE CONTROL MODULE NOT PROGRAMED

This Diagnostic Trouble Code will set if the Body Control Module (BCM) is not configured for Adaptive Cruise Control (ACC).

- Program the BCM with the correct sales code. Refer to **STANDARD PROCEDURE** .
- Verify that both the ACC Horizontal and Vertical alignments are correct. Perform the Adaptive Speed Control Module Alignment procedures. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, MODULE PROGRAMMING** .
- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2225-00-PCM DISABLED ECU

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- Module detects an active Diagnostic Trouble Code (DTC) is set in the Powertrain Control Module (PCM).

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
POWERTRAIN CONTROL MODULE DTC PRESENT

DIAGNOSTIC TEST

CHECK FOR POWERTRAIN CONTROL MODULE (PCM) DTCS

This Diagnostic Trouble Code (DTC) will set if a DTC is detected in the Powertrain Control Module (PCM).

- Repair the PCM DTC(s). Refer to **DTC INDEX** .
- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2226-00-TCM DISABLED ECU

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.
- ACC or Forward Collision Warning (FCW) system is enabled.

SET CONDITION

- Module detects an active Diagnostic Trouble Code (DTC) is set in the Transmission Control Module (TCM).

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
TRANSMISSION CONTROL MODULE (TCM) DTC(S) PRESENT

DIAGNOSTIC TEST

CHECK FOR TRANSMISSION CONTROL MODULE (TCM) DTCS

This Diagnostic Trouble Code (DTC) will set if a DTC is detected in the Transmission Control Module (TCM).

- Repair the TCM DTC(s). Refer to **DTC INDEX** .
- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2227-00-ABS DISABLED ECU

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.

- ESP is not in diagnostic mode.

SET CONDITION

- Module detects an active Diagnostic Trouble Code (DTC) is set in the Antilock Brake System (ABS) Module.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
ANTILOCK BRAKE SYSTEM (ABS) MODULE DTC(S) PRESENT

DIAGNOSTIC TEST

CHECK FOR ANTILOCK BRAKE SYSTEM (ABS) MODULE DTCS

This Diagnostic Trouble Code (DTC) will set if a DTC is detected in the Antilock Brake System (ABS) module.

- Refer to **DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.
- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

P0585-00 SPEED CONTROL SWITCH 1/2 CORRELATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Speed Control Switch uses a Lin Bus to communicate to the Steering Column Control Module (SCCM). The SCCM then broadcast the speed control switch status over the Can Bus. The Adaptive Cruise Control (ACC) module monitors the Can Bus for speed control switch status.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.

SET CONDITION

- Module has received over the Can Bus that the Speed Control Switch is functioning improperly.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
SPEED CONTROL SWITCH
STEERING WHEEL WIRING HARNESS / CONNECTORS
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ACC Module DTCs and record on the repair order.
    3. With the scan tool, erase ACC DTCs,
    4. Turn the ignition off.
    5. Start the engine.
    6. With the scan tool, read ACC Module DTCs.

    Does the DTC return?

    Yes

    - Go To 2

    No

    - Go To 3
2. **CHECK SPEED CONTROL SWITCH OPERATION**
    1. With the scan tool, read the Speed Control Switch status under the Steering Column Control Module (SCCM) while pressing multiple switch positions.

    Does the switch positions change correctly in the scan tool?

    Yes

    - If any Body Control Module (BCM) Bus related DTCs are present, perform those respective diagnostic procedures first and recheck. Inspect the wiring and connectors between the

SCCM and the Speed Control Switch and the output to the BCM for any possible problems. If no problems are found, replace and program the SCCM in accordance with the Service Information.

No

- Inspect the wiring and connectors between the SCCM and the Speed Control Switch. If no problems are found, replace the Speed Control Switch in accordance with the Service Information. Refer to **SWITCH, SPEED CONTROL, REMOVAL** .

3. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module, Speed Control Switch and the Steering Column Control Module (SCCM). Wiggle the wiring and connectors while checking for shorted and open circuits.
    3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Check Service Bulletins for any possible causes that may apply.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

P1593-2A-SPEED CONTROL SWITCH 1/2 STUCK

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Speed Control Switch uses a Lin Bus to communicate to the Steering Column Control Module (SCCM). The SCCM then broadcast the speed control switch status over the Can Bus. The Adaptive Cruise Control (ACC) module monitors the Can Bus for speed control switch status.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- No CAN Bus DTCs present.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.

- ESP is not in diagnostic mode.
- ACC is enabled and engaged.

SET CONDITION

- Module has received over the Can Bus that the Speed Control Switch is stuck in an on position.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
SPEED CONTROL SWITCH STUCK
STEERING WHEEL WIRING HARNESS / CONNECTORS
SPEED CONTROL SWITCH
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read Adaptive Cruise Control (ACC) Module DTCs and record on the repair order.
    3. With the scan tool, erase ACC Module DTCs.
    4. Turn the ignition off
    5. Start the engine.
    6. Activate the ACC.
    7. With the scan tool, read ACC Module DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - Go To 3
2. **CHECK SPEED CONTROL SWITCH OPERATION**
    1. With the scan tool, read the Speed Control Switch status under the Steering Column Control Module (SCCM) while pressing multiple switch positions.

Does the switch positions change correctly in the scan tool?

Yes

- If any Body Control Module (BCM) Bus related DTCs are present, perform those respective diagnostic procedures first and recheck. Inspect the wiring and connectors between the SCCM and the Speed Control Switch and the output to the BCM for any possible problems. If no problems are found, replace and program the SCCM in accordance with the Service Information.

No

- Inspect the wiring and connectors between the SCCM and the Speed Control Switch. If no problems are found, replace the Speed Control Switch in accordance with the Service Information. Refer to **SWITCH, SPEED CONTROL, REMOVAL** .

3. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module, Speed Control Switch and the Steering Column Control Module (SCCM). Wiggle the wiring and connectors while checking for shorted and open circuits.
   3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Check Service Bulletins for any possible causes that may apply.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

P1666-00-CRUISE CONTROL MODULE INTERNAL

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.

SET CONDITION

- The Module regularly performs internal controller diagnostic test and an internal hardware failure has been detected.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

VERIFY DTC IS ACTIVE

1. Using a scan tool, read ACC DTCs.

   Is this DTC active?

   Yes

   - Check for any controller updates. If no updates are available, erase DTC and cycle the ignition off then on. If the DTC resets, repeat erasing the DTC and cycling the ignition at least 3 times. If the DTC continues to reset, replace and program the Adaptive Cruise Control (ACC) module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - No repair is necessary. Make sure the lens is free of dirt, damage, and other obstructions. Clear the DTC and verify the proper operation of the ACC system.
   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U0002-00-CAN C BUS OFF PERFORMANCE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0100-00-LOST COMMUNICATION WITH ECM/PCM

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0101-00-LOST COMMUNICATION WITH TCM

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0121-00-LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0140-00-LOST COMMUNICATION WITH BODY CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0151-00-LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0155-00-LOST COMMUNICATION WITH CLUSTER-CCN

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0401-00-IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.
- ACC or Forward Collision Warning (FCW) system is enabled.

SET CONDITION

- Module receives an implausible (default/error value, toggle error or parity error) message from the Powertrain Control Module (PCM).

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
BODY CONTROL MODULE (BCM) DTCS PRESENT

Possible Causes
POWERTRAIN CONTROL MODULE (PCM) DTCS PRESENT
POWERTRAIN CONTROL MODULE (PCM)
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read Adaptive Cruise Control (ACC) Module DTCs and record on the repair order.
    3. With the scan tool, erase ACC Module DTCs.
    4. Turn the ignition off.
    5. Start the engine.
    6. Activate the ACC.
    7. With the scan tool, read ACC Module DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **CHECK FOR BODY CONTROL MODULE (BCM) DTCS**
    1. With the scan tool, read BCM DTCs and record on the repair order.

    Are there any BCM DTCs present?

    Yes

    - Repair the BCM DTC(s). Refer to **DIAGNOSIS AND TESTING** .

    No

    - Go To 3
3. **CHECK FOR POWERTRAIN CONTROL MODULE (PCM) DTCS**
    1. With the scan tool, read PCM DTCs and record on the repair order.

    Are there any PCM DTCs present?

    Yes

    - Repair the PCM DTC(s). Refer to **DTC INDEX** .

No

- Go To 4

4. **CHECK OTHER MODULES FOR DTCS**
    1. With the scan tool, read DTCs.

    Are there any other modules reporting communication DTCs against the PCM?

    Yes

    - Replace and program the Powertrain Control Module (PCM) in accordance with the Service Information. Refer to **MODULE, POWERTRAIN CONTROL, REMOVAL** .

    No

    - Using the schematics as a guide, check the ACC Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
5. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
    3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Check Service Bulletins for any possible causes that may apply.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

U0402-00-IMPLAUSIBLE DATA RECEIVED FROM TCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.
- ACC or Forward Collision Warning (FCW) system is enabled.

SET CONDITION

- Module receives an implausible (default/error value, toggle error or parity error) message from the Transmission Control Module (TCM).

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
BODY CONTROL MODULE (BCM) DTCS PRESENT
TRANSMISSION CONTROL MODULE (TCM) DTCS PRESENT
TRANSMISSION CONTROL MODULE (TCM)
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read Adaptive Cruise Control (ACC) Module DTCs and record on the repair order.
    3. With the scan tool, erase ACC Module DTCs.
    4. Turn the ignition off.
    5. Start the engine.
    6. Activate the ACC.
    7. With the scan tool, read ACC Module DTCs.

        Is the DTC active?

        Yes

        - Go To 2

No

- Go To 5

2. **CHECK FOR BODY CONTROL MODULE (BCM) DTCS**
    1. With the scan tool, read BCM DTCs and record on the repair order.

       Are there any BCM DTCs present?

       Yes

       - Repair the BCM DTC(s). Refer to **DIAGNOSIS AND TESTING** .

       No

       - Go To 3

3. **CHECK FOR TRANSMISSION CONTROL MODULE (TCM) DTCS**
    1. With the scan tool, read TCM DTCs.

       Are there any TCM DTCs present?

       Yes

       - Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.

       No

       - Go To 4

4. **CHECK OTHER MODULES FOR DTCS**
    1. With the scan tool, read DTCs.

       Are there any other modules reporting communication DTCs against the TCM?

       Yes

       - Replace and program the Transmission Control Module (TCM) in accordance with the Service Information.

       No

       - Using the schematics as a guide, check the ACC Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
       - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.

2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
4. Check Service Bulletins for any possible causes that may apply.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

U0415-00-IMPLAUSIBLE DATA RECEIVED FROM ABS

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.
- ACC or Forward Collision Warning (FCW) system is enabled.

SET CONDITION

- Module receives an implausible (default/error value, toggle error or parity error) message from the Antilock Brake System (ABS) Module.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes

Possible Causes
BODY CONTROL MODULE (BCM) DTCS PRESENT
ANTILOCK BRAKE SYSTEM (ABS) MODULE DTCS PRESENT
ANTILOCK BRAKE SYSTEM (ABS) MODULE
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read Adaptive Cruise Control (ACC) Module DTCs and record on the repair order.
    3. With the scan tool, erase ACC Module DTCs.
    4. Turn the ignition off.
    5. Start the engine.
    6. Activate the ACC.
    7. With the scan tool, read ACC Module DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **CHECK FOR BODY CONTROL MODULE (BCM) DTCS**
    1. With the scan tool, read BCM DTCs and record on the repair order.

    Are there any BCM DTCs present?

    Yes

    - Repair the BCM DTC(s). Refer to **DIAGNOSIS AND TESTING** .

    No

    - Go To 3
3. **CHECK FOR ANTILOCK BRAKE SYSTEM (ABS) DTCS**
    1. With the scan tool, read ABS Module DTCs.

    Are there any ABS Module DTCs present?

    Yes

    - Repair the ABS Module DTC(s). Refer to **DIAGNOSIS AND TESTING** .

No

- Go To 4

4. **CHECK OTHER MODULES FOR DTCS**
    1. With the scan tool, read DTCs.

    Are there any other modules reporting communication DTCs against the ABS?

    Yes

    - Replace and program the Antilock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

    No

    - Using the schematics as a guide, check the ACC Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
5. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
    3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Check Service Bulletins for any possible causes that may apply.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

U0422-00-IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.
- ACC or Forward Collision Warning (FCW) system is enabled.

SET CONDITION

- Module receives an implausible (default/error value, toggle error or parity error) message from the Body Control Module (BCM).

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
BODY CONTROL MODULE (BCM) DTCS PRESENT
BODY CONTROL MODULE
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Turn the ignition on.
   2. With the scan tool, read Adaptive Cruise Control (ACC) Module DTCs and record on the repair order.
   3. With the scan tool, erase ACC Module DTCs.
   4. Turn the ignition off.
   5. Start the engine.
   6. Activate the ACC.
   7. With the scan tool, read ACC Module DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

- Go To 4

2. **CHECK FOR BODY CONTROL MODULE (BCM) DTCS**
    1. With the scan tool, read BCM DTCs and record on the repair order.

       Are there any BCM DTCs present?

       Yes

       - Repair the BCM DTC(s). Refer to **DIAGNOSIS AND TESTING** .

       No

       - Go To 3
3. **CHECK OTHER MODULES FOR DTCS**
    1. With the scan tool, read DTCs.

       Are there any other modules reporting communication DTCs against the BCM?

       Yes

       - Replace and program the Body Control Module (BCM) in accordance with the Service Information. Refer to **MODULE, BODY CONTROL, REMOVAL** .

       No

       - Using the schematics as a guide, check the ACC Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
       - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
    3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Check Service Bulletins for any possible causes that may apply.

       Were there any problems found?

       Yes

       - Repair as necessary.
       - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

U0423-00-IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.
- ACC or Forward Collision Warning (FCW) system is enabled.

SET CONDITION

- Module receives an implausible (default/error value, toggle error or parity error) message from the Instrument Panel Cluster (IPC).

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
BODY CONTROL MODULE (BCM) DTCS PRESENT
INSTRUMENT PANEL CLUSTER (IPC) DTCS PRESENT
INSTRUMENT PANEL CLUSTER (IPC)
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read Adaptive Cruise Control (ACC) Module DTCs and record on the repair order.
    3. With the scan tool, erase ACC Module DTCs.
    4. Turn the ignition off.

5. Start the engine.
6. Activate the ACC.
7. With the scan tool, read ACC Module DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Go To 5

2. **CHECK FOR BODY CONTROL MODULE (BCM) DTCS**
   1. With the scan tool, read BCM DTCs and record on the repair order.

      Are there any BCM DTCs present?

      Yes

      - Repair the BCM DTC(s). Refer to **DIAGNOSIS AND TESTING** .

      No

      - Go To 3

3. **CHECK FOR INSTRUMENT PANEL CLUSTER (IPC) DTCS**
   1. With the scan tool, read IPC DTCs and record on the repair order.

      Are there any IPC DTCs present?

      Yes

      - Repair the IPC DTC(s). Refer to **DIAGNOSIS AND TESTING** .

      No

      - Go To 4

4. **CHECK OTHER MODULES FOR DTCS**
   1. With the scan tool, read DTCs.

      Are there any other modules reporting communication DTCs against the IPC?

      Yes

      - Replace and program the Instrument Cluster in accordance with the Service Information. Refer to **REMOVAL** .

      No

      - Using the schematics as a guide, check the ACC Module pins, terminals, and connectors for

corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .

- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
    3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Check Service Bulletins for any possible causes that may apply.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

U0429-00-IMPLAUSIBLE DATA RECEIVED FROM SCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.
- ACC or Forward Collision Warning (FCW) system is enabled.

SET CONDITION

- Module receives an implausible (default/error value, toggle error or parity error) message from the Steering Column Control Module (SCCM).

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service

Required".

- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
BODY CONTROL MODULE (BCM) DTCS PRESENT
STEERING COLUMN MODULE (SCCM) DTCS PRESENT
STEERING COLUMN CONTROL MODULE (SCCM)
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Turn the ignition on.
   2. With the scan tool, read Adaptive Cruise Control (ACC) Module DTCs and record on the repair order.
   3. With the scan tool, erase ACC Module DTCs.
   4. Turn the ignition off.
   5. Start the engine.
   6. Activate the ACC.
   7. With the scan tool, read ACC Module DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Go To 5
2. **CHECK FOR BODY CONTROL MODULE (BCM) DTCS**
   1. With the scan tool, read BCM DTCs and record on the repair order.

   Are there any BCM DTCs present?

   Yes

   - Repair the BCM DTC(s). Refer to **DIAGNOSIS AND TESTING** .

   No

   - Go To 3
3. **CHECK FOR STEERING COLUMN CONTROL MODULE (SCCM) DTCS**

1. With the scan tool, read SCCM DTCs.

   Are there any SCCM DTCs present?

   Yes

   - Repair the SCCM DTC(s). Refer to **DIAGNOSIS AND TESTING** .

   No

   - Go To 4

4. **CHECK OTHER MODULES FOR DTCS**
   1. With the scan tool, read DTCs.

      Are there any other modules reporting communication DTCs against the SCCM?

      Yes

      - Replace and program the Steering Column Control Module (SCCM) in accordance with the Service Information.

      No

      - Using the schematics as a guide, check the ACC Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
      - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
5. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
   3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Check Service Bulletins for any possible causes that may apply.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

- Test complete.

U0452-00-IMPLAUSIBLE DATA RECEIVED FROM RESTRAINTS CONTROL MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.
- ACC or Forward Collision Warning (FCW) system is enabled.

SET CONDITION

- Module receives an implausible (default/error value, toggle error or parity error) message from the Occupant Restraint Controller (ORC).

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
BODY CONTROL MODULE (BCM) DTCS PRESENT
OCCUPANT RESTRAINT CONTROLLER (ORC) DTCS PRESENT
OCCUPANT RESTRAINT CONTROLLER (ORC)
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read Adaptive Cruise Control (ACC) Module DTCs and record on the repair order.
    3. With the scan tool, erase ACC Module DTCs.
    4. Turn the ignition off.
    5. Start the engine.
    6. Activate the ACC system.

7. With the scan tool, read ACC Module DTCs.

   Did the DTC return?

   Yes

   - Go To 2

   No

   - Go To 5

2. **CHECK FOR BODY CONTROL MODULE (BCM) DTCS**
   1. With the scan tool, read BCM DTCs and record on the repair order.

      Are there any BCM DTCs present?

      Yes

      - Repair the BCM DTC(s). Refer to **DIAGNOSIS AND TESTING** .

      No

      - Go To 3

3. **CHECK FOR OCCUPANT RESTRAINT CONTROLLER (ORC) DTCS**
   1. With the scan tool, read ORC DTCs.

      Are there any ORC DTCs present?

      Yes

      - Repair the ORC DTC(s). Refer to **DIAGNOSIS AND TESTING** .

      No

      - Go To 4

4. **CHECK OTHER MODULES FOR DTCS**
   1. With the scan tool, read DTCs.

      Are there any other modules reporting communication DTCs against the ORC?

      Yes

      - Replace and program the Occupant Restraint Controller (ORC) in accordance with the Service Information.
      - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Using the schematics as a guide, check the ACC Module pins, terminals, and connectors for

corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .

- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
    3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Check Service Bulletins for any possible causes that may apply.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

U110A-00-LOST COMMUNICATION WITH SCM - CAN-C

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U11F9-00-ENGINE DID NOT RESPOND TO ACC TORQUE REQUEST

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Engine running.
- System voltage between 10.0 and 16.0 volts.
- Adaptive Cruise Control (ACC) Module is not in Plant-Mode.
- ESP is not in diagnostic mode.
- ACC or Forward Collision Warning (FCW) system is enabled.

SET CONDITION

- Module detects that the Powertrain Control Module is not responding to Adaptive Cruise Control (ACC) module torque request.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
BODY CONTROL MODULE (BCM) DTCS PRESENT
POWERTRAIN CONTROL MODULE (PCM) DTCS PRESENT
POWERTRAIN CONTROL MODULE (PCM) IMPROPERLY CONFIGURED

DIAGNOSTIC TEST

CHECK FOR OTHER DTCS

NOTE: **To help in the service of the Adaptive Cruise Control (ACC) system, it is recommended to communicate with the customer to obtain the environmental conditions they were driving in when the cruise control concern took place. Heavy rain, snow, ice, and fog can cause the ACC system to become inoperative. This is considered as a normal operational reaction of the ACC system and no repair is necessary.**

1. This is an informational Diagnostic Trouble Code (DTC). The Adaptive Cruise Control (ACC) Module communicates over the CAN Bus with the Powertrain Control Module (PCM) to increase engine speed when needed. If other ACC Module DTCs are present, perform their respective diagnostic procedures first.

   Check for:

   - PCM DTCs present.
   - PCM improperly configured.
   - BCM DTCs present.
   - BCM improperly configured.
   - Implausible DTCs against the PCM.
   - Any Service Bulletins that may apply.

   Were any of the above conditions present?

   Yes

   - Refer to the appropriate diagnostic procedure repair/reprogram as necessary.
   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Erase this DTC and perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
- If the DTC continues to set, no other modules are reporting any DTCs, and all modules are configured properly, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .

U121E-00-LOST COMMUNICATION WITH STEERING WHEEL CRUISE CONTROL SWITCH

IF the Body Control Module (BCM), Adaptive Cruise Control (ACC) module, or Steering Column Control Module (SCCM) has any other lost communication DTCs present, perform those respective test first. If no other communication DTCs are set, refer to the SCCM diagnostics and perform the diagnostic procedure for U121E-00-Lost Communication With Steering Wheel Cruise Control Switch as if the DTC is active.

U1600-00-ECU APPLICATION SOFTWARE MISMATCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

- One time during an ignition cycle.

SET CONDITION

- The Adaptive Cruise Control (ACC) Module was reprogrammed with a corrupted flash file, or the reprogramming of the ACC was interrupted before it was complete.

DEFAULT ACTION

- The Electronic Vehicle Information Center (EVIC) will display "ACC/FCW Unavailable Service Required".
- The Adaptive Cruise Control (ACC) system will be disabled.
- Once the DTC changes from active to stored, the ACC feature will return to normal operation.
- The DTC will be cleared after a 100 consecutive ignition cycles with no active detection.

POSSIBLE CAUSES

Possible Causes
ADAPTIVE CRUISE CONTROL MODULE NOT PROGRAMMED PROPERLY
ADAPTIVE CRUISE CONTROL MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Adaptive Cruise Control (ACC) Module DTCs and record on the repair order.

       Is the DTC active?

Yes

- This is an indication that the software installed on the vehicle is corrupted, incorrect or the flash procedure was interrupted. Flash the controller, making sure the correct flash file is used. If this DTC continues to set after flashing a at least three times, replace and program the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
- Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 2

2. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the schematics as a guide, inspect the wiring and connectors specific to this Module. Wiggle the wiring and connectors while checking for shorted and open circuits.
   3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Check Service Bulletins for any possible causes that may apply.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADAPTIVE CRUISE CONTROL VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

STANDARD PROCEDURE

ADAPTIVE CRUISE CONTROL VERIFICATION TEST

ADAPTIVE CRUISE CONTROL VERIFICATION TEST

1. Disconnect all jumper wires and reconnect all previously disconnected components and connectors.
2. With the scan tool, erase Adaptive Cruise Control (ACC) DTCs.
3. Make sure that all accessories are turned off and that the battery is fully charged.
4. If the ACC Module was replaced or moved in any way, the ACC Module must be aligned. Perform both the Vertical and Horizontal Sensor Alignment procedures in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, MODULE PROGRAMMING** .
5. Test drive the vehicle and verify proper operation.
6. With the scan tool, read ACC Module DTCs and record on the repair order.

Are there any DTCs present in the ACC Module?

Yes

- Repair the ACC Module DTC(s). Refer to **DIAGNOSIS AND TESTING**.

No

- Repair is complete.

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Article GUID: A00735881

2015-16 SUSPENSION

Active Damping Control Module (ADCM) - Electrical Diagnostics - SRT8 - Dodge Challenger

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
B222A-00	VEHICLE LINE MISMATCH
C15AF-1F	LOW SIDE DRIVER - CIRCUIT INTERMITTENT
C15B1-11	REAR ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
C15B1-12	REAR ACCELERATION - CIRCUIT SHORT TO BATTERY
C15B1-76	REAR ACCELERATION SENSOR - WRONG MOUNTING POSITION
C15B2-11	LEFT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
C15B2-12	LEFT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
C15B2-76	LEFT FRONT ACCELERATION SENSOR - WRONG MOUNTING POSITION
C15B3-11	RIGHT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
C15B3-12	RIGHT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
C15B3-76	RIGHT FRONT ACCELERATION SENSOR - WRONG MOUNTING POSITION
C15B4-04	LEFT FRONT DAMPING VALVE LOW SIDE 1 - SYSTEM INTERNAL FAILURES
C15B4-11	LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15B4-12	LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15B4-13	LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15B5-08	LEFT FRONT DAMPING VALVE LOW SIDE 2 - BUS SIGNAL/MESSAGE FAILURES
C15B5-11	LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND
C15B5-12	LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY
C15B5-13	LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN
C15B6-11	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15B6-12	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15B6-13	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15B7-11	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND
C15B7-12	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY
C15B7-13	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN

DTC	Description
C15B8-11	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15B8-12	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15B8-13	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15B8-14	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND OR OPEN
C15B9-11	LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND
C15B9-12	LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY
C15B9-13	LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN
C15B9-18	LEFT REAR DAMPING VALVE LOW SIDE 2 - UNDER CURRENT
C15BA-11	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15BA-12	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15BA-13	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15BA-1C	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT VOLTAGE OUT OF RANGE
C15BB-11	RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT SHORT TO GROUND
C15BB-12	RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT SHORT TO BATTERY
C15BB-13	RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT OPEN
C15BC-11	LEFT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND
C15BC-12	LEFT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY
C15BD-11	RIGHT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND
C15BD-12	RIGHT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY
C15BE-11	REAR ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND
C15BE-12	REAR ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY
C15C2-19	LEFT FRONT DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C3-19	LEFT FRONT DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C15C4-19	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C5-19	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C15C6-19	LEFT REAR DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C7-19	LEFT REAR DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C15C8-19	RIGHT REAR DAMPING VALVE LOW SIDE 1 - OVERCURRENT

DTC	Description
C15C9-19	RIGHT REAR DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C211B-92	IGNITION RUN/START INPUT CIRCUIT - PERFORMANCE OR INCORRECT OPERATION
C2129-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2129-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-16	SYSTEM VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD
C212A-17	SYSTEM VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212C-11	SUSPENSION VALVE POWER SUPPLY VOLTAGE - CIRCUIT SHORT TO GROUND
C212C-12	SUSPENSION VALVE POWER SUPPLY VOLTAGE - CIRCUIT SHORT TO BATTERY
C2202-00	ORIGINAL VIN MISMATCH / MISSING
C2206-00	VEHICLE CONFIGURATION MISMATCH
C220C-00	ACTIVE SUSPENSION MODULE INTERNAL
U0001-00	CAN C BUS
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0126-00	LOST COMMUNICATION WITH STEERING ANGLE SENSOR
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM

DTC TROUBLESHOOTING

B222A-00-VEHICLE LINE MISMATCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- Battery voltage between 10 and 16 volts.
- No CAN Bus DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects a mismatch between stored (learned) vehicle variant and current evaluated vehicle variant over the CAN C Bus.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
VEHICLE CONFIGURATION NOT STORED IN THE BODY CONTROL MODULE (BCM)
CONTROL MODULE INSTALLED IN INCORRECT VEHICLE
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

CHECK THE VEHICLE CONFIGURATION

NOTE: The DTC must be active and no BUS communication DTCs present before performing this test. If BUS communication DTCs are present, perform their respective test first. If the DTC is stored, erase the DTC and cycle the ignition. If the DTC resets and changes to active, then proceed.

1. With the scan tool, check the vehicle configuration stored in the Body Control Module (BCM).
2. With the scan tool, check the vehicle configuration stored in the ADCM.

Pick the answer that best describes your findings:

BCM has wrong or no vehicle configuration.

- With the scan tool, program the proper vehicle configuration in the BCM.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

ADCM has wrong vehicle configuration but BCM has correct configuration.

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

ADCM and BCM have proper calibration and the DTC is active in the ADCM.

- Check if other modules such as the Powertrain Control Module (PCM) have the wrong configuration stored in the controller and reprogram or replace as necessary. If all other modules show the proper 8 configuration, replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C15AF-1F-LOW SIDE DRIVER - CIRCUIT INTERMITTENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

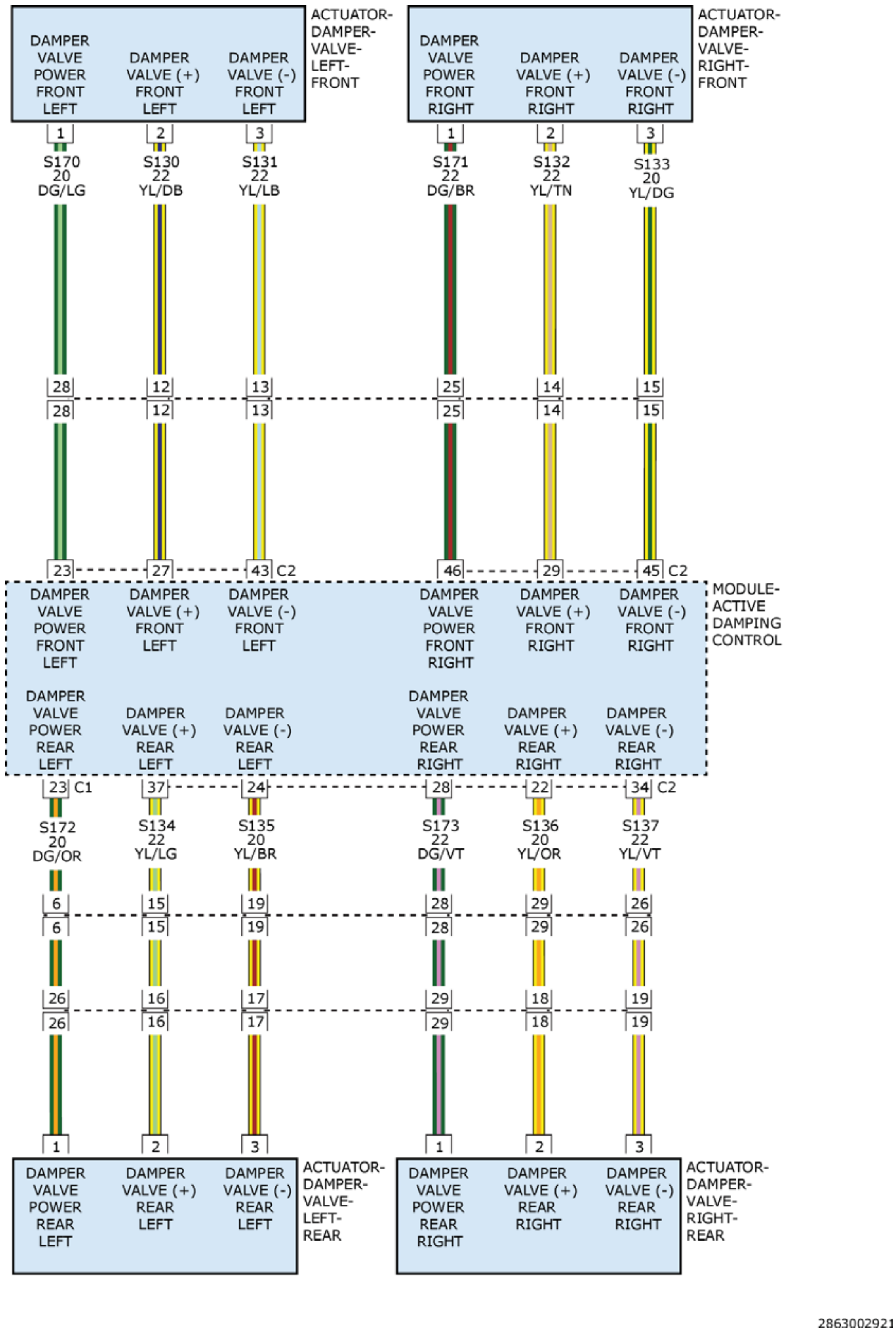


Fig. 1: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects excessive voltage fluctuation on the Mode Sensor Signal circuit.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
(S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
(S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
(S170) LEFT FRONT DAMPER VALVE POWER CIRCUIT SHORTED TO GROUND
(S170) LEFT FRONT DAMPER VALVE POWER CIRCUIT OPEN OR HIGH RESISTANCE
(S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
(S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
(S171) RIGHT FRONT DAMPER VALVE POWER CIRCUIT SHORTED TO GROUND
(S171) RIGHT FRONT DAMPER VALVE POWER CIRCUIT OPEN OR HIGH RESISTANCE
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
(S172) LEFT REAR DAMPER VALVE POWER CIRCUIT SHORTED TO GROUND
(S172) LEFT REAR DAMPER VALVE POWER CIRCUIT OPEN OR HIGH RESISTANCE
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
(S173) RIGHT REAR DAMPER VALVE POWER CIRCUIT SHORTED TO GROUND
(S173) RIGHT REAR DAMPER VALVE POWER CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.

2. With the scan tool, read ADCM DTCs and record on the repair order.
3. With the scan tool, erase DTCs.
4. Start the Engine.
5. With the scan tool, read the DTCs in the ADCM.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Go To 20

2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

   1. Turn the ignition off.
   2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Check for continuity between ground and the (S130) Left Front Damper Valve (+) circuit at the ADCM C2 harness connector.

   Is there continuity between ground and the (S130) Left Front Damper Valve (+) circuit?

   Yes

   - Repair the (S130) Left Front Damper Valve (+) circuit for a short ground.

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **CHECK THE (S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S130) Left Front Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly C2 harness connector.

       Is the resistance above 5.0 Ohms?

       Yes

       - Repair the (S130) Left Front Damper Valve (+) circuit for an open or high resistance.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 5
5. **CHECK THE (S170) LEFT FRONT DAMPER VALVE POWER CIRCUIT FOR A SHORT TO GROUND**
    1. Check for continuity between ground and the (S170) Left Front Damper Valve Power circuit at the ADCM C2 harness connector.

       Is there continuity between ground and the (S170) Left Front Damper Valve Power circuit?

       Yes

       - Repair the (S170) Left Front Damper Valve Power circuit for a short ground.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 6
6. **CHECK THE (S170) LEFT FRONT DAMPER VALVE POWER CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S170) Left Front Damper Valve Power circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

       Is the resistance above 5.0 Ohms?

       Yes

       - Repair the (S170) Left Front Damper Valve Power circuit for an open or high resistance.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

- Go To 7

7. **CHECK THE (S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
    1. Check for continuity between ground and the (S132) Right Front Damper Valve (+) circuit at the ADCM C2 harness connector.

       Is there continuity between ground and the (S132) Right Front Damper Valve (+) circuit?

       Yes

       - Repair the (S132) Right Front Damper Valve (+) circuit for a short ground.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 8

8. **CHECK THE (S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S132) Right Front Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

       Is the resistance above 5.0 Ohms?

       Yes

       - Repair the (S132) Right Front Damper Valve (+) circuit for an open or high resistance.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 9

9. **CHECK THE (S171) RIGHT FRONT DAMPER VALVE POWER CIRCUIT FOR A SHORT TO GROUND**
    1. Check for continuity between ground and the (S171) Right Front Damper Valve Power circuit at the ADCM C2 harness connector.

       Is there continuity between ground and the (S171) Right Front Damper Valve Power circuit?

       Yes

       - Repair the (S171) Right Front Damper Valve Power circuit for a short ground.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 10

10. **CHECK THE (S171) RIGHT FRONT DAMPER VALVE POWER CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

1. Measure the resistance of the (S171) Right Front Damper Valve Power circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the (S171) Right Front Damper Valve Power circuit for an open or high resistance.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 11

11. **CHECK THE (S134) LEFT REAR DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
    1. Check for continuity between ground and the (S134) Left Rear Damper Valve (+) circuit at the ADCM C2 harness connector.

       Is there continuity between ground and the (S134) Left Rear Damper Valve (+) circuit?

       Yes

       - Repair the (S134) Left Rear Damper Valve (+) circuit for a short ground.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 12
12. **CHECK THE (S134) LEFT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S134) Left Rear Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

       Is the resistance above 5.0 Ohms?

       Yes

       - Repair the (S134) Left Rear Damper Valve (+) circuit for an open or high resistance.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 13
13. **CHECK THE (S172) LEFT REAR DAMPER VALVE POWER CIRCUIT FOR A SHORT TO GROUND**
    1. Check for continuity between ground and the (S172) Left Rear Damper Valve Power circuit at the ADCM C2 harness connector.

Is there continuity between ground and the (S172) Left Rear Damper Valve Power circuit?

Yes

- Repair the (S172) Left Rear Damper Valve Power circuit for a short ground.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 14

14. **CHECK THE (S172) LEFT REAR DAMPER VALVE POWER CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S172) Left Rear Damper Valve Power circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

       Is the resistance above 5.0 Ohms?

       Yes

       - Repair the (S172) Left Rear Damper Valve Power circuit for an open or high resistance.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 15
15. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
    1. Check for continuity between ground and the (S136) Right Rear Damper Valve (+) circuit at the ADCM C2 harness connector.

       Is there continuity between ground and the (S136) Right Rear Damper Valve (+) circuit?

       Yes

       - Repair the (S136) Right Rear Damper Valve (+) circuit for a short ground.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 16
16. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S136) Right Rear Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

       Is the resistance above 5.0 Ohms?

       Yes

- Repair the (S136) Right Rear Damper Valve (+) circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 17

17. **CHECK THE (S173) RIGHT REAR DAMPER VALVE POWER CIRCUIT FOR A SHORT TO GROUND**
    1. Check for continuity between ground and the (S173) Right Rear Damper Valve Power circuit at the ADCM C2 harness connector.

       Is there continuity between ground and the (S173) Right Rear Damper Valve Power circuit?

       Yes

       - Repair the (S173) Right Rear Damper Valve Power circuit for a short ground.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 18
18. **CHECK THE (S173) RIGHT REAR DAMPER VALVE POWER CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S173) Right Rear Damper Valve Power circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

       Is the resistance above 5.0 Ohms?

       Yes

       - Repair the (S173) Right Rear Damper Valve Power circuit for an open or high resistance.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 19
19. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

       Does the DTC remain active?

Yes

- Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** or **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

20. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

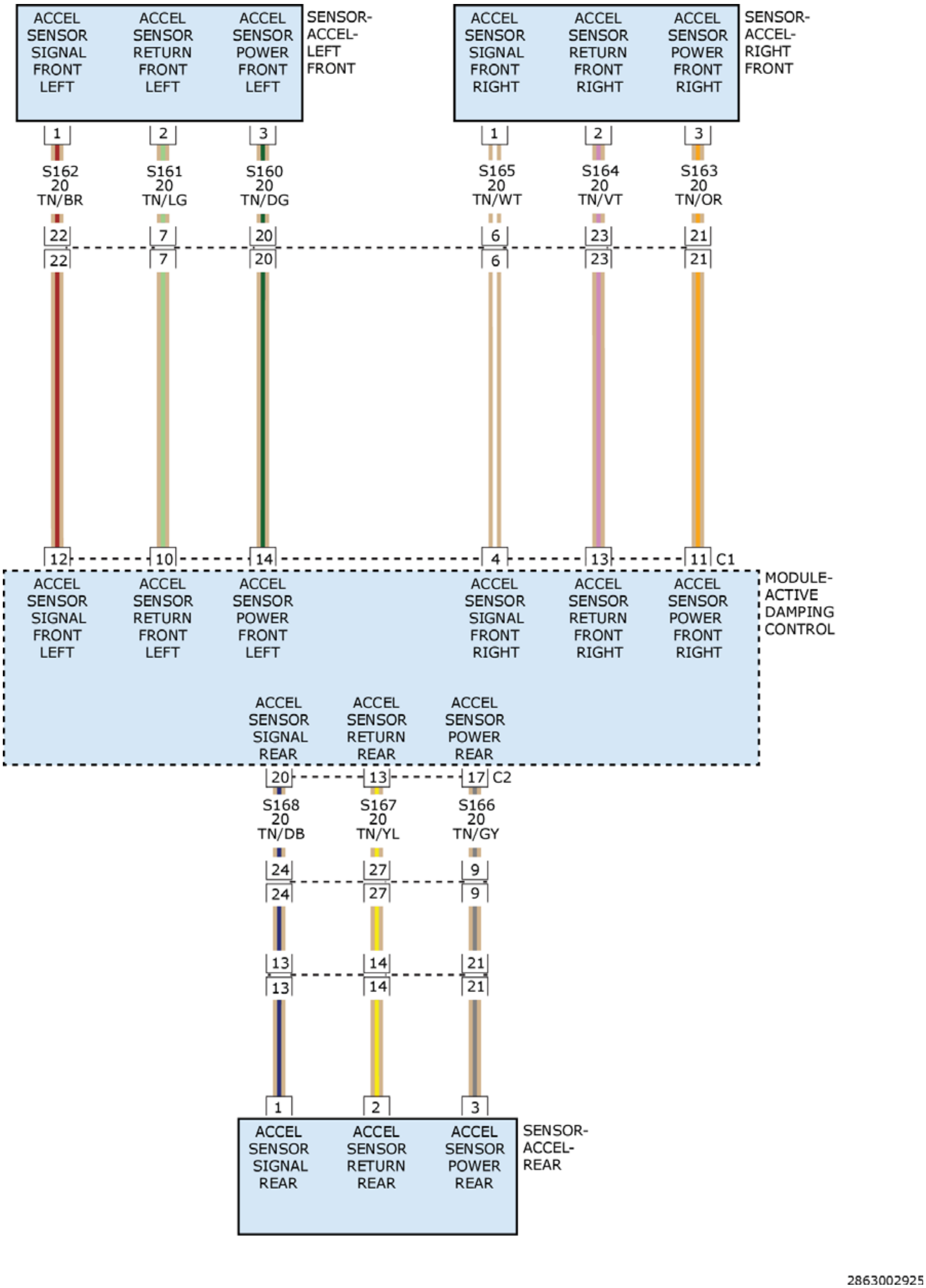
    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B1-11-REAR ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 2: Acceleration Sensor Circuit Diagram]
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Rear Acceleration Sensor Signal circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S168) REAR ACCELERATION SENSOR SIGNAL CIRCUIT SHORT TO GROUND
(S168) REAR ACCELERATION SENSOR SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE
(S166) REAR ACCELERATION SENSOR POWER CIRCUIT OPEN OR HIGH RESISTANCE
REAR ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Turn the ignition on.
   2. With the scan tool, read DTCs and record on the repair order.
   3. With the scan tool, erase DTCs.
   4. Start the Engine.
   5. With the scan tool, read ADCM DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Go To 7
2. **REAR ACCELERATION SENSOR HARNESS CONNECTOR**

   NOTE: Make sure the Acceleration Sensor harness connector is connected correctly.

   1. Turn the ignition off.

2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S168) REAR ACCELERATION SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Acceleration Sensor harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Check for continuity between ground and the (S168) Rear Acceleration Sensor Signal circuit at the ADCM C2 harness connector.

      Is there continuity between ground and the (S168) Rear Acceleration Sensor Signal circuit?

      Yes

      - Go To 5

      No

      - Repair the (S168) Rear Acceleration Sensor Signal circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **CHECK THE (S168) REAR ACCELERATION SENSOR SIGNAL CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Measure the resistance of the (S168) Rear Acceleration Sensor Signal circuit between the Rear Acceleration Sensor harness connector and the ADCM C2 harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S166) Rear Acceleration Sensor Signal circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 5
5. **CHECK THE (S166) REAR ACCELERATION SENSOR POWER CIRCUIT FOR AN OPEN OR**

HIGH RESISTANCE

1. Measure the resistance of the (S166) Rear Acceleration Sensor Power circuit between the Rear Acceleration Sensor harness connector and the ADCM C2 harness connector.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the (S166) Rear Acceleration Sensor Power circuit for an open or high resistance.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 6

6. **ACCELERATION SENSOR**
   1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read the DTCs in the ADCM.

      Does the DTC remain active?

      Yes

      - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete.

7. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B1-12- REAR ACCELERATION - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

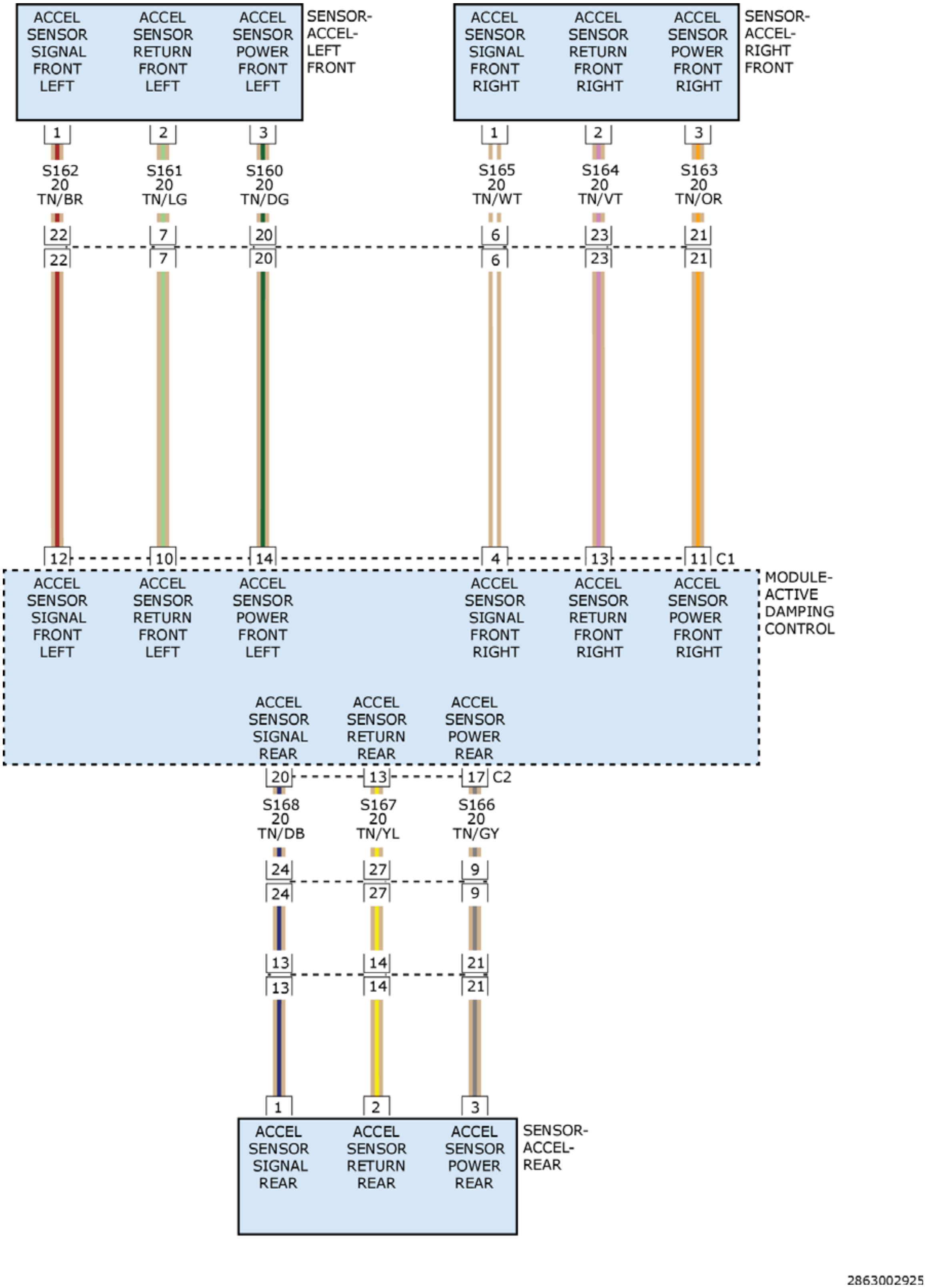


Fig. 3: Acceleration Sensor Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects that the Rear Acceleration Sensor Signal is shorted to voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S168) REAR ACCELERATION SENSOR SIGNAL CIRCUIT SHORT TO BATTERY
(S167) REAR ACCELERATION SENSOR RETURN CIRCUIT OPEN OR HIGH RESISTANCE
REAR ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read the ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 6
2. **REAR ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed

out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S168) REAR ACCELERATION SENSOR SIGNAL CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Rear Acceleration Sensor harness connector.
   3. Disconnect the ADCM C2 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S168) Rear Acceleration Sensor Signal circuit.

      Is the voltage above 5.25 volts?

      Yes

      - Repair the (S168) Rear Acceleration Sensor Power circuit for a short battery.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **CHECK THE (S167) REAR ACCELERATION SENSOR RETURN CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Measure the resistance of the (S167) Rear Acceleration Sensor Return circuit between the Rear Acceleration Sensor harness connector and the ADCM C2 harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S167) Rear Acceleration Sensor Return circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

- Go To 5

5. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

6. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B1-76-REAR ACCELERATION SENSOR - WRONG MOUNTING POSITION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Acceleration Sensor is installed incorrectly or damaged.

DEFAULT ACTION

- Active Damping Suspension (ADS) is disabled.

POSSIBLE CAUSES

Possible Causes
REAR ACCELERATION SENSOR DAMAGED, DISCONNECTED, LOOSE, OR INSTALLED INCORRECTLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
2. **REAR ACCELERATION SENSOR**

    NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

    1. Turn the ignition off.

2. Verify the Acceleration Sensor is mounted correctly.
3. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
4. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C15B2-11-LEFT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

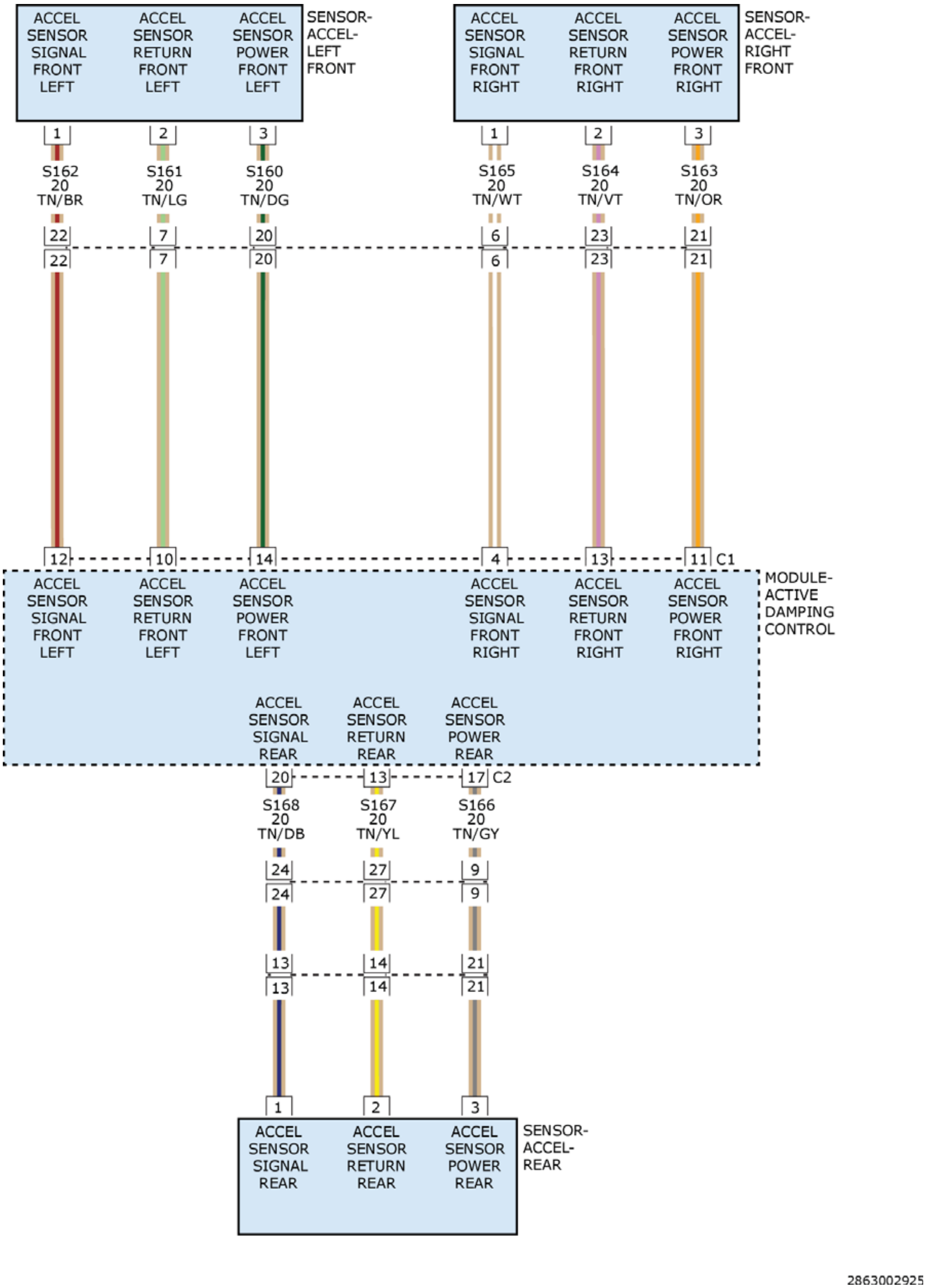


Fig. 4: Acceleration Sensor Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Front Acceleration Sensor Signal circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S162) LEFT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT SHORT TO GROUND
(S162) LEFT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE
(S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT OPEN OR HIGH RESISTANCE
LEFT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Turn the ignition on.
   2. With the scan tool, read ADCM DTCs and record on the repair order.
   3. With the scan tool, erase DTCs.
   4. Start the Engine.
   5. With the scan tool, read ADCM DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Go To 7
2. **LEFT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

   NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

   1. Turn the ignition off.

2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S162) LEFT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Acceleration Sensor harness connector.
   2. Disconnect the ADCM C1 harness connector.
   3. Check for continuity between ground and the (S162) Left Front Acceleration Sensor Signal circuit at the ADCM C1 harness connector.

      Is there continuity between ground and the (S162) Left Front Acceleration Sensor Signal circuit?

      Yes

      - Go To 5

      No

      - Repair the (S162) Left Front Acceleration Sensor Signal circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **CHECK THE (S162) LEFT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Measure the resistance of the (S162) Left Front Acceleration Sensor Signal circuit between the Left Front Acceleration Sensor harness connector and the ADCM C1 harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S160) Left Front Acceleration Sensor Signal circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 5

5. **CHECK THE (S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S160) Left Front Acceleration Sensor Power circuit between the Left Front Acceleration Sensor harness connector and the ADCM C1 harness connector.

       Is the resistance above 5.0 Ohms?

       Yes

       - Repair the (S160) Left Front Acceleration Sensor Power circuit for an open or high resistance.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 6
6. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

       Does the DTC remain active?

       Yes

       - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Test complete.
7. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

       Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B2-12-LEFT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

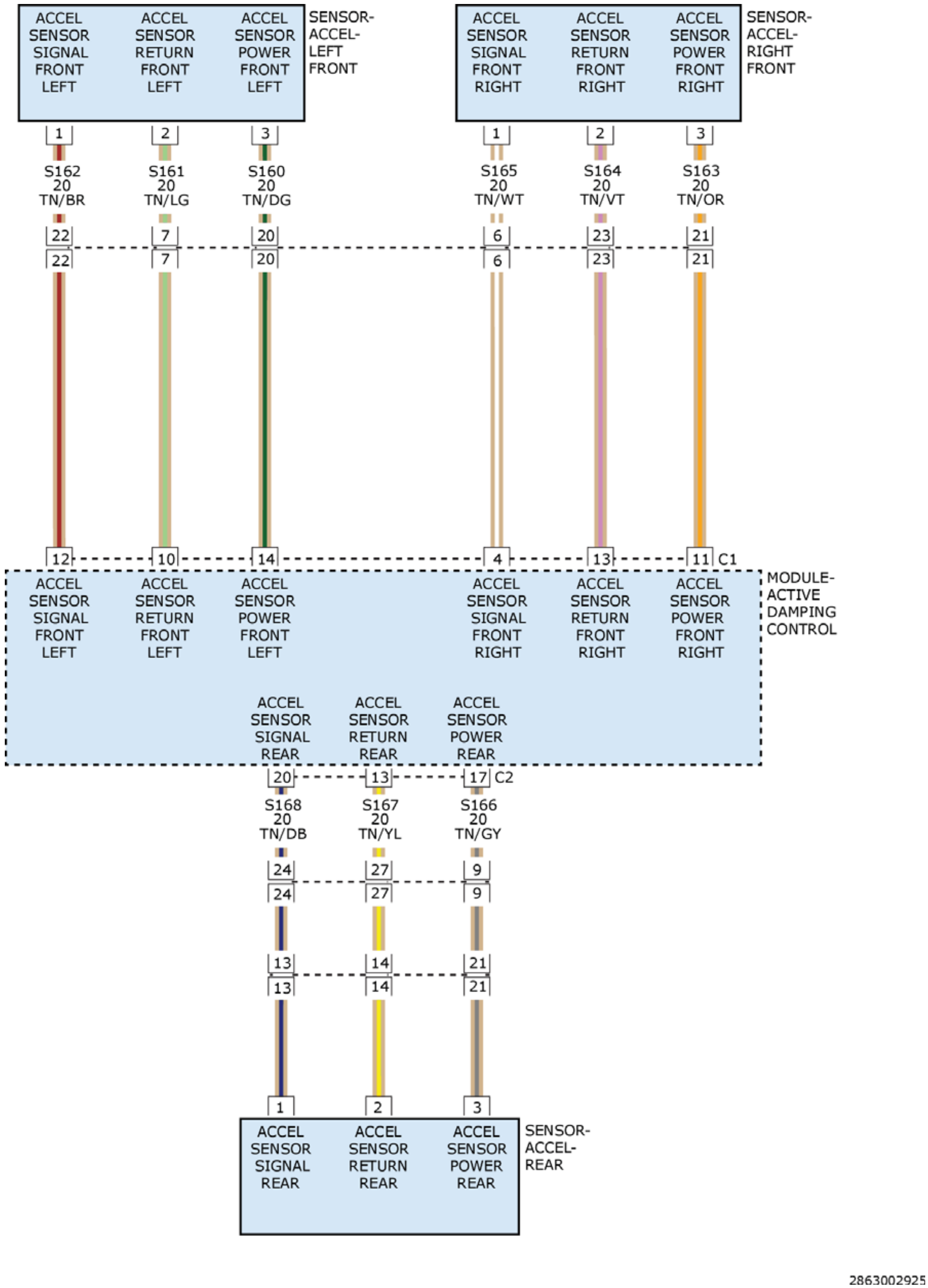


Fig. 5: Acceleration Sensor Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Front Acceleration Sensor Signal is shorted to voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S162) LEFT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT SHORT TO BATTERY
(S161) LEFT FRONT ACCELERATION SENSOR RETURN CIRCUIT OPEN OR HIGH RESISTANCE
LEFT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 6
2. **LEFT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

    1. Turn the ignition off.

2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S162) LEFT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Left Front Acceleration Sensor harness connector.
   3. Disconnect the ADCM C1 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S162) Left Front Acceleration Sensor Signal circuit.

   Is the voltage above 5.25 volts?

   Yes

   - Repair the (S162) Left Front Acceleration Sensor Power circuit for a short battery.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4

4. **CHECK THE (S161) LEFT FRONT ACCELERATION SENSOR RETURN CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Measure the resistance of the (S161) Right Front Acceleration Sensor Return circuit between the Left Front Acceleration Sensor harness connector and the ADCM C1 harness connector.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the (S161) Right Front Acceleration Sensor Return circuit for an open or high resistance.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

6. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B2-76-LEFT FRONT ACCELERATION SENSOR - WRONG MOUNTING POSITION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Acceleration Sensor is installed incorrectly or damaged.

DEFAULT ACTION

- Active Damping Suspension (ADS) is disabled.

POSSIBLE CAUSES

Possible Causes
LEFT FRONT ACCELERATION SENSOR DAMAGED, DISCONNECTED, LOOSE, OR INSTALLED INCORRECTLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
2. **LEFT FRONT ACCELERATION SENSOR**

NOTE: **Make sure the Acceleration Sensor harness connector is connected**

correctly.

1. Turn the ignition off.
2. Verify the Acceleration Sensor is mounted correctly.
3. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
4. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C15B3-11-RIGHT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

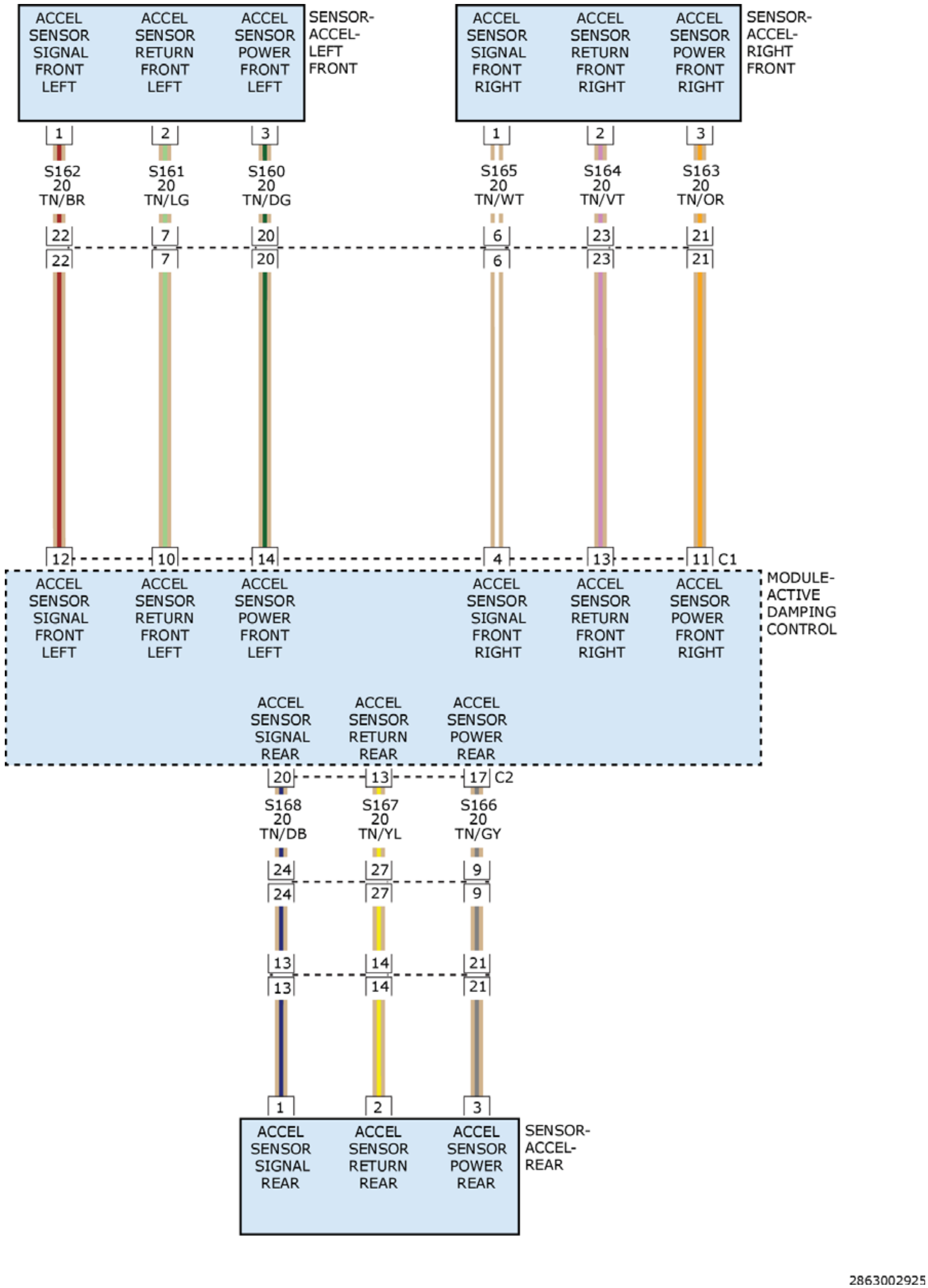


Fig. 6: Acceleration Sensor Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Right Front Acceleration Sensor Signal circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S165) RIGHT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT SHORT TO GROUND
(S165) RIGHT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE
(S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT OPEN OR HIGH RESISTANCE
RIGHT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 7
2. **RIGHT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

NOTE: **Make sure the Acceleration Sensor harness connector is connected**

correctly.

1. Turn the ignition off.
2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S165) RIGHT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Acceleration Sensor harness connector.
   2. Disconnect the ADCM C1 harness connector.
   3. Check for continuity between ground and the (S165) Right Front Acceleration Sensor Signal circuit at the ADCM C1 harness connector.

      Is there continuity between ground and the (S165) Right Front Acceleration Sensor Signal circuit?

      Yes

      - Go To 5

      No

      - Repair the (S165) Right Front Acceleration Sensor Signal circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **CHECK THE (S165) RIGHT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Measure the resistance of the (S165) Right Front Acceleration Sensor Signal circuit between the Right Front Acceleration Sensor harness connector and the ADCM C1 harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S165) Right Front Acceleration Sensor Signal circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **CHECK THE (S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S163) Right Front Acceleration Sensor Power circuit between the Right Front Acceleration Sensor harness connector and the ADCM C1 harness connector.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S163) Right Front Acceleration Sensor Power circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 6

6. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

7. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.

5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B3-12-RIGHT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

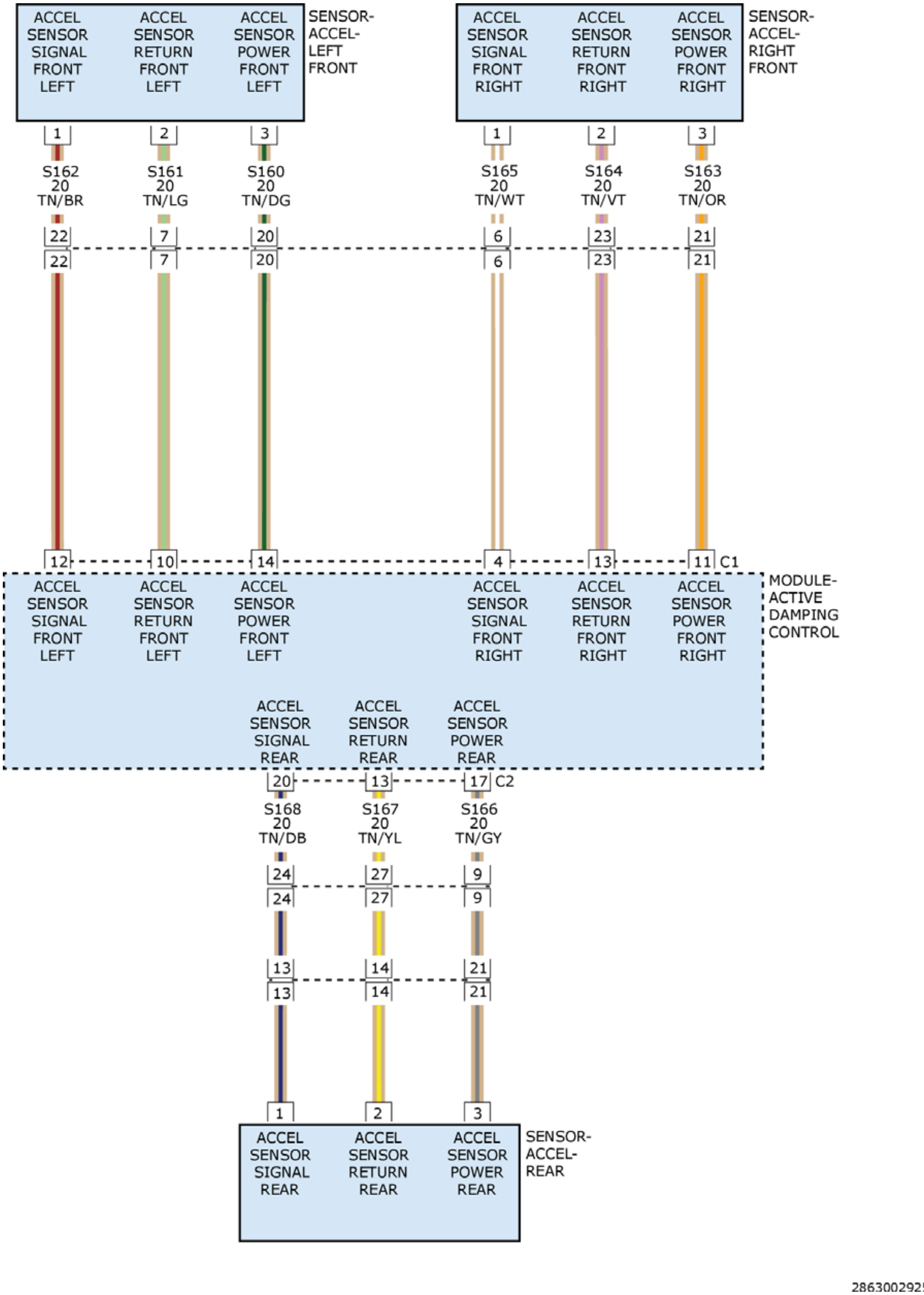


Fig. 7: Acceleration Sensor Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Right Front Acceleration Sensor Signal is shorted to voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S165) RIGHT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT SHORT TO BATTERY
(S164) RIGHT FRONT ACCELERATION SENSOR RETURN CIRCUIT OPEN OR HIGH RESISTANCE
RIGHT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 6
2. **RIGHT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

    1. Turn the ignition off.

2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S165) RIGHT FRONT ACCELERATION SENSOR SIGNAL CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Right Front Acceleration Sensor harness connector.
   3. Disconnect the ADCM C1 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S165) Right Front Acceleration Sensor Signal circuit.

      Is the voltage above 5.25 volts?

      Yes

      - Repair the (S165) Right Front Acceleration Sensor Power circuit for a short battery.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **CHECK THE (S164) RIGHT FRONT ACCELERATION SENSOR RETURN CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Measure the resistance of the (S164) Right Front Acceleration Sensor Return circuit between the Right Front Acceleration Sensor harness connector and the ADCM C1 harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S164) Right Front Acceleration Sensor Return circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.
6. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B3-76-RIGHT FRONT ACCELERATION SENSOR - WRONG MOUNTING POSITION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Acceleration Sensor is installed incorrectly or damaged.

DEFAULT ACTION

- Active Damping Suspension (ADS) is disabled.

POSSIBLE CAUSES

Possible Causes
RIGHT FRONT ACCELERATION SENSOR DAMAGED, DISCONNECTED, LOOSE, OR INSTALLED INCORRECTLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

        Is the DTC active?

        Yes

        - Go To 2

        No

        - Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
2. **RIGHT FRONT ACCELERATION SENSOR**

NOTE: **Make sure the Acceleration Sensor harness connector is connected**

correctly.

1. Turn the ignition off.
2. Verify the Acceleration Sensor is mounted correctly.
3. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
4. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C15B4-04-LEFT FRONT DAMPING VALVE LOW SIDE 1 - SYSTEM INTERNAL FAILURES

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Low Side 1 Damping Valve has an internal failure.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes

Possible Causes
AIR SUSPENSION CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 3

    No

    - Go To 2
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 3
3. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

3. Turn the ignition on.
4. With the scan tool, erase the DTCs.
5. Start the Engine.
6. With the scan tool, read ADCM DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

4. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

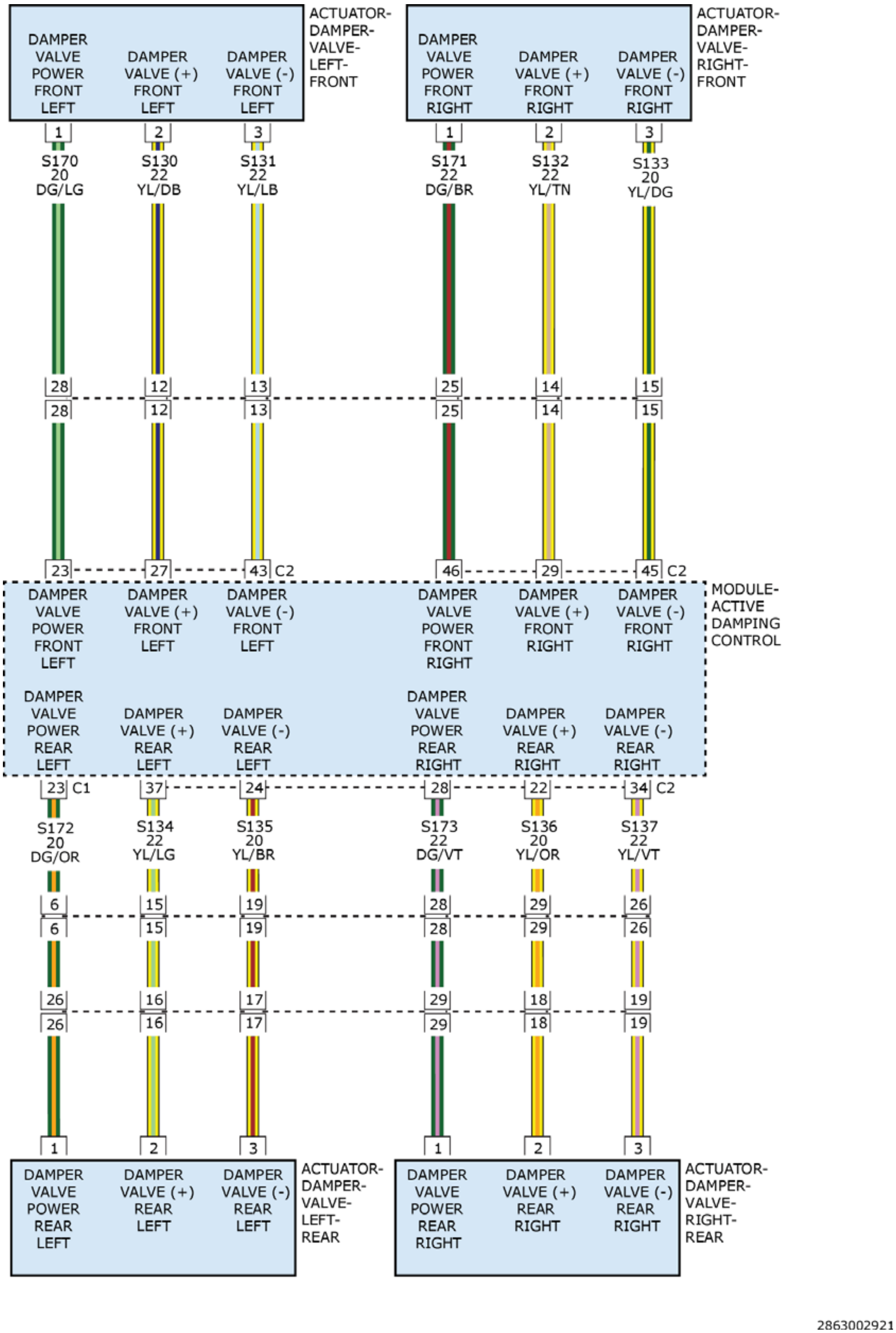
   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B4-11-LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 8: Valve Damper Actuator Circuit Diagram]

Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Adaptive Damping Control Module (ADCM) detects when the Left Front Damping Valve circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Check for continuity between ground and the (S130) Left Front Damper Valve (+) circuit at the ADCM C2 harness connector.

      Is there continuity between ground and the (S130) Left Front Damper Valve (+) circuit?

      Yes

      - Repair the (S130) Left Front Damper Valve (+) circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B4-12-LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

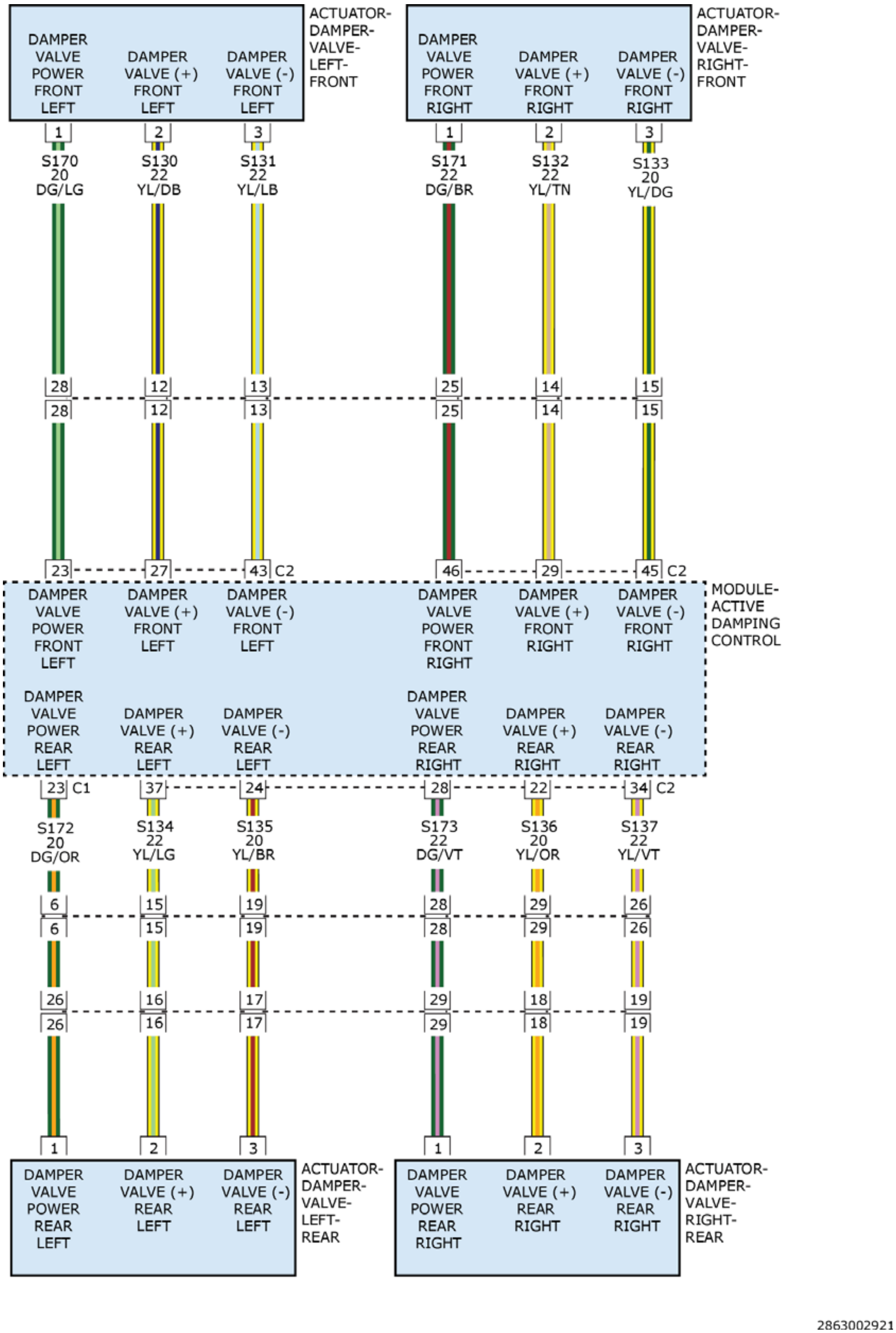


Fig. 9: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Front Damping Valve circuit is shorted to battery voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Damping Valve Shock Assembly harness connector.
   3. Disconnect the ADCM C2 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S130) Left Front Damper Valve (+) circuit.

      Is there any voltage present?

      Yes

      - Repair the (S130) Left Front Damper Valve (+) circuit for a short battery.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B4-13-LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

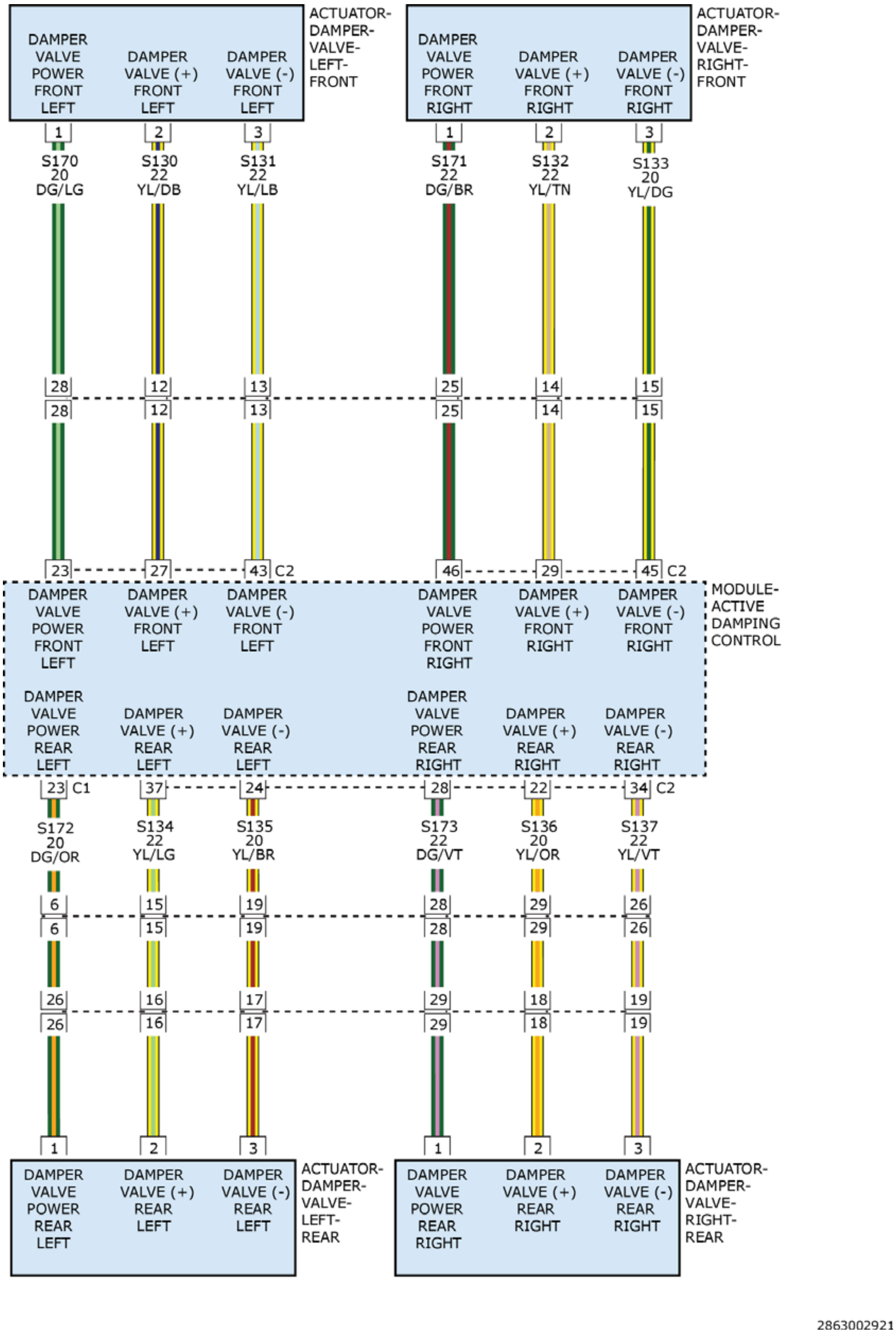


Fig. 10: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Adaptive Damping Control Module (ADCM) detects when the Left Front Damping Valve circuit is open.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance of the (S130) Left Front Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S130) Left Front Damper Valve (+) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B5-08-LEFT FRONT DAMPING VALVE LOW SIDE 2 - BUS SIGNAL/MESSAGE FAILURES

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

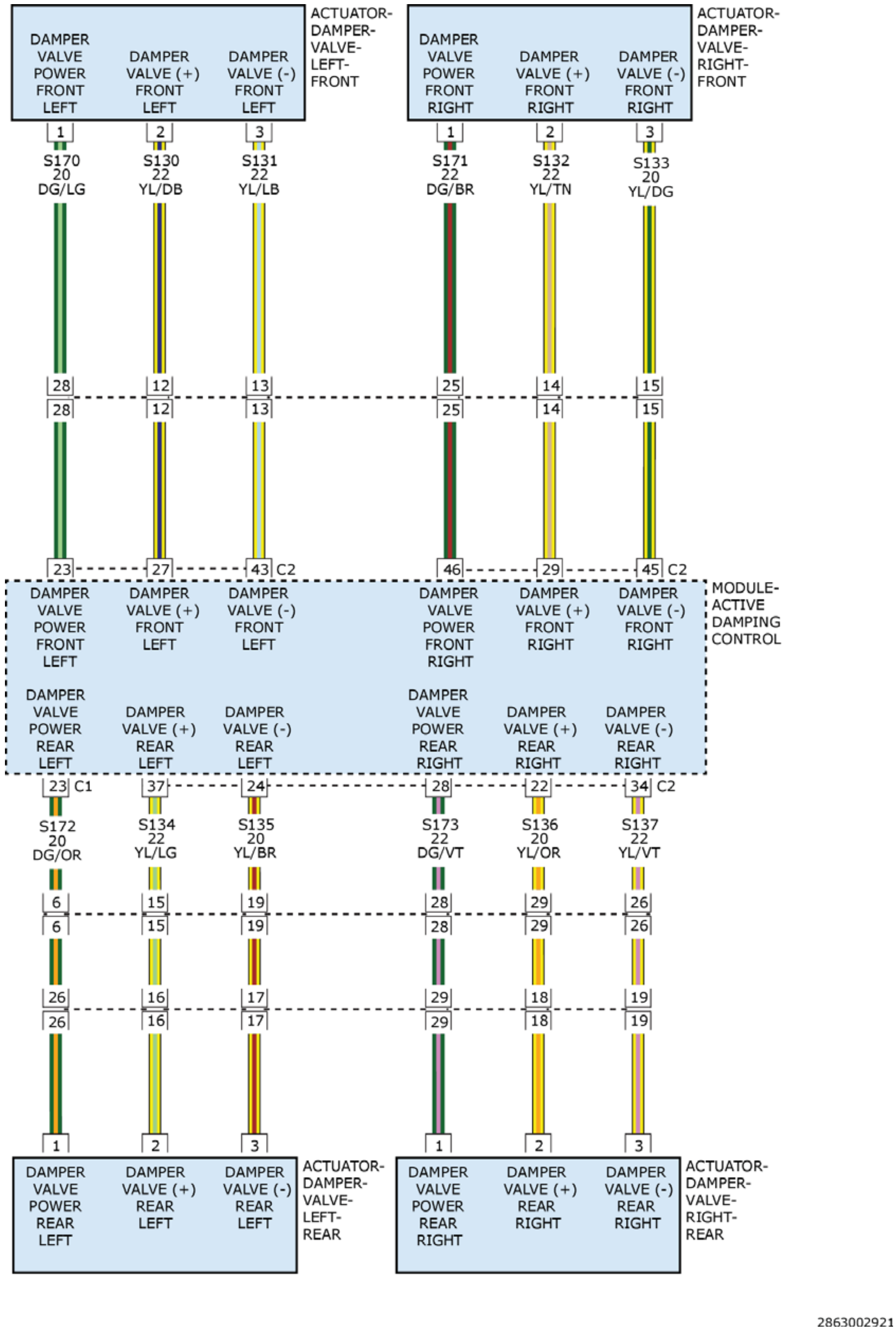


Fig. 11: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Left Front Damper Valve (-) circuit is not communicating with the Active Damping Control Module (ADCM).

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance of the (S131) Left Front Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S131) Left Front Damper Valve (-) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B5-11-LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

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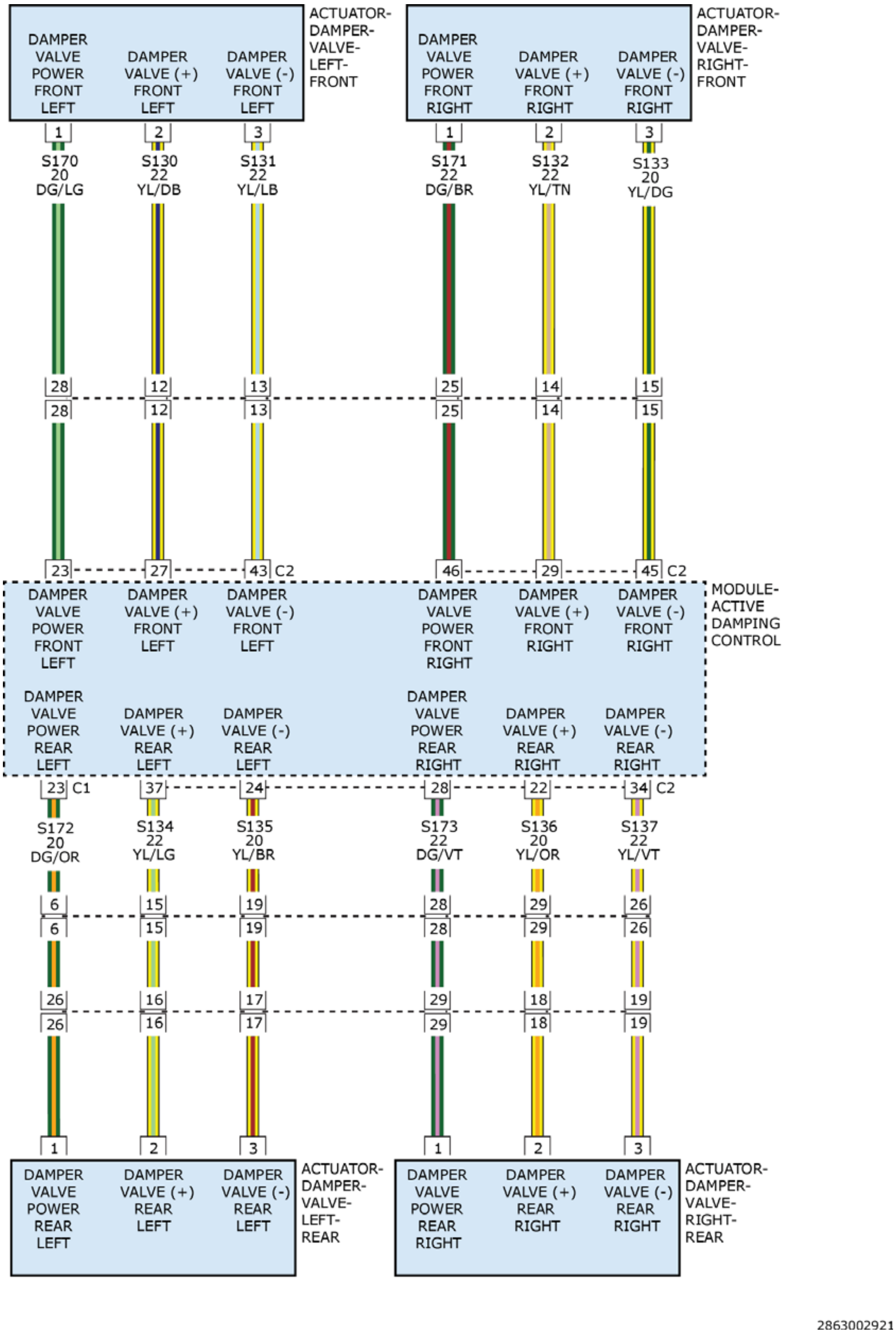


Fig. 12: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Front Damping Valve circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Check for continuity between ground and the (S131) Left Front Damper Valve (-) circuit at the ADCM C2 harness connector.

      Is there continuity between ground and the (S131) Left Front Damper Valve (-) circuit?

      Yes

      - Repair the (S131) Left Front Damper Valve (-) circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B5-12-LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

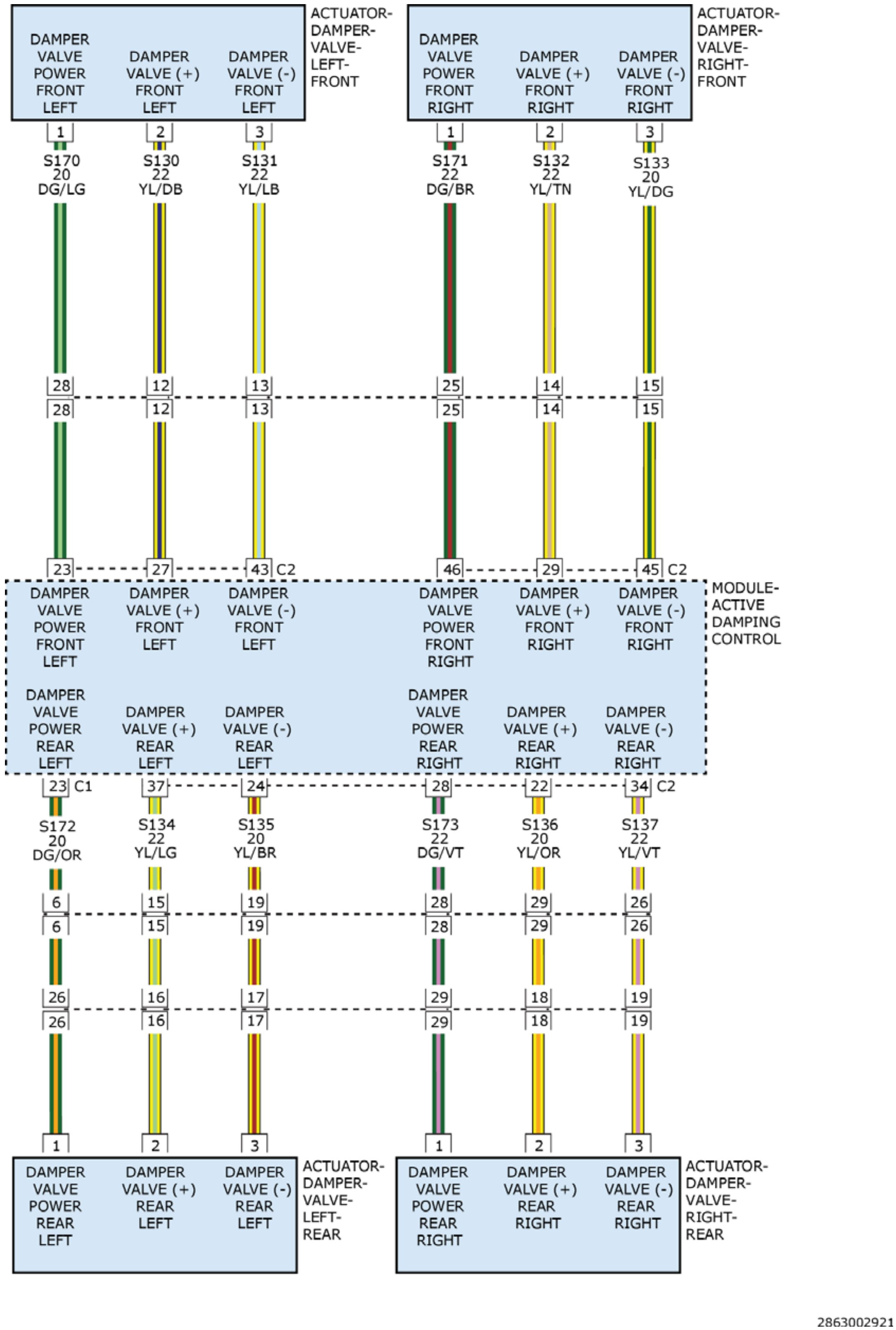


Fig. 13: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Adaptive Damping Control Module (ADCM) detects when the Left Front Damping Valve circuit is shorted to battery voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

       Is the DTC active?

       Yes

       - Go To 2

       No

       - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Damping Valve Shock Assembly harness connector.
   3. Disconnect the ADCM C2 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S131) Left Front Damper Valve (-) circuit.

      Is there any voltage present?

      Yes

      - Repair the (S131) Left Front Damper Valve (-) circuit for a short battery.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B5-13-LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

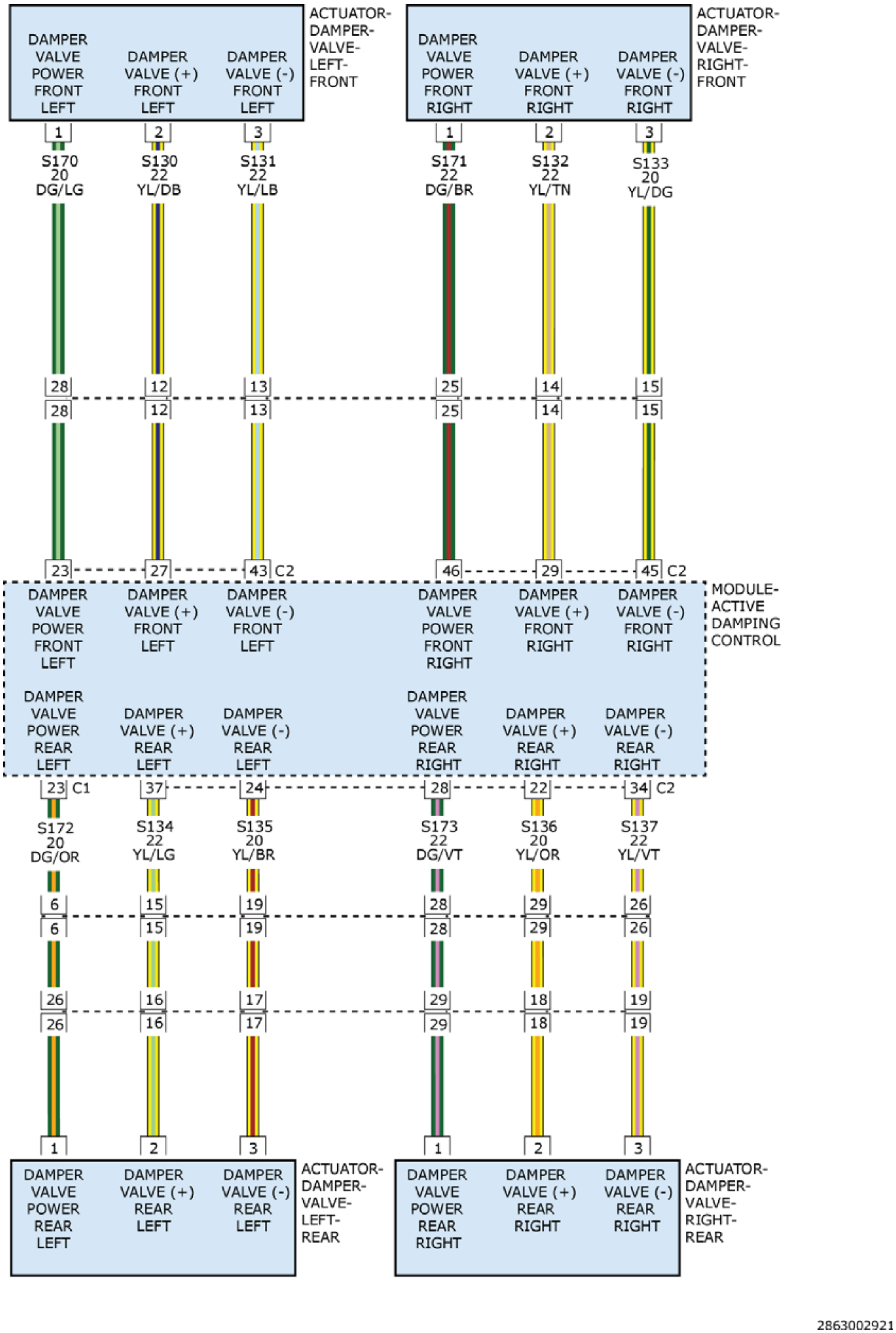


Fig. 14: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Front Damping Valve (-) circuit is open.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance of the (S131) Left Front Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S131) Left Front Damper Valve (-) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B6-11-RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

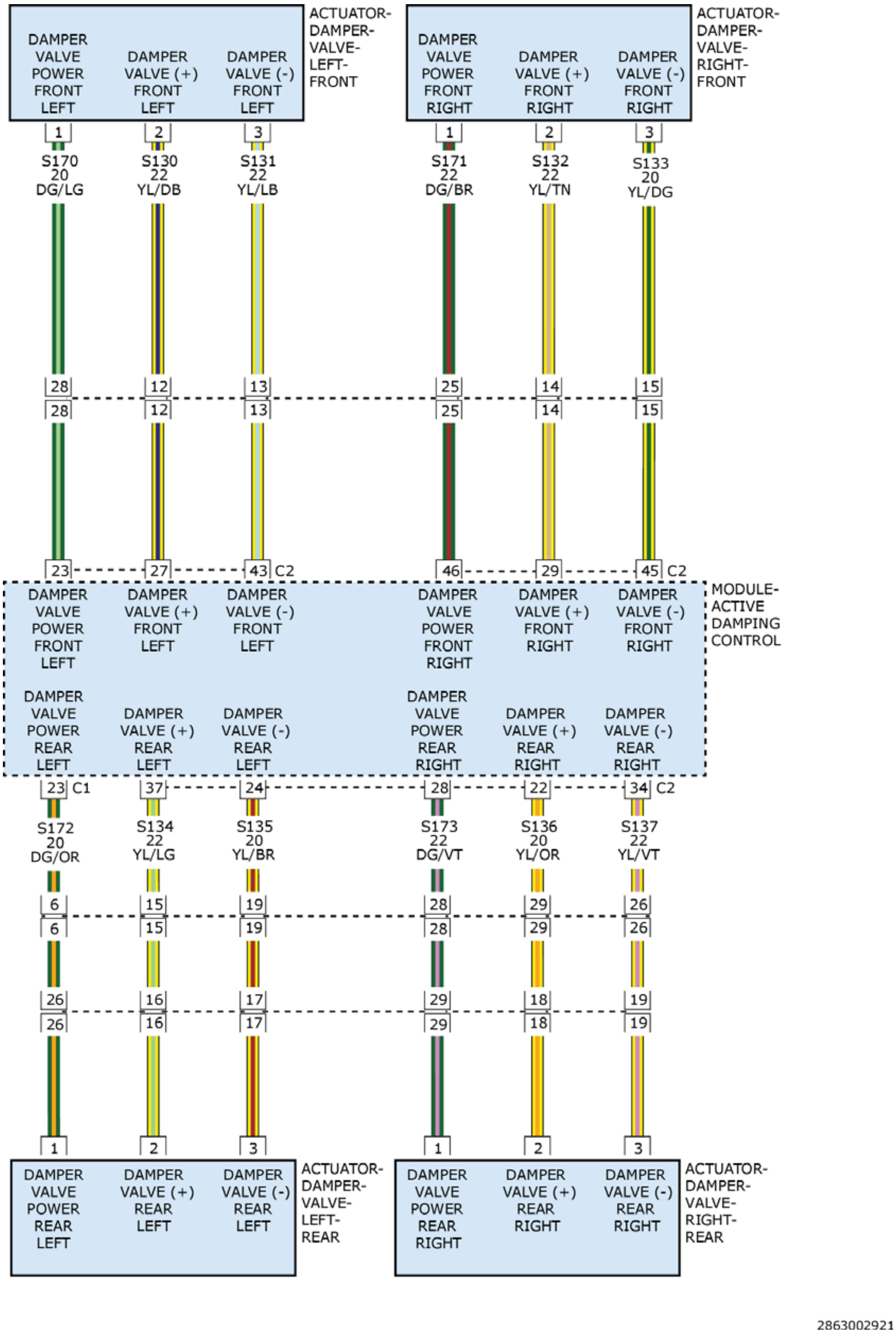


Fig. 15: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Adaptive Damping Control Module (ADCM) detects when the Right Front Damping Valve circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Check for continuity between ground and the (S132) Right Front Damper Valve (+) circuit at the ADCM C2 harness connector.

      Is there continuity between ground and the (S132) Right Front Damper Valve (+) circuit?

      Yes

      - Repair the (S132) Right Front Damper Valve (+) circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B6-12-RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

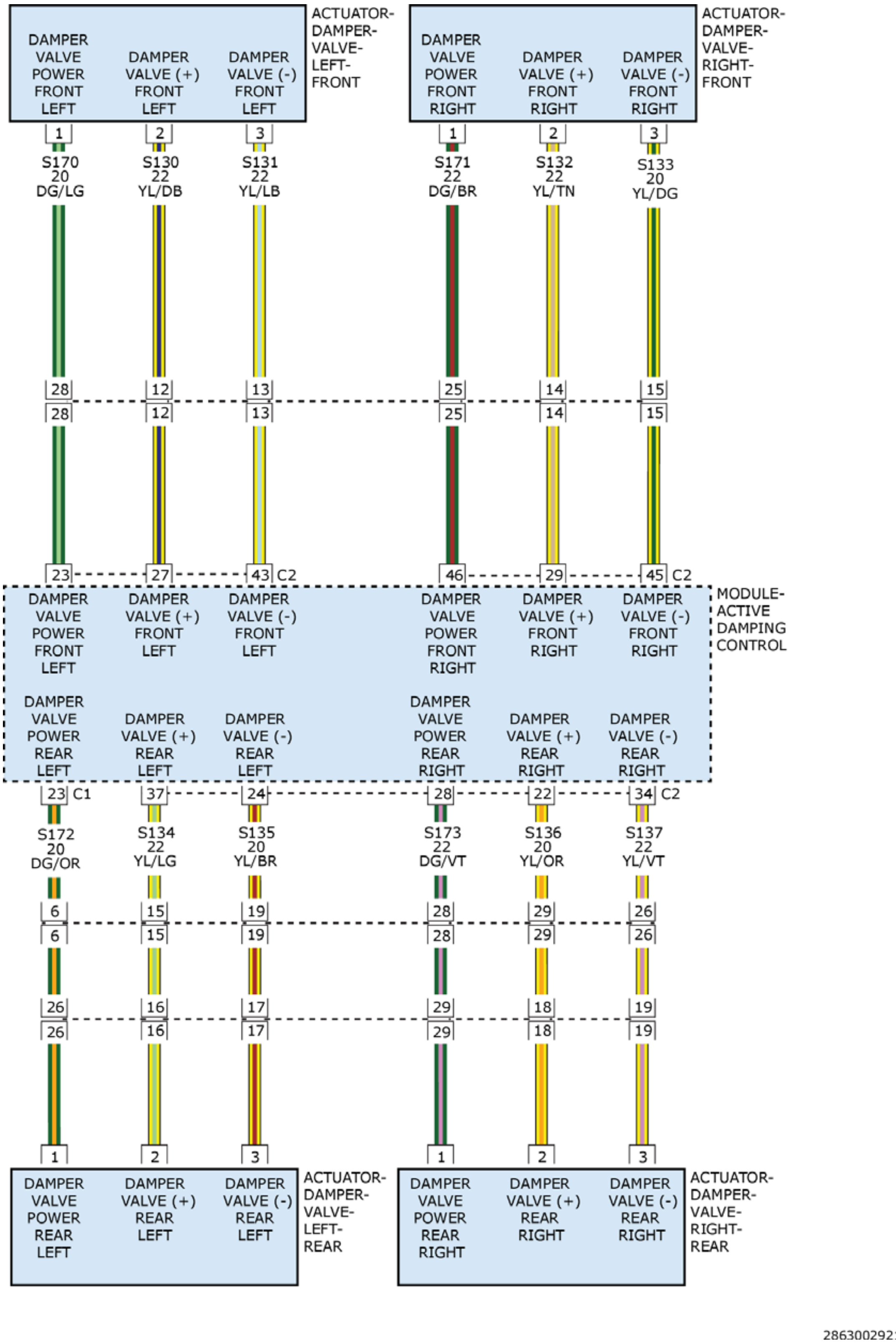


Fig. 16: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Adaptive Damping Control Module (ADCM) detects when the Right Front Damping Valve circuit is shorted to battery voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Damping Valve Shock Assembly harness connector.
   3. Disconnect the ADCM C2 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S132) Right Front Damper Valve (+) circuit.

      Is there any voltage present?

      Yes

      - Repair the (S132) Right Front Damper Valve (+) circuit for a short battery.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

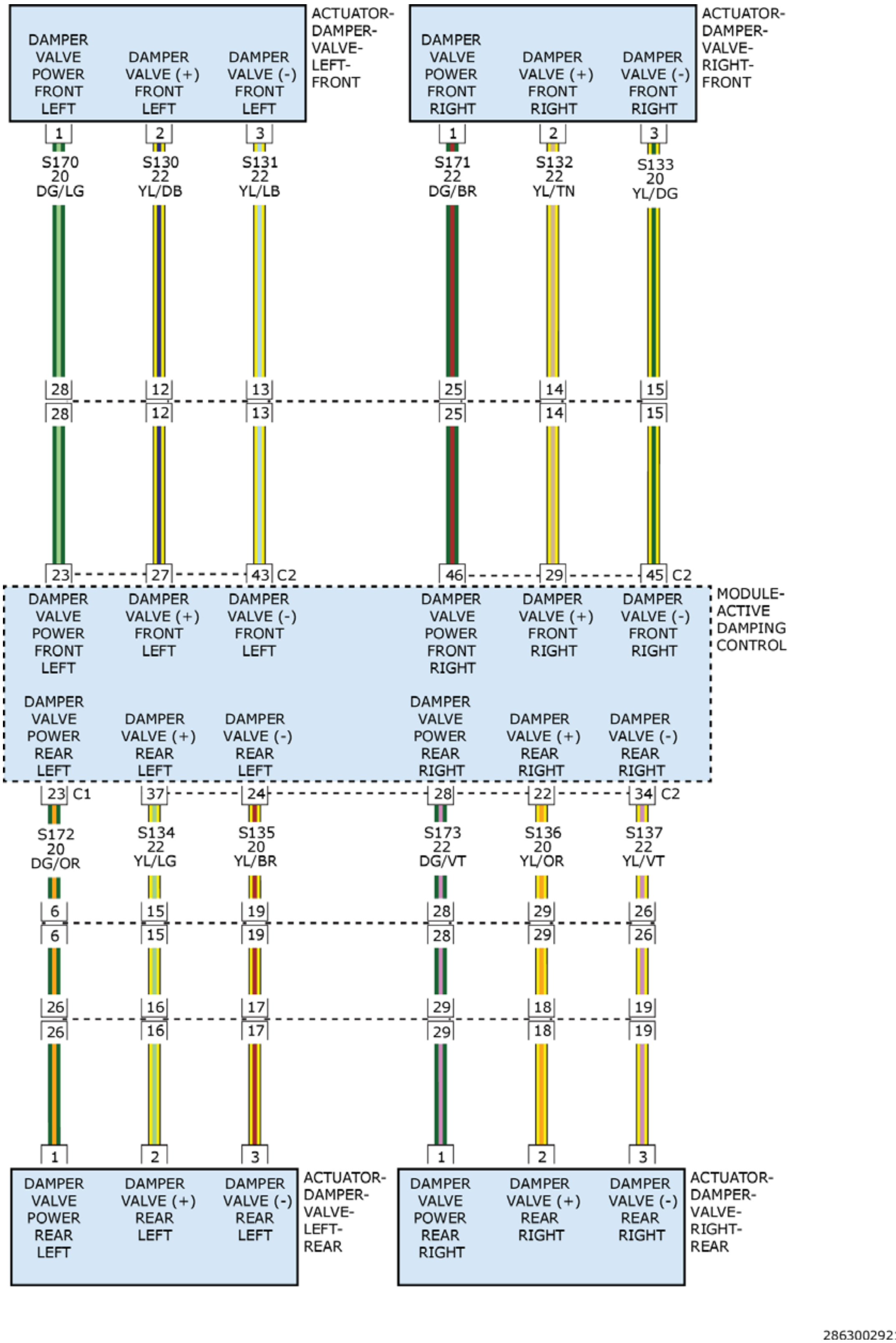
    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B6-13-RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[**Fig. 17: Valve Damper Actuator Circuit Diagram**]
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Adaptive Damping Control Module (ADCM) detects when the Left Front Damping Valve circuit is open.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

       Is the DTC active?

       Yes

       - Go To 2

       No

       - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance of the (S132) Right Front Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S132) Right Front Damper Valve (+) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B7-11-RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

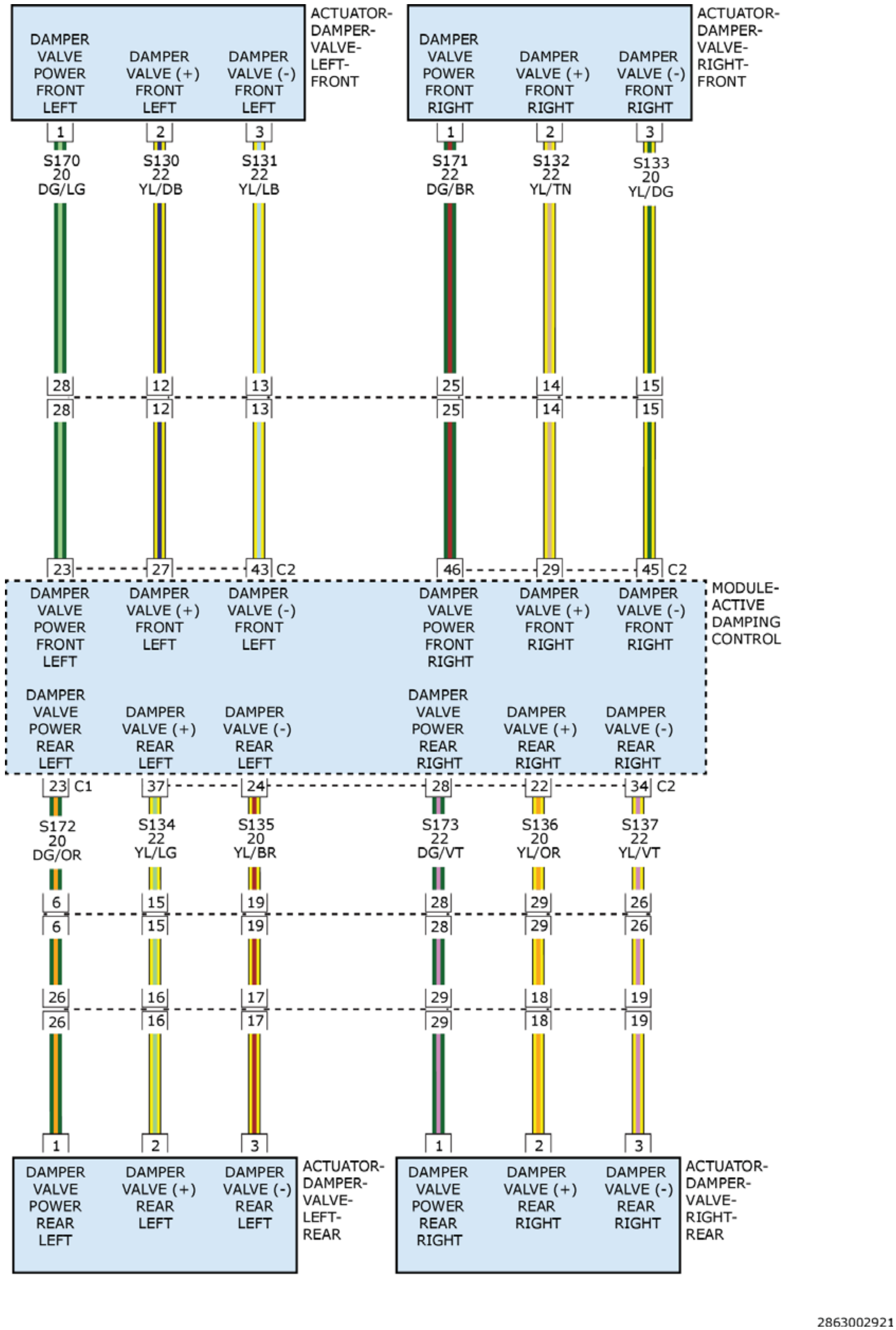


Fig. 18: Valve Damper Actuator Circuit Diagram

Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Adaptive Damping Control Module (ADCM) detects when the Right Front Damping Valve circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Turn the ignition on.
   2. With the scan tool, read ADCM DTCs and record on the repair order.
   3. With the scan tool, erase DTCs.
   4. Start the Engine.
   5. With the scan tool, read ADCM DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

   1. Turn the ignition off.
   2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Check for continuity between ground and the (S133) Right Front Damper Valve (-) circuit at the ADCM C2 harness connector.

      Is there continuity between ground and the (S133) Right Front Damper Valve (-) circuit?

      Yes

      - Repair the (S133) Right Front Damper Valve (-) circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B7-12-RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

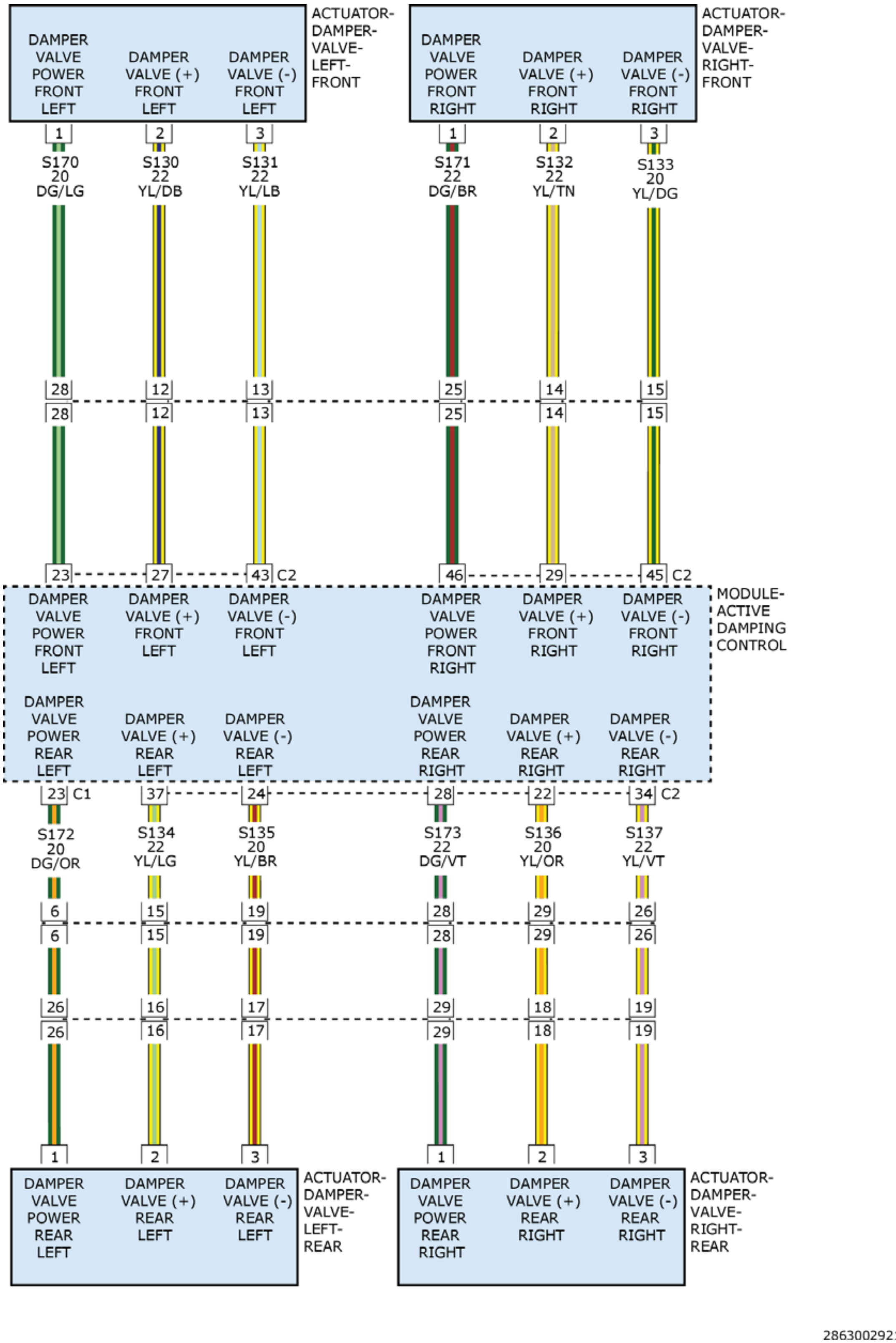


Fig. 19: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Adaptive Damping Control Module (ADCM) detects the Right Front Damping Valve circuit is shorted to battery voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Damping Valve Shock Assembly harness connector.
   3. Disconnect the ADCM C2 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S133) Right Front Damper Valve (-) circuit.

      Is there any voltage present?

      Yes

      - Repair the (S133) Right Front Damper Valve (-) circuit for a short battery.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

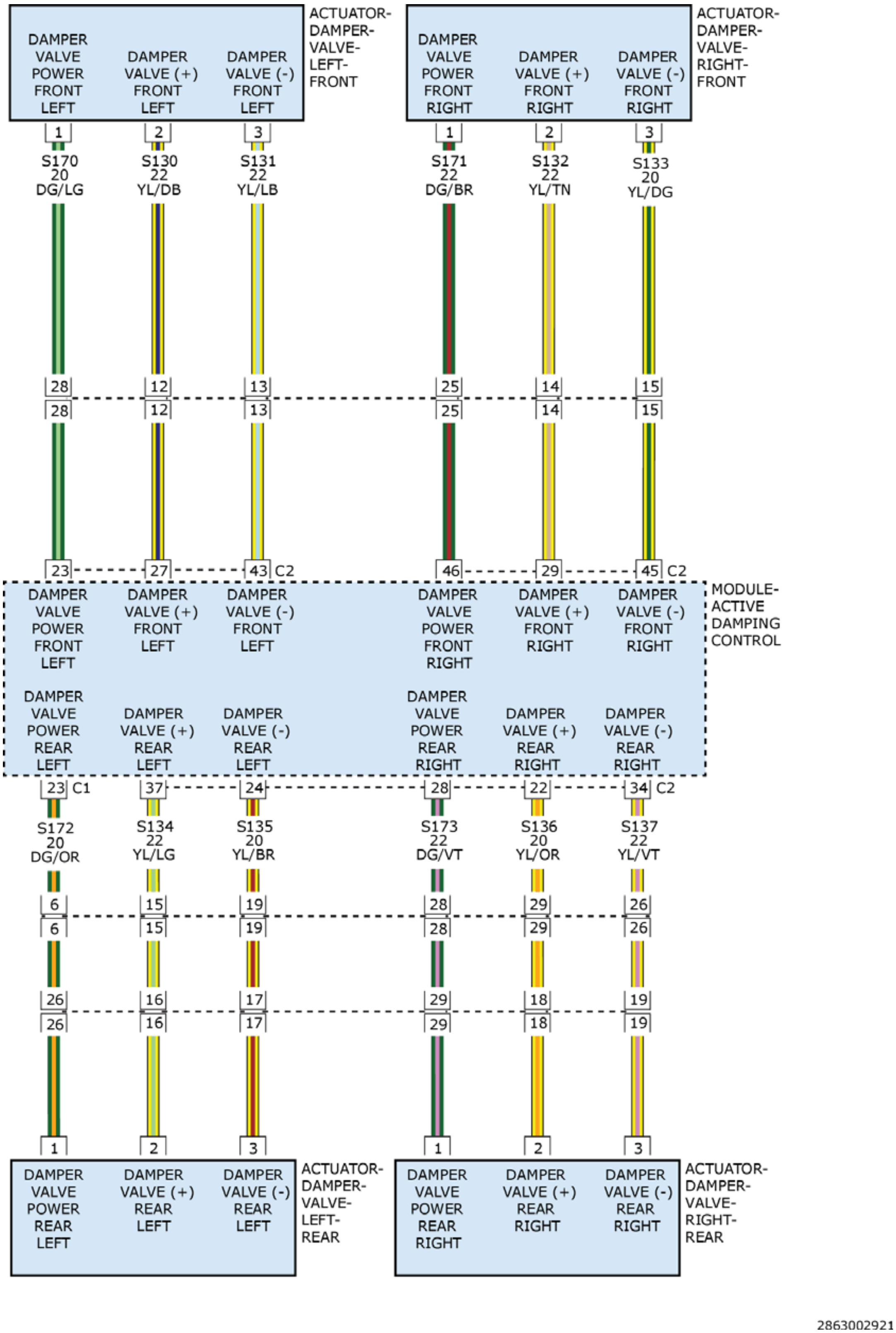
    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B7-13-RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 20: Valve Damper Actuator Circuit Diagram](#)
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Adaptive Damping Control Module (ADCM) detects when the Right Front Damping Valve circuit is open.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance of the (S133) Right Front Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S133) Right Front Damper Valve (-) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B8-11-LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

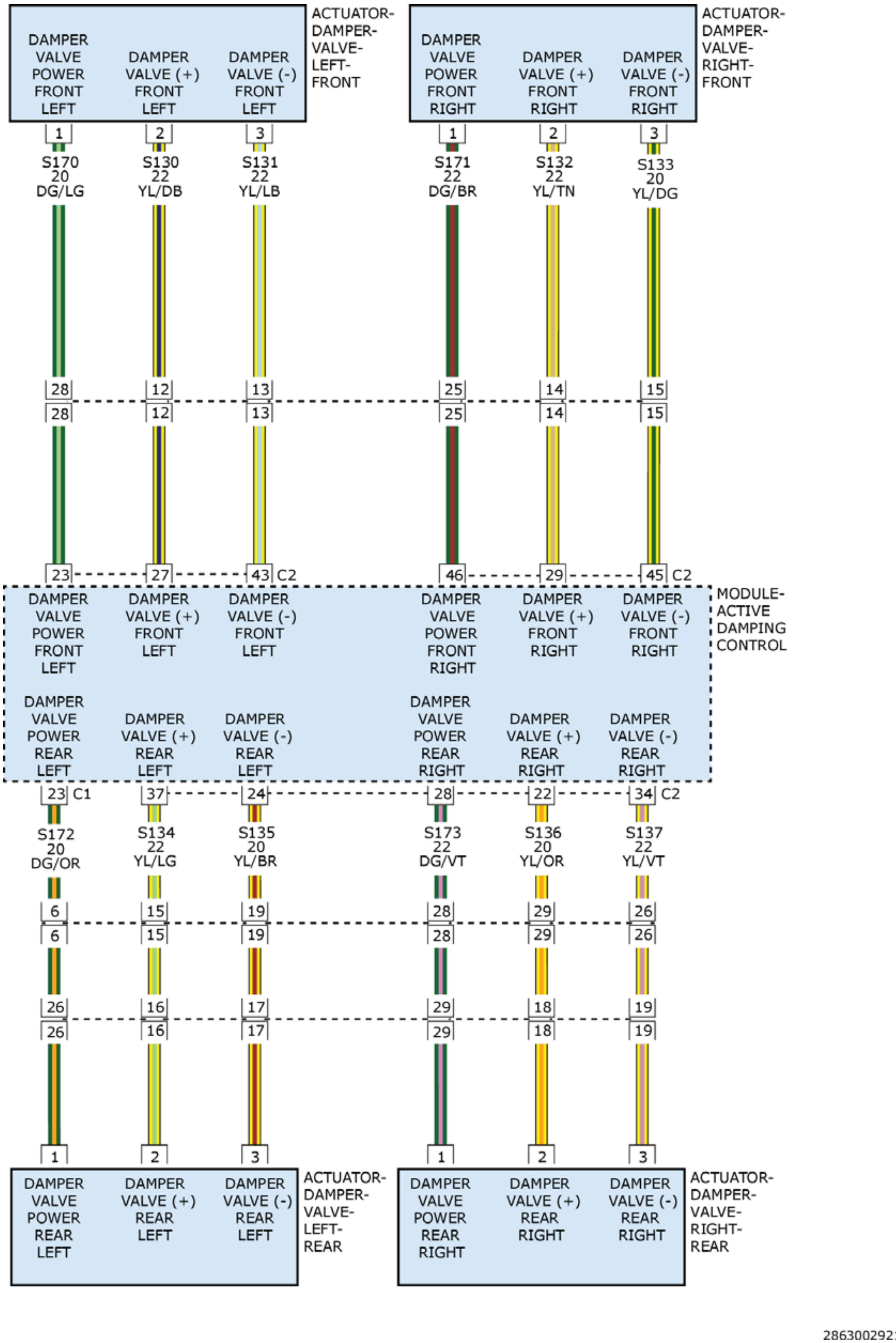


Fig. 21: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Adaptive Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Turn the ignition on.
   2. With the scan tool, read ADCM DTCs and record on the repair order.
   3. With the scan tool, erase DTCs.
   4. Start the Engine.
   5. With the scan tool, read ADCM DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

   1. Turn the ignition off.
   2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S134) LEFT REAR DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Check for continuity between ground and the (S134) Left Rear Damper Valve (+) circuit at the ADCM C2 harness connector.

      Is there continuity between ground and the (S134) Left Rear Damper Valve (+) circuit?

      Yes

      - Repair the (S134) Left Rear Damper Valve (+) circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B8-12-LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

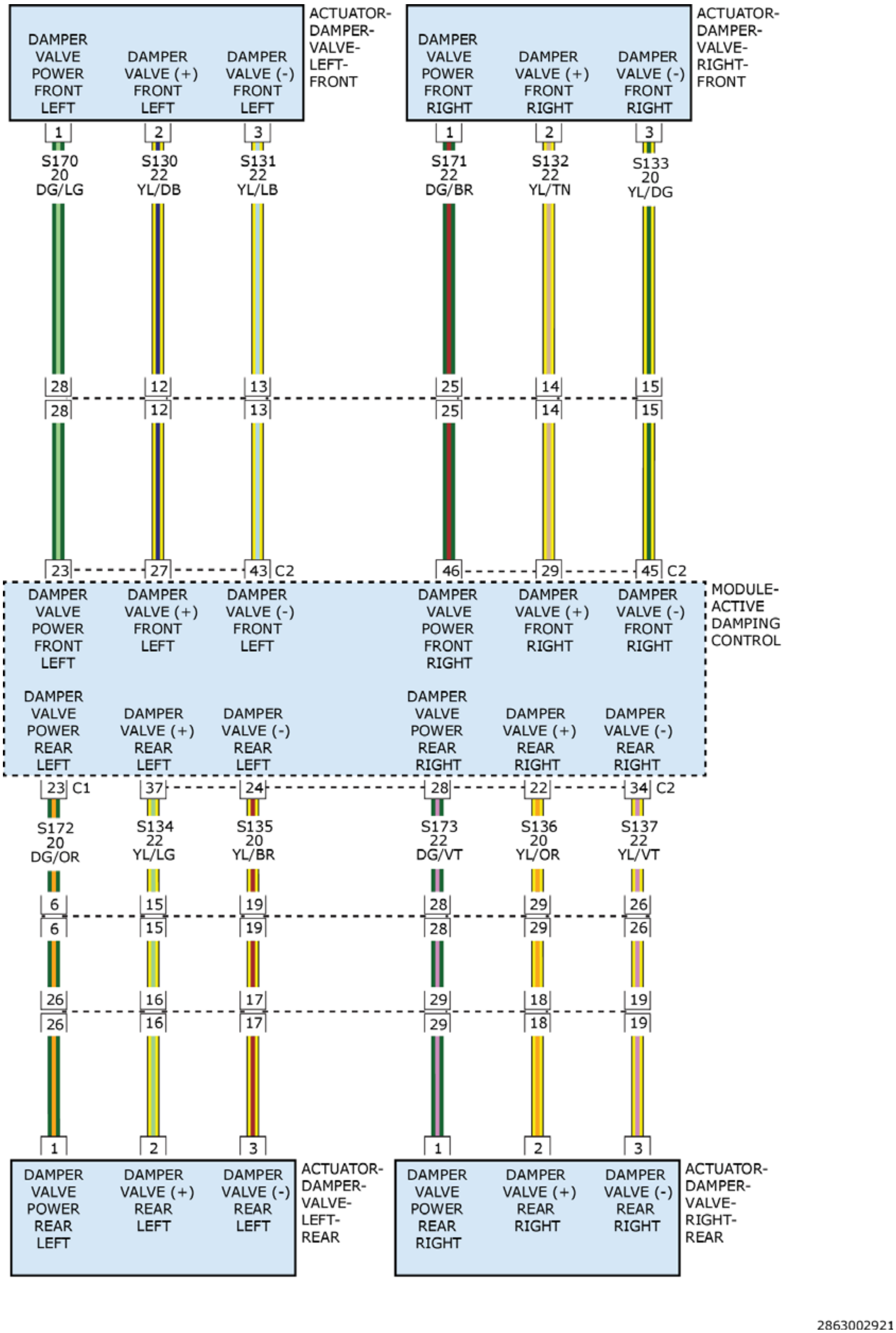


Fig. 22: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is shorted to battery.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S134) LEFT REAR DAMPER VALVE (+) CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Damping Valve Shock Assembly harness connector.
   3. Disconnect the ADCM C2 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S134) Left Rear Damper Valve (+) circuit.

      Is there any voltage present?

      Yes

      - Repair the (S134) Left Rear Damper Valve (+) circuit for a short battery.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B8-13-LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

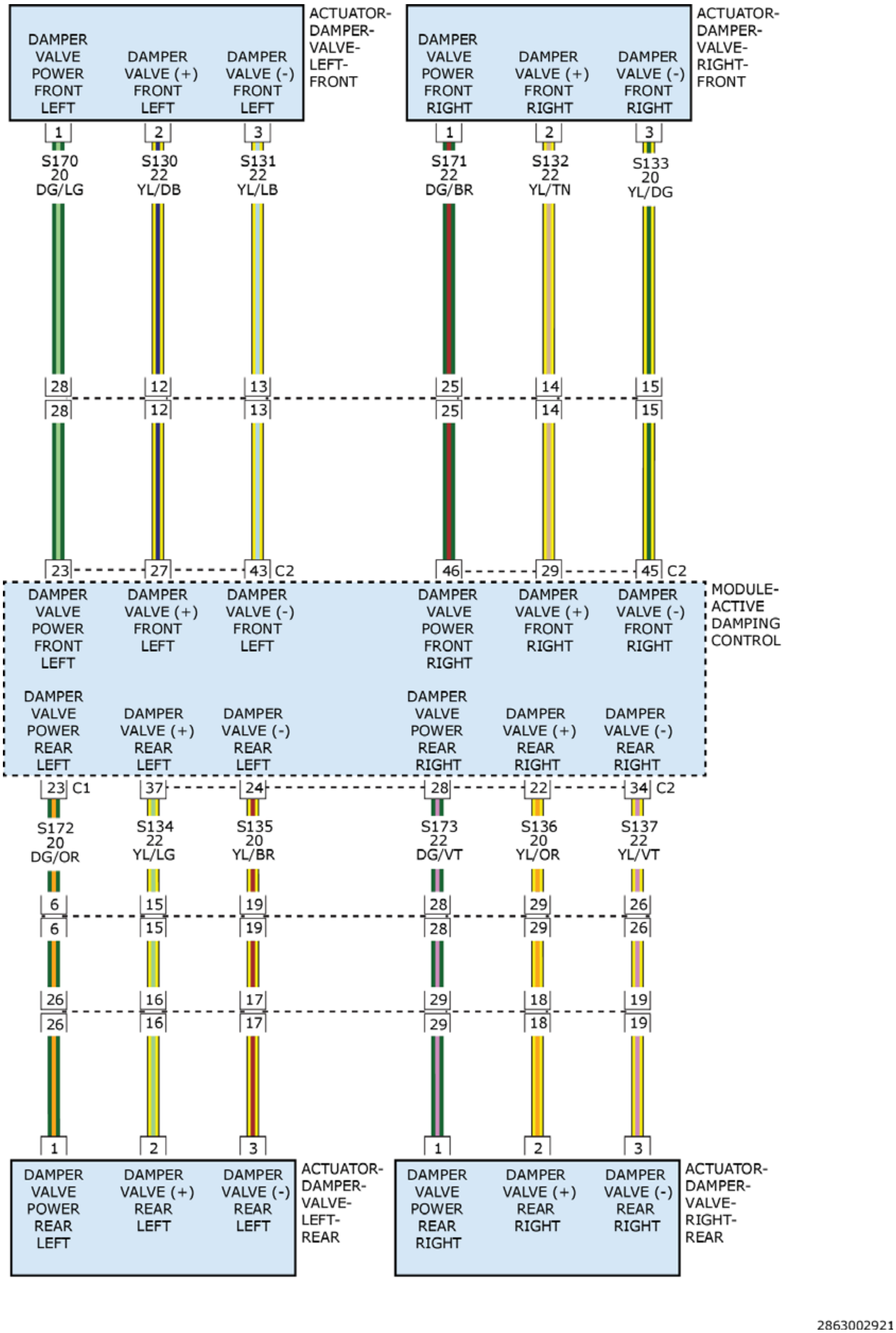


Fig. 23: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is open.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S134) LEFT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance of the (S134) Left Rear Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

      Is the resistance above 5.0 Ohms?

      Yes

      - Repair the (S134) Left Rear Damper Valve (+) circuit for an open or high resistance.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B8-14-LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND OR OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

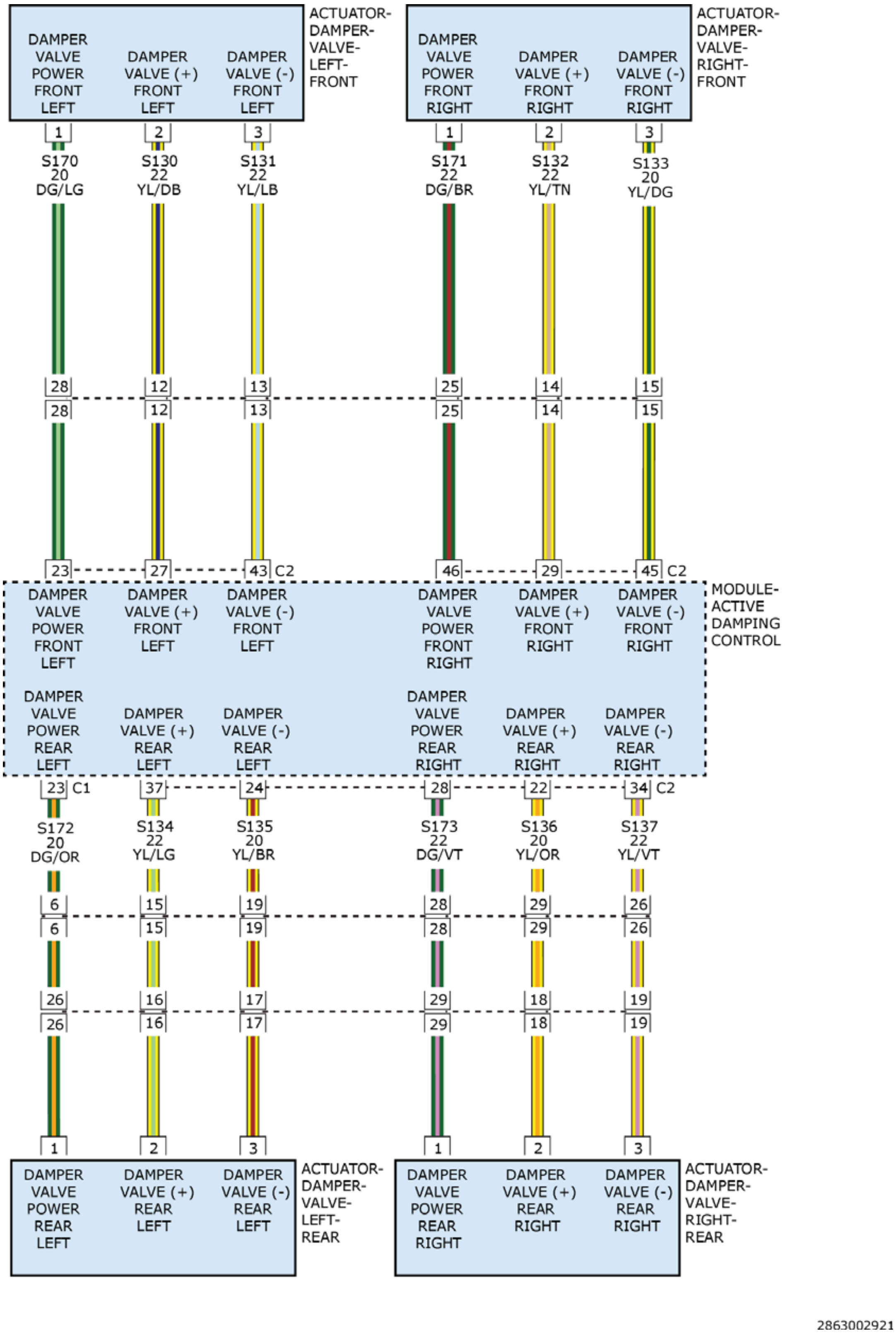


Fig. 24: Valve Damper Actuator Circuit Diagram

Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is shorted to ground or open.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 6
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion,

corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S134) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Check for continuity between ground and the (S134) Left Rear Damper Valve (+) circuit at the ADCM C2 harness connector.

    Is there continuity between ground and the (S134) Left Rear Damper Valve (+) circuit?

    Yes

    - Repair the (S134) Left Rear Damper Valve (+) circuit for a short ground.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **CHECK THE (S134) LEFT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (S134) Left Rear Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S134) Left Rear Damper Valve (+) circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5

5. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

3. Turn the ignition on.
4. With the scan tool, erase the DTCs.
5. Start the Engine.
6. With the scan tool, read ADCM DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

6. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B9-11-LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

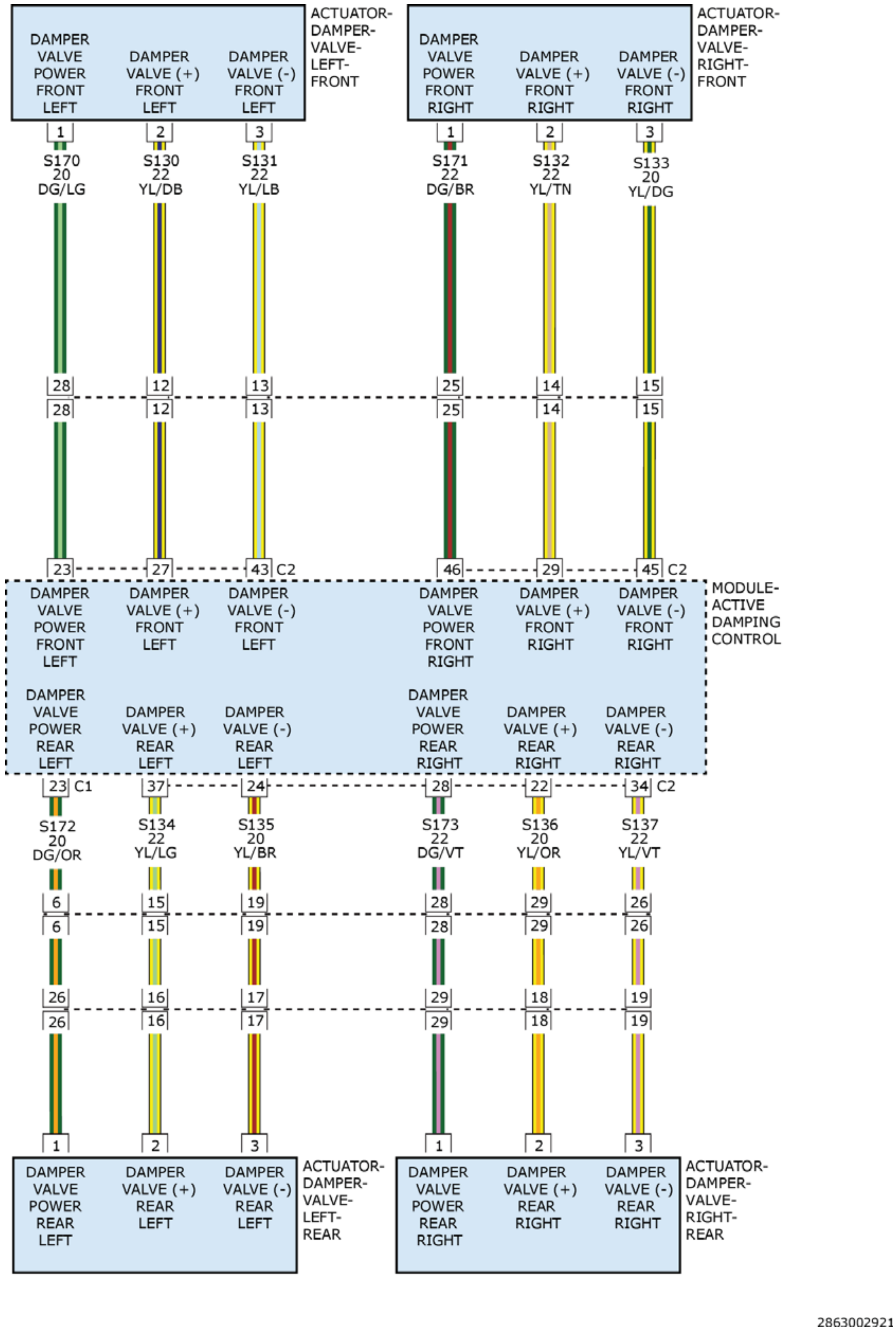


Fig. 25: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S135) LEFT REAR DAMPER VALVE (-) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S135) LEFT REAR DAMPER VALVE (-) CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Check for continuity between ground and the (S135) Left Rear Damper Valve (-) circuit at the ADCM C2 harness connector.

    Is there continuity between ground and the (S135) Left Rear Damper Valve (-) circuit?

    Yes

    - Repair the (S135) Left Rear Damper Valve (-) circuit for a short ground.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**

1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
3. Look for the data to change or for the DTC to reset during the wiggle test.
4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B9-12-LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

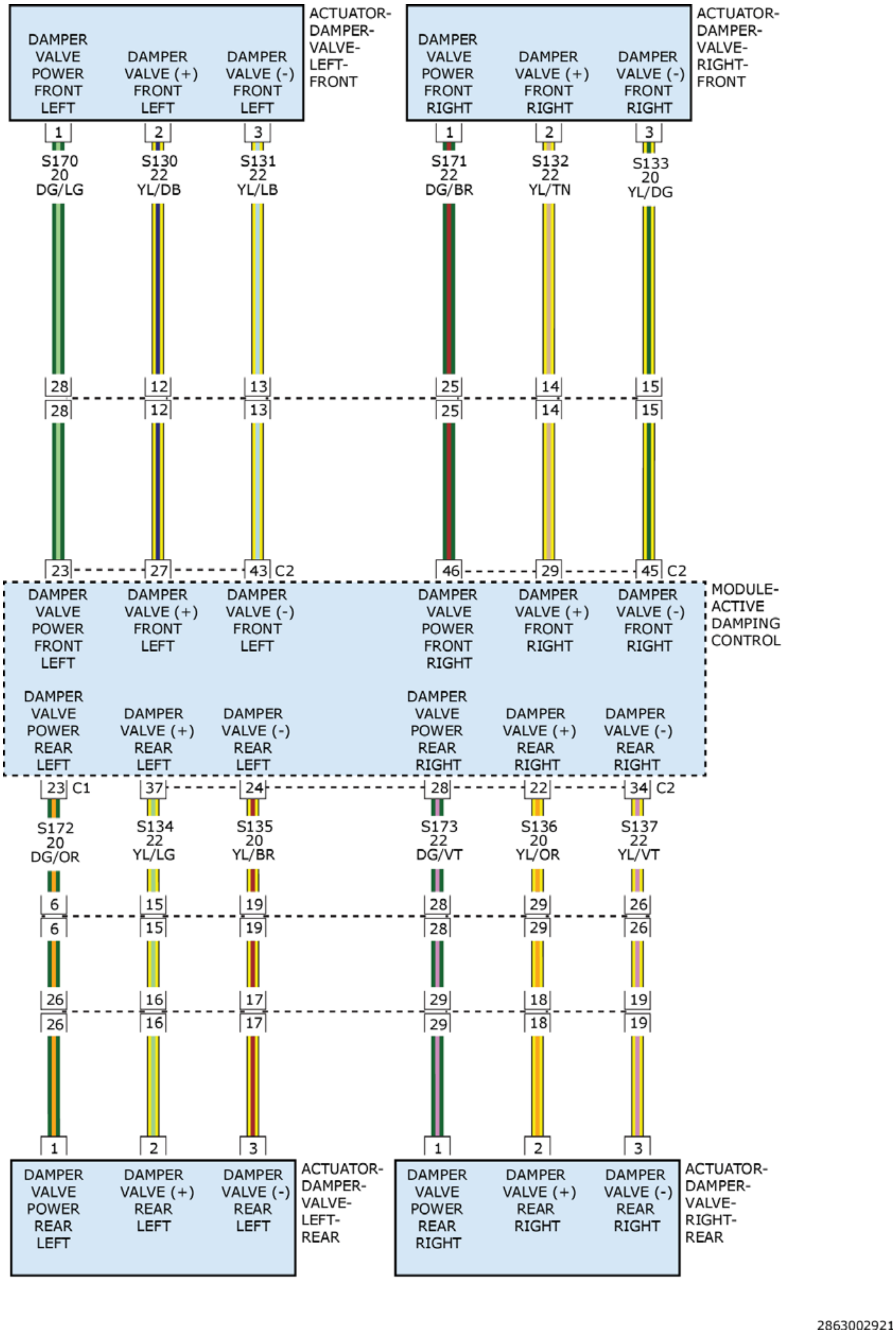


Fig. 26: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is shorted to battery voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S135) LEFT REAR DAMPER VALVE (-) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S135) LEFT REAR DAMPER VALVE (-) CIRCUIT FOR A SHORT TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Damping Valve Shock Assembly harness connector.
   3. Disconnect the ADCM C2 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (S135) Left Rear Damper Valve (-) circuit.

   Is there any voltage present?

   Yes

   - Repair the (S135) Left Rear Damper Valve (-) circuit for a short battery.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4
4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B9-13-LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

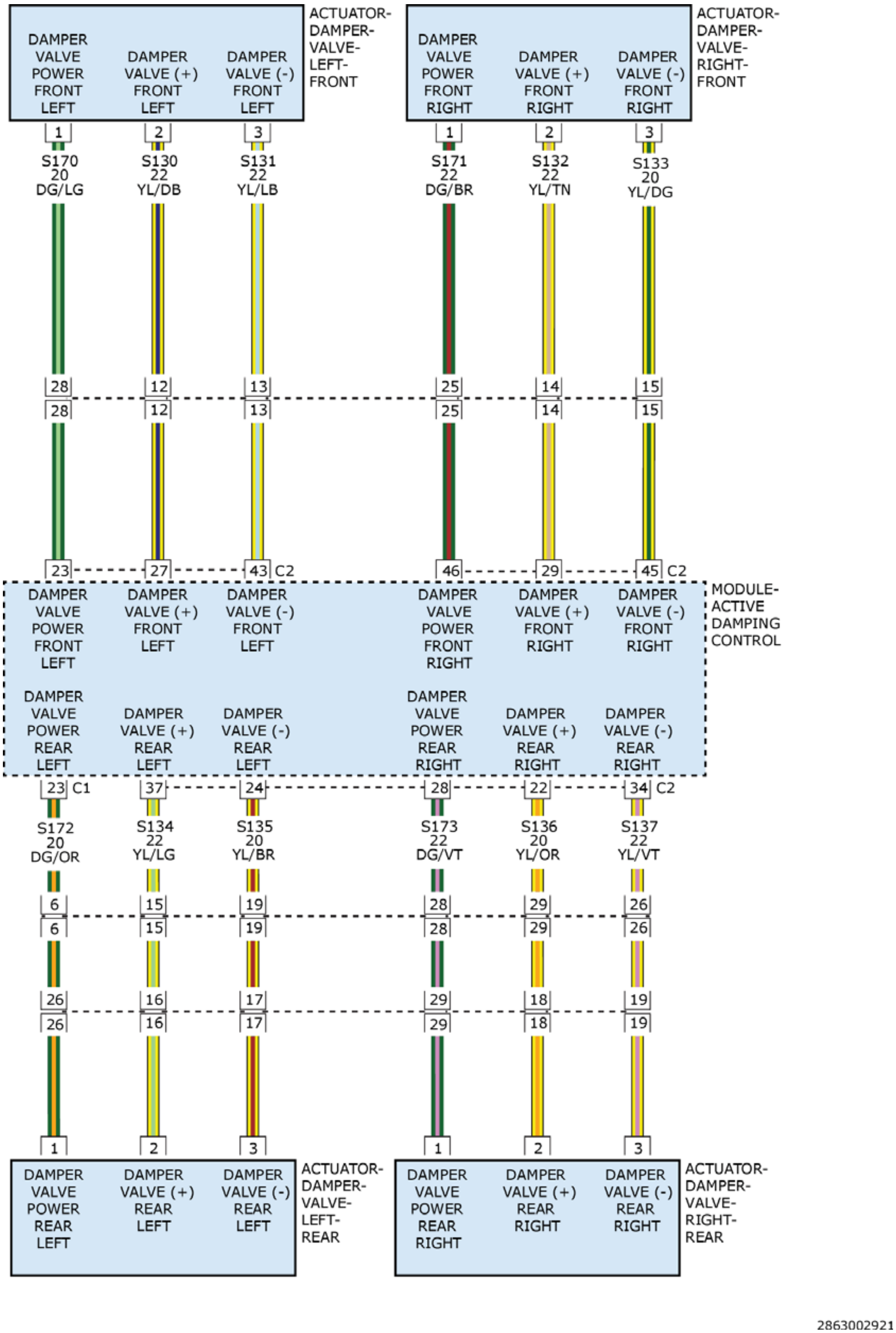


Fig. 27: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Rear Damping Valve circuit is open.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S135) LEFT REAR DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S135) LEFT REAR DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Measure the resistance of the (S135) Left Rear Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S135) Left Rear Damper Valve (-) circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15B9-18-LEFT REAR DAMPING VALVE LOW SIDE 2 - UNDER CURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE:	**If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

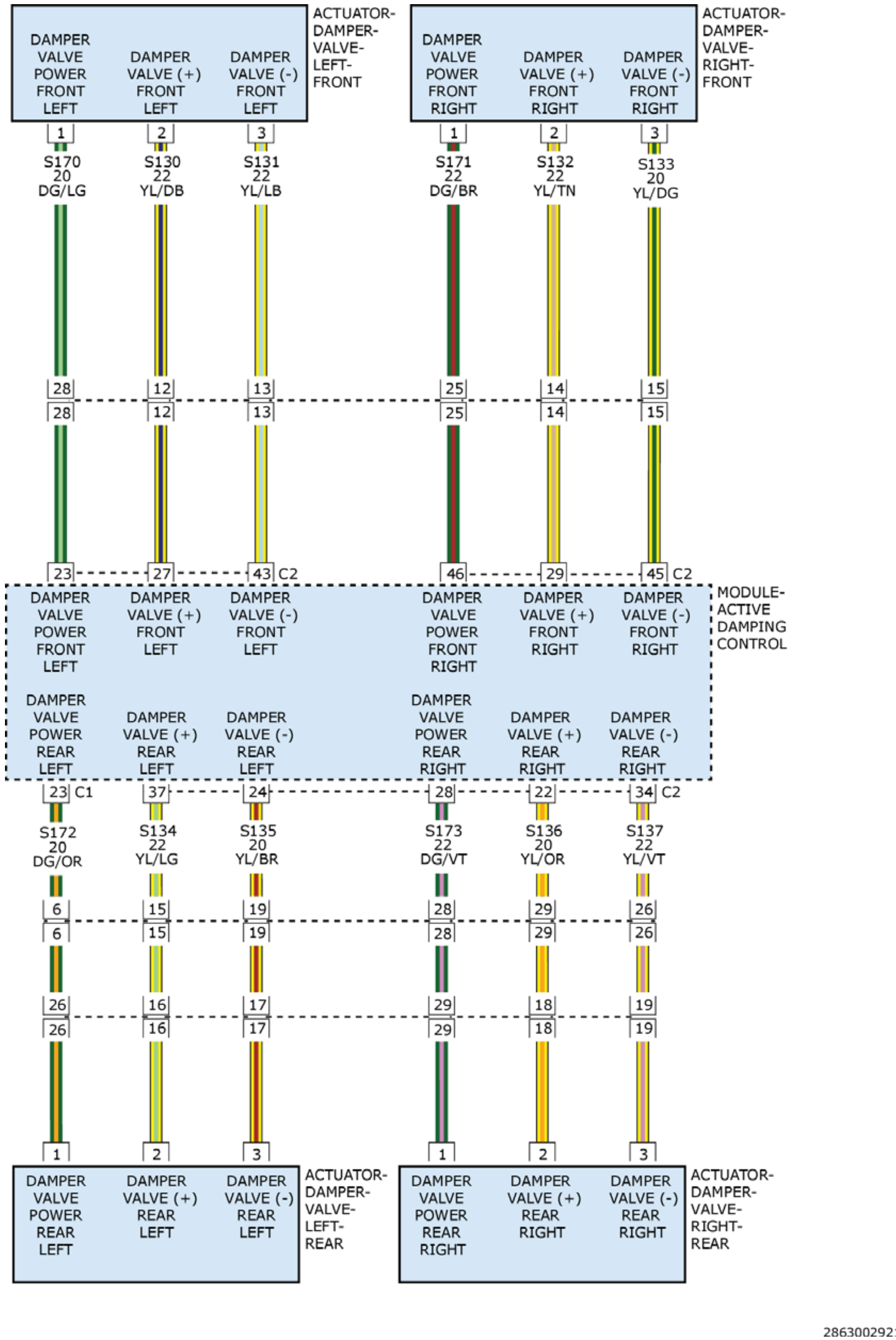


Fig. 28: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Left Rear Damping Valve Solenoid Low Side 2 (rebound stage) is overcurrent caused by an internal failure in the Damping Valve Shock Assembly.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S135) LEFT REAR DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Turn the ignition on.
   2. With the scan tool, read ADCM DTCs and record on the repair order.
   3. With the scan tool, erase DTCs.
   4. Start the Engine.
   5. With the scan tool, read ADCM DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

   NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

   1. Turn the ignition off.
   2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S135) LEFT REAR DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Left Rear Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Measure the resistance of the (S135) Left Rear Damper Valve (-) circuit between the Left Rear Damping Valve Shock Assembly harness connector and the ADCM C2 harness connector.

   Is the resistance above 5.0 Ohms?

   Yes

   - Repair the (S135) Left Rear Damper Valve (-) circuit for an open or high resistance.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BA-11-RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

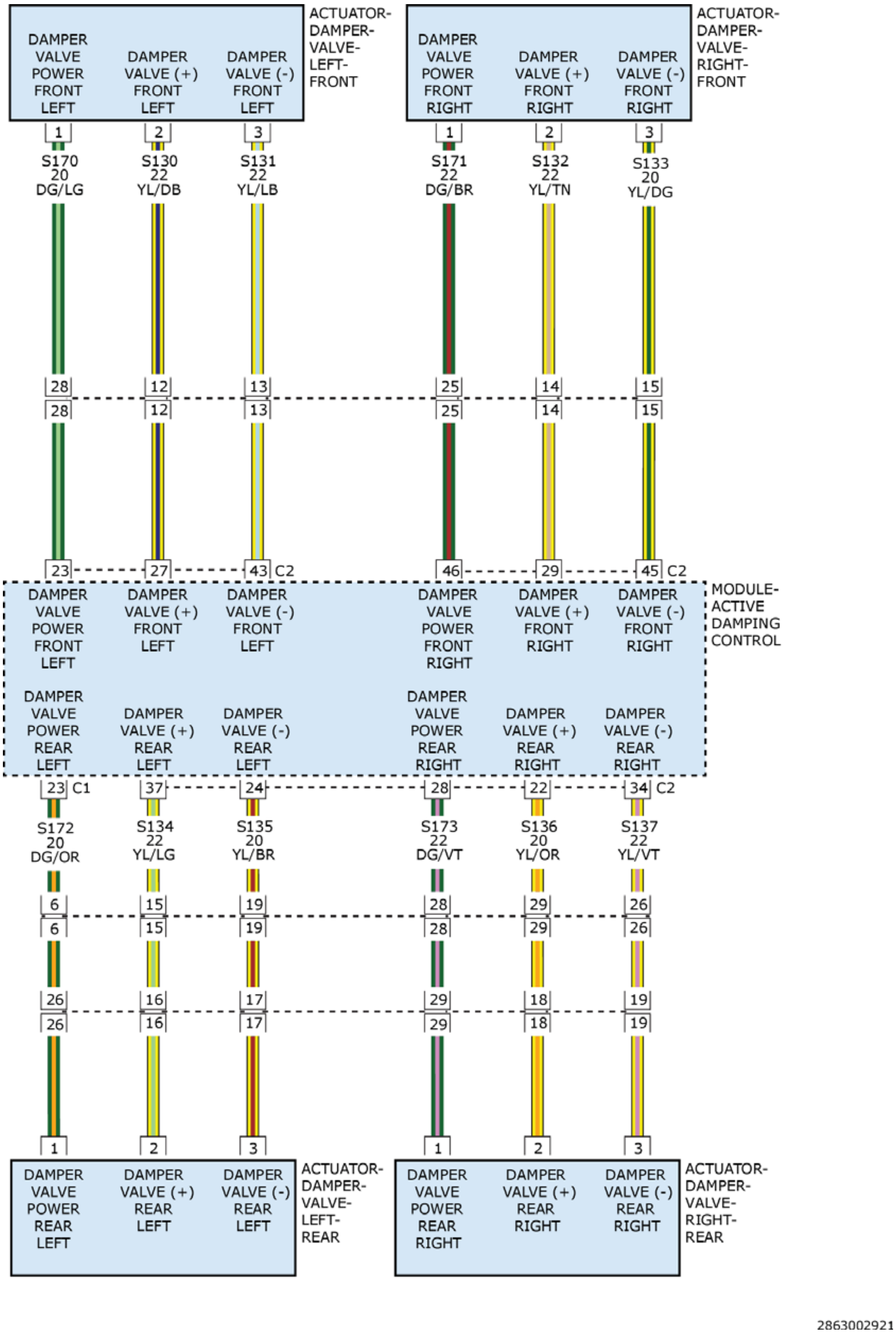


Fig. 29: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Right Rear Damping Valve circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Check for continuity between ground and the (S136) Right Rear Damper Valve (+) circuit at the ADCM C2 harness connector.

    Is there continuity between ground and the (S136) Right Rear Damper Valve (+) circuit?

    Yes

    - Repair the (S136) Right Rear Damper Valve (+) circuit for a short ground.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BA-12-RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

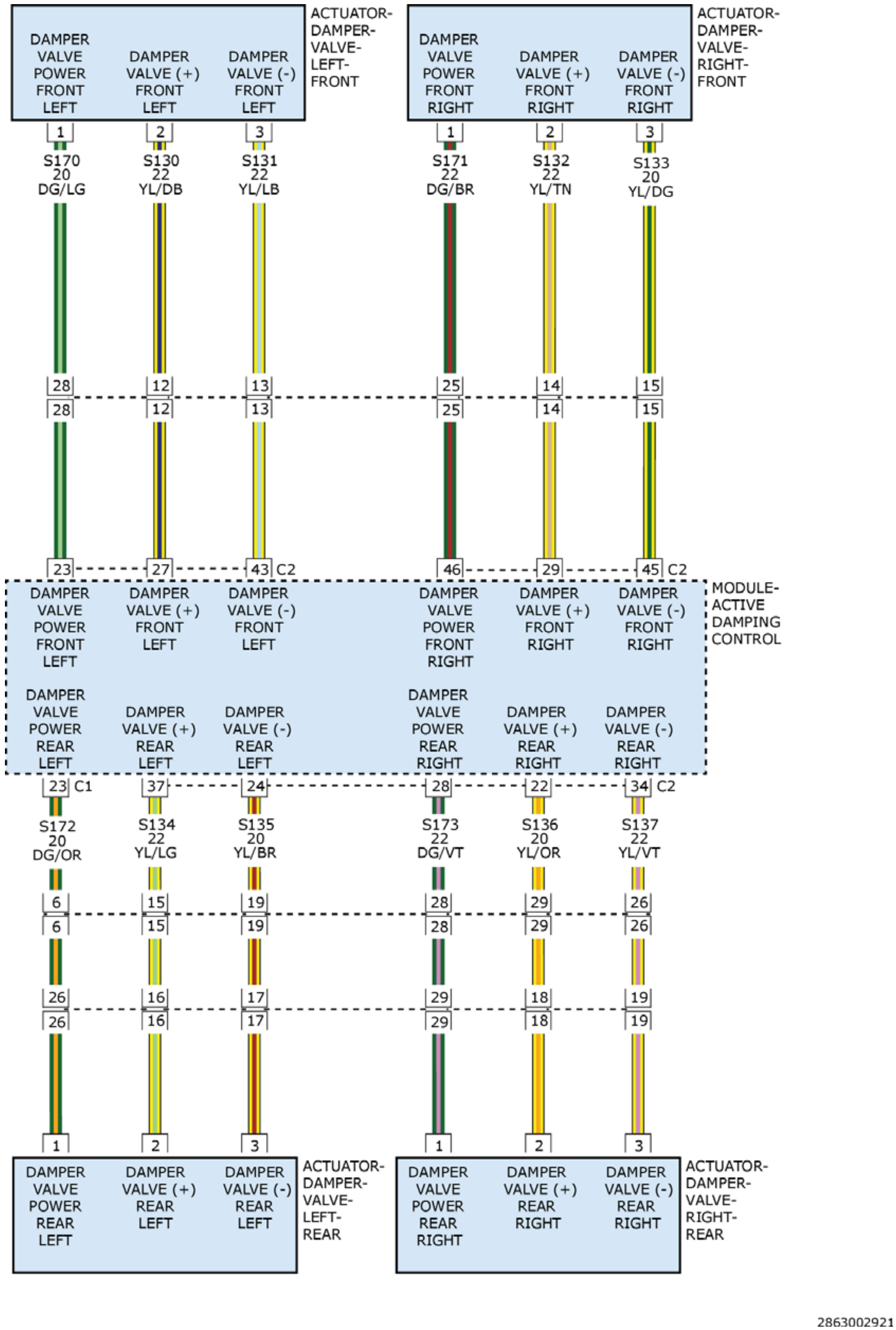


Fig. 30: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Right Rear Damping Valve circuit is shorted to battery voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR A SHORT TO BATTERY**
    1. Turn the ignition off.
    2. Disconnect the Damping Valve Shock Assembly harness connector.
    3. Disconnect the ADCM C2 harness connector.
    4. Turn the ignition on.
    5. Measure the voltage between ground and the (S136) Right Rear Damper Valve (+) circuit.

    Is there any voltage present?

    Yes

    - Repair the (S136) Right Rear Damper Valve (+) circuit for a short battery.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BA-13-RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

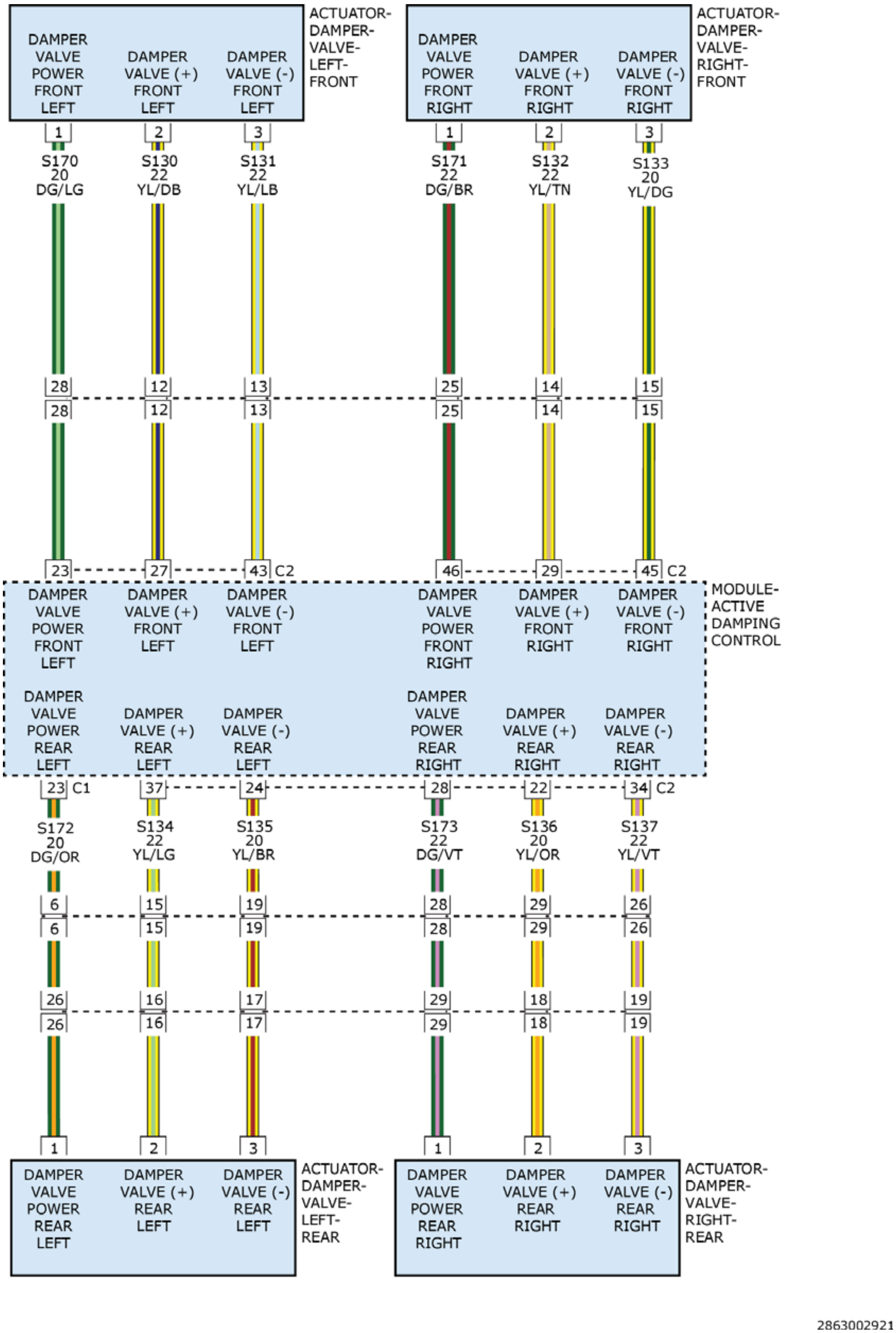


Fig. 31: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Right Rear Damping Valve circuit is open.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Measure the resistance of the (S136) Right Rear Damper Valve (+) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S136) Right Rear Damper Valve (+) circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BA-1C-RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT VOLTAGE OUT OF RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

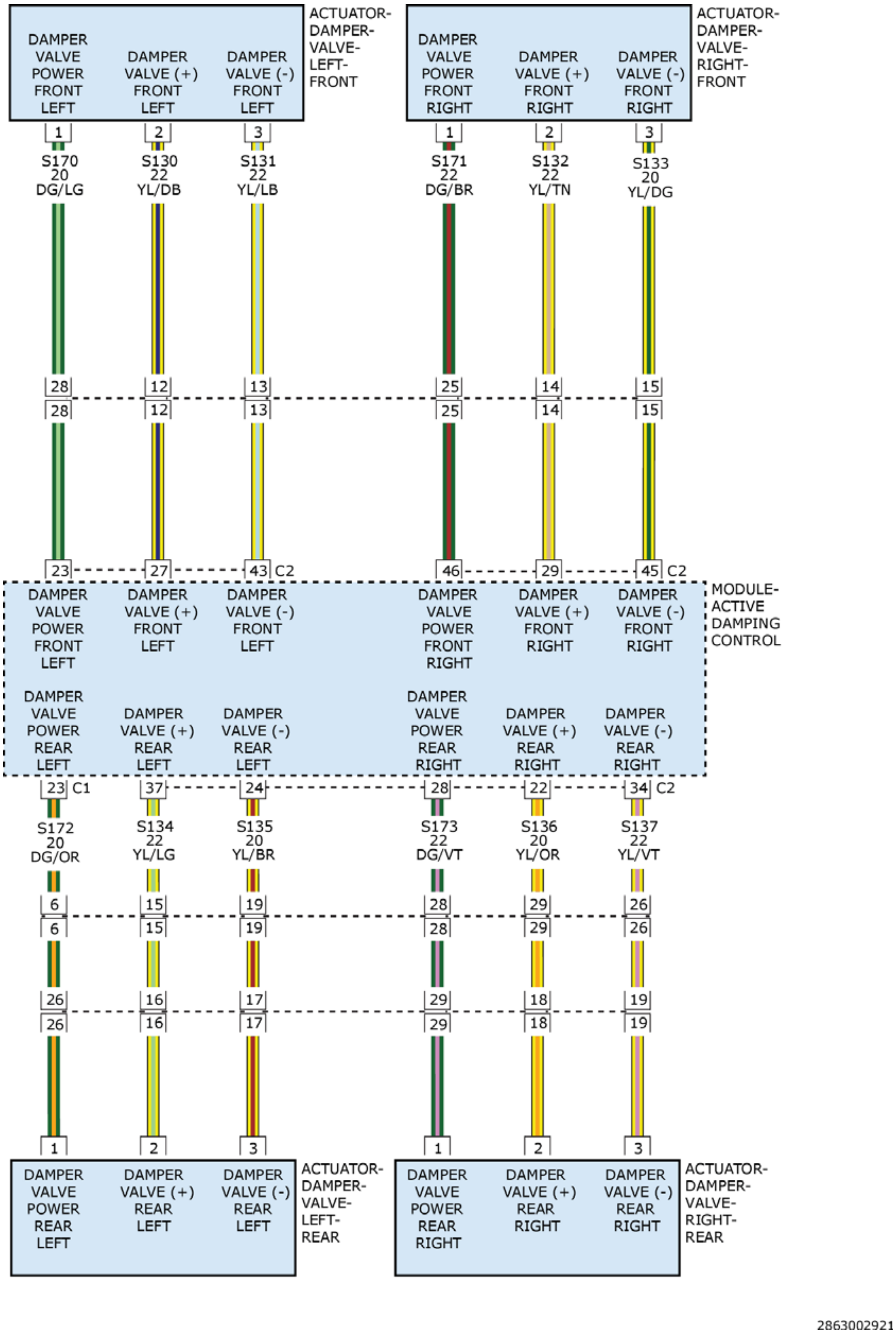


Fig. 32: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Right Rear Damper Valve voltage is out of range.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR A SHORT TO BATTERY**
    1. Turn the ignition off.
    2. Disconnect the Damping Valve Shock Assembly harness connector.
    3. Disconnect the ADCM C2 harness connector.
    4. Turn the ignition on.
    5. Measure the voltage between ground and the (S136) Right Rear Damper Valve (+) circuit.

    Is there any voltage present?

    Yes

    - Repair the (S136) Right Rear Damper Valve (+) circuit for a short battery.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BB-11-RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

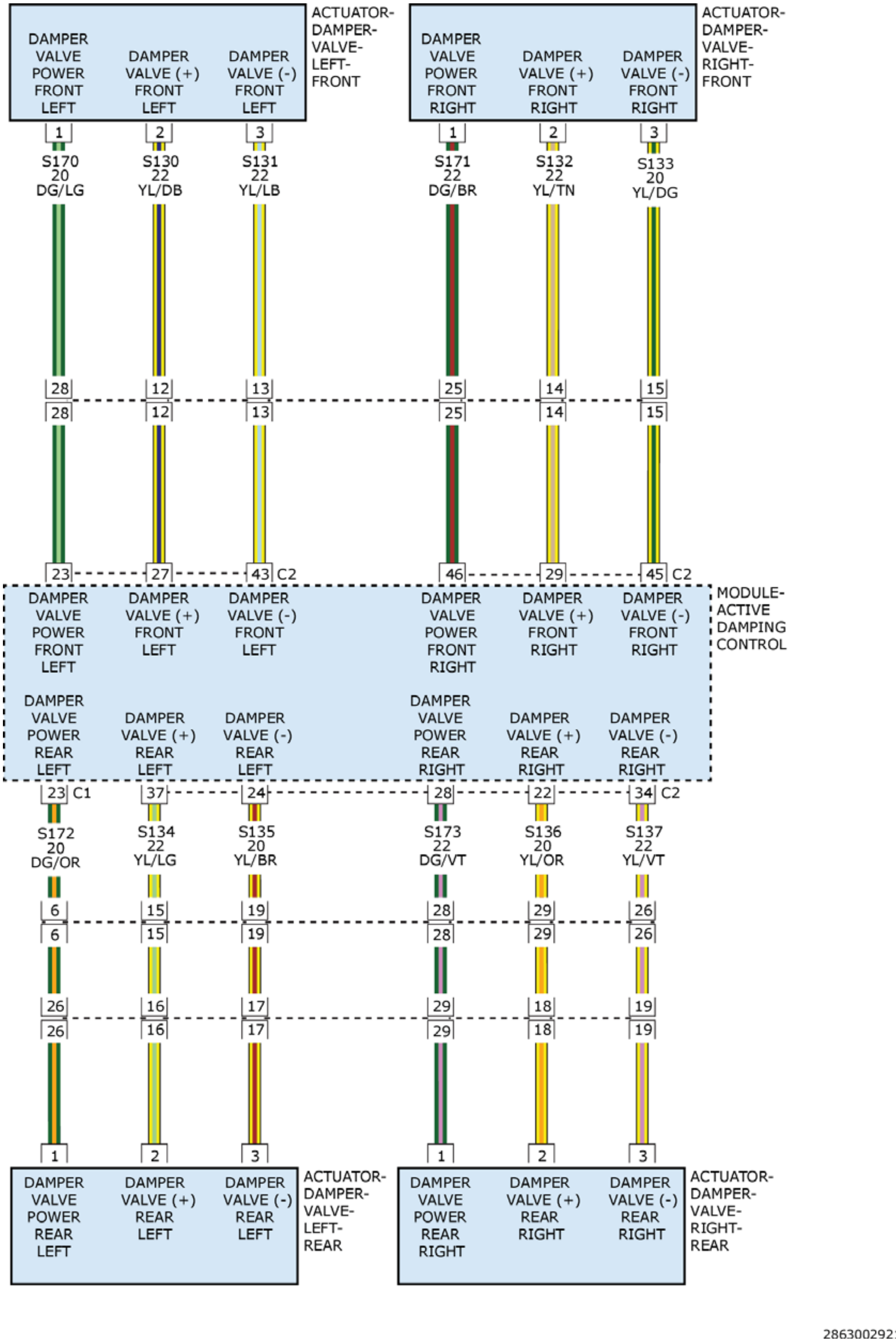


Fig. 33: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Right rear Damping Valve circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Check for continuity between ground and the (S137) Right Rear Damper Valve (-) circuit at the ADCM C2 harness connector.

   Is there continuity between ground and the (S137) Right Rear Damper Valve (-) circuit?

   Yes

   - Repair the (S137) Right Rear Damper Valve (-) circuit for a short ground.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
   1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BB-12-RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

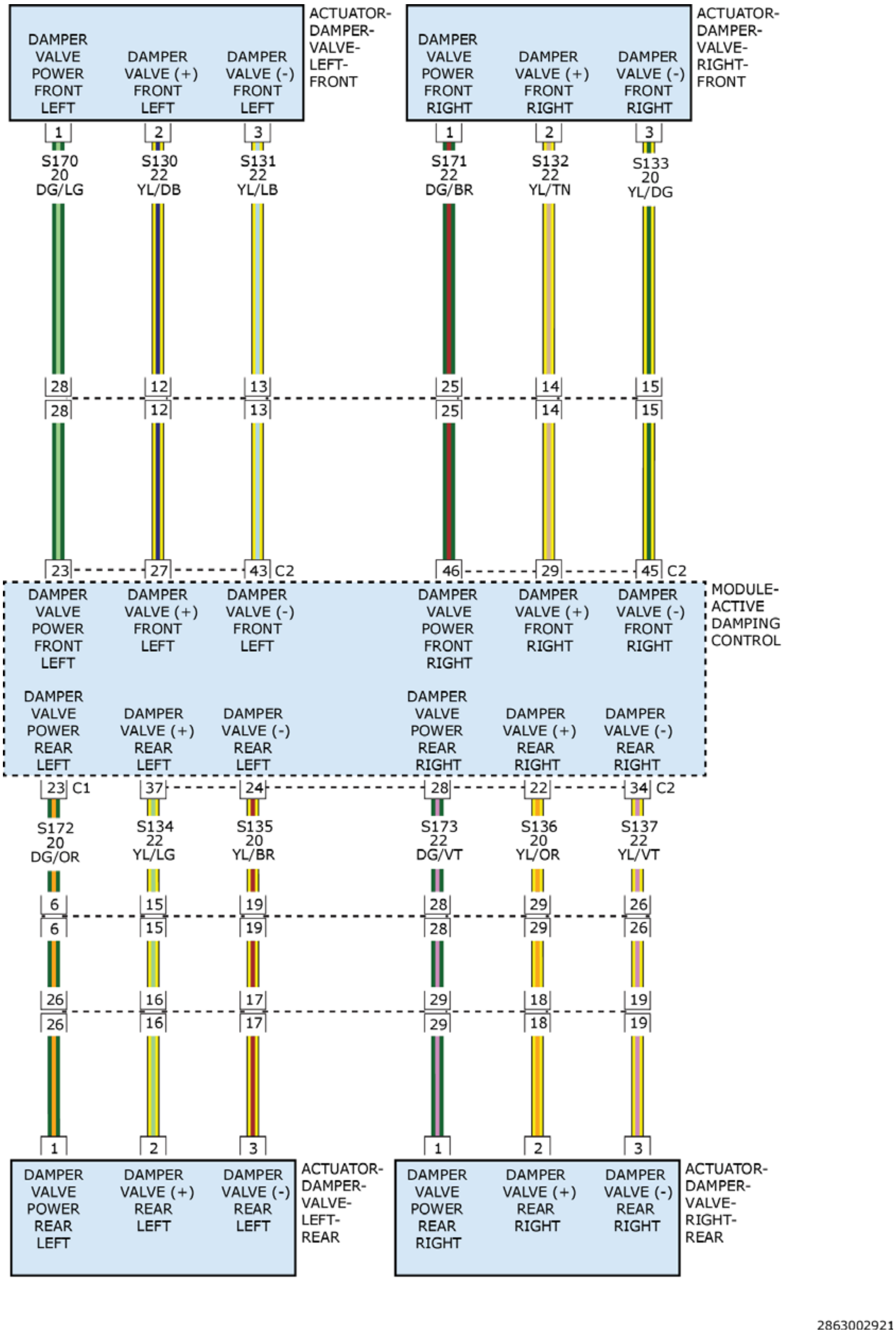


Fig. 34: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Right Rear Damping Valve circuit is shorted to battery voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT SHORTED TO BATTERY
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT FOR A SHORT TO BATTERY**
    1. Turn the ignition off.
    2. Disconnect the Damping Valve Shock Assembly harness connector.
    3. Disconnect the ADCM C2 harness connector.
    4. Turn the ignition on.
    5. Measure the voltage between ground and the (S137) Right Rear Damper Valve (-) circuit.

    Is there any voltage present?

    Yes

    - Repair the (S137) Right Rear Damper Valve (-) circuit for a short battery.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4
4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BB-13-RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

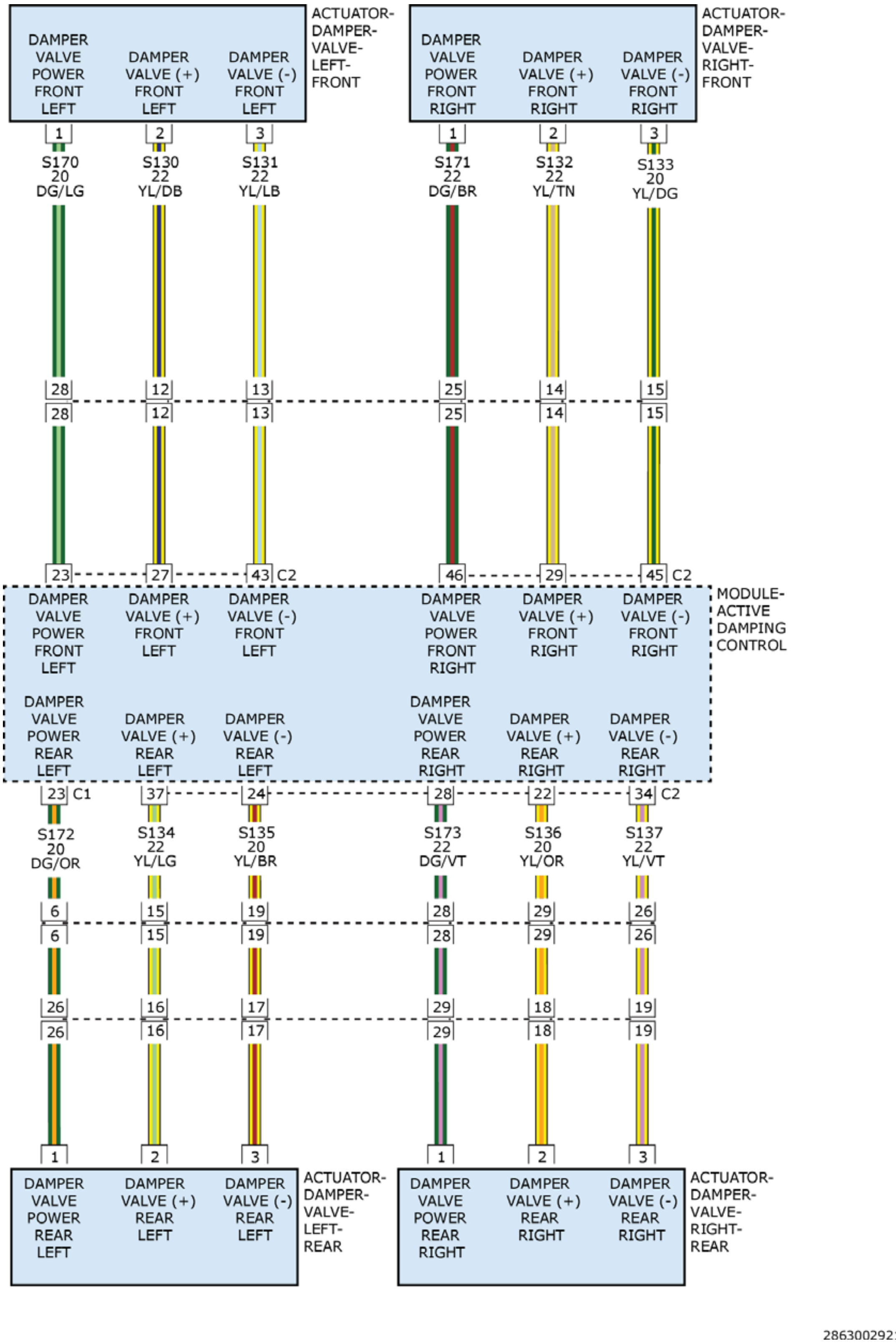


Fig. 35: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Right Rear Damping Valve circuit is open.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)
DAMPING VALVE SHOCK ASSEMBLY

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Measure the resistance of the (S137) Right Rear Damper Valve (-) circuit between the ADCM C2 harness connector and the Damping Valve Shock Assembly harness connector.

    Is the resistance above 5.0 Ohms?

    Yes

    - Repair the (S137) Right Rear Damper Valve (-) circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **ACTIVE DAMPING CONTROL MODULE (ADCM)**
    1. Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BC-11-LEFT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

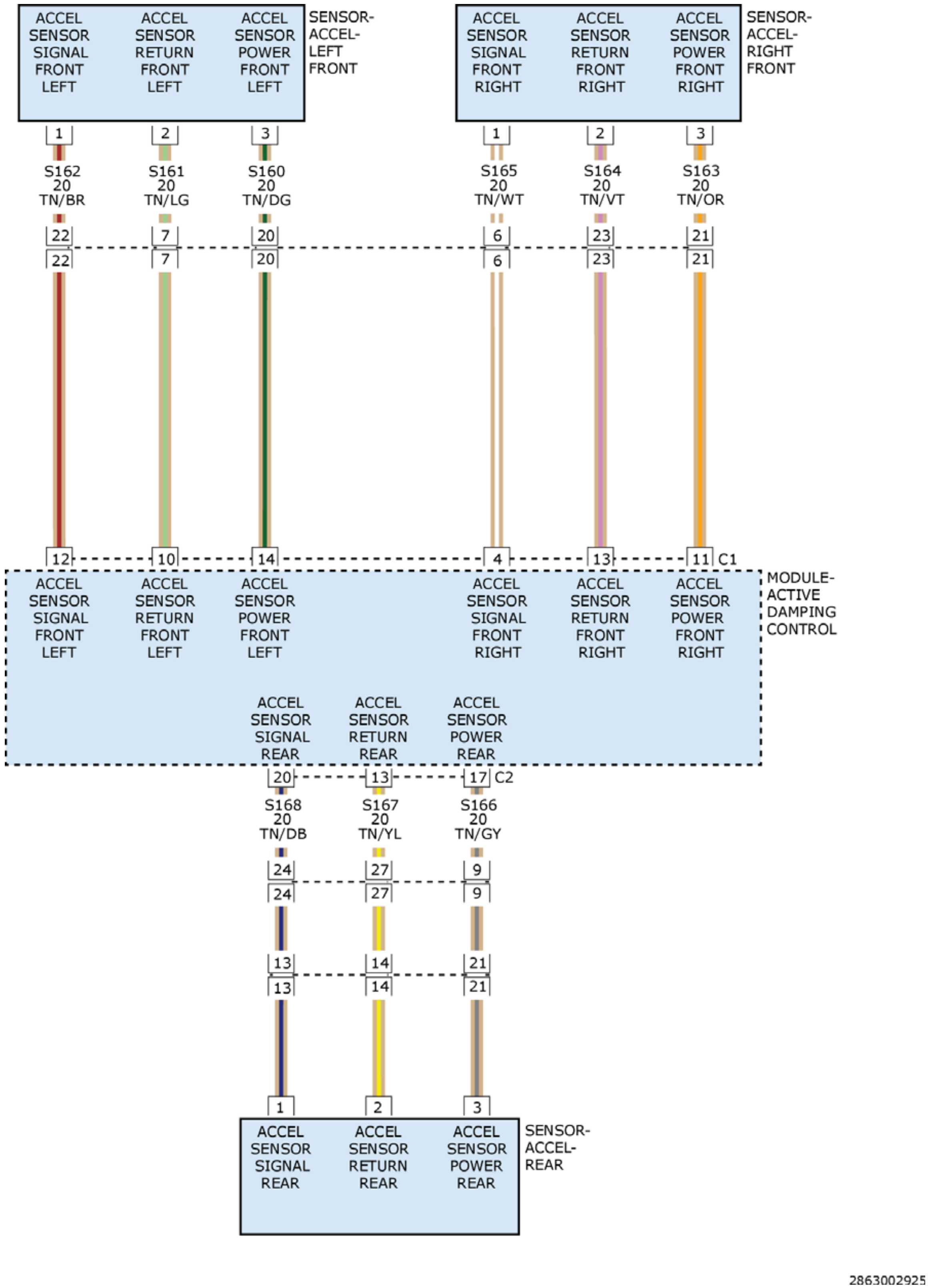


Fig. 36: Acceleration Sensor Circuit Diagram

Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Front Acceleration Sensor Power circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT SHORT TO GROUND
(S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT SHORT TO (S161) LEFT FRONT ACCELERATION SENSOR RETURN
LEFT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Turn the ignition on.
   2. With the scan tool, read ADCM DTCs and record on the repair order.
   3. With the scan tool, read ADCM DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Go To 6
2. **LEFT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

   NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

   1. Turn the ignition off.
   2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the Acceleration Sensor harness connector.
    2. Disconnect the ADCM C1 harness connector.
    3. Check for continuity between ground and the (S160) Left Front Acceleration Sensor Power circuit at the ADCM C1 harness connector.

    Is there continuity between ground and the (S160) Left Front Acceleration Sensor Power circuit?

    Yes

    - Go To 4

    No

    - Repair the (S160) Left Front Acceleration Sensor Power circuit for a short ground.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **CHECK THE (S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO THE (S161) LEFT FRONT ACCELERATION SENSOR RETURN**
    1. Measure the resistance between the (S160) Left Front Acceleration Sensor Power circuit and the (S161) Left Front Acceleration Sensor Return circuit.

    Is the resistance above 5.0 Ohms?

    Yes

    - Go To 5

    No

    - Repair the (S160) Left Front Acceleration Sensor Power circuit for a short to the (S161) Acceleration Sensor Return circuit.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
5. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

3. Turn the ignition on.
4. With the scan tool, erase the DTCs.
5. Start the Engine.
6. With the scan tool, read ADCM DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

6. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BC-12-LEFT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

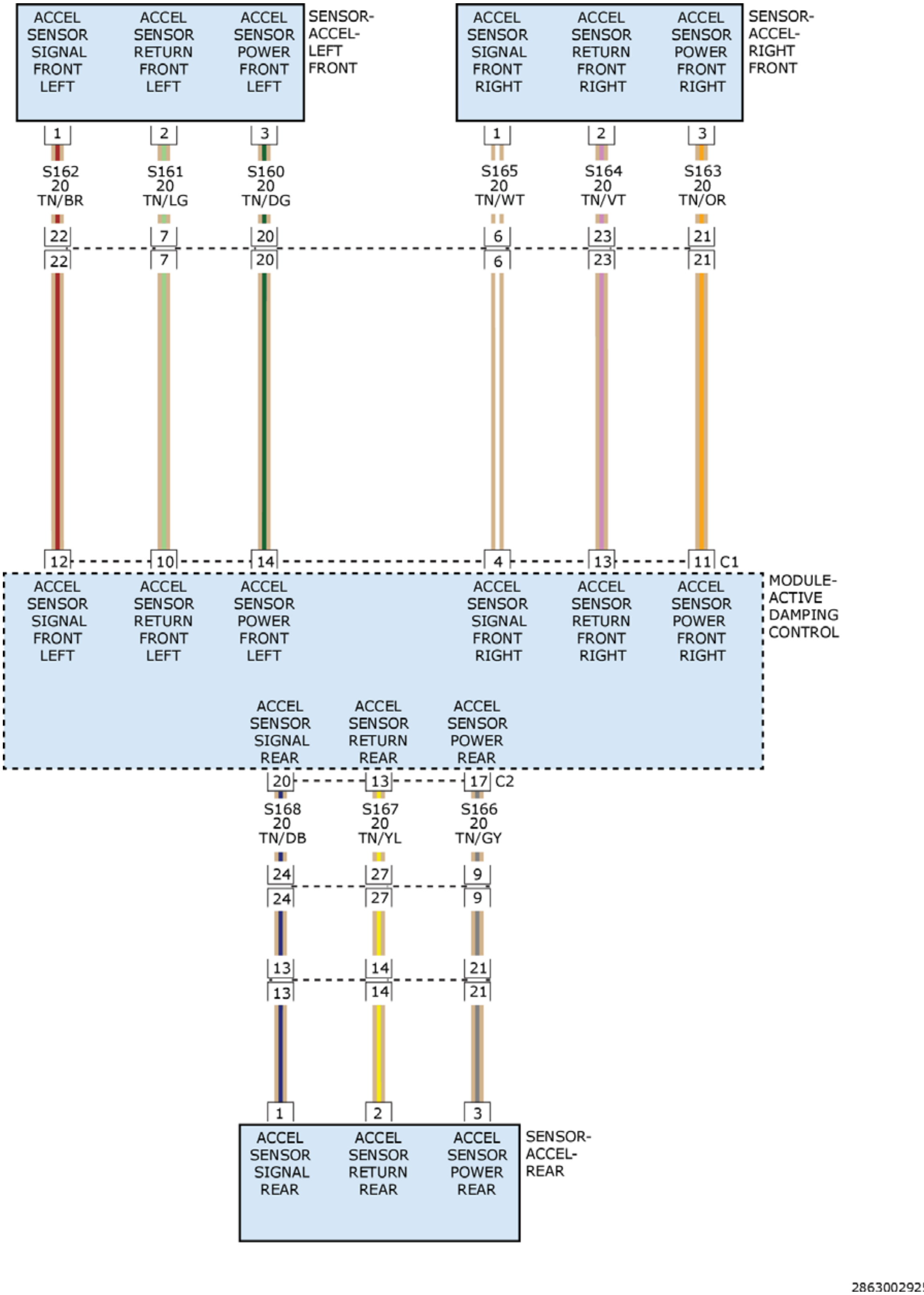


Fig. 37: Acceleration Sensor Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Left Front Acceleration Sensor Power circuit is shorted to battery voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT SHORT TO BATTERY
LEFT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **LEFT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S160) LEFT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO BATTERY**
    1. Turn the ignition off.
    2. Disconnect the Left Front Acceleration Sensor harness connector.
    3. Disconnect the ADCM C1 harness connector.
    4. Turn the ignition on.
    5. Measure the voltage between ground and the (S160) Left Front Acceleration Sensor Power circuit.

    Is the voltage above 5.25 volts?

    Yes

    - Repair the (S160) Left Front Acceleration Sensor Power circuit for a short battery.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4
4. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BD-11-RIGHT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

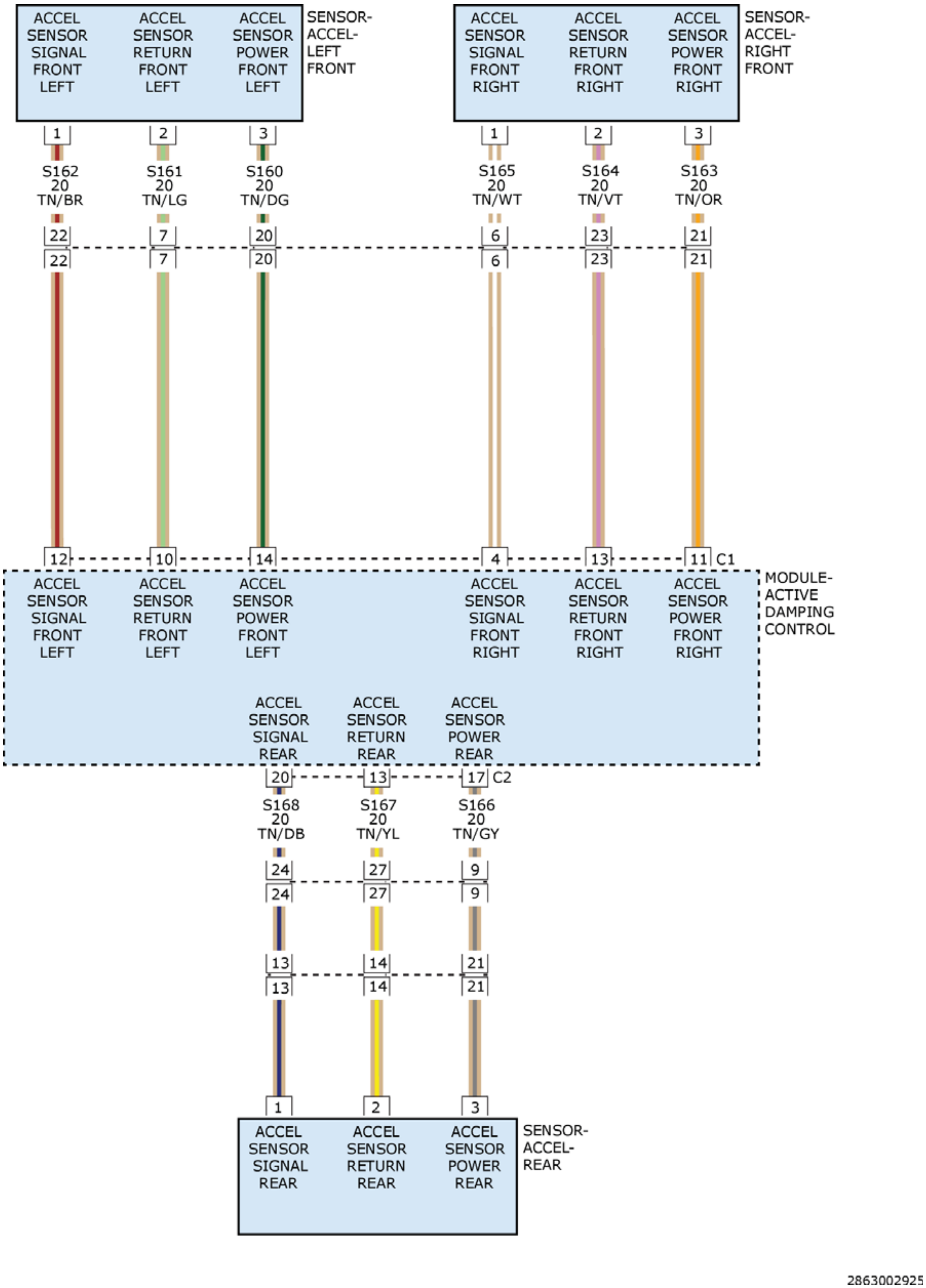


Fig. 38: Acceleration Sensor Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Right Front Acceleration Sensor Power circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT SHORT TO GROUND
(S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT SHORT TO (S164) RIGHT FRONT ACCELERATION SENSOR RETURN
RIGHT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 6
2. **RIGHT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

    1. Turn the ignition off.

2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Acceleration Sensor harness connector.
   2. Disconnect the ADCM C1 harness connector.
   3. Check for continuity between ground and the (S163) Right Front Acceleration Sensor Power circuit at the ADCM C1 harness connector.

      Is there continuity between ground and the (S163) Right Front Acceleration Sensor Power circuit?

      Yes

      - Go To 4

      No

      - Repair the (S163) Right Front Acceleration Sensor Power circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

4. **CHECK THE (S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO (S164) RIGHT FRONT ACCELERATION SENSOR RETURN**
   1. Measure the resistance between the (S163) Right Front Acceleration Sensor Power circuit and the (S164) Right Front Acceleration Sensor Return circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Go To 5

      No

      - Repair the (S163) Right Front Acceleration Sensor Power circuit for a short to the (164) Right Front Acceleration Sensor Return circuit.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **ACCELERATION SENSOR**
   1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR,**

ACTIVE DAMPING, REMOVAL .

2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
3. Turn the ignition on.
4. With the scan tool, erase the DTCs.
5. Start the Engine.
6. With the scan tool, read ADCM DTCs.

Does the DTC remain active?

Yes

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

6. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BD-12-RIGHT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

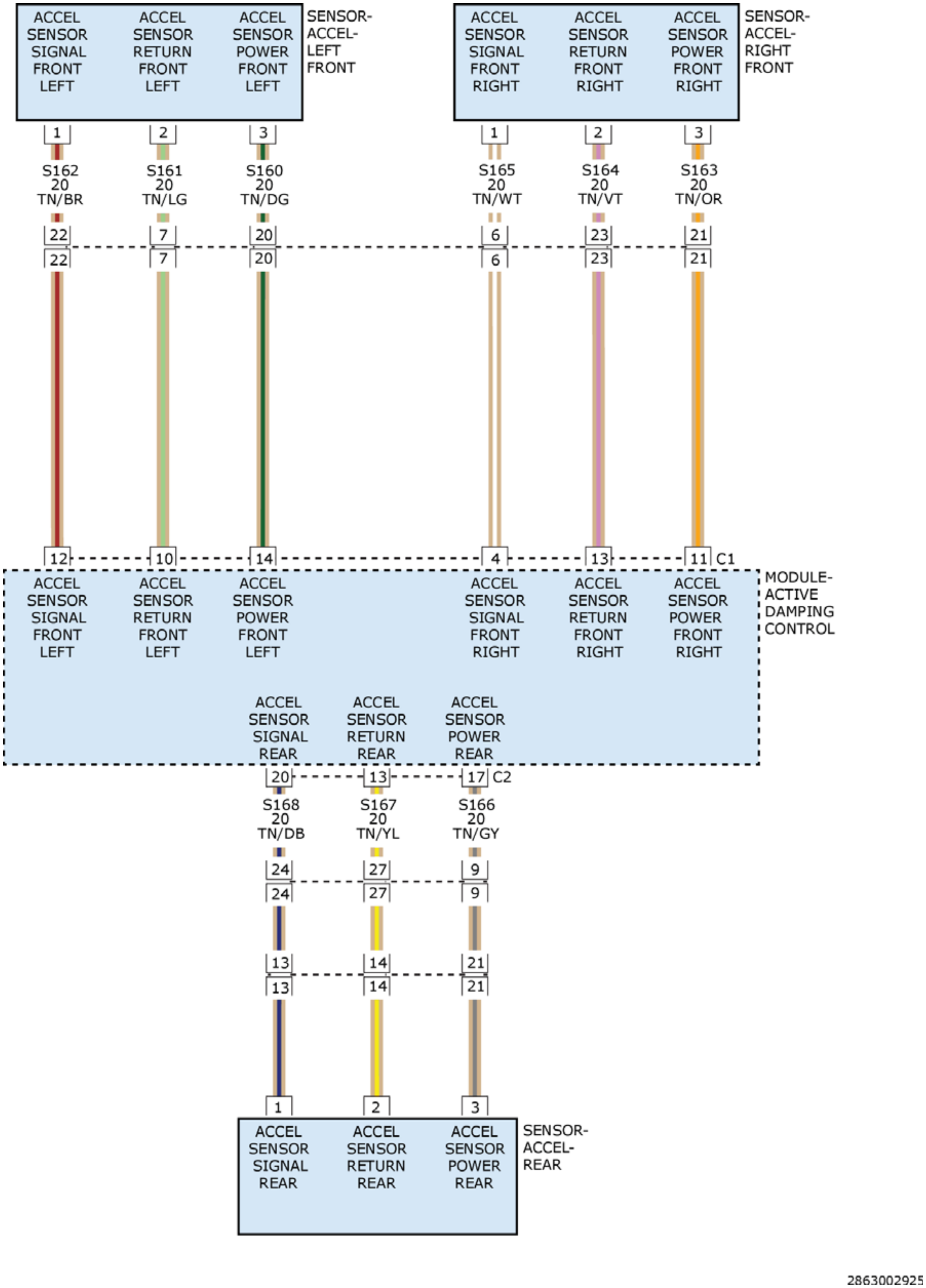


Fig. 39: Acceleration Sensor Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Right Front Acceleration Sensor Power circuit is shorted to battery voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT SHORT TO BATTERY
RIGHT FRONT ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **RIGHT FRONT ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S163) RIGHT FRONT ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO BATTERY**
    1. Turn the ignition off.
    2. Disconnect the Acceleration Sensor harness connector.
    3. Disconnect the ADCM C1 harness connector.
    4. Turn the ignition on.
    5. Measure the voltage between ground and the (S163) Right Front Acceleration Sensor Power circuit.

    Is the voltage above 5.25 volts?

    Yes

    - Repair the (S163) Right Front Acceleration Sensor Power circuit for a short battery.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BE-11-REAR ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

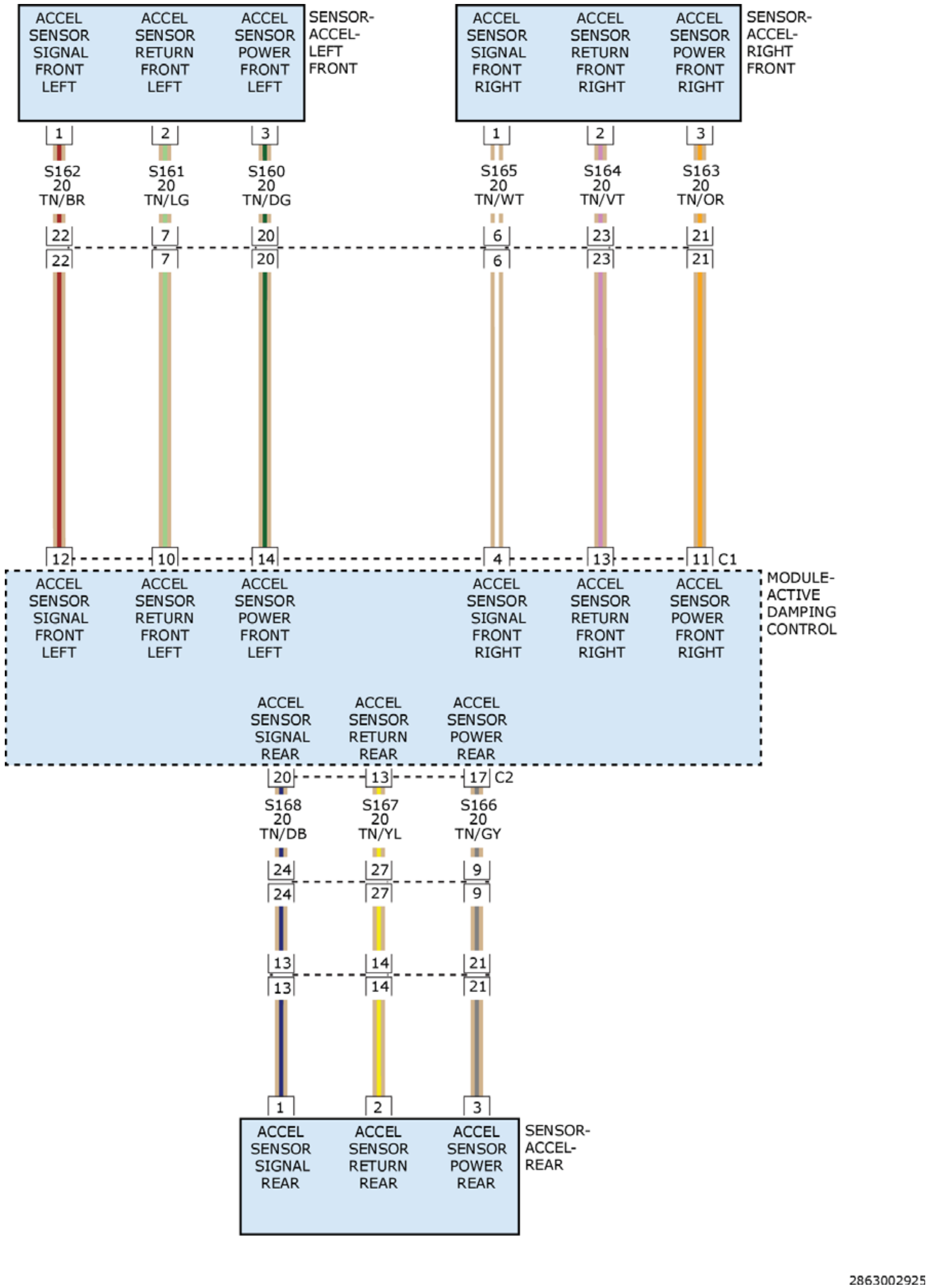


Fig. 40: Acceleration Sensor Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Rear Acceleration Sensor Power circuit is shorted to ground.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S166) REAR ACCELERATION SENSOR POWER CIRCUIT SHORT TO GROUND
(S166) REAR ACCELERATION SENSOR POWER CIRCUIT SHORT TO (S167) REAR ACCELERATION SENSOR RETURN
REAR ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Turn the ignition on.
   2. With the scan tool, read ADCM DTCs and record on the repair order.
   3. With the scan tool, erase DTCs.
   4. Start the Engine.
   5. With the scan tool, read ADCM DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Go To 6
2. **REAR ACCELERATION SENSOR HARNESS CONNECTOR**

   NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

   1. Turn the ignition off.

2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S166) REAR ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Acceleration Sensor harness connector.
   2. Disconnect the ADCM C1 harness connector.
   3. Check for continuity between ground and the (S166) Rear Acceleration Sensor Power circuit at the ADCM C2 harness connector.

      Is there continuity between ground and the (S166) Rear Acceleration Sensor Power circuit?

      Yes

      - Go To 4

      No

      - Repair the (S166) Rear Acceleration Sensor Power circuit for a short ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

4. **CHECK THE (S166) REAR ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO THE (S167) REAR ACCELERATION SENSOR RETURN**
   1. Measure the resistance between the (S166) Rear Acceleration Sensor Power circuit and the (S167) Rear Acceleration Sensor Return circuit.

      Is the resistance above 5.0 Ohms?

      Yes

      - Go To 5

      No

      - Repair the (S166) Rear Acceleration Sensor Power circuit for a short to the (160) Acceleration Sensor Return circuit.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **ACCELERATION SENSOR**
   1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR,**

ACTIVE DAMPING, REMOVAL .

2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
3. Turn the ignition on.
4. With the scan tool, erase the DTCs.
5. Start the Engine.
6. With the scan tool, read ADCM DTCs.

Does the DTC remain active?

Yes

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

6. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15BE-12- REAR ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

..

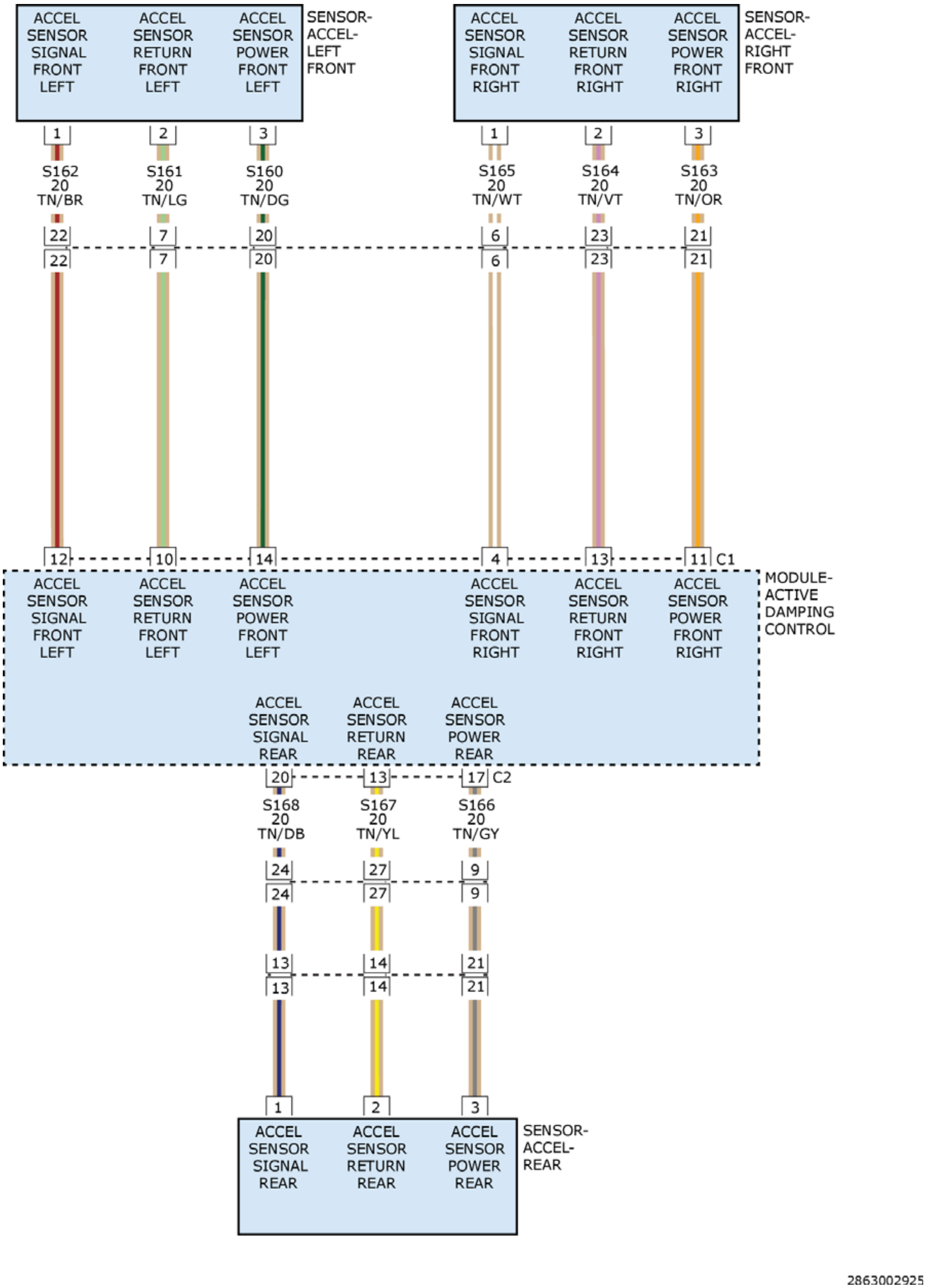


Fig. 41: Acceleration Sensor Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects when the Rear Acceleration Sensor Power circuit is shorted to battery voltage.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGED OR DISCONNECTED
(S166) REAR ACCELERATION SENSOR POWER CIRCUIT SHORT TO BATTERY
REAR ACCELERATION SENSOR
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **REAR ACCELERATION SENSOR HARNESS CONNECTOR**

    NOTE: **Make sure the Acceleration Sensor harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Acceleration Sensor harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S166) REAR ACCELERATION SENSOR POWER CIRCUIT FOR A SHORT TO BATTERY**
    1. Turn the ignition off.
    2. Disconnect the Rear Acceleration Sensor harness connector.
    3. Disconnect the ADCM C2 harness connector.
    4. Turn the ignition on.
    5. Measure the voltage between ground and the (S166) Rear Acceleration Sensor Power circuit.

    Is the voltage above 5.25 volts?

    Yes

    - Repair the (S166) Rear Acceleration Sensor Power circuit for a short battery.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4
4. **ACCELERATION SENSOR**
    1. Replace the Acceleration Sensor in accordance with the Service Information. Refer to **SENSOR, ACTIVE DAMPING, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

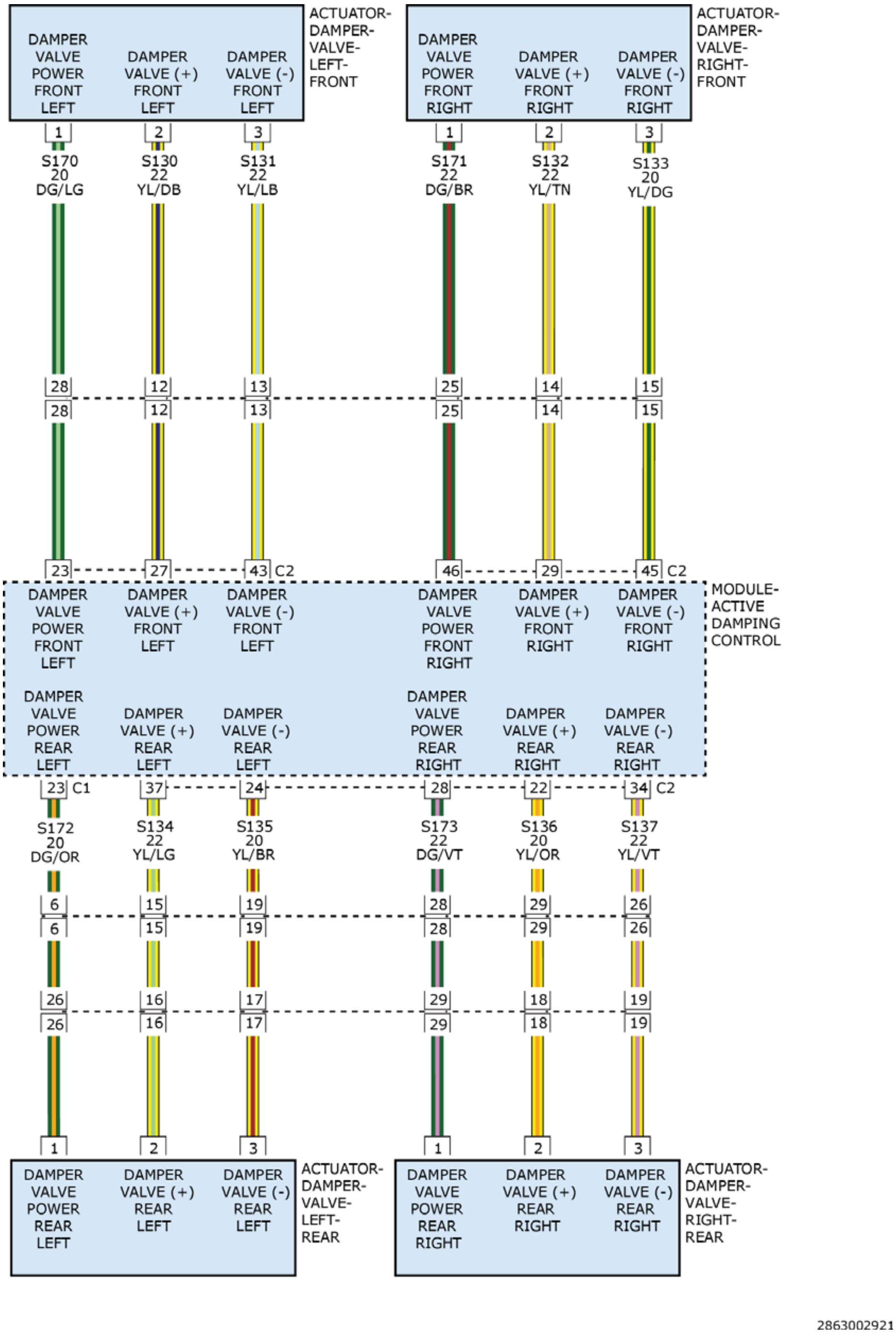
    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C2-19-LEFT FRONT DAMPING VALVE LOW SIDE 1 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**



[Fig. 42: Valve Damper Actuator Circuit Diagram]
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Left Front Damping Valve Solenoid Low Side 1 (compression stage) is overcurrent caused by an internal failure in the Damping Valve Shock Assembly.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase the DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S130) LEFT FRONT DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Left Front Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Connect a jumper wire between Ground and the (S130) Left Front Damper Valve (+) circuit in the Left Front Damping Valve Shock Assembly harness connector.
    4. Using a 12-volt test light connected to B+, check the (S130) Left Front Damper Valve (+) circuit in the ADCM C2 harness connector.

    NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

    Does the test light illuminate brightly?

    Yes

    - Go To 4

    No

    - Repair the (S130) Left Front Damper Valve (+) circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **DAMPING VALVE SHOCK ASSEMBLY**
    1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service

Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C3-19-LEFT FRONT DAMPING VALVE LOW SIDE 2 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE:	**If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

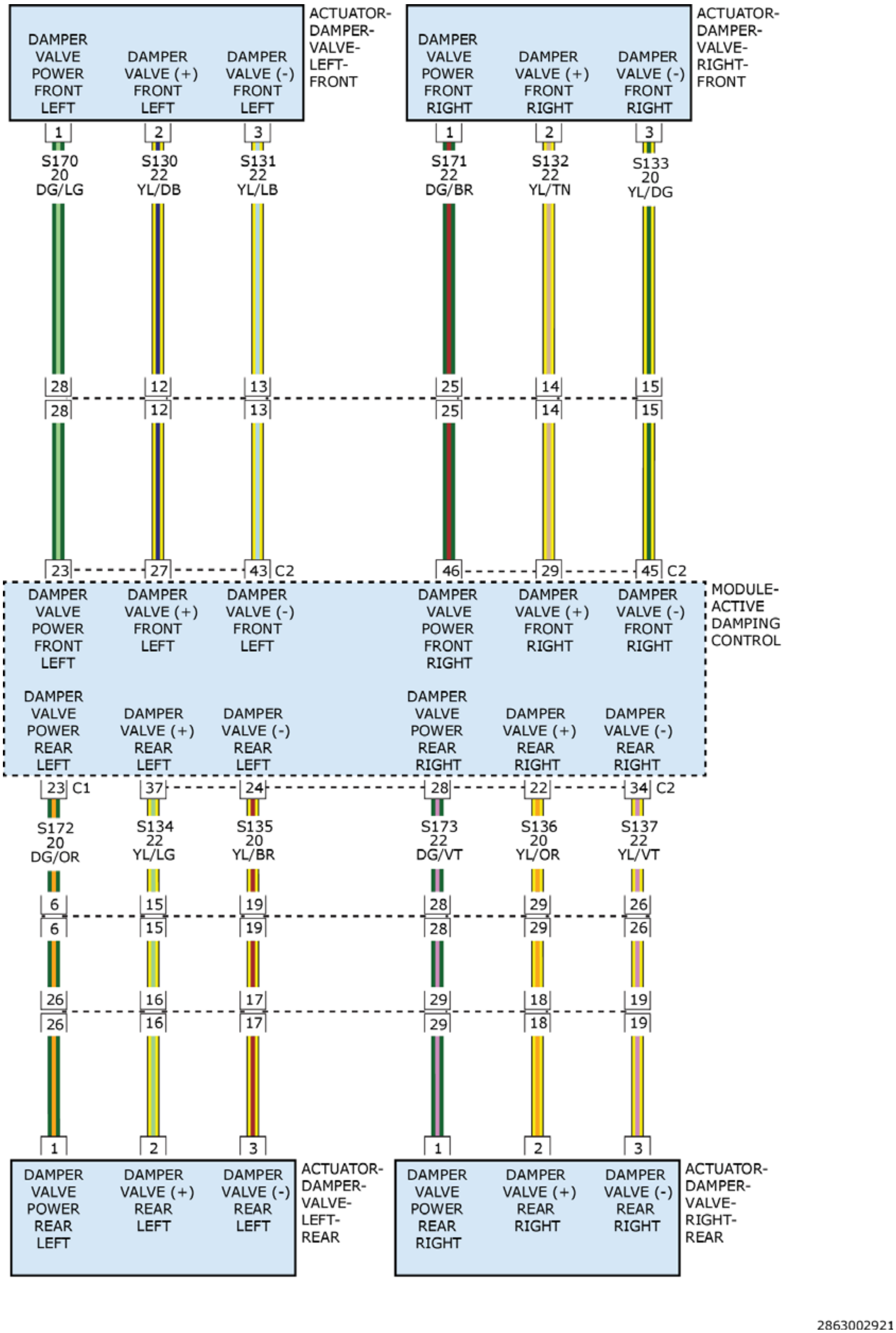


Fig. 43: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Left Front Damping Valve Solenoid Low Side 2 (rebound stage) overcurrent caused by an internal failure in the Damping Valve Shock Assembly.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, read the DTCs in the ADCM.

       Is the DTC active at this time?

       Yes

       - Go To 2

       No

       - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

       Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S131) LEFT FRONT DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Left Front Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Connect a jumper wire between Ground and the (S131) Left Front Damper Valve (-) circuit in the Left Front Damping Valve Shock Assembly harness connector.
    4. Using a 12-volt test light connected to B+, check the (S131) Left Front Damper Valve (-) circuit in the ADCM C2 harness connector.

    NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

    Does the test light illuminate brightly?

    Yes

    - Go To 4

    No

    - Repair the (S131) Left Front Damper Valve (-) circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **DAMPING VALVE SHOCK ASSEMBLY**
    1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the vehicle.
    6. With the scan tool, read the DTCs in the ADCM.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C4-19-RIGHT FRONT DAMPING VALVE LOW SIDE 1 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

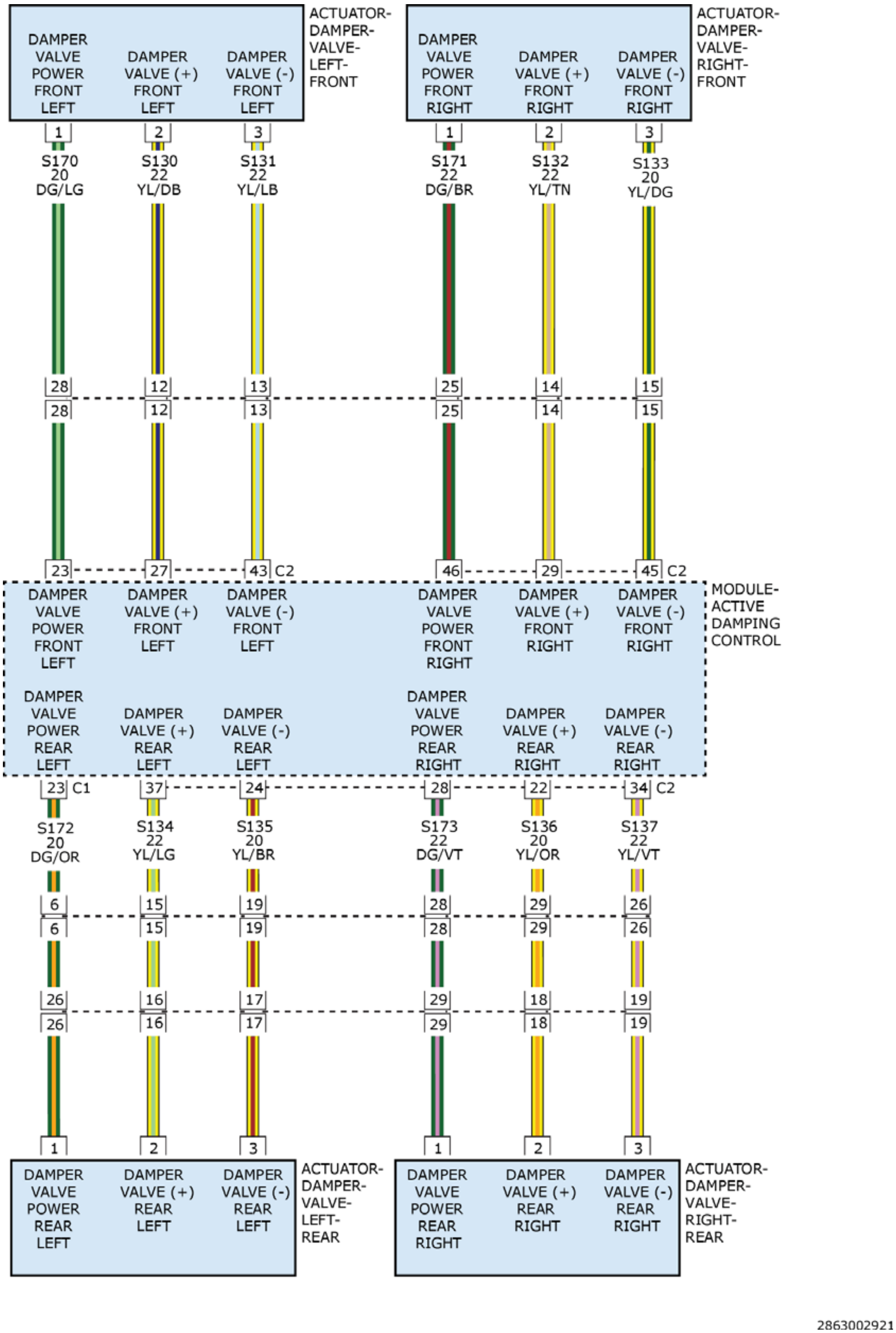


Fig. 44: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Right Front Damping Valve Solenoid Low Side 1 (compression stage) overcurrent caused by an internal failure in the Damping Valve Shock Assembly.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase the DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S132) RIGHT FRONT DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Right Front Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Connect a jumper wire between Ground and the (S132) Right Front Damper Valve (+) circuit in the Right Front Damping Valve Shock Assembly harness connector.
    4. Using a 12-volt test light connected to B+, check the (S132) Right Front Damper Valve (+) circuit in the ADCM C2 harness connector.

    NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

    Does the test light illuminate brightly?

    Yes

    - Go To 4

    No

    - Repair the (S132) Right Front Damper Valve (+) circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **DAMPING VALVE SHOCK ASSEMBLY**
    1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service

Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

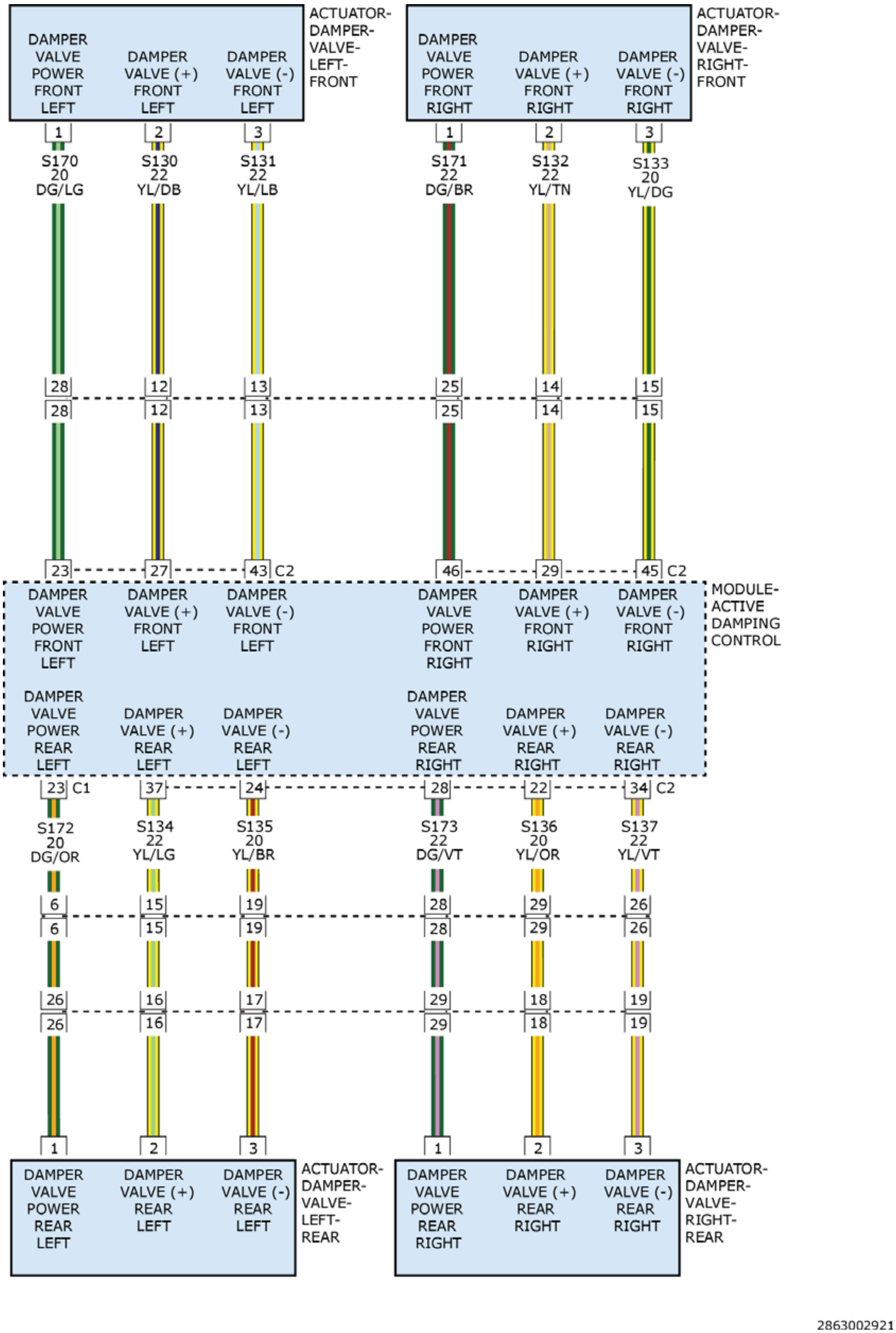
    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C5-19-RIGHT FRONT DAMPING VALVE LOW SIDE 2 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**



[Fig. 45: Valve Damper Actuator Circuit Diagram]
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Right Front Damping Valve Solenoid Low Side 2 (rebound stage) overcurrent caused by an internal failure in the Damping Valve Shock Assembly.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S133) RIGHT FRONT DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Right Front Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Connect a jumper wire between Ground and the (S133) Right Front Damper Valve (-) circuit in the Right Front Damping Valve Shock Assembly harness connector.
   4. Using a 12-volt test light connected to B+, check the (S133) Right Front Damper Valve (-) circuit in the ADCM C2 harness connector.

NOTE:	**The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

Does the test light illuminate brightly?

Yes

- Go To 4

No

- Repair the (S133) Right Front Damper Valve (-) circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

4. **DAMPING VALVE SHOCK ASSEMBLY**
   1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

Does the DTC remain active?

Yes

- Replace the Active Damping Control Module (ADCM) in accordance with the Service

Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C6-19-LEFT REAR DAMPING VALVE LOW SIDE 1 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

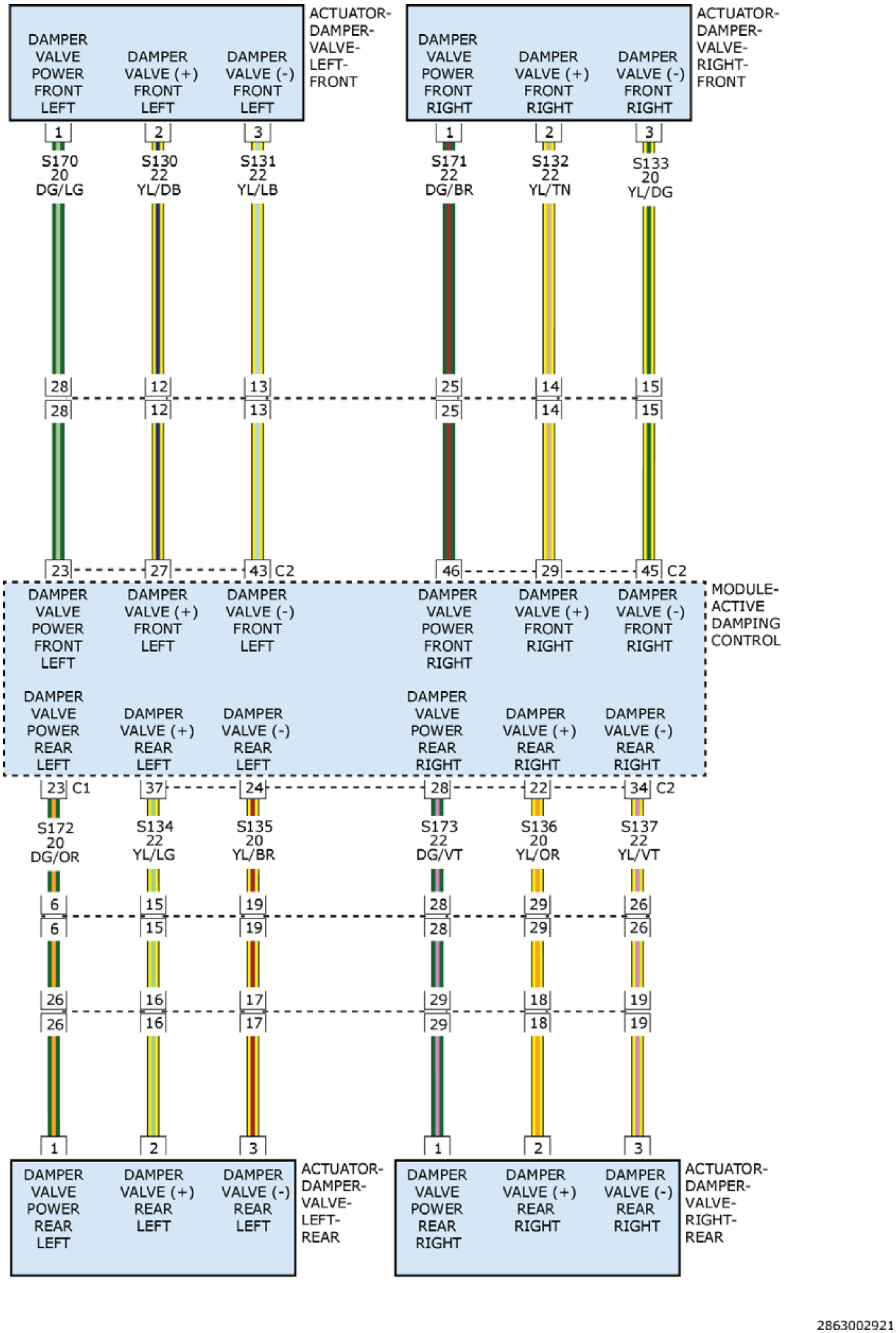


Fig. 46: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Left Rear Damping Valve Solenoid Low Side 1 (compression stage) is overcurrent caused by an internal failure in the Damping Valve Shock Assembly.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S134) LEFT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase the DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: Make sure the Damping Valve Shock Assembly harness connector is connected correctly.

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S134) LEFT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Disconnect the Left Rear Damping Valve Shock Assembly harness connector.
    2. Disconnect the ADCM C2 harness connector.
    3. Connect a jumper wire between Ground and the (S134) Left Rear Damper Valve (+) circuit in the Left Rear Damping Valve Shock Assembly harness connector.
    4. Using a 12-volt test light connected to B+, check the (S134) Left Rear Damper Valve (+) circuit in the ADCM C2 harness connector.

    NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

    Does the test light illuminate brightly?

    Yes

    - Go To 4

    No

    - Repair the (S134) Left Rear Damper Valve (+) circuit for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **DAMPING VALVE SHOCK ASSEMBLY**
    1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
    2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Turn the ignition on.
    4. With the scan tool, erase the DTCs.
    5. Start the Engine.
    6. With the scan tool, read ADCM DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service

Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C7-19-LEFT REAR DAMPING VALVE LOW SIDE 2 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

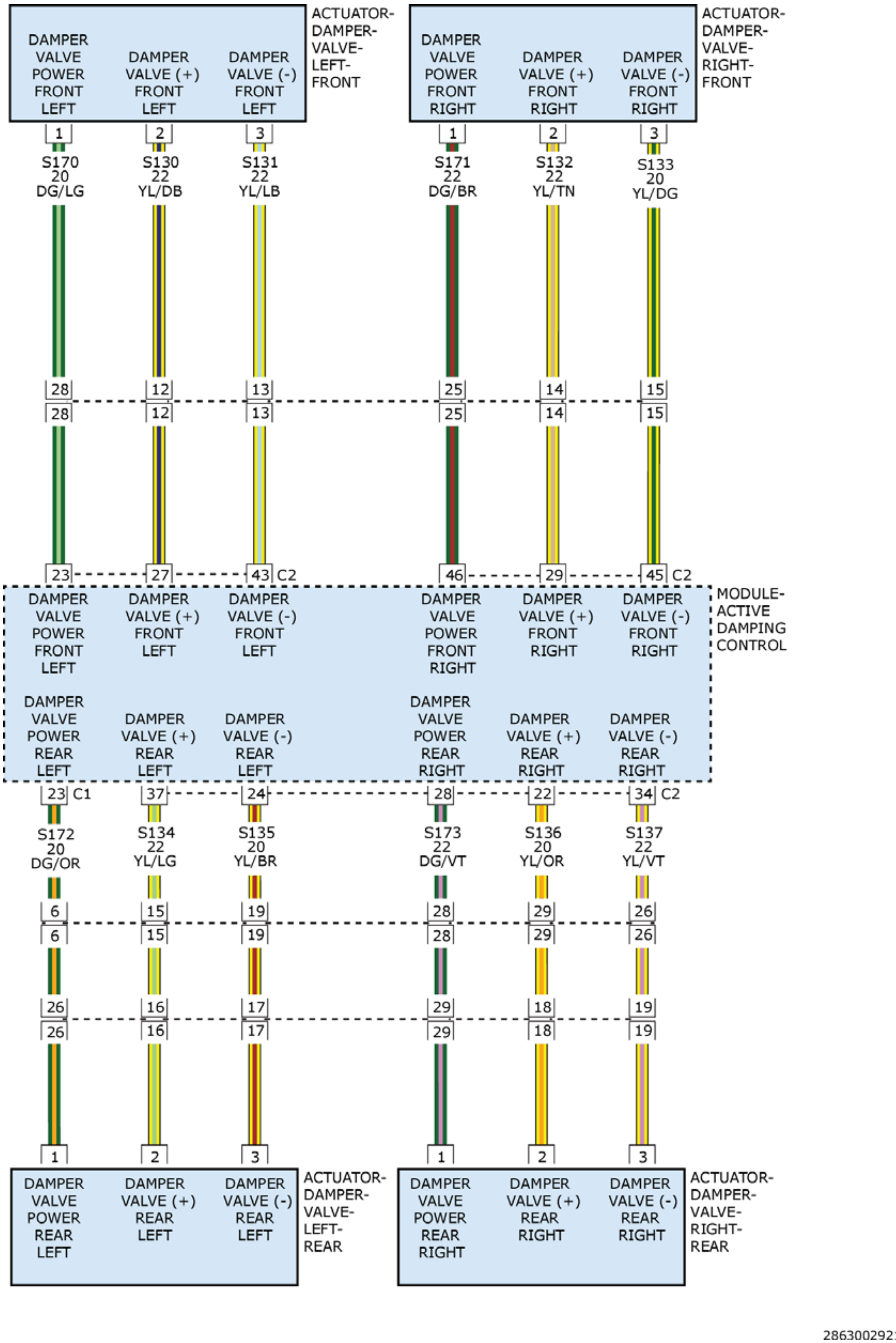


Fig. 47: Valve Damper Actuator Circuit Diagram

Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Left Rear Damping Valve Solenoid Low Side 2 (rebound stage) is overcurrent caused by an internal failure in the Damping Valve Shock Assembly.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S135) LEFT REAR DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read the DTCs in the ADCM.

    Is the DTC active at this time?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S135) LEFT REAR DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Left Rear Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Connect a jumper wire between Ground and the (S135) Left Rear Damper Valve (-) circuit in the Left Rear Damping Valve Shock Assembly harness connector.
   4. Using a 12-volt test light connected to B+, check the (S135) Left Rear Damper Valve (-) circuit in the ADCM C2 harness connector.

   NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

   Does the test light illuminate brightly?

   Yes

   - Go To 4

   No

   - Repair the (S135) Left Rear Damper Valve (-) circuit for an open or high resistance.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **DAMPING VALVE SHOCK ASSEMBLY**
   1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the vehicle.
   6. With the scan tool, read the DTCs in the ADCM.

   Does the DTC remain active?

   Yes

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service

Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C8-19-RIGHT REAR DAMPING VALVE LOW SIDE 1 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

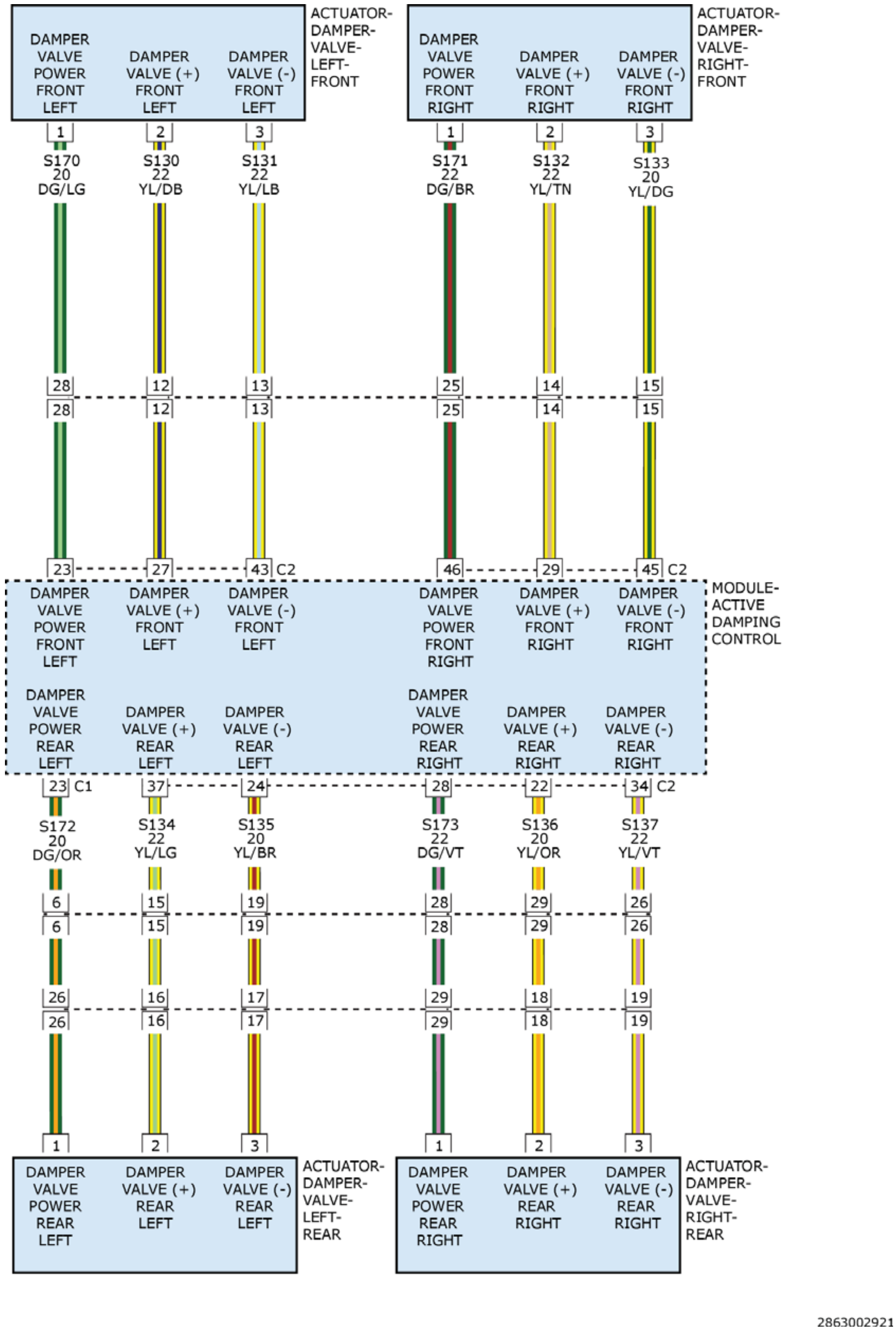


Fig. 48: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Right Rear Damping Valve Solenoid Low Side 1 (compression stage) overcurrent caused by an internal failure in the Damping Valve Shock Assembly.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase the DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (S136) RIGHT REAR DAMPER VALVE (+) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Right Rear Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Connect a jumper wire between Ground and the (S136) Right Rear Damper Valve (+) circuit in the Right Rear Damping Valve Shock Assembly harness connector.
   4. Using a 12-volt test light connected to B+, check the (S136) Right Rear Damper Valve (+) circuit in the ADCM C2 harness connector.

   NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

   Does the test light illuminate brightly?

   Yes

   - Go To 4

   No

   - Repair the (S136) Right Rear Damper Valve (+) circuit for an open or high resistance.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **DAMPING VALVE SHOCK ASSEMBLY**
   1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service

Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

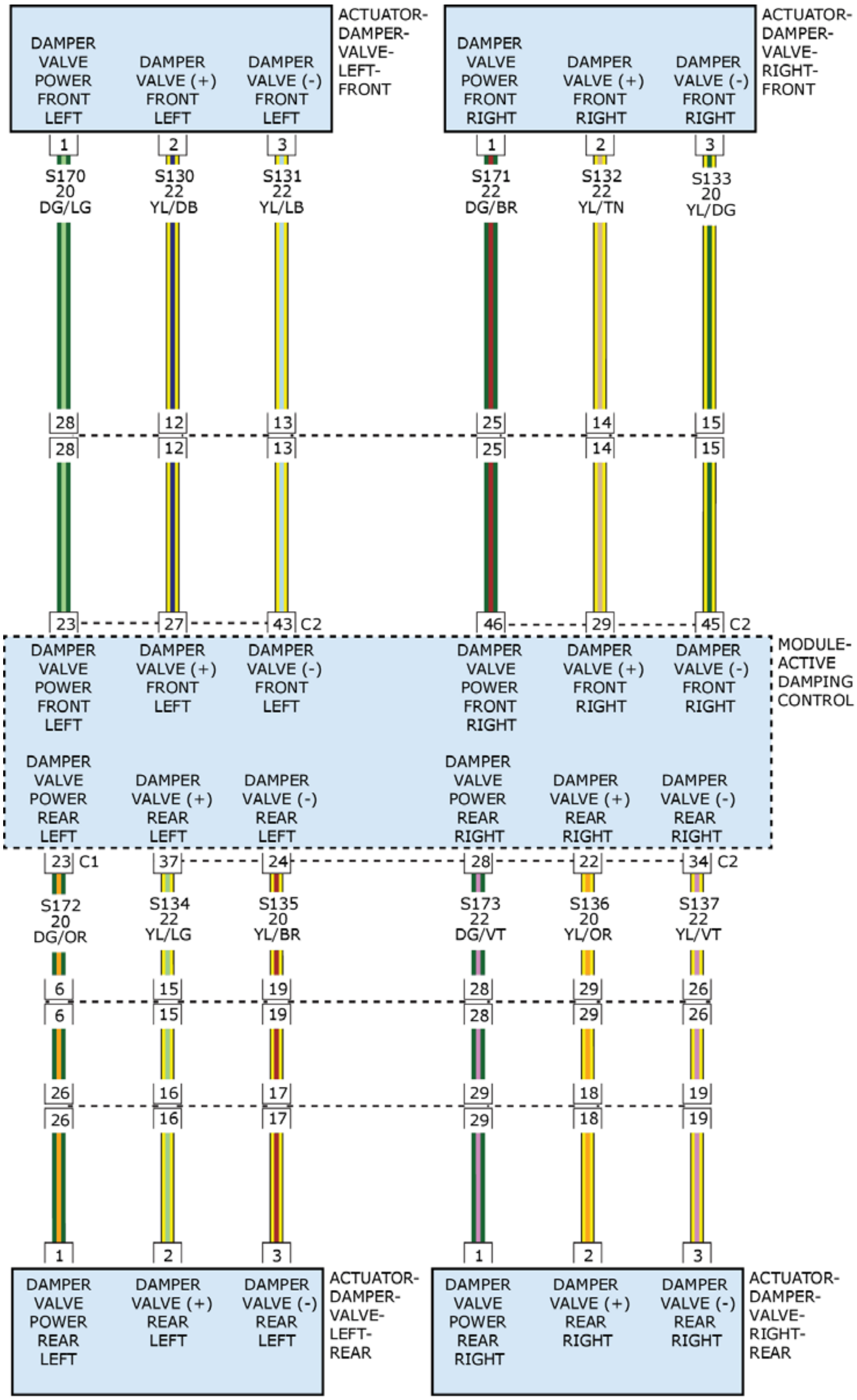
    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C15C9-19-RIGHT REAR DAMPING VALVE LOW SIDE 2 - OVERCURRENT

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE:	**If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**



2863002921

Fig. 49: Valve Damper Actuator Circuit Diagram

Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the Right Rear Damping Valve Solenoid Low Side 2 (rebound stage) overcurrent caused by an internal failure in the Damping Valve Shock Assembly.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR
(S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT OPEN OR HIGH RESISTANCE
DAMPING VALVE SHOCK ASSEMBLY
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 5
2. **DAMPING VALVE SHOCK ASSEMBLY HARNESS CONNECTOR**

    NOTE: **Make sure the Damping Valve Shock Assembly harness connector is connected correctly.**

    1. Turn the ignition off.
    2. Inspect the Damping Valve Shock Assembly harness connector for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

3. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S137) RIGHT REAR DAMPER VALVE (-) CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Disconnect the Right Rear Damping Valve Shock Assembly harness connector.
   2. Disconnect the ADCM C2 harness connector.
   3. Connect a jumper wire between Ground and the (S137) Right Rear Damper Valve (-) circuit in the Right Rear Damping Valve Shock Assembly harness connector.
   4. Using a 12-volt test light connected to B+, check the (S137) Right Rear Damper Valve (-) circuit in the ADCM C2 harness connector.

   NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

   Does the test light illuminate brightly?

   Yes

   - Go To 4

   No

   - Repair the (S137) Right Rear Damper Valve (-) circuit for an open or high resistance.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

4. **DAMPING VALVE SHOCK ASSEMBLY**
   1. Replace the Damping Valve Shock Assembly in accordance with the Service Information. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL** .
   2. Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Turn the ignition on.
   4. With the scan tool, erase the DTCs.
   5. Start the Engine.
   6. With the scan tool, read ADCM DTCs.

   Does the DTC remain active?

Yes

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

5. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C211B-92-IGNITION RUN/START INPUT CIRCUIT - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

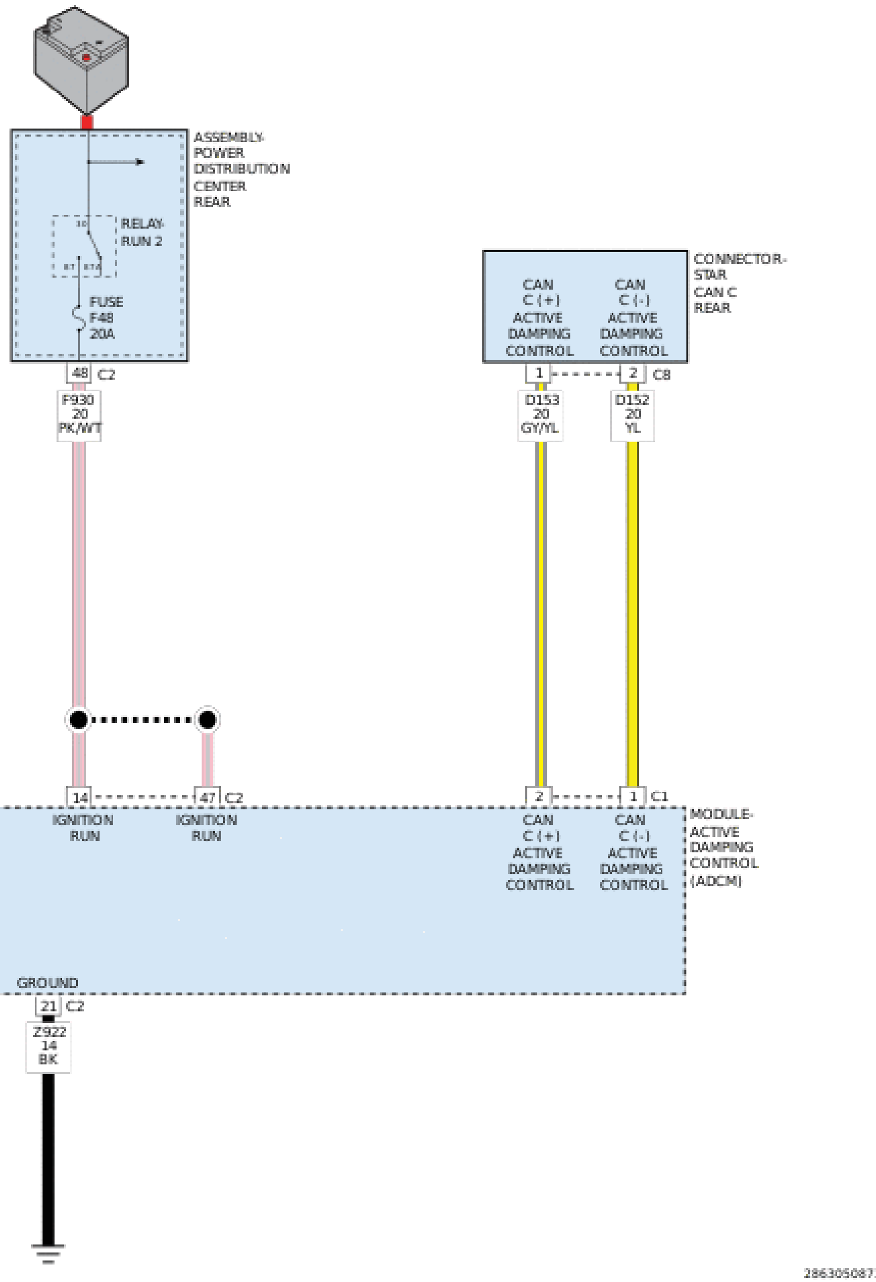


Fig. 50: Active Damping Control Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.

- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Ignition Status reported on the CAN Bus does not match the state of the Ignition Input.

POSSIBLE CAUSES

Possible Causes
FUSE F48 (20A)
(F930) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUITS SHORT TO VOLTAGE
(F930) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUITS OPEN OR HIGH RESISTANCE
(Z922) GROUND CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read ADCM DTCs and record on the repair order.
   3. With the scan tool, erase the DTCs.
   4. Start the engine.
   5. With the scan tool, read ADCM DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Go To 6
2. **CHECK THE FUSE**
   1. Turn the ignition on.
   2. Using a 12-volt test light connected to ground, check the fuse for power.

   Is the fuse good?

   Yes

   - Go To 3

No

- If the related fuse is open, check the (F930) Fused Ignition Switch Output (RUN/START) circuits for a short to ground.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

3. **(F930) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUITS SHORT TO VOLTAGE**
    1. Turn ignition off.
    2. Disconnect the ADCM C2 harness connector.
    3. With a 12-volt test light connected to ground, check the (F930) Fused Ignition Switch Output (RUN/START) circuits in the ADCM C2 harness connector.

    NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

    Does the test light illuminate brightly?

    Yes

    - Repair the (F930) Fused Ignition Switch Output (RUN/START) circuits for a short to voltage.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4
4. **(F930) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUITS FOR AN OPEN OR HIGH RESISTANCE**
    1. Turn the ignition on.
    2. With a 12-volt test light connected to ground check (F930) Fused Ignition Switch Output (RUN/START) circuits in the ADCM C2 harness connector.

    NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

    Does the test light illuminate brightly?

    Yes

    - Go To 5

    No

    - Repair the (F930) Fused Ignition Switch Output (RUN/START) circuits for an open or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
5. **(Z922) GROUND CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Turn the ignition off.

2. With a 12-volt test light connected to (B+) check (Z922) Ground circuit in the ADCM C2 harness connector.

NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

Does the test light illuminate brightly?

Yes

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Repair the (Z922) Ground circuit for an open or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

Were any problems found?

Yes

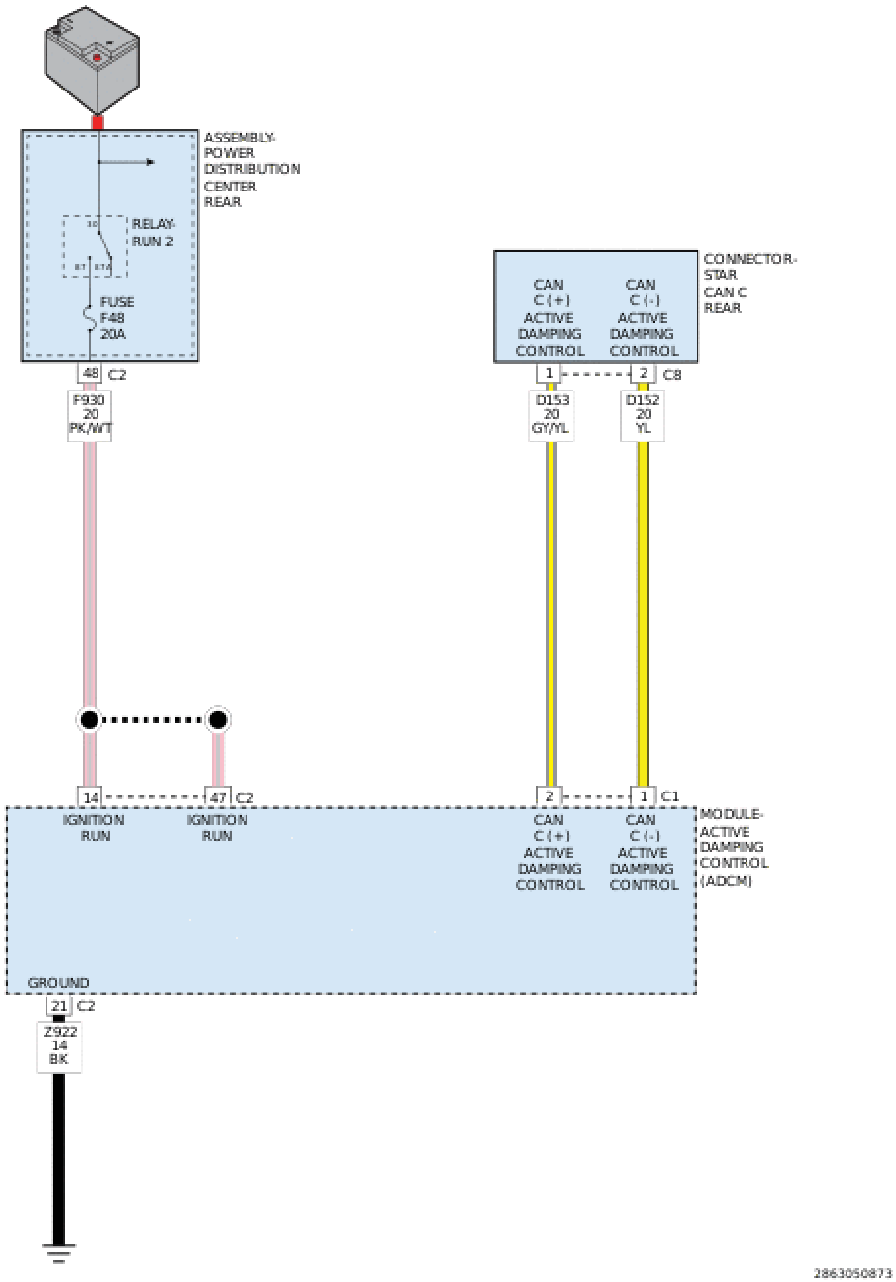
- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C2129-16-BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 51: Active Damping Control Module Circuit Diagram]
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.

- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects the battery voltage has dropped below 10 Volts for more than 15 seconds.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM DTCS PRESENT
(F930) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUITS OPEN OR HIGH RESISTANCE
(Z922) GROUND CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHARGING SYSTEM DTCS PRESENT**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs in the Powertrain Control Module (PCM).

       Are there any Charging System or related voltage DTCs present?

       Yes

       - Perform the appropriate Charging System DTC diagnostic procedures before continuing with this test. Refer to **DTC INDEX** .

       No

       - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read ADCM DTCs and record on the repair order.
    2. With the scan tool, erase the DTCs.
    3. Start the Engine.
    4. With the scan tool, read ADCM DTCs.

       Is the DTC active?

       Yes

- Go To 3

No

- Go To 5

3. **(F930) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUITS FOR AN OPEN OR HIGH RESISTANCE**
    1. Turn the ignition off.
    2. Disconnect the ADCM C2 harness connector.
    3. Turn the ignition on.
    4. With a 12-volt test light connected to ground, check the (F930) Fused Ignition Switch Output (RUN/START) circuits in the ADCM C2 harness connector.

    NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

    Does the test light illuminate brightly?

    Yes

    - Go To 4

    No

    - Repair the (F930) Fused Ignition Switch Output (RUN/START) circuits for an open circuit or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

4. **(Z922) GROUND CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Turn the ignition off.
    2. With a 12-volt test light connected to (B+) check (Z922) Ground circuit in the ADCM C2 harness connector.

    NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

    Does the test light illuminate brightly?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Repair the (Z922) Ground circuit for an open circuit or high resistance.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

       Were any problems found?

       Yes

       - Repair as necessary.
       - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C2129-17-BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects battery voltage has increased above 16 Volts for more than 15 seconds.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM DTCS PRESENT
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHARGING SYSTEM DTCS PRESENT**
   1. Turn the ignition on.
   2. With the scan tool, read DTCs in the Powertrain Control Module (PCM).

   Are there any Charging System or related voltage DTCs present?

   Yes

   - Perform the appropriate diagnostic procedure. Refer to **DTC INDEX** .

   No

   - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
   1. With the scan tool, read DTCs and record DTCs on the repair order.
   2. With the scan tool, erase the DTCs.
   3. Start the Engine.
   4. With the scan tool, read ADCM DTCs.

   Is the DTC active?

   Yes

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3
3. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
   5. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C212A-16-SYSTEM VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **Repair all other DTCs first before continuing with this test.**

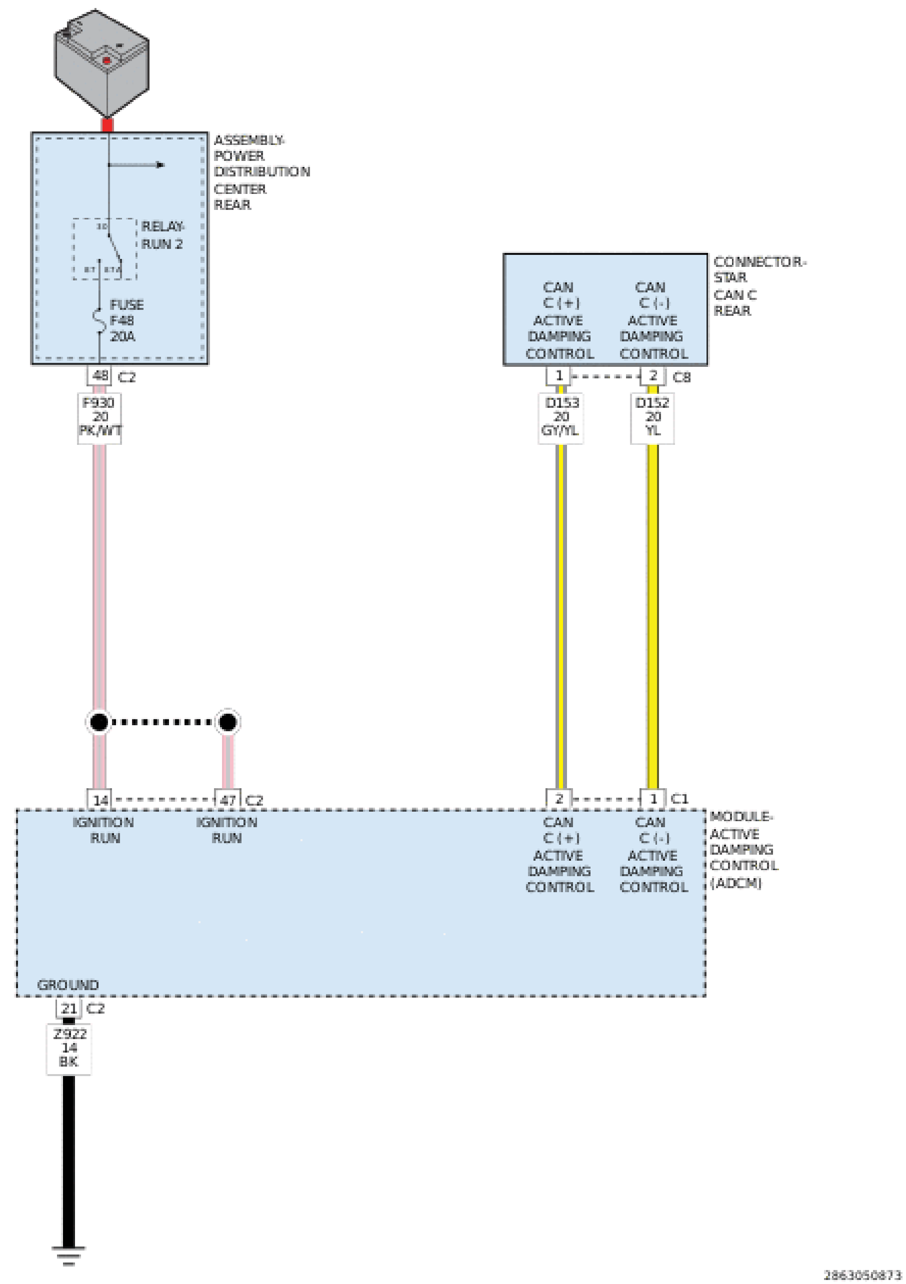


Fig. 52: Active Damping Control Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.

- Battery voltage between 10 and 16 volts.

SET CONDITION

- Active Damping Control Module (ADCM) detects the battery voltage has dropped below 10 Volts for more than 15 seconds.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.

POSSIBLE CAUSES

Possible Causes
(F930) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUITS OPEN OR HIGH RESISTANCE
(Z922) GROUND CIRCUIT OPEN OR HIGH RESISTANCE
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read ADCM DTCs and record on the repair order.
    2. With the scan tool, erase the DTCs.
    3. Start the Engine.
    4. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 4
2. **(F930) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUITS FOR AN OPEN OR HIGH RESISTANCE**
    1. Turn the ignition off.
    2. Disconnect the ADCM C2 harness connector.
    3. Turn the ignition on.
    4. With a 12-volt test light connected to ground, check the (F930) Fused Ignition Switch Output (RUN/START) circuits in the ADCM C2 harness connector.

    NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

    Does the test light illuminate brightly?

Yes

- Go To 3

No

- Repair the (F930) Fused Ignition Switch Output (RUN/START) circuits for an open circuit or high resistance.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

3. **(Z922) GROUND CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. With a 12-volt test light connected to (B+) check (Z922) Ground circuit in the ADCM C2 harness connector.

   NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

   Does the test light illuminate brightly?

   Yes

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Repair the (Z922) Ground circuit for an open circuit or high resistance.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

4. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. Look for the data to change other than as expected or for the DTC to reset.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C212A-17-SYSTEM VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **Repair all other DTCs first before continuing with this test.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- Battery voltage between 10 and 16 volts.

SET CONDITION

- Active Damping Control Module (ADCM) detects the system voltage has increased above 16 Volts for more than 15 seconds.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM DTCS PRESENT
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHARGING SYSTEM DTCS PRESENT**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs in the Powertrain Control Module (PCM).

       Are there any Charging System or related voltage DTCs present?

       Yes

       - Perform the appropriate diagnostic procedure. Refer to **DTC INDEX** .

       No

       - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read ADCM DTCs and record on the repair order.
    2. With the scan tool, erase the DTCs.
    3. Start the Engine.
    4. With the scan tool, read ADCM DTCs.

Is the DTC active?

Yes

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C212C-11-SUSPENSION VALVE POWER SUPPLY VOLTAGE - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

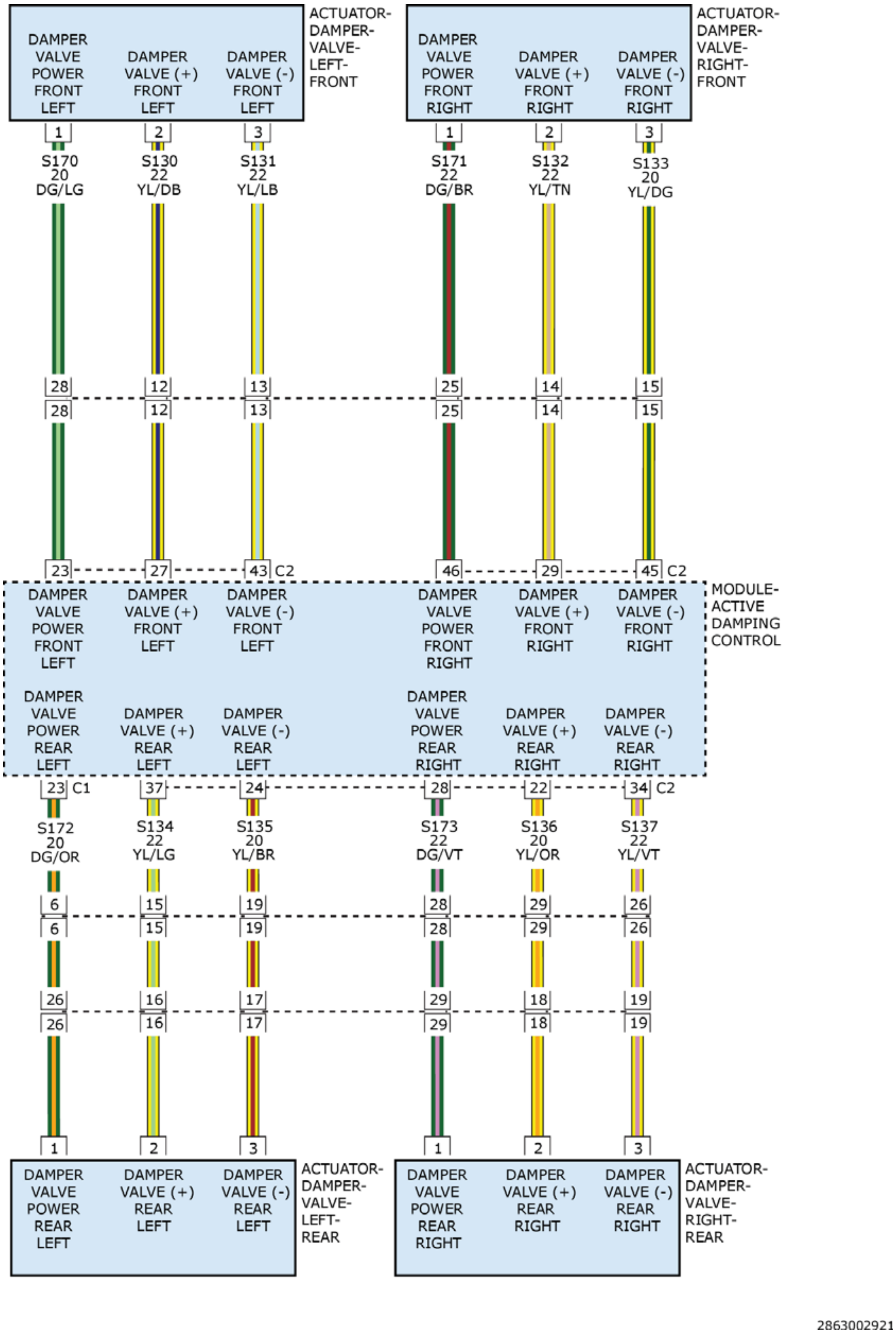


Fig. 53: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects that too much current is being used when the on-board 12 volt power supply is turned on.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
(S170) LEFT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
(S171) RIGHT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
(S172) LEFT REAR DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
(S173) RIGHT REAR DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase the DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Go To 6
2. **CHECK THE (S170) LEFT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the ADCM C1 harness connector.
    3. Disconnect the ADCM C2 harness connector.
    4. Disconnect the Left Front Damper Valve harness connector.

5. Measure the resistance between ground and the (S170) Left Front Damper Valve Power Supply circuit at the ADCM C2 harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Repair the (S170) Left Front Damper Valve Power Supply circuit for a short to ground.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S171) RIGHT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Right Front Damper Valve harness connector.
   2. Measure the resistance between ground and the (S171) Right Front Damper Valve Power Supply circuit at the ADCM C2 harness connector.

      Is the resistance below 5.0 Ohms?

      Yes

      - Repair the (S171) Right Front Damper Valve Power Supply circuit for a short to ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4
4. **CHECK THE (S172) LEFT REAR DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Left Rear Damper Valve harness connector.
   2. Measure the resistance between ground and the (S172) Left Rear Damper Valve Power Supply circuit at the ADCM C1 harness connector.

      Is the resistance below 5.0 Ohms?

      Yes

      - Repair the (S172) Left Rear Damper Valve Power Supply circuit for a short to ground.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 5
5. **CHECK THE (S173) RIGHT REAR DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO GROUND**
   1. Disconnect the Right Rear Damper Valve harness connector.

2. Measure the resistance between ground and the (S173) Right Rear Damper Valve Power Supply circuit at the ADCM C2 harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Repair the (S173) Right Rear Damper Valve Power Supply circuit for a short to ground.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **INTERMITTENT WIRING AND CONNECTORS**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
   2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
   3. Look for the data to change or for the DTC to reset during the wiggle test.
   4. Look for the data to change other than as expected or for the DTC to reset.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C212C-12-SUSPENSION VALVE POWER SUPPLY VOLTAGE - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

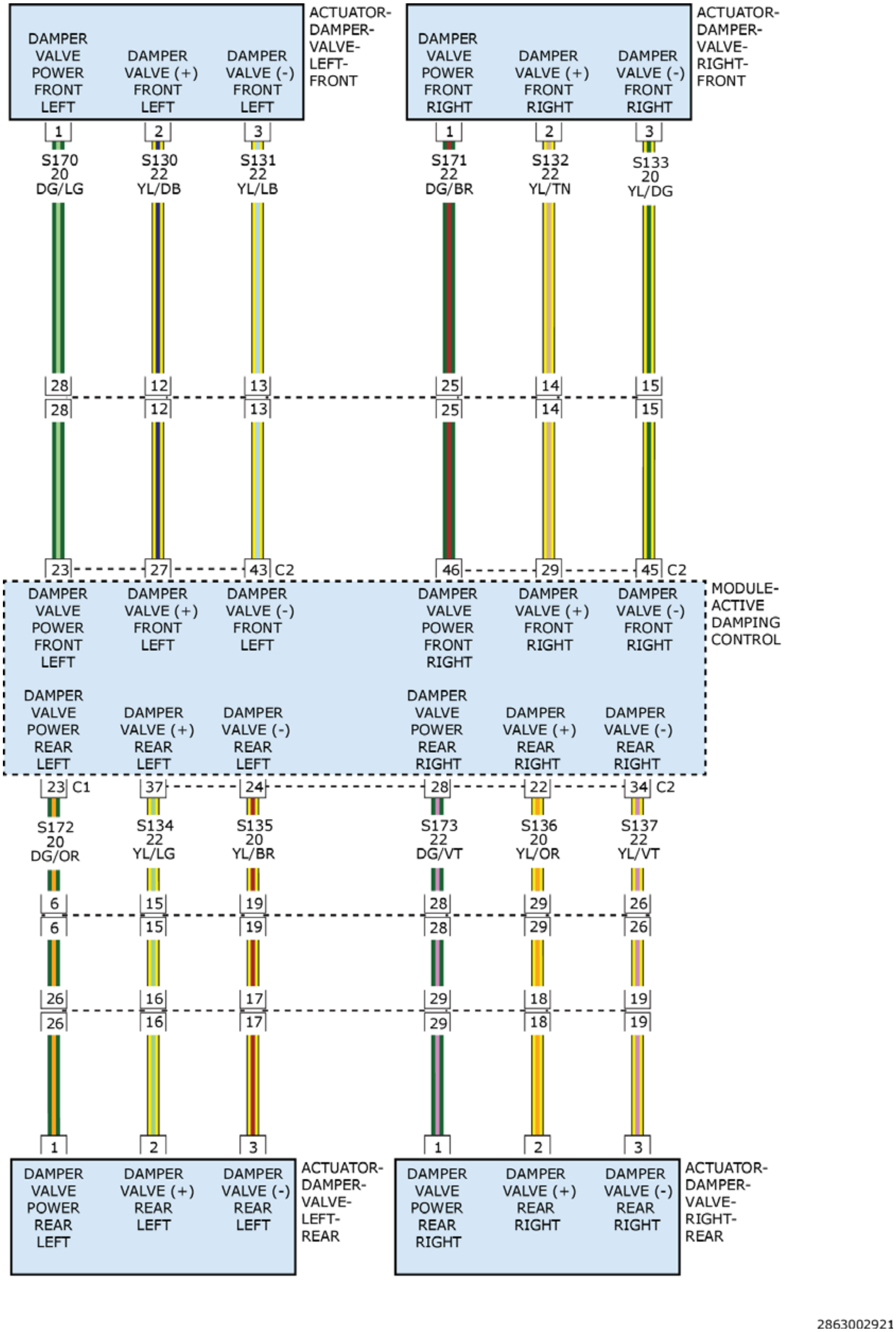


Fig. 54: Valve Damper Actuator Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Active Damping Control Module (ADCM) detects that too much current is being used when the on-board 12 volt power supply is turned on.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
(S170) LEFT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
(S171) RIGHT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
(S172) LEFT REAR DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
(S173) RIGHT REAR DAMPER VALVE POWER SUPPLY CIRCUIT SHORTED TO GROUND
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase the DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.

        Is the DTC active?

        Yes

        - Go To 2

        No

        - Go To 6
2. **CHECK THE (S170) LEFT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the ADCM C1 harness connector.
    3. Disconnect the ADCM C2 harness connector.
    4. Disconnect the Left Front Damper Valve harness connector.

5. Turn the ignition on.
6. Measure the voltage of the (S170) Left Front Damper Valve Power Supply circuit at the ADCM C2 harness connector.

   Is there any voltage present?

   Yes

   - Repair the (S170) Left Front Damper Valve Power Supply circuit for a short to voltage.
   - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (S171) RIGHT FRONT DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE**
   1. Turn the ignition off.
   2. Disconnect the Right Front Damper Valve harness connector.
   3. Turn the ignition on.
   4. Measure the voltage of the (S171) Right Front Damper Valve Power Supply circuit at the ADCM C2 harness connector.

      Is there any voltage present?

      Yes

      - Repair the (S171) Right Front Damper Valve Power Supply circuit for a short to voltage.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **CHECK THE (S172) LEFT REAR DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE**
   1. Turn the ignition off.
   2. Disconnect the Left Rear Damper Valve harness connector.
   3. Turn the ignition on.
   4. Measure the voltage of the (S172) Left Rear Damper Valve Power Supply circuit at the ADCM C1 harness connector.

      Is there any voltage present?

      Yes

      - Repair the (S172) Left Rear Damper Valve Power Supply circuit for a short to voltage.
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **CHECK THE (S173) RIGHT REAR DAMPER VALVE POWER SUPPLY CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the Right Rear Damper Valve harness connector.
    3. Turn the ignition on.
    4. Measure the voltage of the (S173) Right Rear Damper Valve Power Supply circuit at the ADCM C2 harness connector.

    Is there any voltage present?

    Yes

    - Repair the (S173) Right Rear Damper Valve Power Supply circuit for a short to voltage.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Replace the Active Damping Control Module (ADCM) at accordance with the Service formation. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
6. **INTERMITTENT WIRING AND CONNECTORS**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring harness and connectors.
    2. Wiggle test the wiring harness and connectors while monitoring the scan tool data relative to this circuit.
    3. Look for the data to change or for the DTC to reset during the wiggle test.
    4. While monitoring the scan tool data relative to this circuit, move the selector switch to each position several times.
    5. Look for the data to change other than as expected or for the DTC to reset.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C2202-00-ORIGINAL VIN MISMATCH / MISSING

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Active Damping Control Module (ADCM) continuously monitors the vehicle's VIN (from the CAN bus) and compares it to the VIN which is internally stored within the ADCM when the vehicle was first assembled. When they do not match this fault sets.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- The vehicle's Vehicle Identification Number (VIN) (being transmitted on the CAN bus) does not match the current VIN stored within the Active Damping Control Module (ADCM).

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
COMMUNICATIONS DTC(S) PRESENT
POWERTRAIN CONTROL MODULE (PCM)
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ADCM DTCs and record on the repair order.
    3. With the scan tool, erase the DTCs.
    4. Start the Engine.
    5. With the scan tool, read ADCM DTCs.
    6. With the scan tool, read DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

- Go To 3

2. **WRONG VIN PROGRAMMED IN PCM**
    1. Turn the ignition on.
    2. With the scan tool, read the VIN in the PCM.
    3. Compare VIN in the PCM to the vehicle VIN.

    Is the correct VIN programmed in the PCM?

    Yes

    - Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Replace the Powertrain Control Module (PCM) in accordance with the Service Information. Refer to **MODULE, POWERTRAIN CONTROL, REMOVAL** .
    - Perform the PCM VERIFICATION TEST. Refer to the appropriate Diagnosis & Testing article in Engine Performance .

3. **COMMUNICATION DTCS PRESENT**
    1. Turn the ignition off.
    2. With the scan tool, read DTCs in all other modules. If any communications DTCs are present, perform the appropriate diagnostic procedure. Refer to **DIAGNOSIS AND TESTING** .
    3. Perform any Service Bulletins that may apply.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

C2206-00-VEHICLE CONFIGURATION MISMATCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If the BCM has been serviced make sure that the Restore Vehicle Configuration is performed before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- Battery voltage between 10 and 16 volts.

SET CONDITION

- Any of the learned Vehicle Configuration data from the CAN Bus has changed.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
BODY CONTROL MODULE (BCM) CAN BUS DTCS
POWERTRAIN CONTROL MODULE (PCM) DTCS
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

1. **BODY CONTROL MODULE (BCM) CAN BUS DTCS ARE PRESENT**
    1. With the scan tool, read BCM DTCs and record on the repair order.

        Are there any BCM CAN BUS DTCs present?

        Yes

        - Perform the appropriate diagnostic procedure. Refer to **DIAGNOSIS AND TESTING** .

        No

        - Go To 2
2. **POWERTRAIN CONTROL MODULE (PCM) DTCS ARE PRESENT**
    1. With the scan tool, read PCM DTCs and record on the repair order.

        Are there any PCM DTCs present?

        Yes

        - Perform the appropriate diagnostic procedure. Refer to **DTC INDEX** .

        No

        - Using the schematics as a guide, check the ADCM pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Active Damping Control Module (ADCM) Module in accordance with the Service Information. Refer to **MODULE, ACTIVE**

DAMPING CONTROL, REMOVAL .

- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C220C-00-ACTIVE SUSPENSION MODULE INTERNAL

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Active Damping Control Module (ADCM) continuously monitors internal hardware circuitry for defects. The Service Active Damping System Message will be displayed on the cluster when this fault is first active.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.

SET CONDITION

- Detection of RAM, ROM, EEPROM, Watchdog, no current calibration, or high side switch defect recognized.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
ACTIVE DAMPING CONTROL MODULE (ADCM)

DIAGNOSTIC TEST

ACTIVE DAMPING CONTROL MODULE (ADCM) INTERNAL CONDITION

1. The ASCM is reporting internal errors.

   NOTE: **Before continuing, check the Air Suspension Control Module (ASCM) harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.**

2. Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.
3. Perform any Service Bulletins that may apply.

   Were there any problems found?

Yes

- Repair as necessary.
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U0001-00-CAN C BUS

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- Battery voltage between 10 and 16 volts.

SET CONDITION

- Active Damping Control Module (ADCM) detects an open, short to ground or a short to voltage on the CAN C Bus circuit.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
CAN C BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
BODY CONTROL MODULE (BCM) POWER AND GROUND
BODY CONTROL MODULE (BCM)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

VERIFY THE DTC IS ACTIVE

NOTE: **Make sure the IOD fuse is installed and battery voltage is between 10 and 16 volts before proceeding.**

1. Turn the ignition on.
2. With the scan tool, read active DTCs.

Is the DTC active at this time?

Yes

- **Refer to DTC INDEX** and perform the U0001-CAN C Bus diagnostic procedure.

No

- **Refer to STORED LOST COMMUNICATION DTCS** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0100-00-LOST COMMUNICATION WITH ECM/PCM

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0101-00-LOST COMMUNICATION WITH TCM

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0121-00-LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0126-00-LOST COMMUNICATION WITH STEERING ANGLE SENSOR

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0140-00-LOST COMMUNICATION WITH BODY CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0155-00-LOST COMMUNICATION WITH CLUSTER-CCN

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0401-00-IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10 and 16 volts.
- One valid CAN message received at least once.

SET CONDITION

- Active Damping Control Module (ADCM) detects an incorrect CAN message from the Powertrain Control Module (PCM).

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
ACTIVE DAMPING CONTROL MODULE (ADCM) CAN BUS DTCS
POWERTRAIN CONTROL MODULE (PCM) CAN BUS DTCS
ACTIVE DAMPING CONTROL MODULE
POWERTRAIN CONTROL MODULE (PCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **This DTC must be active for the results of this test to be valid.**

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ADCM DTCs and record on the repair order.
   4. With the scan tool, erase the DTCs.
   5. Cycle the ignition switch from off to on.
   6. With the scan tool, read the DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
2. **CHECK POWERTRAIN CONTROL MODULE (PCM) CAN BUS DTCS ARE PRESENT**
   1. With the scan tool, read the PCM DTCs.

      Are there any PCM CAN BUS DTCs present?

      Yes

      - Perform the appropriate diagnostic procedures. Refer to **DTC INDEX** .

      No

- Go To 3

3. **CHECK OTHER MODULES FOR CAN BUS DTCS**
    1. With the scan tool, read the DTCs.

    Are there any CAN BUS DTCs present?

    Yes

    - Using the schematics as a guide, check the Powertrain Control Module (PCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Powertrain Control Module (PCM) in accordance with the Service Information. Refer to **MODULE, POWERTRAIN CONTROL, REMOVAL** .

    No

    - Using the schematics as a guide, check the Active Damping Control Module (ADCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
    - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U0402-00-IMPLAUSIBLE DATA RECEIVED FROM TCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10 and 16 volts.
- One valid CAN message received at least once.

SET CONDITION

- Active Damping Control Module (ADCM) detects an incorrect CAN message from the Transmission Control Module (TCM).

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
ACTIVE DAMPING CONTROL MODULE (ADCM) CAN BUS DTCS

Possible Causes
TRANSMISSION CONTROL MODULE (TCM) CAN BUS DTCS
ACTIVE DAMPING CONTROL MODULE
TRANSMISSION CONTROL MODULE (TCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **This DTC must be active for the results of this test to be valid.**

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ADCM DTCs and record on the repair order.
   4. With the scan tool, erase the DTCs.
   5. Cycle the ignition switch from off to on.
   6. With the scan tool, read the DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

2. **CHECK TRANSMISSION CONTROL MODULE (TCM) CAN BUS DTCS ARE PRESENT**
   1. With the scan tool, read the TCM DTCs.

   Are there any TCM CAN BUS DTCs present?

   Yes

   - Perform the appropriate diagnostic procedures. Refer to **DTC INDEX** .

   No

   - Go To 3

3. **CHECK OTHER MODULES FOR CAN BUS DTCS**
   1. With the scan tool, read the DTCs.

   Are there any CAN BUS DTCs present?

   Yes

- Using the schematics as a guide, check the Transmission Control Module (TCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Transmission Control Module (TCM) in accordance with the Service Information. Refer to **MODULE, TRANSMISSION CONTROL, REMOVAL** .

No

- Using the schematics as a guide, check the Active Damping Control Module (ADCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U0415-00-IMPLAUSIBLE DATA RECEIVED FROM ABS

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No over voltage DTCs.
- One valid CAN message received at least once.
- No CAN BUS circuit error condition present.
- No lost communication with ABS condition present.

SET CONDITION

- Active Damping Control Module (ADCM) is receiving implausible data for vehicle speed, wheel speeds, brake switch status, longitudinal acceleration, yaw rate, or lateral acceleration from the Anti-lock Brake System (ABS) Module.

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
ACTIVE DAMPING CONTROL MODULE (ADCM) DTCS
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE DTCS
ACTIVE DAMPING CONTROL MODULE (ADCM)
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ADCM DTCs and record on the repair order.
   4. With the scan tool, erase the DTCs.
   5. Cycle the ignition switch from off to on.
   6. With the scan tool, read the DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

2. **CHECK ANTI-LOCK BRAKE SYSTEM (ABS) MODULE CAN BUS DTCS ARE PRESENT**
   1. With the scan tool, read the ABS DTCs.

   Are there any ABS CAN BUS DTCs present?

   Yes

   - Perform the appropriate diagnostic procedures. Refer to **DIAGNOSIS AND TESTING** .

   No

   - Go To 3

3. **CHECK OTHER MODULES FOR CAN BUS DTCS**
   1. With the scan tool, read the DTCs.

   Are there any CAN BUS DTCs present?

   Yes

   - Using the schematics as a guide, check the Anti-lock Brake System (ABS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

No

- Using the schematics as a guide, check the Active Damping Control Module (ADCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
- Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U0422-00-IMPAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10 and 16 volts.
- One valid CAN message received at least once.

SET CONDITION

- Active Damping Control Module (ADCM) detects an incorrect CAN message from the Body Control Module (BCM).

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
ACTIVE DAMPING CONTROL MODULE (ADCM) CAN BUS DTCS
BODY CONTROL MODULE (BCM) CAN BUS DTCS
ACTIVE DAMPING CONTROL MODULE
BODY CONTROL MODULE (BCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: **This DTC must be active for the results of this test to be valid.**

1. Perform any Service Bulletins that may apply.
2. Turn the ignition on.
3. With the scan tool, read ADCM DTCs and record on the repair order.
4. With the scan tool, erase the DTCs.

5. Cycle the ignition switch from off to on.
6. With the scan tool, read the DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

2. **CHECK BODY CONTROL MODULE (BCM) CAN BUS DTCS ARE PRESENT**
   1. With the scan tool, read the BCM DTCs.

      Are there any BCM CAN BUS DTCs present?

      Yes

      - Perform the appropriate diagnostic procedures. Refer to **DIAGNOSTIC CODE INDEX** .

      No

      - Go To 3

3. **CHECK OTHER MODULES FOR CAN BUS DTCS**
   1. With the scan tool, read the DTCs.

      Are there any CAN BUS DTCs present?

      Yes

      - Using the schematics as a guide, check the Body Control Module (BCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Body Control Module (BCM) in accordance with the Service Information. Refer to **MODULE, BODY CONTROL, REMOVAL** .

      No

      - Using the schematics as a guide, check the Active Damping Control Module (ADCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
      - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U0429-00-IMPLAUSIBLE DATA RECEIVED FROM SCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10 and 16 volts.
- One valid CAN message received at least once.

SET CONDITION

- Active Damping Control Module (ADCM) detects an incorrect CAN message from the Body Control Module (BCM).

DEFAULT ACTION

- Active Damping Suspension (ADS) in full firm mode.
- "Service ADS" displayed in Electronic Vehicle Information Center (EVIC).

POSSIBLE CAUSES

Possible Causes
ACTIVE DAMPING CONTROL MODULE (ADCM) CAN BUS DTCS
STEERING COLUMN CONTROL MODULE (SCCM) CAN BUS DTCS
ACTIVE DAMPING CONTROL MODULE
STEERING CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ADCM DTCs and record on the repair order.
   4. With the scan tool, erase the DTCs.
   5. Cycle the ignition switch from off to on.
   6. With the scan tool, read the DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

- Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

2. **CHECK STEERING COLUMN CONTROL MODULE (SCCM) CAN BUS DTCS ARE PRESENT**
    1. With the scan tool, read the SCCM DTCs.

        Are there any SCCM CAN BUS DTCs present?

        Yes

        - Perform the appropriate diagnostic procedures. Refer to **DIAGNOSIS AND TESTING** .

        No

        - Go To 3
3. **CHECK OTHER MODULES FOR CAN BUS DTCS**
    1. With the scan tool, read the DTCs.

        Are there any CAN BUS DTCs present?

        Yes

        - Using the schematics as a guide, check the Steering Column Control Module (SCCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .

        No

        - Using the schematics as a guide, check the Active Damping Control Module (ADCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Active Damping Control Module (ADCM) in accordance with the Service Information. Refer to **MODULE, ACTIVE DAMPING CONTROL, REMOVAL** .
        - Perform the ADCM VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

STANDARD PROCEDURE

ADCM VERIFICATION TEST

DIAGNOSTIC TEST

ADCM VERIFICATION TEST

1. Turn the ignition off.
2. Connect all previously disconnected components and connectors.
3. Verify all accessories are turned off and the battery is fully charged.

4. Verify that the ignition is on, with the scan tool, erase all Diagnostic Trouble Codes (DTCs) from All modules. Start the engine and allow it to run for two minutes and fully operate the system that was indicating the failure.
5. Turn the ignition off and wait five seconds. Turn the ignition on and using the scan tool, read DTCs from all modules.
6. If any Diagnostic Trouble Codes are present, and perform the diagnostic procedure. Refer to **DIAGNOSIS AND TESTING**.
7. If there are no DTCs present after turning ignition on, road test the vehicle for at least five minutes.
   - Test drive the vehicle by turning the vehicle left or right in a curving manner at a speed above 25 km/h (15 mph).
8. Again, with the scan tool read DTCs. If any DTCs are present, refer to **DIAGNOSIS AND TESTING** for the diagnostic procedure and troubleshoot the new or recurring DTC.
9. If there are no Diagnostic Trouble Codes (DTCs) present, and the customer's concern can no longer be duplicated, the repair is complete.

   Are any DTCs present or is the original concern still present?

   Yes

   - Repair is not complete, perform the appropriate diagnostic procedure. Refer to **DIAGNOSIS AND TESTING**.

   No

   - Repair is complete.

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Article GUID: A00735880

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
B1783-01	STOP LAMP CONTROL - GENERAL ELECTRICAL FAILURE
C0020-01	ABS PUMP MOTOR CONTROL - GENERAL ELECTRICAL FAILURE
C0020-16	ABS PUMP MOTOR CONTROL - CIRCUIT VOLTAGE BELOW THRESHOLD
C0020-1C	ABS PUMP MOTOR CONTROL - CIRCUIT VOLTAGE OUT OF RANGE
C0020-35	ABS PUMP MOTOR CONTROL - SIGNAL HIGH TIME>MAXIMUM
C0021-02	BRAKE BOOSTER - GENERAL SIGNAL FAILURE
C0030-02	LEFT FRONT TONE WHEEL - GENERAL SIGNAL FAILURE
C0031-1D	LEFT FRONT WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE
C0031-2F	LEFT FRONT WHEEL SPEED SENSOR - SIGNAL ERRATIC
C0031-4A	LEFT FRONT WHEEL SPEED SENSOR - INCORRECT COMPONENT INSTALLED
C0031-62	LEFT FRONT WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE
C0033-02	RIGHT FRONT TONE WHEEL - GENERAL SIGNAL FAILURE
C0034-1D	RIGHT FRONT WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE
C0034-2F	RIGHT FRONT WHEEL SPEED SENSOR - SIGNAL ERRATIC
C0034-4A	RIGHT FRONT WHEEL SPEED SENSOR - INCORRECT COMPONENT INSTALLED
C0034-62	RIGHT FRONT WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE
C0036-02	LEFT REAR TONE WHEEL - GENERAL SIGNAL FAILURE
C0037-1D	LEFT REAR WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE
C0037-2F	LEFT REAR WHEEL SPEED SENSOR - SIGNAL ERRATIC
C0037-4A	LEFT REAR WHEEL SPEED SENSOR - INCORRECT COMPONENT INSTALLED
C0037-62	LEFT REAR WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE
C0039-02	RIGHT REAR TONE WHEEL - GENERAL SIGNAL FAILURE
C003A-1D	RIGHT REAR WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE
C003A-2F	RIGHT REAR WHEEL SPEED SENSOR - SIGNAL ERRATIC
C003A-4A	RIGHT REAR WHEEL SPEED SENSOR - INCORRECT COMPONENT INSTALLED
C003A-62	RIGHT REAR WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE
C0042-11	BRAKE PEDAL POSITION SENSOR - CIRCUIT SHORT TO GROUND
C0042-12	BRAKE PEDAL POSITION SENSOR - CIRCUIT SHORT TO BATTERY

DTC	Description
C0042-28	BRAKE PEDAL POSITION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE
C0042-2A	BRAKE PEDAL POSITION SENSOR - STUCK
C0042-54	BRAKE PEDAL POSITION SENSOR - MISSING CALIBRATION
C0042-62	BRAKE PEDAL POSITION SENSOR - SIGNAL COMPARE FAILURE
C0044-01	BRAKE PRESSURE SENSOR 1 - GENERAL ELECTRICAL FAILURE
C0044-28	BRAKE PRESSURE SENSOR 1 - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE
C0044-49	BRAKE PRESSURE 1 - INTERNAL ELECTRONIC FAILURE
C0044-62	BRAKE PRESSURE SENSOR 1 - SIGNAL COMPARE FAILURE
C0051-22	STEERING WHEEL POSITION SENSOR - SIGNAL AMPLITUDE > MAXIMUM
C0051-28	STEERING WHEEL POSITION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE
C0051-49	STEERING WHEEL POSITION SENSOR - INTERNAL ELECTRONIC FAILURE
C0051-62	STEERING WHEEL POSITION SENSOR - SIGNAL COMPARE FAILURE
C006A-28	MULTI-AXIS ACCELERATION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE
C006A-49	MULTI-AXIS ACCELERATION SENSOR - INTERNAL ELECTRONIC FAILURE
C006A-56	MULTI-AXIS ACCELERATION SENSOR- INVALID / INCOMPATIBLE CONFIGURATION
C006A-62	MULTI-AXIS ACCELERATION SENSOR - SIGNAL COMPARE FAILURE
C0078-86	TIRE DIAMETER - SIGNAL INVALID
C1046-92	LEFT FRONT WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION
C1047-92	RIGHT FRONT WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION
C1048-92	LEFT REAR WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION
C1049-92	RIGHT REAR WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION
C1082-01	VACUUM PRESSURE SENSOR - GENERAL ELECTRICAL FAILURE
C1082-02	VACUUM PRESSURE SENSOR - GENERAL SIGNAL FAILURE
C1082-2F	VACUUM PRESSURE SENSOR - SIGNAL ERRATIC
C121A-09	STEERING ANGLE SENSOR NOT INITIALIZED - COMPONENT FAILURES
C121C-00	TORQUE REQUEST SIGNAL DENIED
C1239-00	EMISSION ROLLS TEST ACTIVE
C123B-4B	ESP SYSTEM CONTROL TOO LONG - OVER TEMPERATURE
C1246-1C	VACUUM PRESSURE SENSOR SUPPLY - CIRCUIT VOLTAGE OUT OF RANGE

DTC	Description
C124F-00	ESP REQUEST DENIED FROM ACC
C1252-92	VACUUM PUMP CONTROL CIRCUIT - PERFORMANCE OR INCORRECT OPERATION
C2100-16	BATTERY VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD
C2101-17	BATTERY VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD
C2114-16	DYNAMICS SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2114-17	DYNAMICS SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C211B-92	IGNITION RUN/START INPUT CIRCUIT - PERFORMANCE OR INCORRECT OPERATION
C212A-16	SYSTEM VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD
C212A-17	SYSTEM VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD
C2200-41	ANTI-LOCK BRAKE MODULE INTERNAL - GENERAL CHECKSUM FAILURE
C2200-44	ANTI-LOCK BRAKE MODULE INTERNAL - DATA MEMORY FAILURE
C2200-45	ANTI-LOCK BRAKE MODULE INTERNAL - PROGRAM MEMORY FAILURE
C2200-46	ANTI-LOCK BRAKE MODULE INTERNAL - CALIBRATION / PARAMETER MEMORY FAILURE
C2200-47	ANTI-LOCK BRAKE MODULE INTERNAL - WATCHDOG / SAFETY AuC FAILURE
C2200-48	ANTI-LOCK BRAKE MODULE INTERNAL - SUPERVISION SOFTWARE FAILURE
C2200-49	ANTI-LOCK BRAKE MODULE INTERNAL - INTERNAL ELECTRONIC FAILURE
C2202-00	ORIGINAL VIN MISMATCH / MISSING
C2206-00	VEHICLE CONFIGURATION MISMATCH
C220B-00	ABS ACC NOT CALIBRATED
U0002-88	CAN C BUS OFF PERFORMANCE - BUS OFF
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0104-00	LOST COMMUNICATION WITH CRUISE CONTROL MODULE
U0125-00	LOST COMMUNICATION WITH DYNAMICS SENSOR
U0126-00	LOST COMMUNICATION WITH STEERING ANGLE SENSOR
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0405-00	INVALID DATA RECEIVED CRUISE CONTROL MODULE
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM
U0432-00	INVALID DATA RECEIVED FROM MULTI-AXIS ACCELERATION SENSOR MODULE

DTC	Description
U1003-88	ESP CAN C BUS PERFORMANCE - BUS OFF
U140E-00	IMPLAUSIBLE VEHICLE CONFIGURATION DATA RECEIVED

DTC TROUBLESHOOTING

B1783-01-STOP LAMP CONTROL - GENERAL ELECTRICAL FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

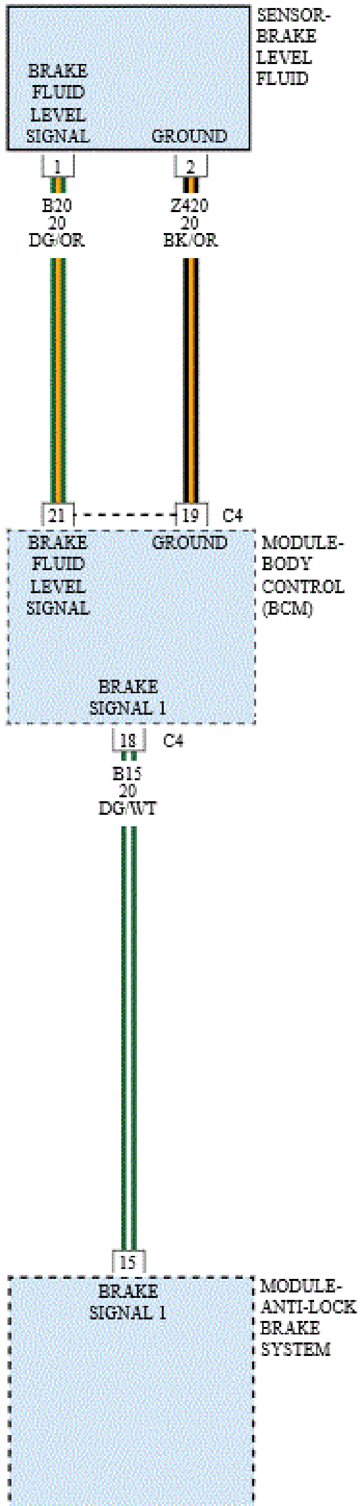


Fig. 1: Brake Level Fluid Sensor & Brake Lamp Control Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module has detected an improper voltage level at the brake lamp signal.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
BRAKE SIGNAL 1 SHORTED TO VOLTAGE
BRAKE SIGNAL 1 SHORTED TO GROUND
BRAKE SIGNAL 1 OPEN OR HIGH RESISTANCE
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order.
   3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase the DTCs.
   5. Start the engine.
   6. Press and release the brake pedal.
   7. With the scan tool, read ABS DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **CHECK THE (B15) BRAKE SIGNAL 1 FOR A SHORT TO VOLTAGE**
   1. Turn the ignition off.
   2. Disconnect the Body Control Module (BCM) C4 harness connector.

3. Disconnect the Anti-lock Brake System (ABS) Module harness connector.
4. Turn the ignition on.
5. Measure the voltage between ground and the (B15) Brake Signal 1 circuit at the ABS Module harness connector.

   Is there any voltage present?

   Yes

   - Repair the (B15) Brake Signal circuit for a short to voltage.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (B15) BRAKE SIGNAL 1 FOR A SHORT TO GROUND**
   1. Turn the ignition off.
   2. Check for continuity between ground and the (B15) Brake Signal 1 circuit at the ABS Module harness connector.

      Is there continuity between ground and the ABS Module circuit?

      Yes

      - Go To 4

      No

      - Repair the (B15) Brake Signal 1 circuit for a short to ground.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **CHECK THE (B15) BRAKE SIGNAL FOR AN OPEN OR HIGH RESISTANCE**
   1. Measure the resistance of the (B15) Brake Signal 1 circuit between the BCM harness connector and the ABS Module harness connector.

      Is the resistance below 5.0 Ohms?

      Yes

      - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Repair the (B15) Brake Signal 1 circuit for an open circuit or high resistance.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0020-01-ABS PUMP MOTOR CONTROL - GENERAL ELECTRICAL FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If DTC C0020-16 or C0020-35 are present, refer to the diagnostics for these DTCs before continuing with this procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs set.

SET CONDITION

- Anti-lock Brake System (ABS) Module has detected improper voltage level when the motor is not running or is not seeing the proper response when the motor is running.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
HYDRAULIC CONTROL UNIT (HCU)

DIAGNOSTIC TEST

ANTI-LOCK BRAKE SYSTEM (ABS)

1. Perform any Technical Service Bulletins (TSBs) that may apply.
2. Turn the ignition off.
3. Inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.
4. Inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   NOTE: **For this failure it is necessary to replace both the ABS Module and the HCU as a complete unit.**

   - Replace the Integrated Control Unit (ICU) in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** and **HYDRAULIC CONTROL**

UNIT (HCU), REMOVAL .

- Perform the ABS VERIFICATION TEST. Refer to STANDARD PROCEDURE.

C0020-16-ABS PUMP MOTOR CONTROL - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

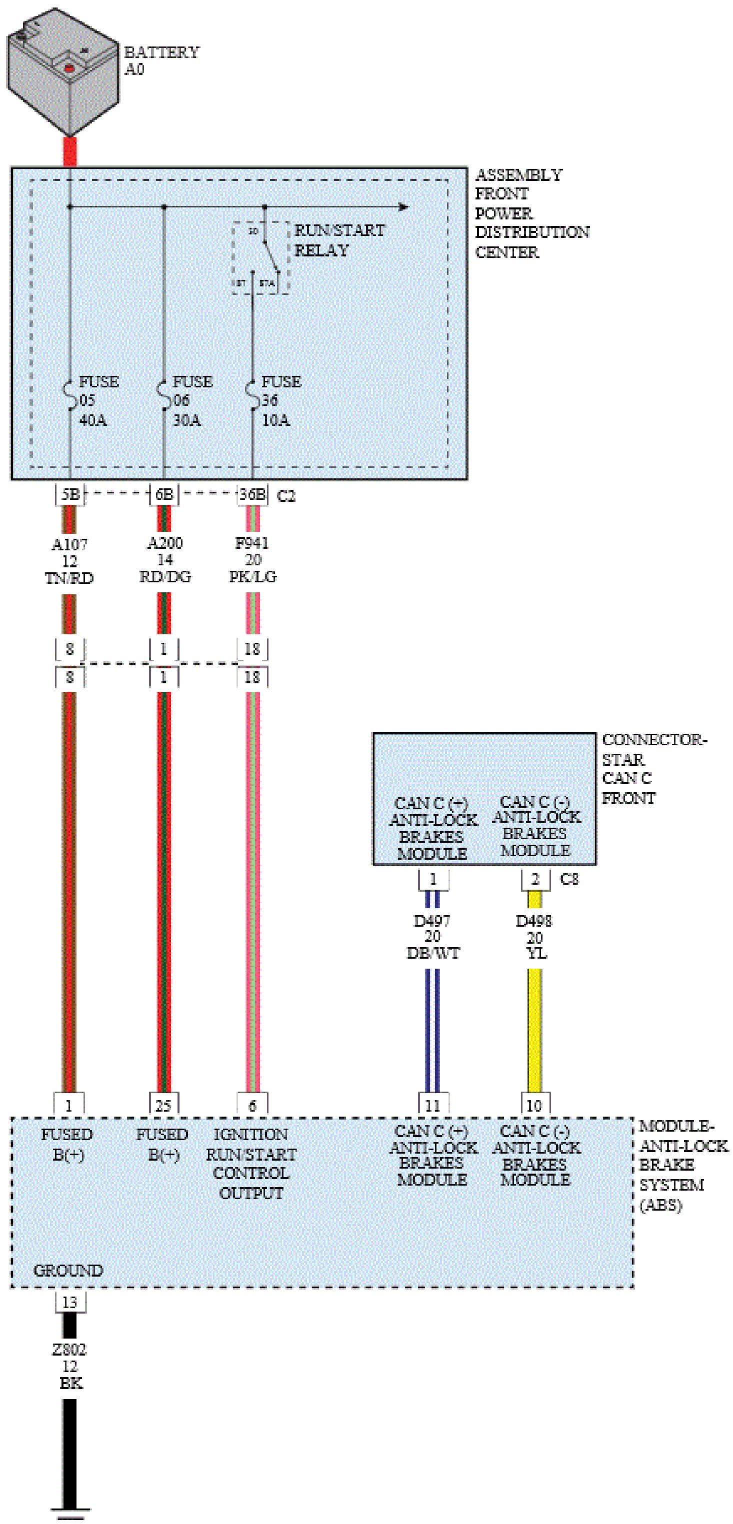


Fig. 2: Anti-Lock Brake System Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Motor voltage supplied to the Anti-lock Brake System (ABS) Module is 50 percent of ignition voltage.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
FUSE 5 (40A)
(A107) FUSED B+ CIRCUIT SHORTED TO GROUND
(A107) FUSED B+ CIRCUIT OPEN OR HIGH RESISTANCE
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
HYDRAULIC CONTROL UNIT (HCU)

DIAGNOSTIC TEST

1. **CHECK THE FUSE**
    1. Turn the ignition on.
    2. Using a 12-volt test light connected to ground, check the fuse for power.

       Is the fuse good?

       Yes

       - Go To 3

       No

       - Go To 2
2. **(A107) FUSED B+ CIRCUIT SHORTED TO GROUND**
    1. Turn the ignition off.
    2. Remove the Fuse.
    3. Disconnect the ABS Module harness connector.
    4. Check for continuity between ground and the (A107) Fused B+ Circuit in the ABS Module harness connector.

Is there continuity between ground and the (A107) Fused B+ circuit?

Yes

- Repair the (A107) Fused B+ circuit for a short to ground.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **ABS PUMP MOTOR**
   1. Install the Fuse.
   2. Turn the ignition on.
   3. With the scan tool, read and record the DTCs.
   4. With the scan tool, actuate the ABS pump motor.

   Did the Pump Motor operate correctly when actuated with out blowing the fuse?

   Yes

   - Go To 4

   No

   - Go To 5

4. **(A107) FUSED B+ CIRCUIT OPEN OR HIGH RESISTANCE**

   NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

   1. Using a 12-volt test light connected to ground, check the (A107) Fused B+ circuit at the ABS harness connector.

   Is the test light illuminated and bright?

   Yes

   - Go To 5

   No

   - Repair the (A107) Fused B+ circuit for an open or high resistance.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
   1. Turn the ignition off.
   2. Inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.
   3. Inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded

terminals.

4. Perform any Service Bulletins that may apply.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0020-1C-ABS PUMP MOTOR CONTROL - CIRCUIT VOLTAGE OUT OF RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

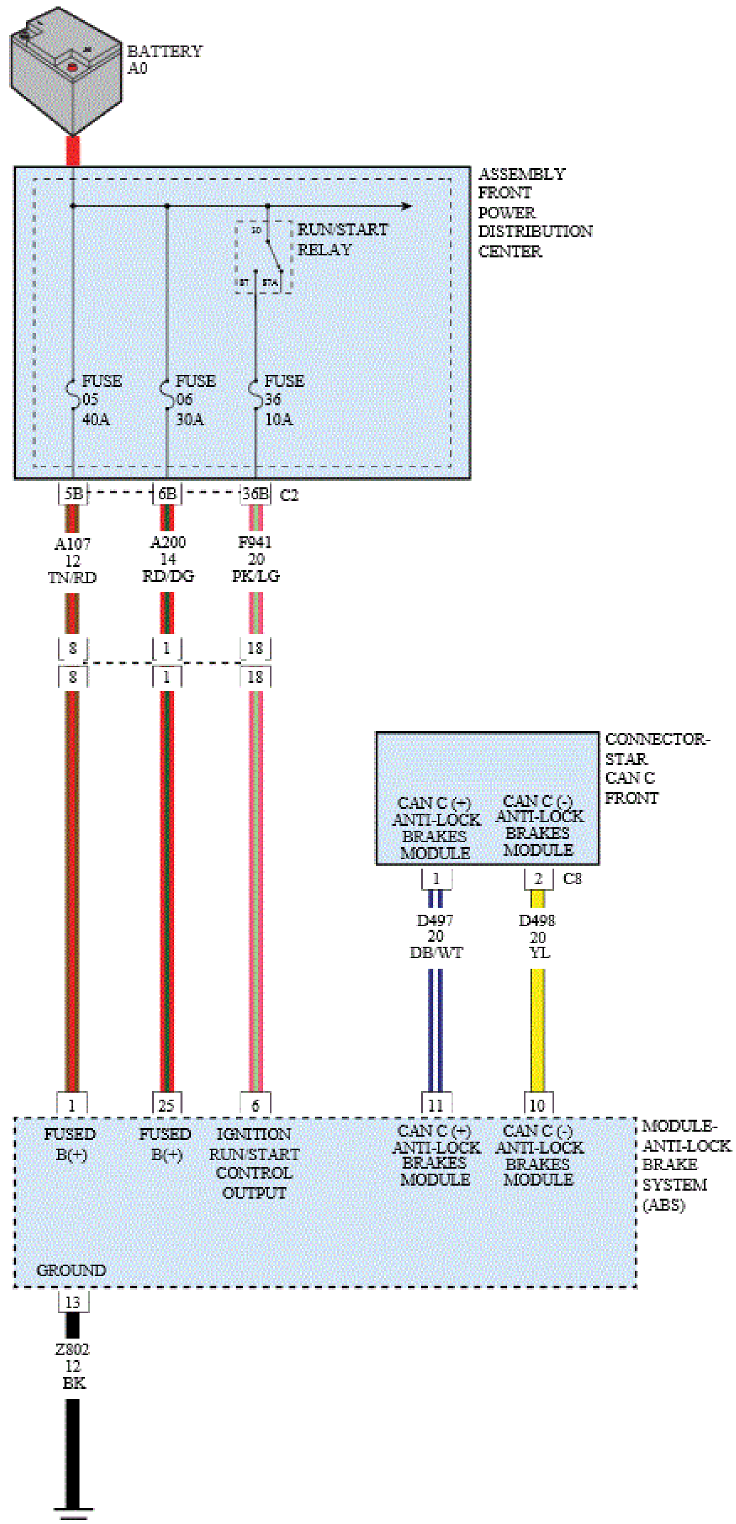


Fig. 3: Anti-Lock Brake System Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects that the pump motor has a poor ground.
- ABS has internal pump motor driver shorted.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
(Z802) GROUND CIRCUITS OPEN OR HIGH RESISTANCE
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
HYDRAULIC CONTROL UNIT (HCU)
INTEGRATED CONTROL UNIT (ICU)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

   NOTE: **This DTC must be active for the results of this test to be valid.**

   1. Ignition on.
   2. With the scan tool, read and record the DTCs.
   3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase the DTCs.
   5. Start the engine.
   6. With the scan tool, read and record the DTCs.

      Is the DTC active at this time?

      Yes

      - Go To 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **(Z802) GROUND CIRCUIT OPEN OR HIGH RESISTANCE**

   NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

1. Using a 12-volt test light connected to 12-volts, check the (Z802) Ground circuits.

   Does the test light illuminate brightly?

   Yes

   - Go To 3

   No

   - Repair the (Z802) Ground circuit(s) for an open circuit or high resistance.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

3. **INTEGRATED CONTROL UNIT (ICU)**
   1. Turn the ignition off.
   2. Inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.
   3. Inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.
   4. Perform any Service Bulletins that may apply.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      NOTE: **For this failure it is necessary to replace both the ABS Module and the HCU as a complete unit.**

      - Replace the Integrated Control Unit (ICU) in accordance with the Service Information. Refer to **HYDRAULIC CONTROL UNIT (HCU), REMOVAL** .
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0020-35-ABS PUMP MOTOR CONTROL - SIGNAL HIGH TIME>MAXIMUM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

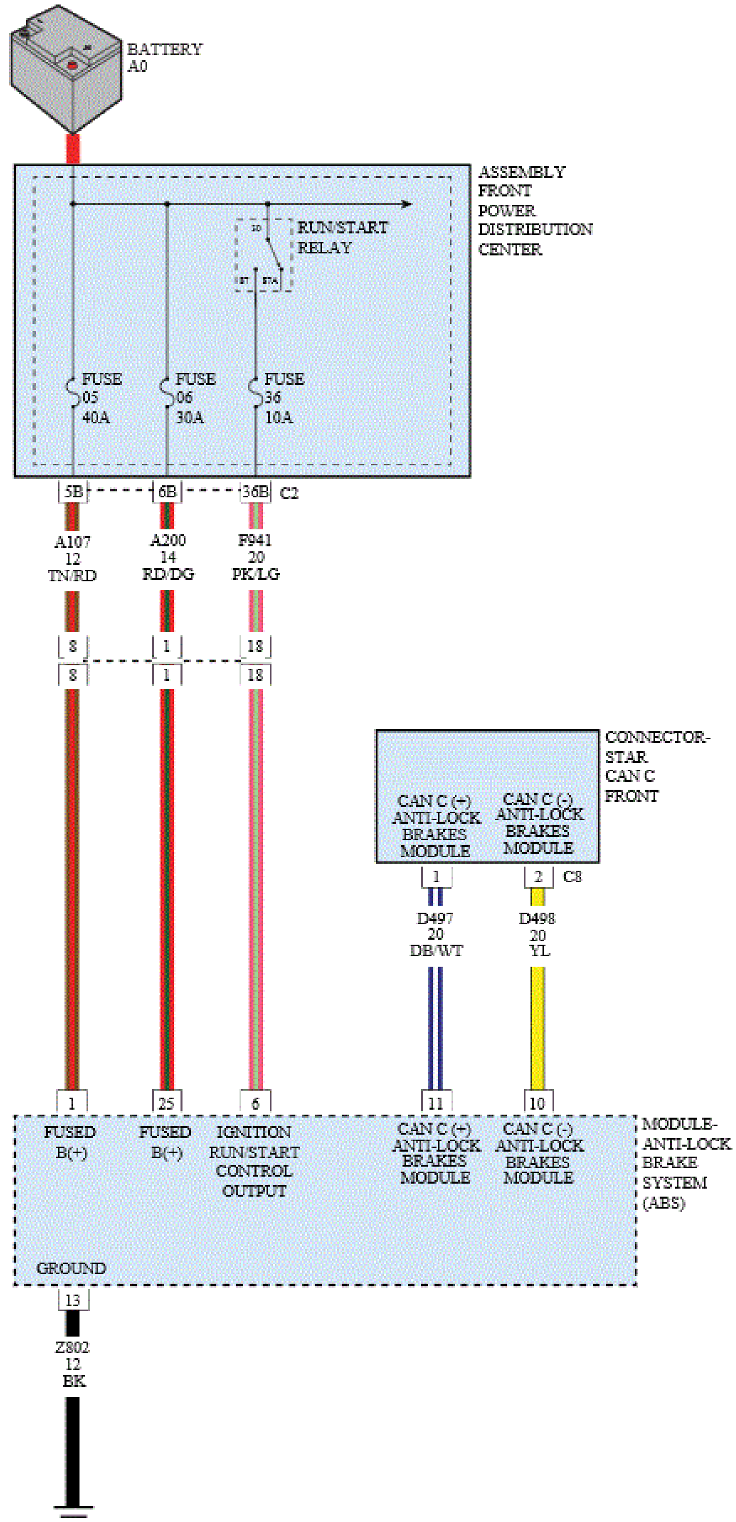


Fig. 4: Anti-Lock Brake System Module Circuit Diagram

Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects that the pump motor has a poor ground.
- ABS has internal pump motor driver shorted.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
(Z901) GROUND CIRCUITS OPEN OR HIGH RESISTANCE
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
HYDRAULIC CONTROL UNIT (HCU)
HYDRAULIC CONTROL UNIT (HCU)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record the DTCs.
   3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase the DTCs.
   5. Start the engine.
   6. With the scan tool, read and record the DTCs.

      Is the DTC active at this time?

      Yes

      - Go To 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **(Z802) GROUND CIRCUIT OPEN OR HIGH RESISTANCE**

   NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

1. Using a 12-volt test light connected to 12-volts, check the (Z802) Ground circuit.

   Does the test light illuminate brightly?

   Yes

   - Go To 3

   No

   - Repair the (Z802) Ground circuit for an open circuit or high resistance.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

3. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
   1. Turn the ignition off.
   2. Inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.
   3. Inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.
   4. Perform any Service Bulletins that may apply.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   NOTE: For this failure it is necessary to replace both the ABS Module and the HCU as a complete unit.

   - Replace the Integrated Control Unit (ICU) in accordance with the Service Information. Refer to **HYDRAULIC CONTROL UNIT (HCU), REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0021-02-BRAKE BOOSTER - GENERAL SIGNAL FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: If DTC C1252-92 is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.

THEORY OF OPERATION

When the Vacuum Pressure Sensor indicates a failure in the Vacuum Booster. After the cold start phase (i.e. 3 min after engine is running) and if the engine is running above 600 RPM there should be at least -135 mbar (-1.96 psi) of differential pressure in the vacuum-chamber for boosting the pedal force. If the pressure remains below this value for more than two minutes. Timer resets if the pressure remains above 220 mbar (3.19 psi) for

10 seconds or engine off vehicle speed present and low booster vacuum present.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Vacuum Pressure Sensor indicates a failure in the Vacuum Booster.
- Engine off vehicle speed present.
- Low booster vacuum present.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ENGINE STALLED WHILE ROLLING IN NEUTRAL
PINCHED, CUT OR OPEN VACUUM SUPPLY LINE
BRAKE BOOSTER
VACUUM PRESSURE SENSOR

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, read and record the DTCs.
    3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
    4. With the scan tool, erase the DTCs.
    5. Start the engine.
    6. Press and release the brake pedal.
    7. Wait five minutes or until red brake lamp illuminates.

    WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

    8. Test drive the vehicle at speeds above 10 km/h (6 mph).
    9. With the scan tool, read and record the DTCs.

    Is the DTC Active at this time?

    Yes

- Go To 2

No

- Check the vacuum supply line to brake booster for a pinched, cut, loose or cracked vacuum hose which could cause an intermittent condition.
- Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **CHECK VACUUM SUPPLY LINE**
    1. Turn the ignition off.
    2. Check the vacuum supply line to brake booster for a pinched, cut, loose or open vacuum hose.
    3. Disconnect the booster vacuum supply line and attach a vacuum pressure gauge.
    4. Start the engine.

    Does the vacuum fluctuate with RPM change?

    Yes

    - Repair as necessary.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 3
3. **CHECK FOR VACUUM PRESSURE SIGNAL CHANGE**
    1. Turn the ignition on.
    2. Remove the Vacuum Pressure Sensor from the Booster.
    3. Block off the vacuum feed port.
    4. Connect a vacuum pump to the Vacuum Pressure Sensor.
    5. Apply vacuum to the Vacuum Pressure Sensor.
    6. Using the scan tool, and a pressure gauge watch for the signal change.
    7. Using the scan tool, watch for signal change.

    Is the signal changing and does it compare to the pressure gauge reading?

    Yes

    - Go To 4

    No

    - Replace the Vacuum Pressure Sensor in accordance with the Service Information. Refer to **BOOSTER, POWER BRAKE, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **CHECK BRAKE BOOSTER CHECK VALVE**

1. Remove the Brake Booster Check Valve.
2. Apply vacuum to the booster side of the check valve.

   Is the Brake Booster Check Valve holding vacuum?

   Yes

   - Replace the Brake Booster in accordance with the Service Information. Refer to **BOOSTER, POWER BRAKE, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace Brake Booster Check Valve in accordance with the Service Information. Refer to **BOOSTER, POWER BRAKE, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0030-02-LEFT FRONT TONE WHEEL - GENERAL SIGNAL FAILURE

For a complete wiring diagram **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- Vehicle speed.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects periodic drops of a Wheel Speed Sensor (WSS) signal.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
LEFT FRONT TONE WHEEL/ BEARING DAMAGE
IMPROPER LEFT FRONT TIRE PRESSURE/MISMATCHED TIRES
DEBRIS IN TONE WHEEL/BEARING/SENSOR OR DAMAGED

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: **This DTC must be active for the results of this test to be valid. If DTC C0030-1D is present it must be repaired before continuing.**

1. Turn the ignition on.
2. With the scan tool, read DTCs.
3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
4. With the scan tool, erase DTCs.
5. Cycle the ignition switch off then on.

   CAUTION: Ensure brake capability is available before road testing.

6. Test drive the vehicle in a straight line to 40 km/h (25 mph).

   NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

7. With the scan tool, read DTCs.

   Is the DTC active?

   Yes

   - Go To 3

   No

   - Go To 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.
   2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

      NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

   3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

      Is the Left Front WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

      Yes

      - Go To 3

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

3. **CHECK FOR IMPROPER LEFT FRONT TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.

2. Check and adjust the Left Front Tire pressure.
3. Check and adjust all other tire pressures.
4. Inspect for mismatched tires on vehicle.

Is the Left Front Tire improperly inflated or mismatched tires on vehicle?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **CHECK THE LEFT FRONT TONE WHEEL/BEARING FOR DAMAGE**

NOTE: **Check the tone wheel teeth for missing teeth, cracks, or looseness. Teeth should be perfectly square, not bent, or nicked.**

1. Check the Left Front Tone Wheel for damage.
2. Inspect the Left Front Tone Wheel for debris.

Was there debris on the tone wheel?

Yes

- Clean tone wheel and sensor. Clear codes and retest.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Replace the Left Front Tone Wheel/Bearing in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0031-1D-LEFT FRONT WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

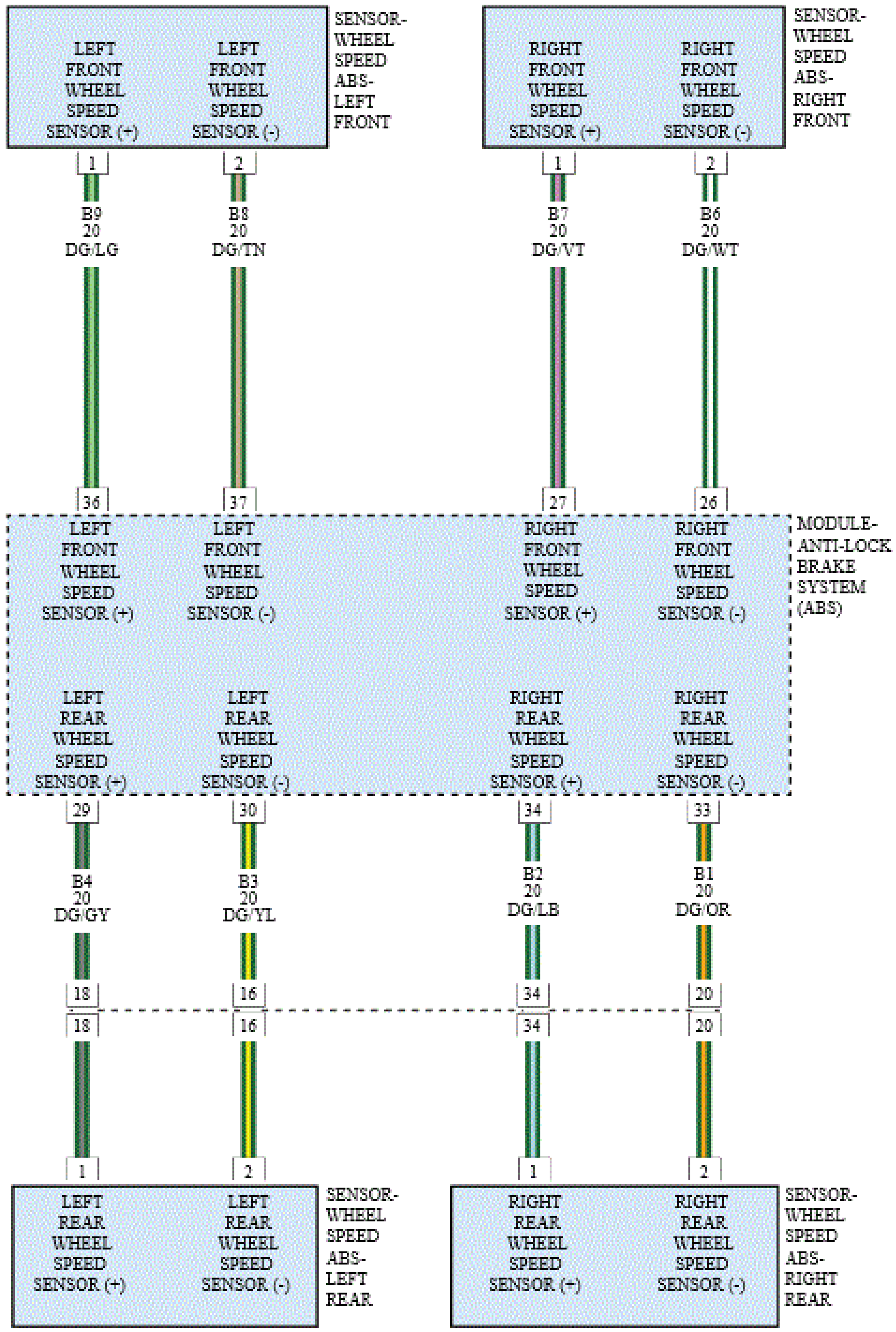


Fig. 5: Wheel Speed Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects Left Front Wheel Speed Sensor (WSS) circuit failure.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
CONNECTOR/TERMINAL DAMAGE
(B8) LEFT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
(B9) LEFT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO VOLTAGE
(B8) LEFT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
(B9) LEFT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO GROUND
(B8) LEFT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT OPEN
(B9) LEFT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT OPEN
(B9) LEFT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO THE (B8) LEFT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT
LEFT FRONT WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. Cycle the ignition switch from off to on.
    4. With the scan tool, read DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
    - Perform the ABS INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **CHECK CONNECTOR/TERMINAL FOR DAMAGE**

NOTE: **Check all terminals for broken, bent, pushed out, or corroded terminals.**

1. Turn the ignition off.
2. Inspect the Wheel Speed Sensor harness and connector.
3. Inspect the Wheel Speed Sensor for excessive debris on the sensor.

   Were any problems found?

   Yes

   - Repair as necessary in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK (B9) LEFT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT VOLTAGE**
   1. Disconnect the Left Front Wheel Speed Sensor harness connector.
   2. Turn the ignition on.
   3. Measure the voltage between the (B9) Left Front Wheel Speed Sensor Supply circuit and ground.

      Is the voltage above 10 volts?

      Yes

      - Go To 6

      No

      - Go To 4

4. **(B9) LEFT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO GROUND**
   1. Turn the ignition off.
   2. Disconnect the ABS Module harness connector.
   3. Measure the resistance between the (B9) Left Front Wheel Speed Sensor Supply circuit and ground.

      Is the resistance below 5.0 Ohms?

      Yes

      - Repair the (B9) Left Front Wheel Speed Sensor Supply circuit for a short to ground.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 5

5. **(B9) LEFT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT OPEN**
   1. Measure the resistance of the (B9) Left Front Wheel Speed Sensor Supply circuit between the Left Front Wheel Speed Sensor harness connector and the ABS Module harness connector.

Is the resistance below 5 Ohms?

Yes

- Go To 6

No

- Repair the open (B9) Left Front Wheel Speed Sensor Supply circuit.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **(B8) LEFT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE**
    1. Turn the ignition on.
    2. Measure the voltage of the (B8) Left Front Wheel Speed Sensor Signal circuit at the Left Front Wheel Speed Sensor harness connector.

    Is there any voltage present?

    Yes

    - Repair the (B8) Left Front Wheel Speed Sensor Signal circuit for a short to voltage.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 7
7. **(B8) LEFT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO GROUND**
    1. Turn the ignition off.
    2. Measure the resistance between the (B8) Left Front Wheel Speed Sensor Signal circuit and ground.

    Is the resistance below 5.0 Ohms?

    Yes

    - Repair the (B8) Left Front Wheel Speed Sensor Signal circuit for a short to ground.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 8
8. **(B8) LEFT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT OPEN**
    1. Measure the resistance of the (B8) Left Front Wheel Speed Sensor Signal circuit between the Left Front Wheel Speed Sensor harness connector and the ABS Module harness connector.

    Is the resistance below 5 Ohms?

    Yes

    - Go To 9

No

- Repair the open (B8) Left Front Wheel Speed Sensor Signal circuit.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

9. **(B9) LEFT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO THE (B8) LEFT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT**
   1. Turn the ignition off.
   2. Measure the resistance between the (B9) Left Front Wheel Speed Sensor Supply circuit and the (B8) Left Front Wheel Speed Sensor Signal circuit at the ABS Module harness connector.

      Is the resistance below 5.0 Ohms?

      Yes

      - Repair (B9) Left Front Wheel Speed Sensor Supply circuit for a short to the (B8) Left Front Wheel Speed Sensor Signal circuit.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 10

10. **LEFT FRONT WHEEL SPEED SENSOR**
    1. Replace the Left Front Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       CAUTION: Make sure braking capability is available before road testing.

    3. Road test the vehicle over 40 km/h (25 mph).

       NOTE: Vehicle must be driven for several minutes above 40 km/h (25 mph) for set conditions to be meet.

    4. With the scan tool, read ABS DTCs.

       Does the DTC remain active?

       Yes

       - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Test complete.

C0031-2F-LEFT FRONT WHEEL SPEED SENSOR - SIGNAL ERRATIC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

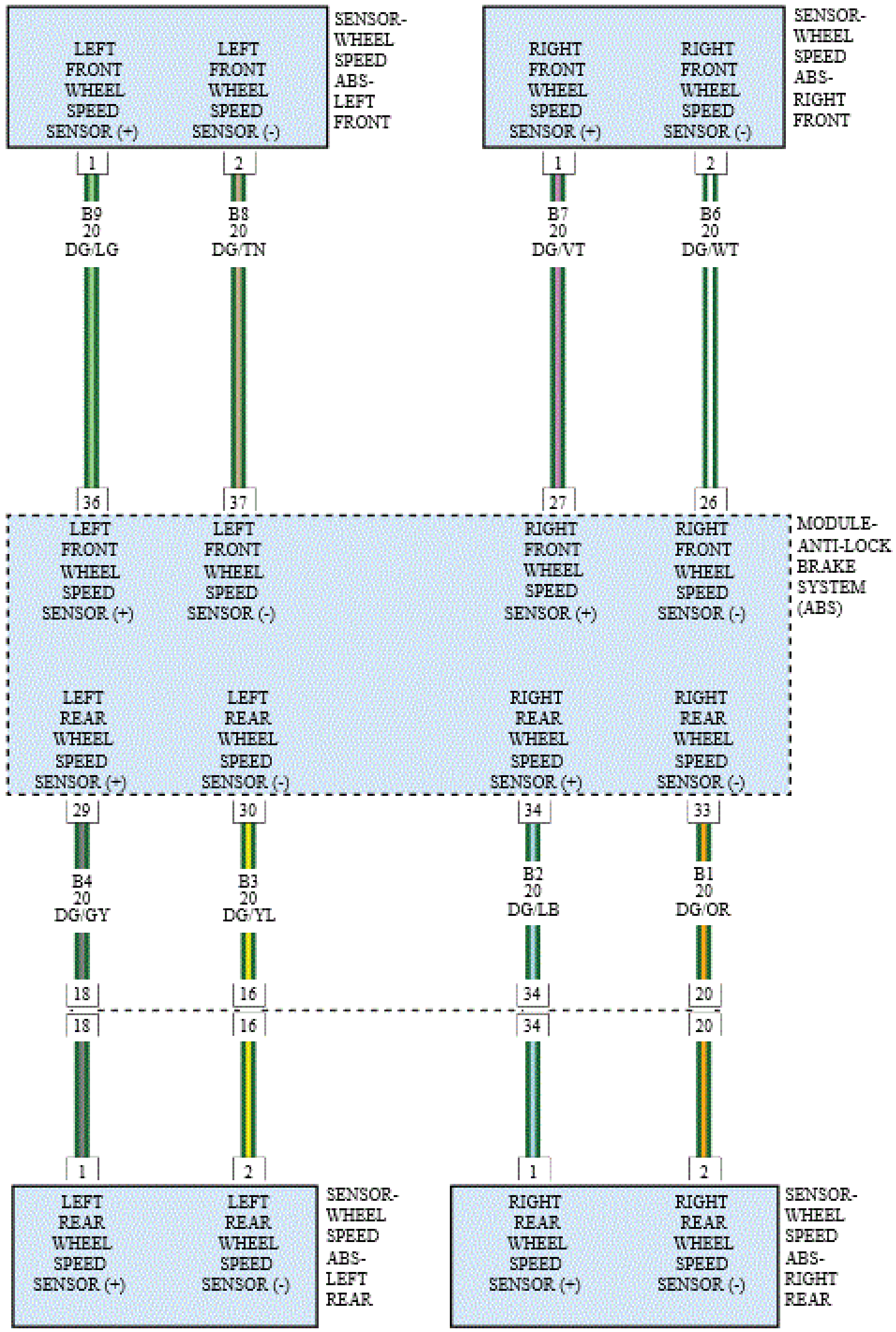


Fig. 6: Wheel Speed Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.

- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects multiple drastic changes in Left Front Wheel Speed Sensor (WSS) signals.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
CHECK LEFT FRONT WHEEL SPEED SENSOR FOR LOOSENESS
INSPECT CIRCUITS/CONNECTOR/TERMINALS FOR DAMAGE
LEFT FRONT WHEEL BEARING AND HUB OR ENCODER FOR DAMAGE
LEFT FRONT WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

    NOTE: **If DTC C0032-01 is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.

        CAUTION: **Make sure braking capability is available before road testing.**

    3. Road test the vehicle over 40 km/h (25 mph).

        NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

    4. With the scan tool, read DTCs.

        Is the DTC active?

        Yes

        - Go To 3

        No

        - Go To 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
    1. Turn the ignition on.

2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

NOTE: **If graph shows periodic dropouts pay close attention to the tone wheel.**

3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

Is the Left Front WSS speed showing 0 km/h (0 mph), not matching other wheels, or showing erratic behavior?

Yes

- Go To 3

No

- Perform ABS INTERMITTENT CONDITION diagnostic procedure. Refer to **STANDARD PROCEDURE**.

3. **CHECK LEFT FRONT WSS FOR LOOSENESS, INSPECT CIRCUITS/CONNECTORS /TERMINALS FOR DAMAGE**

NOTE: **Check all terminals for broken, bent, pushed out, or corroded terminals.**

1. Turn the ignition off.
2. Inspect the ABS Module harness connector and the Left Front WSS harness connector.
3. Check the Left Front WSS for looseness, excessive corrosion and not properly fastened.
4. Inspect the (B8) Left Front WSS Signal and (B9) Left Front WSS Supply circuits between the Left Front WSS and Anti-Lock Brake Module for damage.

Is the Left Front WSS loose or any of the wiring/connectors/terminals damaged?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **CHECK LEFT FRONT WHEEL SPEED SENSOR FOR DAMAGE**

1. Remove the Left Front Wheel Speed Sensor.
2. Inspect the Wheel Speed Sensor for proper mounting.
3. Inspect the Wheel Speed Sensor harness and connector.
4. Inspect the Wheel Speed Sensor for excessive debris on the sensor.

Is the Left Front Wheel Speed Sensor damaged?

Yes

- Replace the Left Front Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **CHECK LEFT FRONT WHEEL BEARING AND HUB OR ENCODER FOR DAMAGE**
   1. Inspect the Left Front wheel bearing, hub and Encoder for excessive runout, clearance or damage.

      NOTE: **Refer to the appropriate service information, if necessary, for procedures or specifications.**

      Is the Left Front Wheel Bearing, Hub or Encoder Damaged?

      Yes

      - Replace the Hub and Wheel Bearing in accordance with the Service Information. Refer to **HUB AND BEARING, REMOVAL** .
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 6

6. **LEFT FRONT WHEEL SPEED SENSOR**
   1. Replace the Left Front Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
   2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

   4. With the scan tool, read ABS DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test Complete.

C0031-4A-LEFT FRONT WHEEL SPEED SENSOR - INCORRECT COMPONENT INSTALLED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects that the wrong component is installed.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
LEFT FRONT WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **If DTC C0031-1D is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

   NOTE: **This vehicle uses directional front wheel speed sensors and non-directional rear wheel speed sensors.**

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. With the scan tool, read DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Test Complete.
2. **LEFT FRONT WHEEL SPEED SENSOR**

NOTE: **This vehicle uses a directional front wheel speed sensor, make sure the correct wheel speed sensor is installed on the vehicle.**

1. Replace the Left Front Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** . Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   CAUTION: **Make sure braking capability is available before road testing.**

2. Road test the vehicle over 40 km/h (25 mph).
3. With the scan tool, read DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

C0031-62-LEFT FRONT WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE

For a complete wiring diagram **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

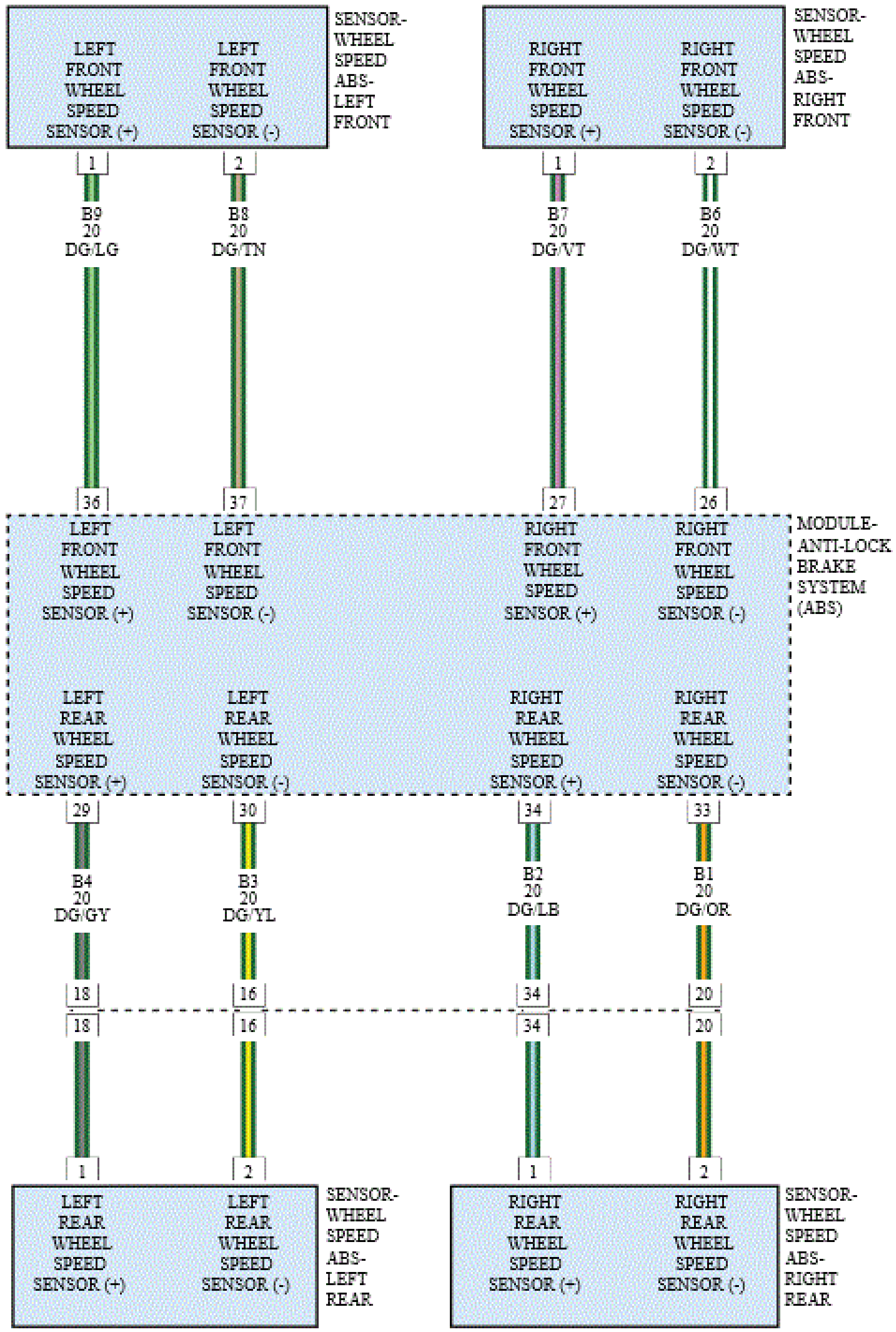


Fig. 7: Wheel Speed Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects if the wheel speed signal is 0 km/h (0 mph) or very low when compared to the other wheel speed signals.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
IMPROPER LEFT FRONT TIRE PRESSURE/MISMATCHED TIRES
CHECK LEFT FRONT WHEEL SPEED SENSOR FOR LOOSENESS
INSPECT CIRCUITS/CONNECTOR/TERMINALS FOR DAMAGE
LEFT FRONT HUB AND WHEEL BEARING
LEFT FRONT WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **If DTC C0031-1D is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: **Make sure braking capability is available before road testing.**

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

   4. With the scan tool, read DTCs.

      Is the DTC active?

      Yes

      - Go To 3

      No

      - Go To 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.

2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

   NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

   Is the Left Front WSS speed showing 0 km/h (0 mph), not matching other wheels, or showing erratic behavior?

   Yes

   - Go To 3

   No

   - Perform ABS INTERMITTENT CONDITION diagnostic procedure. Refer to **STANDARD PROCEDURE**.

3. **CHECK FOR IMPROPER LEFT FRONT TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Left Front Tire pressure.
   3. Check and adjust all other tire pressures.
   4. Inspect for mismatched tires on vehicle.

   Is the Left Front Tire improperly inflated or mismatched tires on vehicle?

   Yes

   - Repair as necessary
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4

4. **CHECK LEFT FRONT WSS FOR LOOSENESS, INSPECT CIRCUITS/CONNECTORS /TERMINALS FOR DAMAGE**

   NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals.

   1. Turn the ignition off.
   2. Inspect the ABS Module harness connector and the Left Front WSS harness connector.
   3. Check the Left Front WSS for looseness, excessive corrosion and not properly fastened.
   4. Inspect the (B8) Left Front WSS Signal and (B9) Left Front WSS Supply circuits between the Left Front WSS and Anti-Lock Brake Module for damage.

   Is the Left Front WSS loose or any of the wiring/connectors/terminals damaged?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **CHECK LEFT FRONT WHEEL SPEED SENSOR FOR DAMAGE**
    1. Remove the Left Front Wheel Speed Sensor.
    2. Inspect the Wheel Speed Sensor for proper mounting.
    3. Inspect the Wheel Speed Sensor harness and connector.
    4. Inspect the Wheel Speed Sensor for excessive debris on the sensor.

    Is the Left Front Wheel Speed Sensor damaged?

    Yes

    - Replace the Left Front Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 6

6. **CHECK LEFT FRONT WHEEL BEARING AND HUB OR ENCODER FOR DAMAGE**
    1. Inspect the Left Front wheel bearing, hub and Encoder for excessive runout, clearance or damage.

    NOTE: **Refer to the appropriate service information, if necessary, for procedures or specifications.**

    Is the Left Front Wheel Bearing, Hub or Encoder Damaged?

    Yes

    - Replace the Hub and Wheel Bearing in accordance with the Service Information. Refer to **HUB AND BEARING, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 7

7. **LEFT FRONT WHEEL SPEED SENSOR**
    1. Replace the Left Front Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Road test the vehicle over 40 km/h (25 mph).

NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

4. With the scan tool, read ABS DTCs.

Does the DTC remain active?

Yes

- Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test Complete.

C0033-02-RIGHT FRONT TONE WHEEL - GENERAL SIGNAL FAILURE

For a complete wiring diagram **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- Vehicle speed.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects periodic drops of a Wheel Speed Sensor (WSS) signal.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
RIGHT FRONT TONE WHEEL/BEARING DAMAGE
IMPROPER RIGHT FRONT TIRE PRESSURE/MISMATCHED TIRES
DIRTY TONE WHEEL/SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: **This DTC must be active for the results of this test to be valid. If DTC C0033-1D is present it must be repaired before continuing.**

1. Turn the ignition on.

2. With the scan tool, read DTCs.
3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
4. With the scan tool, erase DTCs.
5. Cycle the ignition switch off then on.

CAUTION: Ensure brake capability is available before road testing.

6. Test drive the vehicle in a straight line to 25 mph (40 km/h).

NOTE: Vehicle must be driven above 25 mph (40 km/h) for set conditions to be meet.

7. With the scan tool, read DTCs.

   Is the DTC active?

   Yes

   - Go To 3

   No

   - Go To 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.
   2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

   NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

   3. Slowly accelerate as straight as possible from a stop to 25 mph (40 km/h).

      Is the Right Front WSS speed showing 0 mph (0 km/h) or not matching other wheels or showing erratic behavior?

      Yes

      - Go To 3

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

3. **CHECK FOR IMPROPER RIGHT FRONT TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Right Front Tire pressure.

3. Check and adjust all other tire pressures.
4. Inspect for mismatched tires on vehicle.

   Is the Right Front Tire improperly inflated or mismatched tires on vehicle?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4

4. **CHECK THE RIGHT FRONT TONE WHEEL/BEARING FOR DAMAGE**

NOTE: **Check the tone wheel teeth for missing teeth, cracks, or looseness. Teeth should be perfectly square, not bent, or nicked.**

1. Check the Right Front Tone Wheel for damage.
2. Inspect the Right Front Tone Wheel for debris.

   Was there debris on the tone wheel?

   Yes

   - Clean tone wheel and sensor. Clear codes and retest.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Right Front Tone Wheel/Bearing in accordance with the Service Information.
   - Perform ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0034-1D-RIGHT FRONT WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

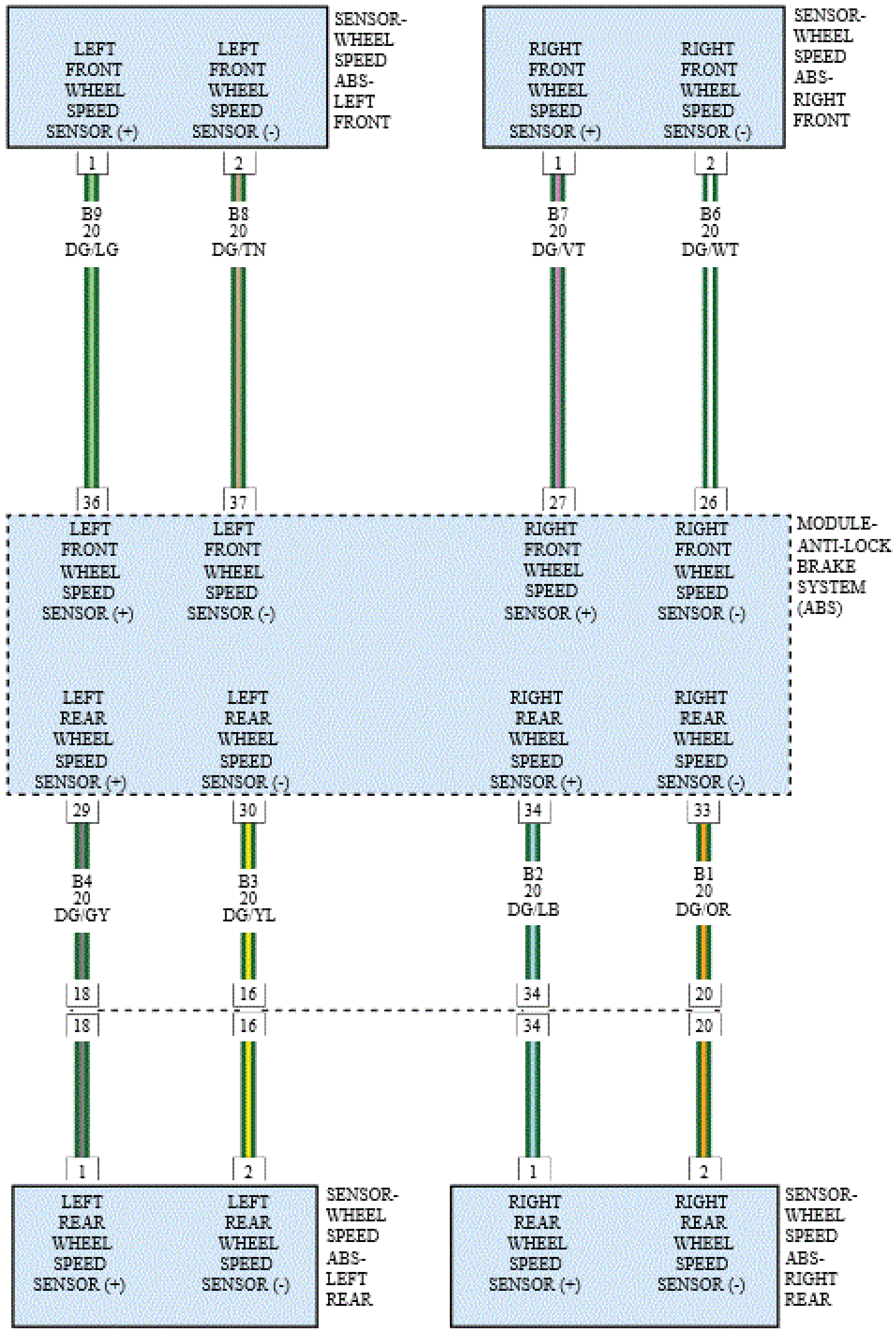


Fig. 8: Wheel Speed Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects Right Front Wheel Speed Sensor (WSS) circuit failure.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
CONNECTOR/TERMINAL DAMAGE
(B6) RIGHT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
(B7) RIGHT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO VOLTAGE
(B6) RIGHT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
(B7) RIGHT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO GROUND
(B6) RIGHT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT OPEN
(B7) RIGHT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT OPEN
(B7) RIGHT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO THE (B6) RIGHT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT
RIGHT FRONT WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. Cycle the ignition switch from off to on.
    4. With the scan tool, read DTCs.

    Is the DTC active at this time?

    Yes

    - Go To 2

    No

    - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
    - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **CHECK CONNECTOR/TERMINAL FOR DAMAGE**

NOTE: **Check all terminals for broken, bent, pushed out, or corroded terminals.**

1. Turn the ignition off.
2. Inspect the Wheel Speed Sensor harness and connector.
3. Inspect the Wheel Speed Sensor for excessive debris on the sensor.

Were any problems found?

Yes

- Repair as necessary in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK (B7) RIGHT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT VOLTAGE**
    1. Disconnect the Right Front Wheel Speed Sensor harness connector.
    2. Turn the ignition on.
    3. Measure the voltage between the (B7) Right Front Wheel Speed Sensor Supply circuit and ground.

    Is the voltage above 10 volts?

    Yes

    - Go To 6

    No

    - Go To 4

4. **(B7) RIGHT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the ABS Module harness connector.
    3. Measure the resistance between the (B7) Right Front Wheel Speed Sensor Supply circuit and ground.

    Is the resistance below 5.0 Ohms?

    Yes

    - Repair the (B7) Right Front Wheel Speed Sensor Supply circuit for a short to ground.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5

5. **(B7) RIGHT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT OPEN**
    1. Measure the resistance of the (B7) Right Front Wheel Speed Sensor Supply circuit between the Right Front Wheel Speed Sensor harness connector and the ABS Module harness connector.

Is the resistance below 5 Ohms?

Yes

- Go To 6

No

- Repair the open (B7) Right Front Wheel Speed Sensor Supply circuit.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **(B6) RIGHT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE**
   1. Turn the ignition on.
   2. Measure the voltage of the (B6) Right Front Wheel Speed Sensor Signal circuit at the Right Front Wheel Speed Sensor harness connector.

   Is there any voltage present?

   Yes

   - Repair the (B6) Right Front Wheel Speed Sensor Signal circuit for a short to voltage.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 7

7. **(B6) RIGHT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO GROUND**
   1. Turn the ignition off.
   2. Measure the resistance between the (B6) Right Front Wheel Speed Sensor Signal circuit and ground.

   Is the resistance below 5.0 Ohms?

   Yes

   - Repair the (B6) Right Front Wheel Speed Sensor Signal circuit for a short to ground.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 8

8. **(B6) RIGHT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT OPEN**
   1. Measure the resistance of the (B6) Right Front Wheel Speed Sensor Signal circuit between the Right Front Wheel Speed Sensor harness connector and the ABS Module harness connector.

   Is the resistance below 5 Ohms?

   Yes

- Go To 9

No

- Repair the open (B6) Right Front Wheel Speed Sensor Signal circuit.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

9. **(B7) RIGHT FRONT WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO THE (B6) RIGHT FRONT WHEEL SPEED SENSOR SIGNAL CIRCUIT**
    1. Turn the ignition off.
    2. Measure the resistance between the (B7) Right Front Wheel Speed Sensor Supply circuit and the (B6) Right Front Wheel Speed Sensor Signal circuit at the ABS Module harness connector.

       Is the resistance below 5.0 Ohms?

       Yes

       - Repair (B7) Right Front Wheel Speed Sensor Supply circuit for a short to the (B6) Right Front Wheel Speed Sensor Signal circuit.
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 10

10. **RIGHT FRONT WHEEL SPEED SENSOR**
    1. Replace the Right Front Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       CAUTION: Make sure braking capability is available before road testing.

    3. Road test the vehicle over 40 km/h (25 mph).

       NOTE: Vehicle must be driven for several minutes above 40 km/h (25 mph) for set conditions to be meet.

    4. With the scan tool, read ABS DTCs.

       Does the DTC remain active?

       Yes

       - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Test complete.

C0034-2F-RIGHT FRONT WHEEL SPEED SENSOR - SIGNAL ERRATIC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

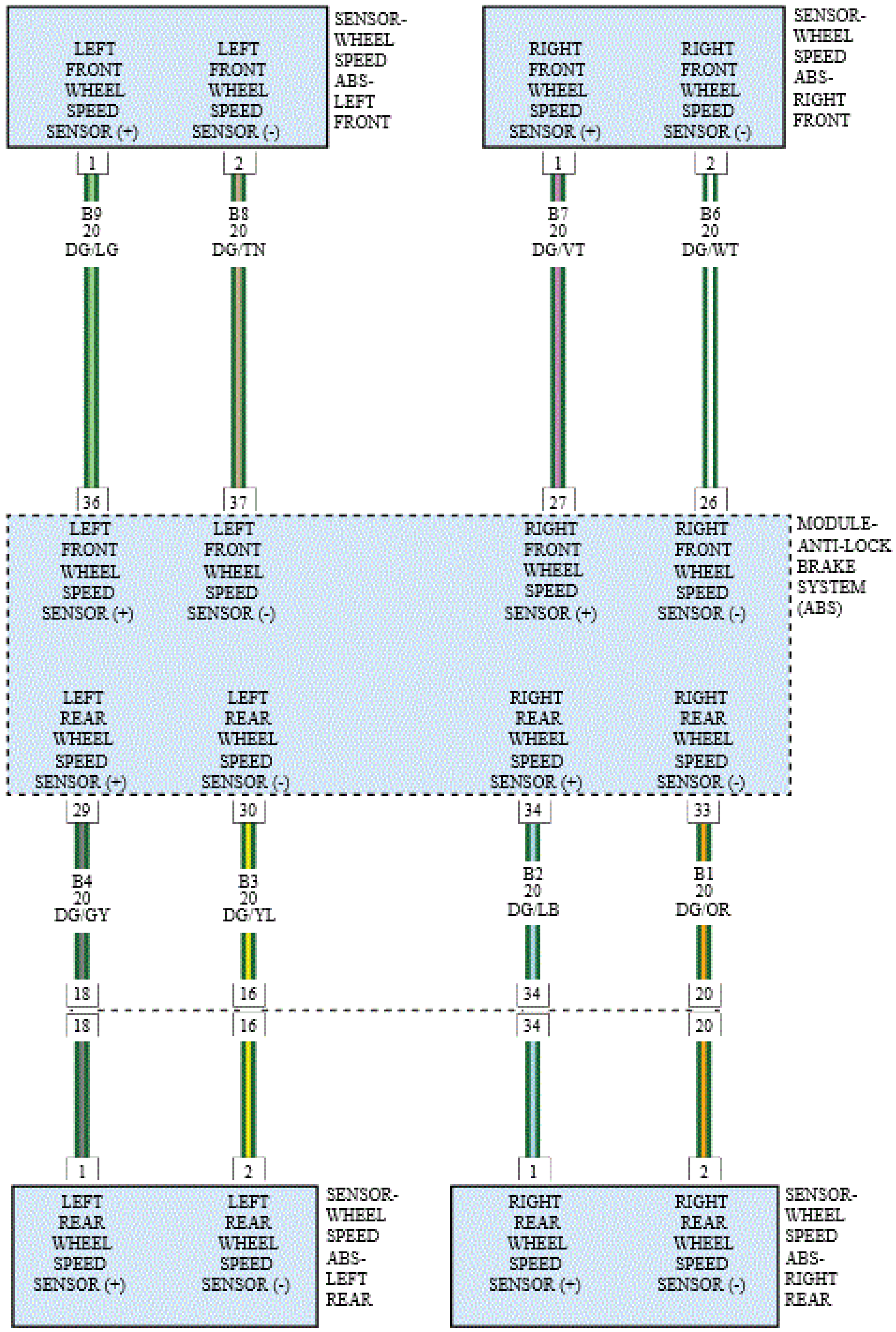


Fig. 9: Wheel Speed Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects multiple drastic changes in Right Front Wheel Speed Sensor (WSS) signals.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
CHECK RIGHT FRONT WHEEL SPEED SENSOR FOR LOOSENESS
INSPECT CIRCUITS/CONNECTOR/TERMINALS FOR DAMAGE
RIGHT FRONT WHEEL BEARING AND HUB OR ENCODER FOR DAMAGE
RIGHT FRONT WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **If DTC C0035-01 is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: **Make sure braking capability is available before road testing.**

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

   4. With the scan tool, read DTCs.

      Is the DTC active?

      Yes

      - Go To 3

      No

      - Go To 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**

1. Turn the ignition on.
2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

NOTE: **If graph shows periodic dropouts pay close attention to the tone wheel.**

3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

   Is the Right Front WSS speed showing 0 km/h (0 mph), not matching other wheels, or showing erratic behavior?

   Yes

   - Go To 3

   No

   - Perform ABS INTERMITTENT CONDITION diagnostic procedure. Refer to **STANDARD PROCEDURE**.

3. **CHECK RIGHT FRONT WSS FOR LOOSENESS, INSPECT CIRCUITS/CONNECTORS /TERMINALS FOR DAMAGE**

   NOTE: **Check all terminals for broken, bent, pushed out, or corroded terminals.**

   1. Turn the ignition off.
   2. Inspect the ABS Module harness connector and the Right Front WSS harness connector.
   3. Check the Right Front WSS for looseness, excessive corrosion and not properly fastened.
   4. Inspect the (B6) Right Front WSS Signal and (B7) Right Front WSS Supply circuits between the Right Front WSS and Anti-Lock Brake Module for damage.

   Is the Right Front WSS loose or any of the wiring/connectors/terminals damaged?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4

4. **CHECK RIGHT FRONT WHEEL SPEED SENSOR FOR DAMAGE**
   1. Remove the Right Front Wheel Speed Sensor.
   2. Inspect the Wheel Speed Sensor for proper mounting.
   3. Inspect the Wheel Speed Sensor harness and connector.
   4. Inspect the Wheel Speed Sensor for excessive debris on the sensor.

Is the Right Front Wheel Speed Sensor damaged?

Yes

- Replace the Right Front Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **CHECK RIGHT FRONT WHEEL BEARING AND HUB OR ENCODER FOR DAMAGE**
   1. Inspect the Right Front wheel bearing, hub and Encoder for excessive runout, clearance or damage.

   NOTE: **Refer to the appropriate service information, if necessary, for procedures or specifications.**

   Is the Right Front Wheel Bearing, Hub or Encoder Damaged?

   Yes

   - Replace the Hub and Wheel Bearing in accordance with the Service Information. Refer to **HUB AND BEARING, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 6

6. **RIGHT FRONT WHEEL SPEED SENSOR**
   1. Replace the Right Front Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
   2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Road test the vehicle over 40 km/h (25 mph).

   NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

   4. With the scan tool, read ABS DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Anti-Lock Brakes Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

- Test Complete.

C0034-4A-RIGHT FRONT WHEEL SPEED SENSOR - INCORRECT COMPONENT INSTALLED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects that the wrong component is installed.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
RIGHT FRONT WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **If DTC C0034-1D is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

   NOTE: **This vehicle uses directional front wheel speed sensors and non-directional rear wheel speed sensors.**

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. With the scan tool, read DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Test Complete.
2. **RIGHT FRONT WHEEL SPEED SENSOR**

NOTE: This vehicle uses a directional front wheel speed sensor, make sure the correct wheel speed sensor is installed on the vehicle.

1. Replace the Right Front Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** . Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

CAUTION: Make sure braking capability is available before road testing.

2. Road test the vehicle over 40 km/h (25 mph).
3. With the scan tool, read DTCs.

Does the DTC remain active?

Yes

- Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

C0034-62-RIGHT FRONT WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

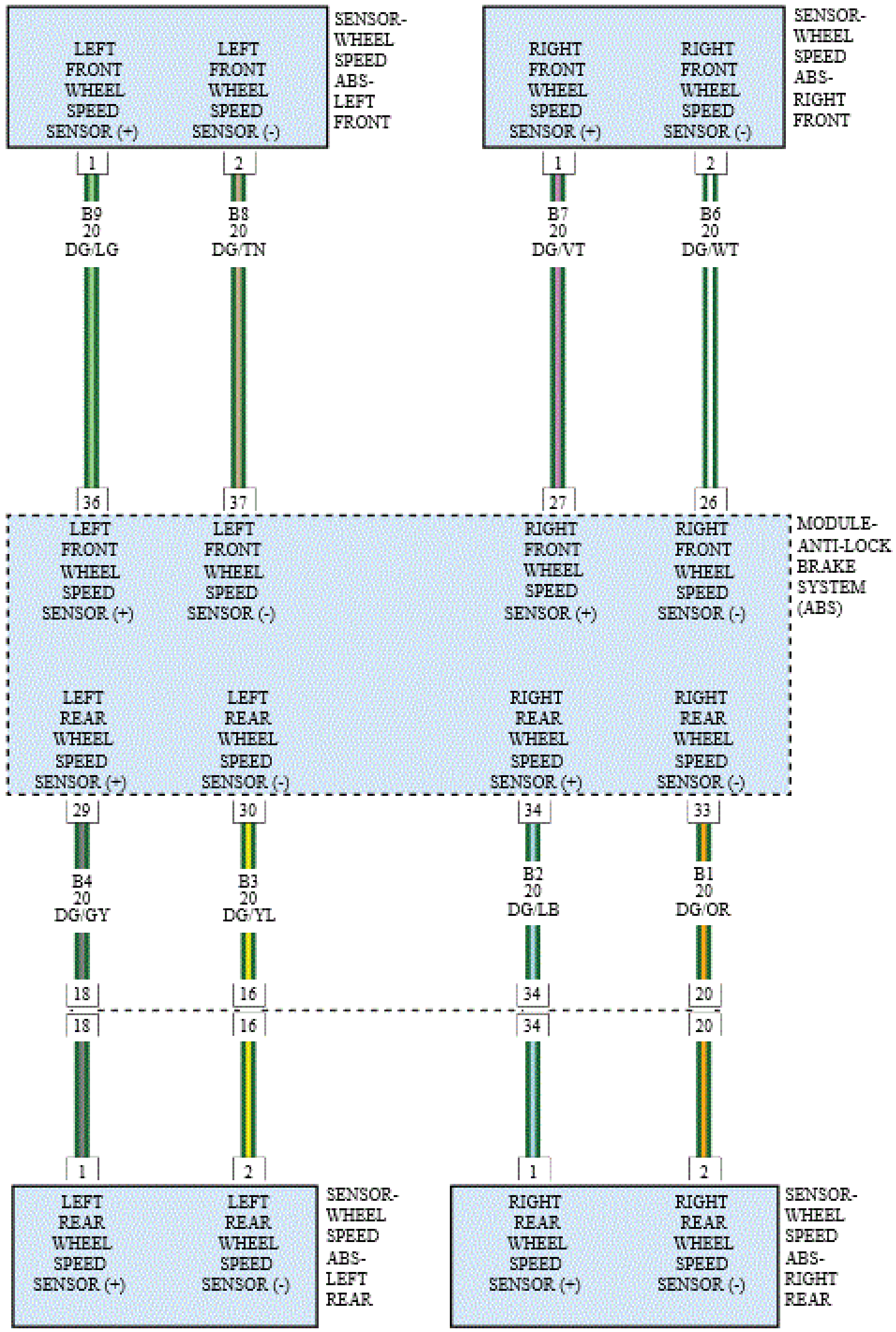


Fig. 10: Wheel Speed Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects if the wheel speed signal is 0 km/h (0 mph) or very low when compared to the other wheel speed signals.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
IMPROPER RIGHT FRONT TIRE PRESSURE/MISMATCHED TIRES
CHECK RIGHT FRONT WHEEL SPEED SENSOR FOR LOOSENESS
INSPECT CIRCUITS/CONNECTOR/TERMINALS FOR DAMAGE
RIGHT FRONT WHEEL BEARING AND HUB OR ENCODER FOR DAMAGE
RIGHT FRONT WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **If DTC C0034-1D is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: **Make sure braking capability is available before road testing.**

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

   4. With the scan tool, read DTCs.

      Is the DTC active?

      Yes

      - Go To 3

      No

      - Go To 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.

2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

NOTE: **If graph shows periodic dropouts pay close attention to the tone wheel.**

3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

Is the Right Front WSS speed showing 0 km/h (0 mph), not matching other wheels, or showing erratic behavior?

Yes

- Go To 3

No

- Perform ABS INTERMITTENT CONDITION diagnostic procedure. Refer to **STANDARD PROCEDURE**.

3. **CHECK FOR IMPROPER RIGHT FRONT TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Right Front Tire pressure.
   3. Check and adjust all other tire pressures.
   4. Inspect for mismatched tires on vehicle.

Is the Right Front Tire improperly inflated or mismatched tires on vehicle?

Yes

- Repair as necessary
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **CHECK RIGHT FRONT WSS FOR LOOSENESS, INSPECT CIRCUITS/CONNECTORS /TERMINALS FOR DAMAGE**

NOTE: **Check all terminals for broken, bent, pushed out, or corroded terminals.**

1. Turn the ignition off.
2. Inspect the ABS Module harness connector and the Right Front WSS harness connector.
3. Check the Right Front WSS for looseness, excessive corrosion and not properly fastened.
4. Inspect the (B6) Right Front WSS Signal and (B7) Right Front WSS Supply circuits between the Right Front WSS and Anti-Lock Brake Module for damage.

Is the Right Front WSS loose or any of the wiring/connectors/terminals damaged?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **CHECK RIGHT FRONT WHEEL SPEED SENSOR FOR DAMAGE**
    1. Remove the Right Front Wheel Speed Sensor.
    2. Inspect the Wheel Speed Sensor for proper mounting.
    3. Inspect the Wheel Speed Sensor harness and connector.
    4. Inspect the Wheel Speed Sensor for excessive debris on the sensor.

    Is the Right Front Wheel Speed Sensor damaged?

    Yes

    - Replace the Right Front Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 6

6. **CHECK RIGHT FRONT WHEEL BEARING AND HUB OR ENCODER FOR DAMAGE**
    1. Inspect the Right Front wheel bearing, hub and Encoder for excessive runout, clearance or damage.

    NOTE: **Refer to the appropriate service information, if necessary, for procedures or specifications.**

    Is the Right Front Wheel Bearing, Hub or Encoder Damaged?

    Yes

    - Replace the Hub and Wheel Bearing in accordance with the Service Information. Refer to **HUB AND BEARING, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 7

7. **RIGHT FRONT WHEEL SPEED SENSOR**
    1. Replace the Right Front Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Road test the vehicle over 40 km/h (25 mph).

NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

4. With the scan tool, read ABS DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test Complete.

C0036-02-LEFT REAR TONE WHEEL - GENERAL SIGNAL FAILURE

For a complete wiring diagram **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- Vehicle speed.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects periodic drops of a Wheel Speed Sensor (WSS) signal.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
LEFT REAR TONE WHEEL/BEARING DAMAGE
IMPROPER LEFT REAR TIRE PRESSURE/MISMATCHED TIRES
AXLE SHAFT FASTENER HARDWARE
DIRTY TONE WHEEL/SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: **This DTC must be active for the results of this test to be valid. If DTC C0036 -1D is present it must be repaired before continuing.**

1. Turn the ignition on.
2. With the scan tool, read DTCs.
3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
4. With the scan tool, erase DTCs.
5. Cycle the ignition switch off then on.

CAUTION: Ensure brake capability is available before road testing.

6. Test drive the vehicle in a straight line to 40 km/h (25 mph).

NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

7. With the scan tool, read DTCs.

Is the DTC active?

Yes

- Go To 3

No

- Go To 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
    1. Turn the ignition on.
    2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

    NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

    3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

    Is the Left Rear WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

    Yes

    - Go To 3

    No

    - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

3. **CHECK FOR IMPROPER LEFT REAR TIRE PRESSURE/MISMATCHED TIRES**
    1. Turn the ignition off.

2. Check and adjust the Left Rear Tire pressure.
3. Check and adjust all other tire pressures.
4. Inspect for mismatched tires on vehicle.

   Is the Left Rear Tire improperly inflated or mismatched tires on vehicle?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4

4. **CHECK AXLE SHAFT FASTENER HARDWARE FOR LOOSENESS**
   1. Inspect the axle shaft fastener for looseness, and not properly fastened. Tighten fastener to proper specification as required.

      Was the Axle Shaft fastener loose?

      Yes

      - Repair as necessary.

      No

      - Go To 5

5. **CHECK THE LEFT REAR TONE WHEEL FOR DAMAGE**

   NOTE: **Check the tone wheel teeth for missing teeth, cracks, or looseness. Teeth should be perfectly square, not bent, or nicked.**

   1. Check the Left Rear Tone Wheel for damage.
   2. Inspect the Left Rear Tone Wheel for debris.

      Was there debris on the tone wheel?

      Yes

      - Clean tone wheel and sensor. Clear codes and retest.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Replace the Left Rear Tone Wheel in accordance with the Service Information.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0037-1D-LEFT REAR WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

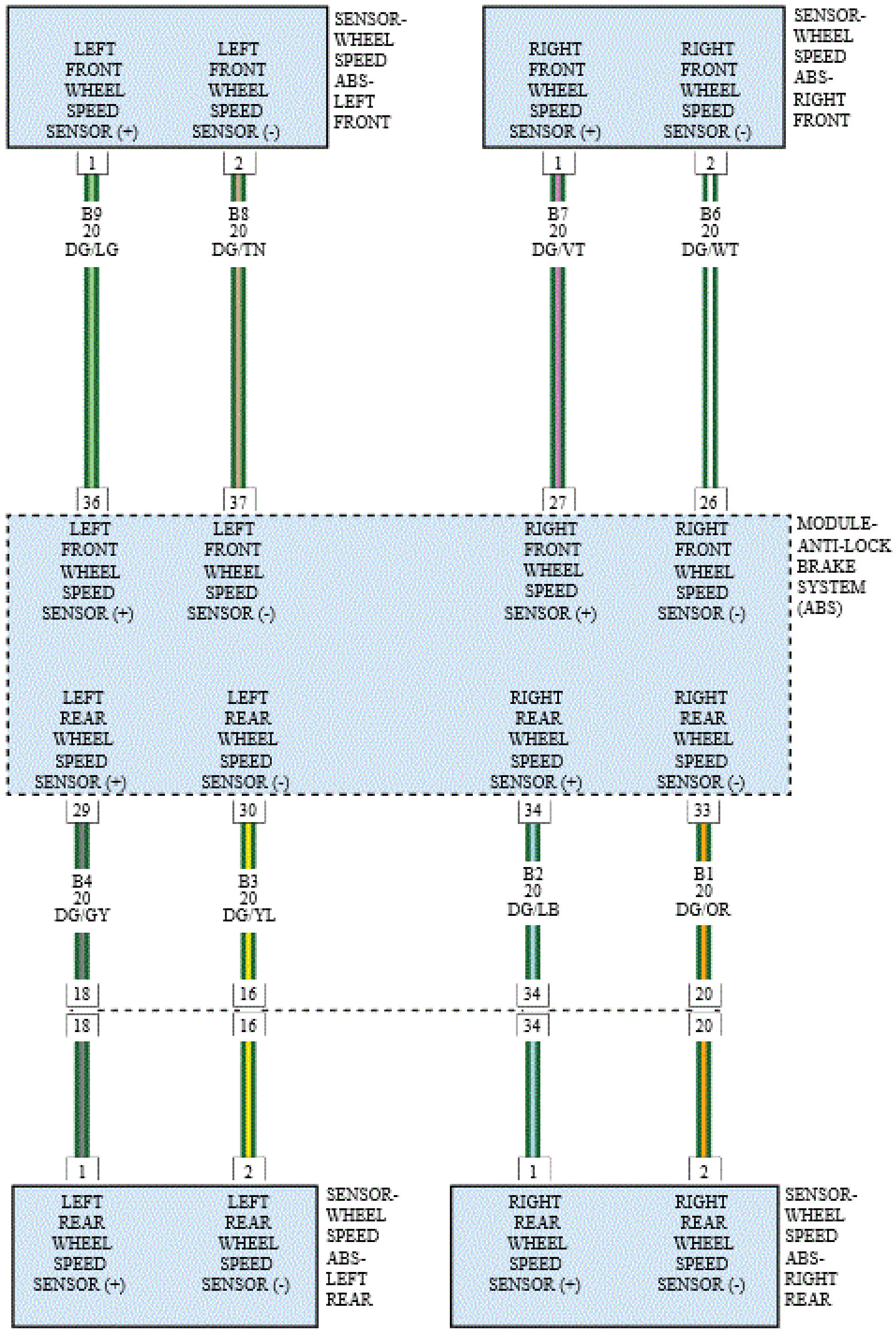


Fig. 11: Wheel Speed Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.

- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects Left Rear Wheel Speed Sensor (WSS) circuit failure.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
CONNECTOR/TERMINAL DAMAGE
(B3) LEFT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
(B4) LEFT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO VOLTAGE
(B3) LEFT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
(B4) LEFT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO GROUND
(B3) LEFT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT OPEN
(B4) LEFT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT OPEN
(B4) LEFT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO THE (B3) LEFT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT
LEFT REAR WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, record and erase DTCs.
    3. Cycle the ignition switch from off to on.
    4. With the scan tool, read DTCs.

    Is the DTC active at this time?

    Yes

    - Go To 2

    No

    - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
    - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **CHECK CONNECTOR/TERMINAL FOR DAMAGE**

NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals.

1. Turn the ignition off.
2. Inspect the Wheel Speed Sensor harness and connector.
3. Inspect the Wheel Speed Sensor for excessive debris on the sensor.

   Were any problems found?

   Yes

   - Repair as necessary in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK (B4) LEFT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT VOLTAGE**
   1. Disconnect the Left Rear Wheel Speed Sensor harness connector.
   2. Turn the ignition on.
   3. Measure the voltage between the (B4) Left Rear Wheel Speed Sensor Supply circuit and ground.

      Is the voltage above 10 volts?

      Yes

      - Go To 6

      No

      - Go To 4

4. **(B4) LEFT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO GROUND**
   1. Turn the ignition off.
   2. Disconnect the ABS Module harness connector.
   3. Measure the resistance between the (B4) Left Rear Wheel Speed Sensor Supply circuit and ground.

      Is the resistance below 5.0 Ohms?

      Yes

      - Repair the (B4) Left Rear Wheel Speed Sensor Supply circuit for a short to ground.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 5

5. **(B4) LEFT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT OPEN**
   1. Measure the resistance of the (B4) Left Rear Wheel Speed Sensor Supply circuit between the Left

Rear Wheel Speed Sensor harness connector and the ABS Module harness connector.

Is the resistance below 5 Ohms?

Yes

- Go To 6

No

- Repair the open (B4) Left Rear Wheel Speed Sensor Supply circuit.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **(B3) LEFT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE**
    1. Turn the ignition on.
    2. Measure the voltage of the (B3) Left Rear Wheel Speed Sensor Signal circuit at the Left Rear Wheel Speed Sensor harness connector.

    Is there any voltage present?

    Yes

    - Repair the (B3) Left Rear Wheel Speed Sensor Signal circuit for a short to voltage.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 7

7. **(B3) LEFT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO GROUND**
    1. Turn the ignition off.
    2. Measure the resistance between the (B3) Left Rear Wheel Speed Sensor Signal circuit and ground.

    Is the resistance below 5.0 Ohms?

    Yes

    - Repair the (B3) Left Rear Wheel Speed Sensor Signal circuit for a short to ground.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 8

8. **(B3) LEFT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT OPEN**
    1. Measure the resistance of the (B3) Left Rear Wheel Speed Sensor Signal circuit between the Left Rear Wheel Speed Sensor harness connector and the ABS Module harness connector.

    Is the resistance below 5 Ohms?

    Yes

- Go To 9

No

- Repair the open (B3) Left Rear Wheel Speed Sensor Signal circuit.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

9. **(B4) LEFT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO THE (B3) LEFT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT**
   1. Turn the ignition off to the lock position.
   2. Measure the resistance between the (B4) Left Rear Wheel Speed Sensor Supply circuit and the (B3) Left Rear Wheel Speed Sensor Signal circuit at the ABS Module harness connector.

      Is the resistance below 5.0 Ohms?

      Yes

      - Repair (B4) Left Rear Wheel Speed Sensor Supply circuit for a short to the (B3) Left Rear Wheel Speed Sensor Signal circuit.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 10
10. **LEFT REAR WHEEL SPEED SENSOR**
    1. Replace the Left Rear Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       CAUTION: Make sure braking capability is available before road testing.

    3. Road test the vehicle over 40 km/h (25 mph).

       NOTE: Vehicle must be driven for several minutes above 40 km/h (25 mph) for set conditions to be meet.

    4. With the scan tool, read ABS DTCs.

       Does the DTC remain active?

       Yes

       - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Test complete.

C0037-2F-LEFT REAR WHEEL SPEED SENSOR - SIGNAL ERRATIC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

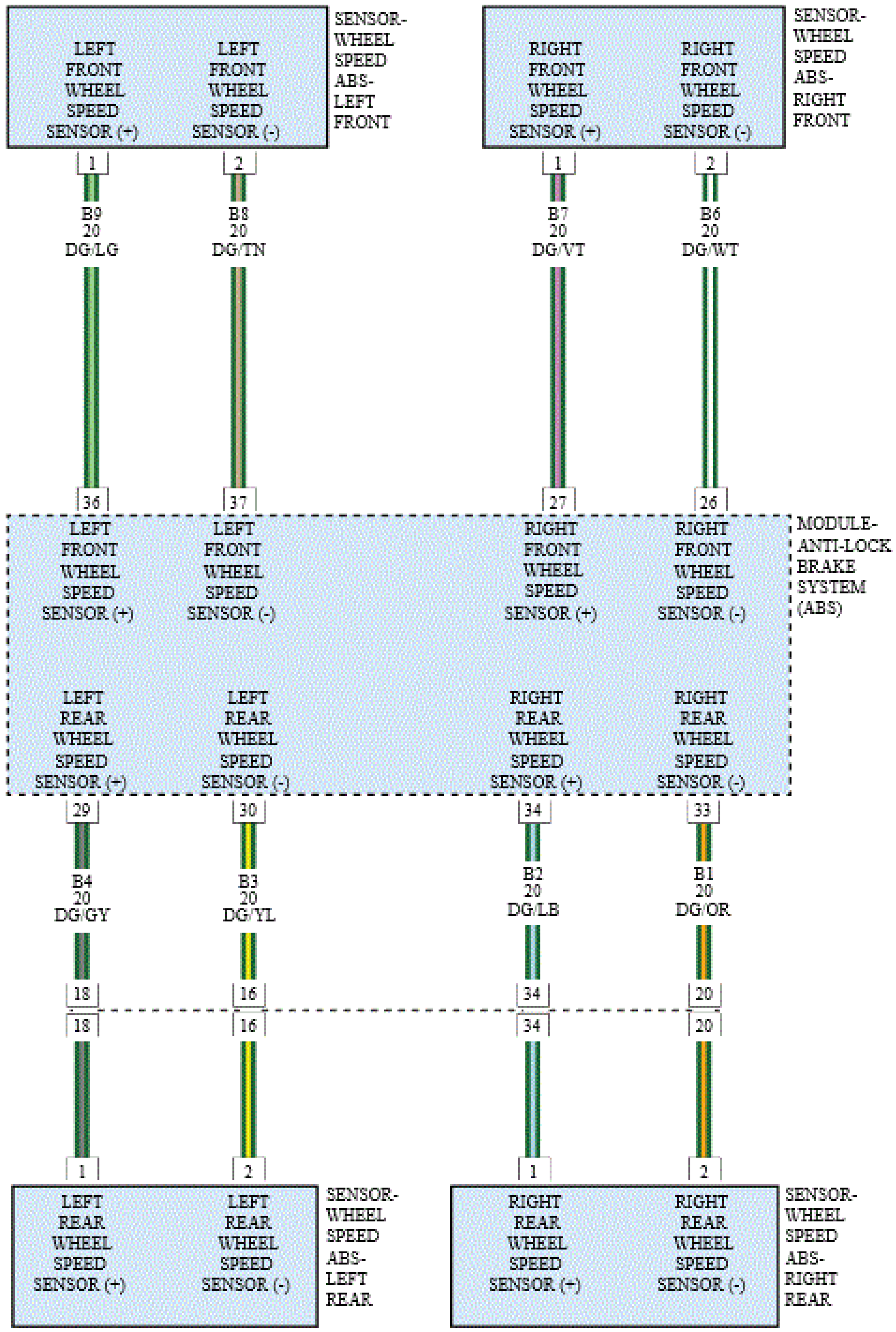


Fig. 12: Wheel Speed Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects multiple drastic changes in Left Rear Wheel Speed Sensor (WSS) signals.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
CHECK LEFT REAR WHEEL SPEED SENSOR FOR LOOSENESS
INSPECT CIRCUITS/CONNECTOR/TERMINALS FOR DAMAGE
LEFT REAR TONE WHEEL DAMAGED/MISSING
LEFT REAR WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **If DTC C0038-01 is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: **Make sure braking capability is available before road testing.**

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

   4. With the scan tool, read DTCs.

      Is the DTC active?

      Yes

      - Go To 3

      No

      - Go To 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**

1. Turn the ignition on.
2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

NOTE: **If graph shows periodic dropouts pay close attention to the tone wheel.**

3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

   Is the Left Rear WSS speed showing 0 km/h (0 mph), not matching other wheels, or showing erratic behavior?

   Yes

   - Go To 3

   No

   - Perform ABS INTERMITTENT CONDITION diagnostic procedure. Refer to **STANDARD PROCEDURE**.

3. **CHECK LEFT REAR WSS FOR LOOSENESS, INSPECT CIRCUITS/CONNECTORS /TERMINALS FOR DAMAGE**

   NOTE: **Check all terminals for broken, bent, pushed out, or corroded terminals.**

   1. Turn the ignition off.
   2. Inspect the ABS Module harness connector and the Left Rear WSS harness connector.
   3. Check the Left Rear WSS for looseness, excessive corrosion and not properly fastened.
   4. Inspect the (B3) Left Rear WSS Signal and (B4) Left Rear WSS Supply circuits between the Left Rear WSS and Anti-Lock Brake Module for damage.

   Is the Left Rear WSS loose or any of the wiring/connectors/terminals damaged?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4

4. **CHECK LEFT REAR WHEEL SPEED SENSOR FOR DAMAGE**
   1. Remove the Left Rear Wheel Speed Sensor.
   2. Inspect the Wheel Speed Sensor for proper mounting.
   3. Inspect the Wheel Speed Sensor harness and connector.
   4. Inspect the Wheel Speed Sensor for excessive debris on the sensor.

Is the Left Rear Wheel Speed Sensor damaged?

Yes

- Replace the Left Rear Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **CHECK THE LEFT REAR TONE WHEEL DAMAGED/MISSING**
    1. Inspect the Left Rear Tone Wheel for excessive runout, clearance or damage.

NOTE: **Refer to the appropriate service information, if necessary, for procedures or specifications.**

Is the Left Rear Tone Wheel Damaged?

Yes

- Replace the Tone Wheel in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 6

6. **LEFT REAR WHEEL SPEED SENSOR**
    1. Replace the Left Rear Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Road test the vehicle over 40 km/h (25 mph).

NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

4. With the scan tool, read ABS DTCs.

Does the DTC remain active?

Yes

- Replace the Anti-Lock Brakes Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test Complete.

C0037-4A-LEFT REAR WHEEL SPEED SENSOR - INCORRECT COMPONENT INSTALLED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects that the wrong component is installed.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
LEFT REAR WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **If DTC C0037-1D is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

   NOTE: **This vehicle uses directional front wheel speed sensors and non-directional rear wheel speed sensors.**

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. With the scan tool, read DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Test Complete.
2. **LEFT REAR WHEEL SPEED SENSOR**

NOTE: This vehicle uses a non-directional rear wheel speed sensor, make sure the correct wheel speed sensor is installed on the vehicle.

1. Replace the Left Rear Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** . Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   CAUTION: Make sure braking capability is available before road testing.

2. Road test the vehicle over 40 km/h (25 mph).
3. With the scan tool, read DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

C0037-62-LEFT REAR WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

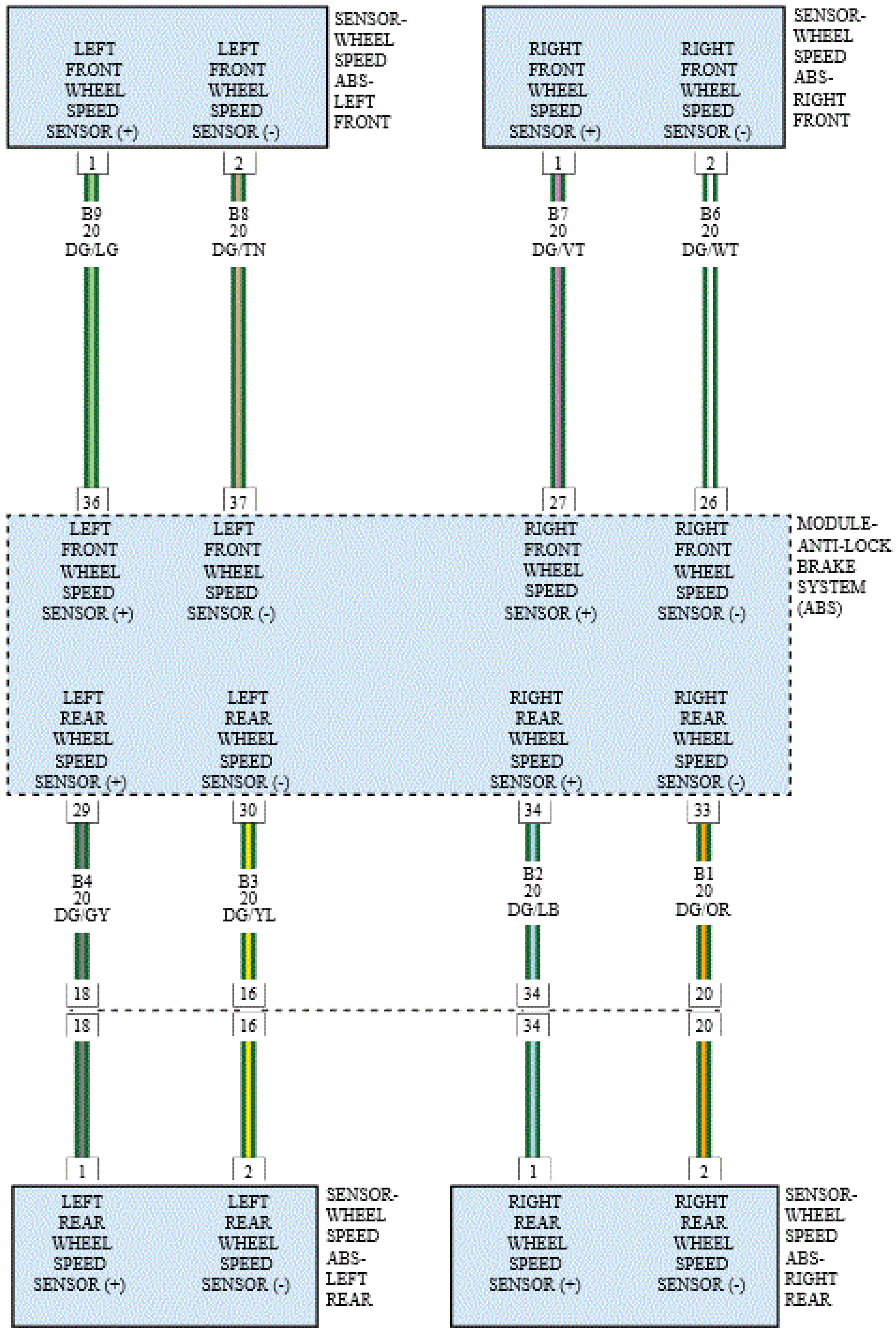


Fig. 13: Wheel Speed Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects if the wheel speed signal is 0 km/h (0 mph) or very low when compared to the other wheel speed signals.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
IMPROPER LEFT REAR TIRE PRESSURE/MISMATCHED TIRES
CHECK LEFT REAR WHEEL SPEED SENSOR FOR LOOSENESS
INSPECT CIRCUITS/CONNECTOR/TERMINALS FOR DAMAGE
LEFT REAR TONE WHEEL DAMAGED/MISSING
LEFT REAR WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **If DTC C0037-1D is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: **Make sure braking capability is available before road testing.**

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

   4. With the scan tool, read DTCs.

      Is the DTC active?

      Yes

      - Go To 3

      No

      - Go To 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.

2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

NOTE: **If graph shows periodic dropouts pay close attention to the tone wheel.**

3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

Is the Left Rear WSS speed showing 0 km/h (0 mph), not matching other wheels, or showing erratic behavior?

Yes

- Go To 3

No

- Perform ABS INTERMITTENT CONDITION diagnostic procedure. Refer to **STANDARD PROCEDURE**.

3. **CHECK FOR IMPROPER LEFT REAR TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Left Rear Tire pressure.
   3. Check and adjust all other tire pressures.
   4. Inspect for mismatched tires on vehicle.

Is the Left Rear Tire improperly inflated or mismatched tires on vehicle?

Yes

- Repair as necessary
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **CHECK LEFT REAR WSS FOR LOOSENESS, INSPECT CIRCUITS/CONNECTORS /TERMINALS FOR DAMAGE**

NOTE: **Check all terminals for broken, bent, pushed out, or corroded terminals.**

1. Turn the ignition off.
2. Inspect the ABS Module harness connector and the Left Rear WSS harness connector.
3. Check the Left Rear WSS for looseness, excessive corrosion and not properly fastened.
4. Inspect the (B3) Left Rear WSS Signal and (B4) Left Rear WSS Supply circuits between the Left Rear WSS and Anti-Lock Brake Module for damage.

Is the Left Rear WSS loose or any of the wiring/connectors/terminals damaged?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **CHECK LEFT REAR WHEEL SPEED SENSOR FOR DAMAGE**
    1. Remove the Left Rear Wheel Speed Sensor.
    2. Inspect the Wheel Speed Sensor for proper mounting.
    3. Inspect the Wheel Speed Sensor harness and connector.
    4. Inspect the Wheel Speed Sensor for excessive debris on the sensor.

    Is the Left Rear Wheel Speed Sensor damaged?

    Yes

    - Replace the Left Rear Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 6

6. **CHECK THE LEFT REAR TONE WHEEL DAMAGED/MISSING**
    1. Inspect the Left Rear Tone Wheel for excessive runout, clearance or damage.

    NOTE: **Refer to the appropriate service information, if necessary, for procedures or specifications.**

    Is the Left Rear Tone Wheel Damaged?

    Yes

    - Replace the Tone Wheel in accordance with the Service Information.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 7

7. **LEFT REAR WHEEL SPEED SENSOR**
    1. Replace the Left Rear Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Road test the vehicle over 40 km/h (25 mph).

NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

4. With the scan tool, read ABS DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test Complete.

C0039-02-RIGHT REAR TONE WHEEL - GENERAL SIGNAL FAILURE

For a complete wiring diagram **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- Vehicle speed.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects periodic drops of a Wheel Speed Sensor (WSS) signal.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
RIGHT REAR TONE WHEEL/BEARING DAMAGE
IMPROPER RIGHT REAR TIRE PRESSURE/MISMATCHED TIRES
AXLE SHAFT FASTENER HARDWARE
DIRTY TONE WHEEL/SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: **This DTC must be active for the results of this test to be valid. If DTC C0039-1D is present it must be repaired before continuing.**

1. Turn the ignition on.
2. With the scan tool, read DTCs.
3. Record DTC and Freeze Frame information.
4. With the scan tool, erase DTCs.
5. Cycle the ignition switch off then on.

CAUTION: Ensure brake capability is available before road testing.

6. Test drive the vehicle in a straight line to 40 km/h (25 mph).

NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

7. With the scan tool, read DTCs.

Is the DTC active?

Yes

- Go To 3

No

- Go To 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.
   2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

   3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

Is the Right Rear WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

Yes

- Go To 3

No

- Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

3. **CHECK FOR IMPROPER RIGHT REAR TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.

2. Check and adjust the Right Rear Tire pressure.
3. Check and adjust all other tire pressures.
4. Inspect for mismatched tires on vehicle.

Is the Right Rear Tire improperly inflated or mismatched tires on vehicle?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **CHECK AXLE SHAFT FASTENER HARDWARE FOR LOOSENESS**
    1. Inspect the axle shaft fastener for looseness, and not properly fastened. Tighten fastener to proper specification as required.

    Was the Axle Shaft fastener loose?

    Yes

    - Repair as necessary.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5

5. **CHECK THE RIGHT REAR TONE WHEEL FOR DAMAGE**

NOTE: Check the tone wheel teeth for missing teeth, cracks, or looseness. Teeth should be perfectly square, not bent, or nicked.

1. Check the Right Rear Tone Wheel for damage.
2. Inspect the Right Rear Tone Wheel for debris.

Was there debris on the tone wheel?

Yes

- Clean tone wheel and sensor. Clear codes and retest.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Replace the Right Rear Tone Wheel in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C003A-1D-RIGHT REAR WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE

For a complete wiring diagram **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

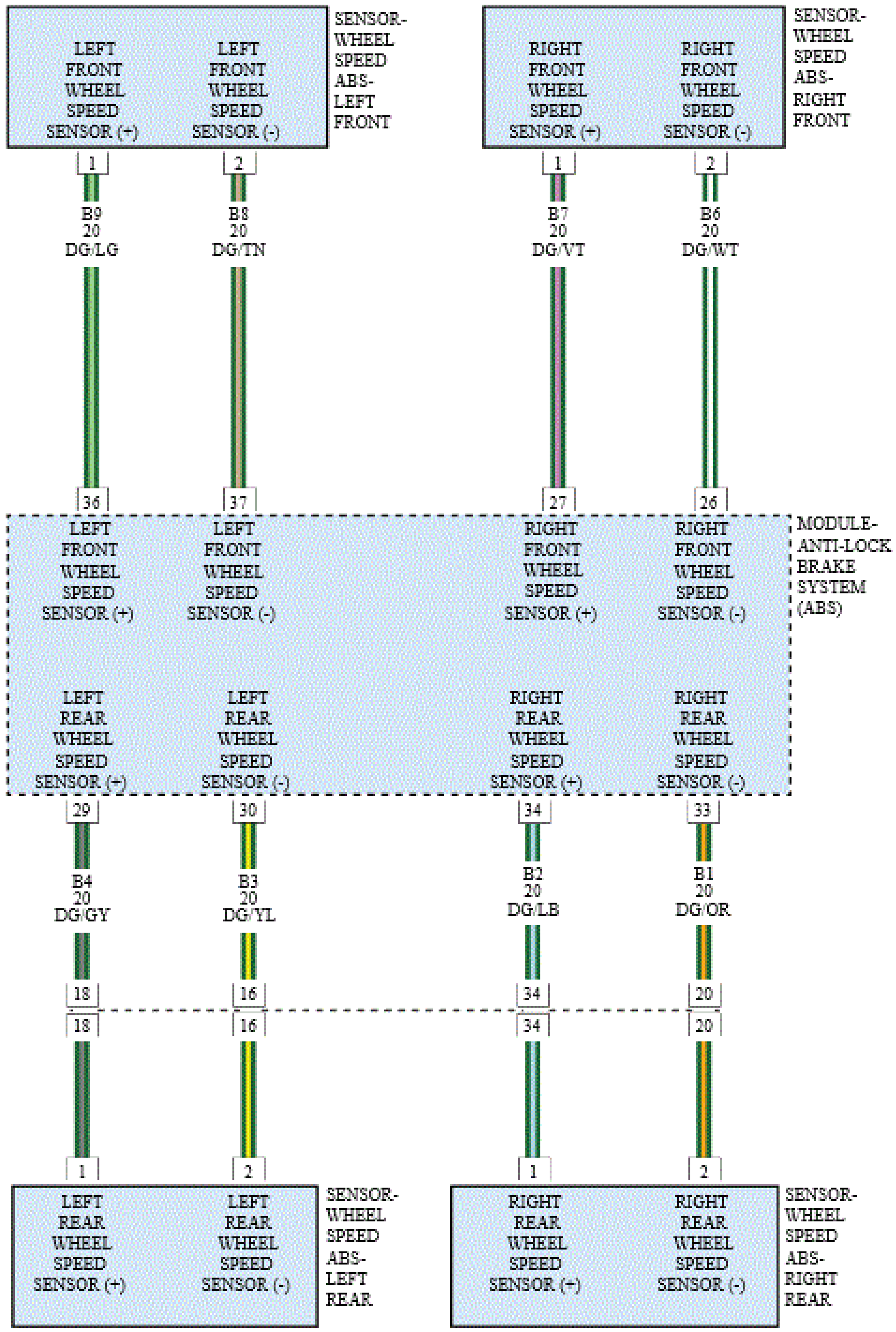


Fig. 14: Wheel Speed Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects Right Rear Wheel Speed Sensor (WSS) circuit failure.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
CONNECTOR/TERMINAL DAMAGE
(B1) RIGHT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
(B2) RIGHT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO VOLTAGE
(B1) RIGHT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
(B2) RIGHT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO GROUND
(B1) RIGHT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT OPEN
(B2) RIGHT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT OPEN
(B2) RIGHT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO THE (B1) RIGHT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT
RIGHT REAR WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**
   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs.

      Is the DTC active at this time?

      Yes

      - Go To 2

      No

      - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **CHECK CONNECTOR/TERMINAL FOR DAMAGE**

NOTE: **Check all terminals for broken, bent, pushed out, or corroded terminals.**

1. Turn the ignition off.
2. Inspect the Wheel Speed Sensor harness and connector.
3. Inspect the Wheel Speed Sensor for excessive debris on the sensor.

Were any problems found?

Yes

- Repair as necessary in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK (B2) RIGHT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT VOLTAGE**
   1. Disconnect the Right Rear Wheel Speed Sensor harness connector.
   2. Turn the ignition on.
   3. Measure the voltage between the (B2) Right Rear Wheel Speed Sensor Supply circuit and ground.

Is the voltage above 10 volts?

Yes

- Go To 6

No

- Go To 4

4. **(B2) RIGHT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO GROUND**
   1. Turn the ignition off.
   2. Disconnect the ABS Module harness connector.
   3. Measure the resistance between the (B2) Right Rear Wheel Speed Sensor Supply circuit and ground.

Is the resistance below 5.0 Ohms?

Yes

- Repair the (B2) Right Rear Wheel Speed Sensor Supply circuit for a short to ground.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **(B2) RIGHT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT OPEN**
    1. Measure the resistance of the (B2) Right Rear Wheel Speed Sensor Supply circuit between the Right Rear Wheel Speed Sensor harness connector and the ABS harness connector.

       Is the resistance below 5 Ohms?

       Yes

       - Go To 6

       No

       - Repair the open (B2) Right Rear Wheel Speed Sensor Supply circuit.
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
6. **(B1) RIGHT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE**
    1. Turn the ignition on.
    2. Measure the voltage of the (B1) Right Rear Wheel Speed Sensor Signal circuit at the Right Rear Wheel Speed Sensor harness connector.

       Is there any voltage present?

       Yes

       - Repair the (B1) Right Rear Wheel Speed Sensor Signal circuit for a short to voltage.
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 7
7. **(B1) RIGHT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORTED TO GROUND**
    1. Turn the ignition off.
    2. Measure the resistance between the (B1) Right Rear Wheel Speed Sensor Signal circuit and ground.

       Is the resistance below 5.0 Ohms?

       Yes

       - Repair the (B1) Right Rear Wheel Speed Sensor Signal circuit for a short to ground.
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 8
8. **(B1) RIGHT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT OPEN**
    1. Measure the resistance of the (B1) Right Rear Wheel Speed Sensor Signal circuit between the Right Rear Wheel Speed Sensor harness connector and the ABS Module harness connector.

Is the resistance below 5 Ohms?

Yes

- Go To 9

No

- Repair the open (B1) Right Rear Wheel Speed Sensor Signal circuit.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

9. **(B2) RIGHT REAR WHEEL SPEED SENSOR SUPPLY CIRCUIT SHORTED TO THE (B1) RIGHT REAR WHEEL SPEED SENSOR SIGNAL CIRCUIT**
    1. Turn the ignition off.
    2. Measure the resistance between the (B2) Right Rear Wheel Speed Sensor Supply circuit and the (B1) Right Rear Wheel Speed Sensor Signal circuit at the ABS Module harness connector.

       Is the resistance below 5.0 Ohms?

       Yes

       - Repair (B2) Right Rear Wheel Speed Sensor Supply circuit for a short to the (B1) Right Rear Wheel Speed Sensor Signal circuit.
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 10

10. **RIGHT REAR WHEEL SPEED SENSOR**
    1. Replace the Right Rear Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       CAUTION: Make sure braking capability is available before road testing.

    3. Road test the vehicle over 40 km/h (25 mph).

       NOTE: Vehicle must be driven for several minutes above 40 km/h (25 mph) for set conditions to be meet.

    4. With the scan tool, read ABS DTCs.

       Does the DTC remain active?

       Yes

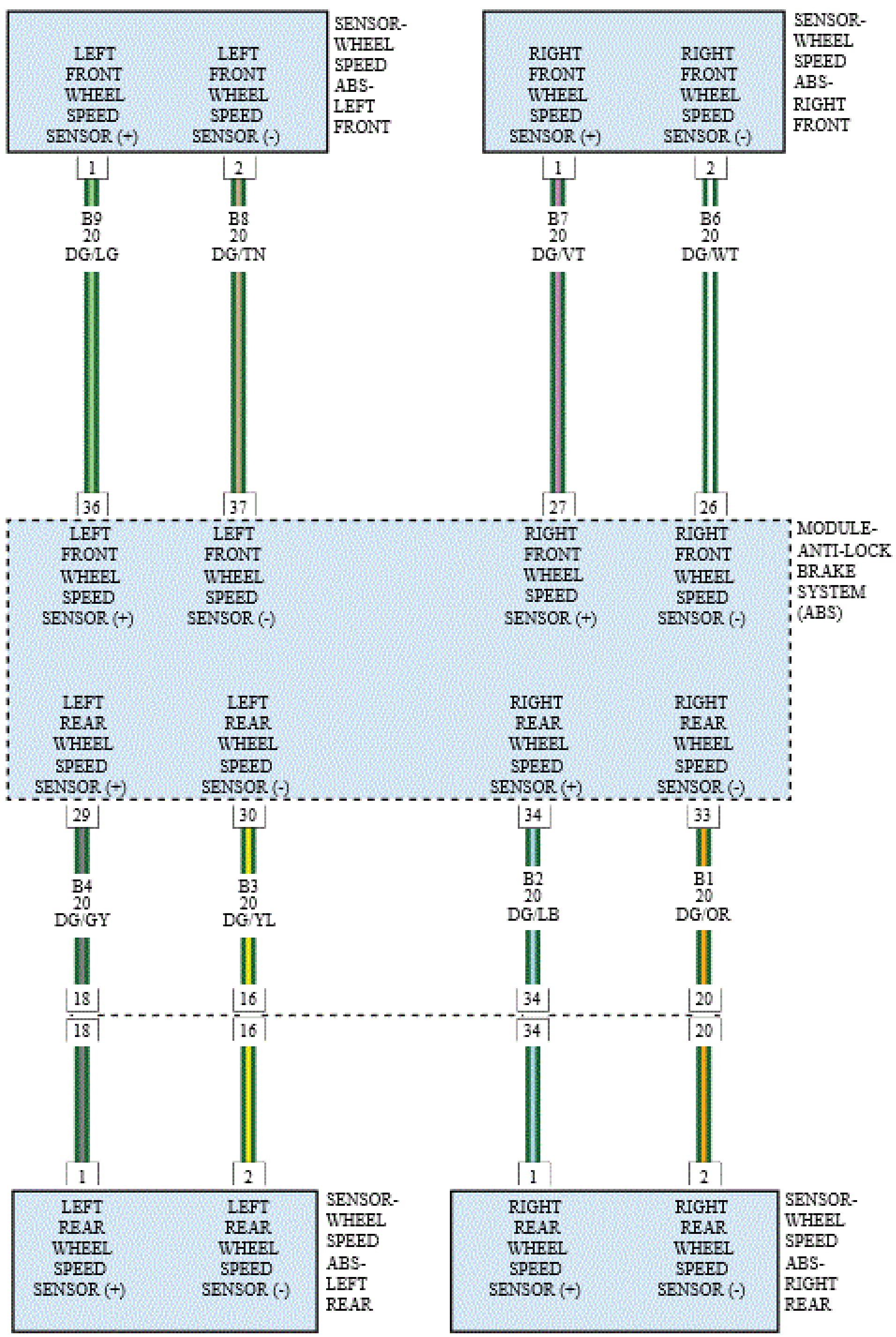
       - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

C003A-2F-RIGHT REAR WHEEL SPEED SENSOR - SIGNAL ERRATIC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 15: Wheel Speed Sensor - Circuit Diagram]

Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects multiple drastic changes in Right Rear Wheel Speed Sensor (WSS) signals.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
CHECK RIGHT REAR WHEEL SPEED SENSOR FOR LOOSENESS
INSPECT CIRCUITS/CONNECTOR/TERMINALS FOR DAMAGE
RIGHT REAR TONE WHEEL DAMAGED/MISSING
RIGHT REAR WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **If DTC C003B-01 is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: **Make sure braking capability is available before road testing.**

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

   4. With the scan tool, read DTCs.

      Is the DTC active?

      Yes

      - Go To 3

No

- Go To 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
    1. Turn the ignition on.
    2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

    NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

    3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

    Is the Right Rear WSS speed showing 0 km/h (0 mph), not matching other wheels, or showing erratic behavior?

    Yes

    - Go To 3

    No

    - Perform ABS INTERMITTENT CONDITION diagnostic procedure. Refer to **STANDARD PROCEDURE**.

3. **CHECK RIGHT REAR WSS FOR LOOSENESS, INSPECT CIRCUITS/CONNECTORS /TERMINALS FOR DAMAGE**

    NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals.

    1. Turn the ignition off.
    2. Inspect the ABS Module harness connector and the Right Rear WSS harness connector.
    3. Check the Right Rear WSS for looseness, excessive corrosion and not properly fastened.
    4. Inspect the (B1) Right Rear WSS Signal and (B2) Right Rear WSS Supply circuits between the Right Rear WSS and Anti-Lock Brake Module for damage.

    Is the Right Rear WSS loose or any of the wiring/connectors/terminals damaged?

    Yes

    - Repair as necessary.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **CHECK RIGHT REAR WHEEL SPEED SENSOR FOR DAMAGE**
    1. Remove the Right Rear Wheel Speed Sensor.

2. Inspect the Wheel Speed Sensor for proper mounting.
3. Inspect the Wheel Speed Sensor harness and connector.
4. Inspect the Wheel Speed Sensor for excessive debris on the sensor.

   Is the Right Rear Wheel Speed Sensor damaged?

   Yes

   - Replace the Right Rear Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 5

5. **CHECK THE RIGHT REAR TONE WHEEL DAMAGED/MISSING**
   1. Inspect the Right Rear Tone Wheel for excessive runout, clearance or damage.

   NOTE: Refer to the appropriate service information, if necessary, for procedures or specifications.

   Is the Right Rear Tone Wheel Damaged?

   Yes

   - Replace the Tone Wheel in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 6

6. **RIGHT REAR WHEEL SPEED SENSOR**
   1. Replace the Right Rear Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
   2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. Road test the vehicle over 40 km/h (25 mph).

   NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

   4. With the scan tool, read ABS DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Anti-Lock Brakes Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test Complete.

C003A-4A-RIGHT REAR WHEEL SPEED SENSOR - INCORRECT COMPONENT INSTALLED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects that the wrong component is installed.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
RIGHT REAR WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: **If DTC C003A-1D is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

NOTE: **This vehicle uses directional front wheel speed sensors and non-directional rear wheel speed sensors.**

1. Turn the ignition on.
2. With the scan tool, record and erase DTCs.
3. With the scan tool, read DTCs.

Is the DTC active?

Yes

- Go To 2

No

- Test Complete.

2. **RIGHT REAR WHEEL SPEED SENSOR**

NOTE: **This vehicle uses a non-directional rear wheel speed sensor, make sure the correct wheel speed sensor is installed on the vehicle.**

1. Replace the Right Rear Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** . Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

CAUTION: **Make sure braking capability is available before road testing.**

2. Road test the vehicle over 40 km/h (25 mph).
3. With the scan tool, read DTCs.

Does the DTC remain active?

Yes

- Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

C003A-62-RIGHT REAR WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

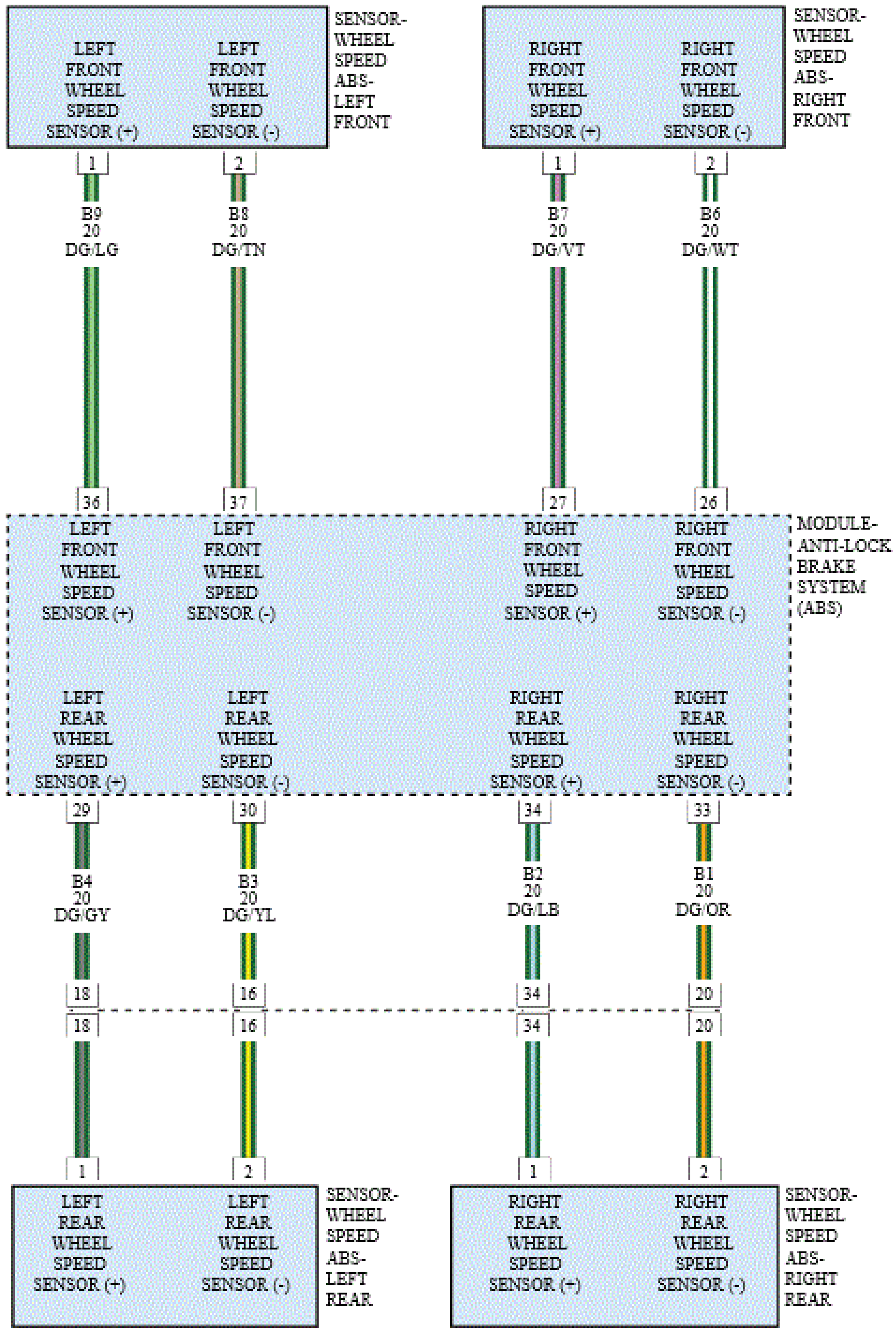


Fig. 16: Wheel Speed Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects if the wheel speed signal is 0 km/h (0 mph) or very low when compared to the other wheel speed signals.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
IMPROPER RIGHT REAR TIRE PRESSURE/MISMATCHED TIRES
CHECK RIGHT REAR WHEEL SPEED SENSOR FOR LOOSENESS
INSPECT CIRCUITS/CONNECTOR/TERMINALS FOR DAMAGE
RIGHT REAR TONE WHEEL DAMAGED/MISSING
RIGHT REAR WHEEL SPEED SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **If DTC C003A-1D is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: **Make sure braking capability is available before road testing.**

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

   4. With the scan tool, read DTCs.

      Is the DTC active?

      Yes

      - Go To 3

      No

      - Go To 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.

2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

NOTE: **If graph shows periodic dropouts pay close attention to the tone wheel.**

3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

Is the Right Rear WSS speed showing 0 km/h (0 mph), not matching other wheels, or showing erratic behavior?

Yes

- Go To 3

No

- Perform ABS INTERMITTENT CONDITION diagnostic procedure. Refer to **STANDARD PROCEDURE**.

3. **CHECK FOR IMPROPER RIGHT REAR TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Right Rear Tire pressure.
   3. Check and adjust all other tire pressures.
   4. Inspect for mismatched tires on vehicle.

Is the Right Rear Tire improperly inflated or mismatched tires on vehicle?

Yes

- Repair as necessary
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **CHECK RIGHT REAR WSS FOR LOOSENESS, INSPECT CIRCUITS/CONNECTORS /TERMINALS FOR DAMAGE**

NOTE: **Check all terminals for broken, bent, pushed out, or corroded terminals.**

1. Turn the ignition off.
2. Inspect the ABS Module harness connector and the Right Rear WSS harness connector.
3. Check the Right Rear WSS for looseness, excessive corrosion and not properly fastened.
4. Inspect the (B1) Right Rear WSS Signal and (B2) Right Rear WSS Supply circuits between the Right Rear WSS and Anti-Lock Brake Module for damage.

Is the Right Rear WSS loose or any of the wiring/connectors/terminals damaged?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **CHECK RIGHT REAR WHEEL SPEED SENSOR FOR DAMAGE**
    1. Remove the Right Rear Wheel Speed Sensor.
    2. Inspect the Wheel Speed Sensor for proper mounting.
    3. Inspect the Wheel Speed Sensor harness and connector.
    4. Inspect the Wheel Speed Sensor for excessive debris on the sensor.

    Is the Right Rear Wheel Speed Sensor damaged?

    Yes

    - Replace the Right Rear Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 6

6. **CHECK THE RIGHT REAR TONE WHEEL DAMAGED/MISSING**
    1. Inspect the Right Rear Tone Wheel for excessive runout, clearance or damage.

    NOTE: Refer to the appropriate service information, if necessary, for procedures or specifications.

    Is the Right Rear Tone Wheel Damaged?

    Yes

    - Replace the Tone Wheel in accordance with the Service Information.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 7

7. **RIGHT REAR WHEEL SPEED SENSOR**
    1. Replace the Right Rear Wheel Speed Sensor in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Road test the vehicle over 40 km/h (25 mph).

NOTE: **Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.**

4. With the scan tool, read ABS DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test Complete.

C0042-11-BRAKE PEDAL POSITION SENSOR - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

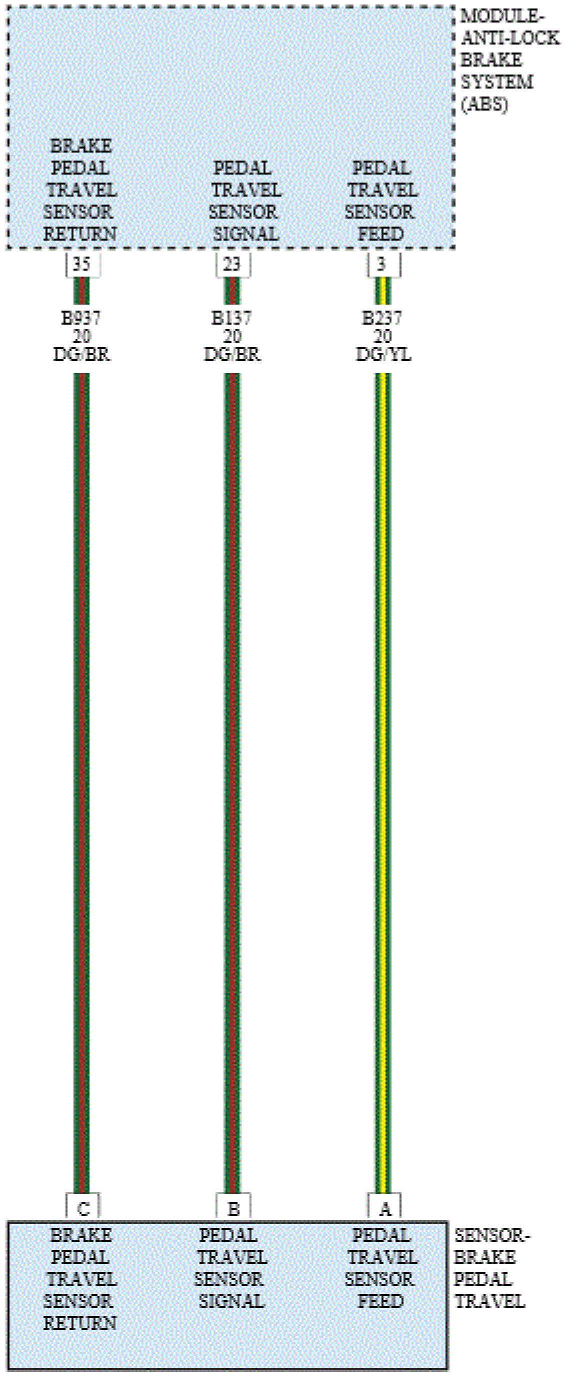


Fig. 17: Brake Pedal Position Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects a short from the Brake Pedal Position (BPP) Sensor.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
BRAKE PEDAL POSITION (BPP) SENSOR IMPROPERLY INSTALLED, DAMAGE OR MECHANICAL FAILURE
(B237) BPP SENSOR SUPPLY CIRCUIT OPEN OR HIGH RESISTANCE
(B137) BPP SENSOR SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE
(B137) BPP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
(B137) BPP SENSOR SIGNAL CIRCUIT SHORTED TO (B937) BPP SENSOR RETURN CIRCUIT
BRAKE PEDAL POSITION (BPP) SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

NOTE: **If DTC C1246-1C is present, perform the diagnostics for this DTC first before continuing with this diagnostic procedure.**

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.
    3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
    4. With the scan tool, erase the DTCs.
    5. Start the engine.
    6. Slowly press the brake pedal and release.
    7. With the scan tool, read ABS DTCs and record on the repair order.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to STANDARD PROCEDURE.
2. **INSPECT THE BRAKE PEDAL POSITION (BPP) SENSOR FOR INCORRECT INSTALLATION, DAMAGE OR MECHANICAL FAILURE**
    1. Turn the ignition off.

2. Visually inspect the BPP Sensor for Improper installation, damage or mechanical failure. Refer to **SENSOR, STOP LAMP, INSTALLATION** .

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **(B237) BPP SENSOR FEED CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Disconnect the ABS Module harness connector.
   2. Disconnect the Brake Pedal Position (BPP) Sensor harness connector.
   3. Measure the resistance of the (B237) BPP Sensor Feed circuit between the BPP Sensor harness connector and the ABS Module harness connector.

      Is the resistance below 5.0 Ohms?

      Yes

      - Go To 4

      No

      - Repair the (B237) BPP Sensor Feed circuit for an open circuit or high resistance.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **(B137) BPP SENSOR SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Measure the resistance of the (B137) BPP Sensor Signal circuit between the BPP Sensor harness connector and the ABS Module harness connector.

      Is the resistance below 5.0 Ohms?

      Yes

      - Go To 5

      No

      - Repair the (B137) BPP Sensor Signal circuit for an open circuit or high resistance.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
5. **(B137) BPP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND**
   1. Measure the resistance between ground and the (B137) BPP Sensor Signal circuit in the BPP Sensor harness connector.

      Is the resistance above 5 Ohms?

Yes

- Go To 6

No

- Repair the (B137) BPP Signal circuit for a short to ground.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **(B137) BPP SENSOR SIGNAL CIRCUIT SHORTED TO THE (B937) BPP SENSOR RETURN CIRCUIT**
    1. Measure the resistance between the (B937) BPP Sensor Return circuit and the (B137) BPP Sensor Signal circuit in the BPP Sensor harness connector.

       Is the resistance above 5 Ohms?

       Yes

       - Go To 7

       No

       - Repair the (B137) BPP Sensor Signal circuit and the (B937) BPP Sensor Return circuit for a short.
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
7. **BRAKE PEDAL POSITION (BPP) SENSOR**
    1. Turn the ignition off.
    2. Connect the ABS Module harness connector.
    3. Turn the ignition on.
    4. Measure the voltage at the BPP Sensor harness connector between the (B237) BPP Sensor Feed and the (B937) BPP Sensor Return.

       Is the voltage above 4.75 volts?

       Yes

       - Replace the Brake Pedal Position (BPP) Sensor in accordance with the Service Information. Refer to **SENSOR, STOP LAMP, REMOVAL** .
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Replace the Anti-lock Brake System (ABS) Module in accordance with the service information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0042-12-BRAKE PEDAL POSITION SENSOR - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

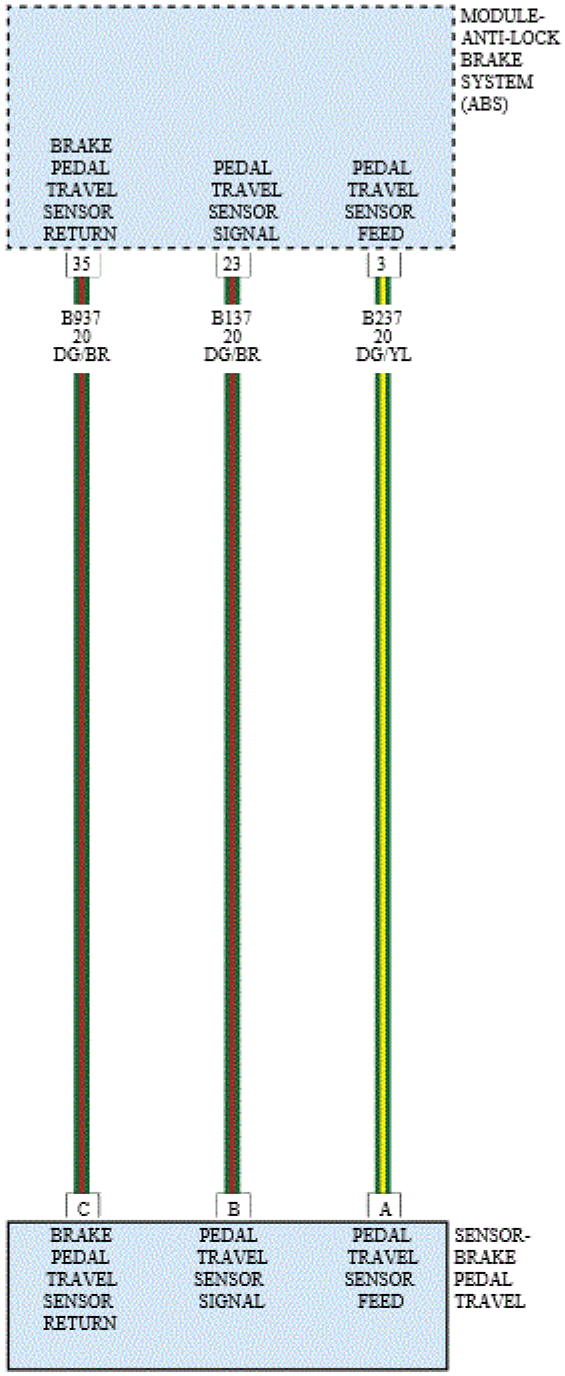


Fig. 18: Brake Pedal Position Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects a short from the Brake Pedal Position (BPP) Sensor.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
BRAKE PEDAL POSITION (BPP) SENSOR IMPROPERLY INSTALLED, DAMAGE OR MECHANICAL FAILURE
(B237) BPP SENSOR SUPPLY CIRCUIT SHORTED TO VOLTAGE
(B137) BPP SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
(B937) BPP SENSOR RETURN CIRCUIT SHORTED TO VOLTAGE
(B937) BPP SENSOR RETURN CIRCUIT OPEN OR HIGH RESISTANCE
(B237) BPP SENSOR SUPPLY CIRCUIT SHORTED TO THE (B137) BPP SENSOR SIGNAL CIRCUIT
BRAKE PEDAL POSITION (BPP) SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

NOTE: **If DTC C1246-1C is present, perform the diagnostics for this DTC before continuing with this diagnostic procedure.**

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order.
   3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase the DTCs.
   5. Start the engine.
   6. Slowly press the brake pedal completely.
   7. With the scan tool, read ABS DTCs and record on the repair order.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **INSPECT THE BRAKE PEDAL POSITION (BPP) SENSOR FOR INCORRECT INSTALLATION, DAMAGE OR MECHANICAL FAILURE**

1. Turn the ignition off.
2. Visually inspect the BPP Sensor for Improper installation, damage or mechanical failure. (Refer to **INSTALLATION**).

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **(B237) BPP SENSOR SUPPLY CIRCUIT SHORTED TO VOLTAGE**
   1. Disconnect the BPP Sensor harness connector.
   2. Turn the ignition on.
   3. Measure the voltage of the (B237) BPP Sensor Supply circuit in the BPP Sensor harness connector.

      Is the voltage above 5.5 volts?

      Yes

      - Repair the (B237) BPP Sensor Supply circuit for a short to voltage.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **(B137) BPP SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE**
   1. Measure the voltage of the (B137) BPP Sensor Signal circuit in the BPP Sensor harness connector.

      Is there any voltage present?

      Yes

      - Go To 5

      No

      - Repair the (B137) BPP Sensor Signal circuit for a short to voltage.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **(B937) BPP SENSOR RETURN CIRCUIT SHORTED TO VOLTAGE**
   1. Measure the voltage of the (B937) BPP Sensor Return circuit in the BPP Sensor harness connector.

      Is there any voltage present?

      Yes

- Go To 7

No

- Repair the (B937) BPP Sensor Return circuit for a short to voltage.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **(B937) BPP SENSOR RETURN SUPPLY CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Disconnect the ABS Module harness connector.
   3. Measure the resistance of the (B937) BPP Sensor Return circuit between the BPP Sensor harness connector and the ABS Module harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Go To 7

   No

   - Repair the (B937) BPP Sensor Signal Return circuit for an open circuit or high resistance.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
7. **(B237) BPP SENSOR SUPPLY CIRCUIT SHORTED TO THE (B137) BPP SENSOR SIGNAL CIRCUIT**
   1. Measure the resistance between ground and the (B937) BPP Sensor Return circuit and the (B137) BPP Sensor Signal circuit in the BPP Sensor harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Repair the (B237) BPP Sensor Supply circuit and the (B137) BPP Sensor Signal circuit for a short.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 8
8. **BRAKE PEDAL POSITION (BPP) SENSOR**
   1. Turn the ignition off.
   2. Connect the ABS Module harness connector.
   3. Turn the ignition on.
   4. Measure the voltage at the BPP Sensor harness connector between the (B237) BPP Sensor Feed and the (B937) BPP Sensor Return.

   Is the voltage above 4.75 volts?

Yes

- Replace the Brake Pedal Position (BPP) Sensor in accordance with the Service Information. (Refer to **REMOVAL**).
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Replace the Anti-lock Brake System (ABS) Module in accordance with the service information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0042-28-BRAKE PEDAL POSITION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module is sensing the latest learned brake off voltage has changed by an amount too great from the original calibrated voltage.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
BRAKE PEDAL POSITION (BPP) SENSOR IMPROPERLY INSTALLED, DAMAGE OR MECHANICAL FAILURE
BRAKE PEDAL POSITION (BPP) SENSOR NOT CALIBRATED
BRAKE PEDAL POSITION (BPP) SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order.

3. With the scan tool, erase the DTCs.
4. Start the Engine.
5. Apply the brake pedal several times.
6. With the scan tool, read the ABS DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **INSPECT THE BRAKE PEDAL POSITION (BPP) SENSOR FOR INCORRECT INSTALLATION, DAMAGE OR MECHANICAL FAILURE**
   1. Turn the ignition off.
   2. Visually inspect the BPP Sensor for Improper installation, damage or mechanical failure. (Refer to **INSTALLATION**).

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **BRAKE PEDAL POSITION (BPP) SENSOR NOT APPLIED VOLTAGE**
   1. Start the engine.
   2. With the scan tool, under "Data Display" read the BPP voltage with brake pedal not pressed.
   3. Press the brake pedal several times.
   4. Lightly pull upward on the brake pedal.

   Was the brake pedal not applied BPP voltage change greater than 0.3 volt?

   Yes

   - Go To 5

   No

   - Go To 4

4. **INITIALIZE ANTI-LOCK BRAKES SYSTEM (ABS) MODULE**

1. Turn the ignition on.

WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

NOTE: When performing the ABS Initialization routine, the vehicle temperature must be above 10Ā°C (50Ā°F).

2. Initialize the ABS Module, Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
3. Park the vehicle.

Was the ABS Module initialization successful?

Yes

- Go To 5

No

- Perform the ABS Module Initialization routine again, if still unsuccessful.
- Replace the Anti-lock Brake System (ABS) Module in accordance with the service information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **BRAKE PEDAL POSITION SENSOR**
    1. Turn the ignition off.
    2. Replace the Brake Pedal Position Sensor in accordance with the Service Information. (Refer to **REMOVAL**).
    3. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    4. Start the engine.
    5. With the scan tool, under "Data Display" read the BPP voltage with brake pedal not pressed.
    6. Press the brake pedal several times.
    7. Lightly pull upward on the brake pedal.

    Was the brake pedal not applied BPP voltage change greater than 0.3 volt?

    Yes

    - Replace the Brake Pedal Assembly in accordance with the Service Information. Refer to **PEDAL(S), BRAKE AND/OR ACCELERATOR, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C0042-2A-BRAKE PEDAL POSITION SENSOR - STUCK

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

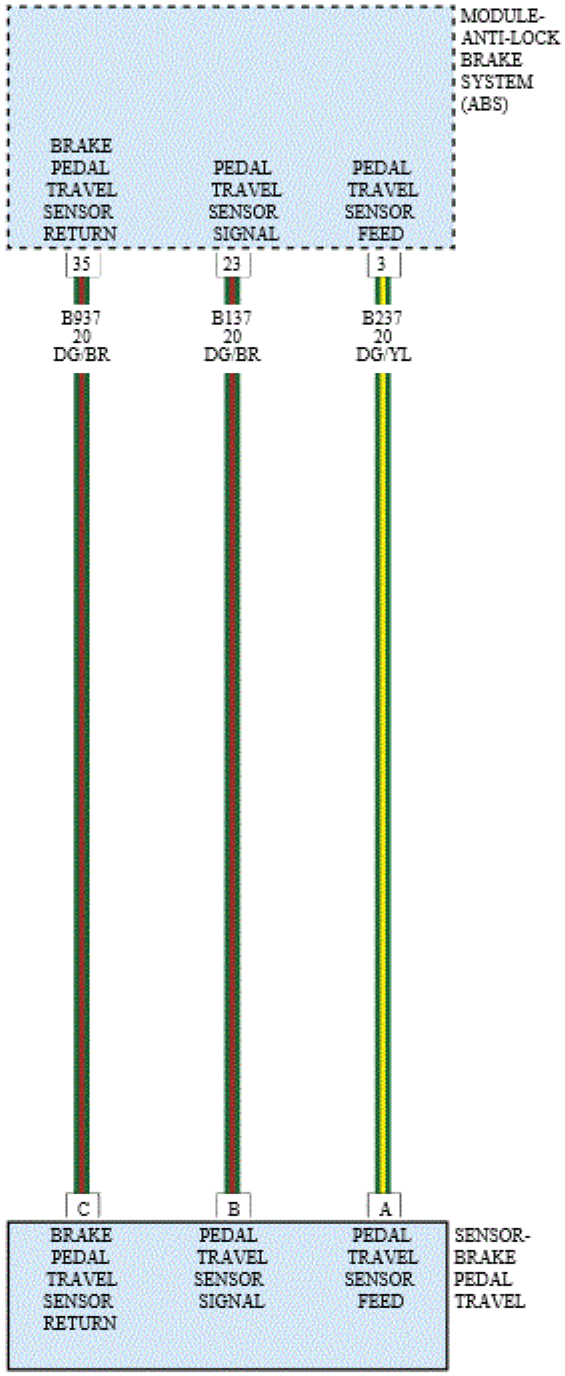


Fig. 19: Brake Pedal Position Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.

- No under voltage DTCs.

SET CONDITION

- Brake Pedal Position (BPP) sensor rationality checks both failure modes of the brake pedal position sensor.
- Brake Pedal Position (BPP) sensor stuck on test checks for a high vehicle speed condition where the brake pedal position sensor is continually pressed.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
BRAKE PEDAL POSITION (BPP) SENSOR IMPROPERLY INSTALLED, DAMAGE OR MECHANICAL FAILURE
BRAKE PEDAL POSITION (BPP) SENSOR NOT CALIBRATED
BRAKE PEDAL POSITION ASSEMBLY
BRAKE PEDAL POSITION (BPP) SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **This DTC must be active for the results of this test to be valid.**

   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order.
   3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase the DTCs.
   5. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   6. With the scan tool, read the DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

- Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **BRAKE PEDAL POSITION (BPP) SENSOR NOT APPLIED VOLTAGE**
   1. Start the engine.
   2. With the scan tool, under "Data Display" monitor the BPP voltage and Stoplamp Switch while pressing the brake pedal slowly.

      Does the voltage increase and the stoplamp switch status change when the BPP voltage changes by 0.3 volt while the brake pedal is being applied?

      Yes

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 3

3. **INSPECT THE BRAKE PEDAL POSITION (BPP) SENSOR FOR INCORRECT INSTALLATION, DAMAGE OR MECHANICAL FAILURE**
   1. Turn the ignition off.
   2. Visually inspect the BPP Sensor for Improper installation, damage or mechanical failure. (Refer to **INSTALLATION**).

      Were any problems found?

      Yes

      - Repair as necessary and perform the "Brake Pedal Sensor Calibration" routine.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **BRAKE PEDAL POSITION (BPP) SENSOR**
   1. Replace the Brake Pedal Position (BPP) Sensor in accordance with the Service Information.
   2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

   3. Test drive the vehicle on mainly straight road conditions at a velocity above 20 km/h (12 mph).
   4. With the scan tool, read the DTCs.

      Does the DTC remain active?

      Yes

- Replace the Anti-lock Brake System (ABS) Module in accordance with the service information. Refer to **MODULE, POWERTRAIN CONTROL, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

C0042-54-BRAKE PEDAL POSITION SENSOR - MISSING CALIBRATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- Brake Pedal Position (BPP) Sensor calibration.

SET CONDITION

- Brake Pedal Position (BPP) Sensor calibration performed, but voltage out of allowable range.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
BRAKE PEDAL POSITION (BPP) SENSOR IMPROPERLY INSTALLED, DAMAGE OR MECHANICAL FAILURE
BRAKE PEDAL POSITION (BPP) SENSOR NOT CALIBRATED
BRAKE PEDAL POSITION (BPP) SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **BRAKE PEDAL CALIBRATION**
    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.
    3. Park the vehicle.

NOTE: **When performing the Brake Pedal Calibration routine, make sure the brake pedal is not pressed.**

4. With the scan tool, under "Miscellaneous Functions" run the Brake Pedal Calibration routine.

   Was the Brake Pedal Calibration routine successful?

   Yes

   - Test complete.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Perform the Brake Pedal Calibration routine again, if still unsuccessful.
   - Go To 2

2. **INSPECT THE BRAKE PEDAL POSITION (BPP) SENSOR FOR INCORRECT INSTALLATION, DAMAGE OR MECHANICAL FAILURE**
   1. Turn the ignition off.
   2. Visually inspect the BPP Sensor for Improper installation, damage or mechanical failure. Refer to **SENSOR, STOP LAMP, INSTALLATION** .

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 3

3. **BRAKE PEDAL POSITION (BPP) SENSOR**
   1. Turn the ignition off.
   2. Disconnect the BPP Sensor harness connector.
   3. Turn the ignition on.
   4. Measure the voltage at the BPP Sensor harness connector between the (B237) BPP Sensor Feed and the (B937) BPP Sensor Return.

      Is the voltage above 4.75 volts?

      Yes

      - Replace the Brake Pedal Position (BPP) Sensor in accordance with the Service Information. Refer to **SENSOR, STOP LAMP, REMOVAL** .
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Replace the Anti-lock Brake System (ABS) Module in accordance with the service information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0042-62-BRAKE PEDAL POSITION SENSOR - SIGNAL COMPARE FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

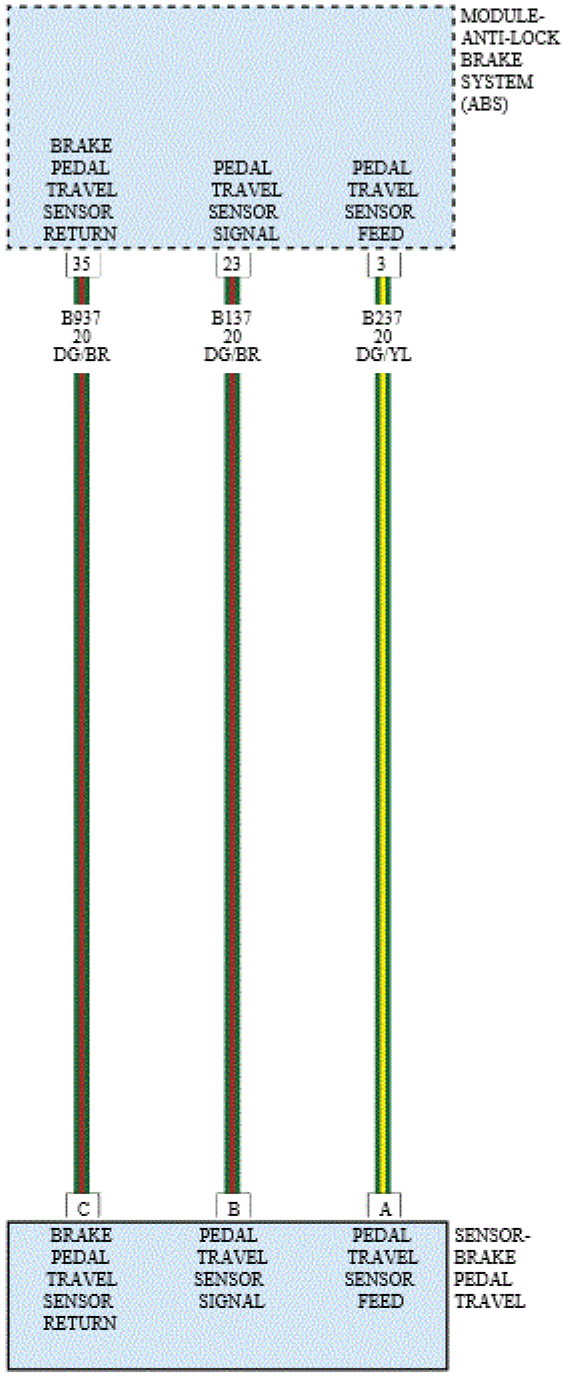


Fig. 20: Brake Pedal Position Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No Anti-lock Brake System (ABS) Module system activation.

SET CONDITION

- Anti-lock Brake System (ABS) Module sees brake pressure, but no corresponding with Brake Pedal Position (BPP) Sensor voltage for one second.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
BRAKE PEDAL POSITION (BPP) SENSOR NOT CALIBRATED
BRAKE PEDAL POSITION (BPP) SENSOR IMPROPERLY INSTALLED, DAMAGE OR MECHANICAL FAILURE
BRAKE PEDAL POSITION (BPP) SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

DIAGNOSTIC TEST

1. **INITIALIZE ANTI-LOCK BRAKES SYSTEM (ABS) MODULE**
    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.

    WARNING: **To avoid possible serious or fatal injury, check brake capability is available before road testing.**

    NOTE: **When performing the ABS Initialization routine, the vehicle temperature must be above 10Ā°C (50Ā°F).**

    3. Initialize the ABS Module, Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    4. Park the vehicle.

    Was the ABS Module initialization successful?

    Yes

    - Go To 2

    No

- Perform the ABS Module Initialization routine again, if still unsuccessful. Go To 4

2. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, erase the DTCs.
    3. Start the engine.
    4. Press the brake pedal slowly.
    5. With the scan tool, read ABS DTCs.

    Is the DTC active?

    Yes

    - Go To 3

    No

    - Test complete.

3. **INSPECT THE BRAKE PEDAL POSITION (BPP) SENSOR FOR INCORRECT INSTALLATION, DAMAGE OR MECHANICAL FAILURE**
    1. Turn the ignition off.
    2. Visually inspect the BPP Sensor for Improper installation, damage or mechanical failure. (Refer to **INSTALLATION**).

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **BRAKE PEDAL POSITION (BPP) SENSOR**
    1. Turn the ignition off.
    2. Replace the Brake Pedal Position Sensor in accordance with the Service Information. (Refer to **INSTALLATION**).
    3. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

    4. Test drive the vehicle by turning the vehicle left and right in a curving manner at a velocity between 15 and 35 km/h (9 and 22 mph).
    5. With the scan tool, read the DTCs.

Does the DTC remain active?

Yes

- Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

C0044-01-BRAKE PRESSURE SENSOR 1 - GENERAL ELECTRICAL FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module indicates that the Brake Pressure Sensor Signal is out of range.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
HYDRAULIC CONTROL UNIT (HCU)

DIAGNOSTIC TEST

CHECK FOR AN ACTIVE DTC

NOTE: **This DTC must be active for the results of this test to be valid.**

1. Turn the ignition on.
2. With the scan tool, read ABS DTCs and record on the repair order.
3. With the scan tool, read and record Freeze Fame information.
4. With the scan tool, erase DTCs.
5. Start the engine.
6. Press the brake pedal firmly and release.

7. With the scan tool, read ABS DTCs and record on the repair order.

   Is the DTC active?

   Yes

   - Replace the Integrated Control Unit (ICU) in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

C0044-28-BRAKE PRESSURE SENSOR 1 - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **Repair all other DTC's before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects brake pressure when the brake pedal has not been applied.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
BRAKE FLUID CONTAMINATION
PINCHED OR BENT BRAKE LINES
BRAKE PEDAL PRESSURE (BPP) SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
HYDRAULIC CONTROL UNIT (HCU)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **This DTC must be active for the results of this test to be valid.**

   1. Turn the ignition on.

2. With the scan tool, read ABS DTCs and record on the repair order.
3. With the scan tool, read and record Freeze Frame information.
4. With the scan tool, erase DTCs.
5. Start the engine.
6. Press the brake pedal firmly and release.
7. With the scan tool, read ABS DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Perform the ABS INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **MECHANICAL BRAKE SYSTEM INSPECTION**
   1. Turn the ignition off.
   2. Check the brake fluid for contaminants.
   3. Visually inspect all the brake lines for bent, damaged, or pinched restrictions.

   Where any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **PRIMARY CIRCUIT PRESSURE**
   1. Start the engine.
   2. The brake pedal released.
   3. With the scan tool, under "Data Display" read the primary circuit pressure.

   Is the primary circuit pressure below 10 bar (145 psi)?

   Yes

   - Go To 4

   No

   - Go To 5

4. **BRAKE PEDAL INSPECTION**

1. Turn the ignition off.
2. Check the brake pedal for damage or restrictions not allowing it to fully return.

   Where any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   NOTE: **For this failure it is necessary to replace both the Anti-lock Brake System (ABS) Module and the Hydraulic Control Unit (HCU) as a complete unit. This is known as the Integrated Control Unit (ICU).**

   - Replace the Integrated Control Unit (ICU) in accordance with the Service Information. Refer to **HYDRAULIC CONTROL UNIT (HCU), REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **BRAKE PEDAL POSITION (BPP) SENSOR**
   1. Start the engine.
   2. With the scan tool, under "Data Display" monitor the brake switch and the primary circuit pressure.
   3. Press the brake pedal slowly.

   Did the BP sensor indicate pressed before their was primary circuit pressure?

   Yes

   NOTE: **For this failure it is necessary to replace both the Anti-lock Brake System (ABS) Module and the Hydraulic Control Unit (HCU) as a complete unit. This is known as the Integrated Control Unit (ICU).**

   - Replace the Integrated Control Unit (ICU) in accordance with the Service Information. Refer to **HYDRAULIC CONTROL UNIT (HCU), REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Brake Pedal Position (BPP) Sensor in accordance with the Service Information. Refer to **SENSOR, STOP LAMP, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0044-49-BRAKE PRESSURE 1 - INTERNAL ELECTRONIC FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module has detected Brake Pressure Sensor has internal failure.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
HYDRAULIC CONTROL UNIT (HCU)

DIAGNOSTIC TEST

VERIFY THE IS ACTIVE

1. Perform any Service Bulletins that may apply.
2. Turn the ignition on.
3. With the scan tool, read ABS DTCs and record on the repair order.
4. With the scan tool, read and record Environmental Data (EV Data).
5. With the scan tool, erase ABS DTCs.

WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

6. Test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 15 and 35 km/h (9 and 22 mph).
7. Park the vehicle on level ground.
8. With the scan tool, read the ABS DTCs.

   Is the DTC active?

   Yes

   - Replace the Hydraulic Control Unit (HCU) in accordance with the Service Information. Refer to **HYDRAULIC CONTROL UNIT (HCU), REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

C0044-62-BRAKE PRESSURE SENSOR 1 - SIGNAL COMPARE FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **Repair all other DTCs first before continuing with this test.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module indicates that the redundant brake pressure sensor elements do not agree.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
HYDRAULIC CONTROL UNIT (HCU)

DIAGNOSTIC TEST

CHECK FOR AN ACTIVE DTC

1. Turn the ignition on.
2. With the scan tool, read ABS DTCs and record on the repair order.
3. With the scan tool, read and record Freeze Frame information.
4. With the scan tool, erase DTCs.
5. Start the engine.
6. Press and release the brake pedal.
7. With the scan tool, read the DTCs.

   Is the DTC active?

   Yes

   NOTE: **For this failure it is necessary to replace both the Anti-lock Brake System (ABS) Module and the Hydraulic Control Unit (HCU) as a complete unit. This is known as the Integrated Control Unit (ICU).**

   - Replace the Integrated Control Unit (ICU) in accordance with the Service Information. Refer to **HYDRAULIC CONTROL UNIT (HCU), REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Perform the ABS INTERMITTENT TEST. Refer to **STANDARD PROCEDURE**.

C0051-22-STEERING WHEEL POSITION SENSOR - SIGNAL AMPLITUDE > MAXIMUM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **Repair any Steering Control Module (SCM) or Loss of Communications DTCs first before continuing with this with this diagnostic procedure. (Refer to DIAGNOSTIC CODE INDEX).**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- No CAN time out failure is detected.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects a Steering Angle Sensor overtravel above 720 degrees.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
STEERING WHEEL ALIGNMENT
STEERING COLUMN OR INTERMEDIATE SHAFT IMPROPERLY INSTALLED OR DAMAGED
STEERING ANGLE SENSOR (SAS) LOOSE
STEERING CONTROL MODULE (SCM)
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE/INTEGRATED CONTROL UNIT (ICU)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **This DTC must be active for the results of this test to be valid.**

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ABS DTCs and record on the repair order.
   4. With the scan tool, read and record Environmental Data.
   5. With the scan tool, erase ABS DTCs.
   6. Start the engine.

7. Slowly turn the steering wheel from stop to stop.
8. With the scan tool, read ABS DTCs.

Is the DTC active?

Yes

- Go To 2

No

- Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **INSPECT THE WHEEL ALIGNMENT, STEERING COLUMN AND INTERMEDIATE SHAFT FOR INCORRECT INSTALLATION OR DAMAGE**

NOTE: **If available, check the vehicle repair history for collision damage.**

1. Turn the ignition off.
2. Inspect the vehicle for proper wheel alignment.
3. Inspect the vehicle for damage causing tracking problems or steering wheel misalignment.
4. Inspect the steering column and intermediate shaft for damage.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE STEERING ANGLE**
   1. Turn steering wheel so wheels point in a straight ahead position.
   2. With scan tool, read the steering angle.

Is the Steering Angle reading within Ā±15Ā° of 0Ā°?

Yes

- Go To 4

No

- Go To 5

4. **CHECK STEERING ANGLE CHANGE**
   1. Turn steering wheel so wheels point in a straight ahead position.

2. With scan tool, graph the steering angle sensor to see if the reading ever travels above the 720Ā° while rotating the steering wheel from lock to lock.
3. Rotate steering wheel to the right and the degrees will decrease and rotating steering wheel to the left the degrees will increase.

   Did the steering angle change accordingly with no irregularities and display lower than 720Ā° from lock to lock?

   Yes

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Steering Control Module (SCCM) in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **CHECK THE CLOCKSPRING (SAS) INSTALLATION**

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

NOTE: **Proper Clockspring (SAS) installation is crucial for proper operation.**

1. Turn the ignition off.
2. Verify that the Clockspring (SAS) is properly installed. Refer to **CLOCKSPRING, STANDARD PROCEDURE** .

   Is the Clockspring (SAS) properly installed?

   Yes

   - Replace the Steering Column Control Module (SCCM) in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C0051-28-STEERING WHEEL POSITION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- Driving straight.
- Speeds above 15 km/h (9 mph).

SET CONDITION

- Anti-lock Brake System (ABS) Module detects the Steering Angle Sensor (SAS) signal is above than Ā±15Ā° of 0Ā° while driving straight.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
STEERING WHEEL ALIGNMENT
STEERING COLUMN OR INTERMEDIATE SHAFT IMPROPERLY INSTALLED OR DAMAGED
STEERING ANGLE SENSOR (SAS) LOOSE
STEERING COLUMN CONTROL MODULE (SCCM)
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ABS DTCs and record on the repair order.
   4. With the scan tool, read and record Environmental Data.
   5. With the scan tool, erase ABS DTCs.
   6. Test drive the vehicle straight with speeds above 15 km/h (9 mph).
   7. Stop the vehicle.
   8. Slowly turn the steering wheel from stop to stop.
   9. With the scan tool, read ABS DTCs.

Is the DTC active?

Yes

- Go To 2

No

- Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **INSPECT THE WHEEL ALIGNMENT, STEERING COLUMN AND INTERMEDIATE SHAFT FOR INCORRECT INSTALLATION OR DAMAGE**

NOTE: If available, check the vehicle repair history for collision damage.

1. Turn the ignition off.
2. Inspect the vehicle for proper wheel alignment.
3. Inspect the vehicle for damage causing tracking problems or steering wheel misalignment.
4. Inspect the steering column and intermediate shaft for damage.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE STEERING ANGLE**

1. Test drive the vehicle straight with speeds above 15 km/h (9 mph).
2. With scan tool, read the steering angle in the SCCM.

Is the Steering Angle reading within Ā±15Ā° of 0Ā°?

Yes

- Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **CHECK THE CLOCKSPRING (SAS)**

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable

the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: **If available, check the vehicle repair history for collision damage.**

NOTE: **Proper Clockspring (SAS) installation is crucial for proper operation.**

1. Turn the ignition off.
2. Verify that the Clockspring (SAS) is properly installed.
3. Inspect the vehicle for damage causing tracking problems or steering wheel misalignment.

   Is the Clockspring (SAS) properly installed?

   Yes

   - Replace the Steering Column Control Module (SCCM) in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. Refer to STANDARD PROCEDURE.

   No

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to STANDARD PROCEDURE.

C0051-49-STEERING WHEEL POSITION SENSOR - INTERNAL ELECTRONIC FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **Repair any Steering Angle Sensor (SAS) DTCs first before continuing with this with this diagnostic procedure. (Refer to DIAGNOSTIC CODE INDEX).**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- Vehicle speed is above 15 k/mh (9 mph).
- Yaw rate, lateral acceleration, steering angle and vehicle-speed are all valid.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects the Steering angle Sensor (SAS) has an internal failure

status.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
STEERING CONTROL MODULE (SCM)

DIAGNOSTIC TEST

STEERING WHEEL POSITION SENSOR-INTERNAL ELECTRONIC FAILURE

1. Perform any Service Bulletins that may apply.
2. The ABS Module is reporting internal errors from the SAS.

NOTE: **Before continuing, check the Steering Angle Sensor harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.**

3. Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to STANDARD PROCEDURE.

   No

   - Replace the Steering Control Module (SCM) in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. Refer to STANDARD PROCEDURE.

C0051-62-STEERING WHEEL POSITION SENSOR - SIGNAL COMPARE FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **Repair any Steering Control Module (SCM) DTCs first before continuing with this with this diagnostic procedure. (Refer to DIAGNOSTIC CODE INDEX).**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.

- No under voltage DTCs.
- Vehicle speed is above 15 km/h (9 mph).
- Yaw rate, lateral acceleration, steering angle and vehicle-speed are all valid.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects the Electronic Stability Control (ESC) calculated Steering Angle does not match the sensor signal from the Steering Column Control Module (SCCM).

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
STEERING WHEEL ALIGNMENT
STEERING COLUMN OR INTERMEDIATE SHAFT IMPROPERLY INSTALLED OR DAMAGED
STEERING ANGLE SENSOR (SAS) LOOSE
STEERING COLUMN CONTROL MODULE (SCCM)
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ABS DTCs and record on the repair order.
   4. With the scan tool, read and record Environmental Data.
   5. With the scan tool, erase ABS DTCs.
   6. Start the engine.
   7. Slowly turn the steering wheel from stop to stop.
   8. With the scan tool, read ABS DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **INSPECT THE WHEEL ALIGNMENT, STEERING COLUMN AND INTERMEDIATE SHAFT**

FOR INCORRECT INSTALLATION OR DAMAGE

NOTE: If available, check the vehicle repair history for collision damage.

1. Inspect the vehicle for proper wheel alignment.
2. Inspect the vehicle for damage causing tracking problems or steering wheel misalignment.
3. Inspect the steering column and intermediate shaft for damage.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE STEERING ANGLE**
   1. Turn steering wheel so wheels point in a straight ahead position.
   2. With scan tool, read the steering angle.

   Is the Steering Angle reading within Ā±15Ā° of 0Ā°?

   Yes

   - Go To 4

   No

   - Replace the Steering Column Control Module (SCCM) in accordance with the Service Information.

4. **CHECK STEERING ANGLE CHANGE**
   1. Turn steering wheel so wheels point in a straight ahead position.
   2. With scan tool, graph the steering angle to see while rotating wheel from lock to lock.

   NOTE: Sensor damage can occur if wheel is turned over 720Ā°.

   3. Rotate steering wheel to the right and the degrees will decrease and rotating steering wheel to the left the degrees will increase.

   Did the steering angle change accordingly and display lower then 720Ā° from stop to stop with no erratic signal behavior?

   Yes

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **CHECK THE CLOCKSPRING (SAS) INSTALLATION**

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: If available, check the vehicle repair history for collision damage.

NOTE: Proper Clockspring (SAS) installation is crucial for proper operation.

1. Turn the ignition off.
2. Verify that the Clockspring (SAS) is properly installed. Refer to **CLOCKSPRING, STANDARD PROCEDURE** .

   Is the Clockspring (SAS) properly installed?

   Yes

   - Replace the Steering Control Module (SCM) in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C006A-28-MULTI-AXIS ACCELERATION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

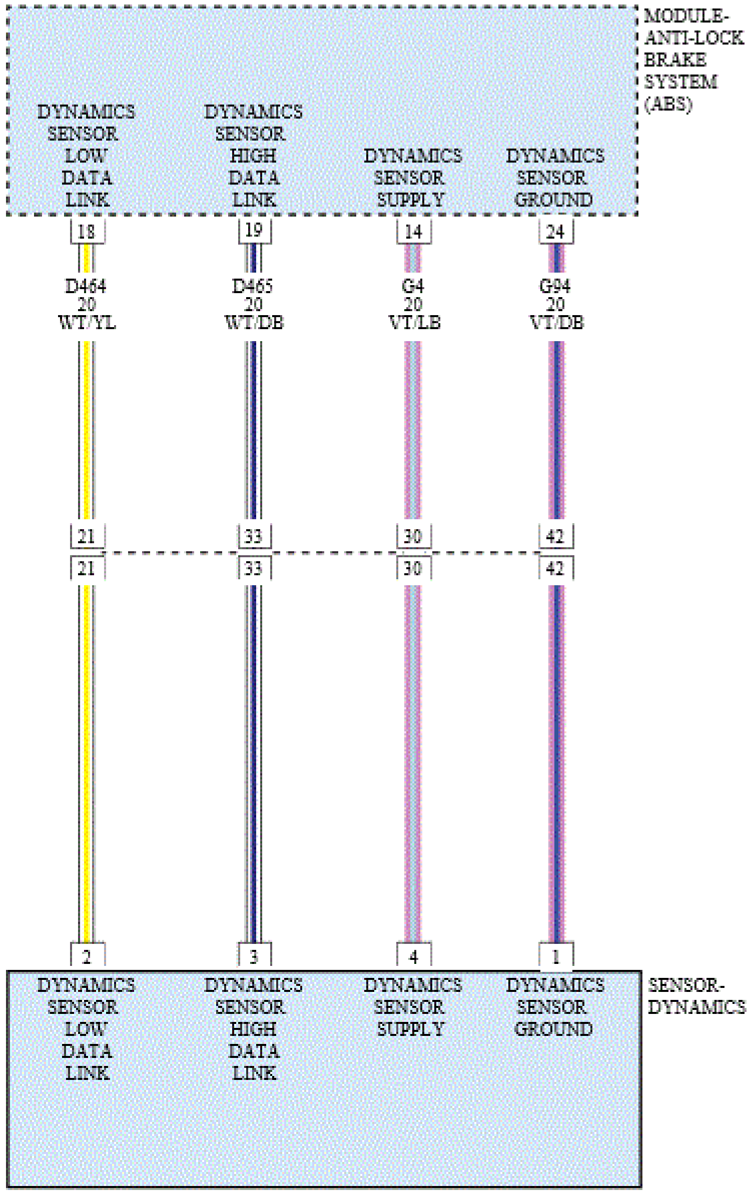


Fig. 21: Dynamics Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects that one of the Dynamic Sensors offset levels are above threshold limits.

DEFAULT ACTION

- ABS is disabled.
- **Set Condition:**

  When the ABS Module detects that one of the Dynamic Sensors offset levels are above reasonable levels.

POSSIBLE CAUSES

Possible Causes
DYNAMICS SENSOR INSTALLATION
DYNAMICS SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

NOTE: **If DTC C006A-49-MULTI- AXIS ACCELERATION SENSOR - INTERNAL ELECTRONIC FAILURE is present, follow the diagnostic procedure for that DTC first before continuing with this test.**

DIAGNOSTIC TEST

1. **CHECK THE DYNAMICS SENSOR INSTALLATION**

   NOTE: **Dynamics Sensor installation and mounting bolt torque is crucial for proper operation.**

   1. Perform any Service Bulletins that may apply.
   2. Check the Dynamics Sensor for damaged, modified, and bent mounting brackets.
   3. Check the Dynamics Sensor mounting bolts for a loose or over tightened condition.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 2
2. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
   1. Turn the ignition off.
   2. Replace the Dynamic Sensor in accordance with the Service Information. Refer to **SENSOR, DYNAMICS, REMOVAL** .
   3. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   4. Test drive the vehicle on mainly straight road conditions at a velocity between 15 and 35 km/h (9 and 22 mph).
   5. With the scan tool, read the DTCs.

      Does the DTC remain active?

Yes

- Replace the Anti-Lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

C006A-49-MULTI-AXIS ACCELERATION SENSOR - INTERNAL ELECTRONIC FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

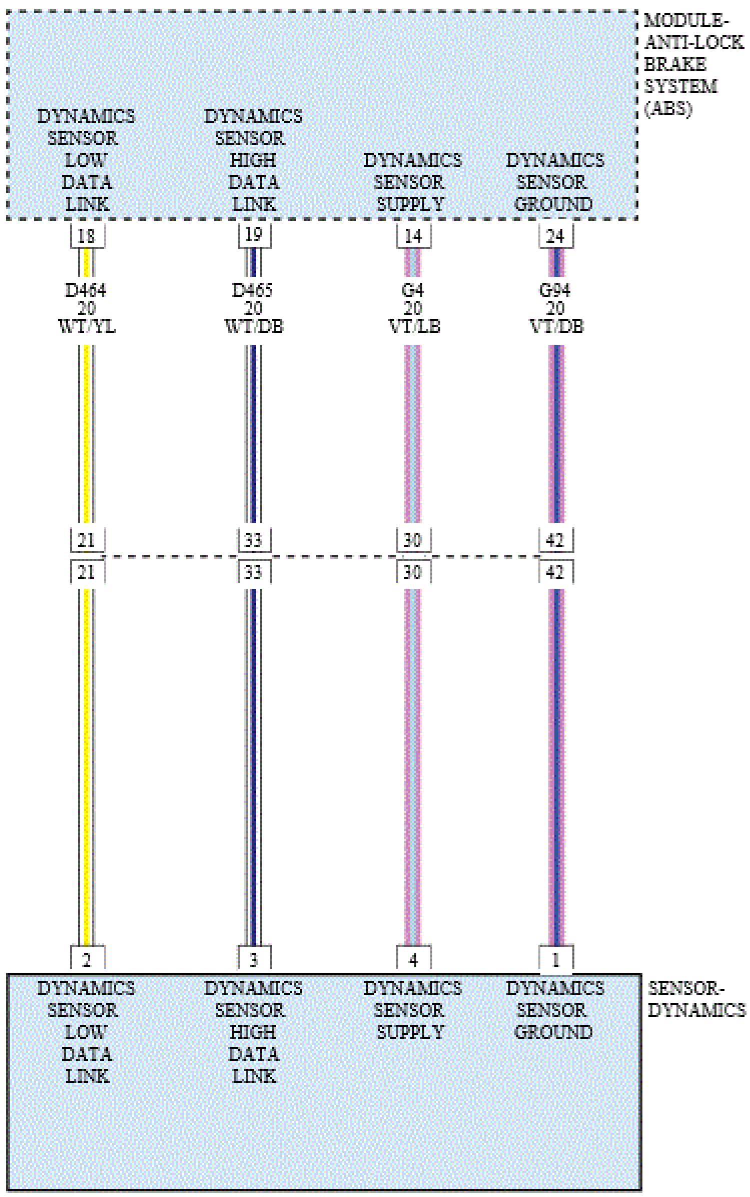


Fig. 22: Dynamics Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects a Dynamics Sensor internal failure.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
DYNAMICS SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

NOTE: **If DTC U0126-00 or U1003-88 are present, refer to the diagnostics for these DTCs before continuing with this test.**

DIAGNOSTIC TEST

1. **VERIFY THE IS ACTIVE**
    1. Perform any Service Bulletins that may apply.
    2. Turn the ignition on.
    3. With the scan tool, read ABS DTCs and record on the repair order.
    4. With the scan tool, read and record Environmental Data (EV Data).
    5. With the scan tool, erase ABS DTCs.

    WARNING: **To avoid possible serious or fatal injury, check brake capability is available before road testing.**

    6. Test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 15 and 35 km/h (9 and 22 mph).
    7. Park the vehicle on level ground.
    8. With the scan tool, read the ABS DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

- Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
   1. Turn the ignition off.
   2. Replace the Dynamics Sensor in accordance with the Service Information. Refer to **SENSOR, DYNAMICS, REMOVAL** .
   3. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   4. Test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 15 and 35 km/h (9 and 22 mph).
   5. With the scan tool, read the DTCs.

      Does the DTC remain active?

      Yes

      - Replace the Anti-Lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C006A-56-MULTI-AXIS ACCELERATION SENSOR- INVALID / INCOMPATIBLE CONFIGURATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

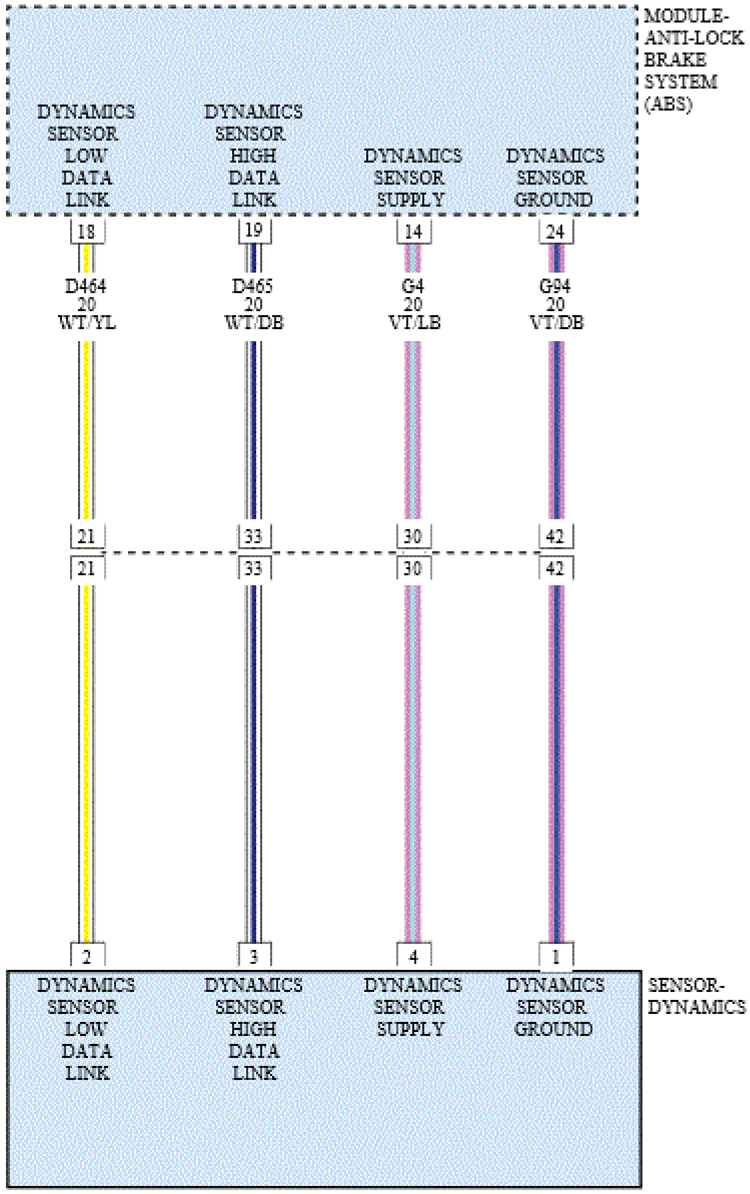


Fig. 23: Dynamics Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- Speed is greater than 2 km/h (1 mph).

SET CONDITION

- Anti-lock Brake System (ABS) Module detects incorrect Dynamics Sensor installed.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
INCORRECT DYNAMICS SENSOR INSTALLED
INCORRECT ANTI-LOCK BRAKE SYSTEM (ABS) MODULE INSTALLED
DYNAMICS SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.
    3. With the scan tool, read and record Environmental Data (EV Data).
    4. With the scan tool, erase ABS DTCs.
    5. Cycle the ignition switch.
    6. With the scan tool, read ABS DTCs.

        Is the DTC active?

        Yes

        - Go To 2

        No

        - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **CHECK FOR CORRECT COMPONENTS INSTALLED**
    1. Turn the ignition off.
    2. Verify the correct Dynamics Sensor and ABS Module part numbers are installed on the vehicle.

        Were any problems found?

        Yes

        - Repair as necessary.
        - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

        No

        - Go To 3
3. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
    1. Replace the Dynamics Sensor in accordance with the Service Information. Refer to **SENSOR, DYNAMICS, REMOVAL** .

2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
3. Test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 10 and 20 km/h (6 and 12 mph).
4. With the scan tool, read the DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C006A-62-MULTI-AXIS ACCELERATION SENSOR - SIGNAL COMPARE FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

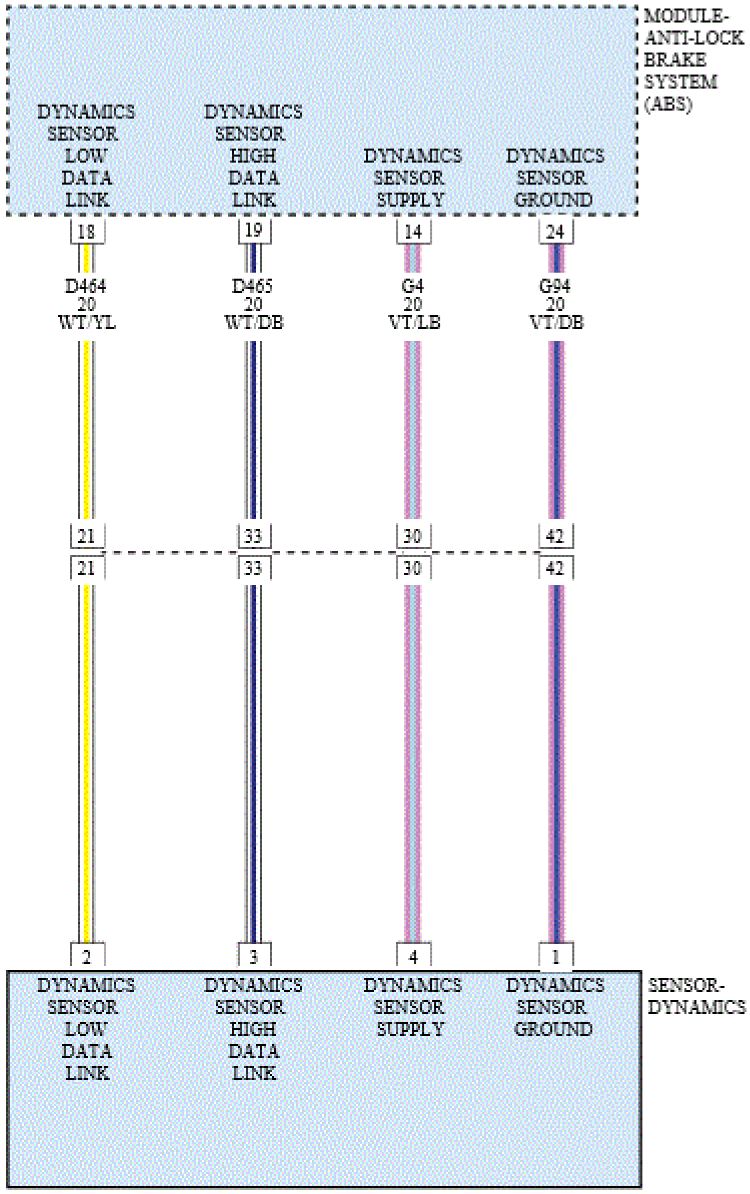


Fig. 24: Dynamics Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- Vehicle speed is above 15 km/h (9 mph).

SET CONDITION

- Anti-lock Brake System (ABS) Module detects that one of the three Dynamic Sensor signals do not agree with the calculated value.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
DYNAMICS SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs and record on the repair order.
    3. With the scan tool, record and erase DTCs.

    WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

    4. Test drive the vehicle by turning the vehicle left and right in a curving manner at a velocity between 15 and 35 km/h (9 and 22 mph).
    5. Park the vehicle.
    6. With the scan tool, read ABS DTCs.

    Is this DTC active?

    Yes

    - Go To 2

    No

    - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
    1. Replace the Dynamic Sensor in accordance with the Service Information. Refer to **SENSOR, DYNAMICS, REMOVAL** .
    2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    3. Test drive the vehicle by turning the vehicle left and right in a curving manner at a velocity between 15 and 35 km/h (9 and 22 mph).
    4. With the scan tool, read the DTCs.

    Does the DTC remain still active?

    Yes

    - Replace the Anti-Lock Brake System (ABS) Module in accordance with the Service

Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

C0078-86-TIRE DIAMETER - SIGNAL INVALID

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Stored tire size is out of range
- Tire size changed from the previous initialization.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
NEW OR INCORRECT TIRE SIZE PROGRAMMED INTO BODY CONTROL MODULE (BCM)
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **INCORRECT TIRES PROGRAMMED INTO BCM**
   1. Inspect all four tires on the vehicle and note the size of each tire.

      NOTE: **A non-production size tire cannot be programmed into the BCM. The production Powertrain, with the production size tires, is the only emissions certified configuration that is available for reprogramming.**

   2. Verify the correct Tire/wheel information is programmed in the BCM.

      Is the correct value programmed in the BCM?

      Yes

      - Go To 2

      No

- Program the correct Tire/Wheel information in the BCM.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

2. **PERFORM ABS MODULE INITIALIZATION**
   1. Turn the ignition on.
   2. With the scan tool, read and record the ABS DTCs.

   NOTE: **When performing the ABS Initialization routine, the vehicle temperature must be above 10Ā°C (50Ā°F).**

   3. With the scan tool, under "Miscellaneous Functions" perform the ABS Initialization routine. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   4. With the scan tool, read the DTCs.

   Does the DTC remain active?

   Yes

   - Perform the ABS Module Initialization routine again, if still unsuccessful.
   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

C1046-92-LEFT FRONT WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- During active ABS control.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects a pressure reduction phase and the following pressure hold phase is too long.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
LEFT FRONT TONE WHEEL/BEARING DAMAGED
WHEEL SPEED SIGNALS SWAPPED
LEFT FRONT WHEEL SPEED SENSOR (WSS)
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.
    3. With the scan tool, read and record Freeze Fame information.
    4. With the scan tool, erase DTCs.
    5. Start the engine.
    6. Test drive the vehicle above 40 km/h (25 mph).
    7. With the scan tool, read ABS DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Perform the ABS INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **COMPARE WHEEL SPEED SENSOR SIGNALS**

    WARNING: Make sure brake capability is available before road testing.

    1. With the scan tool, monitor ALL the WSS speeds while an assistant drives the vehicle.
    2. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

    Does the Left Front WSS speed differ from the other WSS speeds by 8 km/h (5 mph) or show NO speed?

    Yes

    - Go To 4

    No

    - Go To 3
3. **CHECKING INSIDE WHEEL SPEED**
    1. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph) and perform a 90 degree turn while monitoring if inside wheel is slower than outside.

Was the inside wheel slower than outside?

Yes

- Perform the ABS INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **INSPECT TONE WHEEL/BEARING**
    1. Turn the ignition off.
    2. Visually inspect the tone wheel and bearing for damage.
    3. Check the tone wheel teeth for missing teeth, cracks, and looseness. The teeth must be perfectly square, not bent, or nicked. Check the wheel bearing for worn/looseness.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5
5. **CHECK WHEEL SPEED SENSOR (WSS) WIRING**
    1. Check the ABS Module and WSS harness connectors for incorrectly wired connectors.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 6
6. **LEFT FRONT WHEEL SPEED SENSOR (WSS)**
    1. Replace the Left Front Wheel Speed Sensor (WSS) in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    CAUTION: Make sure braking capability is available before road testing.

    3. Road test the vehicle over 40 km/h (25 mph).

NOTE:	Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

4. With the scan tool, read ABS DTCs.

NOTE:	The Anti-lock Brake System (ABS) Module must sense ALL 4 wheels at 12 km/h (7.5 mph) before it will extinguish the ABS indicators.

Does the DTC remain active?

Yes

- Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

C1047-92-RIGHT FRONT WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- During active ABS control.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects a pressure reduction phase and the following pressure hold phase is too long.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
RIGHT FRONT TONE WHEEL/BEARING DAMAGED
WHEEL SPEED SIGNALS SWAPPED
RIGHT FRONT WHEEL SPEED SENSOR (WSS)
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.
    3. With the scan tool, read and record Freeze Fame information.
    4. With the scan tool, erase DTCs.
    5. Start the engine.
    6. Test drive the vehicle above 40 km/h (25 mph).
    7. With the scan tool, read ABS DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Perform the ABS INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **COMPARE WHEEL SPEED SENSOR SIGNALS**

    WARNING: Make sure brake capability is available before road testing.

    1. With the scan tool, monitor ALL the WSS speeds while an assistant drives the vehicle.
    2. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

    Does the Right Front WSS speed differ from the other WSS speeds by 8 km/h (5 mph) or show NO speed?

    Yes

    - Go To 4

    No

    - Go To 3
3. **CHECKING INSIDE WHEEL SPEED**
    1. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph) and perform a 90 degree turn while monitoring if inside wheel is slower than outside.

    Was the inside wheel slower than outside?

    Yes

    - Perform the ABS INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **INSPECT TONE WHEEL/BEARING**
   1. Turn the ignition off.
   2. Visually inspect the tone wheel and bearing for damage.
   3. Check the tone wheel teeth for missing teeth, cracks, and looseness. The teeth must be perfectly square, not bent, or nicked. Check the wheel bearing for worn/looseness.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 5

5. **CHECK WHEEL SPEED SENSOR (WSS) WIRING**
   1. Check the ABS Module and WSS harness connectors for incorrectly wired connectors.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 6

6. **RIGHT FRONT WHEEL SPEED SENSOR (WSS)**
   1. Replace the Right Front Wheel Speed Sensor (WSS) in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
   2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   CAUTION: Make sure brake capability is available before road testing.

   3. Road test the vehicle over 40 km/h (25 mph).

   NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

   4. With the scan tool, read ABS DTCs.

   NOTE: The Anti-lock Brake System (ABS) Module must sense ALL 4 wheels

at 12 km/h (7.5 mph) before it will extinguish the ABS indicators.

Does the DTC remain active?

Yes

- Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

C1048-92-LEFT REAR WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- During active ABS control.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects a pressure reduction phase and the following pressure hold phase is too long.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
LEFT REAR TONE WHEEL/BEARING DAMAGED
WHEEL SPEED SIGNALS SWAPPED
LEFT REAR WHEEL SPEED SENSOR (WSS)
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.

3. With the scan tool, read and record Freeze Fame information.
4. With the scan tool, erase DTCs.
5. Start the engine.
6. Test drive the vehicle above 40 km/h (25 mph).
7. With the scan tool, read ABS DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Perform the ABS INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **COMPARE WHEEL SPEED SENSOR SIGNALS**

   WARNING: Make sure brake capability is available before road testing.

   1. With the scan tool, monitor ALL the WSS speeds while an assistant drives the vehicle.
   2. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

   Does the Left Rear WSS speed differ from the other WSS speeds by 8 km/h (5 mph) or show NO speed?

   Yes

   - Go To 4

   No

   - Go To 3

3. **CHECKING INSIDE WHEEL SPEED**

   1. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph) and perform a 90 degree turn while monitoring if inside wheel is slower than outside.

   Was the inside wheel slower than outside?

   Yes

   - Perform the ABS INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4

4. **INSPECT TONE WHEEL/BEARING**

1. Turn the ignition off.
2. Visually inspect the tone wheel and bearing for damage.
3. Check the tone wheel teeth for missing teeth, cracks, and looseness. The teeth must be perfectly square, not bent, or nicked. Check the wheel bearing for worn/looseness.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 5

5. **CHECK WHEEL SPEED SENSOR (WSS) WIRING**
   1. Check the ABS Module and WSS harness connectors for incorrectly wired connectors.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 6

6. **LEFT REAR WHEEL SPEED SENSOR (WSS)**
   1. Replace the Left Rear Wheel Speed Sensor (WSS) in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, REAR, REMOVAL** .
   2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      CAUTION: Make sure brake capability is available before road testing.

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

   4. With the scan tool, read ABS DTCs.

      NOTE: The Anti-lock Brake System (ABS) Module must sense ALL 4 wheels at 12 km/h (7.5 mph) before it will extinguish the ABS indicators.

      Does the DTC remain active?

      Yes

- Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

C1049-92-RIGHT REAR WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- During active ABS control.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects a pressure reduction phase and the following pressure hold phase is too long.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
RIGHT REAR TONE WHEEL/BEARING DAMAGED
WHEEL SPEED SIGNALS SWAPPED
RIGHT REAR WHEEL SPEED SENSOR (WSS)
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.
    3. With the scan tool, read and record Freeze Fame information.
    4. With the scan tool, erase DTCs.
    5. Start the engine.
    6. Test drive the vehicle above 40 km/h (25 mph).
    7. With the scan tool, read ABS DTCs.

Is the DTC active?

Yes

- Go To 2

No

- Perform the ABS INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **COMPARE WHEEL SPEED SENSOR SIGNALS**

   WARNING: Make sure brake capability is available before road testing.

   1. With the scan tool, monitor ALL the WSS speeds while an assistant drives the vehicle.
   2. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

   Does the Right Rear WSS speed differ from the other WSS speeds by 8 km/h (5 mph) or show NO speed?

   Yes

   - Go To 4

   No

   - Go To 3

3. **CHECKING INSIDE WHEEL SPEED**

   1. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph) and perform a 90 degree turn while monitoring if inside wheel is slower than outside.

   Was the inside wheel slower than outside?

   Yes

   - Perform the ABS INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4

4. **INSPECT TONE WHEEL/BEARING**

   1. Turn the ignition off.
   2. Visually inspect the tone wheel and bearing for damage.
   3. Check the tone wheel teeth for missing teeth, cracks, and looseness. The teeth must be perfectly square, not bent, or nicked. Check the wheel bearing for worn/looseness.

   Were any problems found?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **CHECK WHEEL SPEED SENSOR (WSS) WIRING**
    1. Check the ABS Module and WSS harness connectors for incorrectly wired connectors.

       Were any problems found?

       Yes

       - Repair as necessary.
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 6

6. **RIGHT REAR WHEEL SPEED SENSOR (WSS)**
    1. Replace the Right Rear Wheel Speed Sensor (WSS) in accordance with the Service Information. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .
    2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       CAUTION: Make sure brake capability is available before road testing.

    3. Road test the vehicle over 40 km/h (25 mph).

       NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

    4. With the scan tool, read ABS DTCs.

       NOTE: The Anti-lock Brake System (ABS) Module must sense ALL 4 wheels at 12 km/h (7.5 mph) before it will extinguish the ABS indicators.

       Does the DTC remain active?

       Yes

       - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

- Test complete.

C1082-01-VACUUM PRESSURE SENSOR - GENERAL ELECTRICAL FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

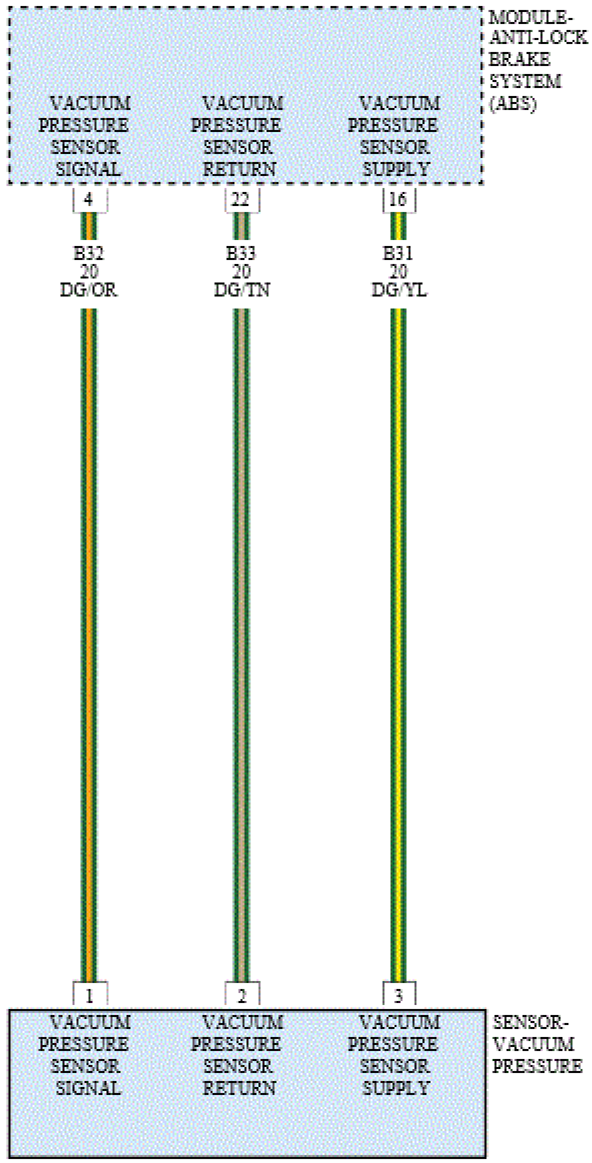


Fig. 25: Vacuum Pressure Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Vacuum Sensor Signal voltage level is below 0.1 volt for 100 msec.
- Vacuum Sensor Signal indicating voltage above 3.5 volts for 100 msec.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
(B31) VACUUM PRESSURE SENSOR SUPPLY CIRCUIT OPEN OR HIGH RESISTANCE
(B32) VACUUM PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
(B32) VACUUM PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
(B32) VACUUM PRESSURE SENSOR SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE
(B33) VACUUM PRESSURE SENSOR RETURN CIRCUIT OPEN OR HIGH RESISTANCE
VACUUM PRESSURE SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ABS DTCs and record on the repair order.
   4. Cycle the ignition switch from off to on.
   5. With the scan tool, read ABS DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **(B31) VACUUM PRESSURE SENSOR SUPPLY CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Turn ignition off to the lock position.
   2. Disconnect the ABS Module harness connector.
   3. Measure the resistance of the (B31) Vacuum Pressure Sensor Supply circuit between the Vacuum Pressure Sensor harness connector and the ABS Module harness connector.

   Is the resistance below 5.0 Ohms?

Yes

- Go To 3

No

- Repair the (B31) Vacuum Pressure Sensor Supply circuit for an open or high resistance.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

3. **(B32) VACUUM PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE**
   1. Turn ignition off to the lock position.
   2. Disconnect the ABS Module harness connector.
   3. Disconnect the Vacuum Pressure Sensor harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (B32) Vacuum Pressure Sensor Signal circuit at the Vacuum Pressure Sensor harness connector.

   Is there any voltage present?

   Yes

   - Repair the (B32) Vacuum Pressure Sensor Signal circuit for a short to ground.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4

4. **(B32) VACUUM PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO GROUND**
   1. Turn ignition off.
   2. Disconnect the ABS Module harness connector.
   3. Measure the resistance between ground and the (B32) Vacuum Pressure Sensor Signal circuit at the Vacuum Pressure Sensor harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Repair the (B32) Vacuum Pressure Sensor Signal circuit for a short to ground.
   - Perform ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 5

5. **(B32) VACUUM PRESSURE SENSOR SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Turn ignition off to the lock position.
   2. Disconnect the ABS Module harness connector.
   3. Measure the resistance of the (B32) Vacuum Pressure Sensor Signal circuit between the Vacuum

Pressure Sensor harness connector and the ABS Module harness connector.

Is the resistance below 5.0 Ohms?

Yes

- Go To 6

No

- Repair the (B32) Vacuum Pressure Sensor Signal circuit for an open or high resistance.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **(B33) VACUUM PRESSURE SENSOR RETURN CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Turn ignition off to the lock position.
   2. Measure the resistance of the (B33) Vacuum Pressure Sensor Return circuit between the Vacuum Pressure Sensor harness connector and the ABS Module harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Go To 7

   No

   - Repair the (B33) Vacuum Pressure Sensor Return circuit for an open or high resistance.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
7. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
   1. Turn the ignition off.
   2. Replace the Vacuum Pressure Sensor.
   3. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   4. With the scan tool, read the DTCs.

   Is the DTC still active?

   Yes

   - Replace the Anti-Lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

C1082-02-VACUUM PRESSURE SENSOR - GENERAL SIGNAL FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

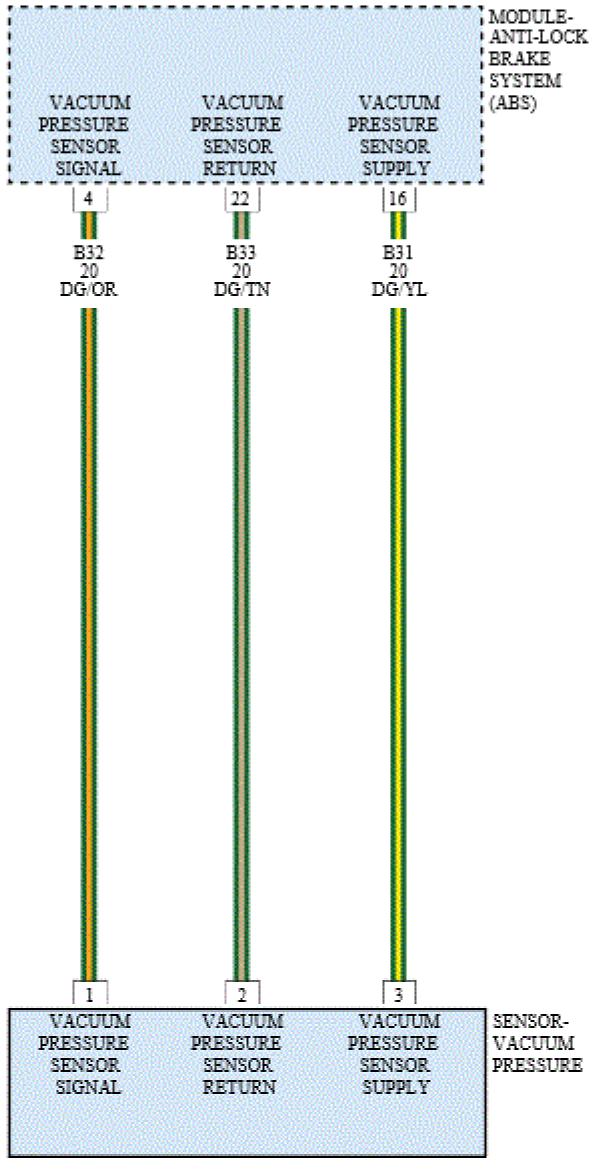


Fig. 26: Vacuum Pressure Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- Engine running for 5 minutes.

SET CONDITION

- Anti-Lock Brake Module detects that the Vacuum Sensor Signal is out of range based on other vehicle conditions.
- Vacuum Sensor Signal indicating no signal change.

- Vacuum Sensor Signal indicating signal rapid change.
- Vacuum Sensor Signal indicating unexpected change.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
VACUUM PRESSURE SENSOR
BRAKE VACUUM BOOSTER
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **VACUUM PRESSURE SIGNAL**
    1. Start the engine.
    2. With the scan tool, view and record the vacuum pressure signal with no brake applied.
    3. Turn the engine off.
    4. Turn the ignition on.
    5. With the scan tool, view and record the vacuum pressure with no brake applied.

    Is the vacuum pressure signal staying consistent?

    Yes

    - Go To 2

    No

    - Go To 4
2. **MEASURE THE VACUUM PRESSURE SIGNAL**
    1. Start the engine.
    2. Measure the vacuum pressure while pressing the brake pedal several times.
    3. Turn the engine off.
    4. Turn the ignition on.

    Does the vacuum drop below 14 mbar (2 psi)?

    Yes

    - Go To 3

    No

    - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

3. **CHECK FOR VACUUM PRESSURE SIGNAL CHANGE**
    1. Turn the ignition on.
    2. Remove the Vacuum Pressure Sensor from the Booster.
    3. Connect a vacuum pump to the Vacuum Pressure Sensor.
    4. Apply vacuum to the Vacuum Pressure Sensor and watch for signal change.

    Is the vacuum pressure signal changing on the scan tool as vacuum is being applied?

    Yes

    - Go To 4

    No

    - Replace the Vacuum Pressure Sensor.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **CHECK BRAKE BOOSTER CHECK VALVE**
    1. Remove the Brake Booster Check Valve.
    2. Apply vacuum to the booster side of the check valve.

    Is the Brake Booster Check Valve holding vacuum?

    Yes

    - Go To 5

    No

    - Replace the Brake Booster Check Valve.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
5. **CHECK BRAKE BOOSTER**
    1. Reinstall the Brake Booster Check Valve.
    2. Using a vacuum pump apply vacuum to the Brake Booster.

    Is the Brake Booster holding vacuum?

    Yes

    - Go To 6

    No

    - Replace the Power Brake Booster in accordance with the Service Information. Refer to **BOOSTER, POWER BRAKE, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
6. **(3.6L) ENGINE WITH ELECTRIC VACUUM PUMP**
    1. Verify vehicle is equipped with a 3.6L engine and an electric vacuum pump.

Is the vehicle is equipped with a 3.6L engine and an electric vacuum pump?

Yes

- Replace the Electric Vacuum Pump in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 7

7. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
    1. Turn the ignition off.
    2. Replace the Vacuum Pressure Sensor.
    3. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    4. With the scan tool, read the DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C1082-2F-VACUUM PRESSURE SENSOR - SIGNAL ERRATIC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

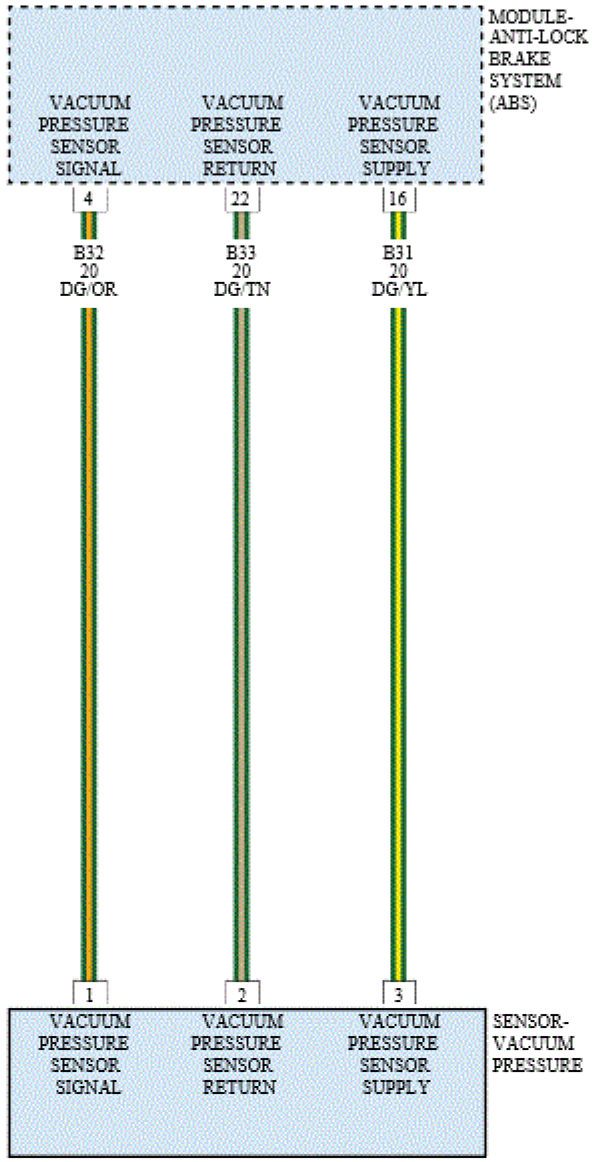


Fig. 27: Vacuum Pressure Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects multiple quick voltage transitions to faulted levels.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
VACUUM PRESSURE SENSOR
POWER BRAKE BOOSTER
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

DIAGNOSTIC TEST

1. **INSPECT RELATED WIRING HARNESS, TERMINALS, AND CONNECTORS**
    1. Perform any Service Bulletins that may apply.
    2. Review the scan tool Environmental Data (EV Data). If possible, try to duplicate the conditions under which the DTC set.
    3. Turn the ignition off.
    4. Visually inspect the related wire harness. Disconnect all the related harness connectors. Look for any chafed, pierced, pinched, partially broken wires and broken, bent, pushed out, or corroded terminals.
    5. Wiggle the wires while checking for shorts and open circuits.
    6. Inspect and clean all ABS, engine, and chassis grounds that are related to the most current DTC.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 2
2. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
    1. Turn the ignition off.
    2. Replace the Vacuum Pressure Sensor in accordance with the Service Information.
    3. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    4. With the scan tool, read the DTCs.

    Is the DTC still active?

    Yes

    - Replace the Anti-Lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

- Perform the ABS VERIFICATION TEST. Refer to STANDARD PROCEDURE.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C121A-09-STEERING ANGLE SENSOR NOT INITIALIZED - COMPONENT FAILURES

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **Repair any Steering Control Module (SCM) or Loss of Communications DTCs first before continuing with this with this diagnostic procedure. (Refer to DIAGNOSTIC CODE INDEX).**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-Lock Brake Module detects a low voltage at the Steering Angle Sensor.
- Steering Angle Sensor failure.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
TERMINAL/CONNECTOR/WIRING HARNESS DAMAGE
CLOCKSPRING (SAS)
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **INITIALIZE ANTI-LOCK BRAKES SYSTEM (ABS) MODULE**
   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order.

   WARNING: **To avoid possible serious or fatal injury, check brake capability is available before road testing.**

   NOTE: **When performing the ABS Initialization routine, the vehicle temperature must be above 10Â°C (50Â°F).**

3. Initialize the ABS Module, Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. Park the vehicle.

   Was the ABS Module initialization successful?

   Yes

   - Go To 2

   No

   - Perform the ABS Module Initialization routine again, if still unsuccessful. Go To 3

2. **CHECK FOR AN ACTIVE DTC**
   1. Turn the ignition on.
   2. With the scan tool, erase the DTCs.

   WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

   3. Test drive the vehicle by turning the vehicle left and right in a curving manner at a velocity between 15 and 35 km/h (9 and 22 mph).
   4. Park the vehicle.
   5. With the scan tool, read ABS DTCs.

   Is the DTC active?

   Yes

   - Go To 3

   No

   - Test complete.

3. **STEERING ANGLE SENSOR**
   1. Turn the ignition off.
   2. Replace the Steering Angle Sensor in accordance with the Service Information. Refer to **COLUMN, REMOVAL** .
   3. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

   4. Test drive the vehicle by turning the vehicle left and right in a curving manner at a velocity between 15 and 35 km/h (9 and 22 mph).
   5. With the scan tool, read the DTCs.

Does the DTC remain active?

Yes

- Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

C121C-00-TORQUE REQUEST SIGNAL DENIED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- Engine running.

SET CONDITION

- Powertrain Control Module (PCM) informed the Anti-lock Brake System (ABS) Module that it will not allow the engine torque reduction requests.
- Engine is above 360 rpm.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
EXCESSIVE LOAD ON ENGINE
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
POWERTRAIN CONTROL MODULE (PCM)

NOTE: **If any PCM DTCs are present, perform the appropriate diagnostic procedure. Refer to DTC INDEX .**

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: **This DTC must be active for the results of this test to be valid and this DTC may set while driving under severe load conditions.**

1. Turn the ignition on.
2. With the scan tool, read ABS DTCs and record on the repair order.
3. With the scan tool, read and record Freeze Frame information.
4. With the scan tool, erase DTCs.
5. Cycle the ignition switch from off to on.
6. Start the engine and raise the engine RPM to 2500.
7. With the scan tool, read ABS DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **CHECK ENGINE IDLE**
   1. Allow the engine to idle.

      Does the engine run rough at idle?

      Yes

      - Replace the Powertrain Control Module (PCM) in accordance with the Service Information. Refer to **MODULE, POWERTRAIN CONTROL, REMOVAL** .
      - Perform the POWERTRAIN VERIFICATION TEST. Refer to the appropriate article in Engine Performance Diagnosis & Testing .

      No

      - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C1239-00-EMISSION ROLLS TEST ACTIVE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- Body Control Module (BCM) has the Emissions Test Mode bit set.

SET CONDITION

- Body Control Module (BCM) has been requested to activate the Emission Rolls Test.
- Anti-lock Brake System (ABS) Module receives two messages in a row.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
EMISSION ROLLS TEST ENABLED
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
BODY CONTROL MODULE (BCM)

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool record and erase the DTCs.
    3. Turn the ignition off.
    4. Turn the ignition on.
    5. With the scan tool, read ABS DTCs.

    Is this DTC active?

    Yes

    - Go To 2

    No

    - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **EMISSION ROLLS TEST ENABLED**
    1. Turn the ignition on.
    2. Using the scan tool, under "Miscellaneous Functions" DISABLE the Emission Rolls Test in the BCM.
    3. With the scan tool, erase the DTCs.
    4. Turn the ignition off and wait ten seconds.
    5. Turn the ignition on.
    6. Using the scan tool, the read DTCs in ABS.

    Is the DTC active?

    Yes

- Go To 3

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

3. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
    1. Turn the ignition off.
    2. Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
    3. Turn the ignition on.
    4. With the scan tool, read ABS DTCs in the ABS.

    Is the DTC still remain active?

    Yes

    - Replace the Body Control Module (BCM) in accordance with the Service Information. Refer to **MODULE, BODY CONTROL, REMOVAL** .

    No

    - Test complete.

C123B-4B-ESP SYSTEM CONTROL TOO LONG - OVER TEMPERATURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-Lock Brake System (ABS) Module indicates excessive valve control.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
AGGRESSIVE DRIVING MANEUVERS, MISMATCHED TIRES, FRONT END ALIGNMENT

Possible Causes
TCS, ESP CONTROL TOO LONG OR TO FREQUENT
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

ANTI-LOCK BRAKE SYSTEM (ABS)

NOTE: **Check with customer for unusual driving terrain (e.g. mud, snow, ice) or aggressive driving maneuvers at the time of set condition.**

1. Perform any related Service Bulletins for this DTC.
2. Check for mismatched tires.
3. Visually inspect the ABS Module wiring.
4. Visually inspect the braking system.
5. Check the alignment.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

C1246-1C-VACUUM PRESSURE SENSOR SUPPLY - CIRCUIT VOLTAGE OUT OF RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

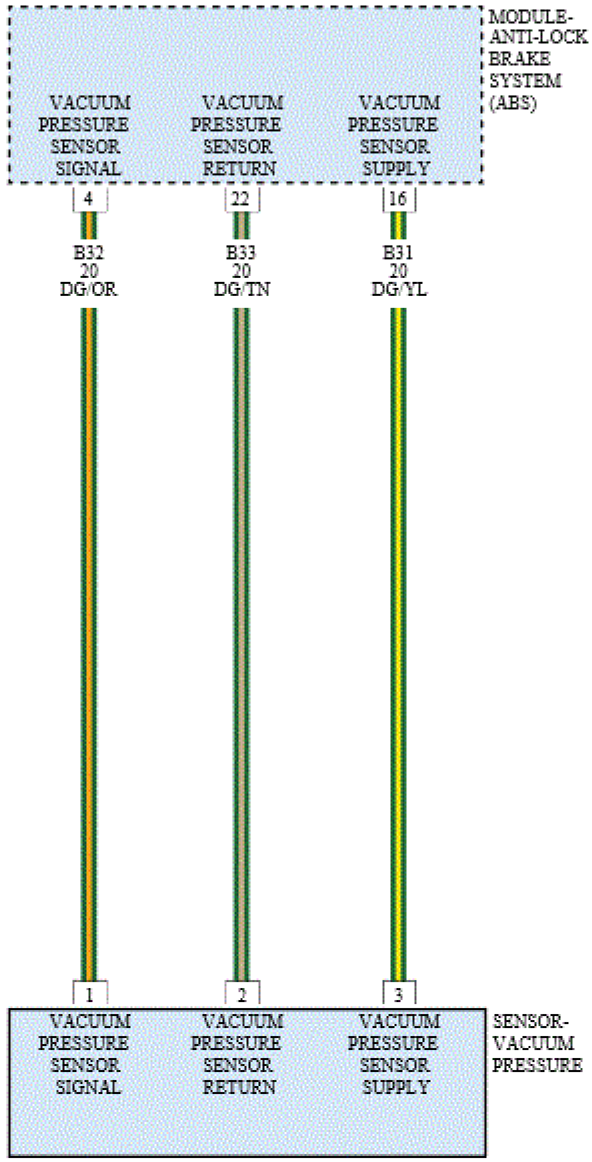


Fig. 28: Vacuum Pressure Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Vacuum Sensor Supply circuit voltage feedback level is below 4.75 volts for more than 50msec.
- Vacuum Sensor Supply circuit voltage feedback level is above 5.25 volts for more than 50msec.

DEFAULT ACTION

- Anti-lock Brake System (ABS) amber light is illuminated.
- Anti-lock Brake System (ABS) is disabled.

POSSIBLE CAUSES

Possible Causes
(B31) VACUUM PRESSURE SENSOR SUPPLY CIRCUIT SHORTED TO VOLTAGE
(B31) VACUUM PRESSURE SENSOR SUPPLY CIRCUIT SHORTED TO GROUND
VACUUM PRESSURE SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.
    3. Cycle the ignition switch from off to on.
    4. With the scan tool, read the DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - The condition that caused this DTC to set is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
    - Perform the ABS INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **(B31) VACUUM PRESSURE SENSOR SUPPLY CIRCUIT SHORTED TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the ABS Module harness connector.
    3. Disconnect the Vacuum Pressure Sensor harness connector.
    4. Turn the ignition on.
    5. Measure the voltage of the (B31) Vacuum Pressure Sensor Supply circuit in the Vacuum Pressure Sensor harness connector.

    Is the voltage above 5.25 volts?

    Yes

    - Repair the (B31) Vacuum Pressure Sensor Supply circuit for a short to voltage.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **(B31) VACUUM PRESSURE SENSOR SUPPLY CIRCUIT SHORTED TO GROUND**
    1. Turn the ignition off.
    2. Measure the resistance between ground and the (B31) Vacuum Pressure Sensor Supply circuit at the Vacuum Pressure Sensor harness connector.

    Is the resistance below 5.0 Ohms?

    Yes

    - Repair the (B31) Vacuum Pressure Sensor Supply circuit for a short to ground.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
    1. Turn the ignition off.
    2. Replace the Vacuum Pressure Sensor.
    3. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    4. With the scan tool, read the DTCs.

    Does the DTC remain active?

    Yes

    - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

C124F-00-ESP REQUEST DENIED FROM ACC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any PCM DTCs are present, repair them first before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Turn the ignition on.

- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module has determined that there is a disagreement between what the Powertrain Control Module (PCM) is requesting and what ESP thinks it should be requesting.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
POWERTRAIN CONTROL MODULE (PCM)
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **CHECK FOR ANY CRUISE CONTROL DTCs**
   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order in the PCM.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs in the PCM.

   Are there any cruise control DTCs?

   Yes

   - Perform the appropriate diagnostic procedure. Refer to **DTC INDEX** .

No

- Using the schematics as a guide, check the Anti-lock Brake System (ABS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C1252-92-VACUUM PUMP CONTROL CIRCUIT - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any PCM DTCs are present, repair them first before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Powertrain Control (PCM) has indicated there is a Vacuum Pump failure.

DEFAULT ACTION

- None.

POSSIBLE CAUSES

Possible Causes
ELECTRIC VACUUM PUMP (3.6L)
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
POWERTRAIN CONTROL MODULE (PCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: **This DTC must be active for the results of this test to be valid.**

1. Perform any Service Bulletins that may apply.
2. Turn the ignition on.
3. With the scan tool, read ABS DTCs and record on the repair order.
4. With the scan tool, read and record Environmental Data.
5. With the scan tool, erase ABS DTCs.

6. Start the engine.
7. Slowly turn the steering wheel from stop to stop.
8. With the scan tool, read ABS DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **CHECK FOR ANY ENGINE DTCs**
   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order in the PCM.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs in the PCM.

   Are there any PCM DTCs?

   Yes

   - Perform the appropriate diagnostic procedure. Refer to **DTC INDEX** .

   No

   - Using the schematics as a guide, check the Anti-lock Brake System (ABS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-lock Brake Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2100-16-BATTERY VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

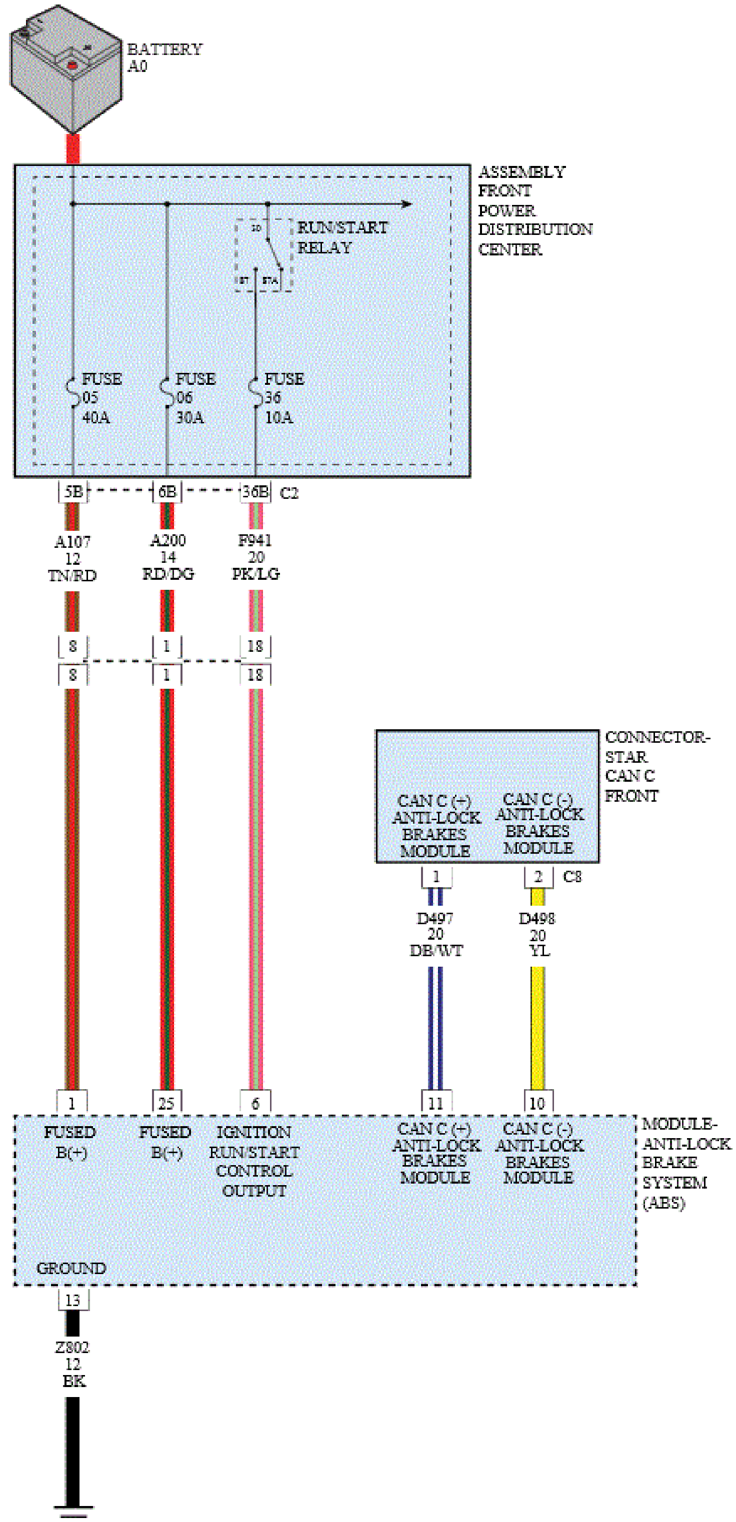


Fig. 29: Anti-Lock Brake System Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.

SET CONDITION

- Battery voltage is below 7.5 volts with ignition on.
- Sensed ignition voltage drops below 9 volts with vehicle speed above 6 km/h (4 mph).

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM
POWER CIRCUITS OPEN OR HIGH RESISTANCE
GROUND CIRCUITS OPEN OR HIGH RESISTANCE
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: Diagnose and repair any Powertrain Charging system DTCs before continuing with this procedure.

   NOTE: Make sure the battery is fully charged.

   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order.
   3. Turn the ignition off.
   4. Start the engine.
   5. With the scan tool, read DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **POWER CIRCUITS FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Disconnect the ABS Module harness connector.
   3. Turn the ignition on.

NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

4. With a 12-volt test light connected to ground, check the (A107) Fused B+, (A200) Fused B+ and (F941) Fused Ignition Switch Output circuits at the ABS harness connector.

   Does the test light illuminate brightly?

   Yes

   - Go To 3

   No

   - Repair the Power circuits for an open or high resistance.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

3. **GROUND CIRCUITS OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. With a test light connected to B+ check the (Z802) Ground circuits at the ABS harness connector.

      Does the test light illuminate brightly?

      Yes

      - Replace the Anti-lock Brake System (ABS) Module in accordance with the service information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Repair the Ground circuits for an open or high resistance.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2101-17-BATTERY VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.

SET CONDITION

- Battery voltage is above 16.5 volts with ignition on.
- Sensed ignition voltage is above 18 volts with vehicle speed above 6 km/h (4 mph).

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
POWERTRAIN CONTROL MODULE (PCM) CHARGING SYSTEM DTCS PRESENT
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHARGING SYSTEM DTCS PRESENT**

   NOTE: Disconnect battery charger before continuing.

   1. Start the engine.
   2. With the scan tool, read DTCs in the PCM.

   Are there any Charging System or related voltage DTCs present?

   Yes

   - Perform the appropriate Charging System DTC diagnostic procedures before continuing with this test. Refer to **DTC INDEX** .

   No

   - Go To 2

2. **VERIFY THE DTC IS ACTIVE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Ignition on, engine not running.
   2. With the scan tool, record and erase DTCs.
   3. Turn ignition off to the lock position.
   4. Start the engine.
   5. With the scan tool, read DTCs.

   Is the DTC active at this time?

   Yes

   - Replace the Anit-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Perform the ABS-INTERMITTENT TEST. Refer to **STANDARD PROCEDURE**.

C2114-16-DYNAMICS SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

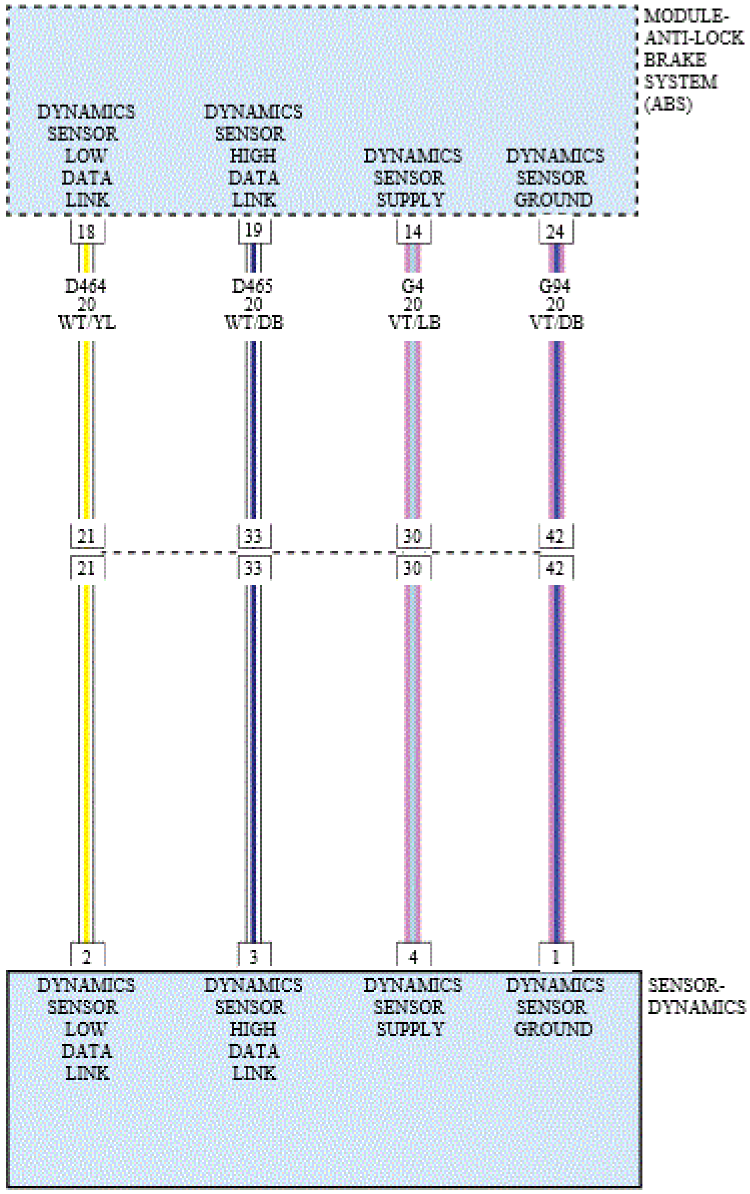


Fig. 30: Dynamics Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detected that the Dynamic Sensor Voltage is below 6.5 volts.

- Dynamic Sensor Voltage is below 6.5 volts.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
(G4) DYNAMICS SENSOR SUPPLY CIRCUIT VOLTAGE
(G4) DYNAMICS SENSOR SUPPLY CIRCUIT SHORTED TO GROUND
(G4) DYNAMICS SENSOR SUPPLY CIRCUIT OPEN OR HIGH RESISTANCE
(G94) DYNAMICS SENSOR GROUND CIRCUIT OPEN OR HIGH RESISTANCE
DYNAMICS SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.
    3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
    4. With the scan tool, erase the DTCs.
    5. Start the engine.
    6. With the scan tool, read ABS DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **(G4) DYNAMICS SENSOR SUPPLY CIRCUIT FOR VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the Dynamics Sensor harness connector.
    3. Turn the ignition on.
    4. Measure the voltage of the (G4) Dynamics Sensor Supply Circuit in the Dynamics Sensor harness connector.

    Is the voltage below 10 volts?

Yes

- Go To 3

No

- Go To 5

3. **(G4) DYNAMICS SENSOR SUPPLY CIRCUIT SHORTED TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the ABS Module harness connector.
    3. Measure the resistance between ground and the (G4) Dynamics Sensor Supply circuit at the Dynamics Sensor harness connector.

    Is the resistance above 5 Ohms?

    Yes

    - Go To 4

    No

    - Repair the (G4) Dynamics Sensor Supply circuit for an open or high resistance.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

4. **(G4) DYNAMICS SENSOR SUPPLY CIRCUIT FOR OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (G4) Dynamics Sensor Supply circuit between the ABS Module harness connector and the Dynamics Sensor harness connector.

    Is the resistance above 5 Ohms?

    Yes

    - Repair the (G4) Dynamics Sensor Supply circuit for an open or high resistance.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **CHECK (G94) DYNAMICS SENSOR GROUND CIRCUIT FOR OPEN OR HIGH RESISTANCE**
    1. Turn the ignition off.
    2. Using a 12-volt test light connected to B+, check the (G94) Ground Circuit in the Dynamics Sensor harness connector.

    NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

Does the test light illuminate brightly?

Yes

- Replace the Dynamic Sensor in accordance with the Service Information. Refer to **SENSOR, DYNAMICS, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Repair the (G94) Dynamics Sensor Ground circuit for an open or high resistance.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2114-17-DYNAMICS SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

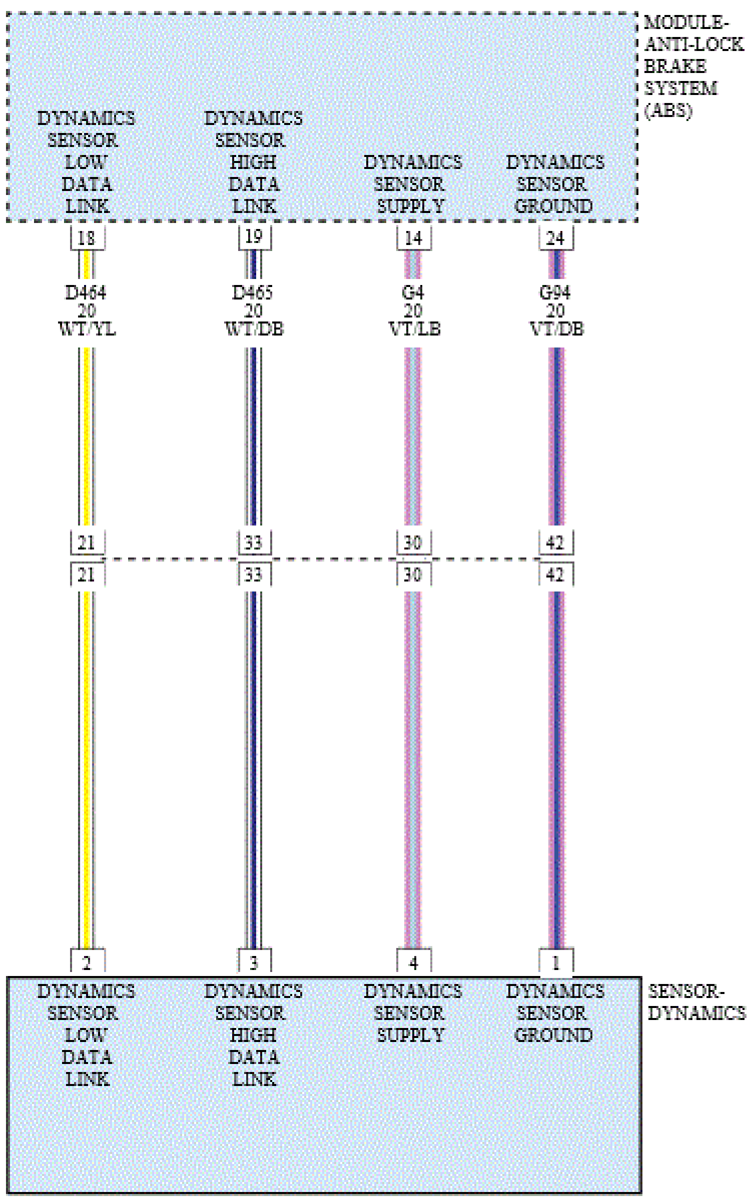


Fig. 31: Dynamics Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.
- Dynamics Sensor Supply circuit power on.

SET CONDITION

- Dynamic Sensor has reported an event where voltage went above 18 volts.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
(G4) DYNAMICS SENSOR SUPPLY CIRCUIT SHORTED TO VOLTAGE
DYNAMICS SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.
    3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
    4. With the scan tool, erase the DTCs.
    5. Start the engine.
    6. With the scan tool, read ABS DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **(G4) DYNAMICS SENSOR SUPPLY CIRCUIT SHORTED TO VOLTAGE**

1. Disconnect the Dynamic Sensor harness connector.
2. Disconnect the ABS Module harness connector.
3. Turn the ignition on.
4. Measure the voltage between ground and the (G4) Dynamics Sensor Supply circuit in the Dynamics Sensor harness connector.

   Is there any voltage present?

   Yes

   - Repair the (G4) Dynamics Sensor Supply circuit for a short.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **DYNAMIC SENSOR**
   1. Replace the Dynamic Sensor in accordance with the Service Information. Refer to **SENSOR, DYNAMICS, REMOVAL** .
   2. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
   3. With the scan tool, read the DTCs.

      Is this DTC still active?

      Yes

      - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete.

C211B-92-IGNITION RUN/START INPUT CIRCUIT - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

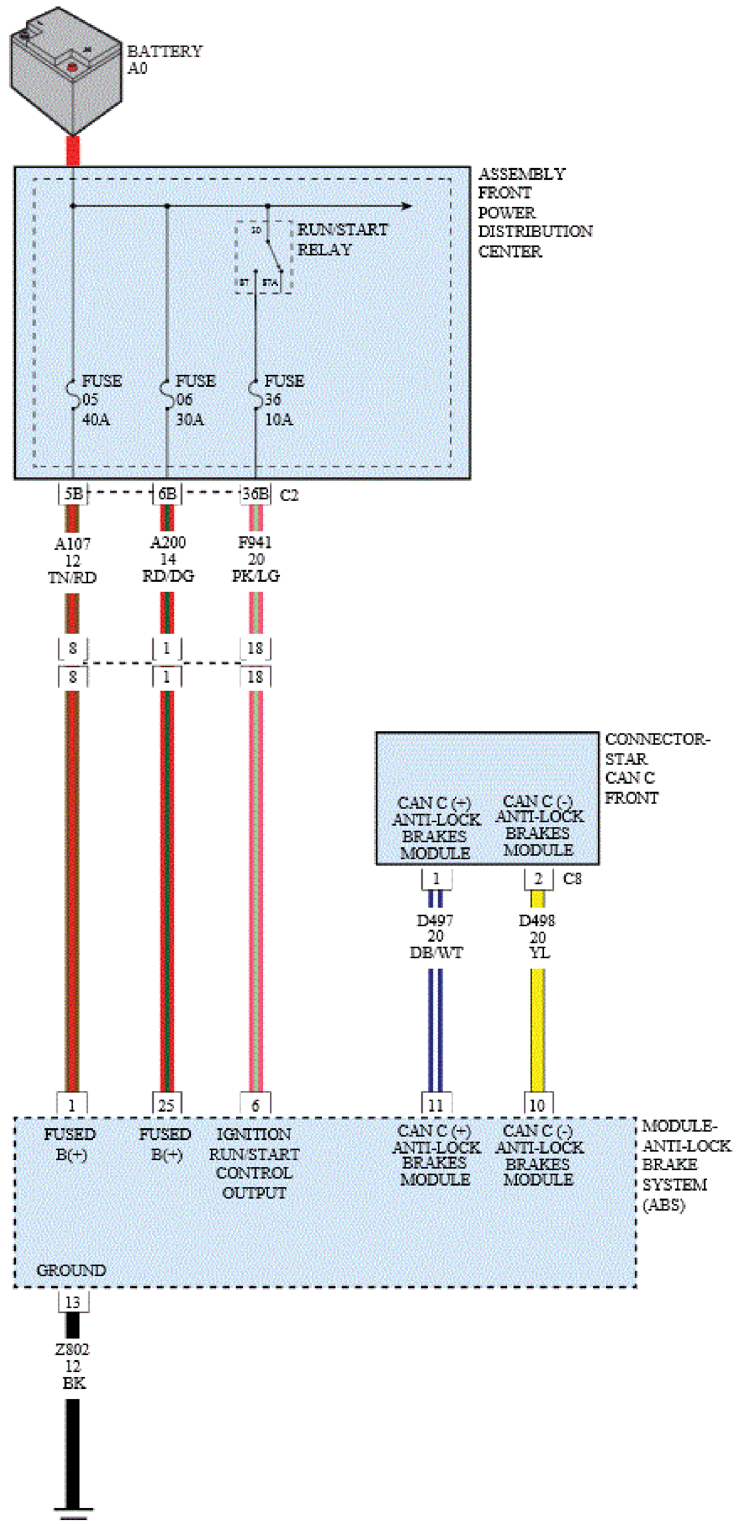


Fig. 32: Anti-Lock Brake System Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Ignition Status reported over the CAN Bus does not match the state of the Ignition Input.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
FUSE
(F941) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT SHORT TO VOLTAGE
POWER CIRCUITS OPEN OR HIGH RESISTANCE
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **This DTC must be active for the results of this test to be valid.**

   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order.
   3. With the scan tool, erase the DTCs.
   4. Start the engine.
   5. With the scan tool, read ABS DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **CHECK THE FUSE**
   1. Turn the ignition on.
   2. Using a 12-volt test light connected to ground, check the fuse for power.

Is the fuse good?

Yes

- Go To 3

No

- If the related fuse is open, check the (F941) Fused Ignition Switch Output (RUN/START) circuit for a short to ground.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

3. **(F941) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT SHORT TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the ABS Module harness connector.
    3. With a 12-volt test light connected to ground, check the (F941) Fused Ignition Switch Output (RUN/START) circuit at the ABS harness connector.

    NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

    Does the test light illuminate brightly?

    Yes

    - Repair the (F941) Fused Ignition Switch Output (RUN/START) circuit for a short to voltage.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **POWER CIRCUITS FOR AN OPEN OR HIGH RESISTANCE**
    1. Turn the ignition on.
    2. With a test light connected to ground check (A901) Fused B+, (A902) Fused B+ and (F941) Fused Ignition Switch Output (RUN/START) circuits at the ABS harness connector.

    NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

    Does the test light illuminate brightly?

    Yes

    - Replace the Anti-lock System Brake (ABS) Module in accordance with the service information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

- Repair the Power circuits for an open or high resistance.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C212A-16-SYSTEM VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module has detected a low voltage system error.
- Body Control Module (BCM) battery voltage CAN message indicates a low voltage condition.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM DTCS PRESENT
BATTERY
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHARGING SYSTEM DTCS PRESENT**
   1. Turn the ignition on.
   2. With the scan tool, read DTCs in the Powertrain Control Module (PCM).

      Are there any Charging System or related voltage DTCs present?

      Yes

      - Perform the appropriate Charging System DTC diagnostic procedures before continuing with this test. Refer to **DTC INDEX** .

      No

      - Go To 2
2. **BATTERY**

NOTE: **Make sure the Battery is in good condition. Using the Midtronics Battery Tester or an equivalent Battery tester, test the Battery before continuing.**

Does the Battery pass the load test for this specific application?

Yes

- Go To 3

No

- Replace the Battery in accordance with the Service Information. Refer to **BATTERY, REMOVAL** .

3. **CHECK FOR AN ACTIVE DTC**

NOTE: This DTC must be active for the results of this test to be valid.

1. Turn the ignition on.
2. With the scan tool, read ABS DTCs and record on the repair order.
3. With the scan tool, erase the DTCs.
4. Start the engine.
5. With the scan tool, read ABS DTCs.

Is the DTC active?

Yes

- Replace the Anti-lock Brake System (ABS) Module in accordance with the service information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

C212A-17-SYSTEM VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.

SET CONDITION

- Anti-lock Brake System (ABS) Module has detected a high voltage system error.
- Body Control Module (BCM) battery voltage CAN message indicates a high voltage condition.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM DTCS PRESENT
BATTERY
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHARGING SYSTEM DTCS PRESENT**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs in the Powertrain Control Module (PCM).

    Are there any Charging System or related voltage DTCs present?

    Yes

    - Perform the appropriate Charging System DTC diagnostic procedures before continuing with this test. Refer to **DTC INDEX** .

    No

    - Go To 2
2. **BATTERY**

    NOTE: **Make sure the Battery is in good condition. Using the Midtronics Battery Tester or an equivalent Battery tester, test the Battery before continuing.**

    Does the Battery pass the load test for this specific application?

    Yes

    - Go To 3

    No

    - Replace the Battery in accordance with the Service Information. Refer to **BATTERY, REMOVAL** .
3. **CHECK FOR AN ACTIVE DTC**

    NOTE: **This DTC must be active for the results of this test to be valid.**

    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.
    3. With the scan tool, erase the DTCs.
    4. Start the engine.

5. With the scan tool, read ABS DTCs.

   Is the DTC active?

   Yes

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the service information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

C2200-41-ANTI-LOCK BRAKE MODULE INTERNAL - GENERAL CHECKSUM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detected an internal error.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

1. The Anti-lock Brake System (ABS) Module is reporting internal errors.

   NOTE: **Before continuing, check the Anti-lock Brake System (ABS) Module harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.**

2. Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

3. Perform any Technical Service Bulletins that may apply.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2200-44-ANTI-LOCK BRAKE MODULE INTERNAL - DATA MEMORY FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detected an internal error.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

ANTI-LOCK BRAKE SYSTEM (ABS) MODULE INTERNAL CONDITION

1. The ABS Module is reporting internal errors.

   NOTE: **Before continuing, check the Anti-lock Brake System (ABS) Module harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.**

2. Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

3. Perform any Technical Service Bulletins that may apply.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2200-45-ANTI-LOCK BRAKE MODULE INTERNAL - PROGRAM MEMORY FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detected an internal error.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

ANTI-LOCK BRAKE SYSTEM (ABS) MODULE INTERNAL CONDITION

1. The ABS Module is reporting internal errors.

   NOTE: Before continuing, check the Anti-lock Brake System (ABS) Module harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

2. Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

3. Perform any Technical Service Bulletins that may apply.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2200-46-ANTI-LOCK BRAKE MODULE INTERNAL - CALIBRATION / PARAMETER MEMORY FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module has detected an internal error.
- Anti-lock Brake System (ABS) Module replaced.
- Hydraulic Control Unit (HCU) replaced.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE REPLACED
HYDRAULIC CONTROL UNIT (HCU) REPLACED

DIAGNOSTIC TEST

ANTI-LOCK BRAKE SYSTEM (ABS) MODULE INTERNAL CONDITION

1. The ABS Module is reporting internal errors.

NOTE: Before continuing, check the Anti-lock Brake System (ABS) Module harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

2. Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.
3. Perform any Technical Service Bulletins that may apply.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2200-47-ANTI-LOCK BRAKE MODULE INTERNAL - WATCHDOG / SAFETY AUC FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detected an internal error.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

ANTI-LOCK BRAKE SYSTEM (ABS) MODULE INTERNAL CONDITION

1. The ABS Module is reporting internal errors.

NOTE: **Before continuing, check the Anti-lock Brake System (ABS) Module harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.**

2. Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.
3. Perform any Technical Service Bulletins that may apply.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2200-48-ANTI-LOCK BRAKE MODULE INTERNAL - SUPERVISION SOFTWARE FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detected an internal error.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

ANTI-LOCK BRAKE SYSTEM (ABS) MODULE INTERNAL CONDITION

1. The ABS Module is reporting internal errors.

NOTE: **Before continuing, check the Anti-lock Brake System (ABS) Module harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.**

2. Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.
3. Perform any Technical Service Bulletins that may apply.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2200-49-ANTI-LOCK BRAKE MODULE INTERNAL - INTERNAL ELECTRONIC FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detected an internal error.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE/HYDRAULIC CONTROL UNIT DO NOT MATCH
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

ANTI-LOCK BRAKE SYSTEM (ABS) MODULE INTERNAL CONDITION

1. The ABS Module is reporting internal errors.

2. Verify that the Anti-lock Brake System (ABS) Module or the Hydraulic Control Unit (HCU) were not replaced individually from another vehicle.

NOTE: **Before continuing, check the Anti-lock Brake System (ABS) Module harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.**

3. Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.
4. Perform any Technical Service Bulletins that may apply.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2202-00-ORIGINAL VIN MISMATCH / MISSING

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **Diagnose and repair any Powertrain Control Module (PCM), VIN or Communication DTCs before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Current Vehicle Identification Number (VIN) in Anti-lock Brake System (ABS) Module does not match the broadcast VIN.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE NOT INITIALIZED
POWERTRAIN CONTROL MODULE (PCM) VIN NOT PROGRAMMED
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
POWERTRAIN CONTROL MODULE (PCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **This DTC must be active for the results of this test to be valid.**

   1. Turn the ignition on.
   2. With the scan tool, erase DTCs.
   3. Turn the ignition off.
   4. Turn the ignition on.
   5. Wait ten seconds.
   6. With the scan tool, read DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **WRONG VIN PROGRAMMED IN PCM**
   1. Turn the ignition on.
   2. With the scan tool, read the VIN in the PCM.
   3. Compare VIN in the PCM to the vehicle VIN.

      Is the correct VIN programmed in the PCM?

      Yes

      - Go To 3

      No

      - Program the correct VIN into the PCM. Follow the VIN programing procedure in the PCM/ECM reprogramming procedure. Refer to **MODULE PROGRAMMING** .
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
3. **INITIALIZE ABS MODULE**

1. Perform any Service Bulletins that may apply.

NOTE: When performing the ABS Initialization routine, the vehicle temperature must be above 10Ā°C (50Ā°F).

2. With the scan tool, under "Miscellaneous Functions" run the ABS Initialization routine.
3. Turn the ignition off.
4. Cycle the ignition from off to on.
5. Wait ten seconds.
6. With the scan tool, read DTCs.

Does the DTC remain active?

Yes

- Replace the Anti-lock Brake System (ABS) Module in accordance with the service information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C2206-00-VEHICLE CONFIGURATION MISMATCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: If the BCM has been serviced make sure that the Restore Vehicle Configuration is performed before continuing with this diagnostic procedure.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- If any of the learned Vehicle Configuration data from the CAN Bus has changed.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE NOT INITIALIZED

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

INITIALIZE THE ABS MODULE

NOTE: **Diagnose and repair any Powertrain Module (PCM), VIN or Communication DTCs before continuing with this diagnostic procedure.**

NOTE: **If C2202-00-Original VIN mismatch / Missing is set along with this DTC, perform the diagnostic procedure for C2202-00 before continuing with this test.**

NOTE: **ABS initialization data will not be saved if ignition has not been off for five minutes or if battery has been disconnected.**

1. Perform any Service Bulletins that may apply.

   NOTE: **When performing the ABS Initialization routine, the vehicle temperature must be above 10Ā°C (50Ā°F).**

2. With the scan tool, under "Miscellaneous Functions" perform the ABS Initialization routine.
3. Turn the ignition off.
4. Wait five minutes.
5. Turn ignition on.
6. With the scan tool, erase DTCs.
7. With the scan tool, read DTCs.

   Does the DTC remain active?

   Yes

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the service information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

C220B-00-ABS ACC NOT CALIBRATED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.

- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module and Hydraulic Control Unit (HCU) do not match.
- ABS analog valves are not calibrated.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
HYDRAULIC CONTROL UNIT (HCU)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read ABS DTCs and record on the repair order.
    3. Cycle the ignition from off to on.
    4. With the scan tool, read DTCs.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **ABS INITIALIZATION ROUTINE**

    NOTE: **When performing the ABS Initialization routine, the vehicle temperature must be above 10Ā°C (50Ā°F).**

    1. With the scan tool, under "Miscellaneous Functions" perform the ABS Initialization routine.
    2. With the scan tool, erase the DTCs.
    3. Cycle the ignition from off to on.
    4. With the scan tool, read the DTCs.

    Does the DTC remain active?

    Yes

- Using the schematics as a guide, check the ABS Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace thee Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test Complete.

U0002-88-CAN C BUS OFF PERFORMANCE - BUS OFF

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake Module (ABS) Module detected a catastrophic failure on the CAN bus.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
CAN BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
BODY CONTROL MODULE (BCM) POWER AND GROUND
BCM NOT CONFIGURED CORRECTLY
BODY CONTROL MODULE (BCM)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

CHECK FOR AN ACTIVE DTC

1. Turn the ignition on.
2. With the scan tool, read ABS DTCs and record on the repair order.
3. With the scan tool, erase DTCs.
4. Cycle the ignition from off to on.
5. With the scan tool, read DTCs.

Is the DTC active?

Yes

NOTE: **Diagnose the U0002-88 CAN C BUS OFF PERFORMANCE as the U0010-00-CAN INTERIOR BUS test.**

- Perform the U0010-00-CAN INTERIOR BUS diagnostic procedure. **Refer to** **DTC INDEX** .

No

- Perform the Stored Lost Communication DTCs diagnostic procedure. **Refer to** **STORED LOST COMMUNICATION DTCS** .

U0100-00-LOST COMMUNICATION WITH ECM/PCM

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0101-00-LOST COMMUNICATION WITH TCM

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0104-00- LOST COMMUNICATION WITH CRUISE CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0125-00-LOST COMMUNICATION WITH DYNAMICS SENSOR

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

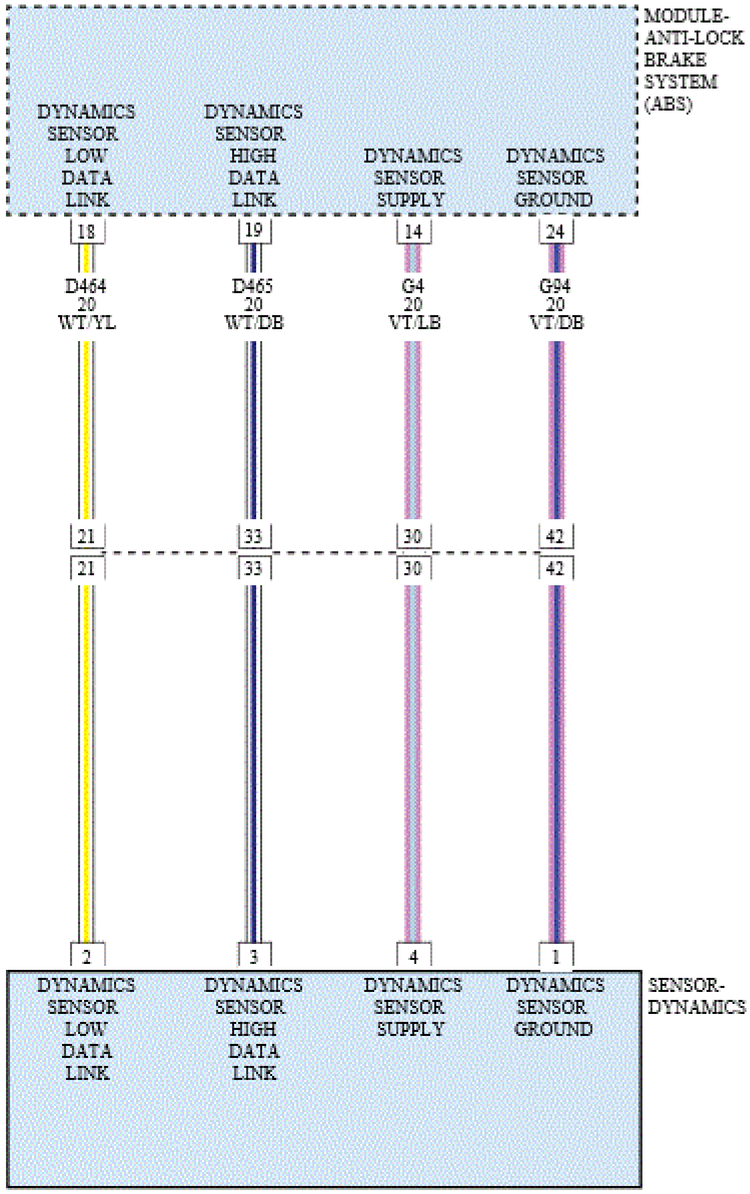


Fig. 33: Dynamics Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module fails to receive bus messages from the Dynamics Sensor.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
(G4) DYNAMICS SENSOR SUPPLY CIRCUIT OPEN OR HIGH RESISTANCE
(G94) GROUND CIRCUIT OPEN OR HIGH RESISTANCE
(D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT OPEN
(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT SHORTED TO VOLTAGE
(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT SHORTED TO GROUND
(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT OPEN
(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT SHORTED TO THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT
DYNAMICS SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **If DTC C2114-16, C2114-17 or U1003-88 are present, perform the diagnostics for these DTCs before continuing with this diagnostic procedure.**

   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order.
   3. With the scan tool, read and record Environmental Data (EV Data).
   4. With the scan tool, erase ABS DTCs.
   5. Cycle the ignition switch.
   6. With the scan tool, read ABS DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Perform the ABS-INTERMITTENT CONDITION diagnostic procedure. Refer to **STANDARD PROCEDURE**.
2. **INSPECT RELATED WIRING HARNESS, TERMINALS, AND CONNECTORS**
   1. Turn the ignition off.

   WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner,**

impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: **Proper Steering Angle Sensor installation is crucial for proper operation.**

2. Visually inspect the related wiring harness. Look for any pinched, chafed, pierced, and partially broken wires.
3. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, and corroded terminals.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **(G4) DYNAMICS SENSOR SUPPLY CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Disconnect the ABS Module harness connector.
   2. Disconnect the Dynamics Sensor harness connector.
   3. Measure the resistance of the (G4) Dynamics Sensor Supply circuit between the Dynamics Sensor harness connector and the Anti-lock Brake System (ABS) Module harness connector.

      Is the resistance below 5.0 Ohms?

      Yes

      - Go To 4

      No

      - Repair the (G4) Dynamics Sensor Supply circuit for an open.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **(G94) GROUND CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Using a 12-volt test light connected to B+, check the (G94) Ground circuit at the Dynamics Sensor harness connector.

      NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

Does the test light illuminate brightly?

Yes

- Go To 5

No

- Repair the (G94) Ground circuit for an open or high resistance.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **CHECK THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition on.
    2. Measure the voltage of the (D465) Dynamics Sensor High Data Link circuit.

    Is there any voltage present?

    Yes

    - Repair the (D465) Dynamics Sensor High Data Link circuit for a short to voltage.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 6

6. **CHECK THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Measure the resistance of the (D465) Dynamics Sensor High Data Link circuit between ground and the Dynamics Sensor harness connector.

    Is the resistance below 5.0 Ohms?

    Yes

    - Repair the (D465) Dynamics Sensor High Data Link circuit for a short to ground.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 7

7. **CHECK THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT FOR AN OPEN**
    1. Measure the resistance of the (D465) Dynamics Sensor High Data Link circuit between the Dynamics Sensor harness connector and the Anti-lock Brake System (ABS) Module harness connector.

    Is the resistance below 5.0 Ohms?

Yes

- Go To 8

No

- Repair the (D465) Dynamics Sensor High Data Link circuit for an open.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

8. **CHECK THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition on.
    2. Measure the voltage of the (D464) Dynamics Sensor Low Data Link circuit.

    Is there any voltage present?

    Yes

    - Repair the (D464) Dynamics Sensor Low Data Link circuit for a short to voltage.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 9
9. **CHECK THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Measure the resistance of the (D464) Dynamics Sensor Low Data Link circuit between ground and the Dynamics Sensor harness connector.

    Is the resistance below 5.0 Ohms?

    Yes

    - Repair the (D464) Dynamics Sensor Low Data Link circuit for a short to ground.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 10
10. **CHECK THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR AN OPEN**
    1. Measure the resistance of the (D464) Dynamics Sensor Low Data Link circuit between the Dynamics Sensor harness connector and the ABS Module harness connector.

    Is the resistance below 5.0 Ohms?

    Yes

    - Go To 11

No

- Repair the (D464) Dynamics Sensor Low Data Link circuit for an open.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

11. **(D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT SHORTED TO THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT**
    1. Turn the ignition off.
    2. Measure the resistance between the (D465) Dynamics Sensor High Data Link circuit and the (D464) Dynamics Sensor Low Data Link circuit at the ABSModule harness connector.

       Is the resistance below 5.0 Ohms?

       Yes

       - Repair the (D464) Dynamics Sensor Low Data Link circuit for a short to (D465) Dynamics Sensor High Data Link circuit.
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 12
12. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
    1. Replace the Dynamics Sensor in accordance with the Service Information. Refer to **SENSOR, DYNAMICS, REMOVAL** . Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    2. Turn the ignition on.
    3. With the scan tool, read ABS DTCs and record on the repair order.
    4. Cycle the ignition switch from off to on.
    5. With the scan tool, read DTCs.

       Does the DTC remain active?

       Yes

       - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
       - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Test complete.

U0126-00-LOST COMMUNICATION WITH STEERING ANGLE SENSOR

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0140-00-LOST COMMUNICATION WITH BODY CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to STANDARD PROCEDURE .

U0401-00-IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **Check for DTCs in the associated module before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.
- No U0002-88-CAN C Bus Off Performance DTC present.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects an incorrect CAN message from the Powertrain Control Module (PCM).

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE CAN BUS DTCS
POWERTRAIN CONTROL MODULE (PCM) CAN BUS DTCS
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
POWERTRAIN CONTROL (PCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **This DTC must be active for the results of this test to be valid.**

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ABS DTCs and record on the repair order.
   4. Cycle the ignition switch from off to on.
   5. With the scan tool, read ABS DTCs.

   Is the DTC active?

Yes

- Go To 2

No

- Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **CHECK IF POWERTRAIN CONTROL MODULE DTCS ARE PRESENT**
    1. With the scan tool, read the PCM DTCs.

    Are there any PCM DTCs present?

    Yes

    - Perform the appropriate diagnostic procedures. Refer to **DTC INDEX** .

    No

    - Go To 3

3. **CHECK OTHER MODULES FOR CAN BUS DTCS**
    1. With the scan tool, read the DTCs.

    Are there any CAN BUS DTCs present?

    Yes

    - Using the schematics as a guide, check the Powertrain Control Module (PCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Powertrain Control Module (PCM) in accordance with the Service Information. Refer to **MODULE, POWERTRAIN CONTROL, REMOVAL** .

    No

    - Using the schematics as a guide, check the Anti-lock Brake System (ABS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U0402-00-IMPLAUSIBLE DATA RECEIVED FROM TCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE:	**Check for DTCs in the associated module before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.
- No U0002-88-CAN C Bus Off Performance DTC present.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects an incorrect CAN message from the Transmission Control Module (TCM).

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE CAN BUS DTCS
TRANSMISSION CONTROL MODULE (TCM) CAN BUS DTCS
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
TRANSMISSION CONTROL MODULE (TCM)

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ABS DTCs and record on the repair order.
   4. Cycle the ignition switch from off to on.
   5. With the scan tool, read the DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **CHECK IF TRANSMISSION CONTROL MODULE (TCM) DTCS ARE PRESENT**
   1. With the scan tool, read TCM DTCs.

Are there any TCM DTCs present?

Yes

- Perform the appropriate diagnostic procedures. Refer to **DTC INDEX** .

No

- Go To 3

3. **CHECK OTHER MODULES FOR CAN BUS DTCS**
    1. With the scan tool, read the DTCs.

    Are there any CAN BUS DTCs present?

    Yes

    - Using the schematics as a guide, check the Transmission Control Module (TCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Transmission Control Module (TCM) in accordance with the Service Information. Refer to **MODULE, TRANSMISSION CONTROL, REMOVAL** .

    No

    - Using the schematics as a guide, check the Anti-lock Brake System (ABS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U0405-00-INVALID DATA RECEIVED CRUISE CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.
- No U0002-88-CAN C Bus Off Performance DTC present.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects an incorrect CAN message from the Adaptive Cruise Control (ACC) Module.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE CAN BUS DTCS
ADAPTIVE CRUISE CONTROL (ACC) MODULE CAN BUS DTCS
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
ADAPTIVE CRUISE CONTROL (ACC) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **This DTC must be active for the results of this test to be valid.**

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ABS DTCs and record on the repair order.
   4. Cycle the ignition switch from off to on.
   5. With the scan tool, read the DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.
2. **CHECK IF ACC MODULE DTCS ARE PRESENT**
   1. With the scan tool, read the ACC DTCs.

      Are there any ACC DTCs present?

      Yes

      - Perform the appropriate diagnostic procedures. Refer to **DIAGNOSIS AND TESTING** .

      No

      - Go To 3
3. **CHECK OTHER MODULES FOR CAN BUS DTCS**
   1. With the scan tool, read the DTCs.

      Are there any CAN BUS DTCs present?

Yes

- Using the schematics as a guide, check the Adaptive Cruise Control (ACC) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Adaptive Cruise Control (ACC) Module in accordance with the Service Information. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .

No

- Using the schematics as a guide, check the Anti-lock Brake System (ABS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U0422-00-IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **Check for DTCs in the associated module before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.
- No U0002-88-CAN C Bus Off Performance DTC present.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects an incorrect CAN message from the Body Control Module (BCM).

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE CAN BUS DTCS
BODY CONTROL MODULE (BCM) CAN BUS DTCS
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
BODY CONTROL MODULE (BCM)

DIAGNOSTIC TEST

1. **VERIFY THE DTC IS ACTIVE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Perform any Technical Service Bulletins (TSBs) that may apply.
   2. Turn the ignition on.
   3. With the scan tool, record and erase the DTCs.
   4. Cycle the ignition switch from off to on.
   5. With the scan tool, read the DTCs.

   Is the DTC active at this time?

   Yes

   - Go To 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **CHECK BODY CONTROL MODULE (BCM) CAN BUS DTCS ARE PRESENT**
   1. With the scan tool, read the BCM DTCs.

   Are there any BCM CAN BUS DTCs present?

   Yes

   - Perform the appropriate diagnostic procedures. Refer to **DIAGNOSIS AND TESTING** .

   No

   - Go To 3

3. **CHECK OTHER MODULES FOR CAN BUS DTCS**
   1. With the scan tool, read the DTCs.

   Are there any CAN BUS DTCs present?

   Yes

   - Using the schematics as a guide, check the Body Control Module (BCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Body Control Module (BCM) in accordance with the Service Information. Refer to **MODULE, BODY CONTROL, REMOVAL** .

   No

- Using the schematics as a guide, check the Anti-lock Brake System (ABS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U0429-00-IMPLAUSIBLE DATA RECEIVED FROM SCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **Check for DTCs in the associated module before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.
- No U0002-88-CAN C Bus Off Performance DTC present.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects an incorrect CAN message from the Steering Column Control Module (SCCM).

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE CAN BUS DTCS
STEERING COLUMN CONTROL MODULE (SCCM) CAN BUS DTCS
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **This DTC must be active for the results of this test to be valid.**

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ABS DTCs and record on the repair order.

4. Cycle the ignition switch from off to on.
5. With the scan tool, read ABS DTCs.

Is the DTC active?

Yes

- Go To 2

No

- Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **CHECK FOR STEERING COLUMN CONTROL MODULE (SCCM) DTCS PRESENT**
   1. With the scan tool, read SCCM DTCs.

   Are there any SCCM DTCs present?

   Yes

   - Perform the appropriate diagnostic procedures. (Refer to **DIAGNOSTIC CODE INDEX**).

   No

   - Go To 3

3. **CHECK OTHER MODULES FOR CAN BUS DTCS**
   1. With the scan tool, read DTCs.

   Are there any CAN BUS DTCs present?

   Yes

   - Using the schematics as a guide, check the Steering Column Control Module (SCCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Steering Column Control Module (SCCM) in accordance with the Service Information.

   No

   - Using the schematics as a guide, check the Anti-lock Brake System (ABS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U0432-00-INVALID DATA RECEIVED FROM MULTI-AXIS ACCELERATION SENSOR MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects an incorrect CAN message from the Dynamics Sensor.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
DYNAMICS SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read ABS DTCs and record on the repair order.
   4. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
   5. With the scan tool, erase the DTCs.
   6. Start the engine.
   7. With the scan tool, read the DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**

1. Replace the Dynamics Sensor in accordance with the Service Information. Refer to **SENSOR, DYNAMICS, REMOVAL** . Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
2. Turn the ignition on.
3. With the scan tool, read ABS DTCs.
4. Cycle the ignition switch from off to on.
5. With the scan tool, read DTCs.

   Is the DTC still active?

   Yes

   - Replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

U1003-88-ESP CAN C BUS PERFORMANCE - BUS OFF

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

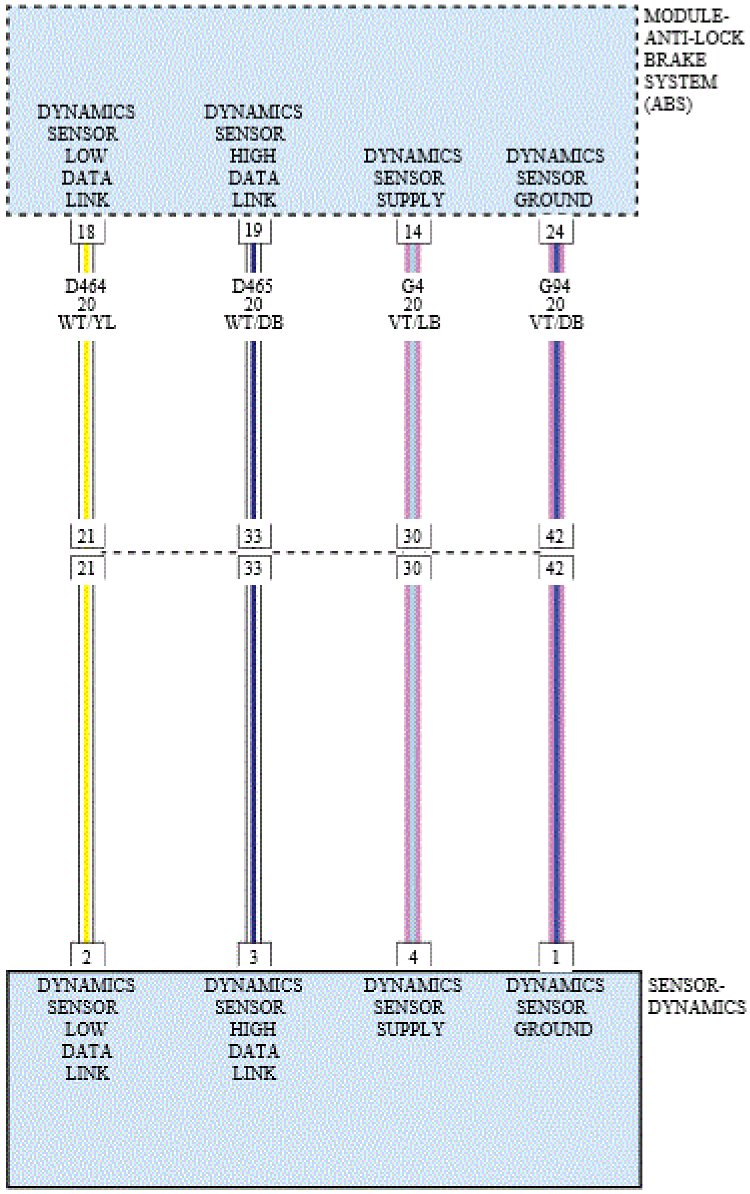


Fig. 34: Dynamics Sensor - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects one CAN messages that is assigned to the basic CAN channel was missed by the CAN driver.
- ABS system to slow in responding to CAN interrupts.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT SHORTED TO VOLTAGE
(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT SHORTED TO GROUND
(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT OPEN
(D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT SHORTED TO VOLTAGE
(D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT SHORTED TO GROUND
(D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT OPEN
(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT SHORTED TO THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT
DYNAMICS SENSOR
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order.
   3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase the DTCs.
   5. Start the engine.
   6. With the scan tool, read the DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT SHORTED TO VOLTAGE**
   1. Turn the ignition off.
   2. Disconnect the ABS Module harness connector.
   3. Disconnect the Dynamics Sensor harness connector.

4. Turn the ignition on.
5. Measure the voltage of the (D464) Dynamics Sensor Low Data Link circuit.

   Is there any voltage present?

   Yes

   - Repair the (D464) Dynamics Sensor Low Data Link circuit for a short to voltage.
   - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT SHORTED TO GROUND**
   1. Turn the ignition off.
   2. Measure the resistance of the (D464) Dynamics Sensor Low Data Link circuit between ground and the Dynamics Sensor harness connector.

      Is the resistance below 5.0 Ohms?

      Yes

      - Repair the (D464) Dynamics Sensor Low Data Link circuit for a short to ground.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR AN OPEN**
   1. Measure the resistance of the (D464) Dynamics Sensor Low Data Link circuit between the Dynamics Sensor harness connector and the Anti-lock Brake System (ABS) Module harness connector.

      Is the resistance below 5.0 Ohms?

      Yes

      - Go To 5

      No

      - Repair the (D464) Dynamics Sensor Low Data Link circuit for an open.
      - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **(D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT SHORTED TO VOLTAGE**
   1. Turn the ignition on.
   2. Measure the voltage of the (D465) Dynamics Sensor High Data Link circuit.

      Is there any voltage present?

Yes

- Repair the (D465) Dynamics Sensor High Data Link circuit for a short to voltage.
- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 6

6. **(D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT SHORTED TO GROUND**
    1. Turn the ignition off.
    2. Measure the resistance of the (D465) Dynamics Sensor High Data Link circuit between ground and the Dynamics Sensor harness connector.

    Is the resistance below 5.0 Ohms?

    Yes

    - Repair the (D465) Dynamics Sensor High Data Link circuit for a short to ground.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 7

7. **(D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT OPEN**
    1. Measure the resistance of the (D465) Dynamics Sensor High Data Link circuit between the Dynamics Sensor harness connector and the Anti-lock Brake System (ABS) Module harness connector.

    Is the resistance below 5.0 Ohms?

    Yes

    - Go To 8

    No

    - Repair the (D465) Dynamics Sensor High Data Link circuit for an open.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

8. **(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT SHORTED TO THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT**
    1. Measure the resistance between the (D464) Dynamics Sensor Low Data Link circuit and the (D465) Dynamics Sensor High Data Link circuit at the ABS Module harness connector.

    Is the resistance below 5.0 Ohms?

    Yes

    - Repair the (D464) Dynamics Sensor Low Data Link circuit for a short to the (D465)

Dynamics Sensor High Data Link circuit.

- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 9

9. **ANTI-LOCK BRAKE SYSTEM (ABS) MODULE**
    1. Turn the ignition off.
    2. Replace the Dynamic Sensor in accordance with the Service Information. Refer to **SENSOR, DYNAMICS, REMOVAL** .
    3. Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    4. With the scan tool, read the DTCs.

    Does the DTC remain active?

    Yes

    - Using the schematics as a guide, check the Anti-lock Brake System (ABS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

U140E-00-IMPLAUSIBLE VEHICLE CONFIGURATION DATA RECEIVED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

NOTE: **If any other DTCs are present, repair them first before continuing with this diagnostic procedure.**

NOTE: **If the BCM has been replaced or is not configured address this issue first before continuing with this diagnostic procedure.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Anti-lock Brake System (ABS) Module detects the Body Control Module (BCM) is indicating that the Vehicle Configuration data has not been programmed.

DEFAULT ACTION

- ABS is disabled.

POSSIBLE CAUSES

Possible Causes
BODY CONTROL MODULE (BCM) NOT CONFIGURED
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read ABS DTCs and record on the repair order.
   3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase the DTCs.
   5. Start the engine.
   6. With the scan tool, read ABS DTCs.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE**.

2. **VERIFY THE BCM IS CONFIGURED CORRECTLY**
   1. With the scan tool, under BCM enter program network configuration and program the BCM to the vehicle configuration.
   2. With the scan tool, erase the ABS DTCs.
   3. Cycle the ignition switch from off to on, leaving the ignition on for a minimum of ten seconds.
   4. With the scan tool, read the ABS DTCs.

      Does the DTC remain active?

      Yes

      - Using the schematics as a guide, check the Anti-lock Brake System (ABS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-lock

Brake System (ABS) Module accordance with Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

- Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

STANDARD PROCEDURE

ABS VERIFICATION TEST

DIAGNOSTIC TEST

ABS VERIFICATION TEST

WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

1. Connect all previously disconnected components and connectors.
2. If any of the following components were replaced, use the following table below and perform the correct routines using the scan tool under "Miscellaneous Functions":

NOTE: When performing the ABS Initialization routine, the vehicle temperature must be above 10Â°C (50Â°F).

NOTE: If the ABS is not initialized, the ABS indicator will flash continuously.

Component	Routines
Anti-lock Brake System (ABS) Module	ABS Initialization/Brake Pedal Calibration
Hydraulic Control Unit (HCU)	ABS Initialization/ABS Bleed Brakes/Brake Pedal Calibration
Integrated Control Unit (ICU)	ABS Initialization/ABS Bleed Brakes/Brake Pedal Calibration
Brake Pedal Sensor	Brake Pedal Calibration
Dynamics Sensor	ABS Initialization
Steering Column Control Module (SCCM)/Steering Angle Sensor (SAS)	ABS Initialization

NOTE: If any of the Wheel Speed Sensors were replaced, test drive the vehicle at a speed above 25 km/h (15 mph) for several minutes.

NOTE: If the ABS Module or the Dynamic Sensor was replaced, there may be a Dynamic Sensor DTC active. To initialize the ABS Module and clear offsets have the vehicle on level ground and wheels pointing straight ahead and follow the directions on the scan tool. If the Dynamics Sensor was replaced, test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 10 and 25 km/h (6 and 15 mph).

3. Turn the ignition off.
4. Verify all accessories are turned off and the battery is fully charged.
5. Turn the ignition on.
6. With the scan tool, erase all Diagnostic Trouble Codes (DTCs) from All modules. Start the engine and allow it to run for two minutes and fully operate the system that was indicating the failure.
7. Cycle the ignition off and to ignition on.
8. With the scan tool, read DTCs in the ABS Module.
9. If any DTCs are present, perform the appropriate diagnostic procedure. Refer to **DIAGNOSIS AND TESTING**.

NOTE: **For Sensor Signal Plausibility and Pump Motor faults, the ABS Module must verify that the failure conditions are no longer present in the current ignition cycle before it can turn off the failure lamp(s). This may require the vehicle to be driven for several minutes above 15 k/mh (9 mph). Once it has been determined that the failure condition is no longer present the lamp(s) will be turned off.**

10. If there are no DTCs present after turning ignition on, road test the vehicle for at least five minutes.
    - Slowly turn the steering wheel from stop to stop.
    - Test drive the vehicle by turning the vehicle left or right in a curving manner at a speeds between 10 and 25 km/h (6 and 15 mph).
    - Perform several anti-lock braking stops.
11. Again, with the scan tool read DTCs. If any DTCs are present, for the diagnostic procedure and troubleshoot the new or recurring DTC. Refer to **DIAGNOSIS AND TESTING**.
12. If there are no Diagnostic Trouble Codes (DTCs) present, and the customer's concern can no longer be duplicated, the repair is complete.

    Are any DTCs present or is the original concern still present?

    Yes

    - Repair is not complete, perform the appropriate diagnostic procedure. Refer to **DIAGNOSIS AND TESTING**.

    No

    - Repair is complete.

ABS INTERMITTENT CONDITION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

DIAGNOSTIC TEST

PERFORM ABS INTERMITTENT CONDITION TEST

NOTE: **The conditions that set the DTC are not present at this time. The following list**

may help in identifying the intermittent condition.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

1. Perform any Service Bulletins that may apply.
2. Review the scan tool Environmental Data (EV Data). If possible, try to duplicate the conditions under which the DTC set.
3. Turn the ignition off.
4. Visually inspect the related wire harness. Disconnect all the related harness connectors. Look for any chafed, pierced, pinched, partially broken wires and broken, bent, pushed out, or corroded terminals.
5. Wiggle the wires while checking for shorts and open circuits.
6. Perform a voltage drop test on the related circuits between the suspected inoperative component and the Anti-Lock Brake System (ABS) Module.
7. Inspect and clean all PCM, ABS, engine, and chassis grounds that are related to the most current DTC.
8. If numerous trouble codes were set, use a wire schematic and look for any common ground or supply circuits.
9. For any Relay DTCs, actuate the Relay with the scan tool and wiggle the related wire harness to try to interrupt the actuation.
10. Use the scan tool to perform a System Test if one applies to failing component.
11. A co-pilot, data recorder, or lab scope should be used to help diagnose intermittent conditions.
12. Test drive the vehicle over 15 km/h (9 mph).

    Were any problems found during the above inspections?

    Yes

    - Perform the necessary repairs.
    - Perform the ABS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time.

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Article GUID: A00735882

DESCRIPTION

DESCRIPTION

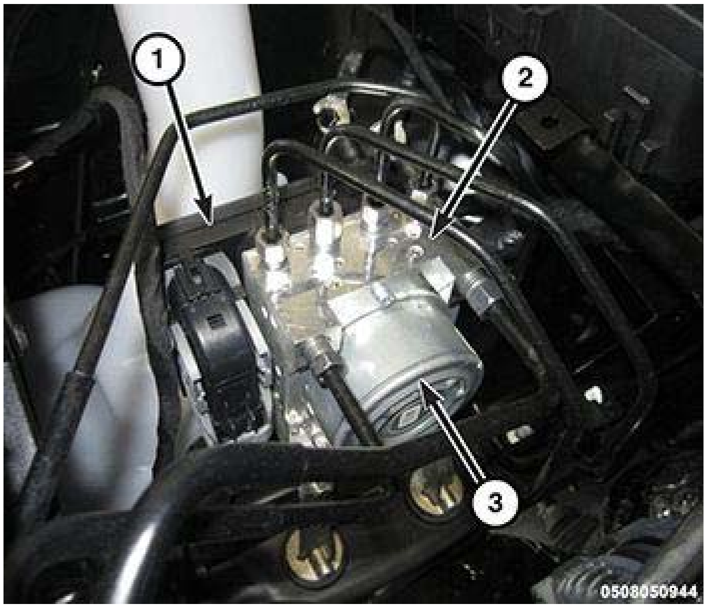


Fig. 1: Antilock Brake Module (ABM) & Hydraulic Control Unit (HCU)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.**

This vehicle uses an electronic brake control system designated MK100. This system includes Antilock Brake System (ABS), Traction Control System (TCS), Brake Assist System (BAS), Electronic Variable Brake Proportioning (EVPB) and Electronic Stability Control (ESC). All of these systems work together to enhance vehicle stability and control in various driving conditions and are commonly referred to as ESC.

This system uses components of the base brake system, but also features the following components:

- Integrated Control Unit (ICU) - Includes Hydraulic Control Unit (HCU) (2) and Antilock Brake Module (ABM) (1).
- Wheel Speed Sensors (WSS) - Four sensors (one at each wheel).
- Dynamics Sensor - Includes a yaw rate sensor and a lateral accelerometer.
- Steering Angle Sensor (SAS) - The SAS is part of the Steering Column Control Module (SCCM).
- Brake Pressure Sensor - The brake pressure sensor is located in the HCU and is not serviceable separate from the HCU.

ABS

The purpose of the Antilock Brake System (ABS) is to prevent wheel lockup under braking conditions on virtually any type of road surface. Antilock braking is desirable because a vehicle that is stopped without locking the wheels retains directional stability and some steering capability. This allows the driver to retain greater control of the vehicle during braking.

ALL-SPEED TRACTION CONTROL

The Traction Control System (TCS) is an all-speed traction control. All-Speed Traction Control enhances mobility and prevents wheel slip when accelerating on slippery surfaces. It also provides a measure of directional stability control. Using the wheel-speed sensors, it can detect excessive yaw and help keep the car on the intended course, as for instance, when accelerating around a curve.

With rear-wheel drive, All-Speed Traction Control is effective up to 85 mph (137 km/h).

ELECTRONIC STABILITY CONTROL

The Electronic Stability Control (ESC) enhances control and stability of the vehicle under various driving conditions. ESC corrects for over/under steering of the vehicle by applying the brake of the appropriate wheel to assist in counteracting the over/under steer condition. Engine power may also be reduced to help the vehicle maintain the desired path. ESC uses sensors in the vehicle to determine the vehicle path intended by the driver and compares it to the actual path of the vehicle. When the actual path does not match the intended path, ESC applies the brake of the appropriate wheel to assist in counteracting the oversteer or understeer condition.

- Oversteer - When the vehicle is turning more that appropriate for the steering wheel position.
- Understeer - When the vehicle is turning less than appropriate for the steering wheel position.

The "ESC/TCS" indicator light located in the instrument cluster starts to flash as soon as the tires lose traction and the ESC system becomes active. The "ESC/TCS" indicator light also flashes when TCS is active.

The ESC can be turned off by using the ESC Off switch. When the ESC Off switch is depressed, it does not completely turn the system off. The ESC system shuts off engine management but retains brake activations for yaw control.

The SRT8 equipped vehicles have three-mode ESC functionality. When the ESC Off switch is depressed and quickly released, the system enters "partial" mode which has no engine management but retains brake activations for yaw control. If the switch is held down for a period of five seconds or longer before releasing, a chime will sound and the ESC system enters "full-off" mode which disables engine management as well as brake activations. The system can be returned to "normal" by briefly pressing and releasing the ESC Off switch. The system will default to full-on mode at the beginning of each ignition cycle.

BRAKE ASSIST SYSTEM

The Brake Assist System (BAS) is designed to optimize the vehicle's braking capability during emergency braking maneuvers. The system detects an emergency braking situation by sensing the rate and amount of brake application and then applies optimum pressure to the brakes. This can help reduce braking distances. The BAS complements the Antilock Brake System (ABS). Applying the brakes very quickly results in the best BAS assistance.

ELECTRONIC VARIABLE BRAKE PROPORTIONING

Electronic Variable Brake Proportioning (EVBP) is used to balance front-to-rear braking in place of a traditional rear proportioning valve. The EVBP system uses the ABS system to control the slip of the rear wheels in partial braking range. The braking force of the rear wheels is controlled electronically by using the inlet and outlet valves located in the integrated control unit (ICU).

EVBP activation is invisible to the customer since there is no pump motor noise or brake pedal feedback.

OPERATION

OPERATION

NOTE: **The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.**

ABS

There are a few performance characteristics of the Antilock Brake System (ABS) that may at first seem abnormal, but in fact are normal. These characteristics are described below.

NORMAL BRAKING

Under normal braking conditions, the ABS functions the same as a standard base brake system with a front/rear split master cylinder and conventional vacuum assist.

ABS BRAKING

ABS operation is available at all vehicle speeds above 3-5 mph. If a wheel locking tendency is detected during a brake application, the brake system enters the ABS mode. During ABS braking, hydraulic pressure in the four wheel circuits is modulated to prevent any wheel from locking. Each wheel circuit is designed with a set of electric solenoids to allow modulation. Wheel lockup may be perceived at the very end of an ABS stop and is considered normal.

During an ABS event, the Integrated Control Unit (ICU) regulates hydraulic pressure at all four of the vehicle's wheels.

The hydraulic pressure at each front wheel is controlled independently (relative to the amount of slip at each wheel) in order to maximize the braking force generated by the front brakes. The rear wheels are controlled such that the hydraulic pressure at either rear wheel does not exceed that of the highest slip rear wheel in order to maintain vehicle stability.

The system can build and release pressure at each wheel, depending on signals generated by the wheel speed sensors (WSS) at each wheel and received at the Antilock Brake Module (ABM).

NOISE AND BRAKE PEDAL FEEL

During ABS braking, some brake pedal movement may be felt. In addition, ABS braking will create ticking, popping, or groaning noises heard by the driver. This is normal and is due to pressurized fluid being transferred between the master cylinder and the brakes. If ABS operation occurs during hard braking, some pulsation may be felt in the vehicle body due to fore and aft movement of the suspension as brake pressures are modulated.

At the end of an ABS stop, ABS is turned off when the vehicle is slowed to a speed of 3-4 mph. There may be a slight brake pedal drop anytime that the ABS is deactivated, such as at the end of the stop when the vehicle speed is less than 3 mph or during an ABS stop where ABS is no longer required. These conditions exist when a vehicle is being stopped on a road surface with patches of ice, loose gravel, or sand on it. Also, stopping a vehicle on a bumpy road surface activates ABS because of the wheel hop caused by the bumps.

TIRE NOISE AND MARKS

Although the ABS system prevents complete wheel lockup, some wheel slip is desired in order to achieve optimum braking performance. Wheel slip is defined as follows: 0 percent slip means the wheel is rolling freely and 100 percent slip means the wheel is fully locked. During brake pressure modulation, wheel slip is allowed to reach up to 25-30 percent. This means that the wheel rolling velocity is 25-30 percent less than that of a free rolling wheel at a given vehicle speed. This slip may result in some tire chirping, depending on the road surface. This sound should not be interpreted as total wheel lockup.

Complete wheel lockup normally leaves black tire marks on dry pavement. The ABS will not leave dark black tire marks since the wheel never reaches a fully locked condition. However, tire marks may be noticeable as light patched marks.

START-UP AND DRIVE-OFF CYCLES

When the ignition is turned on, a popping sound and a slight brake pedal movement may be noticed. The ABS warning lamp will also be on for up to 5 seconds after the ignition is turned on.

When the vehicle is first driven off, a humming may be heard or felt by the driver at approximately 12-25 mph (20-40 km/h). All of these conditions are a normal function of ABS as the system is performing a diagnosis check.

PREMATURE ABS CYCLING

Symptoms of premature ABS cycling include: clicking sounds from the solenoid valves; pump/motor running; and pulsations in the brake pedal. Premature ABS cycling can occur at any braking rate of the vehicle and on any type of road surface. Neither the red BRAKE indicator lamp, nor the amber ABS indicator lamp, illuminate and no faults are stored in the ABM.

Premature ABS cycling is a condition that needs to be correctly assessed when diagnosing problems with the antilock brake system. It may be necessary to use a scan tool to detect and verify premature ABS cycling.

Check the following common causes when diagnosing premature ABS cycling: damaged wheel bearings (causing tone wheel issues); damaged wheel bearing housings where wheel speed sensors mount; and loose wheel speed sensor mounting bolts.

After diagnosing the defective component, repair or replace it as required. When the component repair or replacement is completed, test drive the vehicle to verify that premature ABS cycling has been corrected.

ALL-SPEED TRACTION CONTROL

Traction control systems sense impending wheel spin based on a model of the rate of change of wheel speed under normal traction conditions. The All-Speed Traction Control uses signals from the same wheel speed sensors as ABS to determine when to apply the brakes to one or more wheels and when to reduce engine torque output using the electronic throttle control (ETC) to prevent wheel slip during acceleration. Throttle control

makes the vehicle less reliant on brake application alone to maintain traction, increasing the operating speed range and more closely modulates speed, resulting in smoother operation. With All-Speed Traction Control reducing engine torque as well as applying the brakes, it is possible to achieve almost seamless torque application at the wheels.

If the wheel slip is severe enough to require throttle intervention, All-Speed Traction Control will reduce engine torque and sometimes upshift the transmission to avoid the condition. In milliseconds, All-Speed Traction Control interrogates the engine control system to determine the current torque output, determines how much the torque output the current conditions will allow, and signals this requirement to the engine control system, which reduces the torque by partially closing the throttle. With execution of the torque reduction, the brake system reduces brake pressure to make the transition smooth, while maintaining forward progress. By reducing engine power, braking effectiveness is maintained and the system can operate throughout the normal vehicle speed range. That is why the system is identified as providing "all-speed" traction control.

ELECTRONIC STABILITY CONTROL

To determine whether the car is responding properly to cornering commands, ESC uses steering wheel angle, yaw (turning) rate and lateral acceleration sensors (combined into Dynamics Sensor). Using signals from these sensors, in addition to individual wheel speed sensor signals, the system determines appropriate brake and throttle actions. Once initiated, ESC operates much like All-Speed Traction Control, except that the goal is directional stability. If the vehicle yaw response, or rate of turning, is inconsistent with the steering angle and vehicle speed indications, the ESC system applies the brakes and, if necessary closes the throttle, to restore control. This occurs whether the vehicle is turning too rapidly (oversteering) or not rapidly enough (understeering).

ELECTRONIC VARIABLE BRAKE PROPORTIONING

Upon entry into EVBP the inlet valve for the rear brake circuit is switched ON so that the fluid supply from the master cylinder is shut off. In order to decrease the rear brake pressure, the outlet valve for the rear brake circuit is pulsed. This allows fluid to enter the low pressure accumulator (LPA) in the Hydraulic Control Unit (HCU) resulting in a drop in fluid pressure to the rear brakes. In order to increase the rear brake pressure, the outlet valve is switched off and the inlet valve is pulsed. This increases the pressure to the rear brakes. This back-and-forth process will continue until the required slip difference is obtained. At the end of EVBP braking (brakes released) the fluid in the LPA drains back to the master cylinder by switching on the electronic shuttle valve.

The EVBP will remain functional during many ABS fault modes. If both the red BRAKE and amber ABS warning indicators are illuminated, the EVBP may not be functioning.

STANDARD PROCEDURE

STANDARD PROCEDURE - ANTILOCK BRAKE SYSTEM BLEEDING

The base brake's hydraulic system must be bled anytime air enters the hydraulic system. The Antilock Brake System (ABS) must always be bled anytime it is suspected that the HCU has ingested air.

Brake systems with ABS must be bled as two independent braking systems. The non-ABS portion of the brake system with ABS is to be bled the same as any non-ABS system.

The ABS portion of the brake system must be bled separately. Use the following procedure to properly bleed the brake hydraulic system including the ABS.

NOTE: **During the brake bleeding procedure, be sure the brake fluid level remains close to the FULL level in the master cylinder fluid reservoir. Check the fluid level periodically during the bleeding procedure and add MoparÃ® DOT 3 brake fluid as required.**

BLEEDING

When bleeding the ABS system, the following bleeding sequence must be followed to insure complete and adequate bleeding.

1. Make sure all hydraulic fluid lines are installed and properly torqued.
2. Connect the scan tool to the diagnostics connector. The diagnostic connector is located under the lower steering column cover to the left of the steering column.
3. Using the scan tool, check to make sure the ABM does not have any fault codes stored. If it does, clear them.

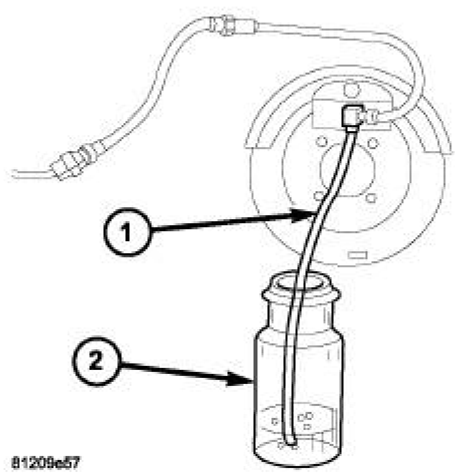


Fig. 2: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

WARNING: **When bleeding the brake system wear safety glasses. A clear bleed tube (1) must be attached to the bleeder screws and submerged in a clear container filled part way with clean brake fluid (2). Direct the flow of brake fluid away from yourself and the painted surfaces of the vehicle. Brake fluid at high pressure may come out of the bleeder screws when opened.**

NOTE: **Pressure bleeding is recommended to bleed the base brake system to ensure all air is removed from system. Manual bleeding may also be used, but additional time is needed to remove all air from system.**

4. Bleed the base brake system. Refer to **STANDARD PROCEDURE** .
5. Using the scan tool, select ECU VIEW, followed by ABS MISCELLANEOUS FUNCTIONS to access bleeding. Follow the instructions displayed. When finished, disconnect the scan tool and proceed.
6. Bleed the base brake system a second time. Check brake fluid level in the reservoir periodically to prevent emptying, causing air to enter the hydraulic system.

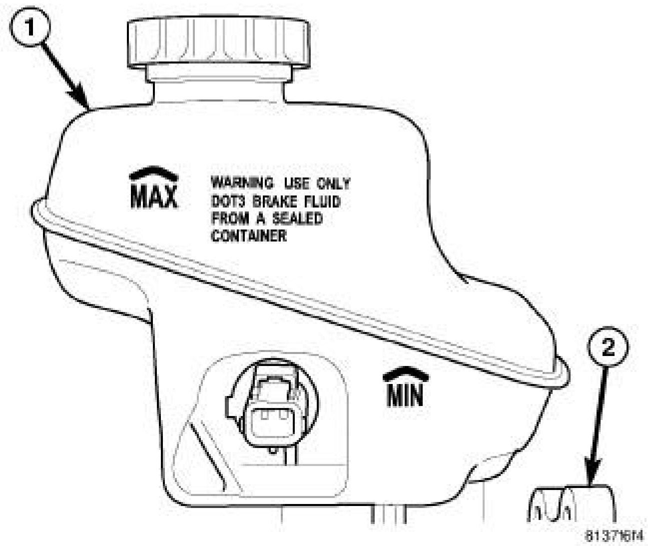


Fig. 3: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

7. Fill the master cylinder fluid reservoir (1) to the MAX level.
8. Test drive the vehicle to be sure the brakes are operating correctly and that the brake pedal does not feel spongy.

SPECIFICATIONS

TORQUE SPECIFICATIONS

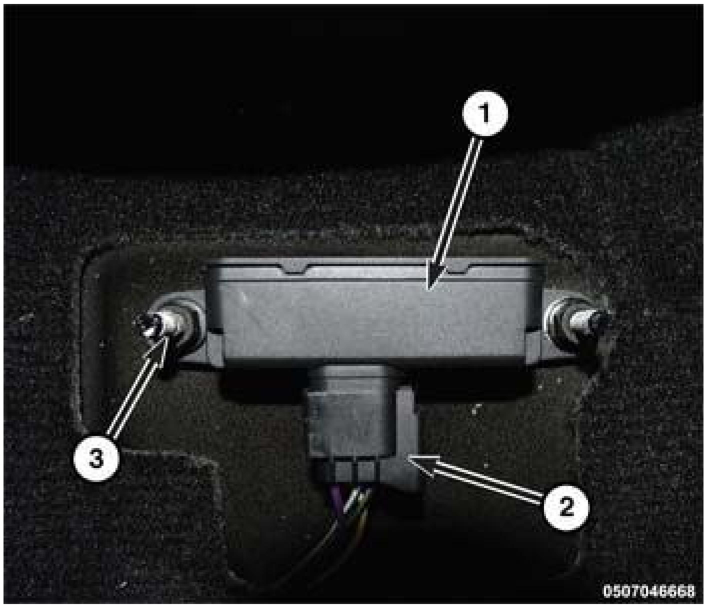
For ABS fastener torque specifications, refer to **SPECIFICATIONS** .

ELECTRICAL

SENSOR, DYNAMICS

DESCRIPTION

DESCRIPTION



[Fig. 4: Dynamics Sensor Components](#)
Courtesy of CHRYSLER GROUP, LLC

The Yaw Rate and Lateral Acceleration Sensors are housed into one unit known as the Dynamics Sensor. The sensor is used to measure side-to-side (lateral) motion and vehicle rotational sensing (how fast the vehicle is turning - yaw).

Yaw and Lateral Acceleration Sensors cannot be serviced separately. The entire Dynamics Sensor must be replaced when necessary.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove floor console. Refer to **CONSOLE, FLOOR, REMOVAL** .

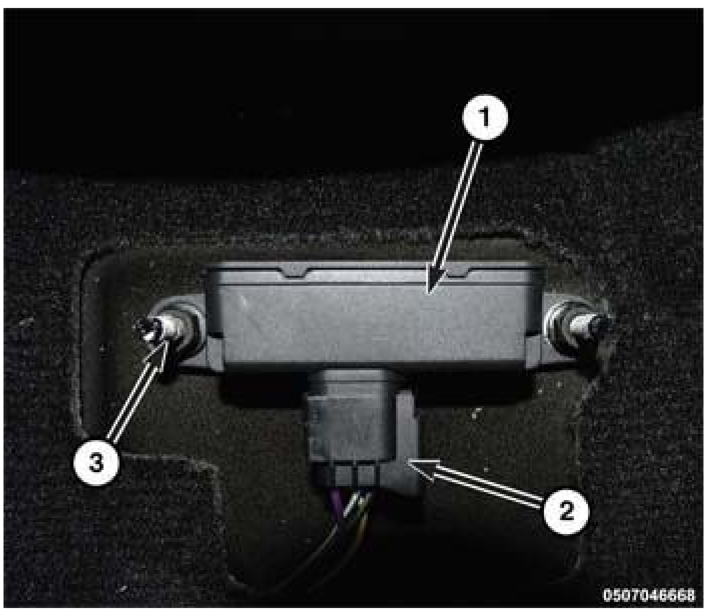


Fig. 5: Dynamics Sensor Components
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect wiring harness connector (2) at the sensor (1).
4. Remove two nuts (3) and the sensor (1).

INSTALLATION

INSTALLATION

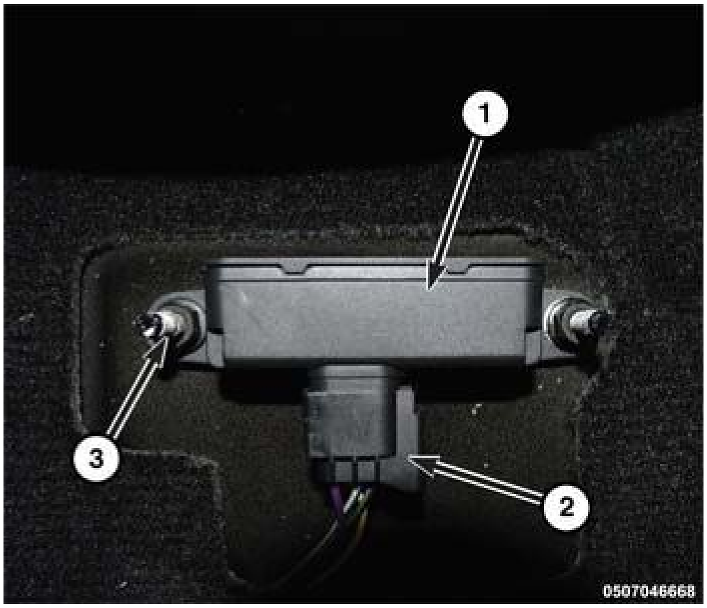


Fig. 6: Dynamics Sensor Components
Courtesy of CHRYSLER GROUP, LLC

1. Install dynamics sensor (1). Tighten the dynamic sensor nuts (3) to the proper **SPECIFICATIONS** .
2. Connect the dynamic sensor wiring harness connector (2).
3. Install floor console. Refer to **CONSOLE, FLOOR, INSTALLATION** .
4. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
5. Perform Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

SENSOR, STEERING WHEEL ANGLE

REMOVAL

REMOVAL

The steering angle sensor is serviced as an assembly with the steering column control module (SCCM). Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .

INSTALLATION

INSTALLATION

The steering angle sensor is serviced as an assembly with the steering column control module (SCCM). Refer to **MODULE, STEERING COLUMN CONTROL, INSTALLATION** .

SENSOR, WHEEL SPEED, FRONT

DESCRIPTION

DESCRIPTION

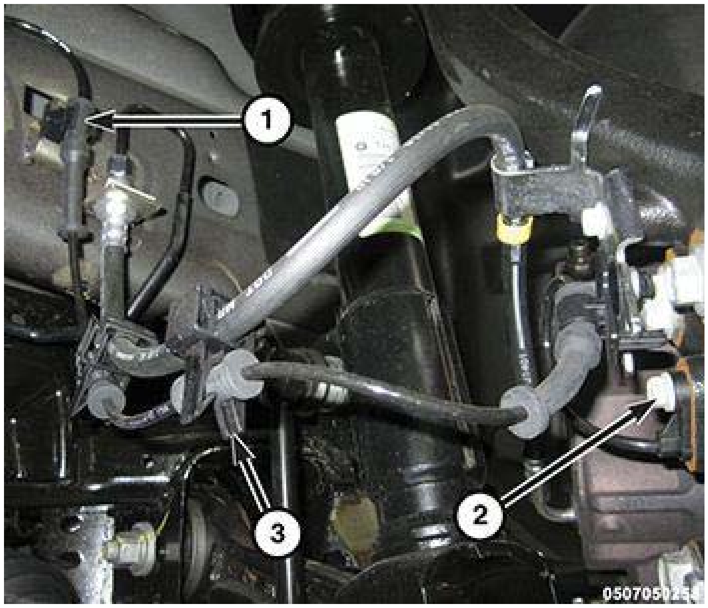


Fig. 7: Wheel Speed Sensor & Routing Clips
Courtesy of CHRYSLER GROUP, LLC

One Wheel Speed Sensor (WSS) is mounted to each knuckle. The WSS, using a tone wheel attached to the hub and bearing as a trigger mechanism, communicates with the Antilock Brake Module (ABM), informing it of that wheel's speed.

The head of the front WSS mounts to the inside of the knuckle.

REMOVAL

REMOVAL

NOTE: Removal process is the same for both sides of the vehicle.

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove wheel liner. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .

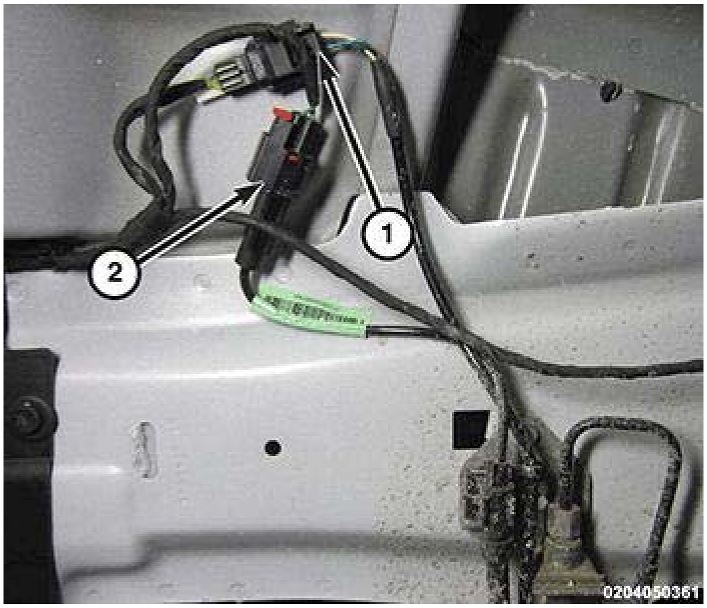


Fig. 8: Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

4. Remove the WSS harness connector from the body connector (2).

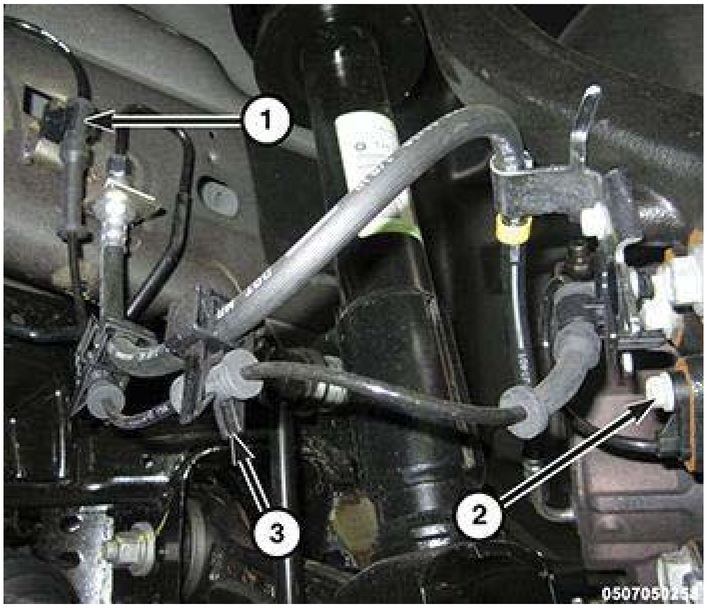
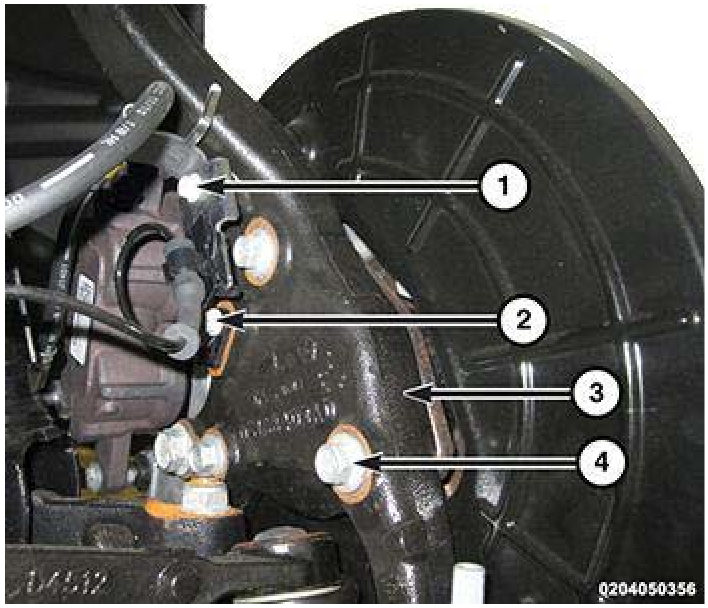


Fig. 9: Wheel Speed Sensor & Routing Clips
Courtesy of CHRYSLER GROUP, LLC

5. Remove the WSS from the routing clips (1 and 3).



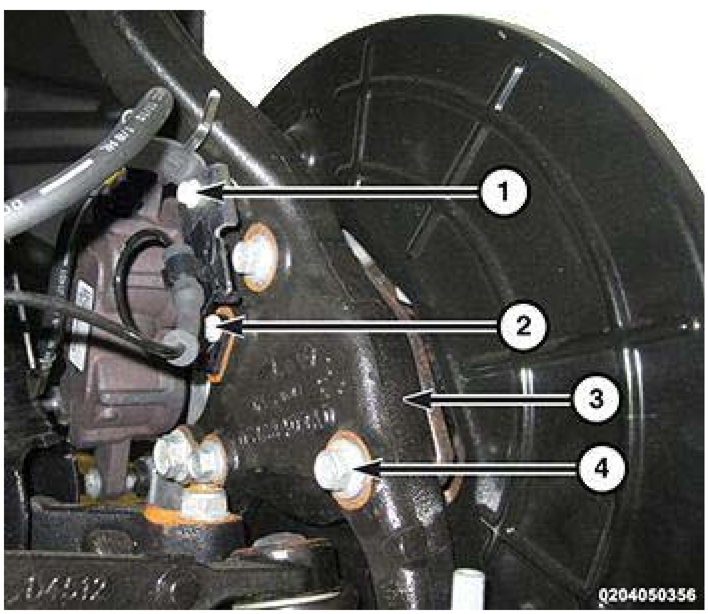
[**Fig. 10: Front Brake Hose Support Bracket Bolt & Front Hub And Bearing To Knuckle Bolt**]
Courtesy of CHRYSLER GROUP, LLC

6. Remove the WSS from the brake hose routing bracket (1).
7. Remove the WSS head to knuckle bolt (2). Pull sensor head out of knuckle.

INSTALLATION

INSTALLATION

NOTE: **Installation process is the same for both sides of the vehicle.**



[**Fig. 11: Front Brake Hose Support Bracket Bolt & Front Hub And Bearing To Knuckle Bolt**]
Courtesy of CHRYSLER GROUP, LLC

1. Install the Wheel Speed Sensor (WSS). Tighten the wheel speed sensor head to knuckle bolt (2) to the proper **SPECIFICATIONS** .

2. Attach WSS to the brake hose routing bracket (1).

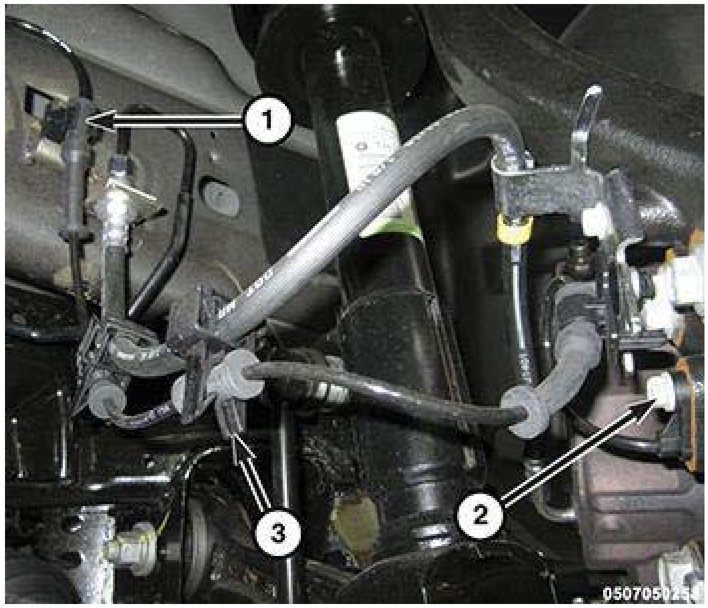


Fig. 12: Wheel Speed Sensor & Routing Clips
Courtesy of CHRYSLER GROUP, LLC

3. Install the WSS harness isolators to the routing brackets (1 and 3).

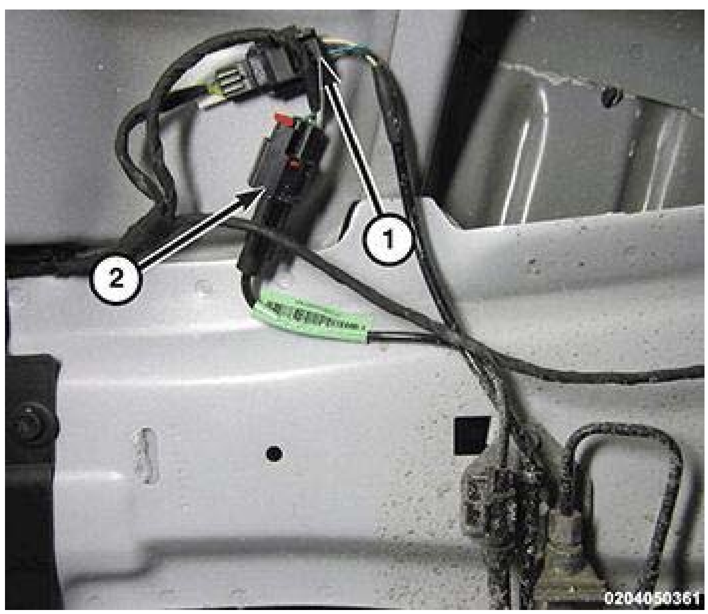


Fig. 13: Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

4. Connect the WSS harness to the body connector (2) and make sure retaining clip is properly in place and sensor connector cannot be pulled out.
5. Install wheel liner. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION** .
6. Remove the support and lower the vehicle.
7. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

8. Perform Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

SENSOR, WHEEL SPEED, REAR

DESCRIPTION

DESCRIPTION

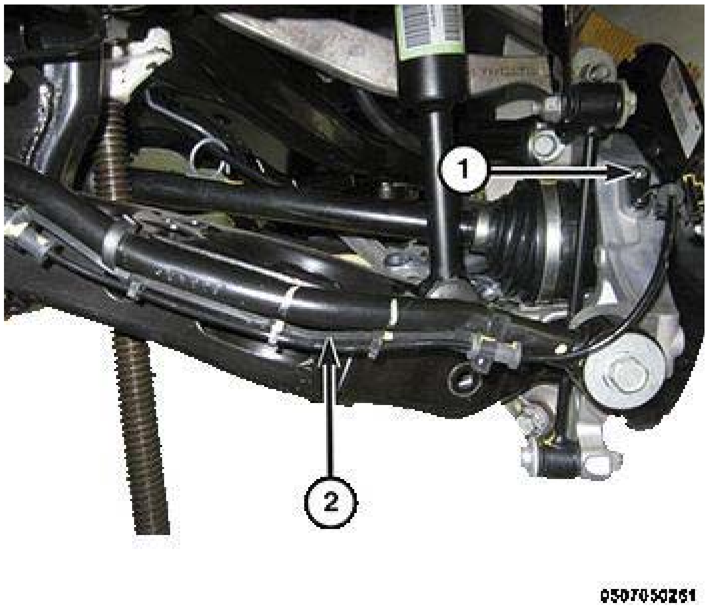


Fig. 14: Wheel Speed Sensor (WSS) & Bolt
Courtesy of CHRYSLER GROUP, LLC

One Wheel Speed Sensor (WSS) (1) is mounted to the rear of each rear knuckle. The WSS, using a tone wheel attached to the rear axle half shaft as a trigger mechanism, communicates with the Antilock Brake Module (ABM), informing it of that wheel's speed.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

Fig. 15: Wheel Speed Sensor (WSS) Connectors
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The left Wheel Speed Sensor (WSS) connector is gray in color, the right WSS is black in color as shown**

3. Disconnect the appropriate WSS wire harness connector (1).

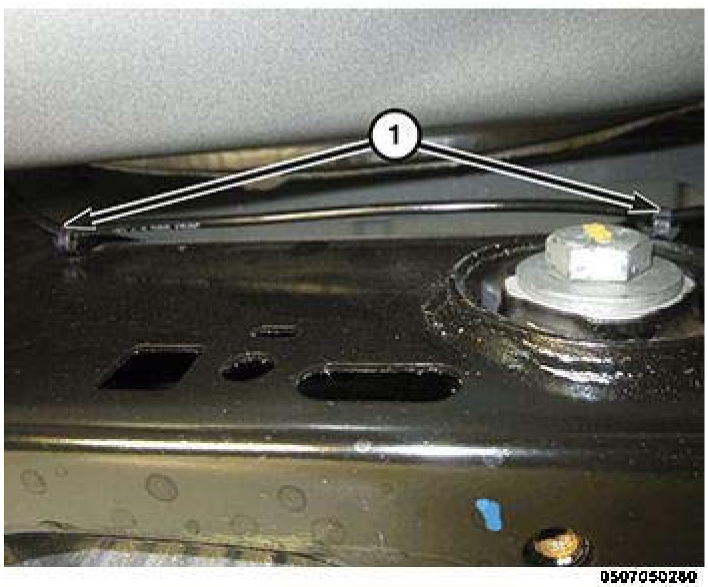
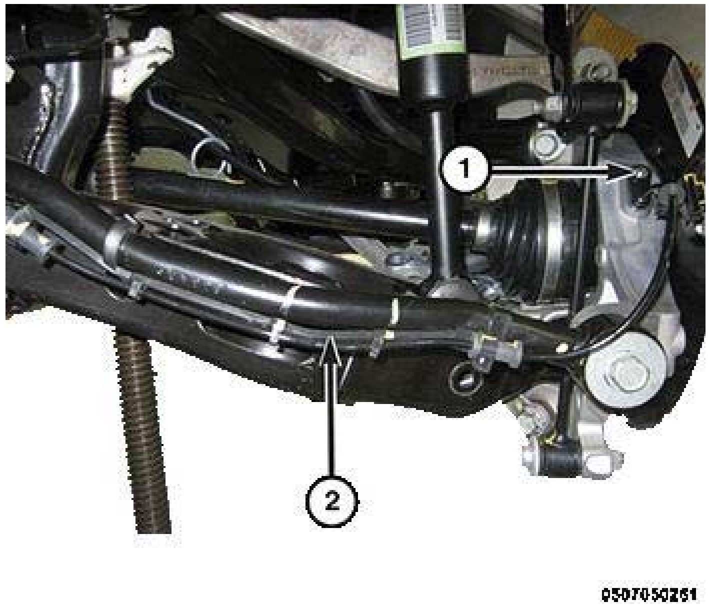


Fig. 16: Sensor Cable Retaining Clips
Courtesy of CHRYSLER GROUP, LLC

4. If removing left WSS, remove sensor cable retaining clips (1) along rear of crossmember near the rear differential.

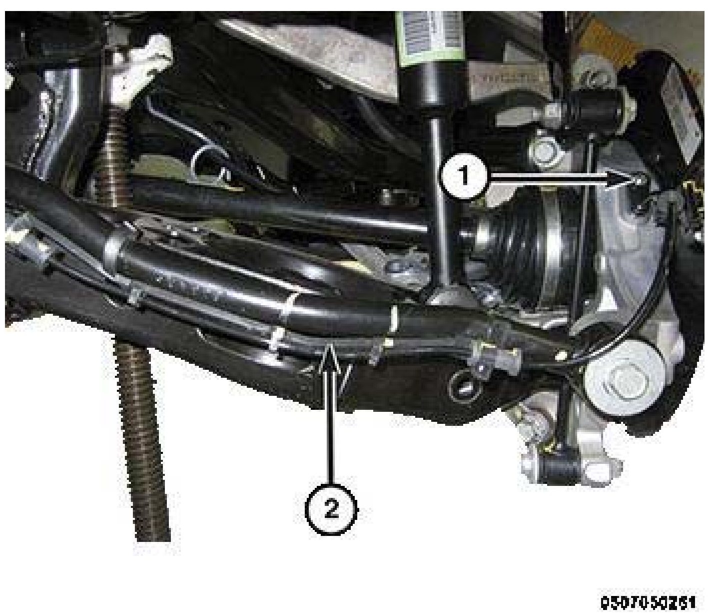


[Fig. 17: Wheel Speed Sensor (WSS) & Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

5. Remove WSS cable from routing clips (2) along toe link.
6. Disconnect WSS cable at rear brake rotor shield.
7. Remove the WSS head to knuckle bolt (1).
8. Remove WSS.

INSTALLATION

INSTALLATION



[Fig. 18: Wheel Speed Sensor (WSS) & Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

1. Insert Wheel Speed Sensor (WSS) head into mounting hole in rear of knuckle.

2. Install the WSS head to knuckle bolt (1) and tighten to the proper **SPECIFICATIONS** .
3. Install the WSS cable at rear brake rotor shield.
4. Connect the WSS cable to the routing clips (2) along the toe link.

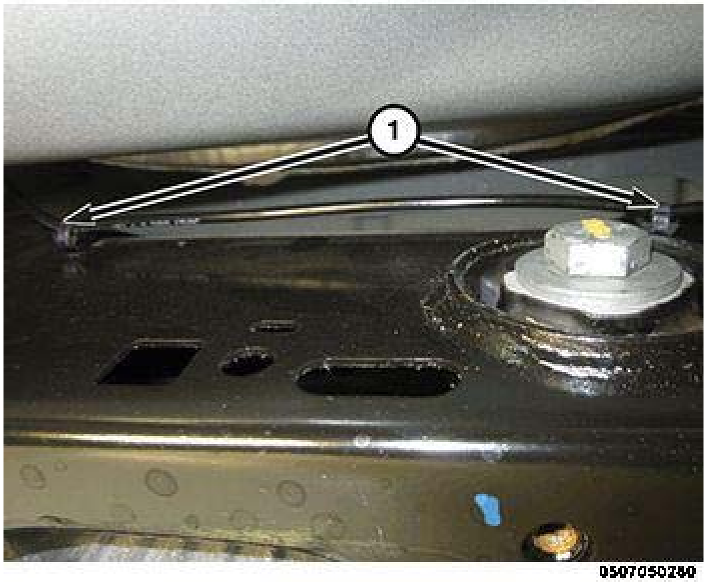


Fig. 19: Sensor Cable Retaining Clips
Courtesy of CHRYSLER GROUP, LLC

5. If installing left sensor, clip the WSS cable to the routing clips (1) along the rear of crossmember.

Fig. 20: Wheel Speed Sensor (WSS) Connectors
Courtesy of CHRYSLER GROUP, LLC

6. Connect the appropriate wheel speed sensor (1).
7. Remove the support and lower vehicle.
8. Perform Verification Test and clear any faults. Refer to **STANDARD PROCEDURE** .

SWITCH, ELECTRONIC STABILITY PROGRAM (ESP)

DESCRIPTION

DESCRIPTION

Fig. 21: ESC OFF Switch
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.**

The ESC off Switch (1) is located in the instrument panel switch pod in the center of the instrument panel. The ESC off switch turns the ESC off whenever the switch is depressed. Depressing the switch a second time turns the ESC back on. The switch resets itself each time the ignition is cycled.

When the ESC off switch is depressed and released, turning ESC off, it does not completely turn the system off. The ESC system reduces torque management to a lesser amount, but ESC function can still occur if the system perceives the need.

This vehicle has what is known as three-mode ESC. When the ESC off switch is depressed and quickly released, the system turns off ESC like any other model, but if the switch is held down for a period of five seconds or longer before releasing, the ESC system further reduces the amount of torque management provided. The system can be returned to "normal" by briefly pressing and releasing the ESC Off switch.

The ESC off switch is serviced as part of the instrument panel switch pod.

REMOVAL

REMOVAL

NOTE: **The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration.**

Certain components may also reference ESP, ESC, or use the traction control symbol.

The ESC switch is serviced as an assembly with the Instrument Cluster Switch Bank Pod. Refer to **POD, SWITCH BANK, REMOVAL** .

INSTALLATION

INSTALLATION

NOTE: **The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.**

The ESC switch is serviced as an assembly with the Instrument Cluster Switch Bank Pod. Refer to **POD, SWITCH BANK, INSTALLATION** .

HYDRAULIC/MECHANICAL

HYDRAULIC CONTROL UNIT (HCU)

REMOVAL

REMOVAL

To remove the HCU, the ICU must be removed and disassembled. Refer to **INTEGRATED CONTROL UNIT (ICU), REMOVAL** and **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

INSTALLATION

INSTALLATION

To install the HCU, assemble and install the ICU. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, INSTALLATION** and **INTEGRATED CONTROL UNIT (ICU), INSTALLATION** .

INTEGRATED CONTROL UNIT (ICU)

DESCRIPTION

DESCRIPTION

The Hydraulic Control Unit (HCU) (2) and the Antilock Brake Module (ABM) (1) used with this antilock brake system are combined (integrated) into one unit, which is called the Integrated Control Unit (ICU).

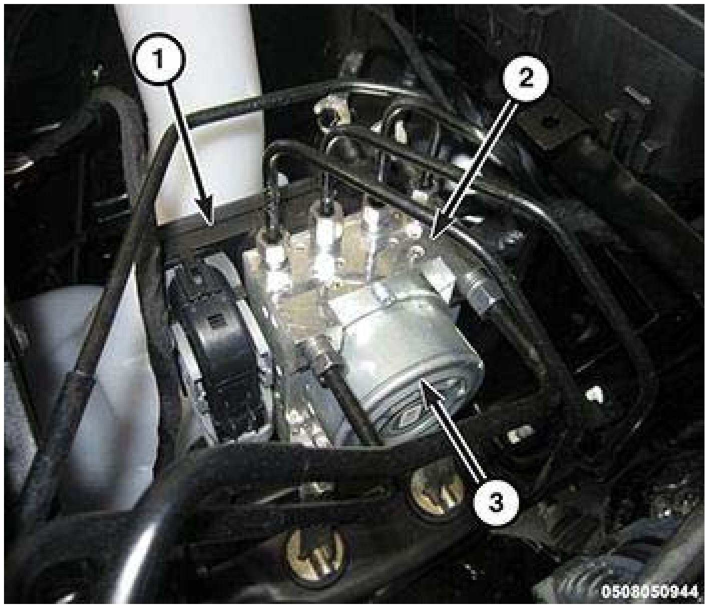


Fig. 22: Antilock Brake Module (ABM) & Hydraulic Control Unit (HCU)
Courtesy of CHRYSLER GROUP, LLC

The ICU (2) is located in the engine compartment, mounted to a bracket that is attached to the right side rail through the use of isolation grommets.

The Antilock Brake System (ABS) with traction control ICU consists of the following components: the ABM, eight (build/decay) solenoid valves (four inlet valves and four outlet valves), two traction control solenoid valves, two hydraulic shuttle valves, valve block, fluid accumulators, a pump, and an electric pump/motor.

The replaceable components of the ICU are the HCU and the ABM. No attempt should be made to service any components of the HCU or ABM. For replacement of the ABM, refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

For additional information on the ABM, refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, DESCRIPTION** .

REMOVAL

REMOVAL

NOTE: Before proceeding, refer to CAUTION and WARNING .

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.

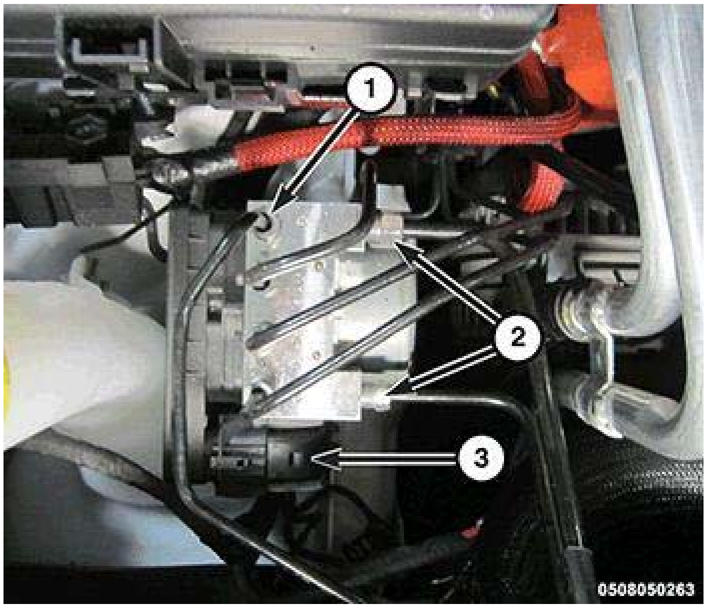


Fig. 23: Brake Tubes & Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

3. Remove primary and secondary brake tubes (2) at hydraulic control unit.
4. Remove remaining four brake tubes (1) at hydraulic control unit.
5. Disconnect Antilock Brake Module (ABM) wiring harness connector (3).

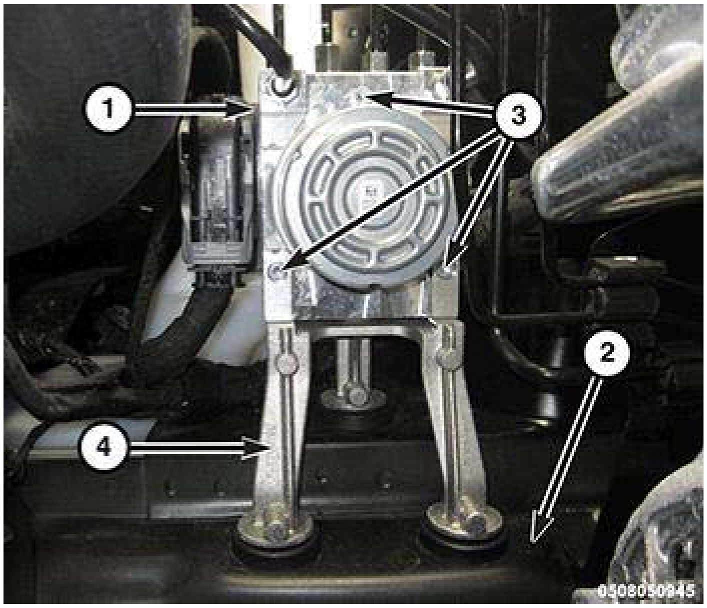


Fig. 24: Integrated Control Unit & Mounting Grommets
Courtesy of CHRYSLER GROUP, LLC

6. Pull up on unit (4) and remove from mounting grommets in body side rail (2).

INSTALLATION

INSTALLATION

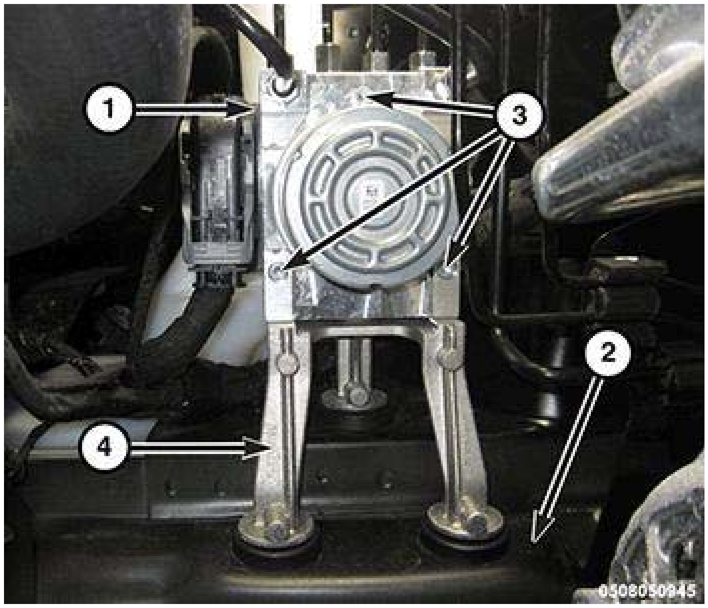


Fig. 25: Integrated Control Unit & Mounting Grommets
Courtesy of CHRYSLER GROUP, LLC

1. Install unit (4), pushing mounting bracket down into mounting grommets located in body side rail (2).

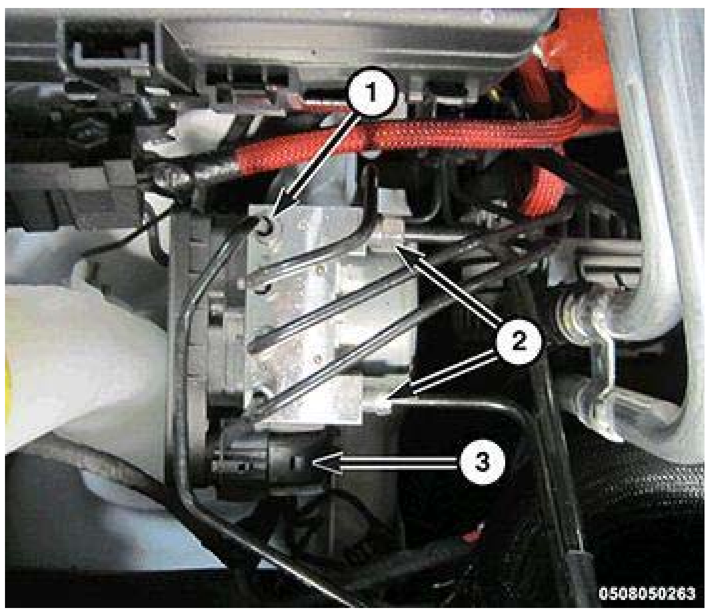


Fig. 26: Brake Tubes & Wiring Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before installing the Antilock Brake Module (ABM) wire harness connector (3) on the ABM, be sure the seal is properly installed in the connector.**

2. Connect the ABM wire harness connector (3).
3. Install the four brake lines (1) to the top of the ICU and tighten the brake tube nuts to the proper **SPECIFICATIONS** .
4. Install primary and secondary brake lines (2) to the ICU and tighten the brake tube nuts to the proper **SPECIFICATIONS** .

5. Remove brake pedal holding tool.
6. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
7. Fill and bleed base brake hydraulic system and ABS. Refer to **STANDARD PROCEDURE** .
8. Perform ABS Initialization and clear any faults. Refer to **STANDARD PROCEDURE** .

.

Article GUID: A00735954

ATEQ TPMS RESET PROCEDURE (NORMAL BUILD)

NOTE: **Early build vehicles are up to VIN 4R499999. Normal build vehicles are after VIN 4R499999.**

NOTE: **Tire pressure may increase from 2 to 6 psi (14 to 41 kPa) during normal driving conditions. Do NOT reduce this normal pressure build up.**

If warning light is lit continuously due to low pressure in one or more tires, adjust tire inflation to specification. The light will remain on until tire pressure is properly set. After adjusting air pressure in a tire, allow approximately two minutes for the message or indicator lamp to go out.

If warning light is flashing on/off for 60 to 75 seconds, there is a problem in the TPMS. See appropriate manufacturer service information.

NOTE: **If a tire pressure sensor has been replaced, the TPMS needs to relearn tire pressure sensor IDs.**

Using an RF signal, each sensor transmits tire pressure data approximately once every minute. Each sensor's (transmitter) broadcast is uniquely coded so that the Wireless Control Module (WCM) can monitor the state of each of the sensors on the 4 rotating road wheels. The TPMS automatically learns and stores the sensor's ID while driving after a sensor has been replaced. There is no formal retraining procedure necessary.

Drive vehicle for a minimum of 10 to 20 minutes while maintaining a continuous speed above 15 mph (24 km/h). During this time, the system will learn the new sensor ID code and will clear any DTCs automatically. If a sensor cannot be trained, see appropriate manufacturer service information.

NOTE: **On some models, the full-size spare tire could be equipped with a TPMS sensor.**

Models With Spare Tire TPMS Sensor

Model	Year
Commander	2006-08
Grand Cherokee	2005-10
Liberty	2008

.

Article GUID: A00859906

2015-16 BRAKES

Base Brakes - Service Information - Challenger

WARNING

WARNING

WARNING: **Chrysler LLC does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.**

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

CAUTION

CAUTION

CAUTION: **Use only MoparÃ® brake fluid or an equivalent from a tightly sealed container. Brake fluid must conform to DOT 3 specifications. Do not use petroleum-based fluid because seal damage in the brake system will result.**

CAUTION: **Brake fluid will damage painted surfaces. If brake fluid is spilled on any painted surfaces, wash it off immediately with water.**

CAUTION: **Never use gasoline, kerosene, alcohol, motor oil, transmission fluid, or any fluid containing mineral oil to clean system components. These fluids damage rubber cups and seals.**

CAUTION: **During service procedures, grease or any other foreign material must be kept off the caliper assembly, brake linings, brake rotor and external surfaces of the hub.**

CAUTION: **Disc brake calipers are made of aluminum. They are anodized and appear black in color. When handling the calipers or brake rotors, be careful to avoid damaging them, and avoid scratching or nicking the brake pad lining.**

STANDARD PROCEDURE

BASE BRAKE BLEEDING

CAUTION: **Before removing the master cylinder cover, wipe it clean to prevent dirt and other foreign matter from dropping into the master cylinder.**

CAUTION: **Use only MoparÃ® brake fluid or an equivalent from a fresh, tightly sealed**

container. Brake fluid must conform to DOT 3 specifications.

NOTE: **For bleeding the antilock brake hydraulic system, refer to STANDARD PROCEDURE .**

NOTE: **Do not pump the brake pedal at any time while having a bleeder screw open during the bleeding process. This will only increase the amount of air in the system and make additional bleeding necessary.**

NOTE: **Do not allow the master cylinder reservoir to run out of brake fluid while bleeding the system. An empty reservoir will allow additional air into the brake system. Check the fluid level frequently and add fluid as needed.**

The following wheel circuit sequence for bleeding the brake hydraulic system should be used to ensure adequate removal of all trapped air from the brake hydraulic system.

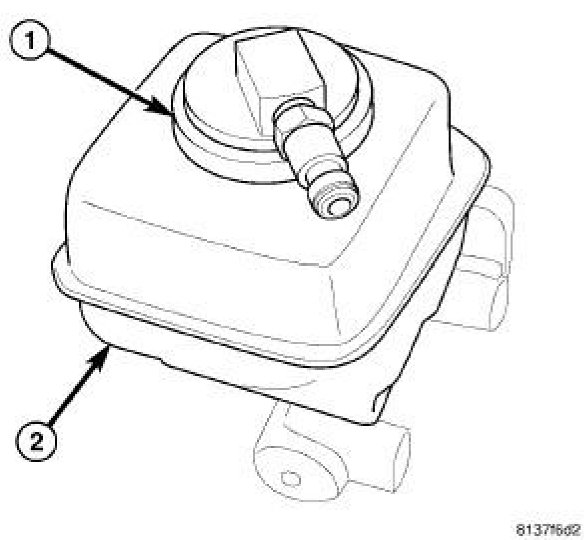
- Right rear wheel
- Left rear wheel
- Right front wheel
- Left front wheel

NOTE: **Pressure bleeding is highly recommended to bleed this brake system to ensure all air is removed from system. Manual bleeding may also be used, but additional time is needed to remove all air from system.**

The base brake system can be bled using the pressure method or the manual method. Both methods are presented in this text.

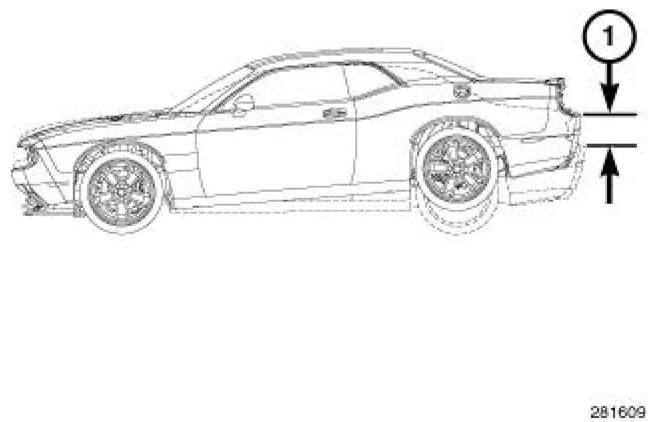
PRESSURE BLEEDING METHOD

NOTE: **Follow pressure bleeder manufacturer's instructions for use of pressure bleeding equipment.**



[Fig. 1: Fluid Reservoir & Adapter](#)
Courtesy of CHRYSLER GROUP, LLC

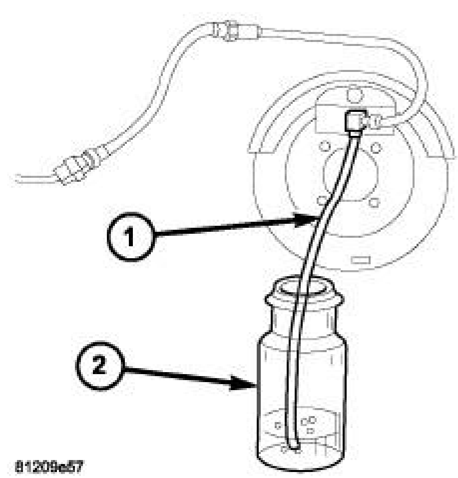
1. Remove filler cap from the top of fluid reservoir (2) on master cylinder.
2. Install Adapter (1), Special Tool (special tool #6921, Cap, Master Cylinder), in the caps place on the reservoir (2).
3. Attach Bleeder Tank, Special Tool C-3496-B, or equivalent, to Adapter (special tool #6921, Cap, Master Cylinder) (1). Pressurize the system following the pressure bleeder manufacturer's instructions.



[Fig. 2: Raising Rear Bumper](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To ensure all air is bled from the ICU or junction block in a timely manner, it is recommended to raise the rear of the vehicle approximately 5Ā° higher than the front or approximately 10-12 inches as measured at the rear bumper (1).**

4. Raise and support vehicle placing rear of vehicle approximately 5Ā° higher than the front or if measured at the rear bumper (1), approximately 10-12 inches above level. It will be necessary to add extra support stands under vehicle to support this angle.



[Fig. 3: Bleeding Brakes](#)
Courtesy of CHRYSLER GROUP, LLC

5. If installed, remove rubber dust caps from all four bleeder screws on calipers.
6. Starting at the first wheel circuit as listed earlier, attach a clear hose (1) to the bleeder screw at that wheels brake caliper and feed the other end of hose into a clear jar (2) containing enough fresh brake fluid to submerge the end of the hose.

CAUTION: **Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.**

7. Open bleeder screw at least one full turn or more to obtain an adequate flow of brake fluid.
8. After 4 to 8 ounces of brake fluid has been bled through the brake hydraulic circuit, and an air-free flow (no bubbles) is maintained in the clear plastic hose (1) and jar (2), close the bleeder screw.
9. Bleed the remaining wheel circuits in the same manner until all air is removed from the brake hydraulic system.
10. Check brake pedal travel. If pedal travel is excessive or has not improved, some air may still be trapped in the hydraulic system. Re-bleed the brake system as necessary.
11. If equipped with antilock brakes, the hydraulic control unit may need to be bled, then rebleed base brakes. Refer to STANDARD PROCEDURE .
12. Reinstall all 4 bleeder screw dust caps.
13. Test drive vehicle to ensure brakes are operating properly and pedal feel is correct.

MANUAL BLEEDING METHOD

NOTE: **To bleed the base brake system manually, an assistants help is required.**

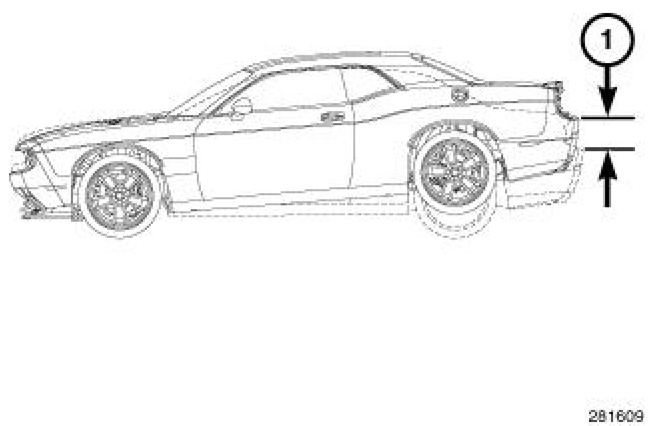


Fig. 4: Raising Rear Bumper
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To ensure all air is bled from the ICU or junction block in a timely manner, it is recommended to raise the rear of the vehicle approximately 5Â° higher than the front or approximately 10-12 inches as measured at the rear bumper (1).**

1. Raise and support vehicle placing rear of vehicle approximately 5Â° higher than the front or if measured at the rear bumper (1), approximately 10-12 inches above level. It will be necessary to add extra support stands under vehicle to support this angle.

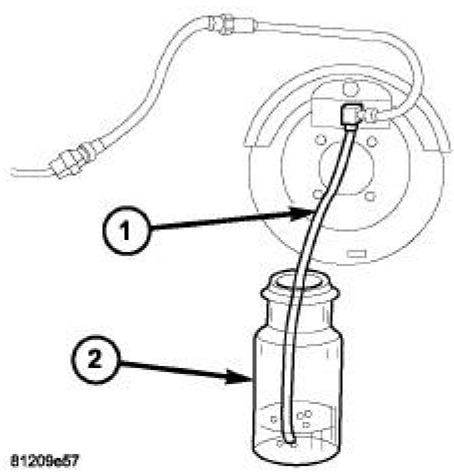


Fig. 5: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

2. Remove rubber duct caps from all 4 bleeder screws.
3. Attach a clear hose (1) to the bleeder screw at one wheel and feed the other end of the hose into a clear jar (2) containing fresh brake fluid.
4. Have an assistant pump the brake pedal three or four times and hold it down before the bleeder screw is opened.

CAUTION: **Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.**

5. While the pedal is being held down, open the bleeder screw at least 1 full turn. When the bleeder screw opens the brake pedal will drop all the way to the floor. Continue to hold the pedal all the way down.
6. Once the brake pedal has dropped, close the bleeder screw. The pedal can then be released.
7. Repeat steps One through Five until all trapped air is removed from that wheel circuit (usually four or five times). This should pass a sufficient amount of fluid to expel all the trapped air from the brakes hydraulic system. Be sure to monitor brake fluid level in master cylinder fluid reservoir making sure it stays at a proper level. This will ensure air does not reenter brake hydraulic system through master cylinder.

NOTE: **Monitor the brake fluid level in the fluid reservoir periodically to make sure it does not go too low. This will ensure that air does not reenter the brake hydraulic system.**

8. Bleed the remaining wheel circuits in the same manner until all air is removed from the brake hydraulic system.
9. Check brake pedal travel. If pedal travel is excessive or has not improved, some air may still be trapped in the hydraulic system. Re-bleed the brake system as necessary.
10. If equipped with antilock brakes, the hydraulic control unit may need to be bled, then rebleed base brakes. Refer to STANDARD PROCEDURE .
11. Reinstall all 4 bleeder screw dust caps.
12. Test drive vehicle to ensure brakes are operating properly and pedal feel is correct.

BASE BRAKE BLEEDING - SRT8

Use the following procedure to bleed the rear brake calipers of this vehicle. The front brake calipers may be bled using the same procedure as the standard model.

CAUTION: **Before removing the master cylinder cover, wipe it clean to prevent dirt and other foreign matter from dropping into the master cylinder.**

CAUTION: **Use only MoparÂ® brake fluid or an equivalent from a fresh, tightly sealed container. Brake fluid must conform to DOT 3 specifications.**

NOTE: **For bleeding the antilock-brake hydraulic system, refer to STANDARD PROCEDURE .**

NOTE: **Do not pump the brake pedal at any time with a bleeder screw open during the bleeding process. This only increases the amount of air in the system and makes additional bleeding necessary.**

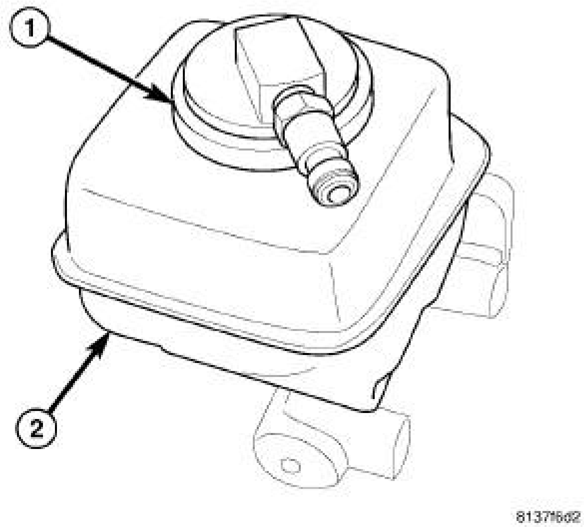
NOTE: **Do not allow the master cylinder reservoir to run out of brake fluid while bleeding the system. An empty reservoir allows additional air into the brake system. Check the fluid level frequently and add fluid as needed.**

NOTE: **Pressure bleeding is highly recommended to bleed this brake system to make sure all air is removed from system. Manual bleeding may also be used, but additional time is needed to remove all air from system.**

Although the **pressure method** is recommended for bleeding the base brake system, the manual method can also be performed. Both methods are presented in this text.

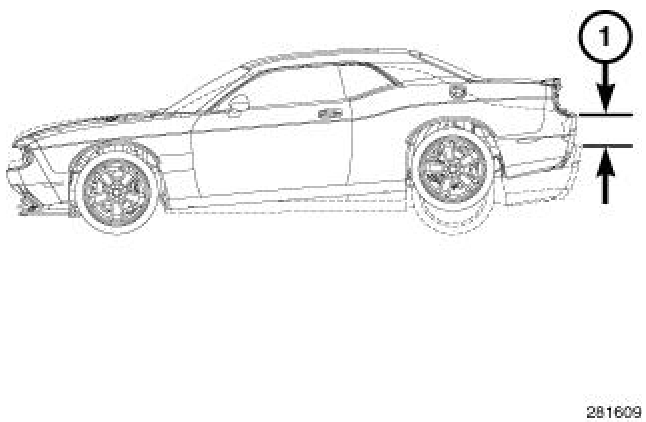
PRESSURE BLEEDING METHOD

NOTE: **Follow pressure bleeder manufacturer's instructions for use of pressure bleeding equipment.**



[Fig. 6: Fluid Reservoir & Adapter]
Courtesy of CHRYSLER GROUP, LLC

1. Remove the filler cap from the top of the fluid reservoir (2) on the master cylinder.
2. Install Adapter (1) (special tool #6921, Cap, Master Cylinder), in the caps place on the reservoir (2).
3. Attach Bleeder Tank C-3496-B, or equivalent, to Adapter (special tool #6921, Cap, Master Cylinder) (1). Pressurize the system following the pressure bleeder manufacturer's instructions.



[Fig. 7: Raising Rear Bumper]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To make sure all air is bled from the ICU or junction block in a timely manner, it is recommended to raise the rear of the vehicle approximately 5Ā° higher than the front or approximately 254-305 mm (10 -12 inches) as measured at the rear bumper (1).**

4. Raise and support vehicle placing rear of vehicle approximately 5Ā° higher than the front or if measured at the rear bumper (1), approximately 10-12 inches above level. It will be necessary to add extra support stands under vehicle to support this angle.

NOTE: **Use the following wheel circuit sequence for bleeding the brake hydraulic**

system to adequately remove all trapped air from the brake hydraulic system.

- **Right rear wheel**
- **Left rear wheel**
- **Right front wheel**
- **Left front wheel**

REAR BRAKES

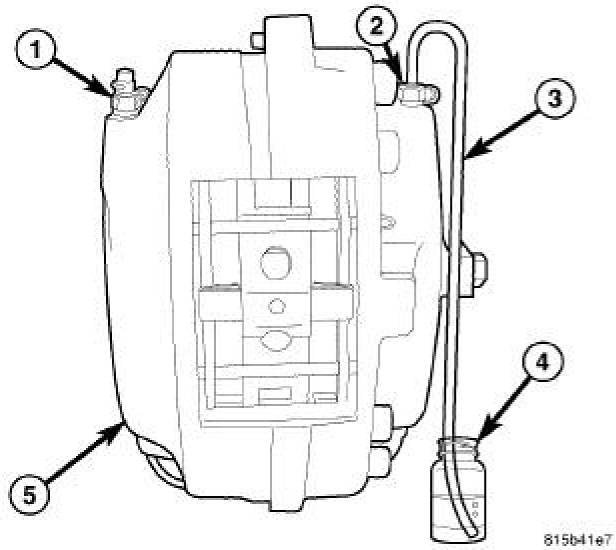
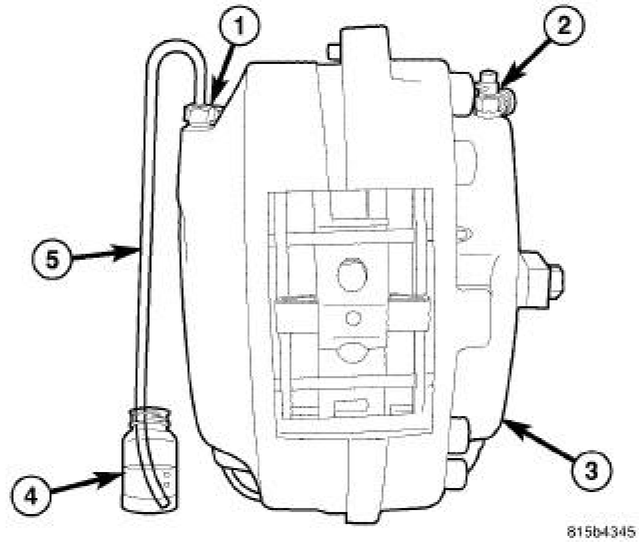


Fig. 8: Bleeding Caliper Inboard Half
Courtesy of CHRYSLER GROUP, LLC

1. If installed, remove the rubber dust caps from both bleeder screws on each caliper.
2. Start at the first wheel circuit that needs to be bled (See list in above note). Attach a clear hose (3) to the inboard bleeder screw (2) at the wheels brake caliper and feed the other end of hose into a clear jar (4) containing enough fresh brake fluid to submerge the end of the hose.

CAUTION: Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.

3. Open the inboard bleeder screw (2) one full turn to obtain an adequate flow of brake fluid.
4. After bleeding 118-237 ml. (4-8 oz.) of brake fluid through the brake hydraulic circuit, and maintaingan air-free flow (no bubbles) is in the clear plastic hose (3) and jar (4), close the bleeder screw (2).
5. Remove the clear hose and install the bleeder screw dust cap.



[**Fig. 9: Bleeding Caliper Outboard Half**]
Courtesy of CHRYSLER GROUP, LLC

6. Attach a clear hose (5) to the outboard bleeder screw (1) at the same brake caliper and feed the other end of hose into a clear jar (4) containing enough fresh brake fluid to submerge the end of the hose.

CAUTION: Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.

7. Open the outboard bleeder screw (1) one full turn to obtain an adequate flow of brake fluid.
8. After bleeding 118-237 ml. (4-8 oz.) of brake fluid through the brake hydraulic circuit, and maintaining an air-free flow (no bubbles) is in the clear plastic hose (5) and jar (4), close the bleeder screw (1).
9. Remove the clear hose and install the bleeder screw dust cap.
10. Bleed the opposite rear brake wheel circuits as necessary in the same manner until all air is removed from the brake hydraulic system, then proceed to the front brakes.

FRONT BRAKES

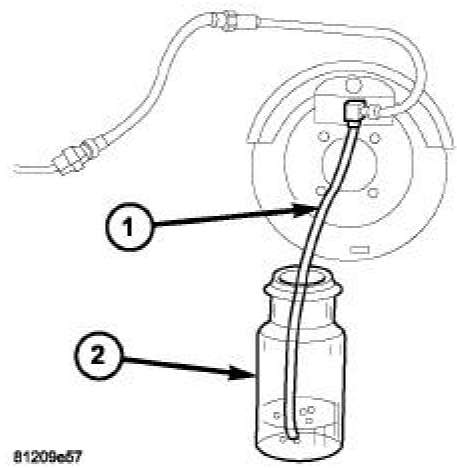


Fig. 10: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

1. If installed, remove the rubber dust cap from bleeder screw on each front brake caliper.
2. Start at the first wheel circuit that needs to be bled (See list in above note), attach a clear hose (1) to the bleeder screw at that wheels brake caliper and feed the other end of hose into a clear jar (2) containing enough fresh brake fluid to submerge the end of the hose.

CAUTION: Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.

3. Open bleeder screw one full turn to obtain an adequate flow of brake fluid.
4. After bleeding 118-237 ml. (4-8 oz.) of brake fluid through the brake hydraulic circuit, and maintainingan air-free flow (no bubbles) is in the clear plastic hose (1) and jar (2), close the bleeder screw.
5. Install the bleeder screw dust cap.
6. Bleed the opposite front brake wheel circuit as necessary in the same manner until all air is removed from the brake hydraulic system.
7. If equipped with anti-lock brakes, and the hydraulic control unit needs to be bled, then rebleed the base brakes. Refer to STANDARD PROCEDURE .
8. Once all brakes are bled, check brake pedal travel. If pedal travel is excessive or has not improved, some air may still be trapped in the brake hydraulic system. Re-bleed the brake system as necessary.
9. Test drive vehicle to make sure the brakes are operating properly and pedal feel is correct.

MANUAL BLEEDING METHOD

NOTE: To bleed the base brake system manually, an assistant's help is required.

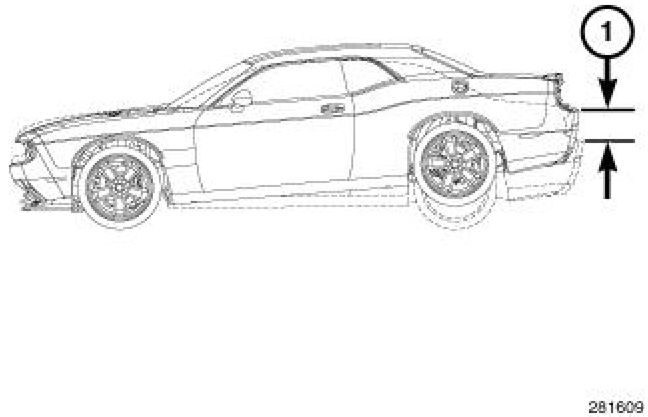


Fig. 11: Raising Rear Bumper
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To make sure all air is bled from the ICU or junction block in a timely manner, it is recommended to raise the rear of the vehicle approximately 5Ā° higher than the front or approximately 254-305 mm (10-12 inches) as measured at the rear bumper (1).**

1. Raise and support vehicle placing rear of vehicle approximately 5Ā° higher than the front or if measured at the rear bumper (1), approximately 10-12 inches above level. It will be necessary to add extra support stands under vehicle to support this angle.

NOTE: **Use the following wheel circuit sequence for bleeding the brake hydraulic system to adequately remove all trapped air from the brake hydraulic system.**

- **Right rear wheel**
- **Left rear wheel**
- **Right front wheel**
- **Left front wheel**

REAR BRAKES

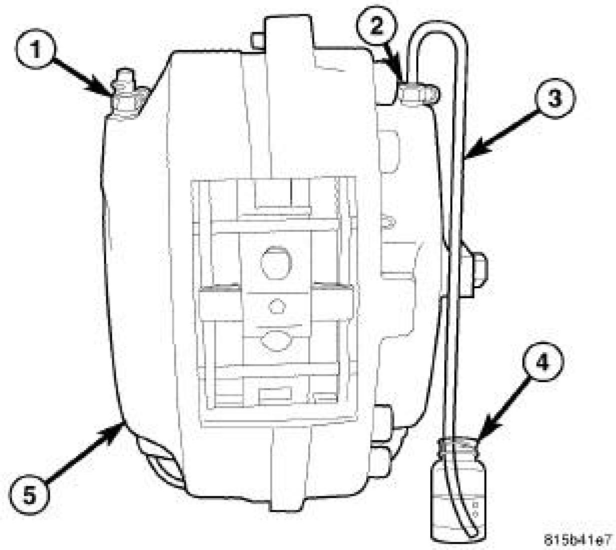


Fig. 12: Bleeding Caliper Inboard Half
Courtesy of CHRYSLER GROUP, LLC

1. If installed, remove the rubber dust caps from both bleeder screws on each caliper.
2. Start at the first wheel circuit that needs to be bled (See list in above note), attach a clear hose (3) to the inboard bleeder screw at that the brake caliper and feed the other end of hose into a clear jar (4) containing enough fresh brake fluid to submerge the end of the hose.
3. Have an assistant pump the brake pedal three or four times, then hold it down before the bleeder screw is opened.

CAUTION: **Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.**

4. While holding down the brake pedal, open the inboard bleeder screw (2) at least one full turn. When the bleeder screw opens the brake pedal will drops all the way to the floor. Continue holding the pedal all the way down.
5. Once the brake pedal drops, close the bleeder screw. Release the pedal.
6. Repeat the previous three steps until all trapped air is removed from that wheel circuit (usually four or five times). This should pass a sufficient amount of fluid to expel all the trapped air from the brake hydraulic system. **Be sure to monitor brake fluid level in master cylinder fluid reservoir making sure it stays at a proper level.** This will ensure air does not reenter brake hydraulic system through master cylinder.

NOTE: **Monitor the brake fluid level in the fluid reservoir periodically to make sure it does not go too low. This makes sure that air does not reenter the brake hydraulic system.**

7. Remove the clear hose and install the bleeder screw dust cap.

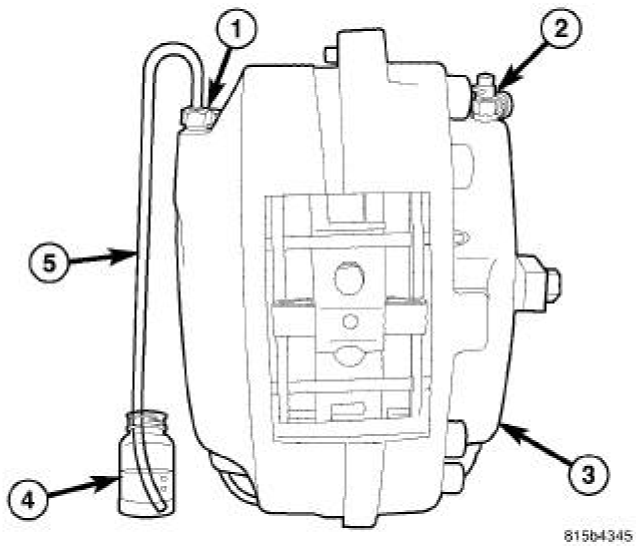


Fig. 13: Bleeding Caliper Outboard Half
Courtesy of CHRYSLER GROUP, LLC

8. Attach a clear hose (5) to the outboard bleeder screw (1) at the brake caliper and feed the other end of hose into a clear jar (4) containing enough fresh brake fluid to submerge the end of the hose.
9. Have an assistant pump the brake pedal three or four times, then hold it down before the bleeder screw is opened.

CAUTION: **Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.**

10. While holding down the brake pedal, open the outboard bleeder screw (2) at least one full turn. When the bleeder screw opens the brake pedal drops all the way to the floor. Continue holding the pedal all the way down.
11. Once the brake pedal drops, close the bleeder screw. Release the pedal.
12. Repeat the previous three steps until all trapped air is removed from that wheel circuit (usually four or five times). This passes a sufficient amount of fluid to expel all the trapped air from the brake hydraulic system. **Be sure to monitor brake fluid level in master cylinder fluid reservoir making sure it stays at a proper level.** This will ensure air does not reenter brake hydraulic system through master cylinder.

NOTE: **Monitor the brake fluid level in the fluid reservoir periodically to make sure it does not go too low. This will ensure that air does not reenter the brake hydraulic system.**

13. Remove the clear hose and install the bleeder screw dust cap.

14. Bleed the opposite rear brake wheel circuits as necessary in the same manner until all air is removed from the brake hydraulic system, then proceed to the front brakes.

FRONT BRAKES

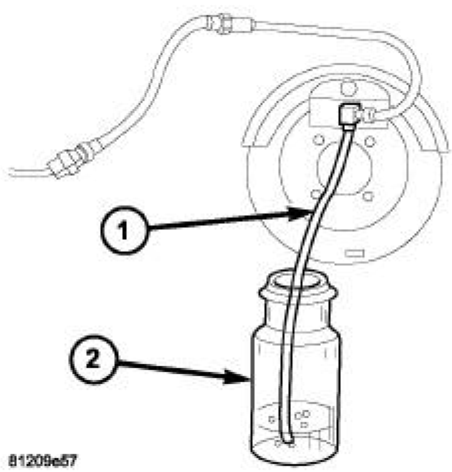


Fig. 14: Bleeding Brakes
Courtesy of CHRYSLER GROUP, LLC

1. If installed, remove the rubber dust cap from the bleeder screw on each front brake caliper.
2. Start at the first wheel circuit that needs to be bled (See list in above note), attach a clear hose (1) to the bleeder screw at that the brake caliper and feed the other end of hose into a clear jar (2) containing enough fresh brake fluid to submerge the end of the hose.
3. Have an assistant pump the brake pedal three or four times and hold it down before the bleeder screw is opened.

CAUTION: **Open the bleeder screw at least one full turn when instructed. Some air may be trapped in the brake lines or valves far upstream, as far as ten feet or more from the bleeder screw. If the bleeder screw is not opened sufficiently, fluid flow is restricted causing a slow, weak fluid discharge. This will NOT get all the air out. Therefore, it is essential to open the bleeder screw at least one full turn to allow a fast, large volume discharge of brake fluid.**

4. While holding down the brake pedal open the bleeder screw at least one full turn. When the bleeder screw opens the brake pedal drops all the way to the floor. Continue holding the pedal all the way down.
5. Once the brake pedal drops, close the bleeder screw. Release the pedal.
6. Repeat the previous five steps until all trapped air is removed from that wheel circuit (usually four or five times). This passes a sufficient amount of fluid to expel all the trapped air from the brake hydraulic system. Be sure to monitor brake fluid level in master cylinder fluid reservoir making sure it stays at a proper level. This will ensure air does not reenter brake hydraulic system through master cylinder.

NOTE: **Monitor the brake fluid level in the fluid reservoir periodically to make sure it does not go too low. This makes sure that air does not reenter the brake hydraulic system.**

7. Install the bleeder screw dust cap.
8. Bleed the opposite front brake wheel circuit as necessary in the same manner until all air is removed from the brake hydraulic system.
9. If equipped with anti-lock brakes, and the hydraulic control unit needs to be bled, then rebleed the base brakes. Refer to **STANDARD PROCEDURE** .
10. Once all brakes are bled, check brake pedal travel. If pedal travel is excessive or has not improved, some air may still be trapped in the brake hydraulic system. Re-bleed the brake system as necessary.
11. Test drive the vehicle to make sure the brakes are operating properly and pedal feel is correct.

SPECIFICATIONS

TORQUE SPECIFICATIONS

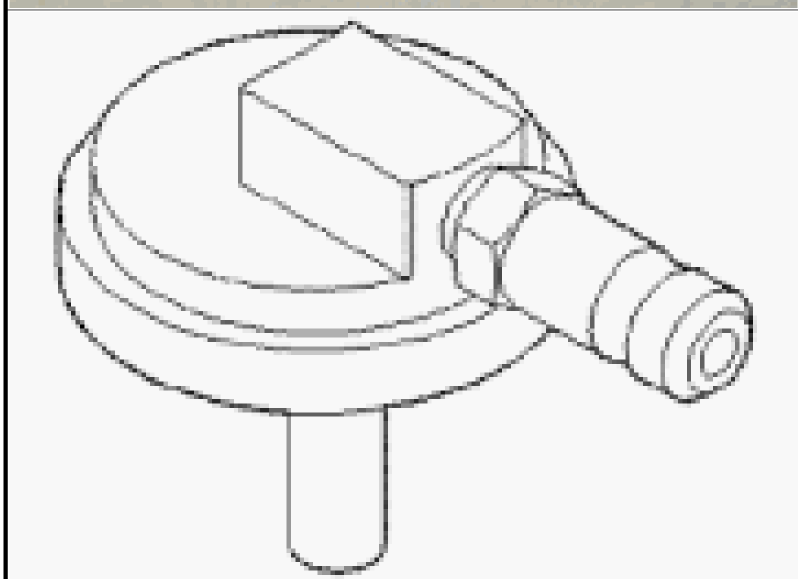
TORQUE SPECIFICATIONS TABLE

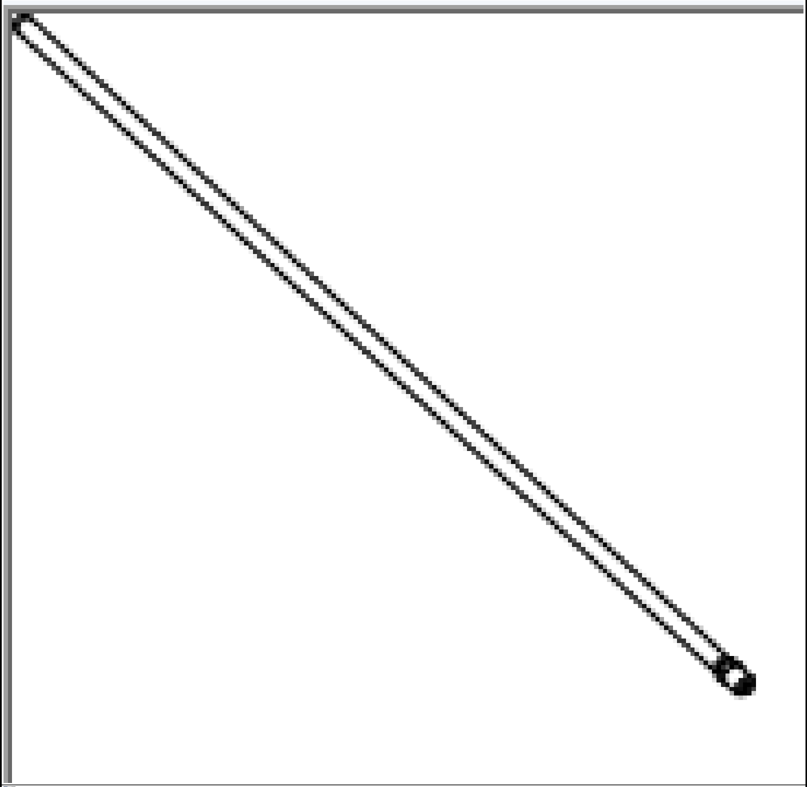
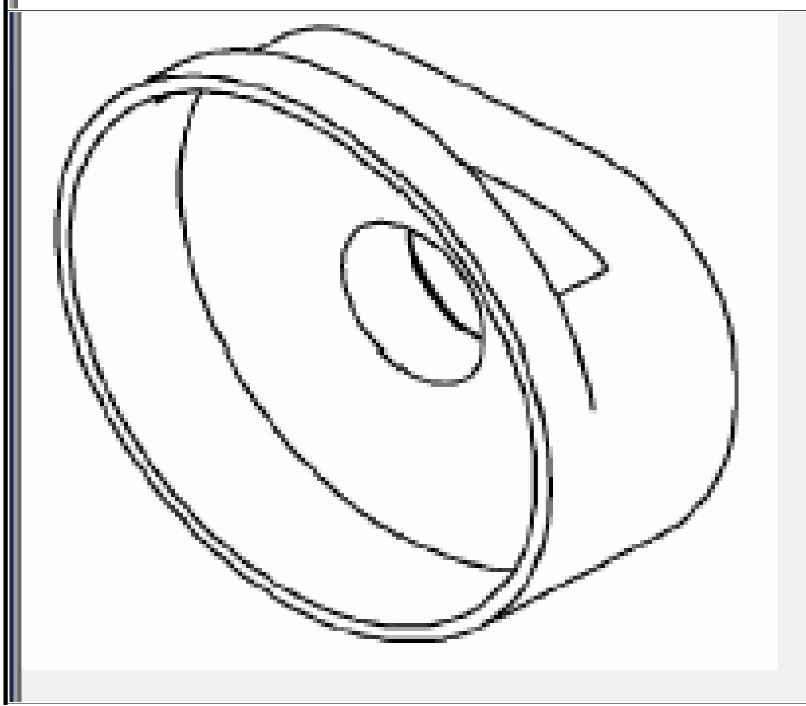
DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
ABM to HCU Mounting Screws	6	-	53	Ā
Brake Caliper Adapter to Knuckle Bolts - Front	133	98	-	X
Brake Caliper Adapter to Knuckle Bolts - Rear	110	81	-	X
Brake Caliper to Knuckle Bolts - Front - SRT8	164	121	-	Ā
Brake Caliper to Knuckle Bolts - Rear - SRT8	133	98	-	Ā
Brake Caliper Guide Pin Bolts - Front	60	44	-	Ā
Brake Caliper Guide Pin Bolts - Rear	31	23	-	Ā
Brake Hose to Brake Caliper Banjo Bolt - Front	50	37	-	Ā
Brake Hose to Brake Caliper Banjo Bolt - Rear	36	27	-	Ā
Brake Hose to Brake Caliper Banjo Bolt - Front - SRT8	33	24	-	Ā
Brake Hose to Brake Caliper Banjo Bolt - Rear - SRT8	36	27	-	Ā
Brake Pedal/Booster Nuts	25	18	-	Ā
Brake Tube Nuts	23	17	-	Ā
Dynamic Sensor Mounting Nuts	7	-	62	Ā
Electric Vacuum Pump to Bracket Bolts	8	-	71	Ā
ICU to Bracket Bolts	11	8	-	Ā
Master Cylinder Mounting Nuts	24	17	-	X
Parking Brake Cable to Knuckle Bolt	12	8	-	Ā
Parking Brake Lever to Body Bolt And Nuts	28	20	-	Ā
Wheel Speed Sensor Head to Knuckle Bolt - Front	11	8	-	Ā
Wheel Speed Sensor Head Knuckle Bolt - Rear	8	-	71	Ā

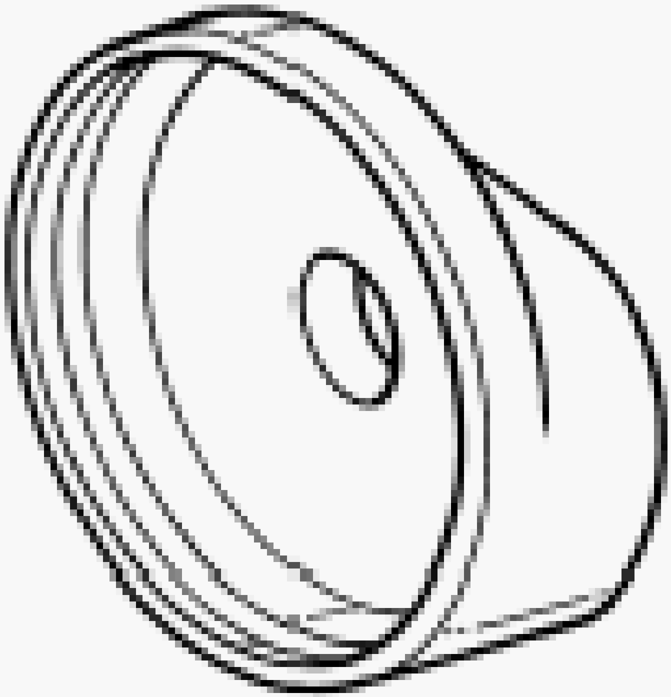
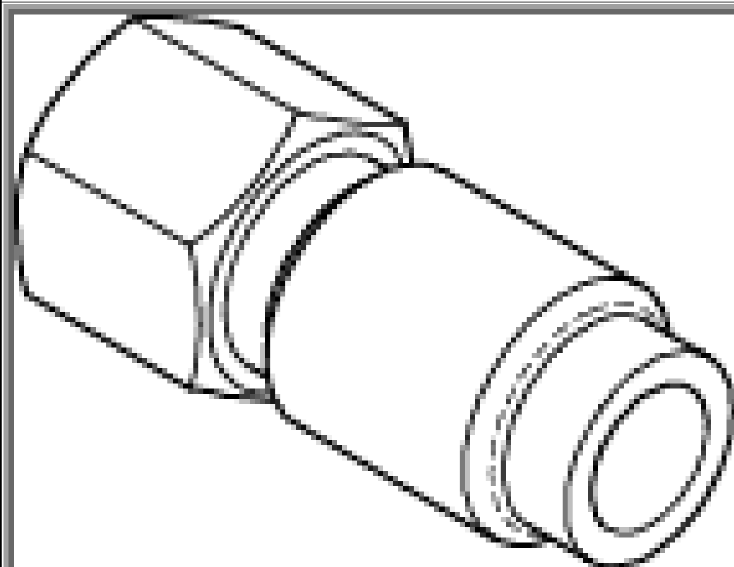
DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
*** New Fastener:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

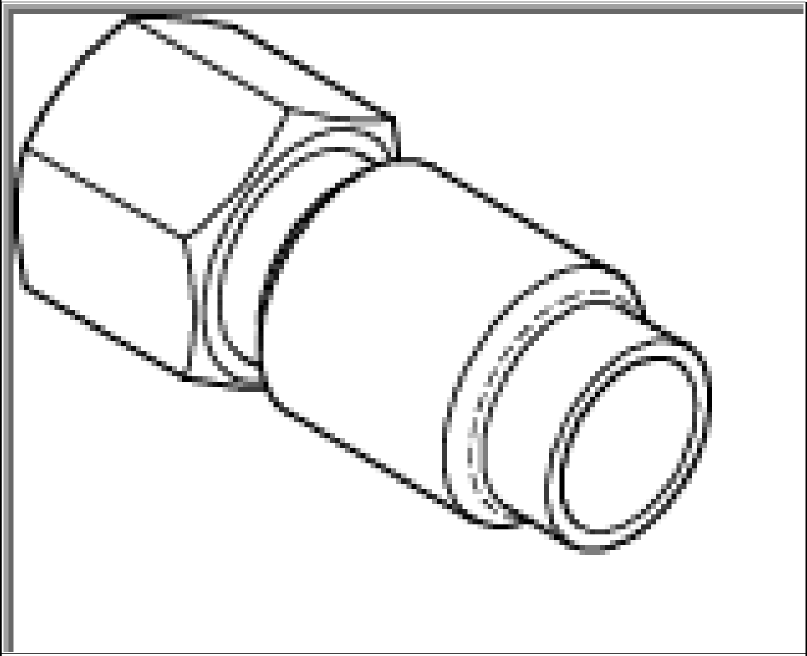
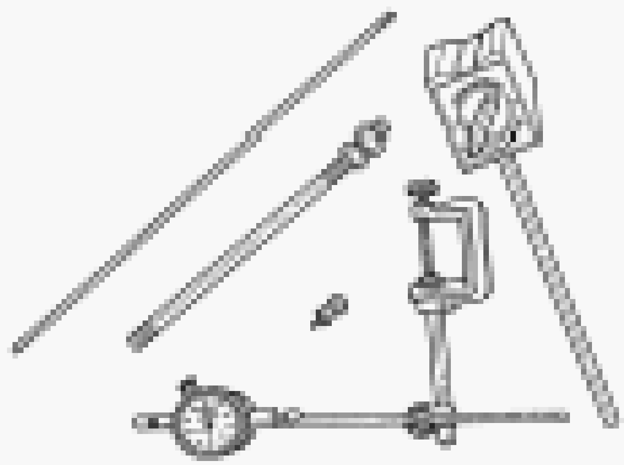
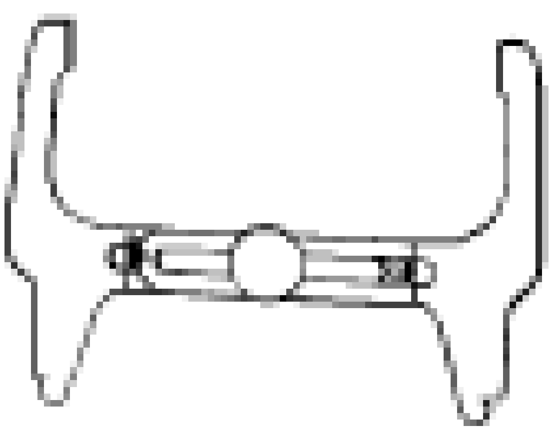
SPECIAL TOOLS

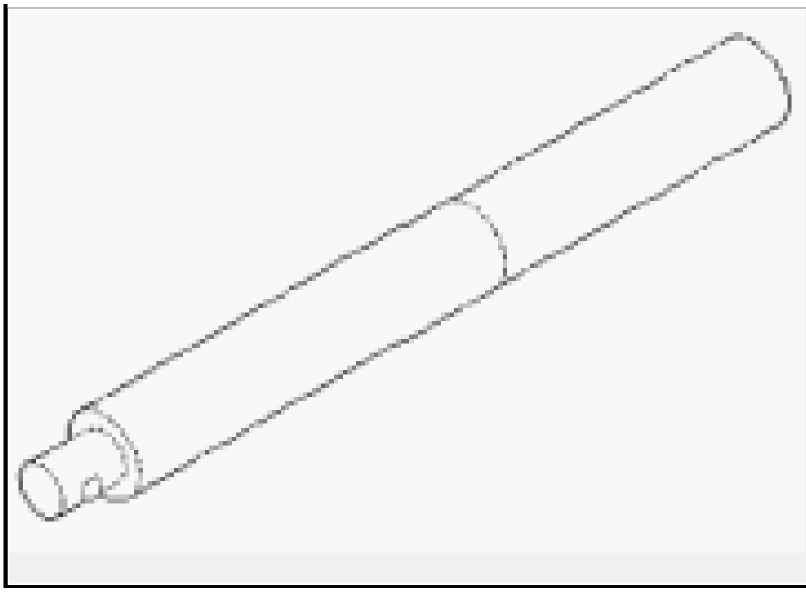
SPECIAL TOOLS

	25-W - Roller Contact Point
	6921 - Cap, Master Cylinder (Originally Shipped In Kit Number(s) 6907.)

	8358-1 - Bleed Tube (Originally Shipped In Kit Number(s) 8646, 8647, 8648.)
	9314 - Installer, Dust Boot (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)

	9315 - Installer, Dust Boot (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
	9748-1 - Adapter, Bleeder (Originally Shipped In Kit Number(s) 9796.)

	9748-2 - Adapter, Bleeder (Originally Shipped In Kit Number(s) 9796.)
	C-3339A - Set, Dial Indicator (Originally Shipped In Kit Number(s) 9202.)
	C-3919 - Gauge, Brake Shoes

	C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)

ELECTRICAL

PUMP, ELECTRIC VACUUM

DESCRIPTION

DESCRIPTION

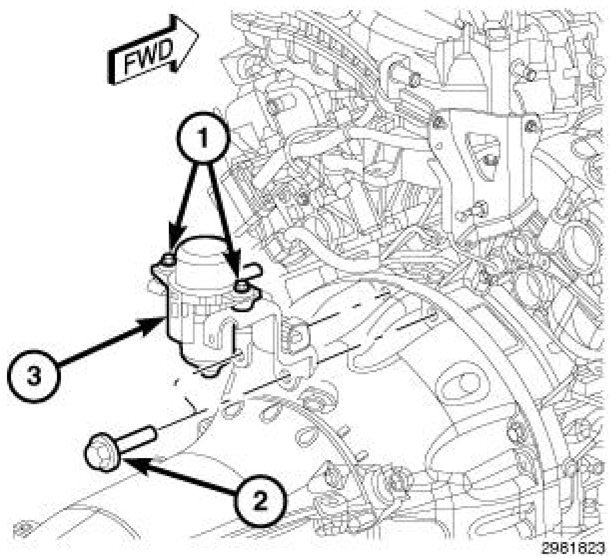


Fig. 15: Electric Vacuum Pump, Bolts & Studs
Courtesy of CHRYSLER GROUP, LLC

NOTE: Only vehicles with a 3.6L engine have an electric vacuum pump.

There is an electric vacuum pump (3) located on the back of the engine mounted to the top of the transmission. The vacuum pump (3) has one electrical connector on a pigtail connected to the mounting bracket. The vacuum pump (3) mounts to the bracket with two rubber insulated studs (1) to reduce vibration, and the bracket mounts to the transmission with two bolts (2). The vacuum hose has a quick-connect type end with a locking tab at the vacuum pump.

OPERATION

OPERATION

The Electric Vacuum Pump (EVP) system is installed to provide supplemental vacuum to the brake booster when the engine vacuum supply is low. The vacuum pump is connected to the engine and the brake booster through a series of hoses and one-way flow check valves. A pressure senor, mounted in the brake booster, provides information to the Antilock Brake System (ABS) module, then the vacuum level is sent over CAN to the Powertrain Control Module (PCM). The PCM modulates the EVP operation to maintain the brake booster vacuum within a given range. This system ensures that the customer experiences a consistent brake pedal feel under all driving conditions.

A two wire electrical connector is used to supply power and ground for the vacuum pump. Operating voltage is between 9V - 16V. Control of the vacuum pump is provided by the Powertrain Control Module (PCM) using a low side driver to a normally open relay (coil side). The relay coil side power is from a fuse in the under hood PDC. The switched power to the vacuum pump relay comes directly from the battery through an inline fuse holder located in the engine compartment.

The PCM monitors the Manifold Absolute Pressure (MAP) sensor and when the signal indicates low engine vacuum the PCM will cycle the vacuum pump as necessary to add vacuum to the power brake booster. The vacuum hoses are connected between the vacuum pump, the engine manifold (for MAP sensor signal), and the power brake booster vacuum sensor (on the brake booster). When the PCM cycles the vacuum pump on, the PCM monitors the MAP sensor and if the vacuum signal does not indicate a rising vacuum then DTCs will be set. Additionally the Antilock Brake System (ABS) module monitors the vacuum at the brake booster vacuum sensor and DTCs will also set in the ABS module.

REMOVAL

REMOVAL

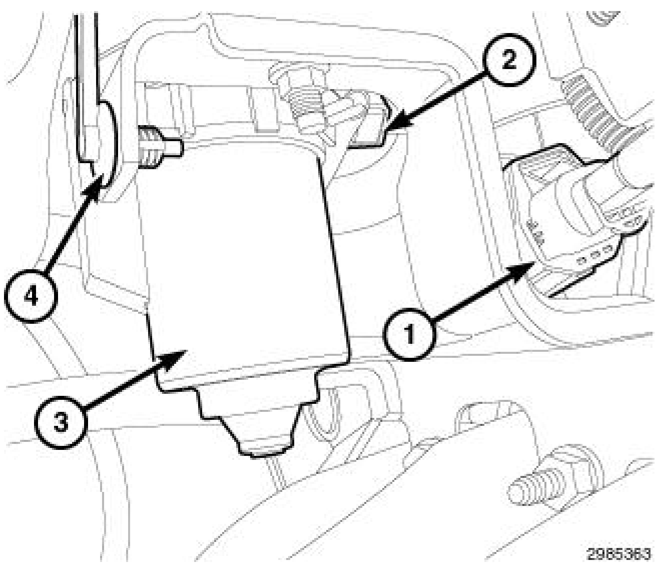


Fig. 16: Electrical Connector, Harness Connector, Hose & Vacuum Pump
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.

2. Remove the engine cover.
3. Disconnect the wire harness connector (1) and remove the harness connector (4) from the mounting bracket.
4. Release the locking tab and disconnect the quick connect vacuum hose (2) from the vacuum pump (3).

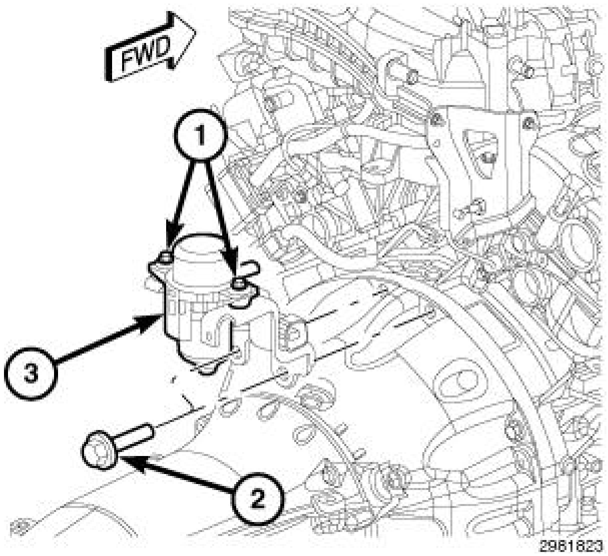


Fig. 17: Electric Vacuum Pump, Bolts & Studs
Courtesy of CHRYSLER GROUP, LLC

5. Remove the vacuum pump bracket bolts (2) and the vacuum pump assembly (3).

INSTALLATION

INSTALLATION

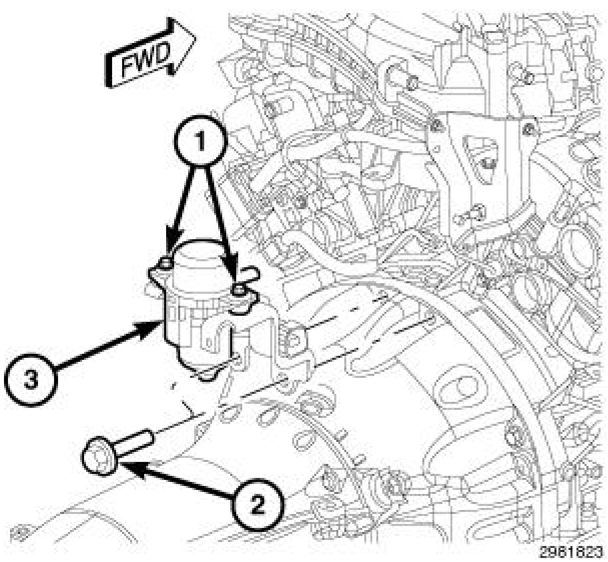
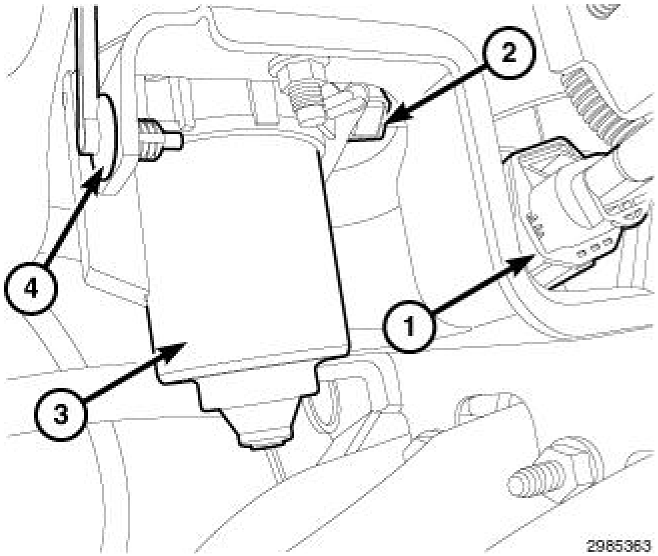


Fig. 18: Electric Vacuum Pump, Bolts & Studs
Courtesy of CHRYSLER GROUP, LLC

1. Install the Electric Vacuum Pump (EVP) to Bracket Bolts (2). Tighten bolts to the proper **SPECIFICATIONS** .



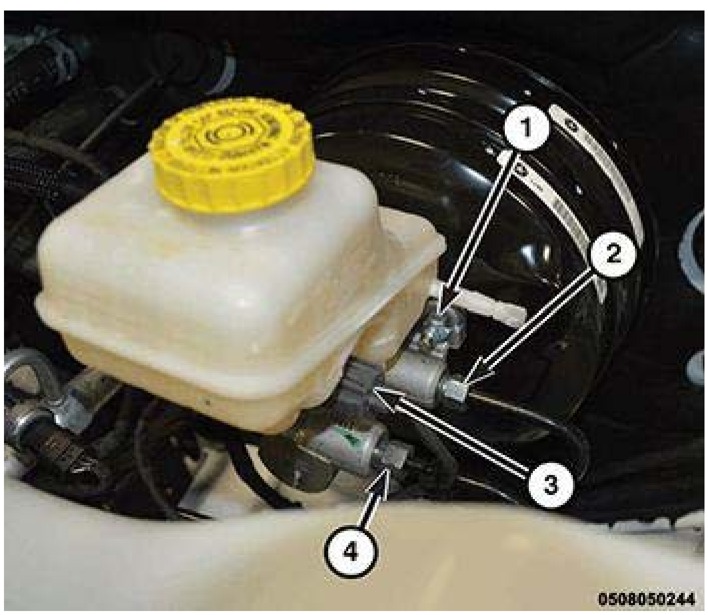
[Fig. 19: Electrical Connector, Harness Connector, Hose & Vacuum Pump]
Courtesy of CHRYSLER GROUP, LLC

2. Attach the wire harness connector to the bracket (4), and connect the electrical connector (1).
3. Connect the quick-connect vacuum hose (2) to the vacuum pump (3) and seat the locking tab.
4. Install the engine cover.

SWITCH, BRAKE FLUID LEVEL

REMOVAL

REMOVAL



[Fig. 20: Master Cylinder To Brake Booster Nut, Primary And Secondary Outlet Ports & Brake Fluid Level Sensor Wire Harness Connector]
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.

2. Remove the windshield wiper cowl. Refer to **COVER, COWL PANEL, REMOVAL** .
3. Disconnect the brake fluid level sensor wire harness connector (3).

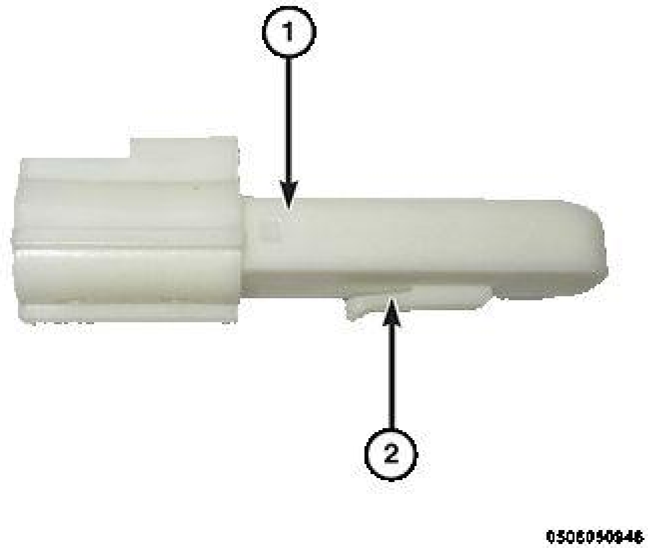


Fig. 21: Brake Fluid Level Sensor & Brake Fluid Level Sensor Retaining Clip
Courtesy of CHRYSLER GROUP, LLC

4. Remove the brake fluid level sensor (1) from the reservoir by pushing up on the brake fluid level sensor retaining clip (2) and pulling sensor outward.

INSTALLATION

INSTALLATION

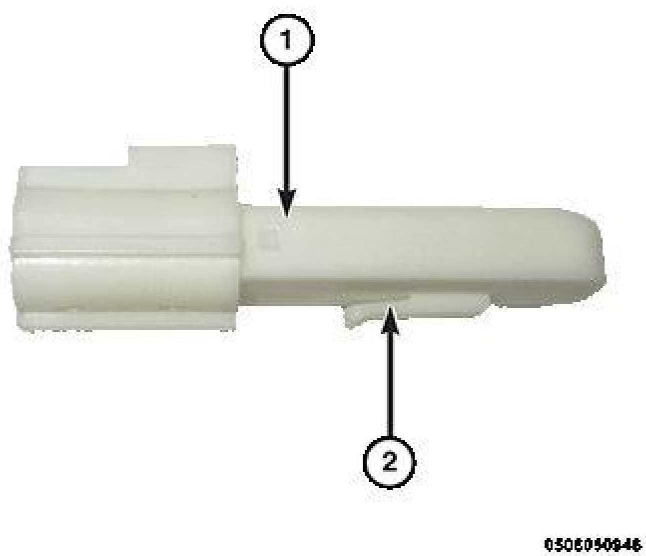


Fig. 22: Brake Fluid Level Sensor & Brake Fluid Level Sensor Retaining Clip
Courtesy of CHRYSLER GROUP, LLC

1. Install the brake fluid level sensor (1) into the fluid reservoir until the retaining clip (2) has clicked into

place.

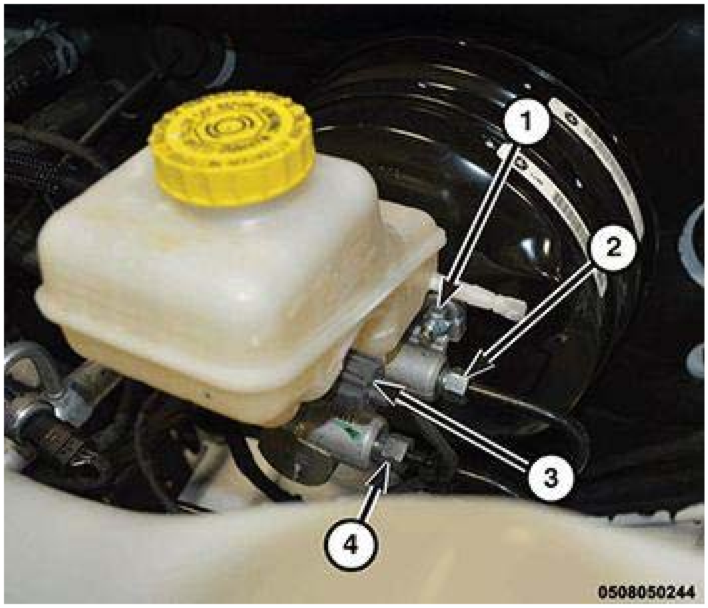


Fig. 23: Master Cylinder To Brake Booster Nut, Primary And Secondary Outlet Ports & Brake Fluid Level Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

2. Reconnect the brake fluid level sensor wire harness connector (3).
3. Install the windshield wiper cowl. Refer to **COVER, COWL PANEL, INSTALLATION** .
4. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

HYDRAULIC/MECHANICAL

DESCRIPTION

NON SRT

The non SRT system features twin-piston aluminum calipers and vented rotors in the front and single-piston aluminum calipers with vented rotors in the rear.

SRT

SRT8 models utilize four-wheel disc brakes.

All brake rotors are the internal vented type. There are no dust shields behind the front brake rotors.

The SRT8 6.2L front brakes feature six piston calipers and a two piece rotor design.

The SRT8 6.4L front brakes feature four piston calipers and a one piece rotor design.

All SRT8 calipers mount directly to the knuckle. They do not use brake caliper adapters.

All SRT8 calipers are not serviceable. Do not attempt disassembly.

The rear brake calipers feature four piston calipers.

Each SRT8 caliper half has their own bleeder screw at the top and must be bled individually when bleeding is required.

The SRT8 rear brake rotors have integrated parking brake drums like the standard rear disc brake system.

BOOSTER, POWER BRAKE

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - MASTER CYLINDER/POWER BOOSTER

1. Start the engine and check the booster vacuum hose connections. A hissing noise indicates a vacuum leak. Correct any vacuum leaks before proceeding.
2. Stop the engine and pump the brake pedal until all vacuum reserve in the booster is depleted.
3. Press and hold the brake pedal under light foot pressure. The pedal should hold firm. If the pedal falls away, there may be an external leak or the master cylinder is faulty (internal leakage).
4. Start the engine and note pedal action. It should fall away slightly under light foot pressure, then hold firm. If no pedal action is discernible, the power booster, vacuum supply or vacuum check valve is faulty, proceed to the POWER BOOSTER VACUUM TEST.
5. If the POWER BOOSTER VACUUM TEST passes, rebuild the booster vacuum reserve as follows: Release the brake pedal. Increase engine speed to 1500 RPM, close the throttle and immediately turn off the ignition to stop the engine.
6. Wait a minimum of 90 seconds and try brake action again. The booster should provide two or more vacuum assisted pedal applications. If the vacuum assist is not provided, the booster is faulty.

POWER BOOSTER VACUUM TEST

1. Connect a vacuum gauge to the booster check valve with a short length of hose and T-fitting.
2. Start and run the engine at curb idle for one minute.
3. Observe the vacuum supply. If the vacuum supply is less that 12 inches HG (406 millibars), repair the vacuum supply.
4. Clamp the hose shut between the intake vacuum source and the check valve.
5. Stop the engine and observe the vacuum gauge.
6. If the vacuum drops more than one inch HG (33 millibars) within 15 seconds, the booster diaphragm or check valve is faulty.

POWER BOOSTER CHECK VALVE TEST

1. Remove the power booster check valve from the power booster.
2. Using a hand operated vacuum pump, apply 15-20 inches HG (508-677 millibars) vacuum at the booster side of the check valve.
3. The vacuum should hold steady. If the gauge on the pump indicates vacuum loss, the check valve is faulty and should be replaced.

REMOVAL

REMOVAL

1. Move driver seat to full rearward position.
2. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
3. Remove windshield wiper module. Refer to **LINKAGE, WIPER ARM, REMOVAL** .
4. Remove the master cylinder. Refer to **MASTER CYLINDER, BRAKE, REMOVAL**.

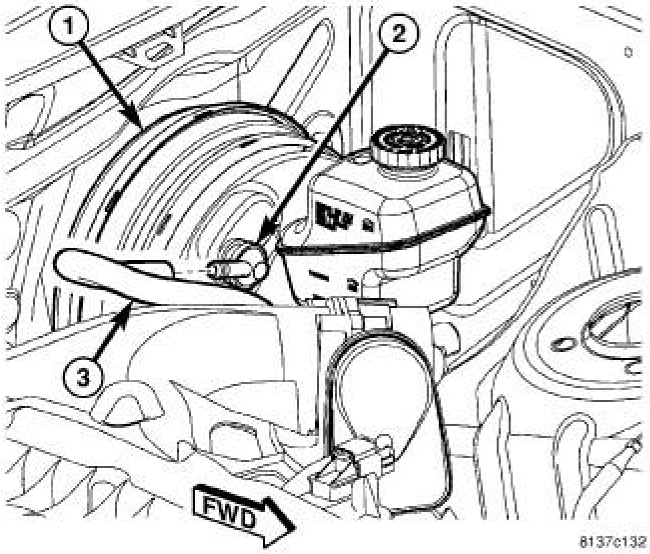


Fig. 24: Vacuum Hose Connection
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect vacuum hose (3) from check valve (2) on face of booster (1). **Do not remove check valve from booster.**

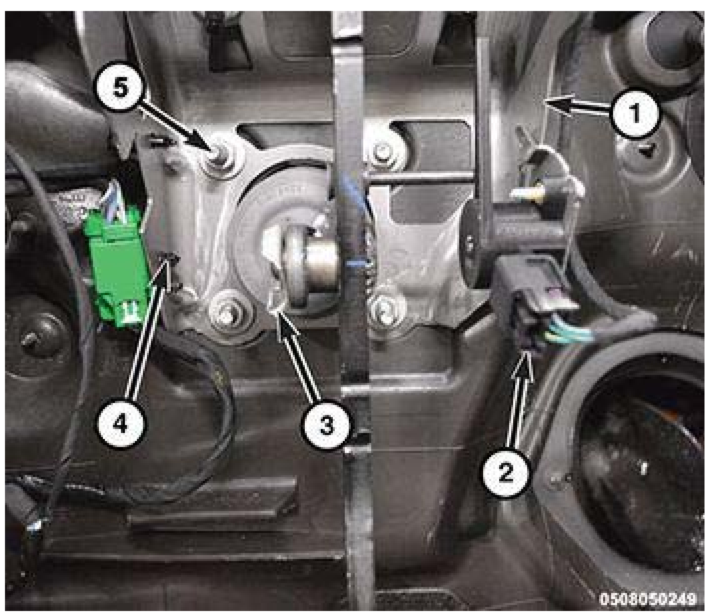


Fig. 25: Removing/Installing Stop Lamp Sensor
Courtesy of CHRYSLER GROUP, LLC

6. Remove stop lamp sensor. Refer to **SENSOR, STOP LAMP, REMOVAL** .

NOTE: **Do not discard the stop lamp switch as it can be adjusted and reinstalled.**

7. Disengage brake booster push rod to brake pedal retaining clip (3).

NOTE: **Discard retaining clip. It is not to be reused. Install NEW retaining clip when assembling.**

8. Slide booster push rod off brake pedal pin.
9. Remove the four brake booster nuts (5).
10. Slide power brake booster forward out of dash panel and remove through opening between cross-brace and windshield.

INSTALLATION

INSTALLATION

NOTE: **Make sure there is a NEW booster seal placed over push rod and mounting studs on rear of booster prior to installation. Failure to do so may result in a leak and possible premature failure of the brake booster.**

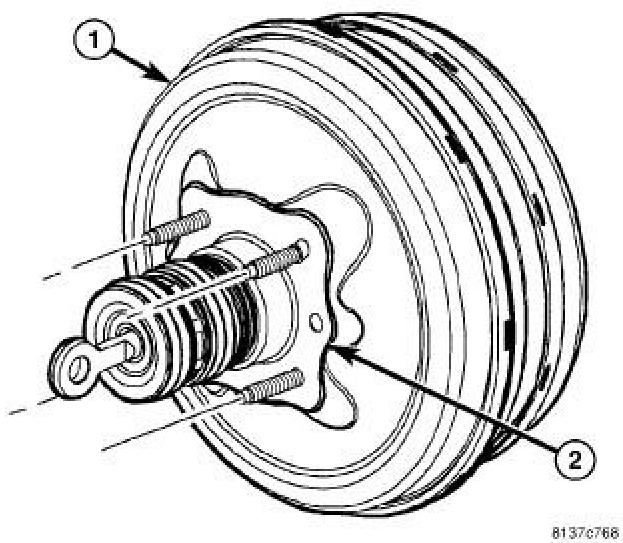


Fig. 26: Booster Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install a **NEW** booster seal (2) over push rod and mounting studs on rear of booster (1).

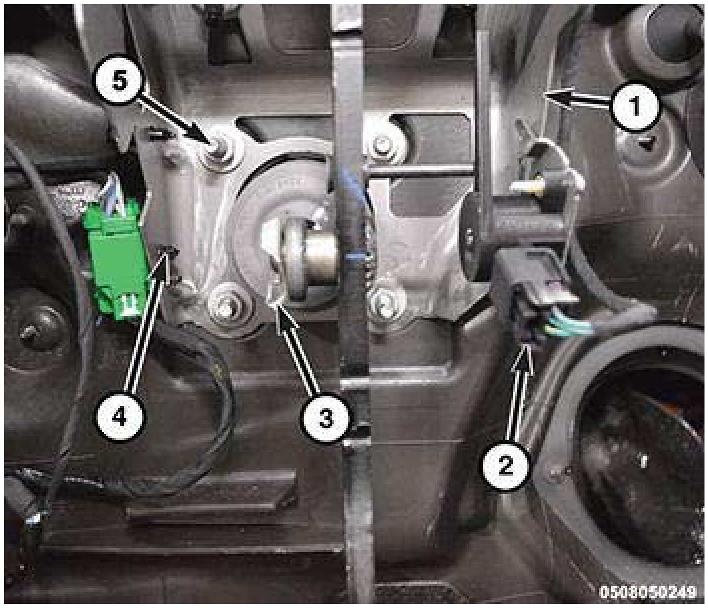


Fig. 27: Removing/Installing Stop Lamp Sensor
Courtesy of CHRYSLER GROUP, LLC

2. Install power brake booster through opening between cross-brace and windshield. Guide booster push rod and mounting studs (5) through dash panel.

NOTE: **Be sure to tighten all four booster mounting nuts to specifications or a vacuum leak can result.**

3. Install four brake booster nuts (5). Tighten to the proper **SPECIFICATIONS** .
4. Slide booster push rod onto brake pedal pin. Install **NEW** retaining clip (3) securing push rod to brake pedal.
5. Reinstall and adjust the stop lamp sensor that was set aside for reuse. Refer to **SENSOR, STOP LAMP, INSTALLATION** .

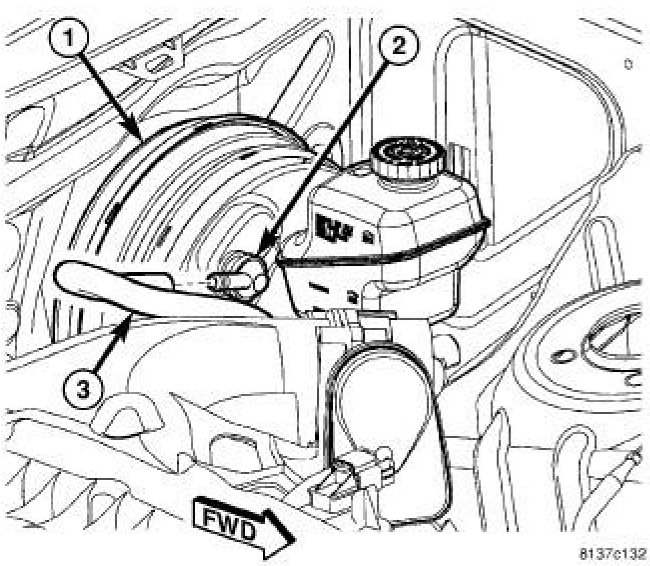


Fig. 28: Vacuum Hose Connection

Courtesy of CHRYSLER GROUP, LLC

6. Connect vacuum hose (3) to check valve (2) on face of booster (1). **Do not remove check valve from booster.**
7. Install master cylinder. Refer to **MASTER CYLINDER, BRAKE, INSTALLATION**.
8. Install windshield wiper module. Refer to **LINKAGE, WIPER ARM, INSTALLATION** .
9. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
10. Fill and bleed brakes system as necessary. Refer to **STANDARD PROCEDURE** .

CALIPER, DISC BRAKE, FRONT

REMOVAL

REMOVAL

NOTE: Before proceeding, refer to CAUTION and WARNING.

1. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the tire and wheel assembly. Refer to **REMOVAL** .

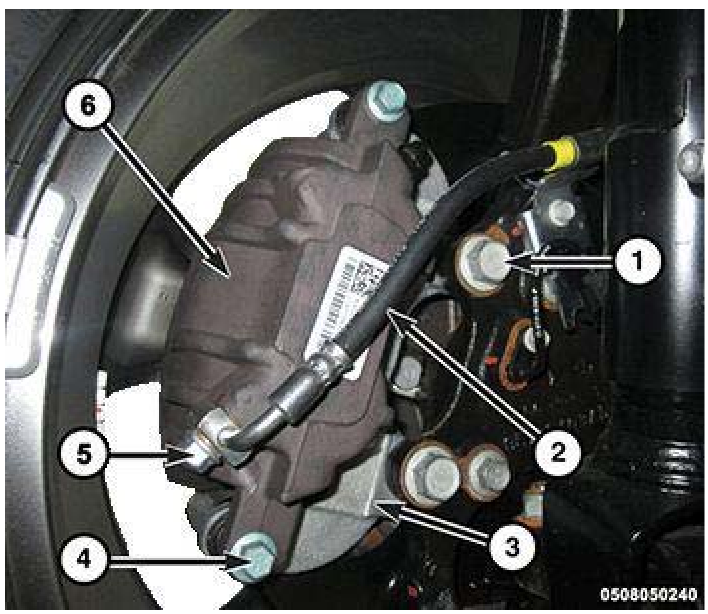


Fig. 29: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

4. Remove the brake hose to brake caliper banjo bolt (5). There are two sealing washers (one on each side of hose fitting) that will come off when bolt is removed. Discard these washers; install **NEW** washers on installation.
5. While holding guide pins from turning, remove the brake caliper guide pin bolts (4).
6. Remove brake caliper (6) from brake adapter (3).

DISASSEMBLY

DISASSEMBLY

NOTE: Before disassembling the brake caliper, clean and inspect it. Refer to INSPECTION and CLEANING .

WARNING: Under no condition should high pressure air ever be used to remove a piston from a caliper bore. Personal injury could result from such practice.

1. Drain brake fluid from caliper.

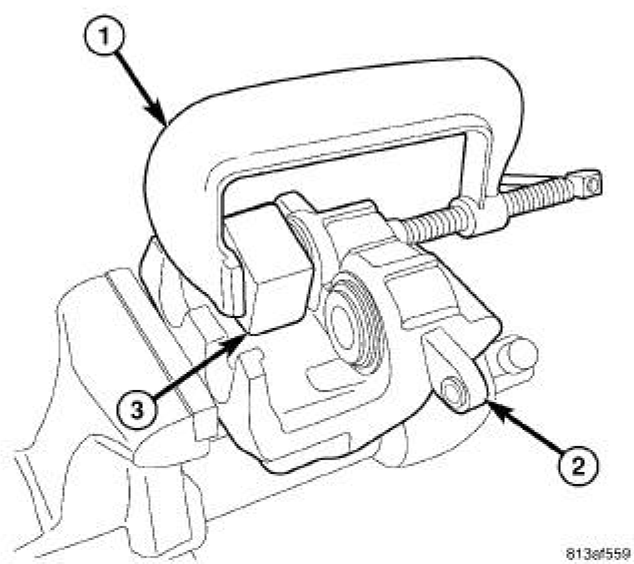


Fig. 30: C-Clamp Over Piston Number 1
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use excessive force when clamping caliper (2) in vise. Caliper housing is made of aluminum. Excessive vise pressure will cause bore distortion.

2. Mount caliper (2) in vise equipped with protective jaws.
3. C-clamp (1) a block of wood (3) over one piston.

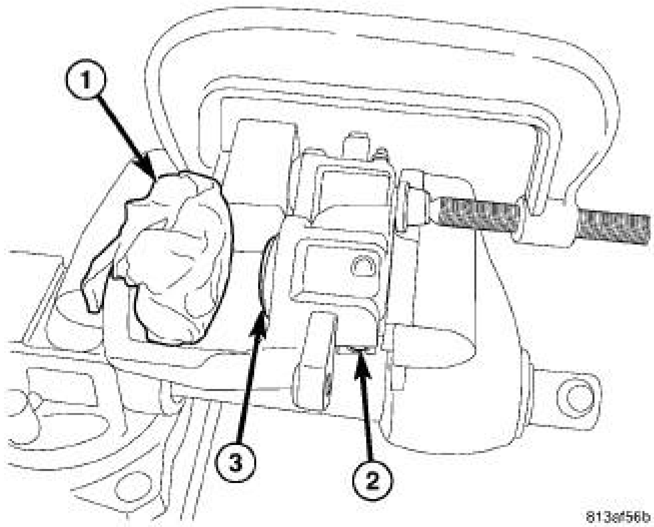


Fig. 31: Padded Block In Front Of Piston Number 2
Courtesy of CHRYSLER GROUP, LLC

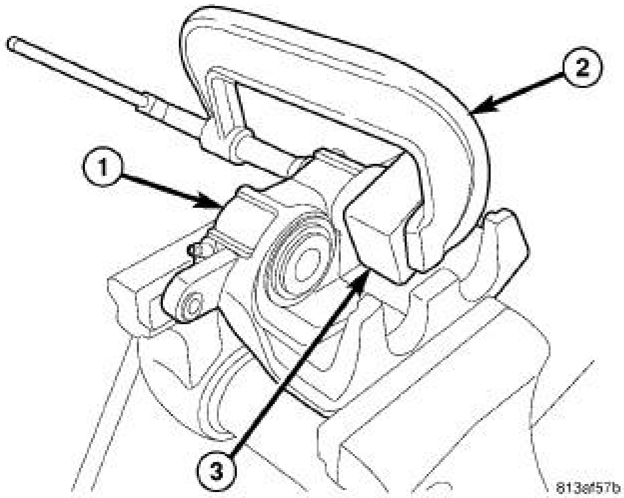
4. Take another block of wood and pad it with one-inch thickness of shop towels. Padded block should be sized to allow piston to push out of bore far enough to be removed by hand after being loosened by air pressure, yet large enough to keep piston from coming completely out.
5. Place the padded block of wood (1) in outboard shoe side of caliper (2) in front of exposed piston (3). This will cushion and protect caliper piston during removal.

WARNING: Do not place face or hands near caliper and piston if using compressed air to remove piston. Do not use high pressure.

WARNING: Never attempt to catch piston as it leaves bore. This could result in personal injury.

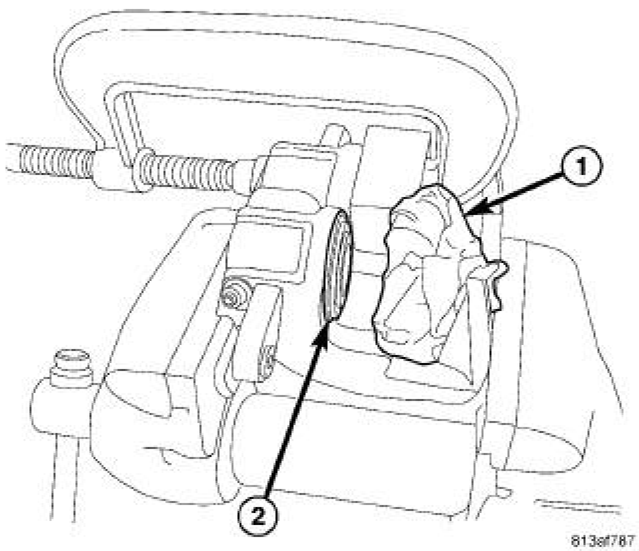
CAUTION: Do not blow piston out of bore with sustained air pressure. This could result in a cracked piston. Use only short spurts of air.

6. Apply **short spurts of low pressure air** with a rubber tipped blow gun through caliper brake hose port. Use only enough air pressure to ease piston out of bore.
7. Remove piston from caliper (2).
8. Remove C-clamp and block of wood.



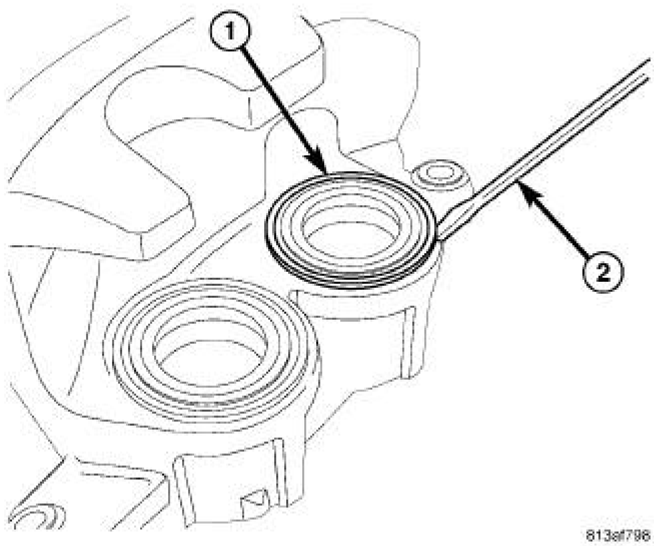
[Fig. 32: C-Clamp Over Piston Number 2 Boot](#)
Courtesy of CHRYSLER GROUP, LLC

9. C-clamp (1) the block of wood (3) over dust boot of first piston removed. This will seal empty piston bore.



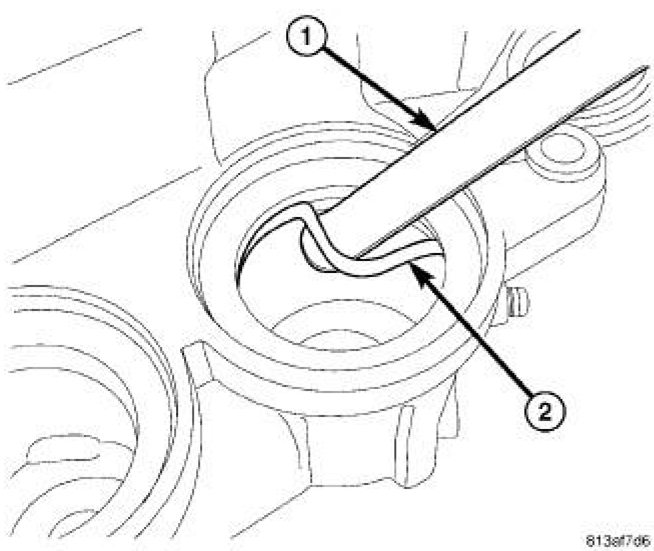
[Fig. 33: Padded Block In Front Of Piston 1](#)
Courtesy of CHRYSLER GROUP, LLC

10. Move padded piece of wood (1) in front of piston (2) yet to be removed.
11. Remove second piston using same procedure with **short spurts of low pressure air** .
12. Remove C-clamp and block of wood from caliper.



[Fig. 34: Removing Dust Boots](#)
Courtesy of CHRYSLER GROUP, LLC

13. Remove piston dust boots (1) (over each bore) with an appropriate pry tool (2). **Use care not to damage aluminum housing.**



[Fig. 35: Removing Piston Seals](#)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Use an appropriate tool (1) to remove piston seals (2) to avoid scratching piston bore. Do not use a screwdriver or other metal tool to remove seals.

14. Using a soft tool such as a plastic trim stick (1), remove piston seals (2) from caliper bores.

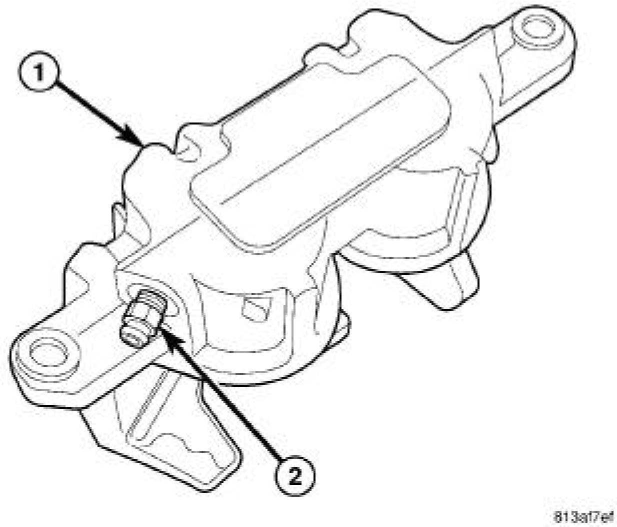


Fig. 36: Twin Piston Caliper Bleeder Screw
Courtesy of CHRYSLER GROUP, LLC

15. Remove caliper bleeder screw (2) from caliper housing (1).
16. Clean piston bore and drilled passage ways with alcohol or a suitable solvent. Wipe it dry using only a lint-free cloth.
17. Inspect both piston and bore for scoring or pitting.

NOTE: **It is not recommended to hone caliper bore. The anodized coating would be compromised.**

CLEANING

CLEANING

WARNING: **Chrysler does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.**

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

To clean or flush the internal passages of the brake caliper, use fresh brake fluid or MoparÂ® Non-Chlorinated Brake Parts Cleaner. Never use gasoline, kerosene, alcohol, oil, transmission fluid or any fluid containing mineral oil to clean the caliper. These fluids will damage rubber cups and seals.

INSPECTION

INSPECTION

Inspect the disc brake caliper for the following:

- Cracked or damaged housing

- Brake fluid leaks in and around boot area
- Ruptures, brittleness or damage to the piston dust boot

If caliper fails inspection, disassemble and recondition caliper, replacing the seals and dust boots or replace caliper.

ASSEMBLY

ASSEMBLY

CAUTION: Dirt, oil, and solvents can damage caliper seals. Ensure assembly area is clean and dry.

NOTE: Always use new, clean MoparÃ® DOT 3 Motor Vehicle Brake Fluid when assembling brake caliper.

NOTE: Never use old or used piston seals or boots for assembly.

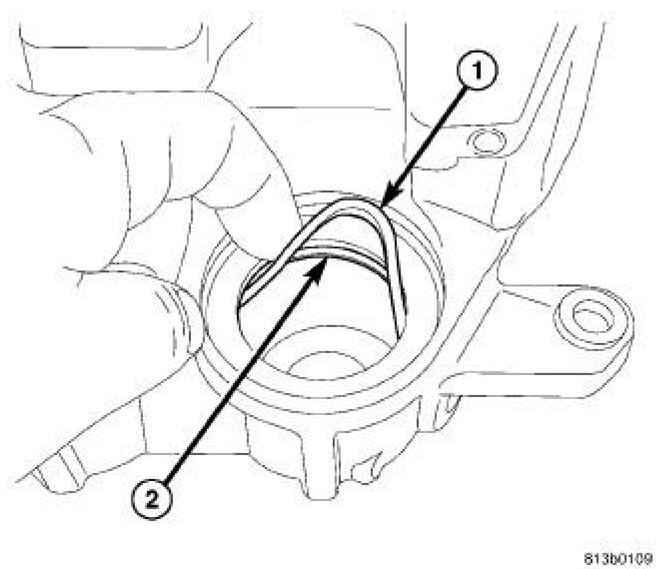


Fig. 37: Installing Piston Seals
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate caliper pistons, piston seals (1) and piston bores (2) with clean, fresh brake fluid.
2. Install NEW piston seal (1) into groove of each caliper piston bore (2).

   NOTE: Make sure seal is fully seated and not twisted in groove.

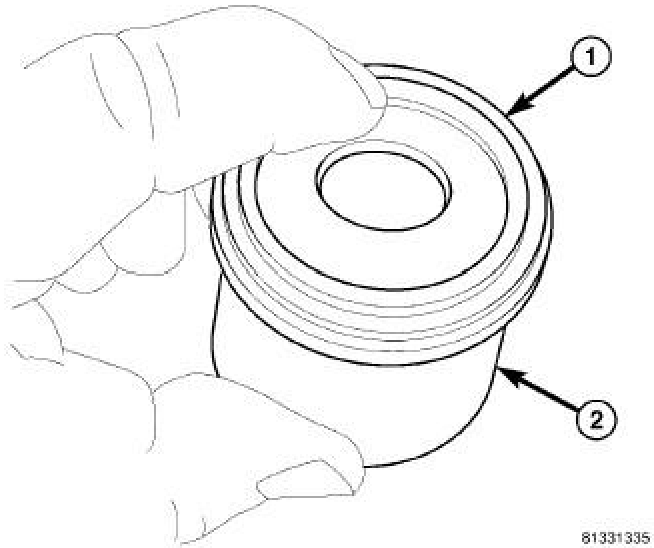


Fig. 38: Installing Boot On Caliper Piston
Courtesy of CHRYSLER GROUP, LLC

3. Install NEW boot (1) on each piston (2) and work boot lip into groove at top of piston. Stretch boot rearward straightening boot folds, then move boot forward as necessary until folds snap uniformly into place.

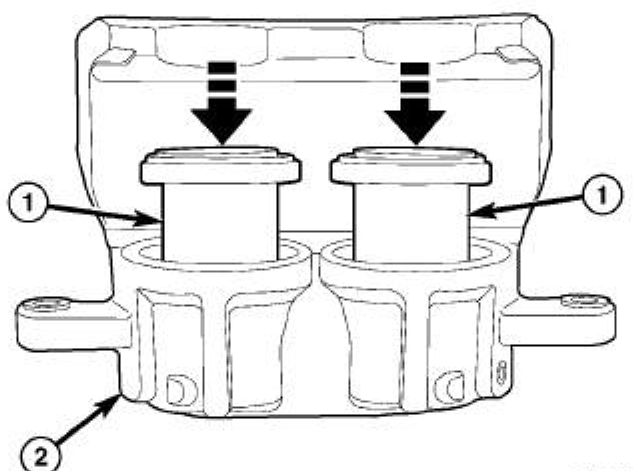


Fig. 39: Installing Pistons In Caliper
Courtesy of CHRYSLER GROUP, LLC

4. Install each piston (1), one at a time, into its caliper piston (2) bore, pressing piston down to bottom of bore using hand-pressure. Using a piece of wood or wooden hammer handle may also suffice as long as piston and boot damage is avoided.

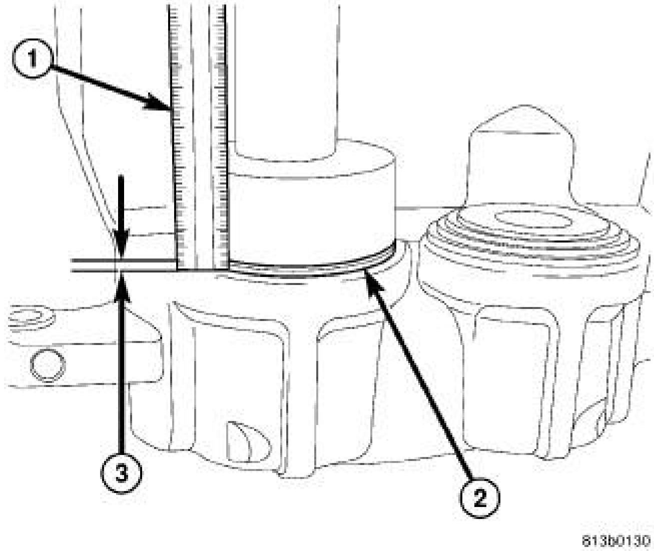


Fig. 40: Measuring Dust Boot Heights
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When seating dust boots in following step, use care not to over-install boots or damage will occur. Each boot (2) will bottom in the counterbore before the top of the boot reaches the surface of the caliper. The boot will bottom with approximately 2 mm (1/16 inch) (3) of boot still showing above caliper housing.

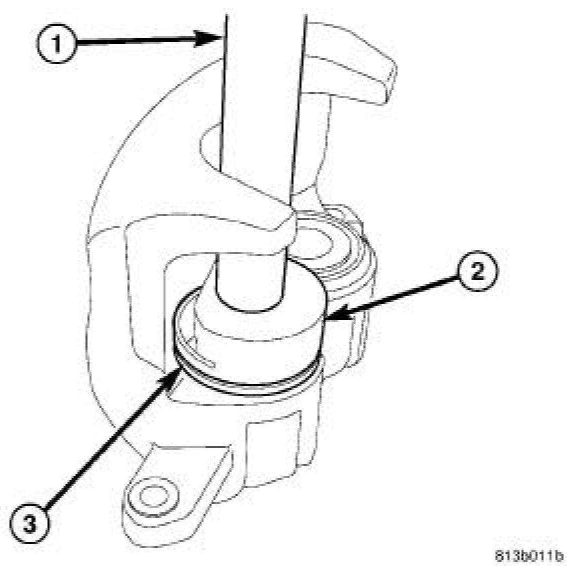


Fig. 41: Seating Boots Using Tools 9315 & C-4171
Courtesy of CHRYSLER GROUP, LLC

5. Seat dust boots (3) in caliper counterbores using Installer (special tool #9315, Installer, Dust Boot) (2) with Handle (special tool #C-4171, Driver Handle, Universal) (1). Install each dust boot until it bottoms. Do not over-seat dust boot or damage will occur.

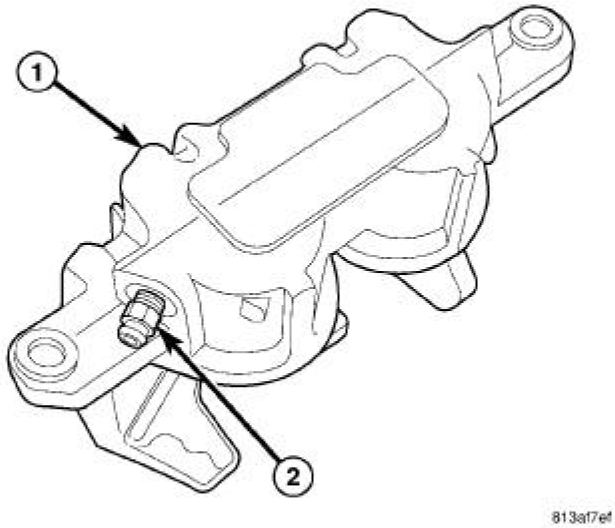


Fig. 42: Twin Piston Caliper Bleeder Screw
Courtesy of CHRYSLER GROUP, LLC

6. Install caliper bleeder screw (2) in caliper housing (1). Tighten bleeder screw to the proper **SPECIFICATIONS** .
7. Install caliper on vehicle. Refer to **CALIPER, DISC BRAKE, FRONT, INSTALLATION** .

INSTALLATION

INSTALLATION

CAUTION: Always inspect brake pads before installing disc brake caliper and replace as necessary.

CAUTION: Use care when installing caliper onto disc brake adapter to avoid damaging boots on caliper guide pins.

1. Completely retract caliper pistons back into bores of caliper. Use hand pressure or a C-clamp may also be used to retract pistons, first placing a wood block over piston before installing C-clamp to avoid damaging piston.
2. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.

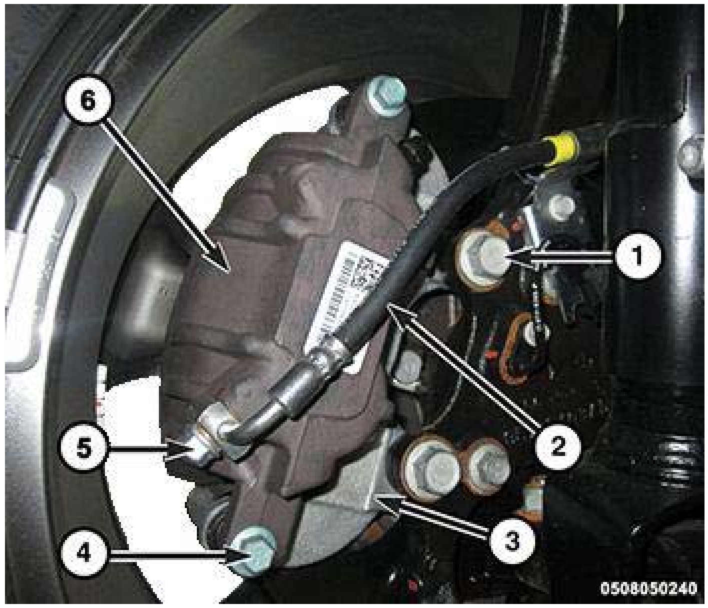


Fig. 43: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Extreme caution should be taken not to cross thread caliper guide pin bolts (2) when they are installed.**

3. Install the caliper (6) over brake pads and onto caliper adapter (3).
4. Align the brake caliper guide pin bolts (4) with the brake caliper adaptor. While holding guide pins from turning, tighten to the proper **SPECIFICATIONS** .
5. Install the brake hose to brake caliper banjo bolt (5). Tighten to the proper **SPECIFICATIONS** .

NOTE: **Install NEW washers on each side of hose fitting as banjo bolt (5) is placed through fitting.**

6. Install the tire and wheel assembly. Refer to **INSTALLATION** .
7. Remove support and lower the vehicle.
8. Remove brake pedal holding tool.
9. Bleed braking system. Refer to **STANDARD PROCEDURE** .
10. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes.

CALIPER, DISC BRAKE, FRONT SRT8

REMOVAL

REMOVAL

NOTE: **Before proceeding, refer to CAUTION and WARNING.**

NOTE: **Six piston caliper shown, four piston caliper similar.**

1. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will

not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.

2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the tire and wheel assembly. Refer to **REMOVAL** .

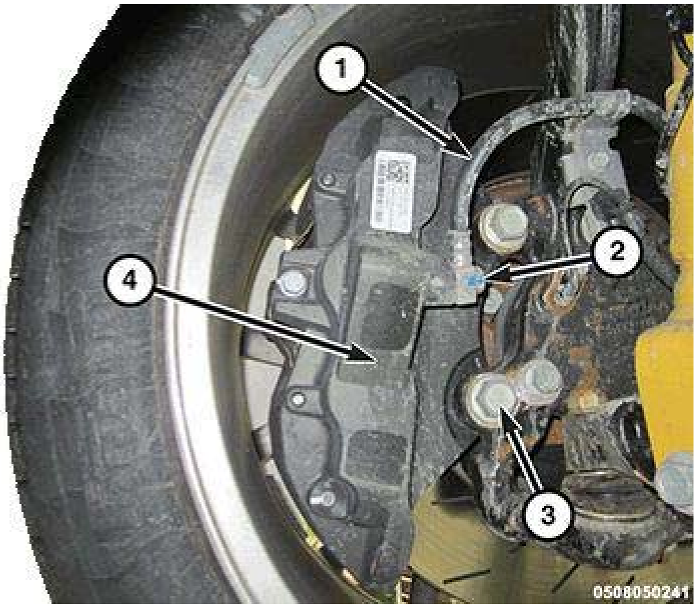


Fig. 44: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

4. Remove the brake hose to brake caliper banjo bolt (2). There are two sealing washers (one each side of hose fitting) that will come off when bolt is removed. Discard these washers; use **NEW** washers upon installation.

CAUTION: When pushing pistons back into caliper bores, use only a trim stick as shown or other suitable soft tool. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor, caliper, pistons or dust boots.

5. Using trim stick, slowly apply pressure against brake pad until the caliper pistons (on that side of caliper) are completely bottomed in bores of caliper half.

NOTE: Repeat above procedure to opposite brake pad and pistons as necessary.

6. Remove brake caliper to knuckle bolts (3).
7. Remove brake caliper (4) with pads from knuckle.
8. Remove the brake pads. Refer to **PADS, BRAKE, REMOVAL**.

NOTE: These calipers are not serviceable. Do not attempt disassembly.

INSTALLATION

INSTALLATION

CAUTION: Always inspect brake pads before installing disc brake caliper and replace as

necessary.

NOTE: **Six piston caliper shown, four piston similar.**

1. Completely retract caliper pistons back into bores of caliper. Use hand pressure or a C-clamp may also be used to retract pistons, first placing a wood block or used brake pad (not to be reused) over pistons before installing C-clamp to avoid damaging piston.
2. If brake pads need to be installed in caliper before installation. Refer to **PADS, BRAKE, INSTALLATION**.

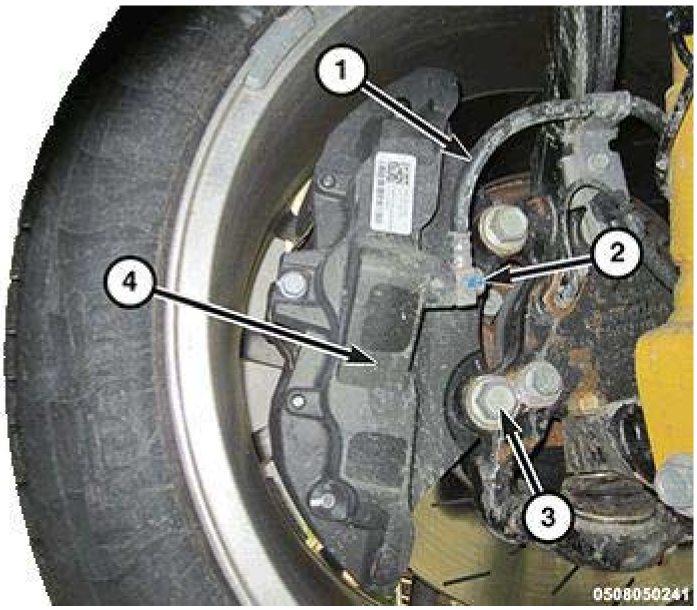


Fig. 45: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

3. Install the caliper with pads (4).
4. Install the brake caliper to knuckle bolts (3). Tighten to the proper **SPECIFICATIONS** .
5. Install brake hose to brake caliper banjo bolt (2). Tighten to the proper **SPECIFICATIONS** .

NOTE: **Install NEW washers on each side of hose fitting as banjo bolt (2) is placed through banjo fitting.**

6. Install the tire and wheel assembly. Refer to **INSTALLATION** .
7. Remove support and lower the vehicle.
8. Remove brake pedal holding tool.
9. Bleed the braking system. Refer to **STANDARD PROCEDURE** .
10. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake pads. If NEW brake pads are installed, they need to be properly burnished. Refer to **PADS, BRAKE, STANDARD PROCEDURE**.

CALIPER, DISC BRAKE, REAR

REMOVAL

REMOVAL

NOTE: **Before proceeding, refer to CAUTION and WARNING.**

1. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the tire and wheel assembly. Refer to **REMOVAL** .

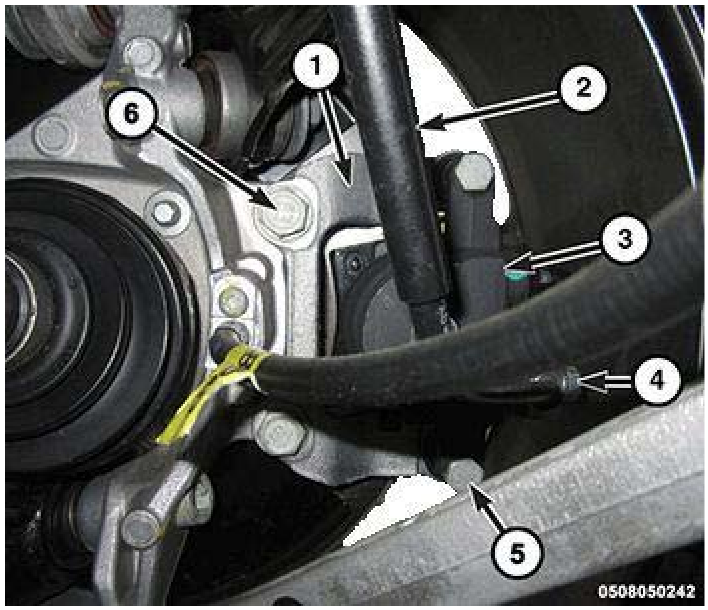


Fig. 46: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

4. Remove the brake hose to brake caliper banjo bolt (4). There are two sealing washers (one each side of hose fitting) that will come off when bolt is removed. Discard these washers; install **NEW** washers on installation.
5. While holding guide pins from turning, remove the brake caliper guide pin bolts (5).
6. Remove brake caliper (3) from brake adapter (1).

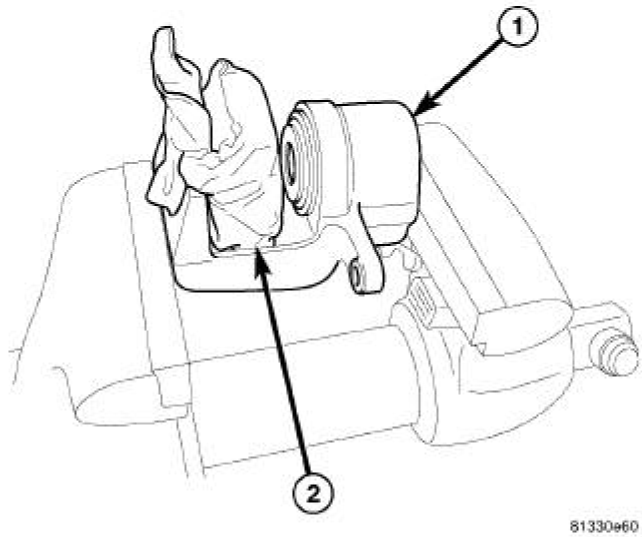
DISASSEMBLY

DISASSEMBLY

NOTE: **Before disassembling brake caliper, clean and inspect it. Refer to INSPECTION and CLEANING .**

WARNING: **Under no condition should high pressure air ever be used to remove a piston from a caliper bore. Personal injury could result from such a practice.**

CAUTION: **Do not use excessive force when clamping caliper in vise. Excessive vise pressure will cause bore distortion.**

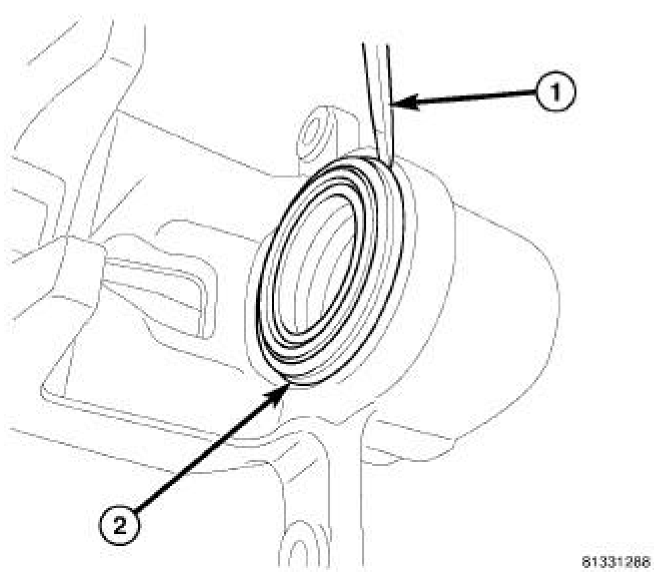


[Fig. 47: Rear Caliper In Vise](#)
Courtesy of CHRYSLER GROUP, LLC

1. Drain brake fluid from caliper.
2. Mount caliper in a vise equipped with protective jaws.
3. Place a wooden block (2) (padded with approximately one-inch thickness of shop towels) in front of caliper (1) piston as shown. Padded block should be sized to allow piston to push out of bore far enough to be removed by hand after being loosened by air pressure, yet large enough to keep piston from coming completely out. This will cushion and protect caliper piston during removal.

WARNING: Do not place face or hands near caliper and piston if using compressed air pressure to remove piston. Do not use high pressure.

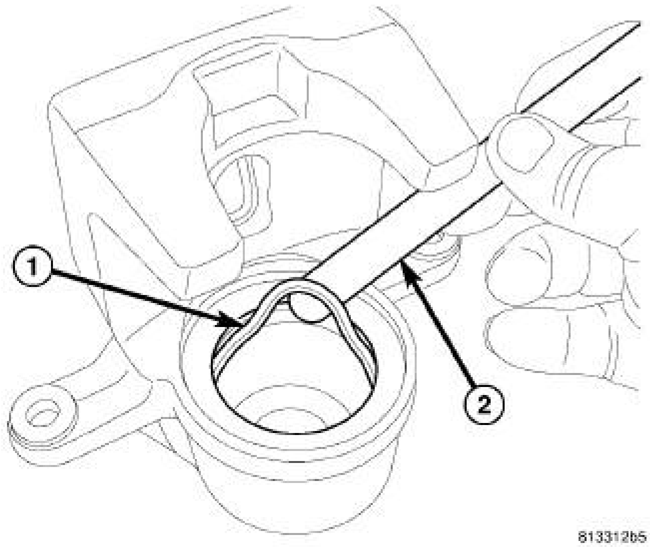
4. Apply low pressure compressed air to caliper fluid inlet in **short spurts** to ease piston out of bore.
5. Remove piston from caliper (1).



[Fig. 48: Removing Rear Caliper Dust Boot](#)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When working on disc brake caliper, always use care and suitable tools to avoid damaging the aluminum housing.

6. Using a suitable tool (1), carefully remove dust boot (2) and discard it.



[Fig. 49: Removing Rear Caliper Piston Seal](#)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use a screw driver or other metal tool for seal removal. Using such tools can scratch bore or leave burrs on seal groove edges.

7. Using a soft tool such as a plastic trim stick (2), work piston seal (1) out of its groove in caliper piston bore. Discard used seal.

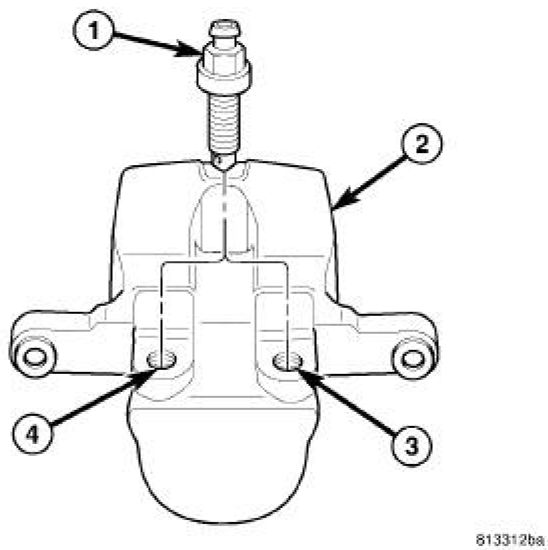


Fig. 50: Rear Caliper Bleeder Screw
Courtesy of CHRYSLER GROUP, LLC

8. Remove caliper bleeder screw (1) from caliper housing (2).
9. Clean piston bore and drilled passage ways with alcohol or a suitable solvent. Wipe it dry using only a lint-free cloth.
10. Inspect both piston and bore for scoring or pitting.

NOTE: **It is not recommended to hone caliper bore. The anodized coating would be compromised.**

CLEANING

CLEANING

WARNING: **Chrysler LLC does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.**

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

To clean or flush the internal passages of the brake caliper, use fresh brake fluid or MoparÂ® Non-Chlorinated Brake Parts Cleaner. Never use gasoline, kerosene, alcohol, oil, transmission fluid or any fluid containing mineral oil to clean the caliper. These fluids will damage rubber cups and seals.

INSPECTION

INSPECTION

Inspect the disc brake caliper for the following:

- Cracked or damaged housing
- Brake fluid leaks in and around boot area
- Ruptures, brittleness or damage to the piston dust boot

If caliper fails inspection, disassemble and recondition caliper, replacing the seals and dust boots or replace caliper.

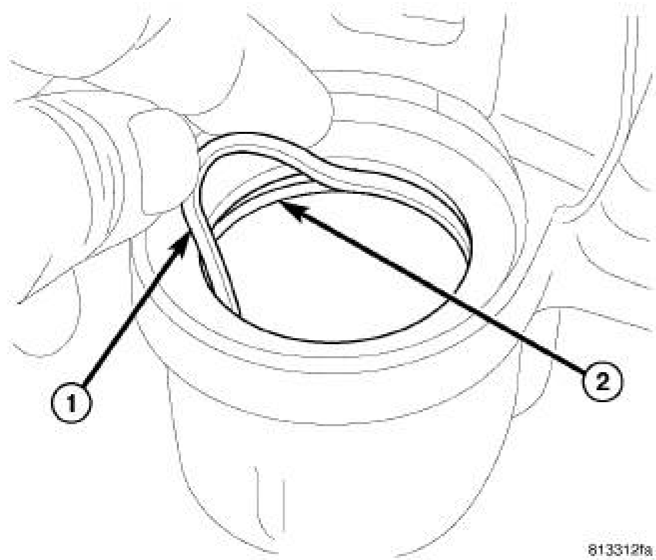
ASSEMBLY

ASSEMBLY

CAUTION: **Dirt, oil, and solvents can damage caliper seals. Ensure assembly area is clean and dry.**

NOTE: **Always use new, clean MoparÂ® DOT 3 Motor Vehicle Brake Fluid or equivalent when assembling brake caliper.**

NOTE: **Never use used or old piston seals or boots for reassembly.**



[**Fig. 51: Installing Rear Caliper Piston Seal**]
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate caliper piston, piston seal (1) and piston bore (2) with clean, fresh brake fluid.
2. Install NEW piston seal (1) in groove of caliper bore (2). Seal should be started at one area of groove and gently worked around and into the groove using only your clean fingers to seat it.

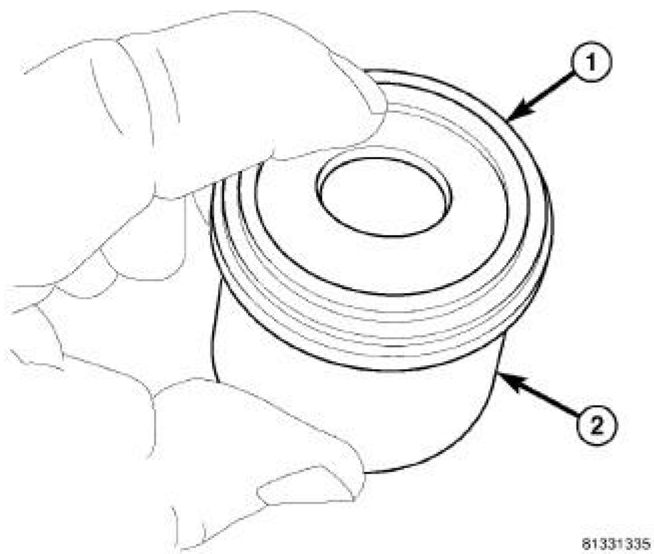
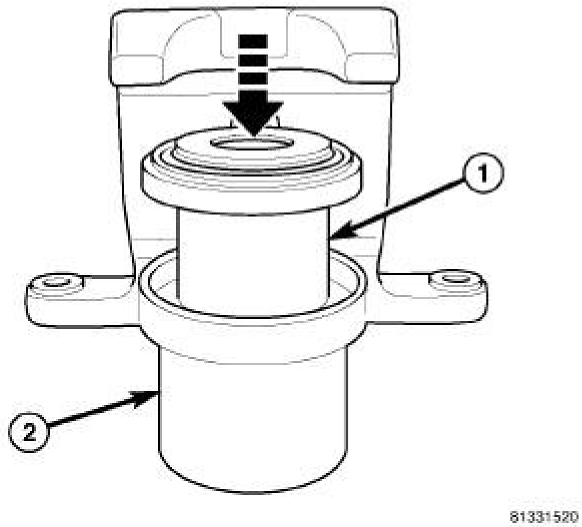


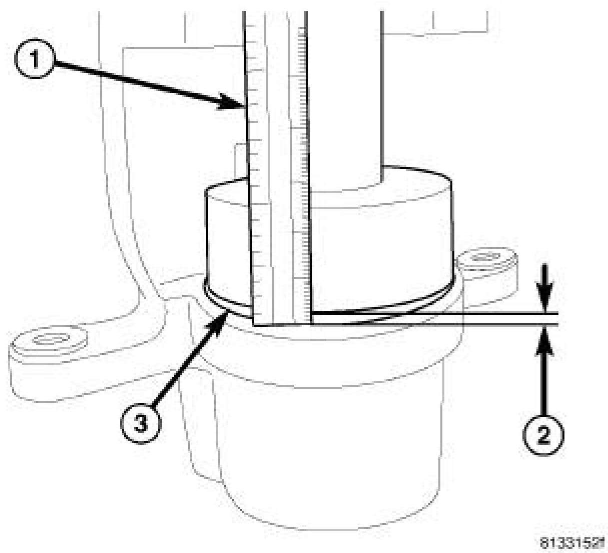
Fig. 52: Installing Boot On Caliper Piston
Courtesy of CHRYSLER GROUP, LLC

3. Install NEW dust boot (1) on piston (2) and work boot lip into groove at top of piston. Stretch boot downward, straightening boot folds, then move boot back upward as necessary until folds snap uniformly into place.



[Fig. 53: Installing Piston In Rear Caliper](#)
Courtesy of CHRYSLER GROUP, LLC

4. Install piston (1) into caliper piston (2) bore, pressing piston down to bottom of bore using hand-pressure. Using a piece of wood or wooden hammer handle may also suffice as long as piston and boot damage can be avoided.



[Fig. 54: Measuring Dust Boot Height](#)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When installing dust boot in following step, use care not to over-install boot or damage will occur. The boot (3) will bottom in the counterbore before the top of the boot reaches the surface of the caliper. The boot will bottom with approximately 2 mm (1/16 inch) (2) of boot still showing above caliper housing.

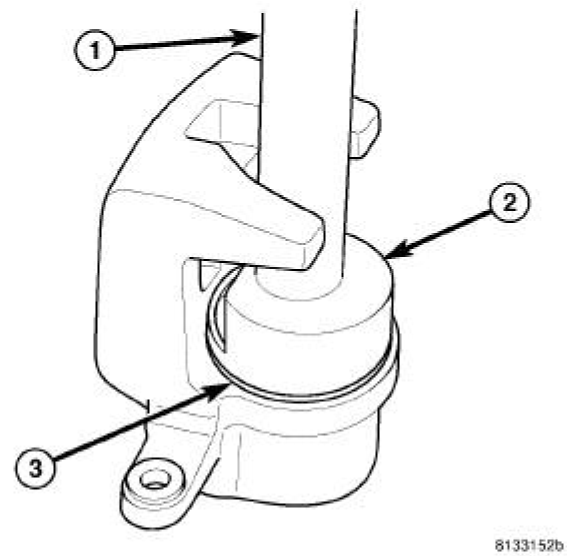


Fig. 55: Installing Dust Boot Using Tool
Courtesy of CHRYSLER GROUP, LLC

5. Seat dust boot (3) in caliper counterbore using Installer, Special Tool (special tool #9314, Installer, Dust Boot), with Handle, Special Tool (special tool #C-4171, Driver Handle, Universal). Install dust boot until it bottoms. Do not over-seat dust boot or damage will occur.

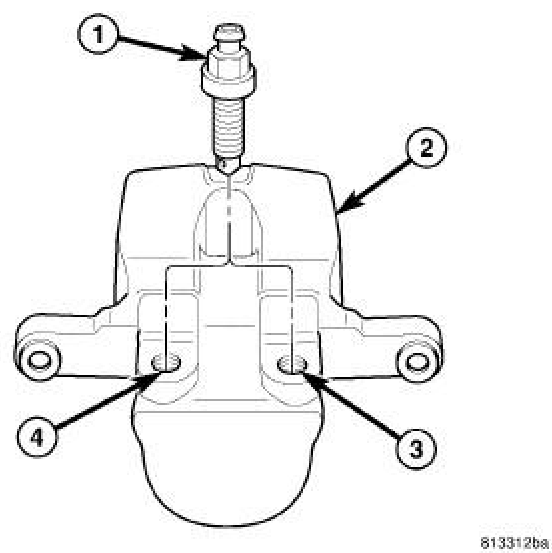


Fig. 56: Rear Caliper Bleeder Screw
Courtesy of CHRYSLER GROUP, LLC

6. Install bleeder screw in correct threaded hole. Caliper housing is not side-specific, so it is important to install bleeder screw in threaded hole that will be uppermost once caliper is installed on vehicle. Tighten bleeder screw to the proper **SPECIFICATIONS** .
7. Install caliper on vehicle. Refer to **CALIPER, DISC BRAKE, REAR, INSTALLATION** .

INSTALLATION

INSTALLATION

CAUTION: Always inspect brake pads before installing disc brake caliper and replace as necessary.

CAUTION: Use care when installing caliper onto disc brake adapter to avoid damaging boots on caliper guide pins.

1. Completely retract caliper piston back into bore of caliper. Use hand pressure or a C-clamp may be used to retract piston, first placing a wood block over piston before installing C-clamp to avoid damaging piston.
2. Push caliper guide pins into caliper adapter to clear caliper mounting bosses when installing.

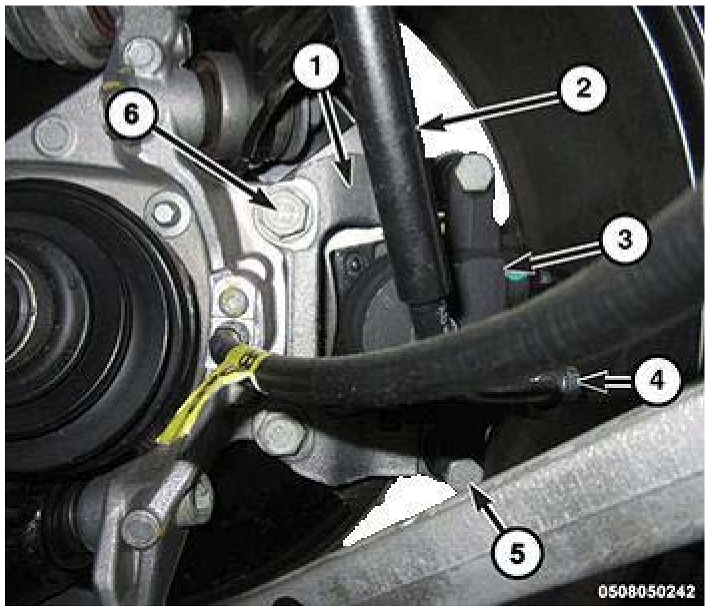


Fig. 57: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

3. Install the caliper (3) over brake pads and onto caliper adapter (3).

CAUTION: Extreme caution should be taken not to cross thread caliper guide pin bolts (2) when they are installed.

NOTE: Before installing the brake caliper guide pin bolts, clean guide pin bolt threads and apply MoparÂ® Lock AND Seal Adhesive or equivalent.

4. Align the brake caliper guide pin bolts (5) with the brake caliper adaptor (1). While holding guide pins from turning, tighten to the proper **SPECIFICATIONS** .
5. Install the brake hose to brake caliper banjo bolt (4) and tighten to the proper **SPECIFICATIONS** .

NOTE: Install NEW washers on each side of hose fitting as banjo bolt is placed through fitting.

6. Install the tire and wheel assembly. Refer to **INSTALLATION** .

7. Remove support and lower the vehicle.
8. Remove brake pedal holding tool.
9. Bleed the braking system. Refer to STANDARD PROCEDURE .
10. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes.

CALIPER, DISC BRAKE, REAR SRT8

REMOVAL

REMOVAL

NOTE: Before proceeding, refer to CAUTION and WARNING.

1. Using a brake pedal holding tool, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.
2. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .
3. Remove the tire and wheel assembly. Refer to REMOVAL .

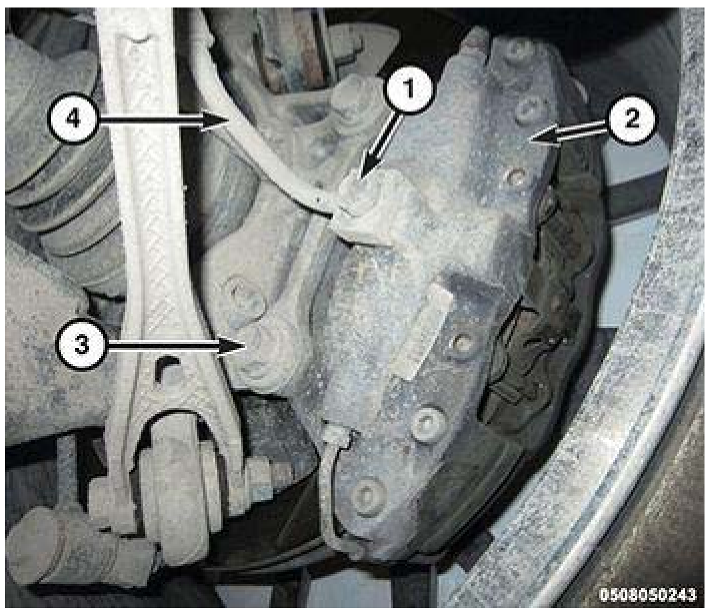


Fig. 58: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

4. Remove the brake hose to brake caliper banjo bolt (1). There are two sealing washers (one each side of hose fitting) that will come off when bolt is removed. Discard these washers; install **NEW** washers on installation.

CAUTION: When pushing pistons back into caliper bores, use only a trim stick as shown or other suitable soft tool. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor, caliper, pistons or dust boots.

5. Using trim stick, slowly apply pressure against brake pad until both pistons (on that side of caliper) are completely bottomed in bores of caliper half.

NOTE: **Repeat above procedure to opposite brake pad and pistons as necessary.**

6. Support spring link using a transmission jack or other appropriate jack. Raise spring link just enough to access the lower brake caliper to knuckle bolt (3).
7. Remove the brake caliper to knuckle bolts (3).
8. Remove brake caliper (2) with pads.
9. Remove the brake pads. Refer to **PADS, BRAKE, REMOVAL**.

NOTE: **These calipers are not serviceable. Do not attempt disassembly.**

INSTALLATION

INSTALLATION

CAUTION: **Always inspect brake pads before installing disc brake caliper and replace as necessary.**

1. Completely retract caliper pistons back into bores of caliper. Use hand pressure or a C-clamp may also be used to retract pistons, first placing a wood block or used brake pad (not to be reused) over piston before installing C-clamp to avoid damaging piston.
2. If brake pads need to be installed in caliper before installation. Refer to **PADS, BRAKE, INSTALLATION**.

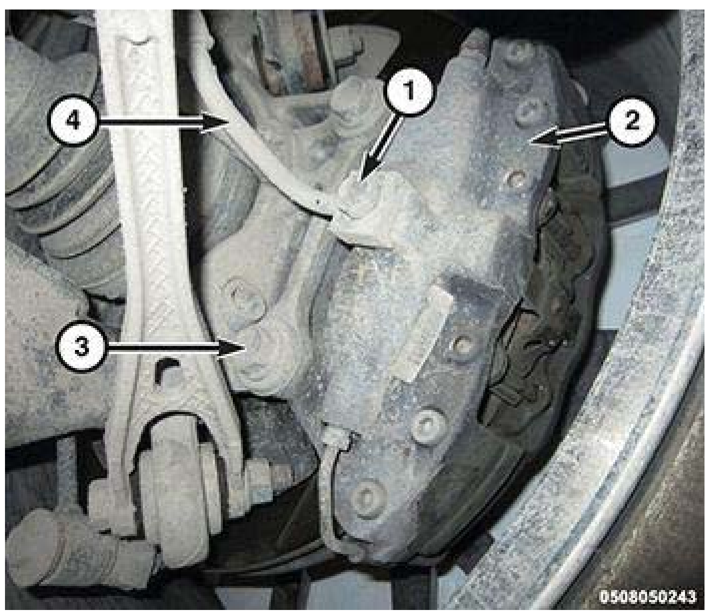


Fig. 59: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

3. Install the brake caliper (2) with pads onto the knuckle.
4. Install the brake caliper to knuckle bolts (1), and tighten to the proper **SPECIFICATIONS** .
5. Remove jack from under spring link.
6. Install brake hose to brake caliper banjo bolt (1), and tighten to the proper **SPECIFICATIONS** .

NOTE: Install NEW washers on each side of hose fitting as banjo bolt is placed through banjo fitting. Thread banjo bolt into caliper and tighten to the proper SPECIFICATIONS.

7. Install the tire and wheel assembly. Refer to **INSTALLATION** .
8. Remove support and lower the vehicle.
9. Remove brake pedal holding tool.
10. Bleed the braking system. Refer to **STANDARD PROCEDURE** .
11. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake pads. If NEW brake pads are installed, they need to be properly burnished. Refer to **PADS, BRAKE, STANDARD PROCEDURE**.

FLUID

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - BRAKE FLUID CONTAMINATION

Indications of fluid contamination are swollen or deteriorated rubber parts.

Swollen rubber parts indicate the presence of petroleum in the brake fluid.

To test for contamination, put a small amount of drained brake fluid in clear glass jar. If fluid separates into layers, there is mineral oil or other fluid contamination of the brake fluid.

If brake fluid is contaminated, drain and thoroughly flush system. Replace master cylinder, proportioning valve, caliper seals, wheel cylinder seals, Antilock Brake hydraulic unit and all hydraulic fluid hoses.

SPECIFICATIONS

SPECIFICATIONS

The brake fluid used in this vehicle must conform to DOT 3 specifications and SAE J1703 standards. No other type of brake fluid is recommended or approved for usage in the vehicle brake system. Use only MoparÃ® Brake Fluid DOT 3 Motor Vehicle or equivalent from a tightly sealed container.

CAUTION: Never use reclaimed brake fluid or fluid from an container which has been left open. An open container of brake fluid will absorb moisture from the air and contaminate the fluid.

CAUTION: Never use any type of a petroleum-based fluid in the brake hydraulic system. Use of such type fluids will result in seal damage of the vehicle brake hydraulic system causing a failure of the vehicle brake system. Petroleum based fluids would be items such as engine oil, transmission fluid, power steering fluid, etc.

MASTER CYLINDER, BRAKE

DESCRIPTION

DESCRIPTION

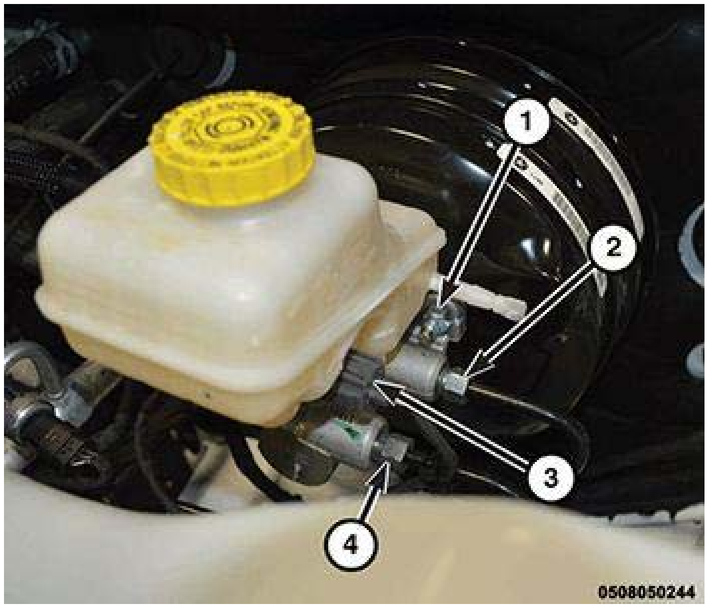


Fig. 60: Master Cylinder To Brake Booster Nut, Primary And Secondary Outlet Ports & Brake Fluid Level Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

All master cylinders are a two-outlet design and the brake tubes from these primary (2) and secondary (4) outlet ports lead directly to the Integrated Control Unit (ICU) before going to each wheel brake.

The master cylinder has the brake fluid reservoir mounted on top of it which gravity feeds brake fluid to the master cylinder when it is required. On manual transmission model vehicles the brake fluid reservoir also feeds the clutch hydraulic circuit. The reservoir is made of see-through plastic and it houses the brake fluid level switch (3).

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - MASTER CYLINDER/POWER BOOSTER

1. Start the engine and check the booster vacuum hose connections. A hissing noise indicates a vacuum leak. Correct any vacuum leaks before proceeding.
2. Stop the engine and pump the brake pedal until all vacuum reserve in the booster is depleted.
3. Press and hold the brake pedal under light foot pressure. The pedal should hold firm. If the pedal falls away, there may be an external leak or the master cylinder is faulty (internal leakage).
4. Start the engine and note pedal action. It should fall away slightly under light foot pressure, then hold firm. If no pedal action is discernible, the power booster, vacuum supply or vacuum check valve is faulty, proceed to the POWER BOOSTER VACUUM TEST.
5. If the POWER BOOSTER VACUUM TEST passes, rebuild the booster vacuum reserve as follows: Release the brake pedal. Increase engine speed to 1500 RPM, close the throttle and immediately turn off the ignition to stop the engine.
6. Wait a minimum of 90 seconds and try brake action again. The booster should provide two or more vacuum assisted pedal applications. If the vacuum assist is not provided, the booster is faulty.

POWER BOOSTER VACUUM TEST

1. Connect a vacuum gauge to the booster check valve with a short length of hose and T-fitting.

2. Start and run the engine at curb idle for one minute.
3. Observe the vacuum supply. If the vacuum supply is less that 12 inches HG (406 millibars), repair the vacuum supply.
4. Clamp the hose shut between the intake vacuum source and the check valve.
5. Stop the engine and observe the vacuum gauge.
6. If the vacuum drops more than one inch HG (33 millibars) within 15 seconds, the booster diaphragm or check valve is faulty.

POWER BOOSTER CHECK VALVE TEST

1. Remove the power booster check valve from the power booster.
2. Using a hand operated vacuum pump, apply 15-20 inches HG (508-677 millibars) vacuum at the booster side of the check valve.
3. The vacuum should hold steady. If the gauge on the pump indicates vacuum loss, the check valve is faulty and should be replaced.

STANDARD PROCEDURE

STANDARD PROCEDURE - MASTER CYLINDER BLEEDING

CAUTION: When clamping master cylinder in vise, only clamp master cylinder by its mounting flange. Do not clamp master cylinder piston rod, reservoir, seal or body.

1. Clamp master cylinder in a vise.

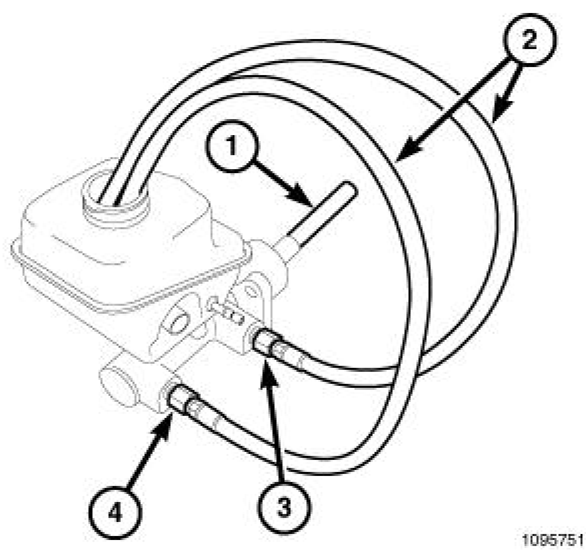


Fig. 61: Bleeding Tools On Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When installing Adapters in master cylinder, do not overtighten. Damage to master cylinder could occur.

NOTE: Bleeder Adapters (special tool #9748-1, Adapter, Bleeder) and (special tool

#9748-2, Adapter, Bleeder) are not interchangeable. To avoid mix-up, Bleeder Adapter (special tool #9748-1, Adapter, Bleeder) is silver while Bleeder Adapter (special tool #9748-2, Adapter, Bleeder) is black.

2. Attach special tools for bleeding master cylinder in following fashion:
   a. Thread Bleeder Adapter (special tool #9748-2, Adapter, Bleeder) (3), into primary outlet port. Tighten to 14 N.m (124 in. lbs.).
   b. Thread Bleeder Adapter (special tool #9748-1, Adapter, Bleeder) (4), into secondary outlet port. Tighten to 14 N.m (124 in. lbs.).
   c. Thread a Bleeder Tube (special tool #8358-1, Bleed Tube) (2), into each Adapter. Tighten each tube to 14 N.m (124 in. lbs.). Flex each bleeder tube and place open end into mouth of fluid reservoir as far down as possible.

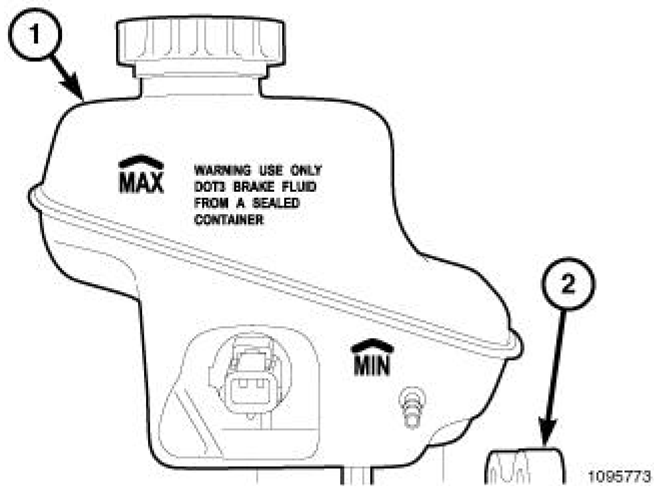


Fig. 62: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Make sure open ends of bleeder tubes stay below surface of brake fluid once reservoir is filled to proper level.**

3. Fill brake fluid reservoir (1) to the MAX level with MoparÂ® brake fluid or equivalent conforming to DOT 3 specifications. Make sure fluid level is above tips of bleeder tubes in reservoir to ensure no air is ingested during bleeding.

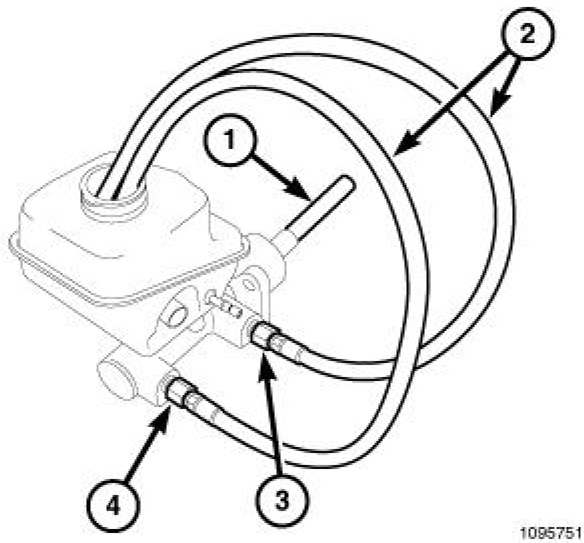


Fig. 63: Bleeding Tools On Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

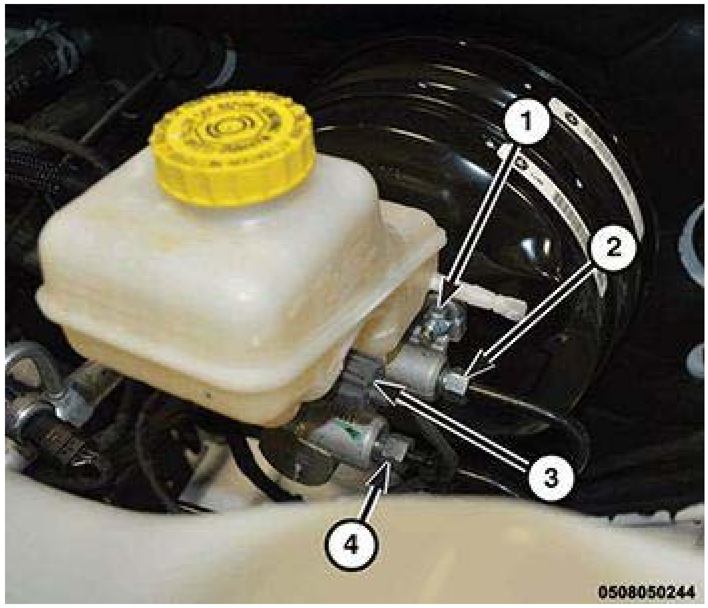
4. Using a wooden dowel as a pushrod (1), slowly depress master cylinder pistons, then release pressure, allowing pistons to return to released position. Repeat several times until all air bubbles are expelled. Make sure fluid level stays above tips of bleeder tubes in reservoir while bleeding.
5. Remove bleeder tubes (2) and adapters (3, 4) from master cylinder outlet ports, then plug outlet ports and install fill cap on reservoir.
6. Remove master cylinder from vise.
7. Install master cylinder on vehicle. Refer to **MASTER CYLINDER, BRAKE, INSTALLATION**.

REMOVAL

REMOVAL

CAUTION: Vacuum in power brake booster must be pumped down (removed) before removing master cylinder from power brake booster. This is necessary to prevent power brake booster from sucking in any contamination as master cylinder is removed. This can be done simply by pumping brake pedal, with vehicle's engine not running, until a firm feeling brake pedal is achieved.

1. With the engine not running, pump the brake pedal until a firm pedal is achieved (4-5 strokes).
2. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
3. Remove the windshield wiper cowl. Refer to **COVER, COWL PANEL, REMOVAL** .
4. Thoroughly clean all surfaces of the brake fluid reservoir and master cylinder. Use only MoparÃ® Brake Parts Cleaner or equivalent.

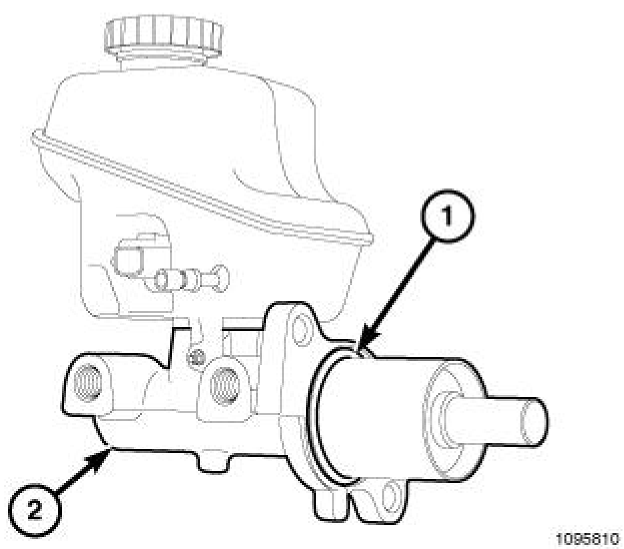


[Fig. 64: Master Cylinder To Brake Booster Nut, Primary And Secondary Outlet Ports & Brake Fluid Level Sensor Wire Harness Connector]
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the brake fluid level sensor wiring harness connector (3).
6. Disconnect the primary (2) and secondary (4) brake tubes from the master cylinder. Install sealing plugs in the open brake tube outlet ports.

CAUTION: Before removing master cylinder from power brake vacuum booster, master cylinder and vacuum booster must be thoroughly cleaned. This must be done to prevent dirt particles from falling into power brake vacuum booster. Use only MoparÃ® Brake Parts Cleaner or equivalent.

7. Remove the two nuts (1) attaching the master cylinder (3) to the power brake booster (1).
8. Slide the master cylinder straight out of the power brake booster.



[Fig. 65: Vacuum Seal On Rear Of Master Cylinder]

Courtesy of CHRYSLER GROUP, LLC

CAUTION: Vacuum seal (1) on rear of master cylinder (2) is used to allow vacuum ability in power brake vacuum booster. Vacuum seal MUST be replaced whenever master cylinder is removed from power brake vacuum booster.

9. Remove the vacuum seal (1) located on the mounting flange of the master cylinder (2). The vacuum seal is removed by **carefully** pulling it off the rear of master cylinder. **Do not attempt to pry the seal off the master cylinder by inserting a sharp tool between seal and the master cylinder casting. Damage can occur.**

INSTALLATION

INSTALLATION

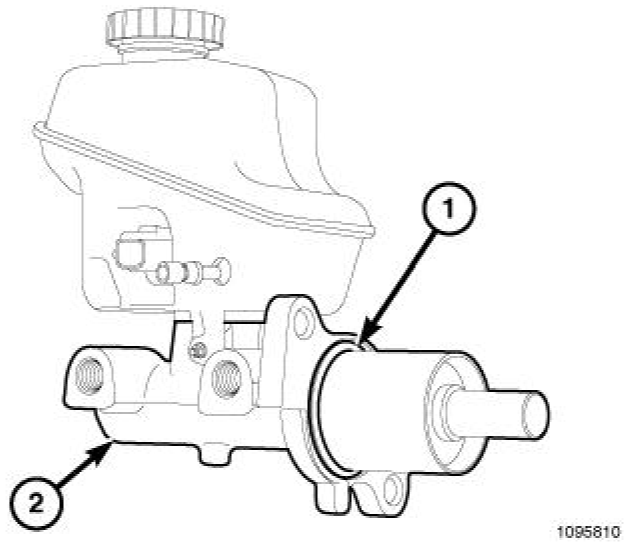


Fig. 66: Vacuum Seal On Rear Of Master Cylinder
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When replacing master cylinder on vehicle, a NEW vacuum seal (1) MUST be installed on master cylinder.

1. Thoroughly bleed master cylinder before installing it on vehicle. Refer to **MASTER CYLINDER, BRAKE, STANDARD PROCEDURE**.
2. Install a **NEW** vacuum seal (1) on rear of master cylinder (2) making sure seal fits squarely in mounting groove.

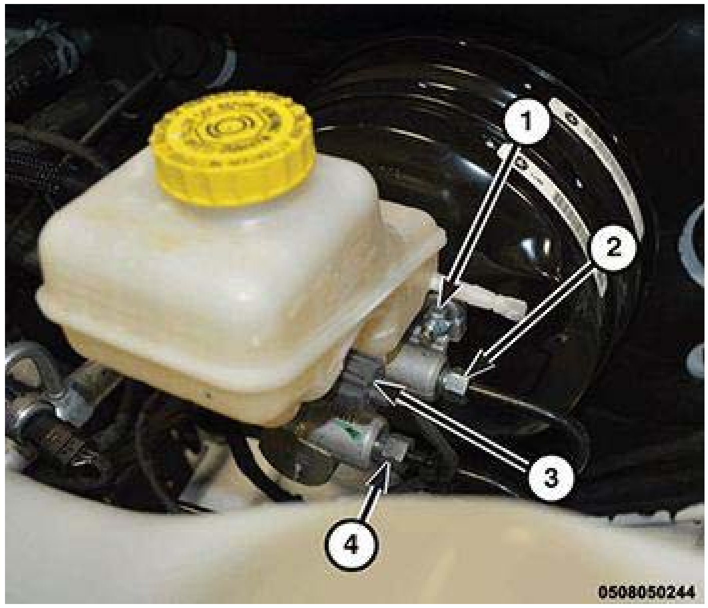


Fig. 67: Master Cylinder To Brake Booster Nut, Primary And Secondary Outlet Ports & Brake Fluid Level Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

3. Position master cylinder on studs of power brake booster, aligning booster push rod with master cylinder piston.
4. Install two **NEW** Master Cylinder to Brake Booster Nuts (1). Tighten to the proper **SPECIFICATIONS** .
5. Thread primary (2) and secondary (4) brake tubes into master cylinder primary and secondary ports. Tighten Brake Tube Nuts to the proper **SPECIFICATIONS** .
6. Connect the brake fluid level sensor wiring harness connector (4).
7. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

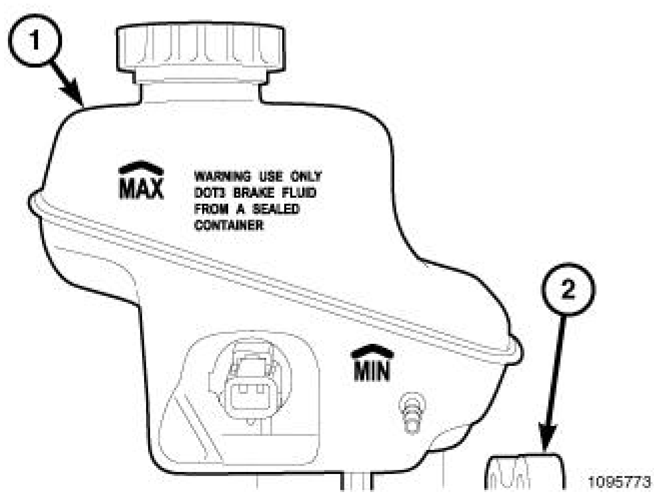


Fig. 68: Reservoir Fluid Level Markings
Courtesy of CHRYSLER GROUP, LLC

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WARNING: Be certain a firm brake pedal is achieved prior to attempting vehicle operation. If a firm brake pedal cannot be achieved, bleed entire brake hydraulic system and check for leaks.

8. Fill master cylinder fluid reservoir (1) with clean, fresh MoparÃ® Brake Fluid or equivalent.
9. Install access panel in cowl area.
10. Road test vehicle to ensure proper operation of brakes.

PADS, BRAKE

STANDARD PROCEDURE

STANDARD PROCEDURE - BRAKE PAD BURNISHING - SRT8

CAUTION: After installing NEW brake pads, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications.

When NEW brake pads are installed on a vehicle, this procedure must be used to correctly burnish (seat) the brake linings to the brake rotor discs.

1. Accelerate the vehicle to a steady speed of about 40 mph (65 km/h).
2. Using light brake pedal pressure, slow the vehicle from 40 mph to 0 mph in approximately 6 seconds.
3. Accelerate back up to 40 mph for approximately one minute to allow the brakes to cool down.
4. Repeat this procedure 15 to 20 times to correctly seat the brake lining material.

REMOVAL

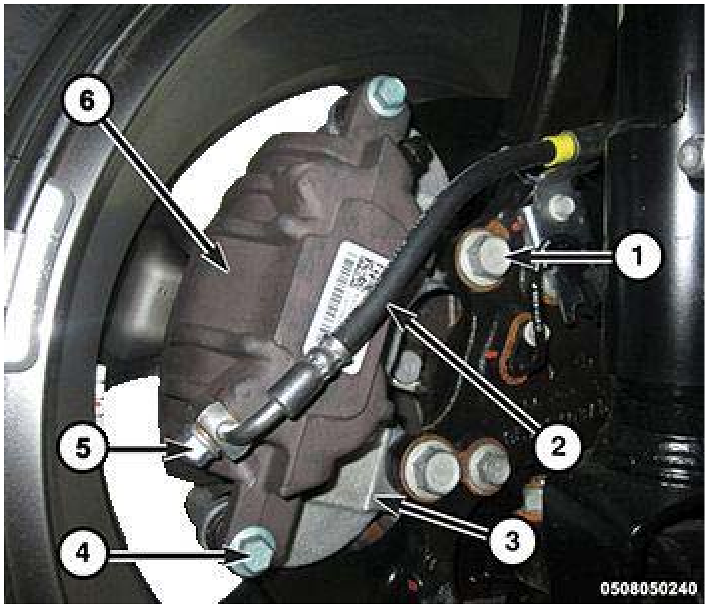
FRONT (EXCEPT SRT8)

NOTE: Before proceeding, refer to CAUTION and WARNING.

NOTE: Removal process is the same for both sides of the vehicle.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

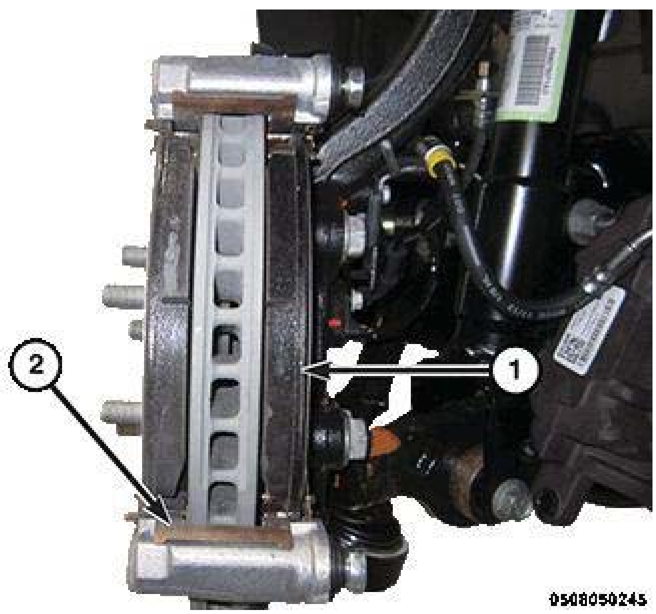
NOTE: In some cases, it may be necessary to retract caliper piston in its bore a small amount in order to provide sufficient clearance between shoes and rotor to easily remove caliper from knuckle. This can usually be accomplished before guide pin bolts are removed by grasping rear of caliper and pulling outward working with guide pins, thus retracting piston. Never push on piston directly as it may get damaged.



[Fig. 69: Brake Caliper Components]
Courtesy of CHRYSLER GROUP, LLC

3. Remove the two brake caliper guide pin bolts (4).
4. Remove the brake caliper (6) from the brake caliper adapter bracket (3) and position it aside.

NOTE: **Use care when installing the caliper onto the adapter bracket to avoid damaging the guide pin boot.**



[Fig. 70: Brake Pad & Anti-Rattle Clip]
Courtesy of CHRYSLER GROUP, LLC

5. Remove the brake pads (1) from caliper adapter.
6. If necessary, remove anti-rattle clips (2) from upper and lower abutments of adapter.

SRT8

NOTE: **Review all Warnings and Cautions. Refer to WARNING.**

NOTE: **Removal process is the same for both sides of the vehicle.**

NOTE: **Six piston caliper shown, four piston caliper similar.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

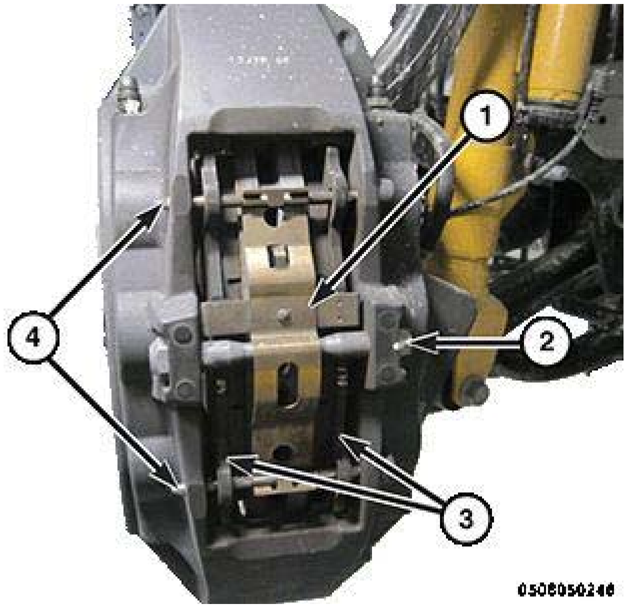


Fig. 71: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

3. Using hammer and pin punch on the outboard end, remove the lower brake pad support pin (4) out of the caliper.
4. Remove brake pad spring clip (1) out from under the upper support pin (4) still in caliper.
5. Using hammer and pin punch on the outboard end, remove the upper brake pad support pin (4) out of the caliper.
6. If equipped, remove the brake caliper center support bolt (2).

CAUTION: **When pushing pistons back into caliper bores, if hand pressure is not sufficient, use only a trim stick as shown or other suitable soft tool to do so. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor or pads.**

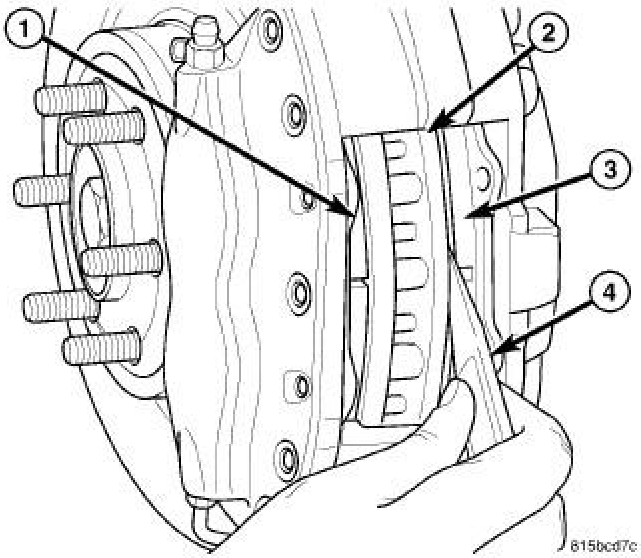


Fig. 72: Pushing Back Pistons Into Bores
Courtesy of CHRYSLER GROUP, LLC

7. Using hand pressure, pull pads back to seat caliper pistons into bores if possible. If not possible, perform the following to do this correctly without damaging the caliper, pistons, dust boots or brake rotor disc.
    a. Place trim stick (3) between inboard brake pad and outer edge of rotor (1).
    b. Using trim stick (3), apply pressure against the inboard brake pad until both pistons are completely bottomed in bores of inboard caliper half. Leave trim stick in place to hold pistons in place.
    c. Place second trim stick between outboard brake pad and rotor, then repeat above step on outboard pad and pistons.

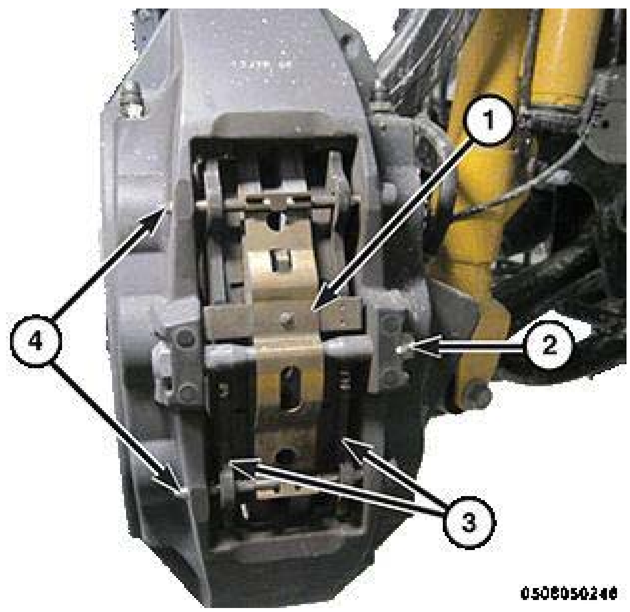


Fig. 73: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

8. Remove the brake pads (3) through opening in caliper.
9. Once brake pads are removed from caliper, inspect all four caliper pistons and dust boots for evidence of

brake fluid leakage. Also inspect dust boots on all caliper pistons for any cuts, tears or heat cracks and brake pad supports (if equipped) for excess wear or damage. If caliper fails inspection, it should be replaced.

REAR (EXCEPT SRT8)

NOTE: **Before proceeding, refer to CAUTION and WARNING.**

NOTE: **Removal process is the same for both sides of the vehicle.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

NOTE: **In some cases, it may be necessary to retract caliper piston in its bore a small amount in order to provide sufficient clearance between shoes and rotor to easily remove caliper from knuckle. This can usually be accomplished before guide pin bolts are removed by grasping rear of caliper and pulling outward working with guide pins, thus retracting piston. Never push on piston directly as it may get damaged.**

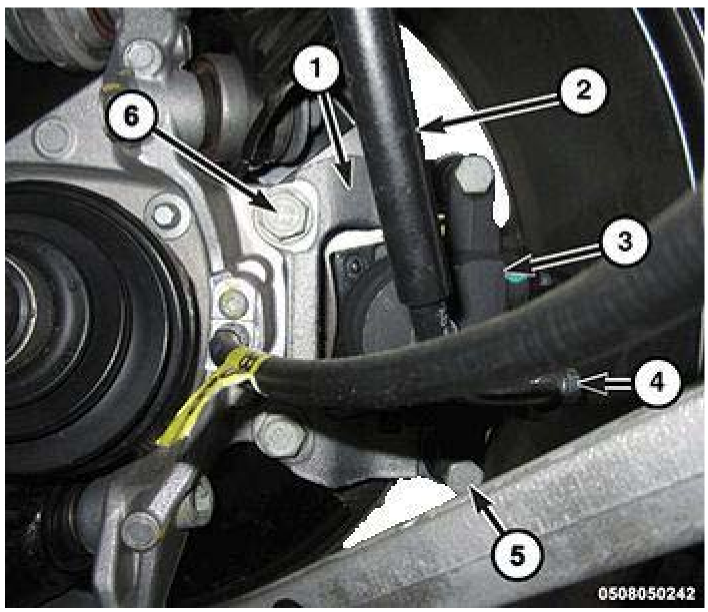
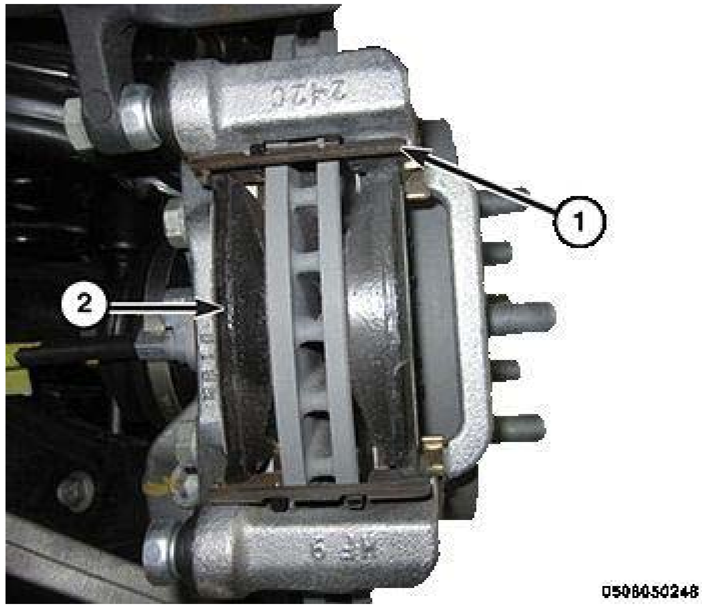


Fig. 74: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

3. Remove the two brake caliper guide pin bolts (5).
4. Remove the brake caliper (3) from the brake caliper adapter bracket (1) and position it aside.

NOTE: **Use care when installing the caliper onto the adapter bracket to avoid damaging the guide pin boot.**



[Fig. 75: Brake Pad & Anti-Rattle Clip](#)
Courtesy of CHRYSLER GROUP, LLC

5. Remove the brake pads (2) from caliper adapter.
6. If necessary, remove anti-rattle clips (1) from upper and lower abutments of adapter (4).

SRT8

NOTE: **Review all Warnings and Cautions. Refer to WARNING.**

NOTE: **Removal process is the same for both sides of the vehicle.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

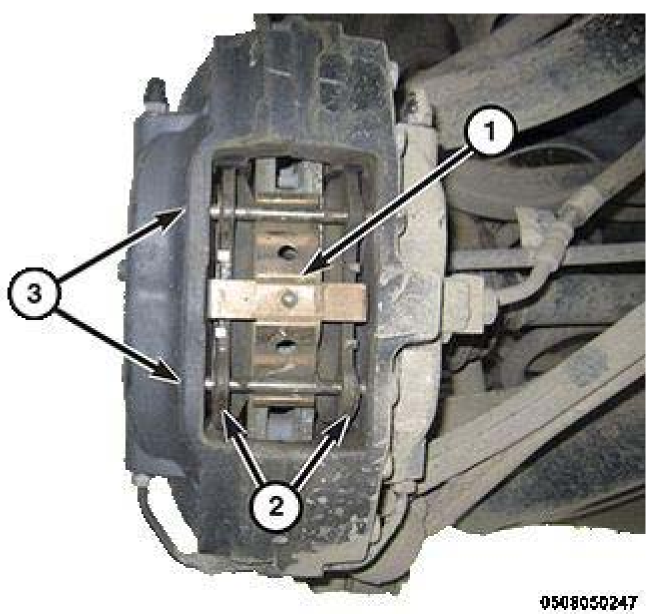


Fig. 76: Brake Caliper Components

Courtesy of CHRYSLER GROUP, LLC

3. Using hammer and pin punch on the outboard end, remove the lower brake pad support pin (3) out of the caliper.
4. Remove brake pad spring clip (1) out from under the upper support pin (3) still in caliper.
5. Using hammer and pin punch on the outboard end, remove the upper brake pad support pin (3) out of the caliper.

CAUTION: When pushing pistons back into caliper bores, if hand pressure is not sufficient, use only a trim stick as shown or other suitable soft tool to do so. Never use a screwdriver or other metal pry bar due to potential damage to braking surface of rotor or pads.

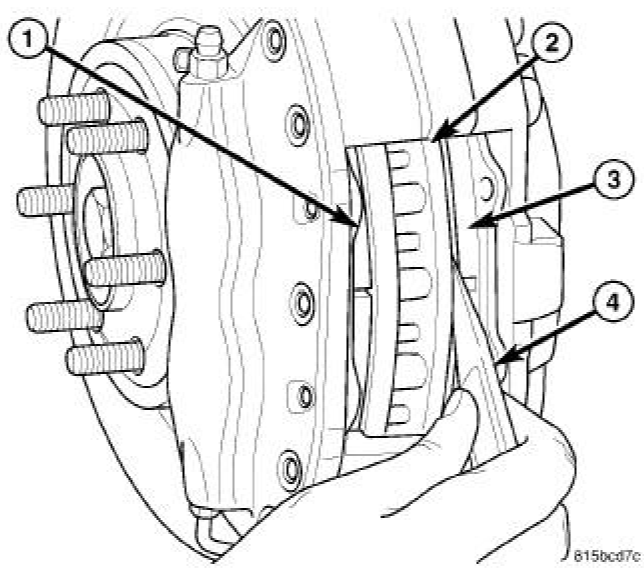


Fig. 77: Pushing Back Pistons Into Bores
Courtesy of CHRYSLER GROUP, LLC

6. Using hand pressure, pull pads back to seat caliper pistons into bores if possible. If not possible, perform the following to do this correctly without damaging the caliper, pistons, dust boots or brake rotor disc.
   a. Place trim stick (3) between inboard brake pad and outer edge of rotor (1).
   b. Using trim stick (3), apply pressure against the inboard brake pad until both pistons are completely bottomed in bores of inboard caliper half. Leave trim stick in place to hold pistons in place.
   c. Place second trim stick between outboard brake pad and rotor, then repeat above step on outboard pad and pistons.

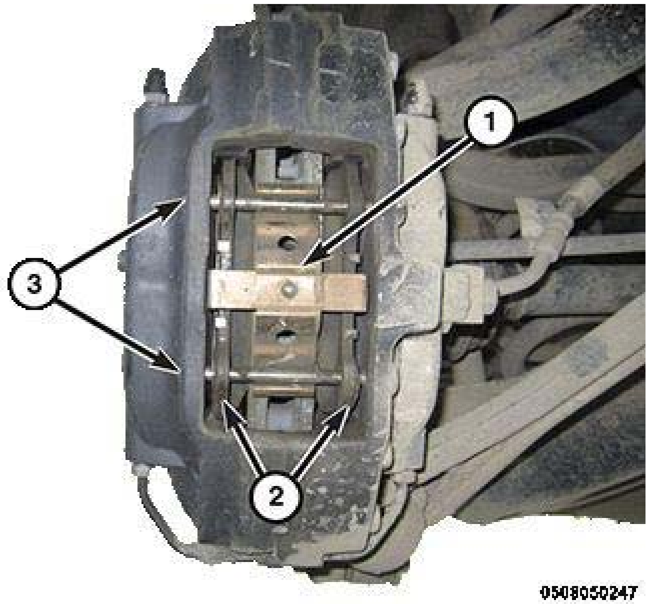


Fig. 78: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

7. Remove the brake pads (2) through opening in caliper.
8. Once brake pads are removed from caliper, inspect all four caliper pistons and dust boots for evidence of brake fluid leakage. Also inspect dust boots on all caliper pistons for any cuts, tears or heat cracks and brake pad supports (if equipped) for excess wear or damage. If caliper fails inspection, it should be replaced.

CLEANING

CLEANING

WARNING: **Chrysler LLC does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.**

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

INSPECTION

INSPECTION

Visually inspect brake pads for uneven lining wear. Also inspect for excessive lining deterioration. Check the clearance between the tips of the wear indicators (if equipped) on the pads and the brake rotors.

If a visual inspection does not adequately determine the condition of the lining, a physical check will be necessary. To check the amount of lining wear, remove the disc brake pads from the vehicle.

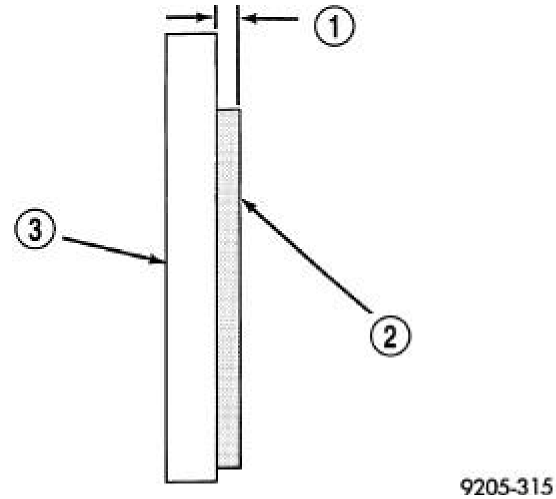


Fig. 79: Brake Pad Friction Material Thickness Measurement
Courtesy of CHRYSLER GROUP, LLC

Measure brake pad minimum thickness (1). Brake pads must be replaced when usable material on a brake pad lining (2) measured at its **thinnest point** measures one millimeter (0.04 inches) or less.

If a brake pad fails inspection, replace **both** disc brake pads (inboard and outboard) at each caliper. It is also necessary to replace the pads on the opposite side of the vehicle as well as the pads failing inspection to maintain proper braking characteristics.

If the brake pad assemblies do not require replacement, be sure to reinstall the brake pads in the original position they were removed from.

NOTE: **It is important to inspect both front and rear brake pads during the same inspection.**

INSTALLATION

FRONT (EXCEPT SRT8)

NOTE: **Installation process is the same for both sides of the vehicle.**

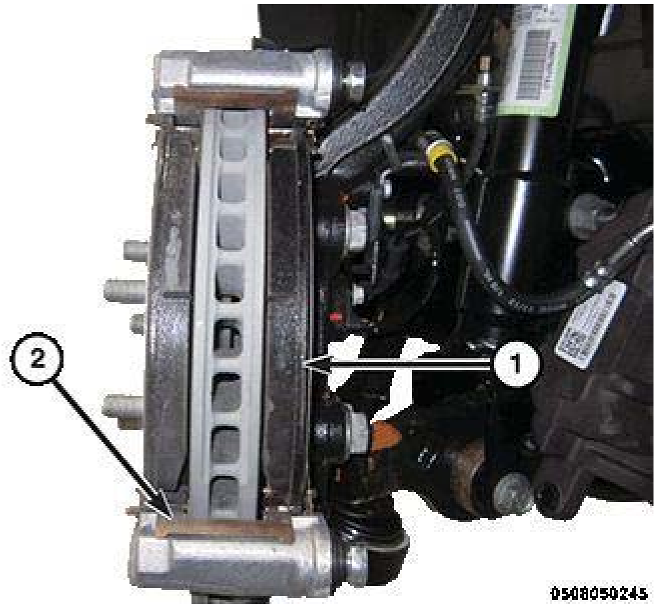


Fig. 80: Brake Pad & Anti-Rattle Clip
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the abutment shims (2) onto the brake caliper adapter bracket.
2. If equipped, remove the film from the brake pad double sticky isolator.
3. Install the brake pads (1) onto the brake caliper adapter bracket.

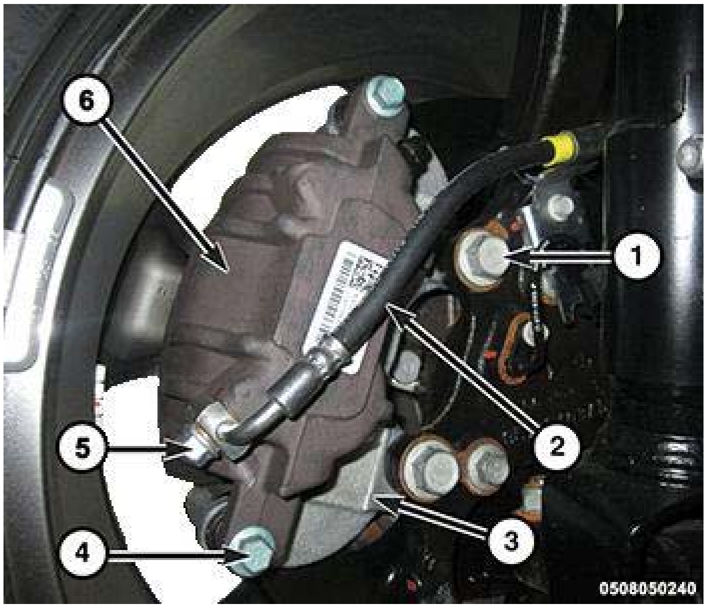


Fig. 81: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

4. Completely retract the caliper piston back into the bore of the caliper. Use a C-clamp to retract the piston. Place a wood block over the piston before installing the C-clamp to avoid damaging the piston.

NOTE:	**Use care when installing the caliper onto the adapter bracket to avoid damaging the guide pin boots.**

5. Install the brake caliper (6) onto the front brake caliper adapter bracket (3).
6. Install the brake caliper guide pin bolts (4) and tighten to the proper **SPECIFICATIONS** .
7. Install the tire and wheel assembly. Refer to **INSTALLATION** .
8. Remove the support and lower the vehicle.
9. Pump brake pedal several times to set pads to caliper and brake rotor.

CAUTION: **When NEW brake pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.**

10. Check and adjust brake fluid level in reservoir.
11. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes.

SRT8

NOTE: **Installation process is the same for both sides of the vehicle.**

NOTE: **Six piston caliper shown, four piston similar.**

NOTE: **On vehicles with the four piston calipers only, it is required to apply the copper paste on the brake pads between the pad and loose stainless shims as well as the side abutments.**

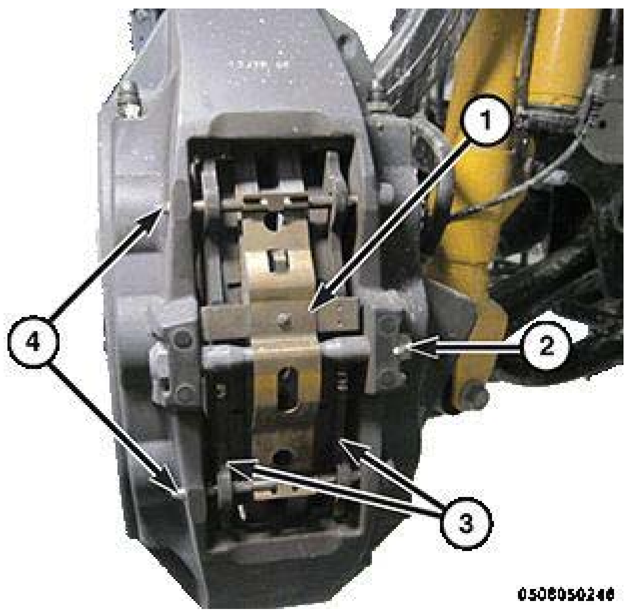


Fig. 82: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

1. Make sure all caliper pistons are fully seated (bottomed) in bores.
2. If equipped, remove the film from the brake pad double sticky isolator.
3. Slide the **NEW** brake pads into opening in disc brake caliper.
4. From inboard side, slide upper brake pad support pin (4) through caliper and upper holes in both brake pads (3). Ensure that the small end of support pin is in the hole in outboard half of caliper.

5. If equipped, install the brake caliper center support bolt (2), and tighten to the proper **SPECIFICATIONS** .
6. Install upper end of brake pad spring clip (1) under upper brake pad support pin (4).
7. Press on lower end of spring clip (1) until it touches brake rotor.
8. From inboard side, slide lower brake pad support pin (4) through caliper and lower holes in both brake pads (3). Ensure that the small end of support pin is in hole in outboard half of caliper.
9. Release the spring clip (1) allowing it to engage lower support pin.
10. From inboard side, seat upper and lower support pins (4) into caliper using pin punch and hammer. Support pins must be driven into caliper until support pin retaining rings are locked into place.
11. Once support pins are fully installed into caliper, inspect assembled caliper to make sure spring clip (1) is centered in opening of caliper, correctly engaging upper and lower support pins, and is resting against both brake pads (3).
12. Install the tire and wheel assembly. Refer to **INSTALLATION** .
13. Remove the support and lower the vehicle.
14. Pump brake pedal several times to set pads to caliper and brake rotor.
15. Check and adjust brake fluid level in reservoir.

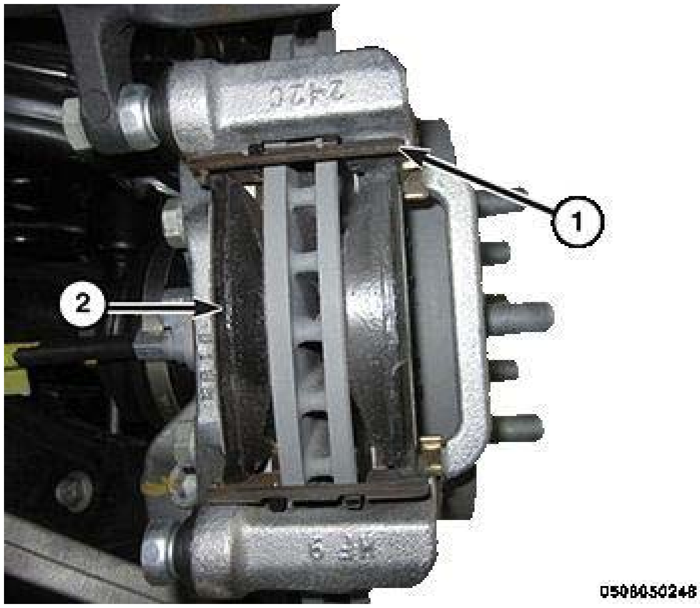
CAUTION: When NEW brake pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.

NOTE: When NEW brake pads are installed, they must be burnished (seated) to the rotor. This must be done to ensure the proper performance of the replacement brake pads.

16. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake pad linings. NEW brake pads need to be burnished properly. Refer to **PADS, BRAKE, STANDARD PROCEDURE**.

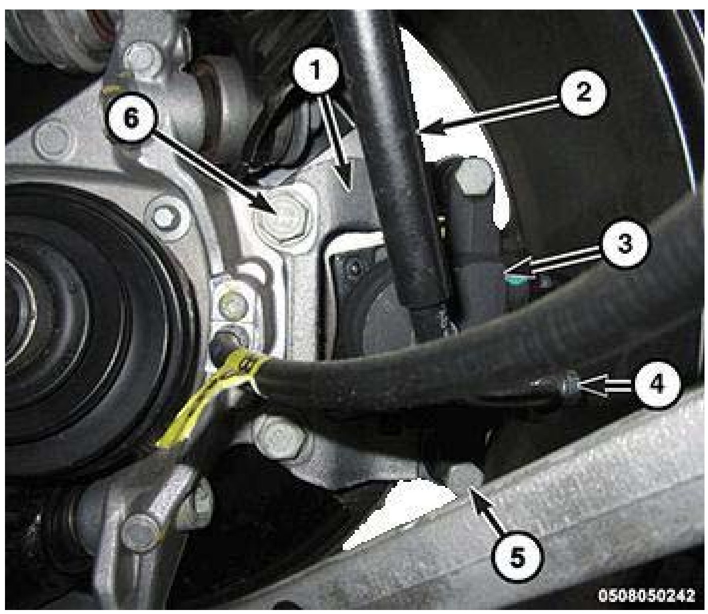
REAR (EXCEPT SRT8)

NOTE: Installation process is the same for both sides of the vehicle.



[Fig. 83: Brake Pad & Anti-Rattle Clip]
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the abutment shims (1) onto the brake caliper adapter bracket.
2. If equipped, remove the film from the brake pad double sticky isolator.
3. Install the brake pads (2) onto the brake caliper adapter bracket.



[Fig. 84: Brake Caliper Components]
Courtesy of CHRYSLER GROUP, LLC

4. Completely retract the caliper piston back into the bore of the caliper. Use a C-clamp to retract the piston. Place a wood block over the piston before installing the C-clamp to avoid damaging the piston.

NOTE: **Use care when installing the caliper onto the adapter bracket to avoid damaging the guide pin boot.**

5. Install the brake caliper (3) onto the front brake caliper adapter bracket (1).
6. Install the brake caliper guide pin bolts (5) and tighten to the proper **SPECIFICATIONS** .
7. Install the tire and wheel assembly. Refer to **INSTALLATION** .
8. Remove the support and lower the vehicle.
9. Pump brake pedal several times to set pads to caliper and brake rotor.

CAUTION: When NEW brake pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.

10. Check and adjust brake fluid level in reservoir.
11. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes.

SRT8

NOTE: Installation process is the same for both sides of the vehicle.

NOTE: On vehicles with the four piston calipers only, it is required to apply the copper paste on the brake pads between the pad and loose stainless shims as well as the side abutments.

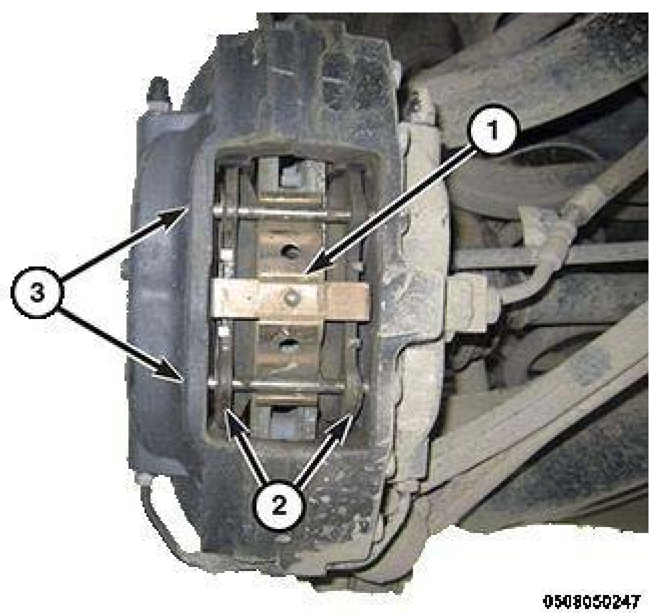


Fig. 85: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

1. Make sure all caliper pistons are fully seated (bottomed) in bores.
2. If equipped, remove the film from the brake pad double sticky isolator.
3. Slide the **NEW** brake pads into opening in disc brake caliper.
4. From inboard side, slide upper brake pad support pin (4) through caliper and upper holes in both brake pads (2). Ensure that the small end of support pin is in the hole in outboard half of caliper.
5. Install upper end of brake pad spring clip (1) under upper brake pad support pin (3).

6. Press on lower end of spring clip (1) until it touches brake rotor.
7. From inboard side, slide lower brake pad support pin (3) through caliper and lower holes in both brake pads (2). Ensure that the small end of support pin is in hole in outboard half of caliper.
8. Release the spring clip (1) allowing it to engage lower support pin.
9. From inboard side, seat upper and lower support pins (3) into caliper using pin punch and hammer. Support pins must be driven into caliper until support pin retaining rings are locked into place.
10. Once support pins are fully installed into caliper, inspect assembled caliper to make sure spring clip (1) is centered in opening of caliper, correctly engaging upper and lower support pins, and is resting against both brake pads (2).
11. Install the tire and wheel assembly. Refer to **INSTALLATION** .
12. Remove the support and lower the vehicle.
13. Pump brake pedal several times to set pads to caliper and brake rotor.
14. Check and adjust brake fluid level in reservoir.

CAUTION: When NEW brake pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.

NOTE: When NEW brake pads are installed, they must be burnished (seated) to the rotor. This must be done to ensure the proper performance of the replacement brake pads.

15. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake pad linings. NEW brake pads need to be burnished properly. Refer to **PADS, BRAKE, STANDARD PROCEDURE**.

PEDAL(S), BRAKE AND/OR ACCELERATOR

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove driver side silencer under instrument panel.
3. Remove steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .

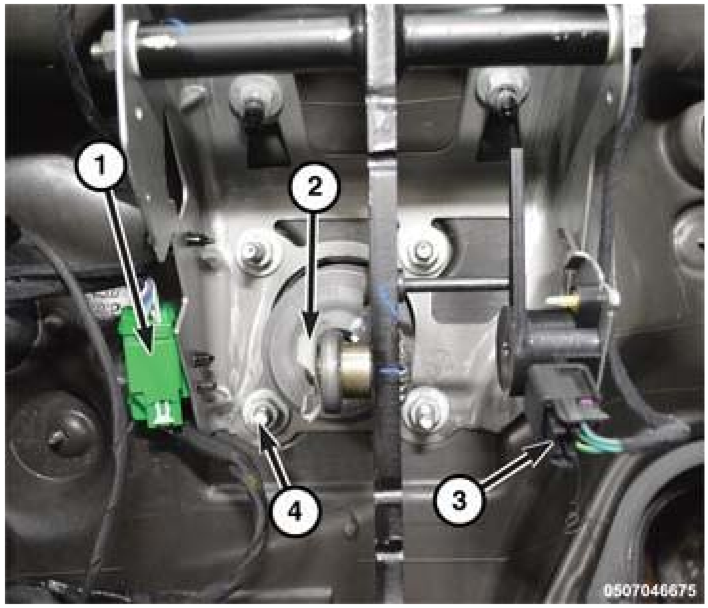
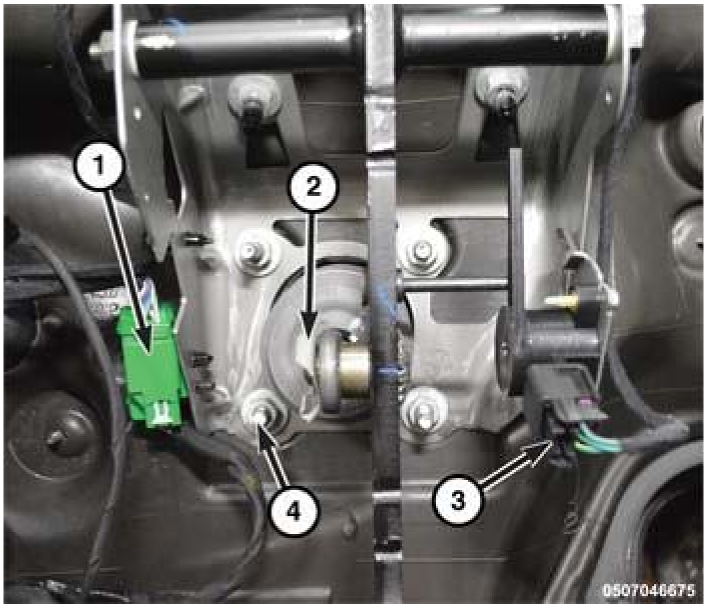


Fig. 86: Removing/Installing Pedal
Courtesy of CHRYSLER GROUP, LLC

4. Remove stop lamp switch wiring harness connector (3).
5. Remove booster push rod from pin on brake pedal. To do so:
    a. Position small screwdriver between center tang on power brake booster brake pedal pin retaining clip.
    b. Rotate screwdriver enough to allow retaining clip center tang to pass over end of brake pedal pin, then slide retaining clip off brake pedal pin.
    c. **Discard retaining clip (2). It is not to be reused. Install NEW retaining clip when assembling.**
6. Slide booster push rod off brake pedal pin.
7. Remove four power brake booster mounting nuts (4).
8. Remove two nuts fastening pedal bracket to upper dash panel.
9. Push power brake booster forward into engine compartment as far as possible by hand. Do not force it.
10. Remove brake pedal assembly.

INSTALLATION

INSTALLATION



[Fig. 87: Removing/Installing Pedal]
Courtesy of CHRYSLER GROUP, LLC

1. Install the brake pedal assembly under instrument panel and slide over booster push rod.
2. From engine compartment side, push power brake booster mounting studs back through dash panel and brake pedal bracket.
3. Install two upper mounting nuts fastening pedal bracket to upper dash panel. **Do not tighten at this time.**
4. Install the four Brake Pedal/Booster Nuts (4), and tighten to the proper **SPECIFICATIONS** .
5. Tighten two upper Brake Pedal/Booster Nuts (1) to the proper **SPECIFICATIONS** .
6. Slide booster push rod onto brake pedal pin. Install **NEW** retaining clip (3) securing push rod to brake pedal.
7. Connect the stop lamp switch wiring harness connector (3).
8. Install steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
9. Install driver side silencer under instrument panel.
10. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
11. Road test vehicle testing operation of brakes.

RESERVOIR, BRAKE MASTER CYLINDER

REMOVAL

REMOVAL

1. Remove the brake master cylinder and brake master cylinder reservoir assembly. Refer to **MASTER CYLINDER, BRAKE, REMOVAL**.
2. Thoroughly clean all surfaces of brake fluid reservoir and master cylinder. Use only MoparÂ® Brake Parts Cleaner or equivalent.

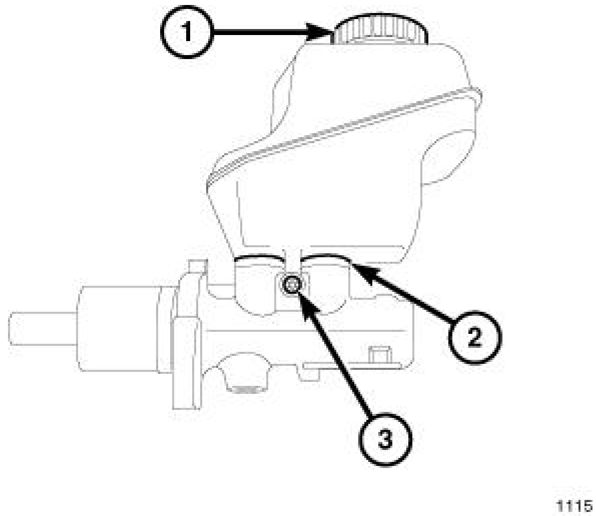


Fig. 88: Fluid Reservoir Mounting
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When removing fluid reservoir from the master cylinder, do not pry off using any type of tool. This can damage the fluid reservoir or master cylinder housing.

3. Remove screw (3) fastening fluid reservoir to master cylinder housing.
4. Rock the brake fluid reservoir side-to-side while pulling up to remove it from seal grommets in master cylinder housing.

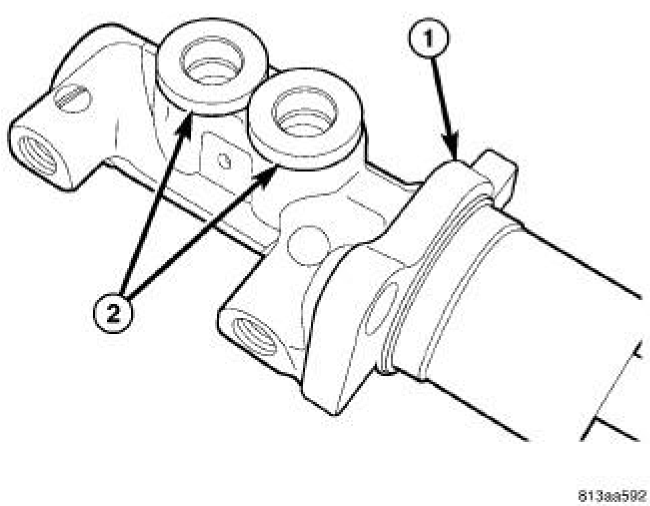
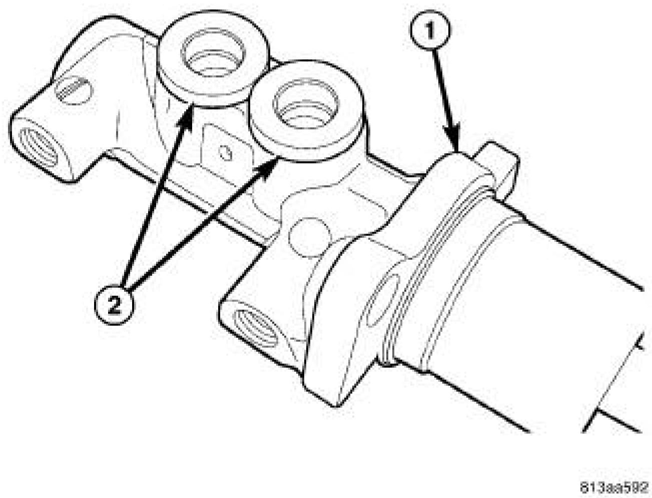


Fig. 89: Reservoir Seal Grommets
Courtesy of CHRYSLER GROUP, LLC

5. Remove two brake fluid reservoir seal grommets (2) from master cylinder housing (1).

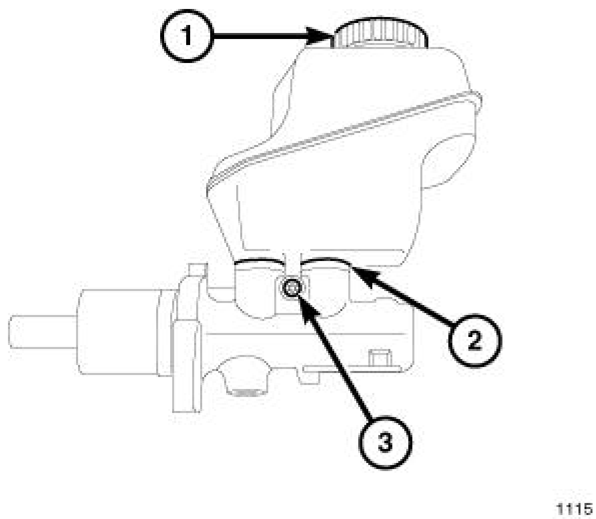
INSTALLATION

INSTALLATION



[Fig. 90: Reservoir Seal Grommets](#)
Courtesy of CHRYSLER GROUP, LLC

1. Install **NEW** brake fluid reservoir sealing grommets (2) in master cylinder housing (1).



[Fig. 91: Fluid Reservoir Mounting](#)
Courtesy of CHRYSLER GROUP, LLC

2. Lubricate reservoir mounting area with fresh clean brake fluid. Place reservoir in position over sealing grommets. Seat reservoir into sealing grommets using a rocking motion while firmly pressing down on fluid reservoir. Once installed, make sure fluid reservoir is touching the top of both sealing grommets (2) or reservoir is not properly installed.
3. Install and tighten the brake fluid reservoir to master cylinder bolt (3).
4. Install the brake master cylinder and brake master cylinder reservoir assembly. Refer to **MASTER CYLINDER, BRAKE, INSTALLATION**.

ROTOR, BRAKE

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - BRAKE ROTOR

Any servicing of the rotor requires extreme care to maintain the rotor within service tolerances to ensure proper brake action.

Excessive runout or wobble in a rotor can increase pedal travel due to piston knock-back. This increases guide pin sleeve wear due to the tendency of the caliper to follow the rotor wobble.

When diagnosing a brake noise or pulsation, the machined disc braking surface should be inspected.

BRAKING SURFACE INSPECTION

Light braking surface scoring and wear is acceptable. If heavy scoring or warping is evident, the rotor must be refaced or replaced. Refer to **ROTOR, BRAKE, STANDARD PROCEDURE**.

Excessive wear and scoring of the rotor can cause improper lining contact on the rotor's braking surface. If the ridges on the rotor are not removed before new brake shoes are installed, improper wear of the shoes will result.

If a vehicle has not been driven for a period of time, the rotor's braking surface will rust in the areas not covered by the brake shoes at that time. Once the vehicle is driven, noise and chatter from the disc brakes can result when the brakes are applied.

Some discoloration or wear of the rotor surface is normal and does not require resurfacing when linings are replaced. If cracks or burned spots are evident, the rotor must be replaced.

ROTOR MINIMUM THICKNESS

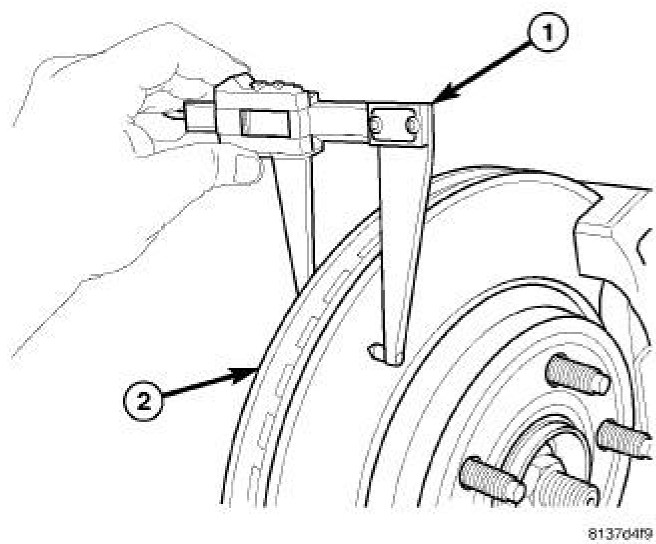
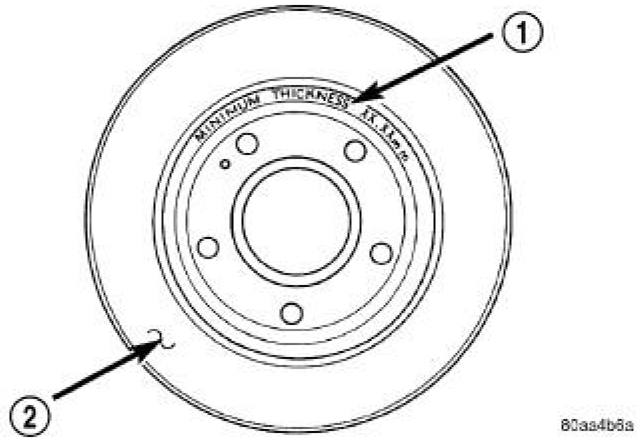


Fig. 92: Measuring Rotor Thickness
Courtesy of CHRYSLER GROUP, LLC

Measure rotor thickness (1) at the center of the brake shoe contact surface. Replace the rotor if it is worn below minimum thickness or if machining the rotor will cause its thickness to fall below specifications.

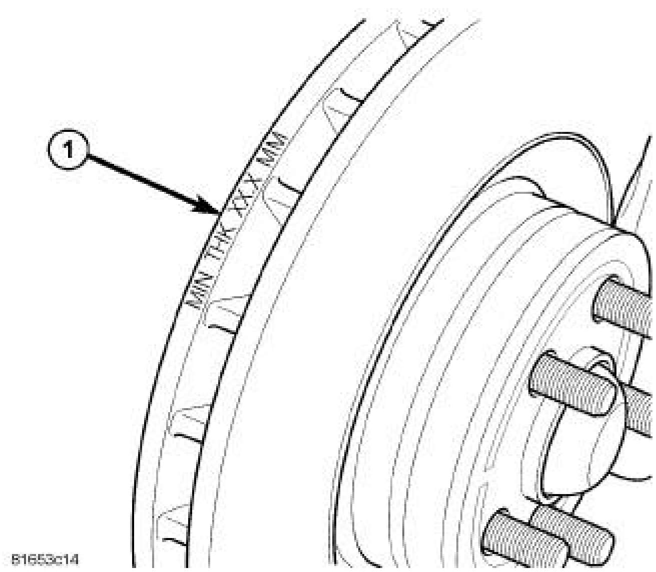
CAUTION: **Do not machine the rotor if it will cause the rotor to fall below minimum thickness.**



[Fig. 93: Minimum Brake Rotor Thickness Markings (Typical)](#)
Courtesy of CHRYSLER GROUP, LLC

1 - ROTOR MINIMUM THICKNESS MARKING
2 - ROTOR

Most minimum thickness specifications (1) are cast into the rotor's unmachined surface (2). Some brake rotors have the minimum thickness specification located elsewhere. Refer to the following paragraph. Limits can also be found in this component's specification table. Refer to **ROTOR, BRAKE, SPECIFICATIONS**.



[Fig. 94: Minimum Thickness Markings On Rotor Edge](#)
Courtesy of CHRYSLER GROUP, LLC

The minimum thickness specification is stamped into the outer diameter edge (1) (along vented end) of the disc.

ROTOR THICKNESS VARIATION

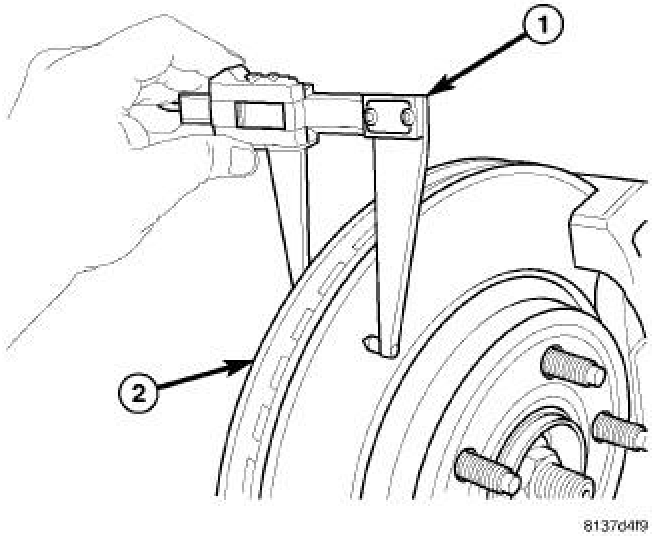


Fig. 95: Measuring Rotor Thickness
Courtesy of CHRYSLER GROUP, LLC

Thickness variation in a rotor's braking surface can result in pedal pulsation, chatter and surge. This can also be caused by excessive runout in the rotor or the hub.

Rotor thickness variation measurements should be made in conjunction with measuring runout. Measure thickness of the brake rotor (2) at 12 equal points around the rotor braking surface with a micrometer (1) at a radius approximately 25 mm (1 inch) from edge of rotor. If thickness measurements vary beyond the specification listed in the specification table, the rotor should be refaced or replaced. Refer to **ROTOR, BRAKE, SPECIFICATIONS** or **ROTOR, BRAKE, STANDARD PROCEDURE**.

ROTOR RUNOUT

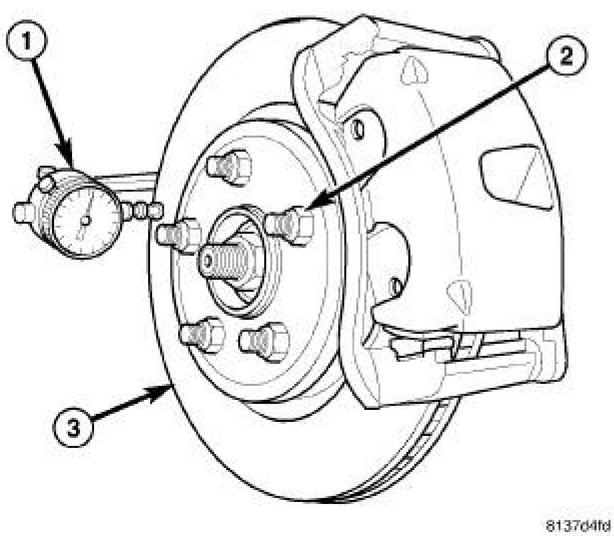


Fig. 96: Measuring Rotor Runout
Courtesy of CHRYSLER GROUP, LLC

On-vehicle rotor runout is the combination of the individual runout of the hub face and the runout of the brake rotor (hub runout can be measured separately). To measure rotor runout on the vehicle:

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove tire and wheel assembly. Refer to **REMOVAL** .
3. Install standard wheel mounting nuts, flat side to rotor, on all studs (2). Progressively tighten nuts to 150 N.m (110 ft. lbs.).
4. Mount Dial Indicator (special tool #C-3339A, Set, Dial Indicator) (1), with Whee, (special tool #25-W, Roller Contact Point), or equivalent, to knuckle. Position Dial Indicator Wheel to contact rotor braking surface approximately ten millimeters from outer edge of rotor (3).
5. Slowly rotate brake rotor checking lateral runout, marking the low and high spots. Record these measurements.
6. Check and record runout of opposite side of rotor in same fashion, marking the low and high spots.
7. Compare runout measurement to specifications. Refer to **ROTOR, BRAKE, SPECIFICATIONS**.

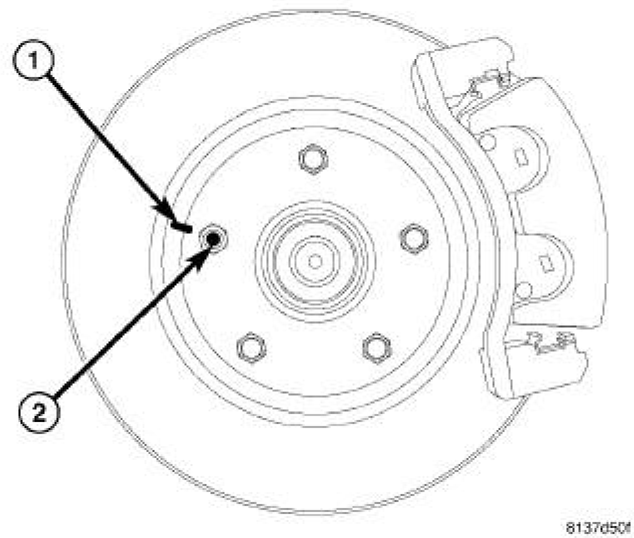


Fig. 97: Wheel Stud & Rotor Index Marked
Courtesy of CHRYSLER GROUP, LLC

If runout is in excess of specifications, check the lateral runout of the hub face. Before removing the rotor from the hub, place a chalk mark across both the rotor (1) and the one wheel stud (2) closest to where the high runout measurement was taken. This way, the original mounting spot of the rotor on the hub is indexed.

8. Remove the rotor from the hub. Refer to **ROTOR, BRAKE, REMOVAL**.

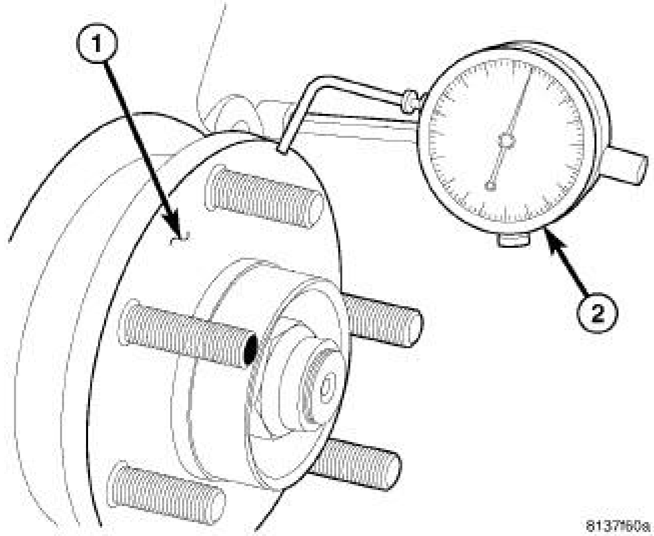


Fig. 98: Measuring Hub Runout
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before measuring hub runout, clean the hub face surface with an appropriate cleaner. This provides a clean surface to get an accurate indicator reading.**

9. Mount Dial Indicator (special tool #C-3339A, Set, Dial Indicator) (2), to the knuckle. Position Dial Indicator stem so it contacts hub face (1) near outer diameter. Care must be taken to position stem outside of stud circle, but inside of chamfer on the hub rim.
10. Slowly rotate hub measuring runout. Hub runout should not exceed 0.01 mm (0.0004 inch). If runout exceeds this specification, the hub must be replaced. Refer to **HUB AND BEARING, REMOVAL** .

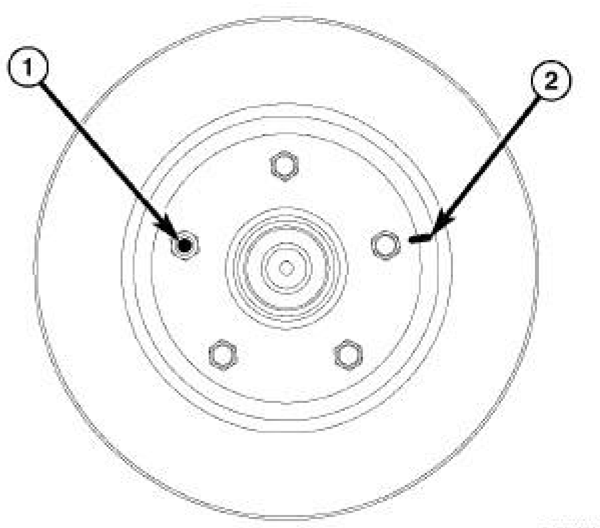


Fig. 99: Rotor Reindexed On Wheel Studs
Courtesy of CHRYSLER GROUP, LLC

11. If hub runout does not exceed this specification, install original rotor back on hub, aligning chalk mark on rotor (2) with a wheel mounting stud, two studs apart from original stud (1).

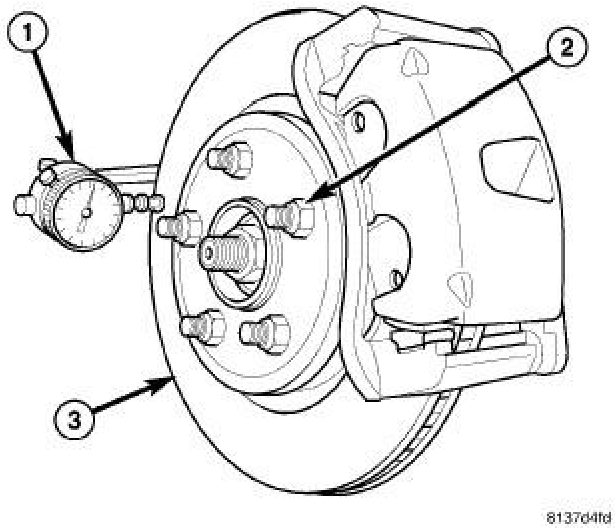


Fig. 100: Measuring Rotor Runout
Courtesy of CHRYSLER GROUP, LLC

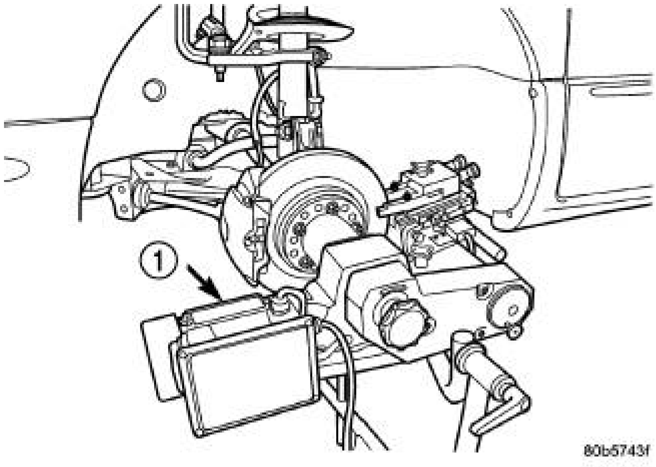
12. Tighten the lug nuts to the proper **WHEELS, SPECIFICATIONS** .
13. Mount Dial Indicator (1) and remeasure runout on both sides of the brake rotor as explained in earlier steps to see if runout is now within specifications. Refer to **ROTOR, BRAKE, SPECIFICATIONS**.
14. If runout is still not within specifications, reface or replace brake rotor. Refer to **ROTOR, BRAKE, STANDARD PROCEDURE**.

STANDARD PROCEDURE

STANDARD PROCEDURE - BRAKE ROTOR MACHINING

NOTE: **Refacing the rotor is not required each time the brake pads are replaced, only when the need is foreseen.**

Any servicing of the rotor requires extreme care to maintain the rotor within service tolerances to ensure proper brake action.



[Fig. 101: On-Car Brake Lathe]

Courtesy of CHRYSLER GROUP, LLC

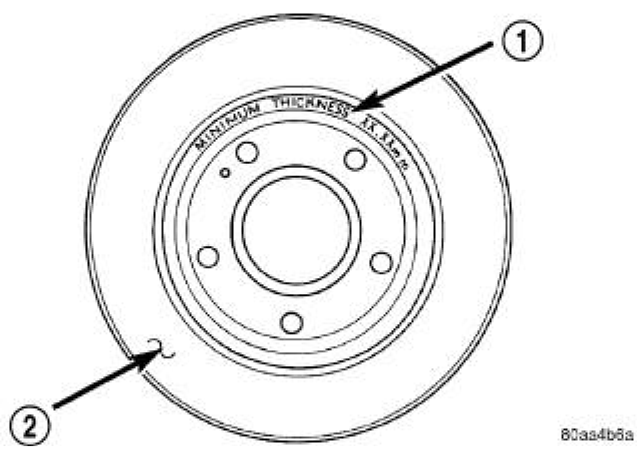
1 - ON-CAR BRAKE LATHE

If the rotor surface is deeply scored or warped, or there is a complaint of brake roughness or brake pedal pulsation, the rotor should be refaced using a hub-mounted on-car brake lathe (1), or replaced.

The use of a hub-mounted on-car brake lathe (1) is highly recommended to eliminate the possibility of excessive runout. It trues the brake rotor to the vehicle's hub and bearing.

Minimum allowable thickness is the minimum thickness to which the brake rotor machined surface may be cut.

CAUTION: **Do not machine the rotor if it will cause the rotor to fall below minimum thickness.**



[Fig. 102: Minimum Brake Rotor Thickness Markings (Typical)]

Courtesy of CHRYSLER GROUP, LLC

NOTE: **Most brake rotors (2) have markings for minimum allowable thickness specification cast into an unmachined surface of the rotor or stamped into the hat section (1). Some brake rotors have the minimum thickness specification located elsewhere. Refer to the following paragraph. Minimum thickness specifications can also be found in this component's specification table. Refer**

to ROTOR, BRAKE, SPECIFICATIONS.

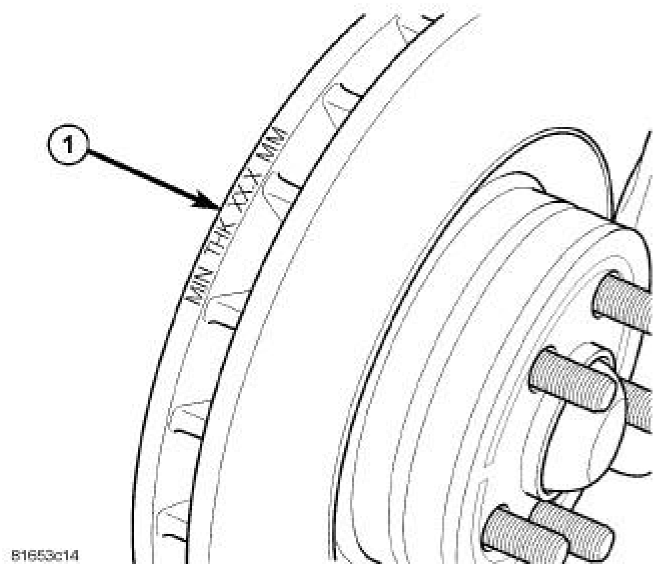


Fig. 103: Minimum Thickness Markings On Rotor Edge
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The minimum thickness specification is stamped into the outer diameter edge (1) (along vented end) of the disc.**

Before lathe installation, verify the brake rotor face and the hub adapters are free of any chips, rust, or contamination.

When mounting and using the brake lathe, strict attention to the brake lathe manufacturer's operating instructions is required.

Machine both sides of the brake rotor at the same time. Cutting both sides at the same time minimizes the possibility of a tapered or uneven cut.

When refacing a rotor, the required TIR (Total Indicator Reading) and thickness variation limits MUST BE MAINTAINED. Extreme care in the operation of rotor turning equipment is required. Specifications for brake rotor machining can be found in ROTOR, BRAKE, SPECIFICATIONS.

SPECIFICATIONS

SPECIFICATIONS

NOTE: **When refacing a rotor, the required TIR (Total Indicator Reading) and thickness variation limits MUST BE MAINTAINED. Extreme care in the operation of rotor turning (machining) equipment is required.**

LIMITS/SPECIFICATIONS - 17 INCH BRAKES (BASE)

Brake Rotor	Rotor Thickness	Minimum Rotor Thickness	Rotor Thickness Variation	Rotor Runout *

Brake Rotor	Rotor Thickness	Minimum Rotor Thickness	Rotor Thickness Variation	Rotor Runout *
Front	27.87-28.13 mm	26.5 mm	0.010 mm	0.035 mm
	1.097-1.107 in.	1.040 in.	0.0004 in.	0.0014 in.
Rear	9.87-10.13 mm	8.5 mm	0.010 mm	0.035 mm
	0.389-0.399 in.	0.335 in.	0.0004 in.	0.0014 in.
* TIR Total Indicator Reading (Measured On Vehicle)				

LIMITS/SPECIFICATIONS - 18 INCH BRAKES (PREMIUM)

Brake Rotor	Rotor Thickness	Minimum Rotor Thickness	Rotor Thickness Variation	Rotor Runout *
Front	27.87-28.13 mm	26.5 mm	0.010 mm	0.035 mm
	1.097-1.107 in.	1.040 in.	0.0004 in.	0.0014 in.
Rear	21.87-22.13 mm	20.5 mm	0.010 mm	0.035 mm
	0.861-0.871 in.	0.807 in.	0.0004 in.	0.0014 in.
* TIR Total Indicator Reading (Measured On Vehicle)				

LIMITS/SPECIFICATIONS - SRT8 BRAKES

Brake Rotor	Rotor Thickness	Minimum Rotor Thickness	Rotor Thickness Variation	Rotor Runout *
Front	31.90-32.10 mm	30.00 mm	0.040 mm	0.030 mm
	1.256-1.264 in.	1.181 in.	0.0016 in.	0.0012 in.
Rear	27.90-28.10 mm	26.00 mm	0.040 mm	0.030 mm
	1.098-1.106 in.	1.024 in.	0.0016 in.	0.0012 in.
* TIR Total Indicator Reading (Measured On Vehicle)				

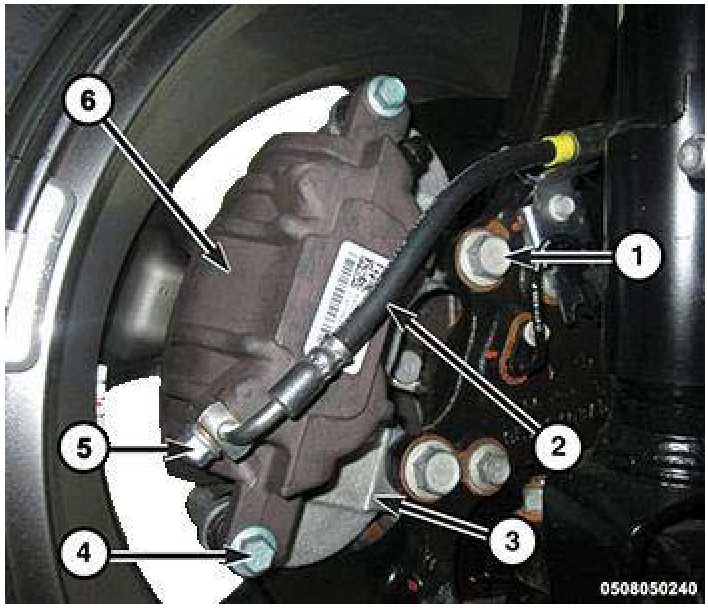
REMOVAL

FRONT-NON SRT

NOTE: **Before proceeding, refer to WARNING and CAUTION.**

NOTE: **Removal process is the same for both sides of the vehicle.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

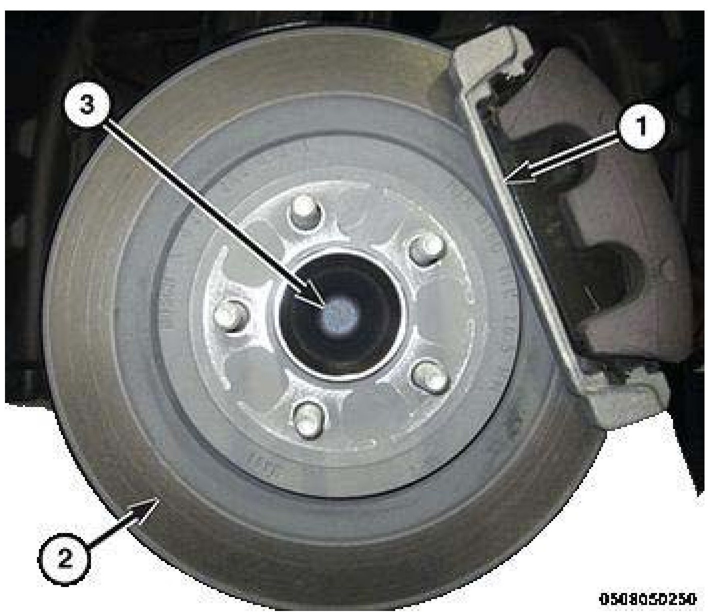


[Fig. 104: Brake Caliper Components](#)
Courtesy of CHRYSLER GROUP, LLC

3. Remove the two brake caliper adapter to knuckle bolts (1).

NOTE: **The bolts (1) are one time use and need to be discarded.**

4. Remove the brake caliper (6) and adapter (3) as an assembly and position aside.



[Fig. 105: Brake Caliper, Rotor & Hub](#)
Courtesy of CHRYSLER GROUP, LLC

5. Remove any clips retaining brake rotor (2) to wheel studs.
6. Slide brake rotor (2) off the hub (3).

FRONT-SRT8

NOTE: **Before proceeding, refer to CAUTION and WARNING.**

NOTE: **Removal process is the same for both sides of the vehicle.**

NOTE: **Six piston braking system shown, four piston braking system similar.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

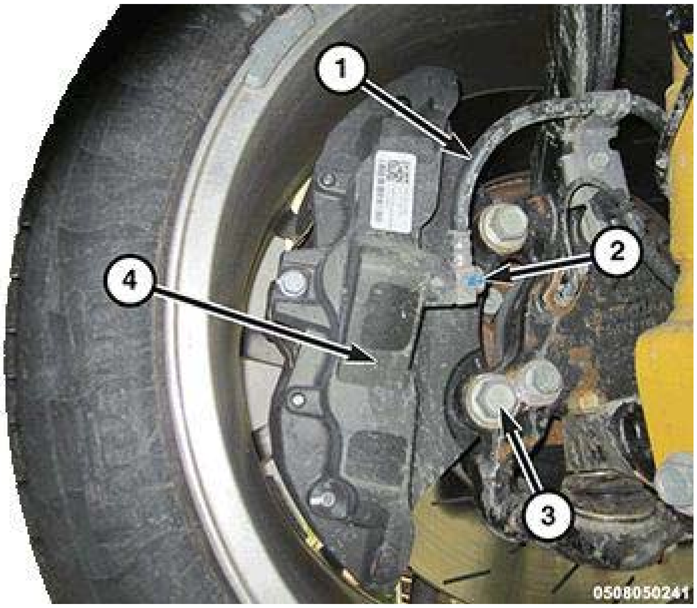


Fig. 106: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

3. Remove the brake caliper to knuckle bolts (3).
4. Remove the brake caliper assembly (4) from the knuckle and position aside.

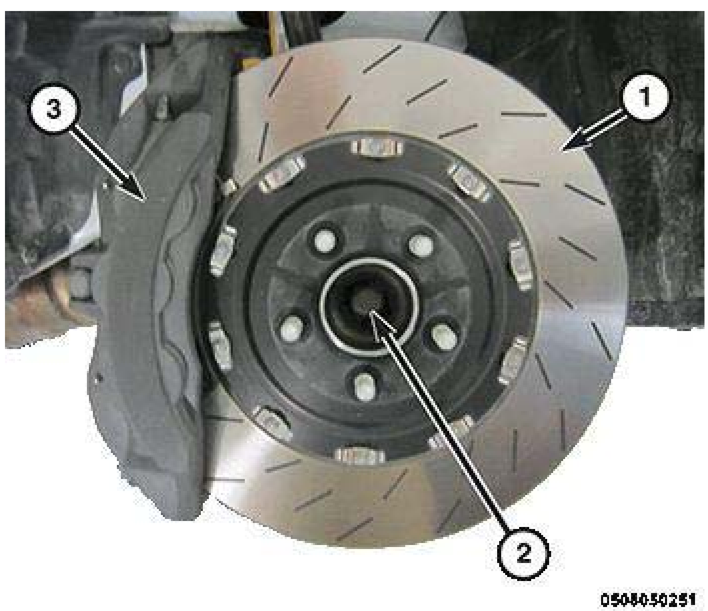


Fig. 107: Brake Rotor, Hub & Caliper

Courtesy of CHRYSLER GROUP, LLC

5. Remove any clips retaining brake rotor (1) to wheel studs.
6. Slide brake rotor (1) off the hub (2).

REAR-NON SRT

NOTE: **Before proceeding, refer to CAUTION and WARNING.**

NOTE: **Removal process is the same for both sides of the vehicle.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

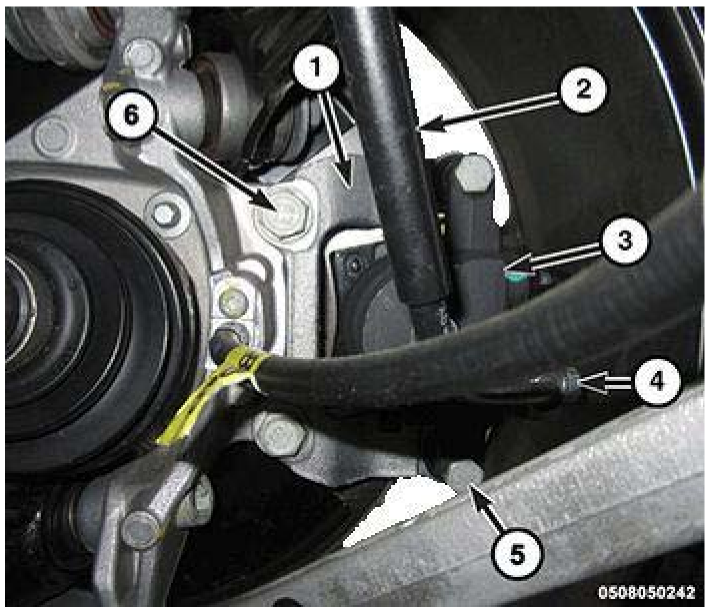


Fig. 108: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

3. Remove the two brake caliper adapter to knuckle bolts (6).
4. Remove the brake caliper (3) and adapter (1) as an assembly and position aside.

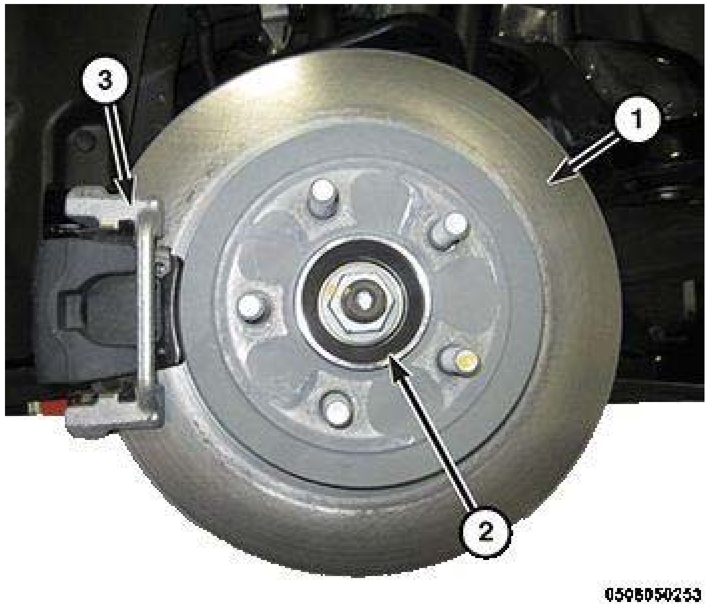


Fig. 109: Brake Rotor, Hub & Caliper
Courtesy of CHRYSLER GROUP, LLC

5. Remove any clips retaining brake rotor (1) to wheel mounting studs.
6. Slide brake rotor (1) off the hub (2).

REAR-SRT8

NOTE: **Before proceeding, refer to CAUTION and WARNING.**

NOTE: **Removal process is the same for both sides of the vehicle.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

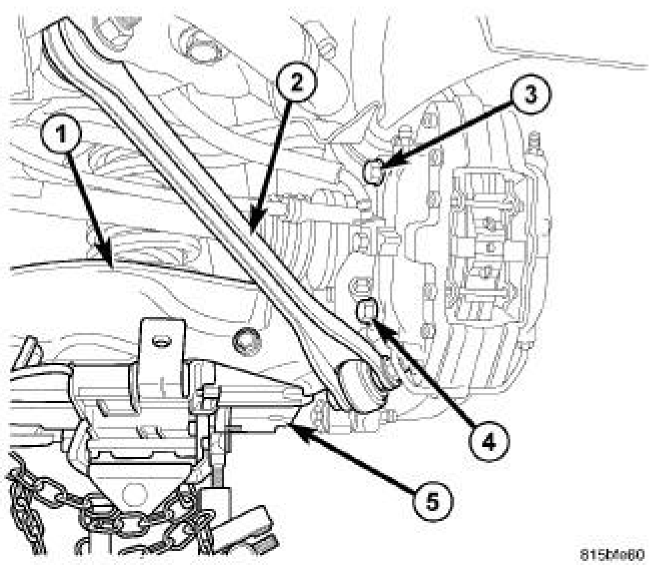


Fig. 110: Accessing Rear Caliper Mounting Bolts

Courtesy of CHRYSLER GROUP, LLC

3. Support spring link (1) using a transmission jack (5) or other appropriate jack. Raise spring link just enough to access brake caliper lower mounting bolt (4) from above compression link (2).

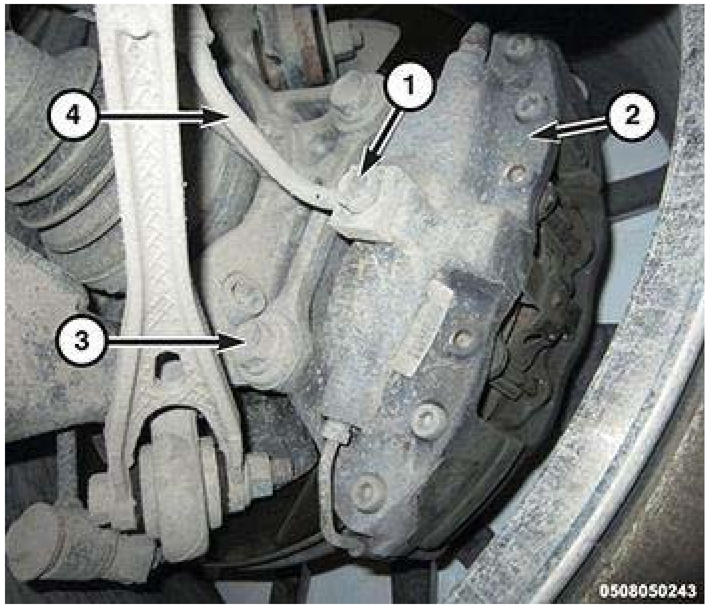


Fig. 111: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

4. Remove the brake caliper to knuckle bolts (3).
5. Remove the brake caliper assembly (2) from the knuckle and position aside.

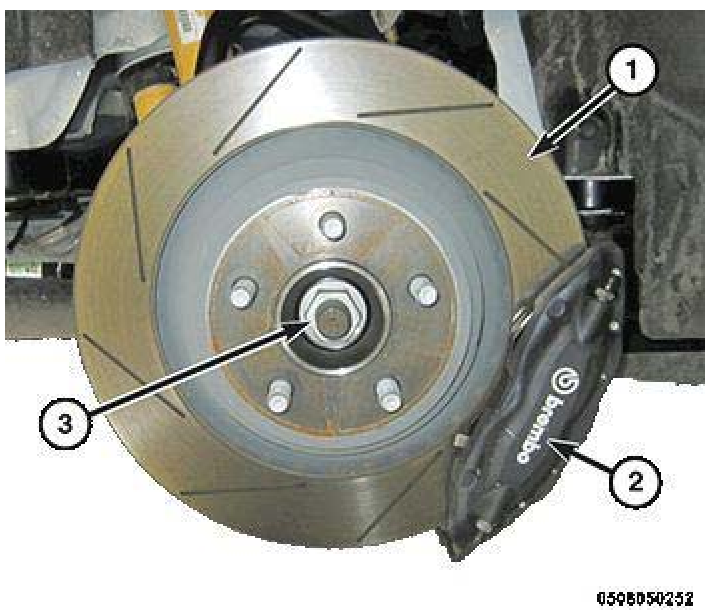


Fig. 112: Brake Rotor, Caliper & Hub Nut
Courtesy of CHRYSLER GROUP, LLC

6. Remove any clips retaining brake rotor (1) to hub.
7. Slide brake rotor (1) off the hub (3).

INSTALLATION

FRONT-NON SRT

NOTE: **Installation process is the same for both sides of the vehicle.**

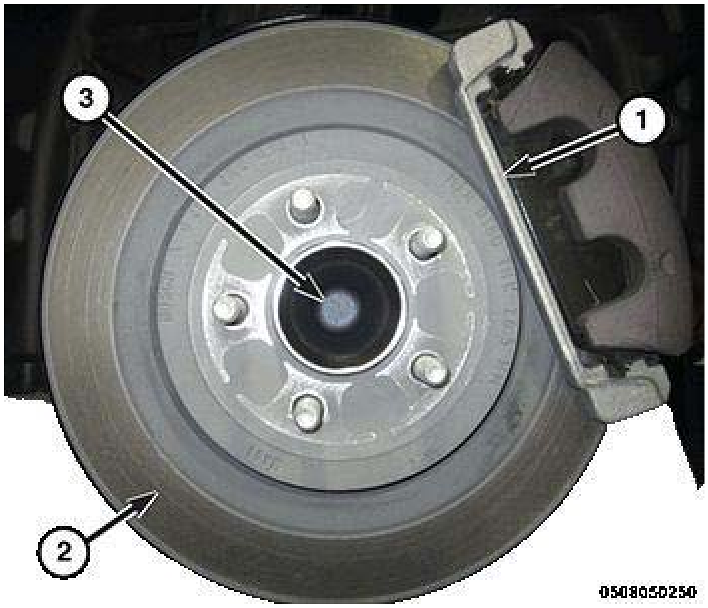


Fig. 113: Brake Caliper, Rotor & Hub
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Inspect brake pads before installation. Refer to PADS, BRAKE, INSPECTION.**

1. Clean hub face to remove any dirt or corrosion where rotor mounts.
2. Install brake rotor (2) onto the hub

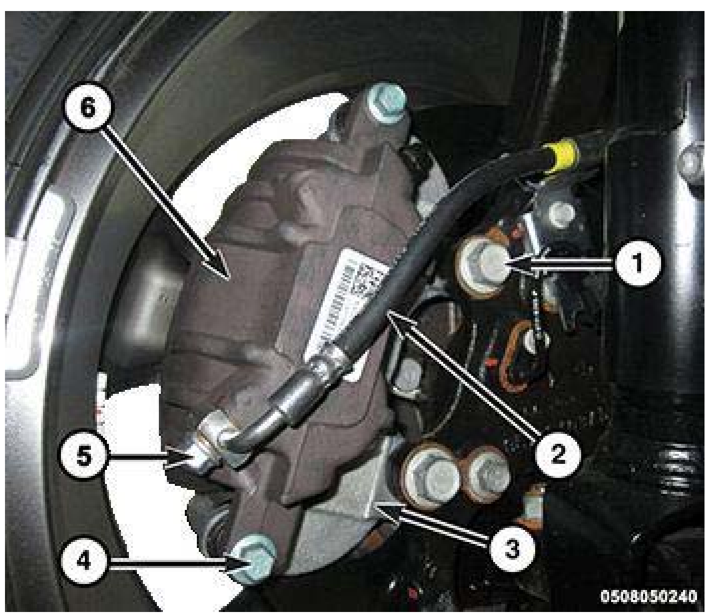


Fig. 114: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

3. Install the brake caliper (6) and adapter (3) over the brake rotor as an assembly.
4. Install **NEW** brake caliper adaptor to knuckle bolts (1), and tighten to the **SPECIFICATIONS** .
5. Install the tire and wheel assembly. Refer to **INSTALLATION** .
6. Remove support and lower the vehicle.
7. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
8. Check and adjust brake fluid level in reservoir as necessary.

CAUTION: If NEW brake rotors or pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.

CAUTION: A burnish procedure must be performed anytime NEW brake pads or rotors are installed on a vehicle equipped with the Police Package. This procedure is particularly important in situations where high speed pursuit is a possibility. It is recommended that the procedure be performed by the Police agency operating the vehicle so it can be performed in a safe controlled environment. This information is covered in the Police Package Owners Manual Supplement which was supplied when the vehicle was originally delivered.

9. Road test the vehicle and make several stops to seat the brake pads to the rotor.

FRONT-SRT8

NOTE: Installation process is the same for both sides of the vehicle.

NOTE: Six piston braking system shown, four piston braking system similar.

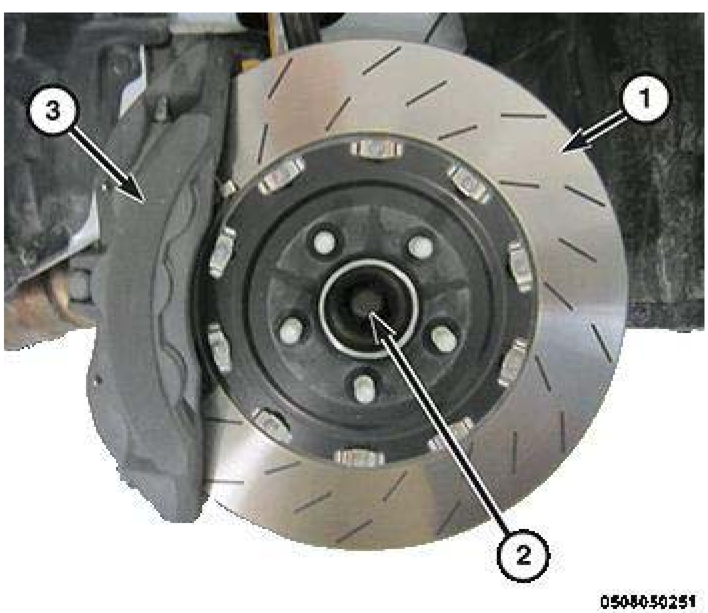


Fig. 115: Brake Rotor, Hub & Caliper
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Inspect brake pads before installation. Refer to PADS, BRAKE, INSPECTION.**

1. Clean hub face to remove any dirt or corrosion where rotor mounts.
2. Install brake rotor (1) onto the hub (2).

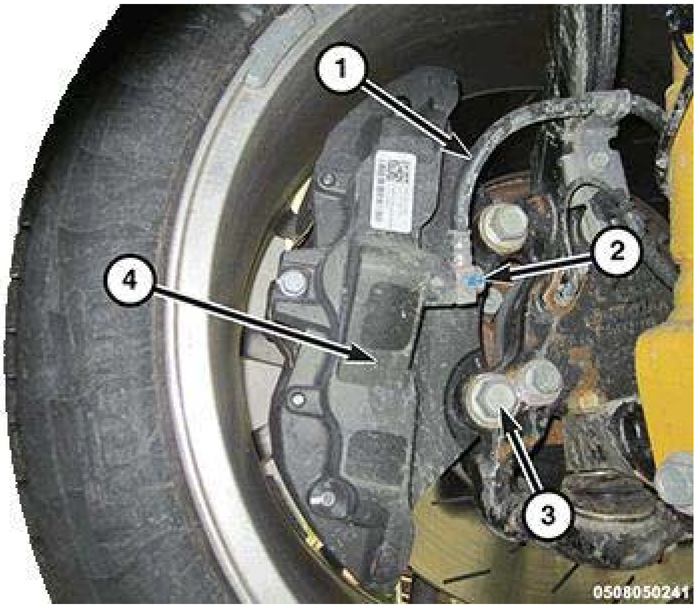


Fig. 116: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

3. Install the brake caliper assembly (4) to the knuckle.
4. Install the brake caliper to knuckle bolts (3), and tighten to the proper **SPECIFICATIONS** .
5. Install the tire and wheel assembly. Refer to **INSTALLATION** .
6. Remove support and lower the vehicle.
7. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
8. Check and adjust brake fluid level in reservoir as necessary.

CAUTION: **If NEW brake rotors or pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.**

9. Road test the vehicle and make several stops to seat the brake pads to the rotor. Refer to **PADS, BRAKE, STANDARD PROCEDURE**.

REAR-NON SRT

NOTE: **Installation process is the same for both sides of the vehicle.**

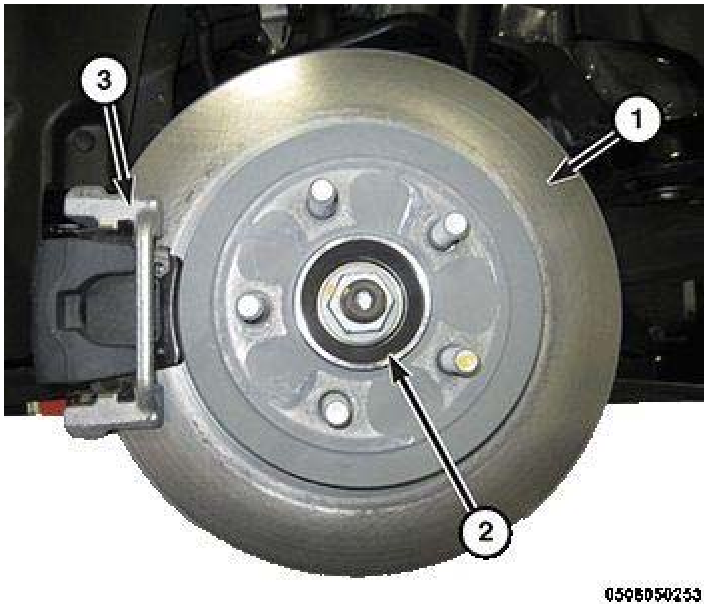


Fig. 117: Brake Rotor, Hub & Caliper
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Inspect disc brake pads and parking brake shoes before installation. Refer to PADS, BRAKE, INSPECTION.**

1. Clean hub face to remove any dirt or corrosion where brake rotor mounts.
2. Install brake rotor (1) onto the hub (2).

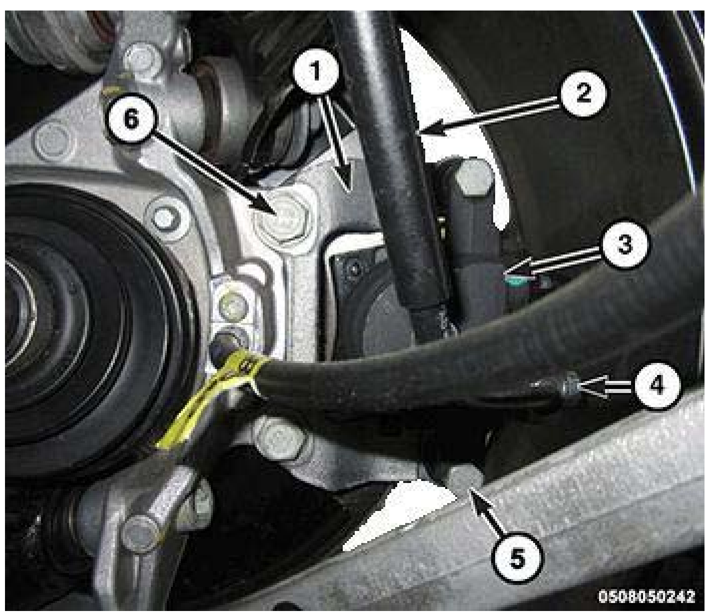


Fig. 118: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Install the brake caliper (3) and adapter (1) over the brake rotor as an assembly.**

3. Install **NEW** brake caliper adaptor to knuckle bolts (6), and tighten to the proper SPECIFICATIONS .

4. Install the tire and wheel assembly. Refer to **INSTALLATION** .
5. Remove the support and lower the vehicle.
6. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
7. Check and adjust brake fluid level in reservoir as necessary.

CAUTION: If NEW brake rotors or pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.

CAUTION: A burnish procedure must be performed anytime NEW brake pads or rotors are installed on a vehicle equipped with the Police Package. This procedure is particularly important in situations where high speed pursuit is a possibility. It is recommended that the procedure be performed by the Police agency operating the vehicle so it can be performed in a safe controlled environment. This information is covered in the Police Package Owners Manual Supplement which was supplied when the vehicle was originally delivered.

8. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake shoes.

REAR-SRT8

NOTE: Installation process is the same for both sides of the vehicle.

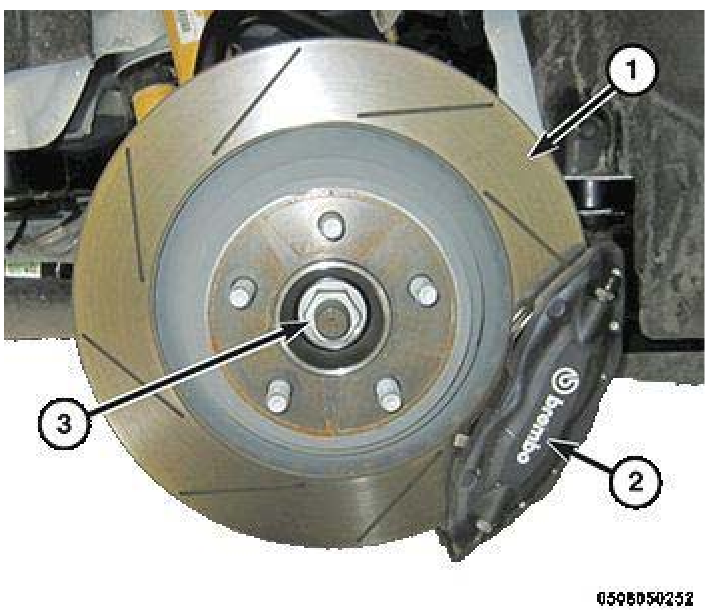


Fig. 119: Brake Rotor, Caliper & Hub Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: Inspect brake pads and parking brake shoes before installation. Refer to PADS, BRAKE, INSPECTION.

1. Clean hub face to remove any dirt or corrosion where rotor mounts.
2. Install brake rotor (1) onto the hub (3).

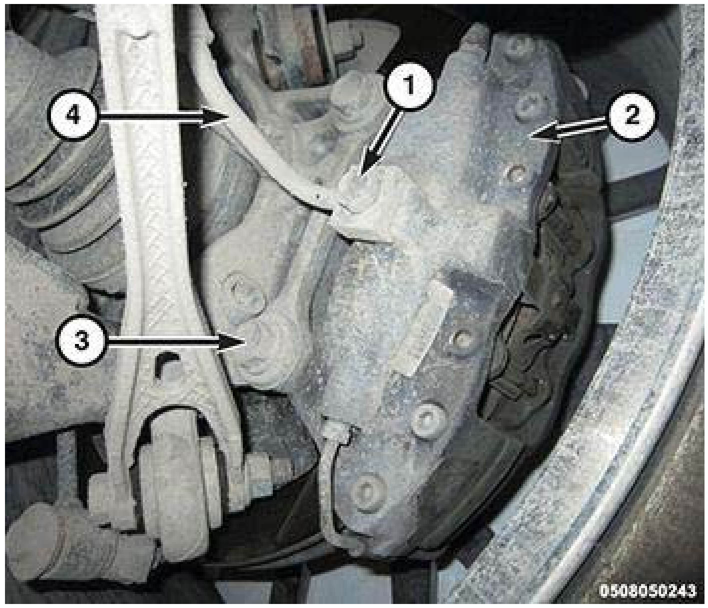


Fig. 120: Brake Caliper Components
Courtesy of CHRYSLER GROUP, LLC

3. Install the brake caliper assembly (2) to the knuckle.
4. Install the brake caliper adaptor to knuckle bolts (3). Tighten to the proper **SPECIFICATIONS** .
5. Remove jack from under spring link.
6. Install the tire and wheel assembly. Refer to **INSTALLATION** .
7. Remove support and lower the vehicle.
8. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
9. Check and adjust brake fluid level in reservoir as necessary.

CAUTION: If NEW brake rotors or pads have been installed, keep in mind that braking effectiveness might be somewhat reduced during the first brake applications following installation.

10. Road test the vehicle and make several stops to seat the brake pads to the rotor. Refer to **PADS, BRAKE, STANDARD PROCEDURE**.

PARKING BRAKE

DESCRIPTION

DESCRIPTION

This vehicle uses drum-in-hat style parking brakes at each rear wheel. The system is actuated using a foot-operated mechanism and three parking brake cables.

CABLE, PARKING BRAKE, FRONT

REMOVAL

REMOVAL

NOTE: **Before proceeding, refer to CAUTION and WARNING.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

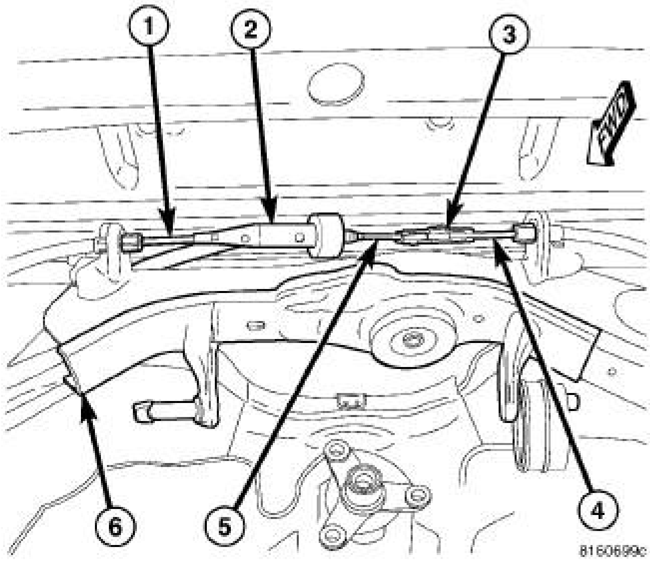


Fig. 121: Cables At Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.**

2. Disconnect front parking brake cable (5) at connector (3) to right rear parking brake cable (4) above axle differential (not shown).

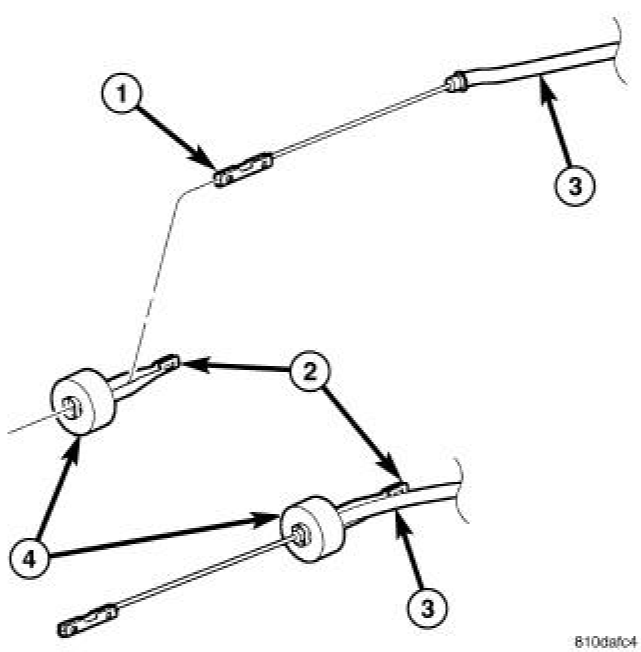


Fig. 122: Front Cable Installation Into Equalizer

Courtesy of CHRYSLER GROUP, LLC

3. Remove front cable (3) from equalizer (2).

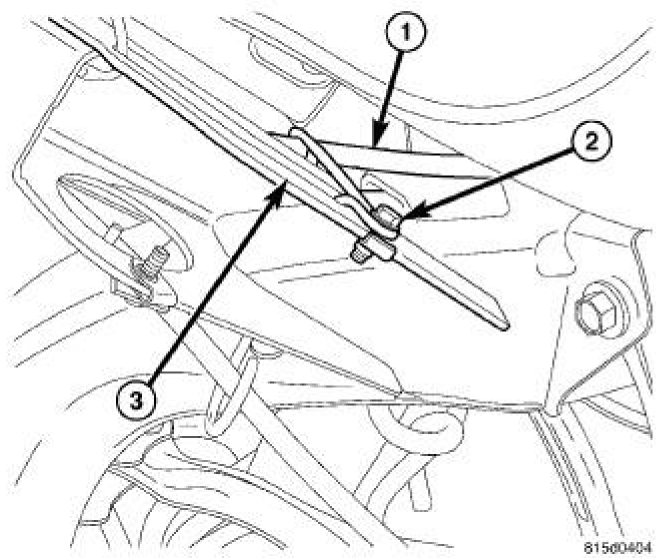


Fig. 123: Front Cable At Left Front Of Crossmember
Courtesy of CHRYSLER GROUP, LLC

4. Remove screw (2) fastening cable (1) routing bracket to rear crossmember front flange (3).

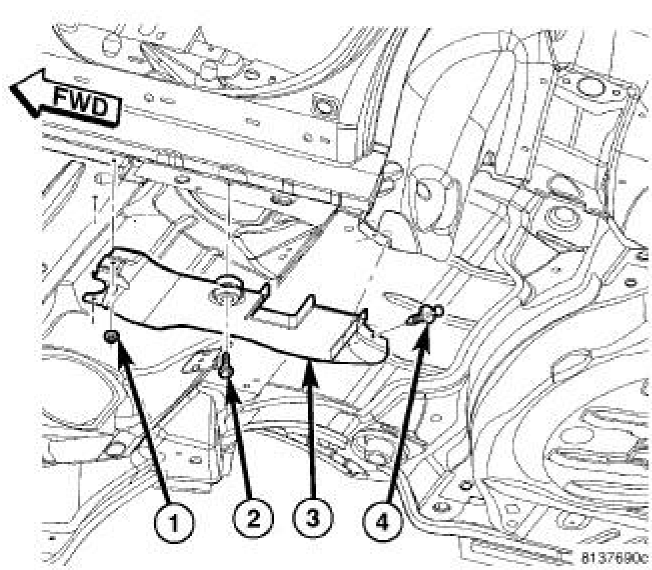


Fig. 124: Lower Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

5. Remove nuts (1), bolt (2) and push-pins (4), securing lower rear wheelhouse shield (3) to body of vehicle. Remove lower rear wheelhouse shield.

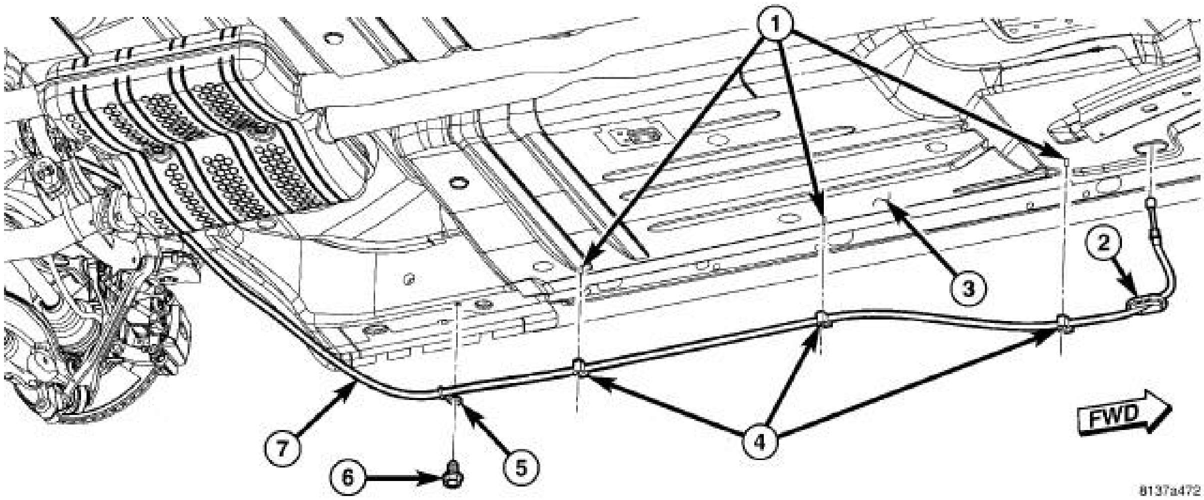


Fig. 125: Front Parking Brake Cable
Courtesy of CHRYSLER GROUP, LLC

6. Remove screw (6) and routing clip (4) nuts fastening cable (7) to underside of body (3).
7. Remove support and lower the vehicle.
8. Remove driver door opening sill scuff plate and cowl side trim.
9. Remove clip and roll back carpet away from front cable.

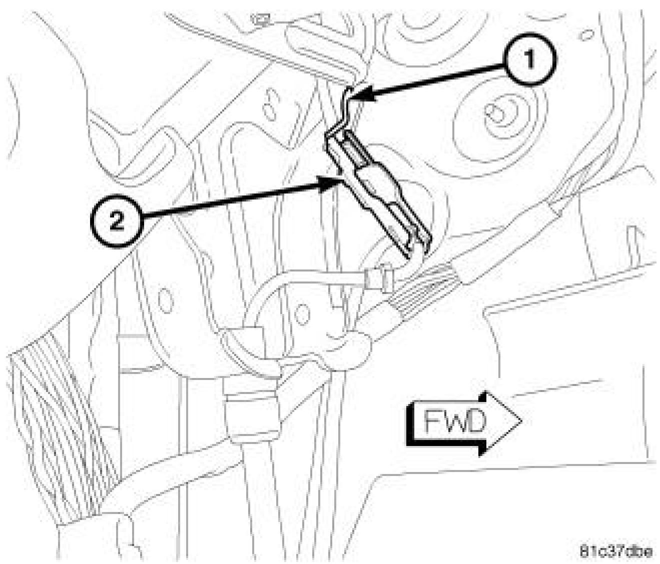
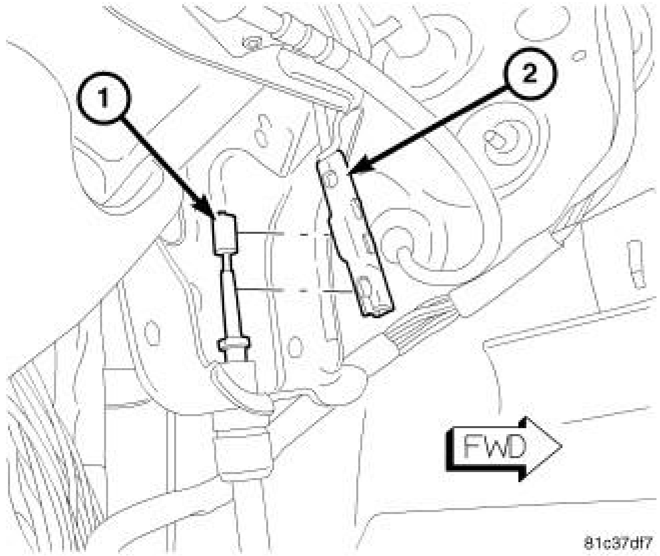


Fig. 126: Cable Connector Secured In Fork
Courtesy of CHRYSLER GROUP, LLC

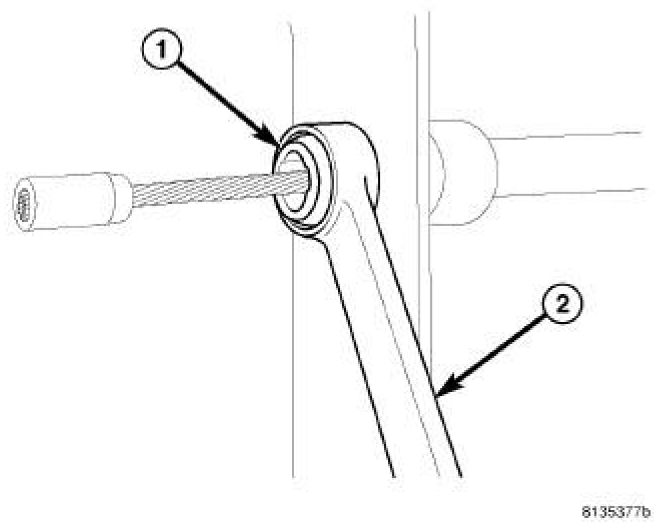
CAUTION: Do not remove front parking brake cable from cable connector at lever without securing connector first. If not secured, cable connector will wind up inside lever assembly making it most difficult to retrieve and reconnect to front cable upon installation.

10. Using pliers, reach up inside parking brake lever assembly and pull downward on parking brake cable connector. Secure cable connector (2) in retaining fork (1) formed into parking brake lever bracket as shown.



[Fig. 127: Front Cable At Lever Connector]
Courtesy of CHRYSLER GROUP, LLC

11. Disengage and remove front parking brake cable strand (1) from cable connector (2), leaving cable connector secured in retaining fork.



[Fig. 128: Removing Cable Using Wrench]
Courtesy of CHRYSLER GROUP, LLC

12. Place 13 mm 12-point box wrench (2) over cable retainer (1) at lever bracket as shown to collapse retainer fingers. Pull cable from bracket.

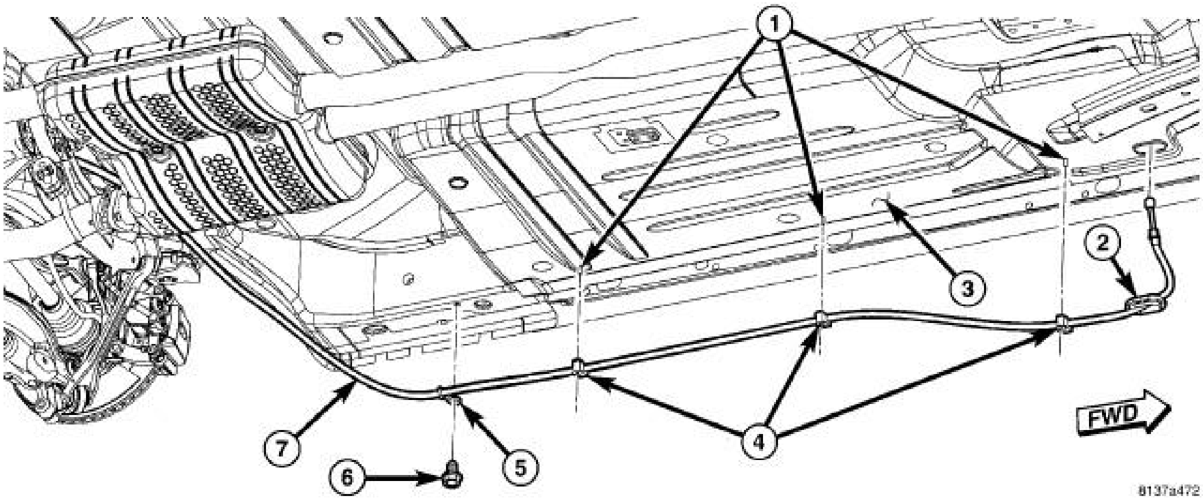


Fig. 129: Front Parking Brake Cable
Courtesy of CHRYSLER GROUP, LLC

13. Remove parking brake cable grommet (2) from floor pan (3).
14. Remove parking brake cable (7) through hole in floor pan.

INSTALLATION

INSTALLATION

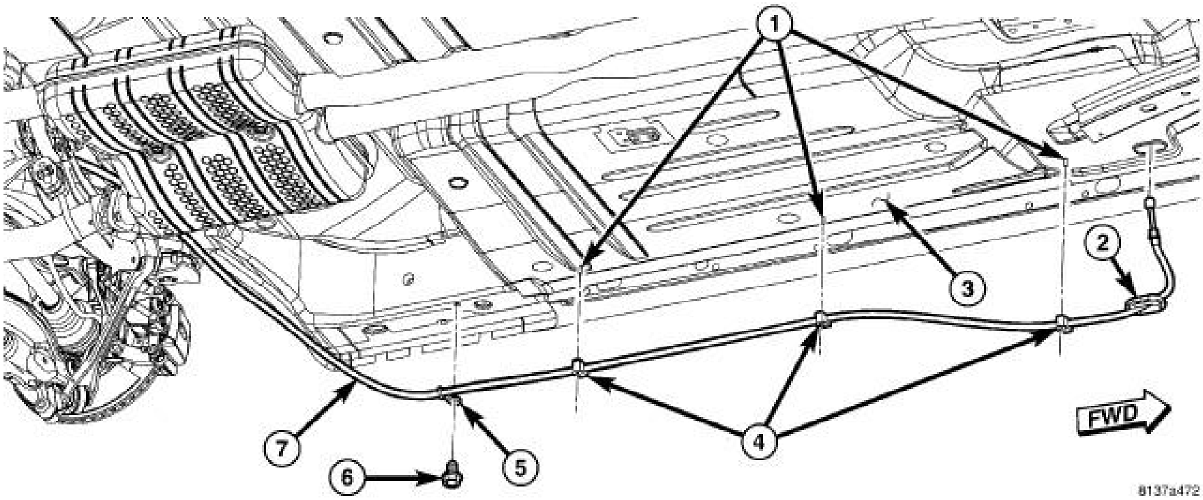
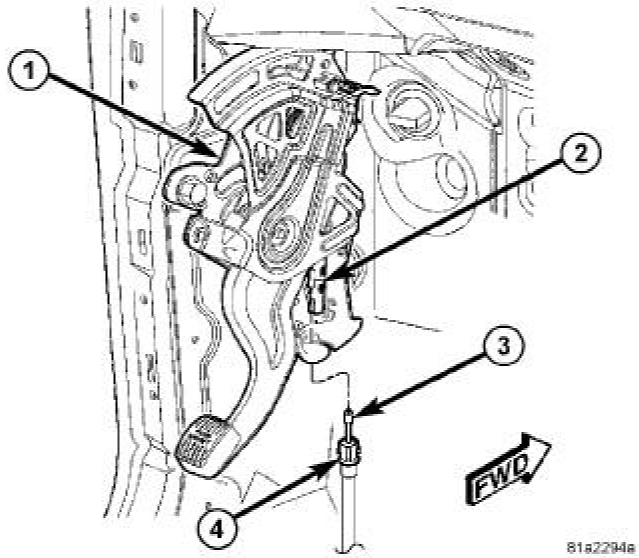


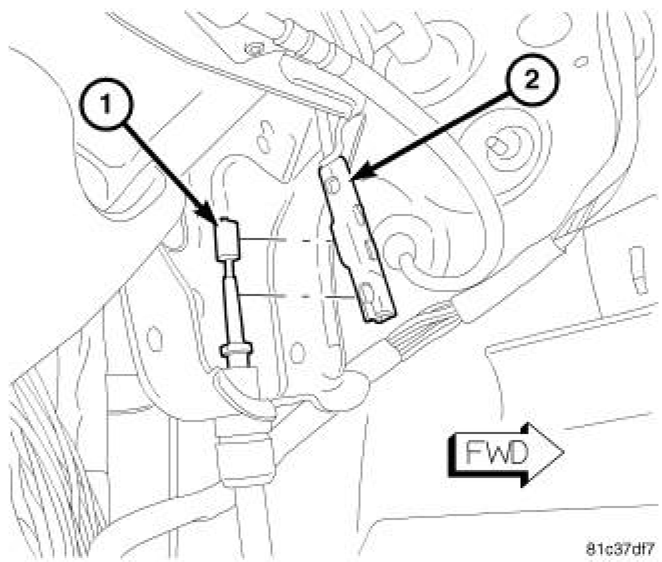
Fig. 130: Front Parking Brake Cable
Courtesy of CHRYSLER GROUP, LLC

1. Guide parking brake cable (7) down through hole in floor pan.
2. Install parking brake cable grommet (2) in hole of floor pan (3).



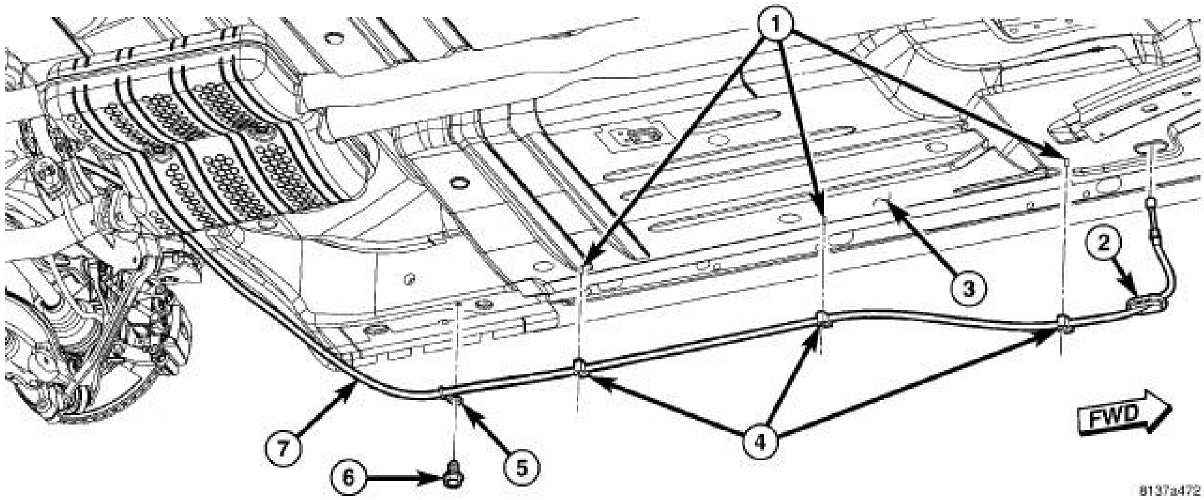
[Fig. 131: Front Cable At Lever](#)
Courtesy of CHRYSLER GROUP, LLC

3. Guide cable strand (3) up through lever bracket and press cable housing retainer (4) into bracket allowing retainer fingers to lock cable in place.



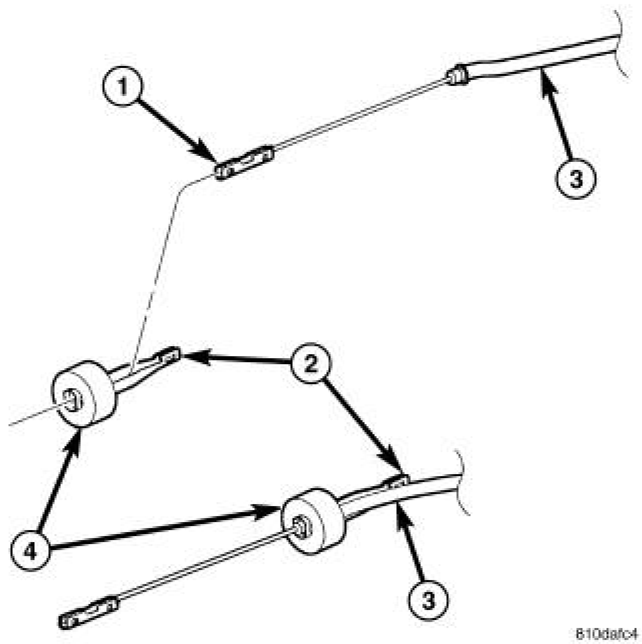
[Fig. 132: Front Cable At Lever Connector](#)
Courtesy of CHRYSLER GROUP, LLC

4. Connect front parking brake cable strand (1) to cable connector (2) secured in retaining fork.
5. Once front parking brake cable strand is completely seated in cable connector (2), lift cable connector out of retaining fork using pliers and slowly allow lever mechanism to take up slack in cable.
6. Lay carpet back into place and install retaining clip.
7. Install driver door opening sill scuff plate and cowl side trim.
8. Raise and support vehicle.



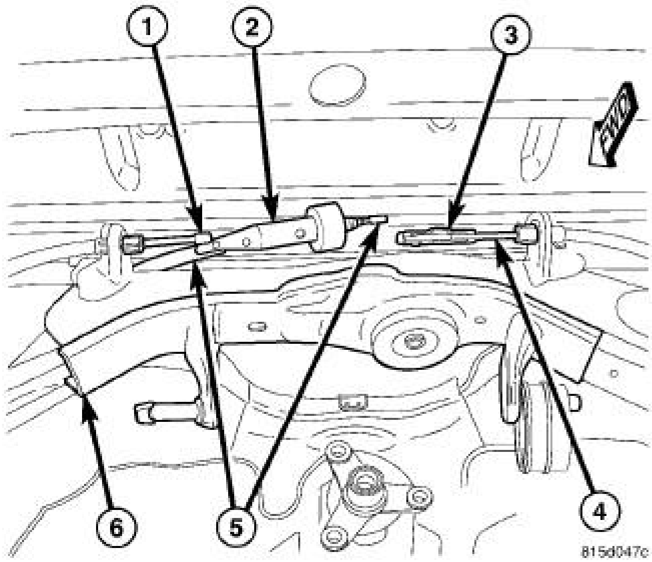
[Fig. 133: Front Parking Brake Cable](#)
Courtesy of CHRYSLER GROUP, LLC

9. Install screw (6) and routing clip (4) nuts fastening cable (7) to underside of body (3).



[Fig. 134: Front Cable Installation Into Equalizer](#)
Courtesy of CHRYSLER GROUP, LLC

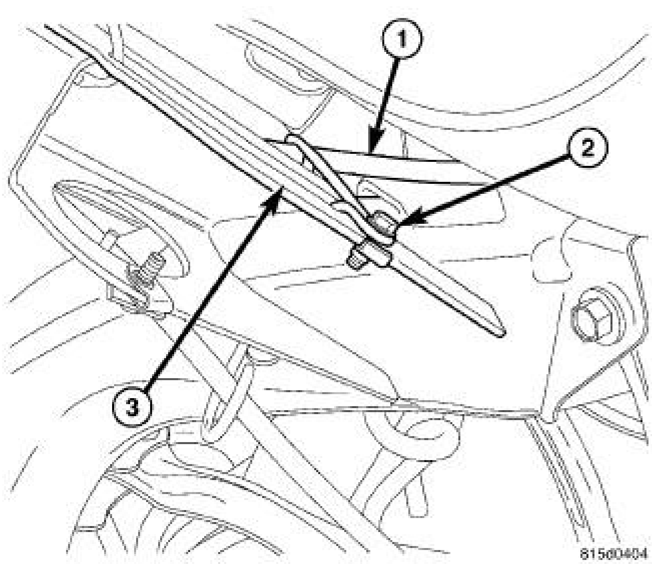
10. Route cable above rear crossmember, then slide cable end (1) (shown with connector) and housing (3) through equalizer (2) above rear axle differential.



[Fig. 135: Parking Brake Cables At Rear Crossmember](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.**

11. Connect front parking brake cable (5) at connector (3) to right rear parking brake cable (4) (axle differential not shown).



[Fig. 136: Front Cable At Left Front Of Crossmember](#)
Courtesy of CHRYSLER GROUP, LLC

12. Install screw (2) fastening cable (1) routing bracket to rear crossmember front flange (3).

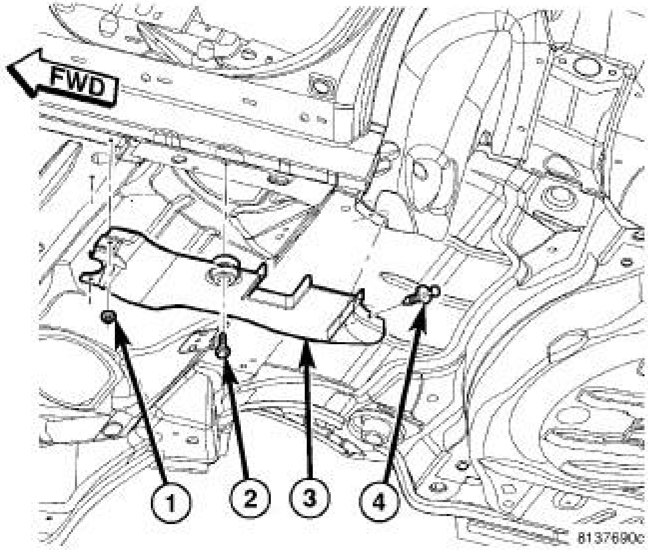


Fig. 137: Lower Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

13. Position lower rear wheelhouse shield (3) onto body of vehicle. Install nuts (1), bolt (2) and push-pins (4) securing lower rear wheelhouse shield to body. Tighten nuts and bolt securely.
14. Lower vehicle until rear wheels are just above floor level.
15. Apply parking brake lever. Release lever, then reapply.
16. Check to make sure rear wheels will not rotate with lever applied.
17. Release parking brake lever, then check to make sure rear wheels rotate without excessive drag.
18. Apply parking brake lever.
19. Remove support and lower the vehicle.

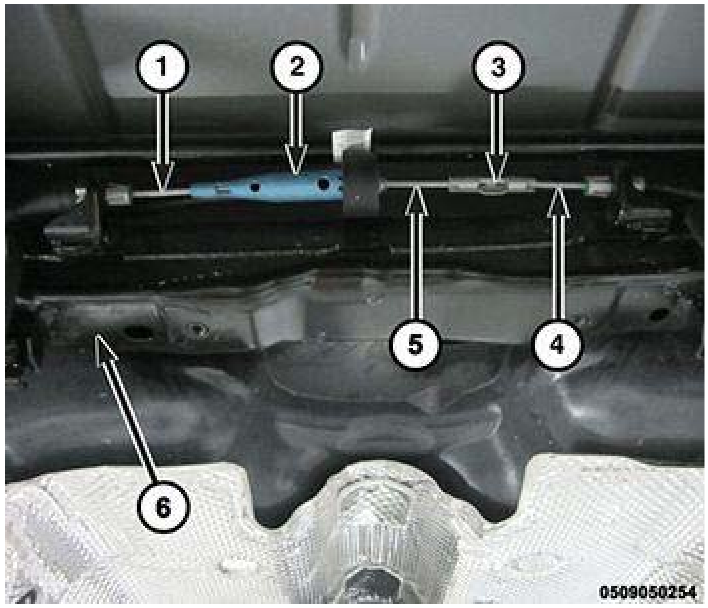
CABLE, PARKING BRAKE, REAR

REMOVAL

REMOVAL

NOTE: Before proceeding, refer to CAUTION and WARNING.

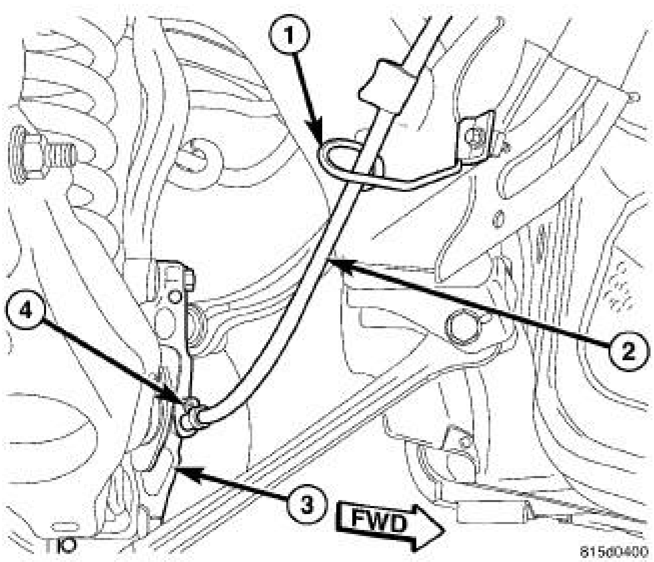
1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .



[Fig. 138: Cables At Equalizer](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.**

2. Disconnect rear parking brake cable near front cable as follows:
    - If removing left rear cable, disconnect cable (1) at equalizer (2) above rear axle differential (not shown) and rear crossmember (6).
    - If removing right rear cable, disconnect cable (4) at connector (3) above rear axle differential (not shown) and rear crossmember (6).
3. Remove parking brake shoes on side of cable service. Refer to **SHOES, PARKING BRAKE, REMOVAL**.



[Fig. 139: Rear Cable Routing To Knuckle](#)
Courtesy of CHRYSLER GROUP, LLC

4. Remove screw (4) fastening cable (2) to knuckle (3). Remove cable from knuckle.
5. Remove cable (2) from routing guide (1).

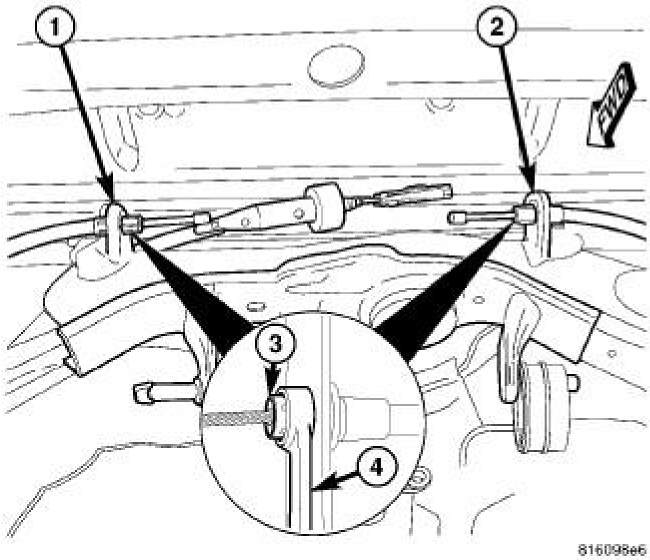


Fig. 140: Cables At Crossmember Bracket
Courtesy of CHRYSLER GROUP, LLC

6. Place 13 mm 12-point box wrench (4) over cable strand and completely onto cable retainer (3) as shown at crossmember bracket (1 - left) (2 - right). It may be necessary to wiggle wrench around somewhat to collapse retainer fingers. With wrench in place, pull cable from bracket.
7. Remove parking brake cable from vehicle.

INSTALLATION

INSTALLATION

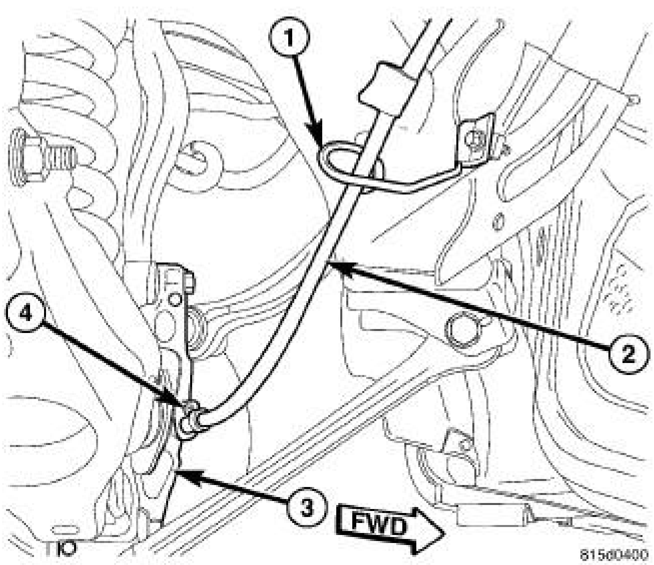


Fig. 141: Rear Cable Routing To Knuckle
Courtesy of CHRYSLER GROUP, LLC

1. Route leading end of rear parking brake cable (2) up through cable guide (1) on crossmember.

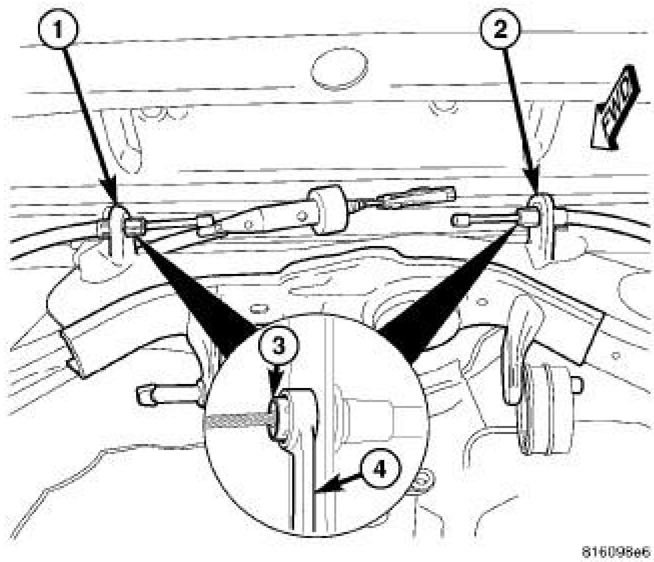


Fig. 142: Cables At Crossmember Bracket
Courtesy of CHRYSLER GROUP, LLC

2. Guide cable leading end through crossmember bracket (1 - left) (2 - right) near equalizer and press cable housing retainer into bracket allowing retainer fingers to lock cable in place.

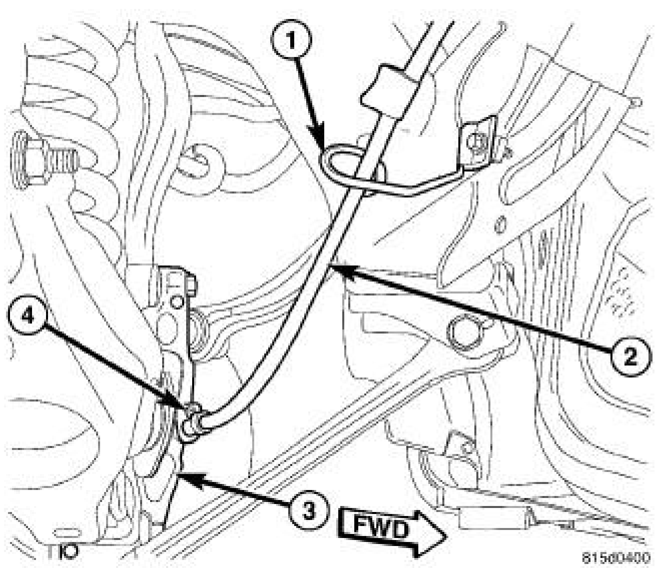


Fig. 143: Rear Cable Routing To Knuckle
Courtesy of CHRYSLER GROUP, LLC

3. Insert opposite end of cable (2) through rear knuckle (3) and install the Parking Brake Cable to Knuckle Bolt (4). Tighten to the proper **SPECIFICATIONS** .
4. Install parking brake shoes as well as all components necessary to access them. Refer to **SHOES, PARKING BRAKE, INSTALLATION**.

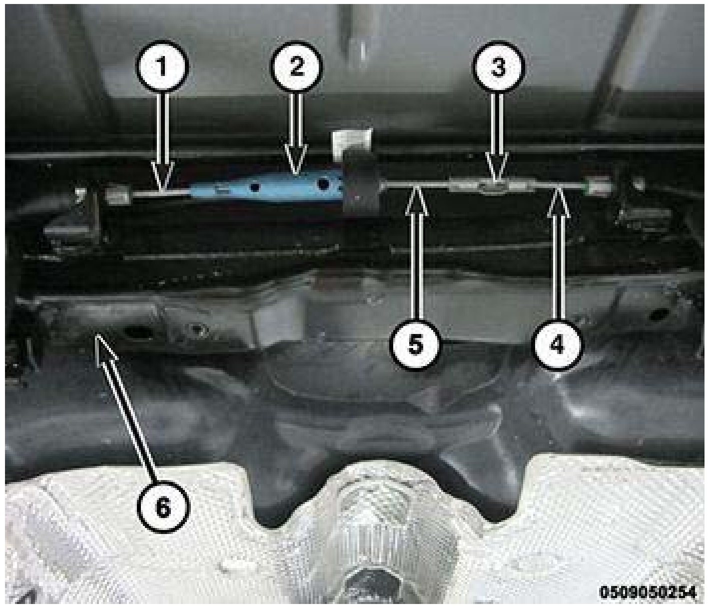


Fig. 144: Cables At Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Due to short travel and low spring tension, it is not necessary to lock out parking brake lever to service parking brake components.**

5. Connect rear parking brake cable at equalizer/front cable as follows:
    - If installing left rear cable, connect cable (1) at equalizer (2) above rear axle differential (not shown) and rear crossmember (6).
    - If installing right rear cable, connect cable (4) at connector (3) above rear axle differential (not shown) and rear crossmember (6).
6. Remove the support and lower the vehicle until rear wheels are just above floor level.
7. Apply parking brake lever. Release lever, then reapply.
8. Check to make sure rear wheels will not rotate with lever applied.
9. Release parking brake lever, then check to make sure rear wheels rotate without excessive drag.
10. Adjust parking brake shoes as necessary. Refer to **SHOES, PARKING BRAKE, ADJUSTMENTS**.
11. Remove support and lower the vehicle.

LEVER, PARKING BRAKE

REMOVAL

REMOVAL

NOTE: **Before proceeding, refer to CAUTION and WARNING.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

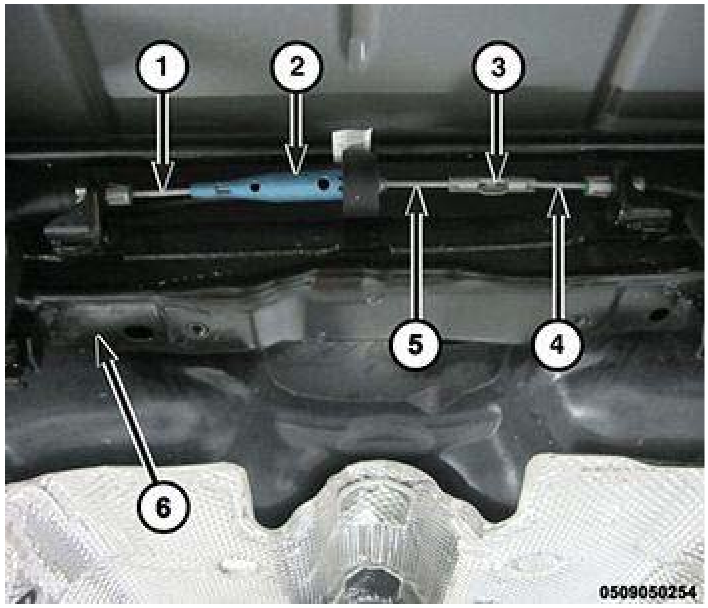


Fig. 145: Cables At Equalizer
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Due to short travel and low spring tension, it is not necessary to lock-out parking brake lever to service parking brake components.**

2. Disconnect front parking brake cable (5) at connector (3) to right rear parking brake cable.
3. Remove support and lower the vehicle.
4. Remove steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, REMOVAL** .

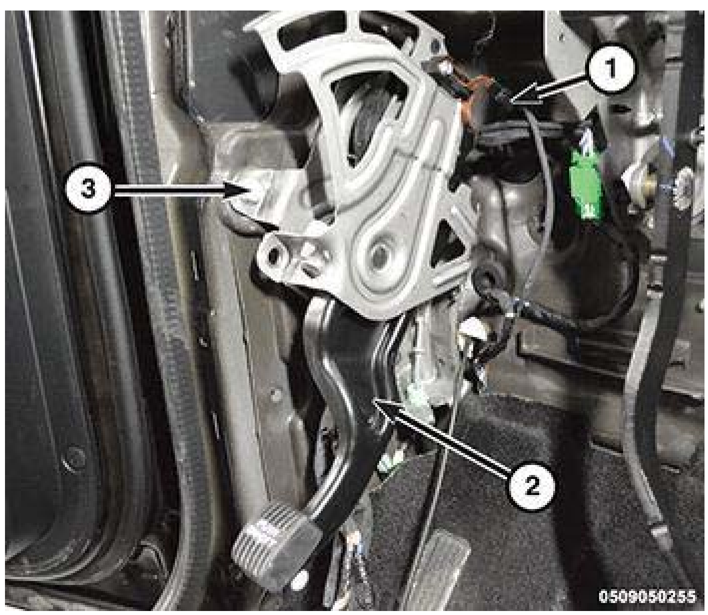


Fig. 146: Locating Parking Brake Switch Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect parking brake switch wire harness connector (1).

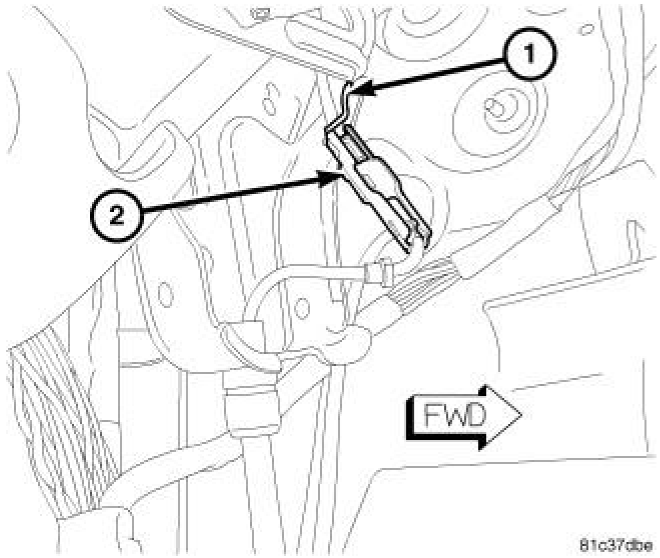


Fig. 147: Cable Connector Secured In Fork
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not remove front parking brake cable from cable connector at lever without securing connector first. If not secured, cable connector will wind up inside lever assembly making it most difficult to retrieve and reconnect to front cable upon installation.

6. Using pliers, reach up inside parking brake lever assembly and pull downward on parking brake cable connector. Secure cable connector (2) in retaining fork (1) formed into parking brake lever bracket as shown.

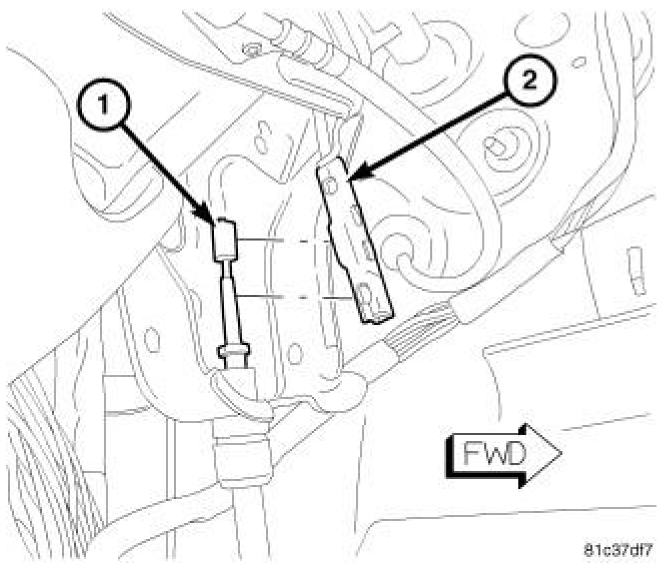
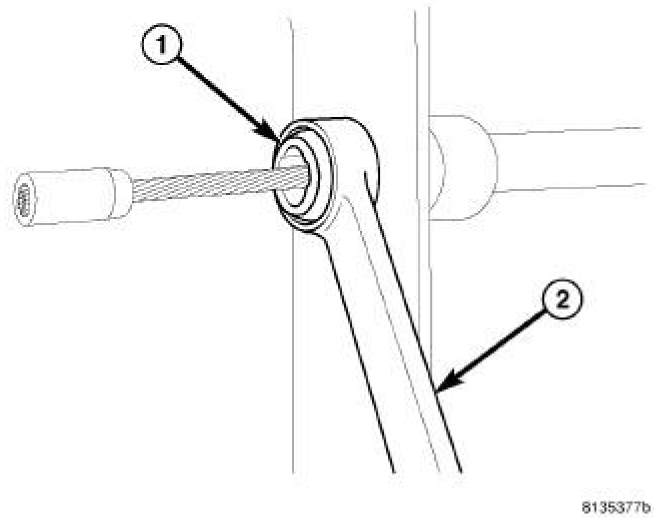


Fig. 148: Front Cable At Lever Connector
Courtesy of CHRYSLER GROUP, LLC

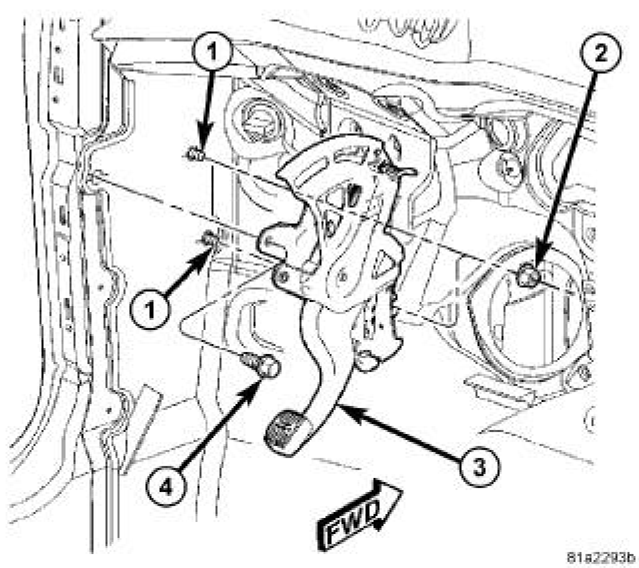
7. Disengage and remove front parking brake cable strand (1) from cable connector (2), leaving cable connector secured in retaining fork.



[Fig. 149: Removing Cable Using Wrench](#)
Courtesy of CHRYSLER GROUP, LLC

1 - CABLE RETAINER
2 - 12-POINT BOX WRENCH

8. Place 13 mm 12-point box wrench (2) over cable retainer (1) at lever bracket as shown to collapse retainer fingers. Pull cable from bracket.



[Fig. 150: Lever Mounting](#)
Courtesy of CHRYSLER GROUP, LLC

9. Remove bolt (4) and two nuts (2) mounting parking brake lever (3) to body.
10. Remove parking brake lever (3).

INSTALLATION

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INSTALLATION

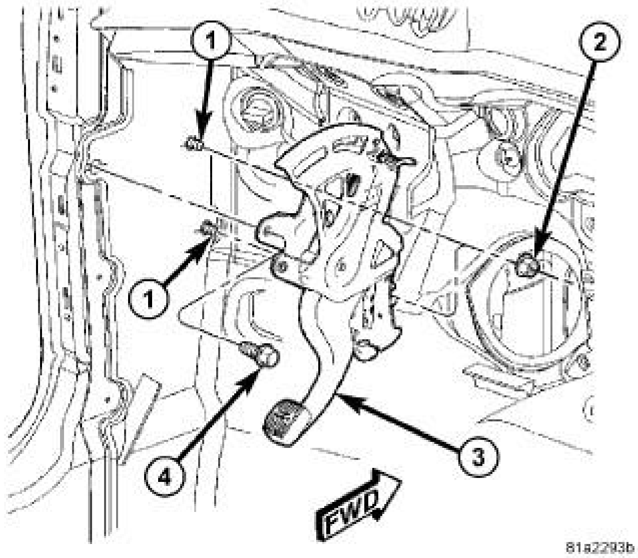


Fig. 151: Lever Mounting
Courtesy of CHRYSLER GROUP, LLC

1. Install parking brake lever (3) over mounting studs (1).
2. Install the Parking Brake Lever to Body Bolt (4) and Nuts (2). Tighten to the proper **SPECIFICATIONS** .

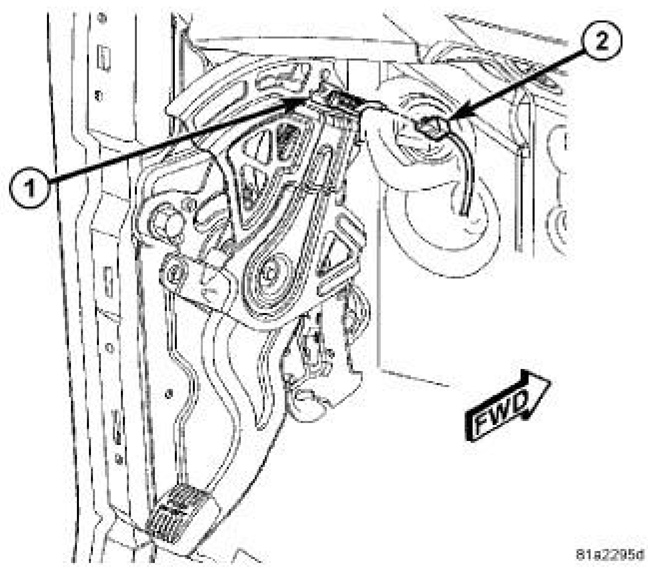


Fig. 152: Parking Brake Switch Connector
Courtesy of CHRYSLER GROUP, LLC

3. Connect wire harness connector (2) at parking brake switch (1).

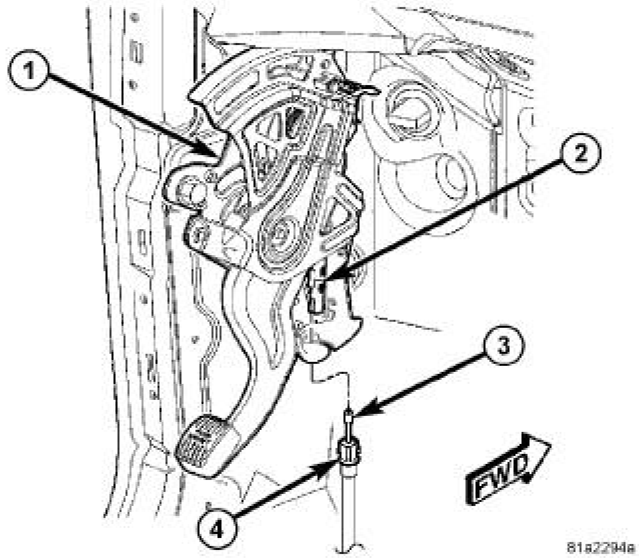


Fig. 153: Front Cable At Lever
Courtesy of CHRYSLER GROUP, LLC

4. Guide cable strand (3) up through lever bracket and press cable housing retainer (4) into bracket allowing retainer fingers to lock cable in place.

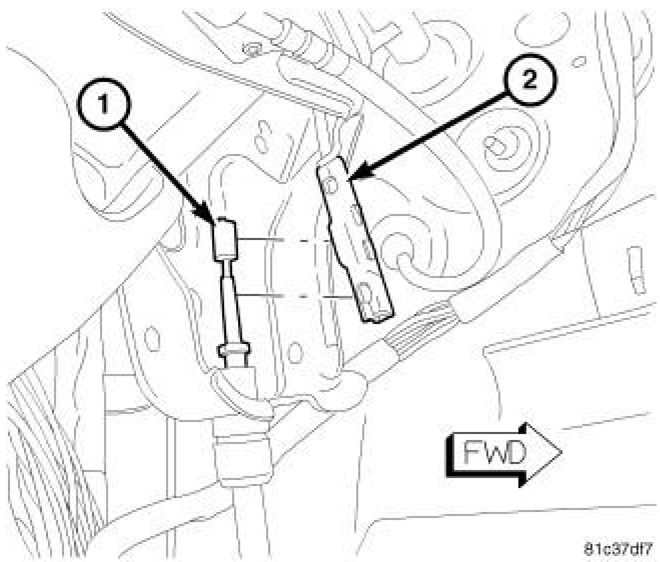
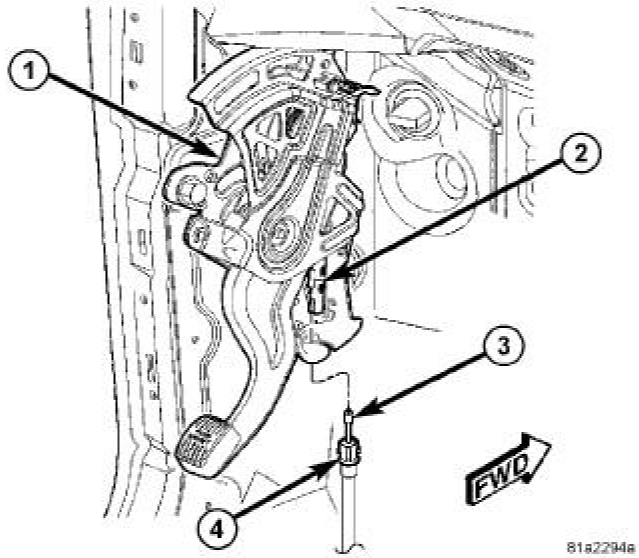


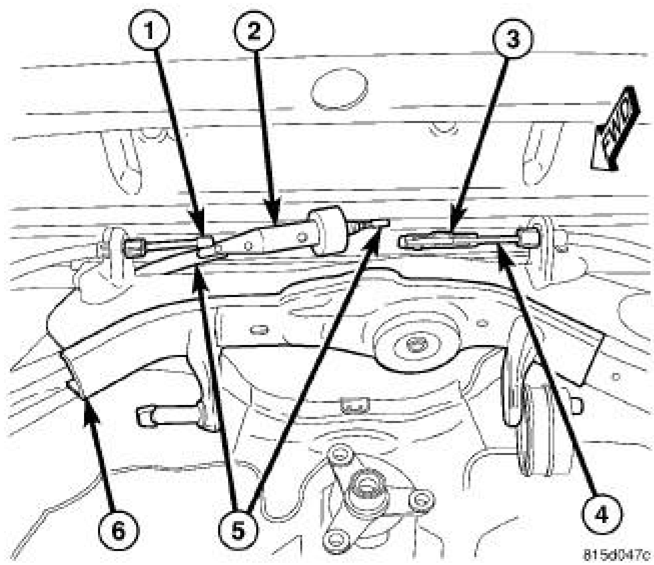
Fig. 154: Front Cable At Lever Connector
Courtesy of CHRYSLER GROUP, LLC

5. If original parking brake lever is being installed:
    a. Connect front parking brake cable strand (1) to cable connector (2) secured in retaining fork.
    b. Once front parking brake cable strand is completely seated in cable connector (2), lift cable connector out of retaining fork using pliers and slowly allow lever mechanism to take up slack in cable.



[Fig. 155: Front Cable At Lever]
Courtesy of CHRYSLER GROUP, LLC

6. If NEW parking brake lever is being installed:
   a. Connect front parking brake cable strand (3) at lever connector (2).
   b. Once front parking brake cable strand is completely seated in cable connector (2), remove pin locking out automatic tensioning spring.
7. Install steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
8. Raise and support the vehicle.



[Fig. 156: Parking Brake Cables At Rear Crossmember]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Due to short travel and low spring tension, it is not necessary to lock-out**

parking brake lever to service parking brake components.

9. Connect front parking brake cable (5) at connector (3) to right rear parking brake cable (4).
10. Remove support and lower the vehicle until rear wheels are just above floor level.
11. Apply parking brake lever. Release lever to test release cable and handle. Reapply lever. While doing this, check to make sure the red indicator lamp in the cluster turns on and off properly.
12. Check to make sure rear wheels will not rotate with lever applied.
13. Release parking brake lever, then check to make sure rear wheels rotate without excessive drag.
14. Apply parking brake lever.
15. Remove support and lower the vehicle.

SHOES, PARKING BRAKE

ADJUSTMENTS

ADJUSTMENTS

While most vehicles require only a fine adjustment of the parking brake shoes, some vehicles may require a preliminary adjustment before a fine adjustment can be made. If a preliminary adjustment must be made, refer to PRELIMINARY ADJUSTMENT following the fine adjustment procedure listed below.

1. Place parking brake lever in "full released" position.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

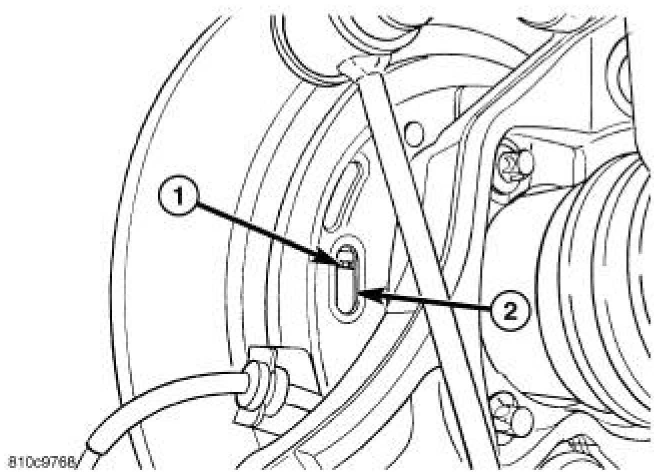


Fig. 157: Access To Shoe Adjuster Star-Wheel
Courtesy of CHRYSLER GROUP, LLC

3. Remove plug in parking brake shoe support to access adjuster star-wheel (1).

NOTE: **Through the access hole (2), rotate the adjuster star wheel (1) in the following direction to expand the shoes outward against the drum.**

- **Left brake - Rotate star-wheel toward rear of vehicle.**
- **Right brake - Rotate star-wheel toward front of vehicle.**

4. Using an appropriate tool, turn adjuster star wheel (1) until wheel will not rotate (dead lock).
5. Back off adjuster six detents (teeth).
6. Rotate wheel, checking for light drag. If drag is too heavy, continue to back off adjuster one detent at a time until light drag is present. **Do not back off star-wheel more than 17 detents from wheel lock.**
7. Install access plug.
8. Adjust opposite wheel parking brake shoes using same method.
9. Remove the support and lower the vehicle.
10. Apply and release parking brake lever once to ensure proper operation of parking brakes.

REMOVAL

REMOVAL

NOTE: **Removal process is the same for both sides of the vehicle.**

NOTE: **Right side shown, left side similar.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove rear hub and bearing. Refer to **HUB AND BEARING, REMOVAL** .

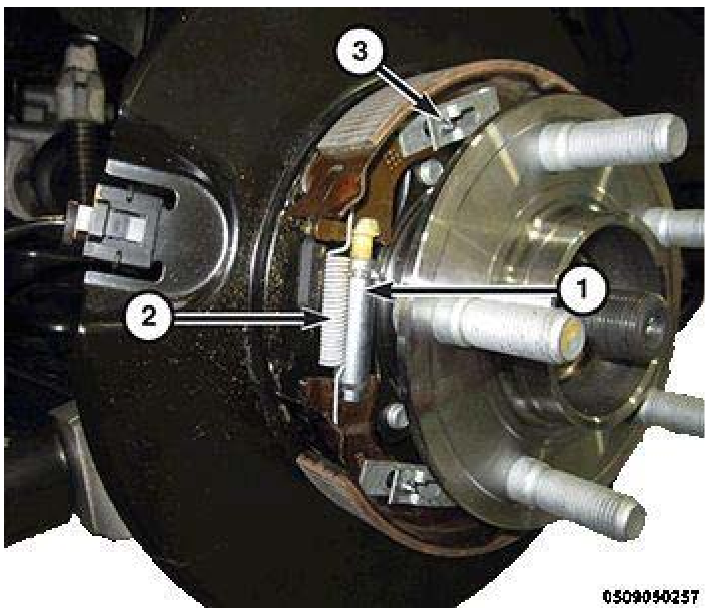


Fig. 158: Parking Brake Shoe Adjustment, Adjuster Spring & Adjuster
Courtesy of CHRYSLER GROUP, LLC

3. Completely back off parking brake shoe adjustment (1).
4. Remove parking brake shoe adjuster spring (2).
5. Remove shoe adjuster (1).
6. Remove upper brake shoe hold-down clip and pin (3).

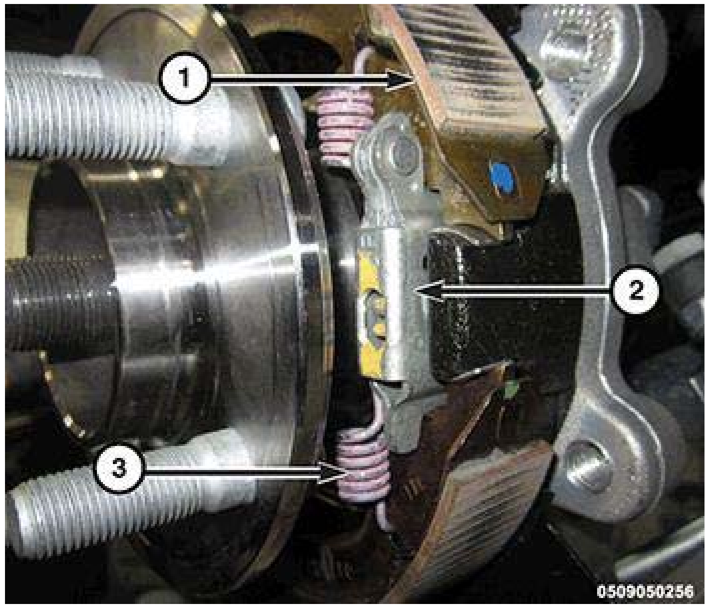


Fig. 159: Upper Shoe, Actuator Lever & Return Spring
Courtesy of CHRYSLER GROUP, LLC

7. Remove upper shoe (1) from return spring (3).
8. Remove return spring (3) from lower shoe.
9. Remove shoe actuator lever (2).
10. Remove lower brake shoe hold-down clip and pin.
11. Remove lower shoe.
12. Inspect springs, adjuster, lever and aluminum shoe anchor pin for wear or damage. Replace as necessary.

INSTALLATION

INSTALLATION

NOTE:	**Installation process is the same for both sides of the vehicle.**
NOTE:	**Right side shown, left side similar.**
NOTE:	**Inspect springs, adjuster, lever and aluminum shoe anchor pin for wear or damage prior to installation. Replace as necessary.**

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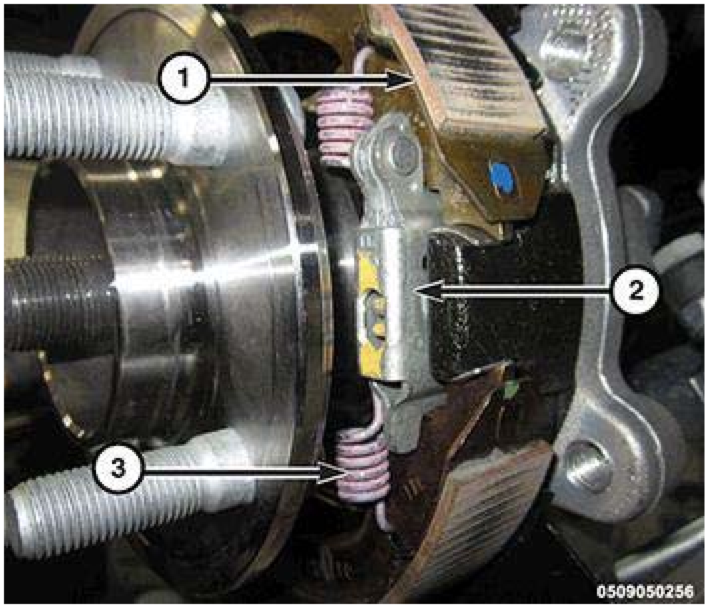


Fig. 160: Upper Shoe, Actuator Lever & Return Spring
Courtesy of CHRYSLER GROUP, LLC

1. Install lower brake shoe hold-down pin through rear of support.
2. Install lower shoe against support plate.
3. Install lower brake shoe hold-down clip.
4. Install shoe actuator lever (2) on end of parking brake cable. Make sure actuator lever is positioned with word "UP" facing outward.
5. Install return spring (3) to lower shoe.
6. Install upper shoe (1) against support plate and onto shoe actuator lever (2).

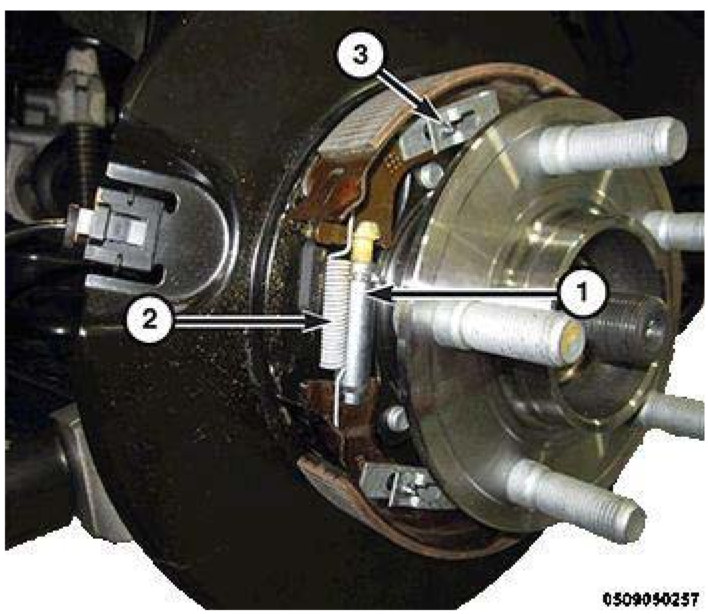


Fig. 161: Parking Brake Shoe Adjustment, Adjuster Spring & Adjuster
Courtesy of CHRYSLER GROUP, LLC

7. Install upper brake shoe hold-down pin (3) through rear of support and upper shoe.

8. Install upper brake shoe hold-down clip.
9. Attach return spring to upper shoe.
10. Install shoe adjuster (1). Place end of adjuster with star wheel upward.
11. Install parking brake shoe adjuster spring (2).

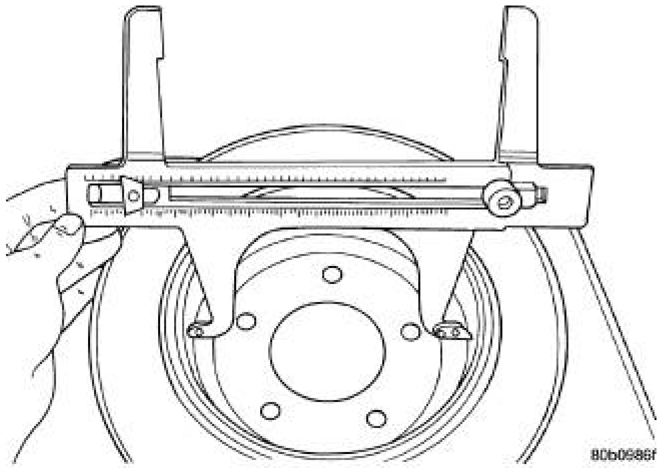


Fig. 162: Measuring Parking Brake Drum Diameter
Courtesy of CHRYSLER GROUP, LLC

12. Using Brake Shoe Gauge, (special tool #C-3919, Gauge, Brake Shoes), or equivalent, measure inside diameter of parking brake drum portion of rotor. Set gauge.

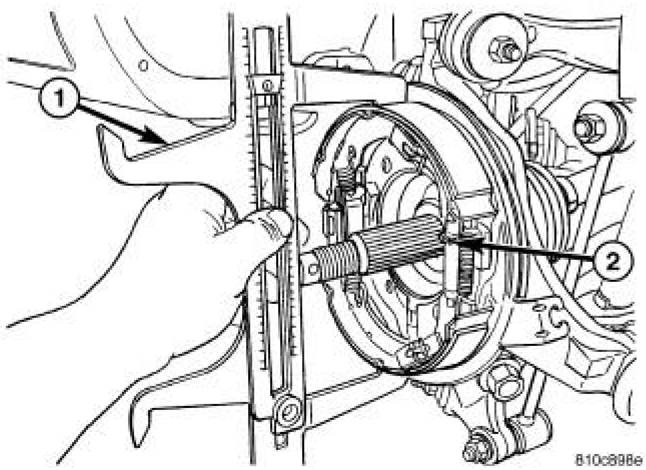


Fig. 163: Measuring Parking Brake Shoes
Courtesy of CHRYSLER GROUP, LLC

13. Place Gauge (1) over parking brake shoes at widest point.
14. Using adjuster star wheel (2), adjust parking brake shoes until linings on both park brake shoes just touch jaws on gauge. This will give a good preliminary adjustment of parking brake shoes, before a final adjustment is made at end of this procedure.
15. Install hub and bearing with wheel speed sensor as well as all components necessary to access it. Refer to **HUB AND BEARING, INSTALLATION** .

16. Remove support and lower the vehicle.
17. Perform final adjustment of parking brake shoes. Refer to **SHOES, PARKING BRAKE, ADJUSTMENTS**.

Article GUID: A00735931

2015-16 ELECTRICAL

Battery System - Service Information - Challenger

DESCRIPTION

DESCRIPTION

This vehicle is equipped with a single 12-volt battery. All of the components of the battery system are located within the trunk compartment of the vehicle. The battery system for this vehicle contains the following components:

- **Battery** - The storage battery provides a reliable means of storing a renewable source of electrical energy within the vehicle.
- **Battery Cables** - The battery cables connect the positive and negative charged battery terminal posts to the vehicle electrical system.
- **Battery Hold-down** - The battery hold-down hardware secures the battery in the battery tray.
- **Battery Tray** - The battery tray provides a secure mounting location in the vehicle for the battery and an anchor point for the battery hold-down hardware.
- **Intelligent Battery Sensor** - The Intelligent Battery Sensor (IBS) serves to record and process measured battery variable values (current, voltage, temperature) for the vehicle powernet management system.

For battery system maintenance schedules, refer to MAINTENANCE SCHEDULES, DESCRIPTION .

OPERATION

OPERATION

The battery system is designed to provide a safe, efficient, reliable and mobile means of delivering and storing electrical energy. This electrical energy is required to operate the engine starting system, as well as to operate many of the other vehicle accessory systems for limited durations while the engine and/or the charging system are not operating. The battery system is also designed to provide a reserve of electrical energy to supplement the charging system for short durations while the engine is running and the electrical current demands of the vehicle exceed the output of the charging system. In addition to delivering, and storing electrical energy for the vehicle, the battery system serves as a capacitor and voltage stabilizer for the vehicle electrical system. It absorbs most abnormal or transient voltages caused by the switching of any of the electrical components or circuits in the vehicle.

DIAGNOSIS AND TESTING

GR8 ELECTRICAL SYSTEM TESTER

The Midtronics GR8 battery system tester is designed to help diagnose the cause of a defective battery. Refer to BATTERY, STANDARD PROCEDURE for directions on using the Midtronics GR8 battery tester.

DIAGNOSIS AND TESTING - BATTERY SYSTEM

The battery, starting, and charging systems in the vehicle operate with one another and must be tested as a

complete system. In order for the engine to start and the battery to maintain its charge properly, all of the components that are used in these systems must perform within specifications. It is important that the battery, starting, and charging systems be thoroughly tested and inspected any time a battery needs to be charged or replaced. The cause of abnormal battery discharge, overcharging or early battery failure must be diagnosed and corrected before a battery is replaced and before a vehicle is returned to service. The service information for these systems has been separated within this service information to make it easier to locate the specific information you are seeking. However, when attempting to diagnose any of these systems, it is important that you keep their interdependency in mind.

The diagnostic procedures used for the battery, starting, and charging systems range from the most basic conventional diagnostic methods, to the more sophisticated On-Board Diagnostics (OBD) built into the Powertrain Control Module (PCM). Use of an induction-type milliampere ammeter, a volt/ohmmeter, a battery charger, a carbon pile rheostat (load tester) and a 12-volt test lamp may be required. All OBD-sensed systems are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for any failure it detects. Refer to **DIAGNOSIS AND TESTING** for the proper charging system on-board diagnostic test procedures.

BATTERY SYSTEM DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
THE BATTERY SEEMS WEAK OR DEAD WHEN ATTEMPTING TO START THE ENGINE.	1. The electrical system ignition-off draw is excessive.	1. Refer to **BATTERY, STANDARD PROCEDURE** for the proper test procedures. Repair the excessive ignition-off draw, as required.
	2. The charging system is inoperative.	2. Determine if the charging system is performing to specifications. Refer to **DIAGNOSIS AND TESTING** . Repair the inoperative charging system, as required.
	3. The battery is discharged.	3. Determine the battery state-of-charge using the Midtronics GR8 battery tester. Refer to **BATTERY, STANDARD PROCEDURE**. Charge the battery as required.
	4. The battery terminal connections are loose or corroded.	4. Refer to **CABLES, BATTERY, DIAGNOSIS AND TESTING**. Clean and tighten the battery terminal connections, as required.
	5. The battery has an incorrect size or rating for this vehicle.	5. Refer to **SPECIFICATIONS** for the proper size and rating. Replace an incorrect battery, as required.
	6. The battery is inoperative.	6. Determine the battery cranking capacity using the Midtronics GR8 battery tester. Refer to **BATTERY, STANDARD PROCEDURE**. Replace the inoperative battery, as required.
	7. The starting system is inoperative.	7. Determine if the starting system is performing to specifications. Refer to **DIAGNOSIS AND TESTING** . Repair the inoperative starting system, as required.

BATTERY SYSTEM DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
	8. The battery is physically damaged.	8. Inspect the battery for loose terminal posts or a cracked and leaking case. Replace the damaged battery, as required.
THE BATTERY STATE OF CHARGE CANNOT BE MAINTAINED.	1. The battery has an incorrect size or rating for this vehicle.	1. Refer to **SPECIFICATIONS** for the proper size and rating. Replace an incorrect battery, as required.
	2. The battery terminal connections are loose or corroded.	2. Refer to **CABLES, BATTERY, DIAGNOSIS AND TESTING**. Clean and tighten the battery terminal connections, as required.
	3. The electrical system ignition-off draw is excessive.	3. Refer to **BATTERY, STANDARD PROCEDURE** for the proper test procedures. Repair the inoperative electrical system, as required.
	4. The battery is inoperative.	4. Test the battery using the Midtronics GR8 battery tester. Refer to **BATTERY, STANDARD PROCEDURE**. Replace the inoperative battery, as required.
	5. The starting system is inoperative.	5. Determine if the starting system is performing to specifications. Refer to **DIAGNOSIS AND TESTING** . Repair the inoperative starting system, as required.
	6. The charging system is inoperative.	6. Determine if the charging system is performing to specifications. Refer to **DIAGNOSIS AND TESTING** . Repair the inoperative charging system, as required.
	7. Electrical loads exceed the output of the charging system.	7. Inspect the vehicle for aftermarket electrical equipment which might cause excessive electrical loads.
	8. Slow driving or prolonged idling with high-amperage draw systems in use.	8. Advise the vehicle operator, as required.
THE BATTERY WILL NOT ACCEPT A CHARGE.	1. The battery is inoperative.	1. Test the battery using the Midtronics GR8 battery tester. Refer to **BATTERY, STANDARD PROCEDURE**. Replace the inoperative battery, as required.

SPECIFICATIONS

SPECIFICATIONS

The battery Group Size number, the Cold Cranking Amperage (CCA) rating, and the Reserve Capacity (RC) rating, or Ampere-Hours (AH) rating, can be found on the original equipment battery label. Be certain that a

replacement battery has the correct Group Size number, as well as CCA, and RC or AH ratings that equal or exceed the original equipment specification for the vehicle being serviced. Battery sizes and ratings are discussed in more detail below.

- **Group Size** - The outside dimensions and terminal placement of the battery conform to standards established by the Battery Council International (BCI). Each battery is assigned a BCI Group Size number to help identify a correct -sized replacement.
- **Cold Cranking Amperage** - The Cold Cranking Amperage (CCA) rating specifies how much current (in amperes) the battery can deliver for 30 seconds at -18Â° C (0Â° F). Terminal voltage must not fall below 7.2 volts during or after the 30 second discharge period. The CCA required is generally higher as engine displacement increases, depending upon the starter current draw requirements.
- **Reserve Capacity** - The Reserve Capacity (RC) rating specifies the time (in minutes) it takes for battery terminal voltage to fall below 10.5 volts, at a discharge rate of 25 amperes. RC is determined with the battery fully-charged at 26.7Â° C (80Â° F). This rating estimates how long the battery might last after a charging system failure, under minimum electrical load.
- **Ampere-Hours** - The Ampere-Hours (AH) rating specifies the current (in amperes) that a battery can deliver steadily for 20 hours, with the voltage in the battery not falling below 10.5 volts. This rating is sometimes identified as the 20-hour discharge rating.

BATTERY CLASSIFICATIONS AND RATINGS				
BCI Group Size Classification	**Cold Cranking Amperage**	**Reserve Capacity**	**Ampere - Hours**	**Load Test Amperage**
H7	730	140 Minutes	80	365

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Battery Terminal Clamp Pinch-Bolt Hex Nut	5	-	45	Â
Negative Battery Cable Remote Terminal Nut	16.5	-	145	Â
Positive Battery Cable Remote Terminal Nut	16.5	-	145	Â
Battery Hold Down Bolt	16	-	142	Â
Starter Solenoid B(+) Terminal Stud Nut	13	-	115	Â
Battery Negative Cable Ground Eyelet Terminal To Engine Block Bolt	16.5	-	145	Â
PDC B(+) Terminal Stud Nut	10	-	90	Â
Battery Tray Support Bolt	16	-	142	Â
Battery Tray Bolt	16	-	142	Â
Intelligent Battery Sensor Ground Terminal	M8 15	Â	133	Â

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Intelligent Battery Sensor Pole Clamp	7	Ā	53	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

CLEANING

CLEANING

The following information details the recommended cleaning procedures for the battery and related components. In addition to the maintenance schedules found in this service information , it is recommended that these procedures be performed any time the battery or related components must be removed for vehicle service. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .

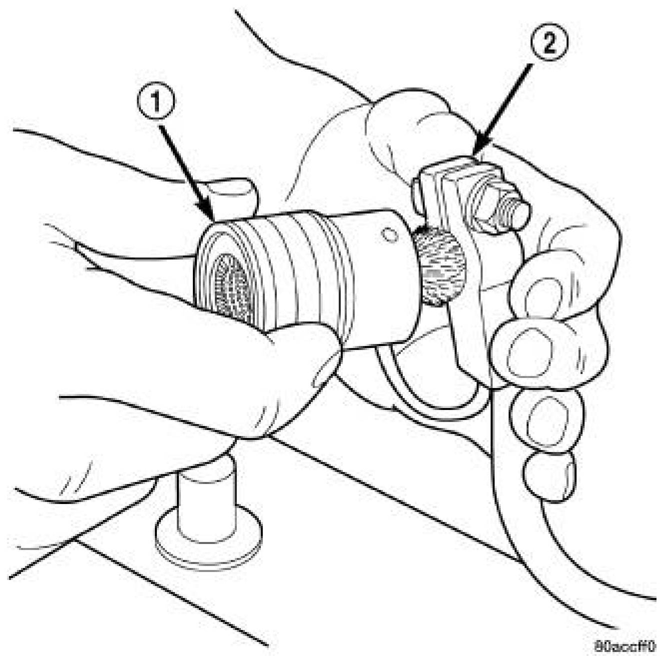


Fig. 1: Cleaning Battery Cable Terminal Clamps
Courtesy of CHRYSLER GROUP, LLC

1. Clean the battery cable terminal clamps (2) of all corrosion. Remove any corrosion using a wire brush or cleaning tool (1), and a sodium bicarbonate (baking soda) and warm water cleaning solution.
2. Clean the battery tray and battery hold-down hardware using a stiff bristle parts cleaning brush and a sodium bicarbonate (baking soda) and warm water cleaning solution.

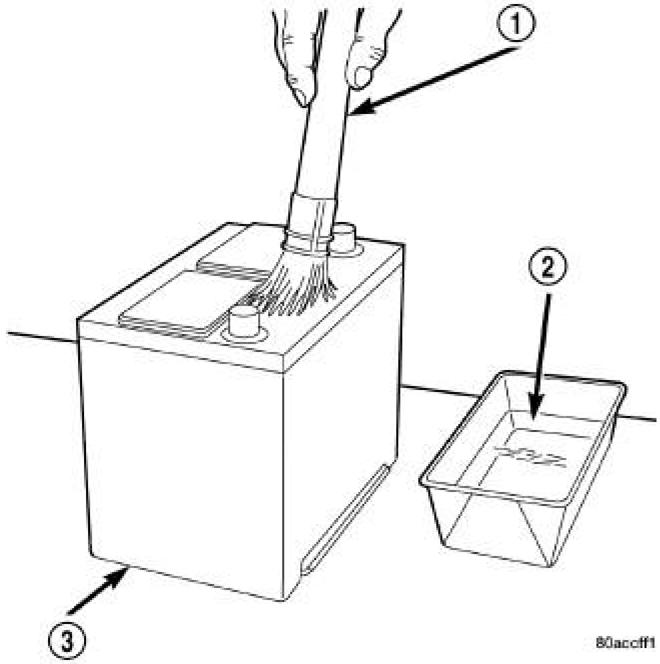


Fig. 2: Cleaning Outside Of Battery Case
Courtesy of CHRYSLER GROUP, LLC

3. If the removed battery is to be reinstalled, clean the outside of the battery case and the top cover (3) with a sodium bicarbonate (baking soda) and warm water cleaning solution (2) using a stiff bristle parts cleaning brush (1) to remove any acid film. Rinse the battery with clean water. Ensure that the cleaning solution does not enter the battery cells through the vent holes. If the battery is being replaced, refer to **SPECIFICATIONS** for the factory-installed battery specifications. Confirm that the replacement battery is the correct size and has the correct ratings for the vehicle.

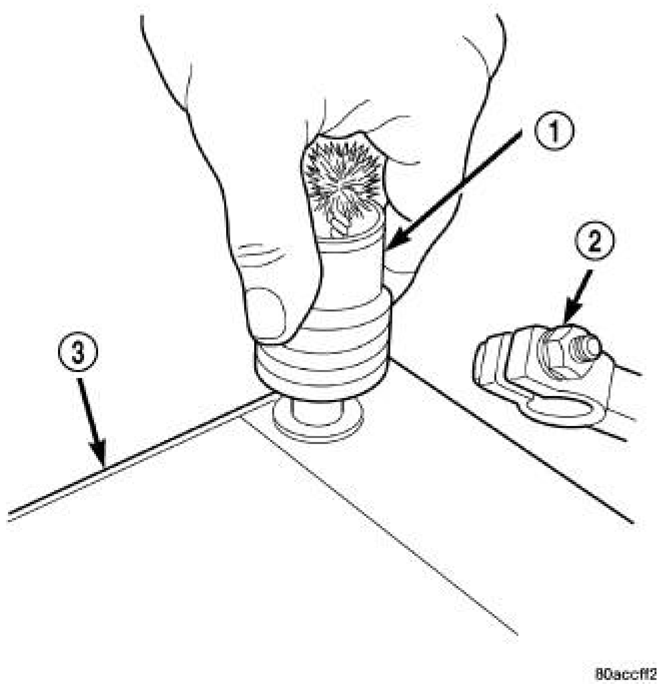


Fig. 3: Cleaning Battery Terminal Post Using Terminal Cleaner
Courtesy of CHRYSLER GROUP, LLC

4. Clean any corrosion from the battery terminals with a wire brush or terminal cleaner (1), and a sodium bicarbonate (baking soda) and warm water cleaning solution.

INSPECTION

INSPECTION

The following information details the recommended inspection procedures for the battery and related components. In addition to the maintenance schedules, it is recommended that these procedures be performed any time the battery or related components are removed for vehicle service. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .

1. Inspect the battery cable terminal clamps for damage. Replace any battery cable that has a damaged or deformed terminal clamp.
2. Inspect the battery tray and battery hold down hardware for damage. Replace any damaged parts.
3. Slide the thermal guard off of the battery case, if equipped. Inspect the battery case for cracks or other damage that could result in electrolyte leaks. Also, check the battery terminal posts for looseness. Batteries with damaged cases or loose terminal posts must be replaced.
4. Inspect the battery thermal guard for tears, cracks, deformation or other damage. Replace any battery thermal guard that has been damaged.
5. Inspect the battery built-in test indicator sight glass (if equipped) for an indication of the battery condition. If the battery is discharged, charge as required. Refer to **BATTERY, STANDARD PROCEDURE**.

BATTERY

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - BATTERY

WARNING: IF THE BATTERY SHOWS SIGNS OF FREEZING, LEAKING OR LOOSE POSTS, DO NOT TEST, ASSIST-BOOST, OR CHARGE. THE BATTERY MAY ARC INTERNALLY AND EXPLODE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

WARNING: EXPLOSIVE HYDROGEN GAS FORMS IN AND AROUND THE BATTERY. DO NOT SMOKE, USE FLAME, OR CREATE SPARKS NEAR THE BATTERY. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

WARNING: THE BATTERY CONTAINS SULFURIC ACID, WHICH IS POISONOUS AND CAUSTIC. AVOID CONTACT WITH THE SKIN, EYES, OR CLOTHING. IN THE EVENT OF CONTACT, FLUSH WITH WATER AND CALL A PHYSICIAN IMMEDIATELY. KEEP OUT OF THE REACH OF CHILDREN.

A battery that will not accept a charge is inoperative, and must be replaced. Further testing is not required. A fully-charged battery must be load tested to determine its cranking capacity. A battery that is fully-charged, but does not pass the load test, is inoperative and must be replaced.

NOTE: **Completely discharged batteries may take several hours to accept a charge. Refer to BATTERY, STANDARD PROCEDURE for the proper battery charging procedures.**

MIDTRONICS GR8 BATTERY TESTER

The Midtronics GR8 battery tester is designed to help diagnose the cause of an inoperative battery. Refer to **BATTERY, STANDARD PROCEDURE** for instructions on the use of the Midtronics GR8 battery tester.

STANDARD PROCEDURE

BATTERY CHARGING

Battery charging is the means by which the battery can be restored to its full voltage potential. A battery is fully-charged when:

- Midtronics (special tool #GR8-1220KIT-CHRY, AGM Battery Tester/Charger Station) tester indicates battery is OK.
- All of the battery cells are gassing freely during battery charging.
- Open-circuit voltage of the battery is 12.65 volts or above.

WARNING: **Never exceed twenty amperes when charging a cold (-1Â° C [30Â° F] or lower) battery. The battery may arc internally and explode. Personal injury and/or vehicle damage may result.**

WARNING: **If the battery shows signs of freezing, leaking, loose posts, do not test, assist-boost, or charge. The battery may arc internally and explode. Personal injury and/or vehicle damage may result.**

WARNING: **EXPLOSIVE HYDROGEN GAS FORMS IN AND AROUND THE BATTERY. DO NOT SMOKE, USE FLAME, OR CREATE SPARKS NEAR THE BATTERY. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.**

WARNING: **THE BATTERY CONTAINS SULFURIC ACID, WHICH IS POISONOUS AND CAUSTIC. AVOID CONTACT WITH THE SKIN, EYES, OR CLOTHING. IN THE EVENT OF CONTACT, FLUSH WITH WATER AND CALL A PHYSICIAN IMMEDIATELY. KEEP OUT OF THE REACH OF CHILDREN.**

CAUTION: **Always disconnect and isolate the battery negative cable before charging a battery. Do not exceed sixteen volts while charging a battery. Damage to the vehicle electrical system components may result.**

CAUTION: **Battery electrolyte will bubble inside the battery case during normal battery charging. Electrolyte boiling or being discharged from the battery vents indicates a battery overcharging condition. Immediately reduce the charging rate or turn off the charger to evaluate the battery condition. Damage to the battery may result from overcharging.**

After the battery has been charged to 12.65 volts or greater, perform a load test to determine the battery

cranking capacity. Refer to **BATTERY, STANDARD PROCEDURE** for the proper battery load test procedures. If the battery will endure a load test, return the battery to service. If the battery will not endure a load test, it is inoperative and must be replaced.

Clean and inspect the battery hold-down, tray, terminals, posts, and top before completing battery service. Refer to **CLEANING** and **INSPECTION** for the proper battery system cleaning and inspection procedures.

CHARGING A COMPLETELY DISCHARGED BATTERY

The following procedure should be used to recharge a completely discharged battery. Unless this procedure is properly followed, a good battery may be needlessly replaced.

1. Measure the voltage at the battery posts with a voltmeter, accurate to 1/10 (0.10) volt. If the reading is below ten volts, the battery charging current will be low. It could take some time before the battery accepts a current greater than a few milliamperes. Such low current may not be detectable on the ammeters built into many battery chargers.
2. Disconnect and isolate the battery negative cable. Connect the Midtronics (special tool #GR8-1220KIT-CHRY, AGM Battery Tester/Charger Station).

NOTE: **Some battery chargers are equipped with polarity-sensing circuitry. This circuitry protects the battery charger and the battery from being damaged if they are improperly connected. If the battery state-of-charge is too low for the polarity-sensing circuitry to detect, the battery charger will not operate. This makes it appear that the battery will not accept charging current. See the instructions provided by the manufacturer of the battery charger for details on how to bypass the polarity-sensing circuitry.**

3. Battery chargers vary in the amount of voltage and current they provide. The amount of time required for a battery to accept measurable charging current at various voltages is shown in **CHARGE RATE TABLE** . If the charging current is still not measurable at the end of the charging time, the battery is inoperative and must be replaced. If the charging current is measurable during the charging time, the battery may be good and the charging should be completed in the normal manner.

CHARGE RATE TABLE

CHARGE RATE TABLE	
Voltage	**Hours**
16.0 volts maximum	up to 4 hours
14.0 to 15.9 volts	up to 8 hours
13.9 volts or less	up to 16 hours

CHARGING TIME REQUIRED

The time required to charge a battery will vary, depending upon the following factors:

- **Battery Capacity** - A completely discharged heavy-duty battery requires twice the charging time of a small capacity battery.
- **Temperature** - A longer time will be needed to charge a battery at -18Â° C (0Â° F) than at 27Â° C (80Â° F). When a fast battery charger is connected to a cold battery, the current accepted by the battery will be very low at first. As the battery warms, it will accept a higher charging current rate (amperage).

- **Charger Capacity** - A battery charger that supplies only five amperes will require a longer charging time. A battery charger that supplies twenty amperes or more will require a shorter charging time.
- **State-Of-Charge** - A completely discharged battery requires more charging time than a partially discharged battery. The specific gravity is very low in a completely discharged battery. At first, the charging current (amperage) will be low. As the battery charges, the specific gravity of the electrolyte will gradually rise.

The Battery Charging Time Table gives an indication of the time required to charge a typical battery at room temperature based upon the battery state-of-charge and the charger capacity.

BATTERY CHARGING TIME TABLE

BATTERY CHARGING TIME TABLE			
Charging Amperage	**5 Amps**	**10 Amps**	**20 Amps**
Open Circuit Voltage	**Hours Charging @ 21Ā° C (70Ā° F)**		
12.25 to 12.49	6 hours	3 hours	1.5 hours
12.00 to 12.24	10 hours	5 hours	2.5 hours
10.00 to 11.99	14 hours	7 hours	3.5 hours
Below 10.00	18 hours	9 hours	4.5 hours

GR8 BATTERY TESTER / CHARGER

Always use the Midtronics GR8 Instruction Manual that was supplied with the tester as a reference. If the Instruction Manual is not available the following procedure can be used:

WARNING: Always wear appropriate eye protection and use extreme caution when working with batteries.

BATTERY TESTING

1. If testing the battery OUT-OF-VEHICLE, clean the battery terminals with a wire brush before testing. Refer to **CLEANING**. If the battery is equipped with side post terminals, install and tighten the supplied lead terminal stud adapters. Do not use steel bolts. Failure to properly install the stud adapters, or using stud adapters that are dirty or worn-out may result in false test readings.
2. If testing the battery IN-THE-VEHICLE, make certain all of the vehicle accessory loads are OFF, including the ignition. Connect the Midtronics GR8 directly to the battery posts.

NOTE: Multiple batteries connected in parallel must have the ground cable disconnected to perform a battery test. Failure to disconnect may result in false battery test readings.

3. Using the ARROW key select **in** or **out** of vehicle testing and press ENTER to make a selection.
4. If not selected, choose the Cold Cranking Amp (CCA) battery rating. Or select the appropriate battery rating for your area (see menu). The tester will then run its self programmed test of the battery and display the results. Refer to the test result table noted below.
5. While viewing the battery test result, press the CODE button and the tester will prompt you for the last 4 digits of the VIN. Use the UP/DOWN arrow buttons to scroll to the correct character; then press ENTER to select and move to the next digit. Then press the ENTER button to view the SERVICE CODE.

Pressing the CODE button a second time will return you to the test results.

NOTE: **The SERVICE CODE is required on every warranty claim submitted for battery replacement.**

QUICK REFERENCE GUIDE

Inspect the battery for damages and check the electrolyte level. Always use the necessary safety precautions when working with batteries to prevent severe injury or death. Follow all manufacturers' instructions and BCI (Battery Council International) safety recommendations, which include the following precautions:

MAIN MENU

The Main Menu is the starting point for all tools and utilities, which are depicted as icons. Some icons lead directly to the function they represent, while others are menu icons that lead to two or more options.

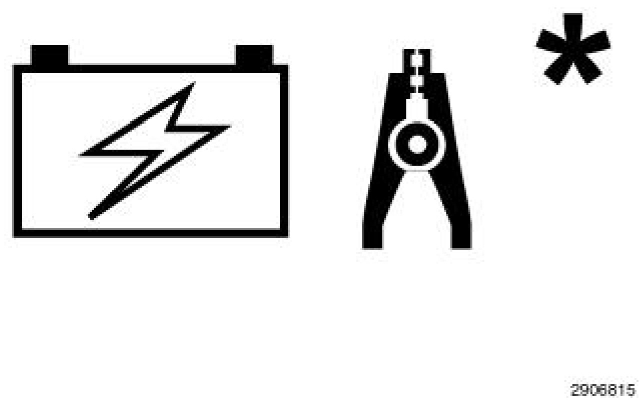
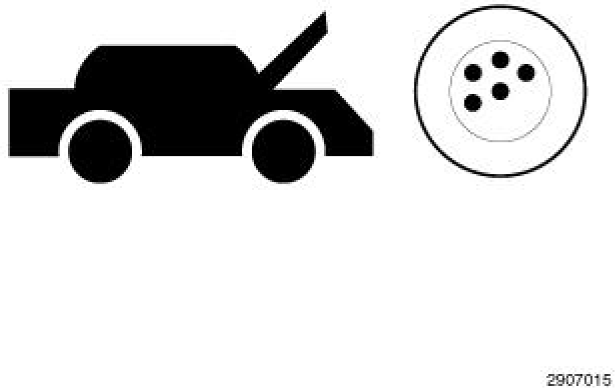


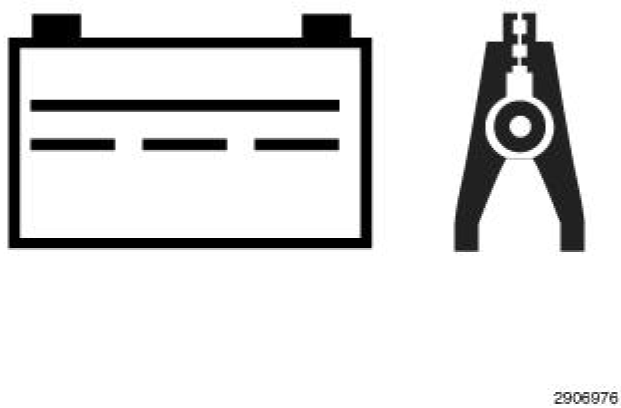
Fig. 4: Battery Tester Main Menu Icon 1
Courtesy of CHRYSLER GROUP, LLC

Automatically tests, charges, and provides battery decision using the information you select in a series of screens. Start here to generate warranty codes.



[Fig. 5: Battery Tester Main Menu Icon 2]
Courtesy of CHRYSLER GROUP, LLC

Tests the starting and charging systems.



[Fig. 6: Battery Tester Main Menu Icon 3]
Courtesy of CHRYSLER GROUP, LLC

Maintains battery voltage at 13.5 volts to provide uninterrupted reprogramming of ECUs and retain vehicle system settings.

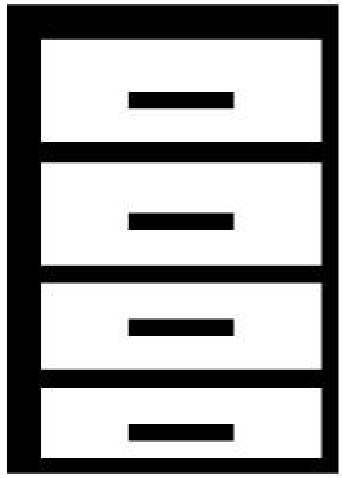


Fig. 7: Battery Tester Main Menu Icon 4
Courtesy of CHRYSLER GROUP, LLC

Includes a utility to view and print a test counter, a data transfer utility, the software version and date, the GR8 serial number for the control module, and current wireless channel.

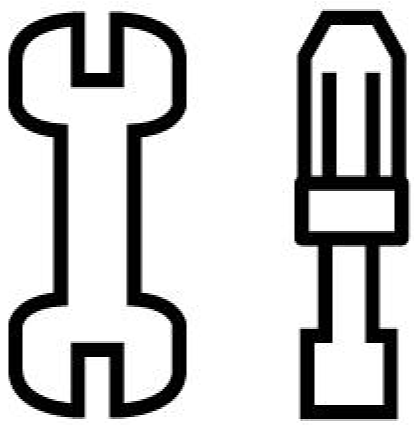


Fig. 8: Battery Tester Main Menu Icon 5
Courtesy of CHRYSLER GROUP, LLC

The Setup Menu lets you customize options in the GR8 to suit your needs.

Fig. 9: Battery Tester Main Menu Icon 6
Courtesy of CHRYSLER GROUP, LLC

Provides a list of topics and definitions. Also includes Midtronics Customer Service phone numbers.

CHARGE/TEST MENU

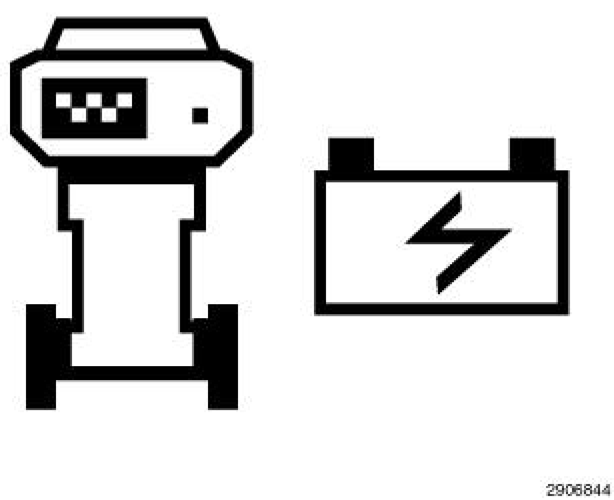


Fig. 10: Charge/Test Menu Icon 1
Courtesy of CHRYSLER GROUP, LLC

Automatically tests and charges battery, starting, and charging system. Generates a warranty code for Replace and Bad Cell decisions.

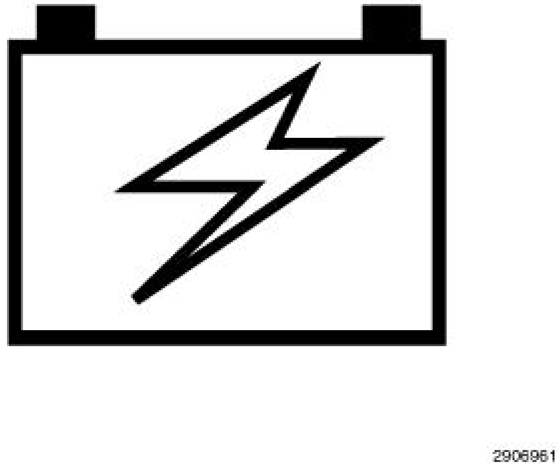


Fig. 11: Charge/Test Menu Icon 2
Courtesy of CHRYSLER GROUP, LLC

Pre Delivery Inspection (PDI): For testing delivered vehicles and lot maintenance. Uses the same inputs as a diagnostic charge.

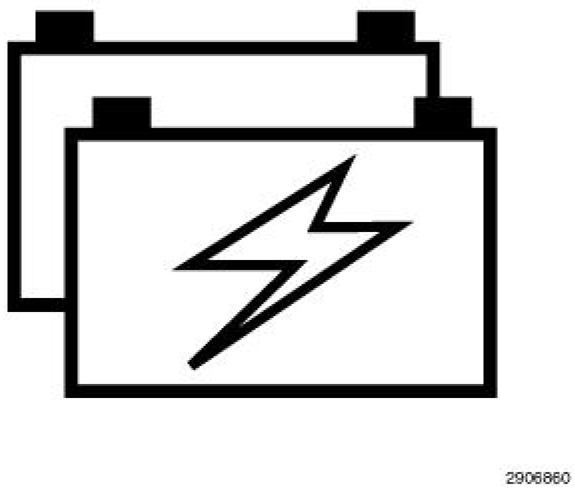


Fig. 12: Charge/Test Menu Icon 3
Courtesy of CHRYSLER GROUP, LLC

Dual Battery Charge mode allows the charger to be used with dual battery systems.

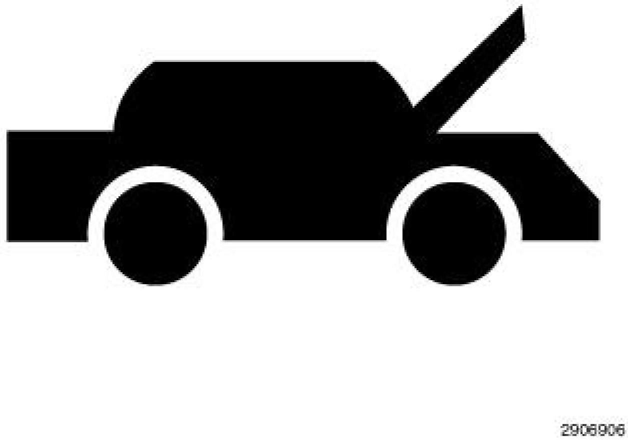


Fig. 13: Charge/Test Menu Icon 4
Courtesy of CHRYSLER GROUP, LLC

Makes high output current available to boost charge an in-vehicle battery and assist in starting the engine.

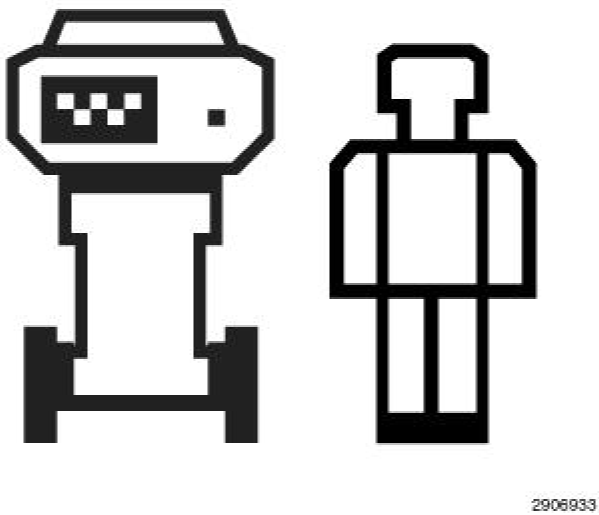


Fig. 14: Charge/Test Menu Icon 5
Courtesy of CHRYSLER GROUP, LLC

Provides a timed charge that ranges from 5 to 120 minutes or a continuous charge that ends when you press the STOP key.

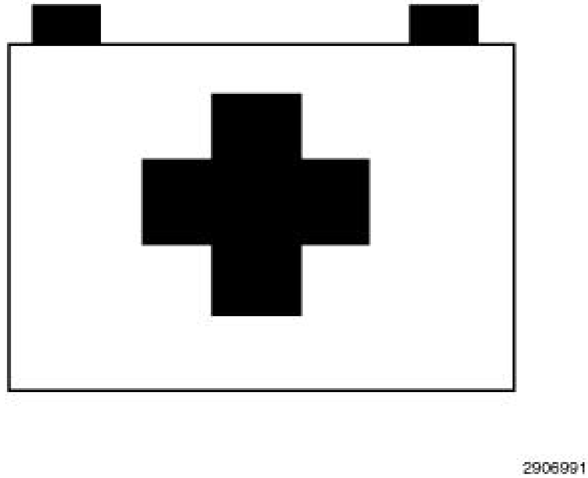
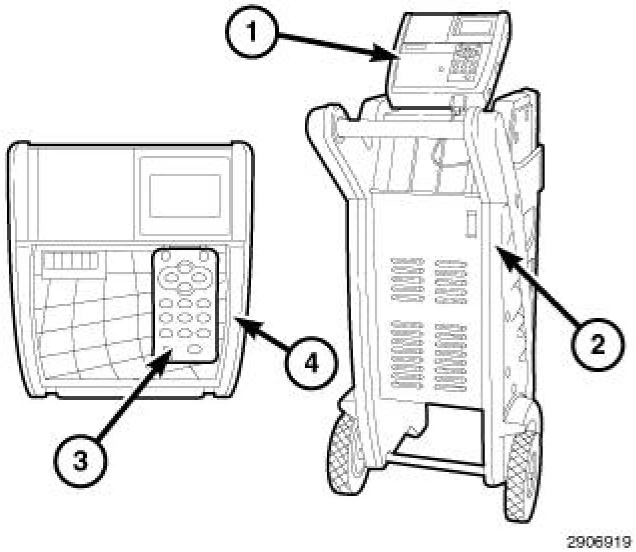


Fig. 15: Charge/Test Menu Icon 6
Courtesy of CHRYSLER GROUP, LLC

In this mode the charger can provide a trickle charge for long term, low amp battery charging.

Fig. 16: Charge/Test Menu Icon 7
Courtesy of CHRYSLER GROUP, LLC

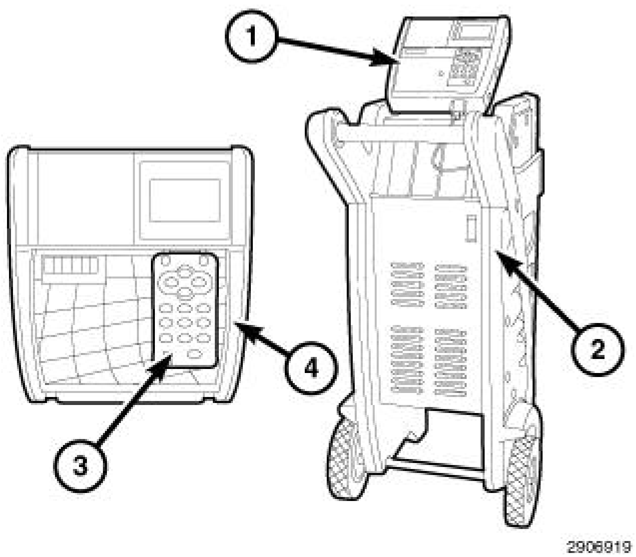
Generates 15-digit warranty codes for physically defective batteries or customer good will.



[Fig. 17: GR8 Battery Tester]
Courtesy of CHRYSLER GROUP, LLC

1. **Control module:** Backlit graphical display and keypad for data entry.
2. **ON/OFF switch:** ON/OFF switch Turns power on and off to the GR8.
3. **STATUS light:** Lights in conjunction with beeping alarm to indicate transitions and warnings.
4. **Data card slot:** For future upgrades via a data card. The slot contains a plastic filler card for protection.

GR8 BATTERY TESTER



[Fig. 18: GR8 Battery Tester]
Courtesy of CHRYSLER GROUP, LLC

1. **Control module:** Backlit graphical display and keypad for data entry.
2. **ON/OFF switch:** ON/OFF switch Turns power on and off to the GR8.
3. **STATUS light:** Lights in conjunction with beeping alarm to indicate transitions and warnings.
4. **Data card slot:** For future upgrades via a data card. The slot contains a plastic filler card for protection.

REPLACE BATTERY DECISIONS

BATTERY DECISIONS

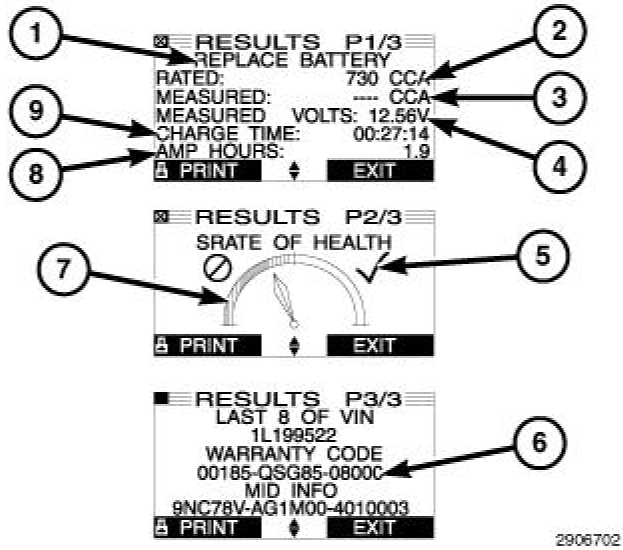


Fig. 19: Battery Test Screen - Example
Courtesy of CHRYSLER GROUP, LLC

1. Battery Decisions
2. Select Rating
3. Measured capacity
4. Measured voltage
5. Good Range

> **NOTE:** **The warranty code screen will only be displayed for REPLACE BATTERY and BAD CELL-REPLACE decisions.**

6. Enter this number into scan tool
7. Replace range
8. Replaced AMP Hours
9. Charging Time

TEST RESULTS-CHARGING SYSTEM

A REPLACE BATTERY or BAD CELL-REPLACE decision gives you the option of generating a warranty code. Enter that warranty code into your scan tool in the Midtronics warranty code validation routine.

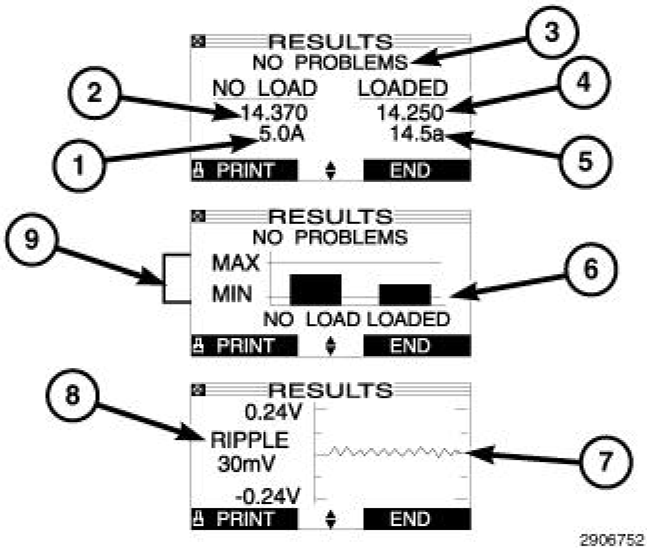


Fig. 20: Battery Tester Test Results Screen - Example
Courtesy of CHRYSLER GROUP, LLC

1. Loads-off current at rev if amp clamp is used
2. Loads-off DC voltage at rev
3. Decision
4. Loads-on DC voltage at rev
5. Loads-on current at rev if amp clamp is used
6. Bar graph of DC voltage within normal range (loads on and off)
7. Graph of diode waveform
8. Peak-to-peak AC voltage
9. Normal DC voltage range

TEST RESULTS-STARTER SYSTEM

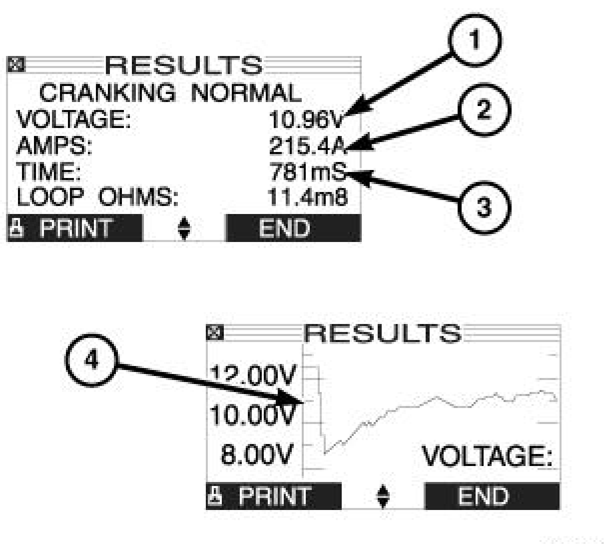


Fig. 21: Test Results-Starter System Example
Courtesy of CHRYSLER GROUP, LLC

1. Average cranking voltage
2. Average cranking current if amp clamp is used
3. Cranking time in seconds
4. Y axis = System performance: cranking voltage

IGNITION-OFF DRAW TEST

The term Ignition-Off Draw (IOD) identifies a normal condition where power is being drained from the battery with the ignition in the Off position. A normal vehicle electrical system will draw from five to thirty-five milliamperes (0.005 to 0.035 ampere) with the ignition switch in the Off position, and all non-ignition controlled circuits in proper working order. Up to thirty-five milliamperes are needed to enable the memory functions for the Powertrain Control Module (PCM), digital clock, electronically tuned radio, and other modules which may vary with the vehicle equipment.

A vehicle that has not been operated for approximately twenty days, may discharge the battery to an inadequate level. When a vehicle will not be used for twenty days or more (stored), use the scan tool to put the vehicle in shipping mode. This will reduce battery discharging.

Excessive IOD can be caused by:

- Electrical items left on.
- Inoperative or improperly adjusted switches.
- Inoperative or shorted electronic modules and components.
- An internally shorted generator.
- Intermittent shorts in the wiring.

If the IOD is over thirty-five milliamperes, the problem must be found and corrected before replacing a battery. In most cases, the battery can be charged and returned to service after the excessive IOD condition has been corrected.

1. Verify that all electrical accessories are off. Turn off all lamps, turn the ignition off, and close all doors. If the vehicle is equipped with an illuminated entry system or an electronically tuned radio, allow the electronic timer function of these systems to automatically shut off (time out). This may take up to ten minutes. See ELECTRONIC MODULE IGNITION-OFF DRAW TABLE for more information.

ELECTRONIC MODULE IGNITION-OFF DRAW TABLE

ELECTRONIC MODULE IGNITION-OFF DRAW (IOD) TABLE			
Module	**Time Out? (If Yes, Interval And Wake-Up Input)**	**IOD**	**IOD After Time Out**
Radio	No	1 to 3 milliamperes	N/A
Audio Power Amplifier	No	up to 1 milliampere	N/A
Powertrain Control Module (PCM)	No	0.95 milliampere	N/A

2. Determine that the underhood lamp is operating properly, then disconnect the lamp wire harness connector or remove the lamp bulb.

3. Turn off all electrical accessories.
4. If connected, disconnect the scan tool. The scan tool can wake the modules on the vehicles or not allow them to sleep.
5. Connect a 10 gauge jumper wire between the negative battery cable and the negative battery post.
6. Disconnect the negative battery cable.

NOTE: Do not break the connection between the 10 amp jumper wire and the battery. If the connection between the battery negative terminal post and the negative cable terminal clamp is lost during any part of the IOD test, the electronic timer function will be activated and all of the tests will have to be repeated.

CAUTION: Do not open any doors, or turn on any electrical accessories with the lowest milliampere scale selected, or the multi-meter may be damaged.

7. Turn the ignition ON and then OFF and wait 10 minutes for all systems to enter sleep mode.
8. Set an electronic digital multi-meter to its highest amperage scale. Connect the multi-meter to the battery negative cable terminal clamp and the battery negative terminal post, but not on the jumper connection.
9. Remove the 10 gauge jumper wire without breaking the digital multi-meter connection.
10. The multi-meter leads must be securely clamped to the battery negative cable terminal clamp and the battery negative terminal post, but not the 10 gauge jumper wire.
11. The high-amperage IOD reading on the multi-meter should be very low or nonexistent, depending upon the electrical equipment in the vehicle. If the amperage reading remains high, remove and replace each fuse or circuit breaker in the PDC, one at a time until the amperage reading becomes very low, or nonexistent. Refer to the appropriate wiring information for complete PDC, circuit breaker, and circuit identification. This will isolate each circuit and identify the circuit that is the source of the high-amperage IOD. If the amperage reading remains high after removing and replacing each fuse, disconnect the wire harness from the generator. If the amperage reading now becomes very low or nonexistent, diagnose and repair the Charging System as necessary. After the high-amperage IOD has been corrected, switch the multi-meter to progressively lower amperage scales and, if necessary, repeat the fuse and circuit breaker remove-and-replace process to identify and correct all sources of excessive IOD. It is now safe to select the lowest milliampere scale of the multi-meter to check the low-amperage IOD.
12. Observe the multi-meter reading. The low-amperage IOD should not exceed thirty-five milliamperes (0.035 ampere). If the current draw exceeds thirty-five milliamperes, isolate each circuit using the fuse and circuit breaker remove and replace process in Step 10. The multi-meter reading will drop to within the acceptable limit when the source of the excessive current draw is disconnected. Repair this circuit as required; whether a wiring short, incorrect switch adjustment, or an inoperative component is the cause.

OPEN-CIRCUIT VOLTAGE TEST

A battery open-circuit voltage (no load) test will show the approximate state-of-charge of a battery.

Before proceeding with this test, completely charge the battery, refer to the appropriate battery charging procedure.

1. Before measuring the open-circuit voltage, the surface charge must be removed from the battery. Turn on the headlamps for fifteen seconds, then allow up to five minutes for the battery voltage to stabilize.

2. Disconnect and isolate both battery cables, negative cable first.
3. Using a voltmeter connected to the battery posts (see the instructions provided by the manufacturer of the voltmeter), measure the open-circuit voltage.

See **OPEN-CIRCUIT VOLTAGE TABLE** . This voltage reading will indicate the battery state-of-charge, but will not reveal its cranking capacity. If a battery has an open-circuit voltage reading of 12.4 volts or greater, it may be load tested to reveal its cranking capacity.

OPEN-CIRCUIT VOLTAGE TABLE

OPEN CIRCUIT VOLTAGE TABLE	
Open Circuit Voltage	**Charge Percentage**
11.7 volts or less	0%
12.0 volts	25%
12.2 volts	50%
12.4 volts	75%
12.6 volts or more	100%

REMOVAL

REMOVAL

WARNING: A SUITABLE PAIR OF HEAVY DUTY RUBBER GLOVES AND SAFETY GLASSES SHOULD BE WORN WHEN REMOVING OR SERVICING A BATTERY.

WARNING: Remove metallic jewelry to avoid injury by accidental arcing of battery current.

1. Make sure ignition switch is in OFF position and all accessories are turned OFF.
2. Remove the rear compartment floor, trim panel to gain access to the battery.
3. Disconnect and isolate negative battery cable with Intelligent Battery Sensor (IBS). Refer to **SENSOR, INTELLIGENT BATTERY (IBS), REMOVAL**.
4. Disconnect the battery positive cable from the battery terminal.
5. Unlatch the battery retention strap.

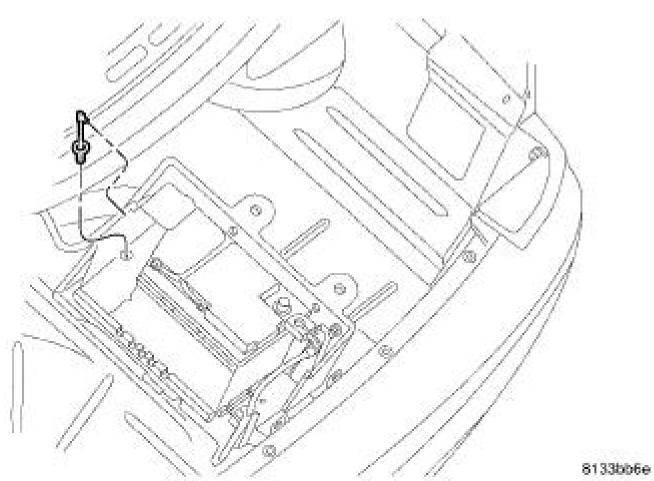


Fig. 22: Battery Vent Tube

Courtesy of CHRYSLER GROUP, LLC

CAUTION: Use care when disconnecting the battery vent tube from the battery. The vent tube nipple is made of plastic and is easily damaged if not disconnected properly.

6. Gently disconnect the battery vent tube from the battery nipple.

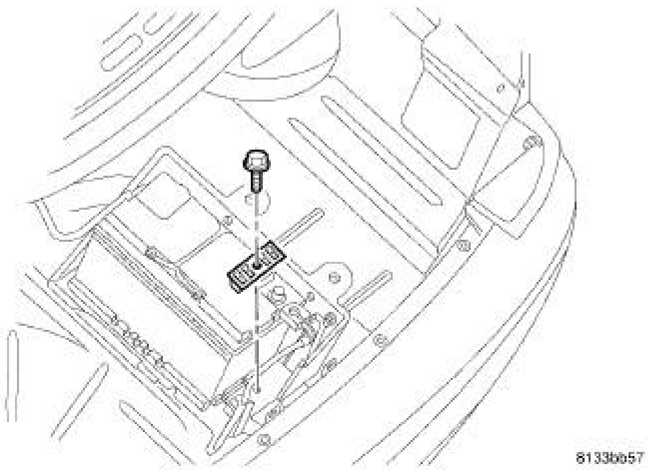


Fig. 23: Battery Hold Down Clamp

Courtesy of CHRYSLER GROUP, LLC

7. Remove the battery hold down clamp and remove the battery from the vehicle.

INSTALLATION

INSTALLATION

WARNING: A SUITABLE PAIR OF HEAVY DUTY RUBBER GLOVES AND SAFETY GLASSES SHOULD BE WORN WHEN REMOVING OR SERVICING A BATTERY.

WARNING: Remove metallic jewelry to avoid injury by accidental arcing of battery current.

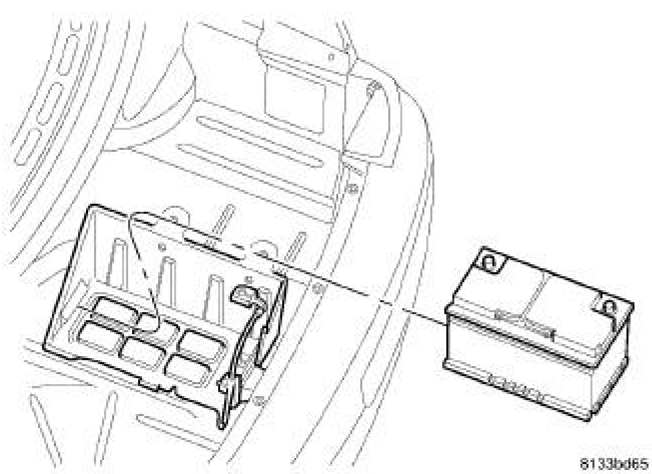


Fig. 24: Battery Tray
Courtesy of CHRYSLER GROUP, LLC

1. Position the battery in the battery tray.

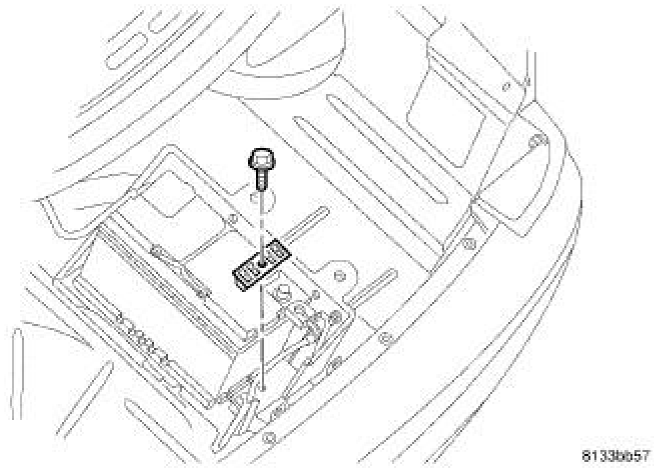


Fig. 25: Battery Hold Down Clamp
Courtesy of CHRYSLER GROUP, LLC

2. Install the battery hold down clamp and bolt. Torque the bolt to the proper torque **SPECIFICATIONS**.

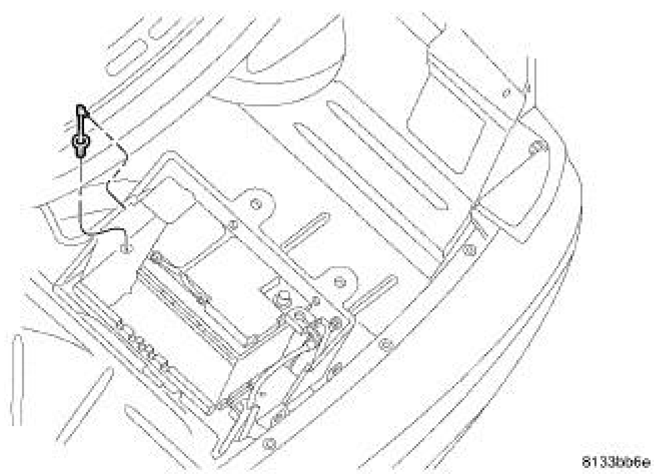


Fig. 26: Battery Vent Tube
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Use care when connecting the battery vent tube to the battery. The vent tube nipple is made of plastic and is easily damaged if not connected properly.

3. Gently connect the battery vent tube to the battery nipple.
4. Latch the battery retention strap.
5. Connect the battery positive cable.
6. Connect the negative battery cable with Intelligent Battery Sensor (IBS). Refer to **SENSOR,**

INTELLIGENT BATTERY (IBS), INSTALLATION.

7. Install the rear compartment floor trim panel.

CABLES, BATTERY

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - BATTERY CABLES

A voltage drop test will determine if there is excessive resistance in the battery cable terminal connections or the battery cable. If excessive resistance is found in the battery cable connections, the connection point should be disassembled, cleaned of all corrosion or foreign material, then reassembled. Following reassembly, check the voltage drop for the battery cable connection and the battery cable again to confirm repair.

When performing the voltage drop test, it is important to remember that the voltage drop is giving an indication of the resistance between the two points at which the voltmeter probes are attached. **EXAMPLE:** When touching the leads of the voltmeter on the battery cable end and the B+ terminal of the starter, the voltage reading should read 0 volts. A reading above 0.2 volts indicates high resistance in the cable.

VOLTAGE DROP TEST

The following operation will require a voltmeter accurate to (0.10) volt. Before performing this test, be certain that the following procedures are accomplished:

- The battery is fully-charged. Refer to **BATTERY, STANDARD PROCEDURE** for the proper battery charging procedure.
- The battery has successfully passed a load test. Refer to **BATTERY, STANDARD PROCEDURE** for the proper load test procedure.
- Fully engage the parking brake.
- If the vehicle is equipped with an automatic transmission, place the gearshift selector lever in the Park position. If the vehicle is equipped with a manual transmission, place the gearshift selector lever in the Neutral position and block the clutch pedal in the fully depressed position.
- Verify that all lamps and accessories are turned off.

1. Remove the spare tire cover to gain access to the battery. Connect the positive lead of the voltmeter to the battery negative terminal post. Connect the negative lead of the voltmeter to the battery negative cable terminal clamp. Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If voltage is detected, correct the poor connection between the battery negative cable terminal clamp and the battery negative terminal post.
2. Connect the positive lead of the voltmeter to the battery positive terminal post. Connect the negative lead of the voltmeter to the battery positive cable terminal clamp. Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If voltage is detected, correct the poor connection between the battery positive cable terminal clamp and the battery positive terminal post.
3. Using a suitable jumper wire, connect the voltmeter to measure between the battery negative cable terminal clamp and a good clean ground on the engine block. Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery negative cable eyelet terminal connection at the transmission housing. Repeat the test. If the reading is still above 0.2 volt, perform steps 4 and 5.

4. Connect the voltmeter to measure between the battery negative cable terminal clamp and the battery negative cable eyelet terminal connection at the vehicle body. Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery negative cable eyelet terminal connection at the vehicle body. Repeat the test. If the reading is still above 0.2 volt, replace the battery rear negative cable. Refer to **CABLES, BATTERY, REMOVAL**.
5. Connect the voltmeter to measure between the battery negative cable eyelet terminal connection at the right front strut tower and the battery negative cable eyelet terminal connection at the transmission housing. Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery negative cable eyelet terminal connection at the right front strut tower. Repeat the test. If the reading is still above 0.2 volt, replace the battery front negative cable. Refer to **CABLES, BATTERY, REMOVAL**.
6. Using a suitable jumper wire, connect the voltmeter to measure between the battery positive cable terminal clamp and the starter solenoid B(+) terminal stud. Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery positive cable eyelet terminal connection at the starter solenoid B(+) terminal stud. Repeat the test. If the reading is still above 0.2 volt, perform steps 7 and 8.
7. Remove the right front wheelhouse splash shield to gain access to the battery positive cable bulkhead outside terminal. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** . Connect the voltmeter to measure between the battery positive cable bulkhead outside terminal and the starter solenoid B(+) terminal stud. Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery positive cable bulkhead outside terminal connection. Repeat the test. If the reading is still above 0.2 volt, replace the battery front positive cable. Refer to **CABLES, BATTERY, REMOVAL**.

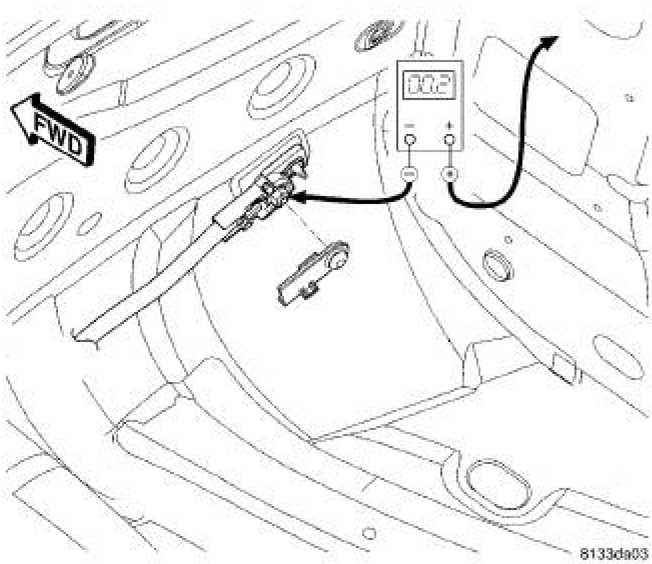


Fig. 27: Testing Battery System
Courtesy of CHRYSLER GROUP, LLC

8. Remove the right front carpet to gain access to the battery positive cable bulkhead inside terminal. Connect the voltmeter to measure between the battery positive cable terminal clamp and the battery positive cable bulkhead inside terminal connection. Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery positive

cable bulkhead inside terminal connection. Repeat the test. If the reading is still above 0.2 volt, replace the battery rear positive cable. Refer to **CABLES, BATTERY, REMOVAL**.

REMOVAL

REMOVAL

NEGATIVE - ENGINE COMPARTMENT

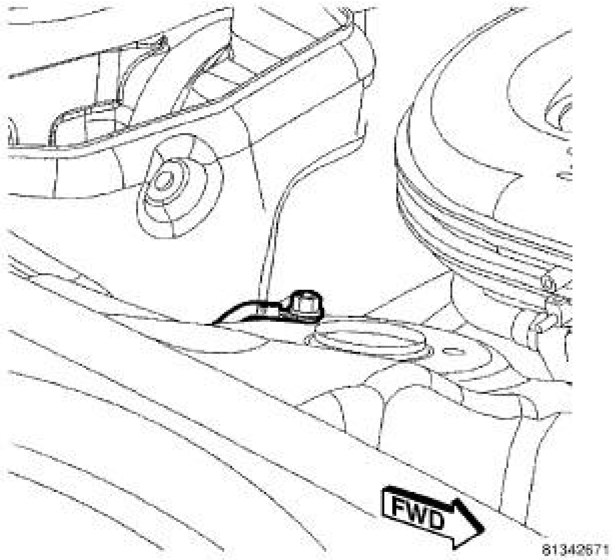


Fig. 28: Fastener Securing Negative Battery Cable To Right Front Strut Tower
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition switch to the Off position. Be certain that all electrical accessories are turned off.
2. Remove the spare tire cover to gain access to the battery.

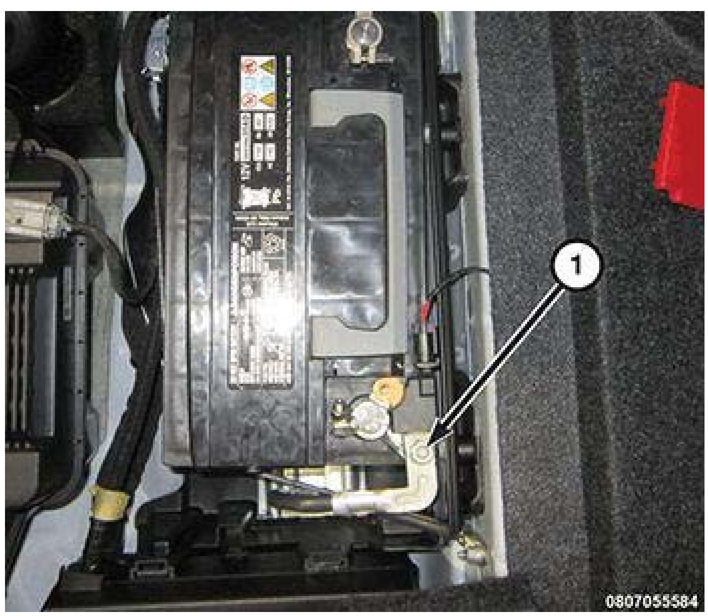


Fig. 29: IBS Stud
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect and isolate the negative battery cable at the Intelligent Battery Sensor (IBS) M8 stud (1).
4. Remove the fastener securing the battery negative cable to the right front strut tower.

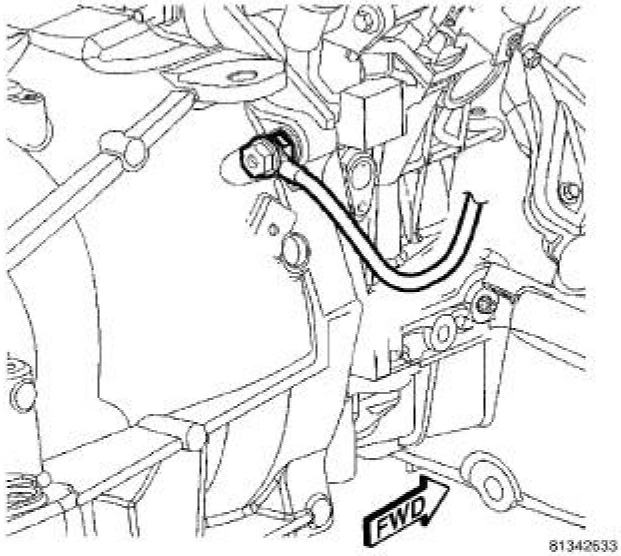


Fig. 30: Fastener Securing Negative Battery Cable To Transmission Housing
Courtesy of CHRYSLER GROUP, LLC

5. Raise vehicle on hoist. Refer to **HOISTING, STANDARD PROCEDURE** .
6. Remove the fastener securing the battery negative cable to the transmission housing.
7. One at a time, remove the battery cable retaining pushpins, fasteners and routing clips until the cable is free from the vehicle.
8. Remove the battery cable from the engine compartment.

NEGATIVE - REAR COMPARTMENT

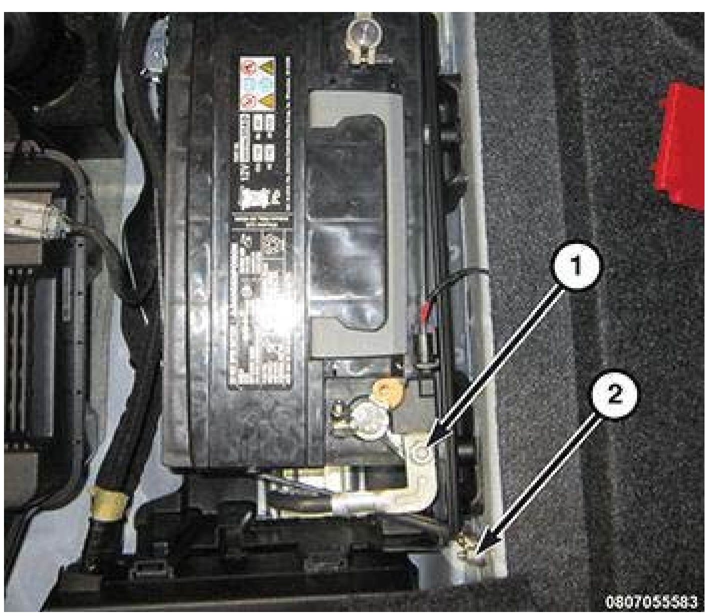


Fig. 31: IBS Stud & Negative Battery Cable Fastener
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition switch to the Off position. Be certain that all electrical accessories are turned off.
2. Remove the spare tire cover to gain access to the battery.
3. Disconnect and isolate the negative battery cable at the Intelligent Battery Sensor (IBS) M8 stud (1).
4. Remove the fastener (2) securing the battery negative cable to the body.
5. Remove the cable from the vehicle.

POSITIVE - BATTERY TO BULKHEAD

1. Turn the ignition switch to the Off position. Be certain that all electrical accessories are turned off.
2. Remove the spare tire cover to gain access to the battery.

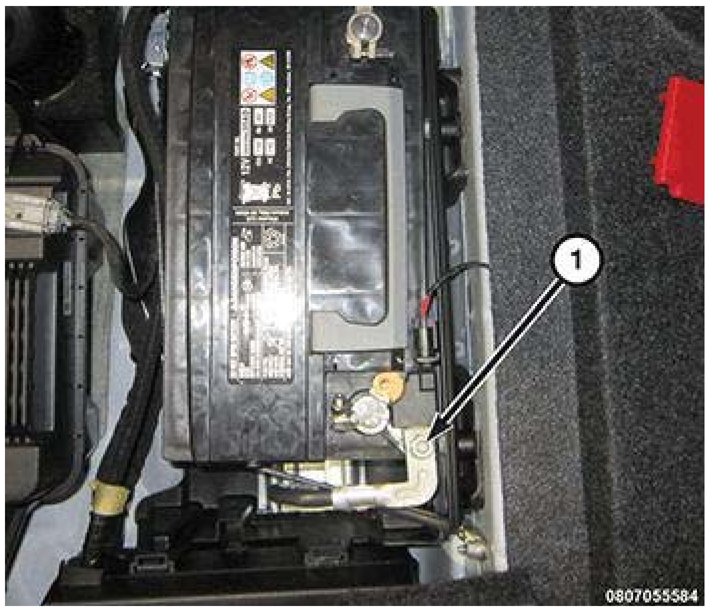


Fig. 32: IBS Stud
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect and isolate the negative battery cable at the Intelligent Battery Sensor (IBS) M8 stud (1).
4. Disconnect the battery positive cable.

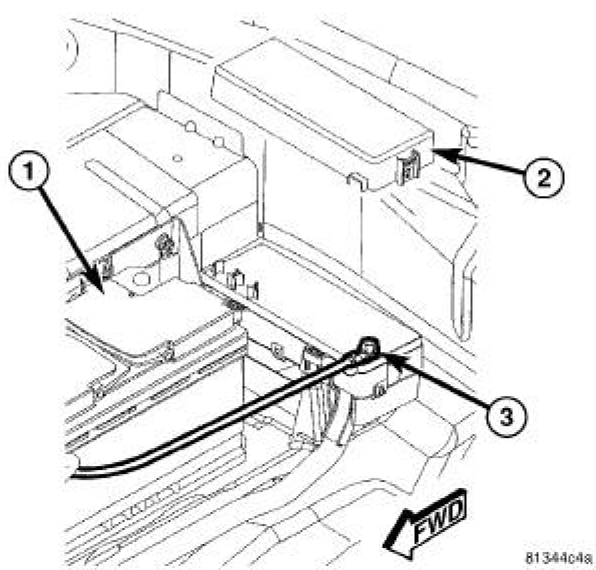


Fig. 33: Power Distribution Center
Courtesy of CHRYSLER GROUP, LLC

5. Remove the Power Distribution Center (PDC) cover (2).
6. Remove the battery positive cable to rear PDC fastener (3).

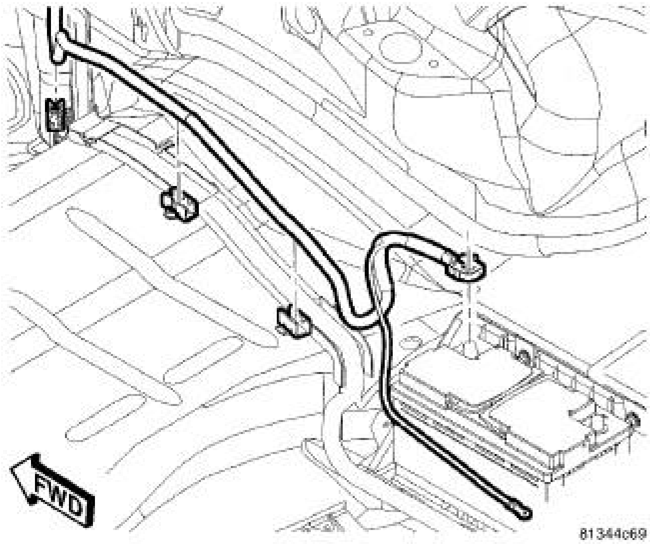


Fig. 34: Routing Clips
Courtesy of CHRYSLER GROUP, LLC

7. One at a time, free the battery positive cable from the routing clips located in the rear compartment area.
8. Remove the right, front seat. Refer to **SEAT, FRONT, REMOVAL** .
9. Remove the right, rear seat cushion. Pull upward at forward edge of each retainer loop of the rear seat cushion to disengage retainer loops from cups in floor.
10. Remove the right cowl trim panel. Refer to **PANEL, COWL TRIM, REMOVAL** .
11. Remove the right quarter trim panel. Refer to **PANEL, QUARTER TRIM, REMOVAL** .
12. Position carpet aside to gain access to the battery positive cable.

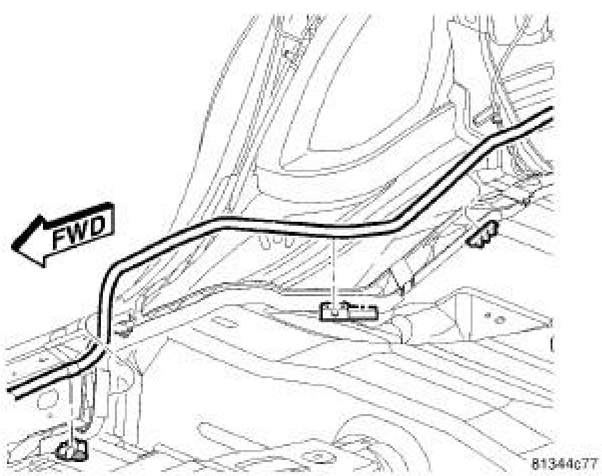


Fig. 35: Routing Clips

Courtesy of CHRYSLER GROUP, LLC

13. One at a time, free the battery positive cable from the routing clips located in the rear seat area.

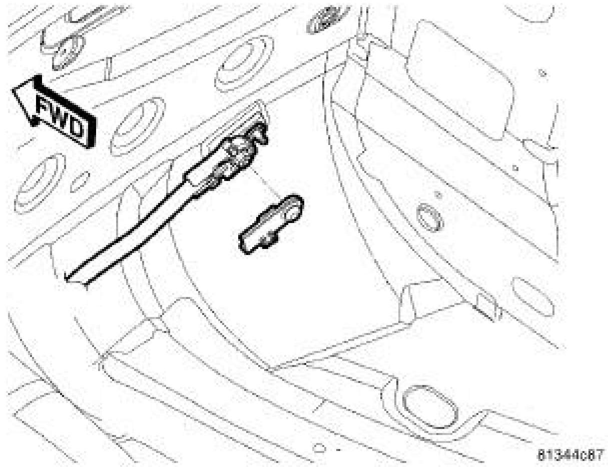


Fig. 36: Bulkhead Fastener
Courtesy of CHRYSLER GROUP, LLC

14. Position the bulkhead insulator aside to gain access to the battery positive cable bulkhead fastener.
15. Remove the battery positive cable to bulkhead fastener.

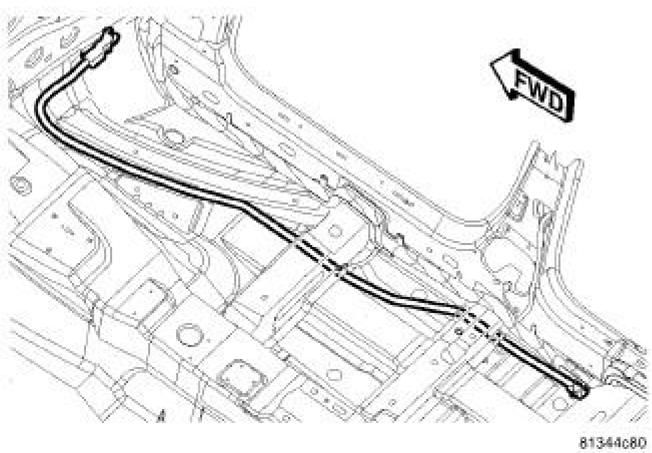


Fig. 37: Battery Positive Cable
Courtesy of CHRYSLER GROUP, LLC

16. Remove the battery positive cable from the vehicle making note of the cable routing under the floor cross members.

POSITIVE - ENGINE COMPARTMENT

1. Turn the ignition switch to the Off position. Be certain that all electrical accessories are turned off.
2. Remove the spare tire cover to gain access to the battery.

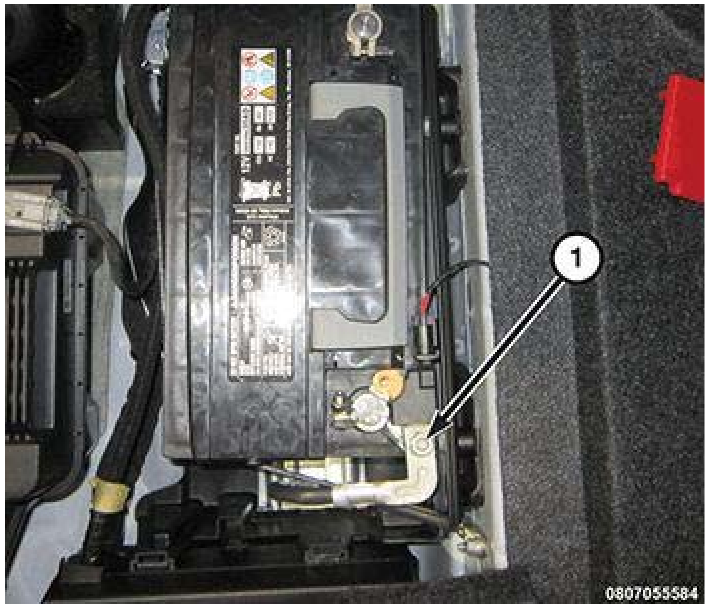


Fig. 38: IBS Stud
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect and isolate the negative battery cable at the Intelligent Battery Sensor (IBS) M8 stud (1).
4. Raise vehicle on hoist. Refer to **HOISTING, STANDARD PROCEDURE** .
5. Remove the right front wheelhouse splash shield to gain access to the battery positive cable bulkhead outside terminal. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .

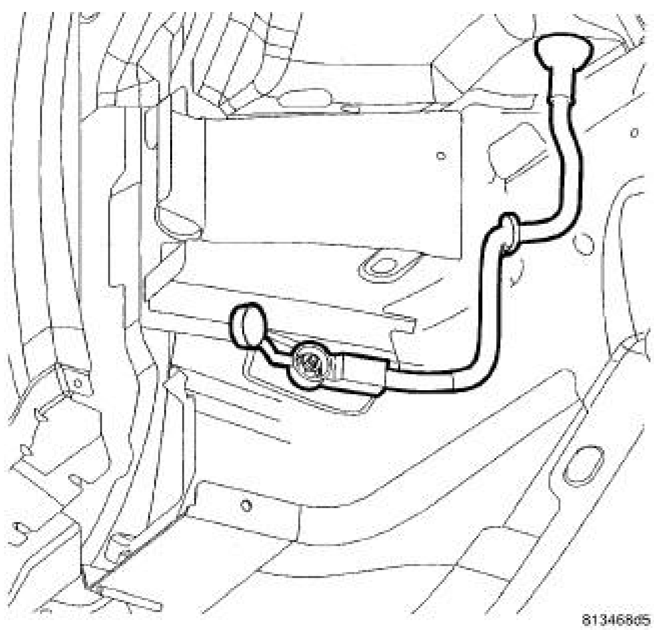


Fig. 39: Bulkhead Fastener
Courtesy of CHRYSLER GROUP, LLC

6. Remove the battery positive cable to bulkhead fastener.

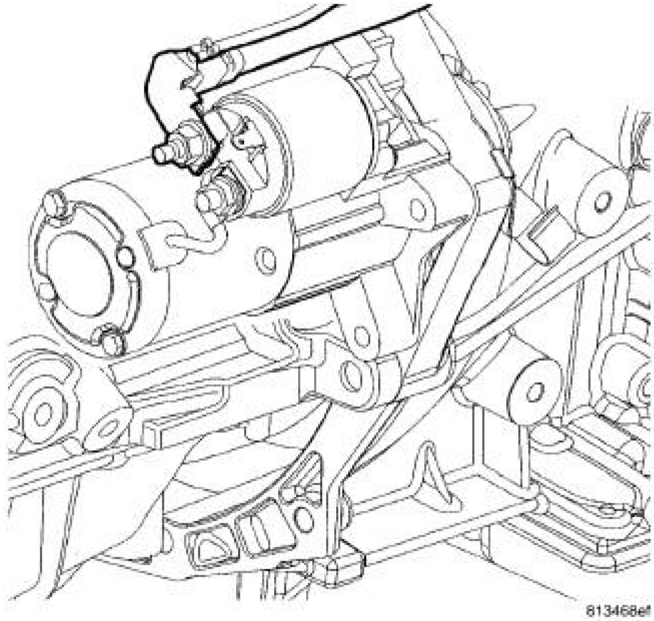


Fig. 40: Battery Positive Cable
Courtesy of CHRYSLER GROUP, LLC

7. Remove the battery positive cable from the routing clip located at the back of the starter.
8. Remove the battery positive cable from the vehicle making note of the cable routing.

INSTALLATION

INSTALLATION

NEGATIVE - ENGINE COMPARTMENT

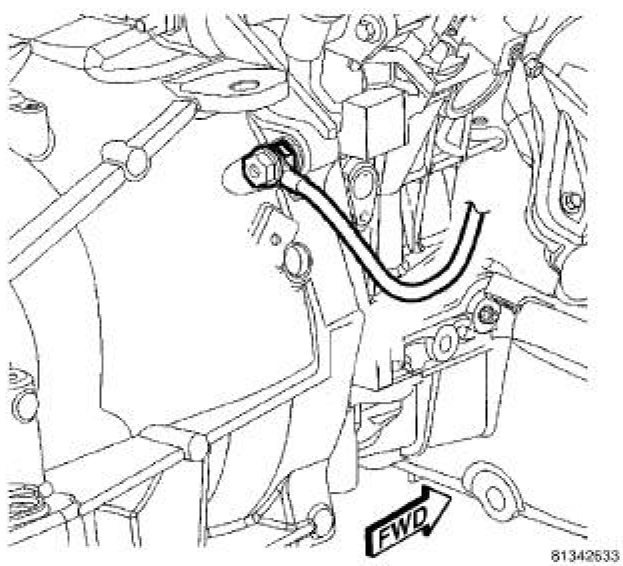


Fig. 41: Fastener Securing Negative Battery Cable To Transmission Housing
Courtesy of CHRYSLER GROUP, LLC

1. Position the battery negative cable in the engine compartment.
2. Raise the vehicle on hoist.
3. Install the fastener securing the battery negative cable to the transmission housing. Tighten the bolt to the proper torque **SPECIFICATIONS**.
4. One at a time, install the battery cable retaining pushpins, fasteners and routing clips until the cable is installed exactly where it was in the vehicle.
5. Lower the vehicle.

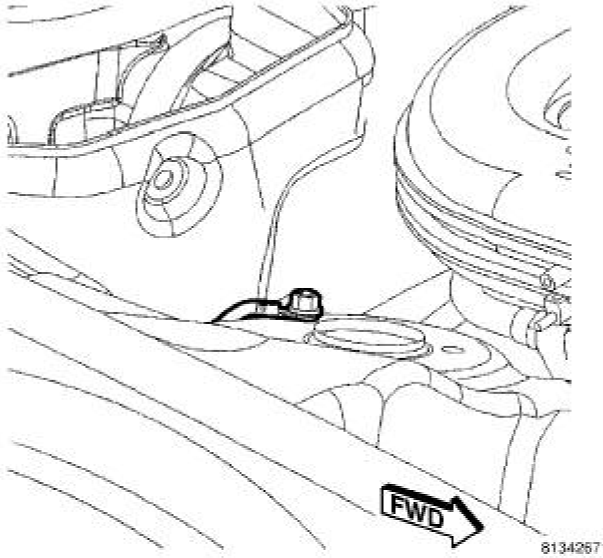


Fig. 42: Fastener Securing Negative Battery Cable To Right Front Strut Tower
Courtesy of CHRYSLER GROUP, LLC

6. Install the fastener securing the battery negative cable to the right front strut tower.

Fig. 43: IBS Stud
Courtesy of CHRYSLER GROUP, LLC

7. Connect the negative battery cable to the Intelligent Battery Sensor (IBS) M8 stud (1) and tighten to the proper **SPECIFICATIONS**.
8. Install the spare tire cover.

NEGATIVE - REAR COMPARTMENT

1. Position the battery negative cable in the vehicle.

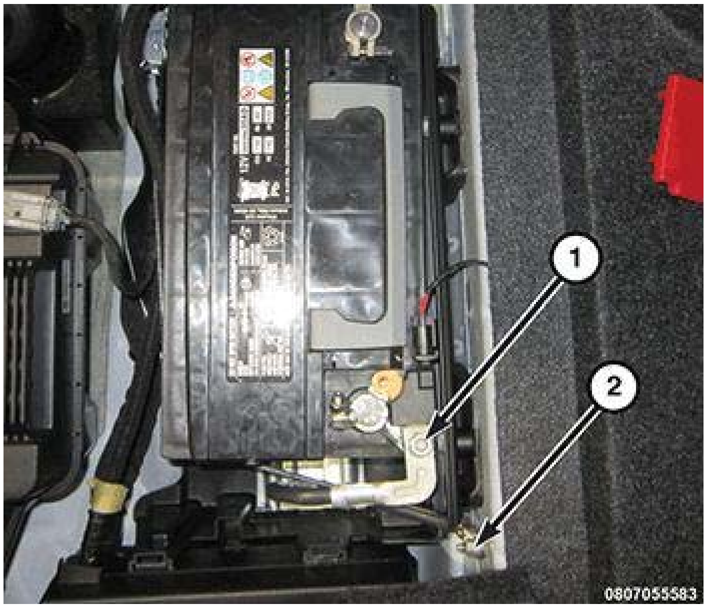


Fig. 44: IBS Stud & Negative Battery Cable Fastener
Courtesy of CHRYSLER GROUP, LLC

2. Install the fastener (2) securing the battery negative cable to the body.
3. Connect the negative battery cable to the Intelligent Battery Sensor (IBS) M8 stud (1) and tighten to the proper **SPECIFICATIONS**.
4. Install the spare tire cover.

POSITIVE - BATTERY TO BULKHEAD

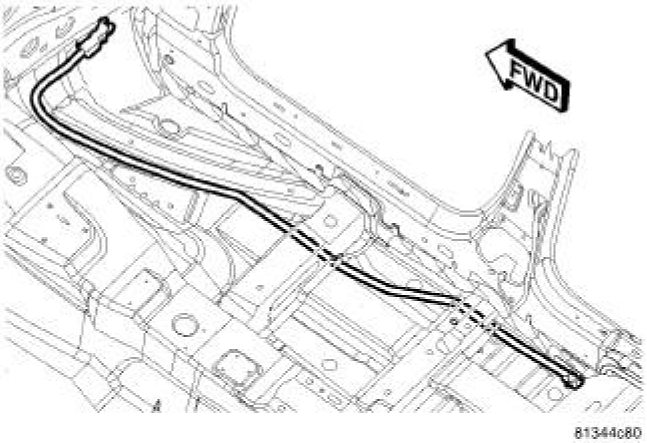


Fig. 45: Battery Positive Cable

Courtesy of CHRYSLER GROUP, LLC

1. Position the battery positive cable in the vehicle taking care to route the cable under the floor cross members.

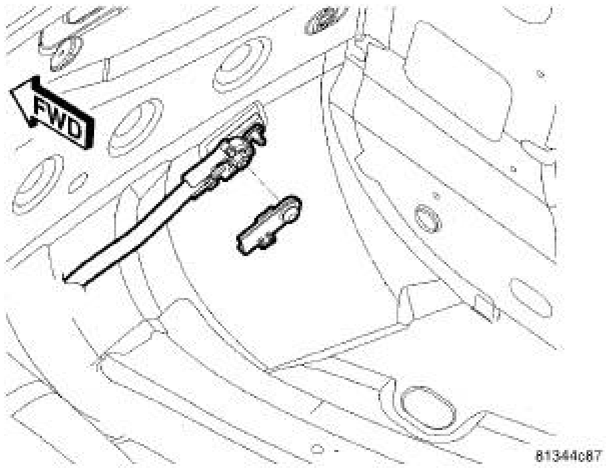


Fig. 46: Bulkhead Fastener
Courtesy of CHRYSLER GROUP, LLC

2. Position the bulkhead insulator aside to gain access to the battery positive cable bulkhead fastener.
3. Install the battery positive cable to bulkhead fastener.
4. Position the bulkhead insulator back to the normal position.

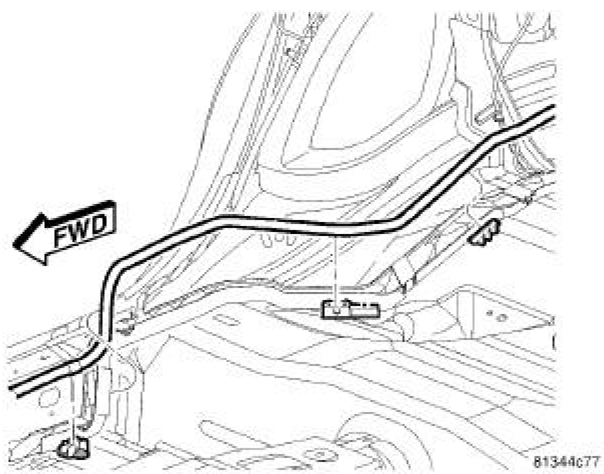


Fig. 47: Routing Clips
Courtesy of CHRYSLER GROUP, LLC

1. One at a time, secure the battery positive cable to the routing clips located in the rear seat area.

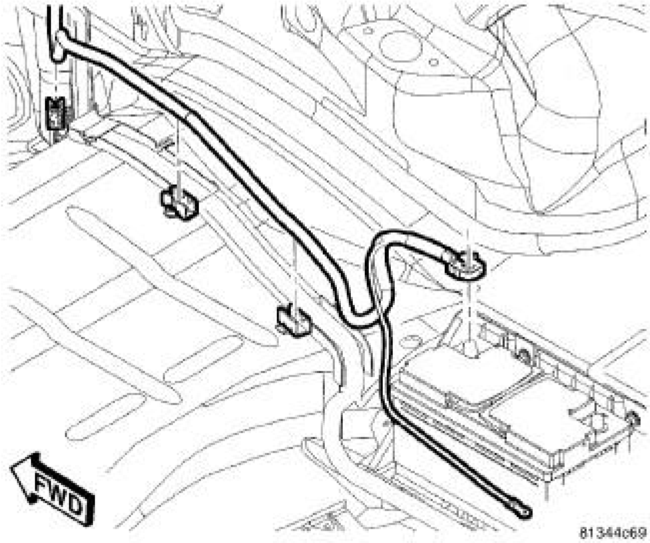


Fig. 48: Routing Clips
Courtesy of CHRYSLER GROUP, LLC

2. One at a time, secure the battery positive cable to the routing clips located in the rear compartment area.
3. Position the carpet back to the normal position.
4. Install the right quarter trim panel. Refer to **PANEL, QUARTER TRIM, INSTALLATION** .
5. Install the right cowl trim panel. Refer to **PANEL, COWL TRIM, INSTALLATION** .
6. Install the right, rear seat cushion. Engage retainer loops into cup on floor kick up. Push downward at forward edge at each retainer loop of the rear seat cushion to engage retainers.
7. Install the right, front seat. Refer to **SEAT, FRONT, INSTALLATION** .

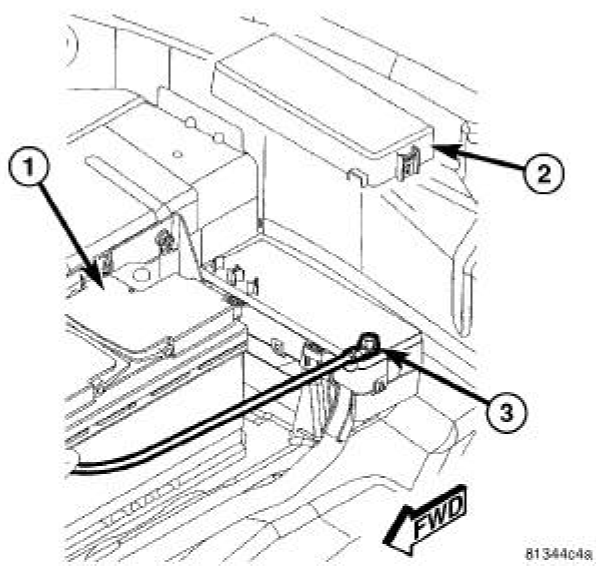


Fig. 49: Power Distribution Center
Courtesy of CHRYSLER GROUP, LLC

8. Install the battery positive cable to rear Power Distribution Center (PDC) fastener (3).

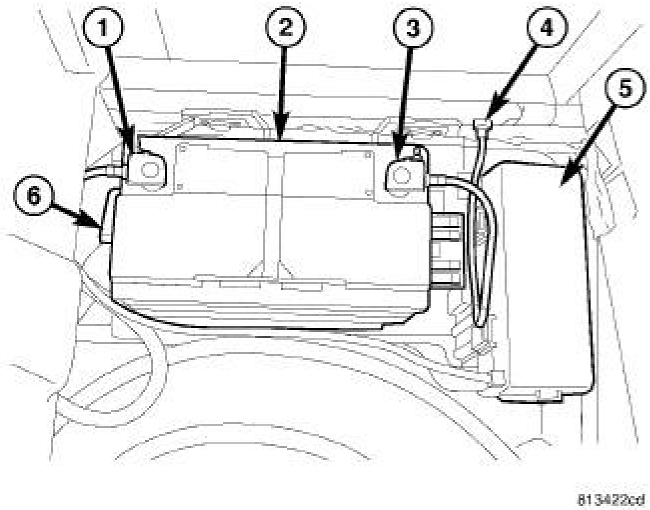


Fig. 50: Battery System Components And PDC Cover
Courtesy of CHRYSLER GROUP, LLC

9. Install the PDC cover (5).
10. Connect the battery positive cable (1).

Fig. 51: IBS Stud
Courtesy of CHRYSLER GROUP, LLC

11. Connect the negative battery cable to the Intelligent Battery Sensor (IBS) M8 stud (1) and tighten to the proper **SPECIFICATIONS**.
12. Install the spare tire cover.

POSITIVE - ENGINE COMPARTMENT

1. Position the battery positive cable in the engine compartment.

2. Secure the battery positive cable to the routing clip located at the back of the starter.

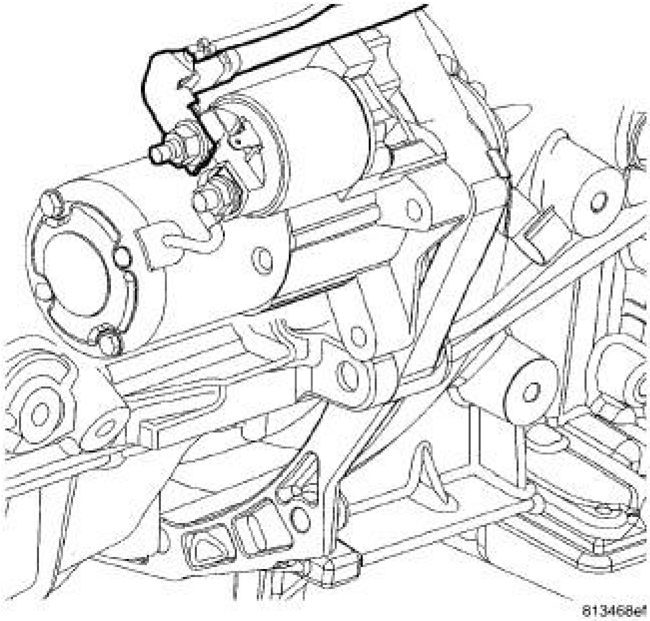


Fig. 52: Battery Positive Cable
Courtesy of CHRYSLER GROUP, LLC

3. Install the battery positive cable to starter fastener.

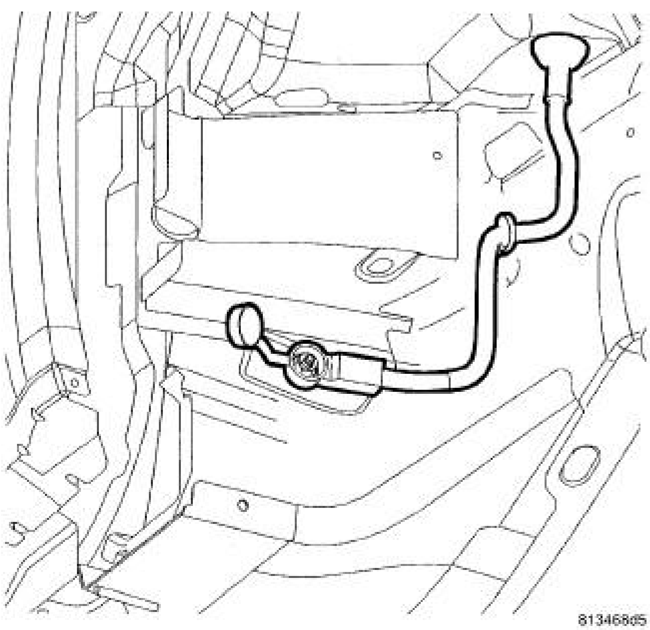


Fig. 53: Bulkhead Fastener
Courtesy of CHRYSLER GROUP, LLC

4. Install the battery positive cable to bulkhead fastener.
5. Install the right front wheelhouse splash shield. Refer to **SHIELD, SPLASH, FRONT**

WHEELHOUSE, INSTALLATION .

6. Lower the vehicle.

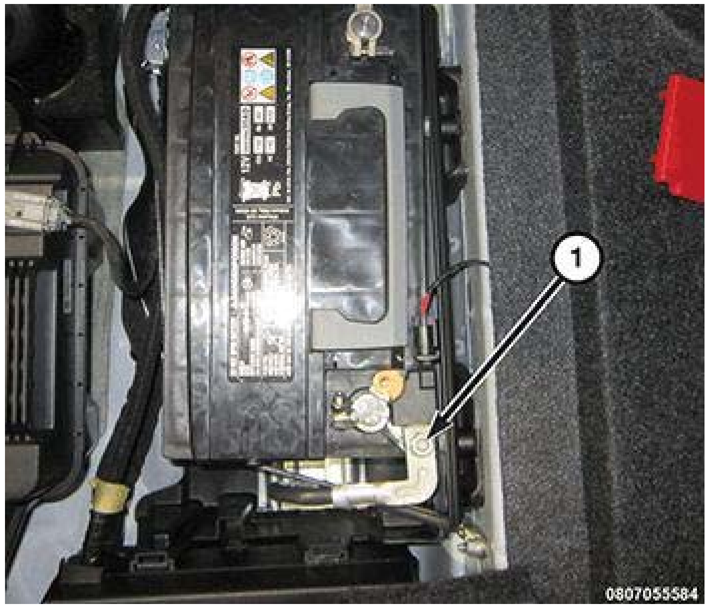


Fig. 54: IBS Stud
Courtesy of CHRYSLER GROUP, LLC

7. Connect the negative battery cable to the Intelligent Battery Sensor (IBS) M8 stud (1) and tighten to the proper SPECIFICATIONS.
8. Install the spare tire cover.

RETAINER, BATTERY

REMOVAL

REMOVAL

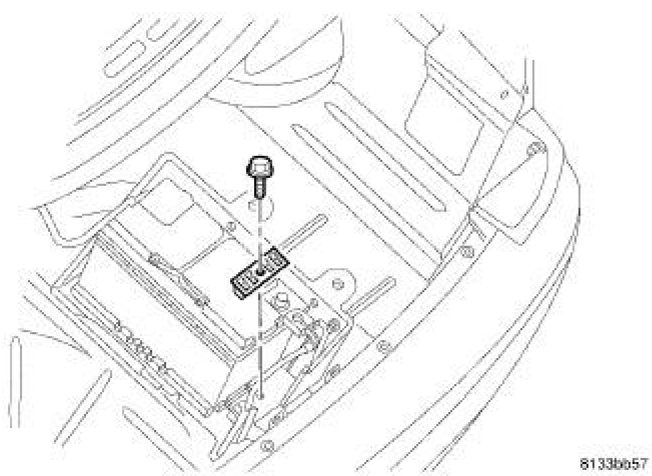


Fig. 55: Battery Hold Down Clamp
Courtesy of CHRYSLER GROUP, LLC

1. Verify that the ignition switch and all accessories are OFF.
2. Remove the rear compartment floor, trim panel to gain access to the battery.
3. Disconnect and isolate the negative battery cable at the Intelligent Battery Sensor (IBS) M8 stud.
4. Remove the bolt from the battery hold-down and remove the hold-down.

INSTALLATION

INSTALLATION

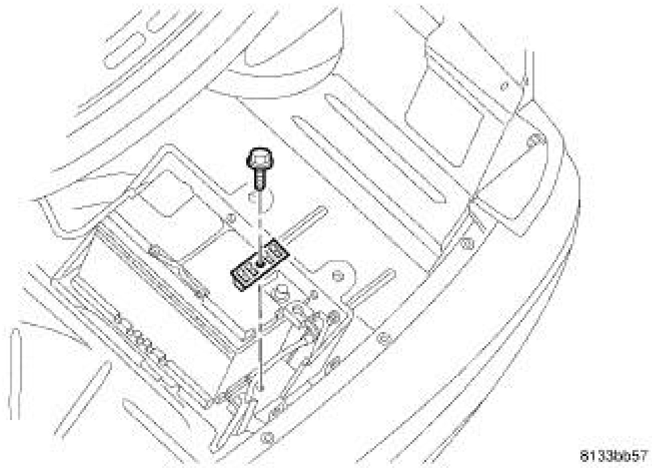


Fig. 56: Battery Hold Down Clamp
Courtesy of CHRYSLER GROUP, LLC

1. Install the battery hold-down clamp and bolt. Tighten the bolt to the proper torque **SPECIFICATIONS**.
2. Connect the negative battery cable to the Intelligent Battery Sensor (IBS) M8 stud and tighten to the proper **SPECIFICATIONS**.
3. Install the rear compartment floor trim panel.

TRAY, BATTERY

REMOVAL

REMOVAL

1. Remove the battery. Refer to **BATTERY, REMOVAL**.

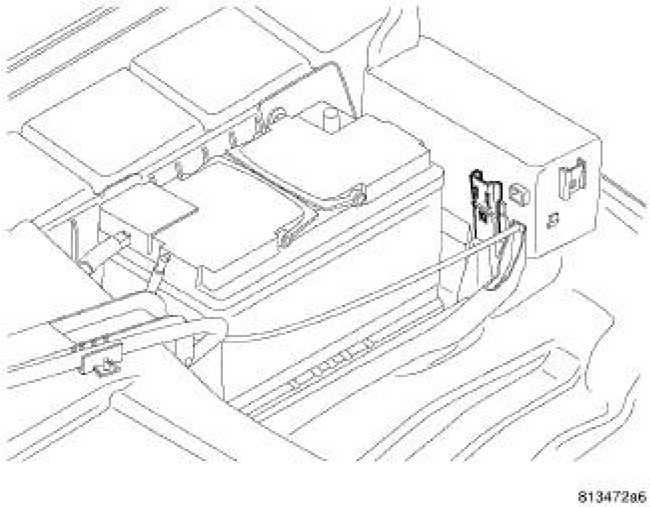


Fig. 57: Removing/Installing Power Distribution Center
Courtesy of CHRYSLER GROUP, LLC

2. Using a small flat bladed tool, gently release the two mounting tabs that secure the Power Distribution Center (PDC) to the battery tray. Position the PDC aside.

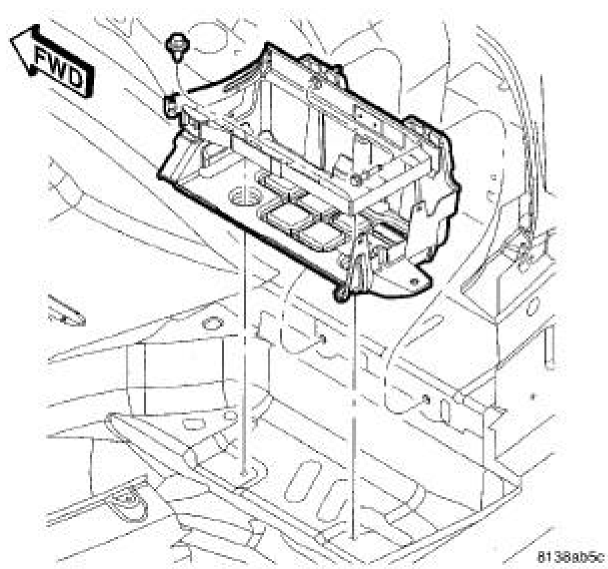


Fig. 58: Removing/Installing Battery Tray
Courtesy of CHRYSLER GROUP, LLC

3. Remove the battery tray mounting fasteners and remove the battery tray from the vehicle.

INSTALLATION

INSTALLATION

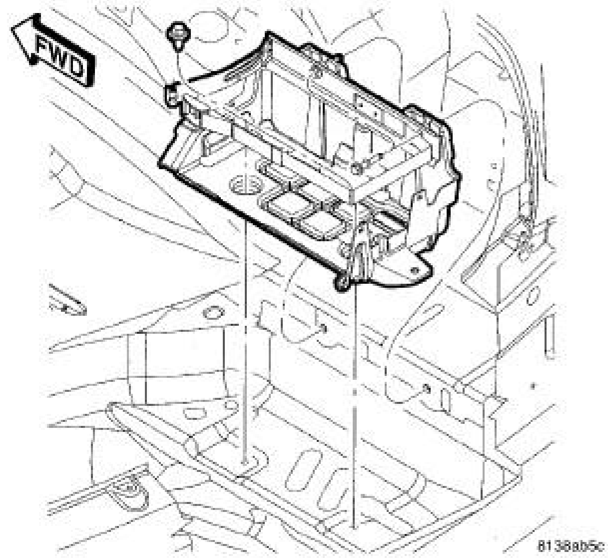


Fig. 59: Removing/Installing Battery Tray
Courtesy of CHRYSLER GROUP, LLC

1. Position the battery tray in the vehicle and install the mounting fasteners.

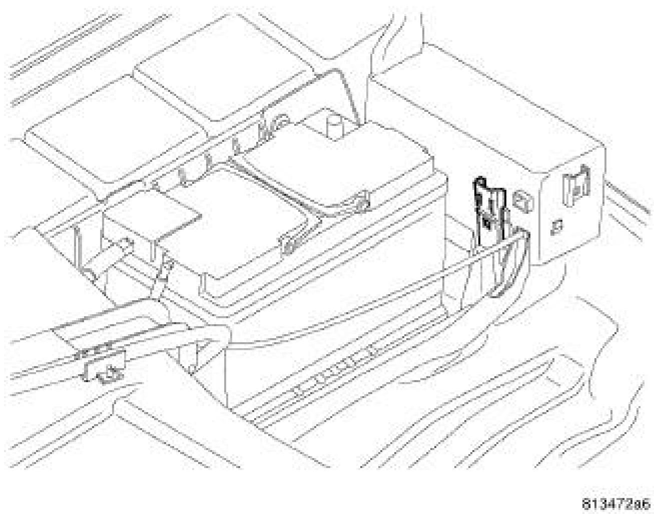


Fig. 60: Removing/Installing Power Distribution Center
Courtesy of CHRYSLER GROUP, LLC

2. Position the Power Distribution Center (PDC) onto the battery tray mounting tabs. Gently apply downward pressure on the PDC until it snaps into place.
3. Install the battery. Refer to **BATTERY, INSTALLATION**.

SENSOR, INTELLIGENT BATTERY (IBS)

DESCRIPTION

DESCRIPTION

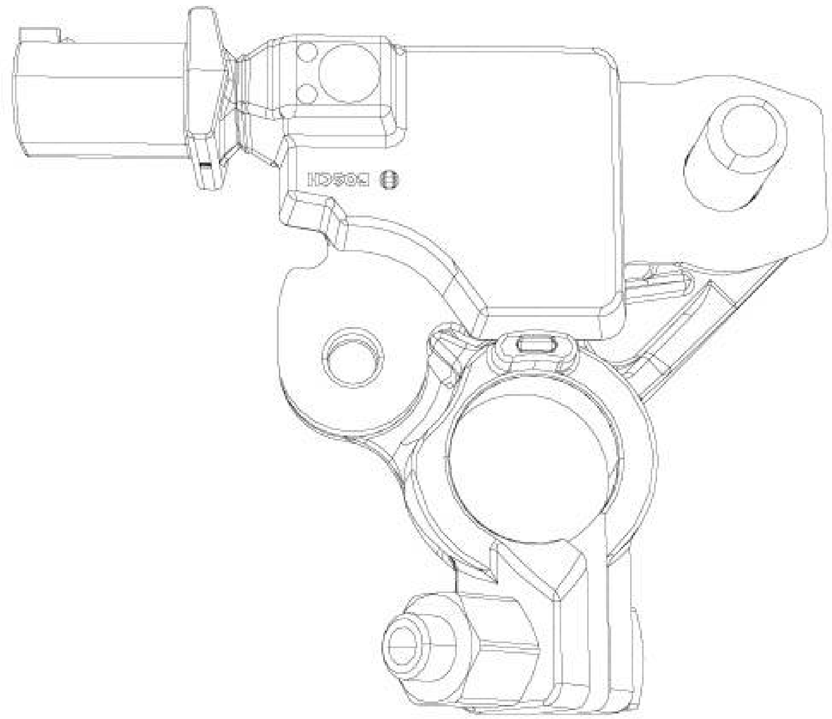


Fig. 61: Intelligent Battery Sensor (IBS) Component Location
Courtesy of CHRYSLER GROUP, LLC

The Intelligent Battery Sensor (IBS) serves to record and process measured battery variable values (current, voltage, temperature) for the vehicle powernet management system. The Intelligent Battery Sensor (IBS) will calculate the Battery 'state of charge', 'state of health', and 'state of function'.

The mechanical part of the IBS is comprised of the battery clamp for the negative terminal and a captured bolt to attach the ground cable to. The functional tasks include establishing the electrical contact between the body and the negative battery post, housing the electronic module (actual sensor element) and the provision of an adequate thermal contact between the sensor system temperature sensor and the negative battery post. The mechanical part of the IBS also protects the sensitive electronic components from external influences.

The IBS is mounted directly on the 12 VDC battery's negative post. The battery post clamp nut is a captive nut and the stud will break if the nut is removed.

OPERATION

OPERATION

The Intelligent Battery Sensor (IBS) contains a low value resistor, or shunt. The shunt creates voltage drop, which is read by an internal microcontroller to determine the current flow in and out of the battery. In addition to the shunt, the IBS contains a sensor to monitor the battery's temperature. Data gathered by the IBS, including temperature, voltage, and current measurements, are transmitted over a LIN communication bus to either the Body Control Module (BCM) or the Powertrain Control Module (PCM), depending on the application. The IBS serves two primary purposes. The first is to provide the Powertrain Control Module (or PCM) with both immediate and historical battery information, so the PCM can precisely control the charging system. The second purpose is to provide data to the BCM for operation of the load-shedding feature. A fused power circuit and the LIN bus are connected to the IBS though a two-terminal connector.

In addition to real-time measurements, the IBS transmits some calculated battery data over the LIN bus, including state of charge, state of health, and state of function. These values are calculated by storing measurements over time.

The battery sensor is readable/diagnosable via a "scan tool" that can display all of the available parameters needed for vehicle servicing or trouble shooting.

Information the Intelligent Battery Sensor (IBS) transmits out on the CAN Bus is

- SOC = Battery state of charge (or SOC) is expressed as a percentage. The IBS calculates the SOC based on measured voltage, and charge and discharge rates. Therefore, SOC is not a direct percentage of battery voltage.
- SOF = Battery State of Function: Battery state of function (or SOF) is a calculated prediction of the lowest voltage the battery will drop to during engine cranking.

The PCM and BCM use this calculated information to optimize vehicle power management for increased fuel efficiency. The data transmitted from IBS is interpreted and sent over the CAN network by the module connected the IBS's LIN bus.

When the IBS is powered up for the first time or is powered after a power disconnection, it enters a "recalibration" phase, where the IBS must recognize the type of battery and its characteristics and state. In this phase the tolerances on the state functions (SOC, SOF) are greater than in normal working condition. When IBS is disconnected from the battery, the device loses its stored memory. When power is restored, the IBS starts a relearn process. Until the relearn process is complete, accurate battery state information is unavailable to other vehicle systems. The IBS relearn process requires five normal, operator initiated starts with at least four hours normal or more during cold ambient conditions of engine off time between each start. Usually, the process takes a few days of vehicle operation to complete. Remember, the relearn process is restarted every time power is reconnected to the IBS.

If the IBS is faulty it cannot be serviced, it must be replaced.

REMOVAL

REMOVAL

WARNING: Do not remove the captive nut, doing so will cause the stud to break.

1. **Loosen** the captive nut.
2. Disconnect the Intelligent Battery Sensor (IBS) electrical connector.
3. Disconnect and isolate the negative battery cable at the IBS M8 stud.
4. Loosen the M6 pole clamp.
5. Remove the IBS from the negative battery post.

INSTALLATION

INSTALLATION

NOTE: Connecting the negative battery cable to the Intelligent Battery Sensor (IBS) must be done before installing on the battery post.

NOTE: DO NOT use a hammer to tap down the sensor. Use a post spreader to open the post if reusing the existing sensor.

NOTE: Avoid IBS rotation during tightening of M8 nut as to avoid contact of 2 way connector breakage when rotating in to the battery.

1. Place the IBS onto the negative battery post and push the IBS down until properly seated on the cone of the post.
2. Connect the negative battery cable to the IBS M8 stud and tighten to the proper **SPECIFICATIONS**.

   NOTE: M8 has much higher torque than the M6 clamp and can break IBS free if the M6 is tightened prior.

3. Secure the M6 pole clamp and tighten to the proper **SPECIFICATIONS**.
4. Install 2 pin connector (Power & LIN) making sure there is no stress on the wires.
5. Install the components removed to access the battery. Refer to **BATTERY, INSTALLATION**.

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Article GUID: A00735929

2015-16 ELECTRICAL

Charging - Service Information - Challenger

DESCRIPTION

DESCRIPTION

The charging system consists of:

- Generator
- Generator decoupler pulley (if equipped)
- Electronic Voltage Regulator (EVR) circuitry within the Powertrain Control Module (PCM)
- Ignition switch
- Battery (refer to **BATTERY SYSTEM - SERVICE INFORMATION**)
- Generator lamp (if equipped)
- Check gauges lamp (if equipped)
- Voltmeter (refer to **INSTRUMENT CLUSTER - SERVICE INFORMATION**)
- Wiring harness and connections (refer to appropriate SYSTEM WIRING DIAGRAMS article)

OPERATION

OPERATION

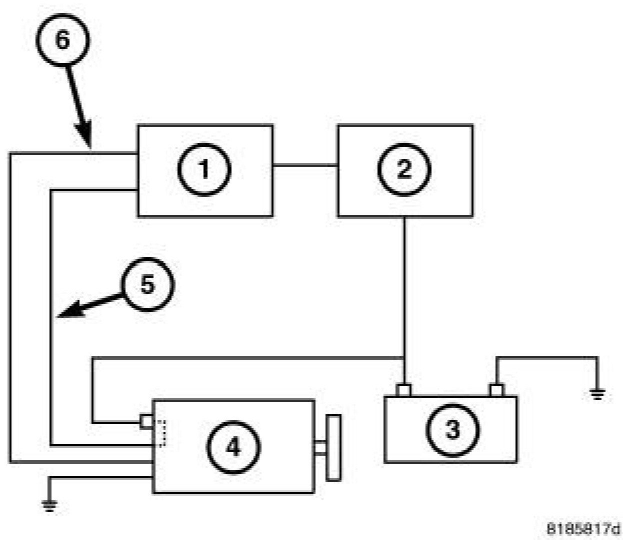


Fig. 1: Charging System Block Diagram
Courtesy of CHRYSLER GROUP, LLC

1 - PCM	
2 - PDC	
3 - Battery	
4 - Generator	

5 - Feed Back Circuit B+
6 - Control Circuit
7 - Battery Sense

The charging system is turned on and off with the Powertrain Control Module (PCM) and ignition switch with engine running. The field circuit will not be energized until engine is running and ignition switch on. This voltage is connected through the PCM and supplied to one of the generator field terminals (Gen. Source B+) at the back of the generator. The generator is internally grounded. The generator regulates the field using pin-1 of the field connector (high side driver).

The generator is driven by the engine through a serpentine belt and pulley, or a decoupler pulley arrangement.

The PCM receives a voltage input from the generator (5) and also a battery voltage input (7) from the Power Distribution Center (PDC), it then compares the voltages to the desired voltage programed in the Electronic Voltage Regulator (EVR) software, and, if there is a difference it sends a signal to the generator EVR circuit to increase or decrease output. It uses a Pulse Width Modulation (PWM) to send signals to the generator circuitry to control the amount of output from the generator. The amount of DC current produced by the generator is controlled by the EVR circuitry contained within the PCM (1).

All vehicles are equipped with On-Board Diagnostics (OBD). All OBD-sensed systems, including EVR circuitry, are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for certain failures it detects.

The Check Gauges Lamp (if equipped) monitors: **charging system voltage,** engine coolant temperature and engine oil pressure. If an extreme condition is indicated, the lamp will be illuminated. This is done as reminder to check the three gauges. The lamp is located on the instrument panel.

Voltage is monitored at the B+ terminal stud to insure it is connected. If the B+ cable is loose, the PCM will shut down generator field. Because of this new feature, pin-2 of the field connector is internally connected to the B+ terminal.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ON-BOARD DIAGNOSTIC SYSTEM

The Powertrain Control Module (PCM) monitors critical input and output circuits of the charging system, making sure they are operational. A Diagnostic Trouble Code (DTC) is assigned to each input and output circuit monitored by the OBD system. Some circuits are checked continuously and some are checked only under certain conditions.

If the OBD system senses that a monitored circuit is bad, it will put a DTC into electronic memory. The DTC will stay in electronic memory as long as the circuit continues to be bad. The PCM is programmed to clear the memory after 40 good trip if the problem does not occur again.

DIAGNOSTIC TROUBLE CODES

A DTC description can be read using the scan tool. Refer to the appropriate Powertrain Diagnosis and Testing information.

A DTC does not identify which component in a circuit is bad. Thus, a DTC should be treated as a symptom, not

as the cause for the problem. In some cases, because of the design of the diagnostic test procedure, a DTC can be the reason for another DTC to be set. Therefore, it is important that the test procedures be followed in sequence, to understand what caused a DTC to be set.

ERASING DIAGNOSTIC TROUBLE CODES

The Scan Tool must be used to erase a DTC.

The following procedures may be used to diagnose the charging system if:

- the check gauges lamp or battery lamp is illuminated with the engine running
- the voltmeter (if equipped) does not register properly
- an undercharged or overcharged battery condition occurs.

Remember that an undercharged battery is often caused by:

- accessories being left on with the engine not running
- a faulty or improperly adjusted switch that allows a lamp to stay on. Refer to Ignition-Off Draw Test. Refer to **IGNITION-OFF DRAW TEST** .
- loose generator belt.

INSPECTION

The Powertrain Control Module (PCM) monitors critical input and output circuits of the charging system, making sure they are operational. A Diagnostic Trouble Code (DTC) is assigned to each input and output circuit monitored by the On-Board Diagnostic (OBD) system. Some charging system circuits are checked continuously, and some are checked only under certain conditions.

For more DTC information, refer to the **DTC INDEX** article. This will include a complete list of DTC's including DTC's for the charging system.

To perform a complete test of the charging system, refer to the appropriate Powertrain Diagnosis and Testing information and the scan tool. Perform the following inspections before attaching the scan tool.

1. Inspect the battery condition. Refer to **DIAGNOSIS AND TESTING** .
2. Inspect condition of battery cable terminals, battery posts, connections at engine block, starter solenoid and relay. They should be clean and tight. Repair as required.
3. Inspect all fuses in both the fuseblock and Power Distribution Center (PDC) or IPM (if equipped) for tightness in receptacles. They should be properly installed and tight. Repair or replace as required.
4. Inspect generator mounting bolts for tightness. Replace or tighten bolts if required. For torque specifications, refer to **TORQUE SPECIFICATIONS**.
5. Inspect generator drive belt condition and tension.
6. Inspect decoupler pulley (if equipped). Ensure decoupler pulley is driving the alternator rotor.
7. Inspect automatic belt tensioner (if equipped). Refer to **ACCESSORY DRIVE** for more information.
8. Inspect generator electrical connections at generator field, battery output, and ground terminal (if equipped). Also check generator ground wire connection at engine (if equipped). They should all be clean and tight. Repair as required.

SPECIFICATIONS

GENERATOR

MANUFACTURER	ENGINE	NOMINAL RATING	MINIMUM OUTPUT (AMPS) (@ SPECIFIED TEST CONDITIONS)
Denso	3.6L, 5.7L	160A	110A
Denso	3.6L, 5.7L	180A	120A
Denso	6.2L, 6.4L	220A	140A
TEST CONDITIONS			
1. Engine RPM : 2500 RPM (ENGINE HOT)			
2. Voltage Output : 13.0 - 16.0 V			

TORQUE SPECIFICATIONS

CHARGING SYSTEM TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Negative Battery Terminal Nut	5	-	45	Ā
Generator Mounting Bolts 3.6	25	18	-	Ā
Generator Mounting Bolts 5.7 - 6.4	54	40	Ā	Ā
Generator Mounting Bolts 6.2	54	40	-	Ā
Generator Support Bracket Bolt	65	48	-	Ā
Generator Support Bracket Nut	28	21	-	Ā
Generator B+ Output Cable Terminal Nut	14	10	124	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specification.				

GENERATOR

REMOVAL

3.6L

WARNING: Disconnect the negative battery cable before removing the battery output wire (B+ wire) from the generator. Failure to do so can result in injury or damage the electrical system.

1. Disconnect and isolate the negative battery cable (1).

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

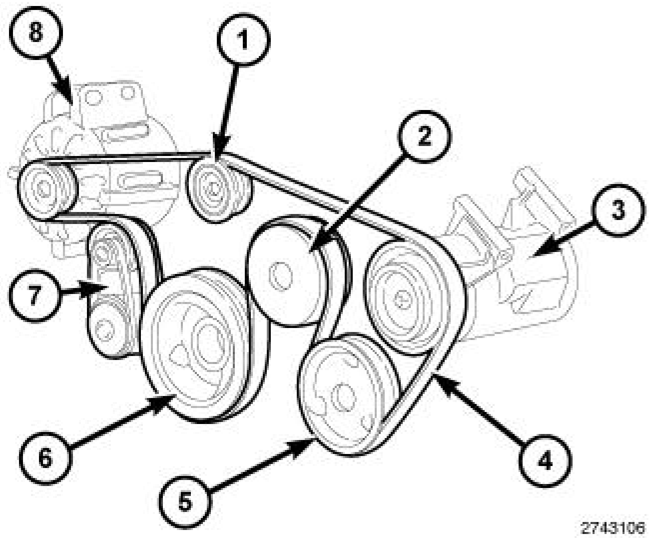


Fig. 2: Identifying Drive Belt Tensioners & Accessory Drive Belt
Courtesy of CHRYSLER GROUP, LLC

2. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts it's stop and remove the accessory drive belt (4), then slowly rotate the tensioner into the freearm position.

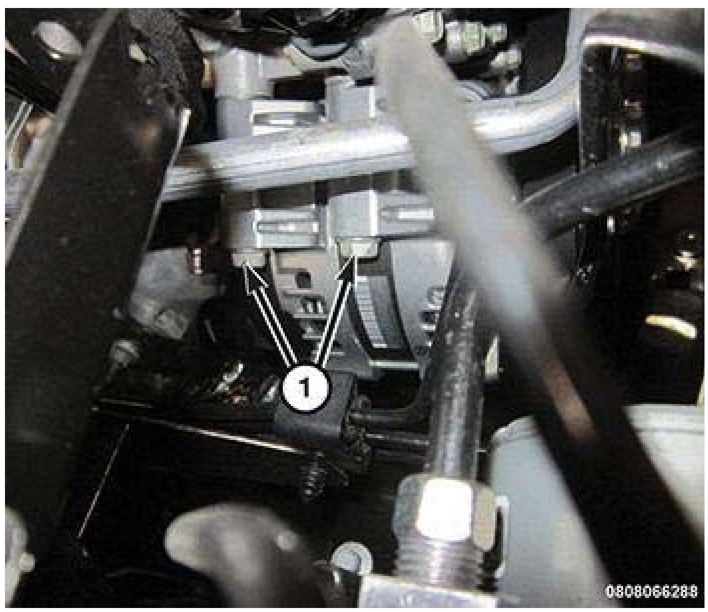
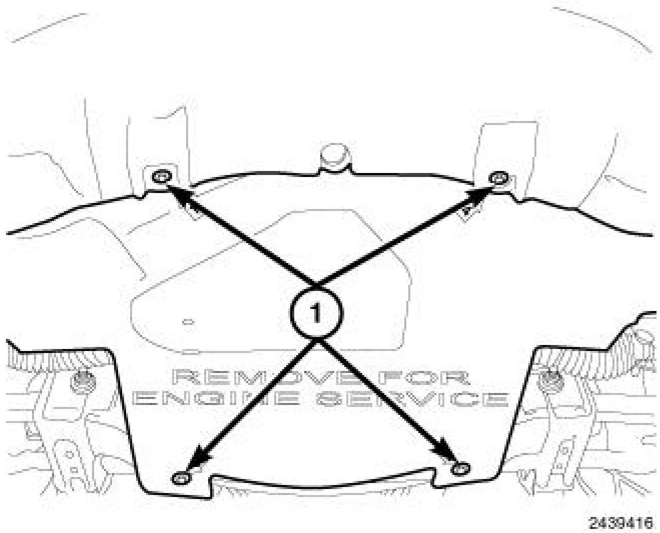


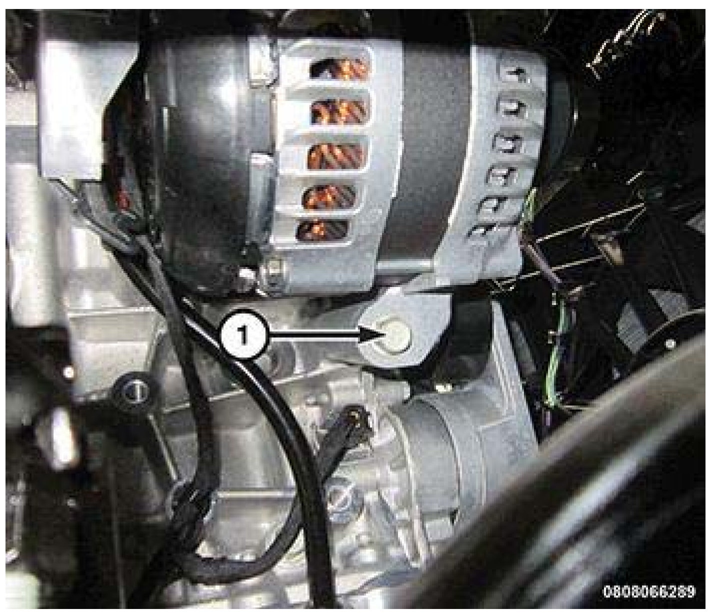
Fig. 3: Upper Generator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the upper generator retaining bolts (1).
4. Remove the insulator cover from the B+ output terminal at the rear of the generator.
5. Remove the B+ terminal retaining nut at the rear of the generator and remove the B+ terminal.
6. Depress the field wire connector tab at the rear of the generator and disconnect the field wire connector (2).



[Fig. 4: Lower Splash Shield & Fasteners](#)
Courtesy of CHRYSLER GROUP, LLC

7. Raise and support the vehicle.
8. Remove the belly pan retainers (1) and remove the belly pan.



[Fig. 5: Lower Generator Retaining Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

9. Remove the lower generator retaining bolt (1).
10. Remove the generator from below the engine compartment.

5.7L AND 6.4L

WARNING: **Disconnect the negative battery cable before removing the battery output wire (B+ wire) from the generator. Failure to do so can result in injury or damage the electrical system.**

1. Disconnect and isolate the negative battery cable.

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

2. Rotate the accessory drive belt tensioner clockwise until it contacts the stop and remove the accessory drive belt, then slowly rotate the tensioner into the freearm position.

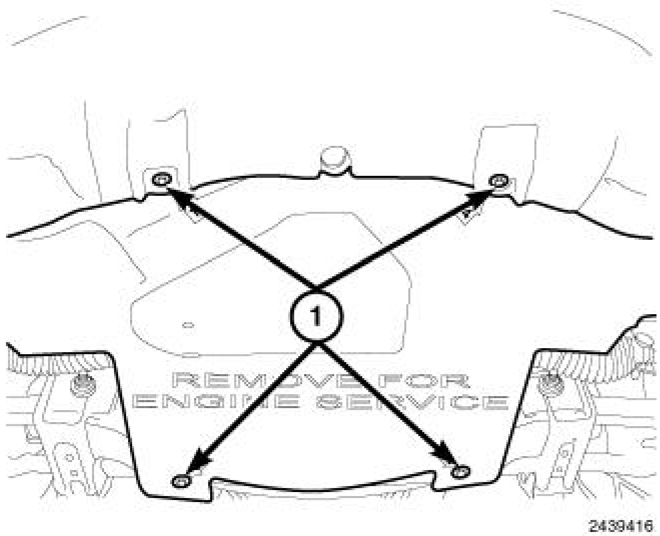


Fig. 6: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Raise and support the vehicle.
4. Remove the belly pan retainers (1) and remove the belly pan.
5. Depress the field wire connector tab at the rear of the generator and disconnect the field wire connector.
6. Remove the insulator cover from B+ output terminal at the rear of the generator.
7. Remove the B+ terminal retaining nut at the rear of the generator and remove the B+ terminal.

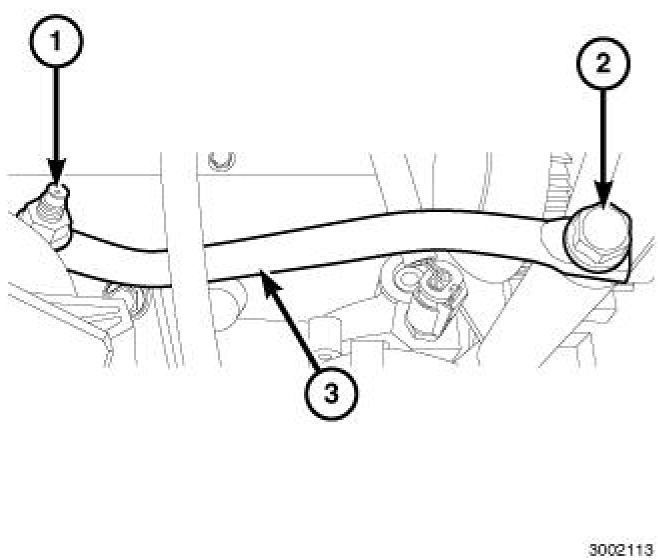


Fig. 7: Support Bracket, Bolt & Nut

Courtesy of CHRYSLER GROUP, LLC

8. Remove the generator support bracket to engine mount retaining nut (1).
9. Remove the generator support bracket retaining bolt (2) and remove the support bracket (3).

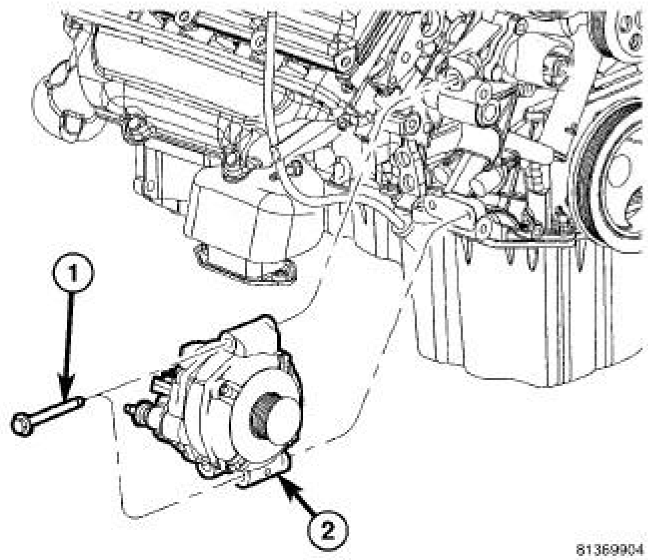


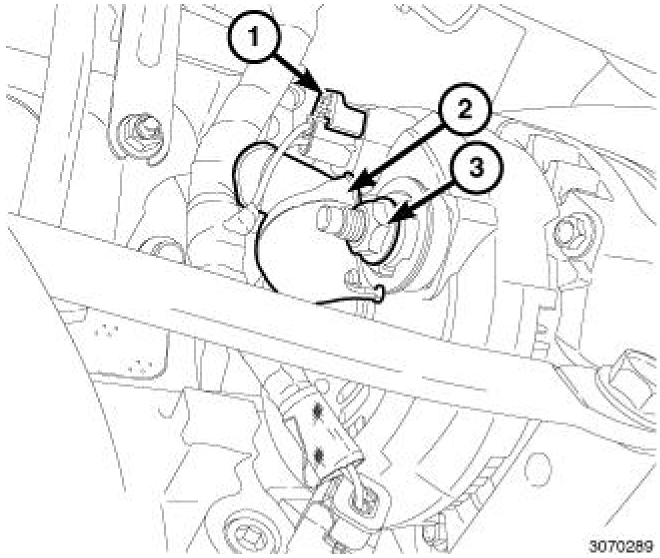
Fig. 8: Generator & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Remove the remaining lower generator retaining bolt (1).
11. Lower the vehicle.
12. Remove the upper generator retaining bolt (1) and remove the generator (2) from the vehicle.

6.2L

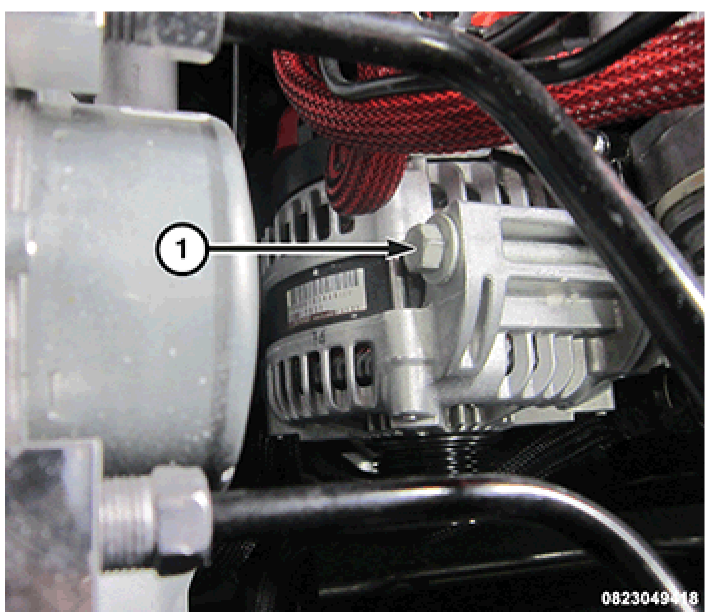
WARNING: Disconnect the negative battery cable before removing the battery output wire (B+ wire) from the generator. Failure to do so can result in injury or damage the electrical system.

1. Disconnect and isolate the negative battery cable (1).
2. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL** .
3. Raise and support the vehicle.
4. Remove the belly pan retainers (1) and remove the belly pan.



[Fig. 9: Connector Tab, Insulator Cover And Retaining Nut]
Courtesy of CHRYSLER GROUP, LLC

5. Depress the field wire connector tab (1) at the rear of the generator and disconnect the field wire connector.
6. Remove the insulator cover (2) from B+ output terminal at the rear of the generator.
7. Remove the B+ terminal retaining nut (3) at the rear of the generator and remove the B+ terminal.
8. Unsnap the plastic insulator cap from B+ output terminal at the rear of the generator.
9. Remove the B+ terminal retaining nut at the rear of the generator and remove the B+ terminal.
10. Depress the field wire connector tab at the rear of the generator and disconnect the field wire connector.



[Fig. 10: Lower Generator Retaining Bolt]
Courtesy of CHRYSLER GROUP, LLC

11. Remove the lower generator retaining bolt (1).
12. Lower the vehicle.

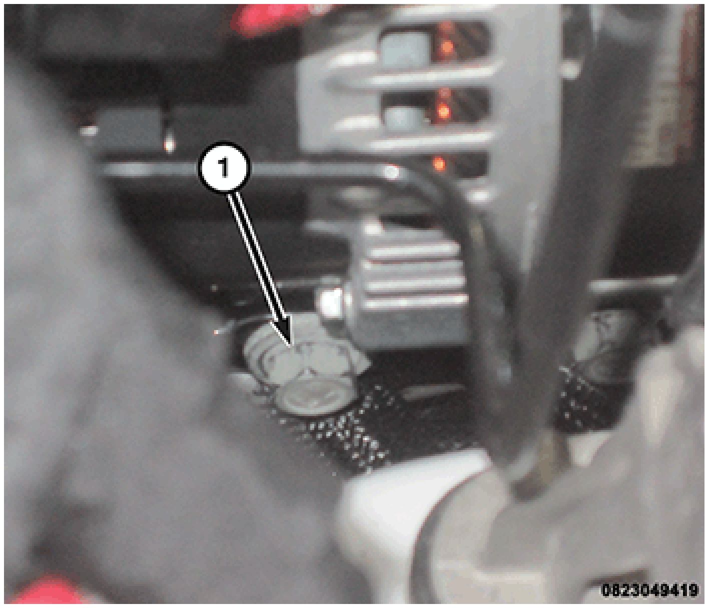


Fig. 11: Upper Generator Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

13. Remove the upper generator retaining bolts (1) and remove the generator from the vehicle.

INSTALLATION

3.6L

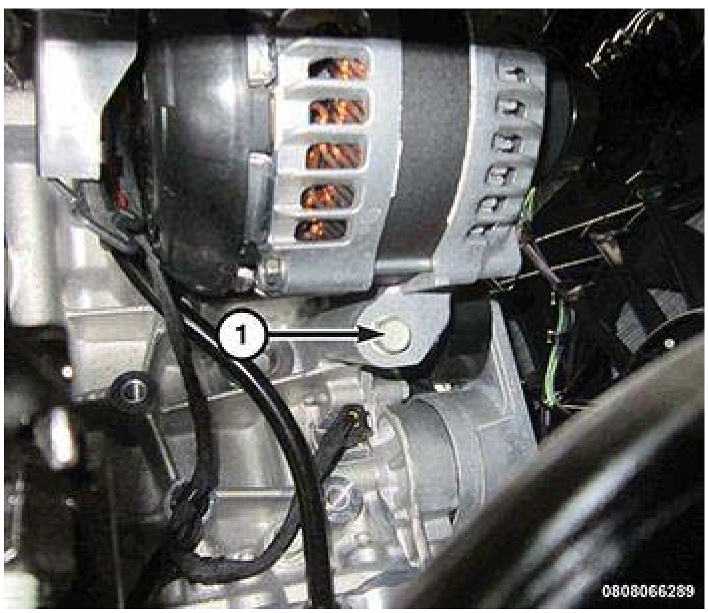


Fig. 12: Lower Generator Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Position the generator, install all bolts to engine finger tight, then tighten fasteners to specification.**

1. Position the generator to the engine and install the lower retaining bolt (1) finger tight.
2. Lower the vehicle.

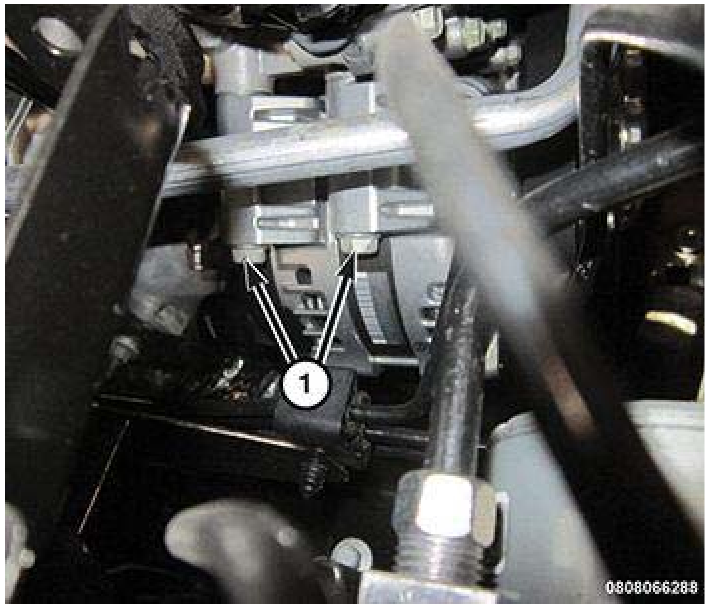


Fig. 13: Upper Generator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the upper generator retaining bolts (1) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Snap the field wire connector into the rear of the generator.
5. Position the generator B+ terminal eyelet to the generator output stud, install the retaining nut and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
6. Install the insulator cover onto the B+ output terminal.
7. Raise and support the vehicle.

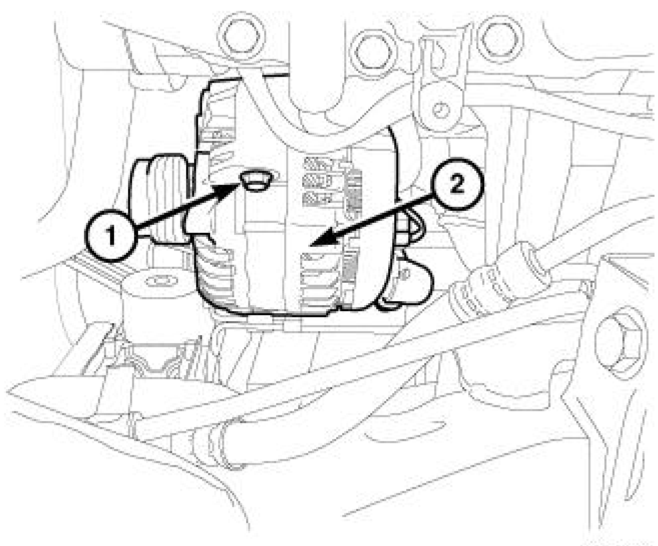
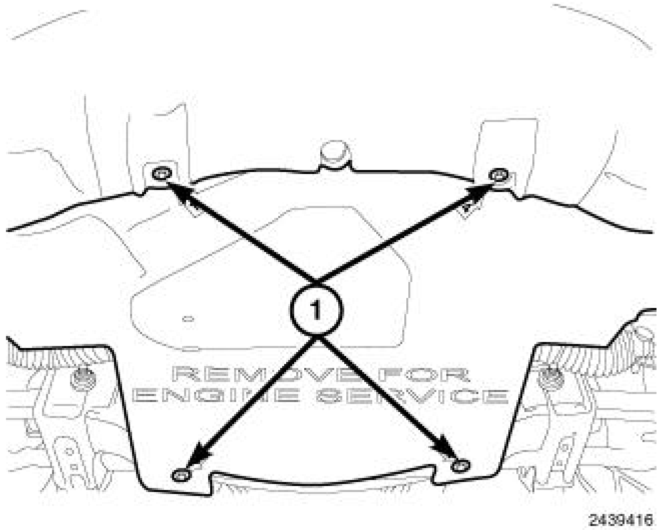


Fig. 14: Generator Retaining Bolt And Generator
Courtesy of CHRYSLER GROUP, LLC

8. Tighten the lower generator retaining bolt to the proper torque specification. Refer to **SPECIFICATIONS**.

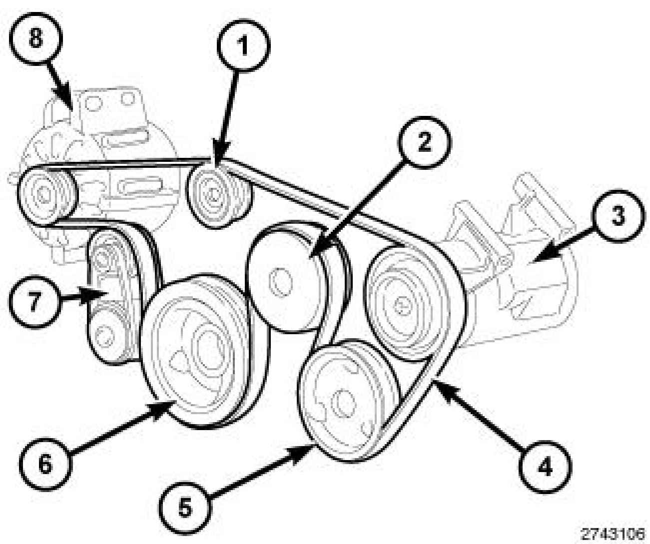


[Fig. 15: Lower Splash Shield & Fasteners](#)
Courtesy of CHRYSLER GROUP, LLC

9. Position the belly pan and install the belly pan retainers (1).
10. Lower the vehicle.

CAUTION: When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump will be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat.

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.



[Fig. 16: Drive Belt Tensioners & Accessory Drive Belt Routing](#)
Courtesy of CHRYSLER GROUP, LLC

11. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts the stop and install the accessory drive belt (4) onto the pulleys and slowly release the tensioner.

12. Connect the negative battery cable and tighten nut to the proper torque specification. Refer to **SPECIFICATIONS**.

5.7L AND 6.4L

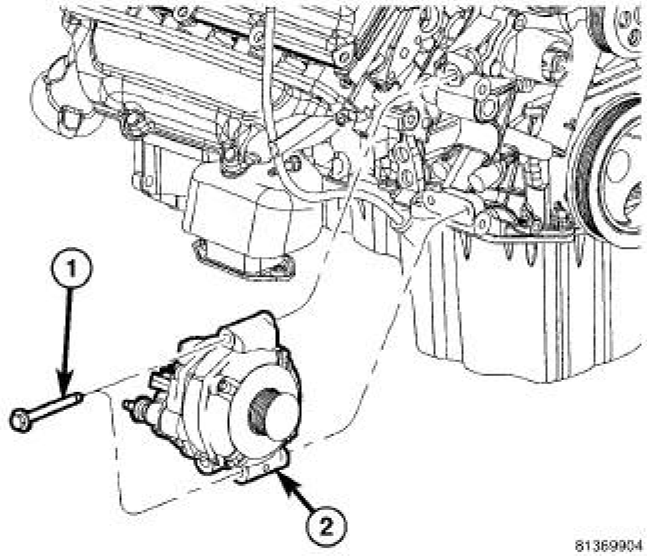


Fig. 17: Generator & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the generator (2) and install the upper generator retaining bolt (1) finger tight.
2. Raise and support the vehicle.

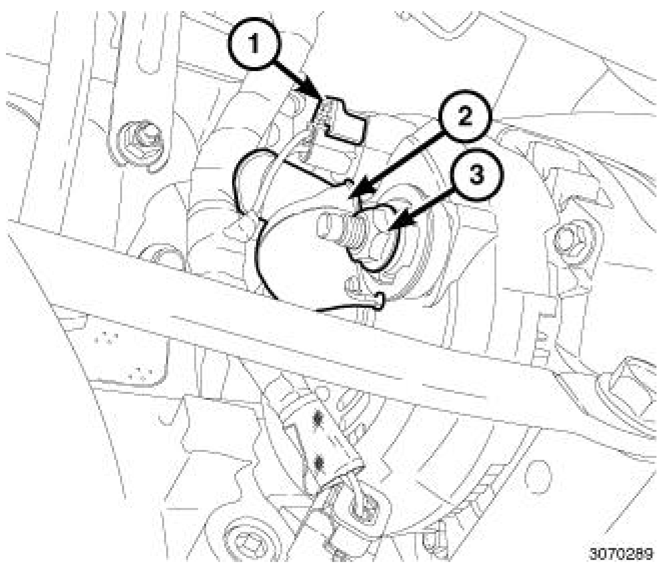
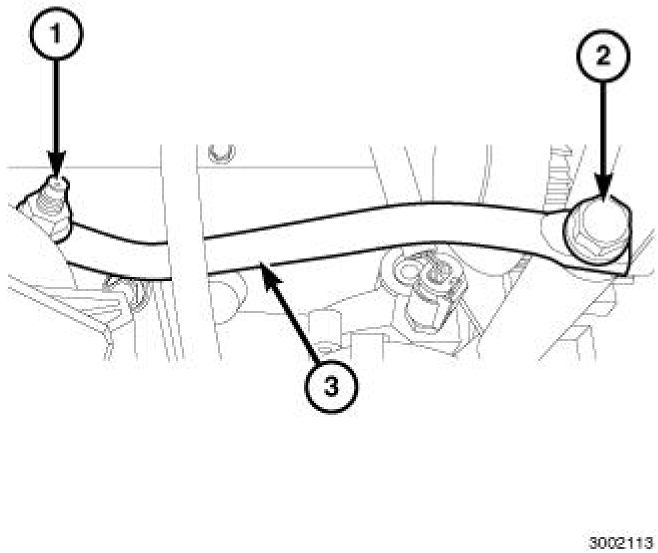


Fig. 18: Connector Tab, Insulator Cover And Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

3. Position the generator B+ terminal eyelet to the generator output stud, install the retaining nut (3) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Install the insulator cover (2) onto the B+ output terminal.
5. Snap the field wire connector (1) into the rear of the generator.



[**Fig. 19: Support Bracket, Bolt & Nut**]
Courtesy of CHRYSLER GROUP, LLC

6. Position the generator support bracket (3) to the engine mount, install the retaining nut (1) finger tight.
7. Position the generator support bracket (3) to the generator and install the retaining bolt (2) finger tight.
8. Install the remaining generator retaining bolt and tighten both lower retaining bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
9. Tighten the generator support bracket (3) to engine mount retaining nut (1) to the proper torque specification. Refer to **SPECIFICATIONS**.

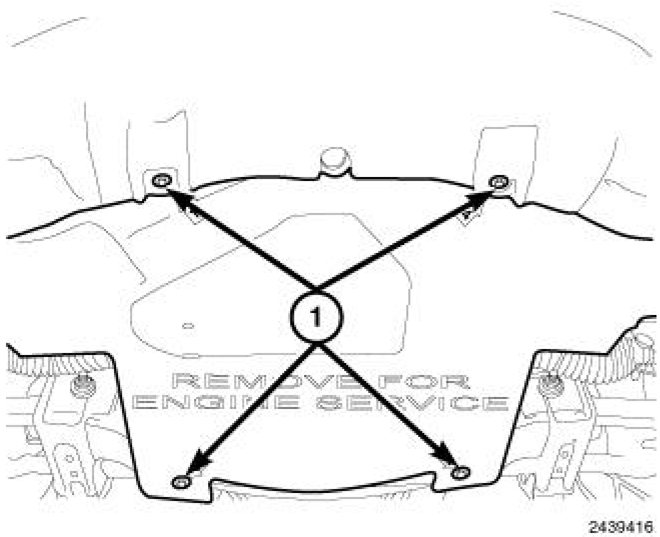


Fig. 20: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. Position the belly pan and install the belly pan retainers (1).
11. Lower the vehicle.
12. Tighten the generator upper retaining bolt to the proper torque specification. Refer to **SPECIFICATIONS**.

CAUTION: **When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump may be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat.**

CAUTION: **Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.**

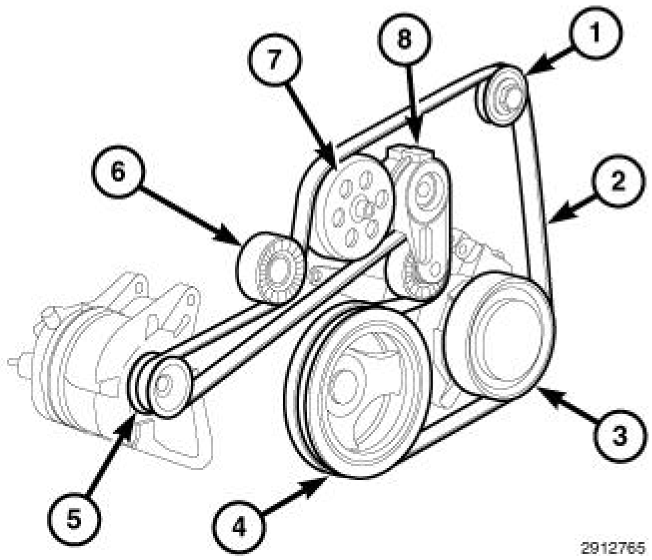


Fig. 21: Identifying Drive Belt Tensioner And Drive Belt
Courtesy of CHRYSLER GROUP, LLC

13. Rotate the accessory drive belt tensioner (8) clockwise until it contacts the stop, install the accessory drive belt (2) onto the pulleys and slowly release the tensioner.
14. Connect the negative battery cable and tighten the nut to the proper torque specification. Refer to **SPECIFICATIONS**.

6.2L

1. Position the generator and install the two upper generator retaining bolts finger tight.
2. Raise and support the vehicle.

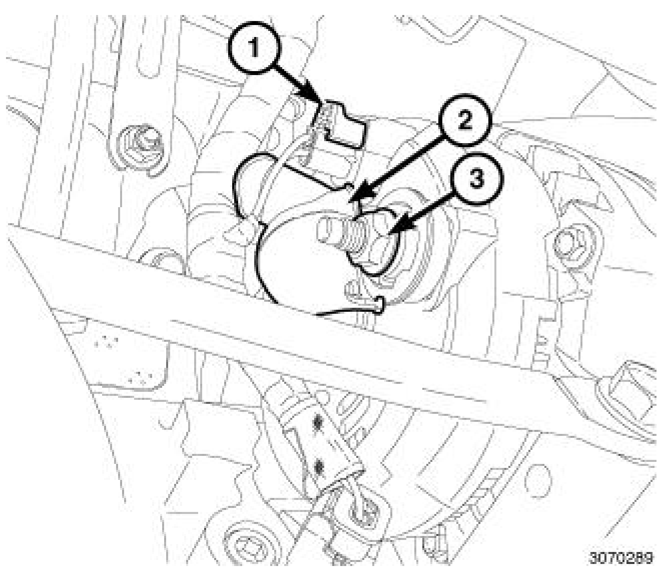


Fig. 22: Connector Tab, Insulator Cover And Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

3. Position the generator B+ terminal eyelet to the generator output stud, install the retaining nut (3) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Install the insulator cover (2) onto the B+ output terminal.
5. Snap the field wire connector (1) into the rear of the generator.

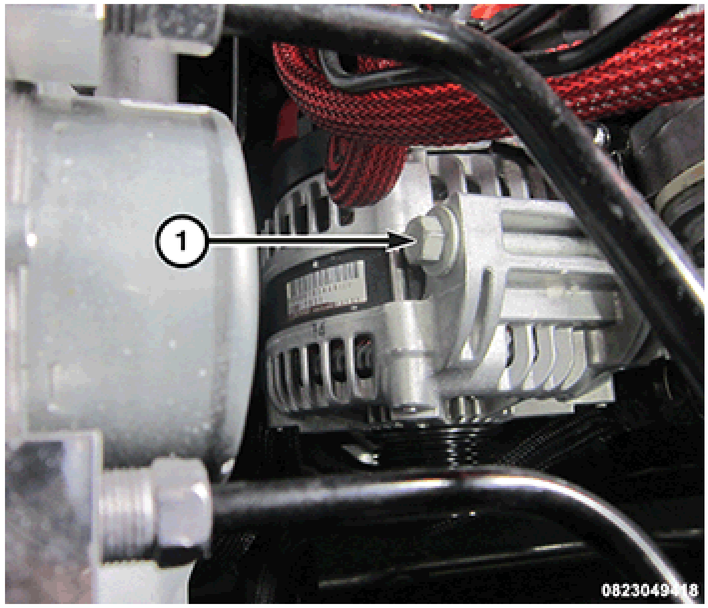


Fig. 23: Lower Generator Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Tighten the lower retaining bolt to the proper torque specification. Refer to **SPECIFICATIONS**.

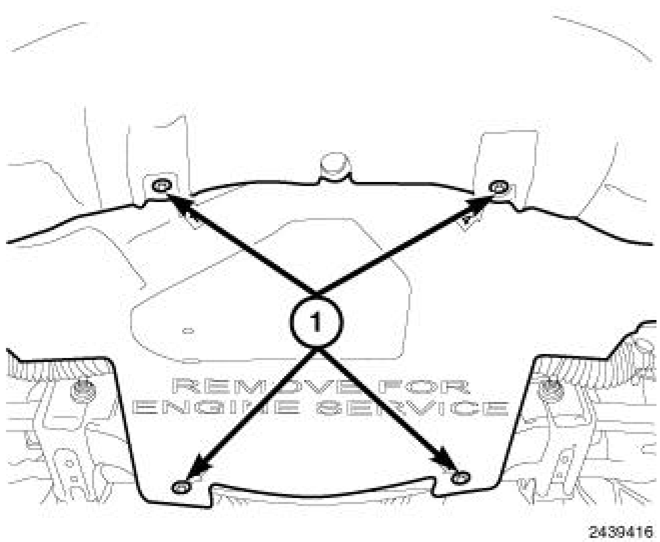


Fig. 24: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Position the belly pan and install the belly pan retainers (1).

8. Lower the vehicle.

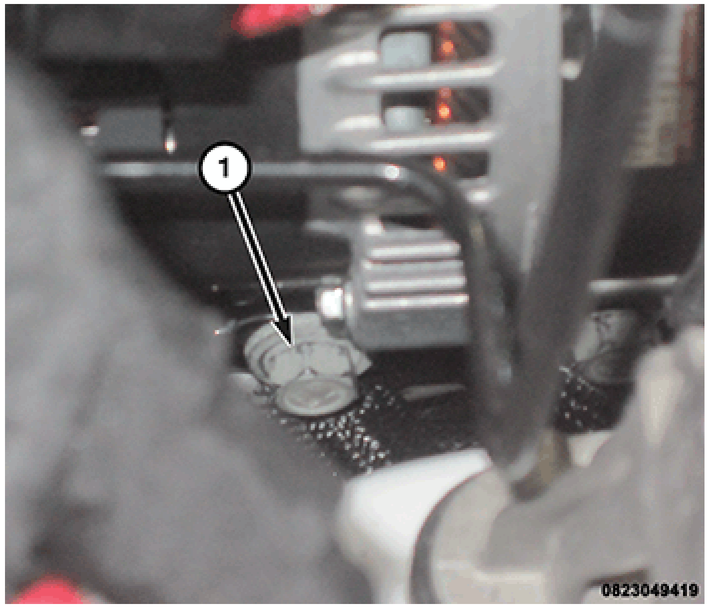


Fig. 25: Upper Generator Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Install and tighten the generator upper retaining bolts to the proper torque specification. Refer to **SPECIFICATIONS**.

CAUTION: When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump may be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat.

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

10. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
11. Connect the negative battery cable and tighten the nut to the proper torque specification. Refer to **SPECIFICATIONS**.

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Article GUID: A00735937

2015-16 GENERAL INFORMATION

Circuit Testing Procedures - Challenger

WARNING

GENERAL WARNINGS

WARNINGS provide information to prevent personal injury and vehicle damage. Below is a list of general warnings that should be followed any time a vehicle is being serviced.

WARNING: Always wear safety glasses for eye protection.

WARNING: Use safety stands anytime a procedure requires being under a vehicle.

WARNING: Be sure that the ignition switch is always in the off position, unless the procedure requires it to be on.

WARNING: Set the parking brake when working on any vehicle. An automatic transmission should be in park. A manual transmission should be in neutral.

WARNING: Operate the engine only in a well-ventilated area.

WARNING: Keep away from moving parts when the engine is running, especially the fan and belts.

WARNING: To prevent serious burns, avoid contact with hot parts such as the radiator, exhaust manifold(s), tail pipe, catalytic converter and muffler.

WARNING: Do not allow flame or sparks near the battery. Gases are always present in and around the battery.

WARNING: Always remove rings, watches, loose hanging jewelry and avoid loose clothing.

DESCRIPTION

CIRCUIT FUNCTIONS

All circuits in the wiring diagrams use an alpha/numeric code to identify the wire and its function. To identify which circuit code applies to a system, refer to the CIRCUIT IDENTIFICATION CODE CHART.

NOTE: This chart shows the main circuits only and does not show the secondary codes that may apply to some models.

CIRCUIT IDENTIFICATION CODE CHART

CIRCUIT CODE	FUNCTION
A	BATTERY FEED

CIRCUIT CODE	FUNCTION
B	BRAKE CONTROLS
C	CLIMATE CONTROLS
D	DIAGNOSTIC CIRCUITS
E	DIMMING ILLUMINATION CIRCUITS
F	FUSED CIRCUITS
G	MONITORING CIRCUITS (GAUGES)
H	MULTIPLE
I	NOT USED
J	OPEN
K	POWERTRAIN CONTROL MODULE
L	EXTERIOR LIGHTING
M	INTERIOR LIGHTING
N	MULTIPLE
O	NOT USED
P	POWER OPTION (BATTERY FEED)
Q	POWER OPTIONS (IGNITION FEED)
R	PASSIVE RESTRAINT
S	SUSPENSION/STEERING
T	TRANSMISSION/TRANSAXLE/ TRANSFER CASE
U	OPEN
V	SPEED CONTROL, WIPER/WASHER
W	WIPERS
X	AUDIO SYSTEMS
Y	TEMPORARY
Z	GROUNDS

CIRCUIT INFORMATION

Each wire shown in the wiring diagrams contains a code which identifies the main circuit, a specific portion of the main circuit, gauge of wire, and color.

As an example, circuit **A 2 18 LB/YL** is decoded in the following manner:

Circuit Type:	**A** (Battery Feed Circuit)
Circuit Level:	**2** (Level Two)
Wire Size:	**18** (Eighteen Gauge Wire)
Wire Color:	**LB/YL** (Light Blue with Yellow Tracer)

WIRE COLOR CODE CHART

COLOR CODE	COLOR
BL	BLUE
BK	BLACK
BR	BROWN

COLOR CODE	COLOR
DB	DARK BLUE
DG	DARK GREEN
GY	GRAY
LB	LIGHT BLUE
LG	LIGHT GREEN
OR	ORANGE
PK	PINK
RD	RED
TN	TAN
VT	VIOLET
WT	WHITE
YL	YELLOW
*	WITH TRACER

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
WIRING	WIRING HARNESS TESTING

DIAGNOSIS AND TESTING

WIRING HARNESS TESTING

TROUBLESHOOTING TOOLS

When diagnosing a problem in an electrical circuit there are several common tools necessary. These tools are listed and explained below:

Voltmeter

The voltmeter is used to measure the electrical pressure or the voltage difference between two points. A voltmeter reads available voltages such as battery voltage, generator output voltage, and voltage drop across a component or conductor. A high voltage drop may indicate a high resistance in the circuit. The voltmeter can be used to locate an open circuit and circuits with an unintentional ground. Observing polarity, always connect a voltmeter in parallel to the existing circuit. If the leads are reversed on a digital multimeter, a minus sign appears in the display.

CAUTION: Most of the electrical components used in today's vehicles are Solid State. When checking voltages in these circuits, use a meter with a 10 - megohm or greater impedance rating.

Ohmmeter

The ohmmeter is used to measure the resistance of a component or the resistance between two points in a circuit in ohms, and to check a portion of the circuit for continuity. Some meters have a built-in tone to indicate that the

circuit has continuity. No resistance indicates a short circuit or unintentional ground whereas resistance that is higher than specification indicates a high resistance in the circuit such as a loose, dirty or corroded connection, or a defective component. An "OL" reading means that the circuit or component had infinite resistance; an open circuit or defective component is indicated. Ohmmeters have an internal battery and must never be connected to a power circuit. Connecting an ohmmeter to a powered circuit causes the meter fuse to blow and can damage its dry cell battery. Ohmmeters can be connected into a circuit without regard to polarity, unless the circuit contains a diode. When using an ohmmeter, the component or portion of the circuit must be isolated from other components or branches to avoid false readings.

CAUTION: Most of the electrical components used in today's vehicles are Solid State. When checking resistance in these circuits use a meter with a 10 - megohm or greater impedance rating. In addition, make sure the power is disconnected from the circuit. Circuits that are powered up by the vehicle's electrical system can cause damage to the equipment and provide false readings.

Ammeter

Amperage or current is the measure of the rate of electron "flow" in a circuit. It is measured in the unit of the Ampere, simply called an Amp (A). In order to measure current in a circuit, the circuit must be broken or opened, and an ammeter must be inserted in series (in-line) with the circuit so that all the current that flows through the circuit will have to go through the meter. When measuring current in this manner, it requires the meter be made part of the circuit, this type of measurement is more difficult than measuring either voltage or resistance.

When an ammeter is placed in series with a circuit, it ideally drops no voltage as current goes through it. In other words, it acts very much like a piece of wire, with very little resistance from one test probe to the other. Consequently, an ammeter will act as a short circuit if placed in parallel (across the terminals of) a substantial source of voltage. If this is done, a surge in current will result, potentially damaging the meter. Ammeters are generally protected from excessive current by means of a small fuse located inside the meter housing. If the ammeter is accidently connected across a substantial voltage source, the resultant surge in current will "blow" the fuse and render the meter incapable of measuring current until the fuse is replaced.

Consult the owner's manual of the particular model of meter you own for details on measuring current.

CAUTION: Do not crank the engine or turn on any accessories that may draw more than 10 Amps. You may open the protective fuse in the multimeter.

12-Volt Test Light

The 12-Volt test light when properly used, is one of the best and quickest pieces of test equipment available for troubleshooting 12-volt power systems. It's especially good for times when there are only two voltages, battery voltage and no voltage. For example, if you're checking to see if you have 12-volts on the Battery(+), the test light will immediately tell you if voltage is present or not.

With any test equipment, you should confirm that it's in good working order before you begin testing. For a test light, you have to have a voltage source. Connect the test light's ground clip to a good ground and touch it to a point where you believe that there is 12-volt supply. If the light doesn't light up, check the light by connecting it directly across the battery. Initially, make sure that you have the ground clip on the negative battery terminal. If you touch the probe to the positive terminal, the test light should light up. If it doesn't and the battery is not

completely dead, the test light isn't working properly. The test light must be in proper working order before any circuit testing can occur.

Jumper Wire

The sole purpose of the jumper wire is to complete a circuit. It is nothing more than a suitable length of insulated wire with terminals or connectors on each end. Jumper wires may be bought or made with various sizes of wire and styles of terminals including alligator clips, spade lugs and pin plugs, and should include a fuse device of some type for circuit and component protection. A jumper wire is used to verify a faulty conductor by substituting a known good one. It is jumped across a suspicious conductor in the circuit. If the circuit works with the jumper, but not without, there is an open somewhere in the area being jumped. A jumper wire is ONLY used to bypass a faulty conductor (including switches and connectors). NEVER bypass a load device with a jumper wire. The circuit needs the resistance from the load device and shorting across it causes high current flow, which could damage other components.

WARNING: Never use a jumper wire across a load, such as a motor, connected between a battery feed and ground.

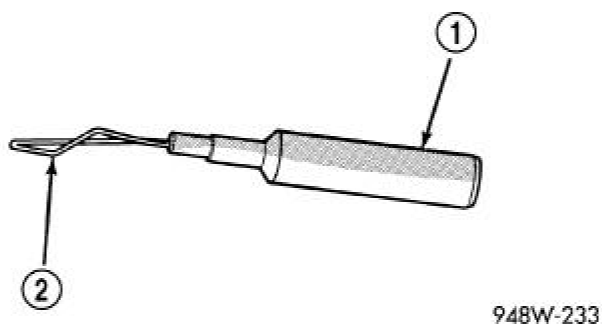


Fig. 1: Probing Tool
Courtesy of CHRYSLER GROUP, LLC

1 - SPECIAL TOOL 6801	
2 - PROBING END	

Probing Tools

These tools are used for probing terminals in connectors. Select the proper size tool from Special Tool Package (special tool #6807, Terminal Tools), and insert the probing end (2) into the terminal being tested. Use the other end of the tool (1) to insert the meter probe.

INTERMITTENT AND POOR CONNECTIONS

Most intermittent electrical problems are caused by faulty electrical connections or wiring. It is also possible for a sticking component or relay to cause a problem.

Before condemning a component or wiring assembly, check the following items:

- Connectors are fully seated
- Spread terminals, or terminal push out

- Terminals in the wiring assembly are fully seated into the connector/component and locked into position
- Dirt or corrosion on the terminals. Any amount of corrosion or dirt could cause an intermittent problem
- Damaged connector/component casing exposing the item to dirt or moisture
- Wire insulation that has rubbed through causing a short to ground
- Some or all of the wiring strands broken inside of the insulation
- Wiring broken inside of the insulation

TROUBLESHOOTING WIRING PROBLEMS

When troubleshooting wiring problems there are six steps which can aid in the procedure. The steps are listed and explained below. Always check for non-factory items added to the vehicle before doing any diagnosis. If the vehicle is equipped with these items, disconnect them to verify these add-on items are not the cause of the problem.

Perform the following Six Step Diagnosis Process:

1. Verify the problem.
2. Verify any related symptoms. Do this by performing operational checks on components that are in the same circuit (refer to appropriate SYSTEM WIRING DIAGRAMS article).
3. Analyze the symptoms. Use the wiring diagrams to determine what the circuit is doing, where the problem most likely is occurring and where the diagnosis will continue.
4. Isolate the problem area.
5. Repair the problem area.
6. Verify the proper operation. For this step, check for proper operation of all items on the repaired circuit (refer to appropriate SYSTEM WIRING DIAGRAMS article).

NOTE:	**The Six Step Diagnosis Process used by Chrysler is a time proven process. The basic concepts of this process have been used by others for problem solving for many years. The successful application of this process requires a solid understanding of the conditions that affect each step, and when its time to advance to the next step. These conditions based on experience formulate what is known as "Best Practices".**

STANDARD PROCEDURE

CHECK A 12-VOLT FUSED BATTERY B(+) CIRCUIT FOR VOLTAGE

THEORY OF OPERATION

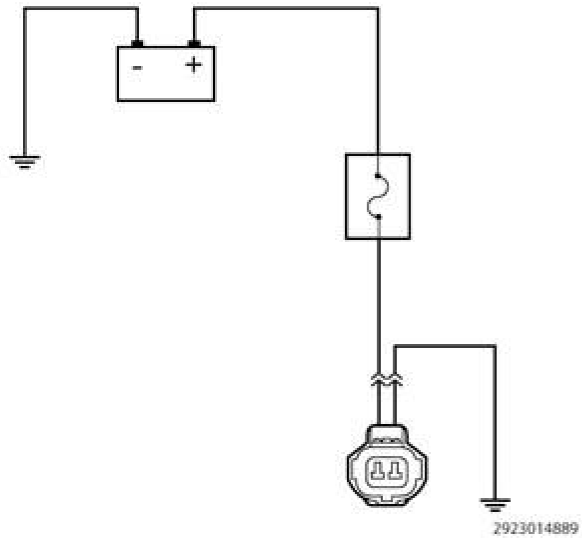


Fig. 2: 12-Volt Fused Battery B(+) Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

The purpose of the following procedure(s) is to demonstrate how to check the voltage of a 12-volt fused battery B(+) circuit with a test light or voltmeter.

NOTE: **The circuit shown in illustration is an example, and is intended for demonstrational purpose only.**

The following are circuit tests covered in this procedure:

- Testing 12-Volt Fused Battery B(+) Circuit Voltage With A Test Light
- Testing 12-Volt Fused Battery B(+) Circuit Voltage With A Voltmeter

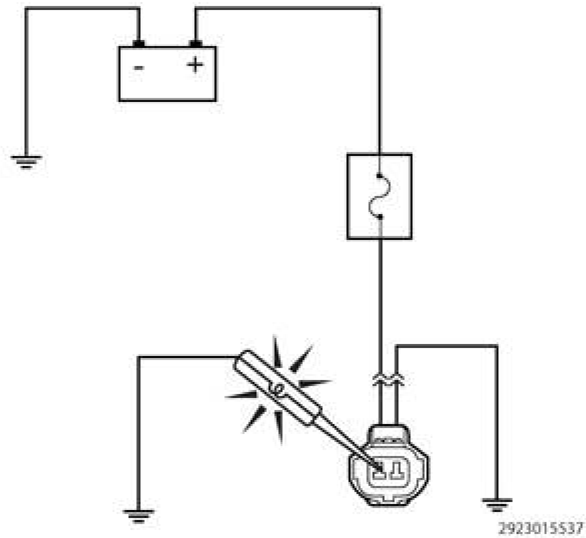
NOTE: **Perform the following test using a known good test light or functioning multimeter.**

Below is a list of possible causes that could be related to a No Voltage condition.

Possible Causes
OPEN CIRCUIT (CHAFED, PIERCED, PINCHED OR BROKEN WIRES)
OPEN FUSE
OPEN IN-LINE CONNECTOR (BENT, PUSHED OUT OR CORRODED TERMINALS)

DIAGNOSTIC TEST

1. **TESTING 12-VOLT FUSED BATTERY B(+) CIRCUIT VOLTAGE WITH A TEST LIGHT**



[Fig. 3: Testing 12-Volt Fused Battery B(+) Circuit Voltage With Test Light]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before testing any circuits, first verify the 12-volt test light is operating properly. Connect the 12-volt test light to battery ground or to any other known good ground. Touch the lead of the test light to Battery(+). If the test light is operational, it should illuminate brightly.**

1. Turn the ignition off.
2. Disconnect the wire harness connector from the component that is being tested.

   NOTE: **Check connectors - Clean/repair as necessary.**

3. At this time, leave all in-line connectors connected.
4. Connect the 12-volt test light to a known good ground.
5. Use the test light lead to carefully probe the Battery or Ignition voltage circuit in the harness connector.
6. First check with the ignition off, next check with the ignition on, and lastly check while cranking the engine.

   Does the test light illuminate brightly?

   Yes

   - The circuit is not open at this time or the condition that originally caused the open may not be present at this time. Continue to monitor the test light and wiggle the wire harness and connectors to check for an intermittent open or excessive resistance condition.
   - Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the open could occur intermittently.
   - Look for any chafed, pierced, pinched, or partially broken wires.
   - Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.

- Perform any Technical Service Bulletins (TSBs) that may apply.

No

- Repair the open in the circuit. Use the wiring diagram as a guide to trace the circuit and look for any in-line connectors where the open could occur.
- One method to help isolate the open is to disconnect any in-line connectors and measure the resistance from one side of the in-line connector to the matching component harness connector. If the open goes away, the open is on the other side of the in-line connector.
- If this is a fused circuit, make sure to inspect the fuse. If the fuse is open, check the circuit for a short to ground before installing a new fuse. The circuit may have a short to ground causing the fuse to open. This short to ground could be in the wire harness or in one of the components the circuit is supplying voltage to.

2. **TESTING 12-VOLT FUSED BATTERY B(+) CIRCUIT VOLTAGE WITH A VOLTMETER**

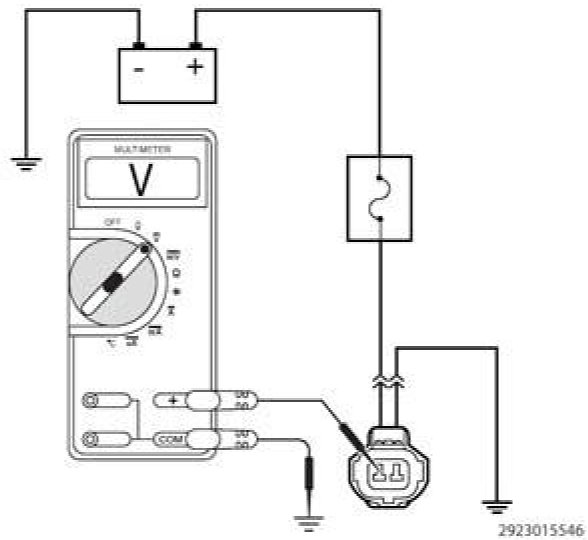


Fig. 4: Testing 12-Volt Fused Battery B(+) Circuit Voltage With Voltmeter
Courtesy of CHRYSLER GROUP, LLC

NOTE: The connector displayed in the graphics are only an example.

1. Turn the ignition off.
2. Disconnect the wire harness connector from the component that is being tested.

NOTE: Check connectors - Clean/repair as necessary.

3. At this time leave all in-line connectors connected.
4. Use a multimeter set to measure DC voltage.
5. Connect the ground lead of the meter to a known good ground.
6. Use the positive lead of the multimeter and probe the circuit that is being checked for voltage.
7. Ignition on, engine not running.

Is the voltage within specifications for this circuit?

Yes

- The circuit is functioning properly or the condition that originally caused the open or short may not be present at this time. Continue to measure the voltage and wiggle the wire harness and connectors while checking for an intermittent open or short.
- Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur intermittently.
- Look for any chafed, pierced, pinched, or partially broken wires.
- Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.
- Perform any Technical Service Bulletins (TSBs) that may apply.

No

- Repair the open or short to ground in the circuit. Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur.
- One method to help isolate the open or short is to disconnect any in-line connectors that the circuit being checked runs through and check for the voltage again. If the voltage is present, the open or short is on the other side of the in-line connector.

CHECK A 12-VOLT SWITCHED BATTERY B(+) CIRCUIT FOR VOLTAGE

THEORY OF OPERATION

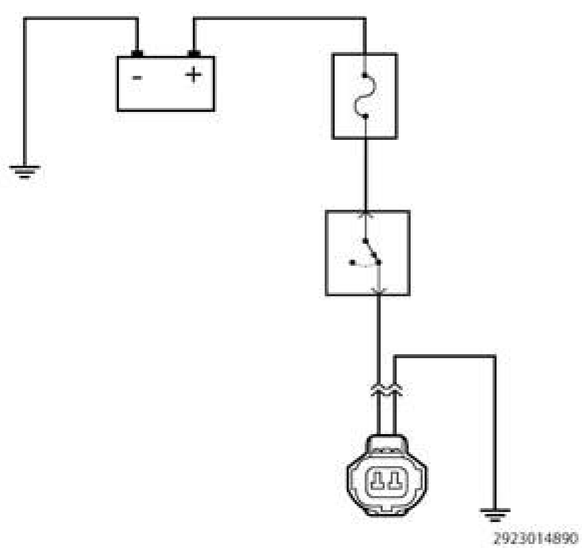


Fig. 5: 12-Volt Switched Battery B(+) Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

The purpose of the following procedure is to demonstrate how to check the voltage of a 12-Volt switched battery B(+) circuit with a test light or voltmeter.

NOTE:	**The circuit shown in illustration is an example, and is intended for demonstrational purpose only.**

The following are circuit tests covered in this procedure:

- Testing 12-Volt Switched Battery B(+) Circuit Voltage With A Test Light
- Testing 12-Volt Switched Battery B(+) Circuit Voltage With A Voltmeter

NOTE: Perform the following test using a known good test light or functioning multimeter.

Below is a list of possible causes that could be related to a No Voltage condition.

Possible Causes
OPEN CIRCUIT (CHAFED, PIERCED, PINCHED OR BROKEN WIRES)
OPEN FUSE
OPEN IN-LINE CONNECTOR (BENT, PUSHED OUT OR CORRODED TERMINALS)

DIAGNOSTIC TEST

1. **TESTING 12-VOLT SWITCHED BATTERY B(+) CIRCUIT VOLTAGE WITH A TEST LIGHT**

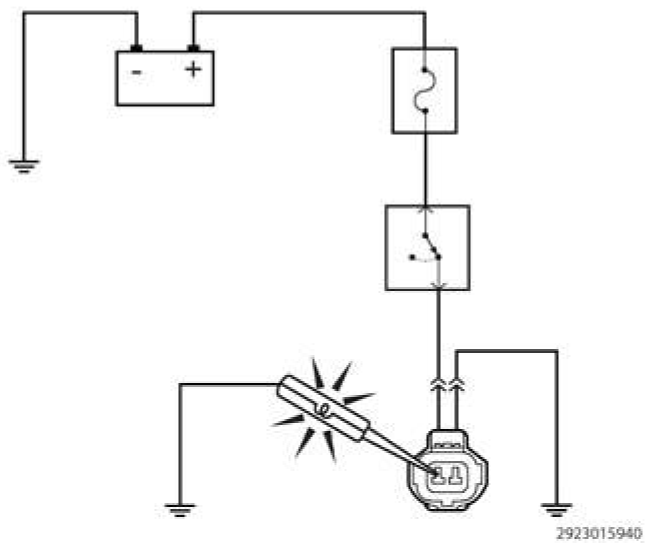


Fig. 6: Testing 12-Volt Switched Battery B(+) Circuit Voltage With Test Light
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before testing any circuits, first verify the 12-volt test light is operating properly. Connect the 12-volt test light to battery ground or to any other known good ground. Touch the lead of the test light to Battery(+). If the test light is operational, it should illuminate brightly.

1. Turn the ignition off.
2. Disconnect the wire harness connector from the component that is being tested.

NOTE: Check connectors - Clean/repair as necessary.

3. At this time, leave all in-line connectors connected.
4. Connect the 12-volt test light to a known good ground.
5. Use the test light lead to carefully probe the Battery or Ignition voltage circuit in the harness

connector.

6. First check with the ignition off, next check with the ignition on, and lastly check while cranking the engine.

   Does the test light illuminate brightly?

   Yes

   - The circuit is not open at this time or the condition that originally caused the open may not be present at this time. Continue to monitor the test light and wiggle the wire harness and connectors to check for an intermittent open or excessive resistance condition.
   - Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the open could occur intermittently.
   - Look for any chafed, pierced, pinched, or partially broken wires.
   - Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.
   - Perform any Technical Service Bulletins (TSBs) that may apply.

   No

   - Repair the open in the circuit. Use the wiring diagram as a guide to trace the circuit and look for any in-line connectors where the open could occur.
   - One method to help isolate the open is to disconnect any in-line connectors and measure the resistance from one side of the in-line connector to the matching component harness connector. If the open goes away, the open is on the other side of the in-line connector.
   - If this is a fused circuit, make sure to inspect the fuse. If the fuse is open, check the circuit for a short to ground before installing a new fuse. The circuit may have a short to ground causing the fuse to open. This short to ground could be in the wire harness or in one of the components the circuit is supplying voltage to.

2. **TESTING 12-VOLT SWITCHED BATTERY B(+) CIRCUIT VOLTAGE WITH A VOLTMETER**

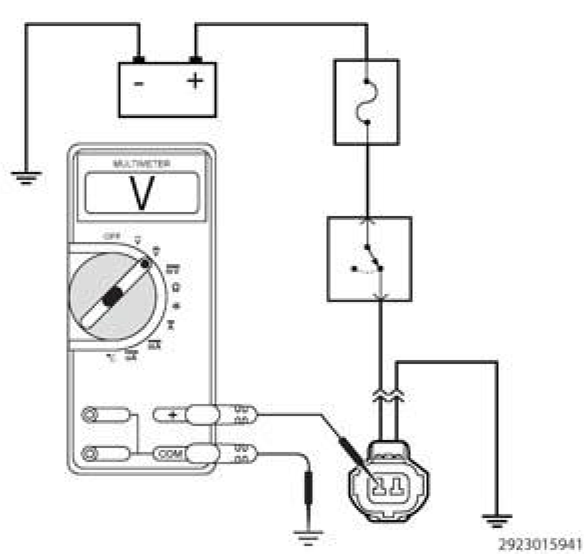


Fig. 7: Testing 12-Volt Switched Battery B(+) Circuit Voltage With Voltmeter

Courtesy of CHRYSLER GROUP, LLC

NOTE: The connector displayed in the graphics are only an example.

1. Turn the ignition off.
2. Disconnect the wire harness connector from the component that is being tested.

   NOTE: Check connectors - Clean/repair as necessary.

3. At this time leave all in-line connectors connected.
4. Use a multimeter set to measure DC voltage.
5. Connect the ground lead of the meter to a known good ground.
6. Use the positive lead of the multimeter and probe the circuit that is being checked for voltage.
7. Ignition on, engine not running.

   Is the voltage within specifications for this circuit?

   Yes

   - The circuit is functioning properly or the condition that originally caused the open or short may not be present at this time. Continue to measure the voltage and wiggle the wire harness and connectors while checking for an intermittent open or short.
   - Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur intermittently.
   - Look for any chafed, pierced, pinched, or partially broken wires.
   - Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.
   - Perform any Technical Service Bulletins (TSBs) that may apply.

   No

   - Repair the open or short to ground in the circuit. Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur.
   - One method to help isolate the open or short is to disconnect any in-line connectors that the circuit being checked runs through and check for the voltage again. If the voltage is present, the open or short is on the other side of the in-line connector.

CHECK A 5-VOLT SUPPLY CIRCUIT FOR VOLTAGE

THEORY OF OPERATION

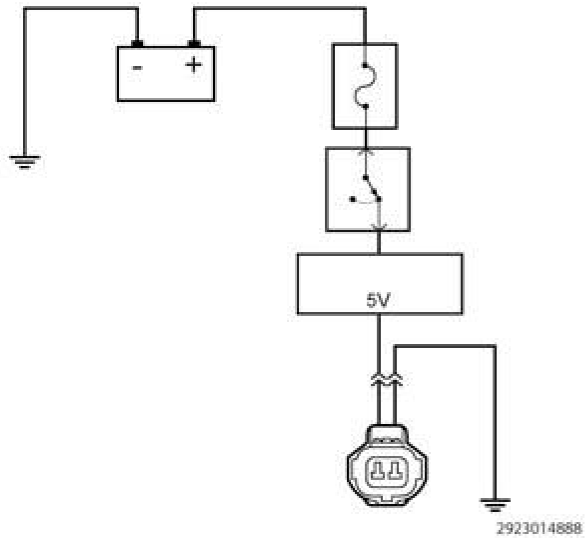


Fig. 8: 5-Volt Supply Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

The purpose of the following procedure is to demonstrate how to check the voltage of a 5-Volt supply circuit with a voltmeter.

NOTE: **The circuit shown in illustration is an example, and is intended for demonstrational purpose only.**

The following are circuit tests covered in this procedure:

- Testing A 5-Volt Supply Circuit For Voltage
- Testing A 5-Volt Supply Circuit And Sensor Ground Circuit

NOTE: **Perform the following test using a known good multimeter.**

Below is a list of possible causes that could be related to a No Voltage condition.

Possible Causes
OPEN CIRCUIT (CHAFED, PIERCED, PINCHED OR BROKEN WIRES)
OPEN IN-LINE CONNECTOR (BENT, PUSHED OUT OR CORRODED TERMINALS)
ELECTRONIC CONTROL MODULE (5-VOLT SUPPLY OUTPUT)

DIAGNOSTIC TEST

1. **TESTING A 5-VOLT SUPPLY CIRCUIT FOR VOLTAGE**

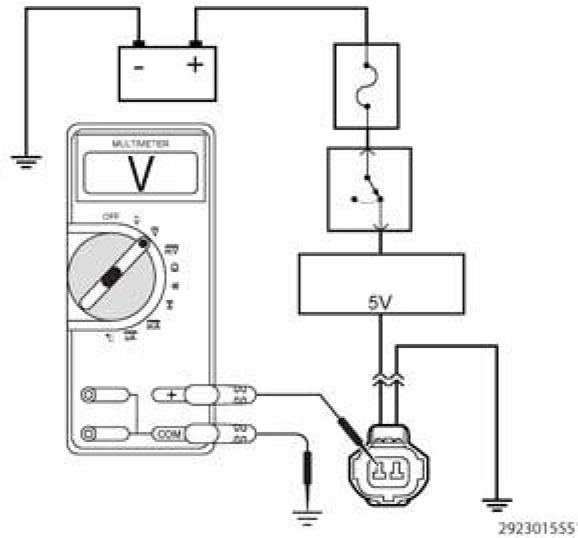


Fig. 9: Testing 5-Volt Supply Circuit For Voltage With Voltmeter
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the sensor harness connector.

NOTE: **Check connectors - Clean/repair as necessary.**

3. Turn the ignition on.
4. Set the multimeter to measure DC voltage.
5. Connect the negative lead of the multimeter to a known good ground.
6. With the positive lead of the multimeter, carefully probe the 5-volt supply circuit.

   Is the voltage between 4.7 and 5.2 volts?

   Yes

   - Go To 2

   No

   - Check the 5-volt supply circuit for an open or short to ground. For further assistance, perform the appropriate Sensor Reference Voltage DTC diagnostic procedure.

2. **TESTING A 5-VOLT SUPPLY CIRCUIT AND SENSOR GROUND CIRCUIT**

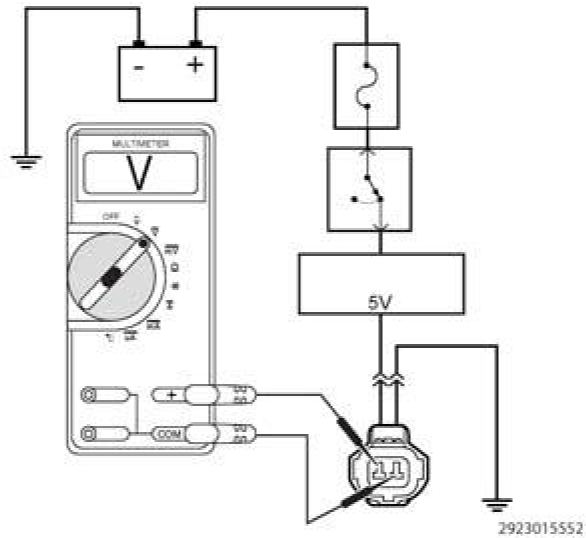


Fig. 10: Testing 5-Volt Supply Circuit And Sensor Ground Circuit
Courtesy of CHRYSLER GROUP, LLC

1. With the multimeter set to measure DC voltage.
2. Move the negative lead of the multimeter to carefully probe the sensor ground or sensor return circuit in the harness connector.
3. With the positive lead of the multimeter, carefully probe the 5-volt supply circuit.

   Is the voltage between 4.7 and 5.2 volts?

   Yes

   - At this time the 5-Volt Supply and sensor ground circuit are working properly. Continue to measure the voltage between the wires, wiggle the wire harness and connectors while checking for an intermittent condition.
   - Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the open could occur intermittently.
   - Look for any chafed, pierced, pinched, or partially broken wires.
   - Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.
   - Perform any Technical Service Bulletins (TSBs) that may apply.

   No

   - Repair the open or excessive resistance in the Sensor Ground (Sensor Return) circuit.

CHECK A CIRCUIT FOR A SHORT TO GROUND

THEORY OF OPERATION

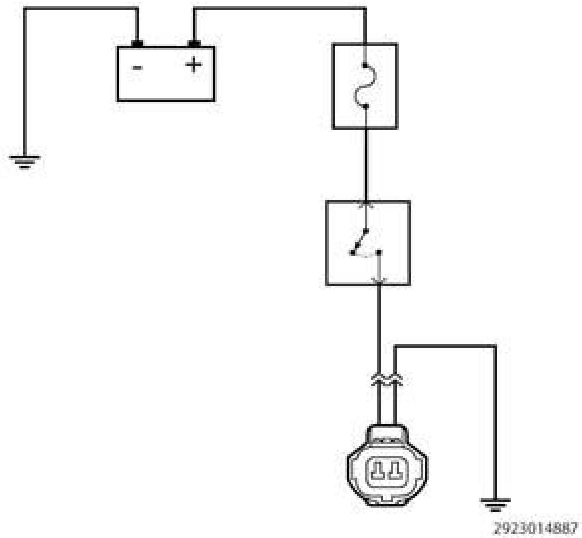


Fig. 11: 12-Volt Switched Battery Circuit (Switch In Off Position)
Courtesy of CHRYSLER GROUP, LLC

The purpose of the following procedure is to demonstrate how to check a circuit for a Short to Ground.

NOTE: **The circuit shown in illustration is an example, and is intended for demonstrational purpose only.**

The following are circuit tests covered in this procedure:

- Testing For A Short To Ground Using An Ohmmeter

NOTE: **Perform the following test using a known good multimeter.**

Below is a list of possible causes that could be related to a Short to Ground condition.

Possible Causes
SHORTED CIRCUIT (CHAFED, PIERCED OR PINCHED WIRES)
SHORTED IN-LINE CONNECTOR (BENT, PUSHED OUT OR CORRODED TERMINALS)

DIAGNOSTIC TEST

TESTING FOR A SHORT TO GROUND USING AN OHMMETER

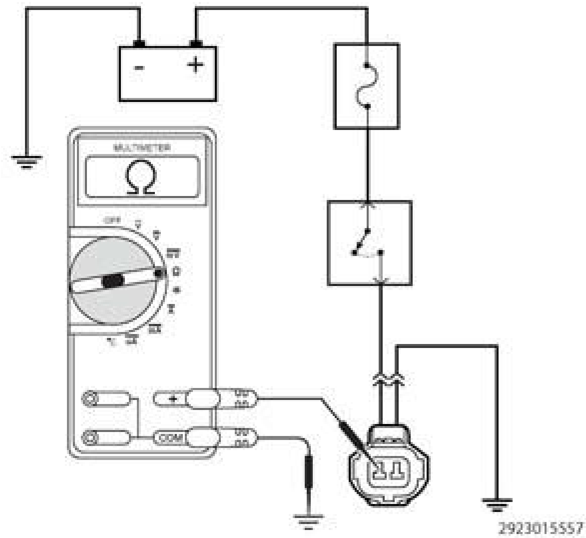


Fig. 12: Testing For A Short To Ground Using An Ohmmeter
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Before measuring the resistance of any circuit, first measure the resistance between the two leads of the multimeter. Take this value and subtract it from the value recorded when measuring the resistance of the circuit being checked (The meter leads can add 0.5 ohm or more of total resistance).**

1. Turn the ignition off.
2. Disconnect the wire harness connectors from the module and component for the suspected circuit being shorted to ground.

NOTE:	**Check connectors - Clean/repair as necessary.**

3. With the component wire harness connectors disconnected, use a meter set to measure Ohms (Ω), and measure the resistance between the circuit and a known good ground.
4. Use the negative lead of the meter and touch a known good ground.
5. Use the positive lead of the meter and carefully probe the circuit suspected of having the short.

Is the resistance to ground below 10k ohms ?

Yes

- Repair the short to ground. Use the wiring diagram as a guide to follow the path of the circuit.
- One method to help isolate the short is to disconnect any in-line connectors that the circuit being tested runs through and measure for the short again. If the short goes away, the short is on the other side of the in-line connector.

No

- The circuit is not shorted to ground or the condition that originally caused the short may not be present at this time. Continue to measure the resistance, wiggle the wire harness and connectors while checking for an intermittent short.

- Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur intermittently.
- Look for any chafed, pierced, pinched, or partially broken wires.
- Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.
- Perform any Technical Service Bulletins (TSBs) that may apply.

CHECK A CIRCUIT FOR A SHORT TO VOLTAGE

THEORY OF OPERATION

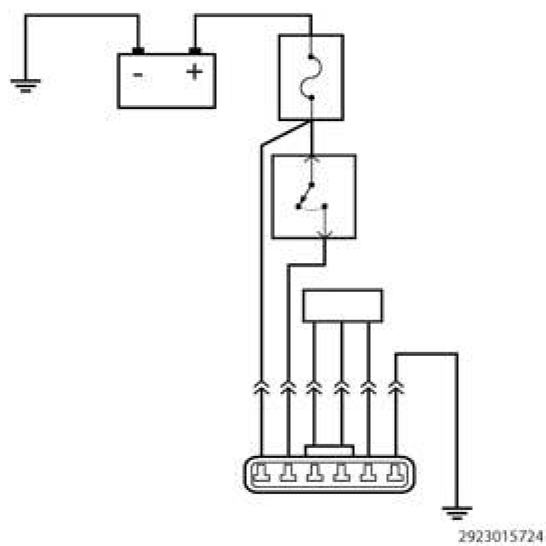


Fig. 13: 12-Volt Switched Ignition Circuit
Courtesy of CHRYSLER GROUP, LLC

The purpose of the following procedure is to demonstrate different methods of checking for a short to voltage in a circuit. When diagnosing a DTC it might be necessary to verify that proper voltage is on a circuit or that a circuit is not shorted high.

NOTE: **The circuit shown in illustration is an example, and is intended for demonstrational purpose only.**

The following are circuit tests covered in this procedure:

- Testing For A Short To Battery Voltage Using A Voltmeter
- Testing For A Short To Switched Battery Voltage Using A Voltmeter
- Testing For A Short To Battery Voltage Using A 12-Volt Test Light
- Testing For A Short To Switched Battery Voltage Using A 12-Volt Test Light

NOTE: **Perform the following test using a known good test light or functioning multimeter.**

Below is a list of possible causes that could be related to a Short To Voltage condition.

Possible Causes
SHORTED CIRCUIT (CHAFED, PIERCED OR PINCHED WIRES)
SHORTED IN-LINE CONNECTOR (BENT, PUSHED OUT OR CORRODED TERMINALS)

DIAGNOSTIC TEST

1. **TESTING FOR A SHORT TO BATTERY VOLTAGE USING A TEST LIGHT**

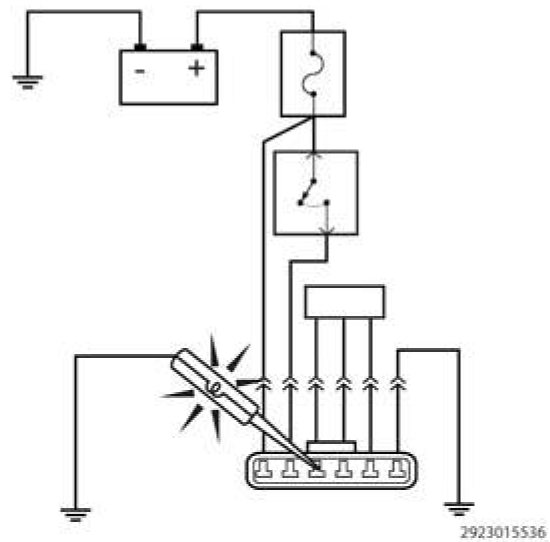


Fig. 14: Testing For A Short To Battery Voltage Using A Test Light
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before testing any circuits, first verify the 12-volt test light is operating properly. Connect the 12-volt test light to battery ground or to any other known good ground. Touch the lead of the test light to Battery(+). If the test light is operational, it should illuminate brightly.**

1. Turn the ignition off.
2. Disconnect the wire harness connectors of all components that contain the circuits that are suspected of having the short.

   NOTE: **Check connectors - Clean/repair as necessary.**

3. At this time leave all in-line connectors connected.
4. Connect the 12-volt test light to a known good ground.
5. Use the lead of the test light and carefully probe the circuit suspected of having the short.

   WARNING: **When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.**

6. First, check with the ignition off, next with the ignition on, and lastly while cranking the engine.

Does the test light illuminate brightly?

Yes

- Repair the short to voltage. Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur.
- One method to help isolate the short is to disconnect any in-line connectors that the circuit being checked runs through and check for the short again. If the short goes away, the short is on the other side of the in-line connector.

No

- The circuit is not shorted to voltage or the condition that originally caused the short may not be present at this time. Continue to measure the resistance and wiggle the wire harness to check for an intermittent short.

  NOTE: **By disconnecting the wire harness connectors you may have eliminated the source of the voltage causing the short. Use the wiring diagram as a guide, check to see if there are any battery circuits in the same wire harness as the circuit you are testing. It is necessary to check for a short to those circuits using an ohmmeter. Perform the Check for a Short Between Multiple Circuits diagnostic procedure. Refer to CHECK FOR A SHORT BETWEEN MULTIPLE CIRCUITS .**

- Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur intermittently.
- Look for any chafed, pierced, pinched, or partially broken wires.
- Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related component and wire harness connectors.
- Perform any Technical Service Bulletins (TSBs) that may apply.

2. **TESTING FOR A SHORT TO SWITCHED IGNITION VOLTAGE USING A TEST LIGHT**

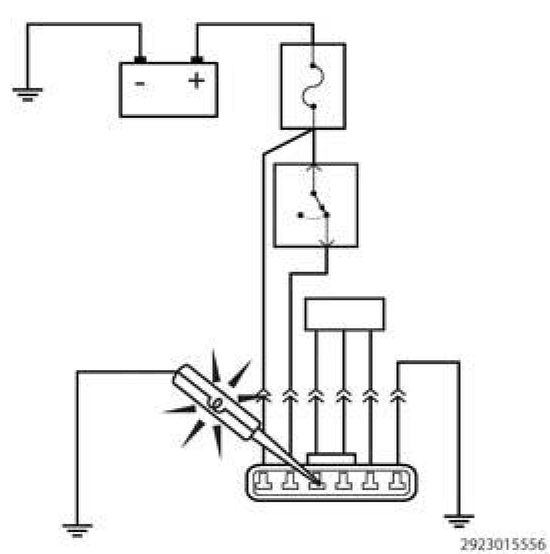


Fig. 15: Testing For A Short To Switched Ignition Voltage Using A Test Light
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before testing any circuits, first verify the 12-volt test light is operating properly. Connect the 12-volt test light to battery ground or to any other known good ground. Touch the lead of the test light to Battery(+). If the test light is operational, it should illuminate brightly.**

1. Turn the ignition off.
2. Disconnect the wire harness connectors of all components that contain the circuits that are suspected of having the short.

   NOTE: **Check connectors - Clean/repair as necessary.**

3. At this time leave all in-line connectors connected.
4. Connect the 12-volt test light to a known good ground.
5. Use the lead of the test light and carefully probe the circuit suspected of having the short.

   WARNING: **When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.**

6. First, check with the ignition off, next with the ignition on, and lastly while cranking the engine.

   Does the test light illuminate brightly?

   Yes

   - Repair the short to voltage. Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur.
   - One method to help isolate the short is to disconnect any in-line connectors that the circuit being checked runs through and check for the short again. If the short goes away, the short is on the other side of the in-line connector.

   No

   - The circuit is not shorted to voltage or the condition that originally caused the short may not be present at this time. Continue to measure the resistance and wiggle the wire harness to check for an intermittent short.

     NOTE: **By disconnecting the wire harness connectors you may have eliminated the source of the voltage causing the short. Use the wiring diagram as a guide, check to see if there are any battery circuits in the same wire harness as the circuit you are testing. It is necessary to check for a short to those circuits using an ohmmeter. Perform the Check for a Short Between Multiple Circuits diagnostic procedure. Refer to CHECK FOR A SHORT**

BETWEEN MULTIPLE CIRCUITS .

- Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur intermittently.
- Look for any chafed, pierced, pinched, or partially broken wires.
- Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related component and wire harness connectors.
- Perform any Technical Service Bulletins (TSBs) that may apply.

3. **TESTING FOR A SHORT TO BATTERY VOLTAGE USING A VOLTMETER**

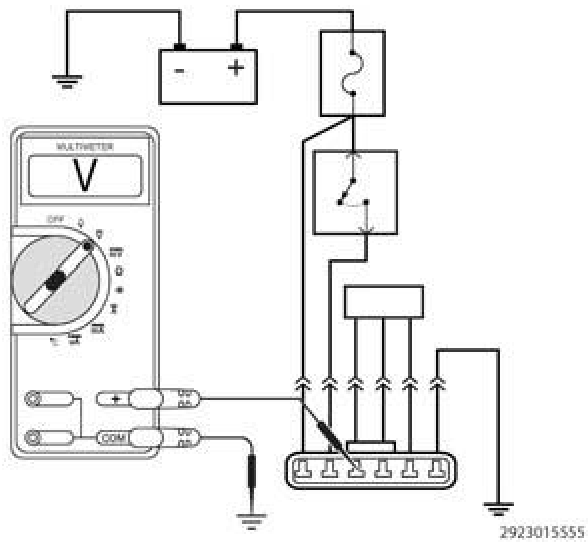


Fig. 16: Testing For A Short To Battery Voltage Using A Voltmeter
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the wire harness connectors of the components that contain the circuit that is suspected as having a short.

NOTE: Check connectors - Clean/repair as necessary.

3. At this time leave all in-line connectors connected.
4. With all the component wire harness connectors disconnected, use a multimeter set to measure DC voltage.
5. Connect the ground lead of the meter to a known good ground.
6. Use the positive lead of the multimeter and probe the circuit that is being checked for a short.

   Is there any voltage present?

   Yes

   - Repair the short to battery voltage. Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur.
   - One method to help isolate the short is to disconnect any in-line connectors that the circuit

being checked runs through and measure for the short again. If the short goes away, the short is on the other side of the in-line connector.

No

- The circuit is not shorted to voltage or the condition that originally caused the short may not be present at this time. Continue to measure the voltage and wiggle the wire harness to check for an intermittent short.

NOTE: **By disconnecting the wire harness connectors you may have eliminated the source of the voltage causing the short. Use the wiring diagram as a guide, check to see if there are any battery circuits in the same wire harness as the circuit you are testing. It is necessary to check for a short to those circuits using an ohmmeter. Perform the Check for a Short Between Multiple Circuits diagnostic procedure. Refer to CHECK FOR A SHORT BETWEEN MULTIPLE CIRCUITS .**

- Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur intermittently.
- Look for any chafed, pierced, pinched, or partially broken wires.
- Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.
- Perform any Technical Service Bulletins (TSBs) that may apply.

4. **TESTING FOR A SHORT TO SWITCHED IGNITION VOLTAGE USING A VOLTMETER**

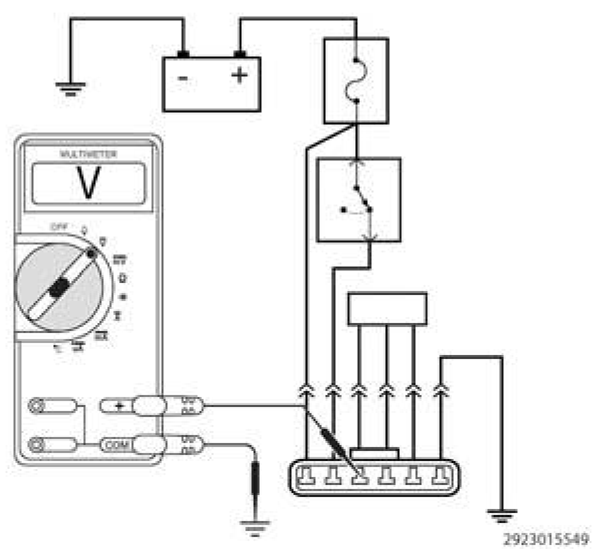


Fig. 17: Testing For A Short To Switched Ignition Voltage Using A Voltmeter
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Disconnect the wire harness connectors of all components that contain the circuits that are suspected as being shorted.

NOTE: **Check connectors - Clean/repair as necessary.**

3. At this time leave all in-line connectors connected.
4. With all the component wire harness connectors disconnected, use a multimeter set to measure DC voltage.
5. Connect the ground lead of the meter to a known good ground.
6. Use the positive lead of the multimeter and probe the circuit suspected of having the short.
7. Ignition on, engine not running.

Is any voltage present?

Yes

- Repair the short to ignition voltage. Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur.
- One method to help isolate the short is to disconnect any in-line connectors that the circuit being checked runs through and check for the short again. If the short goes away, the short is on the other side of the in-line connector.

No

- The circuit is not shorted to voltage or the condition that originally caused the short may not be present at this time. Continue to measure the voltage and wiggle the wire harness to check for an intermittent short.

  NOTE: **By disconnecting the wire harness connectors you may have eliminated the source of the voltage causing the short. Use the wiring diagram as a guide, check to see if there are any battery circuits in the same wire harness as the circuit you are testing. It is necessary to check for a short to those circuits using an ohmmeter. perform the Check for a Short Between Multiple Circuits diagnostic procedure. Refer to CHECK FOR A SHORT BETWEEN MULTIPLE CIRCUITS .**

- Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur intermittently.
- Look for any chafed, pierced, pinched, or partially broken wires.
- Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.
- Perform any Technical Service Bulletins (TSBs) that may apply.

CHECK FOR AN OPEN GROUND CIRCUIT

THEORY OF OPERATION

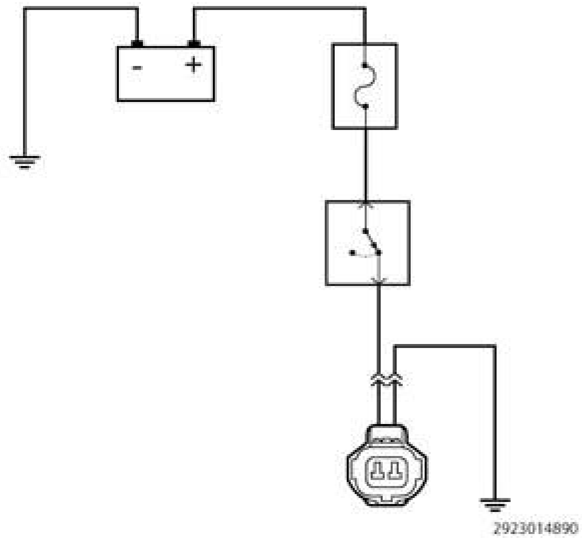


Fig. 18: 12-Volt Switched Battery B(+) Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

The purpose of the following procedure is to demonstrate how to check the operation of a generic ground circuit with a test light.

NOTE: **The circuit shown in illustration is an example, and is intended for demonstrational purpose only.**

The following are circuit tests covered in this procedure:

- Testing Ground Circuit With Test Light

NOTE: **Perform the following test using a known good test light.**

Possible Causes
OPEN GROUND CIRCUIT (CHAFED, PIERCED, PINCHED OR BROKEN WIRE)
OPEN IN-LINE CONNECTOR (BENT, PUSHED OUT OR CORRODED TERMINALS)

DIAGNOSTIC TEST

TESTING GROUND CIRCUIT WITH TEST LIGHT

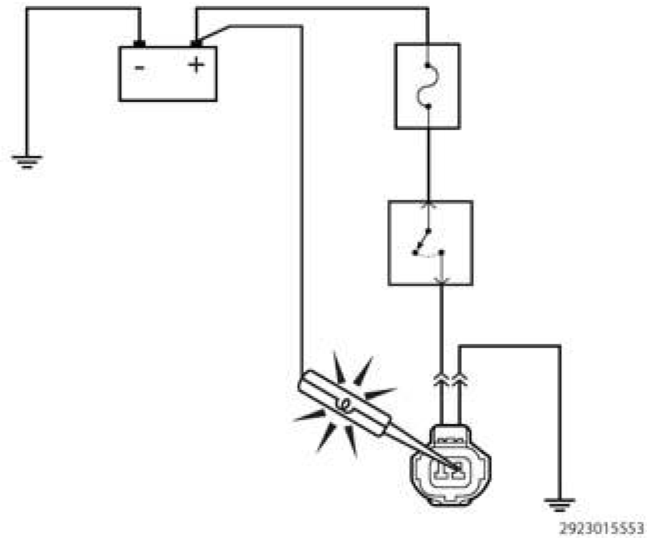


Fig. 19: Testing Ground Circuit With Test Light
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before testing any circuits, first verify the 12-volt test light is operating properly. Connect the 12-volt test light to battery ground or to any other known good ground. Touch the lead of the test light to Battery(+). If the test light is operational, it should illuminate brightly.**

1. Turn the ignition off.
2. Disconnect the wire harness connectors of the components that contain the ground circuit suspected of containing excessive resistance.

   NOTE: **Check connectors - Clean/repair as necessary.**

3. At this time leave all in-line connectors connected.
4. With all the component wire harness connectors disconnected, connect the 12-volt test light to Battery(+).
5. Use the test light lead to lightly probe the ground circuit in the harness connector.

   Does the test light illuminate brightly?

   Yes

   - The suspected ground circuit is not open or the condition that originally caused the open or excessive resistance is not present at this time. Another way to check for an open would be to use an ohmmeter and measure the resistance of the ground circuit. While continuing to measure the resistance of the circuit, wiggle the wire harness and connectors to check for an intermittent open or poor connection.
   - Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the open could occur intermittently.
   - Look for any chafed, pierced, pinched, or partially broken wires.
   - Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.

- Perform any Technical Service Bulletins (TSBs) that may apply.

No

- Repair the open in the ground circuit. Use the wiring diagram as a guide to trace the circuit and look for any in-line connectors where the open could occur.
- One method to help isolate the open is to disconnect any in-line connectors and measure the resistance from one side of the in-line connector to the matching component harness connector. If the open goes away, the open is on the other side of the in-line connector.

CHECK FOR A SHORT BETWEEN MULTIPLE CIRCUITS

THEORY OF OPERATION

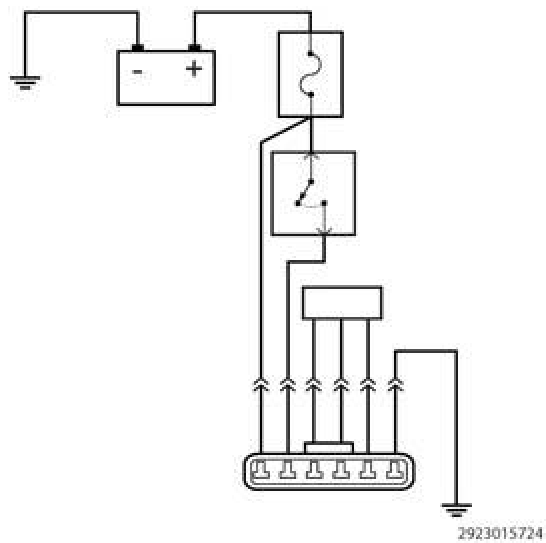


Fig. 20: 12-Volt Switched Ignition Circuit
Courtesy of CHRYSLER GROUP, LLC

The purpose of the following procedure is to demonstrate how to check for a short circuit between multiple circuits.

NOTE: **The circuit shown in illustration is an example, and is intended for demonstrational purpose only.**

The following are circuit tests covered in this procedure:

- Testing For A Short Between Multiple Circuits

NOTE: **Perform the following test using a known good multimeter.**

Below is a list of possible causes that could be related to a Multiple Short condition.

Possible Causes
SHORTED CIRCUIT (CHAFED, PIERCED OR PINCHED WIRES)
SHORTED IN-LINE CONNECTOR (BENT, PUSHED OUT OR CORRODED TERMINALS)

DIAGNOSTIC TEST

TESTING FOR A SHORT BETWEEN MULTIPLE CIRCUITS

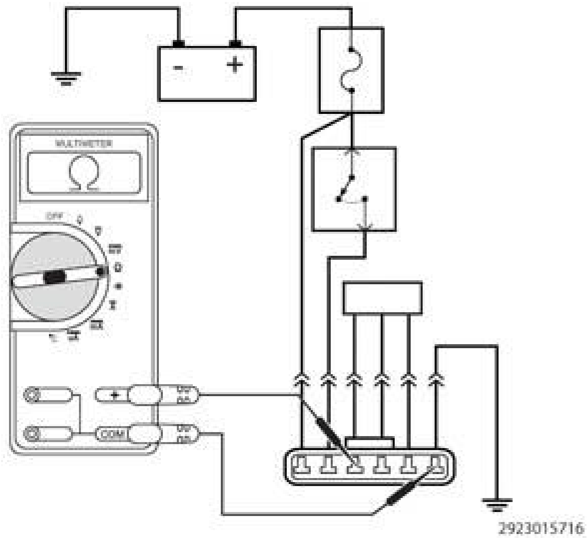


Fig. 21: Testing For A Short Between Multiple Circuits
Courtesy of CHRYSLER GROUP, LLC

NOTE: Before measuring the resistance of any circuit, first measure the resistance between the two leads of the multimeter. Take this value and subtract it from the value recorded when measuring the resistance of the circuit being checked (The meter leads can add 0.5 ohm or more of total resistance).

1. Turn the ignition off.
2. Disconnect the wire harness connectors of the components that contain the circuits that are suspected of being shorted together.

   NOTE: Check connectors - Clean/repair as necessary.

3. At this time leave all in-line connectors connected.
4. With all the component wire harness connectors disconnected, use a multimeter set to Ohms (Ω), and measure the resistance between the applicable circuits in one of the harness connectors.
5. Use one lead of the multimeter and carefully probe the circuit suspected of being shorted.
6. Use the other lead of the meter and one at a time, carefully probe the other circuits in the harness connector.

   Is the resistance below 10k ohms when probing any two circuits?

   Yes

   - Repair the short between the circuits. Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur.
   - One method to help isolate the short is to disconnect any in-line connectors that the circuit being tested runs through and measure for the short again. If the short goes away, the short is on the other

side of the in-line connector.

No

- The circuit is not shorted or the condition that originally caused the short may not be present at this time. Continue to measure the resistance and wiggle the wire harness and connectors while checking for an intermittent short.

NOTE: **By disconnecting the wire harness connectors you may have eliminated the source that was causing the short.**

- Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the short could occur intermittently.
- Look for any chafed, pierced, pinched, or partially broken wires.
- Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.
- Perform any Technical Service Bulletins (TSBs) that may apply.

CHECK THE RESISTANCE OF A CIRCUIT USING AN OHMMETER

THEORY OF OPERATION

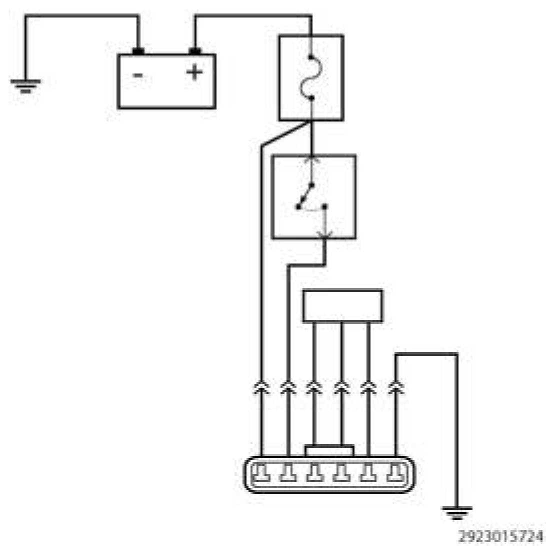


Fig. 22: 12-Volt Switched Ignition Circuit
Courtesy of CHRYSLER GROUP, LLC

The purpose of the following procedure is to demonstrate how to check the resistance of a circuit with an ohmmeter.

NOTE: **The circuit shown in illustration is an example, and is intended for demonstrational purpose only.**

The following are circuit tests covered in this procedure:

- Testing For An Open Circuit Using An Ohmmeter

NOTE: **Perform the following test using a known good multimeter.**

Below is a list of possible causes that could be related to an Open Circuit condition.

Possible Causes
OPEN CIRCUIT (CHAFED, PIERCED, PINCHED OR BROKEN WIRES)
OPEN IN-LINE CONNECTOR (BENT, PUSHED OUT OR CORRODED TERMINALS)

DIAGNOSTIC TEST

TESTING FOR AN OPEN CIRCUIT USING AN OHMMETER

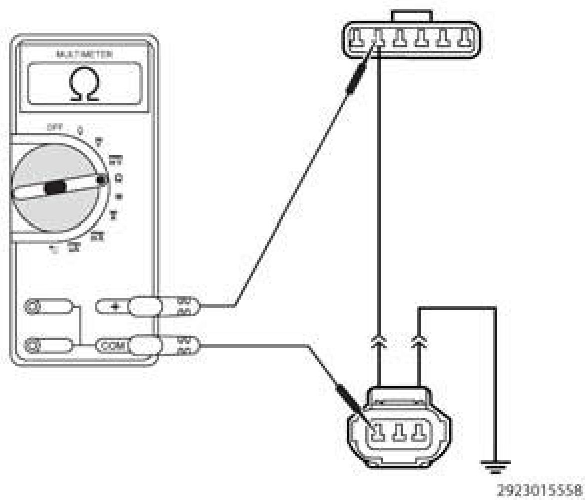


Fig. 23: Testing For An Open Circuit Using An Ohmmeter
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before measuring the resistance of any circuit, first measure the resistance between the two leads of the multimeter. Take this value and subtract it from the value recorded when measuring the resistance of the circuit being checked (The meter leads can add 0.5 ohm or more of total resistance).**

1. Turn the ignition off.
2. Disconnect the wire harness connectors of the components that contain the circuit suspected of being open.

   NOTE: **Check connectors - Clean/repair as necessary.**

3. At this time leave all in-line connectors connected.
4. With the component wire harness connectors disconnected, use a multimeter set to Ohms (Ω), and measure the resistance of the circuit.
5. Use one lead of the meter and probe the circuit in one harness connector.
6. Use the other lead of the meter and probe the same circuit in the other harness connector.

   Is the resistance in the circuit below 10k ohms?

Yes

- The circuit does not contain any excessive resistance or the condition that originally caused the excessive resistance may not be present at this time. Continue to measure the resistance of the circuit, wiggle the wire harness and connectors to check for an intermittent open or poor connection.
- Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the open could occur intermittently.
- Look for any chafed, pierced, pinched, or partially broken wires.
- Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.
- Perform any Technical Service Bulletins (TSBs) that may apply.

No

- Repair the excessive resistance in the circuit between the two wire harness connectors. Using the wiring diagram as a guide, trace the circuit and check for any in-line connectors where the open or excessive resistance could occur.
- One method to help isolate the open is to disconnect any in-line connectors and measure the resistance from one side of the in-line connector to the matching component harness connector. If the open or excessive resistance is not present, the open or excessive resistance is on the other side of the in-line connector.

CHECK FOR EXCESSIVE CURRENT DRAW

THEORY OF OPERATION

What is current draw?

Current draw, or parasitic draw is an electrical load that draws current from the battery when the ignition is turned off. Some are considered normal, some above normal. Normal draw comes from various electronic devices connected to battery positive at all times. Many vehicle modules draw a few mA (milliamps) as a means to "Keep Alive Memory". Whether it's the clock in the radio or the last known position of the memory mirrors, these tiny amounts of current typically will only add up to 20 or 30 mA. The vehicle can sit parked for days, even a few weeks without any problems of excessive battery drain that might prevent starting. As long as the vehicle is driven periodically in order for the alternator to recharge the battery there is no problem. A problem may occur, in situations such as new vehicles in dealer stock or long term airport parking situations.

Below are some examples of modules and components that require keep alive memory:

- Powertrain Control Module (PCM)
- Body Control Module (BCM)
- Memory Seat Module (MSM)
- Radio

What is excessive current draw?

Excessive current draw can be determined by an ammeter reading in excess of 50 mA. The typical "normal"

current draw will not exceed 20 or 30 mA.

How to locate the problem?

Locating the problem involves a process of elimination. If the problem is not obvious, like the trunk light staying on, you will have to start troubleshooting:

- Start by removing one fuse at a time until you see the reading on the meter drop off (be careful to reinstall the fuses in their proper location).
- Once you've determined the high-draw circuit, there still may be a half-dozen loads, each individually drawing current from the battery.
- To zero in on that circuit or circuits, use the schematic diagram and disconnect each device on the circuit one-at-a-time and check the meter.
- When the milliamp reading drops off significantly, you've found the problem.

Perform the following test to determine where the cause of the draw is located.

Possible Causes
INSTALLED AFTERMARKET ACCESSORIES (AUDIO SYSTEMS, VEHICLE ALARMS, ETC.)
COURTESY LIGHTS REMAINING ON (INTERIOR, TRUNK, HOOD, ETC.)
BATTERY CHARGERS PLUGGED INTO THE CIGARETTE LIGHTER/POWER OUTLETS

DIAGNOSTIC TEST

TESTING FOR PARASITIC DRAW

NOTE: **For a more accurate current draw reading, wait 20 minutes to make sure all modules have powered down before continuing. Some modules may stay powered up longer than others.**

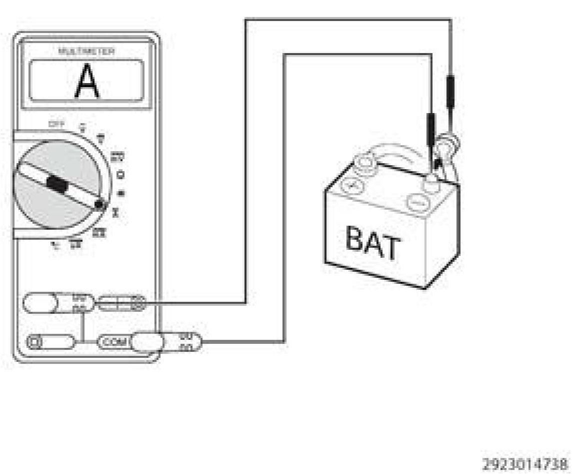


Fig. 24: Testing For Parasitic Draw Using Multimeter
Courtesy of CHRYSLER GROUP, LLC

Turn the ignition off.

1. Disconnect the Negative battery cable (ground).
2. Using a multimeter, set the multimeter leads up to properly measure Amperage.
3. Connect the ground lead that is plugged into the COM port of the multimeter to the Negative battery post/terminal.
4. Connect the other lead of the multimeter that is plugged into the Amp port of the multimeter to the Negative battery cable.

CAUTION: **Do not crank the engine or turn on any accessories that may draw more than 10 Amps. You may open the protective fuse in the multimeter.**

5. While monitoring the amperage reading on the multimeter, begin to remove fuses (one at a time) from each fuse location on the vehicle and see if the amperage drops.

NOTE:

- **Only remove one fuse at a time until the cause of the voltage draw is determined.**
- **Many vehicles have multiple fuse locations on the vehicle.**

6. If the amperage does not drop, install the fuse you just removed and remove the next fuse.

Does the amperage drop to between 0.02 to 0.04 of an Amp when removing any fuses?

Yes

- Use the wiring diagram as a guide to help indicate what components or modules are powered by the fuse.
- At this point you can install the fuse and begin disconnecting the components powered by the fuse.
  - When the amperage drops after disconnecting a component this will indicate which component is at fault.
  - It is important to know how long some modules are designed to remain awake.
  - You don't want to replace a component that is operating normally.
  - The condition that originally caused the draw may not be present at this time.

No

- The condition that originally caused the draw may not be present at this time.
- Look for any chafed, pierced, pinched, or partially broken wires.
- Look for broken, bent, pushed out or corroded ground terminals.
- Perform any Technical Service Bulletins (TSBs) that may apply.

CIRCUIT LOAD TESTING PROCEDURE

THEORY OF OPERATION

A circuit load test can be performed to test the ability of a circuit to carry the current required to operate a

connected device. A circuit load test should be performed after a circuit has passed a resistance test using a DVOM and the circuit is still suspected of a failure.

- A single copper wire strand will carry enough current to light a test light bulb, while showing very low resistance using a DVOM.
- Some test lights are insufficient for load testing because of the very low resistance bulb being used.
- The Load Test tool listed below will require higher current flow to power the bulb; and this will test the ability of the circuit to carry a load.
- This test will indicate if the circuit being tested can carry the current required to operate a connected device.

WARNING: To avoid possible serious or fatal injury, DO NOT load test any air bag/restraint system components or circuits using the procedures listed here. Refer to the Service Information for proper air bag/restraint system testing procedures.

CAUTION: Do not load test any circuits with components still connected to the circuit.

NOTE: Depending upon the location of the circuit in question, this test may require jumper wires.

NOTE: Use the wiring diagrams as a guide to trace the circuits and look for any in-line connectors where the circuit failure could occur intermittently. Look for any chafed, pierced, pinched, or partially broken wires. Look for broken, bent, pushed out or corroded terminals - clean/repair as necessary. Verify that there is good pin to terminal contact in the related wire harness connectors.

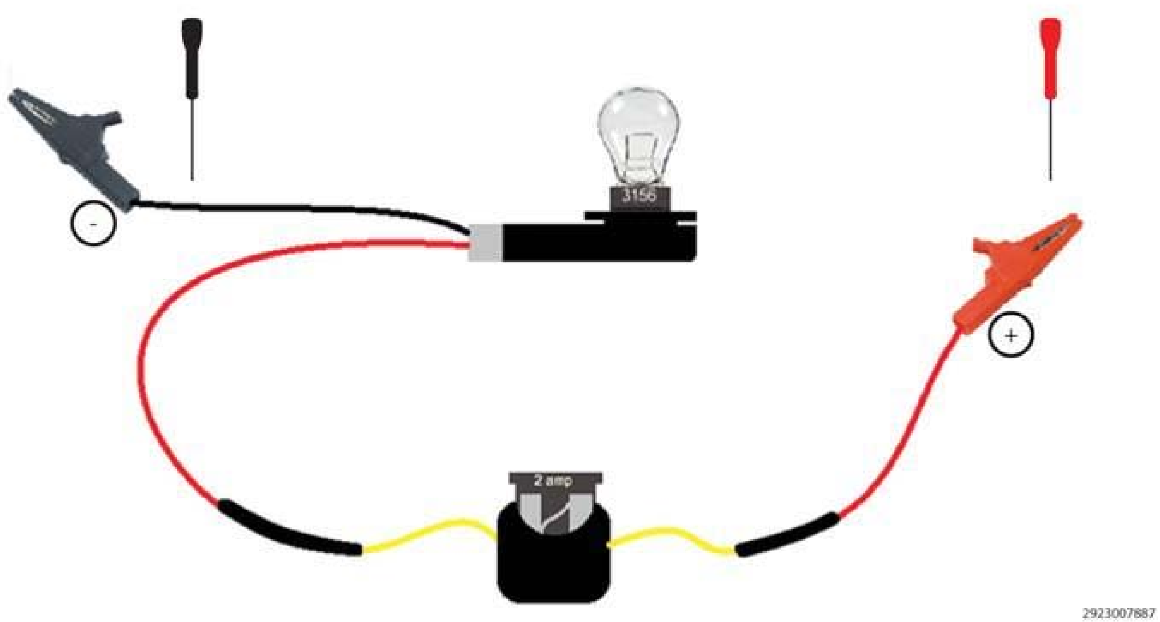


Fig. 25: Load Test Tool
Courtesy of CHRYSLER GROUP, LLC

Here is an example of a simple tool you can build to test a circuit`s ability to carry a load.

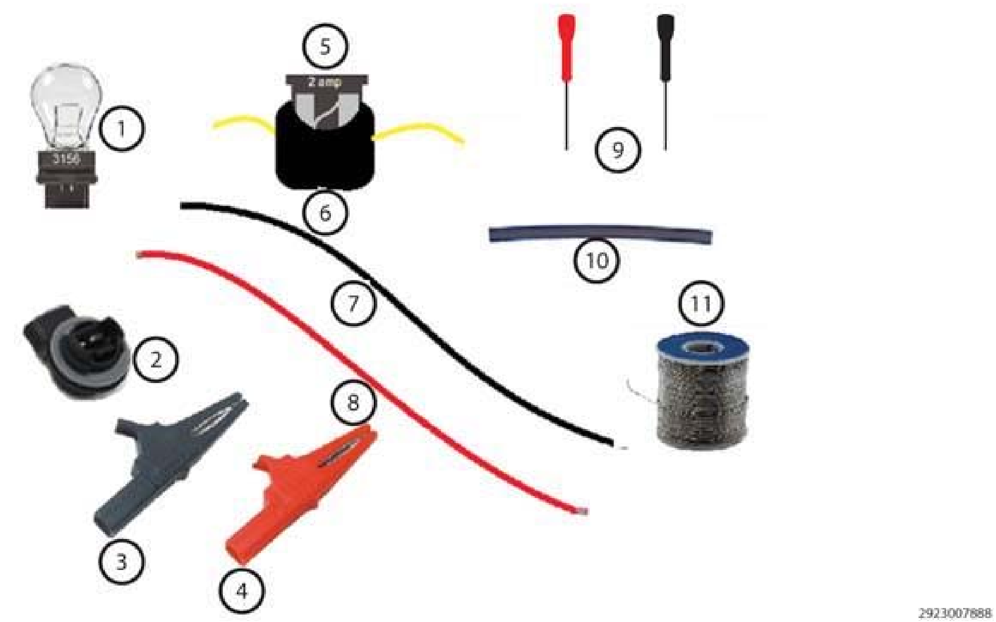


Fig. 26: Load Test Tool Components
Courtesy of CHRYSLER GROUP, LLC

The following is a list of components required to build a load test tool:

1. 3156 Bulb
2. 3156 Bulb socket
3. Negative alligator clip with covers
4. Positive alligator clip with covers
5. 2 Amp mini fuse
6. Mini fuse holder
7. 2' to 4' of Black 16ga wire
8. 2' to 4' of Red 16ga wire
9. Approved back probe tool
10. Shrink tubing
11. Solder

LOAD TESTING A GROUND CIRCUIT

DIAGNOSTIC LOAD TEST (GROUND CIRCUIT)

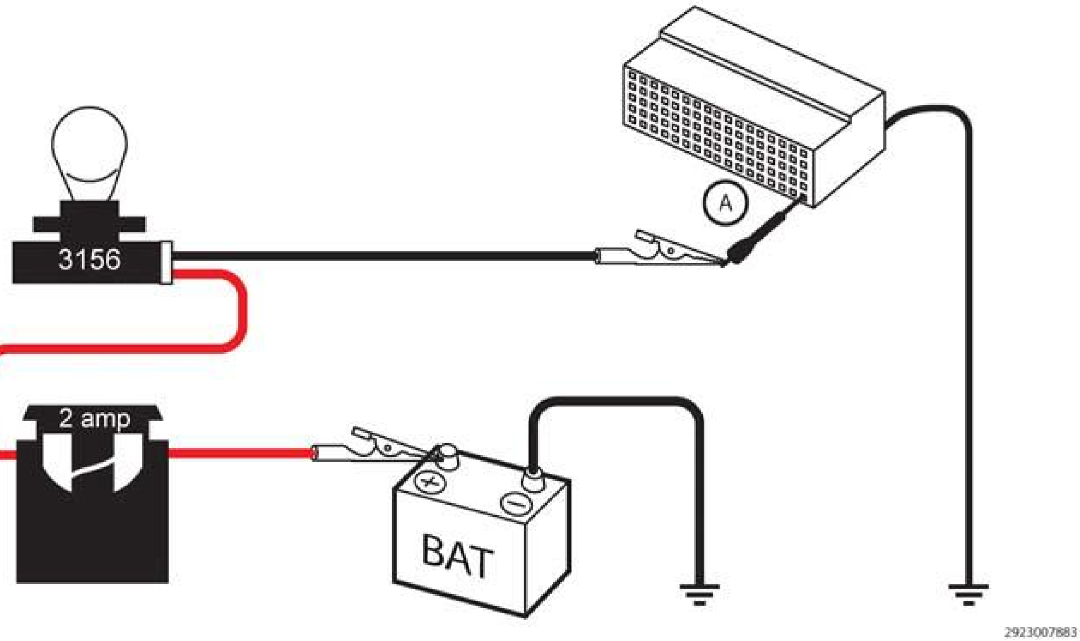


Fig. 27: Performing Diagnostic Load Test (Ground Circuit)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the connector from the device(s) to gain access and isolate the terminal for the circuit being tested.
2. Connect the positive lead of the load test tool to the positive side of the battery.
3. Using an approved connector back probe tool, connect the negative lead of the load test tool to the circuit being tested at point (A).

CAUTION: Use only approved connector back probe tools when back probing a connector so as not to cause damage to the terminals or insulation of the connector. Damage to the terminals can cause poor terminal contact or retention. Damage to the insulation can introduce corrosion due to water infiltration.

Does the bulb light bright, when compared to a direct battery connection?

Yes

- The circuit being tested can carry a load, check other circuits, connectors and terminals for concerns.

No

- Repair the circuit, connector or terminal that has an open or excessive resistance.
- Perform any related Recalls or Technical Service Bulletins (TSBs) that may apply.

LOAD TESTING A BATTERY OR IGNITION FEED CIRCUIT

DIAGNOSTIC LOAD TEST (BATTERY/IGNITION FEED CIRCUIT)

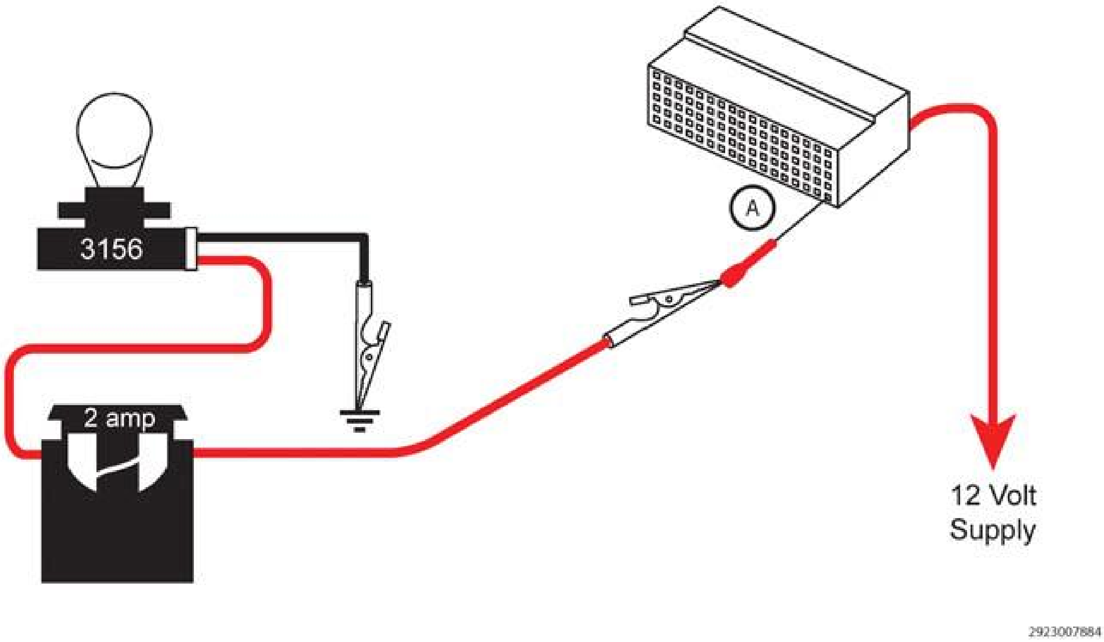


Fig. 28: Performing Diagnostic Load Test (Battery/Ignition Feed Circuit)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the connector from the device(s) to gain access and isolate the terminal for the circuit being tested.
2. Using an approved connector back probe tool, connect the positive lead of the load test tool to the circuit being tested at point (A).
3. Connect the negative lead of the load test tool to the negative side of the battery or ground.

CAUTION: Use only approved connector back probe tools when back probing a connector so as not to cause damage to the terminals or insulation of the connector. Damage to the terminals can cause poor terminal contact or retention. Damage to the insulation can introduce corrosion due to water infiltration.

Does the bulb light bright, when compared to a direct battery connection?

Yes

- The circuit being tested can carry a load, check other circuits, connectors and terminals for concerns.

No

- Repair the circuit, connector or terminal that has an open or excessive resistance.
- Perform any related Recalls or Technical Service Bulletins (TSBs) that may apply.

LOAD TESTING A BATTERY OR IGNITION FEED CIRCUIT AND GROUND CIRCUIT

DIAGNOSTIC LOAD TEST (BATTERY FEED & GROUND CIRCUIT)

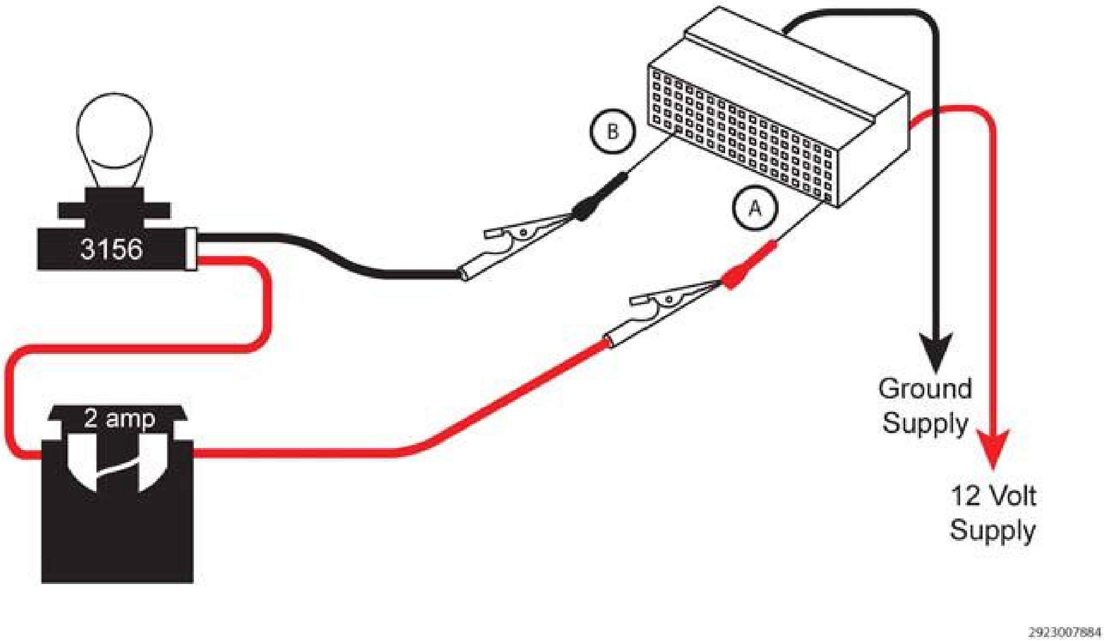


Fig. 29: Performing Diagnostic Load Test (Battery Feed & Ground Circuit)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the connector from the device(s) to gain access and isolate the terminal for the circuit being tested.
2. Using an approved connector back probe tool, connect the positive lead of the load test tool to the circuit being tested at point (A).
3. Using an approved connector back probe tool, connect the negative lead of the load test tool to the circuit being tested at point (B).

CAUTION: Use only approved connector back probe tools when back probing a connector so as not to cause damage to the terminals or insulation of the connector. Damage to the terminals can cause poor terminal contact or retention. Damage to the insulation can introduce corrosion due to water infiltration.

Does the bulb light bright, when compared to a direct battery connection?

Yes

- The circuit being tested can carry a load, check other circuits, connectors and terminals for concerns.

No

- Test the circuits individually to determine which circuit is the cause of the test failure.
- Repair the circuit, connector or terminal that has an open or excessive resistance.
- Perform any related Recalls or Technical Service Bulletins (TSBs) that may apply.

LOAD TESTING A CIRCUIT FOR AN OPEN OR HIGH RESISTANCE

DIAGNOSTIC LOAD TEST (OPEN/HIGH RESISTANCE CIRCUIT)

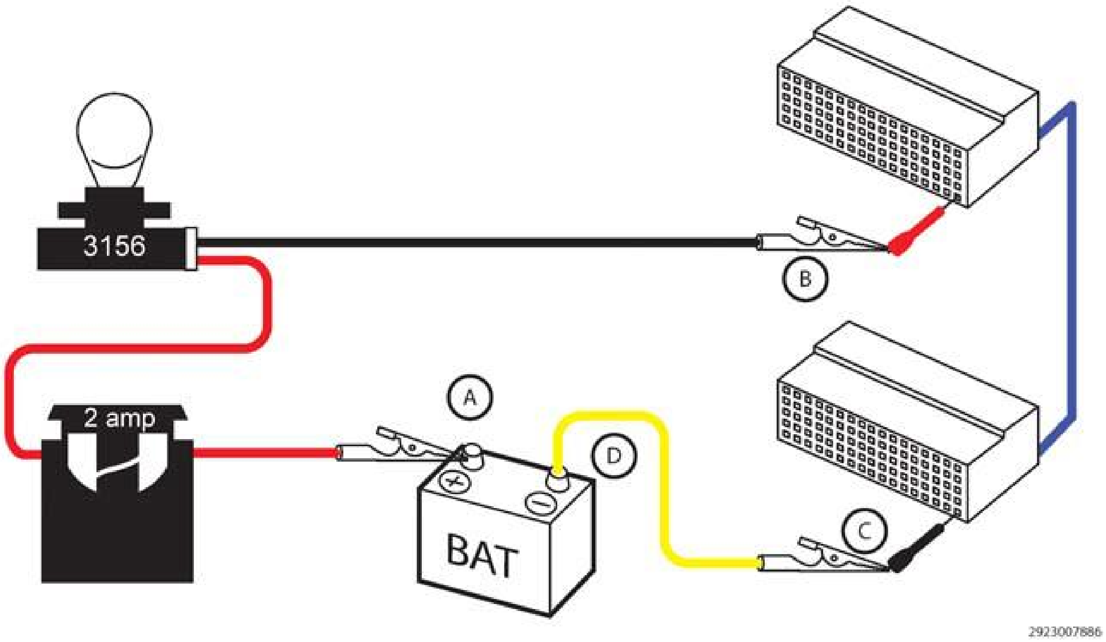


Fig. 30: Performing Diagnostic Load Test (Open/High Resistance Circuit)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect all components from the circuit being tested.
2. Connect the positive lead of the load test tool to the positive side of the battery (A).
3. Using an approved connector back probe tool, connect the negative lead of the load test tool to the circuit being tested at point (B).
4. Using an approved connector back probe tool, connect a jumper wire to the circuit being tested at point (C).
5. Then connect the other end of the jumper wire to the negative side of the battery or ground (D).

CAUTION: Use only approved connector back probe tools when back probing a connector so as not to cause damage to the terminals or insulation of the connector. Damage to the terminals can cause poor terminal contact or retention. Damage to the insulation can introduce corrosion due to water infiltration.

Does the bulb light bright, when compared to a direct battery connection?

Yes

- The circuit being tested can carry a load, check other circuits, connectors and terminals for concerns.

No

- Repair the circuit, connector or terminal that has an open or excessive resistance.
- Perform any related Recalls or Technical Service Bulletins (TSBs) that may apply.

VOLTAGE DROP TEST PROCEDURE

THEORY OF OPERATION

Voltage drop is the reduction in voltage in an electrical circuit between the voltage source and load components. The wires and connectors of a circuit should contain almost no resistance and **all** the voltage should be consumed through the load. The "load" is the component using the power, such as a light, starter, or blower motor. If a circuit has excessive resistance, it prevents the wire from carrying sufficient current under high load conditions. A voltage drop test is an effective way to locate excessive resistance in connections and circuits.

To perform a voltage drop test, a Digital Volt Ohm Meter (DVOM) is used to measure the voltage drop across a live circuit or connection while it is under the load. If the circuit or connection being tested has excessive resistance, the DVOM will measure the voltage that the resistance is using. **Little or no voltage drop should be read, ideally less than 0.2 of a volt** , anything greater indicates excessive resistance and the circuit or connection should be inspected for cleaning or repair.

Possible Causes
EXCESSIVE CIRCUIT RESISTANCE (CHAFED, PIERCED OR CORRODED WIRES)
HIGH RESISTANCE WITH IN-LINE CONNECTOR (BENT, PUSHED OUT OR CORRODED TERMINALS)

DIAGNOSTIC TEST

TESTING FOR VOLTAGE DROP

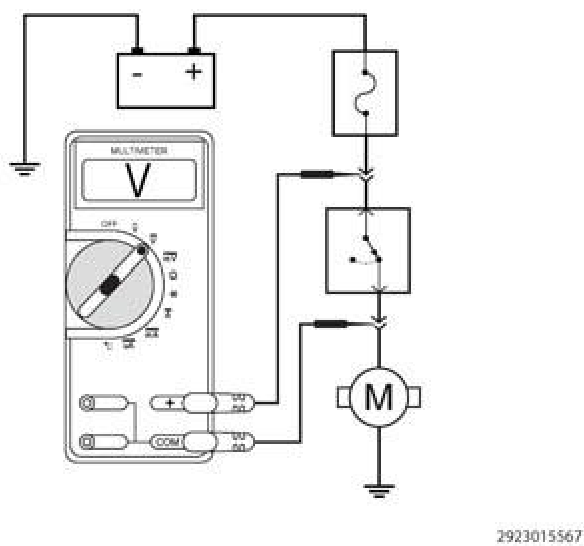


Fig. 31: Testing for Voltage Drop
Courtesy of CHRYSLER GROUP, LLC

1. Turn the ignition off.
2. Use the wiring diagram as a guide, trace the circuit being tested and locate the components related to the circuit.
3. Set the multimeter to measure DC voltage.
4. Carefully back probe the two component harness connectors of the circuit being tested.

WARNING: **When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.**

NOTE: **If you are testing the starting circuit, disable the engine so the engine does not start.**

5. Crank the engine for five seconds if you are testing the starting circuit and monitor the multimeter voltage reading.
6. For circuits that don't require the engine running, turn the ignition on.
7. For circuits that require the engine running, start the engine.

NOTE: **If the circuit you are checking needs to be operating, such as the Blower Motor or a Lamp, do so now.**

8. Monitor the voltage reading.
9. The voltmeter will show the difference in voltage between the two points.

Is the voltage less than 0.2 of a Volt?

Yes

- At this time the circuit is functioning properly. Continue to measure the voltage between the components and wiggle the wire harness and connectors while checking for an intermittent condition.
- Use the wiring diagram as a guide to trace the circuits and look for any in-line connectors where the excessive resistance could occur intermittently.
- Look for any chafed, pierced, pinched, or partially broken wires.
- Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.
- Perform any Technical Service Bulletins (TSBs) that may apply.

No

- Repair the excessive resistance in the circuit.
- Use the wiring diagram as a guide to trace the circuit and look for any in-line connectors where the excessive resistance may occur.
- Look for any chafed, pierced, pinched, or partially broken wires.
- Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the related wire harness connectors.
- Perform any Technical Service Bulletins (TSBs) that may apply.

ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES

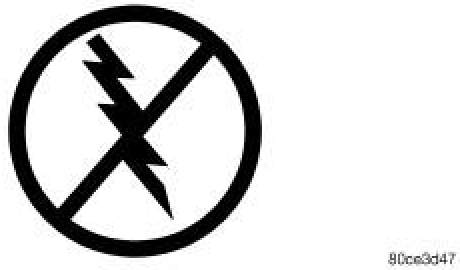


Fig. 32: Electrostatic Discharge Symbol
Courtesy of CHRYSLER GROUP, LLC

All ESD sensitive components are solid state and a symbol is used to indicate this. When handling any component with this symbol, comply with the following procedures to reduce the possibility of electrostatic charge build up on the body and inadvertent discharge into the component. If it is not known whether the component is ESD sensitive, assume that it is.

Perform the following procedure when handling ESD sensitive components:

1. Always touch a known good ground before handling the component. This should be repeated while handling the component and more frequently after sliding across a seat, sitting down from a standing position, or walking a distance.
2. Avoid touching electrical terminals of the component, unless instructed to do so by a written procedure.
3. When using a voltmeter, be sure to connect the ground lead first.
4. Do not remove the component from its protective packing until it is time to install the component.
5. Before removing the component from its package, ground the package to a known good ground on the vehicle.

WIRE SPLICING

CAUTION: If additional wire is needed when making a splice repair to any wire, it is important that the same or next larger size wire gauge be used. Refer to the appropriate wiring diagram for the original wire gauge size.

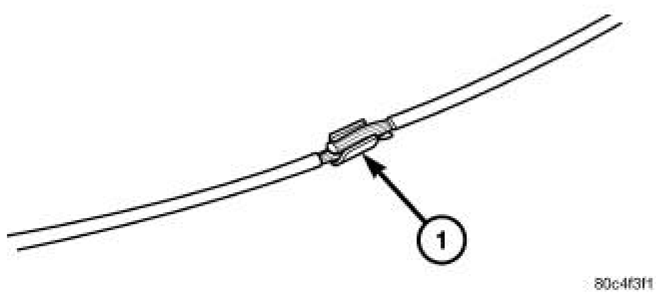


Fig. 33: Splice Band
Courtesy of CHRYSLER GROUP, LLC

1. Remove 13 millimeters (0.50 inch) of insulation from each wire that needs to be spliced.
2. Place a piece of adhesive sealant-lined heat shrink tubing (Part Number 04778570 or equivalent) over the wire on one side of the splice. Be certain the length of tubing will be sufficient to cover and seal the entire

repair area.

3. Place the strands of the wires being spliced so that they are overlapping each other within the splice band (1).

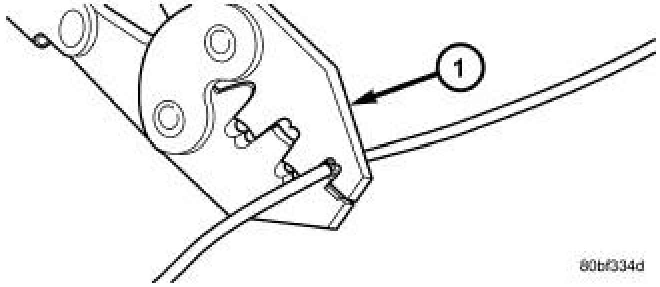


Fig. 34: Crimping Tool
Courtesy of CHRYSLER GROUP, LLC

4. Using a crimping tool (1) (MOPAR Part Number 05019912AA, Miller Special Tool Number (special tool #10042, Crimper, Wire/Terminal) or equivalent) crimp the splice band and wires together securely.

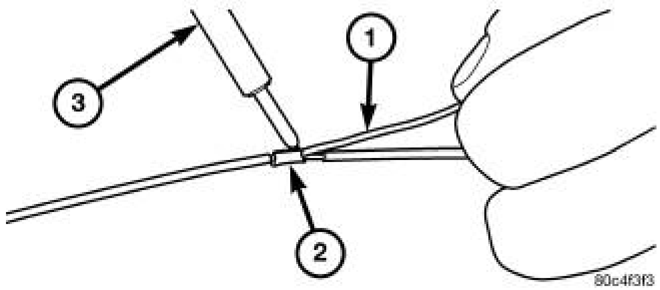


Fig. 35: Solder Splice
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Never use acid core solder for electrical wiring repairs.

5. Using Rosin Core type solder (1) only and a suitable soldering iron (3), solder the wire and splice band connection (2) together.

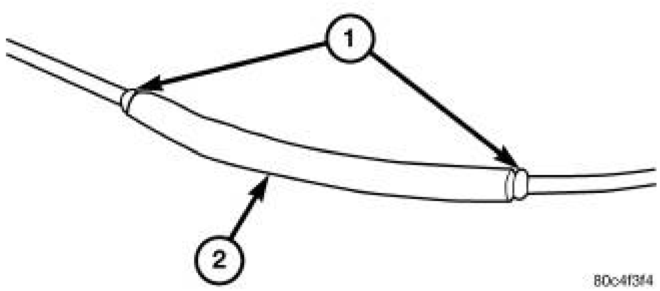


Fig. 36: Heat Shrink Tube
Courtesy of CHRYSLER GROUP, LLC

6. Center the heat shrink tubing (2) over the splice joint repair and heat using a suitable heat gun. Heat the joint until the tubing is tightly sealed and sealant (1) begins to ooze out of both ends of the tubing.

REMOVAL

CONNECTOR TERMINAL REMOVAL

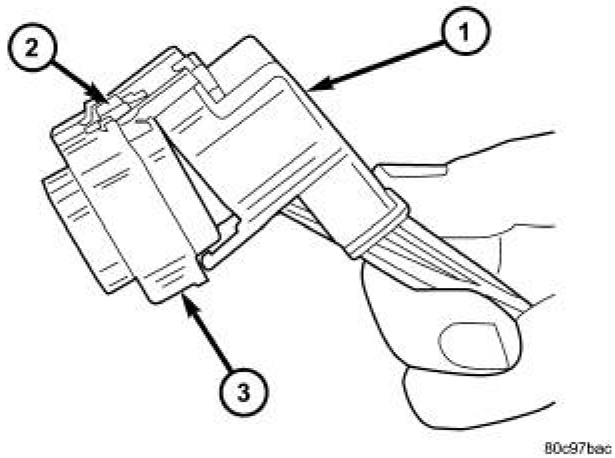


Fig. 37: Removal Of Dress Cover
Courtesy of CHRYSLER GROUP, LLC

1 - DRESS COVER	
2 - CONNECTOR LOCK	
3 - CONNECTOR	

1. Disconnect battery.
2. Release Connector Lock (2).
3. Disconnect the connector (3) being repaired from its mating half/component.
4. Remove the dress cover (if applicable) (1).

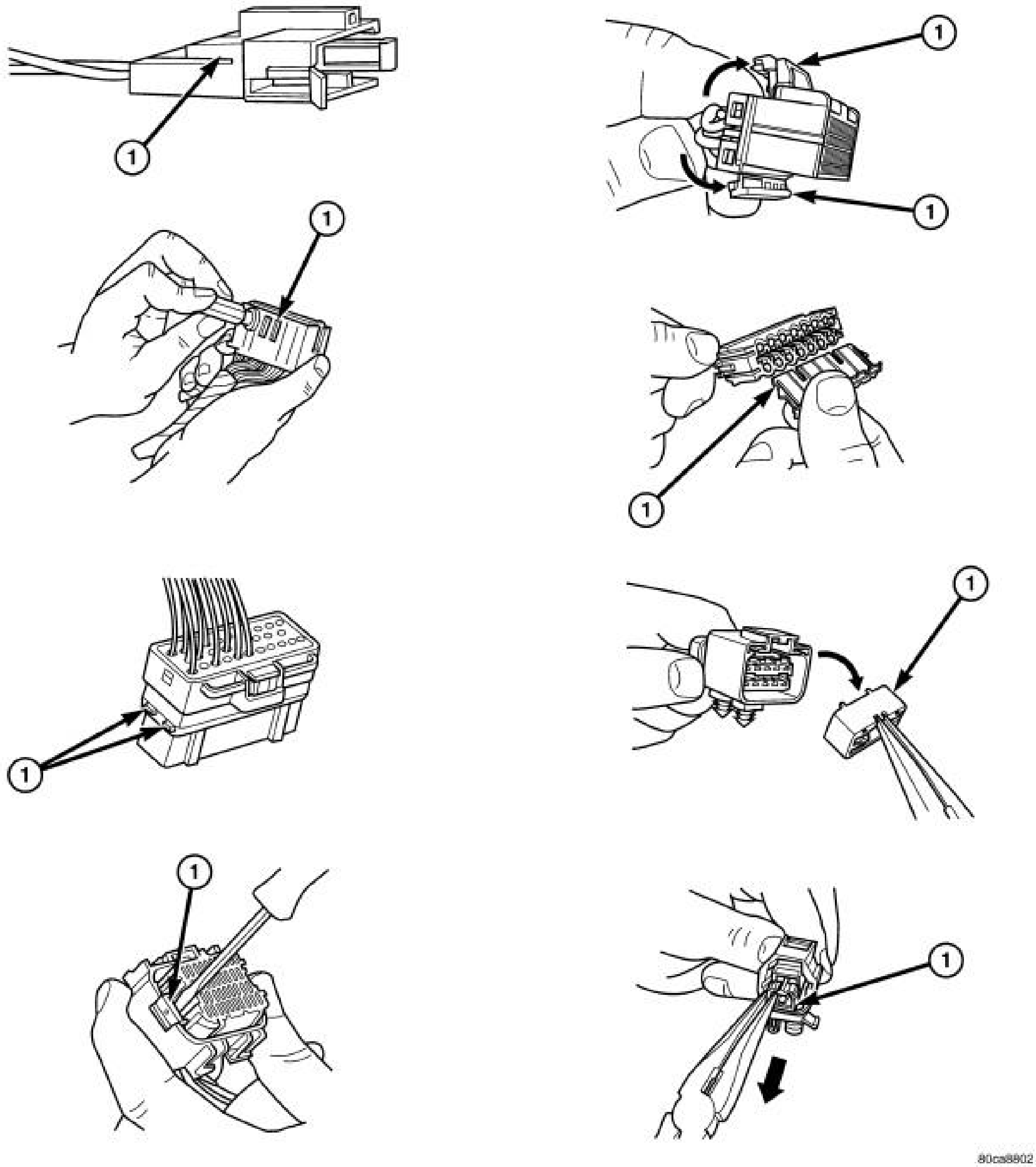


Fig. 38: Connector Secondary Terminal Lock
Courtesy of CHRYSLER GROUP, LLC

1 - Secondary Terminal Lock

5. Release the Secondary Terminal Lock, if required (1).

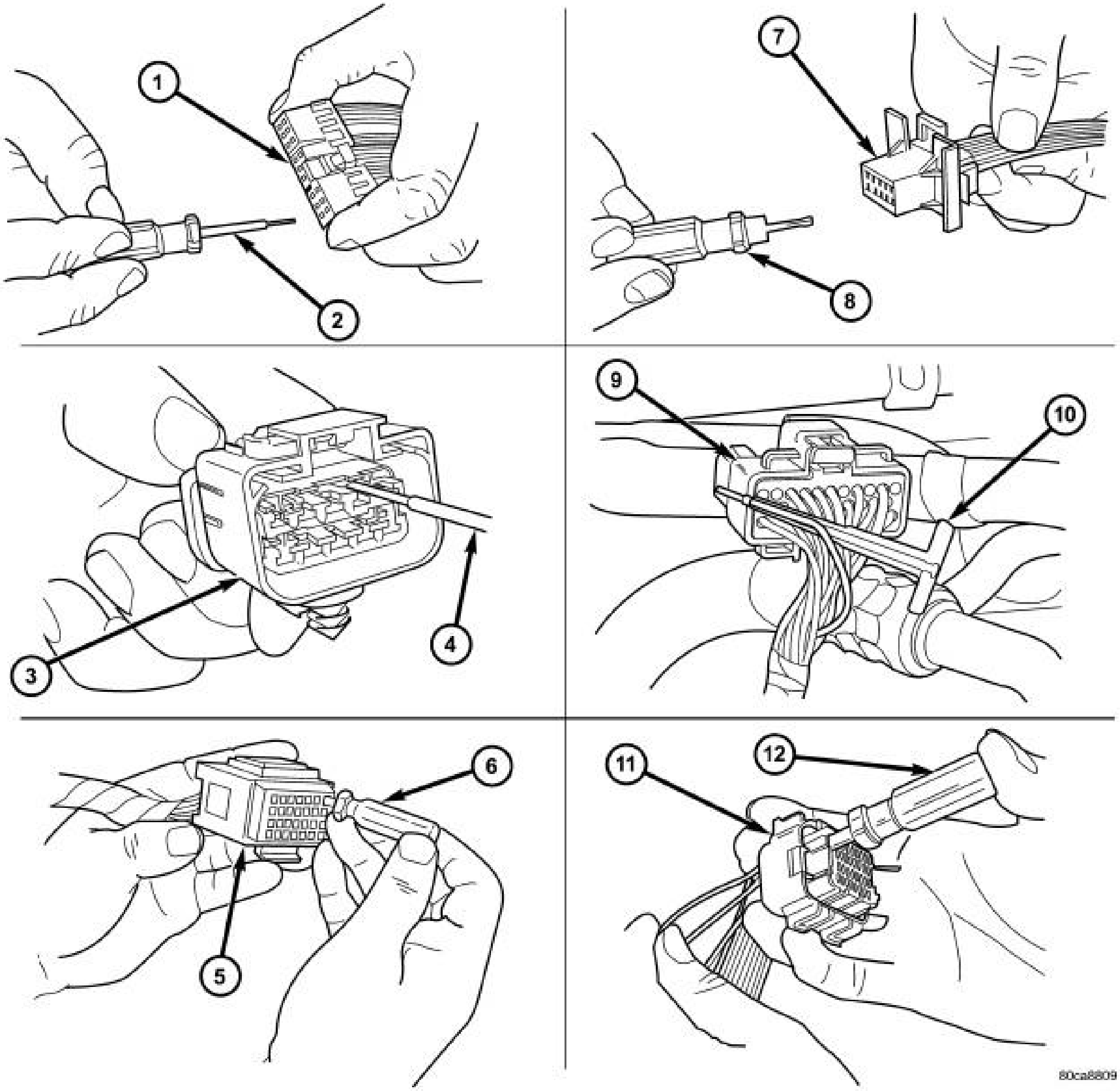


Fig. 39: Terminal Removal
Courtesy of CHRYSLER GROUP, LLC

1 - TYPICAL CONNECTOR
2 - PICK FROM TERMINAL REMOVER KIT 10300
3 - APEX CONNECTOR
4 - PICK FROM TERMINAL REMOVER KIT 10300
5 - AUGAT CONNECTOR
6 - ELECTRICAL TERMINAL REMOVAL TOOL
7 - MOLEX CONNECTOR
8 - PICK FROM TERMINAL REMOVER KIT 10300
9 - THOMAS AND BETTS CONNECTOR
10 - TERMINAL REMOVER
11 - CONNECTOR
12 - ELECTRICAL TERMINAL REMOVER

6. Position the connector locking finger away from the terminal using the proper special tool. Pull on the

wire to remove the terminal from the connector.

INSTALLATION

CONNECTOR TERMINAL INSTALLATION

1. Select a wire from the terminal repair kit that best matches the color and gauge of the wire being repaired.
2. Cut the repair wire to the proper length and remove one-half (1/2) inch of insulation.
3. Splice the repair wire to the wire harness. Refer to **WIRE SPLICING** .
4. Insert the repaired wire into the connector.
5. Install the connector locking wedge, if required, and reconnect the connector to its mating half/component.
6. Re-tape the wire harness starting at 1-1/2 inches behind the connector and 2 inches past the repair.
7. Connect battery and test all affected systems.

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Article GUID: A00735871

2015-16 CLUTCH

Clutch System - Challenger

WARNING

WARNING

WARNING: EXERCISE CARE WHEN SERVICING CLUTCH COMPONENTS. FACTORY INSTALLED CLUTCH DISCS DO NOT CONTAIN ASBESTOS FIBERS. DUST AND DIRT ON CLUTCH PARTS MAY CONTAIN ASBESTOS FIBERS FROM AFTERMARKET COMPONENTS. BREATHING EXCESSIVE CONCENTRATIONS OF THESE FIBERS CAN CAUSE SERIOUS BODILY HARM. WEAR A RESPIRATOR DURING SERVICE AND NEVER CLEAN CLUTCH COMPONENTS WITH COMPRESSED AIR OR WITH A DRY BRUSH. EITHER CLEAN THE COMPONENTS WITH A WATER DAMPENED RAGS OR USE A VACUUM CLEANER SPECIFICALLY DESIGNED FOR REMOVING ASBESTOS FIBERS AND DUST. DO NOT CREATE DUST BY SANDING A CLUTCH DISC. REPLACE THE DISC IF THE FRICTION MATERIAL IS DAMAGED OR CONTAMINATED. DISPOSE OF ALL DUST AND DIRT CONTAINING ASBESTOS FIBERS IN SEALED BAGS OR CONTAINERS. THIS WILL HELP MINIMIZE EXPOSURE TO YOURSELF AND TO OTHERS. FOLLOW ALL RECOMMENDED SAFETY PRACTICES PRESCRIBED BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND THE ENVIRONMENTAL SAFETY AGENCY (EPA), FOR THE HANDLING AND DISPOSAL OF PRODUCTS CONTAINING ASBESTOS.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - CLUTCH

ROAD TEST

Road test the vehicle and inspect components to determine the clutch problem.

During a road test, drive the vehicle at normal speeds. Shift the transmission through all gear ranges and observe clutch action. If the clutch chatters, grabs, slips or does not release properly, remove and inspect the clutch components. If the problem is noise or hard shifting further diagnosis may be needed as the transmission or another driveline component may be at fault.

CLUTCH CONTAMINATION

Clutch contamination can be caused by oil, water or clutch fluid on the clutch discs and pressure plate surfaces. This will cause chatter, slip and grab. Inspect the clutch components and verify the contaminate.

Oil contamination indicates a leak at either the rear main seal or transmission input shaft causing an oil residue on the housing interior and clutch cover and flywheel. Heat buildup caused by slippage between the pressure plate, discs and flywheel can bake the oil residue onto the components. A glaze-like residue ranges in color from amber to black will be noticed.

Road splash contamination, dirt/water can enter the clutch housing due to loose bolts, housing cracks or through hydraulic line openings. Driving through deep water puddles can force water/road splash into the housing through such openings.

IMPROPER CLUTCH RELEASE OR ENGAGEMENT

Clutch release or engagement problems are caused by wear or damage to one or more clutch components.

Release problems can result in hard shifting and noise. Inspect the clutch cylinders/interconnecting line, slave cylinder, release bearing, clutch discs and pressure plate. Inspect these components for loose, worn and damaged mounting bolts or components.

Normal condensation in vehicles that are stored or out of service for long periods of time can generate enough corrosion to make the discs stick to the flywheel, or pressure plate. If this condition is experienced loosen the disc manually through the inspection plate opening if equipped.

Engagement problems can result in slip, chatter/shudder and noisy operation. Inspect the clutch discs and pressure plate for contamination, wear, misalignment and distortion.

CLUTCH MISALIGNMENT

Clutch components must be in proper alignment with the crankshaft and transmission input shaft. Misalignment caused by excessive runout or warpage of any clutch component will cause grab, chatter and improper clutch release.

PRESSURE PLATE

Check pressure plate for flatness with a straightedge. Pressure plate friction area must be flat within 0.50 mm (0.020 in.). Attaching bolt holes should be in contact with surface plate within 0.38 mm (0.015 in.). Inspect friction faces of the flywheel and pressure plate for:

- Flywheel Dowel Pin Fit
- Excessive Discoloration
- Burned Areas
- Small Cracks
- Deep Grooves
- Ridges

CLUTCH DISC

Replace clutch discs and pressure plate if discs are worn within 0.38 mm (0.015 in.) of the rivet heads. Inspect clutch discs for:

- Discoloration
- Burned Areas
- Cracks
- Worn Disc Hub Splines
- Broken Springs

- Loose Rivets
- Oil Soaked

DIAGNOSIS CHART

The diagnosis charts describe common clutch problems, possible causes and correction. Refer to **DIAGNOSIS CHART**.

DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
Discs facing worn out.	1. Normal wear.	1. Replace pressure plate and discs.
	2. Driver frequently rides (slips) the clutch. Results in rapid overheating and wear.	2. Replace pressure plate and discs.
	3. Insufficient pressure plate diaphragm spring tension.	3. Replace pressure plate and discs.
Clutch disc facing contaminated with oil, grease, or clutch fluid.	1. Leak at rear main engine seal or transmission input shaft seal.	1. Replace appropriate seal.
	2. Excessive amount of grease applied to the input shaft splines.	2. Remove grease and apply the correct amount of grease.
	3. Road splash, water entering housing.	3. Replace clutch disc. Clean pressure plate and reuse if in good condition.
	4. Slave cylinder leaking.	4. Replace hydraulic clutch linkage.
Clutch is running partially disengaged.	1. Release bearing sticking or binding and does not return to the normal running position.	1. Verify failure. Replace the release bearing and transmission front bearing retainer as necessary.
Flywheel below minimum thickness specification.	1. Improper flywheel machining. Flywheel has excessive taper or excessive material removal.	1. Replace flywheel.
Pressure plate or diaphragm spring warped or distorted.	1. Rough handling. Impact bent cover, spring, or disc.	1. Replace discs and pressure plate as necessary.
	2. Improper bolt tightening procedure.	2. Tighten clutch cover using proper procedure.
Facing on flywheel side of disc torn, gouged, or worn.	1. Flywheel surface scored or nicked.	1. Correct surface condition if possible. Replace flywheel, discs and pressure plate as necessary.
	2. Clutch disc sticking or binding on transmission input shaft.	2. Inspect components and correct/replace as necessary.
Clutch discs facing burnt. Flywheel and pressure plate surfaces glazed.	1. Frequent operation under high loads or hard acceleration conditions.	1. Correct condition of flywheel and pressure plate surface. Replace discs and pressure plate.
	2. Driver frequently rides (slips) clutch. Results in rapid wear and overheating of disc and cover.	2. Correct condition of flywheel surface. Replace clutch discs and pressure plate.

CONDITION	POSSIBLE CAUSES	CORRECTION
Clutch discs binding on input shaft splines.	1. Clutch discs hub splines damaged during installation.	1. Clean, smooth, and lubricate hub splines if possible. Replace discs and pressure plate if necessary.
	2. Input shaft splines rough, damaged, or corroded.	2. Clean, smooth, and lubricate shaft splines if possible. Replace input shaft if necessary.
Clutch discs rusted to flywheel and/or pressure plate.	1. Clutch not used for and extended period of time (e.g. long term vehicle storage).	1. Sand rusted surfaces with 180 grit sanding paper. Replace discs, pressure plate and flywheel if necessary.
Pilot bearing seized, loose, or rollers are worn.	1. Bearing cocked during installation.	1. Install and lubricate a new bearing.
	2. Bearing defective.	2. Install and lubricate a new bearing.
	3. Bearing not lubricated.	3. Install and lubricate a new bearing.
	4. Clutch misalignment.	4. Inspect clutch and correct as necessary. Install and lubricate a new bearing.
Clutch will not disengage properly.	1. Low clutch fluid level.	1. Replace hydraulic linkage assembly.
	2. Clutch cover loose.	2. Follow proper bolt tightening procedure.
	3. Clutch disc bent or distorted.	3. Replace discs and pressure plate.
	4. Pressure plate diaphragm spring bent or warped.	4. Replace discs and pressure plate.
	5. Clutch disc installed backwards.	5. Remove and install clutch disc correctly.
	6. Clutch master or slave cylinder failure.	6. Replace hydraulic linkage assembly.
Clutch pedal squeak.	1. Pivot pin loose.	1. Tighten pivot pin if possible. Replace clutch pedal if necessary.
	2. Master cylinder bushing not lubricated.	2. Lubricate master cylinder bushing.
	3. Pedal bushings worn out or cracked.	3. Replace and lubricate bushings.
Clutch master or slave cylinder plunger dragging and/or binding.	1. Master or slave cylinder components worn or corroded.	1. Replace clutch hydraulic linkage assembly.
Release bearing is noisy.	1. Release bearing defective or damaged.	1. Replace release bearing.
Contact surface of release bearing damaged.	1. Pressure plate release fingers bent or distorted.	1. Replace pressure plate and release bearing.
	2. Release bearing defective or damaged.	2. Replace the release bearing.

CONDITION	POSSIBLE CAUSES	CORRECTION
	3. Release bearing misaligned.	3. Check and correct runout of clutch components. Check front bearing sleeve for damage/alignment. Repair as necessary.
Partial engagement of clutch discs. One side of disc is worn and the other side is glazed and lightly worn.	1. Clutch pressure plate position incorrect.	1. Replace clutch discs and pressure plate.
	2. Pressure plate release fingers bent or distorted.	2. Replace clutch discs and pressure plate.
	3. Clutch disc damaged or distorted.	3. Replace clutch discs and pressure plate
	4. Clutch misalignment.	4. Check alignment and runout of flywheel, disc, pressure plate, and/or clutch housing. Correct as necessary.

STANDARD PROCEDURE

STANDARD PROCEDURE - CLUTCH SYSTEM BLEED

NOTE: **Be certain the clutch pedal returns to the upper most position while bleeding the clutch system.**

NOTE: **It may take as many as two hundred strokes of the clutch pedal to properly bleed the clutch system.**

1. Check the fluid level in the brake master cylinder reservoir. If the brake fluid level is not up to the step in the reservoir, add DOT 4 brake fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
2. Slowly depress the clutch pedal.
   a. If the pedal feels hard in a short distance, air is present in the clutch slave cylinder.
   b. If the pedal feels spongy, air is present in the clutch master cylinder.
3. Continue checking the fluid level while depressing and releasing the clutch pedal. Depress and release the clutch pedal until an appropriate clutch pedal response and feel is achieved.

SPECIFICATIONS

TORQUE SPECIFICATIONS

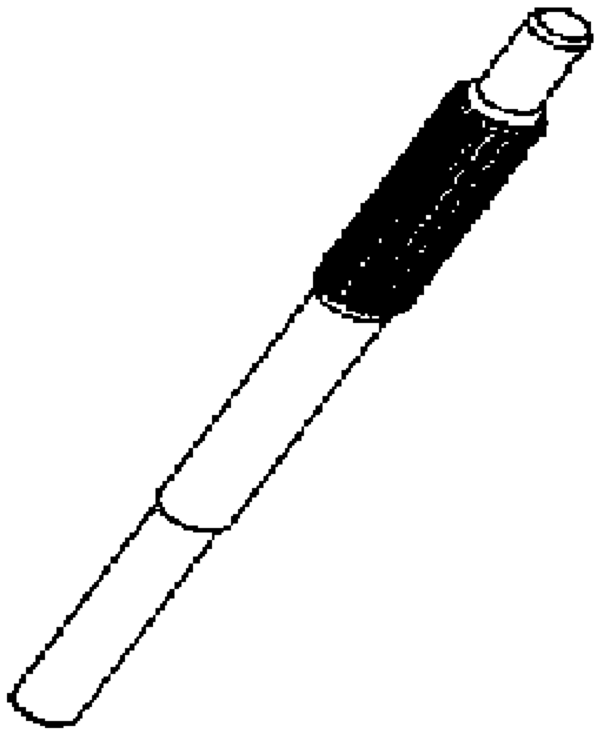
CLUTCH SYSTEM TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Pressure Plate Bolts	Refer to **DISC, CLUTCH, INSTALLATION**.			X
Clutch Release Bearing Bolts	28	21	-	Ā
Flywheel Bolts	Refer to **FLYWHEEL, INSTALLATION**.			X
Clutch / Brake Pedal Nuts	25	19	-	Ā

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

SPECIAL TOOLS

SPECIAL TOOLS

	10018 - Clutch Alignment Tool (Originally Shipped In Kit Number(s) 10017, 10017A.)

BEARING, CLUTCH RELEASE

REMOVAL

CLUTCH RELEASE BEARING/SLAVE CYLINDER

NOTE: The clutch release bearing and slave cylinder are serviced as an assembly.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the transmission and place it on a workbench. For 5.7L & 6.4L, refer to **REMOVAL** . For 6.2L, refer to **REMOVAL** .

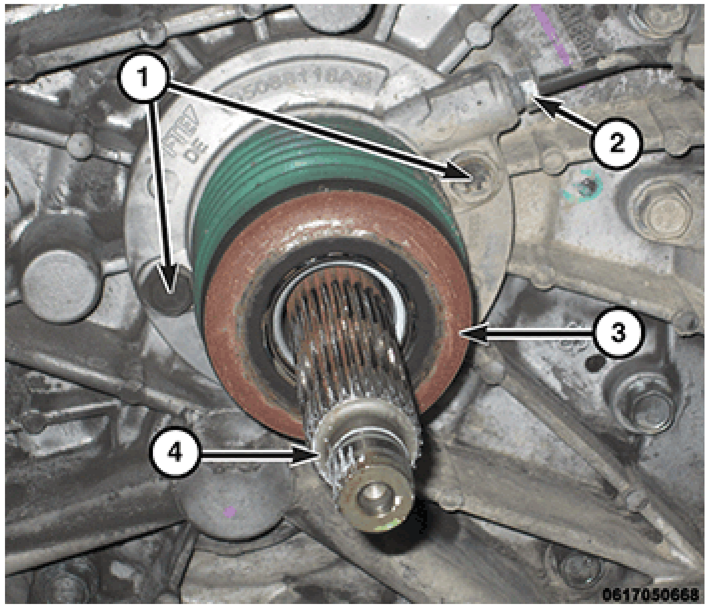


Fig. 1: Clutch Release Bearing/Slave Cylinder & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the clutch release bearing/slave cylinder bolts (1) and remove the clutch release bearing/slave cylinder (3).

INSTALLATION

CLUTCH RELEASE BEARING/SLAVE CYLINDER

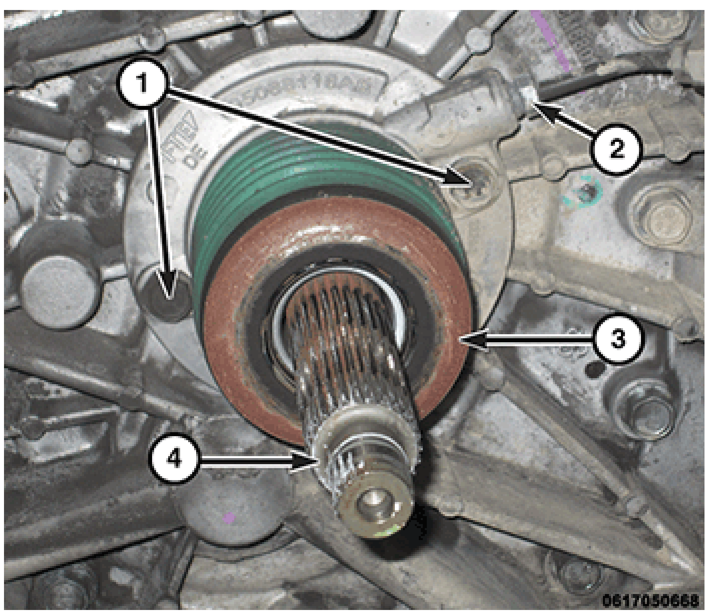


Fig. 2: Clutch Release Bearing/Slave Cylinder & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the clutch release bearing/slave cylinder (3) over input shaft (4).
2. Install the clutch release bearing/slave cylinder bolts (1) tighten to the proper specification. Refer to **SPECIFICATIONS**.
3. Install the transmission. For 5.7L & 6.4L, refer to **INSTALLATION** . For 6.2L, refer to

INSTALLATION .

4. Bleed the clutch system. Refer to STANDARD PROCEDURE.

BEARING, PILOT

REMOVAL

PILOT BEARING

1. Remove the clutch assembly. Refer to DISC, CLUTCH, REMOVAL.

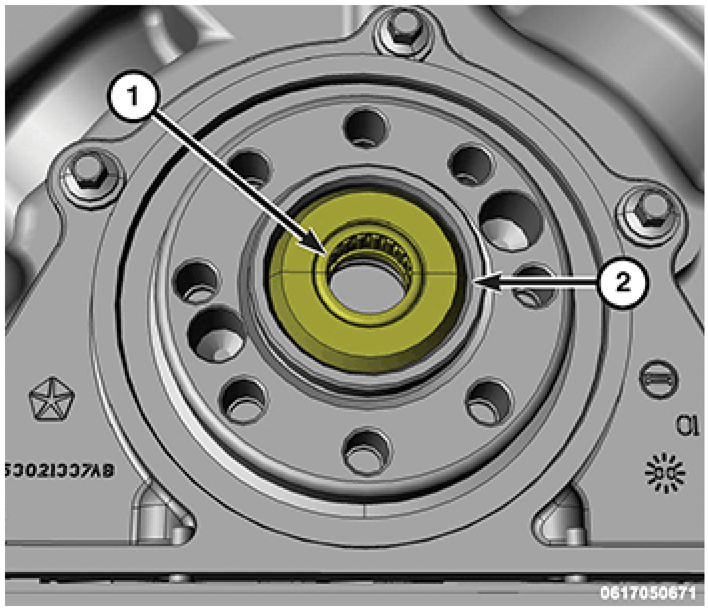


Fig. 3: Crankshaft & Pilot Bearing
Courtesy of CHRYSLER GROUP, LLC

2. Using a suitable blind hole puller, remove the pilot bearing (1) from the crankshaft (2).

INSTALLATION

PILOT BEARING

1. Clean the pilot bearing bore with solvent and wipe dry with shop towel.

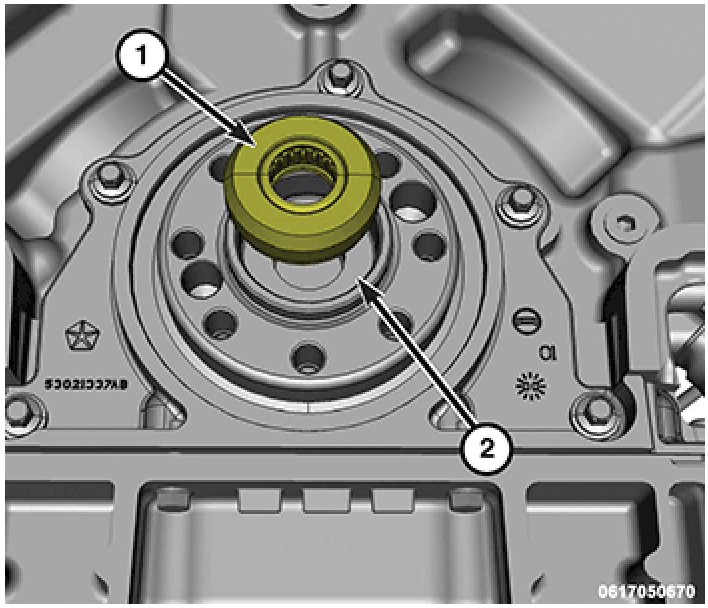


Fig. 4: Pilot Bearing Bore & Pilot Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE: Letter side of the pilot bearing must face the transmission.

2. Install the new the pilot bearing (1) with (special tool #10018, Clutch Alignment Tool). Keep the pilot bearing straight during installation. Do not allow the pilot bearing to become cocked. Tap the pilot bearing into place until it is flush with the edge of the pilot bearing bore (2). Do not recess the pilot bearing.
3. Install the clutch assembly. Refer to **DISC, CLUTCH, INSTALLATION**.

CYLINDER, CLUTCH MASTER

REMOVAL

CLUTCH MASTER CYLINDER

NOTE: The clutch master cylinder and clutch starter interlock switch are serviced as an assembly.

NOTE: Place towels or rags on the floor below the clutch master cylinder to prevent brake fluid from coming into contact with the carpet.

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove the push fasteners and the instrument panel closeout.
3. Remove the instrument panel steering column cover and reinforcement. Refer to **COVER, STEERING COLUMN OPENING, REMOVAL** .

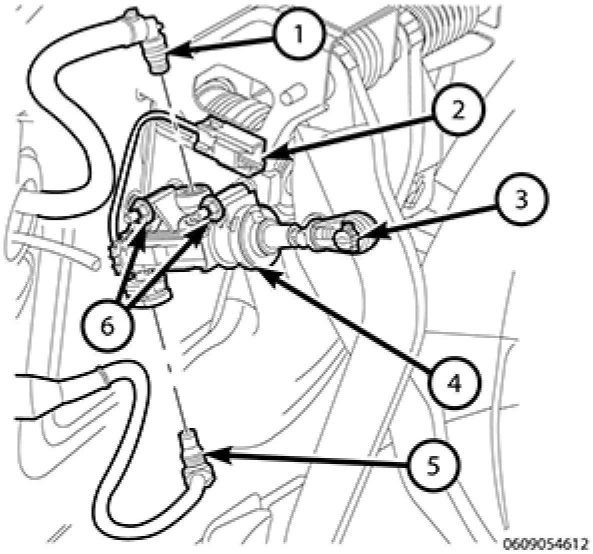


Fig. 5: Clutch Master Cylinder, Lines, Pushrod, Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the clutch master cylinder pushrod (3) from the clutch pedal lever.
5. Disconnect the clutch starter interlock switch harness connector (2).
6. Disconnect the brake/clutch fluid reservoir supply line (1) and plug the line to prevent excessive leakage/loss of brake fluid from the brake master cylinder reservoir.
7. Disconnect the clutch slave cylinder hydraulic line (5).
8. Remove the two clutch master cylinder to the clutch/brake pedal assembly bolts (6) and remove the clutch master cylinder (4).

INSTALLATION

CLUTCH MASTER CYLINDER

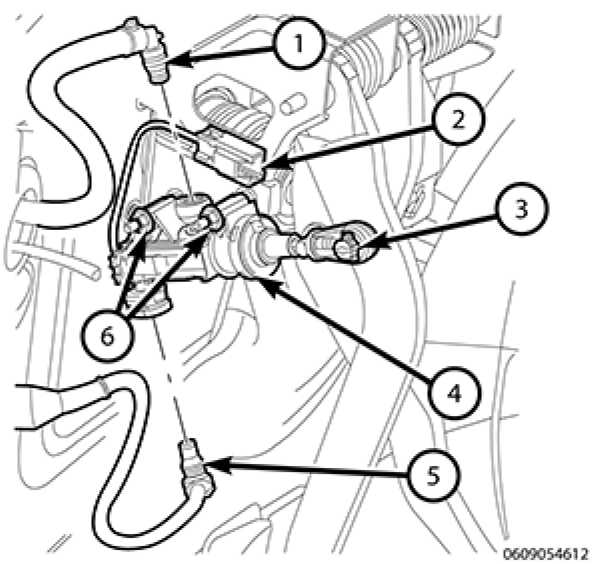


Fig. 6: Clutch Master Cylinder, Lines, Pushrod, Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the clutch master cylinder (4) onto the clutch/brake pedal assembly and install the two bolts (6).

Tighten the nuts to the proper specification. Refer to **SPECIFICATIONS**.

2. Connect the clutch slave cylinder hydraulic line (5).
3. Remove the previously installed plug and connect the brake/clutch fluid reservoir supply line (1).
4. Connect the clutch starter interlock switch wire harness connector (2).
5. Connect the clutch master cylinder pushrod (3) to the clutch pedal lever.
6. Install the instrument panel reinforcement and steering column cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
7. Install the instrument panel closeout and the push pin fasteners.
8. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

NOTE: **While bleeding the clutch system be certain the clutch pedal returns to the most upright position. It may take as many as two hundred clutch strokes to bleed the system.**

9. Bleed the clutch system. Refer to **STANDARD PROCEDURE**.

DISC, CLUTCH

DESCRIPTION

DESCRIPTION

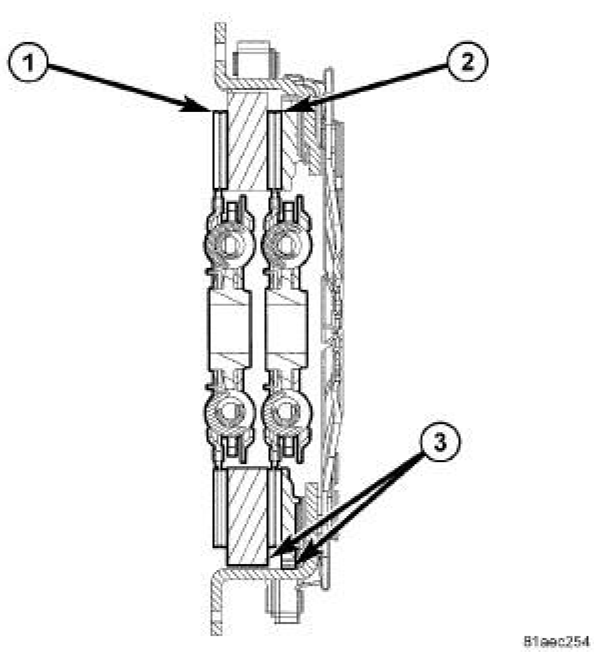


Fig. 7: Dual Disc Clutch
Courtesy of CHRYSLER GROUP, LLC

The clutch is a dual disc design. One disc (1) is independent of the pressure plate, located between the pressure plate and flywheel. The second disc (2) is an internal component located between the pressure plates (3) and cannot be serviced separately.

NOTE: **If either clutch discs or pressure plate is worn or damaged, the independent disc and pressure plate must be replaced as an assembly.**

REMOVAL

CLUTCH ASSEMBLY

1. Remove the transmission. For 5.7L & 6.4L, refer to **REMOVAL** . For 6.2L, refer to **REMOVAL** .
2. Mark pressure plate (1) and flywheel (2) for installation reference.

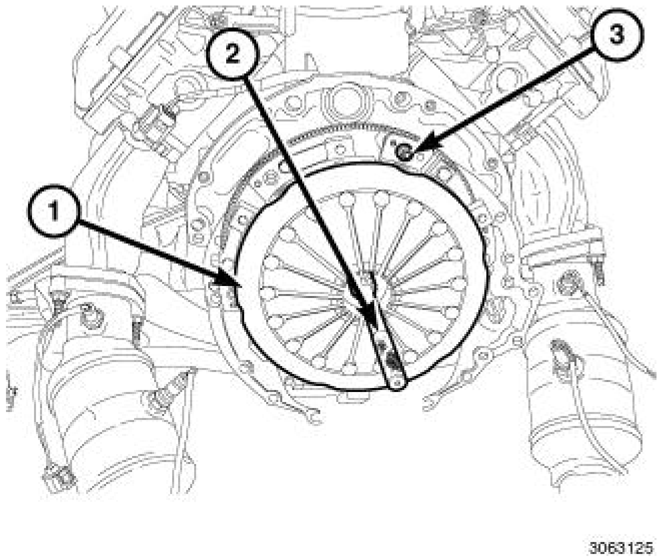


Fig. 8: Pressure Plate Assembly, Alignment Tool & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Insert (special tool #10018, Clutch Alignment Tool) (2) through the clutch discs into the pilot bearing.
4. Loosen the clutch pressure plate assembly (3) bolts evenly in a crisscross pattern. This will release spring pressure evenly and avoid pressure plate damage.
5. Remove the clutch pressure plate assembly (1).

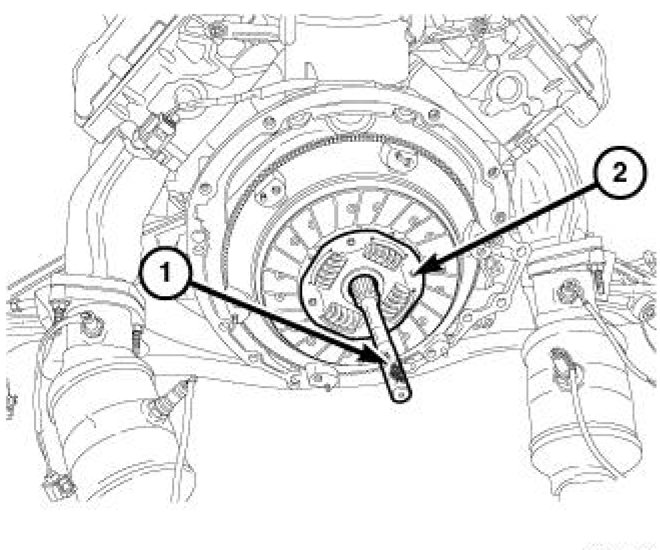


Fig. 9: Clutch Disc & Alignment Tool

Courtesy of CHRYSLER GROUP, LLC

6. Remove the independent disc (2) and clutch alignment tool (1).

CLEANING

CLEANING

Clean flywheel face with crocus cloth or 400-600 grade sandpaper, then wipe surface with mineral spirits.

NOTE: **If flywheel is severely scored, heat checked or warped replace flywheel.**

Wipe friction surface of the pressure plate with mineral spirits.

INSTALLATION

CLUTCH ASSEMBLY

NOTE: **If the flywheel is replaced or removed apply thread sealer to the flywheel retaining bolts. This will prevent engine oil from leaking onto the clutch.**

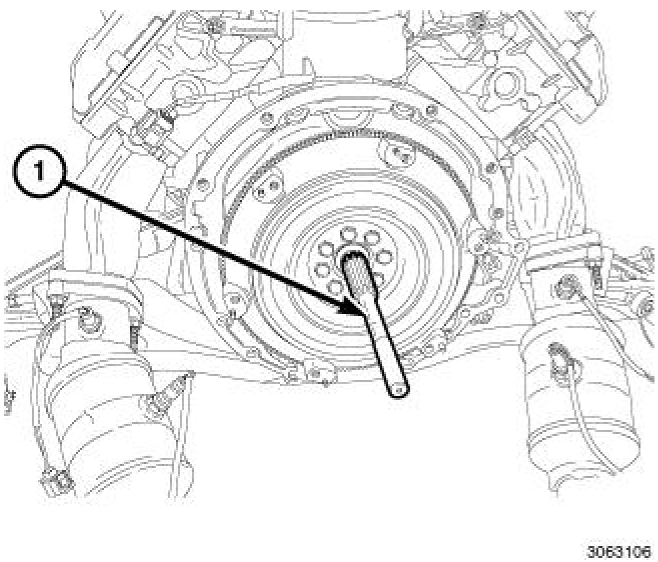


Fig. 10: Clutch Alignment Tool
Courtesy of CHRYSLER GROUP, LLC

1. Insert the (special tool #10018, Clutch Alignment Tool) (1) into the pilot bearing.

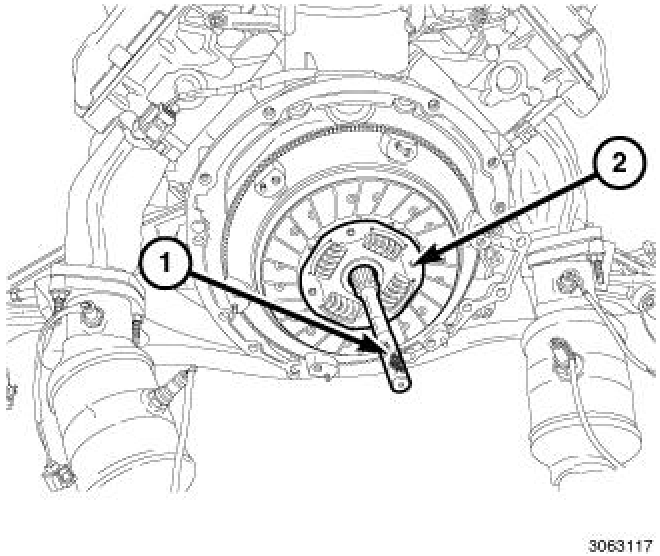


Fig. 11: Clutch Disc & Alignment Tool
Courtesy of CHRYSLER GROUP, LLC

2. Install the independent clutch disc (2) over the (special tool #10018, Clutch Alignment Tool) (1) and position against the flywheel.

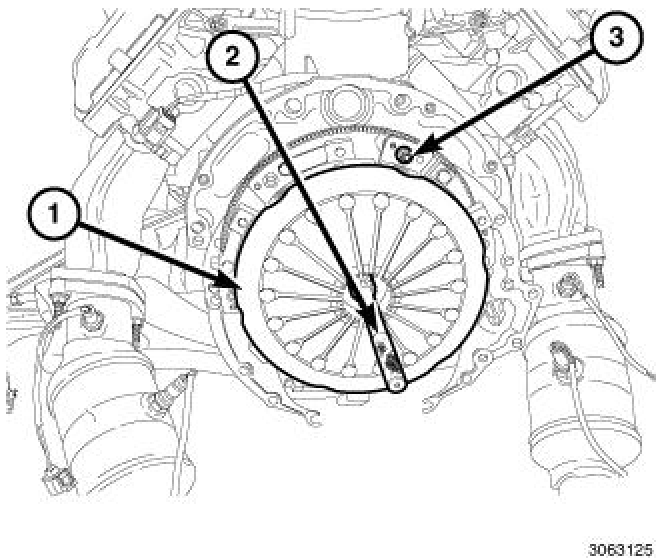


Fig. 12: Pressure Plate Assembly, Alignment Tool & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**If a new clutch pressure plate assembly or flywheel is installed, align cover balance paint spot as close as possible to flywheel balance paint spot.**

3. Install the clutch pressure plate assembly (1) over the (special tool #10018, Clutch Alignment Tool) (2) up against the flywheel and onto the dowel pins.
4. Tighten the **NEW** clutch pressure plate assembly bolts (3) a few turns at a time in a star pattern until the bolts are seated. Then tighten the clutch pressure plate assembly bolts in star pattern to 75 Nm (55 ft.-lbs.).

CAUTION: Do not over lubricate shaft splines. This can result in grease contamination of the disc.

5. Remove the clutch disc alignment tool (2).
6. Apply.55 GRAMS Ā±.1 of GL261 Dupont Krytox Ā® XP2C5 to the splines of transmission input shaft and release bearing slide surface of the transmission front bearing retainer.
7. Install the transmission. For 5.7L & 6.4L, refer to **INSTALLATION** . For 6.2L, refer to **INSTALLATION** .

FLYWHEEL

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - FLYWHEEL

Common flywheel problems:

- Incorrect bolt tightening
- Mounting flywheel on dirty crankshaft flange
- Improper seating on crankshaft flange shoulder
- Heat warped
- Loose flywheel bolts

The flywheel should be replaced if warped or overheated. **Do not machine flywheel to correct a warped or overheated condition.**

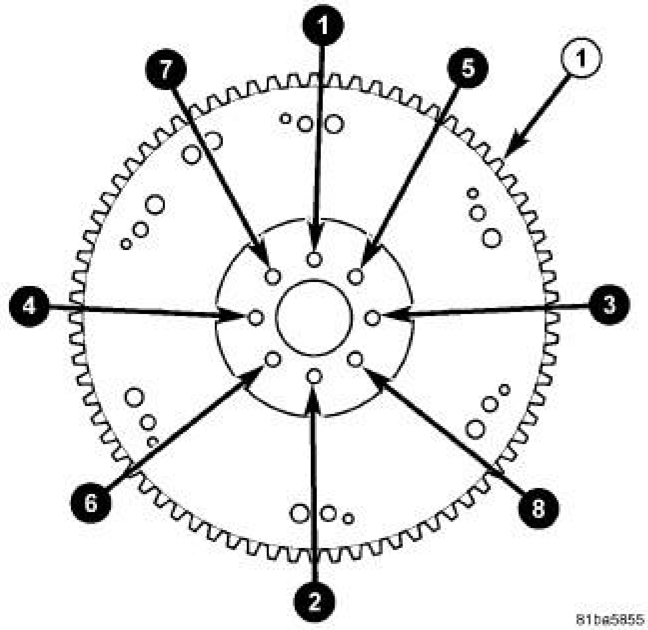
Clean the crankshaft flange and its mating surface on the flywheel before assembling. Dirt in this area could cause the flywheel to mis-align when installing.

Apply Mopar Lock AND Seal or equivalent to **NEW** flywheel bolts. Tighten the flywheel bolts to the proper specification. Refer to **SPECIFICATIONS**. Over tightening the bolts can distort the flywheel.

REMOVAL

FLYWHEEL

1. Remove the clutch assembly. Refer to **DISC, CLUTCH, REMOVAL**.



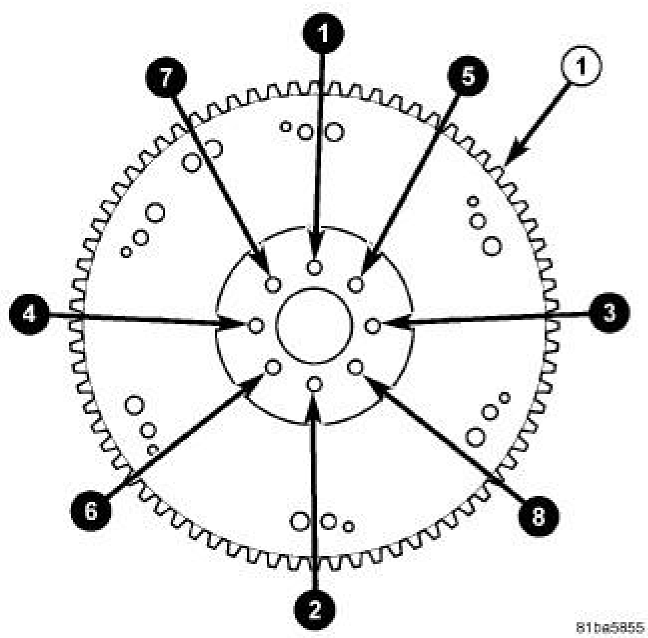
[Fig. 13: Flywheel Bolt Removing/Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

2. Remove and discard the flywheel bolts and remove the flywheel (1) from the crankshaft.

INSTALLATION

FLYWHEEL

1. Apply MoparÂ® Lock AND Seal or equivalent to the **NEW** flywheel bolts.



[Fig. 14: Flywheel Bolt Removing/Tightening Sequence]

Courtesy of CHRYSLER GROUP, LLC

2. Install the flywheel (1) on the engine crankshaft and install the **NEW** flywheel bolts.
3. Tighten the **NEW** flywheel bolts in sequence shown in illustration to 75 Nm (55 ft.-lbs.).
4. Install the clutch assembly. Refer to **DISC, CLUTCH, INSTALLATION**.

PEDAL AND PAD, CLUTCH

REMOVAL

CLUTCH PEDAL

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove the push fasteners and the instrument panel closeout.
3. Remove the steering column opening cover. Refer to **REMOVAL** .

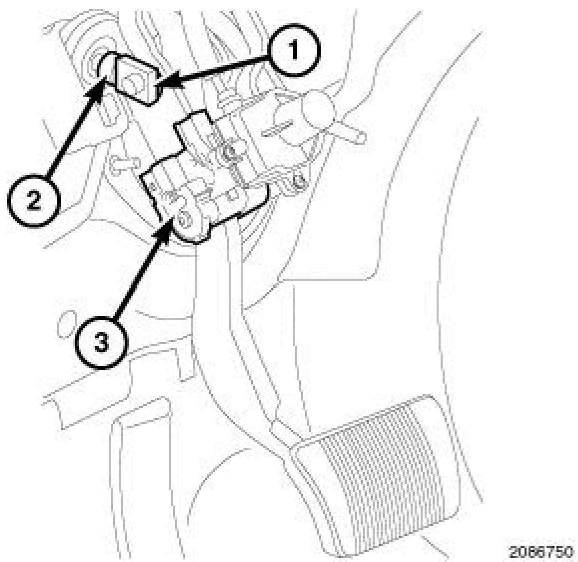


Fig. 15: Brake Booster Push Rod And Clip
Courtesy of CHRYSLER GROUP, LLC

4. Remove the clip (1), and disconnect the brake booster push rod (2).

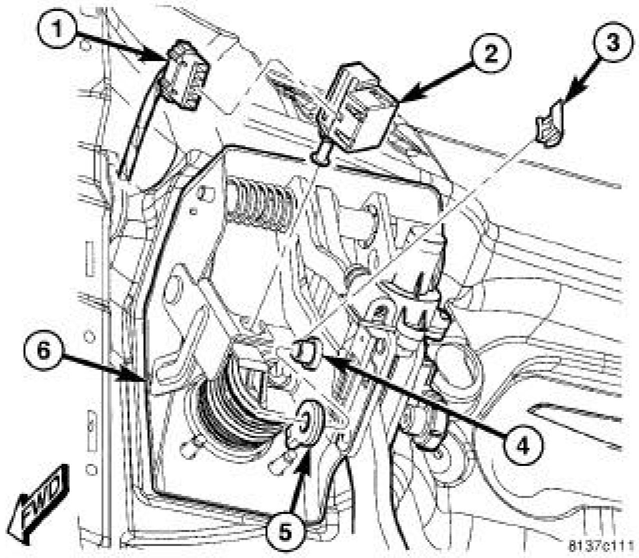


Fig. 16: Brake Lamp Switch & Pedal Rod
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the brake pedal sensor wire harness connector (1).

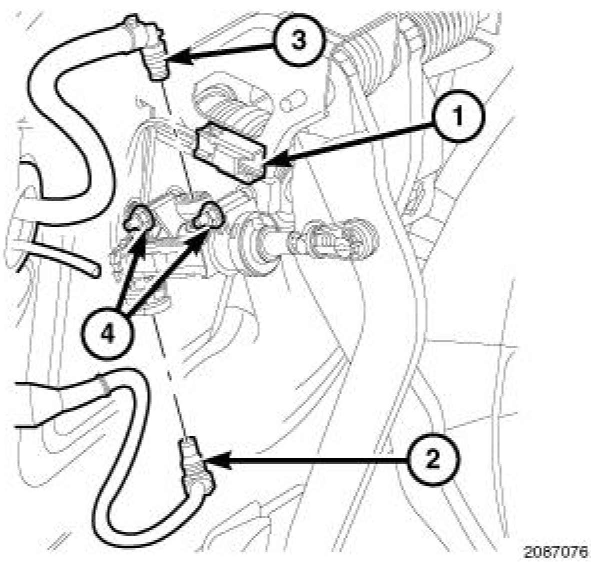


Fig. 17: Brake/Clutch Fluid Reservoir Tube, Clutch Hydraulic Line & Connector
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the clutch starter interlock switch wire harness connector (1).
7. Disconnect the brake/clutch fluid reservoir tube (3).
8. Disconnect the clutch hydraulic line (2).

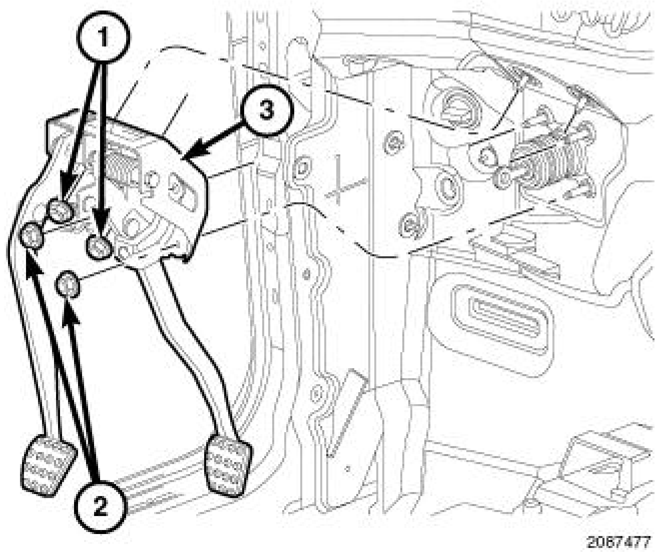


Fig. 18: Remove/Install Clutch/Brake Pedal Assembly & Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

9. Remove the clutch/brake pedal assembly mounting nuts (1) and (2), then remove the clutch/brake pedal assembly (3).

INSTALLATION

CLUTCH PEDAL

NOTE: **While bleeding the clutch system be certain the clutch pedal returns to the most upright position. It may take as many as two hundred clutch strokes to bleed the system. Do not let the brake/clutch fluid reservoir to empty out while bleeding the hydraulic system.**

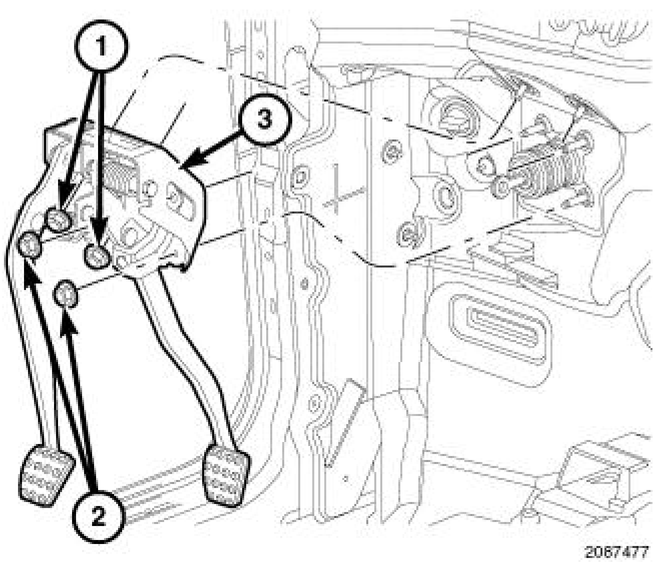


Fig. 19: Remove/Install Clutch/Brake Pedal Assembly & Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Install the clutch/brake pedal assembly (3), and the clutch/brake pedal assembly mounting nuts (1) and (2). Tighten the fasteners to the proper specification. Refer to SPECIFICATIONS.

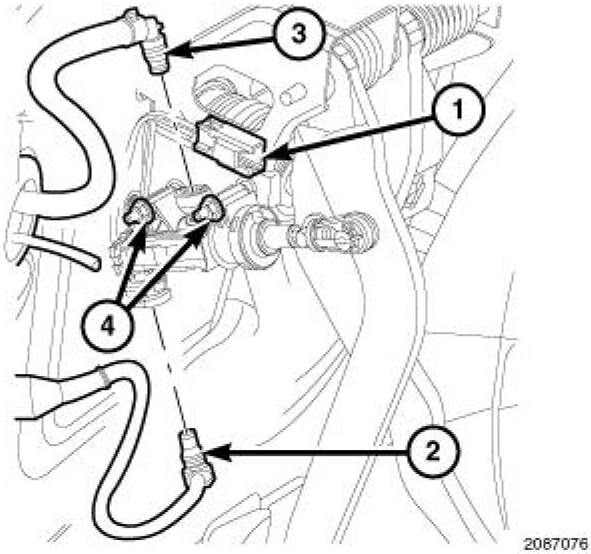


Fig. 20: Brake/Clutch Fluid Reservoir Tube, Clutch Hydraulic Line & Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the clutch hydraulic line (2).
3. Connect the brake/clutch fluid reservoir tube (3).
4. Connect the clutch starter interlock switch wire harness connector (1).

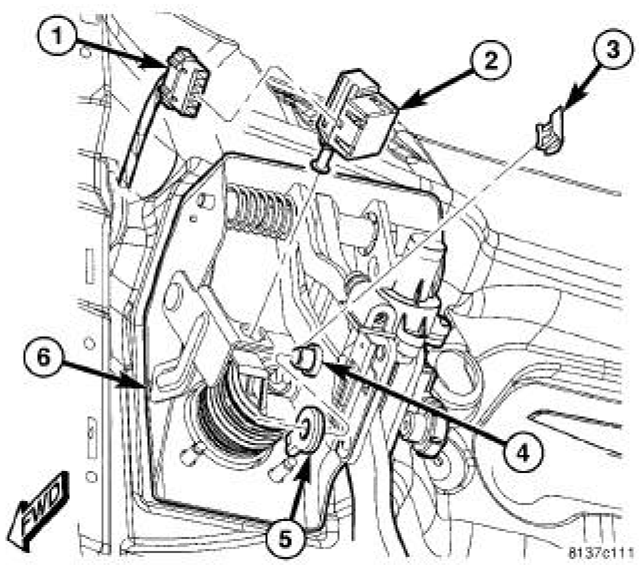


Fig. 21: Brake Lamp Switch & Pedal Rod
Courtesy of CHRYSLER GROUP, LLC

5. Connect the brake pedal sensor wire harness connector (1).

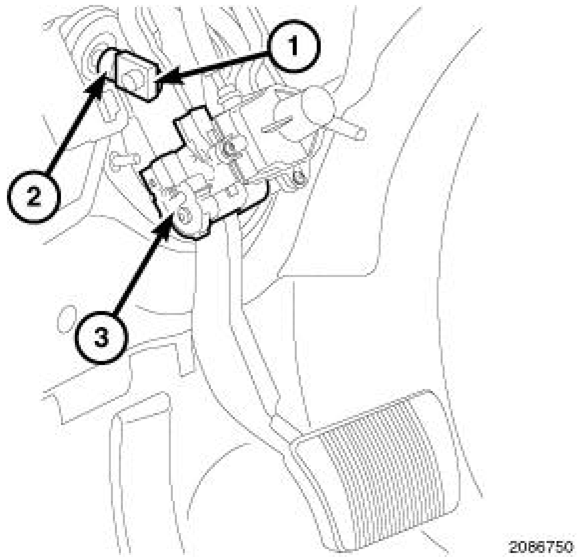


Fig. 22: Brake Booster Push Rod And Clip
Courtesy of CHRYSLER GROUP, LLC

WARNING: Always install a new clutch master cylinder pushrod retainer clip during installation of the clutch master cylinder. Failure to install a new retainer clip may result in loss of vehicle control and serious or fatal injury.

6. Connect the brake booster push rod (2), and install a **NEW** clip (1).
7. If necessary bleed the hydraulic system. Refer to **STANDARD PROCEDURE**.
8. Install steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
9. Install the instrument panel closeout and the push pin fasteners.
10. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

SWITCH, CLUTCH STARTER INTERLOCK

DESCRIPTION

DESCRIPTION

The clutch pedal position switch is attached to the side of the clutch master cylinder.

The clutch pedal position switch cannot be serviced independently, it is serviced with the clutch master cylinder.

For clutch pedal position switch removal and installation, refer to **CYLINDER, CLUTCH MASTER, REMOVAL**.

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Article GUID: A00735953

DESCRIPTION

DESCRIPTION

Several combinations of radio receivers and speaker configurations are offered. The audio system operates on a non-switched fused B+ battery current source and is turned On or Off by electronic messages received over the Controller Area Network (CAN) data bus so that the system will only operate when the status of the ignition switch is Run or Accessory.

The radios can be identified by sales code RA2, RA3 and RA4. An optional navigation feature is also available in the RA3 radio for this vehicle. Navigation is standard in the RA4 radio for this vehicle. Refer to **DESCRIPTION** .

The RA2, RA3 and RA4 radios all have an internal Hands Free Module (HFM). There is no external HFM because all hands free functions are integrated into the Radio Receiver Module (RRM) (also known as the radio or the head unit).

The audio system includes the following components:

- **Antenna** - The base radio antenna is integrated into the back glass and includes an electronic antenna module located on the header above the back glass opening and concealed above the headliner. The base antenna is capable of receiving AM and FM signals. An optional body color, multifunction (satellite audio, GPS and cellular) antenna (also known as the shark fin style antenna) is located at the rear and center of the outer roof panel.
- **Power Amplifier** - One of three optional audio power amplifiers are available with certain premium audio systems only. Either amplifier is located on the instrument panel support structure under the driver side end of the instrument panel. Refer to **AMPLIFIER, DESCRIPTION**.
- **Radio Noise Suppression Components** - Devices designed to suppress Radio Frequency Interference (RFI) and ElectroMagnetic Interference (EMI) radio noise are used in this vehicle. Refer to **COMPONENTS, RADIO NOISE SUPPRESSION, DESCRIPTION**.
- **Radio Receiver Module** - Several optional Radio Receiver Modules (RRM) (also known as the radio or the head unit) are available for this vehicle. Refer to **RADIO, DESCRIPTION**.
- **Remote Radio Switches** - Optional remote radio switches located on the steering wheel are available in this vehicle. Refer to **SWITCH, REMOTE RADIO, OPERATION**.
- **Speakers** - Several optional speaker packages are offered in this vehicle. Refer to **SPEAKER, DESCRIPTION**.
- **Media Hub** - A media hub including a Secure Data (SD) card slot, a Universal Serial Bus (USB) port and an auxiliary cable input jack located within the storage bin of the center floor console is optional equipment. Refer to **MEDIA HUB, DESCRIPTION**.

Certain functions and features of the audio system rely upon resources shared with other electronic modules in the vehicle over the CAN data bus network. The RRM contains a microcontroller and programming that allows it to communicate with other electronic modules in the vehicle over the Controller Area Network - Interior High

Speed (CAN-IHS) data bus. The RRM can also receive electronic message inputs over the CAN-C data bus; however, the RRM is not a CAN gateway. All of the RRM electronic message outputs are through the CAN-IHS data bus. Refer to COMMUNICATION, DESCRIPTION .

Many of the audio system components cannot be adjusted or repaired. If they become damaged or ineffective, that component must be replaced. Those that can be repaired must be serviced by an authorized electronic warranty repair station. Refer to the appropriate warranty policies and procedures information.

OPERATION

OPERATION

The base audio system components are designed to provide audio entertainment and information through the reception, tuning and amplification of locally broadcast radio signals in Amplitude Modulating (AM) and Frequency Modulating (FM) commercial frequency ranges.

Some audio system components operate on battery current received through a fuse in the rear Power Distribution Center (PDC) on a fused B+ circuit and monitor electronic **ignition status** message inputs received over the Controller Area Network (CAN) data bus network so that certain functions remain active regardless of the ignition status. Other components operate on battery current received through the rear PDC on a fused ignition run-accessory circuit so that they will only operate when the status of the ignition switch is Run or Accessory.

Certain audio system components receive electronic message inputs over the CAN-Interior High Speed (IHS) data bus. While the Radio Receiver Module (RRM) (also known as the radio or the head unit) is also connected to the CAN-C data bus, the RRM is not a CAN gateway. All electronic message outputs of the RRM are carried over the CAN-IHS data bus. When the RRM monitors a problem in any of the audio system circuits and components, or in any of the Bluetooth™ transceiver circuits, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit.

The hard wired circuits between components related to the audio system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between modules and other devices that provide some features of the audio system. The most reliable, efficient and accurate means to diagnose the electronic controls and communication related to audio system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - AUDIO SYSTEM

WARNING: Disable the airbag system before attempting any steering wheel, steering column, seat belt tensioner, side airbag or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground)

cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

The hard wired circuits between components related to the audio system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between modules and other devices that provide some features of the audio system. The most reliable, efficient and accurate means to diagnose the audio system or the electronic controls and communication related to audio system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

NOTE: **The MIT019 Multi-Media Interface Tester special tool may also be used for testing where no Diagnostic Trouble Code (DTC) has been recorded, such as with Bluetooth™ reception and phone pairing issues. Refer to DIAGNOSIS AND TESTING .**

AUDIO SYSTEM DIAGNOSTIC TABLE		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
AUDIO SYSTEM INOPERATIVE	1. Fuse ineffective.	1. Check audio system fuses. If fuse requires replacement, repair the shorted circuit or component as required.
	2. Open wiring circuit.	2. Perform the **No Response from Radio** test. Refer to **DIAGNOSIS AND TESTING** .
NO AUDIO - BUT RADIO LIGHTS UP	1. Antenna problem.	1. Perform the **Poor or No AM/FM Audio Reception** test. Refer to **DIAGNOSIS AND TESTING** .
Ā	2. Radio or Amplifier (if equipped) connector damaged.	2. Check for loose or corroded radio/amplifier connector. Repair, as required.
Ā	3. Open or shorted wiring circuit.	3. Check for shorted or open circuits. Repair wiring as required.
Ā	4. Open Radio or Amplifier (if equipped) ground circuit.	4. Check for continuity between radio chassis or amplifier and a known good ground. There should be continuity. Repair ground as required.
Ā	5. Amplifier (if equipped) ineffective.	5. Refer to **DIAGNOSIS AND TESTING** - Premium 1, **DIAGNOSIS AND TESTING** - Premium 2 or **DIAGNOSIS AND TESTING** - Premium 3 .
Ā	6. Speakers ineffective.	6. Refer to **DIAGNOSIS AND TESTING** .

AUDIO SYSTEM DIAGNOSTIC TABLE		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
NO RADIO DISPLAY	1. Fuse ineffective.	1. Check audio system fuses. If fuse requires replacement, repair the shorted circuit or component as required.
Ā	2. Radio connector damaged.	2. Check for loose or corroded radio connector. Repair as required.
Ā	3. Open feed wiring circuit.	3. Check for battery voltage at radio connector. Repair wiring as required.
Ā	4. Open ground circuit.	4. Check for continuity between radio chassis and a known good ground. There should be continuity. Repair ground as required.
Ā	5. Radio ineffective.	5. Perform the **No Response from Radio** test. Refer to **DIAGNOSIS AND TESTING** .
POOR AM/FM RADIO RECEPTION	1. Antenna ineffective.	1. Perform the **Poor or No AM/FM Audio Reception** test. Refer to **DIAGNOSIS AND TESTING** .
	2. Open ground circuit.	2. Check for continuity between radio chassis and a known good ground. There should be continuity. Repair ground as required.
	3. Radio ineffective.	3. Refer to **DIAGNOSIS AND TESTING** or **DIAGNOSIS AND TESTING** .
POOR SDAR AUDIO RECEPTION	1. SDAR antenna ineffective. 2. Coax cable ineffective. 3.Head unit ineffective.	1. Perform the **Poor or No Satellite Audio Reception** test. Refer to **DIAGNOSIS AND TESTING** . 2. Perform the **Poor or No Satellite Audio Reception** test. Refer to **DIAGNOSIS AND TESTING** . 3. Perform the **Poor or No Satellite Audio Reception** test. Refer to **DIAGNOSIS AND TESTING** .
SOUND DISTORTION (VIBRATION FROM SPEAKER AREA, BUZZING - HUMMING)	1. Door trim panel loose or missing fasteners.	1. Inspect door trim panel and correct as necessary. Replace any missing fasteners.
Ā	2. Water shield loose or misaligned.	2. Inspect water shield and adjust as required.
Ā	3. Items placed in door trim panel map pockets vibrating or moving from side to side.	3. Remove items from door trim panel. Ensure that vibration is no longer present.

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Subwoofer Assembly To Left Spare Tire Well Sill Screw	7	5	-	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

AMPLIFIER

DESCRIPTION

DESCRIPTION

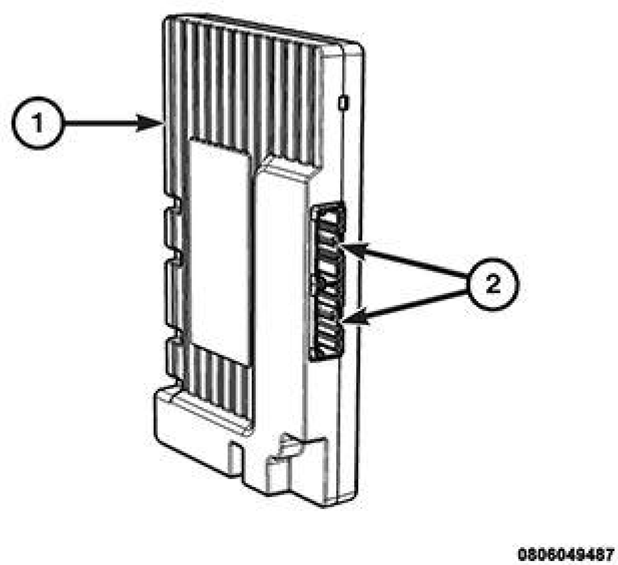


Fig. 1: Amplifier & Connector Receptacles
Courtesy of CHRYSLER GROUP, LLC

An audio power amplifier (1) is included with certain optional speaker packages. The amplifier is available in either 8 channels (Premium I Sound Group - Sales Code RCJ - 6 speakers - 276 watts), 12 channels (Premium II Sound Group - Sales Code RC3 - 10 speakers - 506 watts) and 12 channels (Premium III Sound Group - Sales Code RGE - 19 speakers - Class D amplifier), each of which is specific to the sound system installed in the vehicle.

The amplifier is secured by three screws to a vertical member of the instrument panel structural support to the left of the steering column opening under the instrument panel. Two integral connector receptacles (2) connect the amplifier to the vehicle electrical system through dedicated take outs and connectors of the body wire harness.

The amplifier cannot be adjusted or repaired. If damaged or ineffective, the amplifier must be replaced.

OPERATION

OPERATION

The audio power amplifier receives fused battery current from a fuse in the rear Power Distribution Center (PDC) and is grounded through a circuit of the body wire harness that is secured to the body sheet metal at all times. The internal circuitry of the amplifier switches the amplifier on or off based upon electronic messages that are received over the Controller Area Network (CAN) - Interior High Speed (IHS) data bus from the Radio Receiver Module (RRM) (also known as the radio or the head unit) whenever the RRM is turned on or off.

The amplifier receives analog sound signal inputs from the front and rear, left and right outputs of the RRM, then provides the amplified speaker outputs for each of those channels to the appropriate speakers through dedicated audio output circuits. The amplifier also receives electronic messages from the Body Control Module (BCM) (also known as the Common Body Controller/CBC) and the RRM over the CAN-IHS data bus that communicate the correct channel settings for optimum speaker sound and output.

The hard wired circuits between components related to the amplifier may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the amplifier or the electronic controls and communication between modules and other devices that provide some features of the audio system. The most reliable, efficient and accurate means to diagnose the amplifier or the electronic controls and communication related to audio system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - AUDIO POWER AMPLIFIER

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbags, airbag curtains, knee blocker, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect the IBS/negative battery cable assembly from the negative battery post, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The audio power amplifier unit should be checked if there is no sound output noted from the speakers. Refer to SPEAKER, DIAGNOSIS AND TESTING.

The hard wired circuits between components related to the audio power amplifier may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the amplifier or the electronic controls and communication between modules and other devices that provide some features of the audio system. The most reliable, efficient and accurate means to diagnose the amplifier or the electronic

controls and communication related to audio system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

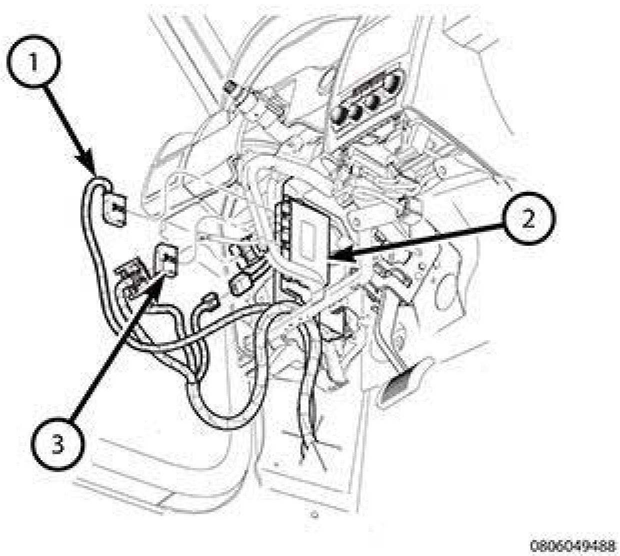


Fig. 2: Amplifier & Connectors
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the steering column opening cover from the instrument panel. Refer to **COVER, STEERING COLUMN OPENING, REMOVAL** .
3. If equipped, remove the Transmission Control Module (TCM) from the instrument panel support structure. Refer to **MODULE, TRANSMISSION CONTROL, REMOVAL** .
4. Disconnect the wire harness connectors (1 and 3) from the audio power amplifier (2).
5. Loosen each of the three screws that secure the amplifier to the vertical bracket of the instrument panel support structure.
6. Slide the amplifier upward far enough to disengage the three mounting screws from the keyed holes in the vertical bracket.
7. Remove the amplifier from under the instrument panel.

INSTALLATION

INSTALLATION

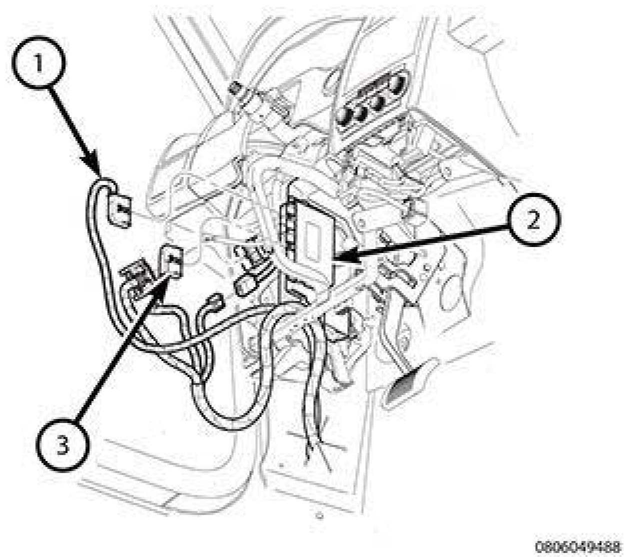


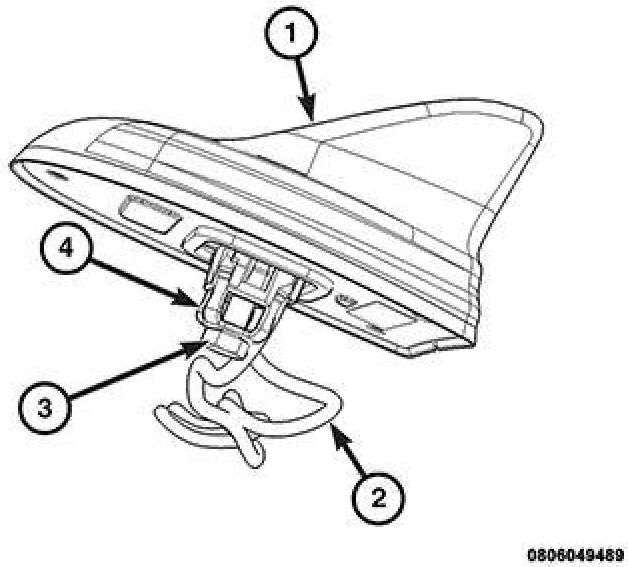
Fig. 3: Amplifier & Connectors
Courtesy of CHRYSLER GROUP, LLC

1. If the audio power amplifier is being replaced with a new unit, transfer the three mounting screws from the old amplifier to the new one.
2. Position the amplifier (2) to the vertical bracket of the support structure under the instrument panel.
3. Engage the three screws that secure the amplifier into the keyed holes of the instrument panel support structure.
4. Tighten the screws securely.
5. Reconnect the wire harness connectors (1 and 3) to the amplifier.
6. If equipped, reinstall the Transmission Control Module (TCM) onto the instrument panel support structure. Refer to **MODULE, TRANSMISSION CONTROL, INSTALLATION** .
7. Reinstall the steering column opening cover onto the instrument panel. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
8. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

ANTENNA, SATELLITE

DESCRIPTION

DESCRIPTION



[Fig. 4: Antenna, Cable, Screw & Retainer]
Courtesy of CHRYSLER GROUP, LLC

In vehicles equipped with a Satellite Digital Audio Receiver (SDAR), a Global Positioning System (GPS) navigation radio, the Uconnect™ Hands Free cellular system or any combination of these systems a single combined antenna is used. Due to the appearance of this antenna (1), it is also known as the shark fin antenna.

The body color shark fin antenna is located at the rear and center of the outer roof panel. It is installed by pressing it with hand pressure into a mounting hole in the outer roof panel until each of the four legs of a spring steel retainer (4) secured to the underside of the antenna body by a single screw (3) snap into place. Antenna removal requires lowering the back of the headliner far enough to access and remove the screw and retainer as well as to disconnect the antenna cable (2) connector from the body wire harness near the right upper C-pillar.

The shark fin antenna cannot be adjusted or repaired. If the antenna is damaged or ineffective it must be replaced with a new unit.

OPERATION

OPERATION

The shark fin antenna includes the following capabilities:

- **Cellular** - The cellular antenna is an electromagnetic circuit component designed to effectively capture radiated frequency and transmit signals in the cellular broadcast bands.
- **Global Positioning System** - The Global Positioning System (GPS) antenna is capable of receiving eight satellite channels. The navigation system requires a minimum of three satellite channels to provide adequate information to the GPS navigation unit.
- **Satellite Digital Audio Receiver** - The Satellite Digital Audio Receiver (SDAR) antenna is part of the satellite audio system of the vehicle. This antenna enables the vehicle to receive signals from the Sirius XM satellite and delivers the signal to the satellite audio receiver.

The shark fin antenna must have open space in which to operate. Items carried on the roof, parking inside an enclosed structure or driving through a long tunnel can have an effect on the ability of the antenna to receive

signals.

For information on diagnosing the satellite antenna cables using the (special tool #9977-6, Kit, Radio Antenna Diagnostic), refer to **DIAGNOSIS AND TESTING** and perform the **Poor Or No Satellite Audio Reception** test.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SATELLITE ANTENNA

For information on diagnosing the satellite antenna cables using the (special tool #9977-6, Kit, Radio Antenna Diagnostic), refer to **DIAGNOSIS AND TESTING** and perform the **Poor Or No Satellite Audio Reception** test.

REMOVAL

REMOVAL

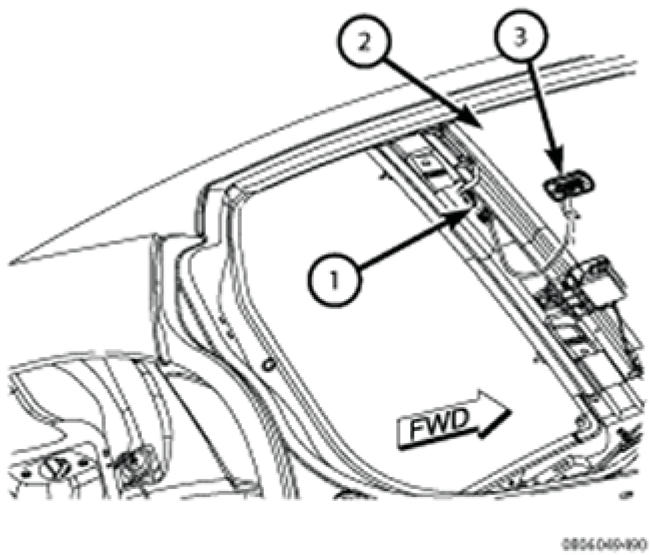


Fig. 5: Inner Roof Panel, Antenna Body, & Pigtail Wiring Connectors
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear seat back from the vehicle. Refer to **SEAT BACK, REAR, REMOVAL** .
2. Fully recline both front seat backs.
3. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.

NOTE: **Use the headliner removal procedure to lower the headliner from the inner roof panel. The headliner will NOT be removed from the vehicle interior; therefore, it is NOT necessary to remove the windshield.**

4. Lower the headliner from the inner roof panel and allow it to rest within the vehicle interior. Refer to **HEADLINER, REMOVAL** .
5. Reach between the headliner and the inner roof panel (2) to access and disconnect the antenna pigtail wiring connectors (1) from the body wire harness connectors.

6. Remove the screw and the spring retainer that secure the antenna body (3) to the inner roof panel.
7. From outside the vehicle remove the antenna and pigtail wiring from the roof panel.

INSTALLATION

INSTALLATION

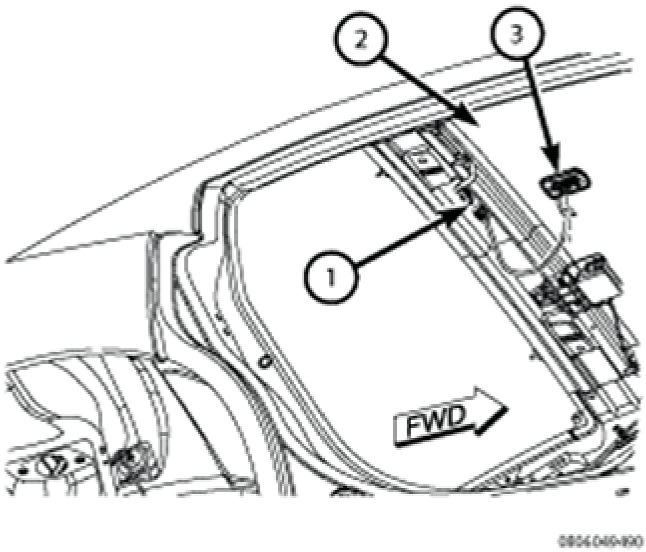


Fig. 6: Inner Roof Panel, Antenna Body, & Pigtail Wiring Connectors
Courtesy of CHRYSLER GROUP, LLC

1. Position the spring retainer to the antenna body (3) then install and tighten the screw. Tighten the screw to 9 N.m (80 in. lbs.).
2. From the outside of the vehicle insert the antenna pigtail wiring through the mounting hole at the rear of the roof panel then position the antenna body over the mounting hole.
3. Use hand pressure to press the antenna down toward the mounting hole until the spring retainer snaps into position on the inner roof panel (2).
4. Reach between the headliner and the inner roof panel to access and reconnect the antenna pigtail wiring connectors (1) to the body wire harness connectors.
5. Reinstall the headliner onto the inner roof panel. Refer to **HEADLINER, INSTALLATION** .
6. Reinstall the rear seat back into the vehicle. Refer to **SEAT BACK, REAR, INSTALLATION** .
7. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

CABLE, ANTENNA

DESCRIPTION

DESCRIPTION

Coaxial antenna cables are used to connect both the AM/FM antenna module above the back glass opening and, if equipped, the combination shark fin antenna (Satellite Digital Audio Receiver (SDAR), Global Positioning System (GPS) navigation radio, Uconnect™ Hands Free cellular system) on the back of the roof outer panel to the Radio Receiver Module (RRM) (also known as the radio or the head unit) in the instrument panel. Each

cable consists of two pieces connected in series, one packaged within the instrument panel wire harness and the other packaged within the body wire harness.

The cables are each fitted with FAKRA (an acronym for the German terms: Fachnormenausschuss Kraftfahrzeugindustrie) coaxial cable connectors at each end. The connector insulators are color-coded to ensure proper connections are readily identifiable.

The antenna cables cannot be adjusted or repaired. If damaged or ineffective they must be replaced by routing and fastening a new coaxial cable along the outside of the respective body or instrument panel wire harness containing the cable or cables being replaced.

OPERATION

OPERATION

The coaxial antenna cables each contain a center copper conductor covered by an inner dielectric insulator. The dielectric insulator is then covered by a braided or woven copper shield, which is then covered by a protective outer plastic sheath. The center conductor carries the Radio Frequency (RF) signals from the antenna module or antenna to the receiver, while the braided copper shield is grounded through the radio chassis at one end and either the antenna module or the antenna base at the other end to help to protect the conductor from RF signal interference.

For more information on testing the coaxial cables using the (special tool #9977-6, Kit, Radio Antenna Diagnostic), refer to **DIAGNOSIS AND TESTING** and perform the procedure for **Poor or No AM/FM Audio Reception** or **Poor or No Satellite Audio Reception** as appropriate.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ANTENNA CABLE

For information on testing the coaxial antenna cables using the (special tool #9977-6, Kit, Radio Antenna Diagnostic), refer to **DIAGNOSIS AND TESTING** and perform the procedure for **Poor or No AM/FM Audio Reception** or **Poor or No Satellite Audio Reception** as appropriate.

REMOVAL

REMOVAL

The antenna cables cannot be adjusted or repaired. If damaged or ineffective they must be replaced by routing and fastening a new coaxial cable along the outside of the respective body or instrument panel wire harness containing the cable or cables being replaced.

INSTALLATION

INSTALLATION

The antenna cables cannot be adjusted or repaired. If damaged or ineffective they must be replaced by routing and fastening a new coaxial cable along the outside of the respective body or instrument panel wire harness containing the cable or cables being replaced.

CAMERA, REAR

DESCRIPTION

DESCRIPTION

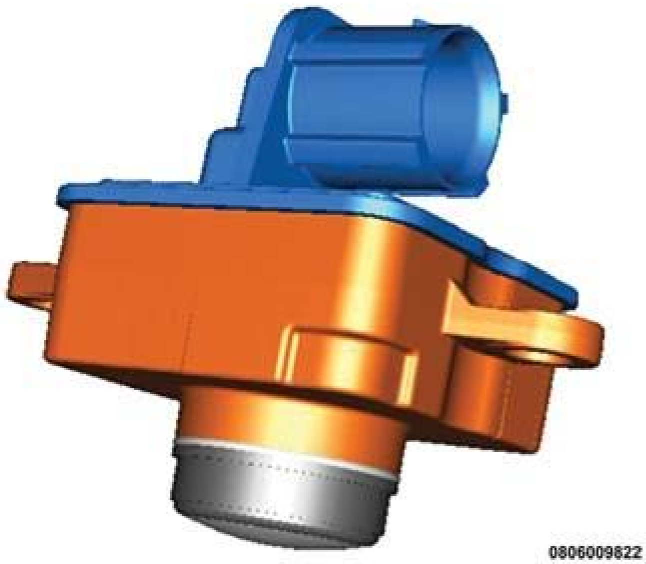


Fig. 7: Rear View Camera (RVC)
Courtesy of CHRYSLER GROUP, LLC

The Rear View Camera (RVC) (also known as ParkView™ Rear Back Up Camera) is an available option for this vehicle. The RVC is intended to be an auxiliary viewing aid and is not promoted as an obstacle detection or safety device. It does not remove vehicle operator responsibility to recognize and obey official traffic laws or regulations or to take sensible precautions and care to avoid pedestrians, other vehicle traffic or both fixed and moving obstacles through the habitual use of safe and defensive driving techniques.

The RVC is a camera on chip device utilizing Complementary Metal Oxide Semiconductor (CMOS) technology. CMOS technology supports the analog image sensor of the RVC. The RVC also contains a microcontroller and a Local Interface Network (LIN) data bus slave node that communicates over the LIN data bus network with the Body Control Module (BCM) (also known as the Common Body Controller), which is a LIN master node and a gateway to the Controller Area Network (CAN) data bus.

The RVC lens is visible on the vehicle center line of the rear vertical surface of the deck lid spoiler. The body of the RVC is concealed within the spoiler where it is secured with two screws to a mounting bracket integral to an access cover secured by four screws to the underside of the spoiler. A jumper wire harness is routed from the RVC connector through clearance holes in the spoiler and the deck lid to a dedicated take out and connector of the body wire harness on the underside of the deck lid. The spoiler is then mounted to the deck lid.

The RVC system uses the touchscreen of the Radio Receiver Module (RRM) near the center of the instrument panel to display the wide angle images captured through the lens of the RVC camera, which faces rearward. The video image includes an active guideline overlay to aid the perception of distance for the operator. These active guidelines change direction with the steering wheel position to indicate the path of the vehicle to aid in parking maneuvers.

The RVC uses hard wired video signal output circuits to provide the RRM video display with compatible National Television System Committee (NTSC) standard composite video M format data, or NTSC-M. These

camera output circuits run the entire length of the vehicle and are arranged in tandem as a twisted pair. Portions of these video signal wires are contained within the body wire harness, the jumper wire harness between the RVC in the deck lid spoiler and the body wire harness, and a second jumper wire harness located between the RRM and the body wire harness below the instrument panel at the right cowl side inner panel. Data signal protection from corruption and interference is provided by a grounded foil jacket shield which is terminated only at the video display of the RRM.

The RVC cannot be adjusted or repaired. If the RVC is damaged or ineffective, it must be replaced.

OPERATION

OPERATION

The Rear View Camera (RVC) receives battery current from a run relay located within the rear Power Distribution Center (PDC) through a fused ignition (run) circuit. The RVC has a path to ground at all times through a take out and eyelet terminal of the body wire harness secured to the body sheet metal. The RVC is activated whenever the status of the ignition is Run and the transmission gear selector is shifted into the Reverse (**R**) position. If the camera delay feature is enabled the RVC will remain active for 10 seconds, up to about 13 kilometers-per-hour (8 miles-per-hour) or until the touch screen display is pressed after the gear selector is shifted from Reverse (**R**) to Neutral (**N**) or Drive (**D**).

The Local Interface Network (LIN) slave node of the RVC microcontroller communicates using electronic messaging over the LIN data bus with the LIN master node of the Body Control Module (BCM) (also known as the Common Body Controller/CBC). The BCM continually monitors the condition of the LIN data bus and the RVC. The BCM will store a Diagnostic Trouble Code (DTC) for any fault that is detected.

The hard wired circuits between components related to the RVC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RVC or the electronic controls and communication between modules and other devices that provide some features of the RVC. The most reliable, efficient and accurate means to diagnose the RVC or the electronic controls and communication related to RVC operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - REAR CAMERA

The hard wired circuits of the Rear View Camera (RVC) and those between the RVC and the Radio Receiver Module (RRM) (also known as the radio or the head unit) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RVC, the RRM or

the electronic controls and communication between modules and other devices that provide some features of the RVC system. The most reliable, efficient and accurate means to diagnose the RVC, the RRM or the electronic controls and communication related to RVC system operation, as well as the retrieval or erasure of a Diagnostic Trouble Code (DTC) requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: Before proceeding with the diagnostic steps below, use the scan tool to check the Body Control Module (BCM) for any RVC or LIN bus related Diagnostic Trouble Codes (DTC). Repair as necessary.

CONDITION	POSSIBLE CAUSES	CORRECTION
VIDEO IMAGE IS BLURRY OR OBSTRUCTED	1. Dirt, smears or fingerprints on RVC lens.	1. Inspect lens for foreign material and clean lens as required, using the lens cleaning procedure.
	2. Ineffective camera shield circuit.	2. Check for loose or damaged wiring connections at the RVC, the deck lid spoiler, the deck lid, the right cowl side inner panel and the RRM. Test and repair the open or shorted camera shield circuit if required.
	3. Moisture buildup on the inside of the lens.	3. Replace the ineffective camera if required.
NO VIDEO DISPLAY IN RADIO - DOES NOT DISPLAY **CHECK ENTIRE SURROUNDINGS** MESSAGE BRIEFLY AFTER SHIFTING INTO REVERSE	1. Incorrect radio software.	1. Check to be certain that the radio has the latest software update installed. Install the radio software update if required.
	2. Ineffective radio fuse.	2. Test and replace the radio fuses if required.
	3. Ineffective radio ground circuit.	3. Check for loose or damaged wiring connections at the radio. Test and repair the open radio ground circuit if required.
	4. Ineffective radio feed circuit.	4. Check for loose or damaged wiring connections at the radio. Test and repair the open radio feed circuit if required.
	5. Ineffective radio inputs or outputs.	5. Use a diagnostic scan tool to test the radio inputs and outputs including those received over the CAN bus. Refer to the appropriate diagnostic information.

CONDITION	POSSIBLE CAUSES	CORRECTION
	6. Ineffective radio.	6. Use a diagnostic scan tool to test the radio. Refer to the appropriate diagnostic information.
NO CAMERA IMAGE IN RADIO VIDEO DISPLAY - DOES DISPLAY **CHECK ENTIRE SURROUNDINGS** MESSAGE BRIEFLY AFTER SHIFTING INTO REVERSE AND BACKUP LAMPS DO OPERATE	1. Ineffective RVC ground circuit.	1. Check for loose or damaged wiring connections at the RVC, the deck lid spoiler and the deck lid. Test and repair the open camera ground circuit if required.
	2. Ineffective RVC feed (run relay) circuit.	2. Check for loose or damaged wiring connections at the RVC, the deck lid spoiler and the deck lid. Test and repair the open RVC feed (run relay) circuit if required.
	3. Ineffective RVC return circuit.	3. Check for loose or damaged wiring connections at the RVC, the deck lid spoiler, the deck lid, the right cowl side inner panel and the radio. Test and repair the open or shorted RVC feed circuit if required.
	4. Ineffective RVC signal circuit.	4. Check for loose or damaged wiring connections at the RVC, the deck lid spoiler, the deck lid, the right cowl side inner panel and the radio. Test and repair the open or shorted RVC signal circuit if required.
	5. Ineffective RVC.	5. Replace the ineffective RVC if required.
NO ACTIVE GRID LINES BEING OVERLAID ON IMAGE	1. Data bus communication ineffective.	1. Use a diagnostic scan tool for further diagnosis. Refer to the appropriate diagnostic information.
	2. Bus message received is incorrect.	2. Use a diagnostic scan tool for further diagnosis. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

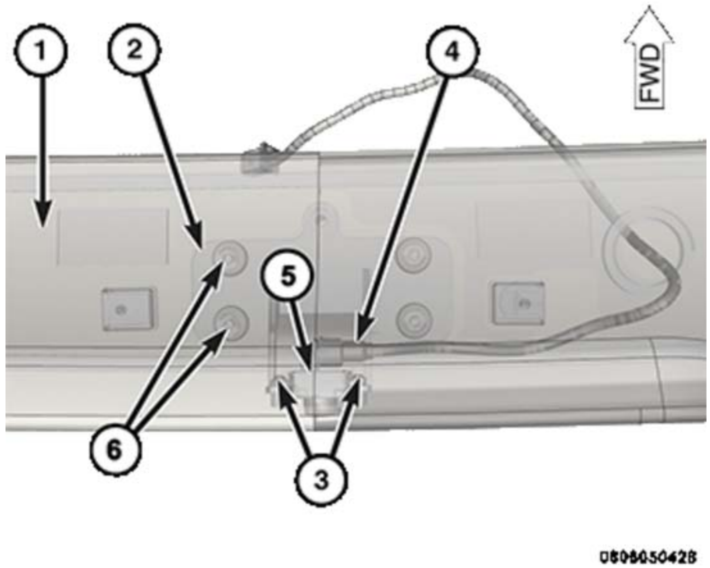


Fig. 8: Spoiler Assembly, Rear View Camera, Mounting Bracket, Connectors & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the spoiler assembly (1) from the outside of the deck lid. Refer to **SPOILER, DECKLID, REMOVAL** .
3. Place the spoiler assembly on a suitable work surface with the top surface facing down.

NOTE: **If the spoiler will be reused, be certain to take the proper precautions to prevent the spoiler from receiving cosmetic damage during the following procedures.**

4. Remove the four screws (6) that secure the access cover and mounting bracket (2) to the underside of the spoiler.
5. Remove the access cover, mounting bracket and Rear View Camera (RVC) as a unit from the spoiler.
6. Disconnect the jumper wire harness connector (4) from the RVC (5).
7. Remove the two screws (3) that secure the RVC mounting tabs to the mounting bracket on the access cover.
8. Remove the RVC.

CLEANING

CLEANING

NOTE: **The use of nylon gloves will prevent oil and debris on your hands from being transferred to the camera body or lens surface. While wearing the gloves, care should be taken not to contact exposed body parts such as the forehead, nose and arms. If contact is made accidentally, gloves should be changed to mitigate the risk of contaminant transfer from the surface of the gloves.**

1. Using compressed air, blow diagonally across the camera lens.

2. Use a microfiber lens tissue to gently wipe the lens.
3. Examine the lens to verify the cleaning process. Proceed to **Step #4** if the lens still shows signs of oil or debris.
4. Apply a lens cleaning solution to a section of an unused lens tissue.
5. Slowly wipe in a circular motion around the edges of the lens to remove any dirt or contamination from the periphery of the lens before cleaning the center.
6. Let the lens air dry.
7. Examine the lens to verify the cleaning process.

INSTALLATION

INSTALLATION

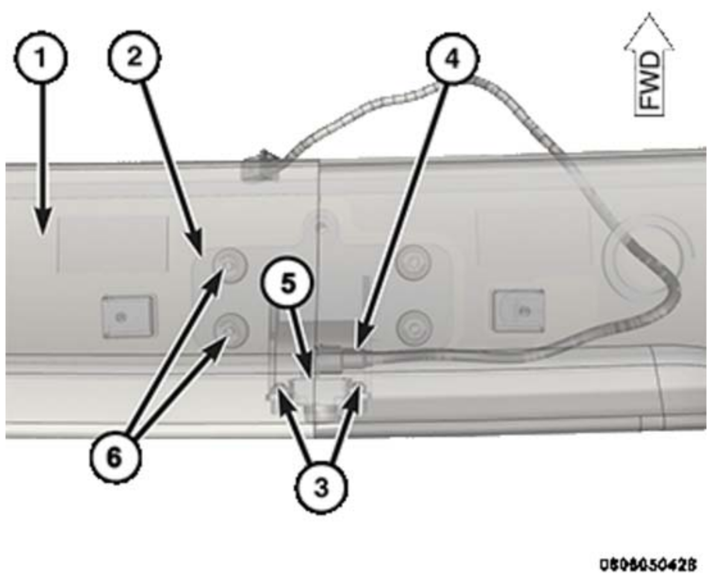


Fig. 9: Spoiler Assembly, Rear View Camera, Mounting Bracket, Connectors & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Position the Rear View Camera (RVC) (5) mounting tabs to the mounting bracket on the access cover (2).
2. Install and tighten the two screws (3) that secure the RVC mounting tabs to the mounting bracket. Tighten the screws securely.
3. Reconnect the jumper wire harness connector (4) to the RVC.
4. Position the access cover, mounting bracket and RVC into the spoiler (1) as a unit. Be certain the RVC lens is inserted through the clearance hole in the rear vertical surface of the spoiler.
5. Install and tighten the four screws (6) that secure the access cover and mounting bracket to the underside of the spoiler. Tighten the screws securely.
6. Reinstall the spoiler assembly onto the outside of the deck lid. Refer to SPOILER, DECKLID, INSTALLATION .
7. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

COMPONENTS, RADIO NOISE SUPPRESSION

DESCRIPTION

DESCRIPTION

Radio noise suppression devices are installed on this vehicle. Radio Frequency Interference (RFI) and ElectroMagnetic Interference (EMI) can be produced by any on-board or external source of electromagnetic energy. These electromagnetic energy sources can radiate electromagnetic signals through the air, or conduct them through the vehicle electrical system.

When the audio system converts RFI or EMI to an audible acoustic wave form, it is referred to as radio noise. This undesirable radio noise is generally manifested in the form of buzzing, hissing, popping, clicking, crackling or whirring sounds. In most cases, RFI and EMI radio noise can be suppressed using a combination of vehicle and component grounding, filtering and shielding techniques. This vehicle is equipped with radio noise suppression devices that were designed to minimize exposure to typical sources of RFI and EMI; thereby, minimizing radio noise complaints.

Radio noise suppression is accomplished primarily through circuitry or devices that are integral to the radios, audio power amplifiers and other on-board electrical components such as generators, wiper motors, blower motors and fuel pumps that have been found to be potential sources of RFI or EMI. External radio noise suppression devices that are used on this vehicle to control RFI or EMI, and can be serviced, include the following:

- **Ground Strap, Radio Ground Engine Left** - This length of braided ground strap has an eyelet terminal connector crimped to each end. One end is secured to the rear stud of the 3.6 liter engine mount. The other end is secured to the engine cradle.

OPERATION

OPERATION

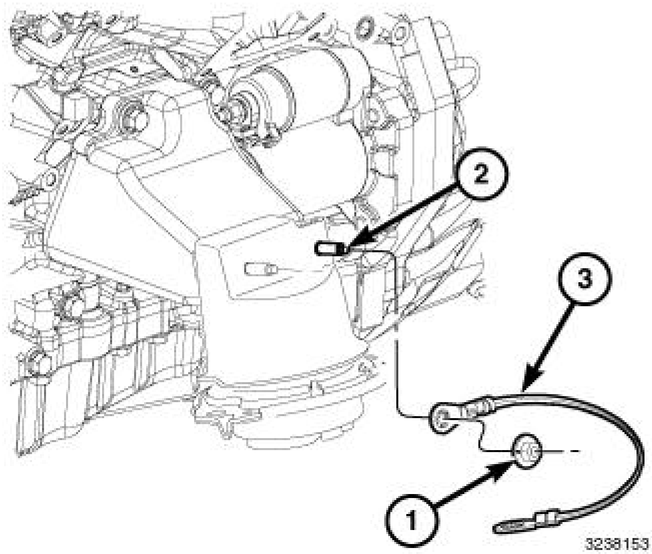
There are two common strategies that can be used to suppress Radio Frequency Interference (RFI) and ElectroMagnetic Interference (EMI) radio noise. The first suppression strategy involves preventing the production of RFI and EMI electromagnetic signals at their sources. The second suppression strategy involves preventing the reception of RFI and EMI electromagnetic signals by the audio system components.

The use of braided ground straps in key locations is part of the RFI and EMI prevention strategy. These ground straps ensure adequate ground paths, particularly for high current components such as many of those found in the starting, charging, ignition, engine control and transmission control systems. An insufficient ground path for any of these high current components may result in radio noise caused by induced voltages created as the high current seeks alternative ground paths through components or circuits intended for use by, or in close proximity to the audio system components or circuits.

Preventing the reception of RFI and EMI is accomplished by ensuring that the audio system components are correctly installed in the vehicle. Loose, corroded or improperly soldered wire harness connections, improperly routed wiring and inadequate audio system component grounding can all contribute to the reception of RFI and EMI. A properly grounded antenna body and radio chassis, as well as a shielded antenna coaxial cable with clean and tight connections will each help reduce the potential for reception of RFI and EMI.

REMOVAL

3.6L LEFT ENGINE MOUNT

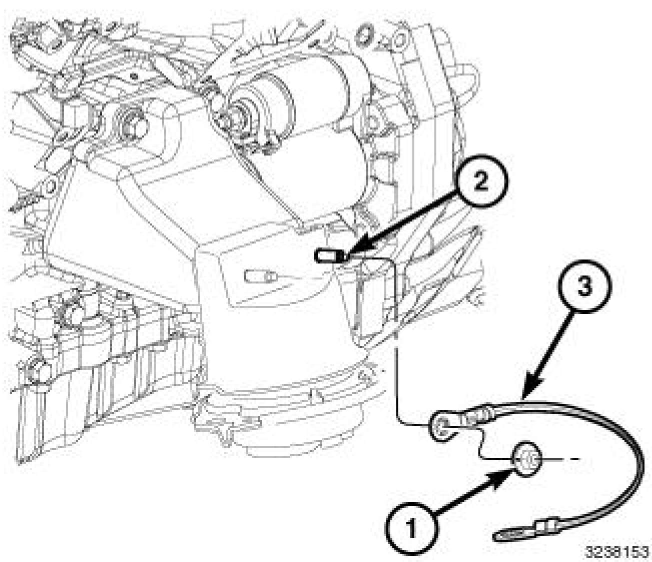


[Fig. 10: Suppression Retainer And Driver Side Engine Mount Stud](#)
Courtesy of CHRYSLER GROUP, LLC

1. Open the hood.
2. Remove the radio noise suppression retainer (1) from the driver side engine mount stud (2).
3. Remove the radio noise suppression retainer from the body side of the strap.
4. Remove the radio noise suppression strap from the vehicle.

INSTALLATION

3.6L LEFT ENGINE MOUNT



[Fig. 11: Suppression Retainer And Driver Side Engine Mount Stud](#)
Courtesy of CHRYSLER GROUP, LLC

1. Position the radio noise suppression strap (3) on the driver side engine mount stud (2).
2. Install the radio noise suppression strap retainer (1) to the engine mount stud (2).
3. Install the radio noise suppression strap to the body.

4. Install the radio noise suppression strap retainer to the body.
5. Close the hood.

MAST, ANTENNA

DESCRIPTION

DESCRIPTION

The on-glass AM-FM antenna elements consist of a grid pattern screened onto the inside of the back glass in this vehicle. A single snap-like terminal also integral to the back glass accepts the snap terminal of the pigtail wire integral to the antenna module.

Minor damage to the elements screened onto the glass can be repaired using a Mopar Rear Window Defogger Repair Kit. Refer to **GRID, DEFOGGER, STANDARD PROCEDURE** . Otherwise, the antenna element terminal and grid lines are serviced only as a unit with the back glass assembly.

OPERATION

OPERATION

The on-glass antenna elements screened onto the back glass capture various radiated Radio Frequency (RF) signals throughout the intended broadcast bands. Those RF signals captured are supplied to the antenna module for Radio Frequency Interference (RFI) filtering, amplification and transmission to the audio system tuner.

The on-glass antenna elements may be diagnosed using conventional diagnostic tools and procedures.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ON-GLASS ANTENNA

The antenna grid pattern is screened on the inside of the back glass above the Electric Back Light (EBL) grid. For circuit descriptions and diagrams, Refer to the appropriate SYSTEM WIRING DIAGRAMS article. To detect breaks in the antenna grid elements, the following procedure is required:

1. Disconnect the antenna module pigtail wire connector from the antenna terminal on the inside of the back glass. Refer to **MODULE, RADIO ANTENNA, REMOVAL**.
2. Using an ohmmeter, connect one lead to the antenna terminal and with the other lead check each end of the grid pattern for continuity.

   NOTE: The resistance should be below 2.4 Ohms on each grid line.

   Measure the resistance of each antenna grid line. The resistance should be exactly the same for each line.

3. If the resistance is not exactly the same for each grid line, check for a breaks or voids in the grid lines. They may be hard to find as all the grid lines are tied together.
4. Even if the resistance is the same for all lines, do a very close visual inspection of the grid for breaks or voids.
5. A break or void in the antenna grid can be repaired using a Mopar Rear Window Defogger Repair Kit or equivalent. Refer to **GRID, DEFOGGER, STANDARD PROCEDURE** .

REMOVAL

REMOVAL

The on-glass antenna elements screened onto the inside of the back glass are serviced as a unit with the back glass. Refer to **BACKLITE, REMOVAL** .

INSTALLATION

INSTALLATION

The on-glass antenna elements screened onto the inside of the back glass are serviced as a unit with the back glass. Refer to **BACKLITE, INSTALLATION** .

MEDIA HUB

DESCRIPTION

DESCRIPTION

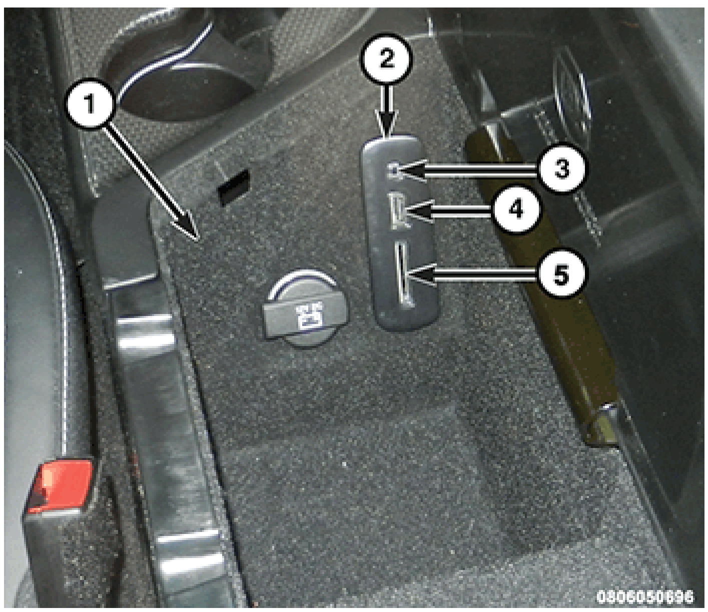


Fig. 12: Center Console Rear Storage Bin, Media Hub, Audio Input Jack, USB Port & SD Card Reader
Courtesy of CHRYSLER GROUP, LLC

The media hub (2) is located in the forward surface of the center console rear storage bin (1). The media hub is a centralized connection point in the vehicle that contains:

- a 3.5 millimeter auxiliary audio input jack (3)
- a powered Universal Serial Bus (USB) port (4)

NOTE: **The powered USB port provides 5 volts at 1.5 amperes to charge the battery of a connected media device.**

- a Secure Data (SD) card reader (5)

Only the molded plastic media hub faceplate and the connection ports are visible within the storage bin. The

media hub housing, wiring and connections to the vehicle electrical system are concealed on the underside of the console. Four latch tabs integral to the media hub housing secure the unit on the back side of the mounting hole in the console rear storage bin.

The media hub cannot be adjusted or repaired. If ineffective or damaged it must be replaced.

OPERATION

OPERATION

In vehicles so equipped, the media hub allows the audio content of various media devices to be connected to Radio Receiver Module (RRM) (also known as the radio or the head unit). Once connected the audio content of the media device may be accessed and played through the audio system components of the vehicle using the RRM controls.

The hard wired circuits between the media hub and the RRM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

REMOVAL

REMOVAL

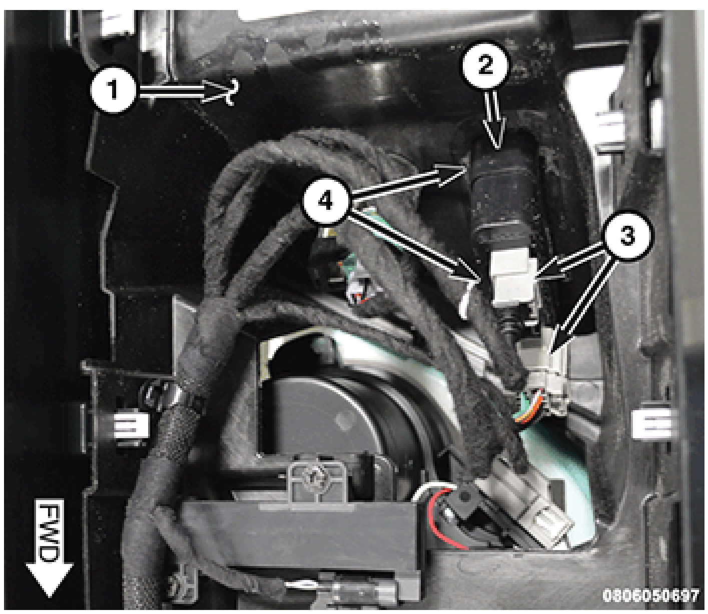


Fig. 13: Rear Storage Bin, Media Hub Housing, Wire Harness Connectors & Latch Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the floor console from the vehicle. Refer to **CONSOLE, FLOOR, REMOVAL** .
3. Place the floor console assembly on a suitable work surface with the top surface facing down.

NOTE: **Be certain to take the proper precautions to prevent the floor console from**

receiving cosmetic damage during the following procedures.

4. Locate the media hub housing (2) on the front of the console rear storage bin (1).
5. Disconnect the console wire harness connectors (3) from the media hub housing.
6. Compress each of the four latch tabs (4) integral to the media hub housing while pushing the housing out through the mounting hole in the floor console storage bin.

INSTALLATION

INSTALLATION

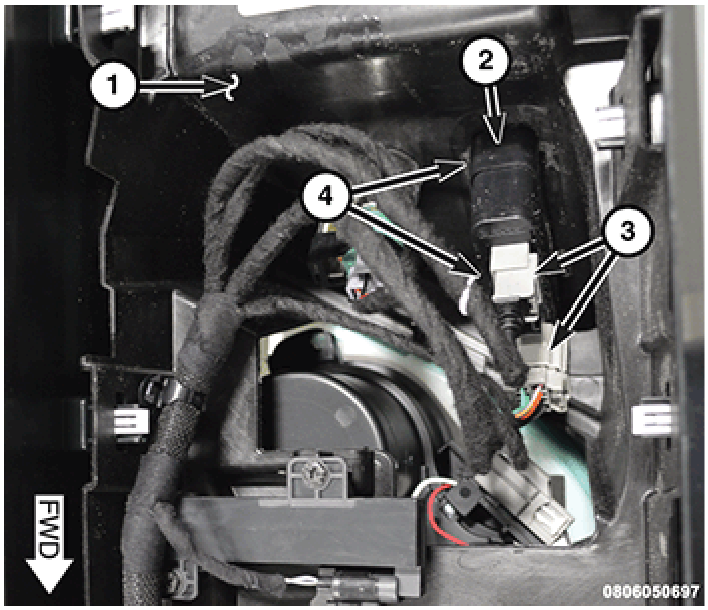


Fig. 14: Rear Storage Bin, Media Hub Housing, Wire Harness Connectors & Latch Tabs
Courtesy of CHRYSLER GROUP, LLC

1. From inside the floor console storage bin, align and insert the media hub housing (2) through the mounting hole until all four integral latch features (4) are fully engaged on the outer surface of the bin (1).
2. From the underside of the floor console, reconnect the console wire harness connectors (3) to the media hub housing.
3. Reinstall the floor console into the vehicle. Refer to **CONSOLE, FLOOR, INSTALLATION** .
4. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

MODULE, RADIO ANTENNA

DESCRIPTION

DESCRIPTION

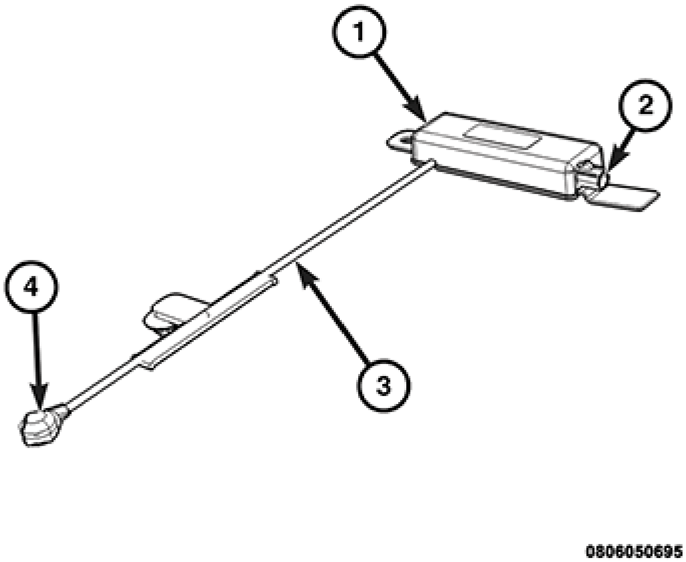


Fig. 15: Antenna Module, Short Pigtail Wire & Connectors
Courtesy of CHRYSLER GROUP, LLC

The antenna module (1) is an electronic circuit component designed to capture and enhance Radio Frequency (RF) signals in both the AM and FM broadcast bands. The antenna module is mounted to the upper header near the center of the back glass opening where it is concealed above the headliner. The module is grounded at all times through an integral mounting bracket that is secured by a nut to a weld stud on the header.

A short pigtail wire (3) and connector (4) on one end of the module snaps onto the antenna element grid terminal on the inside surface of the back glass, while a connector receptacle (2) on the other end of the module accepts the FAKRA (an acronym for the German terms: Fachnormenausschuss Kraftfahrzeugindustrie) connector of the coaxial cable routed to the Radio Receiver Module (RRM) (also known as the radio or the head unit). The RRM supplies a nine volt supply to the module through the coaxial cable.

The antenna module cannot be adjusted or repaired. If ineffective or damaged it must be replaced.

OPERATION

OPERATION

The antenna module is powered by a 9 volt output from the Radio Receiver Module (RRM) (also known as the radio or the head unit) through the coaxial cable whenever the radio receiver is active. The module receives both AM and FM Radio Frequency (RF) signals supplied by the on-glass antenna grid elements screened onto the inside of the back glass. The module selectively filters Radio Frequency Interference (RFI) from and amplifies the received signals. The amplified signal is then sent through the coaxial cable to the RRM AM/FM antenna input.

The hard wired inputs and outputs to the antenna module may be diagnosed using conventional diagnostic tools and procedures. However, the module itself is diagnosed by substituting a known good external antenna to compare reception performance.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - RADIO ANTENNA MODULE

1. Remove the rear seat back from the vehicle. Refer to **SEAT BACK, REAR, REMOVAL** .
2. Fully recline both front seat backs.
3. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.

NOTE: **Use the headliner removal procedure to lower the headliner from the inner roof panel. The headliner will NOT be removed from the vehicle interior; therefore, it is NOT necessary to remove the windshield.**

4. Lower the headliner from the inner roof panel and allow it to rest within the vehicle interior. Refer to **HEADLINER, REMOVAL** .
5. Reach between the headliner and the roof rear header panel to access and check the connections to the antenna module and to the antenna grid terminal. If they are all right, continue. If they are not all right, clean and tighten the connections and retest the radio reception.
6. Disconnect the white AM/FM FAKRA coaxial cable connector from the antenna module and connect the (special tool #9977-6-FM, Antenna) to the coaxial cable in place of the antenna module.
7. Place the magnetic antenna on the roof of the vehicle.
8. Drive the vehicle outside to a clear, unobstructed overhead view.
9. Turn the radio On and try tuning several AM and FM stations, then proceed as follows:
   - **Audio Improved** - Check the antenna grid and repair if necessary. Refer to **MAST, ANTENNA, DIAGNOSIS AND TESTING**. If the grid checks good, replace the antenna module.
   - **Audio Did Not Improve** - Check the radio and coaxial cables. Refer to **MAST, ANTENNA, DIAGNOSIS AND TESTING**, or refer to **DIAGNOSIS AND TESTING** and perform the **Poor Or No AM/FM Audio Reception** test.

REMOVAL

CAPACITOR

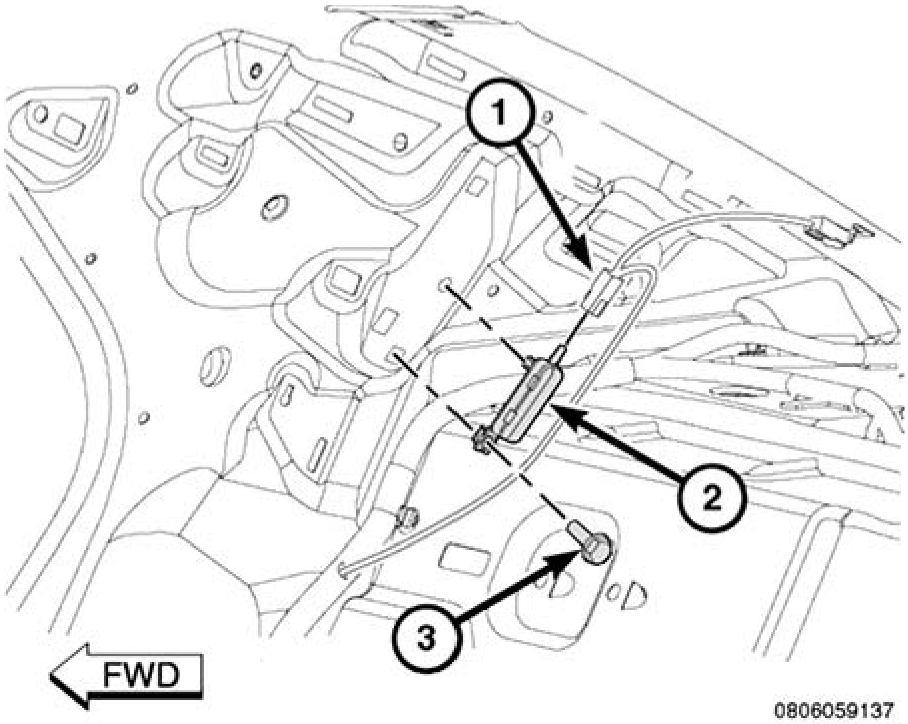


Fig. 16: Body Wire Harness Connector, Antenna Capacitor & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the trim from the upper right C-pillar. Refer to **PANEL, C-PILLAR TRIM, REMOVAL** .
3. Disconnect the body wire harness connector (1) from the antenna capacitor (2).
4. Remove the screw (3) that secures the antenna capacitor to the C-pillar.
5. Disengage the mounting tab of the antenna capacitor from the slotted hole in the C-pillar and remove the capacitor from the vehicle.

MODULE

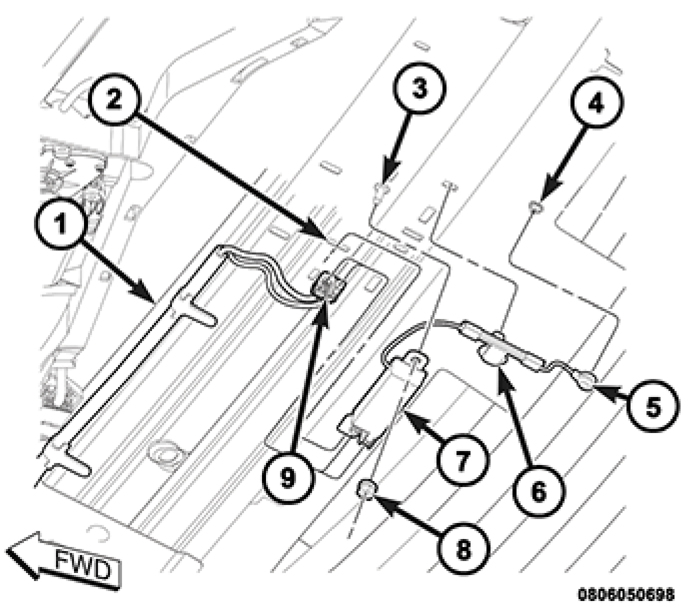


Fig. 17: Radio Antenna Module Components
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear seat back from the vehicle. Refer to **SEAT BACK, REAR, REMOVAL** .
2. Fully recline both front seat backs.
3. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.

NOTE: **Use the headliner removal procedure to lower the headliner from the inner roof panel. The headliner will NOT be removed from the vehicle interior; therefore, it is NOT necessary to remove the windshield.**

4. Lower the headliner from the inner roof panel and allow it to rest within the vehicle interior. Refer to **HEADLINER, REMOVAL** .
5. Reach between the headliner and the roof rear header panel (1) to access and disconnect the body wire harness connections (9) to the antenna module (7).
6. Disconnect the antenna module pigtail wire connector (5) from the on-glass antenna grid terminal (4).
7. Disengage the antenna module pigtail wire retainer (6) from the slot in the roof rear header panel.
8. Remove the nut (8) that secures the left mounting tab of the antenna module to the weld stud (3) on the roof rear header panel.
9. Disengage the left mounting tab of the antenna module from the weld stud on the roof rear header panel.
10. Disengage the right mounting tab of the antenna module from the slot (2) in the roof rear header panel.
11. Remove the antenna module from the vehicle.

INSTALLATION

CAPACITOR

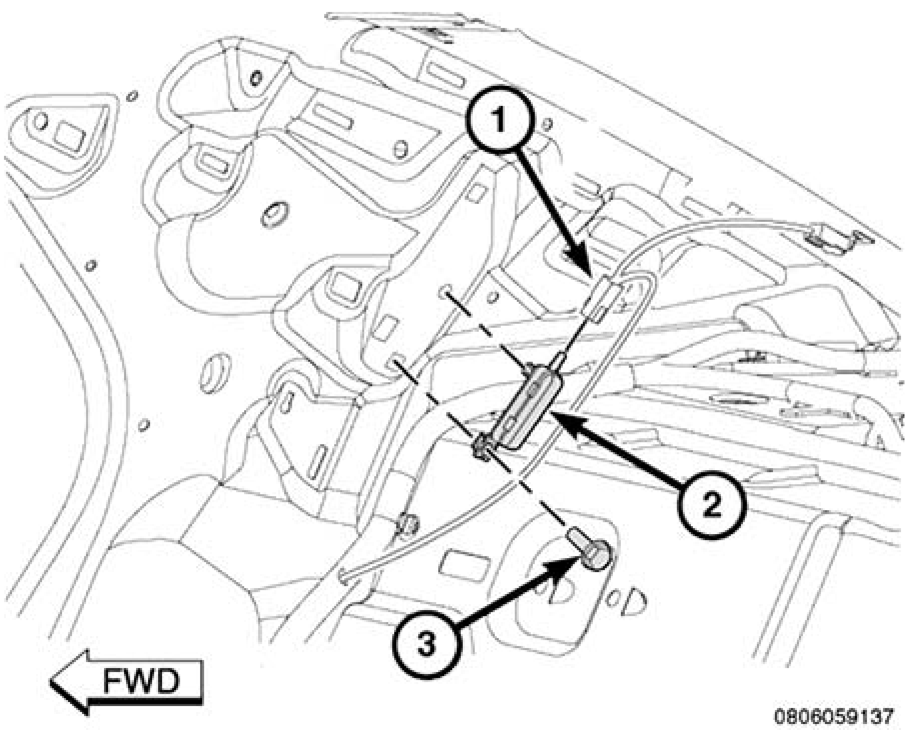


Fig. 18: Body Wire Harness Connector, Antenna Capacitor & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Engage the mounting tab of the antenna capacitor (2) into the slotted hole in the upper right C-pillar.
2. Install and tighten the screw (3) that secures the antenna capacitor to the C-pillar. Tighten the screw securely.
3. Reconnect the body wire harness connector (1) to the antenna capacitor.
4. Reinstall the trim onto the upper right C-pillar. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION** .
5. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

MODULE

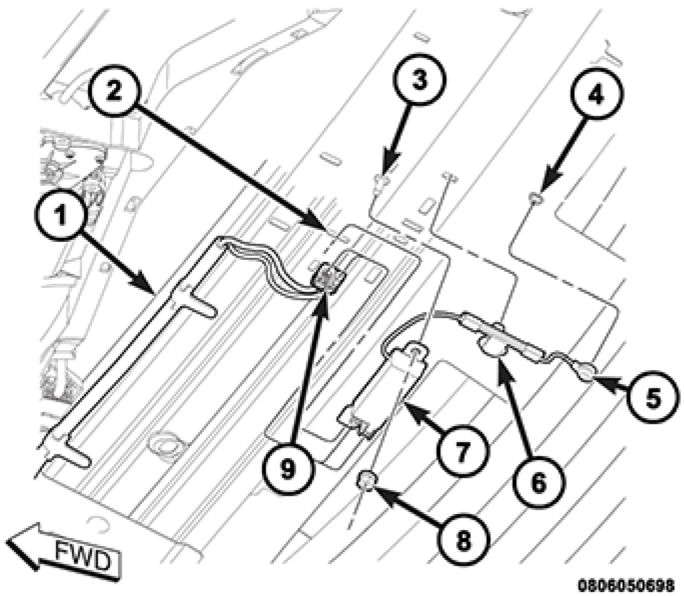


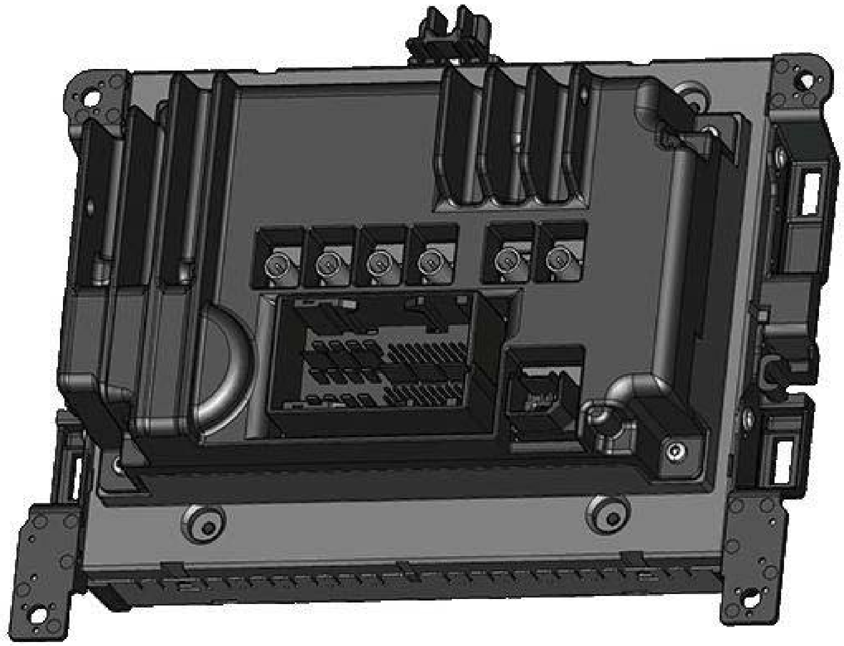
Fig. 19: Radio Antenna Module Components
Courtesy of CHRYSLER GROUP, LLC

1. Position the antenna module (7) to the roof rear header panel (1) in the vehicle.
2. Engage the right mounting tab of the antenna module into the slot (2) in the roof rear header panel.
3. Engage the left mounting tab of the antenna module onto the weld stud (3) on the roof rear header panel.
4. Install and tighten the nut (8) that secures the left mounting tab of the antenna module to the weld stud on the roof rear header panel. Tighten the nut securely.
5. Engage the antenna module pigtail wire retainer (6) into the slot in the roof rear header panel.
6. Reconnect the antenna module pigtail wire connector (5) to the on-glass antenna grid terminal (4).
7. Reconnect the body wire harness connections (9) to the antenna module.
8. Reinstall the headliner onto the inner roof panel. Refer to **HEADLINER, INSTALLATION** .
9. Reinstall the rear seat back into the vehicle. Refer to **SEAT BACK, REAR, INSTALLATION** .
10. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

RADIO

DESCRIPTION

DESCRIPTION



[Fig. 20: Radio Receiver Module](#)
Courtesy of CHRYSLER GROUP, LLC

The radio (also known as the radio module) can be identified by sales codes RA2, RA3 or RA4. There is one distinct chassis design for all radios. The base radio (Sales Code RA2) and the premium radio (Sales Codes RA3 or RA4) have the electronics mounted parallel to the face plate in an aluminum chassis.

RA2 - The RA2 radio has a 127 millimeter (5 inch) touchscreen with hard keys on the faceplate. RA2 radios with control knobs have an integrated center stack that allows the HVAC system to be controlled with the touchscreen, or the redundant controls. There is no external hands free module, all hands free functions are integrated into the radio. An optional remote mounted media hub contains access ports for a 3.5 mm auxiliary audio plug, a powered Universal Serial Bus (USB) connector and a Secure Data (SD) card slot.

- 127 mm (5 inch) touchscreen
- AM/FM receiver
- satellite radio receiver (optional)
- Bluetooth™ connectivity for hands-free phone; streaming audio; voice commands

RA3 or RA4 - The RA3 or RA4 radio is identified by a 213.36 mm (8.4 inch) color touch screen display. There are no visible differences between the RA3 and RA4 with the unit turned off. However, on vehicles sold in the United States, the RA4 offers High Definition (HD) radio reception and can be identified by the HD symbol located on the screen when the radio is in radio mode. If the radio will not power up, the only way to identify the system is through a direct Single VIN inquiry using the TechConnect application on the DealerConnect web site.

- 213.36 mm (8.4 inch) color touchscreen display
- AM/FM/Remote Aux/USB/SD receiver
- satellite radio receiver (optional)
- dealer activated factory installed Global Positioning System (GPS) navigation option (RA3 only)
- factory installed GPS navigation (RA4)
- iPod support via USB
- remote steering wheel mounted controls
- Bluetooth™ connectivity for hands-free phone; streaming audio; voice commands
- climate control integration
- Electronic Vehicle Information Center (EVIC) personalization (optional)
- 3G Wi-Fi hot spot capability (subscription required)
- free form Short Message Service (SMS) dictation (subscription required)
- HD radio receiver (RA4 only)
- 911 - ASSIST automated calling
- remote CD player (optional)
- remote services - door lock/unlock, remote start, panic (subscription required)

The radio contains a microcontroller and programming that allows it to communicate with other electronic modules in the vehicle over the Controller Area Network - Interior High Speed (CAN-IHS) data bus. In vehicles equipped with the RA3 or RA4, the radio also uses electronic message communication with other electronic modules in the vehicle over the CAN-C data bus. Refer to **COMMUNICATION, DESCRIPTION** .

The radio cannot be adjusted or repaired. If an radio is damaged or ineffective, it must be replaced. The external AM/FM antenna and the external combination antenna can be repaired separately from the radio. The radio software is flash programmable through the USB port.

OPERATION

OPERATION

The radio (also known as the radio receiver module) becomes operational when it receives a wake up signal over the Controller Area Network (CAN) - Interior High Speed (IHS) data bus indicating the status of the ignition switch is On or Accessory. For further information on the operation of the radio and media systems in the vehicle, see the heading for the appropriate audio system option in the User Guide or the Owner Manual in the vehicle glove box. Also see the UconnectÂ® web site (**http://www.driveuconnect.com/**) for more information, or refer to the **Owners** link on the vehicle brand web site (**http://dodge.com/en/**) to view or download copies of those publications.

The radio uses a on-glass antenna screened onto the back glass for AM/FM signal reception and, depending upon optional vehicle equipment, a roof mounted shark fin combination antenna that can receive Global Positioning System (GPS), satellite radio and cellular telephone signals.

Depending upon the audio system options, a radio can play music from many different media sources. The media can be played by connecting the source to the audio system via a 3.5 millimeter auxiliary (AUX) audio port, a Universal Serial Bus (USB) port, a remote Secure Data (SD) card slot, a external Compact Disc (CD)

player or through wireless Bluetooth™ audio streaming. Refer to the UconnectĀ® web site (**http://www.driveuconnect.com/**) for compatibility.

NOTE: **USB devices (e.g.: camera memory, USB adaptors, etc. excluding Apple products) must comply with the Mass Storage Device (MSD) standard. This remote USB port can provide power to the connected device.**

REMOVAL

REMOVAL

Fig. 21: Instrument Panel Support Structure & Screws
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If possible, an RA3 radio (also known as the radio module) with GPS navigation activated or any RA4 radio should have the version of the map and Point Of Interest (POI) data retrieved and noted before the original radio is replaced with a new unit. If the version of the map and POI data found on the new radio is not equal to or newer than the version that is found on the original radio, updated map and POI data will need to be downloaded and installed to the new radio at the expense of the dealer.**

Refer to STANDARD PROCEDURE .

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the instrument cluster bezel from the instrument panel. Refer to **BEZEL, INSTRUMENT CLUSTER, REMOVAL** .
3. Remove the four screws (1) that secure the radio to the instrument panel support structure (2).
4. Pull the radio out from the instrument panel far enough to access the connections at the back of the radio.

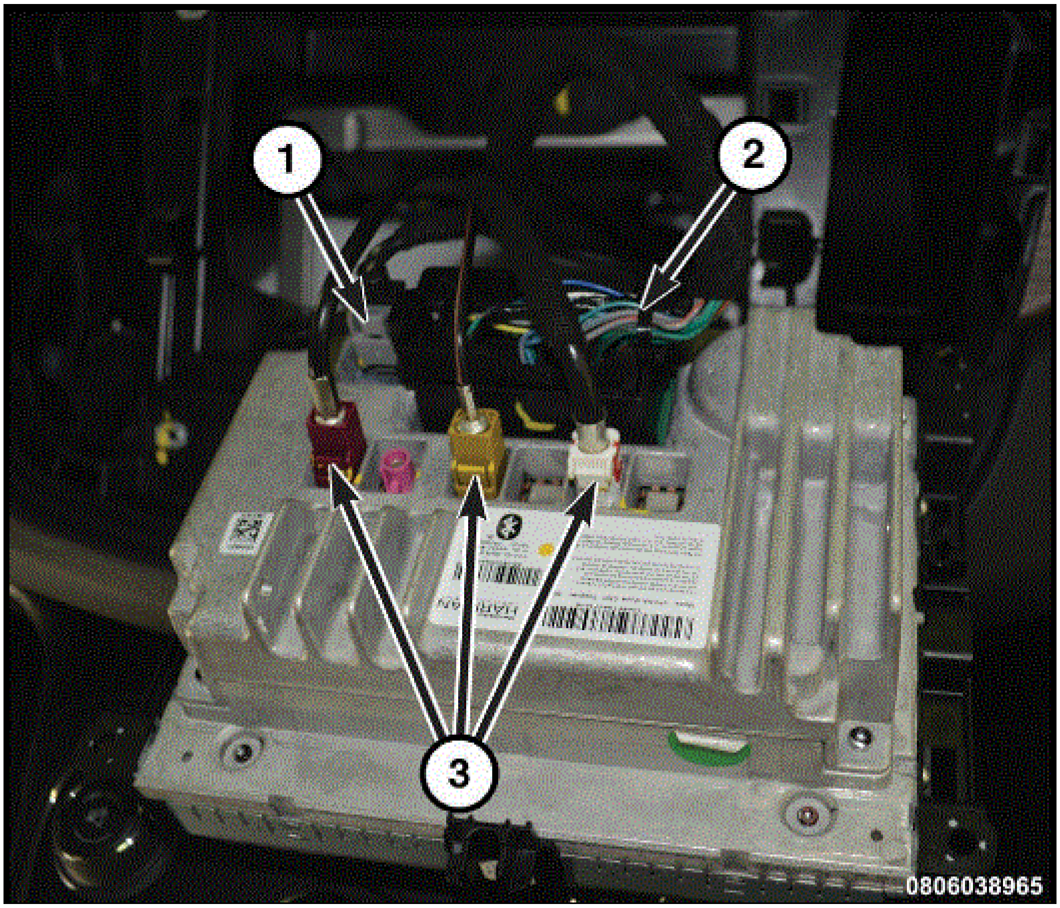


Fig. 22: Radio Receiver Module Connectors
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the antenna connectors (3) and the instrument panel wire harness connector (2) from the back of the radio.
6. If equipped, disconnect the Universal Serial Bus (USB) connector (1) from the back of the radio.
7. Remove the radio from the instrument panel.

INSTALLATION

INSTALLATION

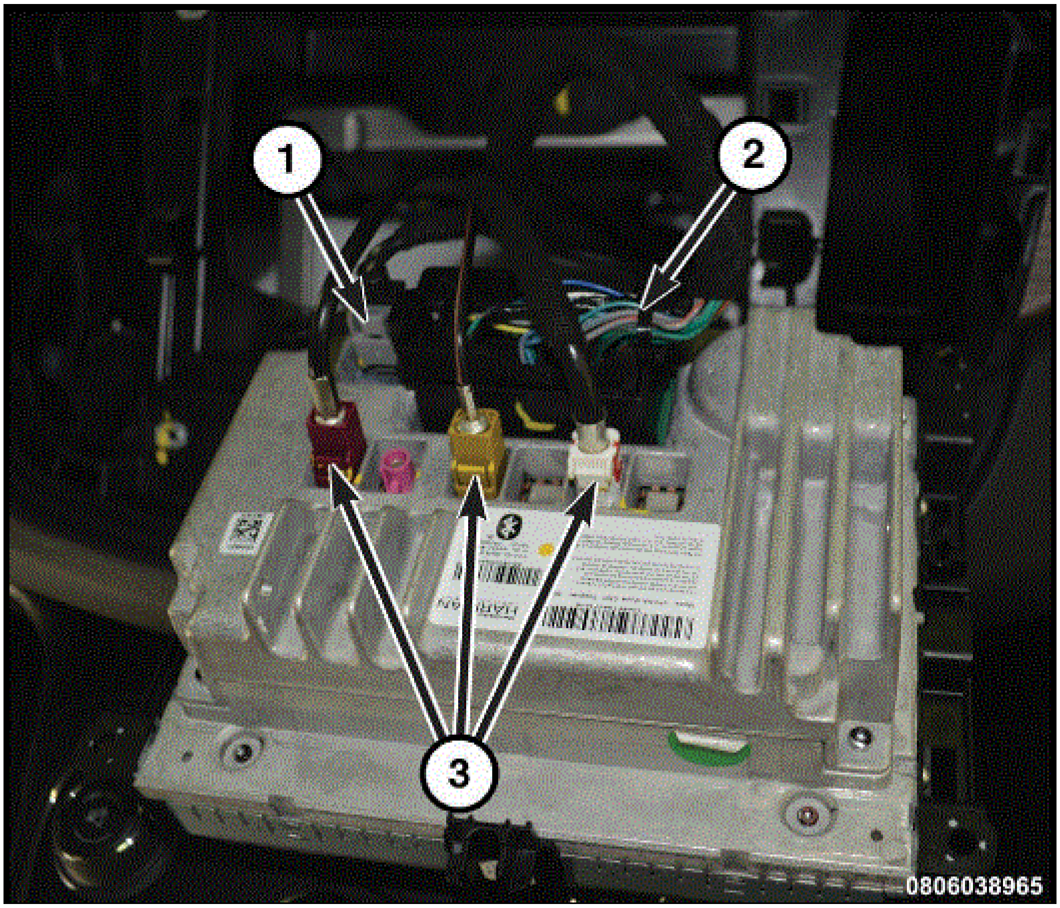


Fig. 23: Radio Receiver Module Connectors
Courtesy of CHRYSLER GROUP, LLC

1. Position the Radio (also known as the Radio Module) near the radio mounting location of the instrument panel.
2. Reconnect the antenna connectors (3) and the instrument panel wire harness connector (2) to the back of the radio.
3. If equipped, reconnect the Universal Serial Bus (USB) connector (1) to the back of the radio.

Fig. 24: Instrument Panel Support Structure & Screws
Courtesy of CHRYSLER GROUP, LLC

4. Position the radio into the mounting location of the instrument panel support structure (2).
5. Install and tighten the four screws (1) that secure the radio to the instrument panel support structure. Tighten the screws securely.
6. Reinstall the instrument cluster bezel onto the instrument panel. Refer to **BEZEL, INSTRUMENT CLUSTER, INSTALLATION** .
7. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

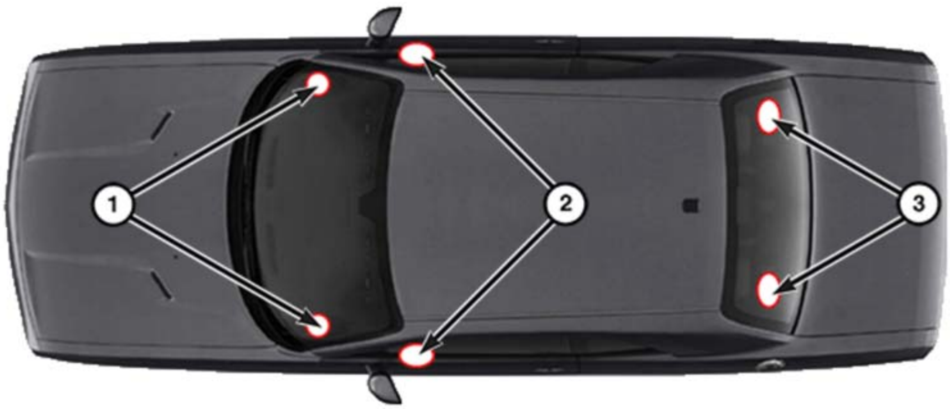
NOTE: **RA3 and RA4 Radio Uconnect Access Applications and WiFi hotspot will be automatically updated in the replacement radio through the embedded cellular phone of the radio based upon the current subscription status of the customer. This update process may take up to an hour, depending upon the number of apps and available cellular services access. The dealer is not expected to perform this process or to oversee it, but may need to explain to the vehicle owner or operator that some features and applications may not be fully restored and overall system response may be slowed until the process has completed.**

NOTE: **For RA3 radio only: If the radio has had the GPS navigation feature activated, any factory replacement radio for the same vehicle will be provided with the GPS navigation system already activated. Refer to DESCRIPTION .**

SPEAKER

DESCRIPTION

BASE



8808061219

Fig. 25: Speakers - Base
Courtesy of CHRYSLER GROUP, LLC

The base speaker system (Sales Code RCG) includes six speakers in six locations.

- Two 8.89 centimeter (3.5 inch) diameter midrange tweeters (1) located on the top of the instrument panel, one at each outboard end.
- Two 15.2 X 23 centimeter (6 X 9 inch) diameter speakers (2) located on the inner door panels, one at the lower front corner of each door.
- Two 16.5 centimeter (6.5 inch) diameter speakers (3) located on the package shelf, one at each outboard end.

The speakers cannot be adjusted or repaired. If ineffective or damaged they must be replaced.

PREMIUM I

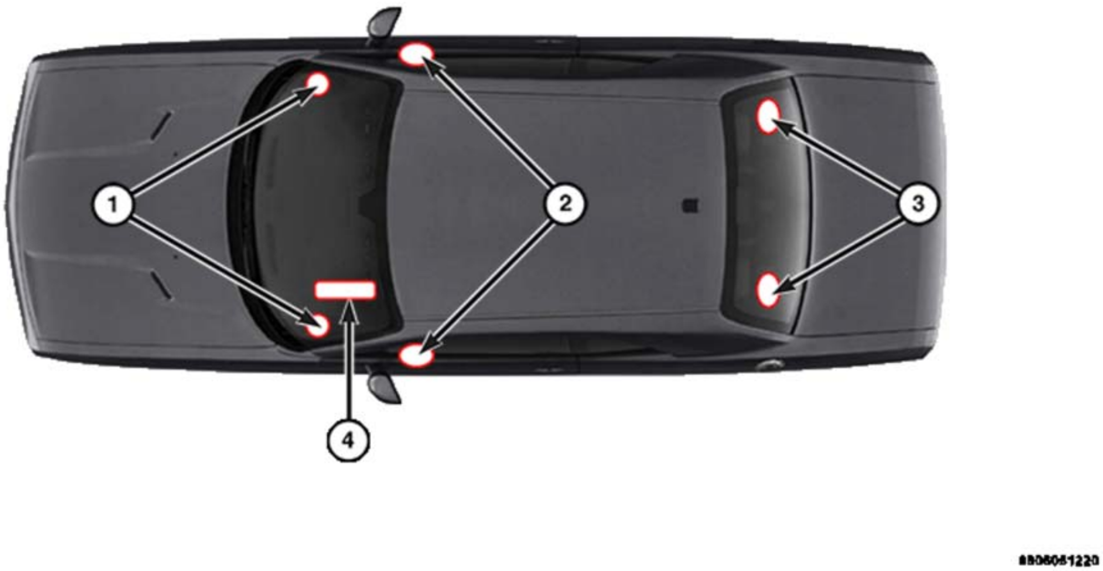


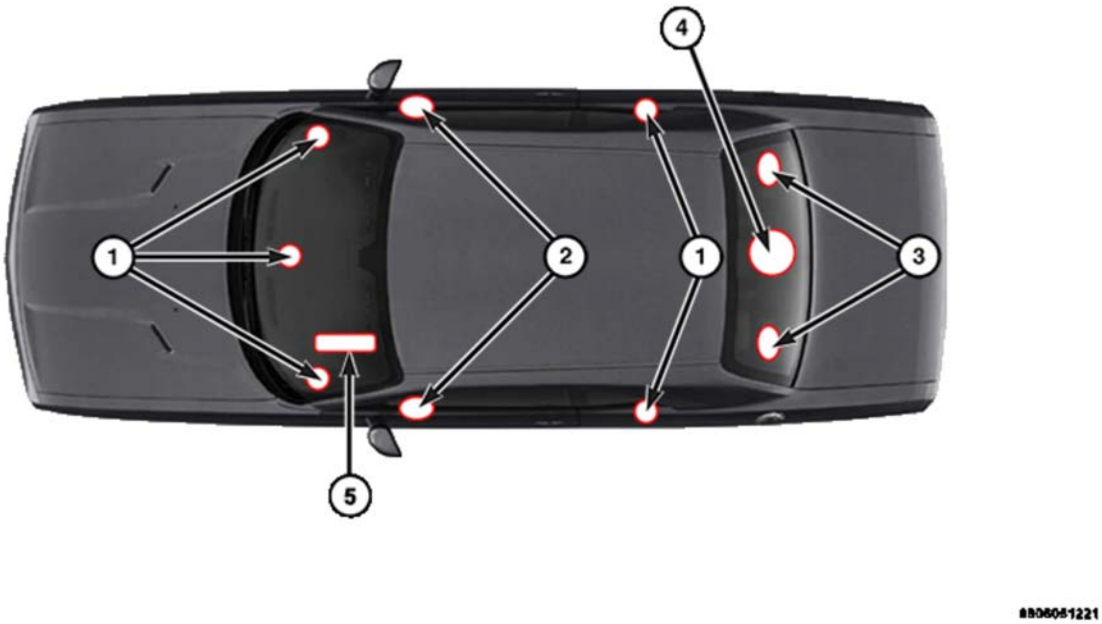
Fig. 26: Speakers - Premium 1
Courtesy of CHRYSLER GROUP, LLC

The Premium 1 speaker system (Sales Code RCJ) includes six speakers in six locations and an audio power amplifier.

- Two 8.89 centimeter (3.5 inch) diameter midrange tweeters (1) located on the top of the instrument panel, one at each outboard end.
- Two 15.2 X 23 centimeter (6 X 9 inch) diameter speakers (2) located on the inner door panels, one at the lower front corner of each door.
- Two 16.5 centimeter (6.5 inch) diameter speakers (3) located on the package shelf, one at each outboard end.
- An 8 channel, 276 watt amplifier (4) is located under the instrument panel to the left of the steering column. Refer to **AMPLIFIER, DESCRIPTION**.

The speakers cannot be adjusted or repaired. If ineffective or damaged they must be replaced.

PREMIUM II



[Fig. 27: Speakers - Premium 2](#)
Courtesy of CHRYSLER GROUP, LLC

The Premium II speaker system (Sales Code RC3) includes nine speakers in nine locations, a dual voice coil subwoofer and an audio power amplifier.

- Five 8.89 centimeter (3.5 inch) diameter midrange tweeters (1) located on the top of the instrument panel and on each quarter trim panel. One is at each outboard end and one in the center of the instrument panel, and one is at the upper front corner of each quarter trim panel.
- Two 15.2 X 23 centimeter (6 X 9 inch) diameter speakers (2) located on the inner door panels, one at the lower front corner of each door.
- Two 16.5 centimeter (6.5 inch) diameter speakers (3) located on the package shelf, one at each outboard end.
- One 20.32 centimeter (8 inch) diameter Dual Voice Coil (DVC) subwoofer (4) located on the package shelf, near the center.
- A 12 channel, 506 watt amplifier (5) is located under the instrument panel to the left of the steering column. Refer to **AMPLIFIER, DESCRIPTION**.

The speakers and subwoofer cannot be adjusted or repaired. If ineffective or damaged they must be replaced.

PREMIUM III

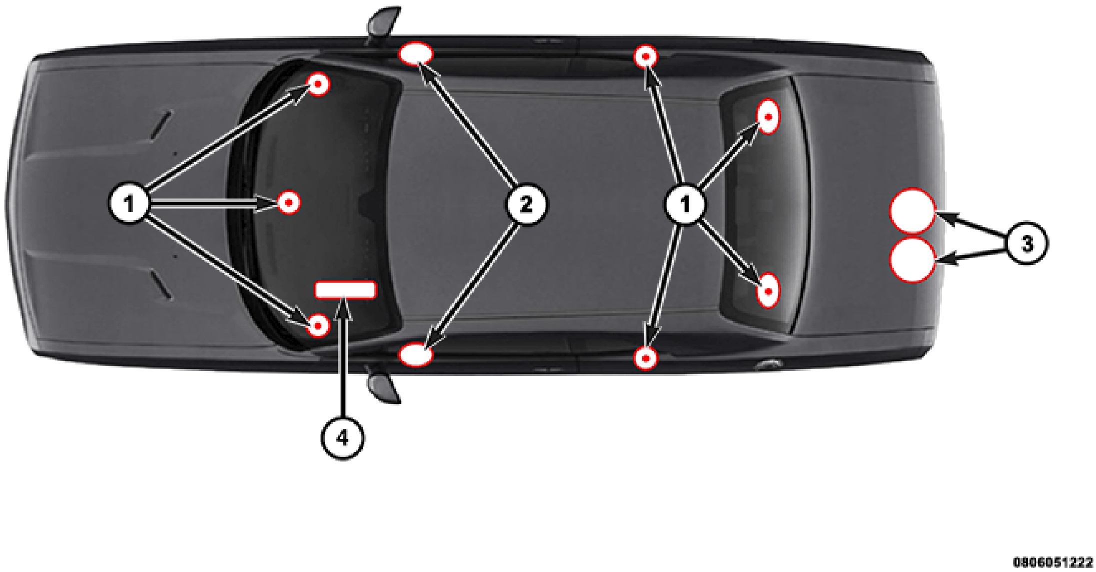


Fig. 28: Speakers - Premium 3
Courtesy of CHRYSLER GROUP, LLC

The Premium III speaker system (Sales Code RGE) includes 17 speakers in nine locations, dual subwoofers and an audio power amplifier.

- Seven 8.89 plus 2.54 centimeter (3.5 plus 1 inch) diameter coaxial speakers (1) located on the top of the instrument panel, on each quarter trim panel and on the package shelf. One is at each outboard end and one in the center of the instrument panel, one is at the upper front corner of each quarter trim panel, and one is at each outboard end of the package shelf.
- Two 15.2 X 23 centimeter (6 X 9 inch) diameter speakers (2) located on the inner door panels, one at the lower front corner of each door.
- Two 25.4 centimeter (10 inch) diameter Dual Voice Coil (DVC) subwoofers (3) located within the trunk compartment. The subwoofers are located within a special enclosure mounted in the spare tire well of the trunk and also includes a bin designed to store a tire inflation kit that replaces the spare tire.
- A 12 channel, Class D amplifier is located under the instrument panel to the left of the steering column. Refer to **AMPLIFIER, DESCRIPTION**.

The speakers and subwoofers cannot be adjusted or repaired. If ineffective or damaged they must be replaced.

OPERATION

BASE

Two wires connected to each speaker, one feed circuit (+) and one return circuit (-), allow the audio output signal electrical current from the amplifier section of the Radio Receiver Module (RRM) (also known as the radio or the head unit) to flow through each speaker voice coil.

The hard wired circuits between the RRM and the speakers may be diagnosed using conventional diagnostic

tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

PREMIUM I

Fig. 29: Speakers - Premium 1
Courtesy of CHRYSLER GROUP, LLC

Two wires connected to each speaker, one feed circuit (+) and one return circuit (-), allow the audio output signal electrical current from the appropriate channel of the audio power amplifier to flow through the speaker voice coil. The graphic above shows the mapping of the amplifier channels to the speakers. However, it should be noted that channels 5 and 6 of the 8 channel amplifier are unused.

The hard wired circuits between the audio power amplifier and the speakers, or between the Radio Receiver Module (RRM) (also known as the radio or the head unit) and the amplifier may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

PREMIUM II

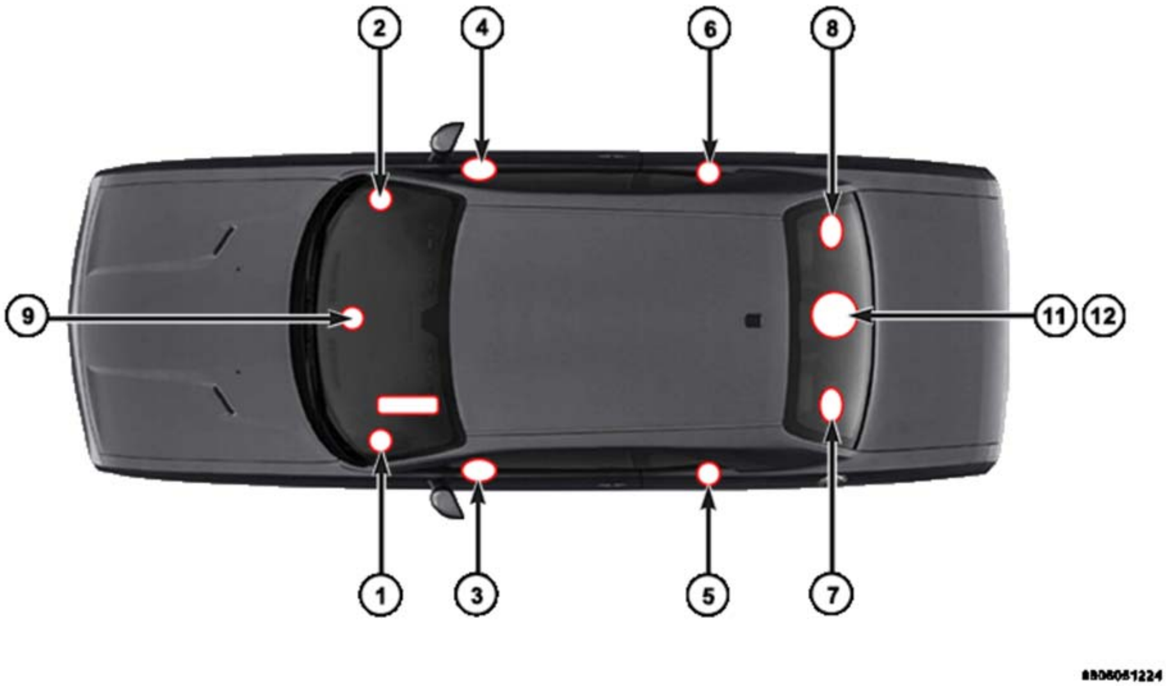


Fig. 30: Speakers - Premium 2
Courtesy of CHRYSLER GROUP, LLC

Two wires connected to each speaker, one feed circuit (+) and one return circuit (-), allow the audio output signal electrical current from the appropriate channel of the audio power amplifier to flow through the speaker voice coil or coils (subwoofer). The graphic above shows the mapping of the amplifier channels to the speakers and subwoofer. However, it should be noted that channel 10 of the 12 channel amplifier is unused.

The hard wired circuits between the audio power amplifier and the speakers and subwoofer, or between the Radio Receiver Module (RRM) (also known as the radio or the head unit) and the amplifier may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

PREMIUM III

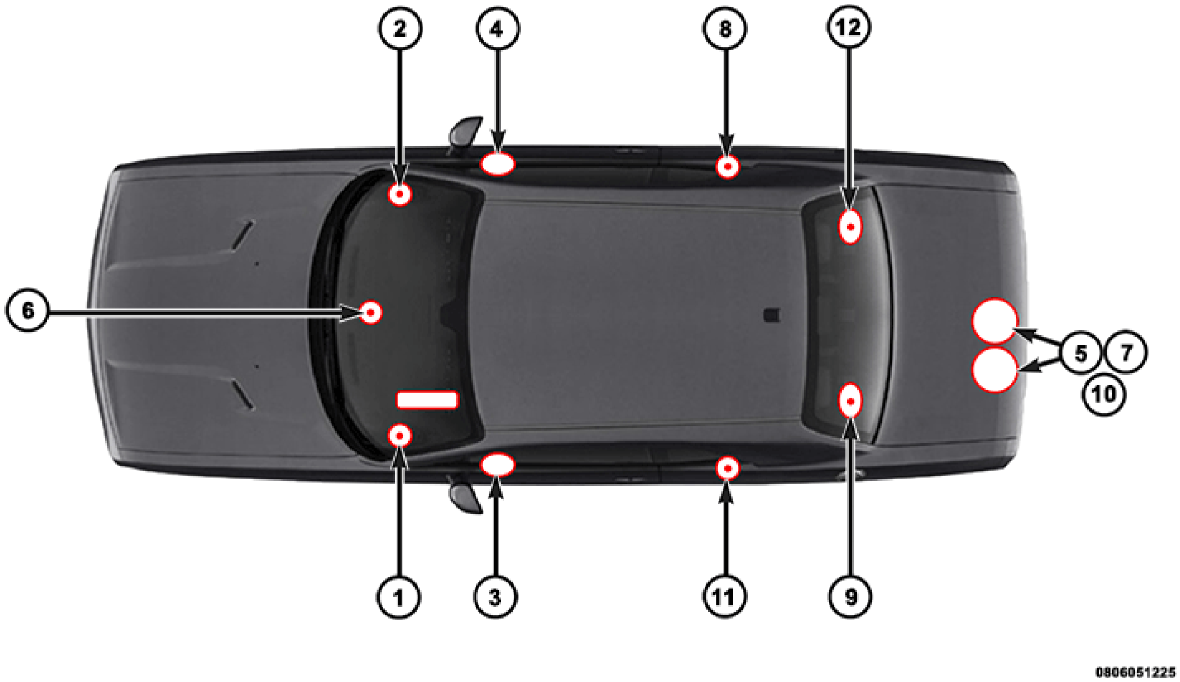


Fig. 31: Speakers - Premium 3
Courtesy of CHRYSLER GROUP, LLC

Two wires connected to each speaker, one feed circuit (+) and one return circuit (-), allow the audio output signal electrical current from the appropriate channel of the audio power amplifier to flow through the speaker voice coil or coils (subwoofer). The graphic above shows the mapping of the amplifier channels to the speakers and subwoofers.

The hard wired circuits between the audio power amplifier and the speakers or subwoofers, or between the Radio Receiver Module (RRM) (also known as the radio or the head unit) and the amplifier may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SPEAKER

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbags, airbag curtains, knee blocker, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect the IBS/negative battery cable assembly from the negative battery post, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

CAUTION: The speaker output of the radio is a "floating ground" system. Do not allow any speaker lead to short to ground, as damage to the radio may result.

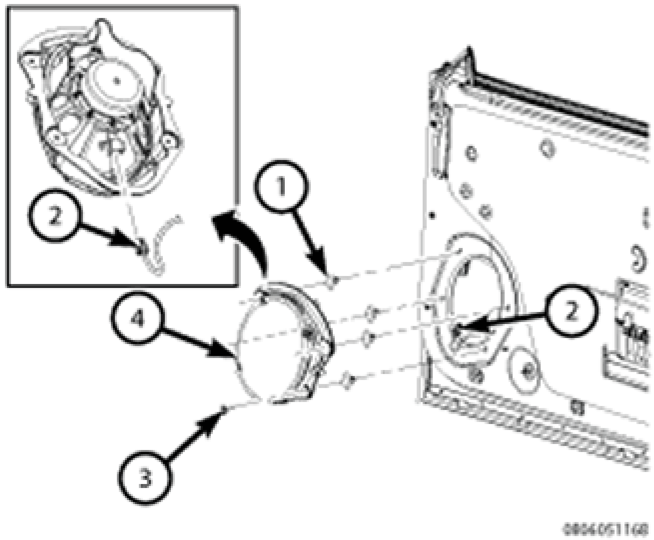
The hard wired circuits between components related to the audio system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the Radio Receiver Module (RRM), the audio power amplifier or the electronic controls and communication between modules and other devices that provide some features of the audio system. The most reliable, efficient and accurate means to diagnose the RRM, the audio power amplifier or the electronic controls and communication related to audio system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

1. If all speakers are inoperative, inspect all of the RRM related fuses. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the ineffective fuse.
2. If equipped with an audio power amplifier, check the fuse for the amplifier. If OK, go to Step 3. If not OK, repair the shorted circuit or component as required and replace the ineffective fuse.
3. Transition the ignition switch to the On status. Turn the RRM On. Adjust the balance and fader control controls to check the performance of each individual speaker. Note the speaker locations that are not performing correctly. Go to Step 4.
4. Turn the RRM Off. Transition the ignition switch to the Off status. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable. If vehicle is **not** equipped with an audio power amplifier, remove the RRM. If vehicle is equipped with an amplifier, disconnect wire harness connector at the output side of the amplifier. Go to Step 5.
5. Check both the speaker feed (+) circuit and return (-) circuit cavities for the inoperative speaker at the RRM wire harness connector for continuity to ground. There should be no continuity. If OK, go to Step 6. If not OK, repair the shorted speaker feed (+) and/or return (-) circuit(s) to the speaker as required.
6. Disconnect the wire harness connector at the inoperative speaker. Check for continuity between the speaker feed (+) circuit cavities of the RRM wire harness connector or, if equipped, the audio power amplifier wire harness connector and the speaker wire harness connector. Repeat the check between the speaker return (-) circuit cavities of the RRM wire harness connector and the speaker wire harness connector. In each case, there should be continuity. If OK, replace the ineffective speaker. If not OK, repair the open speaker feed (+) and/or return (-) circuit(s) as required.

REMOVAL

DOOR PANEL



[Fig. 32: Speaker, Wire Harness Connector & Fasteners]
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the trim panel from the inside of the door. Refer to **PANEL, DOOR TRIM, REMOVAL** .
3. Remove the four screws (3) that secure the speaker (4) to the door inner panel.

NOTE: **Support the speaker while disconnecting the wire harness connector. Do not let the speaker hang from the wire harness.**

4. Pull the speaker away from the door far enough to access and disconnect the wire harness connector (2) from the speaker.
5. Remove the speaker from the door.

INSTRUMENT PANEL

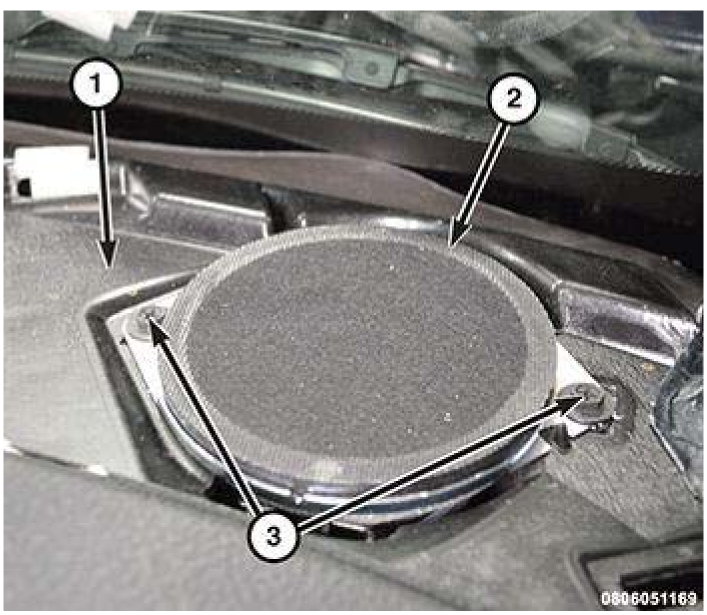


Fig. 33: Instrument Panel Support Structure, Speaker & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the defroster grille from the top of the instrument panel. Refer to **GRILLE, DEFROSTER, REMOVAL** .
3. Remove the two screws (3) that secure the speaker (2) to the top of the instrument panel support structure (1).
4. Pull the speaker out of the instrument panel far enough to access and disconnect the wire harness connector from the speaker.
5. Remove the speaker from the instrument panel.

QUARTER PANEL

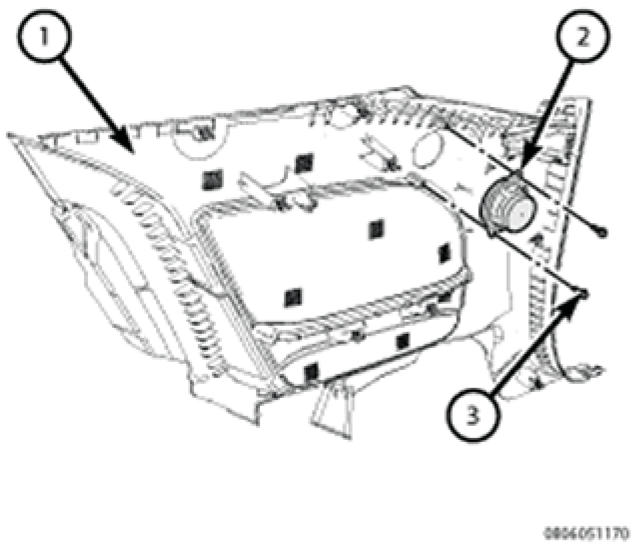
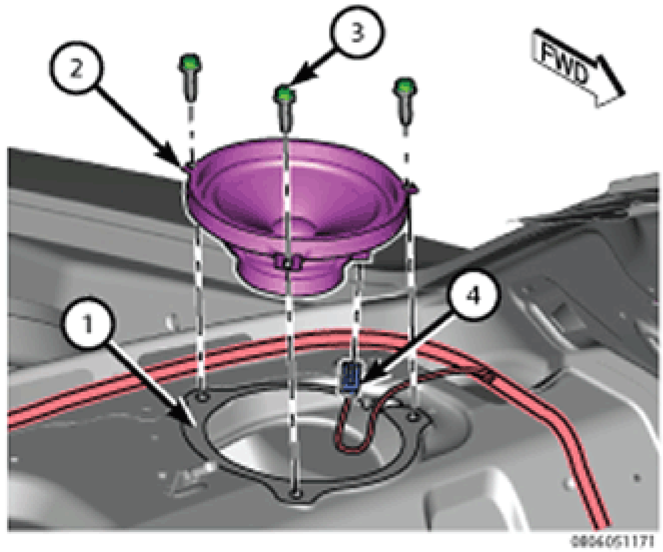


Fig. 34: Quarter Trim Panel, Speaker & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the trim panel from the quarter inner panel. Refer to **PANEL, QUARTER TRIM, REMOVAL** .
3. Remove the two screws (3) that secure the speaker (2) to the back of the quarter trim panel (1).
4. Remove the speaker from the quarter trim panel.

SHELF PANEL



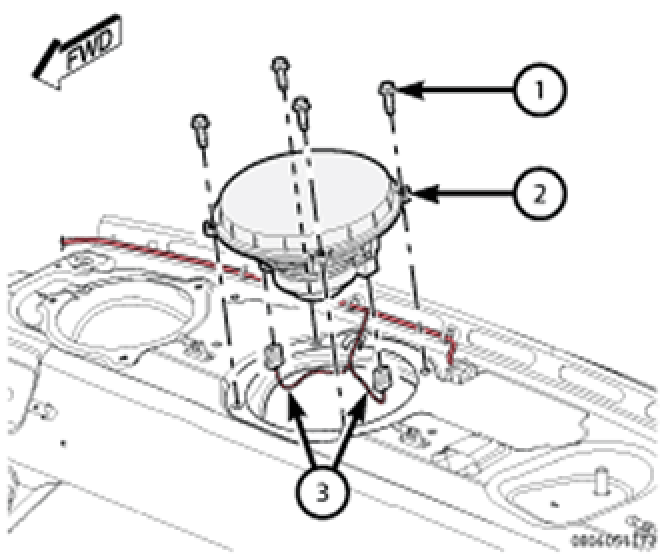
[Fig. 35: Shelf Panel Support, Speaker, Wire Harness Connector & Screws]

Courtesy of CHRYSLER GROUP, LLC

NOTE: **16.5 centimeter (6.5 inch) speaker shown, 8.89 centimeter (3.5 inch) similar.**

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the trim from the package shelf panel. Refer to PANEL, REAR SHELF, REMOVAL .
3. Remove the three screws (3) that secure the speaker (2) to the shelf panel support (1).
4. Lift the speaker up from the shelf panel support far enough to access and disconnect the wire harness connector (4) from the speaker.
5. Remove the speaker from the shelf panel.

SUBWOOFER - SHELF PANEL



[Fig. 36: Subwoofer, Wire Harness Connectors & Screws]

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the trim from the package shelf panel. Refer to **PANEL, REAR SHELF, REMOVAL** .
3. Remove the four screws (1) that secure the subwoofer (2) to the shelf panel support.
4. Lift the subwoofer up from the shelf panel support far enough to access and disconnect the two wire harness connectors (3) from the subwoofer.
5. Remove the subwoofer from the shelf panel.

SUBWOOFER - TRUNK

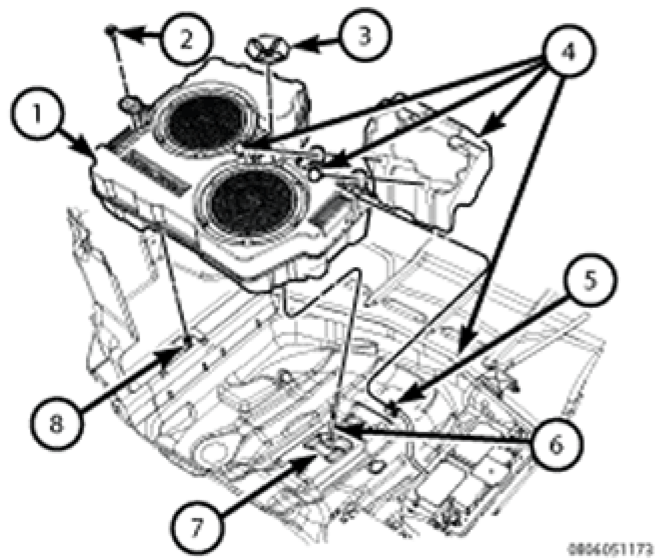
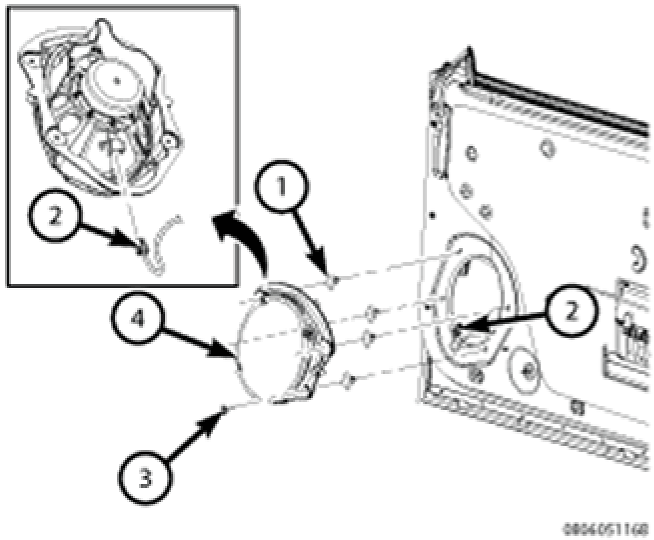


Fig. 37: Subwoofer Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the hold down retainer (3) that secures the subwoofer assembly (1) to the special bolt (6) in the hold down bracket (7) in the spare tire well of the trunk floor panel.
3. Remove the screw (2) that secures the subwoofer assembly to the rivet nut (8) in the left sill of the spare tire well.
4. Disconnect the wire harness connector (5) from the subwoofer assembly.
5. Remove the two push in plastic fasteners that secure the storage bin (4) to the subwoofer assembly.
6. Remove the subwoofer from the vehicle (2).

INSTALLATION

DOOR PANEL



[Fig. 38: Speaker, Wire Harness Connector & Fasteners]
Courtesy of CHRYSLER GROUP, LLC

1. Check to be certain all four spring nuts (1) are properly installed and in good condition in the door inner panel.

NOTE: **Support the speaker while connecting the wire harness connector. Do not let the speaker hang from the wire harness.**

2. Reconnect the wire harness connector (2) to the speaker (4).
3. Position the speaker onto the door inner panel.
4. Install and tighten the four screws (3) that secure the speaker to the door inner panel. Tighten the screws securely.
5. Reinstall the trim panel onto the inside of the door. Refer to PANEL, DOOR TRIM, INSTALLATION .
6. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

INSTRUMENT PANEL

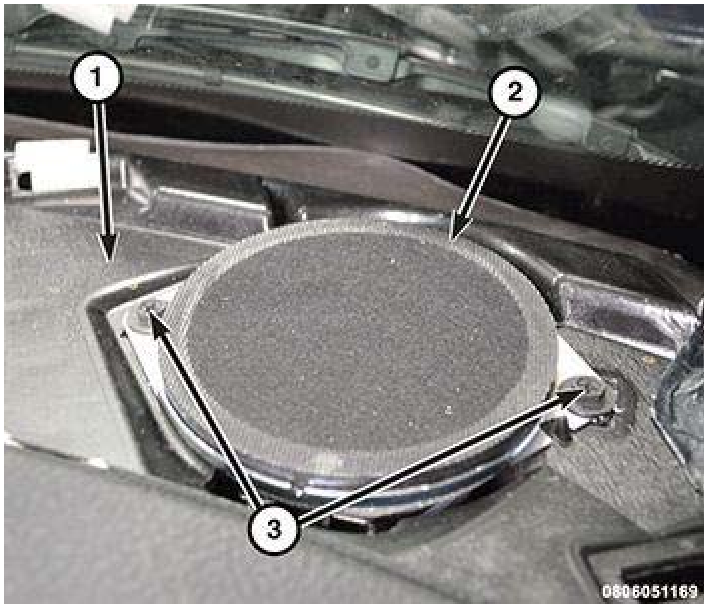


Fig. 39: Instrument Panel Support Structure, Speaker & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Position the speaker (2) near the mounting hole in the top of the instrument panel structural support (1).
2. Reconnect the wire harness connector to the speaker and position it into the mounting hole of the instrument panel.
3. Install and tighten the two screws (3) that secure the speaker to the instrument panel structural support. Tighten the screws securely.
4. Reinstall the defroster grille onto the top of the instrument panel. Refer to **GRILLE, DEFROSTER, INSTALLATION** .
5. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

QUARTER PANEL

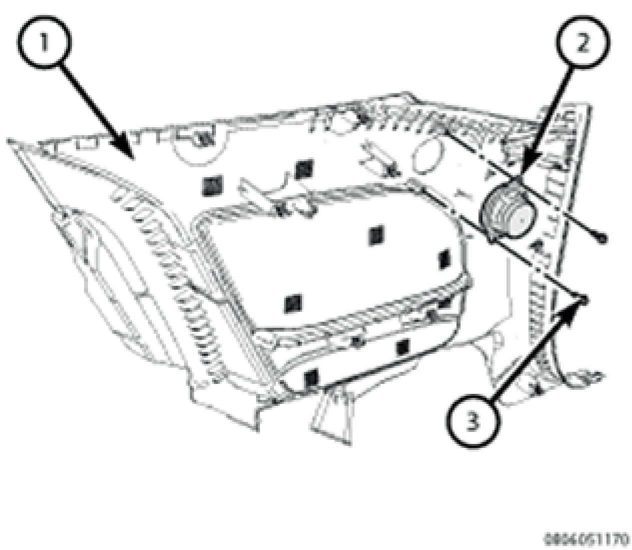


Fig. 40: Quarter Trim Panel, Speaker & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Position the speaker (2) to the back of the quarter trim panel (1).
2. Install and tighten the two screws (3) that secure the speaker to the quarter trim panel. Tighten the screws securely.
3. Reinstall the trim panel onto the quarter inner panel. Refer to **PANEL, QUARTER TRIM, INSTALLATION** .
4. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

SHELF PANEL

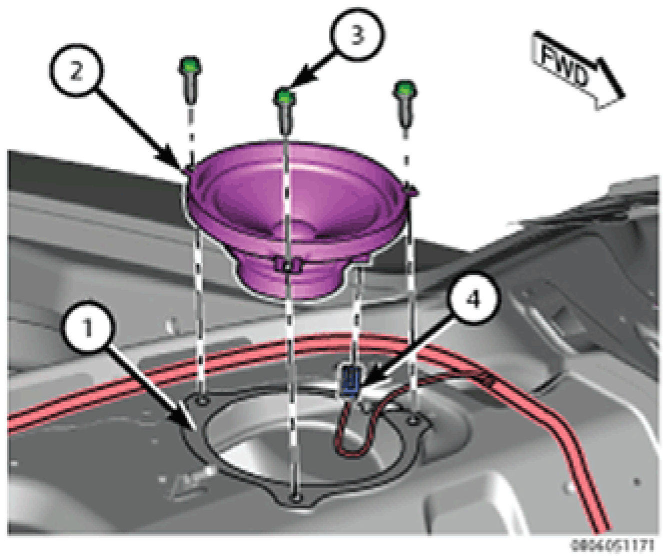


Fig. 41: Shelf Panel Support, Speaker, Wire Harness Connector & Screws
Courtesy of CHRYSLER GROUP, LLC

NOTE: 16.5 centimeter (6.5 inch) speaker shown, 8.89 centimeter (3.5 inch) similar.

1. Position the speaker (2) near the mounting hole in the package shelf panel support (1).
2. Reconnect the wire harness connector (4) to the speaker.
3. Position the speaker into the mounting hole of the shelf panel support.
4. Install and tighten the three screws (3) that secure the speaker to the shelf panel support. Tighten the screws securely.
5. Reinstall the trim onto the shelf panel support. Refer to **PANEL, REAR SHELF, INSTALLATION** .

   Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

SUBWOOFER - SHELF PANEL

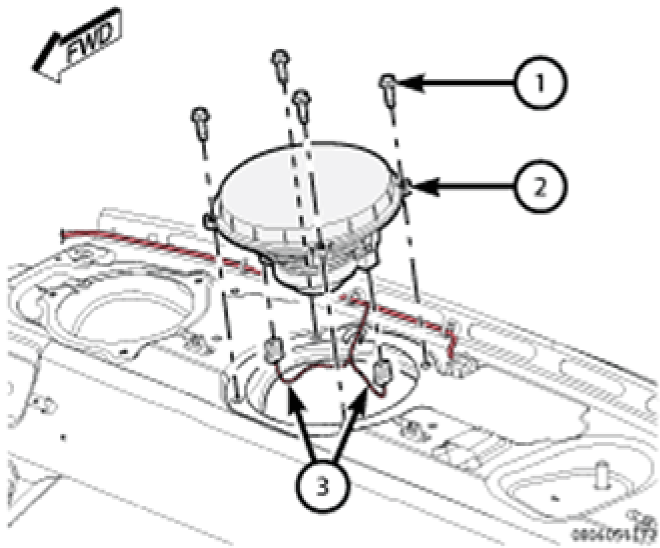


Fig. 42: Subwoofer, Wire Harness Connectors & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Position the subwoofer (2) near the mounting hole in the package shelf panel support.
2. Reconnect the two wire harness connectors (3) to the subwoofer.
3. Position the subwoofer into the mounting hole of the shelf panel support.
4. Install and tighten the four screws (1) that secure the subwoofer to the shelf panel support. Tighten the screws securely.
5. Reinstall the trim onto the shelf panel support. Refer to **PANEL, REAR SHELF, INSTALLATION** .
6. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

SUBWOOFER - TRUNK

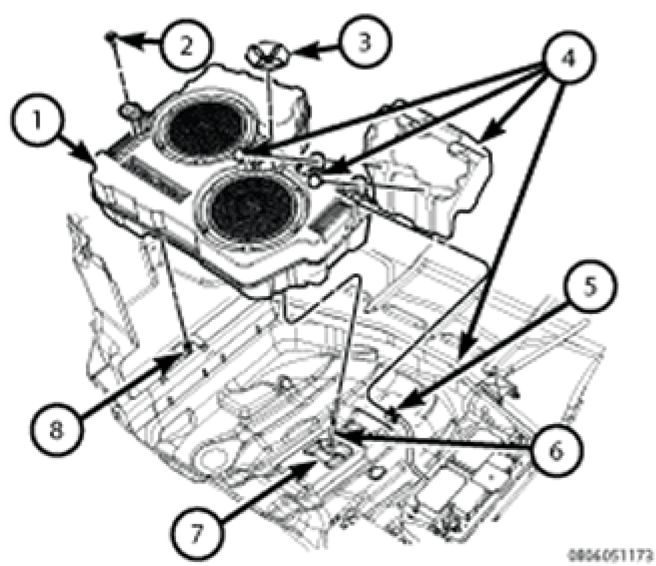


Fig. 43: Subwoofer Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Position the storage bin (4) into the right front corner of the spare tire well in the trunk.

2. Be certain that the special bolt (6) is properly positioned in the hold down bracket (7) in the spare tire well of the trunk floor panel.
3. Position the subwoofer assembly (1) over the special bolt and lower it into the spare tire well.
4. Align the subwoofer assembly with the rivet nut (8) in the left sill of the spare tire well and to the storage bin in the right front corner of the spare tire well.
5. Install the two push in plastic fasteners (4) that secure the storage bin to the subwoofer assembly.
6. Reconnect the wire harness connector (5) to the subwoofer assembly.
7. Install and tighten the screw (2) that secures the subwoofer assembly to the rivet nut in the left sill of the spare tire well. Tighten the screw to **SPECIFICATIONS**.
8. Install and tighten the hold down retainer (3) that secures the subwoofer assembly to the special bolt in the spare tire well of the trunk floor panel. Tighten the retainer securely.
9. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

SWITCH, REMOTE RADIO

DESCRIPTION

WITHOUT PADDLE SHIFT

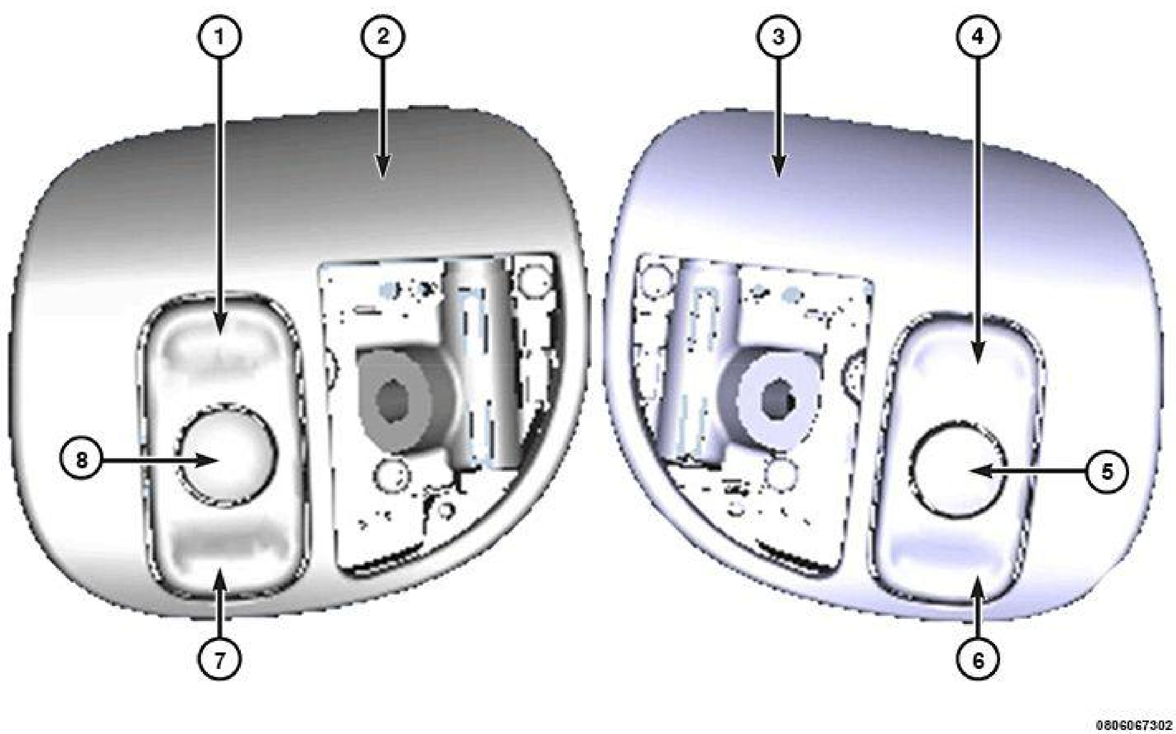


Fig. 44: Remote Radio Switches
Courtesy of CHRYSLER GROUP, LLC

The remote radio switches (2 and 3) are mounted to the back of the steering wheel. Each switch includes a momentary rocker with a momentary push button located in the center, between the two ends of the rocker. On vehicles not equipped with the steering wheel mounted paddle shift switches the right switch (1) includes the following functions:

- Volume Up (1)
- Mode (8)
- Volume Down (7)

On vehicles not equipped with the steering wheel mounted paddle shift switches the left switch (2) includes the following functions:

- Seek Up (4)
- Preset (5)
- Seek Down (6)

Refer to **SWITCH, REMOTE RADIO, OPERATION**.

WITH PADDLE SHIFT

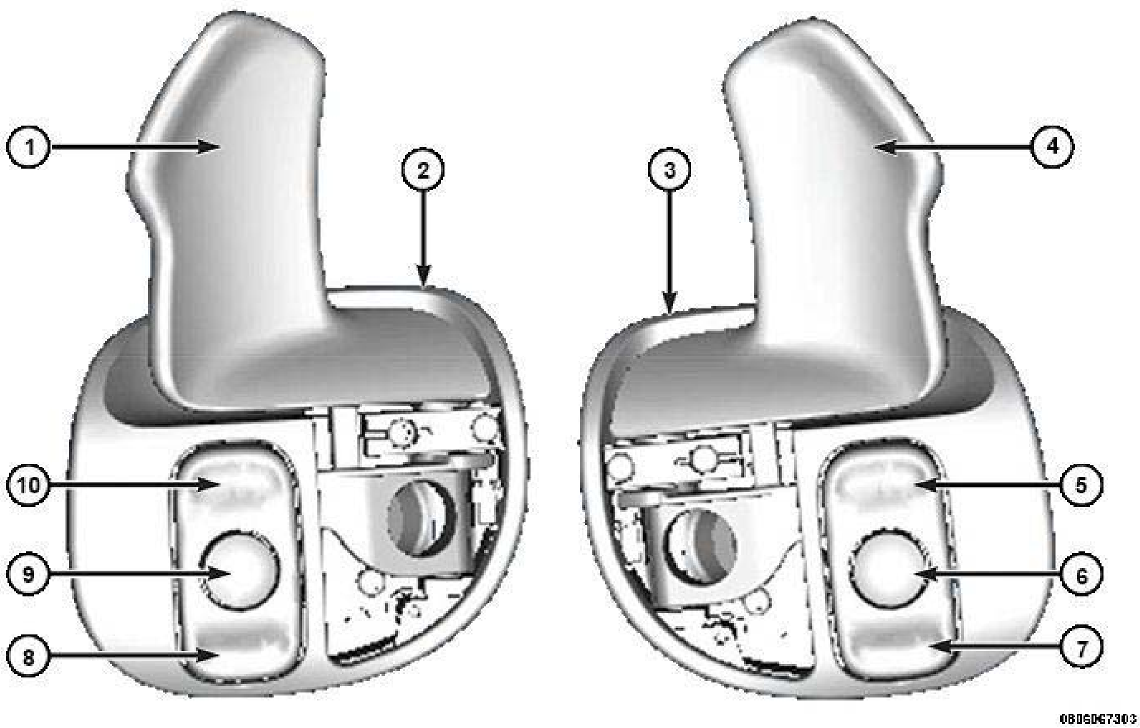


Fig. 45: Remote Radio Switches - With Paddle Shift
Courtesy of CHRYSLER GROUP, LLC

NOTE: SRT paddle shift switches shown. Non-SRT paddle shift switches similar.

The remote radio switches (2 and 3) are mounted to the back of the steering wheel. Each remote radio switch includes a momentary rocker with a momentary push button located in the center, between the two ends of the rocker in addition to the paddle shift switch. On vehicles equipped with the combined steering wheel mounted paddle shift and remote radio switches the right switch (2) includes the following functions:

- Upshift paddle shift switch (1)
- Volume Up (10)
- Mode (9)

- Volume Down (8)

On vehicles equipped with the combined steering wheel mounted paddle shift and remote radio switches the left switch (3) includes the following functions:

- Downshift paddle shift switch (4)
- Seek Up (5)
- Preset (6)
- Seek Down (7)

Refer to **SWITCH, REMOTE RADIO, OPERATION**.

OPERATION

WITHOUT PADDLE SHIFT

The remote radio switches on the backs of both horizontal steering wheel spokes are normally open, resistor multiplexed momentary switches that are hard wired to the left steering wheel switch module (electronic vehicle information center switch). The left steering wheel switch module contains a microcontroller and is a Local Interface Network (LIN) data bus slave node. The left steering wheel switch microcontroller provides a shared five volt signal and monitors shared returns from both remote radio switches. The left steering wheel switch microcontroller senses the status of the remote radio switches by reading the voltage drop on the signal circuit.

When the left steering wheel switch microcontroller senses an input (voltage drop) from any one of the remote radio switches, it communicates the switch status message via the LIN bus and through the clockspring and Steering Column Control Module (SCCM) microcontroller, which is a gateway to the Controller Area Network (CAN) data bus. The CAN bus then broadcasts switch status information to the audio system. The electronic circuitry within the audio system is programmed to respond to these remote radio switch status messages by adjusting the audio settings as requested.

The hard wired circuits between the remote radio switches and the left steering wheel switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the remote radio switches or the electronic communication between modules that provide the features of the remote radio switches. The most reliable, efficient and accurate means to diagnose the remote radio switches or the electronic communication related to remote radio switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

WITH PADDLE SHIFT

REMOTE RADIO SWITCHES

The remote radio switches on the backs of both horizontal steering wheel spokes are normally open, resistor multiplexed momentary switches that are hard wired to the left steering wheel switch module (electronic vehicle information center switch). The left steering wheel switch module contains a microcontroller and is a Local Interface Network (LIN) data bus slave node. The left steering wheel switch microcontroller provides a shared

five volt signal and monitors shared returns from both remote radio switches. The left steering wheel switch microcontroller senses the status of the remote radio switches by reading the voltage drop on the signal circuit.

When the left steering wheel switch microcontroller senses an input (voltage drop) from any one of the remote radio switches, it communicates the switch status message via the LIN bus and through the clockspring and Steering Column Control Module (SCCM) microcontroller, which is a gateway to the Controller Area Network (CAN) data bus. The CAN bus then broadcasts switch status information over the CAN bus to the audio system. The electronic circuitry within the audio system is programmed to respond to these remote radio switch status messages by adjusting the audio settings as requested.

PADDLE SHIFT SWITCHES

The paddle shift switches in the two remote radio switch units are normally open, resistor multiplexed momentary switches that are hard wired to the left steering wheel switch module (electronic vehicle information center switch). The left steering wheel switch module contains a microcontroller and is a Local Interface Network (LIN) data bus slave node. The left steering wheel switch microcontroller provides a shared five volt signal and monitors shared returns from both paddle shift switches. The left steering wheel switch microcontroller senses the status of the paddle shift switches by reading the voltage drop on the signal circuit.

When the left steering wheel switch microcontroller senses an input (voltage drop) from either of the paddle shift switches, it communicates the switch status message via the LIN bus and through the clockspring and Steering Column Control Module (SCCM) microcontroller, which is a gateway to the Controller Area Network (CAN) data bus. The CAN bus then broadcasts switch status information to the Transmission Control Module (TCM) communicating driver request for transmission upshift or downshift.

The hard wired circuits between the remote radio switches or the paddle shift switches and the left steering wheel switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the remote radio switches, the paddle shift switches or the electronic communication between modules that provide the features of the remote radio switches and paddle shift switches. The most reliable, efficient and accurate means to diagnose the remote radio switches, the paddle shift switches or the electronic communication related to remote radio switch and paddle shift switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbags, airbag curtains, knee blocker, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect the IBS/negative battery cable assembly from the negative battery post, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag**

deployment.

Fig. 46: Steering Wheel & Remote Radio Switch Cover
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Without paddle shift shown, with paddle shift similar.**

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the Driver air bag from the steering wheel. Refer to **AIR BAG, DRIVER, REMOVAL** .
3. Working from the back of the steering wheel (2), unsnap and remove the remote radio switch cover (1) (with or without paddle shift unit).

Fig. 47: Remote Radio Switch & Screw
Courtesy of CHRYSLER GROUP, LLC

4. Remove the screw (1) that secures the remote radio switch (2) (with or without paddle shift unit) to the steering wheel spoke armature.
5. Carefully pull the remote radio switch (2) away from the steering wheel spoke armature.

Fig. 48: EVIC Switch Screw - Back Of Steering Wheel
Courtesy of CHRYSLER GROUP, LLC

6. Remove the rear screw (2) that secures the Electronic Vehicle Information Center (EVIC) switch to the steering wheel spoke armature (1).

NOTE: **Noting the position of the wire harnesses prior to removing the EVIC switch will help with assembly.**

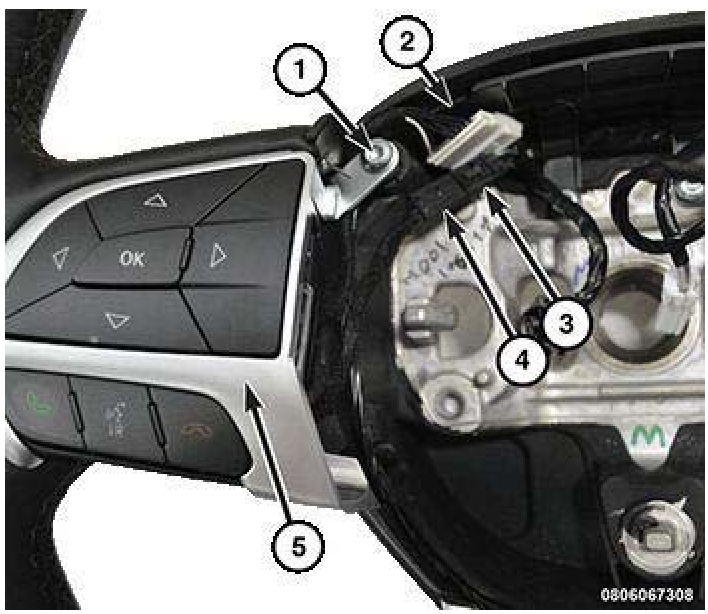


Fig. 49: EVIC Switch, Screw & Connectors
Courtesy of CHRYSLER GROUP, LLC

7. Remove the front screw (1) that secures the EVIC switch to the steering wheel (2) and position it out of the way.
8. Carefully disconnect the remote radio switch connector (4) from the steering wheel wire harness connector (3).

Fig. 50: Steering Wheel & Connector
Courtesy of CHRYSLER GROUP, LLC

9. Carefully pull the remote radio switch connector (1) through the opening in the steering wheel (2) and remove the remote radio switch (with or without paddle shift unit).

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbags, airbag curtains, knee blocker, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect the IBS/negative battery cable assembly from the negative battery post, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

Fig. 51: Steering Wheel & Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Without paddle shift shown, with paddle shift similar.**

1. From the back of the steering wheel, push the remote radio switch connector (1) through the opening in the steering wheel (2).

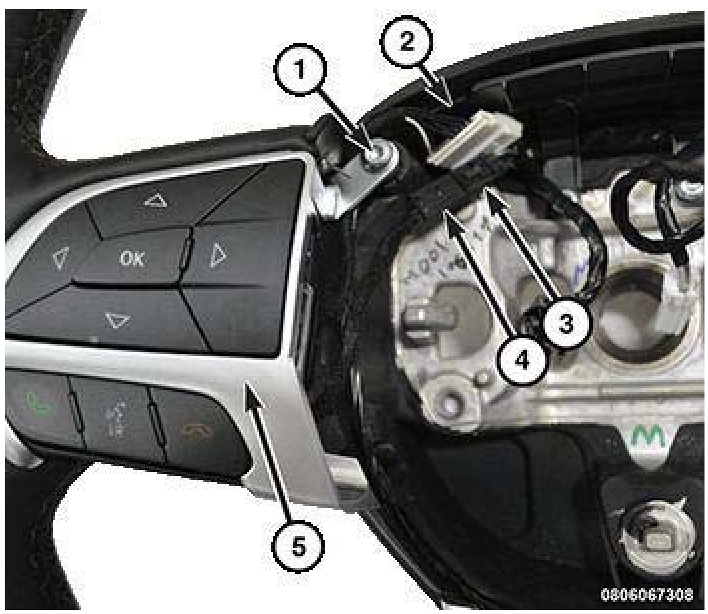


Fig. 52: EVIC Switch, Screw & Connectors
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Make sure that the wire harnesses for the remote radio switch (with or without paddle shift unit) and Electronic Vehicle Information Center (EVIC) switch wiring harness line up with the space provided, as noted during removal, for the wire harnesses before fully seating the EVIC switch in the steering wheel spoke armature.**

2. Connect the remote radio switch connector (4) to the steering wheel wire harness connector (3).
3. Position and carefully seat the EVIC switch (5) and wire harnesses to the steering wheel spoke armature.
4. Install and securely tighten the front screw (1) for the EVIC switch (5) to the steering wheel (2).

Fig. 53: EVIC Switch Screw - Back Of Steering Wheel
Courtesy of CHRYSLER GROUP, LLC

5. From the back of the steering wheel (1), install the rear EVIC switch screw (2) and securely tighten the screw.

Fig. 54: Remote Radio Switch & Screw
Courtesy of CHRYSLER GROUP, LLC

6. Position and carefully seat the remote radio switch (with or without paddle shift unit) to the steering wheel spoke armature.
7. Install and securely tighten the screw (1) that secures the remote radio switch (2) (with or without paddle

shift unit) to the steering wheel spoke armature.

Fig. 55: Steering Wheel & Remote Radio Switch Cover
Courtesy of CHRYSLER GROUP, LLC

8. Install the remote radio switch cover (1) (with or without paddle shift unit). Make sure that the cover is snapped securely into place.
9. Install the Driver air bag in the steering wheel. Refer to **AIR BAG, DRIVER, INSTALLATION** .
10. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

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Article GUID: A00735924

DESCRIPTION

HEATED STEERING WHEEL

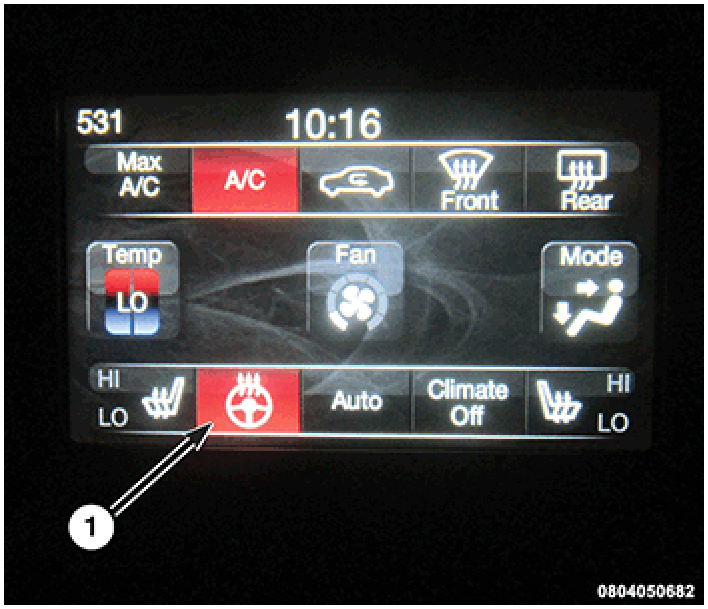


Fig. 1: Heated Steering Wheel Switch
Courtesy of CHRYSLER GROUP, LLC

The heated steering wheel system is designed to enhance the thermal comfort of the driver by heating the steering wheel, when desired. The steering wheel heating element is made of copper wire and is sandwiched between the leather and the substrate material of the steering wheel. A vehicle with a heated steering wheel can easily be identified by the heated steering wheel switch (1) located in the U-Connect Touch ™ screen module, at the center of the instrument panel. When the heated steering wheel switch is pressed on, the heated steering wheel switch illuminates.

The heated steering wheel system consists of the following major components

- **Heated Steering Wheel Switch** - Refer to **SWITCH, HEATED STEERING WHEEL, DESCRIPTION**.
- **Heated Seat Module** - Refer to **MODULE, HEATED SEAT, DESCRIPTION** .
- **Heated Steering Wheel** - Refer to **OPERATION**.

VENTED SEATS

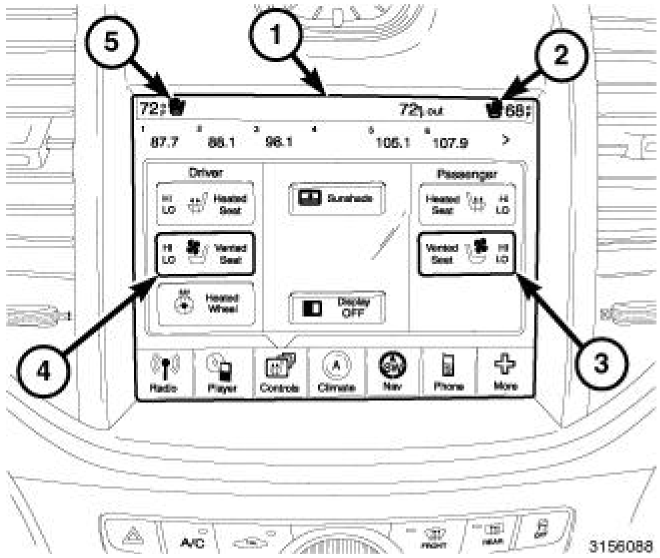


Fig. 2: U-Connect Touch (TM) Screen Module
Courtesy of CHRYSLER GROUP, LLC

The vented seat system is designed to enhance the thermal comfort of the driver and front seat occupant, when desired. Occupant comfort is achieved by pulling air from the outside of the seating surfaces into the seat back and cushion of the seat. Vehicles with the optional vented seat system can be visually identified by the two vented seat switches (3 and 4) located in the U-Connect Touch™ screen module (1), in the center of the instrument panel. The vented seat system allows a ventilated seat occupant to select from two different levels of seat venting (HI and LO).

The vented seat system consist of the following major components:

- **Vented Seat Motors** - Up to four vented seat motors are used per vehicle. Two vented seat motors for each front seat, one for the seat back cushion and the other for the seat bottom cushion.
- **Vented Seat Pads** - Up to four vented seat pads are used per vehicle. Two vented seat pads for each front seat, one on the seat back cushion and the other on the seat bottom cushion.
- **Vented Seat Switches** - Two vented seat switches are used per vehicle, one for each front seat. The vented seat switches are integral to the U-Connect Touch™ screen module and communicate over the Controller Area Network (CAN) data bus. Refer to **SWITCH, VENTED SEAT, DESCRIPTION**.
- **Heated Seat Module** - Refer to **MODULE, HEATED SEAT, DESCRIPTION** .

OPERATION

HEATED STEERING WHEEL

Steering Wheel Switch

- Once the switch is pressed, the switch will illuminate and an International Standards Organization (ISO) symbol appears in to top corner of the U-Connect Touch™ screen module, indicating that the heating element in the steering wheel is operating.
- Pressing the switch while the heated steering wheel is on, will turn the heating steering wheel off.
- When the heated steering wheel switch is pressed and a fault is present in the heated steering wheel system, the switch will illuminate for two seconds and then immediately turn off.

- The heated steering wheel switch located in the U-Connect Touch™ screen module cannot be adjusted or repaired. If a heated steering wheel switch or indicator lamp is inoperative or damaged, the entire U-Connect Touch™ screen module must be replaced.

Heated Seat Module (HSM)

- The HSM provides power to the heated steering wheel heating elements in the steering wheel. This output passes through the Steering Column Control Module (SCCM).
- The SCCM is the interface between the heated steering wheel and the vehicle.
- Body Control Module (BCM) gates messages between the CAN C bus and the CAN IHS bus. Additionally the BCM provides vehicle information to the HSM.
- A thermistor sensor feedback from the heated steering wheel element to the HSM is used to regulate the heat output to prevent the heated steering wheel temperature from rising above the set points.
- The heated steering wheel system will only operate when the vehicle engine is running approximately (RPM > 400).
- The HSM will automatically transition the output from On to Off after a period of 80 minutes has elapsed.

Steering Wheel Thermistor Feedback

- The steering wheel switch receives the steering wheel thermistor data from the heated steering wheel.
- The steering wheel switch transmits the steering wheel thermistor data signal via a LIN bus to the BCM.
- The BCM transmits the steering wheel thermistor data signal to the HSM on the CAN IHS bus.
- When the HSM heated steering wheel output is ON, if the thermistor feedback exceeds 122 degrees Fahrenheit the HSM will immediately turn the heated steering wheel output off.

Auto On Feature

- The "Auto On" feature is a customer configurable feature that, when enabled, will activate the driver heated seat and heated steering wheel on engine start based on ambient temperature.
- If Auto On feature is enabled, and the ambient temperature is at or below 4Â° C (40Â° F) the HSM will activate the driver heated seat and heated steering wheel feature at the high level after engine start.
- This feature also works with Remote Start.

The heated steering wheel system is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** . The steering wheel heating element is not serviced separately from the steering wheel and if inoperative or damaged, the entire steering wheel assembly must be replaced. Refer to **WHEEL, STEERING, REMOVAL** .

VENTED SEATS

Vented Seat Switch

- The vented seat switches located in the U-Connect Touch ™ screen module.
- When the vented seat switch is selected, a CAN-IHS message is delivered to the HSM to operate the vented seat system.
- The vented seats have two selectable speeds with a hidden intermediate speed.

- There are two selectable speeds for the vented motors. These speeds are selected by the driver and/or front passenger by pressing the vented seat switches, located in the U-Connect Touch™ screen module.

Heated Seat Module

- The HSM provides the vented seat motors with a variable Pulse Width Modulated (PWM) signal used to control the brushless fan seat motors.
- The HSM supplies a PWM control circuit to the motors for varied fan output levels.
- The vented seat system will only operate when the vehicle engine is running (EngRPM > 400).
- The HSM will not activate the vented seat output if the heated seat output is active for the same seat.
- The HSM has the ability to control the front left and front right seat outputs individually.
- **Auto On Feature** The Auto On feature is a customer configurable feature that when enabled will activate the driver vented seat on engine start based on ambient temperature. If Auto On feature is enabled, and the ambient temperature is at or above 27Â° C (80Â° F) the HSM will activate the driver vented seat in LOW mode. This feature also works when using remote start. During remote start operation, vented seat is ON in the HIGH mode. Once operator depresses ignition switch into RUN state, vented seat mode switches to LOW setting.

Vented Seat Motor

- The vented seat motor located in the seat bottom pan or in the seat back frame cannot be adjusted or repaired and must be replaced if inoperative or damaged. Refer to **MOTOR, VENTED SEAT, REMOVAL**.
- When the HSM determines a vent output is shorted or fully open the HSM immediately turns the affected vented seat outputs off and matures the appropriate diagnostic trouble code (DTC). Refer to **DIAGNOSIS AND TESTING** .

The vented seat system is diagnosed using a scan tool. The individual front vented seat switches located in the U-Connect Touch ™ screen module cannot be adjusted or repaired. If a front vented seat switch or indicator is inoperative or damaged, the entire U-Connect Touch ™ screen module must be replaced.

DIAGNOSIS AND TESTING

HEATED STEERING WHEEL

NOTE: **Vehicles equipped with the heated steering wheel option utilize a low voltage cut-off feature. This feature turns off power to the heated steering wheel anytime vehicle voltage is below 9.0 volts or above 16.0 volts. Be certain to check the vehicle electrical system for proper voltage anytime the heated steering wheel appears inoperative.**

NOTE: **If a Diagnostic Trouble Code (DTC) can not be verified, it is a good indication that an INTERMITTENT fault condition may be present. To help find an intermittent problem, move the steering wheel around while testing continuity. Also wiggle the heated steering wheel wire harness and electrical connectors while testing continuity.**

NOTE: **For complete circuit diagrams, refer to appropriate SYSTEM WIRING DIAGRAMS article . Wiring Information includes wiring diagrams, connector pin-out and location views, details of wire harness routing and retention, splice and ground locations and proper wire and connector repair procedures.**

NOTE: **The Auto On feature is designed to function at an ambient temperature of 40Â° F or below. Make sure this option is enabled in the customer programmable interface prior to diagnosis of an inoperative Auto On feature concern.**

Before testing any individual components in the heated steering wheel system, check the following:

- Check the ignition fuse in the Power Distribution Center (PDC). Repair as necessary.
- Using a scan tool, check for any Diagnostic Trouble Codes (DTCs) related to the Heated Seat Module (HSM), U-Connect Touch ™ screen module and the Electronic Gateway (EGW). If any DTCs are found, repair as necessary.
- Check the vehicles battery open-circuit voltage and charging system performance. If the vehicle's electrical system is defective or weak it may not be supplying sufficient energy to operate the heated steering wheel system.
- If there are no DTCs and the heated steering wheel system functions properly, but the heated steering wheel indicator does not illuminate, the entire U-Connect Touch ™ screen module must be replaced.

VENTILATED SEATS

NOTE: **Vehicles equipped with the ventilated seat option utilize a low voltage cut-off feature. This feature turns off power to the ventilated seat system anytime vehicle voltage is below 9.0 volts or above 16.0 volts. Be certain to check the vehicle electrical system for proper voltage anytime the ventilated seat system appears inoperative.**

NOTE: **If a Diagnostic Trouble Code (DTC) can not be verified, it is a good indication that an INTERMITTENT fault condition may be present. To help find an intermittent problem, sit in the seat in question and move around within the seat while testing continuity. Also wiggle the ventilated seat wire harness and electrical connectors while testing continuity.**

NOTE: **For complete circuit diagrams, refer to appropriate SYSTEM WIRING DIAGRAMS article . Wiring Information includes wiring diagrams, connector pin-out and location views, details of wire harness routing and retention, splice and ground locations.**

Before testing any individual components in the ventilated seat system, check the following:

- Check the ignition fuse in the Power Distribution Center (PDC). Repair as necessary.
- Using a scan tool, check for any Diagnostic Trouble Codes (DTCs) related to the Heated Seat Module (HSM), U-Connect Touch ™ screen module and the Electronic Gateway (EGW). If any DTCs are found, repair as necessary.
- Check the vehicles battery open-circuit voltage and charging system performance. If the vehicle's

electrical system is defective or weak it may not be suppling sufficient energy to operate the front vented seat system.

- If there are no DTCs and the front vented seat system functions properly, but a vented seat indicator does not illuminate, the entire U-Connect Touch ™ screen module must be replaced.

MOTOR, VENTED SEAT

DESCRIPTION

DESCRIPTION

When equipped, each front seat has two vented seat motors. One motor is mounted to the seat back frame and the second motor is mounted to the seat bottom pan. Each vented seat motor is attached to a vented seat pad. Each vented seat motor consists of a 12 volt Direct Current (DC) motor with an integral fan blade and a wire lead and connector. Each vented seat motor is attached to a metal mounting bracket. Each motor is serviced individually by replacement only.

OPERATION

OPERATION

Refer to **OPERATION**.

REMOVAL

SEAT BACK VENTED MOTOR

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury. Refer to WARNING .

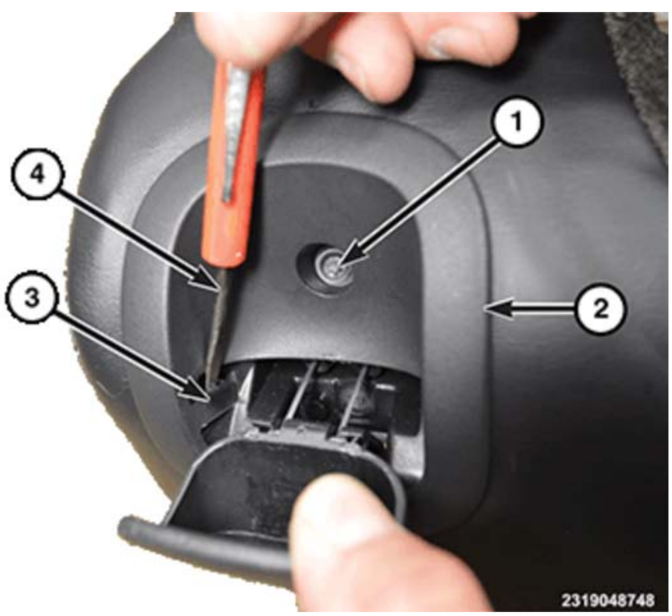


Fig. 3: Seat Back Release Cable Bezel, Tabs, Tool & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, FRONT, WARNING** .
2. Remove the front seat back. Refer to **SEAT BACK, FRONT, REMOVAL** .
3. Remove the front seat back panel. Refer to **PANEL, SEAT BACK, FRONT, REMOVAL** .
4. Remove the screw (1) from the seat back release cable bezel (2).
5. Using a small bladed tool (4), release the tabs (3) and remove the seat back release cable bezel.

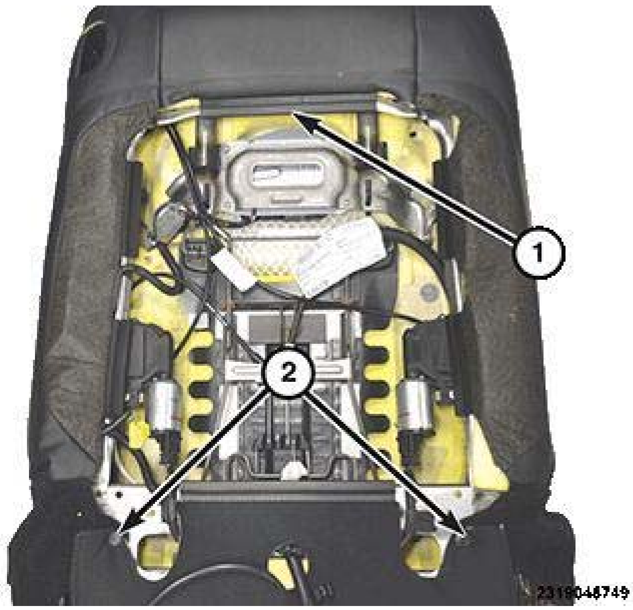
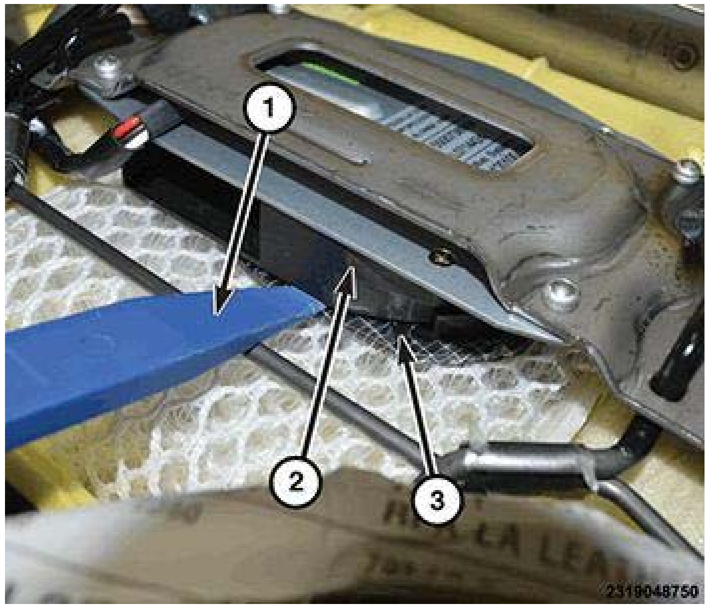


Fig. 4: J-Clip Retainers & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Remove the two push fasteners (2).
7. Release all the J-clip retainers (1).

[Fig. 5: Headrest Sleeve & Tab](#)
Courtesy of CHRYSLER GROUP, LLC

8. Reach up behind the seat back cover and push the tab (1) of the headrest sleeve (2) and pull out to remove.



[Fig. 6: Prying Seat Back Ventilation Plenum](#)
Courtesy of CHRYSLER GROUP, LLC

9. Using a trim stick (1) of equivalent, pry the seat back ventilation plenum (3) from the seat back blower (2), if equipped.
10. Remove the seat back foam and seat back cover as an assembly, from the seat back frame.

[Fig. 7: Vented Seat Motor Connector](#)
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the vented seat motor electrical connector (1) from the wiring harness.

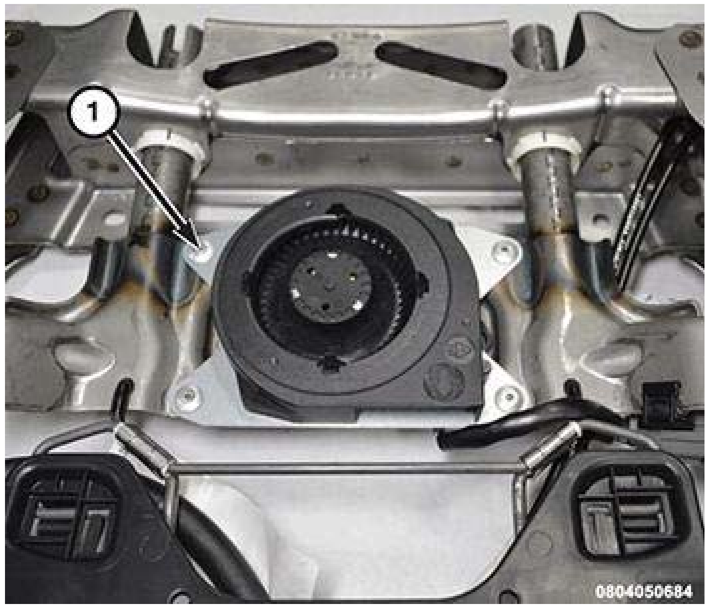


Fig. 8: Vented Seat Motor Rivet
Courtesy of CHRYSLER GROUP, LLC

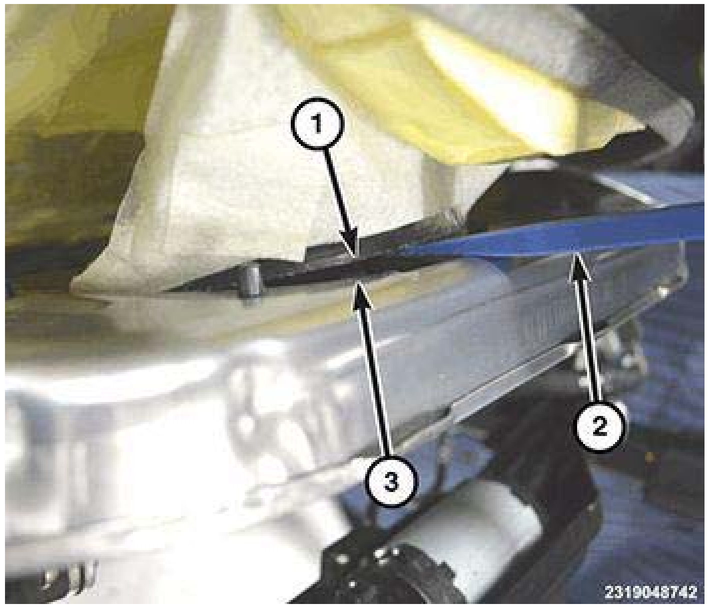
12. Drill out the four rivets (1) to remove the vented seat motor from the bracket mount.

SEAT BOTTOM VENTED MOTOR

WARNING: **Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury. Refer to WARNING .**

NOTE: **On all models, the front passenger seat contains an Occupant Detection Sensor (ODS) to provide information to the Occupant Restraint Controller (ORC). When servicing the front passenger seat, if required, remove the ODS from the seat bottom cushion and discard the sensor. Refer to SENSOR, OCCUPANT DETECTION, REMOVAL .**

1. Remove the seat bottom cover and cushion. Refer to **COVER, SEAT CUSHION, FRONT, REMOVAL** .

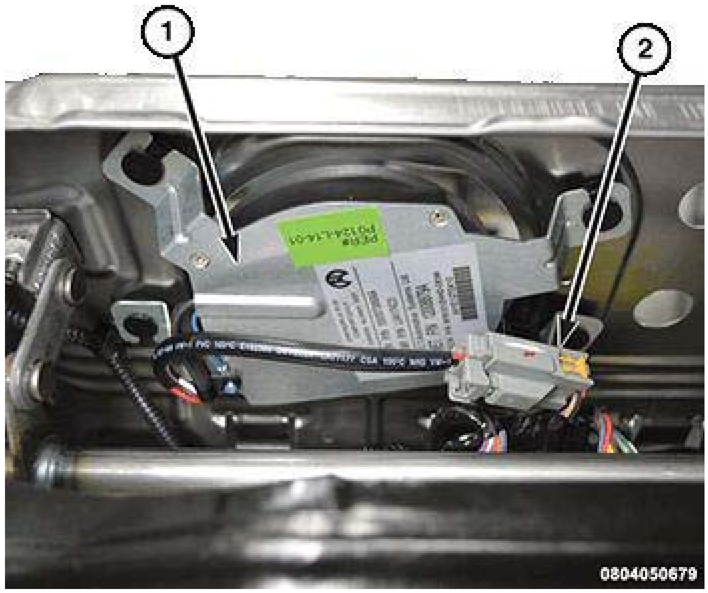


[Fig. 9: Prying Seat Cushion Ventilation Plenum From Seat Cushion Blower]
Courtesy of CHRYSLER GROUP, LLC

2. Carefully unwrap the cover and foam at the front of the seat cushion. Using a trim stick (2) or equivalent, release the seat cushion ventilation plenum (1) from the seat cushion blower (3), if equipped.

[Fig. 10: Seat Cushion Ventilation Plenum]
Courtesy of CHRYSLER GROUP, LLC

3. Lift the seat cushion ventilation plenum (1) away from the vented seat motor.



[**Fig. 11: Vented Seat Motor Electrical Connector**]
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the vented seat motor electrical connector (2) from the wiring harness.

[**Fig. 12: Vented Seat Motor Tabs**]
Courtesy of CHRYSLER GROUP, LLC

5. Break the four tabs (1) securing the vented seat motor to the seat bottom frame.

INSTALLATION

SEAT BACK VENTED MOTOR

WARNING: **Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further**

diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury. Refer to WARNING .

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, FRONT, WARNING** .

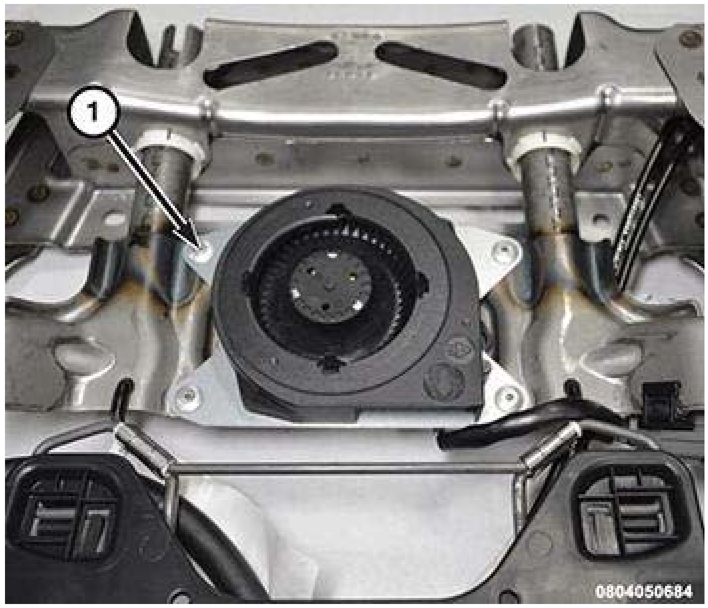


Fig. 13: Vented Seat Motor Rivet
Courtesy of CHRYSLER GROUP, LLC

2. Position the vented seat motor to the bracket. Using a rivet gun, secure the vented seat motor into position.

Fig. 14: Vented Seat Motor Connector
Courtesy of CHRYSLER GROUP, LLC

3. Connect the electrical harness connector (1) to the vented seat motor.

4. Install the seat back cushion and cover. Refer to **SEAT BACK, FRONT, INSTALLATION** .

SEAT BOTTOM VENTED MOTOR

WARNING: **Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury. Refer to WARNING .**

NOTE: **On all models, the front passenger seat contains an Occupant Detection Sensor (ODS) to provide information to the Occupant Restraint Controller (ORC).**

Fig. 15: Vented Seat Motor Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Install the vented seat motor to the seat bottom frame using the new plastic tabs (1).
2. Position the cushion assembly onto the seat adjuster.

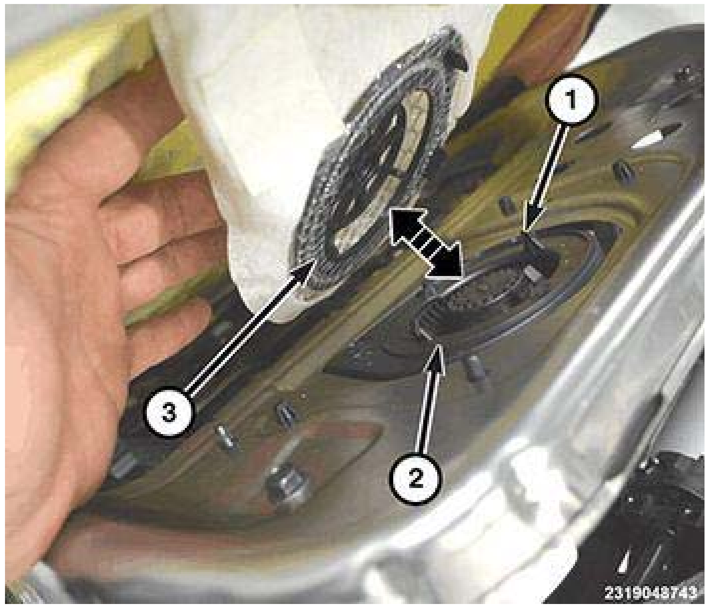


Fig. 16: Aligning Seat Cushion Ventilation Plenum With Tabs
Courtesy of CHRYSLER GROUP, LLC

3. Align the seat cushion ventilation plenum (3) with the tabs (1) on the seat cushion blower (2) and snap into place, if equipped.

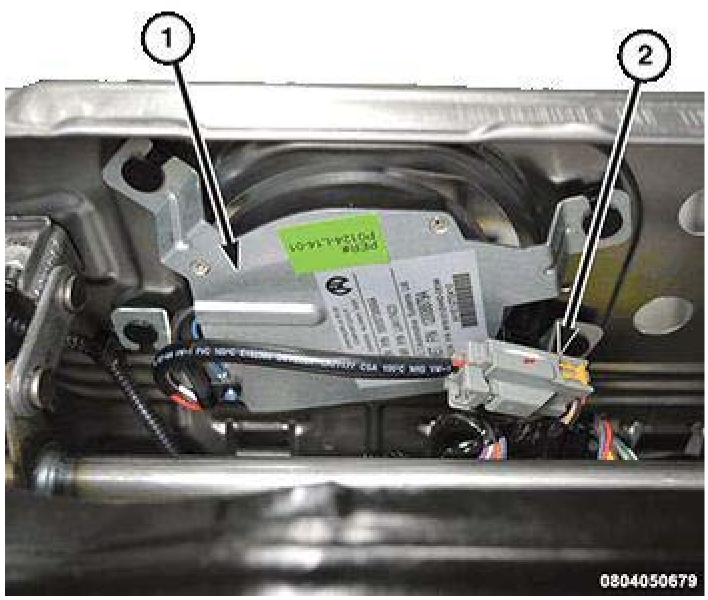


Fig. 17: Vented Seat Motor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

4. Connect the wiring harness to the vented seat connector (1).
5. Install the seat back cushion and cover. Refer to **COVER, SEAT CUSHION, FRONT, INSTALLATION** .

SWITCH, HEATED STEERING WHEEL

DESCRIPTION

DESCRIPTION

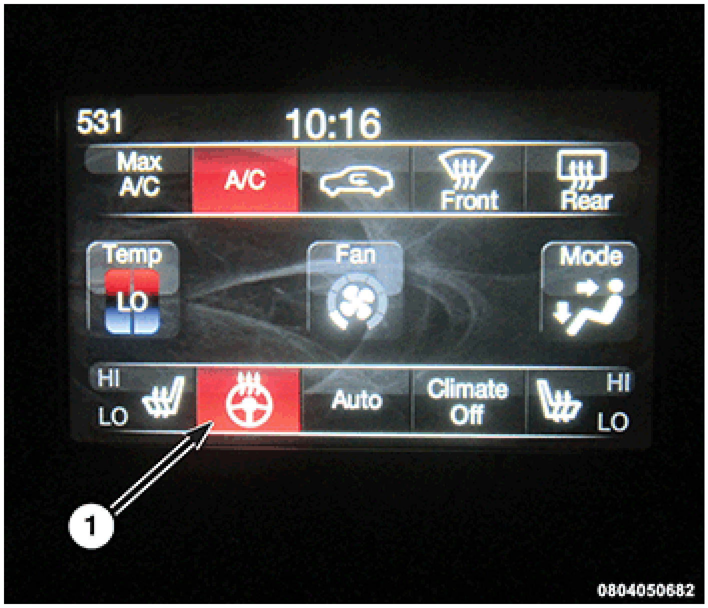


Fig. 18: Heated Steering Wheel Switch
Courtesy of CHRYSLER GROUP, LLC

The switch (1) for the optional heated steering wheel is located in the U-Connect Touch ™ screen module, at the center of the instrument panel. When the heated steering wheel switch is pressed on, the heated steering wheel switch illuminates.

OPERATION

OPERATION

Refer to OPERATION.

SWITCH, VENTED SEAT

DESCRIPTION

DESCRIPTION

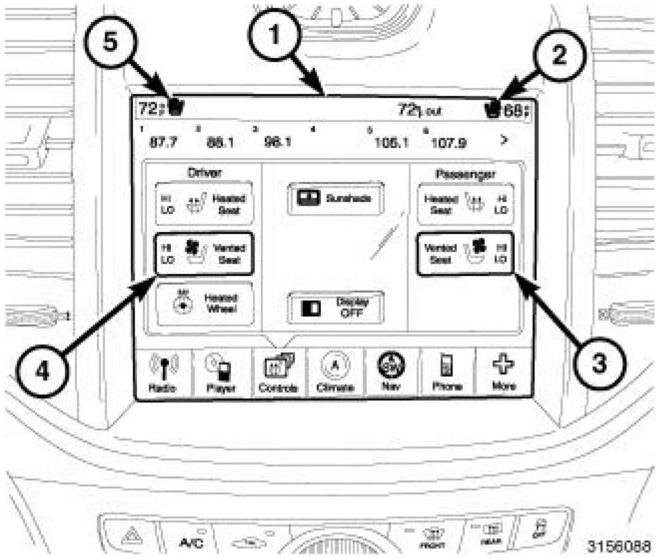


Fig. 19: U-Connect Touch (TM) Screen Module
Courtesy of CHRYSLER GROUP, LLC

The switches (3 and 4) for the optional front vented seat system are located in the U-Connect Touch ™ screen module (1), at the center of the instrument panel. The vented seat system allows the driver and front seat passenger to select from two different speed of electrical seat ventilation (HI and LO). When the vented seat switches are pressed on, each switch illuminates either HI or LO, and an International Standards Organization (ISO) symbol (2 and 5) appears at the top of the U-Connect Touch ™ screen module. Pressing a vented seat switch once will select HI. Pressing the same switch a second time will select LO. Pressing the switch a third time will turn the ventilating function of the seat off.

OPERATION

OPERATION

Refer to **OPERATION**.

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Article GUID: A00735965

2015-16 ENGINE

Cooling System - Challenger

DESCRIPTION

DESCRIPTION

The engine cooling system regulates engine operating temperature. It allows the engine to reach normal operating temperature as quickly as possible, maintains normal operating temperature and prevents overheating.

The engine cooling system also provides a means of heating the passenger compartment. The cooling system is pressurized and uses a centrifugal water pump to circulate coolant throughout the system. A separate and remotely mounted coolant bottle is used.

The 6.2L engine has a secondary closed loop cooling system. For more information, refer to SUPERCHARGER SYSTEM, DESCRIPTION.

OPERATION

OPERATION

The cooling system regulates engine operating temperature. It allows the engine to reach normal operating temperature as quickly as possible. It also maintains normal operating temperature and prevents overheating.

The cooling system also provides a source of hot coolant for heating the passenger compartment and cooling the automatic transmission fluid (if equipped). The cooling system is pressurized and uses a centrifugal water pump to circulate coolant throughout the system.

- When engine is cold and the thermostat is closed, the cooling system has no flow through the radiator. The coolant flows through the engine, water pump, and heater.
- When engine is warm and the thermostat is open, coolant flows through the engine, radiator, heater, and water pump.

DIAGNOSIS AND TESTING

PRELIMINARY CHECKS

ENGINE COOLING SYSTEM OVERHEATING

Establish what driving conditions caused the complaint. Abnormal loads on the cooling system such as the following may be the cause:

- Prolonged idle
- Debris blocking the grill or cooling module
- Slight tail wind at idle
- Slow traffic
- Traffic jams

- High speed
- Trailer towing
- Steep grades
- Any accessory addition that fully or partially blocks the grille opening

RECENT SERVICE OR ACCIDENT REPAIR:

Determine if any recent service has been performed on vehicle that may effect cooling system. This may be:

- Slipping engine accessory drive belt(s)
- Brakes (possibly dragging)
- Changed parts. Incorrect water pump, or pump rotating in wrong direction due to belt not correctly routed
- Reconditioned radiator or cooling system refilling (possibly under filled or air trapped in system).

NOTE: **If investigation reveals none of the previous items as a cause for an engine overheating complaint, refer to the following COOLING SYSTEM DIAGNOSIS CHART.**

These charts are to be used as a quick-reference only. Refer to the appropriate service information text for information.

COOLING SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
TEMPERATURE GAUGE READS LOW	1. Has a Diagnostic Trouble Code (DTC) been set indicating a stuck open thermostat?	1. For On-Board Diagnostics and DTC information, refer to DESCRIPTION . Replace thermostat if necessary.
	2. Is the temperature sending unit connected?	2. Check the temperature sensor connector. Repair connector if necessary.
	3. Is the temperature gauge operating OK?	3. Check gauge operation. Repair as necessary.
	4. Coolant level low in cold ambient temperatures accompanied with poor heater performance.	4. Check coolant level in the coolant reserve/overflow tank and the radiator. Inspect system for leaks. Repair leaks as necessary.
TEMPERATURE GAUGE READS HIGH OR THE COOLANT LAMP ILLUMINATES. COOLANT MAY OR MAY NOT BE LOST OR LEAKING FROM THE COOLING SYSTEM	1. Trailer is being towed, a steep hill is being climbed, vehicle is operated in slow moving traffic, or engine is being idled with very high ambient (outside) temperatures and the air conditioning is on. Higher altitudes could aggravate these conditions.	1. This may be a temporary condition and repair is not necessary. Turn off the air conditioning and attempt to drive the vehicle without any of the previous conditions. Observe the temperature gauge. The gauge should return to the normal range. If the gauge does

CONDITION	POSSIBLE CAUSES	CORRECTION
		not return to the normal range, determine the cause for overheating and repair.
	2. Is the temperature gauge reading correctly?	2. Check gauge. Refer to **DIAGNOSIS AND TESTING** .
	3. Is the temperature warning illuminating unnecessarily?	3. Check warning lamp operation. Refer to **DIAGNOSIS AND TESTING** .
	4. Coolant low in coolant reserve/overflow tank and radiator?	4. Check for coolant leaks and repair as necessary. Refer to **DIAGNOSIS AND TESTING**.
	5. Pressure cap not installed tightly. If cap is loose, boiling point of coolant will be lowered. Also refer to the following STEP 6.	5. Tighten the pressure cap.
	6. Poor seals at the radiator cap.	6. (a) Check condition of cap and cap seals. Refer to **CAP, RADIATOR, DIAGNOSIS AND TESTING**.
		(b) Check condition of radiator filler neck. If neck is bent or damaged, replace radiator.
	7. Coolant level low in radiator but not in coolant reserve/overflow tank. This means the radiator is not drawing coolant from the coolant reserve/overflow tank as the engine cools.	7. (a) Check condition of radiator cap and cap seals. Refer to **CAP, RADIATOR, DIAGNOSIS AND TESTING**.
		(b) Check condition of radiator filler neck. If neck is bent or damaged, replace radiator.
		(c) Check condition of the hose from the radiator to the coolant tank. It should fit tight at both ends without any kinks or tears. Replace hose if necessary.
		(d) Check coolant reserve/overflow tank and tanks hoses for blockage. Repair as necessary.
	8. Incorrect coolant concentration.	8. Check coolant/water mixture ratio. Refer to **COOLANT, DESCRIPTION**.
	9. Coolant not flowing through system.	9. Check for coolant flow with some coolant removed, engine warm and thermostat open. If

CONDITION	POSSIBLE CAUSES	CORRECTION
		flow is not observed, determine area of obstruction and repair as necessary.
	10. Radiator or A/C condenser fins are dirty or clogged.	10. Remove insects and debris from radiator or A/C Condenser fins.
	11. Radiator core is corroded or plugged.	11. Have radiator re-cored or replaced.
	12. Aftermarket A/C installed without proper radiator.	12. Install proper radiator.
	13. Fuel or ignition system problems.	13. Refer to FUEL and/or IGNITION CONTROL for diagnosis. See **FUEL SYSTEM** or **IGNITION SYSTEM** .
	14. Dragging brakes.	14. Check and correct as necessary.
	15. Bug screen or cardboard is being used, reducing airflow.	15. Remove bug screen or cardboard.
	16. Thermostat partially or completely shut.	16. Check thermostat operation and replaces necessary.
	17. Cylinder head gasket leaking.	17. Check for cylinder head gasket leaks. Refer to **DIAGNOSIS AND TESTING**. For repair, refer to **CYLINDER HEAD, REMOVAL** for 3.6L, **CYLINDER HEAD, REMOVAL** for 5.7L, **CYLINDER HEAD, REMOVAL** for 6.2L or **CYLINDER HEAD, REMOVAL** for 6.4L.
	18. Cooling fan operation failure.	18. (a) Check for possible blow fuse. Replace as necessary.
		(b) Check for power at the fan. Repair as necessary.
		(c) Fan motor failure. Repair as necessary.
	19. Heater core leaking.	19. Check heater core for leaks. Refer to **CORE, HEATER, REMOVAL** . Repair as necessary.
TEMPERATURE GAUGE READING IS INCONSISTENT (FLUCTUATES, CYCLES OR IS ERRATIC)	1. During cold weather operation, with the heater blower in the high position, the	1. A normal condition. No correction is necessary.

CONDITION	POSSIBLE CAUSES	CORRECTION
	gauge reading may drop slightly.	
	2. Temperature gauge or engine mounted gauge sensor defective or shorted. Also, corroded or loose wiring in this circuit.	2. Check operation of gauge and repair if necessary. Refer to **DIAGNOSIS AND TESTING** .
	3. Gauge reading rises when vehicle is brought to a stop after heavy use (engine still running).	3. A normal condition. No correction is necessary. Gauge should return to normal range after vehicle is driven.
	4. Gauge reading high after re-starting a warmed up (hot) engine.	4. A normal condition. No correction is necessary. The gauge should return to normal range after a few minutes of engine operation.
	5. Coolant level low in radiator (air will build up in the cooling system causing the thermostat to open late).	5. Check and correct coolant leaks. Refer to **DIAGNOSIS AND TESTING**.
	6. Cylinder head gasket leaking allowing exhaust gas to enter cooling system causing a thermostat to open late.	6. (a) Check for cylinder head gasket leaks. Refer to **DIAGNOSIS AND TESTING**.
		(b) Check for coolant in the engine oil. Inspect for white steam emitting from the exhaust system. Repair as necessary.
	7. Water pump impeller loose on shaft.	7. Check water pump and replace as necessary.
	8. Loose accessory drive belt. (water pump slipping).	8. Check and repair as necessary. Refer to **BELT, SERPENTINE, DIAGNOSIS AND TESTING**.
	9. Air leak on the suction side of the water pump allows air to build up in cooling system causing thermostat to open late.	9. Locate leak and repair as necessary.
PRESSURE CAP IS BLOWING OFF STEAM AND/OR COOLANT TO COOLANT TANK. TEMPERATURE GAUGE READING MAY BE ABOVE NORMAL BUT NOT HIGH. COOLANT LEVEL MAY BE HIGH IN COOLANT RESERVE/OVERFLOW TANK	1. Pressure relief valve in radiator cap is defective.	1. Check condition of radiator cap and cap seals. Refer to **CAP, RADIATOR, DIAGNOSIS AND TESTING**.

CONDITION	POSSIBLE CAUSES	CORRECTION
COOLANT LOSS TO THE GROUND WITHOUT PRESSURE CAP BLOWOFF. GAUGE READING HIGH OR HOT	1. Coolant leaks in radiator, cooling system hoses, water pump or engine.	1. Pressure test and repair as necessary. Refer to **DIAGNOSIS AND TESTING**.
DETONATION OR PRE-IGNITION (NOT CAUSED BY IGNITION SYSTEM). GAUGE MAY OR MAY NOT BE READING HIGH	1. Engine overheating.	1. Check reason for overheating and repair as necessary.
	2. Freeze point of coolant not correct. Mixture is too rich or too lean.	2. Check coolant concentration and adjust ratio as required. Refer to **COOLANT, DESCRIPTION**.
HOSE OR HOSES COLLAPSE WHILE ENGINE IS RUNNING	1. Vacuum created in cooling system on engine cool-down is not being relieved through coolant reserve/overflow system.	1. (a) Radiator cap relief valve stuck. Refer to **CAP, RADIATOR, DIAGNOSIS AND TESTING**. Replace if necessary.
		(b) Hose between coolant reserve/overflow tank and radiator is kinked. Repair as necessary.
		(c) Vent at coolant reserve/overflow tank is plugged. Clean vent and repair as necessary.
		(d) Reserve/overflow tank is internally blocked or plugged. Check for blockage and repair as necessary.
INADEQUATE HEATER PERFORMANCE.	1. Thermostat failed in open position.	1. Check thermostat operation and replace if necessary.
	2. Has a Diagnostic trouble Code (DTC) been set?	2. Refer to the appropriate diagnostic service information.
	3. Coolant level low.	3. Refer to **DIAGNOSIS AND TESTING**.
	4. Obstructions in heater hose/fittings.	4. Remove heater hoses at both ends and check for obstructions
	5. Heater hose kinked.	5. Locate kinked area and repair as necessary
	6. Obstruction in the heater core. When the engine is fully warmed up, both heater hoses should be hot to the touch. If only one of the hoses is hot, the heater core may be plugged.	6. If heater core obstruction is detected, for cooling system reverse flushing. Refer to **STANDARD PROCEDURE**.

CONDITION	POSSIBLE CAUSES	CORRECTION
STEAM IS COMING FROM THE FRONT OF VEHICLE NEAR THE GRILL AREA WHEN WEATHER IS WET, ENGINE IS WARMED UP AND RUNNING, AND VEHICLE IS STATIONARY. TEMPERATURE GAUGE IS IN NORMAL RANGE	1. During wet weather, moisture (snow, ice or rain condensation) on the radiator will evaporate when the thermostat opens. This opening allows heated water into the radiator. When the moisture contacts the hot radiator, steam may be emitted. This usually occurs in cold weather with no fan or airflow to blow it away.	1. Occasional steam emitting from this area is normal. No repair is necessary.
COOLANT COLOR	1. Coolant color is not necessarily an indication of adequate corrosion or temperature protection. Do not rely on coolant color for determining condition of coolant.	1. for coolant concentration information. Refer to **COOLANT, DESCRIPTION**. Adjust coolant mixture as necessary.
COOLANT LEVEL CHANGES IN COOLANT RESERVE/OVERFLOW TANK. TEMPERATURE GAUGE IS IN NORMAL RANGE	1. Level changes are to be expected as coolant volume fluctuates with engine temperature. If the level in the tank was between the FULL and ADD marks at normal operating temperature, the level should return to within that range after operation at elevated temperatures.	1. A normal condition. No repair is necessary.
FAN RUNS ALL THE TIME	1. Fan control sensors inoperative.	1. Check for DTC's. Verify sensor readings.
	2. Fan control relay stuck "on".	2. Check fan operation speeds. Refer to the appropriate Electrical Diagnostic article. .
	3. Fan control relay harness damaged.	3. Check for DTC 1499. Repair as required.
	4. Transmission temperature too high.	4. Check for transmission over temp. DTC.
	5. Engine coolant temperature too high. **NOTE:** **When the A/C system is in use, the fans will**	5. (a) Check coolant level. Correct level as required.
		(b) Thermostat stuck. Replace thermostat.
		(c) Water pump failed. Replace water pump.
		(d) Coolant flow restricted. Clean radiator.

CONDITION	POSSIBLE CAUSES	CORRECTION
	remain on.	(e) Air flow over radiator obstructed. Remove obstruction.
	6. A/C compressor circuit ON.	6. Single fan may run continuously with A/C on or on dual fan systems both may be activated under certain conditions.

COOLING SYSTEM LEAKS

ULTRAVIOLET LIGHT METHOD

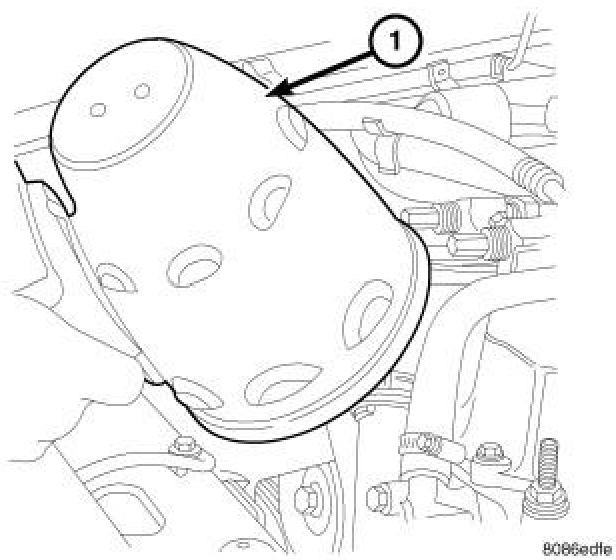


Fig. 1: Ultraviolet Light
Courtesy of CHRYSLER GROUP, LLC

1 - TYPICAL BLACK LIGHT TOOL

A leak detection additive is available through the parts department that can be added to cooling system. The additive is highly visible under ultraviolet light (black light). Pour one ounce of additive into cooling system. Place heater control unit in HEAT position. Start and operate engine until radiator upper hose is warm to touch. Aim the commercially available black light tool at components to be checked. If leaks are present, black light will cause additive to glow a bright green color.

The black light can be used in conjunction with a pressure tester to determine if any external leaks exist.

PRESSURE TESTER METHOD

The engine should be at normal operating temperature. Recheck the system cold if cause of coolant loss is not located during the warm engine examination.

WARNING: Hot, pressurized coolant can cause injury by scalding.

Carefully remove the radiator pressure cap and check the coolant level. Wipe the inside of the filler neck and

examine the lower inside sealing seat for nicks, cracks, paint, dirt and residue. Inspect the coolant hoses for internal obstructions. Insert a wire through the hose to be sure it is not obstructed.

Inspect the outside of the filler neck. If damaged, seating of the pressure cap valve and tester seal will be affected.

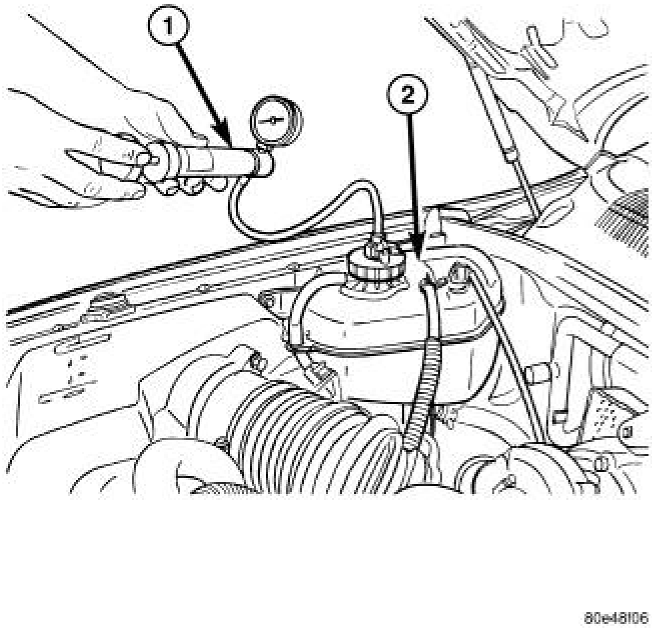


Fig. 2: Cooling Pressure Tester & Pressurized Coolant Bottle
Courtesy of CHRYSLER GROUP, LLC

Attach the SVT275 cooling pressure tester (1) available from MoparÃ® Service Equipment, or an equivalent pressure tester to the pressurized coolant bottle (2).

Operate tester pump to apply 103.4 kPa (15 psi) pressure to system. If hoses enlarge excessively or bulges while testing, replace as necessary. Observe gauge pointer and determine condition of cooling system according to following criteria:

Holds Steady: If pointer remains steady for two minutes, serious coolant leaks are not present in system. However, there could be an internal leak that does not appear with normal system test pressure. If it is certain that coolant is being lost and leaks cannot be detected, inspect for interior leakage or perform Internal Leakage Test. Refer to **INTERNAL LEAKAGE INSPECTION**.

Drops Slowly: Indicates a small leak or seepage is occurring. Examine all connections for seepage or slight leakage with a flashlight. Inspect radiator, hoses, gasket edges and heater. Seal small leak holes with a Sealer Lubricant (or equivalent). Repair leak holes and inspect system again with pressure applied.

Drops Quickly: Indicates that serious leakage is occurring. Examine system for external leakage. If leaks are not visible, inspect for internal leakage.

INTERNAL LEAKAGE INSPECTION

Remove engine oil pan drain plug and drain a small amount of engine oil. If coolant is present in the pan, it will drain first because it is heavier than oil.

WARNING: With radiator pressure tester tool installed on radiator, do not allow pressure to exceed 110 kPa (20 psi). Pressure will build up quickly if a combustion leak is present. To release pressure, rock tester from side to side. When removing tester, do not turn tester more than 1/2 turn if system is under pressure.

- Operate engine without pressure cap on radiator until thermostat opens. Attach a Pressure Tester to filler neck. If pressure builds up quickly it indicates a combustion leak exists. This is usually the result of a cylinder head gasket leak or crack in engine. Repair as necessary.
- If there is not an immediate pressure increase, pump the Pressure Tester. Do this until indicated pressure is within system range. Fluctuation of gauge pointer indicates compression or combustion leakage into cooling system.
- If the needle on dial of pressure tester does not fluctuate, race engine a few times to check for an abnormal amount of coolant or steam. This would be emitting from exhaust pipe. Coolant or steam from exhaust pipe may indicate a faulty cylinder head gasket, cracked engine cylinder block or cylinder head.
- A convenient check for exhaust gas leakage into cooling system is provided by a commercially available Block Leak Check tool. Follow manufacturers instructions when using this product.

COMBUSTION LEAKAGE TEST - WITHOUT PRESSURE TESTER

DO NOT WASTE reusable coolant. If solution is clean, drain coolant into a clean container for reuse.

WARNING: Do not remove cylinder block drain plugs or loosen radiator draincock with system hot and under pressure. Serious burns from coolant can occur.

Drain sufficient coolant to allow thermostat removal. Refer to THERMOSTAT, REMOVAL. Remove accessory drive belt, refer to BELT, SERPENTINE, REMOVAL.

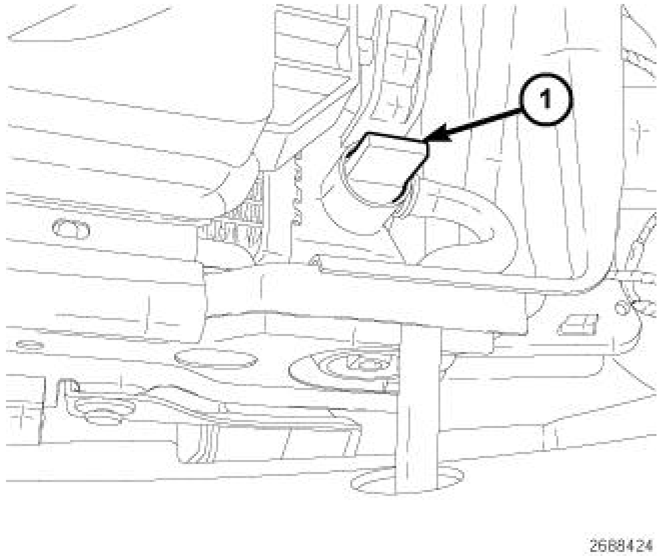
Add coolant to radiator to bring level to within 6 mm (1/4 in) of top of thermostat housing.

CAUTION: Avoid overheating. Do not operate engine for an excessive period of time. Open draincock immediately after test to eliminate boil over.

Start engine and accelerate rapidly three times, to approximately 3000 RPM while observing coolant. If internal engine combustion gases are leaking into cooling system, bubbles will appear in coolant. If bubbles do not appear, internal combustion gas leakage is not present.

STANDARD PROCEDURE

DRAINING ENGINE RADIATOR



[**Fig. 3: Radiator Drain Plug**]()
Courtesy of CHRYSLER GROUP, LLC

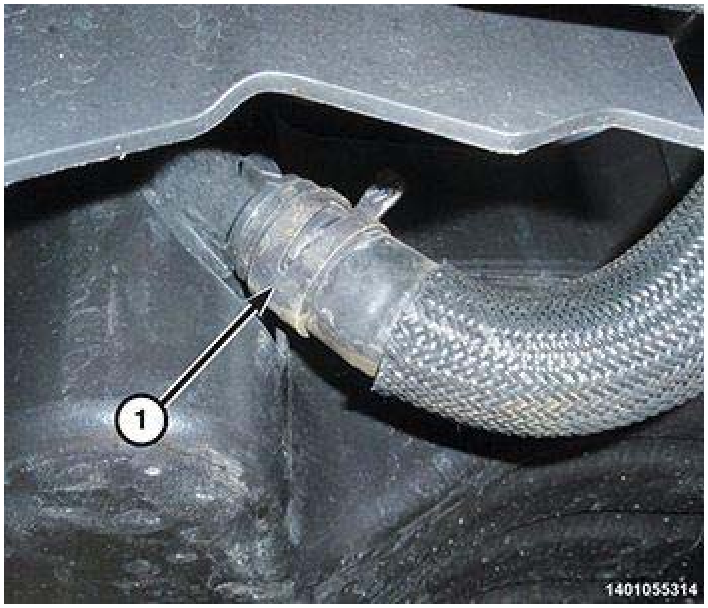
WARNING: Do not remove cylinder block drain plugs or loosen radiator draincock with system hot and under pressure. Serious burns from coolant can occur.

DO NOT WASTE reusable coolant. If solution is clean, drain coolant into a clean container for reuse.

1. Remove radiator pressure cap.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. If equipped, remove the underbody splash shield.
4. Loosen radiator petcock.
5. Drain coolant into a clean container.
6. If necessary, to perform a complete coolant drain of the engine, remove the drain plug from the engine block.

DRAINING LOW TEMPERATURE RADIATOR

NOTE: Do not remove or loosen reservoir cap or coolant hose with system hot and under pressure.



[**Fig. 4: Outlet Coolant Hose**]
Courtesy of CHRYSLER GROUP, LLC

1. Remove the reservoir cap.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the belly pan. Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL** .
4. Remove the outlet coolant hose (1) from the auxiliary low temperature radiator and drain the coolant into a clean container.

COOLANT AIR EVACUATION

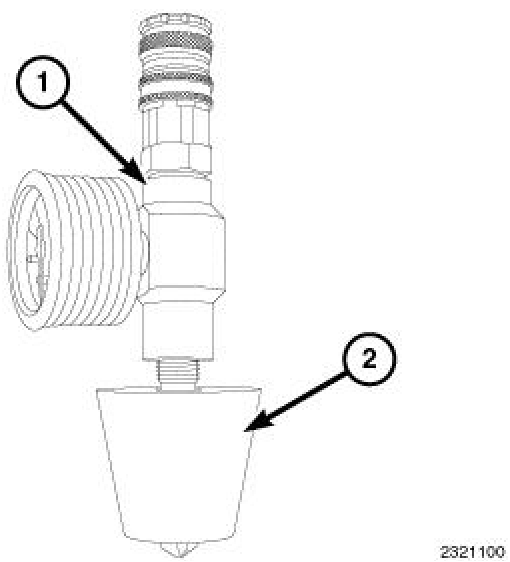


Fig. 5: Adapter Cone And Vacuum Gauge
Courtesy of CHRYSLER GROUP, LLC

Evacuating or purging air from the cooling system involves the use of a pressurized air operated vacuum generator. The vacuum created allows for a quick and complete coolant refilling while removing any airlocks present in the system components.

WARNING: **ANTIFREEZE IS AN ETHYLENE GLYCOL BASE COOLANT AND IS HARMFUL IF SWALLOWED OR INHALED. IF SWALLOWED, DRINK TWO GLASSES OF WATER AND INDUCE VOMITING. IF INHALED, MOVE TO FRESH AIR AREA. SEEK MEDICAL ATTENTION IMMEDIATELY. DO NOT STORE IN OPEN OR UNMARKED CONTAINERS. WASH SKIN AND CLOTHING THOROUGHLY AFTER COMING IN CONTACT WITH ETHYLENE GLYCOL. KEEP OUT OF REACH OF CHILDREN. DISPOSE OF GLYCOL BASED COOLANT PROPERLY. CONTACT YOUR DEALER OR GOVERNMENT AGENCY FOR LOCATION OF COLLECTION CENTER IN YOUR AREA. DO NOT OPEN A COOLING SYSTEM WHEN THE ENGINE IS AT OPERATING TEMPERATURE OR HOT UNDER PRESSURE; PERSONAL INJURY CAN RESULT. AVOID RADIATOR COOLING FAN WHEN ENGINE COMPARTMENT RELATED SERVICE IS PERFORMED; PERSONAL INJURY CAN RESULT.**

WARNING: **WEAR APPROPRIATE EYE AND HAND PROTECTION WHEN PERFORMING THIS PROCEDURE.**

NOTE: **The service area where this procedure is performed should have a minimum shop air requirement of 80 PSI (5.5 bar) and should be equipped with an air dryer system.**

NOTE: **For best results, the radiator should be empty. The vehicle's heater control should be set to the heat position (ignition may need to be turned to the on position but do not start the engine).**

1. Refer to the Chrysler Pentastar Service Equipment (Chrysler PSE) Coolant Refiller #85-15-0650 or equivalent tool's operating manual for specific assembly steps.
2. Choose an appropriate adapter cone that will fit the vehicle's radiator filler neck or reservoir tank.
3. Attach the adapter cone (2) to the vacuum gauge (1).

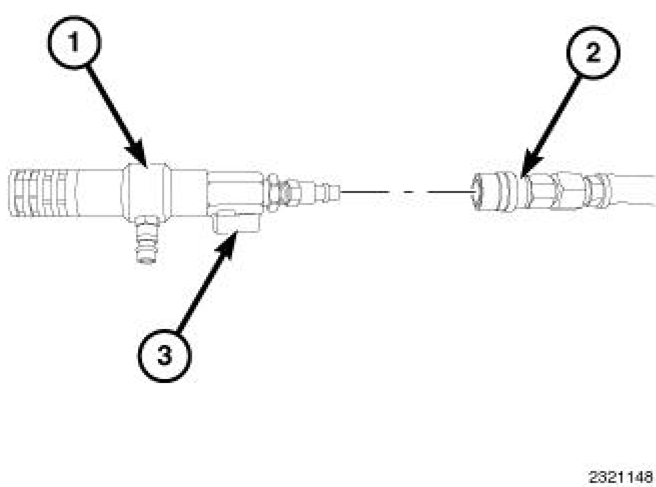


Fig. 6: Vacuum Generator/Venturi, Ball Valve & Airline Hose
Courtesy of CHRYSLER GROUP, LLC

4. Make sure the vacuum generator/venturi ball valve (3) is closed and attach an airline hose (2) with a minimum shop air requirement of 80 PSI (5.5 bar) to the vacuum generator/venturi (1).
5. Position the adaptor cone/vacuum gauge assembly into the radiator filler neck or reservoir tank. Ensure that the adapter cone is sealed properly.

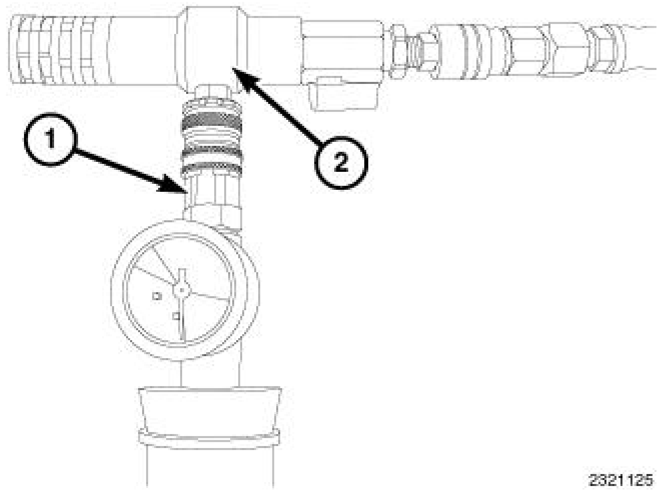


Fig. 7: Vacuum Generator/Venturi & Cone/Vacuum Gauge Assembly
Courtesy of CHRYSLER GROUP, LLC

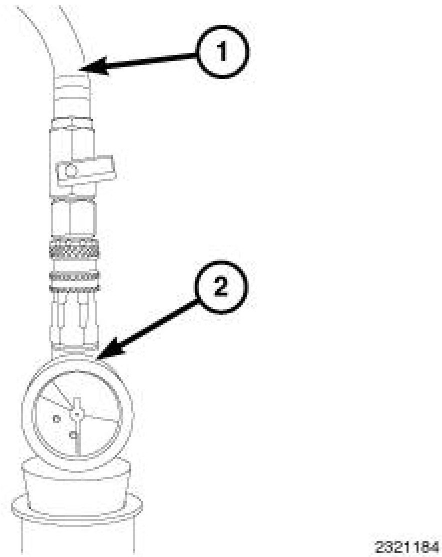
6. Connect the vacuum generator/venturi (2) to the positioned adaptor cone/vacuum gauge assembly (1).
7. Open the vacuum generator/venturi ball valve.

NOTE: **Do not bump or move the assembly as it may result in loss of vacuum. Some radiator overflow hoses may need to be clamped off to obtain vacuum.**

8. Let the system run until the vacuum gauge shows a good vacuum through the cooling system. Refer to the tool's operating manual for appropriate pressure readings.

NOTE: **If a strong vacuum is being created in the system, it is normal to see the radiator hoses collapse.**

9. Close the vacuum generator/venturi ball valve.



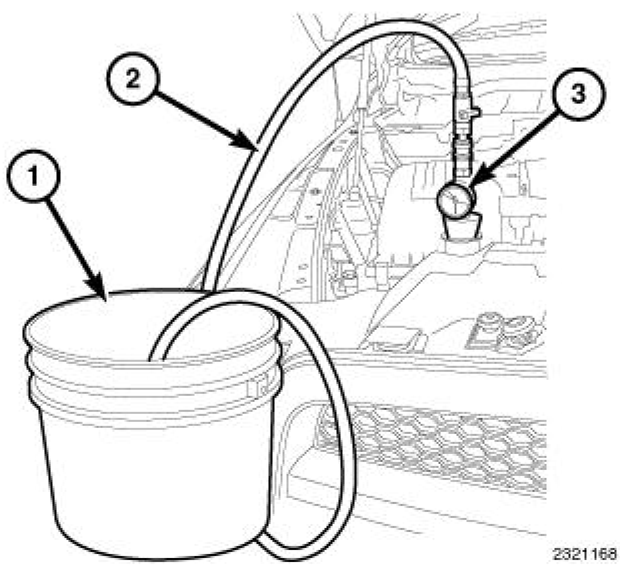
[Fig. 8: Vacuum Generator/Venturi And Air Line]

Courtesy of CHRYSLER GROUP, LLC

10. Disconnect the vacuum generator/venturi and airline from the adaptor cone/vacuum gauge assembly.
11. Wait approximately 20 seconds, if the pressure readings do not move, the system has no leaks. If the pressure readings move, a leak could be present in the system and the cooling system should be checked for leaks and the procedure should be repeated.
12. Place the tool's suction hose into the coolant's container.

NOTE:	**Ensure there is a sufficient amount of coolant, mixed to the required strength/protection level available for use. For best results and to assist the refilling procedure, place the coolant container at the same height as the radiator filler neck. Always draw more coolant than required. If the coolant level is too low, it will pull air into the cooling system which could result in airlocks in the system.**

13. Connect the tool's suction hose (1) to the adaptor cone/vacuum gauge assembly (2).



[Fig. 9: Suction Hose Ball Valve]

Courtesy of CHRYSLER GROUP, LLC

NOTE: **View typical**

14. Open the suction hose's ball valve to begin refilling the cooling system.
15. When the vacuum gauge reads zero, the system is filled.

NOTE: **On some remote pressurized tanks, it is recommended to stop filling when the proper level is reached.**

16. Close the suction hose's ball valve and remove the suction hose from the adaptor cone/vacuum gauge assembly.
17. Remove the adaptor cone/vacuum gauge assembly from the radiator filler neck or reservoir tank.
18. With heater control unit in the HEAT position, operate engine with container cap in place.
19. After engine has reached normal operating temperature, shut engine off and allow it to cool. When engine is cooling down, coolant will be drawn into the radiator from the pressure container.
20. Add coolant to the recovery bottle/container as necessary. **Only add coolant to the container when the engine is cold. Coolant level in a warm engine will be higher due to thermal expansion.** Add necessary coolant to raise container level to the COLD MINIMUM mark after each cool down period.
21. Once the appropriate coolant level is achieved, attach the radiator cap or reservoir tank cap.

ADDING ADDITIONAL COOLANT

When additional coolant is needed, it should be added to the Pressurized Coolant Bottle. With the engine cold, add enough coolant to set the level between the add and full indicators on the bottle.

For the proper type of coolant, refer to CAPACITIES AND RECOMMENDED FLUIDS, DESCRIPTION .

CAUTION: **Do not use coolant additives that are claimed to improve engine cooling.**

COOLANT LEVEL CHECK

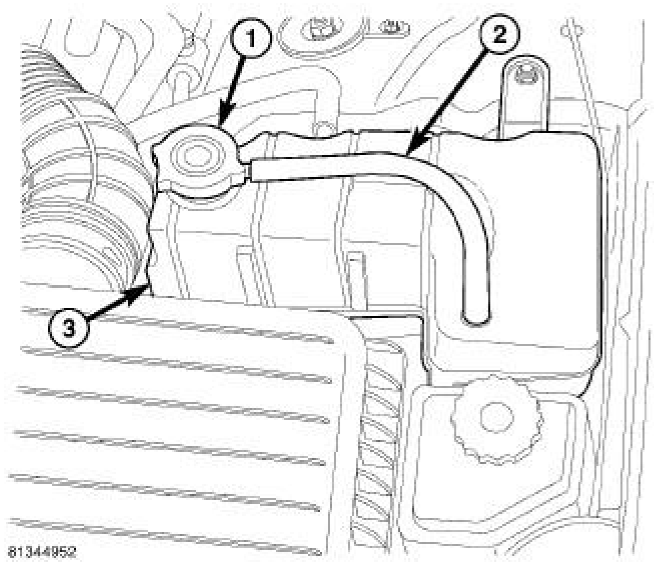


Fig. 10: Coolant Recovery Container
Courtesy of CHRYSLER GROUP, LLC

1 - COOLANT RECOVER CONTAINER PRESSURE CAP
2 - COOLANT RECOVERY CONTAINER
3 - ADD/FULL MARKS

NOTE: **Do not remove radiator cap for routine coolant level inspections. The coolant level can be checked at coolant recovery bottle (2).**

The coolant reserve/overflow system provides a quick method for determining coolant level. With engine not running, the coolant level should be between MIN and MAX marks (3). If the coolant level is at or below the MIN mark, fill the recovery bottle with a 50/50 mixture of antifreeze and water ONE QUART AT A TIME. Repeat this procedure until the coolant level is at the FULL mark.

CLEANING/REVERSE FLUSHING

CLEANING

Drain cooling system and refill with water. Run engine with radiator cap installed until upper radiator hose is hot. Stop engine and drain water from system. If water is dirty, fill system with water, run engine and drain system. Repeat until water drains clean.

REVERSE FLUSHING

Reverse flushing of cooling system is the forcing of water through the cooling system. This is done using air pressure in the opposite direction of normal coolant flow. It is usually only necessary with very dirty systems with evidence of partial plugging.

REVERSE FLUSHING RADIATOR

Disconnect radiator hoses from radiator inlet and outlet. Attach a section of radiator hose to radiator bottom outlet fitting and insert flushing gun. Connect a water supply hose and air supply hose to flushing gun.

CAUTION: **Internal radiator pressure must not exceed 138 kPa (20 psi) as damage to radiator may result.**

Allow radiator to fill with water. When radiator is filled, apply air in short blasts. Allow radiator to refill between blasts. Continue this reverse flushing until clean water flows out through rear of radiator cooling tube passages.

REVERSE FLUSHING ENGINE

Drain cooling system. Remove thermostat housing and thermostat. Install thermostat housing. Disconnect radiator upper hose from radiator and attach flushing gun to hose. Disconnect radiator lower hose from water pump and attach a lead-away hose to water pump inlet fitting.

CAUTION: **On vehicles equipped with a heater water control valve, be sure heater control valve is closed (heat off). This will prevent coolant flow with scale and other deposits from entering heater core.**

Connect water supply hose and air supply hose to flushing gun. Allow engine to fill with water. When engine is filled, apply air in short blasts, allowing system to fill between air blasts. Continue until clean water flows through the lead away hose.

Remove lead away hose, flushing gun, water supply hose and air supply hose. Remove thermostat housing and install thermostat. Install thermostat housing with a replacement gasket. Refer to Thermostat Replacement, see **THERMOSTAT**. Connect radiator hoses, refill cooling system with correct antifreeze/water mixture. Refer to Refilling the Cooling System, see **STANDARD PROCEDURE**.

CHEMICAL CLEANING

In some instances, use a radiator cleaner (Mopar Radiator Kleen or equivalent) before flushing. This will soften scale and other deposits and aid flushing operation.

CAUTION: Follow manufacturers instructions when using these products.

SPECIFICATIONS

3.6L TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Belt Tensioner Bolt	50	37	-	Ā
Block Heater Bolt	12	9	-	Ā
Condenser Bolts	9	-	80	Ā
Coolant Reservoir Return Tube to Air box Nut	16	12	-	Ā
Coolant Return Tube to Oil Filter Housing	40	30	-	Ā
Coolant Supply Tube to Oil Filter Housing	9	-	80	Ā
Cooling Fan Assembly to Radiator Bolts	9	-	80	Ā
Cross Over to Front Cover Bolts	12	9	-	Ā
Engine Coolant Temperature (ECT) Sensor	30	22	-	Ā
Heater Tube Bolts	12	9	-	Ā
Heater Outlet and Radiator Inlet Hose Nuts	7	-	62	Ā
Idler Pulley Bolt	25	18	-	Ā
Pressurized Coolant Bottle Nuts	10	-	89	Ā
Radiator Isolator Bolt	9	-	80	Ā
Thermostat Housing Bolt	12	9	-	Ā
Transmission Oil Cooler Line Bracket to Radiator	9	-	81	Ā

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Transmission Oil Cooler to Condenser	9	-	81	Ā
Transmission Oil Cooler Line at Transmission	20	15	-	Ā
Transmission Oil Cooler Line to Thermal Bypass Valve, Rear	20	15	-	Ā
Transmission Oil Cooler Line to Thermal Bypass Valve, Front	20	15	-	Ā
Water Pump M6 Bolt	11	-	97	Ā
Water Pump M8 Bolt	23	17	-	Ā
Water Pump M10 Bolt	50	37	-	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

6.2L TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Auxiliary Low Temp. Radiator	20	15	-	Ā
Belt Tensioner Bolt	55	41	-	Ā
Charge Air Cooler Temp. Sensor	27	20	-	Ā
Block Heater Bolt	12	9	-	Ā
Condenser Mounting Bolts	9	-	80	Ā
Coolant Pump to Bracket	20	15	-	Ā
Cooling Fan Assembly to Radiator	9	-	80	Ā
Engine Coolant Temperature (ECT) Sensor	27	20	-	Ā
Heater Tube Bolt	18	13	-	Ā
Idler Pulley Bolts	29	21	-	Ā
Pressurized Coolant Bottle bolts	10	-	89	Ā
Upper Radiator Isolator Bolts	12	9	-	Ā
Thermostat Housing Bolts	28	21	-	Ā

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Transmission Oil Cooler Line at Transmission	22	21	-	Ā
Transmission Oil Cooler Line to Thermal Bypass Valve, Rear	20	15	-	Ā
Transmission Oil Cooler Line to Thermal Bypass Valve, Front	20	15	-	Ā
Water Pump Bolts	28	21	-	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

5.7L/6.4L TORQUE SPECIFICATIONS

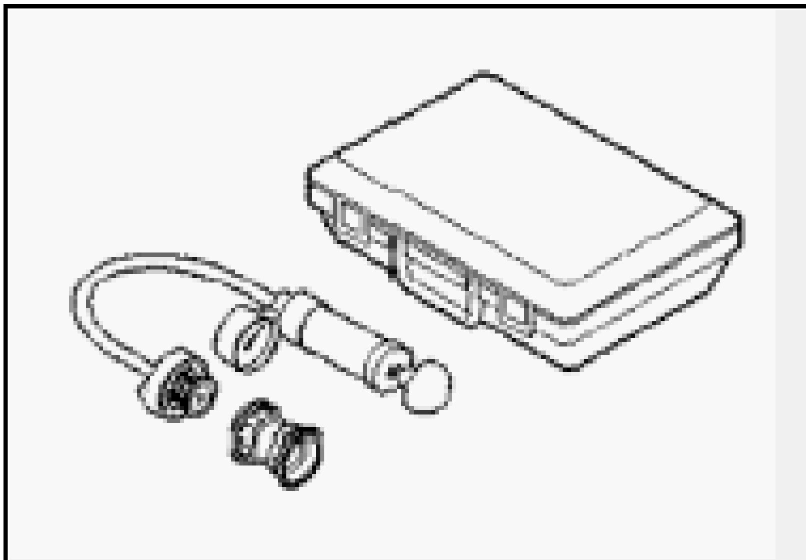
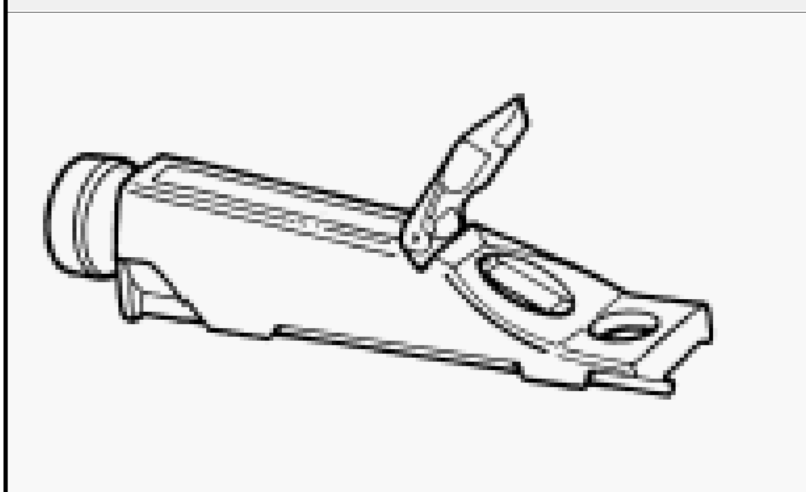
TORQUE SPECIFICATIONS

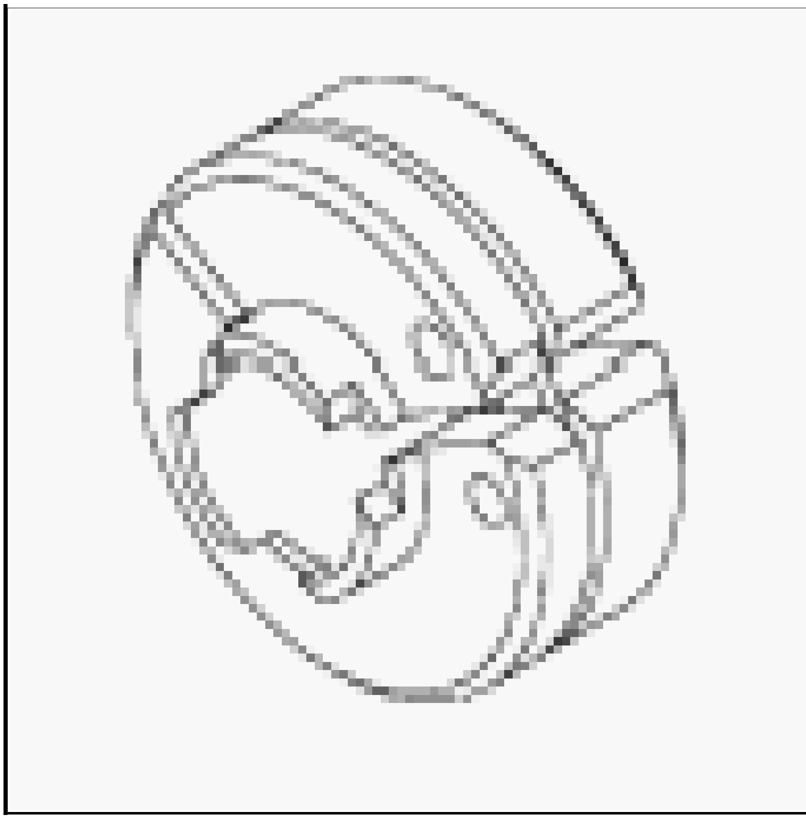
DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Belt Tensioner Bolt	41	30	-	Ā
Belt Tensioner Pulley Bolt	61	45	-	Ā
Block Heater Bolt	12	9	-	Ā
Condenser Mounting Bolts	9	-	80	Ā
Cooling Fan Shroud Bolts	9	-	80	Ā
Engine Coolant Temperature (ECT) Sensor	26	19	-	Ā
Fan Blades to Motor Nut	6	-	53	Ā
Heater Tube Bolt	12	9	-	Ā
Idler Pulley Bolts	29	21	-	Ā
Idler Pulley Support Bracket Bolt	29	21	-	Ā
Pressurized Coolant Bottle Nuts	10	-	89	Ā
Radiator Lower Support Bolt	16	12	-	Ā
Upper Radiator Isolator Bolts	12	9	-	Ā
Thermostat Housing Bolts	28	21	-	Ā

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Transmission Oil Cooler Line at Transmission	20	15	-	Ā
Transmission Oil Cooler Line to Thermal Bypass Valve, Rear	20	15	-	Ā
Transmission Oil Cooler Line to Thermal Bypass Valve, Front	20	15	-	Ā
Water Pump Bolts	24	18	-	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

SPECIAL TOOLS

SPECIAL TOOLS

	7700 - Tester, Cooling System (Originally Shipped In Kit Number(s) 7700-A.)
	8286 - Refractometer

	8875A - Disconnect, Transmission Cooler Line (Originally Shipped In Kit Number(s) 9202, 9328, 9328-CAN, 9329, 9516, 9575.)

ACCESSORY DRIVE

BELT, SERPENTINE

DESCRIPTION

DESCRIPTION

The accessory drive belt is a serpentine type belt. Satisfactory performance of these belts depends on belt condition and proper belt tension.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ACCESSORY DRIVE BELT

NOISE DIAGNOSIS

Noises generated by the accessory drive belt are most noticeable at idle. Before replacing a belt to resolve a noise condition, inspect all of the accessory drive pulleys for alignment, glazing, or excessive end play.

ACCESSORY DRIVE BELT DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
RIB CHUNKING (One or more ribs has separated from belt body)	1. Foreign objects imbedded in pulley grooves.	1. Remove foreign objects from pulley grooves. Replace belt.
	2. Installation damage	2. Replace belt
RIB OR BELT WEAR	1. Pulley misaligned	1. Align pulley(s)
	2. Abrasive environment	2. Clean pulley(s). Replace belt if necessary
	3. Rusted pulley(s)	3. Clean rust from pulley(s)

CONDITION	POSSIBLE CAUSES	CORRECTION
	4. Sharp or jagged pulley groove tips	4. Replace pulley. Inspect belt.
	5. Belt rubber deteriorated	5. Replace belt
BELT SLIPS	1. Belt slipping because of insufficient tension	1. Inspect/Replace tensioner if necessary
	2. Belt or pulley exposed to substance that has reduced friction (belt dressing, oil, ethylene glycol)	2. Replace belt and clean pulleys
	3. Driven component bearing failure (seizure)	3. Replace faulty component or bearing
	4. Belt glazed or hardened from heat and excessive slippage	4. Replace belt.
LONGITUDINAL BELT CRACKING	1. Belt has mis-tracked from pulley groove	1. Replace belt
	2. Pulley groove tip has worn away rubber to tensile member	2. Replace belt
"GROOVE JUMPING" (Belt does not maintain correct position on pulley)	1. Incorrect belt tension	1. Inspect/Replace tensioner if necessary
	2. Pulley(s) not within design tolerance	2. Replace pulley(s)
	3. Foreign object(s) in grooves	3. Remove foreign objects from grooves
	4. Pulley misalignment	4. Align component
	5. Belt cord line is broken	5. Replace belt
BELT BROKEN (Note: Identify and correct problem before new belt is installed)	1. Incorrect belt tension	1. Replace Inspect/Replace tensioner if necessary
	2. Tensile member damaged during belt installation	2. Replace belt
	3. Severe misalignment	3. Align pulley(s)
	4. Bracket, pulley, or bearing failure	4. Replace defective component and belt
NOISE (Objectionable squeal, squeak, or rumble is heard or felt while drive belt is in operation)	1. Incorrect belt tension	1. Inspect/Replace tensioner if necessary
	2. Bearing noise	2. Locate and repair
	3. Belt misalignment	3. Align belt/pulley(s)
	4. Belt to pulley mismatch	4. Install correct belt
	5. Driven component induced vibration	5. Locate defective driven component and repair
	6. Belt flat surface coming apart	6. Replace belt
TENSION SHEETING FABRIC FAILURE	1. Tension sheeting contacting stationary object	1. Correct rubbing condition

CONDITION	POSSIBLE CAUSES	CORRECTION
(Woven fabric on outside, circumference of belt has cracked or separated from body of belt)	2. Excessive heat causing woven fabric to age	2. Replace belt
	3. Tension sheeting splice has fractured	3. Replace belt
CORD EDGE FAILURE (Tensile member exposed at edges of belt or separated from belt body)	1. Incorrect belt tension	1. Inspect/Replace tensioner if necessary
	2. Belt contacting stationary object	2. Replace belt
	3. Pulley(s) out of tolerance	3. Replace pulley
	4. Insufficient adhesion between tensile member and rubber matrix	4. Replace belt

VISUAL DIAGNOSIS

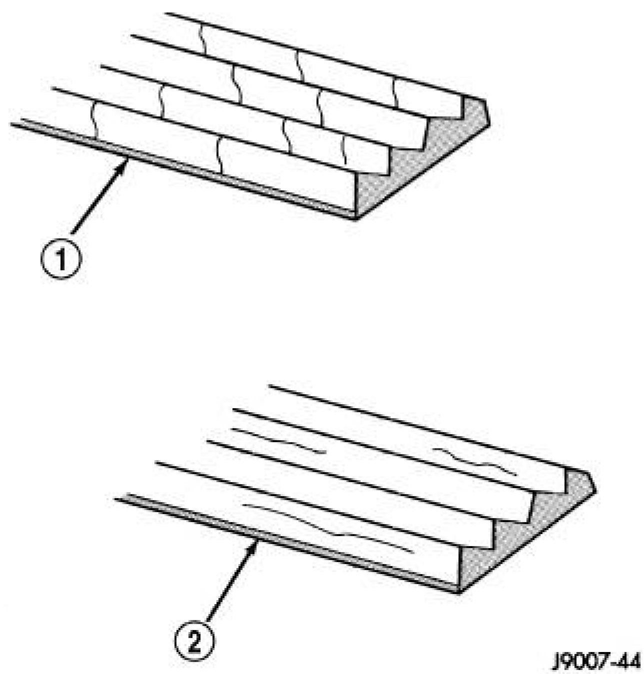


Fig. 11: Belt Wear Patterns
Courtesy of CHRYSLER GROUP, LLC

When diagnosing serpentine accessory drive belts, small cracks (1) that run across the ribbed surface of the belt from rib to rib, are considered normal. These are not a reason to replace the belt. However, cracks (2) running along a rib (not across) are **not** normal. Any belt with cracks running along a rib must be replaced. Also replace the belt if it has excessive wear, frayed cords, severe glazing or chunking.

Any belt with bumps, surface coming apart, or any other uneven indications along the flat surface of the belt must be remove and inspected and replaced if necessary.

Refer to **ACCESSORY DRIVE BELT DIAGNOSIS CHART** for further belt diagnosis.

REMOVAL

3.6L

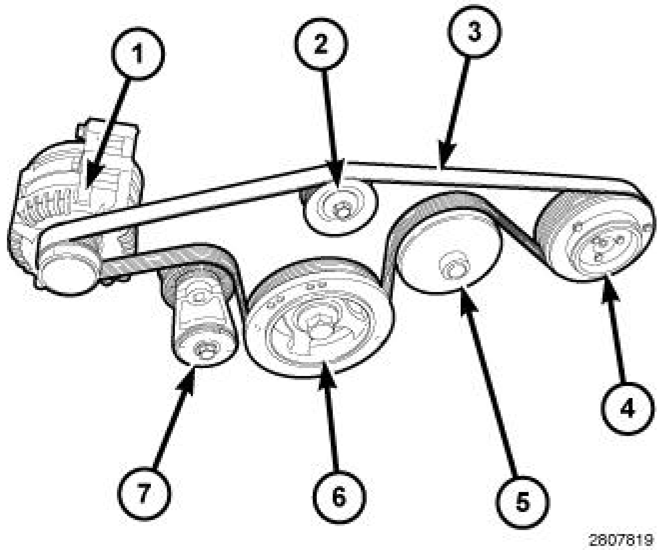


Fig. 12: New Belt, Idler Pulley, Tensioner Arm, Belt, Idler & Tensioner
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not let the tensioner arm snapback to the fully extended position, severe damage may occur to the tensioner.**

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
3. Rotate belt tensioner (7) until it contacts its stop. Remove belt (3), then slowly rotate the tensioner (7) into the freearm position.

6.2L

CAUTION: **Do not let tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.**

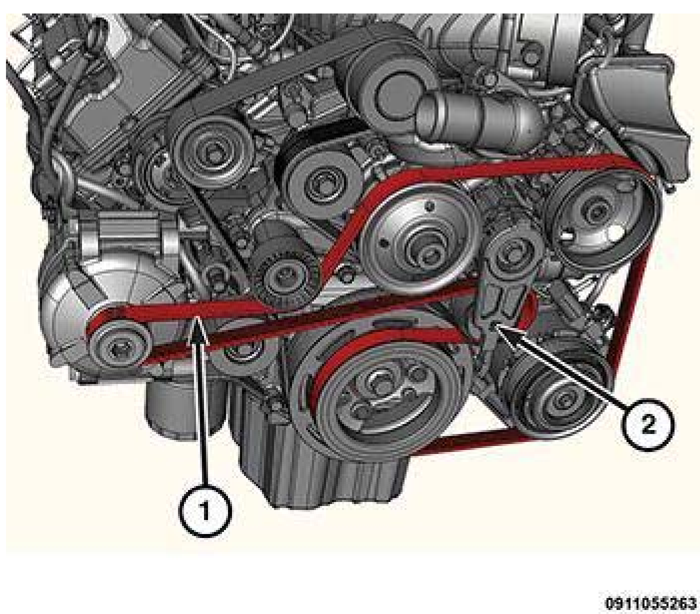


Fig. 13: Serpentine Belt, Belt Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

1. Using a suitable square drive tool, release the belt tension by rotating the tensioner (2) **clockwise** . Rotate the belt tensioner (2) until the serpentine belt (1) can be removed from pulleys.
2. Remove the serpentine belt (1).
3. Gently release the belt tensioner (2).

5.7L/6.4L ELECTRONIC POWER STEERING

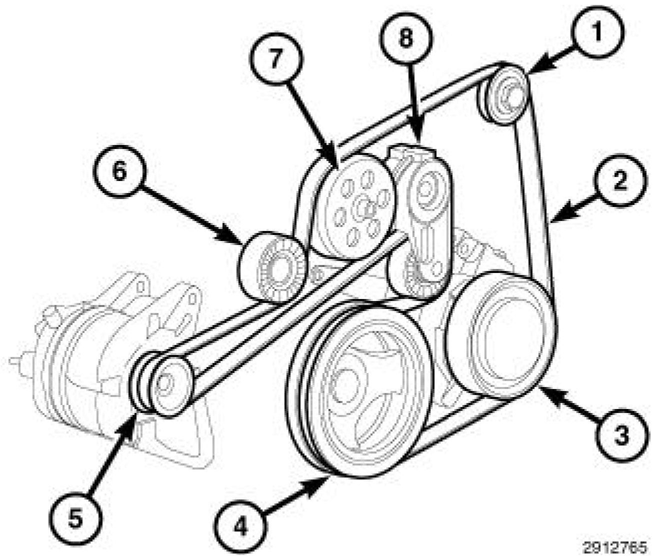


Fig. 14: Drive Belt Tensioner And Drive Belt Routing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the air intake tube between intake manifold and air cleaner body.
3. Using a suitable square drive tool, Rotate the belt tensioner (8) clockwise and remove the serpentine belt (2).
4. Gently release the tensioner (8).

INSTALLATION

3.6L

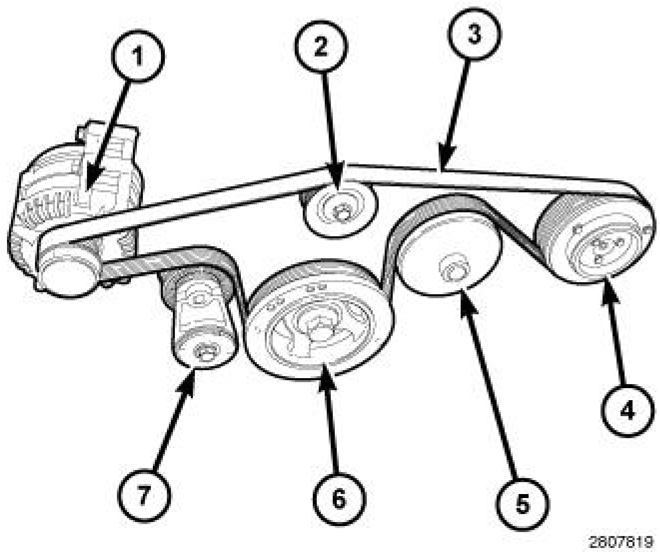


Fig. 15: New Belt, Idler Pulley, Tensioner Arm, Belt, Idler & Tensioner
Courtesy of CHRYSLER GROUP, LLC

1. Check the condition of all of the pulleys.

CAUTION: When installing the serpentine accessory drive belt, the belt MUST be routed correctly. If not, the engine may overheat due to the water pump rotating in the wrong direction.

2. Install the new belt (3). Route the belt around all pulleys except the idler pulley (2). Rotate the tensioner arm (7) until it contacts its stop position. Route the belt (3) around the idler (2) and slowly let the tensioner (7) rotate into the belt. Make sure the belt (3) is seated onto all pulleys.

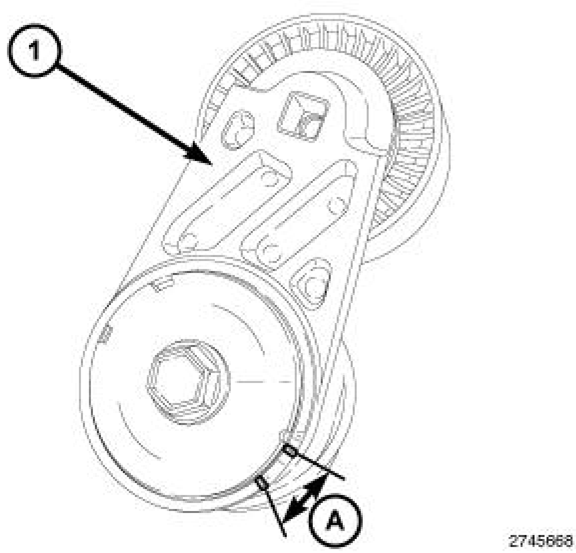


Fig. 16: Belt Wear Indicator (Measurement A)
Courtesy of CHRYSLER GROUP, LLC

3. With the drive belt installed, inspect the belt wear indicator. The gap between the tang and the housing stop (measurement A) must not exceed 24 mm (.94 inches).
4. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .

6.2L

CAUTION: Do not let tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

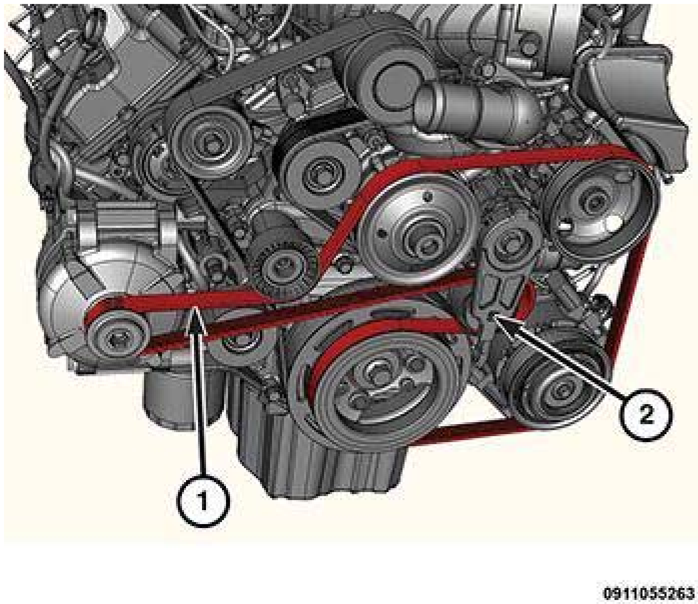


Fig. 17: Serpentine Belt, Belt Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

NOTE: When installing accessory drive belt onto pulleys, make sure that belt is properly routed and all V-grooves make proper contact with pulleys.

1. Position the serpentine belt (1) over all pulleys except for the water pump pulley.
2. Rotate the tensioner (2) **clockwise** and slip the serpentine belt (1) over the water pump pulley.
3. Gently release the belt tensioner (2).

5.7L/6.4L ELECTRONIC POWER STEERING

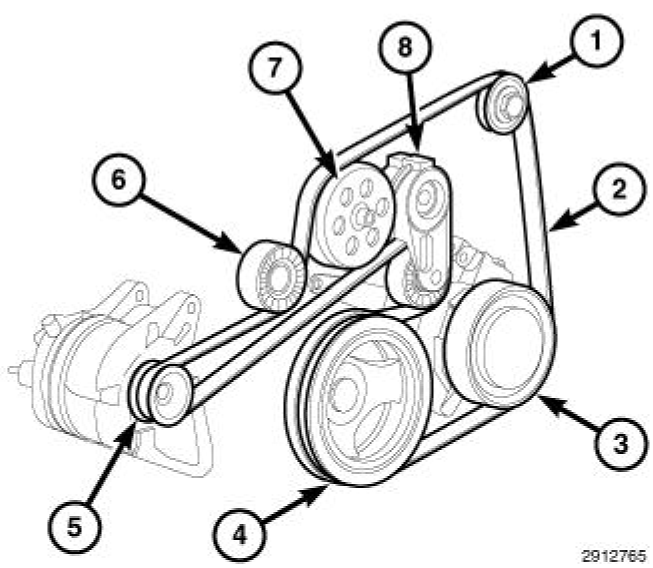


Fig. 18: Drive Belt Tensioner And Drive Belt Routing

Courtesy of CHRYSLER GROUP, LLC

NOTE:	**When installing accessory drive belt onto pulleys, make sure that belt is properly routed and all V-grooves make proper contact with pulleys.**

1. Position the drive belt (2) over all pulleys except for the water pump pulley (7).
2. Rotate the tensioner (8) **clockwise** and slip the belt (2) over the water pump pulley (7).
3. Gently release tensioner (8).
4. Install the air intake tube between intake manifold and the air cleaner body.
5. Connect the negative battery cable.

PULLEY, IDLER

REMOVAL

3.6L

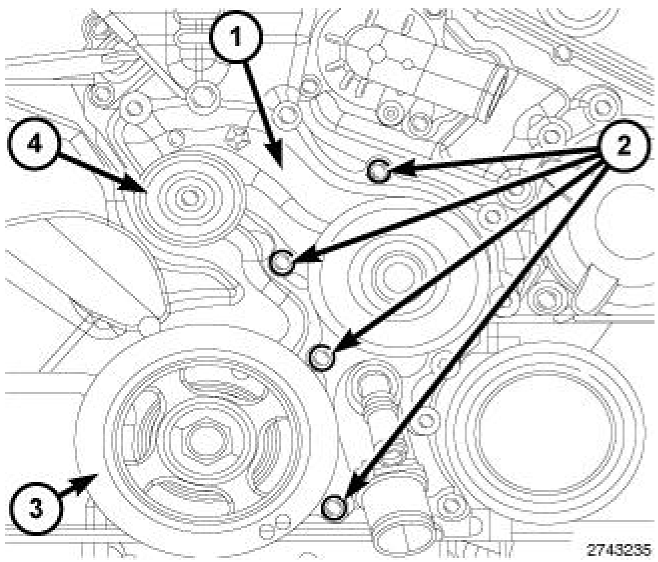
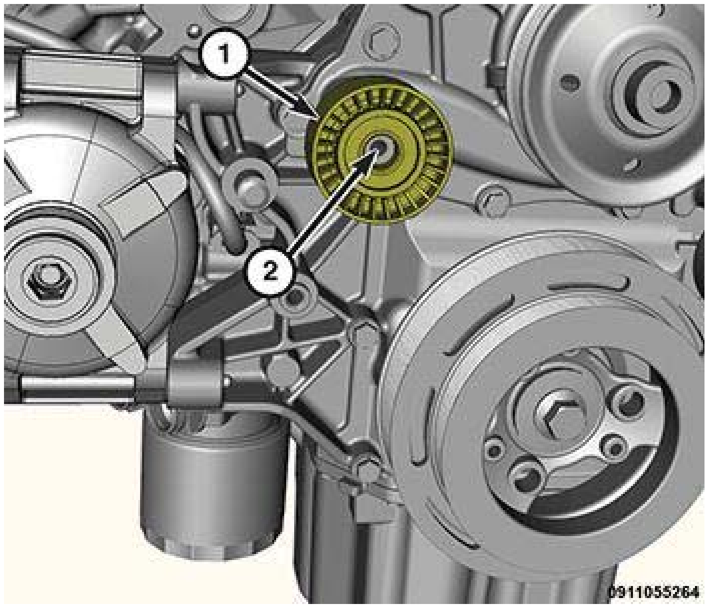


Fig. 19: Idler Pulley, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the serpentine belt. Refer to BELT, SERPENTINE, REMOVAL.
2. Remove bolt and the idler pulley (4).

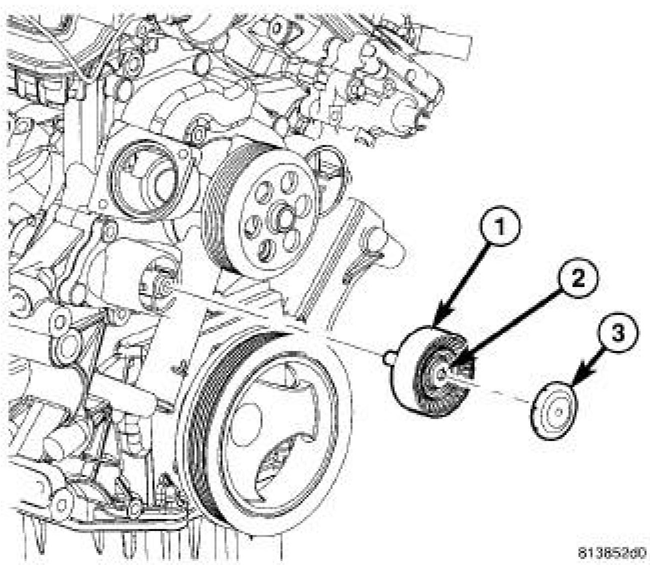
6.2L



[Fig. 20: Idler Pulley & Bolt]
Courtesy of CHRYSLER GROUP, LLC

1. Remove accessory drive belt. Refer to **TENSIONER, BELT, REMOVAL**.
2. Remove bolt (2) and idler pulley (1).

5.7L/6.4L



[Fig. 21: Idler Pulley, Bolt & Cover]
Courtesy of CHRYSLER GROUP, LLC

1 - IDLER PULLEY	
2 - BOLT (PART OF PULLEY)	
3 - COVER	

1. Remove accessory drive belt. Refer to **TENSIONER, BELT, REMOVAL**.

2. Remove the cover (3).
3. Remove bolt (2) and idler pulley (1).

5.7L IDLER BRACKET

NOTE: **The idler bracket takes the place of the power steering pump on the vehicles that use electronic power steering.**

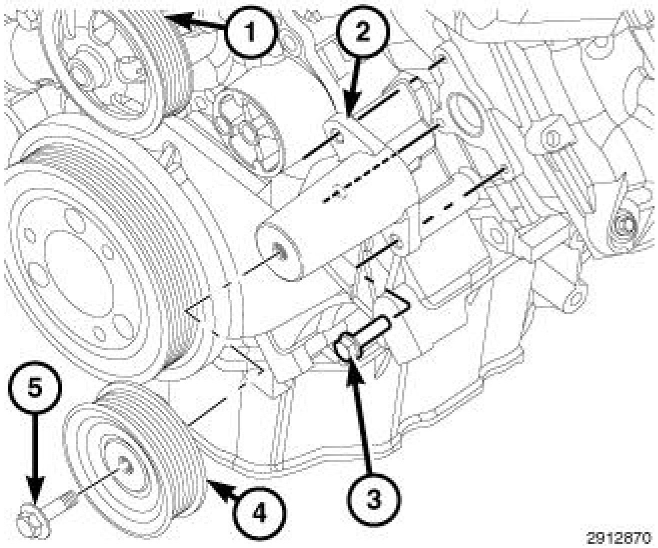


Fig. 22: Idler Pulley, Idler Bracket & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the serpentine drive belt. Refer to **BELT, SERPENTINE, REMOVAL**.
2. Remove bolt (6) and the idler pulley (4) from bracket (2).
3. Remove bolts (3) and the idler pulley bracket (2).

INSTALLATION

3.6L

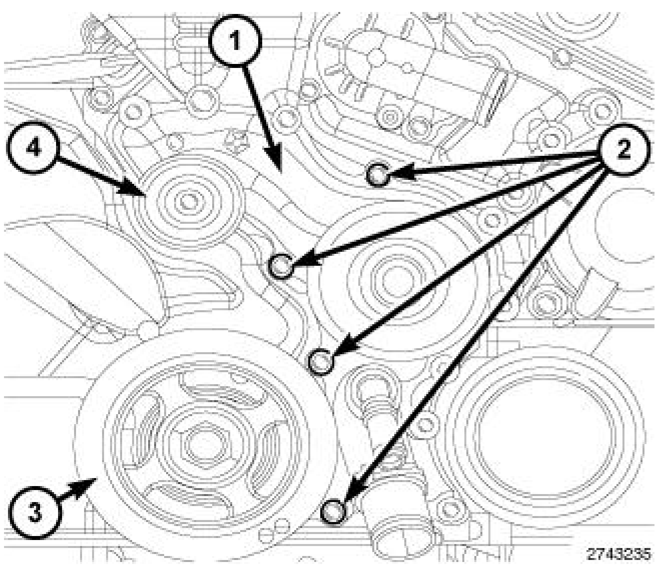


Fig. 23: Idler Pulley, Water Pump & Bolts

Courtesy of CHRYSLER GROUP, LLC

1. Install the idler pulley (4) and tighten bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Install main drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.

6.2L

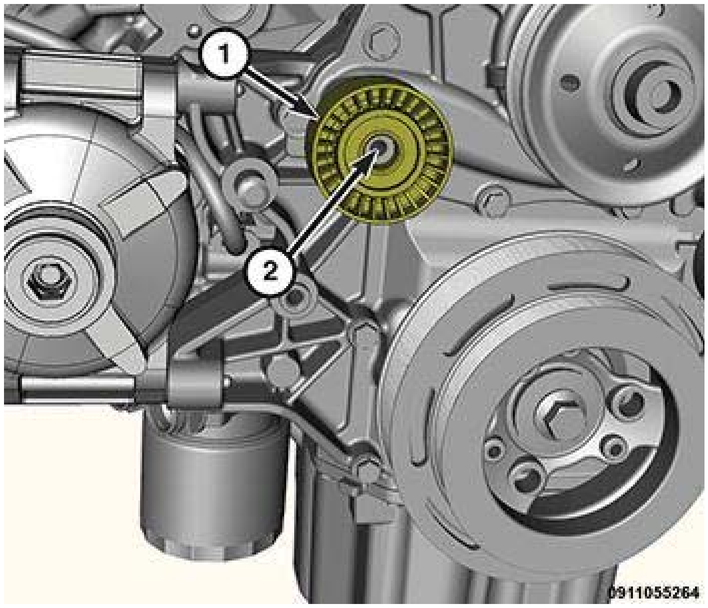


Fig. 24: Idler Pulley & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Install the idler pulley (1). Tighten bolt (2) to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Install accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.

5.7L/6.4L

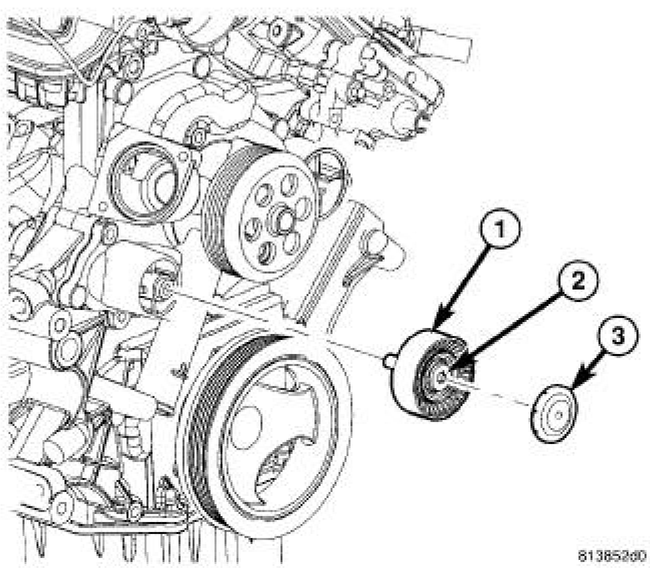


Fig. 25: Idler Pulley, Bolt & Cover
Courtesy of CHRYSLER GROUP, LLC

1 - IDLER PULLEY
2 - BOLT (PART OF PULLEY)
3 - COVER

1. Install the idler pulley (1). Tighten the idler pulley bolt (2) to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Install the cover (3).
3. Install accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.

5.7L IDLER BRACKET

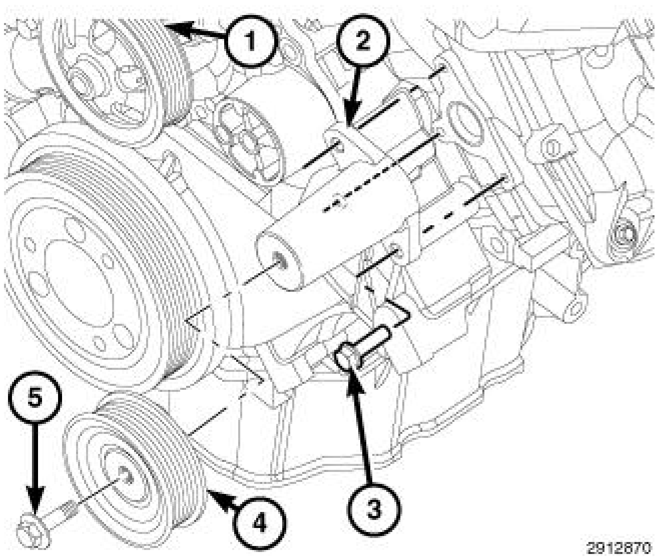


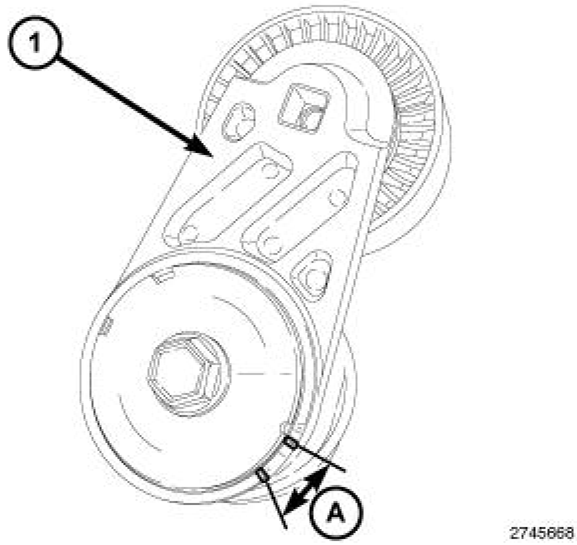
Fig. 26: Idler Pulley, Idler Bracket & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the idler bracket bolts (2). Tighten the idler bracket bolts (3) to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Install the idler pulley (4). Tighten the idler pulley bolt (5) to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the serpentine drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.

TENSIONER, BELT

DESCRIPTION

DESCRIPTION



[**Fig. 27: Belt Wear Indicator (Measurement A)**]
Courtesy of CHRYSLER GROUP, LLC

Correct drive belt tension is required to ensure optimum performance of the belt driven engine accessories. If specified tension is not maintained, belt slippage may cause engine overheating, loss of air conditioning capacity, reduced generator output rate, and greatly reduced belt life.

It is not necessary to adjust belt tension. All engines are equipped with an automatic belt tensioner. The tensioner maintains correct accessory drive belt tension at all times.

REMOVAL

3.6L

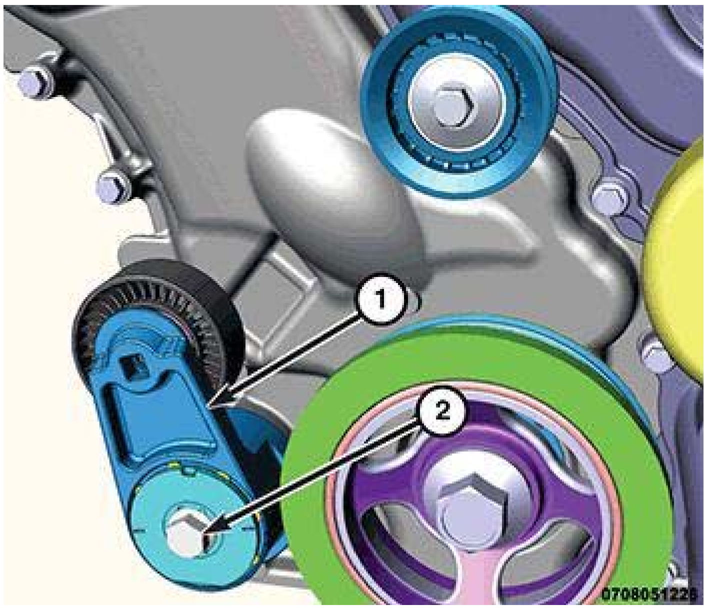


Fig. 28: Belt Tensioner & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the air intake system. Refer to **BODY, AIR CLEANER, REMOVAL** .

3. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL**.
4. Remove bolt (2) and the belt tensioner.

6.2L

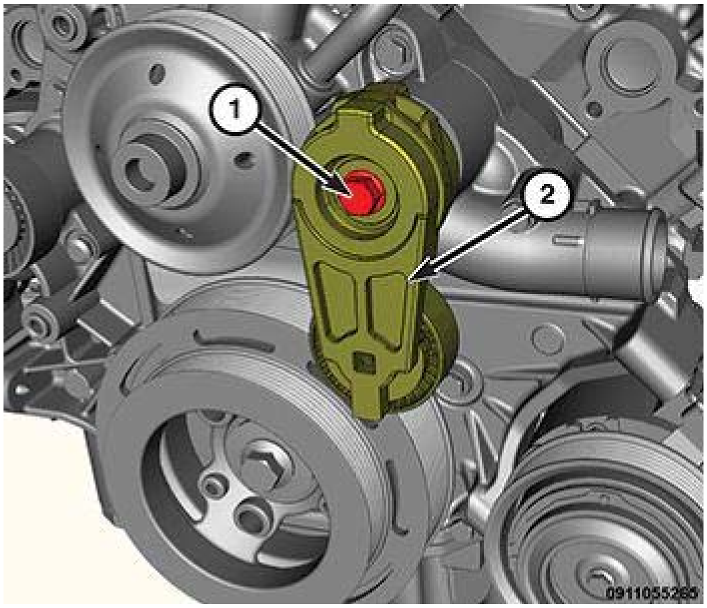


Fig. 29: Belt Tensioner & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
3. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL**.
4. Remove the bolt (1) and the belt tensioner (2).

5.7L/6.4L

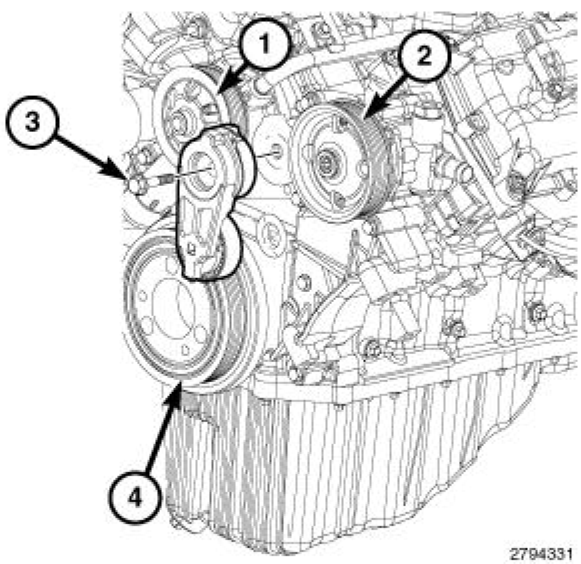


Fig. 30: Tensioner Assembly & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** for 5.7L or **BODY, AIR CLEANER, REMOVAL** for 6.4L .
3. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL**.
4. Remove bolt (3) and the belt tensioner.

INSTALLATION

3.6L

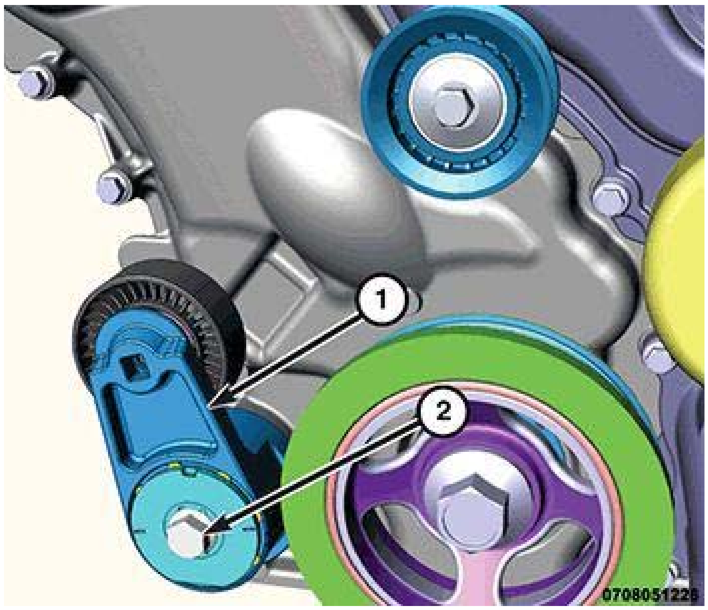


Fig. 31: Belt Tensioner & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Install the belt tensioner (1). Tighten bolt (2) to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION**.
3. Install the air intake system. Refer to **BODY, AIR CLEANER, INSTALLATION** .
4. Connect the negative battery cable.

6.2L

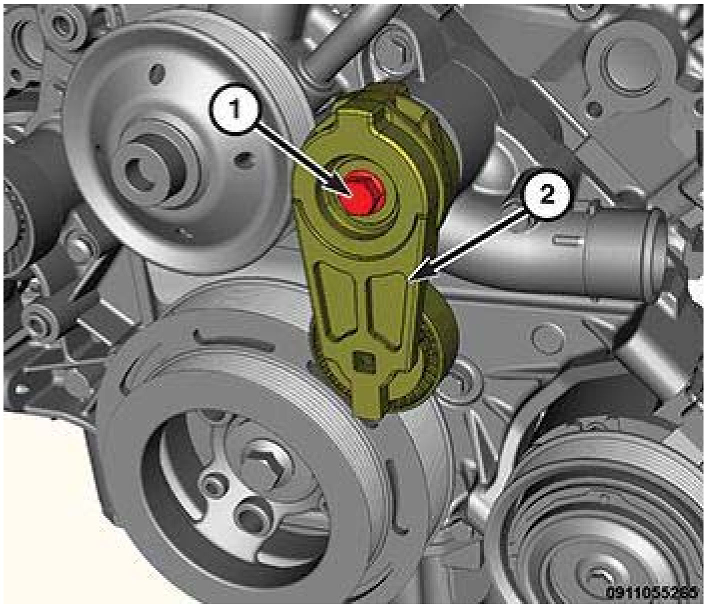


Fig. 32: Belt Tensioner & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Align the locator tang and install the belt tensioner (2). Tighten the bolt (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION**.
3. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .
4. Connect the negative battery cable.

5.7L/6.4L

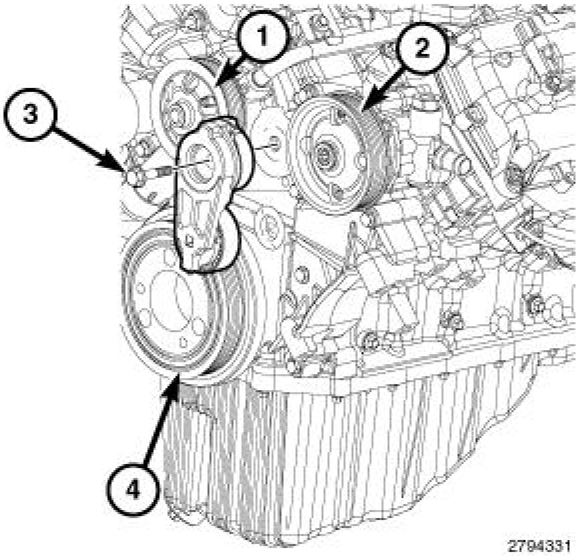


Fig. 33: Tensioner Assembly & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Align the locator tang and install the belt tensioner. Tighten the bolt (3) to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION**.

3. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** for 5.7L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L. .
4. Connect the negative battery cable.

ENGINE

BOTTLE, PRESSURIZED COOLANT

REMOVAL

REMOVAL

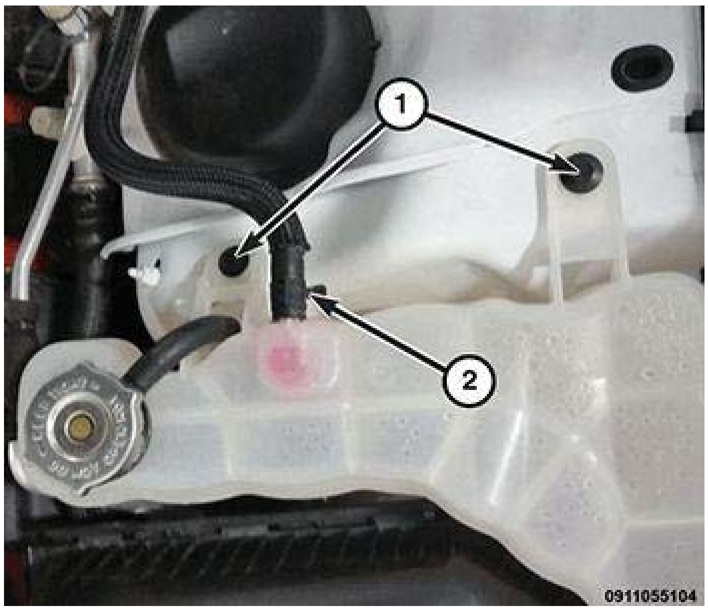
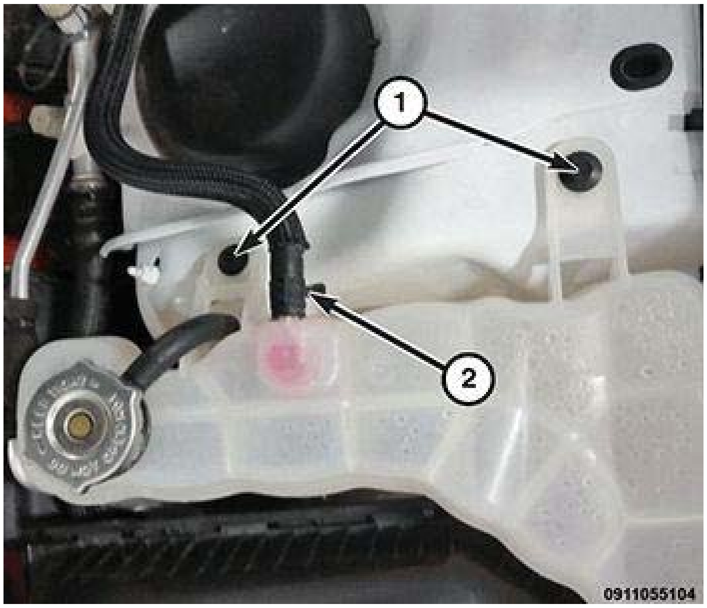


Fig. 34: Bolts & Coolant Hose
Courtesy of CHRYSLER GROUP, LLC

1. Partially drain the cooling system. Refer to **STANDARD PROCEDURE**.
2. Remove and plug coolant hose (2).
3. Remove and plug the lower coolant hose.
4. Remove the bolts (1) and the pressurized coolant bottle.

INSTALLATION

INSTALLATION



[Fig. 35: Bolts & Coolant Hose](#)
Courtesy of CHRYSLER GROUP, LLC

1. Install the lower coolant hose.
2. Install the pressurized coolant bottle. Tighten bolts (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the coolant hose (2).
4. Fill cooling system. Refer to **STANDARD PROCEDURE**.

CAP, RADIATOR

DESCRIPTION

DESCRIPTION

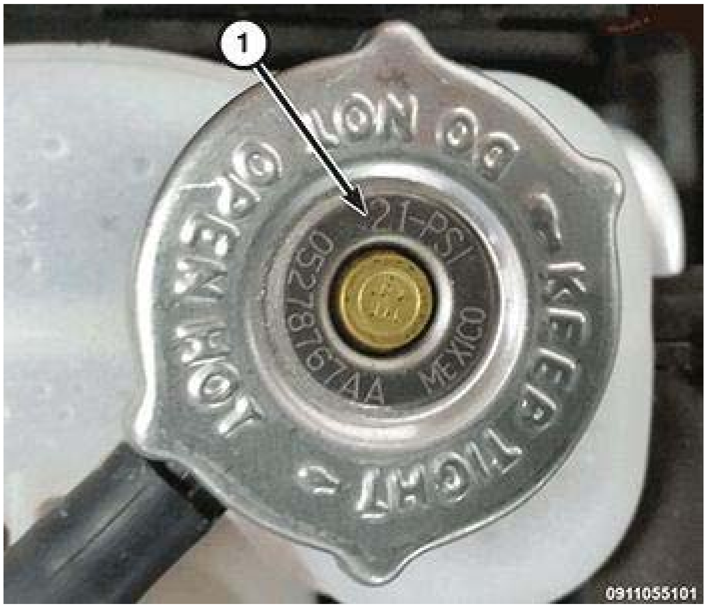


Fig. 36: Typical Pressure Cap - Pressures May Vary
Courtesy of CHRYSLER GROUP, LLC

The engine cooling system is equipped with a pressure cap on the pressurized coolant bottle. This cap releases pressure at some point within a range indicated on the cap. The pressure relief point is engraved on top of the cap (1).

The cooling system will operate at pressures slightly above atmospheric pressure. This results in a higher coolant boiling point allowing increased radiator cooling capacity. The cap contains a spring-loaded pressure relief valve. This valve opens when system pressure reaches the release range indicated on the cap.

A rubber gasket seals the radiator filler neck. This is done to maintain vacuum during coolant cool-down and to prevent leakage when system is under pressure.

DIAGNOSIS AND TESTING

PRESSURE CAP-TO-FILLER NECK SEAL

The pressure cap upper gasket (seal) pressure relief can be tested by removing overflow hose from radiator filler neck nipple. Attach hose of pressure tester tool (special tool #7700, Tester, Cooling System) (or equivalent) to nipple. It will be necessary to disconnect hose from its adapter for filler neck. Pump air into radiator. The pressure cap upper gasket should relieve at the pressure indicated on the cap.

WARNING: The warning words "DO NOT OPEN HOT" on radiator pressure cap, are a safety precaution. When hot, pressure builds up in cooling system. To prevent scalding or injury, radiator cap should not be removed while system is hot and/or under pressure.

Do not remove radiator cap at any time **except** for the following purposes:

1. Check and adjust antifreeze freeze point.
2. Refill system with new antifreeze.
3. Conducting service procedures.
4. Checking for vacuum leaks.

WARNING: If vehicle has been run recently, wait at least 15 minutes before removing radiator cap. With a rag, squeeze radiator upper hose to check if system is under pressure. Place a rag over cap and without pushing cap down, rotate it counter-clockwise to first stop. Allow fluid to escape through the coolant reserve/overflow hose into reserve/overflow tank. Squeeze radiator upper hose to determine when pressure has been released. When coolant and steam stop being pushed into tank and system pressure drops, remove radiator cap completely.

PRESSURE CAP

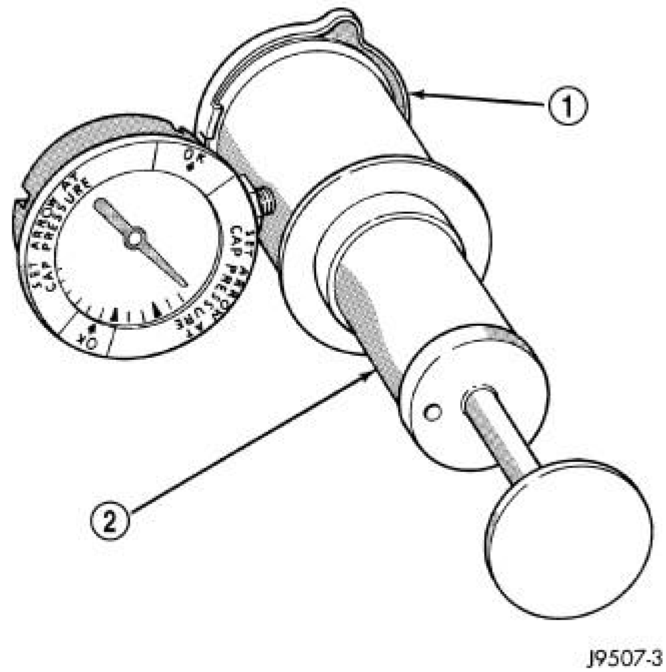


Fig. 37: Pressure Testing Radiator Pressure Cap
Courtesy of CHRYSLER GROUP, LLC

Remove the pressure cap (1). Be sure that sealing surfaces are clean. Moisten rubber gasket with water and install cap (1) on pressure tester (special tool #7700, Tester, Cooling System) (2) or an equivalent.

Operate tester pump to bring pressure to 124 kPa (18 psi) on gauge. If pressure cap (1) fails to hold pressure of at least 110 kPa (16 psi) replace cap. Refer to the following **CAUTION** .

The pressure cap may test properly while positioned on tool (special tool #7700, Tester, Cooling System) (or equivalent). It may not hold pressure or vacuum when installed on radiator. If so, inspect radiator filler neck and cap's top gasket for damage. Also inspect for dirt or distortion that may prevent cap from sealing properly.

CAUTION: Radiator pressure testing tools are very sensitive to small air leaks, which will not cause cooling system problems. A pressure cap that does not have a history of coolant loss should not be replaced just because it leaks slowly when tested with this tool. Add water to tool. Turn tool upside down and recheck pressure cap to confirm that cap needs replacement.

INSPECTION

INSPECTION

Hold cap at eye level, right side up. The vent valve at bottom of cap should open. If rubber gasket has swollen and prevents vent valve from opening, replace cap.

Hold cap at eye level, upside down. If any light can be seen between vent valve and rubber gasket, replace cap. **Do not use a replacement cap that has a spring to hold vent shut.** A replacement cap must be the type designed for a coolant reserve/overflow system with a completely sealed diaphragm spring and a rubber gasket. This gasket is used to seal to radiator filler neck top surface. Use of proper cap will allow coolant return to radiator.

COOLANT

DESCRIPTION

DESCRIPTION

WARNING: Antifreeze is an ethylene-glycol base coolant and is harmful if swallowed or inhaled. If swallowed, drink two glasses of water and induce vomiting. If inhaled, move to fresh air area. Seek medical attention immediately. Do not store in open or unmarked containers. Wash skin and clothing thoroughly after coming in contact with ethylene-glycol. Keep out of reach of children. Dispose of glycol base coolant properly, contact your dealer or government agency for location of collection center in your area. Do not open a cooling system when the engine is at operating temperature or hot under pressure, personal injury can result. Avoid radiator cooling fan when engine compartment related service is performed, personal injury can result.

CAUTION: Mixing of engine coolant (antifreeze) other than specified Organic Additive Technology (OAT) engine coolant (antifreeze), may result in engine damage and may decrease corrosion protection. Organic Additive Technology (OAT) engine coolant is different and should not be mixed with Hybrid Organic Additive Technology (HOAT) engine coolant (antifreeze). If a non-OAT engine coolant (antifreeze) is introduced into the cooling system in an emergency, it should be replaced with the specified engine coolant (antifreeze) as soon as possible.

To find the coolant needed. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS
.

The cooling system is designed around the coolant. The coolant must accept heat from engine metal, in the cylinder head area near the exhaust valves and engine block. Then coolant carries the heat to the radiator where the tube/fin radiator can transfer the heat to the air.

The use of aluminum cylinder blocks, cylinder heads, and water pumps requires special corrosion protection. MoparĀ® Antifreeze/Coolant, or the equivalent ethylene-glycol base coolant with organic corrosion inhibitors (called OAT, for Organic Additive Technology) is recommended. This coolant offers the best engine cooling without corrosion when mixed with 50% ethylene-glycol and 50% distilled water to obtain a freeze point of -37Ā°C (-35Ā°F). If it becomes contaminated, drain, flush, and replace with fresh properly mixed coolant solution.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - COOLANT CONCENTRATION TESTING

Coolant concentration should be checked when any additional coolant was added to system or after a coolant drain, flush and refill. The coolant mixture offers optimum engine cooling and protection against corrosion when mixed to a freeze point of -37Ā°C (-35Ā°F) to -46Ā°C (-51Ā°F). The use of a hydrometer or a refractometer can be used to test coolant concentration.

A hydrometer will test the amount of glycol in a mixture by measuring the specific gravity of the mixture. The higher the concentration of ethylene glycol, the larger the number of balls that will float, and higher the freeze protection (up to a maximum of 60% by volume glycol).

A refractometer Tool (special tool #8286, Refractometer)

Refer to **SPECIAL TOOLS**.

Some coolant manufactures use other types of glycols into their coolant formulations. Propylene glycol is the most common new coolant. However, propylene glycol based coolants do not provide the same freezing protection and corrosion protection and is not recommended.

CAUTION: Do not mix types of coolant - corrosion protection will be severely reduced.

FAN, COOLING

REMOVAL

3.6L SINGLE FAN

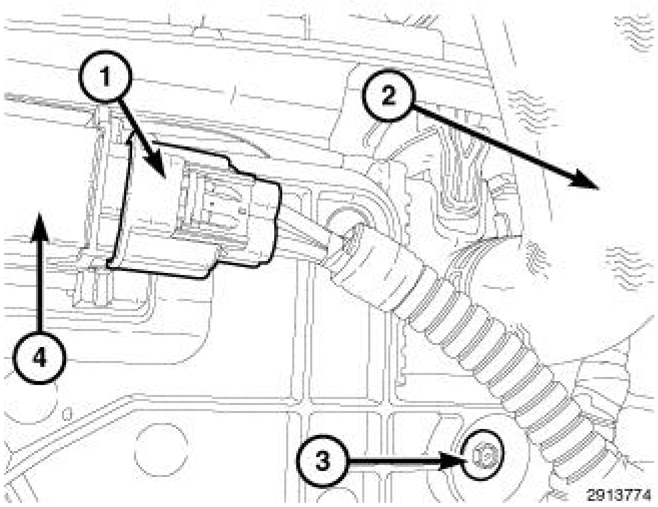


Fig. 38: Cooling Fan Electrical Connector & Upper Cooling Fan Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: If replacing the fan blades. The dual fan blades can be replaced separately from the motor. Single motor fan blades are balanced to the motor and must be replaced as a fan/motor assembly.

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
3. Disconnect the cooling fan wire harness connector (1).
4. Remove the upper cooling fan bolts (3).
5. Remove the cooling fan assembly.

6.2L SINGLE FAN

NOTE: If replacing the fan blades. The dual fan blades can be replaced separately from the motor. Single motor fan blades are balanced to the motor and must be replaced as a fan/motor assembly.

1. Disconnect and isolate the negative battery cable.
2. Remove the water pump. Refer to **PUMP, WATER, REMOVAL**.

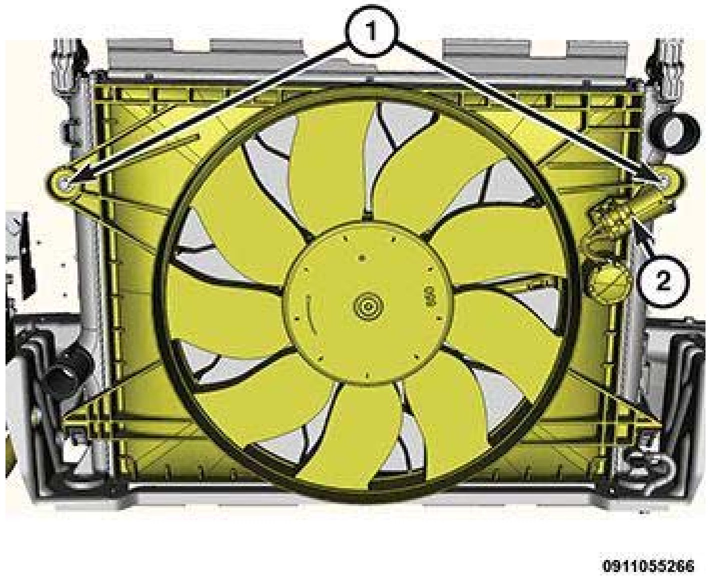


Fig. 39: Cooling Fan Wire Harness Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the cooling fan wire harness connector (2).
4. Remove the bolts (1) and the cooling fan assembly.

5.7L SINGLE FAN

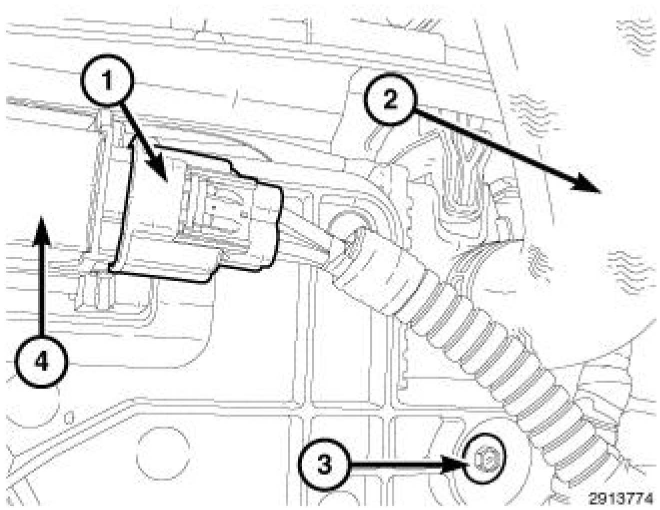


Fig. 40: Cooling Fan Electrical Connector & Upper Cooling Fan Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**If replacing the fan blades. The dual fan blades can be replaced separately from the motor. Single motor fan blades are balanced to the motor and must be replaced as a fan/motor assembly.**

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
3. Disconnect the cooling fan wire harness connector (1).
4. Remove the upper cooling fan mounting bolts (3).
5. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
6. Remove the belly pan. Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL** .
7. **Loosen** the lower radiator support bolts.

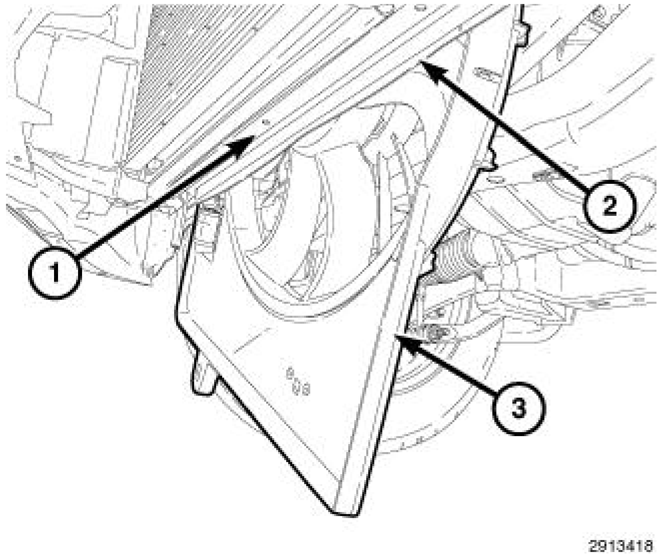


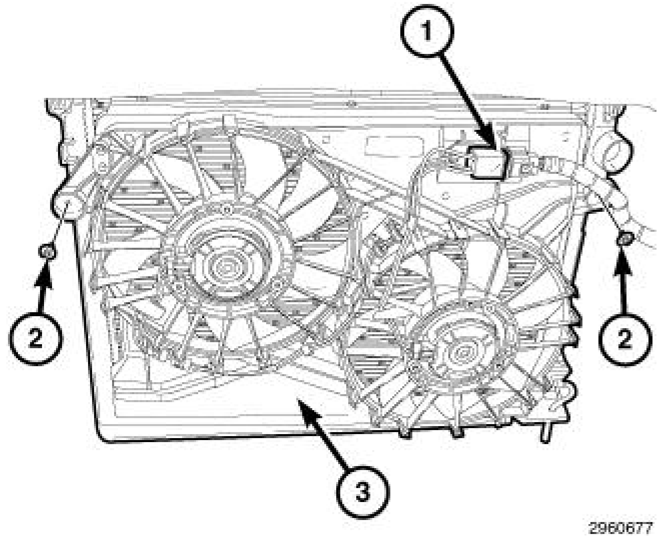
Fig. 41: Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

8. Remove the radiator cooling fan assembly (1) from the radiator by pushing up and away from the radiator mounts.
9. While moving the lower core support forward, slowly lower the left side of the cooling fan assembly from the bottom of the vehicle.
10. Remove the cooling fan assembly.

3.6L DUAL FAN

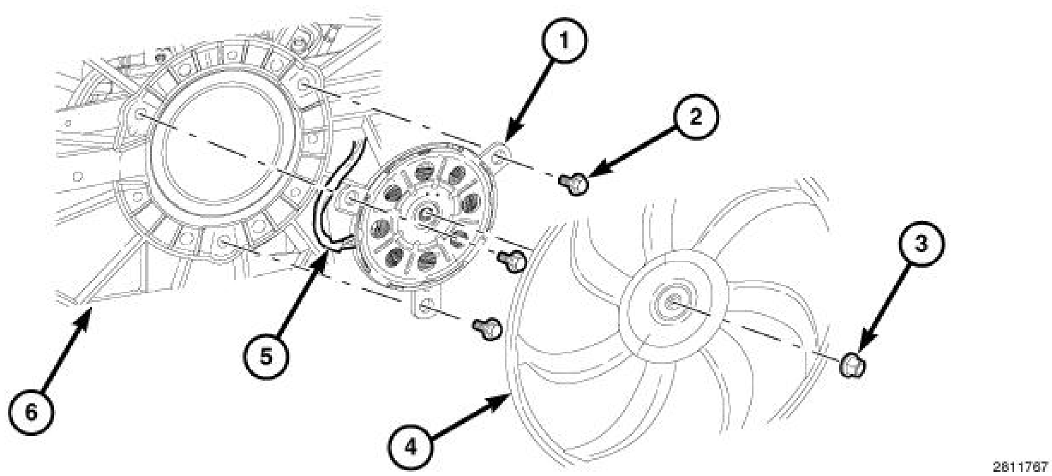
NOTE: **If replacing the fan blades. The dual fan blades can be replaced separately from the motor. Single motor fan blades are balanced to the motor and must be replaced as a fan/motor assembly.**

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .



[Fig. 42: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly]()
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the cooling fan wire harness connector (1).
4. Remove the cooling fan mounting bolts (2).
5. Remove the radiator cooling fan assembly (3) from vehicle.



[Fig. 43: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts]()
Courtesy of CHRYSLER GROUP, LLC

6. Removing the fan motor wiring harness (5) from the fan shroud (6).
7. Remove the fan blade (4) from fan motor.
8. Remove bolts (2) that support the fan motor to the shroud.

5.7L DUAL FAN

1. Disconnect and isolate negative the battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
3. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

4. If equipped, remove the lower closeout panel.
5. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
6. If equipped, install the lower closeout panel.
7. Remove support and lower vehicle.

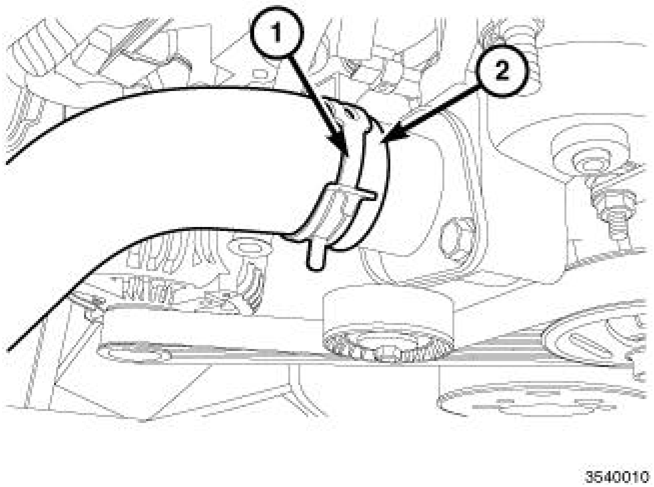


Fig. 44: Upper Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

8. Remove the upper radiator hose (2).

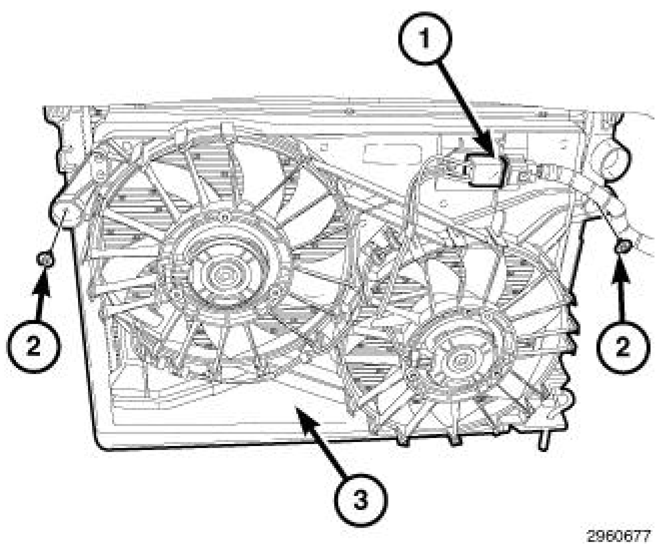


Fig. 45: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the cooling fan wire harness connector (1).
10. Remove bolts (2) and the radiator cooling fan assembly (3).

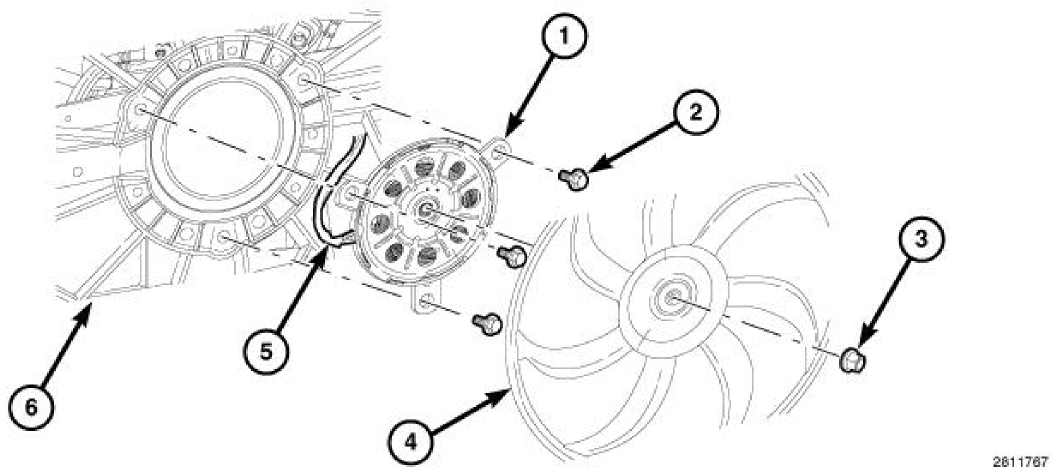


Fig. 46: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Removing the fan motor wiring harness (5) from the fan shroud (6).
12. Remove the fan blade (4) from the fan motor.
13. Remove the bolts (2) that support the fan motor to the shroud.

6.4L DUAL FAN

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
3. Remove the throttle body. Refer to **THROTTLE BODY, REMOVAL** .
4. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
5. Remove the lower closeout panel.
6. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
7. Remove the support and lower the vehicle.

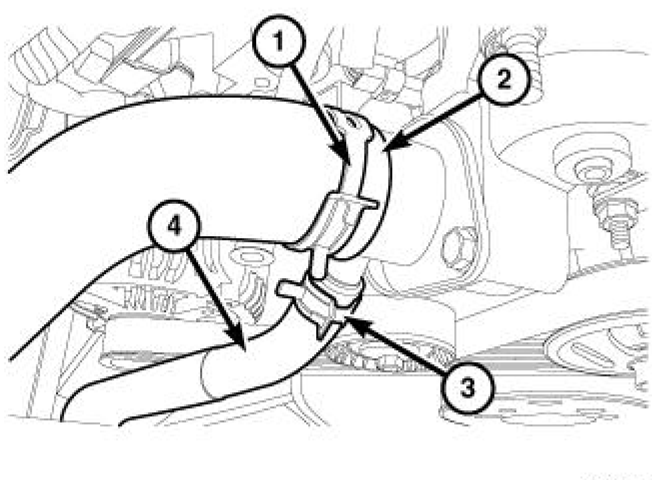


Fig. 47: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

8. Remove the oil cooler supply hose (4) from the thermostat housing (2).
9. Remove the upper radiator hose (2).

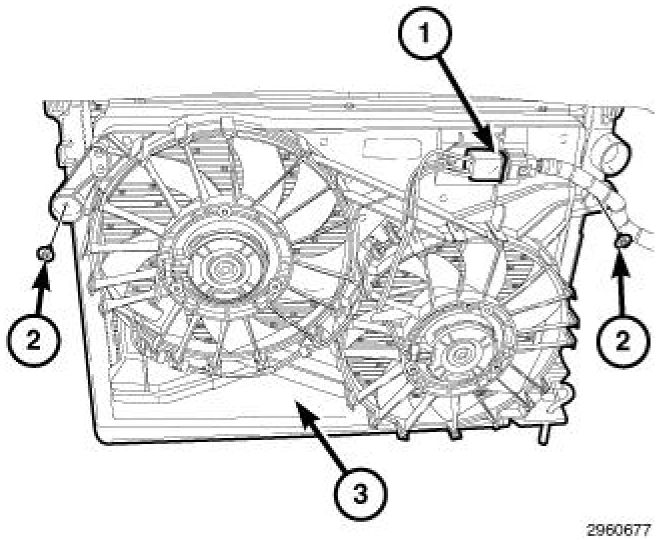


Fig. 48: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

10. Disconnect the cooling fan wire harness connector (1).
11. Remove bolts (2) and the radiator cooling fan assembly (3) from vehicle.

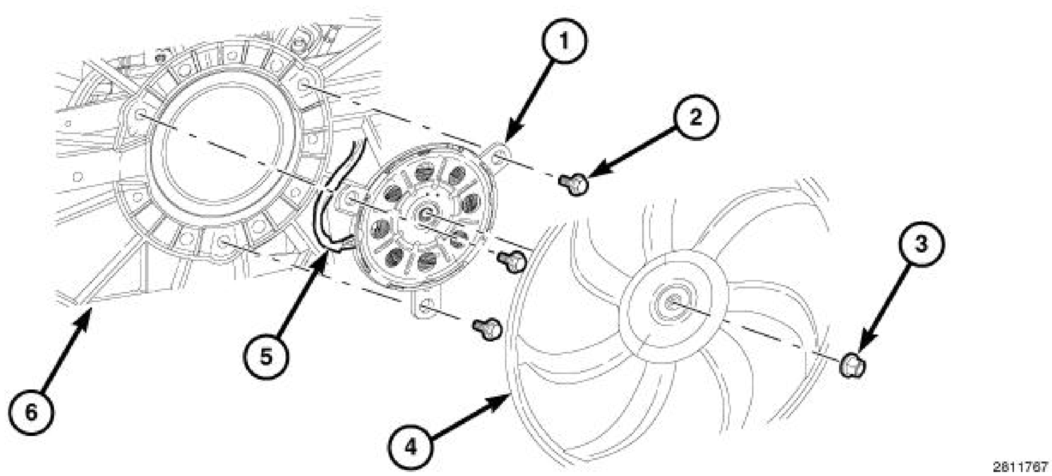


Fig. 49: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Removing the fan motor wiring harness (5) from the fan shroud (6).
13. Remove nut and the fan blade (4) from the fan motor.
14. Remove the bolts (2) that support the fan motor to the shroud.

INSTALLATION

3.6L SINGLE FAN

NOTE: **If replacing the fan blades. The dual fan blades can be replaced separately from the motor. Single motor fan blades are balanced to the motor and must be replaced as a fan/motor assembly.**

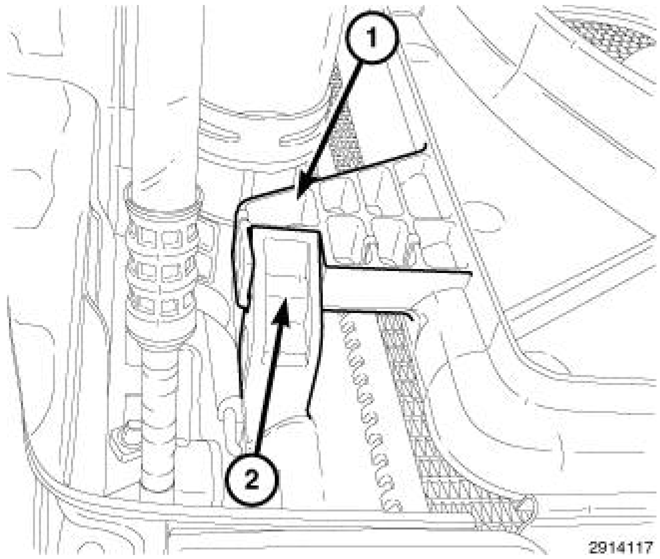


Fig. 50: Radiator Cooling Fan Assembly & Radiator Mounts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **When installing the cooling fan assembly. Care must be used so that the fan shroud does not contact the radiator or the radiator fins. Damaged may cause leaking.**

1. Position the radiator cooling fan assembly (1) in vehicle.

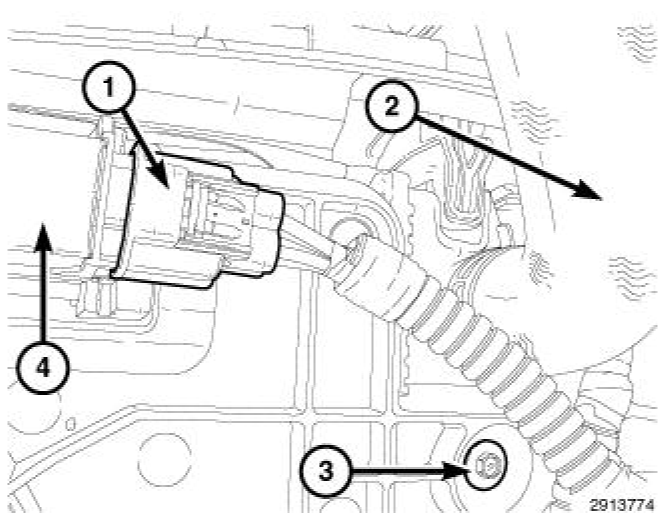


Fig. 51: Cooling Fan Electrical Connector & Upper Cooling Fan Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the cooling fan bolts (3) and tighten to the proper torque specification. Refer to SPECIFICATIONS.
3. Connect cooling fan wire harness connector (1).

4. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .
5. Connect the negative battery cable.
6. Operate engine until it reaches normal operating temperature. Check the fan for proper operation.

6.2L SINGLE FAN

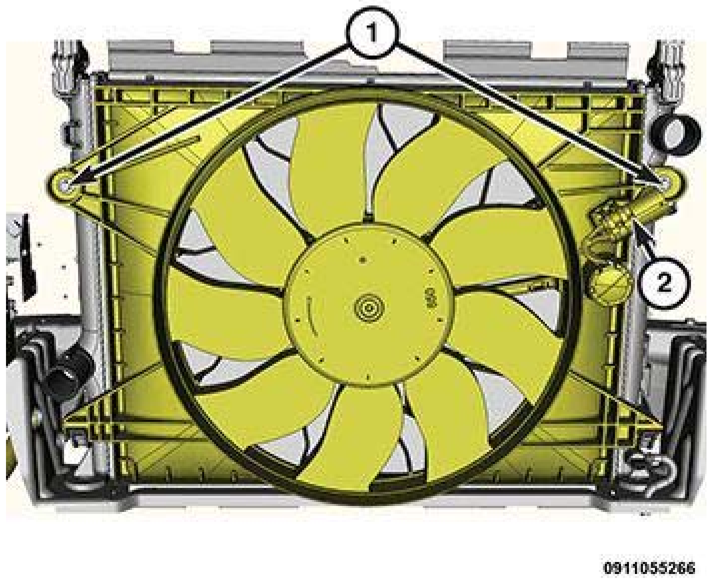


Fig. 52: Cooling Fan Wire Harness Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **When installing the cooling fan assembly. Care must be used so that the fan shroud does not contact the radiator or the radiator fins. Damaged may cause leaking.**

1. Install the cooling fan assembly (1). Tighten bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Connect the cooling fan wire harness connector (2).
3. Install the water pump. Refer to **PUMP, WATER, INSTALLATION**.
4. Connect the negative battery cable.
5. Operate the engine until it reaches normal operating temperature. Check the fan for proper operation.

5.7L SINGLE FAN

NOTE: **If replacing the fan blades. The dual fan blades can be replaced separately from the motor. Single motor fan blades are balanced to the motor and must be replaced as a fan/motor assembly.**

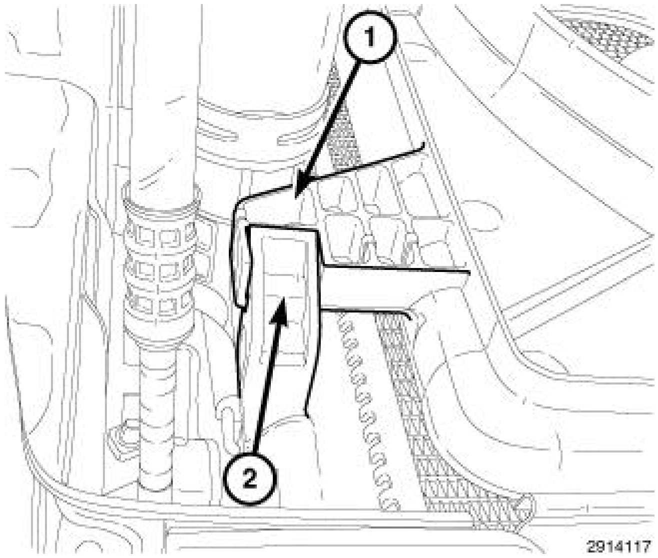


Fig. 53: Radiator Cooling Fan Assembly & Radiator Mounts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When installing the cooling fan assembly. Care must be used so that the fan shroud does not contact the radiator or the radiator fins. Damaged may cause leaking.

1. Install the radiator cooling fan assembly (1) in vehicle.
2. Align the lower cooling fan assembly mounting tabs (1) with the radiator mounts (2).
3. Tighten the lower radiator support bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Install the lower engine belly pan. Refer to **BELLY PAN, INSTALLATION** or **BELLY PAN, ENGINE, INSTALLATION** .
5. Remove support and lower vehicle.

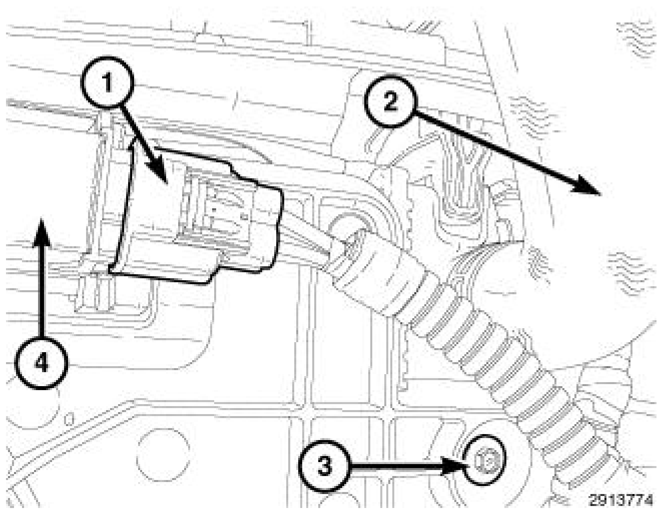


Fig. 54: Cooling Fan Electrical Connector & Upper Cooling Fan Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install the cooling fan assembly mounting bolts (3). Tighten to the proper torque specification. Refer to

SPECIFICATIONS.

7. Connect cooling fan wire harness connector (1).
8. Install the air cleaner body. Refer to BODY, AIR CLEANER, INSTALLATION .
9. Connect the negative battery cable.
10. Operate engine until it reaches normal operating temperature. Check the fan for proper operation.

3.6L DUAL FAN

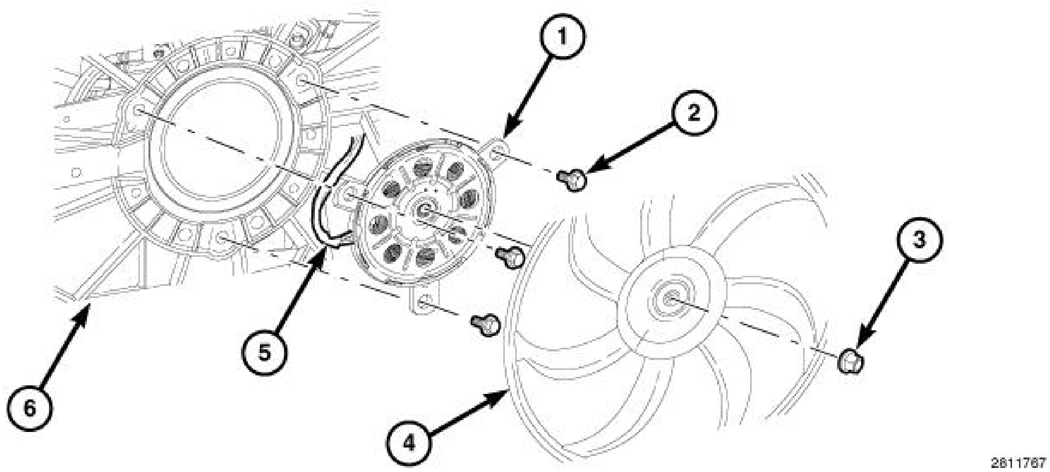


Fig. 55: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the fan blade (4) to the fan motor. Tighten the nut (3) to the proper torque specification. Refer to SPECIFICATIONS.
2. Install the fan motor assembly to the shroud (6). Tighten nut (3) to the proper torque specification. Refer to SPECIFICATIONS.
3. Route the fan motor wiring harness (5) through the fan shroud (6).

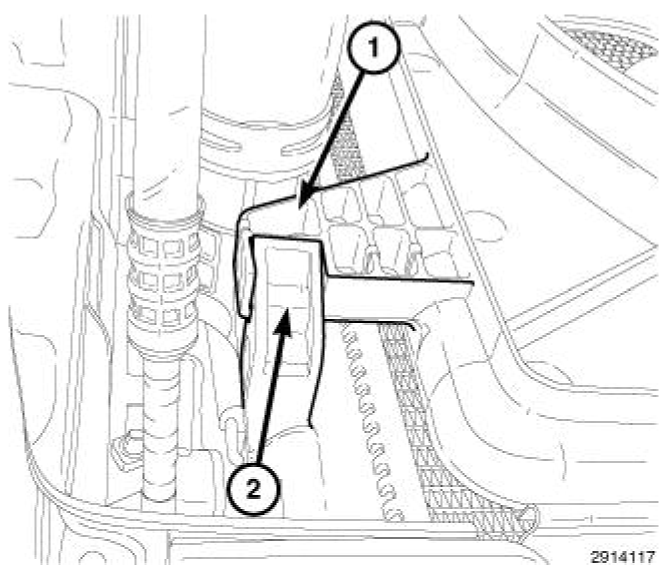


Fig. 56: Radiator Cooling Fan Assembly & Radiator Mounts
Courtesy of CHRYSLER GROUP, LLC

4. Install the cooling fan assembly (1) into the lower radiator mounts (2).

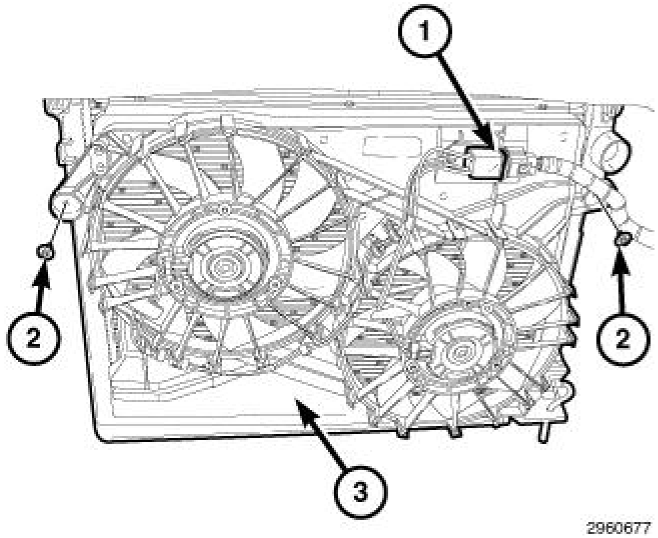


Fig. 57: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Install the cooling fan bolts (2) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
6. Connect the cooling fan wire harness connector (1).
7. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .
8. Connect the negative battery cable.
9. Operate engine until it reaches normal operating temperature.

5.7L DUAL FAN

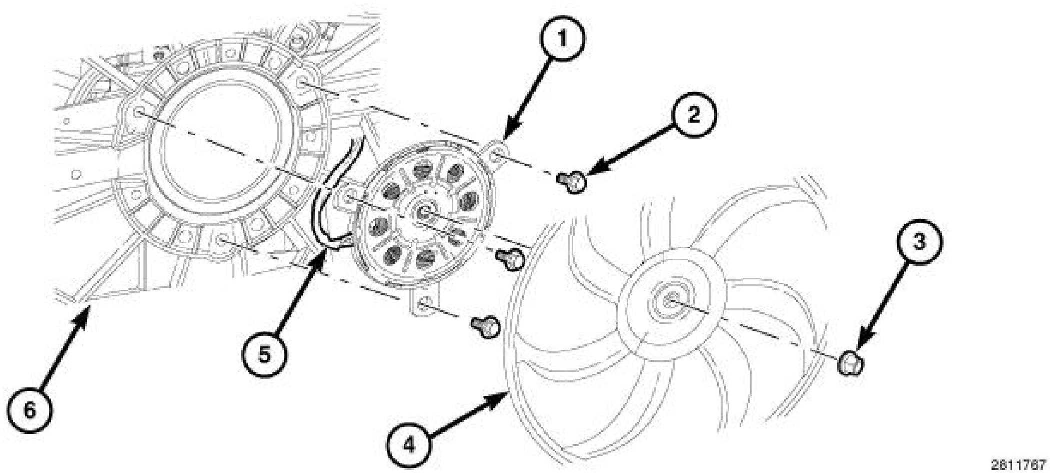


Fig. 58: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the fan blade (4) to the fan motor. Tighten the nut (3) to the proper torque specification. Refer to **SPECIFICATIONS**.

2. Install the fan motor assembly to the shroud (6). Tighten nut (3) to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Route the fan motor wiring harness (5) through the fan shroud (6).

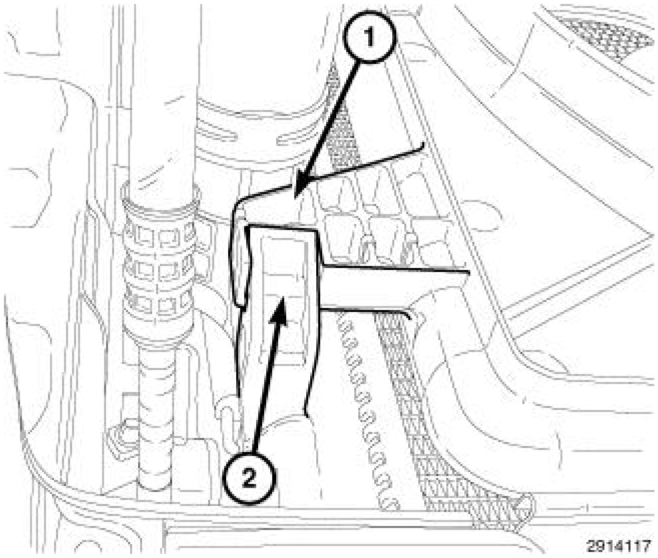


Fig. 59: Radiator Cooling Fan Assembly & Radiator Mounts
Courtesy of CHRYSLER GROUP, LLC

4. Install the cooling fan assembly (1) into the lower radiator mounts (2).

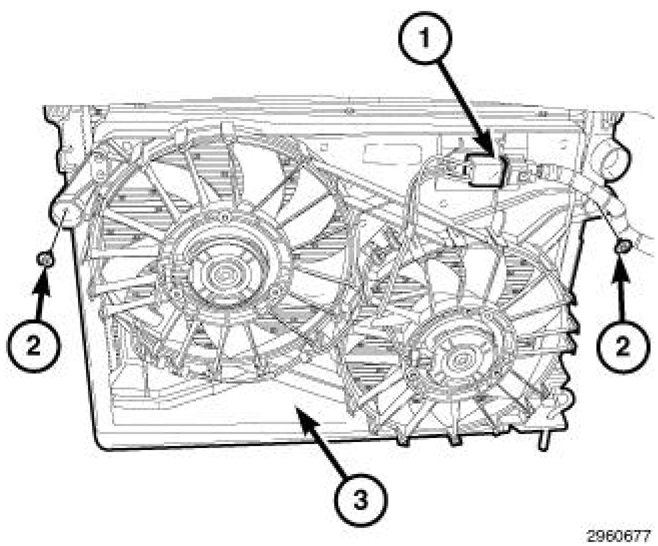


Fig. 60: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Install the cooling fan mounting bolts (2). Tighten bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
6. Connect the cooling fan wire harness connector (1).

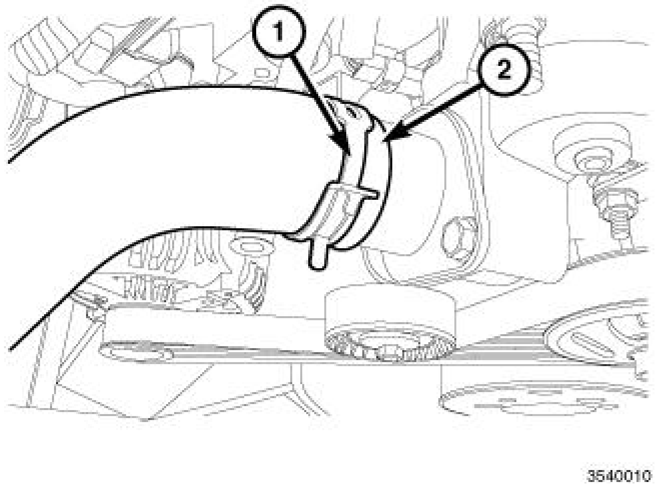


Fig. 61: Upper Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

7. Install the upper radiator hose.
8. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .
9. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
10. Operate the engine until it reaches normal operating temperature.

6.4L DUAL FAN

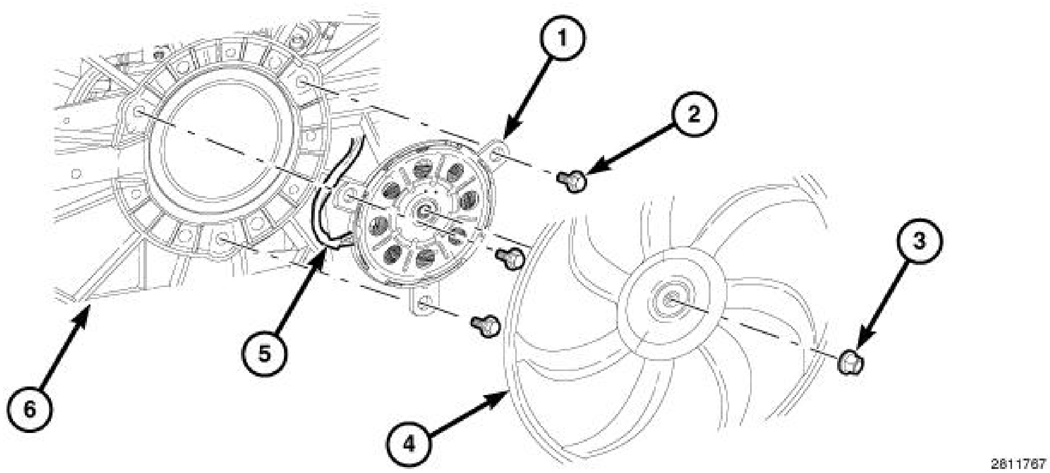


Fig. 62: Fan Motor Wiring Harness, Fan Shroud, Fan Blade & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the fan blade (4) to fan motor. Tighten nut (3) to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Install the fan motor assembly to the shroud (6). Tighten the nut (3) to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Route the fan motor wiring harness (5) through the fan shroud (6).

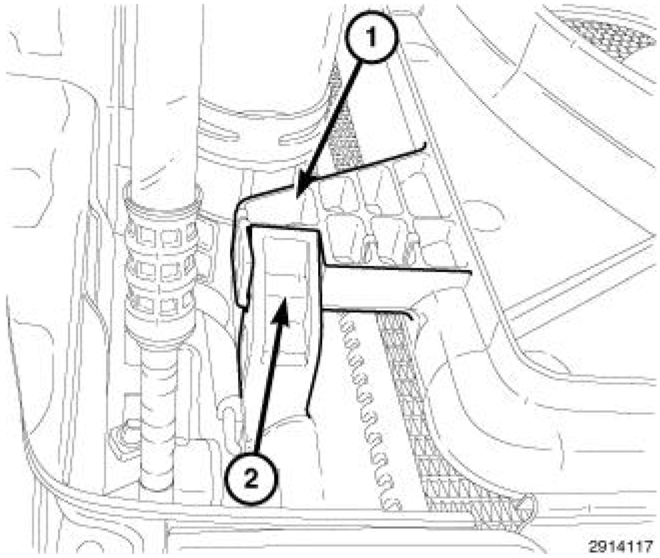


Fig. 63: Radiator Cooling Fan Assembly & Radiator Mounts
Courtesy of CHRYSLER GROUP, LLC

4. Install the cooling fan assembly (1) into the lower radiator mounts (2).

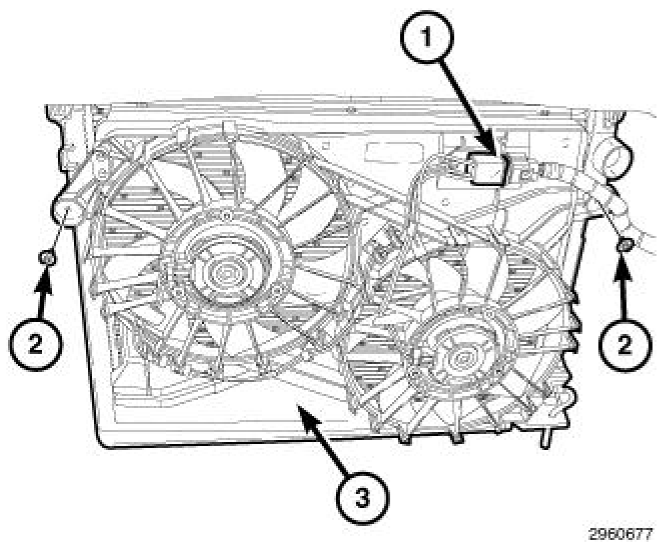


Fig. 64: Cooling Fan Electrical Connector, Cooling Fan Mounting Bolts & Radiator Cooling Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Install cooling fan mounting bolts (2). Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
6. Connect the cooling fan wire harness connector (1).

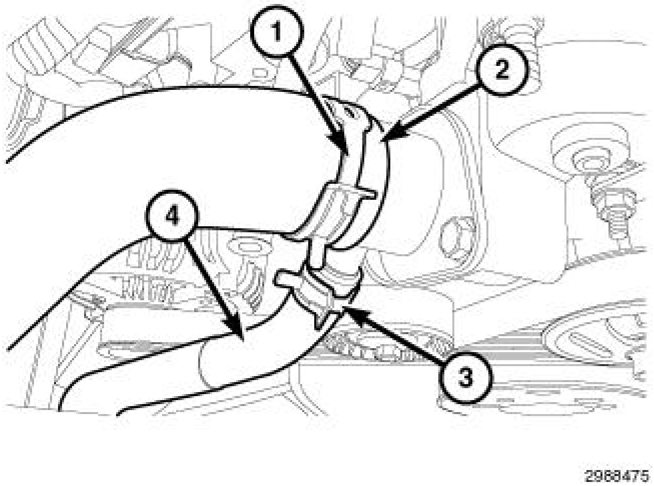


Fig. 65: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

7. Install the upper radiator hose (2).
8. Install the oil cooler supply line (4) to the thermostat housing.
9. Install the throttle body. Refer to **THROTTLE BODY, INSTALLATION** .
10. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .
11. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
12. Operate the engine until it reaches normal operating temperature.

HEATER, ENGINE BLOCK

DESCRIPTION

3.6L

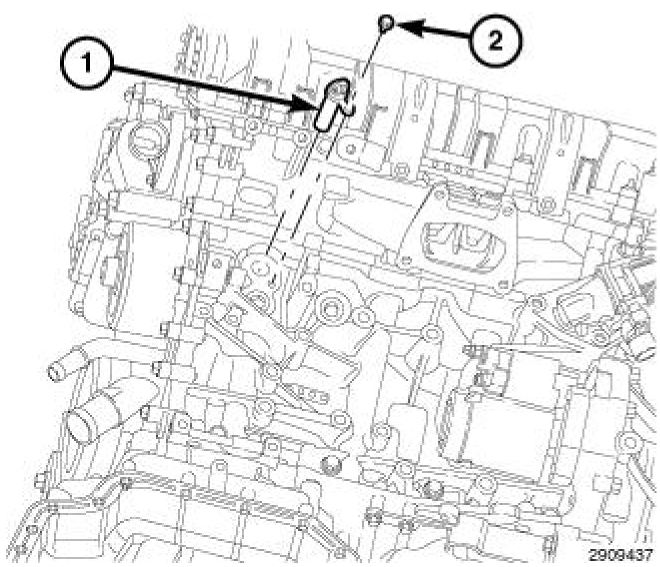


Fig. 66: Block Heater & Screw
Courtesy of CHRYSLER GROUP, LLC

The 3.6L engine block heater (1) is mounted in the cylinder block, near the front drivers side corner. The engine block heater (1) is a dry cylinder type design and is powered by 110 volt AC.

5.7L/6.4L

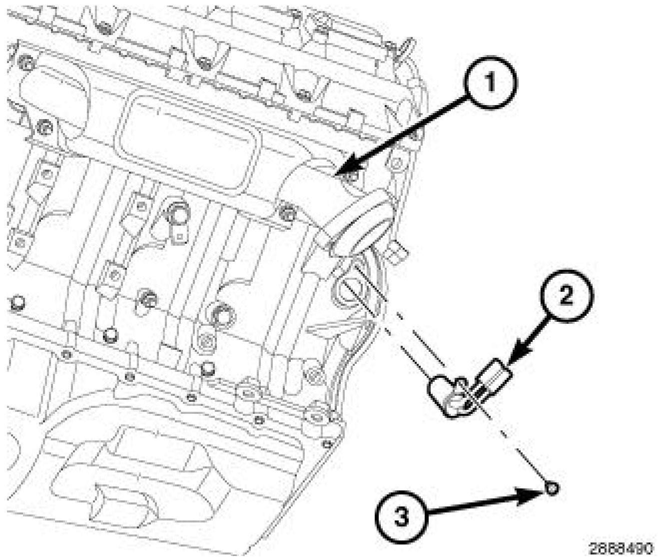


Fig. 67: Heater, Exhaust And Bolt
Courtesy of CHRYSLER GROUP, LLC

The 5.7L engine block heater (1) is mounted in the cylinder block, near the left rear corner. The engine block heater (1) is a dry cylinder type design and is powered by 110 volt AC.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ENGINE BLOCK HEATER

If unit does not operate, trouble can be in either the power cord or the heater element. Test power cord for continuity with a 110-volt voltmeter or 110-volt test light; test heater element continuity with an ohmmeter or 12-volt test light.

REMOVAL

3.6L

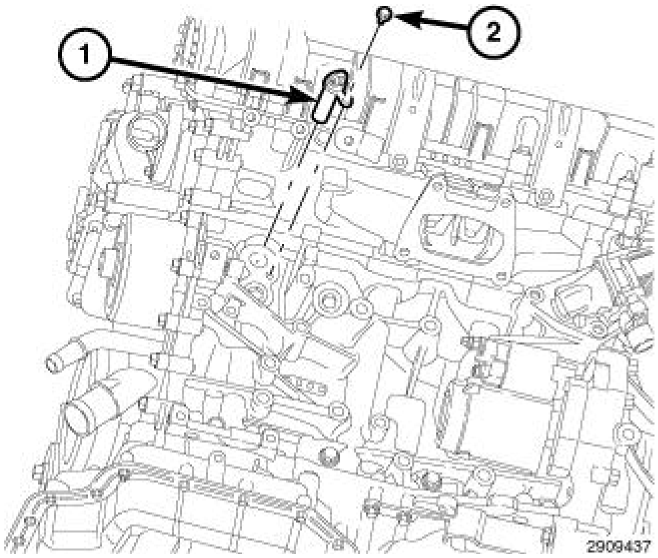


Fig. 68: Block Heater & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .
3. Detach the power cord plug from the block heater (1).
4. Remove the bolt (2) and the engine block heater (1).

5.7L/6.2L/6.4L

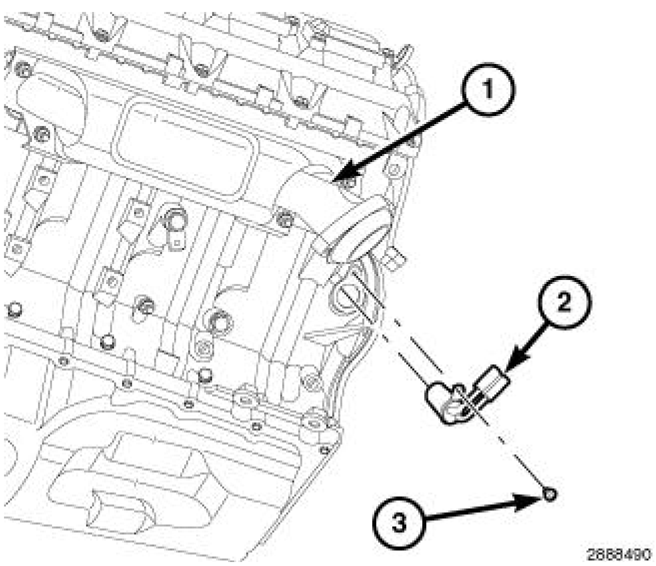


Fig. 69: Heater, Exhaust And Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the belly pan. Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL** .
3. Remove the power cord from the block heater.
4. Remove the bolt (3) and the block heater assembly (2).

INSTALLATION

3.6L

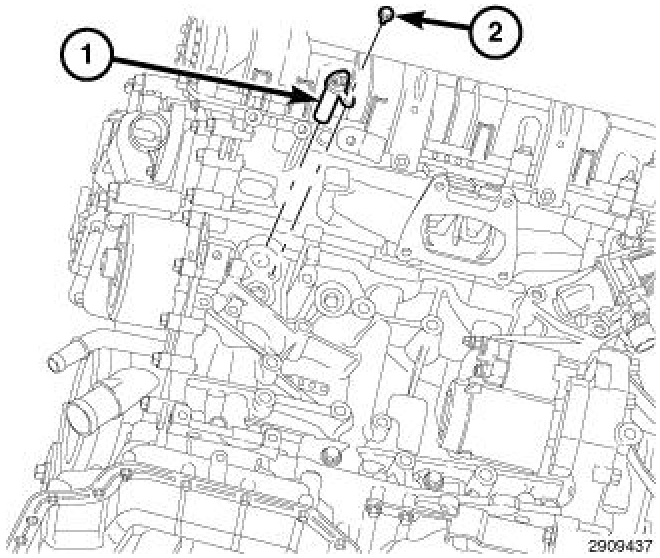


Fig. 70: Block Heater & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Thoroughly clean the cylinder block heater cavity.
2. Insert the engine block heater assembly (1) Tighten the bolt (2) to the proper torque specification. Refer to **SPECIFICATIONS**.

CAUTION: To prevent damage, the power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds.

3. Attach the power cord to heater.
4. Install the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION** .
5. Remove support and lower the vehicle.

5.7L/6.2L/6.4L

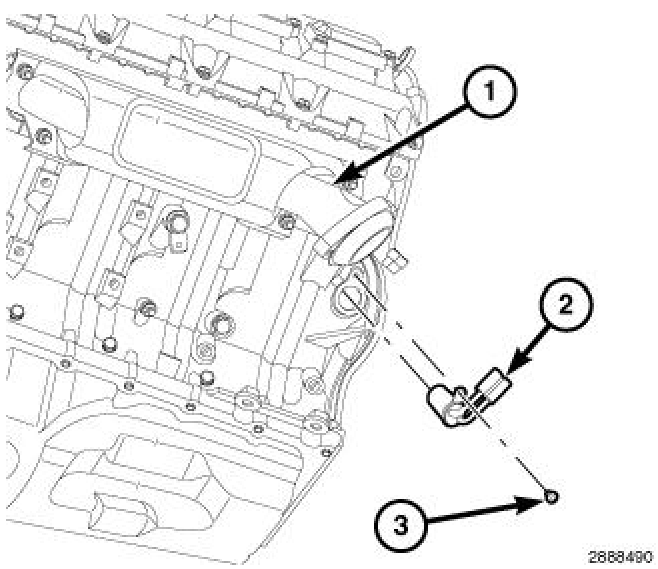


Fig. 71: Heater, Exhaust And Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Thoroughly clean the cylinder block core hole and the block heater seat.
2. Insert the block heater assembly (2) into the engine block.
3. Tighten the bolt (3) to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Connect the power cord to the block heater.
5. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** or **BELLY PAN, ENGINE, INSTALLATION** .

PUMP, WATER

DESCRIPTION

DESCRIPTION

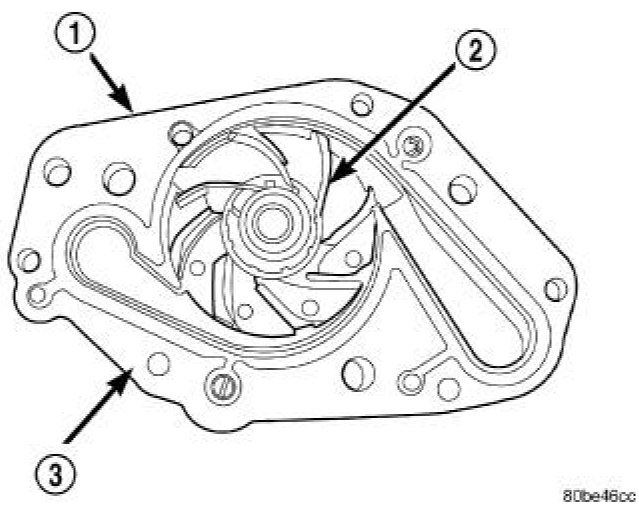


Fig. 72: Water Pump
Courtesy of CHRYSLER GROUP, LLC

A centrifugal water pump (2) circulates coolant through the water jackets, passages, intake manifold, radiator core, cooling system hoses and heater core. The pump is driven from the engine crankshaft by a single serpentine main drive belt.

The water pump impeller is pressed onto the rear of a shaft that rotates in bearings pressed into the housing. The housing has two small holes to allow seepage to escape. The water pump seals are lubricated by the antifreeze in the coolant mixture. No additional lubrication is necessary.

The water pump (1) is mounted directly to the timing chain cover and is equipped with a non serviceable integral pulley.

REMOVAL

3.6L

NOTE:	**The water pump on 3.6L engines is bolted directly to the engine timing chain case cover.**

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
3. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
4. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL**.

WARNING: **Constant tension hose clamps are used on most cooling system hoses. When removing or installing, use only tools designed for servicing this type of clamp. Always wear safety glasses when servicing constant tension clamps.**

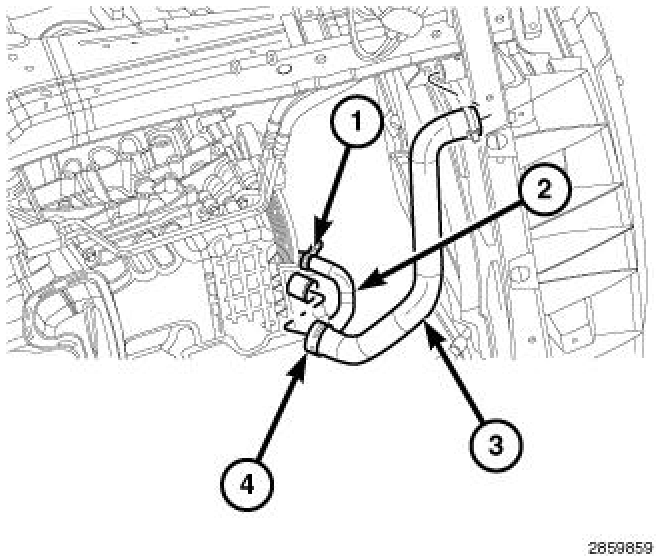


Fig. 73: Lower Heater Hose, Lower Radiator Hose & Tension Clamps
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **A number or letter is stamped into the tongue of constant tension clamps (4). If replacement is necessary, use only an original equipment clamp with matching number or letter.**

5. Remove the lower heater hose (1) from the water pump.
6. Remove the lower radiator hose (3) from the water pump.

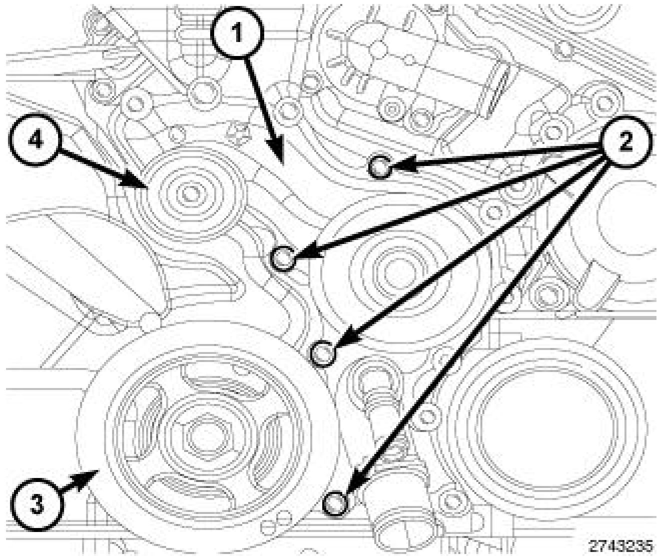


Fig. 74: Idler Pulley, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove idler pulley (4). Refer to **PULLEY, IDLER, REMOVAL**.
8. Remove the eleven water pump mounting bolts. Take notice to the four water pump M6 bolts (2) that bolt directly to the timing cover.

CAUTION: **Do not pry on the water pump at the timing chain case/cover. The machined surfaces may be damaged resulting in leaks.**

9. Remove water pump (1) and discard gasket.

6.2L

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
3. Remove the cooling fan assembly. Refer to **FAN, COOLING, REMOVAL**.
4. Drain the cooling system. Refer to **STANDARD PROCEDURE**.

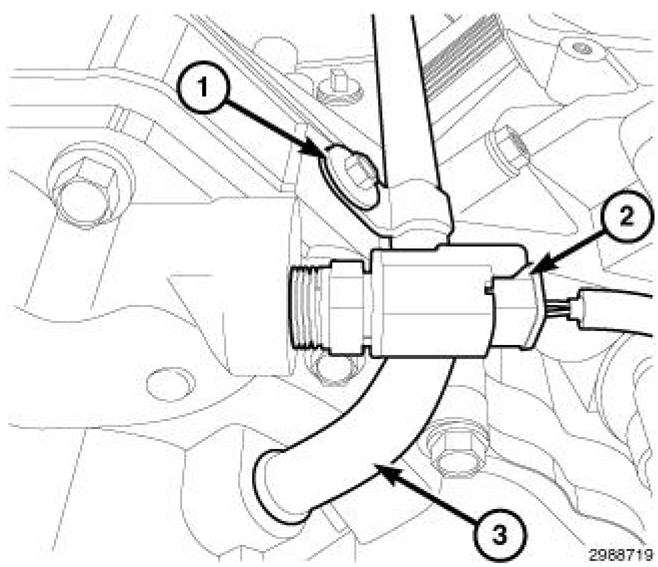


Fig. 75: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL**.
6. Remove bolt (1) and the heater tube (3) from the water pump.
7. Disconnect the Engine Coolant Temperature (ECT) sensor wire harness connector (2).

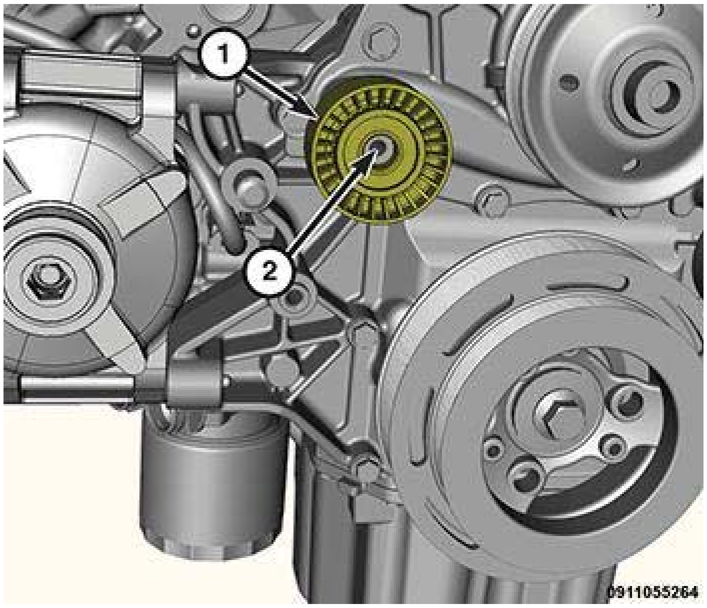


Fig. 76: Idler Pulley & Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Remove the bolt (1) and the idler pulley (2).

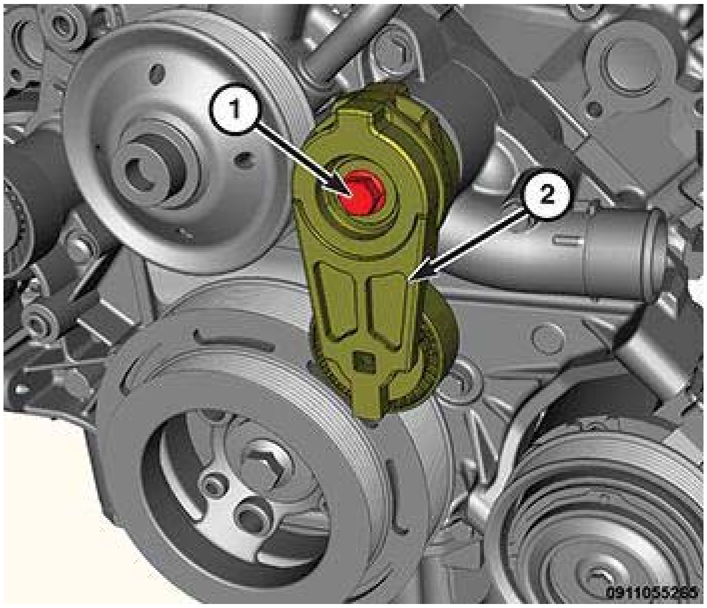


Fig. 77: Belt Tensioner & Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Remove the bolt (1) and the belt tensioner assembly.

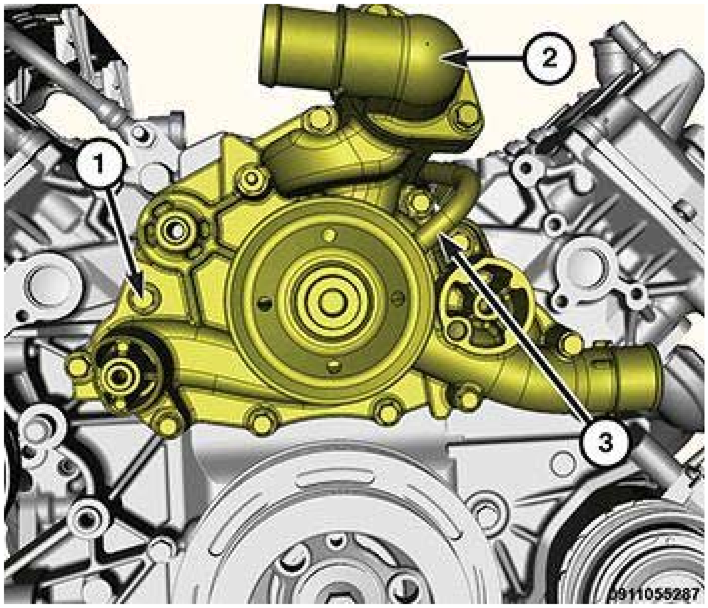


Fig. 78: Water Pump Mounting Bolt & Thermostat Housing
Courtesy of CHRYSLER GROUP, LLC

10. Remove the upper radiator hose from the thermostat housing (2) and position aside.
11. Remove lower radiator hose from the water pump and position aside.
12. Remove the upper stud bolt.
13. Remove the water pump mounting bolts (1) and carefully remove pump.

5.7L/6.4L

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** for 5.7L or **BODY, AIR CLEANER, REMOVAL** for 6.4L .
3. Remove the resonator mounting bracket.
4. Remove cooling fan assembly. Refer to **FAN, COOLING, REMOVAL**.
5. Drain cooling system. Refer to **STANDARD PROCEDURE**.

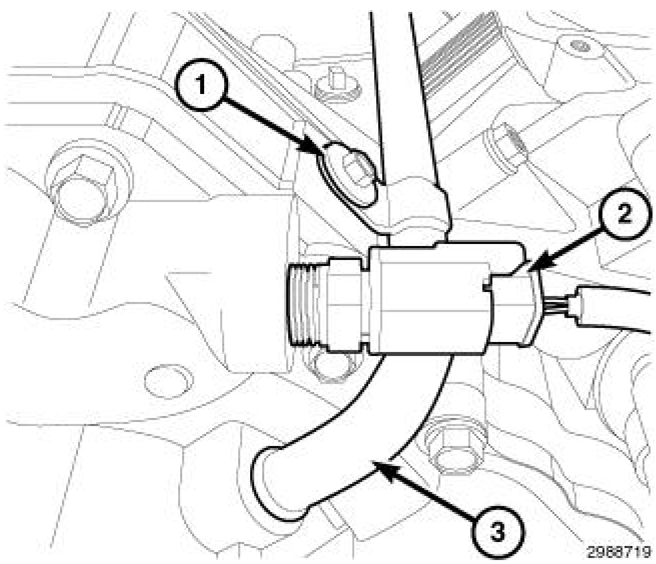


Fig. 79: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL**.
7. Remove bolt (1) and the heater tube (3) from the water pump.
8. Disconnect the Engine Coolant Temperature (ECT) sensor wire harness connector (2).

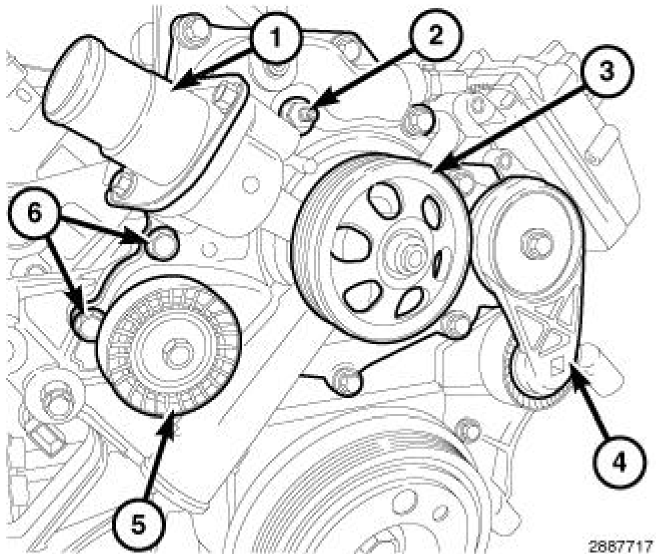


Fig. 80: Thermostat Housing, Water Pump, Belt Tensioner, & Idler Pulley
Courtesy of CHRYSLER GROUP, LLC

9. Remove the upper radiator hose from the thermostat housing (1) and position aside.
10. Remove bolt and the idler pulley (5).
11. Remove belt tensioner assembly (4). Refer to **TENSIONER, BELT, REMOVAL**.
12. Remove the lower radiator hose from the water pump and position aside.
13. Remove the upper stud bolt (2).
14. Remove the water pump mounting bolts (6) and carefully remove pump (3) from the cover while removing the metal bypass tube.

INSPECTION

INSPECTION

Inspect and replace the water pump if it has any of the following defects:

1. Damage or cracks on the pump body.
2. Coolant leaks: If the shaft seal is leaking, this will be evident by traces of thick deposits of dried glycol running down from the pump primary weep passage. A thin black stain below the pump primary weep hole/passage is considered normal operation.
3. Coolant leaks: If the pump primary weep passage is plugged, coolant may come from the secondary weep passage and collect in the valley of the engine. The coolant will eventually run out the back side of the engine. Leakage from the secondary weep passage may give false indications that core plug(s) may be leaking on the back side of the engine block. If this condition is found, clean the primary weep passage of debris.

NOTE: **It is normal for the water pump to weep a small amount of coolant from the primary weep hole (black stain at weep passage). Do not replace the water pump if this condition exists. Replace the water pump if a heavy deposit or a steady flow of engine coolant is evident from the primary weep passage. This indicates a shaft seal failure and pump must be replaced. Coolant may leak from the secondary weep passage and fill the valley of the engine. If this condition is found, clean the primary weep passage of debris. Be sure to perform a thorough analysis before replacing water pump.**

4. Impeller rubs inside of cylinder block.
5. Excessively loose or rough turning bearing.

INSTALLATION

3.6L

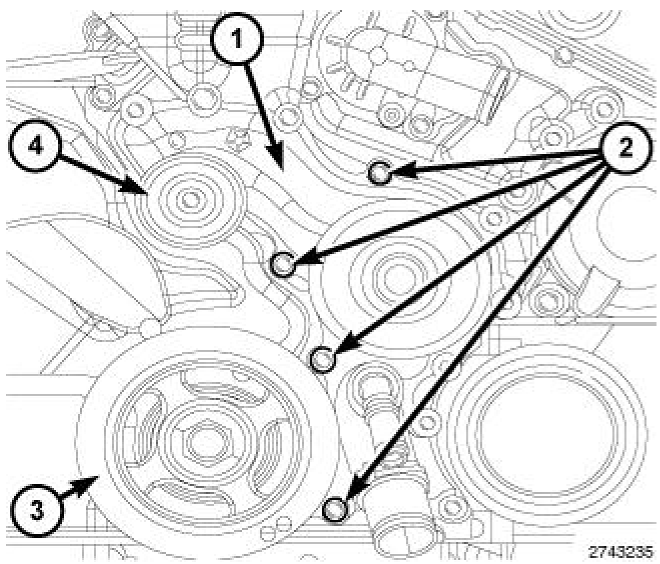
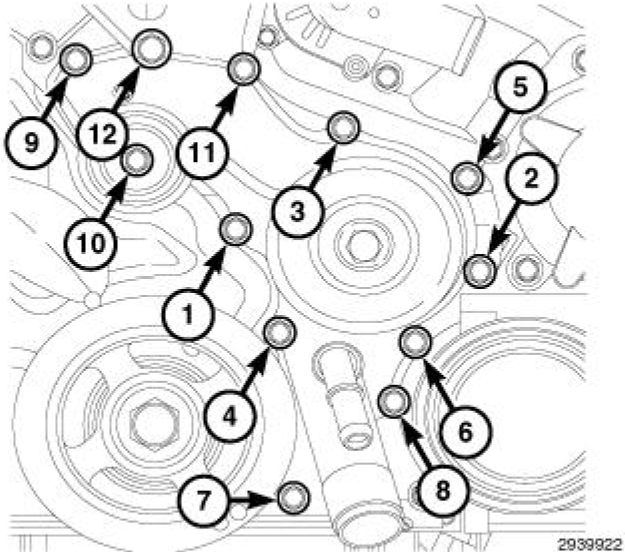


Fig. 81: Idler Pulley, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Clean the gasket mating surfaces.

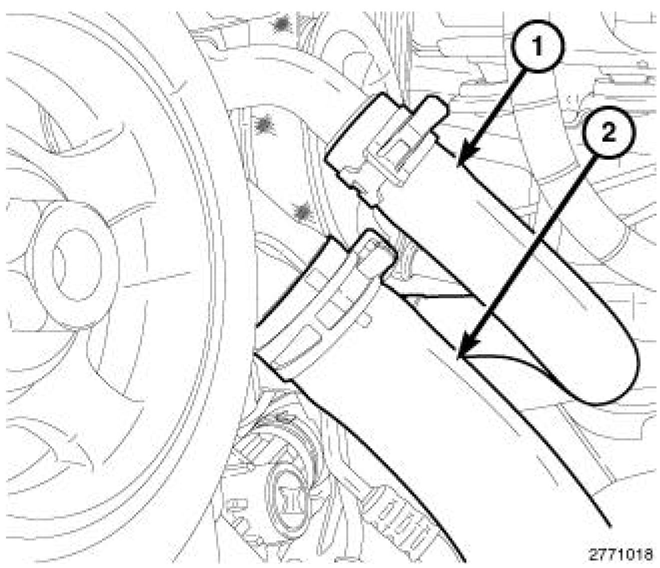
NOTE: **Take notice to the lengths of the mounting bolts. Some M6 bolts mount directly to the timing cover (2).**

2. Using a new gasket, Install water pump (1) and tighten the M6, M8, and M10 bolts finger tight.



[Fig. 82: Water Pump Fasteners Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in the illustration, tighten the bolts 1 - 12 to their proper torque:
   - Tighten the M6 bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
   - Tighten the M8 bolts (10, 11) to the proper torque specification. Refer to **SPECIFICATIONS**.
   - Tighten the M10 bolt (12) to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Install the idler pulley. Refer to **PULLEY, IDLER, INSTALLATION**.



[Fig. 83: Radiator Hose & Heater Hose]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: A number or letter is stamped into the tongue of constant tension clamps (4). If replacement is necessary, use only an original equipment clamp with matching number or letter.

5. Install the lower radiator hose (2).
6. Install the lower return heater hose (1).

CAUTION: **When installing the serpentine accessory drive belt, belt must be routed correctly. If not, engine may overheat due to water pump rotating in wrong direction.**

7. Install accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.
8. Evacuate air and the refill cooling system. Refer to **STANDARD PROCEDURE**.
9. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .
10. Connect the negative battery cable.
11. Check the cooling system for leaks. Refer to **DIAGNOSIS AND TESTING**.

6.2L

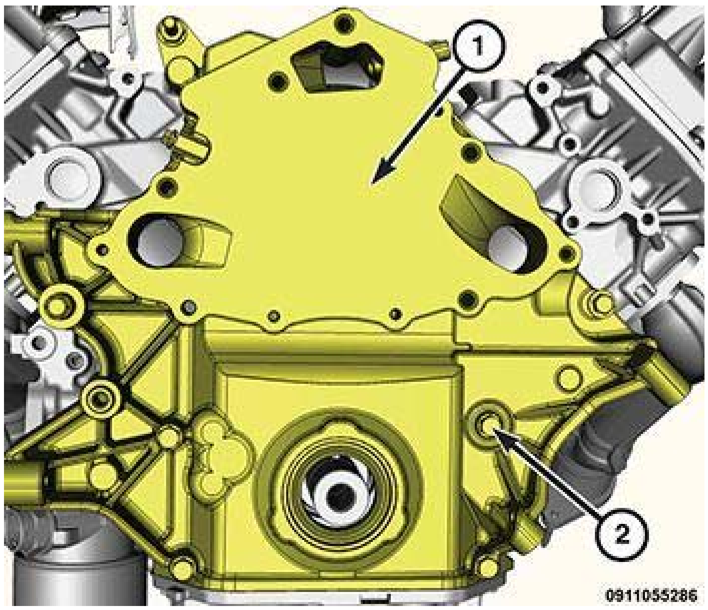


Fig. 84: Timing Chain Cover & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect the mating surfaces of the timing chain cover (1) and the water pump.

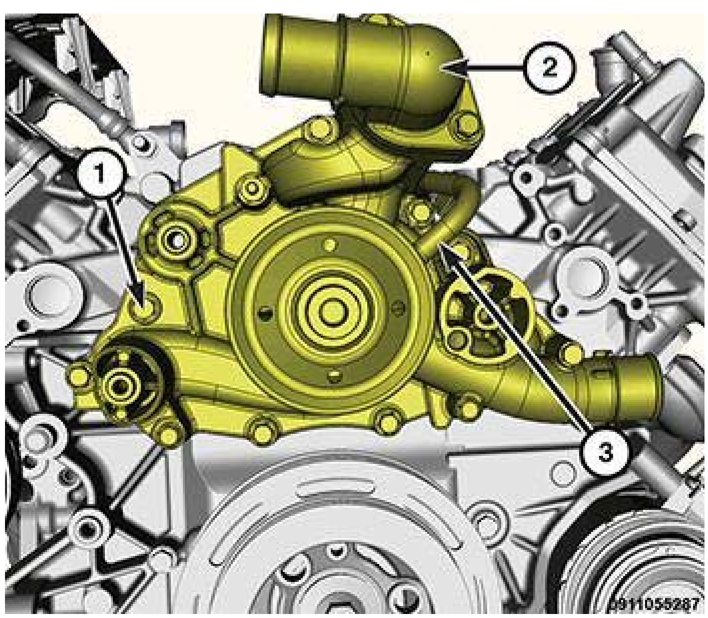


Fig. 85: Water Pump Mounting Bolt & Thermostat Housing
Courtesy of CHRYSLER GROUP, LLC

2. Install the water pump and tighten the bolts (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the lower radiator hose.
4. Install the upper radiator hose to the thermostat housing (2).

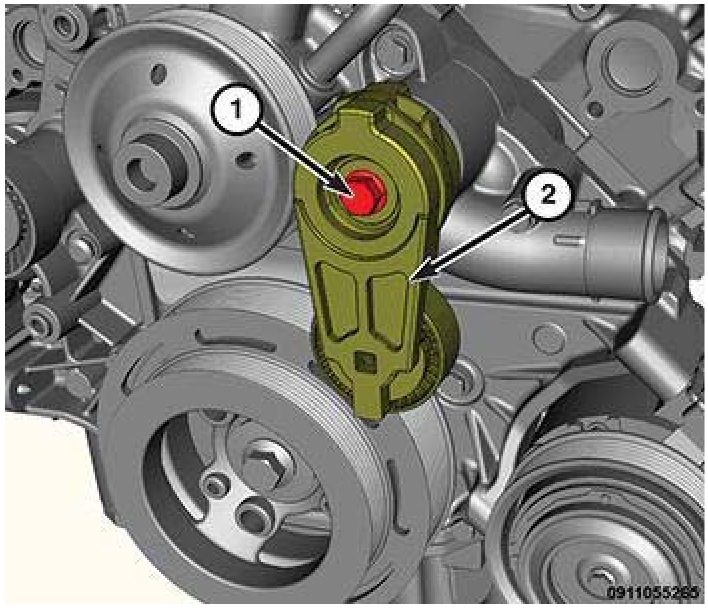


Fig. 86: Belt Tensioner & Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Install the belt tensioner assembly (2) and tighten the bolt (1) to the proper torque specification. Refer to **SPECIFICATIONS**.

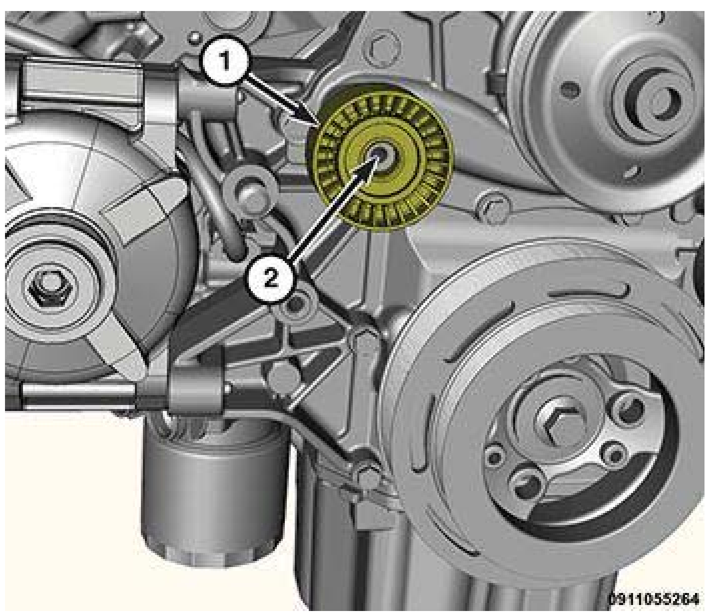


Fig. 87: Idler Pulley & Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Install the idler pulley (1) and tighten the bolt (2) to the proper torque specification. Refer to **SPECIFICATIONS**.

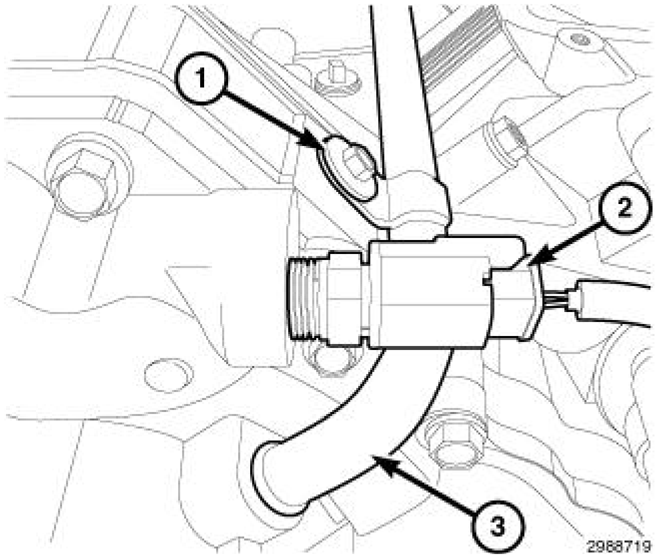


Fig. 88: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Connect the temperature sensor (2) wire hire harness connector (5).
8. Using a new O-ring seal, install heater tube (3). Tighten the bolt (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
9. Install serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION**.
10. Install cooling fan assembly. Refer to **FAN, COOLING, INSTALLATION**.
11. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .
12. Connect the negative battery cable.
13. Evacuate air and refill cooling system. Refer to **STANDARD PROCEDURE**.
14. Check cooling system for leaks. Refer to **DIAGNOSIS AND TESTING**.

5.7L/6.4L

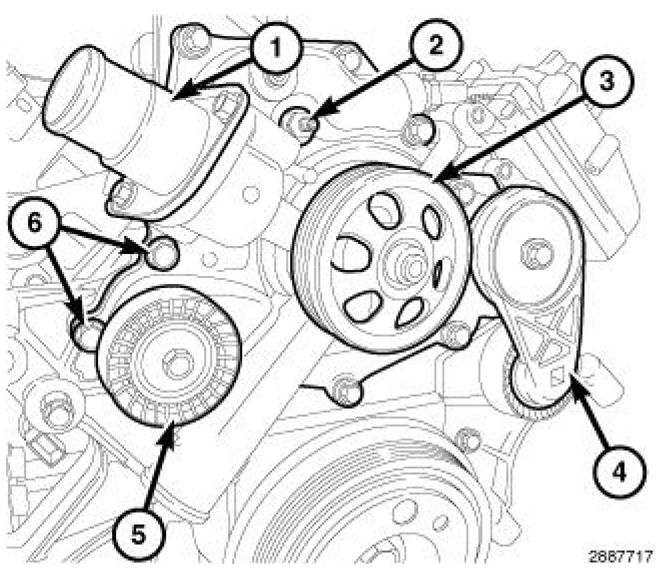


Fig. 89: Thermostat Housing, Water Pump, Belt Tensioner, & Idler Pulley
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect the mating surfaces of the timing chain cover (1) and the water pump.
2. Install the water pump (3). Tighten bolts (6) to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the upper stud bolt (2). Tighten bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Install the lower radiator hose to the water pump.
5. Install the upper radiator hose to the thermostat housing (1).
6. Install the belt tensioner assembly (4). Tighten the bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
7. Install the idler pulley (5). Tighten the bolt to the proper torque specification. Refer to **SPECIFICATIONS**.

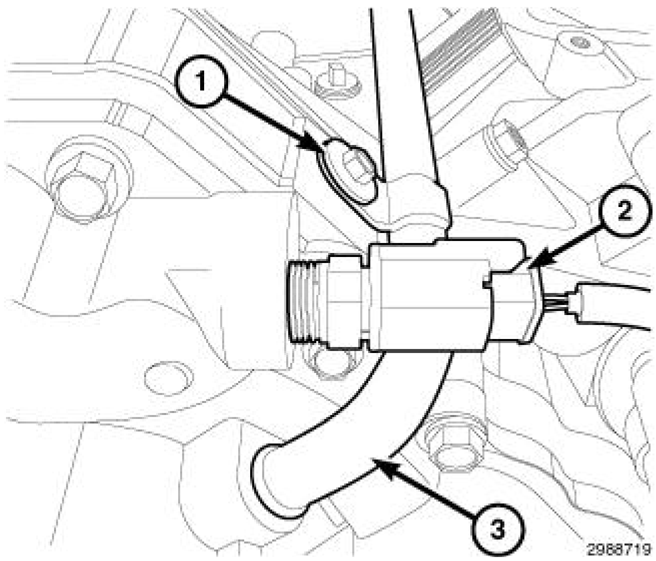


Fig. 90: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Connect the temperature sensor wire hire harness connector (2).
9. Using a new O-ring seal, install heater tube (3). Tighten bolt (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
10. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION**.
11. Install the cooling fan assembly. Refer to **FAN, COOLING, INSTALLATION**.
12. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** for 5.7L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L .
13. Connect the negative battery cable.
14. Evacuate the air and refill cooling system. Refer to **STANDARD PROCEDURE**.
15. Check the cooling system for leaks. Refer to **DIAGNOSIS AND TESTING**.

RADIATOR, ENGINE COOLING

REMOVAL

3.6L

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
3. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
4. Remove the upper radiator hose.
5. Remove the cooling fan assembly. Refer to **FAN, COOLING, REMOVAL**.
6. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
7. Remove bolts (1) and the belly pan.

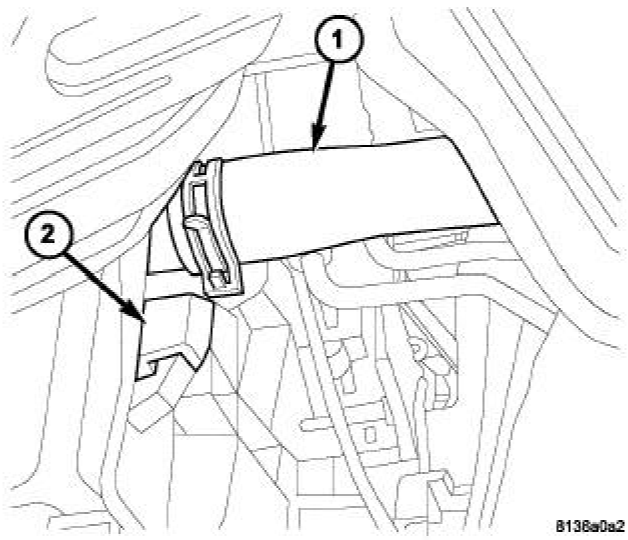


Fig. 91: Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

8. Remove the lower radiator hose (1).
9. Remove support and lower the vehicle.
10. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .

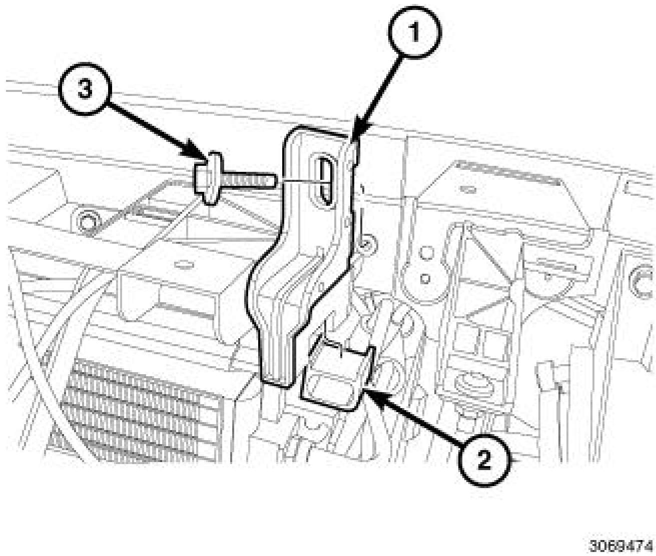


Fig. 92: Upper Radiator Mounting Brackets & Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Bolts are installed with threadlocker. Use hand tools to remove the upper radiator mounting bolts.

11. Remove the bolts (3) and the upper radiator isolator (1).

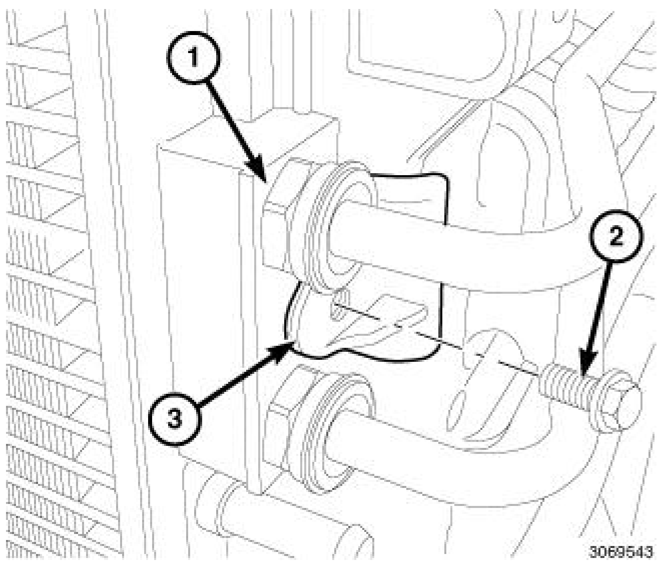


Fig. 93: Mounting & Support Bolt
Courtesy of CHRYSLER GROUP, LLC

12. Remove the lower condenser mounting bolts.
13. Remove the bolt (2) located between the cooler lines.
14. Using a suitable hanger. Support the condenser and remove the right side upper bolt.
15. Separate the condenser assembly from radiator.
16. Tilt the radiator toward engine and remove the radiator from vehicle.

6.2L

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
4. Remove the Low Temperature Radiator (LTR). Refer to **RADIATOR, LOW TEMPERATURE, REMOVAL**.
5. Remove the upper radiator hose.

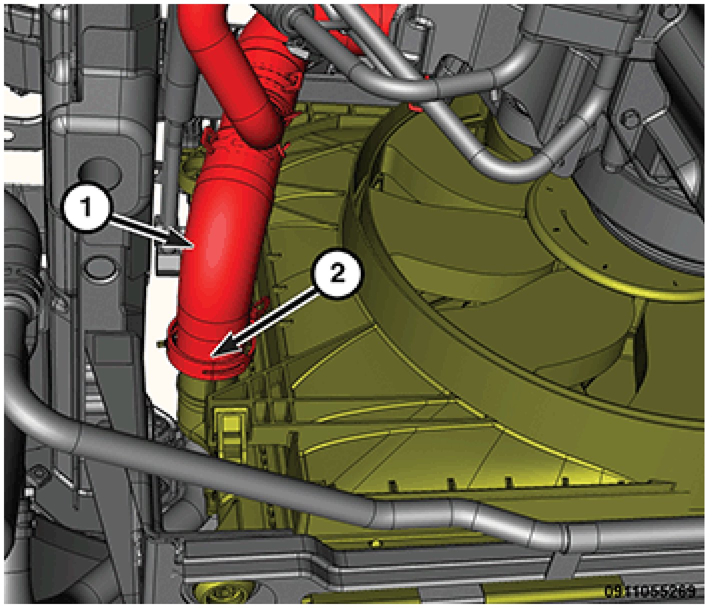


Fig. 94: Lower Radiator Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

6. Remove the lower radiator hose (1).
7. Disconnect the cooling fan wire harness connector.

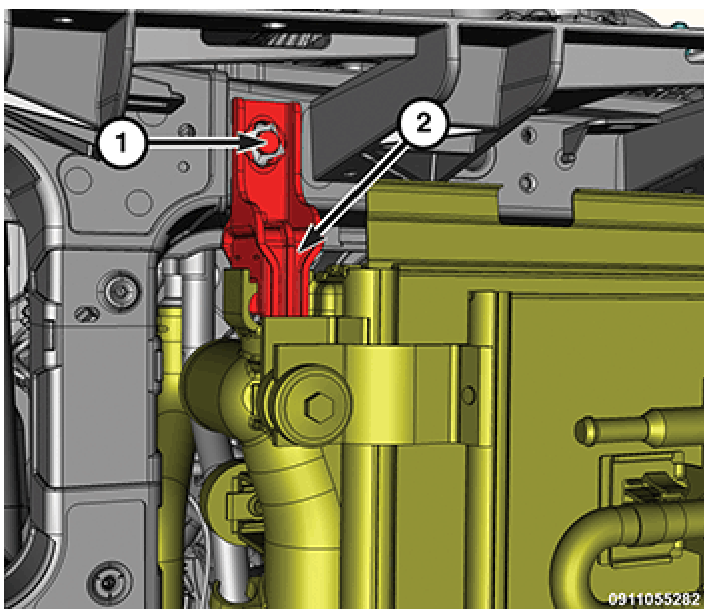


Fig. 95: Upper Radiator Isolator & Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Remove bolts (1) and the upper radiator isolator (2).

CAUTION: Bolts are installed with threadlocker. Use hand tools to remove the upper radiator mounting bolts.

9. Tilt radiator toward the front of the vehicle and remove the radiator and cooling fan.

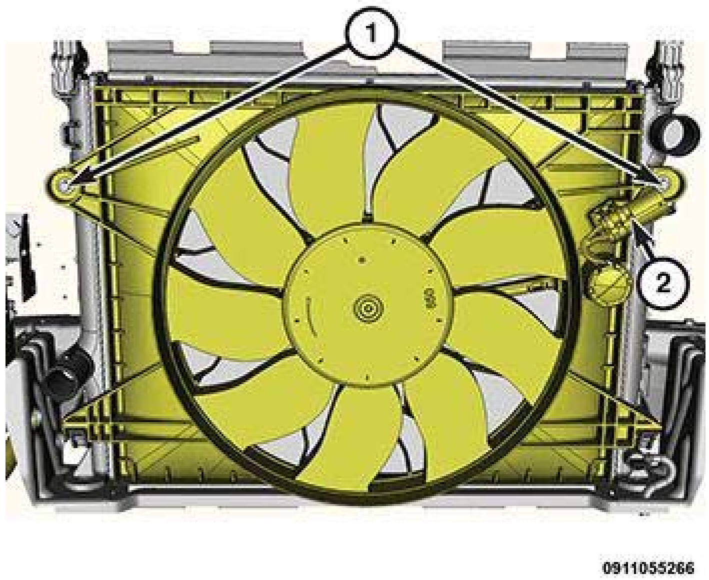


Fig. 96: Cooling Fan Wire Harness Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

10. If necessary, remove the mounting bolts (1) and separate the cooling fan from the radiator.

5.7L/6.4L

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

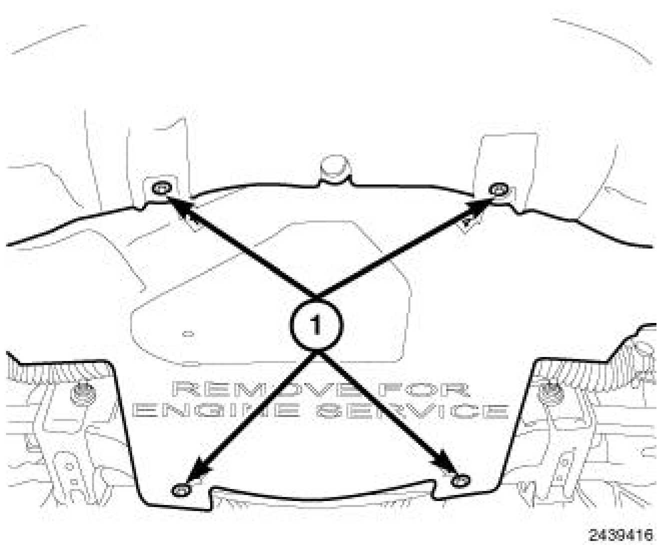


Fig. 97: Belly Pan & Fasteners

Courtesy of CHRYSLER GROUP, LLC

3. Remove bolts (1) and the belly pan.
4. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
5. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** for 5.7L or **BODY, AIR CLEANER, REMOVAL** for 6.4L .
6. Remove the upper radiator hose.

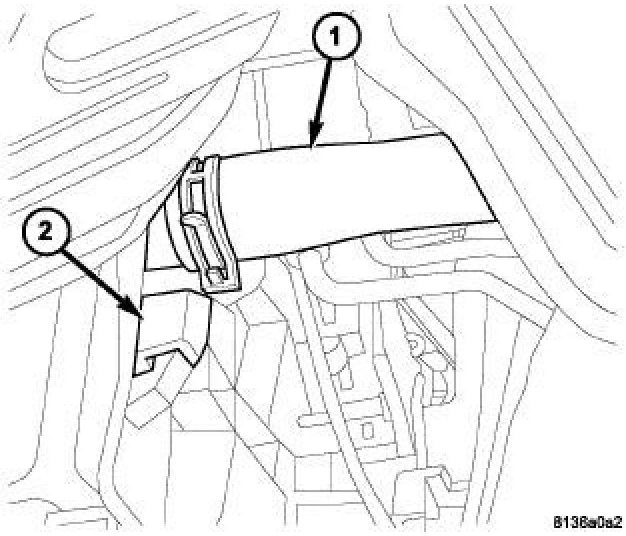


Fig. 98: Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

7. Remove the lower radiator hose (1).
8. Remove the radiator fan assembly. Refer to **FAN, COOLING, REMOVAL**.
9. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .
10. Remove support and lower the vehicle.

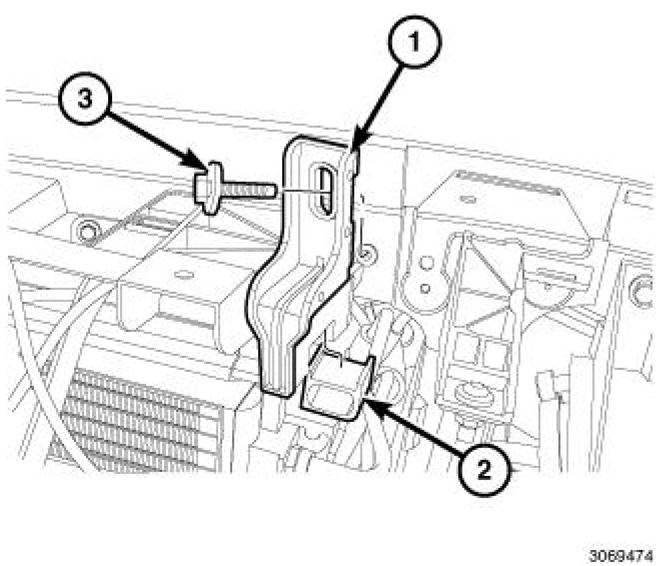


Fig. 99: Upper Radiator Mounting Brackets Bolts

Courtesy of CHRYSLER GROUP, LLC

CAUTION: Bolts are installed with threadlocker. Use hand tools to remove the upper radiator mounting bolts.

11. Remove bolts (3) and the upper radiator isolator (1).

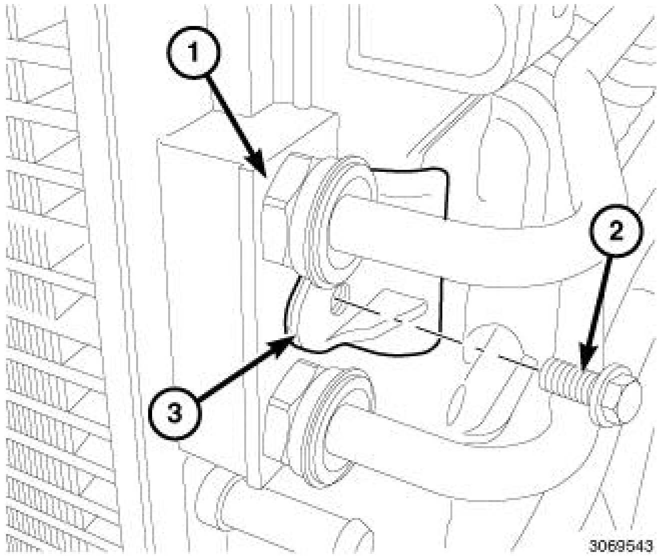


Fig. 100: Mounting & Support Bolt
Courtesy of CHRYSLER GROUP, LLC

12. Remove the lower condenser mounting bolts.
13. Remove the bolt (2) located between the cooler lines.
14. Using a suitable hanger. Support the condenser and remove the right side upper mounting bolt.

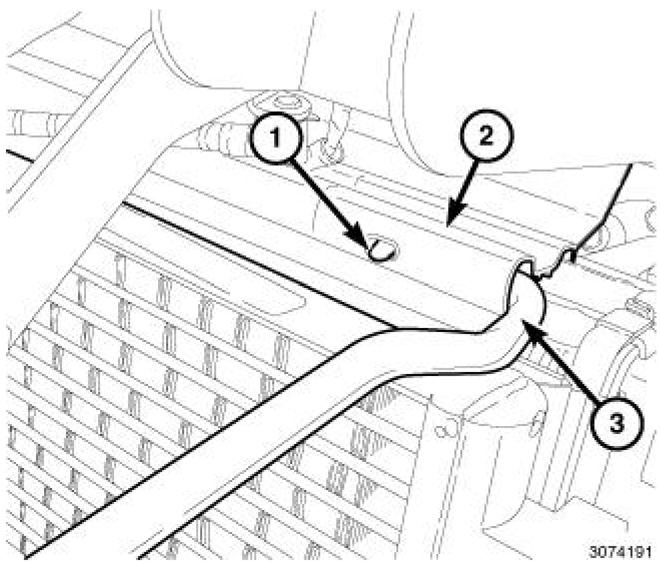


Fig. 101: Upper Shroud Cover, Pick & Clip
Courtesy of CHRYSLER GROUP, LLC

15. Carefully remove the upper shroud cover (2) by using a pick (3) to pull the cover retaining hole away from the clip (1) along the edge.

16. Tilt radiator toward engine and remove the radiator from vehicle.

INSPECTION

INSPECTION

Inspect the radiator tanks for cracks, broken or missing fittings also inspect the joint where the tanks seam up to the radiator core for signs of leakage and/or deteriorating seals.

Inspect radiator core for corroded, bent or missing cooling fins. Inspect the core for bent or damaged cooling tubes.

INSTALLATION

3.6L

1. Install the radiator into engine compartment and seat the lower rubber isolators into the mounting holes of the lower radiator support.

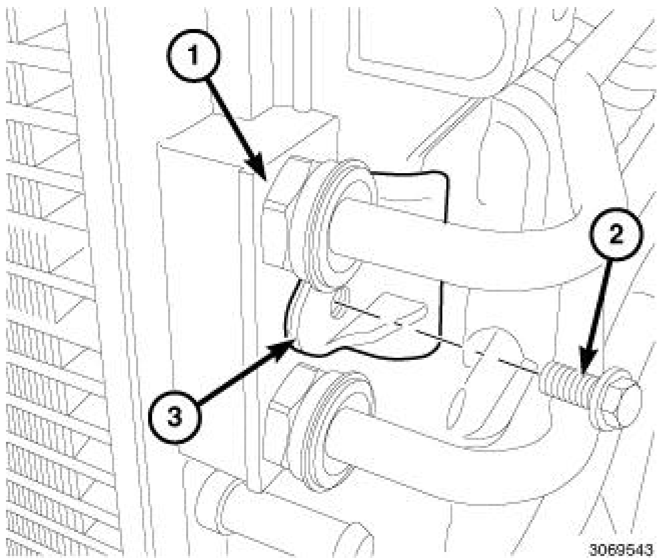


Fig. 102: Mounting & Support Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Position the condenser on radiator and loosely install the right side upper bolt. Tighten bolts to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
3. Install the lower mounting bolt. Tighten the bolts to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
4. Tighten bolt (2) located between the cooler lines to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .

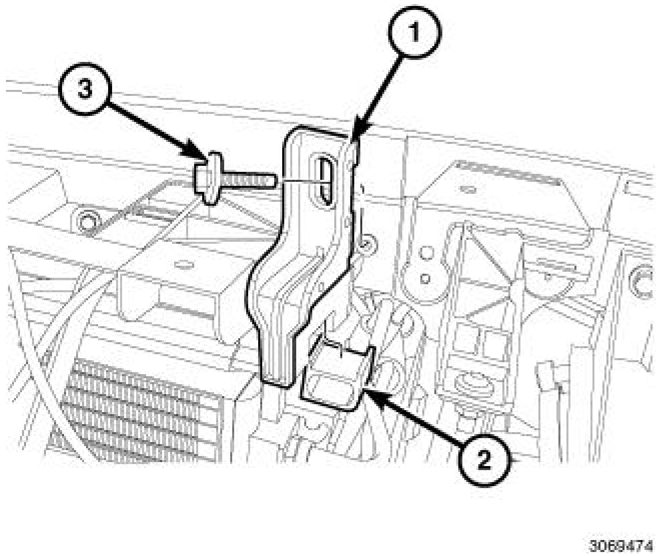


Fig. 103: Upper Radiator Mounting Brackets Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the radiator isolator (1). Tighten the bolts (3) to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
6. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
7. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

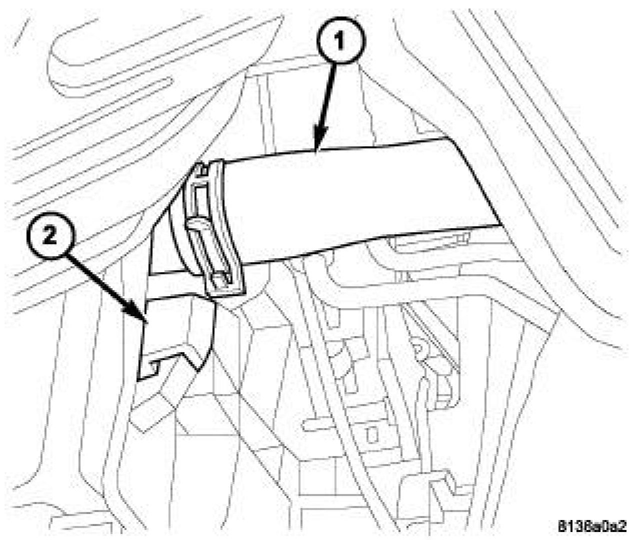


Fig. 104: Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

8. Install the lower radiator hose (1).

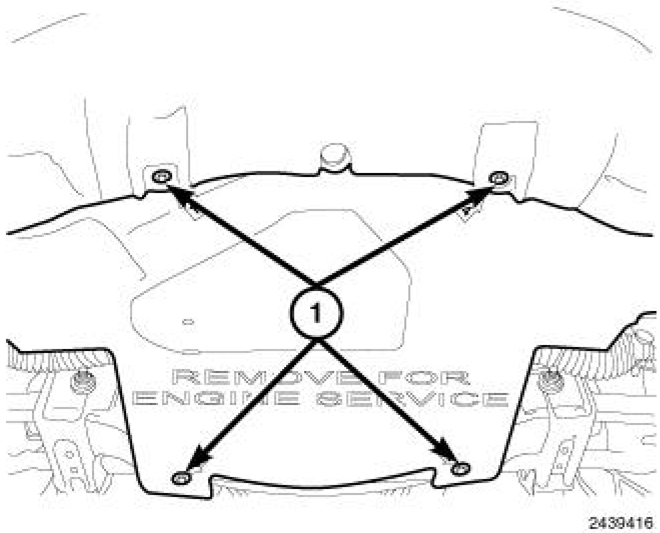


Fig. 105: Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

9. Install the belly pan and securely tighten bolts (1).
10. Remove support and lower vehicle.
11. Install the cooling fan. Refer to **FAN, COOLING, INSTALLATION**.
12. Install the upper radiator upper hose.
13. Fill the cooling system with coolant. Refer to **STANDARD PROCEDURE**.
14. Connect the negative battle cable.
15. Operate the engine until it reaches normal operating temperature. Check the cooling system and automatic transmission for the correct fluid levels.

6.2L

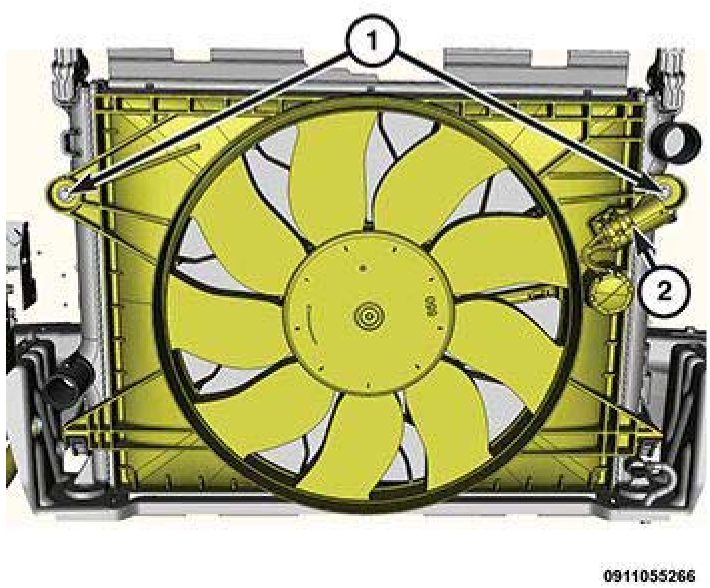


Fig. 106: Cooling Fan Wire Harness Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Engage the cooling fan assembly into lower tabs on the radiator.
2. Install the cooling fan assembly to radiator mounting bolts (1) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the radiator into engine compartment and seat the radiator assembly lower rubber isolators into the mounting holes in radiator lower support.

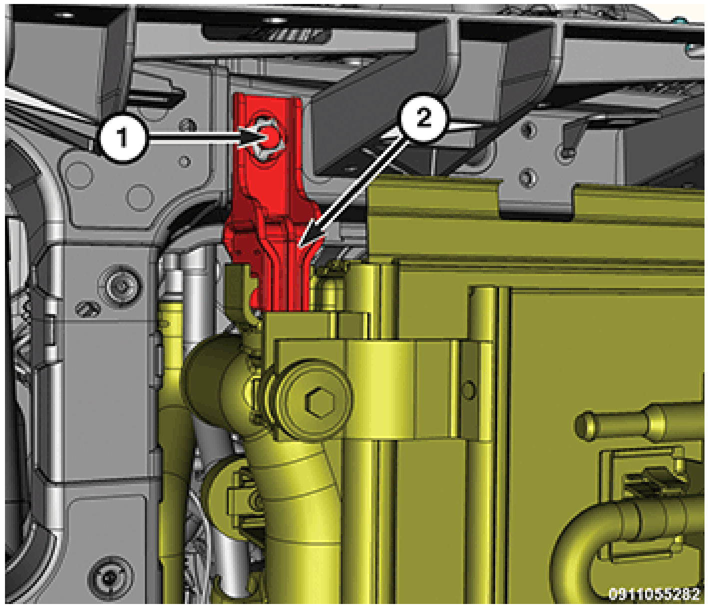


Fig. 107: Upper Radiator Isolator & Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Install the upper radiator isolator (2) and tighten the bolts (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
5. Install the Low Temperature Radiator (LTR). Refer to **RADIATOR, LOW TEMPERATURE, INSTALLATION**.

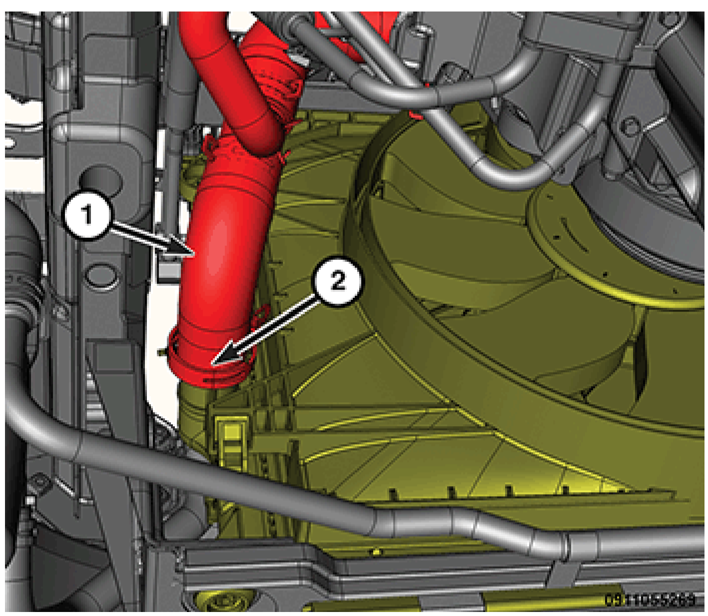


Fig. 108: Lower Radiator Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

6. Install the lower radiator hose (1) and secure the clamp (2).

NOTE: **Ensure that the hose is fully seated on the radiator port and that the clamp in not resting on the port bead.**

7. Install the upper radiator hose and secure the clamp.

NOTE: **Ensure that the hose is fully seated on the radiator port and that the clamp in not resting on the port bead.**

8. Connect the wire harness connector to the cooling fan.
9. Fill the cooling system with coolant. Refer to **STANDARD PROCEDURE**.
10. Connect the negative battery cable.
11. Operate the engine until it reaches normal operating temperature. Check the cooling system and automatic transmission for the correct fluid levels.

5.7L/6.4L

NOTE: **Assistance may be required for radiator placement into vehicle till the lower radiator core support has been installed.**

1. Install the radiator into engine compartment and seat the radiator assembly lower rubber isolators into the mounting holes in radiator lower support.

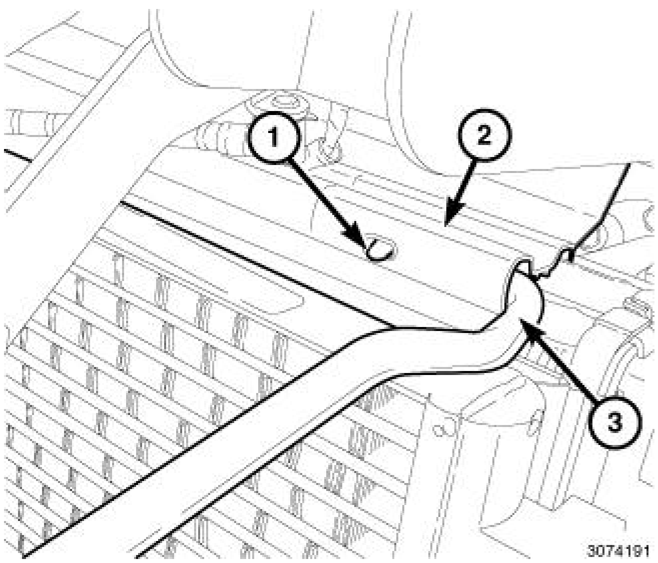


Fig. 109: Upper Shroud Cover, Pick & Clip
Courtesy of CHRYSLER GROUP, LLC

2. Install the upper shroud cover (2) by applying pressure downwards till the snap into place.

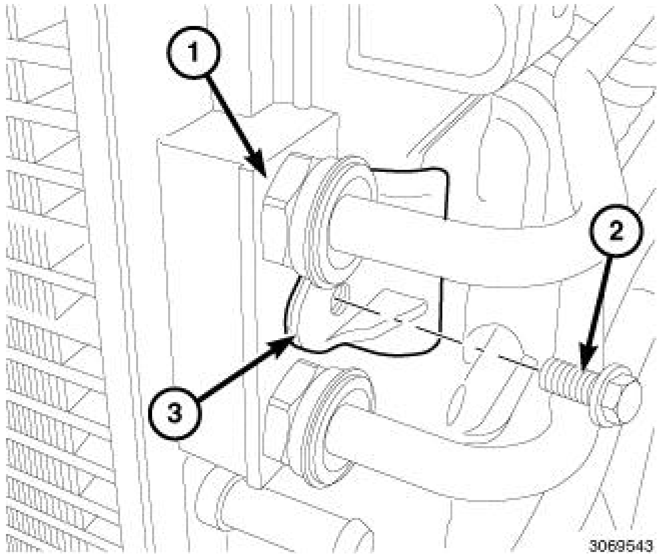


Fig. 110: Mounting & Support Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Position the condenser on radiator and loosely install the support bolt (3). Tighten bolt (3) to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Install the lower mounting bolts. Tighten bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
5. Tighten the bolt (2) located between the cooler lines to the proper torque specification. Refer to **SPECIFICATIONS**.

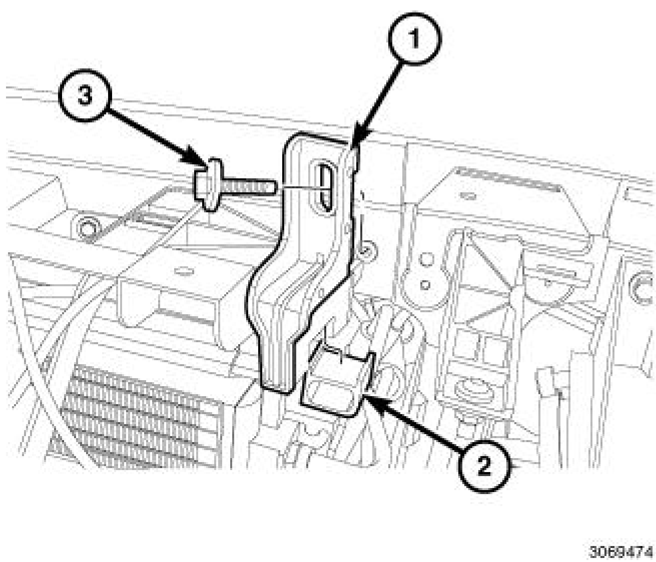


Fig. 111: Upper Radiator Mounting Brackets Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install the upper radiator isolator (1). Tighten the bolts (2) to the proper torque specification. Refer to **SPECIFICATIONS**.
7. Install the front bumper fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
8. Install the radiator fan. Refer to **FAN, COOLING, INSTALLATION**.

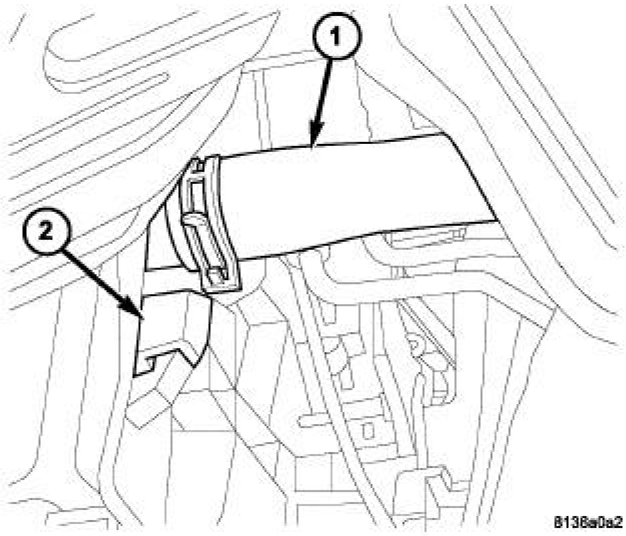


Fig. 112: Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

9. Install the lower radiator hose (1).

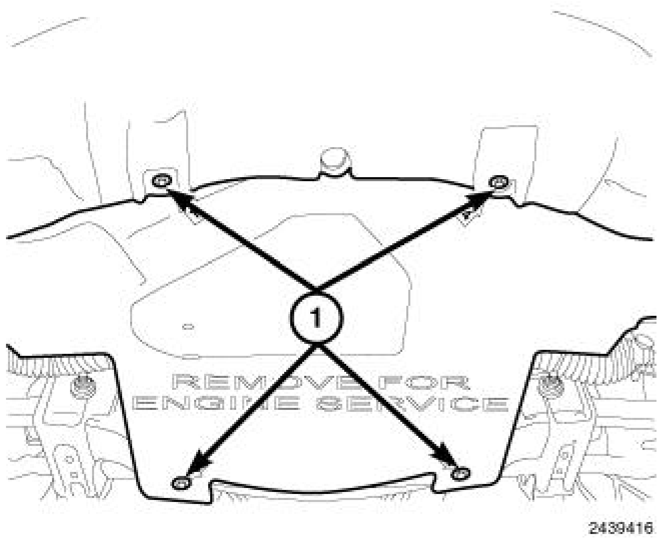


Fig. 113: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. Install the belly pan and securely tighten bolts (1).
11. Remove support and lower the vehicle.
12. Install the upper radiator hose.
13. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** for 5.7L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L .
14. Fill the cooling system with coolant. Refer to **STANDARD PROCEDURE**.
15. Connect the negative battery cable.
16. Operate the engine until it reaches normal operating temperature. Check the cooling system and

automatic transmission for the correct fluid levels.

SENSOR, COOLANT TEMPERATURE

REMOVAL

3.6L

The Engine Coolant Temperature (ECT) sensor on the 3.6L engine is installed into a water jacket at rear of the cylinder head on the left side of the engine.

WARNING: Hot, pressurized coolant can cause injury by scalding. Cooling system must be partially drained before removing the coolant temperature sensor.

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover.
3. Partially drain the cooling system. Refer to **STANDARD PROCEDURE**.

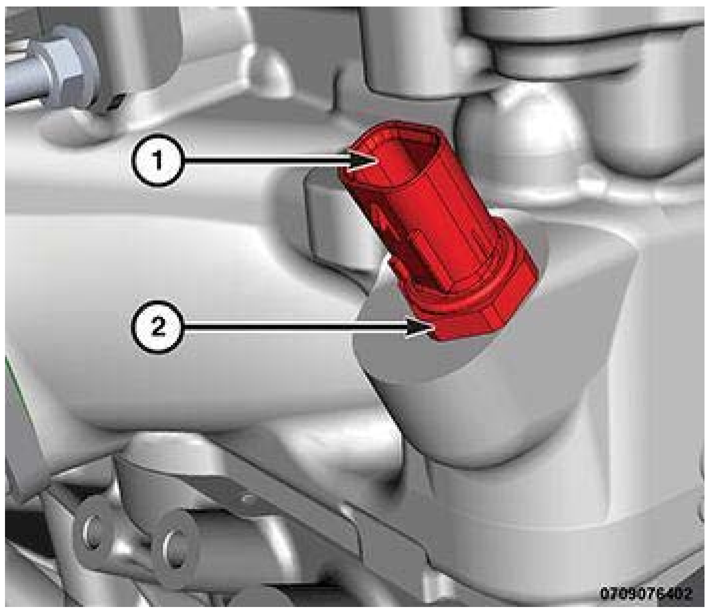


Fig. 114: ECT Sensor & Connector
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the ECT sensor wire harness connector (1).
5. Remove the ECT sensor (2) from the cylinder head.

6.2L

The Engine Coolant Temperature (ECT) sensor is located on the upper portion of the water pump housing. It is installed into a water jacket in-line with the thermostat.

WARNING: Hot, pressurized coolant can cause injury by scalding. Cooling system must be partially drained before removing the coolant temperature sensor.

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .

3. Drain the cooling system. Refer to **STANDARD PROCEDURE**.

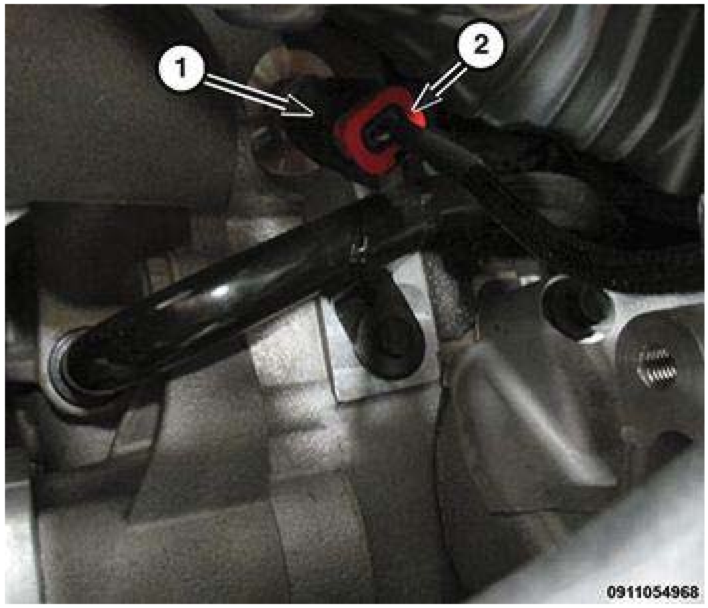


Fig. 115: ECT Sensor & Connector
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the ECT sensor wire harness connector (2).
5. Remove the ECT sensor (1) sensor.

5.7L/6.4L

The Engine Coolant Temperature (ECT) sensor is located on the upper portion of the water pump housing. It is installed into a water jacket in-line with the thermostat.

WARNING: Hot, pressurized coolant can cause injury by scalding. Cooling system must be partially drained before removing the coolant temperature sensor.

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover.
3. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** for 5.7L or **BODY, AIR CLEANER, REMOVAL** for 6.4L .
4. Drain the cooling system. Refer to **STANDARD PROCEDURE**.

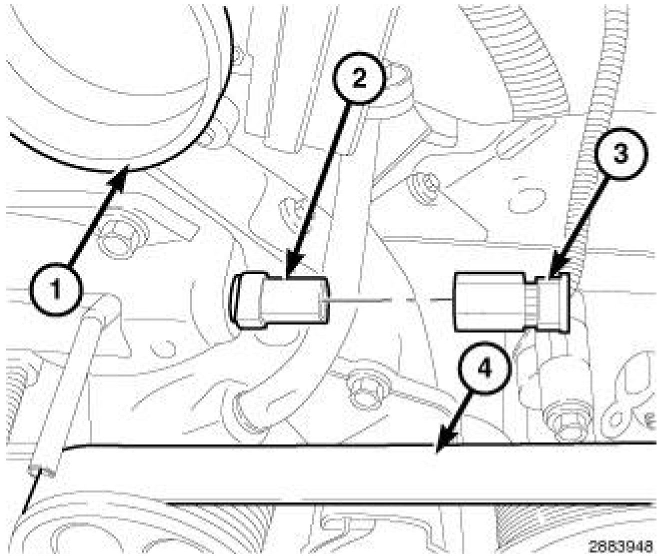


Fig. 116: Electrical Connector, Sensor & Water Pump Housing
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the ECT sensor wire harness connector (3).
6. Remove ECT sensor (2) sensor from the water pump housing.

INSTALLATION

3.6L

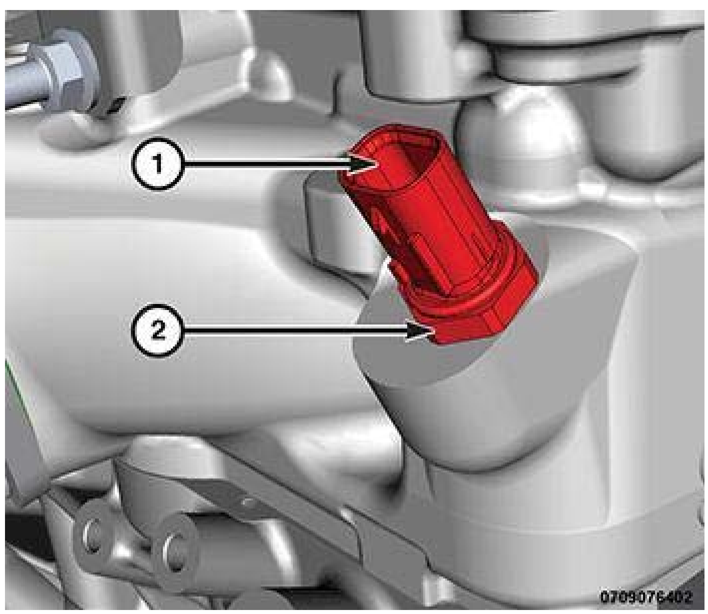


Fig. 117: ECT Sensor & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Install the ECT sensor (2) to the cylinder head and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Connect the ECT sensor wire harness connector (1).
3. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
4. Install the engine cover.

5. Connect the negative battery cable.

6.2L

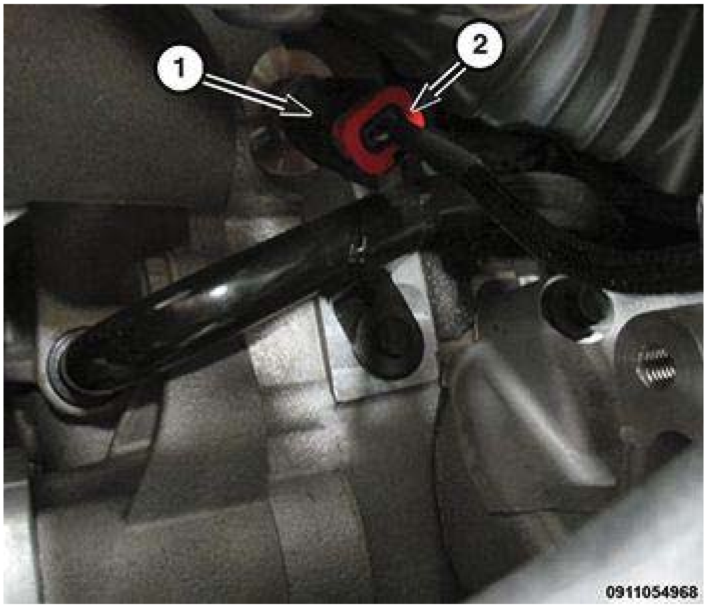


Fig. 118: ECT Sensor & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Apply MOPARĀ® thread sealant with PFTE to the Engine Coolant Temperature (ECT) sensor threads.
2. Install the ECT sensor (1) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Connect the ECT sensor wire harness connector (2).
4. Install air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .
5. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
6. Connect the negative battery cable.

5.7L/6.4L

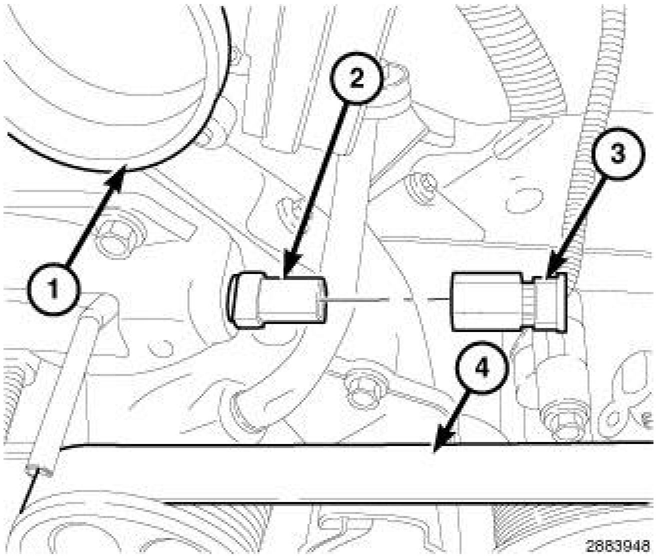


Fig. 119: Electrical Connector, Sensor & Water Pump Housing

Courtesy of CHRYSLER GROUP, LLC

1. Apply MOPARÂ® thread sealant with PFTE to the Engine Coolant Temperature (ECT) sensor threads.
2. Install the ECT sensor (2) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Connect the ECT sensor wire harness connector (3).
4. Install air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** for 5.7L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L .
5. Install the engine cover.
6. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
7. Connect the negative battery cable.

THERMOSTAT

DESCRIPTION

DESCRIPTION

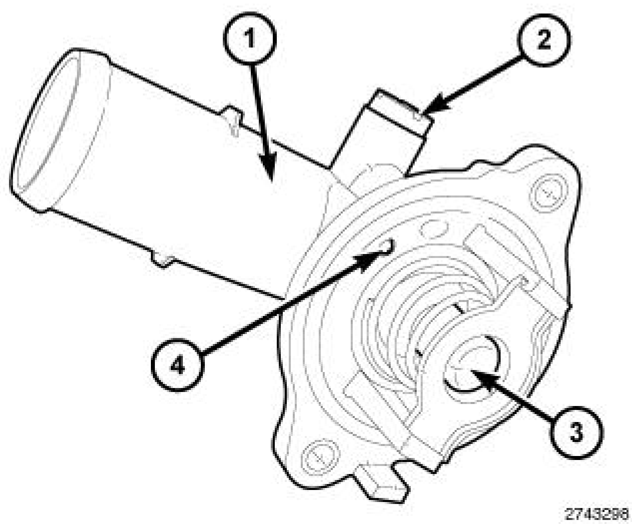


Fig. 120: Thermostat Housing & Thermostat
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not operate an engine without a thermostat, except for servicing or testing.

A pellet-type thermostat controls the operating temperature of the engine by controlling the amount of coolant flow to the radiator. On all engines the thermostat is closed below 195Â°F (90Â°C). Above this temperature, coolant is allowed to flow to the radiator. This provides quick engine warm up and overall temperature control.

The same thermostat is used for winter and summer seasons. An engine should not be operated without a thermostat, except for servicing or testing. Operating without a thermostat causes other problems. These are: longer engine warm-up time, unreliable warm-up performance, increased exhaust emissions and crankcase condensation. This condensation can result in sludge formation.

OPERATION

OPERATION

WARM-UP PHASE

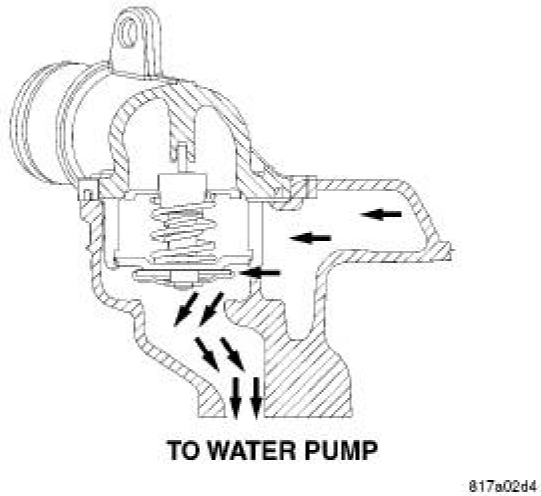


Fig. 121: Thermostat Warm-Up Phase
Courtesy of CHRYSLER GROUP, LLC

Up to a coolant temperature of approximately 87Â° C (189Â° F), the main valve is closed and the bypass valve fully open. The flow through the radiator is interrupted and coolant flows through the bypass passage directly to the inlet side of the water pump.

PARTIAL-LOAD PHASE

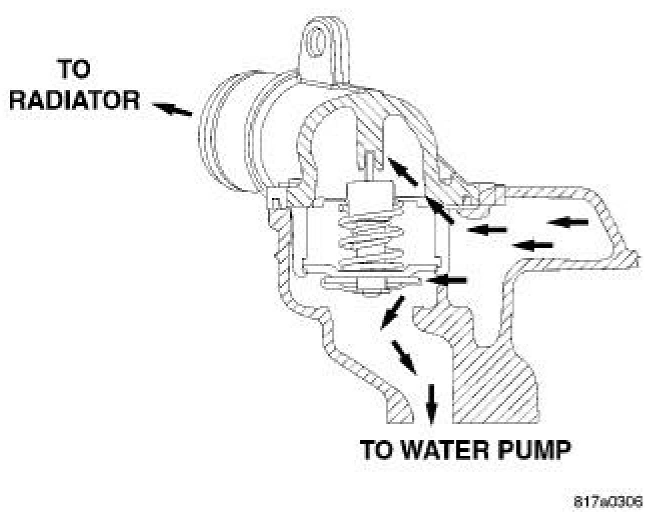


Fig. 122: Thermostat Partial-Load Phase
Courtesy of CHRYSLER GROUP, LLC

The main valve begins to open at a coolant temperature of 86Â° C (189Â° F), and a small amount of coolant flows through the radiator. As the engine temperature increases, the main valve opens further and the bypass valve gradually closes. More coolant flows through the radiator and less coolant flows through the bypass

passage.

FULL-LOAD PHASE

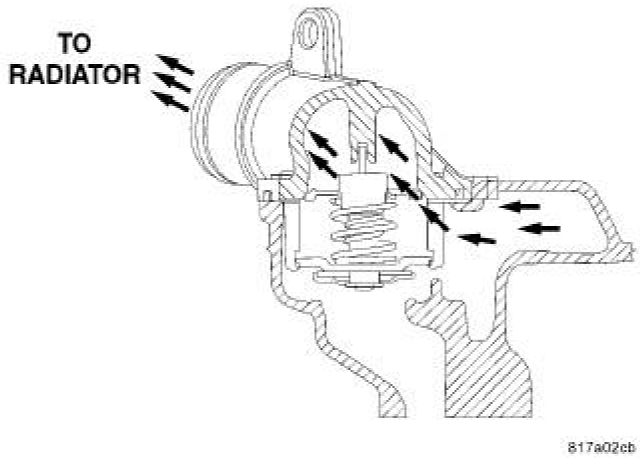


Fig. 123: Thermostat Full-Load Phase
Courtesy of CHRYSLER GROUP, LLC

The main valve is fully open at a coolant temperature above 102Â° C (216Â° F). The bypass plate seals off the bypass passage. The entire quantity of coolant flows through the radiator.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ENGINE COOLANT THERMOSTAT

The thermostat is operated by a wax filled chamber (pellet) which is sealed. When heated coolant reaches a predetermined temperature the wax pellet expands enough to overcome the closing spring and water pump pressure, which forces the valve to open. Coolant leakage into the pellet will cause a thermostat to fail open. Do not attempt to free up a thermostat with a screwdriver.

Thermostat diagnostics is included in powertrain control module's (PCM) programing for on-board diagnosis. The malfunction indicator light (MIL) will illuminate and a diagnostic trouble code (DTC) will be set when an "open too soon" condition occurs. Do not change a thermostat for lack of heater performance or temperature gauge position, unless a DTC is present. For other probable causes, refer to **DIAGNOSIS AND TESTING**. Thermostat failing shut is the normal long term mode of failure, and normally, only on high mileage vehicles. The temperature gauge will indicate this, refer to **DIAGNOSIS AND TESTING**.

REMOVAL

3.6L

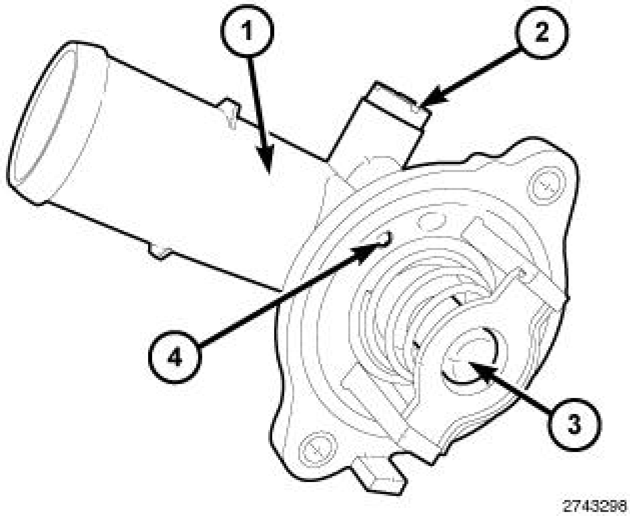


Fig. 124: Thermostat Housing & Thermostat
Courtesy of CHRYSLER GROUP, LLC

WARNING: Do not loosen radiator draincock with system hot and pressurized. Serious burns from coolant can occur.

CAUTION: The Thermostat and housing is serviced as an assembly. Do not remove the thermostat from the housing, damage to the thermostat may occur.

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover.
3. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
4. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
5. Remove the upper radiator hose from the thermostat housing (1).
6. Remove bolts and thermostat housing (1) with thermostat (3).
7. Remove and discard the thermostat housing gasket.

3.6L COOLANT CROSSOVER

1. Remove the thermostat housing. Refer to **THERMOSTAT, REMOVAL**.

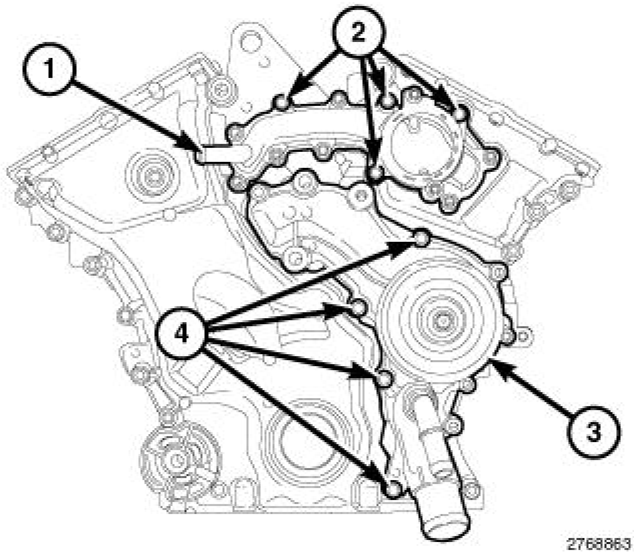


Fig. 125: Coolant Outlet Housing, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Remove the heater supply hose from the coolant crossover (1).
3. Remove the coolant crossover mounting bolts. Take notice to the four bolts (2) that bolt directly to the timing cover.
4. Remove the coolant crossover and discard the gaskets.

6.2L

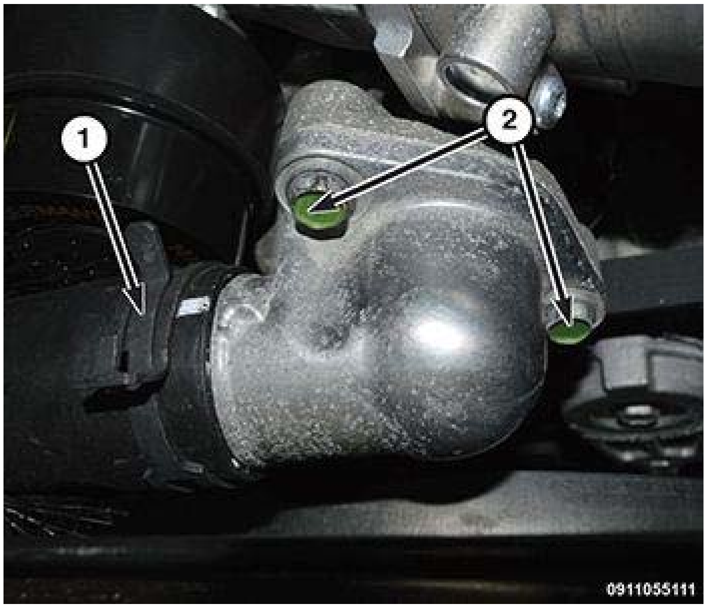


Fig. 126: Upper Radiator Hose & Bolts
Courtesy of CHRYSLER GROUP, LLC

WARNING: Do not loosen the radiator draincock with the cooling system hot and pressurized. Serious burns from the coolant can occur.

If the thermostat is being replaced, be sure that the replacement is the specified thermostat for the vehicle model and engine type.

1. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
2. Remove the upper radiator hose (1) from the thermostat housing and position aside.
3. Remove bolts (2), thermostat housing and thermostat.

5.7/6.4L

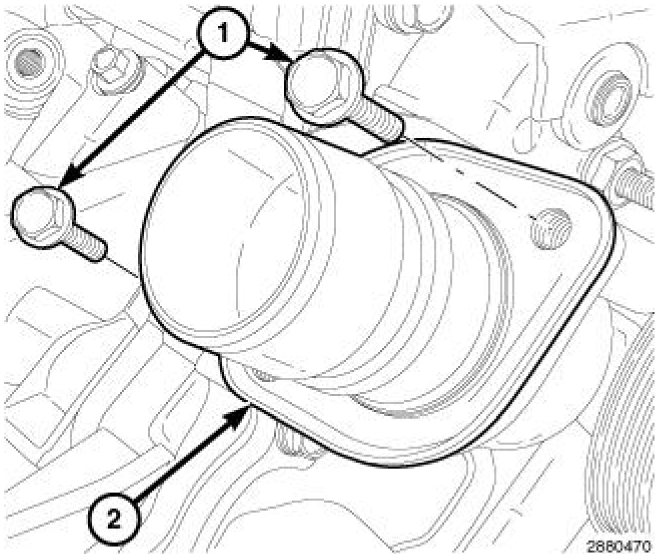


Fig. 127: Thermostat Housing & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

WARNING: Do not loosen the radiator draincock with the cooling system hot and pressurized. Serious burns from the coolant can occur.

If the thermostat is being replaced, be sure that the replacement is the specified thermostat for the vehicle model and engine type.

1. Disconnect the and isolate negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** for 5.7L or **BODY, AIR CLEANER, REMOVAL** for 6.4L. .
3. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
4. Remove the upper radiator hose from the thermostat housing (2) and position aside.
5. Remove bolts (1), thermostat housing (2) and thermostat.

INSTALLATION

3.6L

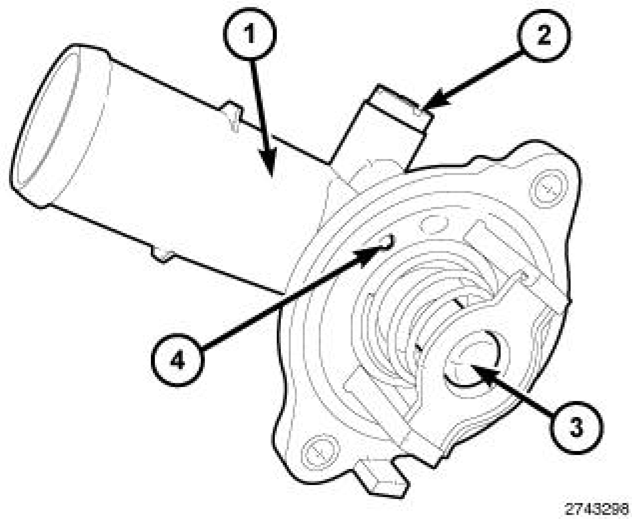


Fig. 128: Thermostat Housing & Thermostat
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The Thermostat and housing is serviced as an assembly. Do not remove the thermostat from the housing, damage to the thermostat may occur.

1. Clean mating areas of timing chain cover and thermostat housing (1).
2. Install a new gasket on to the thermostat housing.
3. Install the thermostat housing (1). Tighten bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Install the upper radiator hose to the thermostat housing (1).
5. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
6. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .
7. Install the engine cover.
8. Connect the negative battery cable.
9. Start and check for leaks.

3.6L COOLANT CROSSOVER

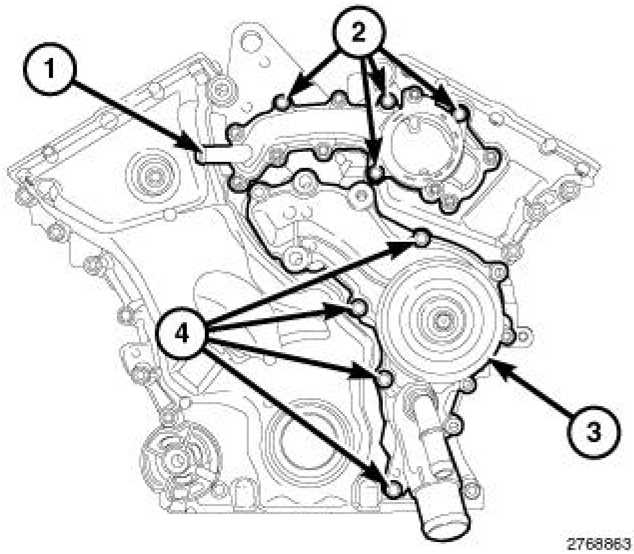


Fig. 129: Coolant Outlet Housing, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Clean gasket sealing surfaces.
2. Install new gasket onto the coolant crossover.

NOTE: **The shorter M6 mounting bolts (2), bolt directly to the engine timing cover.**

3. Install the coolant crossover. Tighten bolts in a criss cross pattern to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Install the heater supply hose to the coolant crossover (1).
5. Install the thermostat housing. Refer to **THERMOSTAT, INSTALLATION**.

6.2L

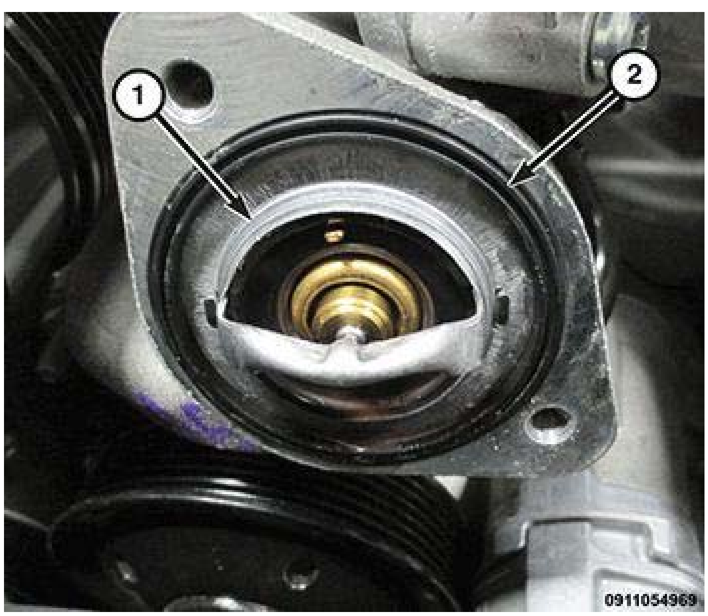


Fig. 130: Thermostat & Seal
Courtesy of CHRYSLER GROUP, LLC

1. Position the thermostat (1) with the vent at the 12 o'clock position and the gasket seal (2) is fully seated.

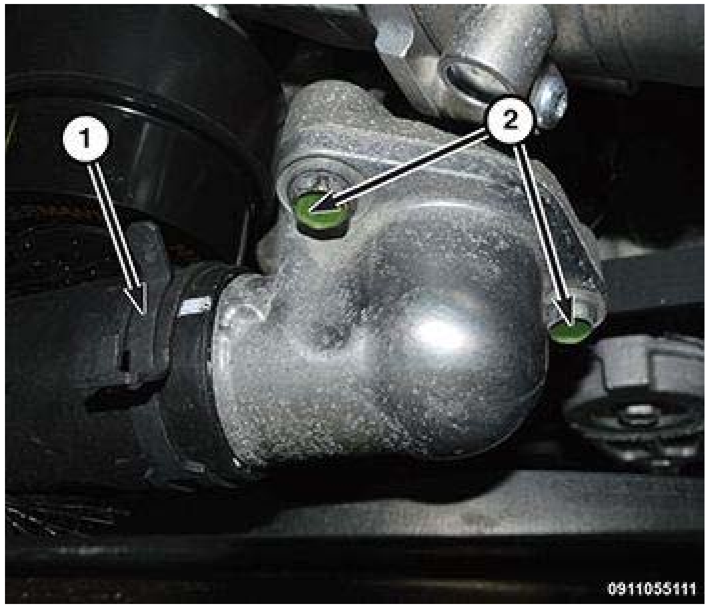


Fig. 131: Upper Radiator Hose & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the thermostat housing. Tighten the bolts (2) to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the radiator hose (1) onto the thermostat housing.
4. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
5. Start and warm the engine. Check for leaks. Refer to **DIAGNOSIS AND TESTING**.

5.7/6.4L

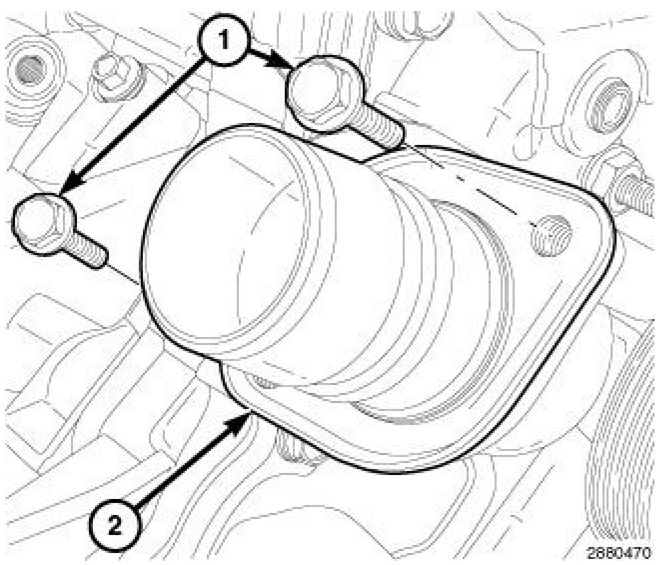


Fig. 132: Thermostat Housing & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the thermostat on the front cover with the vent at the 12 o'clock position.

2. Install the thermostat housing (2). Tighten the bolts (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the radiator hose onto the thermostat housing.
4. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
5. Install the cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** for 5.7L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L.
6. Connect the negative battery cable.
7. Start and warm the engine. Check for leaks, refer to **DIAGNOSIS AND TESTING**.

TUBE, HEATER HOSE, SUPPLY

REMOVAL

6.2L

1. Disconnect and isolate the negative battery cable.
2. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
3. Remove the supercharger. Refer to **SUPERCHARGER, REMOVAL** .
4. Remove heater hoses from heater tubes.

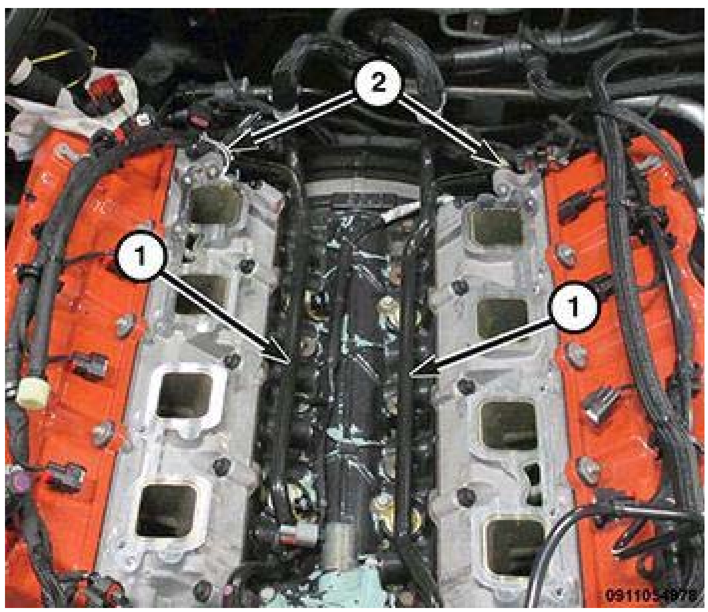


Fig. 133: Heater Tubes & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the bolt(s) (2) securing heater tube(s) (1) to the back of cylinder head.
6. Remove the bolt securing the right side heater tube (1), from the timing cover.
7. Remove the right side heater tube from water pump housing.

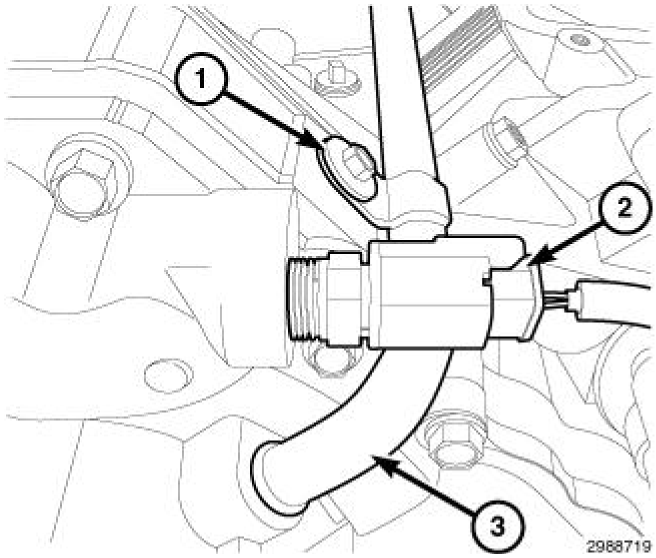


Fig. 134: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Remove the bolt (1) and the left side heater tube (3) from water pump housing and remove the heater tube from vehicle.

5.7L/6.4L

1. Disconnect and isolate the negative battery cable.
2. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
3. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL** for 5.7L or **MANIFOLD, INTAKE, REMOVAL** for 6.4L.

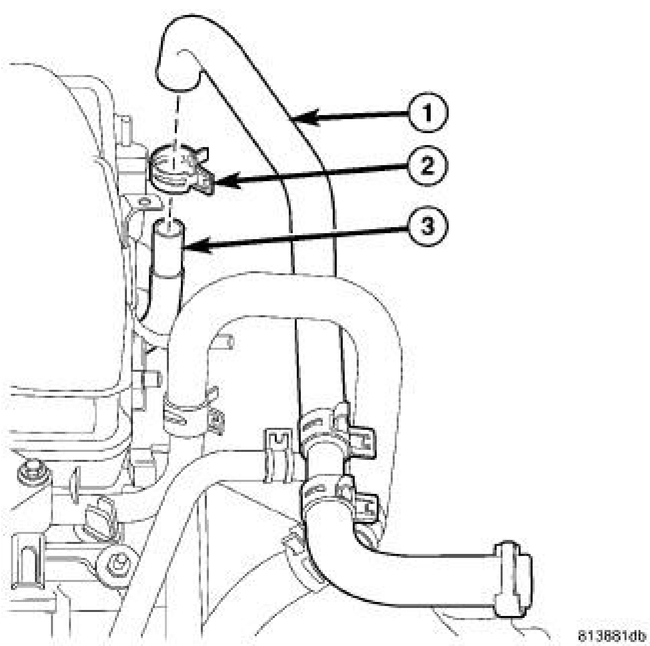


Fig. 135: Heater Hose, Clamp, & Tube
Courtesy of CHRYSLER GROUP, LLC

4. Remove the heater hose (1) from the heater tube.

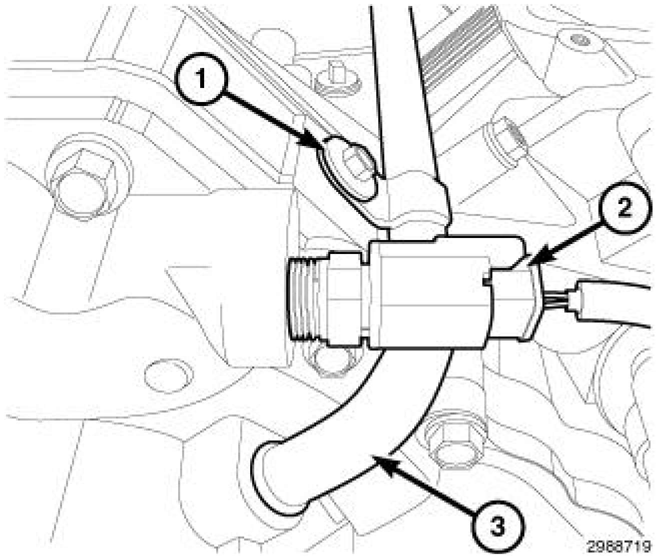


Fig. 136: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Remove the heater tube mounting bolt (1).
6. Remove the heater tube (3) from water pump housing and remove from vehicle.

INSTALLATION

6.2L

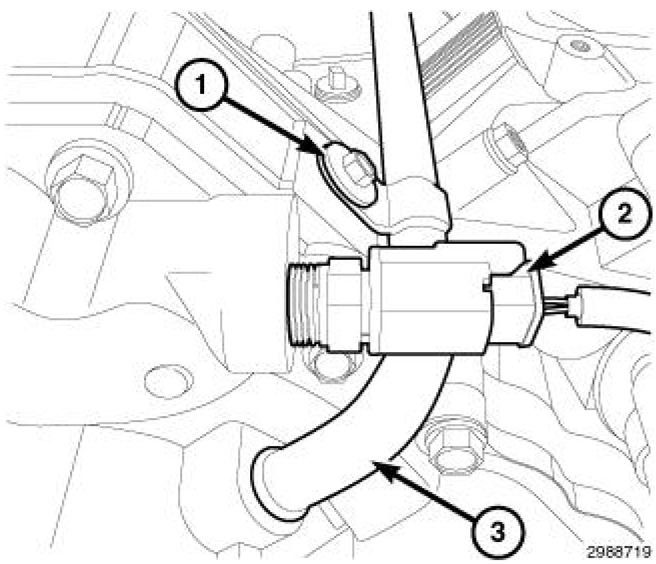


Fig. 137: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Using a new O-ring seal, install left side heater tube (3) into water pump housing and tighten the bolt (1) to the proper torque specification. Refer to **SPECIFICATIONS**.

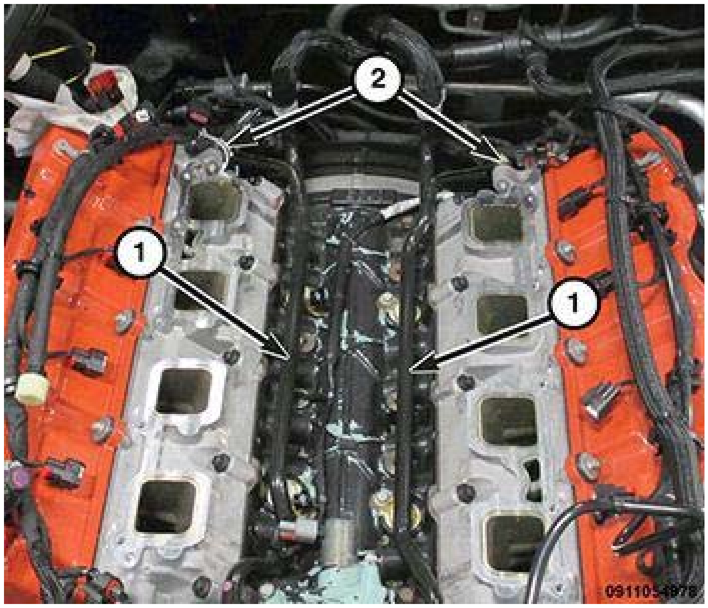


Fig. 138: Heater Tubes & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Using a new O-ring seal, install the right side heater tube (1) into water pump housing.
3. Install the right side heater tube retaining bolt and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Install the bolt(s) (2) securing heater tube(s) (1) to the back of cylinder head and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
5. Install the heater hoses onto the heater tubes.
6. Install the supercharger. Refer to **SUPERCHARGER, INSTALLATION** .
7. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
8. Connect the negative battery cable.
9. Start the engine and check for cooling system leaks.

5.7L/6.4L

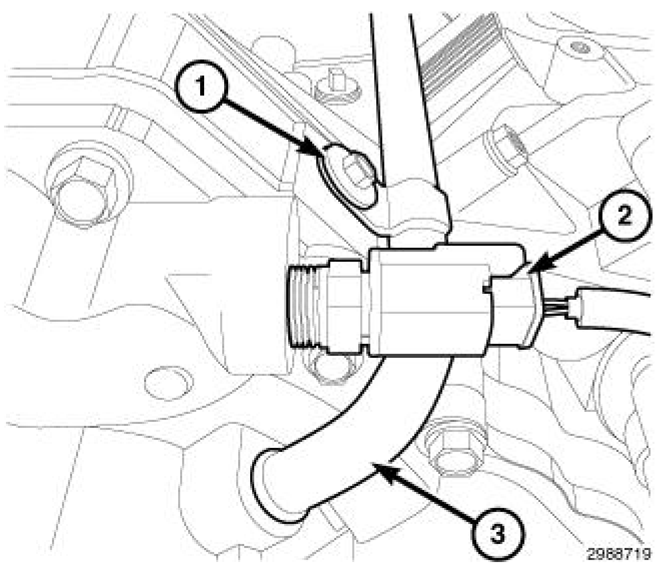


Fig. 139: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Install the heater tube (3) into water pump housing. Tighten the bolt (2) to the proper torque specification. Refer to **SPECIFICATIONS**.

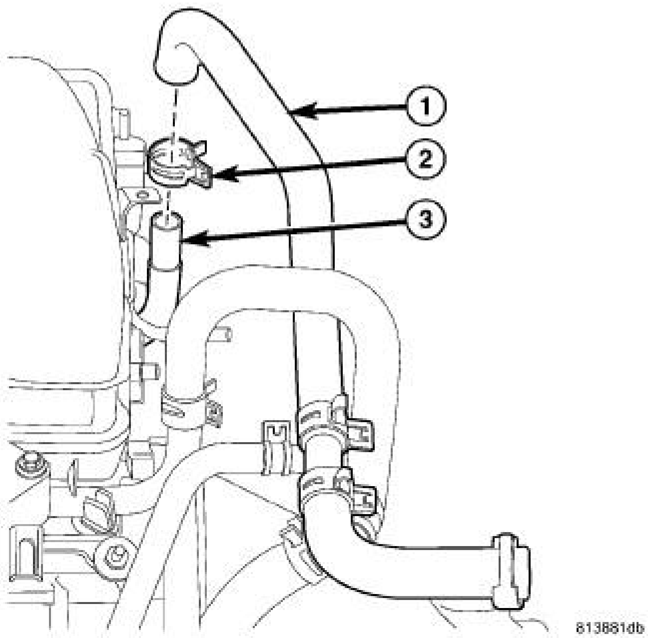


Fig. 140: Heater Hose, Clamp, & Tube
Courtesy of CHRYSLER GROUP, LLC

2. Install the heater hose (1) onto heater tube.
3. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION** for 5.7L or **MANIFOLD, INTAKE, INSTALLATION** for 6.4L.
4. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
5. Connect the negative battery cable.
6. Start the engine and check for cooling system leaks.

SUPERCHARGER SYSTEM

DESCRIPTION

DESCRIPTION

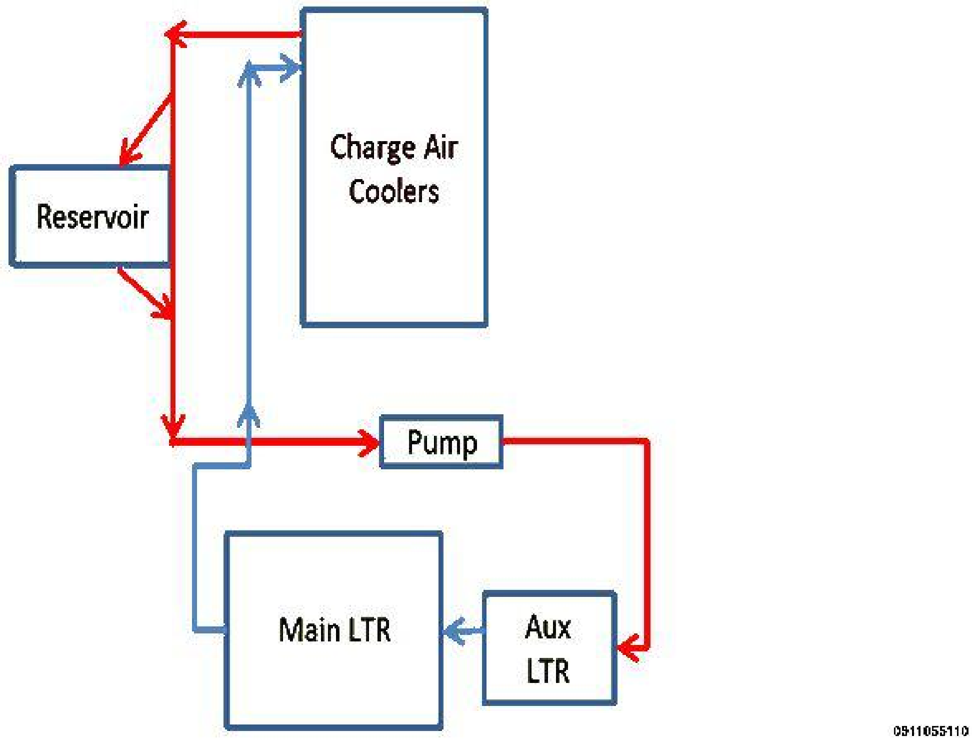


Fig. 141: Supercharger System
Courtesy of CHRYSLER GROUP, LLC

The Low Temperature Radiator (LTR) cooling system is a closed secondary system that regulates charge air cooler operating temperature.

- The system must be vacuum filled. Refer to **STANDARD PROCEDURE**.
- The LTR system has a 18 psi reservoir cap, the engine cooling system has a 21 psi reservoir cap.
- The LTR system uses a 250 watt electric coolant pump.

COOLER, CHARGE AIR

DESCRIPTION

DESCRIPTION

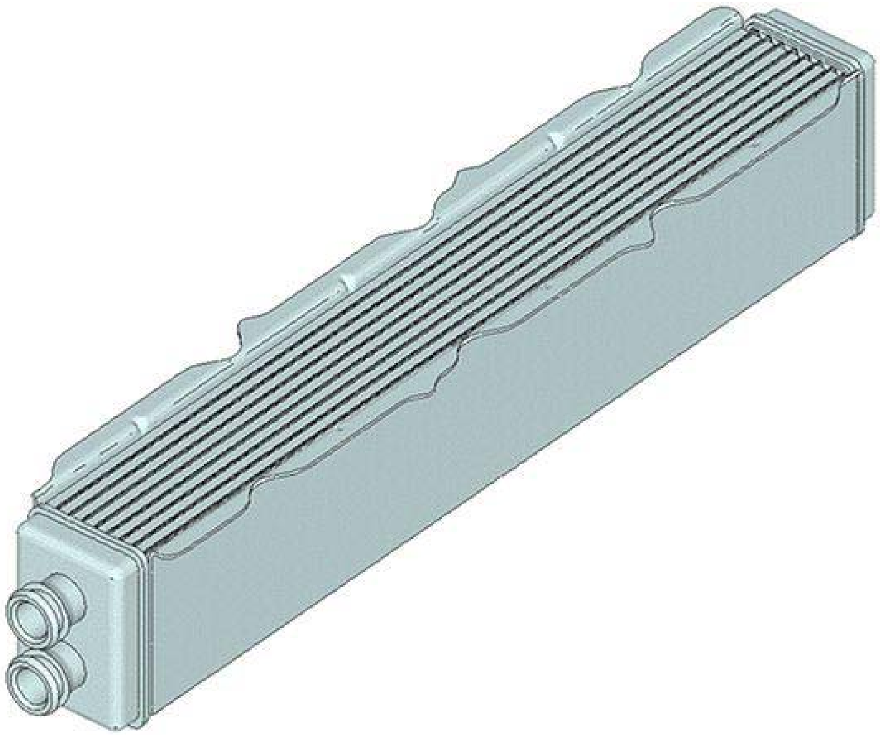


Fig. 142: Charge Air Cooler
Courtesy of CHRYSLER GROUP, LLC

The charge air coolers are located within the supercharger assembly, retained using elastomeric pieces. Both coolers are common parts, connected by the rear crossover tube. The coolers are sealed to the crossover tube using O-ring seals.

RADIATOR, LOW TEMPERATURE

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Drain the low temperature cooling system. Refer to **STANDARD PROCEDURE**.
3. Remove the A/C condenser. Refer to **CONDENSER, A/C, REMOVAL** .

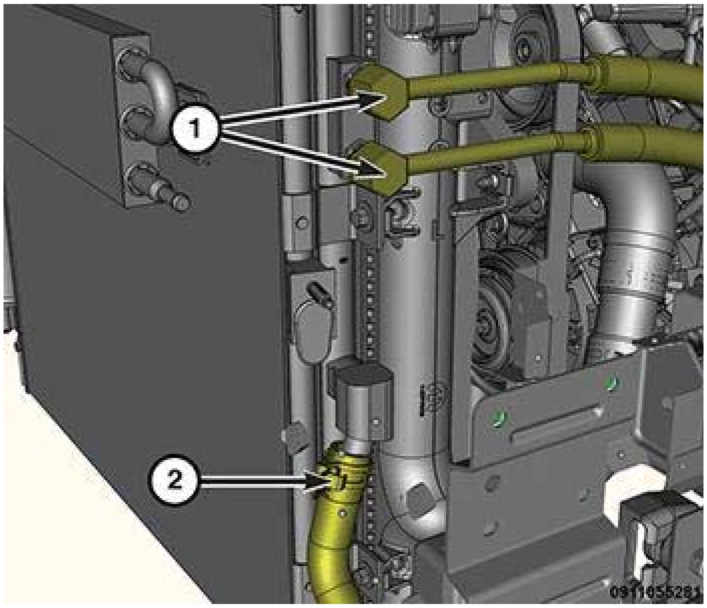


Fig. 143: Transmission Cooler Lines & Inlet Hose
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the transmission cooler lines (1) from the Low Temperature Radiator (LTR).
5. Remove the inlet hose (2) from the LTR.

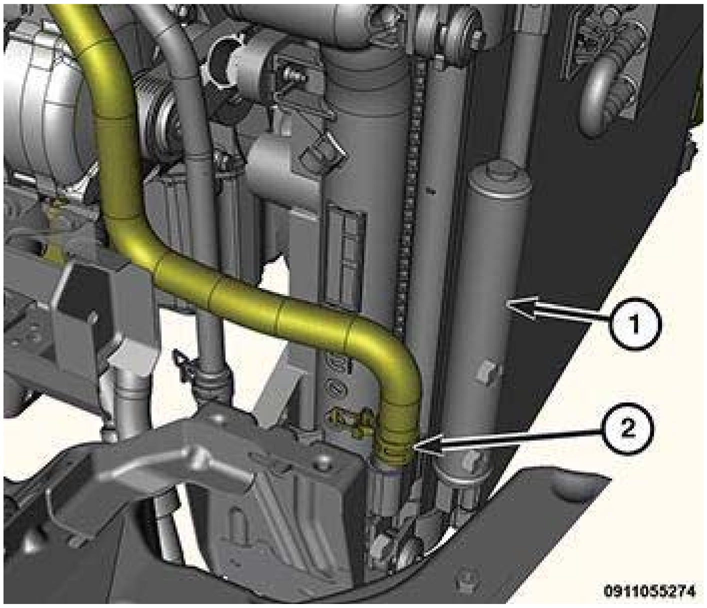


Fig. 144: Outlet Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

6. Remove the outlet hose (2) from the LTR.
7. Tilt the LTR toward the front of the vehicle and remove the LTR from vehicle.

INSTALLATION

INSTALLATION

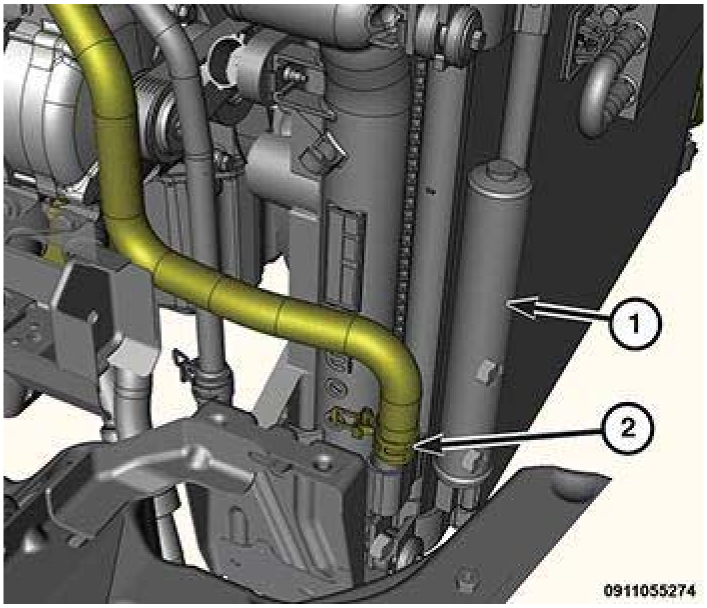


Fig. 145: Outlet Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

1. Install the Low Temperature Radiator (LTR) into engine compartment and align to the engine radiator assembly.
2. Install the outlet hose onto the LTR and secure the clamp (2). Ensure that the hose is fully seated on the port and that the clamp is not resting on the bead.

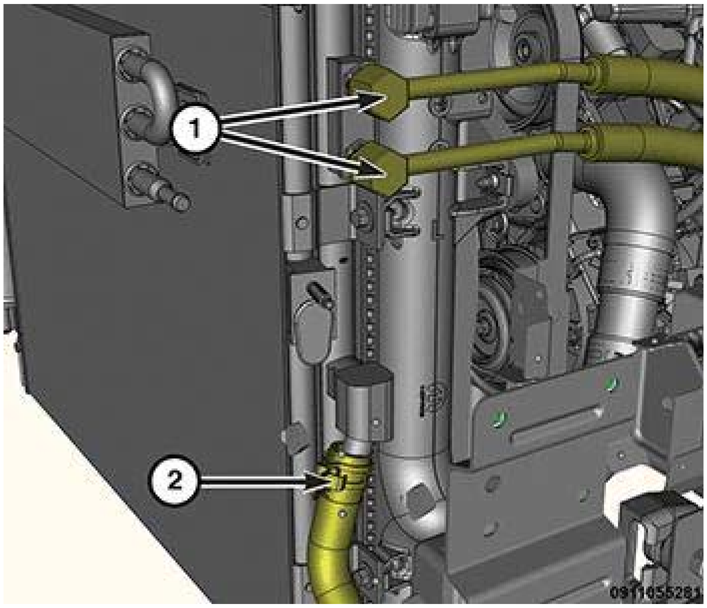


Fig. 146: Transmission Cooler Lines & Inlet Hose
Courtesy of CHRYSLER GROUP, LLC

3. Install the inlet hose onto the LTR and secure the clamp (2). Ensure that the hose is fully seated on the port and that the clamp is not resting on the bead.
4. Install the transmission oil cooler lines (1).
5. Install the A/C condenser. Refer to **CONDENSER, A/C, INSTALLATION** .
6. Fill the cooling system with coolant. Refer to **STANDARD PROCEDURE**.

7. Check and fill the automatic transmission with the appropriate fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
8. Connect the negative battery cable.
9. Operate the engine until it reaches normal operating temperature. Check the cooling system and automatic transmission for the correct fluid levels.

RADIATOR, AUXILIARY LOW TEMPERATURE

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
3. Remove the charge air cooler coolant pump. Refer to **PUMP, COOLANT, CHARGE AIR COOLER, REMOVAL**.

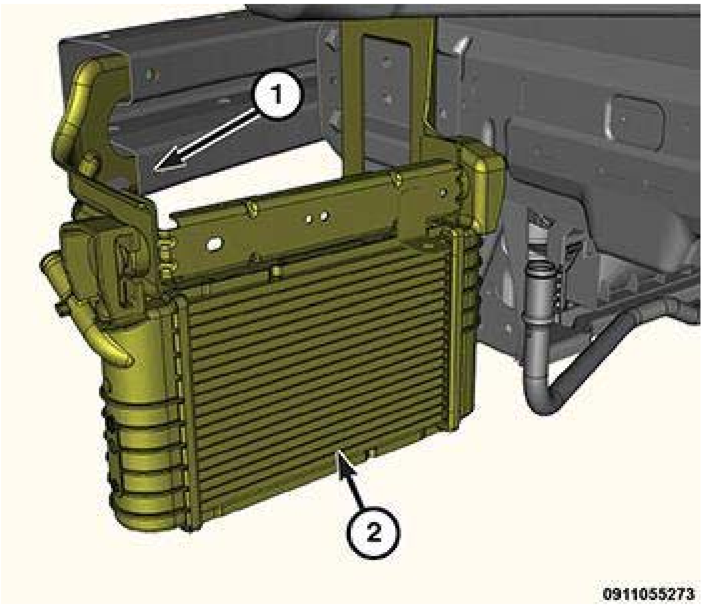


Fig. 147: Auxiliary Low Temperature Radiator & Bracket Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the auxiliary low temperature radiator bracket retaining bolts (1).
5. Remove auxiliary low temperature radiator (1).

INSTALLATION

INSTALLATION

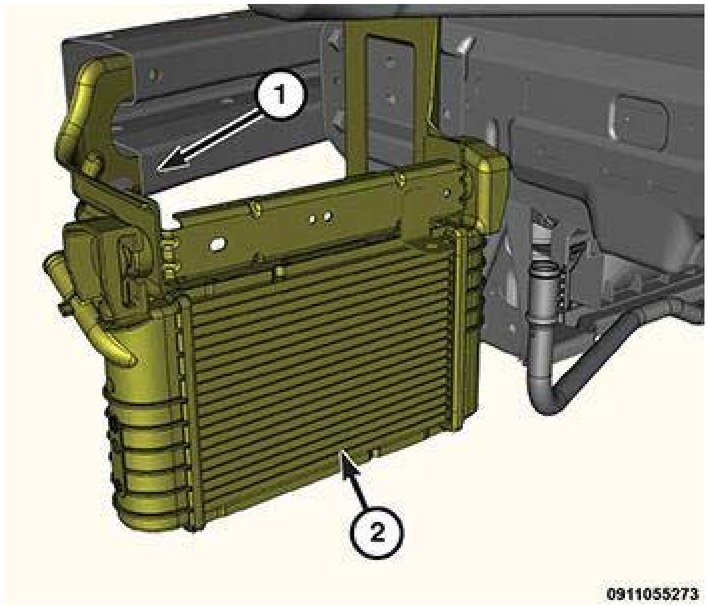


Fig. 148: Auxiliary Low Temperature Radiator & Bracket Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the auxiliary low temperature radiator and bracket assembly (2) to the vehicle.
2. Install the bracket to bumper mounting bolts (1) and tighten the bolts to the proper torque specification. Refer to **SPECIFICATIONS** .
3. Install the charge air cooler coolant pump. Refer to **PUMP, COOLANT, CHARGE AIR COOLER, INSTALLATION**.
4. Fill the cooling system with coolant. Refer to **STANDARD PROCEDURE**.
5. Connect the negative battle cable.
6. Operate the engine until it reaches normal operating temperature. Check the cooling system and automatic transmission for the correct fluid levels.

PUMP, COOLANT, CHARGE AIR COOLER

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
3. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .

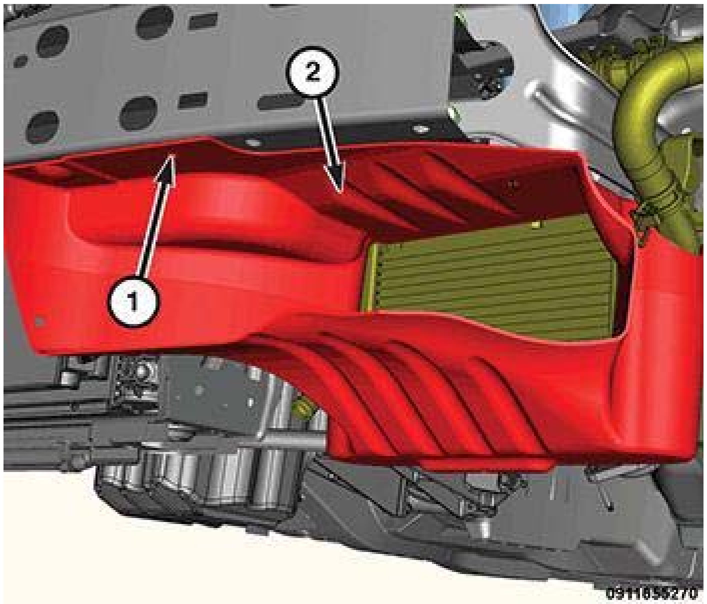


Fig. 149: Low Temperature Radiator Shroud & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Remove the auxiliary low temperature radiator shroud fasteners (1) and remove the shroud (2).
5. Disconnect the coolant pump wire harness connector.

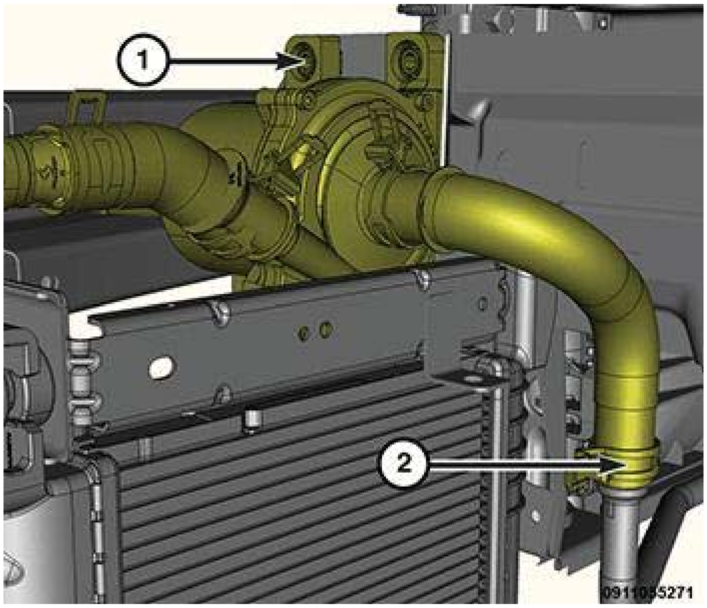
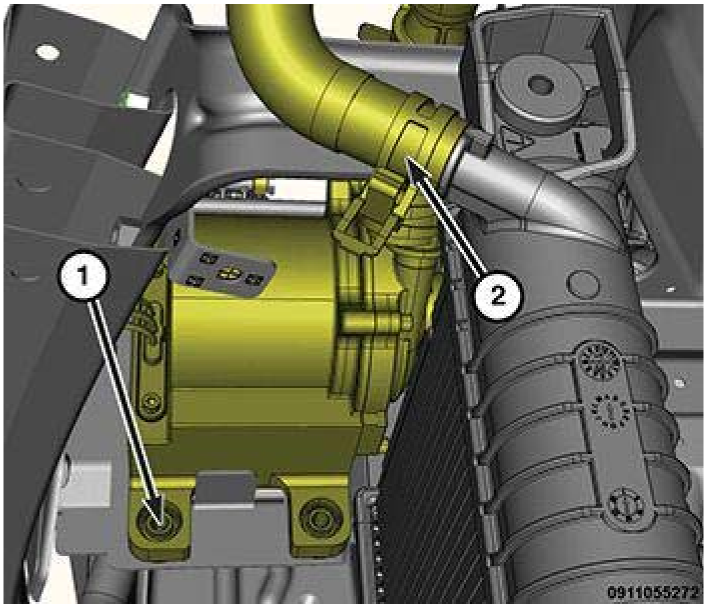


Fig. 150: Coolant Pump To Mounting Bracket Nuts & Clamp
Courtesy of CHRYSLER GROUP, LLC

6. Remove the two upper mounting nuts (1) securing the coolant pump to the mounting bracket.
7. Release the clamp (2) and remove the coolant hose from the pipe.

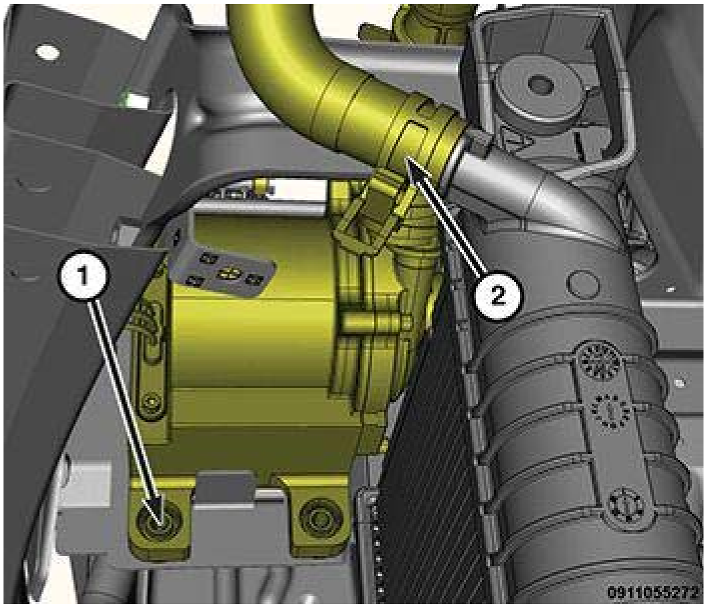


[Fig. 151: Lower Coolant Pump Mounting Nuts & Clamp]
Courtesy of CHRYSLER GROUP, LLC

8. Release the clamp (2) and remove the coolant hose from the auxiliary low temperature radiator.
9. Remove the two lower coolant pump mounting nuts (1).
10. Remove the coolant pump from the vehicle.
11. Remove the coolant hoses from the pump.

INSTALLATION

INSTALLATION



[Fig. 152: Lower Coolant Pump Mounting Nuts & Clamp]
Courtesy of CHRYSLER GROUP, LLC

1. Install the coolant hoses onto the coolant pump.

2. Position the coolant pump onto the lower mounting bracket studs.
3. Install the two lower mounting nuts and tighten the nuts (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Install the coolant hose onto the auxiliary low temperature radiator and secure the clamp (2).

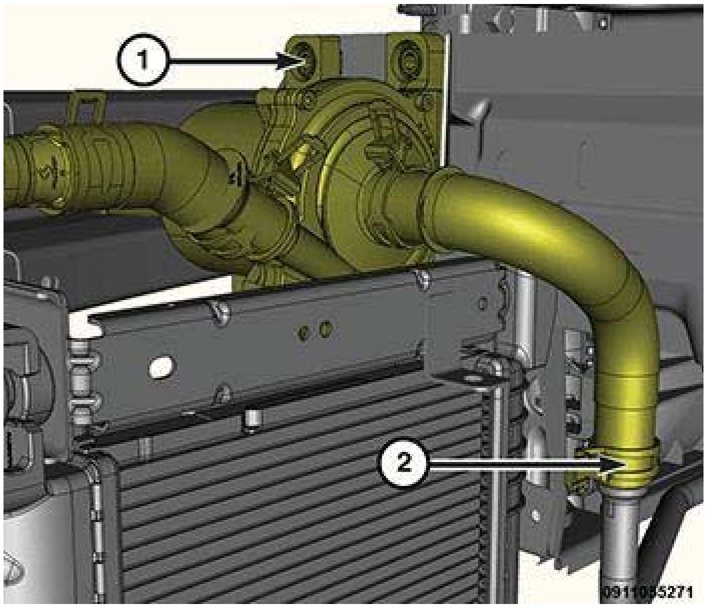


Fig. 153: Coolant Pump To Mounting Bracket Nuts & Clamp
Courtesy of CHRYSLER GROUP, LLC

5. Install the upper mounting nuts (1) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
6. Install the coolant hose onto the coolant tube and secure the clamp (2).

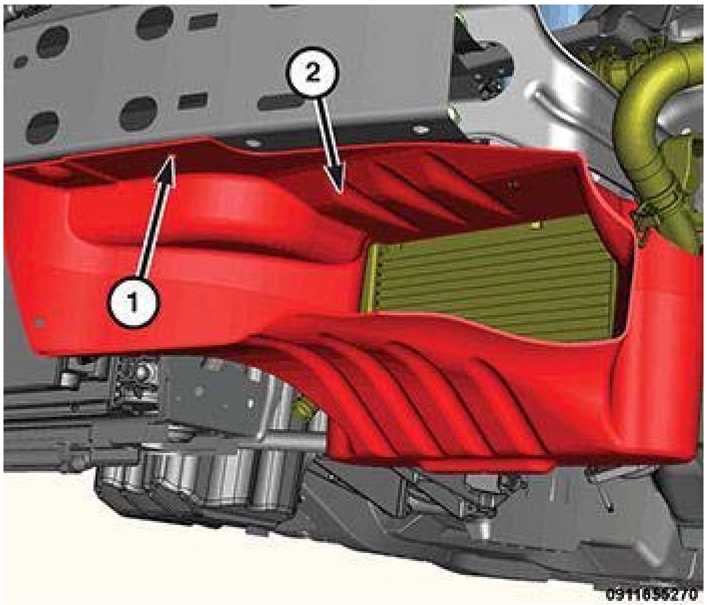


Fig. 154: Low Temperature Radiator Shroud & Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Position the auxiliary low temperature radiator shroud (2) to the vehicle and install the fasteners (1).

8. Connect the wire harness connector to the coolant pump.
9. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
10. Connect the negative battery cable.
11. Evacuate air and refill cooling system. Refer to **STANDARD PROCEDURE**.
12. Check cooling system for leaks. Refer to **DIAGNOSIS AND TESTING**.

RESERVOIR, COOLANT

REMOVAL

REMOVAL

1. Drain the low temperature cooling system below level of the coolant reservoir. Refer to **STANDARD PROCEDURE**.

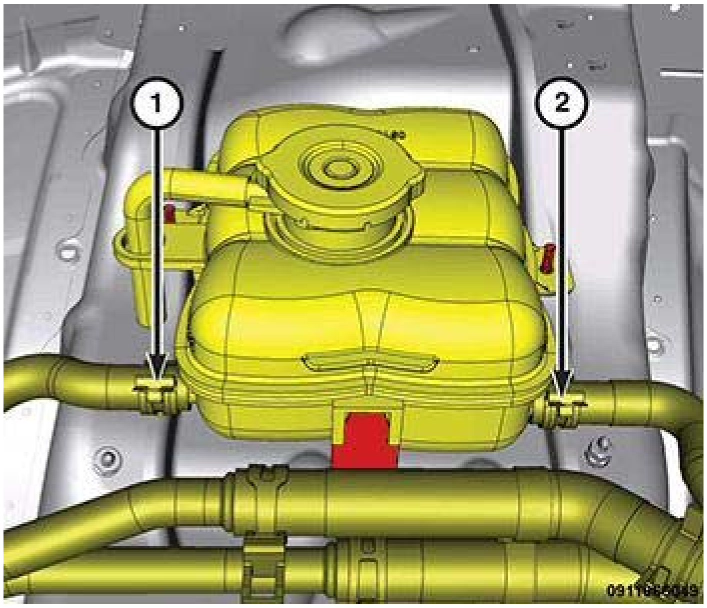
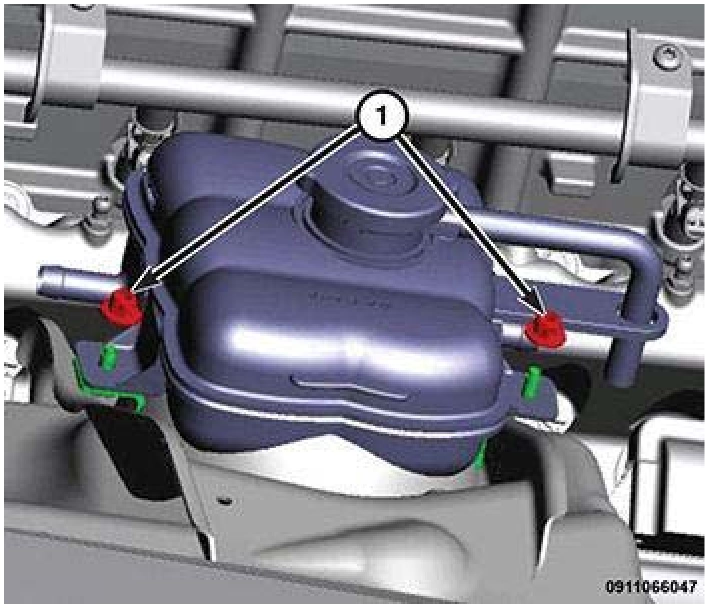


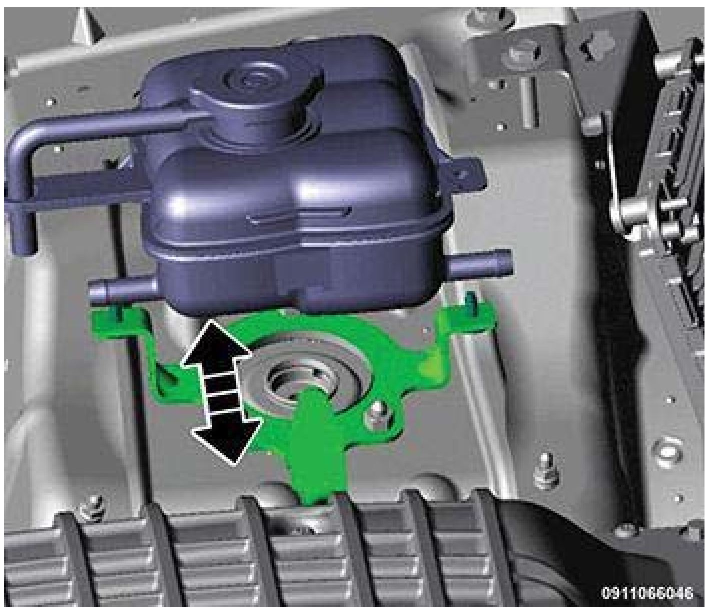
Fig. 155: Inlet & Outlet Hose Clamps
Courtesy of CHRYSLER GROUP, LLC

2. Remove coolant reservoir pressure cap.
3. Remove the inlet hose (2) from the coolant reservoir.
4. Remove the outlet hose (1) from the coolant reservoir.



[Fig. 156: Coolant Reservoir To Bracket Retaining Nuts](#)
Courtesy of CHRYSLER GROUP, LLC

5. Remove the two coolant reservoir to bracket retaining nuts (1).



[Fig. 157: Disengaging/Engaging Coolant Reservoir](#)
Courtesy of CHRYSLER GROUP, LLC

6. Lift the coolant reservoir upward, disengaging it from the mounting bracket.

INSTALLATION

INSTALLATION

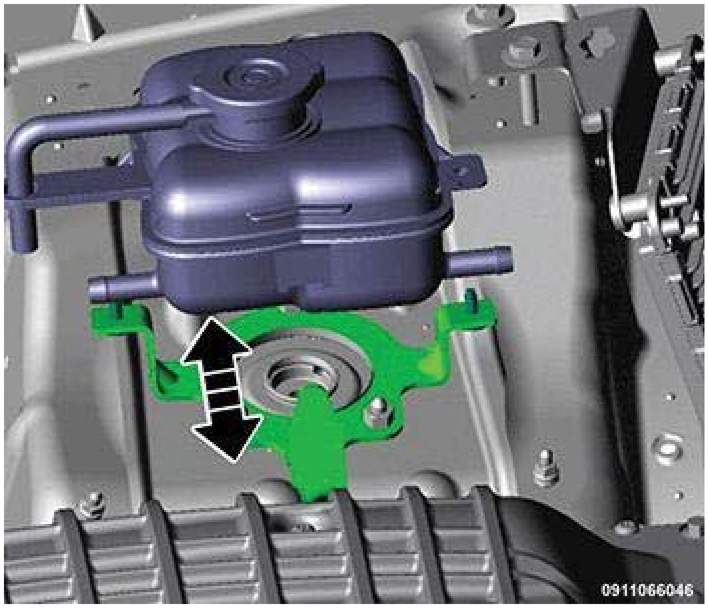


Fig. 158: Disengaging/Engaging Coolant Reservoir
Courtesy of CHRYSLER GROUP, LLC

1. Position the coolant reservoir onto the mounting bracket.

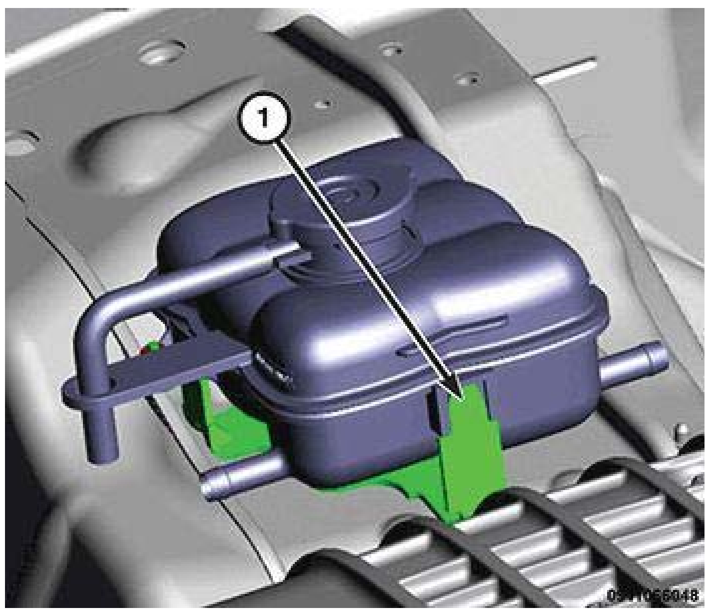


Fig. 159: Coolant Reservoir Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

2. Insert the mounting bracket (1) into the slot on the coolant reservoir.

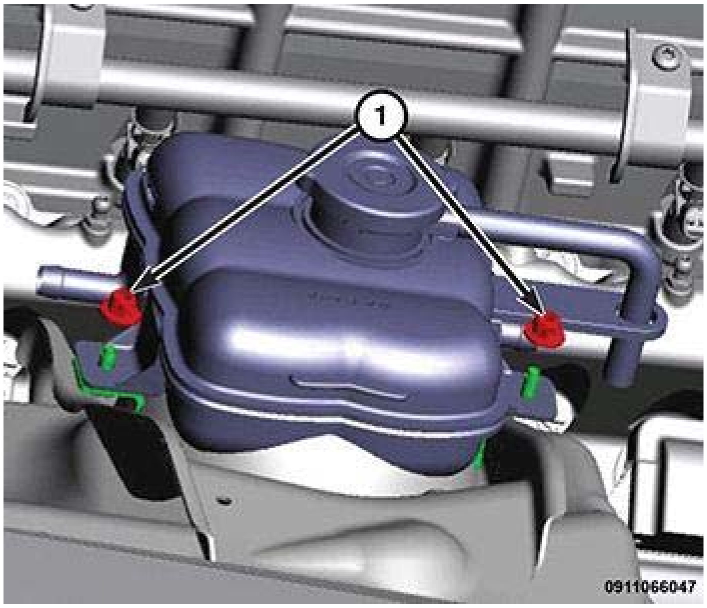


Fig. 160: Coolant Reservoir To Bracket Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

3. Install the coolant reservoir to bracket retaining nuts (1) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

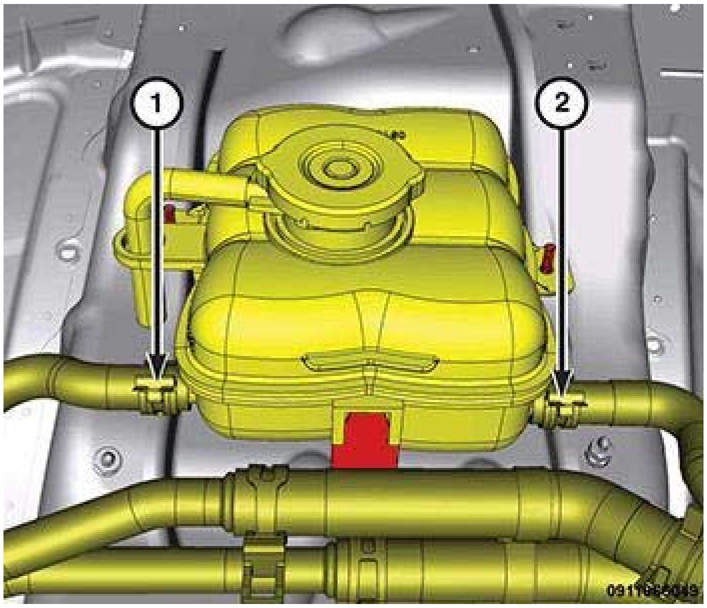


Fig. 161: Inlet & Outlet Hose Clamps
Courtesy of CHRYSLER GROUP, LLC

4. Install the outlet hose (1) onto the coolant reservoir and secure the clamp.
5. Install the inlet hose (2) onto the coolant reservoir and secure the clamp.
6. Fill the cooling system. Refer to **STANDARD PROCEDURE**.

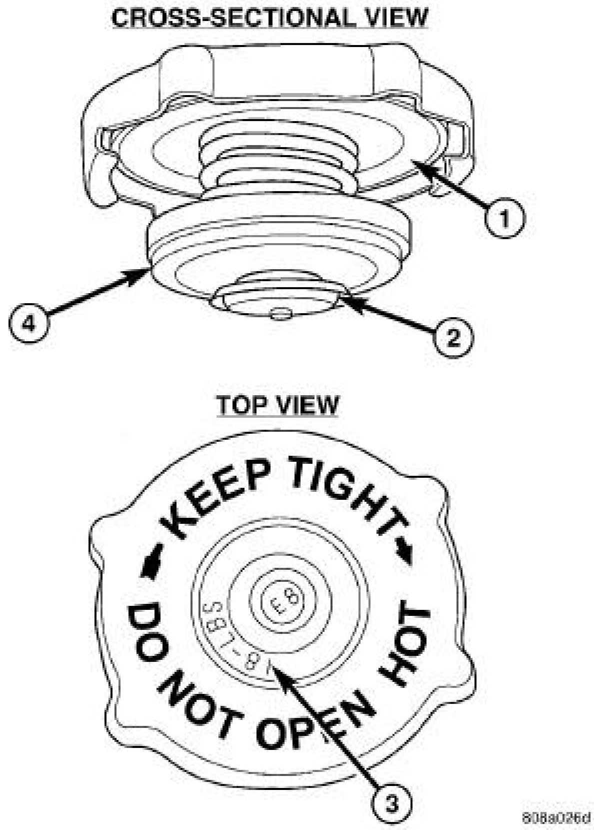
NOTE: **The low temperature cooling system must be vacuum filled.**

7. Install the coolant reservoir pressure cap.

CAP, RESERVOIR

DESCRIPTION

DESCRIPTION



[Fig. 162: Radiator Pressure Cap Components]
Courtesy of CHRYSLER GROUP, LLC

1 - FILLER NECK SEAL
2 - VACUUM VENT VALVE
3 - PRESSURE RATING
4 - PRESSURE VALVE

The Low Temperature Radiator (LTR) cooling system is equipped with an 18 PSI pressure cap. This cap releases pressure at some point within a range of 110 - 138 kPa (16 - 20 psi). The pressure relief point is engraved on top of the cap.

NOTE: **The primary cooling system uses a 21 PSI cap, these caps must not be interchanged.**

The cooling system will operate at pressures slightly above atmospheric pressure. This results in a higher coolant boiling point allowing increased radiator cooling capacity. The cap contains a spring-loaded pressure relief valve. This valve opens when system pressure reaches the release range of 110 - 138 kPa (16 - 20 psi).

A rubber gasket seals to the reservoir filler neck. This is done to maintain vacuum during coolant cool-down

and to prevent leakage when system is under pressure.

MANIFOLD, COOLANT CROSSOVER

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Drain the cooling system. Refer to **STANDARD PROCEDURE**.
3. Remove the cowl cover panel. Refer to **COVER, COWL PANEL, REMOVAL** .

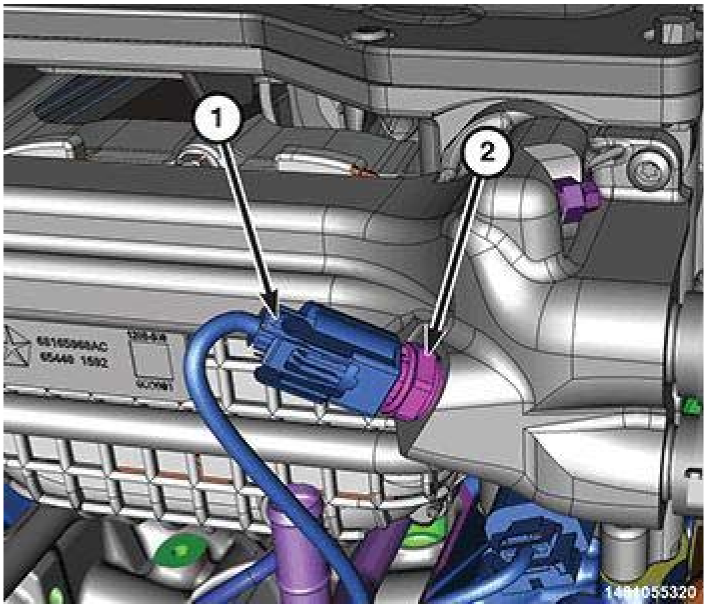


Fig. 163: Charger Air Cooler Temperature Sensor & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the charger air cooler temperature sensor (2) wire harness connector (1).

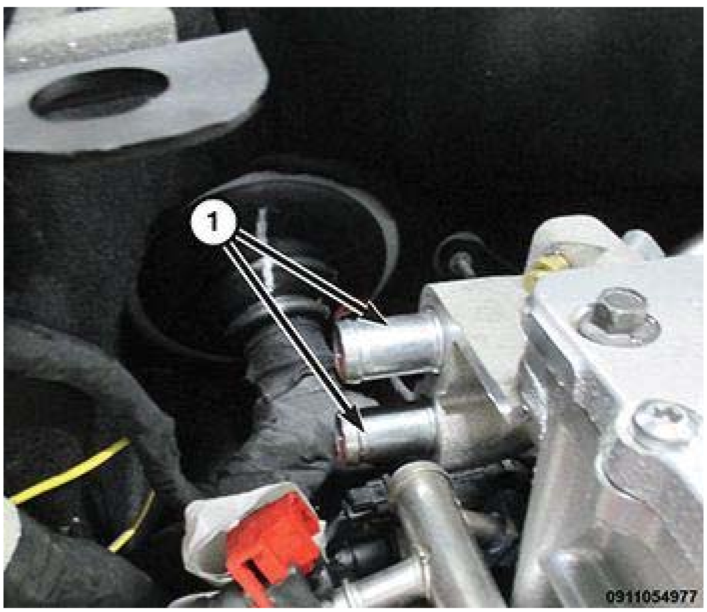
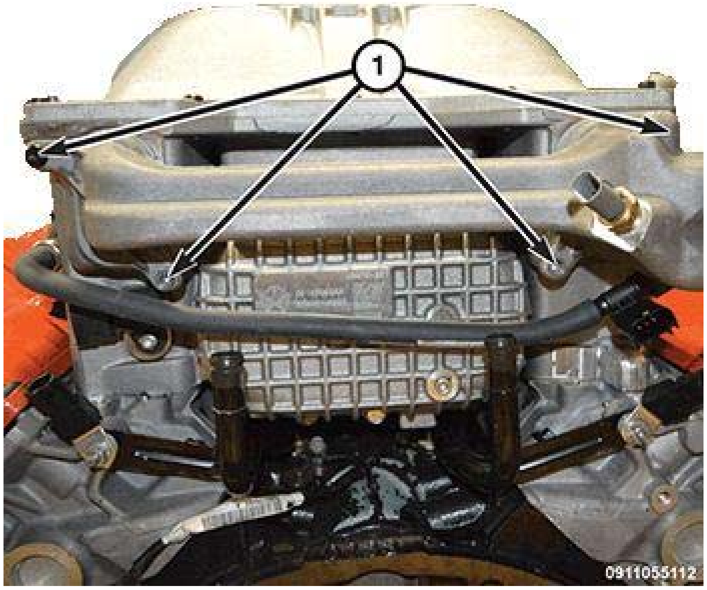


Fig. 164: Coolant Crossover

Courtesy of CHRYSLER GROUP, LLC

5. Remove the Low Temperature Radiator (LTR) circuit hoses from the coolant crossover (1).



[**Fig. 165: Coolant Crossover Manifold Mounting Bolts**]
Courtesy of CHRYSLER GROUP, LLC

6. Remove the coolant crossover manifold mounting bolts (1).
7. Remove the coolant crossover manifold from the vehicle.

INSTALLATION

INSTALLATION

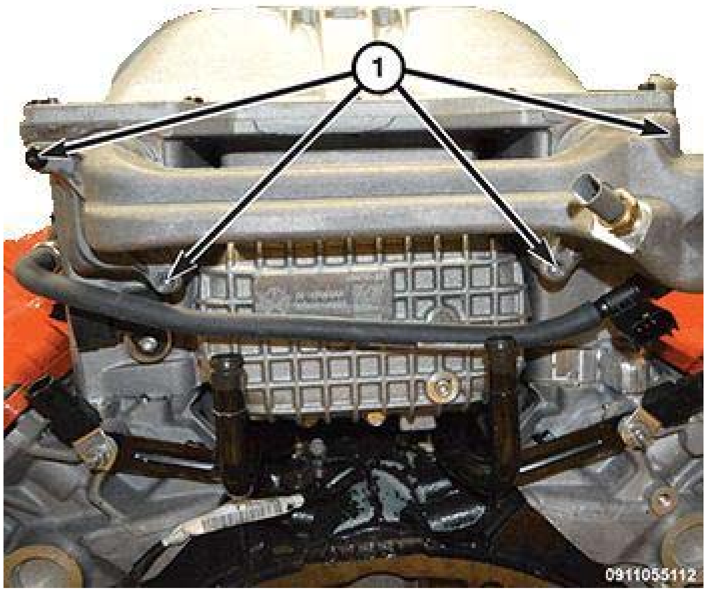


Fig. 166: Coolant Crossover Manifold Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Using **NEW** O-ring seals, install the coolant crossover manifold and tighten the bolts (1) to the proper

torque specification. Refer to **SPECIFICATIONS**.

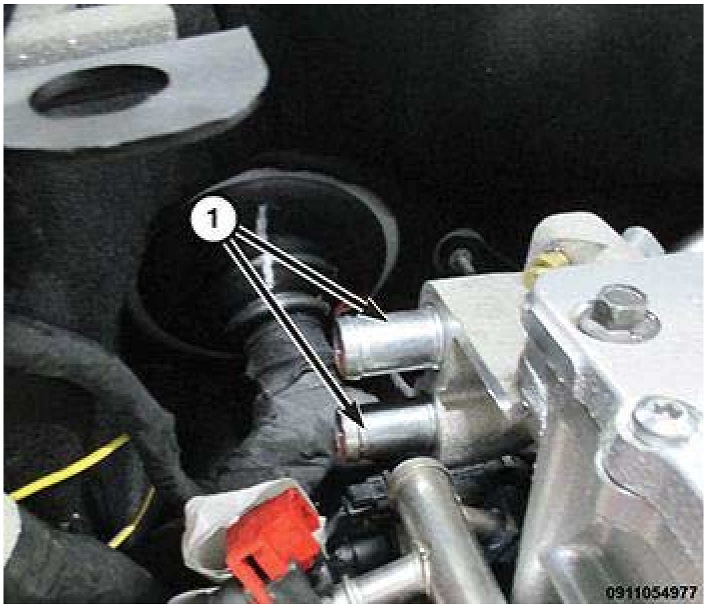


Fig. 167: Coolant Crossover
Courtesy of CHRYSLER GROUP, LLC

2. Install the Low Temperature Radiator (LTR) circuit hoses (1) onto the coolant crossover tube.

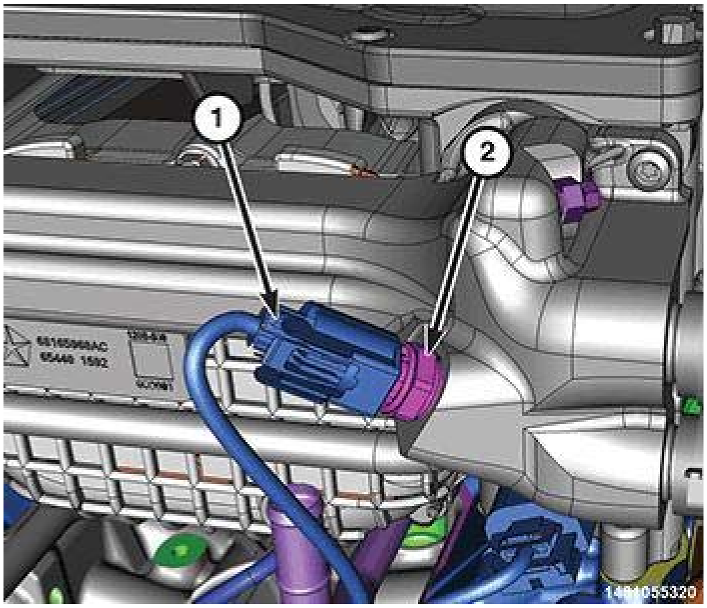


Fig. 168: Charger Air Cooler Temperature Sensor & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

3. Connect the charger air cooler temperature sensor (2) wire harness connector (1).
4. Install the cowl cover panel. Refer to **COVER, COWL PANEL, INSTALLATION** .
5. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
6. Connect the negative battery cable.
7. Start vehicle and check for cooling system leaks.

SENSOR, CHARGE AIR COOLER TEMPERATURE

REMOVAL

REMOVAL

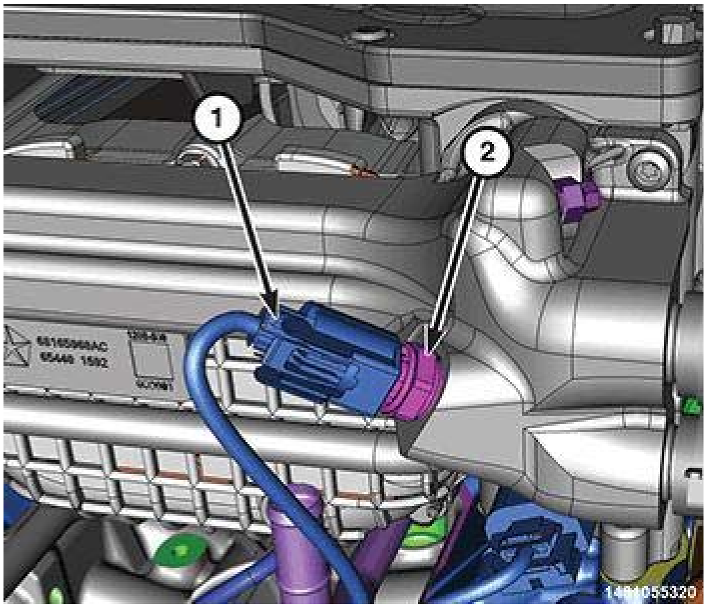


Fig. 169: Charger Air Cooler Temperature Sensor & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

The charge air cooler temperature sensor on the 6.2L engine is located on the right side of the coolant crossover manifold on the supercharger.

WARNING: Hot, pressurized coolant can cause injury by scalding. Cooling system must be partially drained before removing the coolant temperature sensor.

1. Disconnect and isolate the negative battery cable.
2. Partially drain the cooling system. Refer to **STANDARD PROCEDURE**.
3. Remove the cowl panel cover. Refer to **COVER, COWL PANEL, REMOVAL** .
4. Disconnect the charge air cooler temperature sensor wire harness connector (1).
5. Remove the charge air cooler temperature sensor (2) from the supercharger.

INSTALLATION

INSTALLATION

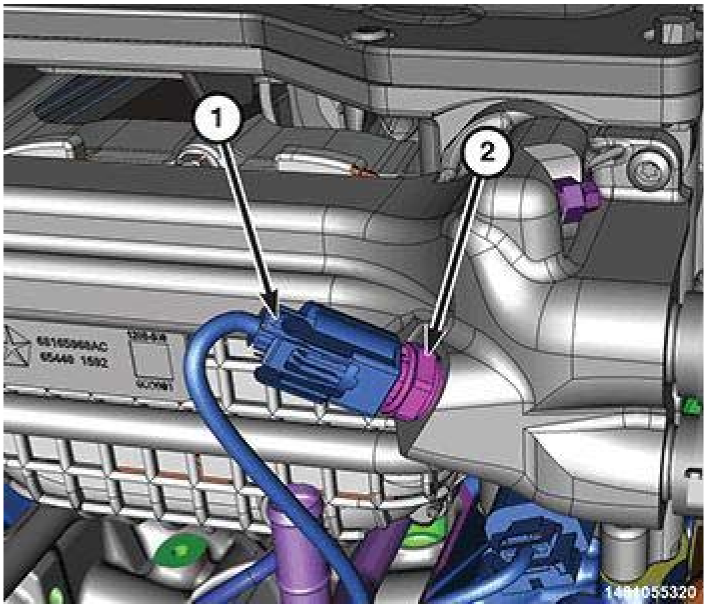


Fig. 170: Charger Air Cooler Temperature Sensor & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

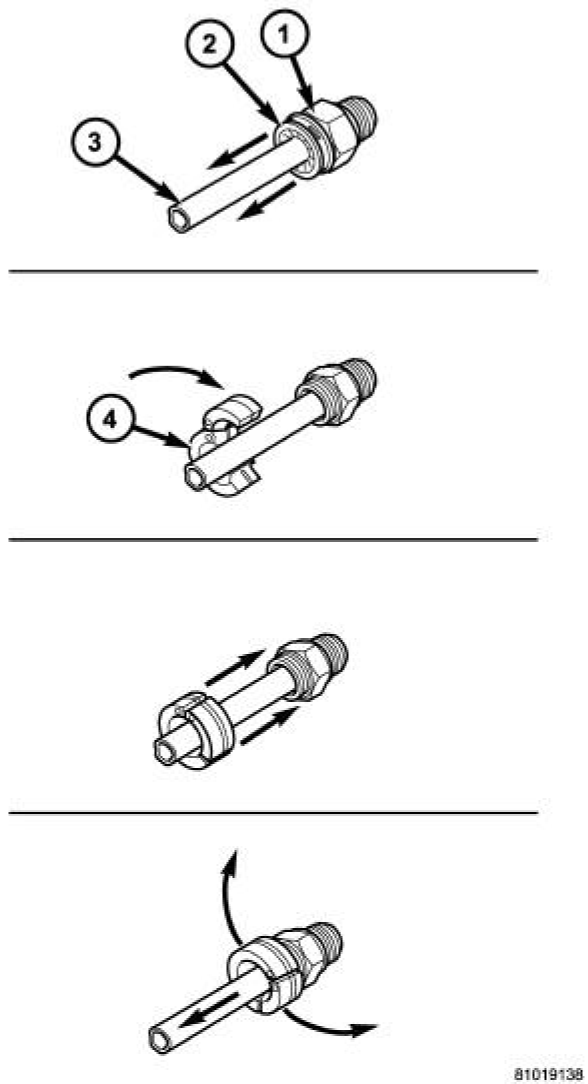
1. Apply MOPAR™ thread sealant with PFTE to sensor threads.
2. Install the charge air cooler temperature sensor (2) into the coolant crossover manifold and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Connect the charge air cooler temperature sensor wire harness connector (1).
4. Install the cowl panel cover. Refer to **COVER, COWL PANEL, INSTALLATION** .
5. Fill the cooling system. Refer to **STANDARD PROCEDURE**.
6. Connect the negative battery cable.

TRANSMISSION

STANDARD PROCEDURE

STANDARD PROCEDURE - TRANSMISSION COOLER LINE QUICK CONNECT FITTING DISASSEMBLY/ASSEMBLY

DISCONNECT



[Fig. 171: Oil Cooler Line Quick Connect Fitting - Disassembly](#)
Courtesy of CHRYSLER GROUP, LLC

1 - QUICK CONNECT FITTING
2 - DUST CAP
3 - OIL COOLER LINE
4 - SPECIAL TOOL 8875A (FOR 3/8 LINE) OR 9546 (FOR 1/2 LINE)

1. Remove dust cap by pulling it straight back off of quick connect fitting
2. Place disconnect (special tool #8875A, Disconnect, Transmission Cooler Line) onto a 3/8 inch transmission cooler lines or (special tool #9546, Disconnect Tool) onto a 1/2 inch transmission cooler lines with the fingers of the tool facing the quick connect fitting.
3. Slide disconnect tool down the transmission line and engage the fingers of the tool into the retaining clip. When properly engaged in the clip, the tool will fit flush against the quick connect fitting.
4. Rotate the disconnect tool 60Â° to expand the retaining clip.
5. While holding the disconnect tool against the quick connect fitting, pull back on the transmission cooler

line to remove.

CONNECT

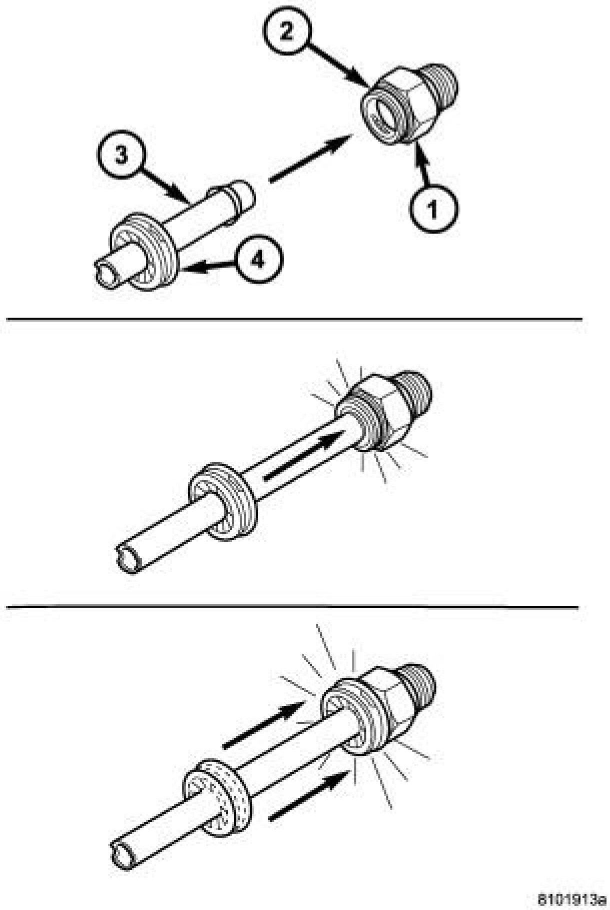


Fig. 172: Oil Cooler Line Quick Connect Fitting - Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - QUICK CONNECT FITTING
2 - CLIP
3 - OIL COOLER LINE
4 - DUST CAP

1. Align transmission cooler line with quick connect fitting while pushing straight into the fitting.
2. Push in on transmission cooler line until a "click" is heard or felt.
3. Slide dust cap down the transmission cooler line and snap it over the quick connect fitting until it is fully seated and rotates freely. Dust cap will only snap over quick connect fitting when the transmission cooler line is properly installed.

NOTE: **If dust cap will not snap into place, repeat assembly step #2.**

COOLER, TRANSMISSION OIL

DESCRIPTION

3.6L/5.7L/6.4L

The automatic transmission cooler is located in the front of the radiator and behind the front fascia and is combined with the A/C condenser. The transmission cooler is a heat exchanger that allows heat in the transmission fluid to be transferred to the air passing over the cooler fins.

The Transmission oil cooler/A/C condenser assembly is equipped with quick connect fitting for the transmission oil cooler lines, a tapping block for the receiver/drier and mounting provisions for the power steering cooler.

The transmission oil cooler/AC condenser is service as an assembly. For removal and installation, refer to **CONDENSER, A/C, REMOVAL** or **CONDENSER, A/C, INSTALLATION** .

6.2L

The automatic transmission cooler is located in the Low Temperature Radiator (LTR). The transmission cooler is a heat exchanger that allows heat in the transmission fluid to be transferred to the air passing over the cooler fins.

The Transmission oil cooler/LTR assembly is equipped with quick connect fittings for the transmission oil cooler lines.

The transmission oil cooler/LTR is serviced as an assembly. For removal and installation, refer to **RADIATOR, LOW TEMPERATURE, REMOVAL** or **RADIATOR, LOW TEMPERATURE, INSTALLATION**.

TUBES AND HOSES, TRANSMISSION OIL COOLER

REMOVAL

8HP45/845RE REMOVAL

1. Remove upper radiator closure panels.

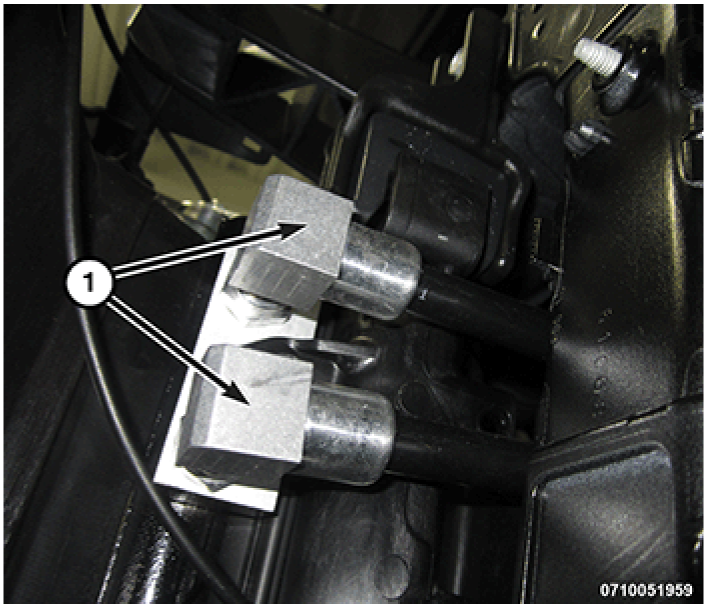


Fig. 173: Transmission Cooler Lines From Transmission Cooler

Courtesy of CHRYSLER GROUP, LLC

2. Using the Transmission Cooler Line Disconnect tool (special tool #8875A, Disconnect, Transmission Cooler Line), remove the transmission cooler lines (1) from transmission cooler. Refer to **STANDARD PROCEDURE**.
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

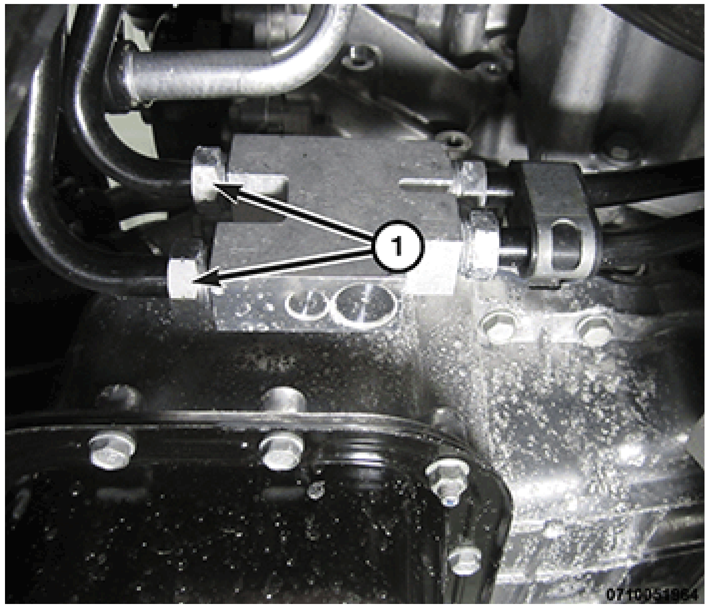


Fig. 174: Front Transmission Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the front transmission cooler lines (1) from the thermal bypass valve block.

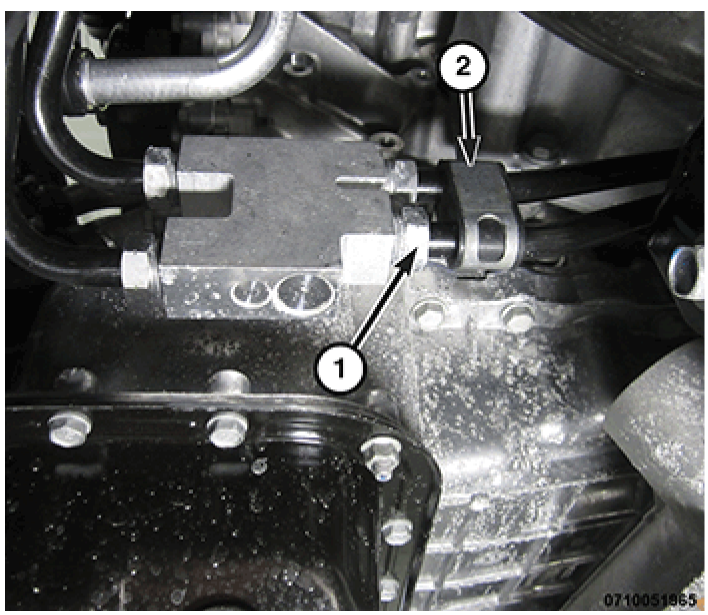


Fig. 175: Rear Transmission Cooler Lines & Bracket
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the rear transmission cooler lines (1) from the thermal bypass valve block.

6. Remove the transmission cooler line bracket bolt and bracket (2).

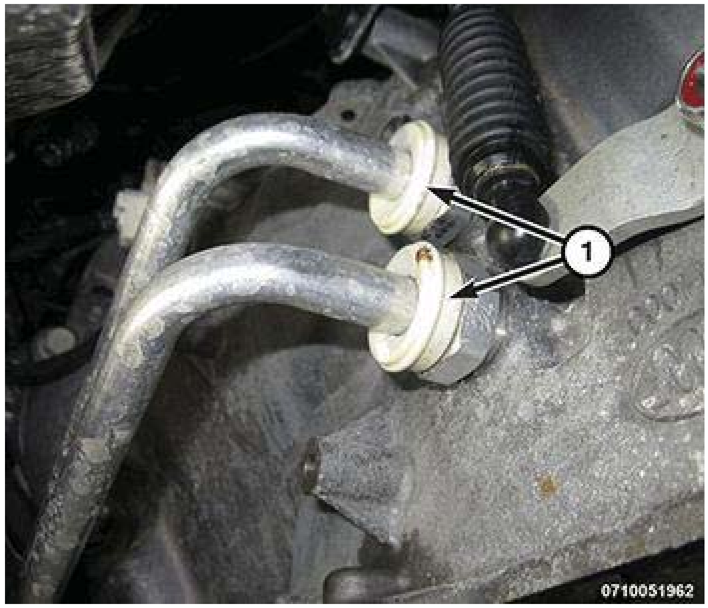


Fig. 176: Transmission Fluid Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

7. Using the Transmission Cooler Line Disconnect tool (special tool #8875A, Disconnect, Transmission Cooler Line), remove the transmission cooler lines (1) from the transmission. Refer to **STANDARD PROCEDURE**.
8. Remove the transmission cooler lines from the vehicle.

8HP70 REMOVAL

1. Remove upper radiator closure panels

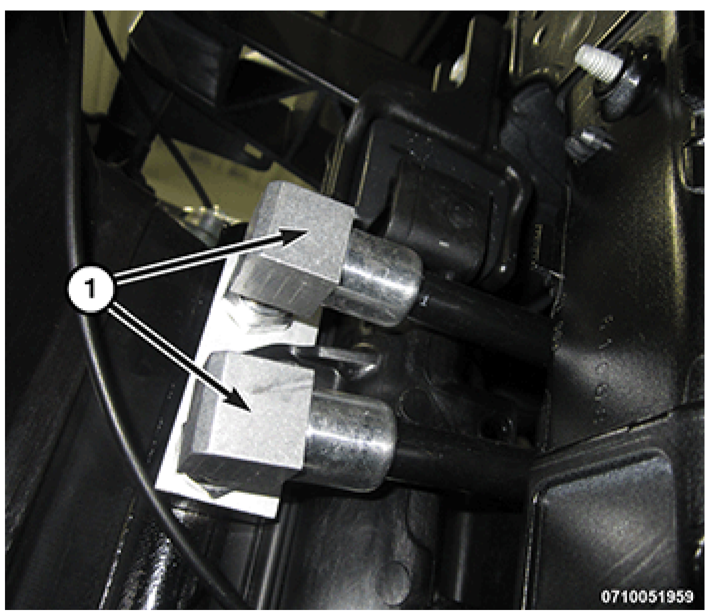


Fig. 177: Transmission Cooler Lines From Transmission Cooler
Courtesy of CHRYSLER GROUP, LLC

2. Using the Transmission Cooler Line Disconnect tool (special tool #8875A, Disconnect, Transmission Cooler Line), remove the transmission cooler lines (1) from transmission cooler. Refer to **STANDARD PROCEDURE**.
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

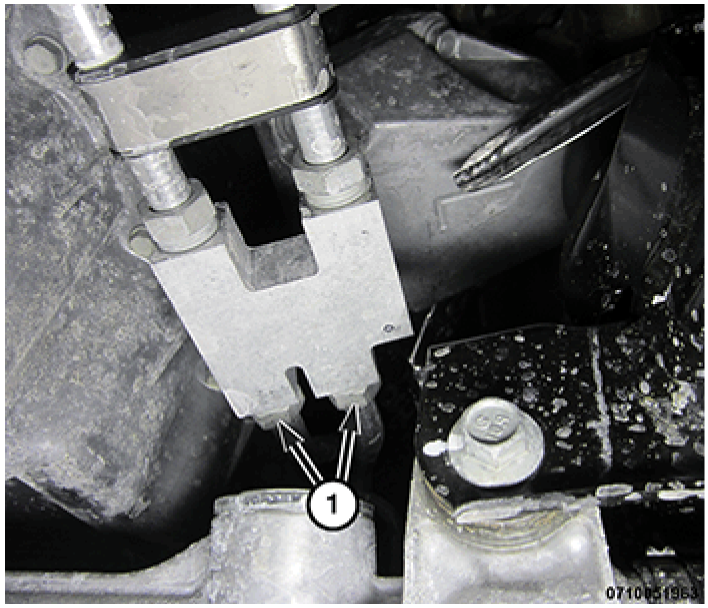


Fig. 178: Front Transmission Cooler Lines From The Thermal Bypass Valve Block
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the front transmission cooler lines (1) from the thermal bypass valve block.

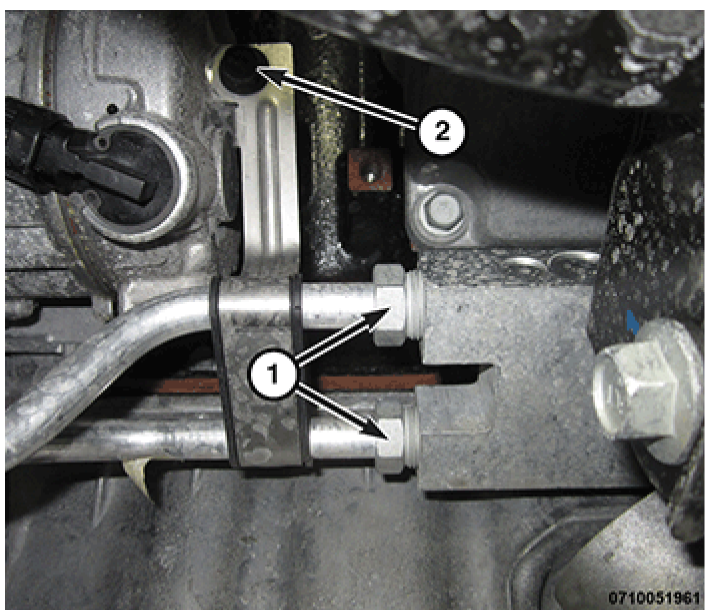


Fig. 179: Rear Transmission Cooler Lines, Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the rear transmission cooler lines (1) from the thermal bypass valve block.
6. Remove the transmission cooler line bracket bolt and bracket (2).

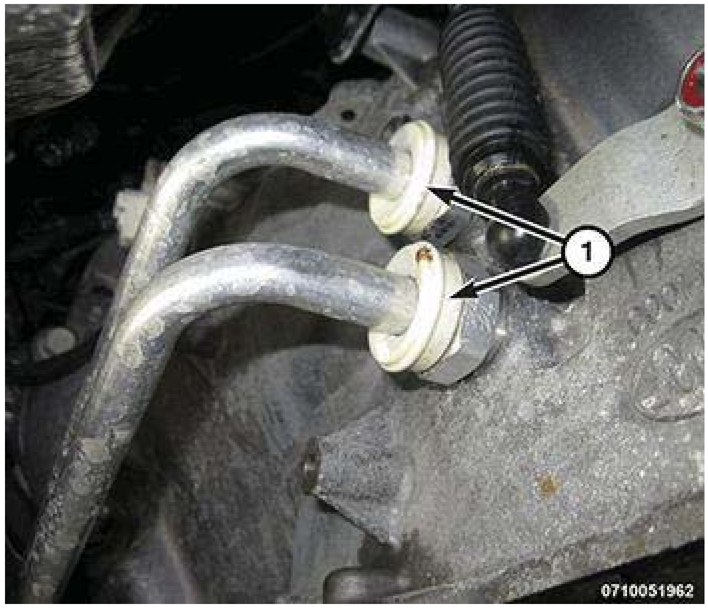


Fig. 180: Transmission Fluid Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

7. Using the Transmission Cooler Line Disconnect tool (special tool #8875A, Disconnect, Transmission Cooler Line), remove the transmission cooler lines (1) from the transmission. Refer to **STANDARD PROCEDURE**.
8. Remove the transmission cooler lines from the vehicle.

8HP90 REMOVAL

1. Remove upper radiator closure panels

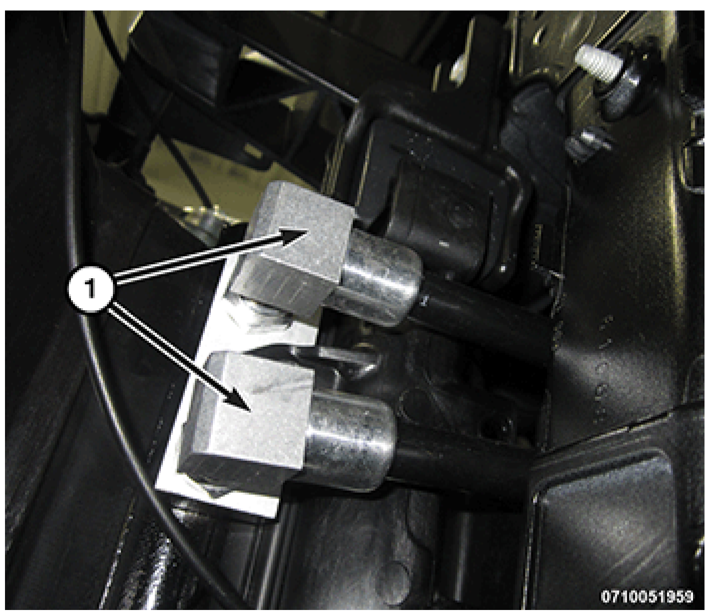


Fig. 181: Transmission Cooler Lines From Transmission Cooler
Courtesy of CHRYSLER GROUP, LLC

2. Using the Transmission Cooler Line Disconnect tool (special tool #8875A, Disconnect, Transmission Cooler Line), remove the transmission cooler lines (1) from transmission cooler. Refer to **STANDARD**

PROCEDURE.

3. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .

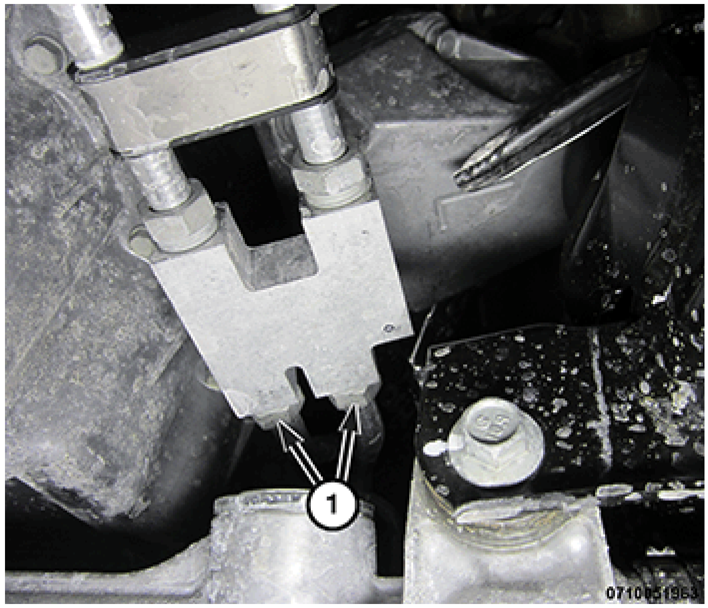


Fig. 182: Front Transmission Cooler Lines From The Thermal Bypass Valve Block
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the front transmission cooler lines (1) from the thermal bypass valve block.

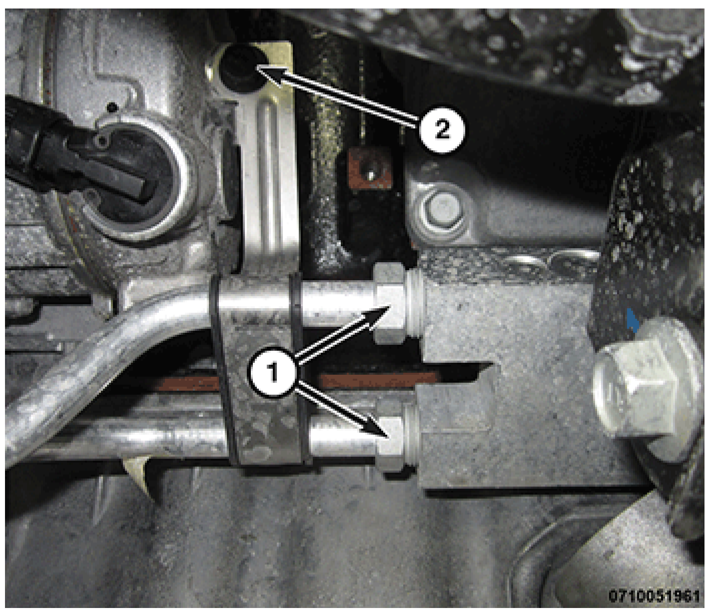


Fig. 183: Rear Transmission Cooler Lines, Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the rear transmission cooler lines (1) from the thermal bypass valve block.
6. Remove the transmission cooler line bracket bolt and bracket (2).

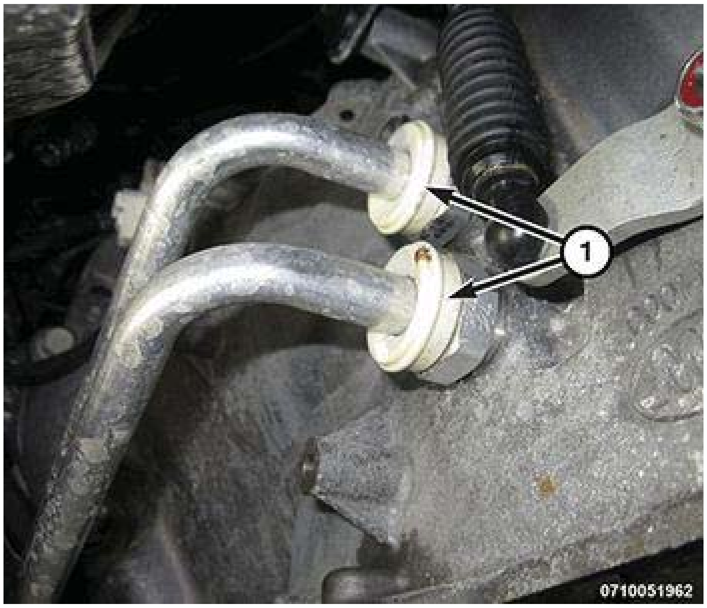


Fig. 184: Transmission Fluid Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

7. Using the Transmission Cooler Line Disconnect tool (special tool #8875A, Disconnect, Transmission Cooler Line), remove the transmission cooler lines (1) from the transmission. Refer to **STANDARD PROCEDURE**.
8. Remove the transmission cooler lines from the vehicle.

TR6060 REMOVAL

1. Remove upper radiator closure panels.

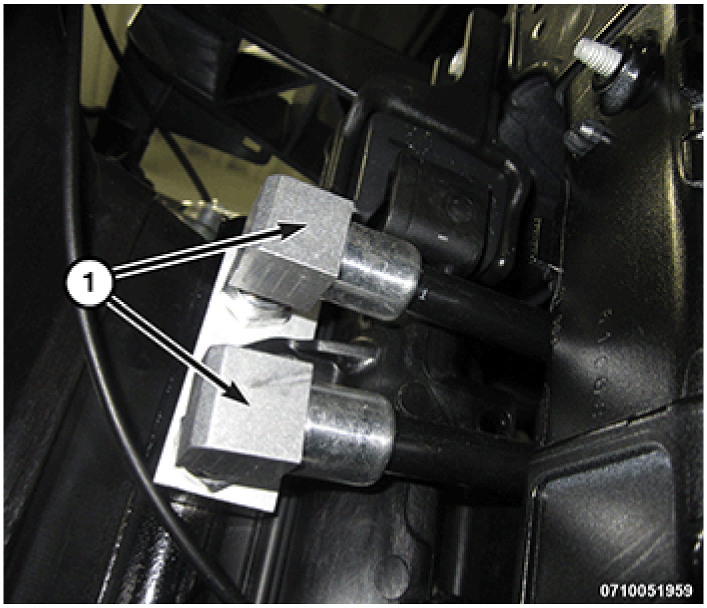


Fig. 185: Transmission Cooler Lines From Transmission Cooler
Courtesy of CHRYSLER GROUP, LLC

2. Using the Transmission Cooler Line Disconnect tool (special tool #8875A, Disconnect, Transmission Cooler Line), remove the transmission cooler lines (1) from transmission cooler. Refer to **STANDARD**

PROCEDURE.

3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

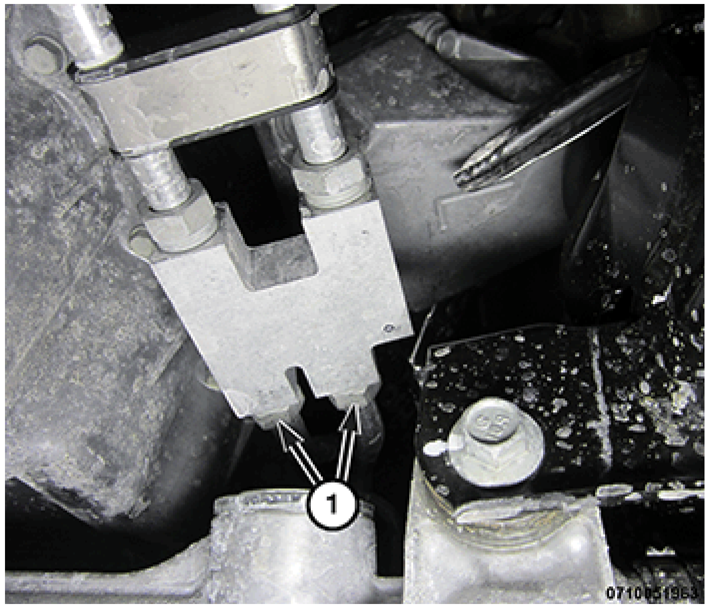


Fig. 186: Front Transmission Cooler Lines From The Thermal Bypass Valve Block
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the front transmission cooler lines (1) from the thermal bypass valve block.

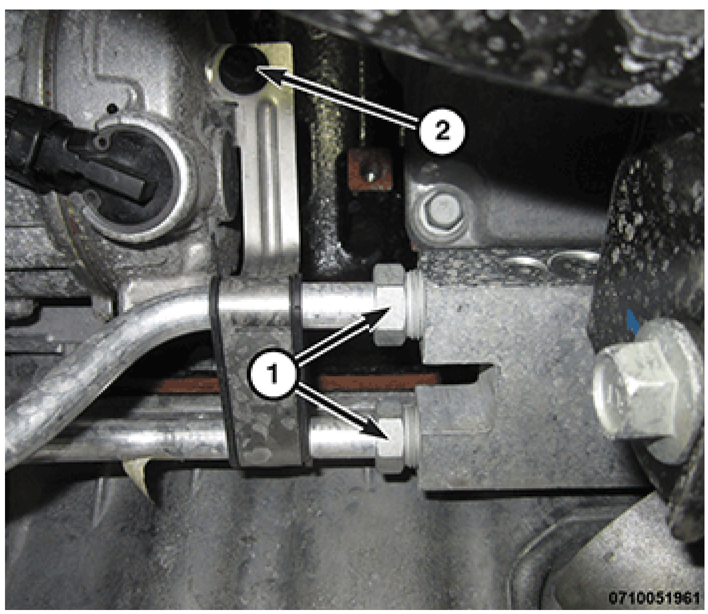


Fig. 187: Rear Transmission Cooler Lines, Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the rear transmission cooler lines (1) from the thermal bypass valve block.
6. Remove the transmission cooler line bracket bolt (2) and position aside the and bracket.

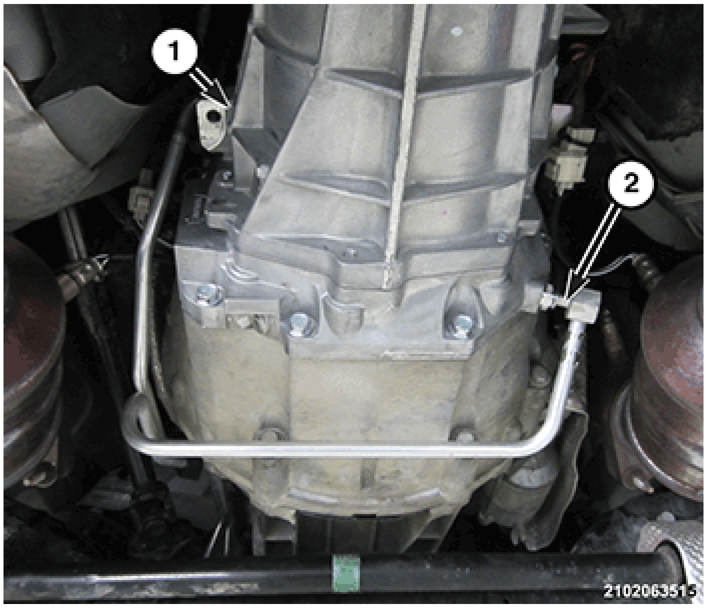


Fig. 188: Transmission Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

7. Using the Transmission Cooler Line Disconnect tool (special tool #8875A, Disconnect, Transmission Cooler Line), remove the transmission cooler lines (1, 2) from the transmission. Refer to **STANDARD PROCEDURE**.
8. Remove the transmission cooler lines from the vehicle.

INSTALLATION

8HP45/854RE INSTALLATION

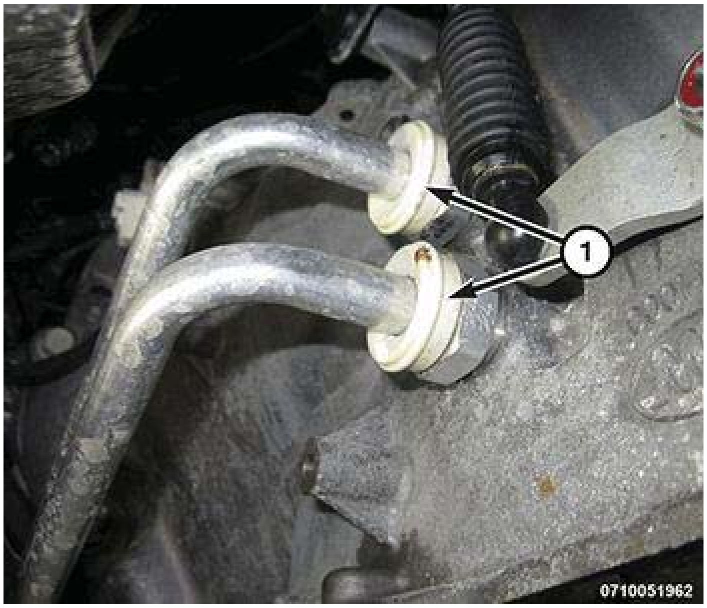


Fig. 189: Transmission Fluid Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

1. Install rear transmission cooler lines (1) at the transmission.

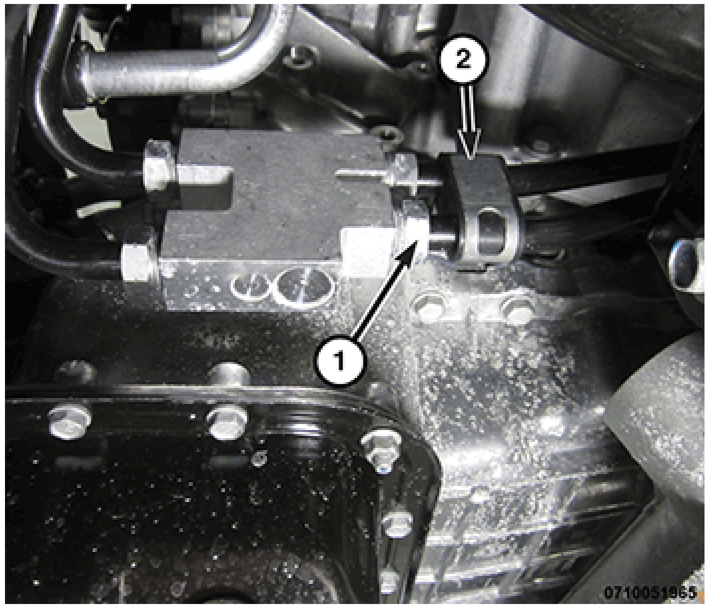


Fig. 190: Rear Transmission Cooler Lines & Bracket
Courtesy of CHRYSLER GROUP, LLC

2. Install the rear transmission cooler lines (1) to the thermal bypass valve. Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the transmission cooler line bracket bolt (2) and tighten bolt to the proper torque specification. Refer to **SPECIFICATIONS**.

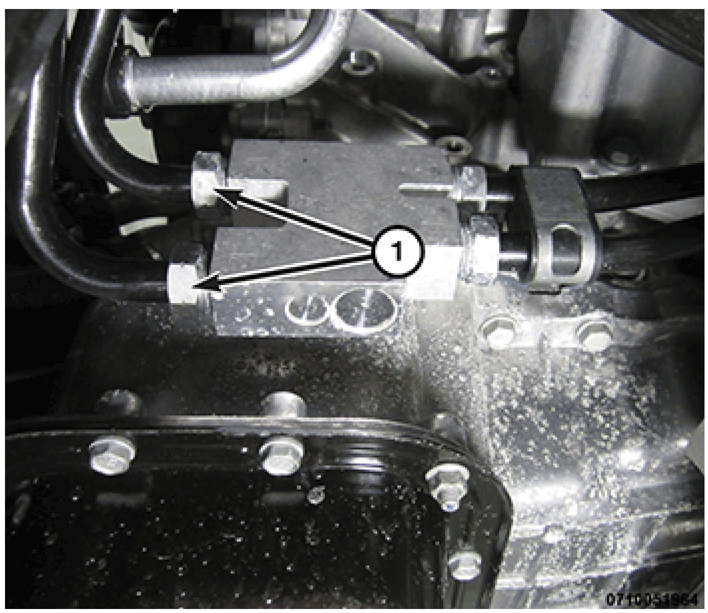


Fig. 191: Front Transmission Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

4. Install the front transmission cooler lines (1) to the thermal bypass valve. Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

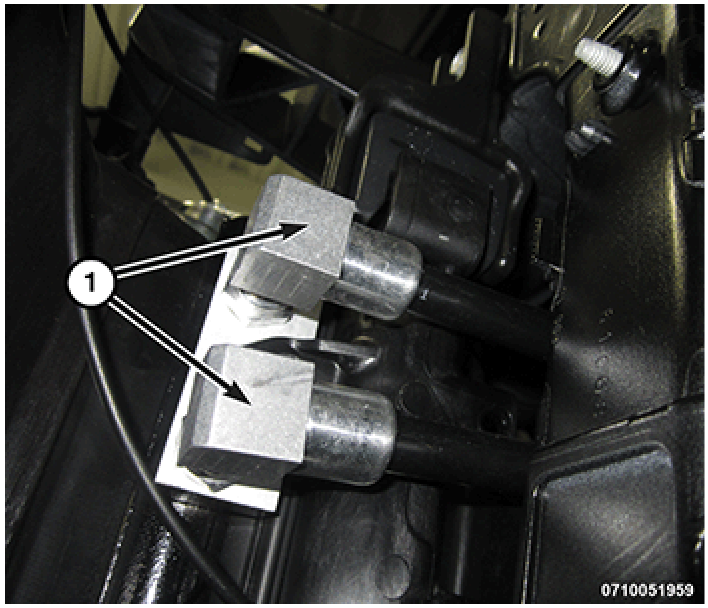


Fig. 192: Transmission Cooler Lines From Transmission Cooler
Courtesy of CHRYSLER GROUP, LLC

5. Install the front transmission cooler lines (1) into the transmission cooler. Refer to **STANDARD PROCEDURE**.
6. Remove the support and lower the vehicle.
7. Install the upper radiator closure panels.
8. Check the transmission fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .

8HP70 INSTALLATION

Fig. 193: Transmission Fluid Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

1. Install rear transmission cooler lines (1) at the transmission.

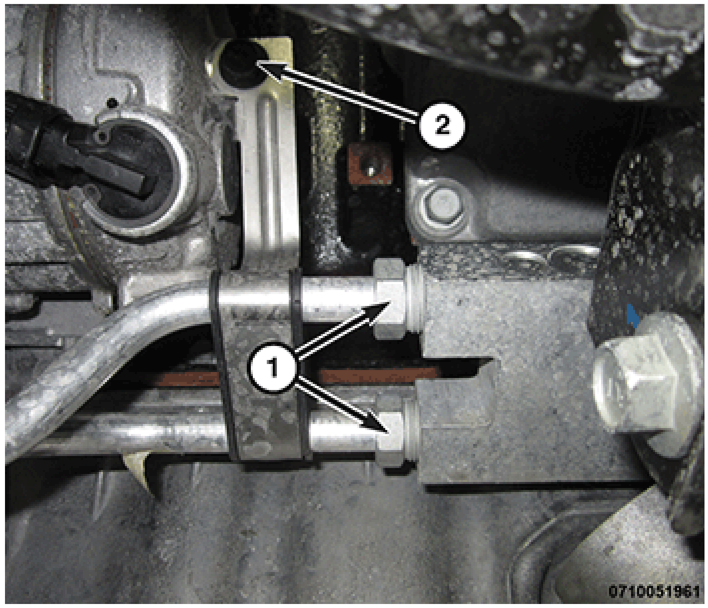


Fig. 194: Rear Transmission Cooler Lines, Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Install the front transmission cooler lines (1) to the thermal bypass valve. Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the transmission cooler line bracket bolt (2) and tighten bolt to the proper torque specification. Refer to **SPECIFICATIONS**.

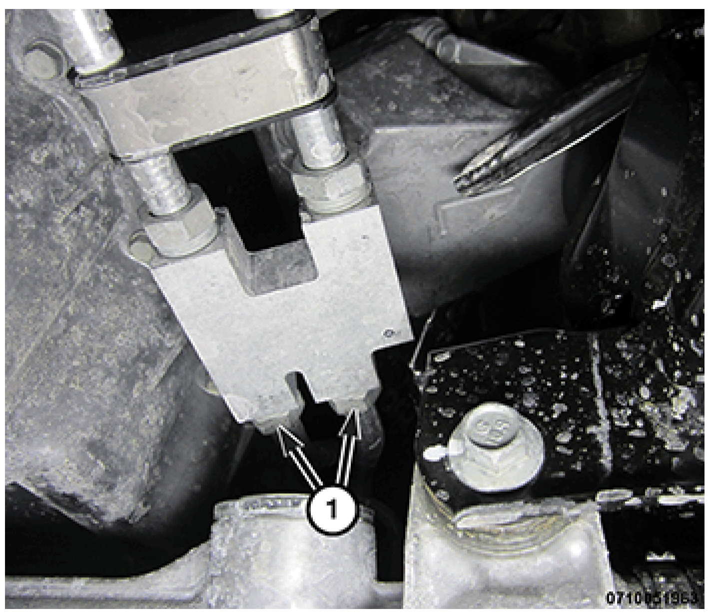


Fig. 195: Front Transmission Cooler Lines From The Thermal Bypass Valve Block
Courtesy of CHRYSLER GROUP, LLC

4. Install the rear transmission cooler lines (1) to the thermal bypass valve. Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

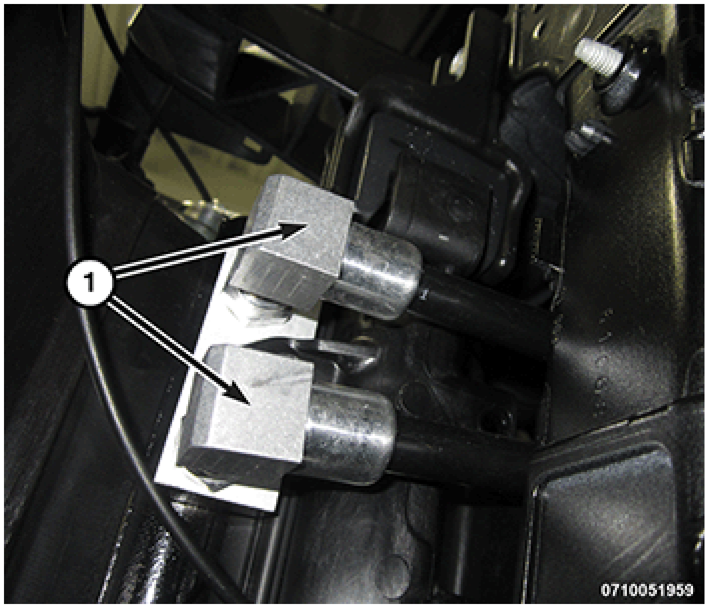


Fig. 196: Transmission Cooler Lines From Transmission Cooler
Courtesy of CHRYSLER GROUP, LLC

5. Install the front transmission cooler lines (1) into the transmission cooler. Refer to **STANDARD PROCEDURE**.
6. Remove the support and lower the vehicle.
7. Install the upper radiator closure panels.
8. Check the transmission fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .

8HP90 INSTALLATION

Fig. 197: Transmission Fluid Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

1. Install rear transmission cooler lines (1) at the transmission.

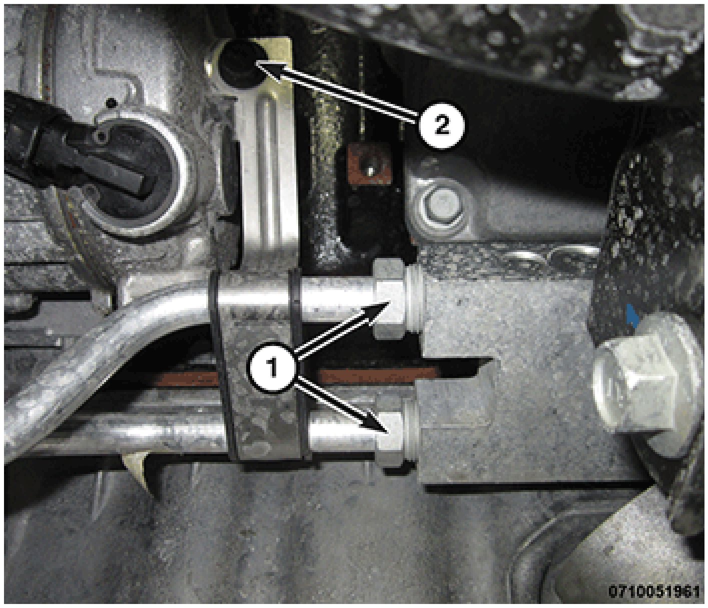


Fig. 198: Rear Transmission Cooler Lines, Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Install the front transmission cooler lines (1) to the thermal bypass valve. Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the transmission cooler line bracket bolt (2) and tighten bolt to the proper torque specification. Refer to **SPECIFICATIONS**.

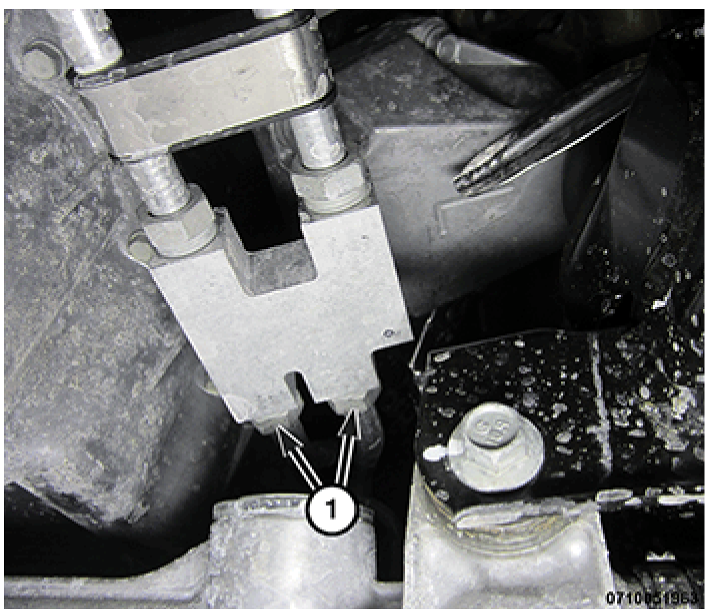


Fig. 199: Front Transmission Cooler Lines From The Thermal Bypass Valve Block
Courtesy of CHRYSLER GROUP, LLC

4. Install the rear transmission cooler lines (1) to the thermal bypass valve. Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

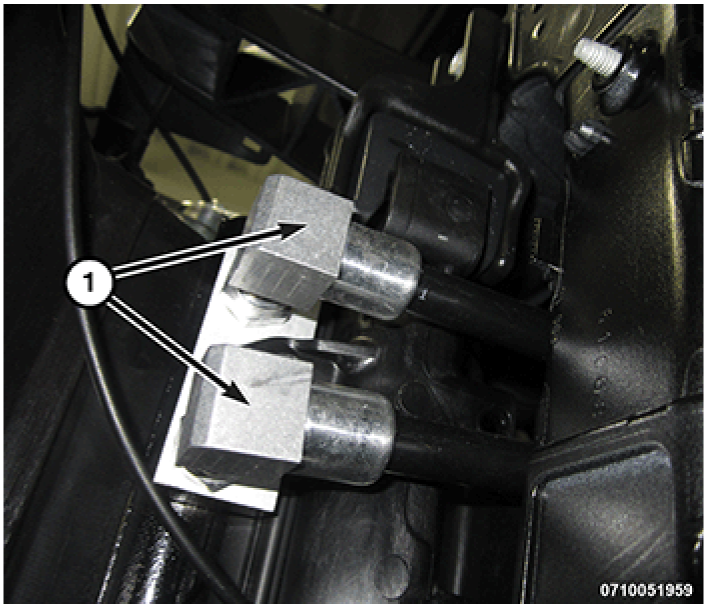


Fig. 200: Transmission Cooler Lines From Transmission Cooler
Courtesy of CHRYSLER GROUP, LLC

5. Install the front transmission cooler lines (1) into the transmission cooler. Refer to **STANDARD PROCEDURE**.
6. Remove the support and lower the vehicle.
7. Install the upper radiator closure panels.
8. Check the transmission fluid level. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .

TR6060 INSTALLATION

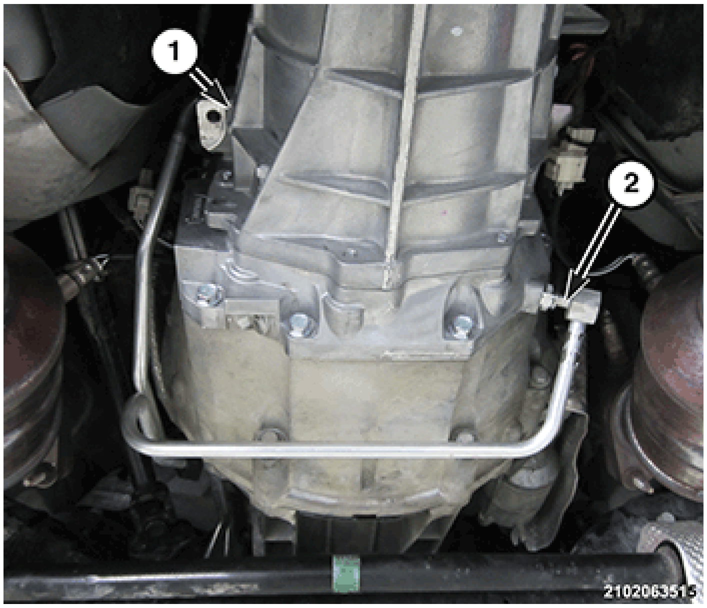


Fig. 201: Transmission Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

1. Install the rear transmission cooler lines (1, 2) at the transmission.

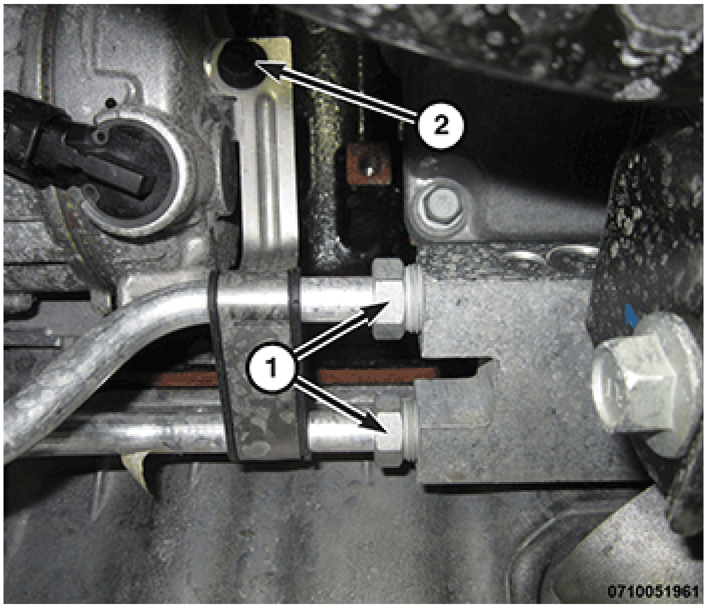


Fig. 202: Rear Transmission Cooler Lines, Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Install the front transmission cooler lines (1) to the thermal bypass valve. Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the transmission cooler line bracket bolt (2) and tighten bolt to the proper torque specification. Refer to **SPECIFICATIONS**.

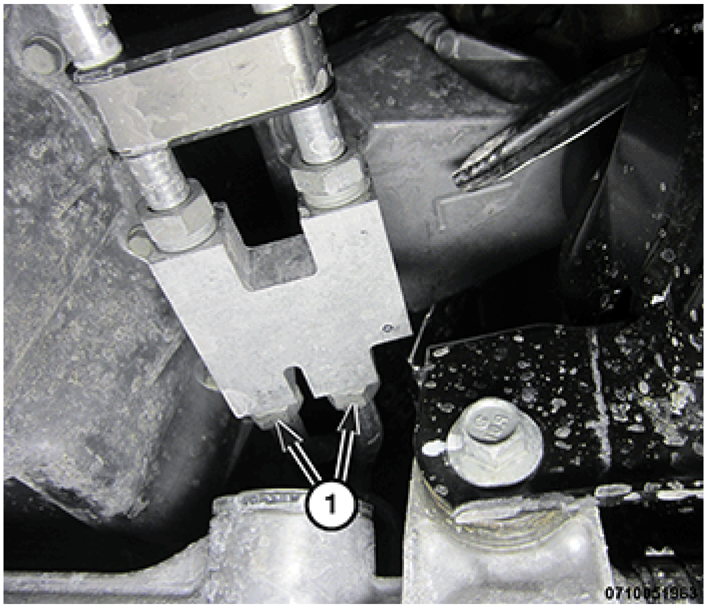


Fig. 203: Front Transmission Cooler Lines From The Thermal Bypass Valve Block
Courtesy of CHRYSLER GROUP, LLC

4. Install the rear transmission cooler lines (1) to the thermal bypass valve. Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

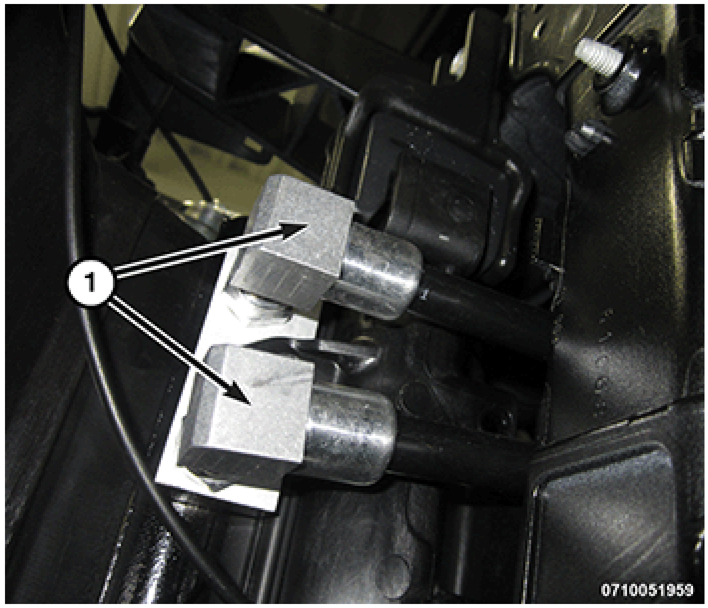


Fig. 204: Transmission Cooler Lines From Transmission Cooler
Courtesy of CHRYSLER GROUP, LLC

5. Install the front transmission cooler lines (1) into the transmission cooler. Refer to **STANDARD PROCEDURE**.
6. Remove the support and lower the vehicle.
7. Install the upper radiator closure panels.
8. Check the transmission fluid level. Refer to **STANDARD PROCEDURE** for 6.2L or **STANDARD PROCEDURE** for 5.7L/6.4L .

VALVE, THERMO BYPASS

DESCRIPTION

DESCRIPTION

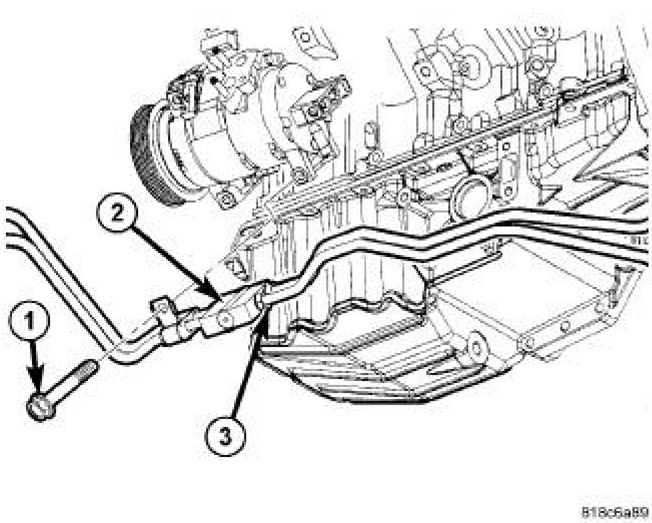


Fig. 205: Thermal Bypass Valve

Courtesy of CHRYSLER GROUP, LLC

The transmission thermal bypass valve is mounted on LH side of the engine at the A/C compressor.

OPERATION

OPERATION

The air-to-oil transmission cooler system has a thermal bypass valve assembly that controls fluid flow through the cooler. When the transmission fluid is cold (less then operating temperature), the fluid is routed through the cooler bypass valve without flowing through the transmission cooler. When the transmission fluid reaches operating temperatures 71Â°C (160Â°F) and above, the thermostat closes off the bypass and allowing fluid to flow through the transmission cooler. The thermal bypass valve is serviced as an assembly.

REMOVAL

REMOVAL

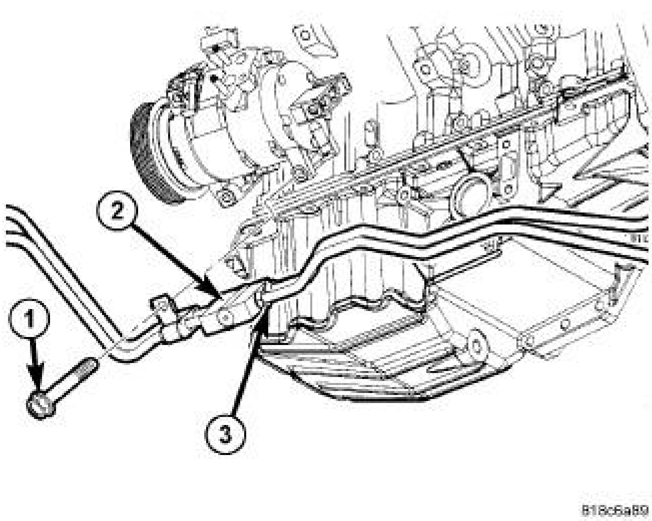


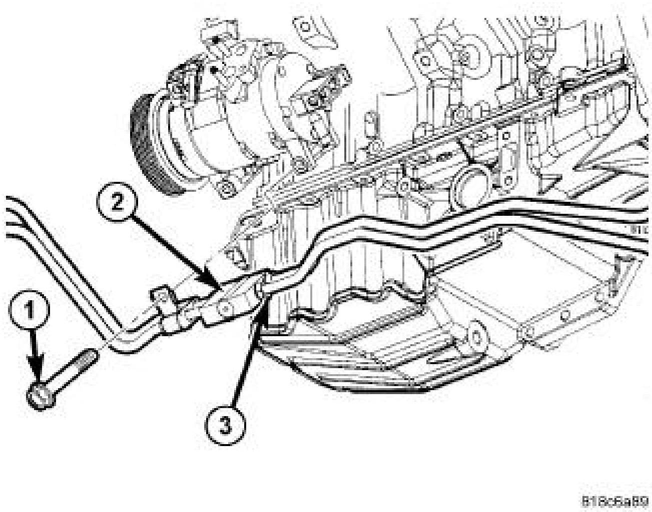
Fig. 206: Thermal Bypass Valve
Courtesy of CHRYSLER GROUP, LLC

1 - BRACKET BOLT
2 - THERMAL BYPASS VALVE
3 - COOLER LINE

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the front transmission cooler lines from the thermal bypass valve (2).
3. Remove the rear transmission cooler lines from the thermal bypass valve (3).
4. Remove the thermal bypass valve bracket bolt (1).
5. Remove the thermal bypass valve (2).

INSTALLATION

INSTALLATION



[Fig. 207: Thermal Bypass Valve]

Courtesy of CHRYSLER GROUP, LLC

1 - BRACKET BOLT	
2 - THERMAL BYPASS VALVE	
3 - COOLER LINE	

1. Position the thermal bypass valve (2) in place and install the bracket bolt (1). Tighten the bracket bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Install the rear transmission cooler lines (3) in the thermal bypass valve. Tighten the transmission cooler lines to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install front transmission cooler lines in thermal bypass valve. Tighten the transmission cooler lines to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Check the transmission fluid level. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

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Article GUID: A00735857

DESCRIPTION

BLIND SPOT MONITOR SYSTEM

The Blind Spot Monitor (BSM) system is an available factory-installed electronic driving aid. This system provides both blind spot and Rear Cross Path (RCP) monitoring features. While the vehicle is being driven, this system alerts the vehicle operator when it detects other highway licensable vehicles that enter the targeted blind spot and cross path alert zones. These zones lie immediately to the right and behind as well as immediately to the left and behind the vehicle. Due to the surrounding rear vehicle structure or other adjacent stationary obstacles outside of the vehicle, these zones might be more difficult for the vehicle operator to easily monitor.

When the BSM system detects another vehicle within one of the target zones, the system is capable of illuminating an amber triangle icon located in each outside rear view mirror glass, as well as reducing audio system volume and sounding chime tones through the audio system speakers to provide the vehicle operator with both visual and audible alerts. However, it should be noted that this BSM system is intended to supplement and not to replace safe vehicle operating habits, including proper adjustment and use of the standard equipment inside and outside rear view mirrors.

The BSM system includes the following major components, which are described in further detail elsewhere in this service information:

- **Blind Spot Displays** - Vehicles equipped with the BSM system have an amber Light Emitting Diode (LED) unit mounted on the back of each outside rear view mirror glass case behind the translucent outline of a triangle in the mirror glass. The BSM system illuminates the appropriate triangle icon in amber each time a vehicle is detected in one of the blind spot or rear cross path alert zones.
- **Blind Spot Sensors** - Vehicles equipped with the BSM system have both a Left Blind Spot Sensor (LBSS) and a Right Blind Spot Sensor (RBSS). The LBSS and the RBSS each include a RAdio Detection And Ranging (RADAR) sensor and an integral electronic control unit. Each of the two control units is independent, communicates on the Controller Area Network (CAN) data bus with its respective Driver Door Module (DDM) or Passenger Door Module (PDM), which is hard wired to its respective right or left blind spot display. The LBSS and the RBSS are concealed behind their respective right or left outboard end of the rear bumper fascia, just behind each rear wheel opening.
- **Door Modules** - An electronic Driver Door Module (DDM) and Passenger Door Module (PDM) receives electronic messages over the Controller Area Network (CAN) data bus from its respective Left Blind Spot Sensor (LBSS) or Right Blind Spot Sensor (RBSS) to control a hard wired output to the BSM display in its respective outside rear view mirror. The door modules are concealed behind the door trim panels on each door inside panel.
- **Electronic Vehicle Information Center** - In vehicles equipped with the optional BSM system, the Electronic Vehicle Information Center (EVIC) within the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) may display textual warnings and error messages related to the current operating status of the BSM system.
- **Radio Receiver Module** - The virtual buttons in the touch screen of the optional premium Radio Receiver Module (RRM) (also known as the radio or the head unit) provide an interface that allows the

vehicle operator to enable, disable and modify certain BSM system settings using the customer programmable features option.

Hard wired circuitry connects the BSM system components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin out and location views for the various wire harness connectors, splices and grounds.

The BSM system components cannot be adjusted or repaired. If any of the BSM system components becomes damaged or ineffective, that component must be replaced.

CHIME WARNING SYSTEM

A chime warning system is standard factory-installed equipment. The chime warning system uses an electromechanical transducer that is soldered onto the electronic circuit board inside of the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) to provide audible indications of various vehicle conditions that may require the attention of the vehicle operator or occupants.

The electromechanical transducer generates beep tones, chime tones and click tones to emulate the sounds associated with conventional turn signal and hazard warning flasher operation. The microcontroller-based IC utilizes electronic **chime request** messages received from other modules in the vehicle over the Controller Area Network (CAN) data bus to monitor many sensors and switches throughout the vehicle. In response to those inputs, the circuitry and programming of the IC allow it to control the audible outputs that are produced through its on-board transducer.

The IC is capable of producing the following audible outputs:

- **Slow Rate Repetitive Click** - Repeated **click** tones that are issued at a slow rate of about 90 clicks per minute.
- **Fast Rate Repetitive Click** - Repeated **click** tones that are issued at a fast rate of more than about 180 clicks per minute.
- **Single Chime Tone** - A single **chime** tone.
- **Slow Rate Repetitive Chime** - Repeated **chime** tones that are issued at a slow rate of about 50 chimes per minute.
- **Fast Rate Repetitive Chime** - Repeated **chime** tones that are issued at a fast rate of about 180 chimes per minute.

Hard wired circuitry connects the IC and the various chime warning system switch and sensor inputs to their modules and to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the IC through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire

harness routing and retention, as well as pin out and location views for the various wire harness connectors, splices and grounds.

The IC chime warning system circuits and components cannot be adjusted or repaired. If the IC circuitry, the on-board transducer or the relay are damaged or ineffective, the IC unit must be replaced.

FORWARD COLLISION WARNING

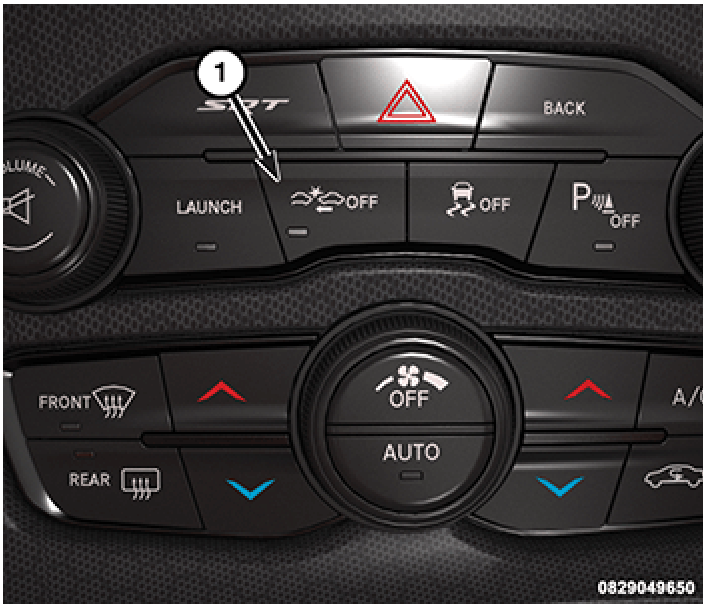


Fig. 1: Forward Collision Warning (FCW) Button
Courtesy of CHRYSLER GROUP, LLC

The Forward Collision Warning (FCW) system is an enhancement to the current vehicles equipped with Adaptive Cruise Control (ACC). The system utilizes radar and video input to detect whether the vehicle is approaching another vehicle or large obstacle in its path too rapidly and warn/assist the driver in avoiding the collision. The system communicates with other components on the vehicle to apply the brakes and/or to alert the driver through visual and audible warnings. The FCW function operates regardless of whether ACC with stop and go is active or not. The system operates down to 0 mph and provides audible closing in proximity warnings as well as brake pedal vibration.

Forward Collision Warning options and Active Braking settings can be changed. When the vehicle is equipped with a UconnectÃ® 8.4/8.4A system screen, the Safety and Driving Assistance soft key needs to be selected to access the options menu. When the vehicle is equipped with the UconnectÃ® 5.0 system, pressing the "+ MORE" hard-key located on the lower right side of the UconnectÃ® system will bring you to the "Settings" soft key.

The following is a list of FCW operations:

- Utilizes Radar sensors to detect whether the vehicle is approaching another vehicle or large obstacle in its path too rapidly and warn / assist the driver in avoiding / mitigating the collision.
- The driver has the ability to adjust the sensitivity and turn brake support on or off in the radio.
- Prefill prepares the brakes for emergency braking.
- Audible & Visual Warnings.

- Brake Jerk: Short deceleration to alert driver.
- CMS (Collision Mitigation System) Up to 1.5 sec of braking to give driver additional reaction time.
- ABA (Advanced Brake Assist) If the driver is not braking enough, ABA will increase the braking to avoid / mitigate the accident. **NOTE: it is important to note the system will use "mitigated" braking to avoid accidents, but will not completely stop the vehicle in all scenarios if an impact is imminent - its purpose is to "warn and assist".**

PARK ASSIST SYSTEM

A park assist system is an optional factory-installed electronic parking aid. During parking and other similar vehicle maneuvers, this system alerts the vehicle operator to obstacles located in the path immediately behind the vehicle which, due to the surrounding vehicle structures, might be otherwise difficult to perceive. When an object is detected, the system uses the cluster display and the audio system in the vehicle to provide the vehicle operator with visual, and audible indications of the presence, and proximity of such objects.

The park assist system includes the following major components, which are described in further detail elsewhere in this service information:

- **Electronic Vehicle Information Center -** In vehicles equipped with the optional park assist system, the optional EVIC in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) displays textual warnings and error messages, and emits audible warnings related to the current operating status of the park assist system.
- **Park Assist Switch** - The optional park assist system can be manually disabled or enabled using a park assist switch that is integral to the switch pod in the instrument panel center stack. The operator can select from one of three options under the settings tab to enable or disable the system, the tone alerts, or the visual alerts.
- **Park Assist Module** - Vehicles equipped with the park assist system include a park assist module which is concealed within the molded plastic park assist module housing. There are two mounting tabs integral to the module housing that secure the module to the vehicle body. Three connector receptacles (only two are used on this model) are integral to one side of the housing and contain terminal pins that connect the module to the vehicle electrical system.
- **Park Assist Sensors** - Vehicles equipped with the rear park assist system have four ultrasonic park assist sensors that are concealed behind the rear bumper fascia. Each sensor is snapped into an individual molded plastic mounting bracket located at horizontal intervals along the back side of the rear bumper fascia.

Hard wired circuitry connects the various park assist system components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin out and location views for the various wire harness connectors, splices and grounds.

The park assist system components cannot be adjusted or repaired. If any of the park assist system components are damaged or ineffective, that component must be replaced.

OPERATION

BLIND SPOT MONITOR SYSTEM

The primary components of the Blind Spot Monitor (BSM) system are the microcontroller based Electronic Control Units (ECU) integral to each of the two RAdio Detection And Ranging (RADAR) sensors, one behind each outboard side of the rear bumper fascia. The two sensors are known as the Right Blind Spot Sensor (RBSS) and the Left Blind Spot Sensor (LBSS). Each ECU operates on battery current received from a fuse in the Power Distribution Center (PDC) whenever the status of the ignition switch is On. Each ECU has a path to ground at all times through a take out and eyelet terminal of the body wire harness that is secured to the body sheet metal. These ECU communicate with each other, with other electronic modules in the vehicle or with a diagnostic scan tool over the Controller Area Network (CAN) - Interior High Speed (IHS) data bus network.

Each BSM system ECU continually monitors its own BSM system circuits and components for readiness, and will store a Diagnostic Trouble Code (DTC) for any fault that is detected. When a BSM system ECU stores a DTC, it sends an electronic request message to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC). The IC will then display a **SERVICE BLIND SPOT SYSTEM** or **BLIND SPOT SYSTEM TEMPORARILY UNAVAILABLE** textual message in the Electronic Vehicle Information Center (EVIC) to alert the vehicle operator.

The Powernet network architecture used in this vehicle includes the Body Control Module (BCM) (also known as the Common Body Controller), which is also a CAN bus gateway and will relay messages received on the CAN-IHS data bus to the IC over the CAN-C data bus. The BSM system ECU sends request messages via the CAN-IHS bus to the BCM. Each BSM system ECU also monitors electronic messages received over the CAN-IHS data bus from the Radio Receiver Module (RRM) (also known as the radio or the head unit) through the CAN-C bus via the BCM gateway indicating the customer programmable features settings for the BSM system.

Each BSM system ECU receives and analyzes data inputs directly from its own radar sensor, calculates and provides the proper electronic messages over the CAN-IHS bus to the BCM as well as to the Driver Door Module (DDM) or Passenger Door Module (PDM). The DDM and PDM use hard wired outputs to illuminate the visual alert displays in their respective right or left outside rear view mirrors, as well as calculates and communicates the proper audible alert output requests to the RRM over the CAN bus network.

The BSM radar sensors allow the BSM system ECU to locate and identify nearby objects of interest meeting the criteria established by algorithms within the system software. The BSM displays provide the vehicle operator with a visual alert indicating that an object of interest has been detected within one of the vehicle detection zones. The BSM audible alerts are then issued by the RRM through the appropriate audio system speakers based upon electronic **audible alert request** messages received from the BSM system ECU. Each BSM system ECU also sends electronic **radio mute request** messages over the CAN data bus to the RRM whenever an audible alert is requested. This message activates the radio mute function while the audible alert is being sounded, then resumes normal radio function when the alert is completed.

The hard wired circuits between components related to the BSM system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the BSM system or the

electronic controls and communication between ECU and other devices that provide some features of this system. The most reliable, efficient and accurate means to diagnose the BSM system or the ECU and communication related to BSM system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

BLIND SPOT MONITOR MODE

Unless disabled in the customer programmable features settings received through the Radio Receiver Module (RRM) (also known as the radio or the head unit), the Blind Spot Monitor (BSM) mode is active only when the transmission gear selector is in a position other than Reverse (**R**) or Park (**P**). The BSM mode is intended to provide a visual alert to the driver when a target vehicle (object of interest) is located in the lane adjacent to and just behind either outside rear view mirror (the detection zone), in the blind spot area where vision of target vehicles may be inhibited by the rear structure of the host vehicle. If a turn signal is activated in the host vehicle in the same direction as that in which the target vehicle is located, a single audible alert tone will also be generated. The audible alerts of the BSM mode are not active unless the turn signal is activated.

The width of the BSM mode detection zone covers one traffic lane over on each side of the host vehicle, approximately 4.0 meters (13 feet). The length of the BSM mode detection zone starts at the outside rear view mirror and extends approximately 4.5 meters (15 feet) rearward from the rear edge of the rear fascia. The BSM mode visual alerts are activated immediately if an object of interest is within the detection zone and meets the warning criteria. However, the BSM system will not activate these alerts if:

- The object of interest (target vehicle) comes from the rear of the detection zone and passes the host vehicle at a speed greater that 50 kilometers-per-hour (31 miles-per-hour).
- The object of interest (target vehicle) enters the detection zone from the front and remains in the zone for less than 1.5 seconds.
- The object of interest (target vehicle) passes through the detection zone with a relative speed greater than 20 kilometers-per-hour (12 miles-per-hour).
- The object of interest (target vehicle) passes the host vehicle from the opposite direction.

The BSM mode audible alert may be deactivated if the operator prefers using the customer programmable features settings within the RRM. The BSM mode can be configured for visual and audible alerts, visual alerts only or for the entire BSM system (including Rear Cross Path/RCP mode) to be turned Off.

REAR CROSS PATH MODE

Unless disabled in the customer programmable features settings received through the Radio Receiver Module (RRM) (also known as the radio or the head unit), the Blind Spot Monitor (BSM) system provides a feature called Rear Cross Path (RCP) mode. The RCP mode is active only when the transmission gear selector is in the Reverse (**R**) position. The RCP mode is intended to aid the driver when backing out of parking spaces where vision of vehicles crossing laterally through the rear path of the host vehicle may be blocked. The host vehicle must proceed slowly and cautiously out of the parking space until the rear end of the vehicle is exposed. The BSM radar sensors will then have a clear view of the crossing traffic and, if an oncoming vehicle (object of interest) is detected, will generate visual and audible alerts to the operator of the host vehicle.

The BSM system monitors the rear detection zones on both sides of the vehicle for objects that are moving toward the side of the vehicle with speeds of from 1 to 3 kilometers-per-hour (1 to 2 miles-per-hour) up to 35 kilometers-per-hour (22 miles-per-hour), such as typically encountered in parking lot situations. In vehicles equipped with the BSM option, the RCP mode is enabled from the factory as a default. The RCP mode can be

manually disabled and enabled by the vehicle operator using the customer programmable features option of the RRM.

The RCP mode normally uses the same BSM system customer programmable features settings. However, the RCP mode will always include the audible alert feature, even if it was disabled for the BSM mode using the RRM customer programmable features settings. The audible alert can not be deactivated for the RCP mode. The RCP mode visual alert is illuminated only in the display located on the same side of the vehicle where the object of interest is detected. Likewise, the RCP mode repeating short audible alert is issued only through the audio system speakers located on the same side of the vehicle where the object of interest is detected.

STANDBY MODE

The Blind Spot Monitor (BSM) system remains in standby mode as long as the automatic transmission gear selector is in the Park (**P**) position. In the standby mode the system receives vehicle information, responds to changes in customer programmable features settings received through the Radio Receiver Module (RRM) (also known as the radio or the head unit) and can perform limited self-diagnostics indicating hard system fault conditions.

CHIME WARNING SYSTEM

The chime warning system operates on battery voltage received on a non-switched fused B(+) circuit so that the system may operate regardless of the status of the ignition switch. The chime warning system also monitors the ignition switch status so that some chime features are functional only when the status of the ignition switch is On, while others are functional regardless of the ignition switch status.

The chime warning system provides an audible indication to the vehicle operator or occupants under the following conditions:

- **ABS Indicator Warning** - On vehicles equipped with an optional Antilock Brake System (ABS), the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) will generate one short chime each time the ABS indicator is illuminated. This warning indicates a failure condition has been monitored affecting the operation of the ABS related components or circuits. This warning will only occur following completion of the ABS indicator bulb test, and will only occur once during any ignition cycle.
- **Adjustable Pedal System Warning** - On vehicles equipped with the optional adjustable pedal system, the IC will generate one short chime each time a pedal adjustment request is received and a **PEDAL ADJUST. DISABLED - CRUISE CONTROL SET** or a **PEDAL ADJUST. DISABLED - SHIFTER IN REVERSE** textual message is displayed in the Electronic Vehicle Information Center (EVIC) display of the IC. A single short chime will also be sounded each time a pedal adjustment request is received while a failure condition has been monitored affecting the operation of the adjustable pedal system related components or circuits.
- **Airbag Indicator Warning** - The IC will generate one short chime when the status of the ignition switch transitions to On and the airbag indicator is illuminated. This warning indicates a failure condition has been monitored affecting the operation of the Supplemental Restraint System (SRS) related components or circuits. This warning will only occur following completion of the airbag indicator bulb test.
- **Automatic Oil Change Indicator** - The IC will generate one short chime each time an **OIL CHANGE REQUIRED** or **OIL CHANGE RESET** textual message is displayed in the EVIC display of the IC. This warning indicates that a duty-cycle algorithm contained within the software of the Powertrain

Control Module (PCM) has determined that a recommended oil change interval has been attained, or that a reset of the interval has been requested following performance of the recommended service.

- **Charging System Indicator Warning** - The IC will generate one short chime each time the status of the ignition switch is On and the charging system indicator is illuminated. This warning indicates that a failure condition has been monitored affecting the operation of the charging system related components or circuits.
- **Check Engine Indicator Warning** - The IC will generate one short chime when the status of the ignition switch is On and the check engine (Malfunction Indicator Lamp/MIL) indicator is illuminated. This warning indicates that a failure condition has been monitored affecting the operation of a critical fuel or emissions related component or circuit.
- **Door Ajar Warning** - The IC will generate one short chime when a **DOOR(S) OPEN** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that a door is, or multiple doors are not closed or completely latched while the vehicle is moving.
- **Electronic Stability Control (ESC) System Warning** - On vehicles equipped with the optional ESC, the IC will generate one short chime when the **ESC OFF** textual message is displayed in the EVIC display of the IC. This warning indicates that the ESC system has been manually disabled using the ESC switch.
- **Electronic Stability System Fault Warning** - On vehicles equipped with the optional ESC, the IC will generate one short chime each time the ESC indicator is illuminated in the instrument cluster. This warning indicates a failure condition has been monitored affecting the operation of the ESC related components or circuits. This warning will only occur following completion of the ESC indicator bulb test, and will only occur once during any ignition cycle.
- **Fasten Seat Belt Indicator Warning** - The IC will generate repetitive chimes at a slow rate to announce that an input from the seat belt switch and the ignition switch indicate that the driver side front seat belt is not fastened while the status of the ignition switch is On. The chime warning system also supports the enhanced seat belt reminder (beltminder) when this feature is enabled. Refer to **INDICATORS, INSTRUMENT CLUSTER, OPERATION** .
- **Head/Park Lamps-ON Warning** - The IC will generate repetitive chimes at a fast rate to indicate that hard-wired inputs from the headlamp switch and the ignition switch indicate that the exterior lamps are turned On while the status of the ignition switch is Off, and either a hard-wired input or an electronic message is received over the CAN data bus indicating that the driver side front door is open. The chimes will continue to sound until the exterior lamps are turned Off, the driver side front door is closed or the status of the ignition switch transitions to On, whichever occurs first.
- **Low Brake Fluid Warning** - The IC will generate one short chime when a **LOW BRAKE FLUID LEVEL** textual message is displayed in the EVIC display of the IC. This warning indicates that the monitored fluid level in the brake master cylinder is low.
- **Low Coolant Warning** - The IC will generate one short chime when the **COOLANT LOW** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that the monitored engine coolant level in the coolant reserve bottle is low. This chime will only occur once during any ignition cycle.
- **Low Fuel Warning** - The IC will generate one short chime when the **FUEL LOW** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that the monitored fuel level in the fuel tank is low. This chime will only occur once during any ignition cycle.
- **Low Oil Pressure Indicator Warning** - The IC will generate one short chime when the low oil pressure indicator is illuminated and the engine speed is greater than 300 revolutions per minute. This warning indicates that the monitored engine oil pressure is low.

- **Low Wash Warning** - The IC will generate one short chime when the **WASHER FLUID LOW** textual message and icon are displayed in the EVIC display of the IC. This warning indicates that the monitored washer fluid level in the washer reservoir is low.
- **Memory System Warning** - On vehicles equipped with the optional memory system, the IC will generate one short chime each time a memory recall request is received and a **MEMORY SYSTEM DISABLED - SEATBELT FASTENED** textual message and icon, or a **MEMORY SYSTEM DISABLED - VEHICLE NOT IN PARK** textual message is displayed in the EVIC display of the IC. A single short chime will also be sounded each time a memory recall request is received while the memory system is inhibited due to a vehicle speed input that is greater than zero.
- **Overspeed Warning** - The IC will generate repetitive chimes at a slow rate when the **WARNING! LIMIT SPEED** textual message is displayed in the EVIC display of the IC. This warning indicates that the vehicle speed is over a pre-programmed speed value. This feature is only enabled on vehicles that have been configured for sale in a Middle East Gulf Coast Country (GCC).
- **Park Assist System Warning** - On vehicles equipped with the optional park assist system, the IC will generate one short chime when the **PARK ASSIST OFF** textual message is displayed in the EVIC display of the IC. This warning indicates that the park assist system has been manually disabled using the park assist switch. The same chime and **PARK ASSIST OFF** textual message is displayed at the beginning of each ignition cycle and each time the gear selector is moved into Reverse **R** while the system has been manually disabled.
- **Park Brake Reminder** - The IC will generate one short chime when the brake/park brake indicator is illuminated to announce that the park brake is applied or not fully released and the vehicle is moving. This chime will only occur once during any ignition cycle.
- **Remote Keyless Entry System Warning** - The IC will generate one short chime when a **SERVICE KEYLESS SYS., KEY FOB NOT DETECTED, VEHICLE NOT IN PARK,** or **VEHICLE NOT IN REVERSE** textual error message is displayed in the reconfigurable display of the IC. This message indicates that a Passive Entry and Keyless Go (PEKG) system feature is inoperable due to the displayed error condition.
- **FOBIK PROGRAMMING. Refer to STANDARD PROCEDURE .**
- **Service Park Assist System Warning** - On vehicles equipped with the optional park assist system, the IC will generate one short chime each time the **SERVICE PARK ASSIST SYSTEM** textual message is displayed in the EVIC display of the IC. This warning indicates a failure condition has been monitored affecting the operation of the park assist system related components or circuits.
- **Service Tire Pressure Monitor System Warning** - On vehicles equipped with a base or optional premium Tire Pressure Monitor (TPM) system, the IC will generate one short chime each time a **SERVICE TIRE PRESS. SYSTEM** textual message is displayed in the EVIC display of the IC. This warning indicates a failure condition has been monitored affecting the operation of the tire pressure monitor system related components or circuits.
- **Tire Pressure Monitor Warning** - On vehicles equipped with a base or optional premium Tire Pressure Monitor (TPM) system, the IC will generate one short chime each time a **LOW PRESSURE** textual message is displayed in the EVIC display of the IC. This warning indicates that a low pressure condition has been monitored in one of the tires on or in the vehicle.
- **Trans Overtemp Warning** - The IC will generate one short chime each time the **TRANSMISSION OVER TEMP** textual message is displayed in the EVIC display of the IC. This warning indicates that the fluid temperature in the automatic transmission is excessive. This chime will repeat each time the trans overtemp message is cycled from Off to On.

- **Turn Signal/Hazard Warning Flasher Emulation** - The IC will generate repetitive clicks at a slow rate to emulate an electromechanical flasher when the turn signal or hazard warning system are operating. The IC will generate repetitive clicks at a fast rate to indicate that the right or left turn signal are operating with one or more bulbs or circuits ineffective. In either case, the clicks will continue until the turn signal and hazard warning systems are turned Off.
- **Turn Signal On Warning** - The IC will generate one short chime and a **TURN SIGNAL ON** textual message with a blinking right or left turn signal icon are displayed in the EVIC display of the IC. This warning indicates that a turn signal has been active continuously for 1.6 kilometers (1 mile) with the vehicle speed greater than 22 kilometers-per-hour (15 miles-per hour). The hazard warning flashers will not activate this chime feature.

The IC provides chime service for all available features in the chime warning system, except for the audible warning function provided by each of the optional park assist system display modules. The IC relies on its internal programming, numerous hard-wired inputs, and electronic message inputs received from other modules over the CAN data bus to provide the chime warning system features. The internal programming of the IC determines the priority of each chime request input that is received, as well as the rate and duration of each chime that is to be generated.

The hard wired circuits between components related to the chime warning system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the chime warning system or the electronic controls and communication between modules and other devices that provide some features of the chime warning system. The most reliable, efficient and accurate means to diagnose the chime warning system or the electronic controls and communication related to chime warning system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

FORWARD COLLISION WARNING

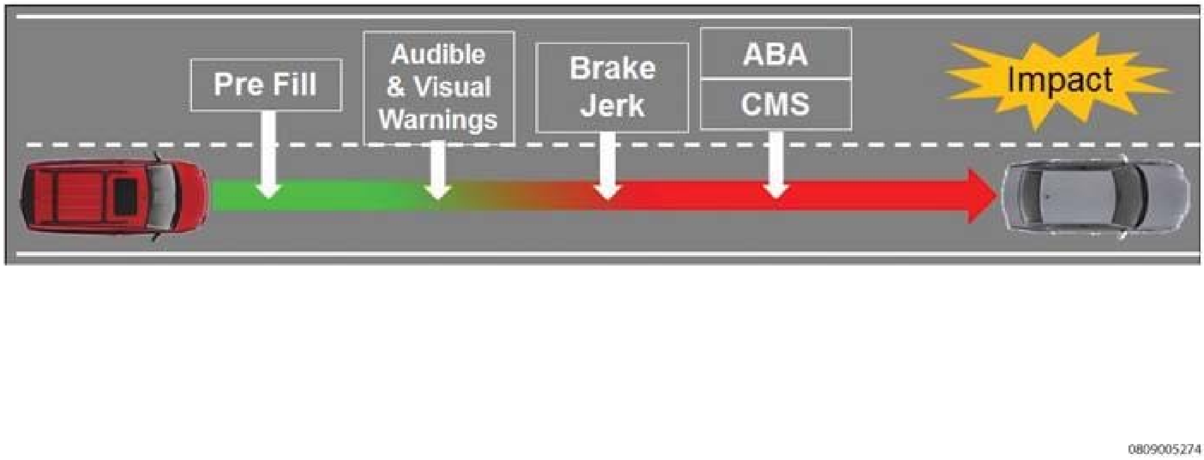
The Forward Collision Warning (FCW) system is only active when the status of the ignition switch is ON and the PRNDL is in D (Drive). The system can be manually disabled and enabled by the vehicle operator using hard button on the Integrated Center Stack (ICS). The default status of FCW is "On". The system state is kept in memory from one key cycle to the next. If the system is turned OFF, it will remain OFF when the vehicle is restarted. The minimum speed for FCW activation is 5 mph (10 km/h).

Components that make up the FCW system are the Powertrain Control Module (PCM), ICS and the Adaptive Cruise Control Plus (ACC) radar sensor/module. The radar module is the component that is responsible for the FCW and ACC decision making process. The radar determines if a FCW or an ACC event needs to occur.

Since there are multiple modules involved in the operation of the FCW system, all faults or diagnostic trouble codes should be checked during diagnosis. The system utilizes the radar sensor in front of the vehicle, so any alignment or configuration issues may cause the system to be inoperative. If the ACC radar detects incorrect or compromised information, the ACC/FCW will function in a limited capacity.

NOTE: **The FCW does not stop the vehicles automatically, but alerts and assists the driver to help avoid or mitigate a collision. If the driver does not respond to any**

of the audible, visual, and haptic warnings, the impact may not be avoided



[Fig. 2: Forward Collision Warning Plus]
Courtesy of CHRYSLER GROUP, LLC

The FCW+ system uses fusion of the sensor data from the ACC radar and the FFC to detect a probable frontal or forward collision. The following actions will be performed when qualified:

- **Pre Fill -** The pre-fill process prepares the brakes for emergency braking by engaging the pump and applying a small amount of pressure to the brakes. This allows for immediate braking. Sufficient pressure applied between the brake pads and the discs means that driver intervention has a more immediate impact.
- **Audible and Visual Warnings -** Audible sounds within the cabin of the vehicle and visual warnings shown within the EVIC are activated when necessary to notify the driver.
- **Brake Jerk -** A short deceleration is performed to alert the driver.
- **Collision Mitigation System (CMS) -** CMS assists braking operation by automatically applying an appropriate amount of braking force to help avoid or minimize the chances of hitting a vehicle. CMS allows up to 1.5 seconds of braking to give the driver additional reaction time. When CMS activates its automatic brake, it also turns the brake lights on.
- **Advanced Brake Assist (ABA) -** Once the driver presses the brake pedal, advanced brake assist (ABA) will engage If the driver is not applying enough force. ABA will increase the braking force required to avoid or mitigate the accident. If the driver does not react to any of the previous warnings, the collision cannot be avoided.

PARK ASSIST SYSTEM

The park assist system is active only when the status of the ignition switch is On, the transmission gear selector is in either the Reverse **R** position and the vehicle speed is less than about 11 kph (7 mph). The system can be manually disabled and enabled by the vehicle operator using the park assist Off push button in the instrument panel center stack switch pod (also known as the Accessory Switch Bank Module/ASBM). In vehicles equipped

with this option, the system is enabled from the factory as a default.

The disable feature is provided for trailer towing purposes or for driver preference. With a trailer attached to the vehicle the audible and visible park assist alerts would be incessant whenever the transmission gear selector was in the Reverse (**R**) position due to the proximity of the trailer to the rear of the vehicle. When the system is disabled, a park assist icon will appear within the display. On vehicles equipped with an optional EVIC, a **PARK ASSIST OFF** textual message will appear within the EVIC display of the instrument cluster whenever the transmission gear selector is in the Reverse **R** position.

The microcontroller-based Park Assist Module (PAM) (also known as the ParkTronic System/PTS module) is the central component of the park assist system. It supplies voltage to the park assist sensors, receives and analyzes data from the sensors, calculates and communicates the proper display information to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC), performs system diagnostics, and communicates with other electronic modules in the vehicle or with a diagnostic scan tool over the Controller Area Network (CAN) data bus. The module operates on battery voltage received through a fuse in the Power Distribution Center (PDC), and is grounded through a take out of the body wire harness.

Four ultrasonic park assist sensors in the rear bumper fascia allow the park assist system to locate and identify the proximity of nearby obstacles. These sensors each generate ultrasonic sound pulses when triggered by the park assist module, then signal the module when an echo of the reflected sound pulses is received. The detection distance range from the rear of the vehicle is about 0.3 meters (11.8 inches) to about 2.0 meters (80 inches), and the detection height range from the ground is about 0.2 meters (7.8 inches) to about 0.8 meters (31 inches). The detection area extends somewhat around both rear sides (corners) of the vehicle.

The park assist display, located within the EVIC unit, provides the vehicle operator with a visible warning if the vehicle comes to within about 100 centimeters (39 inches) to 200 centimeters (79 inches) of the detected object. The display is active any time the vehicle is in Reverse (**R**) and visible to the vehicle operator only when looking forward. When an object is detected within the detection zone, the system will also emit a series of short, intermittent, audible beeps and automatically lower the volume of the audio system 20 dB below a set tone alert volume, if the vehicles audio system is turned On. The audible warning changes from intermittent beeps to a continuous tone as the vehicle comes to within 30 centimeters (12 inches) of a detected object.

When the PAM monitors a problem in any of the park assist system circuits or components, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit. The PAM then sends an electronic message over the CAN data bus, and one of several **SERVICE PARK ASSIST SYSTEM** textual and graphical messages is displayed within the EVIC display when the message is received by the IC.

The hard-wired circuits between components related to the park assist system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the park assist system or the electronic controls and communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient and accurate means to diagnose the park assist system or the electronic controls and communication related to park assist system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - BLIND SPOT MONITOR SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The following textual messages related to the Blind Spot Monitor (BSM) system may appear within the Electronic Vehicle Information Center (EVIC) display of the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC):

- **BLIND SPOT SYSTEM OFF** - This message to the vehicle operator when the ignition switch first transitions to the On status indicates that the BSM system has been turned Off using the customer programmable features function of the Radio Receiver Module (RRM) (also known as the radio or the head unit).
- **SERVICE BLIND SPOT SYSTEM** - This message to the vehicle operator while the ignition switch status is On indicates that the BSM system is unavailable due to a monitored system fault or faults.
- **BLIND SPOT SYSTEM TEMPORARILY UNAVAILABLE** - This message to the vehicle operator while the ignition switch status is On indicates that the BSM system is temporarily unavailable as a result of one of the following:
    1. **Sensor Blockage** - The amber BSM visual icon in both outside rear view mirrors will be illuminated as long as blockage exists or until the ignition switch status transitions to Off, whichever occurs first.
    2. **Monitored System Fault** - The BSM system has detected a monitored system fault condition and has stored a Diagnostic Trouble Code (DTC). The amber BSM visual icon will be illuminated in both outside rear view mirrors for as long as the condition exists or until the ignition switch status transitions to Off, whichever occurs first.

NOTE: If the BLIND SPOT SYSTEM TEMPORARILY UNAVAILABLE message is received for a minimum of 5 minutes, please verify that the outboard area at each end of the rear fascia behind the rear wheel openings where the radar sensors are located is not blocked by snow, ice or road debris. If the area is blocked, remove the blockage and verify that the message is no longer present in the EVIC display.

NOTE: If the vehicle has experienced any trauma in the outboard area at each end of the rear fascia behind the rear wheel openings where the sensors are located, even if the fascia is not damaged, the radar sensor may have become misaligned. A misaligned radar sensor will result in the BSM system not operating properly.

The hard wired circuits between components related to the BSM system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the BSM system or the electronic controls and communication between modules and other devices that provide some features of the system. The most reliable, efficient and accurate means to diagnose the BSM system or the electronic controls and communication related to BSM system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING - CHIME WARNING SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired circuits between components related to the chime warning system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the chime warning system or the electronic controls and communication between modules and other devices that provide some features of the chime warning system. The most reliable, efficient and accurate means to diagnose the chime warning system or the electronic controls and communication related to chime warning system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING - FORWARD COLLISION WARNING

The hard wired circuits between components related to the Forward Collision Warning (FCW) system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the FCW system or the electronic controls and communication between modules and other devices that provide some features of the FCW system. The most reliable, efficient and accurate means to diagnose the FCW system or the electronic controls and communication related to FCW system operation requires the use of a diagnostic scan tool.

DIAGNOSIS AND TESTING - PARK ASSIST SYSTEM

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

NOTE: **The presence of operating heavy construction equipment, large trucks and other vibrations in the vicinity of the vehicle could impact the performance of the system.**

The following textual messages may appear in the Electronic Vehicle Information Center (EVIC):

1. **SERVICE PARK ASSIST** - If a service park assist textual message appears in the EVIC display, the system may or have a hard fault, and further investigation may be needed.
2. **CLEAN PARK ASSIST SENSORS** - If a clean park assist sensors textual message appears in the EVIC display, be certain to confirm the following:
    - The park assist system is self correcting, please verify that the area of the rear bumper where the sensors are located (both the face and the back) is not blocked by ice, snow, mud or other obstructions. If the area is blocked, remove the blockage, shift the transmission gear selector into Reverse (**R**) and verify the message is no longer present in the EVIC display. The system may also be corrected when the vehicle is driven at a speed greater than 14 kph (8 mph).
3. **SERVICE PARK ASSIST SENSORS** - If a service park assist sensors textual message appears in the EVIC display, a sensor or the sensor wiring may be damaged, and further investigation may be needed.
4. **PARK ASSIST OFF** - If a **PARK ASSIST OFF** textual message appears in the EVIC display, the system may have been manually shut Off.

The hard wired circuits between components related to the park assist system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the park assist system or the electronic controls and communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient and accurate means to diagnose the park assist system or the electronic controls and communication related to park assist system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DISPLAY, BLIND SPOT

DESCRIPTION

DESCRIPTION

Vehicles equipped with the Blind Spot Monitor (BSM) system have a display that appears in both the right and

left outside rear view mirrors. The display consists of a translucent triangle icon in the mirror glass that is illuminated by an amber Light Emitting Diode (LED) unit mounted behind the icon on the mirror glass case. When illuminated, only the amber colored triangle is visible on the outer surface of the mirror glass. The LED unit for the display is connected to the vehicle electrical system along with the other wiring for the power mirror through a dedicated take out and connector of the door wire harness.

The BSM displays are each integral to the outside rear view mirror glass and case unit. The displays cannot be adjusted or repaired. If a BSM display is ineffective or damaged, the entire mirror glass and case unit must be replaced. Refer to **MIRROR, OUTSIDE REARVIEW, REMOVAL** , **MIRROR, OUTSIDE REARVIEW, GLASS, REMOVAL** , **MIRROR, OUTSIDE REARVIEW, INSTALLATION** and **MIRROR, OUTSIDE REARVIEW, GLASS, INSTALLATION** .

OPERATION

OPERATION

The Blind Spot Monitor (BSM) displays provide the vehicle operator with a visual alert that a target vehicle (object of interest) has been detected by the BSM system within one of the BSM or Rear Cross Path (RCP) detection zones. The BSM display is also illuminated momentarily as a bulb test each time the ignition switch status transitions to On as a part of the BSM system self tests. If a BSM display remains illuminated with the automatic transmission gear selector in the Park (**P**) position, it indicates that the BSM system has registered a system fault and may require service.

Each BSM display is completely controlled by a hard wired output of the Driver Door Module (DDM) or Passenger Door Module (PDM) on the same side of the vehicle as the display. The DDM and PDM receive electronic messages over the Controller Area Network (CAN) data bus from the Blind Spot Module (BSM) integral to the RAdio Detection And Ranging (RADAR) smart sensor (also known as Left Blind Spot Sensor/LBSS or Right Blind Spot Sensor) for the same side of the vehicle. The display units are grounded at all times through a takeout and eyelet terminal of the body wire harness that is secured to the body sheet metal.

The hard wired circuits between the BSM displays and the DDM or PDM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the BSM displays or the electronic controls and communication between other modules and devices that provide some features of the BSM displays. The most reliable, efficient and accurate means to diagnose the BSM displays or the electronic controls and communication related to BSM display operation requires the use of a diagnostic scan tool.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - BLIND SPOT DISPLAY

The hard wired circuits between the Blind Spot Monitor (BSM) displays and the Driver Door Module (DDM) or Passenger Door Module (PDM) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the BSM displays or the electronic controls and communication between other modules and devices that provide some features of the BSM displays. The most reliable, efficient and accurate means to diagnose the BSM displays or the electronic

controls and communication related to BSM display operation requires the use of a diagnostic scan tool.

REMOVAL

REMOVAL

The Blind Spot Monitor (BSM) display Light Emitting Diode (LED) indicator and icon are integral to the outside rear view mirror glass and case unit. Refer to **MIRROR, OUTSIDE REARVIEW, REMOVAL** and **MIRROR, OUTSIDE REARVIEW, GLASS, REMOVAL** .

INSTALLATION

INSTALLATION

The Blind Spot Monitor (BSM) display Light Emitting Diode (LED) indicator and icon are integral to the outside rear view mirror glass and case unit. Refer to **MIRROR, OUTSIDE REARVIEW, INSTALLATION** and **MIRROR, OUTSIDE REARVIEW, GLASS, INSTALLATION** .

DISPLAY, PARK ASSIST

DESCRIPTION

DESCRIPTION

The park assist display is an integral part of the Electronic Vehicle Information Center (EVIC). The park assist graphic is displayed any time the transmission gear selector is in the Reverse (**R**) position. An electronic message is sent to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) from the Park Assist Module (PAM) (also known as the ParkTronic System/PTS module) over the Controller Area Network (CAN) data bus when an object is within the detection area. The IC then displays the corresponding alert bar with the park assist graphic within the EVIC display giving a graphical representation for the distance and location of the object.

Depending upon market and system capabilities, the display graphic has many different variations with three zones (center zone, left corner zone and right corner zone), each with up to six dedicated alert bars. Which graphic is displayed depends upon the size, location and distance of the object being detected.

Only one alert bar is displayed in each zone at any given time. The display graphic will include the furthest alert bar followed by a single tone for maximum distance, then will switch to nearer and nearer alert bars as the proximity to the object is reduced combined with more and more frequent repetitive tones. For minimum distance the nearest bar is displayed and accompanied by a continuous tone output.

The park assist display is only serviced as a complete unit with the EVIC display in the IC. It cannot be adjusted or repaired. If ineffective or damaged, the entire IC unit must be replaced.

OPERATION

OPERATION

The Park Assist system for this vehicle is only available on vehicles equipped with an Electronic Vehicle Information Center (EVIC). The park assist display is an integrated into the EVIC, which receives battery current and ground through and is completely controlled by the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC).

The IC will display a park assist graphic whenever the transmission gear selector is in the Reverse (**R**) position and a signal is received from the Park Assist Module (PAM) (also known as the ParkTronic System/PTS module) over the Controller Area Network (CAN) data bus. The microcontroller within the PAM continually monitors the display status, and will store a Diagnostic Trouble Code (DTC) in memory for any monitored fault detected in the park assist display.

The hard wired circuits between components related to the park assist display may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the park assist display or the electronic controls and communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient and accurate means to diagnose the park assist display or the electronic controls and communication related to park assist display operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

MODULE, BLIND SPOT

DESCRIPTION

DESCRIPTION

The optional Blind Spot Monitor (BSM) system used in this vehicle has two control modules. One control module is dedicated to each side of the vehicle. A Blind Spot Module (BSM) is integral to the Left Blind Spot Sensor (LBSS) or Right Blind Spot Sensor (RBSS) for the same side of the vehicle. Refer to **SENSOR, BLIND SPOT, DESCRIPTION**.

OPERATION

OPERATION

The optional Blind Spot Monitor (BSM) system used in this vehicle has two control modules. One control module is dedicated to each side of the vehicle. The blind spot modules are each integral to the blind spot sensor for the same side of the vehicle. Refer to **SENSOR, BLIND SPOT, OPERATION**.

REMOVAL

REMOVAL

Two blind spot modules are used in this vehicle, one for the left side and one for the right side. Each blind spot module is integral to the blind spot sensor on the same side of the vehicle. Refer to **SENSOR, BLIND SPOT, REMOVAL**.

INSTALLATION

INSTALLATION

Two blind spot modules are used in this vehicle, one for the left side and one for the right side. Each blind spot module is integral to the blind spot sensor on the same side of the vehicle. Refer to **SENSOR, BLIND SPOT,**

INSTALLATION.

MODULE, PARK ASSIST

DESCRIPTION

DESCRIPTION

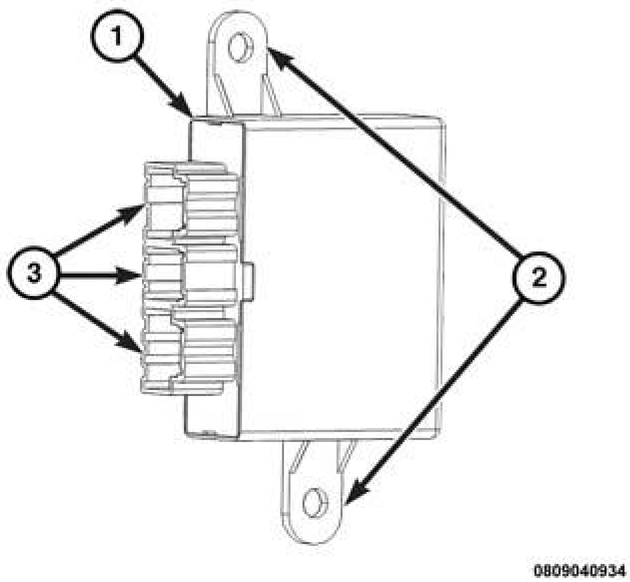


Fig. 3: Park Assist Module, Connector Receptacles & Mounting Tabs
Courtesy of CHRYSLER GROUP, LLC

The Park Assist Module (PAM) (also known as the ParkTronic System/PTS module) (1) is secured to the right inner quarter panel behind the right rear wheel housing in the trunk compartment. One of the two mounting tabs (2) integral to the module housing is inserted into a stamped pocket in the inner quarter panel, while the other mounting tab is secured with a push-in plastic fastener. The module is concealed behind the trunk side trim. Concealed within the molded plastic PAM housing is a microcontroller and the other electronic circuitry of the module. The module housing is sealed to enclose and protect the internal electronic circuitry. The module software is flash programmable.

Three connector receptacles (only two are used for this application) (3) containing terminal pins are integral to the forward-facing side of the housing. The module is connected to the vehicle electrical system through two dedicated take outs and connectors of the body wire harness.

The PAM cannot be adjusted or repaired and, if damaged or ineffective, it must be replaced with a new unit.

OPERATION

OPERATION

The microcontroller within the Park Assist Module (PAM) (also known as the ParkTronic System/PTS module) contains the park assist system logic circuits. The PAM uses On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool using the Controller Area Network (CAN) data bus. This method of communication is also used for park assist system diagnosis and testing through the 16-way data link connector located on the driver side lower edge of the

instrument panel.

The PAM provides source current to the four park assist sensors located on the back of the rear bumper fascia. The PAM then monitors return inputs from each of the sensors on dedicated hard wired data communication circuits. These sensor inputs allow the PAM to determine when an obstacle is in the rear path of the vehicle, to calculate the relative location of the obstacle and to determine whether the distance to that obstacle is increasing or decreasing.

Pre-programmed decision algorithms and calibrations allow the PAM microcontroller to determine the appropriate park assist system outputs based upon the inputs received from the park assist sensors and electronic messages received from other modules in the vehicle over the CAN data bus. When the programmed conditions are met, the PAM sends electronic messages to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and the Radio Receiver Module (RRM) (also known as the radio or the head unit) over the CAN data bus to obtain the proper park assist system visual and audible outputs.

The PAM microcontroller continuously monitors all of the park assist system electrical circuits and components to determine the system readiness. If a monitored system fault is detected, the PAM sets a Diagnostic Trouble Code (DTC) and sends the appropriate electronic messages to the IC to control the display of the appropriate park assist system graphics and textual messages in the Electronic Vehicle Information Center (EVIC) display within the IC and the generation of the appropriate audible warnings by the RRM.

The PAM receives battery current on a fused ignition output (run) circuit through the Body Control Module (BCM). The PAM has a path to ground at all times through a ground circuit and take out of the body wire harness that is secured to the body sheet metal. These connections allow the PAM to be operational whenever the status of the ignition switch is On.

The hard wired circuits between components related to the PAM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the PAM or the electronic controls and communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient and accurate means to diagnose the PAM or the electronic controls and communication related to park assist system operation requires the use of a diagnostic scan tool.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - PARK ASSIST MODULE

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired circuits between components related to the Park Assist Module (PAM) (also known as the ParkTronic System/PTS module) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the PAM or the electronic controls or communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient and accurate means to diagnose the PAM or the electronic controls and communication related to park assist system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

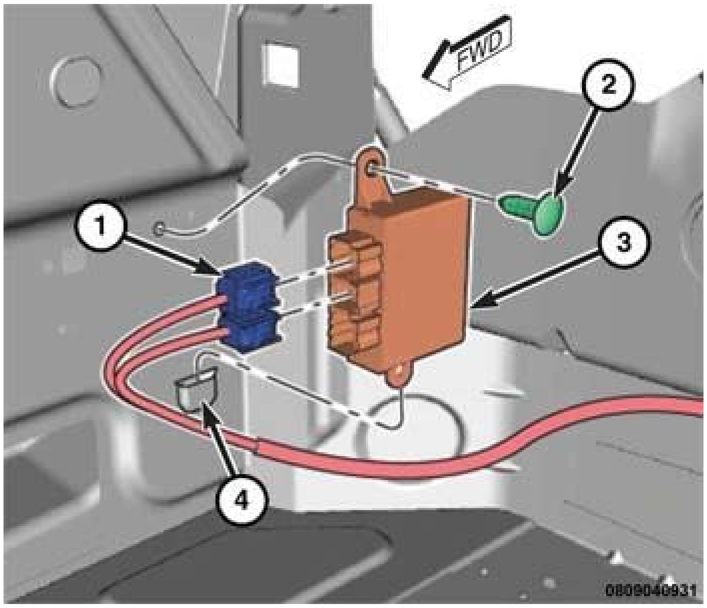


Fig. 4: Park Assist Module (PAM), Wire Harness Connectors, Stamped Pocket & Retainer
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the trim from the right quarter inner panel to access the Park Assist Module (PAM) (3), which is located just behind the right rear wheel house. Refer to **CARPET, REMOVAL** .
3. Disconnect the body wire harness connectors (1) from the PAM connector receptacles.
4. Remove the push-pin type retainer (2) that secures the PAM to the quarter inner panel.
5. Slide the PAM upward far enough to disengage the lower mounting tab from the stamped pocket (4) in the right quarter inner panel.
6. Remove the PAM from the vehicle.

INSTALLATION

INSTALLATION

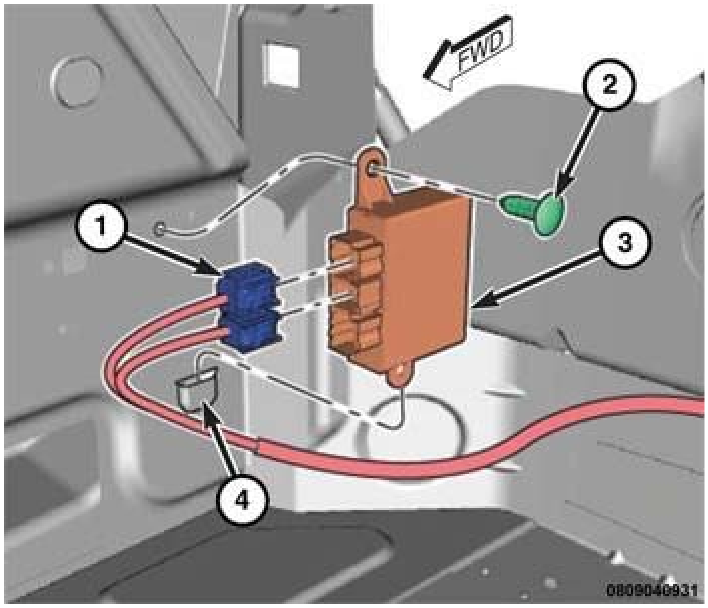


Fig. 5: Park Assist Module (PAM), Wire Harness Connectors, Stamped Pocket & Retainer
Courtesy of CHRYSLER GROUP, LLC

1. Position the Park Assist Module (PAM) (3) to the right quarter inner panel above and behind the right rear wheel house. Be certain to engage the lower mounting tab into the stamped pocket (4) in the right quarter inner panel.
2. Reinstall the push-pin type retainer (2) that secures the PAM to the right quarter inner panel.
3. Reconnect the body wire harness connectors (1) to the PAM connector receptacles.
4. Reinstall the trim onto the right quarter inner panel. Refer to **CARPET, INSTALLATION** .
5. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

SENSOR, BLIND SPOT

DESCRIPTION

DESCRIPTION

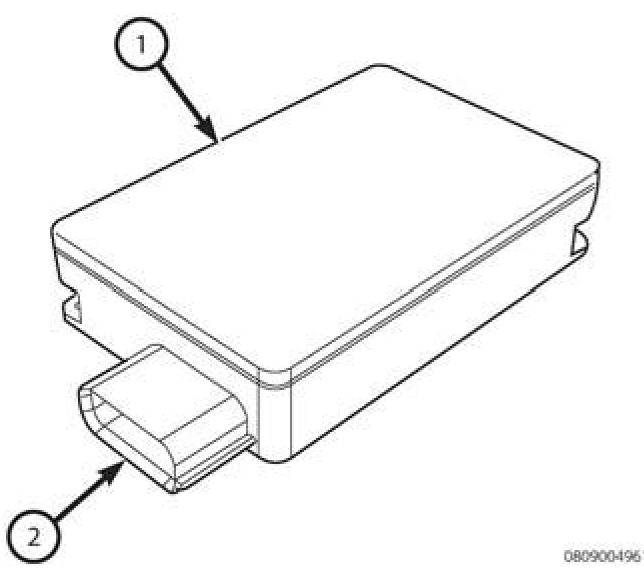


Fig. 6: Blind Spot Sensor
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the optional Blind Spot Monitor (BSM) system have two primary components. These components are the two RAdio Detection And Ranging (RADAR) blind spot sensors (1) (also known as the Left or Right Blind Spot Sensors/LBSS or RBSS). In this vehicle, each sensor also includes an internal microcontroller and control circuitry that monitors and controls both the sensor and the blind spot display for the same side of the vehicle. This explains why the sensors are sometimes referred to as smart sensors.

Each sensor with control circuitry is contained and protected within a molded plastic case that includes an integral connector receptacle (2) at one end. The sensors are each connected to the vehicle electrical system through a dedicated take out and connector of the rear bumper fascia wire harness. The two sensors are concealed behind the outboard ends of the rear bumper fascia. Each sensor is snapped into a dedicated molded plastic mounting bracket that is permanently affixed to the inside surface of the fascia just behind the left and right rear wheel openings.

The blind spot sensors and control circuitry cannot be adjusted or repaired. If a sensor is damaged or ineffective, it must be replaced with a new unit. The sensor module software is flash capable. The mounting bracket for each sensor is serviced only as a unit with the rear bumper fascia.

OPERATION

OPERATION

The Blind Spot Monitor (BSM) RAdio Detection And Ranging (RADAR) smart sensors (also known as the Left Blind Spot Sensor/LBSS and Right Blind Spot Sensor/RBSS) are each controlled by their on-board microcontroller and control circuitry. When the microcontroller recognizes that the appropriate conditions exist, it will energize the sensor to generate 25 Gigahertz radar pulses through the blind spot zone on that side of the vehicle. The sensor receives and filters the radar signals being returned from any objects detected within the zone, then transmits the appropriate data identifying the position and speed of identified objects to the microcontroller.

The microcontroller analyzes the sensor data to determine whether any detected objects should be reported. When it is determined that an object should be reported, the microcontroller sends electronic request messages over the Controller Area Network (CAN) - Interior High Speed (IHS) data bus to its respective Driver Door Module (DDM) or Passenger Door Module (PDM). The DDM or PDM then controls its respective left or right BSM display directly through a hard wired output. The microcontroller of the LBSS or RBSS also sends electronic messages to the Radio Receiver Module (RRM) (also known as the radio or head unit) to mute any current output through the sound system speakers and to generate chime tones as an audible alert.

Each of the two BSM smart sensors is independent and communicates on the CAN data bus. The sensor performs a bulb test by requesting illumination of the triangle icon in its respective right or left blind spot display for a few seconds each time the status of the ignition switch transitions to On. Each sensor microcontroller also continually monitors the BSM system and the sensor circuits and will store a Diagnostic Trouble Code (DTC) for any fault that is detected.

The hard wired circuits between of the smart sensors may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the smart sensors or the electronic controls and communication between other modules and devices that provide some features of the BSM system. The most

reliable, efficient and accurate means to diagnose the smart sensors or the electronic controls and communication related to LBSS or RBSS operation requires the use of a diagnostic scan tool.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - BLIND SPOT SENSOR

The hard wired circuits of the Blind Spot Monitor (BSM) smart sensors (also known as the Left Blind Spot Sensor/LBSS or Right Blind Spot Sensor/RBSS) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the smart sensors or the electronic controls and communication between modules and other devices that provide some features of the BSM system. The most reliable, efficient and accurate means to diagnose the smart sensors or the electronic controls and communication related to LBSS or Right Blind Spot Sensor RBSS operation requires the use of a diagnostic scan tool.

REMOVAL

REMOVAL

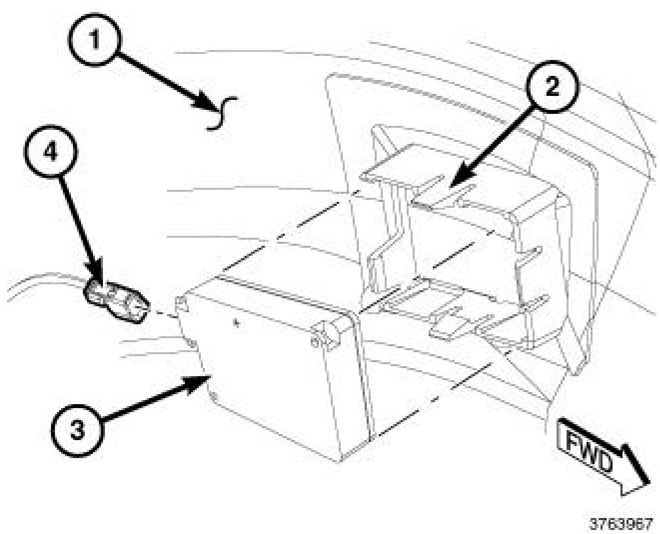


Fig. 7: Blind Spot Sensor, Latch Tabs & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the rear bumper fascia (1) from the vehicle. Refer to **FASCIA, REAR, REMOVAL** and **FASCIA, REAR, LOWER, REMOVAL** .
3. Disconnect the rear bumper fascia wire harness connector (4) from the Left Blind Spot Sensor (LBSS) or Right Blind Spot Sensor (RBSS) (3) connector receptacle.
4. Disengage the latch tabs (2) of the BSM sensor mounting bracket and pull the LBSS or RBSS out of the bracket.

INSTALLATION

INSTALLATION

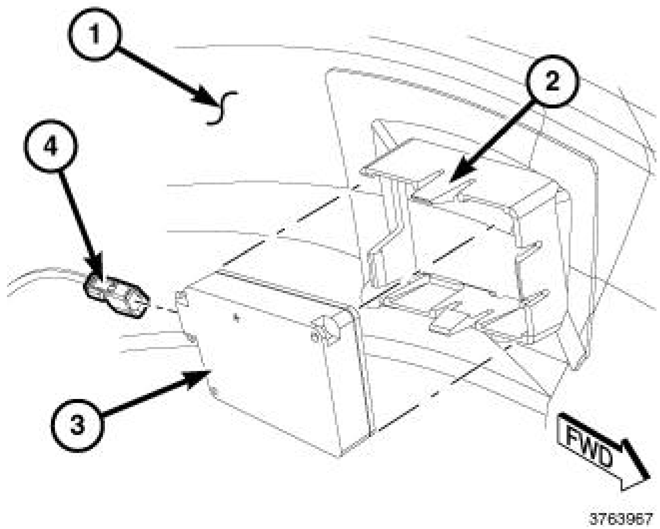


Fig. 8: Blind Spot Sensor, Latch Tabs & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Be certain that both the Left Blind Spot Sensor (LBSS) and the Right Blind Spot Sensor (RBSS) part numbers are at the same revision level. The Blind Spot Monitor (BSM) system will not function or will not function properly if the revision levels of the LBSS and the RBSS part numbers are not synchronized.**

1. Position the Left Blind Spot Sensor (LBSS) or Right Blind Spot Sensor (RBSS) (3) to the mounting bracket on the rear bumper fascia (1).
2. Using hand pressure, press the LBSS or RBSS firmly and evenly into the mounting bracket until the latch tabs (2) are fully engaged.
3. Reconnect the rear bumper fascia wire harness connector (4) to the LBSS or RBSS connector receptacle.
4. Reinstall the rear bumper fascia onto the vehicle. Refer to **FASCIA, REAR, INSTALLATION** and **FASCIA, REAR, LOWER, INSTALLATION** .
5. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

SENSOR, PARK ASSIST

DESCRIPTION

DESCRIPTION

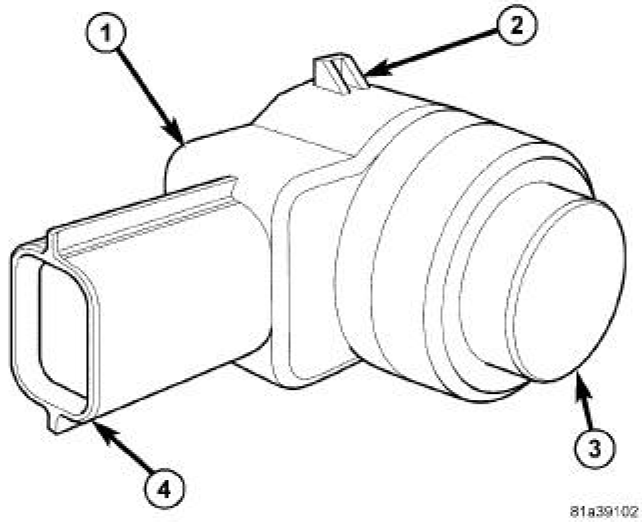


Fig. 9: Park Assist Sensor
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the rear park assist system have four park assist sensors (1) installed on the rear bumper fascia. Only the membrane (3) of each sensor is visible through a hole in the outer vertical surface of the fascia. The remainder of each sensor including the sensor mounting bracket, the sensor spacer and the sensor wiring connection is concealed behind the fascia. A sensor wire harness behind the fascia connects the sensors to the vehicle electrical system.

Each of the four sensors is identical in construction and is interchangeable. The electronic circuitry and a communication chip for each sensor is enclosed and protected within the molded black plastic sensor housing. The housing includes an integral connector receptacle (4) and two integral latch tabs (2). The sensor membrane extends from the surface of the sensor housing, and is finished to match the outer surface of the fascia.

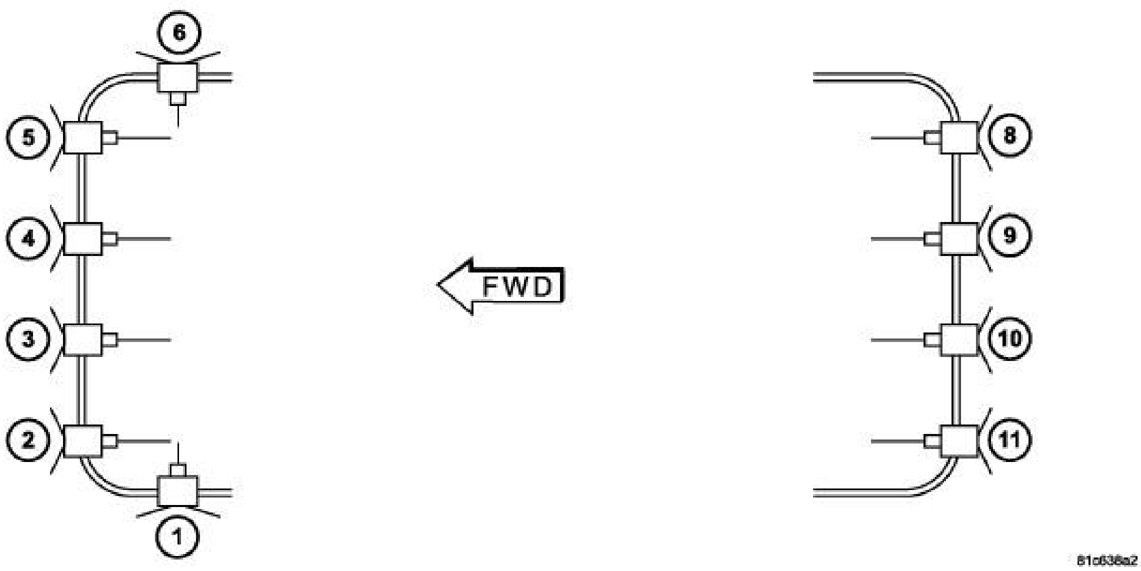


Fig. 10: Park Assist Sensors
Courtesy of CHRYSLER GROUP, LLC

The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if the vehicle were equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle. Since this vehicle uses only four rear sensors, sensor numbers 7 and 12 are omitted, so the left rear sensor is the number 11 sensor.

A resilient O-ring spacer (also known as a decoupling ring) around the circumference of the membrane isolates the membrane from the openings in the fascia. Each sensor is snapped into its own dedicated molded plastic mounting bracket. Each sensor mounting bracket is heat-staked to the back side of the rear bumper fascia.

The park assist sensors cannot be adjusted or repaired. If a sensor is ineffective or damaged it must be replaced with a new unit. The sensor spacers are available for individual service replacement. The sensor mounting brackets are serviced only as a unit with the rear bumper fascia.

OPERATION

OPERATION

The park assist sensors are ultrasonic transceivers that are completely controlled by the Park Assist Module (PAM) (also known as the ParkTronic System/PTS module). The sensors transmit and receive ultrasonic signals. The sensors each receive battery current and ground in parallel from the PAM, but are each connected to individual dedicated serial bus communication circuits to the module.

Each sensor membrane is oscillated, then quieted by the PAM in a pulsing fashion. While the sensor membrane oscillates, it emits an ultrasonic signal. This signal will bounce or echo off of objects in the path of the vehicle. While quieted, each membrane receives the echoes of the ultrasonic signals it and the other sensors have transmitted. The sensors then communicate this echo data over the serial bus lines back to the PAM. The microcontroller within the PAM uses the intervals between the ultrasonic transmission and reception data from the sensors to calculate the distance to any obstacles identified by the ultrasonic echoes.

The hard wired circuits between components related to the park assist sensors may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the park assist sensors or the electronic controls and communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient and accurate means to diagnose the park assist sensors or the electronic controls and communication related to park assist sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - PARK ASSIST SENSOR

The hard wired circuits between the park assist sensors and the Park Assist Module (PAM) (also known as the ParkTronic System/PTS module) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out

information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the park assist sensors or the electronic controls and communication between other modules and devices that provide some features of the park assist system. The most reliable, efficient and accurate means to diagnose the park assist sensors or the electronic controls and communication related to park assist sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

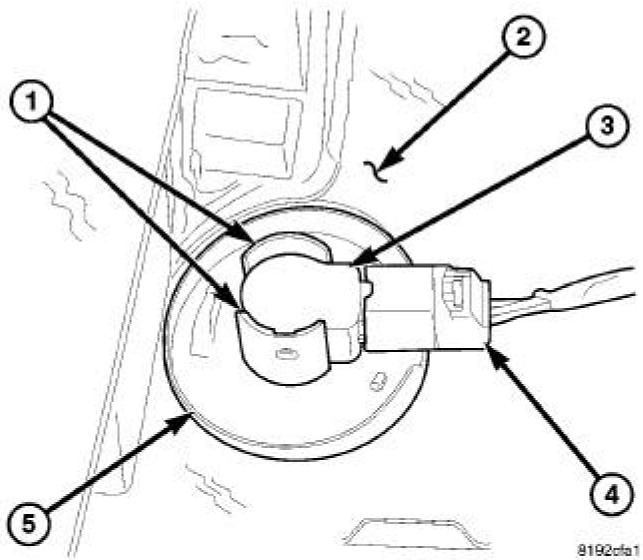


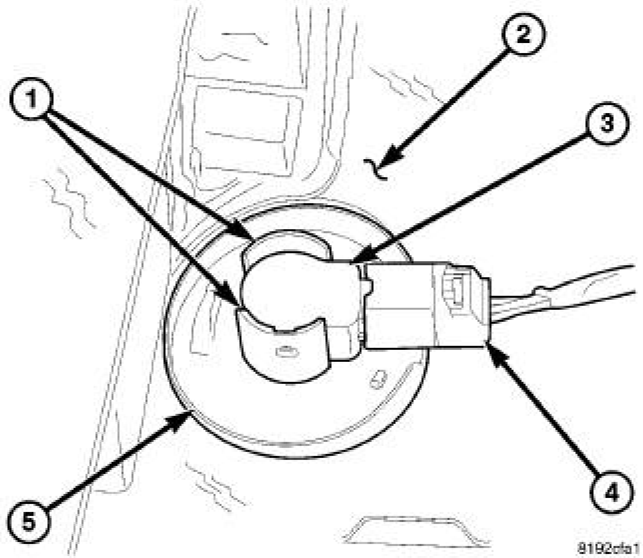
Fig. 11: Identifying Latch Features, Rear Bumper Fascia, Park Assist Sensors, Park Assist Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The park assist sensors (3) and the sensor spacers (O-rings) are each available for separate service replacement. The sensor brackets (5) are bonded to and integral to the back side of the rear bumper fascia (2).**

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the bumper fascia from the rear of the vehicle. Refer to FASCIA, REAR, REMOVAL and FASCIA, REAR, LOWER, REMOVAL .
3. From the back of the fascia (2), disconnect the wire harness connector (4) from the park assist sensor (3) connector receptacle.
4. Carefully pry the sensor bracket (5) latch features (1) away from the top and bottom latch tabs of the sensor far enough to disengage the sensor from the bracket.
5. Disengage the sensor spacer (O-ring) from around the circumference of the sensor membrane protrusion.

INSTALLATION

INSTALLATION



[Fig. 12: Identifying Latch Features, Rear Bumper Fascia, Park Assist Sensors, Park Assist Sensor]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The park assist sensors (3) and the sensor spacers (O-rings) are each available for separate service replacement. The sensor brackets (5) are bonded to and integral to the back side of the rear bumper fascia (2).**

NOTE: **Production and all service replacement O-ring spacers are tapered. The wide side (base) of the O-ring should be seated against the sensor housing and the narrow side should be oriented toward the outer surface of the sensor membrane and the rear fascia.**

1. If the park assist sensor or the sensor spacer are being replaced, engage the O-ring spacer around the circumference of the sensor membrane protrusion.
2. Align and insert the sensor into the sensor bracket on the back of the rear bumper fascia (2) until the bracket latch features (1) are fully engaged over the top and bottom latch tabs of the sensor.

   NOTE: **Be certain that each sensor membrane is properly centered in the openings of the rear fascia and that the O-ring spacers are not pinched. Improper centering or pinched O-rings can be detrimental to proper park assist sensor operation. Be certain that the sensor membrane is flush with the outer surface of the fascia.**

3. From the back of the fascia, reconnect the wire harness connector (4) to the sensor connector receptacle.
4. Reinstall the bumper fascia onto the rear of the vehicle. Refer to **FASCIA, REAR, INSTALLATION** and **FASCIA, REAR, LOWER, INSTALLATION** .
5. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

SWITCH, PARK ASSIST

DESCRIPTION

DESCRIPTION

0809040932

Fig. 13: Integrated Center Stack (ICS), Park Assist Off & Heater/Air Conditioner Switch
Courtesy of CHRYSLER GROUP, LLC

The park assist Off switch (2) is integral to the instrument panel Integrated Center Stack (ICS) controls (also known as the lower switch bank), which is located behind the instrument panel center bezel just above the heater and air conditioner controls (3). Refer to **POD, SWITCH BANK, DESCRIPTION** .

The park assist Off switch push button is clearly identified with a white International Control and Display Symbol graphic for **Parking Aid** and the text **OFF** . An amber Light Emitting Diode (LED) unit is illuminated behind a small clear plastic jewel-like lens in the push button to give a visual indication whenever the park assist system has been manually disabled or is unavailable due to a detected system fault while the status of the ignition switch is On. The switch button also has panel lamps dimmer controlled illumination for night visibility.

All of the circuitry and components of the park assist Off switch are contained within a molded black plastic ICS switch pod housing. The ICS switch pod and display unit is connected to the vehicle electrical system through dedicated take outs and connectors of the instrument panel wire harness.

The park assist Off switch cannot be adjusted or repaired and, if the switch is ineffective or damaged, the entire ICS display and switch pod unit must be replaced with a new unit.

OPERATION

OPERATION

The status of the park assist controls is continually monitored by the circuitry within the instrument panel switch pod (also known as the Accessory Switch Bank Module/ASBM). The switch pod receives battery voltage at all times on a fused battery feed circuit and has a path to ground at all times through the instrument panel wire harness. The inputs to and outputs from the switch pod consist of electronic message communication with the Body Control Module (BCM) (also known as the Common Body Controller/CBC) over the single wire Local Interface Network (LIN) data bus.

Each time the park assist Off switch push button is depressed the switch pod circuitry sends an electronic **park assist switch status** message input to the BCM over the LIN data bus. The BCM then relays an electronic **park assist switch request** message to the Park Assist Module (PAM) over the Controller Area Network (CAN) data bus. The PAM responds to each **park assist switch request** message by toggling the status of the park assist system from enabled to disabled, or from disabled to enabled, then sends an electronic **park assist system status** message back to the BCM over the CAN data bus as confirmation.

The BCM responds to the system status message by sending a message to the switch pod over the LIN data bus to control the park assist Off switch Light Emitting Diode (LED) unit so that the LED is illuminated with the system disabled while the status of the ignition switch is On, and is extinguished with the system enabled or with the status of the ignition switch anything except On.

The hard wired circuits between components related to the park assist switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient and accurate means to diagnose the park assist switch or the electronic controls and communication related to park assist system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

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Article GUID: A00735964

2015-16 DTC INDEX

Challenger

CIRCUIT TESTING PROCEDURES

DIAGNOSTIC CODE INDEX

DTC	Description
WIRING HARNESS TESTING	WIRING HARNESS TESTING

AMPLIFIER (AMP), PREMIUM 1

DIAGNOSTIC CODE INDEX

DTC	Description
B1460-11	CHANNEL 1 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B1460-12	CHANNEL 1 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B1460-13	CHANNEL 1 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B1460-92	CHANNEL 1 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B1464-00	CHANNEL 1 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B1465-11	CHANNEL 2 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B1465-12	CHANNEL 2 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B1465-13	CHANNEL 2 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B1465-92	CHANNEL 2 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B1469-00	CHANNEL 2 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B146A-11	CHANNEL 3 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B146A-12	CHANNEL 3 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B146A-13	CHANNEL 3 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B146A-92	CHANNEL 3 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B146E-00	CHANNEL 3 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B146F-11	CHANNEL 4 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B146F-12	CHANNEL 4 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B146F-13	CHANNEL 4 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B146F-92	CHANNEL 4 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B1473-00	CHANNEL 4 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B147E-11	CHANNEL 7 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B147E-12	CHANNEL 7 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B147E-13	CHANNEL 7 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN

DTC	Description
B147E-92	CHANNEL 7 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B1482-00	CHANNEL 7 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B1483-11	CHANNEL 8 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B1483-12	CHANNEL 8 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B1483-13	CHANNEL 8 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B1483-92	CHANNEL 8 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B1487-00	CHANNEL 8 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B1488-00	CABIN EQ MISMATCH PERFORMANCE
B2199-16	BATTERY VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE-SIGNAL ABOVE ALLOWABLE RANGE
B221F-00	AMPLIFIER INTERNAL
U0010-00	CAN INTERIOR BUS
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0184-00	LOST COMMUNICATION WITH RADIO
U11FB-00	LOST COMMUNICATION WITH LEFT BLIND SPOT SENSOR

AMPLIFIER (AMP), PREMIUM 2

DIAGNOSTIC CODE INDEX

DTC	Description
B1460-11	CHANNEL 1 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B1460-12	CHANNEL 1 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B1460-13	CHANNEL 1 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B1460-92	CHANNEL 1 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B1464-00	CHANNEL 1 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B1465-11	CHANNEL 2 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B1465-12	CHANNEL 2 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B1465-13	CHANNEL 2 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B1465-92	CHANNEL 2 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B1469-00	CHANNEL 2 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B146A-11	CHANNEL 3 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B146A-12	CHANNEL 3 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B146A-13	CHANNEL 3 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B146A-92	CHANNEL 3 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION

DTC	Description
B146E-00	CHANNEL 3 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B146F-11	CHANNEL 4 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B146F-12	CHANNEL 4 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B146F-13	CHANNEL 4 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B146F-92	CHANNEL 4 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B1473-00	CHANNEL 4 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B1474-11	CHANNEL 5 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B1474-12	CHANNEL 5 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B1474-13	CHANNEL 5 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B1474-92	CHANNEL 5 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B1478-00	CHANNEL 5 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B1479-11	CHANNEL 6 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B1479-12	CHANNEL 6 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B1479-13	CHANNEL 6 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B1479-92	CHANNEL 6 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B147D-00	CHANNEL 6 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B147E-11	CHANNEL 7 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B147E-12	CHANNEL 7 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B147E-13	CHANNEL 7 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B147E-92	CHANNEL 7 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B1482-00	CHANNEL 7 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B1483-11	CHANNEL 8 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B1483-12	CHANNEL 8 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B1483-13	CHANNEL 8 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B1483-92	CHANNEL 8 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B1487-00	CHANNEL 8 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B1488-00	CABIN EQ MISMATCH PERFORMANCE
B14B9-11	CHANNEL 9 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B14B9-12	CHANNEL 9 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B14B9-13	CHANNEL 9 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B14B9-2B	CHANNEL 9 AUDIO SPEAKER OUTPUT-WIRES SHORTED TOGETHER
B14B9-92	CHANNEL 9 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B14C3-11	CHANNEL 11 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B14C3-12	CHANNEL 11 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B14C3-13	CHANNEL 11 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN

DTC	Description
B14C3-2B	CHANNEL 11 AUDIO SPEAKER OUTPUT-WIRES SHORTED TOGETHER
B14C3-92	CHANNEL 11 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B14C8-11	CHANNEL 12 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO GROUND
B14C8-12	CHANNEL 12 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B14C8-13	CHANNEL 12 AUDIO SPEAKER OUTPUT-CIRCUIT OPEN
B14C8-2B	CHANNEL 12 AUDIO SPEAKER OUTPUT-WIRES SHORTED TOGETHER
B14C8-92	CHANNEL 12 AUDIO SPEAKER OUTPUT-PERFORMANCE OR INCORRECT OPERATION
B2199-16	BATTERY VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE-SIGNAL ABOVE ALLOWABLE RANGE
B221F-00	AMPLIFIER INTERNAL
U0010-00	CAN INTERIOR BUS
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0184-00	LOST COMMUNICATION WITH RADIO
U11FB-00	LOST COMMUNICATION WITH LEFT BLIND SPOT SENSOR

AMPLIFIER (AMP), PREMIUM 3

DIAGNOSTIC CODE INDEX

DTC	Description
B1460-11	CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1460-12	CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1460-13	CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1460-92	CHANNEL 1 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1464-00	CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1465-11	CHANNEL 2 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1465-12	CHANNEL 2 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1465-13	CHANNEL 2 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1465-92	CHANNEL 2 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1469-00	CHANNEL 2 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B146A-11	CHANNEL 3 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B146A-12	CHANNEL 3 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B146A-13	CHANNEL 3 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B146A-92	CHANNEL 3 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B146E-00	CHANNEL 3 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER

DTC	Description
B146F-11	CHANNEL 4 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B146F-12	CHANNEL 4 AUDIO SPEAKER OUTPUT-CIRCUIT SHORT TO BATTERY
B146F-13	CHANNEL 4 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B146F-92	CHANNEL 4 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1473-00	CHANNEL 4 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1474-11	CHANNEL 5 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1474-12	CHANNEL 5 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1474-13	CHANNEL 5 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1474-92	CHANNEL 5 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1478-00	CHANNEL 5 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1479-11	CHANNEL 6 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1479-12	CHANNEL 6 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1479-13	CHANNEL 6 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1479-92	CHANNEL 6 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B147D-00	CHANNEL 6 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B147E-11	CHANNEL 7 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B147E-12	CHANNEL 7 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B147E-13	CHANNEL 7 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B147E-92	CHANNEL 7 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1482-00	CHANNEL 7 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1483-11	CHANNEL 8 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B1483-12	CHANNEL 8 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B1483-13	CHANNEL 8 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B1483-92	CHANNEL 8 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1487-00	CHANNEL 8 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B1488-00	CABIN EQ MISMATCH PERFORMANCE
B14B9-11	CHANNEL 9 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B14B9-12	CHANNEL 9 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B14B9-13	CHANNEL 9 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B14B9-2B	CHANNEL 9 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B14B9-92	CHANNEL 9 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B14BE-11	CHANNEL 10 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B14BE-12	CHANNEL 10 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B14BE-13	CHANNEL 10 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B14BE-2B	CHANNEL 10 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER

DTC	Description
B14BE-92	CHANNEL 10 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B143C-11	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B143C-12	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B143C-13	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B143C-2B	CHANNEL 11 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B14C3-92	CHANNEL 11 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B14C8-11	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND
B14C8-12	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY
B14C8-13	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT OPEN
B14C8-2B	CHANNEL 12 AUDIO SPEAKER OUTPUT - CIRCUIT SHORTED TOGETHER
B14C8-92	CHANNEL 12 AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B2199-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
B221F-00	AMPLIFIER INTERNAL
U0010-00	CAN INTERIOR BUS
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0184-00	LOST COMMUNICATION WITH RADIO
U11FB-00	LOST COMMUNICATION WITH LEFT BLIND SPOT SENSOR

CLUSTER, INSTRUMENT

DIAGNOSTIC CODE INDEX

DTC	Description
B1612-00	PANEL ILLUMINATION CONTROL
B21DD-84	SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL VOLTAGE ABOVE ALLOWABLE RANGE
B2213-00	CABIN COMPARTMENT NODE/CLUSTER INTERNAL
B275B-00	AIRBAG TELLTALE
U0001-00	CAN C BUS
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0127-00	LOST COMMUNICATION WITH TIRE PRESSURE MONITOR MODULE
U0139-00	LOST COMMUNICATION WITH ACTIVE DAMPING CONTROL MODULE

DTC	Description
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0151-00	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0159-00	LOST COMMUNICATION WITH PARKING ASSIST CONTROL MODULE (PAM)
U0212-00	LOST COMMUNICATION WITH SCM
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPLAUSABLE DATA RECIEVED FROM BODY CONTROL MODULE
U0430-00	IMPLAUSIBLE DATA RECEIVED FROM TPM
U045A-00	IMPLAUSIBLE DATA RECEIVED FROM PARKING ASSIST MODULE
U11B9-00	LOST COMMUNICATION WITH RF HUB
U11E8-00	LOST COMMUNICATION WITH EPS STEERING TORQUE MESSAGE
U1216-00	LOST COMMUNICATION WITH DASM
U1464-00	IMPLAUSIBLE DATA RECEIVED FROM EPS STEERING TORQUE
U1489-00	IMPLAUSIBLE DATA RECEIVED FROM RF HUB

CONTROLLER, OCCUPANT RESTRAINT (ORC)

DIAGNOSTIC CODE INDEX

DTC	Description
B0001-11	DRIVER FRONTAL SQUIB 1 - CIRCUIT SHORT TO GROUND
B0001-12	DRIVER FRONTAL SQUIB 1 - CIRCUIT SHORT TO BATTERY
B0001-13	DRIVER FRONTAL SQUIB 1 - CIRCUIT OPEN
B0001-2B	DRIVER FRONTAL SQUIB 1 - WIRES SHORTED TOGETHER
B0001-95	DRIVER FRONTAL SQUIB 1 - INCORRECT ASSEMBLY
B0001-9A	DRIVER FRONTAL SQUIB 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0002-11	DRIVER FRONTAL SQUIB 2 - CIRCUIT SHORT TO GROUND
B0002-12	DRIVER FRONTAL SQUIB 2 - SHORT TO BATTERY
B0002-13	DRIVER FRONTAL SQUIB 2 - CIRCUIT OPEN
B0002-2B	DRIVER FRONTAL SQUIB 2 - WIRES SHORTED TOGETHER
B0002-95	DRIVER FRONTAL SQUIB 2 - INCORRECT ASSEMBLY
B0002-9A	DRIVER FRONTAL SQUIB 2 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0010-11	PASSENGER FRONTAL SQUIB 1 CONTROL-CIRCUIT SHORT TO GROUND
B0010-12	PASSENGER FRONTAL SQUIB 1 CONTROL-CIRCUIT SHORT TO BATTERY
B0010-13	PASSENGER FRONTAL SQUIB 1 CONTROL- CIRCUIT OPEN
B0010-2B	PASSENGER FRONTAL SQUIB 1 CONTROL-WIRES SHORTED TOGETHER
B0010-95	PASSENGER FRONTAL SQUIB 1 - INCORRECT ASSEMBLY

DTC	Description
B0010-9A	PASSENGER FRONTAL SQUIB 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0011-11	PASSENGER FRONTAL SQUIB 2 CONTROL-CIRCUIT SHORT TO GROUND
B0011-12	PASSENGER FRONTAL SQUIB 2 CONTROL-CIRCUIT SHORT TO BATTERY
B0011-13	PASSENGER FRONTAL SQUIB 2 CONTROL-CIRCUIT OPEN
B0011-2B	PASSENGER FRONTAL SQUIB 2 CONTROL-CIRCUIT WIRES SHORTED TOGETHER
B0011-95	PASSENGER FRONTAL SQUIB 2 - INCORRECT ASSEMBLY
B0011-9A	PASSENGER FRONTAL SQUIB 2 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0020-11	1ST ROW LEFT THORAX/SEAT MOUNTED SIDE SQUIB 1 - CIRCUIT SHORT TO GROUND
B0020-12	1ST ROW LEFT SEAT MOUNTED SIDE SQUIB 1 - CIRCUIT SHORT TO BATTERY
B0020-13	1ST ROW LEFT SEAT MOUNTED SIDE SQUIB 1 - CIRCUIT OPEN
B0020-2B	1ST ROW LEFT SEAT MOUNTED SIDE SQUIB 1 - WIRES SHORTED TOGETHER
B0020-95	1ST ROW LEFT THORAX/SEAT MOUNTED SIDE SQUIB 1 - INCORRECT ASSEMBLY
B0020-9A	1ST ROW LEFT THORAX/SEAT MOUNTED SIDE SQUIB 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0021-11	1ST ROW LEFT WINDOW CURTAIN SQUIB 1 - CIRCUIT SHORT TO GROUND
B0021-12	1ST ROW LEFT WINDOW CURTAIN SQUIB 1 - CIRCUIT SHORT TO BATTERY
B0021-13	1ST ROW LEFT WINDOW CURTAIN SQUIB 1 - CIRCUIT OPEN
B0021-2B	1ST ROW LEFT WINDOW CURTAIN SQUIB 1 - WIRES SHORTED TOGETHER
B0021-95	1ST ROW LEFT WINDOW CURTAIN SQUIB 1 - INCORRECT ASSEMBLY
B0021-9A	1ST ROW LEFT WINDOW CURTAIN SQUIB 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0028-11	1ST ROW RIGHT SEAT MOUNTED SIDE SQUIB 1 - CIRCUIT SHORT TO GROUND
B0028-12	1ST ROW RIGHT SEAT MOUNTED SIDE SQUIB 1 - CIRCUIT SHORT TO BATTERY
B0028-13	1ST ROW RIGHT SEAT MOUNTED SIDE SQUIB 1 - CIRCUIT OPEN
B0028-2B	1ST ROW RIGHT SEAT MOUNTED SIDE SQUIB 1 - WIRES SHORTED TOGETHER
B0028-95	1ST ROW RIGHT THORAX/SEAT MOUNTED SIDE SQUIB 1 - INCORRECT ASSEMBLY
B0028-9A	1ST ROW RIGHT THORAX/SEAT MOUNTED SIDE SQUIB 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS

DTC	Description
B0029-11	1ST ROW RIGHT WINDOW CURTAIN SQUIB 1 - CIRCUIT SHORT TO GROUND
B0029-12	1ST ROW RIGHT WINDOW CURTAIN SQUIB 1 - CIRCUIT SHORT TO BATTERY
B0029-13	1ST ROW RIGHT WINDOW CURTAIN SQUIB 1 - CIRCUIT OPEN
B0029-2B	1ST ROW RIGHT WINDOW CURTAIN SQUIB 1 - WIRES SHORTED TOGETHER
B0029-95	1ST ROW RIGHT WINDOW CURTAIN SQUIB 1 - INCORRECT ASSEMBLY
B0029-9A	1ST ROW RIGHT WINDOW CURTAIN SQUIB 1 - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0050-11	DRIVER SEATBELT BUCKLE SENSOR - CIRCUIT SHORT TO GROUND
B0050-12	DRIVER SEATBELT BUCKLE SENSOR - CIRCUIT SHORT TO BATTERY
B0050-13	DRIVER SEATBELT BUCKLE SENSOR - CIRCUIT OPEN
B0050-2B	DRIVER SEATBELT BUCKLE SENSOR - WIRES SHORTED TOGETHER
B0050-95	DRIVER SEATBELT BUCKLE SENSOR - INCORRECT ASSEMBLY
B0050-9A	DRIVER SEATBELT BUCKLE SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0052-11	PASSENGER SEATBELT BUCKLE SENSOR - CIRCUIT SHORT TO GROUND
B0052-12	PASSENGER SEATBELT BUCKLE SENSOR - CIRCUIT SHORT TO BATTERY
B0052-13	PASSENGER SEATBELT BUCKLE SENSOR - CIRCUIT OPEN
B0052-2B	PASSENGER SEATBELT BUCKLE SENSOR - WIRES SHORTED TOGETHER
B0052-95	PASSENGER SEATBELT BUCKLE SENSOR - INCORRECT ASSEMBLY
B0052-9A	PASSENGER SEATBELT BUCKLE SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0070-11	DRIVER-SEATBELT- BUCKLE PRETENSIONER-CIR
B0070-12	DRIVER SEATBELT BUCKLE PRETENSIONER - CIRCUIT SHORT TO BATTERY
B0070-13	DRIVER SEATBELT BUCKLE PRETENSIONER - CIRCUIT OPEN
B0070-2B	DRIVER SEATBELT BUCKLE PRETENSIONER - WIRES SHORTED TOGETHER
B0070-95	DRIVER SEATBELT BUCKLE PRETENSIONER - INCORRECT ASSEMBLY
B0070-9A	DRIVER SEATBELT BUCKLE PRETENSIONER - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0072-11	PASSENGER SEATBELT BUCKLE PRETENSIONER - CIRCUIT SHORT TO GROUND
B0072-12	PASSENGER SEATBELT BUCKLE PRETENSIONER - CIRCUIT SHORT TO BATTERY
B0072-13	PASSENGER SEATBELT BUCKLE PRETENSIONER - CIRCUIT OPEN
B0072-2B	PASSENGER SEATBELT BUCKLE PRETENSIONER - WIRES SHORTED TOGETHER
B0072-95	PASSENGER SEATBELT BUCKLE PRETENSIONER - INCORRECT ASSEMBLY

DTC	Description
B0072-9A	PASSENGER SEATBELT BUCKLE PRETENSIONER - COMPONENT OR SYSTEM OPERATING CONDITIONS
B007E-11	DRIVER SEATBELT RETRACTOR PRETENSIONER - CIRCUIT SHORT TO GROUND
B007E-12	DRIVER SEATBELT RETRACTOR PRETENSIONER - CIRCUIT SHORT TO BATTERY
B007E-13	DRIVER SEATBELT RETRACTOR PRETENSIONER - CIRCUIT OPEN
B007E-2B	DRIVER SEATBELT RETRACTOR PRETENSIONER - WIRES SHORTED TOGETHER
B007E-95	DRIVER SEATBELT RETRACTOR PRETENSIONER - INCORRECT ASSEMBLY
B007E-9A	DRIVER SEATBELT RETRACTOR PRETENSIONER - COMPONENT OR SYSTEM OPERATING CONDITIONS
B007F-11	PASSENGER SEATBELT RETRACTOR PRETENSIONER - CIRCUIT SHORT TO GROUND
B007F-12	PASSENGER SEATBELT RETRACTOR - CIRCUIT SHORT TO BATTERY
B007F-13	PASSENGER SEATBELT RETRACTOR PRETENSIONER - CIRCUIT OPEN
B007F-2B	PASSENGER SEATBELT RETRACTOR PRETENSIONER - WIRES SHORTED TOGETHER
B007F-95	PASSENGER SEATBELT RETRACTOR PRETENSIONER - INCORRECT ASSEMBLY
B007F-9A	PASSENGER SEATBELT RETRACTOR PRETENSIONER - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0090-11	LEFT FRONTAL ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
B0090-12	LEFT FRONTAL ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
B0090-13	LEFT FRONTAL ACCELERATION SENSOR-CIRCUIT OPEN
B0090-49	LEFT FRONTAL IMPACT SENSOR - INTERNAL ELECTRONIC FAILURE
B0090-87	LEFT FRONTAL IMPACT SENSOR - MISSING MESSAGE
B0090-95	LEFT FRONTAL IMPACT- SENSOR - INCORRECT ASSEMBLY
B0090-9A	LEFT FRONTAL IMPACT SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0095-11	RIGHT FRONTAL ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
B0095-12	RIGHT FRONTAL ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
B0095-13	RIGHT FRONTAL ACCELERATION SENSOR-CIRCUIT OPEN
B0095-49	RIGHT FRONTAL ACCELERATION SENSOR - INTERNAL ELECTRONIC FAILURE
B0095-87	RIGHT FRONTAL IMPACT SENSOR - MISSING MESSAGE
B0095-95	RIGHT FRONTAL IMPACT SENSOR - INCORRECT ASSEMBLY
B0095-9A	RIGHT FRONTAL IMPACT SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
B0099-96	ROLL OVER SENSOR - COMPONENT INTERNAL FAILURE

DTC	Description
B00B5-11	DRIVER SEAT TRACK POSITION SENSOR - CIRCUIT SHORT TO GROUND
B00B5-12	DRIVER SEAT TRACK POSITION SENSOR - CIRCUIT SHORT TO BATTERY
B00B5-13	DRIVER TRACK POSITION SENSOR - CIRCUIT OPEN
B00B5-2B	DRIVER SEAT TRACK POSITION SENSOR - WIRES SHORTED TOGETHER
B00B5-95	DRIVER SEAT TRACK POSITION SENSOR - INCORRECT ASSEMBLY
B00B5-9A	DRIVER SEAT TRACK POSITION SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
B1BC7-00	DEPLOYMENT DATA RECORD FULL
B212C-13	IGNITION RUN/START INPUT - CIRCUIT OPEN
B212C-16	IGNITION RUN/START INPUT - CIRCUIT VOLTAGE BELOW THRESHOLD
B212C-17	IGNITION RUN/START INPUT CIRCUIT VOLTAGE ABOVE THRESHOLD
B212D-13	IGNITION RUN ONLY INPUT - CIRCUIT OPEN
B212D-16	IGNITION RUN ONLY INPUT - CIRCUIT VOLTAGE BELOW THRESHOLD
B212D-17	IGNITION RUN ONLY INPUT - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-16	SYSTEM VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B21DD-17	SYSTEM VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B2207-00	OCCUPANT RESTRAINT CONTROLLER INTERNAL 1
B2208-00	OCCUPANT RESTRAINT CONTROLLER INTERNAL 2
B220B-00	OCCUPANT RESTRAINT CONTROLLER FIRING STORED ENERGY
B222A-00	VEHICLE LINE MISMATCH
B2722-00	ORC UNLOCKED - ALL DEPLOYMENT DISABLED
B2734-11	PASSENGER OCCUPANT DETECTION SENSOR-CIRCUIT SHORT TO GROUND
B2734-12	PASSENGER OCCUPANT DETECTION SENSOR CIRCUIT - SHORT TO BATTERY
B2734-13	PASSENGER OCCUPANT DETECTION SENSOR - CIRCUIT OPEN
B2734-2B	PASSENGER OCCUPANT DETECTION SENSOR-WIRES SHORTED TOGETHER
B2761-11	LEFT B-PILLAR IMPACT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
B2761-12	LEFT B-PILLAR IMPACT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
B2761-13	LEFT B-PILLAR IMPACT ACCELERATION SENSOR-CIRCUIT OPEN
B2761-49	LEFT B-PILLAR IMPACT ACCELERATION SENSOR - INTERNAL ELECTRONIC FAILURE
B2761-87	LEFT B-PILLAR IMPACT ACCELERATION SENSOR - MISSING MESSAGE
B2762-11	LEFT C-PILLAR IMPACT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
B2762-12	LEFT C-PILLAR IMPACT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
B2762-13	LEFT C-PILLAR IMPACT ACCELERATION SENSOR-CIRCUIT OPEN

DTC	Description
B2762-49	LEFT C-PILLAR IMPACT ACCELERATION SENSOR - INTERNAL ELECTRONIC FAILURE
B2762-87	LEFT C-PILLAR IMPACT ACCELERATION SENSOR - MISSING MESSAGE
B2764-11	RIGHT B-PILLAR IMPACT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
B2764-12	RIGHT B-PILLAR IMPACT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
B2764-12	RIGHT B-PILLAR IMPACT ACCELERATION SENSOR - CIRCUIT SHORT T
B2764-49	RIGHT B-PILLAR IMPACT ACCELERATION SENSOR - INTERNAL ELECTRONIC FAILURE
B2764-87	RIGHT B-PILLAR IMPACT ACCELERATION SENSOR - MISSING MESSAGE
B2765-11	RIGHT C-PILLAR IMPACT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
B2765-12	RIGHT C-PILLAR IMPACT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
B2765-13	RIGHT C-PILLAR IMPACT ACCELERATION SENSOR-CIRCUIT OPEN
B2765-49	RIGHT C-PILLAR IMPACT ACCELERATION SENSOR - INTERNAL ELECTRONIC FAILURE
B2765-87	RIGHT C-PILLAR IMPACT ACCELERATION SENSOR - MISSING MESSAGE
B2767-11	LEFT IMPACT PRESSURE SENSOR - CIRCUIT SHORT TO GROUND
B2767-12	LEFT IMPACT PRESSURE SENSOR - CIRCUIT SHORT TO BATTERY
B2767-13	LEFT IMPACT PRESSURE SENSOR - CIRCUIT OPEN
B2767-49	LEFT SIDE PRESSURE SENSOR - INTERNAL ELECTRONIC FAILURE
B2767-87	LEFT-SIDE-PRESSURE-SENSOR-MISSING MESSAGE
B2768-11	RIGHT IMPACT PRESSURE SENSOR - CIRCUIT SHORT TO GROUND
B2768-12	RIGHT IMPACT PRESSURE SENSOR - CIRCUIT SHORT TO BATTERY
B2768-13	RIGHT IMPACT PRESSURE SENSOR - CIRCUIT OPEN
B2768-49	RIGHT SIDE PRESSURE SENSOR - INTERNAL ELECTRONIC FAILURE
B2768-87	RIGHT-SIDE-PRESSURE-SENSOR-MISSING MESSAGE
U0002-00	CAN C BUS OFF PERFORMANCE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U1415-00	IMPLAUSIBLE/MISSING VEHICLE CONFIGURATION DATA
U1601-00	ECU APPLICATION SOFTWARE CODE 1 MISSING OR CORRUPTED

HVAC

DIAGNOSTIC CODE INDEX

DTC	Description
B1030-11	EVAPORATOR TEMPERATURE SENSOR CIRCUIT - SHORT TO GROUND
B1030-15	EVAPORATOR TEMPERATURE SENSOR CIRCUIT - SHORT TO BATTERY OR OPEN
B1058-13	RECIRCULATION DOOR CONTROL CIRCUIT - OPEN

DTC	Description
B1058-92	RECIRCULATION DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B105C-00	RECIRCULATION DOOR TRAVEL RANGE TOO SMALL
B105D-00	RECIRCULATION DOOR TRAVEL RANGE TOO LARGE
B106A-01	REAR-DEFROST-(EBL)-CONTROL CIRCUIT-GENERAL ELECTRICAL FAILURE
B10B2-00	A-C-COOL-DOWN-TEST-PERFORMANCE
B10E8-12	BLOWER MOTOR CONTROL CIRCUIT - SHORT TO BATTERY
B10E8-14	BLOWER MOTOR CONTROL CIRCUIT - SHORT TO GROUND OR OPEN
B1107-11	CABIN TEMPERATURE SENSOR 1 CIRCUIT - SHORT TO GROUND
B1107-15	CABIN TEMPERATURE SENSOR 1-CIRCUIT SHORT TO BATTERY OR OPEN
B11C2-13	FRONT MODE DOOR 1 CONTROL CIRCUIT - OPEN
B11C2-92	FRONT MODE DOOR 1 CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11C3-00	FRONT MODE DOOR 1 TRAVEL RANGE TOO SMALL
B11C4-00	FRONT MODE DOOR 1 TRAVEL RANGE TOO LARGE
B11C8-13	RIGHT TEMPERATURE DOOR CONTROL CIRCUIT -OPEN
B11C8-92	RIGHT TEMPERATURE DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11C9-00	RIGHT TEMPERATURE DOOR TRAVEL TOO SMALL
B11CA-00	RIGHT TEMPERATURE DOOR TRAVEL TOO LARGE
B11CB-13	MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT OPEN
B11CB-92	MAIN/LEFT TEMPERATURE DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11CC-00	MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO SMALL
B11CD-00	MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO LARGE
B11D3-00	A/C COOLDOWN TEST PERFORMANCE - COMPRESSOR NOT ENGAGED
B11D5-00	A/C COOLDOWN TEST PERFORMANCE - EVAP TEMP SENSOR ERROR
B11FE-11	VARIABLE A/C COMPRESSOR CONTROL - CIRCUIT SHORT TO GROUND
B11FE-12	VARIABLE A/C COMPRESSOR CONTROL - CIRCUIT SHORT TO BATTERY
B11FE-13	VARIABLE A/C COMPRESSOR CONTROL - CIRCUIT OPEN
B1600-11	LEFT SOLAR SENSOR - CIRCUIT SHORT TO GROUND
B1600-15	LEFT SOLAR SENSOR - CIRCUIT SHORT TO BATTERY OR OPEN
B1603-11	RIGHT SOLAR SENSOR - CIRCUIT SHORT TO GROUND
B1603-15	RIGHT SOLAR SENSOR - CIRCUIT SHORT TO BATTERY OR OPEN
B160F-11	TWILIGHT/AMBIENT LIGHT SENSOR INPUT - CIRCUIT SHORT TO GROUND
B160F-15	TWILIGHT-AMBIENT LIGHT SENSOR - CIRCUIT SHORT TO BATTERY OR GROUND
B210A-84	SYSTEM VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE
B210B-85	SYSTEM VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE

DTC	Description
B210D-84	BATTERY VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE
B210E-85	BATTERY VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE
B222A-00	VEHICLE LINE MISMATCH
B222D-00	ECU UNABLE TO CONFIGURE-CONFIGURATION NOT LEARNED
U0010-00	CAN INTERIOR BUS
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0147-00	LOST COMMUNICATION WITH TELEMATICS GATEWAY

MODULE, ACTIVE DAMPING CONTROL (ADCM), SRT8

DIAGNOSTIC CODE INDEX

DTC	Description
B222A-00	VEHICLE LINE MISMATCH
C15AF-1F	LOW SIDE DRIVER - CIRCUIT INTERMITTENT
C15B1-11	REAR ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
C15B1-12	REAR ACCELERATION - CIRCUIT SHORT TO BATTERY
C15B1-76	REAR ACCELERATION SENSOR - WRONG MOUNTING POSITION
C15B2-11	LEFT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
C15B2-12	LEFT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
C15B2-76	LEFT FRONT ACCELERATION SENSOR - WRONG MOUNTING POSITION
C15B3-11	RIGHT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO GROUND
C15B3-12	RIGHT FRONT ACCELERATION SENSOR - CIRCUIT SHORT TO BATTERY
C15B3-76	RIGHT FRONT ACCELERATION SENSOR - WRONG MOUNTING POSITION
C15B4-04	LEFT FRONT DAMPING VALVE LOW SIDE 1 - SYSTEM INTERNAL FAILURES
C15B4-11	LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15B4-12	LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15B4-13	LEFT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15B5-08	LEFT FRONT DAMPING VALVE LOW SIDE 2 - BUS SIGNAL/MESSAGE FAILURES
C15B5-11	LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND
C15B5-12	LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY
C15B5-13	LEFT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN
C15B6-11	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15B6-12	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15B6-13	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN

DTC	Description
C15B7-11	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND
C15B7-12	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY
C15B7-13	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN
C15B8-11	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15B8-12	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15B8-13	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15B8-14	LEFT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND OR OPEN
C15B9-11	LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO GROUND
C15B9-12	LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT SHORT TO BATTERY
C15B9-13	LEFT REAR DAMPING VALVE LOW SIDE 2 - CIRCUIT OPEN
C15B9-18	LEFT REAR DAMPING VALVE LOW SIDE 2 - UNDER CURRENT
C15BA-11	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO GROUND
C15BA-12	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT SHORT TO BATTERY
C15BA-13	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT OPEN
C15BA-1C	RIGHT REAR DAMPING VALVE LOW SIDE 1 - CIRCUIT VOLTAGE OUT OF RANGE
C15BB-11	RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT SHORT TO GROUND
C15BB-12	RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT SHORT TO BATTERY
C15BB-13	RIGHT REAR DAMPING VALVE LOW SIDE 2-CIRCUIT OPEN
C15BC-11	LEFT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND
C15BC-12	LEFT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY
C15BD-11	RIGHT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND
C15BD-12	RIGHT FRONT ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY
C15BE-11	REAR ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO GROUND
C15BE-12	REAR ACCELERATION SENSOR SUPPLY - CIRCUIT SHORT TO BATTERY
C15C2-19	LEFT FRONT DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C3-19	LEFT FRONT DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C15C4-19	RIGHT FRONT DAMPING VALVE LOW SIDE 1 - OVERCURRENT

DTC	Description
C15C5-19	RIGHT FRONT DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C15C6-19	LEFT REAR DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C7-19	LEFT REAR DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C15C8-19	RIGHT REAR DAMPING VALVE LOW SIDE 1 - OVERCURRENT
C15C9-19	RIGHT REAR DAMPING VALVE LOW SIDE 2 - OVERCURRENT
C211B-92	IGNITION RUN/START INPUT CIRCUIT - PERFORMANCE OR INCORRECT OPERATION
C2129-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2129-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-16	SYSTEM VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD
C212A-17	SYSTEM VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212C-11	SUSPENSION VALVE POWER SUPPLY VOLTAGE - CIRCUIT SHORT TO GROUND
C212C-12	SUSPENSION VALVE POWER SUPPLY VOLTAGE - CIRCUIT SHORT TO BATTERY
C2202-00	ORIGINAL VIN MISMATCH / MISSING
C2206-00	VEHICLE CONFIGURATION MISMATCH
C220C-00	ACTIVE SUSPENSION MODULE INTERNAL
U0001-00	CAN C BUS
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0126-00	LOST COMMUNICATION WITH STEERING ANGLE SENSOR
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM

MODULE, ADAPTIVE CRUISE CONTROL (ACC)

DIAGNOSTIC CODE INDEX

DTC	Description
B222F-00	FLASH WRITE PERFORMANCE
C0063-9A	YAW RATE SENSOR - COMPONENT OR SYSTEM OPERATING CONDITIONS
C008E-00	ECU INTERNAL PERFORMANCE
C1240-00	STEERING ANGLE SENSOR ANGLE OVERTRAVEL PERFORMANCE
C127A-00	ESP DID NOT RESPOND TO DECELERATION REQUEST

DTC	Description
C14A3-00	XBW RULE VIOLATION
C14A4-00	SENSOR ADJUSTMENT REQUIRED
C14A5-00	SENSOR BLINDED
C15D8-00	MISMATCH TIRE SIZE
C2129-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2129-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
C212A-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
C2206-00	VEHICLE CONFIGURATION MISMATCH
C2210-00	ECU OVERTEMPERATURE
C2212-00	ECU IN - PLANT MODE ACTIVE
C2223-00	ECU CONFIGURATION MISMATCH
C2225-00	PCM DISABLED ECU
C2226-00	TCM DISABLED ECU
C2227-00	ABS DISABLED ECU
P0585-00	SPEED CONTROL SWITCH 1/2 CORRELATION
P1593-2A	SPEED CONTROL SWITCH 1/2 STUCK
P1666-00	CRUISE CONTROL MODULE INTERNAL
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0151-00	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0423-00	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM
U0452-00	IMPLAUSIBLE DATA RECEIVED FROM RESTRAINTS CONTROL MODULE
U110A-00	LOST COMMUNICATION WITH SCM - CAN-C
U11F9-00	ENGINE DID NOT RESPOND TO ACC TORQUE REQUEST
U121E-00	LOST COMMUNICATION WITH STEERING WHEEL CRUISE CONTROL SWITCH
U1600-00	ECU APPLICATION SOFTWARE MISMATCH

MODULE, ANTILOCK BRAKE (ABS)

DIAGNOSTIC CODE INDEX

DTC	Description
B1783-01	STOP LAMP CONTROL - GENERAL ELECTRICAL FAILURE
C0020-01	ABS PUMP MOTOR CONTROL - GENERAL ELECTRICAL FAILURE
C0020-16	ABS PUMP MOTOR CONTROL - CIRCUIT VOLTAGE BELOW THRESHOLD
C0020-1C	ABS PUMP MOTOR CONTROL - CIRCUIT VOLTAGE OUT OF RANGE
C0020-35	ABS PUMP MOTOR CONTROL - SIGNAL HIGH TIME>MAXIMUM
C0021-02	BRAKE BOOSTER - GENERAL SIGNAL FAILURE
C0030-02	LEFT FRONT TONE WHEEL - GENERAL SIGNAL FAILURE
C0031-1D	LEFT FRONT WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE
C0031-2F	LEFT FRONT WHEEL SPEED SENSOR - SIGNAL ERRATIC
C0031-4A	LEFT FRONT WHEEL SPEED SENSOR - INCORRECT COMPONENT INSTALLED
C0031-62	LEFT FRONT WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE
C0033-02	RIGHT FRONT TONE WHEEL - GENERAL SIGNAL FAILURE
C0034-1D	RIGHT FRONT WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE
C0034-2F	RIGHT FRONT WHEEL SPEED SENSOR - SIGNAL ERRATIC
C0034-4A	RIGHT FRONT WHEEL SPEED SENSOR - INCORRECT COMPONENT INSTALLED
C0034-62	RIGHT FRONT WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE
C0036-02	LEFT REAR TONE WHEEL - GENERAL SIGNAL FAILURE
C0037-1D	LEFT REAR WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE
C0037-2F	LEFT REAR WHEEL SPEED SENSOR - SIGNAL ERRATIC
C0037-4A	LEFT REAR WHEEL SPEED SENSOR - INCORRECT COMPONENT INSTALLED
C0037-62	LEFT REAR WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE
C0039-02	RIGHT REAR TONE WHEEL - GENERAL SIGNAL FAILURE
C003A-1D	RIGHT REAR WHEEL SPEED SENSOR - CIRCUIT CURRENT OUT OF RANGE
C003A-2F	RIGHT REAR WHEEL SPEED SENSOR - SIGNAL ERRATIC
C003A-4A	RIGHT REAR WHEEL SPEED SENSOR - INCORRECT COMPONENT INSTALLED
C003A-62	RIGHT REAR WHEEL SPEED SENSOR - SIGNAL COMPARE FAILURE
C0042-11	BRAKE PEDAL POSITION SENSOR - CIRCUIT SHORT TO GROUND
C0042-12	BRAKE PEDAL POSITION SENSOR - CIRCUIT SHORT TO BATTERY
C0042-28	BRAKE PEDAL POSITION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE
C0042-2A	BRAKE PEDAL POSITION SENSOR - STUCK
C0042-54	BRAKE PEDAL POSITION SENSOR - MISSING CALIBRATION
C0042-62	BRAKE PEDAL POSITION SENSOR - SIGNAL COMPARE FAILURE
C0044-01	BRAKE PRESSURE SENSOR 1 - GENERAL ELECTRICAL FAILURE

DTC	Description
C0044-28	BRAKE PRESSURE SENSOR 1 - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE
C0044-49	BRAKE PRESSURE 1 - INTERNAL ELECTRONIC FAILURE
C0044-62	BRAKE PRESSURE SENSOR 1 - SIGNAL COMPARE FAILURE
C0051-22	STEERING WHEEL POSITION SENSOR - SIGNAL AMPLITUDE > MAXIMUM
C0051-28	STEERING WHEEL POSITION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE
C0051-49	STEERING WHEEL POSITION SENSOR - INTERNAL ELECTRONIC FAILURE
C0051-62	STEERING WHEEL POSITION SENSOR - SIGNAL COMPARE FAILURE
C006A-28	MULTI-AXIS ACCELERATION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE
C006A-49	MULTI-AXIS ACCELERATION SENSOR - INTERNAL ELECTRONIC FAILURE
C006A-56	MULTI-AXIS ACCELERATION SENSOR- INVALID / INCOMPATIBLE CONFIGURATION
C006A-62	MULTI-AXIS ACCELERATION SENSOR - SIGNAL COMPARE FAILURE
C0078-86	TIRE DIAMETER - SIGNAL INVALID
C1046-92	LEFT FRONT WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION
C1047-92	RIGHT FRONT WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION
C1048-92	LEFT REAR WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION
C1049-92	RIGHT REAR WHEEL PRESSURE PHASE MONITORING - PERFORMANCE OR INCORRECT OPERATION
C1082-01	VACUUM PRESSURE SENSOR - GENERAL ELECTRICAL FAILURE
C1082-02	VACUUM PRESSURE SENSOR - GENERAL SIGNAL FAILURE
C1082-2F	VACUUM PRESSURE SENSOR - SIGNAL ERRATIC
C121A-09	STEERING ANGLE SENSOR NOT INITIALIZED - COMPONENT FAILURES
C121C-00	TORQUE REQUEST SIGNAL DENIED
C1239-00	EMISSION ROLLS TEST ACTIVE
C123B-4B	ESP SYSTEM CONTROL TOO LONG - OVER TEMPERATURE
C1246-1C	VACUUM PRESSURE SENSOR SUPPLY - CIRCUIT VOLTAGE OUT OF RANGE
C124F-00	ESP REQUEST DENIED FROM ACC
C1252-92	VACUUM PUMP CONTROL CIRCUIT - PERFORMANCE OR INCORRECT OPERATION
C2100-16	BATTERY VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD
C2101-17	BATTERY VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD

DTC	Description
C2114-16	DYNAMICS SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2114-17	DYNAMICS SENSOR SUPPLY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C211B-92	IGNITION RUN/START INPUT CIRCUIT - PERFORMANCE OR INCORRECT OPERATION
C212A-16	SYSTEM VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD
C212A-17	SYSTEM VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD
C2200-41	ANTI-LOCK BRAKE MODULE INTERNAL - GENERAL CHECKSUM FAILURE
C2200-44	ANTI-LOCK BRAKE MODULE INTERNAL - DATA MEMORY FAILURE
C2200-45	ANTI-LOCK BRAKE MODULE INTERNAL - PROGRAM MEMORY FAILURE
C2200-46	ANTI-LOCK BRAKE MODULE INTERNAL - CALIBRATION / PARAMETER MEMORY FAILURE
C2200-47	ANTI-LOCK BRAKE MODULE INTERNAL - WATCHDOG / SAFTEY AuC FAILURE
C2200-48	ANTI-LOCK BRAKE MODULE INTERNAL - SUPERVISION SOFTWARE FAILURE
C2200-49	ANTI-LOCK BRAKE MODULE INTERNAL - INTERNAL ELECTRONIC FAILURE
C2202-00	ORIGINAL VIN MISMATCH / MISSING
C2206-00	VEHICLE CONFIGURATION MISMATCH
C220B-00	ABS ACC NOT CALIBRATED
U0002-88	CAN C BUS OFF PERFORMANCE - BUS OFF
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0104-00	LOST COMMUNICATION WITH CRUISE CONTROL MODULE
U0125-00	LOST COMMUNICATION WITH DYNAMICS SENSOR
U0126-00	LOST COMMUNICATION WITH STEERING ANGLE SENSOR
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0405-00	INVALID DATA RECEIVED CRUISE CONTROL MODULE
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM
U0432-00	INVALID DATA RECEIVED FROM MULTI-AXIS ACCELERATION SENSOR MODULE
U1003-88	ESP CAN C BUS PERFORMANCE - BUS OFF
U140E-00	IMPLAUSIBLE VEHICLE CONFIGURATION DATA RECEIVED

MODULE, BODY CONTROL (BCM)

DIAGNOSTIC CODE INDEX

DTC	Description
B1208-11	ANTI-THEFT INDICATOR - CIRCUIT SHORT TO GROUND
B1208-15	ANTI-THEFT INDICATOR - CIRCUIT SHORT TO BATTERY OR OPEN
B1609-11	PANEL DIMMER INPUT - CIRCUIT SHORT TO GROUND
B1609-15	PANEL DIMMER INPUT - CIRCUIT SHORT TO BATTERY OR OPEN
B161E-11	READING LAMP CONTROL - CIRCUIT SHORT TO GROUND
B162A-11	LEFT LOW BEAM CONTROL - CIRCUIT SHORT TO GROUND - BASE
B162A-11	LEFT LOW BEAM CONTROL-CIRCUIT SHORT TO GROUND-PREMIUM
B162A-15	LEFT LOW BEAM CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN - BASE
B162A-15	LEFT LOW BEAM CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN-PREMIUM
B162E-11	RIGHT LOW BEAM CONTROL - CIRCUIT SHORT TO GROUND - BASE
B162E-11	RIGHT LOW BEAM CONTROL - CIRCUIT SHORT TO GROUND-PREMIUM
B162E-15	RIGHT LOW BEAM CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN - BASE
B162E-15	RIGHT LOW BEAM CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN-PREMIUM
B1632-11	LEFT HIGH BEAM CONTROL - CIRCUIT SHORT TO GROUND
B1632-15	LEFT HIGH BEAM CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1636-11	RIGHT HIGH BEAM CONTROL - CIRCUIT SHORT TO GROUND
B1636-15	RIGHT HIGH BEAM CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B163A-11	FRONT LEFT TURN LAMP CONTROL - CIRCUIT SHORT TO GROUND
B163A-15	FRONT LEFT TURN LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B163E-11	FRONT RIGHT TURN LAMP CONTROL - CIRCUIT SHORT TO GROUND
B163E-15	FRONT RIGHT TURN LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1642-11	REAR LEFT TURN LAMP CONTROL-CIRCUIT SHORT TO GROUND
B1642-15	REAR LEFT TURN LAMP CONTROL-CIRCUIT SHORT TO BATTERY OR OPEN
B1646-11	REAR RIGHT TURN LAMP CONTROL-CIRCUIT SHORT TO GROUND
B1646-15	REAR RIGHT TURN LAMP CONTROL-CIRCUIT SHORT TO BATTERY OR OPEN
B165C-11	RIGHT SIGNATURE LAMP CONTROL-CIRCUIT SHORT TO GROUND
B165C-15	RIGHT SIGNATURE LAMP CONTROL-CIRCUIT SHORT TO BATTERY OR OPEN
B165D-11	LEFT SIGNATURE LAMP CONTROL-CIRCUIT SHORT TO GROUND
B165D-15	LEFT SIGNATURE LAMP CONTROL-CIRCUIT SHORT TO BATTERY OR OPEN
B168E-2A	FRONT FOG LAMP SWITCH - STUCK
B16AB-11	TRUNK LAMP CONTROL - CIRCUIT SHORT TO GROUND

DTC	Description
B16AB-15	TRUNK LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16B7-11	CENTER STOP LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16B7-15	CENTER STOP LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16BF-11	FRONT LEFT SIDEMARKER LAMP CONTROL-CIRCUIT SHORT TO GROUND
B16C3-11	FRONT RIGHT SIDEMARKER LAMP CONTROL-CIRCUIT SHORT TO GROUND
B16DF-11	RIGHT TAILLAMP 1 CONTROL - CIRCUIT SHORT TO GROUND
B16DF-15	RIGHT TAILLAMP 1 CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16E7-11	LICENSE PLATE LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16E7-15	LICENSE PLATE LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16F7-11	FRONT LEFT FOG LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16F7-15	FRONT LEFT FOG LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B16FB-11	FRONT RIGHT FOG LAMP CONTROL - CIRCUIT SHORT TO GROUND
B16FB-15	FRONT RIGHT FOG LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1707-11	LEFT REVERSE LAMP CONTROL - CIRCUIT SHORT TO GROUND
B1707-15	LEFT REVERSE LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B170B-11	RIGHT REVERSE LAMP CONTROL - CIRCUIT SHORT TO GROUND
B170B-15	RIGHT REVERSE LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1751-11	COURTESY LAMP CONTROL-CIRCUIT SHORT TO GROUND
B177A-11	LEFT FRONT LAMP DIAGNOSTIC LINE - CIRCUIT SHORT TO GROUND
B177B-11	RIGHT FRONT LAMP DIAGNOSTIC LINE - CIRCUIT SHORT TO GROUND
B178E-11	HEADLAMP SWITCH INPUT - CIRCUIT SHORT TO GROUND
B178E-15	HEADLAMP SWITCH INPUT - CIRCUIT SHORT TO BATTERY OR OPEN
B1792-11	LEFT REAR LAMP DIAGNOSTIC LINE - CIRCUIT SHORT TO GROUND
B1793-11	RIGHT REAR LAMP DIAGNOSTIC LINE - CIRCUIT SHORT TO GROUND
B17A5-11	HALO LAMPS CONTROL - CIRCUIT SHORT TO GROUND
B17F3-00	AUTO HIGH BEAM SYSTEM AIM
B17FB-00	AUTO HIGH BEAM CAMERA VIEW BLOCKED
B17FF-11	AMBIENT CABIN LIGHT DIMMER SWITCH - CIRCUIT SHORT TO GROUND
B17FF-15	AMBIENT CABIN LIGHT DIMMER SWITCH - CIRCUIT SHORT TO BATTERY OR OPEN
B180F-11	DRIVER DOOR AJAR - CIRCUIT SHORT TO GROUND
B180F-15	DRIVER DOOR AJAR - CIRCUIT SHORT TO BATTERY OR OPEN
B1812-11	PASSENGER DOOR AJAR - CIRCUIT SHORTED TO GROUND
B1812-15	PASSENGER DOOR AJAR - CIRCUIT SHORTED TO BATTERY OR OPEN

DTC	Description
B181E-13	HOOD AJAR INPUT - CIRCUIT OPEN
B1825-11	TRUNK RELEASE SWITCH INPUT-CIRCUIT SHORT TO GROUND
B1825-2A	TRUNK RELEASE SWITCH INPUT-STUCK
B182C-11	ALL DOOR LOCK CONTROL - CIRCUIT SHORT TO GROUND
B182C-12	ALL DOOR LOCK CONTROL-CIRCUIT SHORT TO BATTERY
B182C-13	ALL DOOR LOCK CONTROL - CIRCUIT OPEN
B1830-11	ALL DOORS UNLOCK CONTROL-CIRCUIT SHORT TO GROUND
B1830-12	ALL DOORS UNLOCK CONTROL-CIRCUIT SHORT TO BATTERY
B2103-11	IGNITION RUN/START 1 CONTROL - CIRCUIT SHORT TO GROUND
B2103-15	IGNITION RUN/START 1 CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2119-11	IGNITION RUN/ACC/SPAD CONTROL - CIRCUIT SHORT TO GROUND
B2119-15	IGNITION RUN/ACC/SPAD CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2121-11	IGNITION RUN CONTROL 1 - CIRCUIT SHORT TO GROUND
B2121-15	IGNITION RUN CONTROL 1 - CIRCUIT SHORT TO BATTERY OR OPEN
B212E-11	IGNITION RUN/ACC CONTROL - CIRCUIT SHORT TO GROUND
B212E-15	IGNITION RUN/ACC CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2143-11	UGDO ENABLE CONTROL-CIRCUIT SHORT TO GROUND
B2193-00	INTELLIGENT BATTERY SENSOR INTERNAL
B2199-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21F7-11	ELECTRONIC SHIFTER POWER SUPPLY - CIRCUIT SHORT TO GROUND
B21F8-13	EXTERIOR LIGHTING POWER SUPPLY INPUT 1 - CIRCUIT OPEN
B21F9-13	EXTERIOR LIGHTING POWER SUPPLY INPUT 2 - CIRCUIT OPEN
B2206-00	CURRENT VIN MISSING / MISMATCH
B2216-00	CENTRAL GATEWAY INTERNAL
B221D-00	RAIN SENSOR MODULE (RSM) INTERNAL
B222C-00	VEHICLE CONFIGURATION NOT PROGRAMMED
B223A-00	AUTO HIGH BEAM ECU INTERNAL
B225C-00	COMPASS MODULE INTERNAL
B2267-00	INTERIOR REAR VIEW MIRROR MODULE INTERNAL-
B2303-11	WIPER PARK SWITCH INPUT - CIRCUIT SHORT TO GROUND
B2303-13	WIPER PARK SWITCH INPUT - CIRCUIT OPEN
B2312-11	WIPER ON/OFF CONTROL - CIRCUIT SHORT TO GROUND
B2312-15	WIPER ON/OFF CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2316-11	WIPER HIGH/LOW CONTROL - CIRCUIT SHORT TO GROUND
B2316-15	WIPER HIGH/LOW CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2335-11	HORN CONTROL - CIRCUIT SHORT TO GROUND
B2335-15	HORN CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN

DTC	Description
B233D-11	FRONT/REAR WASHER MOTOR (+) CONTROL - CIRCUIT SHORT TO GROUND
B23AA-00	IMPLAUSIBLE DATA RECEIVED FROM RAIN SENSOR
B259F-11	TRUNK/LIFTGATE LOCK CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B25B5-11	EXTERNAL TRUNK SWITCH-CIRCUIT SHORT TO GROUND
B25B5-2A	EXTERNAL TRUNK SWITCH-STUCK
C1006-13	BRAKE FLUID LEVEL INPUT - CIRCUIT OPEN
P0070-11	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT - CIRCUIT SHORT TO GROUND
P0070-15	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT - CIRCUIT SHORT TO BATTERY OR OPEN
P0460-11	FUEL LEVEL SENSOR 1-CIRCUIT SHORT TO GROUND-NON SRT
P0460-11	FUEL LEVEL SENSOR 1-CIRCUIT SHORT TO GROUND-SRT
P0460-11	FUEL LEVEL SENSOR 1-CIRCUIT SHORT TO GROUND-NON SRT
P0460-15	FUEL LEVEL SENSOR 1-CIRCUIT SHORT TO BATTERY OR OPEN-SRT
P1009-00	HUMIDITY SENSOR MODULE
P1276-11	STARTER CONTROL 2 - CIRCUIT SHORT TO GROUND
P2065-11	FUEL LEVEL SENSOR 2-CIRCUIT SHORT TO GROUND-NON SRT
P2065-11	FUEL LEVEL SENSOR 2-CIRCUIT SHORT TO GROUND-SRT
P2065-15	FUEL LEVEL SENSOR 2-CIRCUIT SHORT TO BATTERY OR OPEN-NON SRT
P2065-15	FUEL LEVEL SENSOR 2-CIRCUIT SHORT TO BATTERY OR OPEN-SRT
U0002-00	CAN C BUS OFF PERFORMANCE
U0010-00	CAN INTERIOR BUS
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0139-00	LOST COMMUNICATION WITH ACTIVE DAMPING CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN
U0164-00	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0199-00	LOST COMMUNICATION WITH DRIVER DOOR MODULE
U0200-00	LOST COMMUNICATION WITH PASSENGER DOOR MODULE
U0212-00	LOST COMMUNICATION WITH SCM
U0213-00	LOST COMMUNICATION WITH INTERIOR MIRROR CONTROL MODULE
U0231-00	LOST COMMUNICATION WITH LIGHT RAIN SENSING MODULE
U0232-00	LOST COMMUNICATION WITH BLIND SPOT DETECTION MODULE
U0241-00	LOST COMMUNICATION WITH AUTO HIGHBEAM HEADLAMP CONTROL MODULE
U0264-00	LOST COMMUNICATION WITH CAMERA MODULE - REAR

DTC	Description
U1008-00	LIN 1 BUS
U1009-00	LIN 2 BUS
U1045-00	LIN 3 BUS
U112D-00	LOST COMMUNICATION WITH EVIC STEERING WHEEL SWITCHES
U113E-00	LOST COMMUNICATION WITH INTELLIGENT BATTERY SENSOR
U1190-00	LOST COMMUNICATION WITH HUMIDITY SENSOR
U11B9-00	LOST COMMUNICATION WITH RF HUB
U1433-23	IMPLAUSIBLE IGNITION SWITCH STATUS MESSAGE RECEIVED-SIGNAL STUCK LOW
U1433-24	IMPLAUSIBLE IGNITION SWITCH STATUS MESSAGE RECEIVED-SIGNAL STUCK HIGH

MODULE, INTEGRATED CENTER STACK/SCREEN

DIAGNOSTIC CODE INDEX

DTC	Description
B156E-96	INTEGRATED CENTER STACK (ICS)-COMPONENT INTERNAL FAILURE
B157F-2A	INTEGRATED CENTER STACK BUTTON-STUCK
B210D-16	BATTERY VOLTAGE LOW - CIRCUIT VOLTAGE BELOW THRESHOLD
B210E-17	BATTERY VOLTAGE HIGH - CIRCUIT VOLTAGE ABOVE THRESHOLD
U0010-00	CAN INTERIOR BUS
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0164-00	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0184-00	LOST COMMUNICATION WITH RADIO

MODULE, DRIVER DOOR (DDM), (DMFL/R)

DIAGNOSTIC CODE INDEX

DTC	Description
B1751-11	COURTESY LAMP CONTROL - CIRCUIT SHORT TO GROUND
B1751-15	COURTESY LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B18B5-00	MASTER SWITCH - FRONT LEFT WINDOW SWITCH - STUCK
B18B6-00	MASTER SWITCH - FRONT RIGHT WINDOW SWITCH - STUCK
B18BA-11	WINDOW CONTROL - CIRCUIT SHORT TO GROUND
B18BA-12	WINDOW CONTROL - CIRCUIT SHORT TO BATTERY
B18BA-13	WINDOW CONTROL - CIRCUIT OPEN
B18BA-4B	WINDOW CONTROL - OVER TEMPERATURE
B1D04-2A	MIRROR ADJUST SWITCH INPUT - STUCK
B1DD0-11	MIRROR HEATER CONTROL - CIRCUIT SHORT TO GROUND
B1DD0-15	MIRROR HEATER CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1E64-00	LEFT MIRROR SELECT SWITCH - STUCK

DTC	Description
B1E65-00	RIGHT MIRROR SELECT SWITCH - STUCK
B1F02-11	MIRROR VERTICAL MOTOR CONTROL - CIRCUIT SHORT TO GROUND
B1F02-12	MIRROR VERTICAL MOTOR CONTROL - CIRCUIT SHORT TO BATTERY
B1F02-13	MIRROR VERTICAL MOTOR CONTROL - CIRCUIT OPEN
B1F03-11	MIRROR HORIZONTAL MOTOR CONTROL - CIRCUIT SHORT TO GROUND
B1F03-12	MIRROR HORIZONTAL MOTOR CONTROL - CIRCUIT SHORT TO BATTERY
B1F03-13	MIRROR HORIZONTAL MOTOR CONTROL - CIRCUIT OPEN
B210C-16	BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE BELOW THRESHOLD
B210C-17	BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL VOLTAGE ABOVE ALLOWABLE RANGE
B224F-54	DOOR MODULE INTERNAL - MISSING CALIBRATION
B224F-96	DOOR MODULE INTERNAL - COMPONENT INTERNAL FAILURE
B25AF-2A	DOOR LOCK/UNLOCK SWITCH - STUCK
B25B0-31	WINDOW POSITION SENSOR - NO SIGNAL
B25B1-11	WINDOW POSITION SENSOR POWER SUPPLY - CIRCUIT SHORT TO GROUND
B25B4-2A	PAWL SWITCH STUCK
B285F-11	BLIND SPOT WARNING LIGHT CONTROL - CIRCUIT SHORT TO GROUND
B285F-15	BLIND SPOT WARNING LIGHT CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2860-11	DOOR AMBIENT LIGHT CONTROL - CIRCUIT SHORT TO GROUND
B2860-15	DOOR AMBIENT LIGHT CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
U0010-00	CAN INTERIOR BUS
U0018-00	CAN INTERIOR BUS (-) SHORTED TO BUS (+)
U0037-11	LIN BUS - CIRCUIT SHORT TO GROUND
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0164-00	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0232-00	LOST COMMUNICATION WITH BLIND SPOT DETECTION MODULE
U113D-00	LOST COMMUNICATION WITH MASTER POWER WINDOW SWITCH

MODULE, ELECTRIC POWER STEERING (EPS)

DIAGNOSTIC CODE INDEX

DTC	Description
C15C1-00	EPS MECHANICAL PERFORMANCE
C15DB-00	EPS DISABLED
C2129-16	BATTERY VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
C2129-17	BATTERY VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD

DTC	Description
C212A-84	SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE
C212A-85	SYSTEM VOLTAGE-SIGNAL ABOVE ALLOWABLE RANGE
C2206-00	VEHICLE CONFIGURATION MISMATCH
C2210-00	ECU OVERTEMPERATURE
C2217-00	ELECTRIC POWER STEERING MODULE INTERNAL
C2219-00	ECU UNABLE TO CONFIGURE/CONFIGURATION NOT LEARNED
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0212-00	LOST COMMUNICATION WITH SCM
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0415-00	IMPAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U1215-00	LOST COMMUNICATION WITH FORWARD FACING CAMERA
U1415-00	IMPLAUSIBLE/MISSING VEHICLE CONFIGURATION DATA
U1447-00	IMPLAUSIBLE DATA RECEIVED FROM SCM
U148D-00	IMPLAUSIBLE DATA RECEIVED FROM FORWARD FACING CAMERA
U1601-00	ECU APPLICATION SOFTWARE CODE 1 MISSING OR CORRUPTED

MODULE, ELECTRONIC SHIFT (ESM), 8HP45/845RE

DIAGNOSTIC CODE INDEX

DTC	Description
P0607-00	ECU INTERNAL PERFORMANCE - ESM
P0814-00	TRANSMISSION RANGE DISPLAY CIRCUIT
P0820-00	GEAR LEVER X-Y POSITION SENSOR CIRCUIT
P0930-00	BTSI CONTROL CIRCUIT LOW
P0931-00	BTSI CONTROL CIRCUIT HIGH
P1C86-14	PRNDL DISPLAY-CIRCUIT SHORT TO GROUND OR OPEN
P1C8B-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
P1C8B-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
P1C8C-16	SYSTEM VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
P1C8C-17	SYSTEM VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
U0002-88	CAN C BUS OFF PERFORMANCE-BUS OFF
U0074-00	DEDICATED POWERTRAIN (D-PT) CAN BUS OFF
U0101-08	LOST COMMUNICATION WITH TCM-BUS SIGNAL / MESSAGE FAILURES

DTC	Description
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U11C3-00	ESM LOST COMMUNICATION WITH TCM ON D-PT CAN
U145D-00	IMPLAUSIBLE DATA RECEIVED FROM TCM ON D-PT

MODULE, ELECTRONIC SHIFT (ESM), 8HP70

DIAGNOSTIC CODE INDEX

DTC	Description
P0607-00	ECU INTERNAL PERFORMANCE - ESM
P0814-00	TRANSMISSION RANGE DISPLAY CIRCUIT
P0820-00	GEAR LEVER XY POSITION SENSOR CIRCUIT
P0930-00	BTSI CONTROL CIRCUIT LOW
P0931-00	BTSI CONTROL CIRCUIT HIGH
P1C86-14	PRNDL DISPLAY CIRCUIT SHORT TO GROUND OR OPEN
P1C8B-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
P1C8B-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
P1C8C-16	SYSTEM VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
P1C8C-17	SYSTEM VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
U0002-88	CAN C BUS OFF PERFORMANCE-BUS OFF
U0074-00	DEDICATED POWERTRAIN (D-PT) CAN BUS OFF
U0101-08	LOST COMMUNICATION WITH TCM-BUS SIGNAL / MESSAGE FAILURES
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U11C3-00	ESM LOST COMMUNICATION WITH TCM ON D-PT CAN
U145D-00	IMPLAUSIBLE DATA RECEIVED FROM TCM ON D-PT

MODULE, ELECTRONIC SHIFT (ESM), 8HP90

DIAGNOSTIC CODE INDEX

DTC	Description
P0607-00	ECU INTERNAL PERFORMANCE - ESM
P0814-00	TRANSMISSION RANGE DISPLAY CIRCUIT
P0820-00	GEAR LEVER XY POSITION SENSOR CIRCUIT
P0930-00	BTSI CONTROL CIRCUIT LOW
P0931-00	BTSI CONTROL CIRCUIT HIGH
P1C86-14	PRNDL DISPLAY CIRCUIT SHORT TO GROUND OR OPEN
P1C8B-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD

DTC	Description
P1C8B-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
P1C8C-16	SYSTEM VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
P1C8C-17	SYSTEM VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
U0002-88	CAN C BUS OFF PERFORMANCE-BUS OFF
U0074-00	DEDICATED POWERTRAIN (D-PT) CAN BUS OFF
U0101-08	LOST COMMUNICATION WITH TCM-BUS SIGNAL / MESSAGE FAILURES
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U11C3-00	ESM LOST COMMUNICATION WITH TCM ON D-PT CAN
U145D-00	IMPLAUSIBLE DATA RECEIVED FROM TCM ON D-PT

MODULE, HEATED SEAT (HSM)

DIAGNOSTIC CODE INDEX

DTC	Description
B10C4-11	HEATED STEERING WHEEL CONTROL - CIRCUIT SHORT TO GROUND
B10C4-12	HEATED STEERING WHEEL CONTROL - CIRCUIT SHORT TO BATTERY
B10C4-13	HEATED STEERING WHEEL CONTROL - CIRCUIT OPEN
B11C1-13	STEERING WHEEL HEATER POWER SUPPLY - CIRCUIT OPEN
B1E99-11	FRONT LEFT HEATER CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B1E99-12	FRONT LEFT HEATER CONTROL CIRCUIT - CIRCUIT SHORT TO BATTERY
B1E99-13	FRONT LEFT HEATER CONTROL CIRCUIT - CIRCUIT OPEN
B1E99-1E	FRONT LEFT HEATER CONTROL CIRCUIT - CIRCUIT RESISTANCE OUT OF RANGE
B1E9A-11	FRONT RIGHT HEATER CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B1E9A-12	FRONT RIGHT HEATER CONTROL CIRCUIT - CIRCUIT SHORT TO BATTERY
B1E9A-13	FRONT RIGHT HEATER CONTROL CIRCUIT - CIRCUIT OPEN
B1E9A-1E	FRONT RIGHT HEATER CONTROL CIRCUIT - CIRCUIT RESISTANCE OUT OF RANGE
B1E9D-11	FRONT LEFT VENT CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B1E9D-12	FRONT LEFT VENT CONTROL CIRCUIT - CIRCUIT SHORT TO BATTERY
B1E9E-11	FRONT RIGHT VENT CONTROL CIRCUIT - CIRCUIT SHORT TO GROUND
B1E9E-12	FRONT RIGHT VENT CONTROL CIRCUIT - CIRCUIT SHORT TO BATTERY
B1EB1-1A	FRONT LEFT SEAT HEATER SENSOR - CIRCUIT RESISTANCE BELOW THRESHOLD
B1EB1-1B	FRONT LEFT SEAT HEATER SENSOR - CIRCUIT RESISTANCE ABOVE THRESHOLD

DTC	Description
B1EB2-1A	FRONT RIGHT SEAT HEATER SENSOR - CIRCUIT RESISTANCE BELOW THRESHOLD
B1EB2-1B	FRONT RIGHT SEAT HEATER SENSOR - CIRCUIT RESISTANCE ABOVE THRESHOLD
B210C-17	BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE ABOVE THRESHOLD
B210C-18	BATTERY VOLTAGE INPUT - UNDER CURRENT
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
B221A-00	(HSM) HEATED SEAT MODULE INTERNAL
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U1446-00	IMPLAUSIBLE HEATED STEERING WHEEL TEMPERATURE MESSAGE RECEIVED

MODULE, MEMORY SEAT, DRIVER (MSMD)

DIAGNOSTIC CODE INDEX

DTC	Description
B1D5E-13	POWER SEAT SWITCH - CIRCUIT OPEN
B1D62-2A	POWER SEAT SWITCH STUCK-STUCK
B1D6B-11	SEAT HORIZONTAL POSITION SENSOR - CIRCUIT SHORT TO GROUND
B1D6B-12	SEAT HORIZONTAL POSITION SENSOR - CIRCUIT SHORT TO BATTERY
B1D6F-11	SEAT FRONT VERTICAL POSITION SENSOR - CIRCUIT SHORT TO GROUND
B1D6F-12	SEAT FRONT VERTICAL POSITION SENSOR - CIRCUIT SHORT TO BATTERY
B1D73-11	SEAT REAR VERTICAL POSITION SENSOR - CIRCUIT SHORT TO GROUND
B1D73-12	SEAT REAR VERTICAL POSITION SENSOR - CIRCUIT SHORT TO BATTERY
B1D7B-00	SEAT HORIZONTAL MOTOR CONTROL CIRCUIT PERFORMANCE
B1D7F-00	SEAT FRONT VERTICAL MOTOR CONTROL CIRCUIT PERFORMANCE
B1D83-00	SEAT REAR VERTICAL MOTOR CONTROL CIRCUIT PERFORMANCE
B1D8B-11	STEERING COLUMN TELESCOPE POSITION SENSOR-CIRCUIT SHORT TO GROUND
B1D8B-12	STEERING COLUMN TELESCOPE POSITION SENSOR-CIRCUIT SHORT TO BATTERY
B1D8F-11	STEERING COLUMN TILT POSITION SENSOR-CIRCUIT SHORT TO GROUND
B1D8F-12	STEERING COLUMN TILT POSITION SENSOR-CIRCUIT SHORT TO BATTERY
B1D93-00	STEERING COLUMN TELESCOPE MOTOR CONTROL CIRCUIT PERFORMANCE
B1D97-00	STEERING COLUMN TILT MOTOR CONTROL CIRCUIT PERFORMANCE

DTC	Description
B1D9B-54	SEAT HORIZONTAL FRONT STOP NOT LEARNED-MISSING CALIBRATION
B210A-84	SYSTEM VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE
B210B-85	SYSTEM VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE
B210D-21	BATTERY VOLTAGE LOW - SIGNAL AMPLITUDE < MINIMUM
B210E-22	BATTERY VOLTAGE HIGH - SIGNAL AMPLITUDE > MAXIMUM
B221C-42	(MSM) MEMORY SEAT MODULE INTERNAL-GENERAL MEMORY FAILURE
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0013-00	CAN INTERIOR BUS (+) CIRCUIT LOW
U0014-00	CAN INTERIOR BUS (+) CIRCUIT HIGH
U0016-00	CAN INTERIOR BUS (-) CIRCUIT LOW
U0017-00	CAN INTERIOR BUS (-) CIRCUIT HIGH
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0199-00	LOST COMMUNICATION WITH DRIVER DOOR MODULE

MODULE, PARK ASSIST (PTS/PAM)

DIAGNOSTIC CODE INDEX

DTC	Description
B1295-12	PTS SENSOR 8-CIRCUIT SHORT TO BATTERY
B1295-14	PTS-SENSOR-8-CIRCUIT-SHORT-TO-GROUND OR OPEN
B1295-25	PTS SENSOR 8-SIGNAL SHAPE / WAVEFORM FAILURE
B1295-92	PTS SENSOR 8-PERFORMANCE OR INCORRECT OPERATION
B1296-12	PTS SENSOR 9-CIRCUIT SHORT TO BATTERY
B1296-14	PTS SENSOR 9-CIRCUIT SHORT TO GROUND OR OPEN
B1296-25	PTS SENSOR 9-SIGNAL SHAPE / WAVEFORM FAILURE
B1296-92	PTS SENSOR 9-PERFORMANCE OR INCORRECT OPERATION
B1297-12	PTS SENSOR 10-CIRCUIT SHORT TO BATTERY
B1297-14	PTS SENSOR 10-CIRCUIT SHORT TO GROUND OR OPEN
B1297-25	PTS SENSOR 10-SIGNAL SHAPE / WAVEFORM FAILURE
B1297-92	PTS SENSOR 10-PERFORMANCE OR INCORRECT OPERATION
B1298-12	PTS SENSOR 11-CIRCUIT SHORT TO BATTERY
B1298-14	PTS SENSOR 11-CIRCUIT SHORT TO GROUND OR OPEN
B1298-25	PTS SENSOR 11-SIGNAL SHAPE / WAVEFORM FAILURE
B1298-92	PTS SENSOR 11-PERFORMANCE OR INCORRECT OPERATION
B212B-11	REAR SENSORS POWER SUPPLY-CIRCUIT SHORT TO GROUND
B2199-16	BATTERY VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE-SIGNAL ABOVE ALLOWABLE RANGE
B222A-00	VEHICLE LINE MISMATCH

DTC	Description
B2232-00	(PTS) PARKTRONICS INTERNAL
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0423-00	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN

MODULE, PASSENGER DOOR (PDM), (DMFL/R)

DIAGNOSTIC CODE INDEX

DTC	Description
B1751-11	COURTESY LAMP CONTROL - CIRCUIT SHORT TO GROUND
B1751-15	COURTESY LAMP CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B18BA-11	WINDOW CONTROL - CIRCUIT SHORT TO GROUND
B18BA-12	WINDOW CONTROL - CIRCUIT SHORT TO BATTERY
B18BA-13	WINDOW CONTROL - CIRCUIT OPEN
B18BA-4B	WINDOW CONTROL - OVER TEMPERATURE
B18E6-2A	WINDOW SWITCH - STUCK
B1DD0-11	MIRROR HEATER CONTROL - CIRCUIT SHORT TO GROUND
B1DD0-15	MIRROR HEATER CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B1F02-11	MIRROR VERTICAL MOTOR CONTROL - CIRCUIT SHORT TO GROUND
B1F02-12	MIRROR VERTICAL MOTOR CONTROL - CIRCUIT SHORT TO BATTERY
B1F02-13	MIRROR VERTICAL MOTOR CONTROL - CIRCUIT OPEN
B1F03-11	MIRROR HORIZONTAL MOTOR CONTROL - CIRCUIT SHORT TO GROUND
B1F03-12	MIRROR HORIZONTAL MOTOR CONTROL - CIRCUIT SHORT TO BATTERY
B1F03-13	MIRROR HORIZONTAL MOTOR CONTROL - CIRCUIT OPEN
B210C-16	BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE BELOW THRESHOLD
B210C-17	BATTERY VOLTAGE INPUT - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
B224F-54	DOOR MODULE INTERNAL - MISSING CALIBRATION
B224F-96	DOOR MODULE INTERNAL - COMPONENT INTERNAL FAILURE
B25AF-2A	DOOR LOCK/UNLOCK SWITCH - STUCK

DTC	Description
B25B0-31	WINDOW POSITION SENSOR - NO SIGNAL
B25B1-11	WINDOW POSITION SENSOR POWER SUPPLY - CIRCUIT SHORT TO GROUND
B25B4-2A	PAWL SWITCH STUCK
B285E-11	WINDOW SWITCH BACKLIGHTING - CIRCUIT SHORT TO GROUND
B285F-11	BLIND SPOT WARNING LIGHT CONTROL - CIRCUIT SHORT TO GROUND-PASS
B285F-15	BLIND SPOT WARNING LIGHT CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
B2860-11	DOOR AMBIENT LIGHT CONTROL - CIRCUIT SHORT TO GROUND
B2860-15	DOOR AMBIENT LIGHT CONTROL - CIRCUIT SHORT TO BATTERY OR OPEN
U0010-00	CAN INTERIOR BUS
U0018-00	CAN INTERIOR BUS (-) SHORTED TO BUS (+)
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0164-00	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0199-00	LOST COMMUNICATION WITH DRIVER DOOR MODULE
U0232-00	LOST COMMUNICATION WITH BLIND SPOT DETECTION MODULE

MODULE, POWERTRAIN CONTROL (PCM), 3.6L

DIAGNOSTIC CODE INDEX

DTC	Description
P000A	BANK 1 CAMSHAFT 1 POSITION SLOW RESPONSE
P000B	BANK 1 CAMSHAFT 2 POSITION SLOW RESPONSE
P000C	BANK 2 CAMSHAFT 1 POSITION SLOW RESPONSE
P000D	BANK 2 CAMSHAFT 2 POSITION SLOW RESPONSE
P0010	BANK 1 CAMSHAFT 1 POSITION ACTUATOR CIRCUIT OPEN
P0013	BANK 1 CAMSHAFT 2 POSITION ACTUATOR CIRCUIT OPEN
P0016	CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT - BANK 1 SENSOR 1
P0017	CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT - BANK 1 SENSOR 2
P0018	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR 1
P0019	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION BANK 2 SENSOR 2
P0020	BANK 2 CAMSHAFT 1 POSITION ACTUATOR CIRCUIT OPEN
P0023	BANK 2 CAMSHAFT 2 POSITION ACTUATOR CIRCUIT OPEN
P0031	O2 SENSOR 1/1 HEATER CIRCUIT LOW
P0032	O2 SENSOR 1/1 HEATER CIRCUIT HIGH
P0037	O2 SENSOR 1/2 HEATER CIRCUIT LOW
P0038	O2-SENSOR 1/2 HEATER CIRCUIT HIGH
P0051	O2-SENSOR 2/1 HEATER CIRCUIT LOW

DTC	Description
P0052	O2-SENSOR 2/1 HEATER CIRCUIT HIGH
P0057	O2 SENSOR 2/2 HEATER CIRCUIT LOW
P0058	O2-SENSOR 2/2 HEATER CIRCUIT HIGH
P0071	AMBIENT AIR TEMPERATURE SENSOR PERFORMANCE
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT LOW
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0107	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT LOW
P0108	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT HIGH
P0111	INTAKE AIR TEMPERATURE SENSOR 1 PERFORMANCE
P0112	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW
P0113	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH
P0116	ENGINE COOLANT TEMPERATURE SENSOR 1 PERFORMANCE
P0117	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW
P0118	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT HIGH
P0121	THROTTLE POSITION SENSOR 1 PERFORMANCE
P0122	THROTTLE POSITION SENSOR 1 CIRCUIT LOW
P0123	THROTTLE POSITION SENSOR 1 CIRCUIT HIGH
P0125	INSUFFICIENT COOLANT TEMP FOR CLOSED-LOOP FUEL CONTROL
P0128	THERMOSTAT RATIONALITY
P0129	BAROMETRIC PRESSURE OUT OF RANGE LOW
P0131	O2 SENSOR 1/1 CIRCUIT LOW
P0132	O2 SENSOR 1/1 CIRCUIT HIGH
P0133	O2 SENSOR 1/1 SLOW RESPONSE
P0135	O2 SENSOR 1/1 HEATER PERFORMANCE
P0137	O2 SENSOR 1/2 CIRCUIT LOW
P0138	O2 SENSOR 1/2 CIRCUIT HIGH
P0139	O2 SENSOR 1/2 SLOW RESPONSE
P0140	O2 SENSOR 1/2 NO ACTIVITY DETECTED
P0141	O2 SENSOR 1/2 HEATER PERFORMANCE
P0151	O2 SENSOR 2/1 CIRCUIT LOW
P0152	O2 SENSOR 2/1 CIRCUIT HIGH
P0153	O2 SENSOR 2/1 SLOW RESPONSE
P0155	O2 SENSOR 2/1 HEATER PERFORMANCE
P0157	O2 SENSOR 2/2 CIRCUIT LOW
P0158	O2 SENSOR 2/2 CIRCUIT HIGH
P0159	O2 SENSOR 2/2 SLOW RESPONSE
P0160	O2 SENSOR 2/2 NO ACTIVITY DETECTED
P0161	O2 SENSOR 2/2 HEATER PERFORMANCE
P0171	FUEL SYSTEM 1/1 LEAN
P0172	FUEL SYSTEM 1/1 RICH
P0174	FUEL SYSTEM 2/1 LEAN

DTC	Description
P0175	FUEL SYSTEM 2/1 RICH
P0196	ENGINE OIL TEMPERATURE SENSOR CIRCUIT PERFORMANCE
P0197	ENGINE OIL TEMPERATURE SENSOR CIRCUIT LOW
P0198	ENGINE OIL TEMPERATURE SENSOR CIRCUIT HIGH
P0201	FUEL INJECTOR 1 CIRCUIT
P0202	FUEL INJECTOR 2 CIRCUIT
P0203	FUEL INJECTOR 3 CIRCUIT
P0204	FUEL INJECTOR 4 CIRCUIT
P0205	FUEL INJECTOR 5 CIRCUIT
P0206	FUEL INJECTOR 6 CIRCUIT
P0221	THROTTLE POSITION SENSOR 2 PERFORMANCE
P0222	THROTTLE POSITION SENSOR 2 CIRCUIT LOW
P0223	THROTTLE POSITION SENSOR 2 CIRCUIT HIGH
P0298	ENGINE OIL TEMPERATURE TOO HIGH
P0300	MULTIPLE CYLINDER MISFIRE
P0301	CYLINDER 1 MISFIRE
P0302	CYLINDER 2 MISFIRE
P0303	CYLINDER 3 MISFIRE
P0304	CYLINDER 4 MISFIRE
P0305	CYLINDER 5 MISFIRE
P0306	CYLINDER 6 MISFIRE
P0325	KNOCK SENSOR 1 CIRCUIT
P0330	KNOCK SENSOR 2 CIRCUIT
P0335	CRANKSHAFT POSITION SENSOR CIRCUIT
P0339	CRANKSHAFT POSITION SENSOR INTERMITTENT
P0340	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 1 SENSOR 1
P0344	CAMSHAFT POSITION SENSOR INTERMITTENT - BANK 1 SENSOR 1
P0345	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 2 SENSOR 1
P0349	CAMSHAFT POSITION SENSOR INTERMITTENT - BANK 2 SENSOR 1
P0365	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 1 SENSOR 2
P0369	CAMSHAFT POSITION SENSOR INTERMITTENT - BANK 1 SENSOR 2
P0390	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 2 SENSOR 2
P0394	BANK 2 CAMSHAFT POSITION SENSOR 2/2 CIRCUIT INTERMITTENT
P0420	CATALYST EFFICIENCY (BANK 1)
P0430	CATALYST EFFICIENCY (BANK 2)
P0440	GENERAL EVAP SYSTEM FAILURE
P0441	EVAP PURGE SYSTEM PERFORMANCE
P0443	EVAP PURGE SOLENOID CIRCUIT
P0452	EVAP PRESSURE SWITCH STUCK CLOSED
P0455	EVAP SYSTEM LARGE LEAK
P0456	EVAP SYSTEM SMALL LEAK

DTC	Description
P0457	EVAP SYSTEM - LOOSE FUEL CAP
P0461	FUEL LEVEL SENSOR 1 PERFORMANCE
P0462	FUEL LEVEL SENSOR 1 CIRCUIT LOW
P0463	FUEL LEVEL SENSOR 1 CIRCUIT HIGH
P0480	COOLING FAN 1 CONTROL CIRCUIT/OPEN
P0481	COOLING FAN 2 CONTROL CIRCUIT/OPEN
P0501	VEHICLE SPEED SENSOR 1 PERFORMANCE
P0503	VEHICLE SPEED SENSOR 1 ERRATIC
P0506	IDLE SPEED PERFORMANCE LOWER THAN EXCEPTED
P0507	IDLE SPEED PERFORMANCE HIGHER THAN EXCEPTED
P050B	COLD START IGNITION TIMING PERFORMANCE
P050D	COLD START ROUGH IDLE
P0513	INVALID SKIM KEY
P0520	ENGINE OIL PRESSURE SENSOR CIRCUIT
P0521	ENGINE OIL PRESSURE SENSOR PERFORMANCE
P0522	ENGINE OIL PRESSURE SENSOR CIRCUIT LOW
P0523	ENGINE OIL PRESSURE SWITCH CIRCUIT HIGH
P0532	A/C PRESSURE SENSOR CIRCUIT LOW
P0533	A/C PRESSURE SENSOR CIRCUIT HIGH
P054A	COLD START EXHAUST CAMSHAFT POSITION TIMING OVER-ADVANCED - BANK 1 SENSOR 2
P054C	COLD START EXHAUST CAMSHAFT POSITION TIMING OVER -ADVANCED - BANK 2
P0562	BATTERY/SYSTEM VOLTAGE LOW
P0563	BATTERY/SYSTEM VOLTAGE HIGH
P0571	BRAKE SWITCH 1 PERFORMANCE
P0572	BRAKE SWITCH 1 STUCK ON
P0573	BRAKE SWITCH 1 STUCK OFF
P0579	SPEED CONTROL SWITCH 1 PERFORMANCE
P0580	SPEED CONTROL SWITCH 1 CIRCUIT LOW
P0581	SPEED CONTROL SWITCH 1 CIRCUIT HIGH
P0585	SPEED CONTROL SWITCH 1/2 CORRELATION
P058C	BATTERY MONITOR MODULE TEMPERATURE MONITORING PERFORMANCE
P0591	SPEED CONTROL SWITCH 2 PERFORMANCE
P0592	SPEED CONTROL SWITCH 2 CIRCUIT LOW
P0593	SPEED CONTROL SWITCH 2 CIRCUIT HIGH
P0600	SERIAL COMMUNICATION LINK
P0601	INTERNAL MEMORY CHECKSUM INVALID
P0606	INTERNAL CONTROL PROCESSOR
P060B	ETC A/D GROUND PERFORMANCE

DTC	Description
P060D	ETC LEVEL 2 APP PERFORMANCE
P060E	ETC LEVEL 2 TPS PERFORMANCE
P060F	ETC LEVEL 2 ECT PERFORMANCE
P061A	LEVEL 2 TORQUE PERFORMANCE
P061C	ETC LEVEL 2 RPM PERFORMANCE
P0622	GENERATOR FIELD CONTROL CIRCUIT
P0627	FUEL PUMP CONTROL CIRCUIT OPEN
P062C	ETC LEVEL 2 MPH PERFORMANCE
P0630	VIN NOT PROGRAMMED IN PCM
P0632	ODOMETER NOT PROGRAMMED IN PCM
P0642	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0645	A/C CONTROL CIRCUIT/OPEN
P0652	SENSOR REFERENCE VOLTAGE 2 CIRCUIT LOW
P0653	SENSOR REFERENCE VOLTAGE 2 CIRCUIT HIGH
P0685	AUTO SHUTDOWN RELAY CONTROL CIRCUIT
P0688	ASD/MAIN SENSE CIRCUIT
P06DA	DUAL STAGE OIL PUMP CIRCUIT
P06DD	DUAL STAGE OIL PUMP STUCK LOW
P06DE	DUAL STAGE OIL PUMP STUCK HIGH
P0850	PARK/NEUTRAL SWITCH PERFORMANCE
P1115	GENERAL TEMPERATURE RATIONALITY
P1128	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1 UPSTREAM
P1129	CLOSED LOOP FUELING NOT ACHIEVED - BANK 2
P113D	O2 SENSOR 1/1 SLOW RESPONSE (HIGH FREQUENCY)
P113E	O2 SENSOR 2/1 SLOW RESPONSE (HIGH FREQUENCY)
P1239	ENGINE OIL TEMPERATURE TOO LOW
P1300	CRANKSHAFT POSITION LEARN OUT OF RANGE
P1400	AFTERMARKET CALIBRATION DETECTED/WARRANTY COVERAGE CONFIRMATION REQUIRED
P1456	FUEL TANK PRESSURE SENSOR CIRCUIT LOW
P1457	FUEL TANK PRESSURE SENSOR CIRCUIT HIGH
P150D	COLD START ROUGH IDLE - OPEN THROTTLE START
P1524	OIL PRESSURE OUT OF RANGE - CAMSHAFT ADVANCE/RETARD DISABLED
P1572	BRAKE PEDAL STUCK ON
P1573	BRAKE PEDAL STUCK OFF
P1593	SPEED CONTROL SWITCH 1/2 STUCK
P1607	PCM INTERNAL SHUTDOWN TIMER RATIONALITY
P1618	SENSOR REFERENCE VOLTAGE 1 CIRCUIT ERRATIC
P1621	O2 SENSOR REFERENCE VOLTAGE CIRCUIT LOW

DTC	Description
P1622	O2 SENSOR REFERENCE VOLTAGE CIRCUIT HIGH
P1628	SENSOR REFERENCE VOLTAGE 2 CIRCUIT ERRATIC
P1696	EEPROM MEMORY WRITE DENIED/INVALID
P1697	EMR (SRI) MILEAGE NOT STORED
P1718	EEPROM INTEGRITY FAILURE
P1C4E	FAULT IN ABS/ESP MODULE
P1CF3	BATTERY TEMPERATURE SENSOR OUT OF RANGE LOW
P1CF4	BATTERY TEMPERATURE SENSOR OUT OF RANGE HIGH
P1E09	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1 DOWNSTREAM
P1E0A	CLOSED LOOP FUELING NOT ACHIEVED - BANK 2 DOWNSTREAM
P2066	FUEL LEVEL SENSOR 2 PERFORMANCE
P2067	FUEL LEVEL SENSOR 2 CIRCUIT LOW
P2068	FUEL LEVEL SENSOR 2 CIRCUIT HIGH
P2072	ELECTRONIC THROTTLE CONTROL SYSTEM - ICE BLOCKAGE
P2096	DOWNSTREAM FUEL TRIM SYSTEM 1 LEAN
P2097	DOWNSTREAM FUEL TRIM SYSTEM 1 RICH
P2098	DOWNSTREAM FUEL TRIM SYSTEM 2 LEAN
P2099	DOWNSTREAM FUEL TRIM SYSTEM 2 RICH
P2100	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT
P2101	ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE
P2107	ELECTRONIC THROTTLE CONTROL MODULE PROCESSOR
P2110	ELECTRONIC THROTTLE CONTROL - FORCED LIMITED RPM
P2111	ELECTRONIC THROTTLE CONTROL - UNABLE TO CLOSE
P2112	ELECTRONIC THROTTLE CONTROL - UNABLE TO OPEN
P2115	ACCELERATOR PEDAL POSITION SENSOR 1 MINIMUM STOP PERFORMANCE
P2116	ACCELERATOR PEDAL POSITION SENSOR 2 MINIMUM STOP PERFORMANCE
P2118	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT
P2122	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT LOW
P2123	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT HIGH
P2127	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT LOW
P2128	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT HIGH
P2135	THROTTLE POSITION SENSOR 1/2 CORRELATION
P2138	ACCELERATOR PEDAL POSITION SENSOR 1/2 CORRELATION
P2166	ACCELERATOR PEDAL POSITION SENSOR 1 MAXIMUM STOP PERFORMANCE
P2167	ACCELERATOR PEDAL POSITION SENSOR 2 MAXIMUM STOP PERFORMANCE
P2172	HIGH AIRFLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION)

DTC	Description
P2173	HIGH AIRFLOW/VACUUM LEAK DETECTED (SLOW ACCUMULATION)
P2174	LOW AIRFLOW/RESTRICTION DETECTED (INSTANTANEOUS ACCUMULATION)
P2181	COOLING SYSTEM PERFORMANCE
P219A	AIR-FUEL RATIO CYLINDER IMBALANCE BANK 1
P219B	AIR-FUEL RATIO CYLINDER IMBALANCE BANK 2
P2271	O2 SENSOR 1/2 SIGNAL BIASED RICH
P2273	O2 SENSOR 2/2 SIGNAL STUCK RICH
P2299	BRAKE PEDAL POSITION / ACCELERATOR PEDAL POSITION INCOMPATIBLE
P2302	IGNITION COIL 1 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2305	IGNITION COIL 2 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2308	IGNITION COIL 3 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2311	IGNITION COIL 4 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2314	IGNITION COIL 5 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2317	IGNITION COIL 6 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2503	CHARGING SYSTEM OUTPUT LOW
P2504	CHARGING SYSTEM OUTPUT HIGH
P258A	ELECTRIC VACUUM PUMP CIRCUIT
P258B	ELECTRONIC VACUUM PUMP PERFORMANCE
P2610	PCM INTERNAL ENGINE OFF TIMER PERFORMANCE
U0001	CAN C BUS
U0101	LOST COMMUNICATION WITH TCM
U0103	LOST COMMUNICATION WITH ELECTRIC GEAR SHIFT MODULE
U0104	LOST COMMUNICATION WITH CRUISE CONTROL MODULE
U0121	LOST COMMUNICATION WITH ABS
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0212	LOST COMMUNICATION WITH SCM
U0300	INTERNAL CONTROL MODULE SOFTWARE INCOMPATIBILITY
U0402	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0416	IMPLAUSIBLE DATA RECEIVED FROM ESP
U0428	IMPLAUSIBLE DATA RECEIVED FROM STEERING ANGLE SENSOR
U110C	LOST FUEL LEVEL MESSAGE
U110E	LOST AMBIENT TEMPERATURE MESSAGE
U110F	LOST FUEL VOLUME MESSAGE
U1110	LOST VEHICLE SPEED MESSAGE
U1120	LOST WHEEL DISTANCE MESSAGE
U113E	LOST COMMUNICATION WITH INTELLIGENT BATTERY SENSOR

DTC	Description
U1141	LOST ESP TORQUE REQUEST MESSAGE
U1186	LOST COMMUNICATION WITH ADAPTIVE CRUISE CONTROL MODULE
U11B9	LOST COMMUNICATION WITH RF HUB
U11BC	LOST BRAKE SWITCH MESSAGE
U11C2	LOST TRANSMISSION MESSAGE
U120C	LOST BRAKE BOOSTER SIGNAL
U1403	IMPLAUSIBLE FUEL LEVEL SIGNAL RECEIVED
U1411	IMPLAUSIBLE FUEL VOLUME SIGNAL RECEIVED
U1412	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1417	IMPLAUSIBLE LEFT WHEEL DISTANCE SIGNAL RECEIVED
U1418	IMPLAUSIBLE RIGHT WHEEL DISTANCE SIGNAL RECEIVED
U1431	IMPLAUSIBLE DATA RECEIVED FROM CRUISE CONTROL MODULE

MODULE, POWERTRAIN CONTROL (PCM), 5.7L

DIAGNOSTIC CODE INDEX

DTC	Description
P000B	BANK 1 CAMSHAFT 2 POSITION SLOW RESPONSE
P0013	BANK 1 CAMSHAFT 2 POSITION ACTUATOR CIRCUIT OPEN
P0016	CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT - BANK 1 SENSOR 1
P0031	O2 SENSOR 1/1 HEATER CIRCUIT LOW
P0032	O2 SENSOR 1/1 HEATER CIRCUIT HIGH
P0037	O2 SENSOR 1/2 HEATER CIRCUIT LOW
P0038	O2-SENSOR 1/2 HEATER CIRCUIT HIGH
P0051	O2-SENSOR 2/1 HEATER CIRCUIT LOW
P0052	O2-SENSOR 2/1 HEATER CIRCUIT HIGH
P0057	O2 SENSOR 2/2 HEATER CIRCUIT LOW
P0058	O2-SENSOR 2/2 HEATER CIRCUIT HIGH
P0071	AMBIENT AIR TEMPERATURE SENSOR PERFORMANCE
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT LOW
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0107	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT LOW
P0108	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT HIGH
P0111	INTAKE AIR TEMPERATURE SENSOR 1 PERFORMANCE
P0112	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW
P0113	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH
P0116	ENGINE COOLANT TEMPERATURE SENSOR 1 PERFORMANCE
P0117	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW
P0118	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT HIGH
P0121	THROTTLE POSITION SENSOR 1 PERFORMANCE
P0122	THROTTLE POSITION SENSOR 1 CIRCUIT LOW

DTC	Description
P0123	THROTTLE POSITION SENSOR 1 CIRCUIT HIGH
P0125	INSUFFICIENT COOLANT TEMP FOR CLOSED-LOOP FUEL CONTROL
P0128	THERMOSTAT RATIONALITY
P0129	BAROMETRIC PRESSURE OUT OF RANGE LOW
P0131	O2 SENSOR 1/1 CIRCUIT LOW
P0132	O2 SENSOR 1/1 CIRCUIT HIGH
P0133	O2 SENSOR 1/1 SLOW RESPONSE
P0135	O2 SENSOR 1/1 HEATER PERFORMANCE
P0137	O2 SENSOR 1/2 CIRCUIT LOW
P0138	O2 SENSOR 1/2 CIRCUIT HIGH
P0139	O2 SENSOR 1/2 SLOW RESPONSE
P0140	O2 SENSOR 1/2 NO ACTIVITY DETECTED
P0141	O2 SENSOR 1/2 HEATER PERFORMANCE
P0151	O2 SENSOR 2/1 CIRCUIT LOW
P0152	O2 SENSOR 2/1 CIRCUIT HIGH
P0153	O2 SENSOR 2/1 SLOW RESPONSE
P0155	O2 SENSOR 2/1 HEATER PERFORMANCE
P0157	O2 SENSOR 2/2 CIRCUIT LOW
P0158	O2 SENSOR 2/2 CIRCUIT HIGH
P0159	O2 SENSOR 2/2 SLOW RESPONSE
P0160	O2 SENSOR 2/2 NO ACTIVITY DETECTED
P0161	O2 SENSOR 2/2 HEATER PERFORMANCE
P0171	FUEL SYSTEM 1/1 LEAN
P0172	FUEL SYSTEM 1/1 RICH
P0174	FUEL SYSTEM 2/1 LEAN
P0175	FUEL SYSTEM 2/1 RICH
P0196	ENGINE OIL TEMPERATURE SENSOR PERFORMANCE
P0197	ENGINE OIL TEMPERATURE SENSOR CIRCUIT LOW
P0198	ENGINE OIL TEMPERATURE SENSOR CIRCUIT HIGH
P0201	FUEL INJECTOR 1 CIRCUIT/OPEN
P0202	FUEL INJECTOR 2 CIRCUIT/OPEN
P0203	FUEL INJECTOR 3 CIRCUIT/OPEN
P0204	FUEL INJECTOR 4 CIRCUIT/OPEN
P0205	FUEL INJECTOR 5 CIRCUIT/OPEN
P0206	FUEL INJECTOR 6 CIRCUIT/OPEN
P0207	FUEL INJECTOR 7 CIRCUIT / OPEN
P0208	FUEL INJECTOR 8 CIRCUIT/OPEN
P0221	THROTTLE POSITION SENSOR 2 CIRCUIT PERFORMANCE
P0222	THROTTLE POSITION SENSOR 2 CIRCUIT LOW
P0223	THROTTLE POSITION SENSOR 2 CIRCUIT HIGH
P0298	ENGINE OIL TEMPERATURE TOO HIGH

DTC	Description
P0300	MULTIPLE CYLINDER MISFIRE
P0301	CYLINDER 1 MISFIRE
P0302	CYLINDER 2 MISFIRE
P0303	CYLINDER 3 MISFIRE
P0304	CYLINDER 4 MISFIRE
P0305	CYLINDER 5 MISFIRE
P0306	CYLINDER 6 MISFIRE
P0307	CYLINDER 7 MISFIRE
P0308	CYLINDER 8 MISFIRE
P0325	KNOCK SENSOR 1 CIRCUIT
P0330	KNOCK SENSOR 2 CIRCUIT
P0335	CRANKSHAFT POSITION SENSOR CIRCUIT
P0339	CRANKSHAFT POSITION SENSOR INTERMITTENT
P0340	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 1 SENSOR 1
P0344	CAMSHAFT POSITION SENSOR INTERMITTENT - BANK 1 SENSOR 1
P0420	CATALYST EFFICIENCY (BANK 1)
P0430	CATALYST EFFICIENCY (BANK 2)
P0440	GENERAL EVAP SYSTEM FAILURE
P0441	EVAP PURGE SYSTEM PERFORMANCE
P0443	EVAP PURGE SOLENOID CIRCUIT
P0452	EVAP PRESSURE SWITCH STUCK CLOSED
P0455	EVAP SYSTEM LARGE LEAK
P0456	EVAP SYSTEM SMALL LEAK
P0457	EVAP SYSTEM - LOOSE FUEL CAP
P0461	FUEL LEVEL SENSOR 1 PERFORMANCE
P0462	FUEL LEVEL SENSOR 1 CIRCUIT LOW
P0463	FUEL LEVEL SENSOR 1 CIRCUIT HIGH
P0480	COOLING FAN 1 CONTROL CIRCUIT/OPEN
P0481	COOLING FAN 2 CONTROL CIRCUIT/OPEN
P0501	VEHICLE SPEED SENSOR 1 PERFORMANCE
P0503	VEHICLE SPEED SENSOR 1 ERRATIC
P0506	IDLE SPEED PERFORMANCE LOWER THAN EXCEPTED
P0507	IDLE SPEED PERFORMANCE HIGHER THAN EXCEPTED
P050B	COLD START IGNITION TIMING PERFORMANCE
P0513	INVALID SKIM KEY
P0520	ENGINE OIL PRESSURE SENSOR CIRCUIT
P0521	ENGINE OIL PRESSURE SENSOR PERFORMANCE
P0522	ENGINE OIL PRESSURE SENSOR CIRCUIT LOW
P0523	ENGINE OIL PRESSURE SENSOR CIRCUIT HIGH
P0524	ENGINE OIL PRESSURE TOO LOW
P0532	A/C PRESSURE SENSOR CIRCUIT LOW

DTC	Description
P0533	A/C PRESSURE SENSOR CIRCUIT HIGH
P0562	BATTERY/SYSTEM VOLTAGE LOW
P0563	BATTERY/SYSTEM VOLTAGE HIGH
P0572	BRAKE SWITCH 1 STUCK ON
P0573	BRAKE SWITCH 1 STUCK OFF
P0579	SPEED CONTROL SWITCH 1 PERFORMANCE
P0580	SPEED CONTROL SWITCH 1 CIRCUIT LOW
P0585	SPEED CONTROL SWITCH 1/2 CORRELATION
P058C	BATTERY MONITOR MODULE TEMPERATURE MONITORING PERFORMANCE
P0591	SPEED CONTROL SWITCH 2 PERFORMANCE
P0592	SPEED CONTROL SWITCH 2 CIRCUIT LOW
P0600	SERIAL COMMUNICATION LINK
P0601	INTERNAL MEMORY CHECKSUM INVALID
P0606	INTERNAL CONTROL PROCESSOR
P060B	ETC A/D GROUND PERFORMANCE
P060D	ETC LEVEL 2 APP PERFORMANCE
P060E	ETC LEVEL 2 TPS PERFORMANCE
P060F	ETC LEVEL 2 ECT PERFORMANCE
P061A	LEVEL 2 TORQUE PERFORMANCE
P061C	ETC LEVEL 2 RPM PERFORMANCE
P0622	GENERATOR FIELD CONTROL CIRCUIT
P0627	FUEL PUMP CONTROL CIRCUIT OPEN
P062C	ETC LEVEL 2 MPH PERFORMANCE
P0630	VIN NOT PROGRAMMED IN PCM
P0632	ODOMETER NOT PROGRAMMED IN PCM
P0642	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0645	A/C CONTROL CIRCUIT/OPEN
P0652	SENSOR REFERENCE VOLTAGE 2 CIRCUIT LOW
P0653	SENSOR REFERENCE VOLTAGE 2 CIRCUIT HIGH
P0685	AUTO SHUTDOWN RELAY CONTROL CIRCUIT
P0688	ASD/MAIN SENSE CIRCUIT
P0801	REVERSE GEAR LOCKOUT CONTROL CIRCUIT
P0803	SKIP SHIFT CONTROL SOLENOID CIRCUIT
P080B	SKIP SHIFT RATIONALITY
P0830	CLUTCH UPSTOP SWITCH STUCK ON
P0835	CLUTCH UPSTOP SWITCH STUCK OFF
P0850	PARK/NEUTRAL SWITCH PERFORMANCE
P1115	GENERAL TEMPERATURE RATIONALITY
P1128	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1 UPSTREAM

DTC	Description
P1129	CLOSED LOOP FUELING NOT ACHIEVED - BANK 2
P113D	O2 SENSOR 1/1 SLOW RESPONSE (HIGH FREQUENCY)
P113E	O2 SENSOR 2/1 SLOW RESPONSE (HIGH FREQUENCY)
P1239	ENGINE OIL TEMPERATURE TOO LOW
P1300	CRANKSHAFT POSITION LEARN OUT OF RANGE
P1400	AFTERMARKET CALIBRATION DETECTED/WARRANTY COVERAGE CONFIRMATION REQUIRED
P1411	CYLINDER 1 REACTIVATION CONTROL PERFORMANCE
P1414	CYLINDER 4 REACTIVATION CONTROL PERFORMANCE
P1416	CYLINDER 6 REACTIVATION CONTROL PERFORMANCE
P1417	CYLINDER 7 REACTIVATION CONTROL PERFORMANCE
P1456	FUEL TANK PRESSURE SENSOR CIRCUIT LOW
P1457	FUEL TANK PRESSURE SENSOR CIRCUIT HIGH
P1521	INCORRECT ENGINE OIL TYPE
P1524	OIL PRESSURE OUT OF RANGE - CAMSHAFT ADVANCE/RETARD DISABLED
P1572	BRAKE PEDAL STUCK ON
P1573	BRAKE PEDAL STUCK OFF
P1593	SPEED CONTROL SWITCH 1/2 STUCK
P1607	PCM INTERNAL SHUTDOWN TIMER RATIONALITY
P1618	SENSOR REFERENCE VOLTAGE 1 ERRATIC
P1621	O2 SENSOR REFERENCE VOLTAGE CIRCUIT LOW
P1622	O2 SENSOR REFERENCE VOLTAGE CIRCUIT HIGH
P1628	SENSOR REFERENCE VOLTAGE 2 CIRCUIT ERRATIC
P1696	EEPROM MEMORY WRITE DENIED/INVALID
P1697	EMR (SRI) MILEAGE NOT STORED
P1718	EEPROM INTEGRITY FAILURE
P1C4E	FAULT IN ABS/ESP MODULE
P1CF3	BATTERY TEMPERATURE SENSOR OUT OF RANGE LOW
P1CF4	BATTERY TEMPERATURE SENSOR OUT OF RANGE HIGH
P1E09	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1 DOWNSTREAM
P1E0A	CLOSED LOOP FUELING NOT ACHIEVED - BANK 2 DOWNSTREAM
P2066	FUEL LEVEL SENSOR 2 PERFORMANCE
P2067	FUEL LEVEL SENSOR 2 CIRCUIT LOW
P2068	FUEL LEVEL SENSOR 2 CIRCUIT HIGH
P2072	ELECTRONIC THROTTLE CONTROL SYSTEM - ICE BLOCKAGE
P2096	DOWNSTREAM FUEL TRIM SYSTEM 1 LEAN
P2097	DOWNSTREAM FUEL TRIM SYSTEM 1 RICH
P2098	DOWNSTREAM FUEL TRIM SYSTEM 2 LEAN
P2099	DOWNSTREAM FUEL TRIM SYSTEM 2 RICH
P2100	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT/OPEN - BANK 1

DTC	Description
P2101	ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE - BANK 1
P2107	ELECTRONIC THROTTLE CONTROL MODULE PROCESSOR
P2110	ELECTRONIC THROTTLE CONTROL SYSTEM BANK 1- FORCED LIMITED RPM
P2111	ELECTRONIC THROTTLE CONTROL SYSTEM - UNABLE TO CLOSE - BANK 1
P2112	ELECTRONIC THROTTLE CONTROL SYSTEM - UNABLE TO OPEN - BANK 1
P2115	ACCELERATOR PEDAL POSITION SENSOR 1 MINIMUM STOP PERFORMANCE
P2116	ACCELERATOR PEDAL POSITION SENSOR 2 MINIMUM STOP PERFORMANCE
P2118	ELECTRONIC THROTTLE CONTROL MOTOR CURRENT PERFORMANCE - BANK 1
P2122	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT LOW
P2123	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT HIGH
P2127	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT LOW
P2128	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT HIGH
P2135	THROTTLE POSITION SENSOR 1/2 CORRELATION
P2138	ACCELERATOR PEDAL POSITION SENSOR 1/2 CORRELATION
P2166	ACCELERATOR PEDAL POSITION SENSOR 1 MAXIMUM STOP PERFORMANCE
P2167	ACCELERATOR PEDAL POSITION SENSOR 2 MAXIMUM STOP PERFORMANCE
P2172	HIGH AIRFLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION)
P2173	HIGH AIRFLOW/VACUUM LEAK DETECTED (SLOW ACCUMULATION)
P2174	LOW AIRFLOW/RESTRICTION DETECTED (INSTANTANEOUS ACCUMULATION)
P2181	COOLING SYSTEM PERFORMANCE
P219A	BANK 1 AIR-FUEL RATIO IMBALANCE
P219B	BANK 2 AIR-FUEL RATIO IMBALANCE
P2271	O2 SENSOR 1/2 SIGNAL BIASED RICH
P2273	O2 SENSOR 2/2 SIGNAL STUCK RICH
P2299	BRAKE PEDAL POSITION / ACCELERATOR PEDAL POSITION INCOMPATIBLE
P2302	IGNITION COIL 1 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2305	IGNITION COIL 2 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2308	IGNITION COIL 3 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2311	IGNITION COIL 4 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2314	IGNITION COIL 5 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2317	IGNITION COIL 6 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION

DTC	Description
P2320	IGNITION COIL 7 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2323	IGNITION COIL 8 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P232A	TCM REQUEST FORCED ENGINE SHUTDOWN
P2503	CHARGING SYSTEM OUTPUT LOW
P2504	CHARGING SYSTEM OUTPUT HIGH
P2610	PCM INTERNAL ENGINE OFF TIMER PERFORMANCE
P3400	CYLINDER DEACTIVATION SYSTEM - BANK 1
P3401	CYLINDER 1 DEACTIVATION CONTROL CIRCUIT
P3402	CYLINDER 1 DEACTIVATION CONTROL PERFORMANCE
P3425	CYLINDER 4 DEACTIVATION CONTROL CIRCUIT
P3426	CYLINDER 4 DEACTIVATION CONTROL PERFORMANCE
P3441	MDS SOLENOID 6 CIRCUIT
P3442	CYLINDER 6 DEACTIVATION CONTROL PERFORMANCE
P3449	CYLINDER 7 DEACTIVATION CONTROL CIRCUIT
P3450	CYLINDER 7 DEACTIVATION CONTROL PERFORMANCE
P3497	CYLINDER DEACTIVATION SYSTEM - BANK 2
U0001	CAN C BUS
U0101	LOST COMMUNICATION WITH TCM
U0103	LOST COMMUNICATION WITH ELECTRIC GEAR SHIFT MODULE
U0121	LOST COMMUNICATION WITH ABS
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE (BCM)
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0212	LOST COMMUNICATION WITH SCM
U0300	INTERNAL CONTROL MODULE SOFTWARE INCOMPATIBILITY
U0402	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0416	IMPLAUSIBLE DATA RECEIVED FROM ESP
U0428	IMPLAUSIBLE DATA RECEIVED FROM STEERING ANGLE SENSOR
U110C	LOST FUEL LEVEL MESSAGE
U110E	LOST AMBIENT TEMPERATURE MESSAGE
U110F	LOST FUEL VOLUME MESSAGE
U1110	LOST VEHICLE SPEED MESSAGE
U1120	LOST WHEEL DISTANCE MESSAGE
U113E	LOST COMMUNICATION WITH INTELLIGENT BATTERY SENSOR
U1141	LOST ESP TORQUE REQUEST MESSAGE
U1186	LOST COMMUNICATION WITH ADAPTIVE CRUISE CONTROL MODULE
U11B9	LOST COMMUNICATION WITH RF HUB
U11BC	LOST BRAKE SWITCH MESSAGE
U11C2	LOST TRANSMISSION MESSAGE
U1403	IMPLAUSIBLE FUEL LEVEL SIGNAL RECEIVED

DTC	Description
U1411	IMPLAUSIBLE FUEL VOLUME SIGNAL RECEIVED
U1412	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1417	IMPLAUSIBLE LEFT WHEEL DISTANCE SIGNAL RECEIVED
U1418	IMPLAUSIBLE RIGHT WHEEL DISTANCE SIGNAL RECEIVED
U1431	IMPLAUSIBLE DATA RECEIVED FROM CRUISE CONTROL MODULE

MODULE, POWERTRAIN CONTROL (PCM), 6.2L

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DTC	Description
P000B	BANK 1 CAMSHAFT 2 POSITION SLOW RESPONSE
P0013	BANK 1 CAMSHAFT 2 POSITION ACTUATOR CIRCUIT OPEN
P0016	CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT - BANK 1 SENSOR 1
P0031	O2 SENSOR 1/1 HEATER CIRCUIT LOW
P0032	O2 SENSOR 1/1 HEATER CIRCUIT HIGH
P0037	O2 SENSOR 1/2 HEATER CIRCUIT LOW
P0038	O2-SENSOR 1/2 HEATER CIRCUIT HIGH
P0051	O2-SENSOR 2/1 HEATER CIRCUIT LOW
P0052	O2-SENSOR 2/1 HEATER CIRCUIT HIGH
P0057	O2 SENSOR 2/2 HEATER CIRCUIT LOW
P0058	O2-SENSOR 2/2 HEATER CIRCUIT HIGH
P0069	MANIFOLD PRESSURE/BAROMETRIC PRESSURE CORRELATION
P0071	AMBIENT AIR TEMPERATURE SENSOR PERFORMANCE
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT LOW
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT HIGH
P007B	CHARGE AIR COOLER TEMPERATURE SENSOR CIRCUIT PERFORMANCE
P007C	CHARGE AIR COOLER TEMPERATURE SENSOR CIRCUIT LOW
P007D	CHARGE AIR COOLER TEMPERATURE SENSOR CIRCUIT HIGH
P0096	INTAKE AIR TEMPERATURE SENSOR 2 CIRCUIT PERFORMANCE
P0097	INTAKE AIR TEMPERATURE SENSOR 2 CIRCUIT LOW
P0098	INTAKE AIR TEMPERATURE SENSOR 2 CIRCUIT HIGH
P00A1	CHARGE AIR COOLER TEMPERATURE SENSOR CIRCUIT RANGE/PERFORMANCE - BANK 2
P00A2	CHARGE AIR COOLER TEMPERATURE SENSOR CIRCUIT LOW - BANK 2
P00A3	CHARGE AIR COOLER TEMPERATURE SENSOR CIRCUIT HIGH- BANK 2
P00DF	CHARGE AIR COOLER COOLANT TEMPERATURE SENSOR CIRCUIT PERFORMANCE
P00E0	CHARGE AIR COOLER COOLANT TEMPERATURE SENSOR "A" CIRCUIT LOW
P00E1	CHARGE AIR COOLER COOLANT TEMPERATURE SENSOR "A" CIRCUIT HIGH
P00E9	INTAKE AIR TEMPERATURE SENSOR 3/1 CIRCUIT PERFORMANCE

DTC	Description
P00EA	INTAKE AIR TEMPERATURE SENSOR 3/1 CIRCUIT LOW
P00EB	INTAKE AIR TEMPERATURE SENSOR 3/1 CIRCUIT HIGH
P00F8	SUPERCHARGER/TURBOCHARGER OUTLET PRESSURE SENSOR 1 CIRCUIT
P00F9	SUPERCHARGER/TURBOCHARGER OUTLET PRESSURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE
P00FA	SUPERCHARGER/TURBOCHARGER OUTLET AIR PRESSURE SENSOR 1 CIRCUIT LOW
P00FB	SUPERCHARGER/TURBOCHARGER OUTLET AIR PRESSURE SENSOR 1 CIRCUIT HIGH
P0102	MASS AIR FLOW SENSOR "A" CIRCUIT LOW
P0103	MASS AIR FLOW SENSOR "A" CIRCUIT HIGH
P0105	MANIFOLD ABSOLUTE PRESSURE SENSOR / BAROMETRIC PRESSURE SENSOR CIRCUIT
P0106	MANIFOLD ABSOLUTE PRESSURE SENSOR PERFORMANCE
P0107	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT LOW
P0108	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT HIGH
P0109-00	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT INTERMITTENT
P0111	INTAKE AIR TEMPERATURE SENSOR 1 PERFORMANCE
P0112	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW
P0113	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH
P0116	ENGINE COOLANT TEMPERATURE SENSOR 1 PERFORMANCE
P0117	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW
P0118	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT HIGH
P0121	THROTTLE POSITION SENSOR 1 PERFORMANCE
P0122	THROTTLE POSITION SENSOR 1 CIRCUIT LOW
P0123	THROTTLE POSITION SENSOR 1 CIRCUIT HIGH
P0125	INSUFFICIENT COOLANT TEMP FOR CLOSED-LOOP FUEL CONTROL
P0128	THERMOSTAT RATIONALITY
P012A	TURBOCHARGER/SUPERCHARGER INLET PRESSURE SENSOR 1
P012B	TURBOCHARGER/SUPERCHARGER INLET PRESSURE SENSOR 1 CIRCUIT PERFORMANCE
P012C	TURBOCHARGER/SUPERCHARGER INLET AIR PRESSURE SENSOR 1 CIRCUIT LOW
P012D	TURBOCHARGER/SUPERCHARGER INLET AIR PRESSURE SENSOR 1 CIRCUIT HIGH
P0133	O2 SENSOR 1/1 SLOW RESPONSE
P0135	O2 SENSOR 1/1 HEATER PERFORMANCE
P0137	O2 SENSOR 1/2 CIRCUIT LOW
P0138	O2 SENSOR 1/2 CIRCUIT HIGH
P0139	O2 SENSOR 1/2 SLOW RESPONSE
P0140	O2 SENSOR 1/2 NO ACTIVITY DETECTED

DTC	Description
P0141	O2 SENSOR 1/2 HEATER PERFORMANCE
P0153	O2 SENSOR 2/1 SLOW RESPONSE
P0155	O2 SENSOR 2/1 HEATER PERFORMANCE
P0157	O2 SENSOR 2/2 CIRCUIT LOW
P0158	O2 SENSOR 2/2 CIRCUIT HIGH
P0159	O2 SENSOR 2/2 SLOW RESPONSE
P0160	O2 SENSOR 2/2 NO ACTIVITY DETECTED
P0161	O2 SENSOR 2/2 HEATER PERFORMANCE
P0171	FUEL SYSTEM 1/1 LEAN
P0172	FUEL SYSTEM 1/1 RICH
P0174	FUEL SYSTEM 2/1 LEAN
P0175	FUEL SYSTEM 2/1 RICH
P018C	FUEL PRESSURE SENSOR CIRCUIT LOW
P018D	FUEL PRESSURE SENSOR CIRCUIT HIGH
P0196	ENGINE OIL TEMPERATURE SENSOR PERFORMANCE
P0197	ENGINE OIL TEMPERATURE SENSOR CIRCUIT LOW
P0198	ENGINE OIL TEMPERATURE SENSOR CIRCUIT HIGH
P0201	FUEL INJECTOR 1 CIRCUIT/OPEN
P0202	FUEL INJECTOR 2 CIRCUIT/OPEN
P0203	FUEL INJECTOR 3 CIRCUIT/OPEN
P0204	FUEL INJECTOR 4 CIRCUIT/OPEN
P0205	FUEL INJECTOR 5 CIRCUIT/OPEN
P0206	FUEL INJECTOR 6 CIRCUIT/OPEN
P0207	FUEL INJECTOR 7 CIRCUIT / OPEN
P0208	FUEL INJECTOR 8 CIRCUIT/OPEN
P0221	THROTTLE POSITION SENSOR 2 CIRCUIT PERFORMANCE
P0222	THROTTLE POSITION SENSOR 2 CIRCUIT LOW
P0223	THROTTLE POSITION SENSOR 2 CIRCUIT HIGH
P023A	CHARGE AIR COOLER COOLANT PUMP CONTROL CIRCUIT/OPEN
P023B	CHARGE AIR COOLER COOLANT PUMP CONTROL CIRCUIT LOW
P023C	CHARGE AIR COOLER COOLANT PUMP CONTROL CIRCUIT HIGH
P025A	FUEL PUMP CONTROL CIRCUIT OPEN
P025B	FUEL PUMP CONTROL CIRCUIT PERFORMANCE
P025C	FUEL PUMP CONTROL CIRCUIT LOW
P025D	FUEL PUMP MODULE CONTROL CIRCUIT HIGH
P026E	CHARGE AIR COOLER COOLANT PUMP PERFORMANCE
P0298	ENGINE OIL TEMPERATURE TOO HIGH
P0300	MULTIPLE CYLINDER MISFIRE
P0301	CYLINDER 1 MISFIRE
P0302	CYLINDER 2 MISFIRE
P0303	CYLINDER 3 MISFIRE

DTC	Description
P0304	CYLINDER 4 MISFIRE
P0305	CYLINDER 5 MISFIRE
P0306	CYLINDER 6 MISFIRE
P0307	CYLINDER 7 MISFIRE
P0308	CYLINDER 8 MISFIRE
P0325	KNOCK SENSOR 1 CIRCUIT
P0330	KNOCK SENSOR 2 CIRCUIT
P0335	CRANKSHAFT POSITION SENSOR CIRCUIT
P0339	CRANKSHAFT POSITION SENSOR INTERMITTENT
P0340	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 1 SENSOR 1
P0344	CAMSHAFT POSITION SENSOR INTERMITTENT
P0420	CATALYST EFFICIENCY (BANK 1)
P0430	CATALYST EFFICIENCY (BANK 2)
P0440	GENERAL EVAP SYSTEM FAILURE
P0441	EVAP PURGE SYSTEM PERFORMANCE
P0443	EVAP PURGE SOLENOID CIRCUIT
P0452	EVAP PRESSURE SWITCH STUCK CLOSED
P0455	EVAP SYSTEM LARGE LEAK
P0456	EVAP SYSTEM SMALL LEAK
P0457	EVAP SYSTEM - LOOSE FUEL CAP
P0461	FUEL LEVEL SENSOR 1 PERFORMANCE
P0462	FUEL LEVEL SENSOR 1 CIRCUIT LOW
P0463	FUEL LEVEL SENSOR 1 CIRCUIT HIGH
P0480	COOLING FAN 1 CONTROL CIRCUIT/OPEN
P0501	VEHICLE SPEED SENSOR 1 PERFORMANCE
P0503	VEHICLE SPEED SENSOR 1 ERRATIC
P0506	IDLE SPEED PERFORMANCE LOWER THAN EXCEPTED
P0507	IDLE SPEED PERFORMANCE HIGHER THAN EXCEPTED
P050B	COLD START IGNITION TIMING PERFORMANCE
P050D	COLD START ROUGH IDLE
P0513	INVALID SKIM KEY
P051C	CRANKCASE PRESSURE SENSOR CIRCUIT LOW
P051D	CRANKCASE PRESSURE SENSOR CIRCUIT HIGH
P0520	ENGINE OIL PRESSURE SENSOR CIRCUIT
P0521	ENGINE OIL PRESSURE SENSOR PERFORMANCE
P0522	ENGINE OIL PRESSURE SENSOR CIRCUIT LOW
P0523	ENGINE OIL PRESSURE SENSOR CIRCUIT HIGH
P0532	A/C PRESSURE SENSOR CIRCUIT LOW
P0533	A/C PRESSURE SENSOR CIRCUIT HIGH
P0562	BATTERY/SYSTEM VOLTAGE LOW
P0563	BATTERY/SYSTEM VOLTAGE HIGH

DTC	Description
P0572	BRAKE SWITCH 1 STUCK ON
P0573	BRAKE SWITCH 1 STUCK OFF
P0579	SPEED CONTROL SWITCH 1 PERFORMANCE
P0580	SPEED CONTROL SWITCH 1 CIRCUIT LOW
P0585	SPEED CONTROL SWITCH 1/2 CORRELATION
P058C	BATTERY MONITOR MODULE TEMPERATURE MONITORING PERFORMANCE
P0591	SPEED CONTROL SWITCH 2 PERFORMANCE
P0592	SPEED CONTROL SWITCH 2 CIRCUIT LOW
P0600	SERIAL COMMUNICATION LINK
P0601	INTERNAL MEMORY CHECKSUM INVALID
P0606	INTERNAL CONTROL PROCESSOR
P060B	ETC A/D GROUND PERFORMANCE
P060D	ETC LEVEL 2 APP PERFORMANCE
P060E	ETC LEVEL 2 TPS PERFORMANCE
P060F	ETC LEVEL 2 ECT PERFORMANCE
P061A	LEVEL 2 TORQUE PERFORMANCE
P061C	ETC LEVEL 2 RPM PERFORMANCE
P0622	GENERATOR FIELD CONTROL CIRCUIT
P0627	FUEL PUMP CONTROL CIRCUIT OPEN
P0628	FUEL PUMP CONTROL CIRCUIT LOW
P0629	FUEL PUMP CONTROL CIRCUIT HIGH
P062A	FUEL PUMP CONTROL PERFORMANCE
P062C	ETC LEVEL 2 MPH PERFORMANCE
P0630	VIN NOT PROGRAMMED IN PCM
P0632	ODOMETER NOT PROGRAMMED IN PCM
P0642	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0645	A/C CONTROL CIRCUIT/OPEN
P064A	FUEL PUMP CONTROL MODULE
P0652	SENSOR REFERENCE VOLTAGE 2 CIRCUIT LOW
P0653	SENSOR REFERENCE VOLTAGE 2 CIRCUIT HIGH
P0685	ASD/MAIN CONTROL CIRCUIT
P0688	ASD/MAIN SENSE CIRCUIT
P0801	REVERSE GEAR LOCKOUT CONTROL CIRCUIT
P0803	SKIP SHIFT CONTROL SOLENOID CIRCUIT
P080B	SKIP SHIFT SOLENOID PERFORMANCE
P0830	CLUTCH UPSTOP SWITCH STUCK ON
P0835	CLUTCH UPSTOP SWITCH STUCK OFF
P0850	PARK/NEUTRAL SWITCH PERFORMANCE
P0EA7	LTR PUMP PERFORMANCE

DTC	Description
P1115	GENERAL TEMPERATURE RATIONALITY
P1128-00	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1 UPSTREAM
P1129	CLOSED LOOP FUELING NOT ACHIEVED - BANK 2 UPSTREAM
P112A	O2 SENSOR 1/1 PUMPING UNDERCURRENT
P112B	O2 SENSOR 1/1 PUMPING OVERCURRENT
P112C	O2 SENSOR 2/1 PUMPING UNDERCURRENT
P112D	O2 SENSOR 2/1 PUMPING OVERCURRENT
P112E	O2 SENSOR 1/1 PERFORMANCE
P112F	O2 SENSOR 2/1 PERFORMANCE
P113D	O2 SENSOR 1/1 SLOW RESPONSE (HIGH FREQUENCY)
P113E	O2 SENSOR 2/1 SLOW RESPONSE (HIGH FREQUENCY)
P1205	FUEL PUMP CONTROL MODULE INTERNAL PERFORMANCE
P1206	FUEL PUMP CONTROL MODULE OPEN CIRCUIT TO FUEL PUMP
P1217	ACTIVE EXHAUST VALVE 1 PERFORMANCE
P121B	ACTIVE EXHAUST VALVE 2 PERFORMANCE
P1239	ENGINE OIL TEMPERATURE TOO LOW
P1300	CRANKSHAFT POSITION LEARN OUT OF RANGE
P1400	AFTERMARKET CALIBRATION DETECTED/WARRANTY COVERAGE CONFIRMATION REQUIRED
P1456	FUEL TANK PRESSURE SENSOR CIRCUIT LOW
P1457	FUEL TANK PRESSURE SENSOR CIRCUIT HIGH
P150D	COLD START ROUGH IDLE - OPEN THROTTLE START
P1524	OIL PRESSURE OUT OF RANGE - CAMSHAFT ADVANCE/RETARD DISABLED
P1572	BRAKE PEDAL STUCK ON
P1573	BRAKE PEDAL STUCK OFF
P1593	SPEED CONTROL SWITCH 1/2 STUCK
P1607	PCM INTERNAL SHUTDOWN TIMER RATIONALITY
P1610	SUPERCHARGER BYPASS VALVE POSITION SENSOR 1 CIRCUIT LOW
P1611	SUPERCHARGER BYPASS VALVE POSITION SENSOR 1 CIRCUIT HIGH
P1613	TURBOCHARGER/SUPERCHARGER BOOST PRESSURE SENSOR/MASS AIR FLOW SENSOR CORRELATION
P1616	SUPERCHARGER BYPASS VALVE POSITION SENSOR 2 CIRCUIT LOW
P1617	SUPERCHARGER BYPASS VALVE POSITION SENSOR 2 CIRCUIT HIGH
P1618	SENSOR REFERENCE VOLTAGE 1 ERRATIC
P1620	SUPERCHARGER BYPASS VALVE CONTROL CIRCUIT OPEN
P1621	O2 SENSOR REFERENCE VOLTAGE CIRCUIT LOW
P1622	O2 SENSOR REFERENCE VOLTAGE CIRCUIT HIGH
P1627	SUPERCHARGER BYPASS VALVE POSITION SENSOR 1/2 CORRELATION
P1628	SENSOR REFERENCE VOLTAGE 2 ERRATIC

DTC	Description
P162A	SUPERCHARGER BYPASS VALVE ACTUATOR CONTROL SYSTEM - MAX PWM EXCEEDED
P162B	SUPERCHARGER BYPASS VALVE ACTUATOR CONTROL SYSTEM - TEMPORARY PWM/RPM MAX EXCEEDED
P162C	SUPERCHARGER BYPASS VALVE CONTROL CIRCUIT
P1643	SUPERCHARGER BYPASS VALVE ACTUATOR CONTROL SYSTEM - STUCK CLOSED
P1645	SUPERCHARGER BYPASS VALVE ACTUATOR CONTROL SYSTEM - UNABLE TO CLOSE
P1665	SUPERCHARGER BYPASS VALVE CONTROL SYSTEM - ICE BLOCKAGE
P1696	EEPROM MEMORY WRITE DENIED/INVALID
P1697	EMR (SRI) MILEAGE NOT STORED
P1718	EEPROM INTEGRITY FAILURE
P1C4E	FAULT IN ABS/ESP MODULE
P1CF3	BATTERY TEMPERATURE SENSOR OUT OF RANGE LOW
P1CF4	BATTERY TEMPERATURE SENSOR OUT OF RANGE HIGH
P1E09	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1 DOWNSTREAM
P1E0A	CLOSED LOOP FUELING NOT ACHIEVED - BANK 2 DOWNSTREAM
P2066	FUEL LEVEL SENSOR 2 PERFORMANCE
P2067	FUEL LEVEL SENSOR 2 CIRCUIT LOW
P2068	FUEL LEVEL SENSOR 2 CIRCUIT HIGH
P2072	ELECTRONIC THROTTLE CONTROL SYSTEM - ICE BLOCKAGE
P2096	DOWNSTREAM FUEL TRIM SYSTEM 1 LEAN
P2097	DOWNSTREAM FUEL TRIM SYSTEM 1 RICH
P2098	DOWNSTREAM FUEL TRIM SYSTEM 2 LEAN
P2099	DOWNSTREAM FUEL TRIM SYSTEM 2 RICH
P2100	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT/OPEN - BANK 1
P2101	ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE - BANK 1
P2107	ELECTRONIC THROTTLE CONTROL MODULE PROCESSOR
P2110	ELECTRONIC THROTTLE CONTROL SYSTEM - FORCED LIMITED RPM
P2111	ELECTRONIC THROTTLE CONTROL SYSTEM - UNABLE TO CLOSE
P2112	ELECTRONIC THROTTLE CONTROL SYSTEM - UNABLE TO OPEN
P2115	ACCELERATOR PEDAL POSITION SENSOR 1 MINIMUM STOP PERFORMANCE
P2116	ACCELERATOR PEDAL POSITION SENSOR 2 MINIMUM STOP PERFORMANCE
P2118	ELECTRONIC THROTTLE CONTROL MOTOR CURRENT PERFORMANCE
P2122	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT LOW
P2123	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT HIGH
P2127	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT LOW
P2128	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT HIGH

DTC	Description
P2135	THROTTLE POSITION SENSOR 1/2 CORRELATION
P2138	ACCELERATOR PEDAL POSITION SENSOR 1/2 CORRELATION
P2166	ACCELERATOR PEDAL POSITION SENSOR 1 MAXIMUM STOP PERFORMANCE
P2167	ACCELERATOR PEDAL POSITION SENSOR 2 MAXIMUM STOP PERFORMANCE
P2172	HIGH AIRFLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION)
P2173	HIGH AIRFLOW/VACUUM LEAK DETECTED (SLOW ACCUMULATION)
P2174	LOW AIRFLOW/RESTRICTION DETECTED (INSTANTANEOUS ACCUMULATION)
P2181	COOLING SYSTEM PERFORMANCE
P219A	BANK 1 AIR-FUEL RATIO IMBALANCE
P219B	BANK 2 AIR-FUEL RATIO IMBALANCE
P2227	BAROMETRIC PRESSURE CIRCUIT PERFORMANCE
P2228	BAROMETRIC PRESSURE CIRCUIT LOW
P2229	BAROMETRIC PRESSURE CIRCUIT HIGH
P2237	O2 SENSOR 1/1 PUMP CELL CURRENT CIRCUIT/OPEN
P2238	O2 SENSOR 1/1 PUMP CELL CURRENT CIRCUIT LOW
P2239	O2 SENSOR 1/1 PUMP CELL CURRENT CIRCUIT HIGH
P2240	O2 SENSOR 2/1 PUMPING CURRENT CIRCUIT/OPEN
P2241	O2 SENSOR 2/1 PUMP CELL CURRENT CIRCUIT LOW
P2242	O2 SENSOR 2/1 PUMP CELL CURRENT CIRCUIT HIGH
P2243	O2 SENSOR 1/1 REFERENCE VOLTAGE CIRCUIT/OPEN
P2244	O2 SENSOR 1/1 REFERENCE VOLTAGE PERFORMANCE
P2245	O2 SENSOR 1/1 REFERENCE VOLTAGE CIRCUIT LOW
P2246	O2 SENSOR 1/1 REFERENCE VOLTAGE CIRCUIT HIGH
P2247	O2 SENSOR 2/1 REFERENCE VOLTAGE CIRCUIT/OPEN
P2248	O2 SENSOR 2/1 REFERENCE VOLTAGE PERFORMANCE
P2249	O2 SENSOR 2/1 REFERENCE VOLTAGE CIRCUIT LOW
P2250	O2 SENSOR 2/1 REFERENCE VOLTAGE CIRCUIT HIGH
P2251	O2 SENSOR 1/1 NEGATIVE CURRENT CONTROL CIRCUIT/OPEN
P2252	O2 SENSOR 1/1 NEGATIVE CURRENT CONTROL CIRCUIT LOW
P2253	O2 SENSOR 1/1 NEGATIVE CURRENT CONTROL CIRCUIT HIGH
P2254	O2 SENSOR 2/1 NEGATIVE CURRENT CONTROL CIRCUIT/OPEN
P2255	O2 SENSOR 2/1 NEGATIVE CURRENT CONTROL CIRCUIT LOW
P2256	O2 SENSOR 2/1 NEGATIVE CURRENT CONTROL CIRCUIT HIGH
P2271	O2 SENSOR 1/2 SIGNAL BIASED RICH
P2273	O2 SENSOR 2/2 SIGNAL STUCK RICH
P2299	BRAKE PEDAL POSITION / ACCELERATOR PEDAL POSITION INCOMPATIBLE

DTC	Description
P2302	IGNITION COIL 1 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2305	IGNITION COIL 2 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2308	IGNITION COIL 3 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2311	IGNITION COIL 4 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2314	IGNITION COIL 5 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2317	IGNITION COIL 6 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2320	IGNITION COIL 7 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2323	IGNITION COIL 8 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P232A	TCM REQUEST FORCED ENGINE SHUTDOWN
P2503	CHARGING SYSTEM OUTPUT LOW
P2504	CHARGING SYSTEM OUTPUT HIGH
P2610	PCM INTERNAL ENGINE OFF TIMER PERFORMANCE
P2626	O2 SENSOR 1/1 PUMP CELL CURRENT TRIM CIRCUIT/OPEN
P2627	O2 SENSOR 1/1 PUMP CELL CURRENT TRIM CIRCUIT LOW
P2628	O2 SENSOR 1/1 PUMP CELL CURRENT TRIM CIRCUIT HIGH
P2629	O2 SENSOR 2/1 PUMP CELL CURRENT TRIM CIRCUIT/OPEN
P2630	O2 SENSOR 2/1 PUMP CELL CURRENT TRIM CIRCUIT LOW
P2631	O2 SENSOR 2/1 PUMP CELL CURRENT TRIM CIRCUIT HIGH
P2A0A	MANIFOLD ABSOLUTE PRESSURE SENSOR 2 CIRCUIT
P2A0B	MANIFOLD ABSOLUTE PRESSURE SENSOR 2 CIRCUIT PERFORMANCE
P2A0C	MANIFOLD ABSOLUTE PRESSURE SENSOR 2 CIRCUIT LOW
P2A0D	MANIFOLD ABSOLUTE PRESSURE SENSOR 2 CIRCUIT HIGH
P3032	BAROMETRIC PRESSURE SENSOR PERFORMANCE PLAUSIBILITY
U0001	CAN C BUS
U0101	LOST COMMUNICATION WITH TCM
U0109	LOST COMMUNICATION WITH FUEL PUMP CONTROL MODULE
U0121	LOST COMMUNICATION WITH ANTI-LOCK BRAKE MODULE
U0140	LOST COMMINICATION WITH BODY CONTROL MODULE
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0212	LOST COMMUNICATION WITH SCM
U02A9	LOST COMMUNICATION WITH CHARGE AIR COOLER COOLANT PUMP
U0300	INTERNAL CONTROL MODULE SOFTWARE INCOMPATIBILITY
U0402	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0416	IMPLAUSIBLE DATA RECEIVED FROM ESP
U0418	IMPLAUSIBLE DATA RECEIVED FROM BRAKE SYSTEM CONTROL MODULE 1
U0428	IMPLAUSIBLE DATA RECEIVED FROM STEERING ANGLE SENSOR MODULE
U05AA	INVALID DATA REDEIVED FROM CHARGE AIR COOLER COOLANT PUMP
U110C	LOST FUEL LEVEL MESSAGE

DTC	Description
U110E	LOST AMBIENT TEMPERATURE MESSAGE
U110F	LOST FUEL VOLUME MESSAGE
U1110	LOST VEHICLE SPEED MESSAGE
U1120	LOST WHEEL DISTANCE MESSAGE
U113E	LOST COMMUNICATION WITH INTELLIGENT BATTERY SENSOR
U113F	LOST COMMUNICATION WITH ACTIVE EXHAUST VALVE 1
U1140	LOST COMMUNICATION WITH ACTIVE EXHAUST VALVE 2
U1141	LOST ESP TORQUE REQUEST MESSAGE
U11B9	LOST COMMUNICATION WITH RF HUB
U11BC	LOST BRAKE SWITCH MESSAGE
U11C2	LOST TRANSMISSION MESSAGE
U1403	IMPLAUSIBLE FUEL LEVEL SIGNAL RECEIVED
U1411	IMPLAUSIBLE FUEL VOLUME SIGNAL RECEIVED
U1412	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1417	IMPLAUSIBLE LEFT WHEEL DISTANCE SIGNAL RECEIVED
U1418	IMPLAUSIBLE RIGHT WHEEL DISTANCE SIGNAL RECEIVED
U142B	IMPLAUSIBLE DATA RECEIVED FROM EXHAUST VALVE 1
U142C	IMPLAUSIBLE DATA RECEIVED FROM EXHAUST VALVE 2

MODULE, POWERTRAIN CONTROL (PCM), 6.4L

DIAGNOSTIC CODE INDEX

DTC	Description
P000B	BANK 1 CAMSHAFT 2 POSITION SLOW RESPONSE
P0013	BANK 1 CAMSHAFT 2 POSITION ACTUATOR CIRCUIT OPEN
P0016	CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT - BANK 1 SENSOR 1
P0031	O2 SENSOR 1/1 HEATER CIRCUIT LOW
P0032	O2 SENSOR 1/1 HEATER CIRCUIT HIGH
P0037	O2 SENSOR 1/2 HEATER CIRCUIT LOW
P0038	O2-SENSOR 1/2 HEATER CIRCUIT HIGH
P0051	O2-SENSOR 2/1 HEATER CIRCUIT LOW
P0052	O2-SENSOR 2/1 HEATER CIRCUIT HIGH
P0057	O2 SENSOR 2/2 HEATER CIRCUIT LOW
P0058	O2-SENSOR 2/2 HEATER CIRCUIT HIGH
P0071	AMBIENT AIR TEMPERATURE SENSOR PERFORMANCE
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT LOW
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0107	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT LOW
P0108	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT HIGH
P0111	INTAKE AIR TEMPERATURE SENSOR 1 PERFORMANCE
P0112	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW

DTC	Description
P0113	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH
P0116	ENGINE COOLANT TEMPERATURE SENSOR 1 PERFORMANCE
P0117	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW
P0118	ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT HIGH
P0121	THROTTLE POSITION SENSOR 1 PERFORMANCE
P0122	THROTTLE POSITION SENSOR 1 CIRCUIT LOW
P0123	THROTTLE POSITION SENSOR 1 CIRCUIT HIGH
P0125	INSUFFICIENT COOLANT TEMP FOR CLOSED-LOOP FUEL CONTROL
P0128	THERMOSTAT RATIONALITY
P0129	BAROMETRIC PRESSURE OUT OF RANGE LOW
P0131	O2 SENSOR 1/1 CIRCUIT LOW
P0132	O2 SENSOR 1/1 CIRCUIT HIGH
P0133	O2 SENSOR 1/1 SLOW RESPONSE
P0135	O2 SENSOR 1/1 HEATER PERFORMANCE
P0137	O2 SENSOR 1/2 CIRCUIT LOW
P0138	O2 SENSOR 1/2 CIRCUIT HIGH
P0139	O2 SENSOR 1/2 SLOW RESPONSE
P0140	O2 SENSOR 1/2 NO ACTIVITY DETECTED
P0141	O2 SENSOR 1/2 HEATER PERFORMANCE
P0151	O2 SENSOR 2/1 CIRCUIT LOW
P0152	O2 SENSOR 2/1 CIRCUIT HIGH
P0153	O2 SENSOR 2/1 SLOW RESPONSE
P0155	O2 SENSOR 2/1 HEATER PERFORMANCE
P0157	O2 SENSOR 2/2 CIRCUIT LOW
P0158	O2 SENSOR 2/2 CIRCUIT HIGH
P0159	O2 SENSOR 2/2 SLOW RESPONSE
P0160	O2 SENSOR 2/2 NO ACTIVITY DETECTED
P0161	O2 SENSOR 2/2 HEATER PERFORMANCE
P0171	FUEL SYSTEM 1/1 LEAN
P0172	FUEL SYSTEM 1/1 RICH
P0174	FUEL SYSTEM 2/1 LEAN
P0175	FUEL SYSTEM 2/1 RICH
P0196	ENGINE OIL TEMPERATURE SENSOR PERFORMANCE
P0197	ENGINE OIL TEMPERATURE SENSOR CIRCUIT LOW
P0198	ENGINE OIL TEMPERATURE SENSOR CIRCUIT HIGH
P0201	FUEL INJECTOR 1 CIRCUIT/OPEN
P0202	FUEL INJECTOR 2 CIRCUIT/OPEN
P0203	FUEL INJECTOR 3 CIRCUIT/OPEN
P0204	FUEL INJECTOR 4 CIRCUIT/OPEN
P0205	FUEL INJECTOR 5 CIRCUIT/OPEN
P0206	FUEL INJECTOR 6 CIRCUIT/OPEN

DTC	Description
P0207	FUEL INJECTOR 7 CIRCUIT / OPEN
P0208	FUEL INJECTOR 8 CIRCUIT/OPEN
P0221	THROTTLE POSITION SENSOR 2 CIRCUIT PERFORMANCE
P0222	THROTTLE POSITION SENSOR 2 CIRCUIT LOW
P0223	THROTTLE POSITION SENSOR 2 CIRCUIT HIGH
P0298	ENGINE OIL TEMPERATURE TOO HIGH
P0300	MULTIPLE CYLINDER MISFIRE
P0301	CYLINDER 1 MISFIRE
P0302	CYLINDER 2 MISFIRE
P0303	CYLINDER 3 MISFIRE
P0304	CYLINDER 4 MISFIRE
P0305	CYLINDER 5 MISFIRE
P0306	CYLINDER 6 MISFIRE
P0307	CYLINDER 7 MISFIRE
P0308	CYLINDER 8 MISFIRE
P0325	KNOCK SENSOR 1 CIRCUIT
P0330	KNOCK SENSOR 2 CIRCUIT
P0335	CRANKSHAFT POSITION SENSOR CIRCUIT
P0339	CRANKSHAFT POSITION SENSOR INTERMITTENT
P0340	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 1 SENSOR 1
P0344	CAMSHAFT POSITION SENSOR INTERMITTENT
P0420	CATALYST EFFICIENCY (BANK 1)
P0430	CATALYST EFFICIENCY (BANK 2)
P0440	GENERAL EVAP SYSTEM FAILURE
P0441	EVAP PURGE SYSTEM PERFORMANCE
P0443	EVAP PURGE SOLENOID CIRCUIT
P0452	EVAP PRESSURE SWITCH STUCK CLOSED
P0455	EVAP SYSTEM LARGE LEAK
P0456	EVAP SYSTEM SMALL LEAK
P0457	EVAP SYSTEM - LOOSE FUEL CAP
P0461	FUEL LEVEL SENSOR 1 PERFORMANCE
P0462	FUEL LEVEL SENSOR 1 CIRCUIT LOW
P0463	FUEL LEVEL SENSOR 1 CIRCUIT HIGH
P0480	COOLING FAN 1 CONTROL CIRCUIT/OPEN
P0481	COOLING FAN 2 CONTROL CIRCUIT/OPEN
P0501	VEHICLE SPEED SENSOR 1 PERFORMANCE
P0503	VEHICLE SPEED SENSOR 1 ERRATIC
P0506	IDLE SPEED PERFORMANCE LOWER THAN EXCEPTED
P0507	IDLE SPEED PERFORMANCE HIGHER THAN EXCEPTED
P050B	COLD START IGNITION TIMING PERFORMANCE
P050D	COLD START ROUGH IDLE

DTC	Description
P0513	INVALID SKIM KEY
P0520	ENGINE OIL PRESSURE SENSOR CIRCUIT
P0521	ENGINE OIL PRESSURE SENSOR PERFORMANCE
P0522	ENGINE OIL PRESSURE SENSOR CIRCUIT LOW
P0523	ENGINE OIL PRESSURE SENSOR CIRCUIT HIGH
P0524	ENGINE OIL PRESSURE TOO LOW
P0532	A/C PRESSURE SENSOR CIRCUIT LOW
P0533	A/C PRESSURE SENSOR CIRCUIT HIGH
P0562	BATTERY/SYSTEM VOLTAGE LOW
P0563	BATTERY/SYSTEM VOLTAGE HIGH
P0572	BRAKE SWITCH 1 STUCK ON
P0573	BRAKE SWITCH 1 STUCK OFF
P0579	SPEED CONTROL SWITCH 1 PERFORMANCE
P0580	SPEED CONTROL SWITCH 1 CIRCUIT LOW
P0581	SPEED CONTROL SWITCH 1 CIRCUIT HIGH
P0585	SPEED CONTROL SWITCH 1/2 CORRELATION
P058C	BATTERY MONITOR MODULE TEMPERATURE MONITORING PERFORMANCE
P0591	SPEED CONTROL SWITCH 2 PERFORMANCE
P0592	SPEED CONTROL SWITCH 2 CIRCUIT LOW
P0600	SERIAL COMMUNICATION LINK
P0601	INTERNAL MEMORY CHECKSUM INVALID
P0606	INTERNAL CONTROL PROCESSOR
P060B	ETC A/D GROUND PERFORMANCE
P060D	ETC LEVEL 2 APP PERFORMANCE
P060E	ETC LEVEL 2 TPS PERFORMANCE
P060F	ETC LEVEL 2 ECT PERFORMANCE
P061A	LEVEL 2 TORQUE PERFORMANCE
P061C	ETC LEVEL 2 RPM PERFORMANCE
P0622	GENERATOR FIELD CONTROL CIRCUIT
P0627	FUEL PUMP CONTROL CIRCUIT OPEN
P062C	ETC LEVEL 2 MPH PERFORMANCE
P0630	VIN NOT PROGRAMMED IN PCM
P0632	ODOMETER NOT PROGRAMMED IN PCM
P063A	GENERATOR VOLTAGE SENSE CIRCUIT
P0642	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0645	A/C CONTROL CIRCUIT/OPEN
P0652	SENSOR REFERENCE VOLTAGE 2 CIRCUIT LOW
P0653	SENSOR REFERENCE VOLTAGE 2 CIRCUIT HIGH
P0685	ASD/MAIN CONTROL CIRCUIT

DTC	Description
P0688	ASD/MAIN SENSE CIRCUIT
P0850	PARK/NEUTRAL SWITCH PERFORMANCE
P1004	SHORT RUNNER VALVE CONTROL PERFORMANCE
P1115	GENERAL TEMPERATURE RATIONALITY
P1128-00	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1 UPSTREAM
P1129	CLOSED LOOP FUELING NOT ACHIEVED - BANK 2
P113D	O2 SENSOR 1/1 SLOW RESPONSE (HIGH FREQUENCY)
P113E	O2 SENSOR 2/1 SLOW RESPONSE (HIGH FREQUENCY)
P1214	ACTIVE EXHAUST VALVE 1 CIRCUIT OPEN
P1215	ACTIVE EXHAUST VALVE 1 CIRCUIT LOW
P1216	ACTIVE EXHAUST VALVE 1 CIRCUIT HIGH
P1217	ACTIVE EXHAUST VALVE 1 PERFORMANCE
P1218	ACTIVE EXHAUST VALVE 2 CIRCUIT OPEN
P1219	ACTIVE EXHAUST VALVE 2 CIRCUIT LOW
P121A	ACTIVE EXHAUST VALVE 2 CIRCUIT HIGH
P121B	ACTIVE EXHAUST VALVE 2 PERFORMANCE
P1239	ENGINE OIL TEMPERATURE TOO LOW
P1300	CRANKSHAFT POSITION LEARN OUT OF RANGE
P1400	AFTERMARKET CALIBRATION DETECTED/WARRANTY COVERAGE CONFIRMATION REQUIRED
P1411	CYLINDER 1 REACTIVATION CONTROL PERFORMANCE
P1414	CYLINDER 4 REACTIVATION CONTROL PERFORMANCE
P1416	CYLINDER 6 REACTIVATION CONTROL PERFORMANCE
P1417	CYLINDER 7 REACTIVATION CONTROL PERFORMANCE
P1456	FUEL TANK PRESSURE SENSOR CIRCUIT LOW
P1457	FUEL TANK PRESSURE SENSOR CIRCUIT HIGH
P150D	COLD START ROUGH IDLE - OPEN THROTTLE START
P1521	INCORRECT ENGINE OIL TYPE
P1524	OIL PRESSURE OUT OF RANGE - CAMSHAFT ADVANCE/RETARD DISABLED
P1572	BRAKE PEDAL STUCK ON
P1573	BRAKE PEDAL STUCK OFF
P1593	SPEED CONTROL SWITCH 1/2 STUCK
P1607	PCM INTERNAL SHUTDOWN TIMER RATIONALITY
P1618	SENSOR REFERENCE VOLTAGE 1 ERRATIC
P1621	O2 SENSOR REFERENCE VOLTAGE CIRCUIT LOW
P1622	O2 SENSOR REFERENCE VOLTAGE CIRCUIT HIGH
P1628	SENSOR REFERENCE VOLTAGE 2 ERRATIC
P1696	EEPROM MEMORY WRITE DENIED/INVALID
P1697	EMR (SRI) MILEAGE NOT STORED
P1718	EEPROM INTEGRITY FAILURE

DTC	Description
P1C4E	FAULT IN ABS/ESP MODULE
P1CF3	BATTERY TEMPERATURE SENSOR OUT OF RANGE LOW
P1CF4	BATTERY TEMPERATURE SENSOR OUT OF RANGE HIGH
P1E09	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1 DOWNSTREAM
P1E0A	CLOSED LOOP FUELING NOT ACHIEVED - BANK 2 DOWNSTREAM
P2008	INTAKE MANIFOLD RUNNER (SWIRL) CONTROL CIRCUIT/OPEN
P2016	INTAKE MANIFOLD RUNNER POSITION SENSOR CIRCUIT LOW
P2017	INTAKE MANIFOLD RUNNER POSITION SENSOR CIRCUIT HIGH
P2066	FUEL LEVEL SENSOR 2 PERFORMANCE
P2067	FUEL LEVEL SENSOR 2 CIRCUIT LOW
P2068	FUEL LEVEL SENSOR 2 CIRCUIT HIGH
P2072	ELECTRONIC THROTTLE CONTROL SYSTEM - ICE BLOCKAGE
P2096	DOWNSTREAM FUEL TRIM SYSTEM 1 LEAN
P2097	DOWNSTREAM FUEL TRIM SYSTEM 1 RICH
P2098	DOWNSTREAM FUEL TRIM SYSTEM 2 LEAN
P2099	DOWNSTREAM FUEL TRIM SYSTEM 2 RICH
P2100	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT/OPEN - BANK 1
P2101	ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE - BANK 1
P2107	ELECTRONIC THROTTLE CONTROL MODULE PROCESSOR
P2110	ELECTRONIC THROTTLE CONTROL SYSTEM - FORCED LIMITED RPM
P2111	ELECTRONIC THROTTLE CONTROL SYSTEM - UNABLE TO CLOSE
P2112	ELECTRONIC THROTTLE CONTROL SYSTEM - UNABLE TO OPEN
P2115	ACCELERATOR PEDAL POSITION SENSOR 1 MINIMUM STOP PERFORMANCE
P2116	ACCELERATOR PEDAL POSITION SENSOR 2 MINIMUM STOP PERFORMANCE
P2118	ELECTRONIC THROTTLE CONTROL MOTOR CURRENT PERFORMANCE
P2122	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT LOW
P2123	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT HIGH
P2127	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT LOW
P2128	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT HIGH
P2135	THROTTLE POSITION SENSOR 1/2 CORRELATION
P2138	ACCELERATOR PEDAL POSITION SENSOR 1/2 CORRELATION
P2166	ACCELERATOR PEDAL POSITION SENSOR 1 MAXIMUM STOP PERFORMANCE
P2167	ACCELERATOR PEDAL POSITION SENSOR 2 MAXIMUM STOP PERFORMANCE
P2172	HIGH AIRFLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION)
P2173	HIGH AIRFLOW/VACUUM LEAK DETECTED (SLOW ACCUMULATION)

DTC	Description
P2174	LOW AIRFLOW/RESTRICTION DETECTED (INSTANTANEOUS ACCUMULATION)
P2181	COOLING SYSTEM PERFORMANCE
P219A	BANK 1 AIR-FUEL RATIO IMBALANCE
P219B	BANK 2 AIR-FUEL RATIO IMBALANCE
P2271	O2 SENSOR 1/2 SIGNAL BIASED RICH
P2273	O2 SENSOR 2/2 SIGNAL STUCK RICH
P2299	BRAKE PEDAL POSITION / ACCELERATOR PEDAL POSITION INCOMPATIBLE
P2302	IGNITION COIL 1 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2305	IGNITION COIL 2 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2308	IGNITION COIL 3 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2311	IGNITION COIL 4 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2314	IGNITION COIL 5 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2317	IGNITION COIL 6 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2320	IGNITION COIL 7 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2323	IGNITION COIL 8 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2503	CHARGING SYSTEM OUTPUT LOW
P2504	CHARGING SYSTEM OUTPUT HIGH
P2610	PCM INTERNAL ENGINE OFF TIMER PERFORMANCE
P3400	CYLINDER DEACTIVATION SYSTEM - BANK 1
P3401	MDS SOLENOID 1 CIRCUIT
P3402	CYLINDER 1 DEACTIVATION CONTROL PERFORMANCE
P3425	MDS SOLENOID 4 CIRCUIT
P3426	CYLINDER 4 DEACTIVATION CONTROL PERFORMANCE
P3441	MDS SOLENOID 6 CIRCUIT
P3442	CYLINDER 6 DEACTIVATION CONTROL PERFORMANCE
P3449	MDS SOLENOID 7 CIRCUIT
P3450	CYLINDER 7 DEACTIVATION CONTROL PERFORMANCE
P3497	CYLINDER DEACTIVATION SYSTEM - BANK 2
U0001	CAN C BUS
U0101	LOST COMMUNICATION WITH TCM
U0121	LOST COMMUNICATION WITH ABS
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE (BCM)
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0212	LOST COMMUNICATION WITH SCM
U0300	INTERNAL CONTROL MODULE SOFTWARE INCOMPATIBILITY
U0402	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0416	IMPLAUSIBLE DATA RECEIVED FROM ESP

DTC	Description
U0428	IMPLAUSIBLE DATA RECEIVED FROM STEERING ANGLE SENSOR
U110C	LOST FUEL LEVEL MESSAGE
U110E	LOST AMBIENT TEMPERATURE MESSAGE
U110F	LOST FUEL VOLUME MESSAGE
U1110	LOST VEHICLE SPEED MESSAGE
U1120	LOST WHEEL DISTANCE MESSAGE
U113E	LOST COMMUNICATION WITH INTELLIGENT BATTERY SENSOR
U113F	LOST COMMUNICATION WITH ACTIVE EXHAUST VALVE 1
U1140	LOST COMMUNICATION WITH ACTIVE EXHAUST VALVE 2
U1141	LOST ESP TORQUE REQUEST MESSAGE
U1186	LOST COMMUNICATION WITH ADAPTIVE CRUISE CONTROL MODULE
U11B9	LOST COMMUNICATION WITH RF HUB
U11BC	LOST BRAKE SWITCH MESSAGE
U11C2	LOST TRANSMISSION MESSAGE
U1403	IMPLAUSIBLE FUEL LEVEL SIGNAL RECEIVED
U1411	IMPLAUSIBLE FUEL VOLUME SIGNAL RECEIVED
U1412	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1417	IMPLAUSIBLE LEFT WHEEL DISTANCE SIGNAL RECEIVED
U1418	IMPLAUSIBLE RIGHT WHEEL DISTANCE SIGNAL RECEIVED
U142B	IMPLAUSIBLE DATA RECEIVED FROM EXHAUST VALVE 1
U142C	IMPLAUSIBLE DATA RECEIVED FROM EXHAUST VALVE 2
U1431	IMPLAUSIBLE DATA RECEIVED FROM CRUISE CONTROL MODULE

MODULE, RADIO FREQUENCY (RF HUB)

DIAGNOSTIC CODE INDEX

DTC	Description
B1A08-00	RKE FOB 1 PERFORMANCE
B1A09-00	RKE FOB 2 PERFORMANCE
B1A0A-00	RKE FOB 3 PERFORMANCE
B1A0B-00	RKE FOB 4 PERFORMANCE
B1A0C-00	RKE FOB 5 PERFORMANCE
B1A0D-00	RKE FOB 6 PERFORMANCE
B1A0E-00	RKE FOB 7 PERFORMANCE
B1A0F-00	RKE FOB 8 PERFORMANCE
B1A10-00	RKE FOB 1 BATTERY LOW
B1A11-00	RKE FOB 2 BATTERY LOW
B1A12-00	RKE FOB 3 BATTERY LOW
B1A13-00	RKE FOB 4 BATTERY LOW
B1A14-00	RKE FOB 5 BATTERY LOW
B1A15-00	RKE FOB 6 BATTERY LOW

DTC	Description
B1A16-00	RKE FOB 7 BATTERY LOW
B1A17-00	RKE FOB 8 BATTERY LOW
B1A28-00	ECM MISMATCH WITH SKIM
B1A71-01	PASSIVE ENTRY ANTENNA 1 - GENERAL ELECTRICAL FAILURE
B1A71-11	PASSIVE ENTRY ANTENNA 1 - CIRCUIT SHORT TO GROUND
B1A71-12	PASSIVE ENTRY ANTENNA 1 - CIRCUIT SHORT TO BATTERY
B1A71-13	PASSIVE ENTRY ANTENNA 1 - CIRCUIT OPEN
B1A72-01	PASSIVE ENTRY ANTENNA 2 - GENERAL ELECTRICAL FAILURE
B1A72-11	PASSIVE ENTRY ANTENNA 2 - CIRCUIT SHORT TO GROUND
B1A72-12	PASSIVE ENTRY ANTENNA 2 - CIRCUIT SHORT TO BATTERY
B1A72-13	PASSIVE ENTRY ANTENNA 2 - CIRCUIT OPEN
B1A73-01	PASSIVE ENTRY ANTENNA 3 - GENERAL ELECTRICAL FAILURE
B1A73-11	PASSIVE ENTRY ANTENNA 3 - CIRCUIT SHORT TO GROUND
B1A73-12	PASSIVE ENTRY ANTENNA 3 - CIRCUIT SHORT TO BATTERY
B1A73-13	PASSIVE ENTRY ANTENNA 3 - CIRCUIT OPEN
B1A74-01	PASSIVE ENTRY ANTENNA 4 - GENERAL ELECTRICAL FAILURE
B1A74-11	PASSIVE ENTRY ANTENNA 4 - CIRCUIT SHORT TO GROUND
B1A74-12	PASSIVE ENTRY ANTENNA 4 - CIRCUIT SHORT TO BATTERY
B1A74-13	PASSIVE ENTRY ANTENNA 4 - CIRCUIT OPEN
B1A75-01	PASSIVE ENTRY ANTENNA 5 - GENERAL ELECTRICAL FAILURE
B1A75-11	PASSIVE ENTRY ANTENNA 5 - CIRCUIT SHORT TO GROUND
B1A75-12	PASSIVE ENTRY ANTENNA 5 - CIRCUIT SHORT TO BATTERY
B1A75-13	PASSIVE ENTRY ANTENNA 5 - CIRCUIT OPEN
B1A76-13	REMOTE START ANTENNA CIRCUIT - CIRCUIT OPEN
B1A7B-01	IMMOBILIZER ANTENNA (KIN) - GENERAL ELECTRICAL FAILURE
B1A7D-01	START BUTTON - GENERAL ELECTRICAL FAILURE
B1A7D-2A	START BUTTON - STUCK
B1A8A-00	MULTI-MODULE VIN HANDSHAKE FAILURE
B215B-12	IGNITION RUN/START 2 CONTROL-CIRCUIT SHORT TO BATTERY
B215B-14	IGNITION RUN/START 2 CONTROL - CIRCUIT SHORT TO GROUND OR OPEN
B2199-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
B2205-00	ORIGINAL VIN MISSING/MISMATCH
B22A0-49	RF HUB INTERNAL - INTERNAL ELECTRONIC FAILURE
B259A-00	FRONT LEFT DOOR HANDLE SENSE
B259A-01	FRONT LEFT DOOR HANDLE SENSE-GENERAL ELECTRIC FAILURE
B259B-00	FRONT RIGHT DOOR HANDLE SENSE
B259B-01	FRONT RIGHT DOOR HANDLE SENSE-GENERAL ELECTRIC FAILURE

DTC	Description
U0001-00	CAN C BUS
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0103-00	LOST COMMUNICATION WITH ELECTRIC GEAR SHIFT MODULE
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U103C-00	KIN COMMUNICATION
U1197-00	SECURITY SEED RESPONSE NOT RECEIVED FROM ECM/PCM
U140E-00	IMPLAUSIBLE VEHICLE CONFIGURATION DATA RECEIVED
U1433-01	IMPLAUSIBLE IGNITION SWITCH STATUS MESSAGE RECEIVED - GENERAL ELECTRICAL FAILURE

MODULE, STEERING COLUMN CONTROL (SCCM)

DIAGNOSTIC CODE INDEX

DTC	Description
B1D9C-00	STEERING COLUMN TILT SWITCH
B1D9C-2A	STEERING COLUMN TILT SWITCH - STUCK
B2225-00	(SCM) STEERING COLUMN MODULE INTERNAL
B2306-2A	FRONT WASHER SWITCH - STUCK
B23A1-2A	FLASH TO PASS/OPTICAL HORN SWITCH - STUCK
C1240-76	STEERING ANGLE SENSOR ANGLE OVERTRAVEL PERFORMANCE - WRONG MOUNTING POSITION
C2129-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2129-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-16	SYSTEM VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C212A-17	SYSTEM VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C2205-00	STEERING ANGLE SENSOR INTERNAL
C2205-29	STEERING ANGLE SENSOR INTERNAL - SIGNAL INVALID
C2205-2F	STEERING ANGLE SENSOR INTERNAL - SIGNAL ERRATIC
C2205-41	STEERING ANGLE SENSOR INTERNAL - GENERAL CHECKSUM FAILURE
C2205-96	STEERING ANGLE SENSOR INTERNAL - COMPONENT INTERNAL FAILURE
P0815-2A	UPSHIFT SWITCH - STUCK
P0816-2A	DOWNSHIFT SWITCH - STUCK
P0826-11	UP/DOWN SHIFT SWITCH - CIRCUIT SHORT TO GROUND
P0826-13	UP/DOWN SHIFT SWITCH - CIRCUIT OPEN
P0826-15	UP/DOWN SHIFT SWITCH - CIRCUIT SHORT TO BATTERY OR OPEN
U0002-00	CAN C BUS OFF PERFORMANCE

DTC	Description
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0401-00	IMPLAUSIBLE DATA RECIEVED FROM ECM/PCM
U0422-00	IMPLAUSIBLE DATA RECIEVED FROM THE BODY CONTROL MODULE
U0423-00	IMPAUSIBLE DATA RECEIVED FROM CLUSTER/CCN
U1008-00	LIN 1 BUS
U121E-00	LOST COMMUNICATION WITH STEERING WHEEL CRUISE CONTROL SWITCH

MODULE, TIRE PRESSURE (TPM)

DIAGNOSTIC CODE INDEX

DTC	Description
B2199-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE - SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE - SIGNAL ABOVE ALLOWABLE RANGE
C0077-00	LOW TIRE PRESSURE
C1501-96	TIRE PRESSURE SENSOR 1 - INTERNAL COMPONENT FAILURE
C1502-96	TIRE PRESSURE SENSOR 2 - INTERNAL COMPONENT FAILURE
C1503-96	TIRE PRESSURE SENSOR 3 - INTERNAL COMPONENT FAILURE
C1504-96	TIRE PRESSURE SENSOR 4 - INTERNAL COMPONENT FAILURE
C151C-00	TIRE PRESSURE SENSORS MISSING
C151D-00	TIRE PRESSURE SENSOR LOCATION UNDETERMINED
C1570-00	DUPLICATE TIRE PRESSURE SENSOR IDS
C1580-00	LEFT/RIGHT SIDE TIRE PRESSURE SENSOR LOCATION UNDETERMINED
C1581-00	FRONT/REAR TIRE PRESSURE SENSOR LOCATION UNDETERMINED
C1597-00	TPM SYSTEM DEACTIVATED-WINTER MODE
C15D6-00	RUN FLAT TIRE PRESSURE BELOW THRESHOLD
C2209-00	TIRE PRESSURE MONITOR INTERNAL
U0001-00	CAN C BUS
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM-PCM
U0415-00	IMPAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0423-00	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER-CCN

MODULE, TRANSMISSION CONTROL (TCM), 8HP45/845RE

DIAGNOSTIC CODE INDEX

DTC	Description
P0219-00	ENGINE OVERSPEED
P0562-00	SYSTEM VOLTAGE LOW
P0563-00	SYSTEM VOLTAGE HIGH
P0601-00	INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR
P0607-00	ECU INTERNAL PERFORMANCE
P060A-00	INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE
P0613-00	INTERNAL TRANSMISSION PROCESSOR
P061B-00	INTERNAL CONTROL MODULE TORQUE CALCULATION PERFORMANCE
P062F-00	INTERNAL CONTROL MODULE EEPROM ERROR
P0634	PCM/ECM/TCM INTERNAL TEMPERATURE TOO HIGH
P0642-00	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643-00	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0657-00	ACTUATOR SUPPLY VOLTAGE A CIRCUIT-OPEN
P0658-00	ACTUATOR SUPPLY VOLTAGE A CIRCUIT LOW
P0659-00	ACTUATOR SUPPLY VOLTAGE A CIRCUIT HIGH
P0666-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 1 CIRCUIT
P0667-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 1 PERFORMANCE
P0668-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 1 CIRCUIT LOW
P0669-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 1 CIRCUIT HIGH
P06AB-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 2 CIRCUIT
P06AC-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 2 PERFORMANCE
P06AD-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 2 CIRCUIT LOW
P06AE-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 2 CIRCUIT HIGH
P0710-00	TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT
P0712-00	TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT LOW
P0713-00	TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT HIGH
P0714-00	TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT INTERMITTENT
P0716-00	INPUT SHAFT SPEED SENSOR 1 PERFORMANCE
P0721-00	OUTPUT SHAFT SPEED SENSOR CIRCUIT PERFORMANCE
P0729-00	GEAR 6 SHIFT INCORRECT RATIO
P0731-00	GEAR 1 SHIFT INCORRECT RATIO
P0732-00	GEAR 2 SHIFT INCORRECT RATIO
P0733-00	GEAR 3 SHIFT INCORRECT RATIO
P0734-00	GEAR 4 SHIFT INCORRECT RATIO
P0735-00	GEAR 5 SHIFT INCORRECT RATIO
P0750-00	SHIFT SOLENOID 1 CONTROL CIRCUIT - OPEN

DTC	Description
P0755-00	SHIFT SOLENOID 2 CONTROL CIRCUIT - OPEN
P076F-00	GEAR 7 SHIFT INCORRECT RATIO
P077C-00	OUTPUT SHAFT SPEED SENSOR CIRCUIT LOW
P077D-00	OUTPUT SHAFT SPEED SENSOR CIRCUIT HIGH
P077E-00	TRANSMISSION FLUID TEMPERATURE MULTIPLE SENSOR CORRELATION
P07BF-00	INPUT-TURBINE SHAFT SPEED SENSOR 1 CIRCUIT LOW
P07C0-00	INPUT-TURBINE SHAFT SPEED SENSOR 1 CIRCUIT HIGH
P07D9-00	GEAR 8 SHIFT INCORRECT RATIO
P081C-00	PARK INPUT CIRCUIT
P0850-00	PARK-NEUTRAL SWITCH PERFORMANCE
P093A-00	HYDRAULIC ACCUMULATOR SOLENOID OPEN
P093B-00	HYDRAULIC ACCUMULATOR SOLENOID SHORT TO GROUND
P093C-00	HYDRAULIC ACCUMULATOR SOLENOID SHORT TO BATTERY
P0960-00	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT OPEN
P0961-00	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT PERFORMANCE
P0962-00	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT LOW
P0963-00	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT HIGH
P0972-00	SHIFT SOLENOID 1 CONTROL CIRCUIT PERFORMANCE
P0973-00	SHIFT SOLENOID 1 CONTROL CIRCUIT LOW
P0974-00	SHIFT SOLENOID 1 CONTROL CIRCUIT HIGH
P0975-00	SHIFT SOLENOID B CONTROL CIRCUIT PERFORMANCE
P0976-00	SHIFT SOLENOID 2 CONTROL CIRCUIT LOW
P0977-00	SHIFT SOLENOID 2 CONTROL CIRCUIT HIGH
P0978-00	SHIFT SOLENOID 3 CONTROL CIRCUIT RANGE-PERFORMANCE
P0979-00	SHIFT SOLENOID 3 CONTROL CIRCUIT LOW
P0980-00	SHIFT SOLENOID 3 CONTROL CIRCUIT HIGH
P0981-00	SHIFT SOLENOID 4 CONTROL CIRCUIT RANGE-PERFORMANCE
P0982-00	SHIFT SOLENOID 4 CONTROL CIRCUIT LOW
P0983-00	SHIFT SOLENOID 4 CONTROL CIRCUIT HIGH
P0984-00	SHIFT SOLENOID 5 CONTROL CIRCUIT RANGE-PERFORMANCE
P0985-00	SHIFT SOLENOID 5 CONTROL CIRCUIT LOW
P0986-00	SHIFT SOLENOID 5 CONTROL CIRCUIT HIGH
P1601-00	INTERNAL TCM COMPUTER ERROR
P1614-00	ECU RESET-RECOVERY OCCURRED
P1634-00	TCM INTERNAL INTERNAL WATCHDOG PERFORMANCE
P167A-00	CALIBRATION MISMATCH
P1731-00	INCORRECT GEAR ENGAGED
P1915-00	TRANSMISSION INHIBITED REMOTE START
P1B13-00	PARKBYWIRE UNINTENDED OUT OF PARK POSITION
P1B14-00	PARKBYWIRE UNINTENDED PARK POSITION

DTC	Description
P1C4E-00	ABS DTC PRESENT
P1D20-00	MULTI MODULE HANDSHAKE FAILURE
P1D25-00	SHIFT CONTROL RATIONALITY
P1D77-00	PARK SOLENOID RANGE-PERFORMANCE
P1D78-00	PARK SOLENOID CIRCUIT LOW
P1D79-00	PARK SOLENOID CIRCUIT HIGH
P1D8A-00	PARK PAWL SOLENOID CIRCUIT LOW
P1D8B-00	PARK PAWL SOLENOID CIRCUIT HIGH
P1D8C-00	PARK PAWL SOLENOID CIRCUIT OPEN
P1D8D-00	PARK SENSE CIRCUIT LOW
P1D8E-00	PARK SENSE CIRCUIT HIGH
P1D8F-00	INCORRECT GEAR RATIO CLUTCH 1 DEFECTIVE
P1D90-00	INCORRECT GEAR RATIO CLUTCH 2 DEFECTIVE
P1D91-00	INCORRECT GEAR RATIO CLUTCH 3 DEFECTIVE
P1D92-00	INCORRECT GEAR RATIO CLUTCH 4 DEFECTIVE
P1D93-00	INCORRECT GEAR RATIO CLUTCH 5 DEFECTIVE
P1D94-00	TCM INTERNAL SBW CALIBRATION MISMATCH
P1D95-00	TCM CLUTCH FAILURE UNDETERMINED
P1D96-00	INCORRECT GEAR RATIO CLUTCH A OR B DEFECTIVE
P1D97-00	INCORRECT GEAR RATIO CLUTCH A OR D DEFECTIVE
P1D98-00	INCORRECT GEAR RATIO CLUTCH B OR D DEFECTIVE
P1D99-00	INCORRECT GEAR RATIO CLUTCH B OR E DEFECTIVE
P1D9A-00	INCORRECT GEAR RATIO CLUTCH C OR D DEFECTIVE
P1D9B-00	INCORRECT GEAR RATIO: CLUTCH A OR E DEFECTIVE
P1D9C-00	INCORRECT GEAR RATIO CLUTCH A OR C DEFECTIVE
P1D9D-00	INCORRECT GEAR RATIO CLUTCH B OR C DEFECTIVE
P1D9E-00	INCORRECT GEAR RATIO CLUTCH C OR E DEFECTIVE
P1D9F-00	INCORRECT GEAR RATIO CLUTCH D OR E DEFECTIVE
P1DA0-00	INCORRECT GEAR RATIO CLUTCH A B OR C DEFECTIVE
P1DA1-00	INCORRECT GEAR RATIO CLUTCH A B OR E DEFECTIVE
P1DA2-00	INCORRECT GEAR RATIO CLUTCH B C OR E DEFECTIVE
P1DA3-00	INCORRECT GEAR RATIO CLUTCH B D OR E DEFECTIVE
P1DA4-00	INCORRECT GEAR RATIO CLUTCH B C OR D DEFECTIVE
P1DA5-00	INCORRECT GEAR RATIO CLUTCH C D OR E DEFECTIVE
P1DA6-00	INCORRECT GEAR RATIO CLUTCH A C OR D DEFECTIVE
P1DA7-00	INCORRECT GEAR RATIO CLUTCH A D OR E DEFECTIVE
P1DA8-00	INCORRECT GEAR RATIO CLUTCH A B OR D DEFECTIVE
P1DA9-00	TRANSMISSION FLUID TEMPERATURE RATIONALITY
P1DAA-00	TRANS TEMP UNDETERMINED
P1DAB-00	VEHICLE SPEED UNDETERMINED
P1DAC-00	ENGINE SPEED UNDETERMINED

DTC	Description
P1DAD-00	INPUT SHAFT-OUTPUT SHAFT DIRECTION CORRELATION
P1DAE-00	POSITION VALVE STUCK 2ND GEAR TRANS LIMP IN
P1DAF-00	INCOMPATIBLE LIMP IN ACTION REQUESTED
P1DB0-00	IMPLAUSIBLE TORQUE REQUEST SIGNAL SENT
P1DB1-00	TCM SYSTEM VOLTAGE EXCESSIVELY LOW
P1DB2-00	ACTUATOR SUPPLY VOLTAGE A CIRCUIT
P1DB3-00	TCM ECU RESET-RECOVERY OCCURRED
P1DB4-00	INCORRECT GEAR RATIO DURING GEAR ENGAGEMENT OR IN GEAR
P1DB5-00	INCORRECT GEAR RATIO DURING SHIFT
P1DB6-00	VEHICLE SPEED SIGNAL PERFORMANCE
P1DB7-00	TORQUE CONVERTER CLUTCH PERFORMANCE
P1DB8-00	UNINTENDED TORQUE APPLIED WHILE IN NEUTRAL
P1DB9-00	TCM ECU RESET EXTENDED LOW VOLTAGE
P1DC6-00	TCM NOT PROGRAMMED
P1DC7-00	CLUTCH TEMP THRESHOLD ACHIEVED SHIFT TIME REDUCTION
P1DC8-00	CLUTCH TEMP THRESHOLD ACHIEVED AUTOSTICK INHIBIT
P1DC9-00	CLUTCH TEMP THRESHOLD ACHIEVED SKIP SHIFT DOWN INHIBIT
P1DCA-00	PARK SENSE CIRCUIT OPEN
P1DCD-00	TCM MONITORING PROCESSOR PERFORMANCE MULTIPLE CLUTCHES LOCKED UP
P1DCE-00	TCM MONITORING PROCESSOR PERFORMANCE INCORRECT DRIVING DIRECTION
P1DCF-00	TCM MONITORING PROCESSOR PERFORMANCE UNALLOWED PARK ENGAGEMENT DO TO ABS FAILURE
P1DD0-00	TCM MONITORING PROCESSOR PERFORMANCE UNALLOWED PARK ENGAGEMENT
P1DD1-00	INPUT-TURBINE SPEED SENSOR 1 GRADIENT FAULT
P1DD2-00	TORQUE REQUEST SIGNAL FROM TCM DENIED
P1DDC-00	TCM MONITORING PROCESSOR PERFORMANCE UNALLOWED REVERSE ENGAGEMENT
P1DDD-00	TCM MONITORING PERFORMANCE UNABLE TO DISENGAGE DRIVE OR REVERSE
P1DDE-00	IGNITION RUN-START INPUT 1-2 CORRELATION
P1DEB-00	INCORRECT GEAR DISPLAYED DUE TO INCORRECT GEAR RATIO
P1DF3-00	ECU NOT INITIALIZED
P1DF7-00	ACTUAL DECREASE OF ENGINE TORQUE LOW
P1DF8-00	ACTUAL DECREASE OF ENGINE TORQUE HIGH
P1DFA-00	ACTUAL INCREASE OF ENGINE TORQUE HIGH
P215C-00	OUTPUT SHAFT SPEED WHEEL SPEED CORRELATION
P2761-00	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT-OPEN

DTC	Description
P2762-00	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT RANGE-PERFORMANCE
P2763-00	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH
P2764-00	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT LOW
U0001-00	CAN C BUS
U0074-00	DEDICATED POWERTRAIN (DPT) CAN BUS OFF
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0103-00	LOST COMMUNICATION WITH ELECTRIC GEAR SHIFT MODULE
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0128-00	LOST COMMUNICATION WITH PARK BRAKE CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0212-00	LOST COMMUNICATION WITH SCM
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM-PCM
U0404-00	IMPLAUSIBLE DATA RECEIVED FROM ESM
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0423-00	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER-CCN
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM
U11E3-00	TCM LOST COMMUNICATION WITH ESM ON DPT CAN
U11E4-00	CAN COMMUNICATION MESSAGES MISSING
U1267-00	NO VALID DATA FROM ESM ON CAN-C OR CAN-DPT
U1400-00	IMPLAUSIBLE TPS SIGNAL RECEIVED
U1401-00	IMPLAUSIBLE ENGINE SPEED SIGNAL RECEIVED
U1412-00	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1424-00	IMPLAUSIBLE ENGINE TORQUE SIGNAL RECEIVED
U1461-00	IMPLAUSIBLE DATA RECEIVED FROM ESM ON DPT
U1465-00	IMPLAUSIBLE DRIVER SHIFT REQUEST SIGNAL RECEIVED
U1466-00	IMPLAUSIBLE DRIVER SHIFT REQUEST SIGNAL RECEIVED ON DPT CAN
U1467-00	IMPLAUSIBLE DRIVER SHIFT REQUEST SIGNAL RECEIVED ON CAN AND
U1469-00	IMPLAUSIBLE GEAR SHIFT POSITION SIGNAL SENT DPT CAN-CAN
U1477-00	IMPLAUSIBLE PADDLE SHIFTER DATA RECEIVED
U1479-00	IMPLAUSIBLE DATA RECEIVED FROM SHIFTER MECHANICAL FAILURE

MODULE, TRANSMISSION CONTROL (TCM), 8HP70

DIAGNOSTIC CODE INDEX

DTC	Description

DTC	Description
P0219-00	ENGINE OVERSPEED
P0562-00	SYSTEM VOLTAGE LOW
P0563-00	SYSTEM VOLTAGE HIGH
P0601-00	INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR
P0607-00	ECU INTERNAL PERFORMANCE
P060A-00	INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE
P0613-00	INTERNAL TRANSMISSION PROCESSOR
P061B-00	INTERNAL CONTROL MODULE TORQUE CALCULATION PERFORMANCE
P062F-00	INTERNAL CONTROL MODULE EEPROM ERROR
P0634-00	PCM-ECM-TCM INTERNAL TEMPERATURE TOO HIGH
P0642-00	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643-00	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0657-00	ACTUATOR SUPPLY VOLTAGE A CIRCUIT-OPEN
P0658-00	ACTUATOR SUPPLY VOLTAGE A CIRCUIT LOW
P0659-00	ACTUATOR SUPPLY VOLTAGE A CIRCUIT HIGH
P0666-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 1 CIRCUIT
P0667-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 1 PERFORMANCE
P0668-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 1 CIRCUIT LOW
P0669-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 1 CIRCUIT HIGH
P06AB-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 2 CIRCUIT
P06AC-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 2 PERFORMANCE
P06AD-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 2 CIRCUIT LOW
P06AE-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 2 CIRCUIT HIGH
P0710-00	TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT
P0712-00	TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT LOW
P0713-00	TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT HIGH
P0714-00	TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT INTERMITTENT
P0716-00	INPUT SHAFT SPEED SENSOR 1 PERFORMANCE
P0721-00	OUTPUT SHAFT SPEED SENSOR CIRCUIT PERFORMANCE
P0729-00	GEAR 6 SHIFT INCORRECT RATIO
P0731-00	GEAR 1 SHIFT INCORRECT RATIO
P0732-00	GEAR 2 SHIFT INCORRECT RATIO
P0733-00	GEAR 3 SHIFT INCORRECT RATIO
P0734-00	GEAR 4 SHIFT INCORRECT RATIO
P0735-00	GEAR 5 SHIFT INCORRECT RATIO
P0750-00	SHIFT SOLENOID 1 CONTROL CIRCUIT - OPEN
P0755-00	SHIFT SOLENOID 2 CONTROL CIRCUIT - OPEN
P076F-00	GEAR 7 SHIFT INCORRECT RATIO
P077C-00	OUTPUT SHAFT SPEED SENSOR CIRCUIT LOW

DTC	Description
P077D-00	OUTPUT SHAFT SPEED SENSOR CIRCUIT HIGH
P077E-00	TRANSMISSION FLUID TEMPERATURE MULTIPLE SENSOR CORRELATION
P07BF-00	INPUT-TURBINE SHAFT SPEED SENSOR 1 CIRCUIT LOW
P07C0-00	INPUT-TURBINE SHAFT SPEED SENSOR 1 CIRCUIT HIGH
P07D9-00	GEAR 8 SHIFT INCORRECT RATIO
P081C-00	PARK INPUT CIRCUIT
P0850-00	PARK-NEUTRAL SWITCH PERFORMANCE
P093A-00	HYDRAULIC ACCUMULATOR SOLENOID OPEN
P093B-00	HYDRAULIC ACCUMULATOR SOLENOID SHORT TO GROUND
P093C-00	HYDRAULIC ACCUMULATOR SOLENOID SHORT TO BATTERY
P0960-00	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT OPEN
P0961-00	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT PERFORMANCE
P0962-00	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT LOW
P0963-00	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT HIGH
P0972-00	SHIFT SOLENOID 1 CONTROL CIRCUIT PERFORMANCE
P0973-00	SHIFT SOLENOID 1 CONTROL CIRCUIT LOW
P0974-00	SHIFT SOLENOID 1 CONTROL CIRCUIT HIGH
P0975-00	SHIFT SOLENOID B CONTROL CIRCUIT PERFORMANCE
P0976-00	SHIFT SOLENOID 2 CONTROL CIRCUIT LOW
P0977-00	SHIFT SOLENOID 2 CONTROL CIRCUIT HIGH
P0978-00	SHIFT SOLENOID 3 CONTROL CIRCUIT RANGE-PERFORMANCE
P0979-00	SHIFT SOLENOID 3 CONTROL CIRCUIT LOW
P0980-00	SHIFT SOLENOID 3 CONTROL CIRCUIT HIGH
P0981-00	SHIFT SOLENOID 4 CONTROL CIRCUIT RANGE-PERFORMANCE
P0982-00	SHIFT SOLENOID 4 CONTROL CIRCUIT LOW
P0983-00	SHIFT SOLENOID 4 CONTROL CIRCUIT HIGH
P0984-00	SHIFT SOLENOID 5 CONTROL CIRCUIT RANGE-PERFORMANCE
P0985-00	SHIFT SOLENOID 5 CONTROL CIRCUIT LOW
P0986-00	SHIFT SOLENOID 5 CONTROL CIRCUIT HIGH
P1601-00	INTERNAL TCM COMPUTER ERROR
P1614-00	ECU RESET-RECOVERY OCCURRED
P1634-00	TCM INTERNAL INTERNAL WATCHDOG PERFORMANCE
P167A-00	CALIBRATION MISMATCH
P1731-00	INCORRECT GEAR ENGAGED
P1915-00	TRANSMISSION INHIBITED REMOTE START
P1B13-00	PARKBYWIRE UNINTENDED OUT OF PARK POSITION
P1B14-00	PARKBYWIRE UNINTENDED PARK POSITION
P1C4E-00	ABS DTC PRESENT
P1D20-00	MULTI MODULE HANDSHAKE FAILURE
P1D25-00	SHIFT CONTROL RATIONALITY

DTC	Description
P1D77-00	PARK SOLENOID RANGE-PERFORMANCE
P1D78-00	PARK SOLENOID CIRCUIT LOW
P1D79-00	PARK SOLENOID CIRCUIT HIGH
P1D8A-00	PARK PAWL SOLENOID CIRCUIT LOW
P1D8B-00	PARK PAWL SOLENOID CIRCUIT HIGH
P1D8C-00	PARK PAWL SOLENOID CIRCUIT OPEN
P1D8D-00	PARK SENSE CIRCUIT LOW
P1D8E-00	PARK SENSE CIRCUIT HIGH
P1D8F-00	INCORRECT GEAR RATIO CLUTCH 1 DEFECTIVE
P1D90-00	INCORRECT GEAR RATIO CLUTCH 2 DEFECTIVE
P1D91-00	INCORRECT GEAR RATIO CLUTCH 3 DEFECTIVE
P1D92-00	INCORRECT GEAR RATIO CLUTCH 4 DEFECTIVE
P1D93-00	INCORRECT GEAR RATIO CLUTCH 5 DEFECTIVE
P1D94-00	TCM INTERNAL SBW CALIBRATION MISMATCH
P1D95-00	TCM CLUTCH FAILURE UNDETERMINED
P1D96-00	INCORRECT GEAR RATIO CLUTCH A OR B DEFECTIVE
P1D97-00	INCORRECT GEAR RATIO CLUTCH A OR D DEFECTIVE
P1D98-00	INCORRECT GEAR RATIO CLUTCH B OR D DEFECTIVE
P1D99-00	INCORRECT GEAR RATIO CLUTCH B OR E DEFECTIVE
P1D9A-00	INCORRECT GEAR RATIO CLUTCH C OR D DEFECTIVE
P1D9B-00	INCORRECT GEAR RATIO: CLUTCH A OR E DEFECTIVE
P1D9C-00	INCORRECT GEAR RATIO CLUTCH A OR C DEFECTIVE
P1D9D-00	INCORRECT GEAR RATIO CLUTCH B OR C DEFECTIVE
P1D9E-00	INCORRECT GEAR RATIO CLUTCH C OR E DEFECTIVE
P1D9F-00	INCORRECT GEAR RATIO CLUTCH D OR E DEFECTIVE
P1DA0-00	INCORRECT GEAR RATIO CLUTCH A B OR C DEFECTIVE
P1DA1-00	INCORRECT GEAR RATIO CLUTCH A B OR E DEFECTIVE
P1DA2-00	INCORRECT GEAR RATIO CLUTCH B C OR E DEFECTIVE
P1DA3-00	INCORRECT GEAR RATIO CLUTCH B D OR E DEFECTIVE
P1DA4-00	INCORRECT GEAR RATIO CLUTCH B C OR D DEFECTIVE
P1DA5-00	INCORRECT GEAR RATIO CLUTCH C D OR E DEFECTIVE
P1DA6-00	INCORRECT GEAR RATIO CLUTCH A C OR D DEFECTIVE
P1DA7-00	INCORRECT GEAR RATIO CLUTCH A D OR E DEFECTIVE
P1DA8-00	INCORRECT GEAR RATIO CLUTCH A B OR D DEFECTIVE
P1DA9-00	TRANSMISSION FLUID TEMPERATURE RATIONALITY
P1DAA-00	TRANS TEMP UNDETERMINED
P1DAB-00	VEHICLE SPEED UNDETERMINED
P1DAC-00	ENGINE SPEED UNDETERMINED
P1DAD-00	INPUT SHAFT-OUTPUT SHAFT DIRECTION CORRELATION
P1DAE-00	POSITION VALVE STUCK 2ND GEAR TRANS LIMP IN
P1DAF-00	INCOMPATIBLE LIMP IN ACTION REQUESTED

DTC	Description
P1DB0-00	IMPLAUSIBLE TORQUE REQUEST SIGNAL SENT
P1DB1-00	TCM SYSTEM VOLTAGE EXCESSIVELY LOW
P1DB2-00	ACTUATOR SUPPLY VOLTAGE A CIRCUIT
P1DB3-00	TCM ECU RESET-RECOVERY OCCURRED
P1DB4-00	INCORRECT GEAR RATIO DURING GEAR ENGAGEMENT OR IN GEAR
P1DB5-00	INCORRECT GEAR RATIO DURING SHIFT
P1DB6-00	VEHICLE SPEED SIGNAL PERFORMANCE
P1DB7-00	TORQUE CONVERTER CLUTCH PERFORMANCE
P1DB8-00	UNINTENDED TORQUE APPLIED WHILE IN NEUTRAL
P1DB9-00	TCM ECU RESET EXTENDED LOW VOLTAGE
P1DC6-00	TCM NOT PROGRAMMED
P1DC7-00	CLUTCH TEMP THRESHOLD ACHIEVED SHIFT TIME REDUCTION
P1DC8-00	CLUTCH TEMP THRESHOLD ACHIEVED AUTOSTICK INHIBIT
P1DC9-00	CLUTCH TEMP THRESHOLD ACHIEVED SKIP SHIFT DOWN INHIBIT
P1DCA-00	PARK SENSE CIRCUIT OPEN
P1DCD-00	TCM MONITORING PROCESSOR PERFORMANCE MULTIPLE CLUTCHES LOCKED UP
P1DCE-00	TCM MONITORING PROCESSOR PERFORMANCE INCORRECT DRIVING DIRECTION
P1DCF-00	TCM MONITORING PROCESSOR PERFORMANCE UNALLOWED PARK ENGAGEMENT DO TO ABS FAILURE
P1DD0-00	TCM MONITORING PROCESSOR PERFORMANCE UNALLOWED PARK ENGAGEMENT
P1DD1-00	INPUT-TURBINE SPEED SENSOR 1 GRADIENT FAULT
P1DD2-00	TORQUE REQUEST SIGNAL FROM TCM DENIED
P1DDC-00	TCM MONITORING PROCESSOR PERFORMANCE UNALLOWED REVERSE ENGAGEMENT
P1DDD-00	TCM MONITORING PERFORMANCE UNABLE TO DISENGAGE DRIVE OR REVERSE
P1DDE-00	IGNITION RUN-START INPUT 1-2 CORRELATION
P1DEB-00	INCORRECT GEAR DISPLAYED DUE TO INCORRECT GEAR RATIO
P1DF3-00	ECU NOT INITIALIZED
P1DF7-00	ACTUAL DECREASE OF ENGINE TORQUE LOW
P1DF8-00	ACTUAL DECREASE OF ENGINE TORQUE HIGH
P1DFA-00	ACTUAL INCREASE OF ENGINE TORQUE HIGH
P215C-00	OUTPUT SHAFT SPEED WHEEL SPEED CORRELATION
P2761-00	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT-OPEN
P2762-00	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT RANGE-PERFORMANCE
P2763-00	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH

DTC	Description
P2764-00	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT LOW
U0001-00	CAN C BUS
U0074-00	DEDICATED POWERTRAIN (DPT) CAN BUS OFF
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0103-00	LOST COMMUNICATION WITH ELECTRIC GEAR SHIFT MODULE
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0128-00	LOST COMMUNICATION WITH PARK BRAKE CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0212-00	LOST COMMUNICATION WITH SCM
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM-PCM
U0404-00	IMPLAUSIBLE DATA RECEIVED FROM ESM
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0423-00	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER-CCN
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM
U11E3-00	TCM LOST COMMUNICATION WITH ESM ON DPT CAN
U11E4-00	CAN COMMUNICATION MESSAGES MISSING
U1267-00	NO VALID DATA FROM ESM ON CAN-C OR CAN-DPT
U1400-00	IMPLAUSIBLE TPS SIGNAL RECEIVED
U1401-00	IMPLAUSIBLE ENGINE SPEED SIGNAL RECEIVED
U1412-00	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1424-00	IMPLAUSIBLE ENGINE TORQUE SIGNAL RECEIVED
U1461-00	IMPLAUSIBLE DATA RECEIVED FROM ESM ON DPT
U1465-00	IMPLAUSIBLE DRIVER SHIFT REQUEST SIGNAL RECEIVED
U1466-00	IMPLAUSIBLE DRIVER SHIFT REQUEST SIGNAL RECEIVED ON DPT CAN
U1467-00	IMPLAUSIBLE DRIVER SHIFT REQUEST SIGNAL RECEIVED ON CAN AND
U1469-00	IMPLAUSIBLE GEAR SHIFT POSITION SIGNAL SENT DPT CAN-CAN
U1477-00	IMPLAUSIBLE PADDLE SHIFTER DATA RECEIVED
U1479-00	IMPLAUSIBLE DATA RECEIVED FROM SHIFTER MECHANICAL FAILURE

MODULE, TRANSMISSION CONTROL (TCM), 8HP90

DIAGNOSTIC CODE INDEX

DTC	Description
P0219-00	ENGINE OVERSPEED
P0562-00	SYSTEM VOLTAGE LOW
P0563-00	SYSTEM VOLTAGE HIGH
P0601-00	INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR

DTC	Description
P0607-00	ECU INTERNAL PERFORMANCE
P060A-00	INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE
P0613-00	INTERNAL TRANSMISSION PROCESSOR
P061B-00	INTERNAL CONTROL MODULE TORQUE CALCULATION PERFORMANCE
P062F-00	INTERNAL CONTROL MODULE EEPROM ERROR
P0634-00	PCM-ECM-TCM INTERNAL TEMPERATURE TOO HIGH
P0642-00	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643-00	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0657-00	ACTUATOR SUPPLY VOLTAGE A CIRCUIT-OPEN
P0658-00	ACTUATOR SUPPLY VOLTAGE A CIRCUIT LOW
P0659-00	ACTUATOR SUPPLY VOLTAGE A CIRCUIT HIGH
P0666-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 1 CIRCUIT
P0667-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 1 PERFORMANCE
P0668-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 1 CIRCUIT LOW
P0669-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 1 CIRCUIT HIGH
P06AB-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 2 CIRCUIT
P06AC-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 2 PERFORMANCE
P06AD-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 2 CIRCUIT LOW
P06AE-00	PCM-ECM-TCM INTERNAL TEMPERATURE SENSOR 2 CIRCUIT HIGH
P0710-00	TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT
P0712-00	TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT LOW
P0713-00	TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT HIGH
P0714-00	TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT INTERMITTENT
P0716-00	INPUT SHAFT SPEED SENSOR 1 PERFORMANCE
P0721-00	OUTPUT SHAFT SPEED SENSOR CIRCUIT PERFORMANCE
P0729-00	GEAR 6 SHIFT INCORRECT RATIO
P0731-00	GEAR 1 SHIFT INCORRECT RATIO
P0732-00	GEAR 2 SHIFT INCORRECT RATIO
P0733-00	GEAR 3 SHIFT INCORRECT RATIO
P0734-00	GEAR 4 SHIFT INCORRECT RATIO
P0735-00	GEAR 5 SHIFT INCORRECT RATIO
P0750-00	SHIFT SOLENOID 1 CONTROL CIRCUIT - OPEN
P0755-00	SHIFT SOLENOID 2 CONTROL CIRCUIT - OPEN
P076F-00	GEAR 7 SHIFT INCORRECT RATIO
P077C-00	OUTPUT SHAFT SPEED SENSOR CIRCUIT LOW
P077D-00	OUTPUT SHAFT SPEED SENSOR CIRCUIT HIGH
P077E-00	TRANSMISSION FLUID TEMPERATURE MULTIPLE SENSOR CORRELATION
P07BF-00	INPUT-TURBINE SHAFT SPEED SENSOR 1 CIRCUIT LOW

DTC	Description
P07C0-00	INPUT-TURBINE SHAFT SPEED SENSOR 1 CIRCUIT HIGH
P07D9-00	GEAR 8 SHIFT INCORRECT RATIO
P081C-00	PARK INPUT CIRCUIT
P0850-00	PARK-NEUTRAL SWITCH PERFORMANCE
P093A-00	HYDRAULIC ACCUMULATOR SOLENOID OPEN
P093B-00	HYDRAULIC ACCUMULATOR SOLENOID SHORT TO GROUND
P093C-00	HYDRAULIC ACCUMULATOR SOLENOID SHORT TO BATTERY
P0960-00	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT OPEN
P0961-00	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT PERFORMANCE
P0962-00	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT LOW
P0963-00	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT HIGH
P0972-00	SHIFT SOLENOID 1 CONTROL CIRCUIT PERFORMANCE
P0973-00	SHIFT SOLENOID 1 CONTROL CIRCUIT LOW
P0974-00	SHIFT SOLENOID 1 CONTROL CIRCUIT HIGH
P0975-00	SHIFT SOLENOID B CONTROL CIRCUIT PERFORMANCE
P0976-00	SHIFT SOLENOID 2 CONTROL CIRCUIT LOW
P0977-00	SHIFT SOLENOID 2 CONTROL CIRCUIT HIGH
P0978-00	SHIFT SOLENOID 3 CONTROL CIRCUIT RANGE-PERFORMANCE
P0979-00	SHIFT SOLENOID 3 CONTROL CIRCUIT LOW
P0980-00	SHIFT SOLENOID 3 CONTROL CIRCUIT HIGH
P0981-00	SHIFT SOLENOID 4 CONTROL CIRCUIT RANGE-PERFORMANCE
P0982-00	SHIFT SOLENOID 4 CONTROL CIRCUIT LOW
P0983-00	SHIFT SOLENOID 4 CONTROL CIRCUIT HIGH
P0984-00	SHIFT SOLENOID 5 CONTROL CIRCUIT RANGE-PERFORMANCE
P0985-00	SHIFT SOLENOID 5 CONTROL CIRCUIT LOW
P0986-00	SHIFT SOLENOID 5 CONTROL CIRCUIT HIGH
P1601-00	INTERNAL TCM COMPUTER ERROR
P1614-00	ECU RESET-RECOVERY OCCURRED
P1634-00	TCM INTERNAL INTERNAL WATCHDOG PERFORMANCE
P167A-00	CALIBRATION MISMATCH
P1731-00	INCORRECT GEAR ENGAGED
P1915-00	TRANSMISSION INHIBITED REMOTE START
P1B13-00	PARKBYWIRE UNINTENDED OUT OF PARK POSITION
P1B14-00	PARKBYWIRE UNINTENDED PARK POSITION
P1C4E-00	ABS DTC PRESENT
P1D20-00	MULTI MODULE HANDSHAKE FAILURE
P1D25-00	SHIFT CONTROL RATIONALITY
P1D77-00	PARK SOLENOID RANGE-PERFORMANCE
P1D78-00	PARK SOLENOID CIRCUIT LOW
P1D79-00	PARK SOLENOID CIRCUIT HIGH
P1D8A-00	PARK PAWL SOLENOID CIRCUIT LOW

DTC	Description
P1D8B-00	PARK PAWL SOLENOID CIRCUIT HIGH
P1D8C-00	PARK PAWL SOLENOID CIRCUIT OPEN
P1D8D-00	PARK SENSE CIRCUIT LOW
P1D8E-00	PARK SENSE CIRCUIT HIGH
P1D8F-00	INCORRECT GEAR RATIO CLUTCH 1 DEFECTIVE
P1D90-00	INCORRECT GEAR RATIO CLUTCH 2 DEFECTIVE
P1D91-00	INCORRECT GEAR RATIO CLUTCH 3 DEFECTIVE
P1D92-00	INCORRECT GEAR RATIO CLUTCH 4 DEFECTIVE
P1D93-00	INCORRECT GEAR RATIO CLUTCH 5 DEFECTIVE
P1D94-00	TCM INTERNAL SBW CALIBRATION MISMATCH
P1D95-00	TCM CLUTCH FAILURE UNDETERMINED
P1D96-00	INCORRECT GEAR RATIO CLUTCH A OR B DEFECTIVE
P1D97-00	INCORRECT GEAR RATIO CLUTCH A OR D DEFECTIVE
P1D98-00	INCORRECT GEAR RATIO CLUTCH B OR D DEFECTIVE
P1D99-00	INCORRECT GEAR RATIO CLUTCH B OR E DEFECTIVE
P1D9A-00	INCORRECT GEAR RATIO CLUTCH C OR D DEFECTIVE
P1D9B-00	INCORRECT GEAR RATIO: CLUTCH A OR E DEFECTIVE
P1D9C-00	INCORRECT GEAR RATIO CLUTCH A OR C DEFECTIVE
P1D9D-00	INCORRECT GEAR RATIO CLUTCH B OR C DEFECTIVE
P1D9E-00	INCORRECT GEAR RATIO CLUTCH C OR E DEFECTIVE
P1D9F-00	INCORRECT GEAR RATIO CLUTCH D OR E DEFECTIVE
P1DA0-00	INCORRECT GEAR RATIO CLUTCH A B OR C DEFECTIVE
P1DA1-00	INCORRECT GEAR RATIO CLUTCH A B OR E DEFECTIVE
P1DA2-00	INCORRECT GEAR RATIO CLUTCH B C OR E DEFECTIVE
P1DA3-00	INCORRECT GEAR RATIO CLUTCH B D OR E DEFECTIVE
P1DA4-00	INCORRECT GEAR RATIO CLUTCH B C OR D DEFECTIVE
P1DA5-00	INCORRECT GEAR RATIO CLUTCH C D OR E DEFECTIVE
P1DA6-00	INCORRECT GEAR RATIO CLUTCH A C OR D DEFECTIVE
P1DA7-00	INCORRECT GEAR RATIO CLUTCH A D OR E DEFECTIVE
P1DA8-00	INCORRECT GEAR RATIO CLUTCH A B OR D DEFECTIVE
P1DA9-00	TRANSMISSION FLUID TEMPERATURE RATIONALITY
P1DAA-00	TRANS TEMP UNDETERMINED
P1DAB-00	VEHICLE SPEED UNDETERMINED
P1DAC-00	ENGINE SPEED UNDETERMINED
P1DAD-00	INPUT SHAFT-OUTPUT SHAFT DIRECTION CORRELATION
P1DAE-00	POSITION VALVE STUCK 2ND GEAR TRANS LIMP IN
P1DAF-00	INCOMPATIBLE LIMP IN ACTION REQUESTED
P1DB0-00	IMPLAUSIBLE TORQUE REQUEST SIGNAL SENT
P1DB1-00	TCM SYSTEM VOLTAGE EXCESSIVELY LOW
P1DB2-00	ACTUATOR SUPPLY VOLTAGE A CIRCUIT
P1DB3-00	TCM ECU RESET-RECOVERY OCCURRED

DTC	Description
P1DB4-00	INCORRECT GEAR RATIO DURING GEAR ENGAGEMENT OR IN GEAR
P1DB5-00	INCORRECT GEAR RATIO DURING SHIFT
P1DB6-00	VEHICLE SPEED SIGNAL PERFORMANCE
P1DB7-00	TORQUE CONVERTER CLUTCH PERFORMANCE
P1DB8-00	UNINTENDED TORQUE APPLIED WHILE IN NEUTRAL
P1DB9-00	TCM ECU RESET EXTENDED LOW VOLTAGE
P1DC6-00	TCM NOT PROGRAMMED
P1DC7-00	CLUTCH TEMP THRESHOLD ACHIEVED SHIFT TIME REDUCTION
P1DC8-00	CLUTCH TEMP THRESHOLD ACHIEVED AUTOSTICK INHIBIT
P1DC9-00	CLUTCH TEMP THRESHOLD ACHIEVED SKIP SHIFT DOWN INHIBIT
P1DCA-00	PARK SENSE CIRCUIT OPEN
P1DCD-00	TCM MONITORING PROCESSOR PERFORMANCE MULTIPLE CLUTCHES LOCKED UP
P1DCE-00	TCM MONITORING PROCESSOR PERFORMANCE INCORRECT DRIVING DIRECTION
P1DCF-00	TCM MONITORING PROCESSOR PERFORMANCE UNALLOWED PARK ENGAGEMENT DO TO ABS FAILURE
P1DD0-00	TCM MONITORING PROCESSOR PERFORMANCE UNALLOWED PARK ENGAGEMENT
P1DD1-00	INPUT-TURBINE SPEED SENSOR 1 GRADIENT FAULT
P1DD2-00	TORQUE REQUEST SIGNAL FROM TCM DENIED
P1DDC-00	TCM MONITORING PROCESSOR PERFORMANCE UNALLOWED REVERSE ENGAGEMENT
P1DDD-00	TCM MONITORING PERFORMANCE UNABLE TO DISENGAGE DRIVE OR REVERSE
P1DDE-00	IGNITION RUN-START INPUT 1-2 CORRELATION
P1DEB-00	INCORRECT GEAR DISPLAYED DUE TO INCORRECT GEAR RATIO
P1DF3-00	ECU NOT INITIALIZED
P1DF7-00	ACTUAL DECREASE OF ENGINE TORQUE LOW
P1DF8-00	ACTUAL DECREASE OF ENGINE TORQUE HIGH
P1DFA-00	ACTUAL INCREASE OF ENGINE TORQUE HIGH
P215C-00	OUTPUT SHAFT SPEED WHEEL SPEED CORRELATION
P2761-00	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT-OPEN
P2762-00	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT RANGE-PERFORMANCE
P2763-00	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT HIGH
P2764-00	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT LOW
U0001-00	CAN C BUS
U0074-00	DEDICATED POWERTRAIN (DPT) CAN BUS OFF

DTC	Description
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0103-00	LOST COMMUNICATION WITH ELECTRIC GEAR SHIFT MODULE
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0128-00	LOST COMMUNICATION WITH PARK BRAKE CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0212-00	LOST COMMUNICATION WITH SCM
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM-PCM
U0404-00	IMPLAUSIBLE DATA RECEIVED FROM ESM
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U0423-00	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER-CCN
U0429-00	IMPLAUSIBLE DATA RECEIVED FROM SCM
U11E3-00	TCM LOST COMMUNICATION WITH ESM ON DPT CAN
U11E4-00	CAN COMMUNICATION MESSAGES MISSING
U1267-00	NO VALID DATA FROM ESM ON CAN-C OR CAN-DPT
U1400-00	IMPLAUSIBLE TPS SIGNAL RECEIVED
U1401-00	IMPLAUSIBLE ENGINE SPEED SIGNAL RECEIVED
U1412-00	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1424-00	IMPLAUSIBLE ENGINE TORQUE SIGNAL RECEIVED
U1461-00	IMPLAUSIBLE DATA RECEIVED FROM ESM ON DPT
U1465-00	IMPLAUSIBLE DRIVER SHIFT REQUEST SIGNAL RECEIVED
U1466-00	IMPLAUSIBLE DRIVER SHIFT REQUEST SIGNAL RECEIVED ON DPT CAN
U1467-00	IMPLAUSIBLE DRIVER SHIFT REQUEST SIGNAL RECEIVED ON CAN AND
U1469-00	IMPLAUSIBLE GEAR SHIFT POSITION SIGNAL SENT DPT CAN-CAN
U1477-00	IMPLAUSIBLE PADDLE SHIFTER DATA RECEIVED
U1479-00	IMPLAUSIBLE DATA RECEIVED FROM SHIFTER MECHANICAL FAILURE

RADIO

DIAGNOSTIC CODE INDEX

DTC	Description
B1400-11	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - BASE
B1400-11	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND-PREMIUM
B1400-12	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - BASE
B1400-12	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - PREMIUM

DTC	Description
B1400-13	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - BASE
B1400-13	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - PREMIUM
B1400-1A	FRONT LEFT AUDIO SPEAKER OUTPUT-CIRCUIT RESISTANCE BELOW THRESHOLD - BASE
B1400-1A	FRONT LEFT AUDIO SPEAKER OUTPUT-CIRCUIT RESISTANCE BELOW THRESHOLD - PREMIUM
B1400-92	FRONT LEFT AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1404-11	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - BASE
B1404-11	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - PREMIUM
B1404-12	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - BASE
B1400-12	FRONT LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - PREMIUM
B1404-13	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - BASE
B1404-13	FRONT RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - PREMIUM
B1404-1A	FRONT RIGHT AUDIO SPEAKER OUTPUT-CIRCUIT RESISTANCE BELOW THRESHOLD - BASE
B1404-1A	FRONT RIGHT AUDIO SPEAKER OUTPUT-CIRCUIT RESISTANCE BELOW THRESHOLD - PREMIUM
B1404-92	FRONT RIGHT AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B1408-11	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - BASE
B1408-11	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - PREMIUM
B1408-12	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - BASE
B1408-12	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - PREMIUM
B1408-13	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - BASE
B1408-13	REAR LEFT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - PREMIUM
B1408-1A	REAR LEFT AUDIO SPEAKER OUTPUT-CIRCUIT RESISTANCE BELOW THRESHOLD - BASE
B1408-1A	REAR LEFT AUDIO SPEAKER OUTPUT-CIRCUIT RESISTANCE BELOW THRESHOLD - PREMIUM
B1408-92	REAR LEFT AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B140C-11	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - BASE

DTC	Description
B140C-11	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND - PREMIUM
B140C-12	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - BASE
B140C-12	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO BATTERY - PREMIUM
B140C-13	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - BASE
B140C-13	REAR RIGHT AUDIO SPEAKER OUTPUT - CIRCUIT OPEN - PREMIUM
B140C-1A	REAR RIGHT AUDIO SPEAKER OUTPUT-CIRCUIT RESISTANCE BELOW THRESHOLD - BASE
B140C-1A	REAR RIGHT AUDIO SPEAKER OUTPUT-CIRCUIT RESISTANCE BELOW THRESHOLD - PREMIUM
B140C-92	REAR RIGHT AUDIO SPEAKER OUTPUT - PERFORMANCE OR INCORRECT OPERATION
B142A-4B	RADIO UNIT HIGH TEMPERATURE - OVER TEMPERATURE
B143A-11	MICROPHONE 1 - CIRCUIT SHORT TO GROUND
B143A-12	MICROPHONE 1 - CIRCUIT SHORT TO BATTERY
B143A-13	MICROPHONE 1 - CIRCUIT OPEN
B143A-1A	MICROPHONE 1-CIRCUIT RESISTANCE BELOW THRESHOLD
B143D-11	MICROPHONE 2 - CIRCUIT SHORT TO GROUND
B143D-12	MICROPHONE 2 - CIRCUIT SHORT TO BATTERY
B143D-13	MICROPHONE 2 - CIRCUIT OPEN
B143D-1A	MICROPHONE 2-CIRCUIT RESISTANCE BELOW THRESHOLD
B1488-00	CABIN EQ MISMATCH PERFORMANCE
B14DA-2A	HEAD UNIT BUTTON-STUCK
B1560-11	CELLULAR ANTENNA 1-CIRCUIT SHORT TO GROUND
B1560-13	CELLULAR ANTENNA 1-CIRCUIT OPEN
B1562-11	GPS ANTENNA - CIRCUIT TO GROUND
B1562-13	GPS ANTENNA-CIRCUIT OPEN
B156B-13	SATELLITE RADIO ANTENNA-CIRCUIT OPEN
B156B-1A	SATELLITE RADIO ANTENNA-CIRCUIT RESISTANCE BELOW THRESHOLD
B1570-19	USB COMMUNICATION-OVERCURRENT
B1577-13	UNIVERSAL CONSUMER INTERFACE (UCI)-CIRCUIT OPEN
B1578-13	AUDIO ANTENNA-CIRCUIT OPEN
B1578-1A	AUDIO ANTENNA-CIRCUIT RESISTANCE BELOW THRESHOLD
B157E-00	TOUCH SCREEN LOCKED
B210A-16	SYSTEM VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
B210B-17	SYSTEM VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
B2206-00	CURRENT VIN MISSING / MISMATCH
B221E-00	RADIO INTERNAL
B223B-00	VEHICLE CONFIGURATION MISMATCH

DTC	Description
B273F-00	AIRBAG SIGNAL TEST FAILED
B280B-00	NTSC VIDEO INPUT
U0002-00	CAN C BUS OFF PERFORMANCE
U0010-00	CAN INTERIOR BUS
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0019-87	CAN B BUS-MISSING MESSAGE
U0019-88	CAN B BUS-BUS OFF
U0020-00	CAN B BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0143-00	LOST COMMUNICATION WITH MULTI-PURPOSE MODULE (VEHICLE SYSTEM INTERFACE MODULE-VSIM)
U0151-00	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0164-00	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0199-00	LOST COMMUNICATION WITH DRIVER DOOR MODULE
U0200-00	LOST COMMUNICATION WITH PASSENGER DOOR MODULE
U0208-00	LOST COMMUNICATION WITH HEATED SEAT CONTROL MODULE
U0209-00	LOST COMMUNICATION WITH MEMORY SEAT CONTROL MODULE
U0232-00	LOST COMMUNICATION WITH BLIND SPOT DETECTION MODULE
U11B8-00	LOST COMMUNICATION WITH INTEGRATED CENTER STACK (ICS)
U1215-00	LOST COMMUNICATION WITH FORWARD FACING CAMERA

SENSOR, LEFT BLIND SPOT (LBSS)

DIAGNOSTIC CODE INDEX

DTC	Description
B128C-2A	DRIVER BLIND SPOT SENSOR-STUCK
B128C-48	DRIVER BLIND SPOT SENSOR-SUPERVISION SOFTWARE FAILURE
B128C-98	DRIVER BLIND SPOT SENSOR-COMPONENT OR SYSTEM OVER TEMPERATURE
B2199-16	BATTERY VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
B223B-00	VEHICLE CONFIGURATION MISMATCH
B2598-00	DOOR MODULE FRONT LEFT
B2599-00	DOOR MODULE FRONT RIGHT
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM

DTC	Description
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0203-00	LOST COMMUNICATION WITH LEFT FRONT DOOR MODULE
U0204-00	LOST COMMUNICATION WITH RIGHT FRONT DOOR MODULE
U1194-01	LOST COMMUNICATION WITH PASSENGER SIDE BLIND SPOT SENSOR-GENERAL ELECTRICAL FAILURE
U1194-87	LOST COMMUNICATION WITH PASSENGER SIDE BLIND SPOT SENSOR-MISSING MESSAGE

SENSOR, RIGHT BLIND SPOT (RBSS)

DIAGNOSTIC CODE INDEX

DTC	Description
B128D-2A	PASSENGER BLIND SPOT SENSOR-STUCK
B128D-48	PASSENGER BLIND SPOT SENSOR-SUPERVISION SOFTWARE FAILURE
B128D-98	PASSENGER BLIND SPOT SENSOR-COMPONENT OR SYSTEM OVER TEMPERATURE
B2199-16	BATTERY VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
B2199-17	BATTERY VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
B223B-00	VEHICLE CONFIGURATION MISMATCH
B2598-00	DOOR MODULE FRONT LEFT
B2599-00	DOOR MODULE FRONT RIGHT
U0011-00	CAN INTERIOR BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0203-00	LOST COMMUNICATION WITH LEFT FRONT DOOR MODULE
U0204-00	LOST COMMUNICATION WITH RIGHT FRONT DOOR MODULE
U1193-01	LOST COMMUNICATION WITH DRIVER SIDE BLIND SPOT SENSOR-GENERAL ELECTRICAL FAILURE
U1193-87	LOST COMMUNICATION WITH DRIVER SIDE BLIND SPOT SENSOR-MISSING MESSAGE

.

Article GUID: A00735870

STANDARD PROCEDURE

RF-HUB, BCM, PCM, FOBIK REPLACEMENT AND PROGRAMMING ORDER GUIDE

Module	MODULE REPLACEMENT GUIDE (RF-HUB, BCM, PCM, FOBIK)							
	Condition 1	Condition 2	Condition 3	Condition 4	Condition 5	Condition 6	Condition 7	Condition 8
RF-HUB	New	Existing	Existing	Existing	New	New	New	Existing
BCM	Existing	New	Existing	Existing	New	Existing	Existing	New
FOBIKs	Existing	Existing	New	Existing	Existing	New	Existing	New
PCM	Existing	Existing	Existing	New	Existing	Existing	New	Existing
PROGRAMMING ORDER	ASSOCIATED MODULE MISC. FUNCTION (SCAN TOOL FUNCTION)							
1	Program Ignition FOBIKs (ignition off)	Cycle ignition on and wait 10 seconds	Program Ignition FOBIKs (ignition off)	Flash update PCM (if PCM arrives in a generic state)	Run Restore Vehicle Configuration (should enable PCM and RF-HUB)	Program Ignition FOBIKs (ignition off)	Program Ignition FOBIKs (ignition off)	Program Ignition FOBIKs (ignition off)
2	RF-HUB Replace	----	----	Check PCM VIN and other PCM routines	Program Ignition FOBIKs (ignition off)	RF-HUB Replace	Flash PCM (if PCM arrives in a generic state)	Cycle ignition on and wait 10 seconds
3	----	----	----	----	Run Restore Vehicle Configuration again to write full configuration	----	Check PCM VIN and other PCM routines	----
4	----	----	----	----	RF-HUB Replace	----	RF-HUB Replace	----
5	----	----	----	----	----	----	----	----

Module	MODULE REPLACEMENT GUIDE (RF-HUB, BCM, PCM, FOBIK)						
	Condition 9	Condition 10	Condition 11	Condition 12	Condition 13	Condition 14	Condition 15
RF-HUB	Existing	Existing	Existing	New	New	New	New
BCM	New	Existing	New	Existing	New	New	New

Module	MODULE REPLACEMENT GUIDE (RF-HUB, BCM, PCM, FOBIK)						
	Condition 9	**Condition 10**	**Condition 11**	**Condition 12**	**Condition 13**	**Condition 14**	**Condition 15**
FOBIKs	Existing	New	New	New	Existing	New	New
PCM	New	New	New	New	New	Existing	New
PROGRAMMING ORDER	**ASSOCIATED MODULE MISC. FUNCTION (SCAN TOOL FUNCTION)**						
1	Flash update PCM (if PCM arrives in a generic state)	Program Ignition FOBIKs (ignition off)	Program Ignition FOBIKs (ignition off)	Program Ignition FOBIKs (ignition off)	Run Restore Vehicle Configuration (should enable PCM and RF-HUB)	Run Restore Vehicle Configuration (should enable PCM and RF-HUB)	Run Restore Vehicle Configuration (should enable PCM and RF-HUB)
2	Check PCM VIN and other PCM routines	Flash update PCM (if PCM arrives in a generic state)	Flash update PCM (if PCM arrives in a generic state)	Flash update PCM (if PCM arrives in a generic state)	Program Ignition FOBIKs (ignition off)	Program Ignition FOBIKs (ignition off)	Program Ignition FOBIKs (ignition off)
3	----	Check PCM VIN and other PCM routines	Check PCM VIN and other PCM routines	Check PCM VIN and other PCM routines	Flash update PCM (if PCM arrives in a generic state)	Run Restore Vehicle Configuration again to write full configuration	Flash update PCM (if PCM arrives in a generic state)
4	----	----	----	RF-HUB Replace	Check PCM VIN and the other needed PCM routines	RF-HUB Replace	Check PCM VIN and the other needed PCM routines
5	----	----	----	----	Run Restore Vehicle Configuration again to write full configuration	----	Run Restore Vehicle Configuration again to write full configuration
6	----	----	----	----	RF-HUB Replace	----	RF-HUB Replace
7	----	----	----	----	----	----	----

VEHICLE SCAN AND CONFIGURATION REPORTS

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Powertrain Control Module (PCM) mounting bracket to PCM retaining nuts.	8	-	71	Ā
PCM bracket to cross support retaining bolt.	16	12	-	Ā
Negative battery cable to battery post	5	-	45	Ā
Adaptive Cruise Control (ACC) mounting bracket	12	-	-	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

COMMUNICATION

DESCRIPTION

DESCRIPTION

This vehicle is equipped with the PowerNet electronic architecture.

The primary on-board communication network between microcontroller-based electronic control modules in this vehicle is the Controller Area Network (CAN) data bus system. A data bus network minimizes redundant wiring connections; and, at the same time, reduces wire harness complexity, sensor current loads and controller hardware by allowing each sensing device to be connected to only one module (also referred to as a node). Each node reads, then broadcasts its sensor data over the bus for use by all other nodes requiring that data. Each node ignores the messages on the bus that it cannot use.

The CAN bus is a two-wire multiplex system. Multiplexing is any system that enables the transmission of multiple messages over a single channel or circuit. The CAN bus is used for communication between most vehicle nodes. However, in addition to the CAN bus network, certain nodes may also be equipped with a Local Interface Network (LIN) data bus. The LIN data bus is a single wire low-speed (9.6 Kbps) serial link bus used to provide direct communication between a LIN master module and certain switch or sensor inputs.

There are actually two separate CAN bus systems used in the vehicle. They are designated: the CAN-IHS and the CAN-C. The CAN-IHS and CAN-C systems provide on-board communication between all of the nodes that are connected to them. The CAN-C is the faster of the two systems providing near real-time communication (500 Kbps). The CAN-C is used typically for communications between more critical nodes, while the slower (125 Kbps). The CAN-IHS system is used for communications between less critical nodes. This electronics architecture is called PowerNet.

The added speed of the CAN data bus is many times faster than previous data bus systems. This added speed facilitates the addition of more electronic control modules or nodes and the incorporation of many new electrical and electronic features in the vehicle.

The BCM is located under the instrument panel to right of the glove box. The central CAN gateway or hub module integral to the BCM is connected to CAN-IHS and CAN-C buses. This gateway physically and electrically isolates the CAN buses from each other and coordinates the bi-directional transfer of messages

between them.

OPERATION

OPERATION

The primary communication network between electronic control modules on this vehicle is the Controller Area Network (CAN) data bus system. The Controller Area Network (CAN) data bus allows all electronic modules connected to the bus to share information with each other. Regardless of whether a message originates from a module on the higher speed CAN C (500K) Bus or on the lower speed CAN Interior High Speed (IHS) (125K) Bus the message structure and layout is similar, which allows the Body Control Module (BCM) to be a Central GateWay to process and transfer messages between the CAN C and CAN IHS buses. The BCM also stores Diagnostic Trouble Codes (DTCs) for certain bus network faults. These data communication network is known as the **PowerNet** electronics architecture.

All modules transmit and receive messages over one of these buses. Data exchange between the modules is achieved by serial transmission of encoded data messages (a form of transmission in which data bits are sent sequentially, one at a time, over a single line). Each module can both send and receive serial data simultaneously. Each data bit of a CAN Bus message is carried over the bus as a voltage differential between the two bus circuits which, when strung together, form a message. Each module uses arbitration to sort the message priority if two competing messages are attempting to be broadcast at the same time. Corruption of a single bit within a message will corrupt the entire message. Each message contains a Cyclic Redundancy Check (CRC) which specifies the message size exactly. If the message detected conflicts with the CRC the ECU receiving it will determine the message to be an error and consider that communication has not been possible. Diagnosis of this condition using a lab scope may reveal activity that appears to be Bus data messages even if no actual communication is possible. Communication problems that affect the whole bus, as a result of opens and terminal push outs are more likely to occur on data busses that operate at a high speed than a data bus that operates at a lower speed.

When an open circuit or terminal push out occurs one or more modules can become isolated from the remainder of the bus. The isolated module will attempt to communicate, but will not be able to receive messages or determine arbitration from other modules. Each time the isolated module attempts to communicate it alters the bus voltage on the intact bus circuit. Without functioning arbitration the isolated module alters the bus voltage while other bus messages are being sent thereby corrupting the messages on the remainder of the bus.

The communication protocol being used for the CAN data bus is a non-proprietary, open standard adopted from the Bosch CAN Specification 2.0b. The CAN-C is the faster of the two primary buses in the CAN bus system, providing near real-time communication (500 Kbps). CAN-IHS communicate at (125 Kbps).

The CAN bus nodes are connected in parallel to the two-wire bus using a twisted pair, where the wires are wrapped around each other to provide shielding from unwanted electromagnetic induction, thus preventing interference with the relatively low voltage signals being carried through them. The twisted pairs have between 33 and 50 twists per meter (yard). While the CAN bus is operating (active), one of the bus wires will carry a higher voltage and is referred to as the CAN bus (+) wire, while the other bus wire will carry a lower voltage and is referred to as the CAN bus (-) wire. Refer to the CAN Bus Voltages chart .

CAN Bus Voltages (Normal Operation)								
CAN-C Bus Circuits	**Sleep**	**Recessive (Bus Idle)**	**Dominant (Bus Active)**	**CAN (-) Short to Ground**	**CAN (+) Short to Ground**	**CAN (-) Short to Battery**	**CAN (+) Short to Battery**	**CAN (+) Short to CAN (-)**

CAN Bus Voltages (Normal Operation)								
CAN-C Bus Circuits	**Sleep**	**Recessive (Bus Idle)**	**Dominant (Bus Active)**	**CAN (-) Short to Ground**	**CAN (+) Short to Ground**	**CAN (-) Short to Battery**	**CAN (+) Short to Battery**	**CAN (+) Short to CAN (-)**
CAN (-)	0 V	2.4 - 2.5 V	1.3 - 2.3 V	0 V	0.3 - 0.5V	Battery Voltage	Battery Voltage Less 0.75 V	2.45 V
CAN (+)	0 V	2.4 - 2.5 V	2.6 - 3.5 V	0.02 V	0 V	Battery Voltage Less 0.75 V	Battery Voltage	2.45 V
CAN-IHS Bus Circuits	**Key-Off (Bus Asleep)**		**Key-On (Bus Active)**	**CAN (-) Short to Ground**	**CAN (+) Short to Ground**	**CAN (-) Short to Battery**	**CAN (+) Short to Battery**	**CAN (+) Short to CAN (-)**
CAN (-)	0.0V		1.3 - 2.3 V	0 V	0.3 - 0.5 V	Battery Voltage	Battery Voltage Less 0.75 V	2.45 V
CAN (+)	0.0 V		2.6 - 3.5 V	0.02 V	0 V	Battery Voltage Less 0.75 V	Battery Voltage	2.45 V
Notes All measurements taken between node ground and CAN terminal with a standard DVOM. DVOM will display average network voltage. Total resistance of CAN networks can be measured with the battery disconnected. The average resistance is approximately 60 Ohms. The termination resistors are integral to the Star Connectors.								

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The CAN bus network remains active until all nodes on that network are ready for sleep. This is determined by the network using tokens in a manner similar to polling. When the last node that is active on the network is ready for sleep, and it has already received a token indicating that all other nodes on the bus are ready for sleep, it broadcasts a **bus sleep acknowledgment** message that causes the network to sleep. Once the CAN-IHS bus network is asleep, any node on the bus can awaken it by transmitting a message on the network. The BCM will keep either the CAN-IHS or the CAN-C bus awake for a timed interval after it receives a diagnostic message for that bus over the Diagnostic CAN-C bus.

In the CAN system, available options are configured into the BCM at the assembly plant, but additional options can be added in the field using the diagnostic scan tool. The configuration settings are stored in non-volatile memory. The BCM also has two 64-bit registers, which track each of the **as-built** and **currently responding** nodes on the CAN-IHS and CAN-C buses. The BCM stores a Diagnostic Trouble Code (DTC) in one of two caches for any detected active or stored faults in the order in which they occur. One cache stores powertrain (P-Code), chassis (C-Code) and body (B-Code) DTCs, while the second cache is dedicated to storing network (U-Code) DTCs.

CONNECTOR, STAR DIAGNOSTIC

DESCRIPTION

DESCRIPTION

Star connectors provide a simple method of diagnosing CAN Bus communication faults through the use of connection points for all modules on the bus. The connectors can be used to eliminate a module or group of modules in order to diagnose issues with the CAN Bus circuits and connectors to the modules or the modules themselves.

There are two locations for the STAR diagnostic connectors on this vehicle:

- The location of IP side CAN IHS Connectors - Behind the glove box on the passenger side. These connectors slide right to left in order to remove from the mounting bracket.
- The location of Body side CAN C Connectors - Drivers rear cargo area of the trunk compartment.

MODULE, ACTIVE DAMPING CONTROL

DESCRIPTION

DESCRIPTION

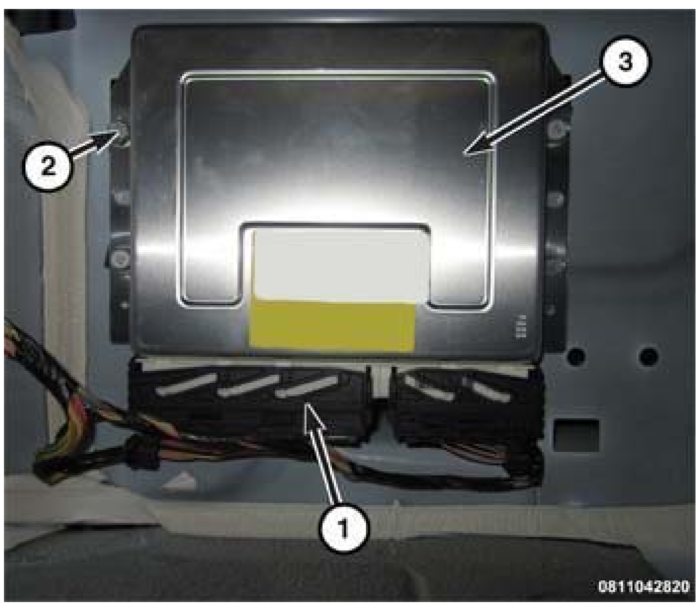

Fig. 1: Active Damping Control Module, Screws & Connectors
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with Active Damping Suspension (ADS) have an Active Damping Control Module (ADCM). The ADCM (3) is located in the left side of the trunk and is retained by four mounting screws (2). The carpet on the left side of the trunk has to be repositioned to access the ADCM.

OPERATION

OPERATION

The Active Damping Control Module (ADCM) uses the CAN bus to communicate with multiple modules. The

ADCM has the following inputs: Vehicle Speed, Steering Angle Sensor (SAS) position, Throttle Position Sensor (TPS), Active Damping System (ADS) input switch, and 3 acceleration sensors. There are solenoid-controlled ADS valving units on each shock absorber assembly which are the outputs for the ADCM.

The ADS input switch is a soft touch button on the radio display. When the ADS input switch is pressed with the key in the ON or RUN position, a signal is sent over the CAN bus to the ADCM and the Transmission Control Module (TCM) to change modes. The resulting change is indicated on the radio display.

The Active Damping Control Module (ADCM) controls the suspension and ride for the SRT version of this vehicle by adjusting the rebound and jounce of the shock assemblies using the above information and predetermined settings for maximum vehicle control. The shock absorbers are unique to the Active Damping System (ADS). Each shock absorber has a valving unit that is external, but still part of the shock absorber. Inside each valving unit are two solenoids that control the damping valves to alter the ride of the vehicle. The shocks are replaced as an assembly, they cannot be disassembled for repair.

The two front acceleration sensors are mounted with one on each wheel well. The rear acceleration sensor is mounted in the right rear wheel well on the shock tower. The ADCM is located in the left side of the trunk.

REMOVAL

REMOVAL

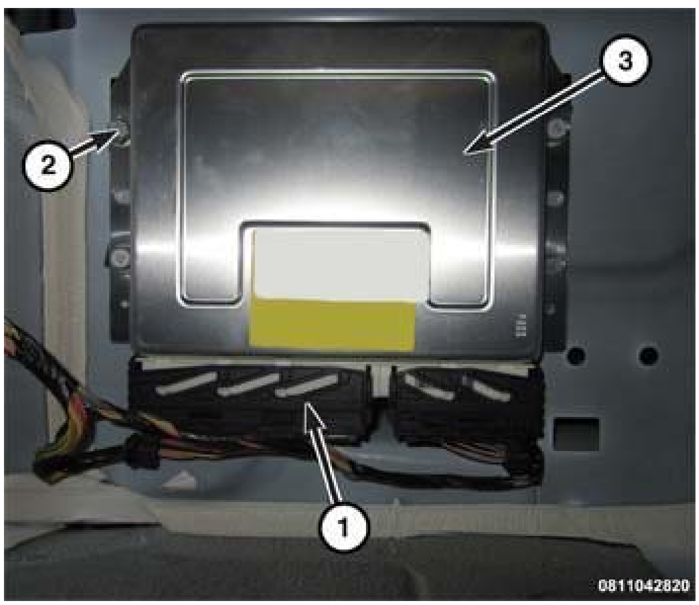

Fig. 2: Active Damping Control Module, Screws & Connectors
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the left rear wheel well carpet. Refer to **CARPET, REMOVAL** .
3. Disconnect the two wire harness connectors (1) and remove the four screws (2) from the Adaptive Damping Control Module (ADCM) (3).
4. Remove the ADCM from the vehicle.

INSTALLATION

INSTALLATION

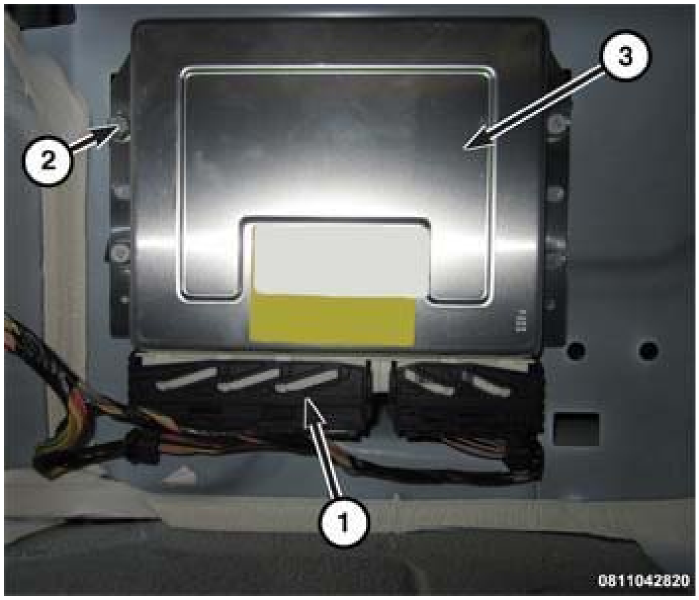

Fig. 3: Active Damping Control Module, Screws & Connectors
Courtesy of CHRYSLER GROUP, LLC

1. Place the Active Damping Control Module (ADCM) (3) into position and install the four ADCM retaining screws (2). Tighten to the proper **SPECIFICATIONS**.
2. Install the retaining screws (2) and tighten to 9 N.m (80 in. lbs.).
3. Connect the wire harness connectors (1) to the ADCM (3). Install the inner left rear wheel well carpet. Refer to **CARPET, INSTALLATION** .
4. Connect the negative battery cable.
5. Perform the ADCM Verification Test. Refer to **STANDARD PROCEDURE** .

MODULE, ADAPTIVE CRUISE CONTROL

DESCRIPTION

DESCRIPTION

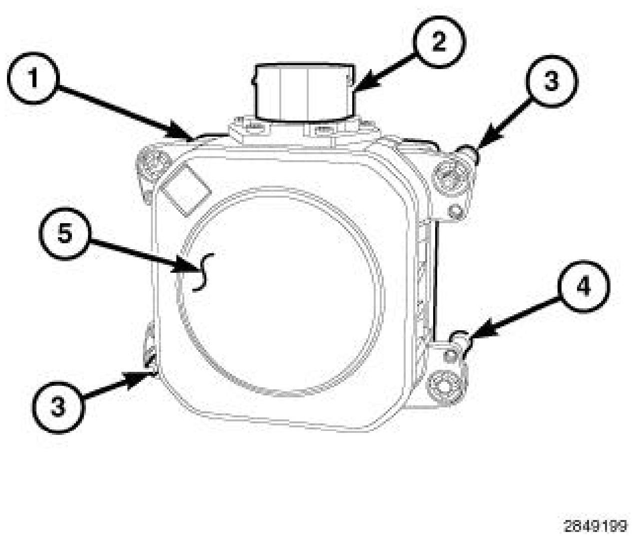

Fig. 4: Adaptive Speed Control Sensor, One Fixed Ball Stud, Two Adjustable Ball Studs & Radar Dome

Courtesy of CHRYSLER GROUP, LLC

The Adaptive Cruise Control (ACC) module (1) is mounted to the front bumper beam at the centerline of the vehicle. The stamped steel ACC module mounting bracket is secured by two screws to rivet nuts installed in the face of the bumper support member. This module is also the primary component of the Forward Collision Warning (FCW) feature of the Electronic Vehicle Information Center (EVIC).

One fixed ball stud (4) and two adjustable ball studs (3) secure the module housing through a pressed fit into molded plastic ball socket clips installed in the mounting bracket. The module pivots on the fixed ball stud while the two adjustable ball studs allow the module to be vertically aligned after installation.

The ACC module electronic circuitry is sealed and protected within a die cast aluminum housing. A molded plastic cover and a lens or radar dome (5) faces forward through an opening in the center of the front fascia lower airflow grille texture that is trimmed with a bezel snapped into the texture opening. A molded plastic module bezel or mirror cover with a center clearance hole for the module lens snaps over the module and conceals a small square mirror in one corner of the module cover that is used for calibration purposes during the module manufacturing process.

The ACC module includes an applied connector receptacle (2) that is sealed and secured to the module housing with screws and faces downward when installed on the mounting bracket. The ACC module is connected to the vehicle electrical system through a single dedicated takeout and connector of the FEM wire harness.

The adjustable ball studs and the ACC module cannot be repaired. If ineffective or damaged the entire module unit must be replaced. The ACC bracket assembly must be replaced if service is needed. This is to ensure proper functionality and the press fit nature of the clips.

OPERATION

OPERATION

The microcontroller within the Adaptive Cruise Control (ACC) module contains the logic circuits and controls many of the features of the adaptive speed control system. The ACC module receives battery voltage on a fused ignition switch output (run) circuit and is grounded at all times through a hard wired remote ground point. These connections allow the ACC module to operate only when the ignition switch is in the ON position. Likewise, the ACC module sleeps whenever the ignition switch is in any position except RUN.

The ACC module is also a Radio Detection And Ranging (RADAR) transceiver. The ACC module transmits electromagnetic signal bursts at an operating frequency of 77 gigahertz. Those signal bursts are scattered by any objects they strike within the 40 degree field of view of the transceiver, which changes the strength and frequency of the signal. The ACC module antenna receives and interprets the returned signals to detect any objects in the path of the vehicle as well as their speed and direction.

The ACC module receives electronic speed control switch status message inputs from the microcontroller integral to the Steering Column Control Module (SCCM) over the Controller Area Network (CAN) data bus. The module also monitors electronic message inputs from the Powertrain Control Module (PCM), the Antilock Brake System (ABS) Module and the Transmission Control Module (TCM).

The ACC module logic processes all of those inputs, then provides the appropriate electronic message outputs over the CAN data bus to the PCM, the TCM and the ABS to control and maintain the separation setting selected by the vehicle operator between the vehicle and any preceding vehicles. The ACC module also provides electronic message outputs to the Instrument Panel Cluster (IPC) and the Electronic Vehicle Information Center

(EVIC) to invoke the Forward Collision Warning (FCW) features.

The module also contains an electronic ambient temperature module and a heating element. When appropriate ambient temperatures are sensed, the heating element is energized by the ACC module control circuitry to keep the module lens or radar dome clear of ice and snow accumulations that might otherwise blind the module to proper reception of returned signals.

The ACC module microcontroller continuously monitors all of its internal electronics to determine the module readiness. If the ACC module detects a monitored module fault, it sets and stores a Diagnostic Trouble Code (DTC). The ACC module uses On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool over the CAN data bus. This method of communication is used for control of the indicators and indications provided to the vehicle operator through the Instrument Panel Cluster (IPC) and the EVIC. The ACC module is also Flash programmable, allowing the module software to be updated using a diagnostic scan tool.

The hard wired inputs for the ACC module may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the ACC module or the electronic controls or communication between other modules and devices that provide features of the ACC and FCW system features. The most reliable, efficient, and accurate means to diagnose the ACC module or the electronic controls and communication related to ACC or FCW system operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

SENSOR AND BRACKET

1. Disconnect and isolate the battery negative cable.
2. Raise and support the vehicle.
3. Remove the front fascia from the vehicle. Refer to **FASCIA, FRONT, REMOVAL** .

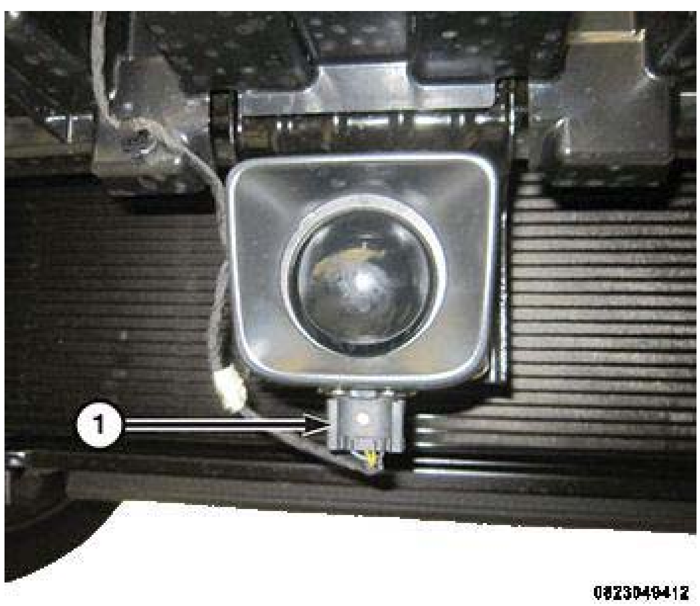

Fig. 5: Adaptive Cruise Control Module Connector
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the wiring harness connector (1) from the Adaptive Cruise Control (ACC) module.
5. Remove the energy absorber from the vehicle. Refer to **ABSORBER, FRONT ENERGY, REMOVAL** .

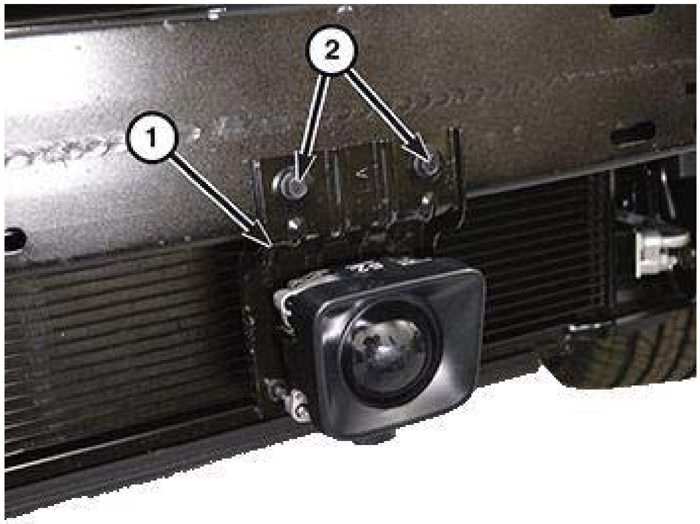

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Fig. 6: Adaptive Cruise Control Module Bracket & Screws
Courtesy of CHRYSLER GROUP, LLC

6. Remove the two screws (2) that secure the bracket (1) to the front bumper support bar.
7. Remove the mounting bracket from the bumper support bar.

INSTALLATION

SENSOR AND BRACKET

1. Check to be certain that the two rivet nuts are properly installed and in good condition in front bumper support bar.
2. Position the mounting bracket to the bumper support bar.

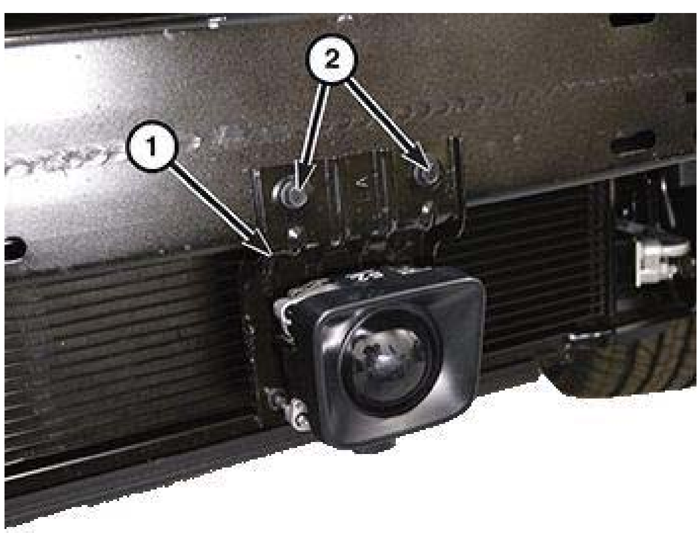

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Fig. 7: Adaptive Cruise Control Module Bracket & Screws
Courtesy of CHRYSLER GROUP, LLC

3. Install and tighten the two screws (2) that secure the mounting bracket (1) to the support bar. Tighten the screws securely.
4. Install the energy absorber. Refer to **ABSORBER, FRONT ENERGY, INSTALLATION** .

Fig. 8: Adaptive Cruise Control Module Connector
Courtesy of CHRYSLER GROUP, LLC

5. Connect the wiring harness connector (1) to the ACC sensor module.
6. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
7. Connect the negative battery cable.
8. Perform the ACC module alignment procedure. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, MODULE PROGRAMMING**.

MODULE PROGRAMMING

ADAPTIVE SPEED CONTROL MODULE - ALIGNMENT

The Adaptive Cruise Control (ACC) module requires alignment when the:

- ACC module is removed and reinstalled
- Front end structural repairs are performed
- A Diagnostic Trouble Code (DTC) indicates ACC adjustment is required
- Any suspension or vehicle alignment changes

ACC module alignment consists of performing the mechanical vertical alignment described in the following procedure, followed by the electronic horizontal alignment that is performed with a diagnostic scan tool and the appropriate diagnostic information.

VEHICLE PREPARATION FOR MODULE ALIGNMENT

NOTE: **The ACC module lens could be obstructed by snow/ice, dirt, mud, and other environmental debris. A message will appear on dash to clean the lens when needed. The module lens is equipped with a heating element that can melt snow/ice. Otherwise the lens must be cleaned manually. Also note that the assembly could be misaligned or damaged from impact or water intrusion.**

1. Repair or replace any ineffective, worn or damaged body components. Repair any loose or cracked fascia components that might interfere with the sensor field of view. The lens dome of the module should be roughly centered in the opening of the fascia.
2. Verify proper tire inflation pressures.
3. Remove any accumulations of mud, snow or ice from the vehicle underbody.
4. Verify that there is no load in the vehicle (cargo or passengers), except for the driver.

   NOTE: **The vehicle MUST be placed upon a wheel alignment or frame rack to achieve the proper module vertical alignment results. If a wheel alignment or frame rack is not available, then a verified level surface can be used. When using the wheel alignment rack, the fore - after specifications must be within 0 (+/- 0.2) degrees.**

5. Rock the vehicle side-to-side three times to allow the suspension to stabilize.
6. Bounce the front and rear suspension three times by pushing downward on the front and rear bumpers and releasing.
7. Verify correct vehicle suspension height.

MODULE ALIGNMENT

1. The Adaptive Cruise Control (ACC) module is located on a bracket secured near the center of the underside of the front bumper support member of the Front End Module (FEM) behind the front fascia.

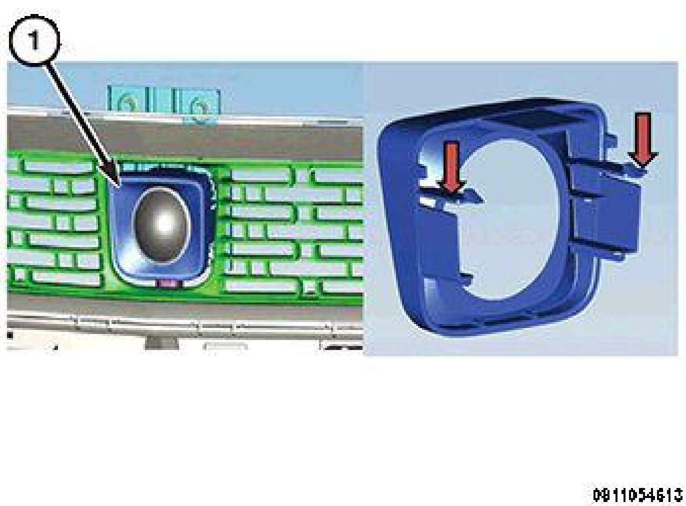


Fig. 9: Adaptive Cruise Control Mirror Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the ACC mirror cover (1). Remove the mirror cover by pushing down on the two attachment levers shown in the supplied graphic and then pulling outward on the cover. This is done without removal of the fascia.
3. Using standard glass cleaner and a clean soft towel, remove any dirt or road salt from the convex molded dark plastic lens dome on the face of the ACC module as well as from the suction cup of the vertical alignment tool.
4. Carefully slide the vertical alignment tool over the sensor housing until the suction cup rests against the lens of the ACC module.

NOTE: **It may take several attempts to get the suction cup of the special tool to fasten securely to the ACC module. If necessary, lightly wet the suction cup with clean water to help improve adhesion.**

5. Depress the plunger of the vertical alignment tool to engage the suction cup and attach the special tool securely to the lens of the ACC module.

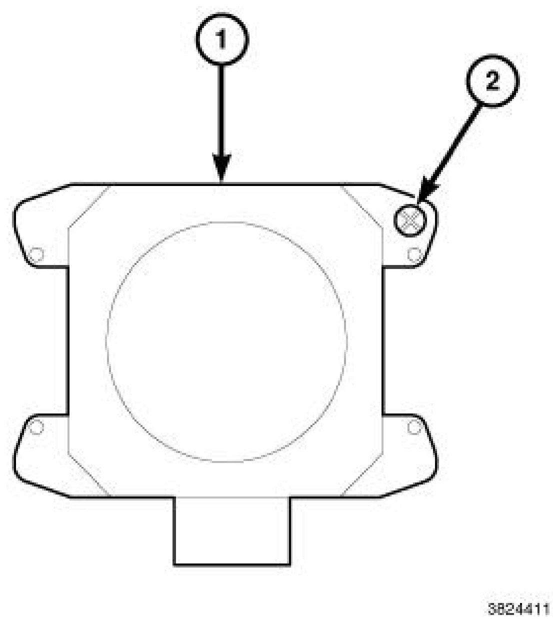


Fig. 10: Sensor & Ball Stud
Courtesy of CHRYSLER GROUP, LLC

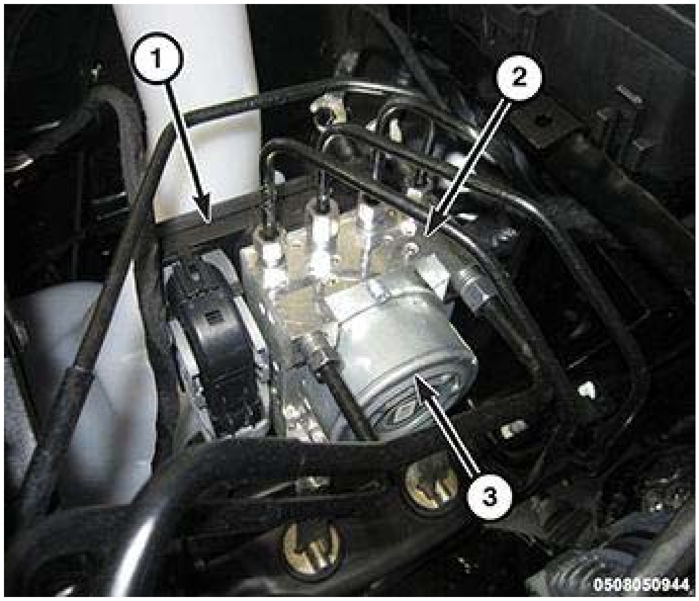
6. Use the 3.5 millimeter hex nut driver (Special Tool No. (special tool #10243-2, Driver, Nut)) to rotate the vertical adjustment ball stud (2) that secures the sensor (1) to the mounting bracket as necessary to center the bubble of the spirit level between the two center marks on the vial of the level located on the top of the vertical alignment tool.
7. Depress the center release button of the special tool to release the suction cup from the sensor lens and remove the special tool from the ACC module.
8. Perform service drive alignment.
9. Perform the "ACC aim mode auto alignment". This is the ACC sensors horizontal alignment procedure. Perform this routine using a diagnostic scan tool and follow the directions on the screen. The use of the 3.5 mm hex nut driver (Special Tool No. 10243-2) may be needed for the procedure.
10. Install the mirror cover onto the front of the module. Press down around the outside edges of the mirror

cover to ensure the cover is fully engaged to the module housing

MODULE, ANTI-LOCK BRAKE SYSTEM

DESCRIPTION

DESCRIPTION



[Fig. 11: Antilock Brake Module (ABM) & Hydraulic Control Unit (HCU)]
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.**

The Anti-lock Brake System (ABS) Module is a microcontroller-based device which monitors the anti-lock brake system during normal braking and controls it when the vehicle is in an ABS stop. The ABS module also monitors the Electronic Stability Control (ESC).

The ABS module (1) is mounted to the HCU (2) as part of the Integrated Control Unit (ICU). The ABS module uses a 38-Way connector on the vehicle wiring harness. The power source for the ABS module is through the ignition switch in the RUN or ON position. The ABS module is on the CAN-C bus.

OPERATION

OPERATION

The primary functions of the Anti-lock Brake System (ABS) module are to:

- Monitor the Anti-lock Brake System (ABS) module and Electronic Stability Program (ESP) for proper operation.
- Detect wheel locking or wheel slipping tendencies by monitoring the speed of all four wheels of the vehicle.

- Control fluid modulation to the wheel brakes while the system is in ABS or traction control mode.
- Modulates fluid pressure to the wheel brakes to control vehicle yaw rate in ESP mode.
- Store diagnostic information.
- Provide communication to the scan tool while in diagnostic mode.
- Illuminate the amber TCS/ESP indicator in the instrument cluster.

The ABS module constantly monitors the ABS and ESP (if equipped) for proper operation. If the ABS module detects a fault, it will turn on the amber TCS/ESP indicator and disable the ABS or ESP if so equipped. The normal base braking system will remain operational at that time.

The ABS module continuously monitors the speed of each wheel through the signals generated by the wheel speed sensors to determine if any wheel is beginning to lock. When a wheel locking tendency is detected, the ABS module commands the solenoid coils to actuate. The coils then open and close the valves in the HCU that modulate brake fluid pressure in some or all of the hydraulic circuits. The ABS module continues to control pressure in individual hydraulic circuits until a locking tendency is no longer present.

REMOVAL

REMOVAL

1. To replace the ABM, the ICU assembly must be removed. Refer to **INTEGRATED CONTROL UNIT (ICU), REMOVAL** .
2. Remove two screws attaching the mounting bracket to the HCU. Remove the bracket.

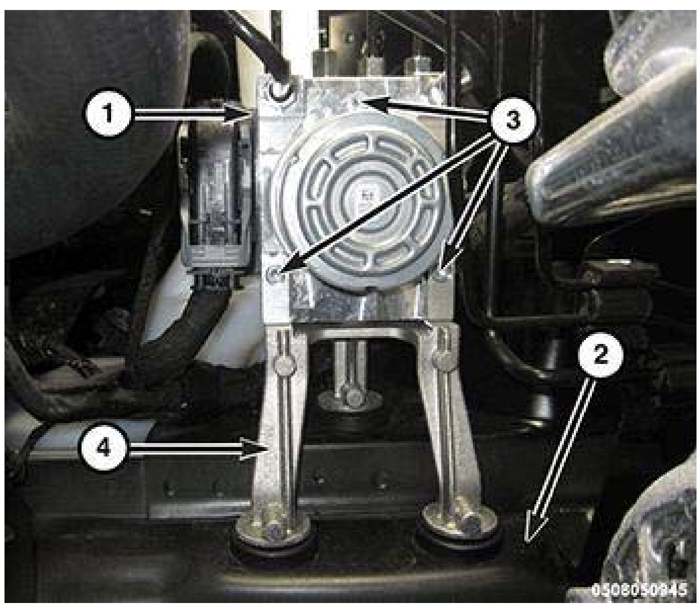


Fig. 12: Integrated Control Unit & Mounting Grommets
Courtesy of CHRYSLER GROUP, LLC

3. Remove the three screws (3) attaching ABM (1) to HCU.

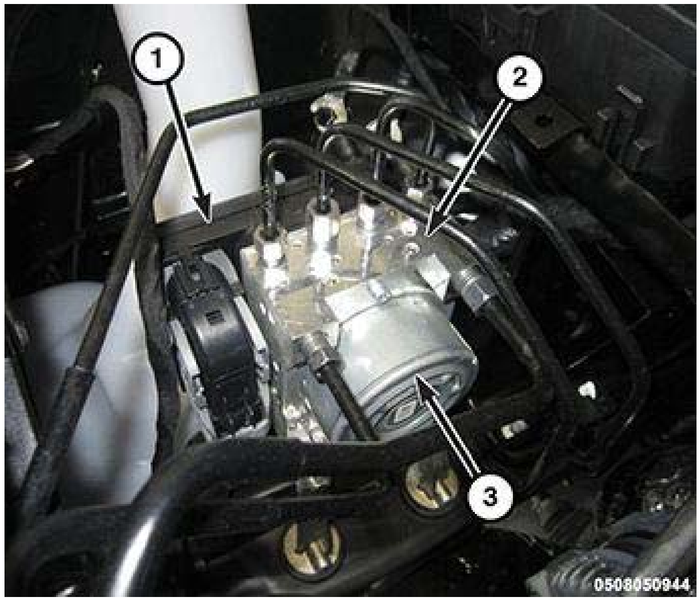


Fig. 13: Antilock Brake Module (ABM) & Hydraulic Control Unit (HCU)
Courtesy of CHRYSLER GROUP, LLC

4. Separate ABM (1) from HCU (2).

INSTALLATION

INSTALLATION

1. Clean any debris off the mating surfaces of the HCU and ABM.

NOTE: When installing a new ABM seal, do not use any type of lubricant.

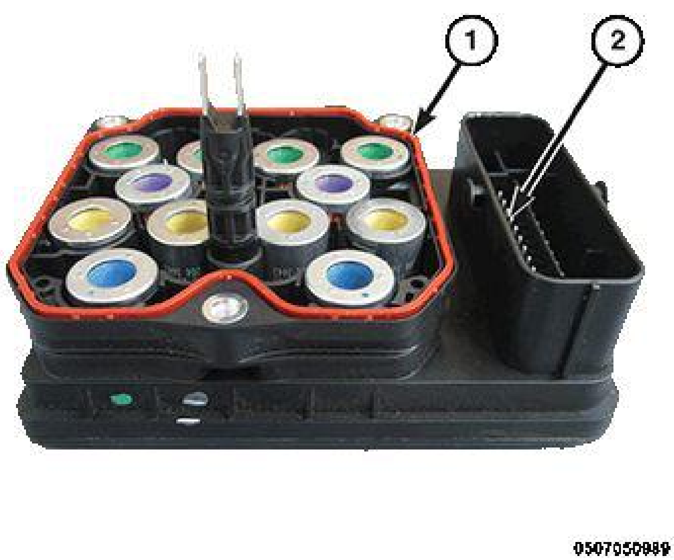


Fig. 14: ABS Module & Seal
Courtesy of CHRYSLER GROUP, LLC

2. If the seal (1) on the ABM (2) are not new, replace them. The ABM seal must be new to keep out moisture and debris; **do not reuse the ABM seal** .

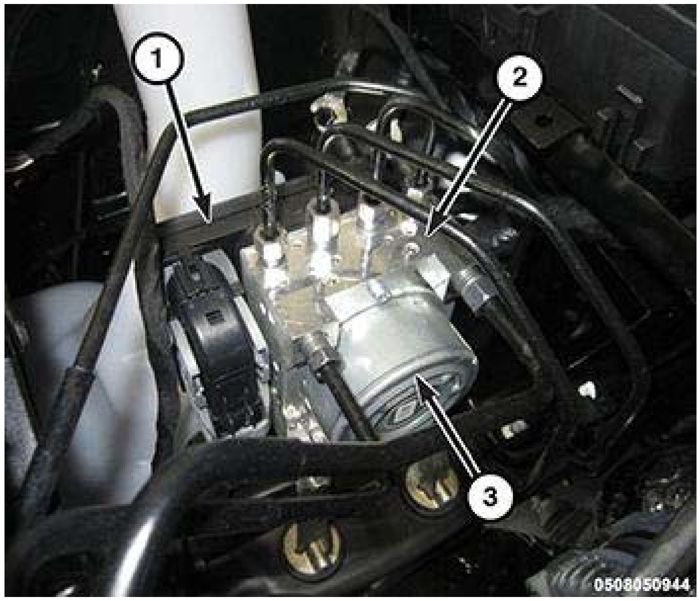


Fig. 15: Antilock Brake Module (ABM) & Hydraulic Control Unit (HCU)
Courtesy of CHRYSLER GROUP, LLC

3. Align components and install the ABM (1) on the HCU (2).

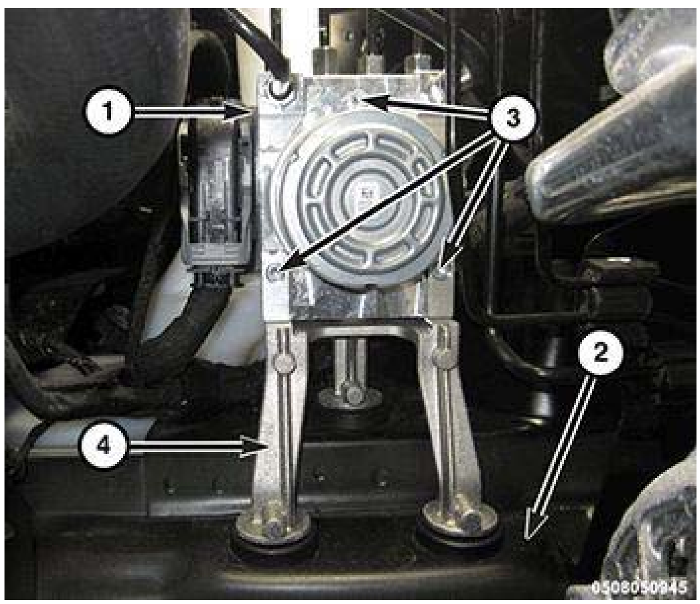


Fig. 16: Integrated Control Unit & Mounting Grommets
Courtesy of CHRYSLER GROUP, LLC

4. Install the three ABM to HCU mounting screws (3). Tighten to the proper **SPECIFICATIONS** .
5. Install the two ICU to bracket bolts and tighten to the proper **SPECIFICATIONS** .
6. Install the ICU in the vehicle. Refer to **INTEGRATED CONTROL UNIT (ICU), INSTALLATION** .

MODULE, BLIND SPOT

DESCRIPTION

DESCRIPTION

The optional Blind Spot Monitor (BSM) system used in this vehicle has two control modules. One control module is dedicated to each side of the vehicle. A Blind Spot Module (BSM) is integral to the Left Blind Spot Sensor (LBSS) or Right Blind Spot Sensor (RBSS) for the same side of the vehicle. Refer to **SENSOR, BLIND SPOT, DESCRIPTION** .

OPERATION

OPERATION

The optional Blind Spot Monitor (BSM) system used in this vehicle has two control modules. One control module is dedicated to each side of the vehicle. The blind spot modules are each integral to the blind spot sensor for the same side of the vehicle. Refer to **SENSOR, BLIND SPOT, OPERATION** .

REMOVAL

REMOVAL

Two blind spot modules are used in this vehicle, one for the left side and one for the right side. Each blind spot module is integral to the blind spot sensor on the same side of the vehicle. Refer to **SENSOR, BLIND SPOT, REMOVAL** .

INSTALLATION

INSTALLATION

Two blind spot modules are used in this vehicle, one for the left side and one for the right side. Each blind spot module is integral to the blind spot sensor on the same side of the vehicle. Refer to **SENSOR, BLIND SPOT, INSTALLATION** .

MODULE, BODY CONTROL

DESCRIPTION

DESCRIPTION

A Body Control Module (BCM) is an electronic control unit with a microcontroller that controls and integrates many of the main body electronic functions and features of the vehicle. Many of the functions and features provided by the BCM are possible because of numerous hard wired inputs and outputs, but most of these features are only possible or are enhanced because the BCM communicates electronically with other electronic modules in the vehicle as well as with a diagnostic scan tool using the Controller Area Network (CAN) data bus.

The BCM is located behind the passenger side door kick panel. The BCM has a molded plastic case that is secured with screws within two stamped metal brackets that form a mounting yoke. The yoke is then secured with screws to a metal support structure. The BCM is connected to the vehicle electrical system through wire harness connections.

The BCM is a gateway between the high and low speed CAN data bus networks as well as a Local Interface Network (LIN) master node. This method of communication allows the sharing of sensor information, which reduces wire harness complexity, internal controller hardware and component sensor current loads. At the same time, this system provides increased reliability, enhanced diagnostics and allows the addition of many new feature capabilities. This method of communication is used by the BCM to acquire vehicle configuration data, including customer programmable features.

OPERATION

OPERATION

A Body Control Module (BCM) is an electronic control unit with a microcontroller that controls and integrates many of the main body electronic functions and features of the vehicle. Many of the functions and features provided by the BCM are possible because of numerous hard wired inputs and outputs, but most of these features are only possible or are enhanced because the BCM communicates electronically with other electronic modules in the vehicle as well as with a diagnostic scan tool using the Controller Area Network (CAN) data bus.

The BCM is a gateway between the high and low speed CAN data bus networks as well as a Local Interface Network (LIN) master node. This method of communication allows the sharing of sensor information, which reduces wire harness complexity, internal controller hardware and component sensor current loads. At the same time, this system provides increased reliability, enhanced diagnostics and allows the addition of many new feature capabilities. This method of communication is used by the BCM to acquire vehicle configuration data, including customer programmable features.

Software programming allows the BCM microcontroller to monitor all of these inputs and provide the appropriate outputs through high side drivers, low side drivers, on-board relays, Pulse-Width Modulation (PWM) and electronic messages to other modules in the vehicle. Some of the functions and features that the BCM supports or controls include:

- **Brake Fluid Level** - The BCM continuously monitors the brake fluid level sensor through a hard-wired input to monitor the brake fluid level. The BCM transmits an electronic message over the Can data bus to Instrument Cluster (IC) to illuminate the Low Fluid indicator based on the input signal received from the fluid level sensor.
- **Enhanced Accident Response Support** - The BCM monitors an input from the Occupant Restraint Controller (ORC) and, following an airbag deployment, will immediately disable the power lock output, unlock all doors by activating the power unlock output, then enables the power lock output if the power lock switch input remains inactive for two seconds. The BCM also monitors an input from the Powertrain Control Module (PCM) to automatically turn ON the interior lighting after an airbag deployment event, 10 seconds after the vehicle speed is zero. The interior lighting remains illuminated until the ignition switch is turned to the OFF position, at which time the interior lighting returns to normal operation and control. These Enhanced Accident Response System (EARS) features are each dependent upon a functional vehicle electrical system following the vehicle impact event.
- **Exterior Lighting Switch Support** - The BCM continuously monitors the headlamp switch position to activate or deactivate the exterior lighting. The headlamp switch provides the appropriate resistor multiplexed output hardwired to the BCM. The BCM reads and responds to this input by energizing or de-energizing the right and left park lamp feed circuits and the right and left high or low beam driver circuits through internal High Side Drivers (HSD) and by sending an electronic confirmation message back to the IC, which controls the high beam indicator as appropriate. The BCM also remembers which headlamp beams were last selected with the multi-function switch, and energizes those beams by default the next time the headlamps are turned ON. If the vehicle is equipped with optional automatic headlamps and the **A** (Automatic) position is selected, the BCM also monitors an electronic **ambient light level** message received over the CAN data bus from the Heat, Ventilation and Air Conditioning (HVAC) control module based upon a hard wired input from the rain sensor to turn the exterior lighting ON and OFF automatically while the ignition switch is in the ON position. The BCM also controls the fog lamps, CHMSL. front combination lamps, and rear combination lamps.
- **Fuel Level Data Support** - The BCM provides a current source for and receives a hard-wired analog input

from the fuel level sending unit located on the fuel pump module in the fuel tank. Based upon this input, the BCM uses electronic messaging to transmit this data over the CAN data bus for use by other electronic modules in the vehicle. The IC calculates the proper fuel gauge needle position and to control low fuel indicator operation based on these messages.

- **Hazard Lamp Circuit Control** - The BCM monitors an input from the hazard switch and receives a hard-wired analog input from the switch. The BCM reads and responds to this input by energizing or de-energizing the right and left turn lamp feed circuits through internal HSD units and by sending an electronic confirmation message to the IC over the CAN data bus, which controls the hazard light indicators as appropriate.
- **Ignition On and Ignition Accessory/On Relay Control** - The BCM monitors electronic **ignition switch status** messages received over the CAN bus from the RF hub and provides high side driver outputs to control both the ignition ON and ignition ACCESSORY/ON relays in the Power Distribution Center (PDC) as appropriate.
- **Interior Lamp Load Shedding** - The BCM provides a battery saver feature which will automatically turn OFF all interior lamps if they remain ON after a timed interval of about eight minutes.
- **Interior Lighting Control** - The BCM monitors electronic messages and hard-wired inputs from the interior lighting switch, the door ajar switches, the decklid ajar, the reading lamp switches and the RF hub to provide courtesy lamp control. This includes support for timed illuminated entry with theater-style fade-to-OFF and courtesy illumination DEFEAT features.
- **Local Interface Network Master Module** - The BCM is the master module for the LIN data bus. In this role it gathers information from the compass sensor, the Intelligent Battery Sensor (IBS), Humidity Sensor, Rear View Camera, the EVIC switches (Steering Column switches) and the Rain Sensor (RLS), then either acts on that information directly or places electronic messages on the CAN data bus for use by other modules.
- **Power Lock System Control** - The BCM monitors inputs from the power lock switches and the RF hub to provide control of the power lock motors through high side and low side driver outputs. This includes support for rolling door locks (also known as automatic door locks), automatic door unlock, and a door lock inhibit mode.
- **Remote Radio Switch Support** - The BCM receives electronic message inputs from the remote radio switches on the steering wheel over the LIN data bus, then provides electronic radio request messages over the CAN data bus to support the remote radio switch function.
- **Remote Start System Support** - The BCM receives electronic message inputs from the RF hub and then displays the appropriate remote start system textual reminder messages to the vehicle operator within the EVIC display.
- **Shipping Mode** - The new Chrysler Telematics Platform (CTP) vehicles no longer have a IOD fuse to use when transporting or storing for a long period of time. The BCM has a mode that takes the place of pulling the IOD fuse called **"Shipping Mode"** that is easily enabled or disabled.
- **Vehicle Theft Security System Control** - The BCM monitors inputs from the door ajar switches, and the RF hub, on vehicles so equipped. The intrusion module provides electronic **horn** and **lighting request** messages to the BCM for the appropriate VTSS alarm output features.
- **Washer Fluid Level** - The continuously monitors the washer fluid level sensor through a hard-wired input to monitor washer fluid level. the BCM transmits an electronic message over the Can data bus to Instrument Cluster (IC) to illuminate the Low Washer Fluid indicator based on the input signal received from the fluid level sensor.

SERVICE NAME	READ DID	FEATURE	INFORMATION REPORTED
ANALOG INPUTS	A010	AMBIENT TEMPERATURE	VOLTAGE SEEN BY BCM FROM THE SENSOR
		BATTERY VOLTAGE FEED 1	VEHICLE VOLTAGE SEEN BY BCM
		BATTERY VOLTAGE FEED 2	VEHICLE VOLTAGE SEEN BY BCM
ANALOG INPUTS	A011	HEADLAMP SWITCH POSITION	OFF/PARKLAMPS /HEADLAMPS/AUTO/SNA
		HEADLAMP SWITCH VOLTAGE	VOLTAGE AT ON/OFF
		PANEL DIMMER SWITCH POSITION	POSITIONS 1-6/DOME ON
		PANEL DIMMER SWITCH VOLTAGE	VOLTAGES AT EACH POSITION
		FOGLAMP	OFF/FRONT FOG
		AMBIENT CABIN DIMMER POSITION	POSITIONS 1-6/DOME ON
		AMBIENT CABIN DIMMER VOLTAGE	VOLTAGES AT EACH POSITION
		SUNSHADE SWITCH POSITION	ON/OFF STATE
ANALOG INPUTS	A012	WASHER FLUID LEVEL VOLTAGE	VOLTAGE SEEN BY BCM (0V-5V)
		WASHER FLUID LEVEL	LOW/NORMAL
		OUTSIDE TRUNK RELEASE SWITCH	PRESSED/NOT PRESSED
ANALOG INPUTS	A013	BRAKE FLUID VOLTAGE	VOLTAGE SEEN BY BCM (0V-5V)
		BRAKE FLUID LEVEL	LOW/NORMAL
		HOOD AJAR SWITCH VOLTAGE	VOLTAGE SEEN BY BCM (0V-5V)
		HOOD AJAR SWITCH STATUS	CLOSED/AJAR
		FUEL LEVEL SENSE 1	VOLTAGE SEEN BY BCM (0V-5V)
		FUEL LEVEL SENSE 2	VOLTAGE SEEN BY BCM (0V-5V)
ANALOG INPUTS	A015	LEFT FRONT DOOR LOCK SWITCH VOLTAGE	VOLTAGE SEEN BY BCM (0V-5V)
		LEFT FRONT DOOR LOCK SWITCH	NOT PRESSED/LOCK PRESSED/UNLOCK PRESSED
		RIGHT FRONT DOOR LOCK SWITCH VOLTAGE	VOLTAGE SEEN BY BCM (0V-5V)
		RIGHT FRONT DOOR LOCK SWITCH	NOT PRESSED/LOCK PRESSED/UNLOCK PRESSED
DIGITAL DOOR	A049	HOOD AJAR	AJAR/NOT AJAR

SERVICE NAME	READ DID	FEATURE	INFORMATION REPORTED
AJAR STATES		PASSENGER DOOR AJAR	AJAR/NOT AJAR
		DRIVER DOOR AJAR	AJAR/NOT AJAR
		TRUNK AJAR	AJAR/NOT AJAR
DIGITAL INPUT (ACTIVE HIGH)	A021	IGNITION RUN START	OFF/ACC and RUN START
DIGITAL INPUT (ACTIVE LOW)	A020	RIGHT FRONT TURN LAMP DIAGNOSTIC	SHORT/NOT SHORT
		LEFT FRONT TURN LAMP DIAGNOSTIC	SHORT/NOT SHORT
		HAZARD SWITCH	PRESSED/NOT PRESSED
		PARK BRAKE SWITCH	PRESSED/NOT PRESSED
		FRONT WIPER PARK SENSE	PARKED/NOT PARKED
		RIGHT REAR TURN LAMP DIAGNOSTIC	SHORT/NOT SHORT
		HORN SWITCH INPUT SENSE	CLOSED/NOT CLOSED
		LIFTGATE/TRUNK AJAR SWITCH	CLOSED/NOT CLOSED
		LEFT REAR TURN LAMP DIAGNOSTIC	SHORT/NOT SHORT
DIRECT MANAGEMENT OF ON/OFF OUTPUTS	D1C0	BAGGAGE LAMPS	ON/OFF/TOGGLE
	D1B3	CHMSL LAMP	ON/OFF/TOGGLE
	D1BF	CONVENIENCE/READING LAMP	ON/OFF/TOGGLE
	D1BE	COURTESY LAMPS	ON/OFF/TOGGLE
	D1C1	FOOTWELL/HALO LAMPS	ON/OFF/TOGGLE
	D1AA	FRONT WIPER HI/LO	LOW/HIGH/TOGGLE
	D1AB	FRONT WIPER ON/OFF	ON/OFF/TOGGLE
	D0AD	HORN	ON/OFF/TOGGLE
	D0B5	IGNITION RUN ACCESSORY 1	ON/OFF/TOGGLE
	D0B9	IGNITION RUN ACCESSORY 2	ON/OFF/TOGGLE
	D0B1	IGNITION RUN	ON/OFF/TOGGLE
	D060	IGNITION RUN START	ON/OFF/TOGGLE
	D1B8	LEFT DAYLIGHT LAMP	ON/OFF/TOGGLE
	D1B9	RIGHT DAYLIGHT LAMP	ON/OFF/TOGGLE
	D0A0	LEFT FRONT FOG LAMP	ON/OFF/TOGGLE
	D0A1	RIGHT FRONT FOG LAMP	ON/OFF/TOGGLE
	D1A4	LEFT FRONT PARKLAMPS	ON/OFF/TOGGLE
	D1A5	RIGHT FRONT PARKLAMPS	ON/OFF/TOGGLE
	D014	LEFT FRONT TURN LAMPS	ON/OFF/TOGGLE
	D015	RIGHT FRONT TURN LAMPS	ON/OFF/TOGGLE
	D0AA	LEFT HIGH BEAM	ON/OFF/TOGGLE

SERVICE NAME	READ DID	FEATURE	INFORMATION REPORTED
	D0AB	RIGHT HIGH BEAM	ON/OFF/TOGGLE
	D0A8	LEFT LOW BEAM	ON/OFF/TOGGLE
	D0A9	RIGHT LOW BEAM	ON/OFF/TOGGLE
	D0A2	LEFT REAR TURN/STOP LAMPS	ON/OFF/TOGGLE
	D0A3	RIGHT REAR TURN/STOP LAMPS	ON/OFF/TOGGLE
	D1A6	LEFT REAR TAIL/PARKLAMPS	ON/OFF/TOGGLE
	D1A7	RIGHT REAR TAIL/PARKLAMPS	ON/OFF/TOGGLE
	D1A8	LEFT REVERSE LAMP	ON/OFF/TOGGLE
	D1A9	RIGHT REVERSE LAMP	ON/OFF/TOGGLE
	D1B2	LICENSE PLATE LAMPS	ON/OFF/TOGGLE
	D0C6	STARTER SOLENOID	ON/OFF/TOGGLE
	D1C2	UGDO POWER SUPPLY	ON/OFF/TOGGLE
	D1BC	UNLOCK 1 DRIVER	SINGLE PULSE
	D1BD	UNLOCK 2 PASSENGER	SINGLE PULSE
	D1B1	UNLOCK RUNS START	ON/OFF/TOGGLE
	D001	VTA INDICATOR	ON/OFF/TOGGLE
Ā	A019	HUMIDITY SENSOR LONG	INFORMATION FROM THE HUMIDITY SENSOR LONG
	A0B4	INTELLIGENT BATTERY SENSOR (IBS) 2	INFORMATION FROM THE IBS
	A0B5	INTELLIGENT BATTERY SENSOR (IBS) 3	INFORMATION FROM THE IBS
	A0B6	INTELLIGENT BATTERY SENSOR (IBS) 4	INFORMATION FROM THE IBS
	A0B3	INTELLIGENT BATTERY SENSOR (IBS) 1	INFORMATION FROM THE IBS
	A0B8	RAIN SENSOR	INFORMATION FROM THE RAIN SENSOR
	A03A	REAR VIEW CAMERA	INFORMATION FROM THE REAR VIEW CAMERA
	A03B	SWS_8L (STEERING SHEEL SWITCHES)	INFORMATION FROM THE STEERING WHEEL SWITCH

The BCM uses On-Board Diagnostics (OBD) to monitor all of the systems and circuits it controls, then sets active and stored Diagnostic Trouble Codes (DTC) for any monitored system faults it detects. The BCM will also send electronic message requests to the Instrument Cluster (IC) (also known as the Instrument Panel Cluster/IPC) for the display of certain textual warning messages related to some detected system conditions or faults.

The hard wired inputs and outputs of the BCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the BCM electronic controls or the communication between modules and other devices that provide some features of the BCM-controlled systems. The most

reliable, efficient and accurate means to diagnose the BCM or the electronic controls and communication related to BCM-controlled systems operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

BATTERY SAVER MODE/BATTERY SAVER ON MESSAGE - IF EQUIPPED

Electrical Load Reduction Actions

This vehicle is equipped with an Intelligent Battery Sensor (IBS) to perform additional monitoring of the electrical system and status of the vehicle battery.

In cases when the IBS detects charging system failure, or the vehicle battery conditions are deteriorating, an electrical load reduction actions will take place to extend the driving time and distance of the vehicle. This is done by reducing power to or turning off non-essential electrical loads.

Load reduction is only active when the engine is running. It will display a message if there is a risk of battery depletion to the point where the vehicle may stall due to lack of electrical supply, or will not restart after the current drive cycle.

When load reduction is activated, the message "Battery Saver On" or "Battery Saver Mode" will appear in the Electronic Vehicle Information Center (EVIC) or Driver Information Display (DID).

These messages indicate the vehicle battery has a low state of charge and continues to lose electrical charge at a rate that the charging system cannot sustain.

NOTE:

- The charging system is independent from load reduction. The charging system performs a diagnostic on the charging system continuously.
- If the Charging System Light is on it may indicate a problem with the charging system.

The electrical loads that may be switched off (if equipped), and vehicle functions which can be effected by load reduction:

- Heated Seat/Vented Seats/Heated Wheel
- Heated/Cooled Cup Holders
- Rear Defroster And Heated Mirrors
- HVAC System
- 115V AC Power Inverter System
- Audio and Telematics System

Loss of the battery charge may indicate one or more of the following:

- The charging system cannot deliver enough electrical power to the vehicle system because the electrical loads are larger than the capability of charging system. The charging system is still functioning properly.
- Turning on all possible vehicle electrical loads (e.g. HVAC to max settings, exterior and interior lights, overloaded power outlets +12V, 115V AC, USB ports) during certain driving conditions (city driving, towing, frequent stopping).
- Installing options like additional lights, up-fitters, audio systems, alarms and similar devices.

- Unusual driving cycles (short trips separated by long parking periods).
- The battery aging.
- The vehicle was parking for extended period of time (weeks, months).
- The battery was recently replaced and was not charged completely.
- The battery was discharged by an electrical load left on when the vehicle is parked.
- The battery was used during parking time to supply radio, lights, chargers, +12V portable appliances like vacuum cleaner's, game consoles and similar devices.

What to do when the electrical load reduction actions message is present ("Battery Saver On" or "Battery Saver Mode")

- During trip, reduce power to unnecessary loads if possible:

- Turn off redundant lights (interior or exterior)
- Check what may be plugged in to power outlets +12V, 115V AC, USB ports
- Check HVAC settings (blower, temperature)
- Check the audio settings (volume)

After trip:

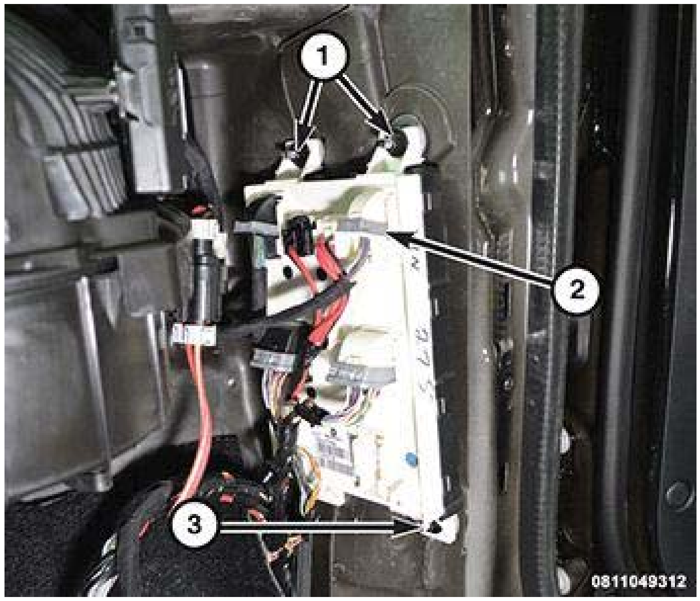
- Check if any aftermarket equipment was installed (additional lights, up-fitters, audio systems, alarms) and review specifications if any (load and Ignition Off Draw currents).
- Evaluate the latest driving cycles (distance, driving time and parking time).
- Review the chapter of this owner's manual regarding the battery maintenance.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

1. Disconnect and isolate the negative battery cable.
2. Remove the glove box assembly (1). Refer to GLOVE BOX, INSTRUMENT PANEL, REMOVAL .

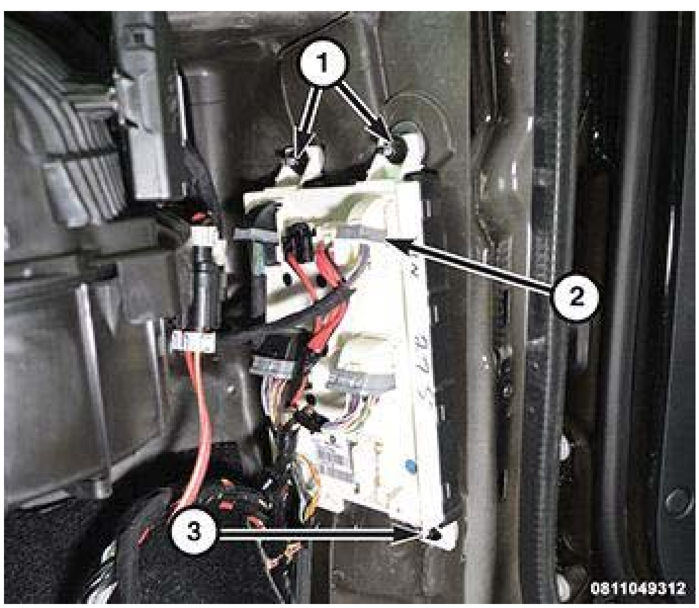


[Fig. 17: Body Control Module & Fasteners]
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect all of the electrical connectors from the Body Control Module (BCM) receptacles.
4. Remove the fastener (3) at the bottom of the BCM.
5. Loosen the top fasteners (1). These fasteners only have to be loosened to allow removal of the BCM. They do not need to be completely removed in order to remove the module.
6. Pull the module away from the side bulk head and down and remove the module.
7. Remove the BCM from the vehicle.

INSTALLATION

INSTALLATION



[Fig. 18: Body Control Module & Fasteners]
Courtesy of CHRYSLER GROUP, LLC

1. Slide the BCM into position so that the top two mounting tabs (1) on the BCM are properly aligned to the mounting weld studs and the lower mounting tabs slide into their respective mounting weld studs.
2. Install the lower fastener (3), and tighten the securely.
3. Tighten the upper fasteners securely.
4. Connect the electrical connectors to the BCM receptacles.
5. Install the glove box assembly (1). Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
6. Connect the negative battery cable.

NOTE: **Program the BCM in accordance with the module replacement and programming guide. Refer to STANDARD PROCEDURE.**

MODULE, COMBINED REAR VIEW MIRROR

DESCRIPTION

DESCRIPTION

The Combined Rear View Multiple Mirror Module (CRVV) is an available factory installed component on this vehicle. The CRVV combines the following modules and items:

- Electro-Mechanical Mirror Module (EMCC).
- Compass Module. **Note:** If the radio module supports navigation, standalone compass module will not be present on the vehicle.
- Auto High Beam Features.
- Two hard wired telematic microphones integral to the housing.

The CRVMM is secured to the same mounting button on the inside of the windshield glass and in the same manner that is used to mount the standard equipment mirrors.

OPERATION

OPERATION

Electrochromic Inside Rear View Mirror - Refer to **MIRROR, AUTOMATIC DAY AND NIGHT, DESCRIPTION** for description and operation characteristics of the mirror assembly.

Remote Compass Module (RCM) - If the vehicle is not equipped with navigation, the RCM will be located within the Combined Rear View mirror Module (CRVMM). The RCM is only serviced by replacing the CRVMM.

Auto High Beam Module (SmartbeamÂ® Module) - The module is integral to the CRVMM. Refer to **OPERATION** for description and operation of the SmartbeamÂ® lighting system.

REMOVAL

REMOVAL

Refer to **MIRROR, REARVIEW, REMOVAL** for removal of the Combined Rearview Mirror Module (CRVMM).

INSTALLATION

INSTALLATION

Refer to **MIRROR, REARVIEW, INSTALLATION** for installation of the Combined Reaview Mirror Module.

MODULE, DOOR

DESCRIPTION

DESCRIPTION

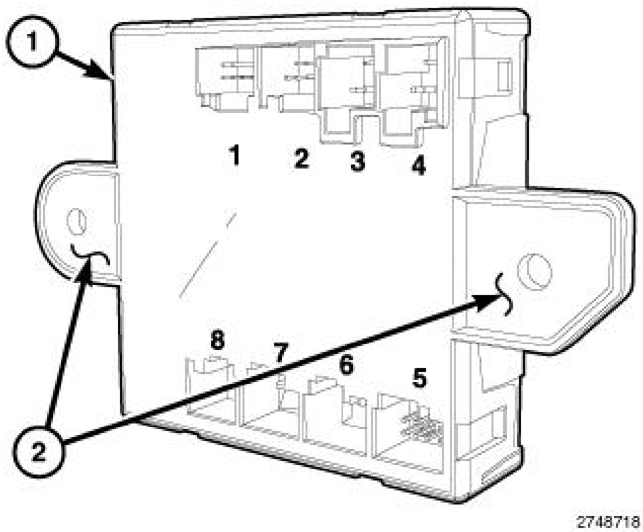


Fig. 19: Identifying Front Door Control Module
Courtesy of CHRYSLER GROUP, LLC

This vehicle is equipped with two electronic front door control modules (1) (Driver Door Module/DDM and a Passenger Door Module/PDM), one each on both the driver and passenger front doors. Each door control module is concealed behind the front door trim panel where it is secured through two integral mounting tabs (2) to the door hardware module carrier by two screws. The front door control modules are located in the upper front corner of the front door hardware carriers, just below the mirror flag area of the front door.

Each door control module contains a microcontroller and is connected to the various switches on that door. In the case of the driver side module, it communicates with some switches over a Local Interface Network (LIN) data bus. Both the driver and passenger side module also receive various hard wired switch inputs and provide numerous hard wired outputs to various devices located on their respective doors. In addition, both front door control modules communicate with each other and with other electronic modules in the vehicle over the Controller Area Network (CAN) Interior High Speed (IHS) data bus system.

Concealed and protected within the molded plastic door control module housing is the printed circuit board and the other electronic circuitry of the module. The front door control modules are connected to the vehicle electrical system through up to eight connector receptacles that are integral to the module housing.

A door control module cannot be adjusted or repaired and, if damaged or ineffective, it must be replaced. The door control module software is flash programmable.

OPERATION

OPERATION

The microcontroller-based electronic front door control modules (also known as a Driver Door Module/DDM and a Passenger Door Module/PDM) contain logic circuits that monitor various hard wired low current, multiplexed inputs from the power window, power lock, power mirror and memory switches on their respective door. They also receive Controller Area Network (CAN) Interior High Speed (IHS) data bus electronic message-based external inputs from the opposing front door control module as well as from other electronic modules in the vehicle. The front door control modules also monitor hard wired power window motor Hall effect sensors and memory mirror position sensor inputs.

In addition, the front door control module on the driver side front door receives electronic message inputs from the driver side front door switch module over the Local Interface Network (LIN) data bus network. The program logic within the front door control module allows the microcontroller to prioritize all of these inputs and determine the tasks it needs to perform. These tasks are then completed either by controlling hard wired outputs to the various motors, actuators or lamps on its own, or by sending electronic message requests over the CAN-IHS bus to the appropriate electronic module in the vehicle.

The front door control modules are powered by a fused B(+) circuit and are grounded at all times so that they can operate regardless of the ignition switch position. Both driver and passenger door control modules provide active and stored Diagnostic Trouble Codes (DTC) through On-Board Diagnostics (OBD) and communicate with a diagnostic scan tool using the CAN data bus.

The hard wired inputs and outputs of the front door control module may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between modules and other devices that provide some features of the power window, power lock, memory, interior lighting or exterior lighting system features the front door control modules provide. The most reliable, efficient and accurate means to diagnose the front door control modules or the electronic controls and communication related to operation of these systems requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

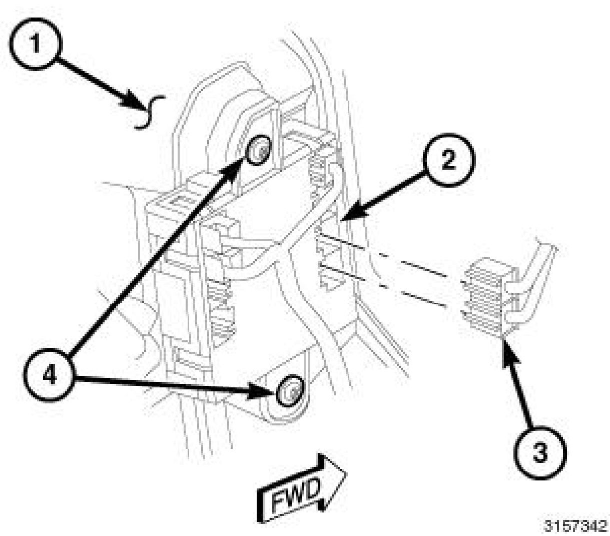


Fig. 20: Electrical Connectors, Door Control Module, Screws & Module Carrier
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the trim panel from the inside of the front door. Refer to **PANEL, DOOR TRIM, REMOVAL** .
3. Disconnect each of the electrical connectors (3) from the connector receptacles of the door control module (2).
4. Remove the two screws (4) that secure the door control module to the front door hardware module carrier (1).
5. Remove the door control module from the door hardware module carrier.

INSTALLATION

INSTALLATION

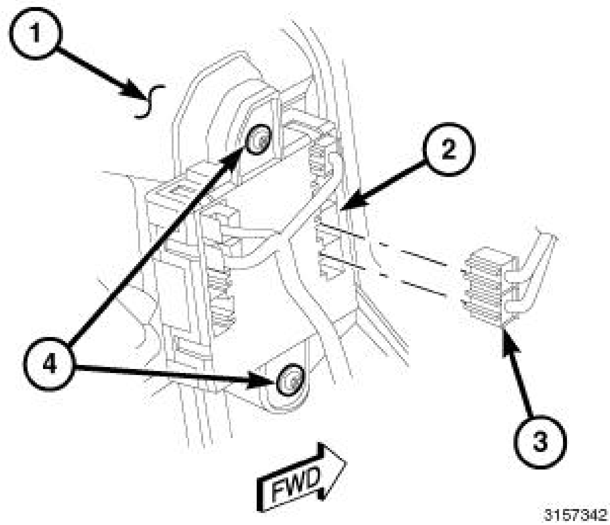


Fig. 21: Electrical Connectors, Door Control Module, Screws & Module Carrier
Courtesy of CHRYSLER GROUP, LLC

1. Position the door control module (2) to the front door hardware module carrier (1).
2. Install and tighten the two screws (4) that secure the door control module to the front door hardware module carrier. Tighten the screws securely.
3. Reconnect each of the electrical connectors (3) to the connector receptacles of the door control module.
4. Reinstall the trim panel to the inside of the front door. Refer to **PANEL, DOOR TRIM, INSTALLATION** .
5. Reconnect the battery negative cable.
6. The manual relearn procedure should be performed following service of a door control module so that the module can learn the correct hard stops of the power window regulator. Refer to **STANDARD PROCEDURE** .

MODULE PROGRAMMING

DOOR MODULE LEARN PROCEDURES

NOTE:

- **This procedure must be performed anytime the power window system has been serviced in either front door or when there is a possible concern with a door module calibration.**
- **The battery must be fully charged or the vehicle running before proceeding with the learn procedure.**
- **All doors must be completely closed before proceeding.**
- **It is suggested to sit inside the vehicle in the drivers seat and close the door.**

Express-up / Express-down possible concerns.

- Glass will not lower all the way down flush to the belt-line.
- Glass will not raise fully; wind noise / water leak.
- Glass will not raise automatically (Expess-up) after lifting the switch to the second detent and releasing.

To relearn the door module memory after module replacement, perform the following procedure:

1. Check and repair any door module Diagnostic Trouble Code (DTC) (s) unrelated to missing calibration before proceeding.
2. Using the window switch, lower the door glass to the full-down position by pushing down (depress) the window switch to its second detent and hold the switch until the door glass is fully open. Continue to hold the window switch down for two seconds after the door glass is fully open.
3. Raise the door glass to the full-up position by pulling up on the window switch and hold the switch until the door glass is fully closed. Continue to hold the window switch up for two seconds after the door glass is full closed.
4. Code should now be stored. Clear code and test window operations.

To relearn the door module memory after window/regulator replacement, perform the following procedure:

1. Using the scan tool, go to the network topology screen.
2. Click on the Diagnostic Procedures tab at the lower portion of the screen.
3. Run ECU Reset for DDM/PDM.
4. DDM/PDM calibration missing DTC will now set.
5. Using the window switch, lower the door glass to the full-down position by pushing down (depress) the window switch to its second detent and hold the switch until the door glass is fully open. Continue to hold the window switch down for two seconds after the door glass is fully open.
6. Raise the door glass to the full-up position by pulling up on the window switch and hold the switch until the door glass is fully closed. Continue to hold the window switch up for two seconds after the door glass is full closed.
7. DTC will now be stored. Clear code and test window operations.

MODULE, ELECTRIC POWER STEERING

DESCRIPTION

DESCRIPTION

This vehicle features an Electric Power Steering (EPS) system. The EPS module is located in a powerpack that contains the motor, module and worm drive on the steering gear assembly. Since the steering system is fully electric - rather than traditional hydraulic - all of the power assist is provided via an electric motor system. This improves fuel economy, since there is no parasitic loss from a power steering pump, and reduces steering system-generated noise, and allows optimal tuning of feedback to the driver.

NOTE: **All diagnostics must be done through the electric power steering module for the electric power steering system. (Refer to STANDARD PROCEDURE). There are no serviceable parts inside the steering rack, module or EPS motor. If any part is found to be defective or needs replacement, motor, and module are serviced as a assembly.**

For the removal of the EPS module and installation, refer to **GEAR, REMOVAL** and **GEAR, INSTALLATION** .

OPERATION

OPERATION

NOTE: **All diagnostics must be done through the electric power steering module for the electric power steering system. (Refer to STANDARD PROCEDURE). There are no serviceable parts inside the column, module or motor. If any part is found to be defective or needs replacement, the column, motor, and module are serviced as a assembly.**

The Electric Power Steering (EPS) module uses input signals received from sensors to vary the current to the electric motor for the desired power steering torque. The boost or assist is variable and speed sensitive, responding to sensors monitoring steering torque, steering wheel speed and angle, and vehicle speed. The steering system is fully integrated with the vehicle's electronic stability control system and helps to compensate in split-traction, torque steer, and pull-drift (crowned road) situations. Communication is received and transmitted to the EPS module on the CAN line.

The EPS module outputs the following actions based on input received:

- **Basic Operation:** Based on vehicle speed, assists the column rotation based on driver input to decrease steering effort for the driver.
- **Variable Servo Steering:** When the speed of the vehicle is increased, the module reduces the amount of assistance to the column.
- **Active Return:** The module commands the motor to quicken the steering wheel in returning to the center position after steering.
- **Damping of Steering Return Oscillations:** After a steering maneuver, the chassis produces oscillations that the module will then use the motor to try and reduce.
- **Selectable Power Assistance:** Instrument panel driver selectable modes vary the level of power steering assistance in three ways: 1) "Comfort" provides a balance of steering feel and steering effort. 2) "Normal" increases steering feel and effort by one level. 3) "Sport" provides the greatest amount of steering feel and

requires the highest of steering effort.

MODULE, ELECTRONIC SHIFT

DESCRIPTION

8 SPEED ESM

The Electronic Shift Module (ESM) is part of the shifter assembly called the E-Shifter. The E-Shifter is an electronic Shift-by-Wire device that is mounted to the vehicle center console. It uses CAN messages to communicate driver requests for transmission gear changes without a mechanical connection. The E-Shifter also provides means for displaying the current/pending transmission gear state via the illuminated PRNDM pattern on the shift knob.

OPERATION

OPERATION

The E-Shifter assembly incorporates an electronic control module called an ESM. The ESM communicates with the TCM and other modules on the Controller Area Network (CAN) C Bus. There is also a CAN DPT (Dedicated Powertrain) bus that is used only by the ESM and TCM. If one CAN bus is faulted, the other CAN bus transmits and receives the information required for uninterrupted operation.

The ESM can set Diagnostic Trouble Codes (DTCs) when a fault is detected. The E-shifter assembly backlighting can also indicate a fault by flashing the gear selection indicator on and off or turning it off completely.

The Electronic Shifter (E-Shifter) offers (P, R, N, D, M) modes of function. The M selection (manual mode) is engaged by moving the shift-lever sideways to M. Requests to up/down shift are achieved by moving the lever fore/aft once in the manual position.

The shifter knob (or handle) is the only serviceable part of the Shifter assembly.

REMOVAL

REMOVAL

1. Apply the parking brake.
2. Using a trim stick or equivalent, carefully release the retaining clips and lift the shifter bezel.

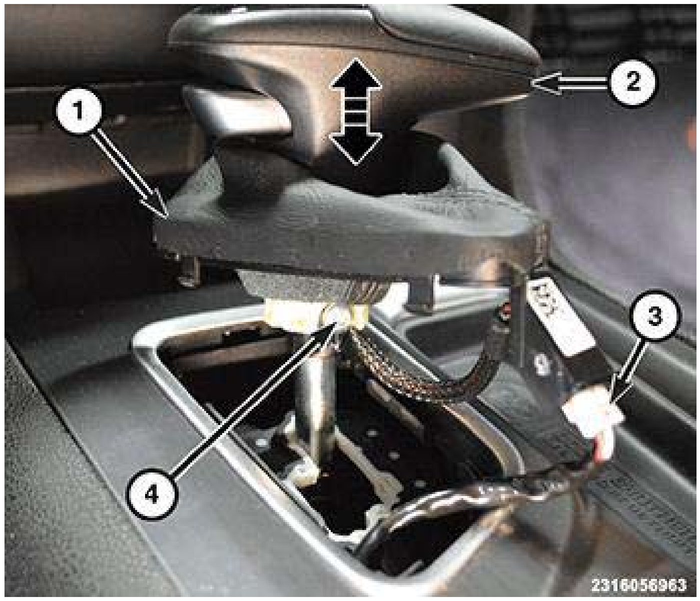


Fig. 22: Shifter Bezel, Knob, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

3. Unplug the wire harness connector (3) between the knob and lower base.

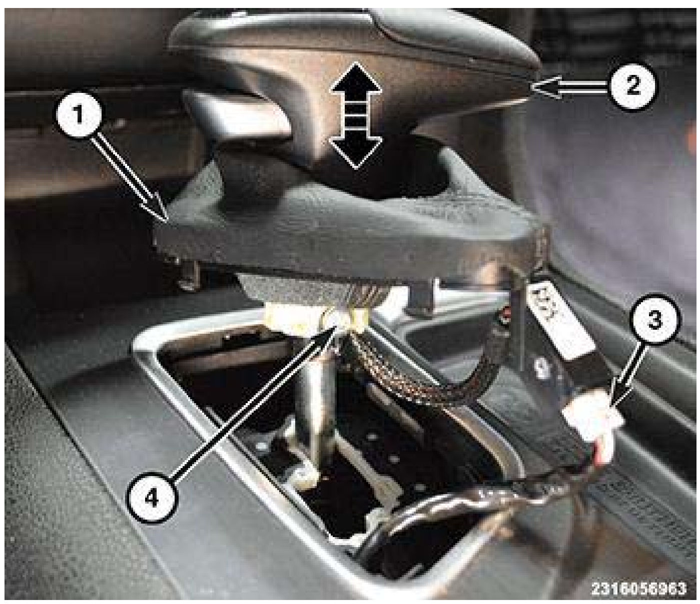
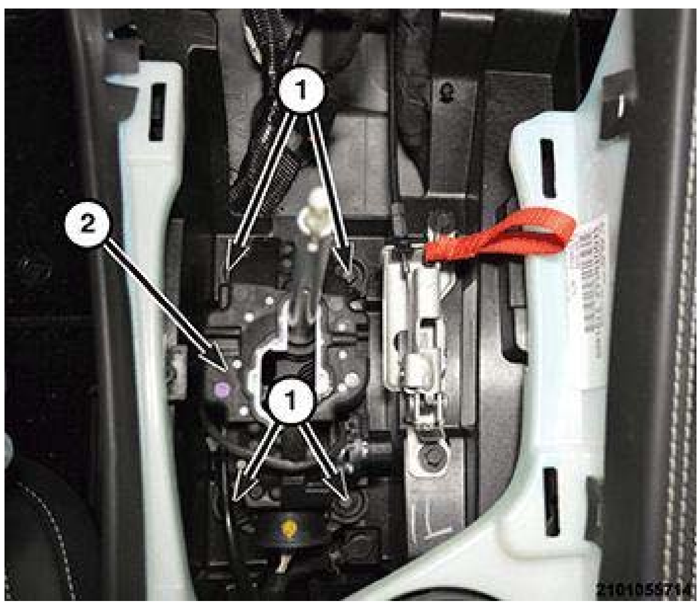


Fig. 23: Shifter Bezel, Knob, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

4. Remove the shifter knob screw (4) and remove the shifter knob (2) and shifter bezel (1).

[Fig. 24: Bezel Panel & Trim Stick](#)
Courtesy of CHRYSLER GROUP, LLC

5. Using a trim stick (2) or equivalent, starting at the rear of the console bezel panel (1), carefully release the retaining clip and lift the console bezel panel. Disconnect the wire harness connectors and remove the console bezel panel.



[Fig. 25: Shifter Assembly & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

6. Remove the shifter bolts (1) and lift the shifter assembly (2) up enough to allow access to the shifter wire harness connector.

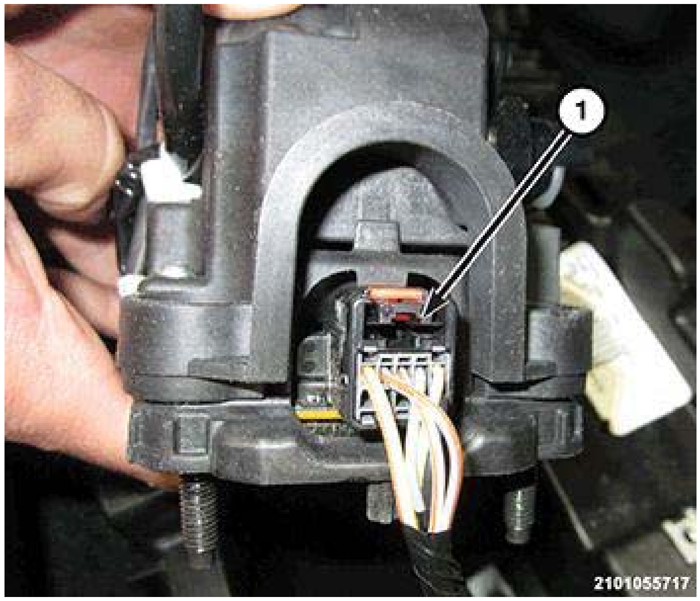


Fig. 26: Shifter Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the shifter wire harness connector (1).
8. Remove the shifter from the vehicle.

INSTALLATION

INSTALLATION

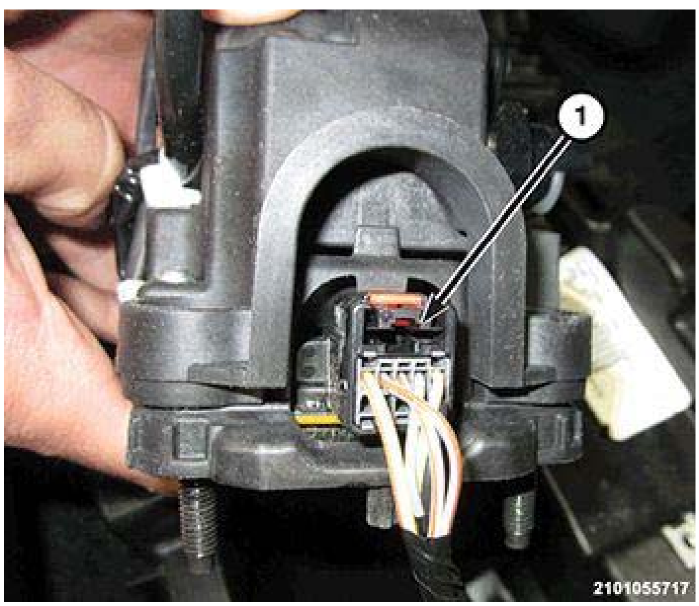
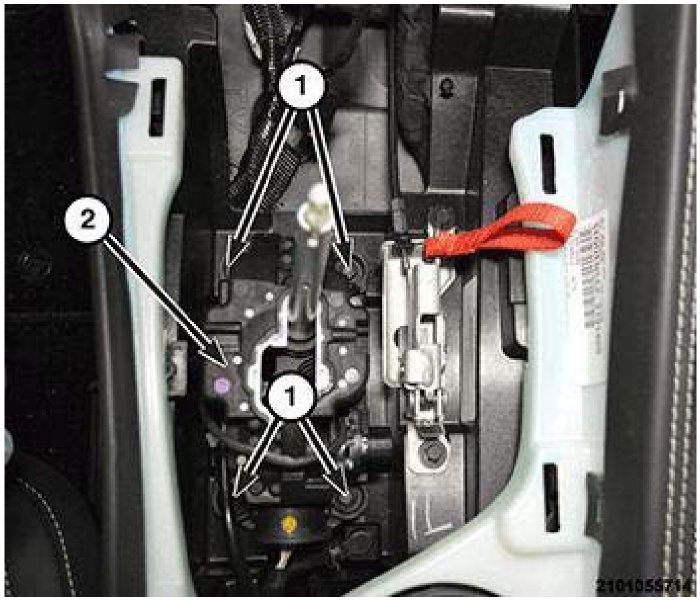


Fig. 27: Shifter Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Position the shifter assembly in place and connect the shifter wire harness connector (1).



[Fig. 28: Shifter Assembly & Bolts]
Courtesy of CHRYSLER GROUP, LLC

2. Install the shifter bolts (1) and tighten to the proper **SPECIFICATIONS** .

[Fig. 29: Bezel Panel & Trim Stick]
Courtesy of CHRYSLER GROUP, LLC

3. Install the shifter bezel panel (1).

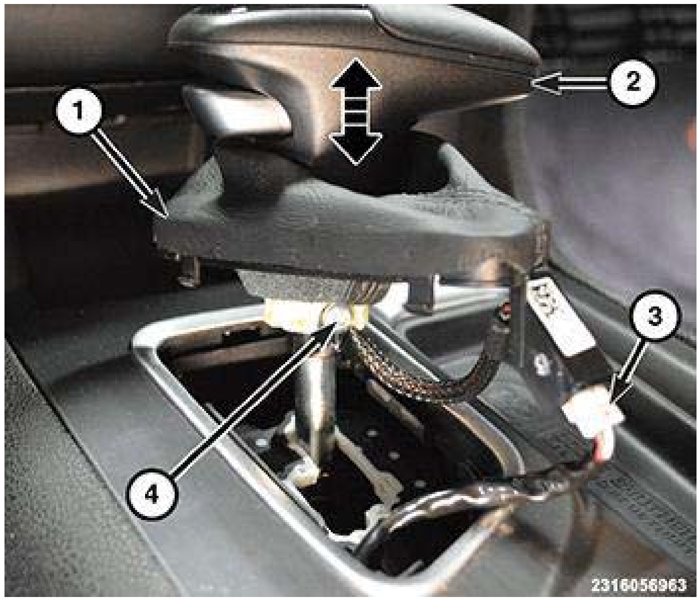


Fig. 30: Shifter Bezel, Knob, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

4. Install the shifter knob (2) and bezel (1).
5. Install the shifter knob screw (4).
6. Connect the shifter wire harness connector (3).

MODULE, FUEL PUMP CONTROL

DESCRIPTION

DESCRIPTION

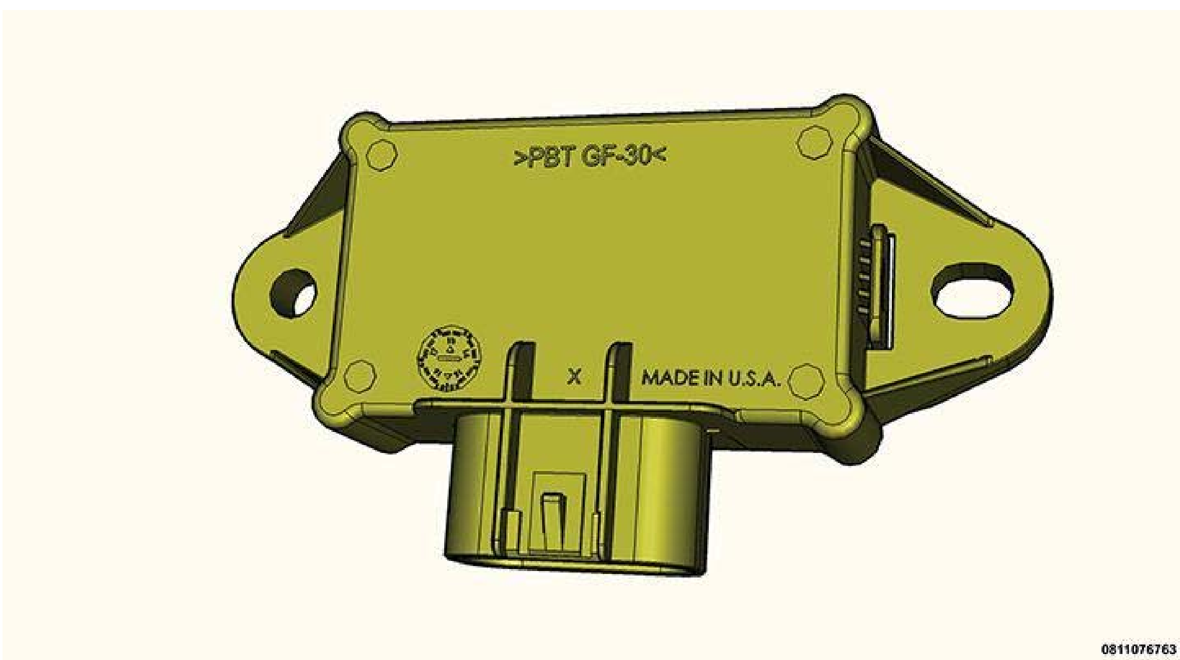


Fig. 31: Fuel Pump Control Module
Courtesy of CHRYSLER GROUP, LLC

The Fuel Pump Control Module (FPCM) is secured to the right inner quarter panel behind the right rear wheel housing in the trunk compartment. The module is concealed behind the trunk side trim.

OPERATION

OPERATION

When the Powertrain Control Module (PCM) receives a 'Start' or 'Run' signal from the ignition; It energizes the Fuel Pump relay which sends a continuous 12 volt supply to the Fuel Pump Control Module (FPCM). The PCM also sends a control signal directly to the FPCM which regulates the Pulse Width Modulated (PWM) signal that will be sent to the Fuel Pump Module. The PWM signal (duty cycle) will vary from 10-100% depending on the input of the Fuel Rail Pressure sensor and other engine demands. The PCM receives a PWM signal from the FPCM representing the state of all inputs and outputs of the FPCM. This is a Constant Pressure Fuel system which means any Delta Pressure test performed on the Fuel Pump would show a continuous pressure (regardless of the changes in PWM). If a pressure sensor fails or other failures are present; The duty cycle goes to Limp mode (100%) to maintain fuel pressure.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the trim from the right quarter inner panel to access Fuel Pump Control Module (FPCM), which is located just behind the right rear wheel house. Refer to CARPET, REMOVAL .

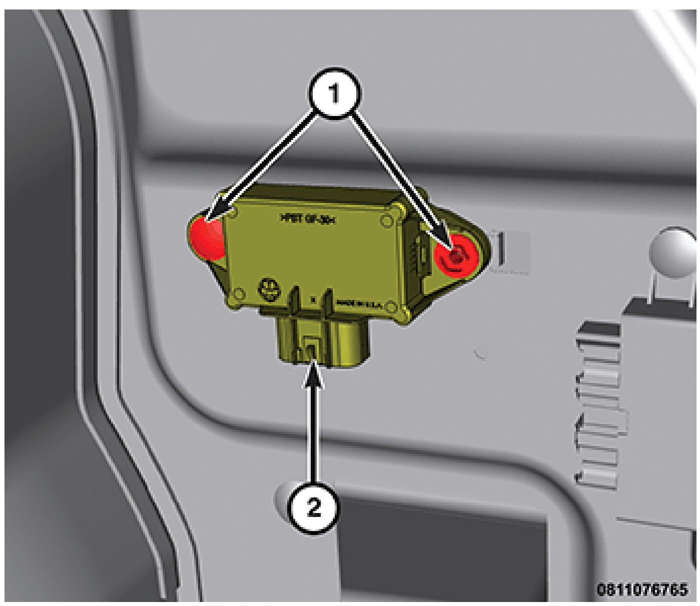


Fig. 32: Body Wire Harness Connector & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the body wire harness connector (2) from the FPCM.
4. Remove the fasteners (1) that secure the FPCM to the quarter inner panel.
5. Remove the FPCM from the vehicle.

INSTALLATION

INSTALLATION

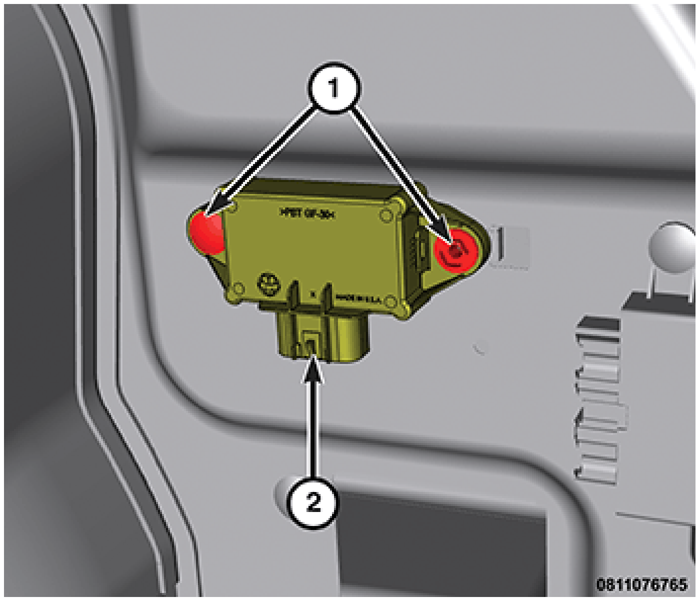


Fig. 33: Body Wire Harness Connector & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Position the Fuel Pump Control Module (FPCM) to the right quarter inner panel above and behind the right rear wheel house.
2. Securely install the fasteners (1) that secure the FPCM to the right quarter inner panel.
3. Connect the body wire harness connector (2) to the FPCM connector receptacle.
4. Install the trim onto the right quarter inner panel. Refer to **CARPET, INSTALLATION** .
5. Connect the negative battery cable.

MODULE, HEATED SEAT

DESCRIPTION

DESCRIPTION

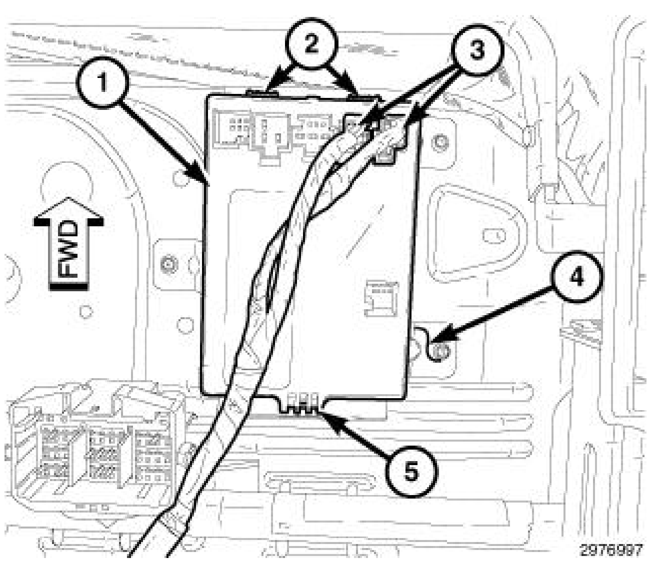


Fig. 34: Electrical Connectors, Heated Seat Module, Retaining Tab & Bracket
Courtesy of CHRYSLER GROUP, LLC

The Heated Seat Module (HSM) is located under the passenger front seat. It has a multiple electrical connectors (CAN + POWER, Front Heat, Front Vent and Heated Steering Wheel connections) and a push pin style retainer that secures it to the seat pan. The module can be accessed from under the passenger seat with the seat in the full back and up position.

The HSM is a CAN-IHS bus microcontroller providing outputs to the power seats, heated seat pads, heated steering wheel, and ventilating up to two seats. The HSM receives commands over the CAN IHS BUS from the BCM. The seat thermistor is hard wired to the HSM.

Heated Seats - The HSM uses a Pulse Width Modulation (PWM) to provide power to the seat cushion and back heating elements. The temperature sensor thermistor is located in the seat cushion. The thermistor sensor feedbacks from each seat heating element to the HSM to regulate the heater outputs to prevent any seat temperature to rise above set points. Seat heating has two selectable heat settings which are HI and LO. Depending on thermistor reading, the HSM will start the heater output by adjusting the PWM heat level according to the calibration table.

Vented Seats - The seat venting has two selectable speeds for the fans. For seat venting, each press of the switch button will cause the seat to change venting modes. The HSM has a single low side control signal to control each vented seat. The HSM does not directly drive the vent motors.

Heated Steering Wheel - The HSM provides power to the steering wheel heating element. The heated steering wheel is standard when the vehicle is equipped with front heated seats. During normal operation, the HSM will switch on the power for the heated wheel only if the engine is running. The heated steering wheel temperature sensor is hardwired to the EVIC (switch) which sends that information over a LIN Bus through the clockspring/SCCM to the BCM. The thermistor sensor feedbacks from the steering wheel heating element via the CAN Internal High Speed (IHS) bus to the HSM regulating the heater output to prevent the wheel temperature to rise above the maximum threshold temperature set point.

OPERATION

OPERATION

The Heated Seat Module (HSM) controls the heated seat system and the Heated Steering Wheel (HSW), when equipped. The HSM is secured to a mounting bracket located under the front passenger seat. The HSM responds to heated seat and steering wheel switch messages and ignition status inputs by controlling the 12 volt Direct Current (DC) output to the seat and steering wheel heating elements through high side drivers.

When either of the front heated seat switches in the U-Connect Touch™ screen module are pressed, the module sends a message over the Controller Area Network (CAN) data bus to the HSM, signaling the HSM to energize the heating elements for the front seat.

When the HSW switch in the U-Connect Touch™ screen module is pressed, the module sends a message over the Controller Area Network (CAN) data bus to the HSM, signaling the HSM to energize the heating element for the steering wheel.

The HSM energizes a high side driver to pulse width modulate the output to the heating elements. Heated seats turn off after approximately 45 minutes of continuous operation. If high-level heating is selected, the control system will remain at the high level for approximately 20 minutes and then drop to the low level. Normal heating

cycle for the heated steering wheel is 52 minutes.

The heated seat and steering wheel system only operate when the engine is running. The heated seat and steering wheel system will turn off automatically whenever the ignition is set to any position other than Run.

The HSM is diagnosed using a scan tool and will automatically turn off the heating elements if it detects an open or low short in a heating element circuit. Refer to **DIAGNOSIS AND TESTING** .

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

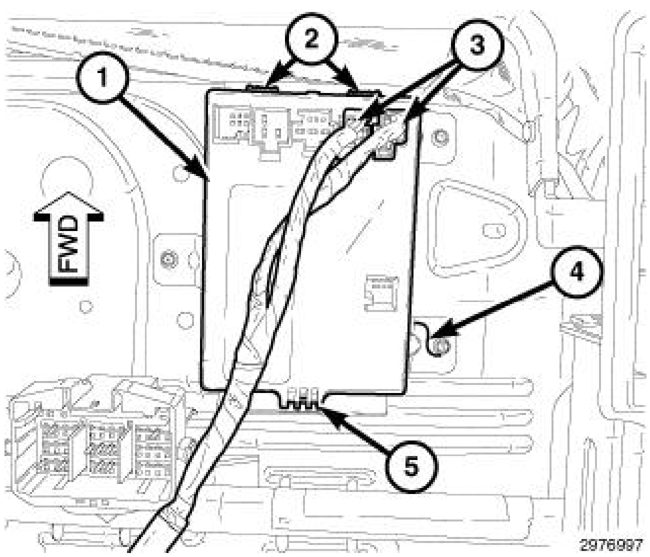


Fig. 35: Electrical Connectors, Heated Seat Module, Retaining Tab & Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the fasteners that secure the front passenger seat to the body and tip the seat rearward to gain access to the underneath of the seat. Refer to **SEAT, FRONT, REMOVAL** .
3. Disconnect the electrical connectors (3) from the Heated Seat Module (HSM) (1).
4. Disengage the retaining tab (5) that secures the rear of the HSM to the bracket (4).
5. Disengage the two front retaining tabs (2) from the bracket and remove the HSM.

INSTALLATION

INSTALLATION

CAUTION: Properly align the Heated Seat Module (HSM) retaining tabs to the bracket, prior to engagement. Failure to follow these instructions may result in damage to the

HSM.

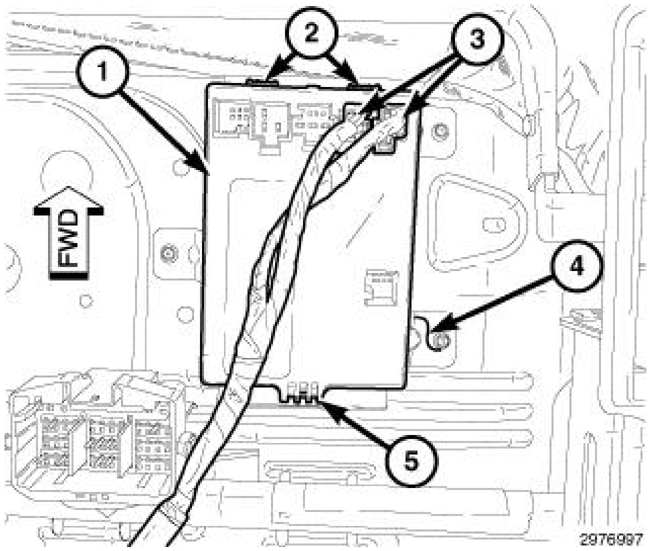


Fig. 36: Electrical Connectors, Heated Seat Module, Retaining Tab & Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Position the Heated Seat Module (HSM) (1) to the bracket (4) and engage the two front retaining tabs (2). Make sure the front retaining tabs are correctly engaged to the bracket.
2. Engage the rear HSM retaining tab (5). Make sure the rear retaining tab is fully engaged to the bracket.
3. Connect the electrical connectors (3) to the HSM.
4. Install the seat. Refer to **SEAT, FRONT, INSTALLATION** .
5. Reconnect the negative battery cable.

MODULE, HVAC

DESCRIPTION

DESCRIPTION

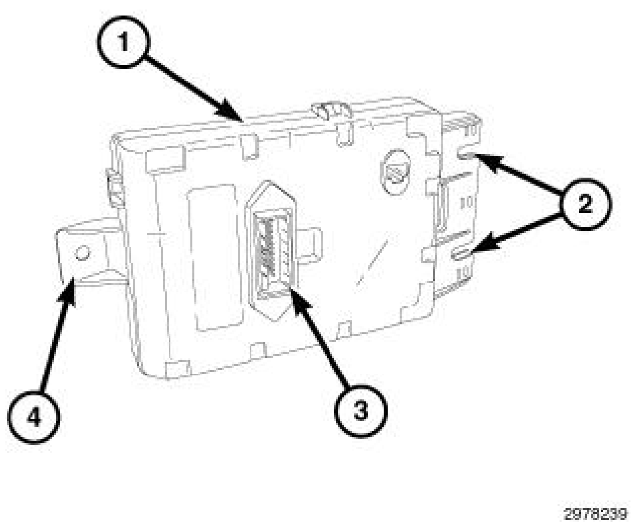


Fig. 37: A/C Heater Module, Mounting Tabs & Connector Receptacle

Courtesy of CHRYSLER GROUP, LLC

The Heating, Ventilation, and Air Conditioning (HVAC) module (1) is a microcontroller designed to operate the heating and A/C system. The HVAC module has a plastic housing with one integral electrical connector receptacle (3) and three mounting tabs (2 and 4).

The HVAC module is located on the air inlet housing, on the passenger side of the vehicle.

OPERATION

OPERATION

The Heating, Ventilation, and Air Conditioning (HVAC) module utilizes integrated circuitry and information carried over the Controller Area Network (CAN) to monitor many sensors and switch inputs throughout the vehicle. In response to those inputs, the internal circuitry and programming of the HVAC module allows it to control electronic functions and features of the HVAC system.

Some of the inputs received by the HVAC module over the CAN are as follows:

- A/C Request
- Ambient Air Temperature
- Electric Back Light (EBL) Request
- Electrical System Voltage
- Engine Coolant Temperature
- Engine Speed
- Humidity, Windshield Glass Temperature and Dewpoint (Automatic Temperature Control)
- Refrigerant Pressure
- Vehicle Identification Number
- Vehicle Odometer

Some of the messages broadcasted by the HVAC module on the CAN are as follows:

- A/C Clutch Engage
- Auto Headlamp Signal
- EBL Status

The HVAC module receives the following information over hardwired circuits:

- Auto Headlamp Signal
- Evaporator Temperature
- Interior Air Temperature
- Left and Right Sun Load

The HVAC module monitors and controls the following over hardwired circuits:

- Driver and Passenger Blend Door Positions
- Blower Motor Speed

- Mode Door Position
- Recirculation Door Position

The HVAC module is diagnosed using a scan tool. Prior to replacing an HVAC module, run the calibration procedure to verify that the concern is not an air door calibration issue. Refer to **STANDARD PROCEDURE** .

The HVAC module cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

WARNING: **Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.**

NOTE: **Illustration shown with instrument panel removed from view for clarity.**

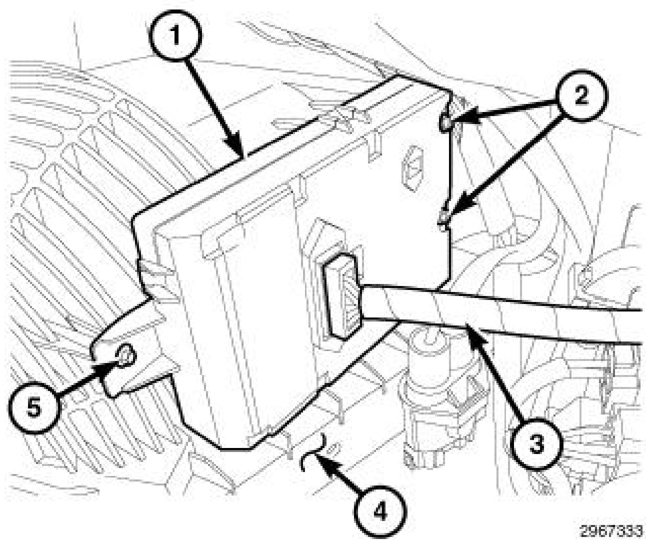


Fig. 38: Wire Harness Connector, A/C Heater Module & Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the glove box and the glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .
3. Disconnect the wire harness connector (3) from the Heating, Ventilation, and Air Conditioning (HVAC) module (1), located on the air inlet housing (4).

NOTE: **It is not necessary to fully remove the two front HVAC module retaining screws. The front HVAC module retaining tabs are slotted to aid in module service.**

4. Loosen the two screws (2) that secure the front of the HVAC module to the air inlet housing.
5. Remove the one screw (5) that secures the rear of the HVAC module to the air inlet housing.
6. Slide the HVAC module rearward to disengage the module from the two front retaining screws and remove the module.

INSTALLATION

INSTALLATION

NOTE: **Illustration shown with instrument panel removed from view for clarity.**

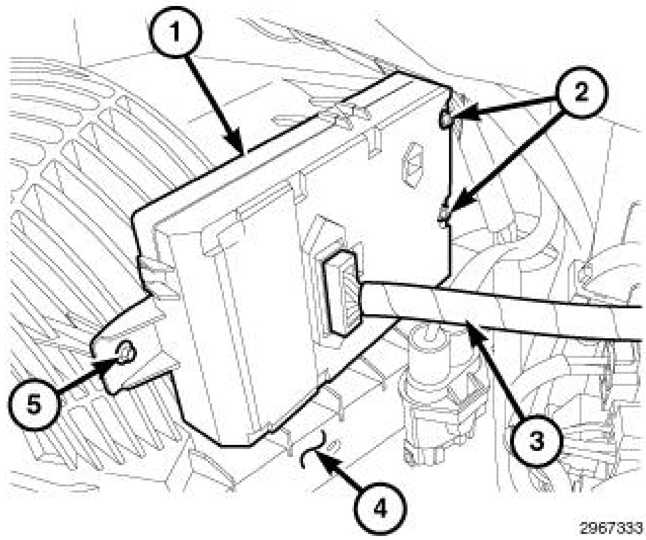


Fig. 39: Wire Harness Connector, A/C Heater Module & Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

1. Position the Heating, Ventilation, and Air Conditioning (HVAC) module (1) to the air inlet housing (4) and engage the module to the two front retaining screws (2).
2. Loosely install the screw (5) that secures the rear of the HVAC module to the air inlet housing.
3. Tighten all the screws that secure the HVAC module to the air inlet housing.
4. Connect the wire harness connector (3) to the HVAC module.
5. Install the glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
6. Connect the negative battery cable.
7. Perform the HVAC Verification Test. Refer to **STANDARD PROCEDURE** .

MODULE, INSTRUMENT PANEL CLUSTER

DESCRIPTION

DESCRIPTION

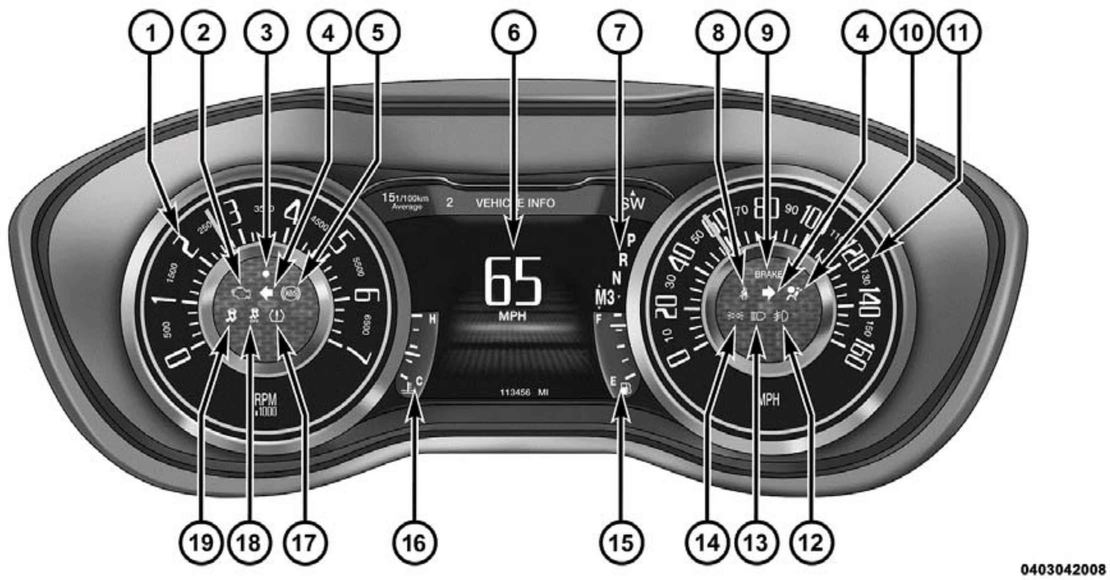


Fig. 40: Instrument Cluster
Courtesy of CHRYSLER GROUP, LLC

The Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) for this vehicle is located directly in front of the driver, above the steering column opening. Only the face of the IC is visible. The remainder of the IC including the mounting provisions and electrical connections are concealed within the instrument panel behind the IC housing and the instrument panel cluster bezel.

The IC gauges and indicators are visible through a dedicated opening in the instrument panel below the cluster hood and are protected by a clear plastic cluster lens. A cluster hood and mask serves as a visor and shields the face of the cluster from ambient light and reflections to reduce glare. The IC has two integral mounting tabs on the sides near the top of the unit as well as two on the bottom which are used to secure the IC to the molded plastic instrument panel cluster carrier with screws.

Besides analog gauges and Light Emitting Diode (LED) unit indicators, the IC incorporates a multicolor Thin Film Transistor (TFT) display unit. The TFT will display odometer information and automatic transmission gear selection. The TFT may also display numerous indications, textual messages, both static and animated graphics and certain diagnostic information, some of which are model and equipment dependent. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, DESCRIPTION** .

Several versions of the IC module are offered for this vehicle. These versions accommodate all of the variations of optional equipment and regulatory requirements for the various markets in which the vehicle is offered. The microcontroller-based IC utilizes integrated circuitry and information carried on the Controller Area Network (CAN) data bus along with several hard wired analog and multiplexed inputs to monitor sensors and switches throughout the vehicle. Refer to **COMMUNICATION, DESCRIPTION**.

The IC gauges, indicators and electronic circuitry along with the cluster housing are only serviced as an assembly, and cannot be adjusted or repaired. If a gauge, a LED unit, the TFT display unit, the electronic circuit board and hardware, the cluster overlay or the cluster housing is damaged or ineffective, the entire IC unit must be replaced. The cluster lens and the cluster hood and mask are available for separate service replacement.

OPERATION

OPERATION

The Instrument Panel Cluster (IPC) is designed to allow the vehicle operator to monitor the conditions of many of the vehicle components and operating systems. The gauges and indicators in the IPC provide valuable information about the various standard and optional power trains, fuel and emissions systems, cooling systems, lighting systems, safety systems and many other convenience items. The IPC is installed in the instrument panel so that the operator of the vehicle can view all of these monitors easily, yet still allow relative ease of access for service.

The microcontroller-based IPC hardware and software uses various inputs to control the gauges and indicators visible on the face of the cluster. Some of these inputs are hard wired, but most are in the form of electronic messages that are transmitted by other electronic modules over the Controller Area Network (CAN) data bus. Refer to **COMMUNICATION, OPERATION**.

The IPC microcontroller smooths the input data using algorithms to provide gauge readings that are accurate, stable and responsive to operating conditions. These algorithms are designed to provide gauge readings during normal operation that are consistent with customer expectations. However, when abnormal conditions exist such as high coolant temperature, the algorithm can drive the gauge pointer to an extreme position and the microcontroller can sound a chime warning to provide distinct visual and audible indications of a problem to the vehicle operator. The IPC may also produce audible warnings for other electronic modules in the vehicle based upon electronic chime request messages received over the CAN data bus. Each audible warning is intended to provide the vehicle operator with an audible alert to supplement a visual indication.

The IPC circuitry operates on battery current received through a fused B(+) fuse on a non-switched fused B(+) circuit, and on battery current received through a fused ignition switch output (run-start) fuse on a fused ignition switch output (run-start) circuit. This arrangement allows the IPC to provide some features regardless of the ignition switch position, while other features will operate only with the ignition switch in the ON or START positions. The circuitry is grounded through a ground circuit of the instrument panel wire harness.

The IPC also has a self-diagnostic test capability that tests each of the CAN bus message-controlled functions of the cluster. This test illuminates the appropriate indicators, positions the gauge needles at several predetermined calibration points across the gauge faces and illuminates all segments of the Electronic Vehicle Information Center (EVIC). The EVIC will display the hardware/software version and the CAN Vehicle Maintenance Monitor (VMM) used in the IPC within the Thin Film Transistor (TFT) display unit. Refer to **DIAGNOSIS AND TESTING** .

Cluster Illumination

Instrument cluster illumination is supplied by several Light Emitting Diode (LED) units controlled by the IPC. The illumination intensity of these LED units can be adjusted only when the exterior lighting is turned ON by rotating the panel dimmer switch thumbwheel (down to dim, up to brighten) of the dimmer module to one of five available minor detent positions. The illumination intensity of the LED units is controlled by the IPC circuitry based upon electronic **dimming level** messages received from the Body Control Module (BCM) (also known as the Common Body Controller/CBC) over the Controller Area Network (CAN) data bus. The BCM monitors an input from the headlamp switch and a dimming level input received from the panel dimmer switch of the dimmer module.

The hard-wired headlamp switch and dimmer module inputs to the BCM may be diagnosed using conventional diagnostic methods. However, proper testing of the electronic communication and processing of the IPC and the electronic **dimming level** messages sent by the BCM over the CAN data bus requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

Thin Film Transistor Display

The Thin Film Transistor (TFT) display unit is soldered to the IPC electronic circuit board. With the ignition switch in the OFF or ACCESSORY positions, the TFT display is activated when the driver door is opened (Rental Car mode) and deactivated when the driver door is closed.

The illumination intensity of the TFT unit is controlled by the IPC circuitry based upon electronic **dimming level** messages received from the Body Control Module (BCM) (also known as the Common Body Controller/CBC) over the Controller Area Network (CAN) data bus. The BCM monitors an input from the headlamp switch and a dimming level input received from the panel dimmer switch of the dimmer module. The BCM synchronizes the illumination intensity of other display units with that of the unit in the IPC by sending electronic **dimming level** messages to other electronic modules in the vehicle over the CAN data bus.

The IPC TFT display unit has several display capabilities. The TFT unit displays odometer, trip odometer, gear selector indication (PRNDL) for models with an automatic transmission, both static and animated graphics, several warning or reminder indications and various diagnostic information when certain fault conditions exist. Steering wheel mounted switches are used to control some of the display modes of the TFT. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, OPERATION** for more information.

The TFT display unit is diagnosed using the IPC self-diagnostic actuator test. Refer to **DIAGNOSIS AND TESTING** . Proper testing of the CAN data bus and the electronic data bus message inputs to the IPC that control some of the TFT display functions requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article. Specific operation details for the odometer, the trip odometer, the gear selector indicator and the various warning and reminder indicator functions of the TFT display unit may be found elsewhere in this service information.

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove the instrument cluster bezel. Refer to **BEZEL, INSTRUMENT CLUSTER, REMOVAL** .

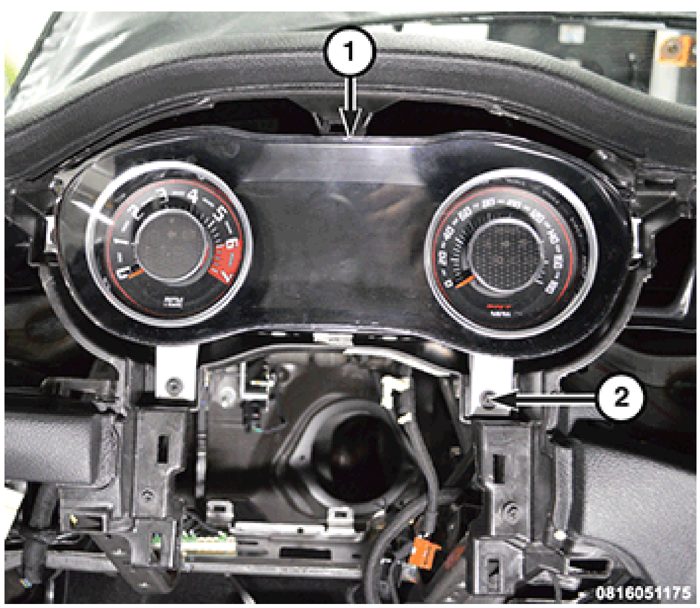


Fig. 41: Instrument Cluster & Screws

Courtesy of CHRYSLER GROUP, LLC

3. Remove the four (2) screws securing the instrument cluster (1) to the instrument panel.
4. Tilt the cluster forward, and disconnect the electrical connector.

INSTALLATION

INSTALLATION

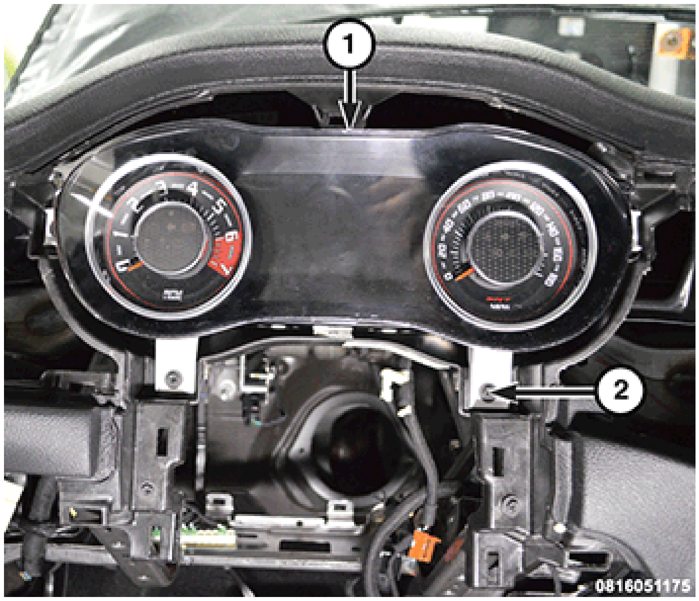


Fig. 42: Instrument Cluster & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Position the cluster (1) into instrument panel opening and connect the electrical connector.
2. Install the four (2) screws that secure the instrument cluster (1) to the instrument panel.
3. Install the instrument cluster bezel. Refer to **BEZEL, INSTRUMENT CLUSTER, INSTALLATION** .
4. Connect the negative battery cable.

NOTE: **If the cluster has been replaced, the replacement cluster should be programmed with the correct mileage. Verify the correct mileage via Scan Tool.**

MODULE, KEYLESS IGNITION NODE

DESCRIPTION

DESCRIPTION

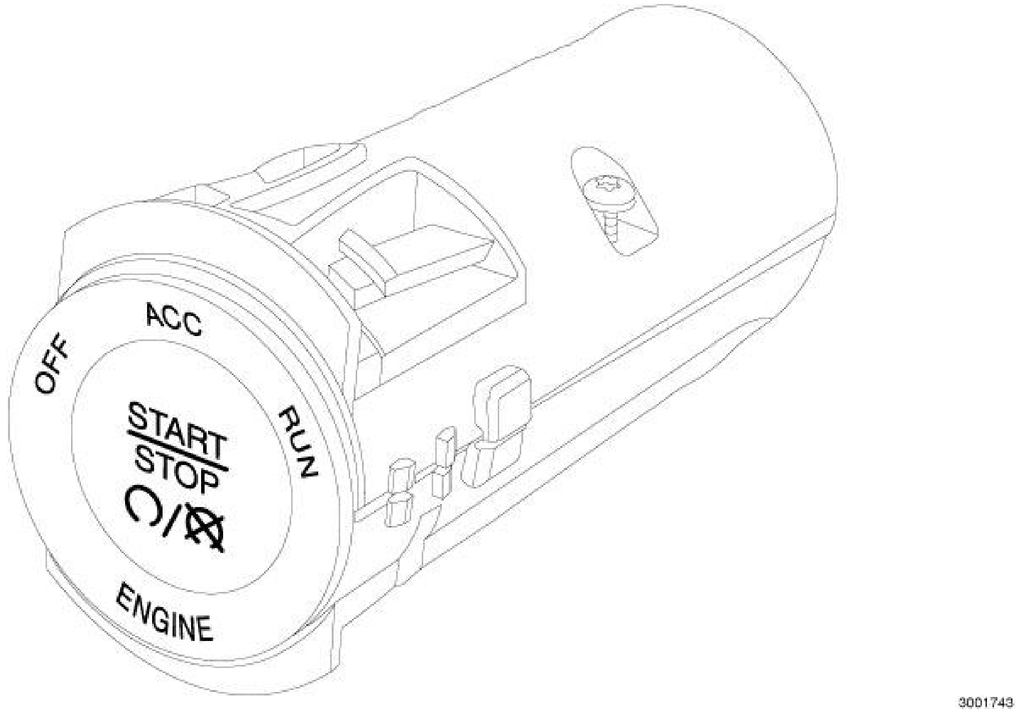


Fig. 43: Keyless Ignition Node (KIN)
Courtesy of CHRYSLER GROUP, LLC

Keyless Ignition Node (KIN) is part of the new ignition system.

The KIN module is located in the instrument panel to the left of the center stack.

OPERATION

OPERATION

The Keyless Go system with the Keyless Ignition Node (KIN) replaces the conventional key and ignition switch with a momentary button press and a wireless electronic key (FOBIK). When the operator presses the GO-Button the FOBIK is interrogated wirelessly. If the FOBIK is recognized as belonging to the vehicle and in the vehicle interior the system allows the ignition state of the vehicle to be manipulated by the operator between the LOCK, ACCESSORY, RUN, and START ignition states. This causes changes in the ignition status signals on the vehicle's CAN-C data buses and hardwired outputs controlled by the starting system master. As far as the vehicle's ignition system is concerned, keyless go control is indiscernible from legacy conventional control using a rotational switch and key.

- When the Go-Button on the KIN is pressed, the Radio Frequency Hub Module (RFHM) is signalled with "request to start".
- The RFHM then uses the LF (low frequency) antennas to communicate with the FOB and confirm the FOB is located inside the vehicle.
- Once located, the FOB's response is evaluated by the RFHM to determine if the person pushing on the Go-Button is in fact the owner. This process completes 'FOB authentication'.
- Once successfully completed, the RFHM next sends the BCM the ignition switch position, which equates to a 'request to start' command.

NOTE: **In case the ignition switch does not change with the push of a button, the RKE**

transmitter may have a low or dead battery. In this situation a back up method can be used to operate the ignition switch. Put the nose side (side opposite of the emergency key) of the Key Fob against the Go-Button and push to operate the ignition switch.

After putting the vehicle into park, pushing the KIN's Go-Button allows the vehicle's engine to be shut off. In an emergency, pressing the Go-Button continuously for 2 seconds or repeatedly (one hit every 30- 500ms) will cause the engine to shut off when vehicle speed is greater than 5 mph.

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Lower the steering column to the lowest position.

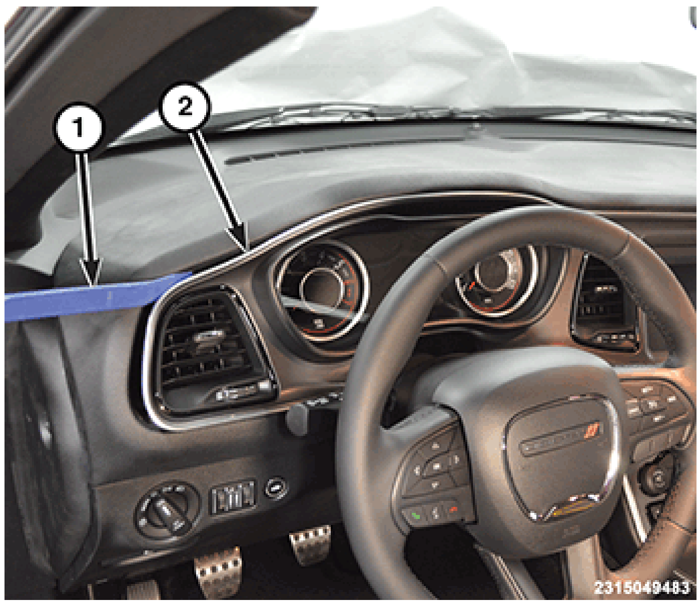


Fig. 44: Instrument Cluster Bezel & Trim Stick
Courtesy of CHRYSLER GROUP, LLC

3. Using a trim stick (1) or equivalent, carefully remove the instrument cluster bezel (2).
4. Reach through the Integrated Center Stack (ICS) screen opening and disconnect the Keyless Ignition Node (KIN) electrical connector.

Fig. 45: Keyless Ignition Node & Tabs
Courtesy of CHRYSLER GROUP, LLC

5. Press on the tabs (2) and push the KIN (1) out the front of the instrument panel.

INSTALLATION

INSTALLATION

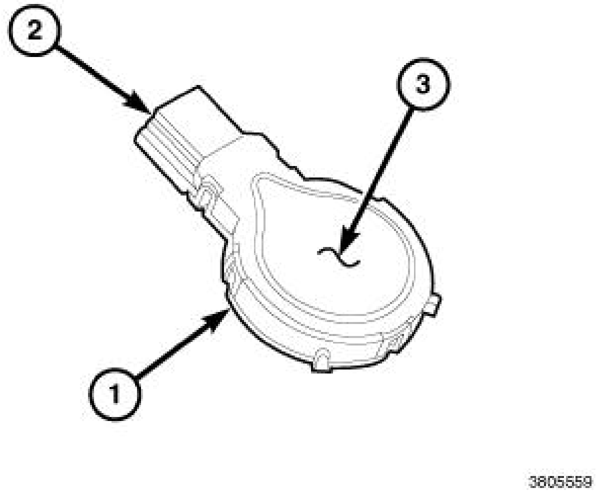
Fig. 46: Keyless Ignition Node & Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Push the Keyless Ignition Node (KIN) into the instrument panel until it snaps into place.
2. Reach through the Integrated Center Stack (ICS) screen opening and connect the KIN electrical connector.
3. Position the instrument cluster bezel (2) and hand tap to engage the retaining clips.
4. Connect the negative battery cable.

MODULE, LIGHT RAIN SENSOR

DESCRIPTION

DESCRIPTION



[Fig. 47: Light Rain Sensor Module Components]
Courtesy of CHRYSLER GROUP, LLC

The Light Rain Sensor Module (LRSM) (1) is the primary component of the automatic wiper system. The LRSM is also capable of performing an ambient light sensor function; therefore, it is alternately referred to as the Rain Light Sensor Module (RLSM), the Light Sensor Module (LSM), the Rain Light Sensor (RLS) or the Rain Sensor Module (RSM). The LRSM is located on the inside of the windshield glass just below and to the right of the inside rear view mirror mounting button. The LRSM is concealed from view within the vehicle interior by a molded plastic inside rear view mirror bracket trim cover that fits over the top of the LRSM housing and the LRSM mounting bracket, but the LRSM is visible through the windshield glass from the exterior of the vehicle.

The molded black plastic LRSM housing has an integral connector receptacle (2) with three terminal pins. These terminal pins connect the LRSM to the vehicle electrical system through a dedicated take out and connector of the overhead wire harness that extends from above the headliner. The windshield side of the housing is filled with a clear, silicone gelatin (also known as SilGel) adhesive membrane pad (3), which serves as an optical coupler between the sensor and the inside of the windshield glass. A spring steel retaining strap or clip extends forward on each side of the housing to latch the LRSM to a molded black plastic mounting bracket, which is permanently bonded to the inside of the windshield glass.

Concealed and protected within the LRSM housing is the electronic circuitry of the module, which includes an InfraRed (IR) diode and photocell based light and rain sensors, control electronics and Local Interface Network (LIN) data bus communication management hardware. The LRSM is a LIN slave node and communicates over a single LIN bus circuit with the Body Control Module (BCM) (also known as the Common Body Controller/CBC). The BCM is a LIN master node and a gateway to the Controller Area Network (CAN) data bus. The BCM controls the exchange of electronic messages back and forth between the LRSM and other electronic modules in the vehicle, as well as with a diagnostic scan tool connected to the Data Link Connector (DLC).

The LRSM cannot be adjusted or repaired. If ineffective or damaged, the entire module must be replaced. The silicone gelatin adhesive membrane pad is available for separate service replacement. The LRSM mounting

bracket is serviced only as a unit with the windshield glass.

OPERATION

OPERATION

The Light Rain Sensor Module (LRSM) (also known as the Rain Light Sensor Module/RLSM, the Light Sensor Module/LSM, the Rain Light Sensor/RLS or the Rain Sensor Module/RSM) senses moisture and ambient light levels on the outside of the windshield glass and sends electronic messages to the Body Control Module (BCM) (also known as the Common Body Controller/CBC) over the Local Interface Network (LIN) data bus. The BCM relays messages back and forth between the LRSM and other electronic modules in the vehicle.

For the rain sensor function, InfraRed (IR) diodes within the LRSM generate infrared light beams that are aimed by the optics of the sensor through the windshield glass, while an IR photo diode monitors the infrared light reflected back from the windshield glass. When sufficient moisture accumulates within the wipe pattern on the windshield glass, less of the infrared light is reflected back and the sensor detects a change in the monitored infrared light intensity. For the light sensor function, an IR photo diode within the sensor monitors the intensity of the ambient infrared light received through the windshield glass and the sensor optics.

The internal programming of the LRSM sends the appropriate electronic **wipe command** messages to the BCM over the LIN data bus. The BCM then responds by activating or deactivating the wiper system. Similarly, the LRSM provides electronic **ambient light level** messages to the BCM, and the BCM relays these messages to other electronic modules in the vehicle.

The Steering Column Control Module (SCCM) microcontroller sends electronic **wiper switch status** and **automatic wipe sensitivity level** messages over the Controller Area Network (CAN) data bus to the BCM based upon the driver-selected settings of the control knob on the control stalk of the multifunction switch. The higher the selected wipe sensitivity setting the more sensitive the LRSM is to the accumulated moisture on the windshield glass, and the more frequently the LRSM will send **wipe commands** to the BCM to operate the wiper system. The BCM also monitors electronic **automatic display brightness level** messages based upon the driver-selected settings of the Electronic Vehicle Information Center (EVIC) as well as electronic messages from other electronic modules in the vehicle received over the CAN data bus, then relays the messages to the LRSM over the LIN bus.

The LRSM operates on battery current received through a fused ignition output (run) circuit. The LRSM has a path to ground at all times through a take out of the body wire harness with an eyelet terminal that is secured to the body sheet metal. Therefore, the LRSM is operational only when the ignition switch status is On.

If the BCM receives an electronic status message from the LRSM indicating a sensor failure condition, a **Rain Sensor Failure** message should be displayed by the Instrument Cluster (IC) (also known as the Instrument Panel Cluster/IPC). It is important to note that the default operation of the automatic wiper system is continuous wipe On, while the default operation for automatic lighting is On. Therefore, if no command message is received by the BCM from the LRSM for more than about five seconds when the Automatic wipe mode is selected, the wipers will default to Low Speed or High Speed continuous wipe operation. Likewise, if no command message is received by the BCM from the LRSM when the Automatic lighting mode is selected, the exterior lighting will default to On. The BCM must be properly configured for the automatic wipers and automatic lighting options in order for these systems to function.

The hard wired circuits of the LRSM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods

will not prove conclusive in the diagnosis of the LRSM or the electronic controls and communication between other modules and devices that provide some features of the automatic wiper and automatic lighting systems. The most reliable, efficient and accurate means to diagnose the LRSM or the electronic controls and communication related to LRSM operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

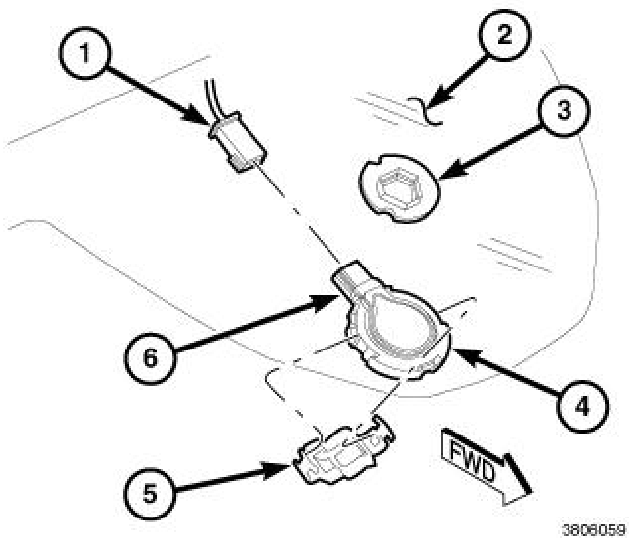


Fig. 48: LRSM, Harness Connector, Mount Bracket & Retaining Strap
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the inside rear view mirror from the mounting button (3) on the inside of the windshield glass (2). Refer to **MIRROR, REARVIEW, REMOVAL** .
3. Disconnect the wire harness connector (1) from the connector receptacle for the Light Rain Sensor Module (LRSM) (6).
4. Insert the tip of a small screwdriver into the rectangular cutout on one side of the spring steel retaining strap (5) on the LRSM and carefully pry the end of the strap closest to the glass away from the groove in the mounting bracket (4) on the windshield. Now rotate the loose side of the strap away from the glass far enough to disengage the other side of the strap from the mounting bracket groove.
5. Firmly grasp the connector receptacle of the LRSM to pull the module away from the windshield glass and the mounting bracket.
6. If the LRSM will be reinstalled, the silicone gelatin (also known as SilGel) adhesive membrane pad MUST be removed, discarded and replaced with a new unit as described in: **STANDARD PROCEDURE** - Silicone Gelatin Pad Replacement.

INSTALLATION

INSTALLATION

CAUTION: The Light Rain Sensor Module (LRSM) is equipped with a clear, silicone gelatin

(SilGel) adhesive membrane that serves as an optical coupler between the sensor and the windshield glass. Extreme care must be exercised to protect this membrane from contamination before it is installed in the vehicle. The LRSM should always be serviced only in a dust-free environment. Do not touch the membrane with your fingers or tools. The membrane should only come into contact with the clean and dry inside surface of the glass within the mounting bracket bonded to the windshield. If contaminated, clean any foreign material from the windshield glass using rubbing alcohol and a lint-free cloth. A contaminated SilGel membrane will negatively impact LRSM performance.

CAUTION: When installing the Light Rain Sensor Module (LRSM) it is necessary to minimize air pockets trapped between the SilGel membrane and the windshield glass. Excessive air pockets will negatively impact LRSM performance. It is important to adhere to the procedure steps in a deliberate manner to achieve satisfactory results.

CAUTION: To avoid excessive air pockets, do not try to install the spring steel retaining strap until AFTER the Light Rain Sensor Module (LRSM) has been successfully positioned to the glass within the mounting bracket bonded to the windshield.

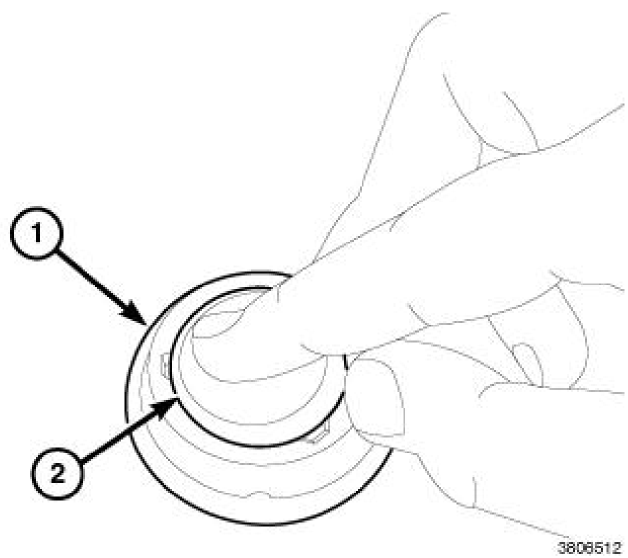


Fig. 49: LRSM & Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

1. If a new Light Rain Sensor Module (LRSM) is being installed, remove the protective shipping cap from the LRSM as described in: **STANDARD PROCEDURE** - Protective Cap Removal. If an existing LRSM is being reused, the silicone gelatin (also known as SilGel) adhesive membrane pad MUST be removed, discarded and replaced with a new unit as described in: **STANDARD PROCEDURE** - Silicone Gelatin Pad Replacement.
2. Grasp the LRSM (2) by the connector receptacle between your thumb and middle finger. Place your index finger on the back of the LRSM at the point opposite the connector receptacle.
3. Align the LRSM with the mounting bracket (1) bonded onto the inside of the windshield glass near the inside rear view mirror mounting button.
4. Slowly insert the LRSM into the mounting bracket at a slight angle so that the edge of the module nearest

the tip of your index finger makes the initial contact with the windshield glass.

5. Using a slow, deliberate motion and light pressure, draw your index finger across the back of the LRSM toward the connector receptacle until the silicone gelatin adhesive membrane pad is in full contact with the windshield glass.

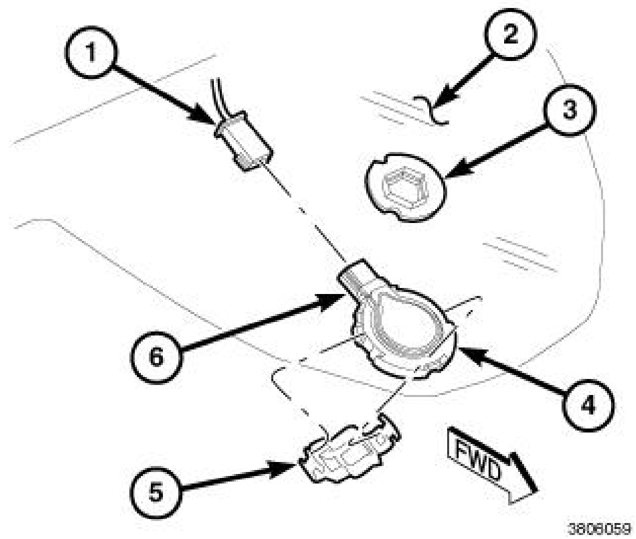


Fig. 50: LRSM, Harness Connector, Mount Bracket & Retaining Strap
Courtesy of CHRYSLER GROUP, LLC

6. Engage one side of the spring steel retaining strap (5) into the groove on one side of the LRSM mounting bracket (4) on the inside of the windshield glass (2).
7. Depress the opposite side of the retaining strap over the LRSM firmly and evenly until it fully engages the groove of the mounting bracket with an audible click.
8. Looking through the windshield from outside the vehicle, inspect the silicone gelatin adhesive membrane pad for air pockets. If air pockets are observed, let the vehicle stand for about four hours at room temperature to allow the air pockets to dissipate. If an adhesive void (air pocket) greater than about 1 millimeter (0.04 inch) is observed, replace the flawed silicone gelatin adhesive membrane pad with a new unit as described in: **STANDARD PROCEDURE** - Silicone Gelatin Pad Replacement.
9. Reconnect the wire harness connector (1) to the LRSM connector receptacle (6).
10. Reinstall the inside rear view mirror to the mounting button (3) on the inside of the windshield glass. Refer to **MIRROR, REARVIEW, INSTALLATION** .
11. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

MODULE, MEMORY

DESCRIPTION

DESCRIPTION

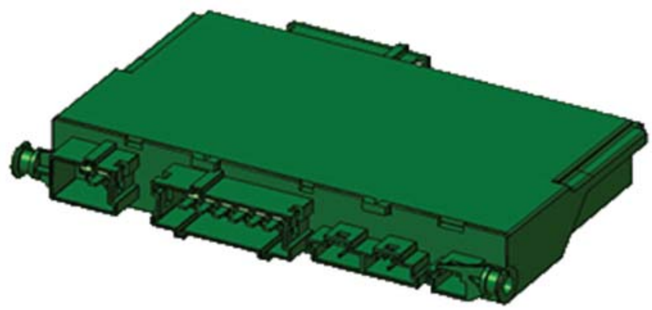


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Fig. 51: Memory Seat Module (MSM)
Courtesy of CHRYSLER GROUP, LLC

The Memory Seat Module (MSM) is located underneath the driver seat. The MSM is attached to a bracket by slide and snap fit. The purpose of the MSM is to operate the driver seat motors and the adjustable steering column.

OPERATION

OPERATION

Memory Seat Module

-

Power and Communication

- The Memory Seat Module (MSM) receives battery current through a fuse in the Power Distribution Center (PDC).
- The MSM receives hard-wired input from the hall effect sensors. The hall effect sensors are internal to the motors and are not serviceable.
- The MSM receives bus input from the Body Control Module (BCM).

Drivers power seat with MSM equipped

- The MSM is used to control driver power seat horizontal and vertical movement.
- The MSM is used to control driver lumbar seat horizontal and vertical movement.
- The drivers seat switch has 6 selectable positions. Forward, rearward, Front Up, Front Down, Rear Up, and Rear Down.
- The MSM is responsible for the 12 volt Direct Current (DC) feed and ground path to the power seat adjuster motors and to the other memory system components.
- When the power seat switch is pressed, the MSM received a hardwired resistor value to identify which seat motor(s) are going to be in use.

- The MSM then provides battery level voltage and ground to the appropriate switch output terminals to drive the seat.

Power Tilt and Telescoping Steering Column Adjustment with MSM equipped

- The MSM is used to control driver power steering column tilt and telescoping movement.
- The Steering Column Control Module (SCCM) monitors the tilt switch input.
- When an input is received from the tilt switch at the SCCM, the input is then sent from the SCCM to the Body Control Module (BCM) on the CAN C bus.
- The BCM converts this input from CAN C bus to CAN B bus.
- The BCM send the request over CAN B bus to the MSM for power steering column tilt and telescoping requests.
- The MSM applies battery level voltage and ground to the appropriate steering column motor.

The hard wired inputs for the MSM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the MSM. The most reliable, efficient, and accurate means to diagnose the MSM requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article

REMOVAL

REMOVAL

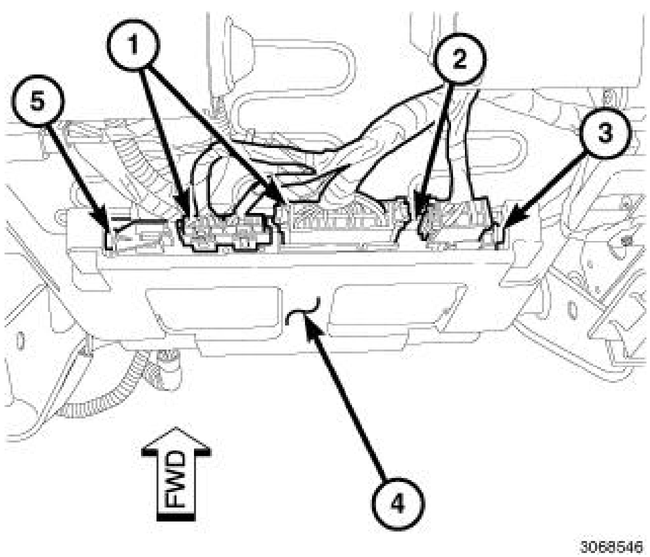


Fig. 52: Electrical Connectors, Memory Seat Module (MSM), MSM Retaining Tabs & Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the fasteners that secure the driver seat to the body and tip the seat rearward to gain access to the underneath of the seat. Refer to **SEAT, FRONT, REMOVAL** .
3. Disconnect all the electrical connectors (1) from the front of the Memory Seat Module (MSM) (2).
4. Disengage the two front MSM retaining tabs (3 and 5) from the bracket (4) by carefully pushing up on the front of the MSM.
5. Disengage the two rear MSM retaining tabs from the bracket by carefully pulling the MSM forward.

6. Disconnect all electrical connectors from the rear of the MSM and remove the MSM.

INSTALLATION

INSTALLATION

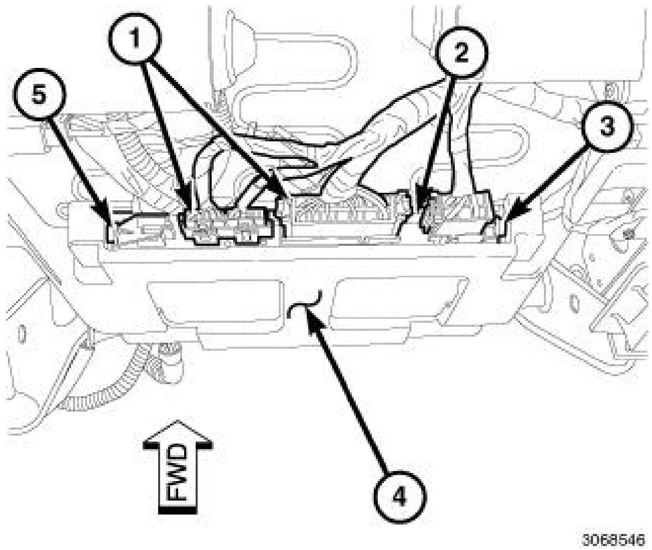


Fig. 53: Electrical Connectors, Memory Seat Module (MSM), MSM Retaining Tabs & Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Position the Memory Seat Module (MSM) (2) to the bracket (4) and connect all electrical connectors to the rear of the MSM.

CAUTION: Properly align the Memory Seat Module (MSM) retaining tabs to the bracket, prior to engagement. Failure to follow these instructions may result damage to the MSM retaining tabs.

2. Install the MSM into the bracket and engage the two rear MSM retaining tabs to the bracket.
3. Engage the two front MSM retaining tabs (3 and 5) to the bracket by carefully pulling down on the front of the MSM.
4. Connect all the electrical connectors (1) to the front of the MSM.
5. Install the driver seat. Refer to SEAT, FRONT, INSTALLATION .
6. Connect the negative battery cable.

MODULE PROGRAMMING

POWER SEAT SYSTEM VERIFICATION TEST

PERFORM POWER SEAT SYSTEM VERIFICATION TEST

1. Disconnect all jumper wires and reconnect all previously disconnected components and connectors.
2. Make sure that all accessories are turned off.
3. Make sure that the battery is fully charged.
4. Turn the ignition on.
5. Using a scan tool, record and erase Diagnostic Trouble Codes (DTCs) from all modules.

6. Operate the driver seat in all positions.
7. Turn the ignition off, wait 10 seconds, then turn the ignition on.
8. With the scan tool, read DTCs.

Are the original condition(s) still present or is there DTCs present in any module(s)?

Yes

- The repair is not complete. Perform the appropriate diagnostic procedure for the DTC or symptom that is still present.

No

- The repair is complete.

MODULE, OCCUPANT RESTRAINT

DESCRIPTION

DESCRIPTION

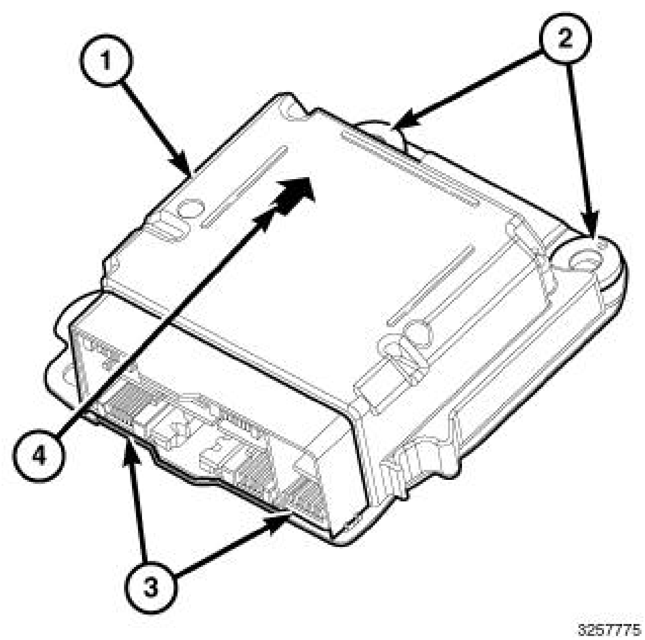


Fig. 54: Occupant Restraint Controller (ORC), Arrow, Integral Mounting Flanges & Electrical Connector Receptacles
Courtesy of CHRYSLER GROUP, LLC

The Occupant Restraint Controller (ORC) (1) is secured by three screws to a stamped steel mounting bracket on the top of the floor panel transmission tunnel near the dash panel and beneath the instrument panel center support in the passenger compartment of the vehicle. Concealed within a hollow in the center of the ORC housing is the electronic circuitry of the ORC which includes a microcontroller, an electronic impact sensor, a rollover sensor, an electronic safing sensor and an energy storage capacitor. A stamped metal cover plate is secured to the bottom of the ORC housing to enclose and protect the internal electronic circuitry and components.

An arrow (4) printed on the label on the top of the ORC housing provides a visual verification of the proper

orientation of the unit, and should always be pointed toward the front of the vehicle. The ORC housing has integral mounting flanges (2) on the right and left front and the left rear corner. The stamped metal cover plate has two integral locating pins on its lower surface. Two molded plastic electrical connector receptacles (3) exit the rearward facing side of the ORC housing. These receptacles connect the ORC to the vehicle electrical system through two dedicated take outs and connectors, one from the instrument panel wire harness and the second from the body wire harness.

The impact sensor and safing sensor internal to the ORC are calibrated for the specific vehicle, and are only serviced as a unit with the ORC. In addition, there are unique versions of the ORC for vehicles with or without certain optional Supplemental Restraint System (SRS) components. The ORC cannot be repaired or adjusted and, if damaged or ineffective, it must be replaced.

OPERATION

OPERATION

The microcontroller within the Occupant Restraint Controller (ORC) contains the Supplemental Restraint System (SRS) logic circuits and controls all of the SRS components. The ORC uses On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool using the Controller Area Network (CAN) data bus. This method of communication is used for control of the airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and for SRS diagnosis and testing through the 16-way data link connector located on the driver side lower edge of the instrument panel.

The ORC microcontroller continuously monitors all of the SRS electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it sets an active and stored Diagnostic Trouble Code (DTC) and sends electronic messages to the IC over the CAN data bus to turn On the airbag indicator. An active fault only remains for the duration of the fault, or in some cases for the duration of the current ignition cycle, while a stored fault causes a DTC to be stored in memory by the ORC. For some DTCs, if a fault does not recur for a number of ignition cycles, the ORC will automatically erase the stored DTC. For other internal faults, the stored DTC is latched forever.

The ORC receives battery current through two circuits; a fused ignition switch output (run) circuit through a fuse in the rear Power Distribution Center (PDC) and a fused ignition switch output (run-start) circuit through a second fuse in the rear PDC. The ORC receives ground through a ground circuit and take out of the instrument panel wire harness that is secured by a ground screw to the body sheet metal. These connections allow the ORC to be operational whenever the status of the ignition switch is Start or On.

The ORC also contains an energy-storage capacitor. When the ignition switch status is Start or On, this capacitor is continually being charged with enough electrical energy to deploy the SRS components for up to one second following a battery disconnect or failure. The purpose of the capacitor is to provide backup SRS protection in case there is a loss of battery current supply to the ORC during an impact.

Various sensors within the ORC are continuously monitored by the ORC logic. These internal sensors, along with several external impact sensor inputs allow the ORC to determine both the severity of an impact and to verify the necessity for deployment of any SRS components. Two remote front impact sensors are located on the back of the right and left vertical members of the radiator support near the front of the vehicle. The electronic impact sensors are accelerometers that sense the rate of vehicle deceleration, which provides verification of the direction and severity of an impact.

The ORC also monitors inputs from the seat track position sensors, seat belt switches, an internal rollover sensor and six additional remote side impact sensors located on the left and right front door module carriers, on the right and left lower B-pillars and on the right and left C-pillars near the belt line to control deployment of the side curtain airbag units and seat (also known as pelvic and thorax) airbags. On vehicles so equipped, the ORC also uses the passenger side seat belt switch input along with an input from the Occupant Detection Sensor (ODS) in the passenger front seat cushion to support the passenger belt alert feature, and will send electronic messages to the IC to illuminate the seat belt indicator when appropriate.

The impact sensors within the ORC are electronic accelerometer sensors that provide an additional logic input to the ORC microcontroller. These sensors are used to verify the need for a SRS component deployment by detecting impact energy of a lesser magnitude than that of the primary electronic impact sensors, and must exceed a safing threshold in order for the SRS components to deploy. On vehicles equipped with side curtain airbags or seat airbags, a separate impact sensor within the ORC provides confirmation to the ORC microcontroller of side impact forces. This separate sensor is a bi-directional unit that detects impact forces from either side of the vehicle.

Pre-programmed decision algorithms in the ORC microcontroller determine when the deceleration rate as signaled by the impact sensors indicate an impact that is severe enough to require SRS protection and, based upon the severity of the monitored impact, determines the level of front airbag deployment force required for each front seating position. When the programmed conditions are met, the ORC sends the proper electrical signals to deploy the dual multistage front airbags at the programmed force levels, the front seat belt tensioners and, if the vehicle is so equipped, the seat airbags and either side curtain airbag unit.

The hard wired inputs and outputs for the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the ORC or the electronic controls and communication between other modules and devices that provide some features of the SRS. The most reliable, efficient and accurate means to diagnose the ORC or the electronic controls and communication related to SRS operation requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC may contain a rollover sensor, which enables the system to deploy the side SRS components in the event of a vehicle rollover event. If an ORC containing a rollover sensor is accidentally rolled during service while still connected to battery power, the side SRS components will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel

component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: **To avoid serious or fatal injury, never strike or drop the Occupant Restraint Controller (ORC), as it can damage the impact sensor or affect its calibration. The ORC contains the impact sensor, which enables the system to deploy the Supplemental Restraint System (SRS) components. If an ORC is accidentally dropped during service, the module must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper SRS component deployment.**

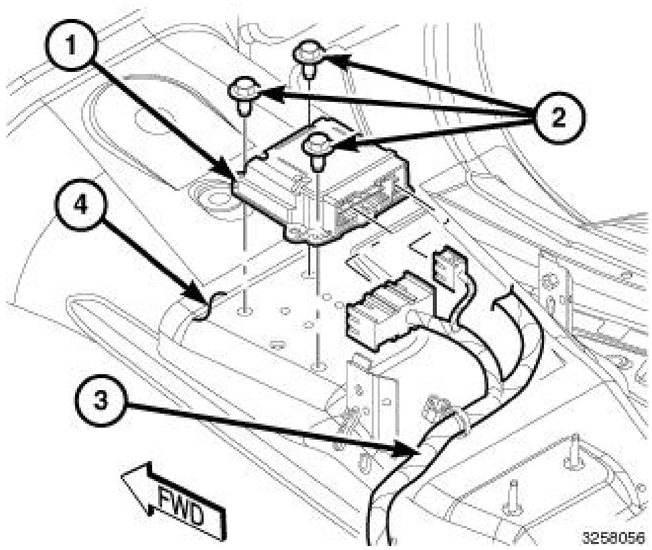


Fig. 55: Floor Panel Transmission Tunnel, Instrument Panel And Body Wire Harness, Three Screws & Occupant Restraint Controller (ORC)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the center console from the top of the floor panel transmission tunnel (4). Refer to **CONSOLE, FLOOR, REMOVAL** .
3. Remove the console floor duct from the floor panel transmission tunnel. Refer to **DUCT, FLOOR CONSOLE, REMOVAL** .

NOTE: **If equipped with a cable-type floor shifter, it is not necessary to disconnect the shift cable from the shifter.**

4. If equipped with a floor shifter:
   a. Disconnect the wire harness connectors from the shifter.
   b. Remove the four nuts that secure the shifter to the weld studs on the floor panel transmission tunnel.
   c. Remove the shifter from the transmission tunnel. If it is a cable-type shifter, carefully position the

shifter and cable out of the way over the right side of the transmission tunnel.

5. Remove the switch bank and bezel from the instrument panel center stack. Refer to **POD, SWITCH BANK, REMOVAL** .
6. Disconnect the instrument panel and body wire harness (3) connectors from the Occupant Restraint Controller (ORC) (1) connector receptacles located on the rearward facing side of the module.
7. Reach through the instrument panel center stack openings to access and cut the sound deadening material along the right side of the ORC.
8. Reach around and behind the left side of the instrument panel center stack support structure to access and cut the sound deadening material along the forward-facing side of the ORC.
9. Pull the sound deadening material over the left side of the ORC far enough to access the mounting provisions.
10. Remove the three screws (2) that secure the ORC to the top of the floor panel transmission tunnel.
11. Remove the ORC from the vehicle.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC may contain a rollover sensor, which enables the system to deploy the side SRS components in the event of a vehicle rollover event. If an ORC containing a rollover sensor is accidentally rolled during service while still connected to battery power, the side SRS components will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the Occupant Restraint Controller (ORC), as it can damage the impact sensor or affect its calibration. The ORC contains the impact sensor, which enables the system to deploy the Supplemental Restraint System (SRS) components. If an ORC is accidentally dropped during service, the module must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper SRS component deployment.

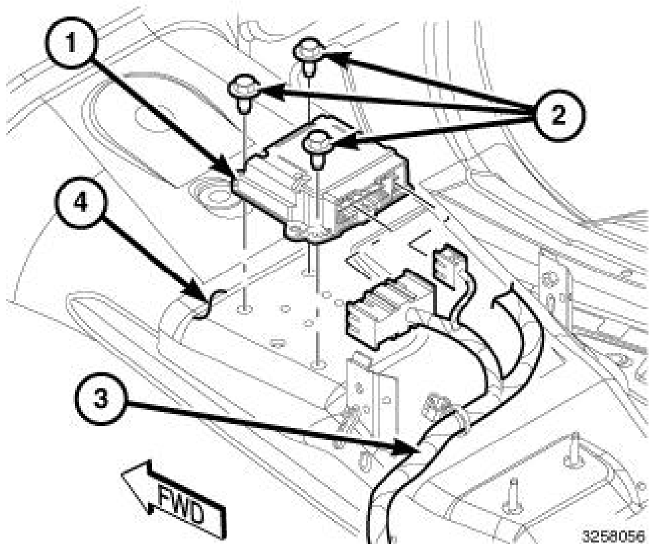


Fig. 56: Floor Panel Transmission Tunnel, Instrument Panel And Body Wire Harness, Three Screws & Occupant Restraint Controller (ORC)
Courtesy of CHRYSLER GROUP, LLC

1. Carefully position the Occupant Restraint Controller (ORC) (1) onto the floor panel transmission tunnel (4). When the ORC is correctly positioned, the orientation arrow on the ORC label will be pointed forward in the vehicle.
2. Install and tighten the three screws (2) that secure the ORC to the floor panel transmission tunnel. Tighten the screws to **SPECIFICATIONS** .
3. Restore the flap of sound deadening material that was cut during the removal procedure over and around the ORC.
4. Reconnect the instrument panel and body wire harness (3) connectors to the ORC connector receptacles located on the rearward facing side of the module. Be certain that the latches and the locks on both connectors are each fully engaged.
5. Reinstall the switch bank and bezel into the instrument panel center stack. Refer to **POD, SWITCH BANK, INSTALLATION** .
6. If equipped with a floor shifter:
   a. Position the shifter over the four weld studs on the top of the floor panel transmission tunnel.
   b. Install and tighten the four nuts that secure the shifter to the weld studs on the floor panel transmission tunnel. Tighten the nuts securely.
   c. Reconnect the wire harness connectors to the shifter.
7. Reinstall the console floor duct onto the floor panel transmission tunnel. Refer to **DUCT, FLOOR CONSOLE, INSTALLATION** .
8. Reinstall the center console onto the top of the floor panel transmission tunnel. Refer to **CONSOLE, FLOOR, INSTALLATION** .
9. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE** .

MODULE, PARK ASSIST

DESCRIPTION

DESCRIPTION

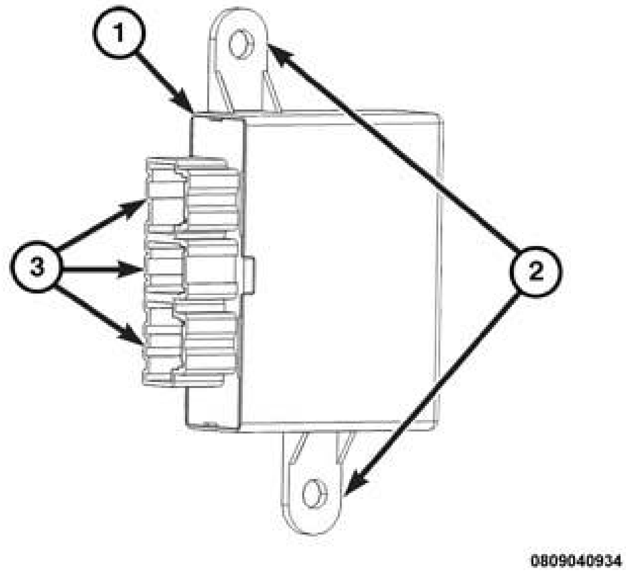


Fig. 57: Park Assist Module, Connector Receptacles & Mounting Tabs
Courtesy of CHRYSLER GROUP, LLC

The Park Assist Module (PAM) (also known as the ParkTronic System/PTS module) (1) is secured to the right inner quarter panel behind the right rear wheel housing in the trunk compartment. One of the two mounting tabs (2) integral to the module housing is inserted into a stamped pocket in the inner quarter panel, while the other mounting tab is secured with a push-in plastic fastener. The module is concealed behind the trunk side trim. Concealed within the molded plastic PAM housing is a microcontroller and the other electronic circuitry of the module. The module housing is sealed to enclose and protect the internal electronic circuitry. The module software is flash programmable.

Three connector receptacles (only two are used for this application) (3) containing terminal pins are integral to the forward-facing side of the housing. The module is connected to the vehicle electrical system through two dedicated take outs and connectors of the body wire harness.

The PAM cannot be adjusted or repaired and, if damaged or ineffective, it must be replaced with a new unit.

OPERATION

OPERATION

The microcontroller within the Park Assist Module (PAM) (also known as the ParkTronic System/PTS module) contains the park assist system logic circuits. The PAM uses On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool using the Controller Area Network (CAN) data bus. This method of communication is also used for park assist system diagnosis and testing through the 16-way data link connector located on the driver side lower edge of the instrument panel.

The PAM provides source current to the four park assist sensors located on the back of the rear bumper fascia. The PAM then monitors return inputs from each of the sensors on dedicated hard wired data communication circuits. These sensor inputs allow the PAM to determine when an obstacle is in the rear path of the vehicle, to calculate the relative location of the obstacle and to determine whether the distance to that obstacle is increasing

or decreasing.

Pre-programmed decision algorithms and calibrations allow the PAM microcontroller to determine the appropriate park assist system outputs based upon the inputs received from the park assist sensors and electronic messages received from other modules in the vehicle over the CAN data bus. When the programmed conditions are met, the PAM sends electronic messages to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and the Radio Receiver Module (RRM) (also known as the radio or the head unit) over the CAN data bus to obtain the proper park assist system visual and audible outputs.

The PAM microcontroller continuously monitors all of the park assist system electrical circuits and components to determine the system readiness. If a monitored system fault is detected, the PAM sets a Diagnostic Trouble Code (DTC) and sends the appropriate electronic messages to the IC to control the display of the appropriate park assist system graphics and textual messages in the Electronic Vehicle Information Center (EVIC) display within the IC and the generation of the appropriate audible warnings by the RRM.

The PAM receives battery current on a fused ignition output (run) circuit through the Body Control Module (BCM). The PAM has a path to ground at all times through a ground circuit and take out of the body wire harness that is secured to the body sheet metal. These connections allow the PAM to be operational whenever the status of the ignition switch is On.

The hard wired circuits between components related to the PAM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the PAM or the electronic controls and communication between modules and other devices that provide some features of the park assist system. The most reliable, efficient and accurate means to diagnose the PAM or the electronic controls and communication related to park assist system operation requires the use of a diagnostic scan tool.

REMOVAL

REMOVAL

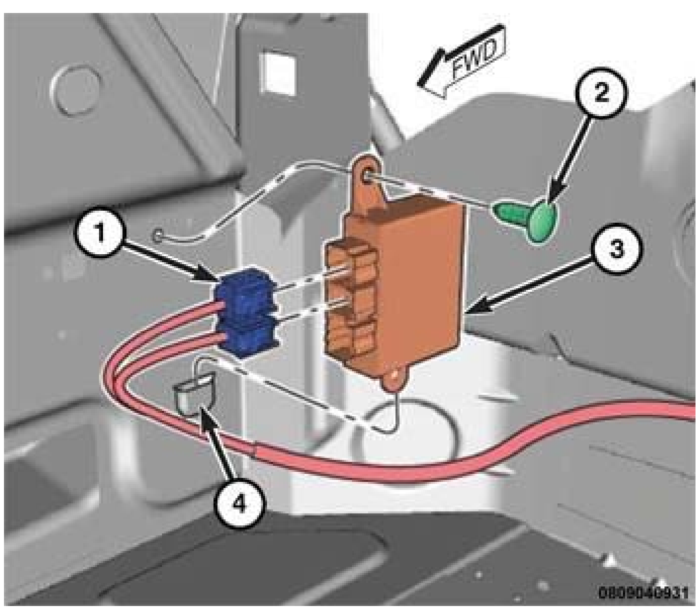


Fig. 58: Park Assist Module (PAM), Wire Harness Connectors, Stamped Pocket & Retainer
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the trim from the right quarter inner panel to access the Park Assist Module (PAM) (3), which is located just behind the right rear wheel house. Refer to CARPET, REMOVAL .
3. Disconnect the body wire harness connectors (1) from the PAM connector receptacles.
4. Remove the push-pin type retainer (2) that secures the PAM to the quarter inner panel.
5. Slide the PAM upward far enough to disengage the lower mounting tab from the stamped pocket (4) in the right quarter inner panel.
6. Remove the PAM from the vehicle.

INSTALLATION

INSTALLATION

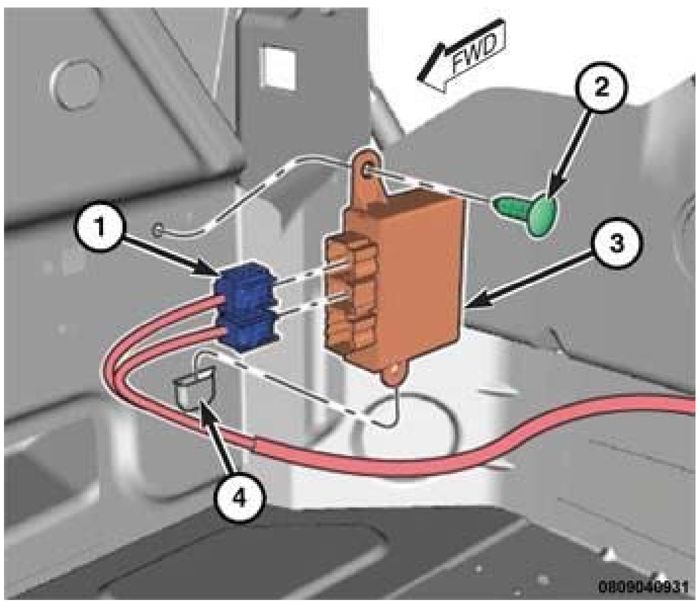


Fig. 59: Park Assist Module (PAM), Wire Harness Connectors, Stamped Pocket & Retainer
Courtesy of CHRYSLER GROUP, LLC

1. Position the Park Assist Module (PAM) (3) to the right quarter inner panel above and behind the right rear wheel house. Be certain to engage the lower mounting tab into the stamped pocket (4) in the right quarter inner panel.
2. Reinstall the push-pin type retainer (2) that secures the PAM to the right quarter inner panel.
3. Reconnect the body wire harness connectors (1) to the PAM connector receptacles.
4. Reinstall the trim onto the right quarter inner panel. Refer to CARPET, INSTALLATION .
5. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

MODULE, POWERTRAIN CONTROL

DESCRIPTION

POWERTRAIN CONTROL MODULE

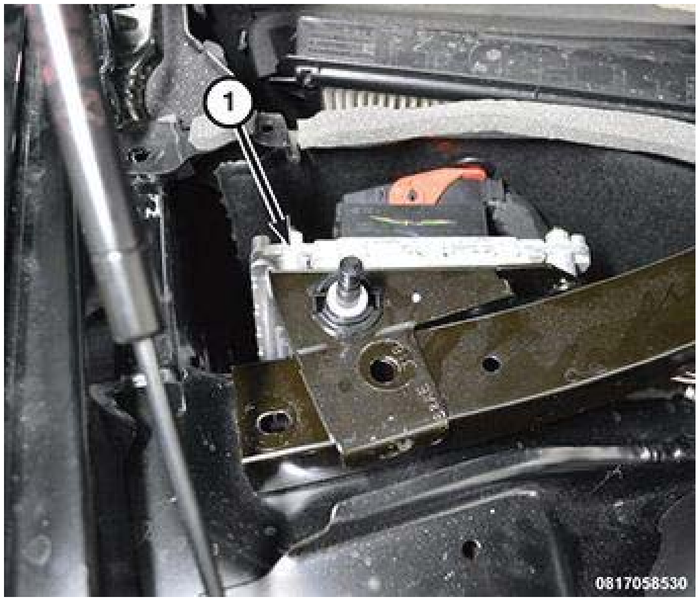


Fig. 60: Powertrain Control Module
Courtesy of CHRYSLER GROUP, LLC

The Powertrain Control Module (PCM) is a pre -programmed, microprocessor digital computer. The PCM operates the fuel system, regulates ignition timing, air-fuel ratio, emission control devices, charging system, certain transmission features, speed control, air conditioning compressor clutch engagement and idle speed. The PCM can adapt its programming to meet changing operating conditions. It also receives input signals from various switches and sensors. Based on these inputs, the PCM regulates various engine and vehicle operations through different system components. These components are referred to as PCM Outputs.

The PCM will operate in two different modes: Open Loop and Closed Loop. During Open Loop operation, the PCM still receives all input signals but, responds only to a limited amount of inputs based on the algorithms for output control. Inputs from the Oxygen (O2) Sensors and other sensors (depending on the PCM programming) are not monitored during Open Loop modes. During Closed Loop operation, the PCM will monitor all inputs and outputs. These inputs indicate to the PCM whether or not the calculated output settings results in the ideal air-fuel ratio. This ratio is 14.7 parts air-to-1 part fuel. By monitoring the exhaust oxygen content through the O2 Sensor and all other inputs, the PCM has the ability to fine tune the air handling, fuel control, ignition timing and spark advance settings. This is done to achieve optimum fuel economy combined with low emission engine performance.

NOTE:	**Depending on vehicle build configuration, transmission and engine type the PCM will be programed with different software to meet the vehicle system needs. It is always important to verify the vehicle`s VIN number and software level in the PCM when diagnosing concerns related to the PCM.**

OPERATION

MODES OF OPERATION

As input signals to the Powertrain Control Module (PCM) change, the PCM adjusts its response to the output devices. For example, the PCM must calculate different injector pulse width and ignition timing for idle than it does for wide open throttle (WOT).

The PCM will operate in two different modes: **Open Loop and Closed Loop** .

During Open Loop modes, the PCM receives input signals and responds only according to preset PCM programming. Input from the oxygen (O2S) sensors is not monitored during Open Loop modes.

During Closed Loop modes, the PCM will monitor the oxygen (O2S) sensors input. This input indicates to the PCM whether or not the calculated injector pulse width results in the ideal air-fuel ratio. This ratio is 14.7 parts air-to-1 part fuel. By monitoring the exhaust oxygen content through the O2S sensor, the PCM can fine tune the injector pulse width. This is done to achieve optimum fuel economy combined with low emission engine performance.

The fuel injection system has the following modes of operation:

- Ignition switch ON
- Engine start-up (crank)
- Engine warm-up
- Idle
- Cruise
- Acceleration
- Deceleration
- Wide open throttle (WOT)
- Ignition switch OFF

The ignition switch On, engine start-up (crank), engine warm-up, acceleration, deceleration and wide open throttle modes are Open Loop modes. The idle and cruise modes, (with the engine at operating temperature) are Closed Loop modes.

IGNITION SWITCH (KEY-ON) MODE

This is an Open Loop mode. When the fuel system is activated by the ignition switch, the following actions occur:

- The PCM determines atmospheric air pressure from the MAP sensor input to determine basic fuel strategy.
- The PCM monitors the engine coolant temperature sensor input. The PCM modifies fuel strategy based on this input.
- Intake manifold air temperature sensor input is monitored.
- Throttle position sensors (TPS) and pedal value sensors are monitored.
- The auto shutdown (ASD) relay is energized by the PCM for approximately three seconds.
- The fuel pump is energized through the fuel pump relay by the PCM. The fuel pump will operate for approximately three seconds unless the engine is operating or the starter motor is engaged.
- The O2S sensor heater element is energized via the O2S heater drivers (solid state devices) internal to the PCM. These drivers provide a PWM 0-12V signal to heat the O2S heater elements to optimize the O2S sensor signal output. The O2S sensor input is not used by the PCM to calibrate air-fuel ratio during this mode of operation.

ENGINE START-UP MODE

This is an Open Loop mode. The following actions occur when the starter motor is engaged.

The PCM receives inputs from:

- Direct Battery voltage
- Accelerator Pedal Position Sensor (APPS)
- Engine Coolant Temperature (ECT) sensor
- Crankshaft Position (CKP) sensor
- Intake Manifold Air Temperature (IMAT) sensor
- Manifold absolute pressure (MAP) sensor
- Throttle position sensors (TPS)
- Camshaft Position Sensor (CPS) signal

The PCM monitors the crankshaft position sensor. If the PCM does not receive a crankshaft position sensor signal within approximately 3 seconds of cranking the engine, it will shut down the fuel injection system.

The fuel pump is activated by the PCM through the fuel pump relay located in the front Power Distribution Center (PDC).

Voltage is applied to the fuel injectors with the ASD relay via the PCM. The PCM will then control the injection sequence and injector pulse width by actuating ground circuit to each individual injector on and off.

The PCM determines the proper ignition timing according to input received from the crankshaft position sensor.

ENGINE WARM-UP MODE

This is an Open Loop mode. During engine warm-up, the PCM receives inputs from:

- Direct Battery voltage
- Crankshaft Position (CKP) sensor
- Engine Coolant Temperature (ECT) sensor
- Intake Manifold Air Temperature (MAT) sensor
- Manifold Absolute Pressure (MAP) sensor
- Throttle Position Sensors (TPS)
- Camshaft Position Sensor (CPS) signal
- Park/neutral switch (gear indicator signal)
- Accelerator Pedal Position Sensor (APPS)
- Air conditioning select signal (if equipped)
- Air conditioning request signal (if equipped)

Based on these inputs the following occurs:

- Voltage is applied to the fuel injectors with the ASD relay via the PCM. The PCM will then control the injection sequence and injector pulse width by turning the ground circuit to each individual injector on and off.
- The PCM adjusts engine idle speed through the electronic throttle control (ETC) motor and adjusts ignition

timing accordingly.

- The PCM operates the A/C compressor clutch through the clutch relay. This is done if A/C has been selected by the vehicle operator and requested by the A/C thermostat.
- When the heating element has reached operating temperature located in the O2S, the PCM will begin monitoring O2 sensor output readings. The system will then leave the warm-up (open loop) mode and go into closed loop operation.

IDLE MODE

When the engine is at operating temperature, this is a Closed Loop mode. At idle speed, the PCM receives inputs from:

- Air conditioning select signal (if equipped)
- Air conditioning request signal (if equipped)
- Battery voltage
- Camshaft Position Sensor (CPS) signal
- Engine Coolant Temperature (ECT) sensor
- Intake Manifold Air Temperature (MAT) sensor
- Manifold absolute pressure (MAP) sensor
- Accelerator Pedal Position Sensor (APPS)
- Throttle position sensors (TPS)
- Crankshaft Position (CKP) sensor
- Battery voltage
- Park/neutral switch (gear indicator signal)
- Oxygen (O2) sensors

Based on these inputs, the following occurs:

- Voltage is applied to the fuel injectors with the ASD relay via the PCM. The PCM will then control injection sequence and injector pulse width by turning the ground circuit to each individual injector on and off.
- The PCM monitors the O2S sensor input and adjusts air-fuel ratio by varying injector pulse width. It also adjusts engine idle speed through the electronic throttle control (ETC) motor.
- The PCM adjusts ignition timing by increasing and decreasing spark advance.
- The PCM operates the A/C compressor clutch through the A/C clutch relay. This happens if A/C has been selected by the vehicle operator and requested by the A/C thermostat.

CRUISE MODE

When the engine is at operating temperature, this is a Closed Loop mode. At cruising speed, the PCM receives inputs from:

- Air conditioning select signal (if equipped)
- Air conditioning request signal (if equipped)
- Battery voltage

- Camshaft Position Sensor (CPS) signal
- Engine Coolant Temperature (ECT) sensor
- Intake Manifold Air Temperature (MAT) sensor
- Manifold absolute pressure (MAP) sensor
- Accelerator Pedal Position Sensor (APPS)
- Throttle position sensors (TPS)
- Crankshaft Position (CKP) sensor
- Battery voltage
- Park/neutral switch (gear indicator signal)
- Oxygen (O2) sensors

Based on these inputs, the following occurs:

- Voltage is applied to the fuel injectors with the ASD relay via the PCM. The PCM will then adjust the injector pulse width by turning the ground circuit to each individual injector on and off.
- The PCM monitors the O2S sensor input and adjusts air-fuel ratio.
- The PCM adjusts ignition timing by turning the ground path to the coils on and off.
- The PCM operates the A/C compressor clutch through the clutch relay. This happens if A/C has been selected by the vehicle operator and requested by the A/C thermostat.

ACCELERATION MODE

This is an Open Loop mode. The PCM recognizes an abrupt increase in throttle position or MAP pressure as a demand for increased engine output and vehicle acceleration. The PCM increases injector pulse width in response to increased throttle opening.

DECELERATION MODE

When the engine is at operating temperature, this is an Open Loop mode. During hard deceleration, the PCM receives the following inputs.

- Air conditioning select signal (if equipped)
- Air conditioning request signal (if equipped)
- Battery voltage
- Camshaft Position Sensor (CPS) signal
- Engine Coolant Temperature (ECT) sensor
- Intake Manifold Air Temperature (MAT) sensor
- Manifold absolute pressure (MAP) sensor
- Accelerator Pedal Position Sensor (APPS)
- Throttle position sensors (TPS)
- Crankshaft Position (CKP) sensor
- Battery voltage
- Park/neutral switch (gear indicator signal)
- Oxygen (O2) sensors

- Vehicle speed

If the vehicle is under hard deceleration with the proper RPM and closed throttle conditions, the PCM will ignore the oxygen sensor input signal. The PCM will enter a fuel cut-off strategy in which it will not supply a ground to the injectors. If a hard deceleration does not exist, the PCM will determine the proper injector pulse width and continue injection.

The PCM adjusts ignition timing by turning the ground path to the coils on and off.

WIDE OPEN THROTTLE MODE

This is an Open Loop mode. During wide open throttle operation, the PCM receives the following inputs.

- Battery voltage
- Crankshaft Position (CKP) sensor
- Engine Coolant Temperature (ECT) sensor
- Intake Manifold Air Temperature (MAT) sensor
- Manifold absolute pressure (MAP) sensor
- Accelerator Pedal Position Sensor (APPS)
- Throttle position sensors (TPS)
- Camshaft Position Sensor (CPS) signal

During wide open throttle conditions, the following occurs:

- Voltage is applied to the fuel injectors with the ASD relay via the PCM. The PCM will then control the injection sequence and injector pulse width by turning the ground circuit to each individual injector on and off. The PCM ignores the oxygen sensor input signal and provides a predetermined amount of additional fuel. This is done by adjusting injector pulse width.
- The PCM adjusts ignition timing by turning the ground path to the coil on and off.

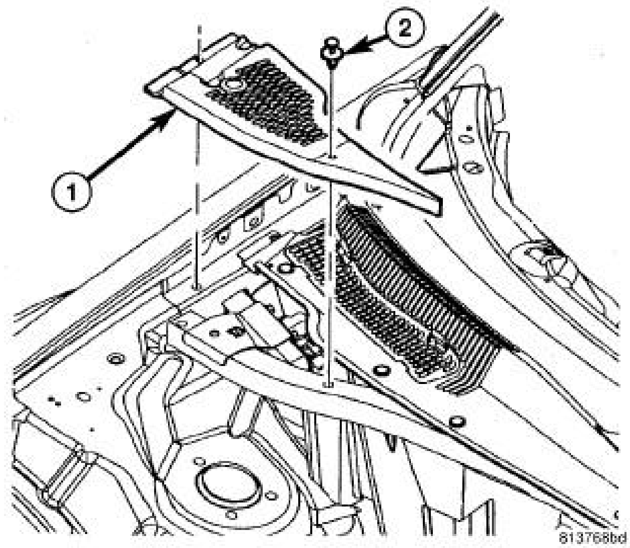
IGNITION SWITCH OFF MODE

When ignition switch is turned to OFF position, the PCM stops operating the injectors, ignition coil, ASD relay and fuel pump relay.

REMOVAL

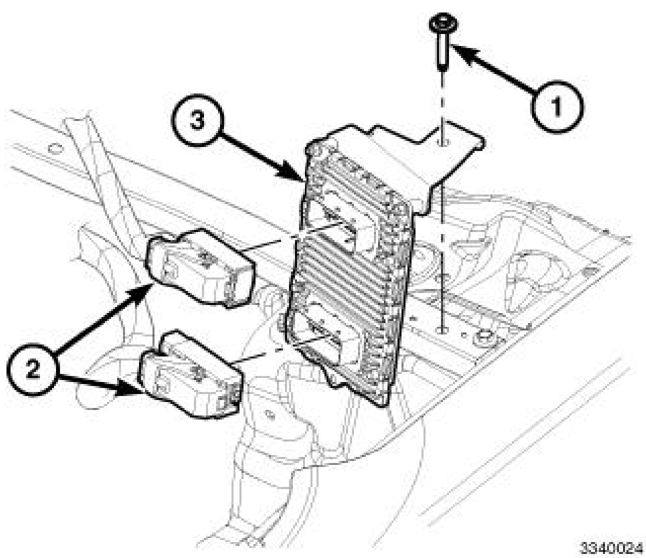
REMOVAL

1. Disconnect and isolate the negative battery cable.



[Fig. 61: Cowl Panel 1](#)
Courtesy of CHRYSLER GROUP, LLC

2. Remove the two push pins (2) that secure the front cowl top panel (1) to the right rear corner of the engine compartment
3. Remove the front cowl top panel.



[Fig. 62: Retaining Bolt, PCM Electrical Connectors & PCM](#)
Courtesy of CHRYSLER GROUP, LLC

4. Remove the Powertrain Control Module (PCM) retaining bolt (1).
5. Disconnect the PCM electrical connectors (2).
6. Remove the PCM (3) from the vehicle.

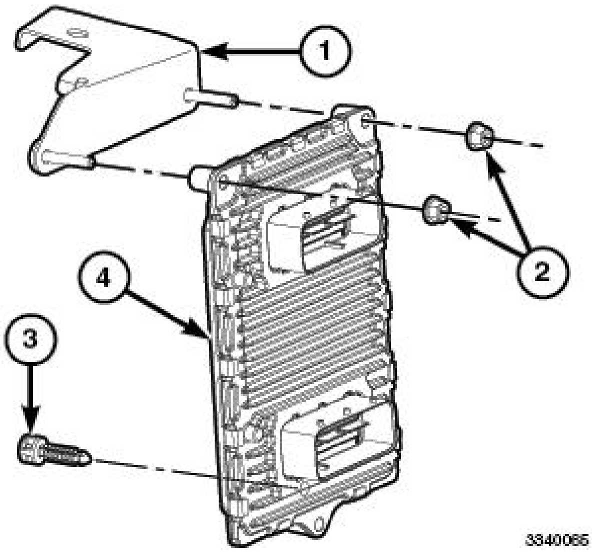


Fig. 63: NVH Rubber Bumper, PCM, Bracket & Nuts
Courtesy of CHRYSLER GROUP, LLC

7. If required, remove the NVH rubber bumper (3) from the PCM (4).
8. If required, remove the PCM mounting bracket (1) retaining nuts (2) and remove the bracket.

INSTALLATION

INSTALLATION

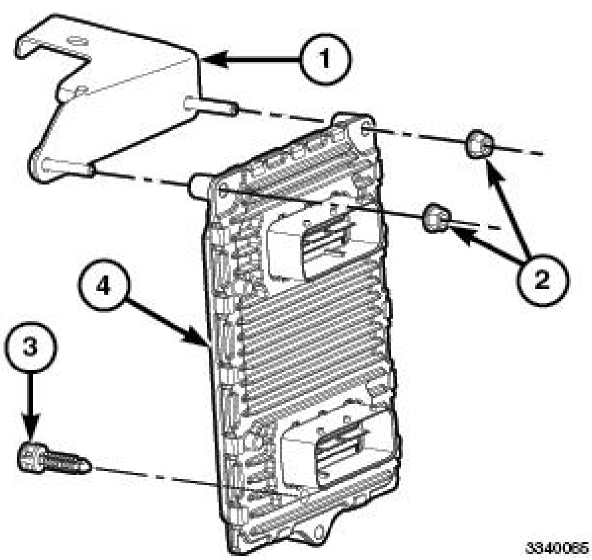
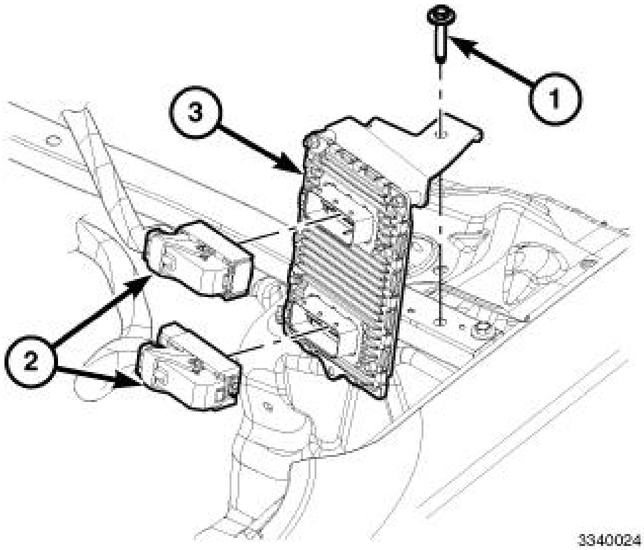


Fig. 64: NVH Rubber Bumper, PCM, Bracket & Nuts
Courtesy of CHRYSLER GROUP, LLC

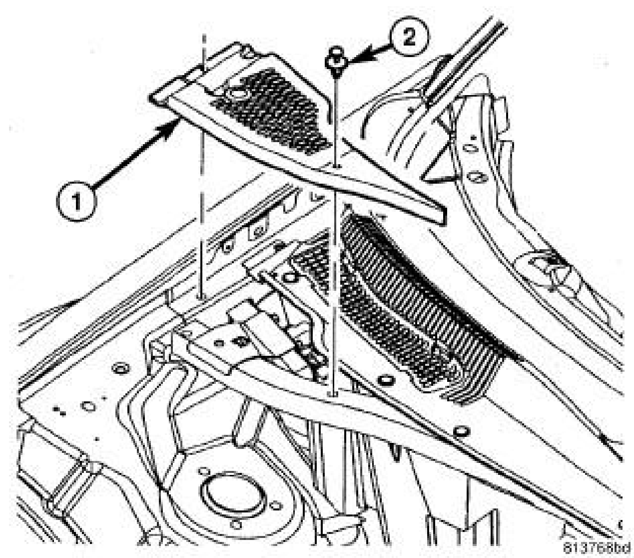
1. If removed, position the Powertrain Control Module (PCM) mounting bracket (1) onto the PCM (4), install the two retaining nuts (2) and tighten to the proper SPECIFICATIONS.
2. If removed, install the NVH rubber bumper (3) onto the PCM.



[Fig. 65: Retaining Bolt, PCM Electrical Connectors & PCM]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Prior to reconnecting the electrical connectors to the PCM, check the pins in the electrical connectors for misalignment and/or damage. Repair as necessary.**

3. Position the PCM (3) into the vehicle.
4. Connect the PCM harness connectors (2).
5. Position the PCM bracket to the cross support, install the retaining bolt (1) and tighten to the proper SPECIFICATIONS.



[Fig. 66: Cowl Panel 1]
Courtesy of CHRYSLER GROUP, LLC

6. Position the front cowl top panel (1) to the right rear corner of the engine compartment.
7. Install the two push-pins (2) that secure the front cowl top panel.

8. Connect the negative battery cable.

NOTE: **If a new PCM is installed, it must be programed with the original Vehicle Identification Number (VIN) and mileage. If this is not done, a Diagnostic Trouble Code (DTC) may set.**

NOTE: **If a new PCM is installed. Refer to MODULE, POWERTRAIN CONTROL, MODULE PROGRAMMING.**

9. If a new PCM is being installed, use a scan tool and program the new PCM with the original VIN and vehicle mileage.

MODULE PROGRAMMING

GAS

This procedure is required when one or more of the following situations are true:

- A Powertrain Control Module (PCM) has been replaced.
- Diagnostic Trouble Code (DTC) P1602 - PCM Not Programmed is set.
- An updated calibration or software release is available for either the PCM or Transmission Control Module (TCM).

This procedure assumes that the scan tool is properly configured to the dealership network with either a wired or wireless connection. For help on how to network the scan tool, use the "Help" tab at the top of the diagnostic application.

Programming Procedure

- Using the scan tool:

1. Verify that the scan tool operating software is programmed with the latest software release.
2. Flash the Powertrain Control Module (PCM)
3. From the "Home" screen, select "ECU View"
4. Select "PCM"
5. Select "Misc functions"
    1. Select "Check PCM VIN" and follow the on screen instructions. When complete, select "Finish".
    2. Select "Learn ETC" and follow the on screen instructions. When complete, select "Finish".
    3. Select "Check PCM Odometer" and follow the on screen instructions. When complete, select "Finish".

NOTE: **Due to the PCM/TCM programming procedure, a DTC may be set in other ECUs within the vehicle. Some DTCs may cause the MIL to illuminate. From the "Home" screen select "System View". Then select "All DTCs". Press "Clear All Stored DTCs" if there are any DTCs shown on the list.**

MODULE, POWER SUNROOF

DESCRIPTION

DESCRIPTION

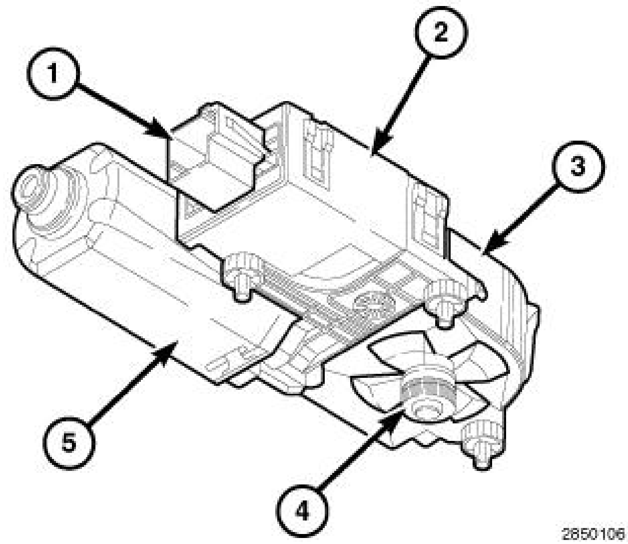


Fig. 67: Single Pane Sunroof Motor Assembly
Courtesy of CHRYSLER GROUP, LLC

The single pane sunroof has a single motor (5) and electronic module unit (2) secured by three screws near the center of the underside of the rear sunroof frame member where it is concealed above the headliner. The motor is a reversible, 12-volt Direct Current (DC) permanent magnet motor with internal thermal protection. The motor is connected mechanically to the sunroof drive gear (4) through a right angle drive and gear reduction transmission (3). The motor also is connected electrically to the on-board electronic control unit that includes an integral connector receptacle (1) that connects the unit to the vehicle electrical system through a dedicated take out and connector of the sunroof wire harness.

The sunroof motor and electronic module units cannot be repaired. If ineffective or damaged, the entire motor and module unit must be replaced.

OPERATION

OPERATION

The single pane power sunroof motor is completely controlled by the circuitry of the on-board electronic module. The module receives battery current on a fused B(+) circuit from the Body Control Module (BCM) and has a path to ground at all times through a take out and eyelet terminal connector secured by a ground screw to the body sheet metal. These connections allow the module to function regardless of the ignition switch position.

However, the module also monitors an input on a fused ignition switch output (run - accessory) circuit, and provides a source current to the sunroof switches in the overhead console only when the ignition switch is in the ON or ACCESSORY positions, or while the accessory delay feature is active. The module then monitors a separate input circuit for each switch position, which it uses to determine the proper outputs to the power sunroof motor. A positive and negative battery connection to the two motor brushes will cause the power sunroof motor to rotate in one direction. Reversing the current through these same two brushes will cause the motor to rotate in the opposite direction.

The hard wired circuits of the power sunroof motor as well as those between the electronic module and the switch

in the overhead console may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic module integral to the power sunroof motor. If the power sunroof switch and the hard wired circuitry test okay, but the motor or the express or Excess Force Limitation (EFL) features are still ineffective following the calibration and initialization procedures, the motor and module must be replaced as a unit.

REMOVAL

REMOVAL

WARNING: Do not attempt to move or reposition the sunroof glass panel or drive cables with the sunroof motor and module unit removed. Damage to the vehicle, to the sunroof or personal injuries may result.

WARNING: The Sunroof Motor And Module Initialization procedure must be completed any time a sunroof motor and module unit is replaced with a new component. Failure to perform this procedure may result in damage to the vehicle, to the sunroof or in serious or fatal injuries.

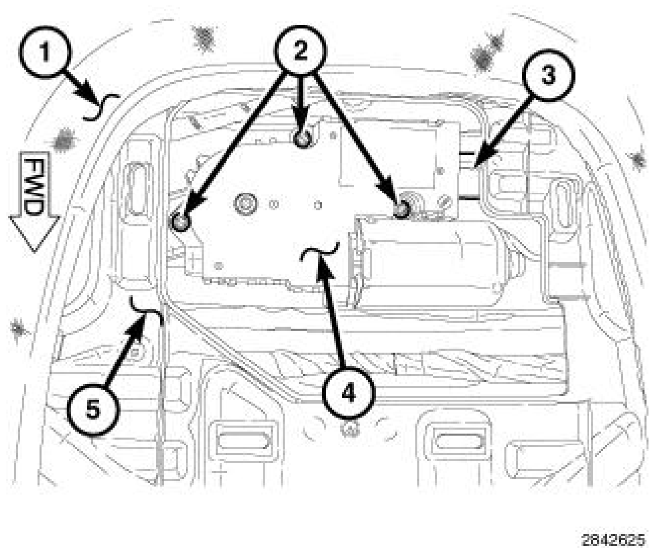


Fig. 68: Headliner, Bracket, Module Unit, Screws & Module Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Lower the back of the headliner (1) to gain access to the module unit (4). Refer to **HEADLINER, REMOVAL** .
3. Remove the three screws (2) that secure the motor and module to the sunroof frame.
4. Lower the motor and module unit far enough to access and disconnect the sunroof wire harness connector from the motor and module connector receptacle (3).
5. Remove the sunroof motor and module unit from the vehicle.

INSTALLATION

INSTALLATION

WARNING: Do not attempt to move or reposition the sunroof glass panel or drive cables with the sunroof motor and module unit removed. Damage to the vehicle, to the sunroof or personal injuries may result.

WARNING: The Sunroof Motor And Module Initialization procedure must be completed any time a sunroof motor and module unit is replaced with a new component. Failure to perform this procedure may result in damage to the vehicle, to the sunroof or in serious or fatal injuries.

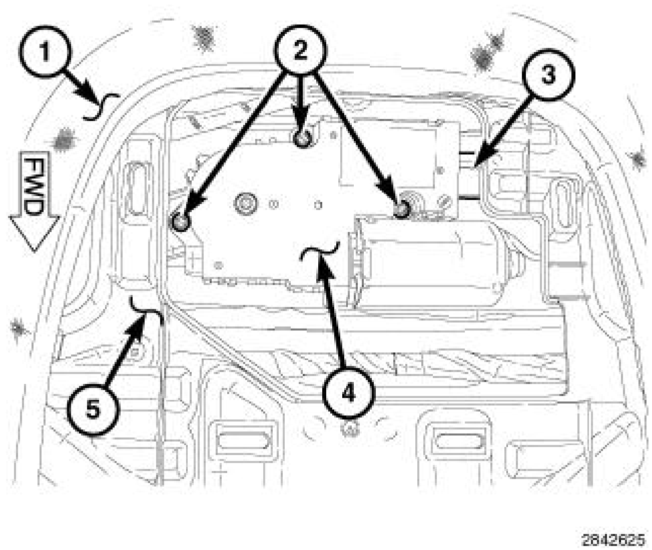


Fig. 69: Headliner, Bracket, Module Unit, Screws & Module Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Position the sunroof motor and module unit (4) close enough to connect the wire harness connector to the motor and module connector receptacle (3).
2. Position the motor and module onto the sunroof frame.
3. Install and tighten the three screws (2) that secure the motor and module to the sunroof frame.
4. Install the rear of the headliner. Refer to **HEADLINER, INSTALLATION** .
5. Reconnect the battery negative cable.
6. Perform the Sunroof Position Calibration procedure followed by the Excessive Force Limitation (EFL) Calibration procedure. Refer to **MODULE, POWER SUNROOF, MODULE PROGRAMMING**.

MODULE PROGRAMMING

EXCESSIVE FORCE LIMITATION (EFL) CALIBRATION

NOTE: Verify the battery is in good condition prior to performing this procedure. Do not leave the vehicle on a battery charger while performing this procedure. If the voltage at the sunroof motor/module drops below 11 volts or exceeds 15 volts at anytime while this procedure is being performed, the Excessive Force Limitation (EFL) function will not be properly calibrated.

1. Depress the VENT push button of the sunroof switch so that the sliding glass panel travels to the fully vented position.

2. Depress the CLOSE push button of the sunroof switch so that the sliding glass panel travels to the fully closed position.
3. Depress the OPEN push button of the sunroof switch so that the sliding glass panel travels to the fully open position.
4. Depress the CLOSE push button of the sunroof switch so that the sliding glass panel travels to the fully closed position.
5. Repeat steps 2 through 5 for at least 5 complete sliding glass panel cycles (VENT, CLOSE, OPEN, CLOSE).

EXCESSIVE FORCE LIMITATION (EFL) OVERRIDE

There are two methods for overriding the obstacle detection feature if the single pane sunroof sliding glass is unable to close due to a known blockage conditions (ice, leaves, debris in the track).

- **OVERRIDE - METHOD 1** - Depress and hold the CLOSE push button of the sunroof switch during the close. The sunroof will be in override mode during the close.
- **OVERRIDE - METHOD 2** - Once the sunroof encounters and reverse on an obstacle during (one touch) closing three consecutive times, the sunroof will be in override mode. All push button commands will be in manual mode (no one-touch or express mode) while the obstacle detection feature is in override mode.

EXITING OVERRIDE MODE - Any sunroof obstacle detection override mode is exited by reaching the close position. Once the override has been existed, all normal operation will resume including the obstacle detection feature.

SUNROOF POSITION CALIBRATION

Press the power sunroof switch (Open, Closed, and Vent). If no movement occurs when either the open switch or closed switch is pressed, but the system does move when the vent button is pressed and held, the system is not calibrated. Perform the following procedure to position calibrate the power sunroof system.

1. Turn the ignition to the RUN position.
2. Press the vent button on the power sunroof switch and hold until the sunroof glass panel has moved to the full vent position and the motor movement has stopped for at least 1 second.
3. Press the close switch on the power sunroof switch and hold for a moment (at least 100ms) and release. The sunroof glass panel should continue travel to the full close position. If the sunroof glass panel does not return to the full close position, refer to the appropriate Diagnostic & Testing article for full system diagnosis.
4. Verify proper system operation.

SUNROOF OVERRIDE POSITION CALIBRATION

The sliding glass panel motor stalls when the glass reaches the fully vented position and the electronic motor module learns that position (hard stop), then counts the number of motor rotation to know where the fully closed and fully open positions of the glass are located. The following procedure causes a previously calibrated and properly operating electronic motor module to relearn the fully vented motor stall position. This routine should be performed after the sunroof position calibration procedure has been performed.

1. Be certain the electrical system voltage is at or above 12.5 volts.
2. Be certain that ignition switch is in the ON position.

3. Be certain the power sunshade is open at least beyond the back of the sliding glass panel opening.
4. Depress and hold the VENT push button of the sunroof switch until the sliding glass panel is in the fully vented position or until the motor will not drive the glass any further towards the fully vented position.
5. Open the drivers side front door.
6. Turn the ignition to the OFF position.
7. Within 2 seconds, turn the ignition back to the ON position.
8. Within 2 seconds, depress and hold the vent push button on the sunroof switch for about ten seconds. At the end of ten seconds, the motor will try to drive the sliding glass panel to the fully vented position. Once the motor stall is detected the electronic module will write that stall position to memory as the new glass position.
9. Verify sliding glass panel motor operation by cycling the glass to fully opened, fully closed, fully vented, then fully closed again.

MODULE, RADIO FREQUENCY (RF HUB)

DESCRIPTION

DESCRIPTION

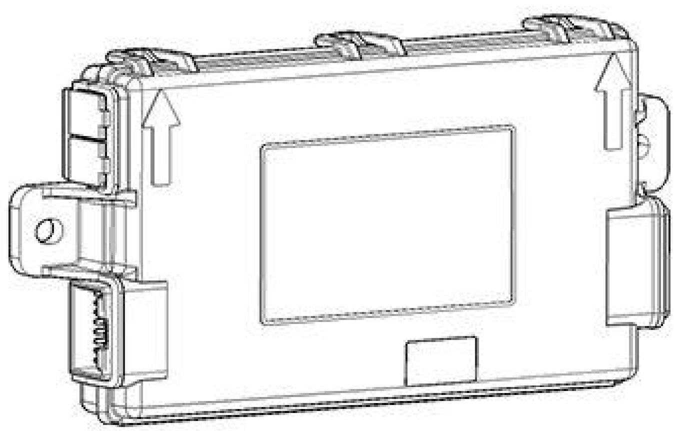


Fig. 70: Radio Frequency Hub Module
Courtesy of CHRYSLER GROUP, LLC

The Radio Frequency Hub Module (RFHM) (2) (also known as the RF Hub/RFH) is a primary component of several standard and optional electronic systems in the vehicle. The RFHM is a Radio Frequency (RF) and Low Frequency (LF) receiver, contains controlling logic for a number of systems and communicates with other electronic modules and nodes in the vehicle over the Controller Area Network (CAN) data bus as well as over a private serial bus. Different signal supporting options include automatic transmission, manual transmission, Passive Entry Keyless go system using smart door handles, the Keyless Ignition Node (KIN) switch, and remote start.

Systems and features supported by the RFHM on Chrysler, Dodge, Jeep vehicles include:

- **Ignition System**
- **Passive Entry (PE) Keyless Go (KG) Systems**
- **Remote Keyless Entry (RKE) System**
- **Remote Start System**
- **Sentry Key Immobilizer System (SKIS)**
- **Vehicle Theft Alarm (VTA) System**

Concealed and protected within the molded black plastic RFHM housing is the microcontroller and the other electronic circuitry of the module. The RFHM is located near the center of the shelf support behind the rear seat back and is concealed beneath the package tray interior trim. It is secured through two mounting tabs integral to the module housing to the shelf support by two nuts on weld studs.

This model RFHM has two connector receptacles integral to the RFHM housing are connected to the vehicle electrical system through dedicated take outs and connectors of the body wire harness. A remote start antenna is located adjacent to the RFHM on the shelf support and is connected directly to the RFHM through a third integral connector receptacle.

The RFHM cannot be adjusted or repaired and, if damaged or ineffective, it must be replaced.

OPERATION

OPERATION

The Radio Frequency Hub Module (RFHM) is an integrated receiver (or base station) in the vehicle that communicates with other electronic modules in the vehicle over either the Controller Area Network (CAN) data bus or a private serial bus to support the following standard and optional vehicle features or systems.

- **Keyless Go Ignition Systems** - The Keyless Ignition Node (KIN) communicates with the FOBIK's through LF signals (125 KHz) then communicates it to RFHM through a private serial bus, then RFHM sends CAN data bus to the Body Control Module (BCM) for IGNITION status after valid key is verified. The RFHM also contains the controlling logic for the back lighting features.
- **Passive Entry** - If the Smart door handles or exterior deck lid release switch are activated, the RFHM signals and monitors the five Low Frequency (LF) antennas. The LF antennas send out Radio Frequency (RF) signals to the FOBIK to verify the FOBIK. When a valid FOBIK is recognized by the RFHM a CAN data bus message is sent to BCM to lock or unlock the vehicle by the RFHM
- **Remote Keyless Entry** - The RFHM receives and monitors RF signals from the Remote Keyless Entry (RKE) transmitter (FOBIK); and relays the appropriate electronic messages BCM module over the CAN data bus to support the features of RKE functions.
- **Remote Start System** - The RFHM receives and monitors RF signals received through the remote start antenna (longer range) from the Remote Keyless Entry (RKE) transmitter or the Passive Entry Keyless Go (PEKG) FOBIK; and relays the appropriate electronic messages to BCM over the CAN data bus to support all RKE functions including optional remote start function.
- **Sentry Key Immobilizer System** - RFHM uses a high security encryption system called "HITAG" for Sentry Key Immobilizer System (SKIM). The system marries FOBIKs, RFHM and ECM with unique secret keys for each vehicle. Swapping parts ARE NOT ALLOWED in the new system. Replacing any part of the system shall be done only in Chrysler authorize dealers using the Chrysler diagnostic scan tool.
- **Vehicle Theft Alarm System** - The RFHM receives and monitors RF signals received from the Remote

Keyless Entry (RKE) transmitter or the Passive Entry Keyless Go (PEKG) FOB with Integrated Key (FOBIK); and relays the appropriate electronic messages to other electronic modules in the vehicle over the CAN data bus to support the features of the optional Vehicle Theft Alarm (VTA) system.

The RFHM is connected to a fused B(+) circuit and has a path to a clean ground at all times. These connections allow it to remain functional regardless of the ignition switch status. Any input to the RFHM that controls a vehicle system function that does not require that the ignition switch status be ON such as depressing a button on an RKE or FOBIK transmitter, prompts the RFHM to wake up and transmit on the CAN data bus.

RFHM uses On-Board Diagnostics (OBD) to monitor all of the Functions and circuits it controls, then sets active and stored Diagnostic Trouble Codes (DTC) for any monitored function faults it detects. RFHM will also send electronic message requests to the Instrument Cluster (IC) through the BCM for the display of certain textual warning messages related to some detected functions conditions or faults.

The hard wired inputs and outputs of the RFHM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RFHM electronic controls or the communication between modules and other devices that provide some features of the RFHM-controlled systems. The most reliable, efficient and accurate means to diagnose the RFHM or the electronic controls and communication related to RFHM-controlled systems operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the rear shelf cover. Refer to PANEL, REAR SHELF, REMOVAL .

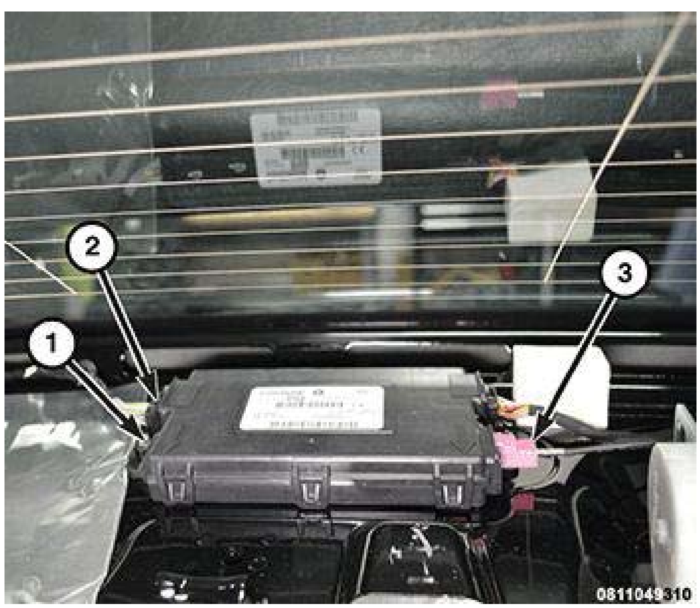


Fig. 71: Radio Frequency Hub Module Retainers, Connectors & Antenna
Courtesy of CHRYSLER GROUP, LLC

3. Remove the Remote Frequency Hub Module (RFHM) retainers (1).
4. Disconnect the electrical connectors (2).

5. If equipped, disconnect the remote start antenna (3).
6. Remove the RFHM from the vehicle.

INSTALLATION

INSTALLATION

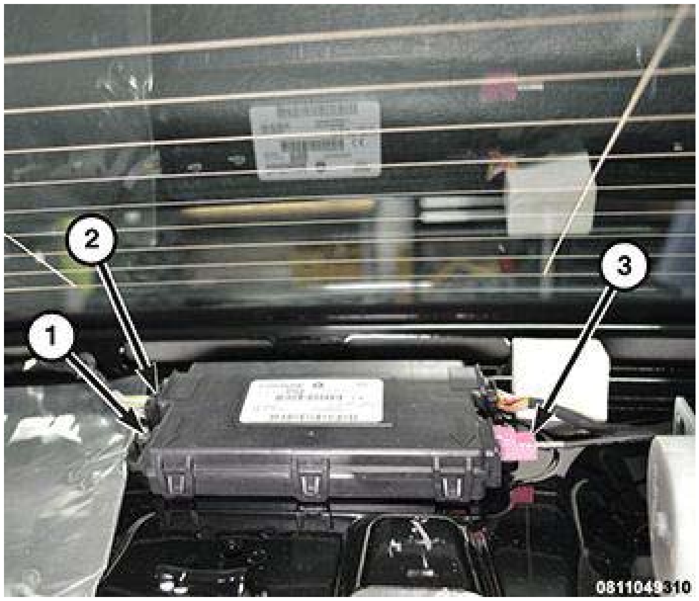


Fig. 72: Radio Frequency Hub Module Retainers, Connectors & Antenna
Courtesy of CHRYSLER GROUP, LLC

1. Position into place and install the Remote Frequency Hub Module (RFHM) and retainers (1).
2. Connect the electrical connectors (2).
3. If equipped, connect the remote start antenna (3).
4. Install the rear shelf cover. Refer to PANEL, REAR SHELF, INSTALLATION .
5. Connect the negative battery cable.
6. Perform the RFHM programming procedure. This must be completed after a diagnostic repair. Refer to MODULE, RADIO FREQUENCY (RF HUB), MODULE PROGRAMMING.

MODULE PROGRAMMING

RADIO FREQUENCY HUB MODULE (RFHM) PROGRAMMING

NOTE: **If other electronic modules need to be replaced, besides the RFHM, see the "Replacement and Programming Order Guide" before proceeding. Refer to STANDARD PROCEDURE.**

NOTE: **If, during programming, the scan tool instructs to "Enter the vehicle PIN number", care should be taken because the RFHM will only allow 3 consecutive attempts to enter the correct PIN. If 3 consecutive incorrect PIN's are entered, the RFHM will Lock Out the scan tool. To exit Lock Mode, the ignition must remain in the Off position for 25 minutes. All accessories must be off. A battery charger connected to the battery during this time period is recommended.**

NOTE: The Powertrain Control Module (PCM) stores the secret key information. When the RFHM needs to be replaced, the secret key information will be retrieved from the PCM and then transferred to the new RFHM for security use.

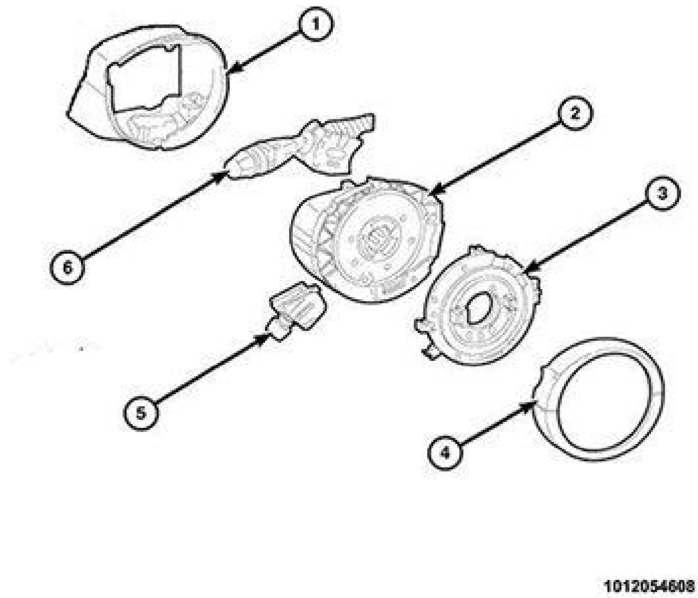
Perform the following after completion of a diagnostic repair:

1. Connect the previously disconnected components and connectors.
2. It may be necessary to obtain the vehicle's unique Personal Identification Number (PIN) assigned to the vehicle. This number can be obtained from the original vehicle invoice or from your Service Manager or Parts Manager.
3. Turn the ignition ON.
4. With the scan tool select: RFH/Radio Frequency Hub.
5. Turn the ignition off.
6. If the RFHM was replaced or any un-programmed or new Frequency Operated Button Integrated Key (FOBIK)s, program all FOBIKs that are to be used with this vehicle. With the scan tool, select "Misc. Functions", "Program Ignition FOBIKs" and follow the instructions on the screen. **All FOBIKs that are to be used in this vehicle must remain on the front seat near the console during programming.**
7. If the RFHM module was replaced, with the scan tool select "Misc. Functions", "RF-HUB Replace" and follow the instructions on the screen.
8. Turn the ignition on then off leaving the key in the ON position.
9. With the scan tool, erase all RFHM DTCs.
10. Operate all equipped RFHM (Passive Entry, Remote Start, Ignition Positions etc.).
11. Wait four minutes.
12. With the scan tool, read the RFHM DTCs.
13. If any RFHM DTCs are present, refer to **DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.
14. If no DTCs are present, the repair is complete.

MODULE, STEERING COLUMN CONTROL

DESCRIPTION

DESCRIPTION



[Fig. 73: Exploded View Of Steering Column Control Module](#)
Courtesy of CHRYSLER GROUP, LLC

The Steering Column Control Module (SCCM) is located near the top of the steering column directly below the steering wheel. The SCCM includes the steering column shroud (1), the Steering Angle Sensor (SAS) (2), the clockspring (3), the multifunction switch (6), a steering column power tilt and telescope switch (5) for vehicles so equipped and a trim cover (4).

The SCCM is secured to the steering column by a unique mounting system using no external fasteners. The SCCM has two key stone features that snap into slots in the upper column jacket to secure the SCCM. In addition, a mechanical red indicator on the lower surface of the column shroud will be flush with the shroud surface when the SCCM is properly installed, but will stand proud of the shroud surface if the key stones are incompletely or improperly seated in the slots of the column jacket.

There are also unique lugs cast into the outer circumference of the steering wheel hub that must be engaged into slots within the inner circumference of the clockspring rotor hub to unlock and drive both the clockspring and the SAS, and the steering wheel must be tightened to specification to ensure proper clockspring and SAS function.

The SCCM includes an integral connector receptacle that faces toward the instrument panel and is connected to the vehicle electrical system through a single take out and connector of the instrument panel wire harness. The instrument panel wire harness take out has been intentionally provided with additional length to facilitate service removal and installation of the SCCM. However, following SCCM installation, this additional length must be pulled back and secured to the instrument panel structure to prevent the potential for undesirable rattling and buzzing noises while driving.

The SCCM shroud, the SAS, the clockspring, the multifunction switch, the steering column power tilt and telescopic switch, as well as the trim cover cannot be adjusted or repaired. If ineffective or damaged the entire SCCM must be replaced as a unit.

OPERATION

OPERATION

The Steering Column Control Module (SCCM) includes an electronic circuit board with a microcontroller. The

microcontroller is a Local Interface Network (LIN) bus master and a gateway for the Controller Area Network (CAN) data bus. Refer to **COMMUNICATION, DESCRIPTION**. The SCCM microcontroller provides power and ground to the multifunction and power tilt and telescope steering column switches of the SCCM, then utilizes integrated circuitry to monitor hard wired analog and digital return inputs from each of these switches. The circuits for the horn switch, the optional heated steering wheel and the standard equipment Driver AirBag (DAB) are pass-through circuits of the SCCM. The steering wheel-mounted electronics functions monitored by the SCCM include the paddle shifter switches and the cruise switches. The output of the horn switch is hard wired to the Body Control Module (BCM) (also known as the Common Body Controller/CBC).

The switch pods in the left and right horizontal spokes of the steering wheel are each LIN bus slave nodes. The switch states of the hands-free communication switches and the Electronic Vehicle Information Center (EVIC) control switches in the left switch pod are communicated over the LIN bus directly to the LIN bus master node of the BCM. The left switch pod also controls the back lighting of both switch pods and both paddle shifter switches. The switch states of the speed control switches in the right switch pod are communicated over the LIN bus to the LIN master node of the SCCM. The internal circuitry of the SCCM gateway then relays electronic message outputs communicating those switch states as well as Steering Angle Sensor (SAS) data to other electronic modules in the vehicle over the CAN bus.

A fixed connector receptacle of the SCCM connects to the vehicle electrical system through a single take out with connector from the instrument panel wire harness. The instrument panel wire harness take out has been intentionally provided with additional length to facilitate service removal and installation of the SCCM. However, following SCCM installation, this additional length must be pulled back and secured to the instrument panel structure to prevent the potential for undesirable rattling or buzzing noises while driving.

The SCCM is connected to a fused B(+) circuit and receives a path to ground at all times. These connections allow it to remain functional regardless of the ignition switch status. Any input to the SCCM that controls a vehicle system function that does not require that the ignition switch status be On such as depressing the horn switch, prompts the SCCM to wake up and transmit on the CAN data bus.

The service replacement SCCM is shipped with the clockspring pre-centered within the SCCM and with a plastic locking tab installed. This locking tab should not be removed until the SCCM has been properly installed on the steering column. If the locking tab is removed before the steering wheel is installed on a steering column, clockspring centering must be confirmed by viewing the inspection window on the clockspring rotor. If the black boxes of the clockspring tape are not visible in the inspection window, the entire SCCM must be replaced with a new unit. Refer to **CLOCKSPRING, STANDARD PROCEDURE** . Proper clockspring installation may also be confirmed by viewing the Steering Angle Sensor (SAS) data using a diagnostic scan tool.

The hard wired circuits between components related to the SCCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SCCM or the electronic controls and communication between modules and other devices that provide some features of the SCCM. The most reliable, efficient and accurate means to diagnose the SCCM or the electronic controls and communication related to SCCM operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

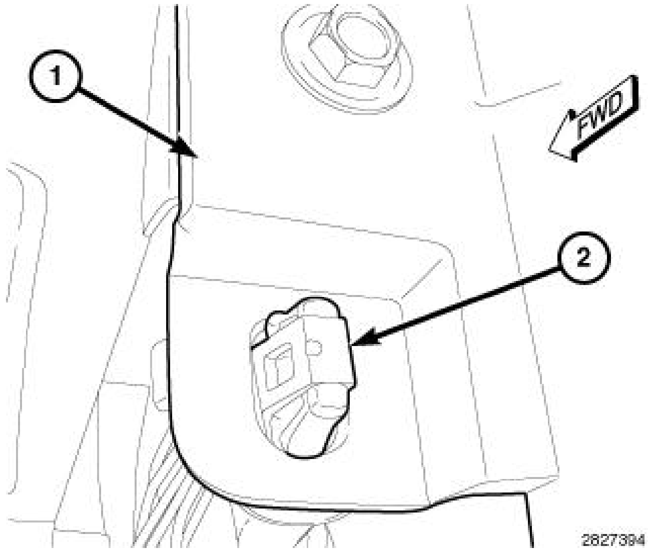


Fig. 74: Retainer Clip & Instrument Panel Base Trim
Courtesy of CHRYSLER GROUP, LLC

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

CAUTION: Always turn the steering wheel until the front wheels are in the straight-ahead position. Then, prior to disconnecting the steering column from the steering gear, lock the steering wheel to the steering column. If clockspring centering has been compromised for ANY reason, the entire Steering Column Control Module (SCCM) and clockspring unit MUST be replaced with a new unit.

1. Place the front wheels in the straight ahead position.
2. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
3. Remove the Driver AirBag (DAB) from the steering wheel. Refer to **AIR BAG, DRIVER, REMOVAL** .
4. Disconnect the steering wheel wire harness connectors from the upper Steering Column Control Module (SCCM) connector receptacles.
5. Remove the steering wheel from the upper steering column shaft. Refer to **WHEEL, STEERING, REMOVAL** .
6. Using a trim stick or another suitable wide flat-bladed tool, disengage the snap clips that secure the molded hard plastic outer edges of the steering column gap hider bezel to the instrument panel.
7. Pull the gap hider bezel up and away from the instrument panel far enough to access and disengage the retainer clip (2) of the service length of the instrument panel wire harness SCCM take out that secures it to the instrument panel base trim (1) on the right side of the steering column opening.

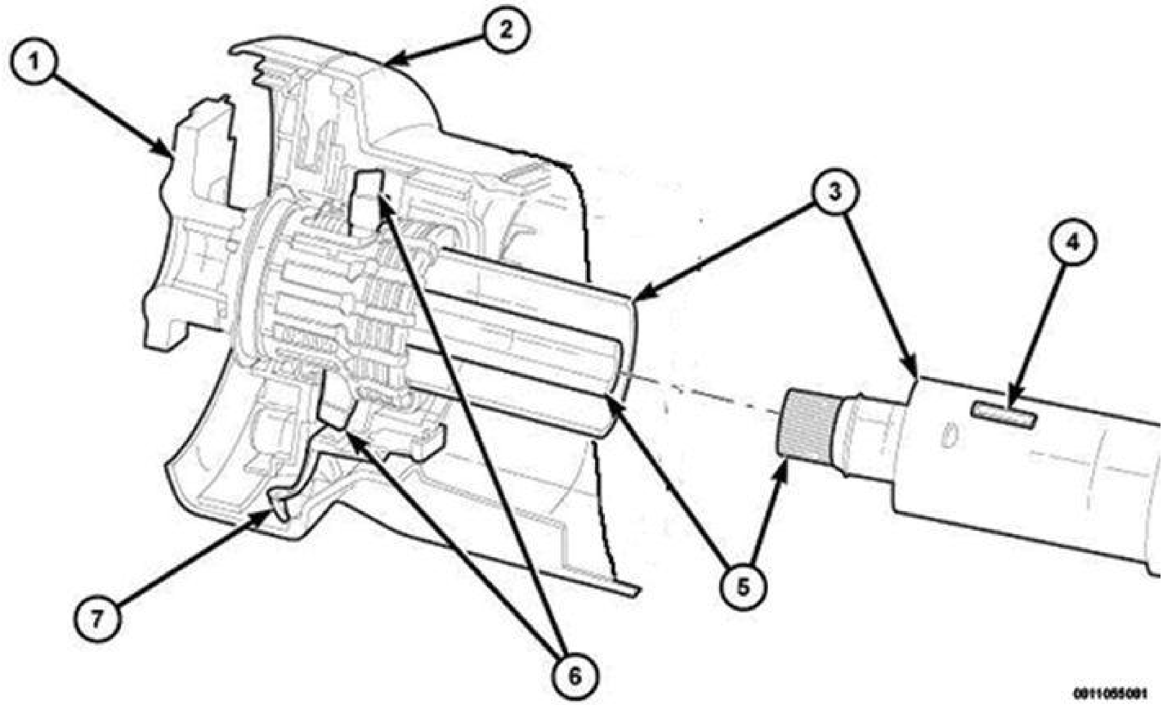


Fig. 75: Steering Column Control Module Shroud, Keystones, Slots & Jacket
Courtesy of CHRYSLER GROUP, LLC

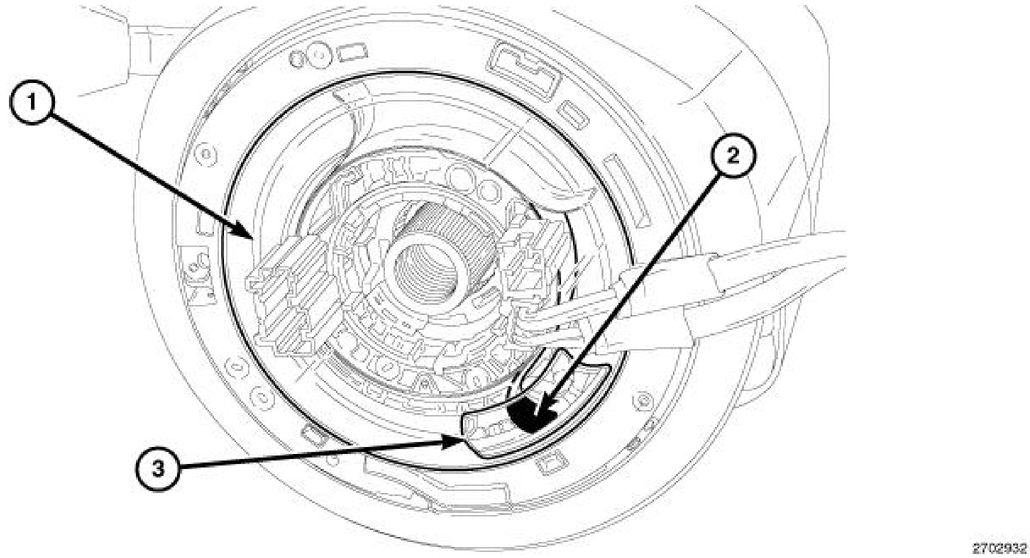
8. Firmly grasp each side of the SCCM shroud (2) on the edges nearest the instrument panel. Use a short, firm tug rearward on the shroud to disengage the spring-loaded upper and lower keystones (6) from the slots (4) in the top and bottom of the steering column jacket (3).
9. Pull the SCCM away from the top of the steering column far enough to reach through the back of the gap hider and shroud to access and disconnect the instrument panel wire harness connector from the lower SCCM connector receptacle.
10. Remove the SCCM from the vehicle.

INSTALLATION

INSTALLATION

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

CAUTION: **Always turn the steering wheel until the front wheels are in the straight-ahead position. Then, prior to disconnecting the steering column from the steering gear, lock the steering wheel to the steering column. If clockspring centering has been compromised for ANY reason, the entire Steering Column Control Module (SCCM) and clockspring unit MUST be replaced with a new unit.**



[Fig. 76: Inspection Window, Clockspring Rotor & Black Squares](#)
Courtesy of CHRYSLER GROUP, LLC

1. Before reinstalling a Steering Column Control Module (SCCM) onto a steering column, clockspring centering must be confirmed by viewing the inspection window (3) on the clockspring rotor (1). If the black squares (2) on the clockspring tape are not visible through the inspection window, clockspring centering has been compromised and the SCCM **MUST** be replaced with a new unit.
2. Be certain that the front wheels are still in the straight ahead position.
3. If a new SCCM is being installed, disengage the steering column gap hider from the lower edge of the used SCCM shroud and transfer it to the new one.
4. Position the SCCM close enough to the top of the steering column to reach through the back of the gap hider and shroud to reconnect the instrument panel wire harness connector SCCM take out to the lower SCCM connector receptacle.

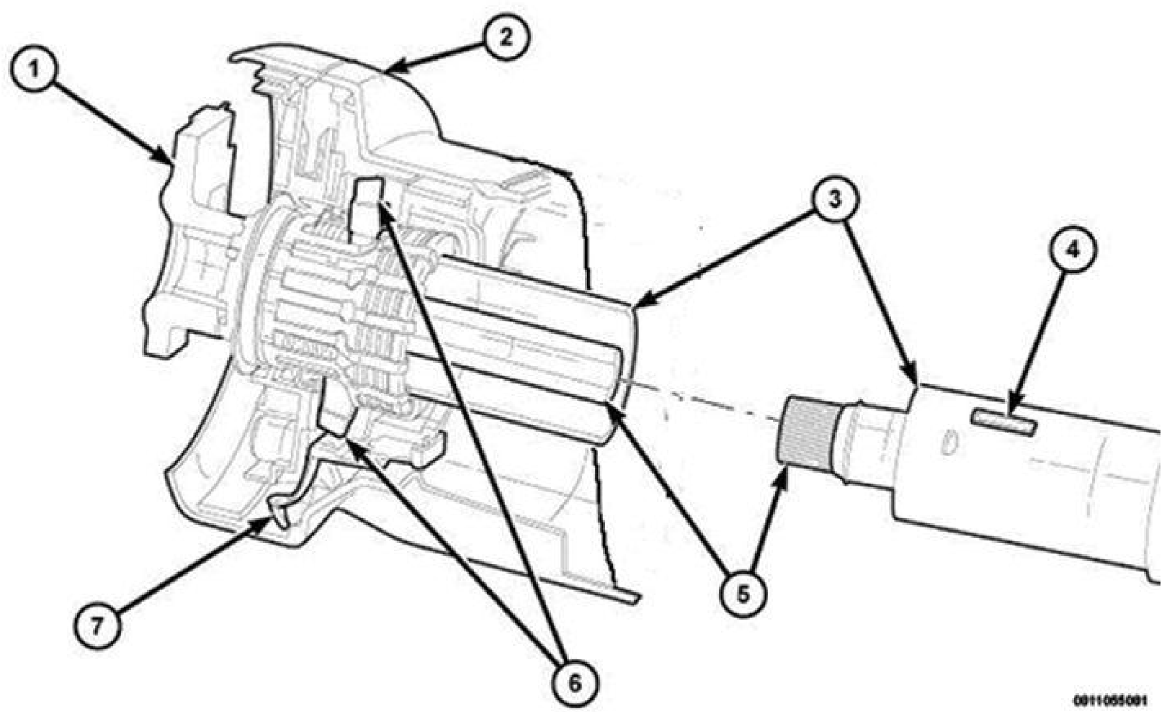


Fig. 77: Steering Column Control Module Shroud, Keystones, Slots & Jacket
Courtesy of CHRYSLER GROUP, LLC

5. Align the hub of the SCCM with the upper steering column shaft (5) and jacket (3).
6. Slide the SCCM over the top of the steering column jacket far enough for the spring-loaded upper and lower keystones (6) to engage the slots (4) in the top and bottom of the steering column jacket.
7. Confirm that the keystones are fully engaged in the column jacket slots by inspecting the round red indicator (7) visible on the lower surface of the SCCM shroud. The indicator should be flush with the shroud. If the indicator stands proud of the shroud, the keystones are **NOT** fully engaged. Carefully slide the SCCM slightly up and down, or rotate it slightly right and left as necessary for the keystones to snap into their slots and the indicator to become flush with the shroud.

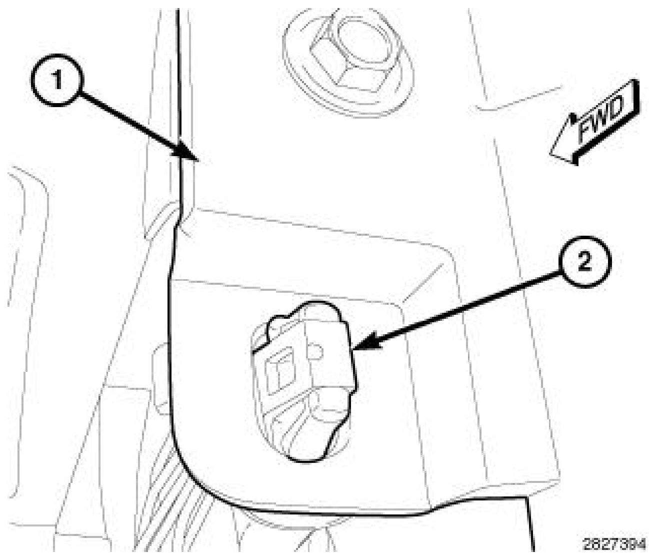


Fig. 78: Retainer Clip & Instrument Panel Base Trim
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The service length of the instrument panel wire harness take out for the SCCM MUST be pulled back out of the SCCM shroud and secured to the instrument panel base trim. Failure to properly accomplish this task will result in unsatisfactory buzzes, squeaks or rattles during vehicle operation.**

8. Pull the gap hider bezel up and away from the instrument panel far enough to access and engage the retainer clip (2) of the service length of the instrument panel wire harness SCCM take out to the instrument panel base trim (1) on the right side of the steering column opening.
9. Align and engage the snap clips that secure the molded hard plastic steering column gap hider bezel to the instrument panel.
10. If a new SCCM is being installed, remove (break off) the red locking tab that secures the clockspring rotor to the clockspring case.
11. Reinstall the steering wheel onto the upper steering column shaft. Be certain to align and insert the rotational lugs on the steering wheel hub into the slots in the hub of the clockspring. Also, the steering wheel fastener **MUST** be tightened to the proper torque specification to ensure proper clockspring and Steering Angle Sensor (SAS) operation. Refer to **WHEEL, STEERING, INSTALLATION** .
12. Reconnect the steering wheel wire harness connectors to the upper SCCM connector receptacles.

13. Reinstall the Driver AirBag (DAB) onto the steering wheel. Refer to **AIR BAG, DRIVER, INSTALLATION** .
14. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

MODULE, TIRE PRESSURE MONITORING (TPM)

DESCRIPTION

DESCRIPTION

The Tire Pressure Monitor (TPM) module is a stand-alone receiver used to perform all TPM functionality in a Premium TPM System on this vehicle. The TPM module is located in the right rear wheel well behind the splash shield and is mounted to the wheel house inner flange with a bracket. The TPM module uses information transmitted from each of the sensors as well as the difference in the strength of the signal received to determine the location of each of the sensors. The TPM module then transmits the required information directly to the Instrument Panel Cluster (IPC) in order to update the lamp, chime and display as required.

OPERATION

OPERATION

The TPM module receives information from each of the sensors in the form of RF signals. The information contained in each of the transmissions provides all the information necessary for the TPM module to determine the pressure in each tire as well as the position of the sensor. This auto locating process only happens in the first 10 minutes of any drive cycle while traveling at speeds above 24 mph (15 km/h) (The auto locating process will start again only if the vehicle has been shut off for approximately 20 minutes or longer).

REMOVAL

REMOVAL

1. Remove the RH splash shield. Refer to **SHIELD, SPLASH, REAR WHEELHOUSE, REMOVAL** .

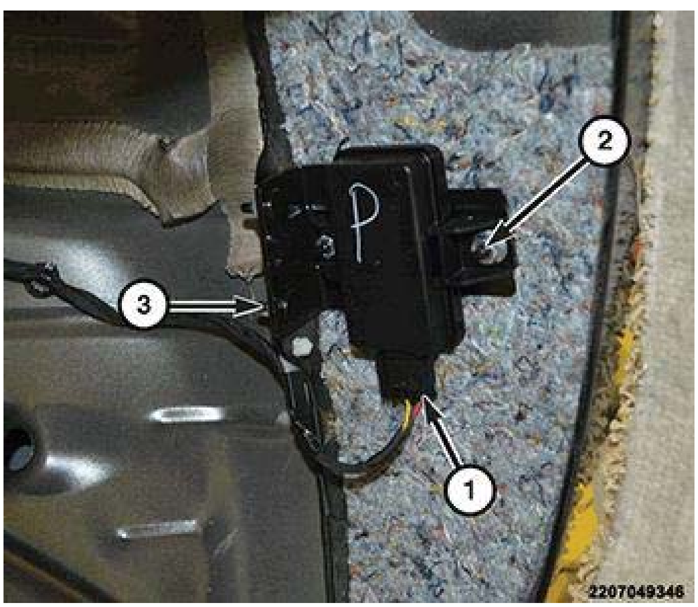


Fig. 79: Tire Pressure Monitoring Module Electrical Connector & Nuts

Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the Tire Pressure Monitoring (TPM) Module electrical connector (1).
3. Remove the front TPM module nuts (2), then remove the TPM module nuts (3) from the body flange (3).
4. Remove the TPM module from the vehicle.

INSTALLATION

INSTALLATION

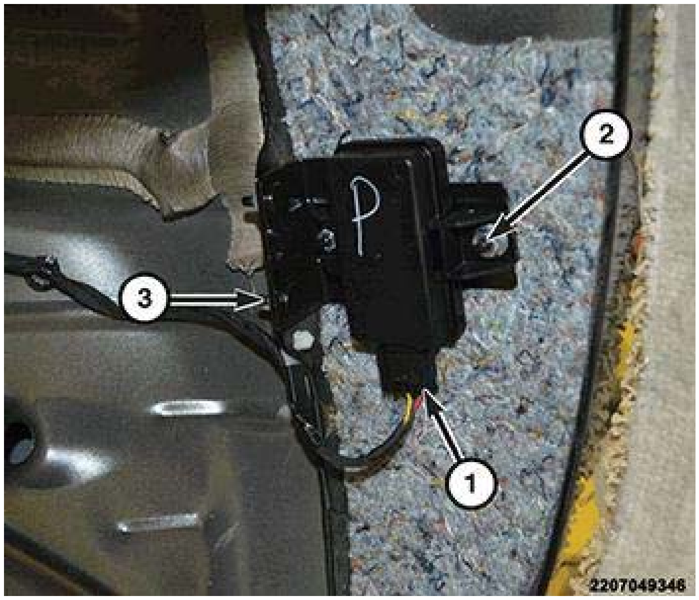


Fig. 80: Tire Pressure Monitoring Module Electrical Connector & Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Position the Tire Pressure Monitoring (TPM) module in the RH wheel well.
2. Install the front TPM module nuts (2), then install the TPM module nuts (3) at the body flange.
3. Connect the TPM module electrical connector (1).
4. Install RH rear splash shield. Refer to **SHIELD, SPLASH, REAR WHEELHOUSE, INSTALLATION** .
5. Carry out one of the following to update the system for the new sensor ID:
   a. Using the TPM-RKE Analyzer 9936 with the Scan Tool, program the TPM Module with the new tire pressure sensor ID. This is part of the TPM Diagnostic Verification Test. Refer to **STANDARD PROCEDURE** .
   b. The vehicle should remain stationary for at least 20 minutes. Drive the vehicle for a minimum of 20 minutes while maintaining a continuous speed above 24 km/h (15 mph). During this time, the system will recognize and add the new sensor ID.

      This is part of the TPM Diagnostic Verification Test. Refer to **STANDARD PROCEDURE** .

MODULE PROGRAMMING

PROGRAMMING PROCEDURE

1. **TIRE PRESSURE MONITORING (TPM) MODULE**

Was the TPM Module replaced during the test procedure?

Yes

- Go To 2

No

- Go To 3

2. **PLACARD PRESSURE VALUES**
    1. Reconnect the previously removed and/or disconnected components and connectors.
    2. With the scan tool, select "Miscellaneous Functions" in the Body Control Module (BCM). Then select the desired procedure and follow the display on the scan tool.
    3. Program the Placard Pressure Values into the Body Control Module (BCM).
    4. Go To "Tire Pressure Module (TPM)", select "Data Display", read "'Tire Placard Pressure - Front" and "'Tire Placard Pressure -Rear" and confirm the values match the Tire Inflation Pressure (Placard) label. Also, go into the Body Control Module (BCM), select Data Display and read "'Tire Placard Pressure - Front" and "'Tire Placard Pressure -Rear" to confirm the values were programmed correctly. If the Placard values are incorrect in the BCM or TPM Module, select the Body Control Module (BCM) then under "Miscellaneous Functions", select "Update Pressure Threshold" and enter the placard pressure value as seen on the Tire Inflation Pressure (Placard) label.
    5. With the scan tool, erase all stored DTCs.
    6. With the scan tool, read TPM Module DTCs.

Are there any DTCs present?

Yes

- Repair not complete, refer to **DIAGNOSIS AND TESTING** perform the appropriate diagnostic procedure.

No

- Go To 3

3. **TPM SENSOR REPLACEMENT**

NOTE: **If a TPM-RKE Tool is not available, let the vehicle sit stationary for more then 20 minutes, and then proceed to step #4 below.**

1. Using an updated TPM-RKE Analyzer Tool, select TPM Functions, then enter the Model Year and the Body Style of the vehicle, and for the Trigger Selection select PARK SENSOR
2. Scan each TPM Sensor at each road wheel, and store each TPM Sensor ID in the correct location. (LEFT FRONT, LEFT REAR, RIGHT FRONT, RIGHT REAR, and SPARE TIRE (if equipped).)
3. Connect the TPM-RKE Analyzer Tool to the scan tool, and then follow the programming steps outlined in the diagnostic scan tool for "Program Tire Pressure Sensor ID w/ TPM Tool" under "MISC" for the TPM.
4. Drive the vehicle for a minimum of 20 minutes while maintaining a continuous speed above 24 km/h

(15 mph).

5. With the scan tool, read TPM DTCs.

Are there any TPM DTCs present?

Yes

- Perform the appropriate diagnostic procedure. Refer to **DIAGNOSIS AND TESTING** .

No

- Repair complete.

MODULE, TRANSMISSION CONTROL

DESCRIPTION

TRANSMISSION CONTROL MODULE 8-SPEED

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The valve body includes the Transmission Control Module (TCM), all solenoids and sensors, and can be referred to as the Transmission Control Module Assembly (TCMA). The TCM is attached to the valve body between the transmission case and the valve body. If any component of the valve body **including the TCM** sensors or solenoids needs to be replaced, the complete TCMA (valve body) must be replaced. For further information of the TCMA, refer to **VALVE BODY, DESCRIPTION** .

OPERATION

8-SPEED TCM OPERATION

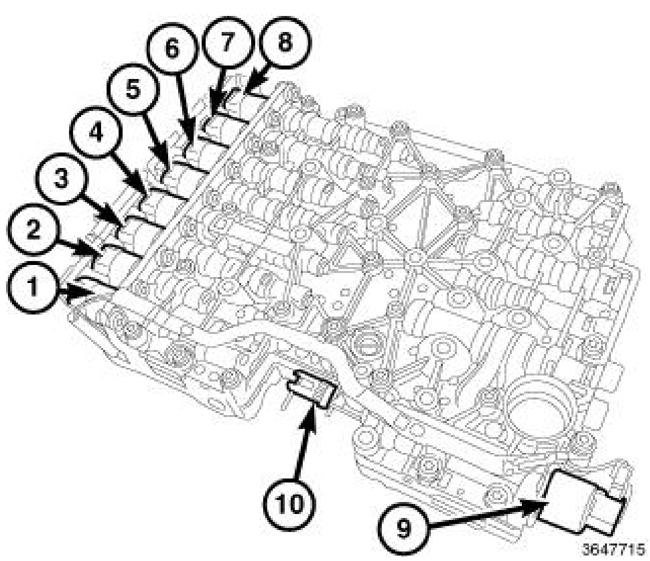


Fig. 81: Solenoid A D E C & Park Release Mechanical Valve

Courtesy of CHRYSLER GROUP, LLC

1 - Solenoid A
2- Solenoid D
3 - Solenoid B
4 - Solenoid E
5 - Solenoid C
6 - TCC Solenoid
7 - Line Pressure Solenoid
8 - Park Release Solenoid
9 - Park Hold Mechanical Solenoid
10 - Park Release Mechanical Valve

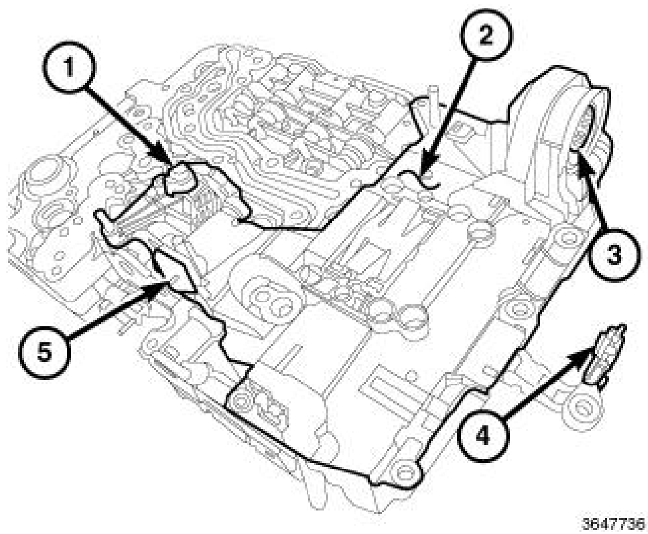


Fig. 82: Input Speed Sensor, Output Speed Sensor, TCM (Includes Transmission Temperature Sensor) & Park Position Sensor
Courtesy of CHRYSLER GROUP, LLC

1 - Input Speed Sensor
2 - TCM (Includes Transmission Temperature Sensor)
3 - External Wire Harness Connector
4 - Output Speed Sensor
5 - Park Position Sensor

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

The valve body, which includes the Transmission Control Module (TCM), controls the delivery and pressure of transmission fluid. The TCM is integrated into the valve body. The TCM regulates the amount of hydraulic pressure used to engage the clutches and the Torque Converter Clutch (TCC), in addition to directing hydraulic pressure to engage or release any given clutch for any given required gear. The TCM will actuate the valves via

solenoids based on the position of the shifter, transmission fluid temperature, engine operating conditions, traction conditions and driver demands. During a shift, the TCM will actuate the solenoids to match the gear ranges to the optimal torque range of the engine based on the position of the accelerator pedal, shifter and vehicle speed as determined by the PCM based on input from the Vehicle Speed Sensor (VSS) and ABS module. Due to the complexity of the 8HP45 transmission control system, always refer to the appropriate Diagnostic & Testing article when attempting to diagnose transmission problems.

If the Transmission Control Module Assembly (TCMA) is replaced, it **must** be programmed and a drive learn needs to be performed before returning the vehicle to the customer. Refer to **STANDARD PROCEDURE** for programming and drive learn procedures .

REMOVAL

VALVE BODY

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Drain the transmission fluid into a clean container. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .

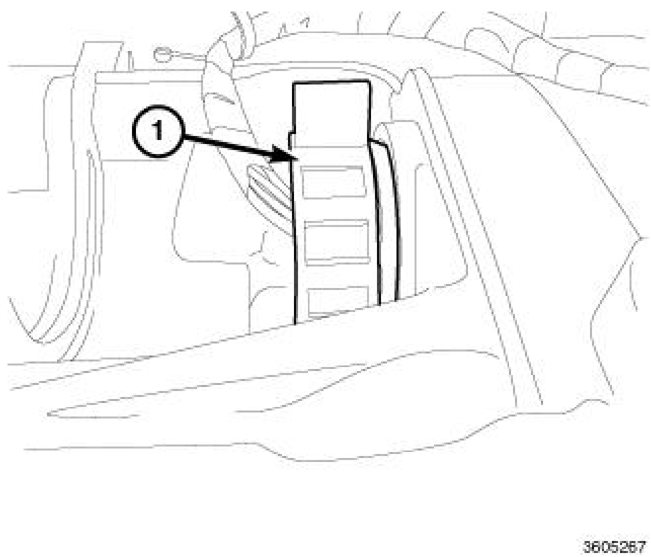


Fig. 83: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

3. Turn the locking mechanism lock (1) of the transmission harness connector counter-clockwise and disconnect the connector from the transmission.

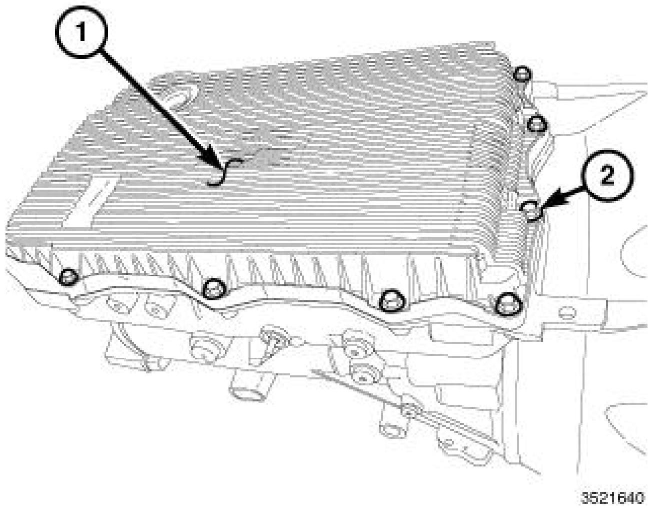


Fig. 84: Thirteen Oil Pan Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.

4. Remove the thirteen transmission oil pan bolts (2).
5. Carefully detach the transmission oil pan (1) and gasket.

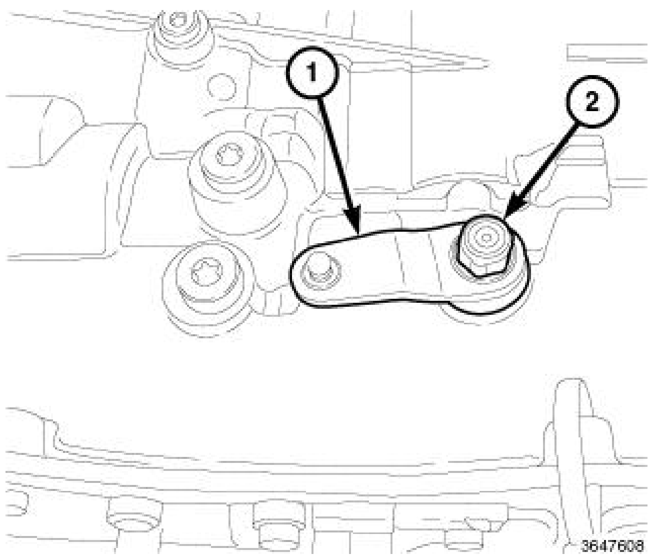
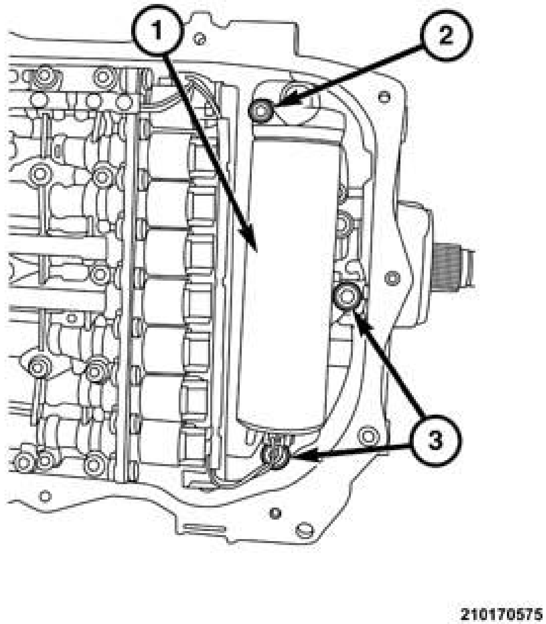


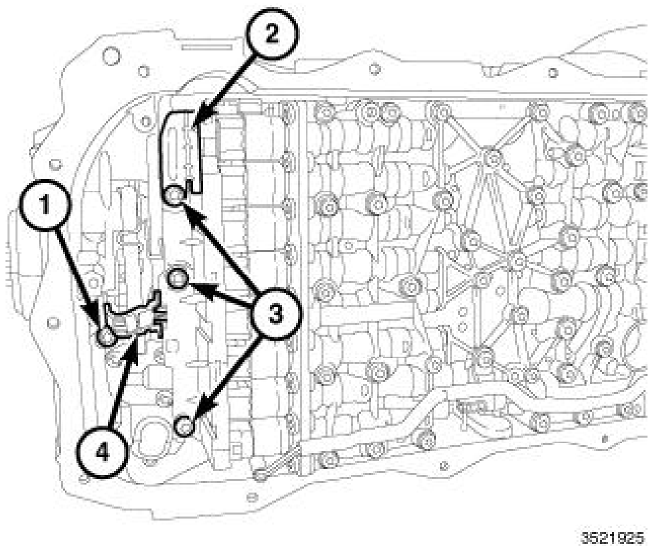
Fig. 85: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

6. Remove the Manual Park Release (MPR) lever retaining nut (2) and remove the lever (1).
7. Reinstall the MPR lever 180 degrees offset. Using a tie strap, secure the lever into position so the park release fork remains in the same position for installation of the valve body assembly.



[Fig. 86: Hydraulic Impulse Storage Unit & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

8. If equipped, disconnect the Hydraulic Impulse Oil Storage (HIS) connector.
9. If equipped, remove three HIS bolts (2 and 3) and the accumulator (1).



[Fig. 87: Valve Body Assembly End Retainer Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

10. Remove the valve body assembly end retainer bolts (3).
11. Lift the electrical connector lock (2) to release the internal harness end from inside the transmission for valve body assembly removal.
12. Remove the Output Shaft Speed (OSS) sensor retaining bolt (1) and pull the OSS sensor (4) loose from the case.

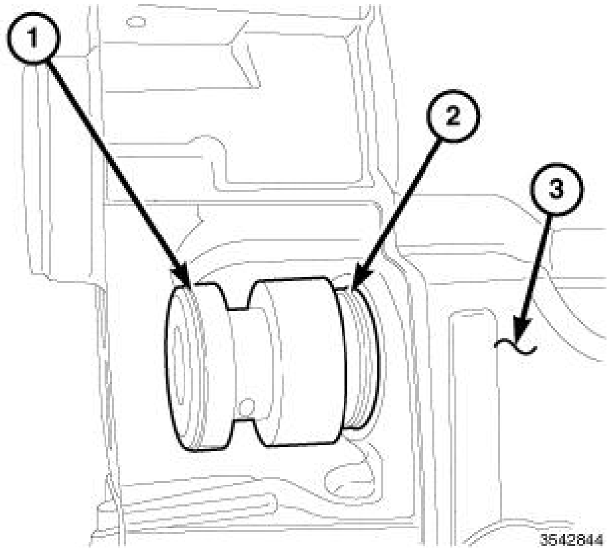


Fig. 88: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

13. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully pull the electrical harness insulator (2) straight out from the transmission case (3).

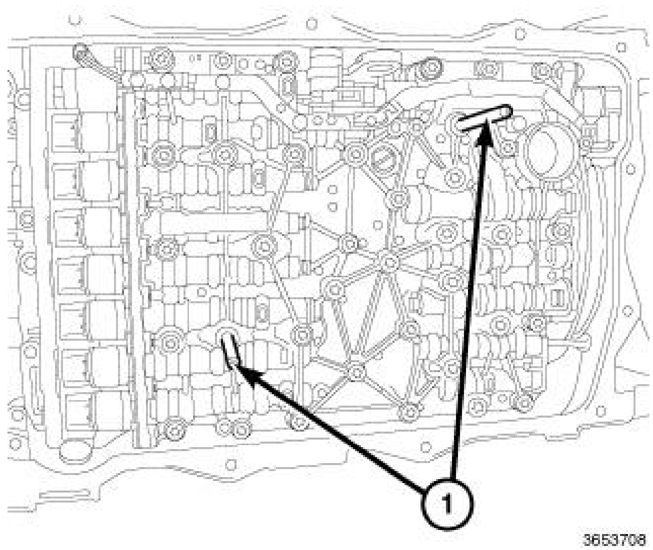
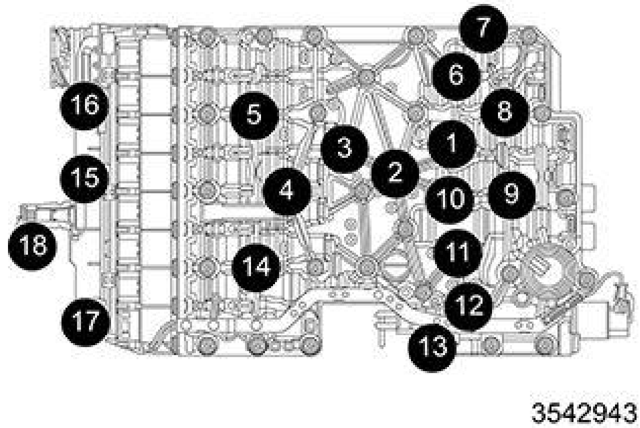


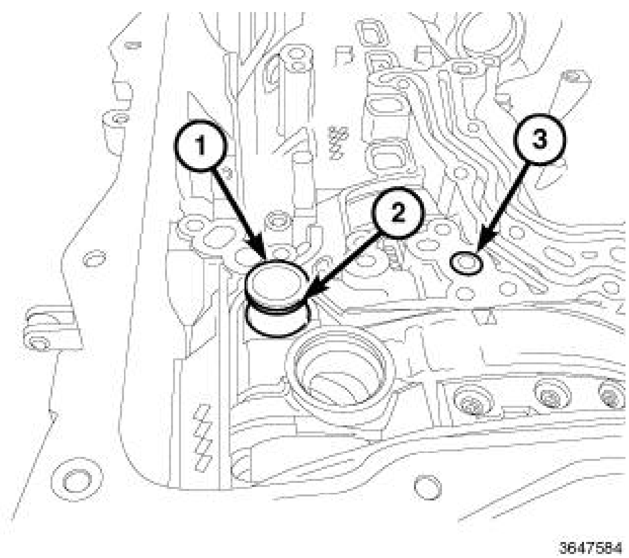
Fig. 89: Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

14. Remove two bolts and hand install (special tool #10379, Pins, Valve Body Alignment) (1).
15. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while removing the remaining fasteners.



[Fig. 90: Valve Body Bolts Loosening And Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

16. Remove remaining valve body bolts.
17. Carefully lower the valve body assembly from the transmission.



[Fig. 91: Fluid Port, Two O-Rings, Compression Seal](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The fluid port may remain in the valve body upon removal, remove and discard the O-rings.**

18. Remove the fluid transfer port (1) from the transmission.
19. Remove and discard the O-ring (2) and seal (3).

REMOVAL 8HP70

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may**

result in damage to the TCM/TCMA.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Drain the transmission fluid into a clean container. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .

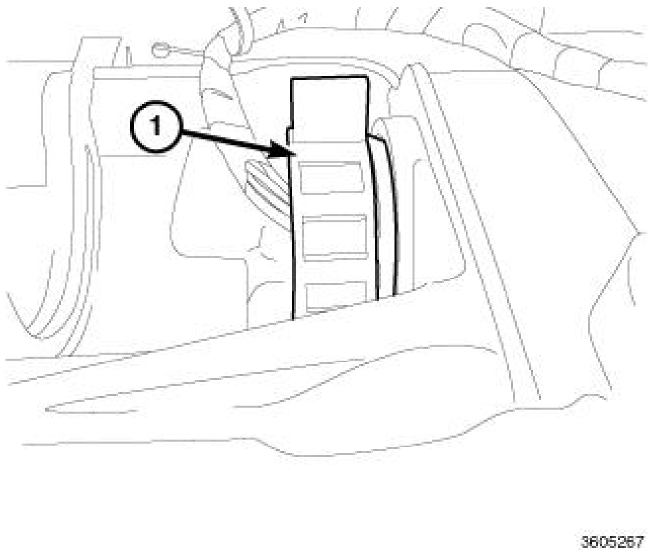


Fig. 92: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

3. Turn the locking mechanism lock (1) of the transmission harness connector counter-clockwise and disconnect the connector from the transmission.

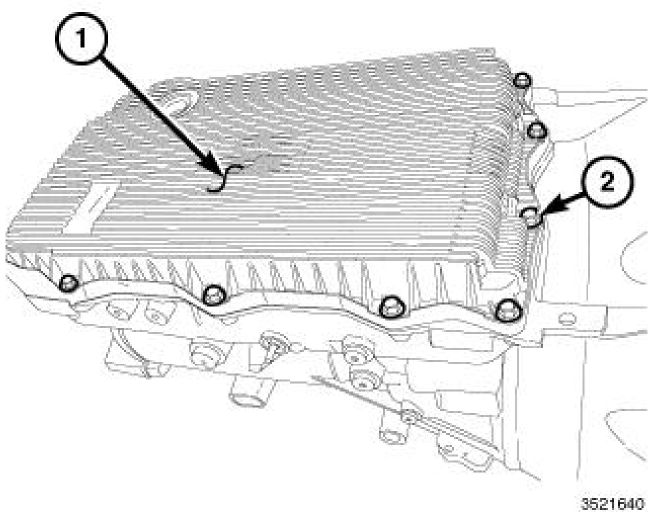


Fig. 93: Thirteen Oil Pan Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.**

4. Remove the thirteen oil pan retaining bolts (2).
5. Carefully detach the oil pan (1) and gasket.

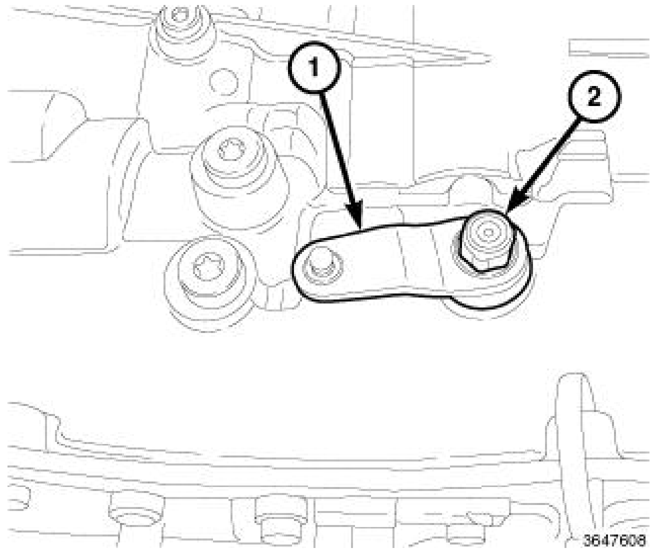


Fig. 94: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

6. Remove the Manual Park Release (MPR) lever retaining nut (2) and remove the lever (1).
7. Reinstall the MPR lever 180 degrees offset. Using a tie strap, secure the lever into position so the park release fork remains in the same position for installation of the valve body assembly.

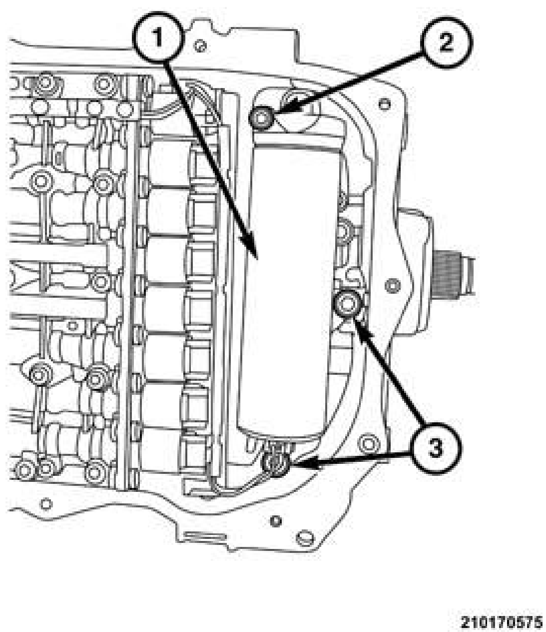
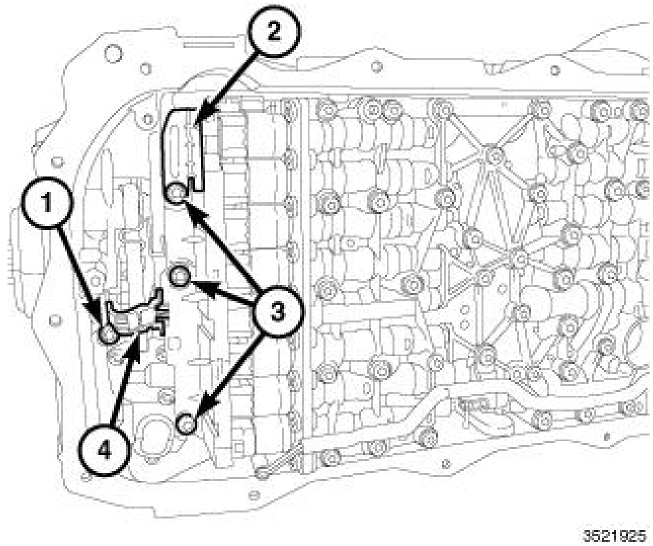


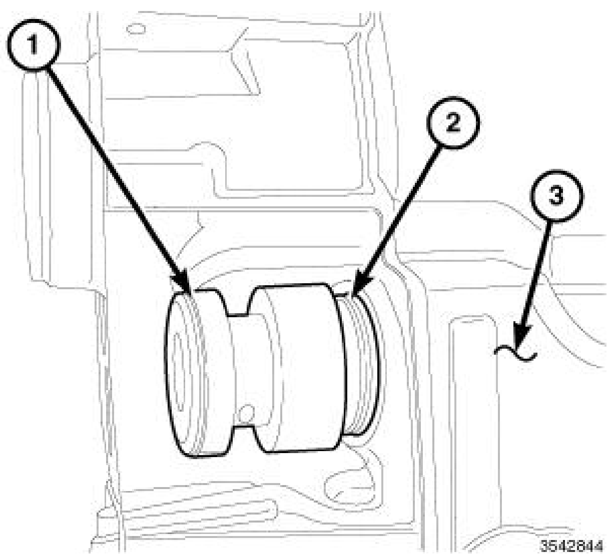
Fig. 95: Hydraulic Impulse Storage Unit & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. If equipped, disconnect the Hydraulic Impulse Oil Storage (HIS) connector.
9. If equipped, remove three HIS bolts (2 and 3) and the accumulator (1).



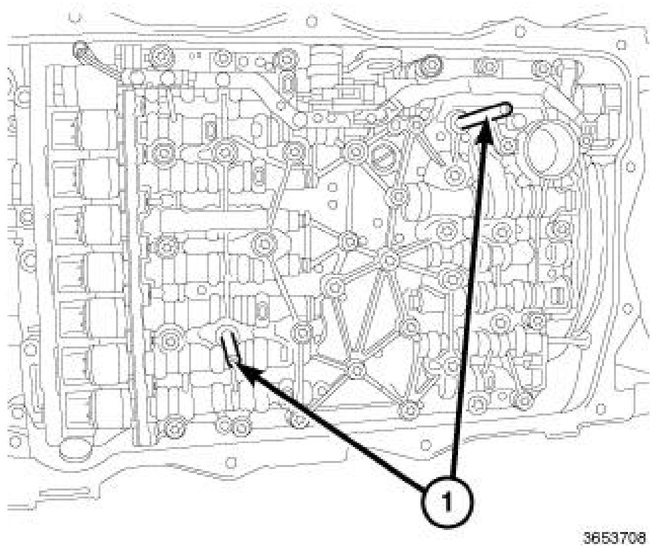
[Fig. 96: Valve Body Assembly End Retainer Bolts]
Courtesy of CHRYSLER GROUP, LLC

10. Remove the valve body assembly end retainer bolts (3).
11. Lift the electrical connector lock (2) to release the internal harness end from inside the transmission for valve body assembly removal.
12. Remove the Output Speed Sensor (OSS) retaining bolt (1) and pull the OSS sensor (4) loose from the case.



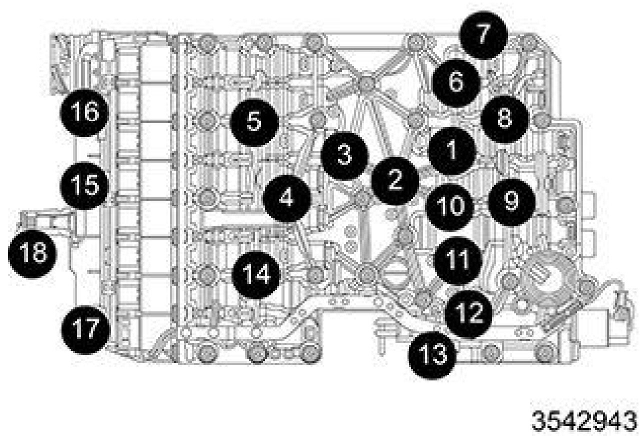
[Fig. 97: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case]
Courtesy of CHRYSLER GROUP, LLC

13. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully pull the electrical harness insulator (2) straight out from the transmission case (3).



[Fig. 98: Valve Body Alignment Pins](#)
Courtesy of CHRYSLER GROUP, LLC

14. Remove two bolts and hand install (special tool #10379, Pins, Valve Body Alignment) (1).
15. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while removing the remaining fasteners.



[Fig. 99: Valve Body Bolts Loosening And Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

16. Remove remaining valve body assembly retaining bolts.
17. Carefully lower the valve body assembly from the transmission.

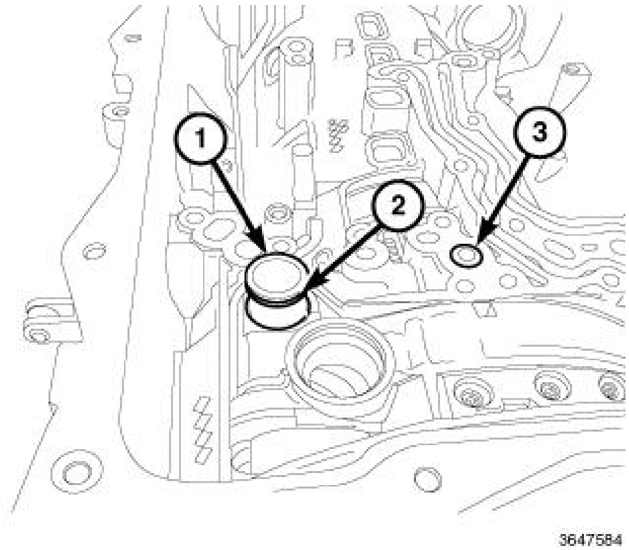


Fig. 100: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The fluid port may remain in the valve body upon removal, remove and discard the O-rings.**

18. Remove the fluid transfer port (1) from the transmission.
19. Remove and discard the O-ring (2) and seal (3).

REMOVAL 8HP90

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Drain the transmission fluid into a clean container. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .

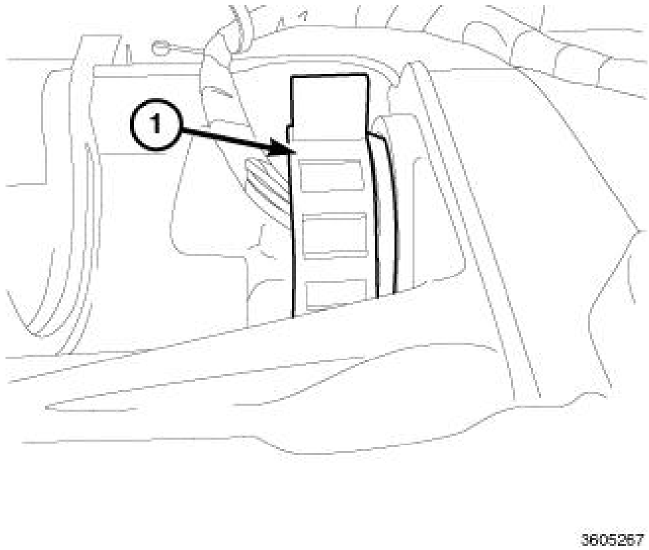


Fig. 101: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

3. Turn the locking mechanism lock (1) of the transmission wire harness connector counter-clockwise and disconnect the wire harness from the transmission.

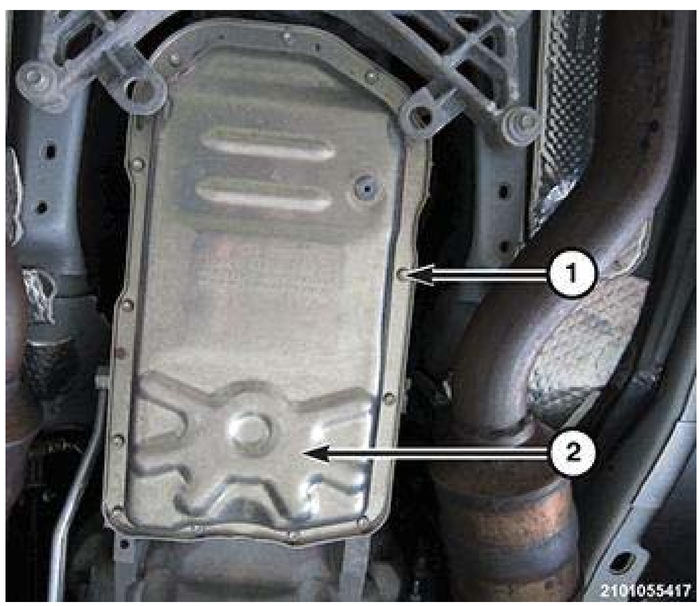


Fig. 102: Transmission Oil Pan & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Inspect the gasket for reuse. If the seal is cut or torn, replace the gasket.**

4. Remove the transmission oil pan bolts (1).
5. Remove the transmission oil pan (2) and gasket.

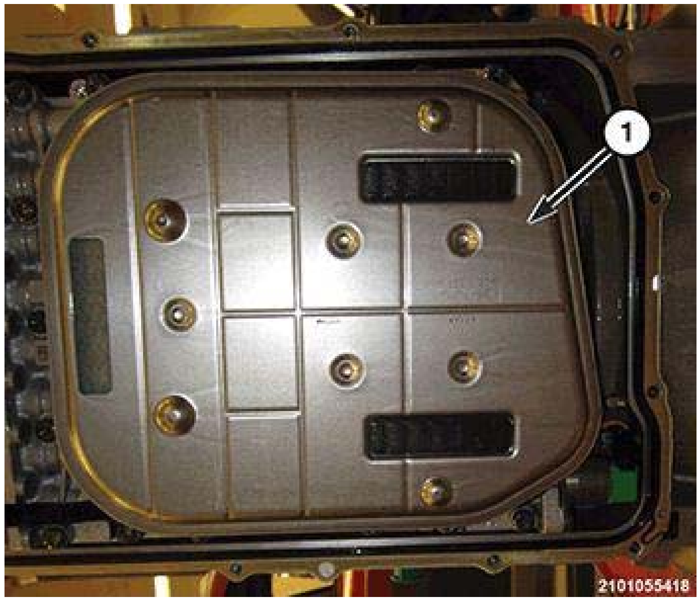


Fig. 103: Transmission Oil Filter
Courtesy of CHRYSLER GROUP, LLC

6. Remove the transmission oil filter (1).

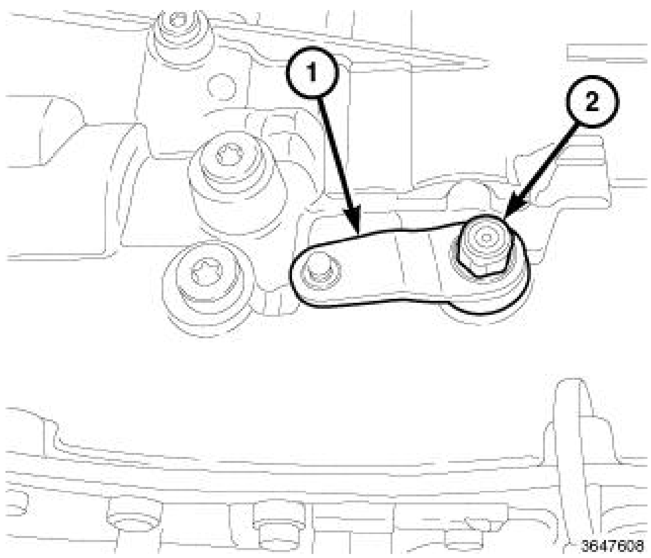


Fig. 104: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

7. Remove the Manual Park Release (MPR) lever nut (2) and remove the MPR lever (1).
8. Reinstall the MPR lever 180 degrees offset. Using a tie strap, secure the lever into position so the park release fork remains in the same position for installation of the valve body assembly.

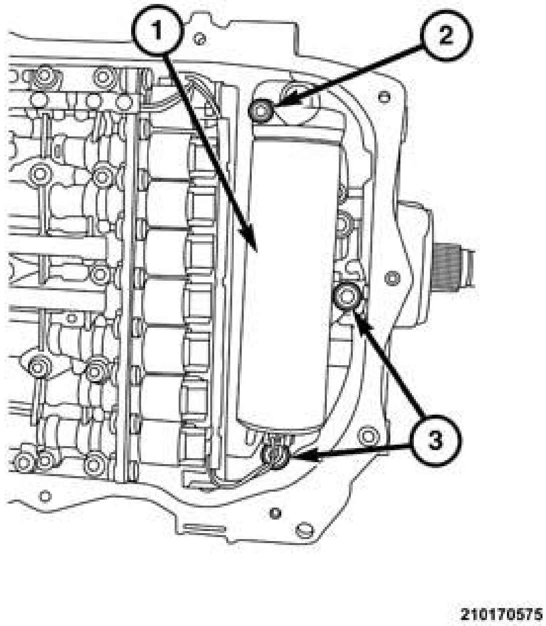


Fig. 105: Hydraulic Impulse Storage Unit & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. If equipped, disconnect the Hydraulic Impulse Oil Storage (HIS) connector.
10. If equipped, remove three HIS bolts (2 and 3) and the accumulator (1).

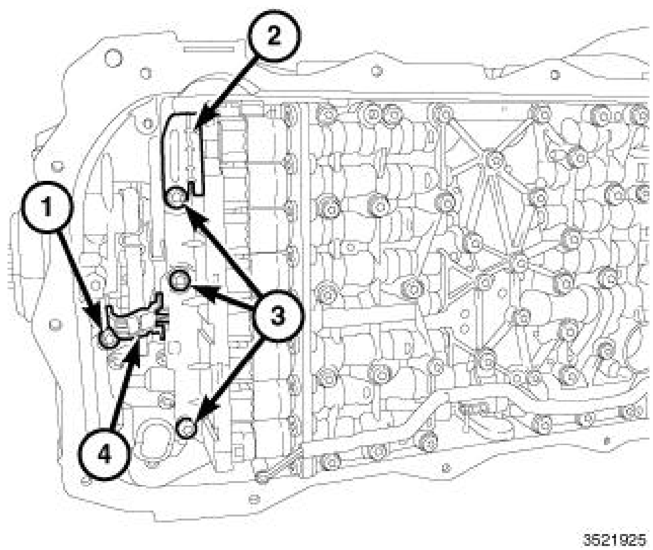


Fig. 106: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Remove the valve body assembly end bolts (3).
12. Lift the wire harness connector lock (2).
13. Remove the speed sensor bolt (1) and pull the speed sensor (4) loose from the case.

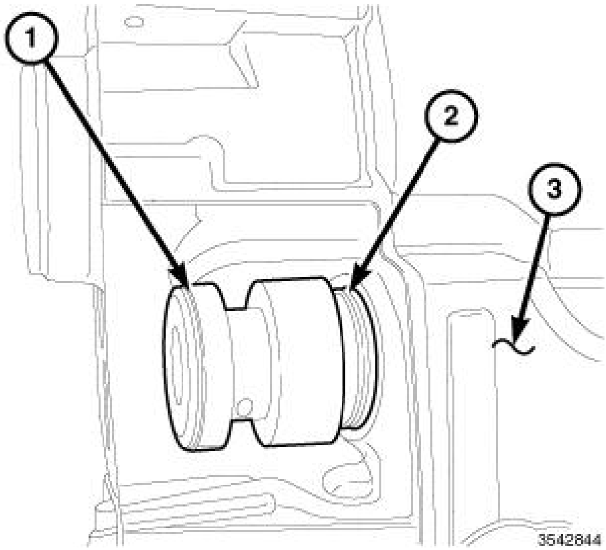


Fig. 107: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

14. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully pull the electrical harness insulator (2) straight out from the transmission case (3).

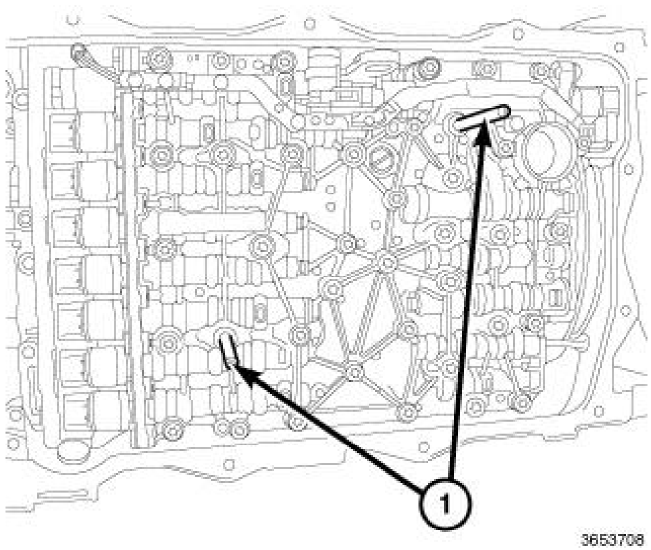
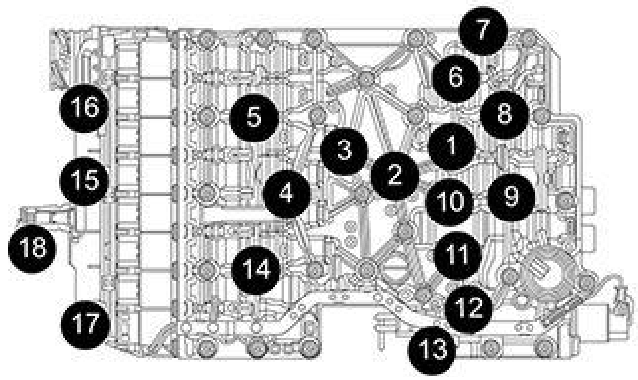


Fig. 108: Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

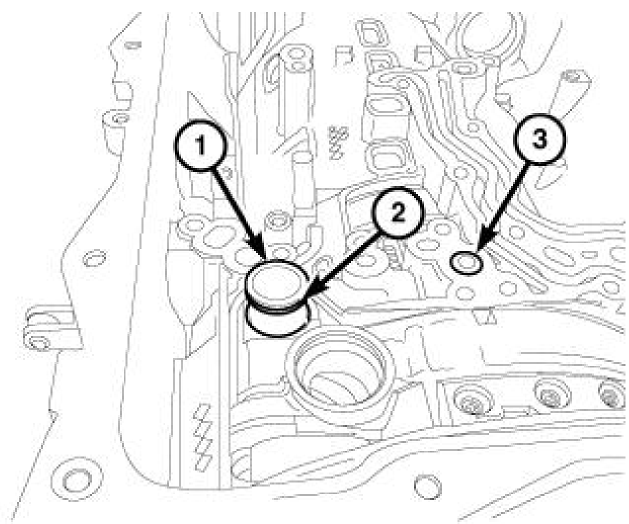
15. Remove two bolts and hand install (special tool #10379, Pins, Valve Body Alignment) (1).
16. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while removing the remaining fasteners.



3542943

Fig. 109: Valve Body Bolts Loosening And Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

17. Remove remaining valve body assembly bolts.
18. Remove the valve body assembly from the transmission.



3647584

Fig. 110: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The fluid port may remain in the valve body upon removal, remove and discard the O-rings.**

19. Remove the fluid transfer port (1) from the transmission.
20. Remove and discard the O-ring (2) and seal (3).

INSTALLATION

VALVE BODY

CAUTION: **The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC**

DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

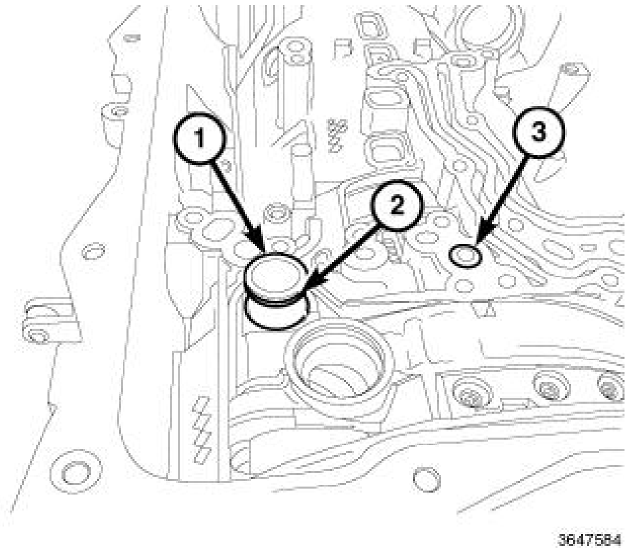


Fig. 111: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install the fluid port (1) with **NEW** O-rings (2) and seal (3) on the valve body.

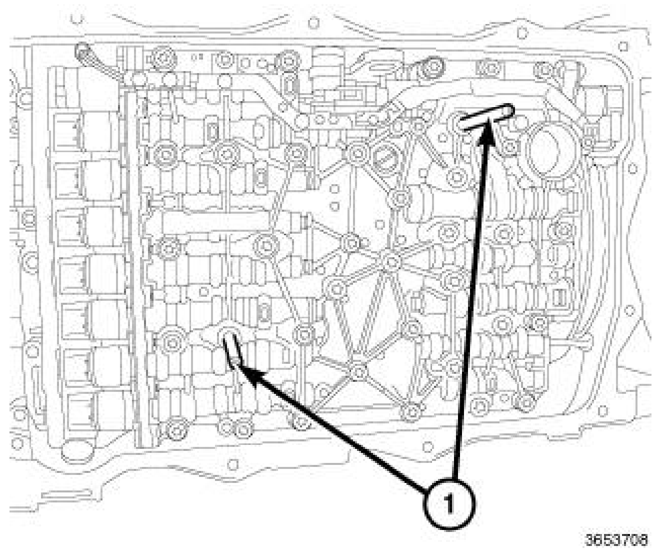
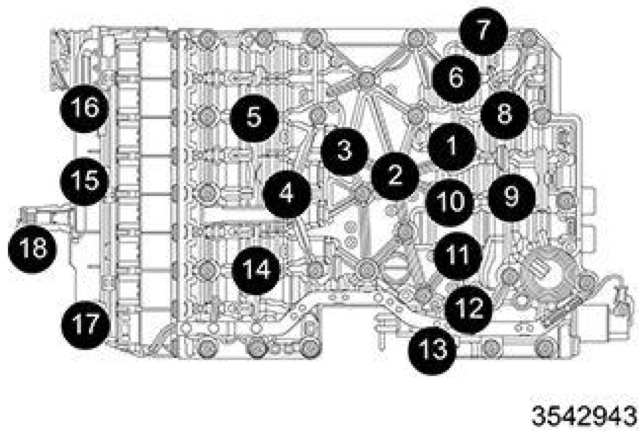


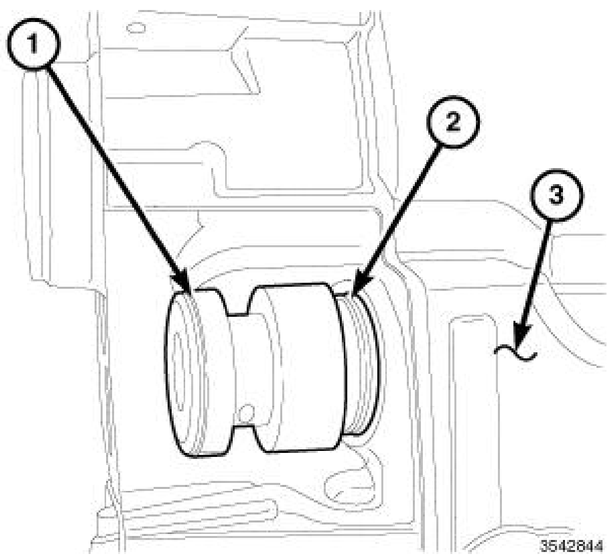
Fig. 112: Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

2. Install the valve body assembly on the transmission using the previously installed (special tool #10379, Pins, Valve Body Alignment) (1) as a guide.
3. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while installing the valve body bolts.



[Fig. 113: Valve Body Bolts Loosening And Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

4. Install the valve body bolts not including 16-18 and hand tighten.
5. Remove the pins and install the remaining bolts.



[Fig. 114: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case]
Courtesy of CHRYSLER GROUP, LLC

6. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully install the electrical harness insulator (2) to the transmission case (3).

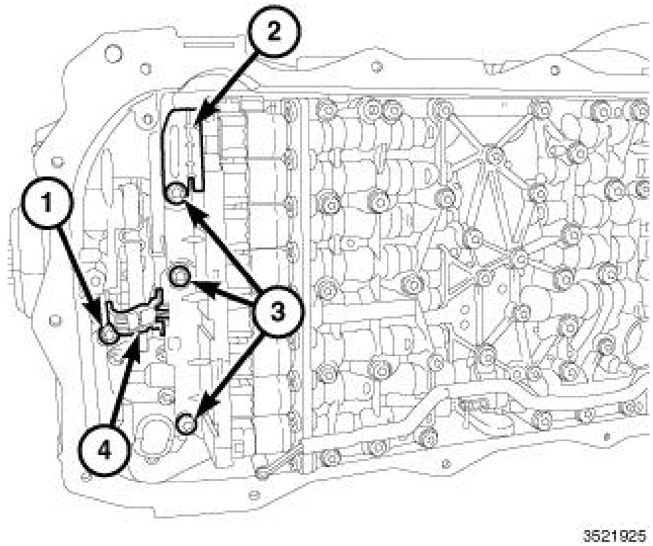


Fig. 115: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Install and lock the electrical connector lock (2) to the internal harness end.
8. Install the Output Shaft Speed (OSS) sensor (4) and tighten to the proper **SPECIFICATIONS** .

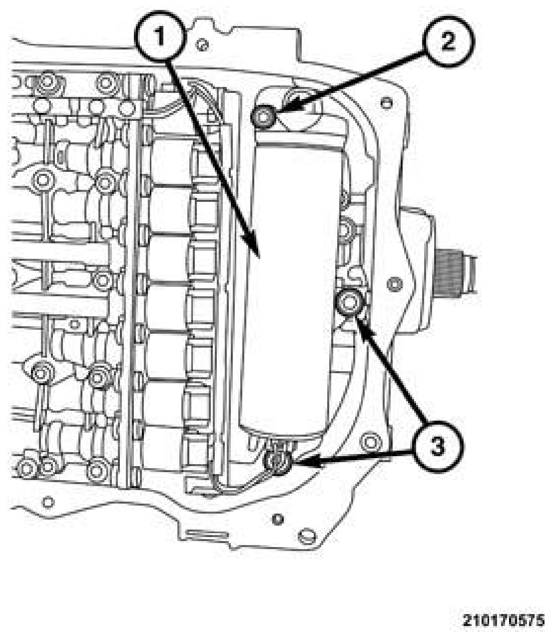
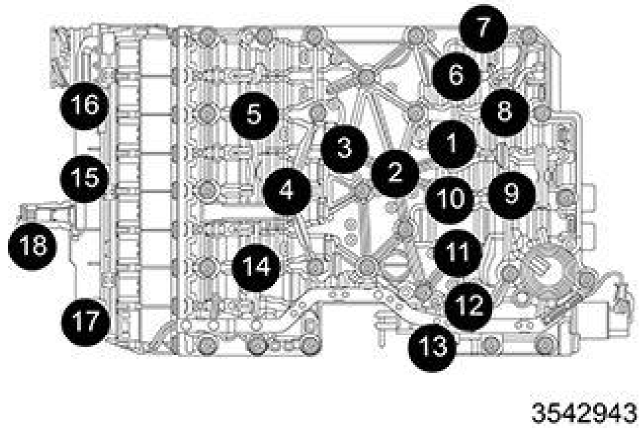


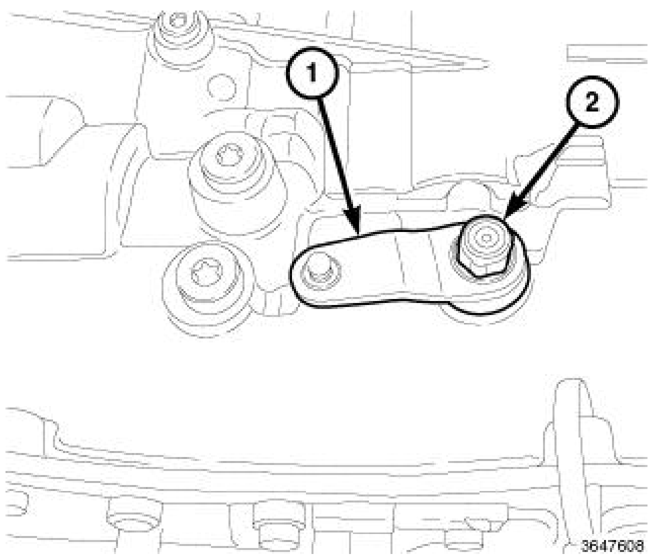
Fig. 116: Hydraulic Impulse Storage Unit & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. If equipped, install the Hydraulic Impulse Oil Storage (HIS) accumulator (1).
10. Tighten the bolts (2 and 3) to the proper **SPECIFICATIONS** .
11. Connect the HIS electrical connector.
12. Install the valve body bolts (3) and hand tighten.



[Fig. 117: Valve Body Bolts Loosening And Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

13. Tighten the valve body bolts to the proper **SPECIFICATIONS** .



[Fig. 118: Manual Park Release Lever Retaining Nut & Lever](#)
Courtesy of CHRYSLER GROUP, LLC

14. Remove the tie strap and return the Manual Park Release (MPR) lever (1) to the original position. Tighten the MPR bolt (2) to the proper **SPECIFICATIONS** .

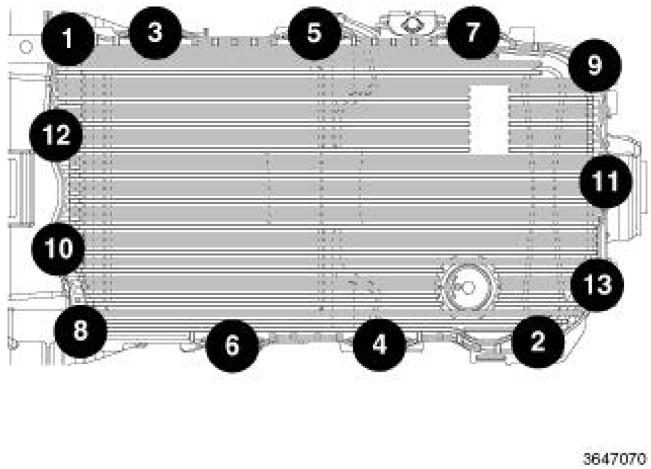


Fig. 119: Oil Pan Retaining Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

15. Install the transmission oil pan and gasket.
16. Install the thirteen transmission oil pan bolts and tighten the to the proper SPECIFICATIONS using the sequence given.

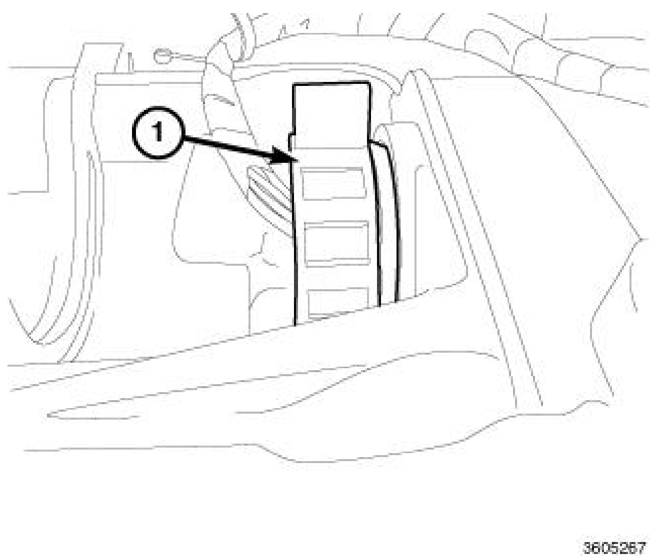


Fig. 120: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

17. Connect the transmission wire harness connector (1).

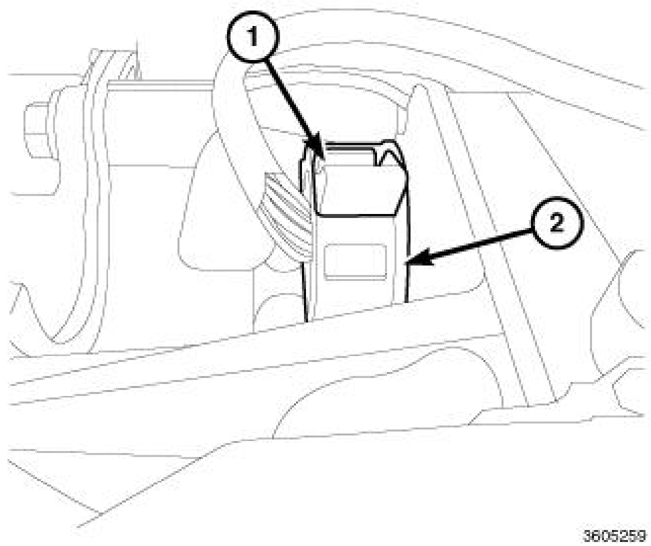


Fig. 121: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

18. Turn the locking mechanism (1) of the transmission wire harness connector (2) clockwise to lock it in place.
19. If the valve body is replaced, program the Transmission Control Module (TCM). Refer to **MODULE, TRANSMISSION CONTROL, MODULE PROGRAMMING**.
20. Perform the TRANSMISSION FILL AFTER SERVICE procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .
21. Perform the TRANSMISSION VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

INSTALLATION 8HP70

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

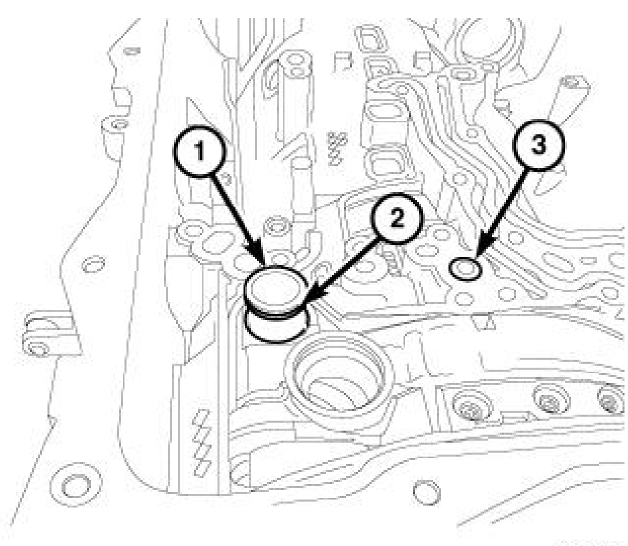


Fig. 122: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install the fluid port (1) with **NEW** O-rings (2) and seal (3) to the valve body.

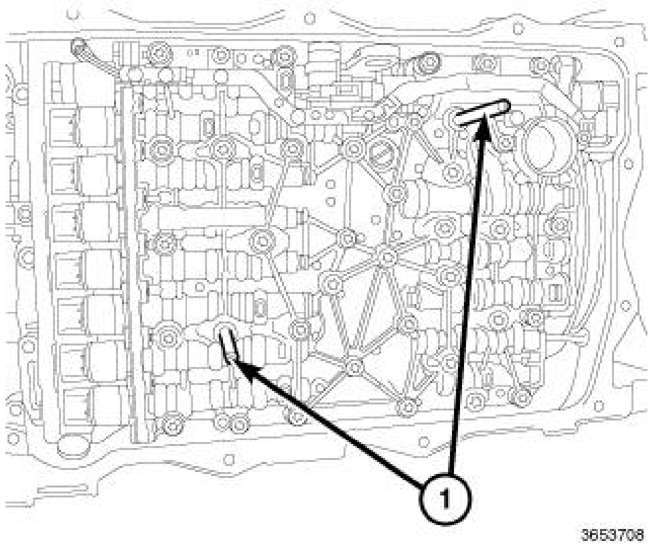


Fig. 123: Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

2. Install the valve body assembly to the transmission using the previously installed (1) (special tool #10379, Pins, Valve Body Alignment) as a guide.
3. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while installing the remaining fasteners.

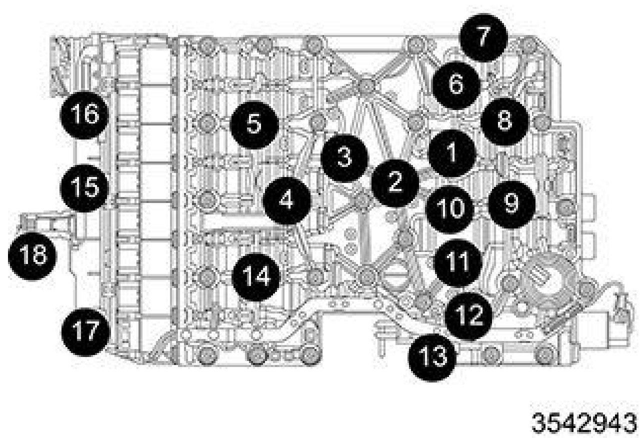


Fig. 124: Valve Body Bolts Loosening And Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Install the valve body assembly retaining bolts not including 16-18 and hand tighten.
5. Remove the pins and install the remaining bolts.

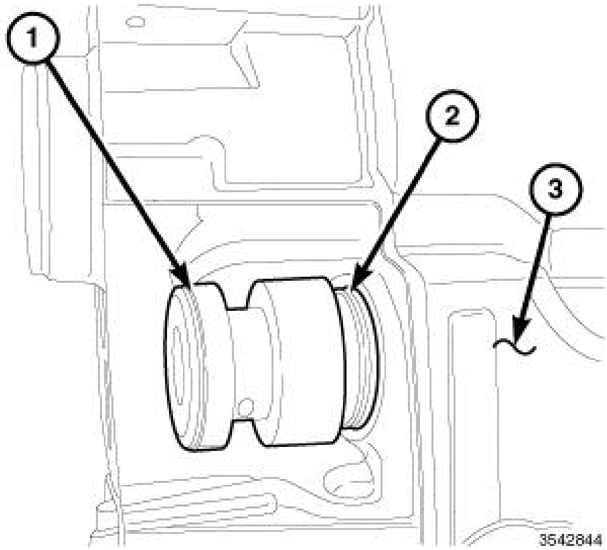


Fig. 125: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

6. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully install the electrical harness insulator (2) to the transmission case (3).

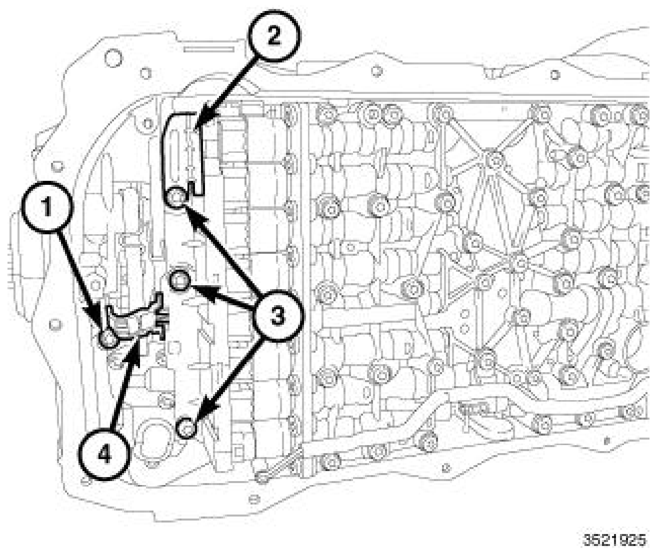


Fig. 126: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Lock the electrical connector lock (2) to the internal harness end.
8. Install the Output Speed Sensor (OSS) (4) to the case install the retaining bolt (1) and tighten to the proper **SPECIFICATIONS** .

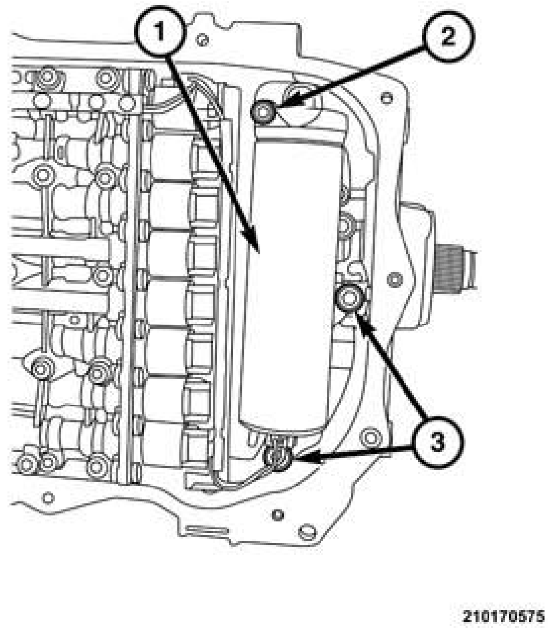


Fig. 127: Hydraulic Impulse Storage Unit & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. If equipped, install the Hydraulic Impulse Oil Storage (HIS) accumulator (1).
10. Tighten the bolts (2 and 3) to the proper SPECIFICATIONS .
11. Connect the HIS electrical connector.
12. Install the valve body assembly end retainer bolts (3) and hand tighten.

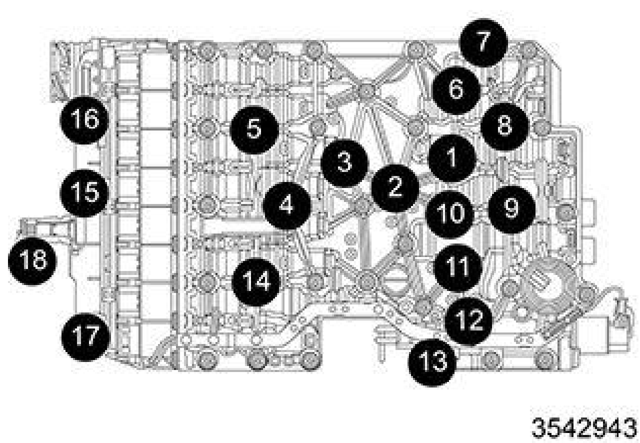


Fig. 128: Valve Body Bolts Loosening And Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

13. Tighten the valve body fasteners to the proper SPECIFICATIONS in the sequence shown.

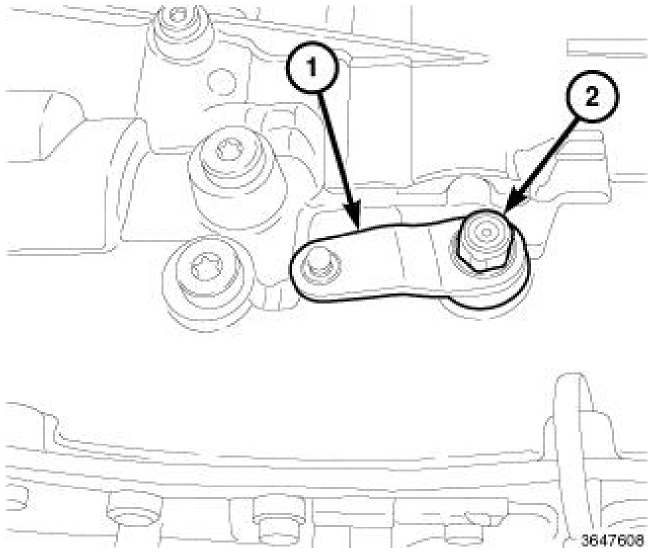


Fig. 129: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

14. Remove the tie strap and return the Manual Park Release (MPR) lever (1) to the original position, tighten the fastener (2) to the proper **SPECIFICATIONS** .

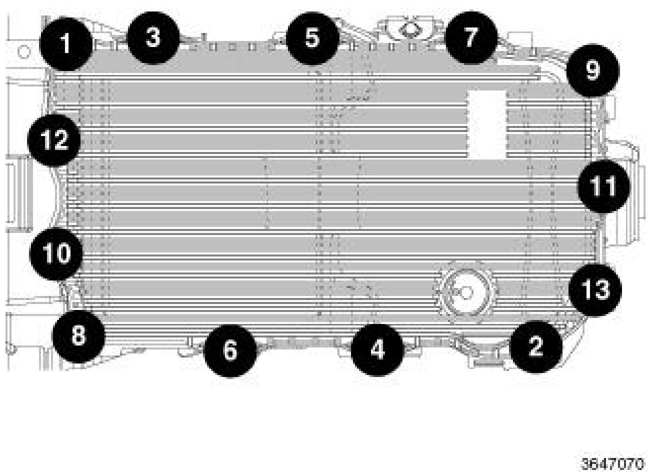


Fig. 130: Oil Pan Retaining Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

15. Install the oil pan and gasket.
16. Install the thirteen oil pan retaining bolts and tighten the fasteners to the proper **SPECIFICATIONS** in the sequence shown.

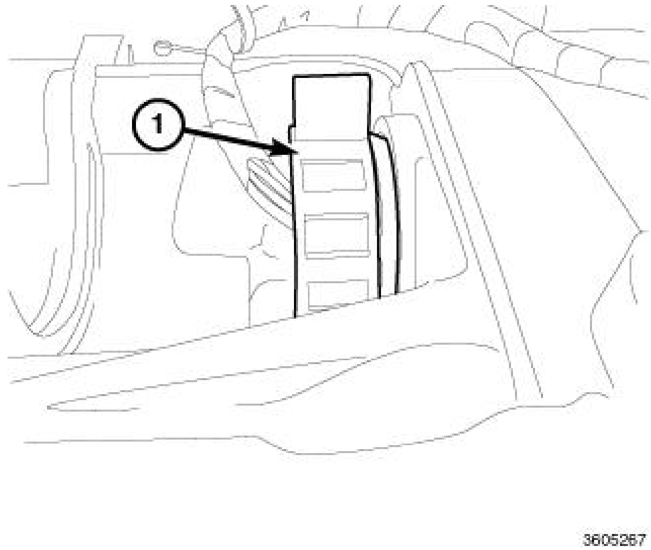


Fig. 131: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

17. Connect the transmission wire harness connector (1).

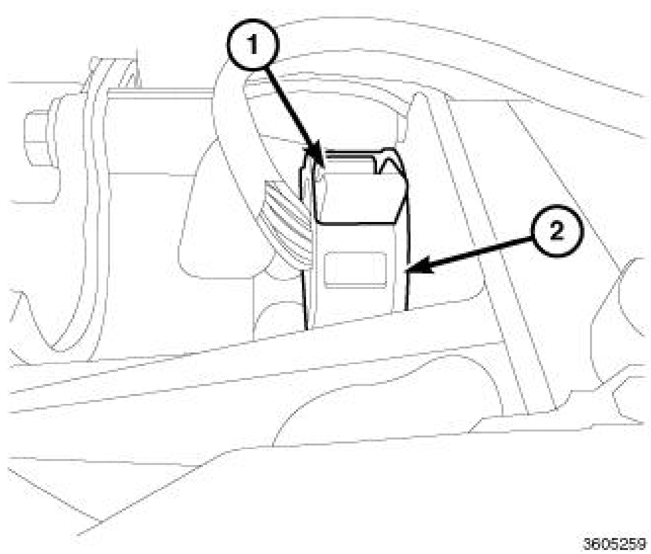


Fig. 132: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

18. Turn the locking mechanism (1) of the transmission wire harness connector (2) clockwise to lock it in place.
19. If the valve body is replaced, program the TCM. Refer to **MODULE, TRANSMISSION CONTROL, MODULE PROGRAMMING**.
20. Perform the TRANSMISSION FILL AFTER SERVICE procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .
21. Perform the TRANSMISSION VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

INSTALLATION 8HP90

CAUTION: The Transmission Control Module (TCM), or Transmission Control Module

Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

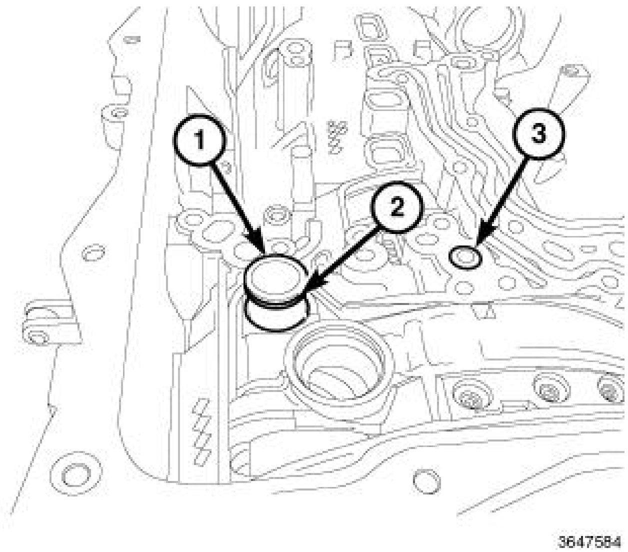


Fig. 133: Fluid Port, Two O-Rings, Compression Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install the fluid port (1) with **NEW** O-rings (2) and seal (3) to the valve body.

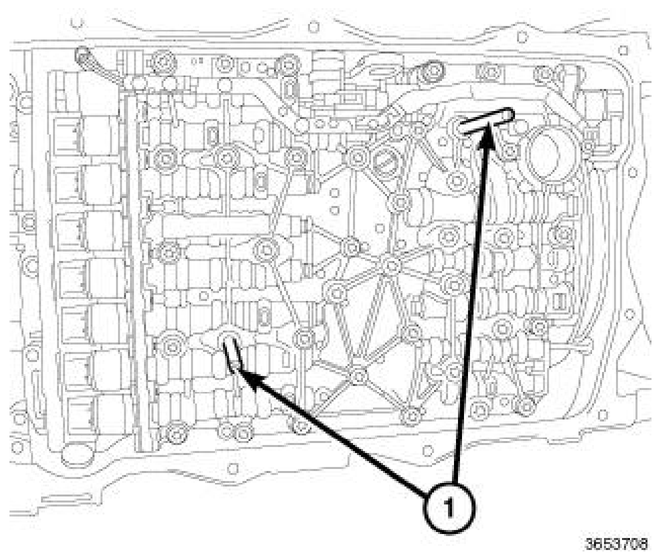
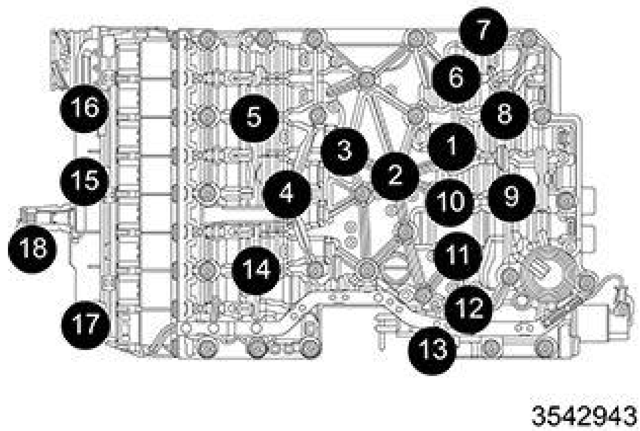


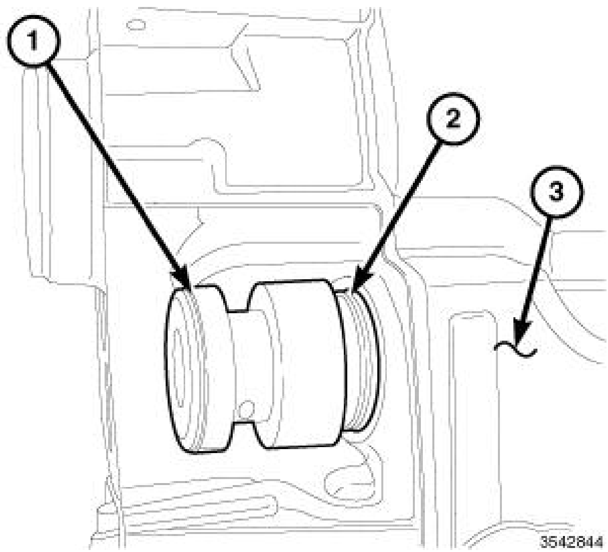
Fig. 134: Valve Body Alignment Pins
Courtesy of CHRYSLER GROUP, LLC

2. Install the valve body assembly to the transmission using the previously installed (1) (special tool #10379, Pins, Valve Body Alignment) as a guide.
3. Use an appropriate tool on one of the alignment pins to assist in holding the valve body in position while installing the remaining fasteners.



[Fig. 135: Valve Body Bolts Loosening And Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

4. Install the valve body assembly bolts not including 16-18 and hand tighten.
5. Remove the pins and install the remaining bolts.



[Fig. 136: Remover/Installer, Guide Sleeve, Electrical Harness Insulator & Transmission Case]
Courtesy of CHRYSLER GROUP, LLC

6. Using (special tool #10377, Remover/Installer, Guide Sleeve) (1) carefully install the electrical harness insulator (2) to the transmission case (3).

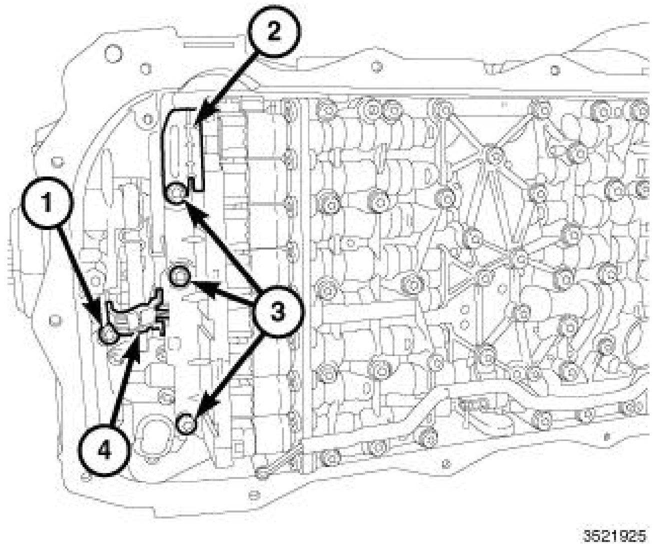


Fig. 137: Valve Body Assembly End Retainer Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Lock the electrical connector lock (2) to the internal harness end.
8. Install the speed sensor (4) to the case install the speed sensor bolt (1) and tighten to the proper **SPECIFICATIONS** .

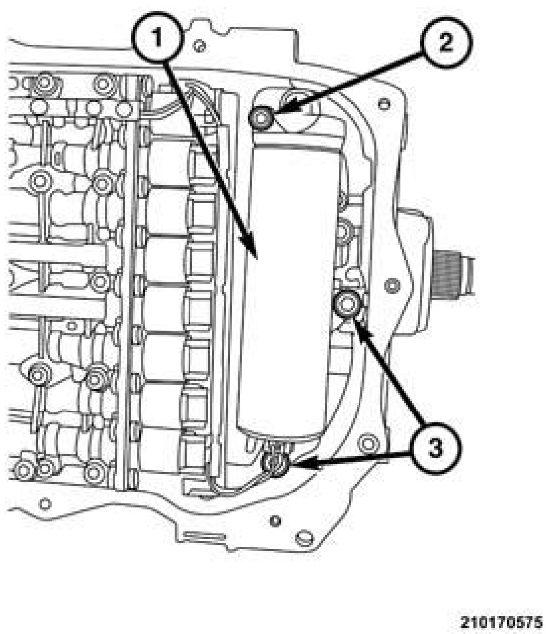


Fig. 138: Hydraulic Impulse Storage Unit & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. If equipped, install the Hydraulic Impulse Oil Storage (HIS) accumulator (1).
10. Tighten the bolts (2 and 3) to the proper **SPECIFICATIONS** .
11. Connect the HIS wire harness connector.
12. Install the valve body assembly end bolts (3) and hand tighten.

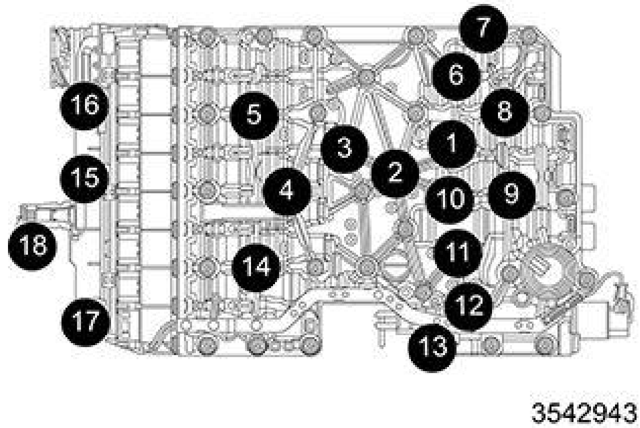


Fig. 139: Valve Body Bolts Loosening And Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

13. Tighten the valve body bolts in the sequence shown to 6 Nm (53 in.-lbs.).

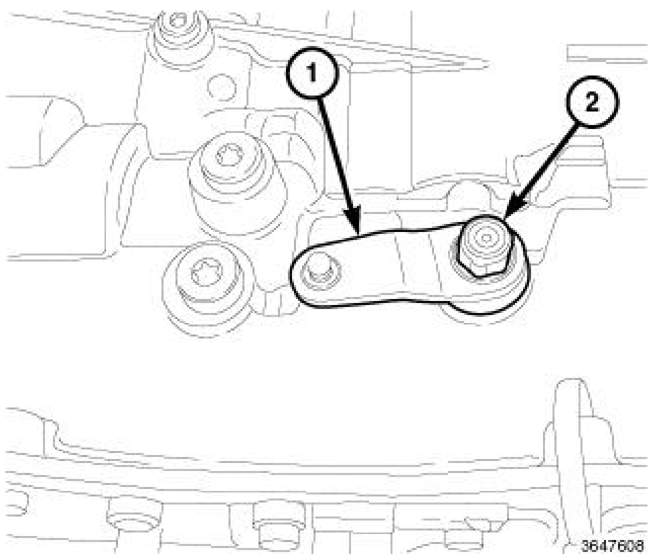


Fig. 140: Manual Park Release Lever Retaining Nut & Lever
Courtesy of CHRYSLER GROUP, LLC

14. Remove the tie strap and return the Manual Park Release (MPR) lever (1) to the original position, tighten the MPR lever nut (2) to the proper **SPECIFICATIONS** .

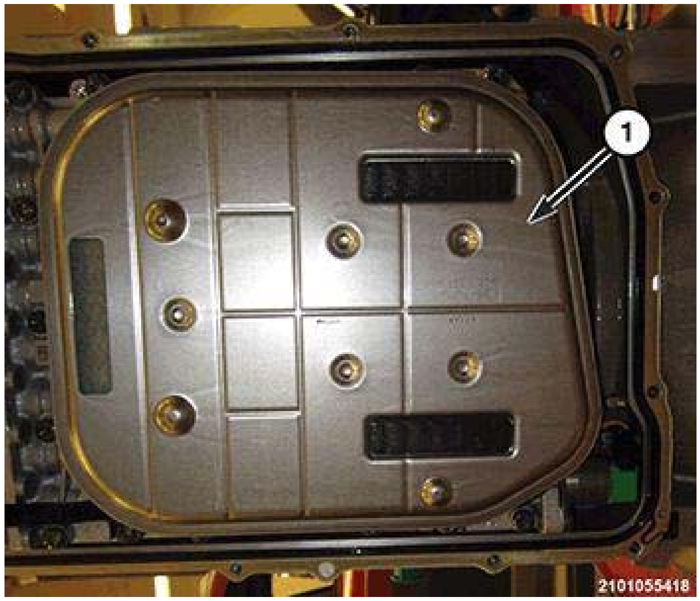


Fig. 141: Transmission Oil Filter
Courtesy of CHRYSLER GROUP, LLC

15. Install the transmission oil filter (1).

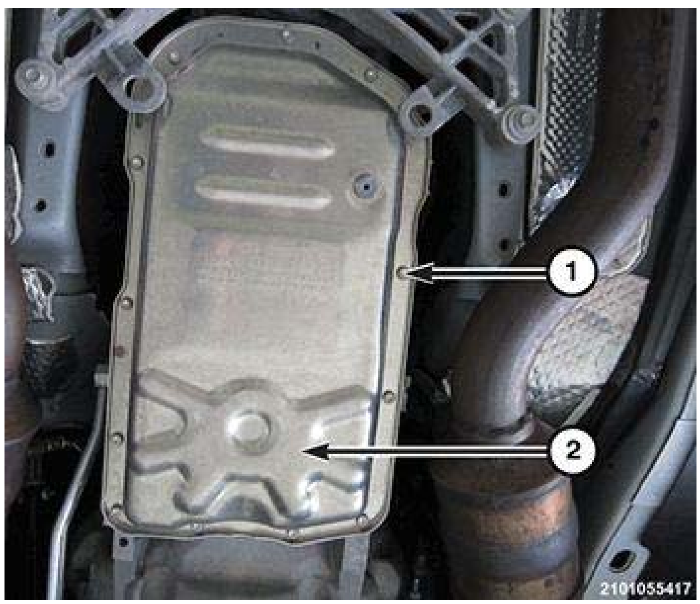


Fig. 142: Transmission Oil Pan & Bolts
Courtesy of CHRYSLER GROUP, LLC

16. Install the transmission oil pan gasket, the oil pan (2) and the bolts (1).

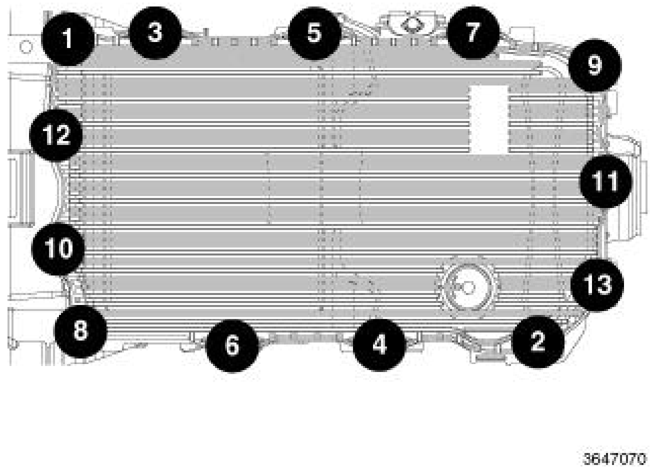


Fig. 143: Oil Pan Retaining Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

17. Tighten the transmission oil pan bolts to 10 Nm (89 in.-lbs.) in the sequence shown.

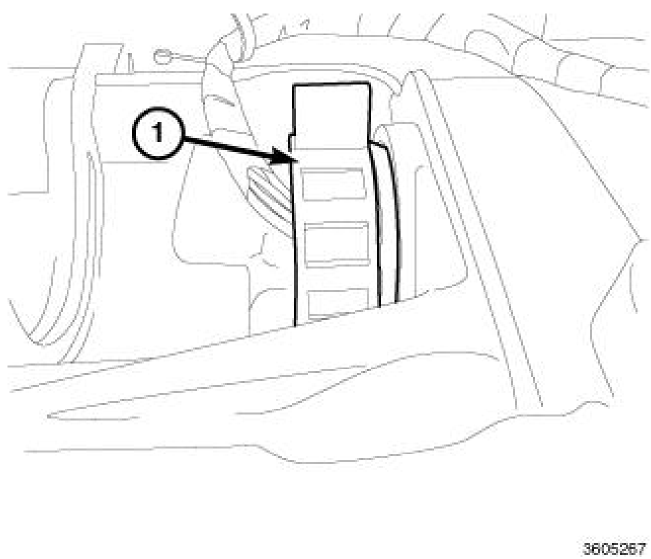


Fig. 144: Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

18. Connect the transmission wire harness connector (1).

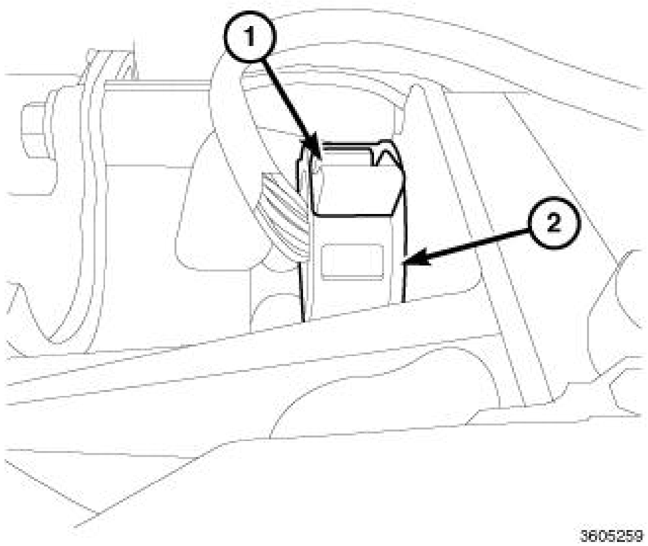


Fig. 145: Locking Mechanism Lock & Adapter Plug Connector
Courtesy of CHRYSLER GROUP, LLC

19. Turn the locking mechanism (1) of the transmission wire harness connector clockwise to lock it in place.
20. If the valve body is replaced, program the TCM. Refer to **STANDARD PROCEDURE** .
21. Perform the TRANSMISSION FILL AFTER SERVICE procedure. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .
22. Perform the TRANSMISSION VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

MODULE PROGRAMMING

PROGRAMMING THE TRANSMISSION CONTROL MODULE (TCM)

PROGRAMMING THE TRANSMISSION CONTROL MODULE (TCM)

NOTE: **New Transmission Control Modules (TCMs) are supplied with generic software. When replacing a TCM, it must be programmed with vehicle specific software.**

NOTE: **Failure to properly program the TCM will cause DTC(s) to be set.**

1. The following conditions must be met during the reprogramming procedure:
   - Battery must be maintained between 10 and 16 volts. Connect a battery charger if necessary.
   - Ambient temperature must be between 0Ā°C (32Ā°F) 60Ā°C (140Ā°F).
   - Gear Selector must be in PARK.
2. With the scan tool and Dealer Connect, download the appropriate TCM flash file to the scan tool.
3. Turn the ignition on.
4. Following the menu on the scan tool, program the TCM.
5. Perform the TCM ADAPTATION procedure. Refer to **MODULE, TRANSMISSION CONTROL, MODULE PROGRAMMING**.
6. Perform the TRANSMISSION VERIFICATION TEST. Refer to **STANDARD PROCEDURE** - 8HP45/845RE, **STANDARD PROCEDURE** - 8HP70 or **STANDARD PROCEDURE** - 8HP90 .

TRANSMISSION CONTROL MODULE (TCM) ADAPTATION - 8HP45 / 845RE / 8HP70 / 8HP90

The TCM or Transmission Control Module Assembly (TCMA) controls the fluid pressure and fill time of each clutch pack to give optimal shift quality. As the clutches wear, the TCM or TCMA will adapt and make adjustments to keep the shift quality consistent over the life of the vehicle. The initial clutch filling pressure and fill times are set at the factory. When a transmission assembly or transmission component is replaced, or when the adaptation values are reset, the adaptation values must be relearned. This procedure should also be followed when it is suspected that a vehicle has not been driven in a manner that encourages clutch adaptation learning in highway or city driving conditions.

NOTE: **The scan tool for some 8-Speed Transmissions now has a QUICK LEARN routine. If the QUICK LEARN routine is available on the scan tool for the application you are working on, then the TCM ADAPTATION PROCEDURES below do not need to be performed.**

QUICK LEARN PROCEDURE

NOTE: **2015 model year vehicles equipped with the 845RE (Sales Code DFL) already contain software in the TCM to enable the Quick Learn procedure. However, 2014 model year vehicles with the 845RE require the Transmission Control Module to be updated to the latest software level.**

NOTE: **The scan tool software must be at the newest revision to perform this procedure.**

NOTE: **The QUICK LEARN PROCEDURE requires that the Transmission fluid temperature be at least 55Ā°C (131Ā°F).**

1. Drive the vehicle briefly to ensure all clutches have been engaged at least twice. Keep the engine running throughout the remainder of this procedure.
2. With the scan tool, activate the RESET ADAPTIVE VALUES routine.
3. With the scan tool, activate the QUICK LEARN routine and follow the on-screen instructions. This procedure requires about 2-5 minutes to complete.

TCM ADAPTATION PROCEDURES

The two procedures to relearn these values are called Fast Filling Adaptation and Standard Clutch Filling Adaptation. Depending on the repair or complaint, one or both procedures must be performed as described below.

NOTE: **Performing a reset of the Transmission Adaptation values does not automatically trigger the TCM to relearn the Adaptation values. If a reset is performed, both procedures must be performed to restore optimal shift quality. Do not reset these values unless specifically instructed to do so.**

NOTE: **This procedure does not need to be performed if the existing TCM or TCMA is re-flashed and that was the only repair performed.**

One or both TCM Adaptation procedures should be performed depending on the situation. Failure to perform these procedures when required could cause shift quality issues.

Fast Filling Adaptation Procedure

Perform the following procedure when the TCM or TCMA, or Transmission assembly (with TCMA) has been replaced, or when the adaptation values have been reset. This procedure should be performed before performing the Standard Clutch Filling Adaptation Procedure when these components are replaced.

NOTE: Perform this procedure on a smooth road surface. The TCM or TCMA will abort the adaptation process if it senses rough road conditions. The road should be clear of traffic due to the start, stop, and slow vehicle speeds required during this procedure.

1. With the Scan Tool, erase Diagnostic Trouble Codes (DTCs).
2. Setup the scan tool to display the Transmission Oil Temperature, Torque, Turbine (Input) Speed Sensor RPM, and Clutch 'X' - Filling Counter for each clutch.
3. Drive the vehicle until the Transmission Oil Temperature is above 30Ā° C (86Ā° F).
4. Stop the vehicle.
5. Drive the vehicle to perform upshifts for all gears under the following conditions:
   - Light to medium throttle position
   - Turbine (Input) Speed between 1, 250 - 2, 000 RPM
   - Torque between 100 N.m and 150 N.m (74 ft. lbs. and 111 ft. lbs.)
6. Release the throttle (0% position) to coast and allow a 6-5 down-shift.
7. Perform steps 4-6 until the Filling Counters for each clutch displays 10 counts.

   The tables below may be used as an alternate reference for the optimal conditions required to learn the Fast Filling Adaptations.

FAST FILLING ADAPTATION CONDITIONS TABLE

Conditions Where Fast Filling Adaptations Occur			
Condition	**Transmission Temperature**	**Torque N.m (ft. lbs.)**	**Input Speed (RPM)**
Upshifts	Between 30Ā° C and 100Ā° C (86Ā° F and 212Ā° F)	Between 100 N.m and 150 N.m (74 ft. lbs. and 111 ft. lbs.)	Between 1250 and 2000 RPM
6-5 Downshifts for B Clutch	Between 30Ā° C and 100Ā° C (86Ā° F and 212Ā° F)	Between negative (-) 60 N.m and negative (-) 40 N.m (negative (-) 44 ft. lbs. and negative (-) 30 ft. lbs.)	Between 750 and 1100 RPM

CLUTCH VS SHIFT TABLE

Shifts Where Each Clutch Will Fast Adapt					
Ā	**A Clutch**	**B Clutch**	**C Clutch**	**D Clutch**	**E Clutch**
Shift	6 - 7	6 - 5	2 - 3 and 4 - 5	3 - 4	1 - 2 and 5 - 6
Optimal conditions under which adaptation	Best performed at highway speeds in excess of 80 kph (50	Coasting with throttle at 0% position.	Best performed at light to medium-throttle - normal vehicle	Best performed at light to medium-throttle - normal vehicle	Best performed at light to medium-throttle - normal vehicle

Shifts Where Each Clutch Will Fast Adapt					
Ā	A Clutch	B Clutch	C Clutch	D Clutch	E Clutch
learning occurs.	mph).		launch.	launch.	launch.

8. Perform the Standard Clutch Filling Adaptation Procedure.

Standard Clutch Filling Adaptation Procedure

Perform the following procedure when a Transmission internal component, Torque Converter, TCM or TCMA, or Transmission has been replaced, or when the adaptation values have been reset. This procedure should also be performed if it is suspected that the vehicle has not been driven in a manner that encourages clutch adaptation learning in highway or city driving conditions.

NOTE: **Perform this procedure on a smooth road surface. The TCM or TCMA will abort the adaptation process if it senses rough road conditions. The road should be clear of traffic due to the start, stop, and slow vehicle speeds required during the procedure.**

NOTE: **The TCM learns the Standard Clutch Filling Adaptation values when the applicable clutch is not applied.**

1. With the Scan Tool, erase DTCs.
2. Setup the scan tool to display the Transmission Oil Temperature, Torque, Turbine (Input) Speed Sensor RPM, and Clutch 'X' - Fast Filling Counter for each clutch.
3. Drive the vehicle until the Transmission Oil Temperature is above 50Ā° C (122Ā° F).

   NOTE: **Adaptation learning will be aborted if the Transmission Oil Temperature is above 100Ā° C (212Ā° F).**

4. Stop the vehicle.
5. Drive the vehicle using the paddle shifters or Gear +/- buttons on steering wheel in order to hold the transmission in the desired gear.

   NOTE: **First and second gears do not require a Standard Clutch Filling Adaptation procedure.**

   NOTE: **If attempting to resolve a specific shift quality issue, use the Gear vs Clutch Table below to see which clutches require further adaptation. For instance, if a rough 2-1 downshift is noted, note that clutch C and clutch E are applying and releasing. Then use the Clutch vs Shift Table above to note that clutch C and clutch E require the adaptation procedure performed in 4th and 7th gear.**

6. In 3rd gear, drive the vehicle within the following conditions until the Clutch D - Fast Filling Counter increments by one count:
   - Vehicle speed between 32-56 kph (20-35 mph)
   - Turbine (Input) speed between 950 - 1750 RPM

- Torque between 25 N.m - 180 N.m (18 ft. lbs. - 133 ft. lbs.)

7. In fourth gear, drive the vehicle within the following conditions until the Clutch C - Fast Filling Counter increments by one count:
   - Vehicle speed between 32-56 kph (20-35 mph)
   - Turbine (Input) speed between 950 - 1750 RPM
   - Torque between 25 N.m - 120 N.m (18 ft. lbs. - 89ft. lbs.)

NOTE: Fifth gear does not require a Standard Clutch Filling Adaptation procedure.

8. In sixth gear, drive the vehicle within the following conditions until the Clutch A - Fast Filling Counter increments by one count:
   - Vehicle speed between 73-81 kph (45-50 mph)
   - Turbine (Input) speed between 950 - 1750 RPM
   - Torque between 50 N.m - 120 N.m (37 ft. lbs. - 89ft. lbs.)
9. In seventh gear, drive the vehicle within the following conditions until the Clutch B- Filling Counter and Clutch E Fast Filling Counter each increment by one count:
   - Vehicle speed between 73-81 kph (45-50 mph)
   - Turbine (Input) speed between 950-1750 RPM
   - Torque between 50 N.m-120 N.m (37 ft. lbs.-89ft. lbs.)

The **Standard Clutch Filling Adaptation Conditions Table** below may be used as an alternate reference for the optimal conditions required to learn the Standard Clutch Filling Adaptations.

STANDARD CLUTCH FILLING ADAPTATION CONDITIONS TABLE

Steady State Gears And Conditions Where Each Clutch Will Adapt					
Clutch	**Gear**	**Optimal Vehicle Speed**	**Input Speed (RPM)**	**Torque N.m (ft. lbs.)**	**Transmission Temperature**
A Clutch	6th	73-81 kph (45-50 mph).	Between 950 and 1750 RPM	Between 50 N.m and 120 N.m (37 ft. lbs. and 89 ft. lbs.)	Between 50Ā° C and 100Ā° C (122Ā° F and 212Ā° F)
B Clutch	7th	73-81 kph (45-50 mph).	Between 950 and 1750 RPM	Between 50 N.m and 120 N.m (37 ft. lbs. and 89 ft. lbs.)	Between 50Ā° C and 100Ā° C (122Ā° F and 212Ā° F)
C Clutch	4th	32-56 kph (20-35 mph).	Between 950 and 1750 RPM	Between 25 N.m and 120 N.m (18 ft. lbs. and 89 ft. lbs.)	Between 50Ā° C and 100Ā° C (122Ā° F and 212Ā° F)
D Clutch	3rd	32-56 kph (20-35 mph).	Between 950 and 1750 RPM	Between 25 N.m and 180 N.m (18 ft. lbs. and 133 ft. lbs.)	Between 50Ā° C and 100Ā° C (122Ā° F and 212Ā° F)

Steady State Gears And Conditions Where Each Clutch Will Adapt					
Clutch	**Gear**	**Optimal Vehicle Speed**	**Input Speed (RPM)**	**Torque N.m (ft. lbs.)**	**Transmission Temperature**
E Clutch	7th	73-81 kph (45-50 mph).	Between 950 and 1750 RPM	Between 50 N.m and 120 N.m (37 ft. lbs. and 89 ft. lbs.)	Between 50Ā° C and 100Ā° C (122Ā° F and 212Ā° F)

10. Perform steps 4-9 until the Fast Filling Counters for each clutch has incriminated by at least five counts.
11. Evaluate shift performance for all gears. If the shift quality for any gear is insufficient, execute the appropriate driving conditions until shift quality improves. Incrementing the Fast Filling Counters by 12 counts for each clutch may be necessary to properly learn the adaptation values.

The following table Controller Area Network (CAN) be used to determine which clutches are involved in a specific up-shift or down-shift quality issue. 'X' indicates when a clutch is applied. The Standard Clutch Filling Adaptation learning occurs when the applicable clutch is not applied and the transmission is in a steady state (not shifting).

GEAR VS CLUTCH TABLE

Gear	Clutch A	Clutch B	Clutch C	Clutch D	Clutch E
1st	X	X	X	Ā	Ā
2nd	X	X	Ā	Ā	X
3rd	Ā	X	X	Ā	X
4th	Ā	X	Ā	X	X
5th	Ā	X	X	X	Ā
6th	Ā	Ā	X	X	X
7th	X	Ā	X	X	Ā
8th	X	Ā	Ā	X	X
Reverse	X	X	Ā	X	Ā

Read the information below for details regarding this procedure.

Reading Clutch Adaptation Data

The Clutch Packs will each have 4 scan tool data labels to observe under the TCM section. Using Clutch A as an example, the data labels are:

- **Clutch A- Fast Filling Counter:** This data label displays the number of Clutch Filling Pressure adaptations that have been performed. These adaptations are the first learned values on a new transmission or after clutch adaptation values are reset. You will need to allow 5 to 12 fast filling counts per clutch to properly learn the clutch adaptations. If the shift quality is sufficient after 5 counts, no further adaptation learns for that clutch are necessary.
- **Clutch A- Filling Counter:** This data label displays the number of Clutch Filling Time adaptations that have been performed. You will need to allow 5 to 12 filling counts per clutch to properly learn the clutch adaptations. If the shift quality is sufficient after 5 counts, no further adaptation learns for that clutch are necessary.
- **Clutch A- Filling Pressure:** This data label displays the clutch filling pressure value that is learned during

the TCM Adaptation procedure. The TCM adaptation software will increase or decrease the clutch fluid filling pressure to improve shift performance. The clutch Filling Pressure value will change over the life of the transmission based first on initial transmission build variation and then due to normal clutch wear.

- **Clutch A- Filling Time:** This data label displays the clutch filling time value that is learned during the TCM Adaptation procedure. The TCM adaptation software will increase or decrease the Clutch Filling Time to improve shift performance. The clutch Filling Time value will change over the life of the transmission based first on initial transmission build variation and then due to normal clutch wear.

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Article GUID: A00735852

2015-16 STEERING

Electronic Power Steering (EPS) Module - Electrical Diagnostics - Dodge Challenger

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
C15C1-00	EPS MECHANICAL PERFORMANCE
C15DB-00	EPS DISABLED
C2129-16	C2129-16 BATTERY VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
C2129-17	C2129-17 BATTERY VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-84	C212A-84 SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE
C212A-85	C212A-85 SYSTEM VOLTAGE-SIGNAL ABOVE ALLOWABLE RANGE
C2206-00	VEHICLE CONFIGURATION MISMATCH
C2210-00	C2210-00 ECU OVERTEMPERATURE
C2217-00	ELECTRIC POWER STEERING MODULE INTERNAL
C2219-00	ECU UNABLE TO CONFIGURE/CONFIGURATION NOT LEARNED
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0212-00	LOST COMMUNICATION WITH SCM
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0415-00	IMPAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE
U1215-00	LOST COMMUNICATION WITH FORWARD FACING CAMERA
U1415-00	IMPLAUSIBLE/MISSING VEHICLE CONFIGURATION DATA
U1447-00	IMPLAUSIBLE DATA RECEIVED FROM SCM
U148D-00	IMPLAUSIBLE DATA RECEIVED FROM FORWARD FACING CAMERA
U1601-00	ECU APPLICATION SOFTWARE CODE 1 MISSING OR CORRUPTED

DIAGNOSIS AND TESTING

C15C1-00-EPS MECHANICAL PERFORMANCE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- Vehicle speed above 30 km/h (19 mph).

SET CONDITION

- Electric Power Steering (EPS) Module detects high friction in the steering system when requesting a motor torque change and rotor positioning is not responding within two seconds.

DEFAULT ACTION

- EPS is disabled.

POSSIBLE CAUSES

Possible Causes
SUSPENSION DAMAGE OR MECHANICAL FAILURE
STEERING GEAR IMPROPERLY INSTALLED, DAMAGED OR MECHANICAL FAILURE
ELECTRIC POWER STEERING (EPS) MODULE

DIAGNOSTIC TEST

1. **INSPECT THE FRONT SUSPENSION FOR DAMAGE OR MECHANICAL FAILURE**
   1. Turn the ignition off.
   2. Visually inspect the Front Suspension for binding, damage or mechanical failure. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 2
2. **INSPECT THE STEERING GEAR FOR INCORRECT INSTALLATION, DAMAGE OR MECHANICAL FAILURE**

   NOTE: **Pay particular attention to the inner tie rod boots for damage.**

   1. Visually inspect the Steering Gear for Improper installation, damage or mechanical failure. Refer to **GEAR, INSTALLATION** .

      Were there any problems found?

Yes

- Repair as necessary.
- Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK FOR AN ACTIVE DTC**

NOTE: **This DTC must be active for the results of this test to be valid.**

1. Turn the ignition on.
2. With the scan tool, read DTCs and record on vehicle work order.
3. With the scan tool, erase DTCs.
4. Test drive the vehicle at road speeds above 30 k/mh (19 mph) and evaluate return effort of power steering.
5. Park the vehicle.
6. With the scan tool, read EPS DTCs.

Is there excessive return effort in the power steering or is the DTC active at this time?

Yes

- Replace the Electric Power Steering (EPS) Module in accordance with Service Information. Refer to **GEAR, REMOVAL** .
- Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension and repair as necessary. If no problems are found, test complete.
- Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C15DB-00-EPS DISABLED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.

SET CONDITION

- DTC C15C1-00 or DTC C2217-00 has set multiple times.

DEFAULT ACTION

- EPS is disabled.
- Power Steering assist is turned off on the next key cycle.

POSSIBLE CAUSES

Possible Causes
ELECTRIC POWER STEERING (EPS) MODULE

DIAGNOSTIC TEST

CHECK FOR AN ACTIVE DTC

NOTE: **If DTC C15C1-00 or C2217-00 are present, refer to the diagnostics for these DTCs before continuing with this diagnostic procedure.**

NOTE: **This DTC must be active for the results of this test to be valid.**

NOTE: **Make sure the ambient temperature of the vehicle is above -40Â°C (-40Â°F)**

1. Turn the ignition on.
2. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
3. With the scan tool, read DTCs and record on vehicle work order.
4. With the scan tool, erase DTCs.
5. Test drive the vehicle at speeds above 30 k/mh (19 mph).
6. Park the vehicle.
7. With the scan tool, read EPS DTCs.

   Is the DTC active?

   Yes

   - Replace the Electric Power Steering (EPS) Module in accordance with service information. Refer to GEAR, REMOVAL .
   - Perform the EPS VERIFICATION TEST. Refer to STANDARD PROCEDURE.

   No

   - The conditions that caused this code to set are not present at this time. Using the wiring diagram/schematic as a guide, inspect the wiring harness and electrical connectors.
   - Perform the EPS VERIFICATION TEST. Refer to STANDARD PROCEDURE.

C2129-16 BATTERY VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

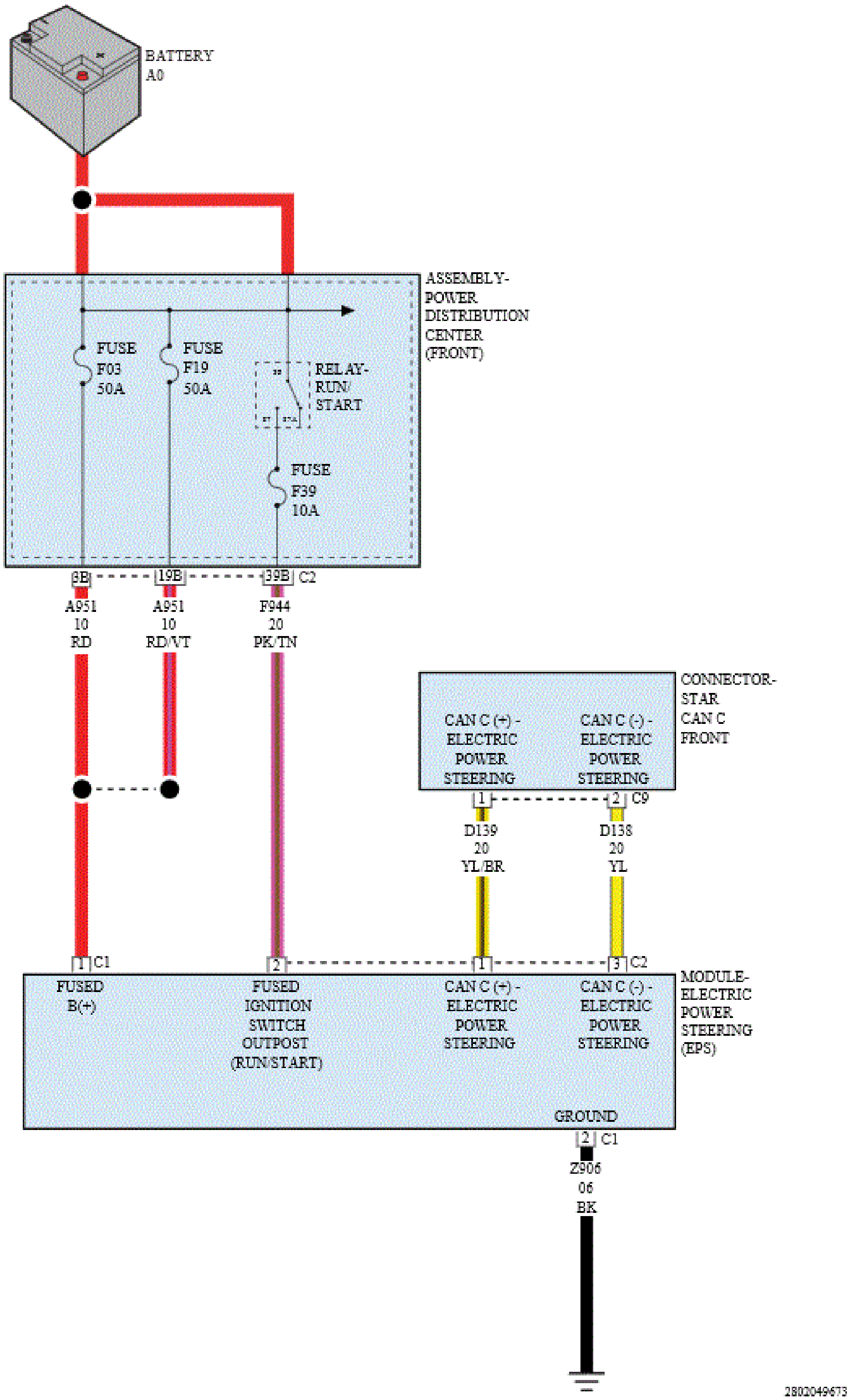

Fig. 1: Electric Power Steering Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.

SET CONDITION

- Electric Power Steering (EPS) Module supply voltage below 10.0 volts.

DEFAULT ACTION

- EPS Module supply voltage below 10.0 volts:
    - Power Steering assist reduced.
    - EPS lamp not illuminated.
- EPS Module supply voltage below 9.0 volts:
    - No Power Steering assist.
    - EPS lamp illuminated.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM
(A951) B(+) CIRCUIT OPEN OR HIGH RESISTANCE
(Z906) GROUND CIRCUIT OPEN OR HIGH RESISTANCE
ELECTRIC POWER STEERING (EPS) MODULE

DIAGNOSTIC TEST

1. **CHARGING SYSTEM DTCS PRESENT**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs in the PCM.

    Is there any Charging System or related voltage DTCs present?

    Yes

    - Perform the appropriate diagnostic procedure. Refer to **DTC INDEX** .

    No

    - Go To 2
2. **CHECK FOR AN ACTIVE DTC**

    NOTE: **Make sure the battery is fully charged.**

    1. Turn the ignition on.
    2. With the scan tool, read DTCs and record on vehicle work order.
    3. With the scan tool, erase DTCs.

4. Start the engine.
5. With the scan tool, read the DTCs while turning the steering wheel from stop to stop.

   Is the DTC active?

   Yes

   - Go To 3

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.

3. **(A951) B(+) CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Turn ignition off.
   2. Disconnect the EPS Module C1 harness connector.
   3. Turn the ignition on.

   NOTE: **Wiggle test the wiring harness and electrical connectors while testing the circuit.**

   NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

   4. With a 12-volt test light connected to ground, check the (A951) Fused B+ circuit at the EPS C1 harness connector.

   Does the test light illuminate brightly?

   Yes

   - Go To 4

   No

   - Repair the (A951) Fused B+ circuit for an open or high resistance.
   - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

4. **(Z906) GROUND CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Turn ignition off.

   NOTE: **Wiggle test the wiring harness and electrical connectors while testing the circuit.**

   2. With a test light connected to B+ check (Z906) Ground circuit at the EPS Module C1 harness connector.

   Does the test light illuminate brightly?

Yes

- Replace the Electric Power Steering (EPS) Module in accordance with the service information. Refer to **GEAR, REMOVAL** .
- Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Repair the (Z906) Ground circuit for an open or high resistance.
- Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2129-17 BATTERY VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.

SET CONDITION

- Electric Power Steering (EPS) Module detects the battery voltage has increased above 16.5 volts for more than 1 second.

DEFAULT ACTION

- EPS is disabled.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM DTCS PRESENT
ELECTRIC POWER STEERING (EPS) MODULE

DIAGNOSTIC TEST

1. **CHARGING SYSTEM DTCS PRESENT**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs in the PCM.

    Are there any Charging System or related voltage DTCs present?

    Yes

    - Perform the appropriate Charging System DTC diagnostic procedures before continuing with this test. Refer to **DTC INDEX** .

    No

- Go To 2

2. **CHECK FOR AN ACTIVE DTC**

NOTE: This DTC must be active for the results of this test to be valid.

1. Turn the ignition on.
2. With the scan tool, read DTCs and record on vehicle work order.
3. With the scan tool, erase DTCs.
4. Start the engine.
5. With the scan tool, read EPS DTCs.

Is the DTC active?

Yes

- Replace the Electric Power Steering (EPS) Module in accordance with the service information. Refer to **GEAR, REMOVAL** .
- Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.
- Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C212A-84 SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

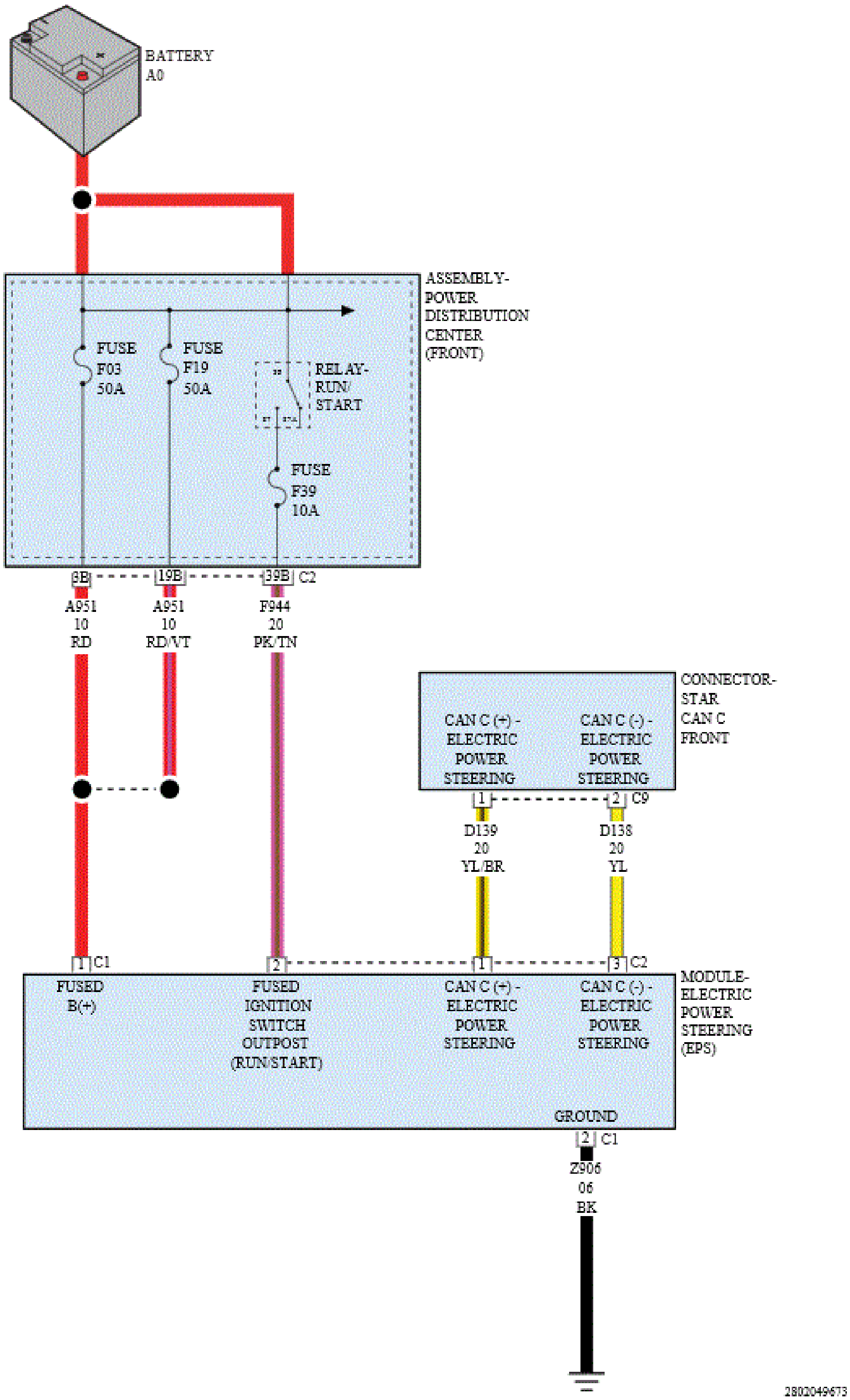

Fig. 2: Electric Power Steering Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.

SET CONDITION

- Electric Power Steering (EPS) Module receives a message over the CAN bus that battery voltage has decreased below 10.0 volts.

DEFAULT ACTION

- Electric Power Steering (EPS) Module operates correctly and stores the DTC.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM VOLTAGE LOW
ELECTRIC POWER STEERING (EPS) MODULE

DIAGNOSTIC TEST

1. **CHARGING SYSTEM DTCS PRESENT**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs in the PCM.

    Is there any Charging System or related voltage DTCs present?

    Yes

    - Perform the appropriate diagnostic procedure. Refer to **DTC INDEX** .

    No

    - Go To 2
2. **CHECK FOR AN ACTIVE DTC**

    NOTE: **Make sure the battery is fully charged.**

    1. Turn the ignition on.
    2. With the scan tool, read DTCs and record on vehicle work order.
    3. With the scan tool, erase DTCs.
    4. Start the engine.
    5. Turn the steering wheel from stop to stop.
    6. Turn the ignition off.
    7. Turn the ignition on.
    8. With the scan tool, read EPS DTCs.

    Is the DTC active?

Yes

- Replace the Electric Power Steering (EPS) Module in accordance with the service information. Refer to **GEAR, REMOVAL** .
- Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time.

C212A-85 SYSTEM VOLTAGE-SIGNAL ABOVE ALLOWABLE RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.

SET CONDITION

- Electric Power Steering (EPS) Module receives a message over the CAN bus that battery voltage has increased above 16.0 volts for more than 15 seconds.

DEFAULT ACTION

- Electric Power Steering (EPS) Module operates correctly and stores the DTC.

POSSIBLE CAUSES

Possible Causes
CHARGING SYSTEM DTCS PRESENT
CHARGING SYSTEM VOLTAGE HIGH
ELECTRIC POWER STEERING (EPS) MODULE

DIAGNOSTIC TEST

1. **CHARGING SYSTEM DTCS PRESENT**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs in the PCM.

    Are there any Charging System or related voltage DTCs present?

    Yes

    - Perform the appropriate Charging System DTC diagnostic procedures before continuing with this test. Refer to **DTC INDEX** .

No

- Go To 2

2. **CHECK THE BATTERY**

NOTE: Make sure the Battery is in good condition.

1. Using the AGM Battery Tester (special tool #GR8-1220KIT-CHRY, AGM Battery Tester/Charger Station), test the Battery before continuing.

   Does the Battery pass the load test for this specific application?

   Yes

   - Go To 3

   No

   - Replace the Battery in accordance with the Service Information. Refer to **BATTERY, REMOVAL** .

3. **CHECK FOR AN ACTIVE DTC**

NOTE: This DTC must be active for the results of this test to be valid.

1. Turn the ignition on.
2. With the scan tool, read DTCs and record on vehicle work order.
3. With the scan tool, erase DTCs.
4. Start the engine.
5. With the scan tool, read EPS DTCs.

   Is the DTC active?

   Yes

   - Replace the Electric Power Steering (EPS) Module in accordance with the service information. Refer to **GEAR, REMOVAL** .
   - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete, the condition or conditions that originally set this DTC are not present at this time.
   - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2206-00-VEHICLE CONFIGURATION MISMATCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- No under voltage DTCs.

SET CONDITION

- Vehicle type is not identified or incorrectly identified.

DEFAULT ACTION

- EPS is disabled.

POSSIBLE CAUSES

Possible Causes
ELECTRIC POWER STEERING (EPS) MODULE
BODY CONTROL MODULE (BCM)

DIAGNOSTIC TEST

1. **CHECK FOR POWERTRAIN CONTROL MODULE (PCM) DTCS**
    1. Turn the ignition on.
    2. With the scan tool, read PCM DTCs.

    Are there any Powertrain Control Module (PCM), Vehicle Identification Number (VIN), or Communication DTCs present?

    Yes

    - Perform the appropriate diagnostic procedure. Refer to **DTC INDEX** .

    No

    - Go To 2
2. **ELECTRIC POWER STEERING (EPS) MODULE**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs and record on the repair order.
    3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
    4. With the scan tool, erase the DTCs.
    5. Cycle the ignition switch from off to on.
    6. With the scan tool, read EPS DTCs.

    Is the DTC active?

    Yes

    - With the scan tool, select BCM under the ECU selection then "Miscellaneous Functions" and

Restore Vehicle Configuration.

No

- Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

C2210-00 ECU OVERTEMPERATURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.

SET CONDITION

- Electric Power Steering (EPS) Module is sensing steering system temperature is above 130Ā°C (266Ā°F).

DEFAULT ACTION

- EPS System has lost partial or full assist.

POSSIBLE CAUSES

Possible Causes
STEERING GEAR MECHANICAL FAILURE
ELECTRIC POWER STEERING (EPS) MODULE

DIAGNOSTIC TEST

1. **INSPECT THE STEERING GEAR FOR INCORRECT INSTALLATION, DAMAGE OR MECHANICAL FAILURE**

   NOTE: **Check with customer for unusual driving terrain (e.g. mud, snow, ice) or aggressive driving maneuvers at the time of set condition.**

   Turn the ignition off.

   1. Visually inspect the Steering Gear for Improper installation, damage or mechanical failure. Refer to **GEAR, INSTALLATION** .

      Were any problems found?

      Yes

      - Repair as necessary.

- Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 2

2. **CHECK FOR AN ACTIVE DTC**

NOTE: **This DTC must be active for the results of this test to be valid.**

NOTE: **Let the vehicle sit for 30 minutes before continuing with this test.**

1. Turn the ignition on.
2. With the scan tool, read DTCs and record on vehicle work order.
3. With the scan tool, erase DTCs.
4. Start the engine.
5. Turn the steering wheel from stop to stop four to five times.
6. With the scan tool, read DTCs.

Is the DTC active?

Yes

- Replace the Electric Power Steering (EPS) Module in accordance with service information. Refer to **GEAR, REMOVAL** .
- Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- The conditions that caused this code to set are not present at this time. Using the wiring diagram/schematic as a guide, inspect the wiring harness and electrical connectors.
- Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2217-00-ELECTRIC POWER STEERING MODULE INTERNAL

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.

SET CONDITION

- Electric Power Steering (EPS) Module detects an internal fault.

DEFAULT ACTION

- EPS System has lost partial or full assist.

POSSIBLE CAUSES

Possible Causes
ELECTRIC POWER STEERING (EPS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
    3. With the scan tool, read DTCs and record on vehicle work order.

    NOTE: Do not erase the DTCs at this time.

    Is the DTC active?

    Yes

    - Replace the Electric Power Steering (EPS) Module in accordance with service information. Refer to **GEAR, REMOVAL** .
    - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 2
2. **VERIFY CUSTOMER COMPLAINT**
    1. Check with customer to verify loss or degradation of power steering assist.

    Was the customer complaint related to a loss or degradation of power steering assist?

    Yes

    - Replace the Electric Power Steering (EPS) Module in accordance with Service Information. Refer to **GEAR, REMOVAL** .
    - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 3
3. **CHECK FOR AN ACTIVE DTC**

    NOTE: This DTC must be active for the results of this test to be valid.

    1. Turn the ignition on.
    2. With the scan tool, read the EPS DTCs.

3. With the scan tool, erase DTCs.
4. Test drive the vehicle at road speeds above 30 k/mh (19 mph).
5. Park the vehicle.
6. With the scan tool, read EPS DTCs.

   Is the DTC active?

   Yes

   - Replace the Electric Power Steering (EPS) Module in accordance with Service Information. Refer to **GEAR, REMOVAL** .
   - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension and repair as necessary. If no problems are found, test complete.
   - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

C2219-00-ECU UNABLE TO CONFIGURE/CONFIGURATION NOT LEARNED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.

SET CONDITION

- If any of the learned Vehicle Configuration data from the CAN Bus has changed.

DEFAULT ACTION

- EPS system has reduced power steering assist.

POSSIBLE CAUSES

Possible Causes
ELECTRIC POWER STEERING (EPS) MODULE NOT CONFIGURED
ELECTRIC POWER STEERING (EPS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: If multiple DTCs are present, inspect the wiring and harness connector at the EPS Assembly.

NOTE: If the Electric Power Steering (EPS) Module was replaced, verify that the correct EPS Assembly was installed on the vehicle.

1. Turn ignition on.
2. With the scan tool, read DTCs and record on vehicle work order.
3. With the scan tool, erase DTCs.
4. With the scan tool, read EPS DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

2. **LOST COMMUNICATION DTCS**
   1. With the scan tool, read DTCs.

   Are there any Lost Communication DTCs present?

   Yes

   - Perform the Stored Lost Communication DTC diagnostic procedure. Refer to **STORED LOST COMMUNICATION DTCS** .

   No

   - Go To 3

3. **BODY CONTROL MODULE (BCM) CONFIGURATION**
   1. Using the scan tool, verify that the BCM has been configured.

   Was the BCM been configured correctly?

   Yes

   - Replace the Electric Power Steering (EPS) Module in accordance with the Service Information. Refer to **GEAR, REMOVAL** .
   - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

- Replace the BCM in accordance with the Service Information. Refer to **MODULE, BODY CONTROL, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

U0002-00-CAN C BUS OFF PERFORMANCE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0100-00-LOST COMMUNICATION WITH ECM/PCM

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0101-00-LOST COMMUNICATION WITH TCM

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0121-00-LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0140-00-LOST COMMUNICATION WITH BODY CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0155-00-LOST COMMUNICATION WITH CLUSTER-CCN

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0212-00-LOST COMMUNICATION WITH SCM

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0401-00-IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.
- No U0002-00-CAN C Bus Off Performance DTC present.

SET CONDITION

- Electric Power Steering (EPS) Module detects an incorrect CAN message from the Powertrain Control Module (PCM).

DEFAULT ACTION

- EPS System has reduced or degraded assist under some conditions.

POSSIBLE CAUSES

Possible Causes
ELECTRIC POWER STEERING (EPS) MODULE CAN BUS DTCS
POWERTRAIN CONTROL MODULE (PCM) DTCS
ELECTRIC POWER STEERING (EPS) MODULE
POWERTRAIN CONTROL MODULE (PCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read DTCs and record on vehicle work order.
   3. With the scan tool, erase DTCs.
   4. Cycle the ignition switch from off to on.
   5. With the scan tool, read EPS DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

2. **CHECK FOR POWERTRAIN CONTROL MODULE (PCM) DTCS**
   1. With the scan tool, read PCM DTCs.

   Are there any PCM DTCs present?

   Yes

   - Refer to DIAGNOSIS AND TESTING and perform the appropriate diagnostic procedure.

   No

   - Go To 3

3. **CHECK OTHER MODULES FOR CAN C BUS DTCS**

1. With the scan tool, read the DTCs.

   Are there any CAN C BUS DTCs present?

   Yes

   - Using the schematics as a guide, check the Powertrain Control Module (PCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Powertrain Control Module (PCM) in accordance with the Service Information. Refer to **MODULE, POWERTRAIN CONTROL, REMOVAL** .

   No

   - Using the schematics as a guide, check the Electric Power Steering (EPS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Electric Power Steering (EPS) Module in accordance with the Service Information. Refer to **GEAR, REMOVAL** .
   - Perform the EPS Verification Test. Refer to **STANDARD PROCEDURE**.

U0402-00-IMPLAUSIBLE DATA RECEIVED FROM TCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.
- No U0002-00-CAN C Bus Off Performance DTC present.

SET CONDITION

- Electric Power Steering (EPS) Module detects an incorrect CAN message from the Transmission Control Module (TCM).

DEFAULT ACTION

- EPS System has reduced or degraded assist under some conditions.

POSSIBLE CAUSES

Possible Causes
ELECTRIC POWER STEERING (EPS) MODULE CAN BUS DTCS
TRANSMISSION CONTROL MODULE (TCM) DTCS
ELECTRIC POWER STEERING (EPS) MODULE
TRANSMISSION CONTROL MODULE (TCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read DTCs and record on vehicle work order.
   3. With the scan tool, erase DTCs.
   4. Cycle the ignition switch from off to on.
   5. With the scan tool, read EPS DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK FOR TRANSMISSION CONTROL MODULE (TCM) DTCS**
   1. With the scan tool, read TCM DTCs.

   Are there any TCM DTCs present?

   Yes

   - Refer to **DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

   No

   - Go To 3

3. **CHECK OTHER MODULES FOR CAN C BUS DTCS**
   1. With the scan tool, read the DTCs.

   Are there any CAN C BUS DTCs present?

   Yes

   - Using the schematics as a guide, check the Transmission Control Module (TCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Transmission Control Module (TCM) in accordance with the Service Information. Refer to **MODULE, TRANSMISSION CONTROL, REMOVAL** .

   No

- Using the schematics as a guide, check the Electric Power Steering (EPS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Electric Power Steering (EPS) Module in accordance with the Service Information. Refer to **GEAR, REMOVAL** .
- Perform the EPS Verification Test. Refer to **STANDARD PROCEDURE**.

U0415-00-IMPAUSIBLE DATA RECEIVED FROM ABS

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.
- No U0002-88-CAN C Bus Off Performance DTC present.

SET CONDITION

- Electric Power Steering (EPS) Module detects an incorrect CAN message from the Anti-lock Brake System (ABS) Module.

DEFAULT ACTION

- EPS System has reduced or degraded assist under some conditions.

POSSIBLE CAUSES

Possible Causes
ELECTRIC POWER STEERING (EPS) MODULE DTCS
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE DTCS
ELECTRIC POWER STEERING (EPS) MODULE
ANTI-LOCK BRAKE SYSTEM (ABS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs and record on vehicle work order.
    3. With the scan tool, erase DTCs.
    4. Cycle the ignition from off to on.
    5. With the scan tool, read EPS DTCs.

    Is the DTC active?

Yes

- Go To 2

No

- Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

2. **CHECK FOR ANTI-LOCK BRAKE SYSTEM (ABS) MODULE DTCS**
   1. With the scan tool, read ABS DTCs.

      Is there any ABS DTCs present?

      Yes

      - Perform the appropriate diagnostic procedure. Refer to **DIAGNOSIS AND TESTING** .

      No

      - Go To 3
3. **CHECK OTHER MODULES FOR CAN C BUS DTCS**
   1. With the scan tool, read the DTCs.

      Are there any CAN C BUS DTCs present?

      Yes

      - Using the schematics as a guide, check the Anti-lock Brake System (ABS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-lock Brake System (ABS) Module in accordance with the Service Information. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, REMOVAL** .

      No

      - Using the schematics as a guide, check the Electric Power Steering (EPS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Electric Power Steering (EPS) Module in accordance with the Service Information. Refer to **GEAR, REMOVAL** .
      - Perform the EPS Verification Test. Refer to **STANDARD PROCEDURE**.

U0422-00-IMPAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.
- No U0002-88-CAN C Bus Off Performance DTC present.

SET CONDITION

- Electric Power Steering (EPS) Module detects an incorrect CAN message from the Body Control Module (BCM).

DEFAULT ACTION

- EPS System has reduced or degraded assist under some conditions.

POSSIBLE CAUSES

Possible Causes
ELECTRIC POWER STEERING (EPS) MODULE CAN BUS DTCS
BODY CONTROL MODULE (BCM) DTCS
ELECTRIC POWER STEERING (EPS) MODULE
BODY CONTROL MODULE (BCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Perform any Service Bulletins that may apply.
   2. Turn the ignition on.
   3. With the scan tool, read DTCs and record on the repair order.
   4. Cycle the ignition from off to on.
   5. With the scan tool, read the DTCs.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

2. **CHECK BODY CONTROL MODULE (BCM) CAN BUS DTCS ARE PRESENT**
   1. With the scan tool, read the BCM DTCs.

Are there any BCM CAN BUS DTCs present?

Yes

- Perform the appropriate diagnostic procedures. Refer to **DIAGNOSIS AND TESTING** .

No

- Go To 3

3. **CHECK OTHER MODULES FOR CAN C BUS DTCS**
    1. With the scan tool, read the DTCs.

    Are there any CAN C BUS DTCs present?

    Yes

    - Using the schematics as a guide, check the Body Control Module (BCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Body Control Module (BCM) in accordance with the Service Information. Refer to **MODULE, BODY CONTROL, REMOVAL** .

    No

    - Using the schematics as a guide, check the Electric Power Steering (EPS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Electric Power Steering (EPS) Module in accordance with the Service Information. Refer to **GEAR, REMOVAL** .
    - Perform the EPS Verification Test. Refer to **STANDARD PROCEDURE**.

U1215-00-LOST COMMUNICATION WITH FORWARD FACING CAMERA

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U1415-00-IMPLAUSIBLE/MISSING VEHICLE CONFIGURATION DATA

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.
- No U0002-88-CAN C Bus Off Performance DTC present.

SET CONDITION

- Electric Power Steering (EPS) Module receives incorrect vehicle configuration information from the Body Control Module (BCM).

DEFAULT ACTION

- EPS System has reduced or degraded assist under some conditions.

POSSIBLE CAUSES

Possible Causes
CAN BUS DTCS SET IN BODY CONTROL MODULE (BCM)
ELECTRIC POWER STEERING (EPS) MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs and record on vehicle work order.

    Is the DTC active?

    Yes

    - Go To 2

    No

    - Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
2. **CAN BUS DTCS SET IN BODY CONTROL MODULE (BCM)**

    NOTE: **Verify that the BCM has the correct vehicle configuration before proceeding with this test step.**

    1. With the scan tool, read DTCs in the BCM.

    Are there any active CAN Bus DTCs present?

    Yes

    - Refer to **DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

    No

    - Replace the EPS Module in accordance with the Service Information. Refer to **GEAR, REMOVAL** .
    - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U1447-00-IMPLAUSIBLE DATA RECEIVED FROM SCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.
- No U0002-00-CAN C Bus Off Performance DTC present.

SET CONDITION

- An error message has been received over the CAN C bus from the Steering Column Control Module (SCCM).

DEFAULT ACTION

- EPS System is operating at 50 percent efficiency.
- Park assist not functioning.

POSSIBLE CAUSES

Possible Causes
ELECTRONIC POWER STEERING (EPS) MODULE DTCS
STEERING COLUMN CONTROL MODULE (SCCM) DTCS
ELECTRONIC POWER STEERING (EPS) MODULE
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: Diagnose and repair any Instrument Cluster DTCs before proceeding with this diagnostic procedure.

   1. Turn the ignition on.
   2. With the scan tool, read DTCs and record on vehicle work order.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Test complete. The condition or conditions that originally set this DTC are not present at this

time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

2. **CHECK FOR DTCS IN THE SCCM**
    1. With the scan tool, read DTCs in the SCCM.

    Is the SCM reporting any DTCs?

    Yes

    - Perform the appropriate diagnostic procedure. Refer to **DIAGNOSIS AND TESTING** .

    No

    - Go To 3
3. **CHECK OTHER MODULES FOR CAN C BUS DTCS**
    1. With the scan tool, read the DTCs.

    Are there any CAN C BUS DTCs present?

    Yes

    - Using the schematics as a guide, check the Steering Column Control Module (SCCM) pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .

    No

    - Using the schematics as a guide, check the Electric Power Steering (EPS) Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Electric Power Steering (EPS) Module in accordance with the Service Information. Refer to **GEAR, REMOVAL** .
    - Perform the EPS Verification Test. Refer to **STANDARD PROCEDURE**.

U148D-00-IMPLAUSIBLE DATA RECEIVED FROM FORWARD FACING CAMERA

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.
- One valid CAN message received at least once.
- No CAN C Bus Off Performance DTC present.

SET CONDITION

- Electric Power Steering (EPS) Module detects an incorrect CAN message from the Forward Facing Camera Module (FFCM).

DEFAULT ACTION

- EPS System has reduced or degraded assist under some conditions.

POSSIBLE CAUSES

Possible Causes
ELECTRIC POWER STEERING (EPS) MODULE CAN BUS DTCS
BODY CONTROL MODULE (BCM) DTCS
FORWARD FACING CAMERA MODULE (FFCM) DTCS
ELECTRIC POWER STEERING (EPS) MODULE
FORWARD FACING CAMERA MODULE (FFCM) DTCS

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Turn the ignition on.
    2. With the scan tool, read EPS DTCs and record on the vehicle repair order.
    3. With the scan tool, erase the EPS DTCs.
    4. Cycle the ignition from off to on.
    5. With the scan tool, read the EPS DTCs.

       Did the DTC return?

       Yes

       - Go To 2

       No

       - Go To 5
2. **CHECK FOR BODY CONTROL MODULE (BCM) DTCS**
    1. With the scan tool, read the BCM DTCs.

       Are there any BCM CAN Bus DTCs present?

       Yes

       - Perform the appropriate diagnostic procedure. Refer to **DIAGNOSIS AND TESTING** .

       No

       - Go To 3
3. **CHECK FOR FORWARD FACING CAMERA MODULE (FFCM) DTCS**

1. With the scan tool, read the FFCM DTCs.

   Are there any FFCM DTCs present?

   Yes

   - Perform the appropriate diagnostic procedure.

   No

   - Go To 4

4. **CHECK OTHER MODULES FOR DTCS**
   1. With the scan tool, read DTCs.

      Are there any other modules reporting implausible communication DTCs against the FFCM?

      Yes

      - Replace the Forward Facing Camera Module (FFCM).
      - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Using the schematics as a guide, check the EPS pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Electric Power Steering (EPS) Module in accordance with the Service Information. Refer to **GEAR, REMOVAL** .
      - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the schematics as a guide, inspect the wiring and connectors specific to this module. Wiggle the wiring and connectors while checking for shorted and open circuits.
   3. Check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Check Service Bulletins for any possible causes that may apply.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete.

U1601-00-ECU APPLICATION SOFTWARE CODE 1 MISSING OR CORRUPTED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- System voltage between 10.0 and 16.0 volts.

SET CONDITION

- Electric Power Steering (EPS) Module detects that its software has been corrupted or is missing.

DEFAULT ACTION

- EPS is disabled.
- No power steering assist.

POSSIBLE CAUSES

Possible Causes
ELECTRIC POWER STEERING (EPS) MODULE

DIAGNOSTIC TEST

CHECK FOR AN ACTIVE DTC

NOTE: **This DTC must be active for the results of this test to be valid. Check for a loose scan tool connection. Verify battery charger is installed and charge rate provides approximately 13.5 volts.**

1. Turn the ignition on.
2. With the scan tool, read DTCs and record on vehicle work order.
3. With the scan tool, erase DTCs.
4. With the scan tool, read EPS DTCs.

   Is the DTC active?

   Yes

   - Replace the Electric Power Steering (EPS) Module in accordance with the Service Information. Refer to **GEAR, REMOVAL** .
   - Perform EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete. The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   - Perform EPS VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

STANDARD PROCEDURE

EPS VERIFICATION TEST

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

EPS VERIFICATION TEST

1. Turn the ignition off.
2. Remove all test equipment.
3. Connect all previously disconnected components and connectors.
4. Verify all accessories are turned off, the battery is fully charged and the charging system has a status of "charged".
5. Verify that the ignition is on. With the scan tool, record and erase all Diagnostic Trouble Codes (DTCs) from all modules. Start the engine and allow it to run for two minutes and fully operate the system that was indicating the failure.

   NOTE: **Turn the steering wheel from stop to stop, holding at each stop position for One second.**

6. Turn the ignition off and wait five minutes. Turn the ignition on and using the scan tool, read DTCs from all modules.
7. If there are no DTCs present after turning ignition on, road test the vehicle for at least five minutes.
8. Again, with the scan tool read DTCs. If any DTCs are present, refer to the **DTC INDEX** in the applicable information for the Diagnostic procedure and troubleshoot the new or recurring symptom.
9. If there are no DTCs present and the customer's concern can no longer be duplicated, the repair is complete.

   Are any DTCs present or is the original concern still present?

   Yes

   - Perform the appropriate diagnostic procedure. Refer to **DIAGNOSIS AND TESTING**.

   No

   - Repair is complete.

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Article GUID: A00735886

2015-16 ENGINE

3.6L - Service Information - Challenger

DESCRIPTION

DESCRIPTION

CAUTION: If the engine has experienced a catastrophic failure, THE INTAKE MANIFOLD MUST BE REPLACED!

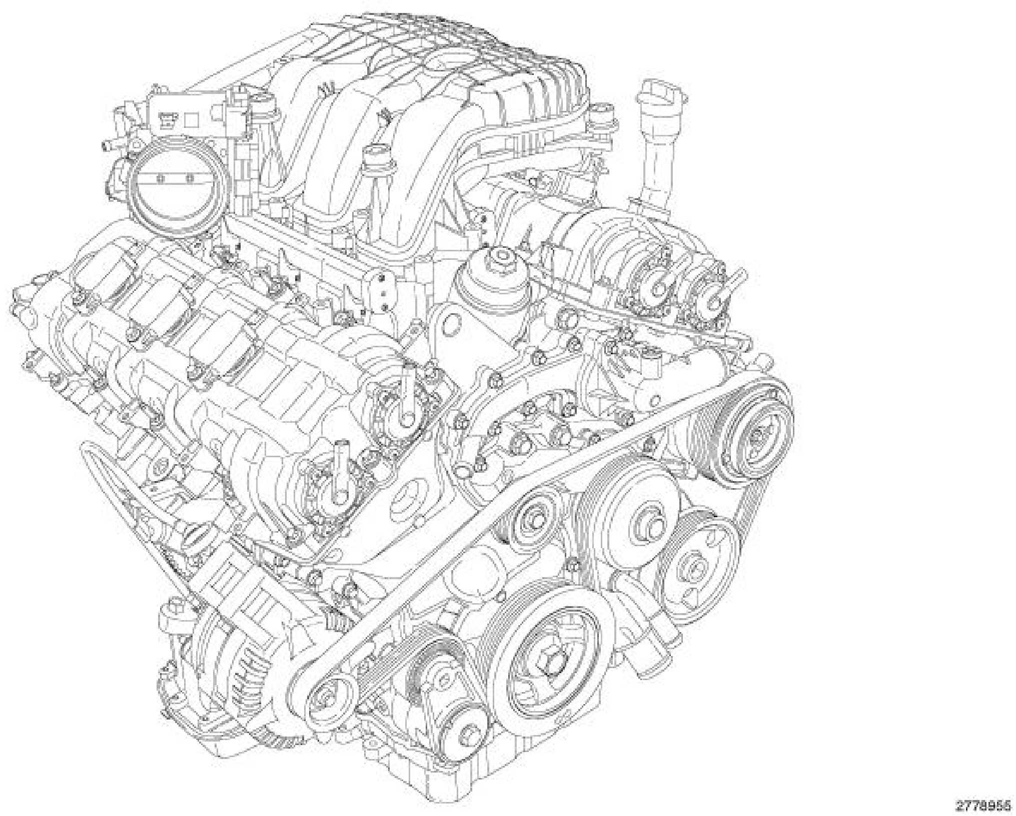


Fig. 1: 3.6L (219.7 CID) Flexible Fuel V-6 Engine
Courtesy of CHRYSLER GROUP, LLC

The 3.6 liter (219.7 CID) flexible fuel V-6 engine features Variable Valve Timing (VVT), Dual Overhead Camshafts (DOHC) and a high-pressure die-cast aluminum cylinder block with steel liners in a 60Â° configuration. The 3.6 liter engine has a chain driven variable discharge oil pump with a two-stage pressure regulator for improved fuel economy. The exhaust manifolds are integrated into the cylinder heads for reduced weight. The cylinders are numbered from front to rear. The right bank is numbered 1, 3, 5 and the left bank is numbered 2, 4, 6. The firing order is 1-2-3-4-5-6. The engine serial number is located on the left side of the cylinder block at the transmission flange.

DIAGNOSIS AND TESTING

ENGINE PERFORMANCE DIAGNOSTIC TABLE

CONDITION	POSSIBLE CAUSE	CORRECTION
ENGINE WILL NOT START	1. Weak battery	1. Charge or replace as necessary. Refer to **BATTERY, DIAGNOSIS AND TESTING** .
	2. Corroded or loose battery connections.	2. Clean and tighten battery connections. Refer to **CLEANING** .
	3. Faulty engine starting system	3. Diagnose engine starting system. Refer to **DIAGNOSIS AND TESTING** .
	4. Faulty coil(s) or control unit	4. Replace ignition coil. Refer to **COIL, IGNITION, REMOVAL** .
	5. Incorrect spark plug gap	5. Set gap. Refer to **SPECIFICATIONS** .
	6. Incorrect cam timing	6. Verify cam timing. Refer to **VALVE TIMING, STANDARD PROCEDURE**.
	7. Contamination in fuel system	7. Clean fuel system and replace fuel filter.
	8. Faulty fuel pump or wiring	8. Repair or replace as necessary.
	9. Faulty Camshaft Position (CMP) sensor	9. Replace the Camshaft Position (CMP) sensor. Refer to **SENSOR, CAMSHAFT POSITION, REMOVAL** .
	10. Faulty Crankshaft Position (CKP) sensor	10. Replace Crankshaft Position (CKP) sensor. Refer to **SENSOR, CRANKSHAFT POSITION, REMOVAL** .
ENGINE STALLS OR ROUGH IDLE	1. Idle speed too low	1. Test minimum air flow. (Refer to Appropriate Diagnostic Information)
	2. Incorrect fuel mixture	2. Refer to Appropriate Diagnostic Information).
	3. Faulty ignition coil(s)	3. Replace ignition coil. Refer to **COIL, IGNITION, REMOVAL** .
	4. Incorrect cam timing	4. Verify cam timing. Refer to **VALVE TIMING, STANDARD PROCEDURE**.
	5. Vacuum leak	5. Inspect intake manifold and vacuum hoses, repair or replace as necessary.
	6. Faulty Crankshaft Position (CKP) sensor	6. (Replace sensor. Refer to **SENSOR, CRANKSHAFT POSITION, REMOVAL** .
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped spark plugs	1. Correct as necessary. Refer to **SPARK PLUG, REMOVAL** .

CONDITION	POSSIBLE CAUSE	CORRECTION
	2. Contamination in fuel system	2. Clean system and replace fuel filter.
	3. Faulty fuel pump	3. Test and replace the fuel pump. Refer to **MODULE, FUEL PUMP, REMOVAL** .
	4. Incorrect cam timing	4. Verify cam timing. Refer to **VALVE TIMING, STANDARD PROCEDURE**.
	5. Leaking cylinder head gasket	5. Replace cylinder head gasket. Refer to **CYLINDER HEAD, REMOVAL**.
	6. Low compression	6. Determine the cause and repair as necessary. Refer to **CYLINDER COMPRESSION TEST**.
	7. Burned, warped or pitted valves	7. Replace valves as necessary. Refer to **VALVES, INTAKE AND EXHAUST, REMOVAL**.
	8. Plugged or restricted exhaust system	8. Perform exhaust restriction test. Install new parts, as necessary. Refer to **DIAGNOSIS AND TESTING** .
	9. Faulty ignition coil	9. Test and replace ignition coil. Refer to **COIL, IGNITION, REMOVAL** .
ENGINE MISSES ON ACCELERATION	1. Dirty or incorrectly gapped spark plugs	1. Clean spark plugs and set gap. Refer to **SPARK PLUG, REMOVAL** .
	2. Contamination in Fuel System	2. Clean fuel system and replace fuel filter.
	3. Burned, warped or pitted valves	3. Replace valves as necessary. Refer to **VALVES, INTAKE AND EXHAUST, REMOVAL**.
	4. Faulty ignition coil	4. Test and replace ignition coil. Refer to **COIL, IGNITION, REMOVAL** .
ENGINE MISSES AT HIGH SPEED	1. Dirty or incorrectly gapped spark plugs	1. Correct as necessary. Refer to **SPARK PLUG, REMOVAL** .
	2. Faulty ignition coil	2. Test and replace ignition coil. Refer to **COIL, IGNITION, REMOVAL** .
	3. Contamination in fuel system	3. Clean system and replace fuel filter.
	4. Dirty fuel injector(s)	4. Test and replace as necessary (Refer to Appropriate Diagnostic Information).

ENGINE MECHANICAL DIAGNOSTIC TABLE

CONDITION	POSSIBLE CAUSES	CORRECTIONS
NOISY VALVES	1. High or low oil level in crankcase.	1. Refer to **STANDARD PROCEDURE**.
	2. Thin or diluted oil	2. Change oil and filter.
	3. Low oil pressure	3. Check oil pump, if OK, check rod and main bearings for excessive wear.
	4. Dirt in lash adjusters	4. Replace as necessary.
	5. Worn rocker arms	5. Replace as necessary.
	6. Worn lash adjusters	6. Replace as necessary.
	7. Worn valve guides	7. Inspect the valve guides for wear, cracks or looseness. If either condition exists, replace the cylinder head. Refer to **CYLINDER HEAD, REMOVAL**.
	8. Excessive runout of valve seats on valve faces	8. Refer to **STANDARD PROCEDURE**.
CONNECTING ROD NOISE	1. Insufficient oil supply	1. Refer to **STANDARD PROCEDURE**.
	2. Low oil pressure	2. Check oil pump, if OK, check rod and main bearings for excessive wear.
	3. Thin or diluted oil	3. Change oil and filter.
	4. Excessive bearing clearance	4. Replace as necessary.
	5. Connecting rod journal out-of-round	5. Service or replace crankshaft.
	6. Misaligned connecting rods	6. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply	1. Refer to **STANDARD PROCEDURE**.
	2. Low oil pressure	2. Check oil pump, if OK, check rod and main bearings for excessive wear.
	3. Thin or diluted oil	3. Change oil and filter.
	4. Excessive bearing clearance	4. Replace as necessary.
	5. Excessive end play	5. Check thrust washers for wear.
	6. Crankshaft journal out-of round	6. Service or replace crankshaft.
	7. Loose flywheel or torque converter	7. Tighten to correct torque.

CYLINDER COMPRESSION TEST

NOTE: **The results of a cylinder compression pressure test can be utilized to diagnose**

several engine malfunctions.

NOTE: **Be certain the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.**

1. Clean the spark plug recesses with compressed air.
2. Remove the spark plug from the cylinder being tested and record the cylinder number of each spark plug for future reference.
3. Inspect the spark plug electrodes for abnormal firing indicators such as fouled, hot, oily, etc.
4. Disable the fuel system and perform the fuel system pressure release procedure. Refer to FUEL DELIVERY, GAS, STANDARD PROCEDURE .
5. Insert a compression pressure gauge and rotate the engine with the engine starter motor for three revolutions.
6. Record the compression pressure on the third revolution. Continue the test for the remaining cylinders.

   NOTE: **The recommended compression pressures are to be used only as a guide to diagnosing engine problems. An engine should not be disassembled to determine the cause of low compression unless some malfunction is present.**

7. Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
8. If one or more cylinders have abnormally low compression pressures, repeat the compression test.

   NOTE: **If the same cylinder or cylinders repeat an abnormally low reading on the second compression test, it could indicate the existence of a problem in the cylinder in question.**

9. If one or more cylinders continue to have abnormally low compression pressures, perform the cylinder combustion pressure leakage test. Refer to CYLINDER LEAKAGE TEST.

CYLINDER LEAKAGE TEST

The combustion pressure leakage test provides an accurate means for determining engine condition.

Cylinder leakage testing will detect:

- Exhaust and intake valve leaks (improper seating).
- Leaks between adjacent cylinders or into water jacket.
- Any causes for combustion pressure loss.

1. Check the coolant level and fill as required. DO NOT install the radiator cap.
2. Start and operate the engine until it attains normal operating temperature, then turn the engine OFF.
3. Remove the spark plugs.
4. Remove the oil filler cap.

5. Remove the air cleaner hose.
6. **Calibrate the tester according to the manufacturer's instructions.** The shop air source for testing should maintain a regulated air pressure at 552 kPa (80 psi).
7. Perform the test procedures on each cylinder according to the tester's manufacturer instructions. Set the piston of the cylinder to be tested at TDC on the compression stroke.
8. As each cylinder is pressurized, listen for the air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the radiator coolant.

All gauge pressure indications should be equal, with **no more** than 25% leakage.

If leakage is greater then 25%, Refer to CYLINDER LEAKAGE DIAGNOSIS CHART below.

CYLINDER LEAKAGE DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
AIR ESCAPES THROUGH THROTTLE BODY	Intake valve bent, burnt, or not seated properly	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
AIR ESCAPES THROUGH TAILPIPE	Exhaust valve bent, burnt, or not seated properly	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
AIR ESCAPES THROUGH RADIATOR	Head gasket leaking or cracked cylinder head or block	Remove cylinder head and inspect. Replace defective part.
MORE THAN 50% LEAKAGE FROM ADJACENT CYLINDERS	Head gasket leaking or crack in cylinder head or block between adjacent cylinders	Remove cylinder head and inspect. Replace gasket, head, or block as necessary.
MORE THAN 25% LEAKAGE AND AIR ESCAPES THROUGH OIL FILLER CAP OPENING ONLY	Stuck or broken piston rings; cracked piston; worn rings and/or cylinder wall	Inspect for broken rings or piston. Measure ring gap and cylinder diameter, taper and out-of-round. Replace defective part as necessary.

OIL CONSUMPTION TEST AND DIAGNOSIS

The following diagnostic procedures are used to determine the source of excessive internal oil consumption, these procedures and tests apply to vehicles with 50, 000 miles or less.

NOTE: **Engine oil consumption may be greater than normal during engine break-in. Repairs should be delayed until vehicle has been driven at least 7, 500 miles.**

Severe service (high ambient temperature, short trips, heavy loading, trailer towing, taxi, off-road, or law enforcement use) may result in greater oil consumption than normal.

Sustained high speed driving and high engine RPM operation may result in increased oil consumption.

Failure to comply with the recommended oil type and viscosity rating, as outlined in the owner's manual, may impact oil economy as well as fuel economy.

Oil consumption may increase with vehicle age and mileage due to normal engine wear.

NOTE: Because a few drops of external oil leakage per mile can quickly account for the loss of one quart of oil in a few hundred miles, be certain there is no external engine oil leaks present.

- **Oil leakage is not the same as oil consumption and all external leakage must be eliminated before any action can be taken to verify and/or correct oil consumption complaints.**
- **Verify that the engine has the correct oil level dipstick and dipstick tube installed.**
- **Verify that the engine is not being run in an overfilled condition. Check the oil level 15 minutes after a hot shutdown with the vehicle parked on a level surface. In no case should the level be above MAX or the FULL mark on the dipstick.**

OIL CONSUMPTION TEST

1. Check the oil level at least 15 minutes after a hot shutdown.
2. If the oil level is low, top off with the proper viscosity and API service level engine oil. Add one bottle of MOPARĀ® 4-In-1 Leak Detection Dye into the engine oil.
3. Tamper proof the oil pan drain plug, oil filter, dipstick and oil fill cap.
4. Record the vehicle mileage.
5. Instruct the customer to drive the vehicle as usual.
6. Ask the customer to return to the servicing dealer after accumulating 500 miles, Check the oil level at least 15 minutes after a hot shutdown. If the oil level is half way between the "FULL" and "ADD" mark continue with the next step.
7. Using a black light, recheck for any external engine oil leaks, repair as necessary, if no external engine oil leaks are present, continue with oil consumption diagnosis.

OIL CONSUMPTION DIAGNOSIS

1. Check the Positive Crankcase Ventilation (PCV) system. Make sure the system is not restricted and the PCV valve has the correct part number and correct vacuum source (18-20 in. Hg at idle below 3000 ft. above sea level is considered normal).
2. Perform a cylinder compression test and cylinder leakage test using the standard cylinder leakage tester and following manufacturers suggested best practices. Refer to CYLINDER COMPRESSION TEST and CYLINDER LEAKAGE TEST.

   NOTE: Verify the spark plugs are not oil saturated. If the spark plugs are oil saturated and compression is good it can be assumed the valve seals or valve guides are at fault.

3. If one or more cylinders have more than 25% leak down further engine tear down and inspection will be required.

TOP 18 REASONS THAT MAY LEAD TO ENGINE OIL CONSUMPTION

1. **Tapered and Out-of-Round Cylinders**

   The increased piston clearances permit the pistons to rock in the worn cylinders. While tilted momentarily, an abnormally large volume of oil is permitted to enter on one side of the piston. The rings,

also tilted in the cylinder, permit oil to enter on one side. Upon reversal of the piston on each stroke, some of this oil is passed into the combustion chamber.

2. **Distorted Cylinders**

   This may be caused by unequal heat distribution or unequal tightening of cylinder head bolts. This condition presents a surface which the rings may not be able to follow completely. In this case, there may be areas where the rings will not remove all of the excess oil. When combustion takes place, this oil will be burned and cause high oil consumption.

3. **Improper operation of "PCV" system**

   The main purpose of the Positive Crankcase Ventilation (PCV) valve is to recirculate blow-by gases back from the crankcase area through the engine to consume unburned hydrocarbons. The PCV system usually has a one way check valve and a make up air source. The system uses rubber hoses that route crankcase blow by gases to the intake manifold. Vacuum within the engine intake manifold pulls the blow by gases out of the crankcase into the combustion chamber along with the regular intake air and fuel mixture.

   The PCV system can become clogged with sludge and varnish deposits and trap blow by gases in the crankcase. This degrades the oil, promoting additional formation of deposit material. If left uncorrected, the result is plugged oil rings, oil consumption, rapid ring wear due to sludge buildup, ruptured gaskets and seals due to crankcase pressurization.

   If equipped with an engine driven vacuum pump, high oil consumption can be caused by unchecked airflow into the pump. This can be caused by anything that opens the vacuum pump intake port up to the atmosphere such as a faulty vacuum pump, hose fitting, hose and brake booster. If there is not a restriction (normally caused by the pump pulling vacuum on the brake booster), then the vacuum pump will pump a high volume of air. This high volume of air will pressurize the crankcase and cause excessive oil burning and oil flow through the PCV system.

4. **Worn Piston Ring Grooves**

   For piston rings to form a good seal, the sides of the ring grooves must be true and flat - not flared or shouldered. Piston rings in tapered or irregular grooves will not seal properly and, consequently, oil will pass around behind the rings into the combustion chamber.

5. **Worn, Broken or Stuck Piston Rings**

   When piston rings are broken, worn or stuck to such an extent that the correct tension and clearances are not maintained, this will allow oil to be drawn into the combustion chamber on the intake stroke and hot gases of combustion to be blown down the cylinder past the piston on the power stroke. All of these conditions will result in burning and carbon build up of the oil on the cylinders, pistons and rings.

6. **Cracked or Broken Ring Lands**

   Cracked or broken ring lands prevent the rings from seating completely on their sides and cause oil pumping. This condition will lead to serious damage to the cylinders as well as complete destruction of the pistons and rings. Cracked or broken ring lands cannot be corrected by any means other than piston replacement.

7. **Worn Valve Stems and Guides**

   When wear has taken place on valve stems and valve guides, the vacuum in the intake manifold will draw oil and oil vapor between the intake valve stems and guides into the intake manifold and then into the cylinder where it will be burned.

8. **Bent or Misaligned Connecting Rods**

   Bent or misaligned connecting rods will not allow the pistons to ride straight in the cylinders. This will prevent the pistons and rings from forming a proper seal with the cylinder walls and promote oil consumption. In addition, it is possible that a bearing in a bent connect rod will not have uniform clearance on the connecting rod wrist pin. Under these conditions, the bearing will wear rapidly and throw off an excessive amount of oil into the cylinder.

9. **Fuel Dilution**

   If raw fuel is allowed to enter the lubrication system, the oil will become thinner and more volatile and will result in higher oil consumption. The following conditions will lead to higher oil consumption:

   - Excess fuel can enter and mix with the oil via a leaking fuel injector
   - Gasoline contaminated with diesel fuel
   - Restricted air intake
   - Excessive idling

10. **Contaminated Cooling Systems**

    Corrosion, rust, scale, sediment or other formations in the water jacket and radiator will prevent a cooling system from extracting heat efficiently. This is likely to cause cylinder distortion thus leading to higher oil consumption.

11. **Oil Viscosity**

    The use of oil with a viscosity that is too light may result in high oil consumption. Refer to the vehicle owner's manual for the proper oil viscosity to be used under specific driving conditions and/or ambient temperatures.

12. **Dirty Engine Oil**

    Failure to change the oil and filter at proper intervals may cause the oil to be so dirty that it will promote accumulation of sludge and varnish and restrict oil passages in the piston rings and pistons. This will increase oil consumption; dirty oil by nature is also consumed at a higher rate than clean oil.

13. **Crankcase Overfull**

    Due to an error in inserting the oil dip stick so that it does not come to a seat on its shoulder, a low reading may be obtained. Additional oil may be added to make the reading appear normal with the stick in this incorrect position which will actually make the oil level too high. If the oil level is so high that the lower ends of the connecting rods touch the oil in the oil pan excessive quantities of oil will be thrown on the cylinder walls and some of it will work its way up into the combustion chamber.

14. **Excessively High Oil Pressure**

    A faulty oil pressure relief valve may cause the oil pressure to be too high. The result will be that the engine will be flooded with an abnormally large amount of oil in a manner similar to that which occurs with worn bearings. This condition may also cause the oil filter to burst.

15. **Aftermarket Performance Chips and Modification**

    Increasing performance through the use of performance/power enhancement products to a stock or factory engine will increase the chance of excessive oil consumption.

16. **Lugging Engine**

    Lugging is running the engine at a lower RPM in a condition where a higher RPM (more power/torque) should be implemented. Especially susceptible on vehicles equipped with a manual transmission. This driving habit causes more stress loading on the piston and can lead to increases in engine oil consumption.

17. **Turbocharged Engines**

    There is a possibility for PCV "push-over" due to higher crankcase pressure (as compared to naturally aspirated engines) which is normal for turbocharged engines. This condition causes varying amounts of engine oil to enter the intake manifold, charge air cooler and associated plumbing to and from the charge air cooler, also a leaking turbocharger seal will draw oil into the combustion chamber where it will burn (blue smoke from tail pipe may be present) and form carbon deposits which contribute to further oil consumption as they interfere with proper engine function.

18. **Restricted Air Intake**

    Excessive restriction in the air intake system will increase engine vacuum and can increase oil consumption, an extremely dirty air filter would be one example of this situation.

ENGINE LUBRICATION DIAGNOSTIC TABLE

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL LEAKS	1. Misaligned or damaged gaskets and O-rings.	1. Replace as necessary.
	(a) Loose fasteners, broken or porous metal parts.	(a) Tighten fasteners, Repair or replace metal parts.
	2. Crankshaft rear oil seal.	2. Replace rear crankshaft oil seal. Refer to **SEAL, CRANKSHAFT OIL, REAR, REMOVAL**.
	3. Crankshaft rear oil seal surface. Scratched, nicked or grooved.	3. Polish or replace crankshaft.
	4. Oil pan flange cracked.	4. Replace oil pan. Refer to **PAN, OIL, REMOVAL**.

CONDITION	POSSIBLE CAUSES	CORRECTION
	5. Damaged or misaligned crankshaft front oil seal.	5. Replace front crankshaft oil seal. Refer to **SEAL, CRANKSHAFT OIL, FRONT, REMOVAL**.
	6. Scratched or damaged vibration damper hub.	6. Polish or replace vibration damper.
OIL PRESSURE DROP	1. Low oil level.	1. Check and correct oil level.
	2. Faulty oil pressure sensor.	2. Replace oil pressure sensor. Refer to **SENSOR, OIL PRESSURE, REMOVAL**.
	3. Low oil pressure.	3. Check main bearing clearance. Refer to **STANDARD PROCEDURE**. 3. Check rod bearing clearance. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.
	4. Clogged oil filter.	4. Replace oil filter. Refer to **FILTER, ENGINE OIL, REMOVAL**.
	5. Worn oil pump.	5. Replace oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.
	6. Thin or diluted oil.	6. Change oil and filter. Refer to **STANDARD PROCEDURE**.
	7. Excessive bearing clearance.	7. Replace crankshaft bearings. Refer to **STANDARD PROCEDURE** . 7. Replace rod bearings. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.
	8. Oil pump relief valve stuck.	8. Replace oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.
	9. Oil pump pickup tube loose, damaged or clogged.	9. Replace oil pump pick-up. Refer to **PICK-UP, OIL PUMP, REMOVAL**.
OIL PUMPING AT RINGS	1. Worn or damaged rings.	1. Hone cylinder bores and replace rings. Refer to **STANDARD PROCEDURE**.
	2. Carbon in oil ring slots.	2. Replace rings. Refer to **ROD, PISTON AND CONNECTING, REMOVAL**.

CONDITION	POSSIBLE CAUSES	CORRECTION
	3. Worn valve guides.	3. Replace cylinder heads. Refer to **CYLINDER HEAD, REMOVAL**.
	4. Leaking valve guide seals.	4. Replace valve guide seals. Refer to **SEAL(S), VALVE GUIDE, REMOVAL**.

STANDARD PROCEDURE

ENGINE GASKET SURFACE PREPARATION

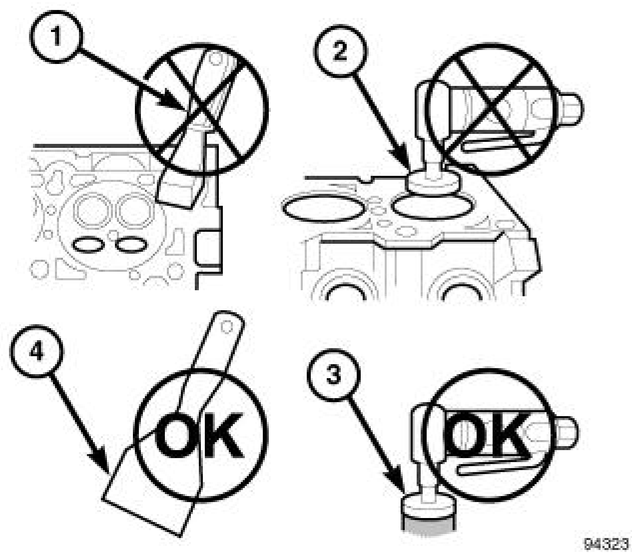


Fig. 2: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper (1).
- Abrasive pad or paper to clean cylinder block and head.
- High speed power tool with an abrasive pad or a wire brush (2).

NOTE: **Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.**

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (4).
- Drill motor with 3M Roloc™ Bristle Disc (3), white is used for the aluminum heads and yellow is used for the iron block.

CAUTION: **Excessive pressure or high RPM (beyond the recommended speed), can**

damage the sealing surfaces. The mild (white, 120 grit) bristle disc is recommended. If necessary, the medium (yellow, 80 grit) bristle disc may be used on cast iron surfaces with care.

DUST COVERS AND CAPS

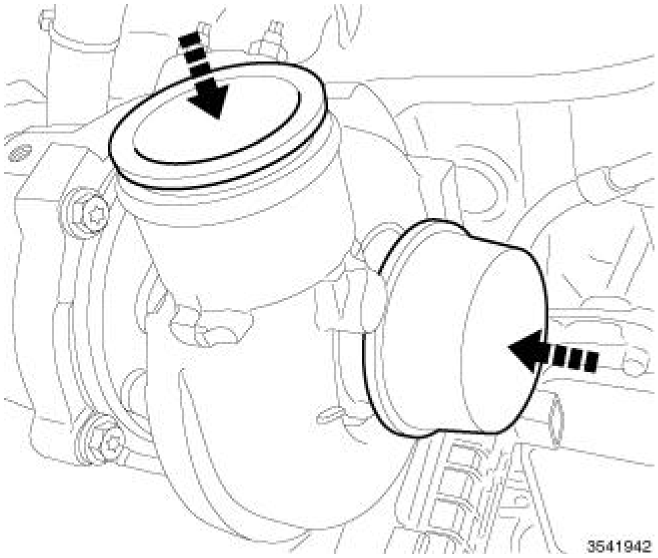


Fig. 3: Covers/Caps
Courtesy of CHRYSLER GROUP, LLC

To avoid the possibility of dust, dirt, moisture and other foreign debris being introduced to the engine during service, cover or cap all openings when hoses and tubes are removed.

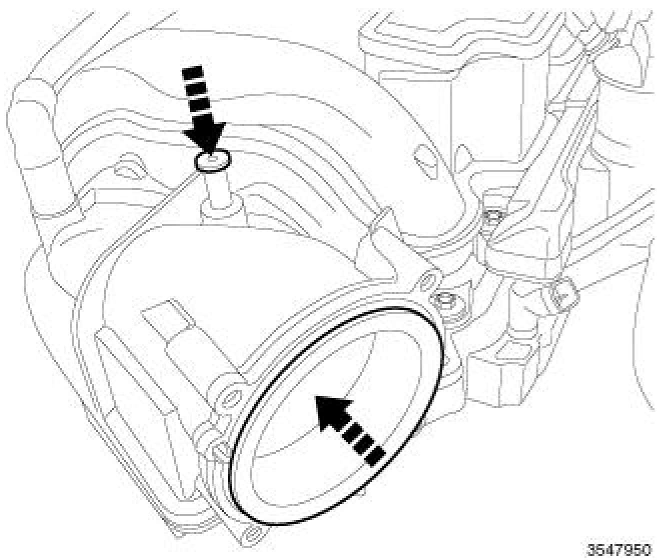


Fig. 4: Opening Cover
Courtesy of CHRYSLER GROUP, LLC

Covers installed over openings will reduce the possibility of foreign materials to entering the engine systems. Using miller tool Universal Protective Cap Set (special tool #10368, Set, Universal Protective Cap), select the appropriate cover needed for the procedure.

REPAIR DAMAGED OR WORN THREADS

CAUTION: Be sure that the tapped holes maintain the original center line.

Damaged or worn threads can be repaired. Essentially, this repair consists of:

- Drilling out worn or damaged threads.
- Tapping the hole with a special Heli-Coil™ Tap, or equivalent.
- Installing an insert into the tapped hole to bring the hole back to its original thread size.

FORM-IN-PLACE GASKETS AND SEALERS

NOTE: All of the sealants mentioned below are not used on every engine, they are listed as a general reference guide. See service information for specific sealer usage.

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results.**Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket. All sealing surfaces that use form-in-place gaskets and sealers **must** be free of grease or oil. Surfaces should be cleaned with MoparĀ® brake parts cleaner prior to sealer application. After the sealer is applied, the parts should be assembled within 10 minutes.

There are numerous types of form-in-place gasket materials that are used in the engine area. Each has different properties and can not be used in place of the other.

SEALANT TYPES

- **MOPARĀ® ENGINE SEALANT RTV SILICONE RUBBER ADHESIVE** is used to seal components exposed to engine oil. This material is a specially designed black silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil. Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.
- **MOPARĀ® ATF-RTV** is a specifically designed black silicone rubber RTV that retains adhesion and sealing properties to seal components exposed to automatic transmission fluid, engine coolants, and moisture. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.
- **MOPARĀ® GASKET MAKER** is an anaerobic type gasket material. The material cures in the absence of air when squeezed between two metallic surfaces. It will not cure if left in the uncovered tube. The anaerobic material is for use between two machined surfaces. Do not use on flexible metal flanges.
- **MOPARĀ® BED PLATE SEALANT** is a unique (green-in-color) anaerobic type gasket material that is specially made to seal the area between the bed plate and cylinder block without disturbing the bearing clearance or alignment of these components. The material cures slowly in the absence of air when torqued between two metallic surfaces, and will rapidly cure when heat is applied.
- **MOPARĀ® THREEBOND™ ENGINE RTV** is formulated as a high performance temperature

vulcanized silicone with good elasticity, temperature and chemical resistance when cured. It is resistant to engine oil, transmission fluid and gear lube but not recommended for sealing engine coolant.

SEALANT APPLICATION

- MoparÂ® Gasket Maker material should be applied sparingly 1 mm (0.040 in.) diameter or less of sealant to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Components should be torqued in place within 15 minutes. The use of a locating dowel is recommended during assembly to prevent smearing material off the location.
- MoparÂ® Engine Sealant RTV or ATF-RTV gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. All mounting holes must be circled. For corner sealing and "T" joint locations, a 3.17 or 6.35 mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be torqued in place while the sealant is still wet to the touch (within 10 minutes). The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.
- MoparÂ® Threebond™ Engine RTV Sealant gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. The gasket surfaces should be cleaned with isopropyl alcohol wipes in preparation for sealant application. All mounting holes must be circled. For corner sealing and "T" joint locations, a 3.17 or 6.35 mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be assembled within 20 minutes and torqued in place within 45 minutes. The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.

SPECIFICATIONS

ENGINE SPECIFICATIONS

GENERAL SPECIFICATIONS - 1 OF 2

Description	Specification
Type	60Â° DOHC V-6 24-Valve
Compression Ratio	10.2:1
Lead Cylinder	#1 Right Bank
Firing Order	1-2-3-4-5-6

GENERAL SPECIFICATIONS - 2 OF 2

Description	Metric	Standard
Displacement	3.6 Liters	220 Cubic Inches
Bore and Stroke	96.0 x 83.0 mm	3.779 in. x 3.268 in.

CYLINDER BLOCK

Description	Specification	
	Metric	Standard
Cylinder Bore Diameter - Grade 1	95.995 mm Â± 0.005 mm	3.7793 in. Â± 0.0002 in.
Cylinder Bore Diameter - Grade 2	96.005 mm Â± 0.005 mm	3.7797 in. Â± 0.0002 in.
Cylinder Bore Out-of-Round (Max.)	0.009 mm	0.00035 in.
Cylinder Bore Cylindricity	0.014 mm	0.0006 in.

Description	Specification	
	Metric	Standard
Crankshaft Bore Taper* (Max.)	0.006 mm	0.0002 in.
*Measured over length of bulkhead		
Engine Oil Galley Plug**	0.0 mm - 2.0 mm	0.0 in - 0.0787 in
**Measured proud of machined surface		

PISTONS

Description	Specification	
	Metric	Standard
Material	Cast Aluminum Alloy	
Piston Diameter (Metal to Metal) - Grade 1	95.955 mm Ā± 0.005 mm	3.7778 in. Ā± 0.0002 in.
Piston Diameter (Metal to Metal) - Grade 2	95.965 mm Ā± 0.005 mm	3.7781 in. Ā± 0.0002 in.
Piston Diameter (Metal to Coating) - Grade 1	95.970 - 96.000 mm	3.7783 - 3.7795 in.
Piston Diameter (Metal to Coating) - Grade 2	95.980 - 96.010 mm	3.7787 - 3.7835 in.
Clearance at Size Location (Metal to Metal)	0.030 - 0.050 mm	0.0012 - 0.0020 in.
Clearance at Size Location (Metal to Coating)	0.010 - 0.030 mm	0.0004 - 0.0012 in.
Piston Weight	354 - 364 grams	12.487 - 12.840 oz.
Piston Pin Offset	0.8 mm	0.031 in.
Piston Ring Groove Diameter - No. 1	88.24 - 88.44 mm	3.474 - 3.482 in.
Piston Ring Groove Diameter - No. 2	86.54 - 86.74 mm	3.407 - 3.415 in.
Piston Ring Groove Diameter - No. 3	89.16 - 89.36 mm	3.510 - 3.518 in.

PISTON PINS

Description	Specification	
	Metric	Standard
Type	Full Floating	
Pin Diameter	21.9985 Ā± 0.0015 mm	0.86608 Ā± 0.00006 in.
Clearance in Piston	0.002 - 0.011 mm	0.0001 - 0.0004 in.
Clearance in Rod	0.011 - 0.024 mm	0.0004 - 0.0009 in.

PISTON RINGS

Description	Specification	
	Metric	Standard
Ring Gap - Number 1 Ring (Top)	0.25 - 0.40 mm	0.010 - 0.016 in.

Description	Specification	
	Metric	Standard
Ring Gap - Number 2 Ring (Center)	0.30 - 0.45 mm	0.012 - 0.018 in.
Ring Gap - Oil Control Ring (Steel Rails)	0.15 - 0.66 mm	0.006 - 0.026 in.

PISTON RING SIDE CLEARANCE

Description	Specification	
	Metric	Standard
Number 1 Ring (Top)	0.025 - 0.083 mm	0.0010 - 0.0033 in.
Number 2 Ring (Center)	0.030 - 0.078 mm	0.0012 - 0.0031 in.
Oil Control Ring (Steel Rails)	0.007 - 0.173 mm	0.0003 - 0.0068 in.

PISTON RING WIDTH

Description	Specification	
	Metric	Standard
Number 1 Ring (Top)	3.00 - 3.20 mm	0.118 - 0.126 in.
Number 2 Ring (Center)	3.59 - 3.85 mm	0.141 - 0.152 in.
Oil Control Ring (Steel Rails)	1.930 - 2.083 mm	0.076 - 0.082 in.

CONNECTING RODS

Description	Specification	
	Metric	Standard
Bearing Clearance (With Crush)	0.023 - 0.064 mm	0.0009 - 0.0025 in.
Side Clearance	0.070 - 0.370 mm	0.0028 - 0.0146 in.
Side Clearance (Max.)	0.370 mm	0.0146 in.
Piston Pin Bore Diameter	22.016 Â± 0.005 mm	0.8668 Â± 0.0002 in.
Bearing Bore Out of Round (Max.)	0.008 mm	0.0003 in.
Total Weight (Less Bearing)	546.7 Â± 8 grams	19.28 Â± 0.28 oz.

CRANKSHAFT MAIN BEARING JOURNALS

Description	Specification	
	Metric	Standard
Diameter	71.996 Â± 0.009 mm	2.8345 Â± 0.0035 in.
Bearing Clearance	0.024 - 0.050 mm	0.0009 - 0.0020 in.
Bearing Clearance (Max.)	0.050 mm	0.0020 in.
Out of Round (Max.)	0.005 mm	0.0002 in.
Taper (Max.)	0.005 mm	0.0002 in.
End Play	0.050 - 0.290 mm	0.0020 - 0.0114 in.
End Play (Max.)	0.290 mm	0.0114 in.

CONNECTING ROD JOURNALS

Description	Specification

	Metric	Standard
Diameter	59.0 Ā± 0.009 mm	2.3228 Ā± 0.0035 in.
Bearing Clearance	0.023 - 0.064 mm	0.0009 - 0.0025 in.
Out of Round (Max.)	0.005 mm	0.0002 in.
Taper (Max.)	0.005 mm	0.0002 in.

CAMSHAFT

Description	Specification	
	Metric	Standard
Bore Diameter - No. 1 Cam Towers	32.020 - 32.041 mm	1.2606 - 1.2615 in.
Bore Diameter - No. 2, 3, 4 Cam Towers	24.020 - 24.041 mm	0.9457 - 0.9465 in.
Bearing Journal Diameter - No. 1	31.976 - 31.995 mm	1.2589 - 1.2596 in.
Bearing Journal Diameter - No. 2, 3, 4	23.977 - 23.996	0.9440 - 0.9447 in.
Bearing Clearance - No. 1	0.025 - 0.065 mm	0.00010 - 0.0026 in.
Bearing Clearance - No. 2, 3, 4	0.024 - 0.064 mm	0.0009 - 0.0025 in.
Duration - Intake	260Ā°	
Duration - Exhaust	251Ā°	
End Play	0.075 - 0.251 mm	0.003 - 0.010 in.
Valve Lift-Intake (Zero Lash)	10.3 mm	0.406 in.
Valve Lift-Exhaust (Zero Lash)	10.0 mm	0.394 in.

VALVE TIMING-INTAKE VALVES

Description	Specification
Opens	2Ā° (ATDC)
Closes	82Ā° (ABDC) or 262Ā° (ATDC)
Centerline	128Ā°
Note: Units are in crank degrees, using 0.1524 mm (0.006 in.) valve lift as the threshold.	

VALVE TIMING-EXHAUST VALVES

Description	Specification
Opens	59Ā° (BBDC) or 239Ā° (BTDC)
Closes	12Ā° (ATDC)
Valve Overlap	10Ā°
Note: Units are in crank degrees, using 0.1524 mm (0.006 in.) valve lift as the threshold.	

CYLINDER HEAD

Description	Specification	
	Metric	Standard
Gasket Thickness* (Compressed)	0.48 - 0.60 mm	0.019 - 0.024 in.
Flatness (Head Gasket Surface)	0.09 mm	0.0035 in.
Valve Seat Angle	44.75Ā° Ā± 0.25Ā° from the valve guide axis	

Description	Specification	
	Metric	Standard
Valve Seat Runout (relative to the valve guide axis) - Intake and Exhaust	0.050 mm	0.002 in.
Intake Valve Seat Width	1.0 - 1.2 mm	0.04 - 0.05 in.
Exhaust Valve Seat Width	1.41 - 1.61 mm	0.055 - 0.063 in.
Guide Bore Diameter (Std.)	6.00 - 6.02 mm	0.236 - 0.237 in.
Valve Guide Height** - Intake and Exhaust	16.05 - 16.55 mm	0.632 - 0.652 in.
*Measured at the fire ring, not at the outer edge **Measured from cylinder head valve spring seat surface to top of guide		

VALVES

Description	Specification	
	Metric	Standard
Face Angle	45.25Ã° Ã± 0.25Ã°	
Head Diameter - Intake	39.0 Ã± 0.100 mm	1.535 Ã± 0.004 in.
Head Diameter - Exhaust	30.0 Ã± 0.100 mm	1.181 Ã± 0.004 in.
Length-Intake (Overall)	116.54 Ã± 0.23 mm	4.588 Ã± 0.009 in.
Length-Exhaust (Overall)	115.6 Ã± 0.23 mm	4.551 Ã± 0.009 in.
Stem Diameter - Intake	5.968 Ã± 0.009 mm	0.2350 Ã± 0.0004 in.
Stem Diameter - Exhaust	5.961Ã± 0.009 mm	0.2347 Ã± 0.0004 in.
Stem-to-Guide Clearance - Intake (New)	0.023 - 0.061 mm	0.0009 - 0.0024 in.
Stem-to-Guide Clearance - Exhaust (New)	0.030 - 0.068 mm	0.0012 - 0.0027 in.
Stem-to-Guide Clearance-Intake (Max., Rocking Method)	0.29 mm	0.011 in.
Stem-to-Guide Clearance - Exhaust (Max., Rocking Method)	0.37 mm	0.015 in.
Valve Stem Tip Height* - Intake	52.4 - 53.5 mm	2.063 - 2.106 in.
Valve Stem Tip Height* - Exhaust	51.8 - 52.9 mm	2.039 - 2.083 in.
*Valve tip to aluminum spring seat boss		

VALVE SPRING

Description	Specification	
	Metric	Standard
Free Length - Intake AND Exhaust (Approx.)	52.5 mm	2.067 in.
Spring Force - Intake AND Exhaust (Valve Closed)	295 Ã± 13 N @ 40.0 mm	66 Ã± 3 lbs. @ 1.57 in.
Spring Force - Intake (Valve Open)	688 Ã± 31 N @ 10.3 mm	155 Ã± 7 lbs. @ 0.4055 in.

Description	Specification	
	Metric	Standard
Spring Force - Exhaust (Valve Open)	676 Ã± 30 N @ 10.0 mm	152 Ã± 6 lbs. @ 0.3937 in.
Number of Coils - Intake AND Exhaust	9.35	
Wire Diameter - Intake AND Exhaust	3.18 x 3.99 mm (ovate)	0.125 x 0.157 in. (ovate)
Installed Height - Intake AND Exhaust (Spring seat top to bottom of retainer)	40.0 mm	1.575 in.

OIL PRESSURE

Description	Specification	
	Metric	Standard
(Note: At Normal Operating Temperatures)		
Pressure @ Curb Idle Speed*	34.7 kPa Min.	5 psi Min.
Pressure @ 600 - 1200 RPM	34.7 (warm) - 958.0 (cold) kPa	5 (warm) - 139 (cold) psi
Pressure @ 1201 - 3500 RPM	206.8 (warm) - 958.0 (cold) kPa	30 (warm) - 139 (cold) psi
Pressure @ 3501 - 6400 RPM	427.0 (warm) - 958.0 (cold) kPa	62 (warm) - 139 (cold) psi
*CAUTION: If oil pressure is zero at idle, DO NOT run the engine.		

TORQUE SPECIFICATIONS

ENGINE BLOCK

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Connecting Rod Cap Bolts	20 + 90Â° Turn	15 + 90Â° Turn	-	X
Crankshaft Target Wheel to Counterweight M6	10	-	89	-
Crankshaft Outer Main Bearing Cap and Windage Tray Bolts	21 + 90Â° Turn	16 + 90Â° Turn	-	-
Crankshaft Inner Main Bearing Cap Bolts	20 + 90Â° Turn	15 + 90Â° Turn	-	-
Crankshaft Side Main Bearing Cap (Tie Bolt) Bolts	30	22	-	-
Crankshaft Position (CKP) Sensor to Engine Block Bolt	12	9	-	-
Crankshaft Rear Oil Seal Retainer - M6	12	9	-	-
Engine Block Heater Bolt	12	9	-	-

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Knock Sensor to Engine Block	22	16	-	-
Oil Pan Drain Plug	27	20	-	-
Oil Pressure Sensor to Oil Filter Housing	20	15	-	-
Oil Temperature Sensor to Oil Filter Housing	20	15	-	-
Lower Oil Pan to Upper Oil Pan M6 Bolts	12	9	-	-
Upper Oil Pan to Engine Block M8 Bolts	25	18	-	-
Upper Oil Pan to Rear Seal Retainer M6 Bolts	10	-	89	-
Piston Oil Cooler Jet to Engine Block M5	6	-	53	-
Oil Filter Housing/Oil Cooler to Engine Block M6 Bolts	12	9	-	-
Oil Filter Housing Cap	25	18	-	-
Oil Pump to Block M6 Bolts	12	9	-	-
Oil Pump Sprocket M8 Bolt	25	18	-	-
Oil Pump Pick Up Tube Bracket to Windage Tray M6 Bolt	12	9	-	-
Oil Pump Pick Up Bolt	12	9	-	-
Timing Gear Splash Shield Bolts	5	-	35	-
* **NEW FASTENERS:** Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

CYLINDER HEAD

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Camshaft Position (CMP) Sensor to Cylinder Head Bolt	9	-	80	-
Camshaft Chain Guide (Primary) Bolt	12	9	-	-
Camshaft Chain Tensioner (Primary) Bolt	12	9	-	-
Camshaft Chain LH Guide (Secondary) Bolt	12	9	-	-

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Camshaft Chain LH Tensioner (Secondary) Bolt	12	9	-	-
Camshaft Chain RH Guide (Secondary) Bolt	12	9	-	-
Camshaft Chain RH Tensioner (Secondary) - Bolt	12	9	-	-
Camshaft Chain Idler Sprocket	25	18	-	-
Camshaft Bearing Cap	Refer to **CAMSHAFT, ENGINE, INSTALLATION**.			-
Catalytic Converter to Cylinder Head Bolts	21	15	-	-
Cylinder Head Oil Galley Plug	5 + 750Â° Turn	-	4 + 750Â° Turn	X
Cylinder Head Oil Restrictor Plug	18	13	-	-
Cylinder Head Bolts	Refer to **CYLINDER HEAD, INSTALLATION**.			-
Cylinder Head Cover Bolts	12	9	-	-
Down Pipe Flange Bolts	21	15	-	-
Engine Coolant Temperature (ECT) Sensor	30	22	-	-
Engine Lifting Bracket Bolts	20	15	-	-
Engine Mount Heat Shield Bolts	25	18	-	-
Exhaust Down Pipe Flange Bolts	23	17	-	-
Fuel Rail to Lower Intake Manifold Bolts	7	-	62	-
Heater Core Supply Tube to Cylinder Head Bolt	12	9	-	-
Heater Core Supply Tube to Cylinder Head Nut	12	9	-	-
Ignition Capacitor to Cylinder Head Bolts	10	-	89	-
Ignition Coil to Cylinder Head Cover Bolts	8	-	71	-
Intake Manifold (Upper) Bolts	10	-	89	-
Intake Manifold (Lower) Bolts	8	-	71	-

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Oil Control Valve - Cam Phaser Bolt	160	118	-	-
Oil Level Indicator to Cylinder Head M6 Bolt	12	9	-	-
PCV Valve	4	-	35	-
Spark Plug	18	13	-	-
Throttle Body Bolts	7	-	62	-
Transmission Oil Cooler Lines Bolt	28	21	-	-
Upper Intake Manifold Support Bracket to Cylinder Head Bolt	20	15	-	-
Upper Intake Manifold Support Bracket to Upper Intake Manifold Nuts	10	-	89	-
Variable Valve Timing Solenoid to Cylinder Head Cover	4	-	35	-
Wire Harness Retainer Bracket to LH Cylinder Head Bolt	12	9	-	-
* **NEW FASTENERS:** Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

FRONT ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Thermostat Housing to Coolant Crossover Bolts	12	9	-	-
Engine Timing Cover - M6 Bolts	12	9	-	-
Engine Timing Cover - M8 Bolt	25	18	-	-
Engine Timing Cover - M10 Bolts	55	41	-	-
Coolant Crossover Housing to Engine Timing Cover Bolts	12	9	-	-
Coolant Pump to Engine Timing Cover Bolts	12	9	-	-
Vibration Damper Bolt	40 + 105Ā° Turn	30 + 105Ā° Turn	-	-
Water Pump Bolts	12	9	-	-
* **NEW FASTENERS:** Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

REAR ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Electric Vacuum Pump Bolts	55	41	-	-
Flexplate Bolts	95	70	-	-
Transmission to Upper Oil Pan Bolts	55	41	-	-
Transmission to Engine Block Bolts	55	41	-	-
Torque Converter Dust Shield Bolt	12	9	-	-
Torque Converter Bolts	42	31	-	-
* **NEW FASTENERS:** Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

ENGINE MOUNTS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Transmission Mount Bracket to Transmission Bolts	61	45	-	-
Transmission Mount Isolator to Bracket Bolts	25	18	-	-
Transmission Mount Crossmember to Frame Bolts	61	45	-	-
Transmission Mount Isolator to Crossmember Bolts	61	45	-	-
Left/Right Engine Mount Bracket to Engine Block Bolts	61	45	-	-
Left/Right Engine Mount Isolator to Engine Mount Bracket Nuts	61	45	-	-
Left/Right Engine Mount Heatshield to Engine Mount Bracket Bolts	25	18	-	-
Left/Right Engine Mount Isolator to Frame Bolts	48	35	-	-
* **NEW FASTENERS:** Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

ACCESSORY DRIVE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
A/C Compressor Bolts	28	21	-	-

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
A/C Compressor Nuts	28	21	-	-
Generator Bolts	25	18	-	-
Idler Pulley Bolt	25	18	-	-
Power Steering Pump Bracket to Engine Bolts	25	18	-	-
Tensioner to Engine Timing Cover - Accessory Drive Bolt	55	41	-	-
* **NEW FASTENERS:** Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

MISCELLANEOUS COMPONENTS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Air Cleaner Body Bolt	12	9	-	-
Air Inlet Hose Band Clamps	5	-	44	-
Coolant Bottle Bolts	12	9	-	-
Lower Intermediate Shaft Pinch Bolts	45	33	-	X
Negative Battery Cable to Battery	5	-	44	-
Steering Gear Bolts	95	70	-	-
Oxygen Sensor	52	38	-	-
* **NEW FASTENERS:** Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

REMOVAL

REMOVAL

CAUTION: If the original engine has experienced a catastrophic failure or an individual failure with the piston, cylinder bore, engine block, valve or valve seat, the intake manifold MUST be replaced with a new manifold.

1. Remove the hood. Refer to **HOOD, REMOVAL** .
2. Remove the cowl panel cover. Refer to **COVER, COWL PANEL, REMOVAL** .

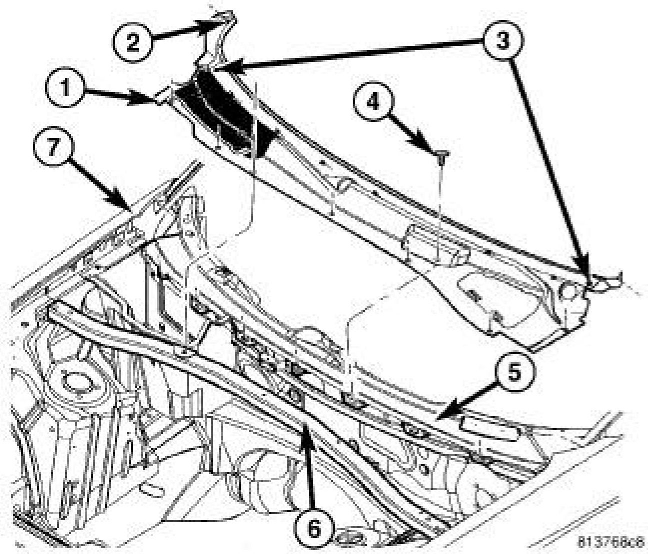


Fig. 5: Removing/Installing Cowl Panel
Courtesy of CHRYSLER GROUP, LLC

3. Remove the strut tower support (6).
4. Perform the fuel pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
5. Disconnect and isolate the negative battery cable.
6. Perform the Refrigerant System Recovery procedure. Refer to **PLUMBING, STANDARD PROCEDURE** .

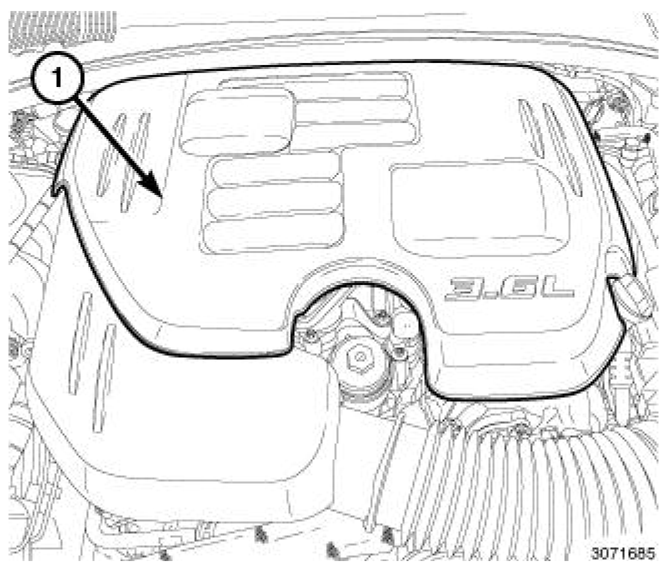


Fig. 6: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

7. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).
8. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.

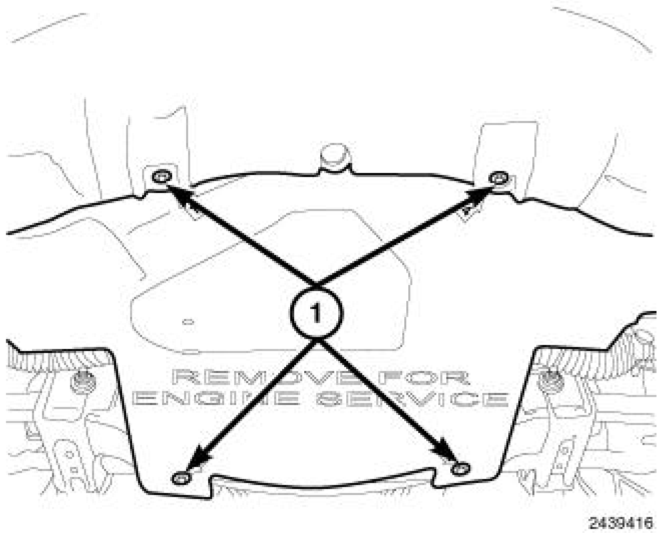


Fig. 7: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

9. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
10. Remove the bolts (1) and the belly pan.
11. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
12. Drain the engine oil. Refer to **STANDARD PROCEDURE**.
13. Remove the starter motor. Refer to **STARTER, REMOVAL** .

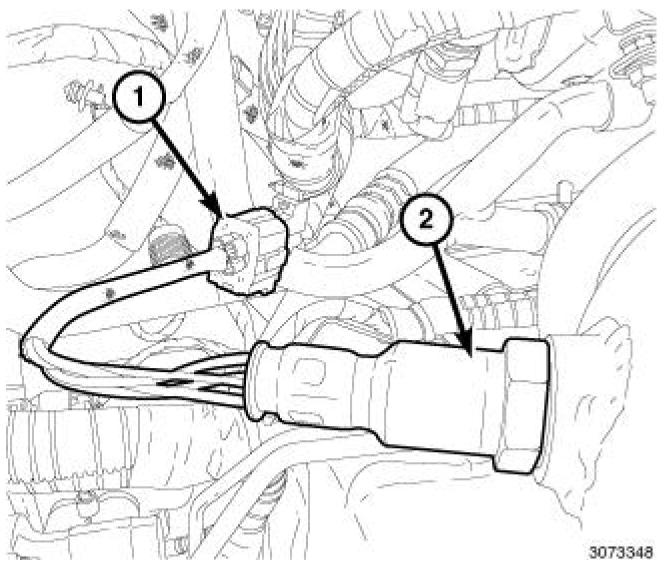


Fig. 8: Upstream Oxygen Sensor & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

14. Disconnect both left and right upstream oxygen sensor (2) wire harness connectors (1).

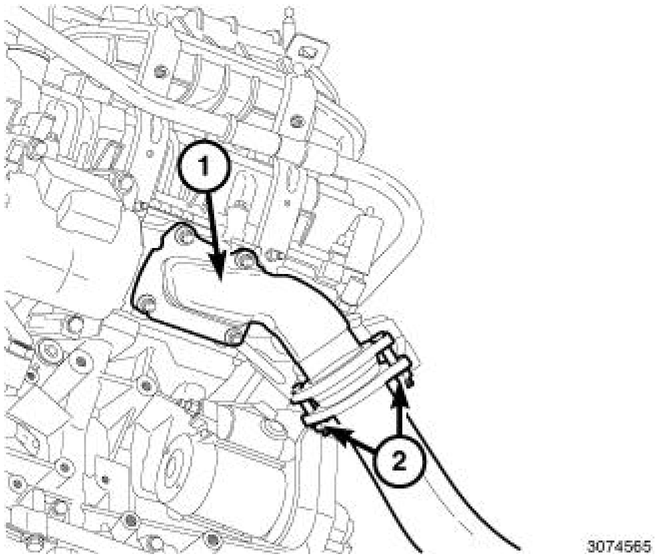


Fig. 9: Exhaust Down Pipe & Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

15. Remove the exhaust down pipe (1) to catalytic converter retaining nuts (2) from both left and right down pipes.

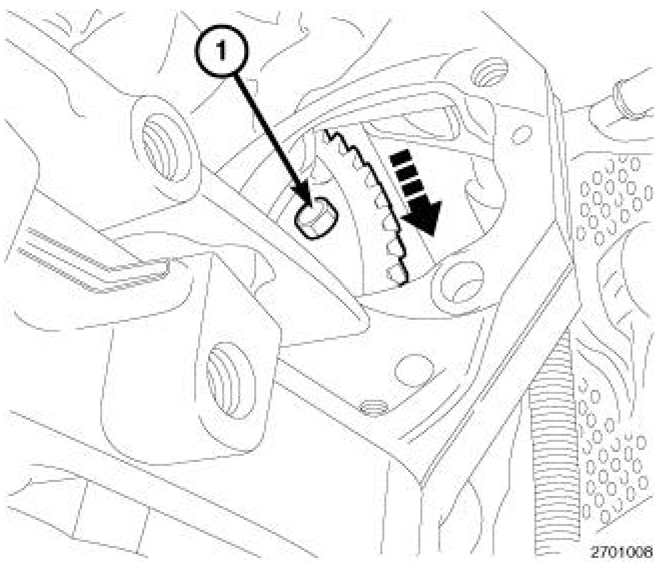


Fig. 10: Torque Converter Bolt
Courtesy of CHRYSLER GROUP, LLC

16. Rotate the crankshaft in a clockwise direction until the torque converter bolts (1) are accessible through the starter mounting hole and remove the six torque converter bolts (1).
17. Remove support and lower the vehicle.
18. Remove the pressurized coolant bottle. Refer to **BOTTLE, PRESSURIZED COOLANT, REMOVAL** .

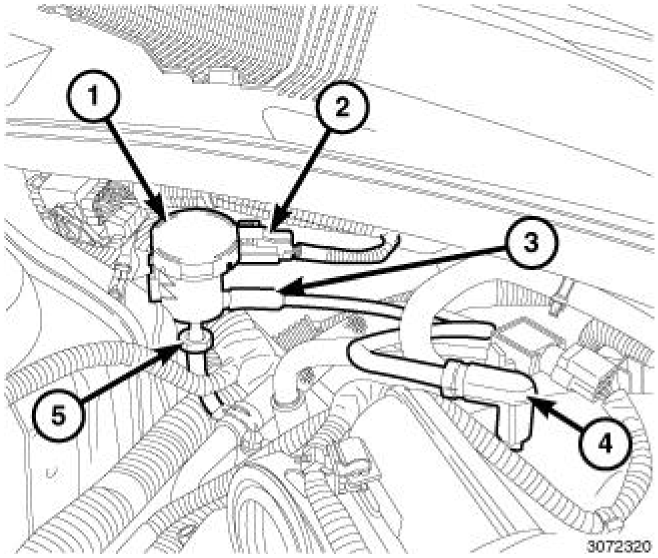


Fig. 11: EVAP Purge Solenoid, Electrical Connector & Vacuum Lines
Courtesy of CHRYSLER GROUP, LLC

19. Disconnect the vacuum line (3) at the EVAP purge solenoid (1).
20. Disconnect the EVAP purge solenoid vacuum line (4) at the intake manifold and remove the vacuum line.

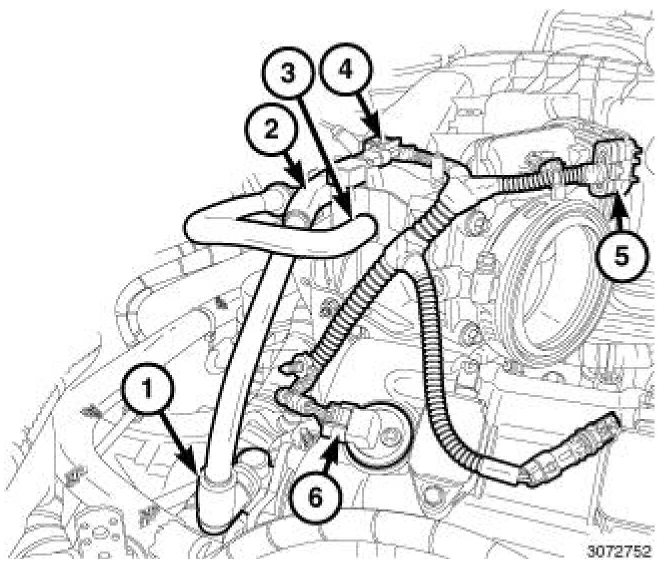


Fig. 12: PCV Valve, Intake Manifold, Brake Booster Vacuum Hose, MAP Sensor, ETC & CMP Sensor Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

21. Remove the Positive Crankcase Ventilation (PCV) hose from the PCV valve (1) and the intake manifold (2).
22. Disconnect the brake booster vacuum hose (3) and position aside.
23. Disconnect the Manifold Absolute Pressure (MAP) sensor wire harness connector (4).
24. Disconnect the Electric Throttle Control (ETC) wire harness connector (5).
25. Disconnect the Camshaft Position sensor (CMP) wire harness connector (6).

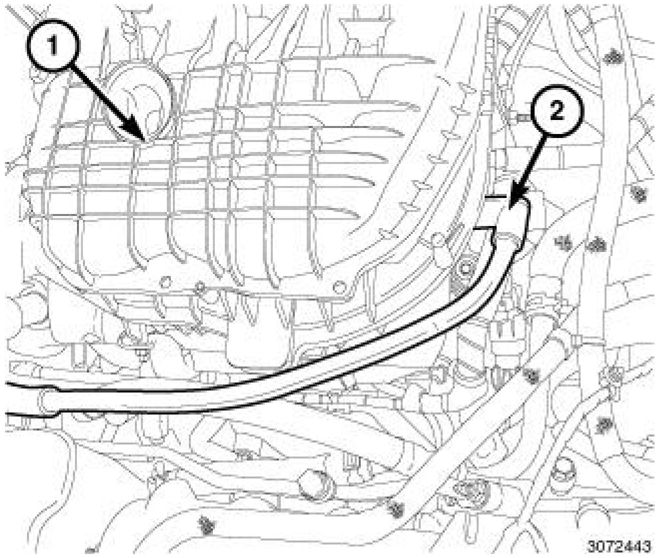


Fig. 13: Fresh Air Makeup Hose At Rear Of Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

26. Remove the fresh air makeup hose (2) from the rear of the intake manifold (1).

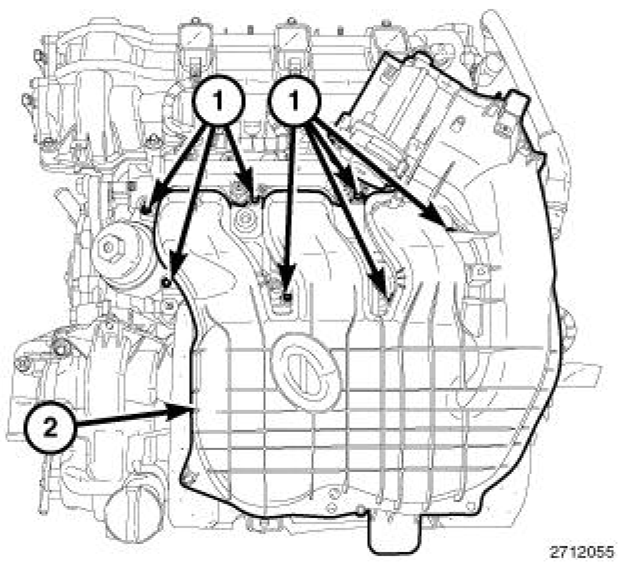


Fig. 14: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

27. Remove the upper intake manifold (2) and insulator. Refer to **MANIFOLD, INTAKE, REMOVAL**.

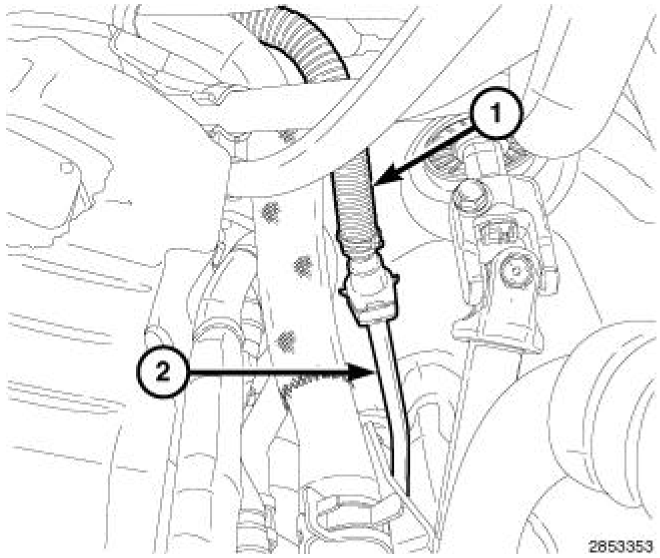


Fig. 15: Fuel Supply Hose At Underbody Fuel Supply Tube
Courtesy of CHRYSLER GROUP, LLC

28. Disconnect the fuel supply hose (1) from the underbody fuel supply tube (2). Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE** .
29. Remove the cooling fan module. Refer to **FAN, COOLING, REMOVAL** .

CAUTION: Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.

30. Remove the generator. Refer to **GENERATOR, REMOVAL** .

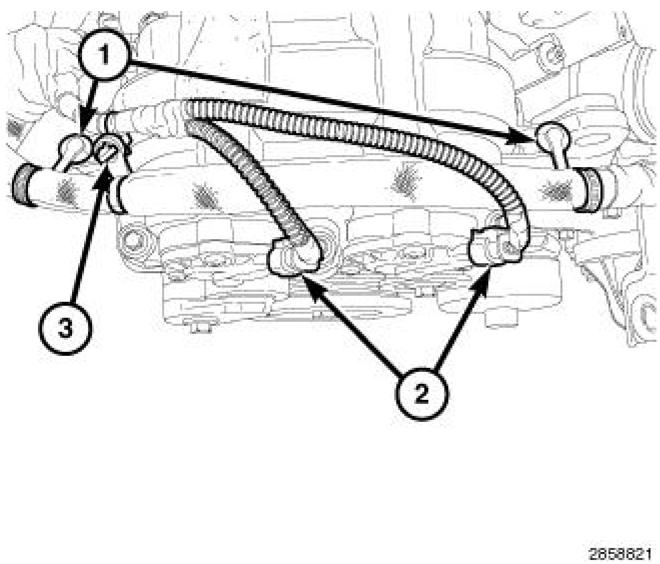


Fig. 16: Variable Valve Timing Solenoid Connectors & Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

NOTE: Mark the variable valve timing solenoid connectors (2) with a paint pen or equivalent so that they may be reinstalled in their original locations.

31. Disconnect the right cylinder head variable valve timing solenoids wire harness connectors (2).

32. Unfasten the starter harness to main harness retainer (3).
33. Unfasten the two starter wire harness retainers (1) from the right cylinder head cover.

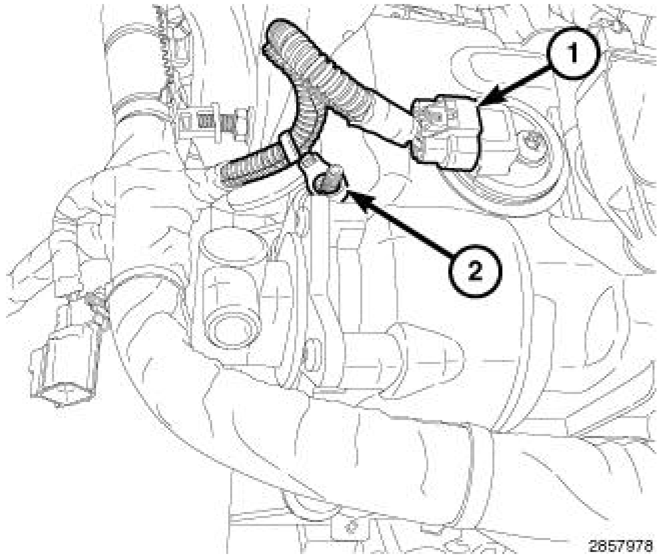


Fig. 17: Main Wire Harness Retainer & Connector
Courtesy of CHRYSLER GROUP, LLC

34. Unfasten the main wire harness retainer (2) from the right cylinder head cover mounting stud.

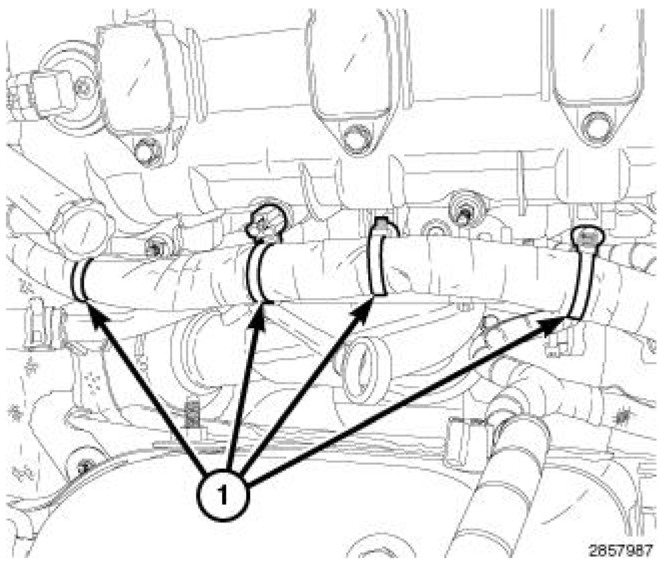


Fig. 18: Main Wire Harness Retainers At Right Cylinder Head Cover
Courtesy of CHRYSLER GROUP, LLC

35. Unfasten the four main wire harness retainers (1) from the right cylinder head cover.

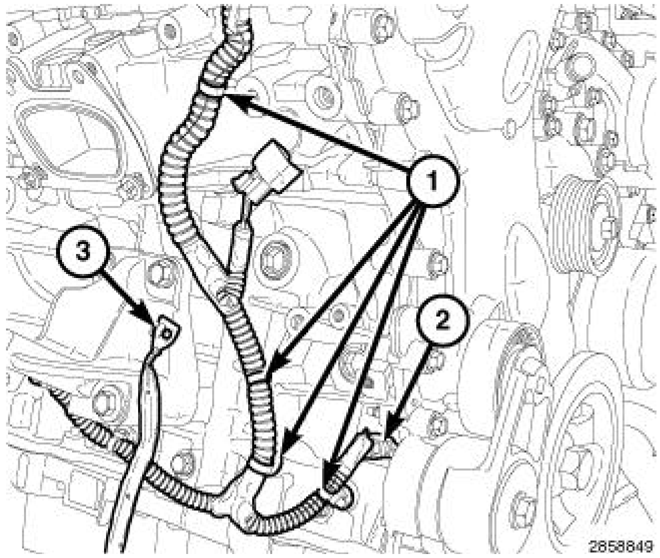


Fig. 19: Wire Harness Retainers, Oil Pump Solenoid Electrical Connector & Ground Strap
Courtesy of CHRYSLER GROUP, LLC

36. Disconnect the oil pump solenoid wire harness connector (2).
37. Unfasten the four wire harness retainers (1).
38. Remove the ground strap (3) from the right engine mount bracket.

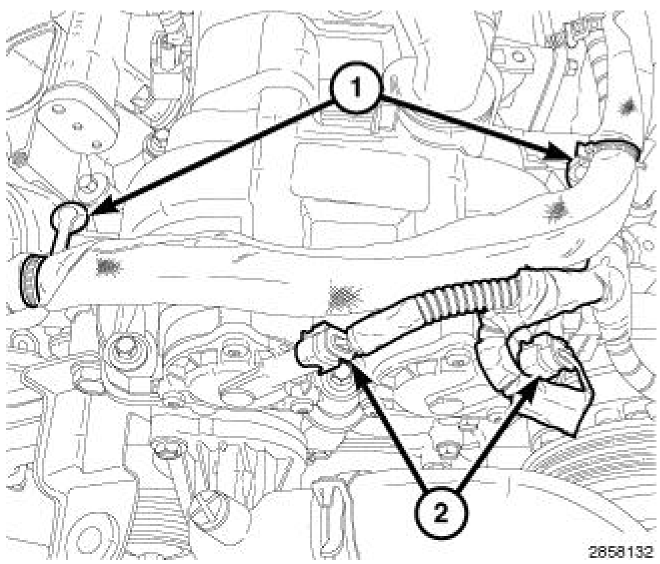


Fig. 20: Variable Valve Timing Solenoid Connectors & Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Mark the variable valve timing solenoid connectors (2) with a paint pen or equivalent so that they may be reinstalled in their original locations.**

39. Disconnect the left variable valve timing solenoids wire harness connectors (2).
40. Unfasten the two starter wire harness retainers (1) from the left cylinder head cover.

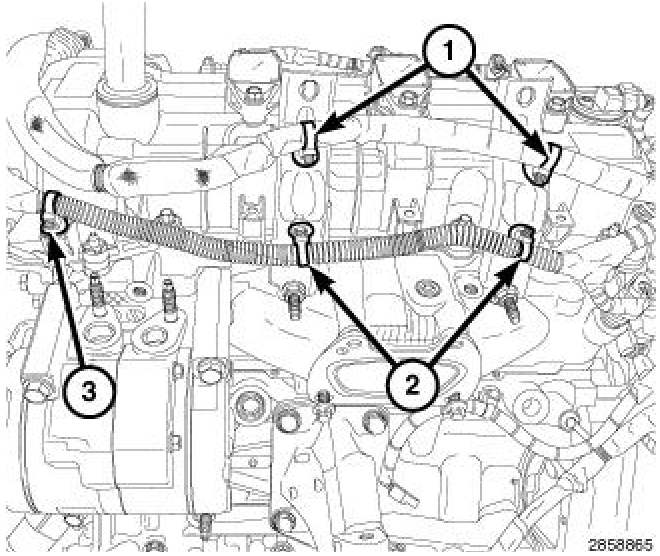


Fig. 21: Starter Wire Harness Retainers, Main Wire Harness Retainer & Manifold Support Bracket Retainers
Courtesy of CHRYSLER GROUP, LLC

41. Unfasten the two starter wire harness retainers (1) from the upper intake manifold support brackets.
42. Unfasten the main wire harness retainer (3) from the left cylinder head cover and two retainers (2) from the upper intake manifold support brackets.

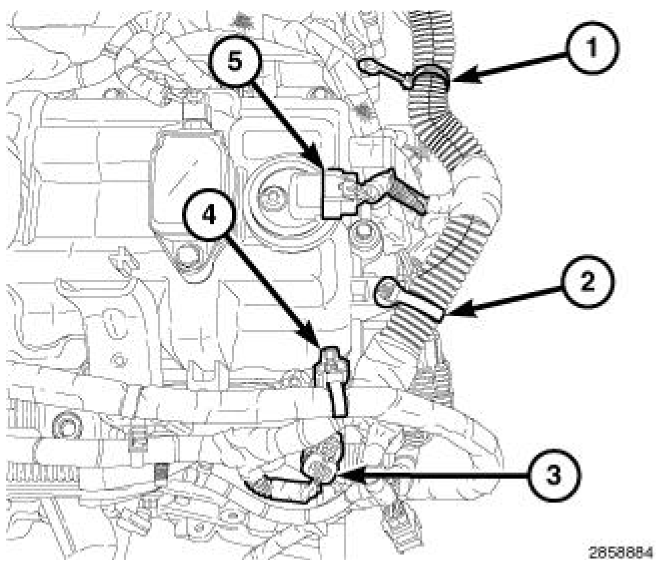


Fig. 22: ECT Sensor Connector, CMP Sensor & Main Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

43. Disconnect the Engine Coolant Temperature (ECT) sensor wire harness connector (3).
44. Disconnect the left CMP sensor wire harness sensor (5).
45. Unfasten the main wire harness retainer (2) from the cylinder head cover and one main wire harness retainer (4) from the cylinder head cover mounting stud.
46. Unfasten the main wire harness retainer (1) form the rear of the lower intake manifold.

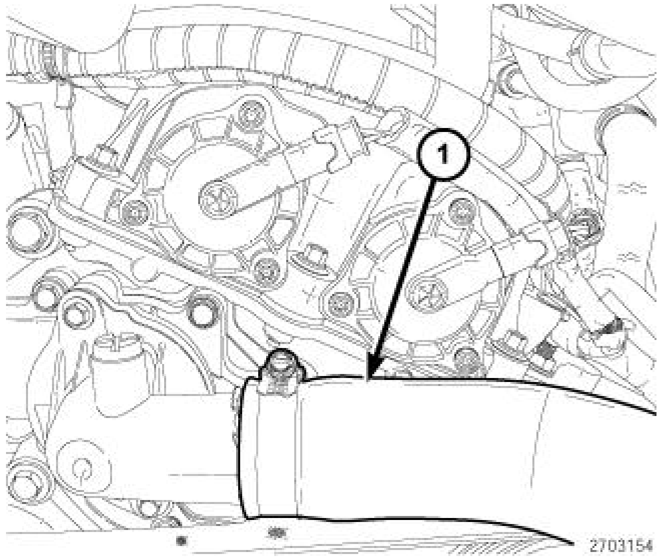


Fig. 23: Upper Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

47. Remove the upper radiator hose (1) from the engine thermostat housing.

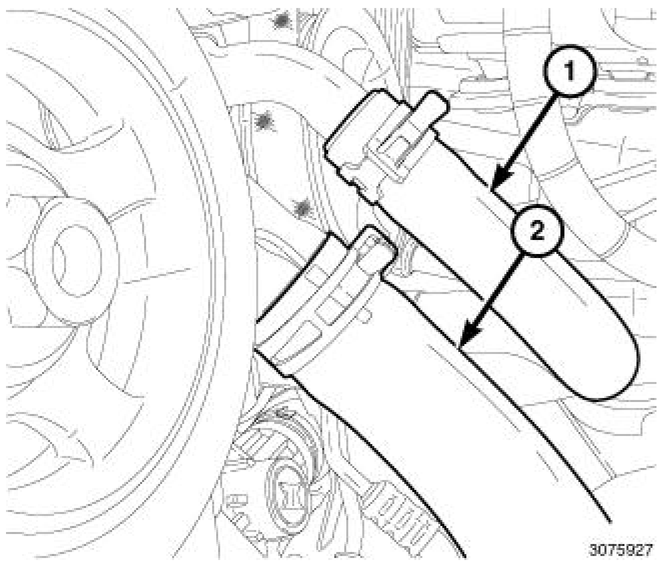


Fig. 24: Lower Heater Core Return Hose & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

48. Remove the lower heater core return hose (1) from the engine coolant pump.
49. Remove the lower radiator hose (2) from the engine coolant pump.

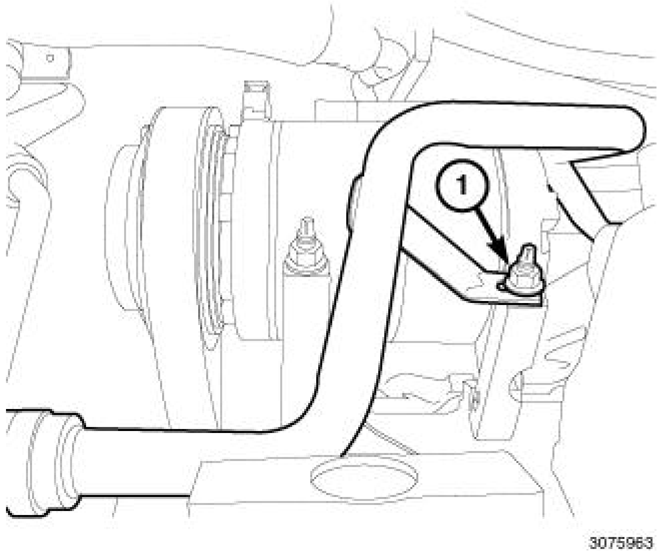


Fig. 25: Heater Core Return Tube Lower Support Bracket Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

50. Remove the heater core return tube lower support bracket retaining nut (1).

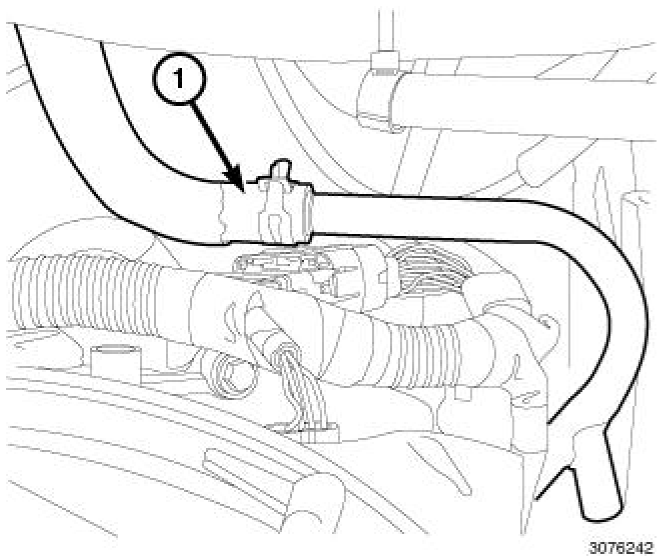


Fig. 26: Heater Core Return Hose
Courtesy of CHRYSLER GROUP, LLC

51. Disconnect the heater core return hose (1).

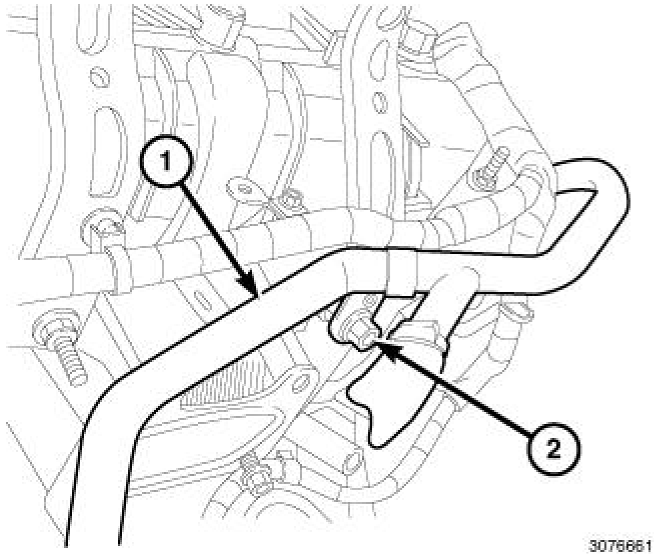


Fig. 27: Heater Core Return Tube Upper Support Bracket Retaining Nut & Tube
Courtesy of CHRYSLER GROUP, LLC

52. Remove the heater core return tube upper support bracket retaining nut (2) and remove the tube (1).

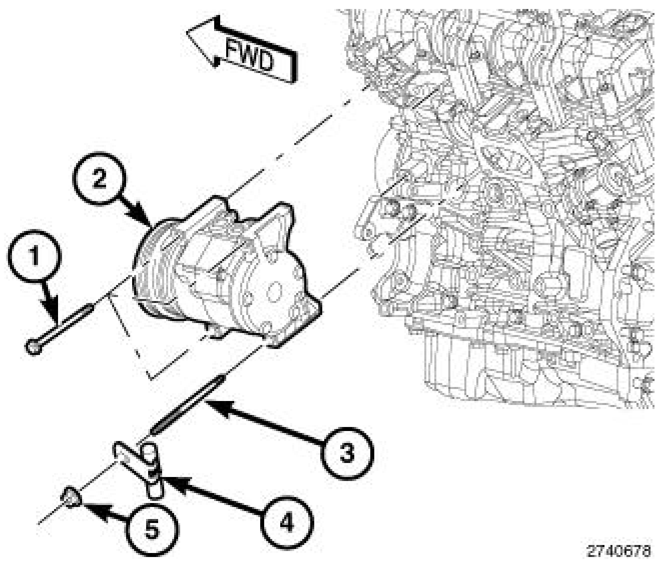
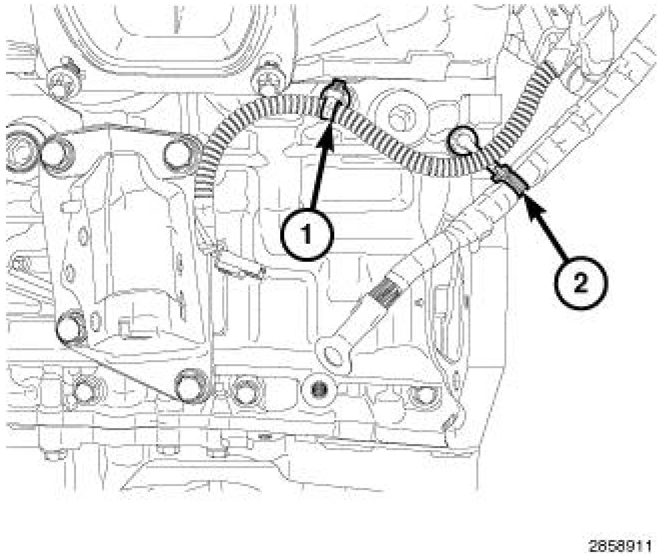


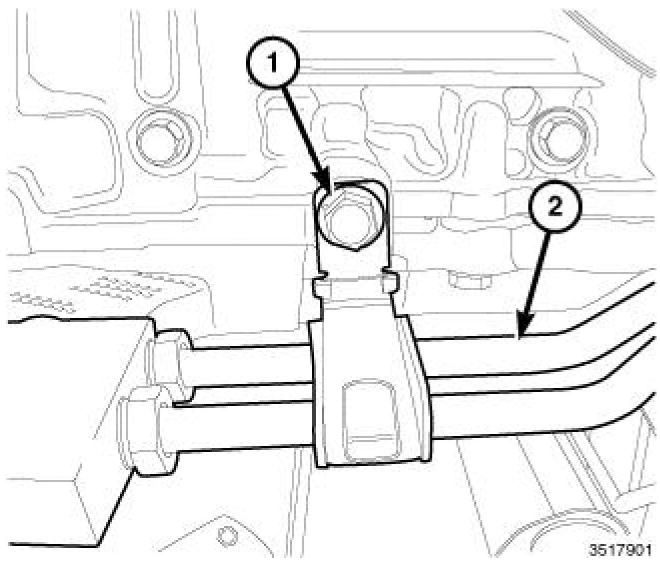
Fig. 28: A/C Compressor, Nut, Stud & Three Bolts
Courtesy of CHRYSLER GROUP, LLC

53. Remove the A/C compressor (2). Refer to **COMPRESSOR, A/C, REMOVAL** .
54. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .



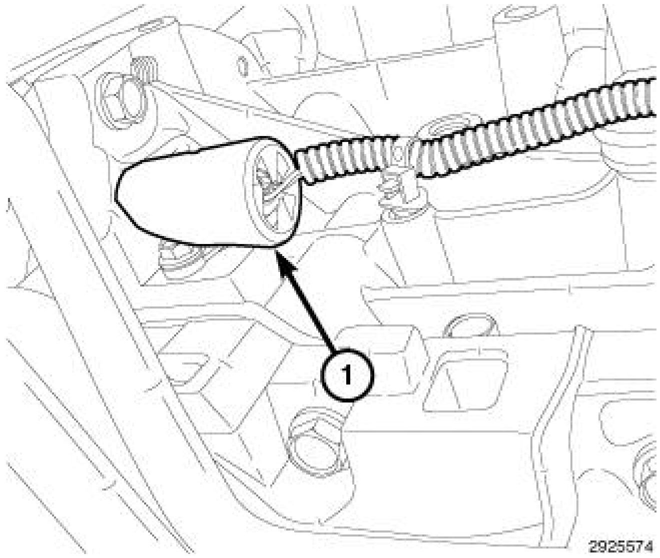
[Fig. 29: Wire Harness Retainers]
Courtesy of CHRYSLER GROUP, LLC

55. Unfasten the starter wire harness retainer (2) and the main wire harness retainer (1) from the engine block.



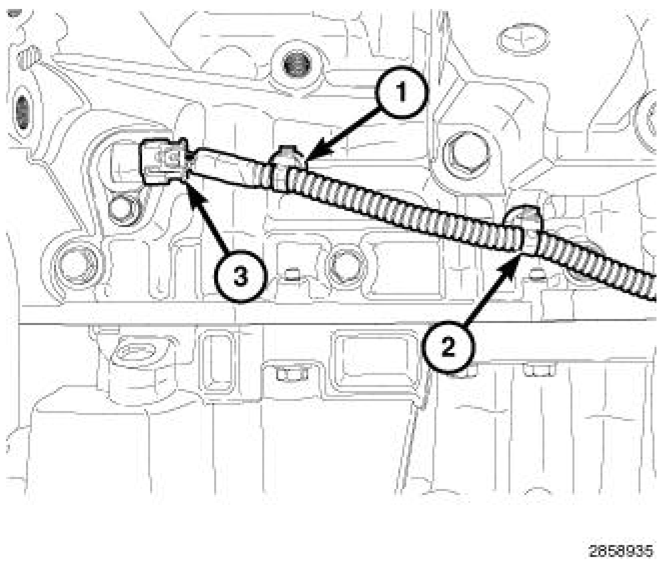
[Fig. 30: Bolt & Transmission Cooling Lines]
Courtesy of CHRYSLER GROUP, LLC

56. Remove the bolt (1) and reposition the transmission cooling lines (2).



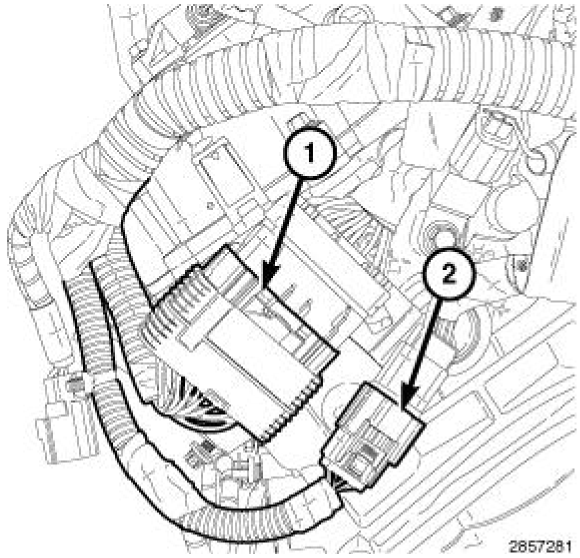
[Fig. 31: Heat Shield](#)
Courtesy of CHRYSLER GROUP, LLC

57. Push back the heat shield (1) from the Crankshaft Position (CKP) sensor.



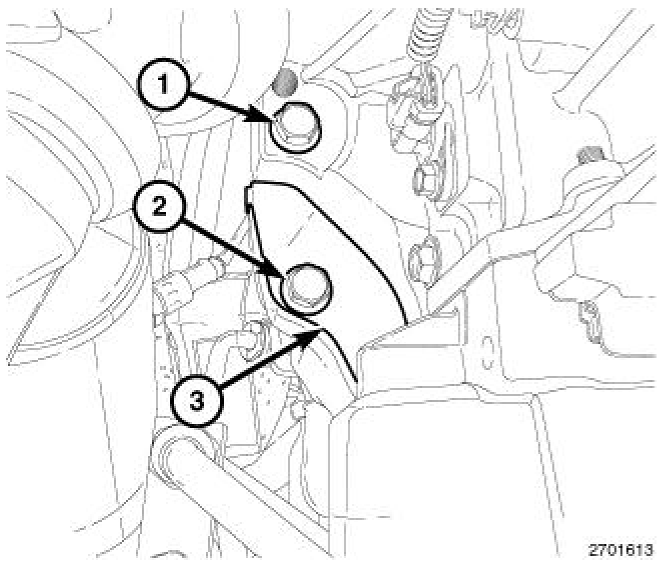
[Fig. 32: Main Wire Harness Retainers & CKP Sensor](#)
Courtesy of CHRYSLER GROUP, LLC

58. Disconnect the CKP sensor wire harness connector (3).
59. Unfasten the main wire harness retainer (1) from the engine block and one main wire harness retainer (2) from the right engine mount bracket.
60. Disconnect and reposition the power cord from the engine block heater (if equipped).
61. Remove the two upper side transmission to engine retaining bolts.



[Fig. 33: Engine Injection/Ignition Harness & Engine Oil Pressure/Temperature Harness]()
Courtesy of CHRYSLER GROUP, LLC

62. Disconnect the main engine wire harness connector (1) at the rear of the left cylinder head.
63. Disconnect the engine oil pressure/temperature main wire harness connector (2) at the rear of the left cylinder head.



[Fig. 34: Side Engine-To-Transmission Bolt, Transmission Dust Shield Retaining Bolt & Dust Shield]()
Courtesy of CHRYSLER GROUP, LLC

64. Remove the side engine to transmission bolt (1).

    Remove bolt (2) and the transmission dust shield (3).

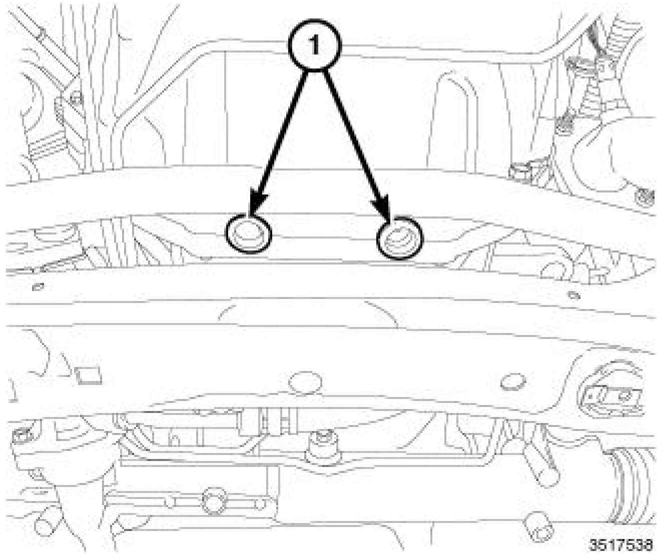


Fig. 35: Rubber Plugs
Courtesy of CHRYSLER GROUP, LLC

65. Remove the two rubber plugs (1) covering the rear oil seal retainer flange bolts.

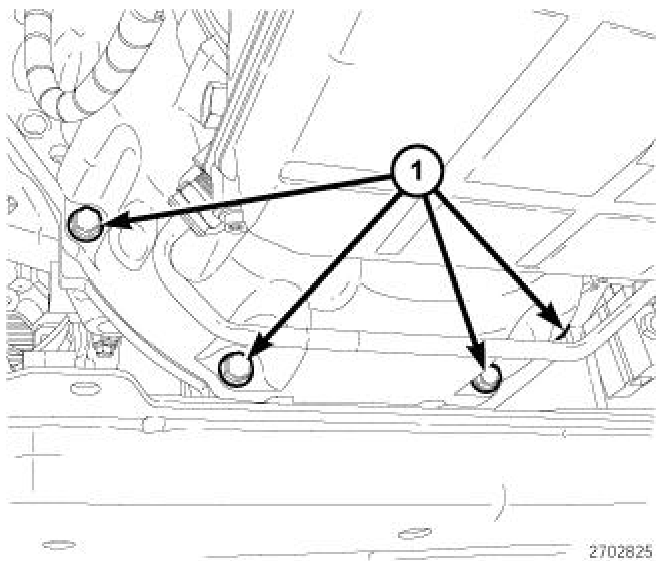


Fig. 36: Transmission-To-Engine Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

66. Remove the four transmission to the engine oil pan bolts (1).

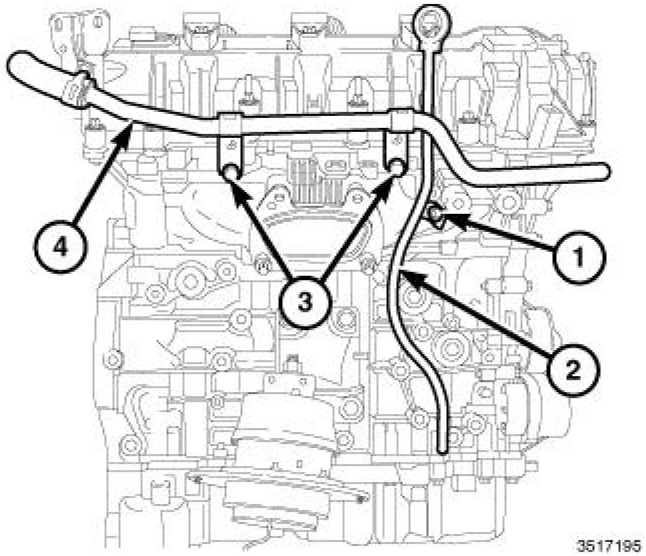


Fig. 37: Heater Core Inlet Tube, Oil Level Indicator & Bolts
Courtesy of CHRYSLER GROUP, LLC

67. Remove support and lower the vehicle.
68. Remove bolts (3) and the heater core inlet tube (4).
69. Remove bolt (1) and the oil level indicator (2).

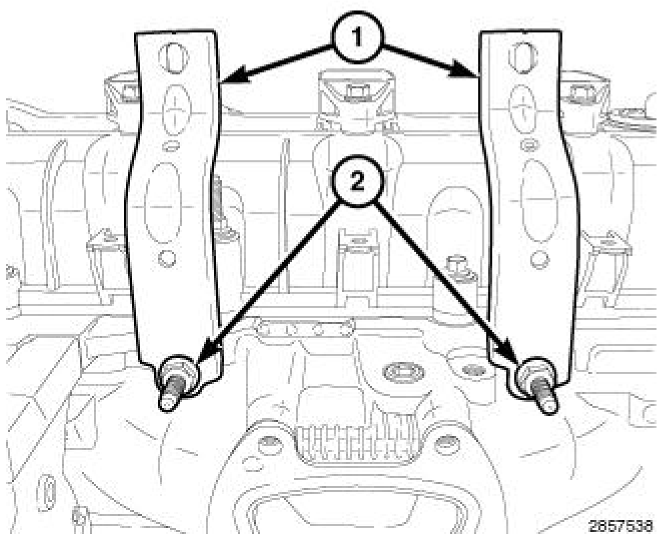


Fig. 38: Left Intake Manifold Support Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

70. Remove bolts (2) and the left intake manifold support brackets (1).

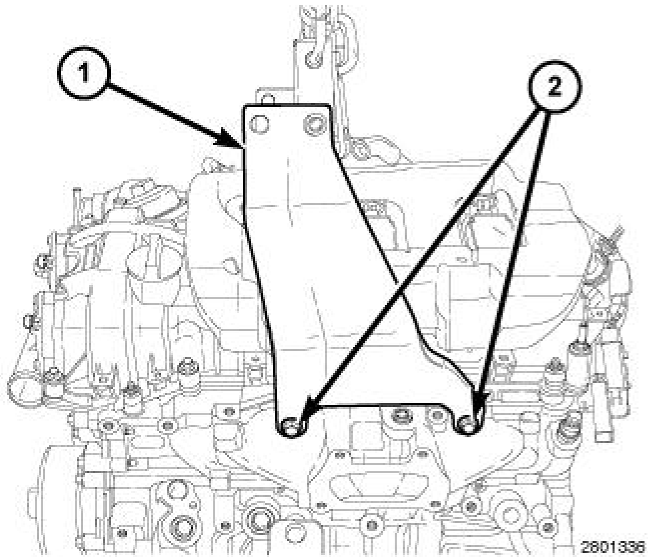


Fig. 39: Driver Side Engine Lifting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

71. Install the Left Side Engine Lifting Bracket (special tool #10242-1, Brackets, Engine Lifting, Left Side) (1) on the left cylinder head with bolts (2) provided with the Engine Lifting Bracket and tighten bolts to proper specification.

    Refer to **TORQUE SPECIFICATIONS**.

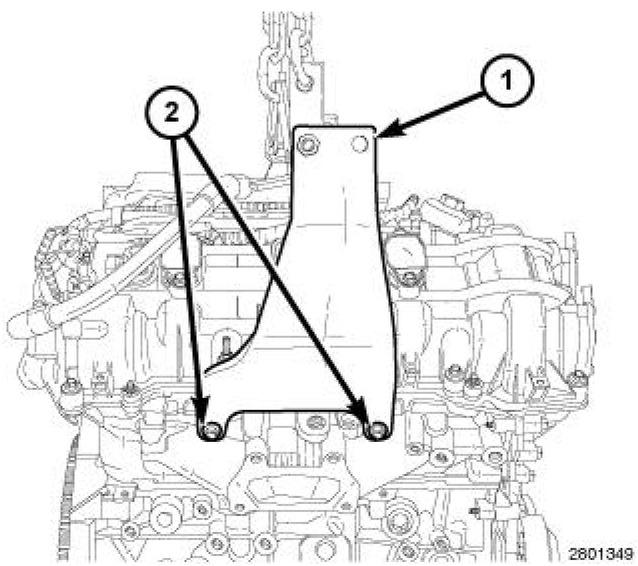


Fig. 40: Passenger Side Engine Lifting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

72. Install the Right Side Engine Lifting Bracket (special tool #10242-2, Brackets, Engine Lifting, Right Side) (1) on the right cylinder head with bolts (2) provided with the Engine Lifting Bracket and tighten bolts to proper specification.

    Refer to **TORQUE SPECIFICATIONS**.

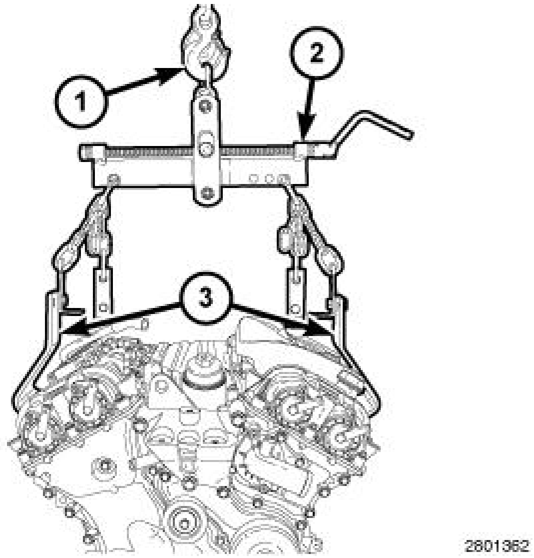


Fig. 41: Lifting Sling, Engine Lifting Brackets & Engine Hoist
Courtesy of CHRYSLER GROUP, LLC

73. Reposition the starter wire harness and the main wire harness to the rear of the engine compartment.
74. Position a load-leveling lifting sling (2), such as OTCÃ® 4305 Engine Load Leveler or equivalent, between the engine lifting brackets (3) and an engine hoist (1).
75. Support the transmission with a suitable jack.

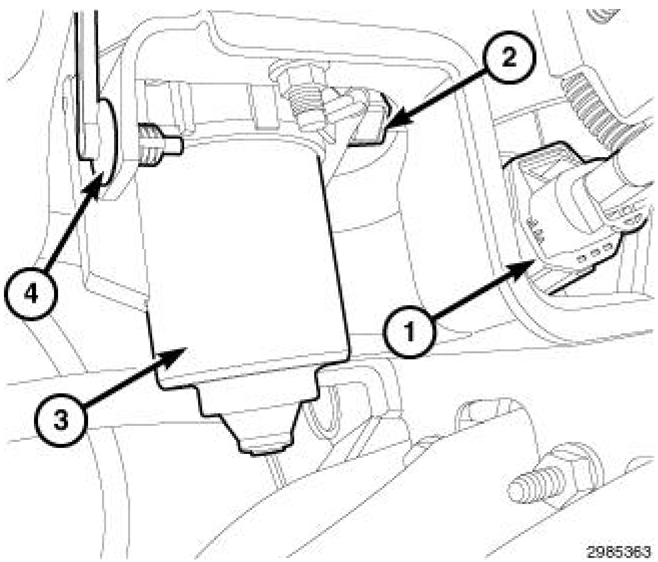


Fig. 42: Electrical Connector, Harness Connector, Hose & Vacuum Pump
Courtesy of CHRYSLER GROUP, LLC

76. Unfasten the wire harness retainer (4) from the electric vacuum pump mounting bracket.
77. Disconnect the electric vacuum pump (3) wire harness connector (1).
78. Remove the quick connect vacuum hose (2) from the electric vacuum pump (3).

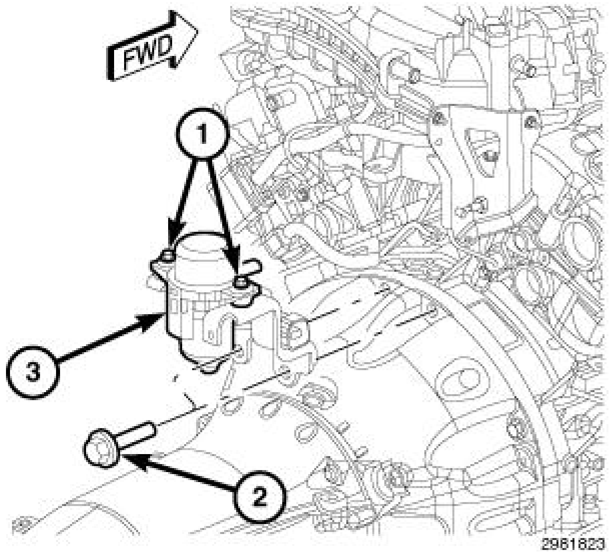


Fig. 43: Electric Vacuum Pump, Bolts & Studs
Courtesy of CHRYSLER GROUP, LLC

79. Remove the bolts (2) and the electric vacuum pump (3).

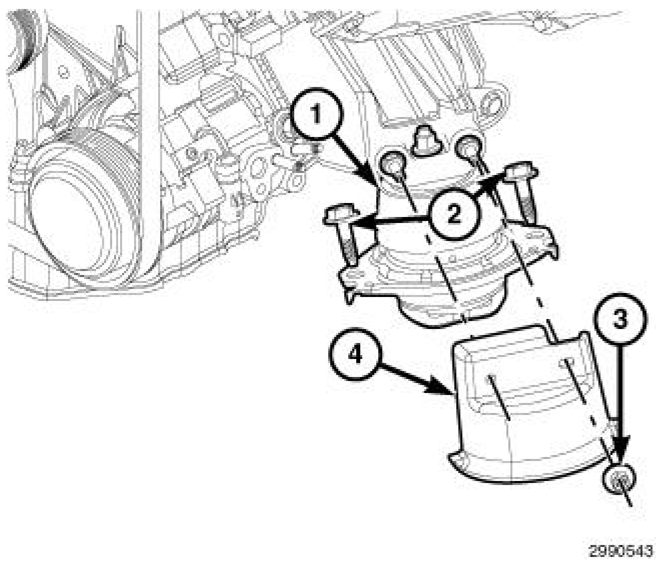


Fig. 44: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left engine mount shown in illustration, right engine mount similar.**

80. Remove the left and right engine mount heat shield nuts (3) and the heat shields (4).
81. Remove the left and right engine mount bolts (2).

CAUTION: **While slowly separating the engine from the vehicle, constant checks must be made to assure proper positioning and that no damage to other components or wiring harnesses occur during separation.**

82. Carefully remove the engine from the engine compartment.
83. If required, remove the following components for installation on the replacement engine:

- Left exhaust down pipe
- Right exhaust down pipe
- Left engine mount bracket
- Left engine mount
- Right engine mount bracket
- Right engine mount
- Accessory drive belt tensioner
- Upper intake manifold support bracket
- Block heater (if equipped).

INSTALLATION

INSTALLATION

CAUTION: If the original engine has experienced a catastrophic failure or an individual failure with the piston, cylinder bore, engine block, valve or valve seat, the intake manifold MUST be replaced with a new manifold.

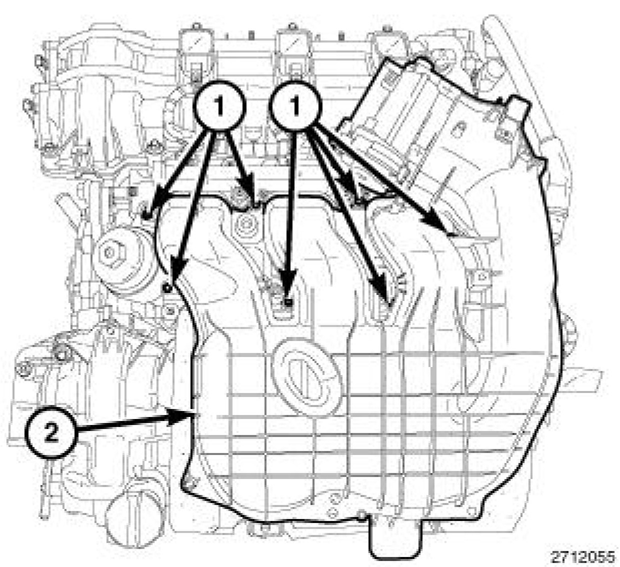


Fig. 45: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: If installing a replacement engine, transfer components such as engine mount brackets, block heater, accessories, heater hoses and tubes to the replacement engine.

1. If required, transfer the following components onto the replacement engine:
    - Left exhaust down pipe
    - Right exhaust down pipe
    - Left engine mount bracket
    - Left engine mount

- Right engine mount bracket
- Right engine mount
- Accessory drive belt tensioner
- Upper intake manifold support bracket
- Block heater (if equipped)

2. If required, remove the upper intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.

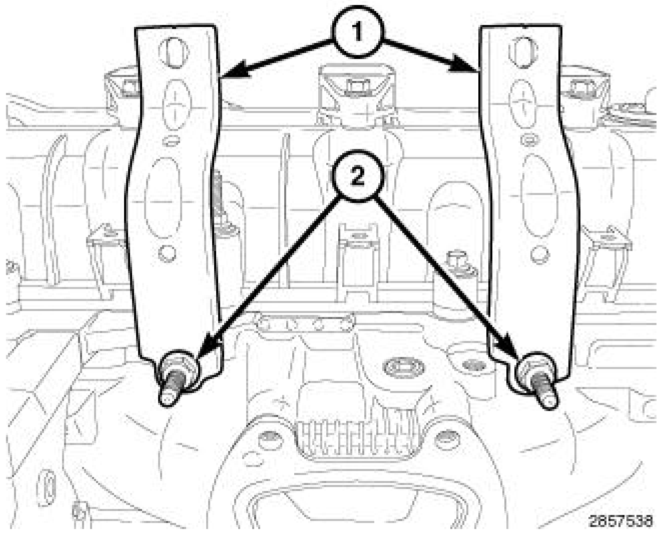


Fig. 46: Left Intake Manifold Support Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the left intake manifold support bracket retaining bolts (2) and remove the support brackets (1).

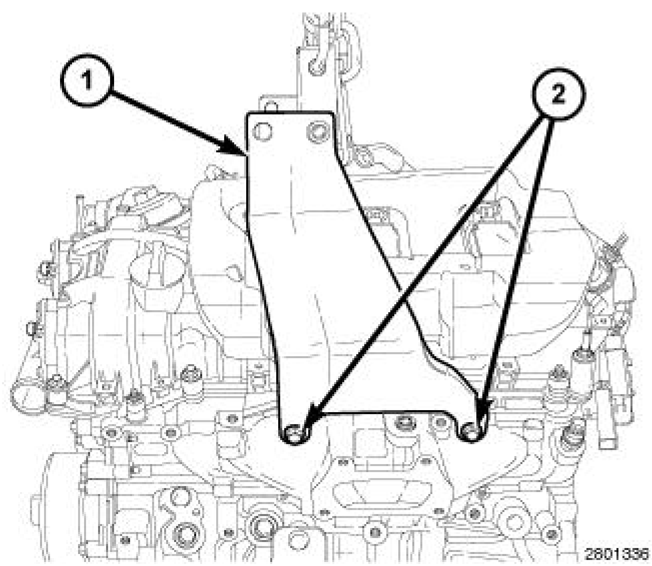


Fig. 47: Driver Side Engine Lifting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the Left Side Engine Lifting Bracket (special tool #10242-1, Brackets, Engine Lifting, Left Side) (1) on the left cylinder head with bolts (2) provided with the Engine Lifting Bracket and tighten bolts to the proper specification.

Refer to **TORQUE SPECIFICATIONS**.

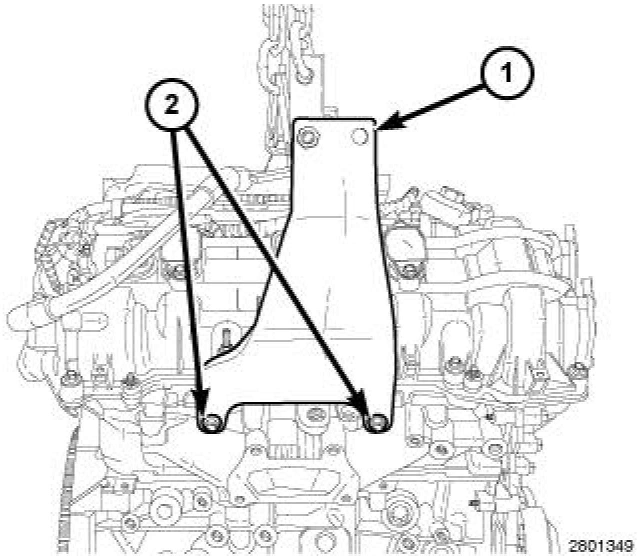


Fig. 48: Passenger Side Engine Lifting Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the Right Side Engine Lifting Bracket (special tool #10242-2, Brackets, Engine Lifting, Right Side) (1) on the right cylinder head with bolts (2) provided with the Engine Lifting Bracket and tighten bolts to the proper specification.

   Refer to **TORQUE SPECIFICATIONS**.

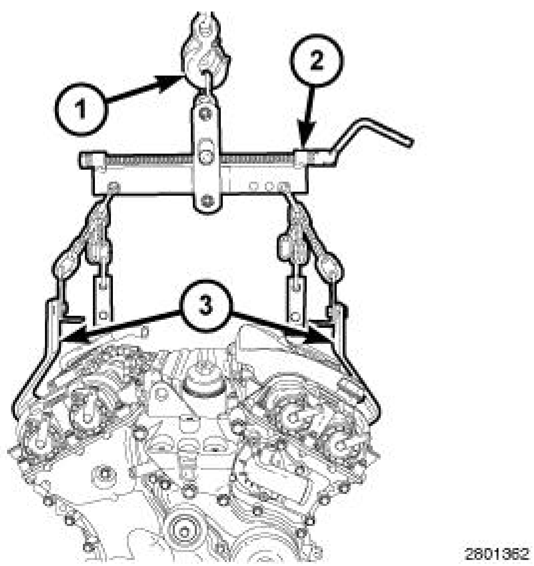


Fig. 49: Lifting Sling, Engine Lifting Brackets & Engine Hoist
Courtesy of CHRYSLER GROUP, LLC

6. Position a load-leveling lifting sling (2), such as OTCĀ® 4305 Engine Load Leveler or equivalent, between the engine lifting brackets (3) and an engine hoist (1).
7. Reposition the starter wire harness and the main wire harness to the rear of the engine compartment.

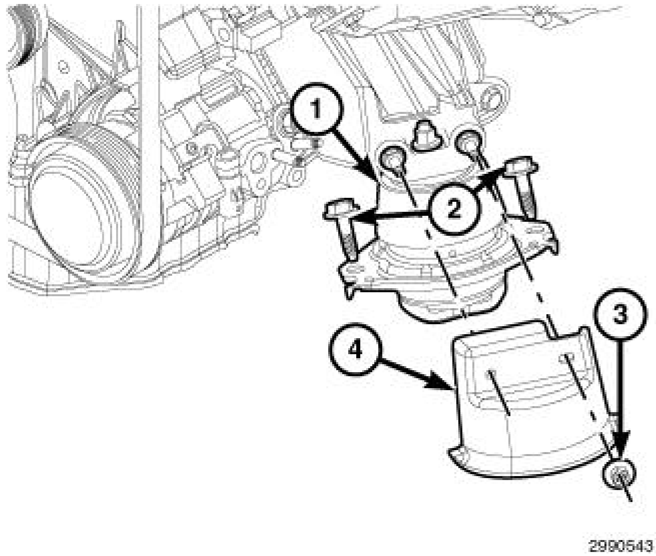


Fig. 50: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left engine mount shown in illustration, right engine mount similar.

8. Carefully lower the engine into the engine compartment while aligning the two locator dowels into the transmission housing.
9. Align the engine mounts, install both left and right engine mount lower retaining bolts (2) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.
10. Position both left and right engine mount heat shields (4), install the retaining nuts (3) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.

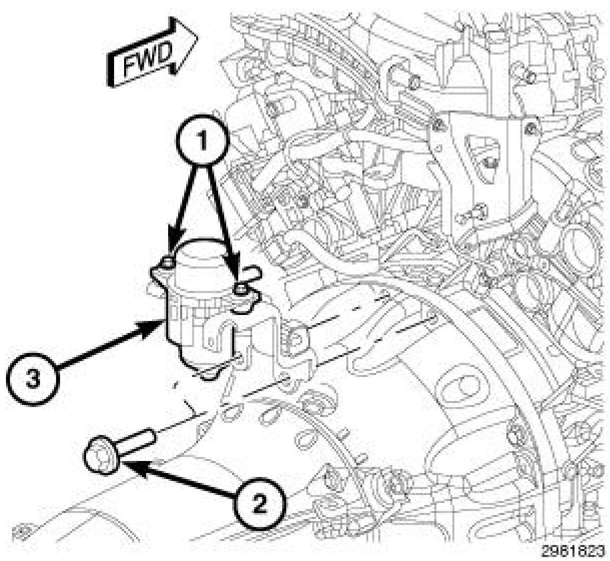


Fig. 51: Electric Vacuum Pump, Bolts & Studs
Courtesy of CHRYSLER GROUP, LLC

11. Position the electric vacuum pump (3), install the two transmission to engine retaining bolts (2) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.

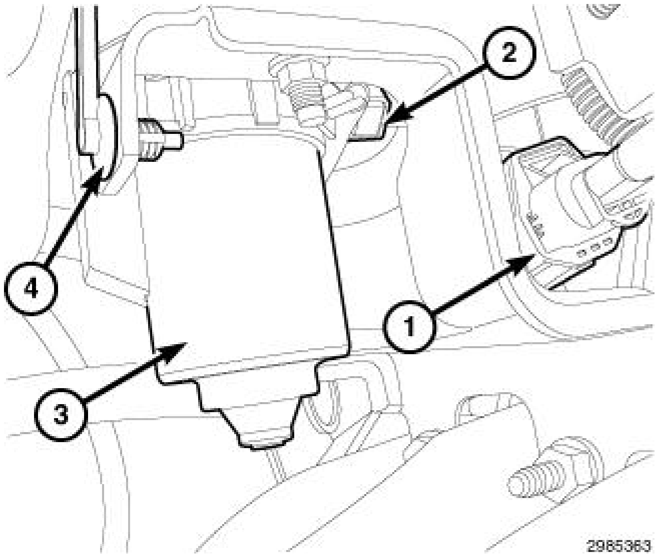


Fig. 52: Electrical Connector, Harness Connector, Hose & Vacuum Pump
Courtesy of CHRYSLER GROUP, LLC

12. Install the quick connect vacuum hose (2) to the electric vacuum pump (3).
13. Connect the electric vacuum pump (3) wire harness connector (1).
14. Secure the harness retainer (4) to the mounting bracket.

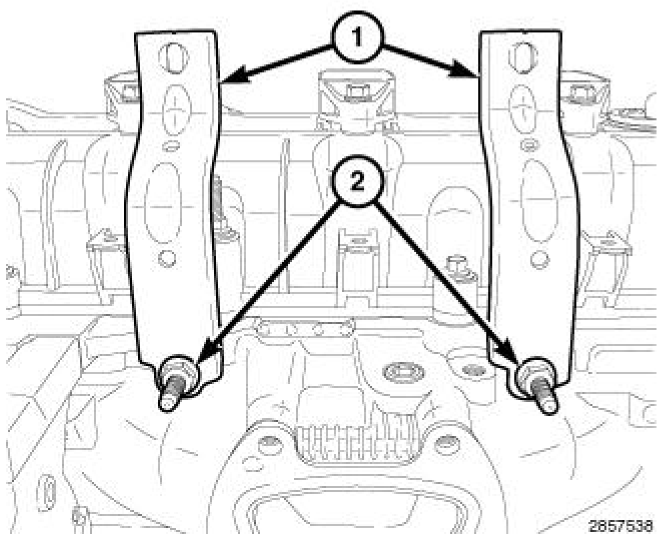


Fig. 53: Left Intake Manifold Support Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Remove the engine lifting brackets and position the left upper intake manifold support brackets (1) and install the retaining studs (2) finger tight.

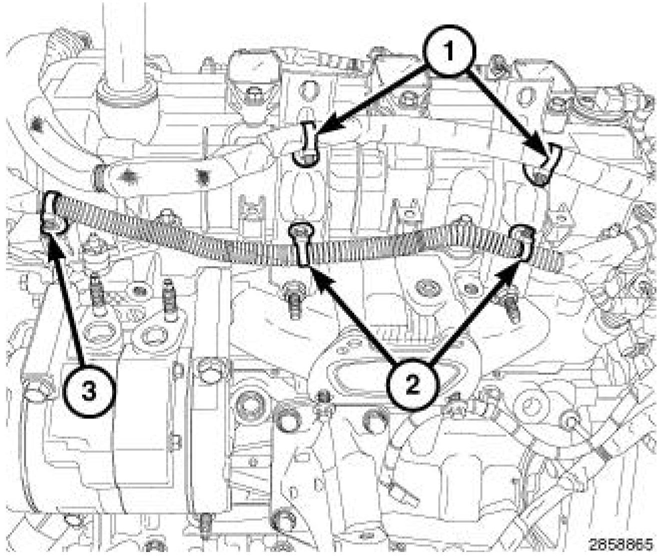


Fig. 54: Starter Wire Harness Retainers, Main Wire Harness Retainer & Manifold Support Bracket Retainers
Courtesy of CHRYSLER GROUP, LLC

16. Route the main wire harness and starter wire harness on the engine.
17. Secure the two starter wire harness retainers (1) to the upper intake manifold support brackets.
18. Secure the main wire harness retainer (3) to the left cylinder head cover and two retainers (2) to the upper intake manifold support brackets.

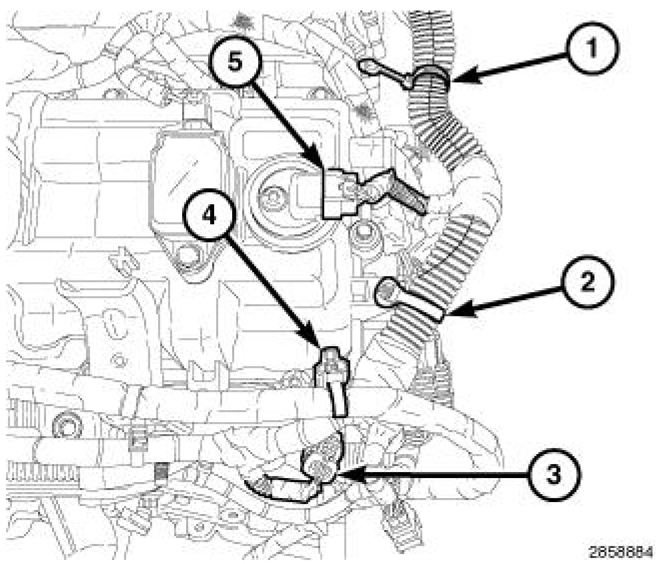


Fig. 55: ECT Sensor Connector, CMP Sensor & Main Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

19. Connect the Engine Coolant Temperature (ECT) sensor wire harness connector (3).
20. Connect the left Camshaft Position (CMP) sensor wire harness connector (5).
21. Secure the main wire harness retainer (2) to the cylinder head cover and one main wire harness retainer (4) to the cylinder head cover mounting stud.
22. Secure the main wire harness retainer (1) to the rear of the lower intake manifold.

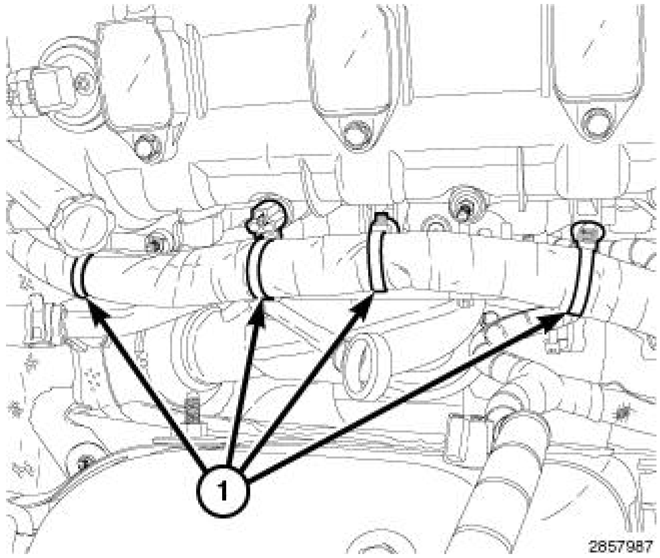


Fig. 56: Main Wire Harness Retainers At Right Cylinder Head Cover
Courtesy of CHRYSLER GROUP, LLC

23. Secure the four main wire harness retainers (1) to the right cylinder head cover.

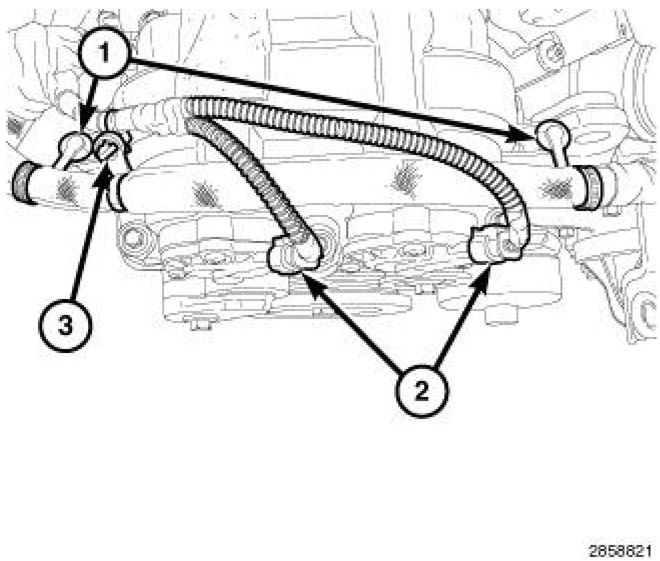


Fig. 57: Variable Valve Timing Solenoid Connectors & Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

24. Connect the variable valve timing solenoids wire harness connectors (2) to the on the right cylinder head.
25. Secure the two starter wire harness retainers (1) to the right cylinder head cover.
26. Secure the starter harness to main harness retainer (3).

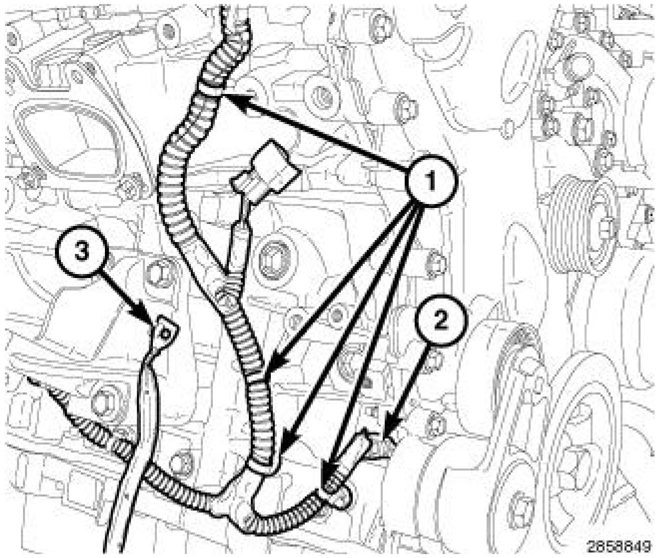


Fig. 58: Wire Harness Retainers, Oil Pump Solenoid Electrical Connector & Ground Strap
Courtesy of CHRYSLER GROUP, LLC

27. Connect the oil pump solenoid wire harness connector (2).
28. Secure the four wire harness retainers (1).
29. Install the ground strap (3) to the right engine mount bracket.

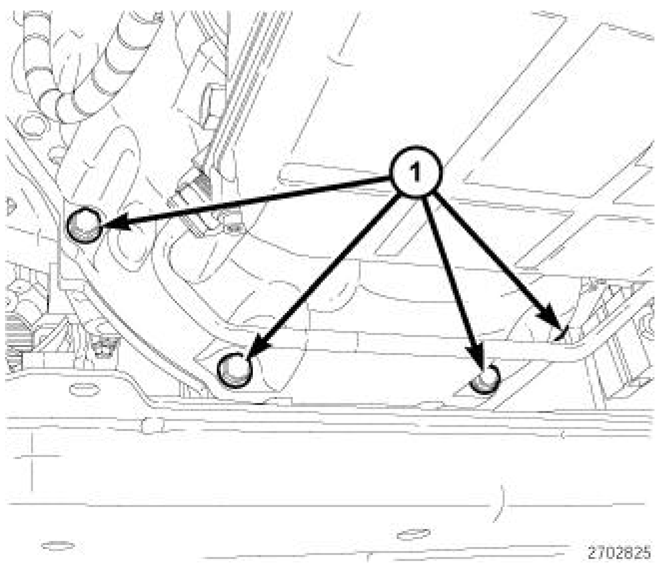


Fig. 59: Transmission-To-Engine Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

30. Remove the jack supporting the transmission.
31. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
32. Install the four transmission to the engine oil pan retaining bolts (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

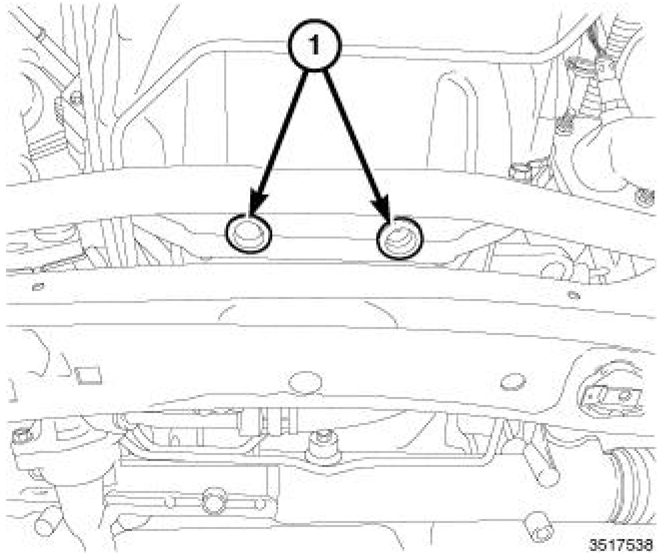


Fig. 60: Rubber Plugs
Courtesy of CHRYSLER GROUP, LLC

33. Install the two rubber plugs (1) covering the rear oil seal retainer flange bolts.

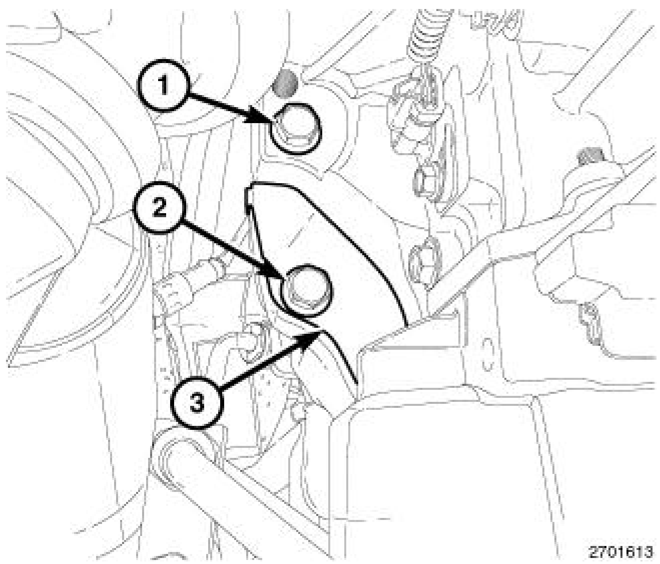


Fig. 61: Side Engine-To-Transmission Bolt, Transmission Dust Shield Retaining Bolt & Dust Shield
Courtesy of CHRYSLER GROUP, LLC

34. Install the side engine to transmission retaining bolt (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
35. Install the torque converter dust shield (3). Tighten bolt (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
36. Install the two upper side transmission to engine retaining bolts and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

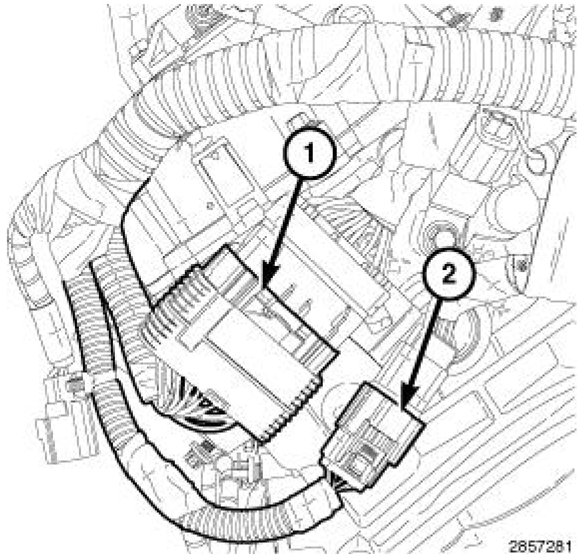


Fig. 62: Engine Injection/Ignition Harness & Engine Oil Pressure/Temperature Harness
Courtesy of CHRYSLER GROUP, LLC

37. Connect the main engine oil pressure/temperature wire harness connector (2) at the rear of the left cylinder head.
38. Connect the main engine wire harness connector (1) at the rear of the left cylinder head.

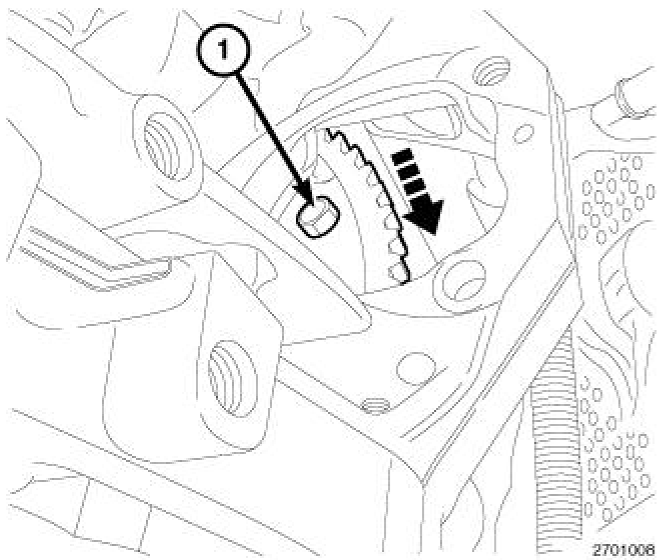


Fig. 63: Torque Converter Bolt
Courtesy of CHRYSLER GROUP, LLC

39. Rotate the crankshaft in a clockwise direction and install the six torque converter bolts (1) through the starter mounting hole and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

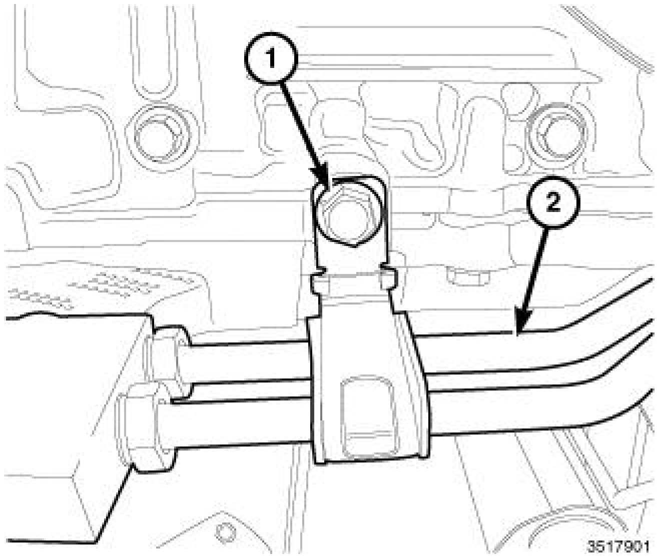


Fig. 64: Bolt & Transmission Cooling Lines
Courtesy of CHRYSLER GROUP, LLC

40. Install the transmission cooling lines (2) and tighten the bolt (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

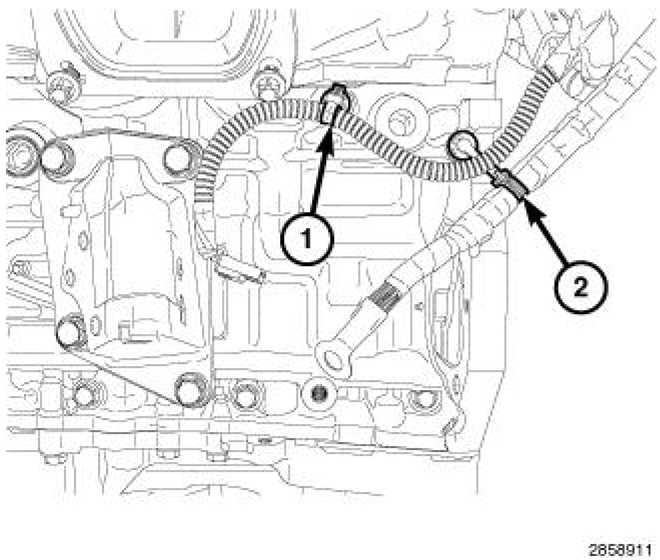


Fig. 65: Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

41. Secure the starter wire harness retainer (2) and the main wire harness retainer (1) to the engine block.
42. Install the starter. Refer to **STARTER, INSTALLATION** .

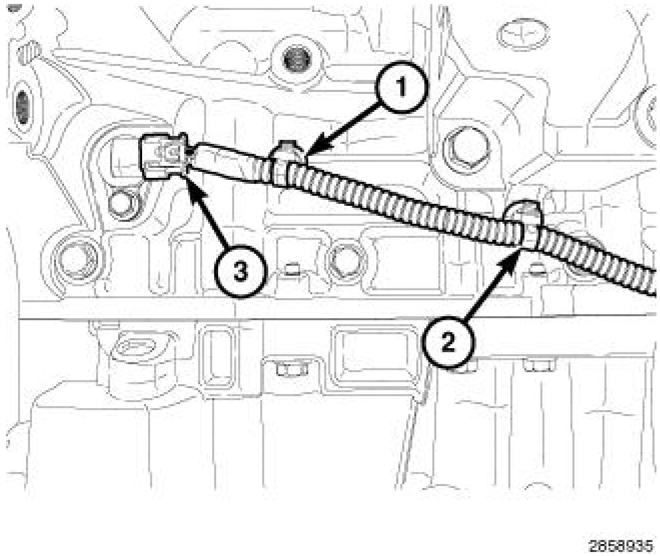


Fig. 66: Main Wire Harness Retainers & CKP Sensor
Courtesy of CHRYSLER GROUP, LLC

43. Connect the power cord to the engine block heater (if equipped).
44. Connect the Crankshaft Position (CKP) sensor wire harness connector (3).
45. Secure the main wire harness retainer (1) to the engine block and one main wire harness retainer (2) to the right engine mounting bracket.

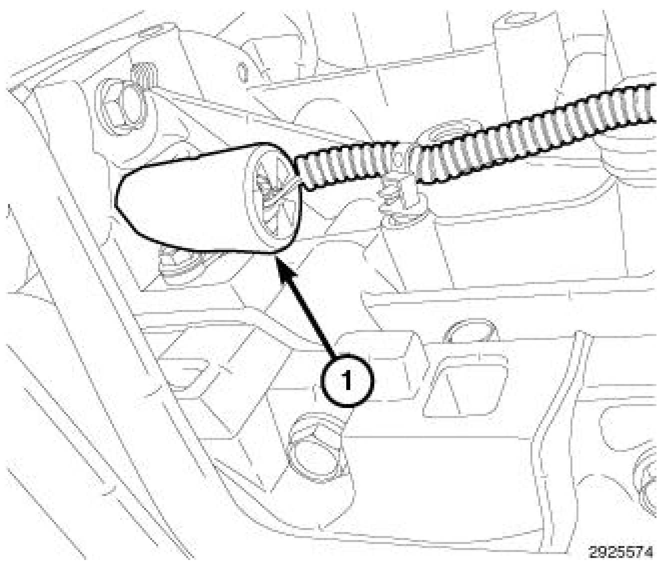


Fig. 67: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

46. Position the heat shield (1) over the CKP sensor.

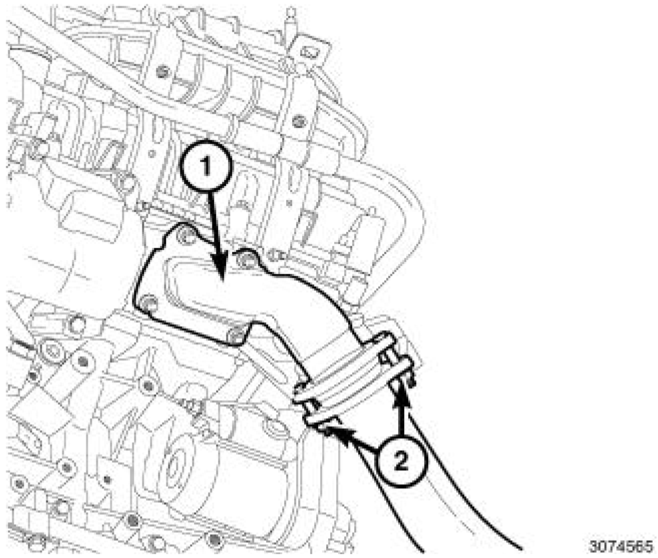


Fig. 68: Exhaust Down Pipe & Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

47. Position both left and right exhaust down pipes (1) to the catalytic converters, install the retaining nuts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

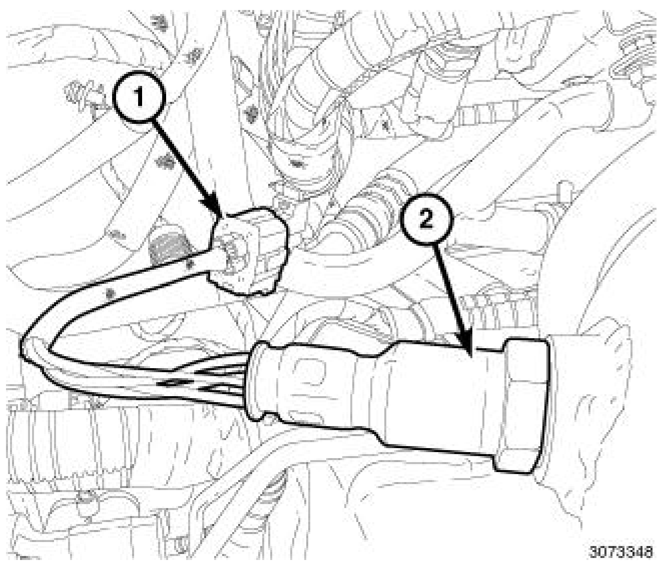


Fig. 69: Upstream Oxygen Sensor & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

48. Connect the left and right upstream oxygen sensor (2) wire harness connectors (1).

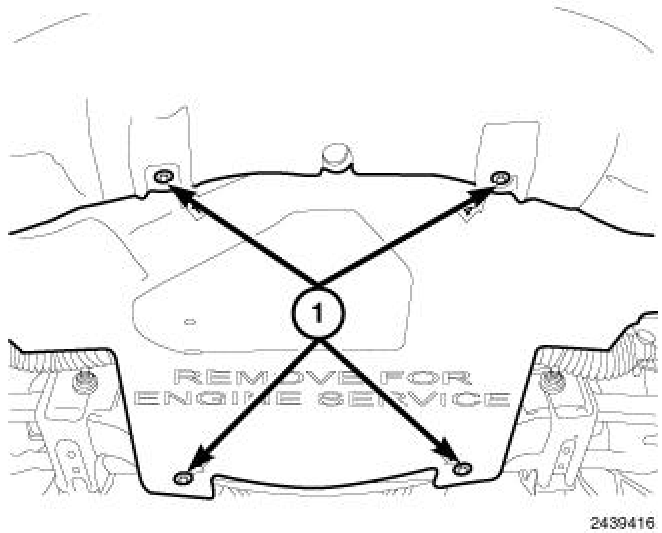


Fig. 70: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

49. Install the belly pan and the retainers (1).
50. Remove support and lower the vehicle.

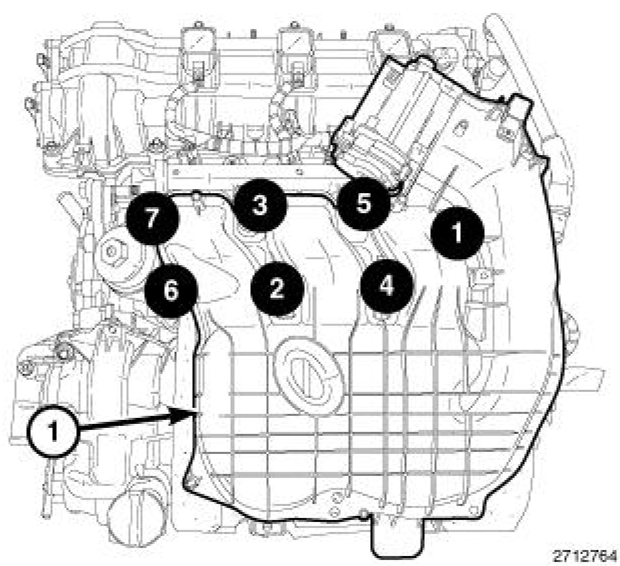


Fig. 71: Upper Intake Manifold Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

51. Install the upper intake manifold and insulator. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

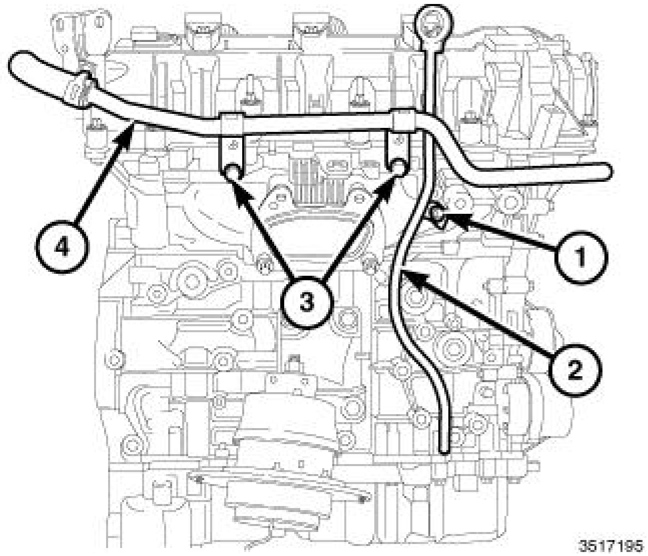


Fig. 72: Heater Core Inlet Tube, Oil Level Indicator & Bolts
Courtesy of CHRYSLER GROUP, LLC

52. Install the oil level indicator tube (2). Tighten bolt (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
53. Position the heater core inlet tube (4). Tighten bolts (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

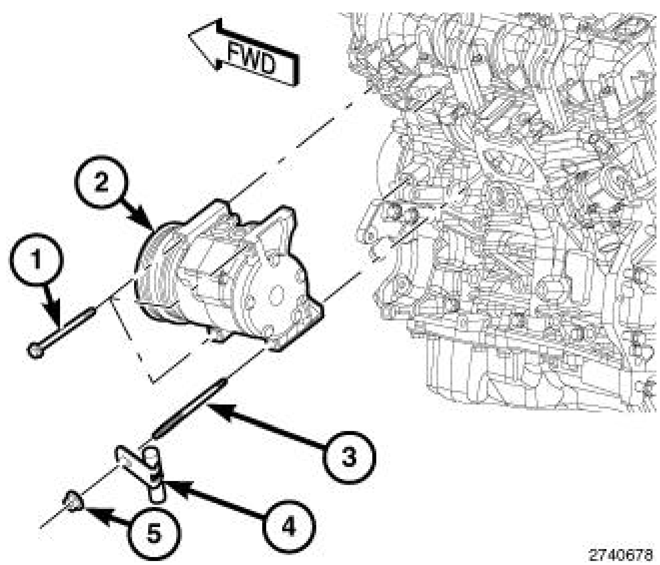


Fig. 73: A/C Compressor, Nut, Stud & Three Bolts
Courtesy of CHRYSLER GROUP, LLC

54. Install the A/C compressor (2). Refer to **COMPRESSOR, A/C, INSTALLATION** .

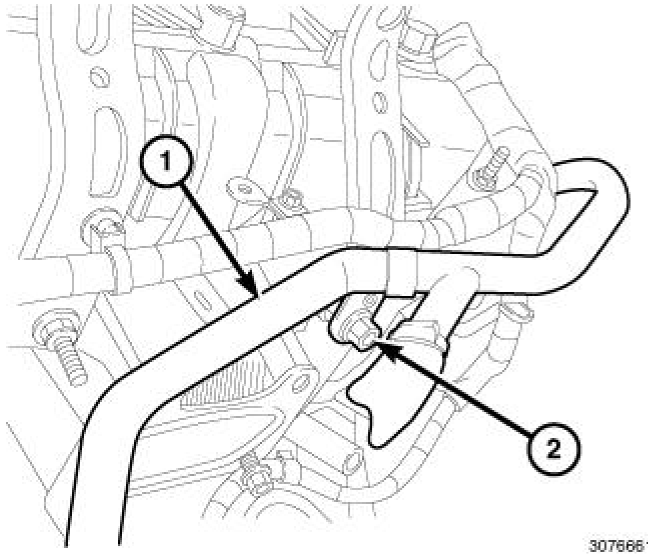


Fig. 74: Heater Core Return Tube Upper Support Bracket Retaining Nut & Tube
Courtesy of CHRYSLER GROUP, LLC

55. Install the heater core return tube (1). Tighten nut (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

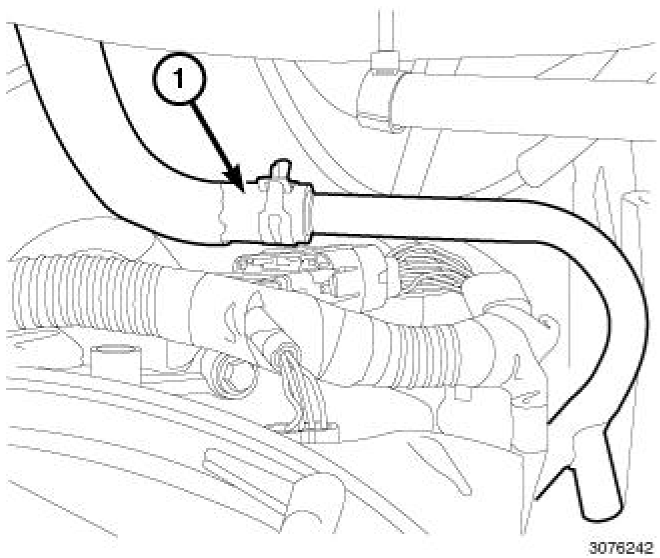


Fig. 75: Heater Core Return Hose
Courtesy of CHRYSLER GROUP, LLC

56. Connect the heater core return hose (1).

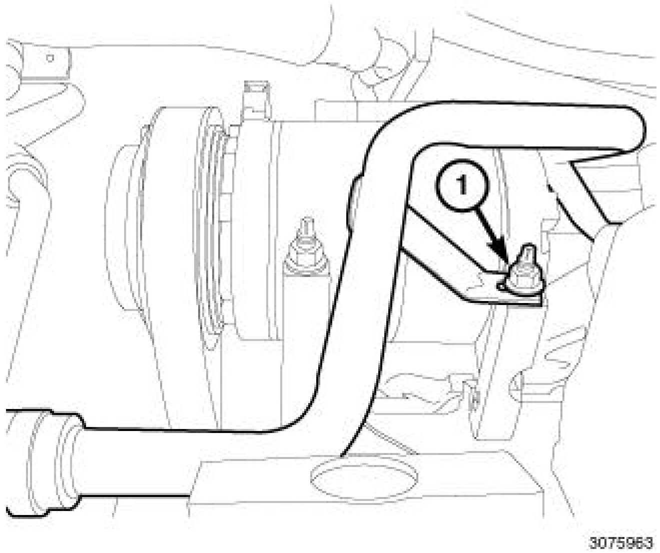


Fig. 76: Heater Core Return Tube Lower Support Bracket Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

57. Install the heater core return tube lower nut (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

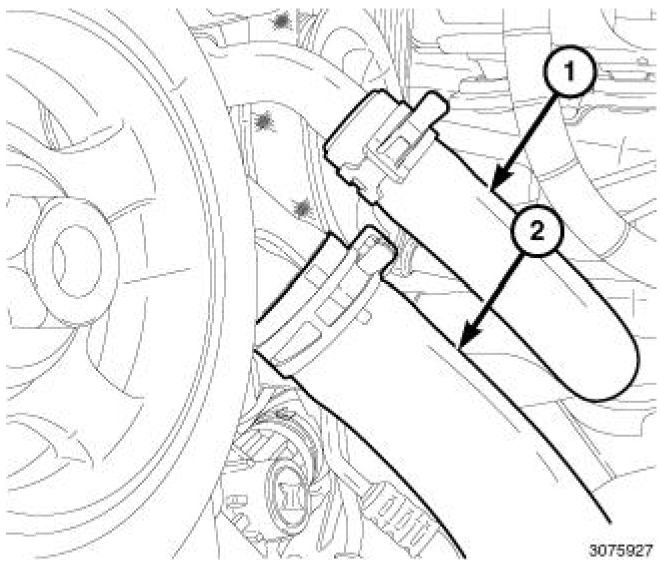


Fig. 77: Lower Heater Core Return Hose & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

58. Install the lower heater core return hose (1) onto the coolant pump.
59. Install the lower radiator hose (2) onto the coolant pump.

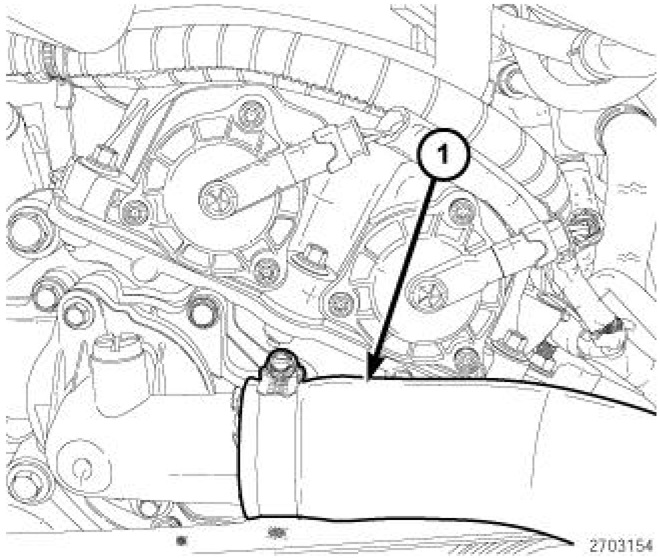


Fig. 78: Upper Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

60. Install the upper radiator hose (1) onto the thermostat housing.

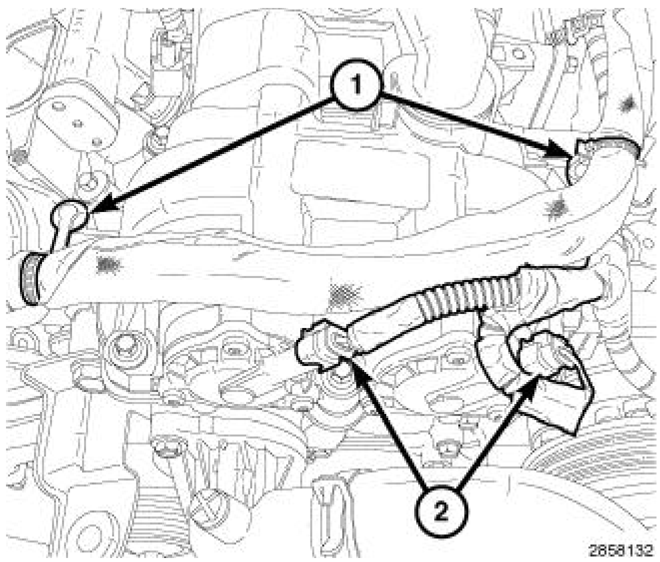
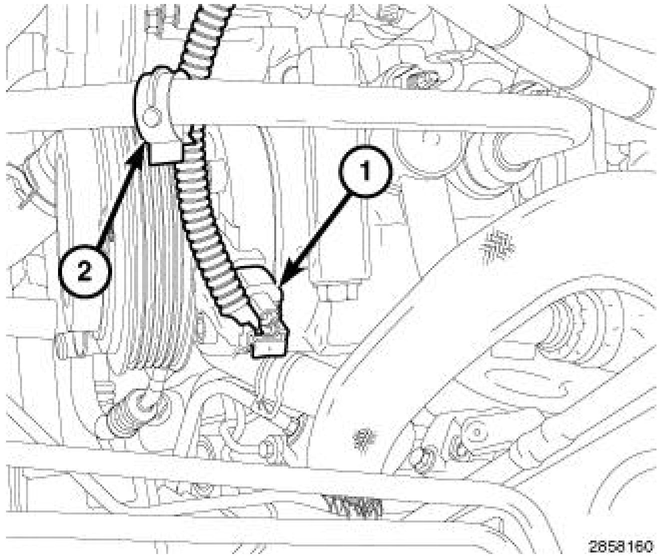


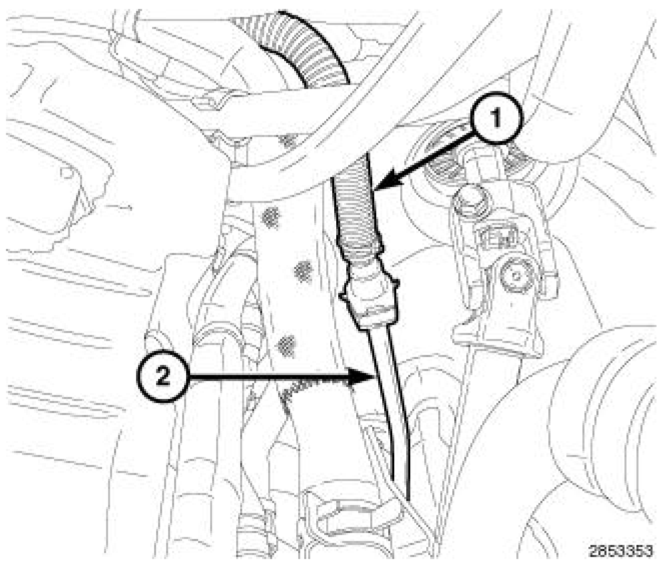
Fig. 79: Variable Valve Timing Solenoid Connectors & Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

61. Connect the left variable valve timing solenoids wire harness connectors (2).
62. Secure the two starter wire harness retainers (1) to the left cylinder head cover.



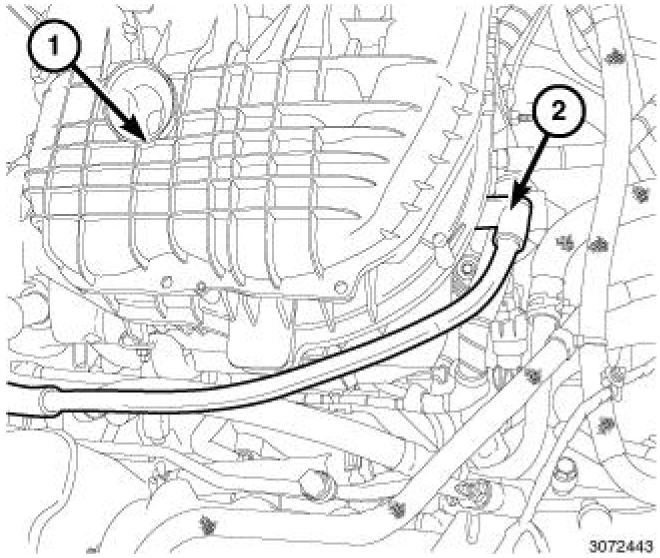
[Fig. 80: A/C Compressor Electrical Connector & Wire Harness Retainer]
Courtesy of CHRYSLER GROUP, LLC

63. Connect the A/C compressor wire harness connector (1) and secure the wire harness retainer (2) to the A/C compressor discharge line.
64. Install the generator. Refer to **GENERATOR, INSTALLATION** .
65. Install the cooling fan module. Refer to **FAN, COOLING, INSTALLATION** .



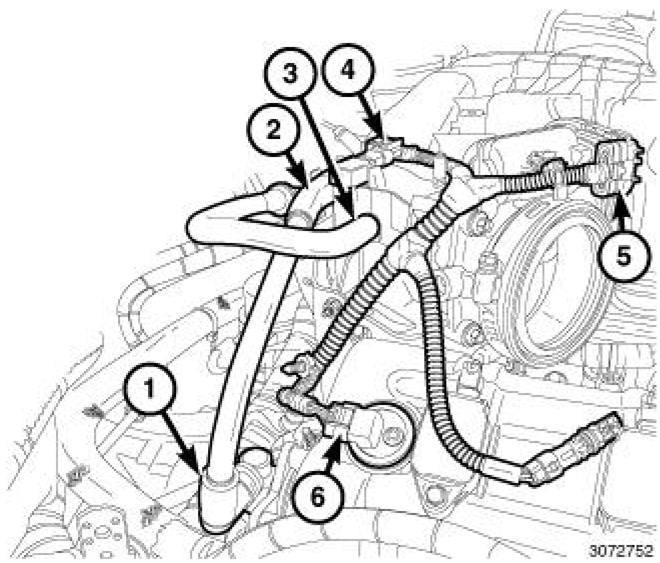
[Fig. 81: Fuel Supply Hose At Underbody Fuel Supply Tube]
Courtesy of CHRYSLER GROUP, LLC

66. Connect the fuel supply hose (1) to the underbody fuel tube (2).



[**Fig. 82: Fresh Air Makeup Hose At Rear Of Intake Manifold**]
Courtesy of CHRYSLER GROUP, LLC

67. Connect the fresh air makeup hose (2) to the rear of the intake manifold (1).



[**Fig. 83: PCV Valve, Intake Manifold, Brake Booster Vacuum Hose, MAP Sensor, ETC & CMP Sensor Electrical Connectors**]
Courtesy of CHRYSLER GROUP, LLC

68. Connect the right Camshaft Position Sensor (CMP) wire harness connector (6).
69. Secure the main wire harness retainer to the right cylinder head cover mounting stud.
70. Connect the Electronic Throttle Control (ETC) wire harness connector (5).
71. Connect the Manifold Absolute Pressure (MAP) Sensor wire harness connector (4).
72. Connect the brake booster vacuum hose (3).
73. Install the Positive Crankcase Ventilation (PCV) hose onto the PCV valve (1) and the intake manifold (2).

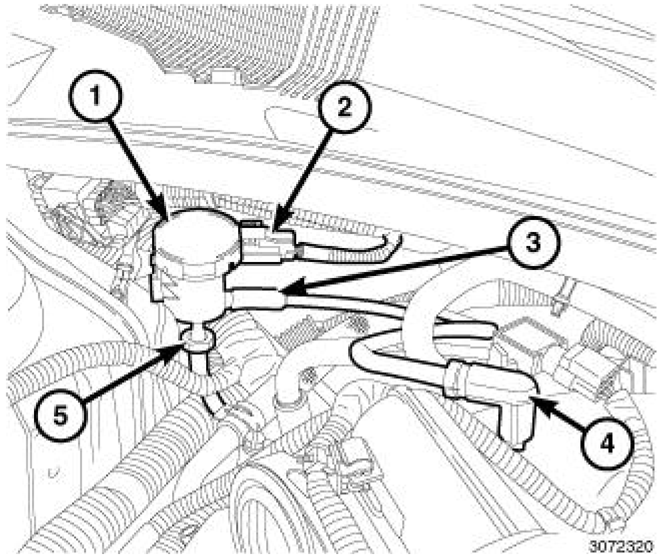


Fig. 84: EVAP Purge Solenoid, Electrical Connector & Vacuum Lines
Courtesy of CHRYSLER GROUP, LLC

74. Position the EVAP purge solenoid (1) vacuum line (4) and connect the vacuum line to the intake manifold.
75. Connect the other end of the vacuum line (3) to the EVAP purge solenoid (1).
76. Install the pressurized coolant bottle. Refer to **BOTTLE, PRESSURIZED COOLANT, INSTALLATION** .
77. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.

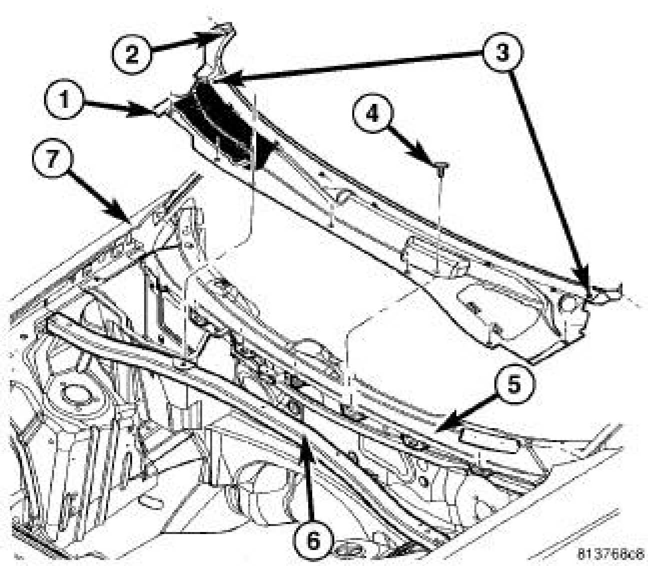


Fig. 85: Removing/Installing Cowl Panel
Courtesy of CHRYSLER GROUP, LLC

78. Install the strut tower support (6).
79. Install the cowl panel cover. Refer to **COVER, COWL PANEL, INSTALLATION** .
80. Install the hood. Refer to **HOOD, INSTALLATION** .

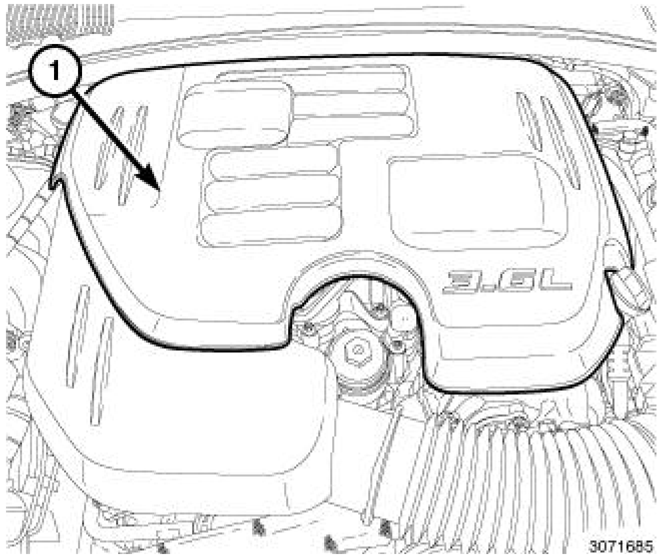


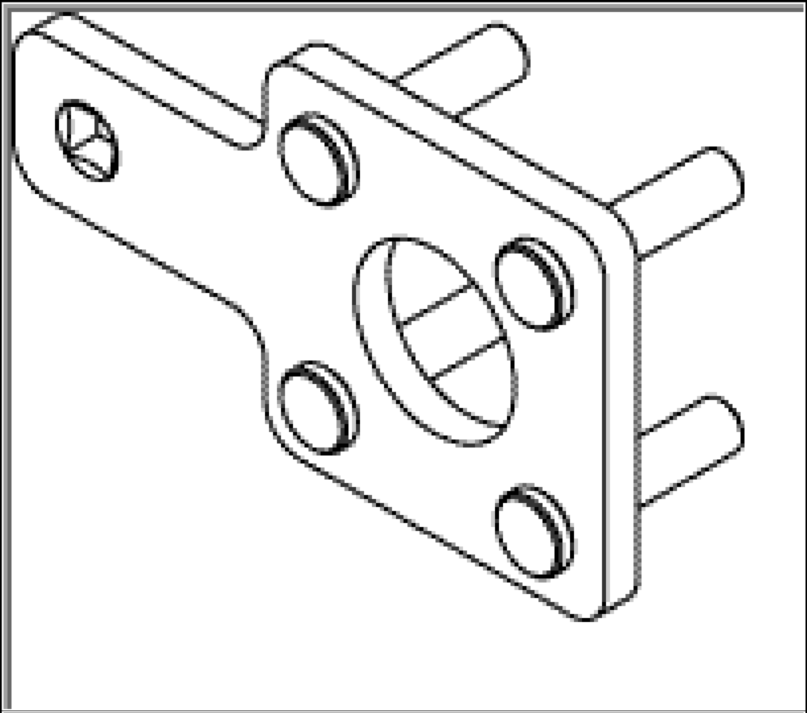
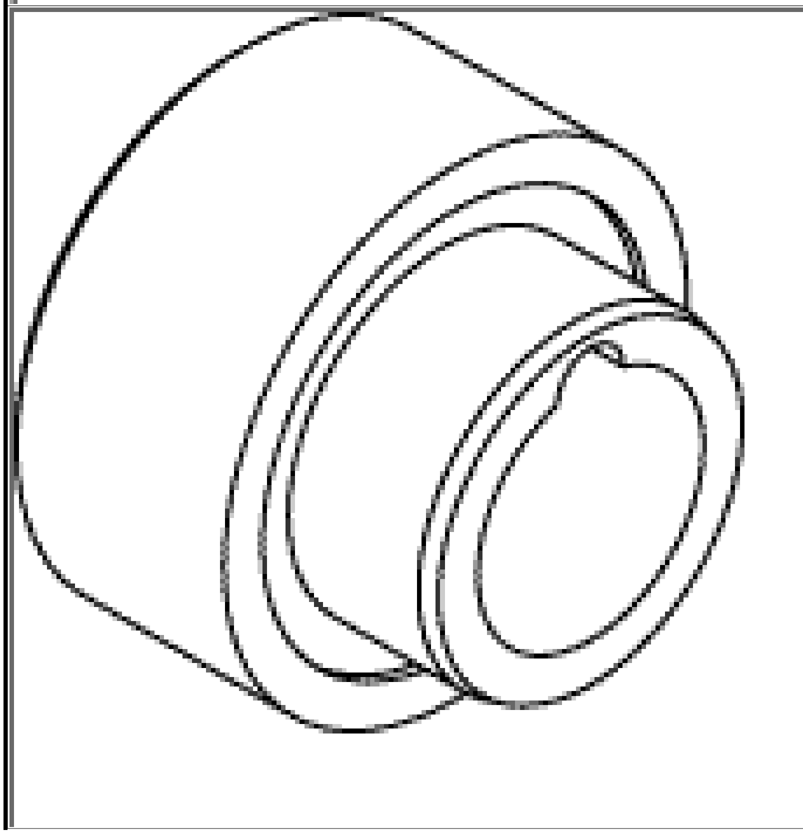
Fig. 86: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

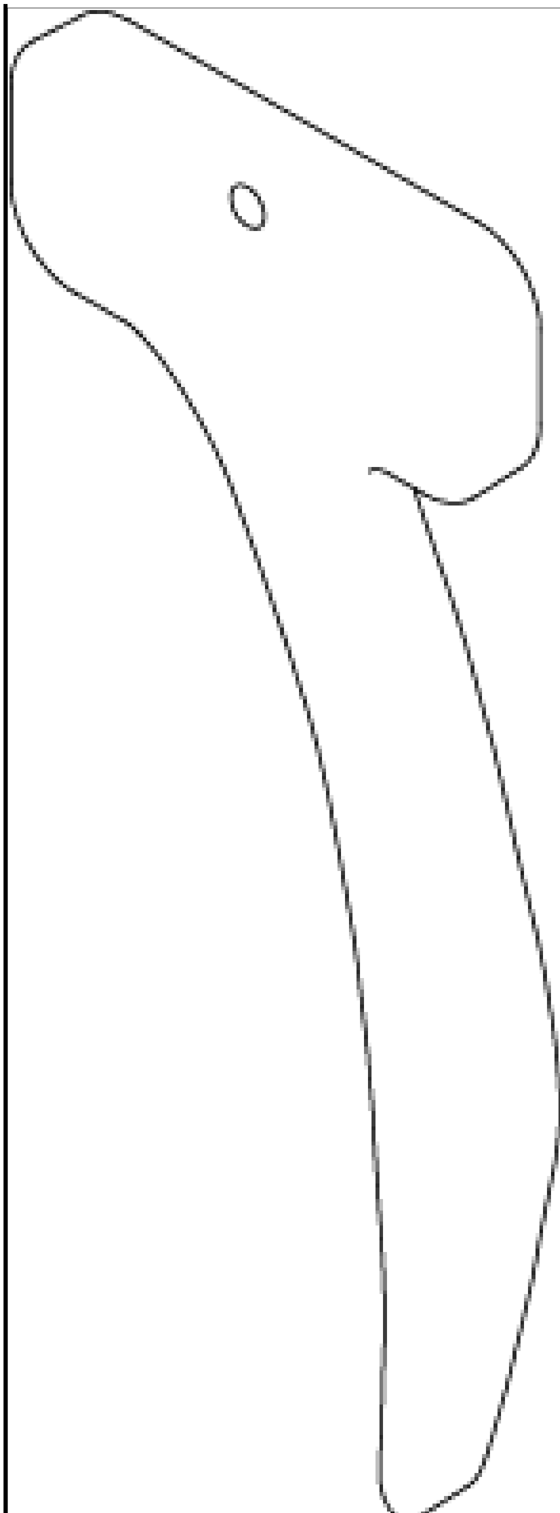
81. If removed, install the oil filter and fill the engine crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
82. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .
83. Perform the Refrigerant System Charge procedure. Refer to **PLUMBING, STANDARD PROCEDURE** .
84. Position the engine cover (1) and secure the retaining grommets onto the ball studs.
85. Connect the negative battery cable.
86. Run the engine until it reaches normal operating temperature and check for leaks.

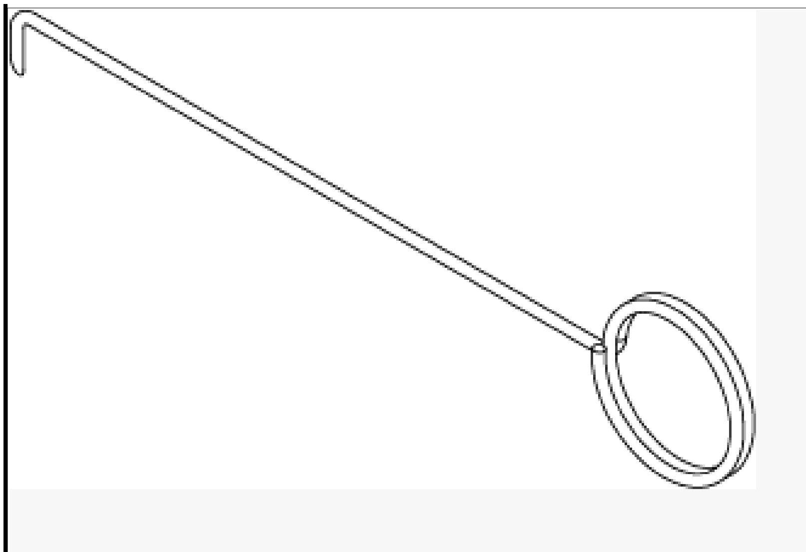
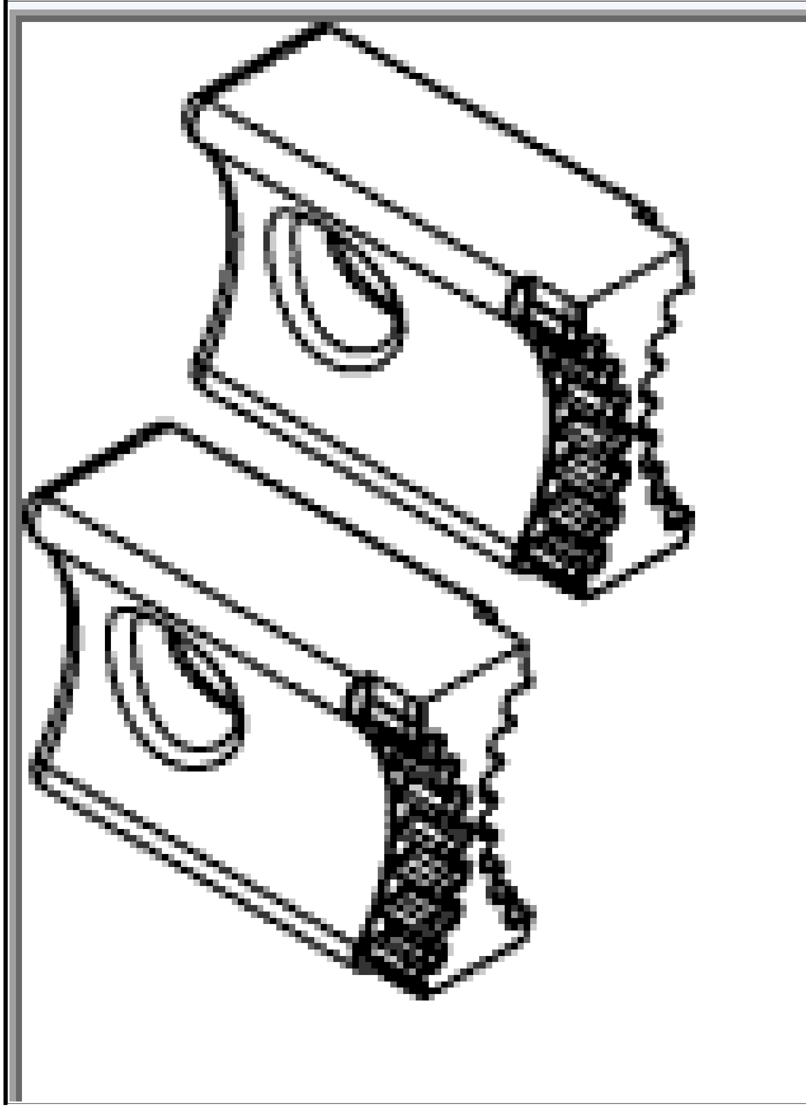
NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

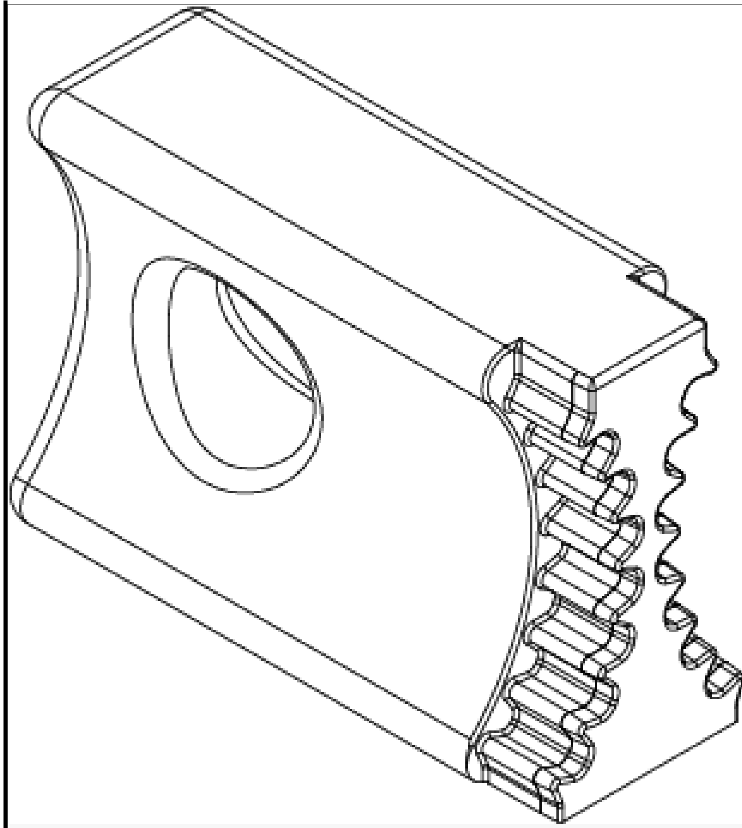
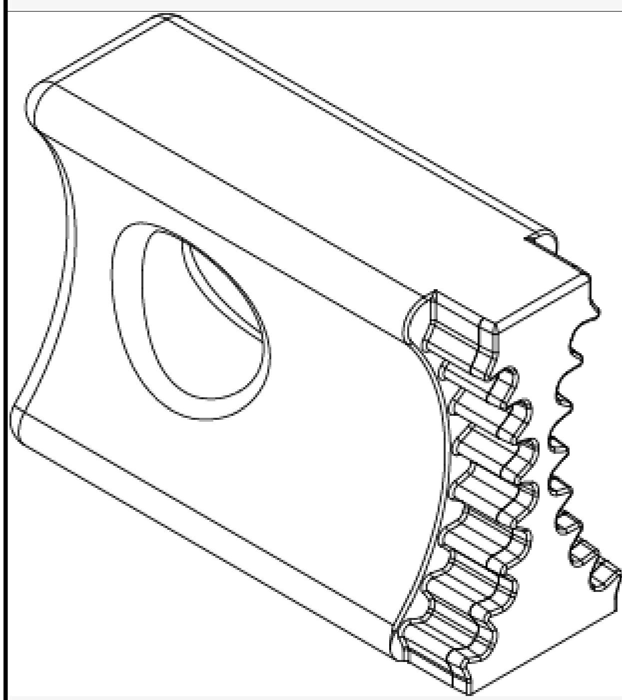
SPECIAL TOOLS

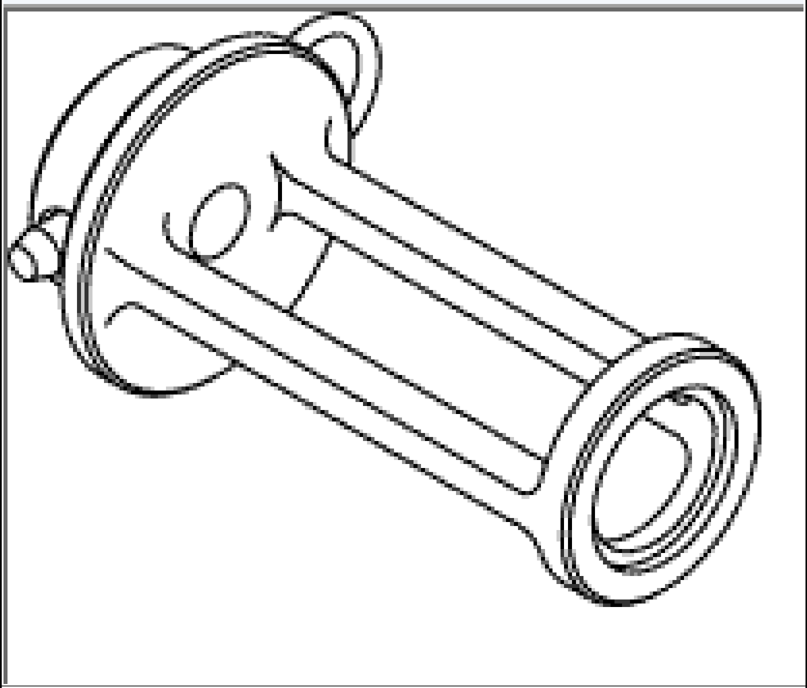
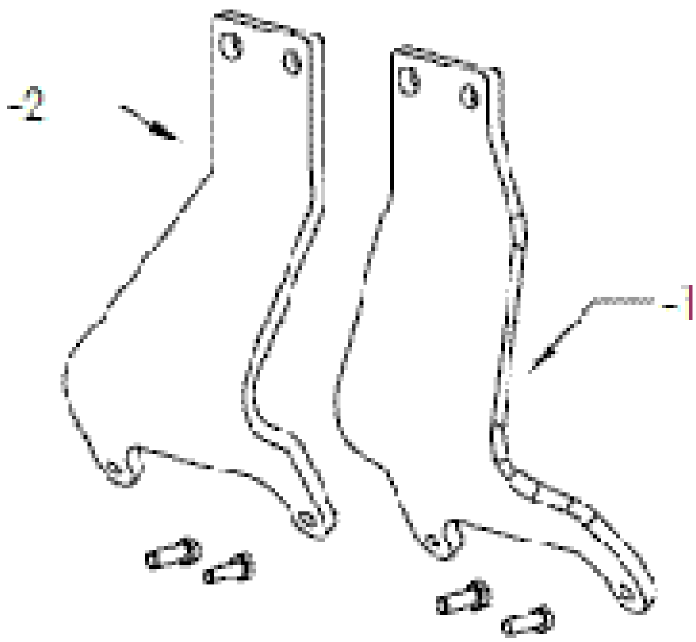
SPECIAL TOOLS

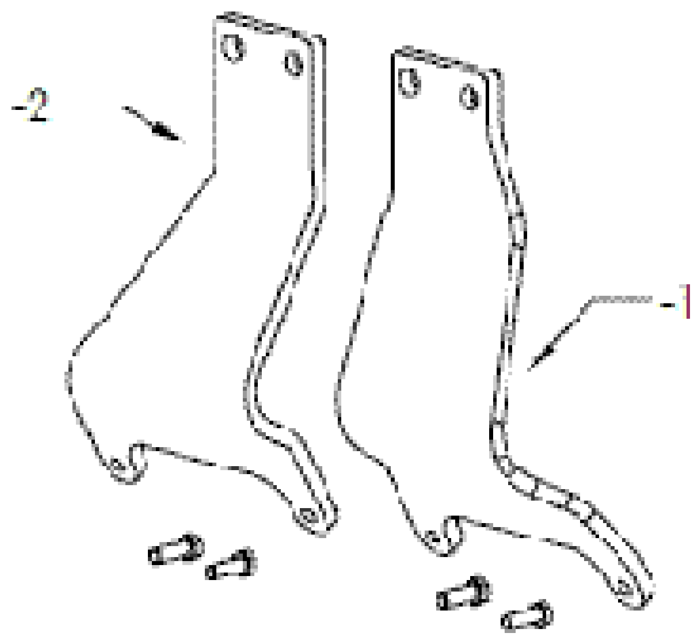
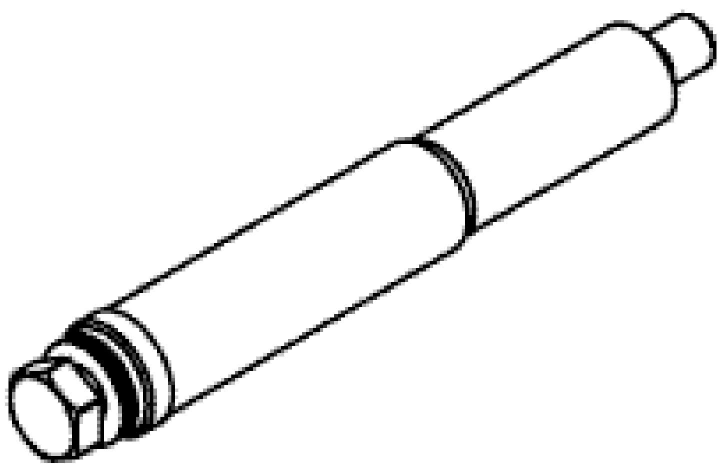
	10198 - Holder, Vibration Damper (Originally Shipped In Kit Number(s) 10223.)
	10199 - Installer, Crankshaft Front Oil Seal (Originally Shipped In Kit Number(s) 10223.)

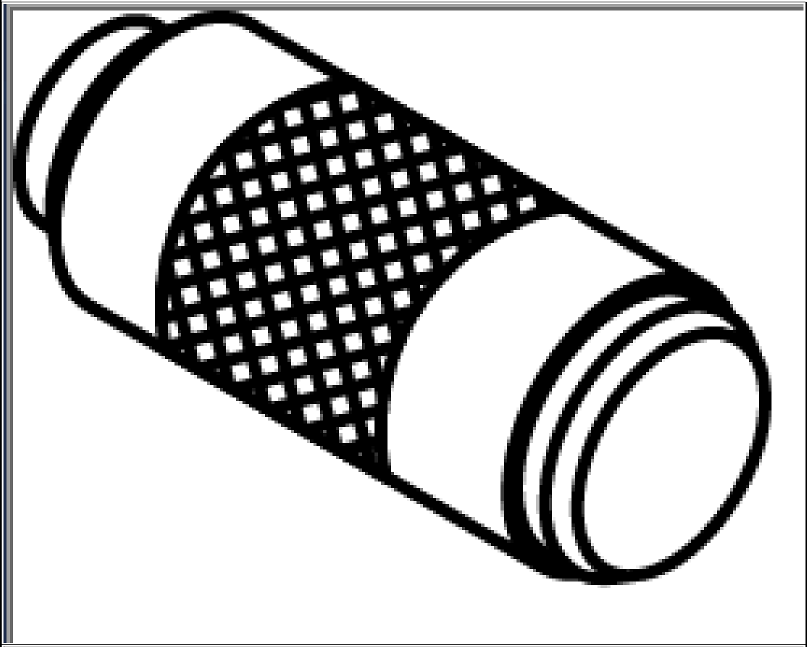
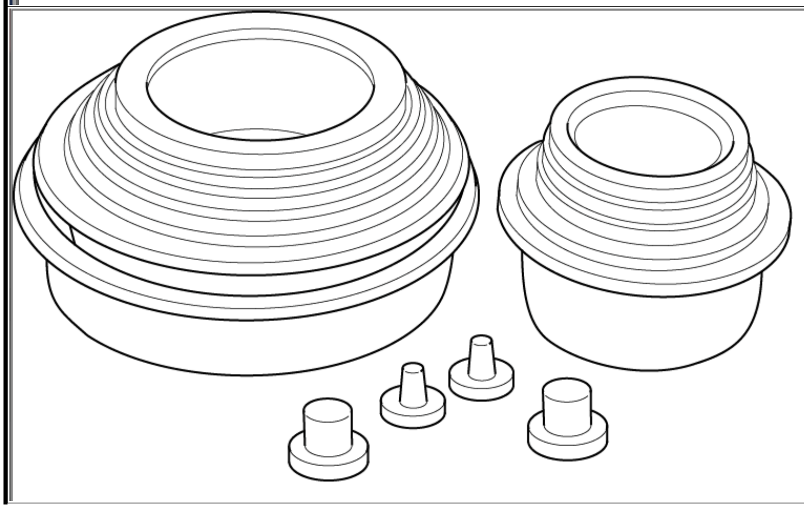
	10200-1 - Holder, Timing Chain, Left Side

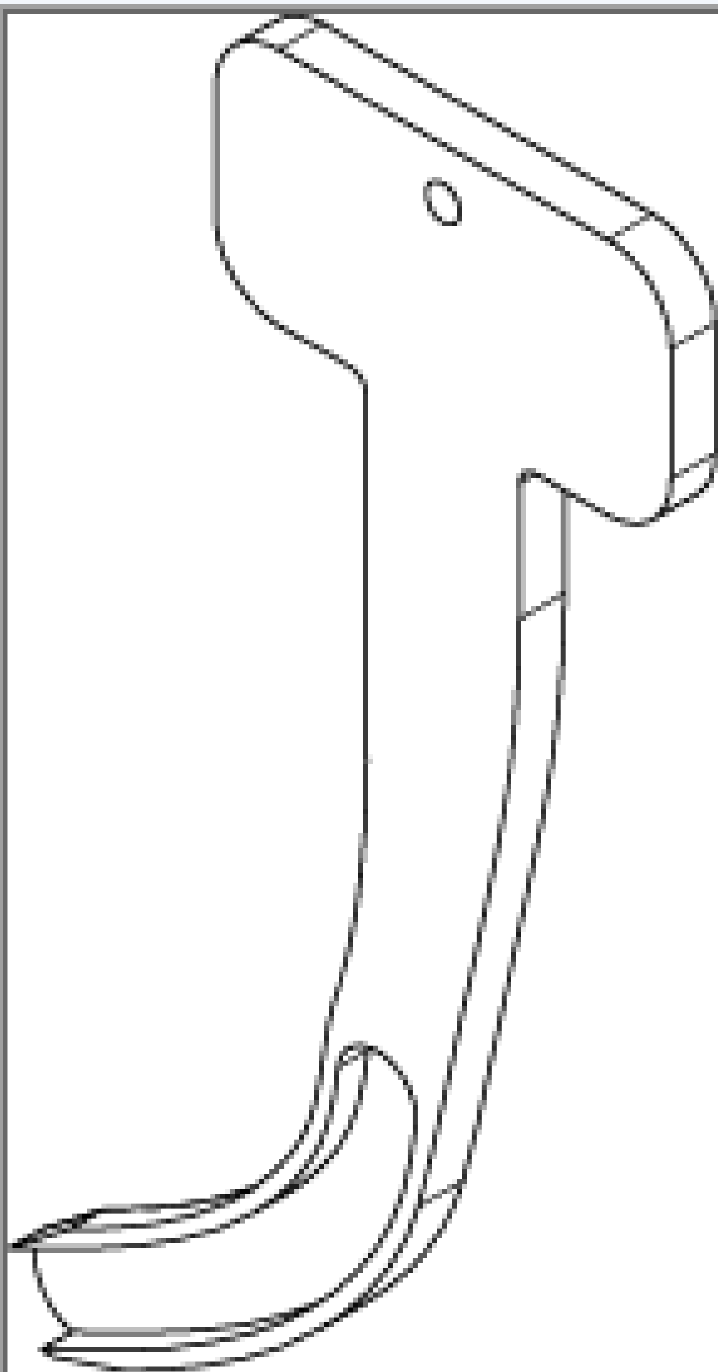
	10200-3 - Pin
	10202 - Locks, Camshaft/Phaser

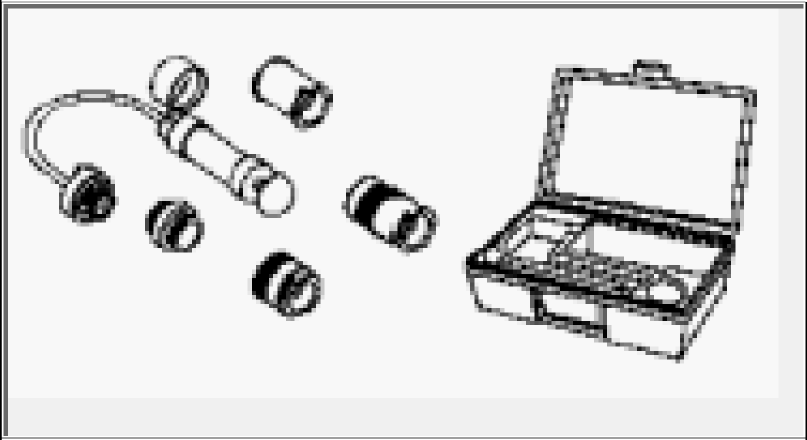
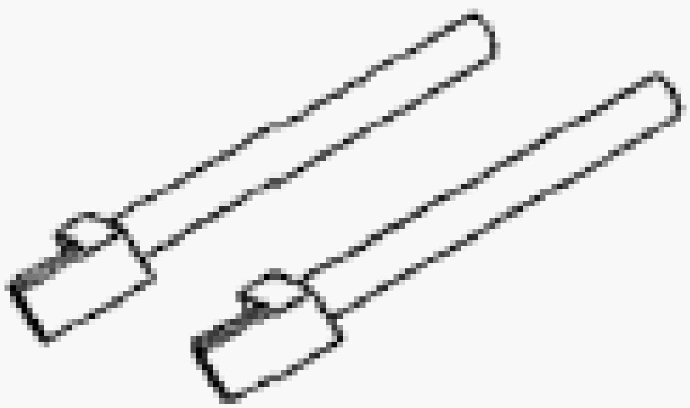
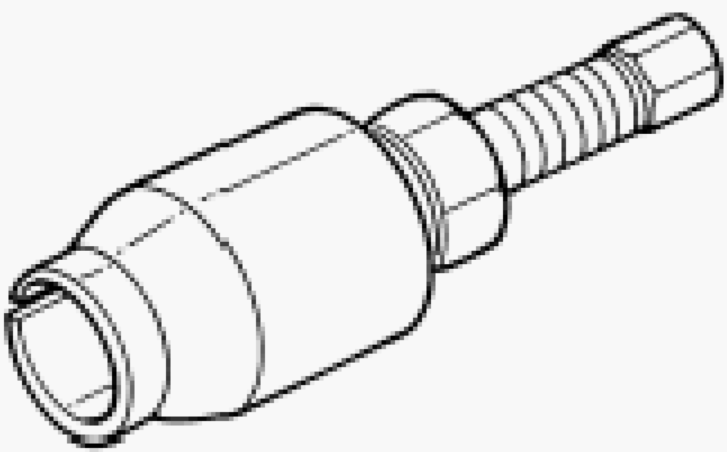
	10202-1 - Lock, Camshaft/Phaser, Right Side
	10202-2 - Lock, Camshaft/Phaser, Left Side

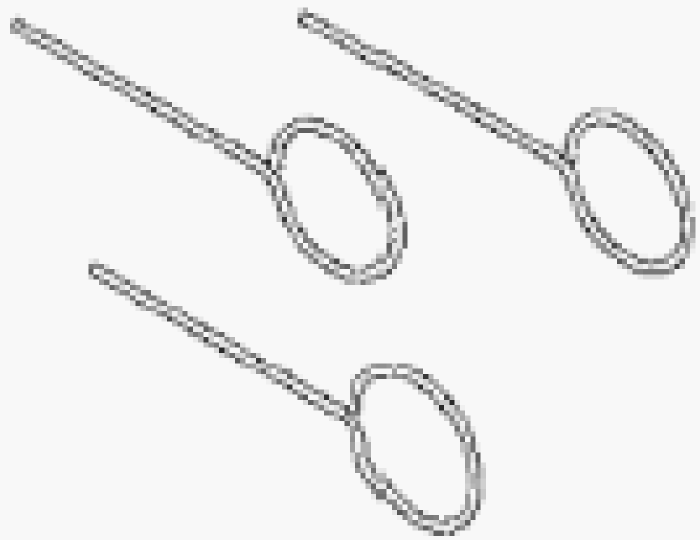
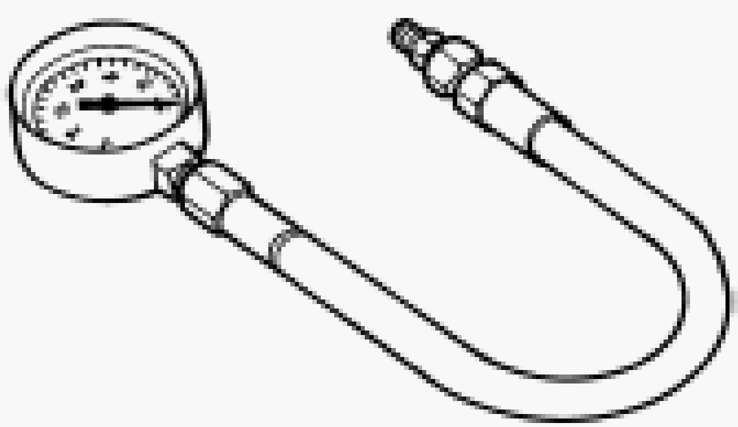
	10224 - Adapter, Valve Spring (Originally Shipped In Kit Number(s) 10223.)
	10242-1 - Brackets, Engine Lifting, Left Side (Originally Shipped In Kit Number(s) 10223.)

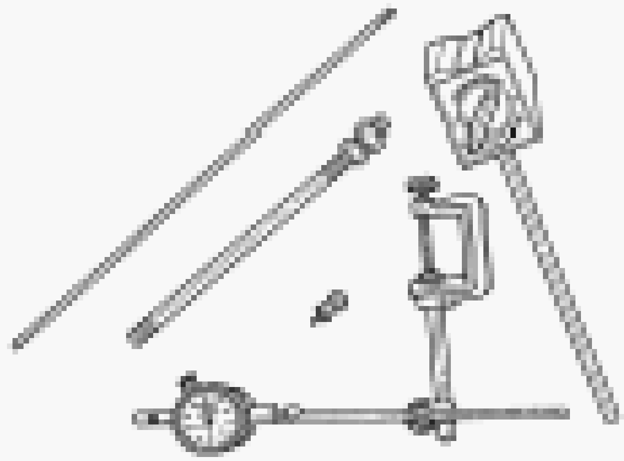
	10242-2 - Brackets, Engine Lifting, Right Side (Originally Shipped In Kit Number(s) 10223.)
	10255 - Installer, Spark Plug Tube

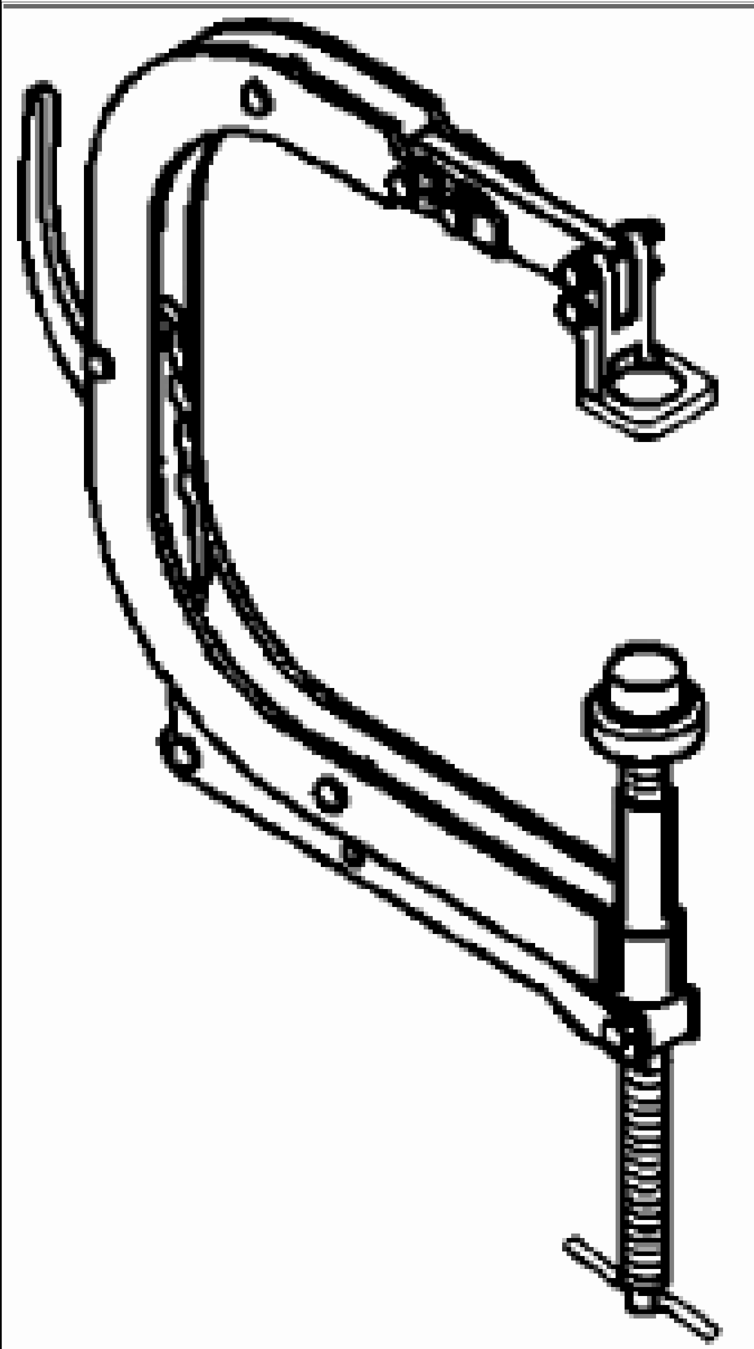
	10256 - Installer, Cam Installer, Cam Sensor/Spark Plug Tube Seal (Originally Shipped In Kit Number(s) 10256.)
	10368 - Set, Universal Protective Cap

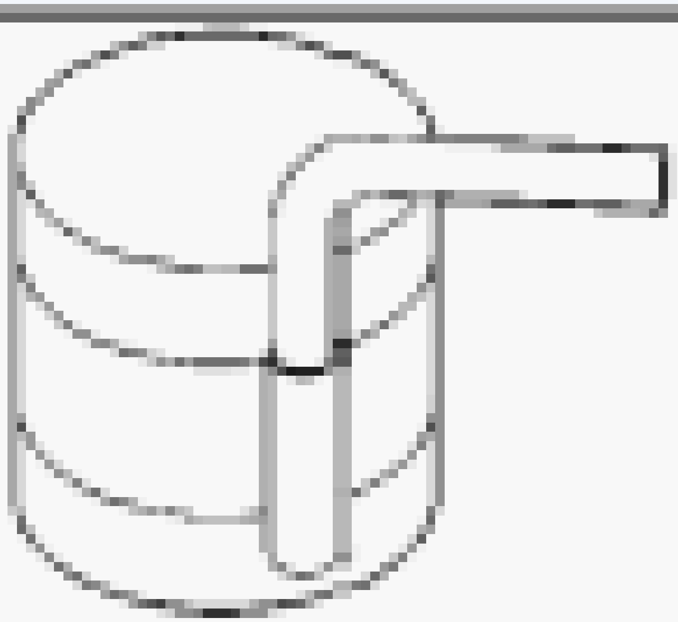
	10369 - Holder, Timing Chain

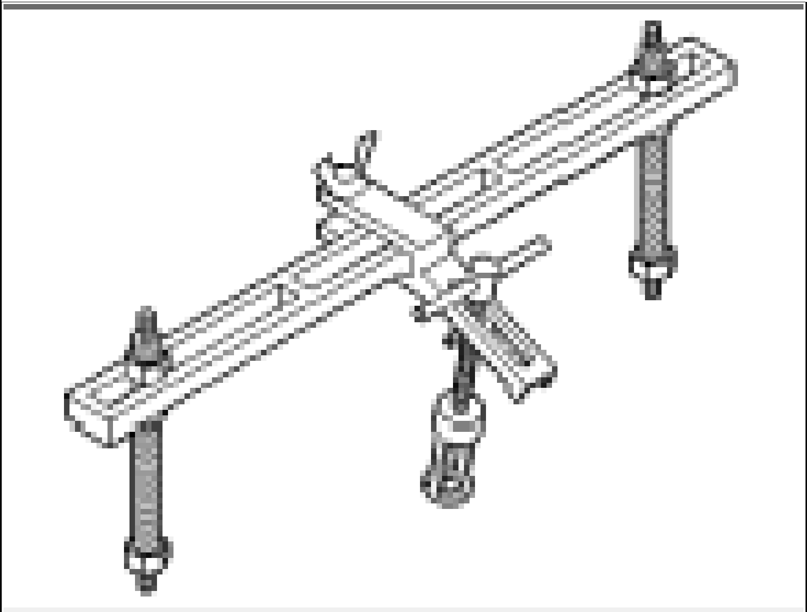
	7700-A - Tester, Cooling System
	8189 - Guide Pins (Originally Shipped In Kit Number(s) 8180, 8180CC, 8263, 8263CC.)
	8511 - Remover, Seal (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.)

	8514 - Pins, Tensioner (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.)
	C-119 - Cylinder Indicator
	C-3292A - Gauge, Pressure

	C-3339A - Set, Dial Indicator (Originally Shipped In Kit Number(s) 9202.)

	C-3422-D - Compressor, Valve Spring

	C-3685-A - Bloc-Chek Kit
	C-385 - Compressor, Piston

	MD998772A - Compressor, Valve Spring (Originally Shipped In Kit Number(s) 8678, 8853, 8854.)

AIR INTAKE SYSTEM

AIR CLEANER

REMOVAL

REMOVAL

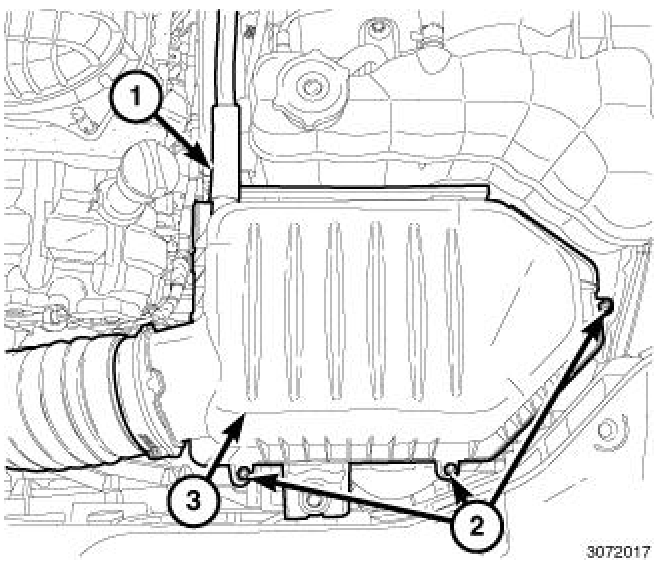


Fig. 87: Fresh Air Makeup Hose, Air Cleaner Housing & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the fresh air makeup hose (1) at the air cleaner housing (3).
2. Remove the air cleaner housing cover retaining bolts (2).

CAUTION: **Do not use compressed air to clean out the air cleaner housing without first covering the air inlet to the throttle body. Dirt or foreign objects could enter the intake manifold causing engine damage.**

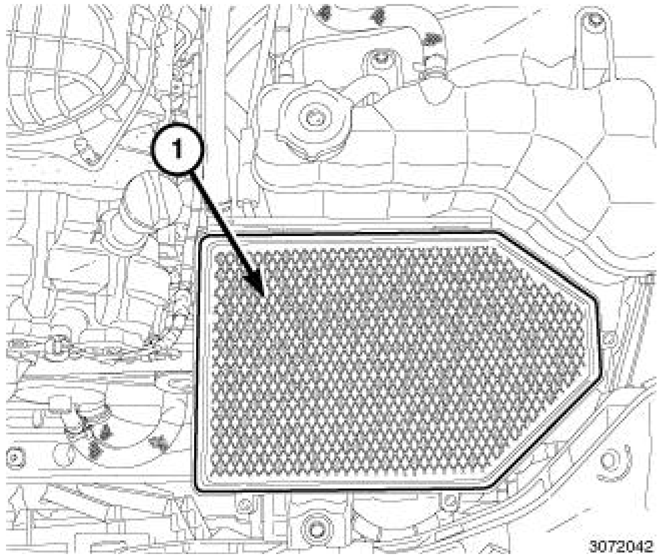


Fig. 88: Air Cleaner Element
Courtesy of CHRYSLER GROUP, LLC

3. Lift the air cleaner housing cover off the housing and position aside.
4. Remove the air cleaner element (1).
5. Remove any dirt or debris from the bottom of the air cleaner housing.

INSTALLATION

INSTALLATION

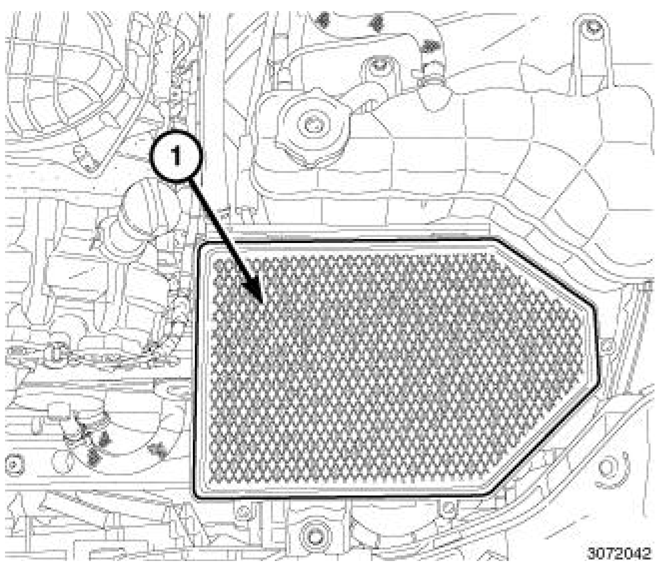


Fig. 89: Air Cleaner Element
Courtesy of CHRYSLER GROUP, LLC

1. Install a new air cleaner element (1) into the air cleaner housing.
2. Position the air cleaner housing cover so that the alignment tabs insert into the lower housing.

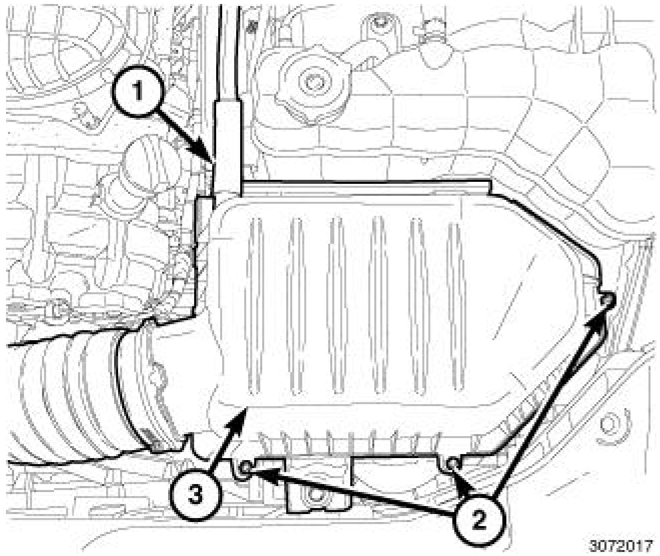


Fig. 90: Fresh Air Makeup Hose, Air Cleaner Housing & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Seat the cover (3) onto the housing and install the retaining bolts (2) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.
4. Connect the fresh air makeup hose (1) onto the air cleaner housing.

BODY, AIR CLEANER

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.

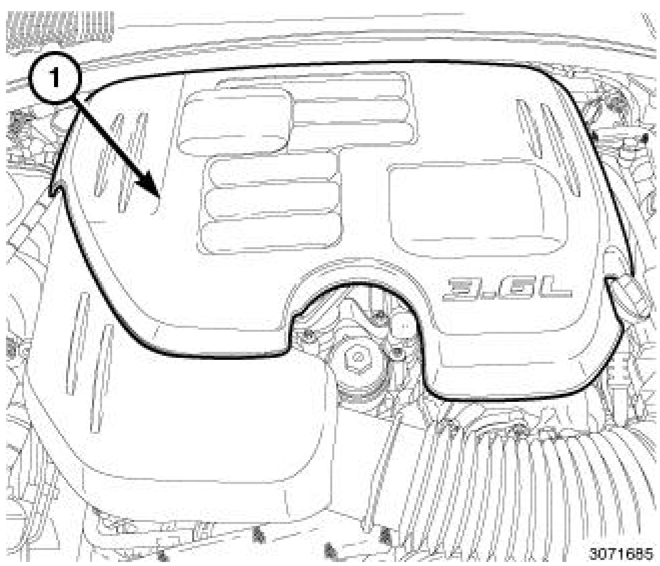


Fig. 91: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

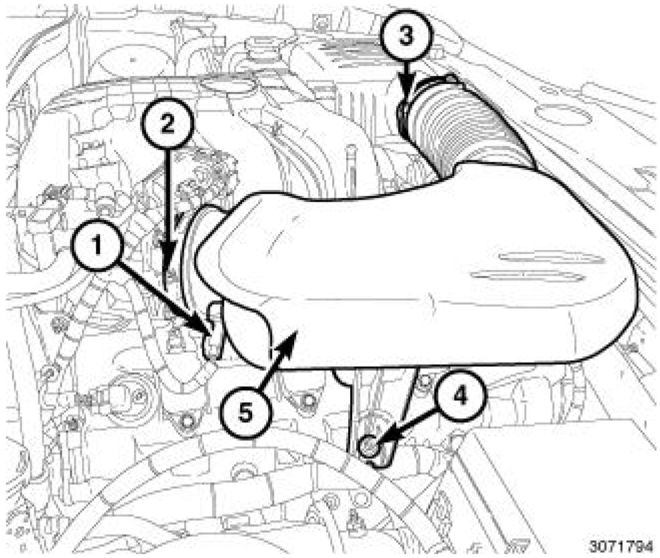


Fig. 92: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the Inlet Air Temperature (IAT) sensor wire harness connector (1).
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.
6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

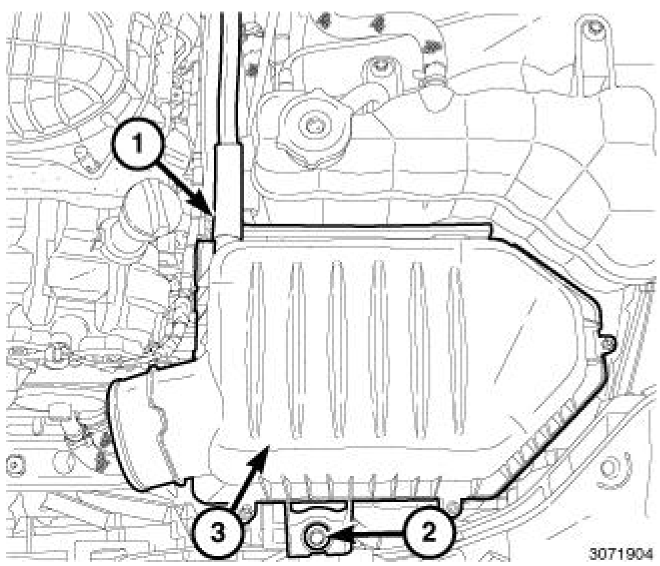


Fig. 93: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the fresh air makeup hose (1) from the air cleaner housing.
9. Remove the air cleaner housing retaining bolt (2).
10. Remove the air cleaner housing (3).

INSTALLATION

INSTALLATION

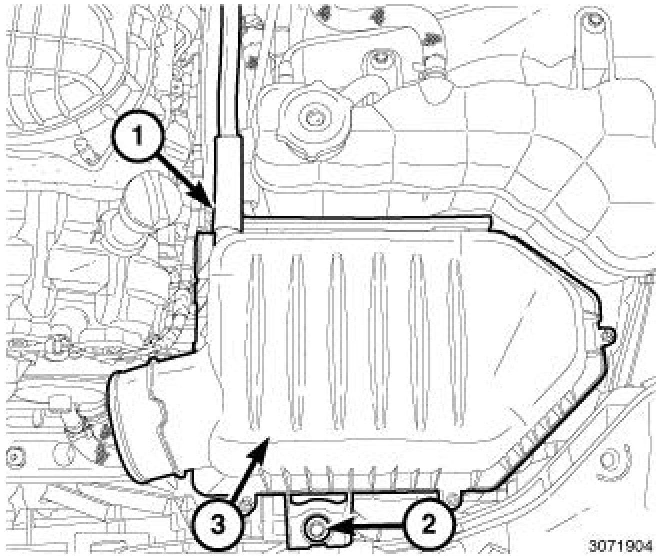


Fig. 94: Fresh Air Makeup Hose, Air Cleaner Housing & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Position the air cleaner housing (3) into the vehicle.
2. Install the air cleaner housing retaining bolt (2) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.
3. Connect the fresh air makeup hose (1) onto the air cleaner housing.

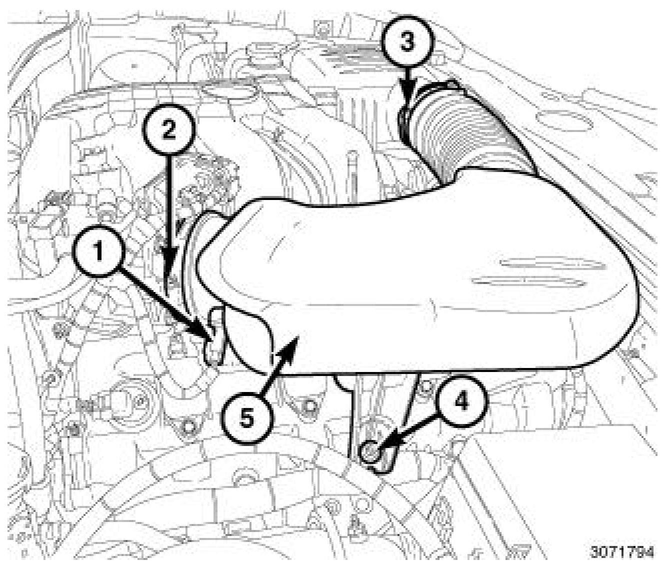


Fig. 95: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Position the air inlet hose assembly (5), connect the air inlet hose to the throttle body and the air cleaner housing.
5. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
6. Tighten the clamp (3) at the air cleaner housing to the proper specification. Refer to TORQUE

SPECIFICATIONS.

7. Tighten the clamp (2) at the throttle body to the proper specification. Refer to TORQUE SPECIFICATIONS.
8. Connect the Inlet Air Temperature (IAT) sensor wire harness connector (1).

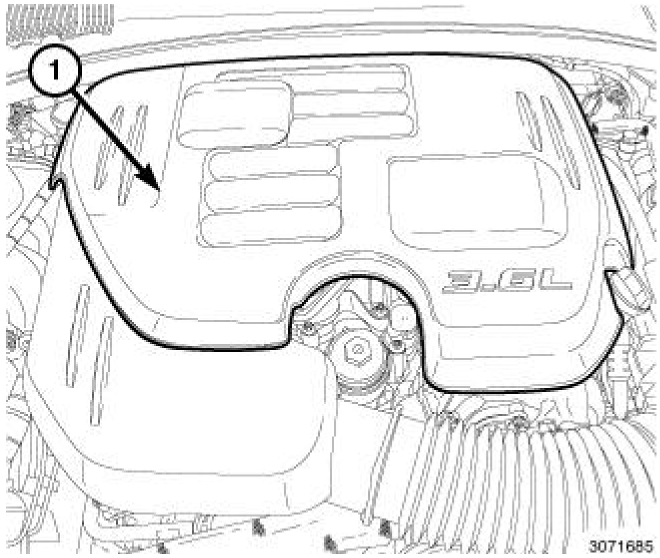


Fig. 96: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

9. Position the engine cover (1) and secure the retaining grommets to the ball studs.
10. Connect the negative battery cable.

CYLINDER HEAD

DESCRIPTION

DESCRIPTION

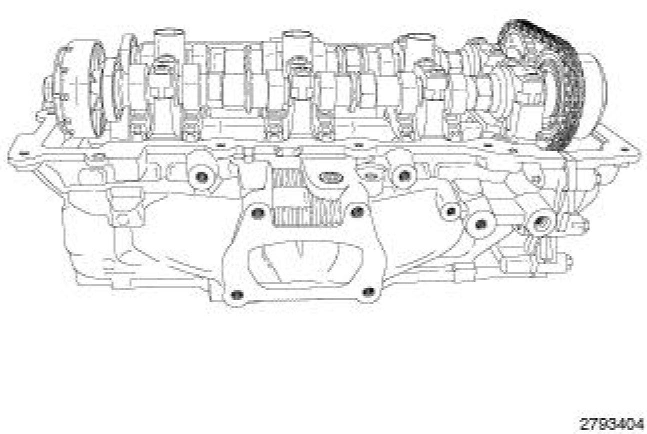


Fig. 97: Aluminum Cylinder Head
Courtesy of CHRYSLER GROUP, LLC

The aluminum cylinder heads are a unique design with left and right castings. The exhaust manifolds are integrated into the cylinder heads. The cylinder head features four valves per cylinder with pressed in powdered metal valve guides. The valve guides are not serviceable. The Dual Over Head Camshaft (DOHC) valvetrain uses roller rocker arms with hydraulic lifters. The cylinder head's camshaft bearing caps are made of powdered metal and the location and direction of each cap is marked on the side of the caps. The spark plug tubes are pressed into the cylinder heads and sealed in place. The tubes are a thin wall design and caution must be taken when working in the spark plug tube area.

DIAGNOSIS AND TESTING

CYLINDER HEAD GASKET

A cylinder head gasket leak can be located between adjacent cylinders or between a cylinder and the adjacent water jacket.

Possible indications of the cylinder head gasket leaking between adjacent cylinders are:

- Loss of engine power
- Engine misfiring
- Poor fuel economy

Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:

- Engine overheating
- Loss of coolant
- Excessive steam (white smoke) emitting from exhaust
- Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between the cylinders located next to each other, follow the procedures in Cylinder Compression Pressure Test. Refer to CYLINDER COMPRESSION TEST. An engine cylinder head gasket leaking between the cylinders will result in approximately a 50 - 70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: USE EXTREME CAUTION WHEN THE ENGINE IS OPERATING WITH COOLANT PRESSURE CAP REMOVED.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

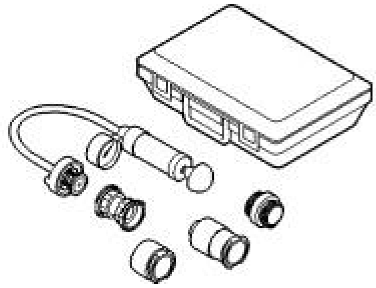


Fig. 98: Cooling System Pressure Tester - 7700a
Courtesy of CHRYSLER GROUP, LLC

WARNING: WITH THE COOLING SYSTEM TESTER IN PLACE, PRESSURE WILL BUILD UP FAST. EXCESSIVE PRESSURE BUILT UP BY CONTINUOUS ENGINE OPERATION MUST BE RELEASED TO A SAFE PRESSURE POINT. NEVER PERMIT THE PRESSURE TO EXCEED 138 kPa (20 psi).

Install Cooling System Tester (special tool #7700-A, Tester, Cooling System) or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Fig. 99: Bloc-Chek-Kit - C-3685-A
Courtesy of CHRYSLER GROUP, LLC

Combustion leaks into the cooling system can also be checked by using a (special tool #C-3685-A, Bloc-Chek Kit) or equivalent. Perform the test following the procedures supplied with the tool kit.

HYDRAULIC LASH ADJUSTER

A tappet-like noise may be produced from several items. Check the following items.

1. Engine oil level too high or too low. This may cause aerated oil to enter the adjusters and cause them to be spongy.
2. Insufficient running time after rebuilding the cylinder head. Low speed running up to 1 hour may be required.
3. Turn the engine off and let set for a few minutes before restarting. Repeat this several times after the engine has reached normal operating temperature.
4. Low oil pressure.
5. The oil restricter in cylinder head gasket or the oil passage to the cylinder head is plugged with debris.
6. Air ingested into oil due to broken or cracked oil pump pick up.
7. Worn valve guides.

8. Rocker arm ears contacting valve spring retainer.
9. Rocker arm loose, adjuster stuck or at maximum extension and still leaves lash in the system.
10. Oil leak or excessive cam bore wear in cylinder head.
11. Faulty lash adjuster.
    - Check lash adjusters for "sponginess" while installed in cylinder head and cam on camshaft at base circle. Depress part of rocker arm over adjuster. Normal adjusters should feel firm when pressed quickly. When pressed very slowly, lash adjusters should collapse.
    - Remove suspected lash adjusters, and replace.
    - Before installation, make sure adjusters are full of oil. This can be verified by little plunger travel when lash adjuster is depressed quickly.

REMOVAL

LEFT

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.**

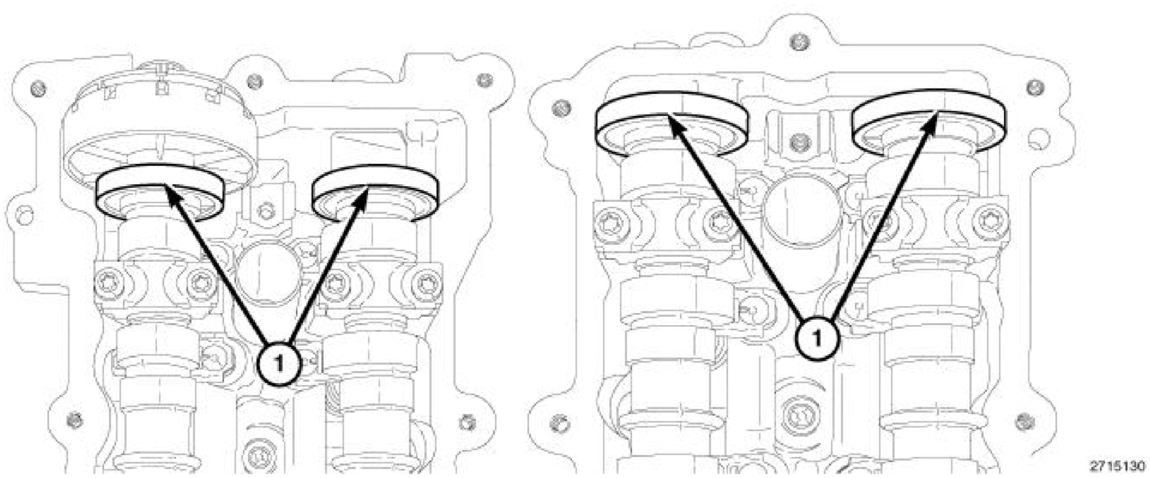


Fig. 100: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Disconnect and isolate the negative battery cable.
3. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL**.

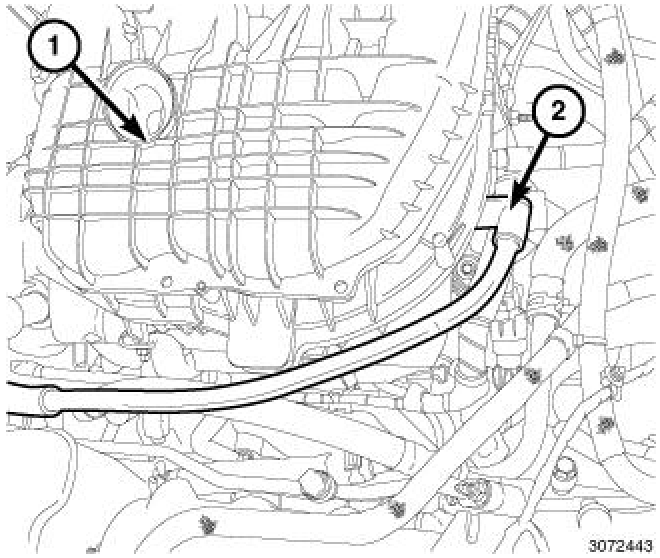


Fig. 101: Fresh Air Makeup Hose At Rear Of Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

4. Remove the fresh air makeup hose (2) from the rear of the intake manifold (1).

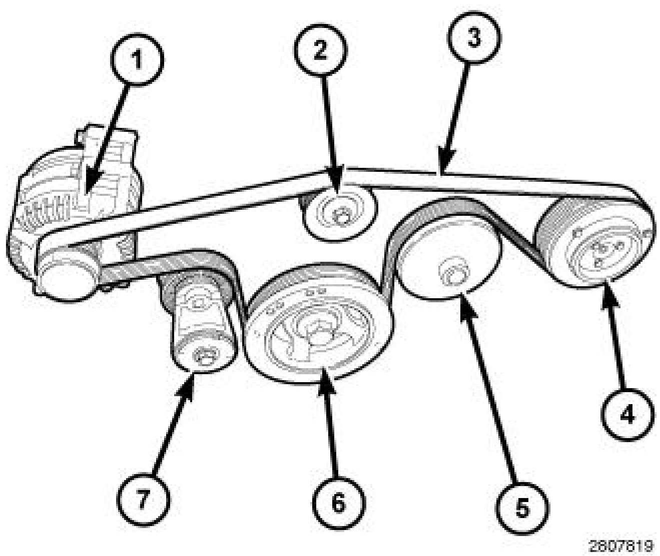


Fig. 102: Idler Pulley, Tensioner Arm, Belt, Idler, Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

5. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts the stop and remove the accessory drive belt (3), then slowly rotate the tensioner into the freearm position.

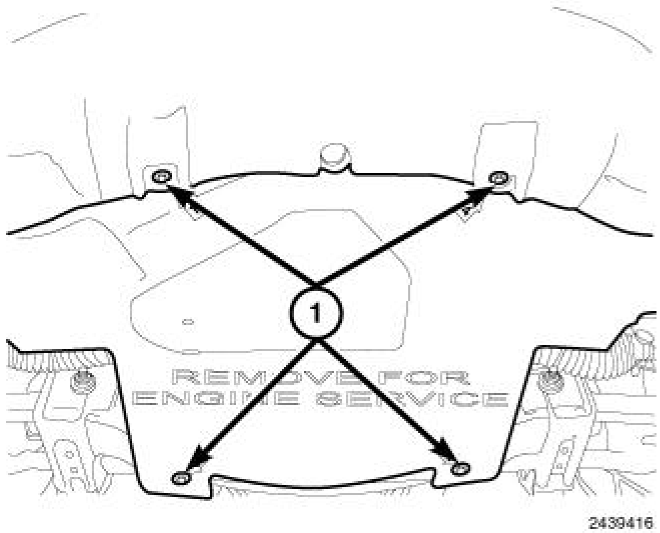


Fig. 103: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
7. Remove bolts (1) and the belly pan.
8. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
9. Drain the engine oil. Refer to **STANDARD PROCEDURE**.

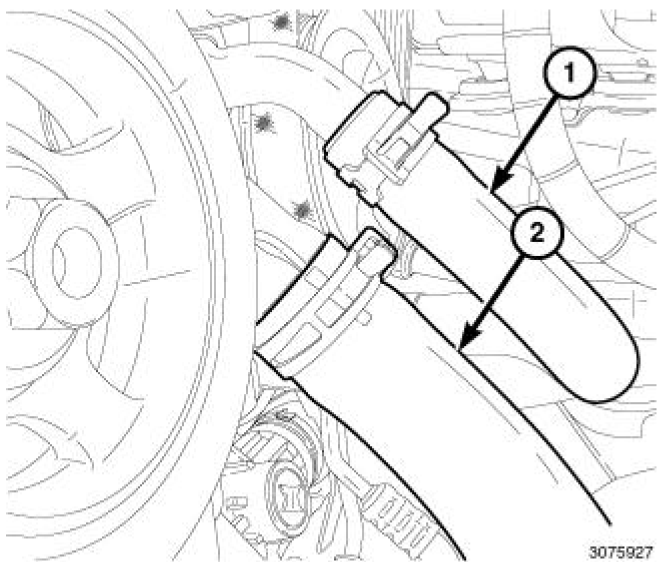


Fig. 104: Lower Heater Core Return Hose & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

10. Remove the lower heater core return hose (1) from the engine coolant pump housing.

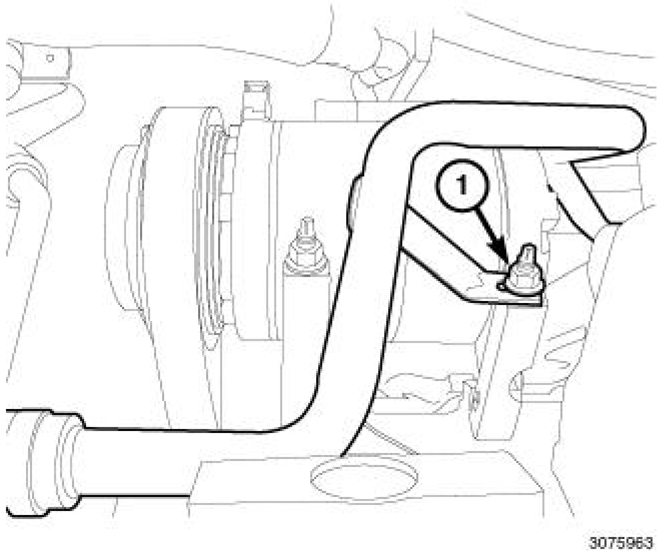


Fig. 105: Heater Core Return Tube Lower Support Bracket Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

11. Remove the heater core return tube lower support bracket retaining nut (1).

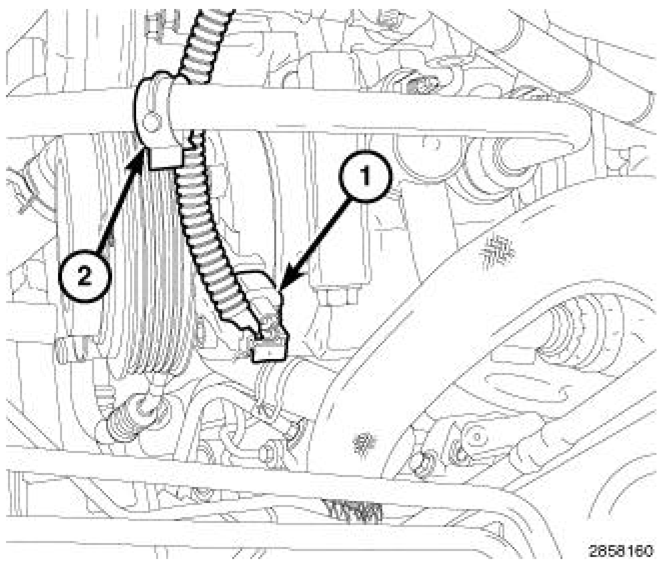


Fig. 106: A/C Compressor Electrical Connector & Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the A/C compressor wire harness connector (1) and disengage the wire harness retainer (2) from the A/C compressor discharge line.

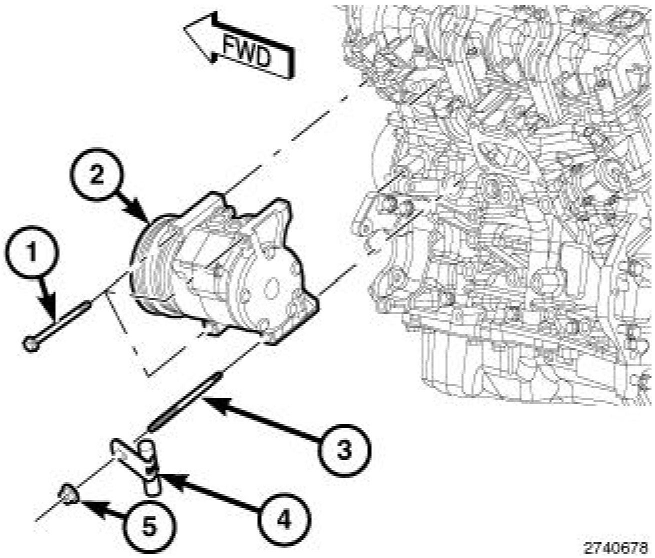


Fig. 107: A/C Compressor, Nut, Stud & Three Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Remove the A/C compressor lower retaining studs (3).
14. Remove support and lower the vehicle.
15. Remove the A/C compressor upper retaining bolts (1) and reposition the A/C compressor aside (2).

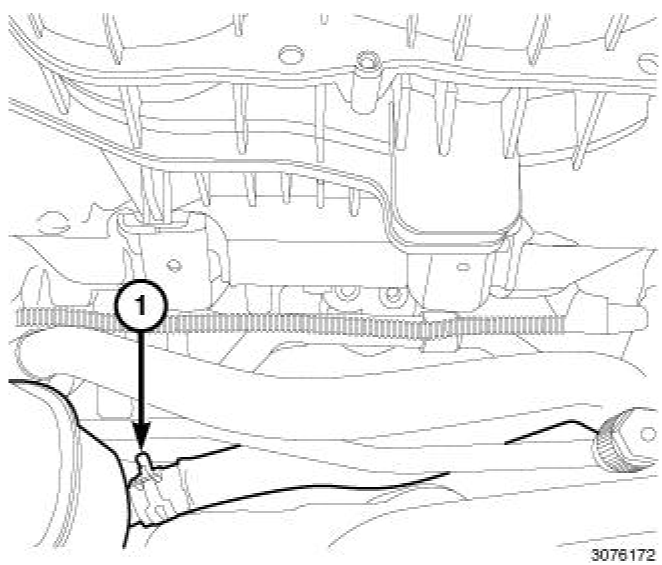


Fig. 108: Coolant Bottle Return Hose
Courtesy of CHRYSLER GROUP, LLC

16. Remove the coolant bottle return hose (1).

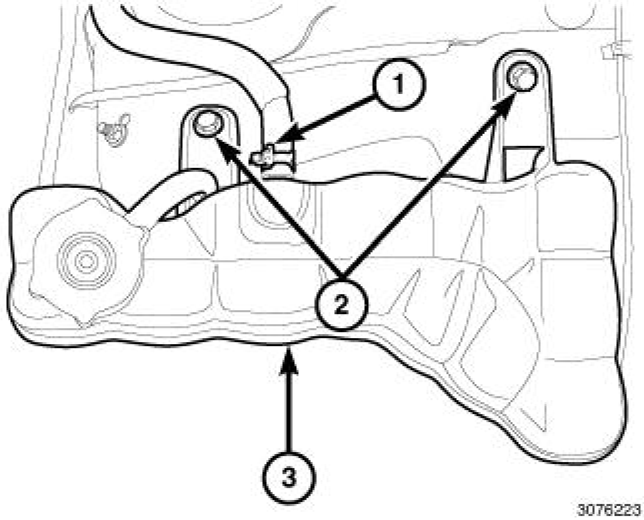


Fig. 109: Heater Core Purge Hose, Coolant Bottle Retaining Bolts & Coolant Bottle
Courtesy of CHRYSLER GROUP, LLC

17. Remove the heater core purge hose (1) from the coolant bottle.
18. Remove bolts (2) the coolant bottle (3).

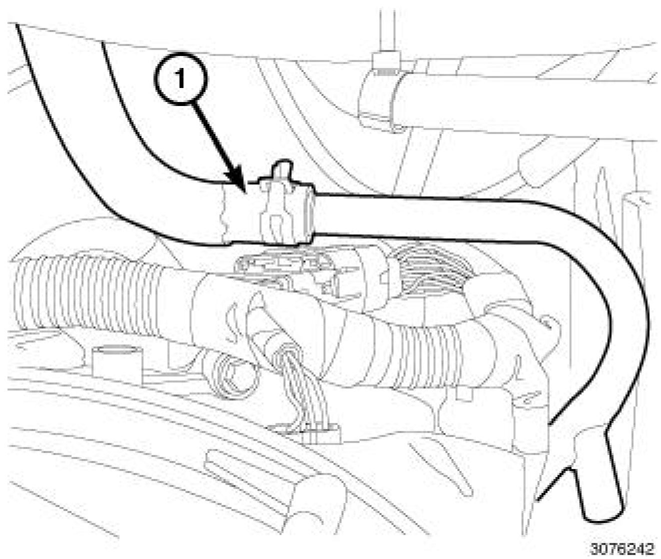


Fig. 110: Heater Core Return Hose
Courtesy of CHRYSLER GROUP, LLC

19. Disconnect the heater core return hose (1).

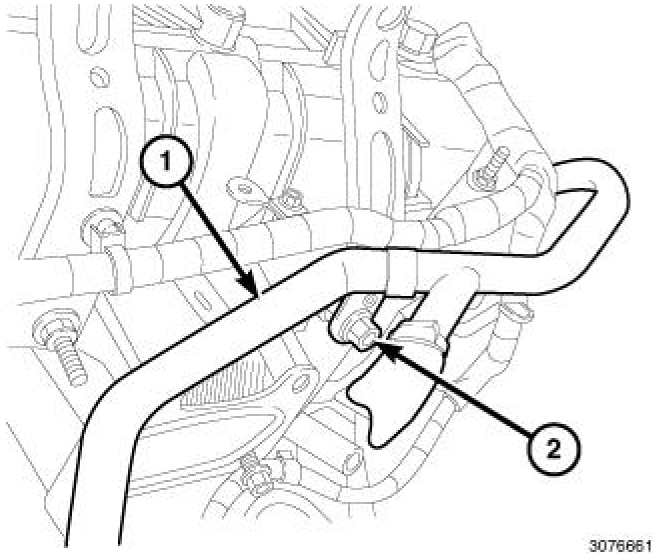


Fig. 111: Heater Core Return Tube Upper Support Bracket Retaining Nut & Tube
Courtesy of CHRYSLER GROUP, LLC

20. Remove the heater core return tube upper support bracket retaining nut (2) and remove the tube (1).
21. Remove the upper and lower intake manifolds and insulator. Refer to **MANIFOLD, INTAKE, REMOVAL**.

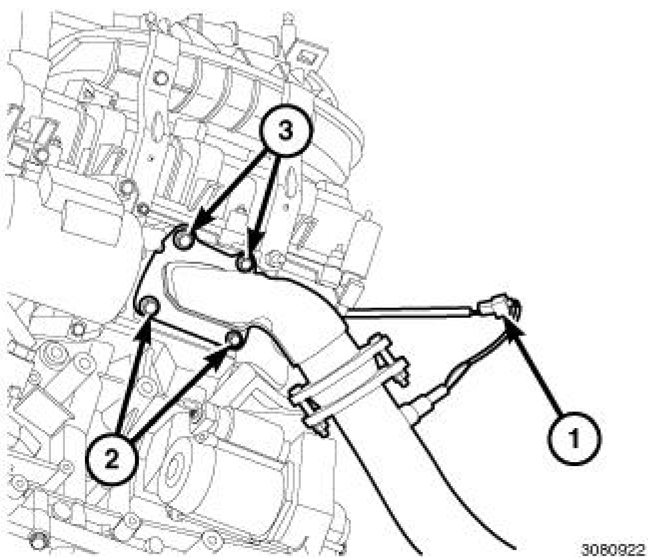


Fig. 112: Left Upstream Oxygen Sensor Electrical Connector & Down Pipe Flange Bolts
Courtesy of CHRYSLER GROUP, LLC

22. Disconnect the left upstream oxygen sensor wire harness connector (1).
23. Loosen the lower down pipe flange bolts (2).
24. Remove the upper down pipe flange bolts (3) and position the down pipe and catalytic converter aside.

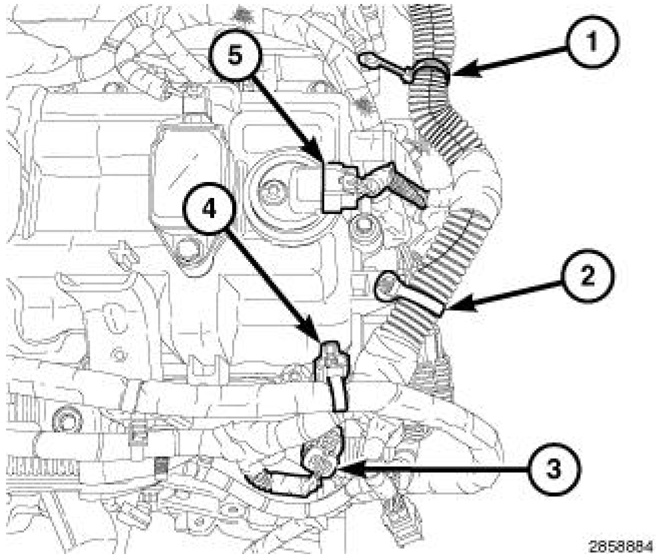


Fig. 113: ECT Sensor Connector, CMP Sensor & Main Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

25. Disconnect the Engine Coolant Temperature (ECT) sensor wire harness connector (3).

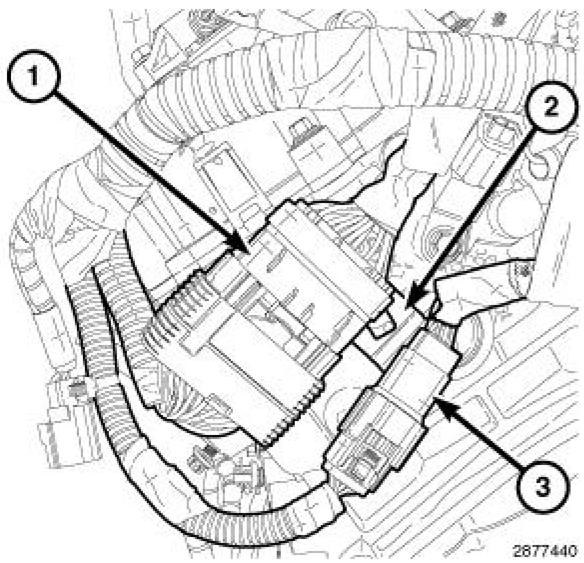


Fig. 114: Injection/Ignition Electrical Connector & Engine Oil Pressure/Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

26. Disconnect the ignition coil capacitor wire harness connector.
27. Disconnect the injection/ignition wire harness connector (1).
28. Disconnect the engine oil pressure/temperature sensor wire harness connector (3).
29. Unfasten the injection/ignition wire harness and the oil pressure/temperature sensor wire harness from the retainer bracket (2) on the rear of the left cylinder head.

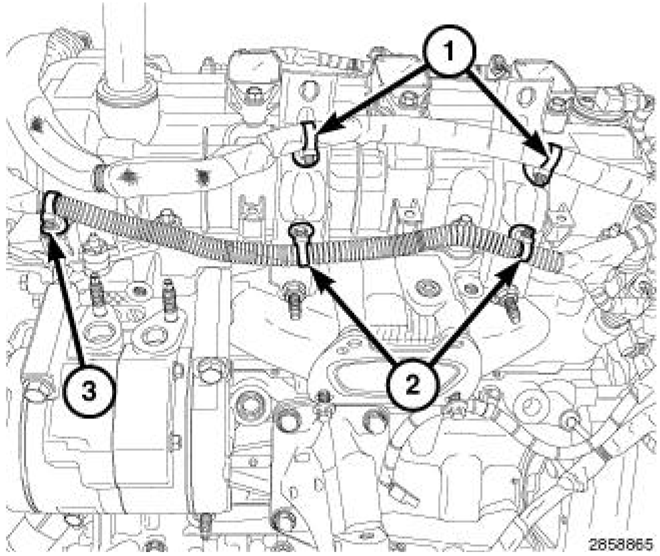


Fig. 115: Starter Wire Harness Retainers, Main Wire Harness Retainer & Manifold Support Bracket Retainers
Courtesy of CHRYSLER GROUP, LLC

30. Unfasten two starter wire harness retainers (1) from the upper intake manifold support brackets.
31. Unfasten one main wire harness retainer (3) from the left cylinder head cover and two retainers (2) from the upper intake manifold support brackets.

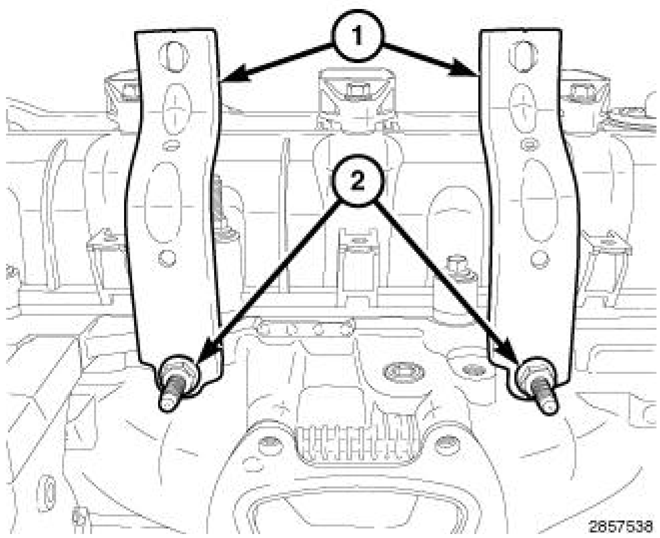
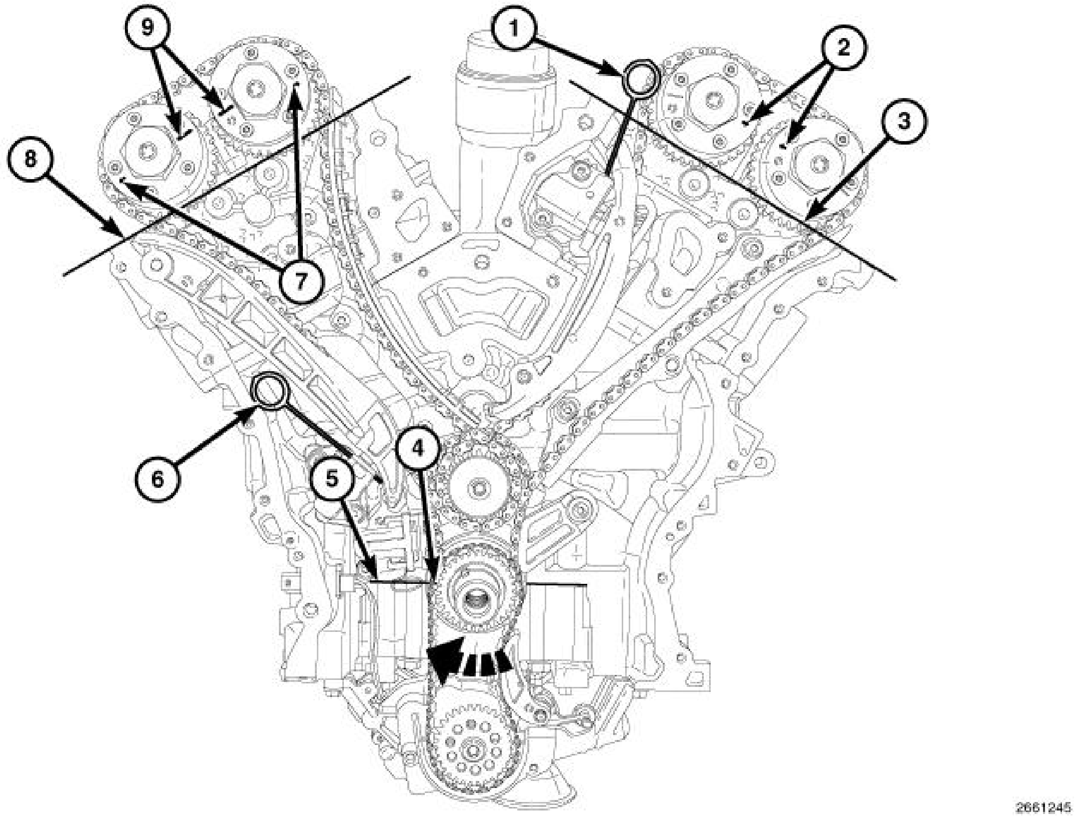


Fig. 116: Left Intake Manifold Support Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

32. Remove the bolts (2) and the left upper intake manifold support brackets (1).
33. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .
34. Remove the cylinder head covers, lower and upper oil pans, crankshaft vibration damper and engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.

NOTE: **Take this opportunity to measure timing chain wear. Refer to VALVE TIMING, STANDARD PROCEDURE.**



[Fig. 117: Rotating Crankshaft Clockwise To Position No. 1 Piston At TDC On Exhaust Stroke]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

35. Rotate the crankshaft clockwise to place the number one piston at TDC on the exhaust stroke by aligning the dimple (4) on the crankshaft with the block/bearing cap junction (5). The left side cam phaser arrows (2) should point toward each other and be parallel to the valve cover sealing surface (3). The right side cam phaser arrows (7) should point away from each other and the scribe lines (9) should be parallel to the valve cover sealing surface (8).

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

36. Mark the direction of rotation on the timing chain using a paint pen or equivalent to aid in reassembly.

CAUTION: When the timing chains are removed and the cylinder heads are still installed, DO NOT rotate the camshafts or crankshaft without first locating the proper crankshaft position. Failure to do so will result in valve and/or piston damage.

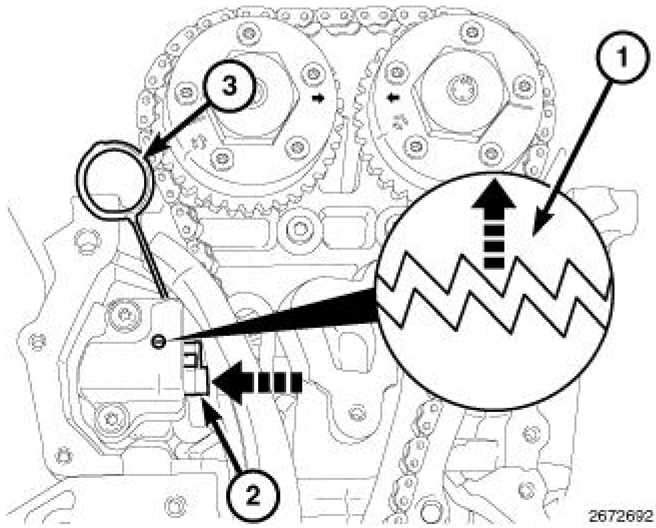


Fig. 118: Resetting Left Cam Chain Tensioner By Lifting Pawl, Pushing Back Piston & Installing Tensioner Pin
Courtesy of CHRYSLER GROUP, LLC

37. Reset the left cam chain tensioner by lifting the pawl (1), pushing back the piston (2) and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (3).

    Refer to **VALVE TIMING, STANDARD PROCEDURE**.

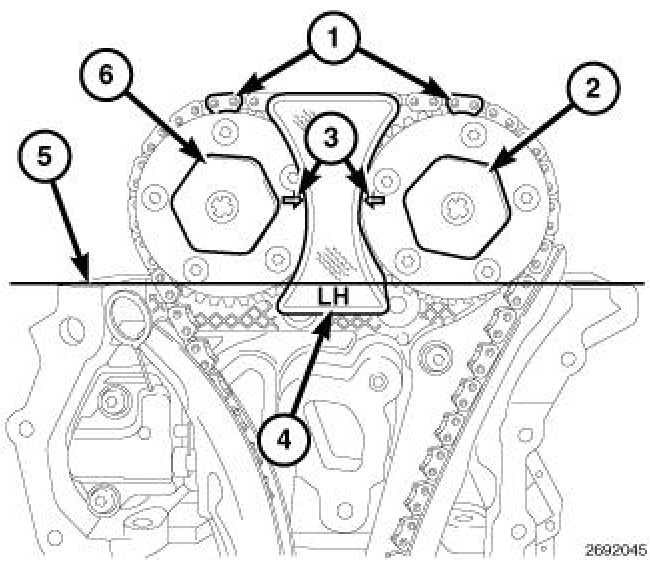


Fig. 119: Phaser Timing Marks, Oil Control Valves & LH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser lock.**

38. Install the LH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) (4).
39. Loosen both the intake oil control valve (6) and exhaust oil control valve (2).
40. Remove the LH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) (4).

41. Remove the oil control valve (2) from the left side exhaust cam phaser and pull the phaser off of the camshaft.
42. Remove the oil control valve (6) from the left side intake cam phaser and pull the phaser off of the camshaft.

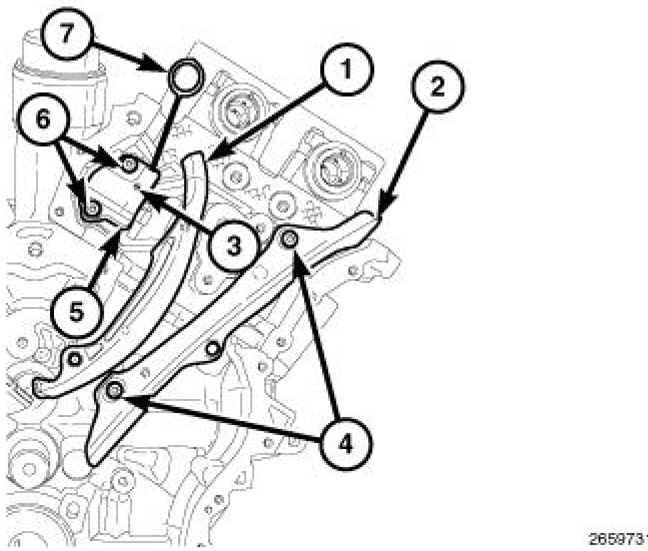


Fig. 120: Left Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

43. Remove the left cam chain tensioner arm (1).
44. Remove two T30 bolts (6) and the left cam chain tensioner (5).
45. Remove two T30 bolts (4) and the left cam chain guide (2).

NOTE: **If the rocker arms are to be reused, identify their positions so that they can be reassembled into their original locations.**

46. Remove the rocker arms. Refer to **ROCKER ARM, VALVE, REMOVAL**.

NOTE: **If the hydraulic lifters are to be reused, identify their positions so that they can be reassembled into their original locations.**

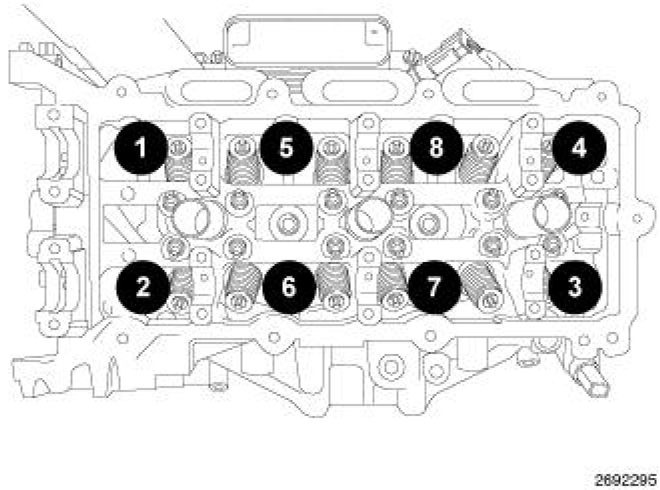


Fig. 121: Cylinder Head Retaining Bolt Removal Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

47. If required, remove the hydraulic lifters.
48. Using the sequence shown in illustration, remove the cylinder head retaining bolts.

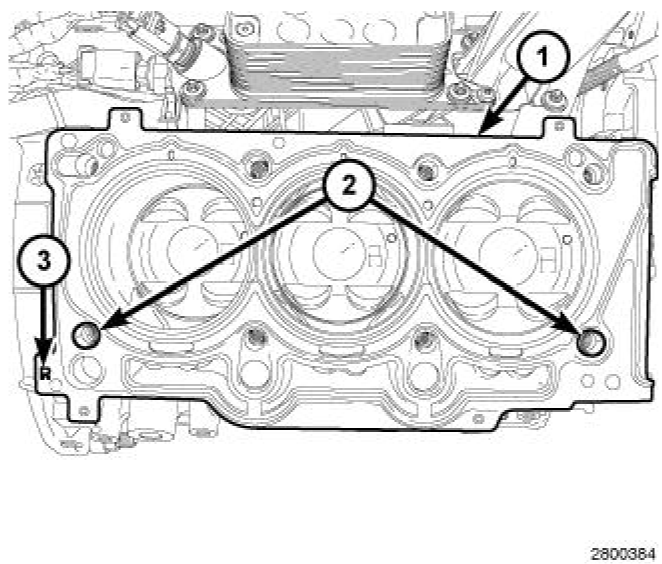


Fig. 122: Head Gasket & Locating Dowels
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Right head gasket shown in illustration, left head gasket similar.**
WARNING:	**The multi-layered steel head gaskets have very sharp edges that could cause personal injury if not handled carefully.**
CAUTION:	**Do not lay the cylinder head on its gasket sealing surface, due to the design of the cylinder head gasket, any distortion to the cylinder head sealing surface may prevent the gasket from properly sealing resulting in leaks.**

NOTE: **The head gasket (1) crimps the locating dowels (2) and the dowels may pull out of the engine block when the head gasket is removed.**

49. Remove the cylinder head and gasket (1) and discard the gasket.

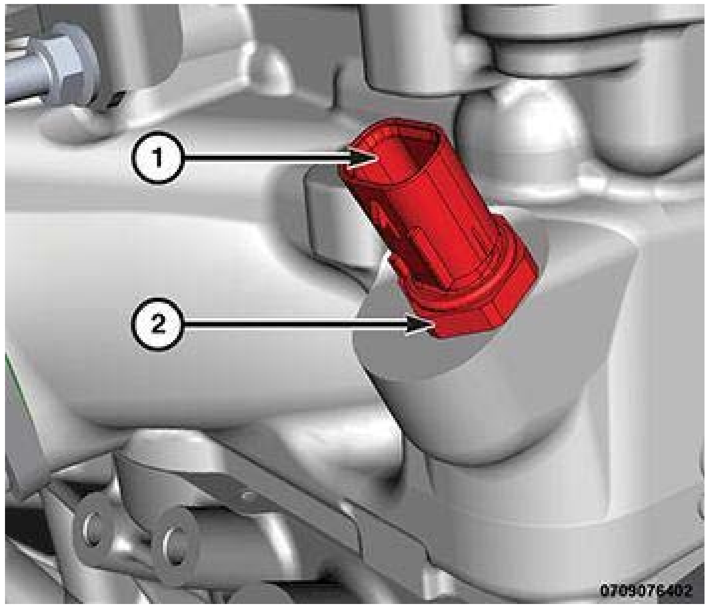


Fig. 123: ECT Sensor & Connector
Courtesy of CHRYSLER GROUP, LLC

50. If required, remove the Engine Coolant Temperature (ECT) sensor (2).
51. If required, remove the ignition coil capacitor and the engine wire harness retainer bracket.

RIGHT

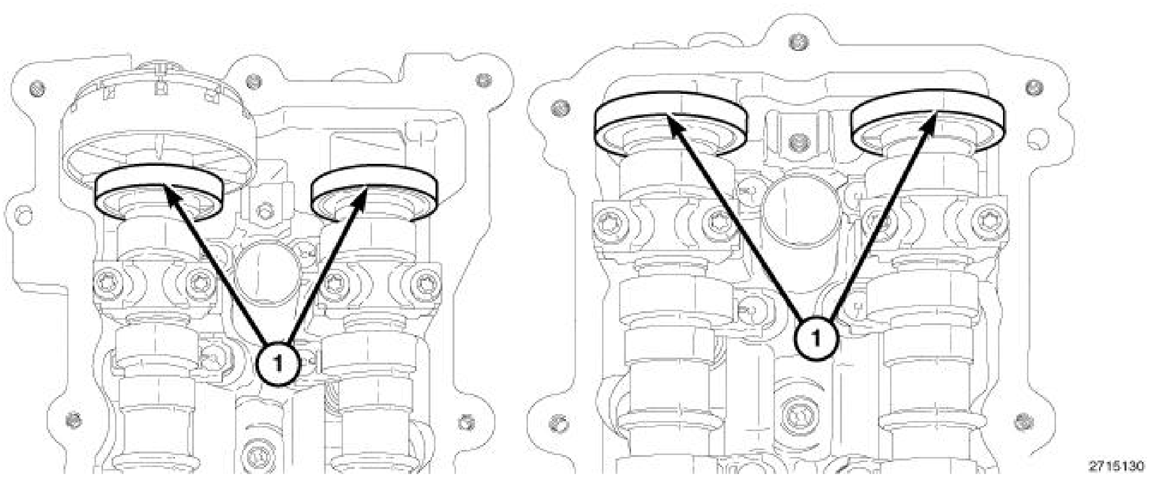


Fig. 124: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.**

1. Perform the fuel pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Disconnect and isolate the negative battery cable.
3. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL**.

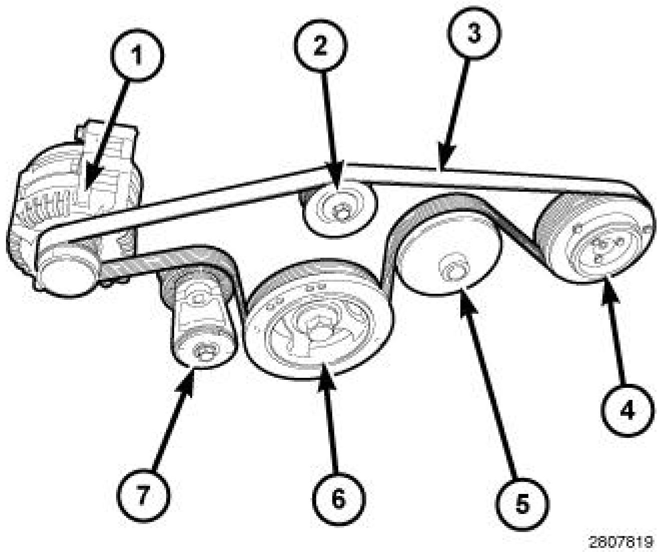


Fig. 125: Idler Pulley, Tensioner Arm, Belt, Idler, Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

4. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts the stop and remove the accessory drive belt (3), then slowly rotate the tensioner into the freearm position.
5. Remove the generator (1). Refer to **GENERATOR, REMOVAL** .

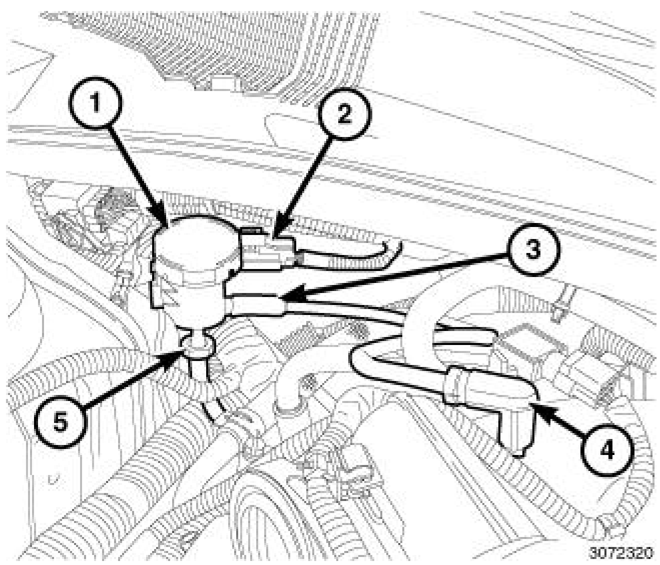


Fig. 126: EVAP Purge Solenoid, Electrical Connector & Vacuum Lines
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the vacuum line (3) at the EVAP purge solenoid (1).
7. Disconnect the EVAP purge solenoid vacuum line (4) at the intake manifold and remove the vacuum line.

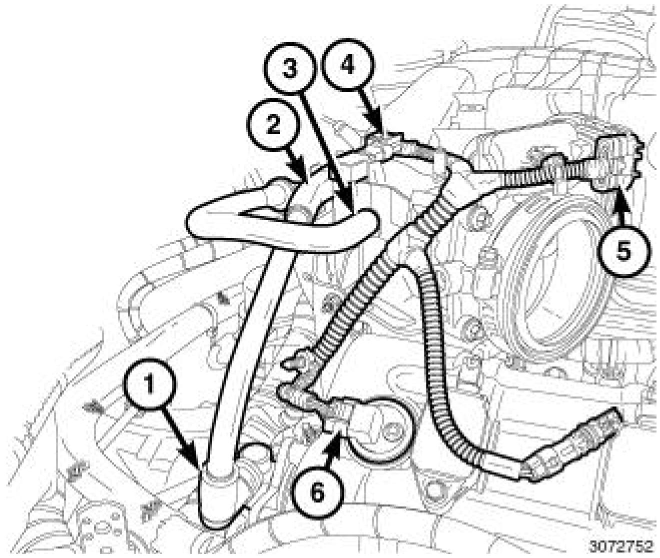


Fig. 127: PCV Valve, Intake Manifold, Brake Booster Vacuum Hose, MAP Sensor, ETC & CMP Sensor Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

8. Remove the Positive Crankcase Ventilation (PCV) hose from the intake manifold (2) and PCV valve (1).
9. Disconnect the brake booster vacuum hose (3) and position aside.
10. Disconnect the Manifold Absolute Pressure (MAP) sensor wire harness connector (4).
11. Disconnect the throttle body wire harness connector (5).
12. Disconnect the Camshaft Position Sensor (CMP) (6) wire harness connector.
13. Remove the upper and lower intake manifolds and insulator. Refer to **MANIFOLD, INTAKE, REMOVAL**.

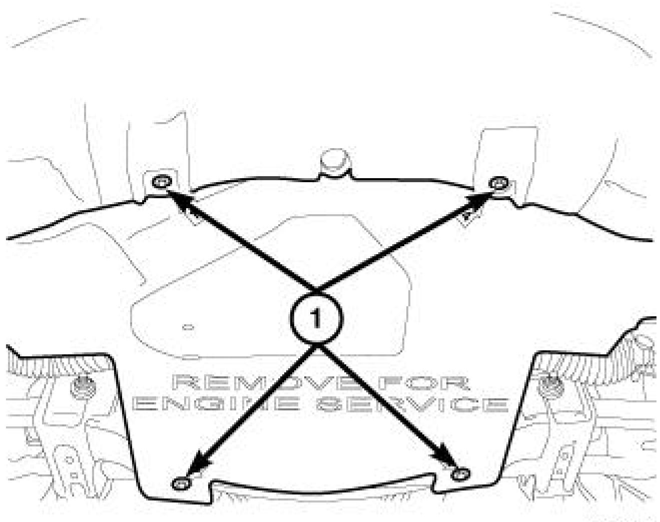


Fig. 128: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

14. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
15. Remove bolts (1) and the belly pan.

16. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
17. Drain the engine oil. Refer to **STANDARD PROCEDURE**.

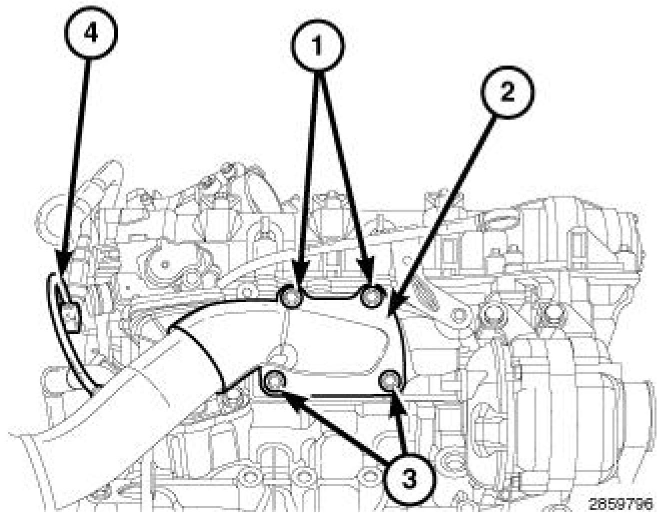


Fig. 129: Right Upstream Oxygen Electrical Sensor Connector, Down Pipe Flanges & Bolts
Courtesy of CHRYSLER GROUP, LLC

18. Disconnect the right upstream oxygen electrical sensor connector (4) from the main wire harness.
19. Loosen the lower down pipe flange bolts (3).
20. Remove the upper down pipe flange bolts (1) and position the down pipe and catalytic converter aside.

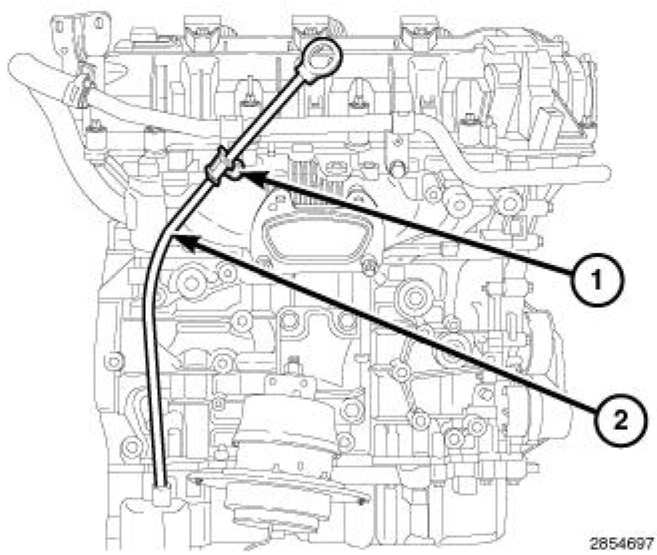
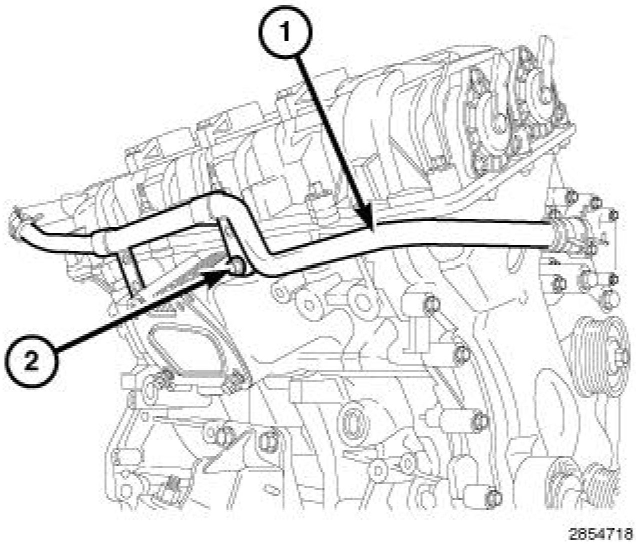


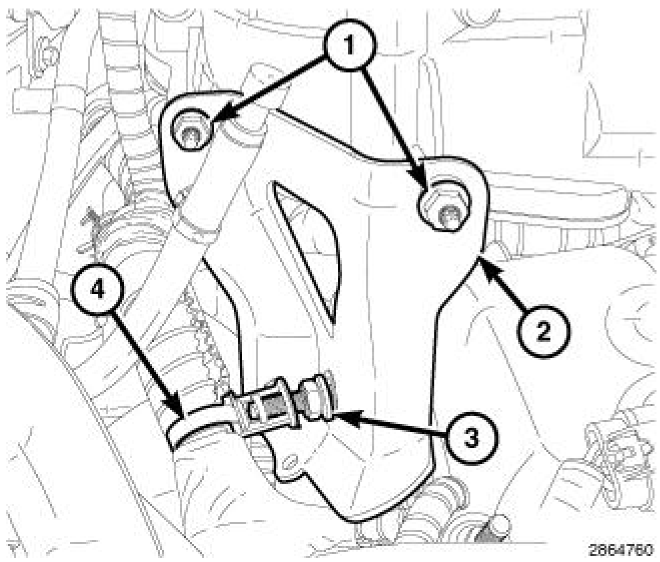
Fig. 130: Oil Level Indicator & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

21. Remove the oil level indicator (2) retaining bolt (1) and remove the oil level indicator.



[Fig. 131: Heater Core Supply Tube Support Bracket & Retaining Bolt]
Courtesy of CHRYSLER GROUP, LLC

22. Remove the heater core supply tube (1) support bracket retaining bolt (2) and remove the heater core supply tube (1).



[Fig. 132: Upper Intake Manifold Support Bracket, Stud & Fasteners]
Courtesy of CHRYSLER GROUP, LLC

23. Disconnect the ignition coil capacitor wire harness connector.
24. Remove the stud (3) and remove the upper intake manifold support bracket (2).
25. Remove the cylinder head covers, lower and upper oil pans, crankshaft vibration damper and engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.

NOTE:	**Take this opportunity to measure timing chain wear. Refer to VALVE TIMING, STANDARD PROCEDURE.**

26. Remove support and lower the vehicle.

27. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

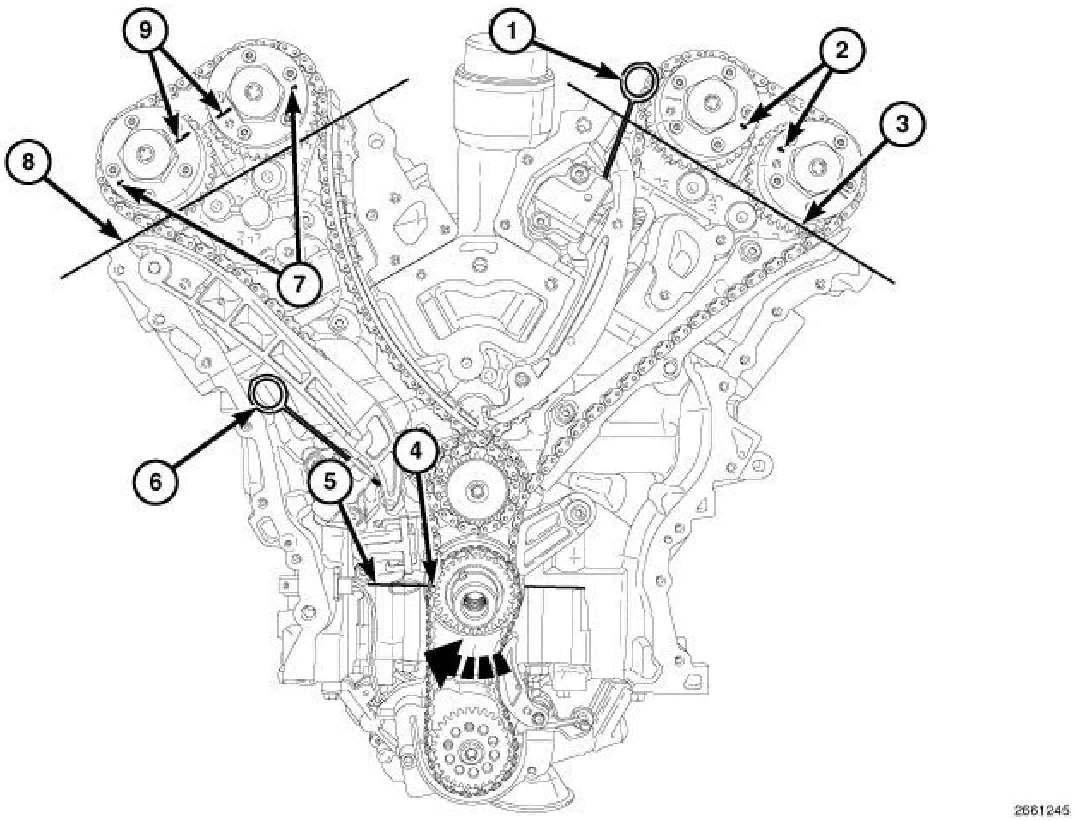


Fig. 133: Rotating Crankshaft Clockwise To Position No. 1 Piston At TDC On Exhaust Stroke
Courtesy of CHRYSLER GROUP, LLC

28. Rotate the crankshaft clockwise to place the number one piston at TDC on the exhaust stroke by aligning the dimple (4) on the crankshaft with the block/bearing cap junction (5). The left side cam phaser arrows (2) should point toward each other and be parallel to the valve cover sealing surface (3). The right side cam phaser arrows (7) should point away from each other and the scribe lines (9) should be parallel to the valve cover sealing surface (8).
29. Mark the direction of rotation on the timing chain using a paint pen or equivalent to aid in reassembly.

CAUTION: When the timing chains are removed and the cylinder heads are still installed, DO NOT rotate the camshafts or crankshaft without first locating the proper crankshaft position. Failure to do so will result in valve and/or piston damage.

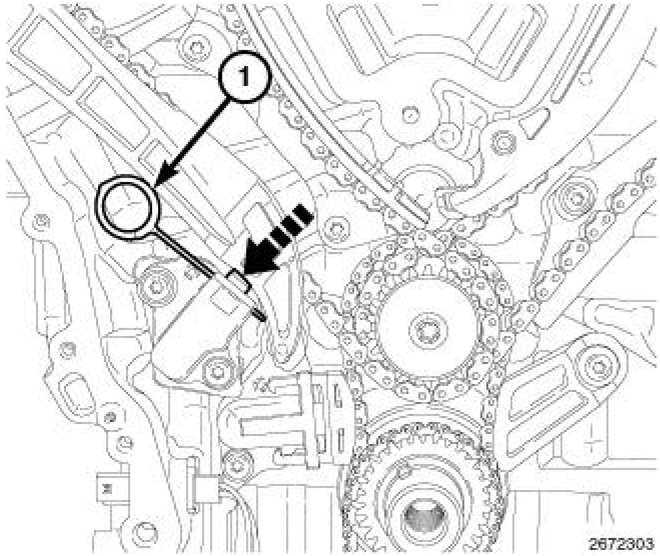


Fig. 134: Resetting Right Cam Chain Tensioner By Pushing Back Tensioner Piston & Installing Tensioner Pin
Courtesy of CHRYSLER GROUP, LLC

30. Reset the right cam chain tensioner by pushing back the tensioner piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (1).

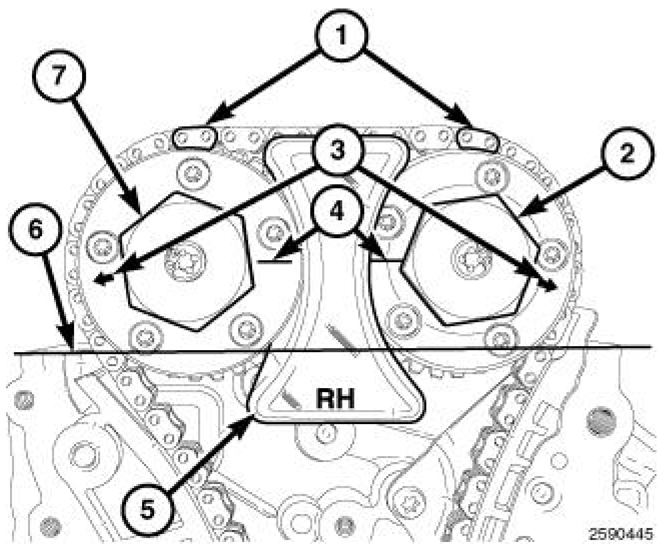


Fig. 135: Phaser Timing Marks, Oil Control Valves & RH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser lock.**

31. Install the RH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) (5).
32. Loosen both the intake oil control valve (2) and exhaust oil control valve (7).
33. Remove the RH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) (5).
34. Remove the oil control valve (2) from the right side intake cam phaser and pull the phaser off of the camshaft.

35. Remove the oil control valve (7) from the right side exhaust cam phaser and pull the phaser off of the camshaft.

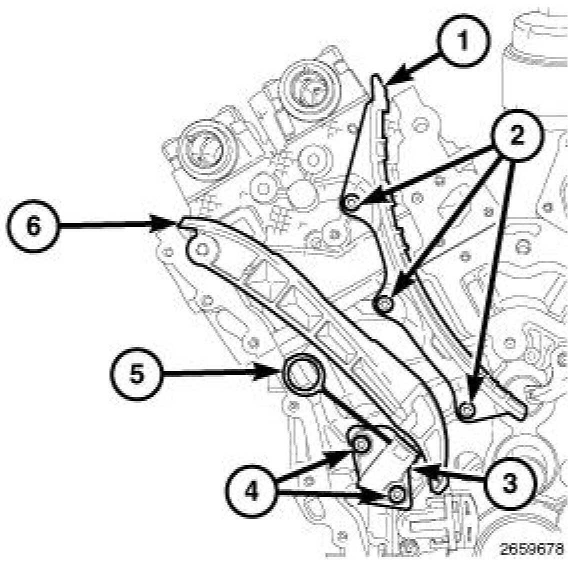


Fig. 136: Right Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

36. Remove the right cam chain tensioner arm (6).
37. Remove two T30 bolts (4) and the right cam chain tensioner (3).
38. Remove three T30 bolts (2) and the right cam chain guide (1).
39. Remove the right camshafts. Refer to **CAMSHAFT, ENGINE, REMOVAL**.

NOTE: **If the rocker arms are to be reused, identify their positions so that they can be reassembled into their original locations.**

40. Remove the rocker arms. Refer to **ROCKER ARM, VALVE, REMOVAL**.

NOTE: **If the hydraulic lifters are to be reused, identify their positions so that they can be reassembled into their original locations.**

41. If required, remove the hydraulic lifters. Refer to **LIFTER(S), HYDRAULIC, REMOVAL**.

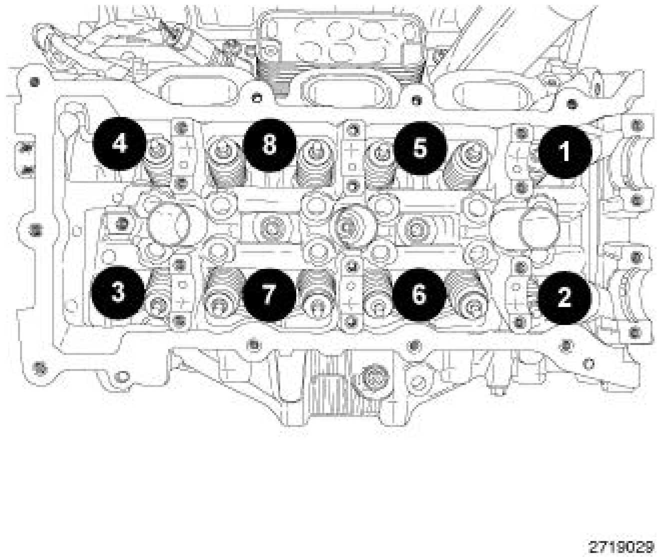


Fig. 137: Cylinder Head Retaining Bolt Removal Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

42. Using the sequence shown in illustration, remove the cylinder head retaining bolts.

WARNING: **The multi-layered steel head gaskets have very sharp edges that could cause personal injury if not handled carefully.**

CAUTION: **Do not lay the cylinder head on its gasket sealing surface, due to the design of the cylinder head gasket, any distortion to the cylinder head sealing surface may prevent the gasket from properly sealing resulting in leaks.**

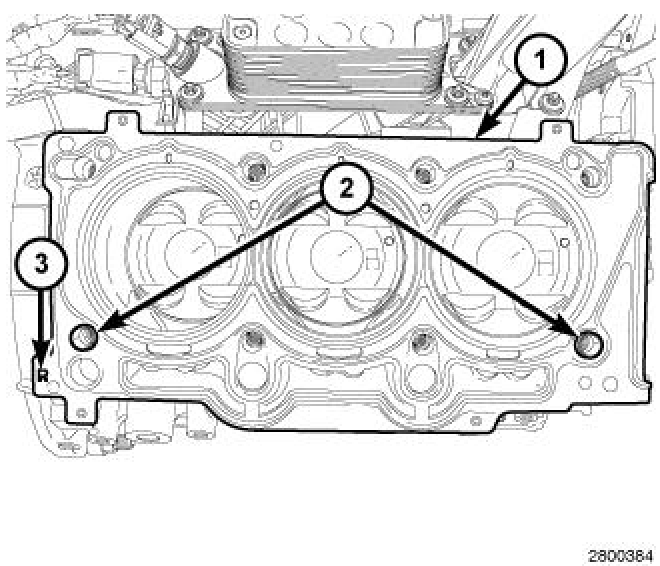


Fig. 138: Head Gasket & Locating Dowels
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The head gasket (1) crimps the locating dowels (2) and the dowels may pull out of the engine block when the head gasket is removed.**

43. Remove the cylinder head and gasket. Discard the gasket.

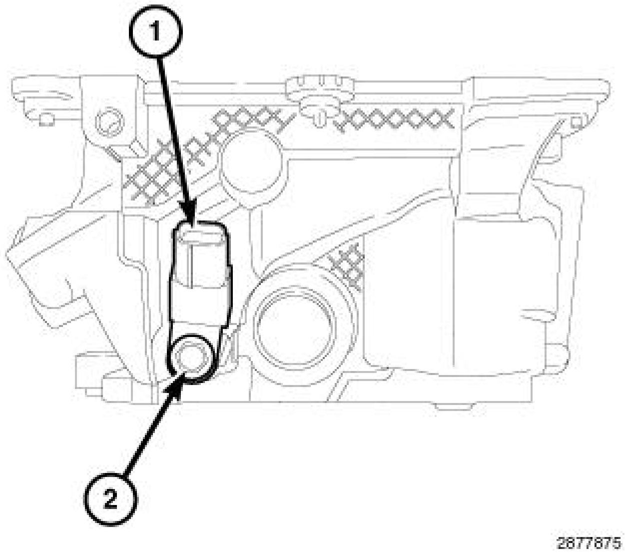


Fig. 139: Ignition Coil Capacitor & Bolt
Courtesy of CHRYSLER GROUP, LLC

44. If required, remove the bolt (2) and the ignition coil capacitor (1).

CLEANING

CLEANING

CAUTION: **When cleaning cylinder head and cylinder block surfaces, DO NOT use a metal scraper because the surfaces could be cut or ground. Use ONLY a wooden or plastic scraper.**

To ensure engine gasket sealing, proper surface preparation must be performed, especially with aluminum engine components and multi-layer steel cylinder head gaskets.

NOTE: **Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.**

1. Remove all gasket material from cylinder head and block. Refer to ENGINE GASKET SURFACE PREPARATION. Be careful not to gouge or scratch the aluminum head sealing surface.
2. Clean all engine oil passages.

   CAUTION: **Non-compressible debris such as oil, coolant or RTV sealants that are not removed from bolt holes can cause the aluminum casting to crack when tightening the bolts.**

3. Clean out the cylinder head bolt holes in the engine block.

   DO NOT USE any adhesives when installing the MLS head gaskets. The use of adhesives may cause the gasket not to seal properly and may leak. MLS gaskets are to be installed on a surface free of debris and oils.

INSPECTION

INSPECTION

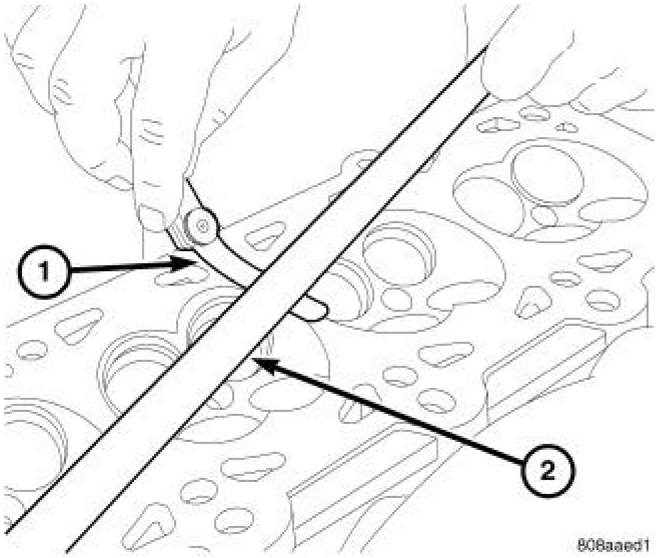


Fig. 140: Checking Cylinder Head Flatness
Courtesy of CHRYSLER GROUP, LLC

1. Check the cylinder head for warping with a straight edge (2) and feeler gauge (1).
2. Cylinder head must be flat within specification. Refer to **ENGINE SPECIFICATIONS**.
3. Verify that the valve tappets move freely in their bores and that they have been rotating.
4. Inspect camshaft bearing journals for scoring.
5. Remove carbon and varnish deposits from inside of valve guides with a reliable guide cleaner.
6. Inspect the following components and verify that they are within specification: Refer to **ENGINE SPECIFICATIONS**.
    - Camshafts
    - Valve Tappets
    - Springs
    - Valve Seats
    - Valve Guides
    - Valves

INSTALLATION

LEFT

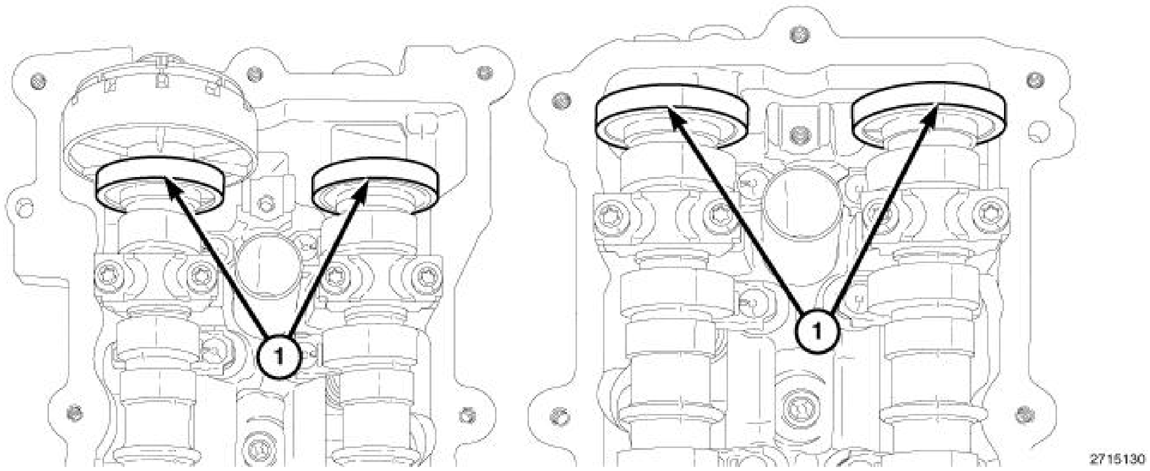


Fig. 141: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

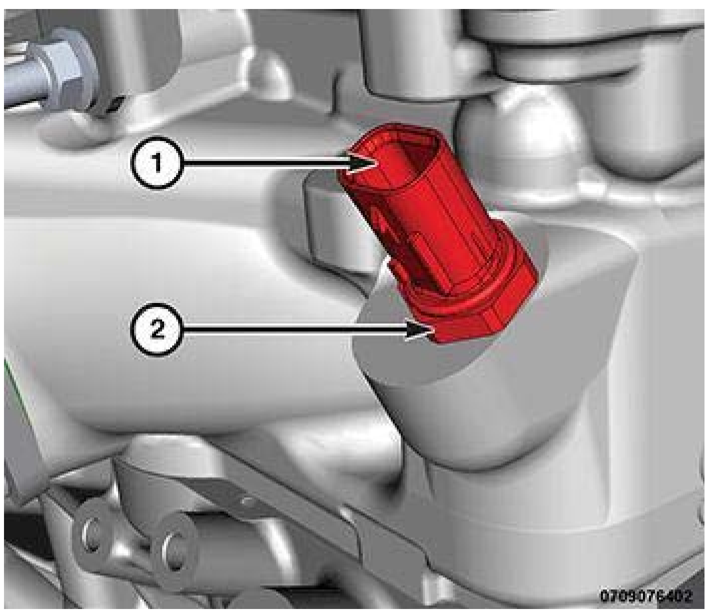
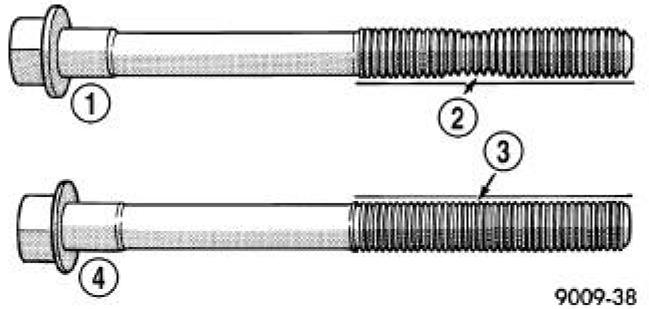


Fig. 142: ECT Sensor & Connector
Courtesy of CHRYSLER GROUP, LLC

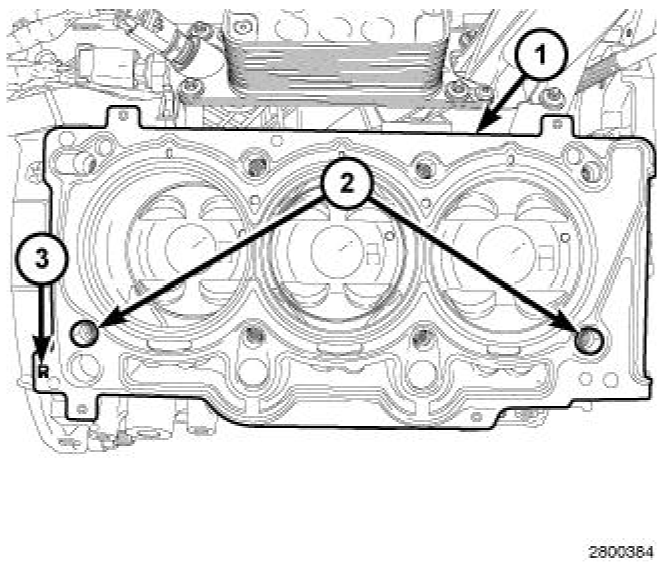
1. If removed, install the Engine Coolant Temperature (ECT) sensor (2) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.
2. If removed, install the ignition coil capacitor and the engine wire harness retainer bracket, then tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.



[Fig. 143: Checking Cylinder Head Bolts For Stretching (Necking)]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The cylinder head bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.**

3. Check cylinder head bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.



[Fig. 144: Head Gasket & Locating Dowels]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Right head gasket shown in illustration, left head gasket similar.**

CAUTION: **When cleaning cylinder head and cylinder block surfaces, DO NOT use a metal scraper because the surfaces could be cut or ground. Use ONLY a wooden or plastic scraper.**

4. Clean and prepare the gasket sealing surfaces of the cylinder head and block. Refer to ENGINE GASKET SURFACE PREPARATION.

CAUTION: **Non-compressible debris such as oil, coolant or RTV sealants that are not removed from bolt holes can cause the aluminum casting to crack when**

tightening the bolts.

5. Clean out the cylinder head bolt holes in the engine block.

WARNING: The multi-layered steel head gaskets have very sharp edges that could cause personal injury if not handled carefully.

CAUTION: The installation of the cylinder head gaskets are not interchangeable between the left and right cylinder heads. They are clearly marked (3) with "R" for right and "L" for left. They must be applied on a dry surface, without the use of any adhesives.

6. Position the new cylinder head gasket (1) onto the locating dowels (2).

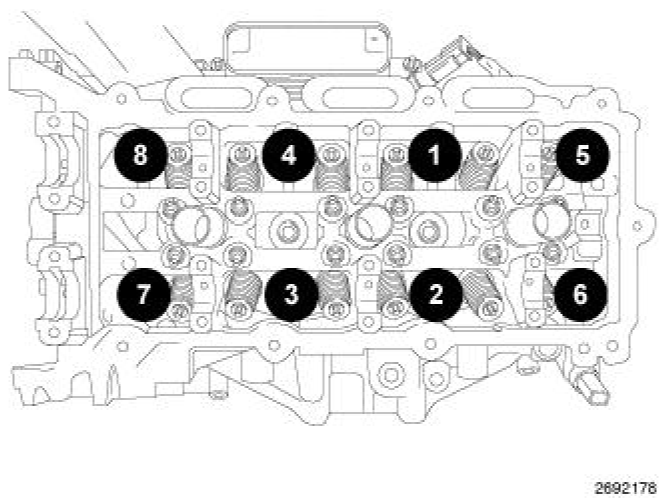


Fig. 145: Cylinder Head Retaining Bolt Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

7. Position the cylinder head onto the cylinder block. Make sure the cylinder head seats fully over the locating dowels.

NOTE: Do not apply any additional oil to the bolt threads.

8. Install the eight cylinder head bolts finger tight.
9. Tighten the cylinder head bolts in the sequence shown in illustration, following this 9 step torque plus angle method. The torque sequence must be used for each step. Tighten according to the following torque values:
   - Step 1: All to 30 N.m (22 ft. lbs.)
   - Step 2: All to 45 N.m (33 ft. lbs.)
   - Step 3: Retighten all to 45 N.m (33 ft. lbs.)
   - Step 4: All + 125Â° Turn (optional angle if 125Â° rotation cannot be accomplished in one motion; tighten all by turning 35Â° followed by tightening all by turning 90Â°) **Do not use a torque wrench for this step.**

- Step 5: Loosen all fasteners in reverse of sequence shown in illustration
- Step 6: All to 30 N.m (22 ft. lbs.)
- Step 7: All to 45 N.m (33 ft. lbs.)
- Step 8: Retighten all to 45 N.m (33 ft. lbs.)
- Step 9: All + 130Â° Turn (optional angle if 130Â° rotation cannot be accomplished in one motion; tighten all by turning 40Â° followed by tightening all by turning 90Â°) **Do not use a torque wrench for this step.**

NOTE: **For engine builds using a new block follow steps 1-9. For engine rebuilds (reuse block) follow step 6-9.**

CAUTION: **Do not rotate the camshafts more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage. If the camshafts need to be rotated more than a few degrees, first move the pistons away from the cylinder heads by rotating the crankshaft counterclockwise to a position 30Â° before-top-dead-center. Once the camshafts are returned to their top-dead-center position, rotate the crankshaft clockwise to return the crankshaft to top-dead-center.**

NOTE: **If the hydraulic lifters are being reused, reassemble them into their original locations.**

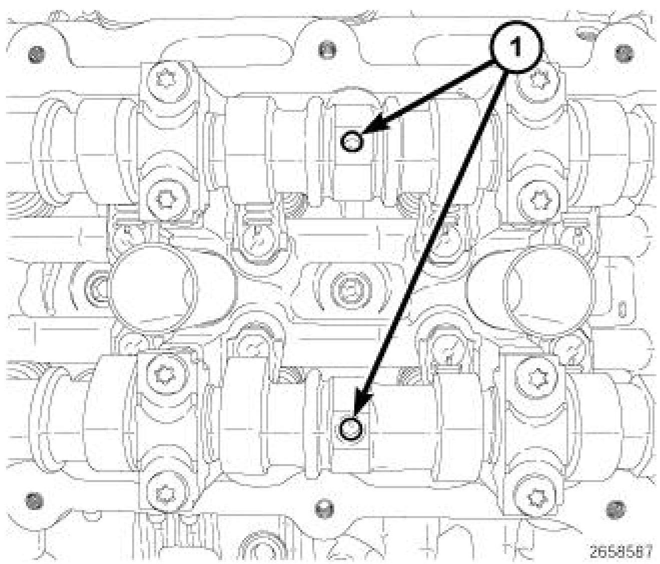


Fig. 146: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

10. If removed, install the hydraulic lifters. Refer to **LIFTER(S), HYDRAULIC, INSTALLATION**.

NOTE: **If the rocker arms are being reused, reassemble them into their original locations.**

11. Install the rocker arms and camshafts. Refer to **CAMSHAFT, ENGINE, INSTALLATION**.
12. Rotate the camshafts clockwise to TDC by positioning the alignment holes (1) vertically.

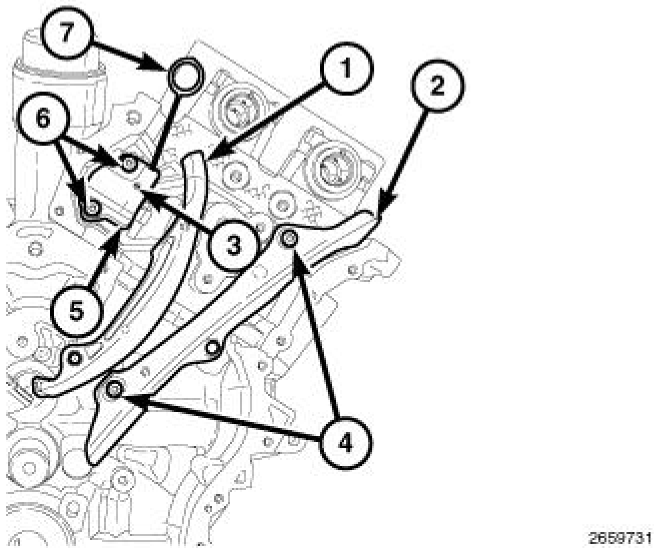


Fig. 147: Left Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Install the left cam chain guide (2). Tighten bolts (4) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
14. Install the left cam chain tensioner (5) to the cylinder head. Tighten bolts (6) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
15. Reset the left cam chain tensioner (5) by lifting the pawl (3), pushing back the piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (7).

    Refer to **VALVE TIMING, STANDARD PROCEDURE**.

16. Install the left tensioner arm (1).

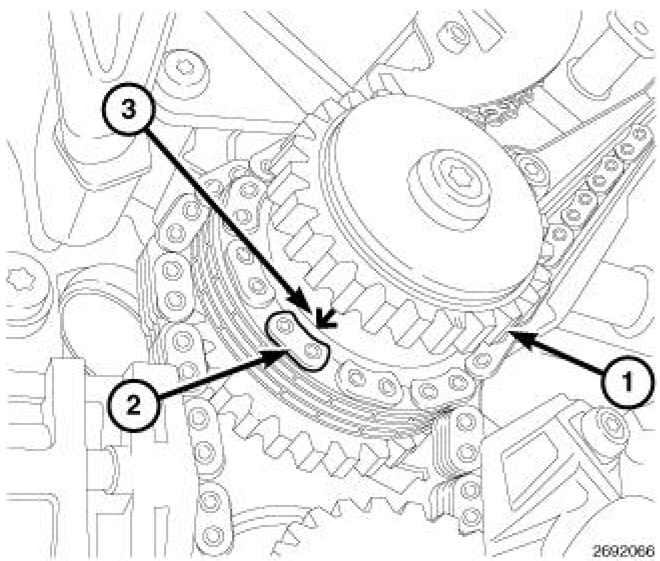


Fig. 148: Idler Sprocket, Plated Link & Arrow
Courtesy of CHRYSLER GROUP, LLC

17. Press the left intake cam phaser onto the intake camshaft, install and hand tighten the oil control valve.

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

18. Drape the left side cam chain over the left intake cam phaser and onto the idler sprocket (1) so that the arrow (3) is aligned with the plated link (2) on the cam chain.

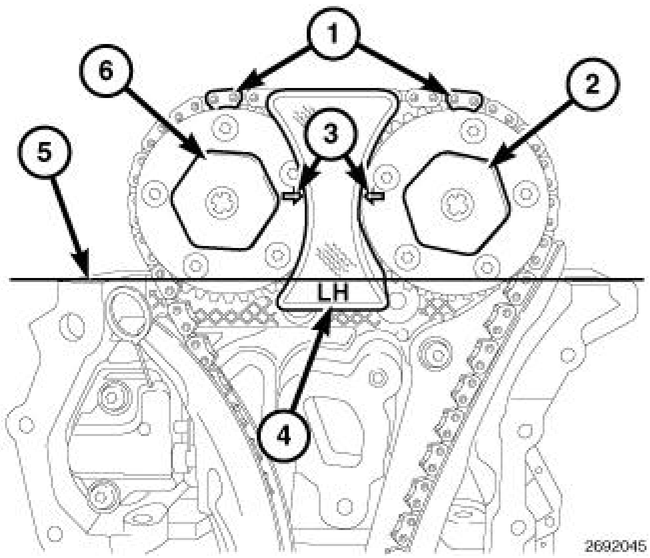


Fig. 149: Phaser Timing Marks, Oil Control Valves & LH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

19. While maintaining this alignment, route the cam chain around the exhaust and intake cam phasers so that the plated links are aligned with the phaser timing marks (1). Position the left side cam phasers so that the arrows (3) point toward each other and are parallel to the valve cover sealing surface (5). Press the exhaust cam phaser onto the exhaust cam, install and hand tighten the oil control valve (2).

NOTE: Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser or phaser lock.

20. Install the LH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) (4) and tighten the oil control valves (2, 6) to proper specification.

    Refer to **TORQUE SPECIFICATIONS**.

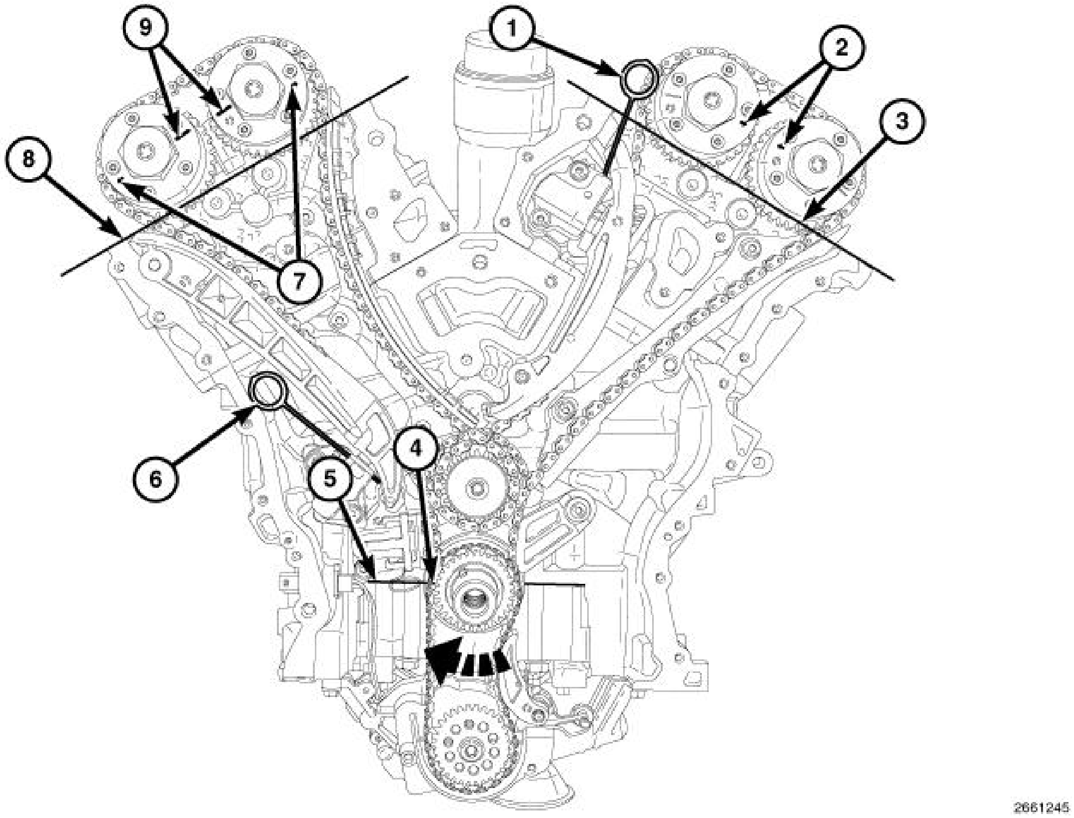


Fig. 150: Rotating Crankshaft Clockwise To Position No. 1 Piston At TDC On Exhaust Stroke
Courtesy of CHRYSLER GROUP, LLC

21. Remove the LH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser).
22. Remove the Tensioner Pin (special tool #8514, Pins, Tensioner) (1) from the left cam chain tensioner.
23. Rotate the crankshaft clockwise two complete revolutions stopping when the dimple (4) on the crankshaft is aligned the with the block/bearing cap junction (5).
24. While maintaining this alignment, verify that the arrows on the left side cam phasers (2) point toward each other and are parallel to the valve cover sealing surface (3) and that the right side cam phaser arrows (7) point away from each other and the scribe lines (9) are parallel to the valve cover sealing surface (8).

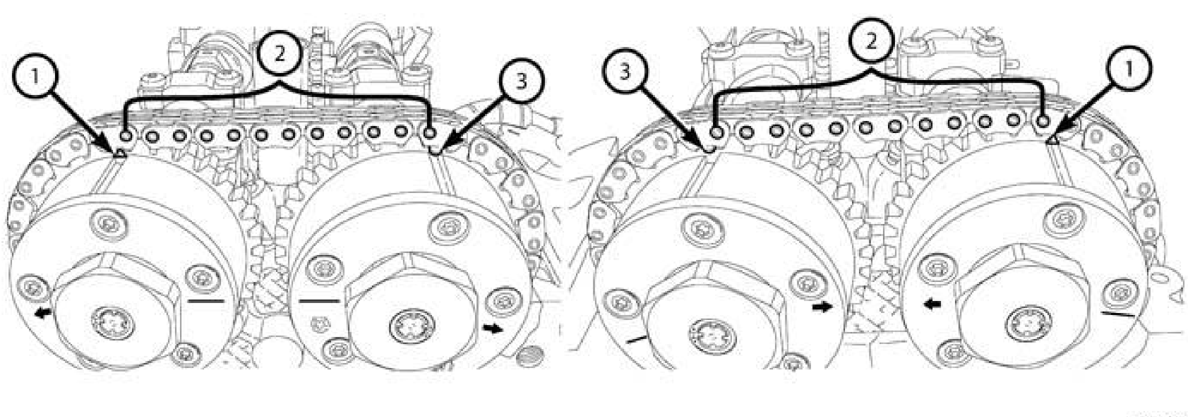


Fig. 151: Chain Pins, Exhaust Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

25. There should be 12 chain pins (2) between the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3).
26. If the engine timing is not correct, repeat this procedure.
27. Install the engine timing cover, crankshaft vibration damper, upper and lower oil pans and cylinder head covers. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.

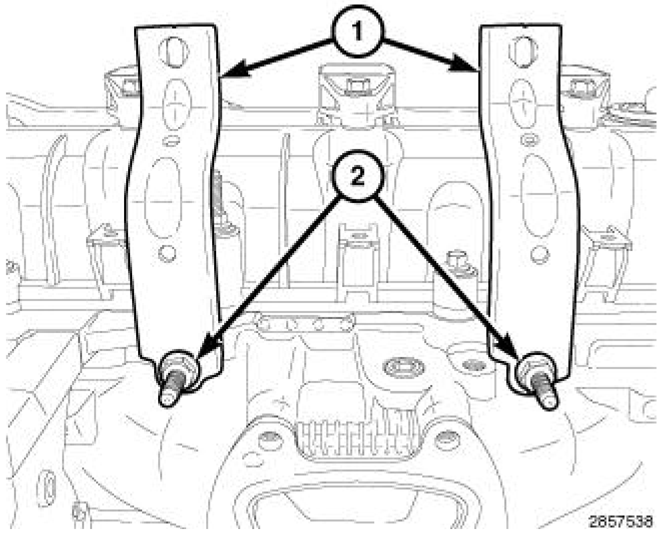


Fig. 152: Left Intake Manifold Support Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

28. Install the left upper intake manifold support brackets (1) and tighten the stud (2) finger tight.

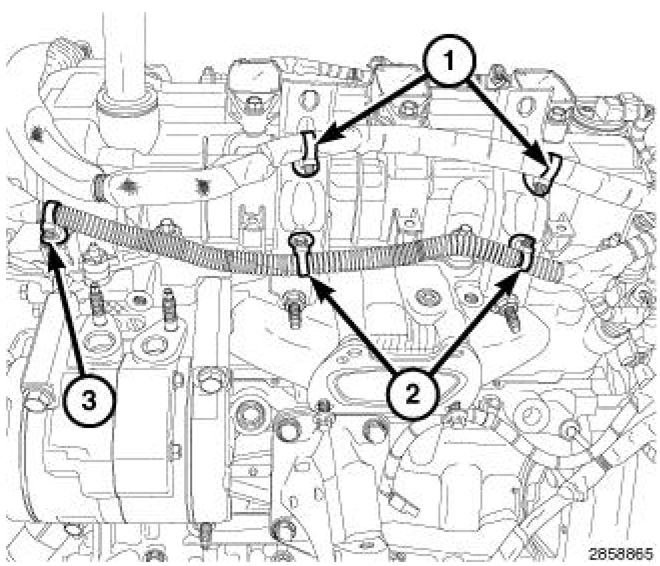


Fig. 153: Starter Wire Harness Retainers, Main Wire Harness Retainer & Manifold Support Bracket Retainers
Courtesy of CHRYSLER GROUP, LLC

29. Fasten two starter wire harness retainers (1) to the upper intake manifold support brackets.
30. Fasten one main wire harness retainer (3) to the left cylinder head cover and two retainers (2) to the upper intake manifold support brackets.

31. Install the spark plugs and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
32. Install the ignition coils. Refer to **COIL, IGNITION, INSTALLATION** .

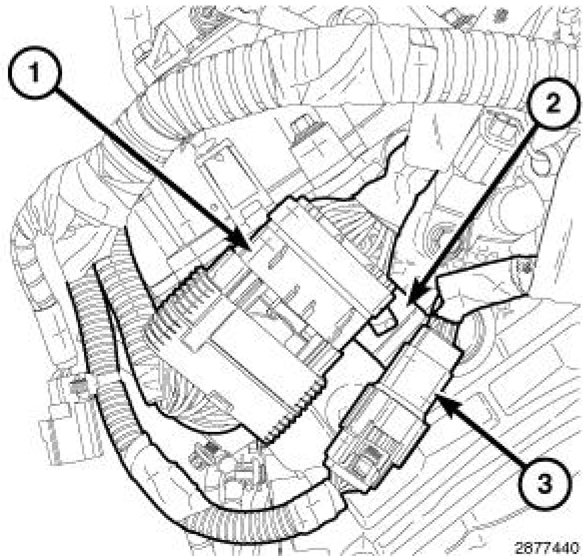


Fig. 154: Injection/Ignition Electrical Connector & Engine Oil Pressure/Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

33. Connect the ignition coil capacitor wire harness connector.
34. Connect the injection/ignition wire harness connector (1).
35. Connect the engine oil pressure/temperature sensor wire harness connector (3).
36. Fasten the injection/ignition wire harness and the oil pressure/temperature sensor wire harness to the retainer bracket (2) on the rear of the left cylinder head.

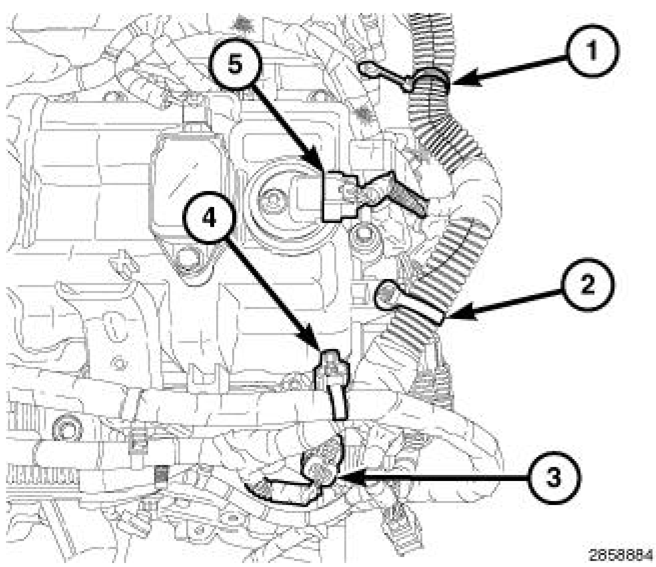


Fig. 155: ECT Sensor Connector, CMP Sensor & Main Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

37. Connect the ECT sensor wire harness connector (3).

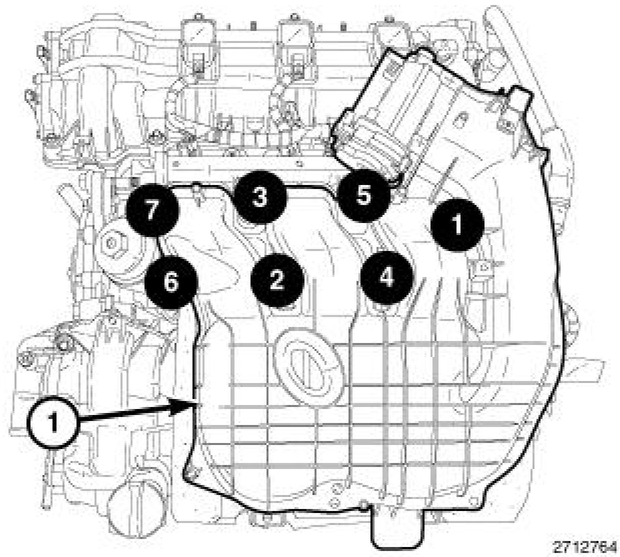


Fig. 156: Upper Intake Manifold Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

38. Install the upper and lower intake manifolds. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

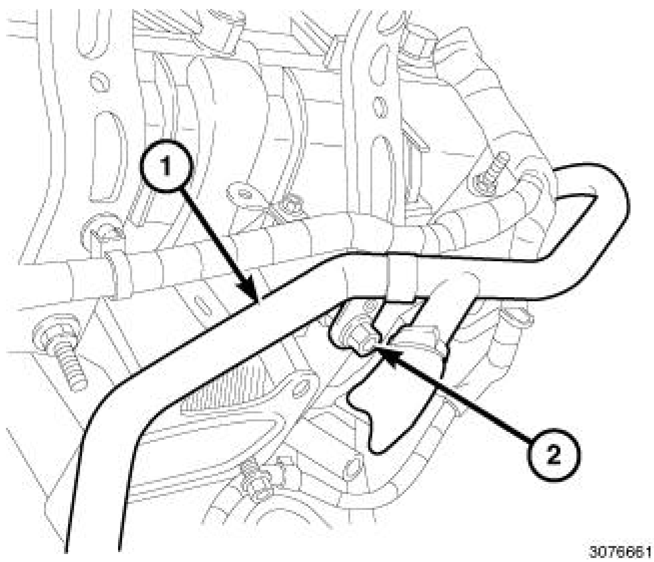


Fig. 157: Heater Core Return Tube Upper Support Bracket Retaining Nut & Tube
Courtesy of CHRYSLER GROUP, LLC

39. Position the heater core return tube (1) onto the upper support bracket, install the retaining nut (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

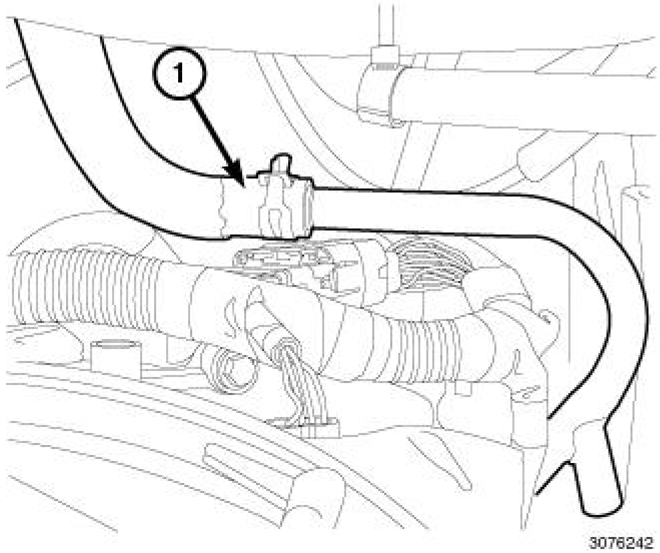


Fig. 158: Heater Core Return Hose
Courtesy of CHRYSLER GROUP, LLC

40. Connect the heater core return hose (1).

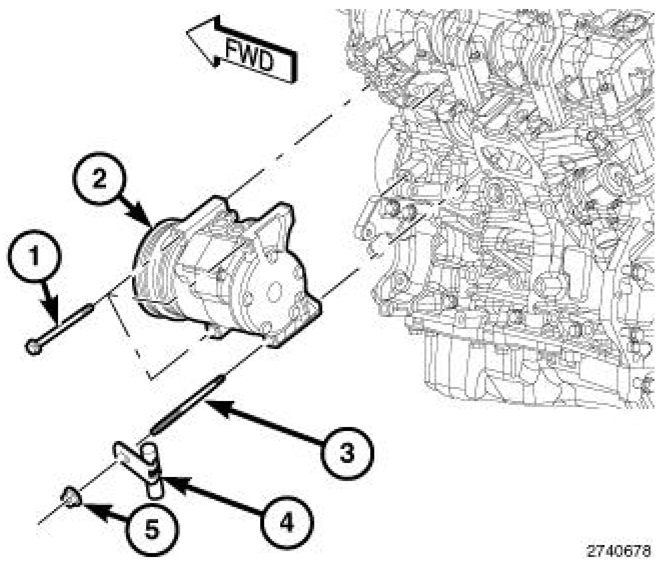


Fig. 159: A/C Compressor, Nut, Stud & Three Bolts
Courtesy of CHRYSLER GROUP, LLC

41. Position the A/C compressor (2), install the upper bolts (1) finger tight.
42. Install the lower A/C compressor retaining studs (3) finger tight
43. Tighten the A/C compressor upper bolts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
44. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

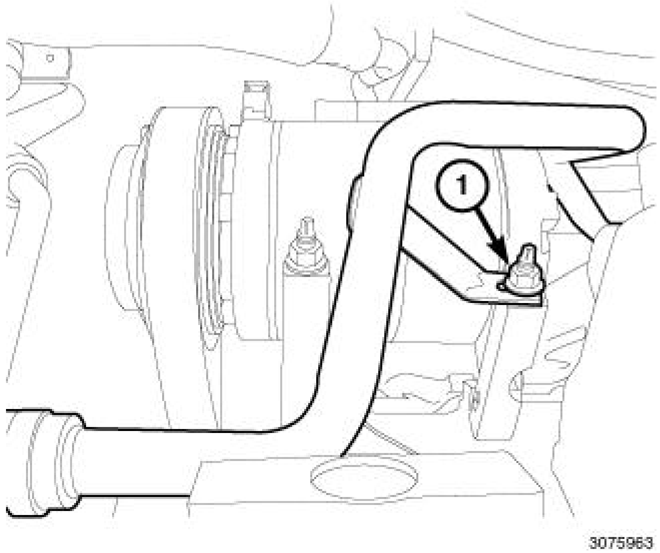


Fig. 160: Heater Core Return Tube Lower Support Bracket Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

45. Position the heater core return tube lower support bracket onto the A/C compressor lower retaining stud, install the nut (1) and tighten both A/C compressor lower retaining nuts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

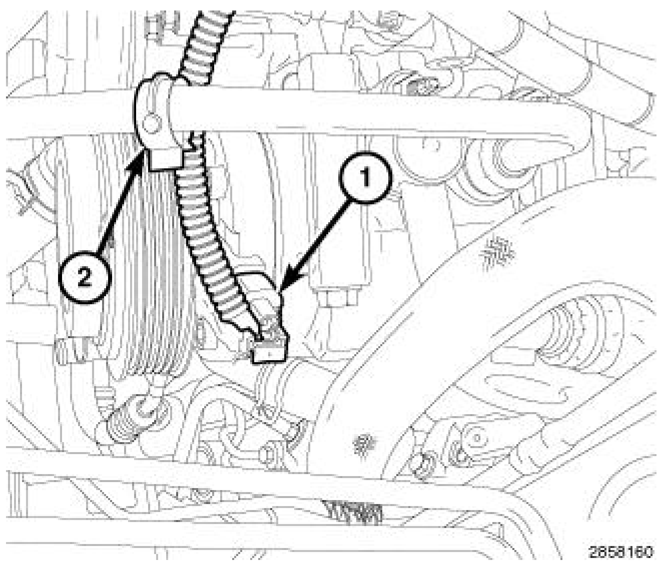


Fig. 161: A/C Compressor Electrical Connector & Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

46. Connect the A/C compressor electrical connector (1) and fasten the wire harness retainer (2) to the A/C compressor discharge line.

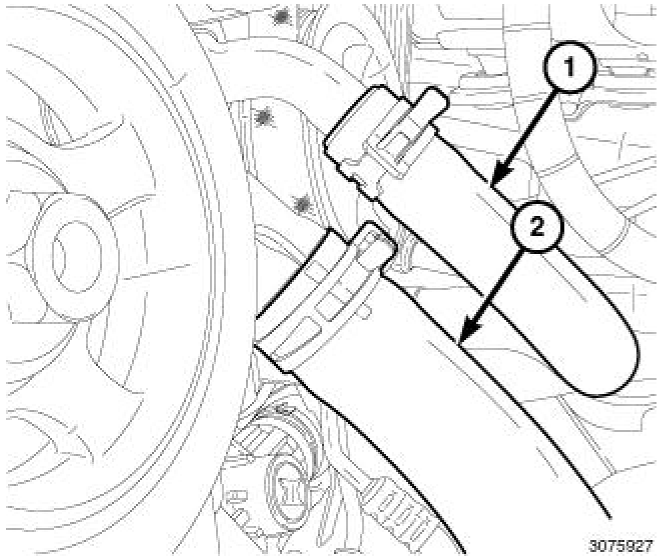


Fig. 162: Lower Heater Core Return Hose & Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

47. Connect the lower heater core return hose (1) to the engine coolant pump housing.

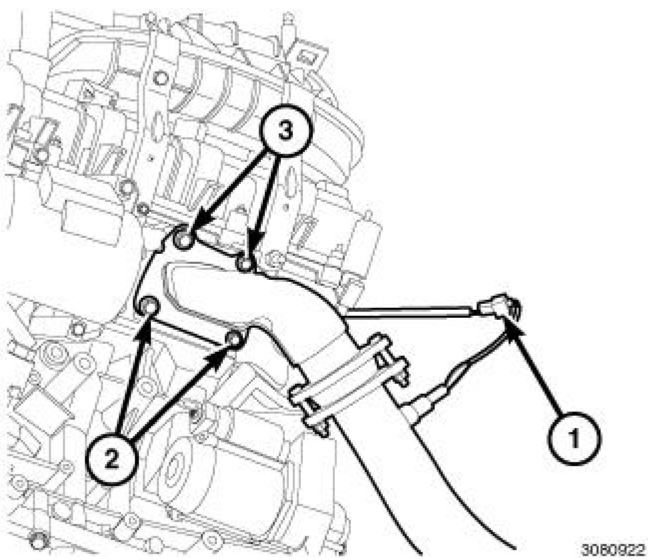


Fig. 163: Left Upstream Oxygen Sensor Electrical Connector & Down Pipe Flange Bolts
Courtesy of CHRYSLER GROUP, LLC

48. Position the left down pipe onto the partially installed lower flange bolts (2).
49. Install the upper down pipe flange bolts (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
50. Tighten the lower down pipe flange bolts (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
51. Connect the left upstream oxygen sensor wire harness connector (1) to the main wire harness.

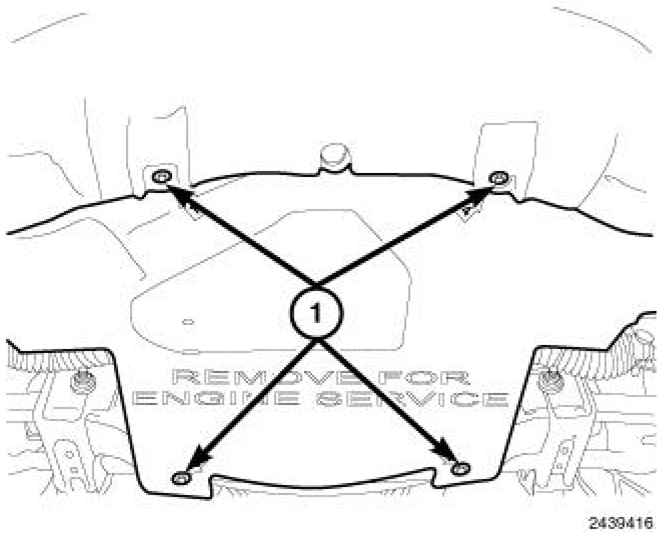


Fig. 164: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

52. If removed, install the oil filter.
53. Position the belly pan and install the retainers (1).
54. Lower the vehicle.

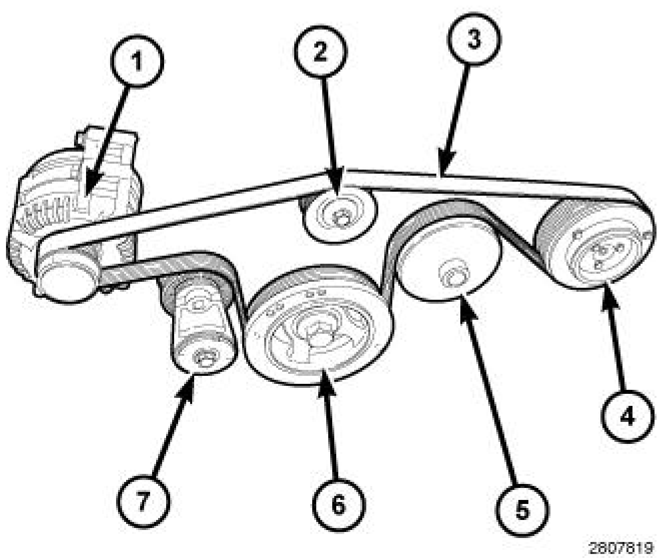


Fig. 165: Idler Pulley, Tensioner Arm, Belt, Idler, Tensioner & Belt Routing
Courtesy of CHRYSLER GROUP, LLC

55. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts the stop and install the accessory drive belt (3), then slowly rotate the tensioner into position.

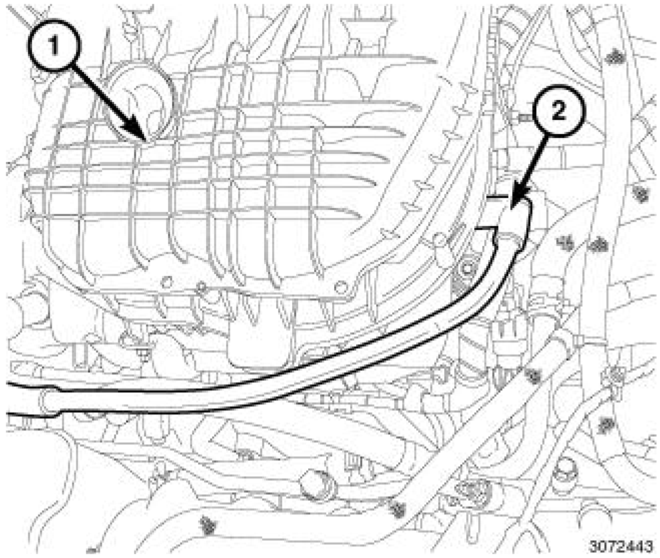


Fig. 166: Fresh Air Makeup Hose At Rear Of Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

56. Connect the fresh air makeup hose (2) to the rear of the intake manifold (1).

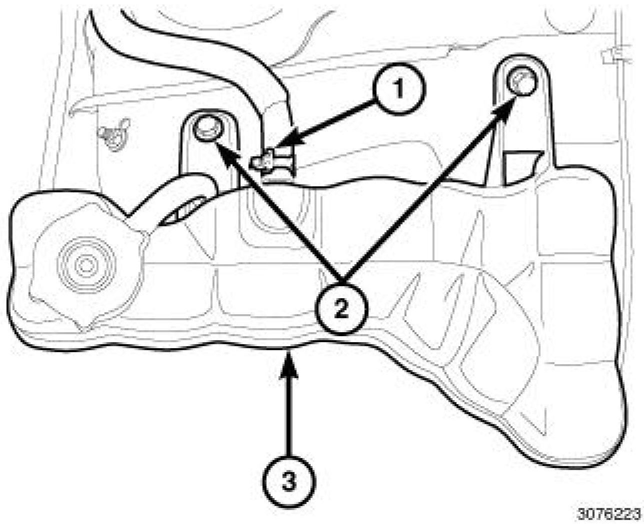


Fig. 167: Heater Core Purge Hose, Coolant Bottle Retaining Bolts & Coolant Bottle
Courtesy of CHRYSLER GROUP, LLC

57. Position the coolant bottle (3) into the engine compartment.
58. Install the pressurized coolant bottle bolts (2) and tighten to the proper specification. Refer to **SPECIFICATIONS** .
59. Connect the heater core purge hose (1) to the coolant bottle.

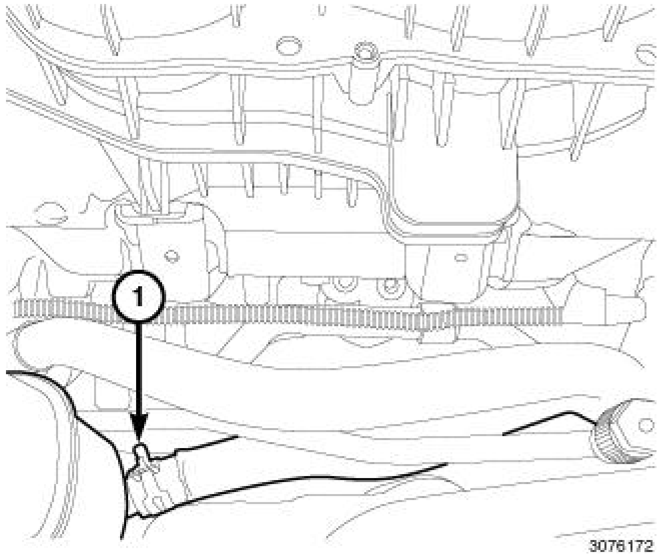


Fig. 168: Coolant Bottle Return Hose
Courtesy of CHRYSLER GROUP, LLC

60. Connect the coolant bottle return hose (1).
61. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.
62. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
63. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .
64. Connect the negative battery cable.
65. Run the engine until it reaches normal operating temperature and check for leaks.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

RIGHT

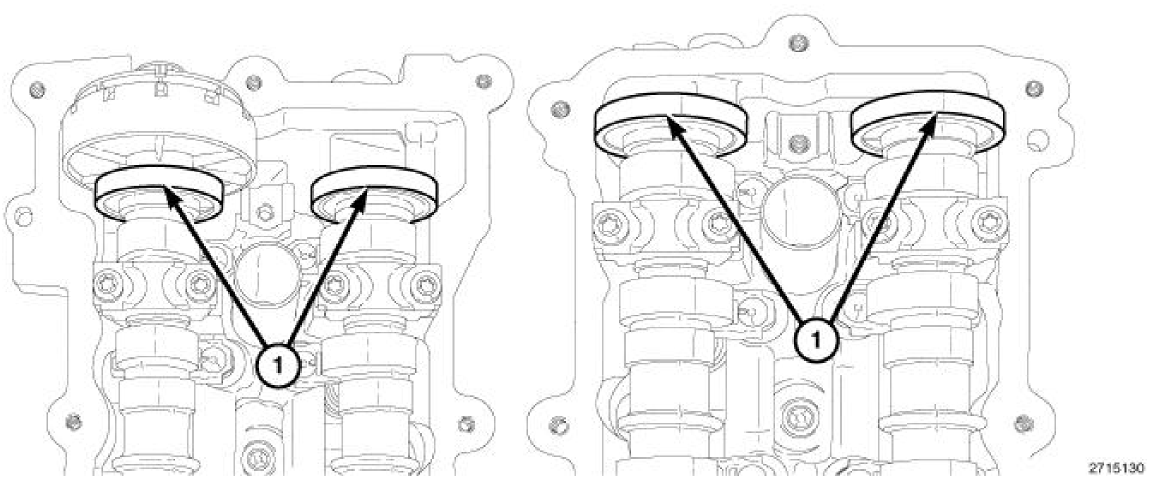


Fig. 169: Magnetic Timing Wheels

Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.**

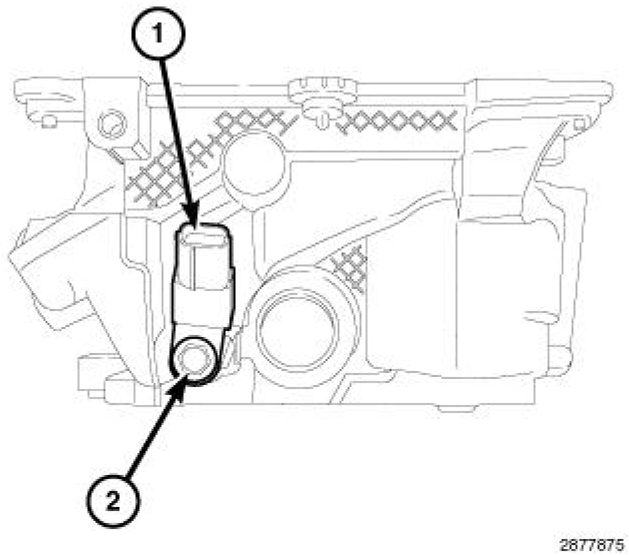


Fig. 170: Ignition Coil Capacitor & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the ignition coil capacitor (1). Tighten bolt (2) to the proper specification. Refer to TORQUE SPECIFICATIONS.

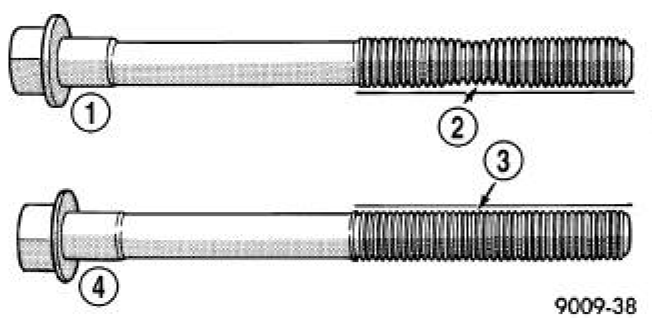


Fig. 171: Checking Cylinder Head Bolts For Stretching (Necking)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The cylinder head bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.**

NOTE: **Typical cylinder head bolt shown in illustration.**

2. Check the cylinder head bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

CAUTION: When cleaning cylinder head and cylinder block surfaces, DO NOT use a metal scraper because the surfaces could be cut or ground. Use ONLY a wooden or plastic scraper.

3. Clean and prepare the gasket sealing surfaces of the cylinder head and block. Refer to **ENGINE GASKET SURFACE PREPARATION**.

CAUTION: Non-compressible debris such as oil, coolant or RTV sealants that are not removed from bolt holes can cause the aluminum casting to crack when tightening the bolts.

4. Clean out the cylinder head bolt holes in the engine block.

WARNING: The multi-layered steel head gaskets have very sharp edges that could cause personal injury if not handled carefully.

CAUTION: The installation of the cylinder head gaskets are not interchangeable between the left and right cylinder heads. They are clearly marked (3) with "R" for right and "L" for left. They must be applied on a dry surface, without the use of any adhesives.

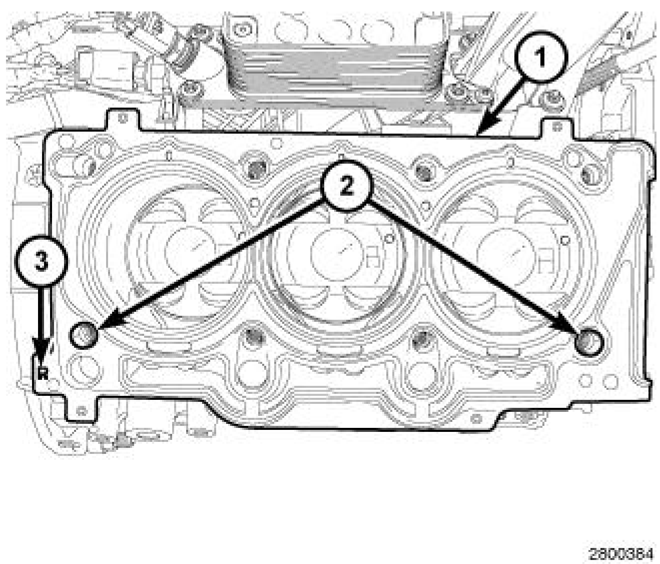


Fig. 172: Head Gasket & Locating Dowels
Courtesy of CHRYSLER GROUP, LLC

5. Position the new cylinder head gasket (1) on the locating dowels (2).

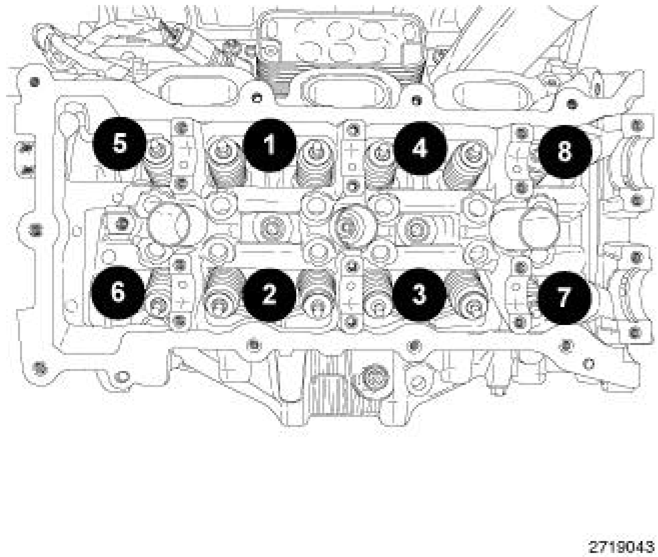


Fig. 173: Cylinder Head Retaining Bolt Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

6. Position the cylinder head onto the cylinder block. Make sure the cylinder head seats fully over the locating dowels.

NOTE: **Do not apply any additional oil to the bolt threads.**

7. Install the eight cylinder head bolts finger tight.
8. Tighten the cylinder head bolts in the sequence shown in illustration, following this 9 step torque plus angle method. The torque sequence must be used for each step. Tighten according to the following torque values:
   - Step 1: All to 30 N.m (22 ft. lbs.)
   - Step 2: All to 45 N.m (33 ft. lbs.)
   - Step 3: Retighten all to 45 N.m (33 ft. lbs.)
   - Step 4: All + 125Ā° Turn (optional angle if 125Ā° rotation cannot be accomplished in one motion; tighten all by turning 35Ā° followed by tightening all by turning 90Ā°) **Do not use a torque wrench for this step.**
   - Step 5: Loosen all fasteners in reverse of sequence shown in illustration
   - Step 6: All to 30 N.m (22 ft. lbs.)
   - Step 7: All to 45 N.m (33 ft. lbs.)
   - Step 8: Retighten all to 45 N.m (33 ft. lbs.)
   - Step 9: All + 130Ā° Turn (optional angle if 130Ā° rotation cannot be accomplished in one motion; tighten all by turning 40Ā° followed by tightening all by turning 90Ā°) **Do not use a torque wrench for this step.**

NOTE: **For engine builds using a new block follow steps 1-9. For engine rebuilds (reuse block) follow step 6-9.**

NOTE: **If the hydraulic lifters are being reused, reassemble them into their original locations.**

9. If removed, install the hydraulic lifters.

NOTE: **If the rocker arms are being reused, reassemble them into their original locations.**

10. Install the rocker arms. Refer to **ROCKER ARM, VALVE, INSTALLATION**.

CAUTION: **Do not rotate the camshafts more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage. If the camshafts need to be rotated more than a few degrees, first move the pistons away from the cylinder heads by rotating the crankshaft counterclockwise to a position 30Â° before-top-dead-center. Once the camshafts are returned to their top-dead-center position, rotate the crankshaft clockwise to return the crankshaft to top-dead-center.**

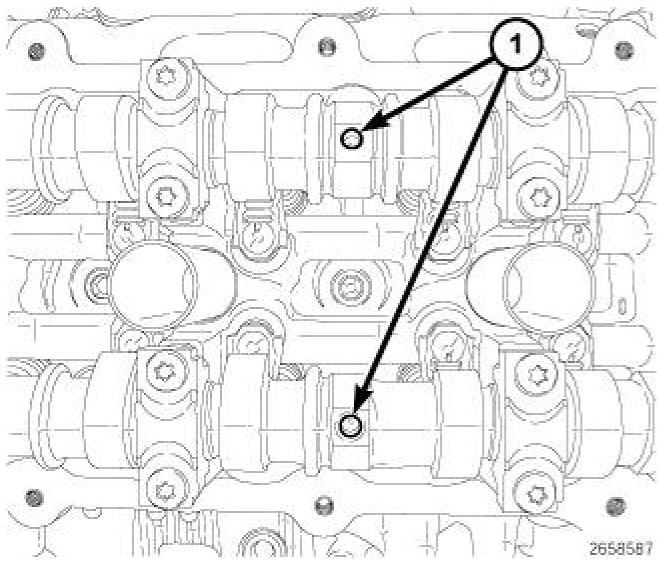
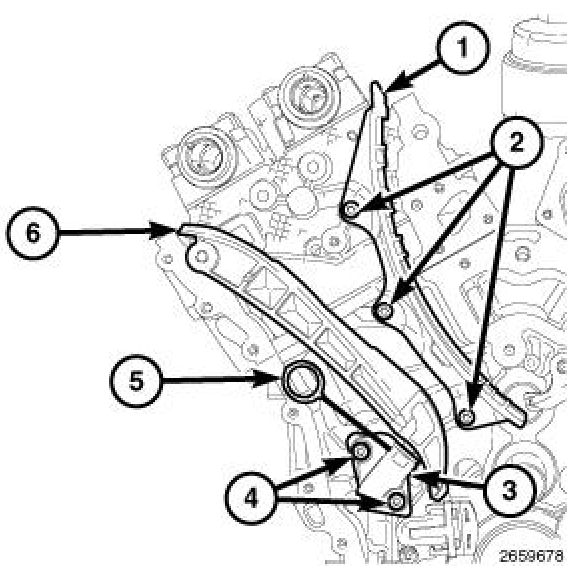


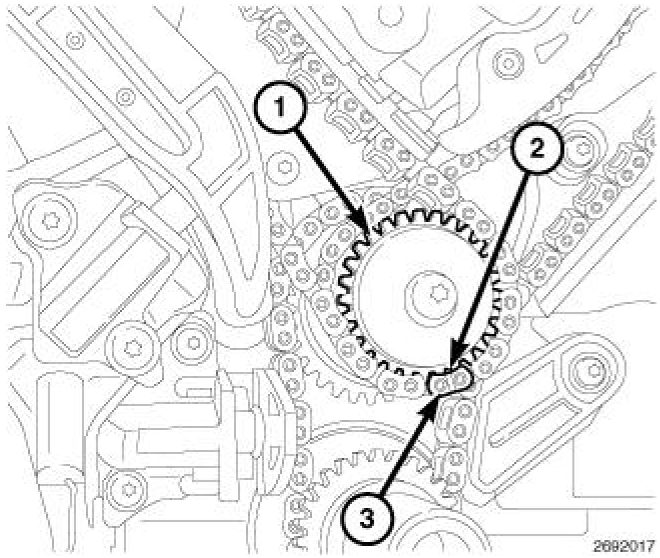
Fig. 174: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

11. Verify that the camshafts are set at TDC by positioning the alignment holes (1) vertically.



[Fig. 175: Right Cam Chain Tensioner, Arm, Guide & Bolts]
Courtesy of CHRYSLER GROUP, LLC

12. Install the right cam chain guide (1) with three bolts (2). Tighten bolts (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
13. Install the right cam chain tensioner (3) to the engine block with two bolts (4). Tighten (4) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
14. Reset the right cam chain tensioner (3) by pushing back the tensioner piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (5).
15. Install the right tensioner arm (6).



[Fig. 176: Idler Sprocket, Dimple & Plated Link]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

16. Press the right exhaust cam phaser onto the exhaust camshaft. Install and hand tighten the oil control valve.
17. Drape the right side cam chain over the right exhaust cam phaser and onto the idler sprocket (1) so that the dimple (2) is aligned with the plated link (3) on the cam chain.

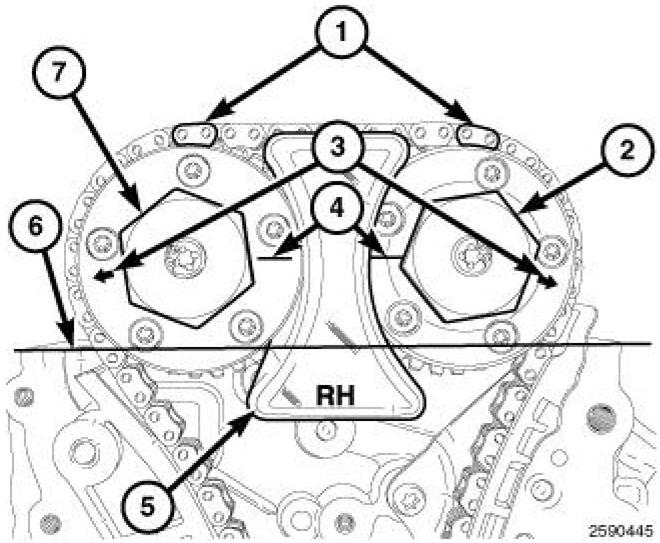


Fig. 177: Phaser Timing Marks, Oil Control Valves & RH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

18. While maintaining this alignment, route the cam chain around the exhaust and intake cam phasers so that the plated links are aligned with the phaser timing marks (1). Position the right side cam phasers so that the arrows (3) point away from each other and the scribe lines (4) are parallel to the valve cover sealing surface (6). Press the intake cam phaser onto the intake cam, install and hand tighten the oil control valve (2).

NOTE: **Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser or phaser lock.**

19. Install the RH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) (5) and tighten the oil control valves (2) and (7) to the proper specification.

    Refer to **TORQUE SPECIFICATIONS**.

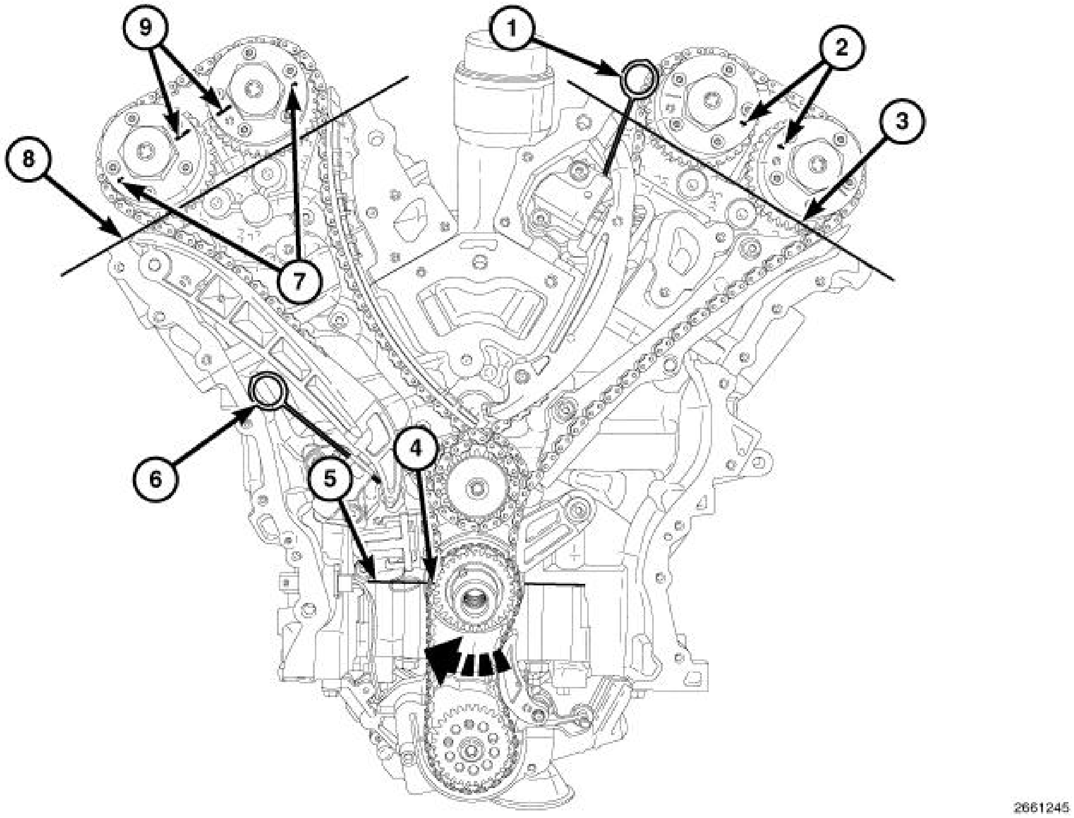


Fig. 178: Rotating Crankshaft Clockwise To Position No. 1 Piston At TDC On Exhaust Stroke
Courtesy of CHRYSLER GROUP, LLC

20. Remove the RH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser).
21. Remove the Tensioner Pin (special tool #8514, Pins, Tensioner) (6) from the RH cam chain tensioner.
22. Rotate the crankshaft clockwise two complete revolutions stopping when the dimple (4) on the crankshaft is aligned the with the block/bearing cap junction (5).
23. While maintaining this alignment, verify that the arrows on the left side cam phasers (2) point toward each other and are parallel to the valve cover sealing surface (3) and that the right side cam phaser arrows (7) point away from each other and the scribe lines (9) are parallel to the valve cover sealing surface (8).

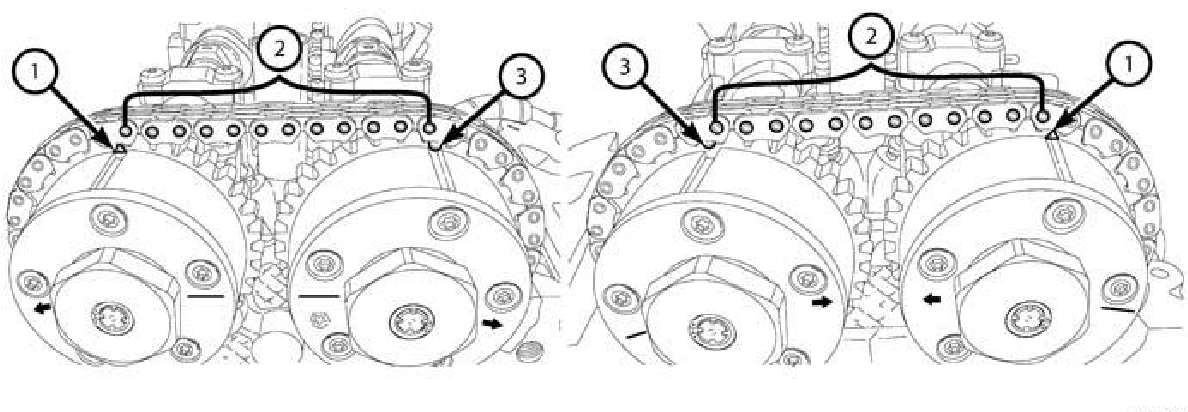


Fig. 179: Chain Pins, Exhaust Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

24. There should be 12 chain pins (2) between the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3).
25. If the engine timing is not correct, repeat this procedure.
26. Install the engine timing cover, crankshaft vibration damper, upper and lower oil pans and cylinder head covers. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.
27. Install the spark plugs. Refer to **SPARK PLUG, INSTALLATION** .

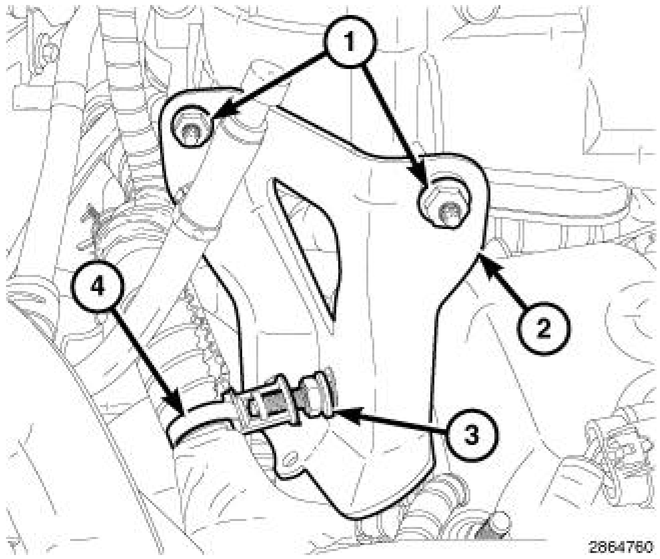


Fig. 180: Upper Intake Manifold Support Bracket, Stud & Fasteners
Courtesy of CHRYSLER GROUP, LLC

28. Position the upper intake manifold support bracket (2) and install the retaining stud (3) finger tight.

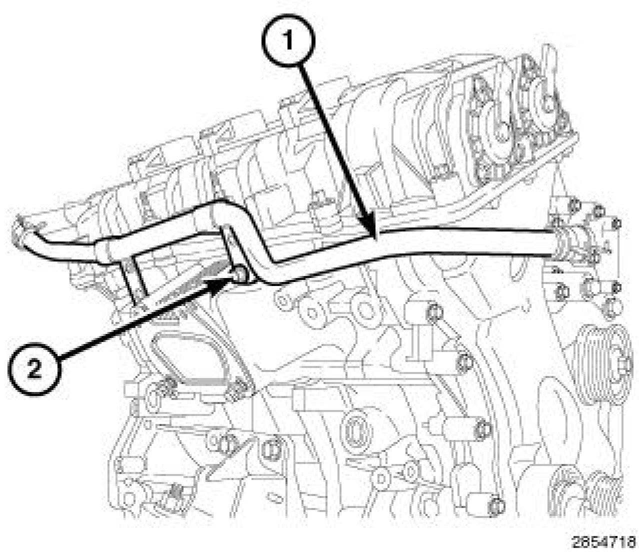
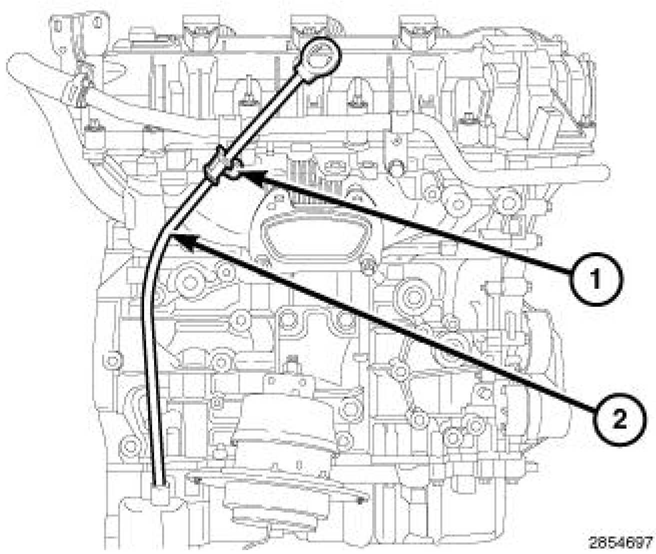


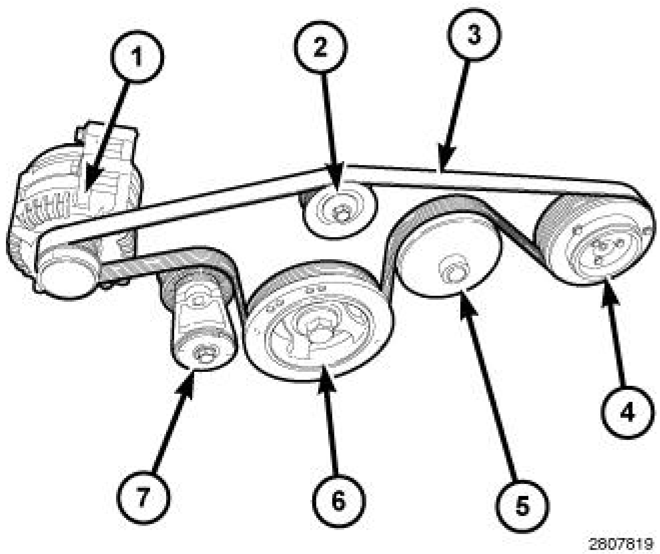
Fig. 181: Heater Core Supply Tube Support Bracket & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

29. Install the heater core supply tube (1) with one bolt (2) tightened to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 182: Oil Level Indicator & Retaining Bolt]
Courtesy of CHRYSLER GROUP, LLC

30. Install the oil level indicator (2). Tighten the bolt (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 183: Idler Pulley, Tensioner Arm, Belt, Idler, Tensioner & Belt Routing]
Courtesy of CHRYSLER GROUP, LLC

31. Install the generator (1). Refer to **GENERATOR, INSTALLATION** .
32. Rotate the accessory drive belt tensioner (7) counterclockwise until it contacts the stop and install the accessory drive belt (3), then slowly rotate the tensioner into position.

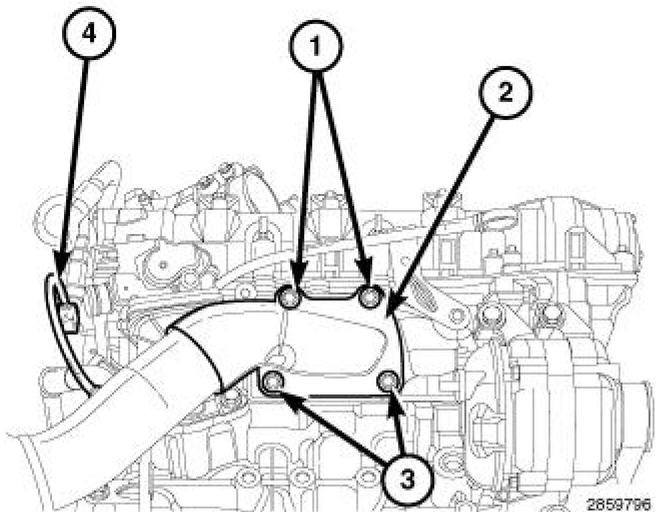


Fig. 184: Right Upstream Oxygen Electrical Sensor Connector, Down Pipe Flanges & Bolts
Courtesy of CHRYSLER GROUP, LLC

33. Install the right down pipe (2) and tighten lower flange bolts (3) finger tight.
34. Install the upper down pipe flange bolts (1) and tighten bolts (1, 3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
35. Connect the right upstream oxygen sensor wire harness connectors (4).
36. Install the upper and lower intake manifolds. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

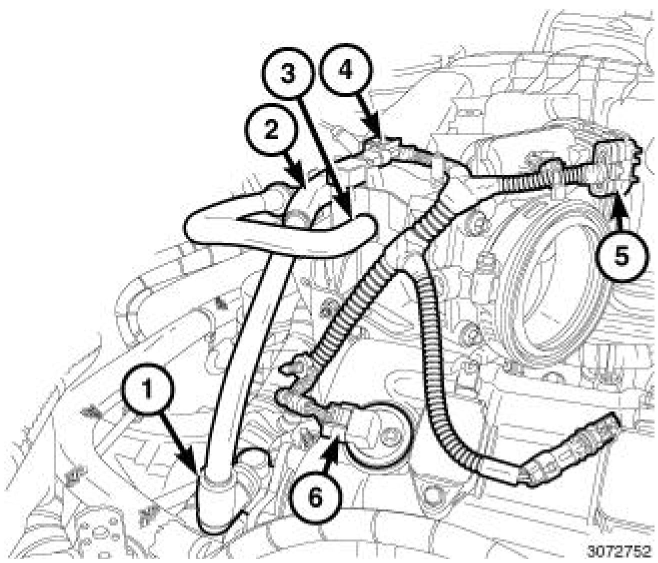


Fig. 185: PCV Valve, Intake Manifold, Brake Booster Vacuum Hose, MAP Sensor, ETC & CMP Sensor Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

37. Connect the Camshaft Position Sensor (CMP) wire harness connector (6).
38. Connect the throttle body wire harness connector (5).
39. Connect the Manifold Absolute Pressure (MAP) Sensor wire harness connector (4).
40. Connect the brake booster vacuum hose (3).

41. Install the PCV hose onto the intake manifold (2) and the PCV valve (1).

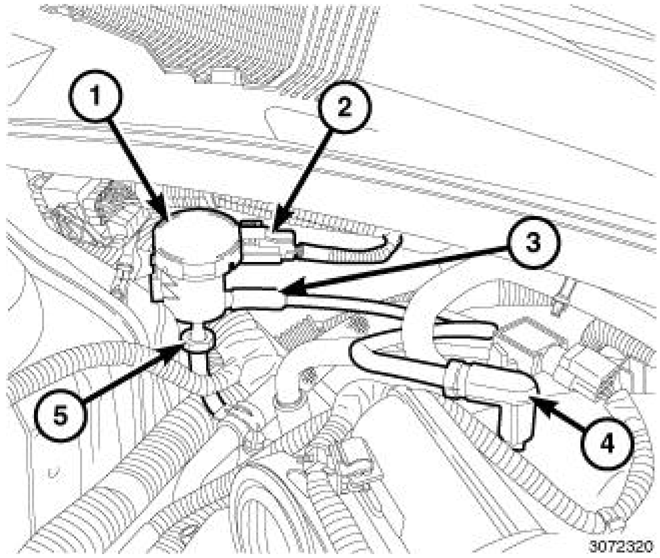


Fig. 186: EVAP Purge Solenoid, Electrical Connector & Vacuum Lines
Courtesy of CHRYSLER GROUP, LLC

42. Connect the EVAP purge solenoid vacuum line (4) to the intake manifold.
43. Connect the vacuum line (3) to the EVAP purge solenoid (1).

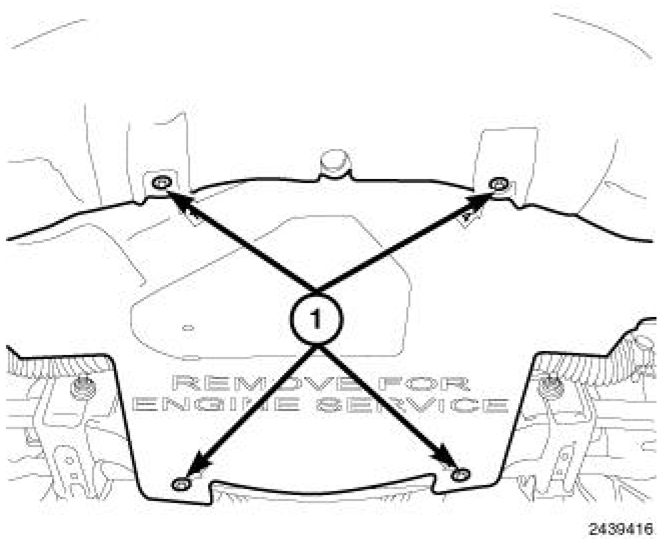


Fig. 187: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

44. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
45. If removed, install the oil filter.
46. Install the belly pan and securely tighten bolts (1).
47. Remove support and lower the vehicle.
48. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.
49. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

50. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .
51. Connect the negative battery cable.
52. Run the engine until it reaches normal operating temperature and check for leaks.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

ASSEMBLY, VARIABLE VALVE TIMING, PHASER/OIL CONTROL VALVE

DESCRIPTION

DESCRIPTION

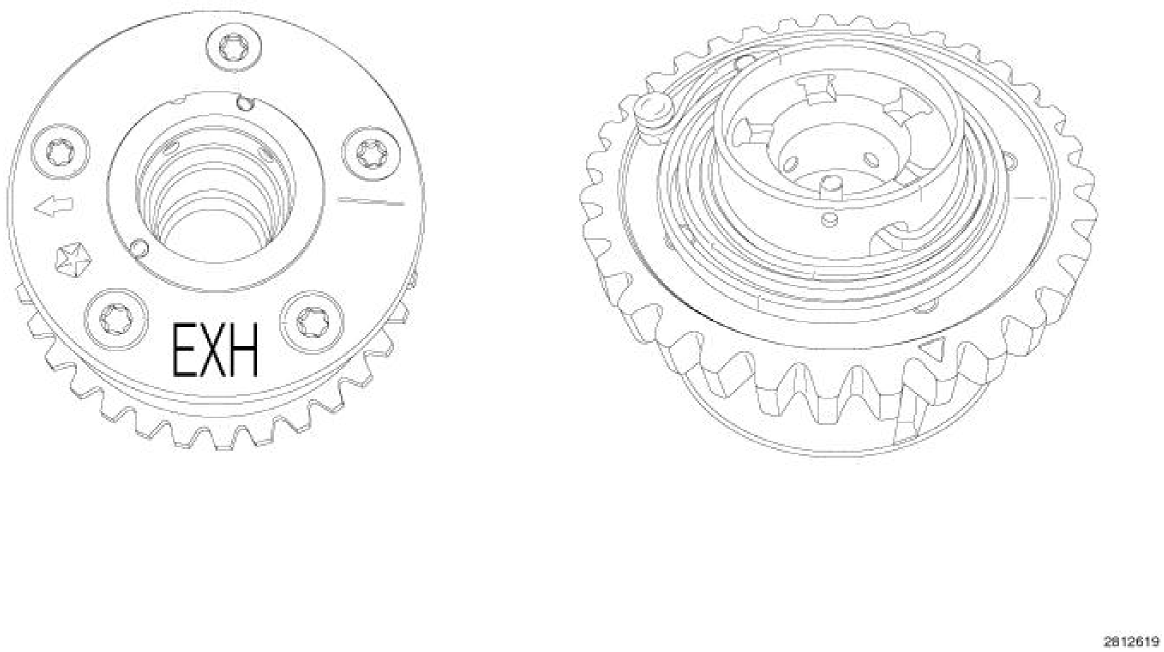


Fig. 188: Identifying Exhaust Phaser Assembly
Courtesy of CHRYSLER GROUP, LLC

The engine is equipped with Variable Valve Timing (VVT). This system adjusts the timing of all four camshafts independently using solenoids and oil control valves to direct oil pressure into the camshaft phaser assemblies. The four phasers are located on the front of the camshafts, behind the VVT solenoids, inside of the engine timing cover.

- The camshaft phaser assembly advances and/or retards camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy, and reduce emissions.
- The exhaust phasers are identified with EXH and the intake phasers are identified with INT.

- The exhaust phaser has a clockspring, the intake phaser does not.
- The camshaft sprockets are integrated with the camshaft phaser and are serviced as an assembly. Do not attempt to disassemble the phasers, they are not serviceable
- Phasers are interchangeable between the right and left cylinder heads, but should be installed in the same location as removed.

The engine has an Oil Control Valve (OCV) for each phaser. The OCV also acts as a bolt for mounting the Phaser to the camshaft. The OCVs spool valve is spring loaded and should move freely within the OCV body. The four OCVs are identical but should be installed in the same location as removed.

OPERATION

OPERATION

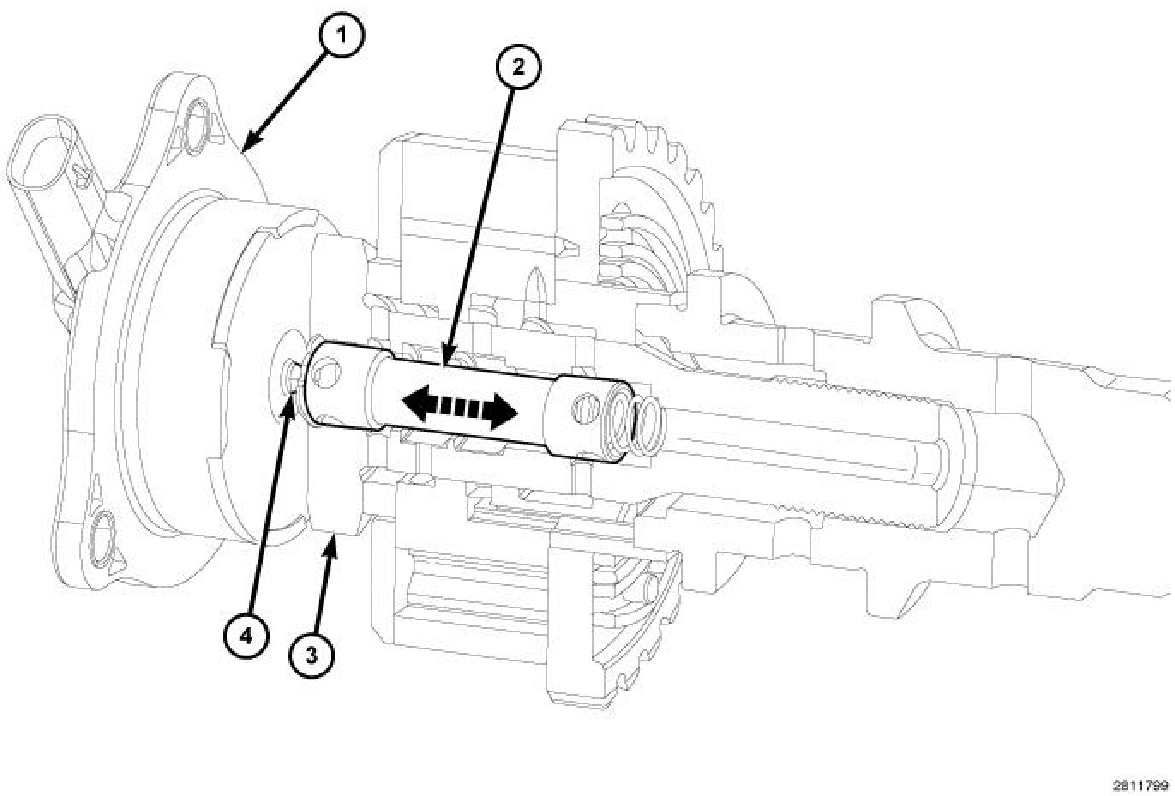
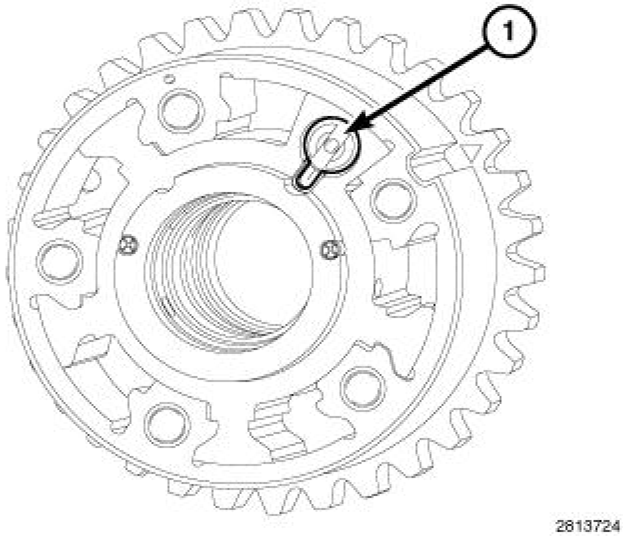


Fig. 189: Oil Control Valve (OCV), VVT Solenoid, Solenoid Pintle & Internal Spool Valve
Courtesy of CHRYSLER GROUP, LLC

Each phaser position is adjusted using regulated oil pressure through the Oil Control Valve (OCV) (3). To begin phaser movement, a voltage signal is applied to the Variable Valve Timing (VVT) solenoid (1) to extend or retract the solenoid pintle (4). The pintle pushes against an internal spool valve (2) within the OCV moving the valve forward and backward to direct oil flow.



[**Fig. 190: Phasers In Lock-Pin Position**]
Courtesy of CHRYSLER GROUP, LLC

At engine startup, system oil pressure overcomes spring pressure and unlocks the phaser lock-pin (1) in preparation for phasing. The phasers remain in this position until a PCM signal is given to pulse-width modulate the VVT solenoid. At engine shutdown, as oil pressure is reduced, both Phasers return to their lock-pin position.

Because the exhaust Phaser needs to travel to a position above and beyond the standard camshaft clockwise rotation, the assistance of a clock spring is required. The intake Phaser on the other hand, simply relies on the torsional resistance from the valvetrain to push it back towards lock-pin position.

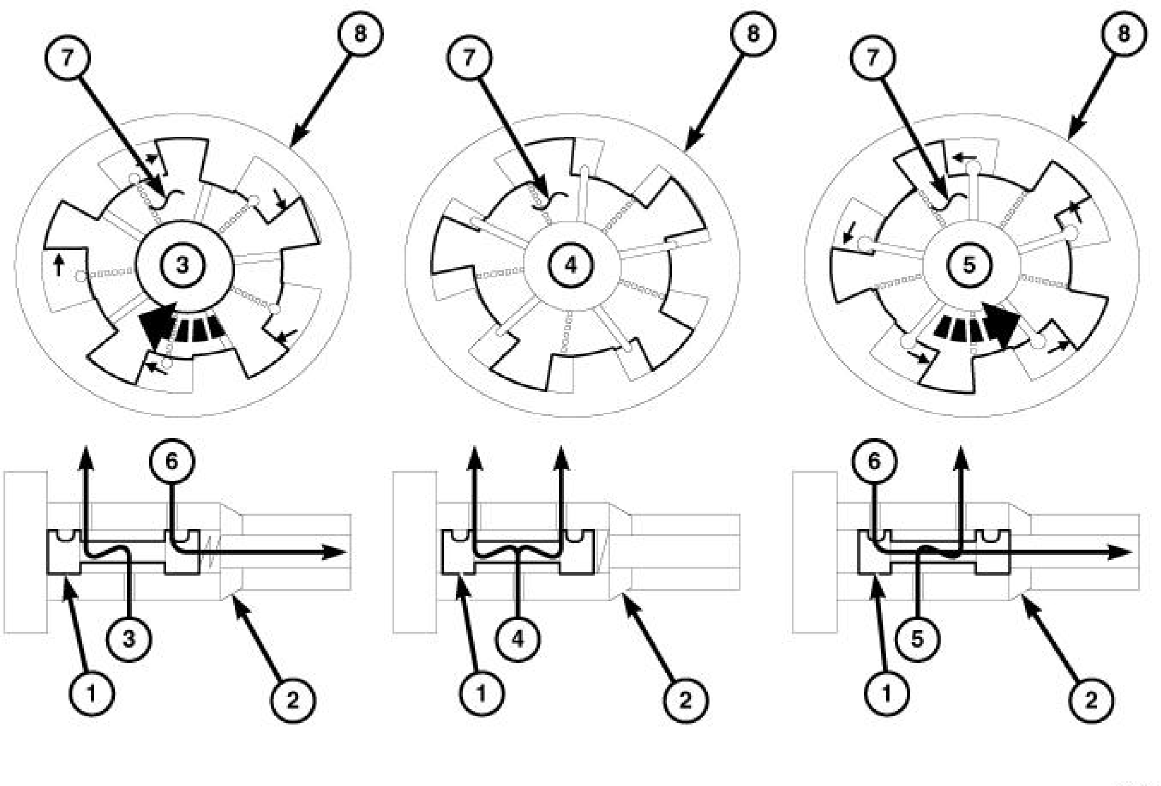


Fig. 191: Spool Valve, Vanes, OCV & Advance, Hold Or Retard Position
Courtesy of CHRYSLER GROUP, LLC

The position of the spool valve (1) inside the OCV (2) determines which ports and chambers inside the phaser are being fed, either to advance (3), hold (4) or retard (5) the timing of the phaser sprocket relative to the camshaft. The spool valve also returns oil from the chambers to the sump (6). The Camshaft Position (CMP) sensor monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM. As oil pressure pushes against the vanes (6) of the phaser rotor, the rotor begins to move. Since this rotor is physically attached to the camshaft, rotor rotation causes the camshaft position to rotate relative to the standard sprocket (7) position.

REMOVAL

LEFT

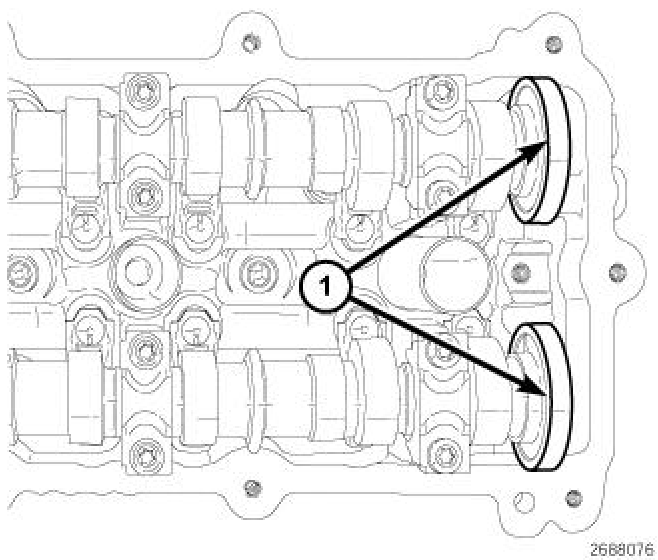
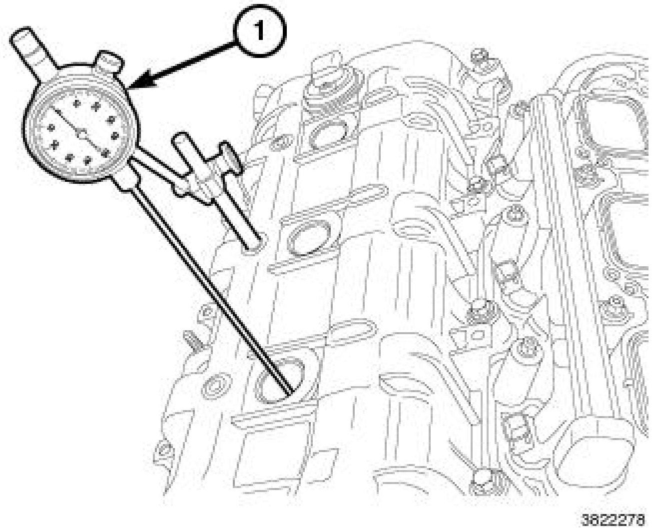


Fig. 192: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

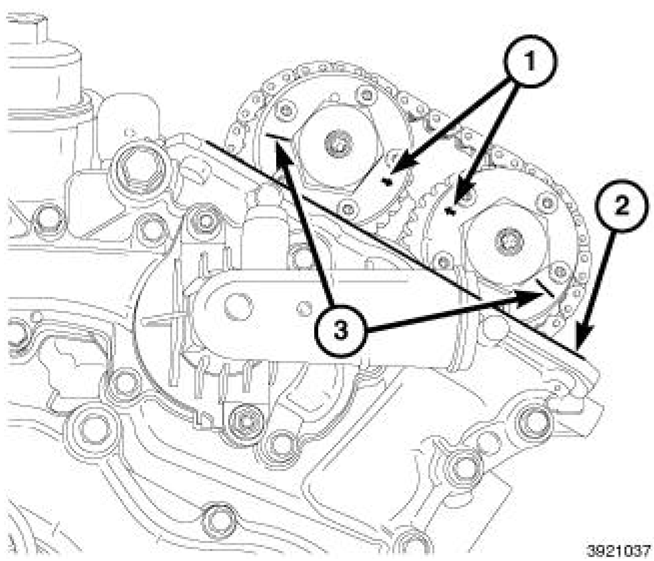
1. Remove the left cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.
2. Remove the right side spark plugs. Refer to **SPARK PLUG, REMOVAL** .



[Fig. 193: Mount Dial Indicator Set To Stationary Point On Engine](#)
Courtesy of CHRYSLER GROUP, LLC

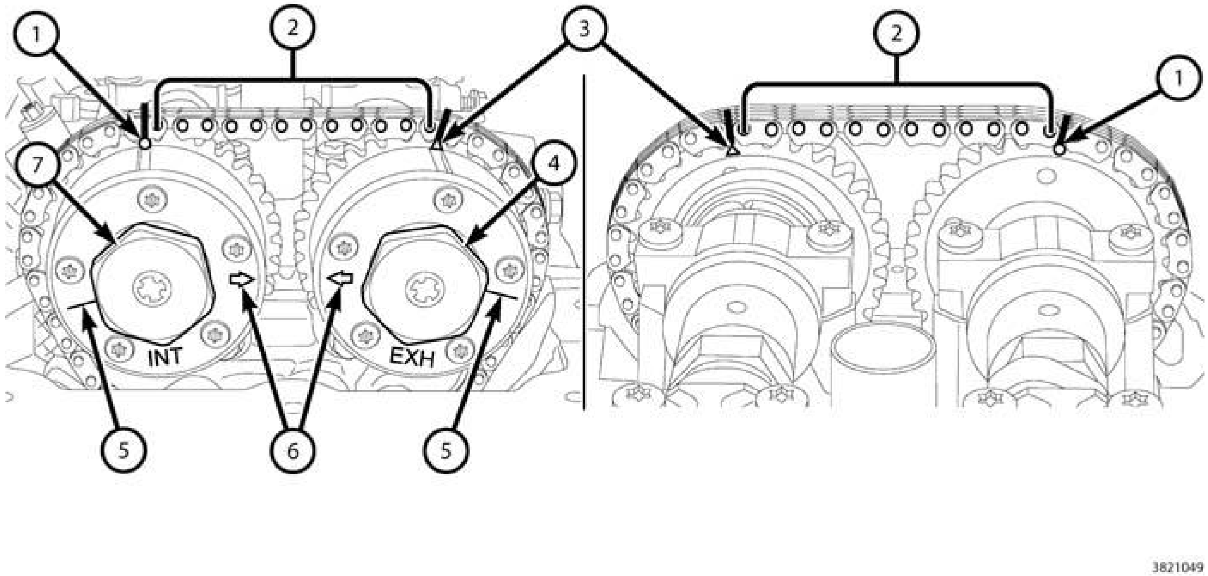
CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

3. Mount the Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) (1) to a stationary point on the engine, such as the number three cylinder ignition coil mount. Position the indicator probe into the number one cylinder, rotate the crankshaft clockwise (as viewed from the front) to place the number one cylinder piston at top-dead-center on the exhaust stroke and set the indicator dial to zero.



[Fig. 194: Arrows, Scribe Lines & Cylinder Head Cover Mounting Surface](#)
Courtesy of CHRYSLER GROUP, LLC

4. The left side cam phaser **SCRIBE LINES** (3) should face away from each other and the **ARROWS** (1) should point toward each other and be parallel to the cylinder head cover mounting surface (2) when the number one cylinder piston is positioned at top-dead-center on the exhaust stroke.



[Fig. 195: Phaser Timing Mark, Chain Pins, Exhaust Cam Phaser Triangle Marking, Oil Control Valve, Scribe Lines & Arrows]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The cam phaser timing markings (1 and 3) could align with either an external or internal chain link. Either alignment is acceptable as long as there are twelve chain pins (2) between the markings.**

NOTE: **Using a paint pen or equivalent. Mark the timing chain links to the corresponding timing marks located on the cam phasers.**

5. There should be twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (3) and the intake cam phaser circle marking (1) as viewed from either the front or rear of the cam phasers.
6. Mark both sides of the cam chain at the phaser timing marks (1 and 3) using a paint pen or equivalent to aid in reassembly.

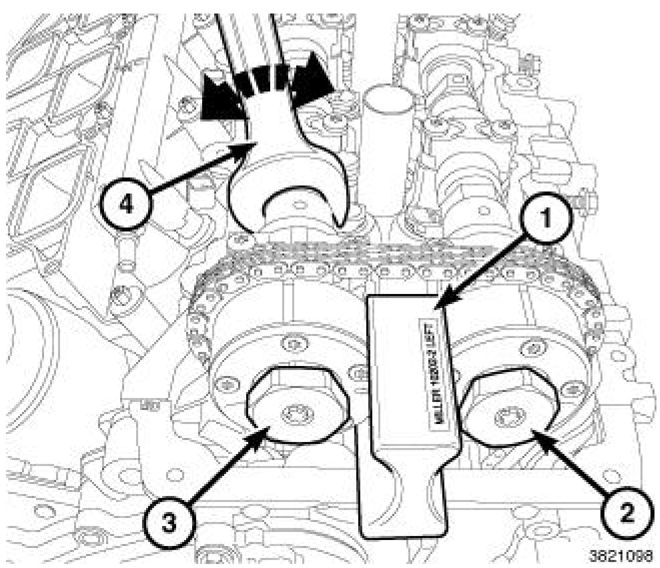


Fig. 196: Wrench, Oil Control Valves & Special Tool
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It may be necessary to rock the camshaft slightly (a few degrees) with a wrench (4) when installing the camshaft phaser lock.**

7. Install the (special tool #10202-2, Lock, Camshaft/Phaser, Left Side) (1) against the cylinder head cover mounting surface with the tool number facing up.
8. Loosen, but do not remove, the exhaust oil control valve (2) and the intake oil control valve (3).
9. Remove the (special tool #10202-2, Lock, Camshaft/Phaser, Left Side) (1).

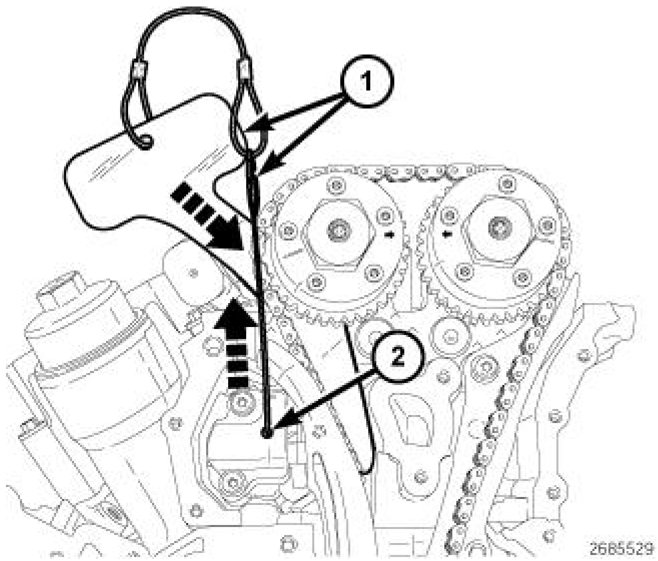


Fig. 197: Pin, Rack & Timing Chain Holder
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Engine timing cover removed in illustration for clarity.**

10. Using the (special tool #10200-3, Pin) (2), lift the pawl off of the rack (3). While holding the pawl off of the rack, push the (special tool #10200-1, Holder, Timing Chain, Left Side) (1) into place between the cylinder head and the cam chain guide to force the rack and piston back into the tensioner body. The holder remains in place while the phasers are removed. Refer to **VALVE TIMING, STANDARD PROCEDURE**.

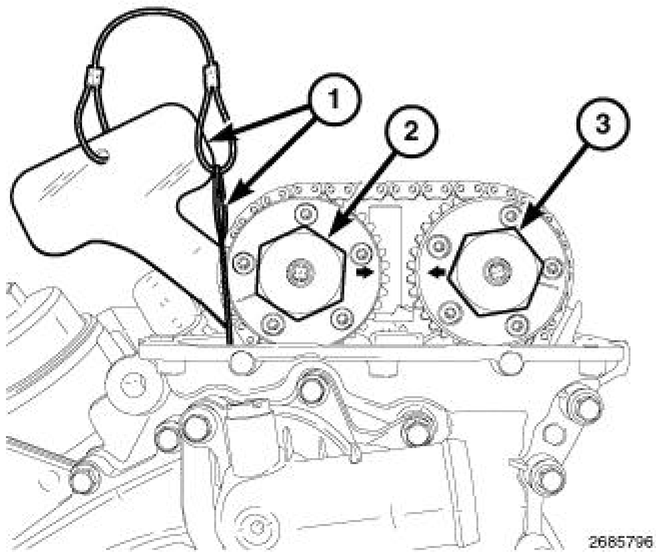


Fig. 198: Pin, Rack, Timing Chain Holder & Oil Control Valves
Courtesy of CHRYSLER GROUP, LLC

11. Remove the oil control valve (2) and pull the left side exhaust cam phaser off of the camshaft.
12. Remove the oil control valve (3) and pull the left side intake cam phaser off of the camshaft.

RIGHT

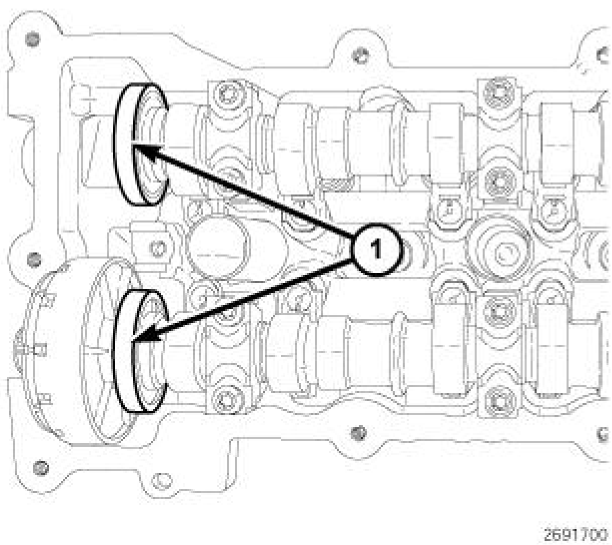
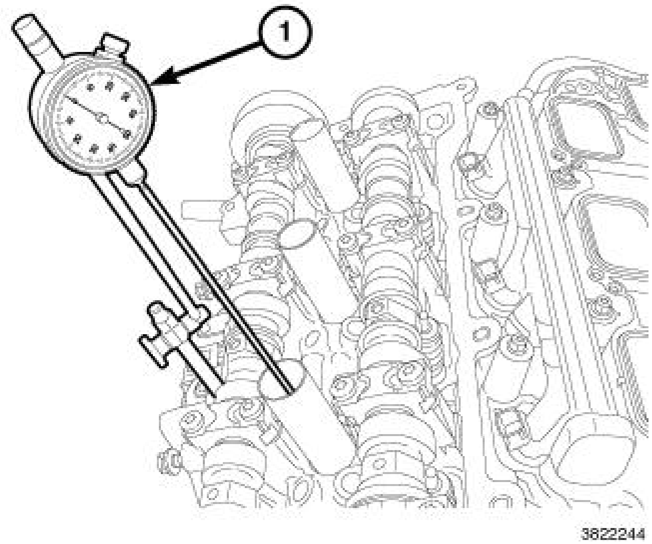


Fig. 199: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.**

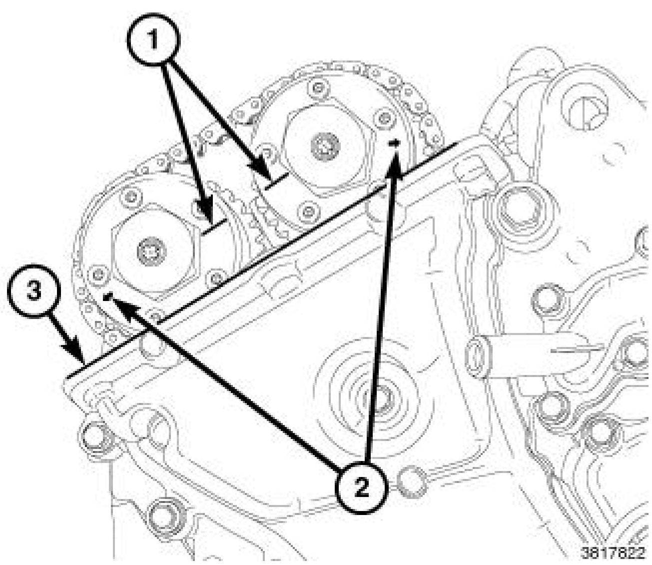
1. Remove the right cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL.
2. Remove all the left spark plugs. Refer to SPARK PLUG, REMOVAL .



[Fig. 200: Mount Dial Indicator Set To Stationary Point On Engine]
Courtesy of CHRYSLER GROUP, LLC

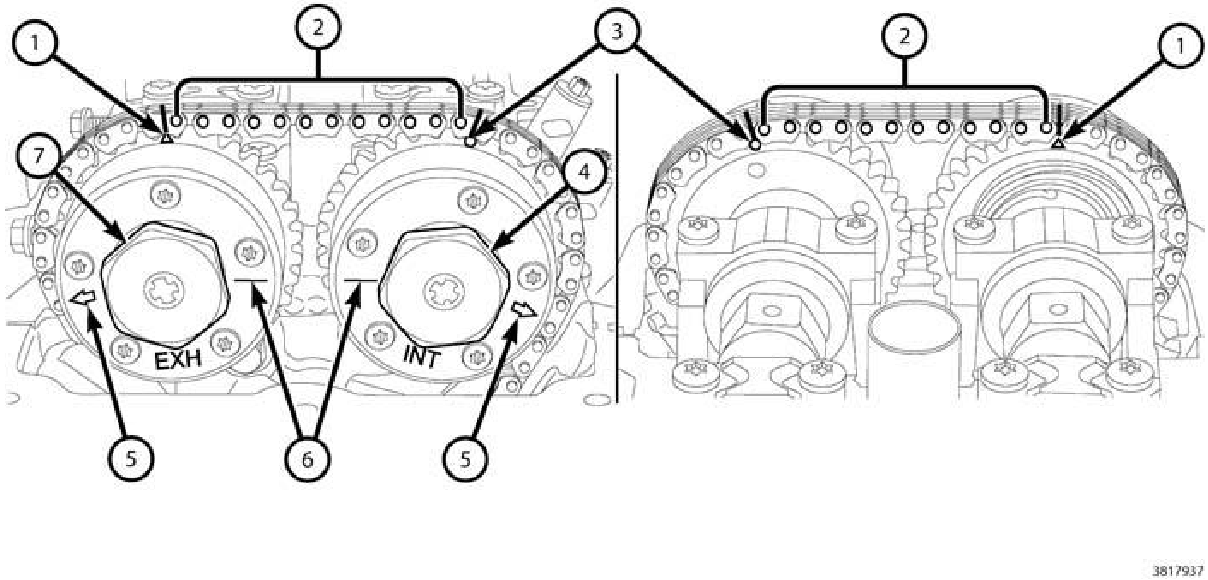
CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

3. Mount the Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) (1) to a stationary point on the engine, such as the cylinder head cover mounting surface. Position the indicator probe into the number one cylinder, rotate the crankshaft clockwise (as viewed from the front) to place the number one piston at top-dead-center on the exhaust stroke and set the indicator dial to zero.



[Fig. 201: Arrows, Scribe Lines & Cylinder Head Cover Mounting Surface]
Courtesy of CHRYSLER GROUP, LLC

4. The right side cam phaser **ARROWS** (2) should point away from each other and the **SCRIBE LINES** (1) should be parallel to the cylinder head cover mounting surface (3) when the right side number one cylinder piston is positioned at top-dead-center on the exhaust stroke.



[Fig. 202: Phaser Timing Mark, Chain Pins, Exhaust Cam Phaser Triangle Marking, Oil Control Valve, Scribe Lines & Arrows]()
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The phaser markings (1 and 3) could align with either an external or internal chain link. Either alignment is acceptable as long as there are twelve chain pins (2) between the markings.**

NOTE:	**Using a paint pen or equivalent. Mark the timing chain links to the corresponding timing marks located on the cam phasers.**

5. There should be twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3) as viewed from either the front or rear of the cam phasers.
6. Mark both sides of the cam chain at the phaser timing marks (1 and 3) using a paint pen or equivalent to aid in reassembly.

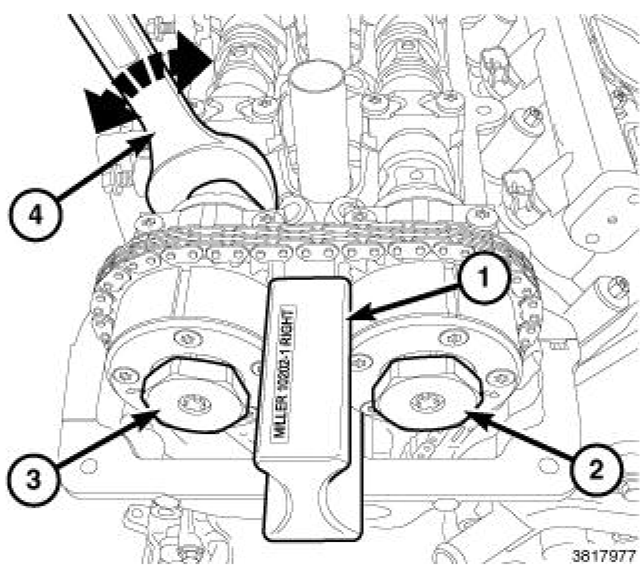


Fig. 203: Wrench, Oil Control Valves & Special Tool
Courtesy of CHRYSLER GROUP, LLC

NOTE: It may be necessary to rock the camshaft slightly (a few degrees) with a wrench (4) when installing the camshaft phaser lock.

7. Install the (special tool #10202-1, Lock, Camshaft/Phaser, Right Side) (1) against the cylinder head cover mounting surface with the tool number facing up.
8. Loosen, but do not remove, the exhaust oil control valve (3) and the intake oil control valve (2).
9. Remove the (special tool #10202-1, Lock, Camshaft/Phaser, Right Side) (1).

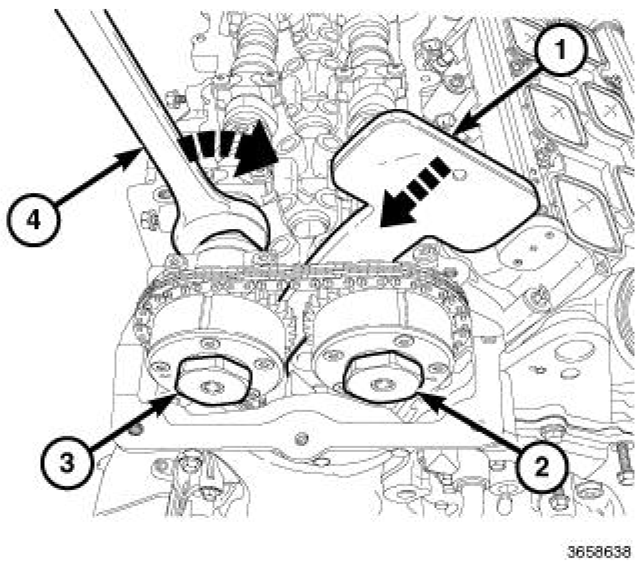


Fig. 204: Compressing Tensioner By Slightly Rotating Exhaust Camshaft Clockwise
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not insert the Timing Chain Holder into position without first compressing the tensioner. The Timing Chain Holder is not designed to compress the tensioner and excessive force can damage the timing chain tensioner arm.

10. Use the timing chain to compress the tensioner by slightly rotating the exhaust camshaft clockwise (4). Insert the (special tool #10369, Holder, Timing Chain) (1) into place between the cylinder head boss and the tensioner arm to hold the tensioner in the compressed position. The Timing Chain Holder remains in place while the phasers are removed.

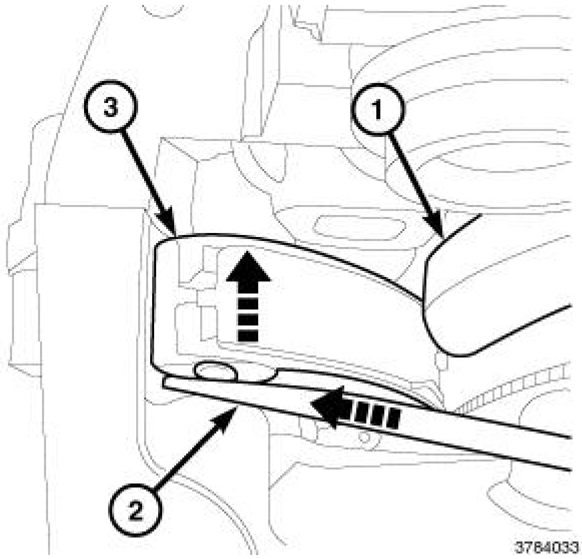


Fig. 205: Timing Chain Holder, Trim Stick & Tensioner Arm
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the Timing Chain Holder (1) does not engage or slips from position, wedge a trim stick (2) or equivalent between the front cover and the tensioner arm (3) to push the tensioner arm towards the rear of the engine and then repeat the previous step.**

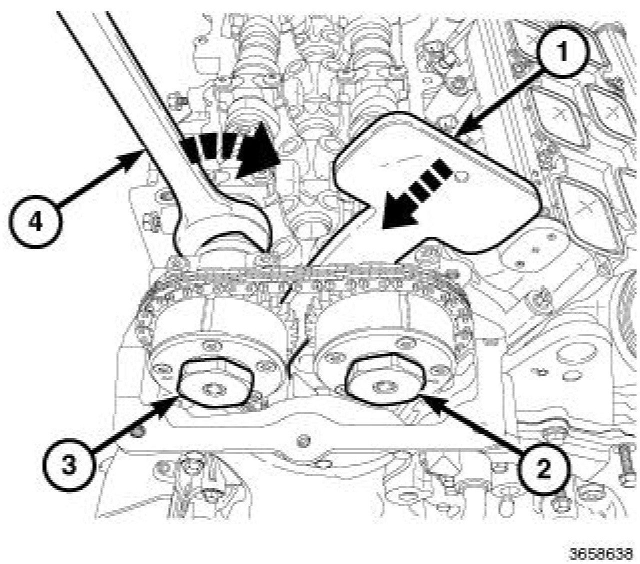


Fig. 206: Compressing Tensioner By Slightly Rotating Exhaust Camshaft Clockwise
Courtesy of CHRYSLER GROUP, LLC

11. Remove the oil control valve (3) and pull the right side exhaust cam phaser off of the camshaft.
12. Remove the oil control valve (2) and pull the right side intake cam phaser off of the camshaft.

INSTALLATION

LEFT

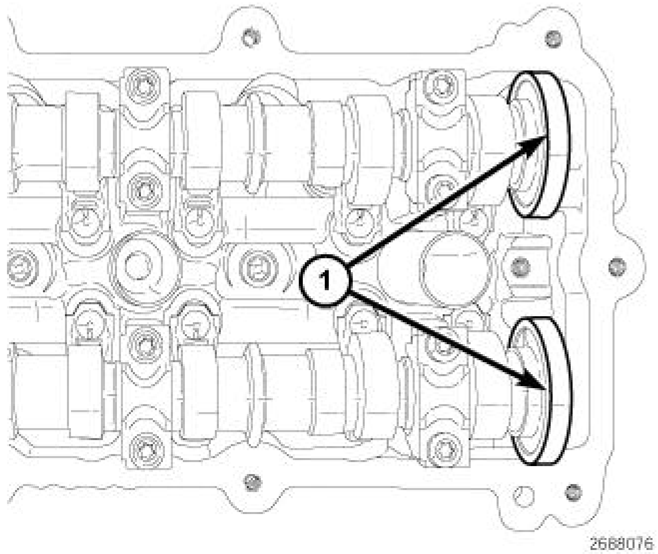


Fig. 207: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.**

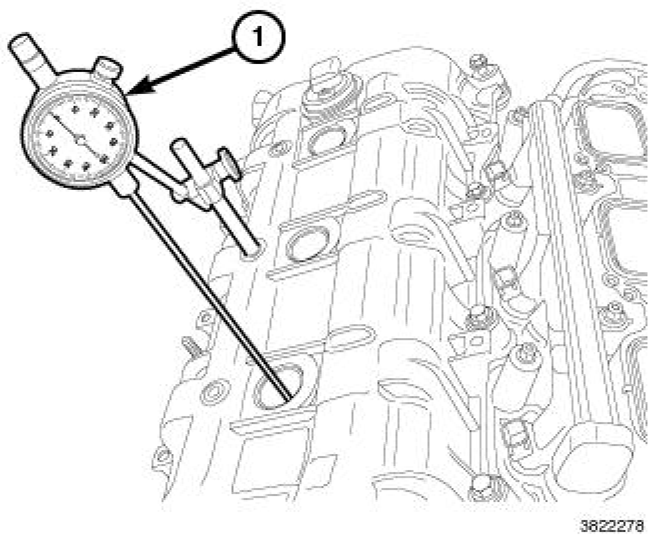


Fig. 208: Mount Dial Indicator Set To Stationary Point On Engine
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not rotate the crankshaft more than a few degrees independently of the camshafts. Piston to valve contact could occur resulting in possible valve damage. If the crankshaft needs to be rotated more than a few degrees, first remove the camshafts.**

1. Verify that the indicator dial (1) is set to zero when the right side number one cylinder piston is positioned at top-dead-center on the exhaust stroke.

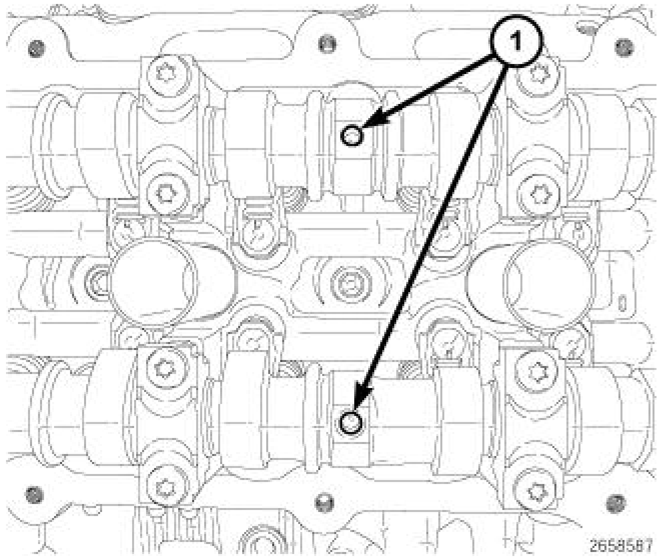


Fig. 209: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rotate the camshafts more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage.

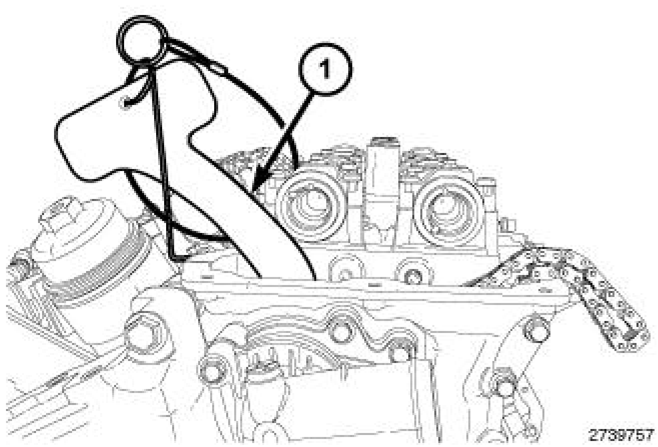


Fig. 210: Timing Chain Holder
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Timing Chain Holder (1) should still be in place as inserted during the Removal procedure. If required, the Timing Chain Holder can be reinserted by repeating Step 10 of the Removal procedure. Refer to ASSEMBLY, VARIABLE VALVE TIMING, PHASER/OIL CONTROL VALVE, REMOVAL.

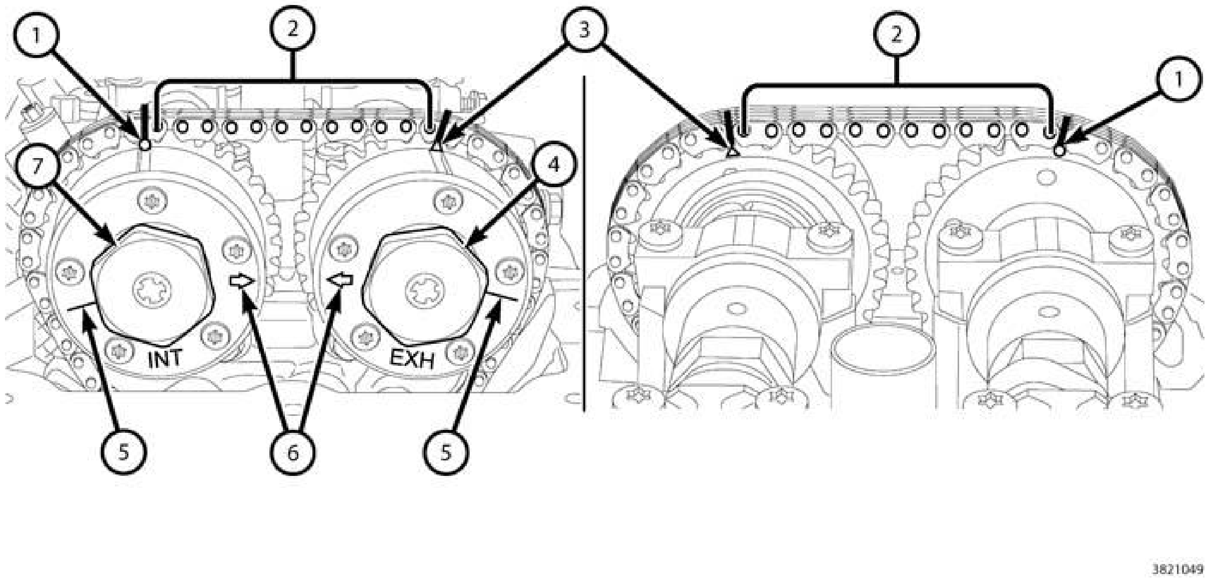


Fig. 211: Phaser Timing Mark, Chain Pins, Exhaust Cam Phaser Triangle Marking, Oil Control Valve, Scribe Lines & Arrows
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser.**

2. Verify that the camshafts are set at top-dead-center by positioning the alignment holes (1) vertically.
3. Route the cam chain around the left intake cam phaser while aligning the paint mark with the phaser timing mark (1). Press the left intake cam phaser onto the intake camshaft. Install and hand tighten the oil control valve (7).
4. While maintaining this alignment, route the cam chain around the exhaust cam phaser so that the paint mark is aligned with the phaser timing mark (3). Press the exhaust cam phaser onto the exhaust cam, install and hand tighten the oil control valve (4).
5. The **SCRIBE LINES** (5) on the cam phasers should face away from each other and the **ARROWS** (6) should point toward each other and be parallel to the cylinder head cover mounting surface. There should be twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (3) and the intake cam phaser circle marking (1).

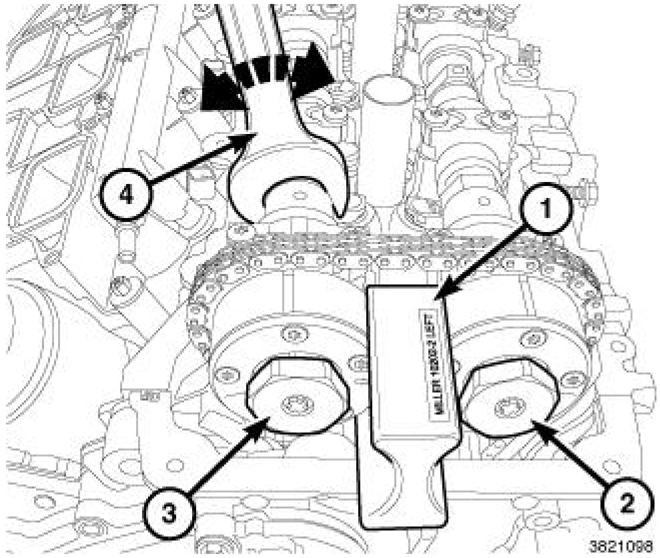


Fig. 212: Wrench, Oil Control Valves & Special Tool
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It may be necessary to rock the camshaft slightly (a few degrees) with a wrench (4) when installing the camshaft phaser lock.**

6. Install the (special tool #10202-2, Lock, Camshaft/Phaser, Left Side) (1) against the cylinder head cover mounting surface with the tool number facing up.
7. Tighten the oil control valves (2) and (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
8. Remove the Camshaft Phaser Lock (1) and the Timing Chain Holder.

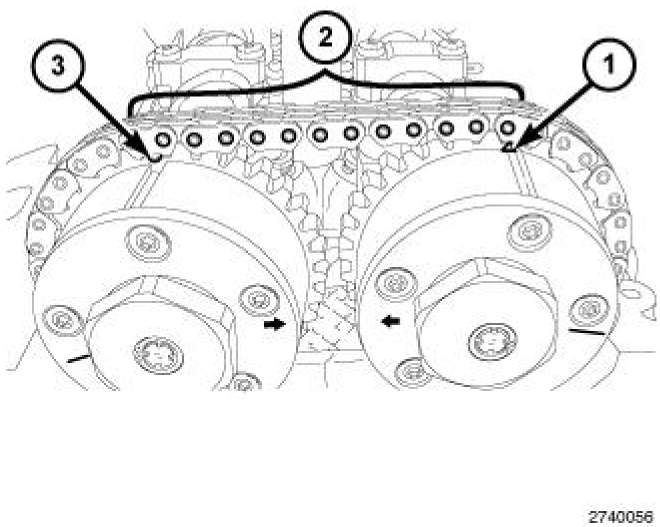


Fig. 213: Chain Pins, Arrows, Scribe Lines, Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

9. Rotate the crankshaft clockwise two complete revolutions stopping when the right side number one cylinder piston is again positioned at top-dead-center on the exhaust stroke. To assure correct engine timing, verify the following;

- The indicator dial is set to **ZERO** when the right side number one cylinder piston is positioned at top-dead-center on the exhaust stroke.
- The **SCRIBE LINES** (3) on the left side cam phasers face away from each other.
- The **ARROWS** (4) on the left side cam phasers point toward each other and are parallel to the cylinder head cover mounting surface.
- There are twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3).

10. If the engine timing is not correct, repeat this procedure.
11. Install the left cylinder head cover. Refer to COVER(S), CYLINDER HEAD, INSTALLATION.
12. Install the right side spark plugs. Refer to SPARK PLUG, INSTALLATION .
13. Connect the negative battery cable.
14. Start the engine and perform the following Powertrain Verification Tests: Refer to appropriate Engine Electrical Diagnostics article.
    - Cam/Crank Variation Relearn
    - Target Coefficient Relearn

NOTE: **Following the first restart after a DTC driven phaser replacement, clear all DTCs and verify that subsequent restarts do not set any additional codes. For any DTCs that reset, refer to appropriate Engine Electrical Diagnostics article.**

RIGHT

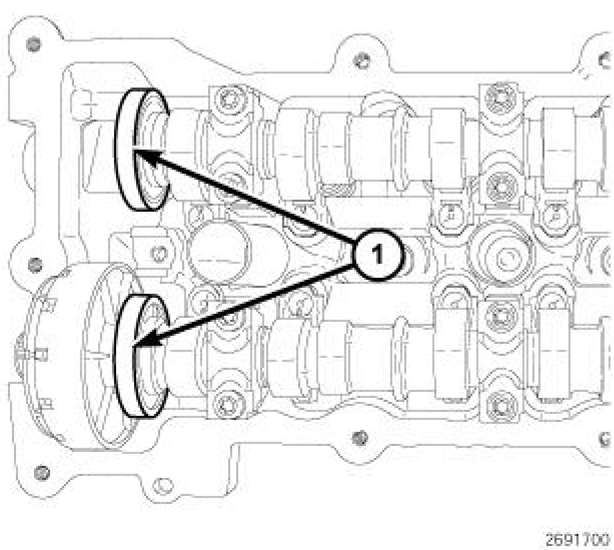


Fig. 214: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.**

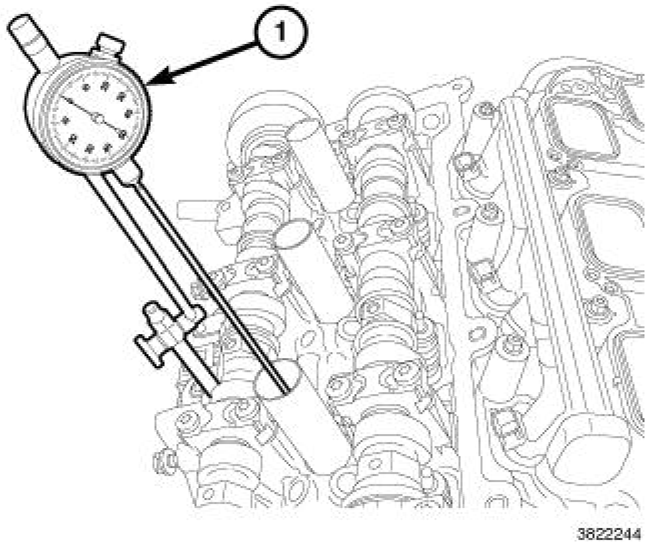


Fig. 215: Mount Dial Indicator Set To Stationary Point On Engine
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rotate the crankshaft more than a few degrees independently of the camshafts. Piston to valve contact could occur resulting in possible valve damage. If the crankshaft needs to be rotated more than a few degrees, first remove the camshafts.

1. Verify that the indicator dial (1) is set to zero when the right side number one cylinder piston is positioned at top-dead-center on the exhaust stroke.

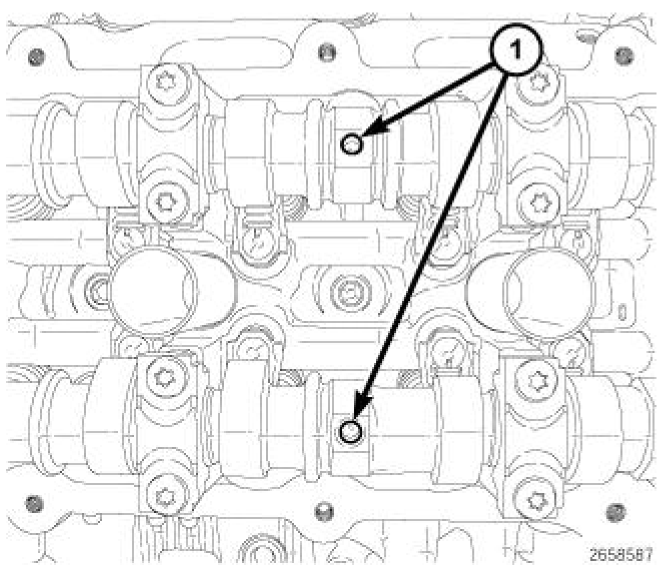


Fig. 216: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rotate the camshafts more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage.

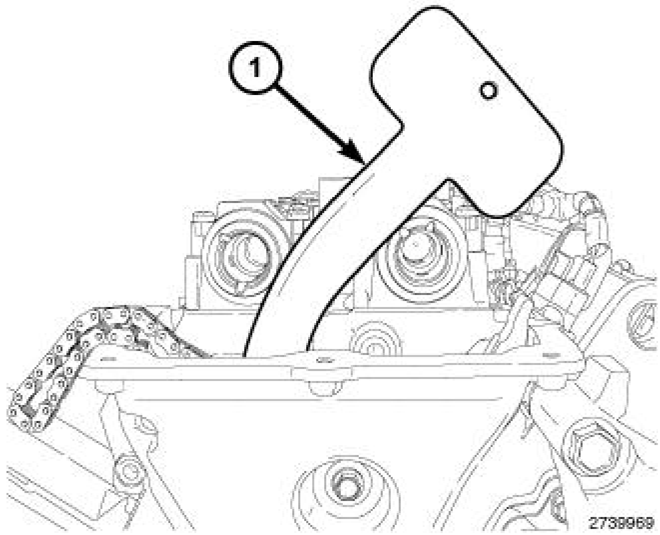


Fig. 217: Timing Chain Holder
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Timing Chain Holder (1) should still be in place as inserted during the Removal procedure. If required, the Timing Chain Holder can be reinserted by installing the exhaust cam phaser and repeating Step 10 of the Removal procedure. Refer to ASSEMBLY, VARIABLE VALVE TIMING, PHASER/OIL CONTROL VALVE, REMOVAL.

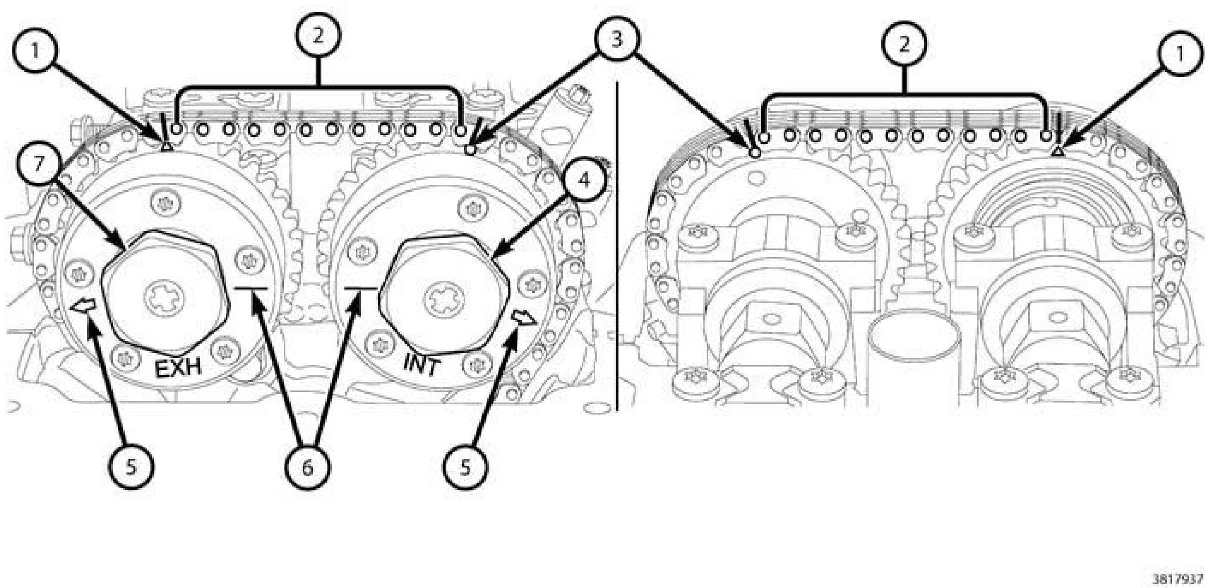


Fig. 218: Phaser Timing Mark, Chain Pins, Exhaust Cam Phaser Triangle Marking, Oil Control Valve, Scribe Lines & Arrows
Courtesy of CHRYSLER GROUP, LLC

NOTE: Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser.

2. Verify that the camshafts are set at top-dead-center by positioning the alignment holes (1) vertically.
3. Route the cam chain around the right exhaust cam phaser while aligning the paint mark with the phaser timing mark (1). Press the right exhaust cam phaser onto the exhaust camshaft. Install and hand tighten the oil control valve (7).
4. While maintaining this alignment, route the cam chain around the intake cam phaser so that the paint mark is aligned with the phaser timing mark (3). Press the intake cam phaser onto the intake cam, install and hand tighten the oil control valve (4).
5. The **ARROWS** (5) on the cam phasers should point away from each other and the **SCRIBE LINES** (6) should be parallel to the cylinder head cover mounting surface. There should be twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3).

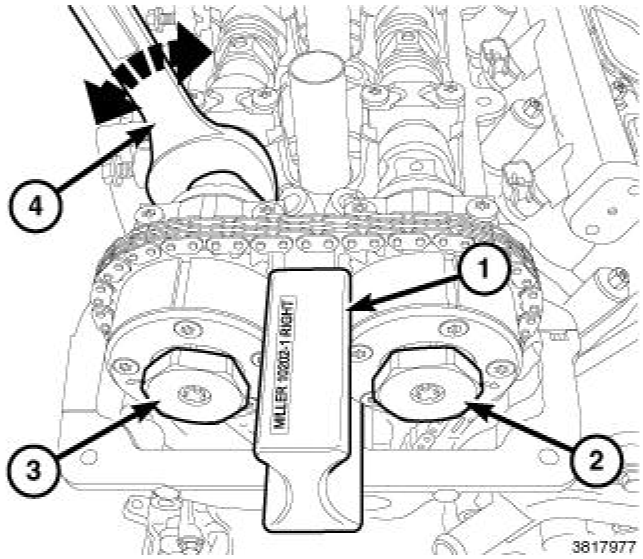


Fig. 219: Wrench, Oil Control Valves & Special Tool
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It may be necessary to rock the camshaft slightly (a few degrees) with a wrench (4) when installing the camshaft phaser lock.**

6. Install the (special tool #10202-1, Lock, Camshaft/Phaser, Right Side) (1) against the cylinder head cover mounting surface with the tool number facing up.
7. Tighten the oil control valves (2) and (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
8. Remove the Camshaft Phaser Lock (1) and the Timing Chain Holder.

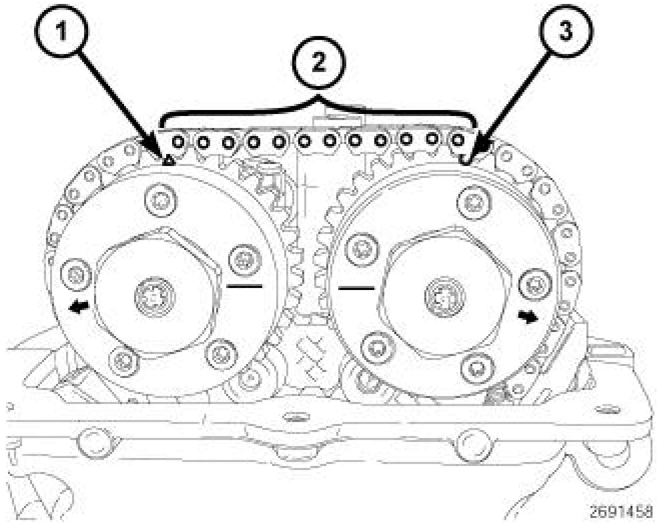


Fig. 220: Chain Pins, Arrows, Scribe Lines, Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

9. Rotate the crankshaft clockwise two complete revolutions stopping when the right side number one cylinder piston is again positioned at top-dead-center on the exhaust stroke. To assure correct engine timing, verify the following;
   - The indicator dial is set to **ZERO** when the right side number one cylinder piston is positioned at top-dead-center on the exhaust stroke.
   - The **ARROWS** (4) on the right side cam phasers point away from each other.
   - The **SCRIBE LINES** (5) on the right side cam phasers are parallel to the cylinder head cover mounting surface.
   - There are twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3).
10. If the engine timing is not correct, repeat this procedure.
11. Install the spark plugs. Refer to **SPARK PLUG, INSTALLATION** .
12. Install the left ignition coils. Refer to **COIL, IGNITION, INSTALLATION** .
13. Install the right cylinder head cover and right ignition coils. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.
14. Connect the negative battery cable.
15. Start the engine and perform the following Powertrain Verification Tests: Refer to appropriate Engine Electrical Diagnostics article.
   - Cam/Crank Variation Relearn
   - Target Coefficient Relearn

NOTE: **Following the first restart after a DTC driven phaser replacement, clear all DTCs and verify that subsequent restarts do not set any additional codes. For any DTCs that reset, refer to appropriate Engine Electrical Diagnostics article.**

CAMSHAFT, ENGINE

DESCRIPTION

DESCRIPTION

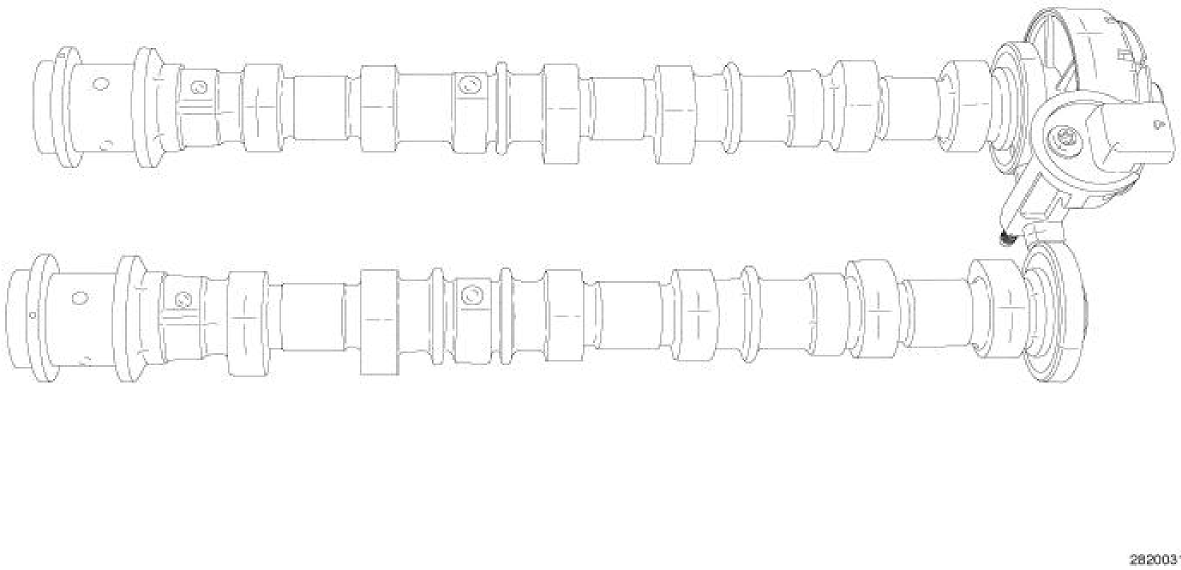


Fig. 221: Dual Over Head Camshaft (DOHC) Configuration
Courtesy of CHRYSLER GROUP, LLC

The Pentastar engine uses a Dual Over Head Camshaft (DOHC) configuration.

- The camshafts are a nodular cast iron design.
- Each camshaft has a pressed on magnetic timing wheel that is magnetically encoded.
- The two Camshaft Position (CMP) sensors are located between the timing wheels.
- Attached to the rear of the right exhaust camshaft is a centrifuge which is part of the crankcase ventilation system.

The centrifuge is used to separate oil droplets from the crankcase gases before they enter the PCV valve. Four bearing journals are machined into the camshaft. Camshaft end play is controlled by two thrust walls that border the nose piece journal.

OPERATION

OPERATION

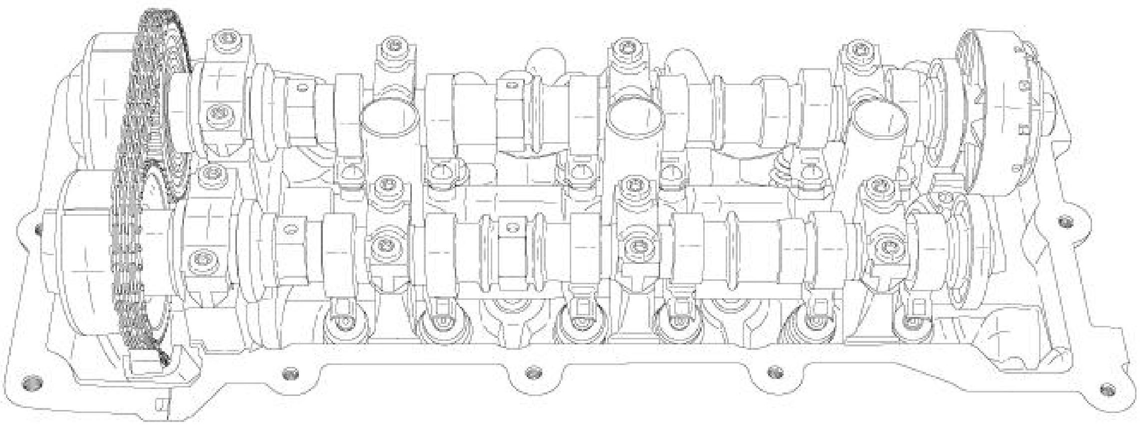


Fig. 222: Right Hand Camshafts
Courtesy of CHRYSLER GROUP, LLC

NOTE: RH camshafts shown in illustration, LH camshafts similar.

The camshaft has precisely machined (egg shaped) lobes to provide accurate valve timing and duration. The camshaft is driven by the crankshaft via drive sprockets and chains.

STANDARD PROCEDURE

CAMSHAFT END PLAY

1. Remove the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL.

   NOTE: Cylinder #1 or #4 must be used when checking for Top Dead Center (TDC).

   NOTE: Right intake camshaft shown in illustration, other camshafts similar.

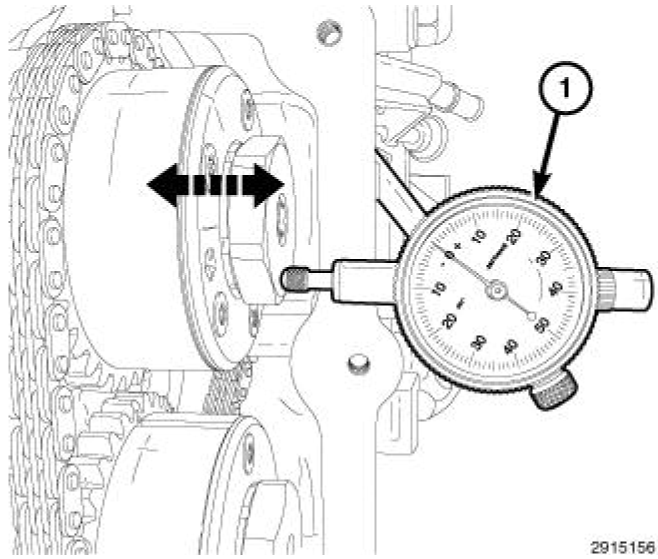


Fig. 223: Mount Dial Indicator Set To A Stationary Point At Front Of Engine
Courtesy of CHRYSLER GROUP, LLC

2. Mount the Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) (1) to a stationary point at the front of the engine. Place the probe perpendicular against the Oil Control Valve (OCV) of the camshaft.
3. Move the camshaft all the way to the rear of its travel.
4. Zero the dial indicator.
5. Move the camshaft forward to the limit of travel and read the dial indicator. Compare the measured end play to the specification. Refer to **ENGINE SPECIFICATIONS**.

REMOVAL

LEFT

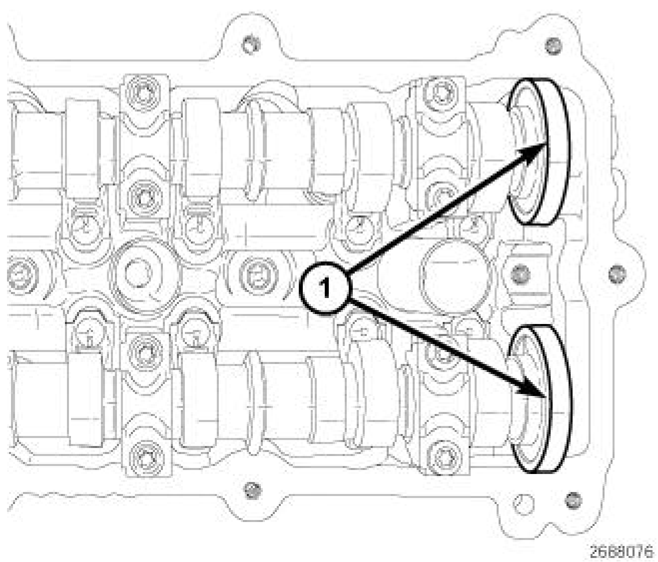


Fig. 224: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing**

wheels ability to correctly relay camshaft position to the camshaft position sensor.

CAUTION: When the timing chain is removed and the cylinder heads are still installed, Do not forcefully rotate the camshafts or crankshaft independently of each other. Severe valve and/or piston damage can occur.

CAUTION: DO NOT STAMP OR STRIKE THE CAMSHAFT BEARING CAPS. SEVERE DAMAGE WILL OCCUR TO THE BEARING CAPS.

1. Remove the variable valve timing assembly. Refer to ASSEMBLY, VARIABLE VALVE TIMING, PHASER/OIL CONTROL VALVE, REMOVAL.

NOTE: Camshaft bearing caps should have been marked during engine manufacturing. For example, the number one exhaust camshaft bearing cap is marked "1E->". The caps should be installed with the notch forward.

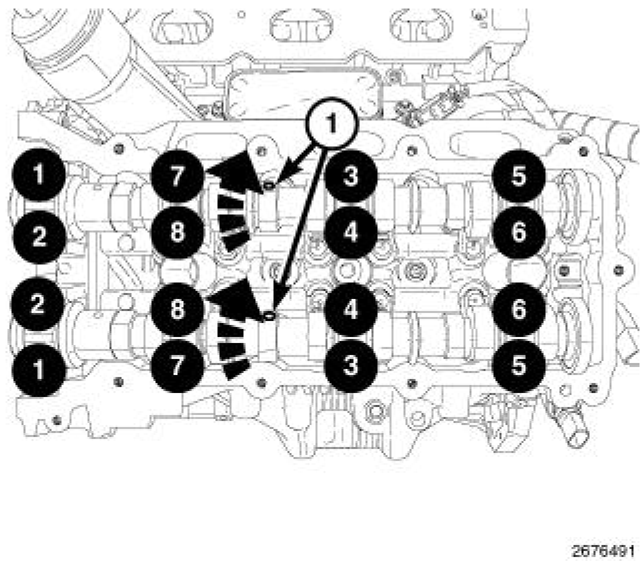


Fig. 225: Camshaft Bearing Cap Bolts Removal Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

2. Rotate the camshafts counterclockwise to position the alignment holes (1) **approximately 30Ā° before top-dead-center** . This places the camshafts in the neutral position (no valve load).
3. Loosen the camshaft bearing cap bolts in the sequence shown in illustration.

NOTE: When the camshaft is removed the rocker arms may slide downward, mark the rocker arms before removing the camshaft.

4. Remove the camshaft bearing caps and the camshafts.

RIGHT

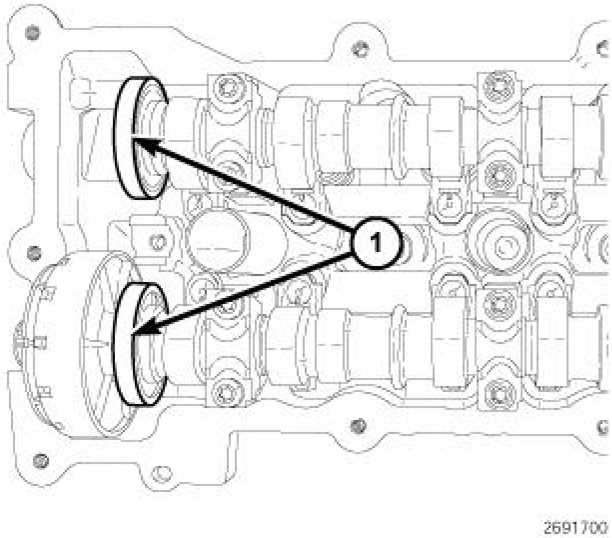


Fig. 226: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.**

CAUTION: **When the timing chain is removed and the cylinder heads are still installed, Do not forcefully rotate the camshafts or crankshaft independently of each other. Severe valve and/or piston damage can occur.**

CAUTION: **DO NOT STAMP OR STRIKE THE CAMSHAFT BEARING CAPS. SEVERE DAMAGE WILL OCCUR TO THE BEARING CAPS.**

1. Remove the variable valve timing assembly. Refer to ASSEMBLY, VARIABLE VALVE TIMING, PHASER/OIL CONTROL VALVE, REMOVAL.

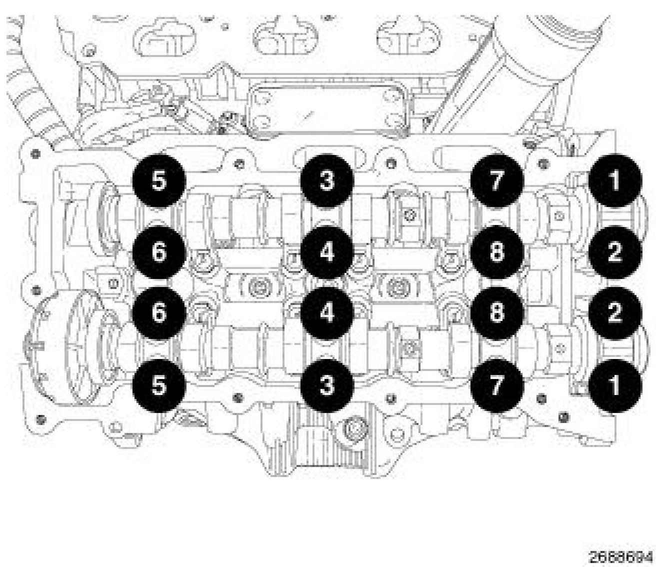


Fig. 227: Camshaft Bearing Cap Bolts Removal Sequence - Right

Courtesy of CHRYSLER GROUP, LLC

2. Camshaft bearing caps should have been marked during engine manufacturing. For example, the number one exhaust camshaft bearing cap is marked "1E->". The caps should be installed with the notch forward.

NOTE: **Loosen the camshaft bearing cap bolts in the sequence shown in illustration.**

NOTE: **When the camshaft is removed the rocker arms may slide downward, mark the rocker arms before removing the camshaft.**

3. Remove the camshaft bearing caps and the camshafts.

INSPECTION

INSPECTION

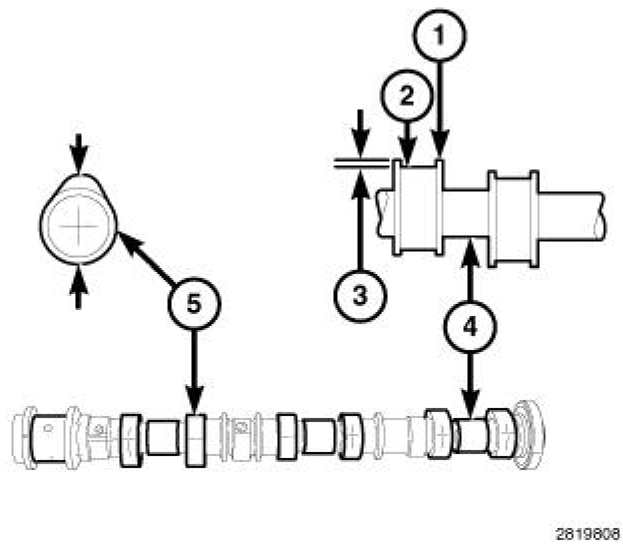


Fig. 228: Inspecting Camshaft Bearing Journals & Cam Lobes
Courtesy of CHRYSLER GROUP, LLC

NOTE: **RH intake camshaft shown in illustration, other camshafts similar.**

1. Inspect camshaft bearing journals (4) for damage and binding. If journals are binding, check the cylinder head for damage. Also check cylinder head oil holes for clogging.
2. Check the surface of the cam lobes (5) for abnormal wear (3). Measure and compare the unworn area (1) to the worn area (2). Replace camshafts that are not within specification. Refer to ENGINE SPECIFICATIONS.

INSTALLATION

LEFT

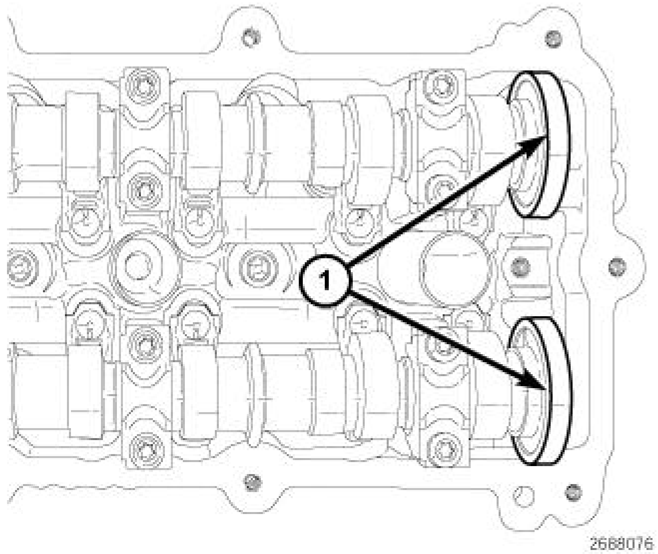


Fig. 229: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

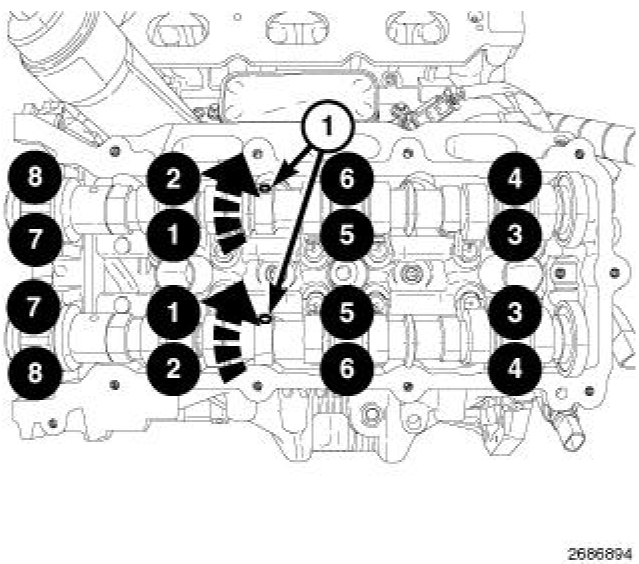


Fig. 230: Bearing Cap Retaining Bolts Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the camshaft journals with clean engine oil.

CAUTION: Do not rotate the camshafts more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage. If the camshafts need to be rotated more than a few degrees, first move the pistons away from the cylinder heads by rotating the crankshaft counterclockwise to a position 30Â° before-top-dead-center. Once the camshafts are returned to their top-dead-center position, rotate the

crankshaft clockwise to return the crankshaft to top-dead-center.

2. Install the left side camshaft(s) with the alignment holes (1) positioned approximately 30Â° before top-dead-center. This will place the camshafts at the neutral position (no valve load) easing the installation of the camshaft bearing caps.

   Caps are identified numerically (1 through 4), intake or exhaust (I or E) and should be installed from the front to the rear of the engine. All caps should be installed with the notch forward so that the stamped arrows (<) on the caps point toward the front of the engine.

3. Verify the rocker arms are aligned to the cam lobe Refer to **ROCKER ARM, VALVE, INSTALLATION**.
4. Install the camshaft bearing caps and tighten the bolts finger tight.
5. Using the tightening sequence shown in illustration, tighten the bearing cap bolts to 10 N.m (89 in. lbs.).

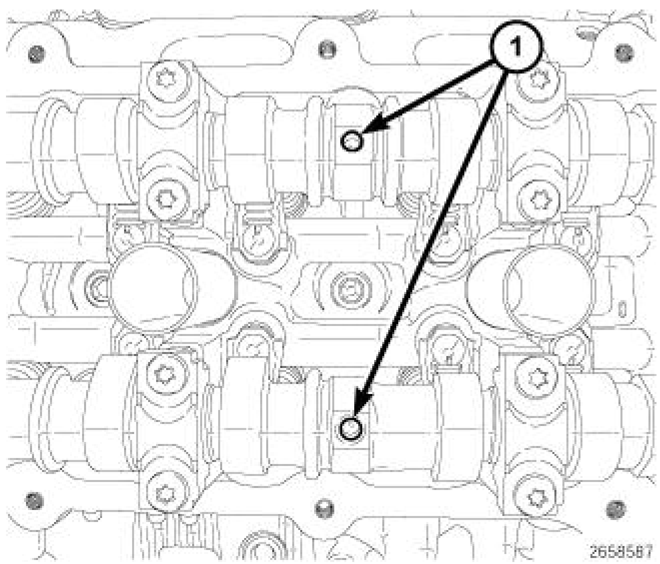


Fig. 231: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

6. Rotate the camshafts clockwise to top-dead-center by positioning the alignment holes (1) vertically.
7. Install the variable valve timing assembly. Refer to **ASSEMBLY, VARIABLE VALVE TIMING, PHASER/OIL CONTROL VALVE, INSTALLATION**.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

RIGHT

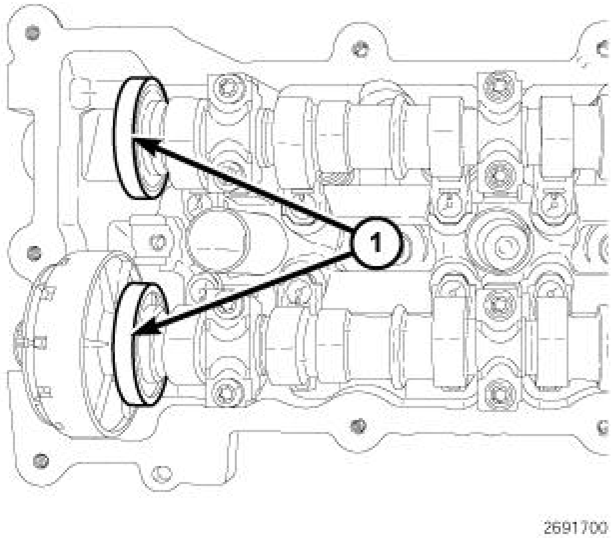


Fig. 232: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

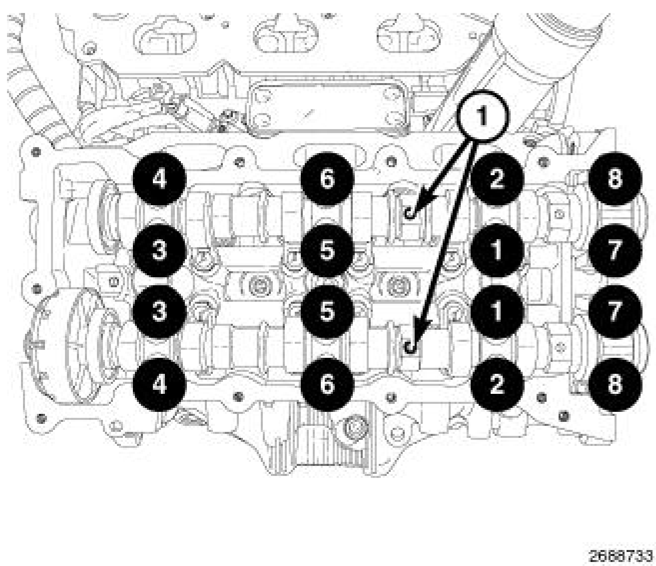


Fig. 233: Bearing Cap Retaining Bolts Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate camshaft journals with clean engine oil.

CAUTION: Do not rotate the camshafts more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage. If the camshafts need to be rotated more than a few degrees, first move the pistons away from the cylinder heads by rotating the crankshaft counterclockwise to a position 30Â° before-top-dead-center. Once the camshafts are returned to their top-dead-center position, rotate the

crankshaft clockwise to return the crankshaft to top-dead-center.

2. Install the right side camshaft(s) at top-dead-center by positioning the alignment holes (1) vertically. This will place the camshafts at the neutral position (no valve load) easing the installation of the camshaft bearing caps.

NOTE: **Caps are identified numerically (1 through 4), intake or exhaust (I or E) and should be installed from the front to the rear of the engine. All caps should be installed with the notch forward so that the stamped arrows (<) on the caps point toward the front of the engine.**

3. Install the camshaft bearing caps and tighten the bolts finger tight.
4. Verify the rocker arms are aligned to the cam lobe.

   Refer to **ROCKER ARM, VALVE, INSTALLATION**.

5. Using the sequence shown in illustration, tighten the bearing cap bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

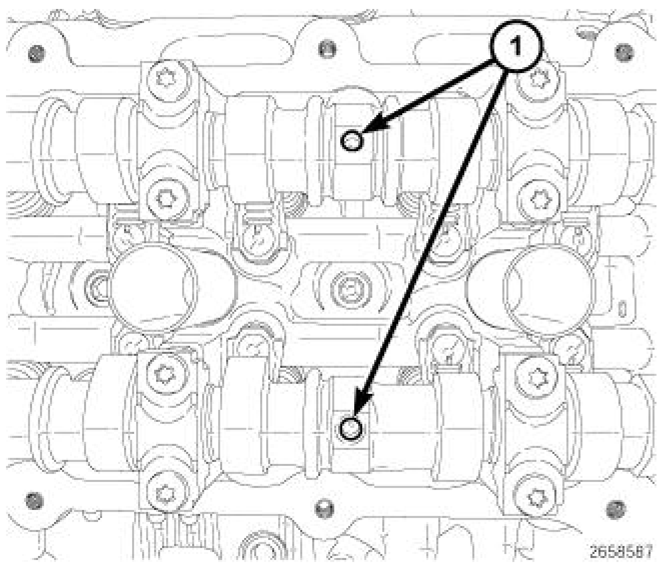


Fig. 234: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

6. Rotate the camshaft clockwise to the top-dead-center by positioning the alignment holes (1) vertically.
7. Install the variable valve timing assembly. Refer to **ASSEMBLY, VARIABLE VALVE TIMING, PHASER/OIL CONTROL VALVE, INSTALLATION**.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

COVER(S), CYLINDER HEAD

DESCRIPTION

DESCRIPTION

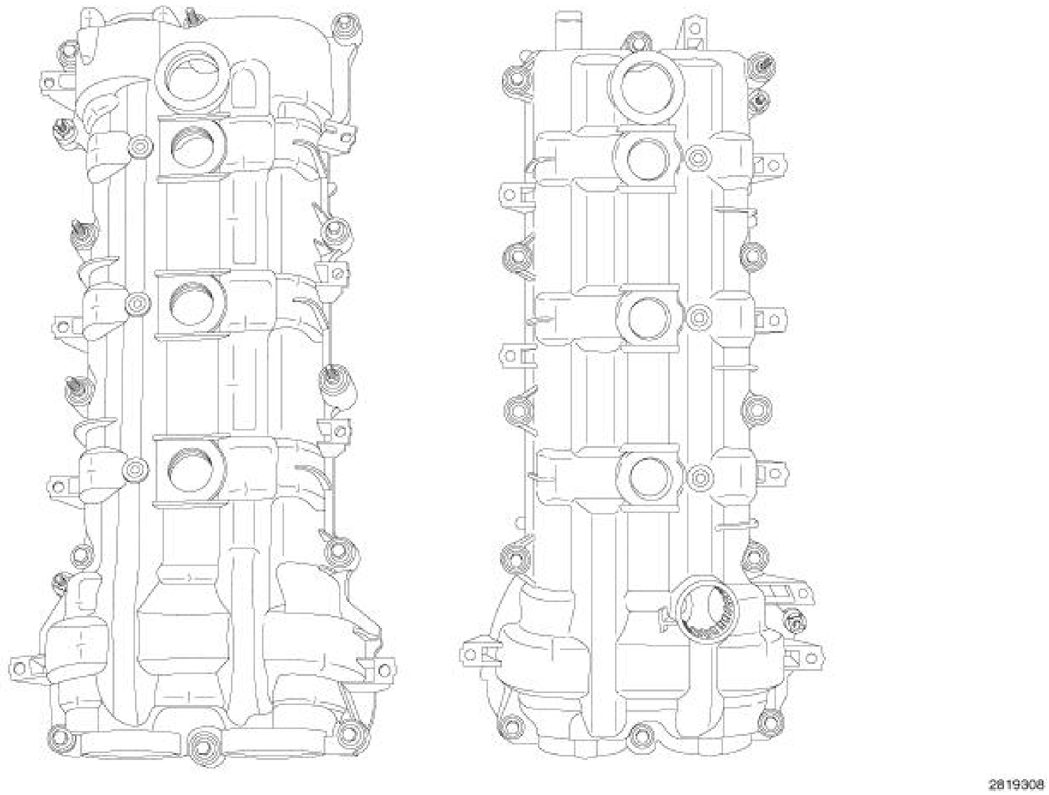


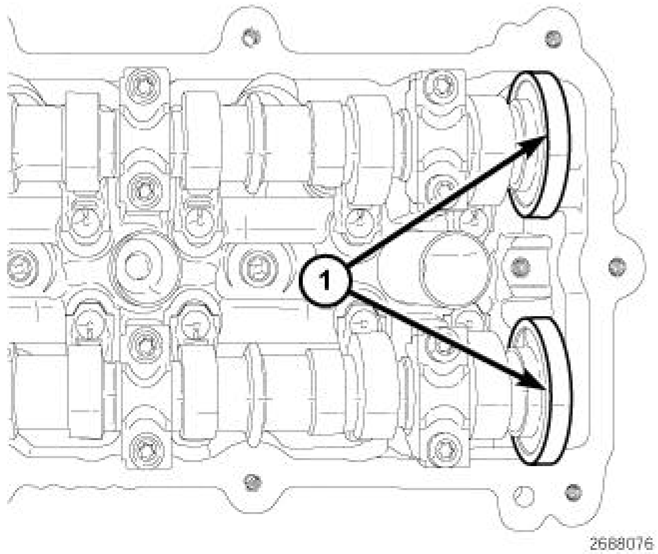
Fig. 235: Cylinder Head Covers
Courtesy of CHRYSLER GROUP, LLC

The cylinder head covers are made of a carbon and fiberglass composite.

- The cylinder head covers are not interchangeable from side-to-side.
- The cylinder head covers are sealed with a press-in-place gasket that is designed to isolate the cover from the cylinder head for improved Noise Vibration and Harshness (NVH).
- There are two dowel pins on the outboard side of the cover flange to locate the cover to holes in the cylinder head.
- Room Temperature Vulcanizing silicone (RTV) is used to seal the T-joint at the timing cover, cylinder head and cylinder head cover.

REMOVAL

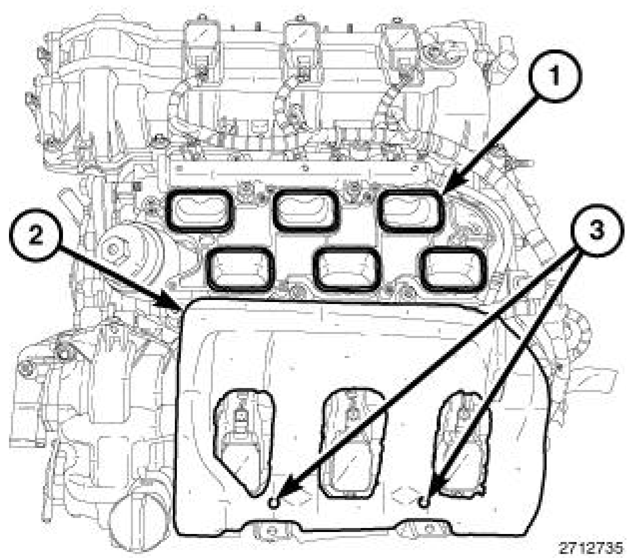
LEFT



[Fig. 236: Magnetic Timing Wheels]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

1. Disconnect and isolate the negative battery cable.
2. Remove the upper intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.



[Fig. 237: Intake Ports, Insulator & Alignment Posts]
Courtesy of CHRYSLER GROUP, LLC

3. Cover the open intake ports (1) to prevent debris from entering the engine.
4. Remove the insulator (2) from the LH cylinder head cover.

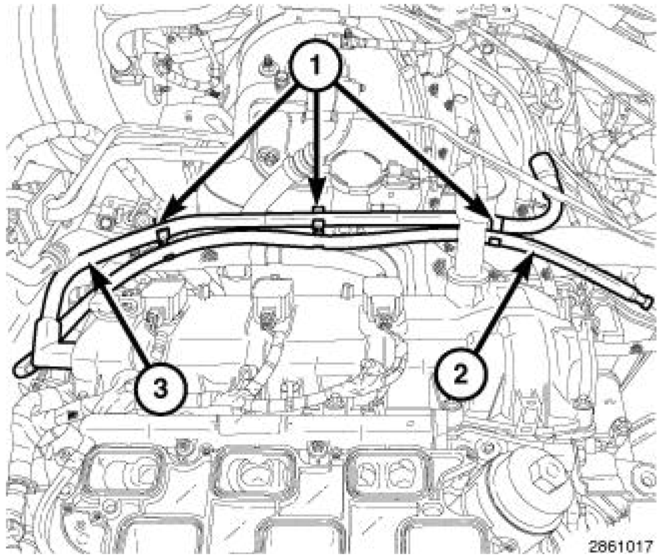


Fig. 238: Transmission Breather Hose, Make-Up Air Tube & Clips
Courtesy of CHRYSLER GROUP, LLC

5. Disengage the clips (1), remove the make-up air tube (3) from the left cylinder head cover and reposition the transmission breather hose (2).

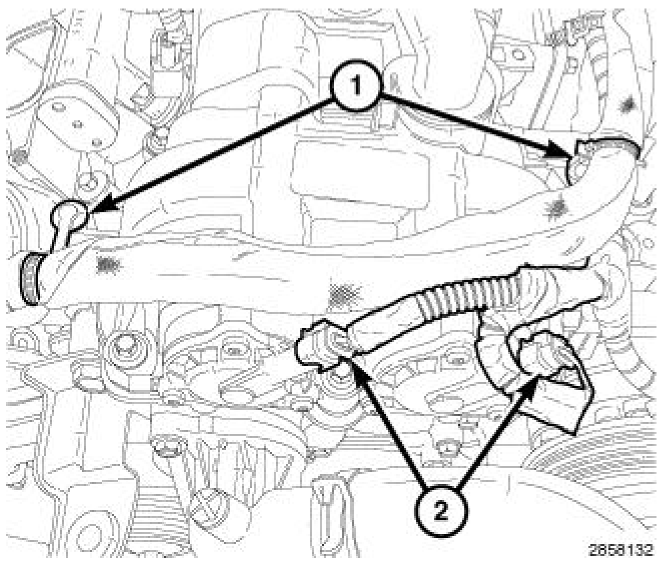


Fig. 239: Variable Valve Timing Solenoid Connectors & Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

6. Disengage two starter wire harness retainers (1) from the left cylinder head cover.
7. Remove the variable valve timing solenoids. Refer to **SOLENOID, VARIABLE VALVE TIMING, REMOVAL** .

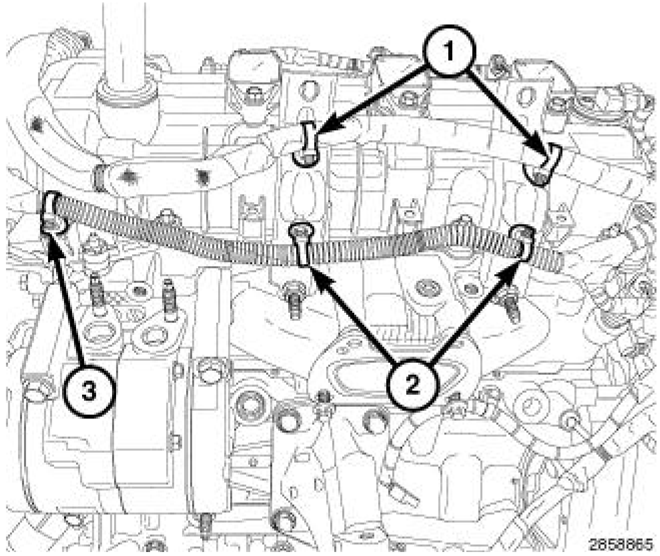


Fig. 240: Starter Wire Harness Retainers, Main Wire Harness Retainer & Manifold Support Bracket Retainers
Courtesy of CHRYSLER GROUP, LLC

8. Disengage one main wire harness retainer (3) from the left cylinder head cover.

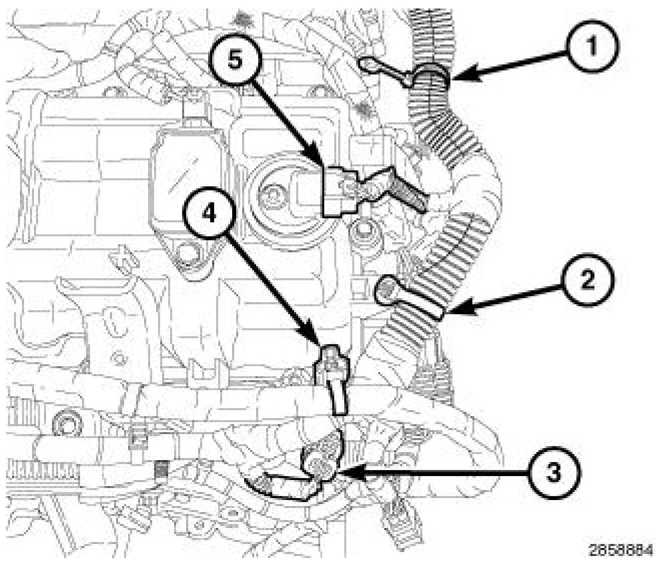
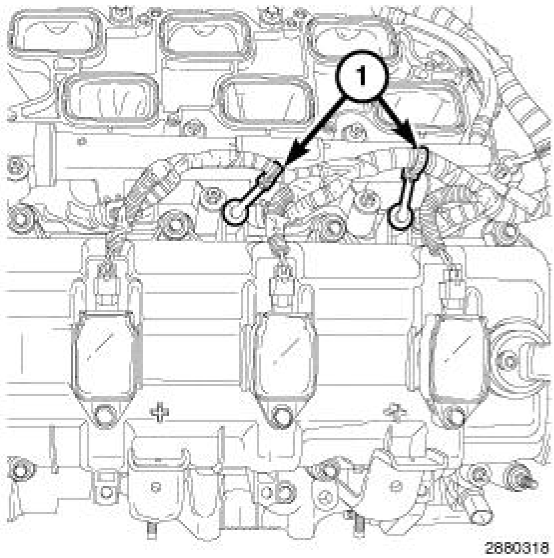


Fig. 241: ECT Sensor Connector, CMP Sensor & Main Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

9. Disengage one main wire harness retainer (2) from the cylinder head cover and one main wire harness retainer (4) from the cylinder head cover mounting stud.

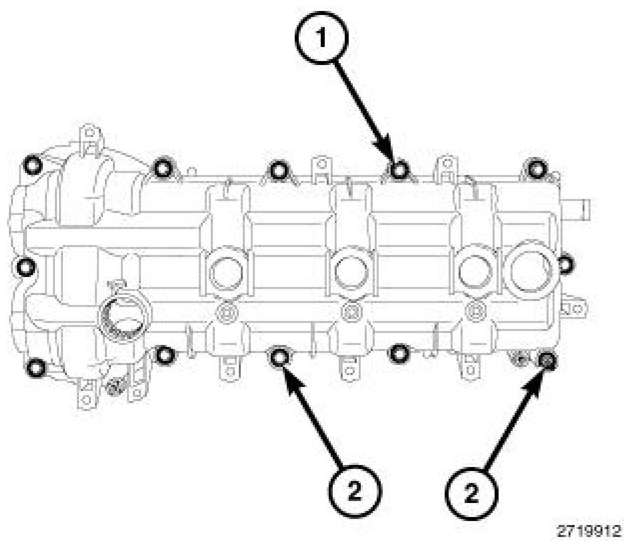
NOTE: **The RH Camshaft Position (CMP) sensor is shown in illustration, the LH CMP sensor is similar. If removing both RH and LH CMP sensors, mark the sensors so they can be installed in their original locations.**

10. Remove the CMP sensor. Refer to SENSOR, CAMSHAFT POSITION, REMOVAL .



[Fig. 242: Injection/Ignition Harness Retainers]
Courtesy of CHRYSLER GROUP, LLC

11. Disengage two injection/ignition harness retainers (1) from the left cylinder head cover.
12. Remove the ignition coils. Refer to **COIL, IGNITION, REMOVAL** .



[Fig. 243: Cylinder Head Cover Mounting Bolts & Studbolts]
Courtesy of CHRYSLER GROUP, LLC

13. Loosen the ten cylinder head cover mounting bolts (1) and two studbolts (2) and remove the cylinder head cover.

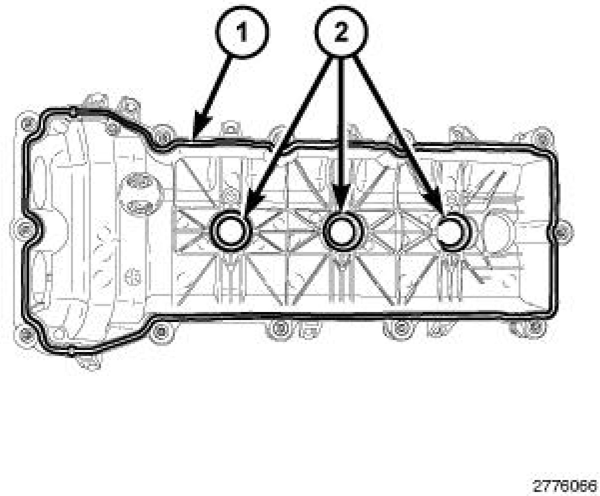


Fig. 244: Cylinder Head Cover Gasket & Spark Plug Tube Seals
Courtesy of CHRYSLER GROUP, LLC

14. Remove and discard the cylinder head cover gasket (1).
15. Remove and discard the spark plug tube seals (2).

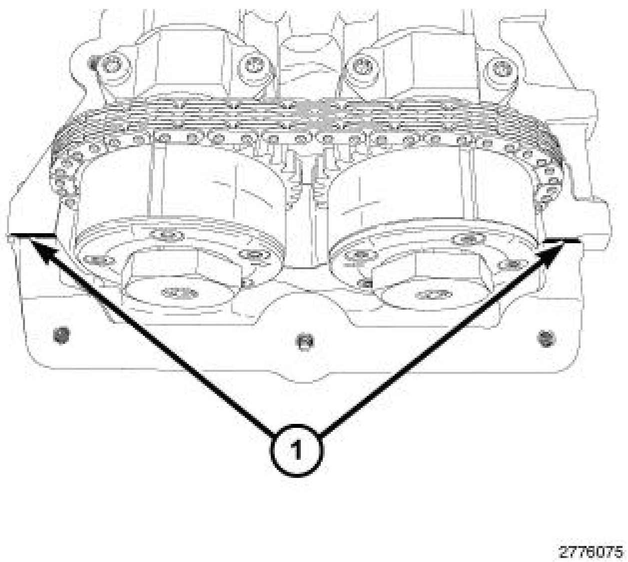


Fig. 245: Residual Sealant
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use oil based liquids, wire brushes, abrasive wheels or metal scrapers to clean the engine gasket surfaces. Use only isopropyl (rubbing) alcohol, along with plastic or wooden scrapers. Improper gasket surface preparation may result in engine fluid leakage.

16. Remove all residual sealant (1) from the cylinder head, timing chain cover and cylinder head cover mating surfaces. Refer to ENGINE GASKET SURFACE PREPARATION.

RIGHT

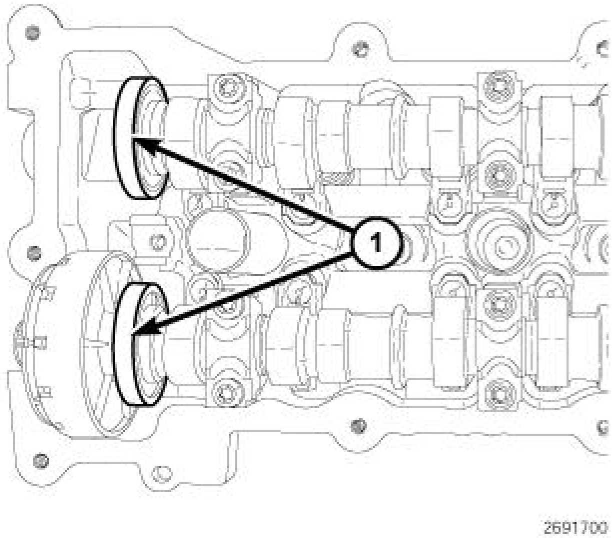


Fig. 246: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

1. Disconnect and isolate the negative battery cable.
2. Remove the air inlet hose and upper intake manifold (2). Refer to MANIFOLD, INTAKE, REMOVAL.

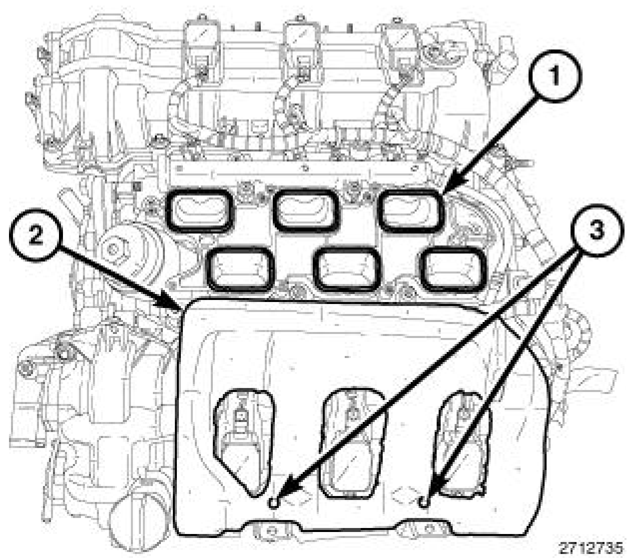


Fig. 247: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

3. Cover the open intake ports (1) to prevent debris from entering the engine.

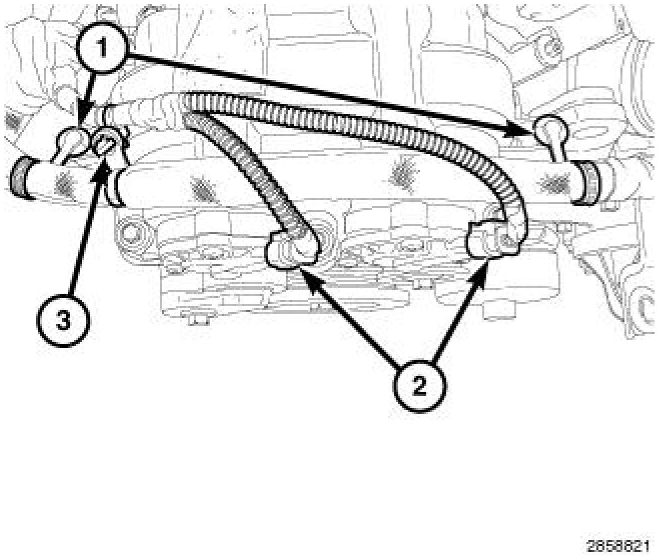


Fig. 248: Variable Valve Timing Solenoid Connectors & Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

4. Disengage the starter harness to main harness retainer (3).
5. Disengage two starter wire harness retainers from the right cylinder head cover (1).
6. Remove the variable valve timing solenoids. Refer to **SOLENOID, VARIABLE VALVE TIMING, REMOVAL** .

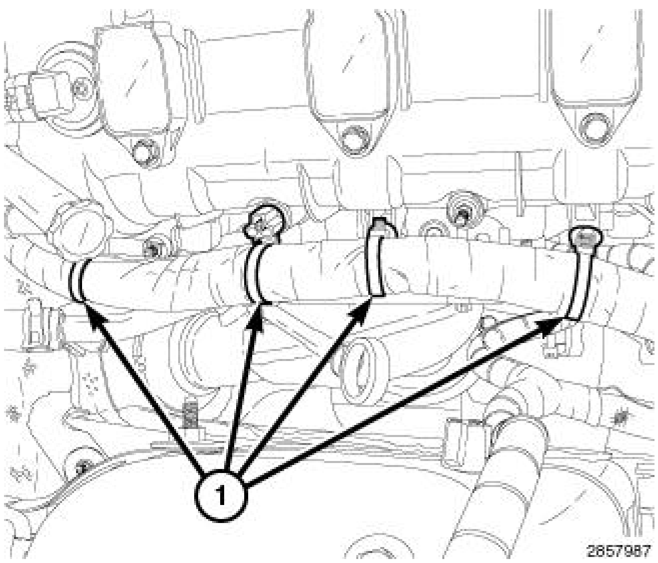


Fig. 249: Main Wire Harness Retainers At Right Cylinder Head Cover
Courtesy of CHRYSLER GROUP, LLC

7. Disengage four main wire harness retainers (1) from the right cylinder head cover.

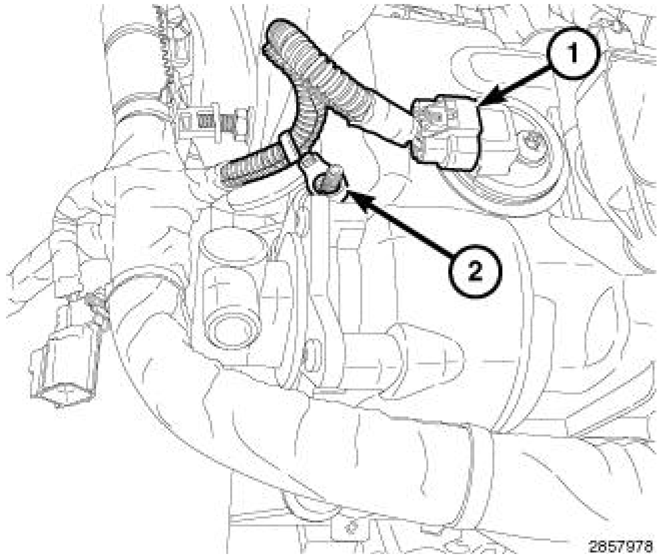


Fig. 250: Main Wire Harness Retainer & Connector
Courtesy of CHRYSLER GROUP, LLC

8. Disengage the main wire harness retainer (2) from the right cylinder head cover mounting stud.

NOTE:	**If removing both RH and LH Camshaft Position (CMP) sensors, mark the sensors so they can be installed in their original locations.**

9. Remove the CMP sensor. Refer to **SENSOR, CAMSHAFT POSITION, REMOVAL** .

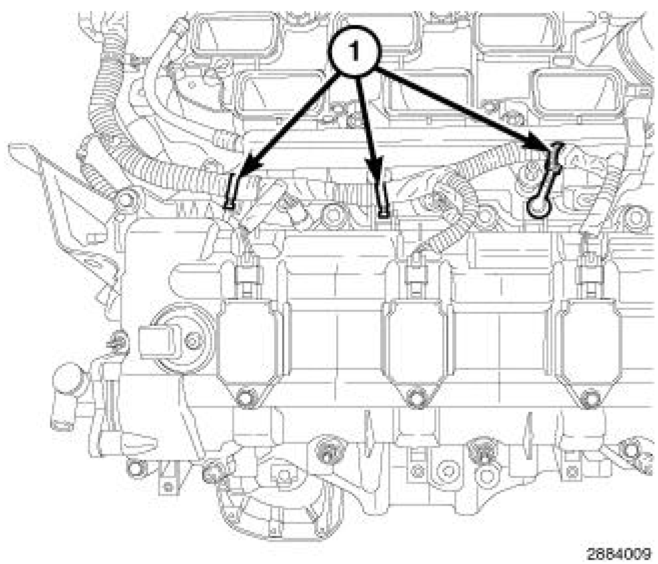


Fig. 251: Injection/Ignition Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

10. Disengage three injection/ignition harness retainers (1) from the right cylinder head cover.
11. Remove the ignition coils. Refer to **COIL, IGNITION, REMOVAL** .
12. Remove the Positive Crankcase Ventilation (PCV) valve. Refer to **VALVE, POSITIVE CRANKCASE VENTILATION (PCV), REMOVAL** .

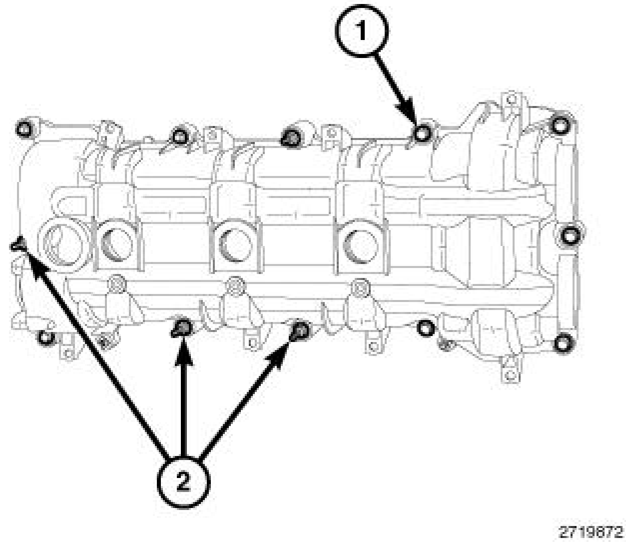


Fig. 252: Cylinder Head Cover Mounting Bolts & Studbolts
Courtesy of CHRYSLER GROUP, LLC

13. Loosen the nine cylinder head cover mounting bolts (1) and three studbolts (2) and remove the cylinder head cover.

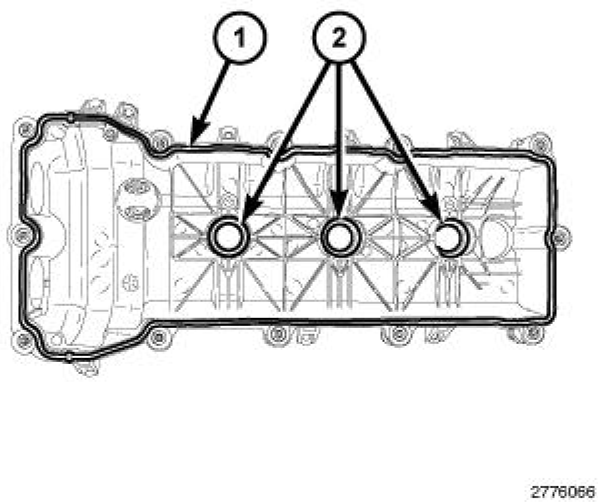


Fig. 253: Cylinder Head Cover Gasket & Spark Plug Tube Seals
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The LH cylinder head cover is shown in illustration, the RH cylinder head cover is similar.**

14. Remove and discard the cylinder head cover gasket (1).
15. Remove and discard the spark plug tube seals (2).

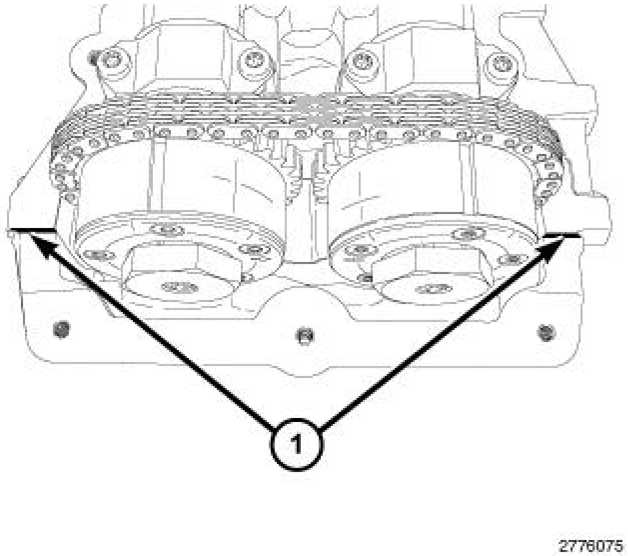


Fig. 254: Residual Sealant
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The LH cylinder head cover T-joints are shown in illustration, the RH cylinder head cover T-joints are similar.**
CAUTION:	**Do not use oil based liquids, wire brushes, abrasive wheels or metal scrapers to clean the engine gasket surfaces. Use only isopropyl (rubbing) alcohol, along with plastic or wooden scrapers. Improper gasket surface preparation may result in engine fluid leakage.**

16. Remove all residual sealant (1) from the cylinder head, timing chain cover and cylinder head cover mating surfaces. Refer to **ENGINE GASKET SURFACE PREPARATION**.

INSTALLATION

LEFT

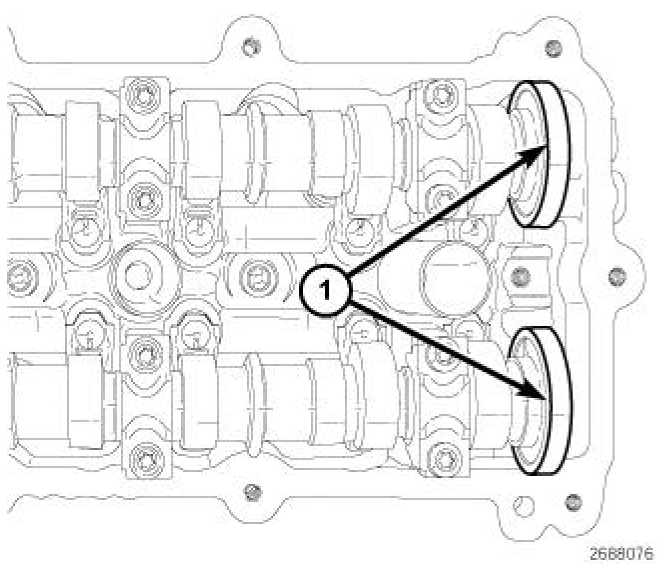


Fig. 255: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.**

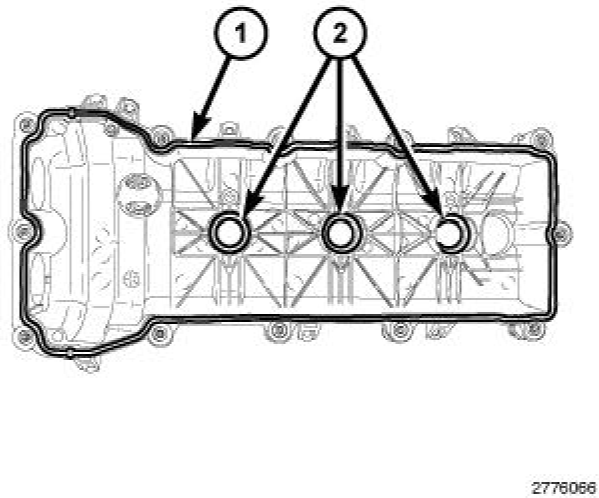


Fig. 256: Cylinder Head Cover Gasket & Spark Plug Tube Seals
Courtesy of CHRYSLER GROUP, LLC

1. Install a **NEW** cylinder head cover gasket (1).

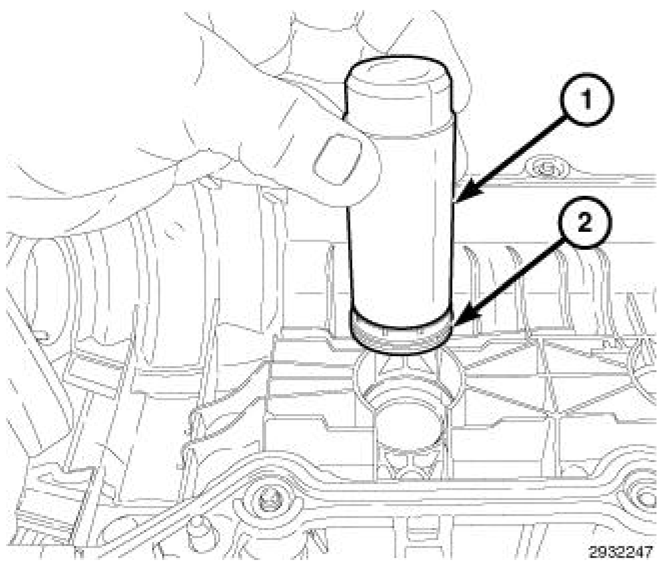
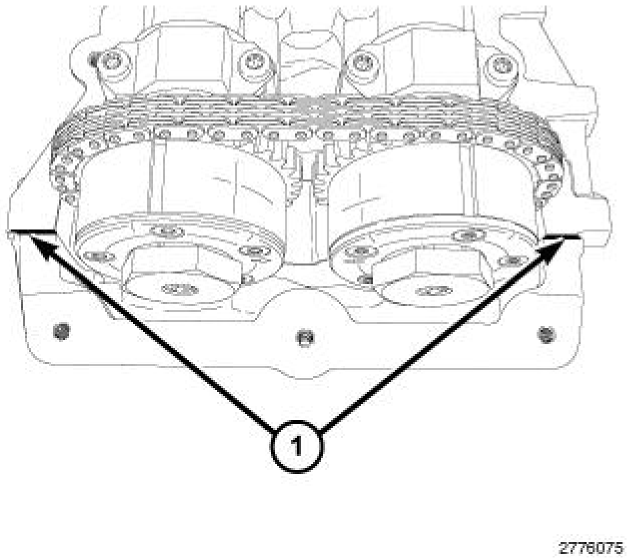


Fig. 257: Spark Plug Tube Seal & Installer
Courtesy of CHRYSLER GROUP, LLC

2. Install a spark plug tube seals (2)
3. Install **NEW** spark plug tube seals (2) in the cylinder head cover:
   - Lubricate the spark plug tube seal inner and outer diameters with clean engine oil.
   - Place the spark plug tube seal (2) on the Cam Sensor/Spark Plug Tube Seal Installer (special tool #10256, Installer, Cam Installer, Cam Sensor/ Spark Plug Tube Seal) (1).

- Push the seal into the cylinder head cover until the base of the seal is seated.
- Remove the tool.



[Fig. 258: Residual Sealant]
Courtesy of CHRYSLER GROUP, LLC

4. Clean the timing engine timing cover, cylinder head and cylinder head cover mating surfaces with isopropyl alcohol in preparation for sealant application.

CAUTION: **Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than MoparÃ® Threebond Engine RTV Sealant may result in engine fluid leakage.**

CAUTION: **Following the application of MoparÃ® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.**

5. Apply a 2 to 3 mm wide bead of MoparÃ® Threebond Engine RTV Sealant (1) to the two engine timing cover to cylinder head T-joints as shown in illustration.

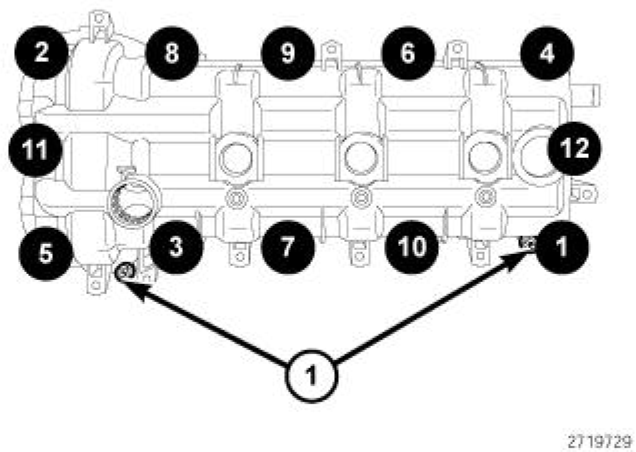


Fig. 259: Cylinder Head Cover Bolts & Double Ended Studs Tightening Sequence - Left
Courtesy of CHRYSLER GROUP, LLC

6. Align the locator pins (1) to the cylinder head and install the cylinder head cover.
7. Tighten the cylinder head cover bolts and double ended studs in the sequence shown in illustration to 12 N.m (9 ft. lbs.).
8. Install the ignition coils. Refer to **COIL, IGNITION, INSTALLATION** .

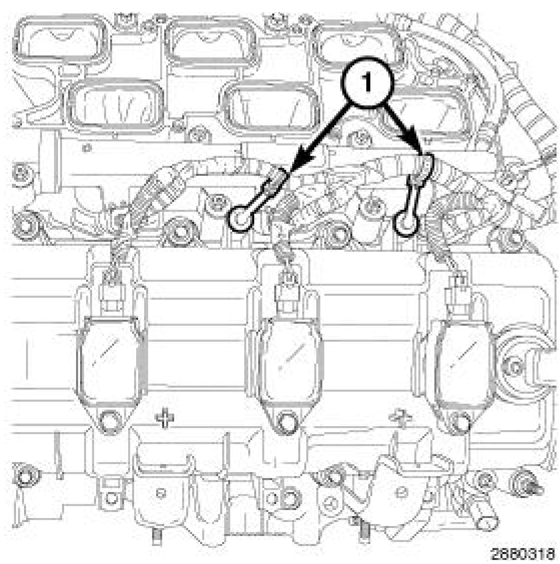


Fig. 260: Injection/Ignition Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

9. Engage two injection/ignition harness retainers (1) to the left cylinder head cover.

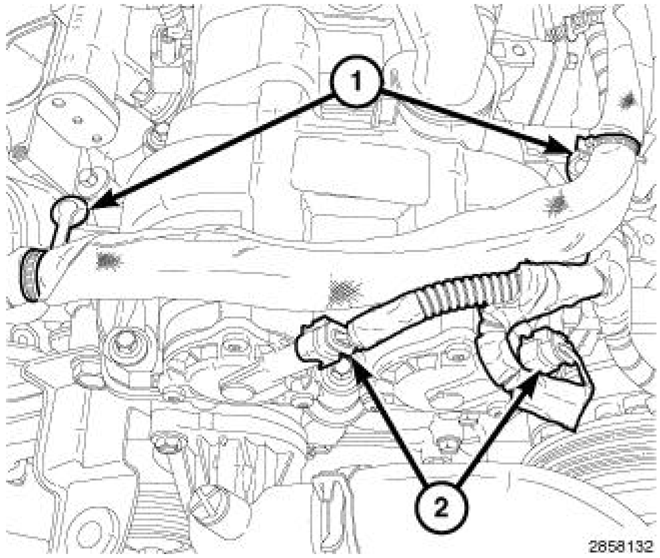


Fig. 261: Variable Valve Timing Solenoid Connectors & Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

10. Refer to the markings made at disassembly and install the variable valve timing solenoids in their original locations. Refer to **SOLENOID, VARIABLE VALVE TIMING, INSTALLATION** .

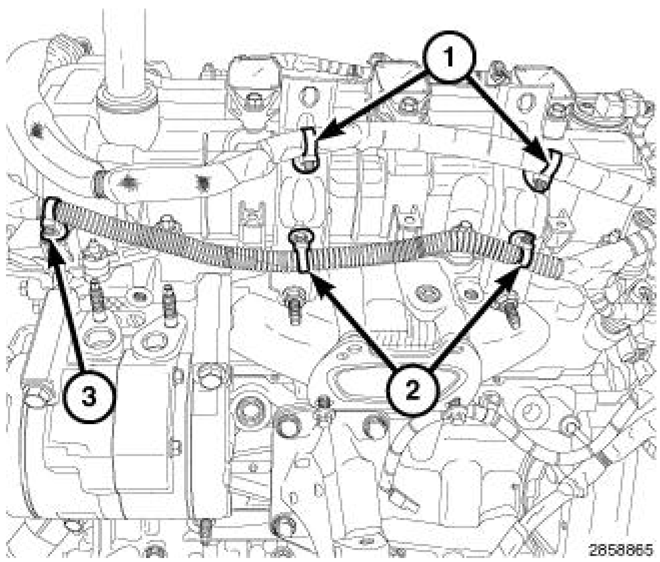


Fig. 262: Starter Wire Harness Retainers, Main Wire Harness Retainer & Manifold Support Bracket Retainers
Courtesy of CHRYSLER GROUP, LLC

11. Engage two starter wire harness retainers (1) to the left cylinder head cover.
12. Engage one main wire harness retainer (3) to the left cylinder head cover.

NOTE: **The RH Camshaft Position Sensor (CMP) sensor is shown in illustration, the LH CMP sensor is similar. If both RH and LH CMP sensors where removed, install them into their original locations.**

13. Install the CMP sensor. Refer to **SENSOR, CAMSHAFT POSITION, INSTALLATION** .

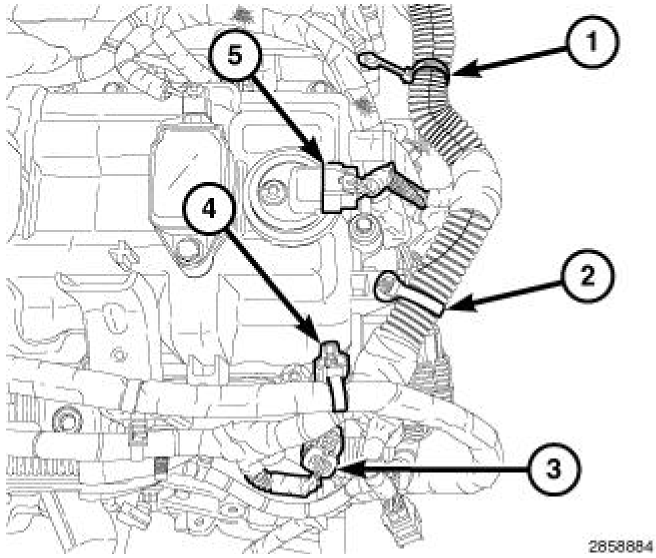


Fig. 263: ECT Sensor Connector, CMP Sensor & Main Wire Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

14. Engage one main wire harness retainer (2) to the cylinder head cover and one main wire harness retainer (4) to the cylinder head cover mounting stud.

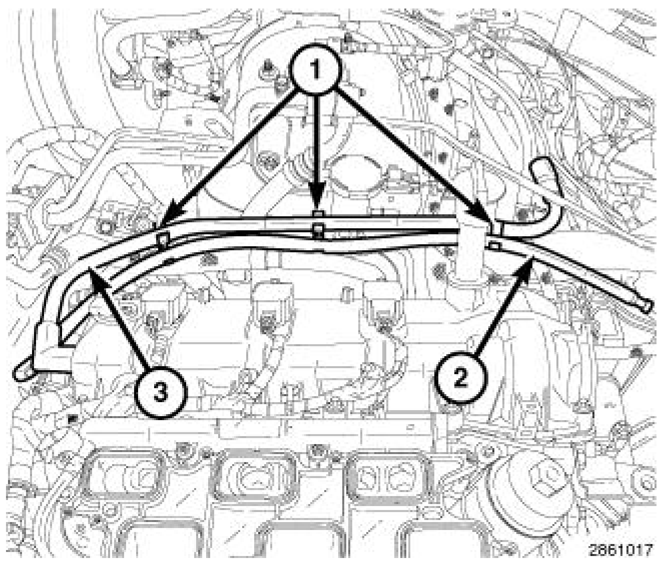


Fig. 264: Transmission Breather Hose, Make-Up Air Tube & Clips
Courtesy of CHRYSLER GROUP, LLC

15. Install the make-up air tube (3) to the left cylinder head cover and engage the clips (1) to the transmission breather hose (2).

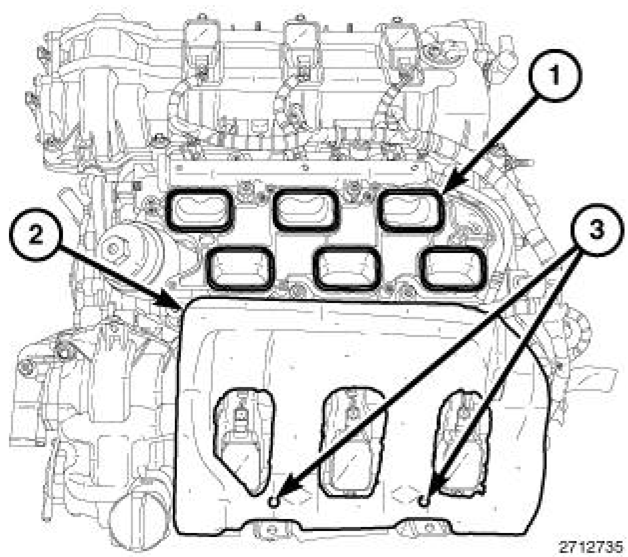


Fig. 265: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

16. Install the insulator (2) to the two alignment posts (3) on top of the LH cylinder head cover.
17. Install the upper intake manifold, support brackets and air inlet hose. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
18. Connect the negative battery cable.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

RIGHT

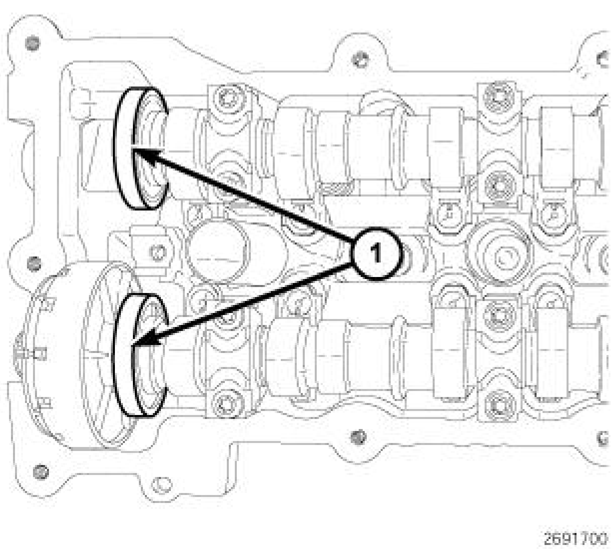


Fig. 266: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup**

tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

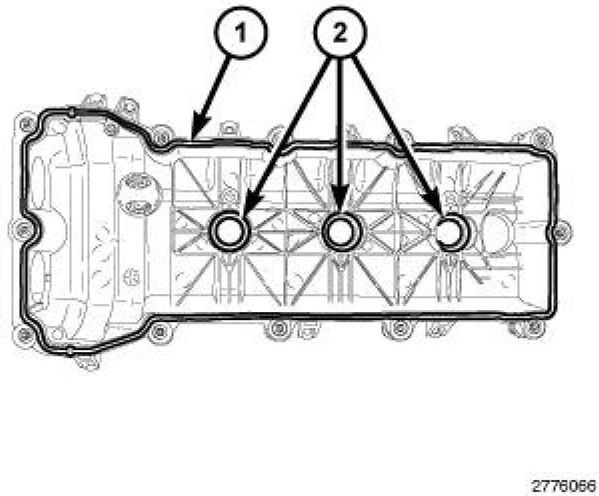


Fig. 267: Cylinder Head Cover Gasket & Spark Plug Tube Seals
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The LH cylinder head cover is shown in illustration, the RH cylinder head cover is similar.**

1. Install a **NEW** cylinder head cover gasket (1).

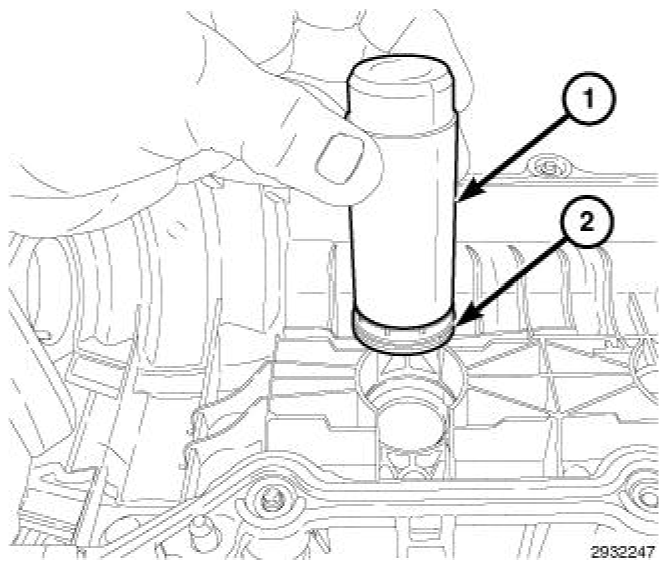


Fig. 268: Spark Plug Tube Seal & Installer
Courtesy of CHRYSLER GROUP, LLC

2. Install **NEW** spark plug tube seals (2) in the cylinder head cover:
   - Lubricate the spark plug tube seal inner and outer diameters with clean engine oil.
   - Place the spark plug tube seal (2) on the Cam Sensor/Spark Plug Tube Seal Installer (special tool

#10256, Installer, Cam Installer, Cam Sensor/ Spark Plug Tube Seal) (1).

- Push the seal into the cylinder head cover until the base of the seal is seated.
- Remove the tool.

NOTE: **The LH cylinder head cover T-joint is shown in illustration, the RH cylinder head cover T-joint is similar.**

3. Clean the timing engine timing cover, cylinder head and cylinder head cover mating surfaces with isopropyl alcohol in preparation for sealant application.

CAUTION: **Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than MoparÃ® Threebond Engine RTV Sealant may result in engine fluid leakage.**

CAUTION: **Following the application of MoparÃ® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.**

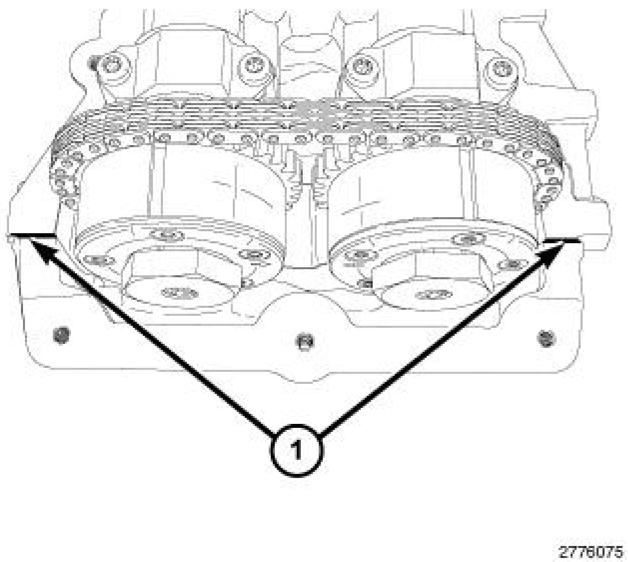


Fig. 269: Residual Sealant
Courtesy of CHRYSLER GROUP, LLC

4. Apply a 2 to 3 mm wide bead of MoparÃ® Threebond Engine RTV Sealant (1) to the two engine timing cover to cylinder head T-joints as shown in illustration.

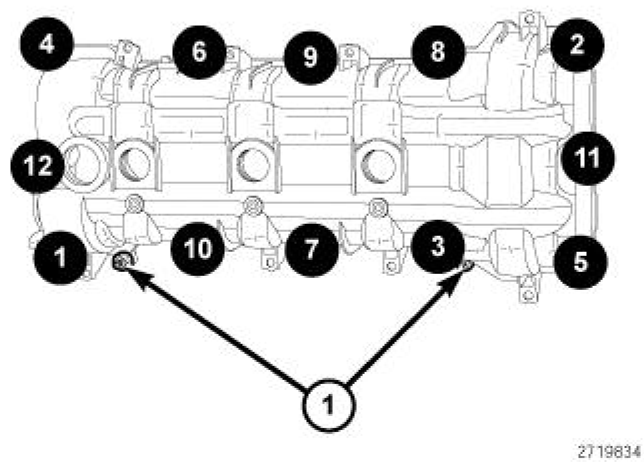


Fig. 270: Cylinder Head Cover Bolts & Double Ended Studs Tightening Sequence - Right
Courtesy of CHRYSLER GROUP, LLC

5. Align the locator pins (1) to the cylinder head and install the cylinder head cover.
6. Tighten the cylinder head cover bolts and double ended studs in the sequence shown in illustration to 12 N.m (ft. lbs.).

NOTE: **The LH ignition coils are shown in illustration, the RH ignition coils are similar.**

7. Install the ignition coils. Refer to **COIL, IGNITION, INSTALLATION** .

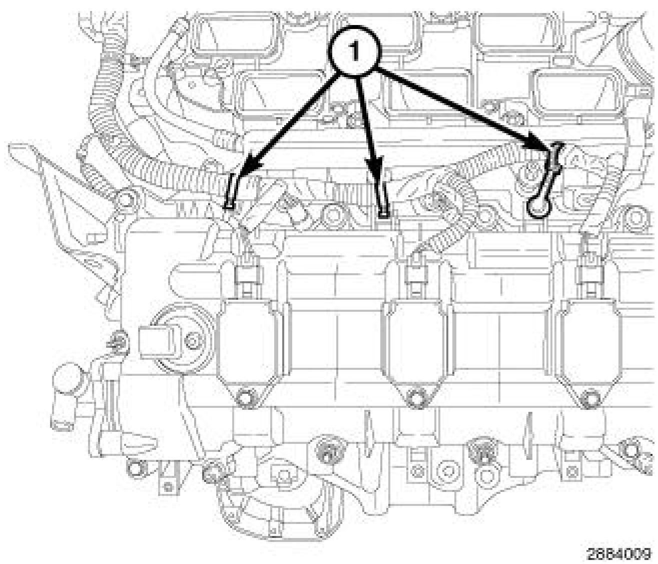


Fig. 271: Injection/Ignition Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

8. Connect three injection/ignition harness retainers (1) to the right cylinder head cover.

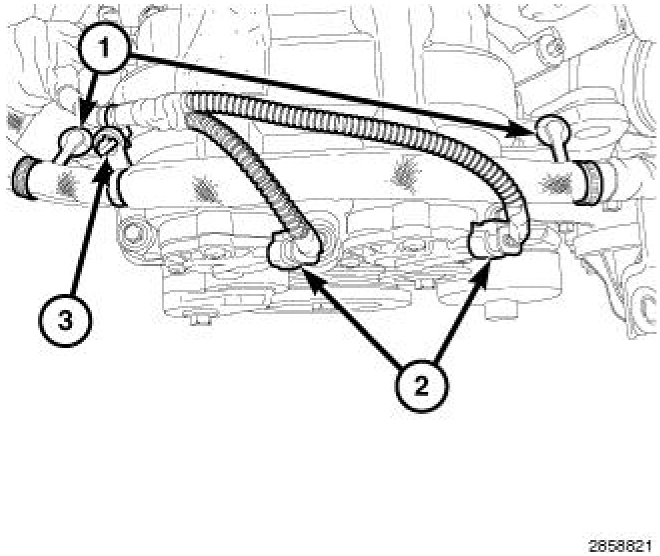


Fig. 272: Variable Valve Timing Solenoid Connectors & Harness Retainers
Courtesy of CHRYSLER GROUP, LLC

9. Refer to the markings made at disassembly and install the variable valve timing solenoids in their original locations. Refer to **SOLENOID, VARIABLE VALVE TIMING, INSTALLATION** .

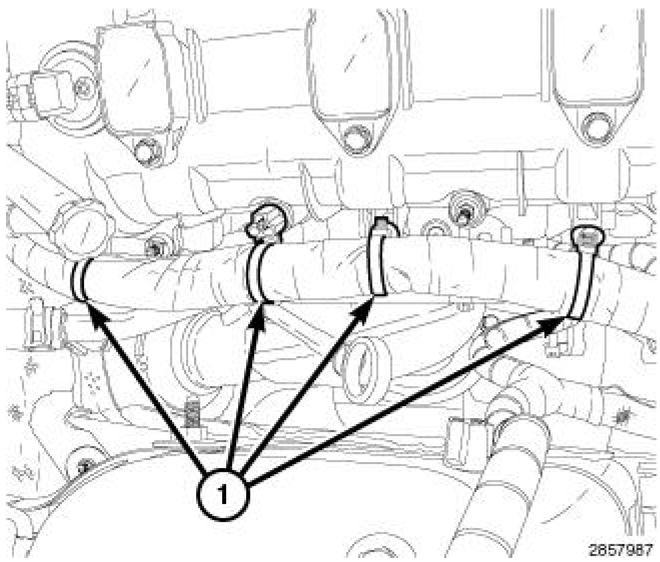


Fig. 273: Main Wire Harness Retainers At Right Cylinder Head Cover
Courtesy of CHRYSLER GROUP, LLC

10. Engage two starter wire harness retainers to the right cylinder head cover (1).
11. Engage the starter harness to main harness retainer (3).
12. Engage four main wire harness retainers (1) to the right cylinder head cover.

NOTE: **If both RH and LH Camshaft Position (CMP) sensors where removed, install them into their original locations.**

13. Install the CMP sensor. Refer to **SENSOR, CAMSHAFT POSITION, INSTALLATION** .

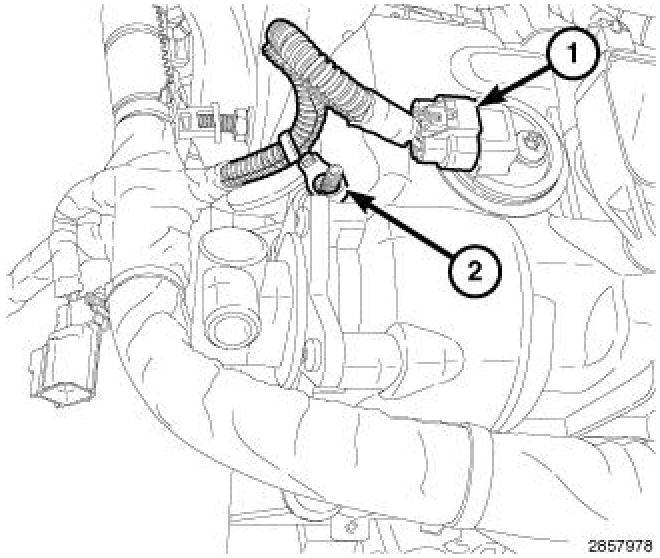


Fig. 274: Main Wire Harness Retainer & Connector
Courtesy of CHRYSLER GROUP, LLC

14. Engage the main wire harness retainer (2) to the right cylinder head cover mounting stud.
15. Install the PCV valve. Refer to **VALVE, POSITIVE CRANKCASE VENTILATION (PCV), INSTALLATION** .

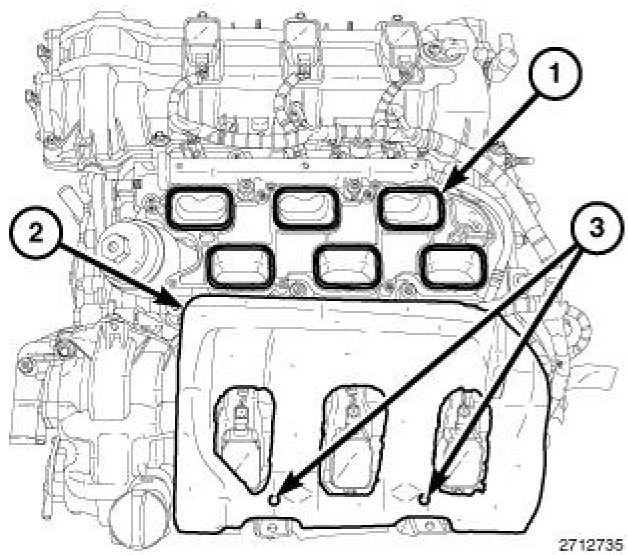


Fig. 275: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

16. If removed, install the insulator (2) to the two alignment posts (3) on top of the LH cylinder head cover.
17. Install the upper intake manifold, support brackets and air inlet hose. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
18. Connect the negative battery cable.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or**

crankshaft sensors or components.

LIFTER(S), HYDRAULIC

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HYDRAULIC LIFTER(S) NOISE DIAGNOSIS

Proper noise diagnosis is essential in locating the source of an NVH complaint. Locating a lash adjuster (tappet) type noise can sometimes be difficult. As a result, an initial misdiagnosis may occur.

Refer to the following LASH ADJUSTER (TAPPET) NOISE CHART for possible causes and correction of a lash adjuster (tappet) type noise.

LASH ADJUSTER (TAPPET) NOISE CHART

POSSIBLE CAUSES	CORRECTION
1. Engine oil level-too high or too low. This may allow aerated oil to enter the adjusters and cause them to be spongy.	1. Check and correct the engine oil level.
2. Insufficient running time after rebuilding a cylinder head.	2. Low speed running of up to 1 hour may be required to fully evacuate trapped air from the valve train system. During this time, turn engine off and let set for a few minutes before restarting. Repeat this several times after engine has reached normal operating temperature.
3. Air trapped in the lash adjuster (after 1 hour of run time).	3. See below:
	(a) Check the lash adjusters for sponginess while installed in the cylinder head. Press down on the rocker arm in a manner that could collapse the lash adjuster. Normal adjusters should feel very firm. Very spongy adjusters can be bottomed out easily.
	(b) If the lash adjuster(s) are still spongy, replace the lash adjuster(s). Refer to **LIFTER(S), HYDRAULIC, REMOVAL**.
4. Low oil pressure.	4. See below:
	(a) Check and correct the engine oil level.
	(b) Check the engine oil pressure. Refer to **DIAGNOSIS AND TESTING**.
	(c) Check for excessive main bearing clearance and correct specification. Refer to **STANDARD PROCEDURE**.
	(d) Check for a worn oil pump. Refer to **INSPECTION**.
	Check the camshaft journals and the bearing bores for abnormal wear patterns, scoring, grooving, fatigue, pitting or a foreign material. Refer to **CAMSHAFT, ENGINE, REMOVAL**.

POSSIBLE CAUSES	CORRECTION
5. A plugged oil restrictor in the oil passages to the cylinder head(s).	5. Check the cylinder head oil passages for blockage. Clean or replace as necessary.
6. Worn valve guide(s).	6. Measure the valve stem-to-guide clearance. Refer to **VALVES, INTAKE AND EXHAUST, INSPECTION**.
7. Rocker arm loose, adjuster stuck or at maximum extension and still leaves lash in the system.	7. See below:
-	(a) Check the camshaft journal and lobe for abnormal wear patterns, scoring, grooving, fatigue, pitting or a foreign material. Refer to **CAMSHAFT, ENGINE, REMOVAL**.
-	(b) Check the rocker arm(s) for proper alignment to the camshaft lobe(s) and valve stem(s). Refer to **ROCKER ARM, VALVE, REMOVAL**.
-	(c) Check the lash adjuster(s) for proper operation and replace as necessary. Refer to **LIFTER(S), HYDRAULIC, REMOVAL**.
8. Air ingested into the engine oil due to a broken or cracked oil pump pickup tube.	8. Check the pickup tube and replace as necessary. Refer to **PICK-UP, OIL PUMP, REMOVAL**.
9. Faulty lash adjuster.	9. Replace the lash adjuster(s). Refer to **LIFTER(S), HYDRAULIC, REMOVAL**.

REMOVAL

REMOVAL

NOTE: **The LH cylinder head hydraulic lifters are shown in illustration, the RH cylinder head hydraulic lifters are similar.**

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove the camshaft(s). Refer to **CAMSHAFT, ENGINE, REMOVAL**.

   NOTE: **If the rocker arms are to be reused, identify their positions so that they can be reassembled into their original locations.**

3. Remove the rocker arm(s). Refer to **ROCKER ARM, VALVE, REMOVAL**.

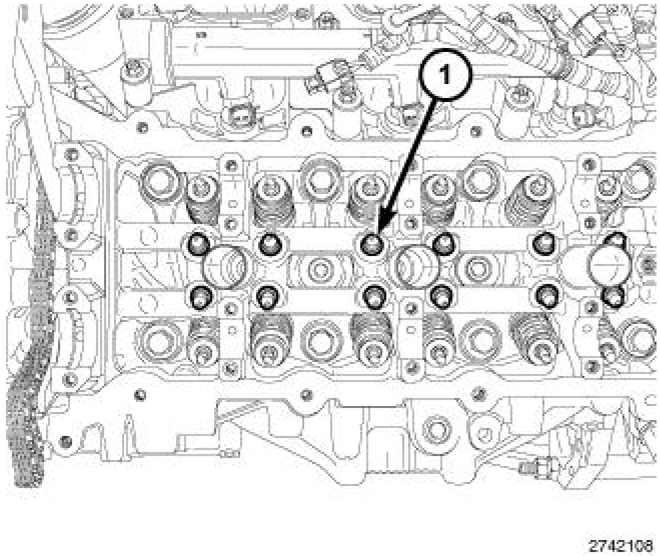


Fig. 276: Hydraulic Lifters
Courtesy of CHRYSLER GROUP, LLC

NOTE: If the hydraulic lifters are to be reused, identify their positions so that they can be reassembled into their original locations.

4. Remove the hydraulic lifter(s) (1).

INSTALLATION

INSTALLATION

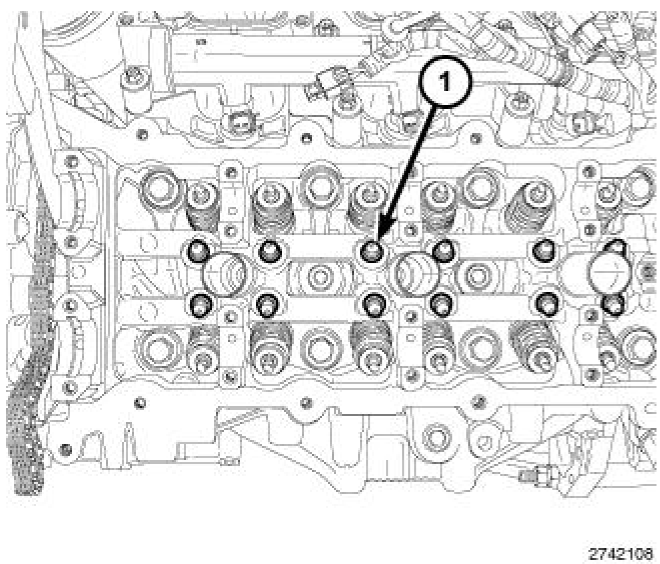


Fig. 277: Hydraulic Lifters
Courtesy of CHRYSLER GROUP, LLC

NOTE: The LH cylinder head hydraulic lifters are shown in illustration, the RH cylinder head hydraulic lifters are similar. If the hydraulic lifters are being reused, reassemble them into their original locations.

1. Verify that the hydraulic lifters are at least partially full of oil. There should be little or no plunger travel

when the hydraulic lifter is depressed.

2. Install the hydraulic lifter(s) (1).

NOTE: **If the rocker arms are being reused, reassemble them into their original locations.**

3. Install the rocker arm(s). Refer to **ROCKER ARM, VALVE, INSTALLATION**.
4. Install the camshaft(s), phasers, cylinder head cover(s) and upper intake manifold. Refer to **CAMSHAFT, ENGINE, INSTALLATION**.
5. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

ROCKER ARM, VALVE

DESCRIPTION

DESCRIPTION

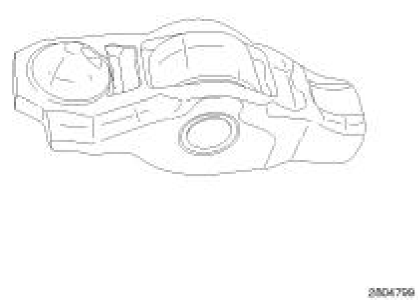


Fig. 278: Rocker Arm
Courtesy of CHRYSLER GROUP, LLC

The rocker arms are steel stampings with an integral roller bearing. The rocker arms incorporate a 0.5 mm oil hole in the lash adjuster socket for roller and camshaft lubrication.

REMOVAL

REMOVAL

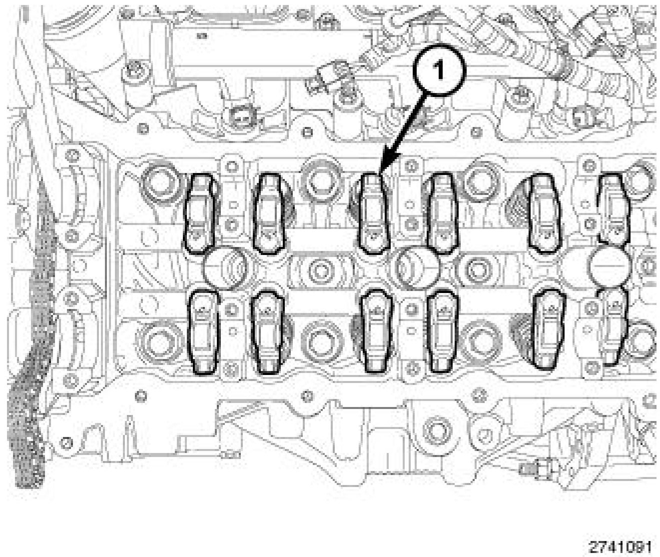


Fig. 279: Locating Rocker Arms
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The LH cylinder head rocker arms are shown in illustration, the RH cylinder head rocker arms are similar.**

1. Remove the camshaft(s). Refer to **CAMSHAFT, ENGINE, REMOVAL**.

   NOTE: **If the rocker arms are to be reused, identify their positions so that they can be reassembled into their original locations.**

2. Remove the rocker arm(s) (1).

INSPECTION

INSPECTION

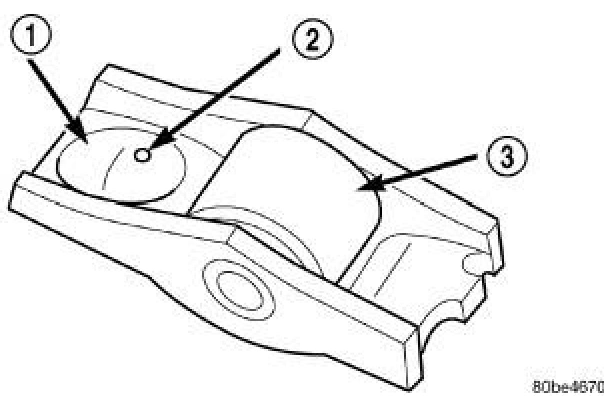


Fig. 280: Rocker Arm
Courtesy of CHRYSLER GROUP, LLC

Inspect the cam follower assembly for wear or damage. Replace as necessary.

INSTALLATION

INSTALLATION

CAUTION: **Proper inspection of the rocker arms is required to ensure proper installation. Inspection from the top and also side view is critical to verify the proper seated position of each and every rocker arm. Failure to install the rocker arms correctly may cause severe engine damage.**

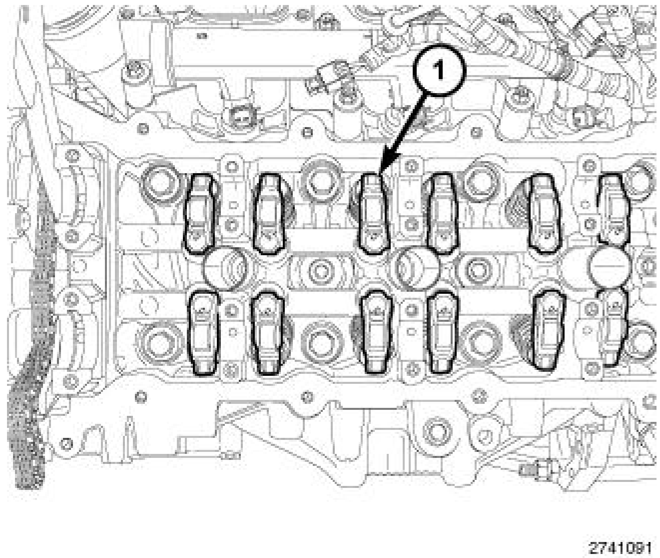


Fig. 281: Locating Rocker Arms
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The LH cylinder head rocker arms are shown in illustration, the RH cylinder head rocker arms are similar. If the rocker arms are being reused, reassemble them into their original locations.**

1. Lubricate the rocker arms with clean engine oil before installation.

   NOTE: **When placing the rocker arms. The valve stem should fit securely into the rocker arm guides.**

2. Position the rocker arm(s) (1) onto the lifter(s) and valve stem(s).

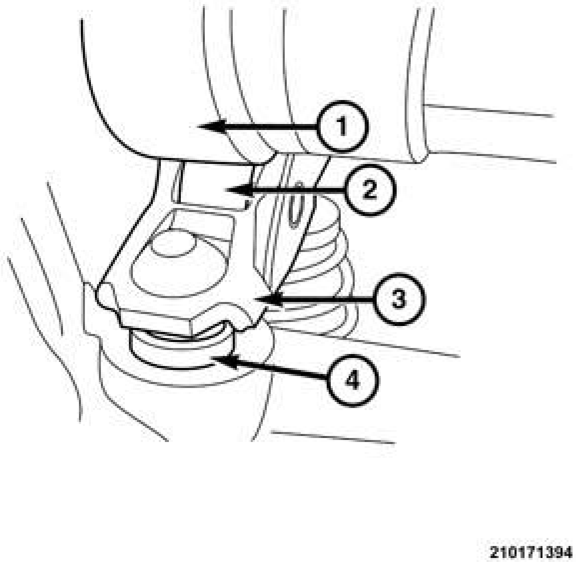
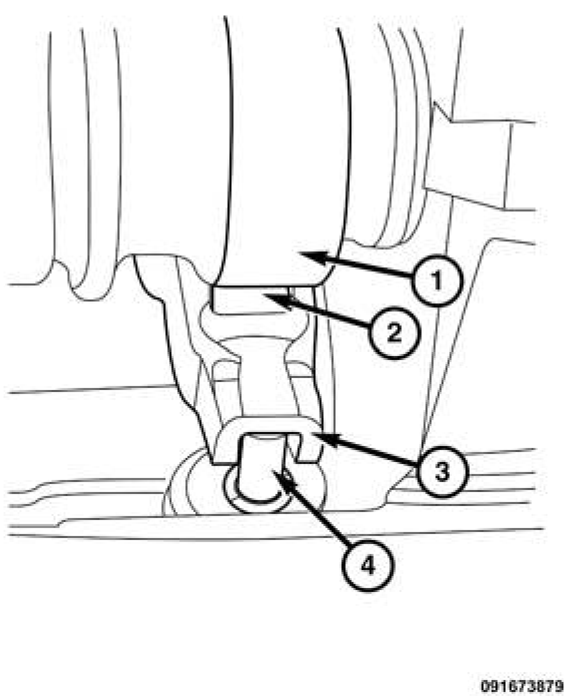


Fig. 282: Rocker Arm & Lifter
Courtesy of CHRYSLER GROUP, LLC

3. Install the camshaft(s) and the bearing caps. Tighten the bolts finger tight.

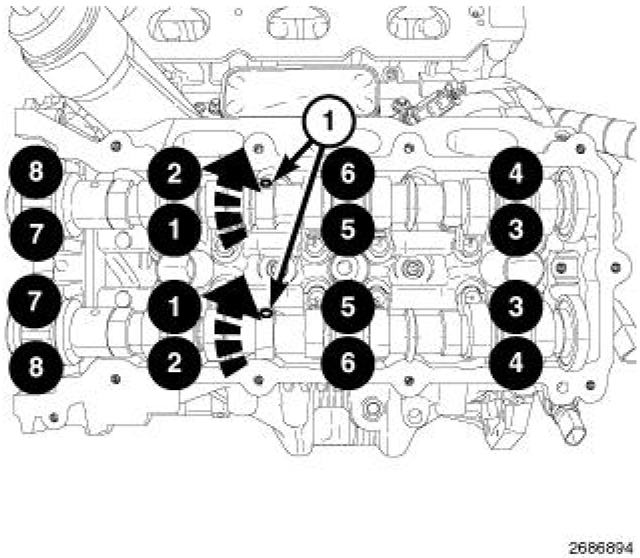
NOTE: **If any of the rocker arms are not installed properly. Loosen the bearing caps and reposition the rocker arms.**

4. Verify that the rocker arm (3) is positioned over the lifter (4).
5. Verify that the rocker arm roller (2) is seated to the camshaft lobe (1).



[Fig. 283: Camshaft Lobe, Rocker Arm Roller, Rocker Arm Guide & Valve Stem]
Courtesy of CHRYSLER GROUP, LLC

6. Use a mirror to verify the valve stem (4) is centered between the rocker arm guides (3).
7. Verify the camshaft lobe (1) is centered over the rocker arm roller (2).



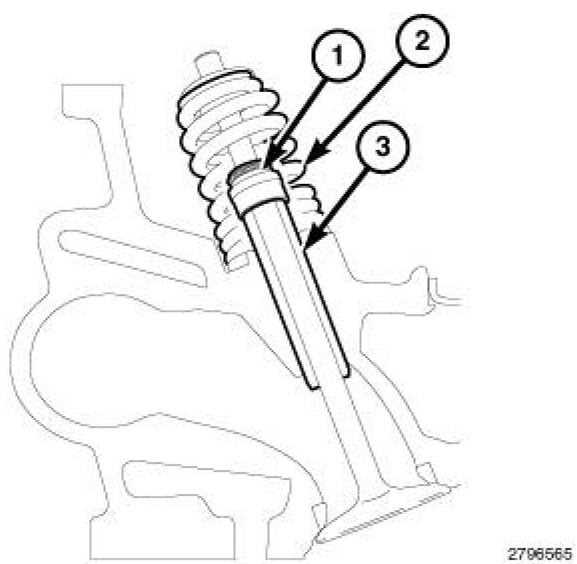
[Fig. 284: Bearing Cap Retaining Bolts Tightening Sequence - Left]
Courtesy of CHRYSLER GROUP, LLC

8. Using the tightening sequence shown in illustration, tighten the bearing cap bolts to 10 N.m (89 in. lbs.).

SEAL(S), VALVE GUIDE

DESCRIPTION

DESCRIPTION



[Fig. 285: Valve Stem Oil Seal, Valve Spring & Valve Guide]
Courtesy of CHRYSLER GROUP, LLC

The valve stem oil seals (1) are made of elastomer over-molded steel in a non-integrated type guide mounted configuration. The seal is not held in place by the valve spring (2). The valve stem seals are not reusable if removed from the valve guides (3), they must be replaced. Always coat the valve seals with clean engine oil before installing the valves.

REMOVAL

REMOVAL

NOTE: If the springs are to be reused, identify their positions so that they can be reassembled into their original locations.

1. Remove the valve spring(s) (2). Refer to **SPRING(S), VALVE, REMOVAL**.

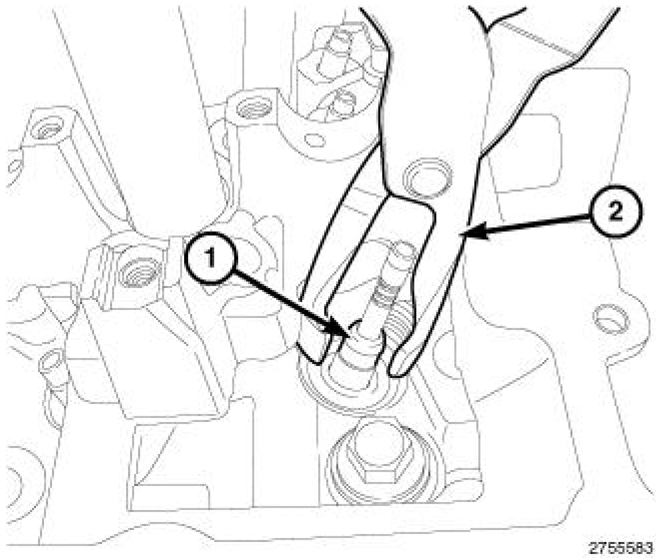


Fig. 286: Valve Guide Seal & Valve Seal Tool
Courtesy of CHRYSLER GROUP, LLC

NOTE: Number 5 cylinder exhaust valve guide seal shown in illustration, all other valve guide seals similar.

2. Remove the valve guide seal (1) using a valve seal tool (2). Discard the removed seal.

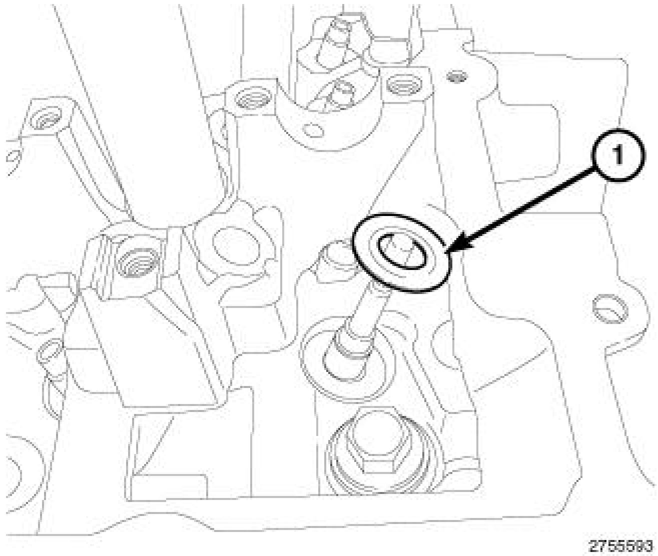


Fig. 287: Valve Spring Seat
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Number 5 cylinder exhaust valve spring seat shown in illustration, all other valve spring seats similar.**

3. If required, remove the valve spring seat (1).
4. If required, remove the valve(s). Refer to VALVES, INTAKE AND EXHAUST, REMOVAL.

INSTALLATION

INSTALLATION

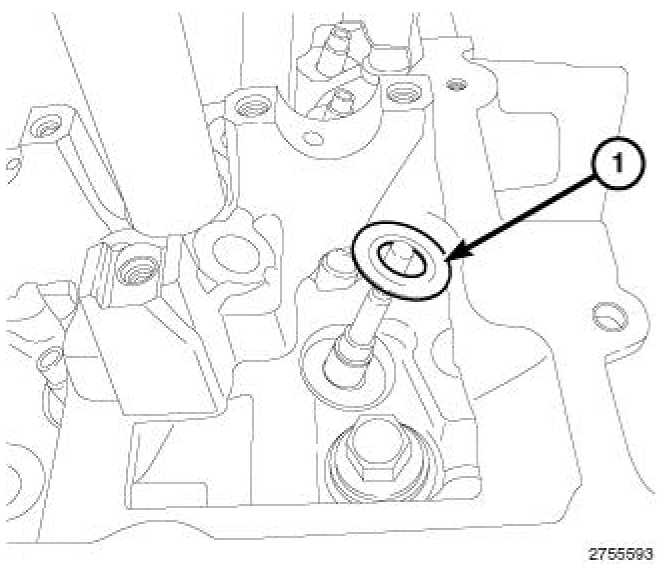


Fig. 288: Valve Spring Seat
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Reassemble the valves into their original locations. If the valves or valve seats have been refinished, verify that the valve stem tip height is within specification. Refer to ENGINE SPECIFICATIONS. Number 5 cylinder exhaust**

valve shown in illustration, all other valves similar.

1. If removed, install the valve(s). Refer to **VALVES, INTAKE AND EXHAUST, INSTALLATION**.
2. If removed, install the spring seat (1) over the valve guide.

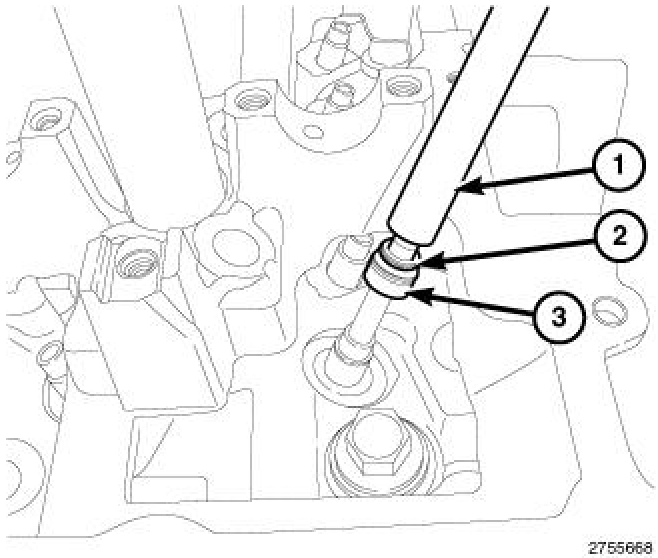


Fig. 289: Installing Valve Guide Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Ensure that the garter spring (2) is intact around the top of the valve guide seal (3). Number 5 cylinder exhaust valve guide seal shown in illustration, all other valves similar.**

3. Apply engine oil to the lip of the valve guide seal (3). Install the valve guide seal (3) over the valve stem. Using an appropriate driver (1), push the seal firmly and squarely over the valve guide. **Do Not Force** the seal against the top of guide.

NOTE: **If the valve springs are being reused, reassemble them into their original locations.**

4. Install the valve spring(s). Refer to **SPRING(S), VALVE, INSTALLATION**.

SPRING(S), VALVE

DESCRIPTION

DESCRIPTION

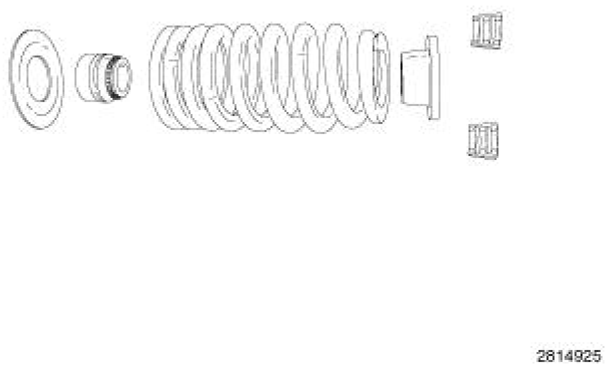


Fig. 290: Valve Spring Components
Courtesy of CHRYSLER GROUP, LLC

The valve springs are a beehive design and made from high strength chrome silicon steel. The springs are common for intake and exhaust applications. Valve guide seals are rubber overmolded on a steel support cylinder with a garter spring at the seal lip. The seals are not integrated with the valve spring seat. The valve spring seat is a flat steel washer. The steel valve spring retainers are designed for use with beehive springs and the valve spring retainer locks are a three bead Butt type design.

REMOVAL

IN VEHICLE

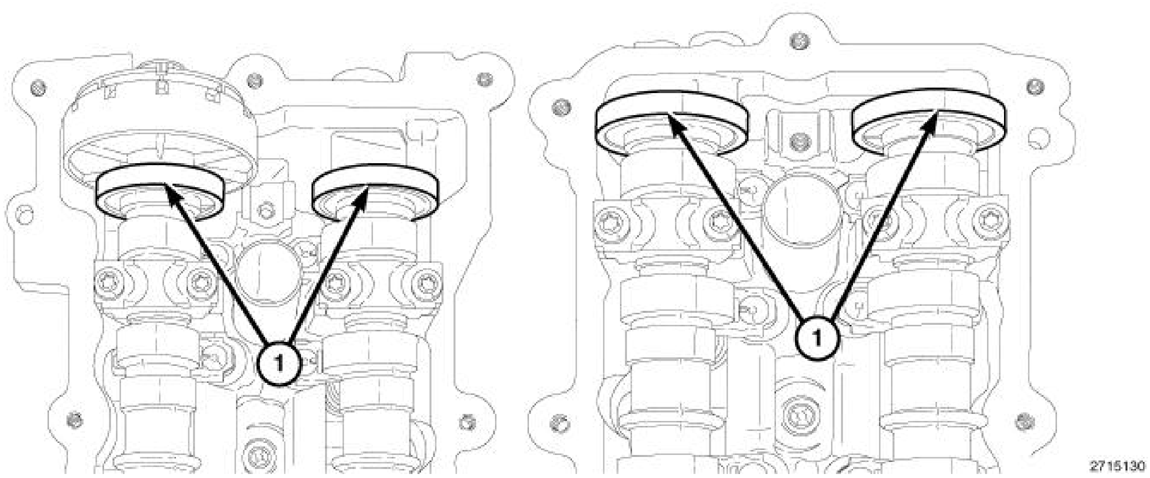


Fig. 291: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

1. Disconnect and isolate the negative battery cable.

2. If removing the LH exhaust valve springs, recover the refrigerant from the refrigerant system and remove the A/C suction and liquid line assembly. Refer to **LINE, A/C SUCTION, REMOVAL** .

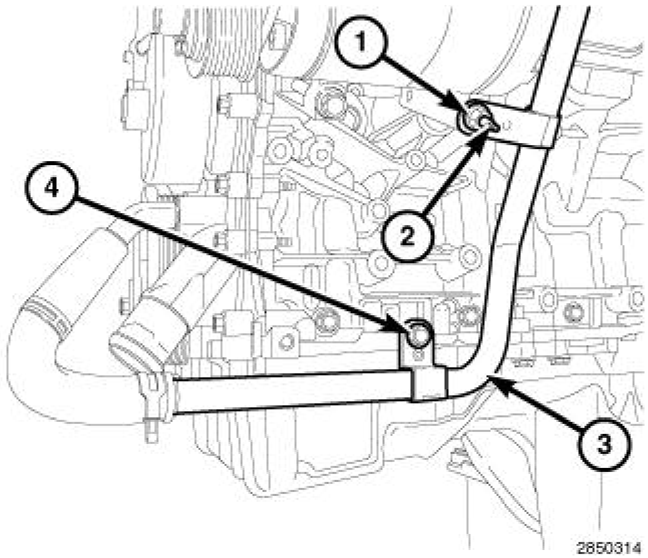


Fig. 292: Heater Core Return Tube, Nut & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Power steering pump not shown in illustration.**

3. If removing the LH exhaust valve springs, remove the nut (1) and bolt (4) from the support brackets of the heater core return tube (3) and reposition the tube.
4. Remove both cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.

NOTE: **Only remove the camshafts from one head at a time. The opposite head must remain assembled in order to lock the crankshaft against rotation.**

5. Remove the camshaft(s). Refer to **CAMSHAFT, ENGINE, REMOVAL**.

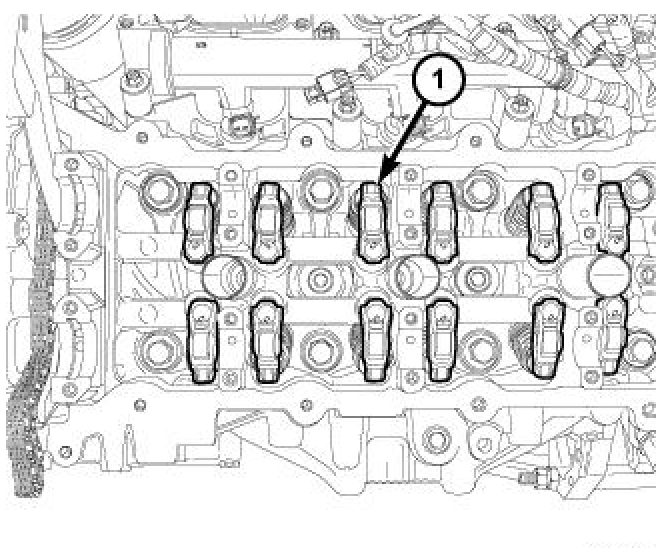


Fig. 293: Locating Rocker Arms
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The LH cylinder head rocker arms are shown in illustration, the RH cylinder head rocker arms are similar.**

NOTE: **If the rocker arms are to be reused, identify their positions so that they can be reassembled into their original locations.**

6. Remove the rocker arm(s) (1).

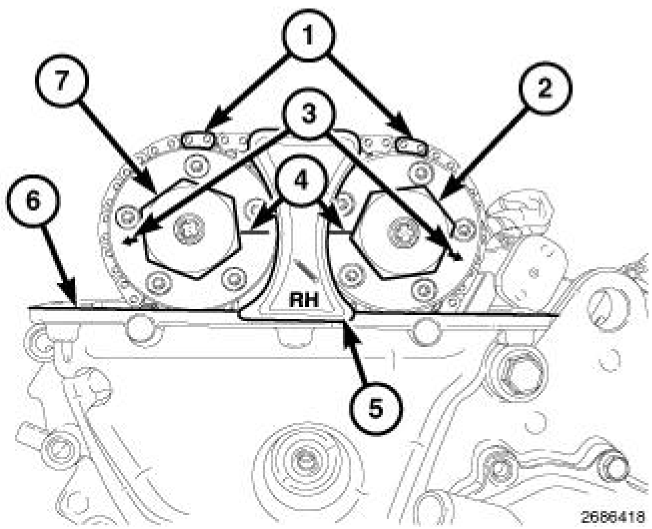


Fig. 294: Phaser Timing Marks, Oil Control Valves & RH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

NOTE: **RH camshaft phaser lock shown in illustration, LH camshaft phaser lock similar.**

CAUTION: **Air pressure applied to the cylinder holds the valves in place. This air pressure also has a tendency to force the piston down and rotate the crankshaft. Do not allow the crankshaft to rotate. Crankshaft rotation may damage the timing chain or front timing cover and affect camshaft timing.**

7. If removing the LH camshafts, install the RH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) -1 (5) to lock the crankshaft against rotation. If removing the RH camshafts, install the LH Camshaft Phaser Lock (special tool #10202, Locks, Camshaft/Phaser) -2 to lock the crankshaft against rotation.
8. Remove the spark plug. Refer to **SPARK PLUG, REMOVAL** .

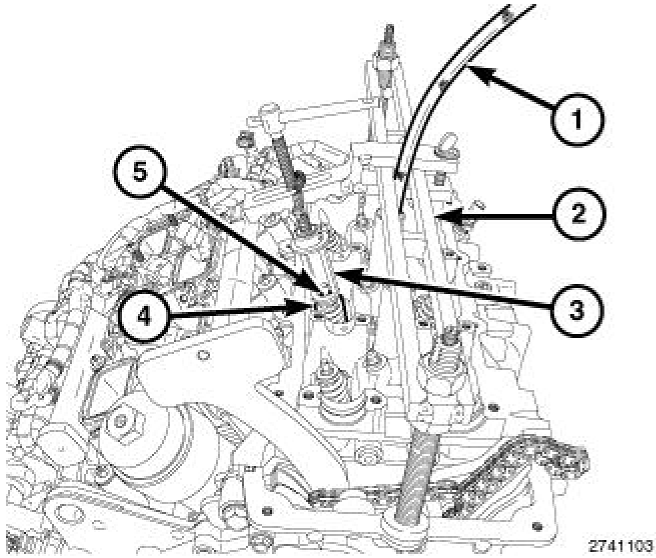


Fig. 295: Shop Air Supply & Valve Spring Compressor
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Number 4 cylinder intake valve spring compression shown in illustration, all other valves similar.**

9. Install Valve Spring Compressor (special tool #MD998772A, Compressor, Valve Spring) (2) onto the cylinder head.
10. Install a spark plug adapter attached to a regulated shop air supply (1). Pressurize the cylinder being serviced to 620.5 - 689 kPa (90 - 100 psi) to hold the valves in place.

CAUTION: **Air pressure must be maintained as long as the valve springs are removed to prevent the valves from dropping into the cylinders.**

11. Using Valve Spring Compressor Adapter (special tool #10224, Adapter, Valve Spring) (3), compress valve spring (4) and remove valve retaining locks (5).

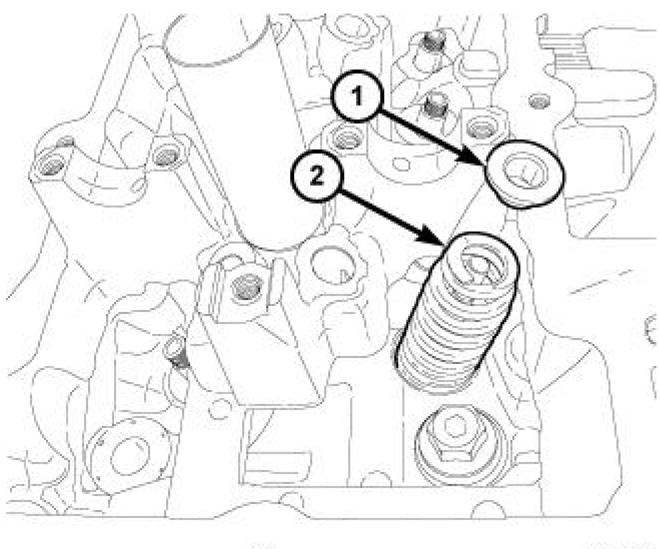


Fig. 296: Valve Spring & Valve Spring Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the springs are to be reused, identify their positions so that they can be reassembled into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all other valve springs similar.**

12. Release the valve spring compression and remove the valve spring retainer (1) and valve spring (2).
13. If required, remove the valve guide seal and spring seat. Refer to **SEAL(S), VALVE GUIDE, REMOVAL**.

OFF VEHICLE

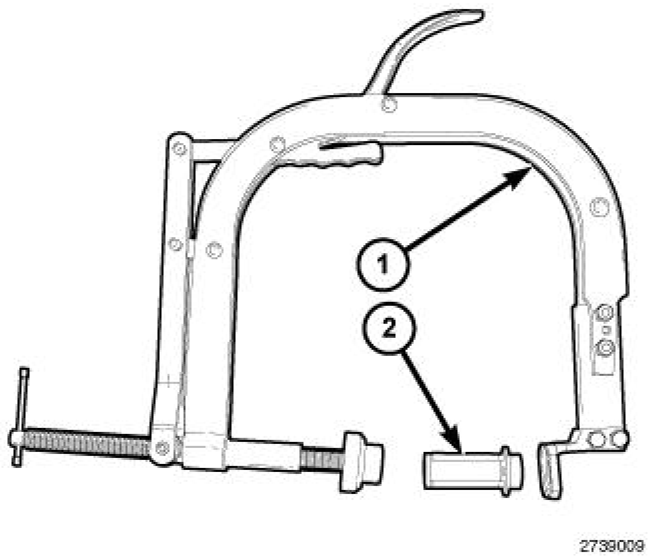


Fig. 297: Valve Spring Compressor Components
Courtesy of CHRYSLER GROUP, LLC

1. Remove the cylinder head(s). Refer to **CYLINDER HEAD, REMOVAL**.
2. Position the Valve Spring Compressor Adapter (special tool #10224, Adapter, Valve Spring) (2) in the Valve Spring Compressor (special tool #C-3422-D, Compressor, Valve Spring) (1).

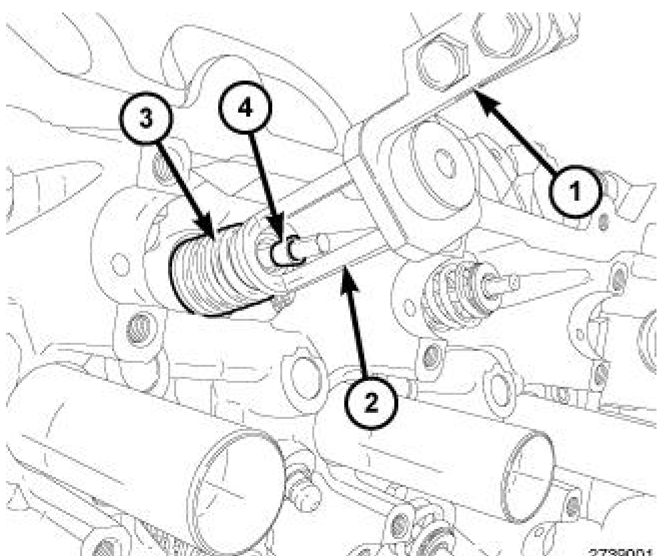


Fig. 298: Compressing Valve Spring & Locating Valve Retaining Locks
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Number 3 cylinder intake valve spring compression shown in illustration, all other valves similar.**

3. Compress the valve spring (3) and remove the valve retaining locks (4).

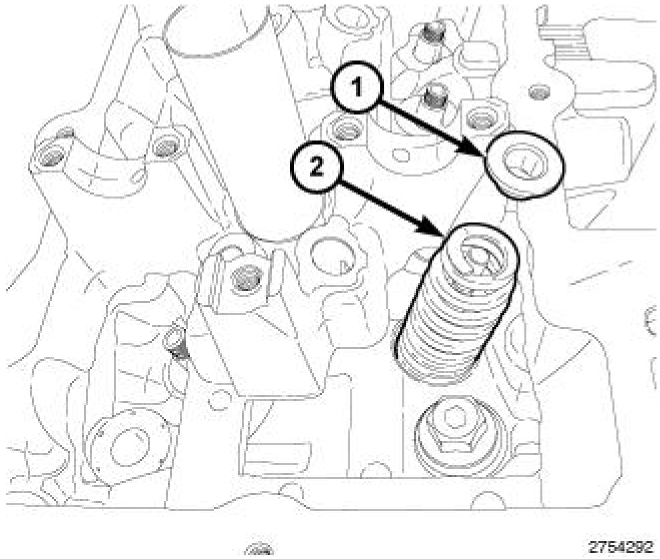


Fig. 299: Valve Spring & Valve Spring Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the springs are to be reused, identify their positions so that they can be reassembled into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all other valves similar.**

4. Release the valve spring compressor and remove the valve spring retainer (1) and valve spring (2).

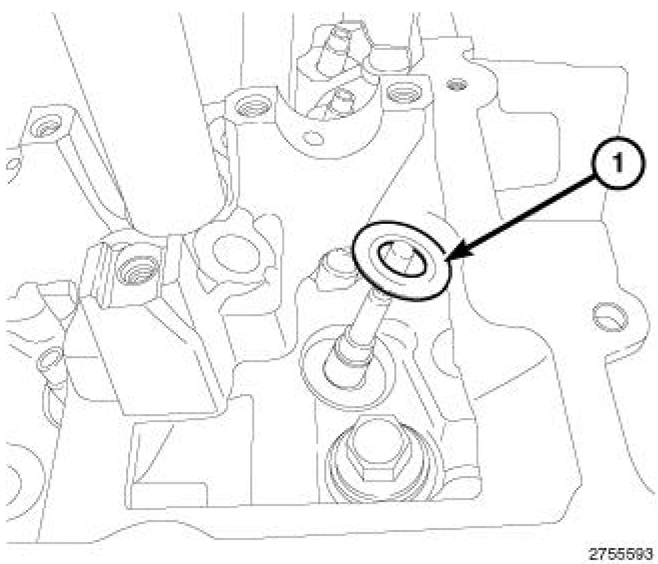
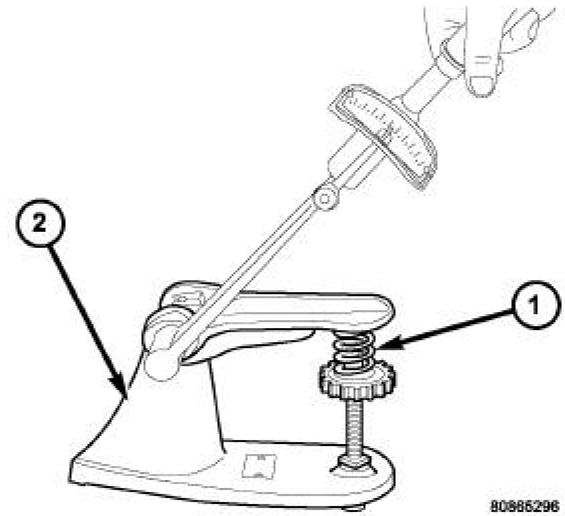


Fig. 300: Valve Spring Seat
Courtesy of CHRYSLER GROUP, LLC

5. Remove the spring seat (1).

INSPECTION

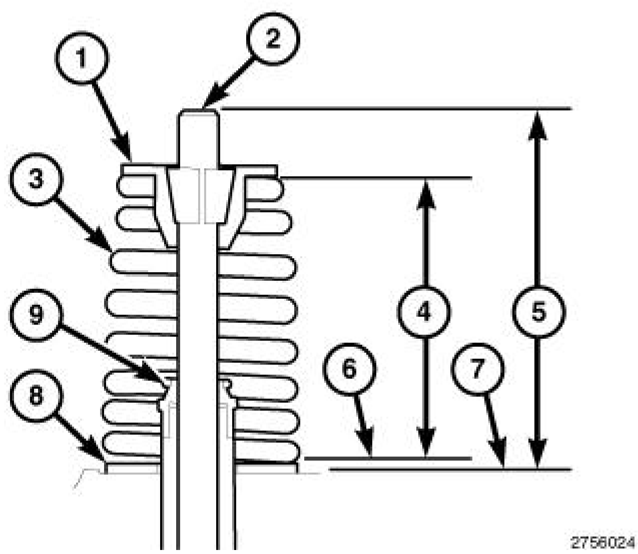
INSPECTION



[Fig. 301: Testing Valve Spring](#)
Courtesy of CHRYSLER GROUP, LLC

When valves have been removed for inspection, reconditioning or replacement, valve springs should be checked against specifications for free-length, spring force and spring installed height. Refer to **ENGINE SPECIFICATIONS**.

Spring force can be measured with a test fixture (2). Follow the tool manufactures instructions. Replace any springs that do not meet specifications.



[Fig. 302: Checking Valve Spring Installed Height](#)
Courtesy of CHRYSLER GROUP, LLC

Installed height of the valve spring must be checked with the valve assembled into the cylinder head. Refer to **SPRING(S), VALVE, INSTALLATION**.

If the valves or valve seats have been refinished and the installed valve spring height (4) is greater than 40.0 mm (1.575 in.). Install a second spring seat (8) in the head counter bore under the original valve spring seat to bring the spring height within specification. Make sure the measurement is taken from the top of spring seat (6) to the bottom surface of spring retainer (1).

INSTALLATION

IN VEHICLE

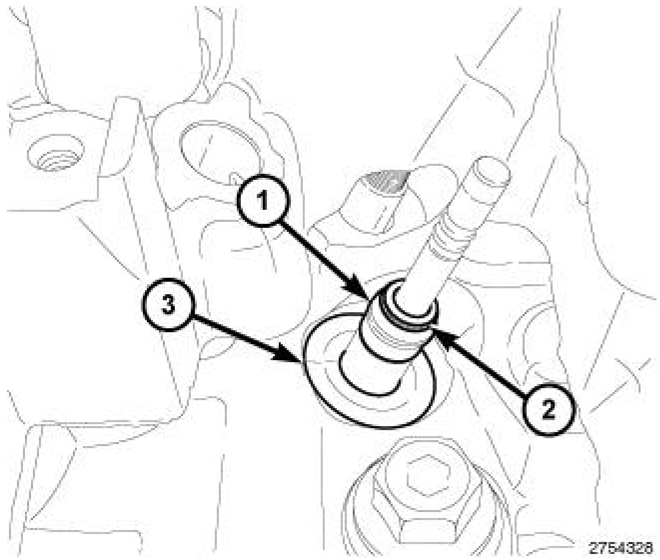


Fig. 303: Spring Seat, Valve Guide Seal & Garter Spring
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the spring seat (3) and valve guide seal (1) over the valve guide. Refer to **SEAL(S), VALVE GUIDE, INSTALLATION**.

NOTE: **Ensure that the garter spring (2) is intact around the top of the valve guide seal (1). Number 5 cylinder exhaust valve guide seal shown in illustration, all other valves similar.**

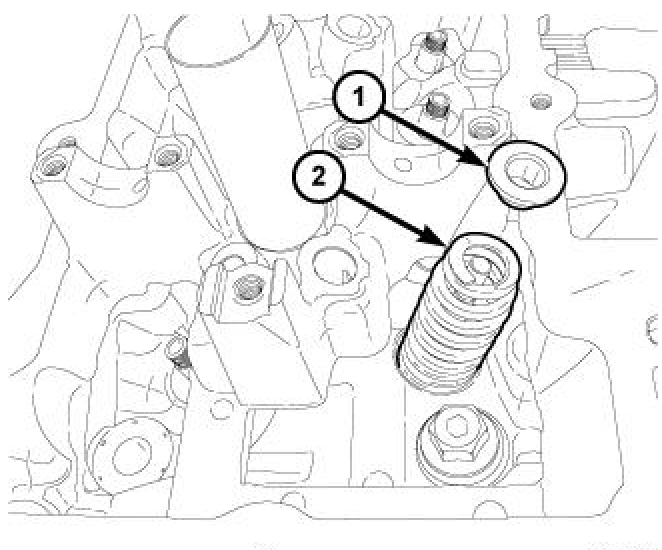


Fig. 304: Valve Spring & Valve Spring Retainer

Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the valve springs are being reused, reassemble them into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all other valves similar.**

2. Install the valve spring (2) and valve spring retainer (1).

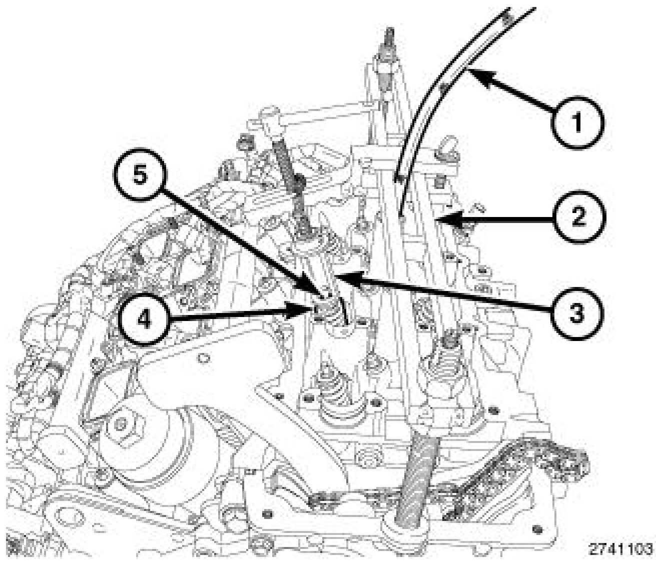


Fig. 305: Shop Air Supply & Valve Spring Compressor
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Number 4 cylinder intake valve spring compression shown in illustration, all other valves similar.**

3. Using Valve Spring Compressor Adapter (special tool #10224, Adapter, Valve Spring) (3) with Valve Spring Compressor (special tool #MD998772A, Compressor, Valve Spring) (2), compress the valve spring (4) **only enough** to install the valve retaining locks (5).
4. Relieve the air pressure and remove the spark plug adapter (1).
5. Install the spark plugs. Refer to **SPARK PLUG, INSTALLATION** .

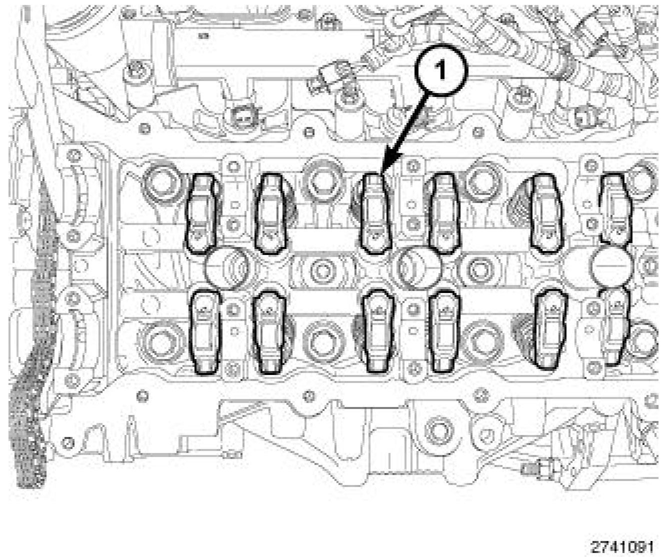


Fig. 306: Locating Rocker Arms
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The LH cylinder head rocker arms are shown in illustration, the RH cylinder head rocker arms are similar. If the rocker arms are being reused, reassemble them into their original locations.**

6. Install the rocker arm(s) (1).
7. Install the camshaft(s). Refer to **CAMSHAFT, ENGINE, INSTALLATION**.

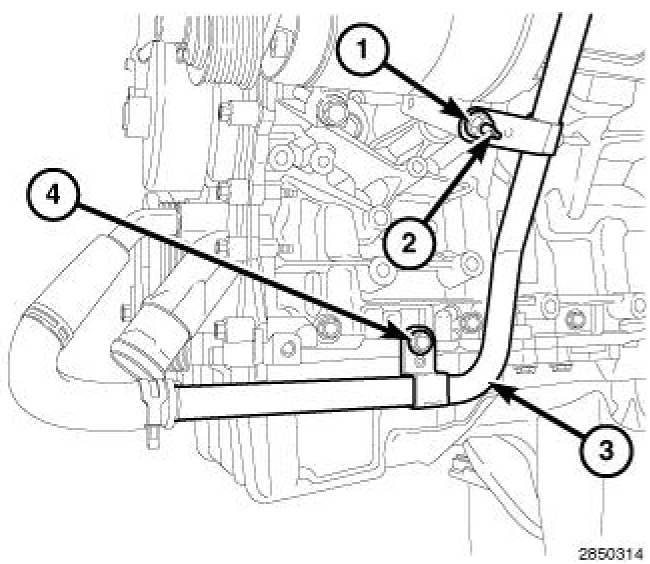


Fig. 307: Heater Core Return Tube, Nut & Bolt
Courtesy of CHRYSLER GROUP, LLC

8. If removed, install the nut (1) and bolt (4) to the support brackets of the heater core return tube (3). Tighten the fasteners to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
9. If removed, install the A/C suction and liquid line assembly. Refer to **LINE, A/C SUCTION, INSTALLATION** .
10. Connect the negative battery cable.

OFF VEHICLE

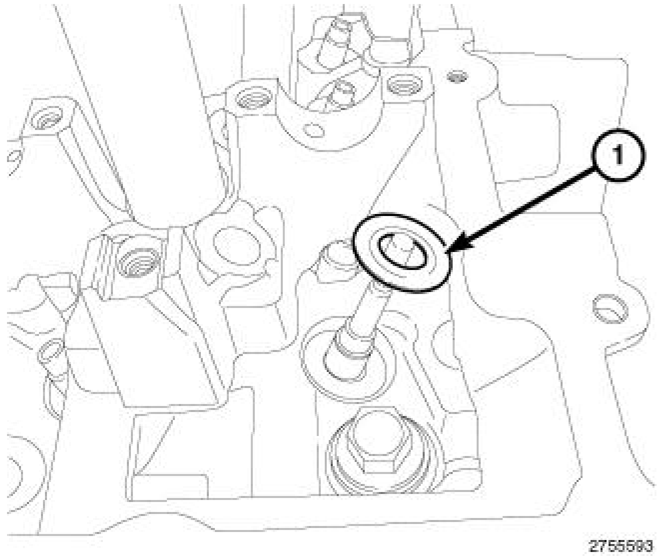


Fig. 308: Valve Spring Seat
Courtesy of CHRYSLER GROUP, LLC

1. Install the spring seat (1).

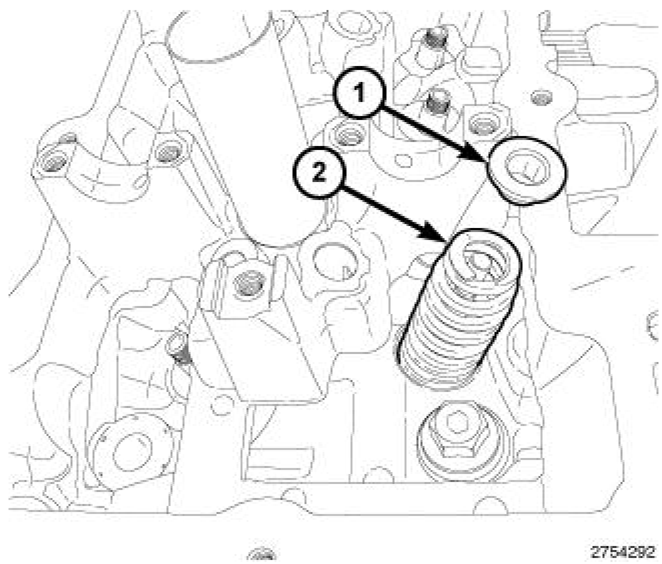


Fig. 309: Valve Spring & Valve Spring Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the valve springs are being reused, reassemble them into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all other valves similar.**

2. Install the valve spring (2) and valve spring retainer (1).

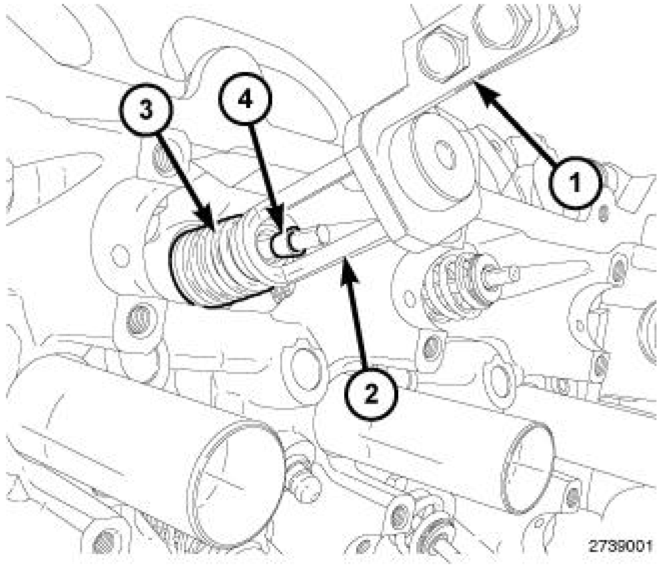


Fig. 310: Compressing Valve Spring & Locating Valve Retaining Locks
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Number 3 cylinder intake valve spring compression shown in illustration, all other valves similar.**

3. Compress valve springs (3) with the Valve Spring Compressor Adapter (special tool #10224, Adapter, Valve Spring) (2) mounted in the Valve Spring Compressor (special tool #C-3422-D, Compressor, Valve Spring) (1). Install the retaining locks (4) and release the valve spring compression.

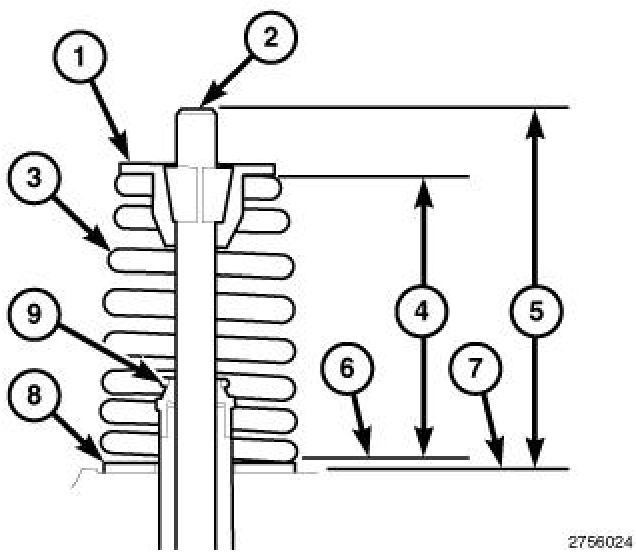


Fig. 311: Checking Valve Spring Installed Height
Courtesy of CHRYSLER GROUP, LLC

4. If the valves or valve seats have been refinished, check the installed height of the valve springs (4). If the installed valve spring height (4) is greater than 40.0 mm (1.575 in.), install an additional spring seat (8) in the head counterbore under the original valve spring seat (8) to bring the spring height back within specification. Make sure the measurement is taken from the top of spring seat (6) to the bottom surface of spring retainer (1).

5. Install the cylinder head(s). Refer to CYLINDER HEAD, INSTALLATION.

TUBE, SPARK PLUG

REMOVAL

REMOVAL

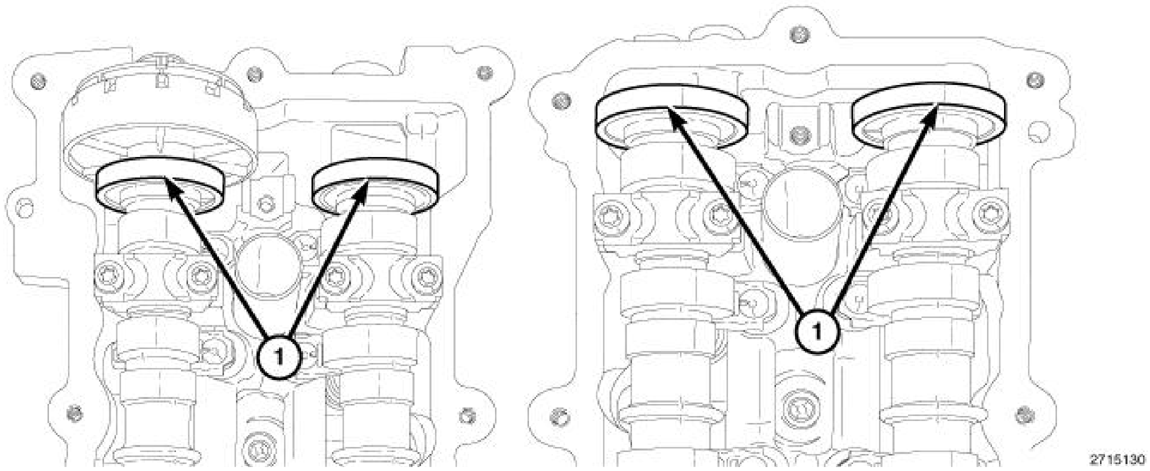


Fig. 312: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

1. Remove the ignition coils. Refer to COIL, IGNITION, REMOVAL .

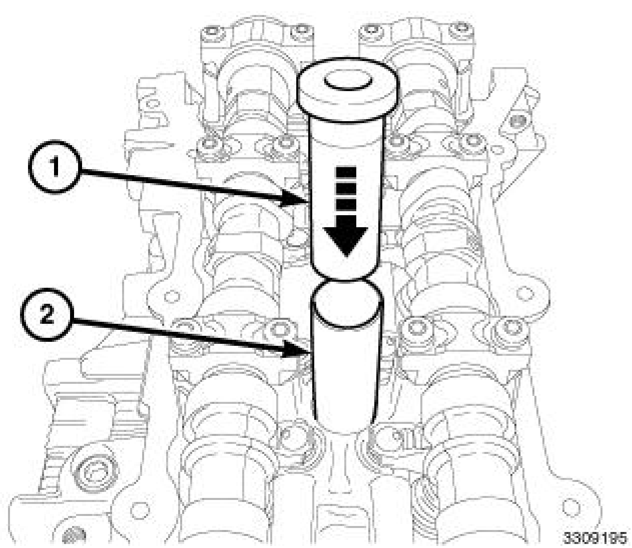


Fig. 313: Spark Plug Tube Installer & Spark Plug Tube
Courtesy of CHRYSLER GROUP, LLC

2. Using compressed air, blow out any dirt or contaminates from around the top of the spark plugs.

3. Remove the cylinder head cover(s). Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.
4. Install the top half of Spark Plug Tube Installer (special tool #10255, Installer, Spark Plug Tube) (1) into the spark plug tube to be removed (2).

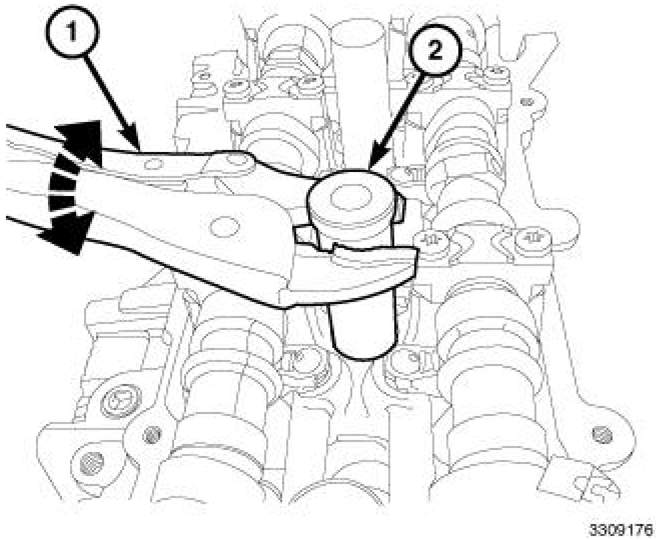


Fig. 314: Locking Pliers & Spark Plug Tube
Courtesy of CHRYSLER GROUP, LLC

5. Using suitable locking pliers (1), remove the spark plug tube (2) from the cylinder head and discard the tube.
6. Clean the area around the spark plug tube mounting with MoparÂ® Parts Cleaner or equivalent.

INSTALLATION

INSTALLATION

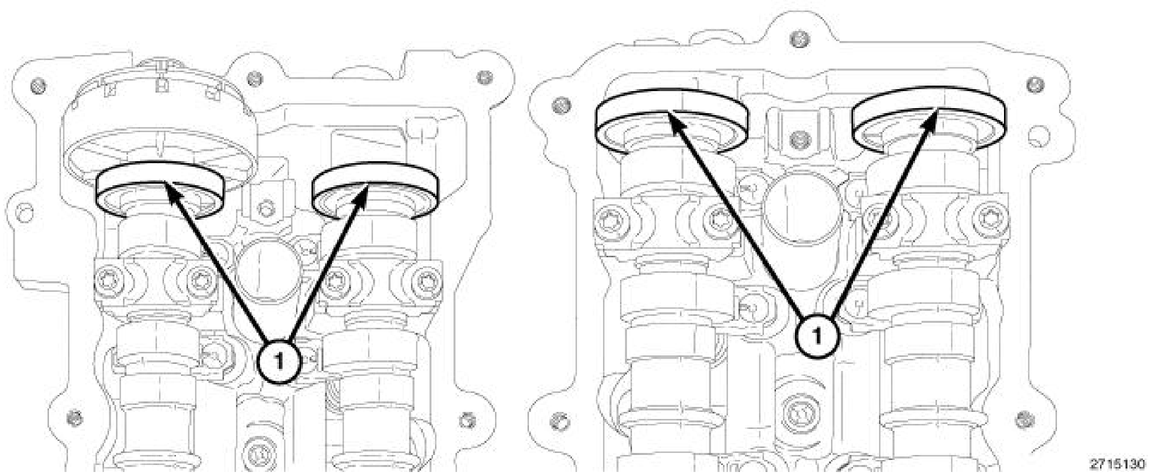


Fig. 315: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position

sensor.

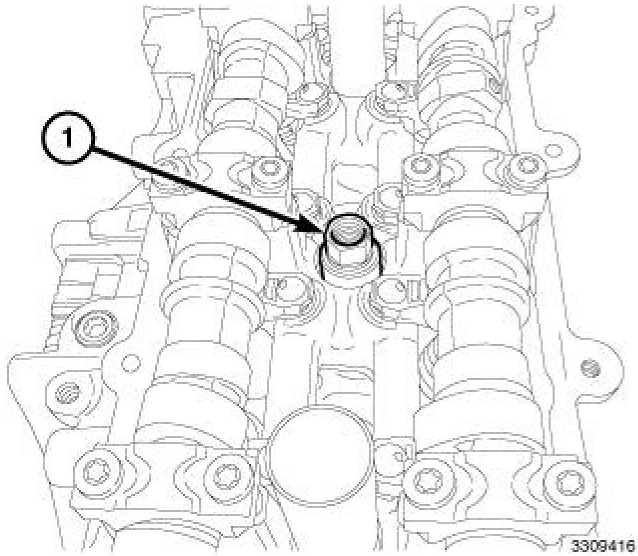


Fig. 316: Spark Plug Tube Installer
Courtesy of CHRYSLER GROUP, LLC

1. Remove the spark plug. Refer to **SPARK PLUG, REMOVAL** .
2. Install the lower half of Spark Plug Tube Installer (special tool #10255, Installer, Spark Plug Tube) (1) into the cylinder head and tighten to the proper specification.

   Refer to **TORQUE SPECIFICATIONS**.

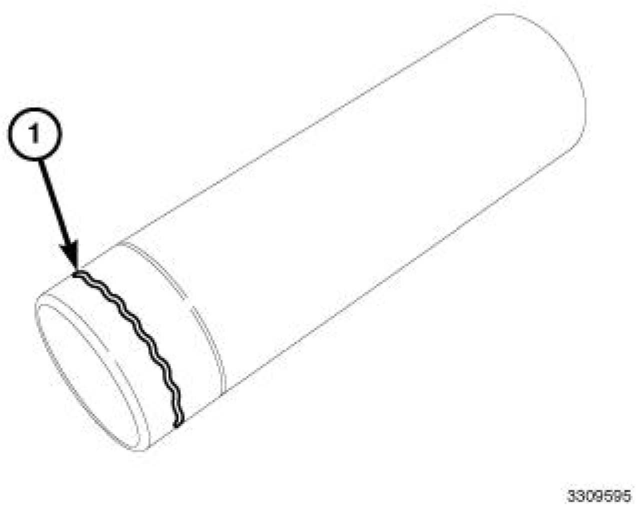


Fig. 317: Applying Stud & Bearing Mount Bead To Spark Plug Tube
Courtesy of CHRYSLER GROUP, LLC

3. Apply MoparÂ® Stud and Bearing Mount to the new spark plug tube approximately 3 mm (0.118 in.) from the end of the tube, in a 2 mm (0.078 in.) wide bead (1).

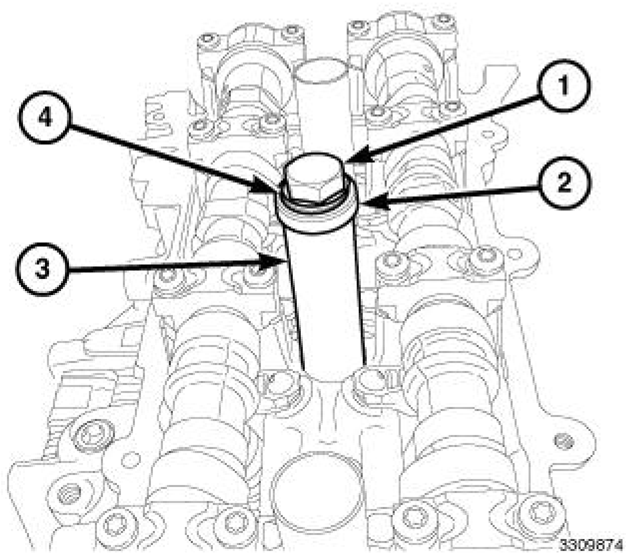


Fig. 318: Spark Plug Tube, Thrust Washers, Spark Plug Tube Installer & Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Position the spark plug tube (3) on the top half of Spark Plug Tube Installer (special tool #10255, Installer, Spark Plug Tube) (2) and assemble the tool on the cylinder head. Make sure there are two thrust washers (4) installed.

CAUTION: Do not overtighten the bolt (1). Overtightening can damage the cylinder head spark plug threads.

5. Tighten the bolt (1) to draw the spark plug tube into position. When the top half of the tool contacts the bottom half of the tool, the tube is installed.

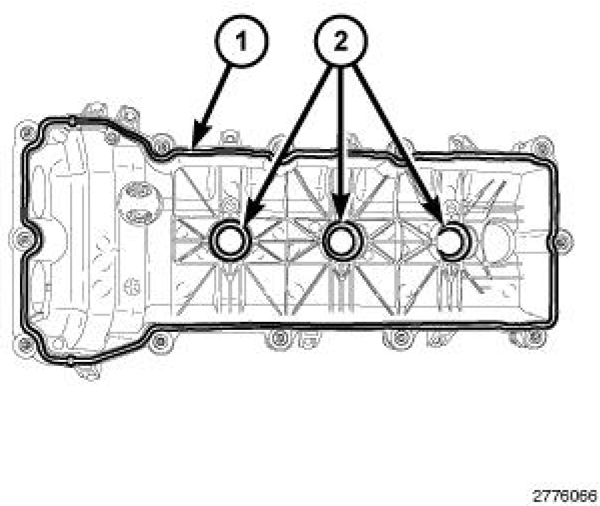


Fig. 319: Cylinder Head Cover Gasket & Spark Plug Tube Seals
Courtesy of CHRYSLER GROUP, LLC

NOTE: LH cylinder head cover shown in illustration, RH cylinder head cover similar.

CAUTION: Spark plug torque is critical and must not exceed the specified value. Overtightening stretches the spark plug shell reducing its heat transfer capability resulting in possible catastrophic engine failure.

6. Install the spark plug. Refer to **SPARK PLUG, INSTALLATION** .
7. If required, install a new spark plug tube seal (2).
8. Install the cylinder head cover(s). Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.

VALVES, INTAKE AND EXHAUST

DESCRIPTION

DESCRIPTION

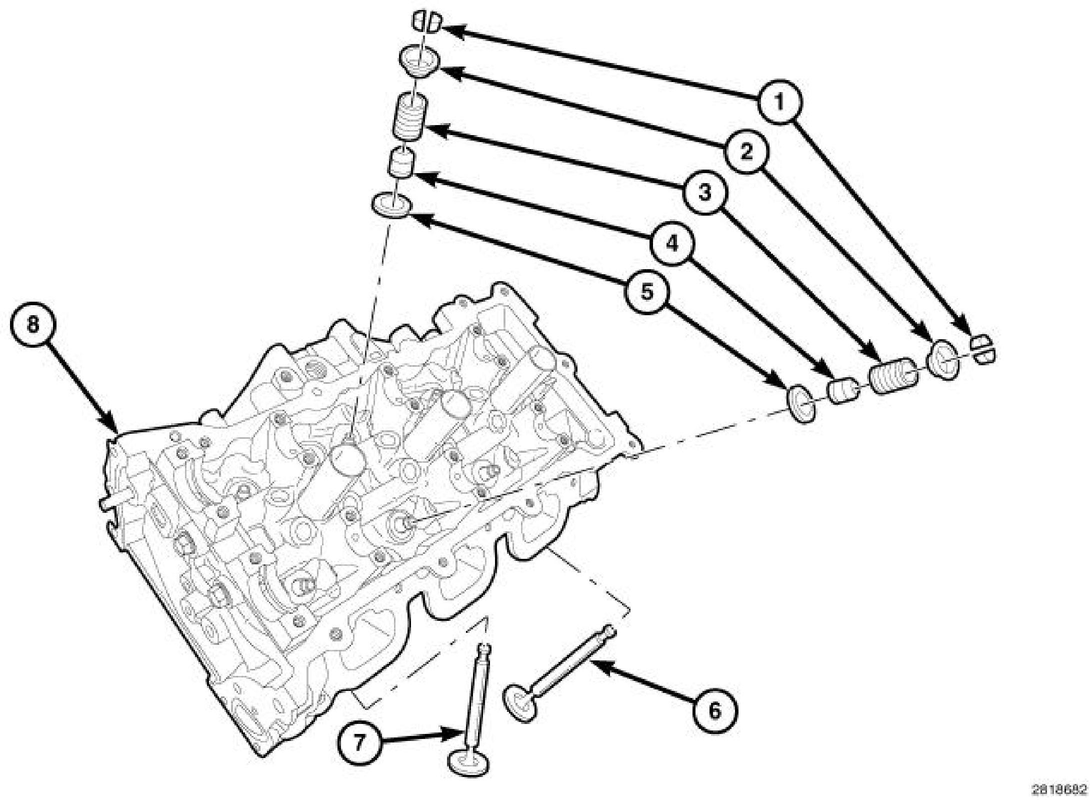
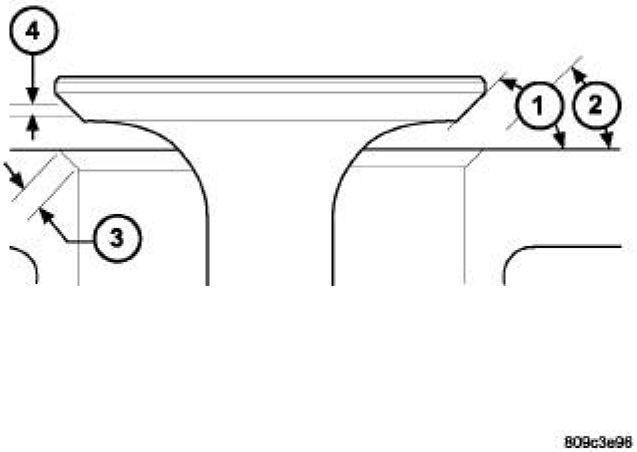


Fig. 320: Intake Valve & Exhaust Valve Component Configuration
Courtesy of CHRYSLER GROUP, LLC

The intake valve (6) is made from a one piece forged heat resistant (martensitic) steel. The exhaust valve (7) is a two piece construction with a forged (austenitic) head welded to the (martensitic) stem. Both valves have a nitrided surface treatment to prevent scuffing except at the tip and lock grooves. The four valves per cylinder are actuated by roller rocker arms, which pivot on stationary lash adjusters. All valves use three bead lock keepers (1) to retain springs (3) and to promote valve rotation.

STANDARD PROCEDURE

REFACING INTAKE AND EXHAUST VALVES

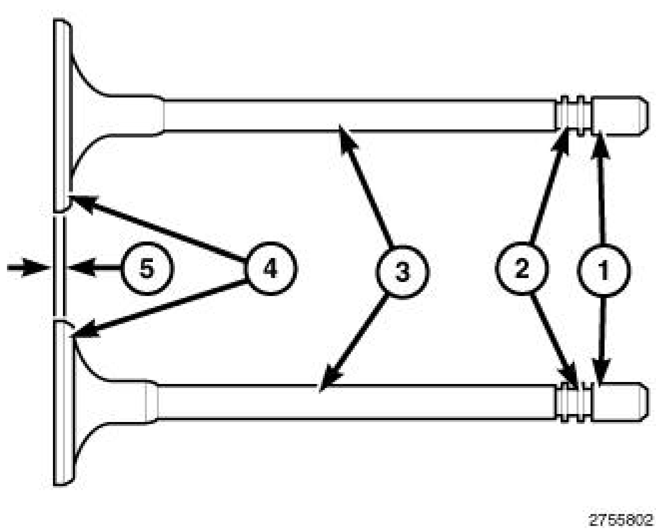


[Fig. 321: Valve Face & Seat](#)
Courtesy of CHRYSLER GROUP, LLC

1 - SEAT WIDTH
2 - FACE ANGLE
3 - SEAT ANGLE
4 - SEAT CONTACT AREA

The intake and exhaust valves have a 45.25 Â± 0.25 degree face angle (1). The valve seats (2) have a 44.75 Â± 0.25 degree face angle.

VALVES



[Fig. 322: Inspecting Valve Margin](#)
Courtesy of CHRYSLER GROUP, LLC

Inspect the remaining margin (5) after the valves are refaced. Refer to **ENGINE SPECIFICATIONS**.

VALVE SEATS

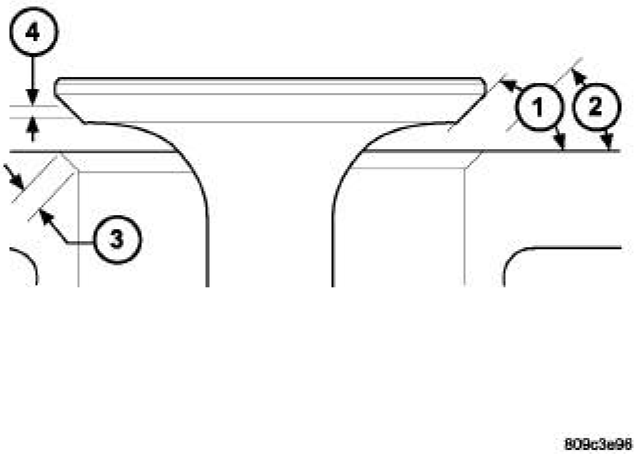


Fig. 323: Valve Face & Seat
Courtesy of CHRYSLER GROUP, LLC

1 - SEAT WIDTH
2 - FACE ANGLE
3 - SEAT ANGLE
4 - SEAT CONTACT AREA

NOTE: When refacing the valve seats, it is important that the correct size valve guide pilot be used for the reseating stones. A true and complete surface must be obtained.

1. Measure the concentricity of the valve seat using a dial indicator. Total runout should not exceed 0.050 mm (0.002 inch.) total indicator reading.

   NOTE: Valve seats which are worn or burned can be reworked, provided that the correct angle and seat width are maintained. Otherwise the cylinder head must be replaced.

2. Check the sealing of the valve(s) to the valve seat(s) on the cylinder head(s):
   - Coat the valve seat (3) **LIGHTLY** with Prussian blue.
   - Install the valve into the cylinder head.
   - Rotate the valve onto the valve seat using light pressure.
   - Using care not to wipe the Prussian blue. Remove the valve from the cylinder head.
   - If the blue is transferred to the center of the valve face (4), contact is within specifications.
   - If the blue is transferred to the top edge of the valve face, then lower the valve seat with a 15 degree stone.
   - If the blue is transferred to the bottom edge of the valve face, then raise the valve seat with a 65

degree stone.

3. When the seat is properly positioned. The width of the intake seat should be 1.0 - 1.2 mm (0.04 - 0.05 in.) and the exhaust seats should be 1.41 - 1.61 mm (0.055 - 0.063 in.).

VALVE AND SPRING INSTALLED HEIGHT

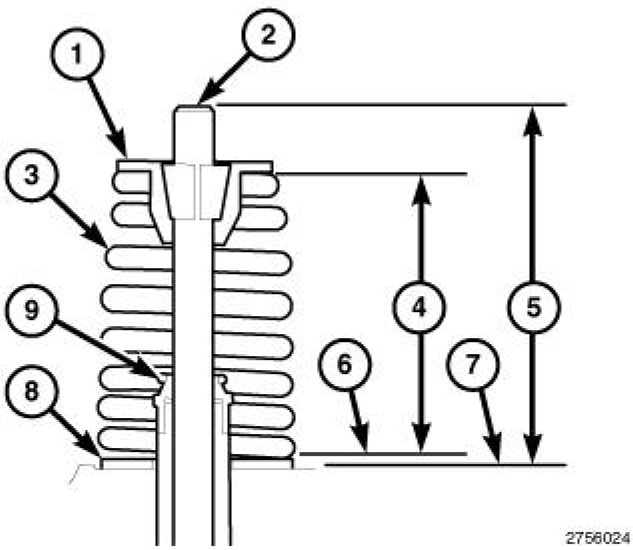


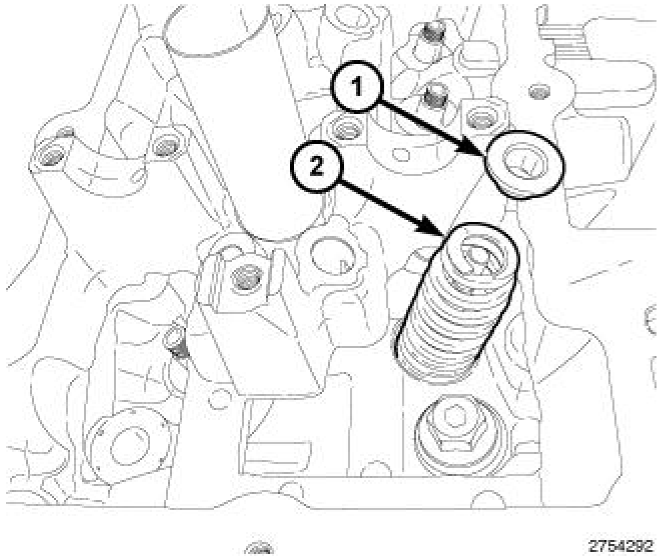
Fig. 324: Checking Valve Spring Installed Height
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the valves are being reused, reassemble them into their original locations.**

1. Coat the valve stems (2) with clean engine oil and install the valves onto the cylinder head.
2. If the valves or valve seats have been refinished, check the valve tip height (5). If the valve tip height (5) exceeds the specification, grind the valve tip until it is within specification. Refer to **ENGINE SPECIFICATIONS**. Make sure the measurement is taken from the cylinder head surface (7) to the top of the valve stem (2).

   NOTE: **Make sure that the garter spring is intact around the top of the valve guide seal.**

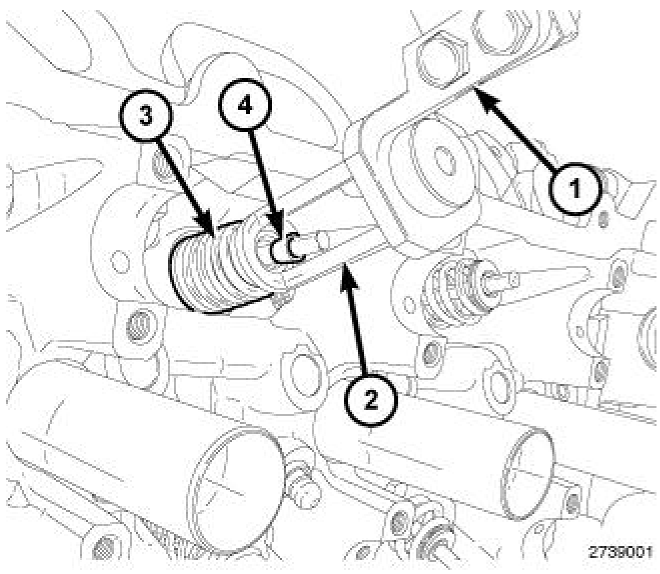
3. If removed, install the spring seat and valve guide seal over the valve guide. Refer to **SEAL(S), VALVE GUIDE, INSTALLATION**.



[Fig. 325: Valve Spring & Valve Spring Retainer](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the valve springs are being reused, reassemble them into their original locations. Number 5 cylinder exhaust valve spring shown in illustration, all other valves similar.**

4. Install the valve spring (2) and valve spring retainer (1).



[Fig. 326: Compressing Valve Spring & Locating Valve Retaining Locks](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Number 3 cylinder intake valve spring compression shown in illustration, all other valves similar.**

5. Compress the valve spring (3) with the Valve Spring Compressor Adapter (special tool #10224, Adapter, Valve Spring) (2) mounted in the Valve Spring Compressor (special tool #C-3422-D, Compressor, Valve Spring) (1). Install the retaining locks (4) and release the valve spring compressor.

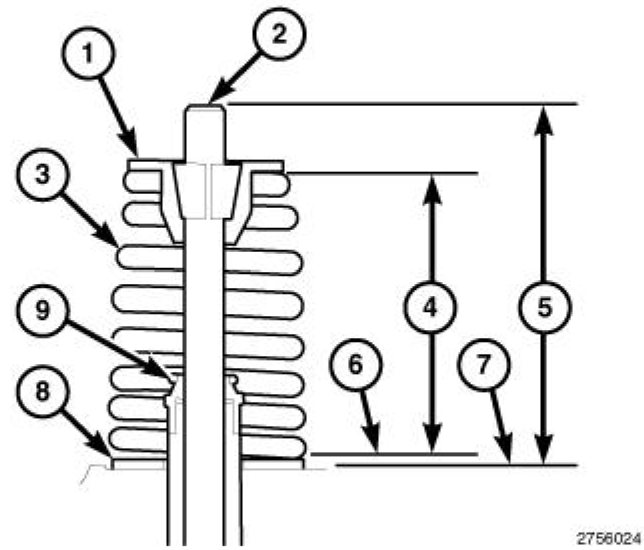


Fig. 327: Checking Valve Spring Installed Height
Courtesy of CHRYSLER GROUP, LLC

6. If the valves or valve seats have been refinished and the installed valve spring height (4) is greater than 40.0 mm (1.575 in.). Install a second spring seat (8) in the head counter bore under the original valve spring seat to bring the spring height within specification. Make sure the measurement is taken from the top of spring seat (6) to the bottom surface of spring retainer (1).

REMOVAL

REMOVAL

1. Remove the cylinder head(s). Refer to **CYLINDER HEAD, REMOVAL**.

NOTE: **If the springs are to be reused, identify their positions so that they can be reassembled into their original locations.**

2. Remove the valve spring(s). Refer to **SPRING(S), VALVE, REMOVAL**.

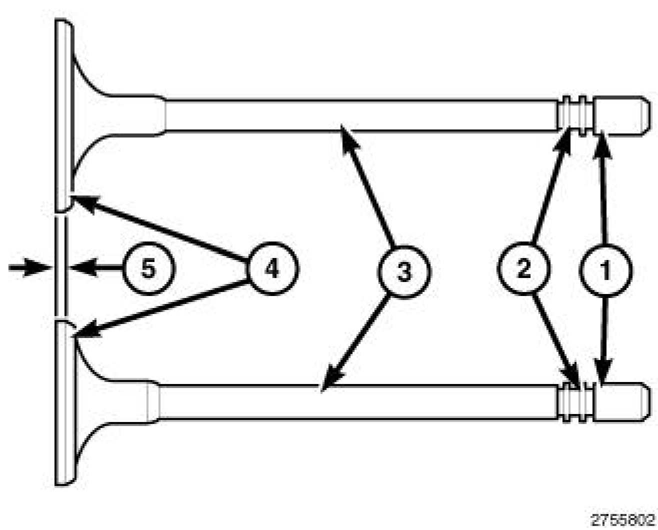


Fig. 328: Inspecting Valve Margin

Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before removing the valves, remove any burrs from the valve stem retainer lock grooves (2) and stem tip (1) to prevent damage to the valve guides.

3. Remove the valve(s) (3). Identify each valve to ensure installation in the original location.
4. If required, remove the valve guide seal and spring seat. Refer to **SEAL(S), VALVE GUIDE, REMOVAL**.

INSPECTION

INSPECTION

VALVES

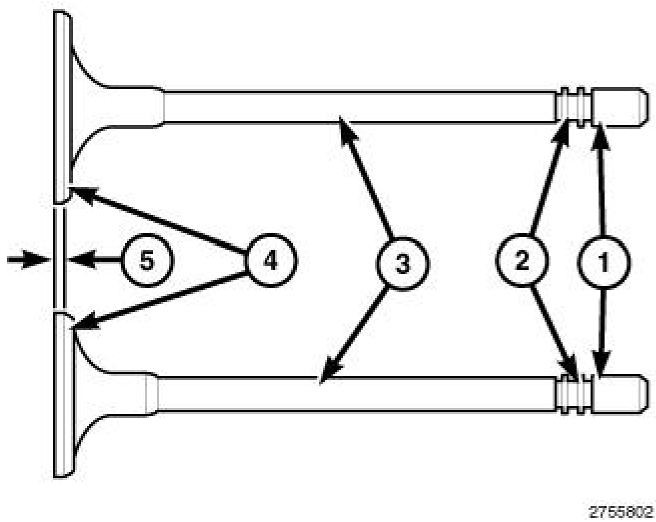


Fig. 329: Inspecting Valve Margin
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect the valves thoroughly. Replace burned, warped and cracked valves.
2. Inspect the retainer lock grooves for wear or damage (2).
3. Inspect the valve face (4) for wear and pitting.
4. Measure the valve stems (3) and margins (5) for wear. Refer to **ENGINE SPECIFICATIONS**.

VALVE GUIDES

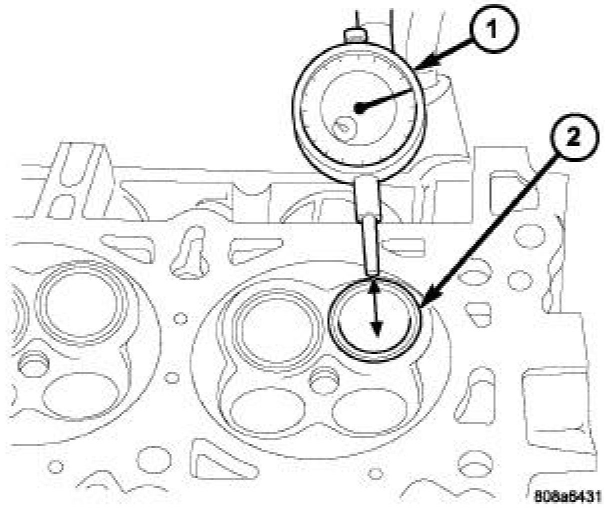


Fig. 330: Measuring Valve Guide Wear - Typical
Courtesy of CHRYSLER GROUP, LLC

1. Remove carbon and varnish deposits from inside of the valve guides with a reliable guide cleaner.
2. Measure valve stem-to-guide clearance as follows:
3. Install the valve (2) into the cylinder head so that it is 15 mm (0.590 inch.) off of the valve seat. A small piece of hose may be used to hold the valve in place.
4. Attach the Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) (1) to the cylinder head and set it at a right angle to the valve stem being measured.

NOTE: **If stem-to-guide clearance exceeds specifications, you must measure the valve stem. If the valve stem is within specification or if the valve guide is loose in the cylinder head, replace the cylinder head.**

5. Move the valve to and from the indicator. Compare this reading to the specification. Refer to ENGINE SPECIFICATIONS.

INSTALLATION

INSTALLATION

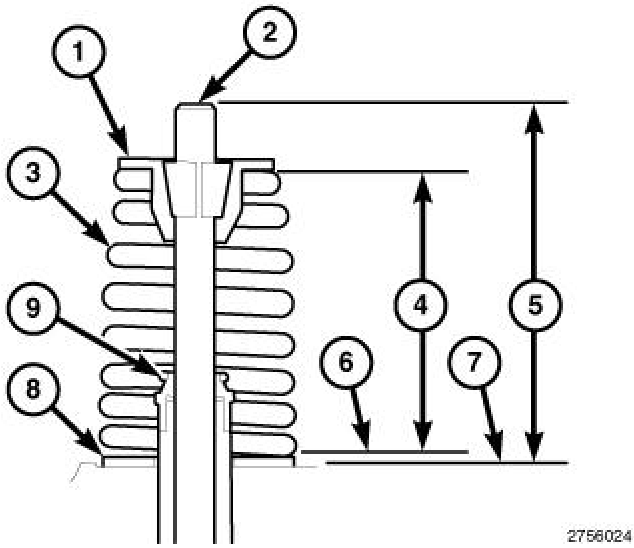


Fig. 331: Checking Valve Spring Installed Height
Courtesy of CHRYSLER GROUP, LLC

1. Coat the valve stems (2) with clean engine oil and install the valves into the cylinder head.

NOTE: **If the valves are being reused, reassemble them into their original locations.**

2. If the valves or valve seats have been refinished, check the valve tip height (5). If the valve tip height (5) exceeds the specification, grind the valve tip until it is within specification. Refer to **ENGINE SPECIFICATIONS**. Make sure the measurement is taken from the cylinder head surface (7) to the top of the valve stem (2).
3. If removed, install the spring seat and valve guide seal over the valve guide. Refer to **SEAL(S), VALVE GUIDE, INSTALLATION**.

NOTE: **Reassemble the valves springs into their original locations. If the valves or valve seats have been refinished, verify that the valve spring installed height is within specification. Refer to ENGINE SPECIFICATIONS.**

4. Install the valve spring(s). Refer to **SPRING(S), VALVE, INSTALLATION**.
5. Install the cylinder head(s). Refer to **CYLINDER HEAD, INSTALLATION**.

ENGINE BLOCK

DESCRIPTION

DESCRIPTION

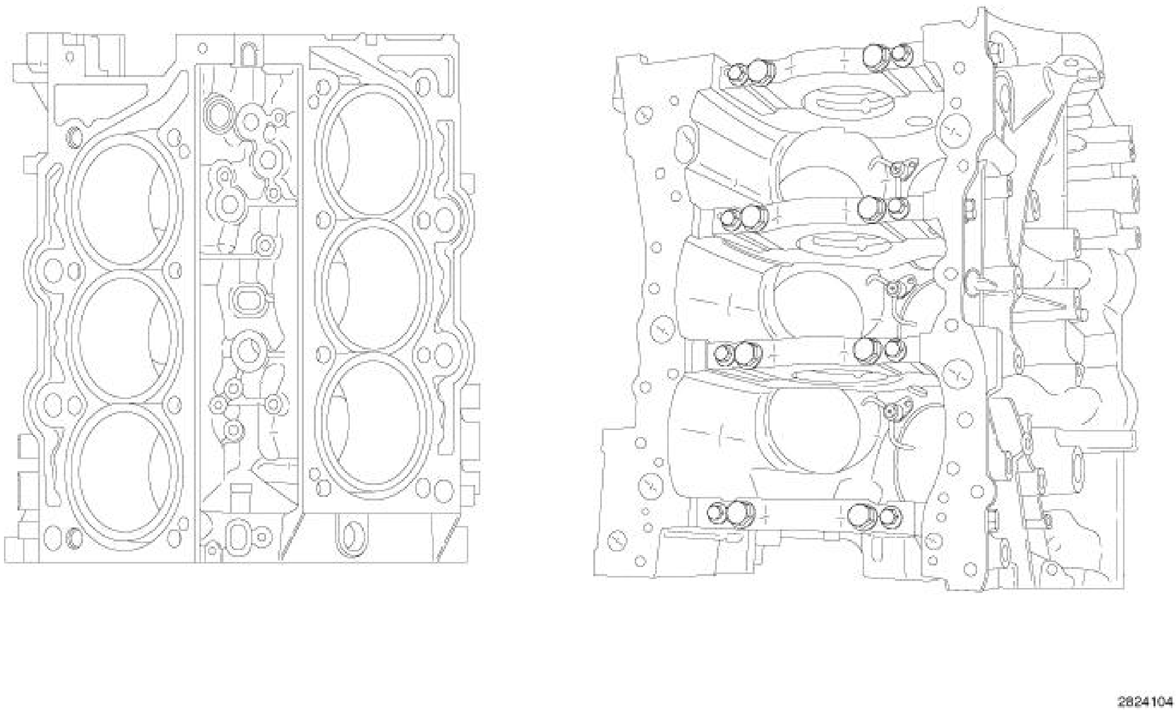


Fig. 332: Cylinder Block & Main Bearing Caps
Courtesy of CHRYSLER GROUP, LLC

The cylinder block is a 60 degree high-pressure die cast aluminum design with cast steel cylinder liners.

- The leading side of the block is on the right side and houses cylinders 1, 3 and 5.
- The cylinder block is an open deck design with cut slots between each cylinder.
- Two knock sensors are located in the block valley.
- The cylinder block has three sets of piston cooling jets which are attached to the main oil gallery.
- The four powdered metal main bearing caps are a cross-bolted design and have directional arrows molded into the caps.
- The number 2 main bearing is the location for the two piece upper half thrust bearings.
- The thrust bearings are installed with the oil groves facing outward.
- The main bearing caps are a six bolt design and cross-bolted for improved lower end strength.
- There are three oil drain back drillings located on each of the cylinder banks.

STANDARD PROCEDURE

MEASURING BEARING CLEARANCE USING PLASTIGAGE

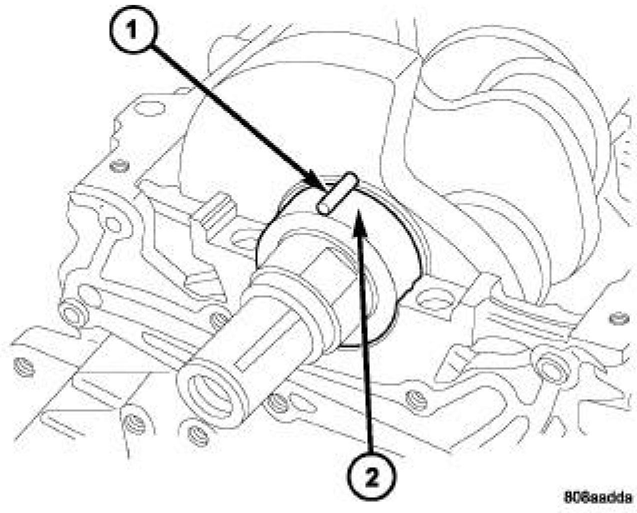


Fig. 333: Plastigage Placed In Lower Shell-Typical
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical crankshaft journal shown in illustration.**

Engine crankshaft and connecting rod bearing clearances can be determined by the use of Plastigage or equivalent. The following is the recommended procedure for the use of Plastigage:

1. Remove the oil film from surface to be checked. Plastigage is soluble in oil.
2. Place a piece of Plastigage (1) across the entire width of the journal (In addition, suspected areas can be checked by placing the Plastigage in the suspected area). Plastigage must not crumble in use. If brittle, obtain fresh stock.

   NOTE: **DO NOT rotate the crankshaft. Plastigage will smear, causing inaccurate results.**

3. Torque the bearing cap bolts of the bearing being checked to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

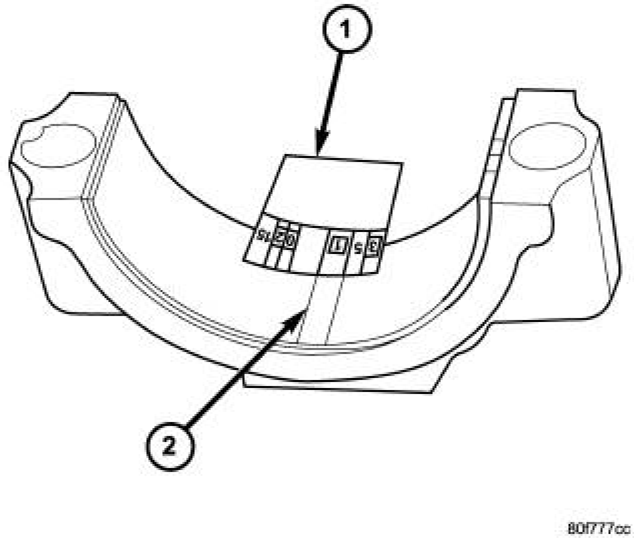
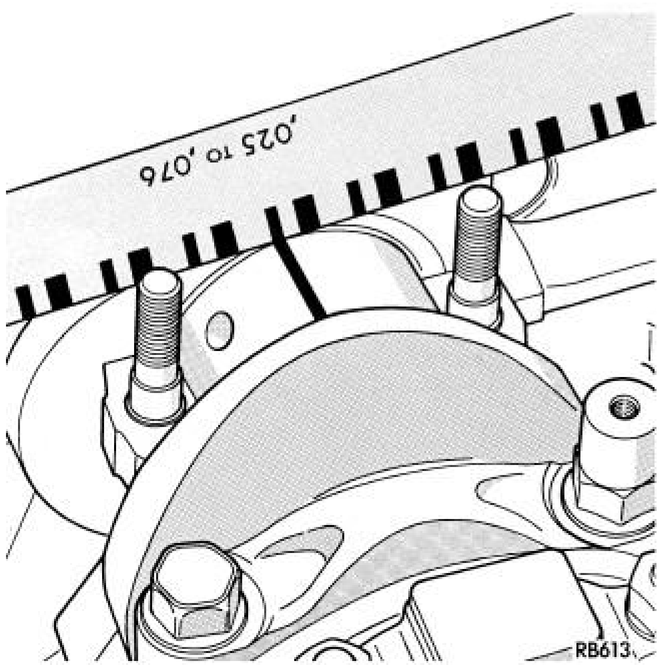


Fig. 334: Measuring Bearing Clearance With Plastigage
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical connecting rod cap shown in illustration.**

4. Remove the bearing cap and compare the width of the flattened Plastigage (2) with the scale provided on the package (1). Locate the band closest to the same width. This band shows the amount of clearance. Differences in readings between the ends indicate the amount of taper present or the possibility of foreign material trapped under the bearing insert.
5. Record all readings taken. Compare clearance measurements to specification. Refer to **ENGINE SPECIFICATIONS**.



[Fig. 335: Checking Connecting Rod Bearing Clearance-Typical]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical connecting rod journal shown in illustration.**

NOTE: **Plastigage is available in a variety of clearance ranges. Use the most appropriate range for the specifications you are checking. Plastigage generally is accompanied by two scales. One scale is in inches, the other is a metric scale.**

6. Install the proper bearings to achieve the specified bearing clearances.
7. Repeat the Plastigage measurement to verify your bearing selection prior to final assembly.

CYLINDER BORE DEGLAZING

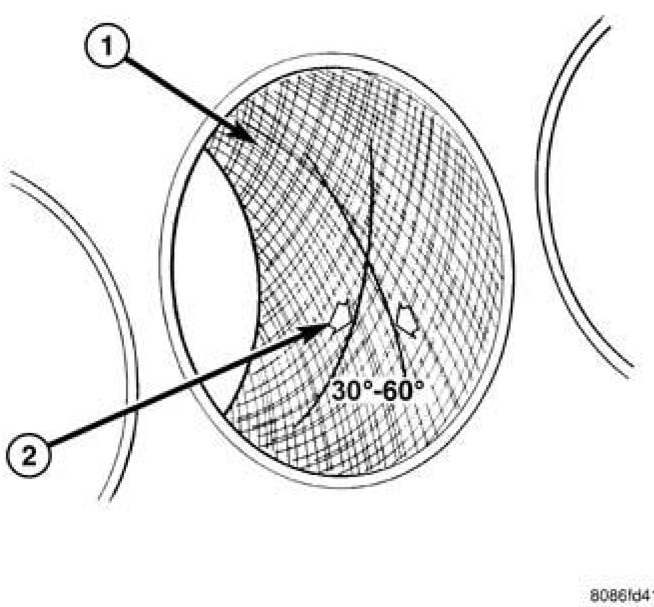
Before deglazing, mask the crankcase area to keep abrasive materials from entering the engine lower end. Tape off any openings to prevent abrasive material from entering the coolant and oil circuits.

CAUTION: **DO NOT use rigid type hones to remove cylinder wall glaze.**

1. Select an appropriate size flexible ball hone.

CAUTION: **DO NOT use engine or transmission oil, mineral spirits, or kerosene.**

2. Deglazing of the cylinder walls may be done if the cylinder bore is straight and round. About 20-60 strokes, depending on the condition of the cylinder bore, will be sufficient to provide a satisfactory surface. Use a light **honing** oil, available from major oil distributors.



[Fig. 336: Identifying Cylinder Bore Crosshatch Pattern]
Courtesy of CHRYSLER GROUP, LLC

3. Deglazing should be done by moving the hone up and down fast enough to get a crosshatch pattern. The hone marks should intersect at 30Â° to 60Â° inclusive angle for proper seating of rings.
4. A controlled hone motor speed between 200 and 300 RPM is necessary to obtain the proper crosshatch angle (1). The number of up and down strokes per minute can be regulated to get the desired 30Â° to 60Â° inclusive angle (2). Faster up and down strokes increase the crosshatch angle.
5. After deglazing, it is necessary that the block be cleaned to remove all traces of abrasive. Use a brush to wash parts with a solution of hot water and detergent. Dry parts thoroughly. Use a clean, white, lint-free cloth to check that the bore is clean. Oil the bores after cleaning to prevent rusting. Upon completion, perform a visual inspection of the cylinder block passages to inspect for abrasive debris. If any debris is found, repeat the cleaning process.

NOTE: **Cylinder bore diameter should not increase more than 20 microns during deglazing process from original nominal bore diameter, if the maximum of 20 microns is exceeded, the cylinder block must be replaced. If deglazing the cylinder bore cannot remove the light scratches and scuffs the cylinder block should be replaced.**

INSPECTION

INSPECTION

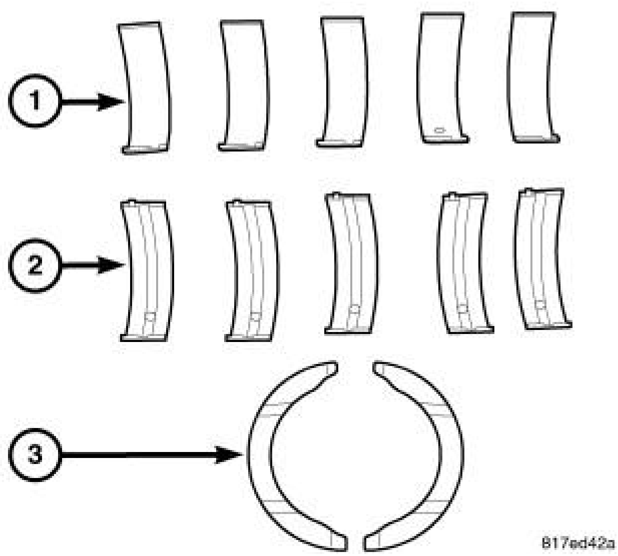


Fig. 337: Bearing Identification
Courtesy of CHRYSLER GROUP, LLC

1. Wipe the bearing inserts (1, 2) clean.
   - Inspect the inserts for abnormal wear patterns, scoring, grooving, fatigue, pitting and for metal or other foreign material imbedded in the lining.
   - Inspect the back of the inserts for fractures, scrapes, or irregular wear patterns.
   - Inspect the insert locking tabs for damage.
   - Inspect the crankshaft thrust bearings (3) for scoring, scratches, wear or blueing.
2. Replace any bearing that shows abnormal wear. Refer to STANDARD PROCEDURE.
3. Inspect the main bearing bores for signs of scoring, nicks and burrs.

4. If the cylinder block main bearing bores show damage the engine block must be replaced.

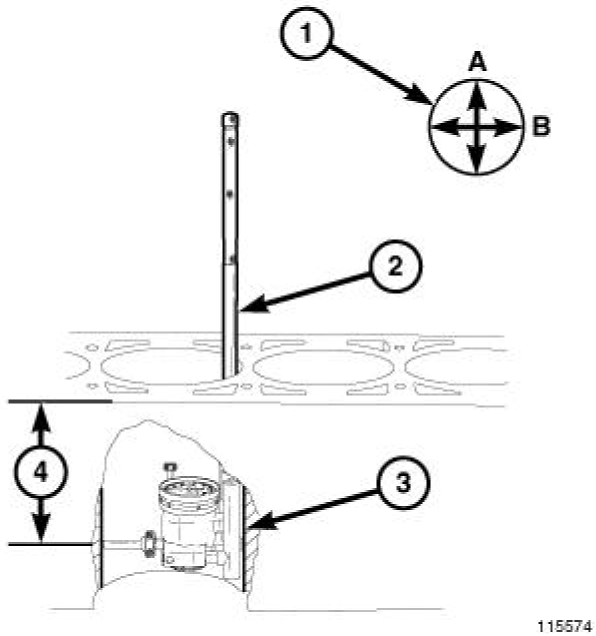


Fig. 338: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER GROUP, LLC

5. Use the Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to correctly measure the inside diameter of the cylinder bore (3). A cylinder bore gauge capable of reading in 0.003 mm (0.0001 in.) INCREMENTS is required. If a bore gauge is not available, do not use an inside micrometer.
6. Measure the inside diameter of the cylinder bore at three levels below the top of the bore (4). Start at the top of the bore, perpendicular (across or at 90 degrees) to the axis of the crankshaft at point A (1).
7. Repeat the measurement near the middle of the bore, then repeat the measurement near the bottom of the bore.
8. Determine taper by subtracting the smaller diameter from the larger diameter.
9. Rotate the Cylinder Indicator 90Â° to point B (1) and repeat the three measurements. Verify that the maximum taper is within specification. Refer to **ENGINE SPECIFICATIONS**.
10. Determine out-of-roundness by comparing the difference between A and B at each of the three levels. Verify that the maximum out of round is within specification. Refer to **ENGINE SPECIFICATIONS**.

NOTE: **A slight amount of taper always exists in the cylinder bore after the engine has been in use for a period of time.**

11. If cylinder bore taper and out-of-roundness are within specification, the cylinder bore can be honed. Refer to **ENGINE BLOCK, STANDARD PROCEDURE**. If the cylinder bore taper or out-of-round condition exceeds the maximum limits, the cylinder block must be replaced.

BEARING(S), CONNECTING ROD

STANDARD PROCEDURE

CONNECTING ROD BEARING FITTING

Bearing oil clearance can also be determined by using Plastigage or equivalent. Refer to **ENGINE BLOCK,**

STANDARD PROCEDURE.

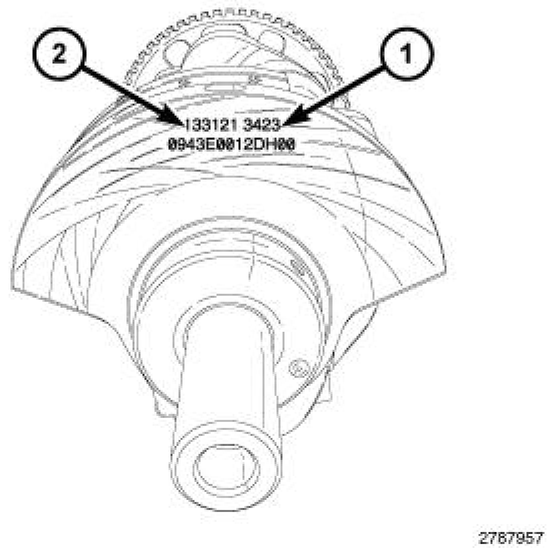


Fig. 339: Crankshaft Main Bearing Journal Diameter Grade Markings & Connecting Rod Bearing Journal Diameter Grade Markings
Courtesy of CHRYSLER GROUP, LLC

The connecting rod bearings are "select fit" to achieve proper oil clearance. Connecting rod bearing journal diameter grade markings (2) are stamped into the front crankshaft counterweight. These marks are read from left to right, corresponding with journal number 1, 2, 3, 4, 5, 6. Select the bearing size that corresponds to the crankshaft markings for each rod bearing journal.

Connecting rod bearing journal diameter grade markings correspond to specific journal diameters. The chart below identifies the three crankshaft grade markings and their associated journal diameters.

Crankshaft Marking	Journal Size mm (in.)
1	58.9910 - 58.9969 mm (2.3225 - 2.3227 in.)
2	58.9970 - 59.0029 mm (2.3227 - 2.3229 in.)
3	59.0030 - 59.0090 mm (2.3229 - 2.3232 in.)

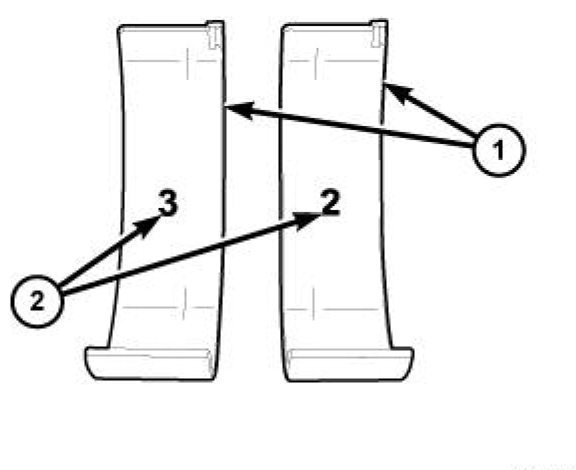


Fig. 340: Connecting Rod Bearing Shells & Bearing Size
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Install the rod bearings in pairs. Do not mix sizes or use a new bearing half with an old bearing half.**

The connecting rod bearing shells (1) are marked with the bearing size (2) on the bearing lining surface. The bearings are available in three different sizes in order to achieve the desired oil clearance.

Rod bearing shells are available in three sizes. The chart below identifies the three bearing sizes.

Bearing Marking	Size mm (in.)
1	1.583 - 1.580 mm (0.0623 - 0.0622 in.)
2	1.580 - 1.577 mm (0.0622 - 0.0621 in.)
3	1.577 - 1.574 mm (0.0621 - 0.0620 in.)

CONNECTING ROD BEARING REPLACEMENT

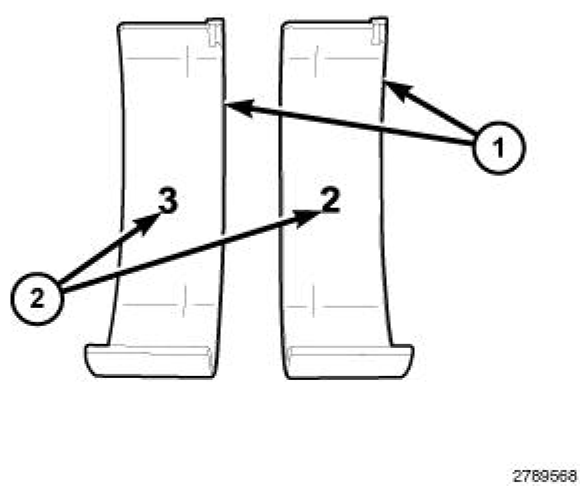


Fig. 341: Connecting Rod Bearing Shells & Bearing Size
Courtesy of CHRYSLER GROUP, LLC

The connecting rod bearings (1) can be serviced in-vehicle. They must be replaced one-at-a-time in order to prevent the pistons from contacting the valves. The connecting rod bearings are "select fit" to achieve proper oil clearances. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.

1. Disconnect and isolate the negative battery cable.
2. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .
3. Remove the oil pan, oil pump pick-up and engine oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.

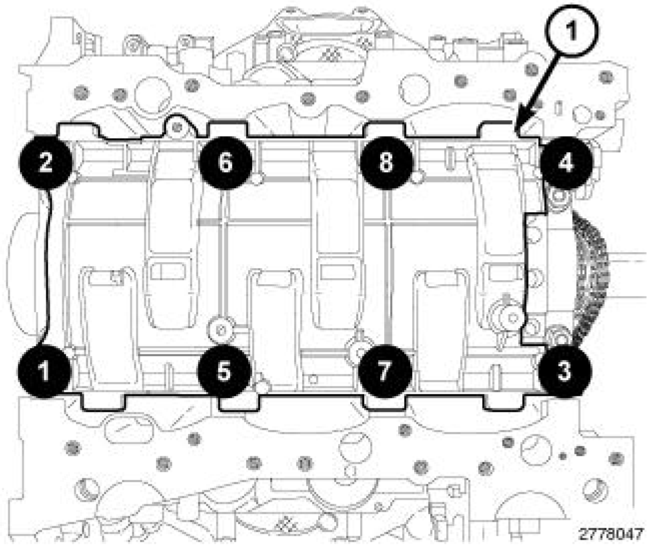


Fig. 342: Main Bearing Cap Bolts From Windage Tray Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Remove the eight main bearing cap bolts from the windage tray in the sequence shown in illustration and remove the windage tray (1).

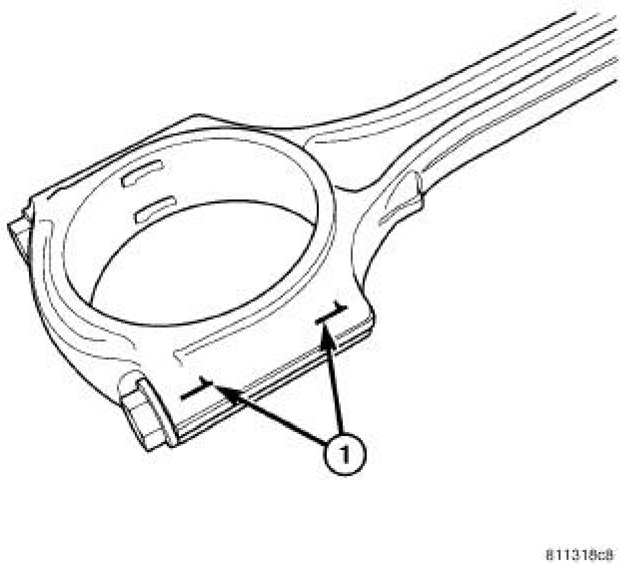


Fig. 343: Connecting Rod To Cylinder Identification
Courtesy of CHRYSLER GROUP, LLC

CAUTION:	**DO NOT use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur**

NOTE:	**Connecting rods and bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.**

5. Mark connecting rod and bearing cap positions (1) using a permanent ink marker or scribe tool.

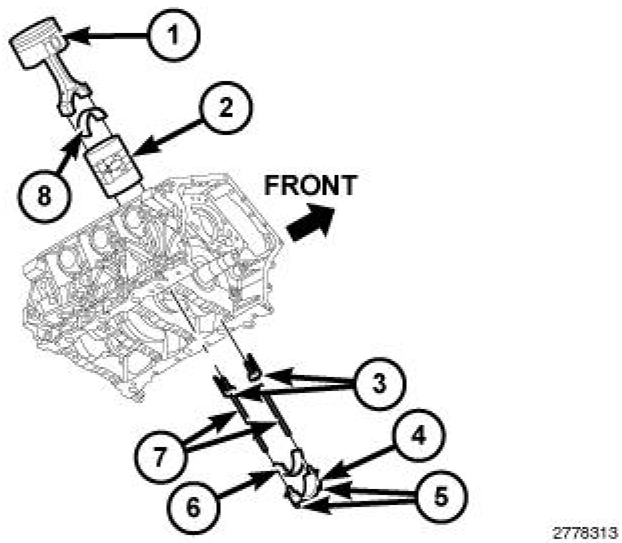


Fig. 344: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Typical V6 engine configuration shown in illustration.**
CAUTION:	**Replace only one connecting rod bearing at a time while all other connecting rod bearing caps remain properly tightened. If all connecting rod bearing caps are removed, crankshaft rotation will result in valve and/or piston damage.**
CAUTION:	**Care must be taken not to damage the fractured rod and cap joint face surfaces, as engine damage may occur.**

6. Remove the connecting rod cap bolts (5) and the connecting rod cap (4). Discard the cap bolts.
7. Remove the plastic guide plates (3) from the Guide Pins (special tool #8189, Guide Pins) (7) and install the Guide Pins to the connecting rod being removed.

CAUTION:	**Care must be taken not to nick crankshaft journals, as engine damage may occur.**

8. Rotate the crankshaft away from the connecting rod and remove the bearing shell.
9. Inspect the rods and bearings for abnormal wear patterns, scoring, grooving, fatigue, pitting and for metal or other foreign material imbedded in the lining. Refer to **INSPECTION**.
10. If required, check the connecting rod bearing clearances by the use of Plastigage or equivalent. Refer to **ENGINE BLOCK, STANDARD PROCEDURE**.
11. If required, select and fit new bearings to the connecting rod. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.
12. Install the bearing shell (8) on the connecting rod with the tang inserted into the machined groove in the rod. Lubricate the bearing surface with clean engine oil.
13. Rotate the crankshaft while guiding the connecting rod into position over the rod journal.

CAUTION: The connecting rod bolts must not be reused. Always replace the connecting rod bolts whenever they are loosened or removed.

14. Install the bearing shell (6) on the connecting rod cap (4) with the tang inserted into the machined groove in the cap. Lubricate the bearing surface with clean engine oil.

NOTE: Do not lubricate the threads of the connecting rod cap bolts (5).

15. Install the connecting rod cap and bearing with the tang on the same side as the rod. Tighten the **NEW** connecting rod cap bolts (5) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
16. If required, check the connecting rod side clearance. Refer to **STANDARD PROCEDURE**.
17. Repeat the previous steps for each connecting rod bearing being replaced.

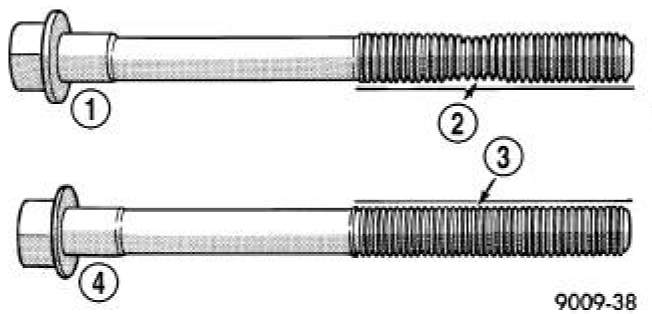


Fig. 345: Checking Cylinder Head Bolts For Stretching (Necking)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The main bearing cap bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

18. Check the main bearing cap bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

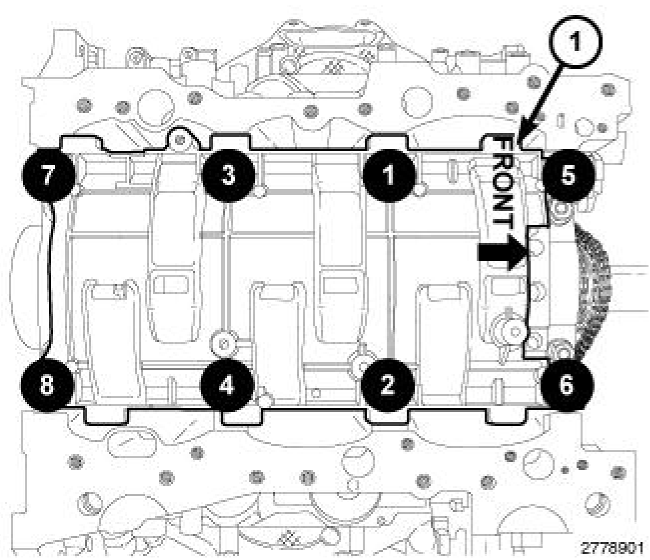


Fig. 346: Windage Tray With Main Bearing Cap Bolts Installation Sequence

Courtesy of CHRYSLER GROUP, LLC

19. Install the windage tray with eight main bearing cap bolts. Tighten the bolts in the sequence shown in illustration to 21 N.m (16 ft. lbs.) plus an additional 90Â° turn.
20. Install the engine oil pump, oil pump pick-up and oil pan. Refer to **PUMP, ENGINE OIL, INSTALLATION**.
21. Install the spark plugs and ignition coils. Refer to **SPARK PLUG, INSTALLATION** .
22. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **STANDARD PROCEDURE**.
23. Connect the negative battery cable.
24. Operate the engine until it reaches normal operating temperature.

BEARING(S), CRANKSHAFT, MAIN

STANDARD PROCEDURE

MAIN BEARING FITTING

NOTE: **Crankshaft thrust washers are not selectable and are only available in a single thickness.**

Bearing oil clearance can also be determined by using Plastigage or equivalent. Refer to **ENGINE BLOCK, STANDARD PROCEDURE**.

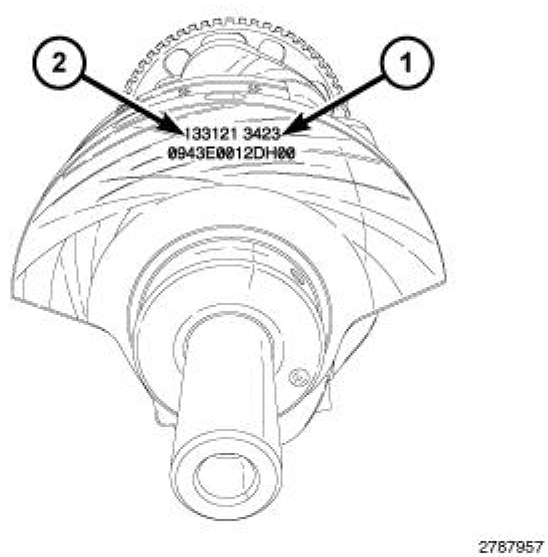


Fig. 347: Crankshaft Main Bearing Journal Diameter Grade Markings & Connecting Rod Bearing Journal Diameter Grade Markings
Courtesy of CHRYSLER GROUP, LLC

The upper and lower main bearings are "select fit" to achieve proper oil clearances. Crankshaft main bearing journal diameter grade markings (1) are stamped into the front crankshaft counterweight. These marks are read from left to right, corresponding with journal number 1, 2, 3, 4.

Crankshaft main bearing journal diameter grade markings correspond to specific journal diameters. The chart below identifies the five crankshaft grade markings and their associated journal diameters.

Crankshaft Marking	Journal Size mm (in.)
1	71.9870 - 71.9905 mm (2.8341 - 2.8343 in.)
2	71.9906 - 71.9941 mm (2.8343 - 2.8344 in.)
3	71.9942 - 71.9977 mm (2.8344 - 2.8345 in.)
4	71.9978 - 72.0013 mm (2.8346 - 2.8347 in.)
5	72.0014 - 72.0050 mm (2.8347 - 2.8348 in.)

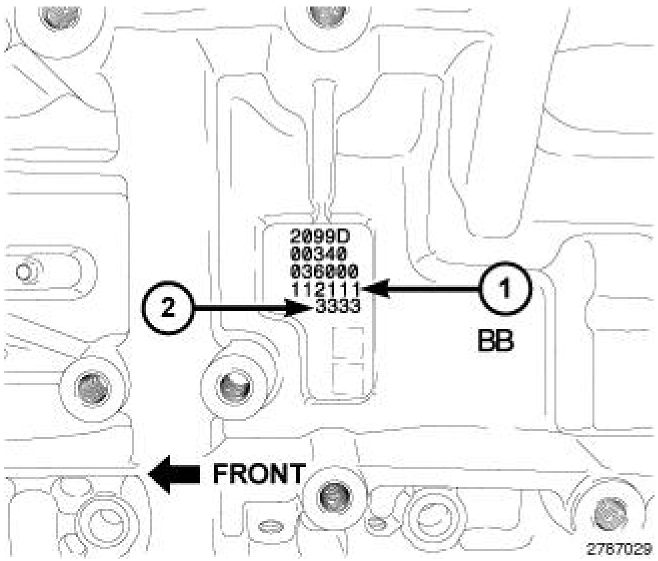


Fig. 348: Engine Block Main Bearing Journal Diameter Grade Markings
Courtesy of CHRYSLER GROUP, LLC

Engine block main bearing journal diameter grade markings (2) are stamped into the left side of the engine block. These marks are read from left to right, corresponding with journal number 1, 2, 3, 4.

Engine block main bearing journal grade markings correspond to specific journal diameters. The chart below identifies the five engine block grade markings and their associated journal diameters.

Engine Block Marking	Journal Size mm (in.)
1	77.0055 - 77.0090 mm (3.0317 - 3.0318 in.)
2	77.0019 - 77.0054 mm (3.0316 - 3.0317 in.)
3	76.9983 - 77.0018 mm (3.0314 - 3.0316 in.)
4	76.9947 - 76.9982 mm (3.0313 - 3.0314 in.)
5	76.9910 - 76.9946 mm (3.0311 - 3.0313 in.)

For upper and lower main bearing selection, obtain the grade identification marks from the crankshaft and engine block. Main bearings are available in five sizes. Upper and lower sizes can be mixed on a journal in order to achieve the desired oil clearance. The chart below identifies the five sizes available and how they should be selected based on crankshaft and engine block grade markings.

Engine Block Marking	Crankshaft Marking				
	1	2	3	4	5
1	1/1	1/2	2/2	2/3	3/3
2	1/2	2/2	2/3	3/3	3/4

3	2/2	2/3	3/3	3/4	4/4
4	2/3	3/3	3/4	4/4	4/5
5	3/3	3/4	4/4	4/5	5/5
UPPER/LOWER Main Bearings to Achieve 0.024 - 0.050 mm (0.0009 - 0.0020 in.) Oil Clearance					

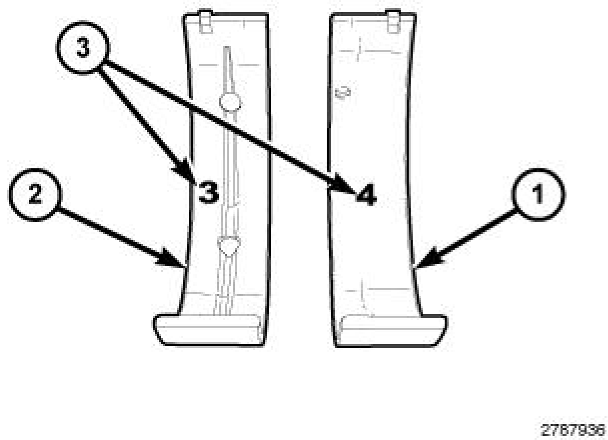


Fig. 349: Main Bearing Inserts
Courtesy of CHRYSLER GROUP, LLC

The upper main bearing shell (2) and lower main bearing shell (1) are marked with the bearing size (3) on the bearing lining surface. The upper and lower bearings are available in five different sizes and can be mixed on a journal in order to achieve the proper oil clearance.

Upper and lower main bearing shells are available in five sizes. The chart below identifies the five bearing sizes.

Bearing Marking	Size mm (in.)
1	2.4951 - 2.4987 mm (0.0982 - 0.0984 in.)
2	2.4915 - 2.4951 mm (0.0981 - 0.0982 in.)
3	2.4879 - 2.4915 mm (0.0979 - 0.0981 in.)
4	2.4843 - 2.4879 mm (0.0978 - 0.0979 in.)
5	2.4807 - 2.4843 mm (0.0977 - 0.0978 in.)

MAIN BEARING REPLACEMENT

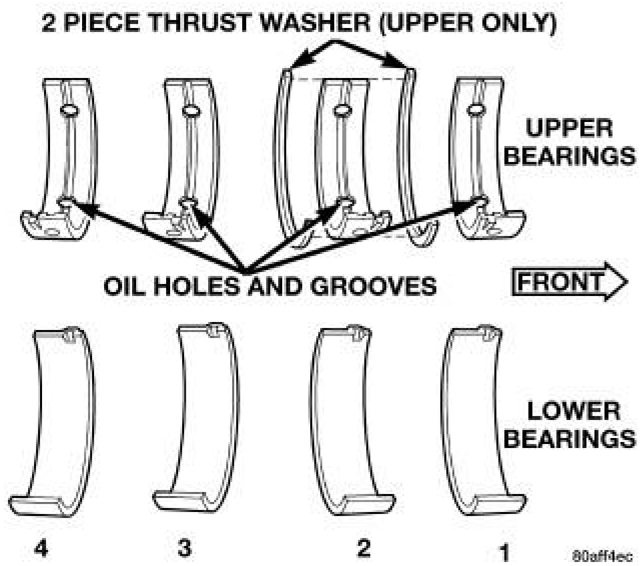


Fig. 350: Main Bearing Identification
Courtesy of CHRYSLER GROUP, LLC

The main bearings are serviced in-vehicle. They must be replaced one-at-a-time in order to properly support the crankshaft. The upper and lower main bearing shells are NOT interchangeable. The upper and lower main bearings are "select fit" to achieve proper oil clearances. Refer to **STANDARD PROCEDURE**.

1. Disconnect and isolate the negative battery cable.

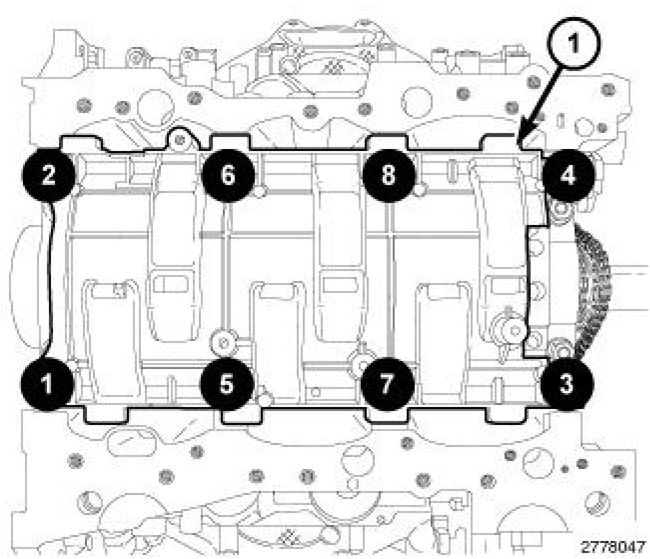


Fig. 351: Main Bearing Cap Bolts From Windage Tray Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.
3. Remove the eight main bearing cap bolts from the windage tray in the sequence shown in illustration and remove the windage tray (1).

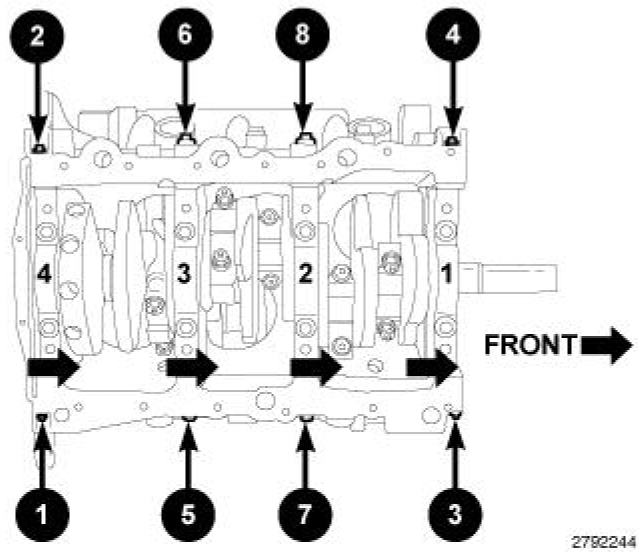


Fig. 352: Main Bearing Tie Bolts Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical V6 engine configuration shown in illustration.**

4. Remove the eight main bearing tie bolts in the sequence shown in illustration.

CAUTION: **DO NOT use a number stamp or a punch to mark main bearing caps, as damage to main bearings could occur.**

NOTE: **Main bearing caps are not interchangeable and are marked to insure correct assembly.**

5. Mark the main bearing cap positions using a permanent ink marker or a scribe tool.

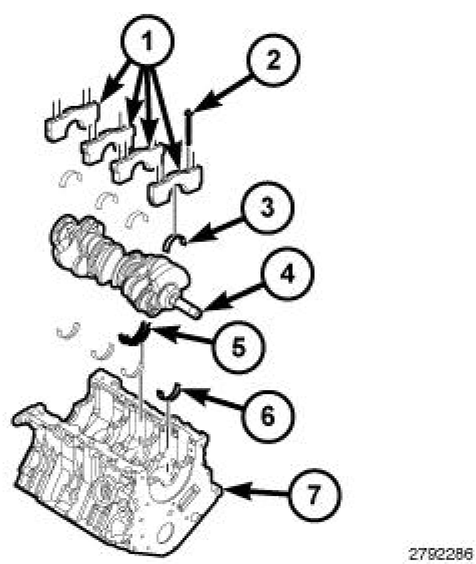


Fig. 353: Main Bearing Caps, Bolts, Crankshaft & Engine Block
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical V6 engine configuration shown in illustration.**

CAUTION: **Replace only one main bearing at a time while all other main bearing caps remain properly tightened. If all main bearing caps are removed, the weight of the unsupported crankshaft will damage the crankshaft oil seals.**

NOTE: **Replace the main bearings in the following order; 2, 3, 1, 4.**

6. Remove the two cap bolts (2) and remove the main bearing cap (1).
7. When removing the No. 2 bearing cap, also remove the thrust washers (5).
8. Slide the upper main bearing half (6) out from between the crankshaft and the engine block.
9. If required, select fit new main bearings to the engine block. Refer to **STANDARD PROCEDURE**.
10. Lubricate the upper main bearing half (6) with clean engine oil and slide the bearing into position.

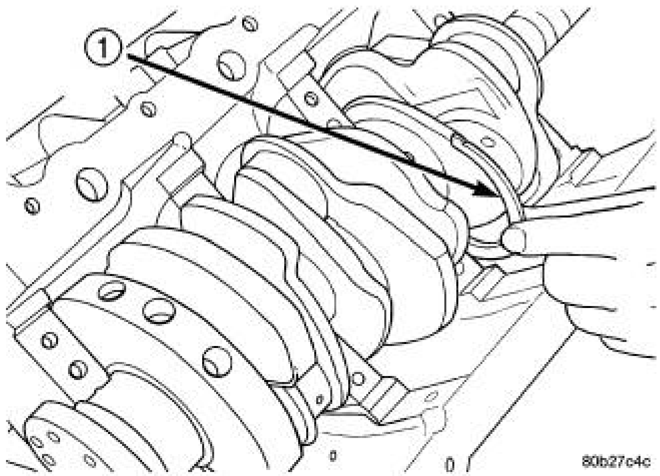


Fig. 354: Thrust Washer Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical V6 engine configuration shown in illustration.**

11. When installing thrust washers (1) at the No. 2 main bearing location, use the following procedure:
    a. Move the crankshaft forward to the limit of travel. Lubricate and install the front thrust washer (1) by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.
    b. Move the crankshaft rearward to the limit of travel. Lubricate and install the rear thrust washer by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.

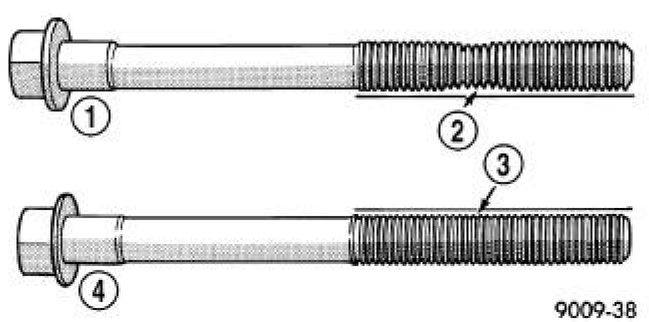


Fig. 355: Checking Cylinder Head Bolts For Stretching (Necking)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The main bearing cap bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

12. Check the main bearing cap bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

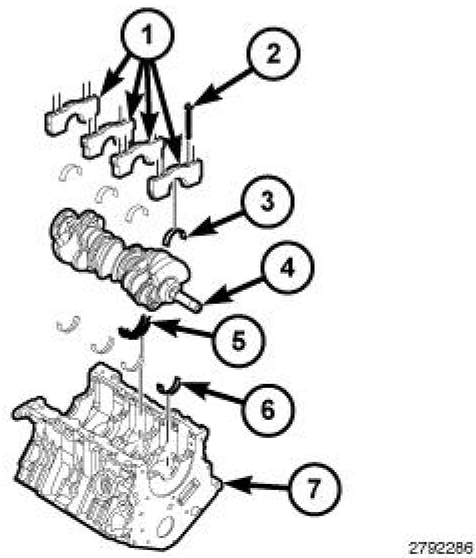


Fig. 356: Main Bearing Caps, Bolts, Crankshaft & Engine Block
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

13. Lubricate and install the lower bearing half (3) onto the main cap (1).
14. Install the main bearing cap (1) with two inner main bearing cap bolts (2) tightened to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
15. Repeat the previous steps for main bearings 3, 1 and 4.
16. Measure crankshaft end play. Refer to **CRANKSHAFT, STANDARD PROCEDURE**.

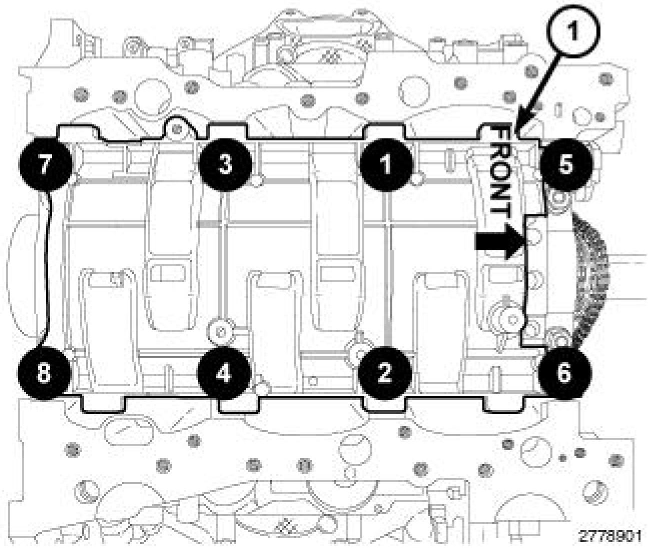


Fig. 357: Windage Tray With Main Bearing Cap Bolts Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

17. Install the windage tray with eight main bearing cap bolts. Tighten the bolts in the sequence shown in illustration to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

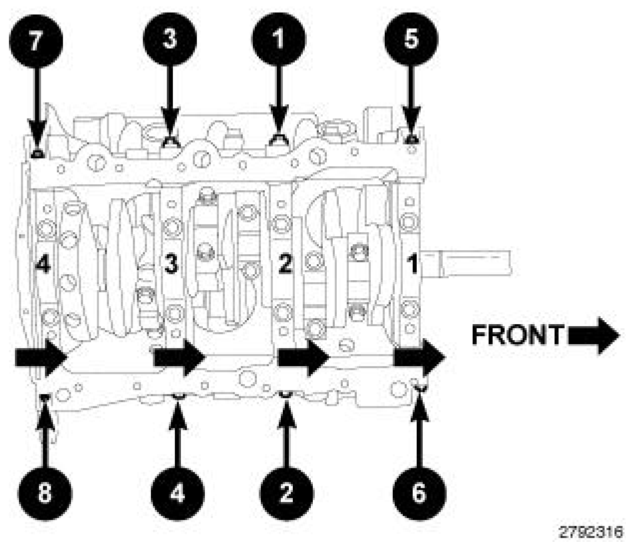


Fig. 358: Main Bearing Tie Bolts Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical V6 engine configuration shown in illustration.**

18. Install the eight main bearing tie bolts. Tighten bolts in the sequence shown in illustration to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
19. Install the engine oil pump. Refer to **PUMP, ENGINE OIL, INSTALLATION**.
20. If removed, install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
21. Install the spark plugs. Refer to **SPARK PLUG, INSTALLATION** .
22. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **STANDARD PROCEDURE**.

23. Connect the negative battery cable.
24. Operate the engine until it reaches normal operating temperature.

CRANKSHAFT

DESCRIPTION

DESCRIPTION

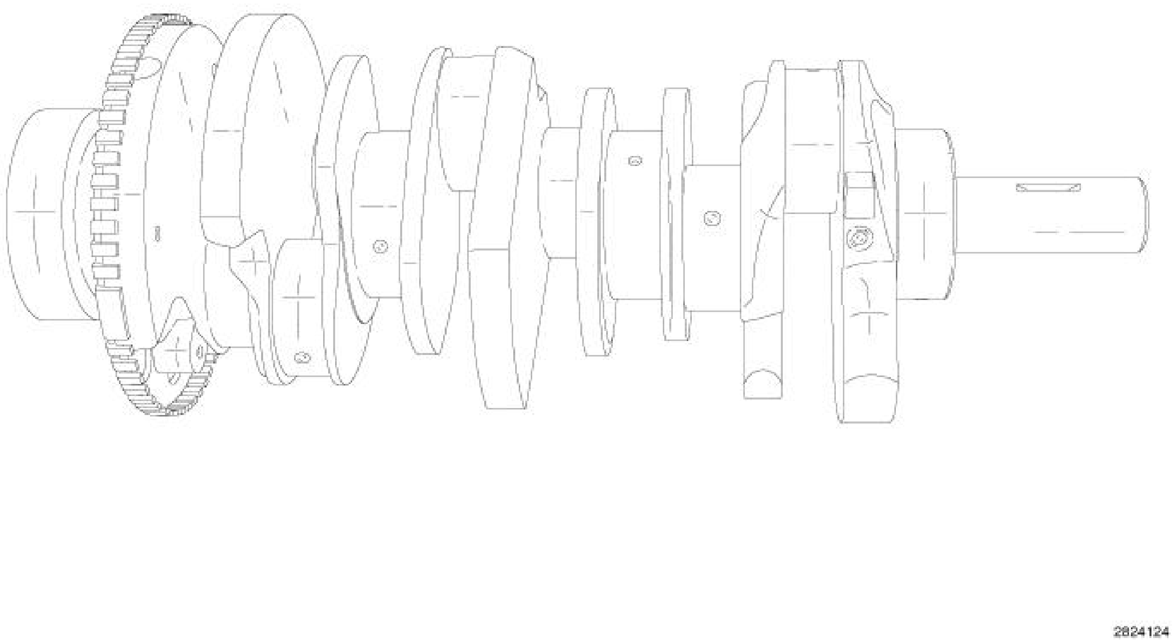


Fig. 359: Crankshaft
Courtesy of CHRYSLER GROUP, LLC

The crankshaft is a cast design and is constructed using ductile iron. The crankshaft is a three throw split pin design with counterweights for balancing purposes. The main journals are crossed drilled for rod bearing lubrication. The crankshaft is supported by four select fit main bearings with number 2 serving as the thrust washer location. The rear counterweight has provisions for crankshaft position sensor target wheel mounting. Both the front and rear seals are a single piece design and are mounted to the timing cover and cylinder block.

STANDARD PROCEDURE

STANDARD PROCEDURE - END PLAY

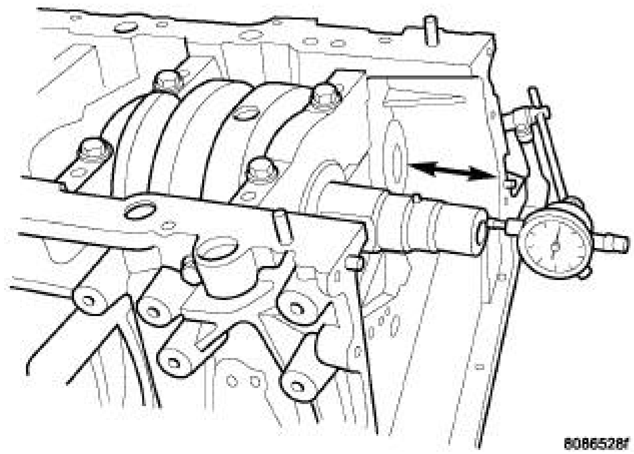


Fig. 360: Checking Crankshaft End Play
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical V6 engine shown in illustration.**

1. Mount Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) to a stationary point at the front of the engine. Locate the probe perpendicular against the nose of the crankshaft.
2. Move the crankshaft all the way to the rear of its travel.
3. Zero the dial indicator.
4. Move the crankshaft forward to the limit of travel and read the dial indicator. Compare the measured end play to the specification. Refer to **ENGINE SPECIFICATIONS**.

NOTE: **Crankshaft thrust washers are not selectable and are only available in a single thickness.**

REMOVAL

REMOVAL

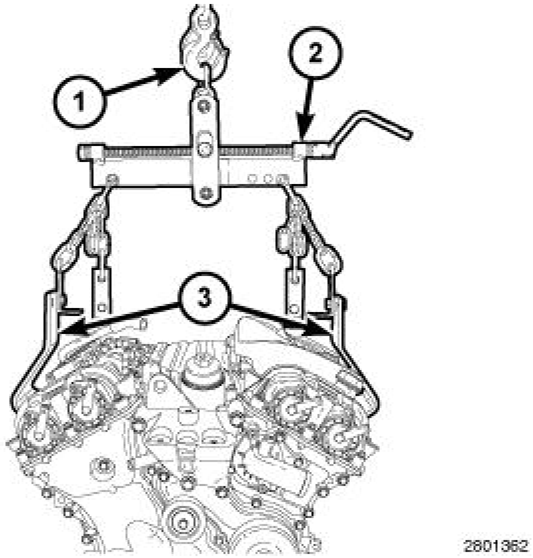


Fig. 361: Lifting Sling, Engine Lifting Brackets & Engine Hoist
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To remove the crankshaft from the engine, the engine must be removed from the vehicle.**

1. Remove the engine. Refer to **REMOVAL**.

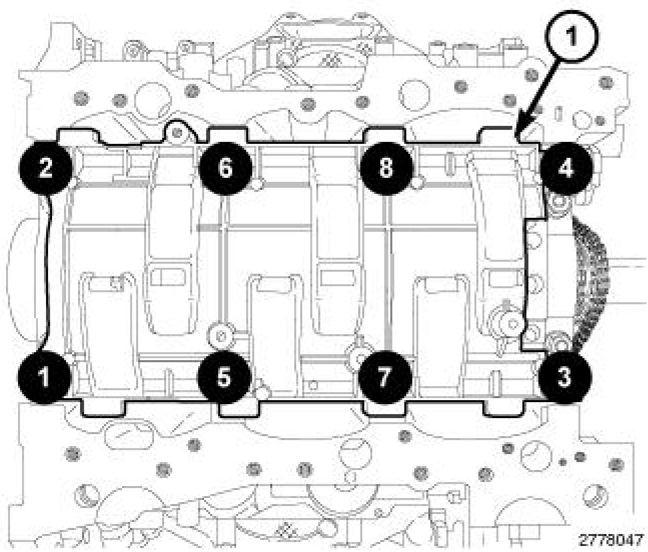
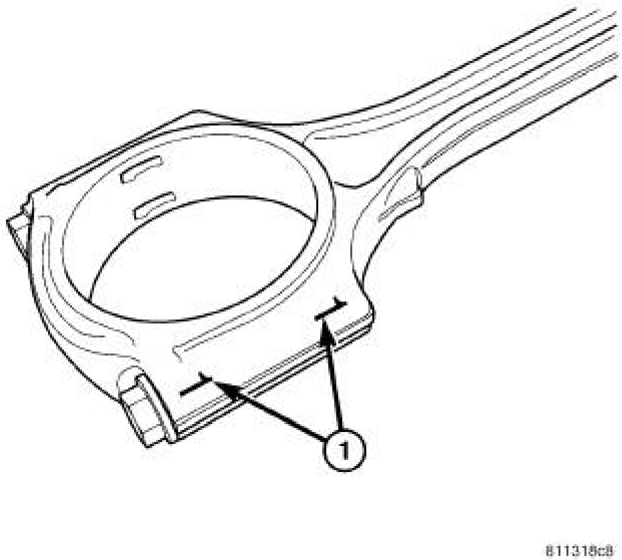


Fig. 362: Main Bearing Cap Bolts From Windage Tray Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

2. Remove the cylinder head covers, spark plugs, upper oil pan, engine timing cover, timing chain and sprockets. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.
3. Remove the flexplate and the rear crankshaft oil seal. Refer to **SEAL, CRANKSHAFT OIL, REAR, REMOVAL**.
4. Remove the oil pump pick-up and engine oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.
5. Remove the eight main bearing cap bolts from the windage tray in the sequence shown in illustration and remove the windage tray (1).



[Fig. 363: Connecting Rod To Cylinder Identification]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **DO NOT use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur**

NOTE: **Connecting rods and bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.**

6. Mark connecting rod and bearing cap positions (1) using a permanent ink marker or scribe tool.

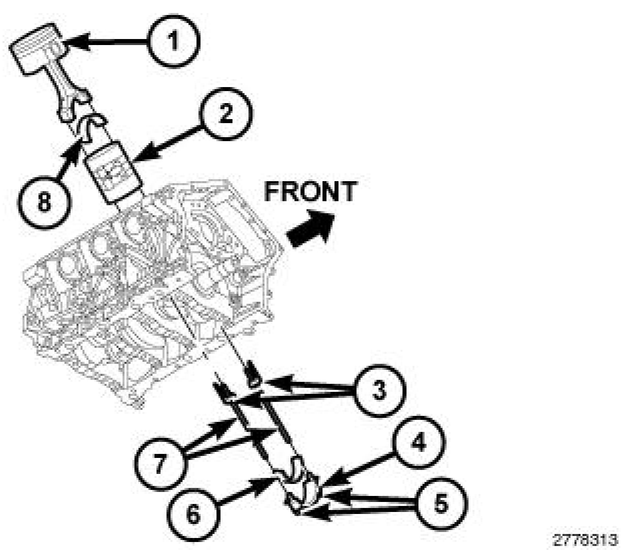


Fig. 364: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical V6 engine configuration shown in illustration.**

CAUTION: Care must be taken not to damage the fractured rod and cap joint face surfaces, as engine damage may occur.

7. Remove the connecting rod cap bolts (5) and the connecting rod caps (4). Discard the cap bolts.

CAUTION: Care must be taken not to nick crankshaft journals, as engine damage may occur.

8. Remove the plastic guide plates (3) from the Guide Pins (special tool #8189, Guide Pins) (7) and install the Guide Pins to the connecting rod.

CAUTION: Avoid contact with the piston oil cooler jet(s). Positioning of the oil cooler jet(s) is critical for proper engine operation.

9. Push the connecting rod and piston into the cylinder until the connecting rod is clear of the crankshaft journal. Remove the guide pins. Repeat this procedure at each cylinder until all of the connecting rods are clear of the crankshaft.

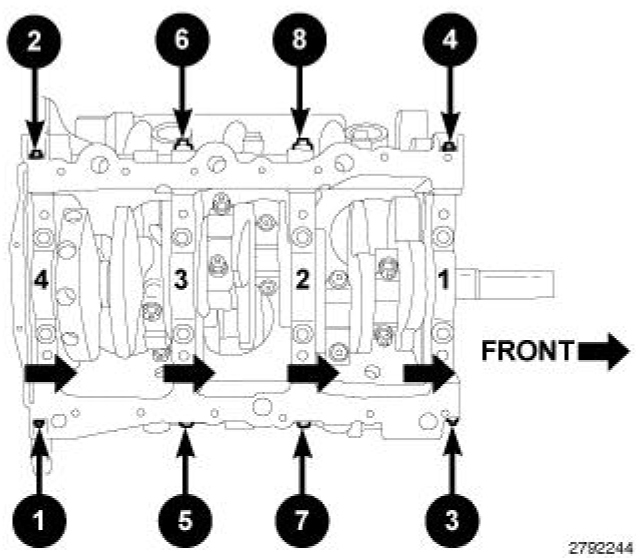


Fig. 365: Main Bearing Tie Bolts Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

Remove the main bearing cross bolts in the sequence shown in illustration.

CAUTION: DO NOT use a number stamp or a punch to mark main bearing caps, as damage to main bearings could occur.

NOTE: Main bearing caps are not interchangeable and are marked to insure correct assembly.

10. Mark the main bearing cap positions using a permanent ink marker or a scribe tool.

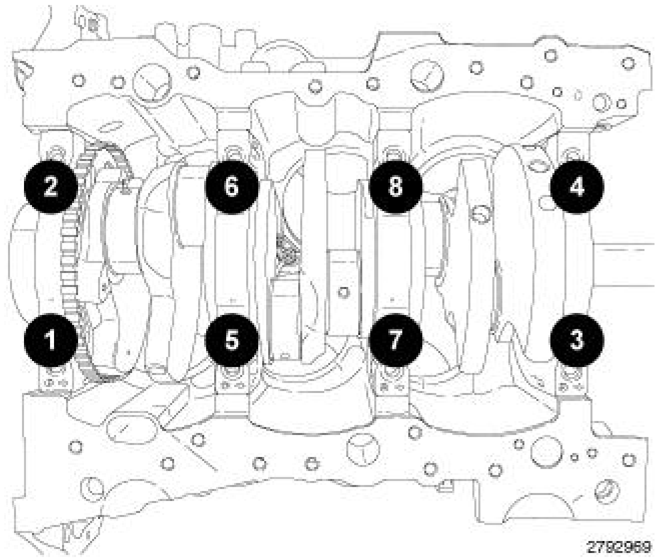


Fig. 366: Main Bearing Cap Bolts Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

11. Remove the eight main bearing cap bolts in the sequence shown in illustration and remove the main bearing caps.

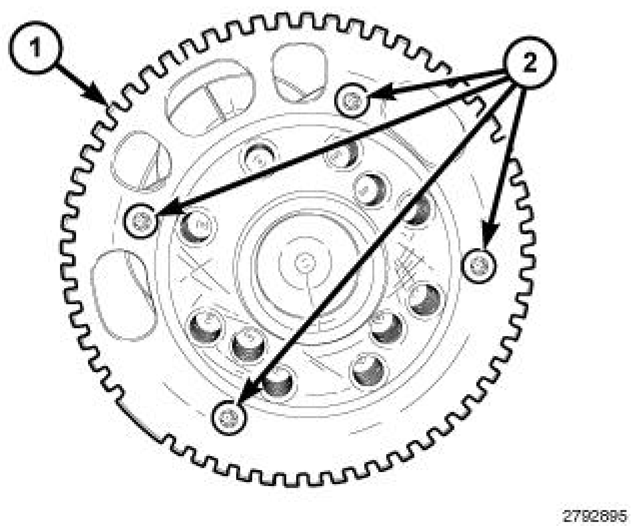


Fig. 367: Target Wheel & Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not rest the crankshaft on the target wheel (1). Damaged or bent target wheel teeth will destroy the target wheels ability to correctly relay crankshaft position to the crankshaft position sensor.**

12. Remove the crankshaft from the engine block.
13. If required, remove the four bolts (2) and the target wheel (1). Discard the four bolts.

INSPECTION

INSPECTION

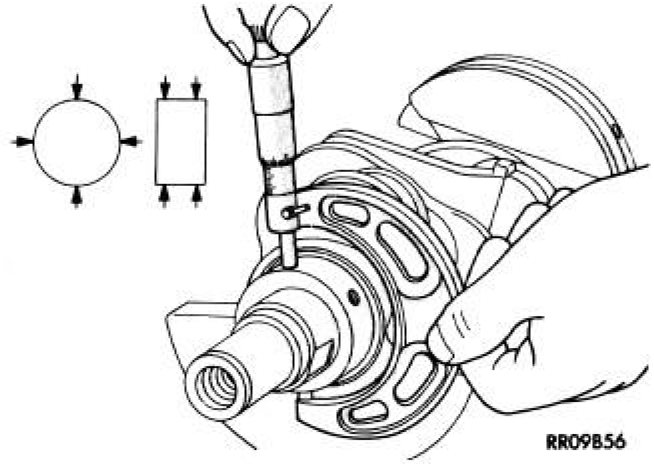


Fig. 368: Crankshaft Journal Measurements - Typical
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical crankshaft journal measurements shown in illustration.**

1. Clean the oil off the bearing journals.
2. Determine the maximum diameter of the journals with a micrometer. Measure at two locations 90Ā° apart at each end of the journals.
3. Compare the measured rod journal diameter to the crankshaft connecting rod bearing journal diameter grade marking chart. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**. Select the bearing size that corresponds to the crankshaft markings for each rod bearing journal that will provide the proper oil clearance.
4. Compare the measured main bearing journal diameter to the crankshaft main bearing journal diameter grade marking chart. Refer to **STANDARD PROCEDURE**. Obtain the main bearing journal grade identification marks from the engine block and select the upper and lower main bearing sizes that will provide the proper oil clearance.
5. For connecting rod journals, verify that the maximum taper and maximum out of round are within specifications. Refer to **ENGINE SPECIFICATIONS**.
6. For main bearing journals, verify that the maximum taper and maximum out of round are within specifications. Refer to **ENGINE SPECIFICATIONS**.

INSTALLATION

INSTALLATION

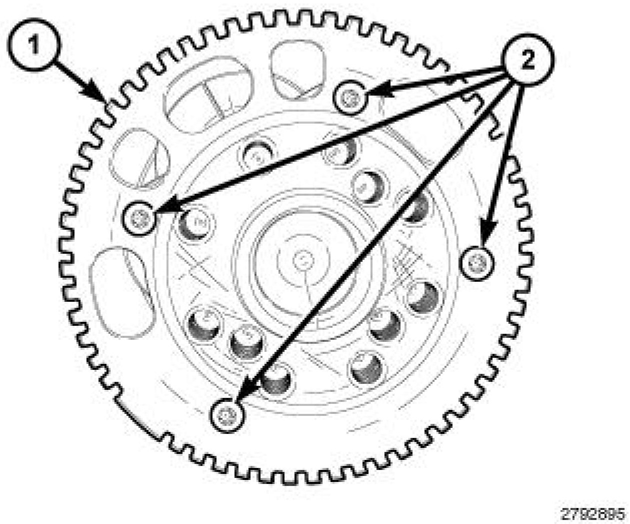


Fig. 369: Target Wheel & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If required, select and fit new crankshaft main bearings to the engine block. Refer to **STANDARD PROCEDURE**.
2. If required, select and fit new bearings to the connecting rod. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.
3. If removed, install the target wheel (1) to the crankshaft with four new bolts (2). Ensure the threaded holes in the crankshaft are free of residual thread lock adhesive. Tighten the bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

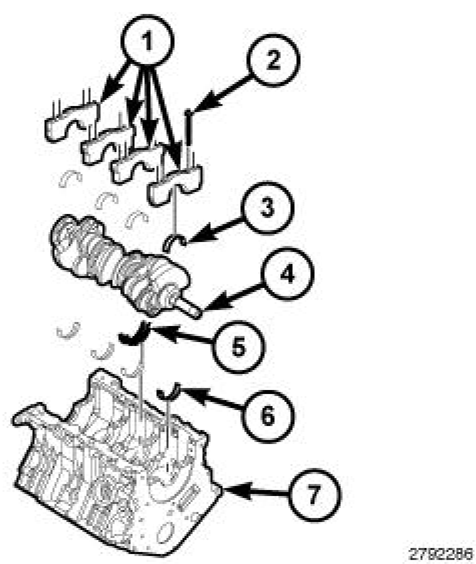


Fig. 370: Main Bearing Caps, Bolts, Crankshaft & Engine Block
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

4. If removed, lubricate and install the upper main bearing halves (6) into the engine block (7).

CAUTION: When installing the crankshaft, use care not to damage bearing surfaces on the crankshaft.

5. Install the crankshaft (4) into the engine block (7).

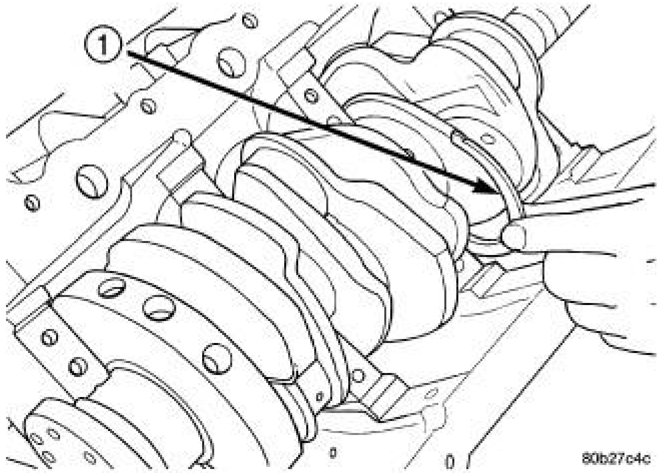


Fig. 371: Thrust Washer Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

6. Installing thrust washers (1) at the No. 2 main bearing location, using the following procedure:
   a. Move the crankshaft forward to the limit of travel. Lubricate and install the front thrust washer (1) by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.
   b. Move the crankshaft rearward to the limit of travel. Lubricate and install the rear thrust washer by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.

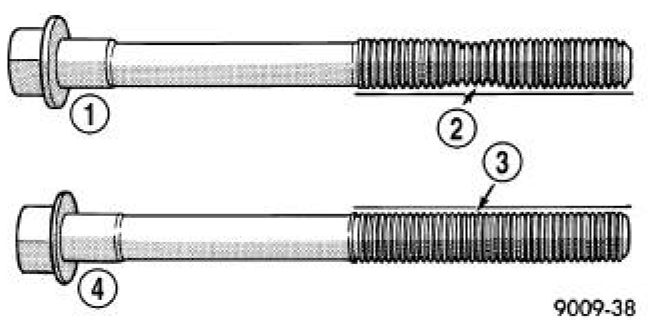
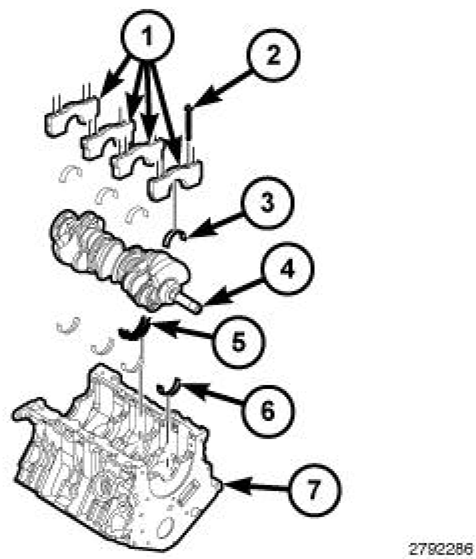


Fig. 372: Checking Cylinder Head Bolts For Stretching (Necking)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The main bearing cap bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

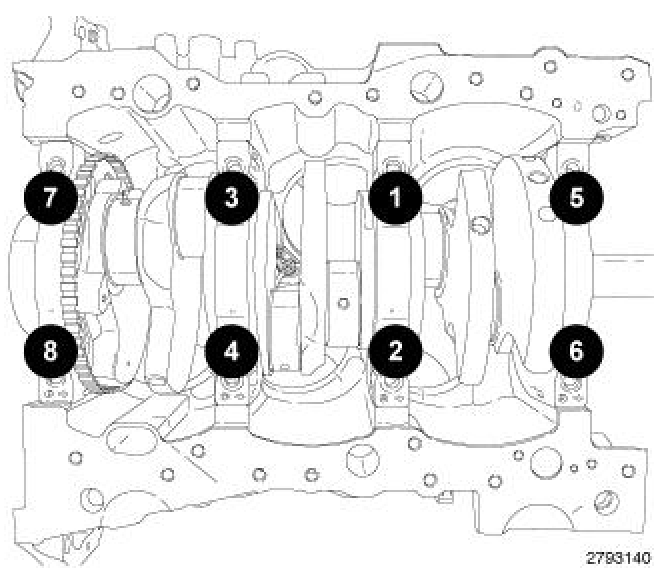
7. Check the main bearing cap bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.



[Fig. 373: Main Bearing Caps, Bolts, Crankshaft & Engine Block](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical V6 engine configuration shown in illustration.**

8. If removed, lubricate and install the lower main bearing halves (3) onto the main caps (1).
9. Install the main bearing caps (1) with two inner main bearing cap bolts (2).



[Fig. 374: Inner Main Bearing Cap Bolts Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

10. Tighten the inner main bearing cap bolts in the sequence shown in illustration to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
11. Measure crankshaft end play. Refer to **CRANKSHAFT, STANDARD PROCEDURE**.

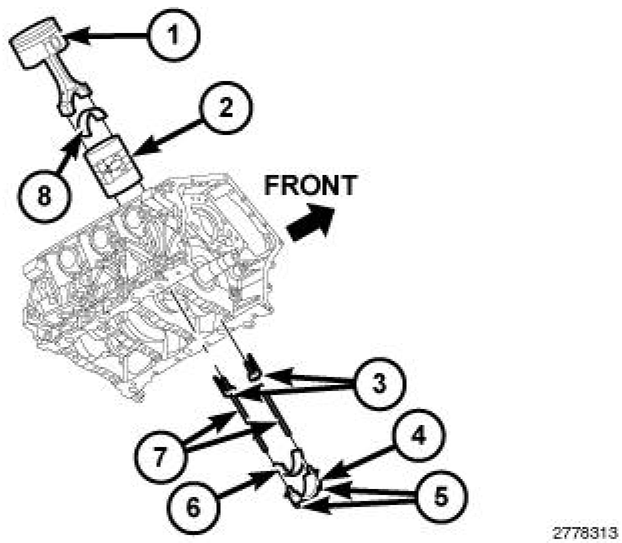


Fig. 375: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical V6 engine configuration shown in illustration.**

12. If removed, install the bearing shell (8) on the connecting rod with the tang inserted into the machined groove in the rod. Lubricate the bearing surface with clean engine oil.

CAUTION: **Care must be taken not to nick crankshaft journals, as engine damage may occur.**

13. Remove the plastic guide plates (3) from the Guide Pins (special tool #8189, Guide Pins) (7) and install the Guide Pins to the connecting rod.

CAUTION: **Avoid contact with the piston oil cooler jet(s). Positioning of the oil cooler jet(s) is critical for proper engine operation.**

14. Pull the connecting rod and piston toward the crankshaft until the connecting rod is seated on the crankshaft journal. Remove the guide pins.

CAUTION: **The connecting rod bolts must not be reused. Always replace the connecting rod bolts whenever they are loosened or removed.**

15. If removed, install the bearing shell (6) on the connecting rod cap (4) with the tang inserted into the machined groove in the cap. Lubricate the bearing surface with clean engine oil.

NOTE: **Do not lubricate the threads of the connecting rod cap bolts (5).**

16. Install the connecting rod cap and bearing with the tang on the same side as the rod. Tighten the **NEW** connecting rod cap bolts (5) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
17. If required, check the connecting rod side clearance. Refer to **STANDARD PROCEDURE**.
18. Repeat the previous steps for the remaining connecting rods.

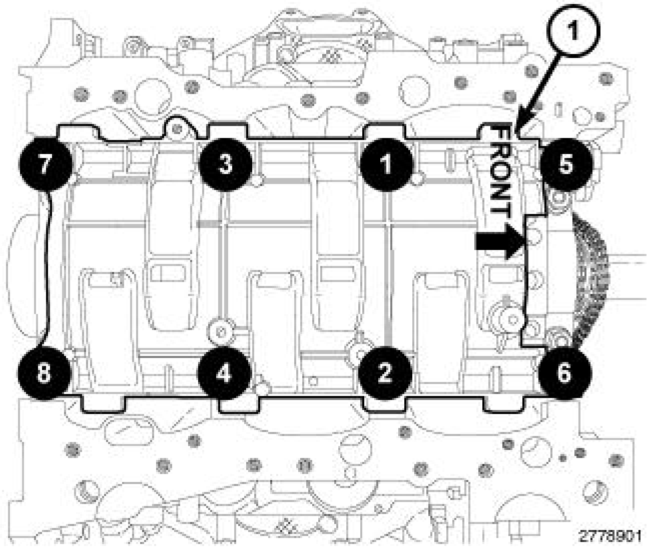


Fig. 376: Windage Tray With Main Bearing Cap Bolts Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

19. Install the windage tray (1) with eight main bearing cap bolts. Tighten the bolts in the sequence shown in illustration to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

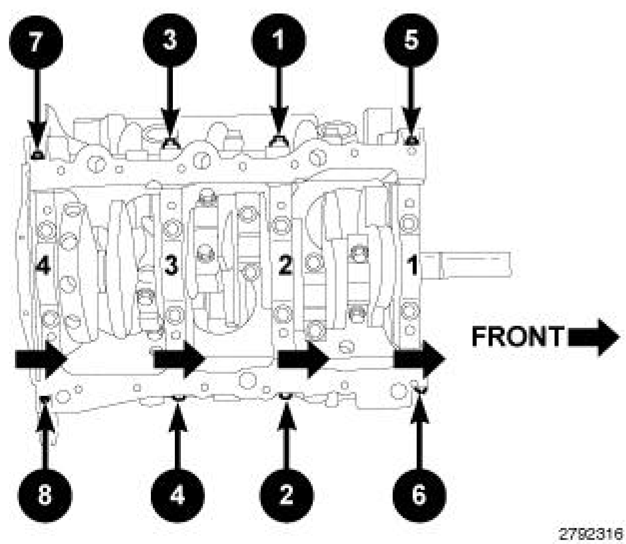


Fig. 377: Main Bearing Tie Bolts Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical V6 engine configuration shown in illustration.**

20. Install the eight main bearing tie bolts. Tighten the bolts in the sequence shown in illustration to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
21. Install the engine oil pump and oil pump pick-up. Refer to **PUMP, ENGINE OIL, INSTALLATION**.
22. Install the rear crankshaft oil seal and flexplate. Refer to **SEAL, CRANKSHAFT OIL, REAR, INSTALLATION**.
23. Install the timing chain and sprockets. Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION**.

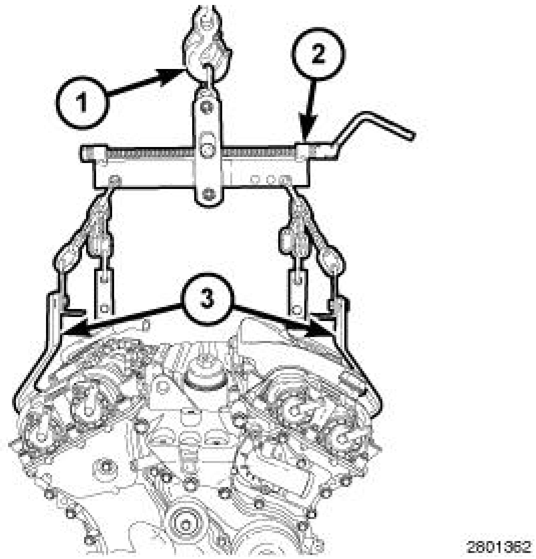


Fig. 378: Lifting Sling, Engine Lifting Brackets & Engine Hoist
Courtesy of CHRYSLER GROUP, LLC

24. Install the engine. Refer to **INSTALLATION**.
25. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **STANDARD PROCEDURE**.
26. Connect the negative battery cable.
27. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
28. Operate the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **STANDARD PROCEDURE** .

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

DAMPER, VIBRATION

REMOVAL

REMOVAL

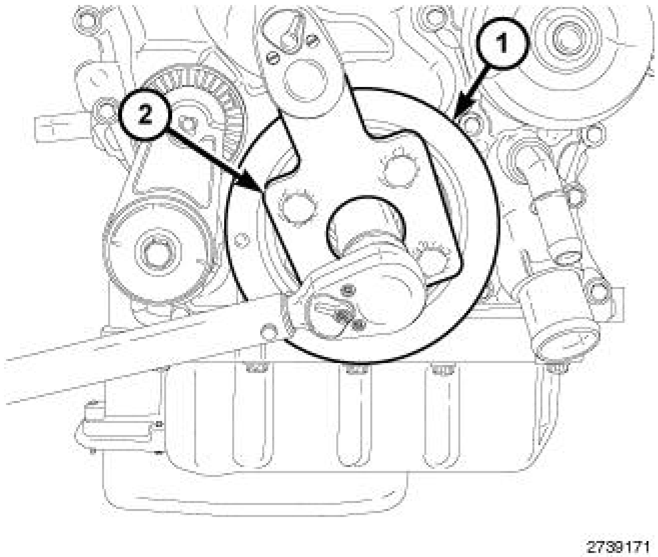


Fig. 379: Crankshaft Vibration Damper & Vibration Damper Holder
Courtesy of CHRYSLER GROUP, LLC

1. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .

NOTE: A force greater than 350 N.m (260 ft. lbs.) may be required to remove the crankshaft vibration damper bolt.

2. Hold the crankshaft vibration damper (1) with Vibration Damper Holder (special tool #10198, Holder, Vibration Damper) (2) and remove the crankshaft vibration damper bolt.
3. Pull the crankshaft vibration damper (1) off of the crankshaft.

INSTALLATION

INSTALLATION

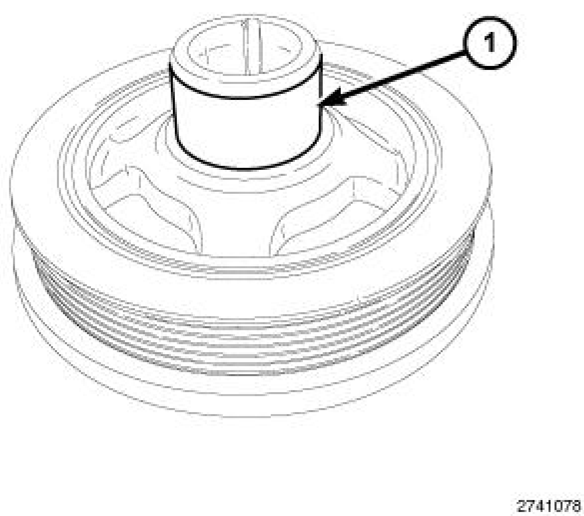


Fig. 380: Front Crankshaft Seal Surface
Courtesy of CHRYSLER GROUP, LLC

1. Apply a light coating of engine oil to the front crankshaft seal surface (1).

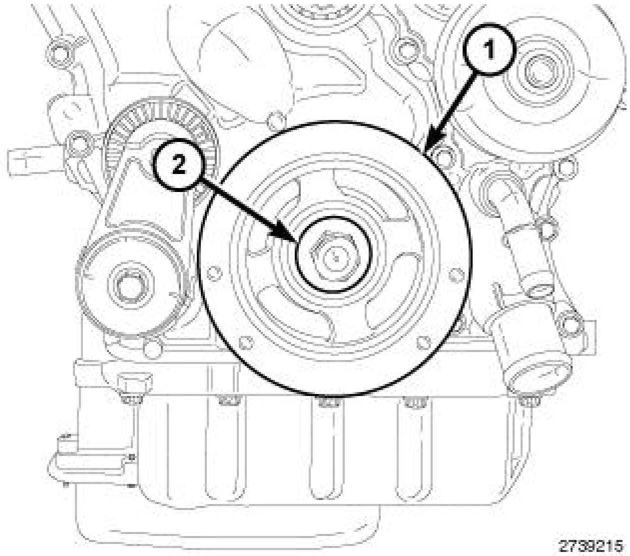


Fig. 381: Crankshaft Vibration Damper & Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Align the crankshaft vibration damper (1) to the flywheel key on the crankshaft and install the damper. Seat the damper on the crankshaft sprocket.
3. Install and hand tighten the crankshaft vibration damper bolt (2).

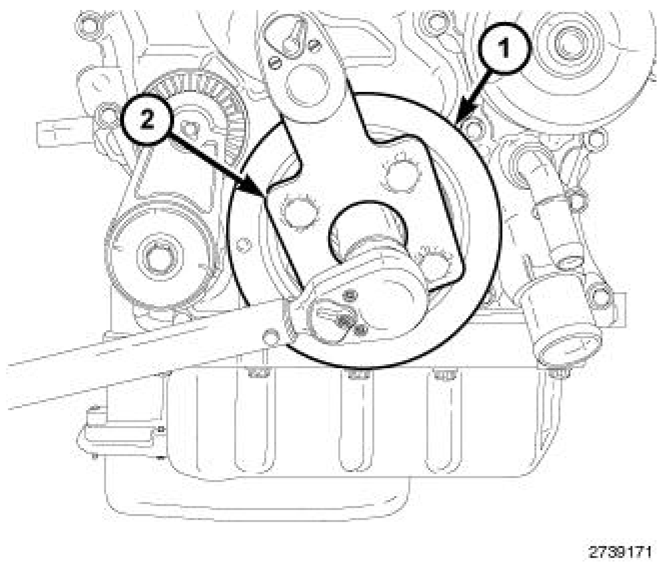


Fig. 382: Crankshaft Vibration Damper & Vibration Damper Holder
Courtesy of CHRYSLER GROUP, LLC

4. Hold the crankshaft vibration damper (1) with Vibration Damper Holder (special tool #10198, Holder, Vibration Damper) (2) and tighten the crankshaft vibration damper bolt to the proper specification.

   Refer to **TORQUE SPECIFICATIONS**.

5. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

FLEXPLATE

REMOVAL

REMOVAL

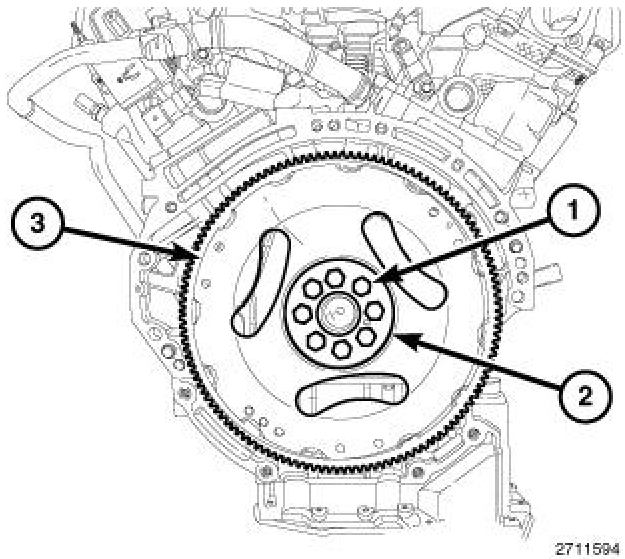


Fig. 383: Flexplate, Spacer Plate & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transmission. Refer to **REMOVAL** .
2. Remove the bolts (1) and the spacer plate (2).
3. Remove the flexplate (3).

INSTALLATION

INSTALLATION

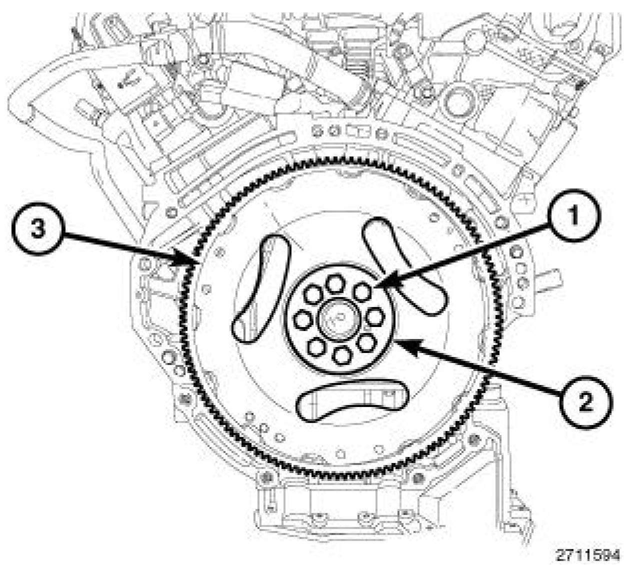


Fig. 384: Flexplate, Spacer Plate & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the flexplate (3) onto the crankshaft.
2. Install the spacer (2) and the bolts (1) hand tight.
3. Tighten the flexplate retaining bolts (1) in a crisscross pattern to the proper specification. Refer to

TORQUE SPECIFICATIONS.

4. Install the transmission. Refer to **INSTALLATION** .

RING(S), PISTON

STANDARD PROCEDURE

STANDARD PROCEDURE - PISTON RING FITTING

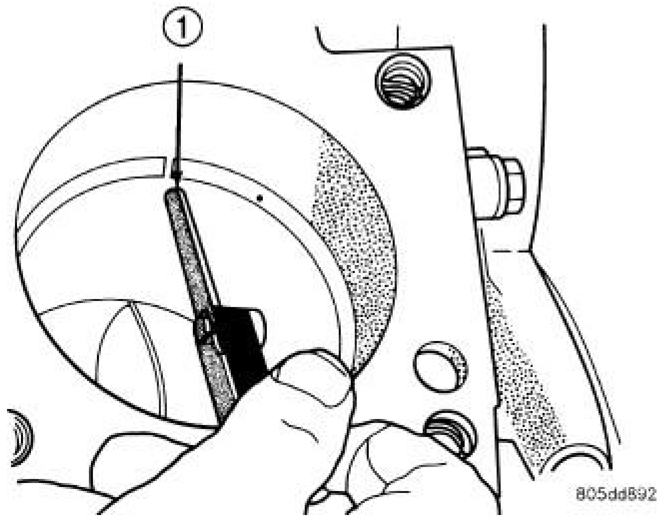


Fig. 385: Measuring Piston Ring End Gap
Courtesy of CHRYSLER GROUP, LLC

1. Wipe the cylinder bore clean.
2. Using a piston, to ensure that the ring is squared in the cylinder bore, slide the ring downward into the cylinder to a position 12 mm (0.50 in.) from the bottom of the cylinder bore.
3. Using a feeler gauge (1), check the ring end gap. Replace any rings not within specification.

Ring Position	Ring End Gap
No. 1 (top) Ring	0.25 - 0.40 mm (0.010 - 0.016 in.)
No. 2 (center) Ring	0.30 - 0.45 mm (0.012 - 0.018 in.)
Oil Control Ring (Steel Rail)	0.15 - 0.66 mm (0.006- 0.26 in.)

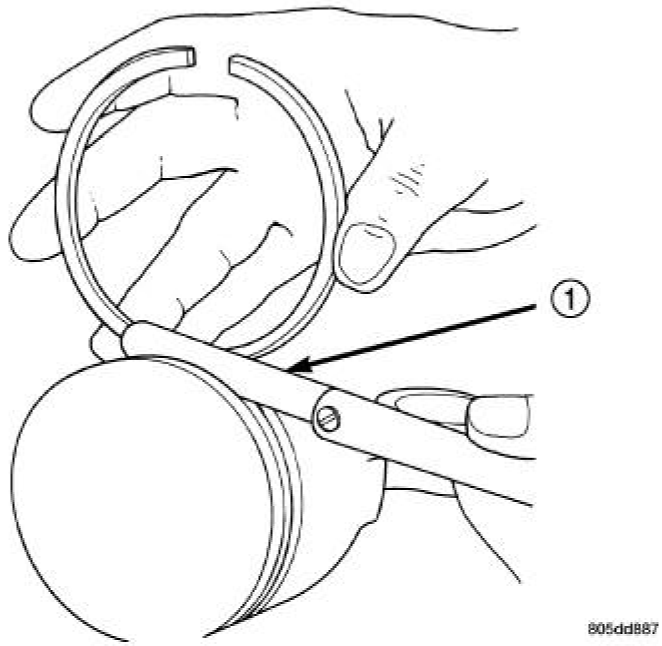


Fig. 386: Checking Piston Ring Grooves Clearances
Courtesy of CHRYSLER GROUP, LLC

4. Clean the piston ring grooves. Remove any nicks or burrs.
5. Measure the ring side clearance as shown in illustration. Make sure the feeler gauge (1) fits snugly between the ring land and the ring. Replace any ring not within specification.

Ring Position	Ring Side Clearance
No. 1 (top) Ring	0.025 - 0.033 mm (0.0010 - 0.0013 in.)
No. 2 (center) Ring	0.030 - 0.078 mm (0.0012 - 0.0031 in.)
Oil Control Ring (Steel Rails)	0.007 - 0.173 mm (.0003 - 0.0068 in.)

REMOVAL

REMOVAL

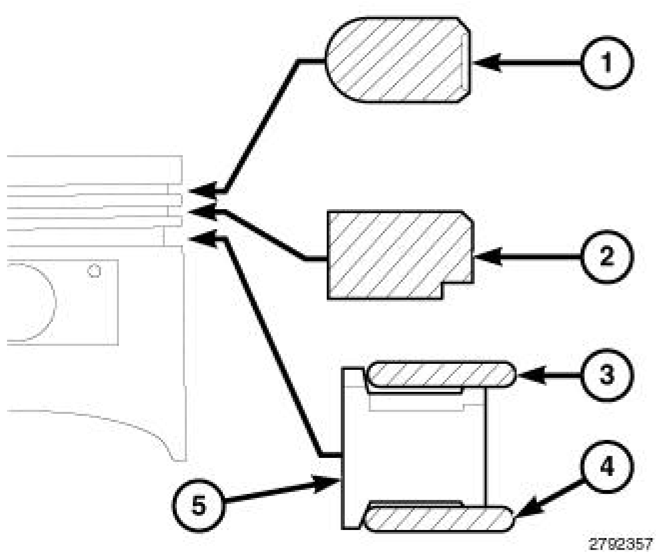


Fig. 387: Piston Ring Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical piston shown in illustration.**

1. Remove the piston and connecting rod(s). Refer to **ROD, PISTON AND CONNECTING, REMOVAL**.

CAUTION: **To avoid damage to the piston rings, they must be removed in the following order:**

- **No. 1 (upper) piston ring (1)**
- **No. 2 (intermediate) piston ring (2)**
- **Oil ring upper side rail (3)**
- **Oil ring lower side rail (4)**
- **Oil ring expander (5)**

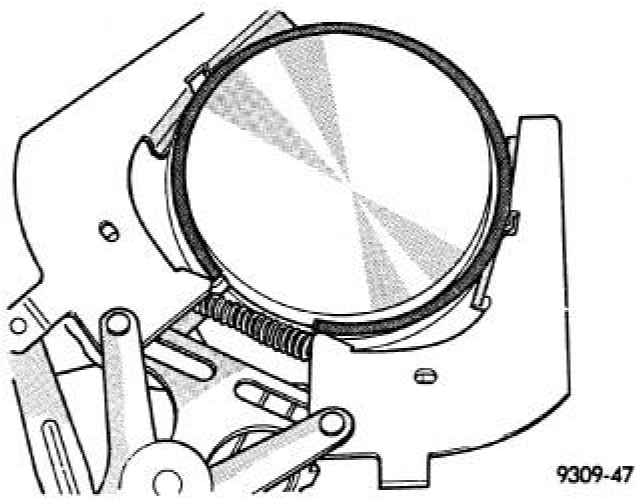


Fig. 388: Installing Intermediate Piston Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical piston shown in illustration.**

2. Remove the No. 1 (upper) piston ring using a ring expander tool.
3. Remove the No. 2 (intermediate) piston ring using a ring expander tool.

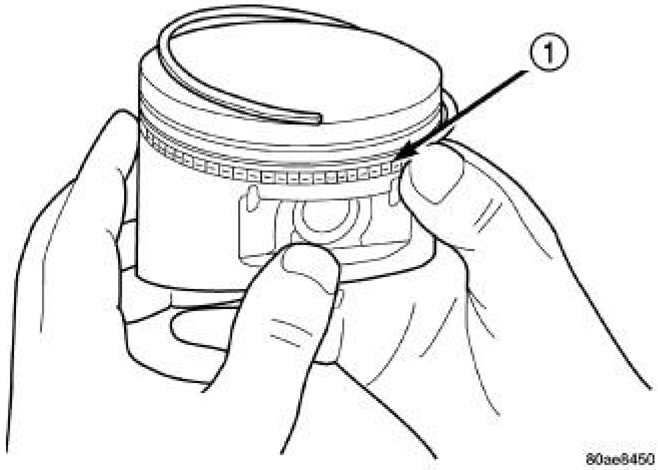


Fig. 389: Installing Piston Ring Side Rail
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical piston shown in illustration. Do not use a piston ring expander to remove the oil ring side rails.**

4. Remove the oil ring upper side rail.
5. Remove the oil ring lower side rail.
6. Remove the oil ring expander (1).

INSTALLATION

INSTALLATION

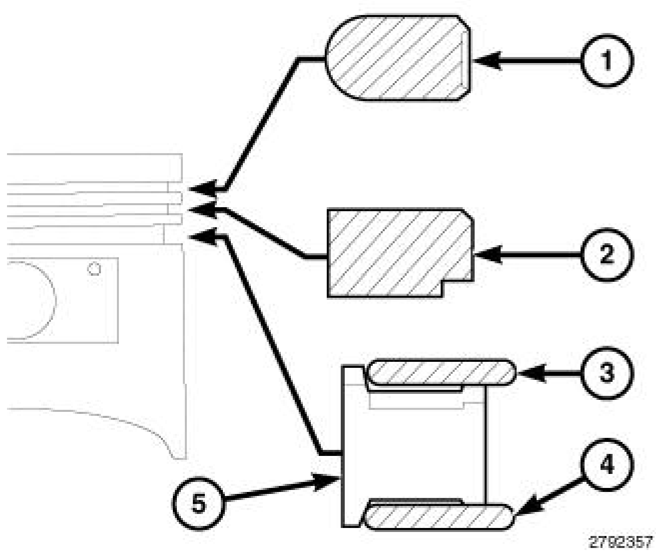


Fig. 390: Piston Ring Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical piston shown in illustration.**

1. If required, fit new rings to the piston. Refer to STANDARD PROCEDURE.

CAUTION: **To avoid damage to the piston rings, they must be installed in the following order:**

- **Oil ring expander (5)**
- **Oil ring lower side rail (4)**
- **Oil ring upper side rail (3)**
- **No. 2 (intermediate) piston ring (2)**
- **No. 1 (upper) piston ring (1)**

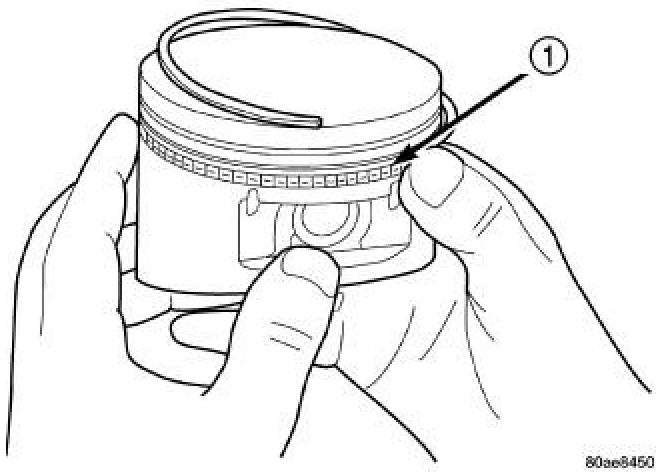


Fig. 391: Installing Piston Ring Side Rail
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical piston shown in illustration. Do not use a piston ring expander to install the oil ring side rails.**

2. Install the oil ring expander (1).
3. Install the oil ring lower side rail by placing one end between the piston ring groove and the oil ring expander. Hold this end firmly and press down the portion to be installed until the side rail is in position.
4. Install the oil ring upper side rail in the same manner as the lower side rail.

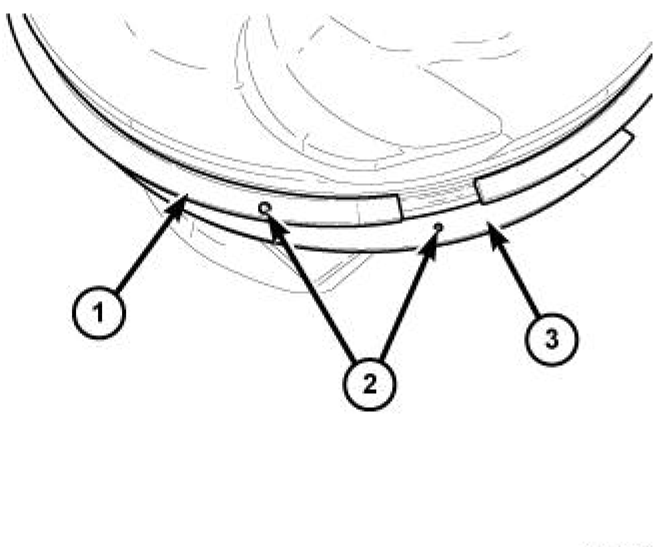


Fig. 392: Identifying Dot Marks On Piston Rings
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The No. 1 (upper) piston ring (1) and No. 2 (intermediate) piston ring (3) have a different cross section. Install the rings with manufacturers I.D. mark (dot) (2) facing up, towards the top of the piston.**

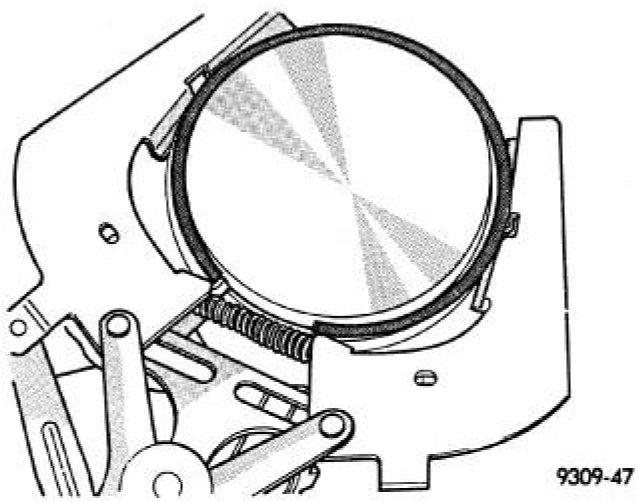


Fig. 393: Installing Intermediate Piston Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical piston shown in illustration.**

5. Install the No. 2 (intermediate) piston ring using a ring expander tool.
6. Install the No. 1 (upper) piston ring using a ring expander tool.
7. Rotate the rings around the piston, the rings must rotate in the grooves with out binding.

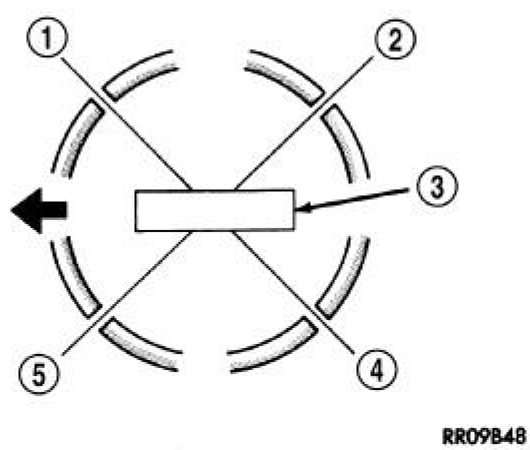


Fig. 394: Piston Ring End Gap Position
Courtesy of CHRYSLER GROUP, LLC

8. Position the piston ring end gaps as follows:
    - Oil ring expander gap (5)

- Oil ring lower side rail end gap (4)
- Oil ring upper side rail end gap (1)
- No. 2 (intermediate) ring end gap (5)
- No. 1 (upper) ring end gap (2)

9. Install the piston and connecting rod(s). Refer to **ROD, PISTON AND CONNECTING, INSTALLATION**.

ROD, PISTON AND CONNECTING

DESCRIPTION

DESCRIPTION

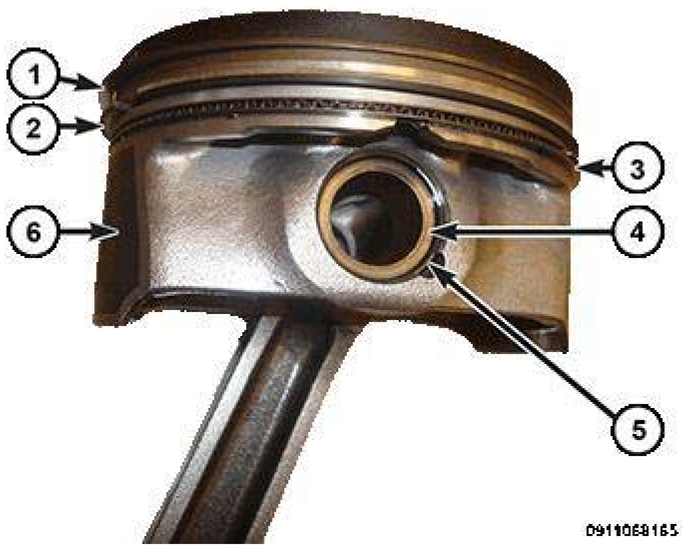


Fig. 395: Piston Components
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use a metal stamp to mark connecting rods as damage may result, instead use ink or a scratch awl.

The pistons are a lightweight design with ultra low tension piston rings for improved fuel economy:

- The pistons are made of a high strength aluminum alloy and the piston skirt (6) has a MolyTÃ® coating.
- The top piston ring land has an anodized coating for improved wear performance.
- The piston is connected to the rod using a full floating pin (5) with a locking clip (4) on both sides.
- The connecting rod is powder-forged steel with a bolted cracked cap design. The connecting rod bolts are not reusable.
- Pistons are available in three diameters (A, B and C) with grade markings for each bore indicated on the side of the cylinder block.
- The upper compression ring (1) is a 1.2 mm steel ring with Physical Vapor Deposition (PVD) coating.
- The intermediate compression ring (2) is 1.2 mm micro napier design.
- Both compression rings have a dot or a mark on the piston ring. The marked side of the ring must face the

top of the piston.

- The 2 mm three piece oil control ring (3) is very thin. Both the rail segments and the expander are nitride steel.

STANDARD PROCEDURE

PISTON FITTING

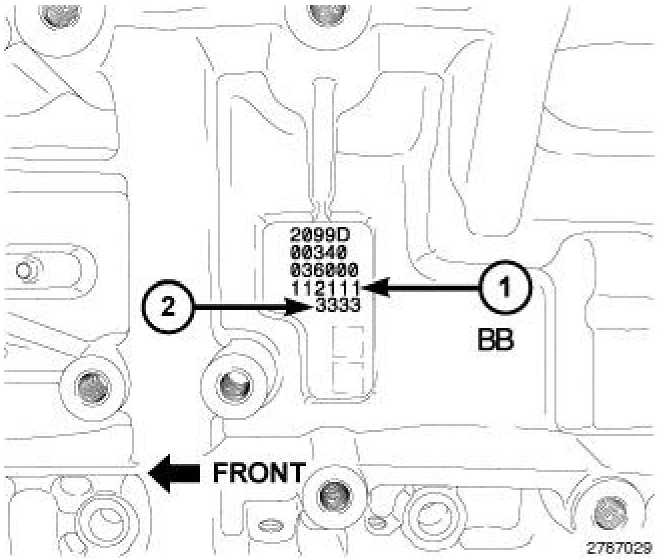


Fig. 396: Engine Block Main Bearing Journal Diameter Grade Markings
Courtesy of CHRYSLER GROUP, LLC

The pistons are "select fit" to achieve proper oil clearance. Engine block cylinder bore diameter grade markings (1) are stamped into the left side of the engine block. These marks are read from left to right, corresponding with cylinder number 1, 2, 3, 4, 5, 6.

Engine block cylinder bore diameter grade markings correspond to specific cylinder bore diameters. The chart below identifies the two engine block grade markings and their associated cylinder bore diameters.

Engine Block Marking	Cylinder Bore Size mm (in.)
1	95.995 Â± 0.005 mm (3.7793 Â± 0.0002 in.)
2	96.005 Â± 0.005 mm (3.7797 Â± 0.0002 in.)

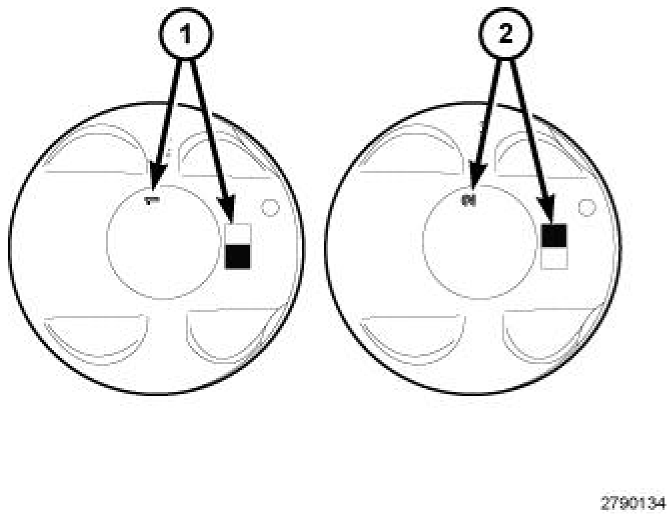


Fig. 397: Piston Size Located On Piston Crown
Courtesy of CHRYSLER GROUP, LLC

The piston is marked with the piston size (1 and 2) on the piston crown. The pistons are available in two different sizes in order to achieve the desired oil clearance. Select the piston size that corresponds to the engine block cylinder bore diameter grade markings for each cylinder.

Pistons are available in two sizes. The chart below identifies the two piston sizes.

Piston Marking	Size mm (in.)	
	Metal to Metal	Metal to Coating
1	95.995 Â± 0.005 mm (3.7793 Â± 0.0002 in.)	95.970 - 96.000 mm (3.7783 - 3.7795 in.)
2	95.965 Â± 0.005 mm (3.7781 Â± 0.0002 in.)	95.980 - 96.010 mm (3.7787 - 3.7835 in.)

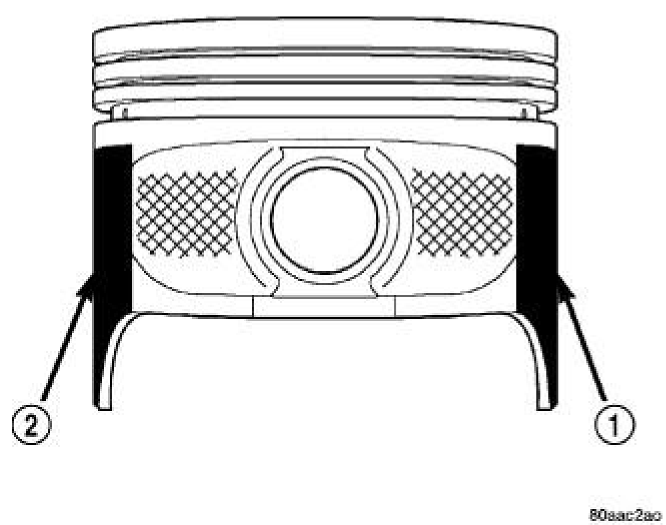


Fig. 398: Identifying Coating Material On Piston
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical coated piston shown in illustration.**

The coated pistons are serviced with the piston pin and connecting rod pre-assembled. The coating material (1 and 2) is applied to the piston after the final piston machining process. Piston installation into the cylinder bore requires slightly more pressure than that required for non-coated pistons. The bonded coating on the piston will give the appearance of a line-to-line fit with the cylinder bore.

CONNECTING ROD SIDE CLEARANCE

DIAL INDICATOR

1. Mount Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) to a stationary point on the engine. Locate the probe perpendicular to and resting against the connecting rod cap being checked.
2. Move the connecting rod all the way to the rear of its travel.

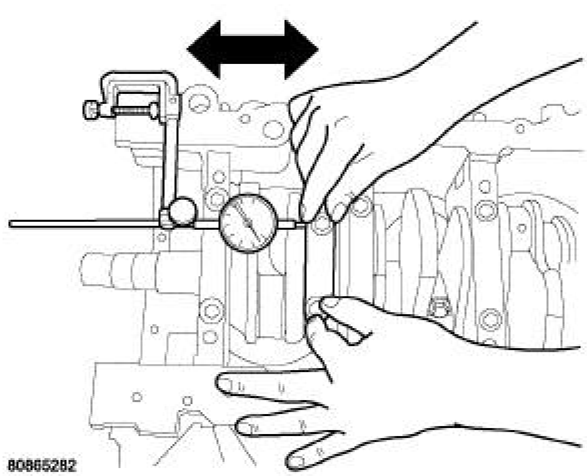


Fig. 399: Measuring Connecting Rod Side Clearance
Courtesy of CHRYSLER GROUP, LLC

3. Zero the dial indicator.
4. Move the connecting rod forward to the limit of travel and read the dial indicator. Compare the measured side clearance to the specification. Refer to **ENGINE SPECIFICATIONS**.
5. Repeat this procedure for each connecting rod. Rotate the crankshaft for connecting rod accessibility.

FEELER GAUGE

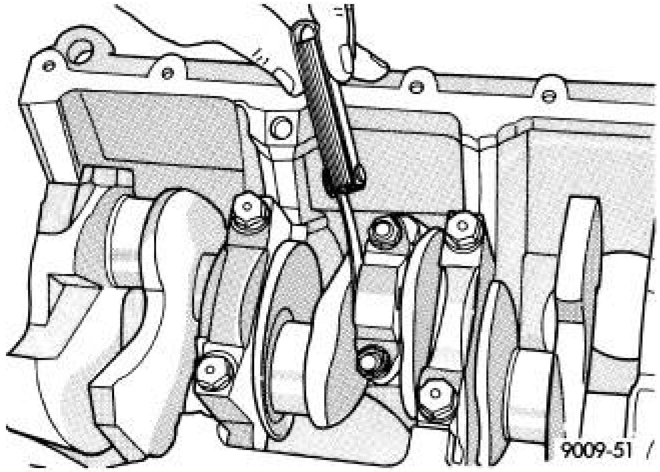


Fig. 400: Measuring Gap Between Connecting Rod & Crankshaft Journal Flange
Courtesy of CHRYSLER GROUP, LLC

1. Slide a snug-fitting feeler gauge between the connecting rod and crankshaft journal flange. Compare the measured side clearance to the specification. Refer to **ENGINE SPECIFICATIONS**.
2. Repeat this procedure for each connecting rod. Rotate the crankshaft for connecting rod accessibility.

REMOVAL

REMOVAL

1. Remove the oil pans, engine timing cover and cylinder heads. Refer to **CYLINDER HEAD, REMOVAL**.

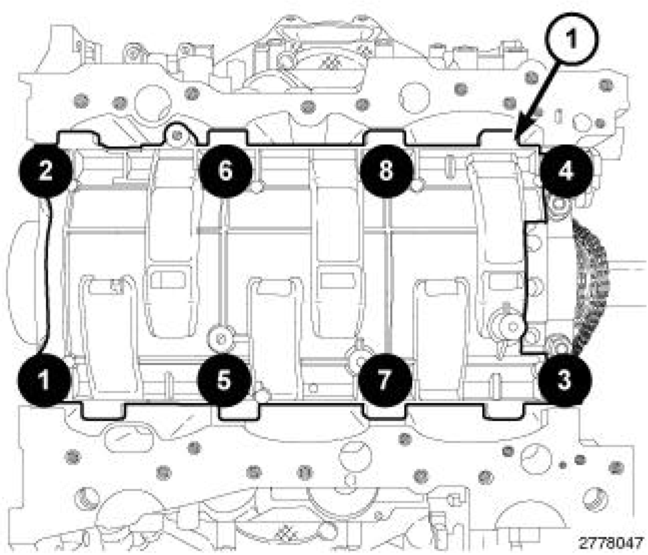


Fig. 401: Main Bearing Cap Bolts From Windage Tray Removal Sequence
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.
3. Remove the eight main bearing cap bolts from the windage tray in the sequence shown in illustration and remove the windage tray (1).

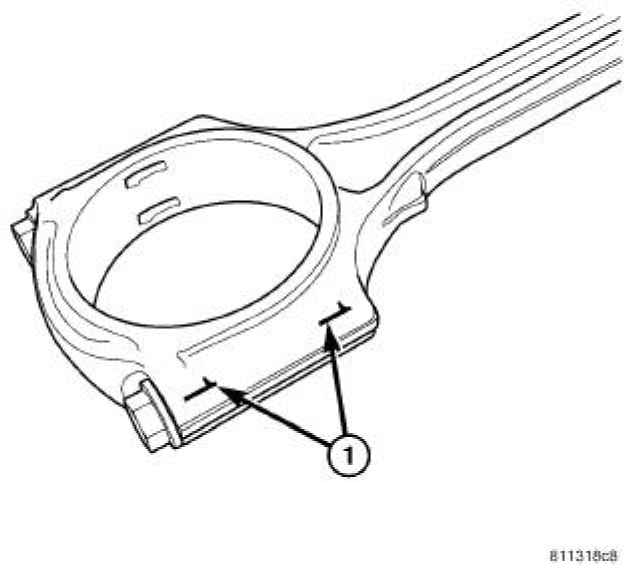


Fig. 402: Connecting Rod To Cylinder Identification
Courtesy of CHRYSLER GROUP, LLC

4. If necessary, remove the top ridge of the cylinder bores with a reliable ridge reamer before removing the pistons from the engine block. **Be sure to keep the tops of pistons covered during this operation.** Pistons and connecting rods must be removed from the top of the engine block. When removing piston and connecting rod assemblies from the engine, rotate the crankshaft clockwise so that each connecting rod is centered in the cylinder bore.

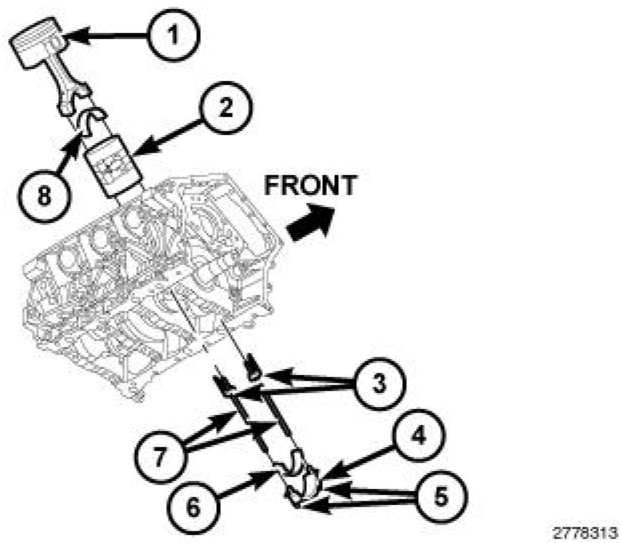
CAUTION: **DO NOT use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur**

NOTE: **Connecting rods and bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.**

5. Mark connecting rod and bearing cap positions (1) using a permanent ink marker or scribe tool.

NOTE: **Typical V6 engine configuration shown in illustration.**

CAUTION: **Care must be taken not to damage the fractured rod and cap joint face surfaces, as engine damage may occur.**



[Fig. 403: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins]
Courtesy of CHRYSLER GROUP, LLC

6. Remove the connecting rod cap bolts (5) and the connecting rod cap (4). Discard the cap bolts.

CAUTION: Care must be taken not to nick crankshaft journals, as engine damage may occur.

7. Remove the plastic guide plates (3) from the Guide Pins (special tool #8189, Guide Pins) (7) and install the Guide Pins to the connecting rod being removed.

CAUTION: Avoid contact with the piston oil cooler jet(s). Positioning of the oil cooler jet(s) is critical for proper engine operation.

8. Remove the piston and connecting rod (1) from cylinder bore.
9. Repeat the previous steps for each piston being removed.
10. Immediately after piston and connecting rod removal, reinstall the bearing cap (4) on the mating connecting rod to prevent damage to the fractured cap and rod surfaces.
11. If required, remove the piston rings. Refer to **RING(S), PISTON, REMOVAL**.
12. Repeat the previous steps for each piston being removed.

CLEANING

CLEANING

CAUTION: DO NOT use a wire wheel or other abrasive cleaning devise to clean the pistons or connecting rods. The pistons have a Moly coating, this coating must not be damaged.

CAUTION: Do not remove the piston pin from the piston and connecting rod assembly.

1. Clean the pistons in warm water using a suitable cleaning solvent and then towel dry.
2. Use a wood or plastic scraper to clean the ring land grooves.

INSPECTION

INSPECTION

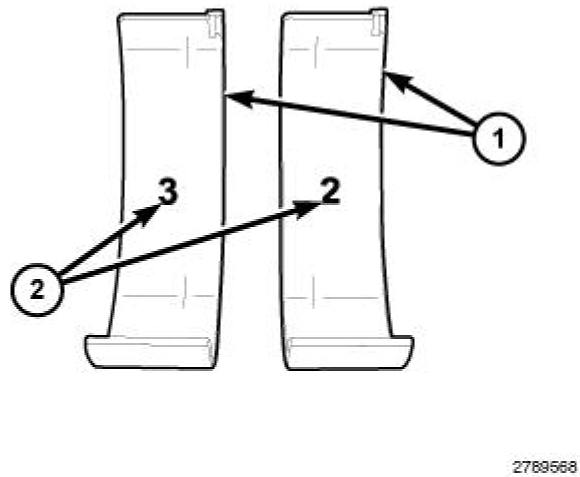


Fig. 404: Connecting Rod Bearing Shells & Bearing Size
Courtesy of CHRYSLER GROUP, LLC

1. Wipe the inserts (1) clean.
2. Inspect the inserts for abnormal wear patterns, scoring, grooving, fatigue, pitting and for metal or other foreign material imbedded in the lining.
3. Inspect the back of the inserts for fractures, scrapes, or irregular wear patterns.
4. Inspect the insert locking tabs for damage.
5. Replace any bearing that shows abnormal wear. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.

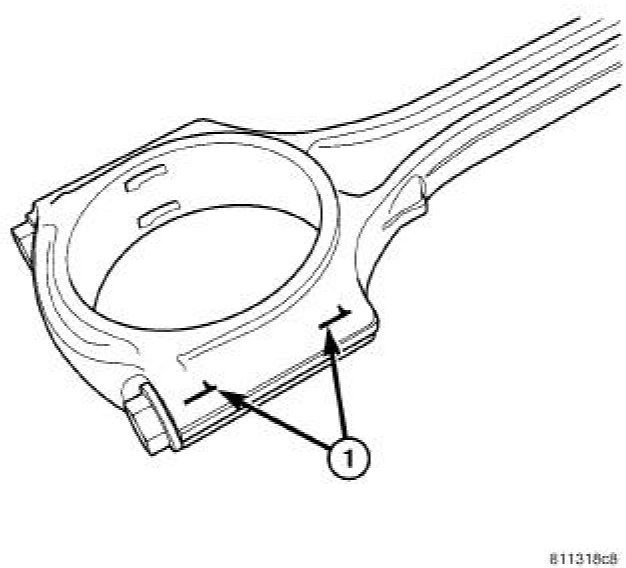


Fig. 405: Connecting Rod To Cylinder Identification
Courtesy of CHRYSLER GROUP, LLC

6. Inspect the connecting rod bearing bores for signs of scoring, nicks and burrs.

NOTE: **Misaligned or bent connecting rods can cause abnormal wear on pistons, piston rings, cylinder walls, connecting rod bearings and crankshaft connecting rod journals. If wear patterns or damage to any of these components indicate the probability of a misaligned connecting rod, inspect it for correct rod alignment.**

7. Replace misaligned, bent or twisted connecting rods.

NOTE: **Connecting rods are serviced with the piston pre-assembled. The pistons are "select fit" to achieve proper oil clearance. Refer to STANDARD PROCEDURE.**

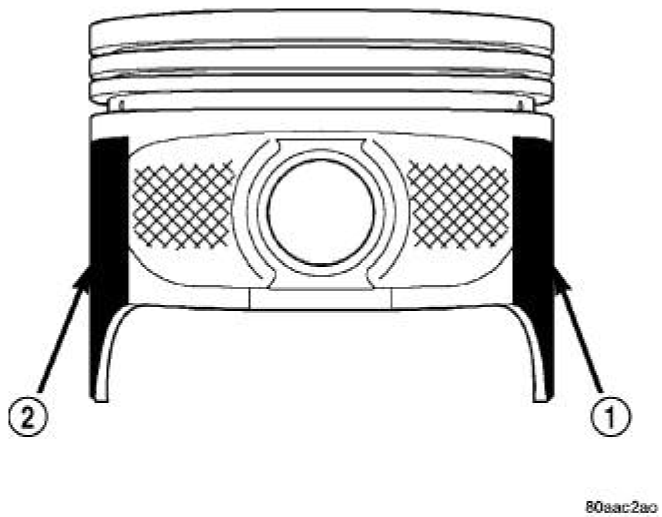


Fig. 406: Identifying Coating Material On Piston
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical coated piston shown in illustration.**

8. Inspect the piston for scoring or scraping marks in the piston skirts. Check the ring lands for cracks and/or deterioration.
9. Check the piston for taper and out of round shape.

NOTE: **The coating material (1 and 2) is applied to the piston after the final piston machining process. Measuring the outside diameter of a coated piston will not provide accurate results. Therefore measuring the inside diameter of the cylinder bore with a dial Bore Gauge is MANDATORY . Refer to INSPECTION.**

10. Compare the measured cylinder bore diameter to the engine block cylinder bore grade marking chart. Select the piston size that corresponds to the engine block markings for each cylinder to provide the proper oil clearance. Refer to STANDARD PROCEDURE.

NOTE: **Piston installation into the cylinder bore requires slightly more pressure than that required for non-coated pistons. The bonded coating on the piston will give the appearance of a line-to-line fit with the cylinder bore.**

NOTE: **The coated pistons will be serviced with the piston pin and connecting rod pre-assembled.**

INSTALLATION

INSTALLATION

1. If required, select and fit new piston and connecting rod assemblies to the engine block. Refer to **STANDARD PROCEDURE**.
2. If required, select and fit new bearings to the connecting rod. Refer to **BEARING(S), CONNECTING ROD, STANDARD PROCEDURE**.
3. If required, hone the cylinder bores. Refer to **ENGINE BLOCK, STANDARD PROCEDURE**.
4. If removed, install the piston rings. Refer to **RING(S), PISTON, INSTALLATION**.

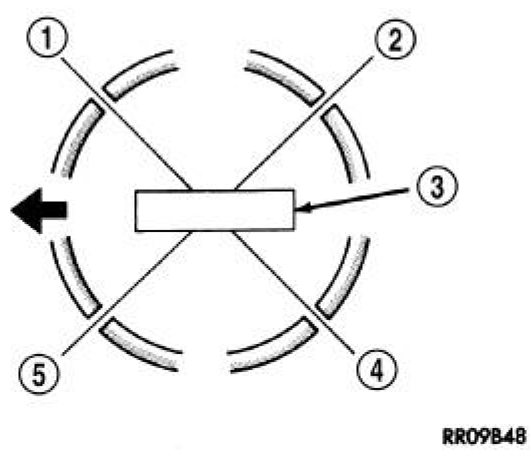


Fig. 407: Piston Ring End Gap Position
Courtesy of CHRYSLER GROUP, LLC

5. Position the piston ring end gaps as follows:
   - Oil ring expander gap (5)
   - Oil ring lower side rail end gap (4)
   - Oil ring upper side rail end gap (1)
   - No. 2 (intermediate) ring end gap (5)
   - No. 1 (upper) ring end gap (2)

NOTE: **Typical V6 engine configuration shown in illustration.**

NOTE: **Ensure the position of the ring end gaps does not change when installing the ring compressor.**

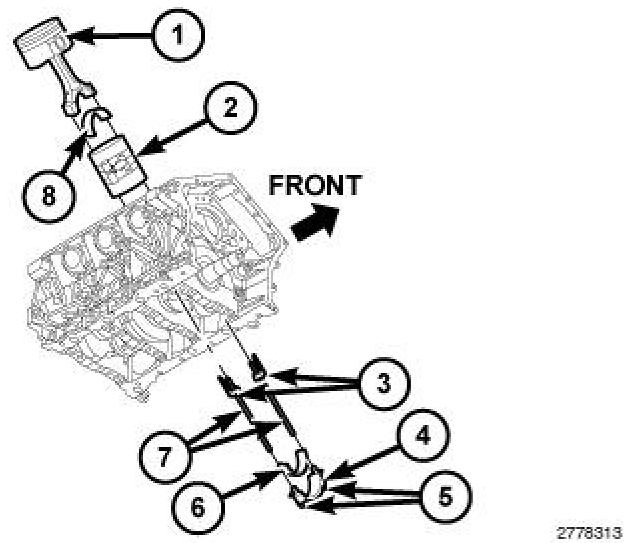


Fig. 408: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins
Courtesy of CHRYSLER GROUP, LLC

6. Lubricate the piston rings with clean engine oil. Position Piston Compressor (special tool #C-385, Compressor, Piston) (2) over the piston and rings. Tighten the compressor (2).

NOTE: **Install the rod bearings in pairs. Do not mix sizes or use a new bearing half with an old bearing half.**

7. Install the bearing shell (8) on the connecting rod with the tang inserted into the machined groove in the rod. Lubricate the bearing surface with clean engine oil.
8. Remove the plastic guide plates (3) from the Guide Pins (special tool #8189, Guide Pins) (7) and install the Guide Pins to the connecting rod being installed.

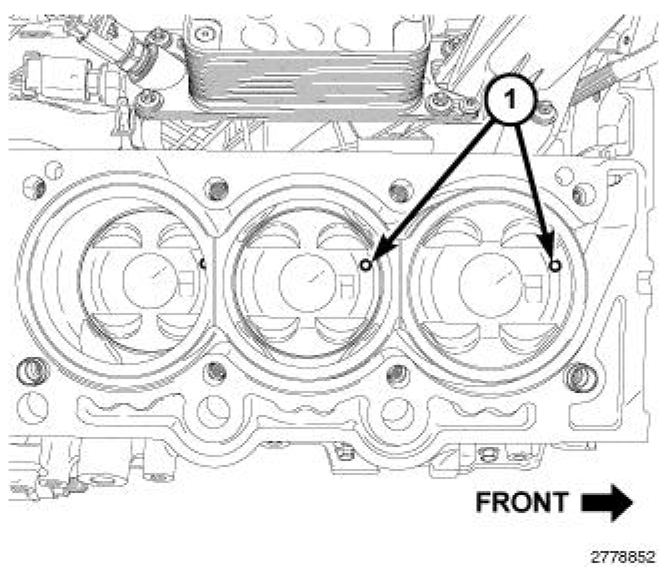


Fig. 409: Piston Installation Position
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Right cylinder bank shown in illustration, left cylinder bank similar.**

9. The pistons crowns are stamped with a mark (1) indicating installation position. This mark must be positioned toward the front of engine on both cylinder banks.
10. Wipe the cylinder bore clean and lubricate with clean engine oil.
11. Rotate the crankshaft until the connecting rod journal is on the center of cylinder bore.

CAUTION: Avoid contact with the piston oil cooler jet(s). Positioning of the oil cooler jet(s) is critical for proper engine operation.

12. Insert the piston and connecting rod into the cylinder bore and carefully position the guide pins over the crankshaft journal.
13. Tap the piston down in the cylinder bore using a hammer handle while guiding the connecting rod into position over the rod journal.

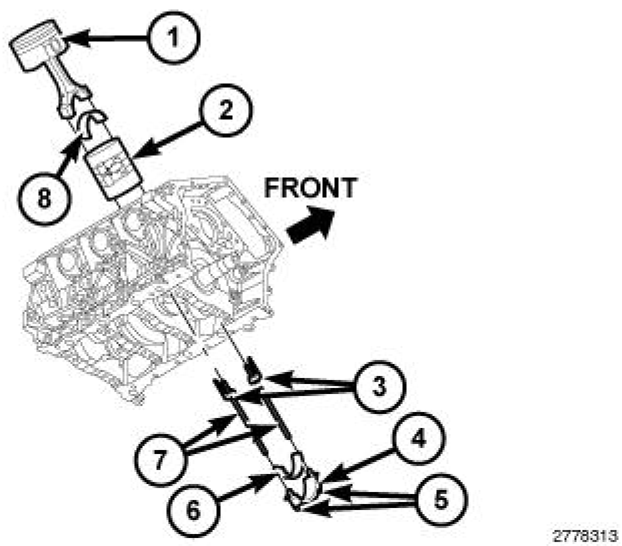


Fig. 410: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical V6 engine configuration shown in illustration.

CAUTION: The connecting rod bolts must not be reused. Always replace the connecting rod bolts whenever they are loosened or removed.

14. Install the bearing shell (6) on the connecting rod cap (4) with the tang inserted into the machined groove in the cap. Lubricate the bearing surface with clean engine oil.

NOTE: Do not lubricate the threads of the connecting rod cap bolts (5).

15. Install the connecting rod cap and bearing with the tang on the same side as the rod. Tighten the **NEW** connecting rod cap bolts (5) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
16. If required, check the connecting rod side clearance. Refer to **STANDARD PROCEDURE**.
17. Repeat the previous steps for each piston being installed.

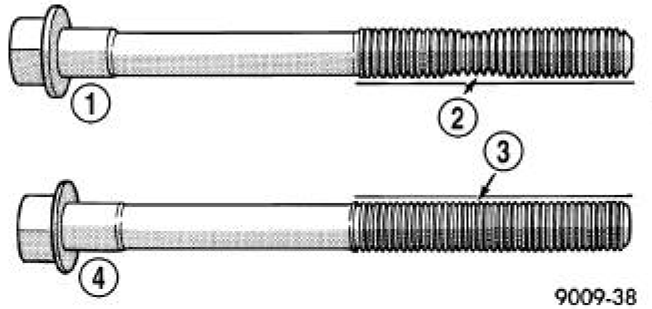


Fig. 411: Checking Cylinder Head Bolts For Stretching (Necking)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The main bearing cap bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

18. Check the main bearing cap bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

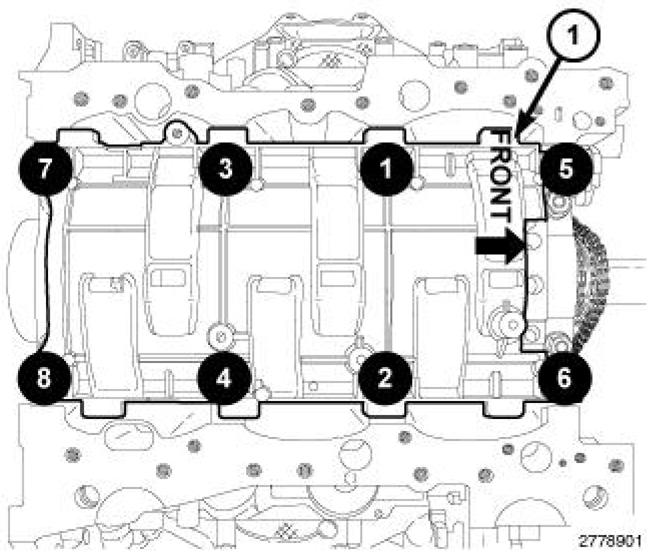


Fig. 412: Windage Tray With Main Bearing Cap Bolts Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

19. Install the windage tray with eight main bearing cap bolts. Tighten the bolts in the sequence shown in illustration to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
20. Install the engine oil pump and oil pump pick-up. Refer to **PUMP, ENGINE OIL, INSTALLATION**.
21. Install the cylinder heads, engine timing cover and oil pans. Refer to **CYLINDER HEAD, INSTALLATION**.
22. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **STANDARD PROCEDURE**.
23. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
24. Operate the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **STANDARD PROCEDURE** .

SEAL, CRANKSHAFT OIL, FRONT

REMOVAL

REMOVAL

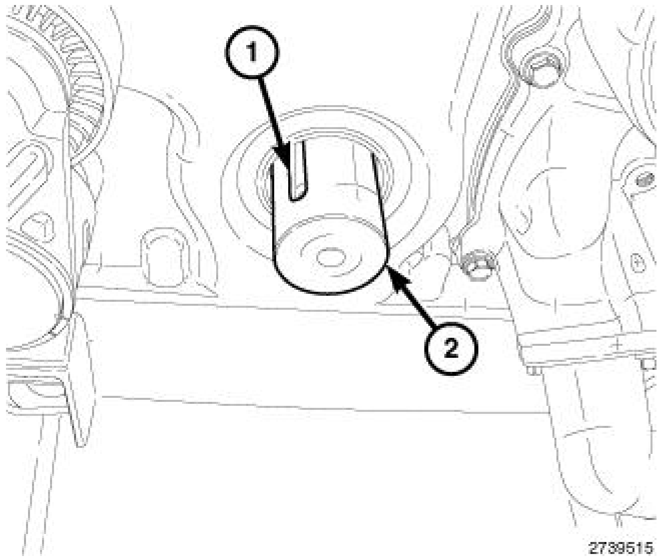


Fig. 413: Sleeve & Flywheel Key
Courtesy of CHRYSLER GROUP, LLC

1. Remove the accessory drive belt and the crankshaft vibration damper. Refer to DAMPER, VIBRATION, REMOVAL.
2. Install the sleeve (2) from Seal Remover (special tool #8511, Remover, Seal) around the flywheel key (1) and onto the nose of the crankshaft.

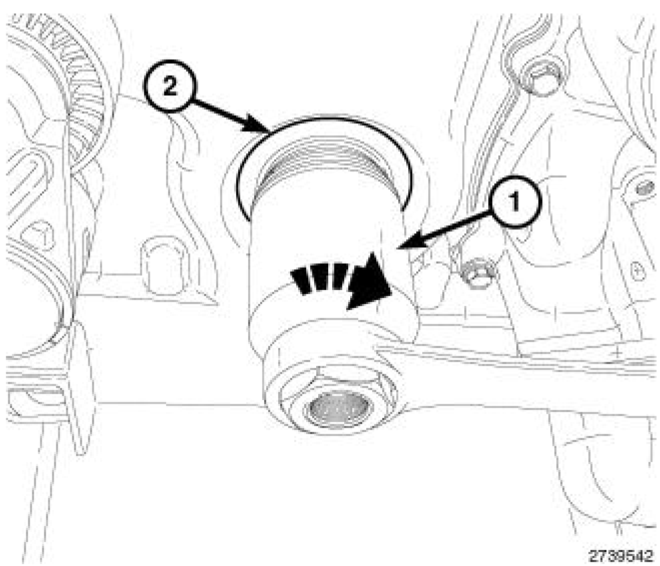


Fig. 414: Seal Remover & Front Crankshaft Oil Seal
Courtesy of CHRYSLER GROUP, LLC

3. Screw Seal Remover (special tool #8511, Remover, Seal) (1) into the front crankshaft oil seal (2).

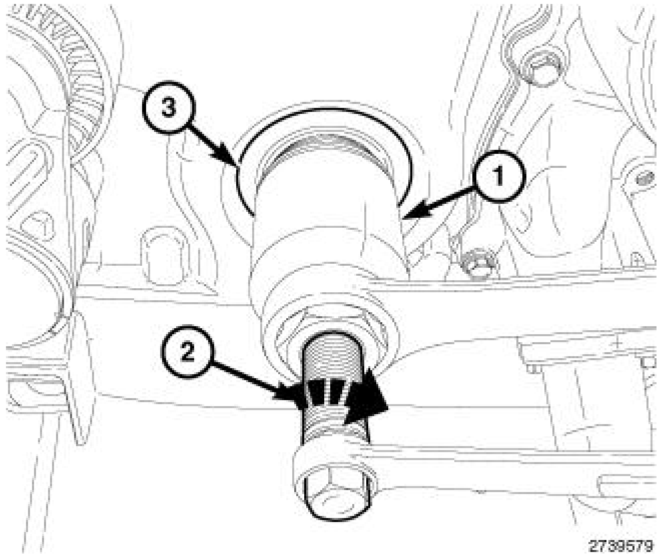


Fig. 415: Extractor Screw, Seal Remover & Front Crankshaft Oil Seal
Courtesy of CHRYSLER GROUP, LLC

4. Install the extractor screw (2) into the Seal Remover (special tool #8511, Remover, Seal) (1). Hold the seal remover stationary and tighten the extractor screw against the sleeve until the front crankshaft oil seal (3) is removed from the engine timing cover.

INSTALLATION

INSTALLATION

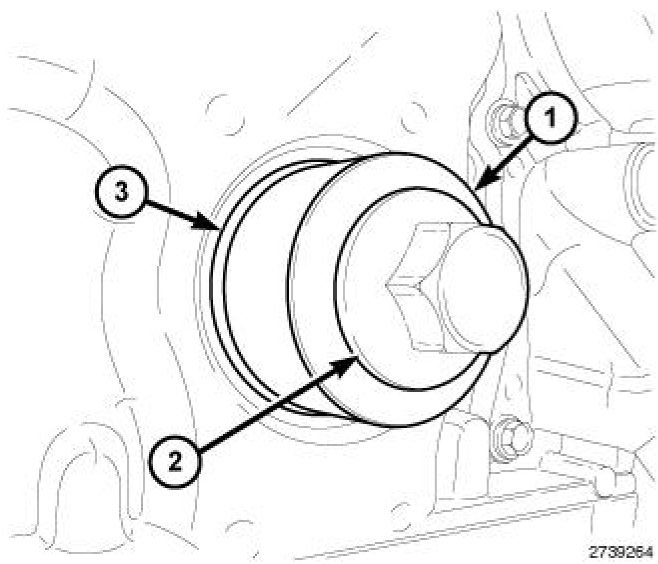


Fig. 416: Front Crankshaft Seal Installer & Oil Seal
Courtesy of CHRYSLER GROUP, LLC

1. Position the front crankshaft oil seal (3) to engine timing cover.
2. Align the Front Crankshaft Seal Installer (special tool #10199, Installer, Crankshaft Front Oil Seal) (1) to the flywheel key on the crankshaft and against the front crankshaft oil seal (3).

CAUTION: Only tighten the crankshaft vibration damper bolt until the oil seal is seated in the cover. Overtightening of the bolt can crack the front timing

cover.

3. Install and tighten the crankshaft vibration damper bolt (2) until the crankshaft oil seal is seated in the engine timing cover.
4. Install the crankshaft vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION**.
5. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

SEAL, CRANKSHAFT OIL, REAR

REMOVAL

REMOVAL

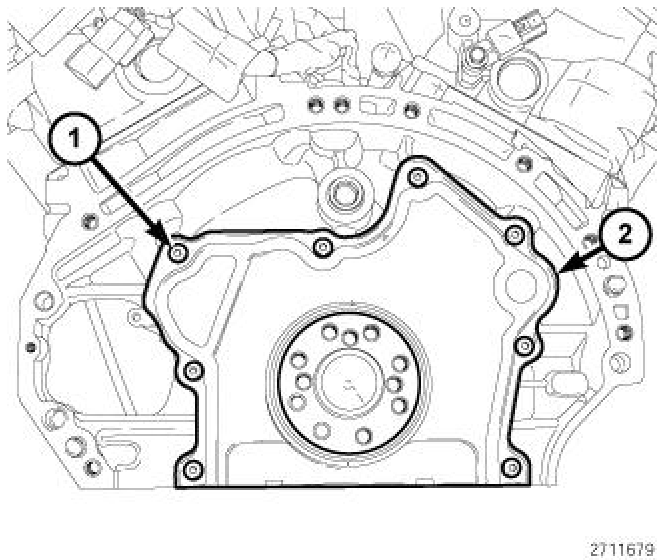


Fig. 417: Seal Retainer & Attaching Screws
Courtesy of CHRYSLER GROUP, LLC

The rear crankshaft oil seal is incorporated into the seal retainer (2) and can not be removed from the retainer. The rear crankshaft oil seal and seal retainer (2) are serviced as an assembly.

1. Remove the flexplate. Refer to **FLEXPLATE, REMOVAL**.
2. Remove the upper oil pan. Refer to **PAN, OIL, REMOVAL**.
3. Remove the eight seal retainer attaching screws (1).
4. Remove and discard the seal retainer (2).

INSTALLATION

INSTALLATION

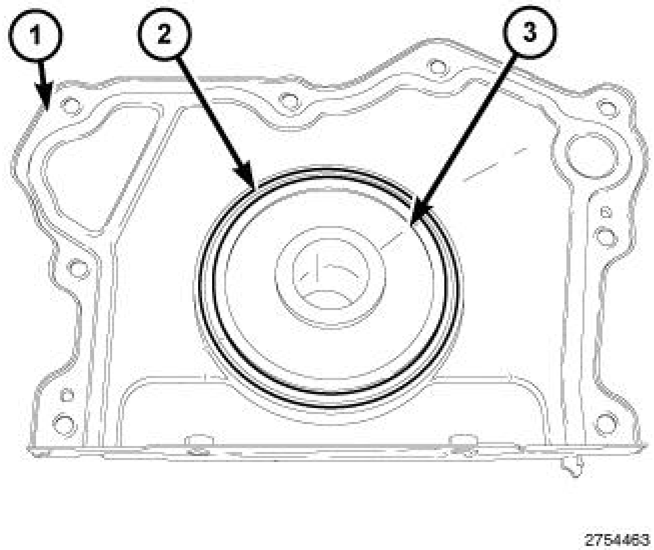


Fig. 418: Rear Crankshaft Oil Seal, Retainer & Seal Protector
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The rear crankshaft oil seal (2) and retainer (1) are an assembly. To avoid damage to the seal lip, DO NOT remove the seal protector (3) from the rear crankshaft oil seal before installation onto the engine.**

CAUTION: **Whenever the crankshaft is replaced, the rear crankshaft oil seal must also be replaced. Failure to do so may result in engine fluid leakage.**

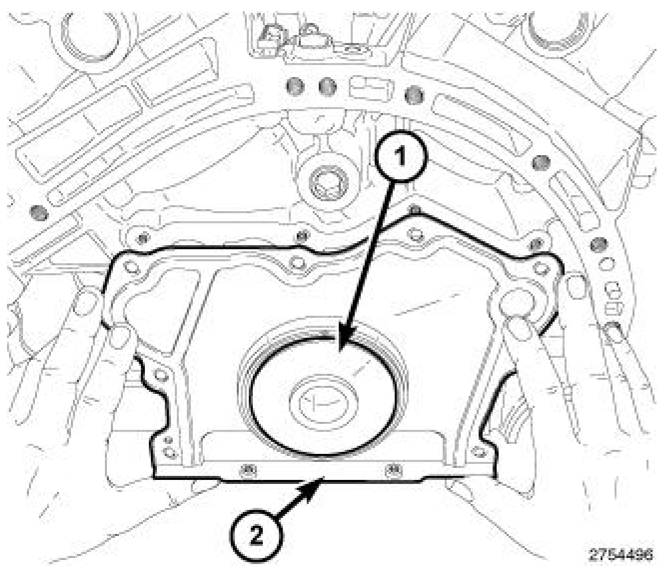


Fig. 419: Oil Seal Retainer Assembly & Seal Protector
Courtesy of CHRYSLER GROUP, LLC

1. Inspect the crankshaft to make sure there are no nicks or burrs on the seal surface.
2. Clean the engine block sealing surfaces thoroughly.

NOTE: **It is not necessary to lubricate the seal or the crankshaft when installing the seal retainer. Residual oil following installation can be mistaken for**

seal leakage.

3. Carefully position the oil seal retainer assembly (2), and seal protector (1) on the crankshaft and push firmly into place on the engine block (during this step, the seal protector will be pushed from the rear oil seal assembly as a result of installing the rear oil seal).

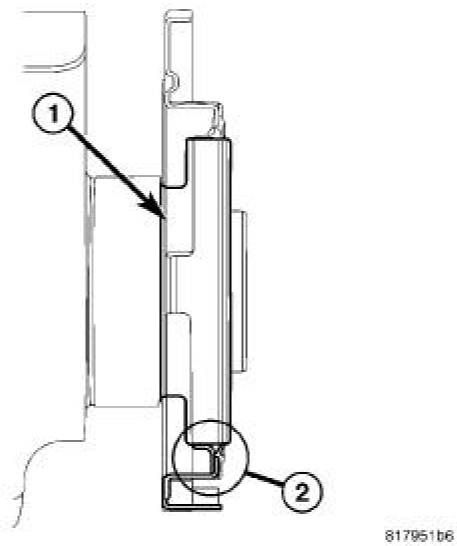


Fig. 420: Rear Seal Installed
Courtesy of CHRYSLER GROUP, LLC

4. Verify that the seal lip (2) on the retainer is uniformly curled inward toward the engine on the crankshaft (1).

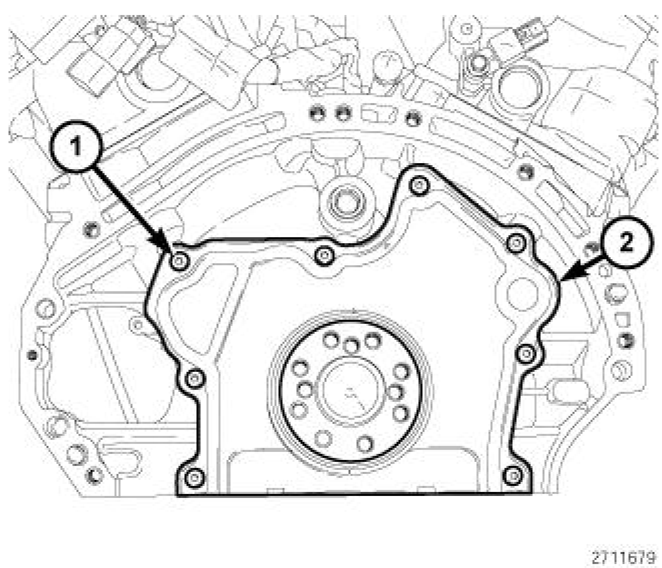


Fig. 421: Seal Retainer & Attaching Screws
Courtesy of CHRYSLER GROUP, LLC

5. Install the eight seal retainer bolts (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

NOTE: **Make sure that the seal retainer flange is flush with the engine block oil pan sealing surface.**

6. Install the upper oil pan. Refer to **PAN, OIL, INSTALLATION**.
7. Install the flexplate. Refer to **FLEXPLATE, INSTALLATION**.
8. Fill the engine crankcase with the proper oil to the correct level. Refer to **STANDARD PROCEDURE**.

ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, LEFT

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.

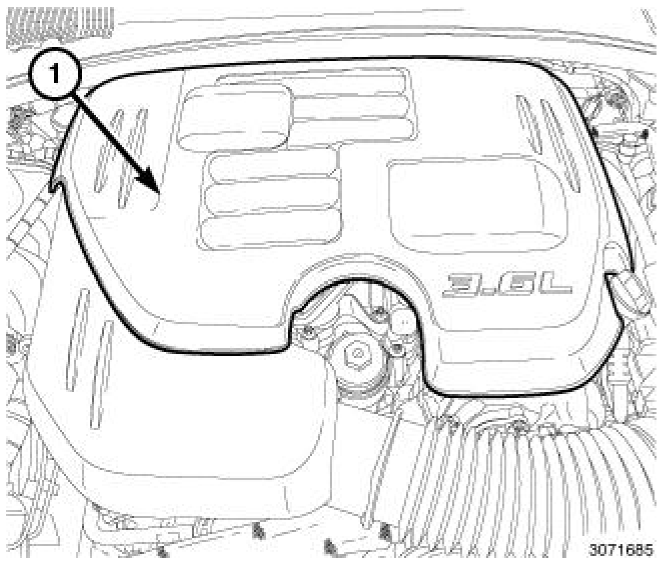


Fig. 422: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine cover (1).

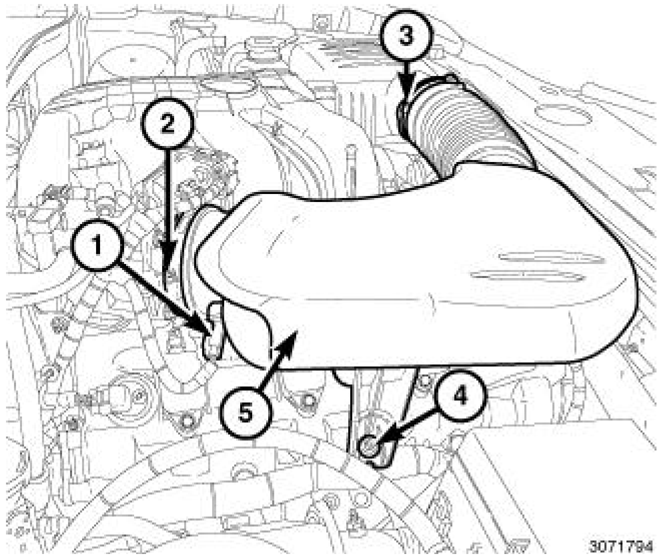


Fig. 423: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the Inlet Air Temperature (IAT) sensor wire harness connector (1).
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.
6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

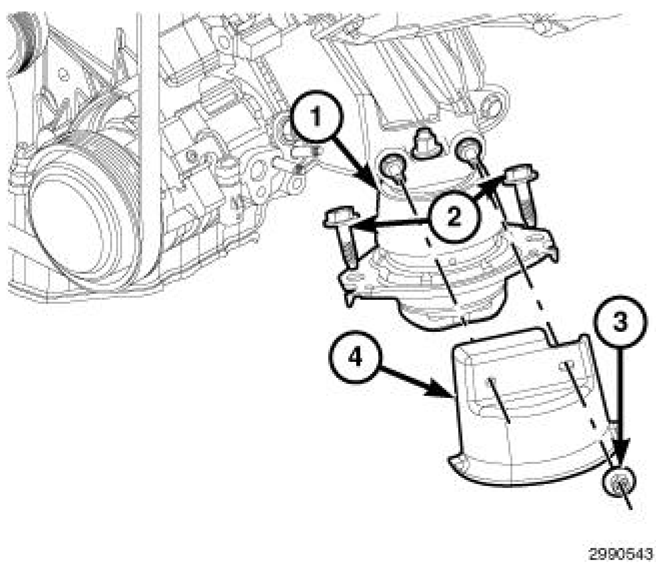


Fig. 424: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left engine mount shown in illustration, right engine mount similar.

8. Remove the left engine mount isolator heat shield retaining nuts (3) and remove the heat shield (4).
9. Remove both left and right engine mount isolator to frame retaining bolts (2).

10. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

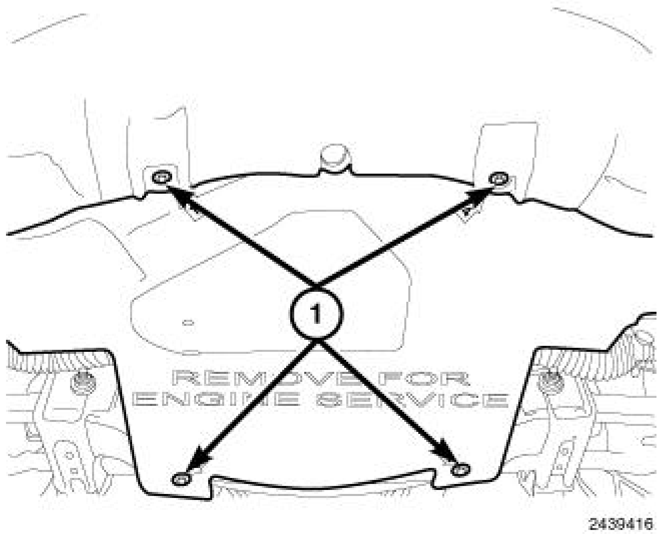


Fig. 425: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Remove retainers (1) and the belly pan.
12. Using a suitable screw jack, raise the engine to gain clearance for engine mount isolator removal.

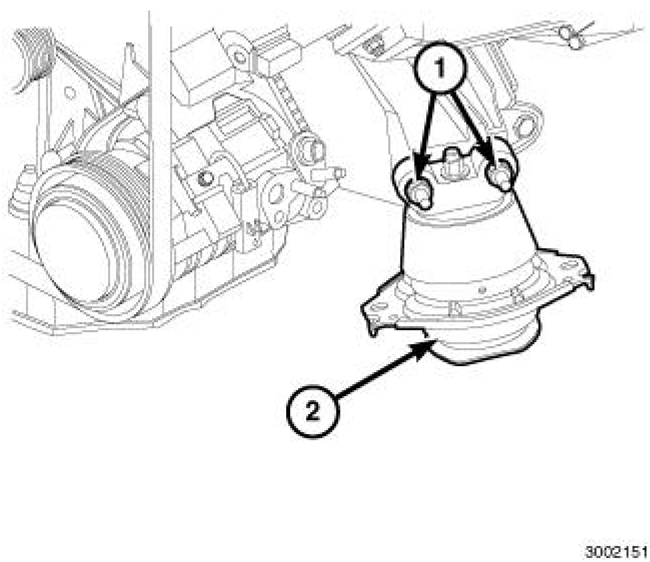
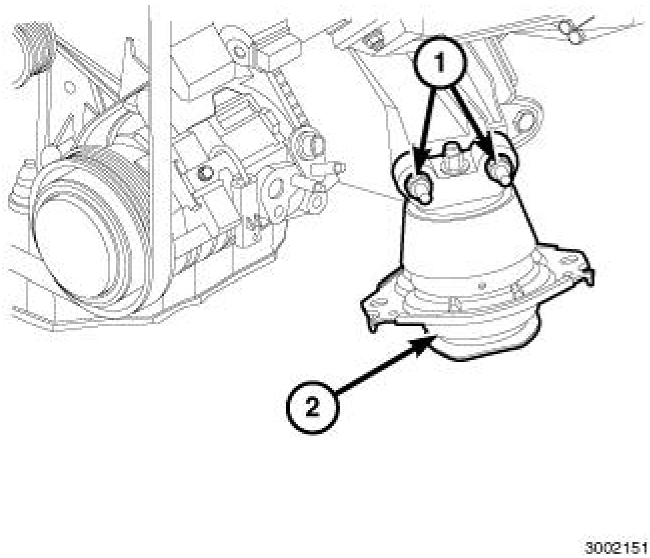


Fig. 426: Engine Mount & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Remove the engine mount bolts (1) and the engine mount isolator (2).
14. If required, remove the left engine mount bracket retaining bolts and remove the left engine mount bracket.

INSTALLATION

INSTALLATION



[Fig. 427: Engine Mount & Retaining Bolts]
Courtesy of CHRYSLER GROUP, LLC

1. If removed, position the left engine mount bracket, install the four retaining bolts and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
2. Install the left engine mount isolator (2) onto the bracket and tighten the retaining nuts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
3. Lower the screw jack until both engine mount isolators are in position.

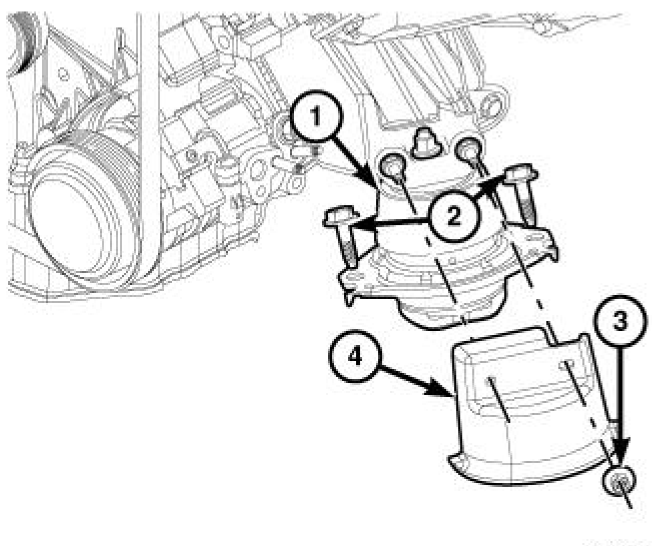


Fig. 428: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

4. Lower the engine so the weight is resting on the isolators and remove the screw jack.
5. Install both left and right engine mount isolator to frame bolts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

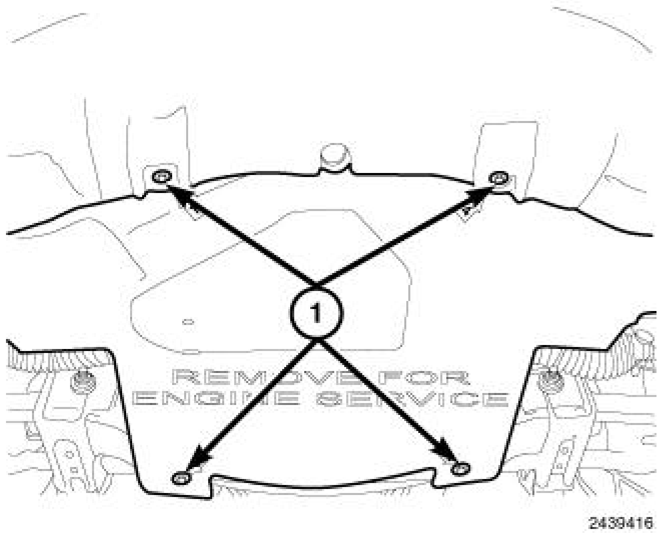


Fig. 429: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Install the belly pan and retainers (1).
7. Remove support and lower the vehicle.

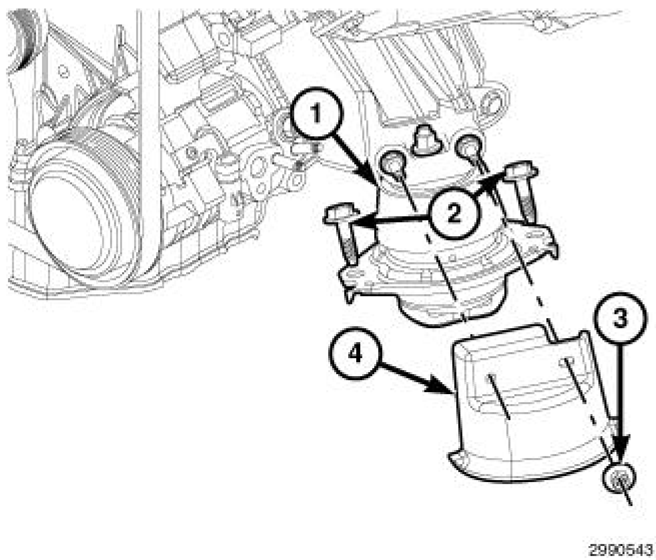


Fig. 430: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

8. Position the engine mount isolator heat shields (4), install the retaining nuts (3) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.

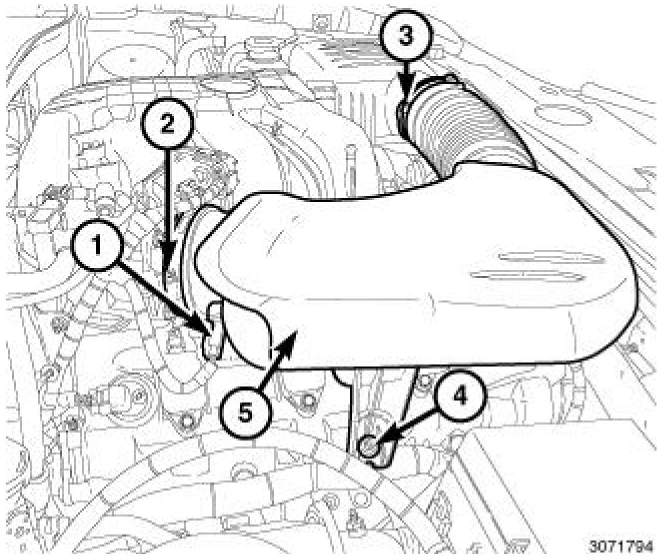


Fig. 431: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

9. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
10. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
11. Tighten the clamp at the air cleaner housing (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
12. Tighten the clamp (2) at the throttle body to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
13. Connect the Inlet Air Temperature (IAT) sensor wire harness connector (1).

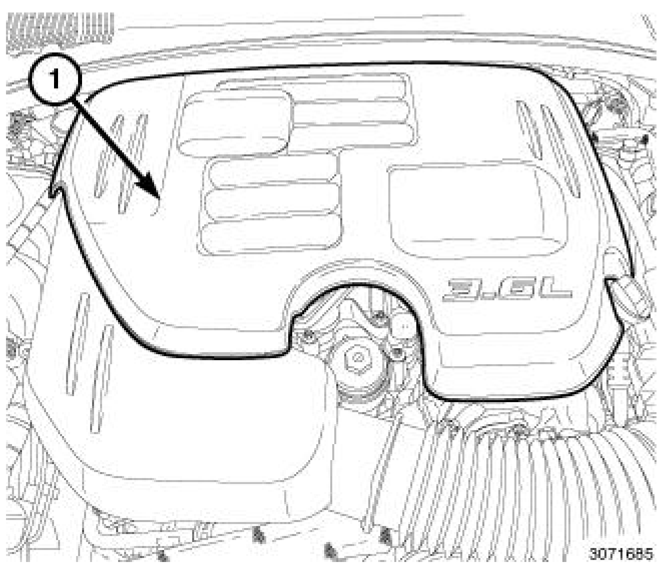


Fig. 432: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

14. Install the engine cover (1).
15. Connect the negative battery cable.

INSULATOR, ENGINE MOUNT, RIGHT

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.

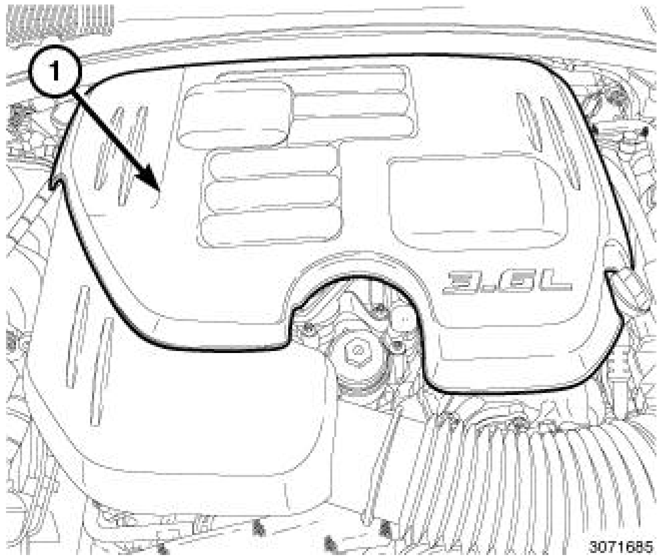


Fig. 433: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine cover (1).

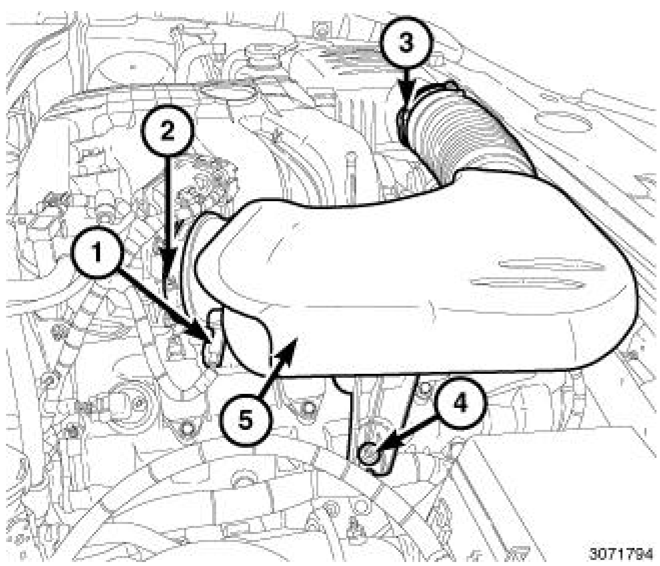


Fig. 434: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the Inlet Air Temperature (IAT) sensor wire harness (1).
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.

6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

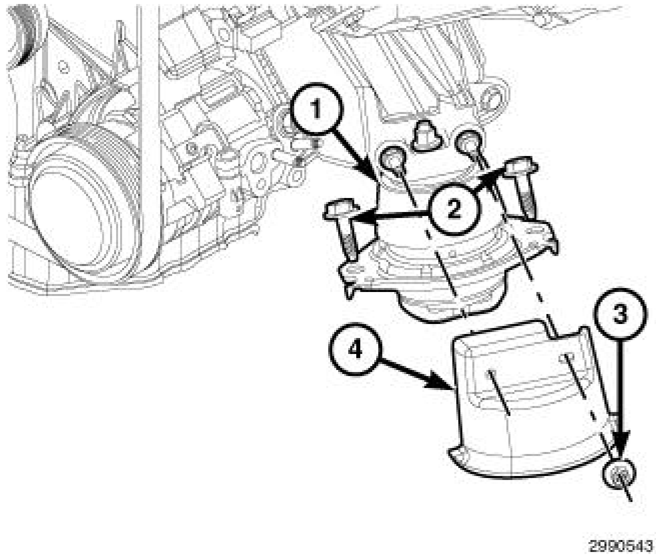


Fig. 435: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left engine mount shown in illustration, right engine mount similar.**

8. Remove the right engine mount isolator heat shield retaining nuts (3) and remove the heat shield (4).
9. Remove both left and right engine mount isolator to frame retaining bolts (2).

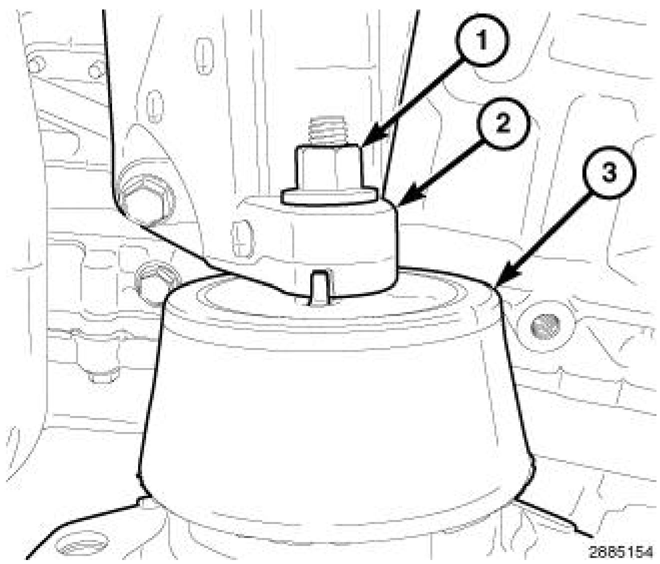


Fig. 436: Left Engine Mount Isolator & Upper Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

10. Remove the right engine mount isolator (3) upper retaining nut (1).

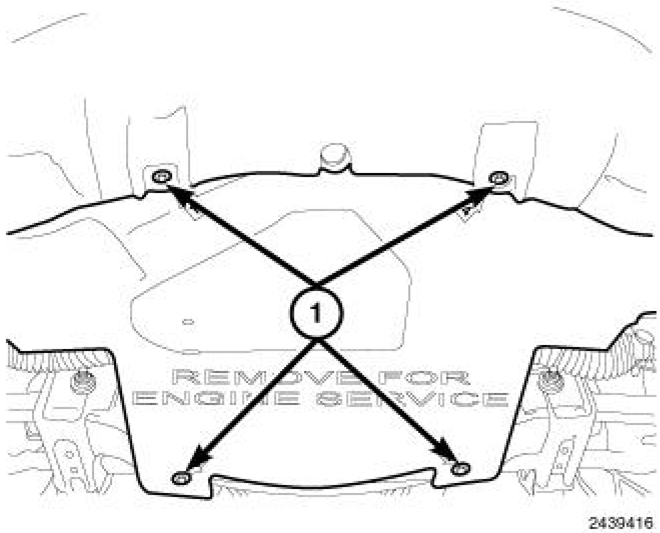


Fig. 437: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
12. Remove retainers (1) and the belly pan.
13. Using a suitable screw jack, raise the engine to gain clearance for engine mount isolator removal.

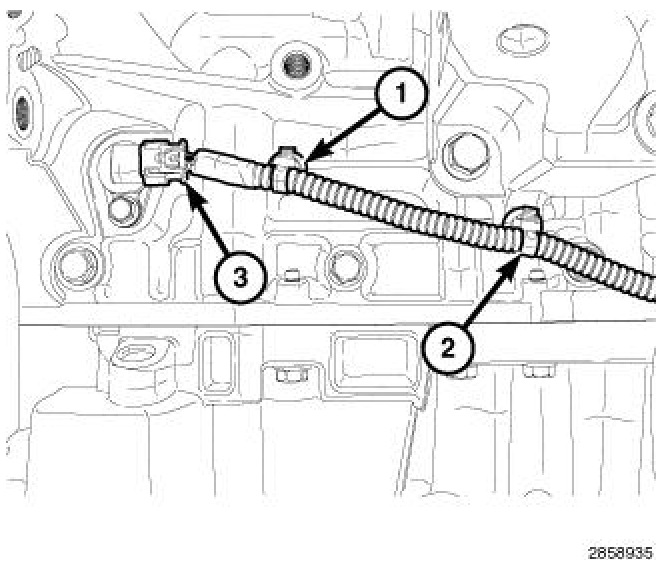
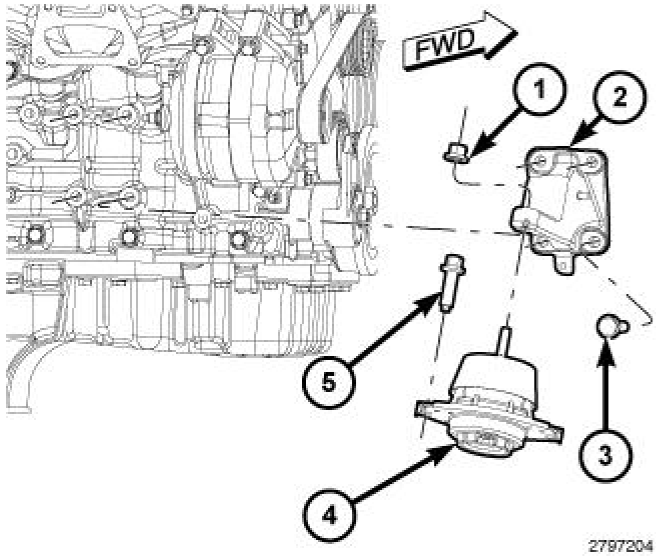


Fig. 438: Main Wire Harness Retainers & CKP Sensor
Courtesy of CHRYSLER GROUP, LLC

14. If required, disconnect the Crankshaft Position (CKP) sensor wire harness connector (3).
15. If required, unfasten the main wire harness retainer (1) from the engine block and one main wire harness retainer (2) from the right engine mount bracket and position harness aside.

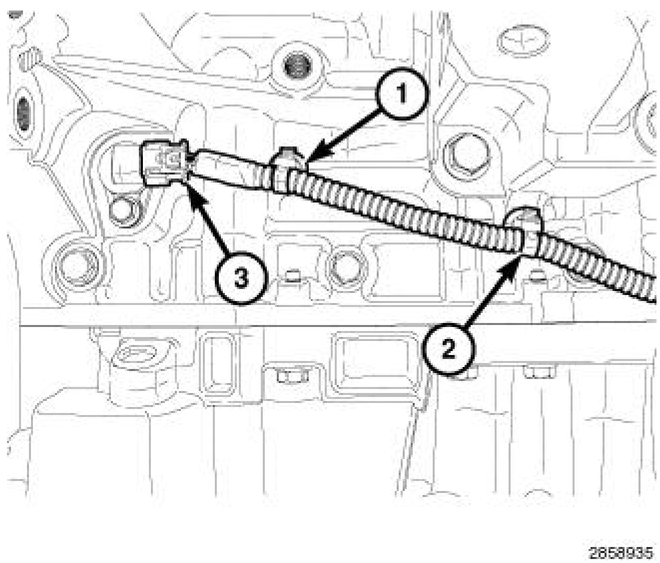


[Fig. 439: Engine Mount Isolator, Right Engine Mount Bracket & Retaining Bolts]
Courtesy of CHRYSLER GROUP, LLC

16. Remove the engine mount isolator (4) from the vehicle.
17. If required, remove the right engine mount bracket (2) four retaining bolts (3) and remove the right engine mount bracket.

INSTALLATION

INSTALLATION



[Fig. 440: Main Wire Harness Retainers & CKP Sensor]
Courtesy of CHRYSLER GROUP, LLC

1. If removed, connect the Crankshaft Position (CKP) sensor wire harness connector (3).
2. If removed, fasten the CKP main wire harness retainer (1) to the engine block and one main wire harness retainer (2) to the right engine mount bracket.

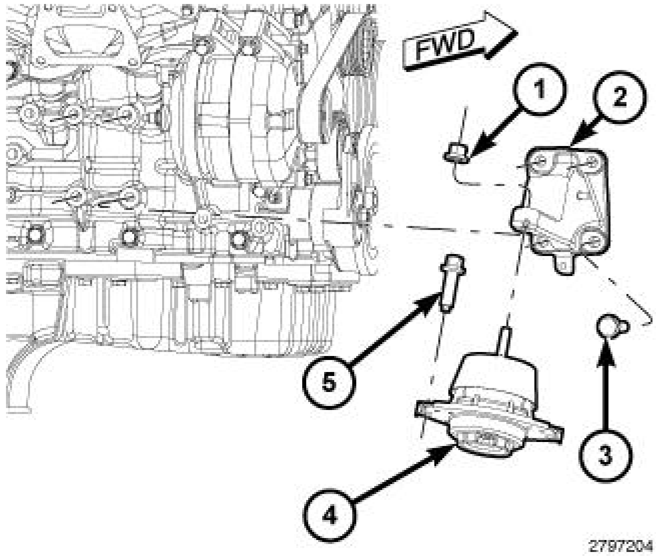


Fig. 441: Engine Mount Isolator, Right Engine Mount Bracket & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. If removed, position the right engine mount bracket (2), install the four retaining bolts (5) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Position the right engine mount isolator (4) stud into the bracket, align the tab on the isolator with the notch in the engine mount bracket, install the retaining nut (1) finger tight.
5. Lower the screw jack until both engine mount isolators are in position.
6. Install the both left and right engine mount isolator to frame bolts (3) finger tight.
7. Lower the engine so the weight is resting on the isolators and remove the screw jack.

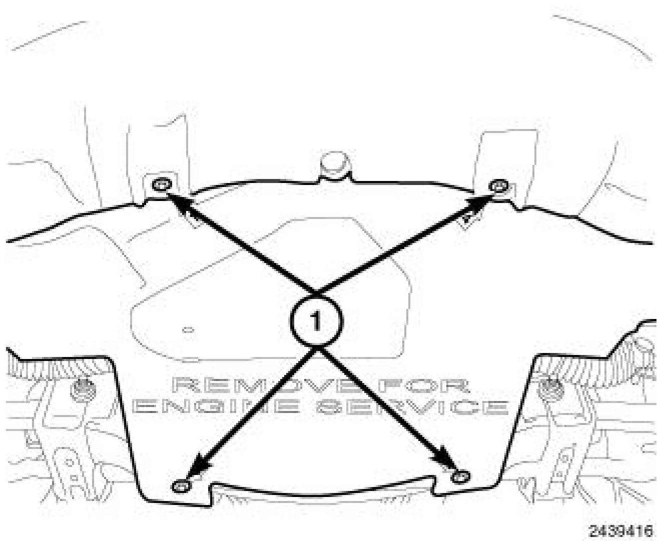


Fig. 442: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Install the belly pan and retainers (1).
9. Remove support and lower the vehicle.

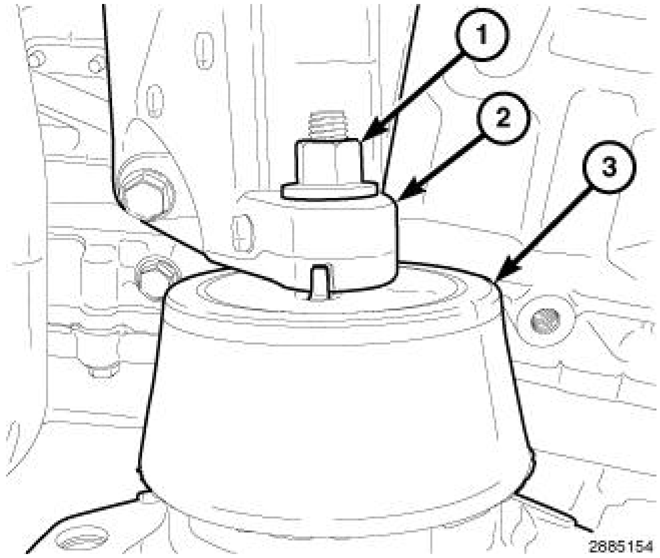


Fig. 443: Left Engine Mount Isolator & Upper Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left engine mount shown in illustration, right engine mount similar.**

10. Tighten the right engine mount isolator (3) upper retaining nut (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

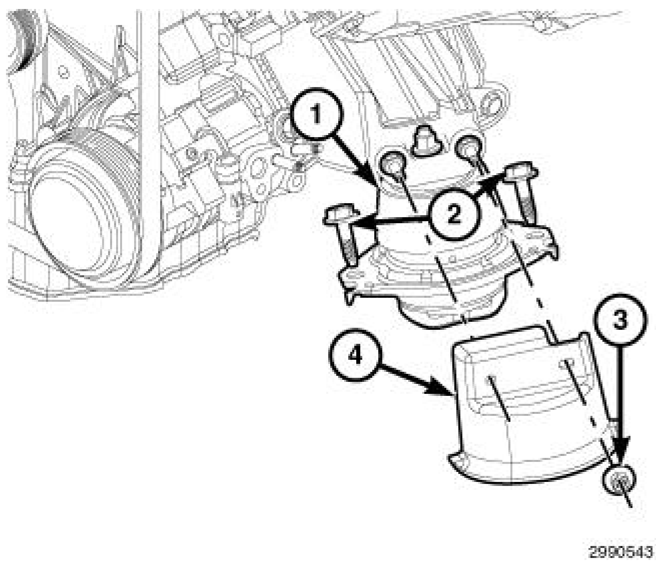


Fig. 444: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left engine mount shown in illustration, right engine mount similar.**

11. Tighten both left and right engine mount isolator to frame bolts (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
12. Position the right engine mount isolator heat shield (4), install the retaining nuts and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

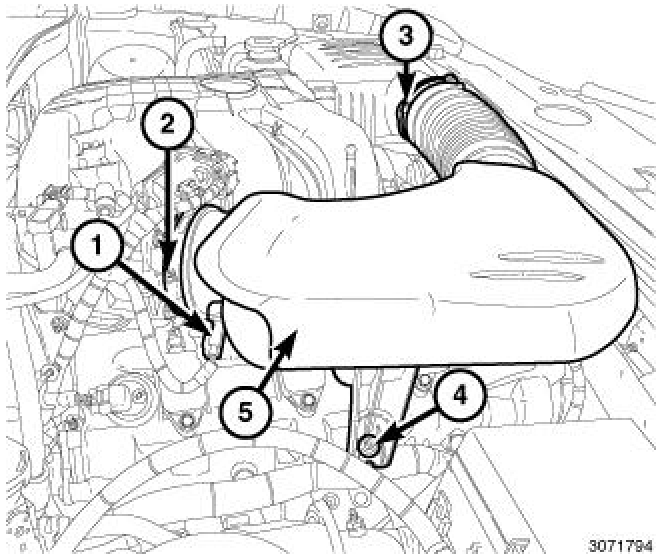


Fig. 445: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

13. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
14. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
15. Tighten the clamp at the air cleaner housing (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
16. Tighten the clamp (2) at the throttle body to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
17. Connect the Inlet Air Temperature (IAT) sensor wire harness connector (1).

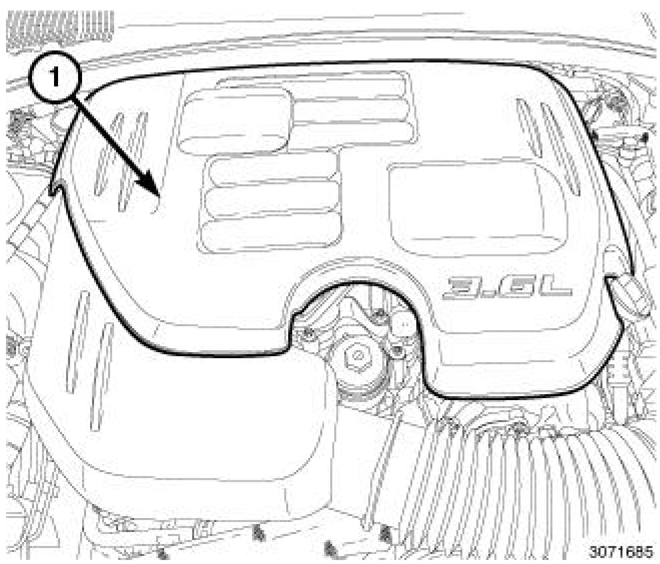


Fig. 446: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

18. Position the engine cover (1) and secure the retaining grommets onto the ball studs.
19. Connect the negative battery cable.

INSULATOR, ENGINE MOUNT, REAR

REMOVAL

REMOVAL

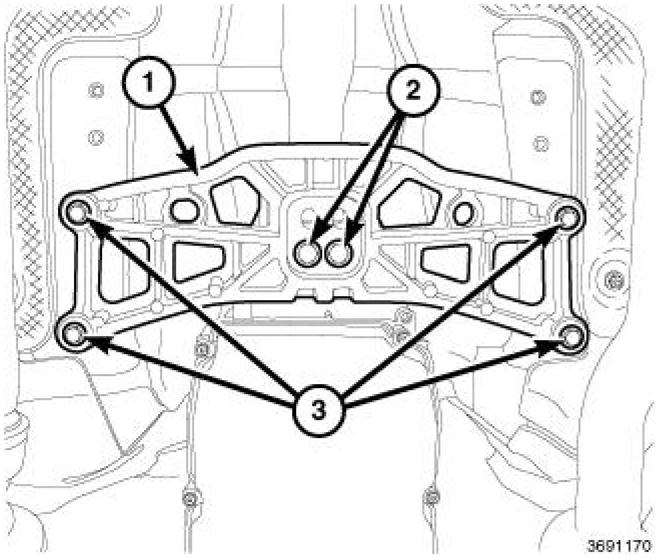


Fig. 447: Crossmember & Bolts (RWD)
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the two bolts (2) from the rear engine mount isolator.
3. Using a suitable jack stand and a block of wood positioned under the transmission oil pan, raise the transmission until the weight is off of the isolator (approximately 5 mm).
4. Remove four bolts (3) and the crossmember (1).

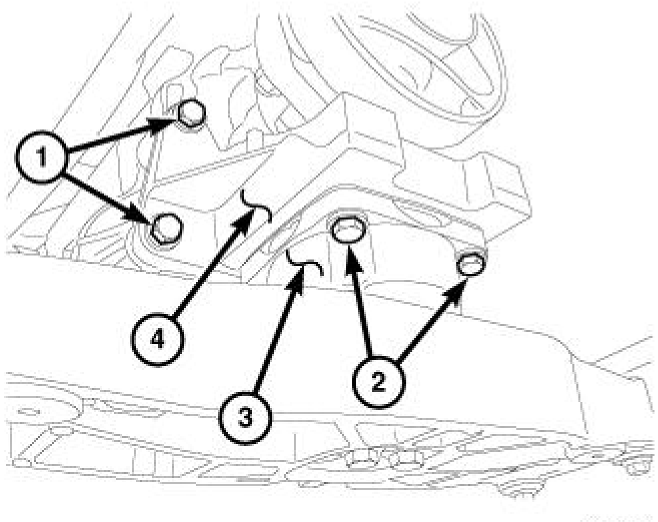


Fig. 448: Transmission Mount Bolts & Transmission Mount
Courtesy of CHRYSLER GROUP, LLC

5. Remove four bolts (2) and the rear engine mount isolator (3).

6. If required, remove four bolts (1) and the rear engine mount bracket (4).

INSTALLATION

INSTALLATION

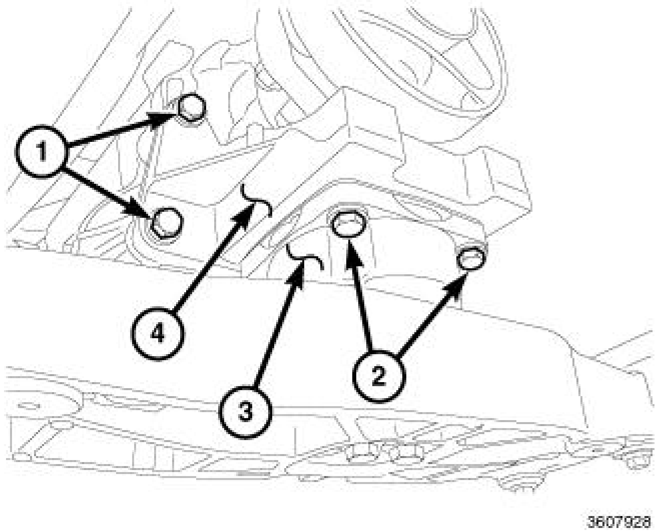


Fig. 449: Transmission Mount Bolts & Transmission Mount
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the rear engine mount bracket (4). Tighten bolts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
2. Install the rear engine mount isolator (3). Tighten bolts (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

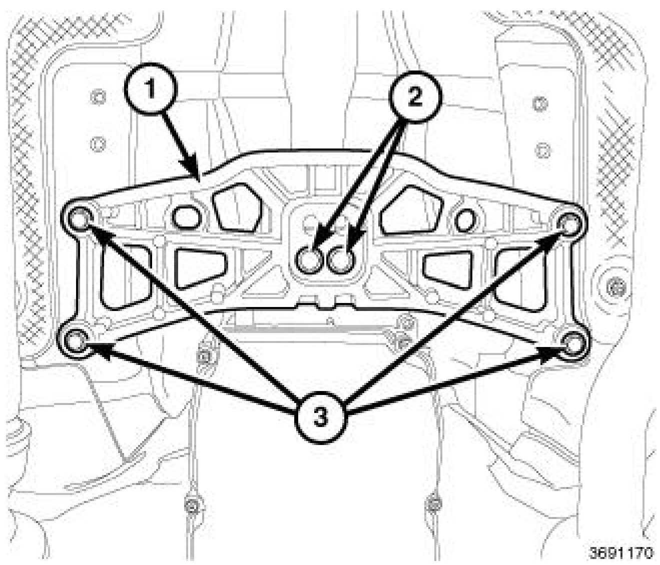


Fig. 450: Crossmember & Bolts (RWD)
Courtesy of CHRYSLER GROUP, LLC

3. Install the crossmember (1). Tighten bolts (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Lower the transmission so the weight is resting on the isolator.

5. Install the rear engine mount isolator bolts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
6. Remove support and lower the vehicle.

LUBRICATION

DESCRIPTION

DESCRIPTION

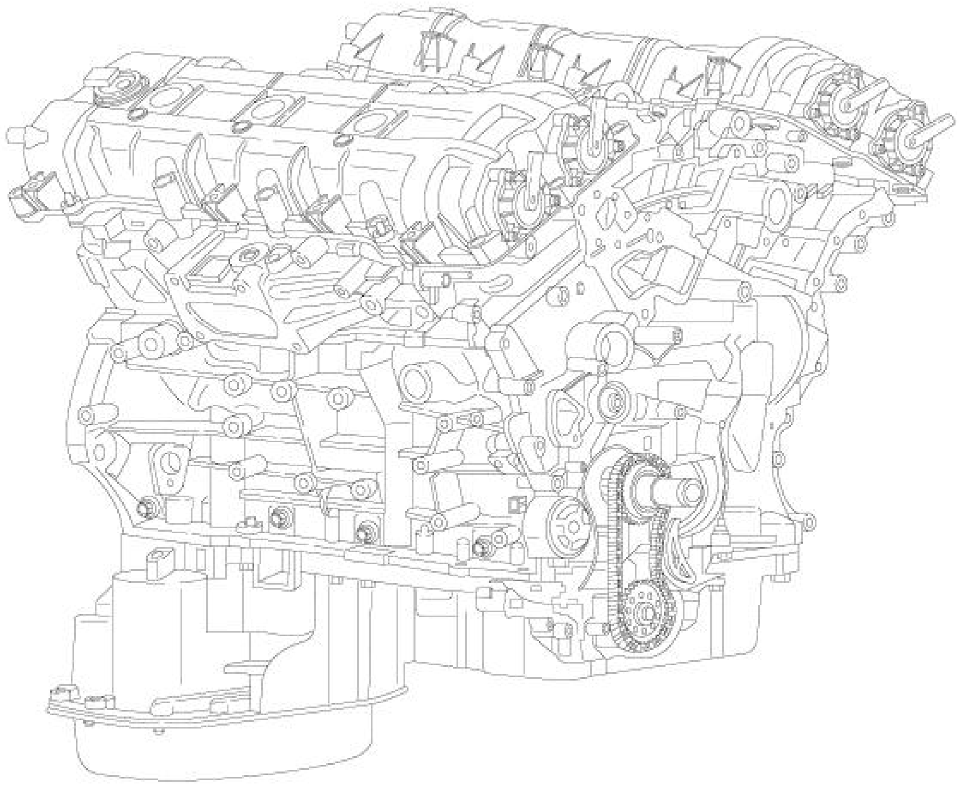


Fig. 451: 3.6L Engine
Courtesy of CHRYSLER GROUP, LLC

The lubrication system is a full flow filtration, pressure feed type lubrication system:

- The oil pump is mounted to the bottom of the cylinder block and chain driven by the crankshaft sprocket.
- The oil pump pick-up tube is attached to the oil pump and supported at the windage tray.
- There are three oil gallery plugs installed in the engine block.
- A system oil pressure sensor allows oil pressure to be monitored with a diagnostic scan tool.
- The oil pressure and oil temperature sensors are located on the oil filter housing assembly which is mounted to the top of the engine block between the cylinder heads.
- The oil cooler is mounted to the oil filter housing.
- There is a pressure relief valve in the oil pump that is only activated on a cold start or for emergency relief since the oil pump output is self-regulating.
- There are three piston oil cooler jets mounted to the engine block that cools two pistons.

OPERATION

OPERATION

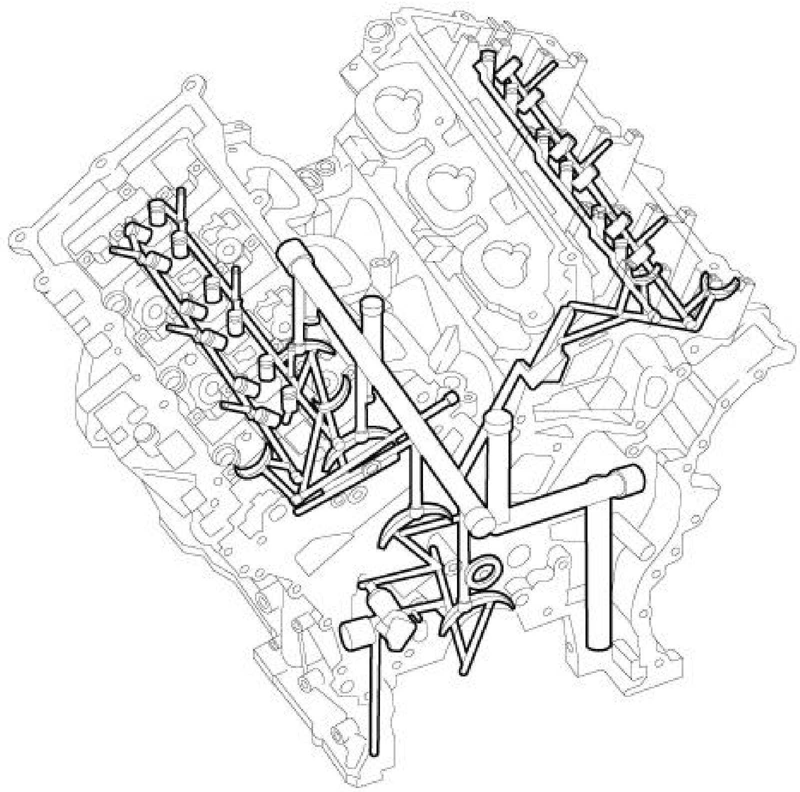


Fig. 452: Engine Lubrication Flow
Courtesy of CHRYSLER GROUP, LLC

Oil Flow:

- The oil from the oil pan is pumped by a vane type oil pump mounted to the bottom of the cylinder block that is chain driven by the crankshaft sprocket
- The oil from the pump travels to the oil filter element and then to the oil cooler assembly
- After the oil has been filtered and cooled, the oil enters the main oil gallery
- The pressurized oil travels through the main gallery to the four main journals to lubricate the crankshaft main bearings
- The pressurized oil travels through the crankshaft main journals to cross-drilling supplying oil to the connecting rod journals
- From the number one main bearing gallery, oil travels to the right secondary chain tensioner and to the primary chain idler shaft
- The main oil gallery also supplies oil to three sets of piston oil cooling jets
- From the cylinder block, the oil flows through the galleys into the left and right cylinder heads
- Left cylinder head oil is supplied to the left secondary timing chain tensioner, camshaft journals and hydraulic lash adjusters
- Right cylinder head oil is supplied to the right camshaft journals and hydraulic lash adjusters
- The camshaft valve lobes and rocker arms are lubricated through a small hole in the rocker arm; oil flows

through the lash adjuster then through the rocker arm and onto the camshaft lobe

- Oil also flows through each of the four forward camshaft bearings into the camshafts and phasers

ENGINE LUBRICATION FLOW CHART

FROM	TO
Oil Pickup Tube	Oil Pump
Oil Pump	Oil Filter
Oil Filter	Oil Cooler
Oil Cooler	Block Main Oil Gallery
Block Main Oil Gallery	1. Crankshaft Main Journals
	2. Left Cylinder Head
	3. Right Cylinder Head
	4. Piston Cooling Jets
Crankshaft Number One Main Journal	1. Primary Chain Idler Shaft
	2. Right Secondary Chain Tensioner
	3. Oil Pump Feedback
Crankshaft Main Journals	Crankshaft Rod Journals
Left Cylinder Head	1. Left Secondary Chain Tensioner
	2. Hydraulic Lash Adjusters
	3. Camshaft Journals
	4. Phaser Oil Control Valves
Right Cylinder Head	1. Hydraulic Lash Adjusters
	2. Camshaft Journals
	3. Phaser Oil Control Valves
Hydraulic Lash Adjusters	1. Rocker Arms
	2. Cam Lobes

DIAGNOSIS AND TESTING

ENGINE OIL LEAK

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

1. Do not clean or de-grease the engine at this time because some solvents may cause rubber to swell, temporarily stopping the leak.
2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.
3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of the oil leak. If the oil leak is found and identified, repair in accordance to the Service Information.
4. If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat the inspection.

   If the oil leak source is not positively identified at this time, proceed with the AIR LEAK DETECTION

TEST METHOD.

AIR LEAK DETECTION TEST METHOD

1. Disconnect the make-up air hose from the cylinder head cover. Cap or plug the make-up air hose nipple.
2. Remove the PCV hose from the PCV valve. Cap or plug the PCV valve nipple.
3. Attach an air hose with a pressure gauge and regulator to the dipstick tube.

CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.

4. Gradually increase air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected leak source. Adjust the regulator to a suitable test pressure within this range that provides the best bubble generation which will pinpoint the leak source. If the oil leak is detected and identified, repair in accordance with the Service Information.
5. If the leakage occurs at the rear oil seal area, follow the procedures for rear seal area leaks. Refer to **REAR SEAL AREA LEAKS**.
6. If no leaks are detected, turn off the air supply and remove the air hose and all plugs and caps. Install the PCV valve and make-up air hoses.
7. Clean the oil off of the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

CHECKING ENGINE OIL PRESSURE

1. Disconnect and isolate the negative battery cable.
2. Remove the oil pressure sensor from the oil filter housing. Refer to **SENSOR, OIL PRESSURE, REMOVAL**.

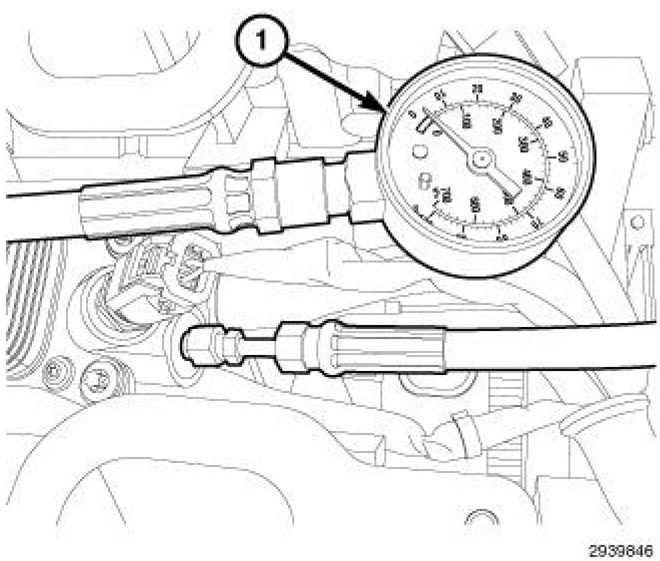


Fig. 453: Pressure Gauge Installed To Oil Pressure Port
Courtesy of CHRYSLER GROUP, LLC

3. Install Pressure Gauge (special tool #C-3292A, Gauge, Pressure) (1) to the oil pressure port. Tighten to 20 N.m (177 in. lbs.).

4. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
5. Connect the negative battery cable. Tighten the nut to the proper specification. Refer to **SPECIFICATIONS** .
6. Start and idle the engine. If oil pressure is 0 at idle, shut off the engine and consult the Engine Lubrication and Diagnostic Table. Refer to **ENGINE LUBRICATION DIAGNOSTIC TABLE**.
7. Run the engine until it reaches normal operating temperature.
8. Verify that the engine has acceptable oil pressure. Refer to **ENGINE SPECIFICATIONS**.

REAR SEAL AREA LEAKS

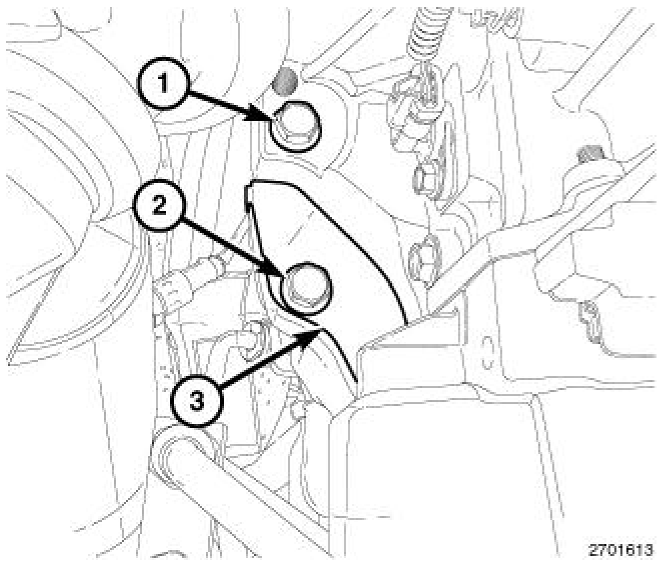


Fig. 454: Side Engine-To-Transmission Bolt, Transmission Dust Shield Retaining Bolt & Dust Shield
Courtesy of CHRYSLER GROUP, LLC

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the bolt (2) and the torque converter dust shield (3).

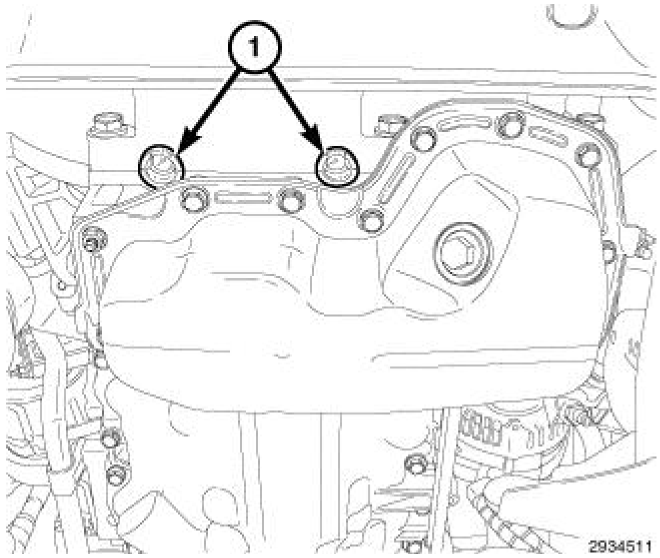


Fig. 455: Rubber Plugs
Courtesy of CHRYSLER GROUP, LLC

4. Remove two rubber plugs (1) covering the rear oil seal retainer flange bolts.
5. Inspect the flexplate and rear of the block for evidence of oil. Use a black light to check for the oil leak:
   a. Circular spray pattern generally indicates seal leakage or crankshaft damage.
   b. Where leakage tends to run straight down, possible causes are a porous block, rear oil seal retainer, oil galley pipe plug and rear seal retainer to oil pan mating surfaces.
6. If no leaks are detected, use the **AIR LEAK DETECTION TEST METHOD**.

CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.

7. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out with emery cloth.

CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks or scratches. The crankshaft seal flange is specially machined to complement the function of the rear oil seal.

8. For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled. Refer to **SEAL, CRANKSHAFT OIL, REAR, REMOVAL**.

COOLER, OIL

DESCRIPTION

DESCRIPTION

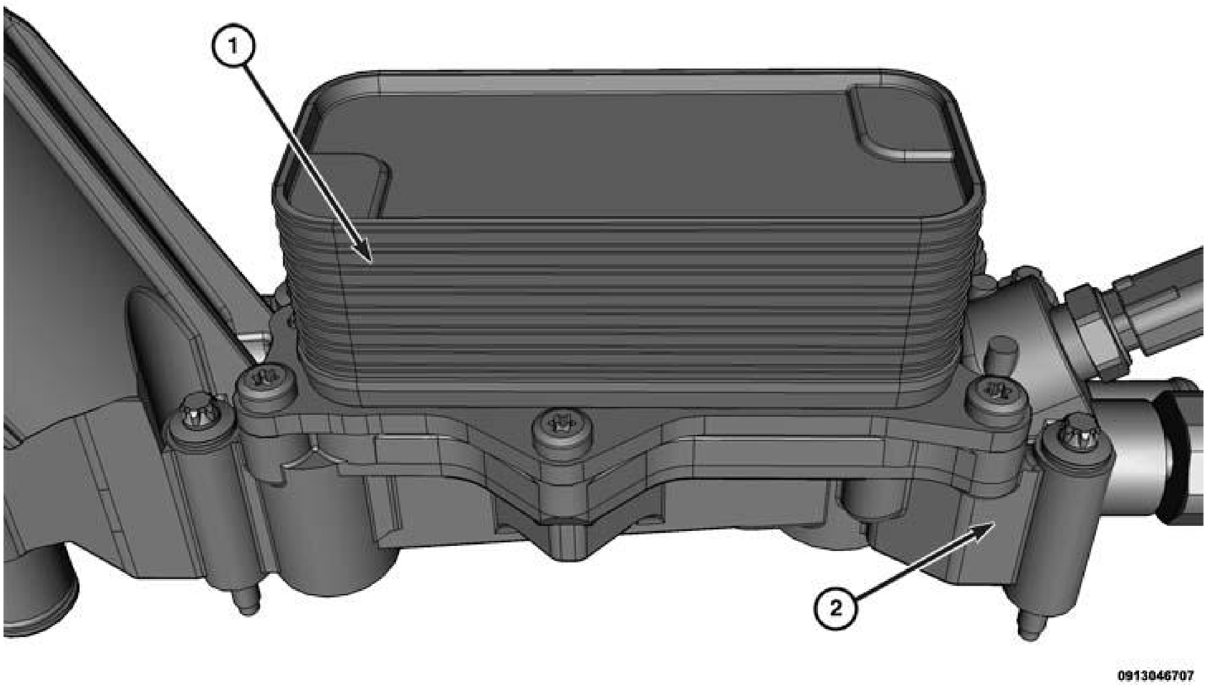


Fig. 456: Oil Cooler & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

The oil cooler (1) is attached to the top of the oil filter housing (2) which is located in the V of the cylinder block. The oil cooler is a plate style coolant-to-oil heat exchanger.

OPERATION

OPERATION

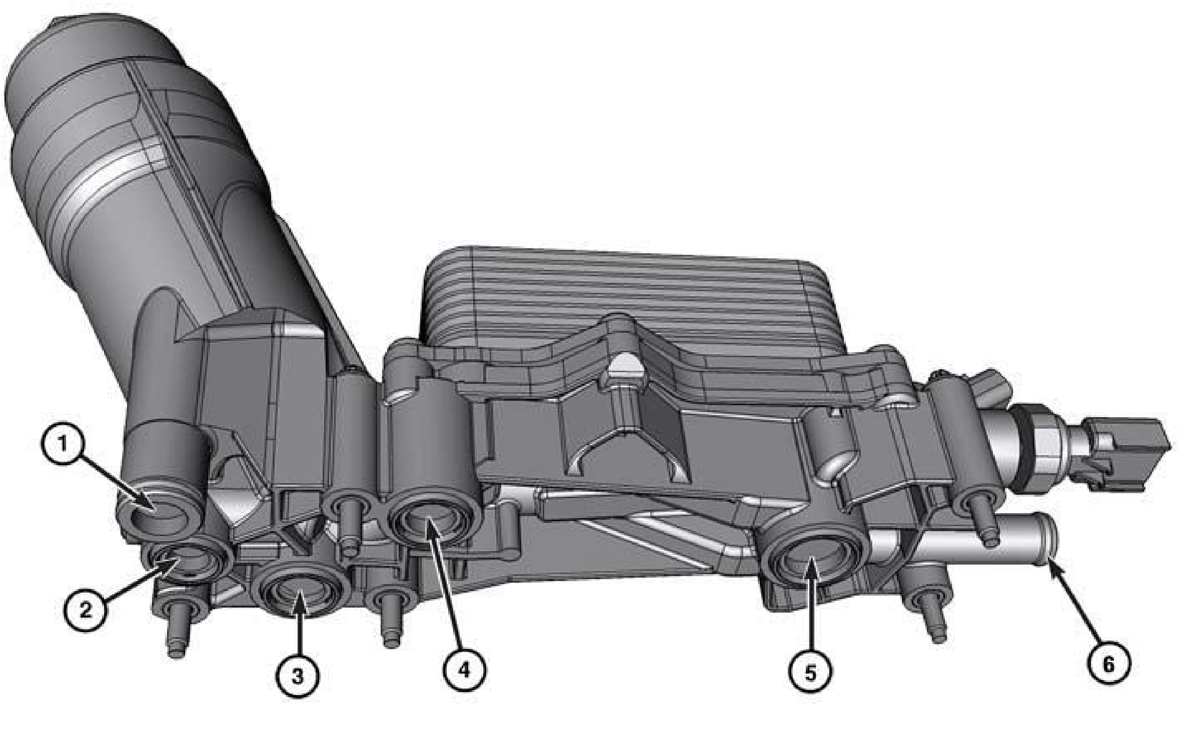


Fig. 457: Oil Flow Locations
Courtesy of CHRYSLER GROUP, LLC

Oil flows from the engine oil pump to the oil filter housing inlet (1) and to the oil filter element located within the oil filter housing. After the oil is filtered it travels internally through the engine oil cooler and then to the main oil gallery (5).

Coolant flows from the right cylinder block water jacket (3) and from the left cylinder block water jacket (4) into the housing. The coolant flows through the oil cooler and exits the housing from the rear hose nipple (6) where it is returned to the water pump. A coolant by-pass in the housing is designed to direct excessive coolant flow around the oil cooler for continuous circulation.

REMOVAL

REMOVAL

NOTE: **The oil cooler can not be cleaned out. In the event that the engine requires rebuilding or replacement, replace the oil cooler.**

NOTE: **The oil cooler is replaced as an assembly with the oil filter housing. For removal, refer to HOUSING, OIL FILTER, REMOVAL.**

INSTALLATION

INSTALLATION

NOTE: **The oil cooler is serviced as an assembly with the oil filter housing, For installation of the oil cooler, refer to HOUSING, OIL FILTER, INSTALLATION.**

FILTER, ENGINE OIL

REMOVAL

REMOVAL

All engines are equipped with a high quality full-flow, disposable type oil filter. Chrysler Corporation recommends a MoparÂ® or equivalent oil filter be used.

CAUTION: **When performing an engine oil change, the oil filter cap must be removed. Removing the oil filter cap releases oil held within the oil filter cavity and allows it to drain into the sump. Failure to remove the cap prior to reinstallation of the drain plug will not allow complete draining of the used engine oil.**

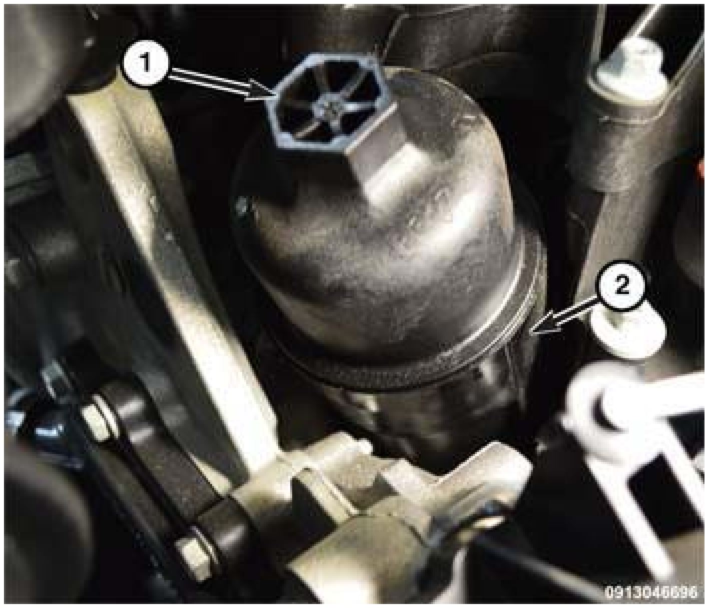


Fig. 458: Oil Filter Cap & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

1. Place an oil absorbent cloth around the oil filter housing at the base of the oil filter cap.
2. Rotate the oil filter cap (1) counterclockwise until it is disengaged from the oil filter housing (2).

Fig. 459: Remove/Install Oil Filter From/To Housing
Courtesy of CHRYSLER GROUP, LLC

3. Lifting the oil filter cap upward, remove the oil filter from the housing.

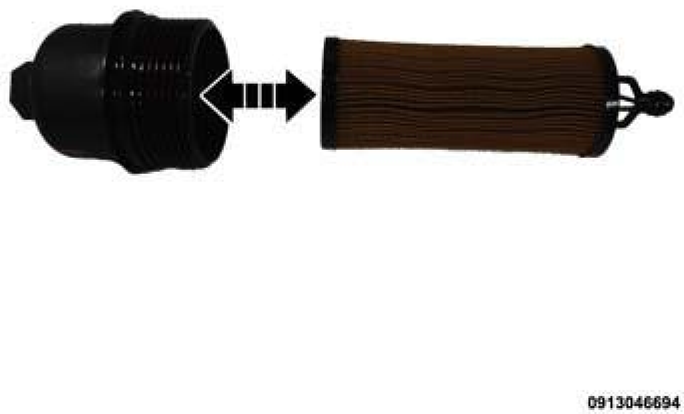


Fig. 460: Remove/Install Oil Filter From/To Oil Filter Cap
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil filter from the oil filter cap.

Fig. 461: O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

5. Remove and discard the O-ring seal (1).

INSTALLATION

INSTALLATION

NOTE: **It is not necessary to pre-oil the oil filter or fill the oil filter housing.**

Fig. 462: O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

1. Lightly lubricate the new O-ring seal (1) with clean engine oil.
2. Install the O-ring seal on the filter cap.

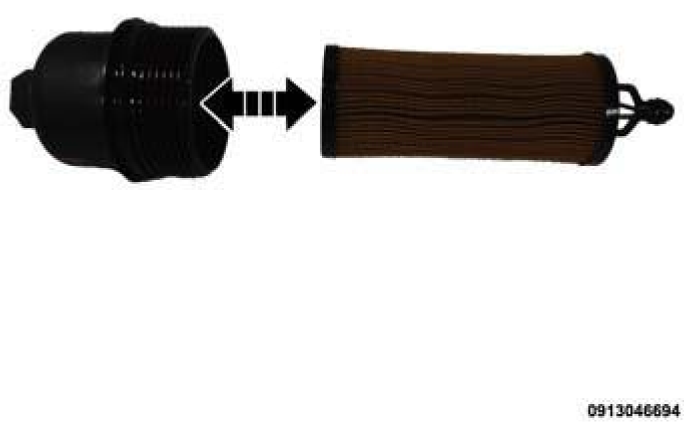


Fig. 463: Remove/Install Oil Filter From/To Oil Filter Cap
Courtesy of CHRYSLER GROUP, LLC

3. Install the new oil filter into the oil filter cap.

Fig. 464: Remove/Install Oil Filter From/To Housing
Courtesy of CHRYSLER GROUP, LLC

4. Install the oil filter into oil filter housing.

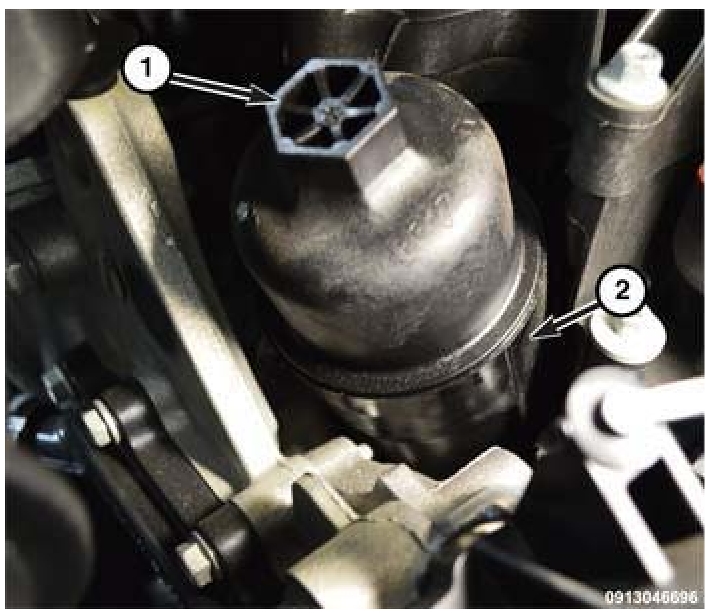


Fig. 465: Oil Filter Cap & Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

5. Thread the oil filter cap (1) into the oil filter housing (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
6. Add oil, verify crankcase oil level and start engine. Inspect for oil leaks. Refer to **STANDARD PROCEDURE**.

HOUSING, OIL FILTER

DESCRIPTION

DESCRIPTION

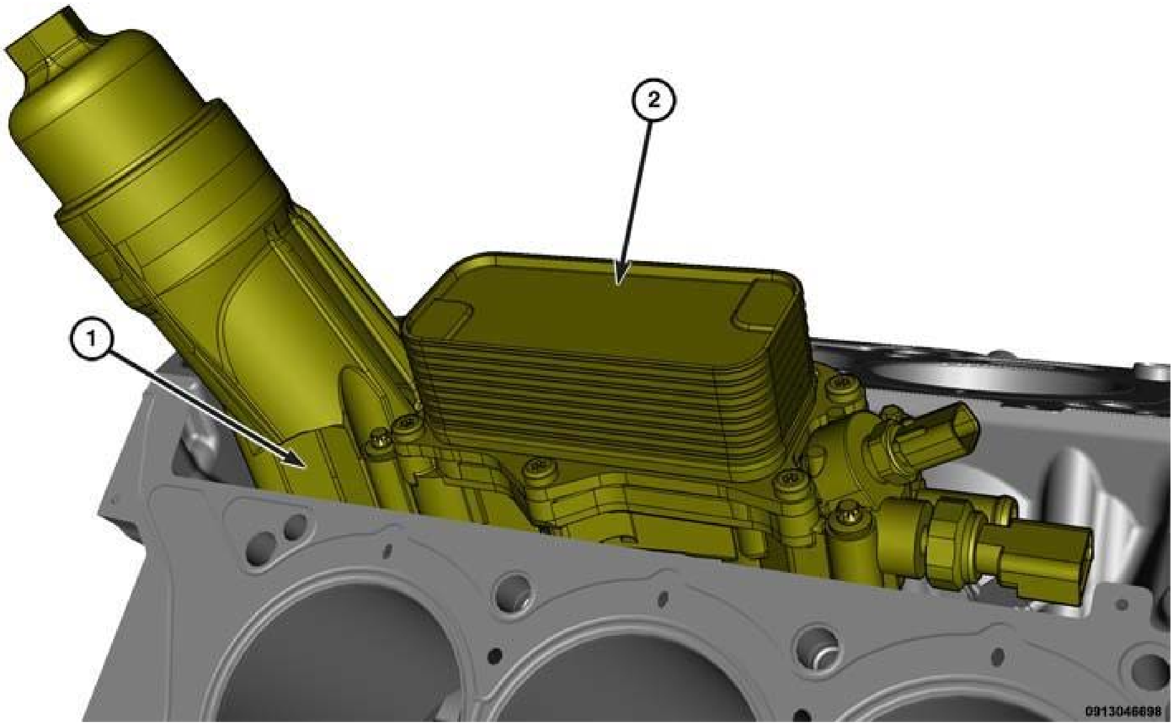


Fig. 466: Oil Filter Housing & Engine Oil Cooler
Courtesy of CHRYSLER GROUP, LLC

The oil filter housing (1) is located in the V of the cylinder block. The oil filter element is located within the housing and the engine oil cooler (2) is attached to the top of the housing. Both the oil pressure and oil temperature sensors are located at the rear of the housing.

OPERATION

OPERATION

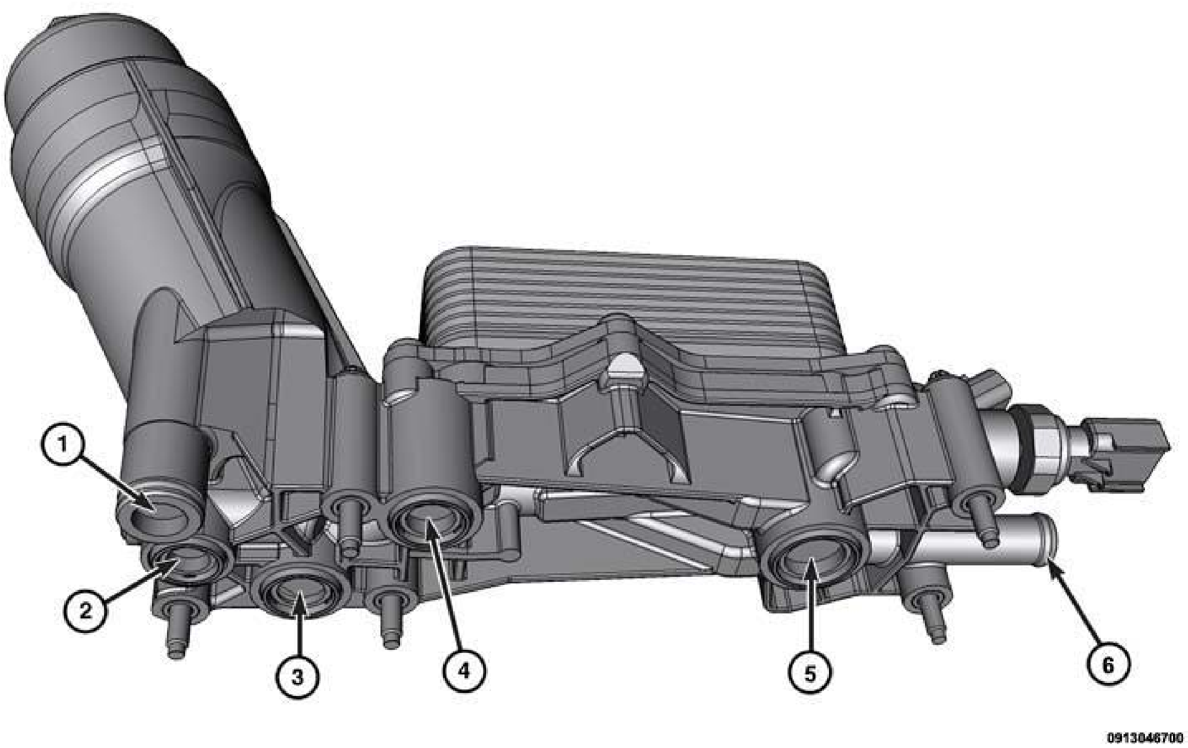


Fig. 467: Oil Flow Locations
Courtesy of CHRYSLER GROUP, LLC

Oil flows from the engine oil pump to the oil filter housing inlet (1) and to the oil filter element located within the oil filter housing. After the oil is filtered and then cooled it travels to the main oil gallery (5). An oil filter by-pass is built into the housing and is not serviceable. Removing the oil filter cap from the housing allows oil to drain from the oil filter cavity into to the crankcase (2).

Coolant flows from the right cylinder block water jacket (3) and from the left cylinder block water jacket (4) into the housing. The coolant flows through the oil cooler and exits the housing from the rear hose nipple (6) where it is returned to the water pump. A coolant by-pass in the housing is designed to direct excessive coolant flow around the oil cooler for continuous circulation.

REMOVAL

REMOVAL

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
3. Remove the lower intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.

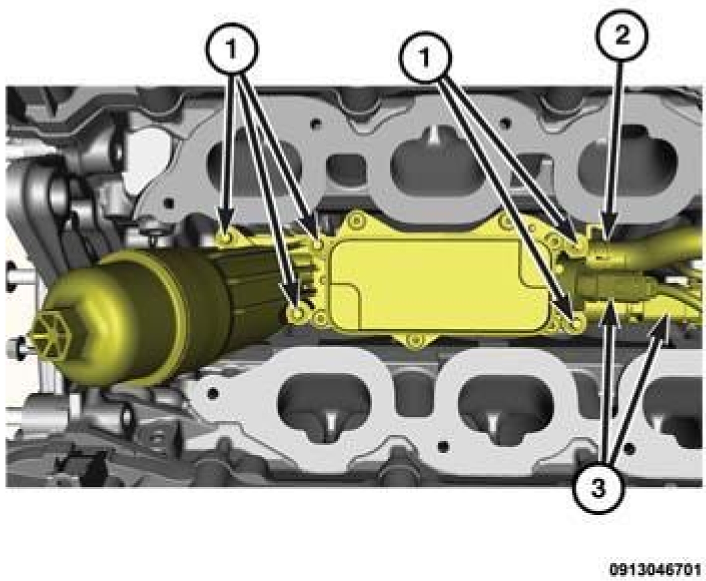
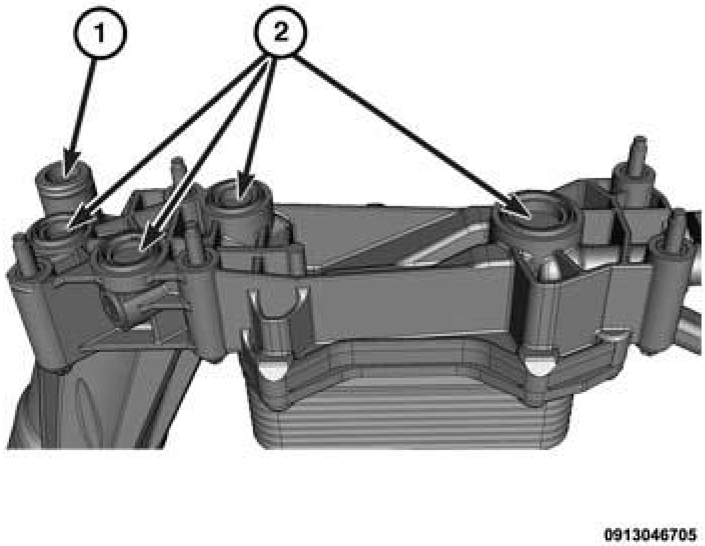


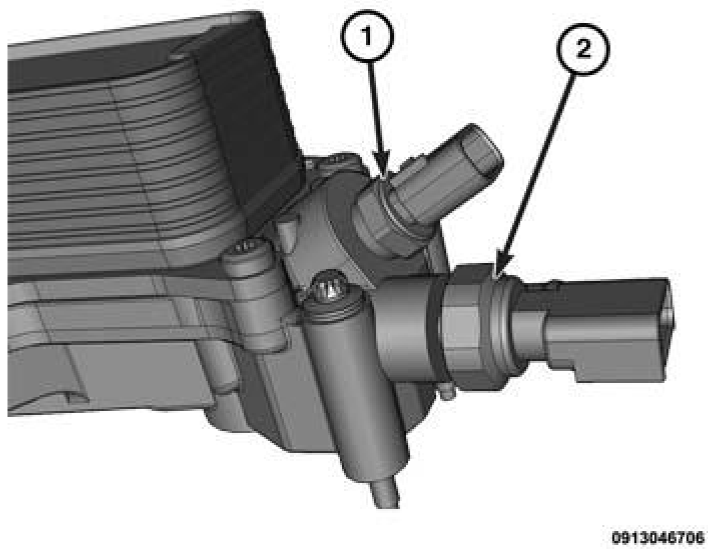
Fig. 468: Oil Temperature Sensor And Oil Pressure Sensor Electrical Connectors, Heater Hose & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the oil temperature sensor and oil pressure sensor electrical connectors (3).
5. Remove five bolts (1) and remove the oil filter housing.
6. Lift the oil filter housing and remove the heater hose (2).



[Fig. 469: O-Ring Seal & Oil Filter Housing Seals]
Courtesy of CHRYSLER GROUP, LLC

7. Remove and discard the oil filter housing seals (2). The O-ring seal (1) can be reused.

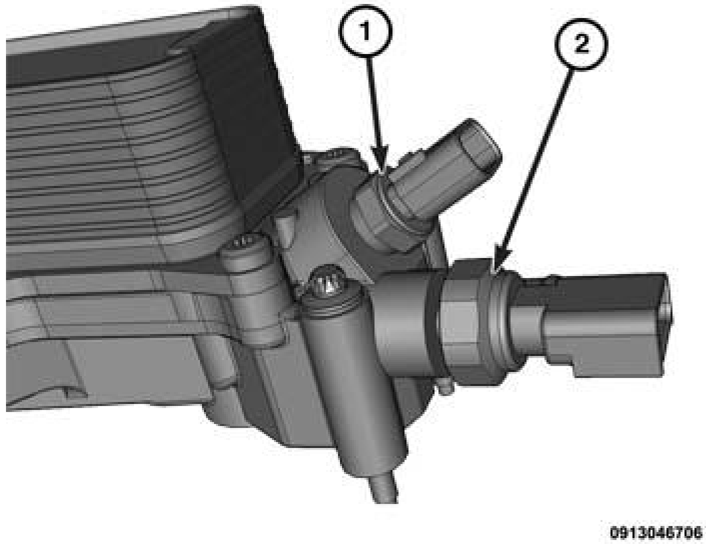


[Fig. 470: Oil Temperature Sensor & Oil Pressure Sensor]
Courtesy of CHRYSLER GROUP, LLC

8. If required, remove the oil temperature sensor (1) from the oil filter housing.
9. If required, remove the oil pressure sensor (2) from the oil filter housing.

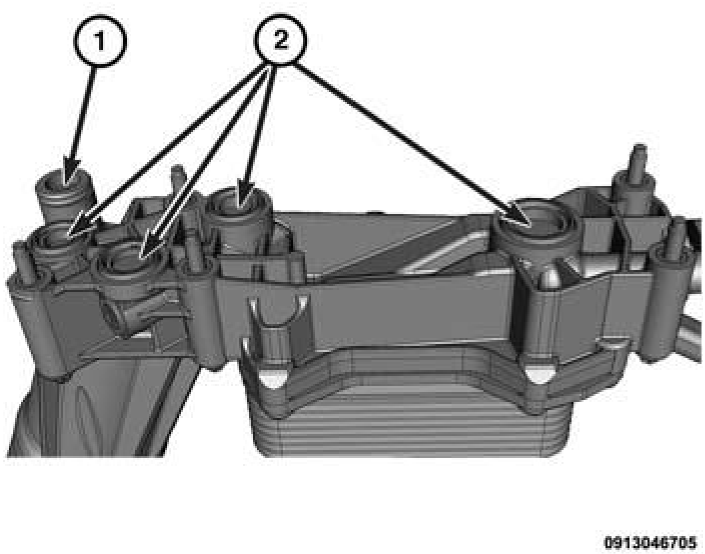
INSTALLATION

INSTALLATION



[Fig. 471: Oil Temperature Sensor & Oil Pressure Sensor]
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the oil pressure sensor (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
2. If removed, install the oil temperature sensor (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 472: O-Ring Seal & Oil Filter Housing Seals]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Always use new dry seals (2) when installing the oil filter housing. Lubricate the O-ring seal (1) with clean engine oil prior to installation.**

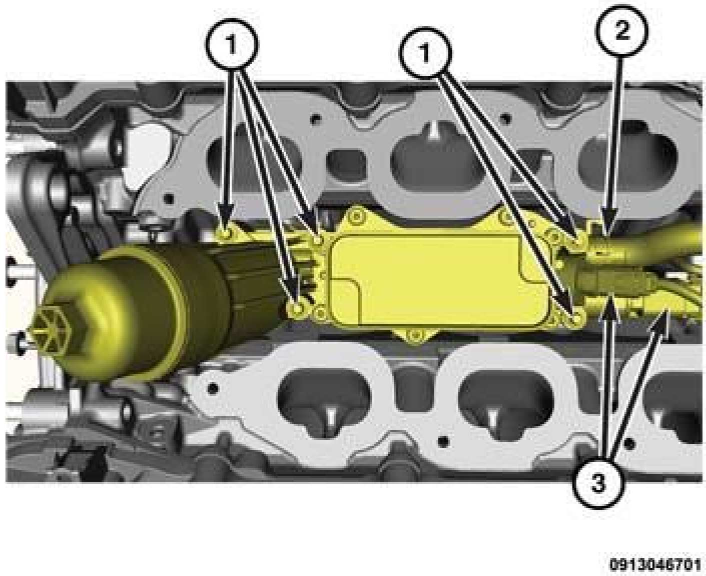


Fig. 473: Oil Temperature Sensor And Oil Pressure Sensor Electrical Connectors, Heater Hose & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install new oil filter housing seals onto the oil filter housing.
4. Install the heater hose (2) to the oil filter housing.
5. Position the oil filter housing on the engine block.
6. Loosely install the five oil filter housing retaining bolts.

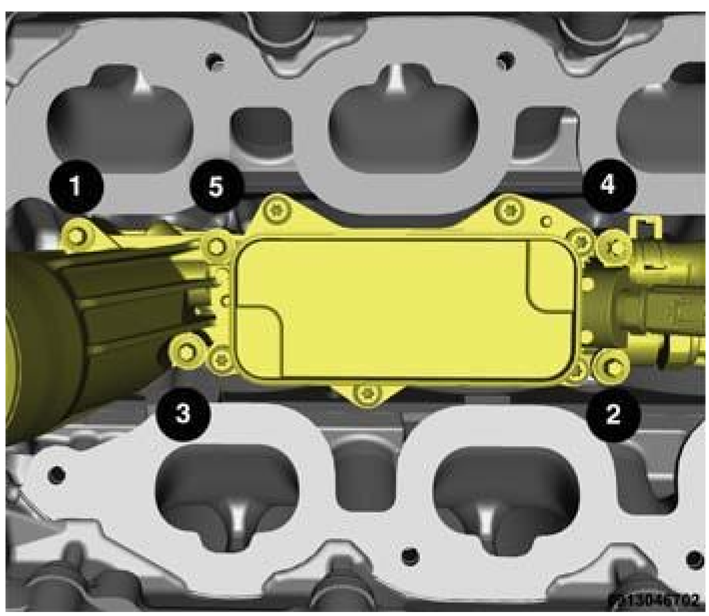


Fig. 474: Oil Cooler Screws Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Tighten the oil filter housing bolts in the sequence shown in illustration to the proper specification. Refer to TORQUE SPECIFICATIONS.

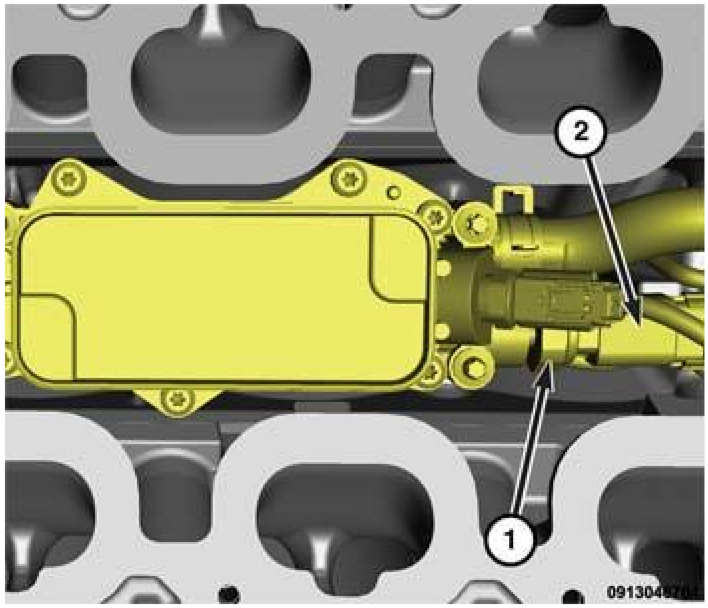


Fig. 475: Oil Pressure Sensor & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

8. Connect the oil pressure sensor (1) electrical connector (2).

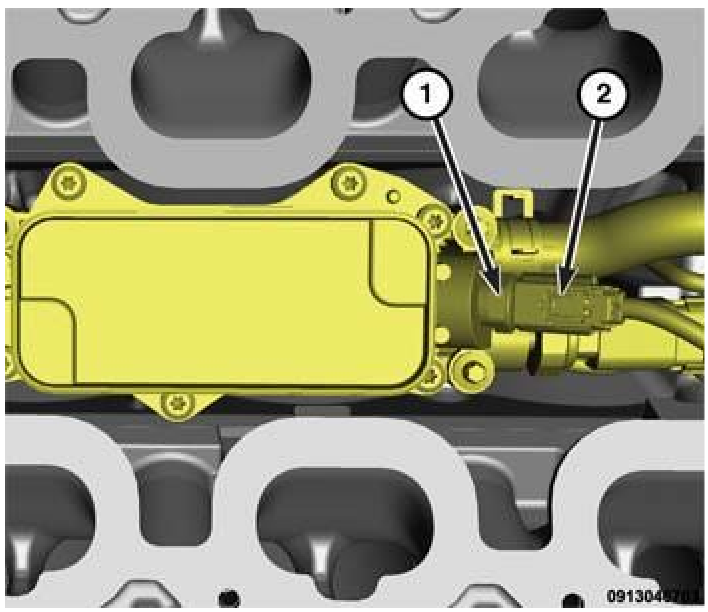


Fig. 476: Oil Temperature Sensor & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

9. Connect the oil temperature sensor (1) electrical connector (2).
10. Install the lower intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
11. If required, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **STANDARD PROCEDURE**.
12. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
13. Operate the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **STANDARD PROCEDURE** .

JET, PISTON OIL COOLER

DESCRIPTION

DESCRIPTION

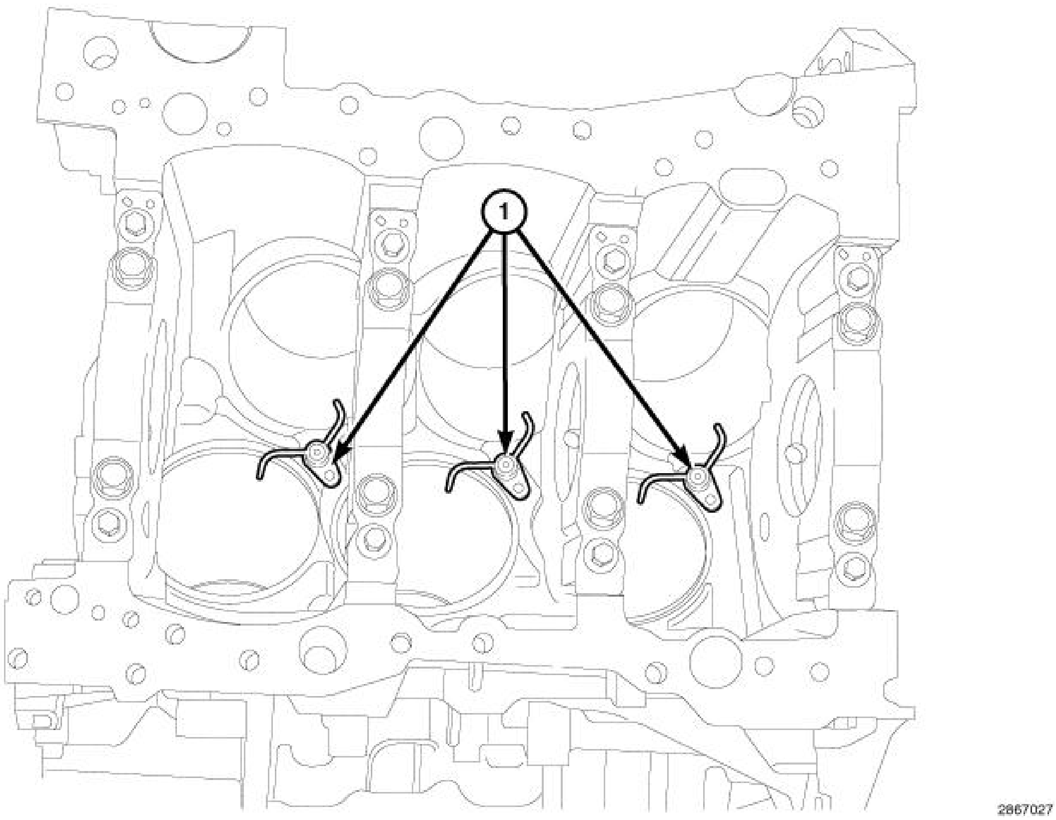


Fig. 477: Engine Blocked-Mounted Oil Jets
Courtesy of CHRYSLER GROUP, LLC

The Piston Oil Cooler Jet (1) is used to aid in the cooling of the pistons and the cylinder walls. There are three Piston Oil Cooler Jets used. Each jet is supplied oil by the main oil gallery. The oil is sprayed upwards onto the bottom of the pistons and sides of the cylinder walls. A Piston Oil Cooler Jet is mounted to the engine block under each pair of opposing cylinders.

Each jet has a check valve that closes below 241 kPa (35 psi) to maintain ample oil pressure at idle. All three oil jets are identical and seal to the engine block using an O-ring and fastener.

REMOVAL

REMOVAL

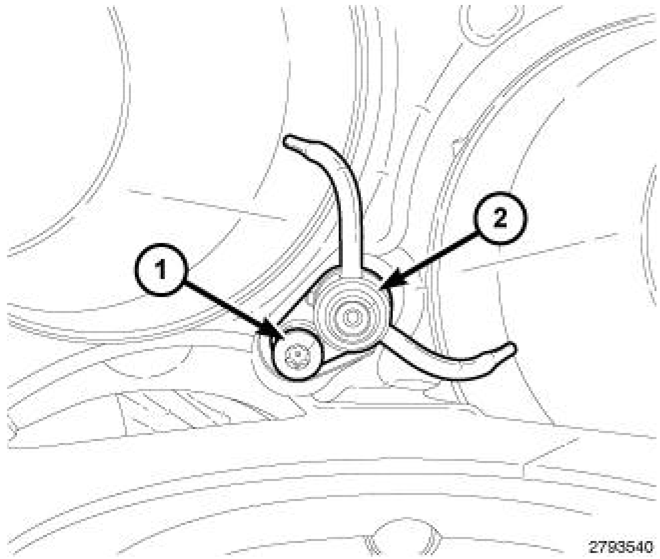


Fig. 478: Piston Oil Cooler Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Piston oil cooler jet for cylinders one/two shown in illustration. Piston oil cooler jets for cylinders three/four and five/six are similar.**

1. Remove the crankshaft. Refer to **CRANKSHAFT, REMOVAL**.
2. Remove the bolt (1) and the piston oil cooler jet(s) (2) from the engine block.

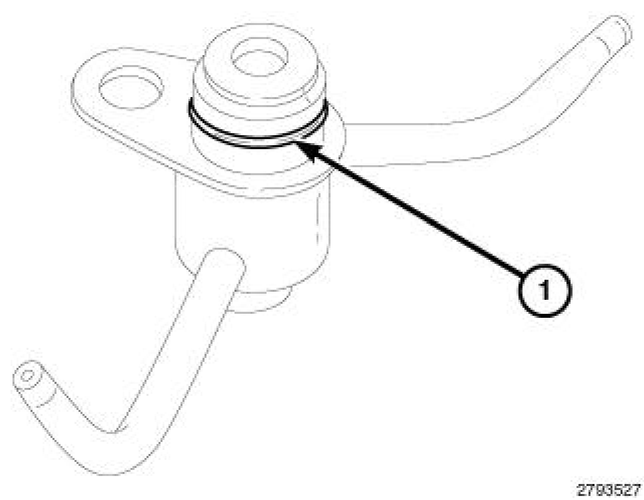


Fig. 479: Piston Oil Cooler Jet O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

3. Remove and discard the O-ring seal (1) from the piston oil cooler jet(s).

INSTALLATION

INSTALLATION

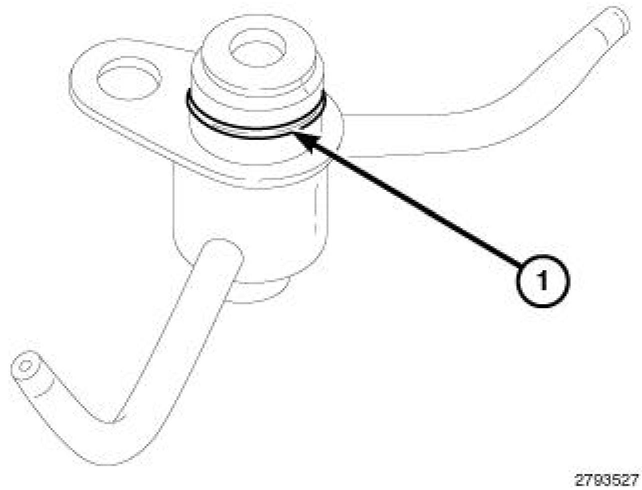


Fig. 480: Piston Oil Cooler Jet O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate a new O-ring seal (1) with engine oil and install on the piston oil cooler jet(s).

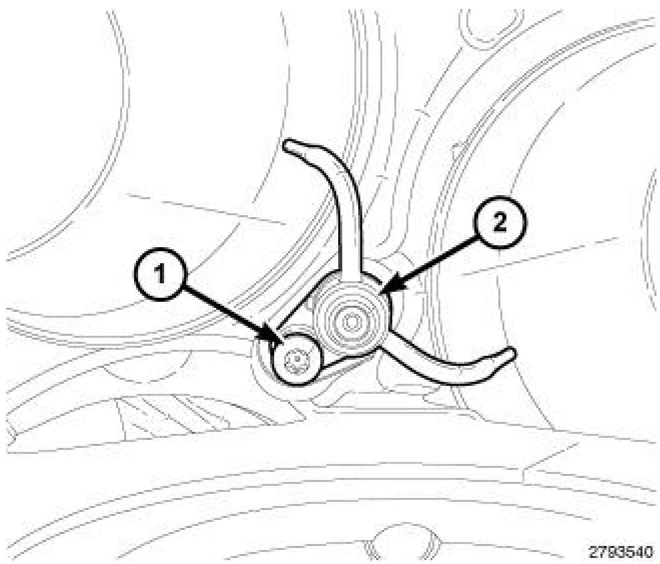


Fig. 481: Piston Oil Cooler Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Piston oil cooler jet for cylinders one/two shown in illustration. Piston oil cooler jets for cylinders three/four and five/six are similar.**

2. Install the piston oil cooler jet(s) (2) into the engine block and tighten the retaining bolt (1) to the proper specification. Refer to TORQUE SPECIFICATIONS.
3. Install the crankshaft. Refer to CRANKSHAFT, INSTALLATION.
4. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to STANDARD PROCEDURE.
5. Fill the cooling system. Refer to STANDARD PROCEDURE .
6. Connect the negative battery cable and tighten the nut to the proper specification. Refer to

SPECIFICATIONS .

7. Run the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to STANDARD PROCEDURE .

OIL

STANDARD PROCEDURE

STANDARD PROCEDURE - ENGINE OIL AND FILTER CHANGE

WARNING: New or used engine oil can be irritating to the skin. Avoid prolonged or repeated skin contact with engine oil. Contaminants in used engine oil, caused by internal combustion, can be hazardous to your health. Thoroughly wash exposed skin with soap and water. Do not wash skin with gasoline, diesel fuel, thinner, or solvents, health problems can result. Do not pollute, dispose of used engine oil properly. Contact your dealer or government agency for location of collection center in your area.

Change the engine oil and filter at mileage and time intervals described in the Maintenance Schedule. Refer to MAINTENANCE SCHEDULES, DESCRIPTION .

CAUTION: When performing an engine oil change, the oil filter cap must be removed. Removing the oil filter cap releases oil held within the oil filter cavity and allows it to drain into the sump. Failure to remove the cap prior to reinstallation of the drain plug will not allow complete draining of the used engine oil.

1. Run the engine until achieving normal operating temperature.
2. Position the vehicle on a level surface and turn the engine off.
3. Remove the engine oil filter. Refer to FILTER, ENGINE OIL, REMOVAL.

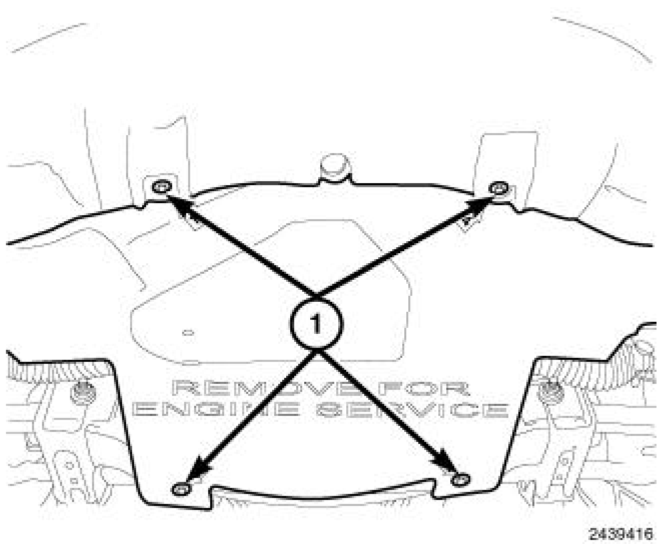


Fig. 482: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .

5. Remove bolts (1) and the belly pan.

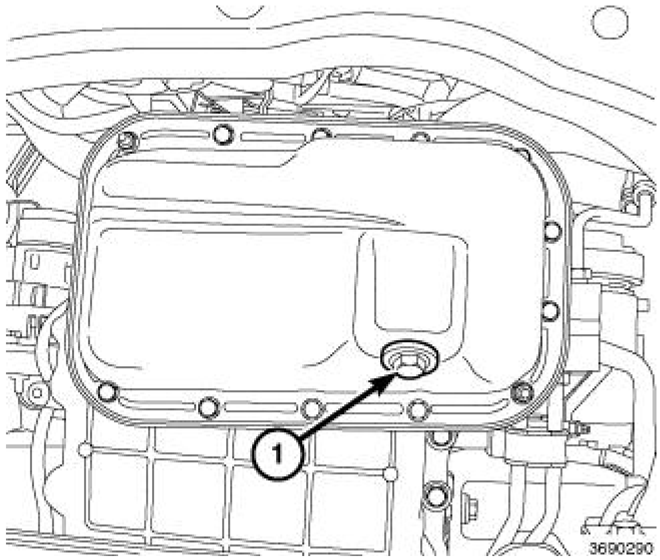


Fig. 483: Oil Pan Drain Plug
Courtesy of CHRYSLER GROUP, LLC

6. Place a suitable drain pan under the crankcase drain plug (1).
7. Remove the drain plug (1) from oil pan and allow the oil to drain into the pan. Inspect the drain plug threads for stretching or other damage. Replace the drain plug and gasket if damaged.
8. Install the drain plug (1) in the oil pan and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

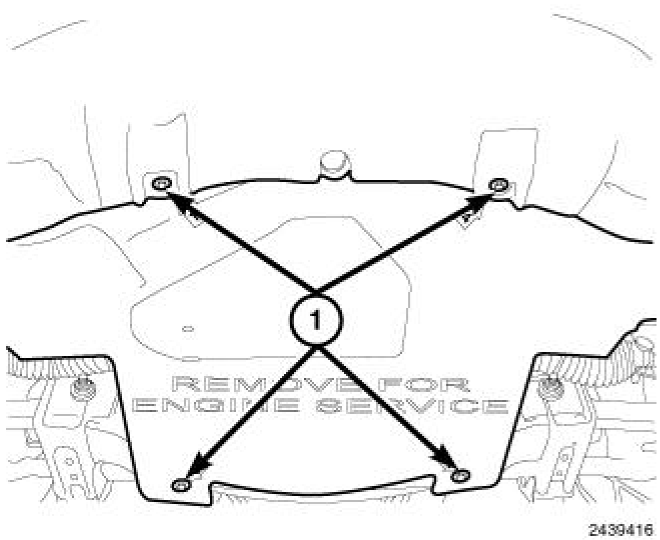
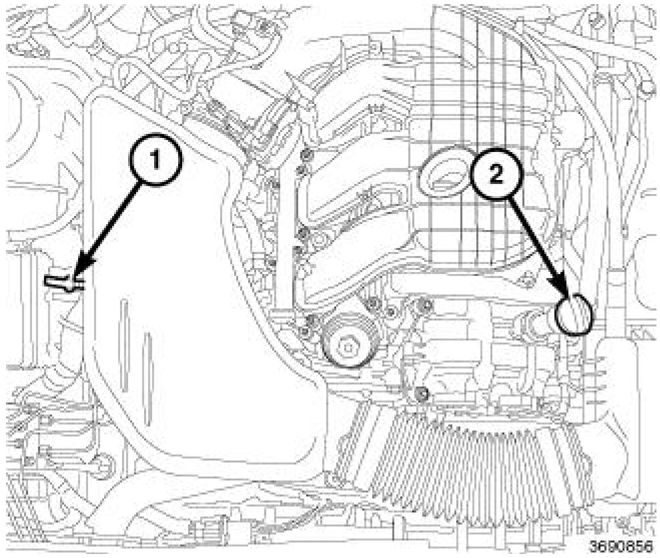


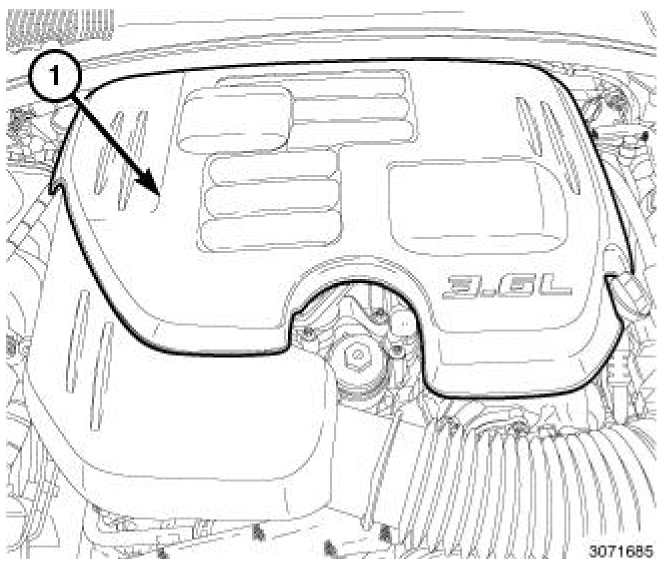
Fig. 484: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

9. Position the belly pan and retainers (1).
10. Remove support and lower the vehicle.
11. Install the engine oil filter. Refer to **FILTER, ENGINE OIL, INSTALLATION**.



[Fig. 485: Oil Fill Cap & Oil Level Gauge](#)
Courtesy of CHRYSLER GROUP, LLC

12. Remove the oil fill cap (2). Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
13. Install the oil fill cap (2).
14. Start the engine and inspect for leaks.
15. Stop the engine and check the oil level (1).



[Fig. 486: Engine Cover](#)
Courtesy of CHRYSLER GROUP, LLC

16. Install the engine cover (1), if removed.

OIL FILTER SPECIFICATION

All engines are equipped with a high quality full-flow, disposable type oil filter. When replacing oil filter, use a MoparÂ® filter or equivalent.

USED ENGINE OIL DISPOSAL

Care should be exercised when disposing of used engine oil after it has been drained from a vehicle engine. Refer to the WARNING listed above.

PAN, OIL

DESCRIPTION

DESCRIPTION

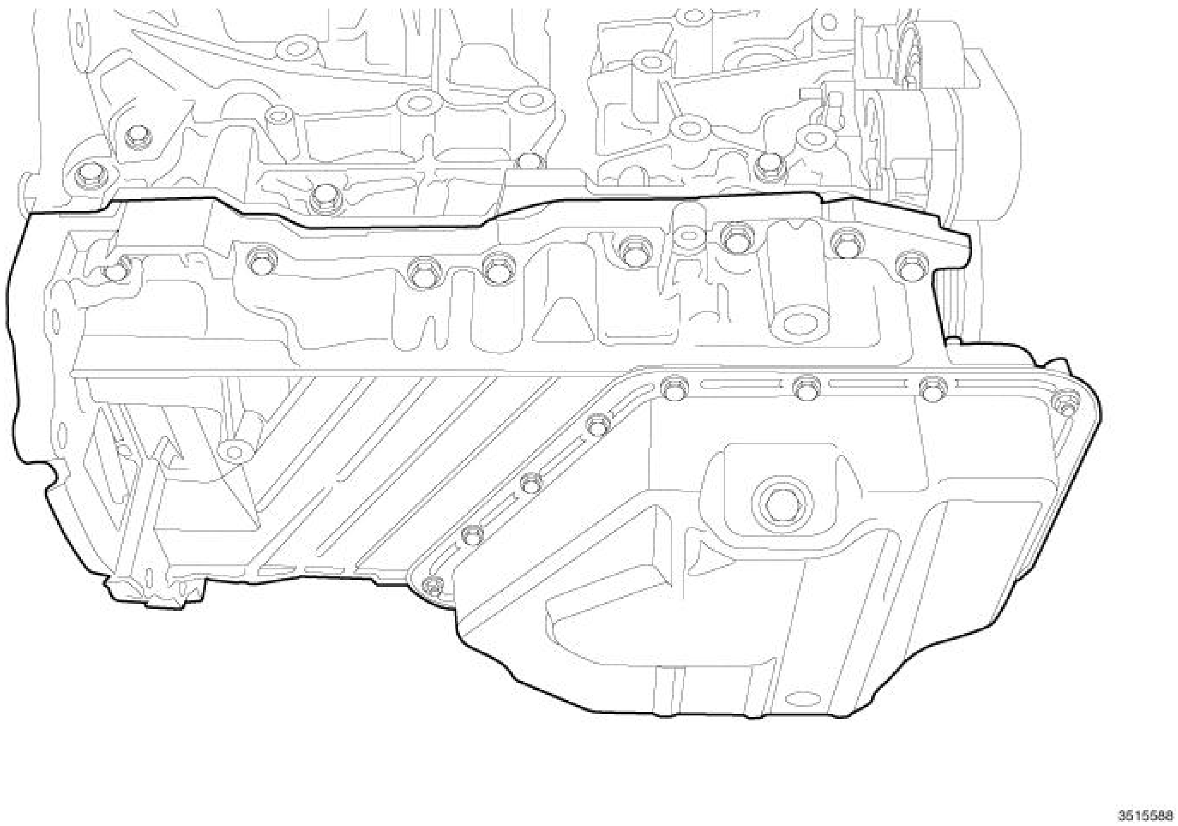


Fig. 487: Upper & Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

There is an upper and lower oil pan. The upper oil pan is cast aluminum and also serves as the lower end structural support. The lower pan is a stamped steel design. Both upper and lower oil pans are sealed using MoparÂ® Threebond Engine RTV Sealant. The lower oil pan must be removed in order to access all of the upper oil pan attaching bolts.

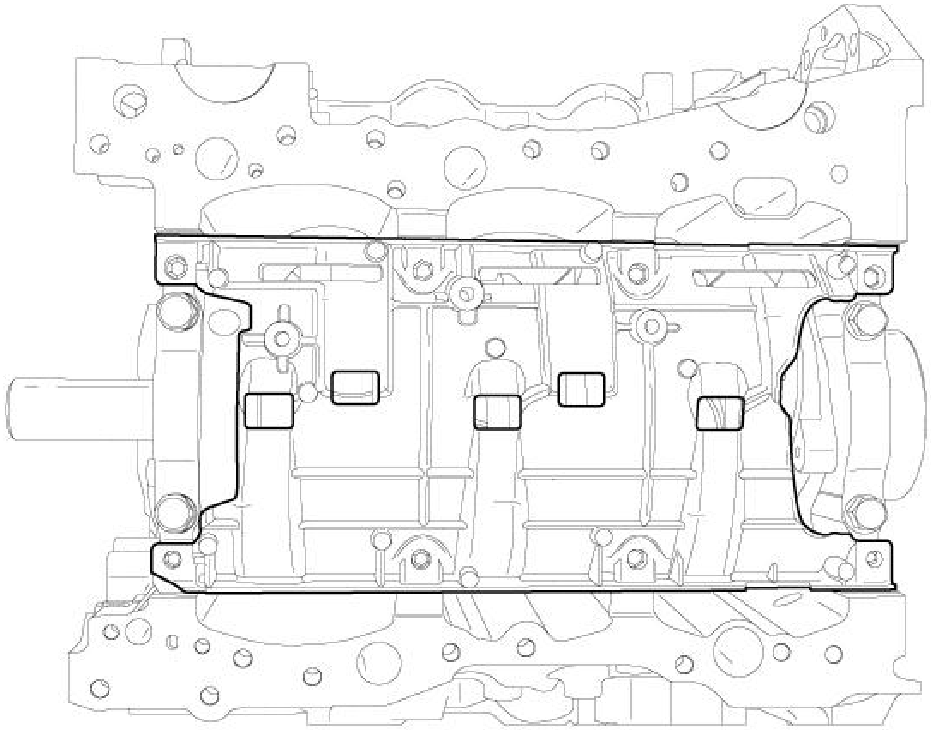


Fig. 488: Windage Tray
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not attempt to support the weight of the engine on the windage tray. The windage tray is a thin cast aluminum construction and can be easily damaged.

The high pressure die cast aluminum windage tray is mounted to the main bearing caps and is designed to keep oil off of the connecting rods as the crankshaft rotates. When the oil is kept off the connecting rods, the engine rotates easier and oil foaming decreases. Like the oil pan, the windage tray is designed to stiffen the lower end of the engine. The tray is directional and the main bearing cap bolts hold it in place.

REMOVAL

LOWER

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

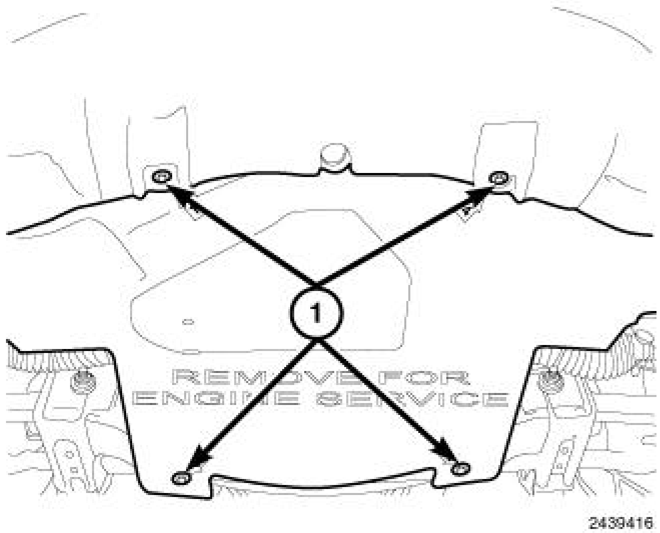


Fig. 489: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

2. Remove bolts (1) and remove the belly pan.
3. Drain the engine oil. Refer to **STANDARD PROCEDURE**.

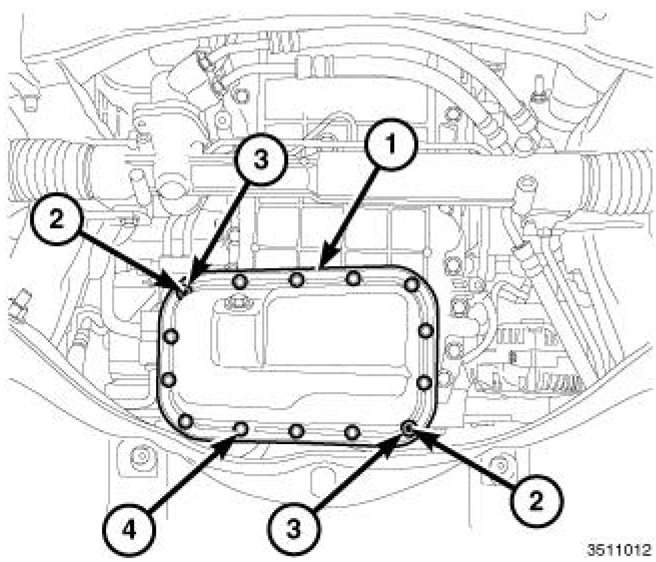


Fig. 490: Bolts, Studs, Nuts & Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The lower oil pan must be removed to access all of the upper oil pan retaining bolts.**

4. Remove twelve bolts (4), two studs (2) and two nuts (3) from the flange of the lower oil pan (1).

CAUTION: **Do not pry on the lower oil pan flange. There are no designated pry points for lower oil pan removal. Prying on only one or a few locations could bend the flange and damage the pan.**

5. Using a gasket scraper or equivalent, loosen the seal around the lower oil pan in order to shear the sealant

bond and remove the pan.

6. Remove all residual sealant from the upper and lower oil pans and clean the mating surfaces with isopropyl alcohol in preparation for sealant application. Refer to **PAN, OIL, CLEANING**.

UPPER

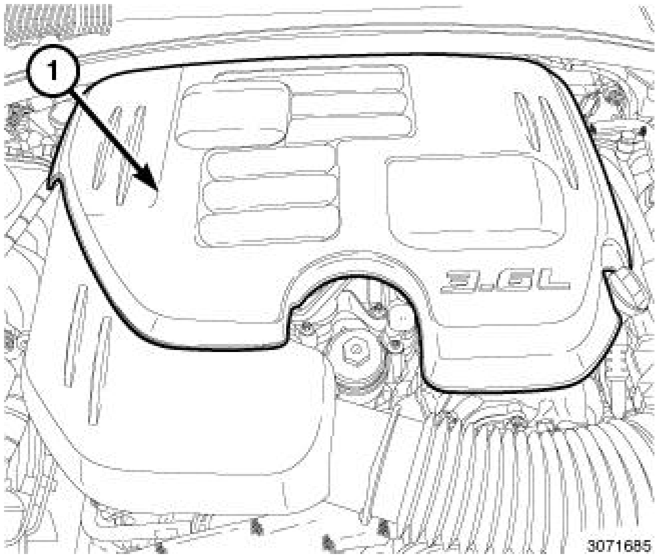


Fig. 491: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover (1).

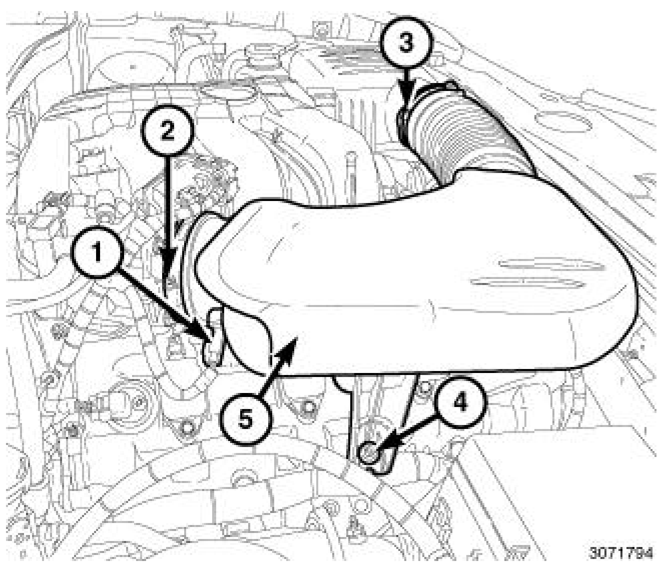


Fig. 492: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the Inlet Air Temperature (IAT) sensor wire harness connector (1).
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.

6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

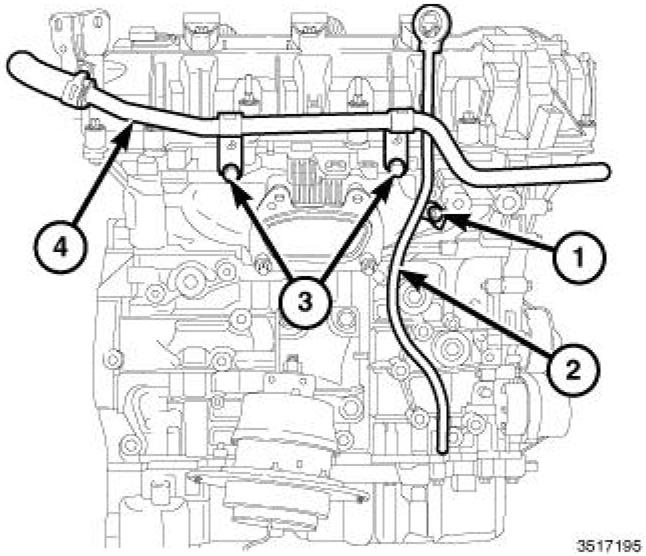


Fig. 493: Heater Core Inlet Tube, Oil Level Indicator & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Remove two bolts (3) from the heater core inlet tube (4) and reposition the tube.
9. Remove the bolt (1) and remove the oil level indicator (2).

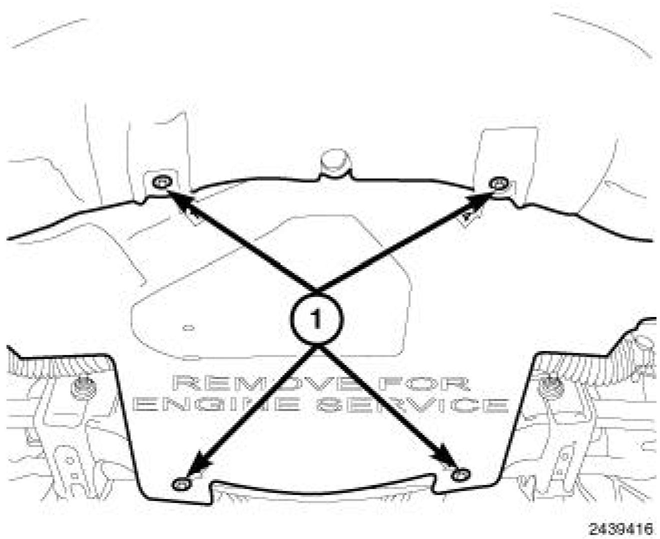


Fig. 494: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
11. Remove bolts (1) and the belly pan.
12. Drain the engine oil. Refer to **STANDARD PROCEDURE**.

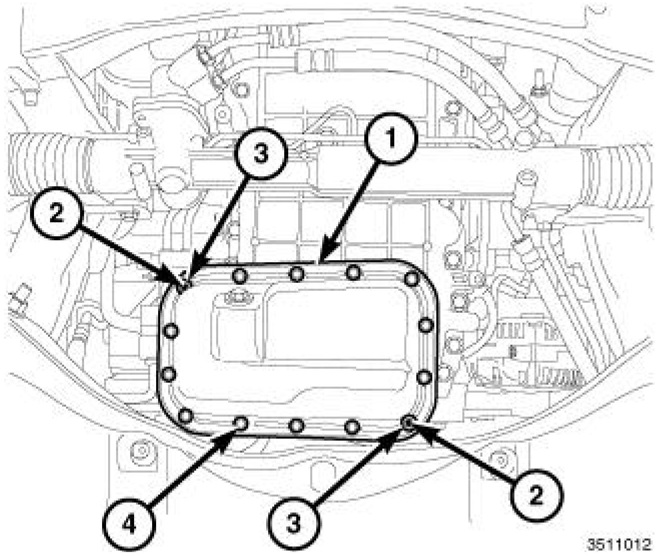


Fig. 495: Bolts, Studs, Nuts & Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The lower oil pan must be removed to access all of the upper oil pan retaining bolts.**

13. Remove the lower oil pan (1). Refer to **PAN, OIL, REMOVAL**.
14. Remove the steering gear. Refer to **GEAR, REMOVAL** .

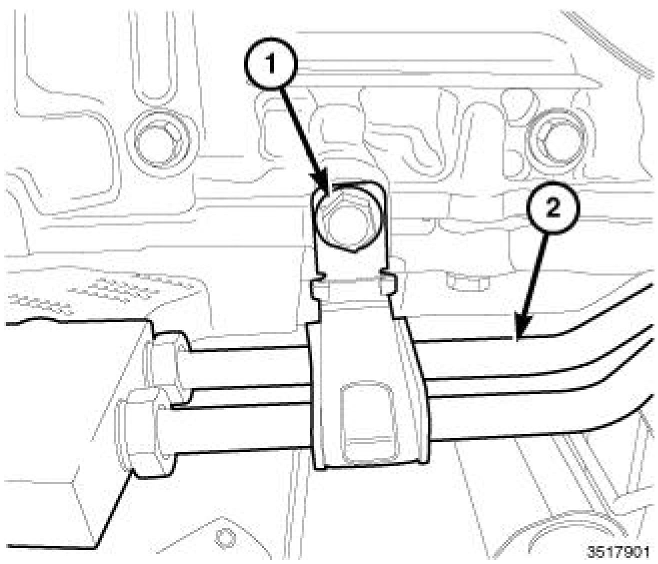
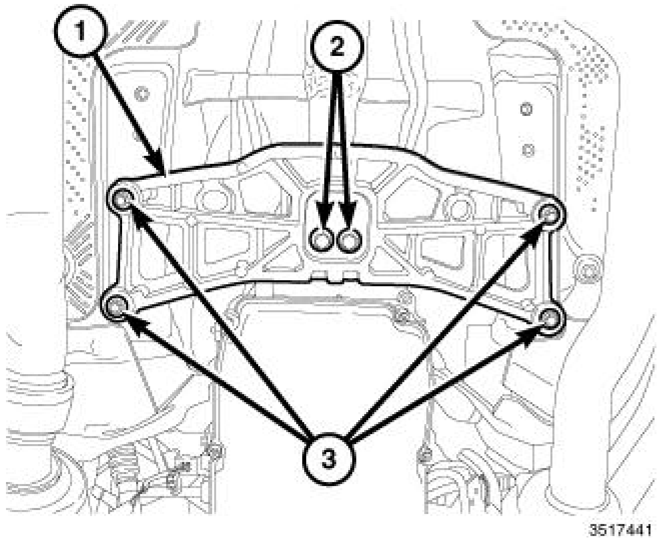


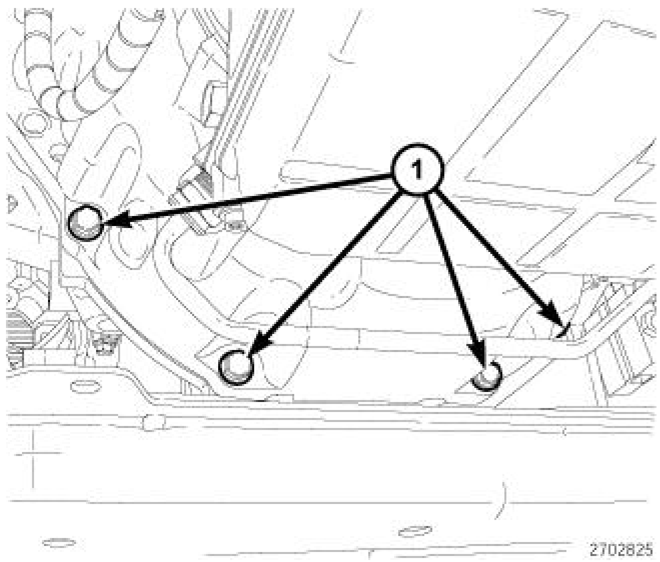
Fig. 496: Bolt & Transmission Cooling Lines
Courtesy of CHRYSLER GROUP, LLC

15. Remove the bolt (1) and reposition the transmission cooling lines (2).



[Fig. 497: Rear Engine Mount Isolator Bolts]
Courtesy of CHRYSLER GROUP, LLC

16. Remove the two bolts (2) from the rear engine mount isolator.
17. Using a suitable jack stand and a block of wood positioned under the transmission oil pan, raise the rear of the engine.



[Fig. 498: Transmission-To-Engine Oil Pan Bolts]
Courtesy of CHRYSLER GROUP, LLC

18. Remove the four transmission to the engine oil pan bolts (1).

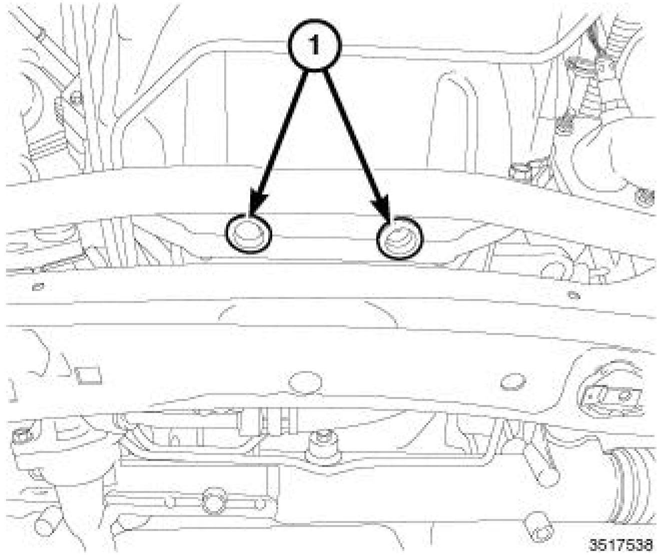


Fig. 499: Rubber Plugs
Courtesy of CHRYSLER GROUP, LLC

19. Remove the two rubber plugs (1) covering the rear oil seal retainer flange bolts.

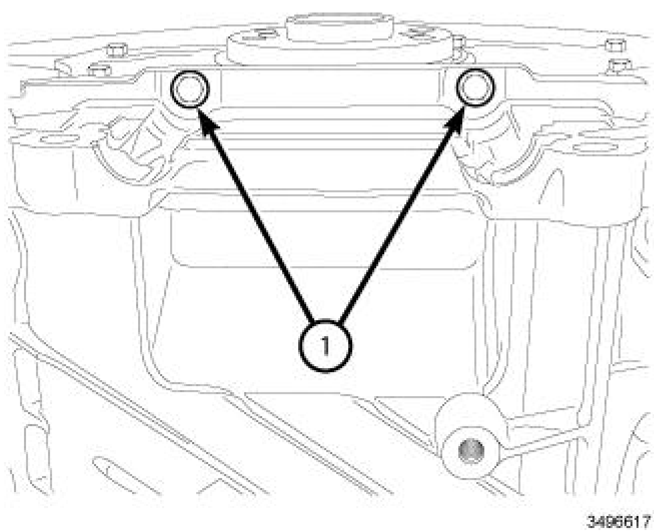


Fig. 500: Rear Oil Seal Retainer Flange Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Shown with transmission removed in illustration for clarity.**

CAUTION: **There are two hidden M6 bolts that must be removed from the rear of the upper oil pan flange. If these bolts are not removed, the rear oil seal retainer flange will be severely damaged.**

20. Remove two M6 bolts (1) from the rear oil seal retainer flange.

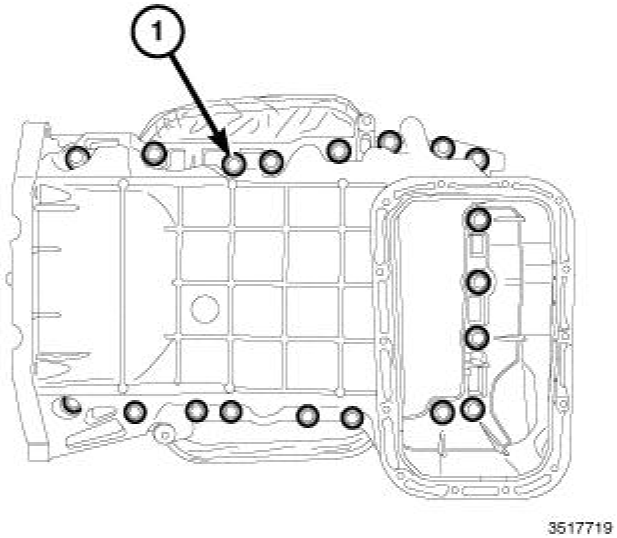


Fig. 501: Oil Pan Mounting Bolts (M8)
Courtesy of CHRYSLER GROUP, LLC

21. Remove nineteen M8 oil pan mounting bolts (1).

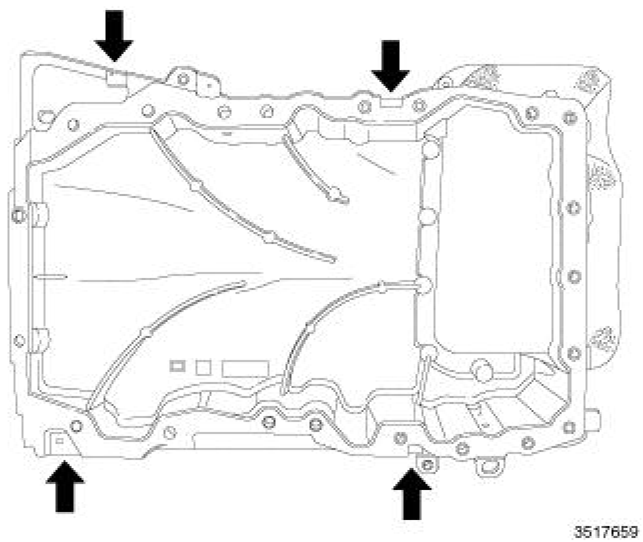


Fig. 502: Locating Pry Points To Remove Oil Pan
Courtesy of CHRYSLER GROUP, LLC

22. Using the four indicated pry points, carefully remove the upper oil pan.
23. Remove all residual sealant from the upper and lower oil pans, timing chain cover, rear seal retainer and engine block mating surfaces. Refer to PAN, OIL, CLEANING.

CLEANING

CLEANING

CAUTION: Clean the upper and lower oil pans, timing chain cover, rear seal retainer and engine block mating surfaces thoroughly with isopropyl alcohol in preparation for sealant application. All surfaces that seal with RTV must be oil and contamination free to ensure proper adhesion of the RTV to the mating surface

to prevent leaks.

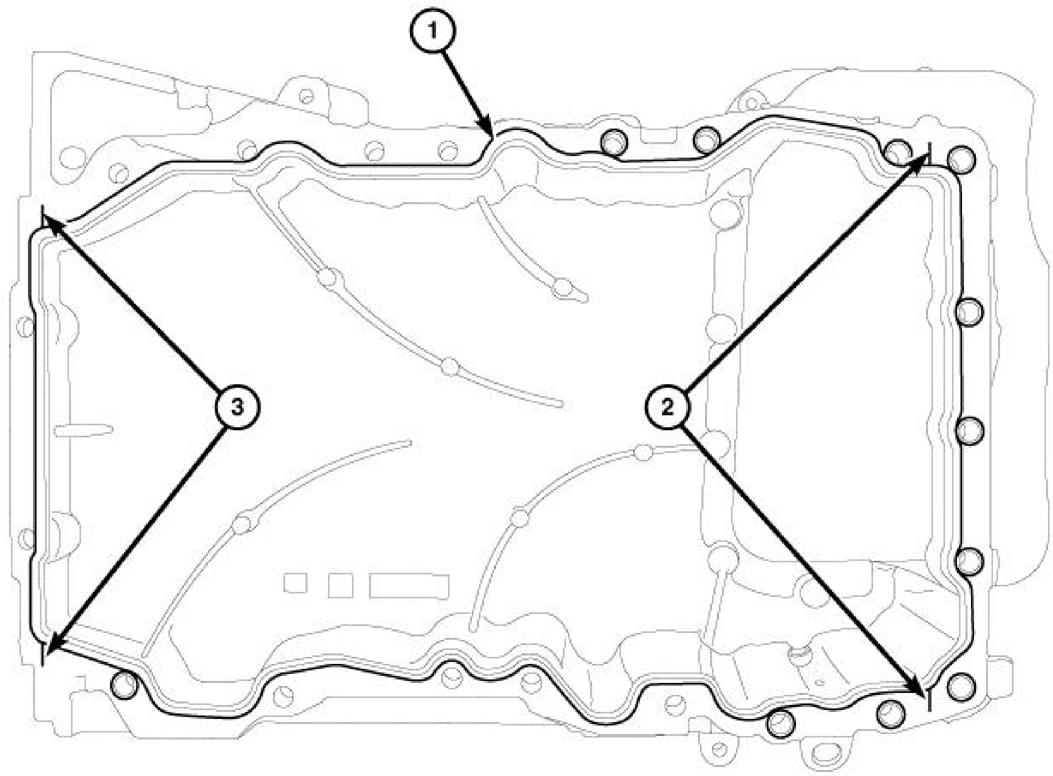


Fig. 503: Locating Sealant On Upper Oil Pan
Courtesy of CHRYSLER GROUP, LLC

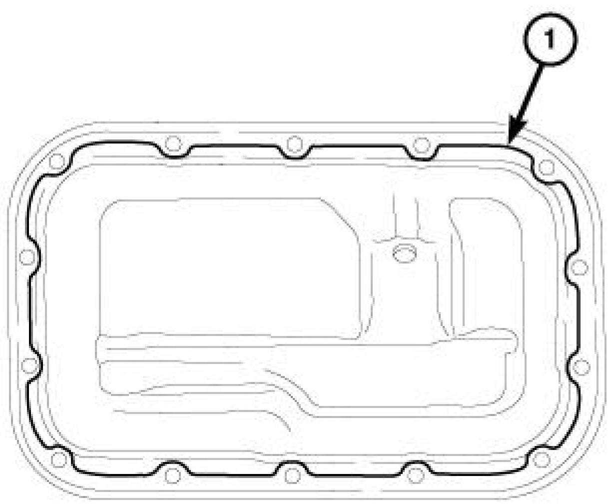


Fig. 504: Locating Sealant On Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

1. Clean the oil pan in solvent and wipe dry with a clean cloth.

CAUTION: Do not use oil based liquids, wire brushes, abrasive wheels or metal scrapers to clean the engine gasket surfaces. Use only isopropyl (rubbing)

alcohol, along with plastic or wooden scrapers. Improper gasket surface preparation may result in engine fluid leakage.

2. Remove all residual sealant (1) from the upper and lower oil pans. Refer to **ENGINE GASKET SURFACE PREPARATION**.

INSTALLATION

LOWER

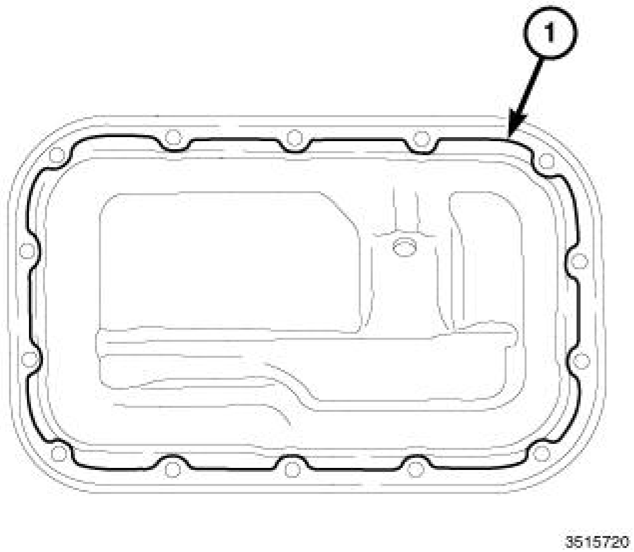


Fig. 505: Locating Sealant On Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than MoparÃ® Threebond Engine RTV Sealant may result in engine fluid leakage.**

CAUTION: **Following the application of MoparÃ® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.**

1. Clean the upper and lower oil pan mating surfaces with isopropyl alcohol in preparation for sealant application. Refer to **PAN, OIL, CLEANING**.
2. Apply a 2 to 3 mm wide bead of MoparÃ® Threebond Engine RTV Sealant (1) to the lower oil pan as shown in illustration.

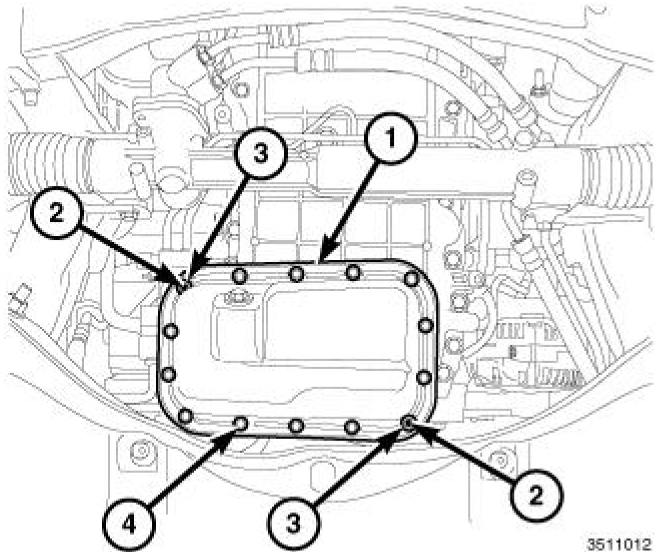


Fig. 506: Bolts, Studs, Nuts & Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Following assembly, the MoparÃ® Threebond Engine RTV Sealant must be allowed to dry for 45 minutes prior to adding oil and engine operation. Premature exposure to oil prior to drying may result in engine fluid leakage.**

3. Install two studs (2) into the upper oil pan flange.
4. Install the lower oil pan (1) to the upper oil pan with twelve bolts (4) and two nuts (3) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS.

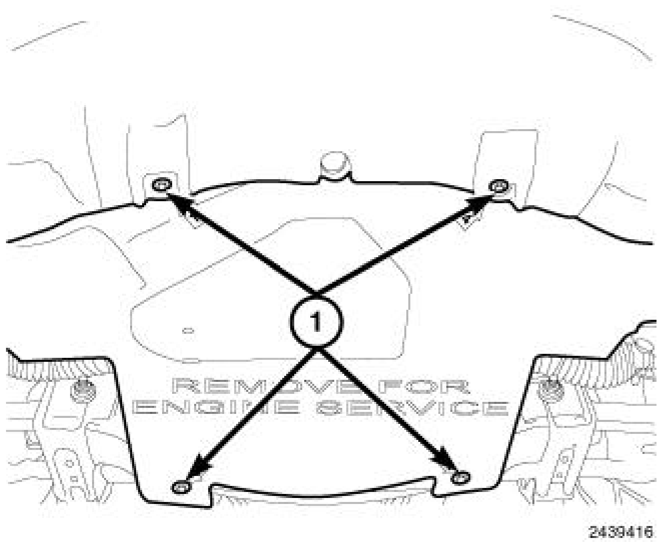


Fig. 507: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Install the belly pan and securely tighten bolts (1).
6. Remove support and lower the vehicle.
7. Fill the crankcase with the specified type and amount of engine oil. Refer to CAPACITIES AND

RECOMMENDED FLUIDS, SPECIFICATIONS .

8. Start and run the engine until it reaches normal operating temperature and check for leaks.

UPPER

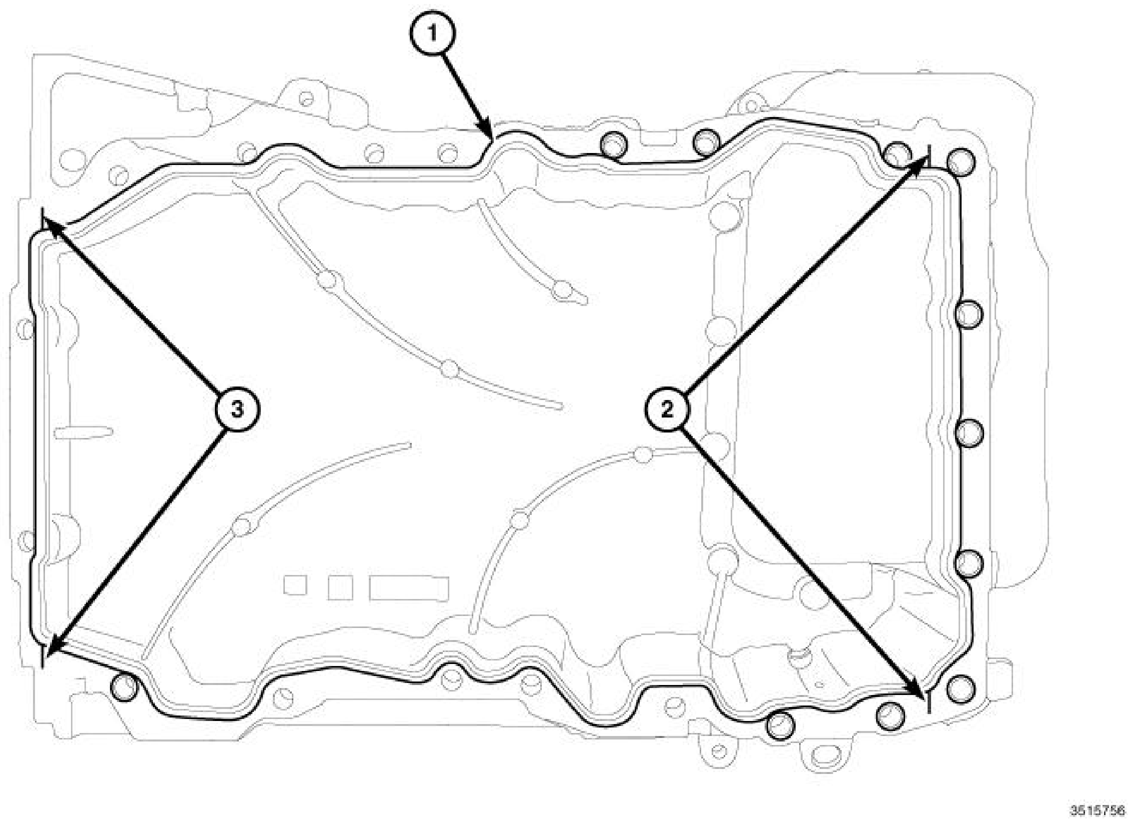


Fig. 508: Locating Sealant On Upper Oil Pan
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than MoparĀ® Threebond Engine RTV Sealant may result in engine fluid leakage.**

CAUTION: **Clean the upper and lower oil pans, timing chain cover, rear seal retainer and engine block mating surfaces thoroughly with isopropyl alcohol in preparation for sealant application. All surfaces that seal with RTV must be oil and contamination free to ensure proper adhesion of the RTV to the mating surface to prevent leaks.**

CAUTION: **Following the application of MoparĀ® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.**

1. Clean the upper and lower oil pans, timing chain cover, rear seal retainer and engine block mating surfaces with isopropyl alcohol in preparation for sealant application. Refer to **PAN, OIL, CLEANING**.
2. Apply a 2 to 3 mm wide bead of MoparĀ® Threebond Engine RTV Sealant to the upper oil pan as shown

in illustration in the following locations:

- Oil pan to engine block flange (1)
- Two timing cover to engine block T-joints (2)
- Two rear seal retainer to engine block T-joints (3)

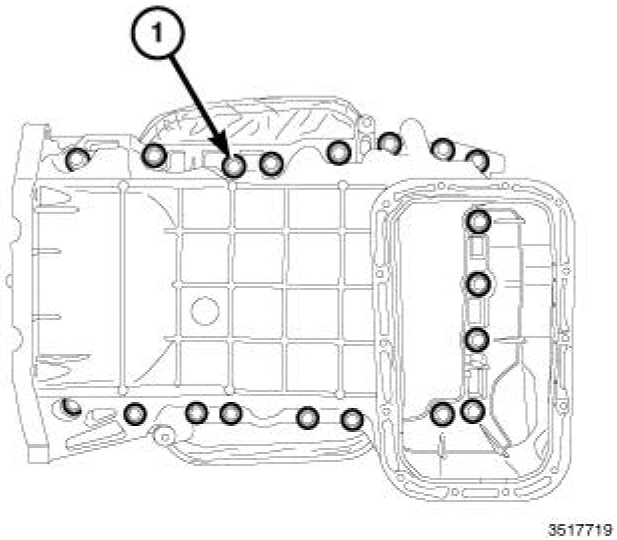


Fig. 509: Oil Pan Mounting Bolts (M8)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Make sure that the rear face of the oil pan is flush to the transmission bell housing before tightening any of the oil pan mounting bolts. A gap between the oil pan and the transmission could crack the oil pan or transmission casting.

3. Install the oil pan to the engine block making sure the oil pan is flush to the transmission bell housing. Secure the oil pan to the engine block with nineteen M8 oil pan mounting bolts (1) finger tight.

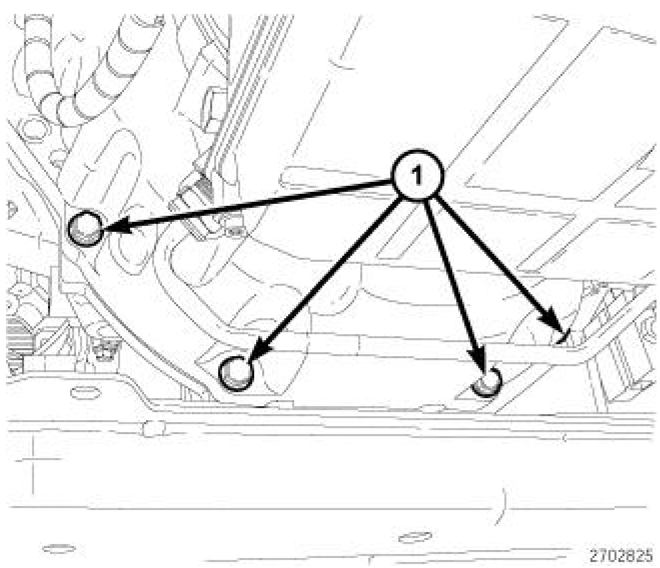


Fig. 510: Transmission-To-Engine Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the four transmission to the engine oil pan bolts (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

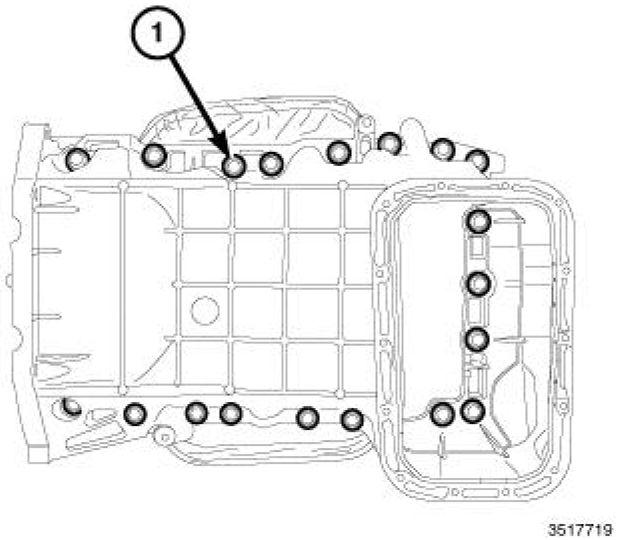


Fig. 511: Oil Pan Mounting Bolts (M8)
Courtesy of CHRYSLER GROUP, LLC

5. Tighten the nineteen previously installed M8 oil pan mounting bolts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

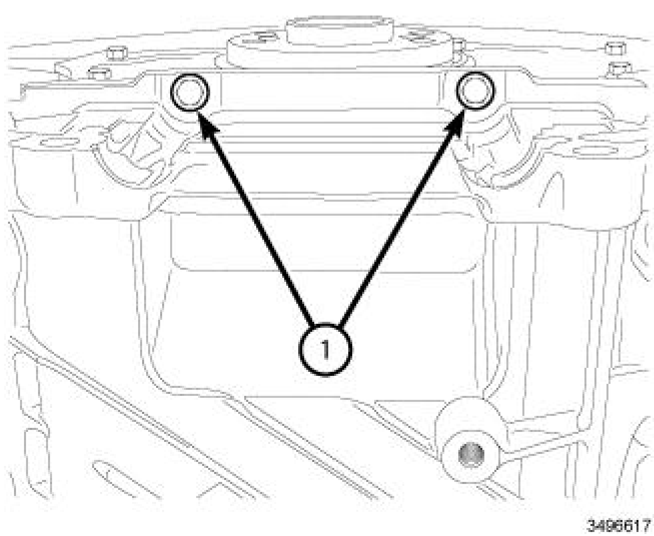


Fig. 512: Rear Oil Seal Retainer Flange Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Shown with transmission removed in illustration for clarity.**

6. Install the two M6 bolts (1) to the rear oil seal retainer flange and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

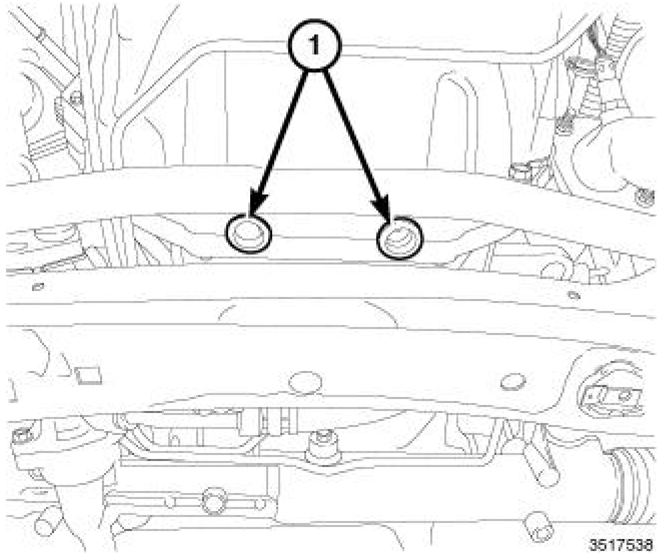


Fig. 513: Rubber Plugs
Courtesy of CHRYSLER GROUP, LLC

7. Install the two rubber plugs (1) covering the rear oil seal retainer flange bolts.

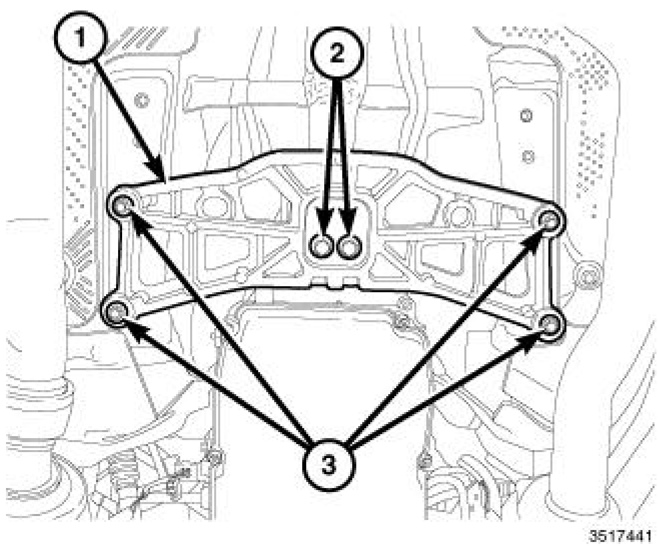


Fig. 514: Rear Engine Mount Isolator Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Lower the rear of the engine and install the two bolts (2) to the rear engine mount isolator. Tighten the bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

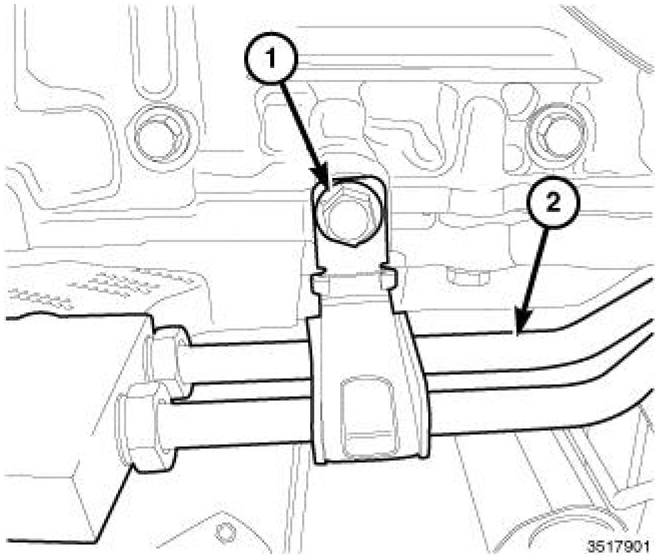


Fig. 515: Bolt & Transmission Cooling Lines
Courtesy of CHRYSLER GROUP, LLC

9. Install the transmission cooling lines (2) and tighten the bolt (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
10. Install the steering gear. Refer to **GEAR, INSTALLATION** .

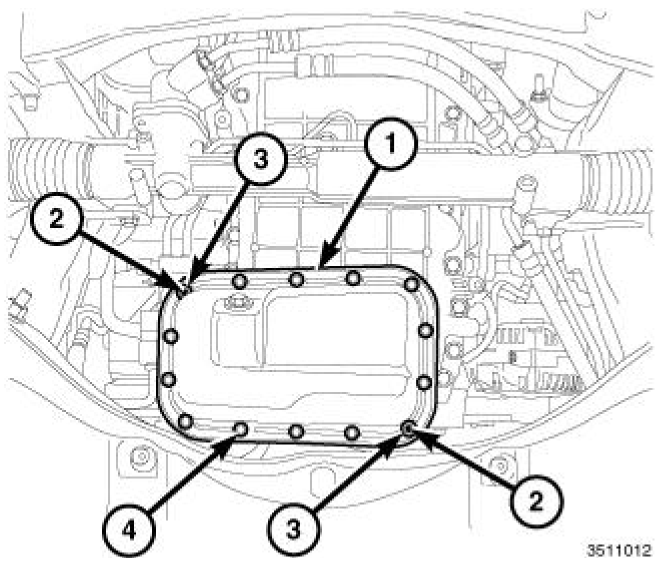


Fig. 516: Bolts, Studs, Nuts & Lower Oil Pan
Courtesy of CHRYSLER GROUP, LLC

11. Install the lower oil pan. Refer to **PAN, OIL, INSTALLATION**.

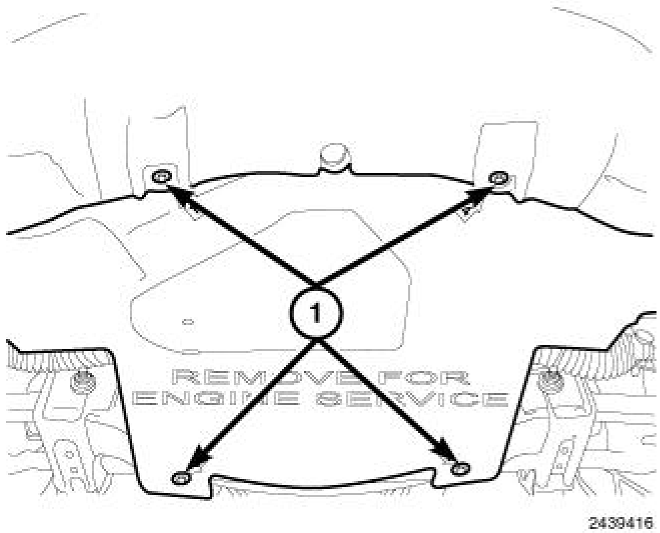


Fig. 517: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

12. Install the belly pan and securely tighten bolts (1).
13. Remove support and lower the vehicle.

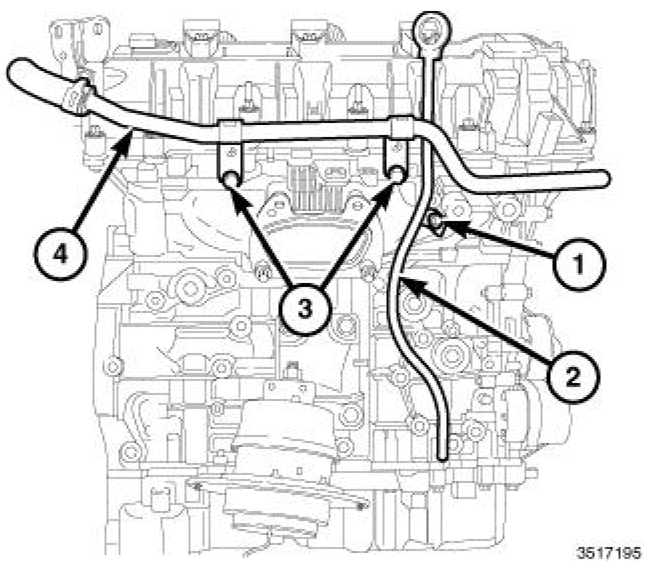


Fig. 518: Heater Core Inlet Tube, Oil Level Indicator & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Install the oil level indicator (2). Tighten bolt (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
15. Install the heater core inlet tube (4). Tightened bolts (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
16. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

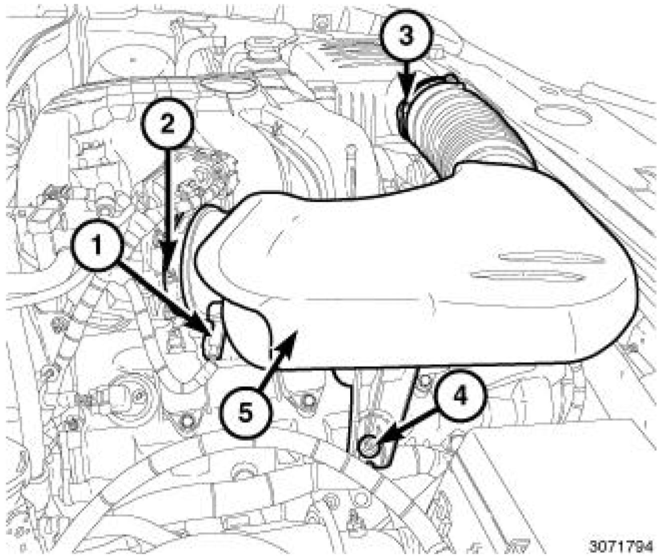


Fig. 519: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

17. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
18. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
19. Tighten the clamp at the air cleaner housing (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
20. Tighten the clamp (2) at the throttle body to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
21. Connect the Inlet Air Temperature (IAT) sensor wire harness connector (1).

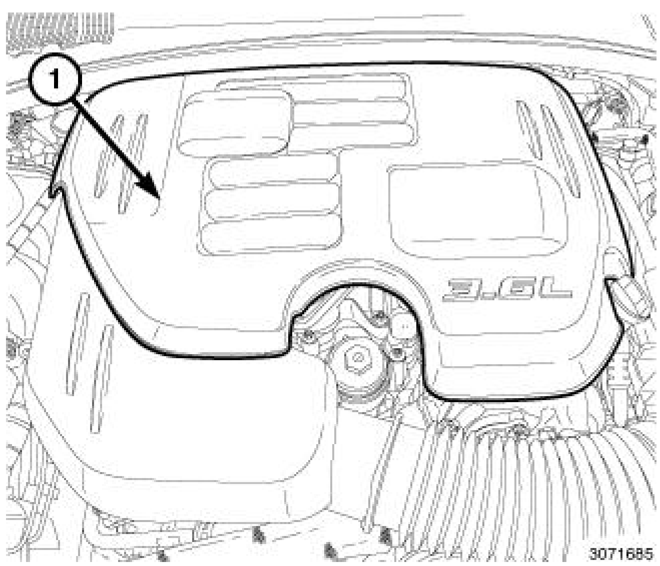


Fig. 520: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

22. Install the engine cover (1).
23. Connect the negative battery cable.
24. Start and run the engine until it reaches normal operating temperature and check for leaks.

PICK-UP, OIL PUMP

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.

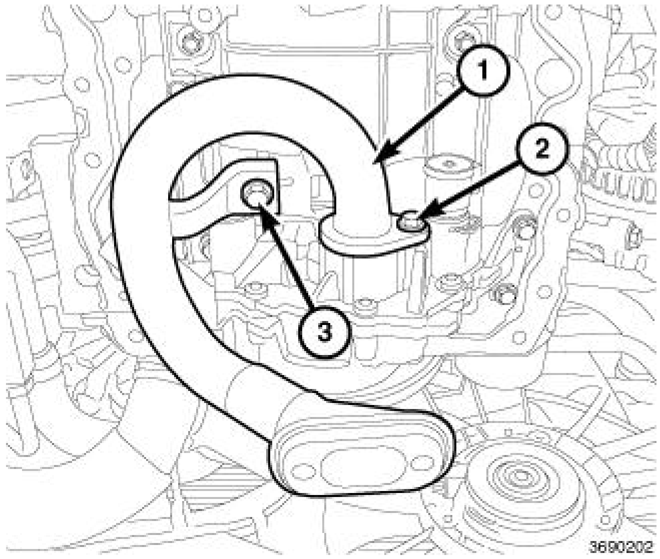


Fig. 521: Oil Pump Pick-Up Tube & Support Bracket Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Remove the upper oil pan. Refer to **PAN, OIL, REMOVAL**.
3. Remove bolt (2, 3) and the oil pump pick-up tube (1) from the oil pump.

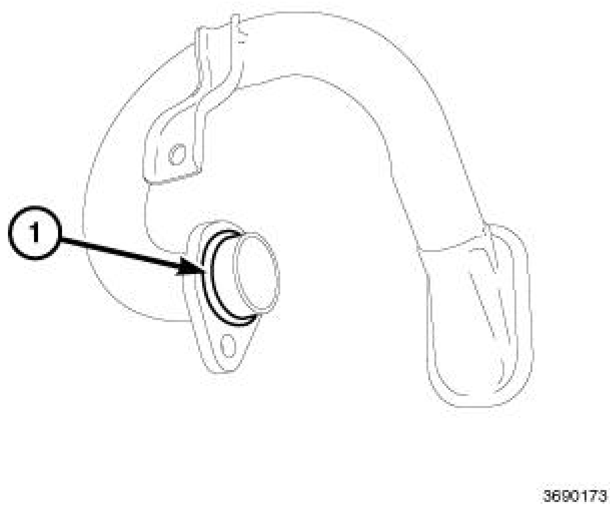


Fig. 522: Oil Pump Pick-Up Tube O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

4. Remove and discard the O-ring seal (1) from the oil pump pick-up tube.

INSTALLATION

INSTALLATION

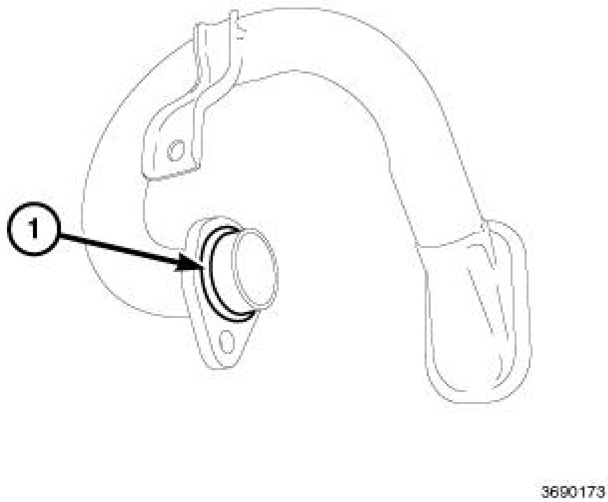


Fig. 523: Oil Pump Pick-Up Tube O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the new O-ring seal (1) with clean engine oil and install the O-ring onto the oil pump pick-up tube.

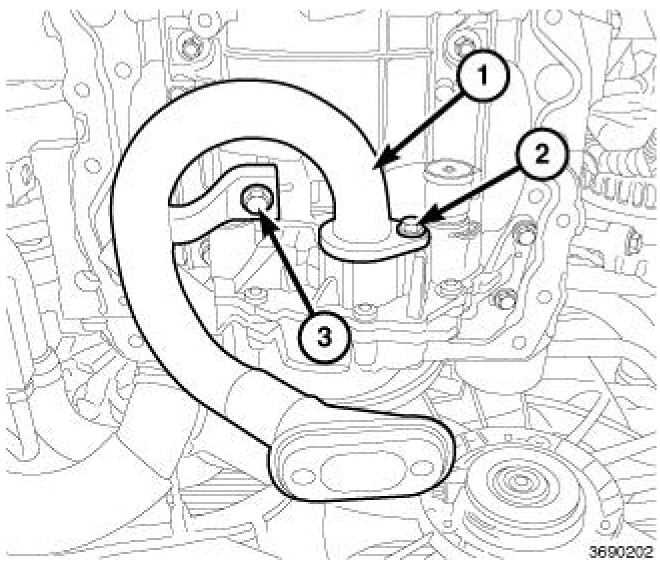


Fig. 524: Oil Pump Pick-Up Tube & Support Bracket Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Position the oil pump pick-up tube (1) onto the oil pump and install the retaining bolt (2) finger tight.
3. Install the oil pump pick-up tube support bracket retaining bolt (3) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Tighten the oil pump pick-up tube retaining bolt (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
5. Install the oil pan. Refer to **PAN, OIL, INSTALLATION**.
6. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer

to **STANDARD PROCEDURE**.

7. Connect the negative battery cable.
8. Run the engine until it reaches normal operating temperature and check for leaks.

PUMP, ENGINE OIL

DESCRIPTION

DESCRIPTION

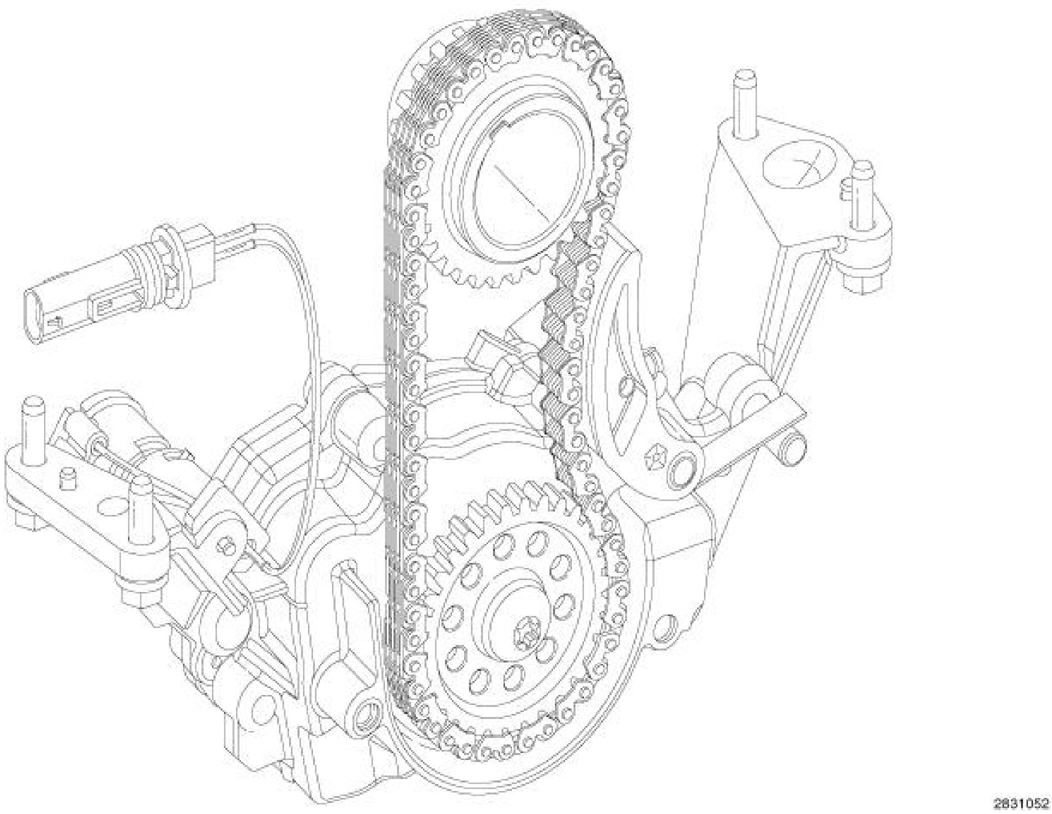


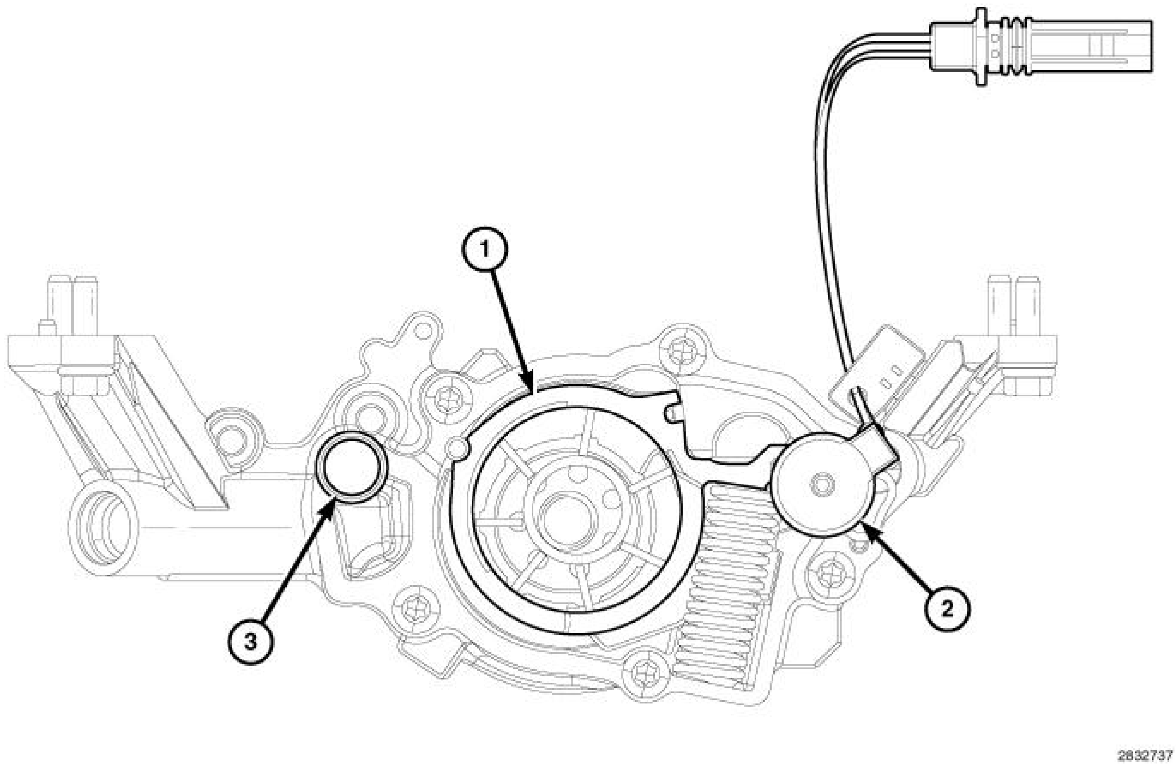
Fig. 525: Oil Pump Chain
Courtesy of CHRYSLER GROUP, LLC

The vane type engine oil pump is mounted to the underside of the cylinder block and is driven by the oil pump chain off the crankshaft at a 1:1 drive ratio:

- This pump location improves efficiency compared to an on-crankshaft location
- The pump is driven with a silent chain which is tensioned using a spring loaded tensioner
- The pump is not timed to the engine
- An internal mechanical ball and spring type relief valve prevents excess pressure in the engine by dumping oil into the sump and provides emergency protection at conditions such as a cold start with high engine speed
- The pump has a moving slide mechanism for variable displacement capability and an on-off solenoid for two-stage pressure regulation
- The pump and the solenoid are not to be disassembled
- Both components are non-serviceable items and are to be replaced as a complete assembly

OPERATION

OPERATION



[Fig. 526: Moving Element, On/Off Solenoid & Relief Valve](#)
Courtesy of CHRYSLER GROUP, LLC

Oil pump operation as follows:

- The engine oil pump features seven vanes and a moving element (1) that continuously adjusts to maintain a regulated oil pressure supply by varying the displacement of the pump
- The pump has two regulated pressure stages of operation controlled by an on/off solenoid (2)
- Low pressure mode regulation (solenoid on) is approximately 200 kPa (29 psi) and high pressure mode regulation (solenoid off) is approximately 450 kPa (65 psi)
- The Powertrain Control Module (PCM) switches the pump between stages based on engine operating conditions, oil and coolant temperatures, speed and load. Under most typical conditions, the pump will run in low mode from idle up to around 3000 RPM, and switch from low to high mode between 3000 and 4000 RPM
- The maximum oil pressure in the engine is limited to 1000 kPa (145 psi) by the relief valve (3)
- Pressure in the main oil gallery of the engine can be monitored with diagnostic equipment through the oil pressure sensor mounted on the rear of the oil filter module
- The minimum pressure for the engine is 41 kPa (6 psi) at any operating condition
- Anything under this pressure could result in damage to critical moving parts

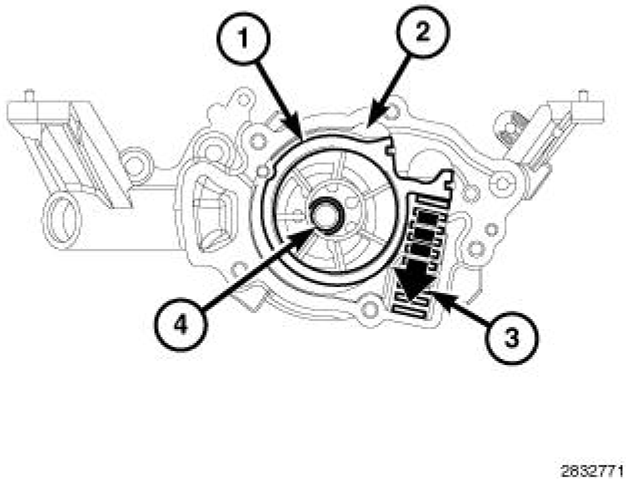


Fig. 527: Moving Element, Main Gallery Oil Pressure, Spring Pressure & Pump Driveshaft
Courtesy of CHRYSLER GROUP, LLC

In high pressure mode regulation (solenoid off) main gallery oil pressure (2) is applied to the moving element (1). The main gallery oil pressure works against spring pressure (3) to move the element to a more concentric location about the pump driveshaft (4) thus reducing displacement and pump output.

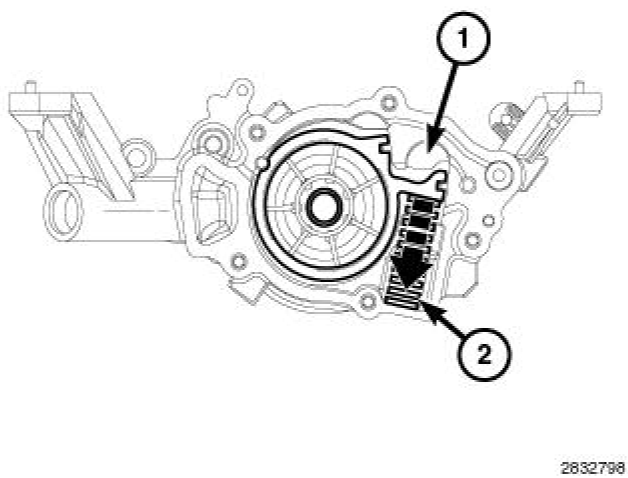


Fig. 528: Chamber & Spring
Courtesy of CHRYSLER GROUP, LLC

In low pressure mode regulation (solenoid on) the energized solenoid opens an additional chamber (1) to main gallery oil pressure increasing the force on the spring (2) to further reduce displacement and output pressure.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the oil pump pick-up. Refer to **PICK-UP, OIL PUMP, REMOVAL**.

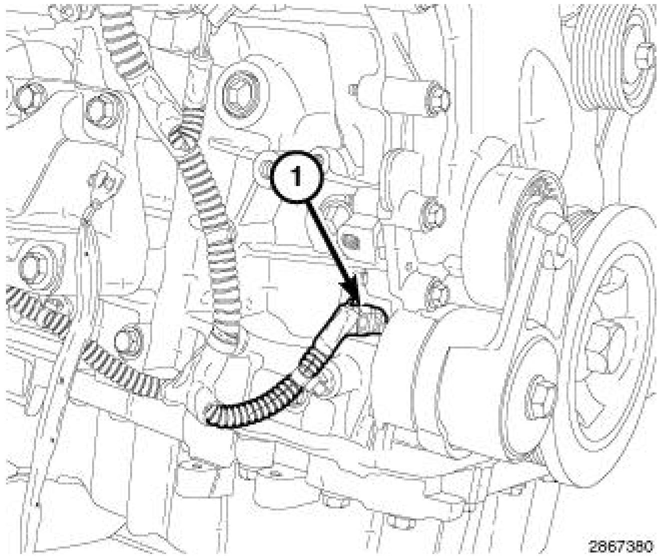


Fig. 529: Oil Pump Solenoid Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the engine wire harness from the oil pump solenoid wire harness connector (1).

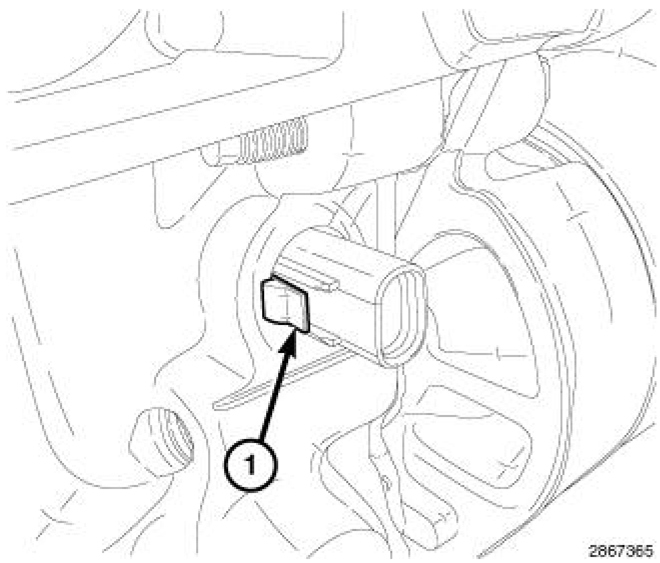


Fig. 530: Oil Pump Solenoid Electrical Connector Retention Lock Tab
Courtesy of CHRYSLER GROUP, LLC

4. Depress the connector retention lock tab (1) to disengage the oil pump solenoid wire harness connector from the engine block.

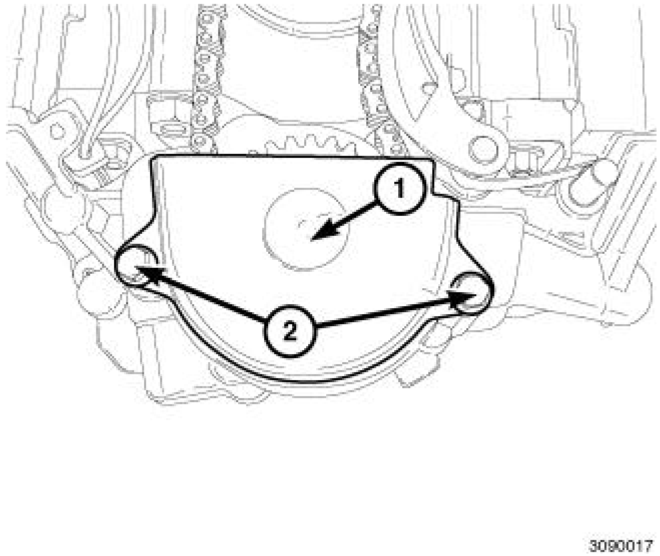


Fig. 531: Timing Gear Splash Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove bolts (2) and the timing gear splash shield (1).

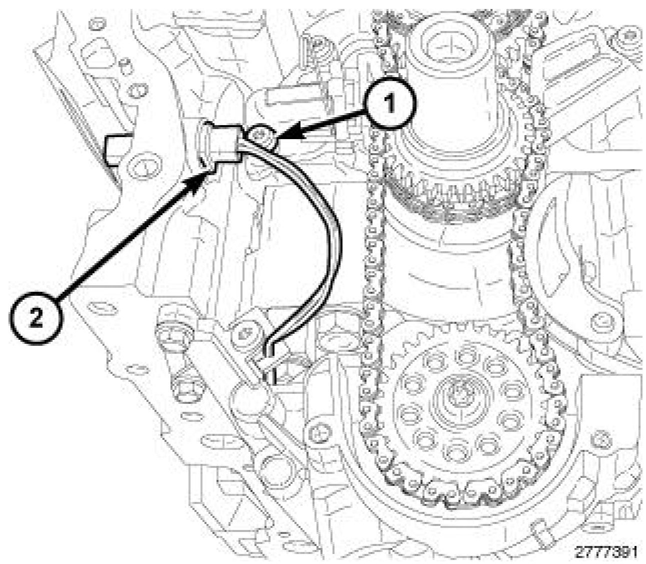


Fig. 532: Oil Pump Solenoid Electrical Connector & Primary Chain Tensioner Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Graphic shows the engine timing cover removed for clarity.**

6. Push the oil pump solenoid wire harness connector into the engine block, rotate the connector slightly CW, push it past the primary chain tensioner mounting bolt (1) and into the engine.

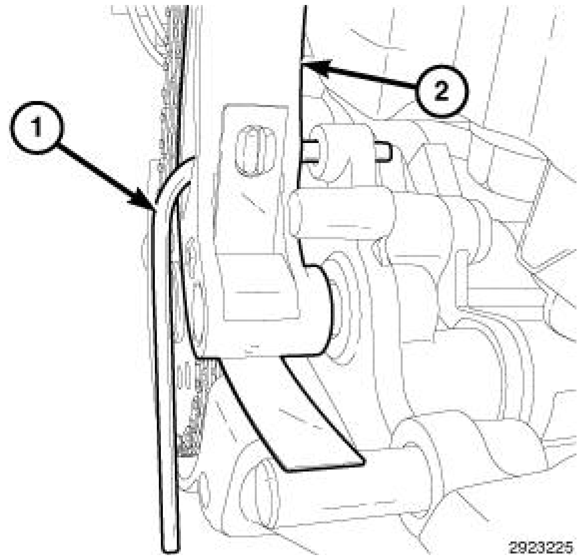


Fig. 533: Oil Pump Chain Tensioner & Retaining Pin
Courtesy of CHRYSLER GROUP, LLC

7. Push back the oil pump chain tensioner (2) and insert a suitable retaining pin (1) such as a 3 mm Allen wrench.

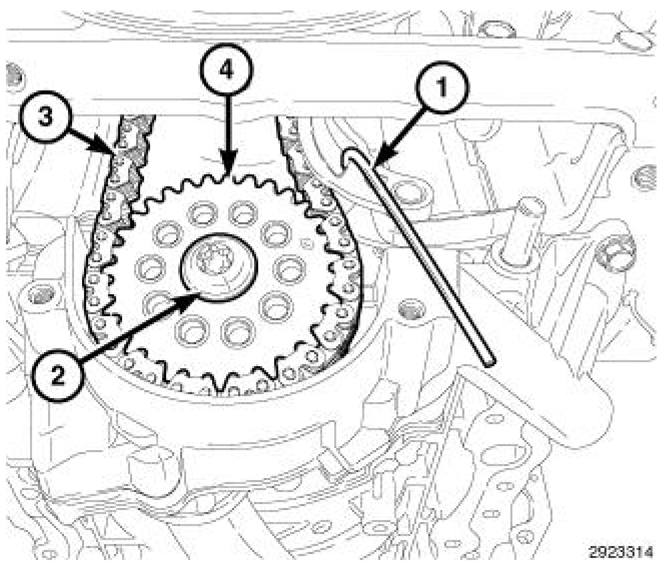


Fig. 534: Retaining Pin, Retaining Bolt, Oil Pump Chain & Sprocket
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.**

8. Mark the direction of rotation on the oil pump chain (3) and sprocket (4) using a paint pen or equivalent to aid in reassembly.

NOTE: **There are no timing marks on the oil pump gear or chain. Timing of the oil pump is not required.**

9. Remove the oil pump sprocket T45 retaining bolt (2) and remove the oil pump sprocket (4).

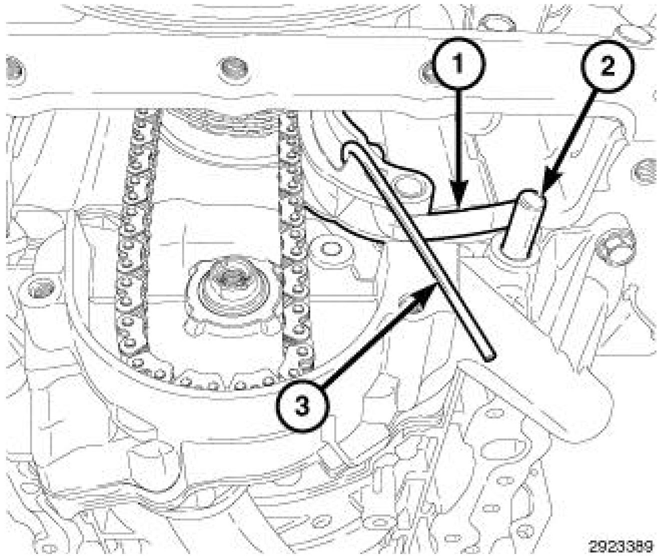


Fig. 535: Retaining Pin, Oil Pump Chain Tensioner Spring & Dowel Pin
Courtesy of CHRYSLER GROUP, LLC

10. Remove the retaining pin (3) and disengage the oil pump chain tensioner spring (1) from the dowel pin (2).
11. Remove the oil pump chain tensioner from the oil pump.

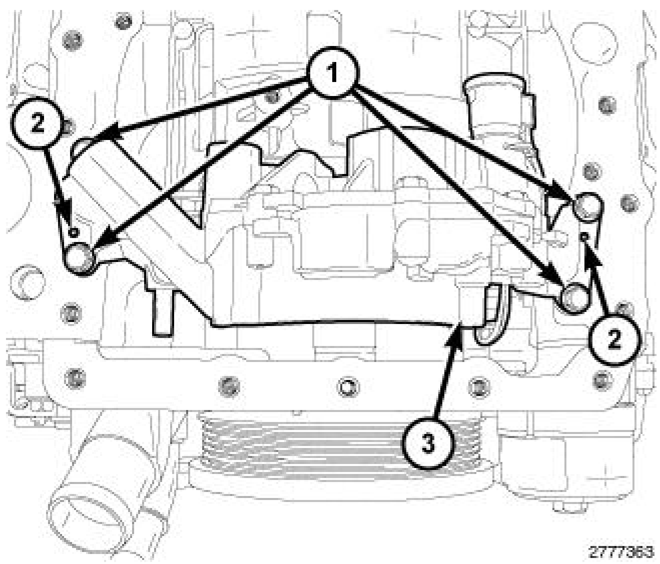


Fig. 536: Oil Pump, Locator Pins & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove bolts (1) and the oil pump (3).

INSPECTION

INSPECTION

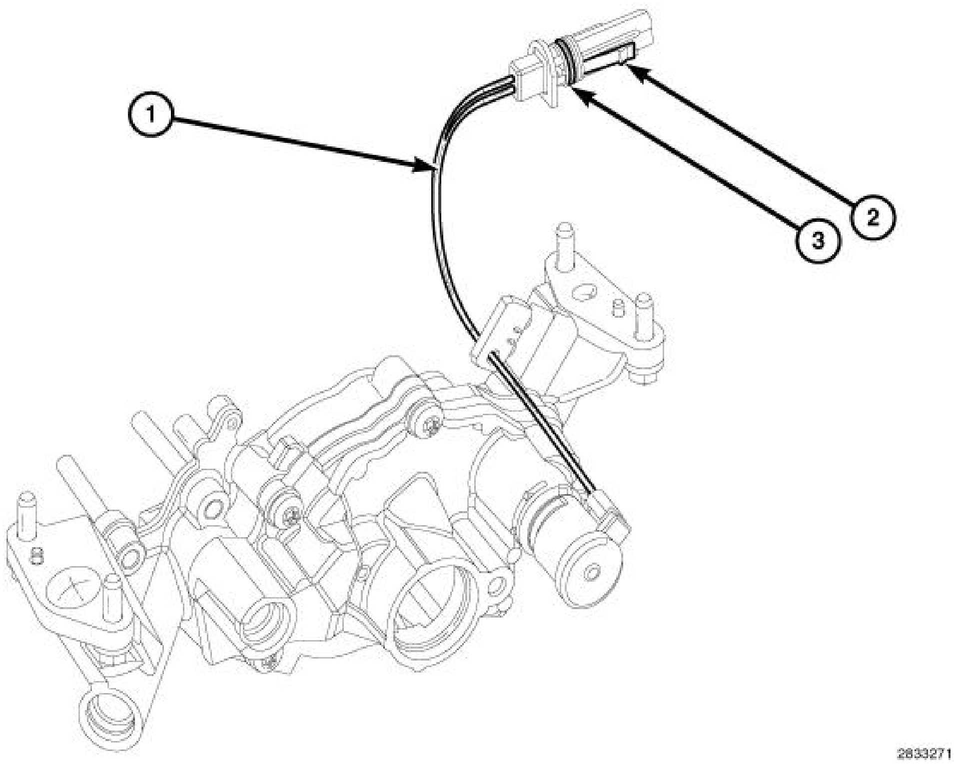


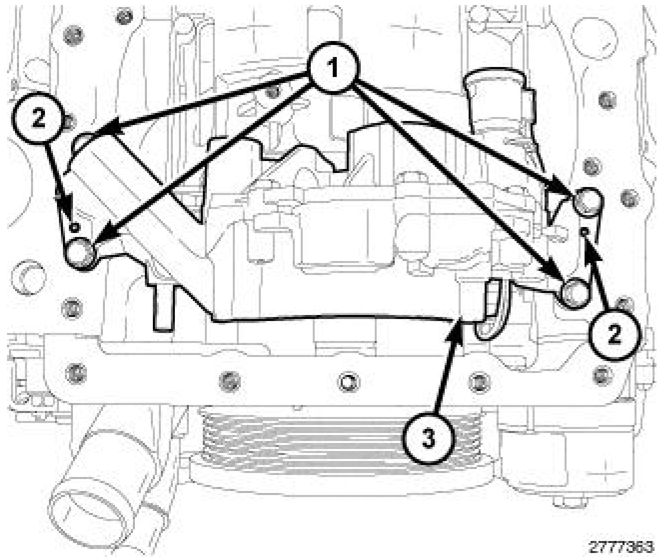
Fig. 537: Solenoid Wires, Connector Retention Lock Tab & O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Oil pump is released as an assembly. The assembly includes both the pump and the solenoid. There are no serviceable sub-assembly components. In the event the oil pump or solenoid are not functioning or out of specification they must be replaced as an assembly.**

1. Inspect the solenoid wires (1) for cuts or chafing.
2. Inspect the condition of the connector O-ring seal (3).

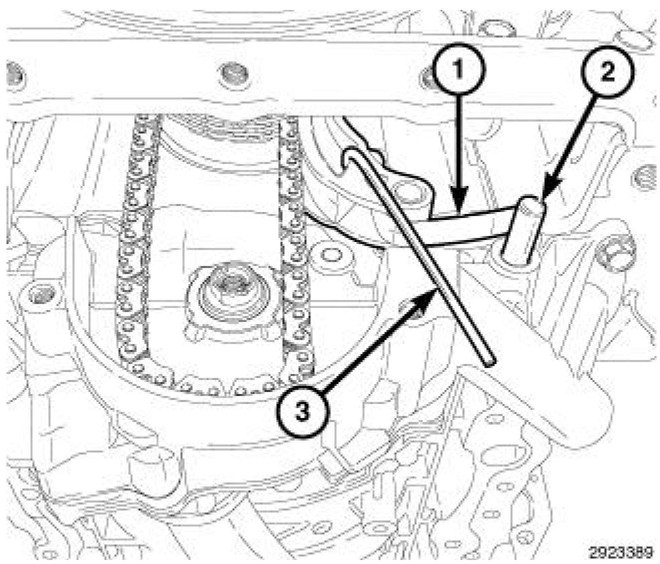
INSTALLATION

INSTALLATION



[Fig. 538: Oil Pump, Locator Pins & Bolts]
Courtesy of CHRYSLER GROUP, LLC

1. Align the locator pins (2) to the engine block and install the oil pump (3) with four bolts (1). Tighten bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 539: Retaining Pin, Oil Pump Chain Tensioner Spring & Dowel Pin]
Courtesy of CHRYSLER GROUP, LLC

2. Install the oil pump chain tensioner on the oil pump.
3. Position the oil pump chain tensioner spring (1) above the dowel pin (2).
4. Push back the oil pump chain tensioner and insert a suitable retaining pin (3) such as a 3 mm Allen wrench.

NOTE: **There are no timing marks on the oil pump gear or chain. Timing of the oil pump is not required.**

CAUTION: **Always reinstall timing chains so that they maintain the same direction of**

rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

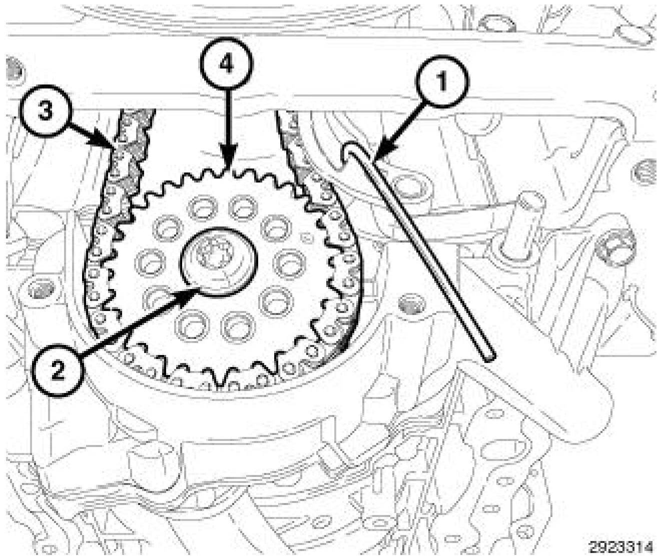


Fig. 540: Retaining Pin, Retaining Bolt, Oil Pump Chain & Sprocket
Courtesy of CHRYSLER GROUP, LLC

5. Place the oil pump sprocket (4) into the oil pump chain (3). Align the oil pump sprocket with the oil pump shaft and install the sprocket. Install bolt (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
6. Remove the retaining pin (1). Verify that the oil pump chain is centered on the tensioner and crankshaft sprocket.
7. Rotate the crankshaft clockwise one complete revolution to verify proper oil pump chain installation.

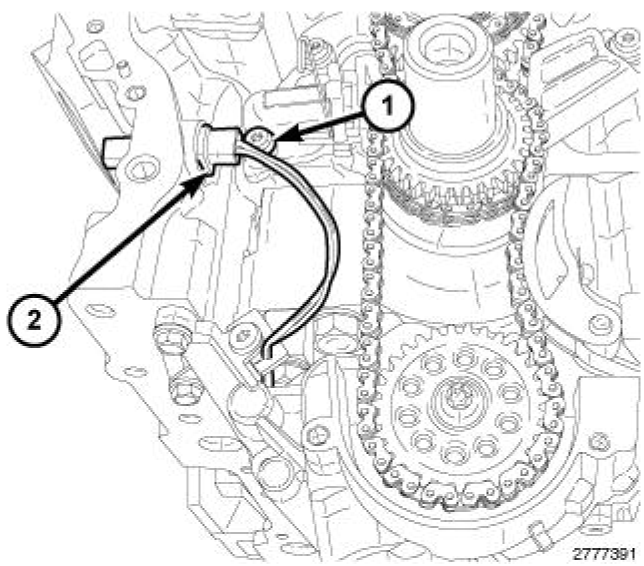


Fig. 541: Oil Pump Solenoid Electrical Connector & Primary Chain Tensioner Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Graphic shows the engine timing cover removed for clarity.**

8. Position the oil pump solenoid wire harness connector (2) into the engine block. Rotate the connector so that it can be pushed past the primary chain tensioner mounting bolt (1). Then rotate the connector slightly counter clockwise and push it into the engine block until it locks in place.

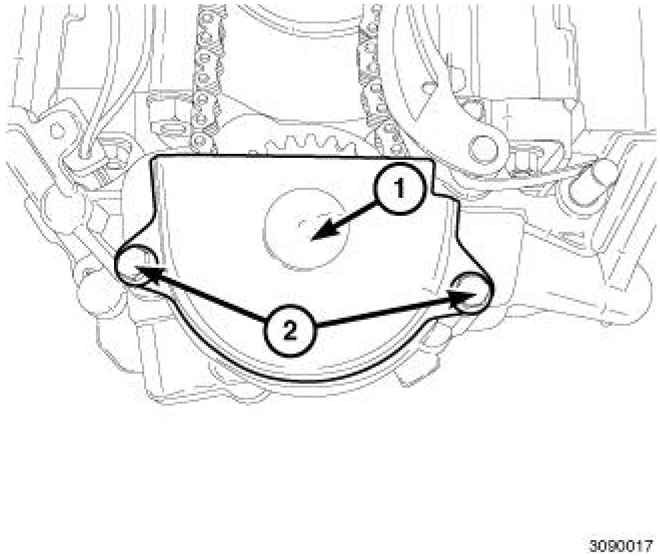


Fig. 542: Timing Gear Splash Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Install the timing gear splash shield (1). Tighten bolts (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

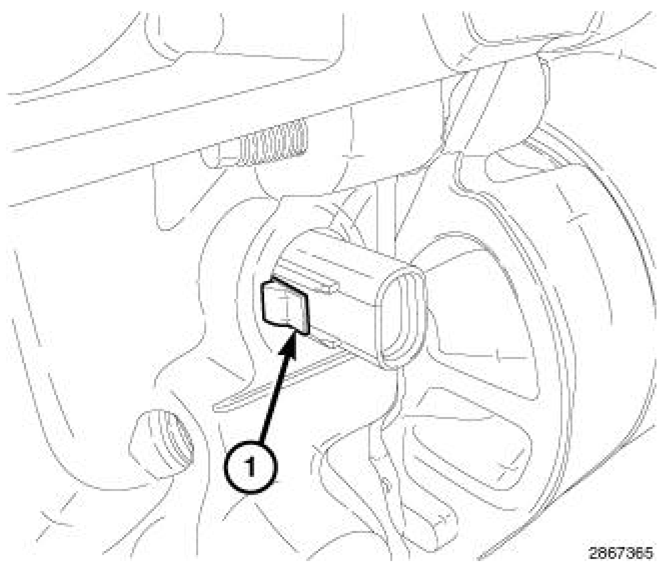


Fig. 543: Oil Pump Solenoid Electrical Connector Retention Lock Tab
Courtesy of CHRYSLER GROUP, LLC

10. Verify that the oil pump solenoid wire harness connector retention lock tab (1) is engaged to the engine block.

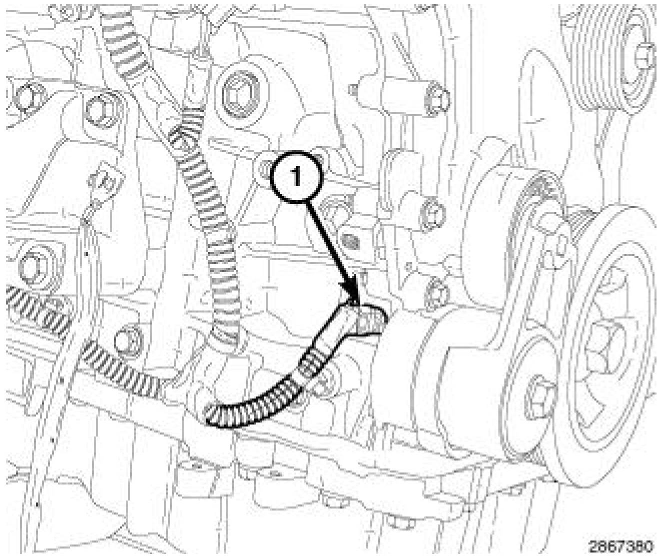


Fig. 544: Oil Pump Solenoid Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

11. Connect the oil pump solenoid wire harness connector (1).
12. Install the oil pump pick-up. Refer to **PICK-UP, OIL PUMP, INSTALLATION**.
13. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **STANDARD PROCEDURE**.
14. Connect the negative battery cable.

CAUTION: A MIL or low oil pressure indicator that remains illuminated for more than 2 seconds may indicate low or no engine oil pressure. Stop the engine and investigate the cause of the indication.

15. Start and run the engine until it reaches normal operating temperature.

SENSOR, OIL PRESSURE

DESCRIPTION

DESCRIPTION

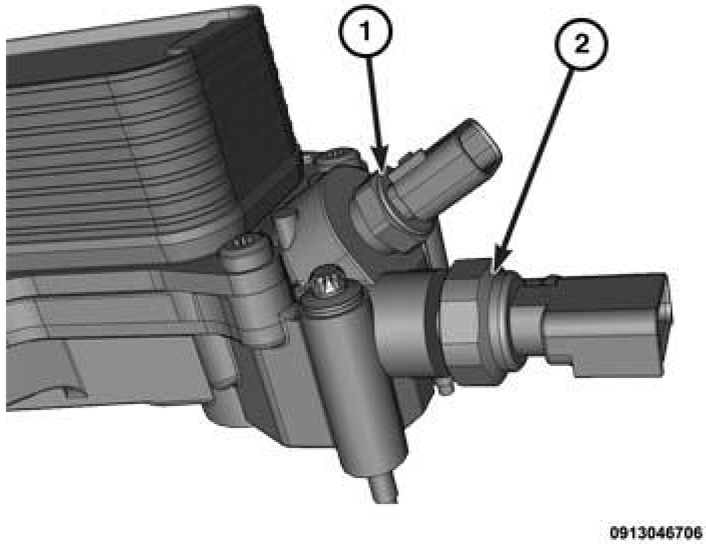


Fig. 545: Oil Temperature Sensor & Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

The oil pressure sensor (2) is located on the oil filter housing. The oil pressure sensor is a three wire sensor with a tapered threaded sensor port. The sensor port is mounted to the oil filter housing through an access hole. A thread lock patch seals the oil pressure sensor to the oil filter housing.

OPERATION

OPERATION

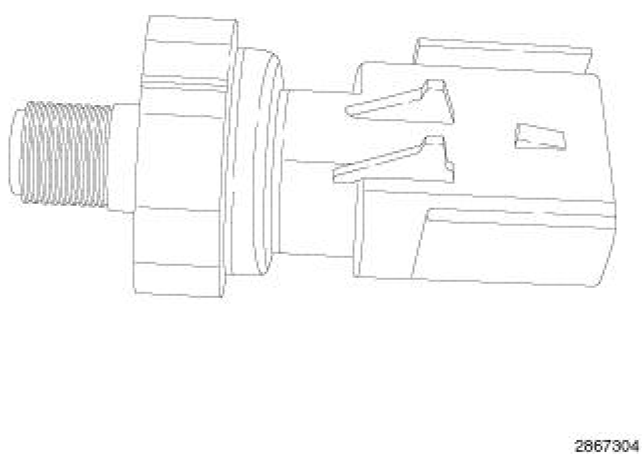


Fig. 546: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

The oil pressure sensor is a silicon based sensing unit that measures the pressure of the engine oil. The Powertrain Control Module (PCM) supplies a 5 volt reference and a ground to the sensor. The input to the PCM occurs on the signal return circuit. The oil pressure sensor is a linear sensor; as pressure changes, voltage changes proportionately and returns a voltage signal to the PCM that reflects oil pressure. The zero pressure reading is 0.5 volt and full scale is 4.5 volt.

REMOVAL

REMOVAL

1. Remove the upper intake manifold and lower intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.

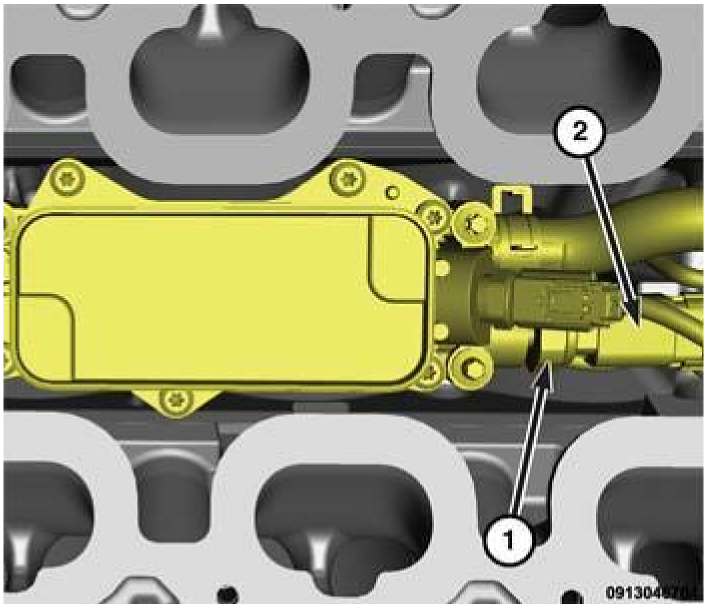


Fig. 547: Oil Pressure Sensor & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the oil pressure sensor wire harness connector (2).
3. Remove the oil pressure sensor (1) from the oil filter housing.

INSTALLATION

INSTALLATION

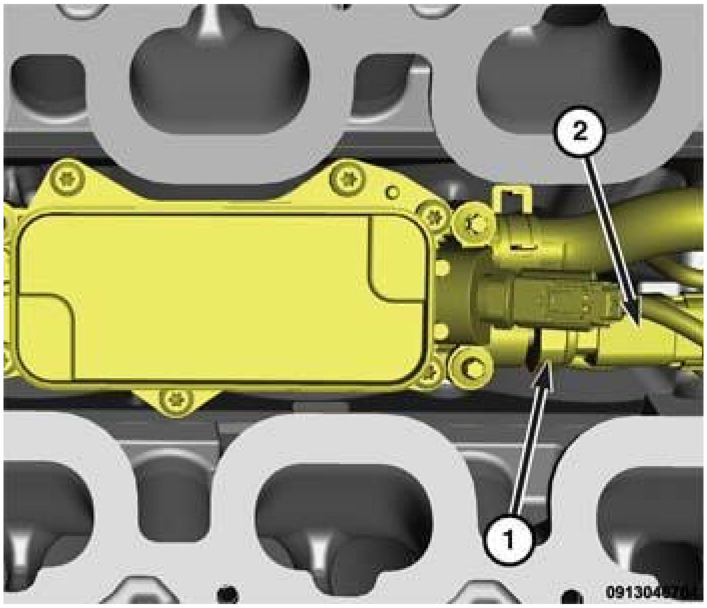


Fig. 548: Oil Pressure Sensor & Electrical Connector

Courtesy of CHRYSLER GROUP, LLC

1. Install the oil pressure sensor (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
2. Connect the oil pressure sensor wire harness connector (2).
3. Install the upper and lower intake manifolds. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

SENSOR, OIL TEMPERATURE

DESCRIPTION

DESCRIPTION

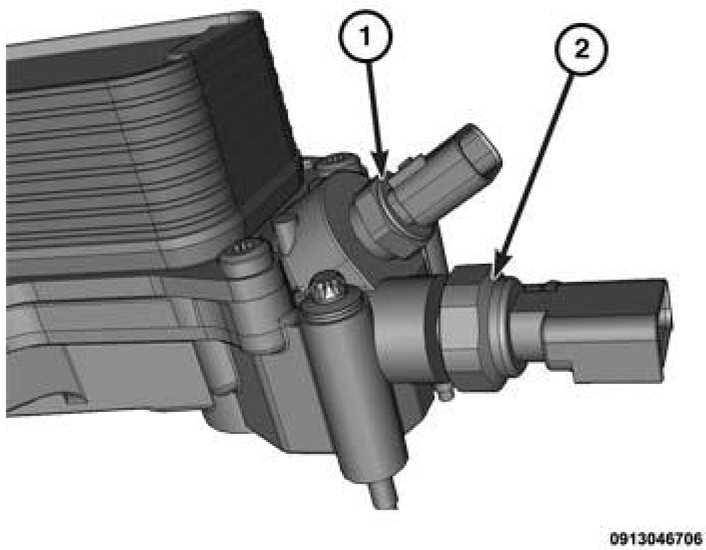


Fig. 549: Oil Temperature Sensor & Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

The oil temperature sensor (1) is located on the oil filter housing. The oil temperature sensor is a two wire sensor with a tapered threaded sensor probe. The sensor probe is mounted to the oil filter housing through an access hole. A thread lock patch seals the oil temperature sensor to the oil filter housing.

OPERATION

OPERATION

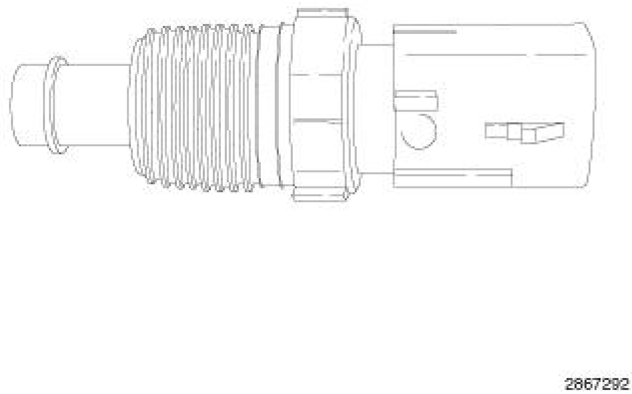


Fig. 550: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

The oil temperature sensor is a variable resistor that measures the temperature of the engine oil. The Powertrain Control Module (PCM) supplies a 5 volt reference and a ground to the sensors low reference signal circuit. When the oil temperature is low, the sensor resistance is high. When the oil temperature is high, the sensor resistance is low.

REMOVAL

REMOVAL

1. Release fuel system pressure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Remove the upper intake manifold and lower intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.

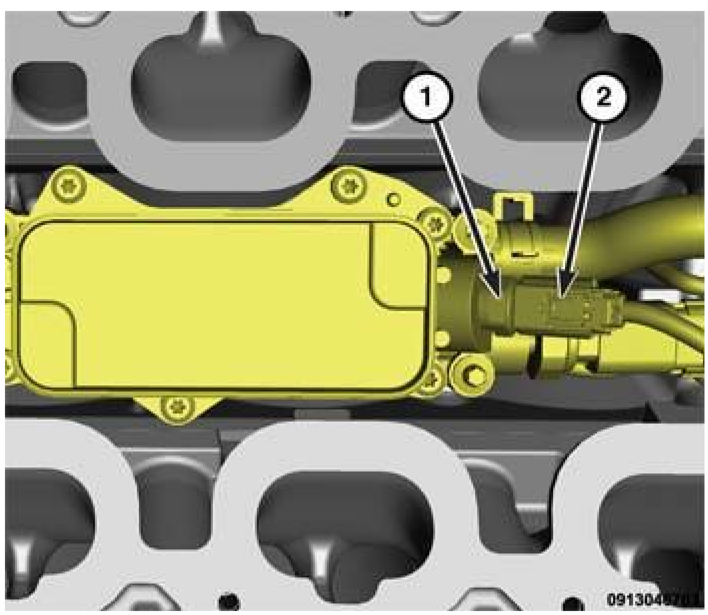


Fig. 551: Oil Temperature Sensor & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oil temperature sensor wire harness connector (2).
4. Remove the oil temperature sensor (1) from the oil filter housing.

INSTALLATION

INSTALLATION

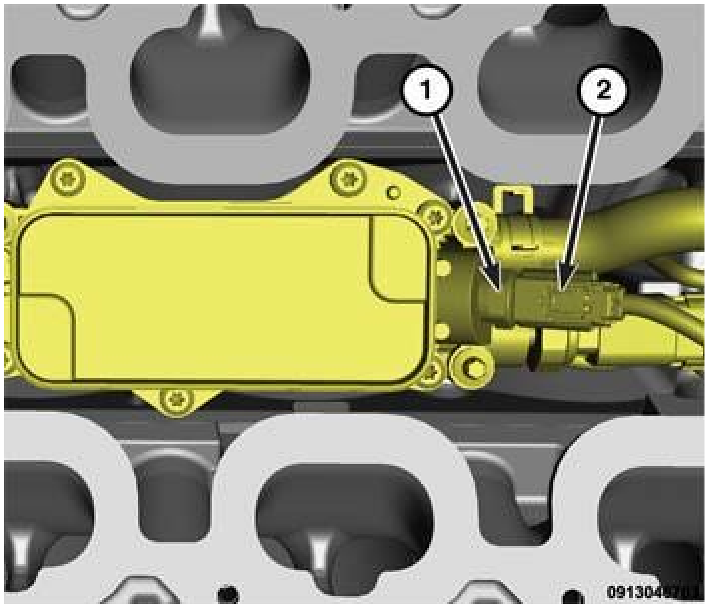


Fig. 552: Oil Temperature Sensor & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

Install the oil temperature sensor (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

1. Connect the oil temperature sensor wire harness connector (2).
2. Install the upper and lower intake manifolds. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

MANIFOLDS

MANIFOLD, EXHAUST

DESCRIPTION

DESCRIPTION

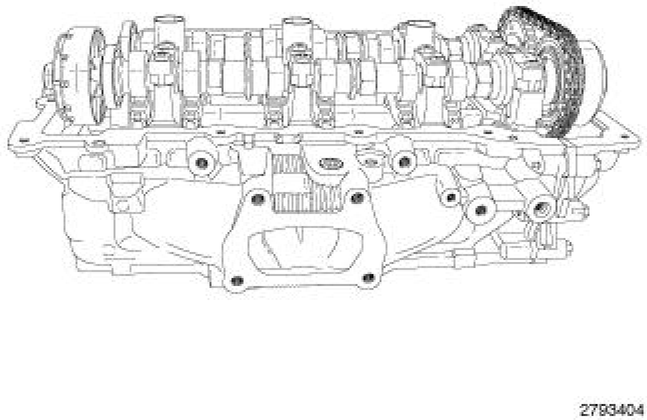


Fig. 553: Aluminum Cylinder Head
Courtesy of CHRYSLER GROUP, LLC

The 3.6L aluminum cylinder heads are a unique design with left and right castings. The exhaust manifolds are integrated into the cylinder heads. If any damaged is found to the exhaust manifold portion, the cylinder head must be removed for repair or replacement. Refer to CYLINDER HEAD, REMOVAL.

MANIFOLD, INTAKE

DESCRIPTION

DESCRIPTION

UPPER INTAKE MANIFOLD

CAUTION: If the engine has experienced a catastrophic failure, THE INTAKE MANIFOLD MUST BE REPLACED!

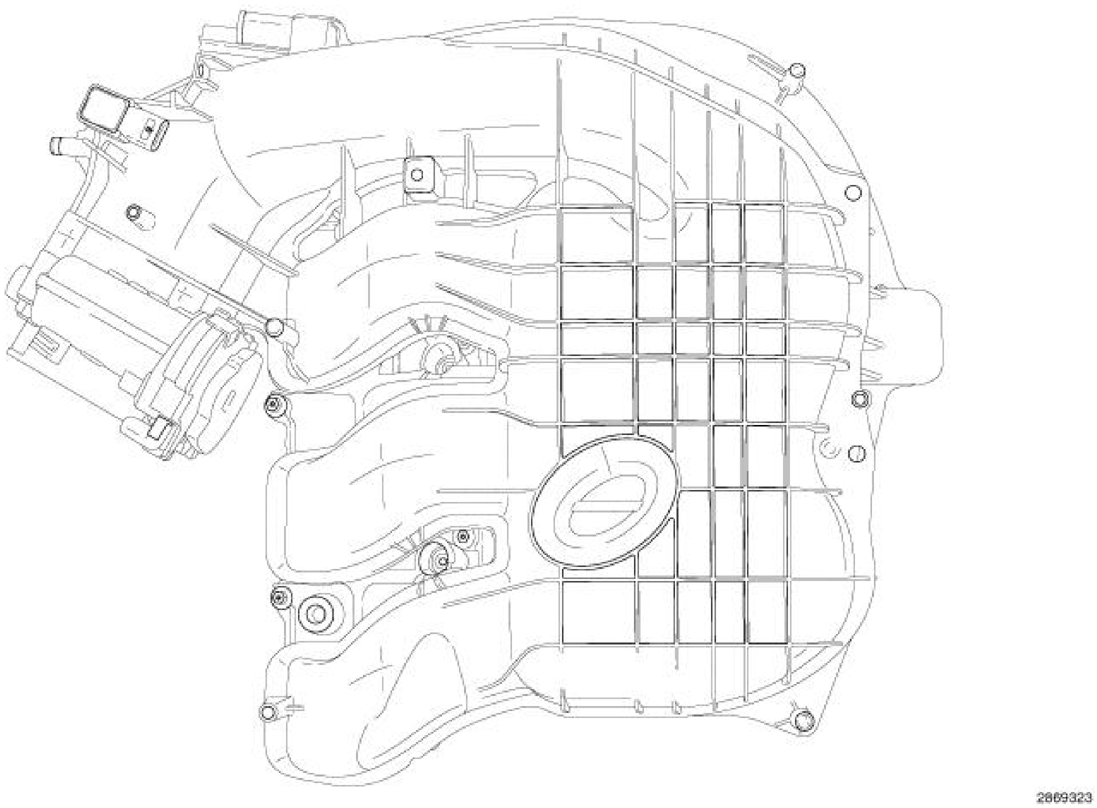


Fig. 554: Upper Intake Manifold Design
Courtesy of CHRYSLER GROUP, LLC

The upper intake manifold is an injection molded nylon composite design:

- The upper intake manifold is sealed to the lower intake manifold using six individual press-in-place port silicone gaskets
- Replace the gaskets whenever the upper intake manifold is removed from the engine
- There is a silencer pad positioned between the upper and lower intake manifolds for improved noise, vibration and harshness (NVH)
- The left cylinder head cover has two alignment posts to aid proper installation of the silencer pad
- The seven upper intake manifold fasteners thread directly into the composite lower intake manifold and are a self-taping design
- If the upper intake manifold is damaged or cracked, it must be replaced
- The Electronic Throttle Control (ETC) and Manifold Air Pressure (MAP) sensor are attached directly to the upper intake manifold
- The upper intake manifold also provides vacuum ports for brake booster, positive crankcase ventilation (PCV) and emissions control

LOWER INTAKE MANIFOLD

CAUTION: If the engine has experienced a catastrophic failure, THE INTAKE MANIFOLD MUST BE REPLACED!

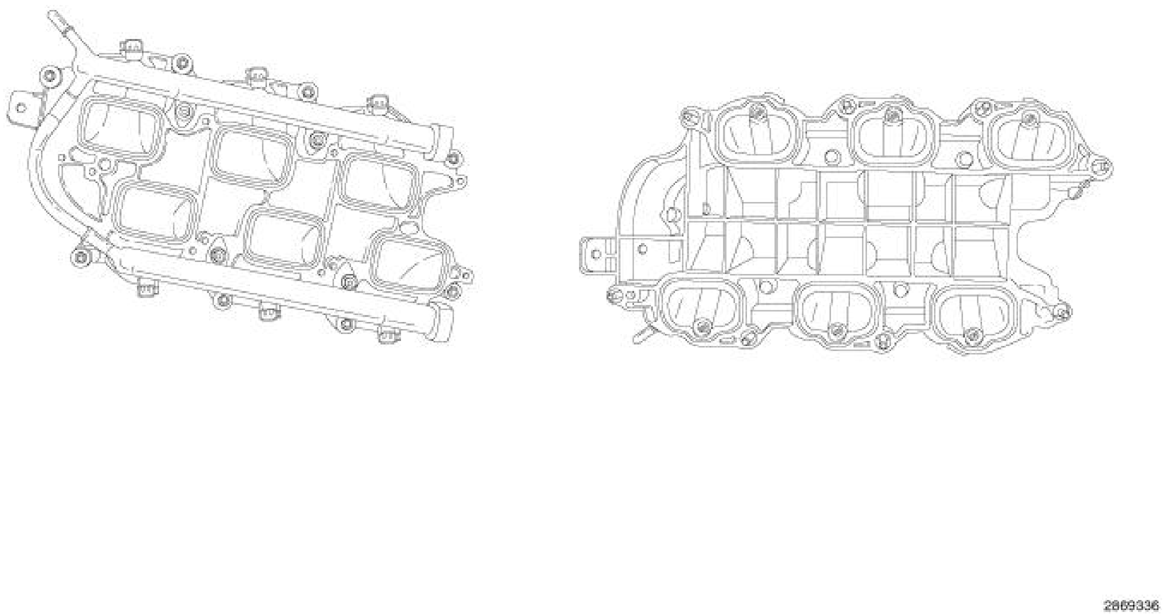


Fig. 555: Lower Intake Manifold Design
Courtesy of CHRYSLER GROUP, LLC

The lower intake manifold is an injection molded nylon composite design:

- The lower intake manifold is sealed to the cylinder heads using six individual press-in-place port silicone gaskets
- Replace the gaskets whenever the lower intake manifold is removed from the engine
- The seven upper intake manifold fasteners thread directly into the composite lower intake manifold and are a self-taping design
- The fuel injection fuel rail is also a composite design
- The four fuel rail fasteners thread directly into the composite lower intake manifold and are a self-taping design
- The lower intake manifold can be serviced without removing the fuel injector rail
- The fuel rail and fuel injectors must be installed into the lower intake manifold as an assembly
- Do not attempt to install the fuel rail when the injectors are in the manifold
- Always install new O-rings on the fuel injectors
- If the lower intake manifold is damaged or cracked, it must be replaced

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - INTAKE MANIFOLD LEAKS

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or the fan. Do not wear loose clothing.

1. Start the engine.
2. Spray a small stream of water (spray bottle) at the suspected leak area.
3. If engine RPM'S change, the area of the suspected leak has been found.
4. Repair as required.

REMOVAL

UPPER

1. Disconnect and isolate the negative battery cable.

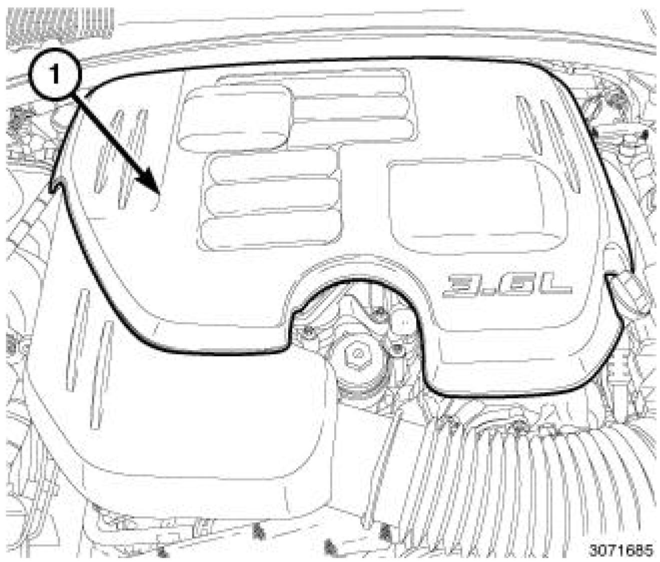


Fig. 556: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

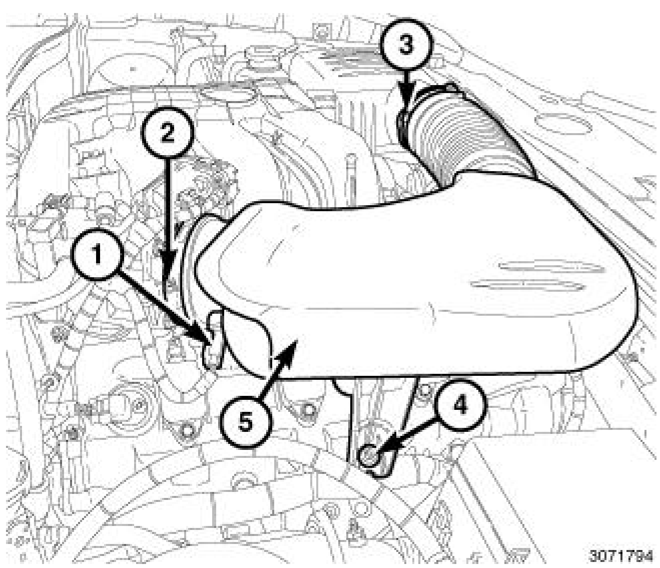


Fig. 557: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the Inlet Air Temperature (IAT) sensor wire harness connector (1).
4. Loosen the clamp (2) at the throttle body.
5. Loosen the clamp (3) at the air cleaner housing.
6. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
7. Remove the air inlet hose assembly (5).

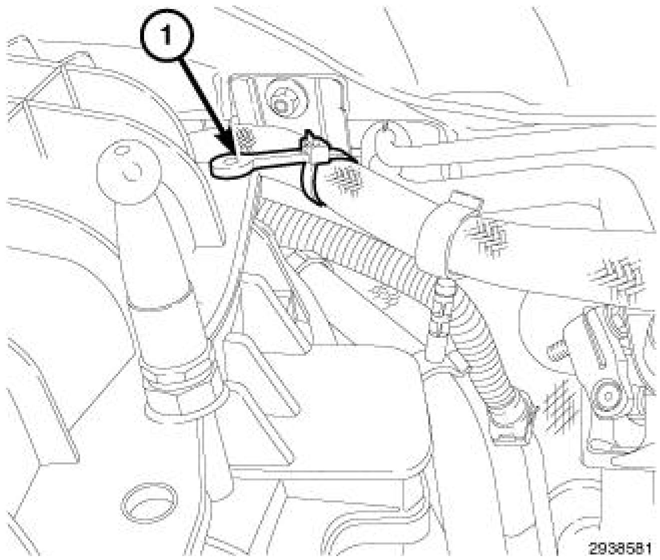


Fig. 558: Brake Booster Hose Retainer
Courtesy of CHRYSLER GROUP, LLC

8. Disengage the brake booster hose retainer (1) from the upper intake manifold.

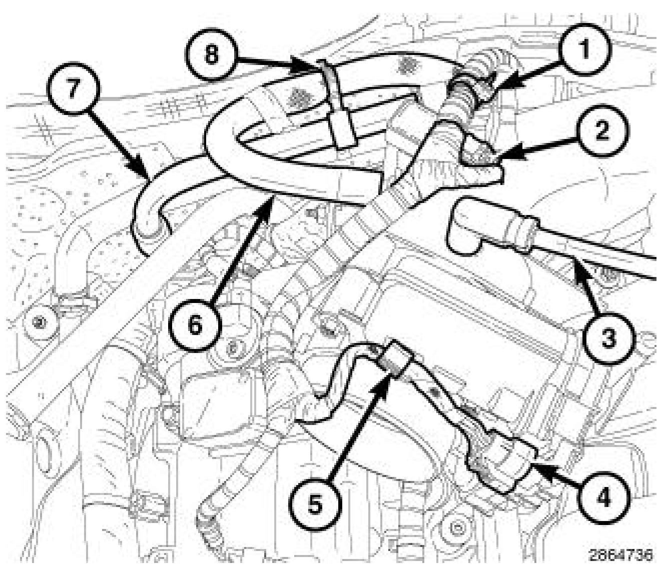


Fig. 559: MAP Sensor, ETC, PCV Hose, Brake Booster Vacuum Hose, EVAP Vapor Purge Line, Clip & Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the Manifold Absolute Pressure (MAP) sensor (2) wire harness connector.
10. Disconnect the Electronic Throttle Control (ETC) wire harness connector (4).
11. Disengage the ETC harness from the clip (5) on the throttle body and unfasten the wire harness retainer (1) from the upper intake manifold near the MAP sensor and reposition the wire harness.
12. Disconnect the following hoses from the upper intake manifold:
    - Positive Crankcase Ventilation (PCV) (7)
    - Brake booster vacuum hose (6)
    - EVAP vapor purge line (3)

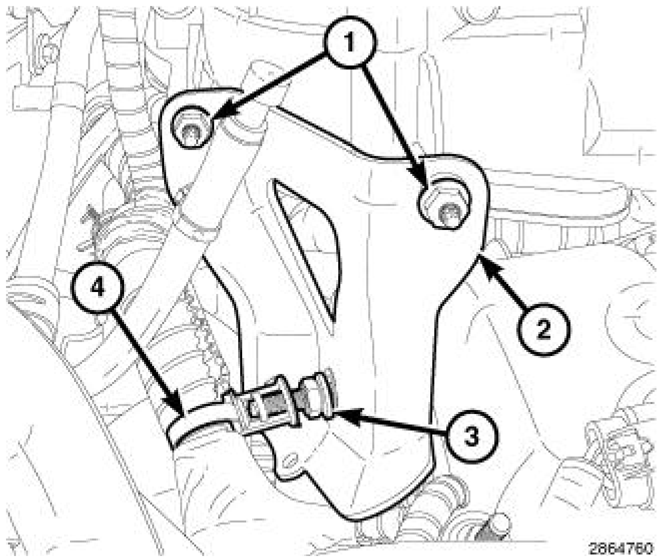


Fig. 560: Upper Intake Manifold Support Bracket, Stud & Fasteners
Courtesy of CHRYSLER GROUP, LLC

13. Unfasten the wire harness retainer (4) from the upper intake manifold support bracket (2) stud retainer (3).
14. Remove nuts (1), loosen the stud (3) and reposition the upper intake manifold support bracket (2).

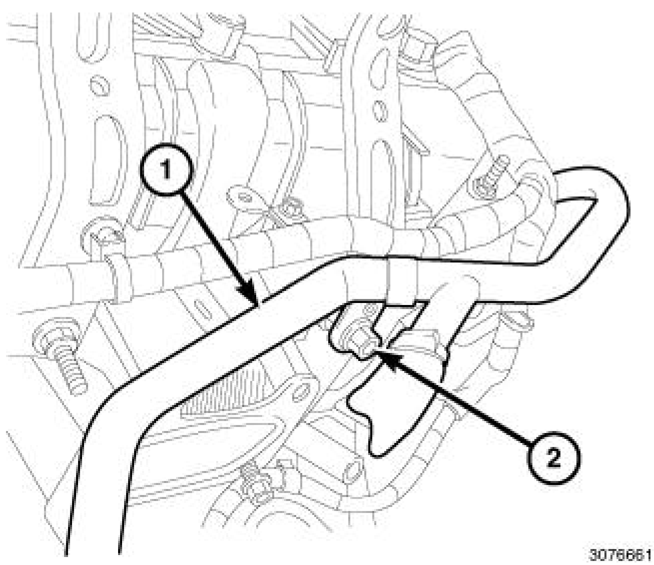


Fig. 561: Heater Core Return Tube Upper Support Bracket Retaining Nut & Tube

Courtesy of CHRYSLER GROUP, LLC

15. Remove the heater core return tube upper support bracket retaining nut (2) and reposition tube (1).

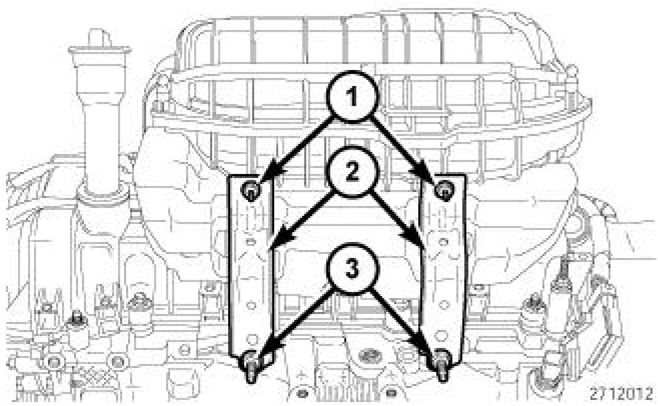


Fig. 562: Nuts, Stud Retainers & Upper Intake Manifold Support Brackets
Courtesy of CHRYSLER GROUP, LLC

16. Remove the two nuts (1), loosen two stud retainers (3) and reposition the two upper intake manifold support brackets (2).

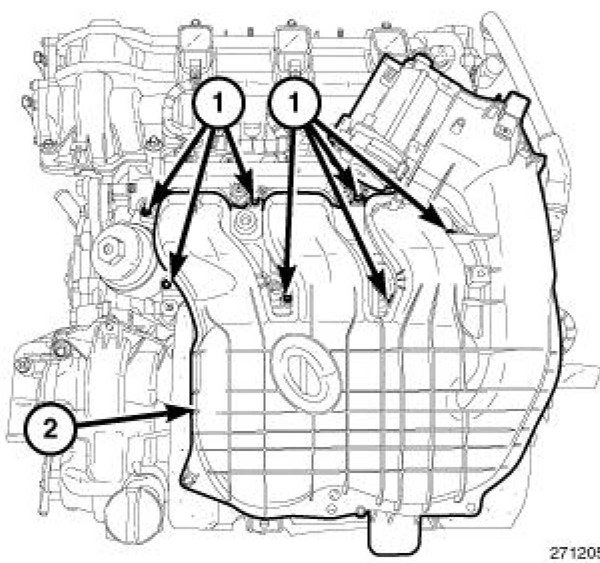


Fig. 563: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The upper intake manifold attaching bolts are captured in the upper intake manifold. Once loosened, the bolts will have to be lifted out of the lower intake manifold and held while removing the upper intake manifold.**

NOTE: **Exercise care not to inadvertently loosen the two fuel rail attachment bolts that are in close proximity of the upper intake manifold attaching bolts.**

17. Remove the seven manifold attaching bolts (1) and remove the upper intake manifold (2).

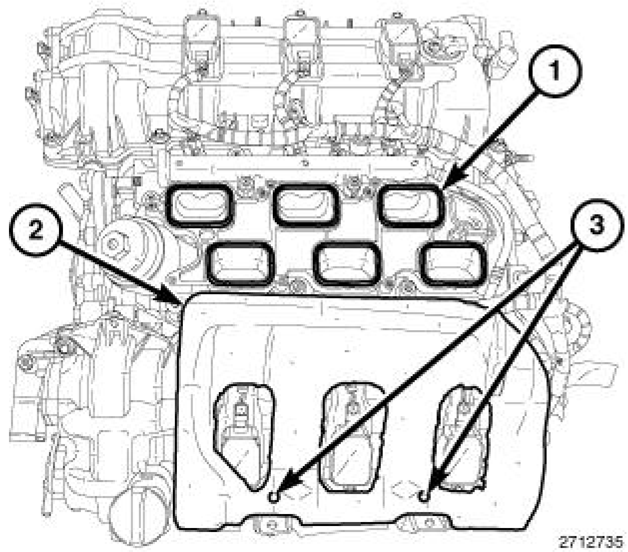


Fig. 564: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

18. Remove and discard the six upper to lower intake manifold seals (1).
19. Cover the open intake ports to prevent debris from entering the engine.
20. If required, remove the insulator (2) from the left cylinder head cover.

LOWER

1. Perform the fuel pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Disconnect and isolate the negative battery cable.

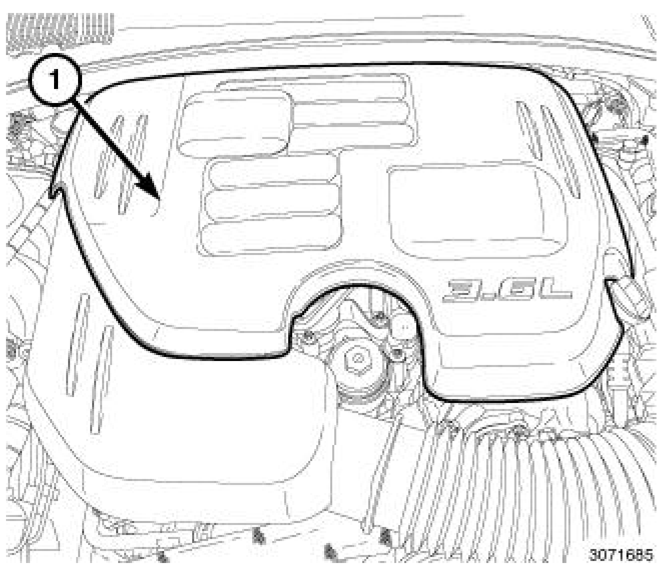


Fig. 565: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

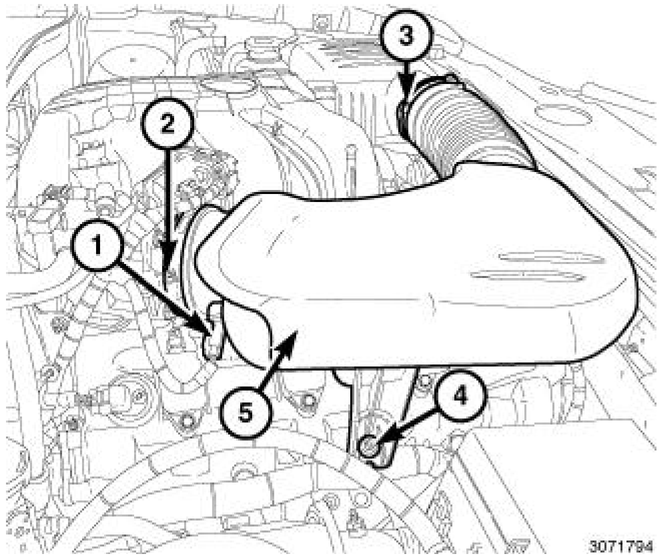


Fig. 566: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the Inlet Air Temperature (IAT) sensor wire harness connector (1).
5. Loosen the clamp (2) at the throttle body.
6. Loosen the clamp (3) at the air cleaner housing.
7. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
8. Remove the air inlet hose assembly (5).

WARNING: The fuel system is under constant pressure even with engine off. Before servicing the fuel rail, fuel system pressure must be released.

9. Remove the upper intake manifold. Refer to MANIFOLD, INTAKE, REMOVAL.

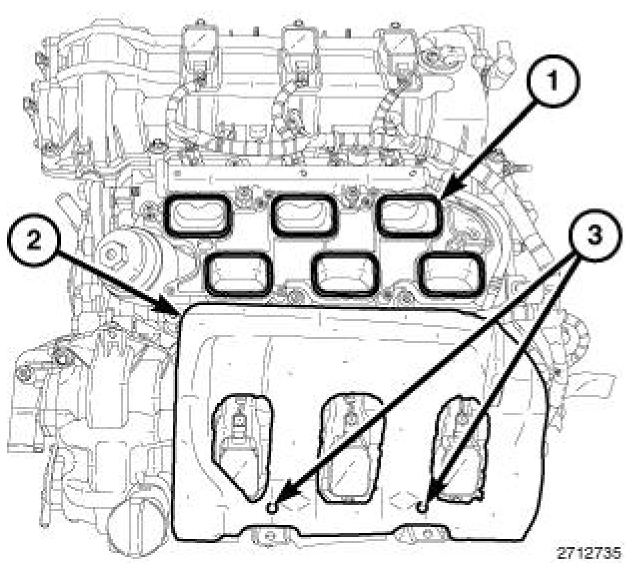


Fig. 567: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

10. Remove the insulator (2) from the left cylinder head cover.

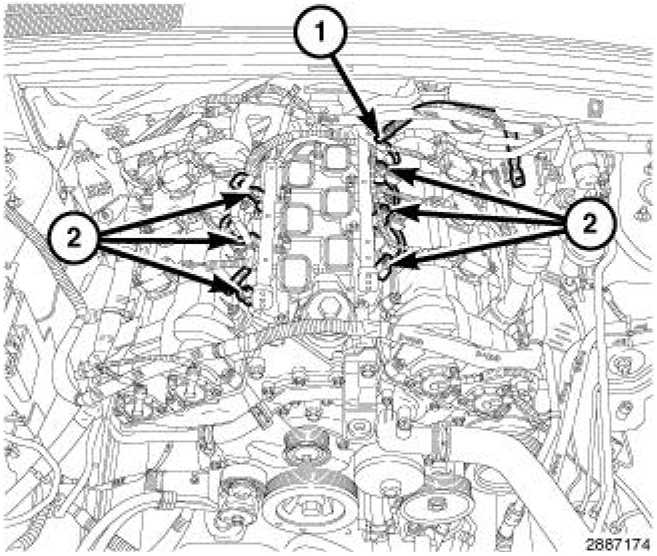


Fig. 568: Fuel Supply Hose & Fuel Injector Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the fuel supply hose (1) from the fuel rail. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE** .
12. Disconnect the fuel injector wire harness electrical connectors (2).

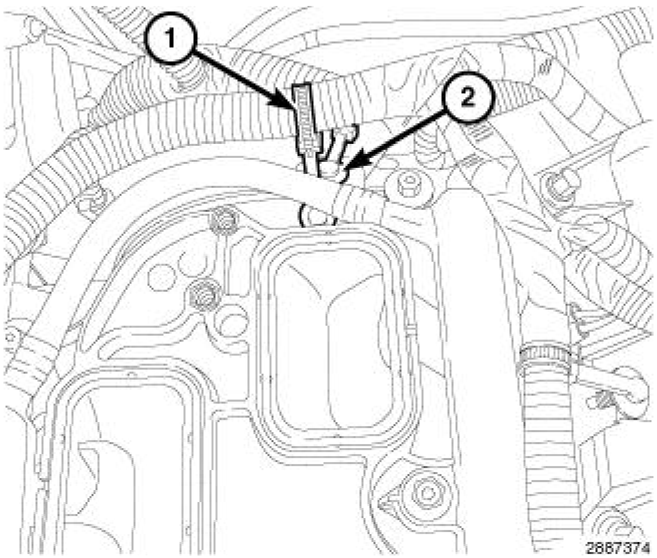


Fig. 569: Injection/Ignition Harness Retainer & Main Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

13. Unfasten the injection/ignition harness retainer (1) from the rear of the lower intake manifold.
14. Disengage the main wire harness retainer (2) form the rear of the lower intake manifold.

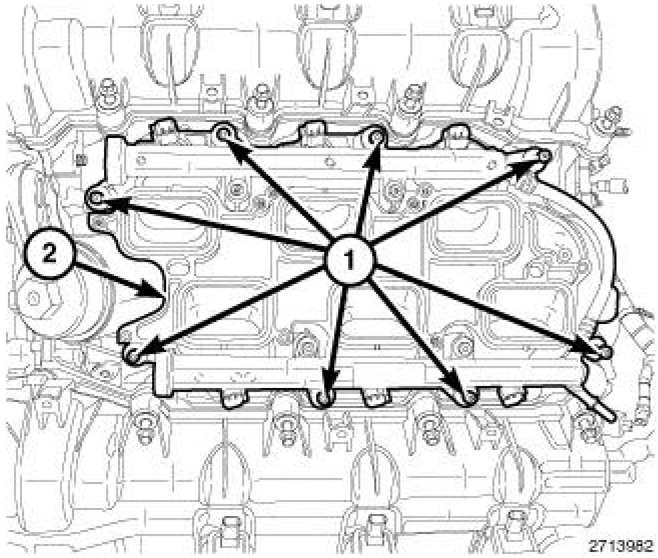


Fig. 570: Lower Intake Manifold & Attaching Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Remove the eight lower intake manifold attaching bolts (1).
16. Remove the lower intake manifold (2) with the fuel injectors and fuel rail as an assembly.

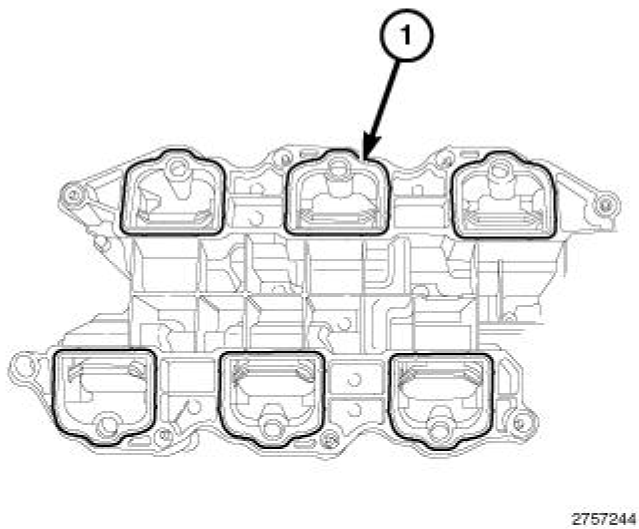


Fig. 571: Lower Intake Manifold To Cylinder Head Seals
Courtesy of CHRYSLER GROUP, LLC

17. Remove and discard the six lower intake manifold to cylinder head seals (1).

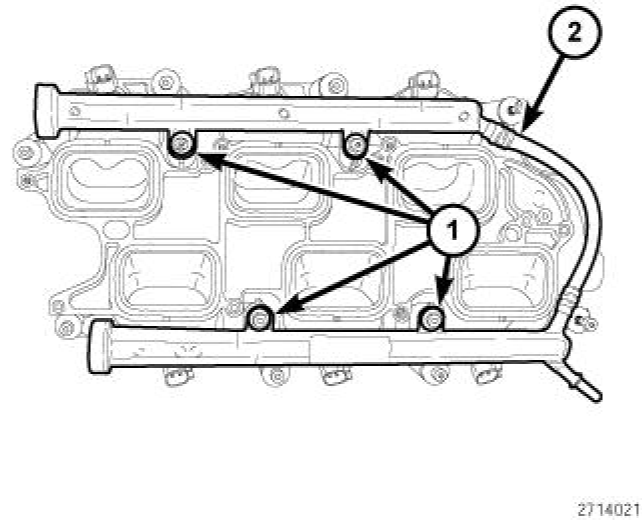


Fig. 572: Fuel Rail & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

18. If required, remove the fuel rail (2) and fuel injectors from the lower intake manifold. Refer to **RAIL, FUEL, REMOVAL** .

INSPECTION

INSPECTION

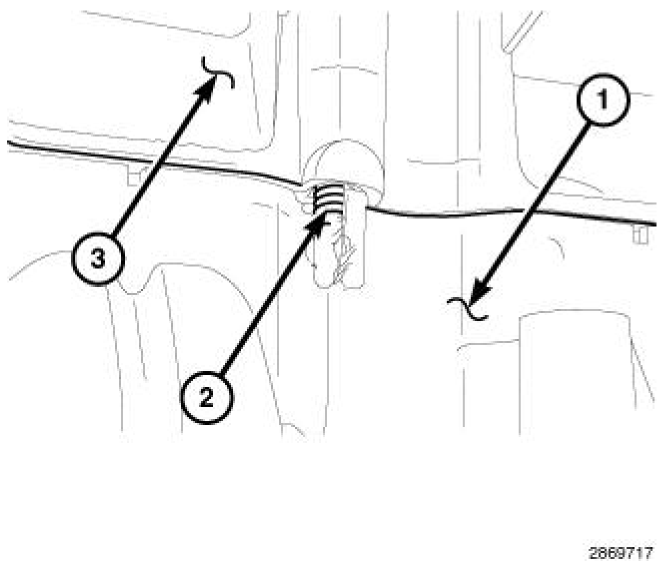


Fig. 573: Non-Repairable Damage To Lower Intake Manifold Due To Cross Threading Of An Upper Intake Manifold Attaching Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When the upper intake manifold (3) and lower intake manifold (1) are not aligned properly, cross threading of the upper intake manifold attaching bolts can occur. The graphic shows non-repairable damage to the lower intake manifold (1) due to cross threading of an upper intake manifold attaching bolt (2).**

Check both the upper and lower intake manifolds for:

- Damage and cracks
- Gasket surface damage or warping

Check the lower intake manifold for:

- Damaged fuel injector ports

If either the upper or lower manifold exhibits any damaged or warped conditions, replace the manifold.

INSTALLATION

UPPER

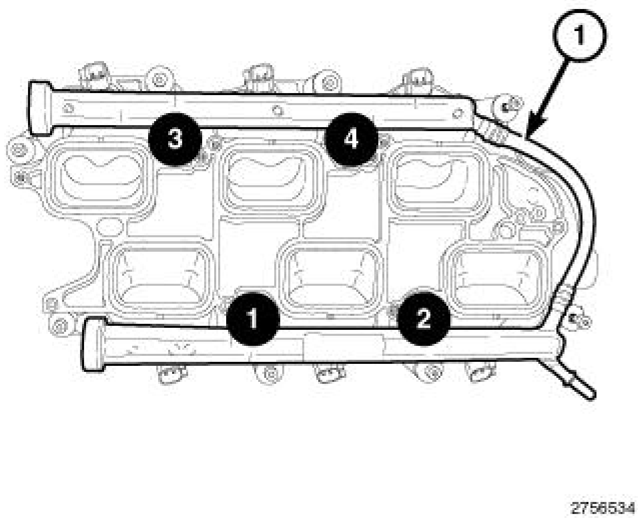
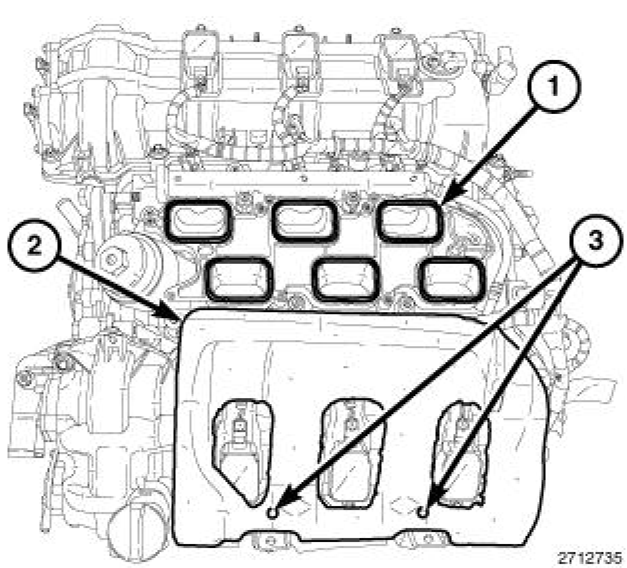


Fig. 574: Fuel Rail Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Prior to installing the upper intake manifold, verify that the four fuel rail bolts were not inadvertently loosened. The bolts must tightened in the sequence shown in illustration to the proper specification. Refer to TORQUE SPECIFICATIONS.**

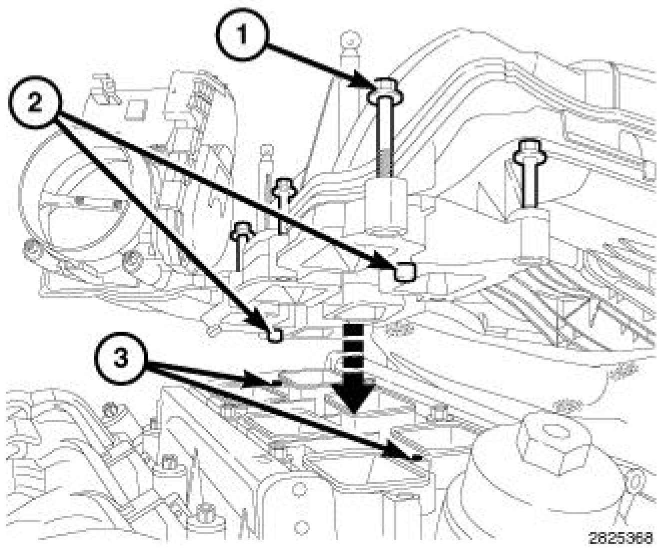


[Fig. 575: Intake Ports, Insulator & Alignment Posts]
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect the sealing surfaces. Install new upper to lower intake manifold seals (1).

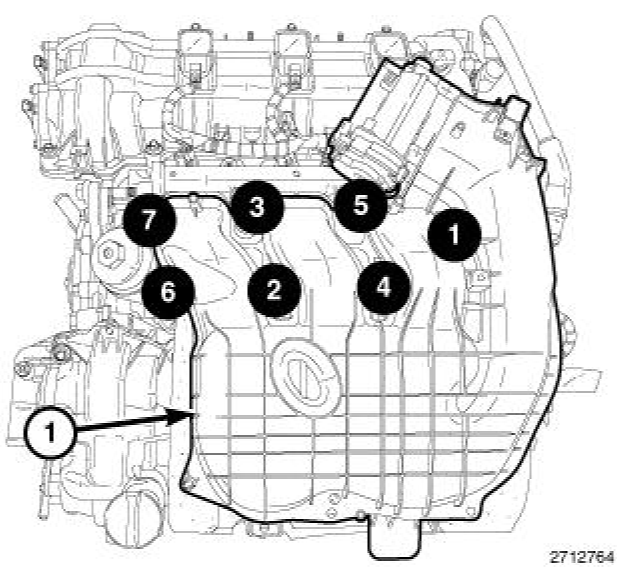
NOTE:	**Make sure the fuel injectors and wiring harnesses are in the correct position so that they don't interfere with the upper intake manifold installation.**

2. If removed, position the insulator (2) onto the two alignment posts (3) on top of the left cylinder head cover.



[Fig. 576: Upper Intake Attaching Bolts, Locating Posts & Holes]
Courtesy of CHRYSLER GROUP, LLC

3. Lift and hold the seven upper intake attaching bolts (1) clear of the mating surface. Back the bolts out slightly or if required, use an elastic band to hold the bolts clear of the mating surface.
4. Position the upper intake manifold (1) onto the lower intake manifold so that the two locating posts (2) on the upper intake manifold align with corresponding holes (3) in the lower intake manifold.



[Fig. 577: Upper Intake Manifold Bolt Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

5. Install the seven upper intake manifold attaching bolts. Tighten the bolts in the sequence shown in illustration to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

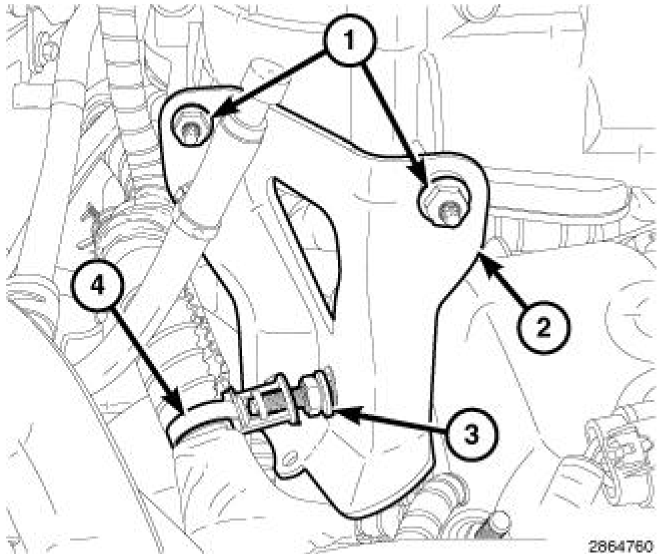


Fig. 578: Upper Intake Manifold Support Bracket, Stud & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Install the upper intake manifold support bracket (2). Tighten fasteners (1, 3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
7. Engage the wire harness retainer (4) to the stud (3).

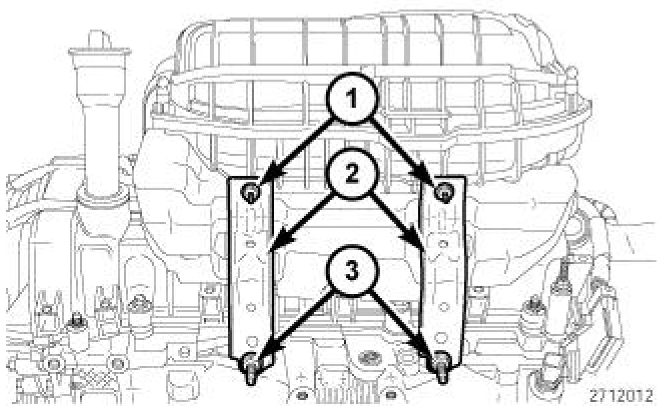


Fig. 579: Nuts, Stud Retainers & Upper Intake Manifold Support Brackets
Courtesy of CHRYSLER GROUP, LLC

8. Install the two upper intake manifold support brackets (2). Tighten fasteners to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

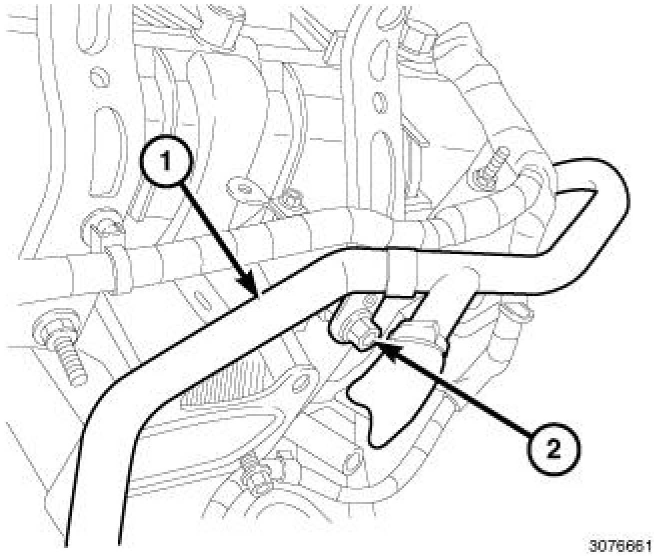


Fig. 580: Heater Core Return Tube Upper Support Bracket Retaining Nut & Tube
Courtesy of CHRYSLER GROUP, LLC

9. Install the heater core return tube (1). Tighten nut (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

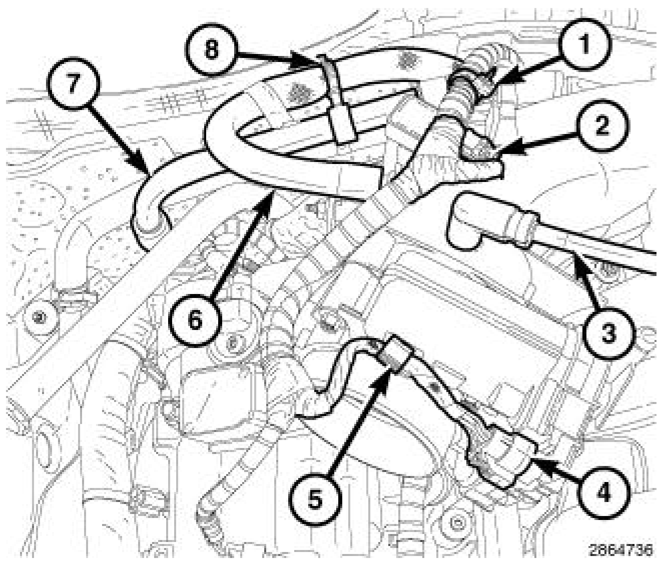


Fig. 581: MAP Sensor, ETC, PCV Hose, Brake Booster Vacuum Hose, EVAP Vapor Purge Line, Clip & Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

10. Connect the following hoses to the upper intake manifold:
    - Positive Crankcase Ventilation (PCV) (7)
    - Brake booster vacuum hose (6)
    - EVAP vapor purge line (3)
11. Connect the Manifold Absolute Pressure (MAP) sensor wire harness connector (2).
12. Connect the Electronic Throttle Control (ETC) wire harness connector (4).
13. Secure the ETC harness to the clip (5) on the throttle body and fasten the wire harness retainer (1) to the upper intake manifold near the MAP sensor.

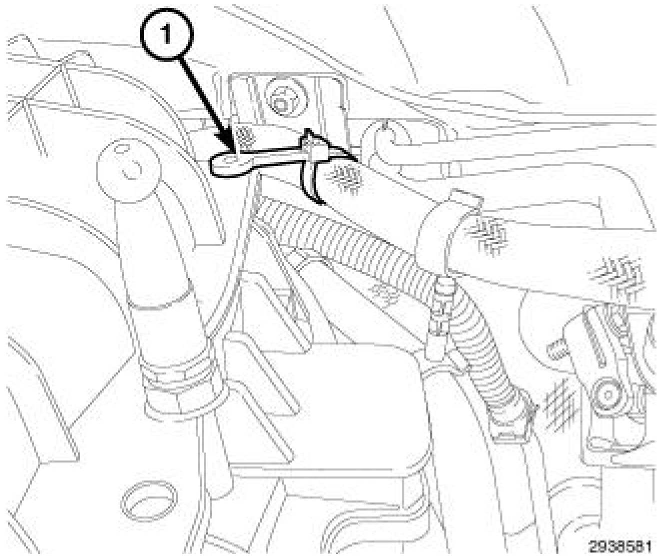


Fig. 582: Brake Booster Hose Retainer
Courtesy of CHRYSLER GROUP, LLC

14. Fasten the brake booster vacuum hose retainer (1) to the upper intake manifold.

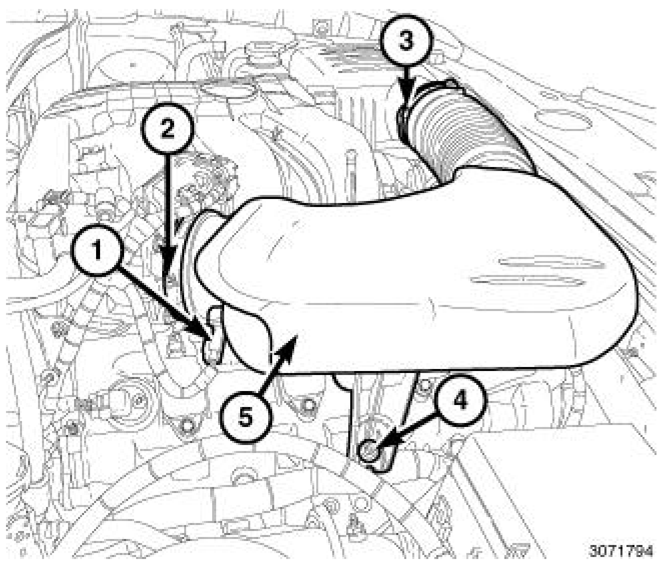


Fig. 583: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

15. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
16. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
17. Tighten the clamp at the air cleaner housing (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
18. Tighten the clamp (2) at the throttle body to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
19. Connect the Inlet Air Temperature (IAT) sensor wire harness connector (1).

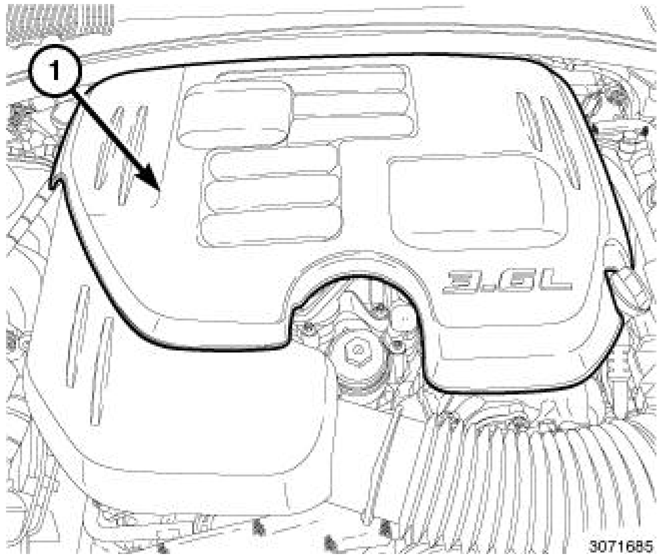


Fig. 584: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

20. Position the engine cover (1) and secure the retaining grommets onto the ball studs.
21. Connect the negative battery cable and tighten nut to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
22. Start the engine and check for leaks.

LOWER

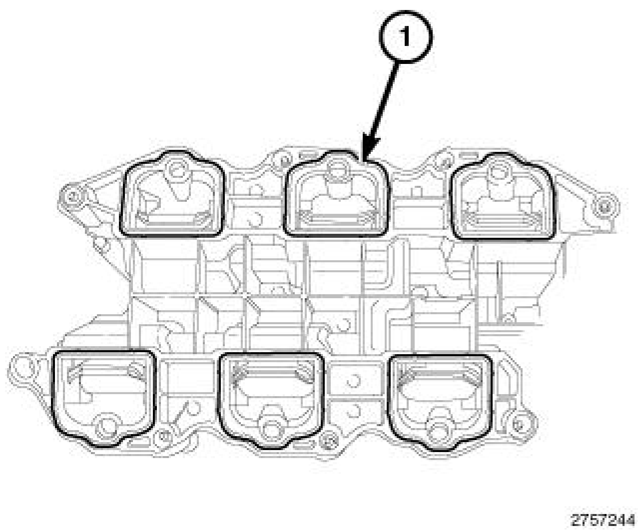
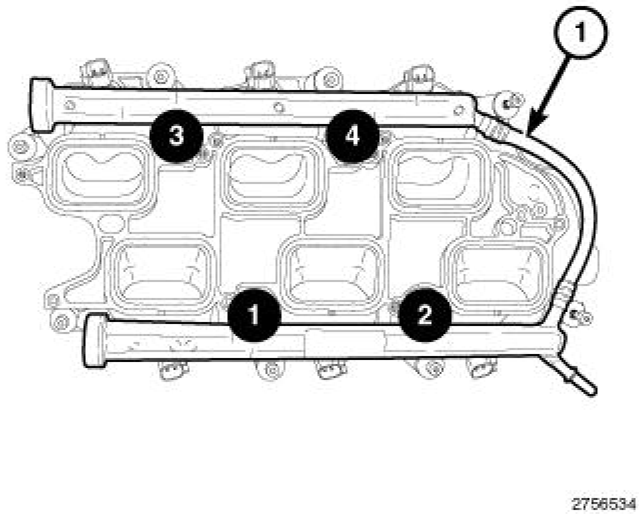


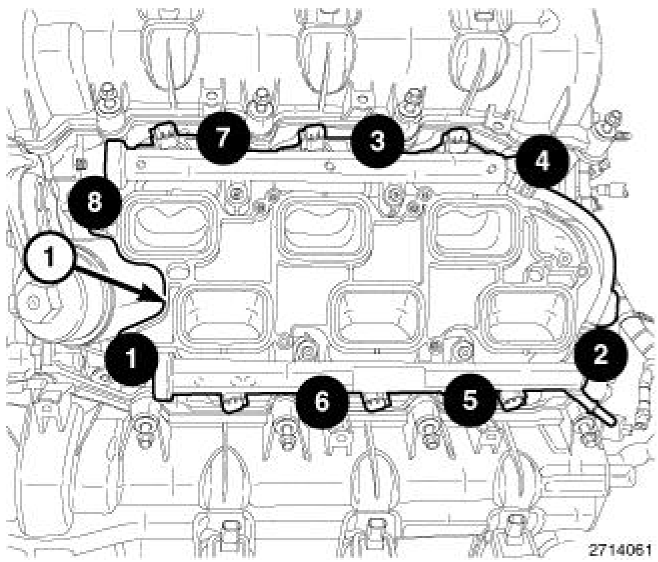
Fig. 585: Lower Intake Manifold To Cylinder Head Seals
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect the sealing surfaces. Install new lower intake manifold to cylinder head seals (1).



[Fig. 586: Fuel Rail Bolt Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

2. If removed, install the fuel injectors and the fuel rail (1) to the lower intake manifold. Tighten bolts in the sequence shown in illustration to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 587: Intake Manifold Retaining Bolts Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

3. Position the lower intake manifold (1) onto the cylinder head surfaces.
4. Install the intake manifold retaining bolts and tighten in the sequence shown in illustration to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

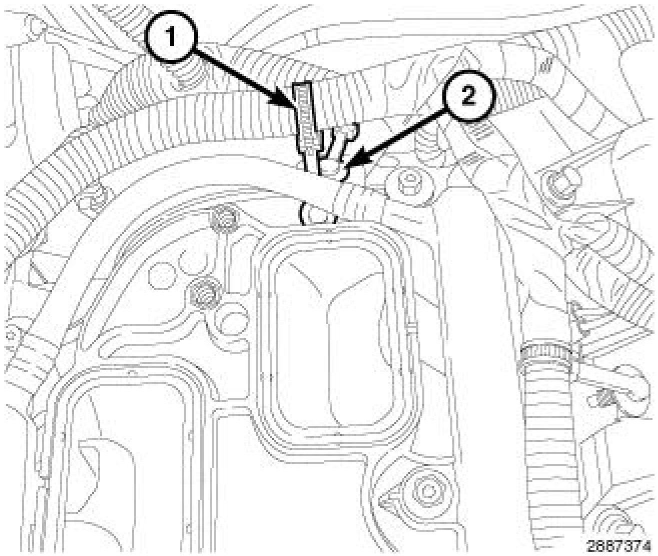


Fig. 588: Injection/Ignition Harness Retainer & Main Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

5. Fasten the main wire harness retainer (2) to the rear of the lower intake manifold.
6. Fasten the injection/ignition harness retainer (1) to the rear of the lower intake manifold.

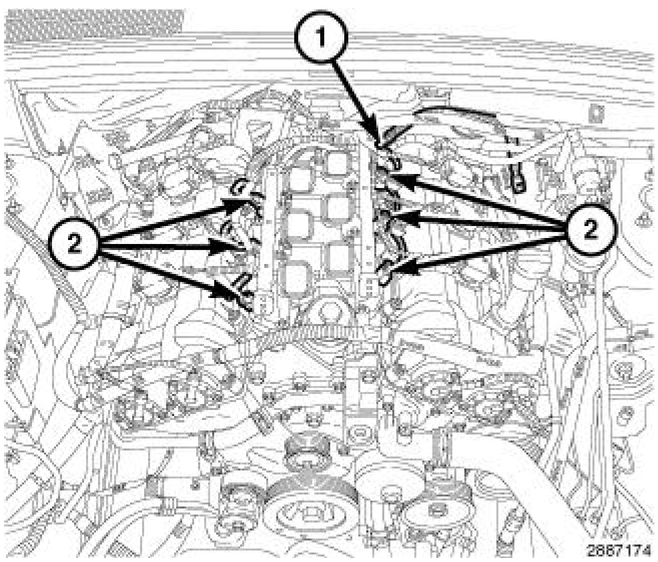


Fig. 589: Fuel Supply Hose & Fuel Injector Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

7. Connect the fuel injector electrical connectors (2).
8. Connect the fuel supply hose to the fuel rail (1). Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE** .

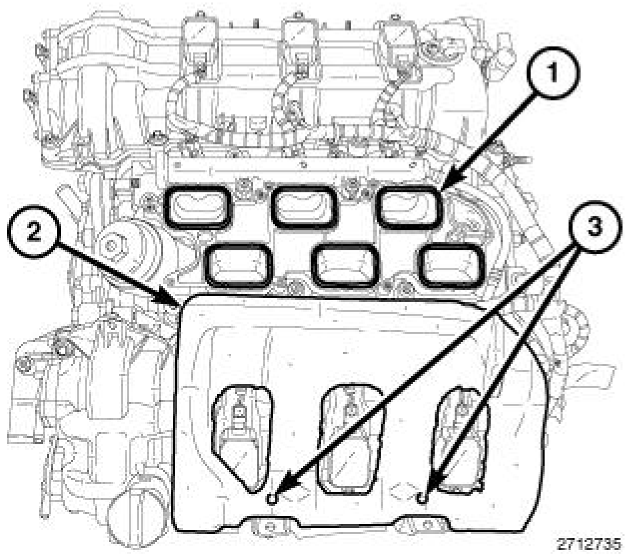


Fig. 590: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

9. Install the insulator (2) to the two alignment posts (3) on top of the left cylinder head cover.
10. Install the upper intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

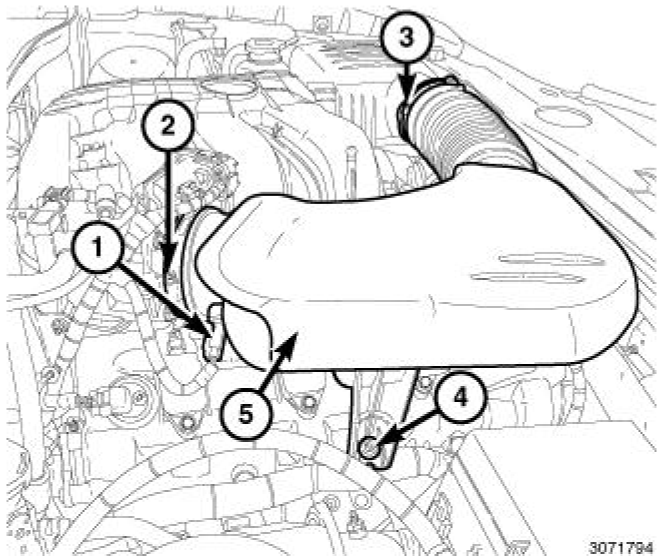


Fig. 591: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
12. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
13. Tighten the clamp at the air cleaner housing (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
14. Tighten the clamp (2) at the throttle body to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
15. Connect the Inlet Air Temperature (IAT) sensor wire harness connector (1).

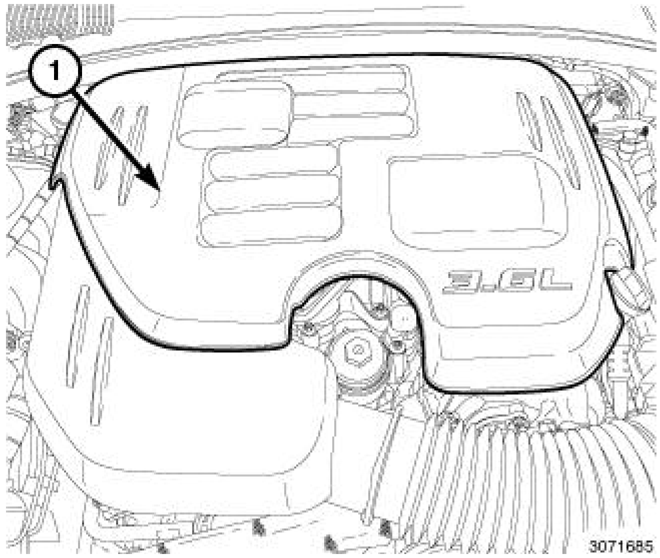


Fig. 592: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

16. Position the engine cover (1) and secure the retaining grommets onto the ball studs.
17. Connect the negative battery cable and tighten nut to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
18. Start the engine and check for leaks.

VALVE TIMING

DESCRIPTION

DESCRIPTION

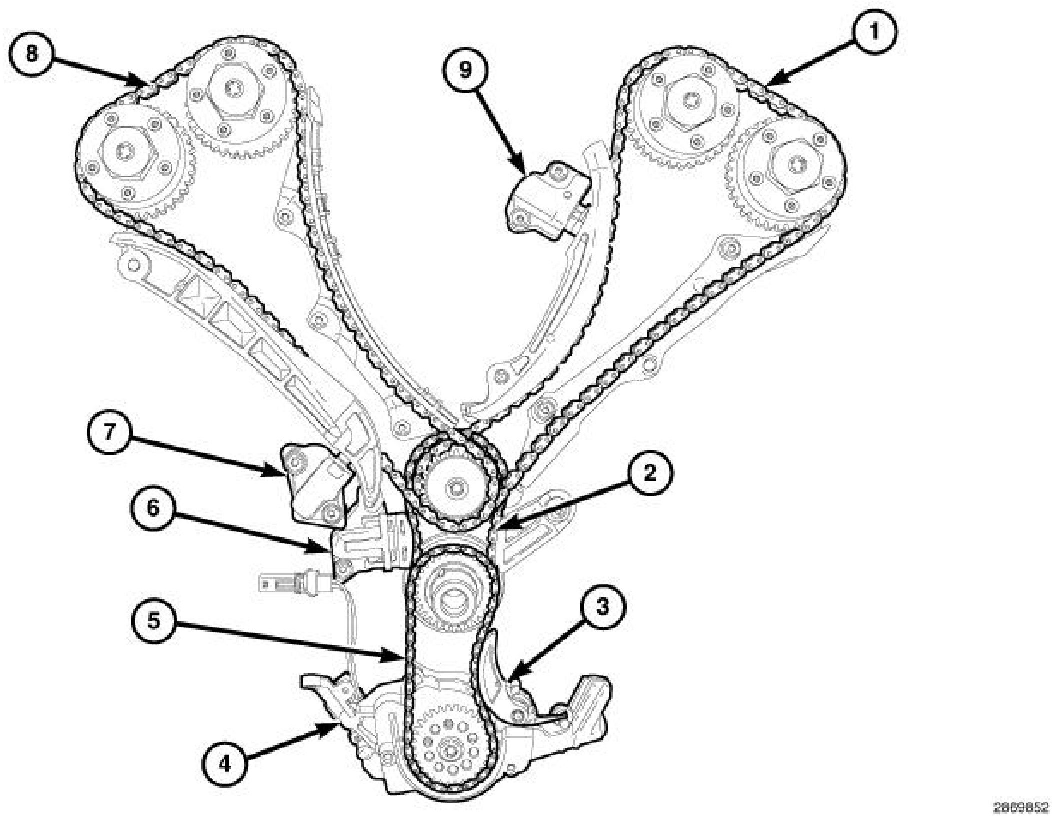


Fig. 593: Valve Timing System Components
Courtesy of CHRYSLER GROUP, LLC

The timing drive uses four silent chains. The silent chain link design improves sprocket engagement and reduces noise, vibration and harshness (NVH). One chain (5) drives the oil pump (4) and three chains drive the camshafts in a two stage design. The left secondary camshaft chain (1) uses an oil pressure controlled chain tensioner (9) with a ratcheting device. The right secondary camshaft chain (8) uses an oil pressure controlled tensioner (7) without a ratchet. The primary chain (2) also uses an oil pressure controlled tensioner (6) without a ratchet. A spring loaded tensioner (3) takes up the slack in the oil pump chain (5). The chain guides and tensioner arms are made of glass filled nylon with nylon wear faces.

OPERATION

OPERATION

Fig. 594: Primary Chain, Idler Sprocket & Crankshaft Sprocket
Courtesy of CHRYSLER GROUP, LLC

The primary timing chain is a silent type. The primary chain drives the 28 tooth idler sprocket directly from a 21 tooth crankshaft sprocket. This results in a 75% speed reduction to the idler sprocket. The idler sprocket assembly connects the primary chain drive and the secondary chain drive. The idler sprocket assembly consists of two integral 22 tooth sprockets a 28 tooth sprocket. The idler sprocket assembly spins on a stationary idler shaft. The idler shaft is a light press-fit into the cylinder block. A large washer on the idler shaft bolt and the rear flange of the idler shaft are used to control sprocket thrust movement. Pressurized oil is routed through the center of the idler shaft to provide lubrication for the bushings used in the idler sprocket assembly. Primary chain motion is controlled by a hydraulic oil damped tensioner and a fixed guide. The tensioner and the guide both use nylon plastic wear faces for low friction and long wear. The primary chain receives oil splash lubrication.

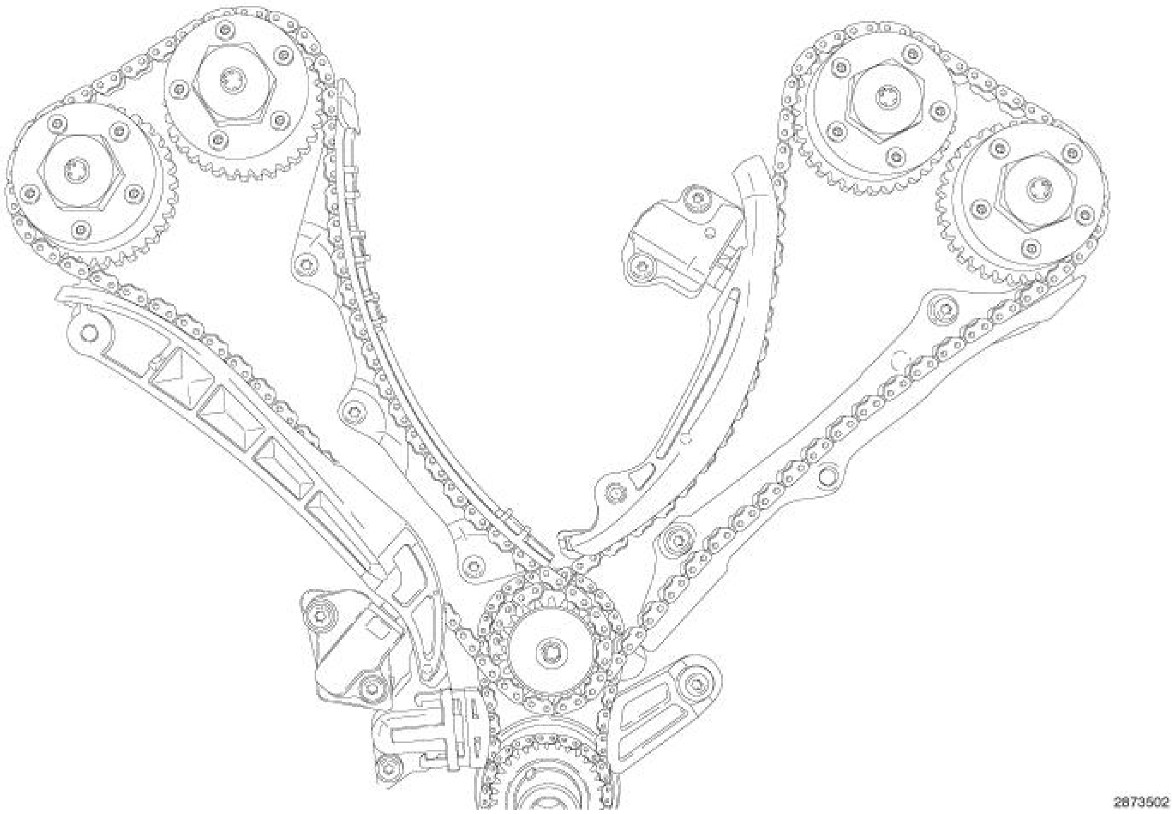


Fig. 595: Secondary Drive Chains
Courtesy of CHRYSLER GROUP, LLC

There are two identical secondary drive chains, both are silent type, one to drive the camshafts in each double overhead cam (DOHC) cylinder head. The secondary chains drive the 33 tooth camshaft sprockets directly from the 22 tooth idler sprockets. This speed reduction combined with the crankshaft to idler sprocket speed reduction produces the required 2:1 camshaft drive ratio. A fixed chain guide and a hydraulic oil damped tensioner are used to maintain tension in each secondary chain system. The left hydraulic secondary chain tensioner is fed from the main oil gallery through the cylinder head. The right hydraulic secondary chain tensioner is fed from the number one main bearing journal. Each tensioner incorporates a controlled leak path through a device known as a vent disc located in the nose of the piston to manage chain loads. Only the left tensioner has a mechanical ratchet system that limits chain slack if the tensioner piston bleeds down after engine shut down. The tensioner arms and guides also utilize nylon wear faces for low friction and long wear. The two secondary timing chains are lubricated by holes in the oil controlled tensioners that spray oil through an opening in the tensioner arms. The holes are protected from clogging by a fine mesh screen which is located on the back of the hydraulic tensioners.

STANDARD PROCEDURE

RESETTING LEFT CAM CHAIN TENSIONER

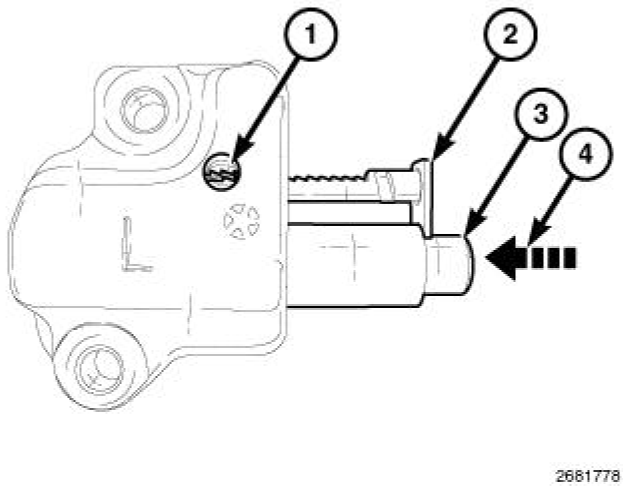


Fig. 596: Left Side Cam Chain Tensioner Ratchet Components
Courtesy of CHRYSLER GROUP, LLC

The left side can chain tensioner used on the 3.6L engine is equipped with a ratchet. The ratchet consists of a rack (2) and a pawl (1). In use, the rack (2) extends with the piston (3) from the tensioner body. The pawl (1) will not allow the rack (2) to retract back into the tensioner body. In order to reset the tensioner, the pawl (1) must be disengaged from the rack (2) so that the piston (3) and rack (2) can be pushed back (4) into the tensioner body.

WITH ENGINE TIMING COVER REMOVED

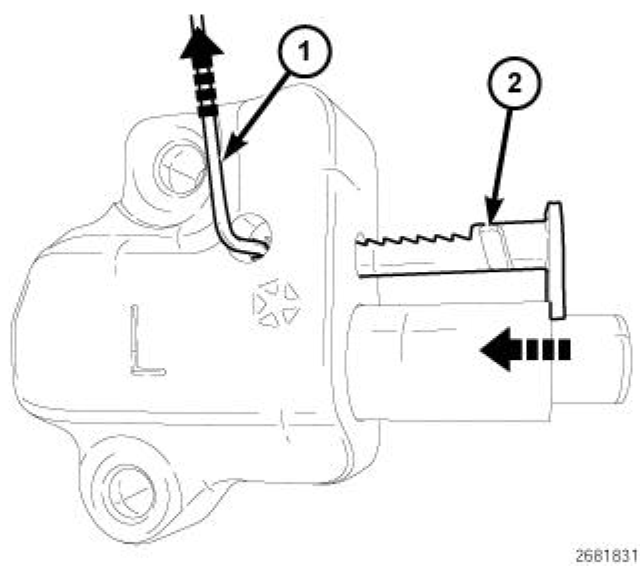


Fig. 597: Locating Slot In Rack & Allen Wrench
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The slot (2) in the rack provides an anchor point for a pin that holds the rack in the retracted position.**

1. Using a suitable tool, such as an Allen wrench (1), lift the pawl off of the rack.
2. While holding the pawl off of the rack, push the rack and the piston into the tensioner body.

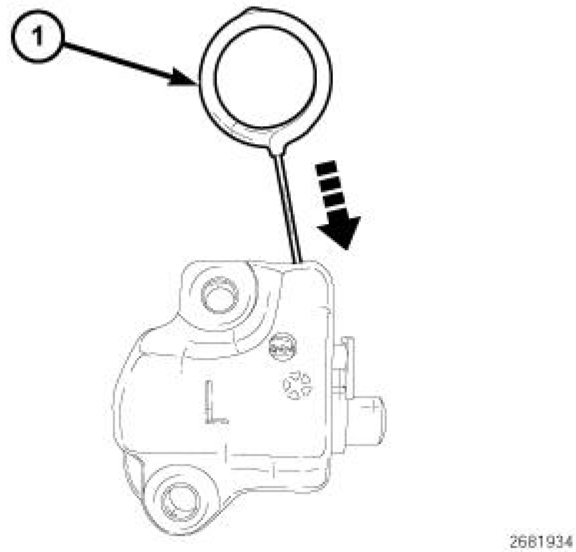


Fig. 598: Inserting Tensioner Pin To Hold Rack & Piston In Retracted Position
Courtesy of CHRYSLER GROUP, LLC

3. When the slot is aligned with the hole in the tensioner body, insert Tensioner Pin (special tool #8514, Pins, Tensioner) (1) to hold the rack and piston in the retracted position.

WITH ENGINE TIMING COVER INSTALLED

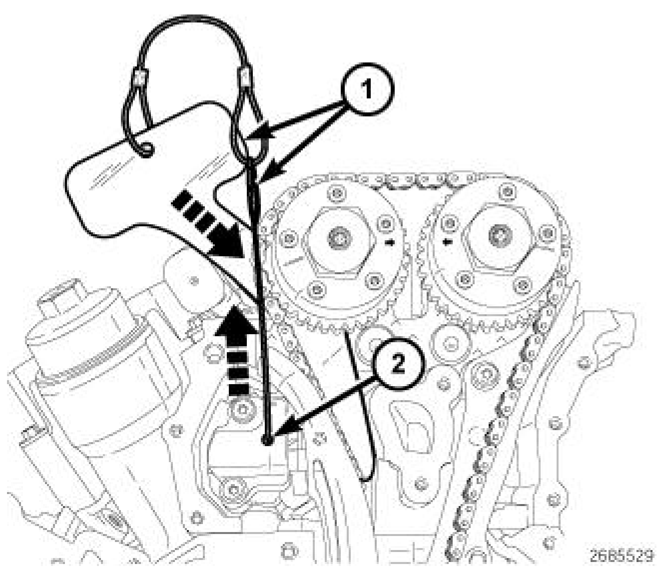
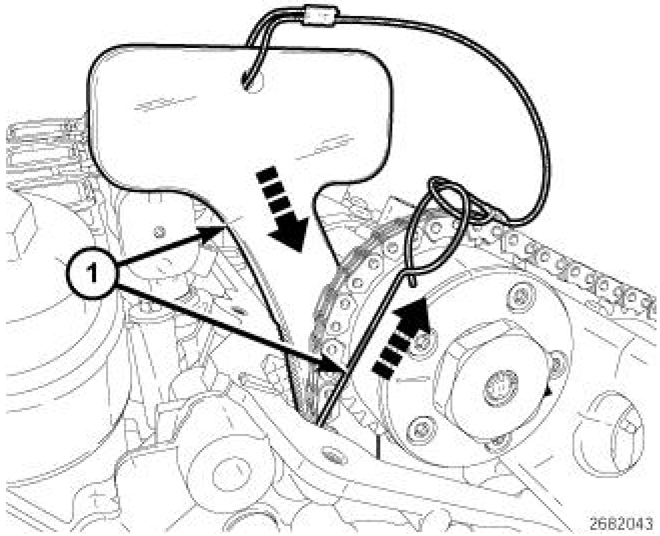


Fig. 599: Pin, Rack & Timing Chain Holder
Courtesy of CHRYSLER GROUP, LLC

NOTE: Graphic shows timing cover removed for clarity.

1. Using (special tool #10200-3, Pin) (2), lift the pawl off of the rack (3).



[Fig. 600: Positioning Timing Chain Holder To Force Rack & Piston Back Into Tensioner Body](#)
Courtesy of CHRYSLER GROUP, LLC

2. While holding the pawl off of the rack, push (special tool #10200-1, Holder, Timing Chain, Left Side) (1) into place between the cylinder head and the cam chain guide to force the rack and piston back into the tensioner body. The holder must remain in place during service to keep the rack and piston in the retracted position.

MEASURING TIMING CHAIN WEAR

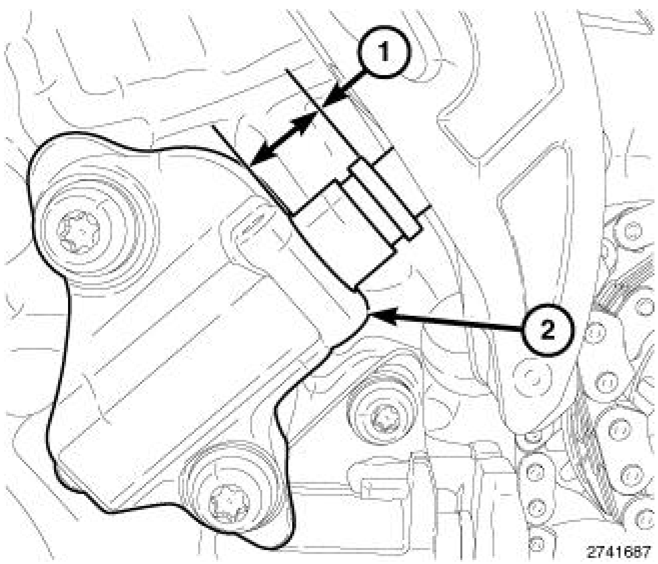


Fig. 601: Piston Extension & Right Hand Cam Chain Tensioner
Courtesy of CHRYSLER GROUP, LLC

1. Remove the engine timing chain cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.
2. To determine if the timing chains are worn, rotate the crankshaft clockwise until maximum tensioner piston extension (1) is obtained on the RH cam chain tensioner (2). Measure the distance between the secondary timing chain tensioner housing and the step ledge on the tensioner piston (1). Piston extension (1) must be less than 16 mm (0.630 in.).
3. Piston extension greater than 16 mm (0.630 in.) indicates that all timing chains are worn and require

replacement. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

ENGINE TIMING VERIFICATION

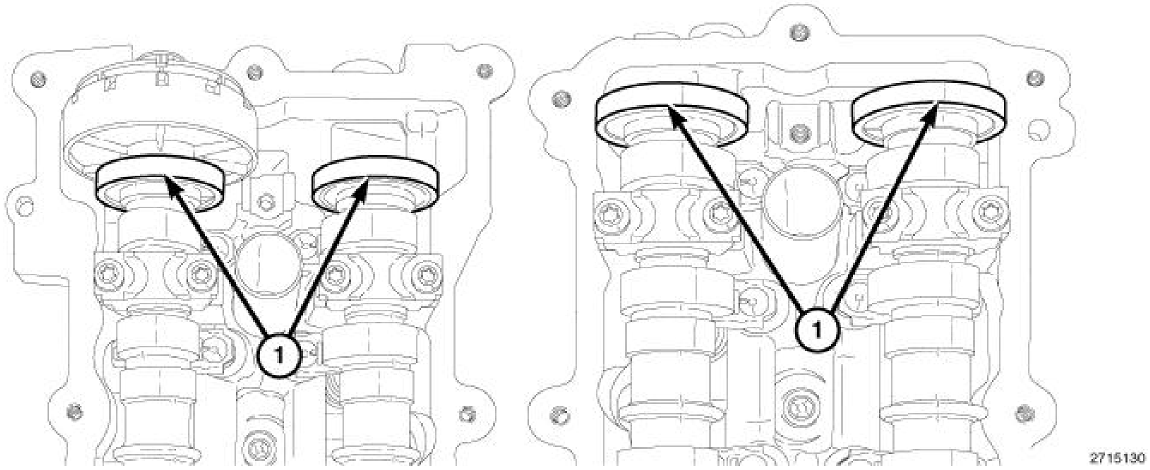


Fig. 602: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

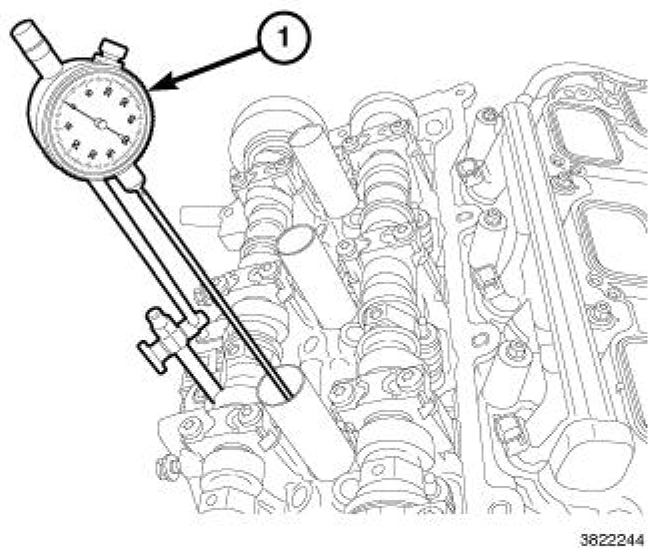


Fig. 603: Mount Dial Indicator Set To Stationary Point On Engine
Courtesy of CHRYSLER GROUP, LLC

Correct timing is critical for the NON free-wheeling designed, 3.6L engine. Engine timing can be verified by using the following procedures:

1. Remove the upper intake manifold and both cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.
2. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

3. Mount Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) (1) to a stationary point on the engine, such as the cylinder head cover mounting surface. Position the indicator probe into the number one cylinder, rotate the crankshaft clockwise (as viewed from the front) to place the number one piston at top-dead-center on the exhaust stroke and set the indicator dial to **ZERO** .

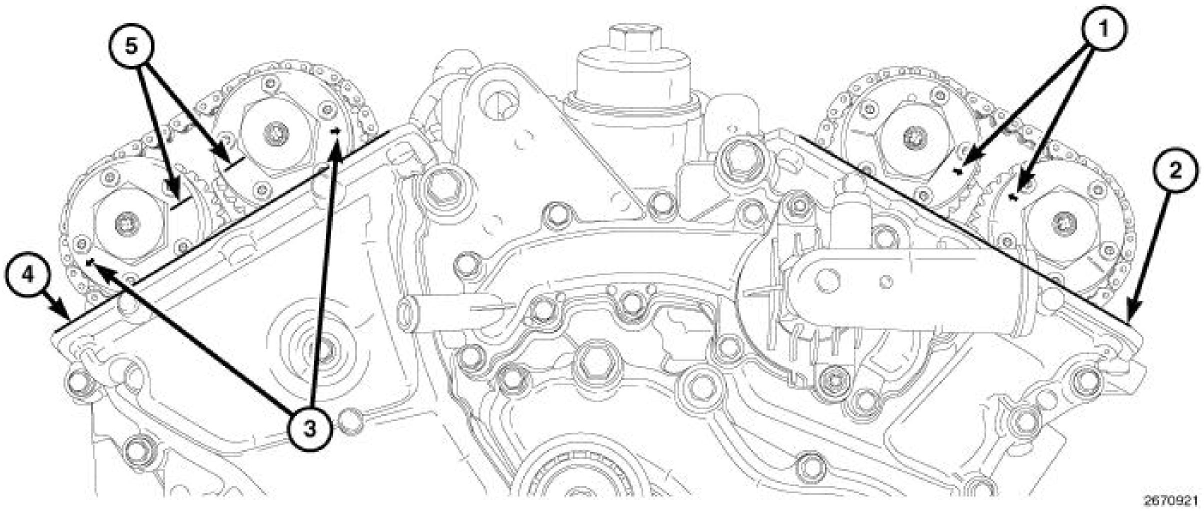


Fig. 604: Arrows, Scribe Lines, & Cam Phasers
Courtesy of CHRYSLER GROUP, LLC

4. While maintaining this alignment, verify that the **ARROWS** (1) on the left side cam phasers point toward each other and are parallel to the cylinder head cover mounting surface (2) and that the right side cam phaser **ARROWS** (3) point away from each other and the **SCRIBE LINES** (5) are parallel to the cylinder head cover mounting surface (4).

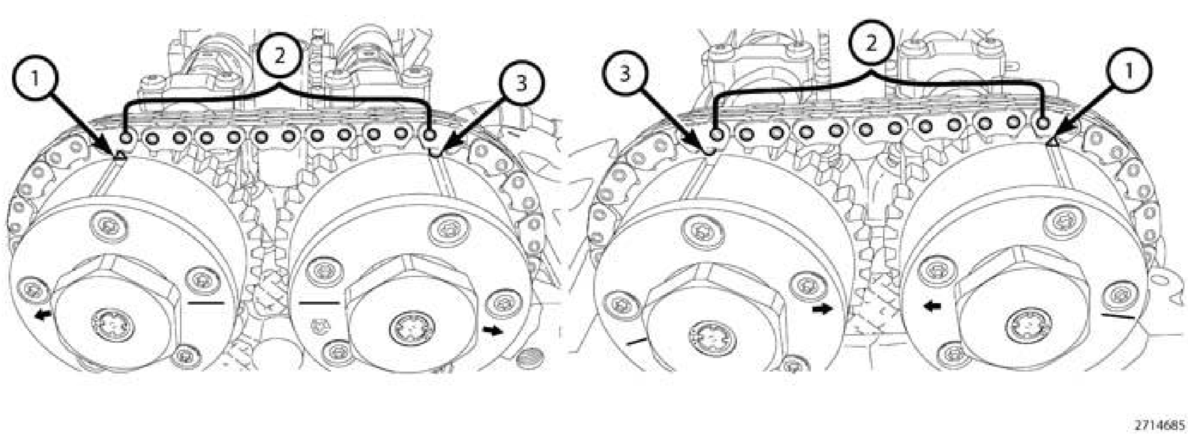


Fig. 605: Chain Pins, Exhaust Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

NOTE: The phaser markings (1 and 3) could align with either an external or internal chain link. Either alignment is acceptable as long as there are

twelve chain pins between the markings.

5. There should be twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3) as viewed from either the front or rear of the cam phasers.
6. If the engine timing is not correct. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

CHAIN AND SPROCKETS, TIMING

REMOVAL

REMOVAL

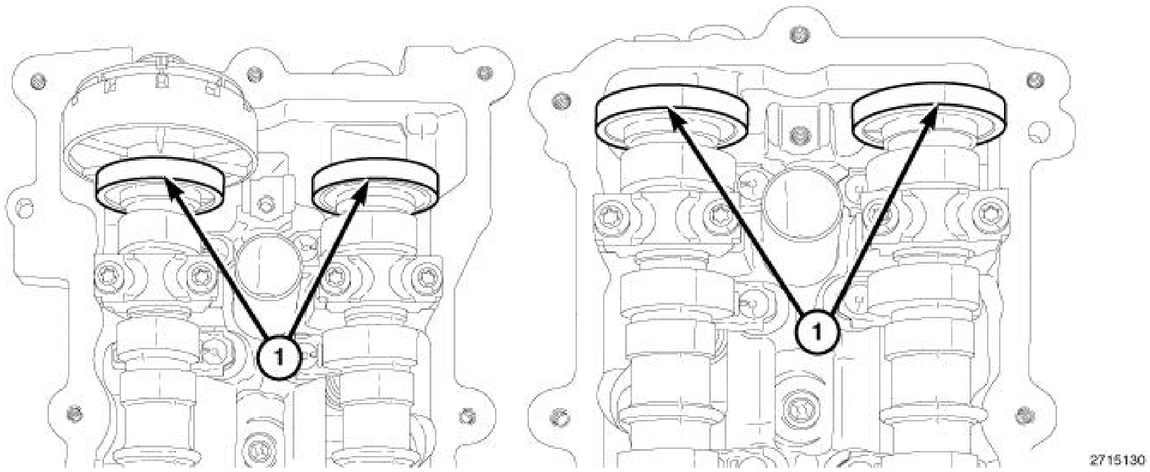


Fig. 606: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.**

CAUTION: **When the timing chains are removed and the cylinder heads are still installed, DO NOT rotate the camshafts or crankshaft without first locating the proper crankshaft position. Failure to do so will result in valve and/or piston damage.**

NOTE: **The Variable Valve Timing (VVT) assemblies (Phasers) and Oil Control Valves (OCVs) can be serviced without removing the engine timing cover. Refer to ASSEMBLY, VARIABLE VALVE TIMING, PHASER/OIL CONTROL VALVE, REMOVAL.**

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL**.
3. Remove both cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.
4. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .
5. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
6. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

7. Remove the engine timing cover. Refer to COVER(S), ENGINE TIMING, REMOVAL.

NOTE: **Take this opportunity to measure timing chain wear. Refer to VALVE TIMING, STANDARD PROCEDURE.**

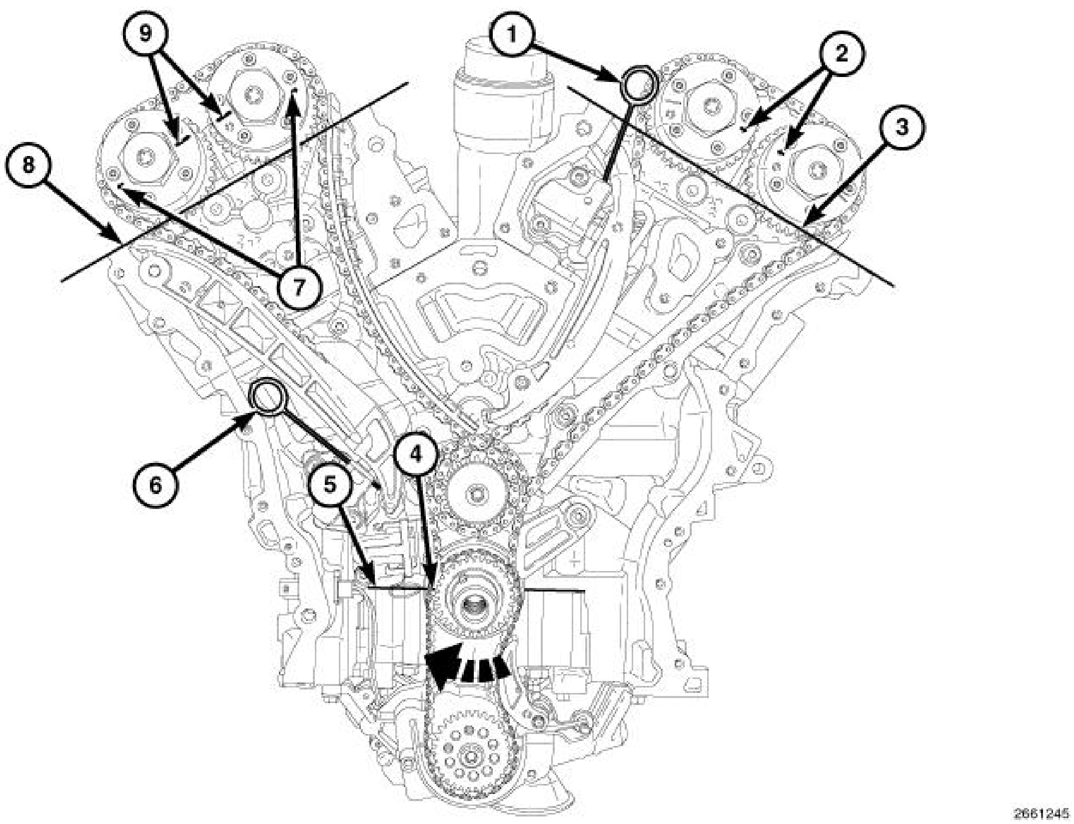


Fig. 607: Rotating Crankshaft Clockwise To Position No. 1 Piston At TDC On Exhaust Stroke
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.**

8. Rotate the crankshaft clockwise (as viewed from the front) to place the number one cylinder piston at top-dead-center on the exhaust stroke by aligning the dimple (4) on the crankshaft with the block/bearing cap junction (5).
9. While maintaining this alignment, verify that the **ARROWS** (2) on the left side cam phasers point toward each other and are parallel to the cylinder head cover mounting surface (3) and that the right side cam phaser **ARROWS** (7) point away from each other and the **SCRIBE LINES** (9) are parallel to the cylinder head cover mounting surface (8).

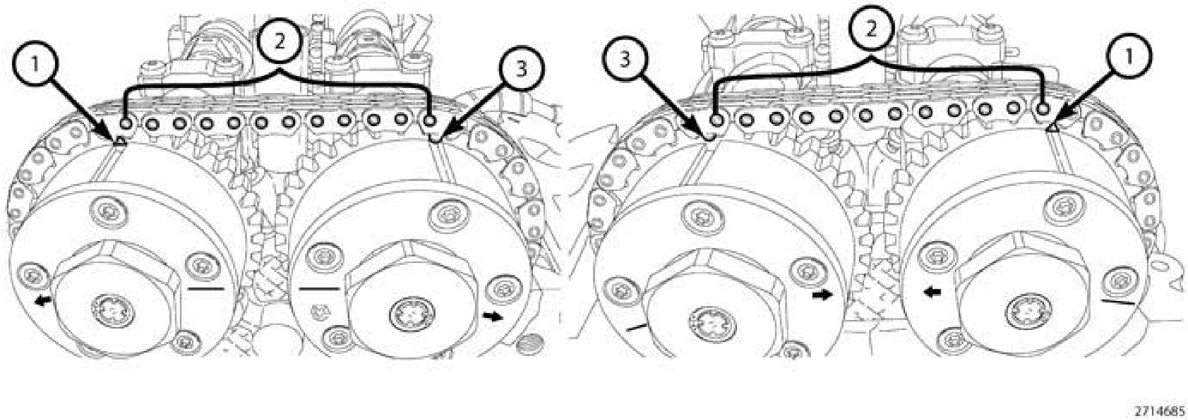


Fig. 608: Chain Pins, Exhaust Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The phaser markings (1 and 3) could align with either an external or internal chain link. Either alignment is acceptable as long as there are twelve chain pins between the markings.**

10. There should be twelve chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3) as viewed from either the front or rear of the cam phasers.

CAUTION: **Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.**

11. Mark the direction of rotation on the following timing chains using a paint pen or equivalent to aid in reassembly:
    - Left side cam chain
    - Right side cam chain
    - Oil pump chain
    - Primary chain

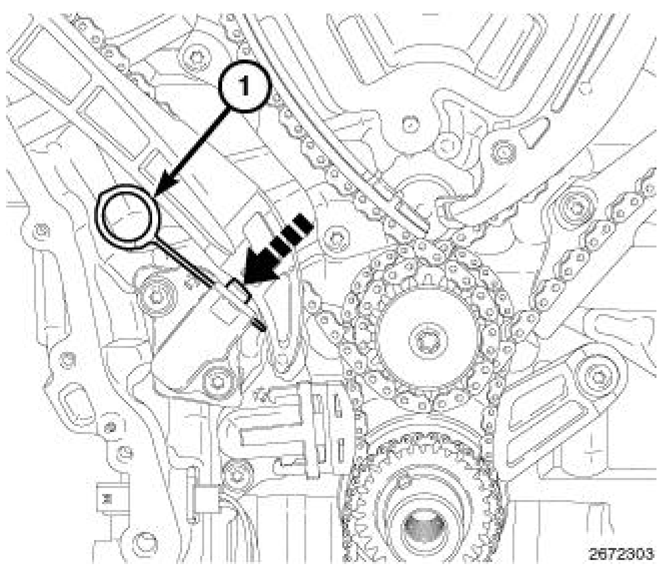


Fig. 609: Resetting Right Cam Chain Tensioner By Pushing Back Tensioner Piston & Installing Tensioner Pin
Courtesy of CHRYSLER GROUP, LLC

12. Reset the right side cam chain tensioner by pushing back the tensioner piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (1).

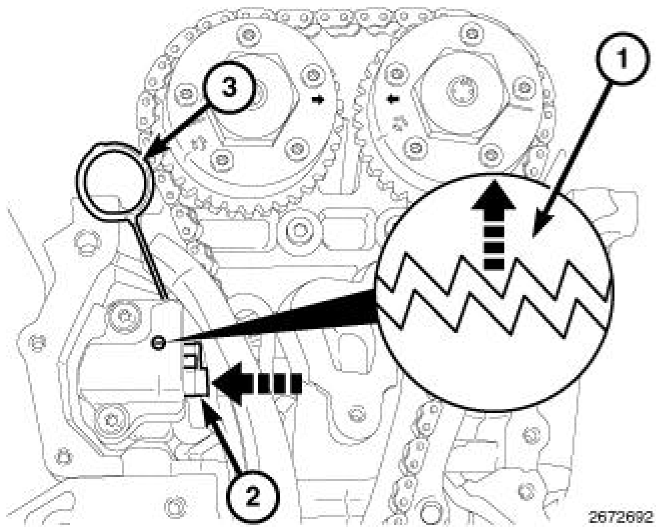


Fig. 610: Resetting Left Cam Chain Tensioner By Lifting Pawl, Pushing Back Piston & Installing Tensioner Pin
Courtesy of CHRYSLER GROUP, LLC

13. Reset the left side cam chain tensioner by lifting the pawl (1), pushing back the piston (2) and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (3).

 Refer to **VALVE TIMING, STANDARD PROCEDURE**.

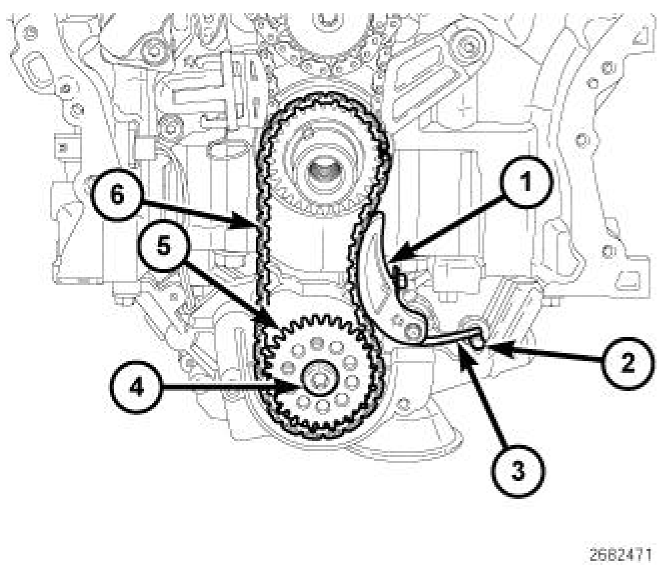


Fig. 611: Oil Pump Chain Tensioner, Spring, Retaining Bolt, Dowel Pin, Oil Pump Sprocket & Oil Pump Chain
Courtesy of CHRYSLER GROUP, LLC

14. Disengage the oil pump chain tensioner spring (3) from the dowel pin (2) and remove the oil pump chain tensioner (1).
15. Remove the oil pump sprocket T45 retaining bolt (4) and remove the oil pump sprocket (5) and oil pump chain (6).

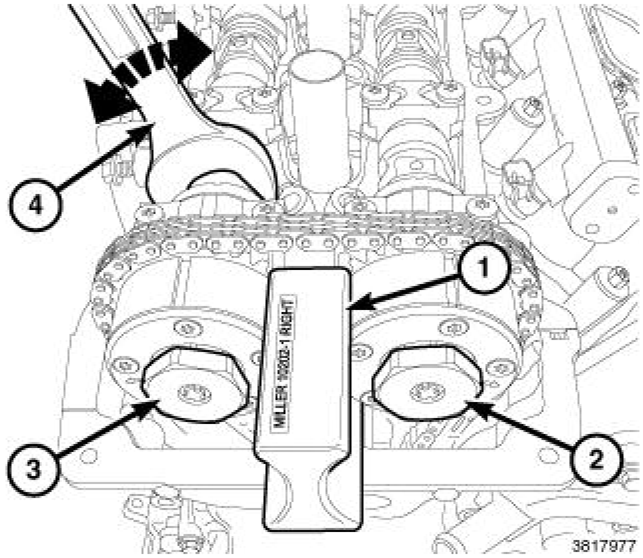
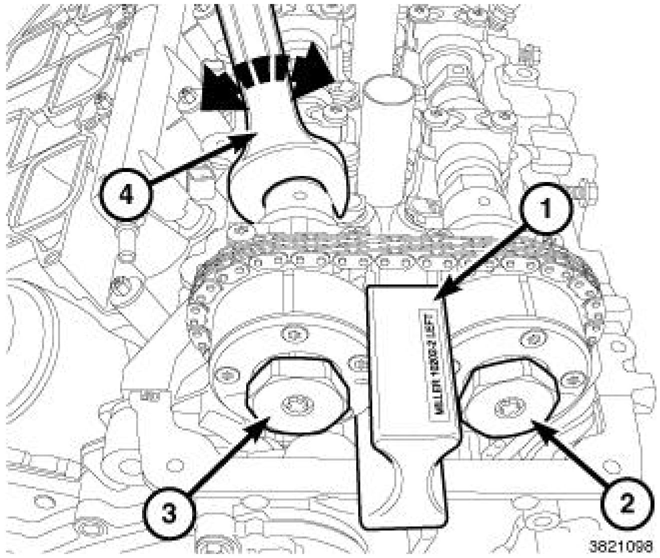


Fig. 612: Wrench, Oil Control Valves & Special Tool
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It may be necessary to rock the camshaft slightly (a few degrees) with a wrench (4) when installing the camshaft phaser lock.**

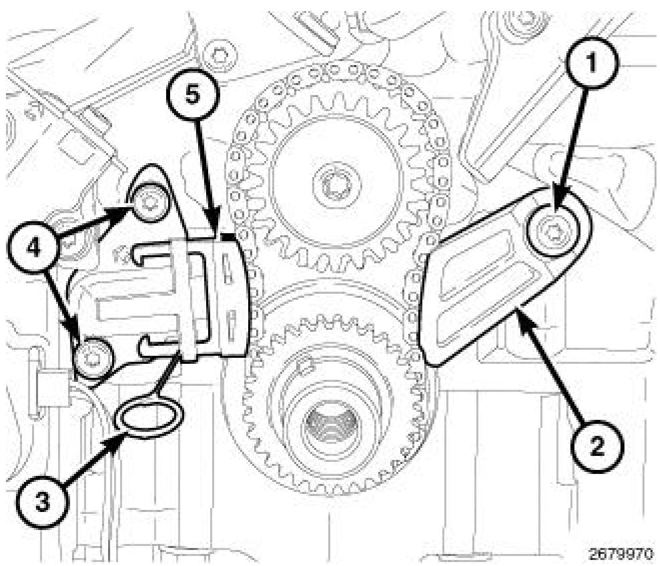
16. Install the (special tool #10202-1, Lock, Camshaft/Phaser, Right Side) (1) with the tool number facing up.
17. Loosen, but do not remove, the exhaust oil control valve (3) and the intake oil control valve (2).
18. Remove the (special tool #10202-1, Lock, Camshaft/Phaser, Right Side) (1).
19. Remove the oil control valve (2) from the right side intake cam phaser.
20. Pull the right side intake cam phaser off of the camshaft and remove the right side cam chain.
21. If required, remove the oil control valve (3) and pull the right side exhaust cam phaser off of the camshaft.



[Fig. 613: Wrench, Oil Control Valves & Special Tool]
Courtesy of CHRYSLER GROUP, LLC

NOTE: It may be necessary to rock the camshaft slightly (a few degrees) with a wrench (4) when installing the camshaft phaser lock.

22. Install the (special tool #10202-2, Lock, Camshaft/Phaser, Left Side) (1) with the tool number facing up.
23. Loosen, but do not remove, the exhaust oil control valve (2) and the intake oil control valve (3).
24. Remove the (special tool #10202-2, Lock, Camshaft/Phaser, Left Side) (1).
25. Remove the oil control valve (2) from the left side exhaust cam phaser.
26. Pull the left side exhaust cam phaser off of the camshaft and remove the left side cam chain.
27. If required, remove the oil control valve (3) and pull the left side intake cam phaser off of the camshaft.



[Fig. 614: Primary Chain Tensioner, Tensioner Pin, Primary Chain Guide & Bolts]
Courtesy of CHRYSLER GROUP, LLC

28. Reset the primary chain tensioner (5) by pushing back the tensioner piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (3). Remove bolts (4) and remove the primary chain tensioner.

29. Remove bolt (1) and the primary chain guide (2).

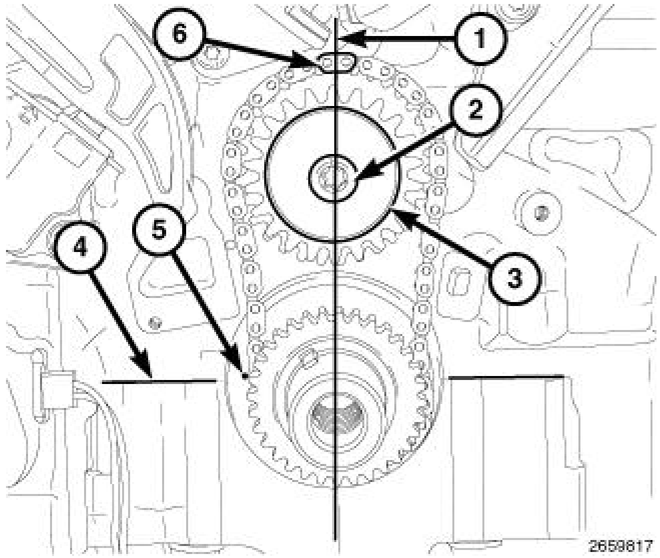


Fig. 615: Timing Chain Plated Link At 12 O'Clock, Washer, Retaining Bolt, Block/Bearing Cap Junction & Dimple
Courtesy of CHRYSLER GROUP, LLC

30. Remove the idler sprocket retaining bolt (2) and washer (3).
31. Remove the primary chain, idler sprocket and crankshaft sprocket as an assembly.

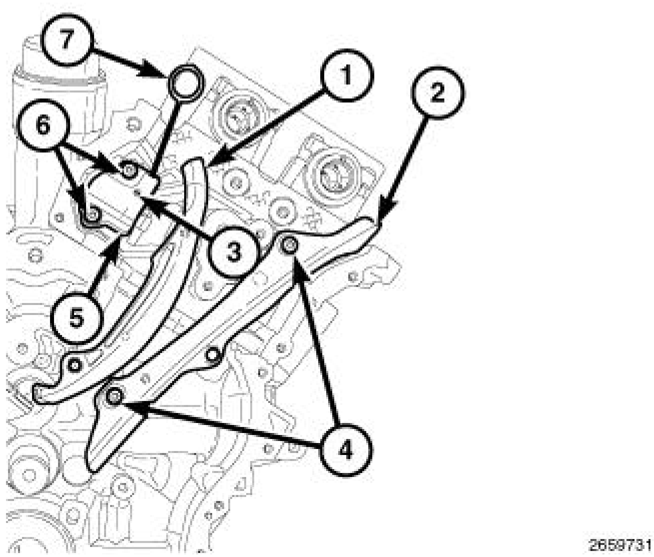


Fig. 616: Left Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

32. If required, remove bolts (6) and the left side cam chain tensioner (5).
33. If required, remove bolts (4) and the left side cam chain guide (2) and tensioner arm (1).

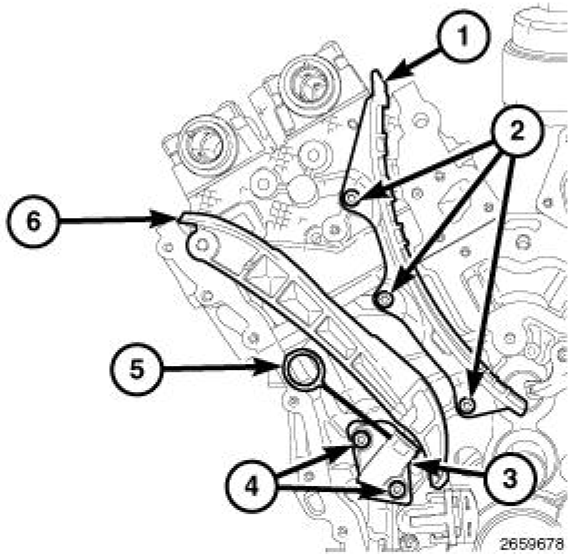


Fig. 617: Right Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

34. If required, remove bolts (4) and the right side cam chain tensioner (3).
35. If required, remove bolts (2) and the right side cam chain guide (1) and tensioner arm (6).
36. Inspect all sprockets and chain guides. Replace if damaged.

INSPECTION

INSPECTION

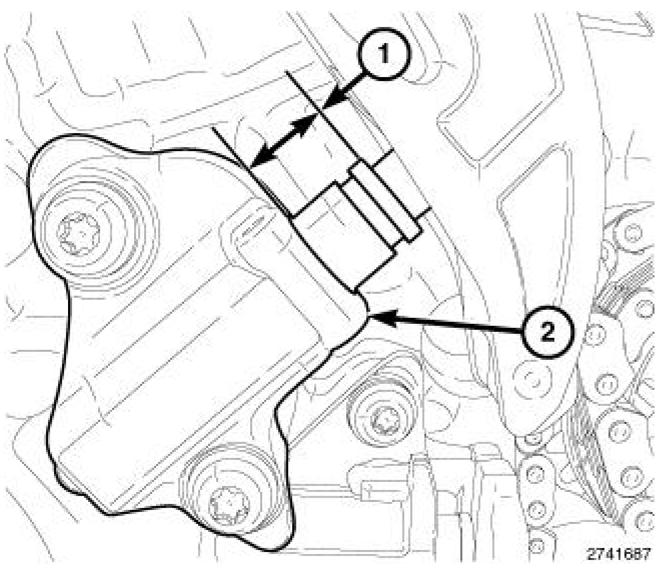


Fig. 618: Piston Extension & Right Hand Cam Chain Tensioner
Courtesy of CHRYSLER GROUP, LLC

Prior to disassembly of the timing chains and sprockets, measure the timing chain wear (1). Refer to **VALVE TIMING, STANDARD PROCEDURE**.

Inspect the following valve timing components:

- Sprockets for excessive tooth wear. Some tooth markings are normal and not a cause for sprocket

replacement.

- Idler sprocket assembly bushing and shaft for excessive wear.
- Chain guides and tensioner arms. Replace these parts if grooving in plastic face is more than 1 mm (0.039 in.) deep.
- Secondary chain tensioner piston and ratcheting device. Inspect for evidence of heavy contact between tensioner piston and tensioner arm. If this condition exist the tensioner arm and chain should be replaced.
- Primary chain tensioner plastic faces. Replace as required.

INSTALLATION

INSTALLATION

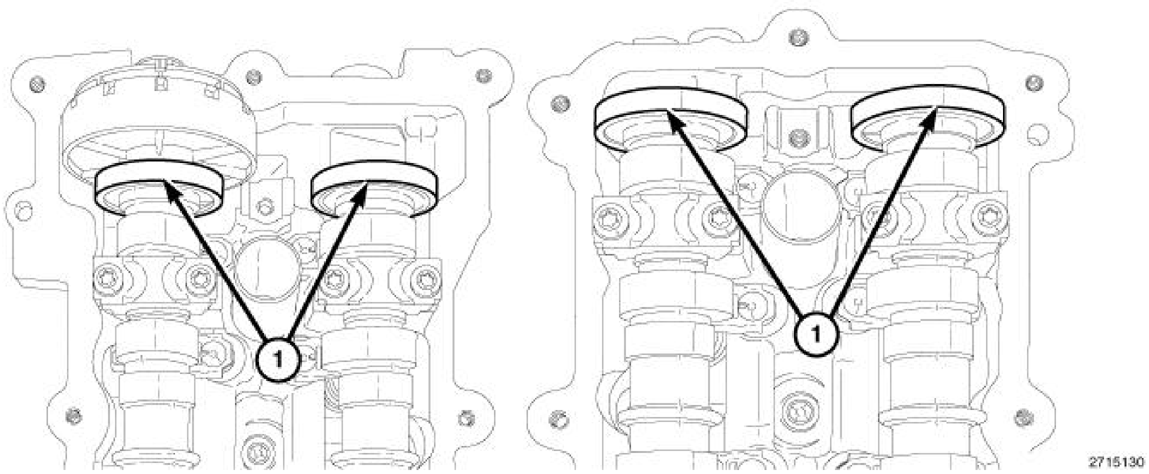


Fig. 619: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

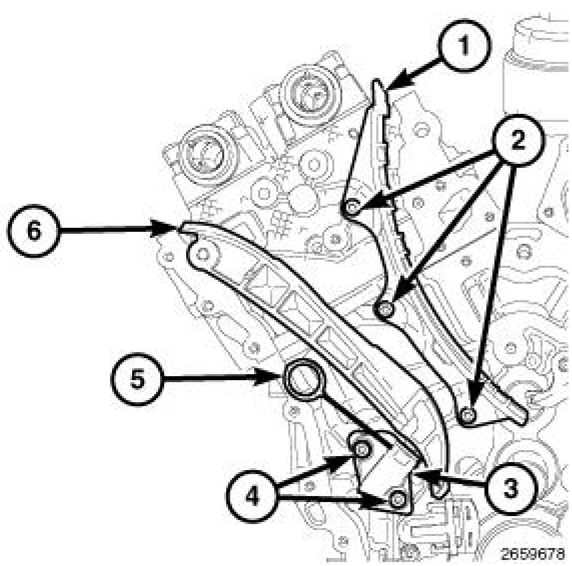


Fig. 620: Right Cam Chain Tensioner, Arm, Guide & Bolts

Courtesy of CHRYSLER GROUP, LLC

1. Inspect all sprockets and chain guides. Replace if damaged.
2. If removed, install the right side cam chain guide (1) and tensioner arm (6). Tighten bolts (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
3. If removed, install the right side cam chain tensioner (3). Tighten bolts (4) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Reset the right side cam chain tensioner (3) by pushing back the tensioner piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (5).

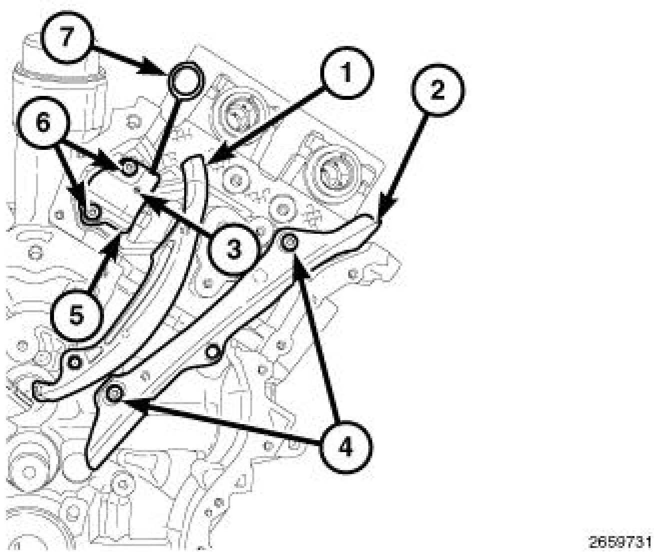


Fig. 621: Left Cam Chain Tensioner, Arm, Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. If removed, install the left side cam chain guide (2) and tensioner arm (1). Tighten bolts (4) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
6. If removed, install the left side cam chain tensioner (5). Tighten bolts (6) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
7. Reset the left side cam chain tensioner (5) by lifting the pawl (3), pushing back the piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (7).

   Refer to **VALVE TIMING, STANDARD PROCEDURE**.

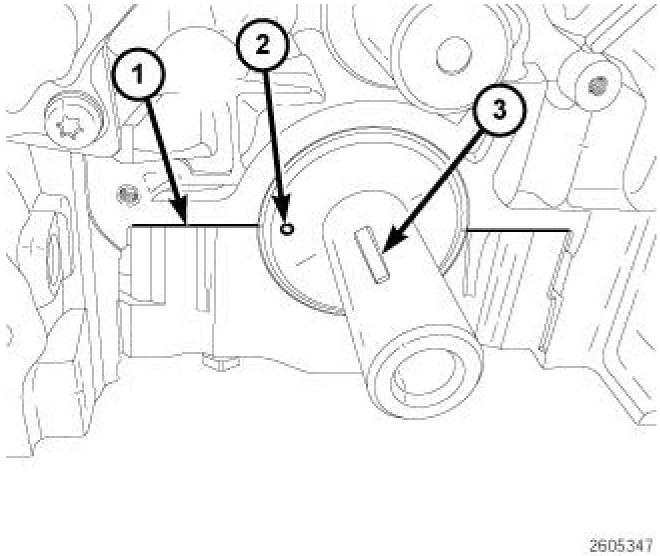


Fig. 622: Crankshaft Key, Dimple & Block/Bearing Cap Junction
Courtesy of CHRYSLER GROUP, LLC

8. Verify that the key (3) is installed in the crankshaft.

CAUTION: **Do not rotate the crankshaft more than a few degrees independently of the camshafts. Piston to valve contact could occur resulting in possible valve damage. If the crankshaft needs to be rotated more than a few degrees, first remove the camshafts.**

9. Verify that the number one cylinder piston is positioned at top-dead-center by aligning the dimple (2) on the crankshaft with the block/bearing cap junction (1).

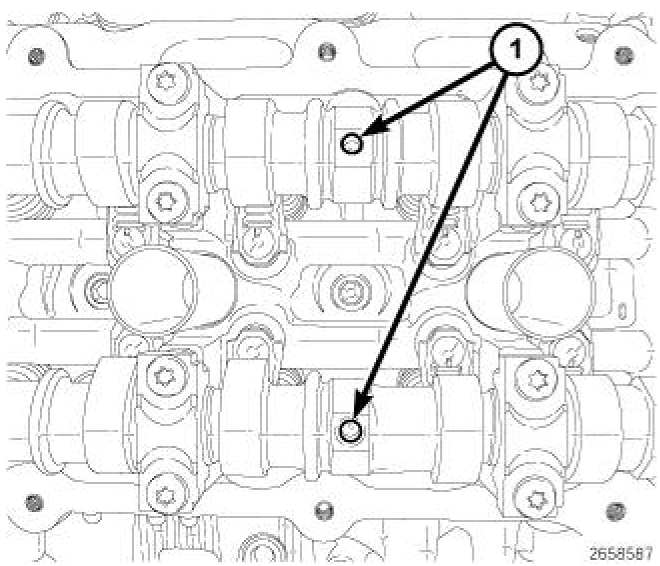


Fig. 623: Positioning Camshaft Alignment Holes Vertically
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not rotate the camshafts more than a few degrees independently of the crankshaft. Valve to piston contact could occur resulting in possible valve damage. If the camshafts need to be rotated more than a few degrees, first**

move the pistons away from the cylinder heads by rotating the crankshaft counterclockwise to a position 30Ā° before-top-dead-center. Once the camshafts are returned to their top-dead-center position, rotate the crankshaft clockwise to return the crankshaft to top-dead-center.

10. Verify that the camshafts are set at top-dead-center by positioning the alignment holes (1) vertically.

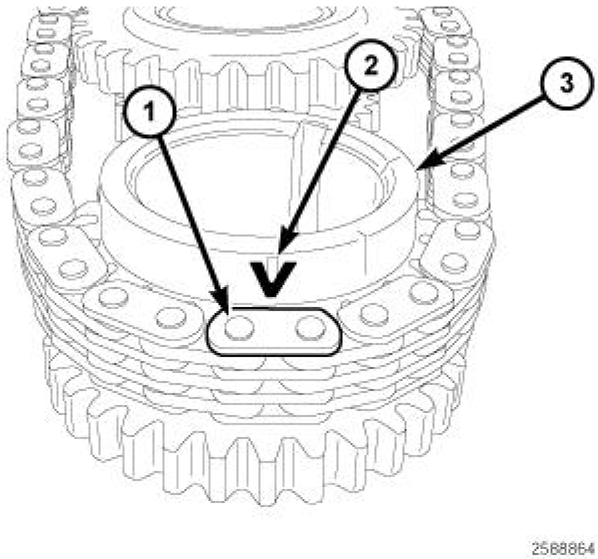


Fig. 624: Aligning Arrow With Plated Link On Primary Chain
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.

11. Place the primary chain onto the crankshaft sprocket (3) so that the arrow (2) is aligned with the plated link (1) on the timing chain.

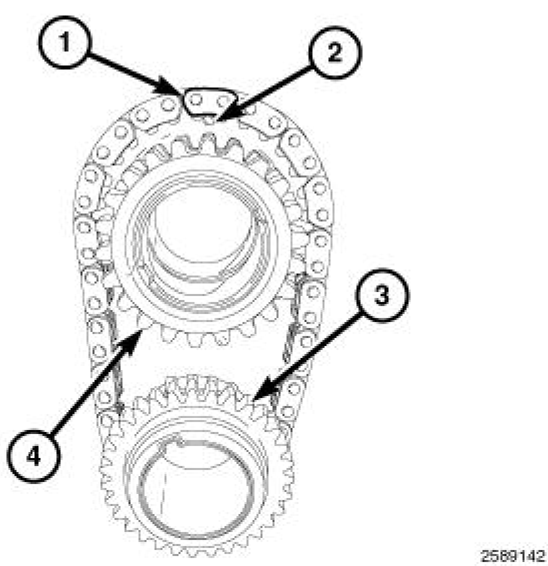


Fig. 625: Placing Idler Sprocket Into Timing Chain So That Dimple Is Aligned With Plated Link On Timing Chain

Courtesy of CHRYSLER GROUP, LLC

12. While maintaining this alignment, invert the crankshaft sprocket and timing chain and place the idler sprocket (4) into the timing chain so that the dimple (2) is aligned with the plated link (1) on the timing chain.

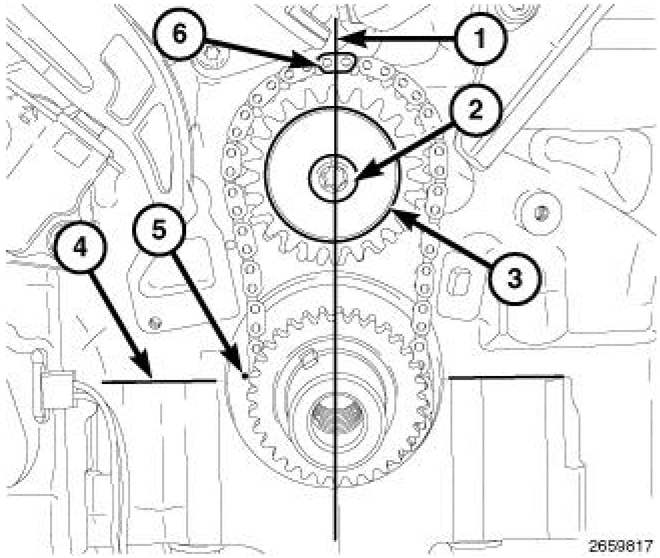


Fig. 626: Timing Chain Plated Link At 12 O'Clock, Washer, Retaining Bolt, Block/Bearing Cap Junction & Dimple
Courtesy of CHRYSLER GROUP, LLC

13. While maintaining this alignment, lubricate the idler sprocket bushing with clean engine oil and install the sprockets and timing chain on the engine. To verify that the timing is still correct, the timing chain plated link (6) should be located at 12:00 (1) when the dimple (5) on the crankshaft is aligned with the block/bearing cap junction (4).
14. Install the idler sprocket retaining bolt (2) and washer (3). Tighten bolt (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

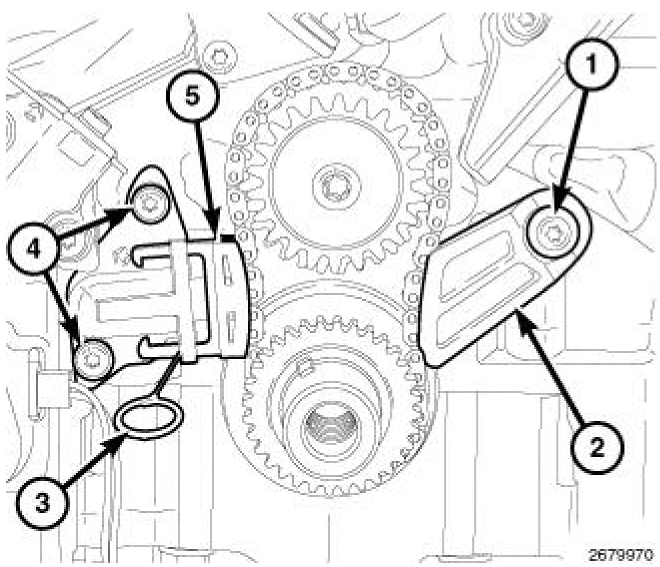


Fig. 627: Primary Chain Tensioner, Tensioner Pin, Primary Chain Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Install the primary chain guide (2). Tighten bolt (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
16. Reset the primary chain tensioner (5) by pushing back the tensioner piston and installing Tensioner Pin (special tool #8514, Pins, Tensioner) (3).
17. Install the primary chain tensioner (5). Tighten bolts (4) to the proper specification.

    Refer to **TORQUE SPECIFICATIONS**.

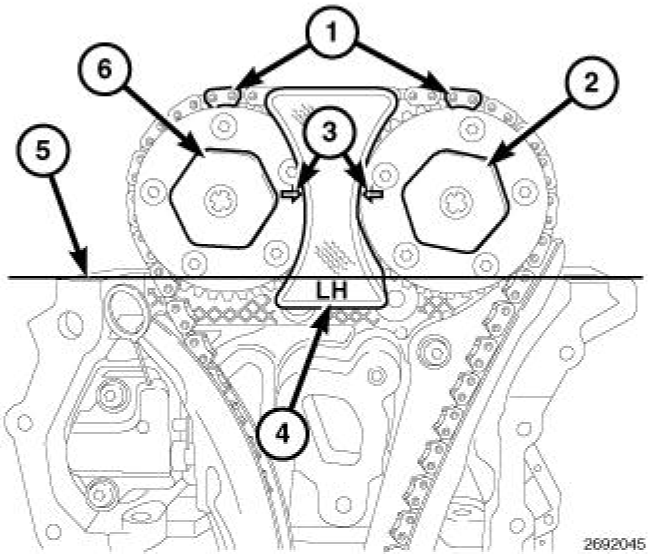


Fig. 628: Phaser Timing Marks, Oil Control Valves & LH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

18. Press the left side intake cam phaser onto the intake camshaft. Install and hand tighten the oil control valve (6).

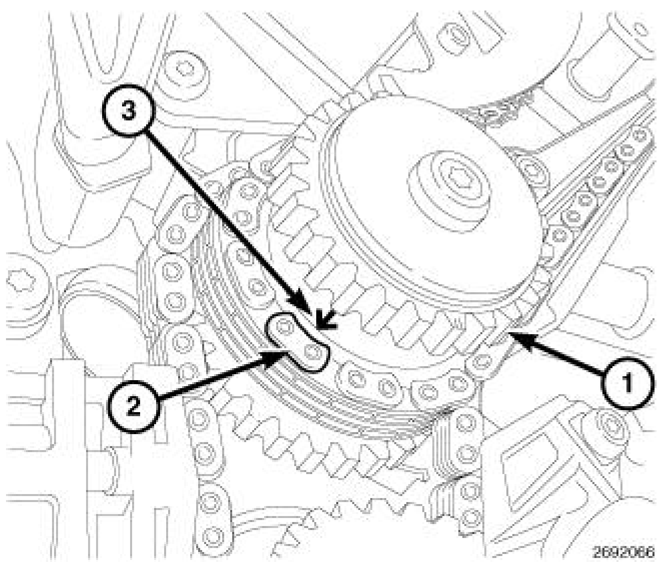


Fig. 629: Idler Sprocket, Plated Link & Arrow
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The left side and right side cam chains are identical.**

CAUTION: **Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.**

19. Drape the left side cam chain over the left side intake cam phaser and onto the idler sprocket (1) so that the arrow (3) is aligned with the plated link (2) on the cam chain.

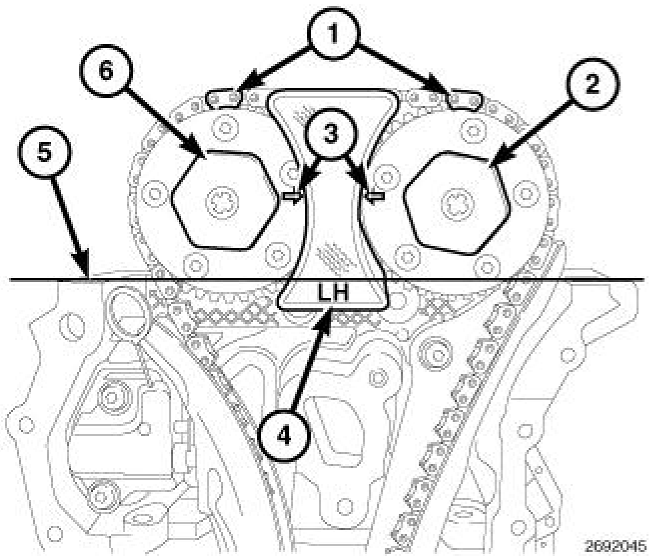


Fig. 630: Phaser Timing Marks, Oil Control Valves & LH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

20. While maintaining this alignment, route the cam chain around the exhaust and intake cam phasers so that the plated links are aligned with the phaser timing marks (1). Position the left side cam phasers so that the arrows (3) point toward each other and are parallel to the cylinder head cover mounting surface (5). Press the exhaust cam phaser onto the exhaust cam, install and hand tighten the oil control valve (2).

NOTE: **Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser or phaser lock.**

21. Install the (special tool #10202-2, Lock, Camshaft/Phaser, Left Side) (4) with the tool number facing up.
22. Tighten the oil control valves (2) and (6) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
23. Remove the Camshaft Phaser Lock (4).

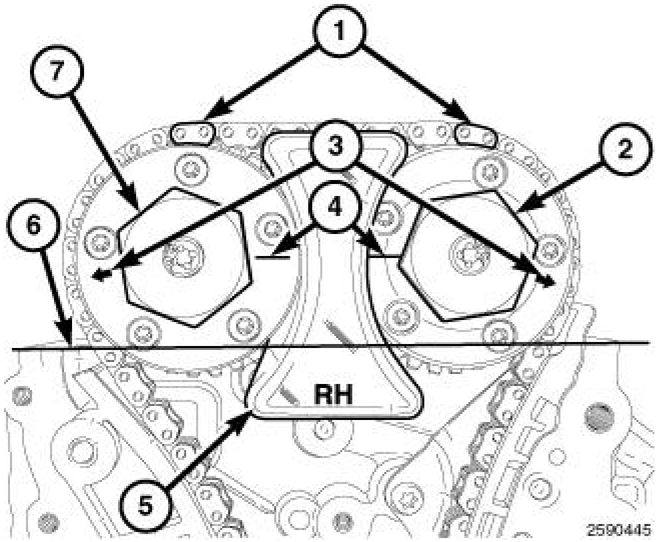


Fig. 631: Phaser Timing Marks, Oil Control Valves & RH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

24. Press the right side exhaust cam phaser onto the exhaust camshaft. Install and hand tighten the oil control valve (7).

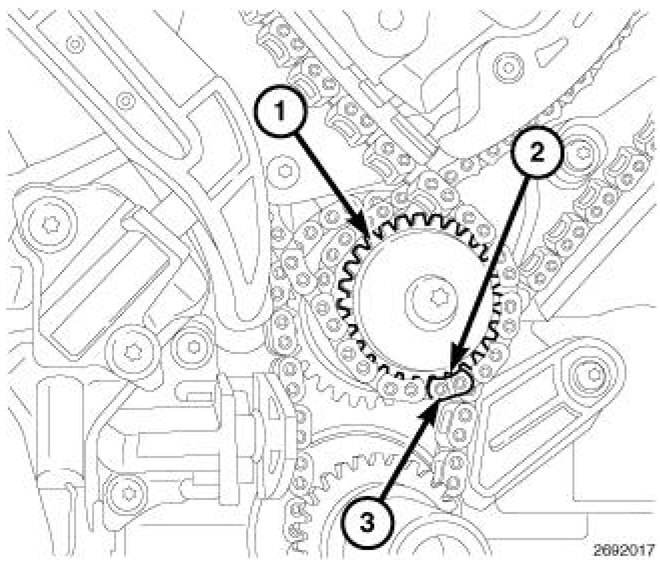


Fig. 632: Idler Sprocket, Dimple & Plated Link
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.**

25. Drape the right side cam chain over the right side exhaust cam phaser and onto the idler sprocket (1) so that the dimple (2) is aligned with the plated link (3) on the cam chain.

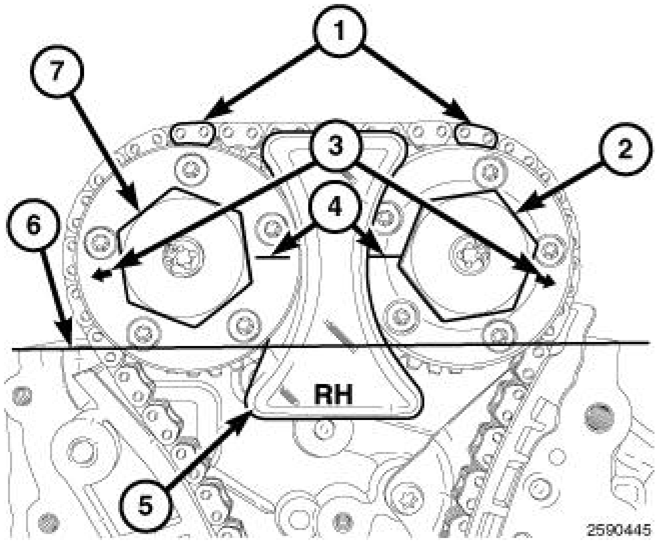


Fig. 633: Phaser Timing Marks, Oil Control Valves & RH Camshaft Phaser Lock
Courtesy of CHRYSLER GROUP, LLC

26. While maintaining this alignment, route the cam chain around the exhaust and intake cam phasers so that the plated links are aligned with the phaser timing marks (1). Position the right side cam phasers so that the arrows (3) point away from each other and the scribe lines (4) are parallel to the cylinder head cover mounting surface (6). Press the intake cam phaser onto the intake cam, install and hand tighten the oil control valve (2).

NOTE: **Minor rotation of a camshaft (a few degrees) may be required to install the camshaft phaser or phaser lock.**

27. Install the (special tool #10202-1, Lock, Camshaft/Phaser, Right Side) (5) with the tool number facing up.
28. Tighten the oil control valves (2) and (7) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
29. Remove the Camshaft Phaser Lock (5).

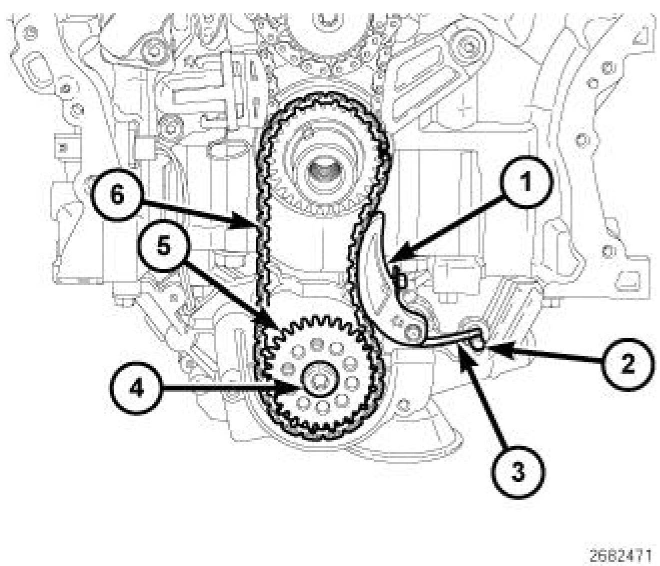


Fig. 634: Oil Pump Chain Tensioner, Spring, Retaining Bolt, Dowel Pin, Oil Pump Sprocket & Oil

Pump Chain
Courtesy of CHRYSLER GROUP, LLC

NOTE: **There are no timing marks on the oil pump gear or chain.**

CAUTION: **Always reinstall timing chains so that they maintain the same direction of rotation. Inverting a previously run chain on a previously run sprocket will result in excessive wear to both the chain and sprocket.**

30. Place the oil pump sprocket (5) into the oil pump chain (6). Place the oil pump chain onto the crankshaft sprocket while aligning the oil pump sprocket with the oil pump shaft. Install the bolt (4) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
31. Install the oil pump chain tensioner (1). Make sure that the spring (3) is positioned above the dowel pin (2).

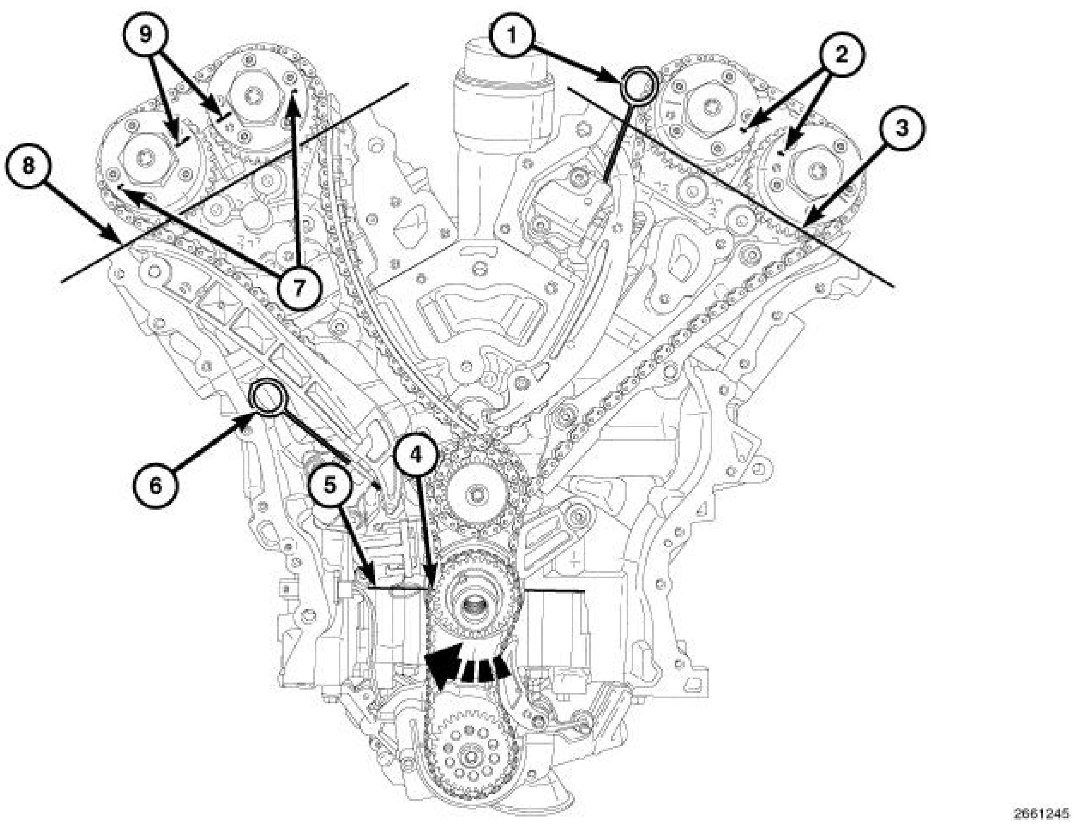


Fig. 635: Rotating Crankshaft Clockwise To Position No. 1 Piston At TDC On Exhaust Stroke
Courtesy of CHRYSLER GROUP, LLC

32. Remove the Tensioner Pins (special tool #8514, Pins, Tensioner) (1) and (6) from the right side and left side cam chain tensioners.
33. Rotate the crankshaft clockwise (as viewed from the front) two complete revolutions stopping when the dimple (4) on the crankshaft is aligned with the block/bearing cap junction (5).
34. While maintaining this alignment, verify that the **ARROWS** (2) on the left side cam phasers point toward each other and are parallel to the cylinder head cover mounting surface (3) and that the right side cam phaser **ARROWS** (7) point away from each other and the **SCRIBE LINES** (9) are parallel to the cylinder head cover mounting surface (8).

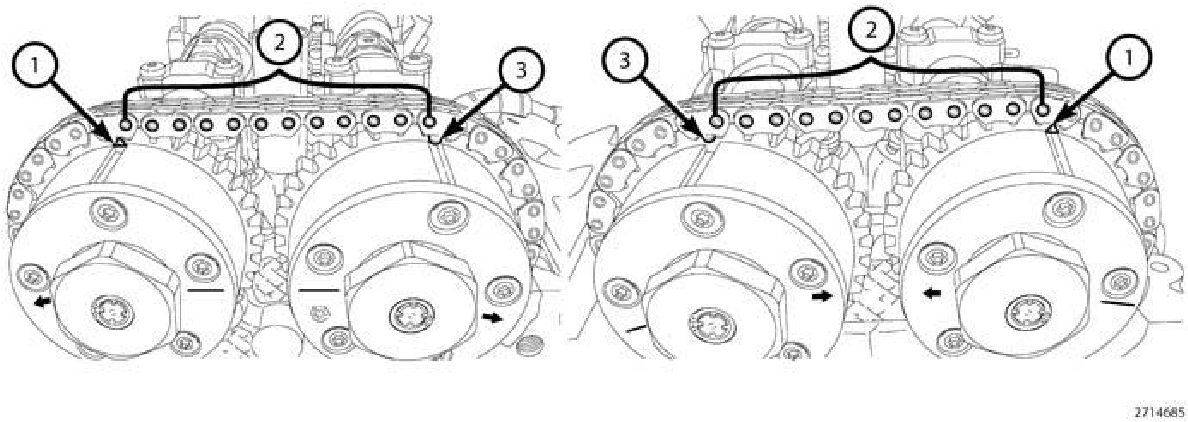


Fig. 636: Chain Pins, Exhaust Cam Phaser Triangle Marking & Circle Marking
Courtesy of CHRYSLER GROUP, LLC

35. There should be 12 chain pins (2) **BETWEEN** the exhaust cam phaser triangle marking (1) and the intake cam phaser circle marking (3) as viewed from either the front or rear of the cam phasers.
36. If the engine timing is not correct, repeat this procedure.
37. Install the engine timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.
38. Install the spark plugs. Refer to **SPARK PLUG, INSTALLATION** .
39. Install the cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.
40. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.
41. Fill the engine crankcase with the proper oil to the correct level. Refer to **STANDARD PROCEDURE**.
42. Connect the negative battery cable and tighten nut to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
43. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
44. Operate the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **STANDARD PROCEDURE** .

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

COVER(S), ENGINE TIMING

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the thermostat housing (1). Refer to **THERMOSTAT, REMOVAL** .

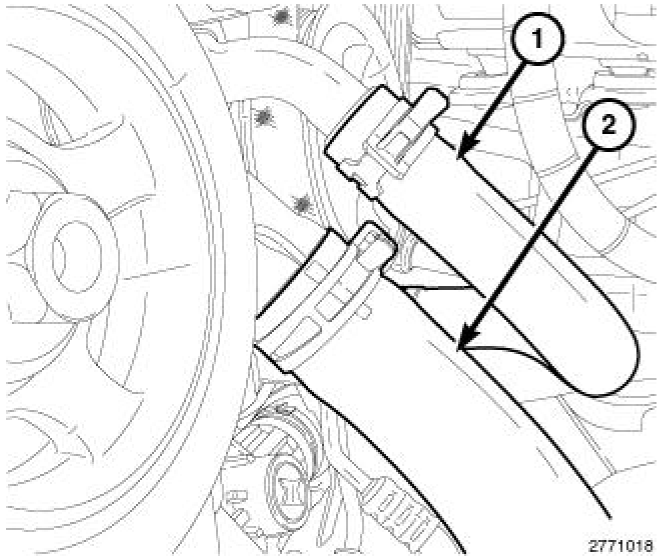


Fig. 637: Radiator Hose & Heater Hose
Courtesy of CHRYSLER GROUP, LLC

3. Remove the heater core return hose (1) from the water pump housing.
4. Remove the lower radiator hose (2) from the water pump housing.

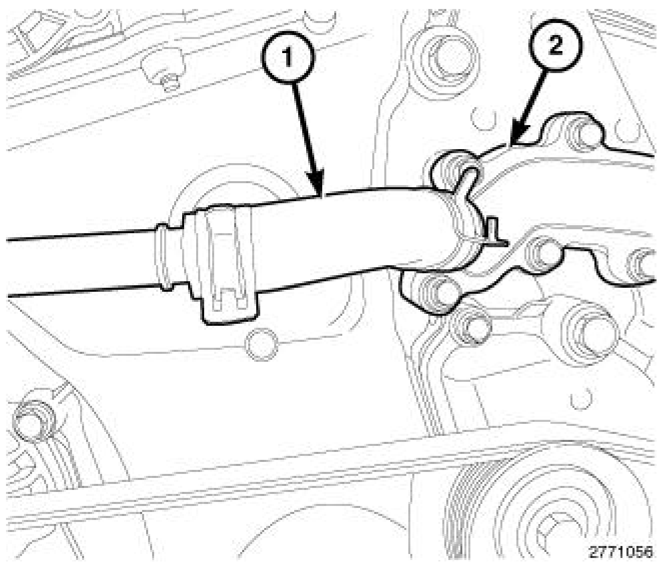


Fig. 638: Heater Core Supply Hose & Coolant Outlet Housing
Courtesy of CHRYSLER GROUP, LLC

5. Remove the heater core supply hose (1) from the coolant outlet housing (2).

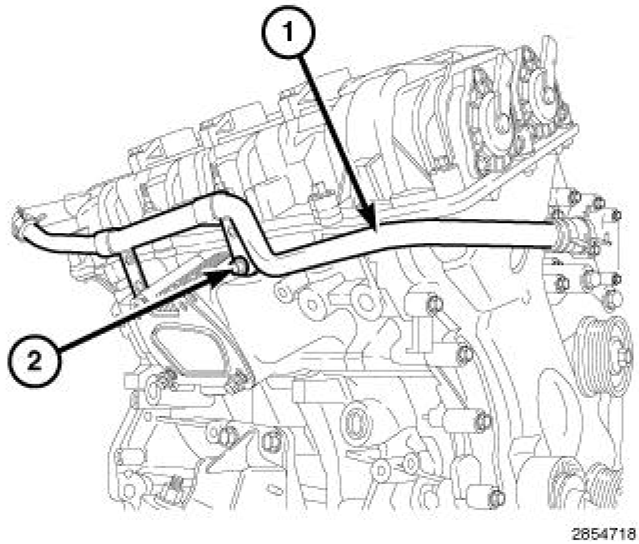


Fig. 639: Heater Core Supply Tube Support Bracket & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Remove the bolt (2) and reposition the heater core supply tube (1).
7. Remove the belt tensioner. Refer to **TENSIONER, BELT, REMOVAL** .
8. Remove the idler pulley. Refer to **PULLEY, IDLER, REMOVAL** .
9. Remove the vibration damper. Refer to **DAMPER, VIBRATION, REMOVAL**.
10. Remove the right and left cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.
11. Remove the upper and lower oil pans. Refer to **PAN, OIL, REMOVAL**.

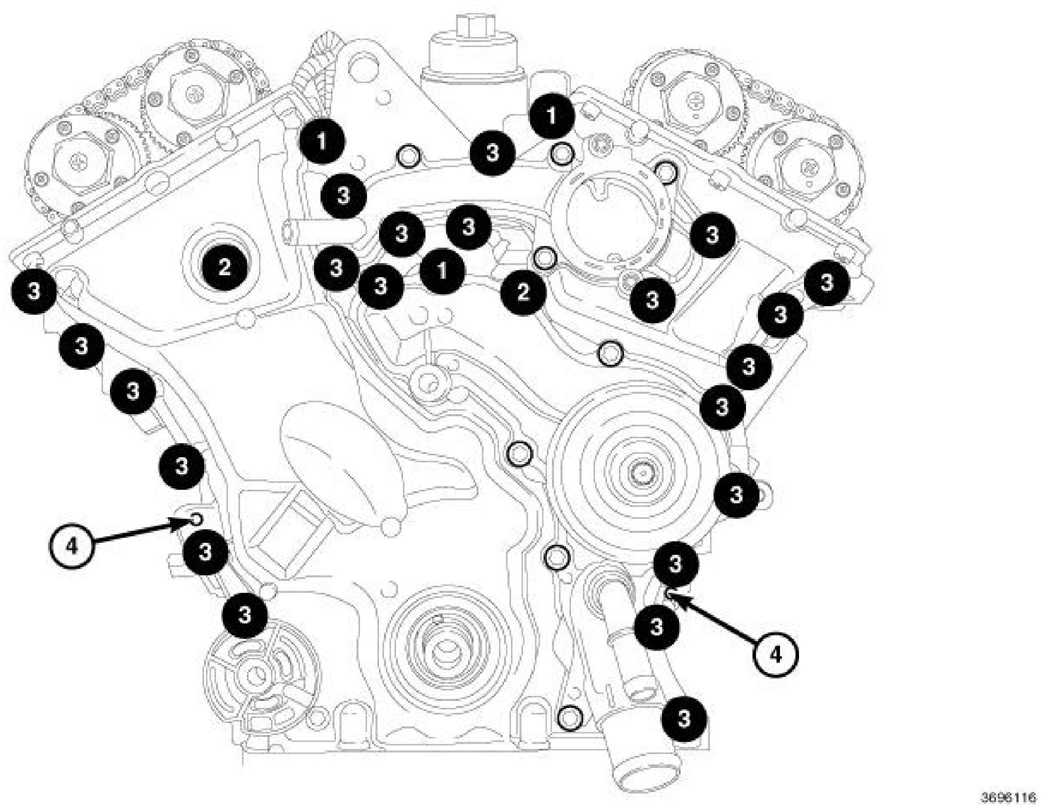


Fig. 640: Timing Cover Bolts

Courtesy of CHRYSLER GROUP, LLC

NOTE: **It is not necessary to remove the water pump or the coolant outlet housing for engine timing cover removal.**

12. Remove the following timing cover attaching bolts:
    - Three M10 bolts (1)
    - Two M8 bolts (2)
    - Twenty-two M6 bolts (3)

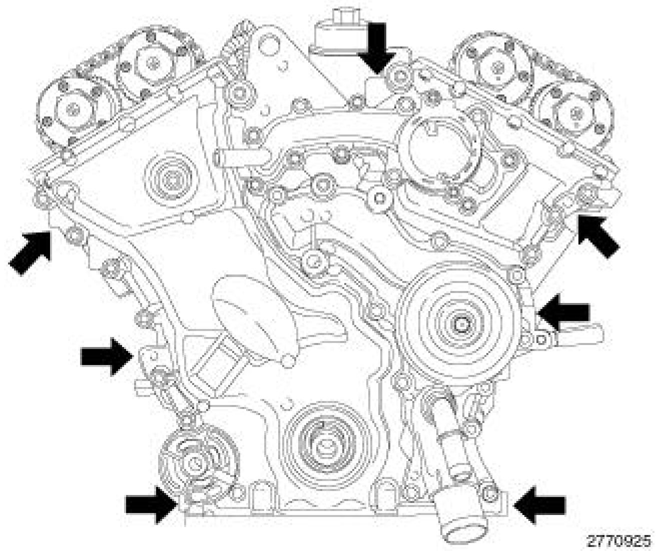


Fig. 641: Timing Cover Removal Pry Points
Courtesy of CHRYSLER GROUP, LLC

13. Using the seven indicated pry points, carefully remove the timing cover.

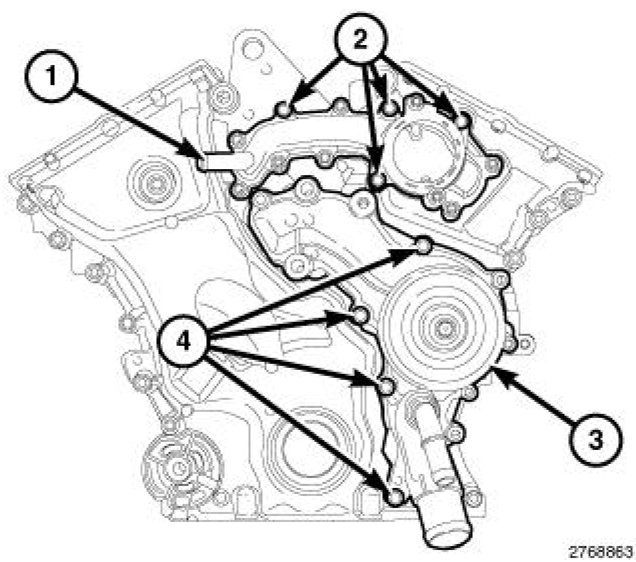


Fig. 642: Coolant Outlet Housing, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. If required, remove bolts (2) and the coolant outlet housing (1).

15. If required, remove bolts (4) and the water pump (3).

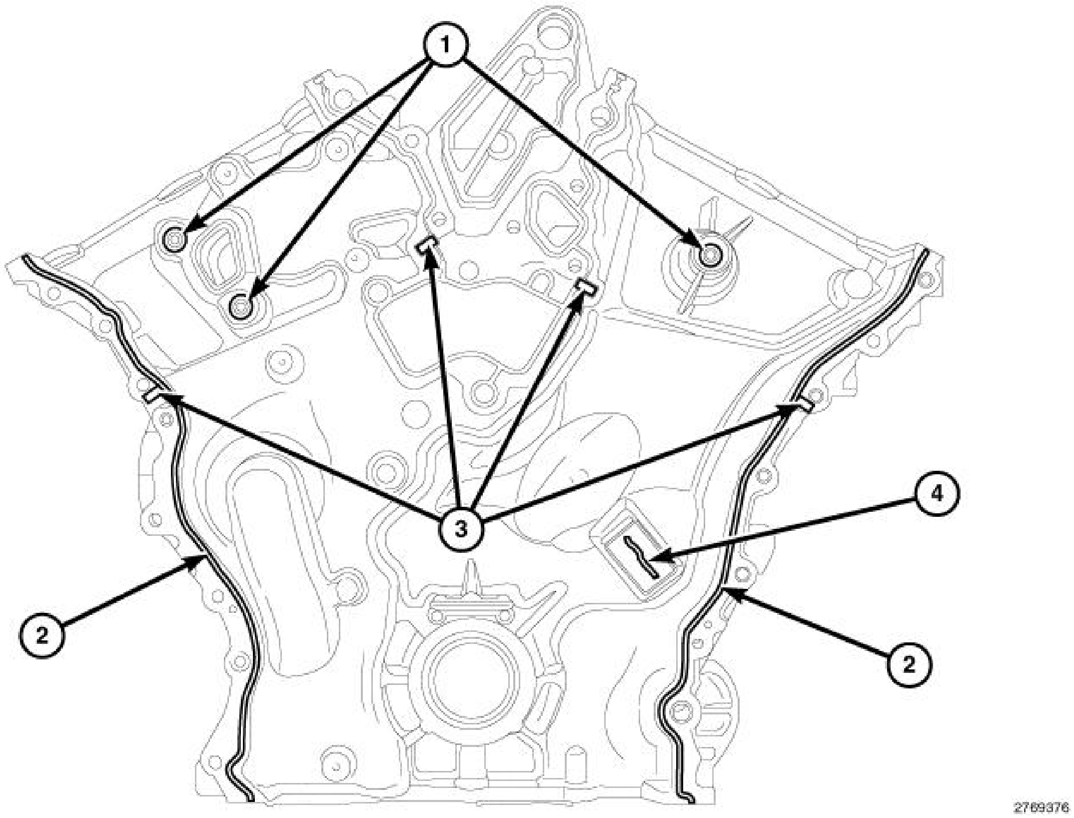


Fig. 643: Sealant At Cylinder Head Bosses, Right & Left Flanges, Cylinder Head-To-Engine Block T-Joints & Cover To Right Cam Chain Tensioner Gap
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not use oil based liquids, wire brushes, abrasive wheels or metal scrapers to clean the engine gasket surfaces. Use only isopropyl (rubbing) alcohol, along with plastic or wooden scrapers. Improper gasket surface preparation may result in engine fluid leakage.**

16. Remove all residual sealant from the timing chain cover, cylinder head and engine block mating surfaces. Refer to **ENGINE GASKET SURFACE PREPARATION**.

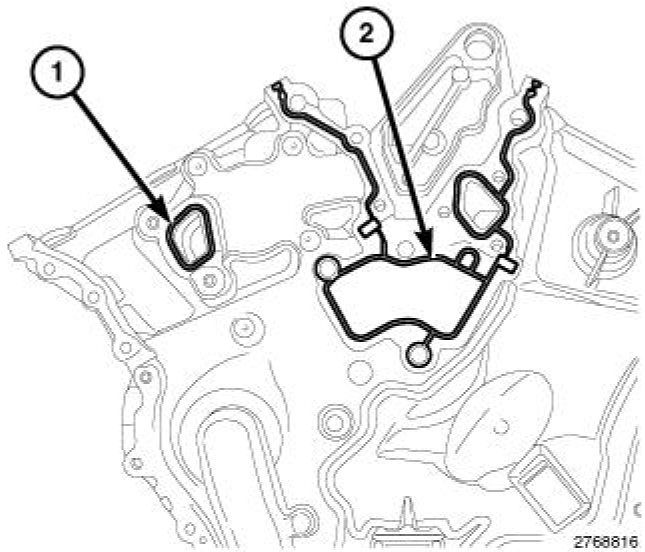


Fig. 644: Coolant Outlet Housing Gasket & Water Pump Gasket
Courtesy of CHRYSLER GROUP, LLC

17. Remove and discard the coolant outlet housing gasket (1) and the water pump gasket (2).

INSTALLATION

INSTALLATION

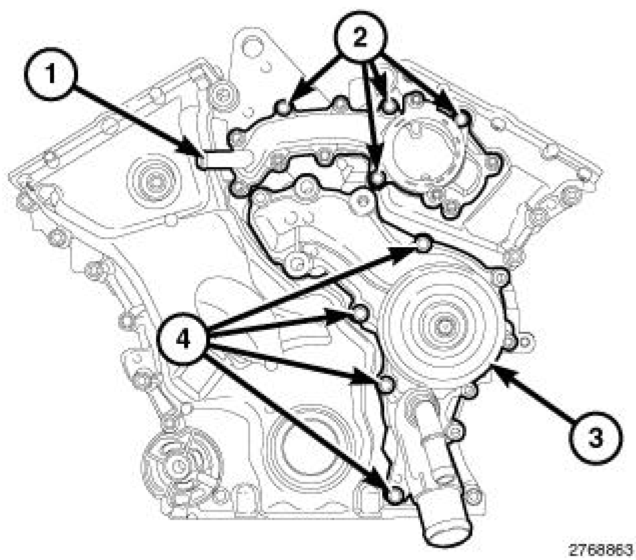


Fig. 645: Coolant Outlet Housing, Water Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the coolant outlet housing (1) to the timing cover with a new gasket using only the four bolts (2) shown in illustration tightened to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
2. If removed, install the water pump (3) to the timing cover using only the four bolts (4) shown in illustration tightened to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

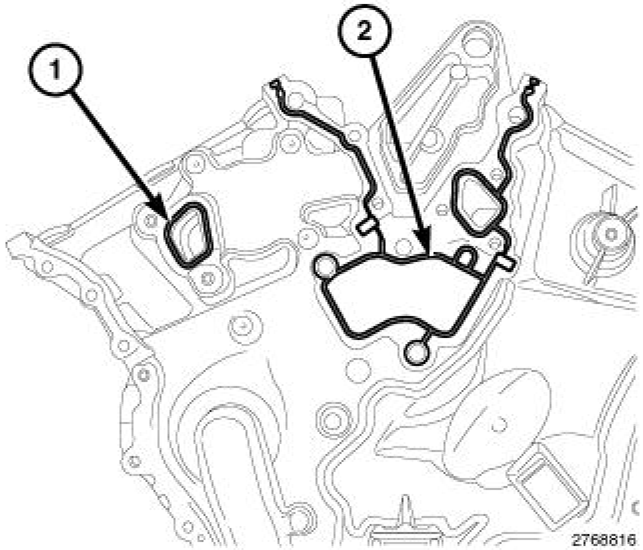


Fig. 646: Coolant Outlet Housing Gasket & Water Pump Gasket
Courtesy of CHRYSLER GROUP, LLC

3. Install the coolant outlet housing gasket (1) and the water pump gasket (2).

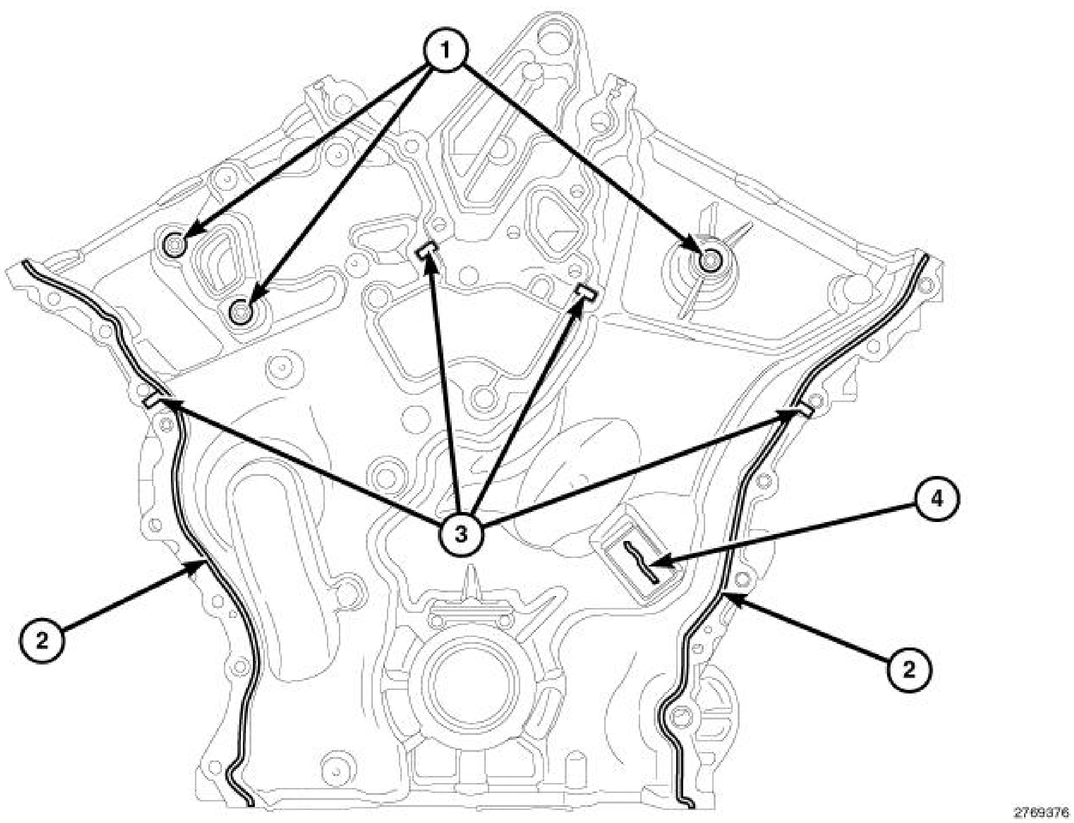


Fig. 647: Sealant At Cylinder Head Bosses, Right & Left Flanges, Cylinder Head-To-Engine Block T-Joints & Cover To Right Cam Chain Tensioner Gap
Courtesy of CHRYSLER GROUP, LLC

4. Clean the engine timing cover, cylinder head and block mating surfaces with isopropyl alcohol in preparation for sealant application. Refer to ENGINE GASKET SURFACE PREPARATION.

CAUTION: **Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than MoparĀ® Threebond Engine RTV Sealant may result in engine fluid leakage.**

CAUTION: **Following the application of MoparĀ® Threebond Engine RTV Sealant to the gasket surfaces, the components must be assembled within 20 minutes and the attaching fasteners must be tightened to specification within 45 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.**

5. Apply a 2 to 3 mm wide bead of MoparĀ® Threebond Engine RTV Sealant to the front cover as shown in illustration in the following locations:
    - Three cylinder head bosses (1)
    - Right and left flanges (2)
    - Four cylinder head to engine block T-joints (3)
    - Cover to right cam chain tensioner gap (4).

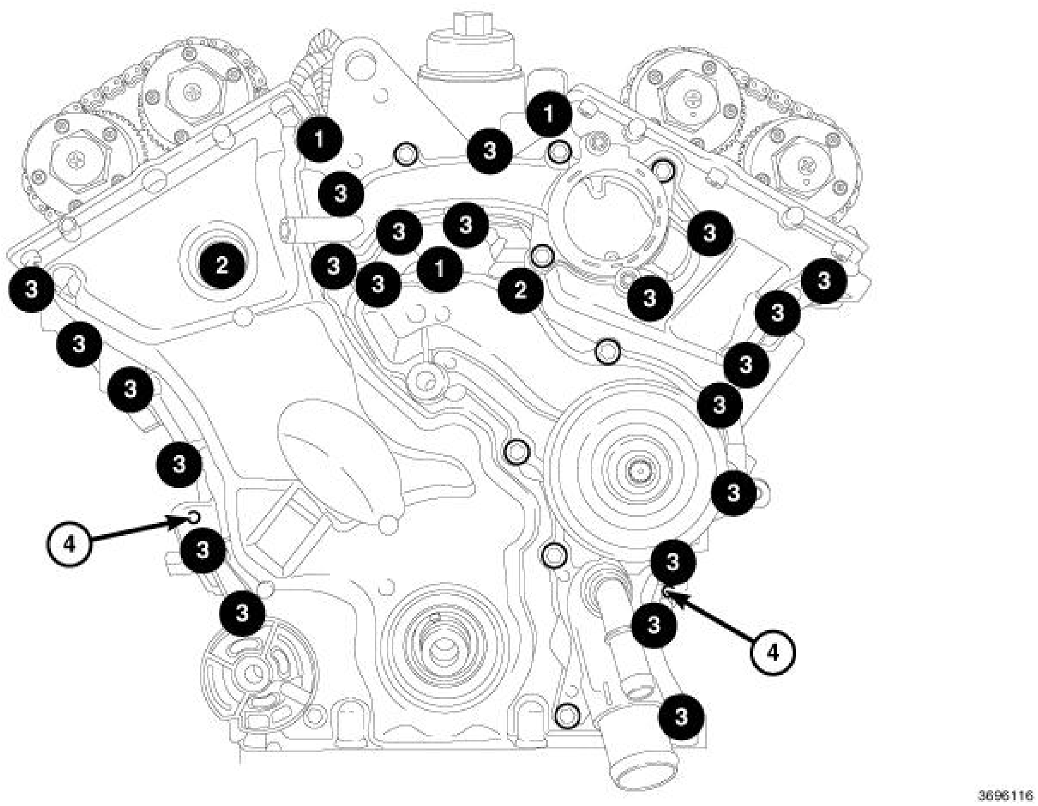


Fig. 648: Timing Cover Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Align the locator pins (4) on the engine block to the engine timing cover and install the cover.
7. Install and tighten the timing cover attaching bolts:
    - Twenty-two M6 bolts (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
    - Two M8 bolts (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
    - Three M10 bolts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

8. Install the upper and lower oil pans. Refer to **PAN, OIL, INSTALLATION**.
9. Install the right and left cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.
10. Install the vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION**.
11. Install the idler pulley. Refer to **PULLEY, IDLER, INSTALLATION** .
12. Install drive belt tensioner. Refer to **TENSIONER, BELT, INSTALLATION** .

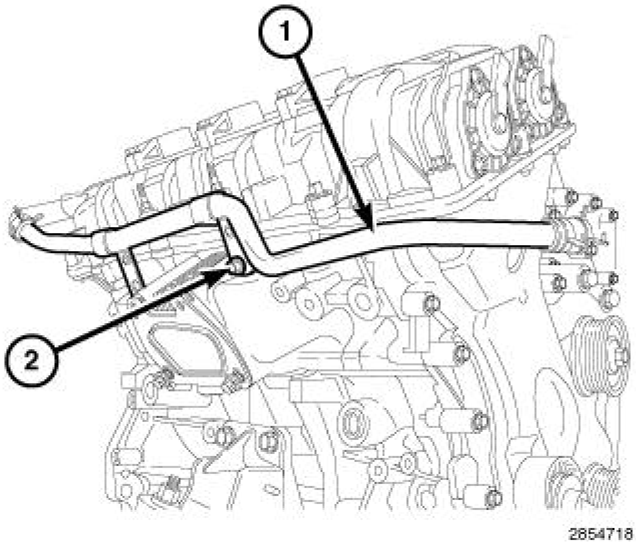


Fig. 649: Heater Core Supply Tube Support Bracket & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

13. Install the heater core supply tube (1) with one bolt (2) tightened to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

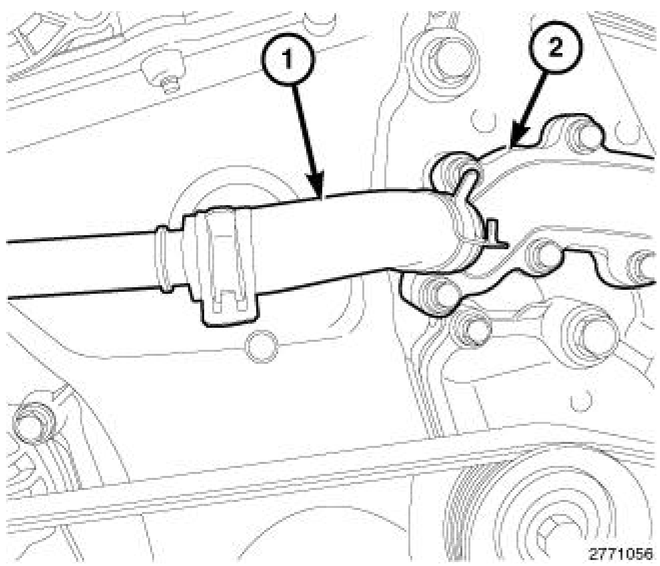


Fig. 650: Heater Core Supply Hose & Coolant Outlet Housing
Courtesy of CHRYSLER GROUP, LLC

14. Install the heater core supply hose (1) to the coolant outlet housing (2).

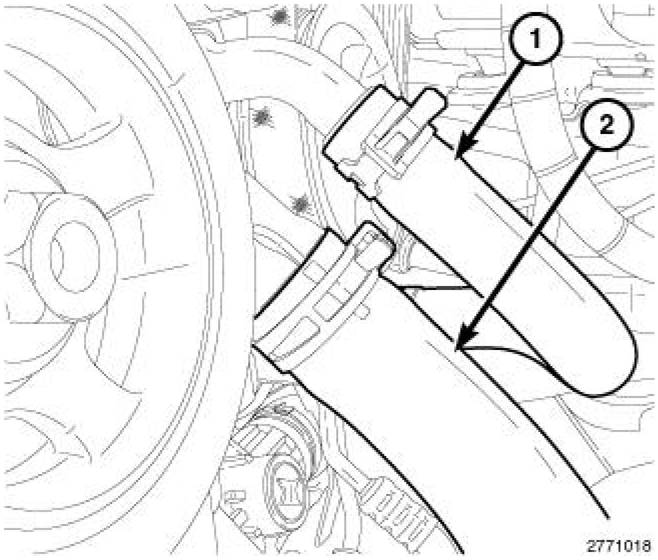


Fig. 651: Radiator Hose & Heater Hose
Courtesy of CHRYSLER GROUP, LLC

15. Install the lower radiator hose (2) to the water pump housing.
16. Install the heater core return hose (1) to the water pump housing.
17. Install the thermostat. Refer to **THERMOSTAT, REMOVAL** .
18. If removed, install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to **STANDARD PROCEDURE**.
19. Connect the negative battery cable.
20. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
21. Run the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **STANDARD PROCEDURE** .

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Article GUID: A00735859

2015-16 ENGINE

5.7L - Service Information - Challenger

DESCRIPTION

DESCRIPTION

CAUTION: If the engine has experienced a catastrophic failure, THE INTAKE MANIFOLD MUST BE REPLACED!

The 5.7L engine (348 CID) eight-cylinder engine is a 90Â° V-Type lightweight, deep skirt cast iron block, aluminum heads, single cam, overhead valve engine with hydraulic roller tappets. The heads incorporate splayed valves with a hemispherical style combustion chamber and dual spark plugs. The cylinders are numbered from front to rear; 1, 3, 5, 7 on the left bank and 2, 4, 6, 8 on the right bank. The firing order is 1-8-4-3-6-5-7-2.

DIAGNOSIS AND TESTING

PERFORMANCE

CONDITION	POSSIBLE CAUSE	CORRECTION
ENGINE WILL NOT START	1. Weak battery.	1. Charge or replace as necessary.
	2. Corroded or loose battery connections.	2. Clean and tighten battery connections. Apply a coat of light mineral grease to the terminals.
	3. Faulty starter.	3. Refer to **DIAGNOSIS AND TESTING** .
	4. Incorrect spark plug gap.	4. Refer to **SPECIFICATIONS** .
	5. Dirt or water in fuel system.	5. Clean system and replace fuel filter.
	6. Faulty fuel pump, relay or wiring.	6. Refer to **FUEL SYSTEM** article.
ENGINE STALLS OR ROUGH IDLE	1. Idle speed set to low.	1. Refer to **MECHANICAL**.
	2. Vacuum leak.	2. Inspect intake manifold and vacuum hoses, repair or replace as necessary.
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped spark plugs.	1. Replace spark plugs.
	2. Dirt or water in fuel system.	2. Clean system and replace fuel filter.
	3. Blown cylinder head gasket.	3. Replace cylinder head gasket.
	4. Low compression.	4. Refer to **CYLINDER COMPRESSION TEST**.

CONDITION	POSSIBLE CAUSE	CORRECTION
	5. Burned, warped or pitted valves.	5. Replace as necessary.
	6. Plugged or restricted exhaust system.	6. Inspect and replace as necessary.

CYLINDER LEAKAGE TEST

The cylinder leakage test provides an accurate means for determining engine condition.

Cylinder leakage testing will detect:

- Exhaust and intake valve leaks (improper seating).
- Leaks between adjacent cylinders or into water jacket.

1. Check the coolant level and fill as required. DO NOT install the radiator cap.
2. Start and operate the engine until it attains normal operating temperature.
3. Turn the engine OFF.
4. Remove the spark plug from the cylinder being tested.
5. Remove the oil filler cap.
6. Remove the air cleaner hose.
7. **Calibrate the tester according to the manufacturer's instructions.** The shop air source for testing should maintain a regulated air pressure at 552 kPa (80 psi).
8. Perform the test procedures on each cylinder according to the tester manufacturer's instructions. Set the piston of the cylinder to be tested at TDC compression.
9. During the testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the radiator coolant.

All gauge pressure indications should be equal, with **no more** than 25% leakage.

FOR EXAMPLE: Input air at 552 kPa (80 psi), the primary gauge factory set at 207 kPa (30 psi) input pressure. The secondary gauge should have no more than 176 kPa (25.5 psi) loss, when connected to the cylinder.

Refer to CYLINDER LEAK TEST DIAGNOSIS CHART.

CYLINDER LEAKAGE TEST DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
AIR ESCAPES THROUGH THROTTLE BODY	Intake valve bent, burnt, or not seated properly	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
AIR ESCAPES THROUGH TAILPIPE	Exhaust valve bent, burnt, or not seated properly	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
AIR ESCAPES THROUGH RADIATOR	Head gasket leaking or cracked cylinder head or block	Remove cylinder head and inspect. Replace defective part.

CONDITION	POSSIBLE CAUSE	CORRECTION
MORE THAN 50% LEAKAGE FROM ADJACENT CYLINDERS	Head gasket leaking or crack in cylinder head or block between adjacent cylinders	Remove cylinder head and inspect. Replace gasket, head, or block as necessary.
MORE THAN 25% LEAKAGE AND AIR ESCAPES THROUGH OIL FILLER CAP OPENING ONLY	Stuck or broken piston rings; cracked piston; worn rings and/or cylinder wall	Inspect for broken rings or piston. Measure ring gap and cylinder diameter, taper and out-of-round. Replace defective part as necessary.

CYLINDER COMPRESSION TEST

NOTE: The results of a cylinder compression pressure test can be utilized to diagnose several engine malfunctions.

NOTE: Be certain the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.

1. Clean the spark plug recesses with compressed air.
2. Remove the spark plug from the cylinder being tested and record the cylinder number of each spark plug for future reference.
3. Inspect the spark plug electrodes for abnormal firing indicators such as fouled, hot, oily, etc.
4. Disable the fuel system and perform the fuel system pressure release procedure. Refer to FUEL DELIVERY, GAS, STANDARD PROCEDURE .
5. Insert a compression pressure gauge and rotate the engine with the engine starter motor for three revolutions.
6. Record the compression pressure on the third revolution. Continue the test for the remaining cylinders.

   NOTE: The recommended compression pressures are to be used only as a guide to diagnosing engine problems. An engine should not be disassembled to determine the cause of low compression unless some malfunction is present.

7. Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
8. If one or more cylinders have abnormally low compression pressures, repeat the compression test.

   NOTE: If the same cylinder or cylinders repeat an abnormally low reading on the second compression test, it could indicate the existence of a problem in the cylinder in question.

9. If one or more cylinders continue to have abnormally low compression pressures, perform the cylinder combustion pressure leakage test. Refer to CYLINDER LEAKAGE TEST.

LUBRICATION

LUBRICATION DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL LEAKS	1. Misaligned or damaged gaskets and O-Rings.	1. Replace as necessary.
	2. Loose fasteners, broken or porous metal parts.	2. Tighten fasteners, Repair or replace metal parts.
	3. Crankshaft rear oil seal.	3. Replace as necessary.
	4. Crankshaft seal flange. Scratched, nicked or grooved.	4. Polish or replace crankshaft.
	5. Oil pan flange cracked.	5. Replace the oil pan.
	6. Front crankshaft oil seal, damaged or misaligned.	6. Replace the front crankshaft oil seal.
	7. Scratched or damaged vibration damper hub.	7. Polish or replace the vibration damper.
-	8. Crankshaft Rear Flange Microporosity.	8. Replace the crankshaft.
OIL PRESSURE DROP	1. Low oil level.	1. Check and correct oil level.
	2. Faulty oil pressure switch.	2. Replace the oil pressure switch.
	3. Low oil pressure.	3. Check the oil pump and bearing clearance.
	4. Clogged oil filter.	4. Replace the oil filter.
	5. Worn oil pump.	5. Replace the oil pump.
	6. Thin or diluted oil.	6. Change the oil and filter.
	7. Excessive bearing clearance.	7. Replace bearings as necessary.
	8. Oil pump relief valve stuck.	8. Replace the oil pump.
	9. Oil pickup tube loose or damaged.	9. Replace the oil pickup tube.
OIL PUMPING AT RINGS; SPARK PLUGS FOULING	1. Worn or damaged rings.	1. Hone the cylinder bores and replace rings.
	2. Carbon in oil ring slots.	2. Replace the rings.
	3. Incorrect ring size installed.	3. Replace the rings.
	4. Worn valve guides.	4. Ream the guides and replace valves.
	5. Leaking valve guide seals.	5. Replace the valve guide seals.

MECHANICAL

ENGINE MECHANICAL DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
ENGINE NOISE	1. Worn accessory drive belt.	1. Check for damage and/or alignment. Refer to **BELT, SERPENTINE, DIAGNOSIS AND TESTING** .
	2. Worn coolant pump.	2. Check for possible coolant leak. If OK, Check the pulley and

CONDITION	POSSIBLE CAUSES	CORRECTION
		input shaft for wear. Replace as necessary.
	3. Worn generator.	3. Check the pulley for wear. Spin the armature. Replace as necessary.
	4. Idler/Tensioner pulley.	4. Check pulleys. Verify bearing noise. Replace as necessary.
	5. Power steering pump (If equipped).	5. Check the pulley and input shaft for wear. Replace as necessary (If equipped).
	6. Flywheel/Flexplate.	6. Check for wear or possible cracking. Check bolts. repair as necessary.
NOISY VALVES/LIFTERS	1. High or low oil level in crankcase.	1. Check for correct oil level. Adjust the oil level by draining or adding as needed. Refer to **STANDARD PROCEDURE**.
	2. Thin or diluted oil.	2. Change the engine oil and filter. Refer to **STANDARD PROCEDURE**.
	3. Low oil pressure.	3. Check the engine oil level. If OK, perform oil pressure test. Refer to **DIAGNOSIS AND TESTING**.
	4. Debris in tappets/lash adjusters.	4. Clean and/or replace the hydraulic tappets/lash adjusters. Refer to **DIAGNOSIS AND TESTING**.
	5. Bent push rod(s).	5. Install new push rods. Refer to **SPRING(S), VALVE, REMOVAL, 5.7L**.
	6. Worn rocker arms	6. Inspect the oil supply to the rocker arms and replace worn rocker arms as needed. Refer to **ROCKER ARM, VALVE, REMOVAL, 5.7L**.
	7. Worn tappets/lash adjusters.	7. Install new hydraulic tappets/lash adjusters. Refer to **LIFTER(S), HYDRAULIC, ROLLER, REMOVAL, 5.7L**.
	8. Worn valve guides.	8. Inspect the valve guides for wear, cracks or looseness. If either condition exist, replace the cylinder head.

CONDITION	POSSIBLE CAUSES	CORRECTION
	9. Excessive runout of valve seats or valve faces.	9. Grind the valves and seats. Refer to **STANDARD PROCEDURE**.
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Check the engine oil level.
	2. Low oil pressure.	2. Check the engine oil level. If OK, perform the engine oil pressure test. Refer to **DIAGNOSIS AND TESTING**.
	3. Thin or diluted oil.	3. Change the engine oil to correct the viscosity. Refer to **STANDARD PROCEDURE**.
	4. Excessive connecting rod bearing clearance.	4. Measure the bearings for correct clearance with plastigage. Repair as necessary.
	5. Connecting rod journal out of round.	5. Replace the crankshaft. Refer to **CRANKSHAFT, REMOVAL, 5.7L**.
	6. Misaligned connecting rods.	6. Replace the bent connecting rods. Refer to **SPRING(S), VALVE, REMOVAL, 5.7L**.
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Check the engine oil level.
	2. Low oil pressure.	2. Check the engine oil level. If OK, perform the engine oil pressure test. Refer to **DIAGNOSIS AND TESTING**.
	3. Thin or diluted oil.	3. Change the engine oil to correct viscosity. Refer to **STANDARD PROCEDURE**.
	4. Excessive main bearing clearance.	4. Measure the bearings for correct clearance with plasti-gage. Repair as necessary.
	5. Excessive end play.	5. Check the crankshaft thrust bearing for excessive wear on flanges Refer to **INSPECTION**.
	6. Crankshaft main journal out of round or worn.	6. Replace the crankshaft. Refer to **CRANKSHAFT, REMOVAL, 5.7L**.
	7. Loose flywheel or torque converter.	7. Inspect the crankshaft, flexplate/flywheel and bolts for damage. Tighten to correct torque.
LOW OIL PRESSURE	1. Low oil level.	1. Check the oil level and fill if necessary.
	2. Faulty oil pressure sending unit.	2. Install a new sending unit.

CONDITION	POSSIBLE CAUSES	CORRECTION
	3. Clogged oil filter.	3. Install a new oil filter. Refer to **FILTER, ENGINE OIL, REMOVAL, 5.7L**.
	4. Worn oil pump.	4. Replace the oil pump assembly. Refer to **PUMP, ENGINE OIL, REMOVAL, 5.7L**.
	5. Thin or diluted oil.	5. Change the engine oil to correct viscosity. Refer to **STANDARD PROCEDURE**.
	6. Excessive bearing clearance.	6. Measure the bearings for correct clearance with plasti-gage. Repair as necessary.
	7. Oil pump relief valve stuck.	7. The oil pump pressure relief valve and spring should not be removed from the oil pump. If these components are disassembled and or removed from the pump the entire oil pump assembly must be replaced. Refer to **PUMP, ENGINE OIL, REMOVAL, 5.7L**.
	8. Oil pickup tube loose, broken, bent or clogged.	8. Inspect the oil pickup tube and pump, and clean or replace as necessary. Refer to **PAN, OIL, REMOVAL, 5.7L**.
	9. Oil pump cover warped or cracked.	9. Install a new oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL, 5.7L**.
OIL LEAKS	1. Misaligned or deteriorated gaskets.	1. Replace the gasket.
	2. Loose fastener, broken or porous metal part.	2. Tighten, repair or replace the part.
	3. Front or rear crankshaft oil seal leaking.	3. Replace the front seal or rear seal. Refer to **SEAL, CRANKSHAFT OIL, FRONT, REMOVAL, 5.7L** or **SEAL, CRANKSHAFT OIL, REAR, REMOVAL, 5.7L**.
	4. Leaking oil gallery plug or cup plug.	4. Remove and reseal threaded plug. Replace the cup style plug.
EXCESSIVE OIL CONSUMPTION OR SPARK	1. CCV System malfunction.	1. Check for correct operation. Refer to **DESCRIPTION** .

CONDITION	POSSIBLE CAUSES	CORRECTION
PLUGS OIL FOULED	2. Defective valve stem seal(s).	2. Repair or replace the seal(s). Refer to **SPRING(S), VALVE, REMOVAL, 5.7L**.
	3. Worn or broken piston rings.	3. Hone the cylinder bores and Install new rings. Refer to **ROD, PISTON AND CONNECTING, REMOVAL, 5.7L**.
	4. Scuffed pistons/cylinder walls.	4. Hone the cylinder bores and replace pistons as required. Refer to **ROD, PISTON AND CONNECTING, REMOVAL, 5.7L**.
	5. Carbon in oil control ring groove.	5. Remove the rings and de-carbon the piston. Refer to **STANDARD PROCEDURE**.
	6. Worn valve guides.	6. Inspect the valve guides for wear, cracks or looseness. If either condition exist, replace the cylinder head.
	7. Piston rings fitted too tightly in grooves.	7. Remove the rings and check the ring end gap and side clearance. Replace if necessary. Refer to **STANDARD PROCEDURE**.

Lifter Purge Guideline

1. Warm engine to standard idle conditions.

NOTE: Engine noise may be in the form of a clicking, chatter, or clattering noise.

2. Listen to the engine for 30 to 60 seconds with the hood up and the engine cover removed.
3. If noise is present, de-aeration of the lifters is required.
4. Run the engine between 2000 and 3000 RPM for three to five minutes.
5. Return the engine to standard idle speed for 30 to 60 seconds.
6. Evaluate noise. If noise is present, repeat the run an additional 4 cycles.

NOTE: The standard drive cycle will be about 10 - 15 miles of non- stop, combined highway and city driving.

7. If noise is present, take the vehicle on a standard drive cycle.

NOTE: Use a feeler gauge to verify clearance is present between the lifter and cam base circle.

8. Evaluate the noise. If noise present, follow standard service procedure for lifter repairs or noise conditions.
9. Evaluate lifters for sponginess, check valve defects, and clearance.

OIL CONSUMPTION TEST AND DIAGNOSIS

The following diagnostic procedures are used to determine the source of excessive internal oil consumption, these procedures and tests apply to vehicles with 50, 000 miles or less.

NOTE: Engine oil consumption may be greater than normal during engine break-in. Repairs should be delayed until vehicle has been driven at least 7, 500 miles.

Severe service (high ambient temperature, short trips, heavy loading, trailer towing, taxi, off-road, or law enforcement use) may result in greater oil consumption than normal.

Sustained high speed driving and high engine RPM operation may result in increased oil consumption.

Failure to comply with the recommended oil type and viscosity rating, as outlined in the owner's manual, may impact oil economy as well as fuel economy.

Oil consumption may increase with vehicle age and mileage due to normal engine wear.

NOTE: Because a few drops of external oil leakage per mile can quickly account for the loss of one quart of oil in a few hundred miles, verify that no external engine oil leaks are present.

- **Oil leakage is not the same as oil consumption and all external leakage must be eliminated before any action can be taken to verify and correct oil consumption complaints.**
- **Verify that the engine has the correct oil level dipstick and dipstick tube installed.**
- **Verify that the engine is not being run in an overfilled condition. Check the oil level 15 minutes after a hot shutdown with the vehicle parked on a level surface. In no case should the level be above MAX or the FULL mark on the dipstick.**

OIL CONSUMPTION TEST

1. Check the oil level at least 15 minutes after a hot shutdown.
2. If the oil level is low, top off with the proper viscosity and API service level engine oil. Add one bottle of MOPARĀ® 4-In-1 Leak Detection Dye into the engine oil.
3. Tamper proof the oil pan drain plug, oil filter, dipstick and oil fill cap.
4. Record the vehicle mileage.
5. Instruct the customer to drive the vehicle as usual.
6. Ask the customer to return to the servicing dealer after accumulating 500 miles, Check the oil level at least 15 minutes after a hot shutdown. If the oil level is half way between the "FULL" and "ADD" mark continue with the next step.
7. Using a black light, recheck for any external engine oil leaks, repair as necessary, if no external engine oil leaks are present, continue with oil consumption diagnosis.

OIL CONSUMPTION DIAGNOSIS

1. Check the Positive Crankcase Ventilation (PCV) system. Make sure the system is not restricted and the PCV valve has the correct part number and correct vacuum source (18-20 in. Hg at idle below 3000 ft. above sea level is considered normal).
2. Perform a cylinder compression test and cylinder leak down test using the standard leak down gauge following manufacturers suggested best practices. Refer to **CYLINDER COMPRESSION TEST** and **CYLINDER LEAKAGE TEST**.

NOTE: **Verify the spark plugs are not oil saturated. If the spark plugs are oil saturated and compression is good it can be assumed the valve seals or valve guides are at fault.**

3. If one or more cylinders have more than 15% leak down further engine tear down and inspection will be required.

TOP 18 REASONS THAT MAY LEAD TO ENGINE OIL CONSUMPTION

1. **Tapered and Out-of-Round Cylinders**

   The increased piston clearances permit the pistons to rock in the worn cylinders. While tilted momentarily, an abnormally large volume of oil is permitted to enter on one side of the piston. The rings, also tilted in the cylinder, permit oil to enter on one side. Upon reversal of the piston on each stroke, some of this oil is passed into the combustion chamber.

2. **Distorted Cylinders**

   This may be caused by unequal heat distribution or unequal tightening of cylinder head bolts. This condition presents a surface which the rings may not be able to follow completely. In this case, there may be areas where the rings will not remove all of the excess oil. When combustion takes place, this oil will be burned and cause high oil consumption.

3. **Improper operation of the PCV system**

   The main purpose of the Positive Crankcase Ventilation (PCV) valve is to recirculate blow-by gases back from the crankcase area through the engine to consume unburned hydrocarbons. The PCV system usually has a one way check valve and a make up air source. The system uses rubber hoses that route crankcase blow by gases to the intake manifold. Vacuum within the engine intake manifold pulls the blow by gases out of the crankcase into the combustion chamber along with the regular intake air and fuel mixture.

   The PCV system can become clogged with sludge and varnish deposits and trap blow by gases in the crankcase. This degrades the oil, promoting additional formation of deposit material. If left uncorrected, the result is plugged oil rings, oil consumption, rapid ring wear due to sludge buildup, ruptured gaskets and seals due to crankcase pressurization.

4. **Worn Piston Ring Grooves**

   For piston rings to form a good seal, the sides of the ring grooves must be true and flat - not flared or shouldered. Piston rings in tapered or irregular grooves will not seal properly and, consequently, oil will pass around behind the rings into the combustion chamber.

5. **Worn, Broken or Stuck Piston Rings**

When piston rings are broken, worn or stuck to such an extent that the correct tension and clearances are not maintained, this will allow oil to be drawn into the combustion chamber on the intake stroke and hot gases of combustion to be blown down the cylinder past the piston on the power stroke. All of these conditions will result in burning and carbon build up of the oil on the cylinders, pistons and rings.

6. **Cracked or Broken Ring Lands**

   Cracked or broken ring lands prevent the rings from seating completely on their sides and cause oil pumping. This condition will lead to serious damage to the cylinders as well as complete destruction of the pistons and rings. Cracked or broken ring lands cannot be corrected by any means other than piston replacement.

7. **Worn Valve Stems and Guides**

   When wear has taken place on valve stems and valve guides, the vacuum in the intake manifold will draw oil and oil vapor between the intake valve stems and guides into the intake manifold and then into the cylinder where it will be burned.

8. **Bent or Misaligned Connecting Rods**

   Bent or misaligned connecting rods will not allow the pistons to ride straight in the cylinders. This will prevent the pistons and rings from forming a proper seal with the cylinder walls and promote oil consumption. In addition, it is possible that a bearing in a bent connect rod will not have uniform clearance on the connecting rod wrist pin. Under these conditions, the bearing will wear rapidly and throw off an excessive amount of oil into the cylinder.

9. **Fuel Dilution**

   If raw fuel is allowed to enter the lubrication system, the oil will become thinner and more volatile and will result in higher oil consumption. The following conditions will lead to higher oil consumption;

   - Excess fuel can enter and mix with the oil via a leaking fuel injector
   - Gasoline contaminated with diesel fuel
   - Restricted air intake
   - Excessive idling

10. **Contaminated Cooling Systems**

    Corrosion, rust, scale, sediment or other formations in the water jacket and radiator will prevent a cooling system from extracting heat efficiently. This is likely to cause cylinder distortion thus leading to higher oil consumption.

11. **Oil Viscosity**

    The use of oil with a viscosity that is too light may result in high oil consumption. Refer to the vehicle owner's manual for the proper oil viscosity to be used under specific driving conditions and ambient temperatures.

12. **Dirty Engine Oil**

Failure to change the oil and filter at proper intervals may cause the oil to be so dirty that it will promote accumulation of sludge and varnish and restrict oil passages in the piston rings and pistons. This will increase oil consumption; dirty oil by nature is also consumed at a higher rate than clean oil.

13. **Crankcase Overfull**

   Due to an error in inserting the oil dip stick so that it does not come to a seat on its shoulder, a low reading may be obtained. Additional oil may be added to make the reading appear normal with the stick in this incorrect position which will actually make the oil level too high. If the oil level is so high that the lower ends of the connecting rods touch the oil in the oil pan excessive quantities of oil will be thrown on the cylinder walls and some of it will work its way up into the combustion chamber.

14. **Excessively High Oil Pressure**

   A faulty oil pressure relief valve may cause the oil pressure to be too high. The result will be that the engine will be flooded with an abnormally large amount of oil in a manner similar to that which occurs with worn bearings. This condition may also cause the oil filter to burst.

15. **Aftermarket Performance Chips and Modification**

   Increasing performance through the use of performance/power enhancement products to a stock or factory engine will increase the chance of excessive oil consumption.

16. **Lugging Engine**

   Lugging is running the engine at a lower RPM in a condition where a higher RPM (more power/torque) should be implemented. Especially susceptible on vehicles equipped with a manual transmission. This driving habit causes more stress loading on the piston and can lead to increases in engine oil consumption.

17. **Turbocharged Engines**

   There is a possibility for PCV "push-over" due to higher crankcase pressure (as compared to naturally aspirated engines) which is normal for turbocharged engines. This condition causes varying amounts of engine oil to enter the intake manifold, charge air cooler and associated plumbing to and from the charge air cooler, also a leaking turbocharger seal will draw oil into the combustion chamber where it will burn (blue smoke from the tail pipe may be present) and form carbon deposits which contribute to further oil consumption as they interfere with proper engine function.

18. **Restricted Air Intake**

   Excessive restriction in the air intake system will increase engine vacuum and can increase oil consumption. An extremely dirty air filter would be one example of this situation.

STANDARD PROCEDURE

DUST COVERS AND CAPS

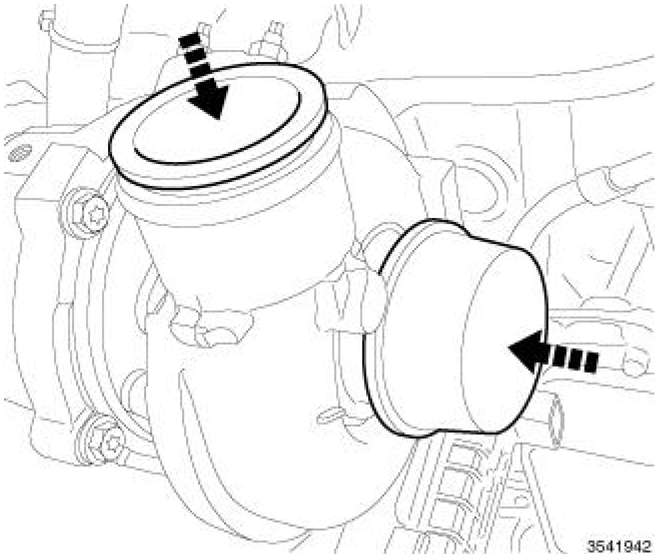


Fig. 1: Covers/Caps
Courtesy of CHRYSLER GROUP, LLC

To avoid the possibility of dust, dirt, moisture and other foreign debris being introduced to the engine during service, cover or cap all openings when hoses and tubes are removed.

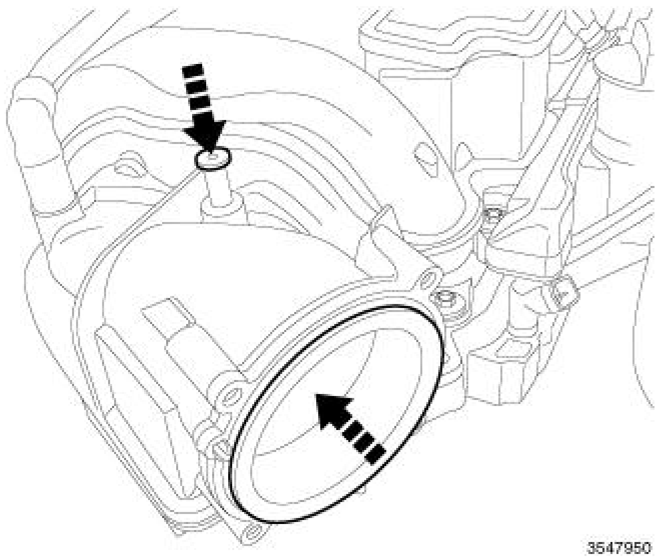


Fig. 2: Opening Cover
Courtesy of CHRYSLER GROUP, LLC

Covers installed over openings will reduce the possibility of foreign materials to entering the engine systems. Using miller tool Universal Protective Cap Set (special tool #10368, Set, Universal Protective Cap), select the appropriate cover needed for the procedure.

ENGINE GASKET SURFACE PREPARATION

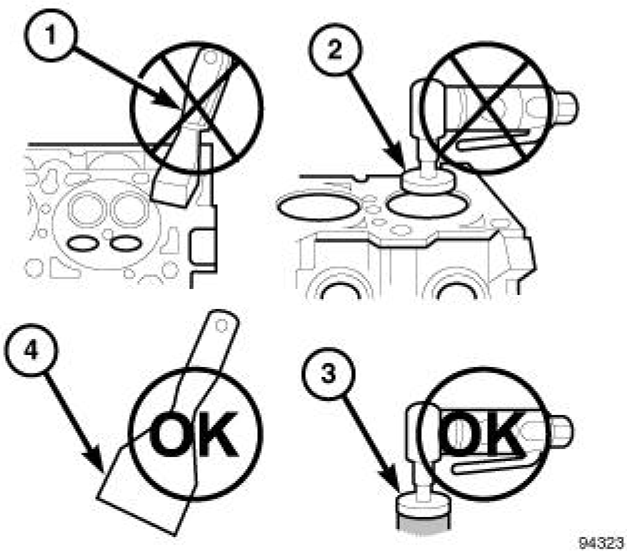


Fig. 3: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper (1).
- Abrasive pad or paper to clean cylinder block and head.
- High speed power tool with an abrasive pad or a wire brush (2).

NOTE: **Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.**

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (4).
- Drill motor with 3M Roloc™ Bristle Disc (3), white is used for the aluminum heads and yellow is used for the iron block.

CAUTION: **Excessive pressure or high RPM (beyond the recommended speed), can damage the sealing surfaces. The mild (white, 120 grit) bristle disc is recommended. If necessary, the medium (yellow, 80 grit) bristle disc may be used on cast iron surfaces with care.**

DUST COVERS AND CAPS

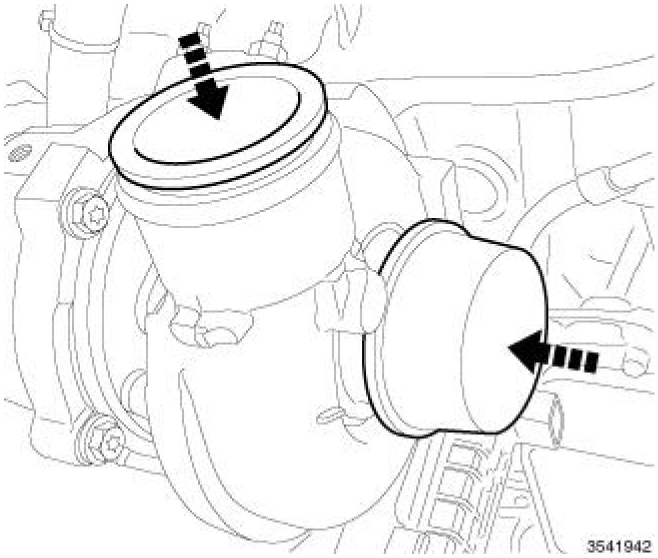


Fig. 4: Covers/Caps
Courtesy of CHRYSLER GROUP, LLC

To avoid the possibility of dust, dirt, moisture and other foreign debris being introduced to the engine during service, cover or cap all openings when hoses and tubes are removed.

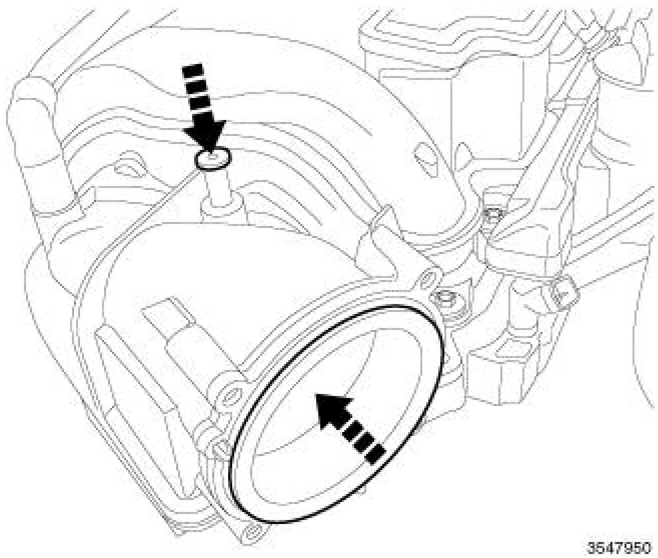


Fig. 5: Opening Cover
Courtesy of CHRYSLER GROUP, LLC

Covers installed over openings will reduce the possibility of foreign materials to entering the engine systems. Using miller tool Universal Protective Cap Set (special tool #10368, Set, Universal Protective Cap), select the appropriate cover needed for the procedure.

REPAIR DAMAGED OR WORN THREADS

CAUTION: Be sure that the tapped holes maintain the original center line.

Damaged or worn threads can be repaired. Essentially, this repair consists of:

- Drilling out worn or damaged threads.

- Tapping the hole with a special Heli-Coil Tap.
- Installing an insert into the tapped hole to bring the hole back to its original thread size.

HYDROSTATIC LOCK

CAUTION: Do not attempt to run engine. Severe damage could occur.

When an engine is suspected of hydrostatic lock (regardless of what caused the problem), follow the steps below.

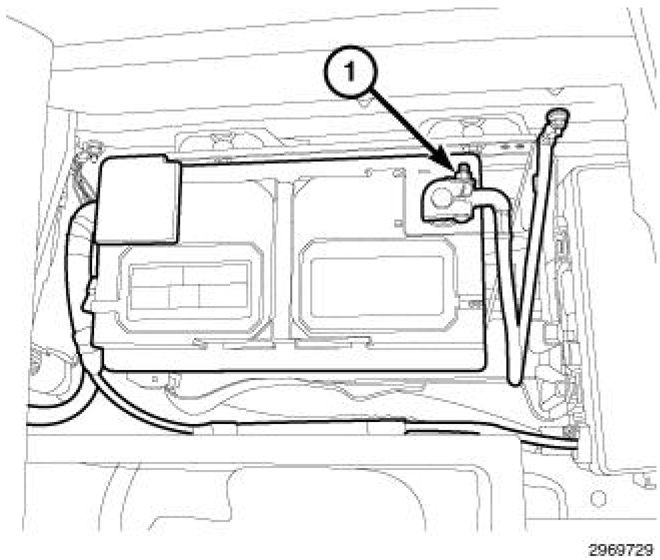


Fig. 6: Negative Battery Cable
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable (1).

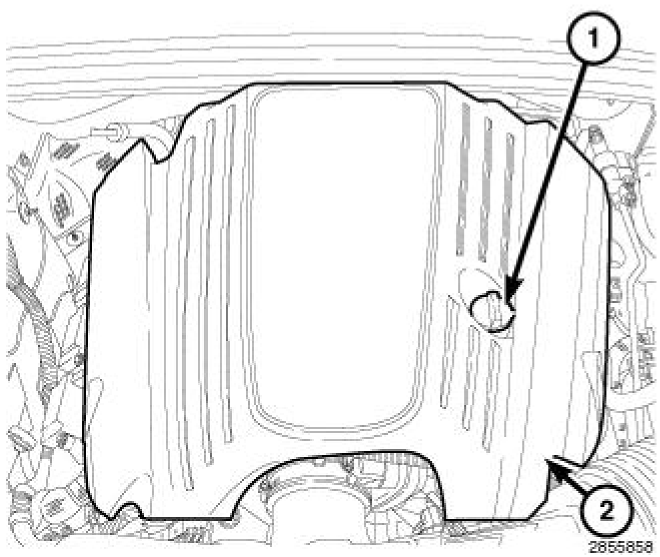


Fig. 7: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (2).

3. Place a shop towel around the fuel supply line Quick Connect Fitting to catch any fuel that may be under pressure and disconnect the fuel supply line. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE** .

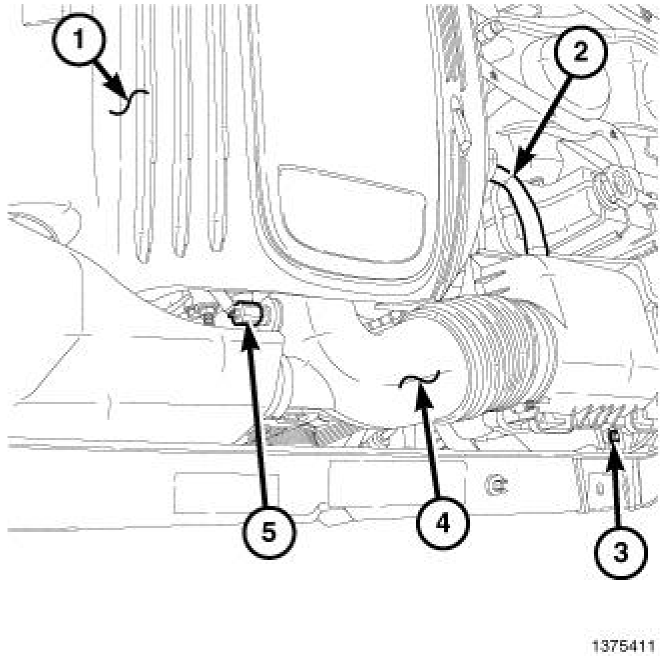


Fig. 8: Air Filter Assembly
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the Intake Air Temperature (IAT) sensor wire harness connector (5).
5. Loosen the air duct retaining clamps at the throttle body and the air cleaner housing and remove the air duct (4).
6. Disconnect the Make Up Air hose (MUA) (2).
7. Remove the air cleaner housing retaining bolt (3).
8. Remove the air cleaner housing from the vehicle.
9. Inspect the air duct, air cleaner housing and the intake manifold to make sure the system is dry and clear of any foreign material.
10. Place a shop towel around the spark plugs to catch any fluid that may possibly be under pressure in the cylinder head.
11. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .
12. With the spark plugs removed, rotate the crankshaft using a breaker bar and socket.
13. Identify the fluid in the cylinders (coolant, fuel, oil).
14. Make sure all fluid has been removed from the cylinders.
15. Repair engine or components as necessary to prevent this problem from occurring again.
16. Squirt a small amount of engine oil into the cylinders to lubricate the walls. This will help prevent engine damage on restart.
17. Install new spark plugs. Refer to **SPARK PLUG, INSTALLATION** .
18. Perform the Engine Oil Service procedure. Refer to **STANDARD PROCEDURE**.
19. Connect the negative battery cable.

20. Start the engine and check for leaks.

FORM-IN-PLACE GASKETS AND SEALERS

NOTE: All sealants mentioned below are not used on every engine; they are listed as general reference guide. See service information for specific sealer usage.

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results.**Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin of a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket. All sealing surfaces that use form-in-place gaskets and sealers must be free of grease or oil. Clean surfaces with MoparĀ® brake parts cleaner prior to sealer application. After the sealer is applied, assemble the parts.

Numerous types of form-in-place gasket materials are used in the engine area. MoparĀ® Sealant RTV Silicone Rubber Adhesive, MOPARĀ® Silicone Rubber RTV, MoparĀ® ATF-RTV and MoparĀ® Gasket Maker gasket materials, each have different properties and cannot be used in place of the other.

MOPARĀ® SEALANT RTV SILICONE RUBBER ADHESIVE is used to seal components exposed to engine oil. This material is a specially designed black silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil. Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPARĀ® SILICONE RUBBER RTV is used to seal components exposed to engine oil, gear lubricant, and coolant. This material is a specially designed gray silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil, gear lubricant and coolant. Excellent adhesion even on oily surfaces, withstands temperatures to 330Ā° C (626Ā° F). Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPARĀ® ATF-RTV is a specially designed black silicone rubber RTV that retains adhesion and sealing properties to seal components exposed to automatic transmission fluid, engine coolants, and moisture. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPARĀ® GASKET MAKER is an anaerobic type gasket material. The material cures in the absence of air when squeezed between two metallic surfaces. It will not cure if left in the uncovered tube. The anaerobic material is for use between two machined surfaces. Do not use on flexible metal flanges.

MOPARĀ® GASKET SEALANT is a slow drying, permanently soft sealer. This material is recommended for sealing threaded fittings and gaskets against leakage of oil and coolant. It can be used on threaded and machined parts under all temperatures. This material also prevents corrosion. MoparĀ® Gasket Sealant is available in a 13 oz. aerosol can or in a 4 oz. or 6 oz. can with applicator.

SEALER APPLICATION

Apply 1 mm (0.040 in.) diameter or less of MoparĀ® Gasket Maker material to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Tighten the components in

place while the sealant is still wet to the touch. Use a locating dowel during assembly to prevent smearing material off the location.

Apply MoparÃ® RTV or ATF-RTV gasket material in a continuous bead approximately 3 mm (0.120 in.) in diameter. For corner sealing and "T-Joint" locations and waffle pad area, a 0.635 mm (0.025 in.) drop is placed in the center of the gasket contact area. Remove uncured sealant with a shop towel. Tighten the components in place while the sealant is still wet to the touch. Use a locating dowel during assembly to prevent smearing material off the location.

SPECIFICATIONS

ENGINE SPECIFICATIONS

EAGLE ENGINE 90Ā° V-8 OHV

EAGLE ENGINE - 90Ā° V-8 OHV

DESCRIPTION	SPECIFICATION	
-	**Metric**	**Standard**
Displacement	5.7 Liters	348 CID
Bore	99.5 mm	3.92 in.
Stroke	90.9 mm	3.58 in.
Compression Ratio	10.5:1	
Max. Variation Between Cylinders	25%	
Firing Order	1-8-4-3-6-5-7-2	
Lubrication	Pressure Feed - Full Flow Filtration	
Cooling System	Liquid Cooled	
Cylinder Block	Cast Iron	
Cylinder Head	Aluminum	
Crankshaft	Nodular Iron	
Camshaft	Cast Iron	
Pistons	Aluminum Alloy	
Connecting Rods	Powdered Metal	

CYLINDER-BLOCK

CYLINDER BLOCK

DESCRIPTION	SPECIFICATION	
-	**Metric**	**Standard**
Cylinder Bore Diameter	99.50 mm	3.92 in.
Out of Round (MAX)	0.0076 mm	0.0003 in.
Taper (MAX)	0.0127 mm	0.0005 in.
Lifter Bore Diameter	21.45 - 21.425 mm	0.8444 - 0.8435 in.

PISTONS & PISTON PINS

PISTONS

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Clearance	-	-
Measured at 38.0 mm (1.5 in.) Below Deck	0.031 - 0.058 mm	0.0012 - 0.0023 in.
Ring Groove Diameter	-	
Top Groove	90.4 - 90.6 mm	3.56 - 3.57 in.
Second Groove	88.4 - 88.7 mm	3.48 - 3.49 in.
Weight	413 grams	14.56 oz.
Piston Length	53.3 mm	2.10 in.
Ring Groove Width	-	
No. 1	1.23 - 1.26 mm	0.048 - 0.0496 in
No. 2	1.23 - 1.25 mm	0.048 - 0.0492 in.
No. 3	2.03 - 2.05 mm	0.079 - 0.080 in.

PISTON PINS

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Clearance In Piston	0.005 - 0.014 mm	0.0001 - 0.0005 in.
Diameter	24.004 - 24.007 mm	0.945 - 0.9451 in.
Length	62.99 - 63.21 mm	2.47 - 2.48 in.

PISTON-RINGS

PISTON RINGS

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Ring Gap		
Top Compression Ring	0.40 - 0.55 mm	0.015 - 0.021 in.
Second Compression Ring	0.24 - 0.51 mm	0.009 - 0.020 in.
Oil Control Rails	0.15 - 0.66 mm	0.0059 - 0.0259 in.
Side Clearance		
Top Compression Ring	0.04 - 0.09 mm	0.002 - 0.004 in.
Second Compression Ring	0.04 -.08 mm	0.001 - 0.003 in.
Oil Control Rails	0.06 - 0.21 mm	0.002 - 0.008 in.
Ring Width		
Top Compression Ring	1.17 - 1.19 mm	0.0461 - 0.0469 in.
Second Compression Ring	1.17 - 1.19 mm	0.0461 - 0.0469 in.
Oil Control Rails	0.387 - 0.413 mm	0.015 - 0.016 in.

CONNECTING-RODS

CONNECTING RODS

DESCRIPTION	SPECIFICATION

-	Metric	Standard
Piston Pin Bore Diameter	24.014 - 24.024 mm	0.9454 - 0.9458 in.
Side Clearance	0.10 - 0.35 mm	0.003 - 0.0137 in.

CRANKSHAFT

CRANKSHAFT

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Main Bearing Journal Diameter	64.988 - 65.012 mm	2.5585 - 2.5595 in.
Bearing Clearance	0.023 - 0.051 mm	0.0009 - 0.002 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.
End Play	0.052 - 0.282 mm	0.002 - 0.011 in.
End Play (MAX)	0.282 mm	0.0111 in.
Connecting Rod Journal Diameter	53.992 - 54.008 mm	2.126 in.
Bearing Clearance	0.020 - 0.060 mm	0.0007 - 0.0023 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.

CAMSHAFT

CAMSHAFT

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Bearing Journal Diameter	-	
No. 1	58.2 mm	2.29 in.
No. 2	57.8 mm	2.28 in.
No. 3	57.4 mm	2.26 in.
No. 4	57.0 mm	2.24 in.
No. 5	43.633 mm	1.72 in.
Bearing To Journal Clearance Standard	-	
No. 1	0.040 - 0.080 mm	.0015 -.003 in.
No. 2	0.050 -0.090 mm	0.0019 -.0035 in.
No. 3	0.040 - 0.080 mm	.0015 -.003 in.
No. 4	0.050 - 0.090 mm	0.0019 -.0035 in.
No. 5	0.040 - 0.080 mm	.0015 -.003 in.
Camshaft End Play	.080 - 0.290 mm	0.0031 - 0.0114 in.

VALVE TIMING

VALVE TIMING

DESCRIPTION	SPECIFICATION

DESCRIPTION	SPECIFICATION
Intake	-
Opens (BTDC)	21.7Â°
Closes (ATDC)	236.3Â°
Duration	258Â°
Exhaust	-
Opens (BTDC)	270.2Â°
Closes (ATDC)	17.8Â°
Duration	288Â°
Valve Overlap	39.5Â°

CYLINDER HEAD

CYLINDER HEAD

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Valve Seat Angle	44.5Â° - 45.0Â°	
Valve Seat Runout (MAX)	0.05 mm	0.0019 in.
Valve Seat Width (finish)	-	-
Intake	1.18 - 1.62 mm	0.0465 - 0.0638 in.
Exhaust	1.48 - 1.92 mm	0.0583 - 0.0756 in.
Guide Bore Diameter (Std.)	7.975 - 8.00 mm	0.314 - 0.315 in.

HYDRAULIC TAPPETS

HYDRAULIC TAPPETS

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Body Diameter	21.387 - 21.405 mm	0.8420 - 0.8427 in.
Clearance (to bore)	0.020 - 0.063 mm	0.0008 - 0.0025 in.
Dry Lash	3.0 mm (at the valve)	0.1181 in. (at the valve)

VALVES

VALVES

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Face Angle	45.0Â° - 45.5Â°	
Head Diameter	-	
Intake	51.94 - 52.20 mm	2.04 - 2.06 in.
Exhaust	39.27 - 39.53 mm	1.55 - 1.56 in.
Length (overall)	-	
Intake	130.87 - 131.51 mm	5.152 - 5.178 in.
Exhaust	130.101 - 130.741 mm	5.122 - 5.147 in.

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Stem Diameter	-	
Intake	7.935 - 7.953 mm	0.312 - 0.313 in.
Exhaust	7.932 - 7.950 mm	0.312 - 0.313 in.
Stem - to - Guide Clearance	-	
Intake	0.022 - 0.062 mm	0.0009 - 0.0024 in.
Exhaust	0.025 - 0.058 mm	0.0010 - 0.0023 in.
Valve Lift (@ zero lash)	-	
Intake	12.0 mm	0.472 in.
Exhaust	11.70 mm	0.461 in.

VALVE SPRING

VALVE SPRING

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Spring Force (valve closed)	435.0 N +/- 22.0 N @ 45 mm	97.8 lbs +/- 5.0 lbs. @ 1.771 in.
Spring Force (valve open)	1077.0 N +/- 48.0 N @ 32.6 mm.	242.0 lbs. +/- 11 lbs. @ 1.283 in.
Free Length (approx).	55.6 mm	2.189 in.
Number of Coils	7.95	
Wire Diameter	4.95 X 4.1 mm	0.194 - 0.161 in.
Installed Height (spring seat to bottom of retainer)	46.0 mm	1.81 in.

OIL PUMP

OIL PUMP

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Clearance Over Rotors (MAX)	0.095 mm	0.0037 in.
Outer Rotor to Pump Body Clearance (MAX)	.235 mm	0.0093 in.
Tip Clearance Between Rotors (MAX)	0.150 mm	0.006 in.

OIL PRESSURE

OIL PRESSURE

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
At Curb Idle Speed (MIN)*	25 kPa	4 psi
@ 3000 RPM	170 - 758 kPa	25 - 110 psi
*** CAUTION: If pressure is zero at curb idle, DO NOT run engine.**		

TORQUE SPECIFICATIONS

ENGINE BLOCK

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Camshaft Phaser Bolt	98	72	-	-
Camshaft Tensioner Plate Bolts	28	21	-	-
Camshaft Thrust Plate Bolts	13	10	-	-
Coolant Drain Plugs 1/4 x 18 NPT	34	25	-	-
Connecting Rod Cap Bolts	20 plus 90Â° Turn	-	177 plus 90Â° Turn	X
Crankshaft Main Bearing Cap Bolts	Refer to **CRANKSHAFT, INSTALLATION, 5.7L**.			-
Exhaust Variable Valve Timing Solenoid Bolt	11	8	-	-
Lifting Stud	55	41	-	-
Lifter Guide Holder	12	9	-	-
Oil Pan Bolts	Refer to **PAN, OIL, INSTALLATION, 5.7L**.			X
Oil Dipstick Tube	11	8	-	-
Oil Filter Adapter	28	21	-	-
Oil Filter	14	10	-	-
Oil Gallery Plugs 1/4 x 18 NPT	20	-	177	-
Oil Pan Drain Plug	27	20	-	-
Oil Pressure Sensor	14	10	-	-
Oil Pump Bolts	Refer to **PUMP, ENGINE OIL, INSTALLATION, 5.7L**.			-
Oil Pump Cover Bolts.	15	11	-	-
Oil Pump Pickup Tube Bolt	28	21	-	-
Oil Pump Pickup Tube Nut	28	11	-	-
Oil Temperature Sensor	27	20	-	-
Plugs 3/8 x 18 NPT	27	20	-	-
Rear Seal Retainer Attaching Bolts	15	-	133	-
Timing Chain Guide Bolts	11	8	-	-
Timing Chain Tensioner Bolts	11	8	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

CYLINDER HEAD

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Cylinder Head Bolts	Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.			-
Cylinder Head Cover Bolts	Refer to **COVER(S), CYLINDER HEAD, INSTALLATION, 5.7L**.			-
Exhaust Manifold Bolts	Refer to **MANIFOLD, EXHAUST, INSTALLATION, 5.7L**.			-
Exhaust Manifold Heat Shield Bolts	8	-	71	-
Ignition Coil Bolts	7	-	62	-
Intake Manifold Bolts	Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.			-
Rocker Arm Bolts	Refer to **ROCKER ARM, VALVE, INSTALLATION, 5.7L**.			-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

FRONT ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Coolant Tube Bolt	12	9	-	-
Timing Chain Case Cover Bolts	28	21	-	-
Thermostat Housing Bolts	28	21	-	-
Vibration Damper Bolt	180	133	-	-
Water Pump-to-Timing Chain Case Cover Bolts	28	21	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

REAR ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Flexplate Bolts	Refer to **FLEXPLATE, INSTALLATION, 5.7L**.			-
Inspection Cover to Transmission Bolt	11	8	-	-
Rear Crankshaft Oil Seal Retainer Bolts	Refer to **SEAL, CRANKSHAFT OIL, REAR, INSTALLATION, 5.7L**.			-
Torque Convertor Bolts	42	31	-	-
Transmission to Oil Pan Bolts	45	33	-	-
Transmission Bell Housing to Engine Bolts	45	33	-	-

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Transmission to Lower Engine Block Below Dowel Bolts - 5 speed only	68	50	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

ENGINE MOUNTS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Engine Mount Bracket to Block Bolts	61	45	-	-
Engine Mount to Engine Mount Bracket Bolts	61	45	-	-
Engine Mount to Cradle Bolts	48	35	-	-
Engine Mount Heat Shield Nuts	25	18	-	-
Transmission Mount Bracket to Transmission - M8 Bolt	38	28	-	-
Transmission Mount Bracket to Transmission - M10 Bolt	61	45	-	-
Transmission Mount to Crossmember Bolt	61	45	-	-
Transmission Crossmember to body Bolts	61	45	-	-
Manual Trans Mount to Crossmember Nut	61	45	-	-
Transmission Mount to Bracket Bolt	25	18	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

ACCESSORY DRIVE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Generator Support Bracket Bolt	65	48	-	-
Generator Support Bracket to Engine Mount Nut	28	21	-	-

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

MISCELLANEOUS COMPONENTS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Air Cleaner Body Bolt	5	-	44	-
Air Cleaner Body Tube Clamp	3	-	27	-
Throttle Body Bolts	12	9	-	-
Oil Control Valve Bolt	11	8	-	-
Heater Core Tube Bolt	11	8	-	-
Steering Gear Bolts	95	70	-	-
Strut Tower Support Bolts	38	28	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

REMOVAL

REMOVAL

CAUTION: If the original engine has experienced a catastrophic failure or an individual failure with the piston, cylinder bore, engine block, valve or valve seat, the intake manifold MUST be replaced with a new manifold.

1. Remove the hood. Refer to HOOD, REMOVAL .
2. Remove the cowl panel cover. Refer to COVER, COWL PANEL, REMOVAL .

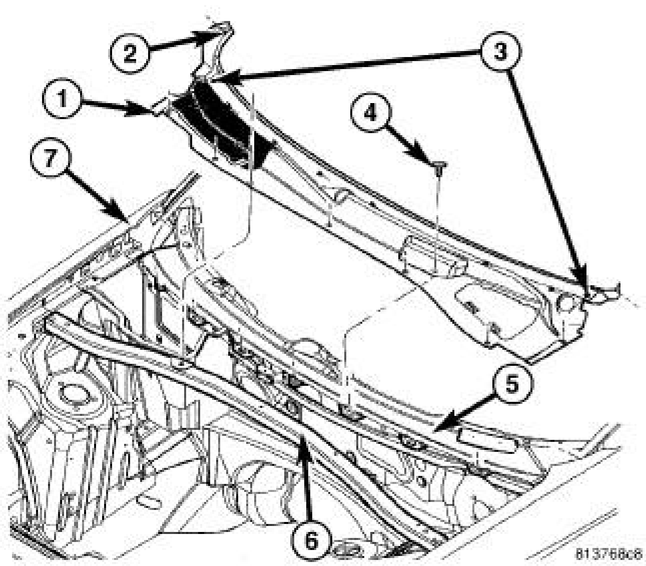


Fig. 9: Removing/Installing Cowl Panel

Courtesy of CHRYSLER GROUP, LLC

3. Remove the strut tower support (6).

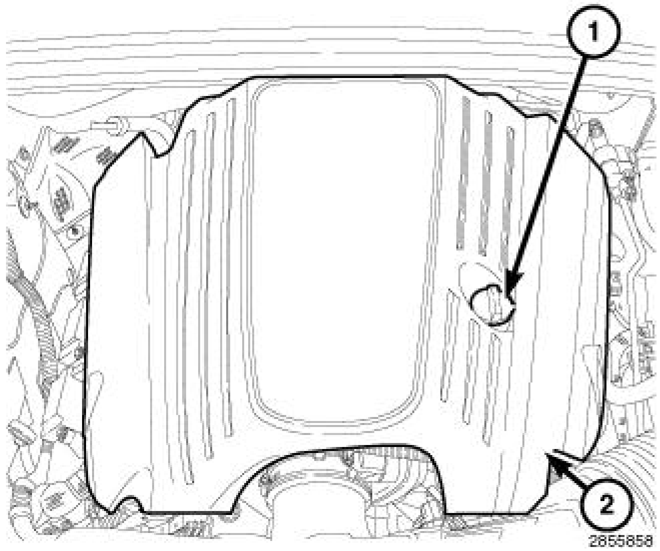


Fig. 10: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

4. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (2).
5. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
6. Disconnect and isolate the negative battery cable.

NOTE: **Remove the intake manifold and throttle body as an assembly.**

7. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

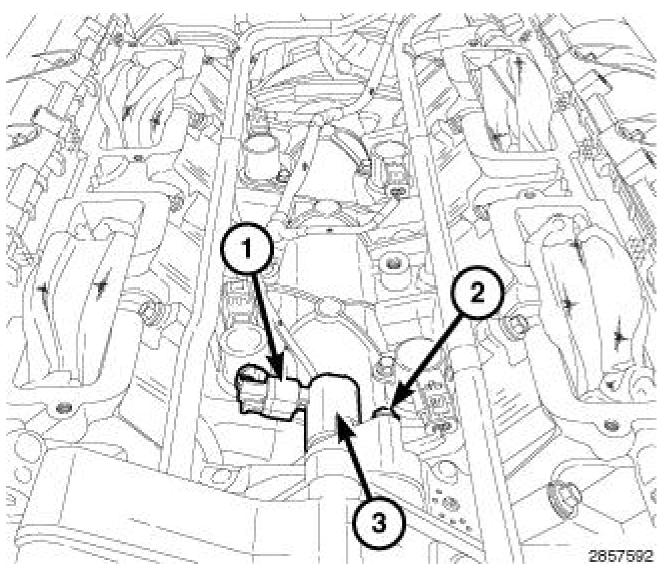


Fig. 11: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The engine must be at room temperature before removing the oil control valve.**

8. Disconnect the oil control valve wire harness connector (1).
9. Remove the oil control valve retaining bolt (2).
10. Rotate the oil control valve (3) to break the seal then pull the oil control valve straight out.
11. Remove the cooling fan. Refer to **FAN, COOLING, REMOVAL** .

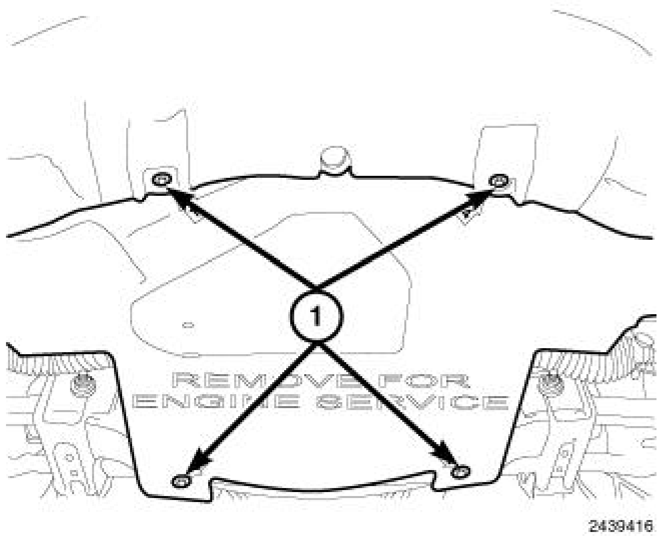


Fig. 12: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

12. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
13. Remove bolts (1) and the belly pan.
14. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
15. Drain the engine oil. Refer to **STANDARD PROCEDURE**.
16. Remove the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .

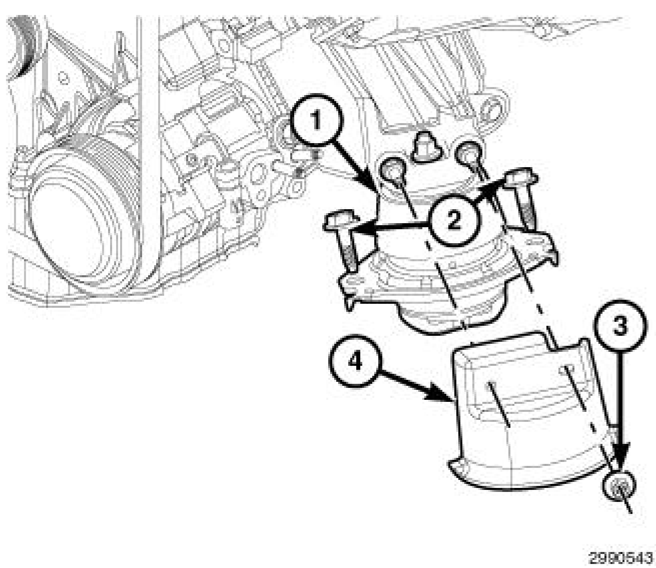


Fig. 13: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

17. Remove both left/right engine mount heat shield (4) retaining nuts (3) and remove the heat shields.
18. Remove both left/right engine mount to frame retaining bolts (2).
19. If equipped, disconnect the transmission oil cooler lines from their retainers at the oil pan.

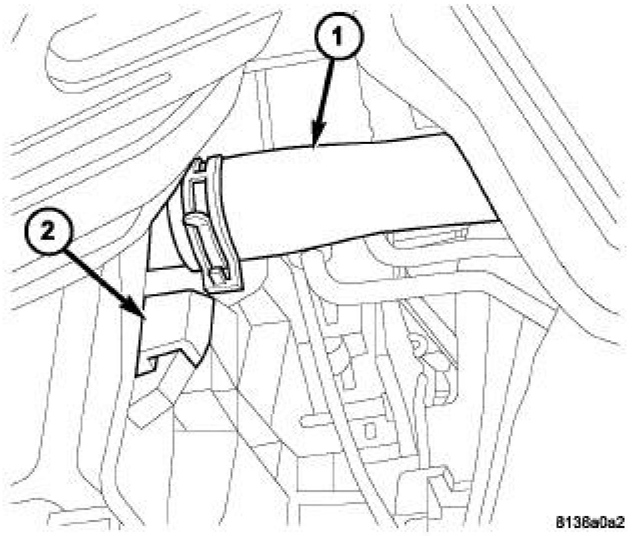


Fig. 14: Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

20. Remove the lower radiator hose (1).

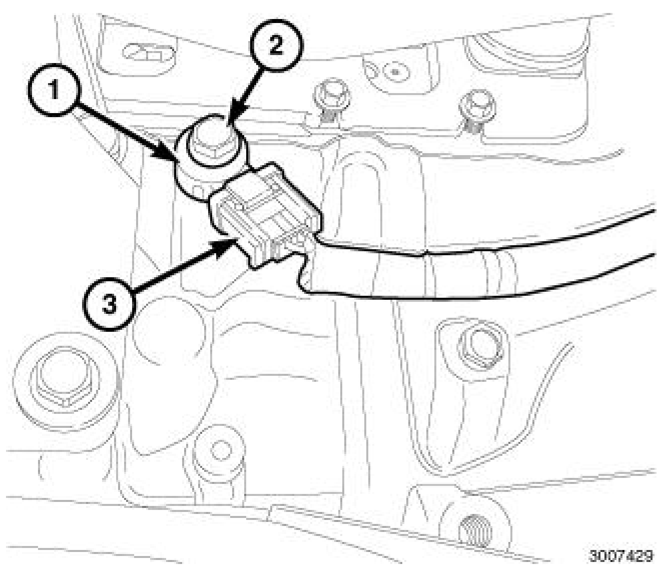


Fig. 15: Knock Sensor, Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Two knock sensors are used. Each sensor is bolted to the outside of the engine block below the exhaust manifold.**

NOTE: **Left side shown in illustration, right side similar.**

21. Remove the heat shields from both knock sensors (shield snaps on/off sensor).
22. Disconnect the knock sensor wire harness connectors (3).

CAUTION: **When separating the catalytic converters from the manifolds, disconnect the oxygen sensor connectors. Allowing the catalytic converters to hang from the oxygen sensor wires damages the harness and/or sensors.**

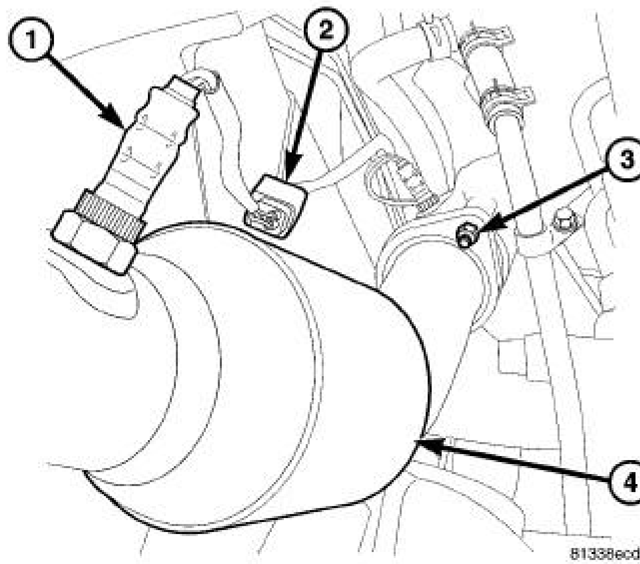


Fig. 16: LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

23. Disconnect all oxygen sensor wire harness connectors (2).
24. Saturate all exhaust bolts and nuts (3) with MoparÃ® Rust Penetrant. Allow five minutes for penetration.
25. Remove the both catalytic converter to manifold flange nuts (3) and separate the catalytic converters (4) from the exhaust manifolds.
26. Remove the starter. Refer to **STARTER, REMOVAL** .

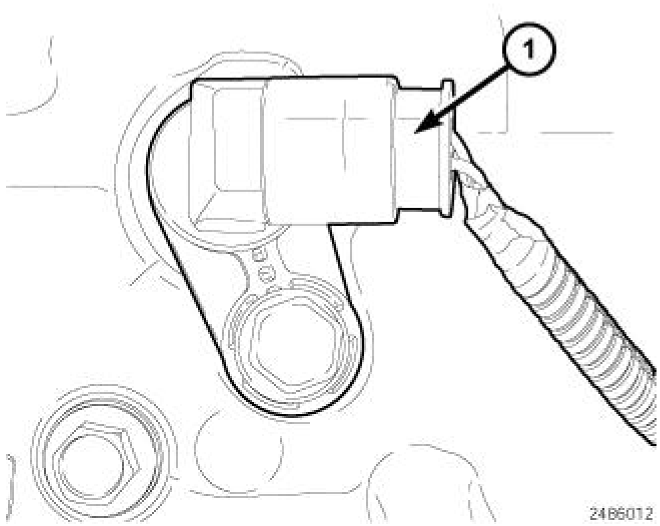


Fig. 17: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Crankshaft Position (CKP) sensor is located at the right-rear side of the engine block.**

27. Remove the CKP sensor wire harness connector (1).
28. Remove the generator. Refer to **GENERATOR, REMOVAL** .

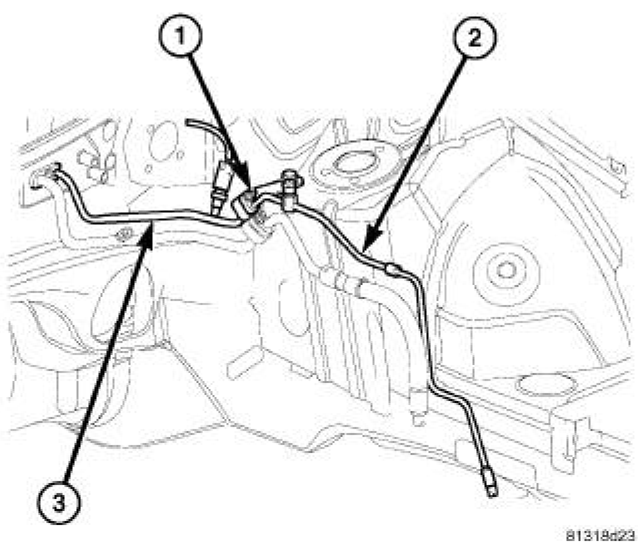


Fig. 18: Removing/Installing A/C Liquid Front Line
Courtesy of CHRYSLER GROUP, LLC

29. Remove the nut (1) from the front section of the A/C liquid line (2) to the rear section of the liquid line (3), separate the lines, remove and discard the dual plane seal.
30. Install plugs or tape over the opened liquid line fittings.
31. Remove the front section of the A/C liquid line (2) from the engine compartment.

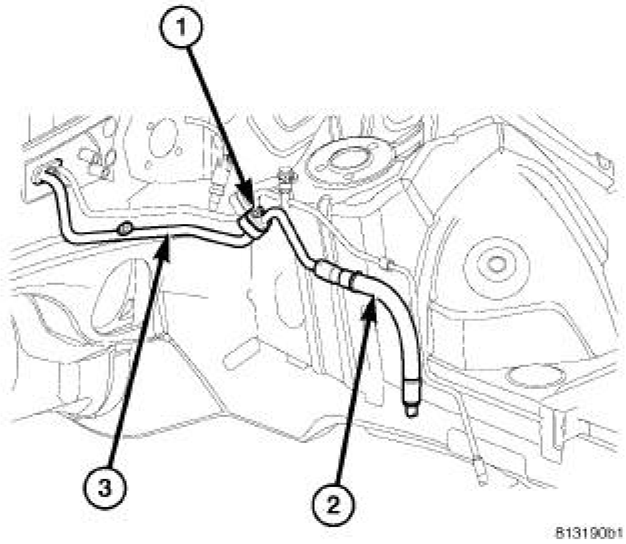


Fig. 19: Removing/Installing A/C Suction Front Line
Courtesy of CHRYSLER GROUP, LLC

32. Remove the nut (1) from the front section of the A/C suction line (2) to the rear section of the suction line (3), separate the lines, remove and discard the dual plane seal.
33. Install plugs or tape over the opened suction line fittings.
34. Remove the front section of the A/C suction line (2) from the engine compartment.

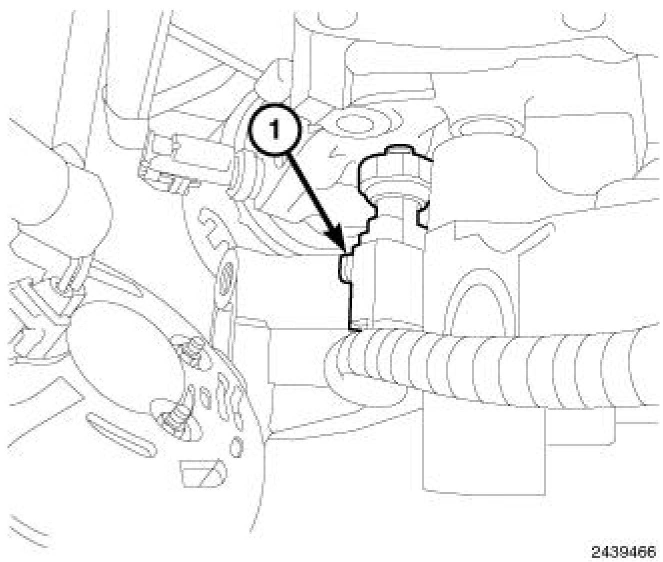
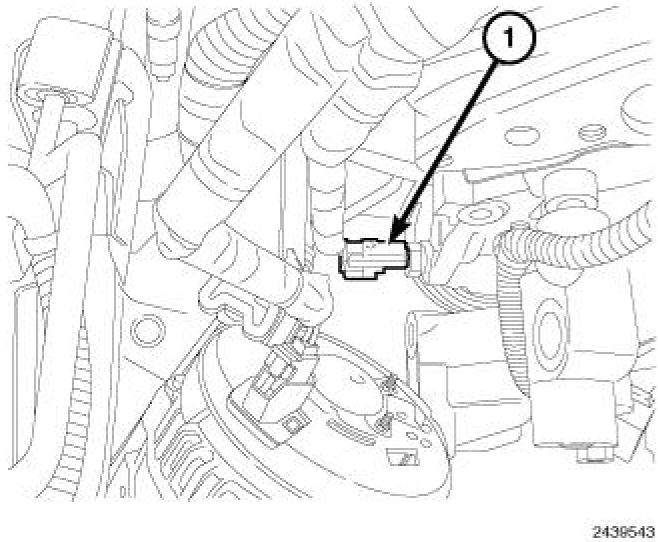


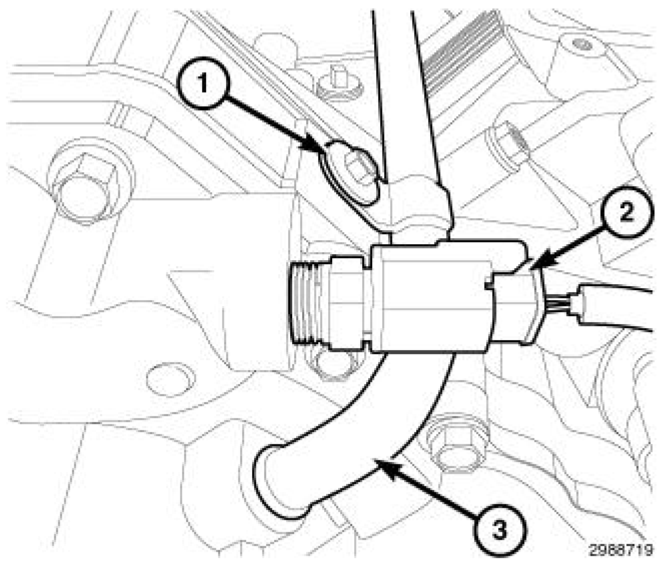
Fig. 20: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

35. Remove the oil pressure sensor wire harness connector (1).



[Fig. 21: Oil Temperature Sensor Electrical Connector]
Courtesy of CHRYSLER GROUP, LLC

36. Remove the oil temperature sensor wire harness connector (1).
37. Remove the upper radiator hose.



[Fig. 22: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt]
Courtesy of CHRYSLER GROUP, LLC

38. Remove the heater tube retaining bolt (1).
39. Remove the Engine Coolant Temperature (ECT) sensor wire harness connector (2).
40. Lift the heater tube (3) out of the water pump and remove the heater tube from the vehicle.

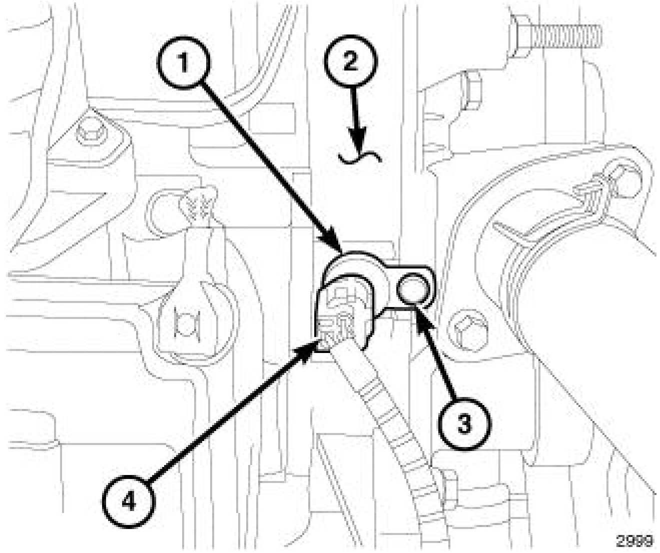


Fig. 23: Camshaft Position Sensor, Connector, Bolt & Timing Cover
Courtesy of CHRYSLER GROUP, LLC

41. Disconnect the Camshaft Position (CMP) sensor wire harness connector (4).

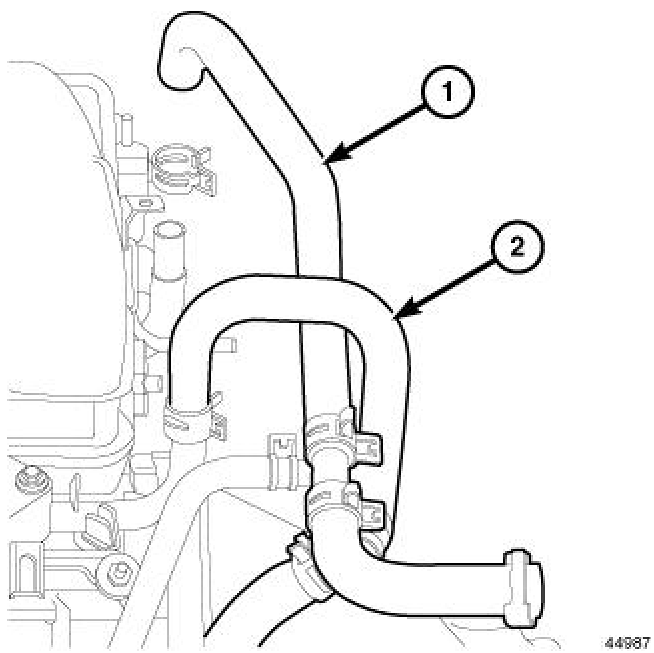


Fig. 24: Heater Hose Supply
Courtesy of CHRYSLER GROUP, LLC

42. Remove the heater hoses (1, 2).

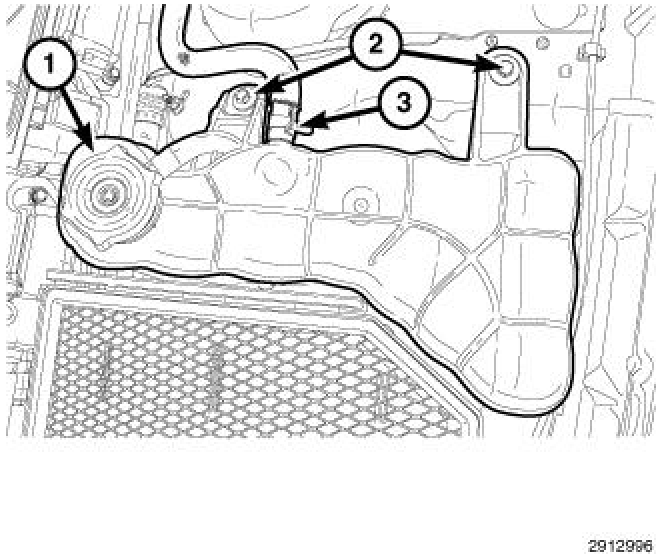


Fig. 25: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It is not necessary to remove the hoses from the coolant bottle for coolant bottle removal.**

43. Remove the coolant bottle retaining bolts (2) and position the coolant bottle (1) aside.

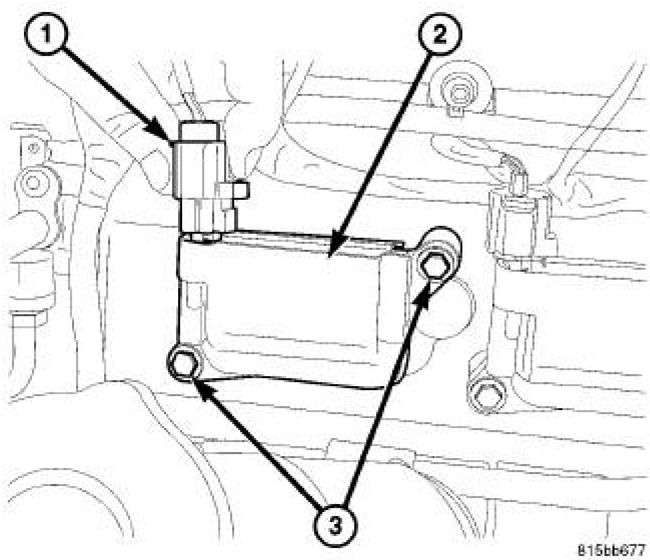


Fig. 26: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

44. Remove all ignition coil wire harness connectors (1) and position the harness aside.
45. Disengage the wire harness mounted on the right hand inner fender panel and position aside.

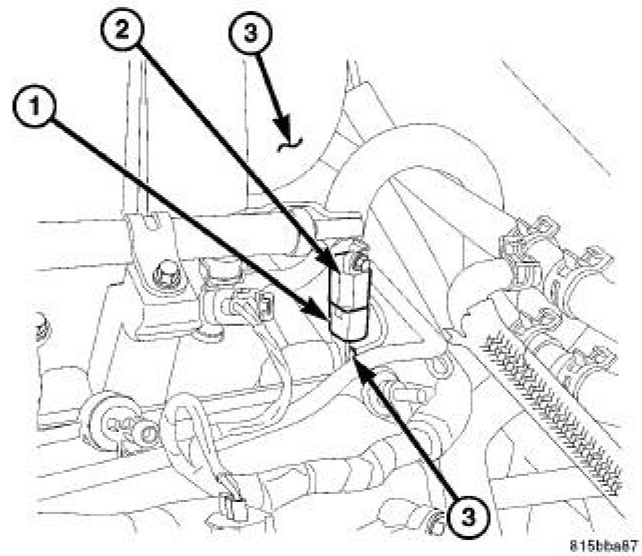


Fig. 27: Ignition Capacitor, Electrical Connector & Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The ignition capacitor (2) is attached to the left rear corner of the intake manifold (3).**

46. Remove the ignition capacitor (2) wire harness connector (1).
47. Remove the ground wires from the rear of each cylinder head.
48. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

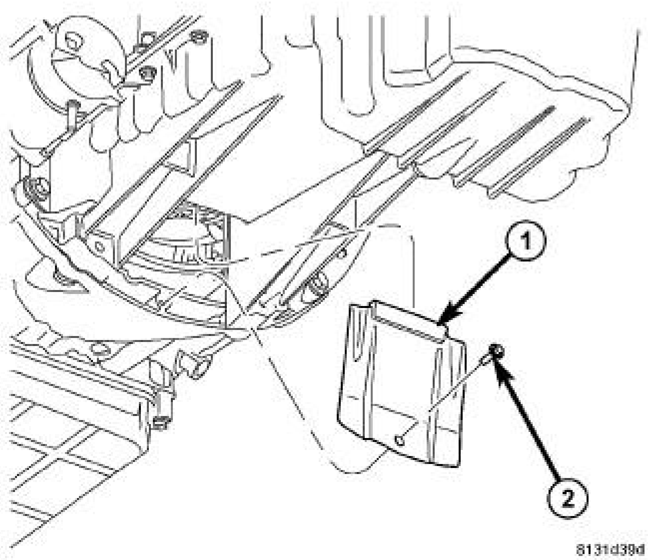


Fig. 28: Remove/Install Torque Converter Access Cover
Courtesy of CHRYSLER GROUP, LLC

49. Remove the inspection cover (1).

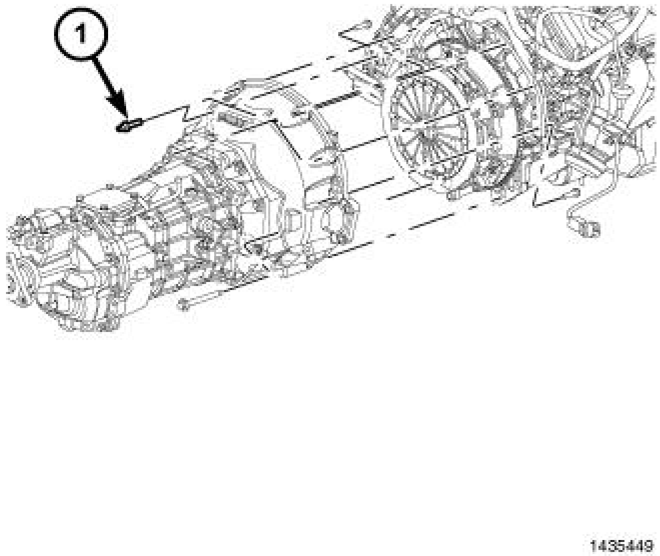


Fig. 29: Removing/Installing Transmission
Courtesy of CHRYSLER GROUP, LLC

50. Manual transmission equipped vehicles, remove the transmission. For 5.7L, refer to **REMOVAL** . For 6.2L, refer to **REMOVAL** .

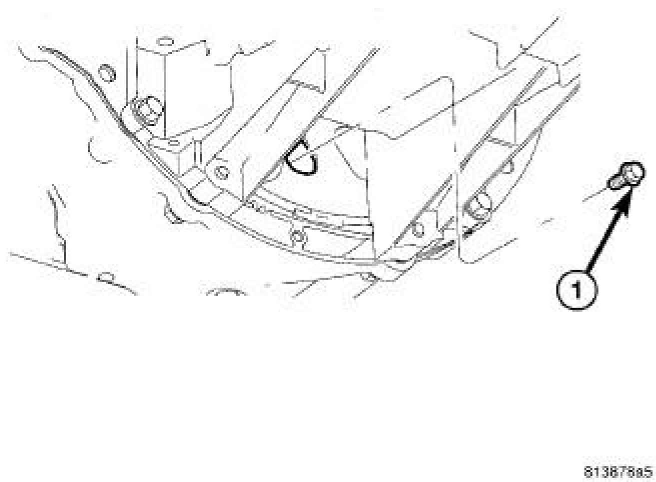
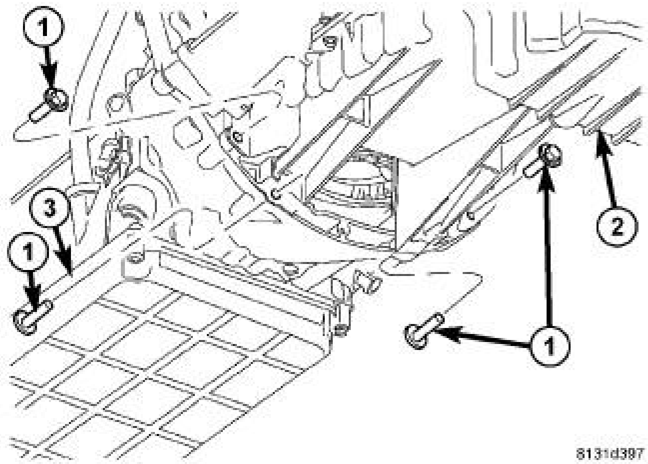


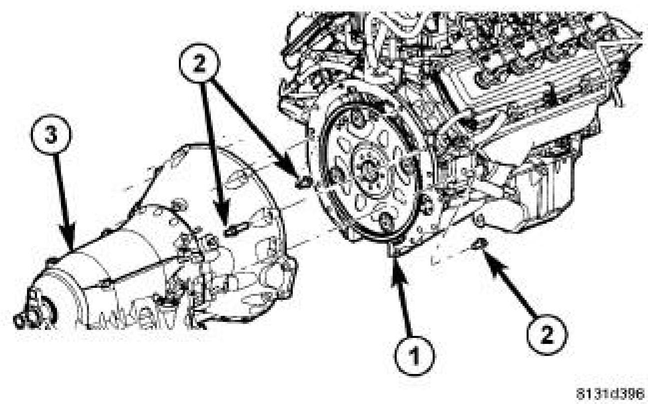
Fig. 30: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

51. Automatic transmission equipped vehicles, rotate the crankshaft in clockwise direction until converter bolts (1) are accessible and remove the six flexplate to converter bolts (1).



[Fig. 31: Removing Transmission To Oil Pan Bolts]
Courtesy of CHRYSLER GROUP, LLC

52. Remove the oil pan to transmission bolts (1).



[Fig. 32: Removing Transmission To Engine Bolts]
Courtesy of CHRYSLER GROUP, LLC

53. Remove the transmission bell housing to engine block bolts (2).

CAUTION: **While carefully separating the engine from the transmission and removing the engine from the vehicle, constant checks must be made to ensure no damage to other components or wiring harnesses occur throughout the removal procedure.**

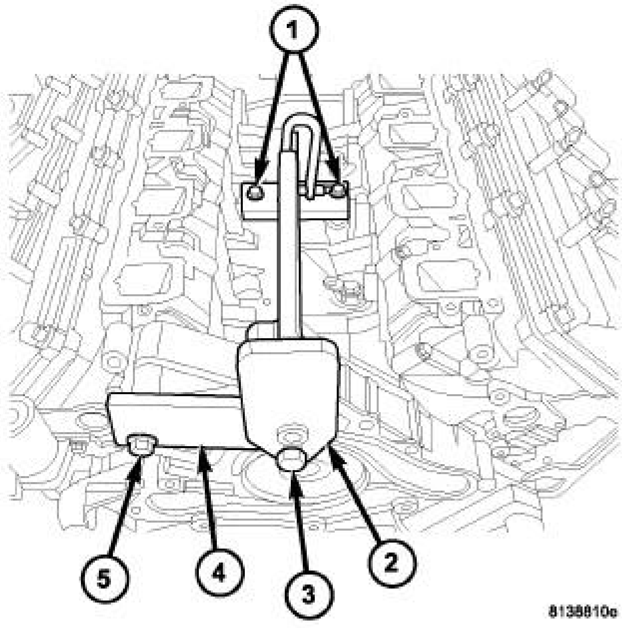


Fig. 33: Engine Lift Fixture And Adapter
Courtesy of CHRYSLER GROUP, LLC

54. Lower the vehicle.
55. Using a suitable jack, support the transmission.

NOTE: **Do not use air tools to install engine lift fixture.**

56. Install the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) (2) and adapter (special tool #8984-UPD, Adapter, Engine Lift) (4).
57. Using a suitable engine hoist, separate the engine from the transmission and carefully remove the engine from the engine compartment.
58. Secure the engine onto a suitable engine stand.

INSTALLATION

INSTALLATION

CAUTION: **If the original engine has experienced a catastrophic failure or an individual failure with the piston, cylinder bore, engine block, valve or valve seat, the intake manifold MUST be replaced with a new manifold.**

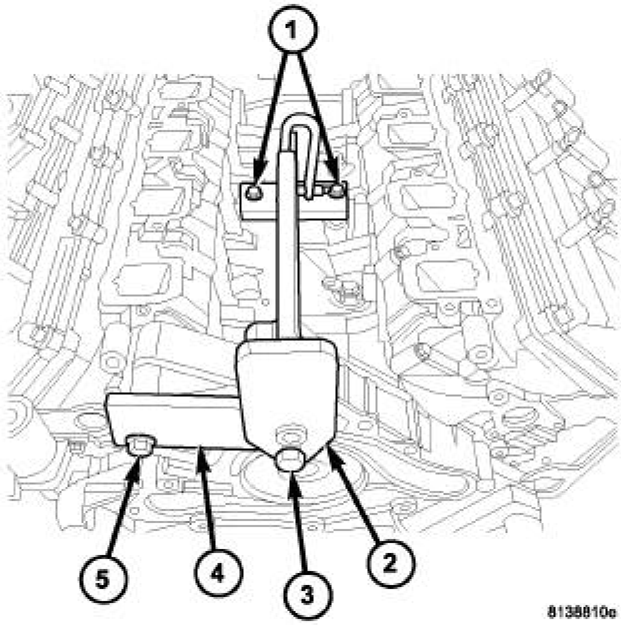


Fig. 34: Engine Lift Fixture And Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not use air tools to install Engine Lift Fixture and Adapter (special tool #8984B, Fixture, Engine Lifting) (2, 3).**

1. Install the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) (2) and adapter (special tool #8984-UPD, Adapter, Engine Lift) (4).
2. Using a suitable engine hoist, lower the engine into in the engine compartment.
3. Automatic transmission equipped vehicles, align the engine with the transmission.
4. Install two transmission to engine block mounting bolts finger tight.
5. Lower the engine assembly until the engine mounts rest in the engine cradle crossmember.

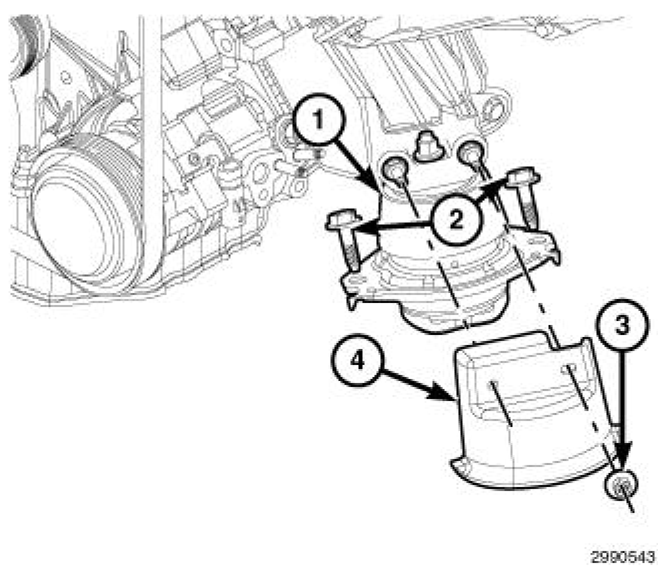


Fig. 35: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields

Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

6. Align the engine mounts, install both left and right engine mount to frame retaining bolts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
7. Position both left and right engine mount heat shields (4), install the retaining nuts (3) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
8. Remove the engine hoist and the jack supporting the transmission.
9. Raise and support the vehicle.

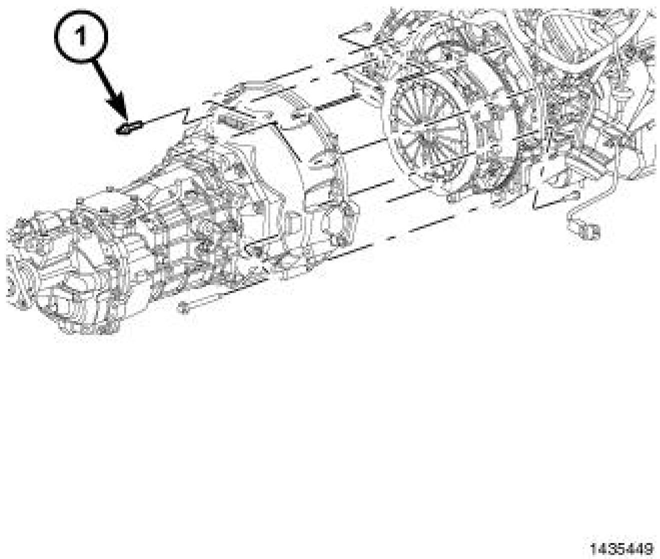


Fig. 36: Removing/Installing Transmission
Courtesy of CHRYSLER GROUP, LLC

10. Manual transmission equipped vehicles, install the transmission. For 5.7L, refer to **INSTALLATION** . For 6.2L, refer to **INSTALLATION** .

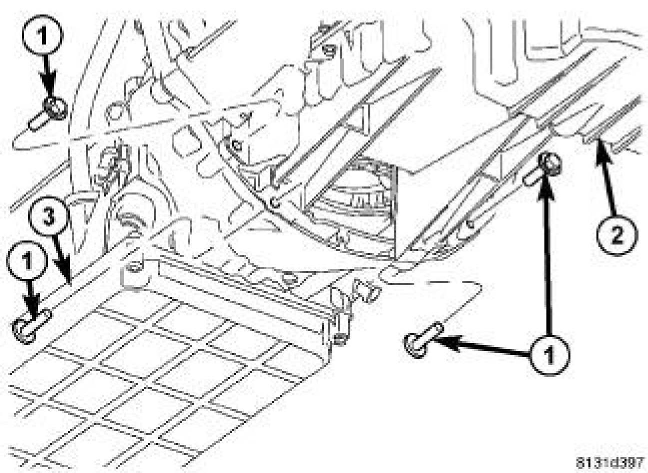


Fig. 37: Remove/Install Transmission To Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Automatic transmission equipped vehicles, Install the transmission to oil pan bolts (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

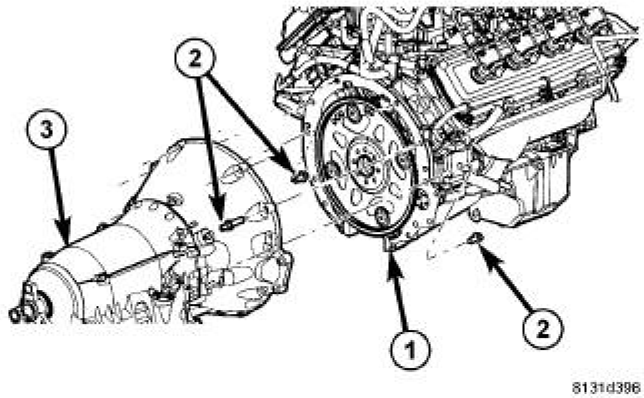


Fig. 38: Remove/Install Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Install the remaining transmission bell housing to engine block bolts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

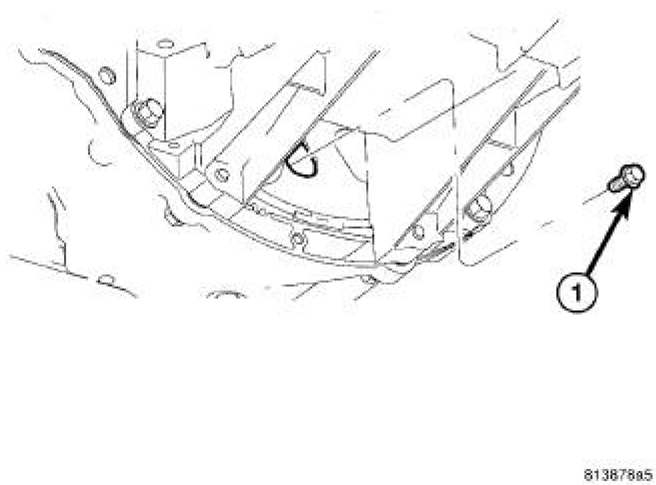


Fig. 39: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: It is essential that the correct length bolts are used to attach the converter to the flexplate. Bolts that are too long will damage the clutch surface inside the torque converter.

13. Rotate the crankshaft in clockwise direction and install all six torque converter to flexplate bolts (1) finger

tight.

14. Verify that the torque converter is pulled flush to the flexplate and tighten bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

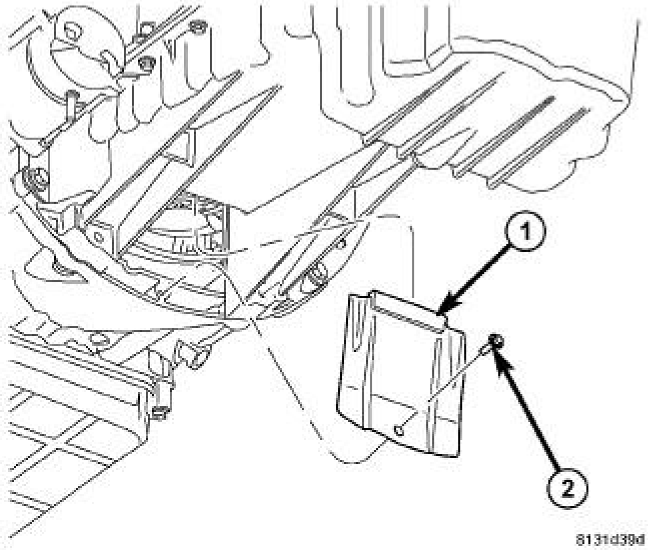


Fig. 40: Remove/Install Torque Converter Access Cover
Courtesy of CHRYSLER GROUP, LLC

15. Install the inspection cover (1) and tighten the retaining bolt (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

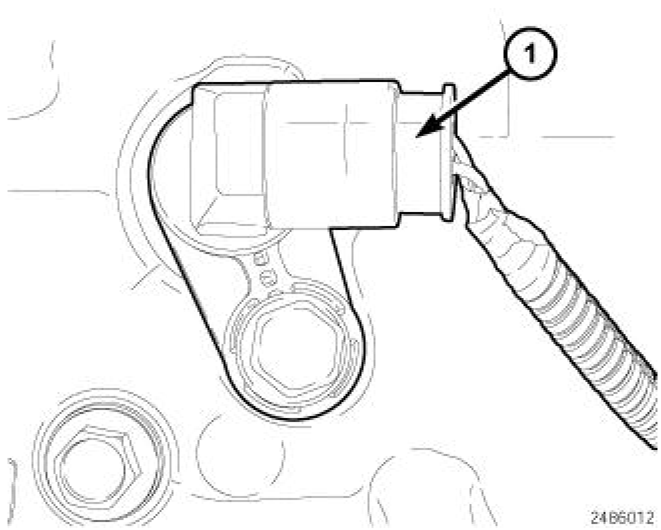


Fig. 41: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

16. Connect the Crankshaft Position Sensor (CKP) sensor wire harness connector (1).
17. Install the starter. Refer to **STARTER, INSTALLATION** .

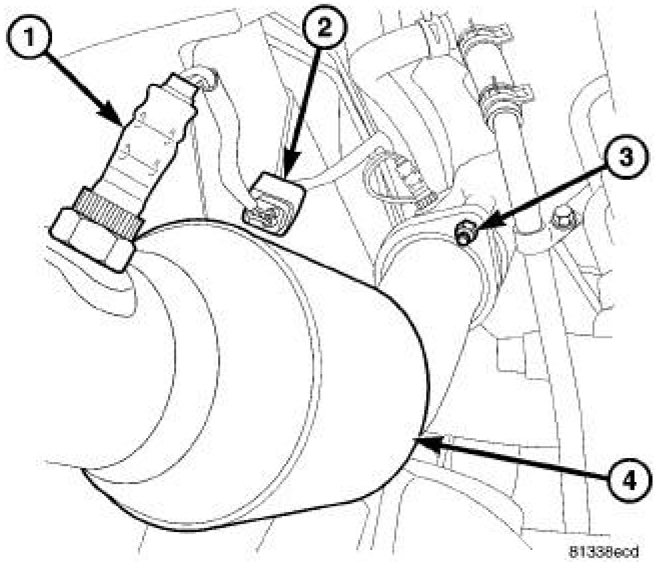


Fig. 42: LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

18. Position the catalytic converters (4) onto the exhaust manifold flanges, install the flange nuts (3) and tighten to the proper specification. Refer to **SPECIFICATIONS** .
19. Connect the oxygen sensor (1) wire harness connectors (2).

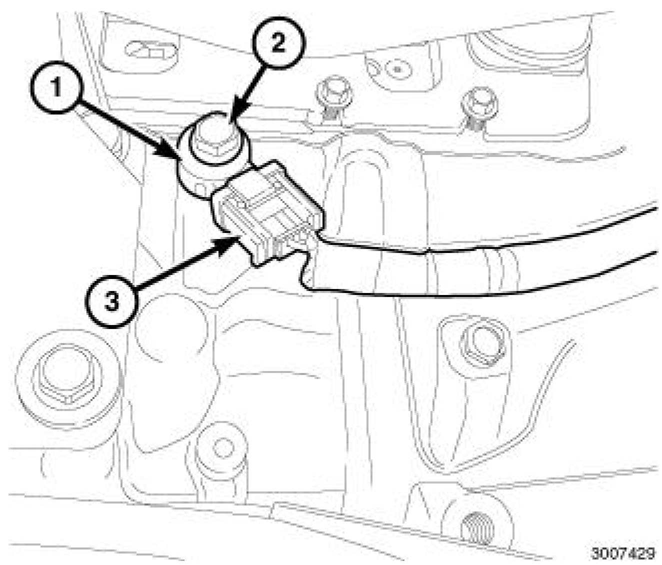


Fig. 43: Knock Sensor, Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

20. Connect the right and left knock sensor (1) wire harness connectors (5).
21. Install the heat shields onto both knock sensors (shield snaps on/off sensor).
22. If equipped, connect the transmission oil cooler lines to their retainers at the oil pan.

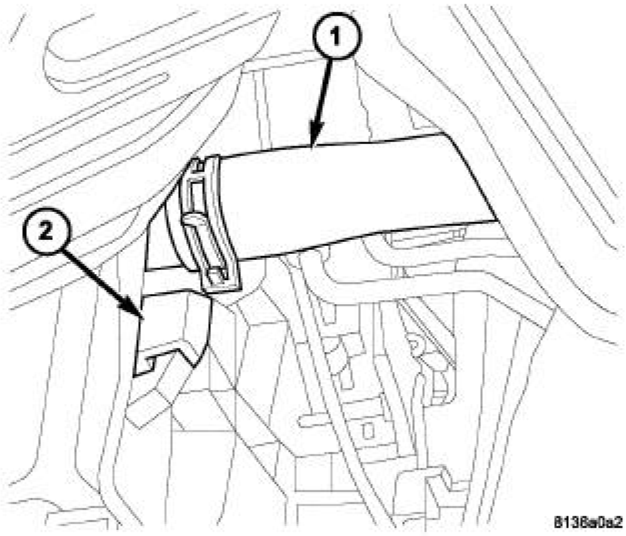


Fig. 44: Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

23. Install the lower radiator hose (1).
24. Lower the vehicle.

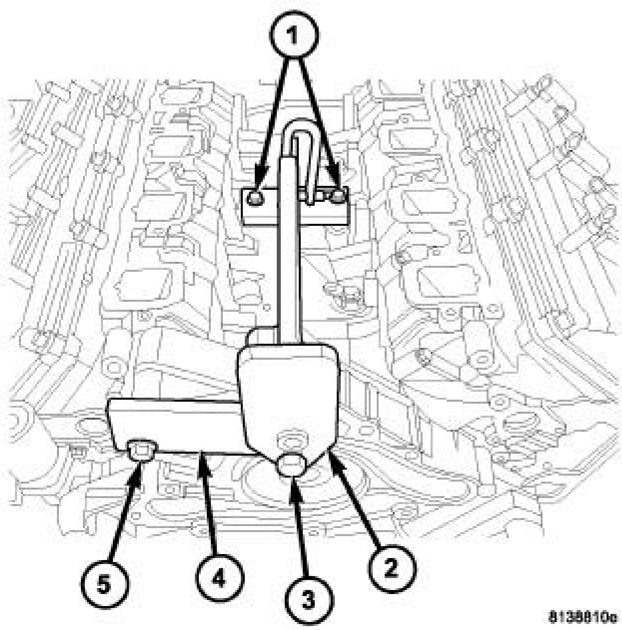


Fig. 45: Engine Lift Fixture And Adapter
Courtesy of CHRYSLER GROUP, LLC

25. Remove the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) (2) and adapter (special tool #8984-UPD, Adapter, Engine Lift) (4).
26. Position the left and right side wiring harness.

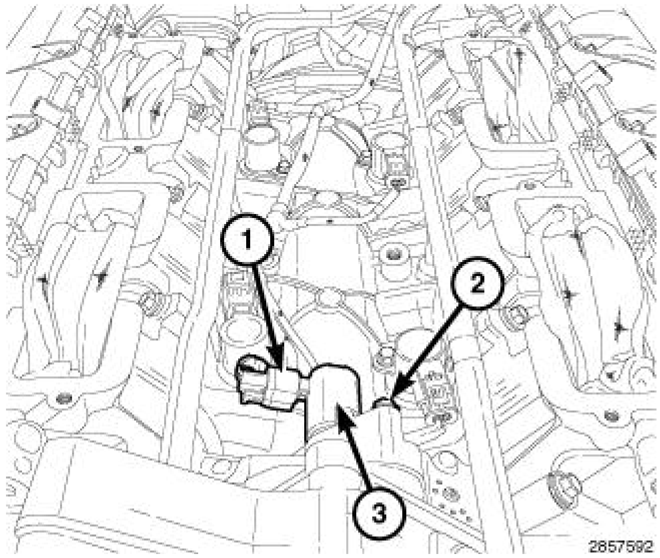


Fig. 46: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

27. Lubricate the Oil Control Valve (OCV) rubber O-ring seal with clean engine oil.
28. Install the OCV (3) and rotate into position.
29. Install the OCV retaining bolt (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
30. Connect the OCV wire harness connector (1).

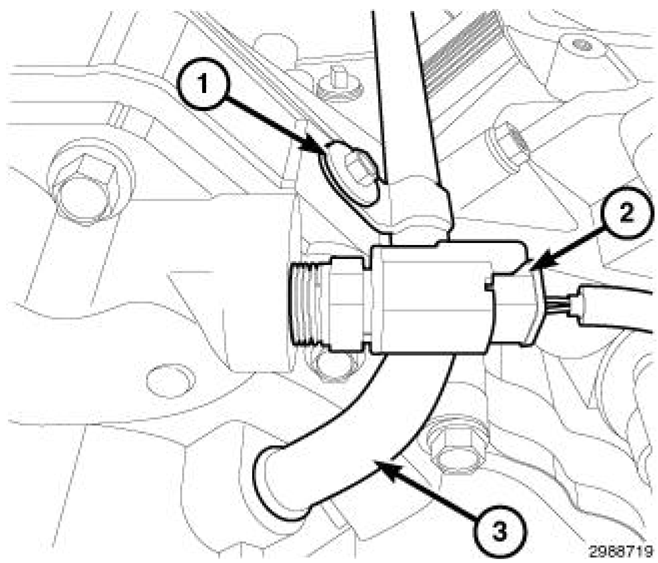


Fig. 47: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

31. Using a **NEW** O-ring seal, install the heater core tube (3) into the water pump.
32. Install the heater core tube retaining bolt (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
33. Connect the Engine Coolant Temperature (ECT) sensor wire harness connector (2).

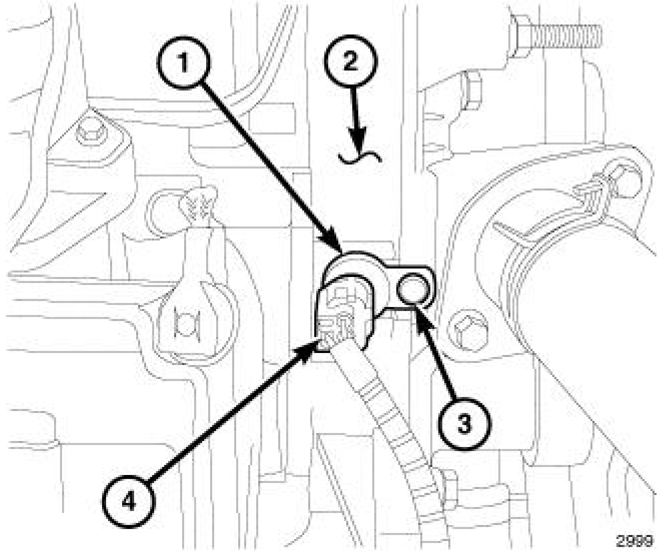


Fig. 48: Camshaft Position Sensor, Connector, Bolt & Timing Cover
Courtesy of CHRYSLER GROUP, LLC

34. Connect the camshaft position sensor wire harness connector (4).
35. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

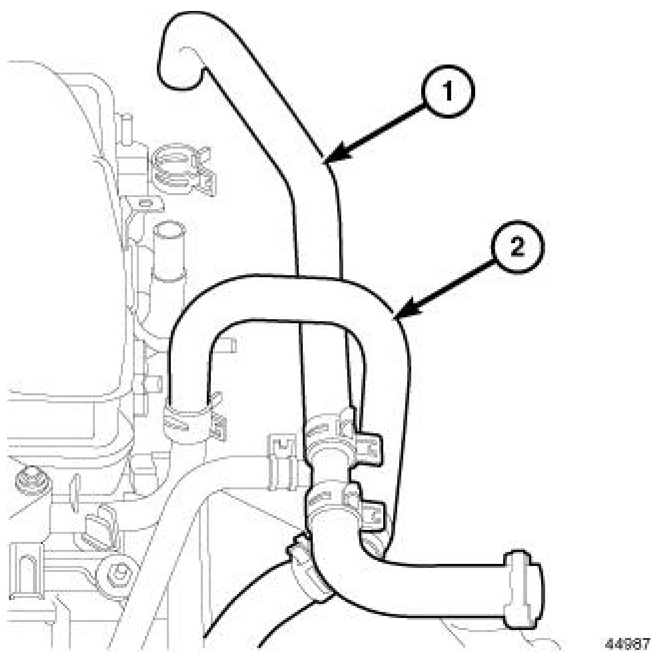


Fig. 49: Heater Hose Supply
Courtesy of CHRYSLER GROUP, LLC

36. Connect the heater hoses (1, 2).
37. Connect the ground wires to the rear of each cylinder head.

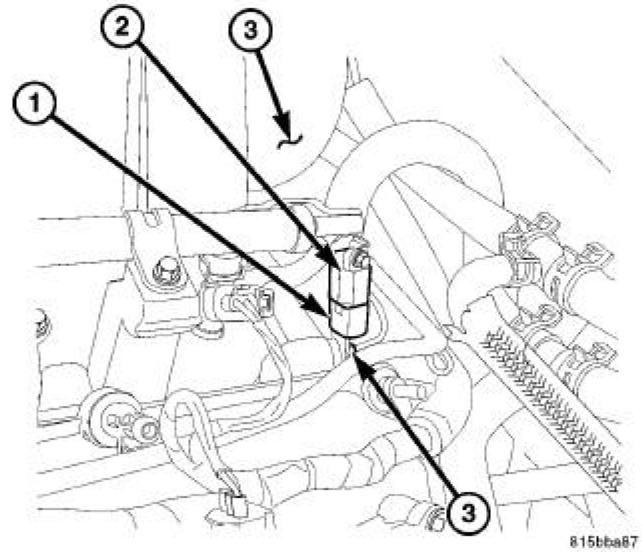


Fig. 50: Ignition Capacitor, Electrical Connector & Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

NOTE: The ignition capacitor (2) is attached to the rear of the left cylinder head.

38. Connect the ignition capacitor (2) wire harness connector (1).

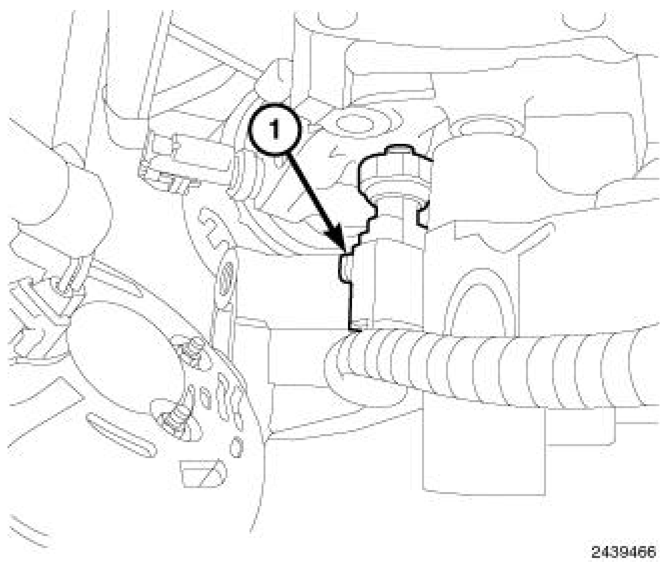


Fig. 51: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

39. Connect the oil pressure sensor wire harness connector (1).

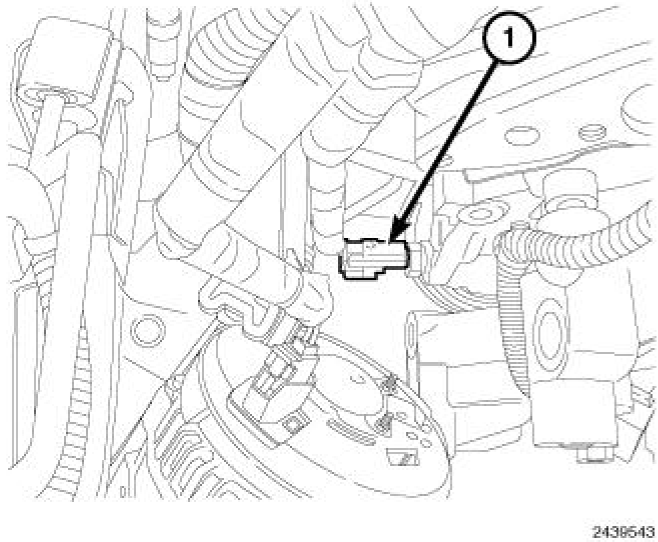


Fig. 52: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

40. Connect the oil temperature sensor wire harness connector.
41. Raise and support the vehicle.
42. Install the generator. Refer to **GENERATOR, INSTALLATION** .
43. Install the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .

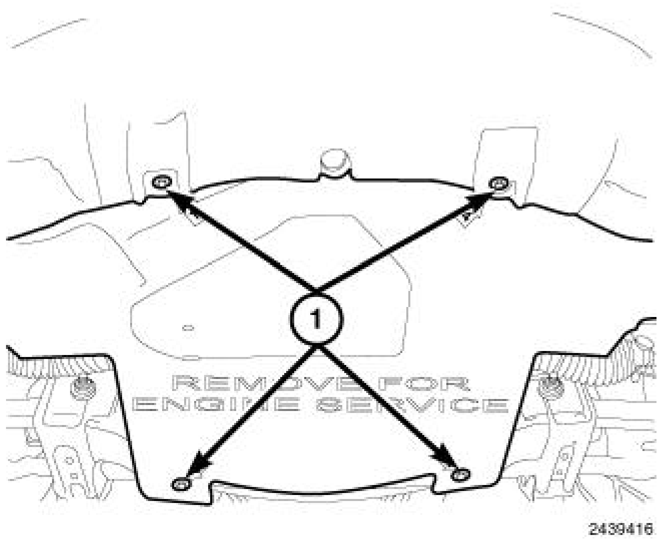


Fig. 53: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

44. Install the belly pan and securely tighten bolts (1).
45. Remove support and lower the vehicle.

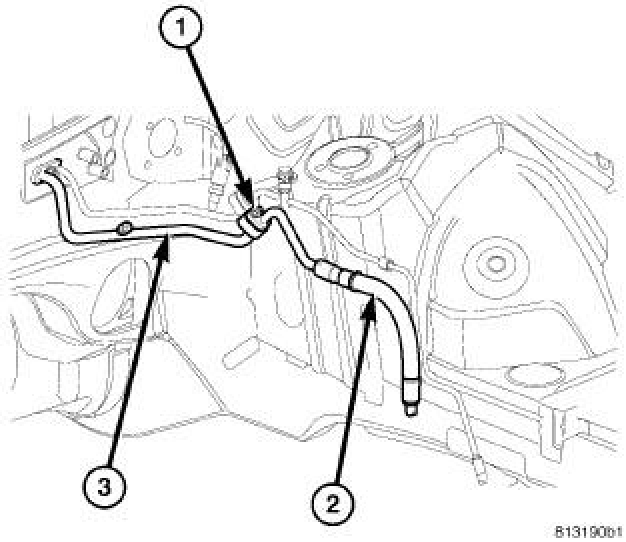


Fig. 54: Removing/Installing A/C Suction Front Line
Courtesy of CHRYSLER GROUP, LLC

46. Position the front section of the A/C suction line (2) into the engine compartment.
47. Remove the tape or plugs from the fittings that connect the front section of the A/C suction line to the rear section of the A/C suction line (3).

NOTE: **Use only the specified seal as it is made of a special material for the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.**

48. Lubricate a **NEW** dual plane seal with clean refrigerant oil and install it onto the suction line fitting. Use only the specified seal as it is made of a special material for the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
49. Connect the front section of the A/C suction line to the rear section of the A/C suction line.
50. Install the nut (1) that secures the front section of the A/C suction line to the rear section of the A/C suction line and tighten the nut to the proper specification. Refer to **SPECIFICATIONS** .

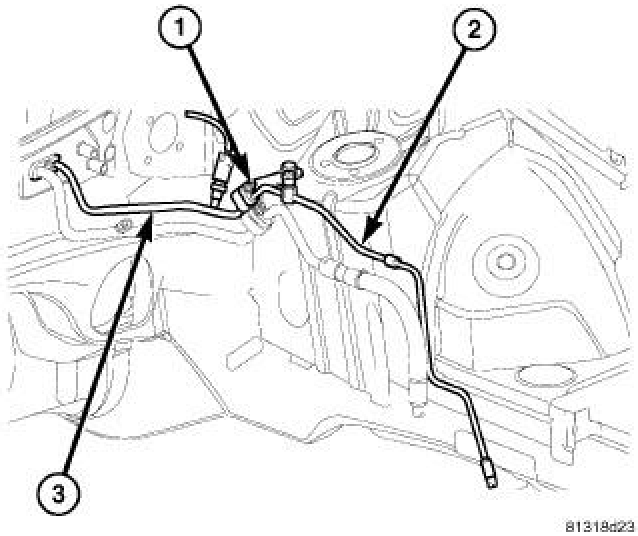


Fig. 55: Removing/Installing A/C Liquid Front Line
Courtesy of CHRYSLER GROUP, LLC

51. Position the front section of the A/C liquid line into the engine compartment.
52. Remove the tape or plugs from the fittings that connect the front section of the A/C liquid line to the rear section of the A/C liquid line (3).

NOTE: **Use only the specified seal as it is made of a special material for the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.**

53. Lubricate a **NEW** dual plane seal with clean refrigerant oil and install it onto the liquid line fitting. Use only the specified seal as it is made of a special material for the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
54. Connect the front section of the A/C liquid line to the rear section of the A/C liquid line.
55. Install the nut (1) that secures the front section of the A/C liquid line to the rear section of the A/C liquid line and tighten the nut to the proper specification. Refer to **SPECIFICATIONS** .

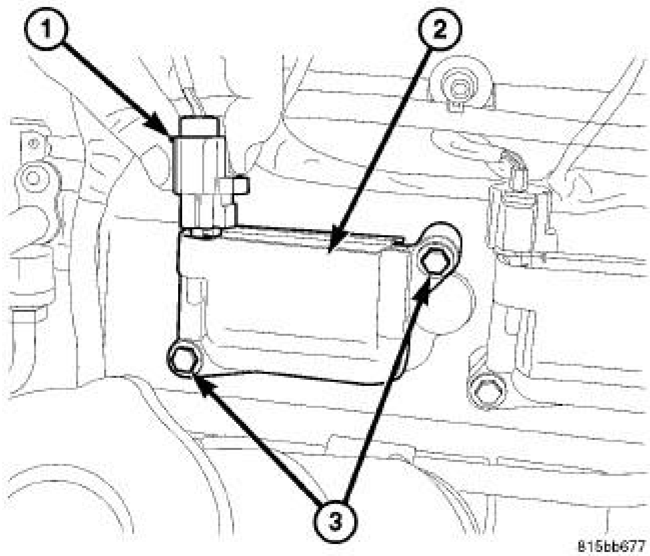


Fig. 56: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

56. Position the ignition coil wire harness and connect all ignition coil wire harness connectors (1).

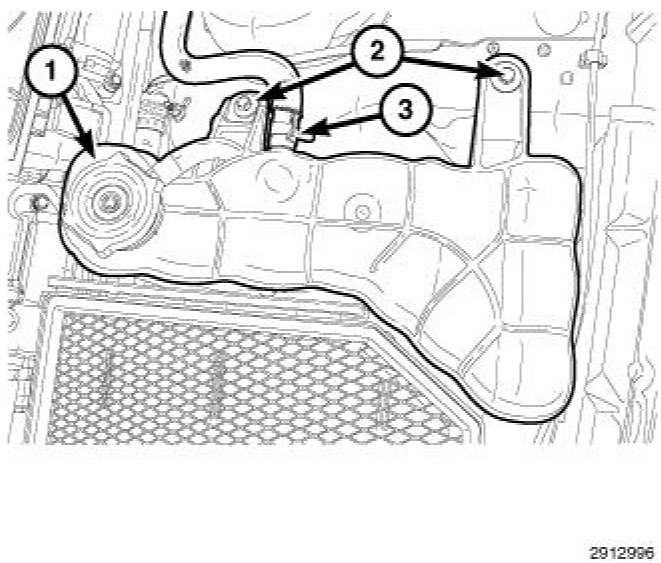


Fig. 57: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

57. Install the pressurized coolant bottle (1). Tighten the bolts (2) the proper specification. Refer to **SPECIFICATIONS** .
58. Position the wire harness and secure to the right hand inner fender panel.
59. Install the cooling fan. Refer to **FAN, COOLING, INSTALLATION** .

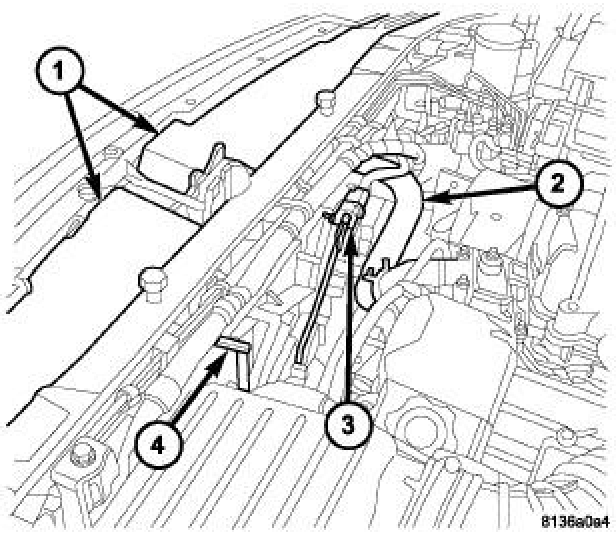


Fig. 58: Radiator Fan Assembly
Courtesy of CHRYSLER GROUP, LLC

60. Install the upper radiator hose (2).

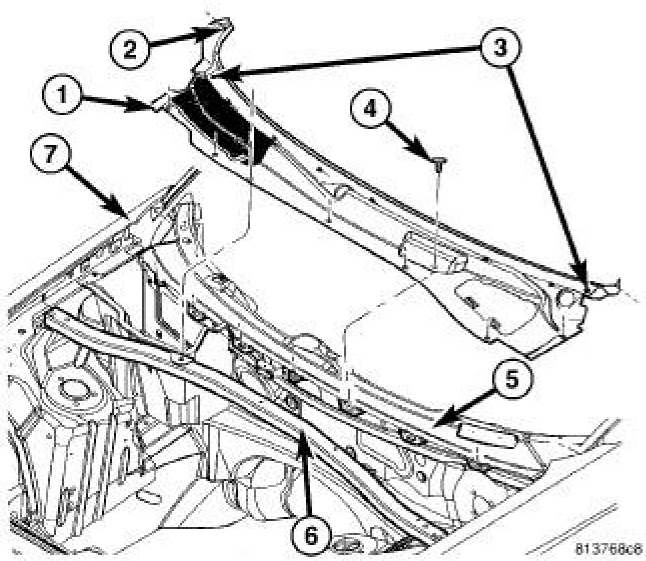


Fig. 59: Removing/Installing Cowl Panel
Courtesy of CHRYSLER GROUP, LLC

61. Install the strut tower support (6) and tighten bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
62. Install the cowl panel cover. Refer to **COVER, COWL PANEL, INSTALLATION** .
63. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
64. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .

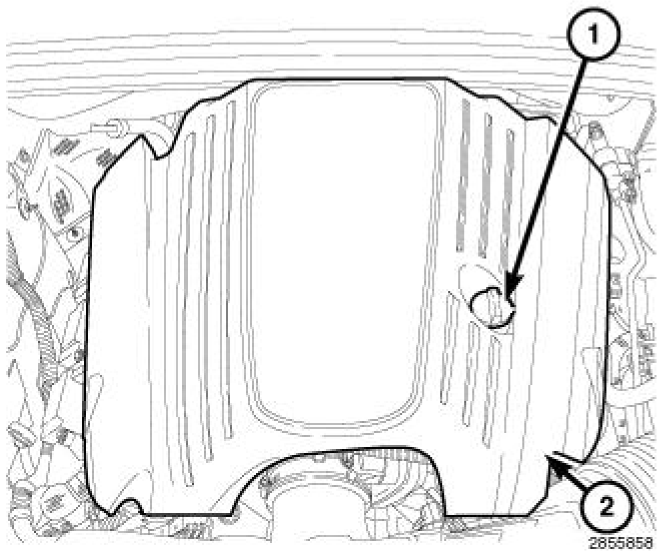


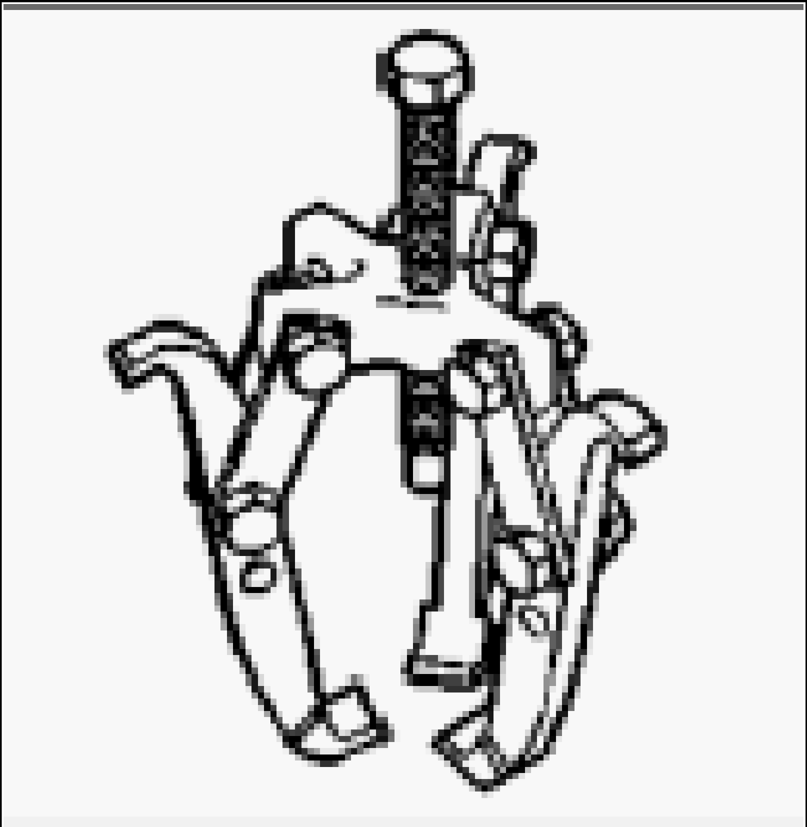
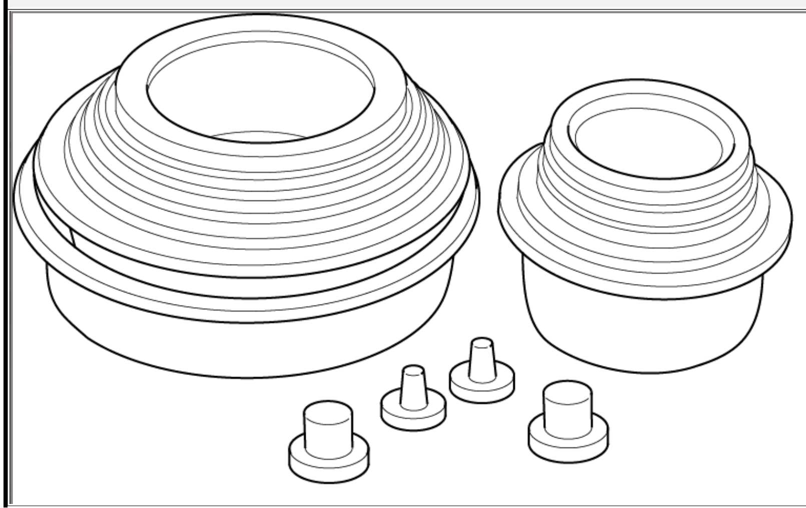
Fig. 60: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

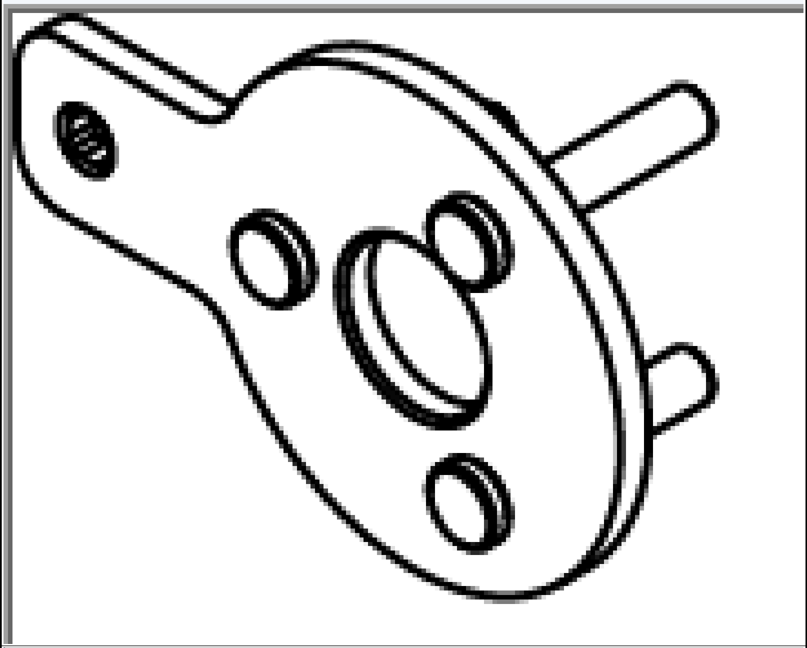
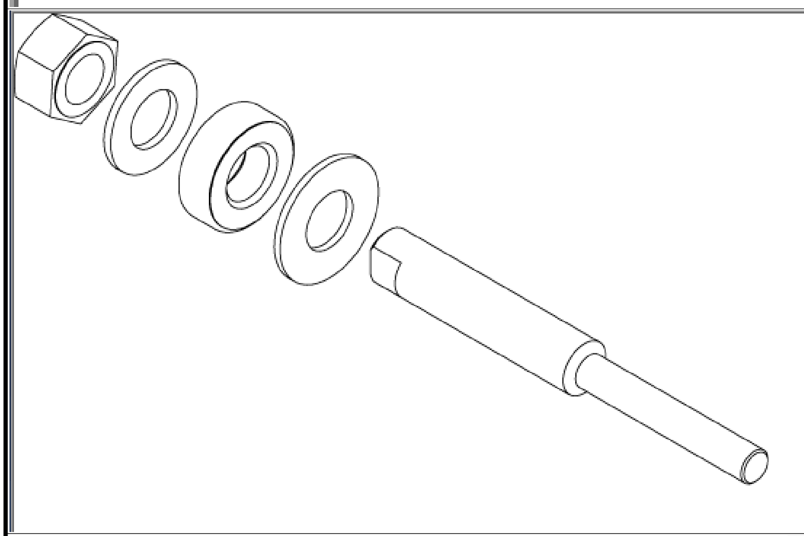
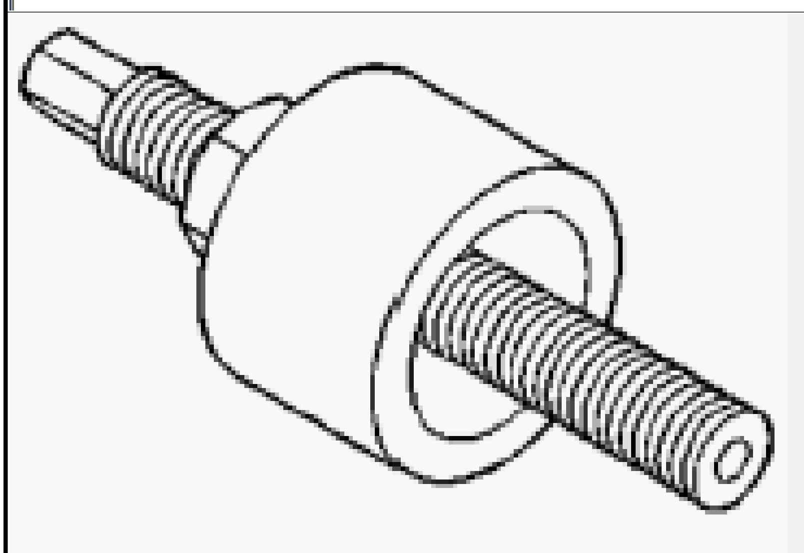
65. Install the engine cover (2).
66. Connect the negative battery cable.
67. Charge the Refrigerant System. Refer to **PLUMBING, STANDARD PROCEDURE** .
68. Start the engine and check for leaks.

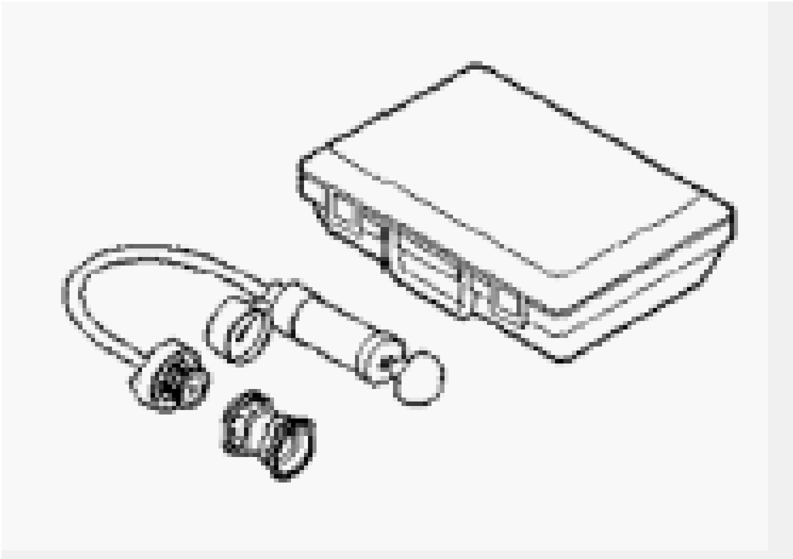
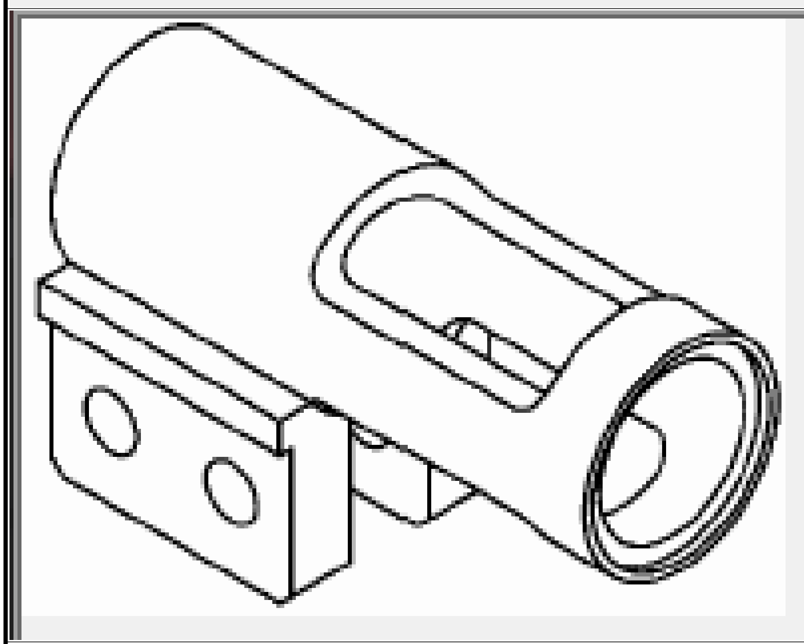
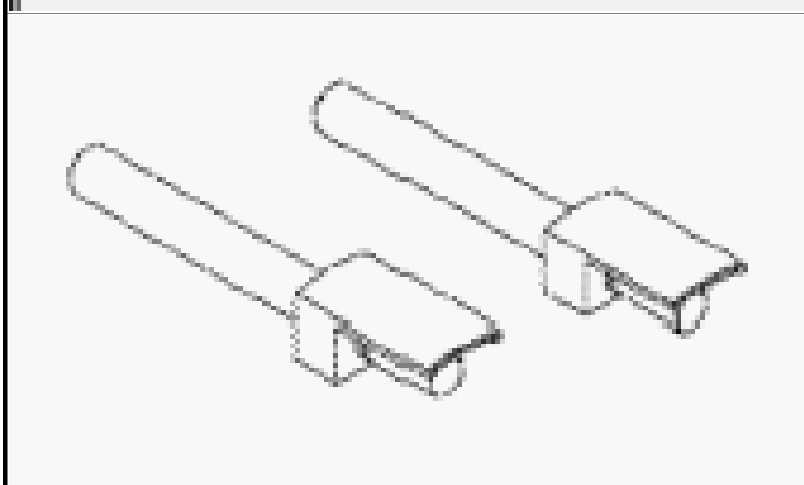
NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

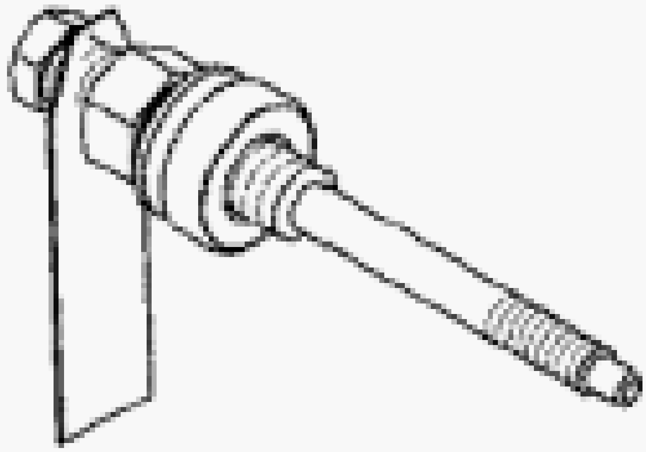
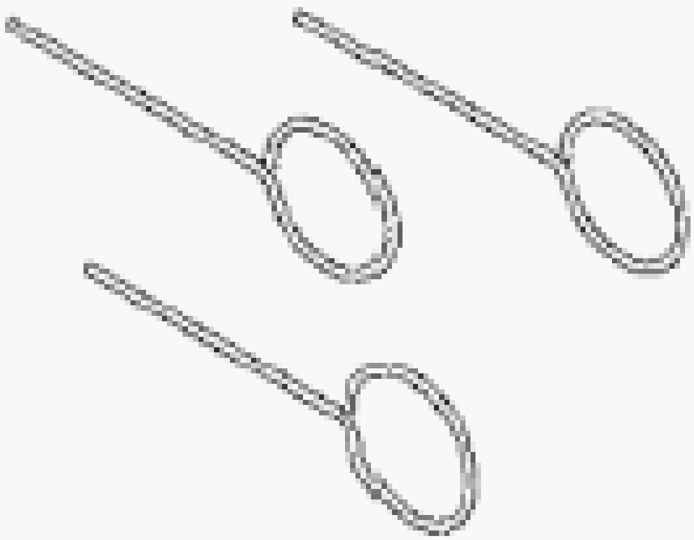
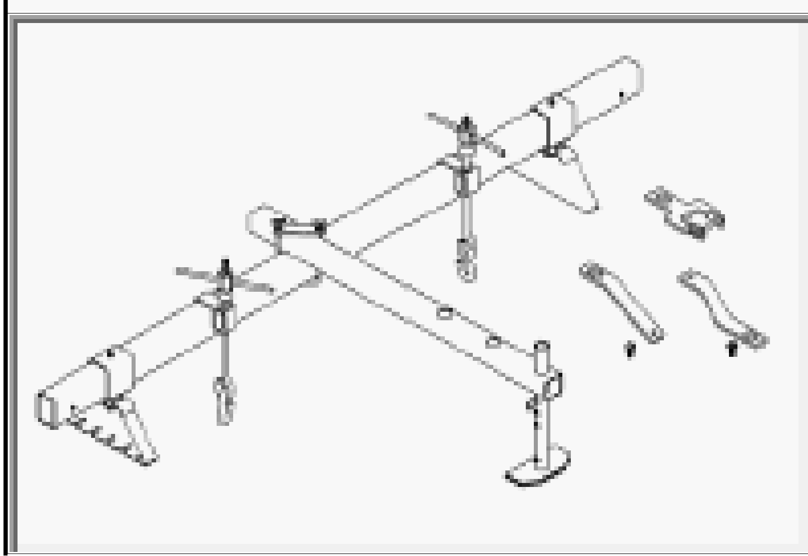
SPECIAL TOOLS

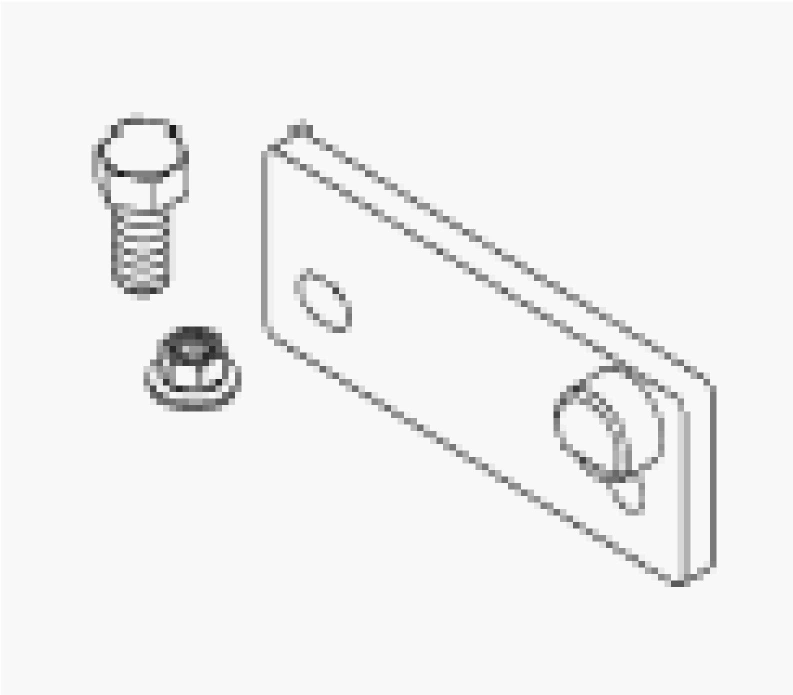
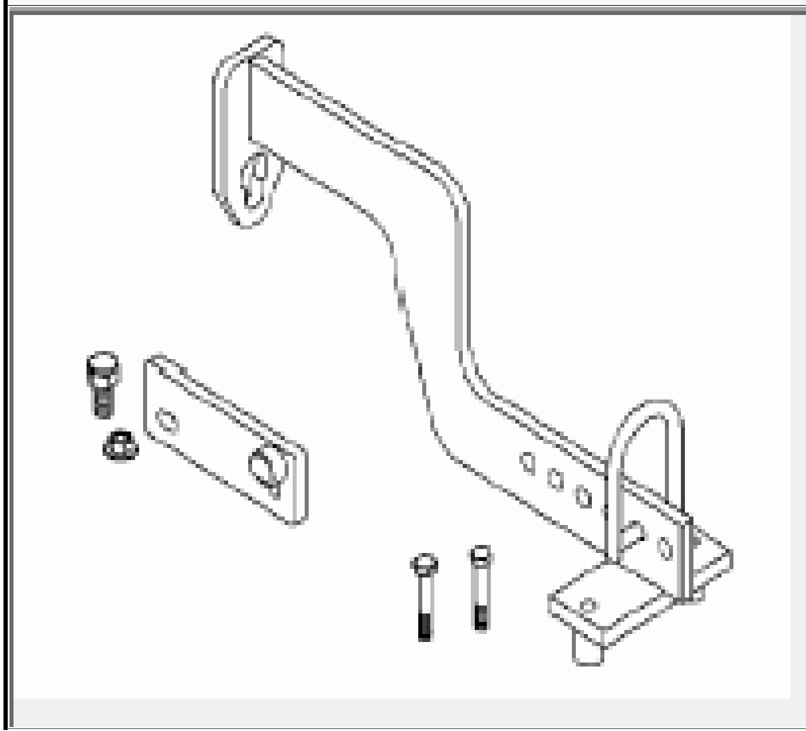
SPECIAL TOOLS

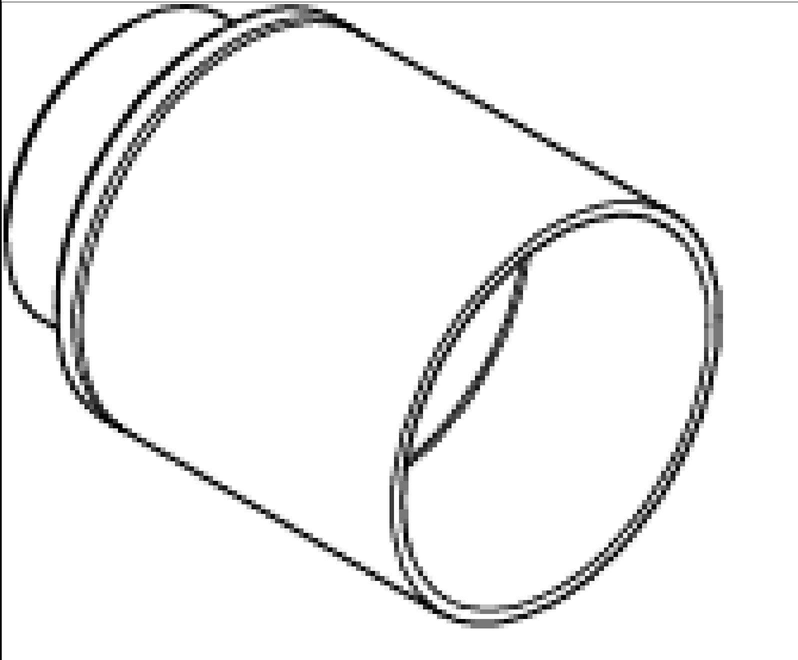
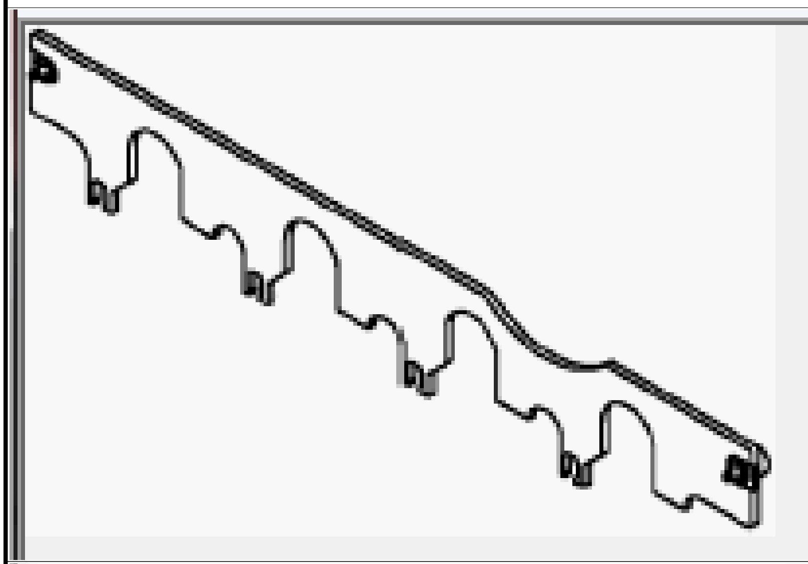
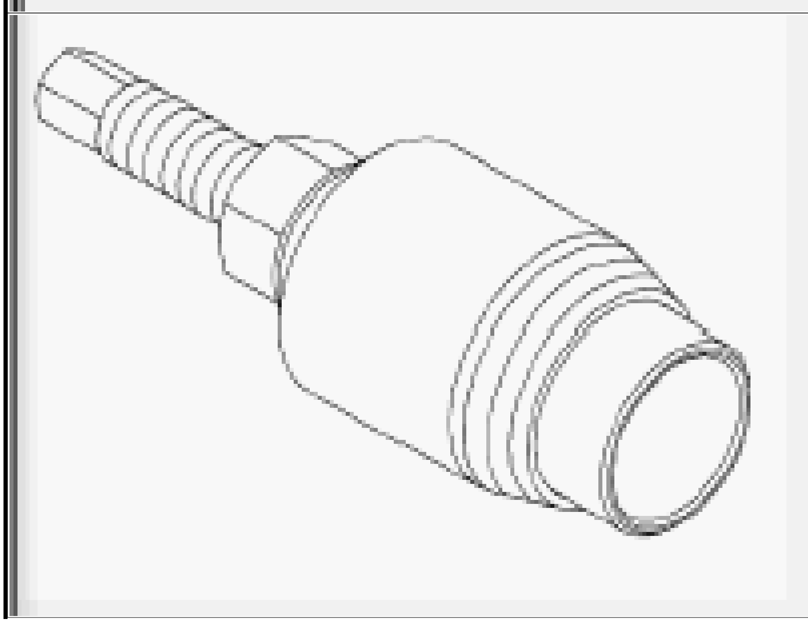
	1023 - Puller (Originally Shipped In Kit Number(s) 8678.)
	10368 - Set, Universal Protective Cap

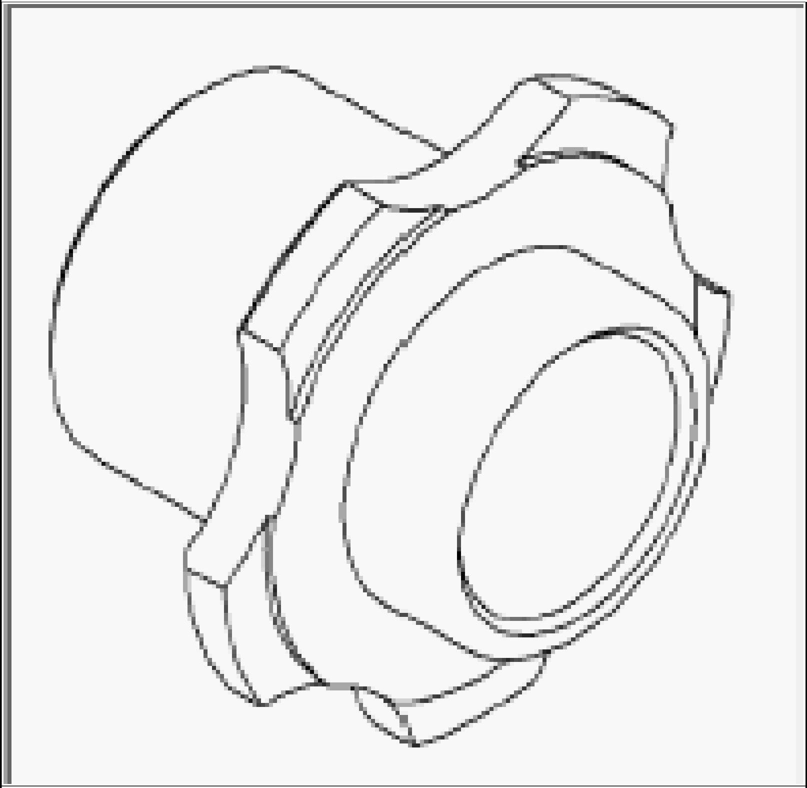
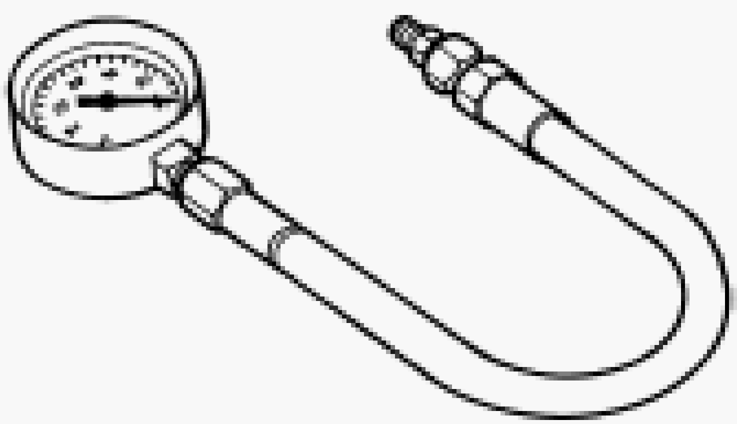
	10386 - Holder, Vibration Damper
	10387 - Installer, Vibration Damper
	6871 - Installer, A/C Hub (Originally Shipped In Kit Number(s) 6896.)

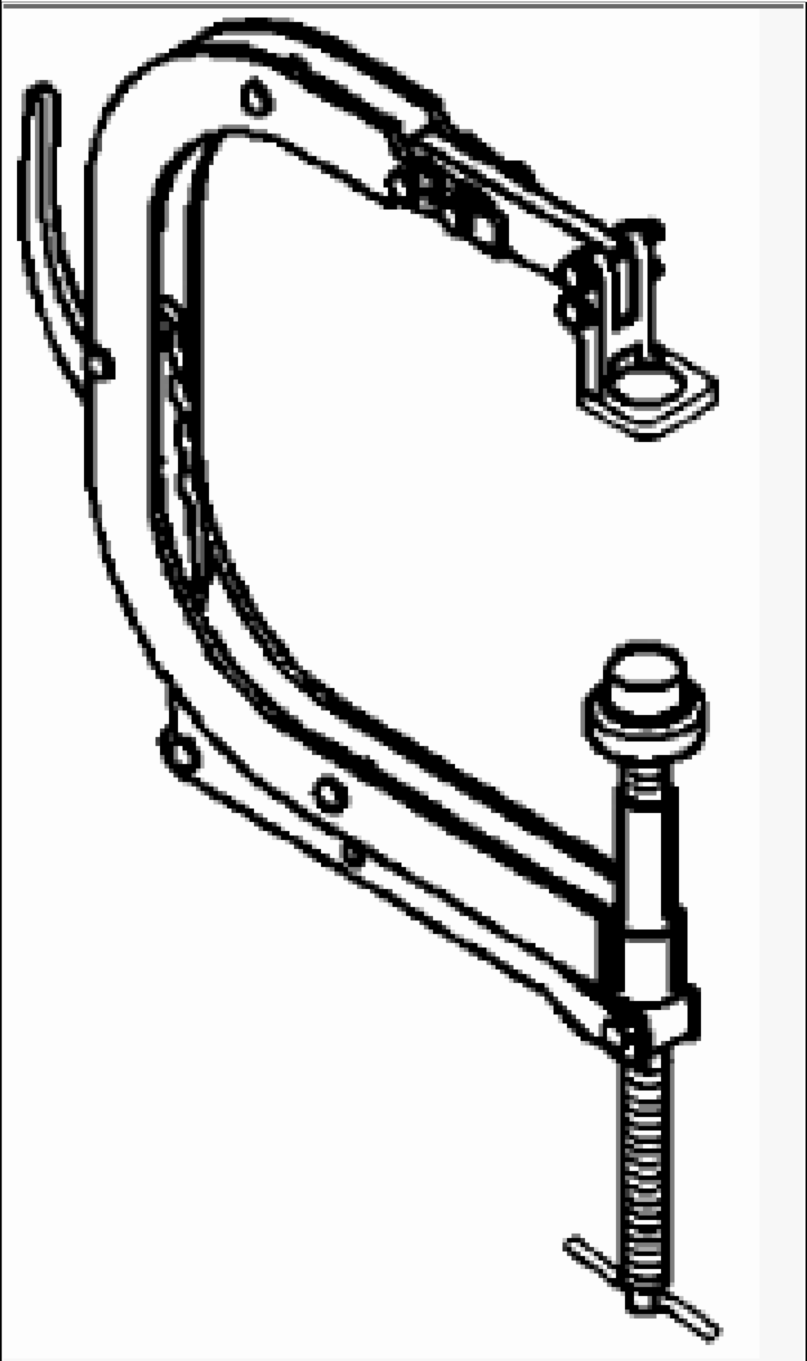
	7700 - Tester, Cooling System (Originally Shipped In Kit Number(s) 7700-A.)
	8464 - Adapter, Valve Spring (Originally Shipped In Kit Number(s) 8664, 8665, 8665CC, 8702, 9577.)
	8507 - Guides, Connecting Rod (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC.)

	10387 - Installer, Damper (Originally Shipped In Kit Number(s) 8283, 8527, 8575, 8575CC, 8660, 8661.)
	8514 - Pins, Tensioner (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.)
	8534B - Fixture, Driveline Support (Originally Shipped In Kit Number(s) 8534, 8534B, 8849, 9565.)

	8984-UPD - Adapter, Engine Lift (Originally Shipped In Kit Number(s) 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519.)
	8984B - Fixture, Engine Lifting (Originally Shipped In Kit Number(s) 8849CC, 9329, 9515, 9516, 9518, 9519, 9540, 9541, 9577.)

	9065C - Compressor, Valve Spring (Originally Shipped In Kit Number(s).)
	9070 - Retainer, Push Rod (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.)
	9071 - Remover, Seal (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.)

	9072 - Installer, Seal (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577, 9975, 9976.)
	C-119 - Cylinder Indicator
	C-3292A - Gauge, Pressure

	C-3422-D - Compressor, Valve Spring

	C-3685-A - Bloc-Chek Kit

MDS SYSTEM

DESCRIPTION

DESCRIPTION

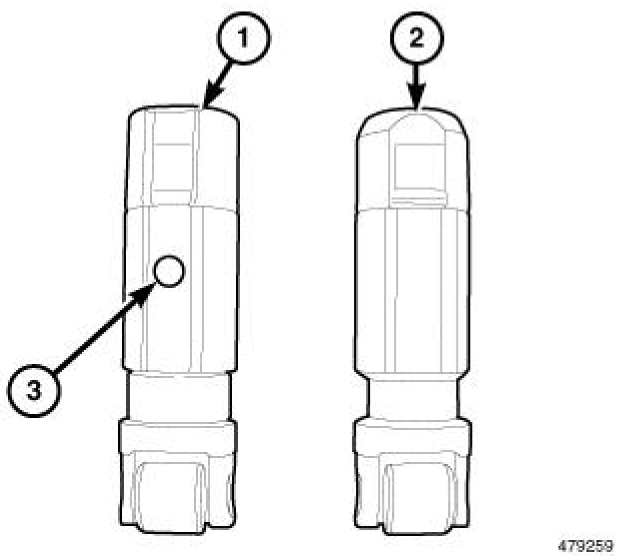


Fig. 61: MDS Lifter
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) selectively deactivates cylinders 1, 4, 6 and 7 during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy.

The MDS can provide a 5 to 20% fuel economy benefit when operating in four-cylinder mode. Depending on driving habits and vehicle usage. For EPA rating purposes the fuel economy is 8 to 15% higher than if the engine was operating on eight-cylinders at all times.

The MDS deactivating lifter (1) can be distinguished from the non-MDS lifter (2) by the disconnecting pin (3) on the side of the MDS lifter.

MDS is integrated into the basic engine architecture requiring these additional components:

- Unique MDS camshaft
- 8 deactivating roller lifters
- 4 MDS control valve solenoids
- MDS control valve solenoid wiring harness
- Oil temperature sensor

OPERATION

OPERATION

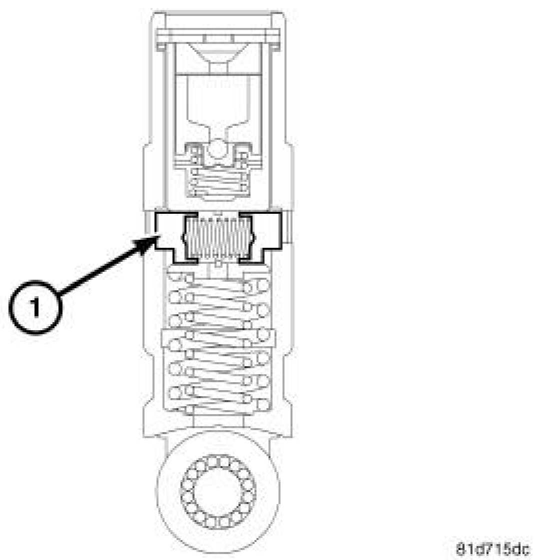


Fig. 62: MDS Lifter Cross-Section
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy. Both four and eight cylinder configurations have even firing intervals to provide smooth operation. The MDS selectively deactivates cylinders 1, 4, 6, and 7, to improve fuel economy. All deactivated cylinders have unique hydraulic lifters that collapse when deactivated to prevent the valves from opening. Engine oil pressure is used to activate and deactivate the valves. Oil is delivered through special oil passages drilled into the cylinder block. The MDS solenoid valves control the flow. When activated, pressurized oil pushes a latching pin on each MDS lifter which becomes a lost motion link. The base of the MDS lifter follows the camshaft while the top remains stationary. The MDS lifter is held in place against the pushrod by light spring pressure but unable to move because of the much higher force of the valve spring.

NOTE: **It is critical to use the recommended oil viscosity in engines that use MDS.**

Deactivation occurs during the compression stroke of each cylinder, after air and fuel enter the cylinder. Ignition occurs, but the combustion products remain trapped in the cylinder under high pressure, because the valves no longer open. No fuel/air enters or leaves during subsequent piston strokes, this high pressure gas is repeatedly

compressed and expanded like an air spring.

AIR INTAKE SYSTEM

AIR CLEANER

REMOVAL

REMOVAL

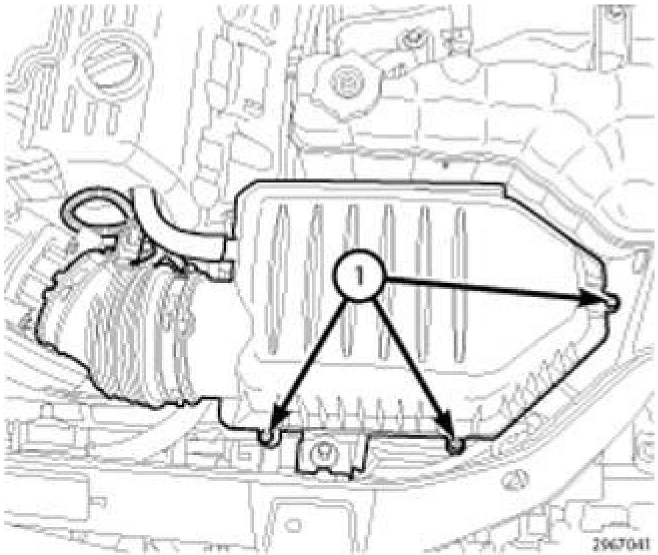


Fig. 63: Air Cleaner Housing Cover Retaining Screws
Courtesy of CHRYSLER GROUP, LLC

1. Remove the air cleaner housing cover retaining screws (1).

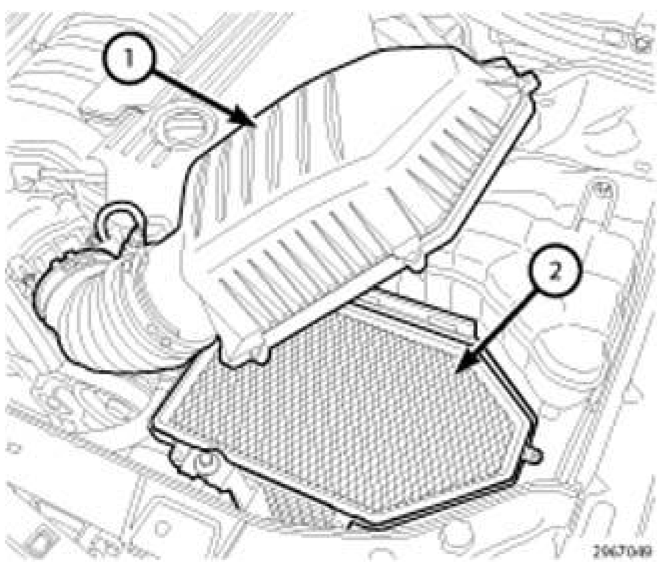


Fig. 64: Air Cleaner Housing Cover & Air Cleaner Element
Courtesy of CHRYSLER GROUP, LLC

2. Lift the air cleaner housing cover (1) while separating the locating tabs from the housing.
3. Remove air cleaner element (2) from the housing.

4. Clean the inside of air cleaner housing before replacing element.

INSTALLATION

INSTALLATION

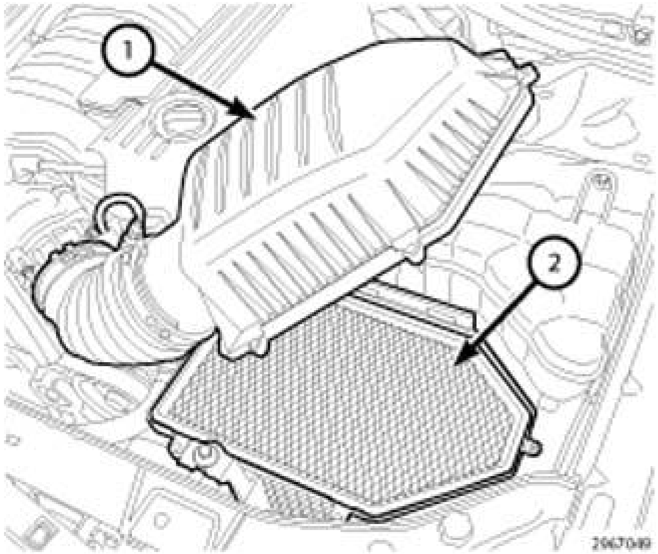


Fig. 65: Air Cleaner Housing Cover & Air Cleaner Element
Courtesy of CHRYSLER GROUP, LLC

1. Install the air cleaner element (2) into the housing.
2. Align the air cleaner housing cover (1) locating tabs into the housing while lowering the cover into position.

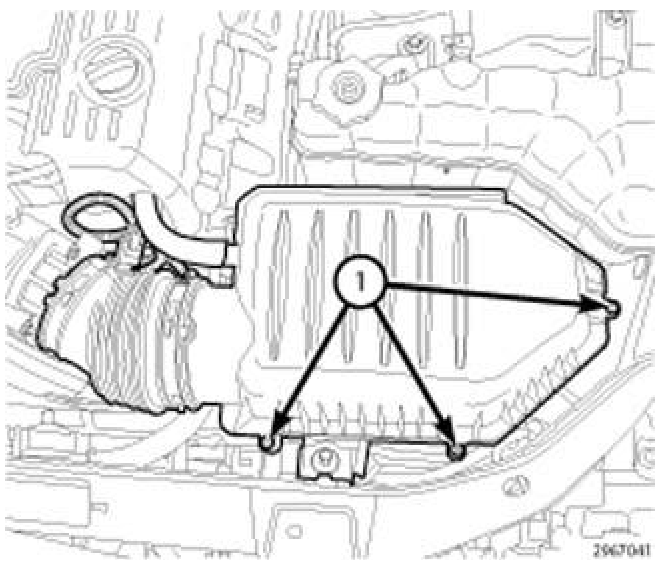


Fig. 66: Air Cleaner Housing Cover Retaining Screws
Courtesy of CHRYSLER GROUP, LLC

3. Securely tighten the air cleaner housing cover screws (1).

BODY, AIR CLEANER

REMOVAL

REMOVAL

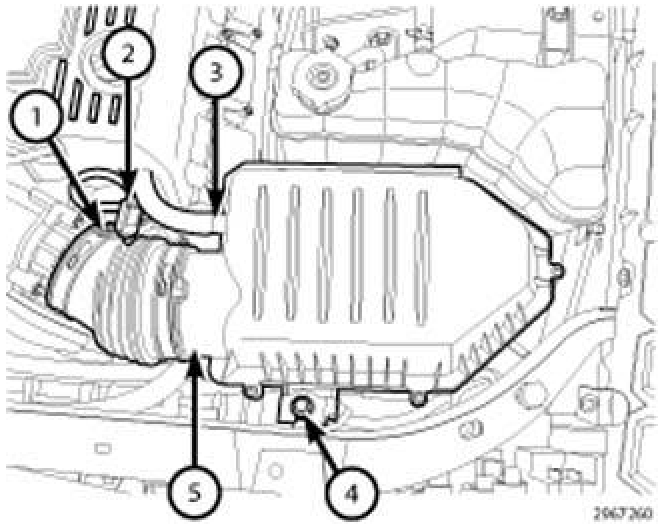


Fig. 67: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Loosen the air duct retaining clamp (1) at the throttle body.
3. Disconnect the intake air temperature sensor wire harness connector (2).
4. Remove the makeup air hose (3) at the air cleaner housing.
5. Remove the air cleaner body bolt (4).
6. While lifting up the air cleaner body (5), slide the air duct off the throttle body and remove the air cleaner housing from the vehicle.

INSTALLATION

INSTALLATION

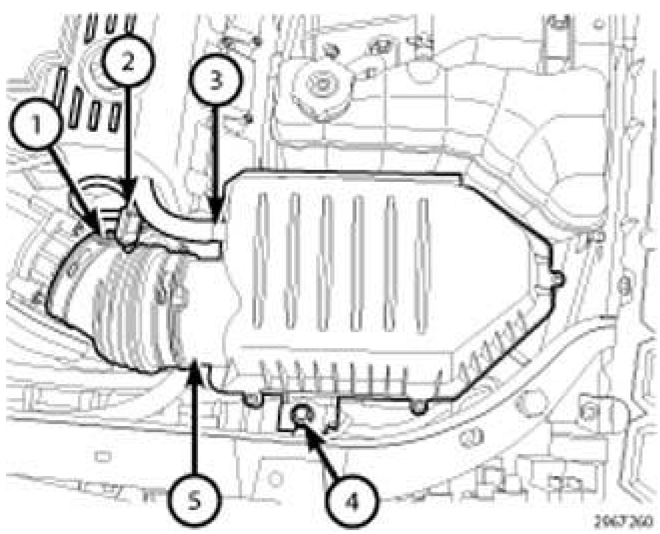


Fig. 68: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing

Courtesy of CHRYSLER GROUP, LLC

1. While sliding the air duct onto the throttle body, lower the air cleaner housing (5) into position and align the locating pin on the bottom of the housing.
2. Install the air cleaner body bolt (4) and securely tighten.
3. Install the makeup air hose (3) at the air cleaner body.
4. Connect the intake air temperature sensor wire harness connector (2).
5. Install the air duct retaining clamp (1) at the throttle body and securely tighten.

CYLINDER HEAD

OPERATION

OPERATION

The cylinder head closes the combustion chamber allowing the pistons to compress the air fuel mixture to the correct ratio for ignition. The valves located in the cylinder head open and close to either allow clean air into the combustion chamber or to allow the exhaust gases out, depending on the stroke of the engine.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - CYLINDER HEAD GASKET FAILURE

A cylinder head gasket leak can be located between adjacent cylinders or between a cylinder and the adjacent water jacket.

- Possible indications of the cylinder head gasket leaking between adjacent cylinders are:
  - Loss of engine power
  - Engine misfiring
  - Poor fuel economy
- Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:
  - Engine overheating
  - Loss of coolant
  - Excessive steam (white smoke) emitting from exhaust
  - Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in the Cylinder Compression Pressure Test. Refer to CYLINDER COMPRESSION TEST. An engine cylinder head gasket leaking between adjacent cylinders will results in approximately a 50 - 70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: Use extreme care when the engine is operating with the coolant pressure cap removed. Failure to follow these instructions may result in possible serious or

fatal injury.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

CAUTION: With the cooling system tester in place, pressure builds up fast. Excessive pressure built up by continuous engine operation must be released to a safe pressure point. Never permit pressure to exceed 138 kPa (20 psi).

Install the commercially available Cooling System Tester to pressure cap neck. Start the engine and observe the tester's pressure gauge. If the gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Combustion leaks into the cooling system can also be checked by using the Bloc-Chek Kit (special tool #C-3685-A, Bloc-Chek Kit) or equivalent. Perform the test following the procedures supplied with the tool kit.

REMOVAL

REMOVAL

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Disconnect and isolate the negative battery cable.

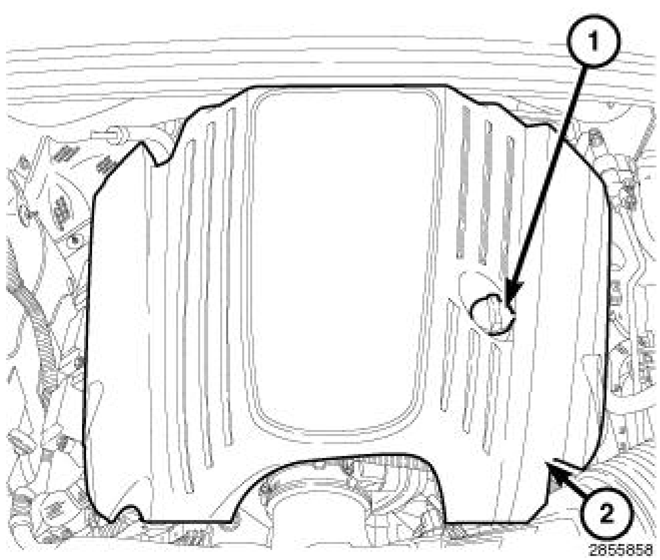


Fig. 69: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

Remove the engine cover (2).

3. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

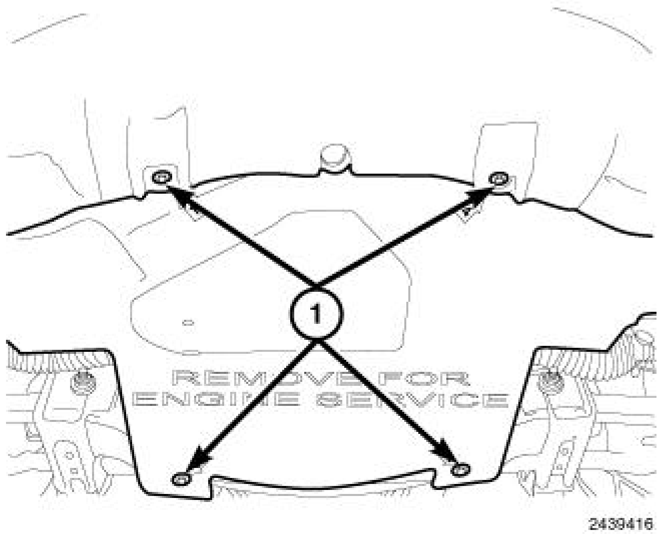


Fig. 70: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
5. Remove retainers (1) and the belly pan.
6. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

CAUTION: **When separating the catalytic converters from the manifolds, disconnect the oxygen sensor connectors. Allowing the catalytic converters to hang from the oxygen sensor wires damages the harness and/or sensors.**

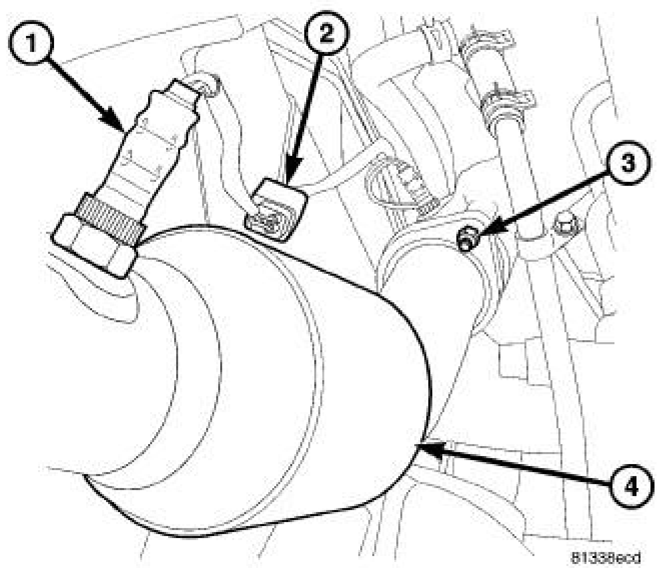


Fig. 71: LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

7. Disconnect all oxygen sensor wire harness connectors (2).
8. Saturate all exhaust bolts and nuts (3) with MoparÃ® Rust Penetrant. Allow five minutes for penetration.
9. Remove nuts (3) and separate the catalytic converters (4) from the exhaust manifolds.
10. Remove support and lower the vehicle.
11. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL** .
12. Remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL, 5.7L**.
13. If removing the right cylinder head, remove nut and the oil dip stick tube.

CAUTION: Pushrods and rocker arm assemblies must be installed in their original locations or engine damage could result.

NOTE: Make sure to identify the original location of the rocker arms and push rods for correct assembly.

14. Remove the rocker arms and push rods. Refer to **ROCKER ARM, VALVE, REMOVAL, 5.7L**.

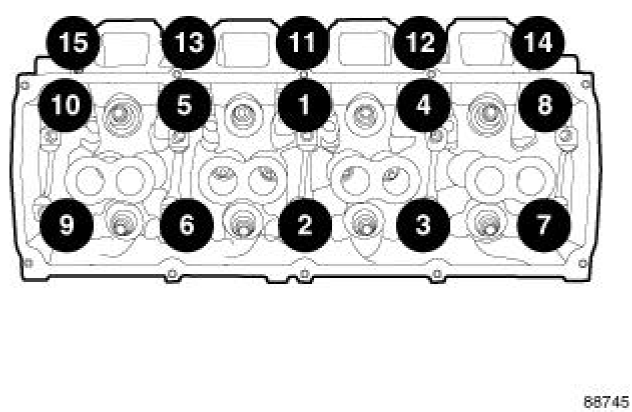


Fig. 72: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to remove the exhaust manifolds to remove the cylinder heads.

15. Using the sequence shown in illustration, remove the cylinder head bolts and remove the cylinder head(s).
16. Remove and discard the cylinder head gasket.
17. Inspect and clean the cylinder head (2) mating surface.

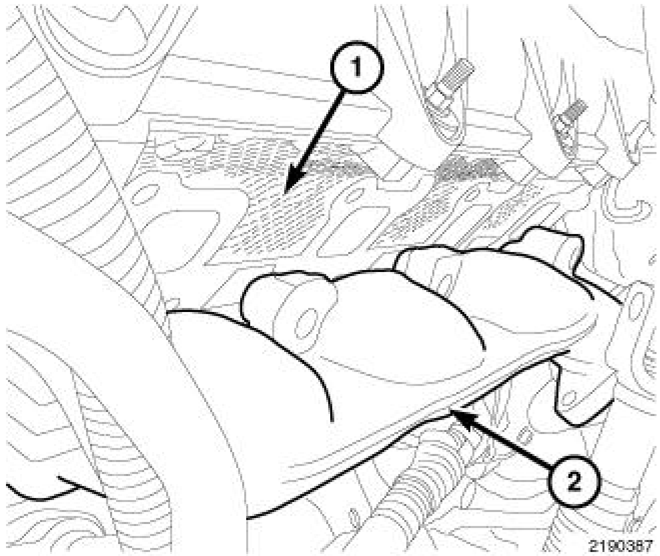


Fig. 73: Locating Exhaust Manifold & Gasket
Courtesy of CHRYSLER GROUP, LLC

18. If necessary, remove bolts and the manifold (2).

CLEANING

CLEANING

Clean all sealing surfaces of the cylinder block and cylinder heads using MoparÂ® Brake Parts Cleaner (or equivalent).

INSPECTION

INSPECTION

1. Inspect the cylinder head for out-of-flatness using a straightedge and a feeler gauge. If tolerances exceed 0.0508 mm (0.002 in.) replace the cylinder head.
2. Inspect the valve seats for damage. Service the valve seats as necessary.
3. Inspect the valve guides for wear, cracks or looseness. If either condition exist, replace the cylinder head.
4. Inspect the pushrods. Replace worn or bent pushrods.
5. Inspect the cylinder head bolts.

INSTALLATION

INSTALLATION

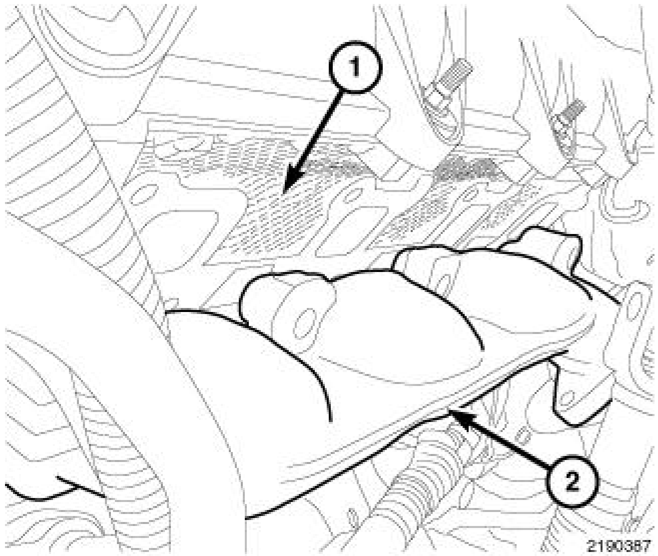


Fig. 74: Locating Exhaust Manifold & Gasket
Courtesy of CHRYSLER GROUP, LLC

1. If replacing the cylinder head, transfer the valves, valve seals and valve springs to the new cylinder head, if valve refacing is necessary. Refer to **VALVES, INTAKE AND EXHAUST, INSTALLATION, 5.7L**.
2. If replacing the cylinder head, transfer the spark plugs to the new cylinder head. Refer to **SPARK PLUG, INSTALLATION** .

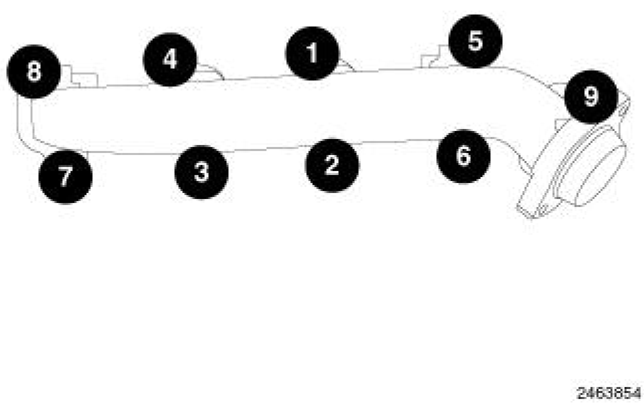
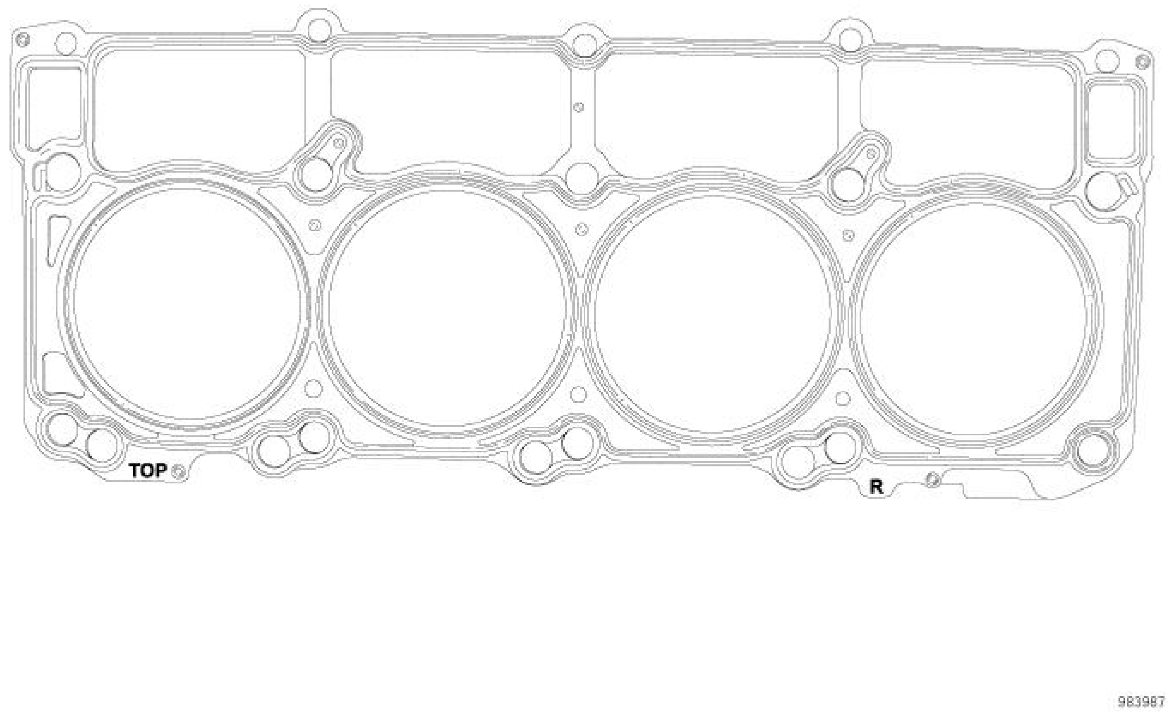


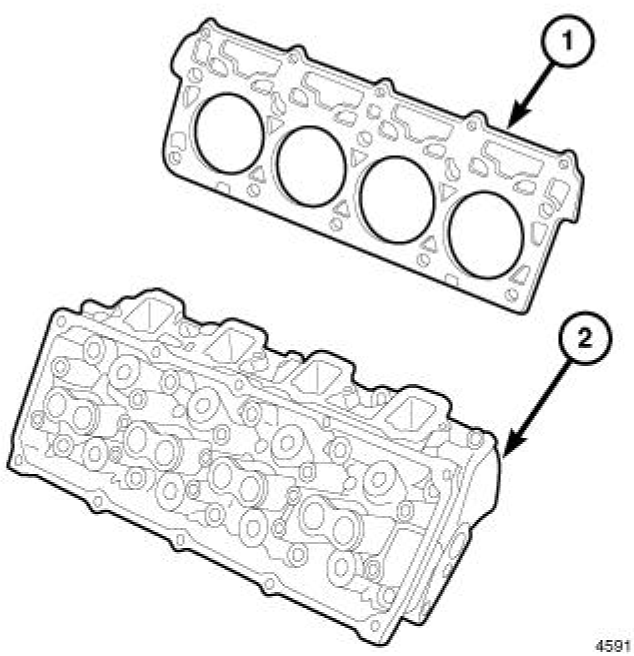
Fig. 75: Removing/Installing Bolts/Studs From Exhaust Manifold In Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Using a new gasket, Install the exhaust manifold. Using the sequence shown in illustration, tighten bolts/studs to 25 N.m (18 ft. lbs.).



[Fig. 76: Identifying Cylinder Head Gasket Marking]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The cylinder head gaskets are not interchangeable between the left and right sides. They are marked with an "L" and "R" to indicate the left or right side and they are marked "TOP" to indicate which side goes up.**



[Fig. 77: Cylinder Head & Gasket]
Courtesy of CHRYSLER GROUP, LLC

4. Clean all gasket sealing surfaces of the cylinder block and cylinder heads using a suitable solvent.
5. Install the new cylinder head gaskets (1).
6. Install the cylinder heads (2).

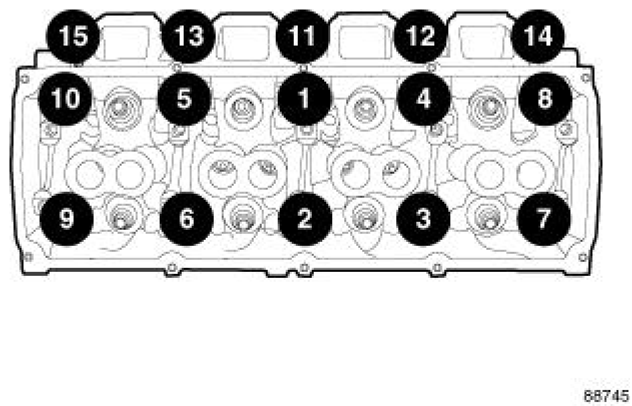


Fig. 78: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Using the sequence shown in illustration, tighten the cylinder head bolts 1 through 10 to 34 N.m (25 ft. lbs.).
8. Using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 20 N.m (177 in. lbs.).
9. Using the sequence shown in illustration, tighten the cylinder head bolts 1 through 10 to 61 N.m (45 ft. lbs.).
10. Using the sequence shown in illustration, tighten the cylinder head bolts 11 through 15 to 28 N.m (21 ft. lbs.).
11. Using the sequence shown in illustration, rotate the cylinder head bolts 1 through 10 an additional 90Ā° turn.

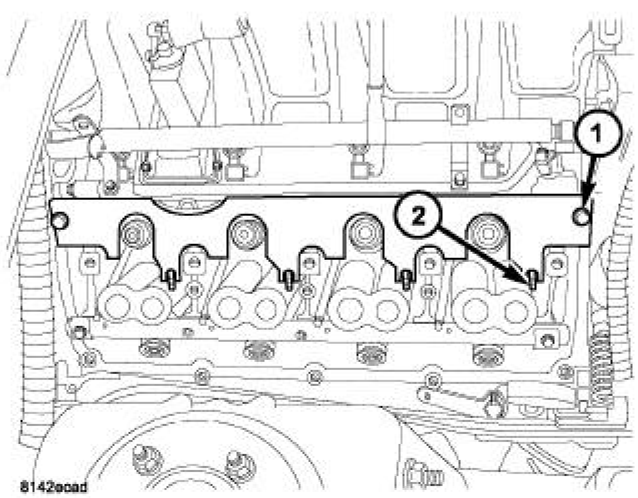


Fig. 79: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

12. Install the push rods and rocker arm assemblies in their original position, using Pushrod Retainer (special tool #9070, Retainer, Push Rod) (1).

    Refer to **ROCKER ARM, VALVE, INSTALLATION, 5.7L**.

13. If Installing the right cylinder head, install the engine oil dip stick tube and nut.
14. Install the cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION, 5.7L**.
15. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

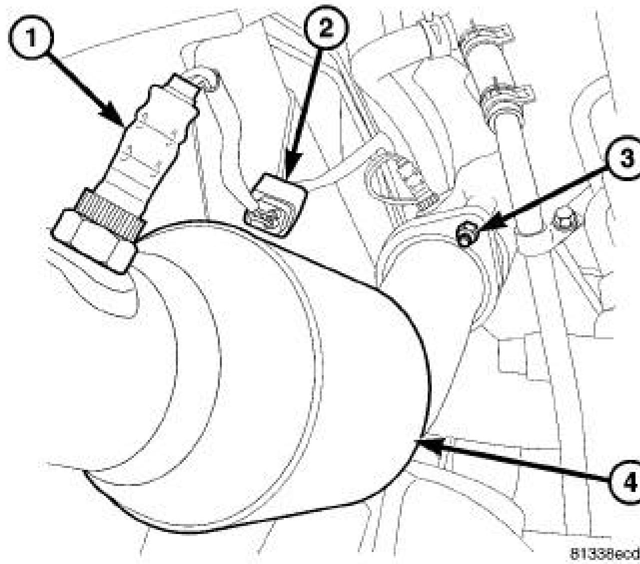


Fig. 80: LH Catalytic Converter
Courtesy of CHRYSLER GROUP, LLC

16. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
17. Install the catalytic converters (4) Tighten nuts (3) to the proper specification. Refer to **SPECIFICATIONS** .
18. Connect the oxygen sensor wire harness connectors (2).

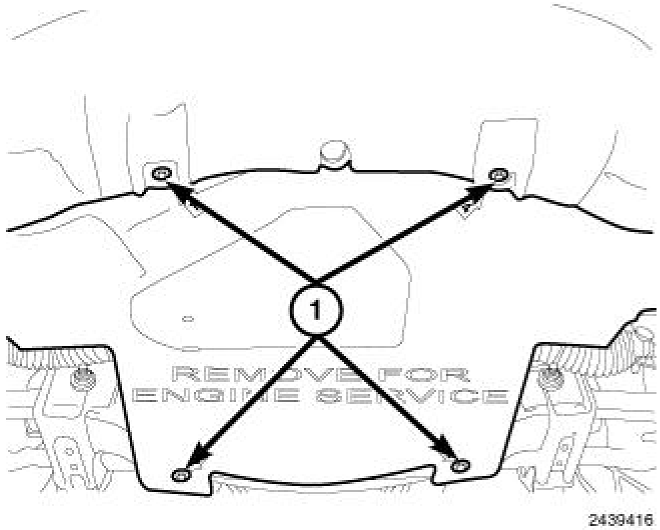


Fig. 81: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

19. Install the belly pan and retainers (1).
20. Remove support and lower the vehicle.
21. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.
22. Change the engine oil and oil filter. Refer to **STANDARD PROCEDURE**.
23. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .

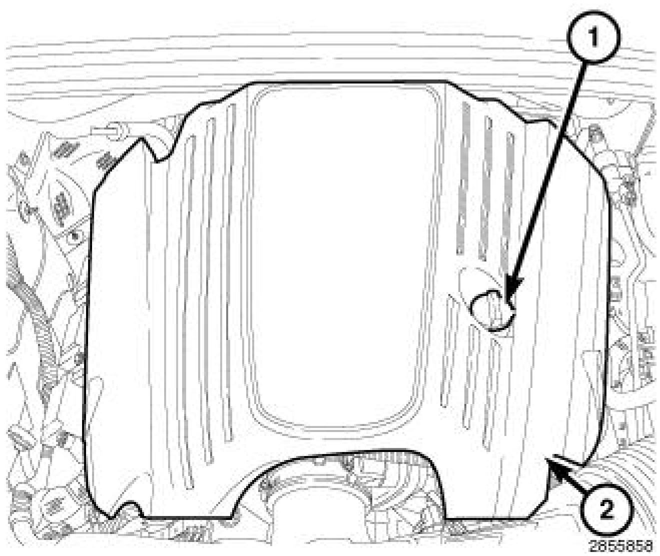


Fig. 82: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

24. Install the engine cover (2).
25. Connect the negative battery cable.
26. Start the engine and check for leaks.

COVER(S), CYLINDER HEAD

REMOVAL

REMOVAL

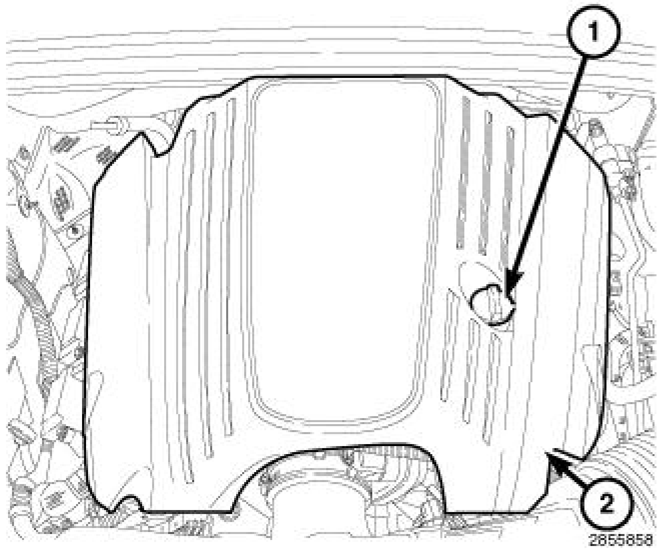


Fig. 83: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover (2).
3. Remove the ignition coils. Refer to COIL, IGNITION, REMOVAL .

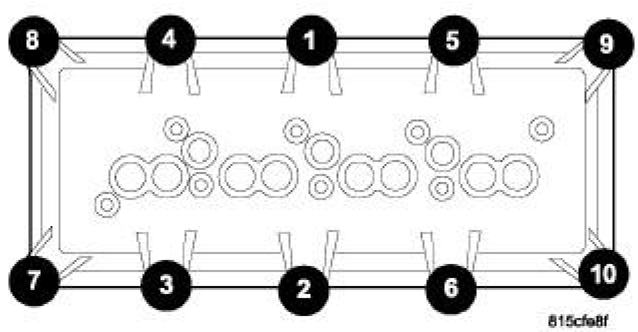


Fig. 84: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the sequence shown in illustration, remove the cylinder head cover bolts.

CAUTION: **Do not use harsh cleaners to clean the cylinder head covers. Severe damage to covers may occur.**

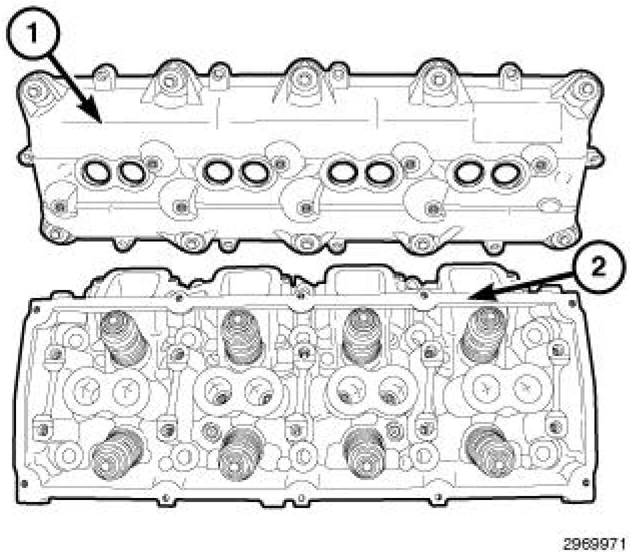


Fig. 85: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

5. Remove the cylinder head cover (1).
6. Clean the sealing surface of the cylinder head (2) and cover.

NOTE: **The cylinder head cover gasket may be used again, provided no cuts, tears, or deformation have occurred.**

INSTALLATION

INSTALLATION

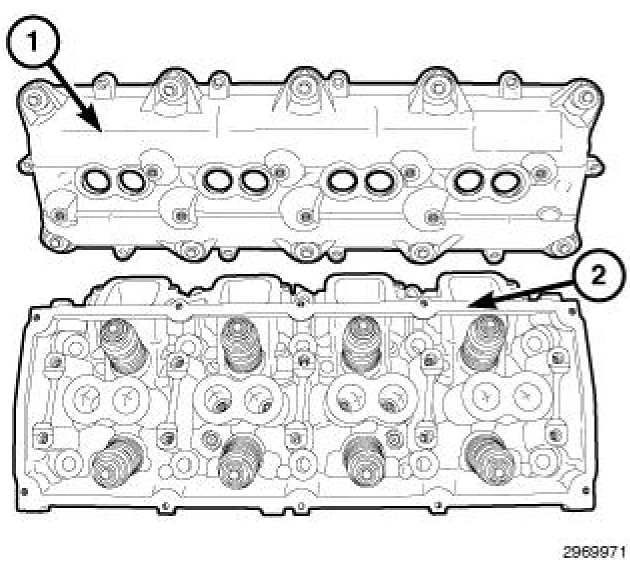


Fig. 86: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not use harsh cleaners to clean the cylinder head covers. Severe damage to covers may occur.**

CAUTION: **Do not allow other components including the wire harness to rest on or against the engine cylinder head cover. Prolonged contact with other objects may wear a hole in the cylinder head cover.**

NOTE: **The cylinder head cover gasket may be used again, provided no cuts, tears, or deformation have occurred.**

1. Clean the cylinder head cover (1) and the sealing surface of the cylinder head (2). Inspect and replace gasket if necessary.
2. Install the cylinder head cover (1) and tighten bolts finger tight.

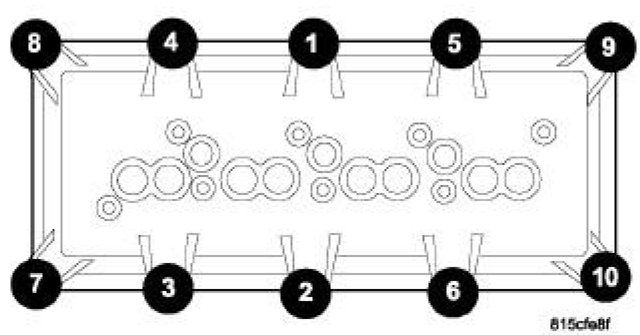


Fig. 87: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, tighten the cylinder head cover bolts to 8 N.m (71 in. lbs.).
4. Install the ignition coils. Refer to COIL, IGNITION, INSTALLATION .

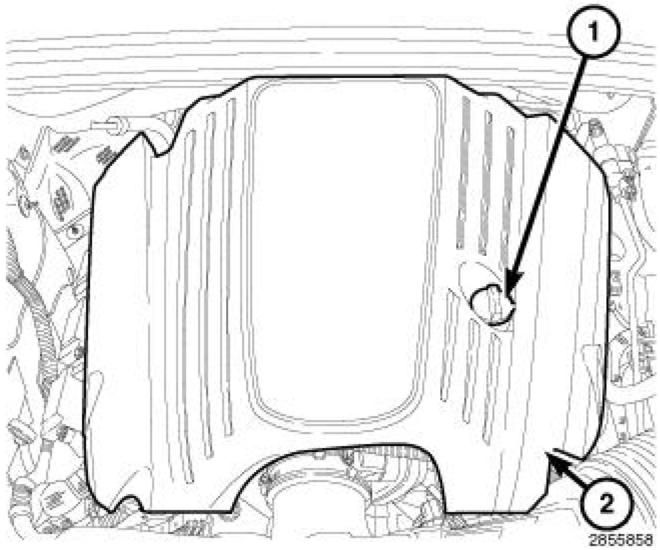


Fig. 88: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

5. Install the engine cover (2).
6. Connect the negative battery cable.

ROCKER ARM, VALVE

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.

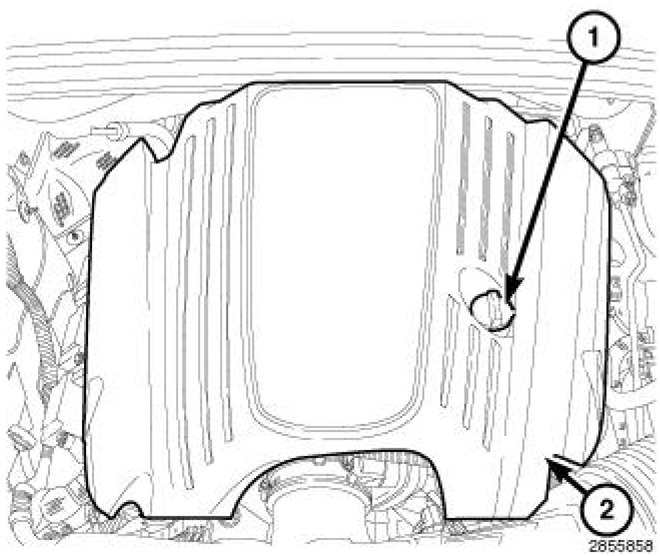


Fig. 89: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine cover (2).
3. Remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL, 5.7L**.

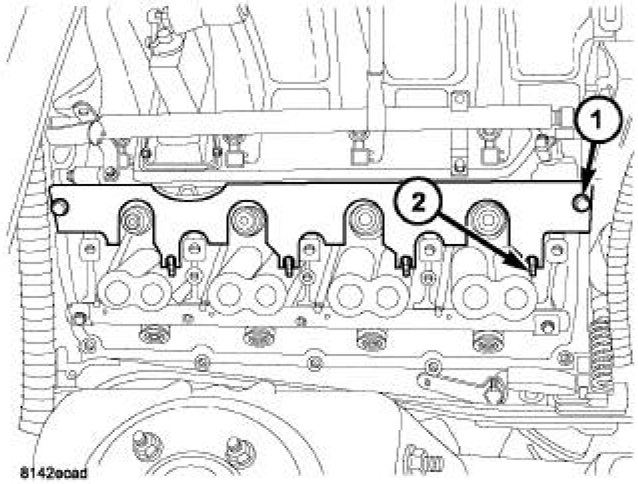


Fig. 90: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

4. Install the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

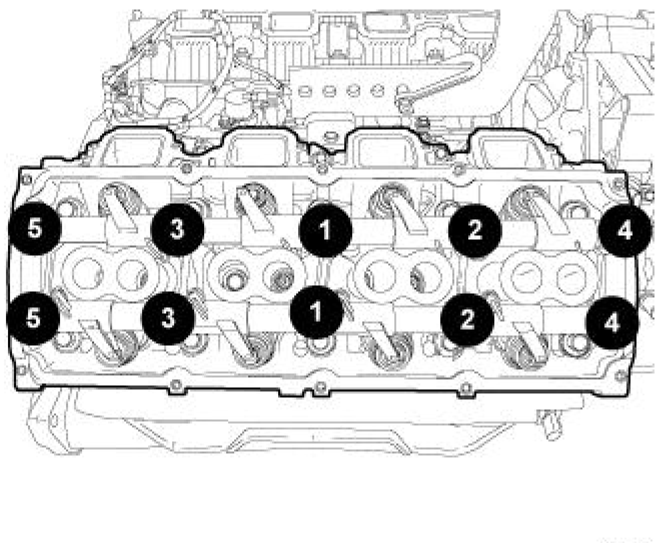


Fig. 91: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

5. Using the sequence shown in illustration, loosen the rocker arm shafts bolts.

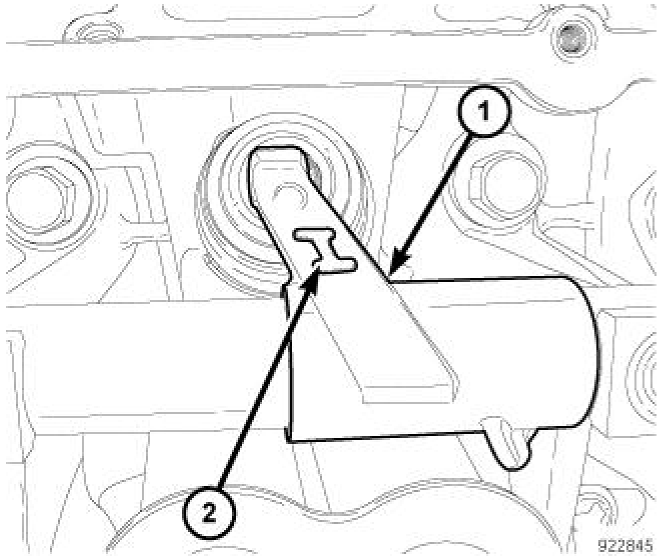


Fig. 92: Intake Rocker Arm Marking
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

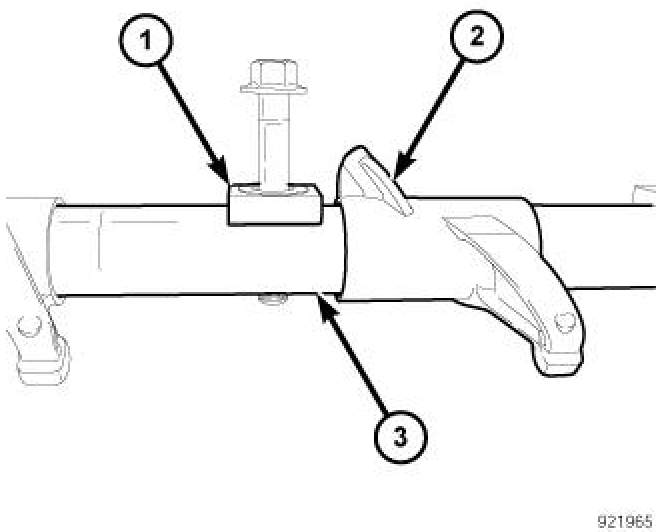


Fig. 93: Rocker Shaft Retainers
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not remove the retainers (1) from the rocker shaft (3).

6. Remove the rocker arm shaft (3) and note the location for reassembly.

CAUTION: The longer pushrods are for the exhaust side and the shorter pushrods are for the intake side.

7. Remove the pushrods and note the location for reassembly.

INSTALLATION

INSTALLATION

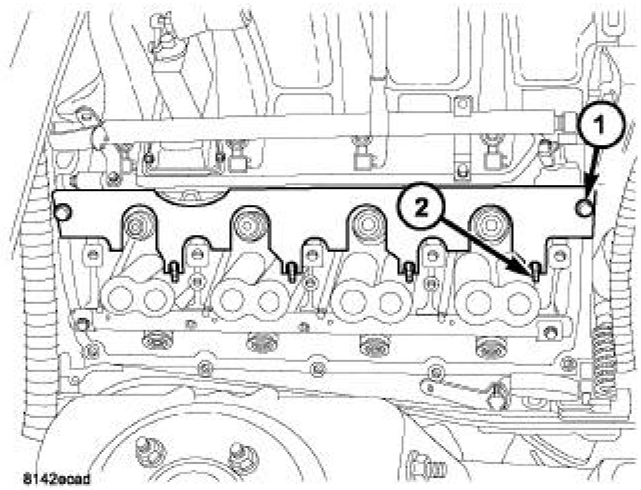


Fig. 94: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The longer pushrods are for the exhaust side and the shorter pushrods are for the intake side.

1. Install the push rods in the same order as removed.
2. Install the push rod retainer (special tool #9070, Retainer, Push Rod) (1).

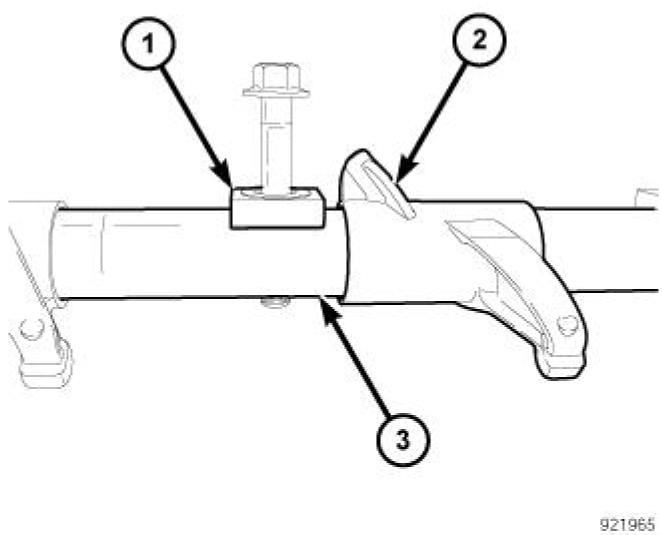


Fig. 95: Rocker Shaft Retainers
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Make sure that the retainers (1) and the rocker arms (2) are not overlapped when tightening bolts or engine damage could result.

CAUTION: Due to the changes in the pushrod clearance holes in the Eagle 5.7L cylinder heads, close attention must be given when installing the pushrod(s) into the tappet(s). Once the pushrod(s) have been installed, use a suitable light to look down through the pushrod hole(s). This will allow you to verify the pushrod(s) are centered properly in the tappet(s) and avoid engine damage. Recheck after the rocker shaft assembly has been installed and tightened to specification.

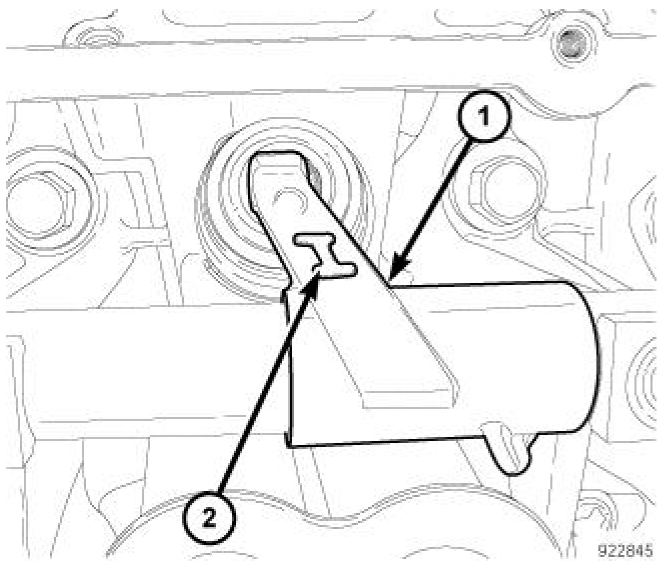


Fig. 96: Intake Rocker Arm Marking
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

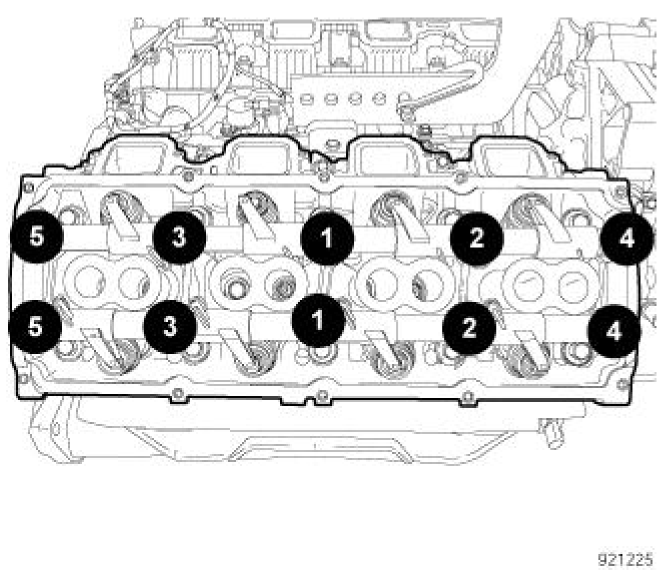


Fig. 97: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Install the rocker arm shaft assemblies in the same order as removed.
4. Using the sequence shown in illustration, tighten the rocker shaft bolts as follows:
   - Snug to 10 N.m (7 ft. lbs.)
   - Torque to 23 N.m (17 ft. lbs.)
   - Individually loosen by 1/2 turn and retorque to 23 N.m (17 ft. lbs.)
   - Finally, Rotate 30 degrees

CAUTION: Do Not rotate or crank the engine during or immediately after rocker arm installation. Allow the hydraulic roller tappets adequate time to bleed down (about five minutes).

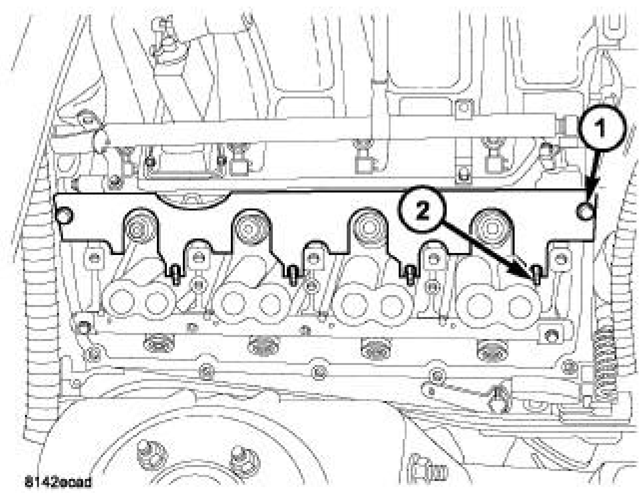


Fig. 98: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

5. Remove pushrod retainer (special tool #9070, Retainer, Push Rod) (1).
6. Install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION, 5.7L**.

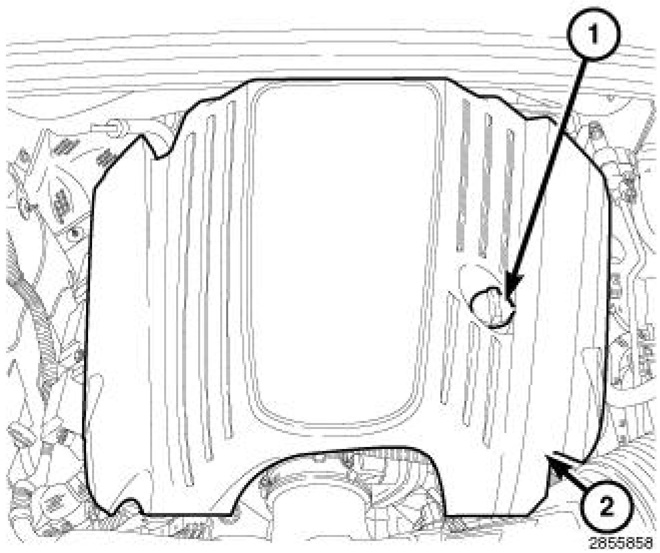


Fig. 99: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

7. Install the engine cover (2).
8. Connect the negative battery cable (1).

SEAL(S), VALVE GUIDE

DESCRIPTION

DESCRIPTION

The valve guide seals are made of rubber and incorporate an integral steel valve spring seat. The integral garter spring maintains consistent lubrication control to the valve stems.

SPRING(S), VALVE

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body and the air intake resonator. Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.
3. Remove the spark plug. Refer to **SPARK PLUG, REMOVAL** .
4. Remove the cylinder head cover Refer to **COVER(S), CYLINDER HEAD, REMOVAL, 5.7L**.

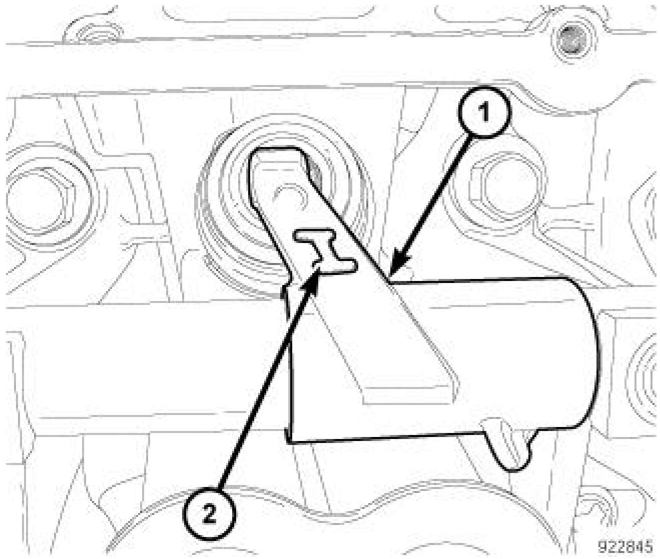


Fig. 100: Intake Rocker Arm Marking
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).**

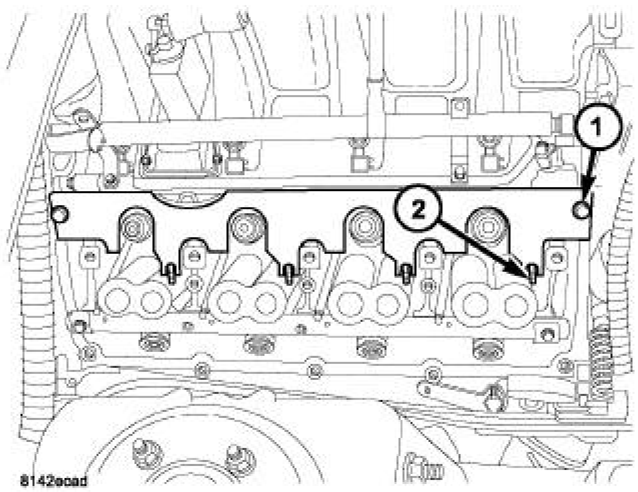


Fig. 101: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The piston must be at TDC and both valves closed on the cylinder to be serviced.**

CAUTION: **The longer pushrods are for the exhaust side and the shorter pushrods are**

for the intake side.

NOTE: Pushrods must be installed in the same order as removed.

5. Install the Pushrod Retainer (special tool #9070, Retainer, Push Rod) (1).

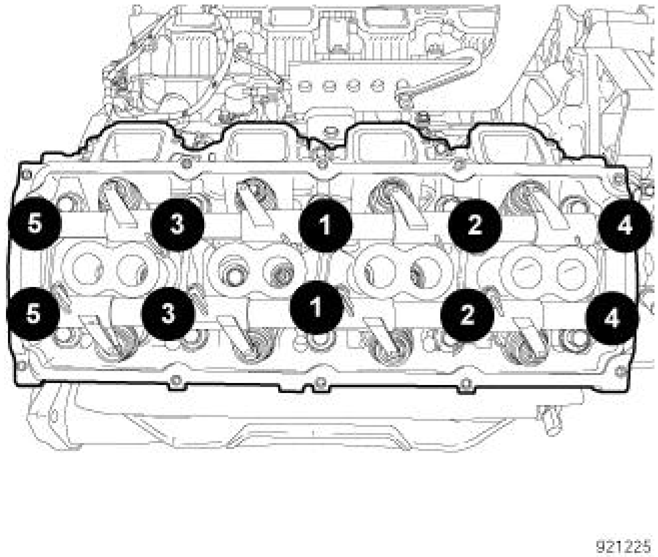


Fig. 102: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

6. Using the sequence shown in illustration, remove the exhaust/intake rocker arm shaft retaining bolts.

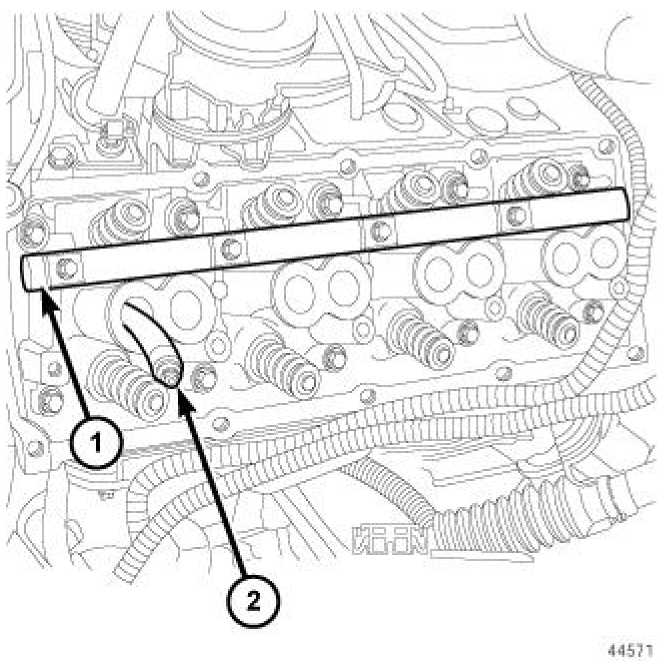


Fig. 103: Rocker Shaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: Tap the top of the valve spring retainer to loosen the spring retainers locks.

7. Install the rocker arm valve spring compressor shaft (special tool #9065C, Compressor, Valve Spring) (1).
8. Install the spring compressor adapter arm (special tool #9065C, Compressor, Valve Spring) if needed.

NOTE: **The valve core needs to be remove from compression test adapter hose.**

9. Install a compression test adapter hose (2) into the spark plug hole and charge the cylinder with air.

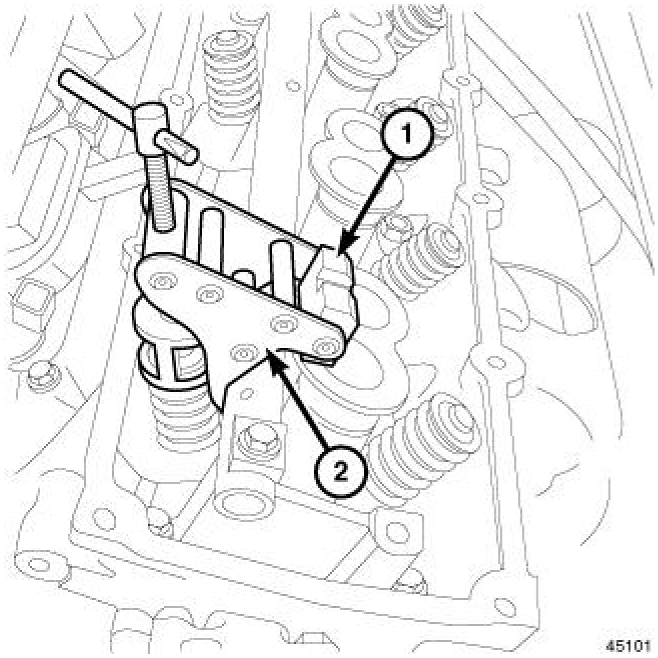


Fig. 104: Intake Valve Spring Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

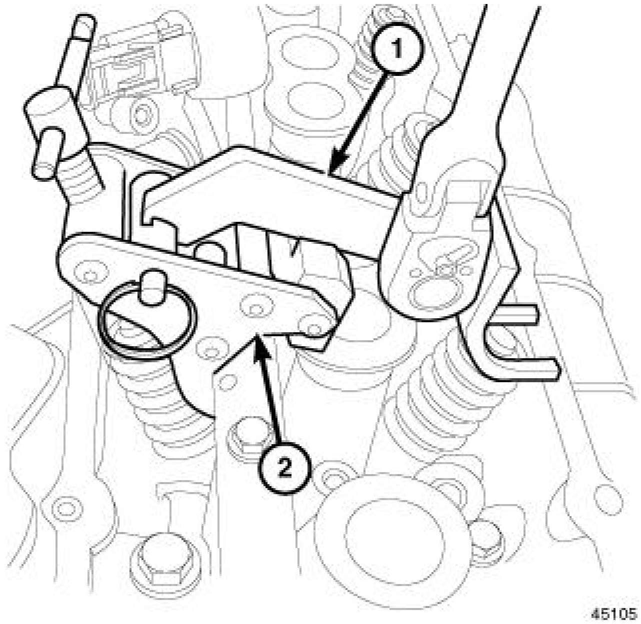
NOTE: **A fulcrum assembly (1) must be rotated to the appropriate setting as marked on the tool for proper valve spring alignment.**

NOTE: **Tap the top of the valve spring retainer to loosen the spring retainers locks.**

10. Compress the valve spring with valve spring compressor (1) and remove the valve retainer locks.
11. Release the spring compressor and remove valve spring.

NOTE: **All valve springs and seals are removed in the same manner and are interchangeable between intake and exhaust.**

12. Remove the valve guide seal.



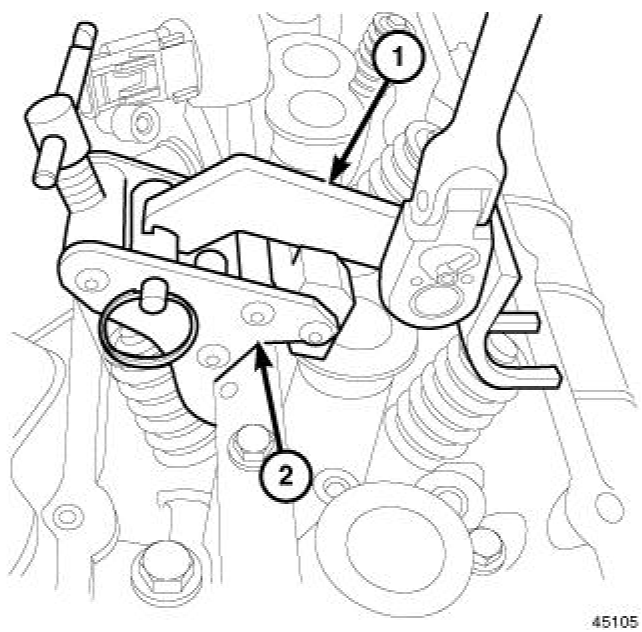
[Fig. 105: Valve Spring Tool Adapter]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When the exhaust spring, seal or valve needs servicing. The exhaust adapter arm (1) must be installed to the spring compressor clamp (3).**

13. Install tool (special tool #9065C, Compressor, Valve Spring), exhaust adapter arm (1) to the spring compressor (3) for servicing the exhaust side.

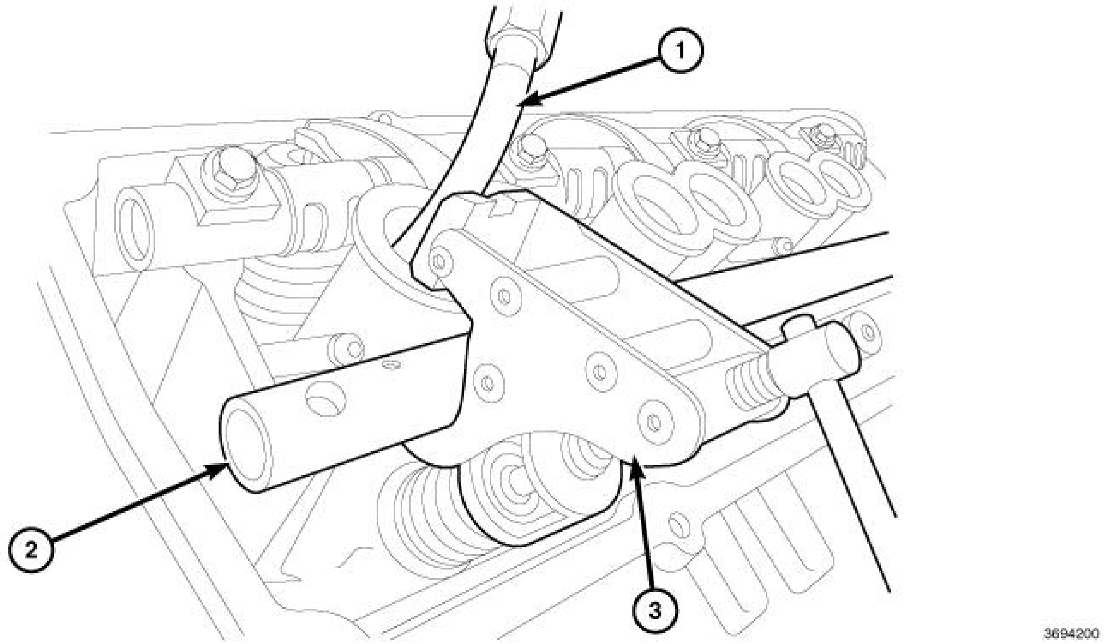
INSTALLATION

INSTALLATION



[Fig. 106: Valve Spring Tool Adapter]
Courtesy of CHRYSLER GROUP, LLC

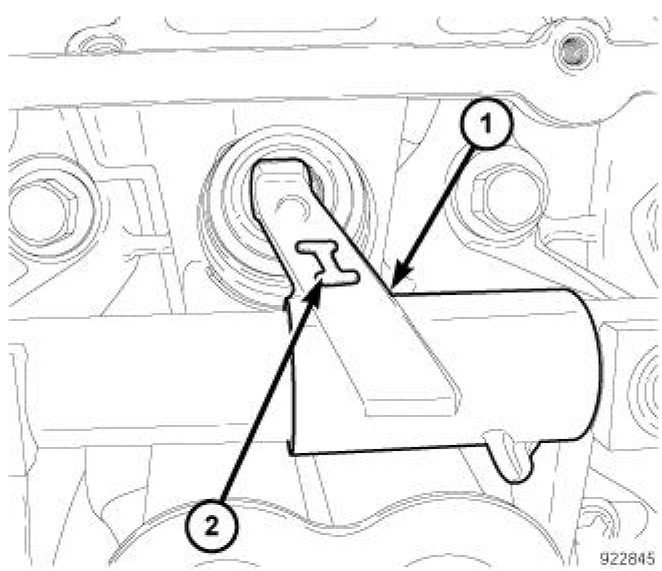
1. Install the valve guide seal.
2. Install the valve spring.
3. Using the valve spring compressor (special tool #9065C, Compressor, Valve Spring) (1), compress the valve spring and install the valve spring retainer and locks.
4. Remove the exhaust extension arm (1).



[Fig. 107: Valve Spring Compressor](#)
Courtesy of CHRYSLER GROUP, LLC

5. Remove the spring compressor (3).
6. Remove air hose and the compression test adapter hose from the spark plug hole.

NOTE: **All valve springs and seals are installed in the same manner.**



[Fig. 108: Intake Rocker Arm Marking](#)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).**

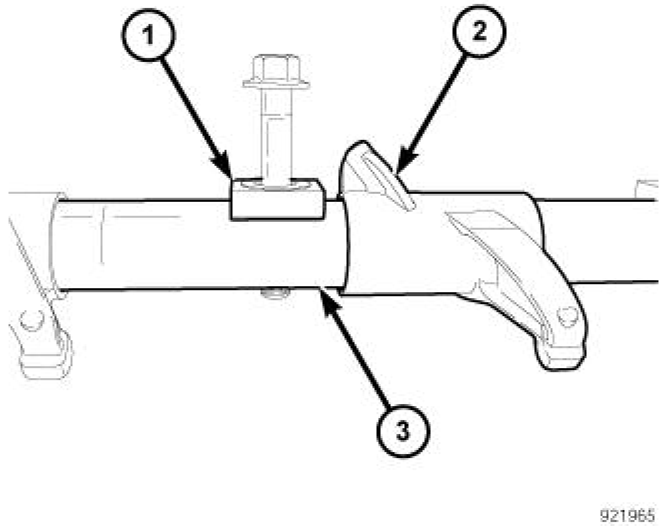


Fig. 109: Rocker Shaft Retainers
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Make sure that the retainers (1) and the rocker arms (2) are not overlapped when tightening bolts or engine damage could result.**

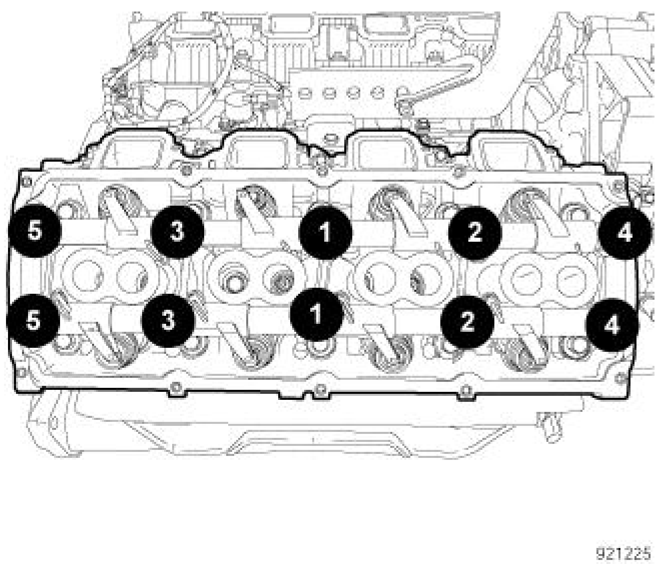


Fig. 110: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Due to the changes in the pushrod clearance holes in the Eagle 5.7L cylinder heads, close attention must be given when installing the pushrod(s) into the tappet(s). Once the pushrod(s) have been installed, use a suitable light to look down through the pushrod hole(s). This will allow you to verify the pushrod(s) are centered properly in the tappet(s)**

and avoid engine damage. Recheck after the rocker shaft assembly has been installed and tightened to specification.

CAUTION: **The longer pushrods are for the exhaust side and the shorter pushrods are for the intake side.**

NOTE: **Pushrods must be installed in the same order as removed.**

7. Install the pushrods and rocker arm shaft. Refer to **ROCKER ARM, VALVE, INSTALLATION, 5.7L**.
8. Using the sequence shown in illustration, tighten the rocker shaft bolts to 22 N.m (16 ft. lbs.).

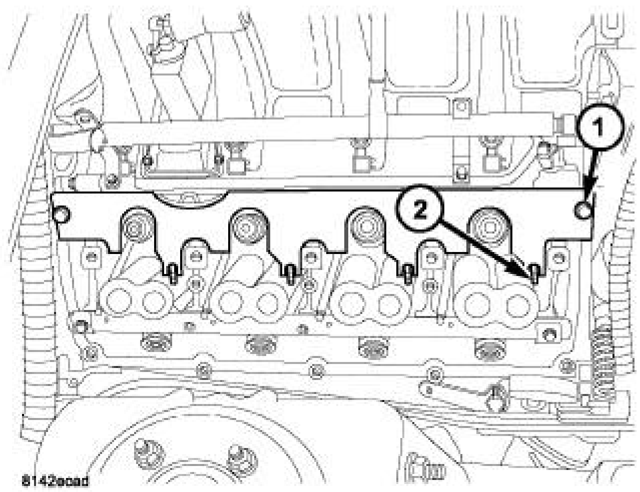


Fig. 111: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

9. If used, remove the pushrod retainer (special tool #9070, Retainer, Push Rod) (1).

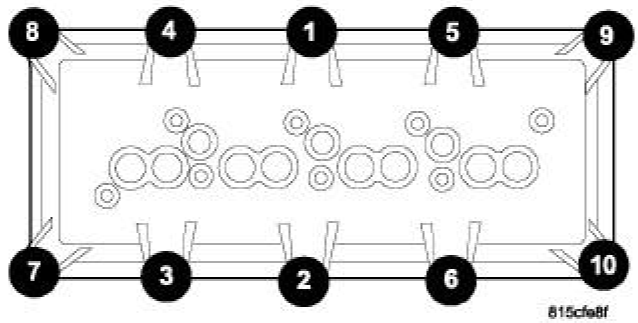


Fig. 112: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not use harsh cleaners to clean the cylinder head covers. Severe damage to covers may occur.**

CAUTION: **Do not allow other components including the wire harness to rest on or against the engine cylinder head cover. Prolonged contact with other objects may wear a hole in the cylinder head cover.**

10. Clean the cylinder head cover and both sealing surfaces, inspect and replace the gasket as necessary.
11. Install the cylinder head cover and hand start all fasteners. Verify that all double ended studs are in the correct location.
12. Using the sequence shown in illustration, tighten the cylinder head cover retaining bolts to 8 N.m (71 in. lbs.).
13. Install the spark plugs.

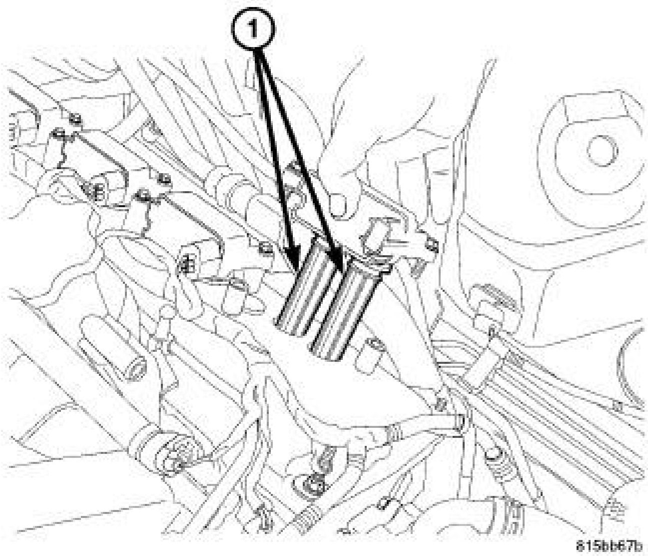


Fig. 113: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

14. Before installing the ignition coils, apply dielectric grease to the inside of the spark plug boots.

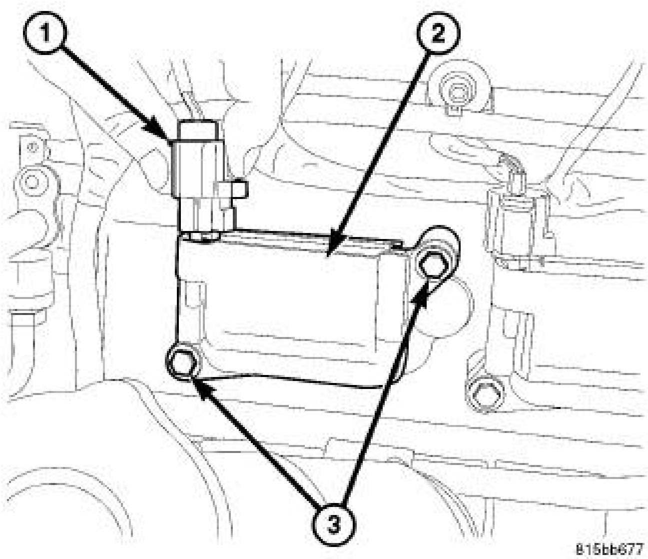


Fig. 114: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Install the ignition coil (2) on the plugs and tighten the fasteners (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
16. Connect the ignition coil wire harness connectors (1).
17. Install the air intake resonator and the air cleaner assembly Refer to **BODY, AIR CLEANER, INSTALLATION, 5.7L**.
18. Connect the negative battery cable.

VALVES, INTAKE AND EXHAUST

DESCRIPTION

VALVE GUIDES

The valve guides are made of powdered metal and pressed into the cylinder head. The guides are not replaceable or serviceable, and valve guide reaming is not recommended. If the guides are worn beyond acceptable limits, replace the cylinder heads.

VALVES

Both the intake and the exhaust valves are made of steel. The intake valve is 50.93 mm (2.00 inches) in diameter and the exhaust valve is 39.53 mm (1.55 inches) in diameter. All valves use three-bead lock keepers to retain the springs and promote valve rotation.

STANDARD PROCEDURE

STANDARD PROCEDURE - REFACING

VALVE FACE AND VALVE SEAT ANGLE CHART

DESCRIPTION	SPECIFICATION	
-	Metric	Standard
Seat Width		
Intake	1.18 - 1.62 mm	0.0464 - 0.0637 in.
Exhaust	1.48 - 1.92 mm	0.058 - 0.075 in.
Face Angle	45Ā° - 45 1/2 Ā°	
Seat Angle	44 1/2 Ā° - 45Ā°	

NOTE: **Valve seats that are worn or burned can be reworked, provided that correct angle and seat width are maintained. Otherwise the cylinder head must be replaced.**

NOTE: **When refacing valves and valve seats, it is important that the correct size valve guide pilot be used for reseating stones. A true and complete surface must be obtained.**

1. Using a suitable dial indicator, measure the center of the valve seat. Total run out must not exceed 0.051 mm (0.002 in).
2. Apply a small amount of Prussian Blue to the valve seat. Insert the valve into the cylinder head. Rotate valve while applying light pressure on the valve seat. Remove the valve and examine the valve face. If the blue is transferred below the top edge of the valve face, lower the valve seat using a 15 degree stone. If the blue is transferred to the bottom edge of the valve face, raise the valve seat using a 65 degree stone.
3. When the seat is properly positioned the width of the intake seat must be 1.18 - 1.62 mm (0.0464 - 0.0637 in.) and the exhaust seat must be 1.48 - 1.92 mm (0.058 - 0.075 in.).
4. Check the valve spring installed height after refacing the valve and seat. The installed height for both intake and exhaust valve springs must not exceed 46.0 mm (1.81 in.).
5. The valve seat must maintain a seat angle of 44 1/2 Ā° - 45Ā°.
6. The valve face must maintain a face angle of 45Ā° - 45 1/2 Ā°.

REMOVAL

REMOVAL

1. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.
2. Compress valve springs using Valve Spring Compressor Tool (special tool #C-3422-D, Compressor, Valve Spring) and Adapter (special tool #8464, Adapter, Valve Spring).
3. Remove valve retaining locks, valve spring retainers, valve stem seals and valve springs.
4. Before removing valves, remove any burrs from valve stem lock grooves to prevent damage to the valve guides. Identify valves to ensure installation in original location.

INSTALLATION

INSTALLATION

1. Clean valves thoroughly. Discard burned, warped and cracked valves.
2. Remove the carbon and varnish deposits from the inside of the valve guides with a reliable guide cleaner.
3. Measure the valve stems for wear. If the wear exceeds 0.051 mm (0.002 inch), replace the valve.
4. Coat the valve stems with clean engine oil and insert them into the cylinder head.
5. If the valves or seats are ground, check the valve stem height. If the valve stem is too long, replace the cylinder head.
6. Install new seals on all valve guides. Install the valve springs and valve retainers.
7. Compress the valve springs with the Valve Spring Compressor (special tool #C-3422-D, Compressor, Valve Spring) and Valve Spring Adapter (special tool #8464, Adapter, Valve Spring). Install the locks and release the tool. If the valves and/or seats are ground, measure the installed height of the springs. Make sure the measurement is taken from the bottom of the spring seat in the cylinder head to the bottom surface of the spring retainer.
8. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.

ENGINE BLOCK

CLEANING

CLEANING

Thoroughly clean the oil pan and engine block gasket surfaces.

Use compressed air to clean:

- Gallery at the oil filter adaptor hole
- Front and rear oil gallery holes
- Multiple Displacement System (MDS) oil gallery holes in the valley
- Oil feed holes for the crankshaft main bearings

Drilled and tapped holes should be free of debris upon assembly.

Once the block has been completely cleaned, apply LoctiteÂ® PST pipe sealant with Teflon 592 to the threads of the front and rear oil gallery plugs and coolant drain plugs. Tighten the oil gallery 1/4 inch x 18 NPT plugs to the proper specification. Refer to **TORQUE SPECIFICATIONS**. Tighten the coolant drain 1/4 inch x 18 NPT

plugs to the proper specification. Refer to **TORQUE SPECIFICATIONS**. Tighten the 3/8 inch x 18 NPT plugs to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

INSPECTION

INSPECTION

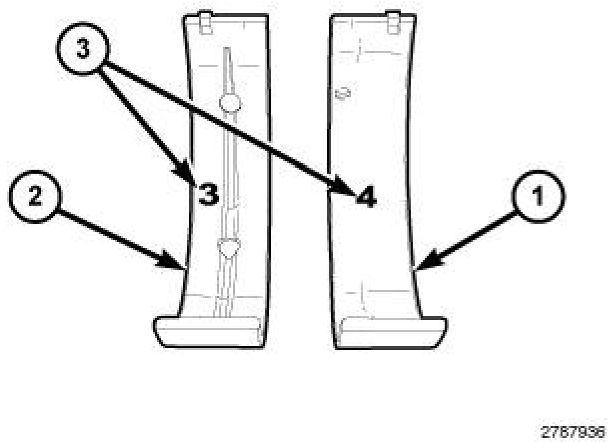


Fig. 115: Main Bearing Inserts
Courtesy of CHRYSLER GROUP, LLC

1. Wipe the main bearing inserts (1, 2) clean.
2. Inspect the inserts for abnormal wear patterns, scoring, grooving, fatigue, pitting and for metal or other foreign material imbedded in the lining.
3. Inspect the back of the inserts for fractures, scrapes or irregular wear patterns.
4. Inspect the insert locking tabs for damage.
5. Inspect the crankshaft thrust washers for scoring, scratches, wear or blueing.
6. Replace any bearing that shows abnormal wear.
7. Inspect the main bearing bores for signs of scoring, nicks and burrs.
8. If the cylinder block main bearing bores show damage, replace the engine block.

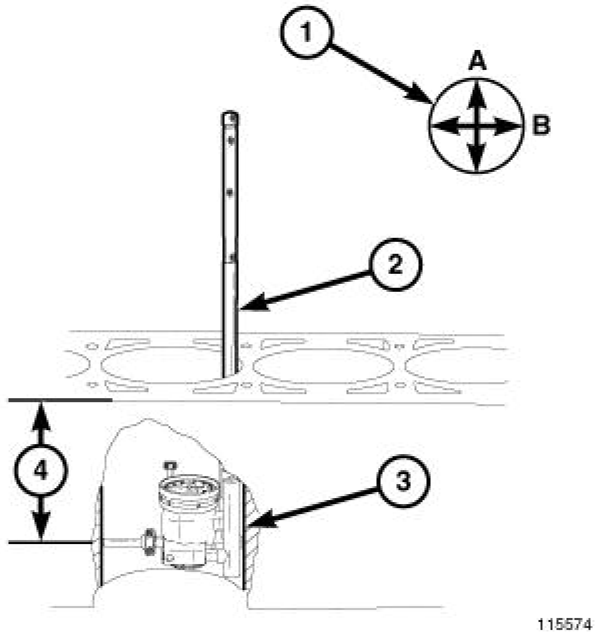


Fig. 116: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER GROUP, LLC

9. Use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to correctly measure the inside diameter of the cylinder bore (3). A cylinder bore gauge capable of reading in 0.003 mm (0.0001 in.) Increments is required. If a bore gauge is not available, do not use an inside micrometer.
10. Measure the inside diameter of the cylinder bore at three levels below the top of the bore (4). Start at the top of the bore, perpendicular (across or at 90Ā°) to the axis of the crankshaft at point A (1).
11. Repeat the measurement near the middle of the bore then repeat the measurement near the bottom of the bore.
12. Determine the taper by subtracting the smaller diameter from the larger diameter.
13. Rotate the measuring device 90Ā° to point B (1) and repeat the three measurements. Verify that the maximum taper is within specification. Refer to **ENGINE SPECIFICATIONS**.
14. Determine out-of-roundness by comparing the difference between each measurement.
15. If the cylinder bore taper and out-of-roundness does not exceed. Refer to **ENGINE SPECIFICATIONS**. Then the cylinder bore can be honed. If the cylinder bore taper or out- of-round condition exceeds the maximum limits, replace the cylinder block.

NOTE: **A slight amount of taper always exists in the cylinder bore after the engine has been in use for a period of time.**

ASSEMBLY, VARIABLE VALVE TIMING

DESCRIPTION

DESCRIPTION

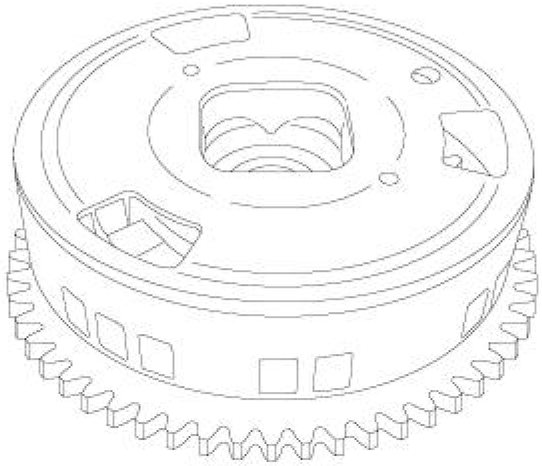


Fig. 117: Variable Cam Timing (VCT) Assembly
Courtesy of CHRYSLER GROUP, LLC

The 5.7L engine is equipped with Variable Cam Timing (VCT). This system advances and/or retards the camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy, and reduce emissions. The VCT assembly is sometimes referred to as a camshaft phaser.

CAUTION: Never attempt to disassemble the camshaft phaser, severe engine damage could result.

The VCT assembly consists of the camshaft sprocket and a timing phaser. The VCT phaser assembly bolts to the camshaft and is serviced as an assembly.

OPERATION

OPERATION

The Variable Cam Timing (VCT) assembly is actuated with engine oil pressure. The oil flow to the VCT assemblies are controlled by an Oil Control Valve (OCV). The OCV consist of a Pulse Width Modulated (PWM) solenoid and a spool valve. The Powertrain Control Module (PCM) actuates the OCV to control oil flow through the spool valve into the VCT assemblies. The VCT assembly consists of a rotor, stator, and sprocket. The stator is connected to the timing chain through the sprocket. The rotor is connected to the camshaft. Oil flow in to the VCT assembly rotates the rotor with respect to the stator, thus rotating the exhaust camshaft with respect to the timing chain and intake camshaft. An infinitely variable cam timing position can be achieved within the limits of the hardware. The CMP monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

CAUTION: Never attempt to disassemble the camshaft phaser, severe engine damage could result.

REMOVAL

REMOVAL

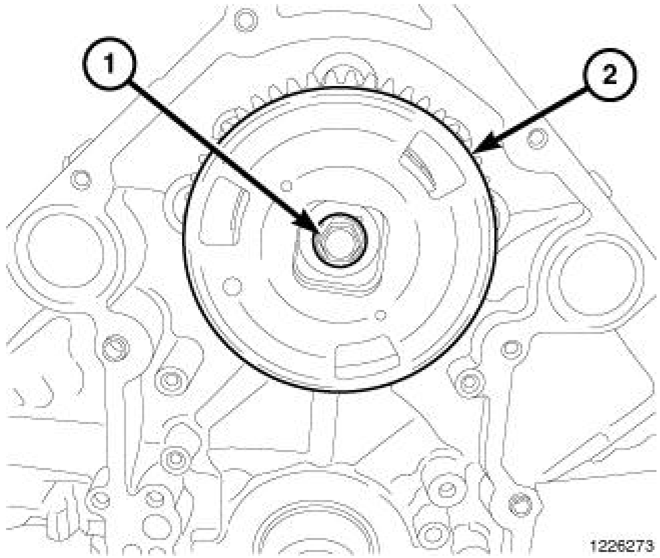


Fig. 118: Camshaft Phaser & Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Never attempt to disassemble the camshaft phaser, severe engine damage could result.

1. Remove the engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.
2. Remove bolt (1) and the camshaft phaser (2).

INSTALLATION

INSTALLATION

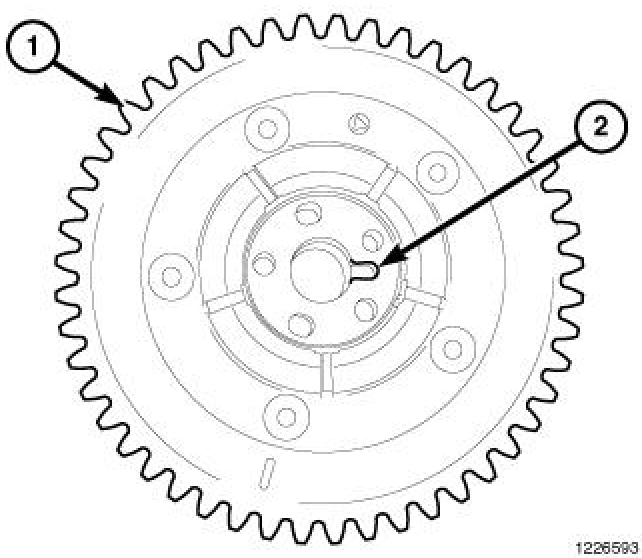


Fig. 119: Phaser Alignment Slot
Courtesy of CHRYSLER GROUP, LLC

1. Align the slot (2) in the phaser (1) with the dowel on the camshaft.

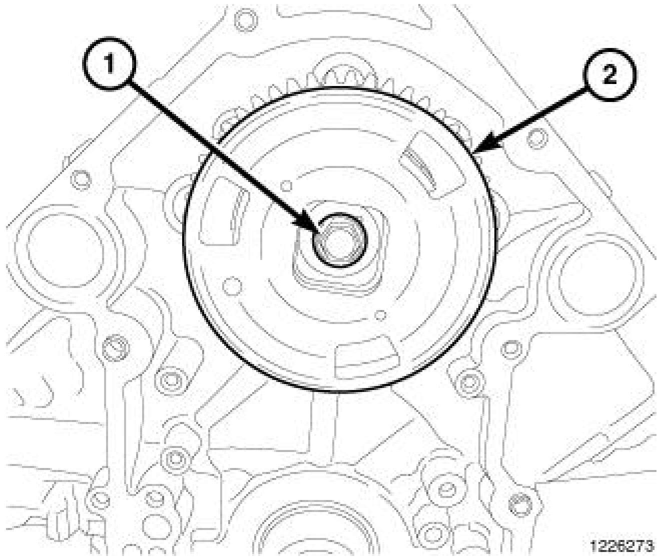


Fig. 120: Camshaft Phaser & Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Never attempt to disassemble the camshaft phaser, severe engine damage could result.

2. Position the phaser (2) in place and install phaser retaining bolt (1) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.
3. Install the engine timing cover. Refer to COVER(S), ENGINE TIMING, INSTALLATION, 5.7L.

BEARING(S), CRANKSHAFT, MAIN

STANDARD PROCEDURE

STANDARD PROCEDURE - CRANKSHAFT MAIN BEARING - FITTING

MAIN BEARING JOURNAL DIAMETER (CRANKSHAFT REMOVED)

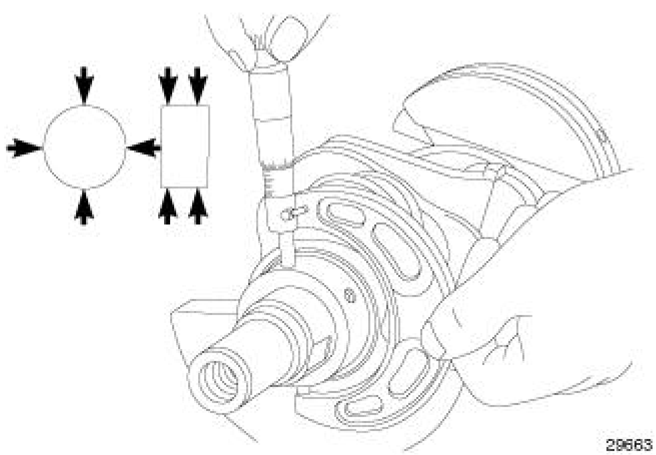


Fig. 121: Crankshaft Journal Measurements - Typical
Courtesy of CHRYSLER GROUP, LLC

With the crankshaft removed from the cylinder block.

Clean the oil off the main bearing journal.

Determine the maximum diameter of the journal with a micrometer. Measure at two locations 90Ā° apart at each end of the journal.

The maximum allowable taper is 0.008 mm (0.0004 inch.) and maximum out of round is 0.005 mm (0.0002 inch). Compare the measured diameter with the journal diameter specification (Main Bearing Fitting Chart). Select the inserts required to obtain the specified bearing-to-journal clearance.

CRANKSHAFT MAIN BEARING SELECTION

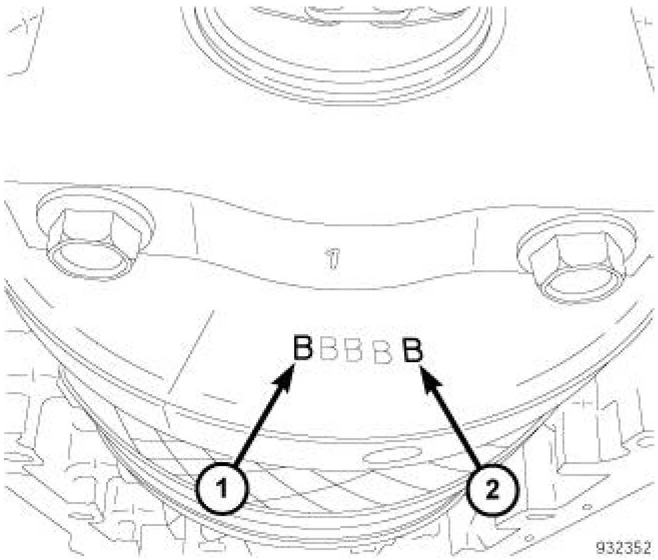


Fig. 122: Crankshaft Counterweight Stamped Grade Identification Marks
Courtesy of CHRYSLER GROUP, LLC

The main bearings are "select fit" to achieve proper oil clearances. For main bearing selection, the crankshaft counterweight has grade identification marks stamped into it. These marks are read from left to right. The left letter (1) refers to the number one main journal and the right letter (2) refers to the number 5 journal.

NOTE: **Service main bearings are coded. These codes identify what size or grade of the bearing.**

MAIN BEARING SELECTION CHART - 5.7L

GRADE MARKING	BEARING SIZE		FOR USE WITH JOURNAL SIZE	
-	METRIC	STANDARD	METRIC	STANDARD
A	0.008 mm U/S	0.0004 in. U/S	64.988 - 64.995 mm	2.5585 - 2.5588 in.
B	NOMINAL		64.996 - 65.004 mm	2.5588 - 2.5592 in.
C	0.008 mm O/S	0.0004 in. O/S	65.005 - 65.012 mm	2.5592 - 2.5595 in.

INSPECTION

INSPECTION

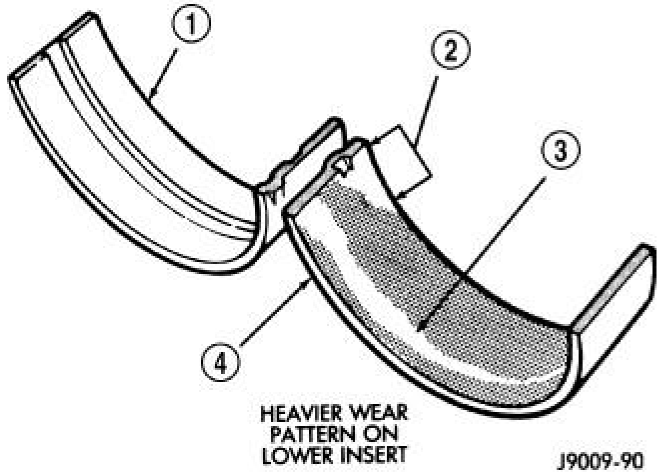


Fig. 123: Main Bearing Wear Patterns
Courtesy of CHRYSLER GROUP, LLC

Wipe the inserts clean and inspect for abnormal wear patterns and for metal or other foreign material imbedded in the lining. Normal main bearing insert wear patterns are illustrated.

NOTE: **If any crankshaft journals are scored, the crankshaft must be repaired or replaced.**

Inspect the back of the inserts for fractures, scrapings or irregular wear patterns.

Inspect the upper insert locking tabs for damage.

Replace all damaged or worn bearing inserts.

CAMSHAFT, ENGINE

REMOVAL

CAMSHAFT CORE HOLE PLUG

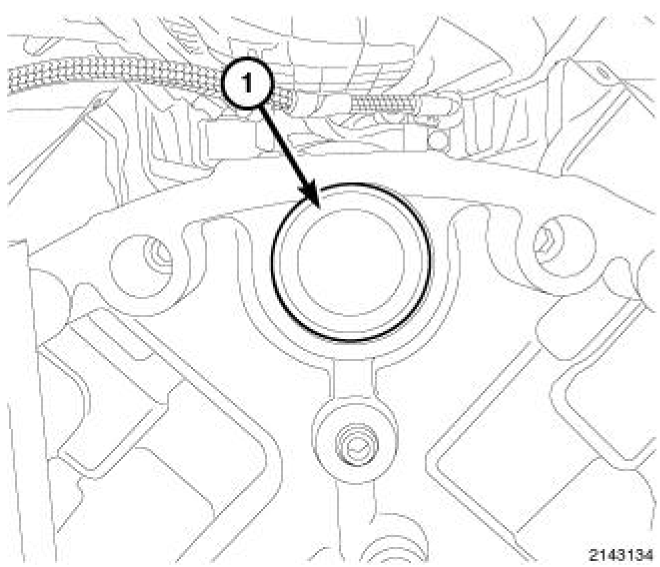


Fig. 124: Camshaft Core Hole Plug

Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Remove the engine from the vehicle. Refer to **REMOVAL, 5.7L**.
3. On automatic transmission models, remove the flexplate. Refer to **FLEXPLATE, REMOVAL, 5.7L**.
4. On manual transmission models, remove the flywheel. Refer to **FLYWHEEL, REMOVAL** .

CAUTION: Do not damage the rear surface of the camshaft or the core plug sealing surface, when removing the core plug.

5. Using a suitable sharp punch, punch a small hole in the camshaft core hole plug (1).
6. Insert a short sheet metal screw into the small hole in the camshaft core hole plug.
7. Using a suitable slide hammer puller, remove the rear camshaft core hole plug.

CAMSHAFT

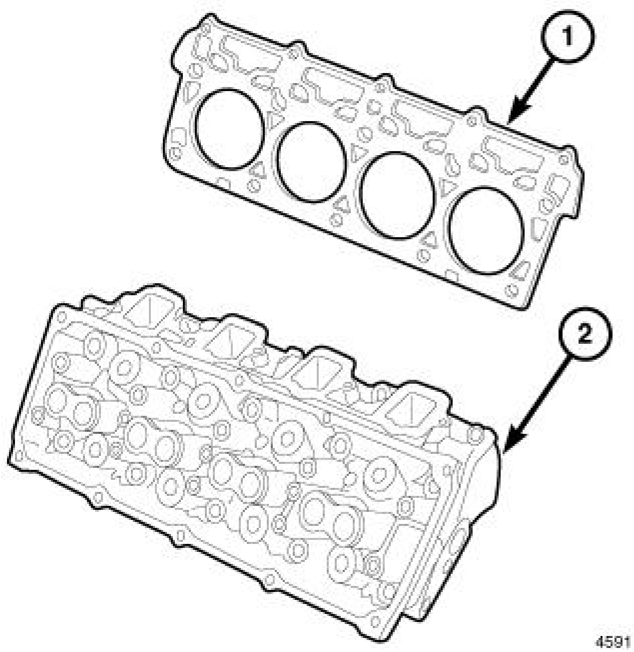


Fig. 125: Cylinder Head & Gasket
Courtesy of CHRYSLER GROUP, LLC

1. Remove both cylinder heads (2). Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.

CAUTION: The 5.7L Multi Displacement System (MDS) engine uses both standard roller lifters and deactivating roller lifters. The deactivating roller lifters must be used in cylinders 1, 4, 6, 7. The deactivating lifters can be identified by the two holes in the side of the lifter body, for the latching pins.

CAUTION: Whenever the camshaft is replaced, all lifters must be replaced. If the lifter and retainer assemblies are to be reused, identify the lifters to ensure

installation in their original location or engine damage could result.

CAUTION: The lifter and retainer assembly must be installed as a unit.

2. Remove the lifters and retainer as an assembly. Refer to **LIFTER(S), HYDRAULIC, ROLLER, REMOVAL, 5.7L**.
3. Remove the generator. Refer to **GENERATOR, REMOVAL** .
4. Remove the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .
5. Remove the radiator. Refer to **RADIATOR, ENGINE COOLING, REMOVAL** .
6. Remove the A/C condenser. Refer to **CONDENSER, A/C, REMOVAL** .
7. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
8. Remove the oil pump pickup tube (1). Refer to **PAN, OIL, REMOVAL, 5.7L**.
9. Remove support and lower the vehicle.
10. Remove the timing chain and camshaft phaser. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL, 5.7L**.

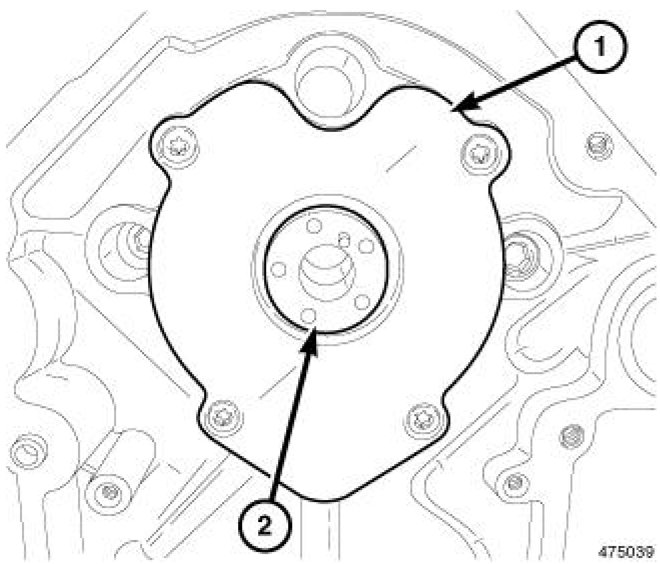


Fig. 126: Camshaft Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

11. Remove the camshaft thrust plate (1).

CAUTION: Use care when removing the camshaft, do not damage the camshaft bearings with the camshaft lobes.

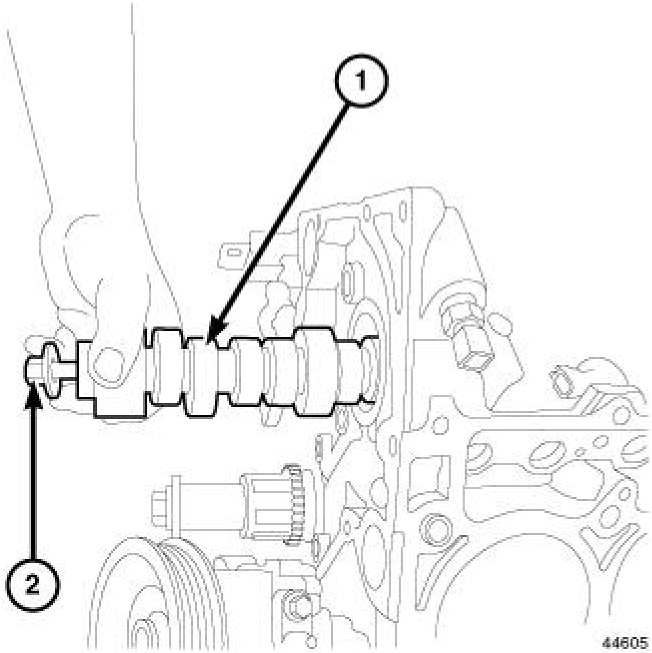


Fig. 127: Removing/Installing Camshaft
Courtesy of CHRYSLER GROUP, LLC

12. Install a long bolt (2) into the front of the camshaft to aid in removal.
13. Remove the camshaft using care not to damage the camshaft bearings with the camshaft lobes (1).

INSPECTION

INSPECTION

The cam bearings are not serviceable. Do not attempt to replace cam bearings for any reason. If the cam bearings are damaged, the cylinder block must be replaced.

INSTALLATION

CAMSHAFT CORE HOLE PLUG

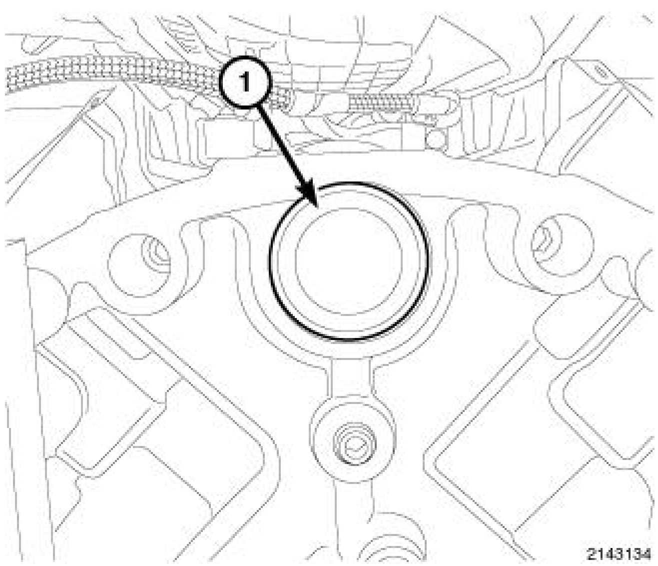


Fig. 128: Camshaft Core Hole Plug

Courtesy of CHRYSLER GROUP, LLC

1. Clean the core hole in the cylinder block.

NOTE: **Do not apply adhesive to the new camshaft core hole plug. A new plug has adhesive pre-applied.**

2. Install a new camshaft core hole plug (1) located at the rear of cylinder block, using a suitable flat faced tool. The plug must be fully seated on the cylinder block shoulder.
3. On manual transmission models, install the flywheel. Refer to **FLYWHEEL, INSTALLATION** .
4. On automatic transmission models, install the flexplate. Refer to **FLEXPLATE, INSTALLATION, 5.7L**.
5. Install the engine. Refer to **INSTALLATION, 5.7L**.

CAMSHAFT

CAUTION: **The 5.7L engine uses a unique camshaft for use with the Multi Displacement System (MDS). When installing a new camshaft, the replacement camshaft must be compatible with MDS.**

CAUTION: **Use care when installing the camshaft into the engine block, do not damage the camshaft bearings with the camshaft lobes.**

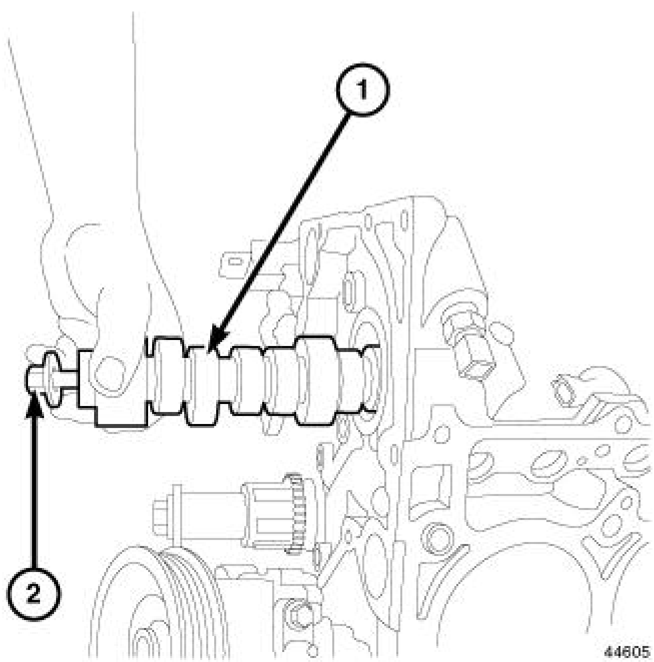


Fig. 129: Removing/Installing Camshaft
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the camshaft lobes (1) and the camshaft bearing journals with clean engine oil.
2. Install a long bolt (2) into the front of the camshaft to aid in the installation, carefully install the camshaft into the engine block.

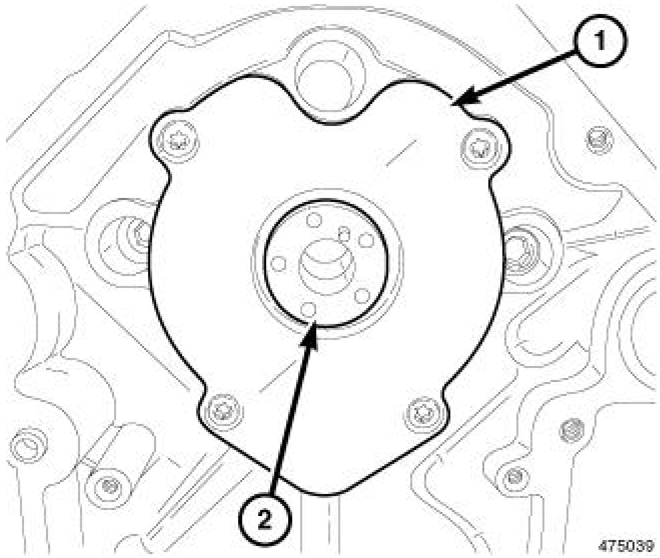


Fig. 130: Camshaft Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

3. Install the camshaft thrust plate (1) and tighten retaining bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Install the timing chain (5) and camshaft phaser (1). Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION, 5.7L**.
5. Using a suitable dial indicator, measure the camshaft end play. Refer to **ENGINE SPECIFICATIONS**. If not within specification, install a new thrust plate.
6. Install the oil pump. Refer to **PUMP, ENGINE OIL, INSTALLATION, 5.7L**.
7. Raise and support vehicle.
8. Install the oil pump pickup tube and oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L**.
9. Remove support and lower the vehicle.
10. Install the A/C condenser. Refer to **CONDENSER, A/C, INSTALLATION** .
11. Install the radiator. Refer to **RADIATOR, ENGINE COOLING, INSTALLATION** .
12. Install the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION** .
13. Install the generator. Refer to **GENERATOR, INSTALLATION** .

CAUTION: The 5.7L Multi Displacement System (MDS) engine uses both standard roller lifters and deactivating roller lifters. The deactivating roller lifters must be used in cylinders 1, 4, 6, 7. The deactivating lifters can be identified by the two holes in the side of the lifter body, for the latching pins.

CAUTION: Whenever the camshaft is replaced, all lifters must be replaced. If the lifter and retainer assemblies are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

CAUTION: The lifter and retainer assembly must be installed as a unit.

14. Install the lifters (2) and retainer (1) as an assembly into their original location. Refer to **LIFTER(S),**

HYDRAULIC, ROLLER, INSTALLATION, 5.7L.

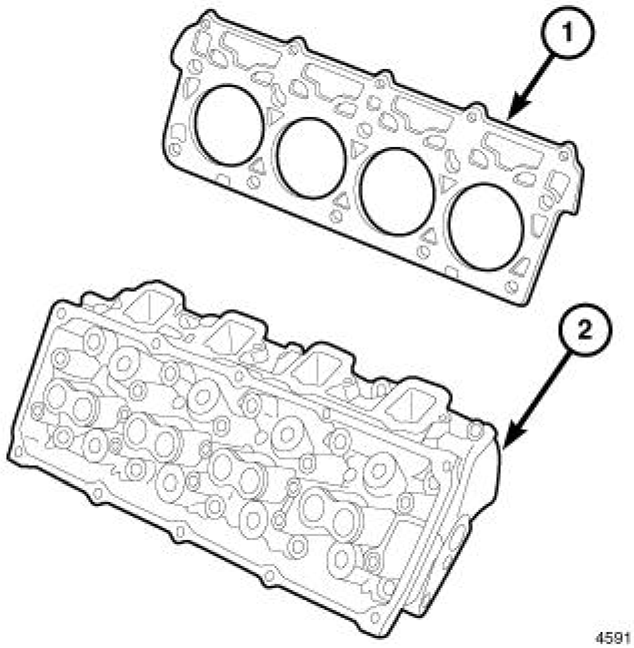


Fig. 131: Cylinder Head & Gasket
Courtesy of CHRYSLER GROUP, LLC

15. Install both cylinder heads (2). Refer to CYLINDER HEAD, INSTALLATION, 5.7L.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

CRANKSHAFT

REMOVAL

REMOVAL

1. Remove the engine. Refer to REMOVAL, 5.7L.
2. Remove the vibration damper. Refer to DAMPER, VIBRATION, REMOVAL, 5.7L.

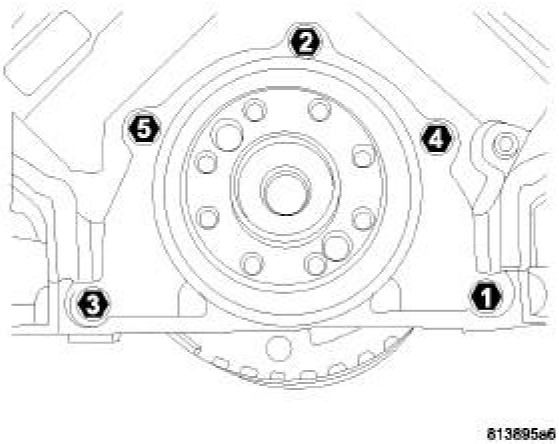


Fig. 132: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Remove the rear oil seal retainer. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL, 5.7L**.
4. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L**.

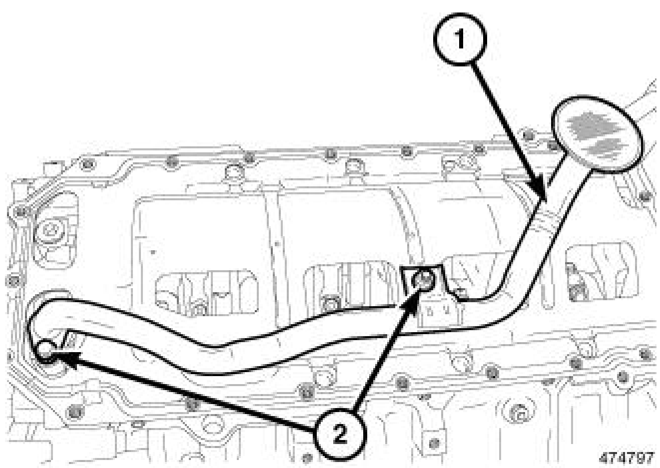


Fig. 133: Oil Pick Up Tube
Courtesy of CHRYSLER GROUP, LLC

5. Remove bolts (2) and the oil pump pickup (1).
6. Remove the windage tray/oil pan gasket.
7. Remove the oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL, 5.7L**.
8. Remove the timing chain and sprockets. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL,**

5.7L.

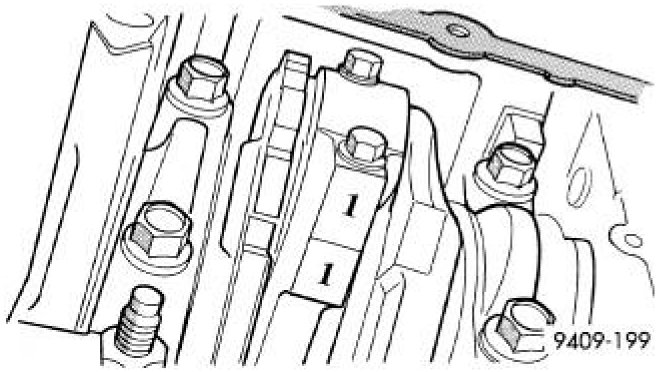


Fig. 134: Identifying Mark On Connecting Rod And Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Mark the connecting rod bearing caps with identity mark before removal.**

9. Remove bolts and the rod bearing caps with bearings.

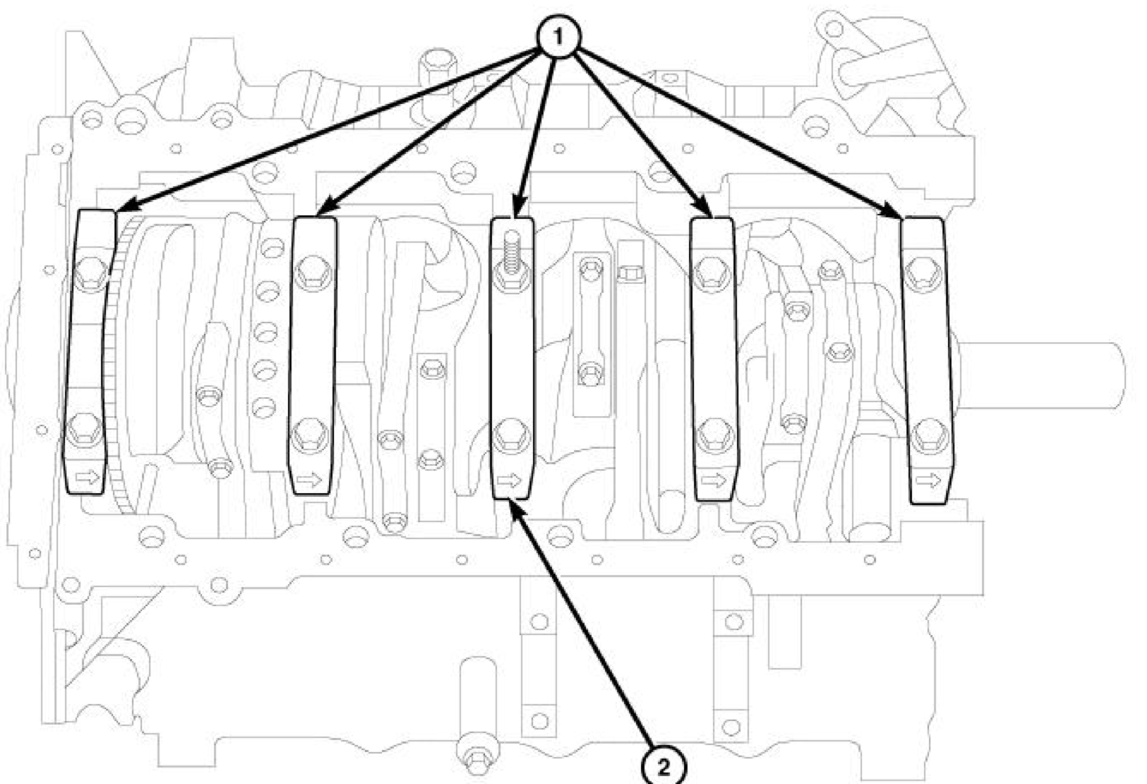
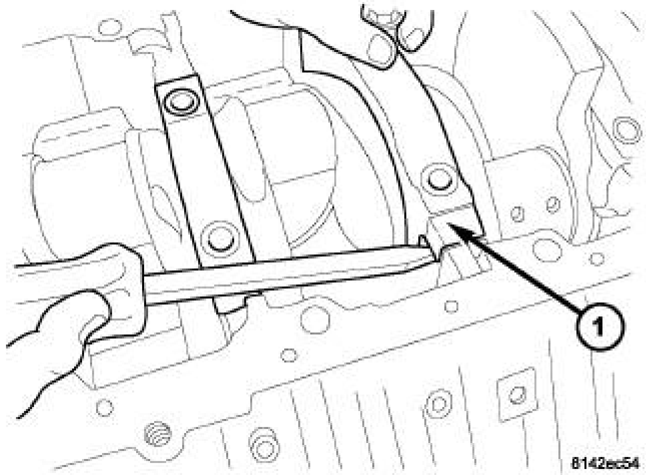


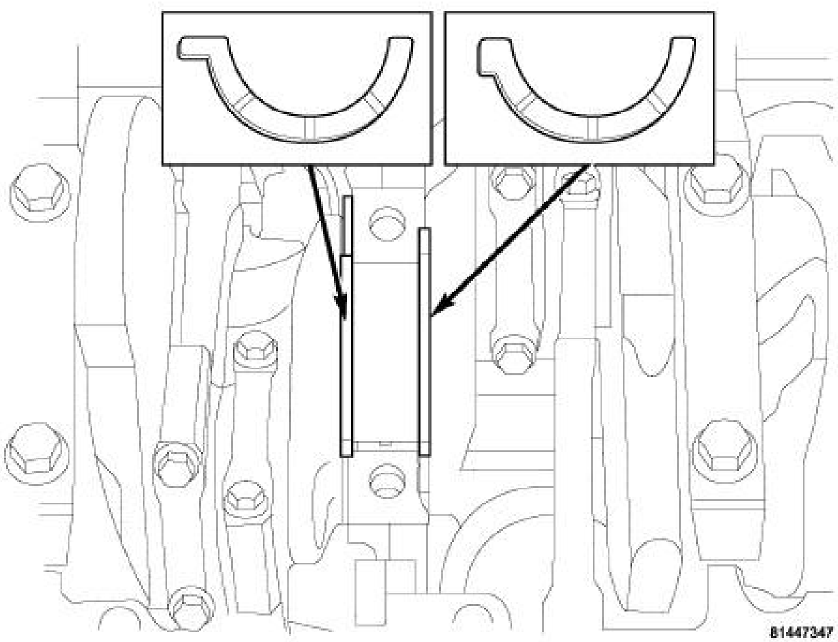
Fig. 135: Main Bearing Caps
Courtesy of CHRYSLER GROUP, LLC

10. Mark the main bearing caps (1) with identity mark before removal.



[Fig. 136: Main Bearing Cap Removal]
Courtesy of CHRYSLER GROUP, LLC

11. Remove bolts and the main bearing caps (1) and bearings one at a time.



[Fig. 137: Identifying Thrust Washer Locations]
Courtesy of CHRYSLER GROUP, LLC

12. Remove the thrust washers.

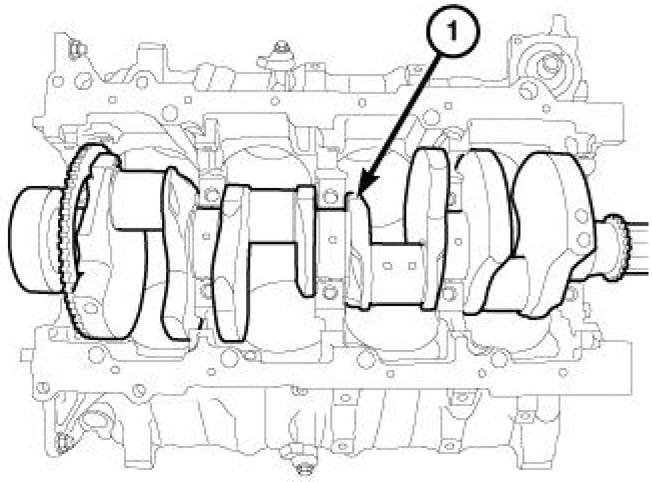


Fig. 138: Crankshaft
Courtesy of CHRYSLER GROUP, LLC

13. Remove the crankshaft (1) from the engine block.

INSTALLATION

INSTALLATION

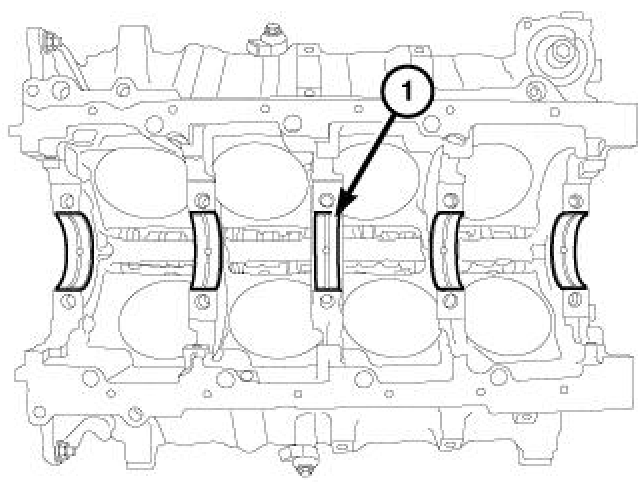


Fig. 139: Main Bearings
Courtesy of CHRYSLER GROUP, LLC

1. Select the proper main bearings. Refer to STANDARD PROCEDURE.
2. Install main bearings in block (1).

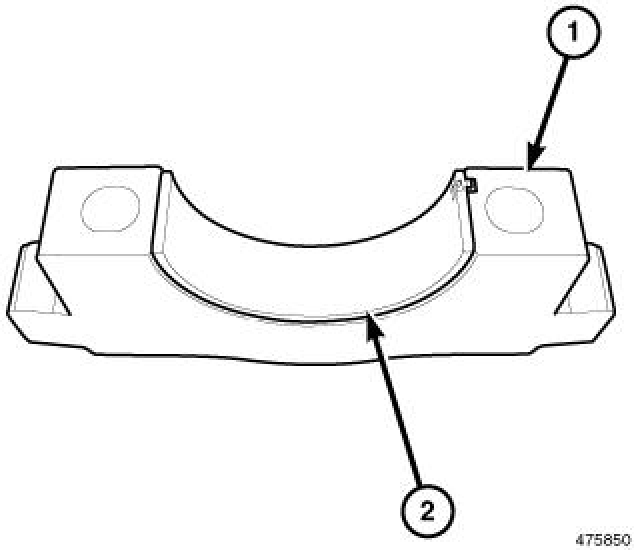


Fig. 140: Main Bearing Shells In The Bearing Caps
Courtesy of CHRYSLER GROUP, LLC

3. Install main bearing shells (2) in the bearing caps (1).

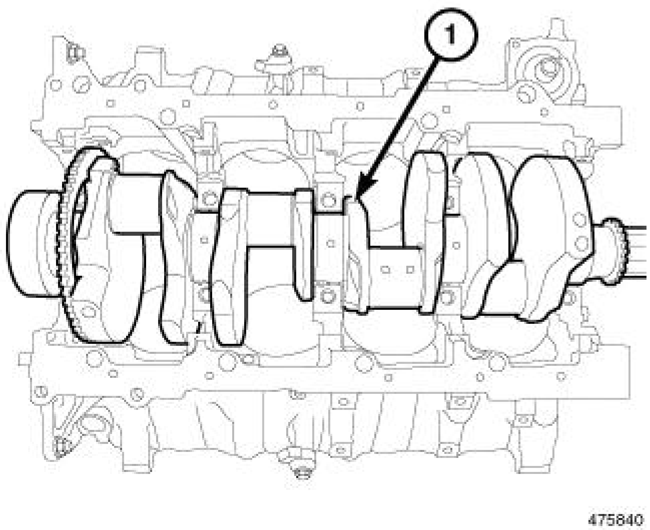


Fig. 141: Crankshaft
Courtesy of CHRYSLER GROUP, LLC

4. Lubricate the main bearing shells with clean engine oil.
5. Position the crankshaft (1) into the engine block.

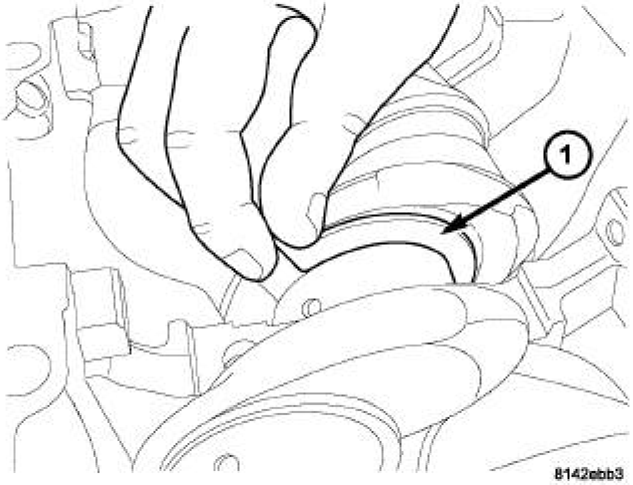


Fig. 142: Removing/Installing Thrust Washer
Courtesy of CHRYSLER GROUP, LLC

6. Lubricate with clean engine oil and install the thrust bearings (1).

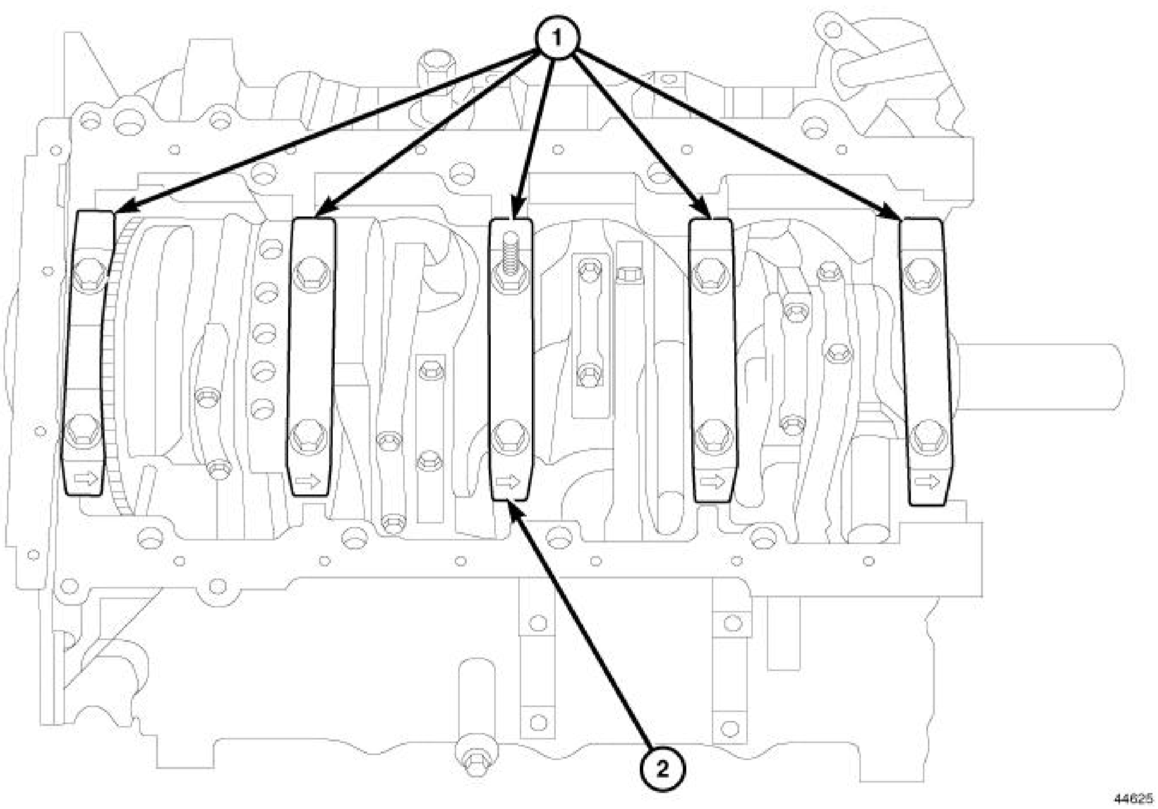


Fig. 143: Main Bearing Caps
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The main cap crossbolts are torqued after final torque of the main cap bolts. Always use a new washer/seal on crossbolts.**

7. Clean and oil all cap bolts. Install all main bearing caps (1) making sure the arrow (2) faces forward.

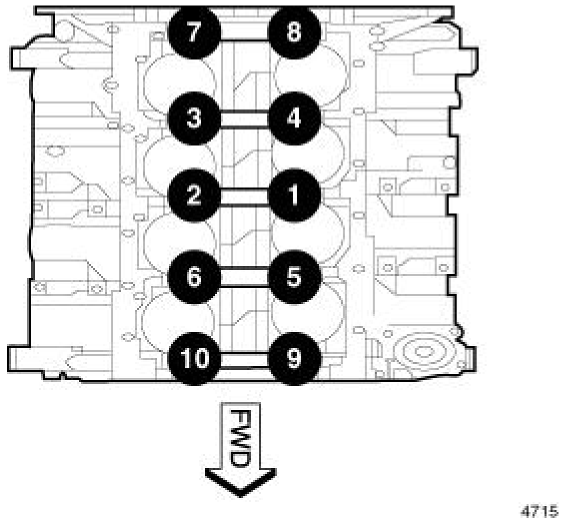


Fig. 144: Main Bearing Cap Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

8. Using the sequence shown in illustration, tighten main bearing cap bolts to 13 N.m (10 ft. lbs.).
9. Using the sequence shown in illustration, tighten main bearing cap bolts to 28 N.m (21 ft. lbs.).
10. Using the sequence shown in illustration, tighten the main cap bolts an additional 90Ā° turn.

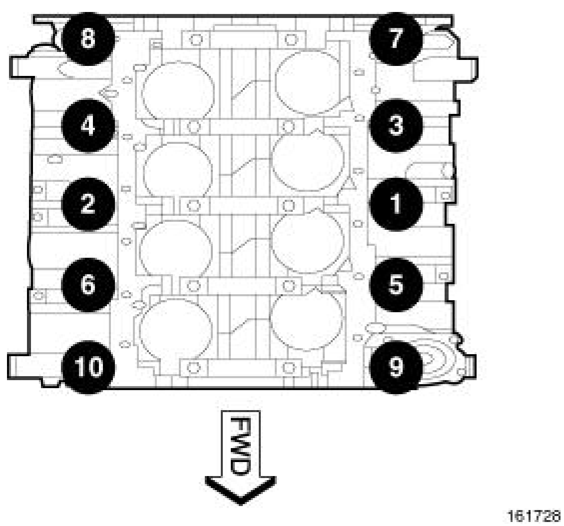


Fig. 145: Crossbolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

11. Install the crossbolts with **NEW** seal washer. Starting with crossbolt No. 1.
12. Tighten crossbolt to 31 N.m (23 ft. lbs.).
13. Repeat crossbolt tightening procedure.
14. Measure crankshaft end play. Refer to **STANDARD PROCEDURE**.

15. Position the connecting rods onto the crankshaft and install the rod bearing caps. Refer to **ROD, PISTON AND CONNECTING, INSTALLATION, 5.7L**.
16. Install timing chain and sprockets. Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION, 5.7L**.
17. Install the timing chain tensioner and guide.
18. Install the oil pump. Refer to **PUMP, ENGINE OIL, INSTALLATION, 5.7L**.

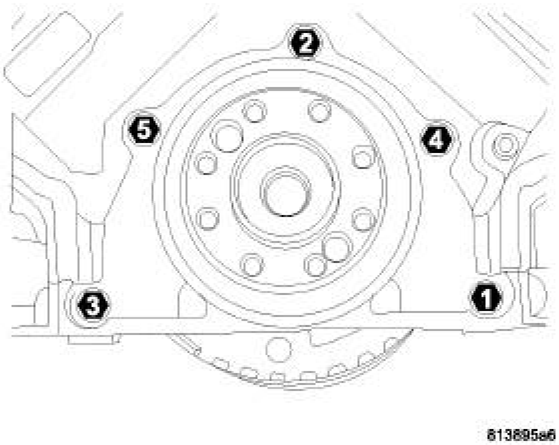


Fig. 146: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

19. Install the rear main seal and retainer. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, INSTALLATION, 5.7L**.

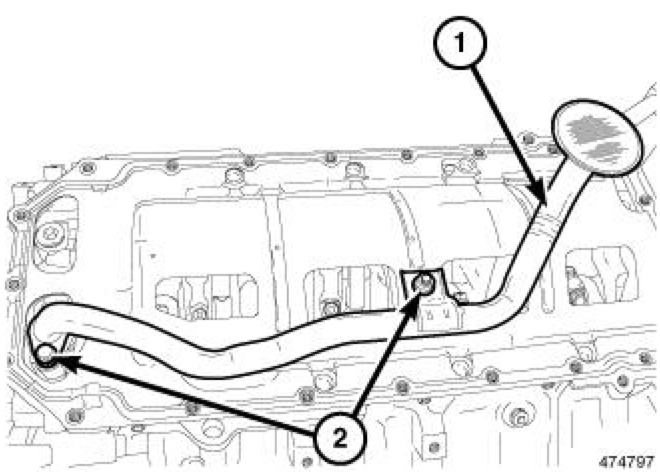


Fig. 147: Oil Pick Up Tube
Courtesy of CHRYSLER GROUP, LLC

20. Install the windage tray/oil pan gasket.
21. Inspect oil pick up tube O-rings, replace as necessary.
22. Install the oil pick up tube (1). Tighten the proper specification. Refer to **TORQUE SPECIFICATIONS**.
23. Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L**.
24. Install the vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION, 5.7L**.
25. Install the engine. Refer to **INSTALLATION, 5.7L**.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

DAMPER, VIBRATION

DESCRIPTION

DESCRIPTION

The crankshaft damper is used to control the resonance that is produced by the engine. The Noise, Vibration, and Harshness (NVH) created from the crankshaft can be controlled by dissipating the torque energy through the damper.

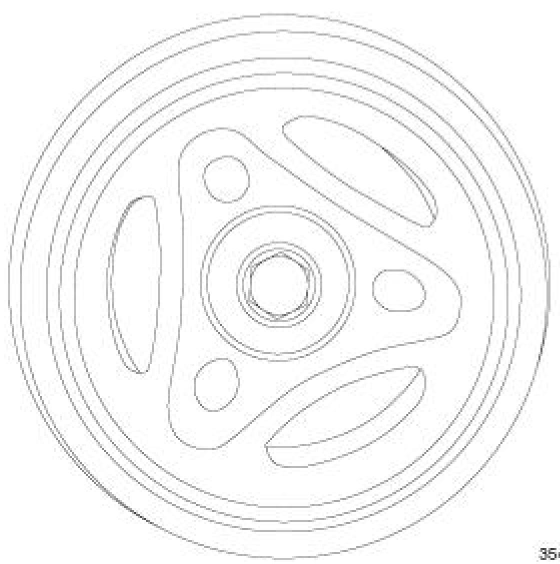
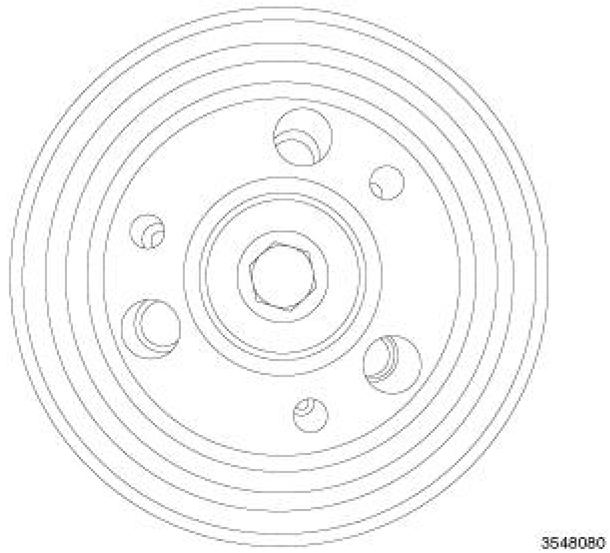


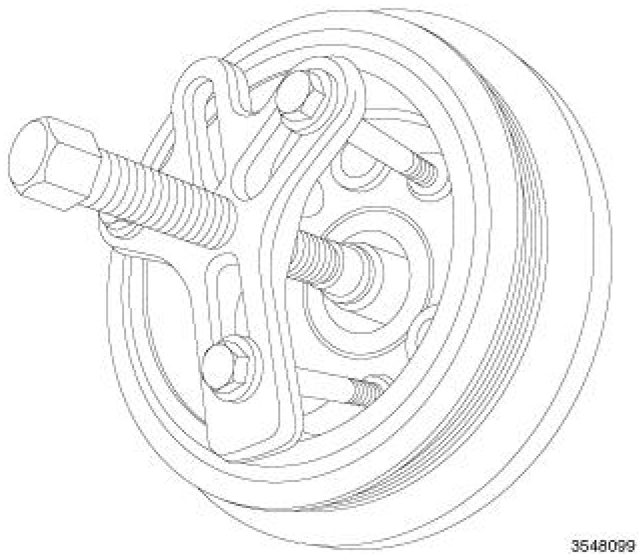
Fig. 148: Crankshaft Damper & Harden Steel Bolt
Courtesy of CHRYSLER GROUP, LLC

The crankshaft damper is held to the crankshaft by means of a harden steel bolt. The damper is pressed onto a specific machined surface of the crankshaft.



[Fig. 149: HEMIĀ® Engine Crankshaft Damper]
Courtesy of CHRYSLER GROUP, LLC

The HEMIĀ® Engines incorporate various crankshaft vibration dampers depending on the engine application.



[Fig. 150: Removing Vibration Damper]
Courtesy of CHRYSLER GROUP, LLC

Finding the proper puller for the application will ensure no damage will come to the damper. The flange puller is used by installing 3 bolts into the pre-tapped holes in the damper.

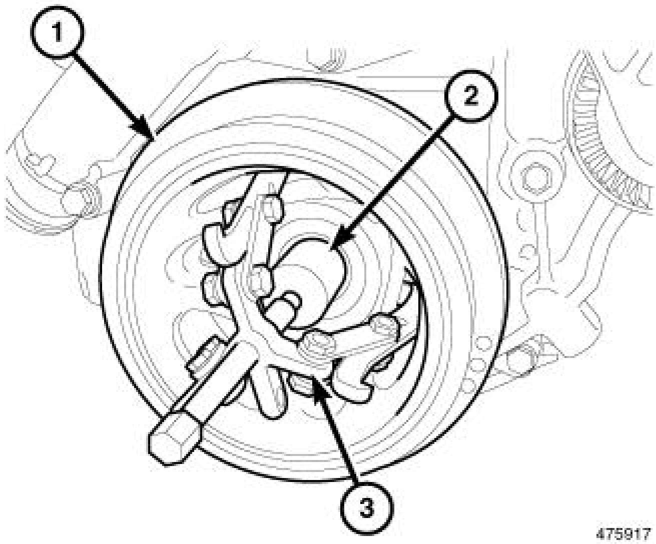


Fig. 151: Removing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

Some pulleys that do not have bolt holes can be removed with a three jaw style (special tool #1023, Puller).

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL** .
3. Remove the cooling fan. Refer to **FAN, COOLING, REMOVAL** .

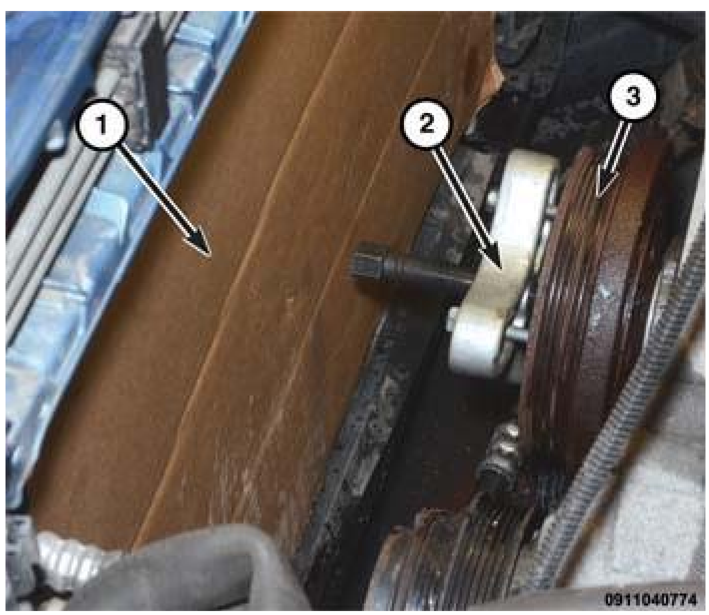


Fig. 152: Crankshaft Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Install a piece of cardboard (1) or equivalent to the radiator face to protect the radiator during the repair procedure.**

4. Remove the crankshaft damper bolt.
5. Install an appropriate flange puller (2) and remove the damper (3).

INSTALLATION

INSTALLATION

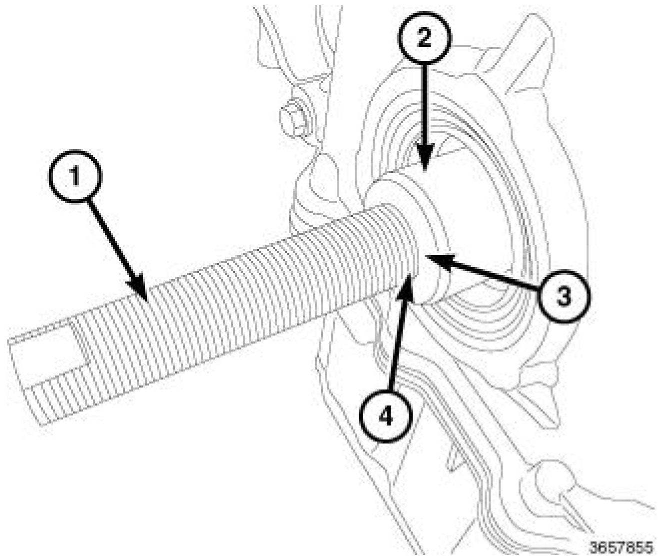


Fig. 153: Installing Vibration Damper Tool Onto Crankshaft
Courtesy of CHRYSLER GROUP, LLC

1. Position damper onto crankshaft.
2. Using (special tool #10387, Installer, Vibration Damper), install the threaded rod (1) onto the crankshaft (2).
3. Tighten the threaded rod (4) until it is seated to the face (3) of the crankshaft.
4. Install the press washer, bearing, washer, and the press nut onto the threaded rod.
5. Press the vibration damper on till seated.

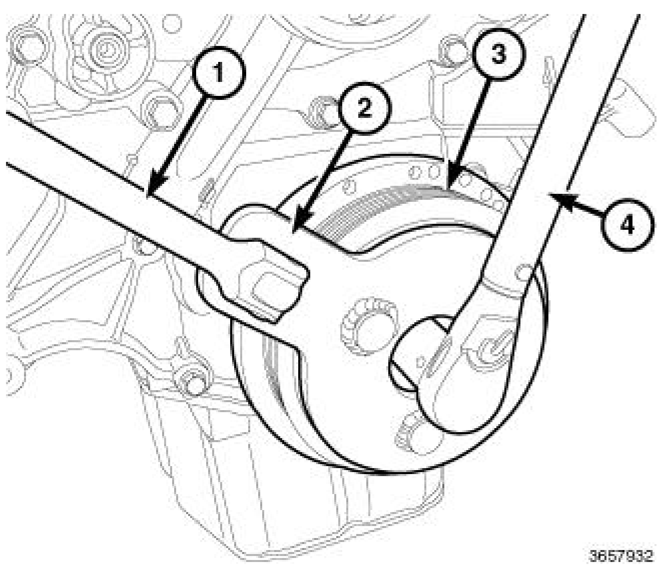


Fig. 154: Installing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

6. Install crankshaft damper bolt.
7. Position the (special tool #10386, Holder, Vibration Damper) (2), onto the vibration damper (3).
8. Tighten the bolt to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
9. Remove the cardboard from radiator face.
10. Install the cooling fan. Refer to **FAN, COOLING, INSTALLATION** .
11. Install the serpentine belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
12. Refill the cooling system. Refer to **STANDARD PROCEDURE** .
13. Connect the negative battery cable.

FLEXPLATE

REMOVAL

REMOVAL

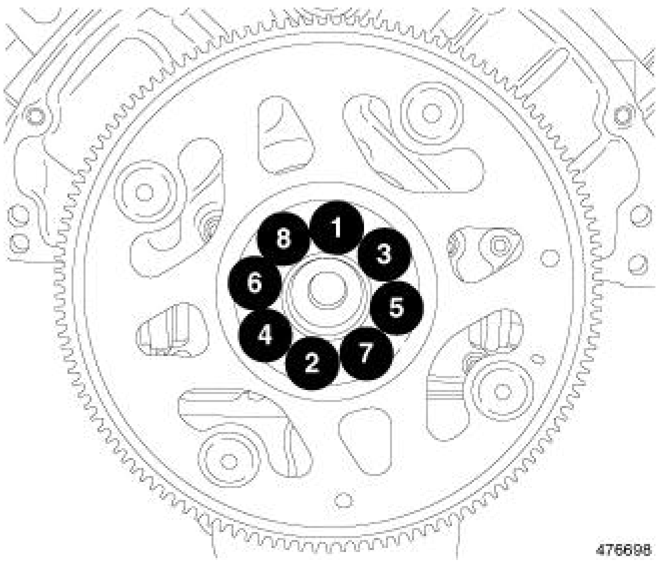


Fig. 155: Flexplate Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transmission. Refer to **REMOVAL** .
2. Using the sequence shown in illustration, remove the flexplate bolts.
3. Remove the flexplate.
4. Inspect the flexplate for cracks or damaged to the teeth.

INSTALLATION

INSTALLATION

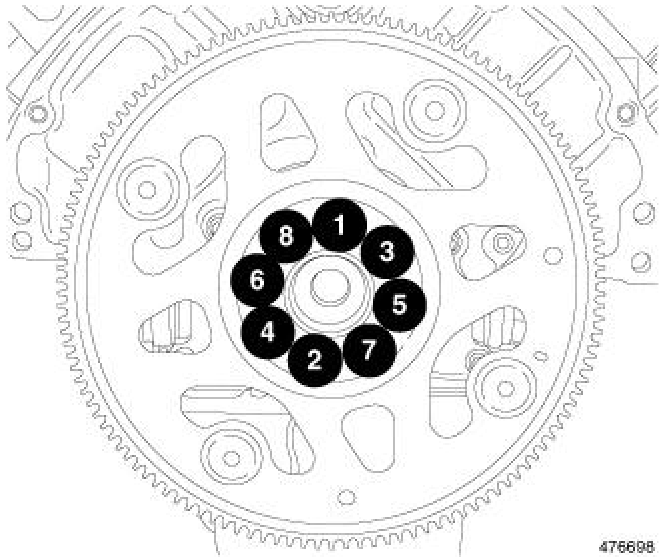


Fig. 156: Flexplate Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Install the flexplate onto the crankshaft and tighten bolts finger tight.
2. Using the sequence shown in illustration, tighten bolts to 95 N.m (70 ft. lbs.).
3. Install the transmission. Refer to **INSTALLATION** .

LIFTER(S), HYDRAULIC, ROLLER

DESCRIPTION

DESCRIPTION

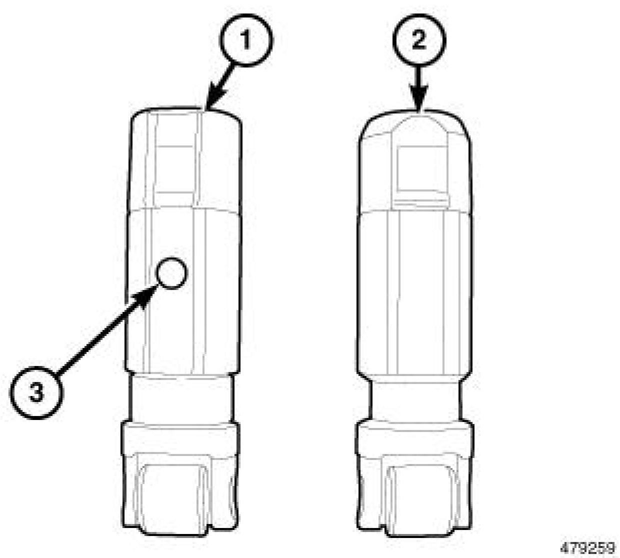


Fig. 157: MDS Lifter
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) selectively deactivates cylinders 1, 4, 6 and 7 during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy.

The MDS can provide a 5 to 20% fuel economy benefit when operating in four-cylinder mode. Depending on

driving habits and vehicle usage. For EPA rating purposes the fuel economy is 8 to 15% higher than if the engine was operating on eight-cylinders at all times.

The MDS deactivating lifter (1) can be distinguished from the non-MDS lifter (2) by the disconnecting pin (3) on the side of the MDS lifter.

MDS is integrated into the basic engine architecture requiring these additional components:

- Unique MDS camshaft
- 8 deactivating roller lifters
- 4 MDS control valve solenoids
- MDS control valve solenoid wiring harness
- Oil temperature sensor

OPERATION

OPERATION

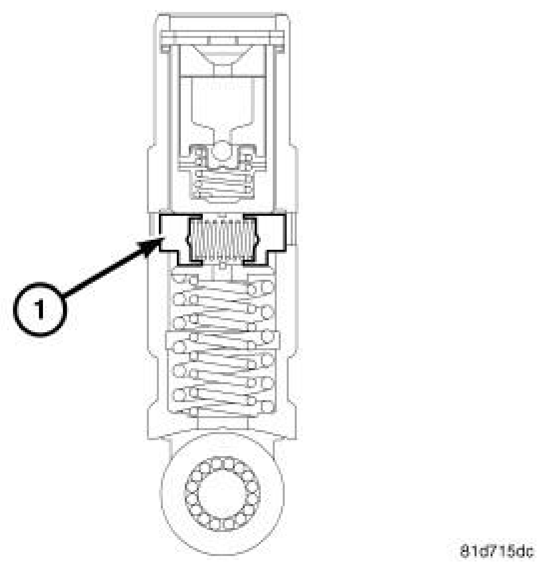


Fig. 158: MDS Lifter Cross-Section
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy. Both four and eight cylinder configurations have even firing intervals to provide smooth operation. The MDS selectively deactivates cylinders 1, 4, 6, and 7, to improve fuel economy. All deactivated cylinders have unique hydraulic lifters that collapse when deactivated to prevent the valves from opening. Engine oil pressure is used to activate and deactivate the valves. Oil is delivered through special oil passages drilled into the cylinder block. The MDS solenoid valves control the flow. When activated, pressurized oil pushes a latching pin on each MDS lifter which becomes a lost motion link. The base of the MDS lifter follows the camshaft while the top remains stationary. The MDS lifter is held in place against the pushrod by light spring pressure but unable to move because of the much higher force of the valve spring.

NOTE: **It is critical to use the recommended oil viscosity in engines that use MDS.**

Deactivation occurs during the compression stroke of each cylinder, after air and fuel enter the cylinder. Ignition occurs, but the combustion products remain trapped in the cylinder under high pressure, because the valves no longer open. No fuel/air enters or leaves during subsequent piston strokes, this high pressure gas is repeatedly compressed and expanded like an air spring.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HYDRAULIC TAPPETS

Check the oil pressure before disassembling any part of the engine to correct tappet noise. If vehicle has no oil pressure gauge, install a reliable gauge at the pressure sending-unit. The pressure should be between 107-758 kPa (25-110 psi) at 3, 000 RPM. Refer to **DIAGNOSIS AND TESTING**.

Check the oil level after the engine reaches normal operating temperature. Allow five minutes for the oil level to stabilize before checking the oil level. The oil level in the pan should never be above the FULL mark or below the ADD OIL mark on the dipstick. Either of these two conditions could be responsible for noisy tappets.

OIL LEVEL

HIGH

If the oil level is above the FULL mark, it is possible for the connecting rods to dip into the oil. With the engine running, this condition could create foam in the oil pan. Foam in the oil pan would be fed to the hydraulic tappets by the oil pump causing them to lose length and allow the valves to seat noisily.

LOW

Low oil level may allow the oil pump to take in air. When air is fed to the tappets, they lose length, which allows valves to seat noisily. Any leaks on the intake side of the oil pump through which air can be drawn creates the same tappet action. Check the lubrication system from the intake strainer to the pump cover, including the relief valve retainer cap. When tappet noise is due to aeration, it may be intermittent or constant, and usually more than one tappet will be noisy. When the oil level and leaks have been corrected, operate the engine at fast idle. Run the engine for a sufficient amount of time to allow all of the air inside the tappets to be bleed out.

TAPPET NOISE DIAGNOSIS

1. To determine the source of tappet noise, crank the engine over with the cylinder head covers removed.
2. Feel each valve spring or rocker arm to detect the noisy tappet. The noisy tappet will cause the affected spring and/or rocker arm to vibrate or feel rough in operation.

   NOTE: **Worn valve guides or cocked springs are sometimes mistaken for noisy tappets. If such is the case, noise may be dampened by applying side thrust on the valve spring. If noise is not appreciably reduced, it can be assumed the noise is in the tappet. Inspect the rocker arm pushrod sockets and pushrod ends for wear.**

3. Valve tappet noise ranges from light noise to a heavy click. A light noise is usually caused by excessive leak-down around the unit plunger, or by the plunger partially sticking in the tappet body cylinder. The tappet should be replaced. A heavy click is caused by a tappet check valve not seating, or by foreign particles wedged between the plunger and the tappet body. This will cause the plunger to stick in the

down position. This heavy click will be accompanied by excessive clearance between the valve stem and rocker arm as valve closes. In either case, tappet assembly should be removed for inspection and cleaning.

4. The valve train generates a noise very much like a light tappet noise during normal operation. Care must be taken to ensure that tappets are making the noise. If more than one tappet seems to be noisy, it's probably not the tappets.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the cylinder head. Refer to CYLINDER HEAD, REMOVAL, 5.7L.

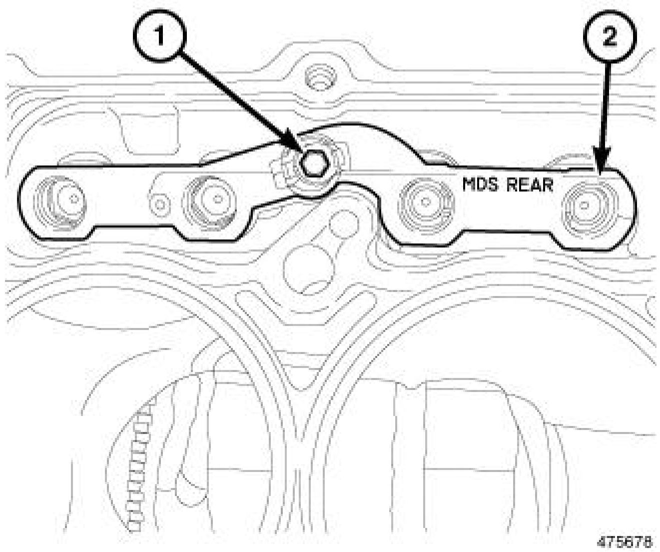


Fig. 159: Rear MDS Lifter Assembly
Courtesy of CHRYSLER GROUP, LLC

3. Remove the tappet guide holder retaining bolt (1) from the tappet guide holder assembly (2).

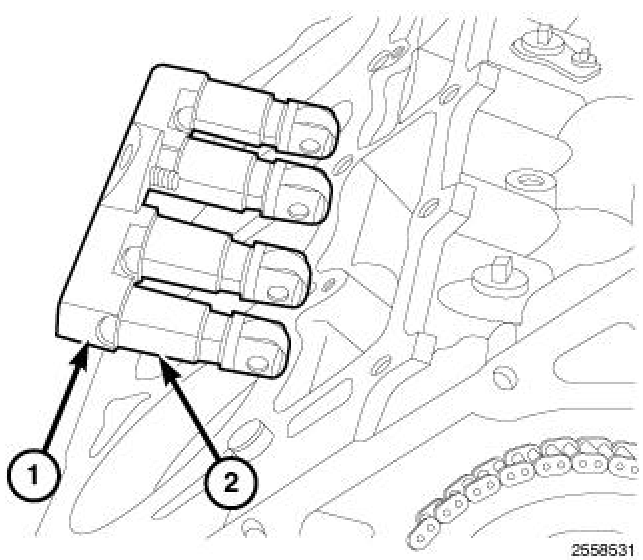


Fig. 160: Tappet Guide Holder Assembly

Courtesy of CHRYSLER GROUP, LLC

CAUTION: The lifter and retainer assembly must be installed as a unit.

CAUTION: If the lifter and retainer assembly are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

4. Remove the tappet guide holder (1) and tappets (2) as an assembly.
5. Check the camshaft lobes for abnormal wear.

INSTALLATION

INSTALLATION

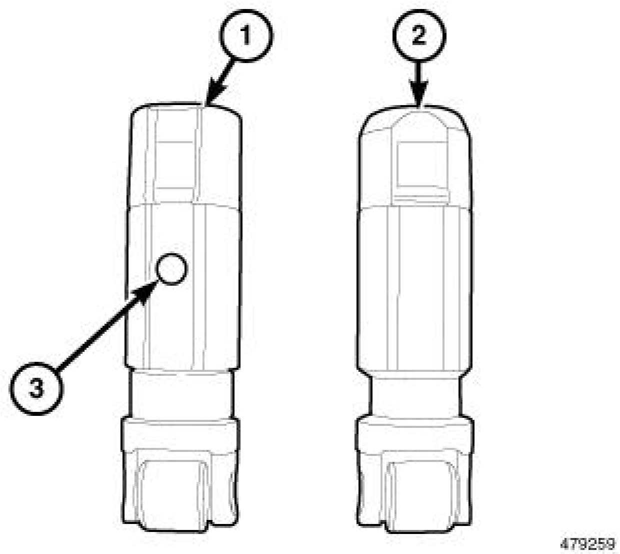


Fig. 161: MDS Lifter
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy.

CAUTION: Engines equipped with MDS use both standard roller lifters (2) and deactivating roller lifters (1). The deactivating roller lifters must be used in cylinders 1, 4, 6, 7. The deactivating lifters can be identified by the two holes in the side of the lifter body (3), for the latching pins.

CAUTION: The lifter and retainer assembly must be installed as a unit.

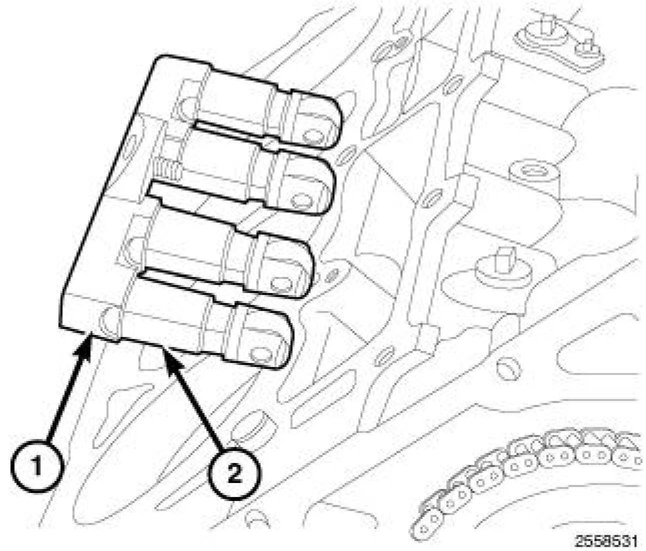


Fig. 162: Tappet Guide Holder Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the tappet guide holder (1) and tappets (2).

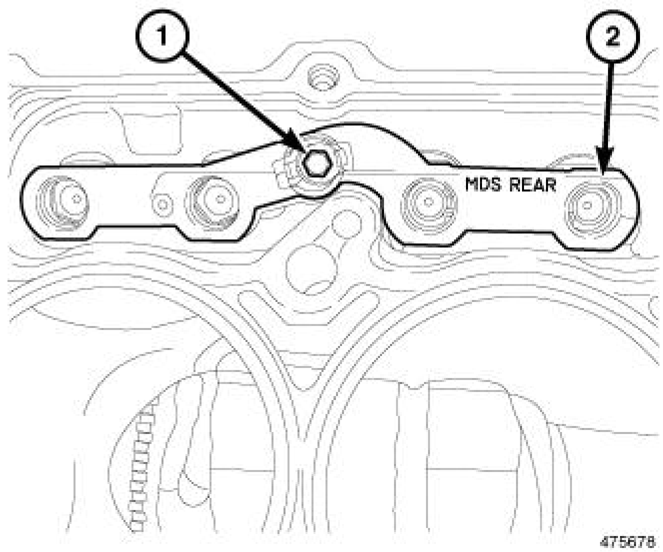


Fig. 163: Rear MDS Lifter Assembly
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the lifters and guide holder assembly are to be reused, they must me installed in their original location.

2. Install roller lifters and the lifter guide holder (2). Tighten bolt (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
3. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.
4. Connect the negative battery cable.

CAUTION: To prevent damage to valve assemblies, do not run the engine above fast idle until all hydraulic lifters have filled with oil and have become quiet.

5. Start the engine and check for leaks.
6. Road test the vehicle.

RETAINER, CRANKSHAFT REAR OIL SEAL

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - REAR SEAL AREA LEAKS

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and cannot be serviced separately.

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Raise and support the vehicle.
2. Remove the transmission inspection/torque converter access cover.
3. Inspect the rear of the cylinder block for evidence of oil leakage, note the following:
   - Circular spray pattern generally indicates seal leakage or crankshaft damage.
   - Where leakage tends to run straight down, possible causes are a porous block, camshaft bore cup plugs, oil gallery pipe plugs, oil filter runoff, and main bearing cap to cylinder block mating surfaces. See appropriate Engine component service information for proper repair procedures of these items.
4. If no leaks are detected, pressurize the crankcase as outlined in **AIR LEAK DETECTION TEST METHOD**.

   CAUTION: Do not exceed 20.6 kPa (3 psi).

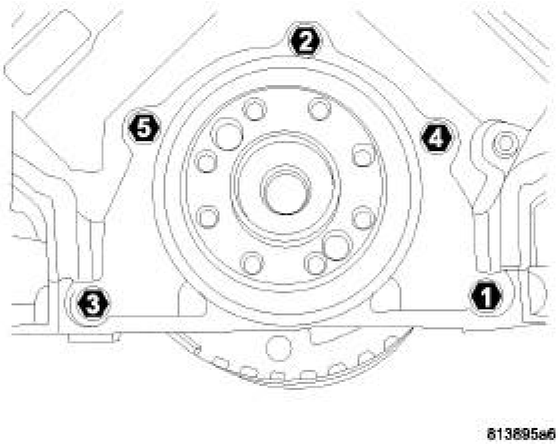
5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out using an emery cloth.

   CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks or scratches. The crankshaft seal flange is specially machined to complement the function of the rear oil seal.

6. For bubbles that remain steady with shaft rotation, no further inspection can be done. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL, 5.7L**.

REMOVAL

REMOVAL



[Fig. 164: Rear Seal Retainer Torque Sequence]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.**

NOTE: **The crankshaft rear oil seal retainer can not be reused after removal.**

NOTE: **This procedure can be performed in vehicle.**

1. Disconnect the negative battery cable.
2. On automatic transmission models, remove the flexplate. Refer to **FLEXPLATE, REMOVAL, 5.7L**.
3. On manual transmission models, remove the flywheel. Refer to **FLYWHEEL, REMOVAL** .
4. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L**.
5. Using the sequence shown in illustration, remove the rear oil seal retainer mounting bolts.
6. Carefully remove the retainer from the engine block.

INSTALLATION

INSTALLATION

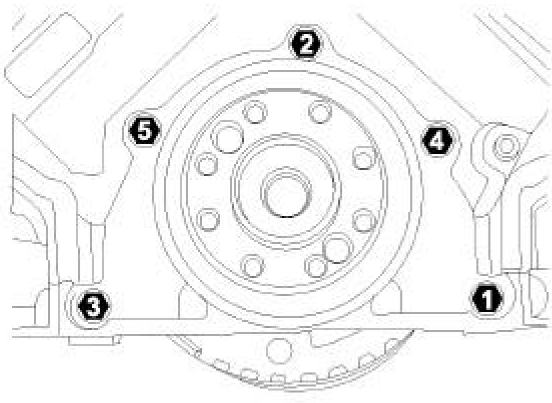


Fig. 165: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.**

NOTE: **The crankshaft rear oil seal retainer can not be reused after removal.**

1. Thoroughly clean all gasket residue from the engine block.
2. Position the gasket onto the new crankshaft rear oil seal retainer.
3. Position the crankshaft rear oil seal retainer onto the engine block.
4. Using the sequence shown in illustration, install the crankshaft rear oil seal retainer mounting bolts and tighten to 13 N.m (10 ft. lbs.).
5. Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L**.
6. Install the flexplate. Refer to **FLEXPLATE, INSTALLATION, 5.7L**.
7. Install the transmission. Refer to **INSTALLATION** .
8. Fill the engine with oil.
9. Start the engine and check for leaks.

RING(S), PISTON

STANDARD PROCEDURE

STANDARD PROCEDURE - PISTON RING FITTING

PISTON RING END GAP

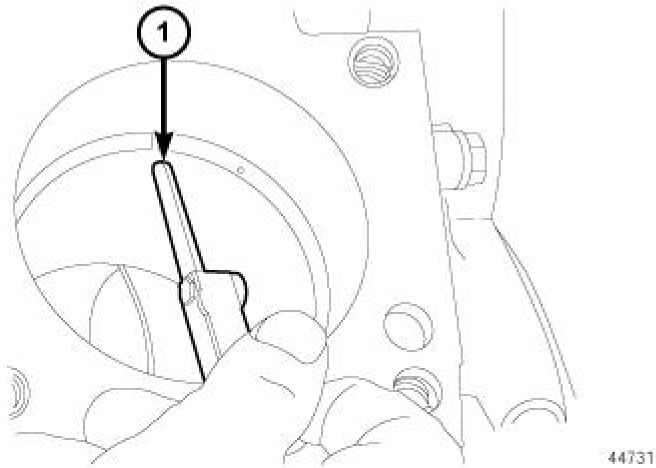


Fig. 166: Checking Piston Ring End Gap Using Feeler Gauge
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before reinstalling used rings or installing new rings, the ring clearances must be checked.**

1. Wipe the cylinder bore clean.
2. Insert the ring in the cylinder bore.

   NOTE: **The ring gap measurement must be made with the ring positioned at least 12 mm (0.472 inch.) from bottom of cylinder bore.**

3. Using a piston, to ensure that the ring is squared in the cylinder bore, slide the ring downward into the cylinder.
4. Using a feeler gauge check the ring end gap. Replace any rings not within specification.

PISTON RING SIDE CLEARANCE

NOTE: **Make sure the piston ring grooves are clean and free of nicks and burrs.**

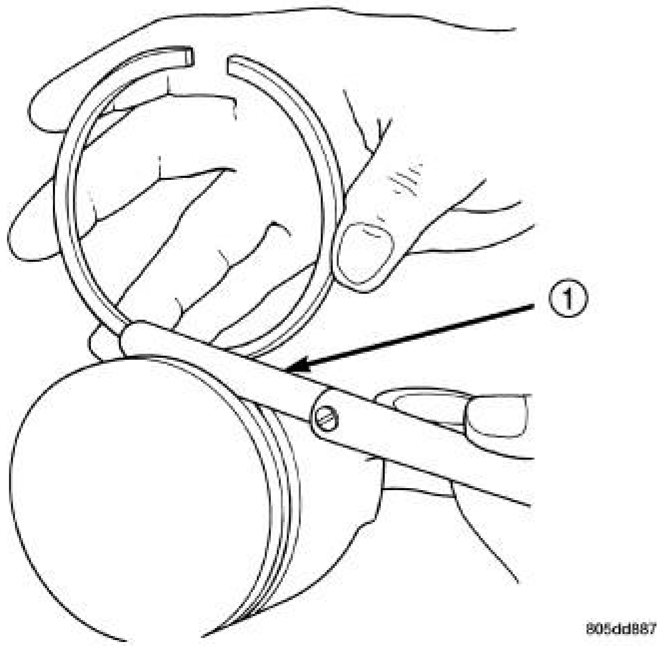


Fig. 167: Checking Piston Ring Grooves Clearances
Courtesy of CHRYSLER GROUP, LLC

1. Measure the ring side clearance as shown in illustration make sure the feeler gauge (1) fits snugly between the ring land and the ring. Replace any ring not within specification.
2. Rotate the ring around the piston, the ring must rotate in the groove with out binding.

PISTON RING SPECIFICATION CHART

Piston Ring Position	Piston Ring Side Clearance	Maximum Clearance
Upper Ring	-	-
Metric	0.04 - 0.09 mm	0.11 mm
Standard	0.001 - 0.003 in.	0.004 in.
Intermediate Ring	-	-
Metric	0.04 - 0.08 mm	0.10 mm
Standard	0.001 - 0.003 in.	0.004 in.
Piston Ring Position	**Piston Ring End Gap**	**Wear Limit**
Upper Ring	-	-
Metric	0.40 - 0.55 mm	0.43 mm
Standard	0.015 - 0.021 in.	0.017 in.
Intermediate Ring	-	-
Metric	0.24 - 0.51 mm	0.74 mm
Standard	0.009 - 0.020 in.	0.029 in.
Oil Control Ring (Steel Rail)	-	-
Metric	0.015 - 0.66 mm	0.76 mm
Standard	0.005 - 0.025 in.	0.030 in.

PISTON RING INSTALLATION

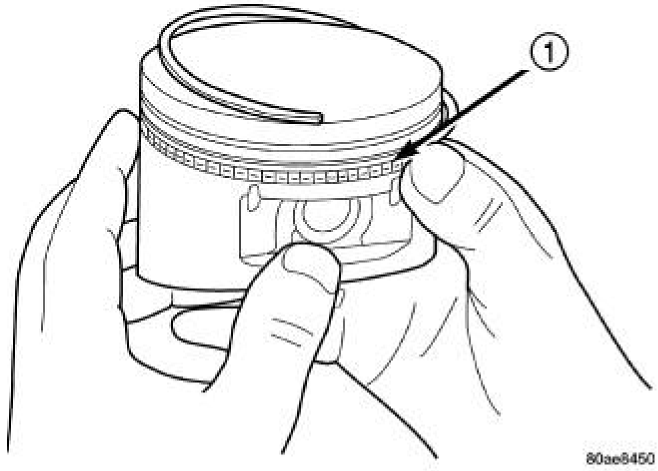


Fig. 168: Installing Piston Ring Side Rail
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The No. 1 and No. 2 piston rings have a different cross section. Ensure No. 2 ring is installed with manufacturers I.D. mark (Dot) facing up, towards top of the piston.**

NOTE: **Piston rings are installed in the following order:**

- **Oil ring expander.**
- **Lower oil ring side rail.**
- **Upper oil ring side rail.**
- **No. 2 Intermediate piston ring.**
- **No. 1 Upper piston ring.**

1. Install the oil ring expander.
2. Install upper side rail by placing one end between the piston ring groove and the expander ring. Hold end firmly and press down the portion to be installed until side rail is in position. Repeat this step for the lower side rail.

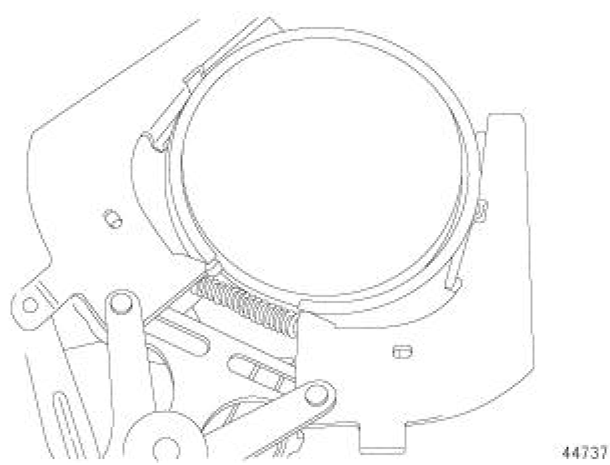


Fig. 169: Installing Upper & Intermediate Rings

Courtesy of CHRYSLER GROUP, LLC

3. Install No. 2 intermediate piston ring using a piston ring installer.
4. Install No. 1 upper piston ring using a piston ring installer.

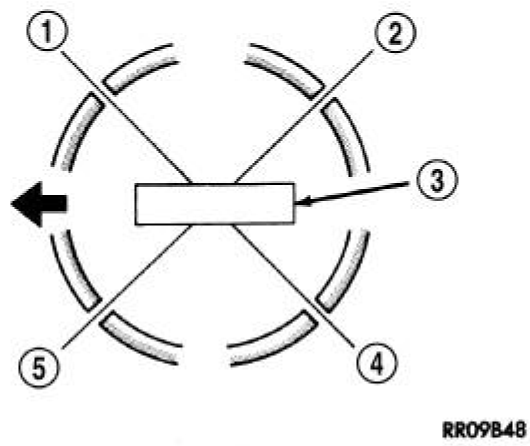


Fig. 170: Piston Ring End Gap Position
Courtesy of CHRYSLER GROUP, LLC

NOTE: Install the piston rings so the gaps positioned as indicated with the piston viewed from the top.

NOTE: Staggering ring gap is important for oil control.

5. Install the oil expander so the ring gap is located in the (1) position.
6. Install the oil ring rails so the ring gap is located in the (2, 4) position.
7. Install the second compression ring so the ring gap is located in the (3) position.
8. Install the top compression so the ring gap is located in the (1) position.

ROD, PISTON AND CONNECTING

DESCRIPTION

DESCRIPTION

CAUTION: Do not use a metal stamp to mark connecting rods as damage may result, instead use ink or a scratch awl.

The pistons are made of a high strength aluminum alloy. Piston skirts are coated with a solid lubricant (MolykoteÂ®) to reduce friction and provide scuff resistance. The piston top ring groove and land is anodized. The connecting rods are made of forged powdered metal, with a fractured cap design.

STANDARD PROCEDURE

STANDARD PROCEDURE - PISTON FITTING

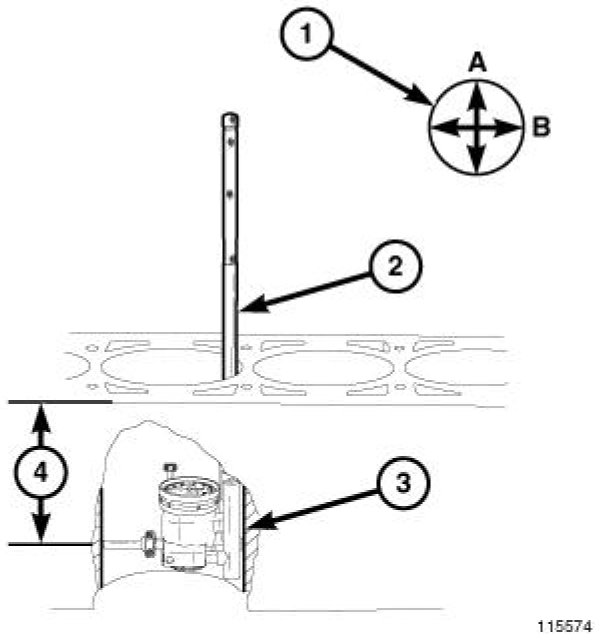


Fig. 171: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER GROUP, LLC

1. To correctly select the proper size piston, use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to measure the inside diameter of the cylinder bore (3). A cylinder bore gauge capable of reading in 0.003 mm (0.0001 in.) Increments is required. If a bore gauge is not available, do not use an inside micrometer.
2. Measure the inside diameter of the cylinder bore at a point 38.0 mm (1.5 inches) below the top of bore (4). Start perpendicular (across or at 90Â°) to the axis of the crankshaft at point A (1) and then take an additional bore reading 90Â° at point B (1).
3. The coated pistons will be serviced with the piston pin and connecting rod pre-assembled. The piston-rod assembly is specific for the left cylinder bank (odd numbered) and the right cylinder bank (even numbered) and must not be interchanged.

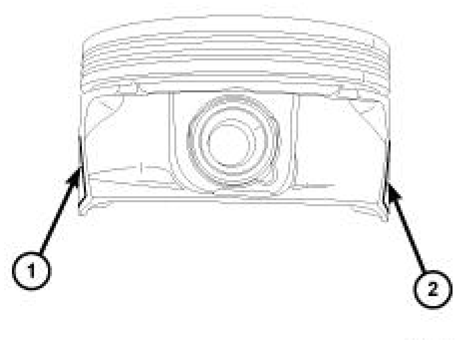


Fig. 172: Piston Diameter Measuring Points
Courtesy of CHRYSLER GROUP, LLC

4. Measure the piston diameter with a micrometer at points (1, 2).

REMOVAL

REMOVAL

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Disconnect and isolate the negative battery cable.
3. Remove the cylinder head(s). Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.
4. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L**.
5. Remove support and lower the vehicle.
6. If necessary, remove the ridge on top of the cylinder bores with a reliable ridge reamer before removing the pistons from the cylinder block. **Be sure to keep the tops of the pistons covered during this operation.**

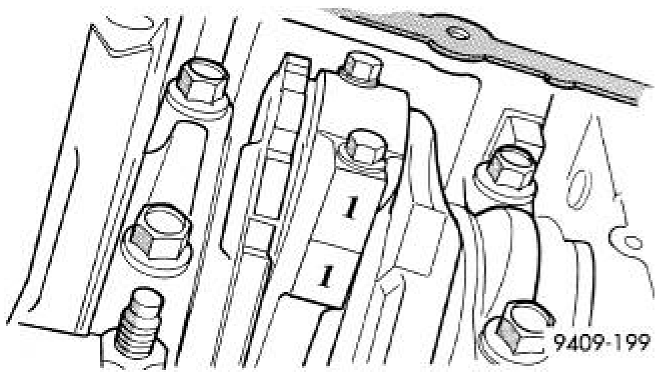


Fig. 173: Identifying Mark On Connecting Rod And Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur.**

NOTE: **Connecting rods and bearing caps are not interchangeable and should be marked before removal to ensure correct reassembly.**

7. Raise and support the vehicle.
8. Mark the connecting rod and bearing cap positions using a permanent ink marker or scribe tool.

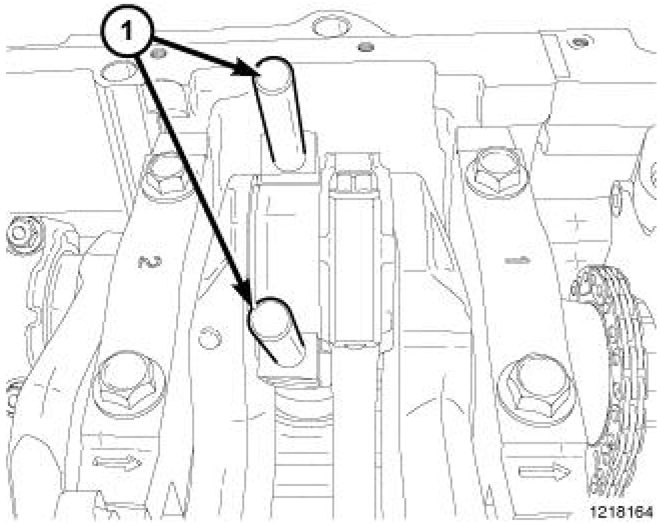


Fig. 174: Connecting Rod Guides
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Care must be taken not to damage the fractured rod and cap joint face surfaces, as engine damage may occur.**

CAUTION: **Care must be taken not to nick crankshaft journals, as engine damage may occur.**

NOTE: **Pistons and connecting rods assemblies must be removed from the top of cylinder block. When removing the piston and connecting rod assemblies from the engine, rotate the crankshaft so each connecting rod is centered in the cylinder bore.**

9. Remove the connecting rod cap, install the Connecting Rod Guides (special tool #8507, Guides, Connecting Rod) (1) and carefully remove the piston from the cylinder bore, repeat this procedure for each piston being removed.
10. Immediately after removing the piston and connecting rod, install the bearing cap on the mating connecting rod to prevent damage to the fractured cap and rod surfaces.
11. Carefully remove the piston rings from the piston(s), starting from the top ring down.

CLEANING

CLEANING

CAUTION: **DO NOT use a wire wheel or other abrasive cleaning devise to clean the pistons or connecting rods. The pistons have a Moly coating, this coating must not be damaged.**

1. Using a suitable cleaning solvent, clean the pistons in warm water and towel dry.
2. Use a wood or plastic scraper to clean the ring land grooves.

CAUTION: **Do not remove the piston pin from the piston and connecting rod assembly.**

INSPECTION

INSPECTION

Check the connecting rod journal for excessive wear, taper and scoring. Refer to **STANDARD PROCEDURE**.

Check the connecting rod for signs of twist or bending.

Check the piston for taper and elliptical shape before it is fitted into the cylinder bore. Refer to **STANDARD PROCEDURE**.

Check the piston for scoring or scraping marks in the piston skirts. Check the ring lands for cracks and/or deterioration.

INSTALLATION

INSTALLATION

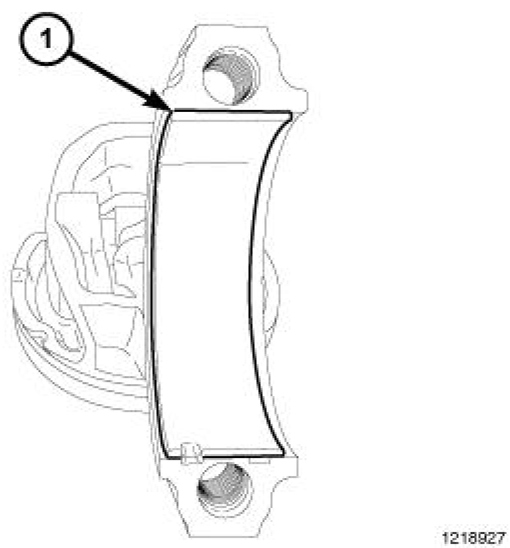


Fig. 175: Rod Bearing
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Before reinstalling used rings or installing new rings, the ring clearances must be checked.**

NOTE:	**Make sure the piston ring grooves are clean and free of nicks and burrs.**

1. Check piston ring clearance. Refer to **STANDARD PROCEDURE**.
2. Before installing piston and connecting rod assemblies into the bore, install the piston rings. Refer to **STANDARD PROCEDURE**.
3. Immerse the piston head and rings in clean engine oil and position a ring compressor over the piston and rings and tighten the ring compressor. **Ensure the position of rings do not change during this operation.**
4. Position the rod bearing (1) onto the connecting rod and lubricate bearing surface with clean engine oil.

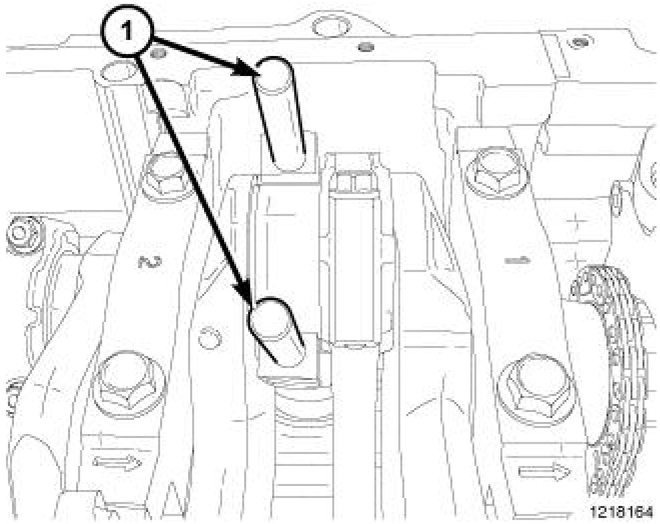


Fig. 176: Connecting Rod Guides
Courtesy of CHRYSLER GROUP, LLC

5. Install Connecting Rod Guides (special tool #8507, Guides, Connecting Rod) (1) into the connecting rod bolt threads.

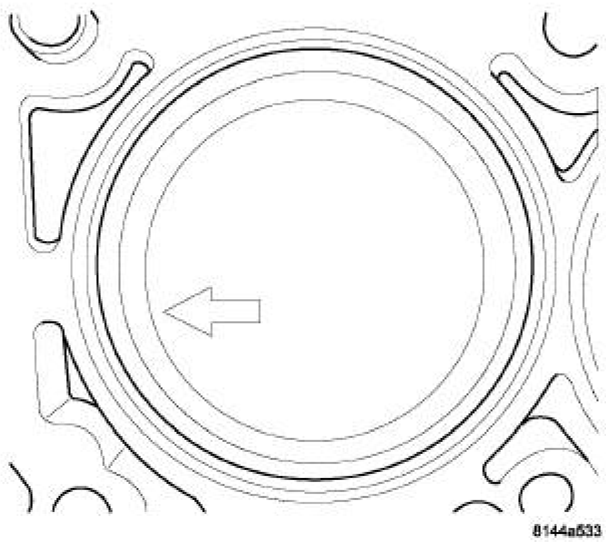


Fig. 177: Piston Direction Arrow
Courtesy of CHRYSLER GROUP, LLC

6. The pistons are marked on the piston pin bore surface with an raised "F" or arrow on top of piston indicating installation position. This mark must be pointing toward the front of engine on both cylinder banks.
7. Wipe cylinder bore clean and lubricate with clean engine oil.
8. Rotate the crankshaft until the connecting rod journal is centered with the cylinder bore.
9. Insert the piston and rod assembly into the cylinder bore and carefully position the connecting rod over

the crankshaft journal.

10. Tap the piston down into the cylinder bore using a hammer handle while guiding the connecting rod into position on the rod journal.

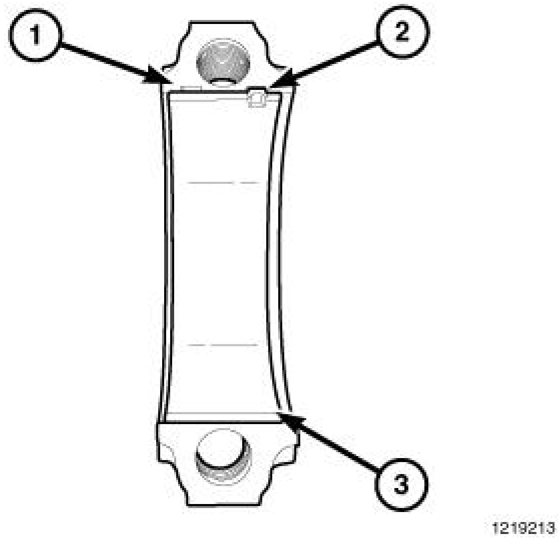


Fig. 178: Connecting Rod Cap
Courtesy of CHRYSLER GROUP, LLC

11. Remove the Connecting Rod Guides (special tool #8507, Guides, Connecting Rod).
12. Wipe the connecting rod cap (1) clean and lubricate with clean engine oil and install the bearing (3).

NOTE: **The connecting rods and bearing caps are not interchangeable, line up the previously marked bearing caps and connecting rods to ensure assembly to their original location.**

13. Lubricate the bearing surfaces with clean engine oil and position the rod cap in place.

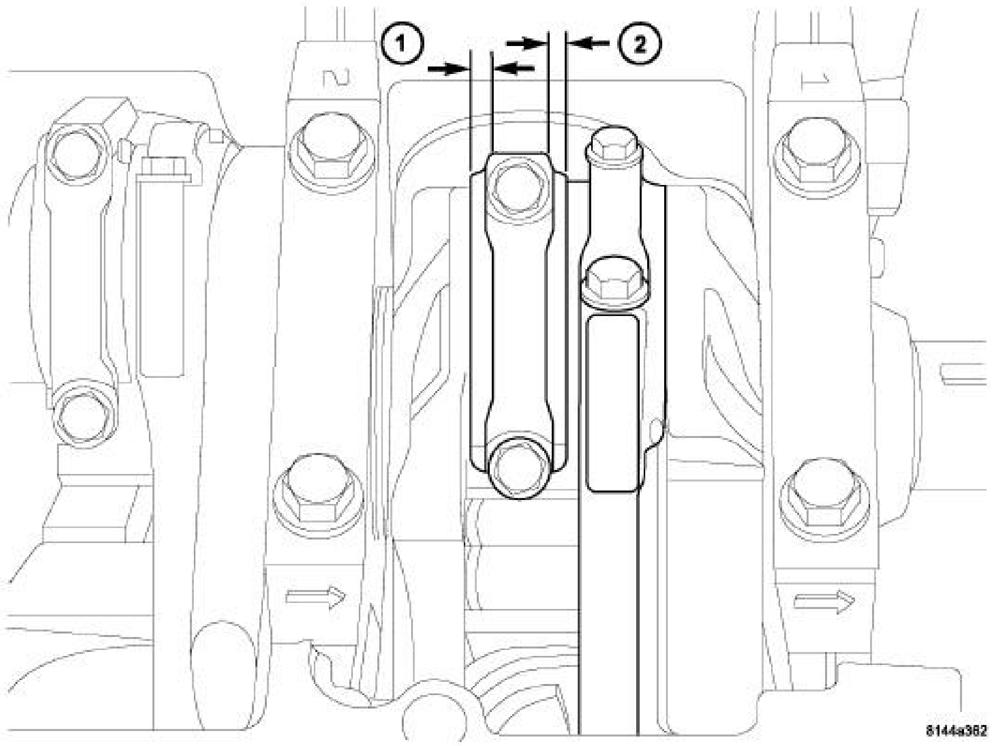


Fig. 179: Identifying Connecting Rod Proper Installation
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **When installing the connecting rods, make sure the wide side of the connecting rod faces the crankshaft and the narrow sides face each other.**

CAUTION: **Always replace the connecting rod bolts whenever they are loosened or removed.**

14. Lubricate the **NEW** rod cap bolts with clean engine oil, install and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.
15. Install the new oil pan gasket/windage tray and oil pan. Refer to PAN, OIL, INSTALLATION, 5.7L.
16. Install the cylinder head(s). Refer to CYLINDER HEAD, INSTALLATION, 5.7L.
17. Connect the negative battery cable.

SEAL, CRANKSHAFT OIL, FRONT

REMOVAL

REMOVAL

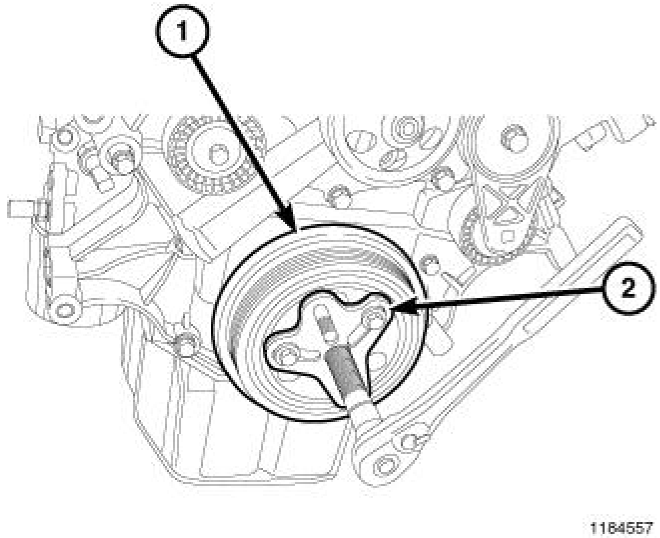


Fig. 180: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative cable from battery.
2. Remove radiator cooling fan. Refer to **FAN, COOLING, REMOVAL** .
3. Remove the vibration damper (1). Refer to **DAMPER, VIBRATION, REMOVAL, 5.7L**.

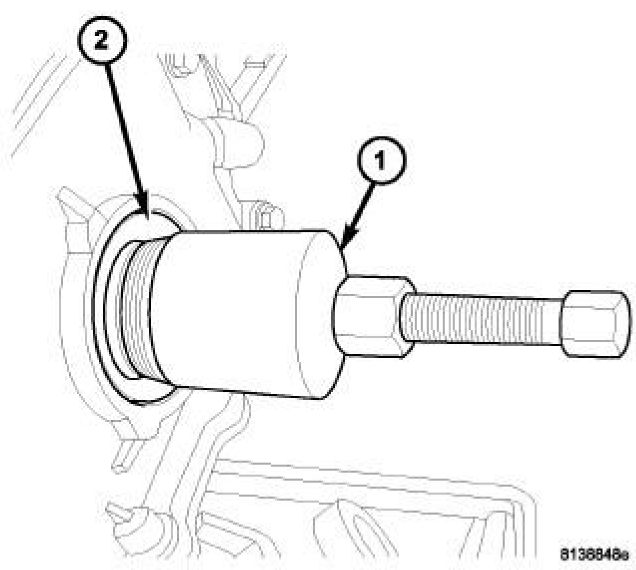


Fig. 181: Front Crankshaft Seal Removal
Courtesy of CHRYSLER GROUP, LLC

4. Using Seal Remover (special tool #9071, Remover, Seal) (1), remove crankshaft front seal (2).

INSTALLATION

INSTALLATION

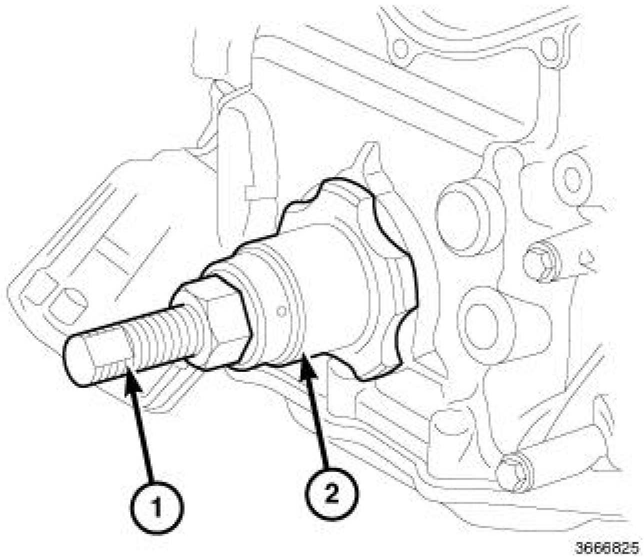


Fig. 182: Front Seal Installation
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The front crankshaft seal must be installed dry. Do not apply lubricant to the sealing lip or the outer edge.

1. Using the Crankshaft Front Oil Seal Installer (special tool #9072, Installer, Seal) (2) and (special tool #10387, Installer, Vibration Damper) (1), install crankshaft front seal.

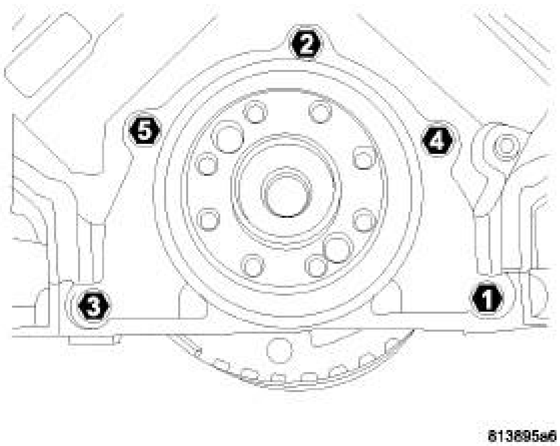
CAUTION: To prevent severe damage to the crankshaft or damper, thoroughly clean the damper bore and the crankshaft nose before installing damper.

2. Install the vibration damper. Refer to DAMPER, VIBRATION, INSTALLATION, 5.7L.
3. Install radiator cooling fan. Refer to FAN, COOLING, INSTALLATION .
4. Connect negative cable to battery.

SEAL, CRANKSHAFT OIL, REAR

DESCRIPTION

DESCRIPTION



[Fig. 183: Rear Seal Retainer Torque Sequence]
Courtesy of CHRYSLER GROUP, LLC

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and is serviced as an assembly.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - REAR SEAL AREA LEAKS

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and cannot be serviced separately.

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Raise and support the vehicle.
2. Remove the transmission inspection/torque converter access cover.
3. Inspect the rear of the cylinder block for evidence of oil leakage, note the following:
    - Circular spray pattern generally indicates seal leakage or crankshaft damage.
    - Where leakage tends to run straight down, possible causes are a porous block, camshaft bore cup plugs, oil gallery pipe plugs, oil filter runoff, and main bearing cap to cylinder block mating surfaces. See appropriate Engine component service information for proper repair procedures of these items.
4. If no leaks are detected, pressurize the crankcase as outlined in **AIR LEAK DETECTION TEST METHOD**.

CAUTION: Do not exceed 20.6 kPa (3 psi).

5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected

between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out using an emery cloth.

CAUTION: **Use extreme caution when crankshaft polishing is necessary to remove minor nicks or scratches. The crankshaft seal flange is specially machined to complement the function of the rear oil seal.**

6. For bubbles that remain steady with shaft rotation, no further inspection can be done and replace the crankshaft rear oil seal. Refer to **SEAL, CRANKSHAFT OIL, REAR, REMOVAL, 5.7L**.

REMOVAL

REMOVAL

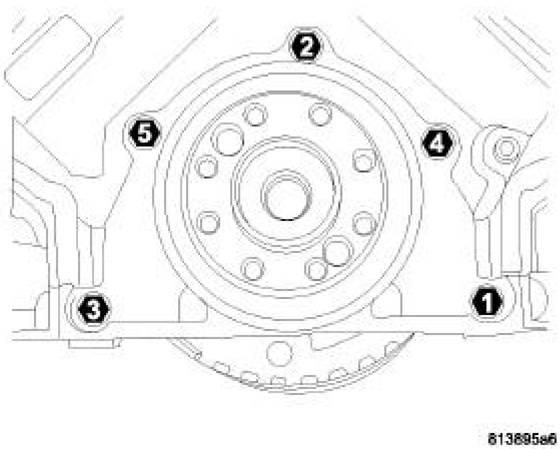


Fig. 184: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.**

NOTE: **The crankshaft rear oil seal retainer can not be reused after removal.**

NOTE: **This procedure can be performed in vehicle.**

1. Disconnect the negative battery cable.
2. On automatic transmission models, remove the flexplate. Refer to **FLEXPLATE, REMOVAL, 5.7L**.
3. On manual transmission models, remove the flywheel. Refer to **FLYWHEEL, REMOVAL** .
4. Remove the oil pan. Refer to **PAN, OIL, REMOVAL, 5.7L**.
5. Using the sequence shown in illustration, remove the rear oil seal retainer mounting bolts.

6. Carefully remove the retainer from the engine block.

INSTALLATION

INSTALLATION

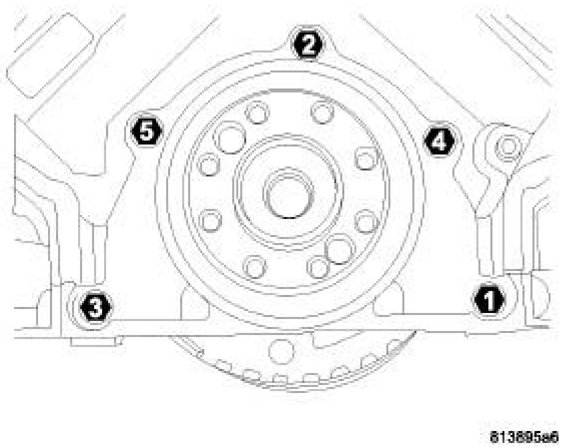


Fig. 185: Rear Seal Retainer Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Thoroughly clean all gasket residue from the engine block.
2. Install the gasket onto the new crankshaft rear oil seal retainer.
3. Install the crankshaft rear oil seal retainer. Using the sequence shown in illustration, tighten bolts to 13 N.m (10 ft. lbs.).
4. Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L**.
5. On manual transmission models, install the flywheel. Refer to **FLYWHEEL, INSTALLATION** .
6. On automatic transmission models, install the flexplate. Refer to **FLEXPLATE, INSTALLATION, 5.7L**.
7. Fill the engine with the recommended engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
8. Start the engine and check for leaks.

SOLENOID, MULTIPLE DISPLACEMENT

DESCRIPTION

DESCRIPTION

The Multi Displacement System (MDS) selectively deactivates cylinders 1, 4, 6, and 7, to improve fuel economy. It has two modes of operation:

- 8 cylinders for acceleration and heavy loads.

- 4 cylinders for cruising and city traffic.

The main components of the Multi Displacement System are:

- Unique MDS camshaft.
- Deactivating roller tappets.
- 4 control valves/solenoids.
- control valve/solenoid wiring harness.
- oil temp sensor.

OPERATION

OPERATION

Cylinder Deactivation

- Trap an exhaust charge from a normal combustion event
- Normal combustion event
- Don't open the exhaust valve
- Don't open the intake valve
- Piston is an air spring
- Cylinders deactivated in firing sequence
- Deactivating roller tappets

Cylinder Reactivation

- Open the exhaust valve
- Empty the cylinder
- Open the intake valve
- Normal combustion event
- Cylinders reactivated in firing sequence
- Reactivating roller tappets

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - MDS SOLENOID

The Multi-Displacement System (MDS) has the following detectable issues:

- solenoid circuit
- fail to deactivate a cylinder(s)
- fail to reactivate a cylinder(s)
- low oil pressure

CONDITION	POSSIBLE CAUSES	CORRECTION
MDS does not activate	1. Low oil pressure.	1. Check for proper oil pressure.

CONDITION	POSSIBLE CAUSES	CORRECTION
	2. Bad oil temperature sensor.	2. Replace the oil temperature sensor.
-	3. Malfunctioning MDS solenoid.	3. Replace the solenoid.
-	4. Malfunctioning MDS tappet.	4. Replace tappet (s).
MDS does not deactivate	1. Low oil pressure.	1. Check or proper oil pressure.
	2. Bad oil temperature sensor.	2. Replace the oil temp sensor.
-	3. Malfunctioning MDS solenoid.	3. Replace the solenoid.
-	4. Malfunctioning MDS tappet.	4. Replace tappet(s).

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.

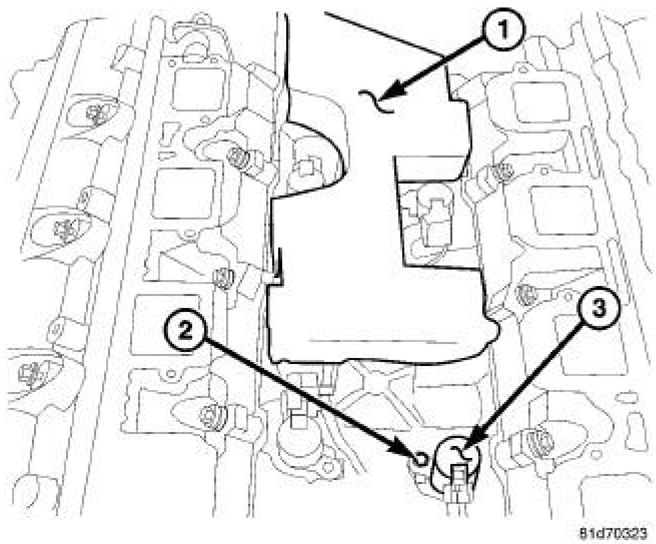


Fig. 186: MDS Solenoids
Courtesy of CHRYSLER GROUP, LLC

3. Remove foam insulator pad (1).

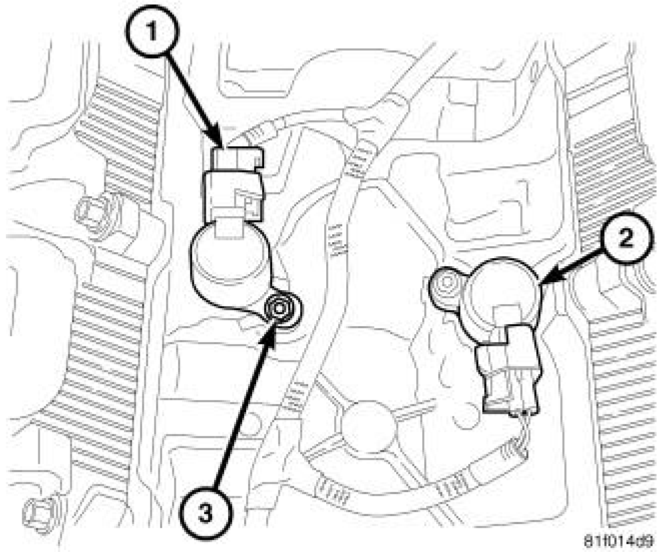


Fig. 187: MDS Solenoid Connector
Courtesy of CHRYSLER GROUP, LLC

4. Remove the Multiple Displacement Solenoid (MDS) (2) wire harness connector(s) (1).
5. Remove the MDS solenoid (2) retaining bolt(s) (3).

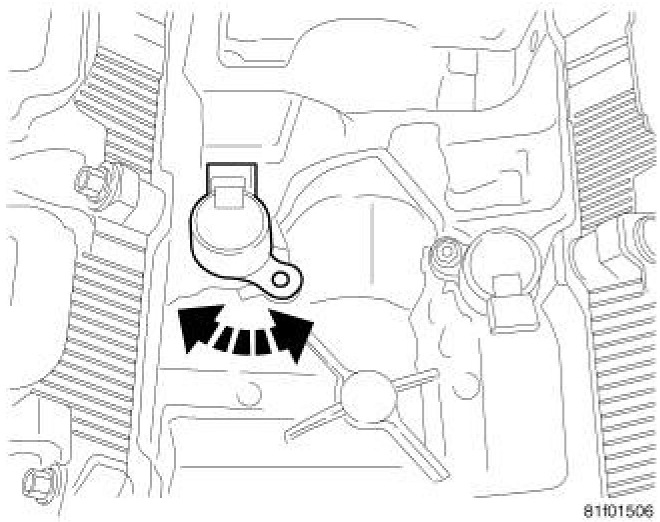


Fig. 188: MDS Solenoid Removal
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not try to pry the solenoid out. This could lead to breakage and contamination of the lubrication system.

6. Lightly tap on the MDS solenoid(s) with a rubber mallet. Rotate the MDS solenoid(s) from side to side to break the seal.
7. Remove the MDS solenoid(s).

INSTALLATION

INSTALLATION

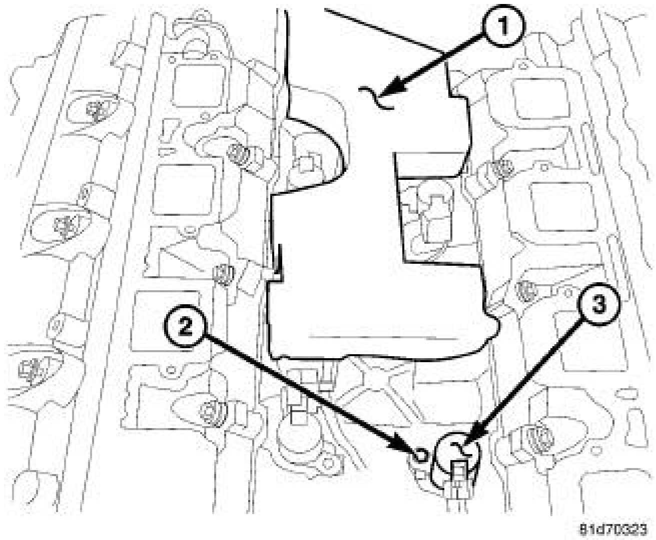


Fig. 189: MDS Solenoids
Courtesy of CHRYSLER GROUP, LLC

1. Verify the Multiple Displacement Solenoid (MDS) bores are free of debris before installing the MDS solenoid into the engine block.
2. Install the MDS solenoid(s) (3), ensure the seal is fully seated into the engine block.
3. Install the retaining bolt(s) (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Connect the MDS solenoid(s) (3) wire harness connector.
5. Install the foam insulator pad (1).
6. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, FRONT

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the Variable Valve Timing Solenoid (VVTS). Refer to **SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST, REMOVAL, 5.7L**.
3. Remove nut and the oil dipstick tube.
4. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

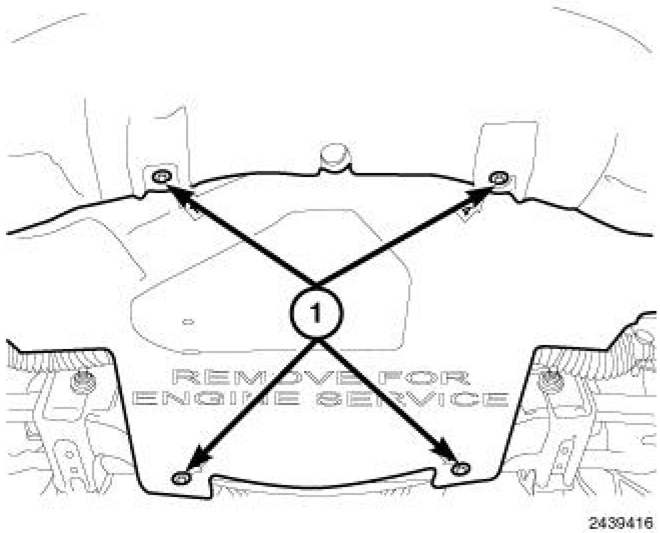


Fig. 190: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Remove the belly pan retainers (1) and remove the belly pan.

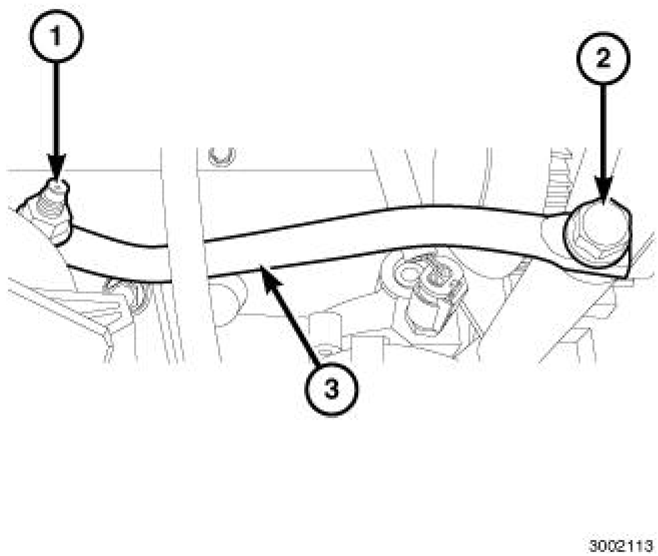


Fig. 191: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

6. Remove fasteners (1, 2) and the generator support bracket (3).
7. Remove support and lower the vehicle.

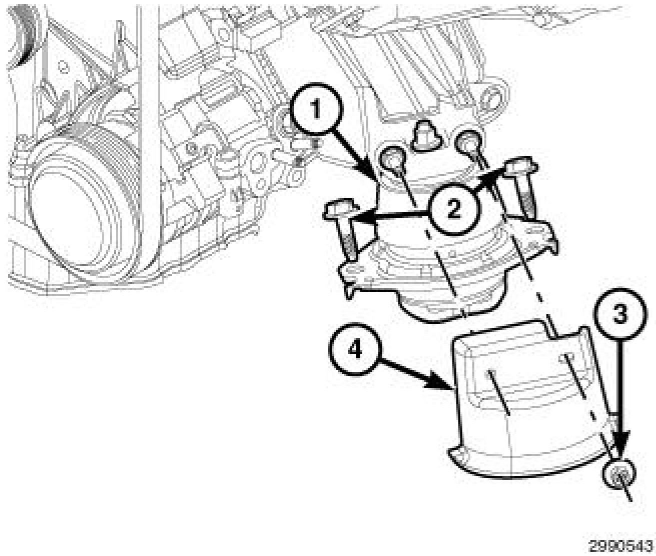


Fig. 192: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Left side shown in illustration, right side similar.**

8. Remove both left/right engine mount heat shield nuts (3) and the heat shields (4).
9. Remove both left/right engine mount bolts (2).

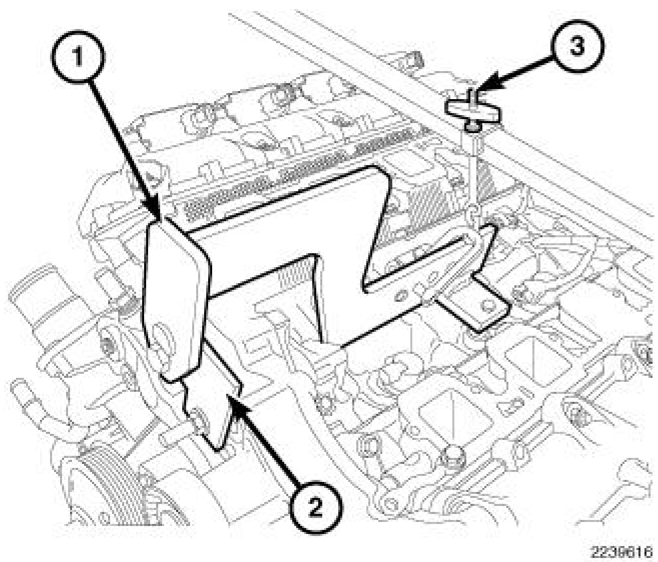


Fig. 193: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Do not use air tools to install the engine lift fixture.**

10. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).
11. Raise the engine to provide clearance to remove the engine mounts.

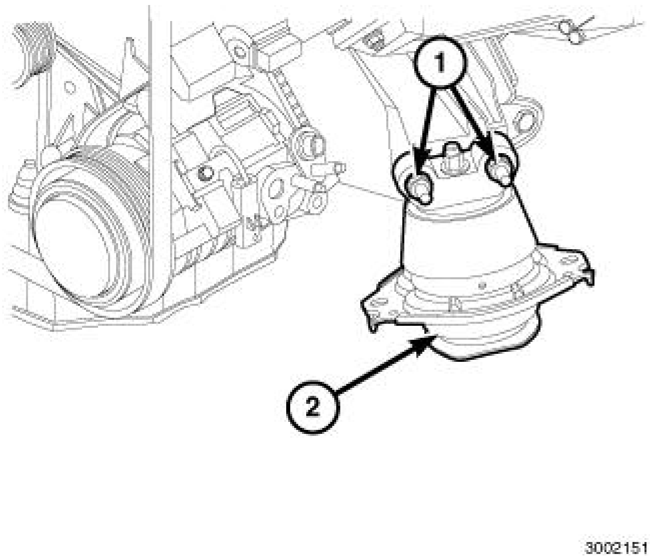


Fig. 194: Engine Mount & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

12. Remove both left/right engine mount bolts (1) and the engine mount(s) (2).

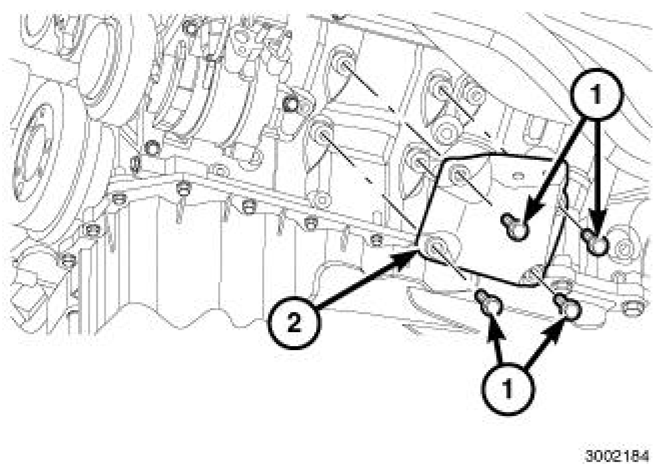


Fig. 195: Engine Mount-To-Engine Block Mounting Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

13. If required, remove bolts (1) and the engine mount bracket(s) (2).

INSTALLATION

INSTALLATION

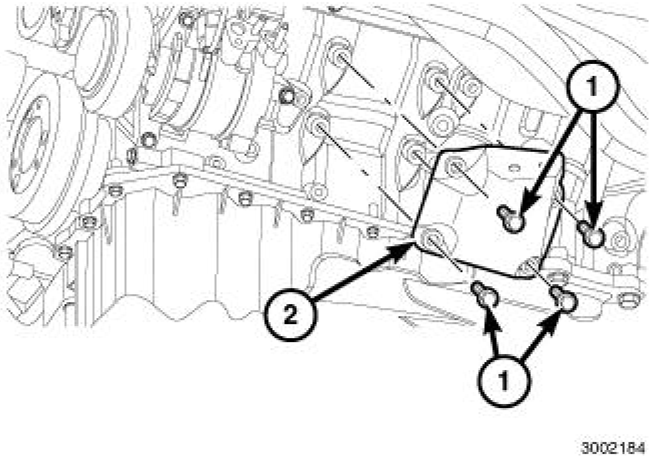


Fig. 196: Engine Mount-To-Engine Block Mounting Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

1. If removed, install the engine mount bracket(s). Tighten bolts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

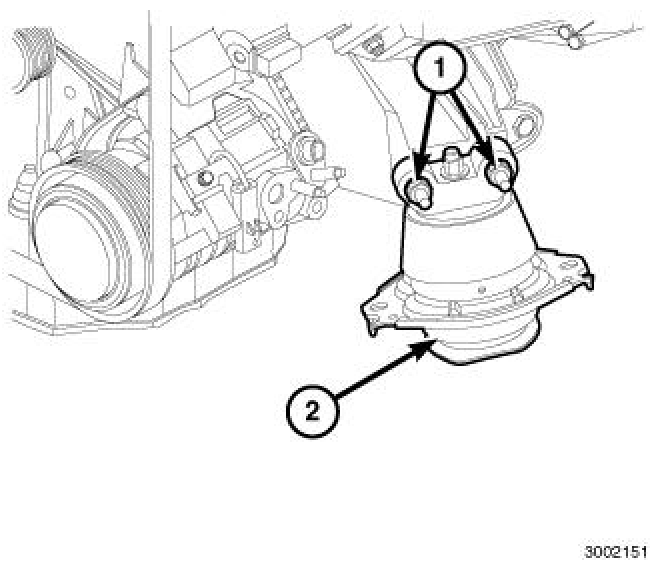


Fig. 197: Engine Mount & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

2. Install the engine mount(s) (2). Tighten bolts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
3. Remove support and lower the vehicle.

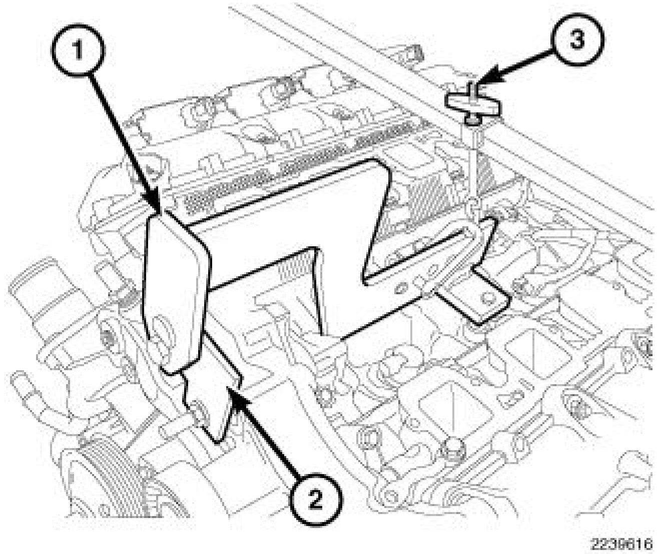


Fig. 198: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

4. Using the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3), lower the engine until the engine mounts are seated on the engine cradle.
5. Remove the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).

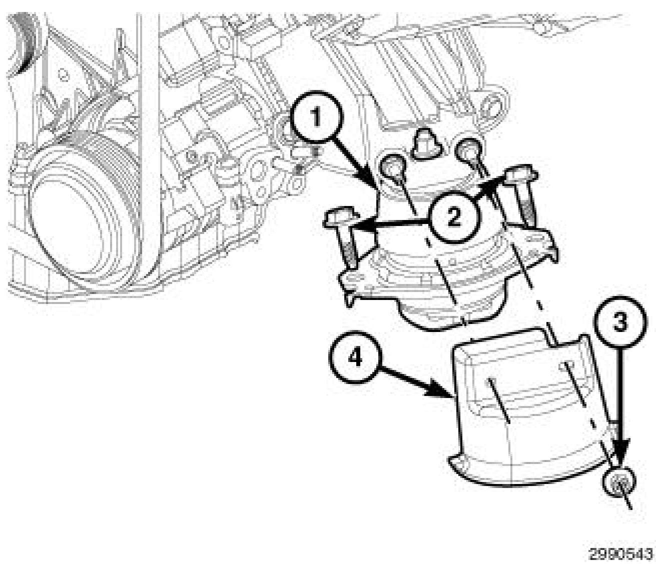


Fig. 199: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

6. Install both left/right engine mount to cradle bolts (2) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.
7. Install both left/right engine mount heat shields (4). Tighten nuts (3) to the proper specification. Refer to

TORQUE SPECIFICATIONS.

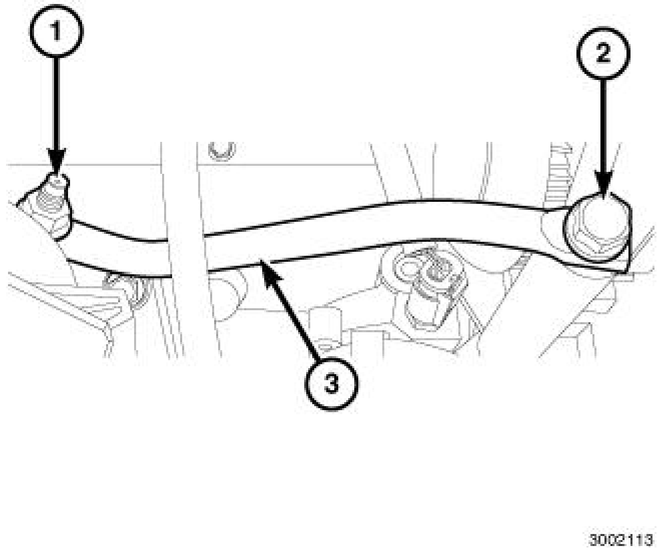


Fig. 200: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

8. Raise and support the vehicle.
9. Tighten the generator support bracket (3). Tighten fasteners (1, 2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

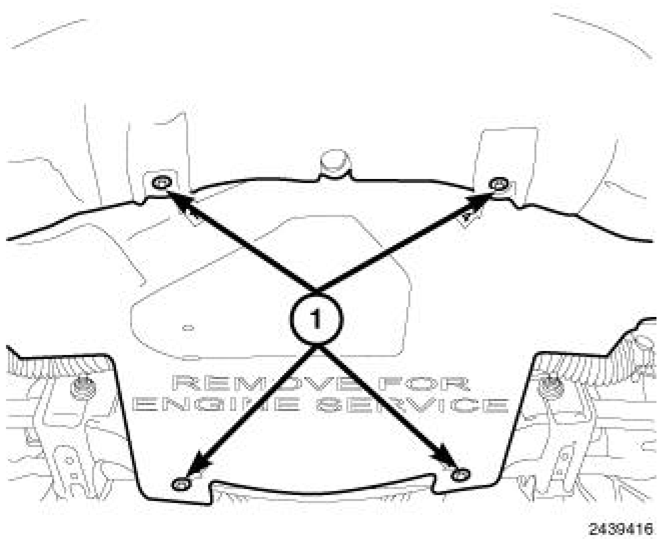


Fig. 201: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. Install the belly pan and the retainers (1).
11. Remove support and lower the vehicle.
12. Install the engine oil dipstick tube and securely tighten nut.
13. Install the Variable Valve Timing Solenoid. Refer to **SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST, INSTALLATION, 5.7L**.
14. Connect the negative battery cable.

INSULATOR, ENGINE MOUNT, REAR

REMOVAL

REMOVAL

AUTOMATIC TRANSMISSION

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

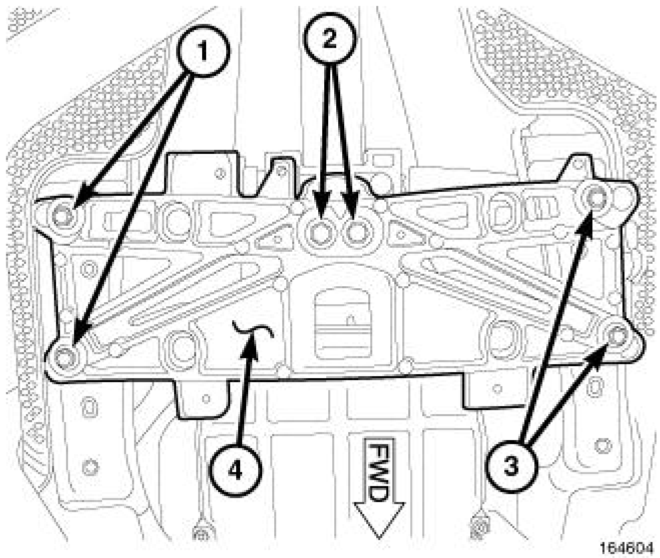


Fig. 202: Rear Cross Member Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Using a suitable jack, support the transmission.
3. Remove the rear transmission mount isolator bolts (2).
4. Remove the rear cross member retaining bolts (1, 3) and remove the cross member (4).

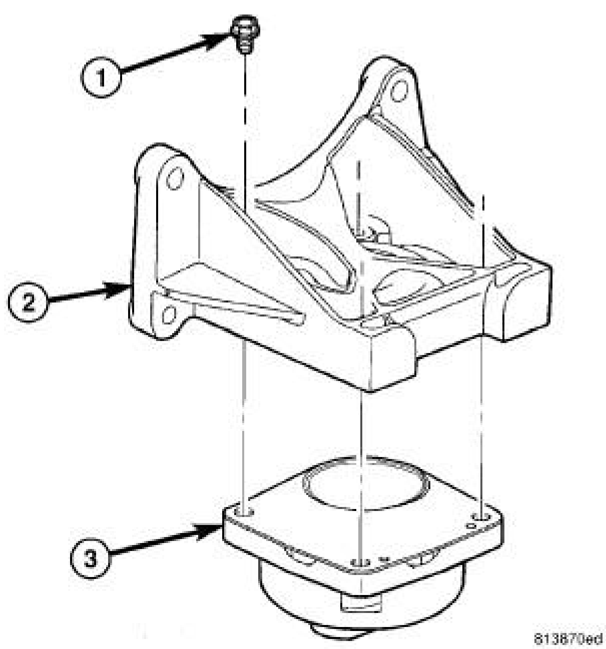


Fig. 203: Transmission Mount
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear transmission mount isolator (3) retaining bolts (1) and remove the isolator.
6. If required, remove the rear transmission mount bracket (2) retaining bolts from the transmission and remove the bracket.

MANUAL TRANSMISSION

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

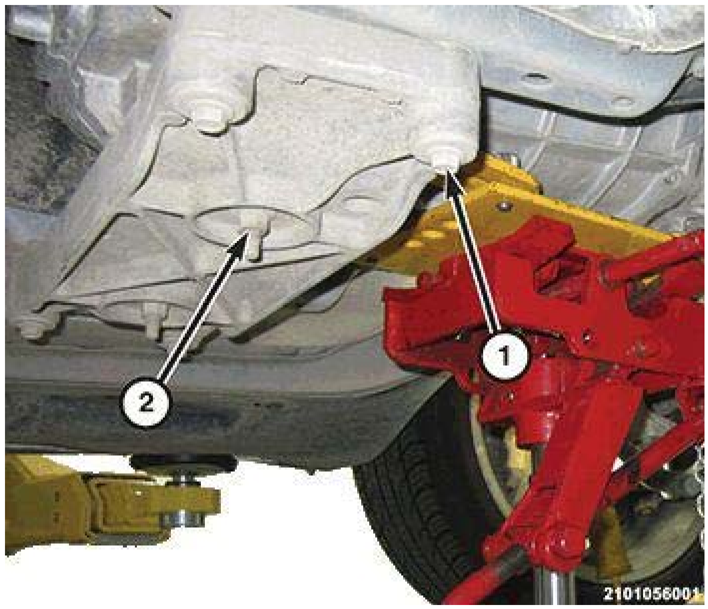


Fig. 204: Rear Cross Member & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Using a suitable jack, support the transmission.
3. Remove the rear transmission mount isolator nuts (2).
4. Remove the rear cross member retaining bolts (1) and remove the cross member.

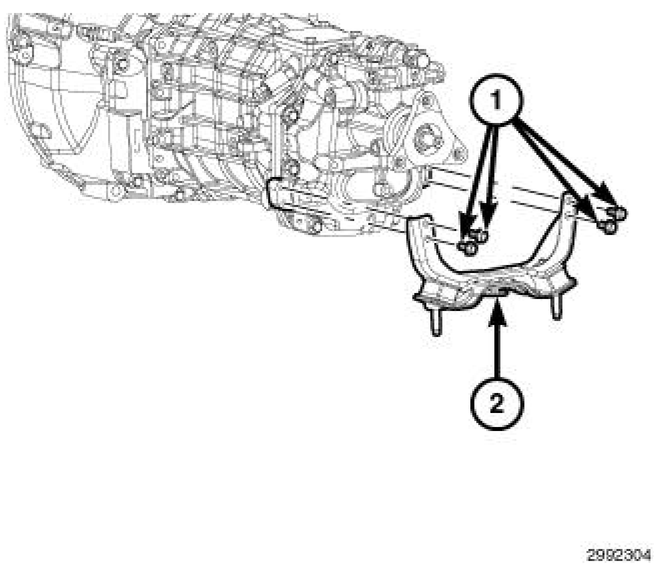


Fig. 205: Rear Transmission Mount Isolator & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove bolts (1) and the rear transmission mount isolator (2).

INSTALLATION

INSTALLATION

AUTOMATIC TRANSMISSION

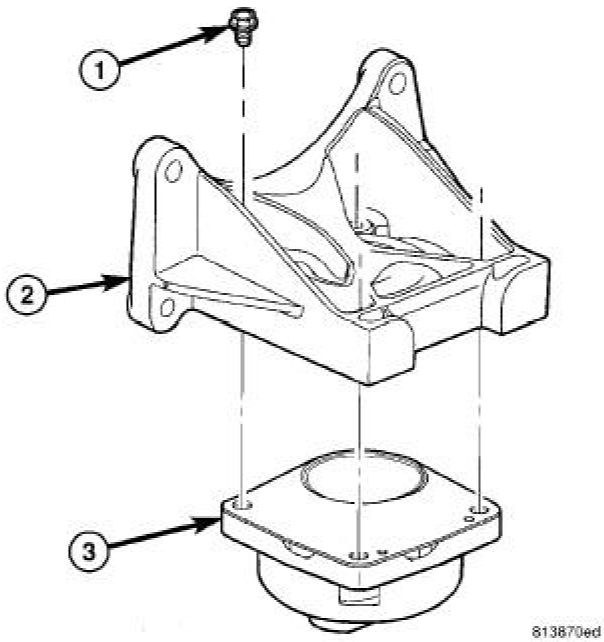
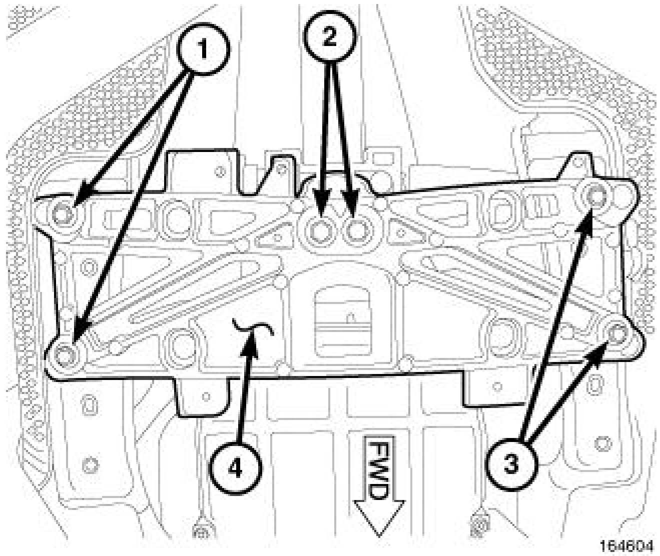


Fig. 206: Transmission Mount
Courtesy of CHRYSLER GROUP, LLC

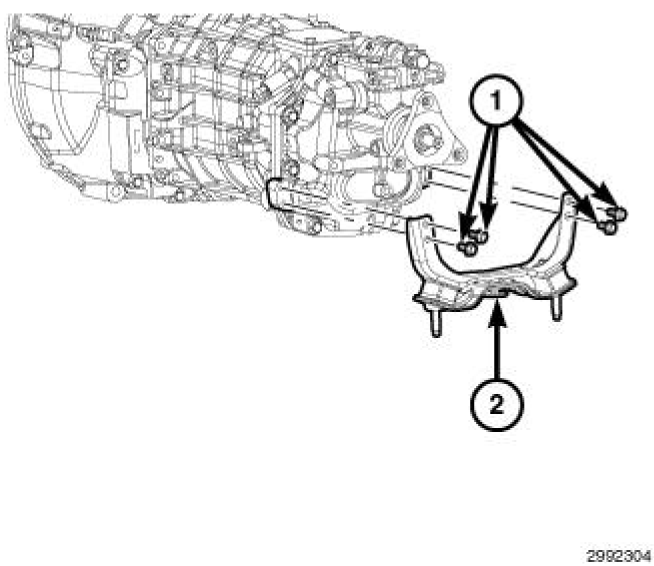
1. If removed, position the rear transmission mount bracket (2) to the transmission and tighten the retaining bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
2. Position the rear transmission mount isolator (3) to the rear transmission mount bracket, install the retaining bolts (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 207: Rear Cross Member Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

3. Position the transmission crossmember (4), install the retaining bolts (1, 3) finger tight.
4. Install the rear transmission mount isolator retaining bolts (2) finger tight.
5. Tighten the transmission crossmember retaining bolts (1, 3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
6. Lower the transmission and remove the jack.
7. Tighten the rear transmission mount isolator retaining bolts (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

MANUAL TRANSMISSION



[Fig. 208: Rear Transmission Mount Isolator & Retaining Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

1. Install the rear transmission mount isolator (2). Tighten the bolts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

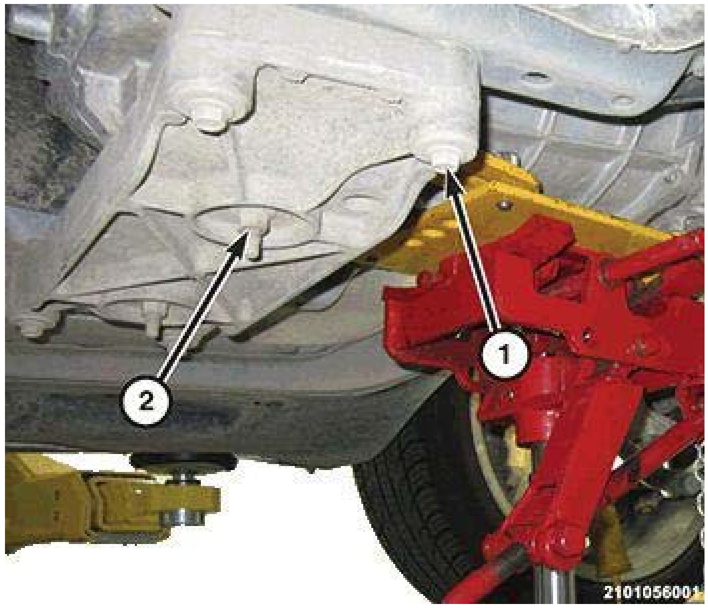


Fig. 209: Rear Cross Member & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the rear cross member and tighten bolts (1) finger tight.
3. Install the rear transmission mount isolator nuts (2) and tighten finger tight.
4. Tighten the transmission crossmember bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
5. Lower the transmission and remove the jack.
6. Tighten the rear transmission mount isolator retaining nuts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

LUBRICATION

DESCRIPTION

DESCRIPTION

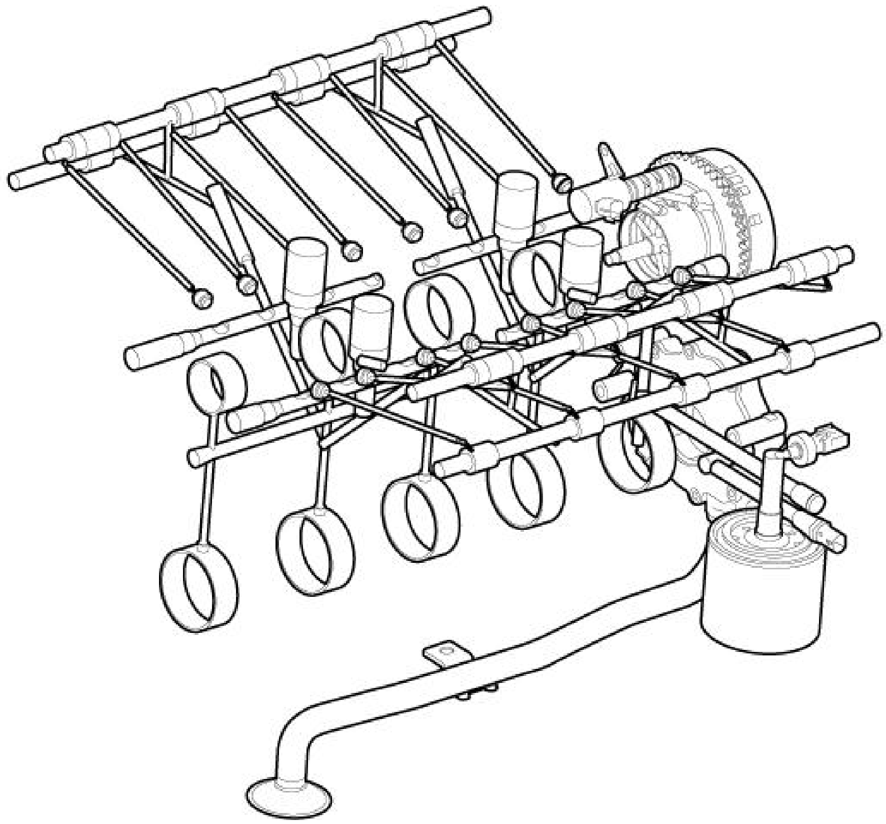


Fig. 210: 5.7L MDS Lubrication System
Courtesy of CHRYSLER GROUP, LLC

The 5.7L MDS lubrication system is a full flow filtration pressure feed type.

DIAGNOSIS AND TESTING

CHECKING ENGINE OIL PRESSURE

1. Remove the oil pressure sending unit and install gauge assembly (special tool #C-3292A, Gauge, Pressure).
2. Run the engine until thermostat opens.
3. Oil Pressure:
   - Curb Idle-25 kPa (4 psi) minimum
   - 3000 RPM-170 - 758 kPa (25 - 110 psi)
4. If oil pressure is 0 at idle, shut off engine. Check for a clogged oil pick-up screen or a pressure relief valve stuck open.

ENGINE OIL LEAK

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

1. Do not clean or degrease the engine at this time because some solvents may cause rubber to swell, temporarily stopping the leak.
2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated

with a bright yellow color under a black light.

3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of the oil leak. If the oil leak is found and identified, repair per service information instructions.
4. If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat inspection.

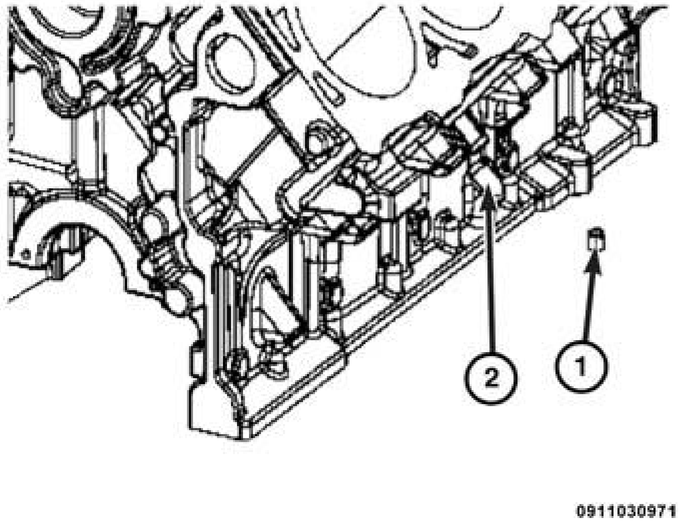


Fig. 211: Engine Oil Pan Plug Component Location
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the oil indicator tube is located in the engine oil pan. A plug (1) is inserted into the hole on the engine block (2). Validation of the plug is required when the engine block has been replaced.**

AIR LEAK DETECTION TEST METHOD

1. Remove the Positive Crankcase Ventilation (PCV) valve from the Integrated Air-Fuel Module (IAFM). Cap or plug the PCV valve grommet.
2. Attach an air hose with a pressure gauge and regulator to the dipstick tube.

CAUTION: **Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.**

3. Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provide the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service information procedures.
4. If the leakage occurs at the rear oil seal area, refer to **INSPECTION FOR REAR SEAL AREA LEAKS**.
5. If no leaks are detected, turn off the air supply and remove the air hose and all plugs and caps. Install the PCV valve.
6. Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

INSPECTION FOR REAR SEAL AREA LEAKS

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Disconnect the battery.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove torque converter or clutch housing cover and inspect rear of block for evidence of oil. Use a black light to check for the oil leak:
    a. Circular spray pattern generally indicates seal leakage or crankshaft damage.
    b. Where leakage tends to run straight down, possible causes are a porous block, distributor seal, camshaft bore cup plugs oil gallery pipe plugs, oil filter runoff, and main bearing cap to cylinder block mating surfaces.
4. If no leaks are detected, pressurize the crankcase as outlined in **AIR LEAK DETECTION TEST METHOD**.

    CAUTION: Do not exceed 20.6 kPa (3 psi).

5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out with emery cloth.

    CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is especially machined to complement the function of the rear oil seal.

6. For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled.

SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST

DESCRIPTION

DESCRIPTION

The 5.7L engine is equipped with Variable Valve Timing (VVT). This system uses an variable valve control valve to direct oil pressure into the camshaft phaser assembly. The camshaft phaser assembly advances and/or retards camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy, and reduce emissions. The VVTS is located under the intake manifold.

OPERATION

OPERATION

The Variable Valve Timing (VVT) assembly is actuated with engine oil pressure. The oil flow to the VVT assemblies are controlled by an Variable Valve Timing Solenoid (VVTS). The VVTS consist of a Pulse Width Modulated (PWM) solenoid and a spool valve. The PCM actuates the VVTS to control oil flow through the spool valve into the VVT assemblies. The VVT assembly consists of a rotor, stator, and sprocket. The stator is

connected to the timing chain through the sprocket. The rotor is connected to the camshaft. Oil flow in to the VVT assembly rotates the rotor with respect to the stator, thus rotating the exhaust camshaft with respect to the timing chain and intake camshaft. An infinitely variable valve timing position can be achieved within the limits of the hardware. The CMP monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

REMOVAL

REMOVAL

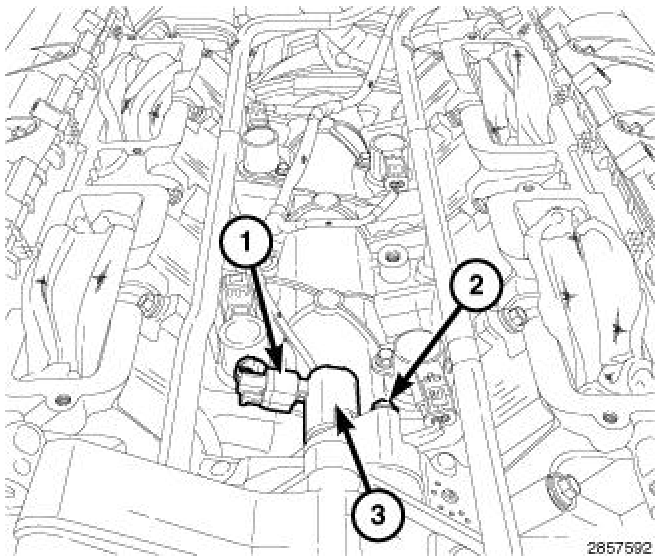


Fig. 212: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Variable Valve Timing Solenoid (VVTS) (3) is located under the intake manifold.**

1. Remove intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL, 5.7L**.
2. Disconnect VVTS wire harness connector (1).
3. Remove VVTS retaining bolt (2).

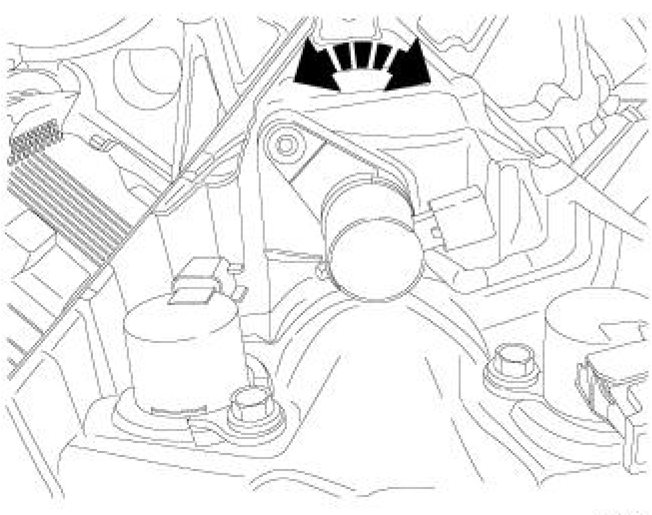


Fig. 213: Oil Control Valve
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To remove the VVTS, the engine must be at room temperature.**

4. Rotate the VVTS to break the seal and remove.

INSTALLATION

INSTALLATION

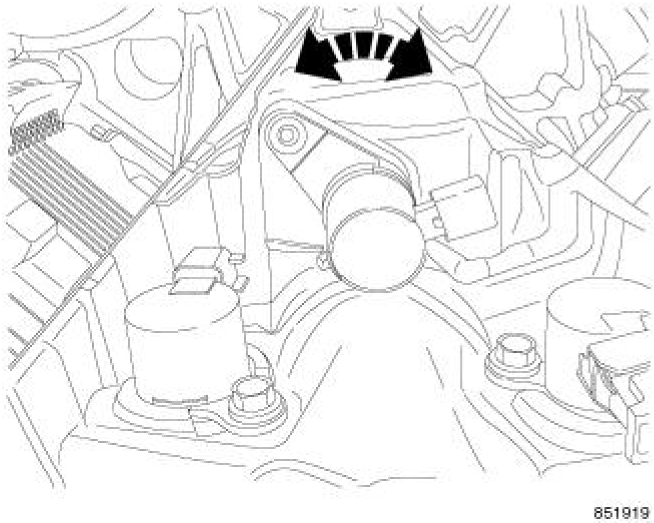


Fig. 214: Oil Control Valve
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the Variable Valve Timing Solenoid (VVTS) rubber O-ring seal with clean engine oil.
2. Install the VVTS and rotate into position.

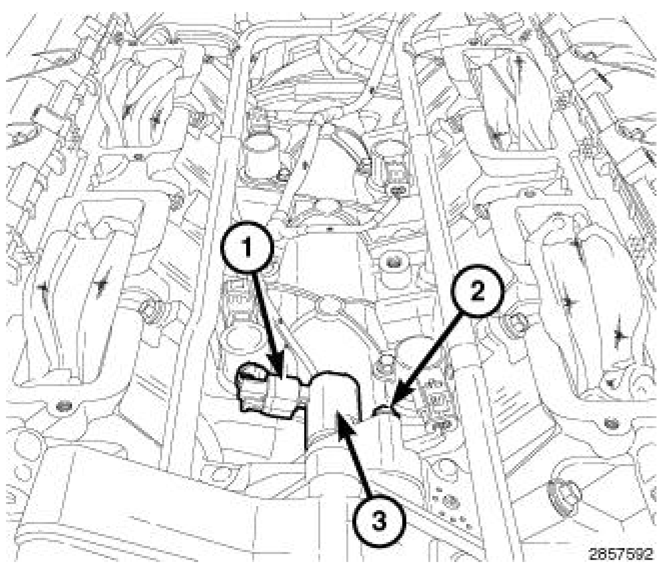


Fig. 215: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Install the VVTS (3) retaining bolt (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Connect the VVTS wire harness connector (1).
5. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION, 5.7L**.

FILTER, ENGINE OIL

REMOVAL

REMOVAL

All engines are equipped with a high quality full-flow, disposable type oil filter.

1. Remove belly pan. Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL** .

Fig. 216: Oil Filter
Courtesy of CHRYSLER GROUP, LLC

2. Position a drain pan under the oil filter (1).
3. Using a suitable oil filter wrench, loosen and rotate the oil filter (1) counterclockwise to remove it from engine.

NOTE: **Make sure oil filter gasket was removed with filter.**

4. Clean the gasket sealing surface.

INSTALLATION

INSTALLATION

Fig. 217: Oil Filter
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate oil filter gasket with engine oil.
2. Install the oil filter (1) until the gasket seal makes contact with the sealing surface. Tighten the oil filter to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
3. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** or **BELLY PAN, ENGINE, INSTALLATION** .
4. Fill crankcase with specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
5. Start engine and inspect for oil leaks.

OIL

STANDARD PROCEDURE

STANDARD PROCEDURE - ENGINE OIL SERVICE

The engine oil level indicator is located at the left hand of the engine on the 5.7L engines.

CRANKCASE OIL LEVEL INSPECTION

CAUTION: Do not overfill crankcase with engine oil, pressure loss or oil foaming can result.

Inspect engine oil level approximately every 800 kilometers (500 miles). Unless the engine has exhibited loss of oil pressure, run the engine for about ten minutes before checking oil level. Checking engine oil level on a cold engine is not accurate.

To ensure proper lubrication of an engine, the engine oil must be maintained at an acceptable level. The acceptable levels are indicated between the ADD and SAFE marks on the engine oil dipstick.

It is recommended that the engine oil level should be checked when the engine is at operating temperature.

1. Position vehicle on level surface.
2. With engine OFF, allow approximately five minutes for oil to settle to bottom of crankcase, remove engine oil dipstick.
3. Wipe dipstick clean.
4. Install dipstick and verify it is seated in the tube.
5. Remove dipstick, with handle held above the tip, take oil level reading.
6. Verify the oil level to be at the top of the "SAFE" range +/- 1/4 of the total distance of the range.
7. Add oil only if level is below the ADD mark on dipstick.

ENGINE OIL CHANGE

Change engine oil at mileage and time intervals described in Maintenance Schedules. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .

Run engine until achieving normal operating temperature.

1. Remove oil fill cap.
2. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

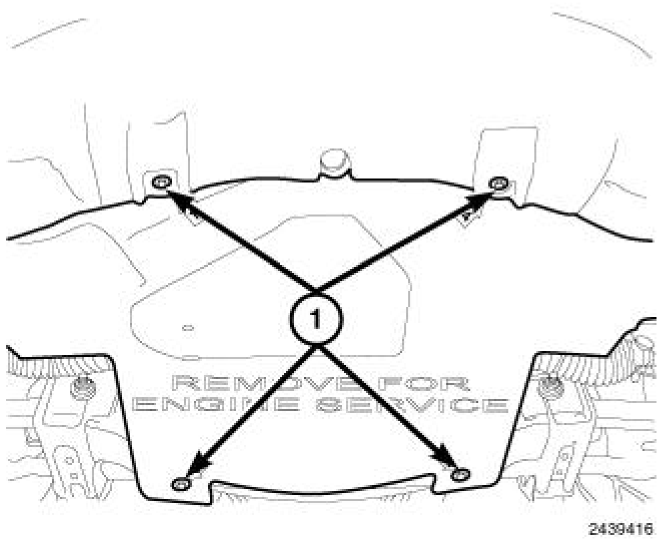


Fig. 218: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Remove bolts (1) and the belly pan.

Fig. 219: Drain Plug
Courtesy of CHRYSLER GROUP, LLC

4. Place a suitable drain pan under the oil pan.
5. Remove drain plug (1) and allow oil to drain into pan. Inspect drain plug threads for stretching or other damage. Replace drain plug if damaged.
6. Install drain plug (1). Tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

Fig. 220: Oil Filter
Courtesy of CHRYSLER GROUP, LLC

7. Place a suitable drain pan under oil filter (1) and remove the oil filter.
8. Clean the gasket sealing surface and insure the old gasket is removed.
9. Lubricate the oil filter (1) gasket seal with clean engine oil.
10. Install the oil filter (1) until the gasket seal makes contact with the sealing surface. Tighten the oil filter to

the proper specification. Refer to **TORQUE SPECIFICATIONS**.

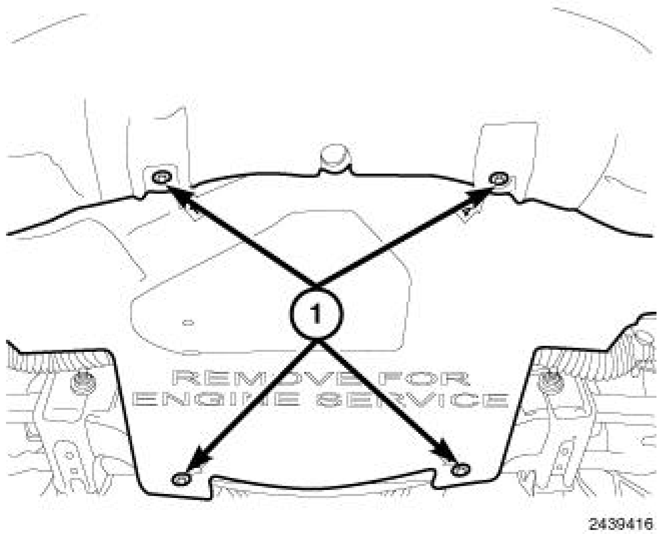


Fig. 221: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Install the belly pan and securely tighten bolts (1).
12. Remove support and lower vehicle.
13. Fill crankcase with specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
14. Install oil fill cap.
15. Start engine and inspect for leaks.
16. Stop engine and inspect oil level.

NOTE: **Care should be exercised when disposing used engine oil after it has been drained from a vehicle engine. Refer to the WARNING at beginning of this section.**

PAN, OIL

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the Variable Valve Timing Solenoid (VVTS). Refer to **SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST, REMOVAL, 5.7L**.
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

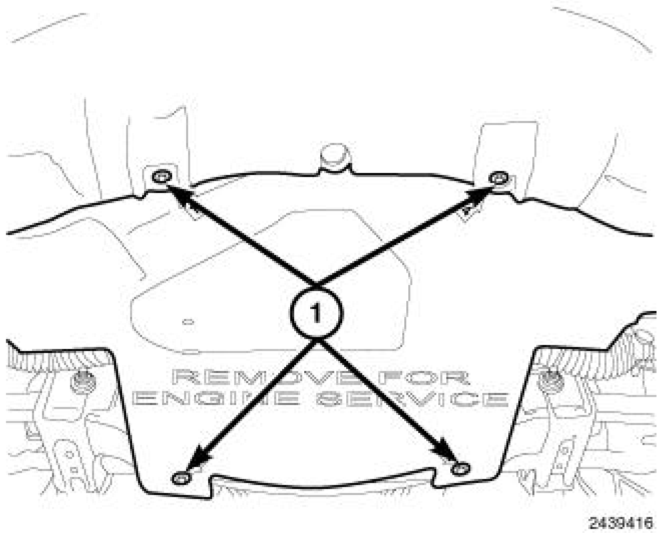


Fig. 222: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Remove bolts (1) and the belly pan.
5. Drain the engine oil and remove the oil filter.

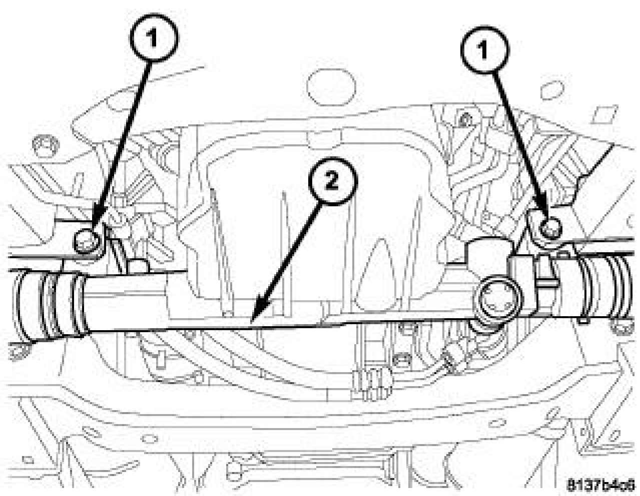


Fig. 223: Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not remove P/S hoses, tie rod ends or disconnect steering column coupler.**

6. Remove the steering gear mounting bolts (1) and lower the steering gear (2) to provide clearance to remove the oil pan.

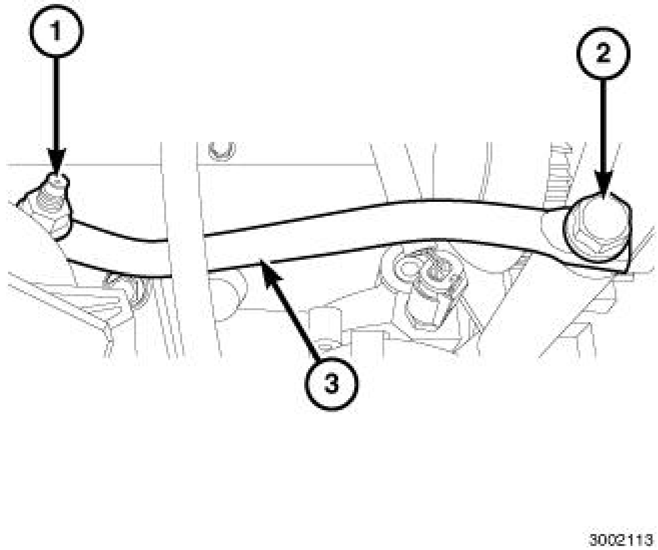


Fig. 224: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

7. Remove fasteners (1, 2) and the generator support bracket (3).

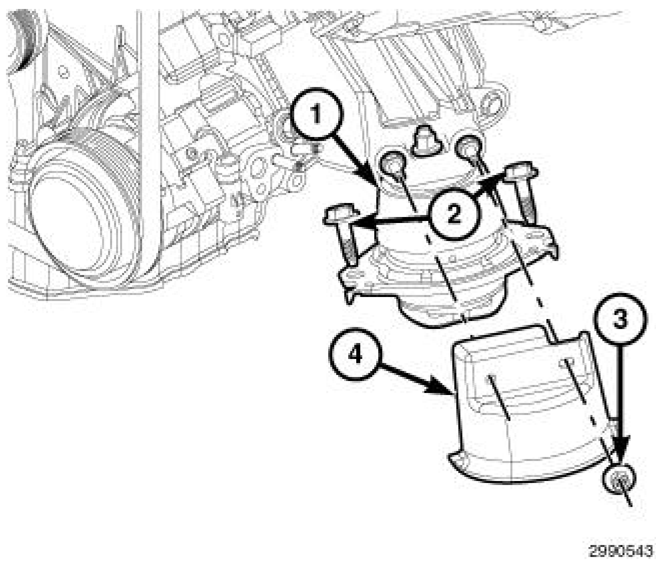


Fig. 225: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

8. Remove both left/right front engine mount heat shield retaining nuts (3) and remove the heat shields (4).
9. Remove both left/right front engine mount lower retaining bolts (2).
10. Remove support and lower the vehicle.

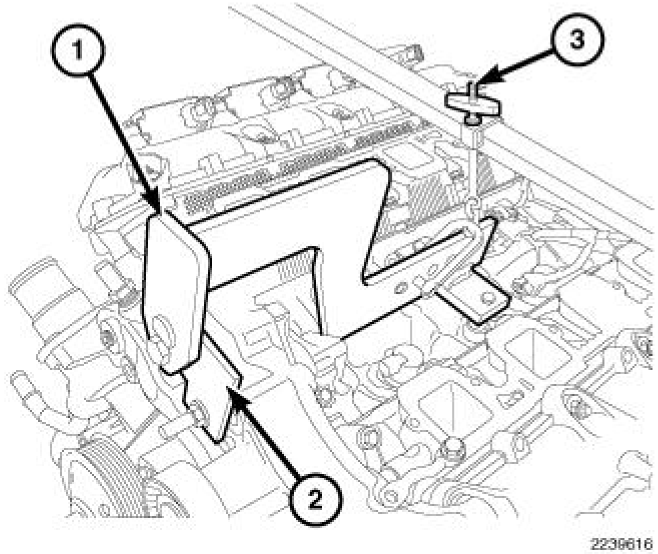


Fig. 226: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not use air tools to install engine lift fixture.**

11. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).
12. Raise the engine to provide clearance to remove the oil pan.

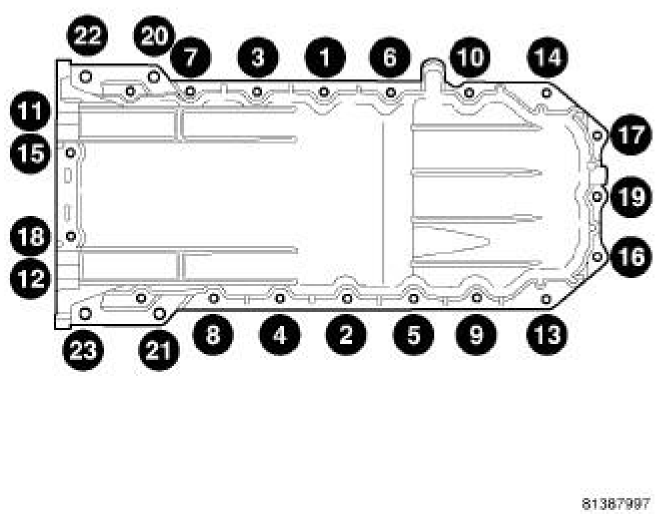


Fig. 227: Oil Pan Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not pry on the oil pan or oil pan gasket. The oil pan gasket is integral to the engine windage tray and does not come out with the oil pan.**

NOTE: **The horizontal M10 bolts (11, 12, 15, 18) are 5 mm longer in length then the vertical M10 bolts (20, 21, 22, 23) and must be reinstalled in their original locations.**

13. Raise and support the vehicle.
14. Remove the M10 bolts (horizontal 11, 12, 15, 18 and vertical 20, 21, 22, 23) from the rear of the oil pan to the transmission.
15. Remove and discard the M6 bolts and the oil pan.

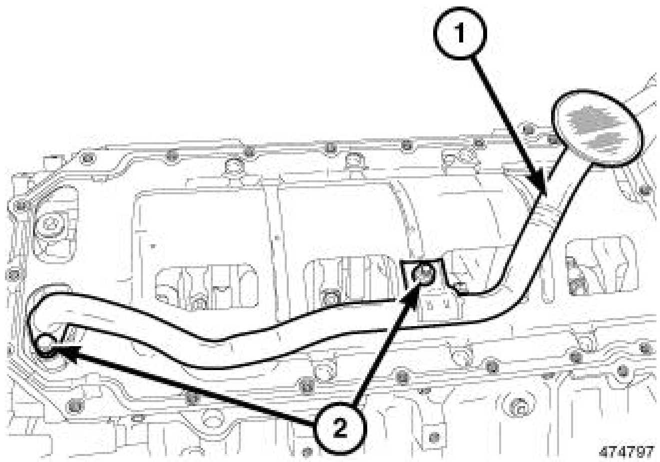


Fig. 228: Oil Pick Up Tube
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When the oil pan is removed, a new oil pan gasket and the integral windage tray assembly must be installed, the old gasket cannot be reused.**

16. Remove bolt, nut (2) and the oil pump pickup tube (1).
17. Remove and discard the oil pan gasket/windage tray.

INSTALLATION

INSTALLATION

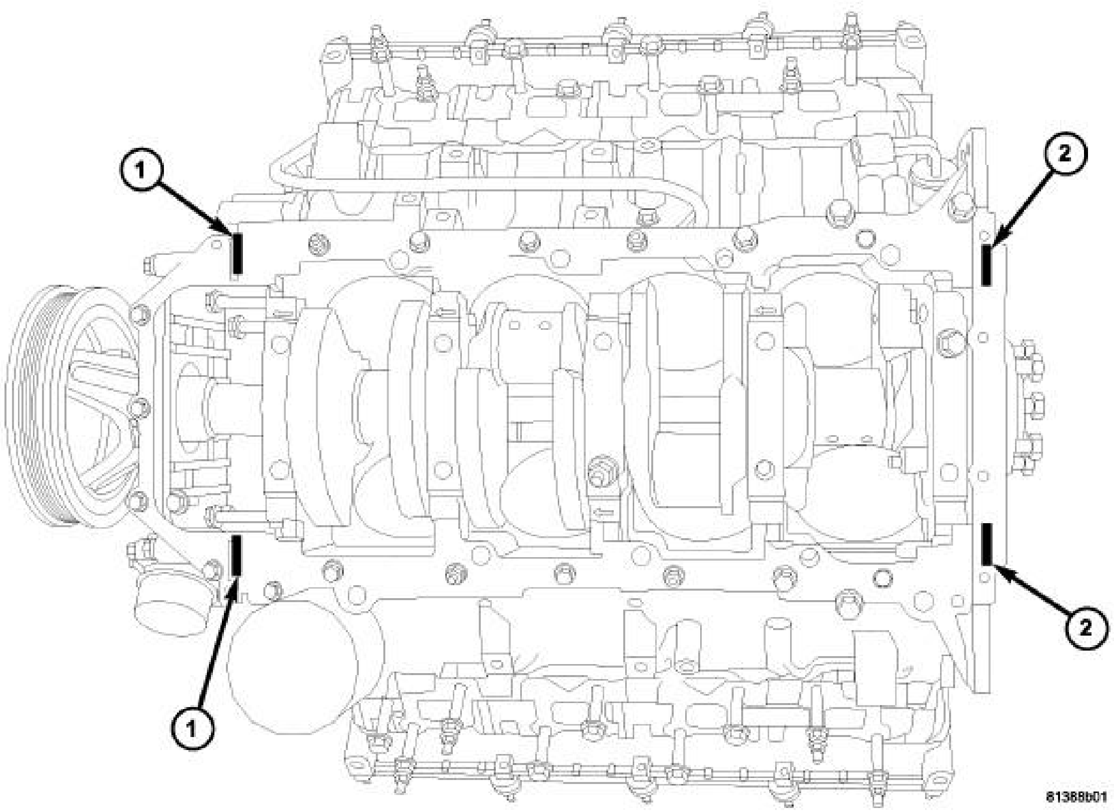


Fig. 229: T-Joint RTV Sealant Application
Courtesy of CHRYSLER GROUP, LLC

1 - Front Cover T-Joints	
2 - Rear Oil Retainer T-Joints	

NOTE: **MoparĀ® Engine RTV must be applied to the 4 T-joints (1, 2), the area where the front cover, rear retainer and oil pan gasket meet. The bead of RTV should cover the bottom of the gasket. This area is approximately 4.5 mm x 25 mm in each of the 4 T-joint (1, 2) locations.**

1. Clean the oil pan gasket mating surface of the engine block and oil pan.
2. Apply MoparĀ® Engine RTV at the 4 T-joints (1, 2).

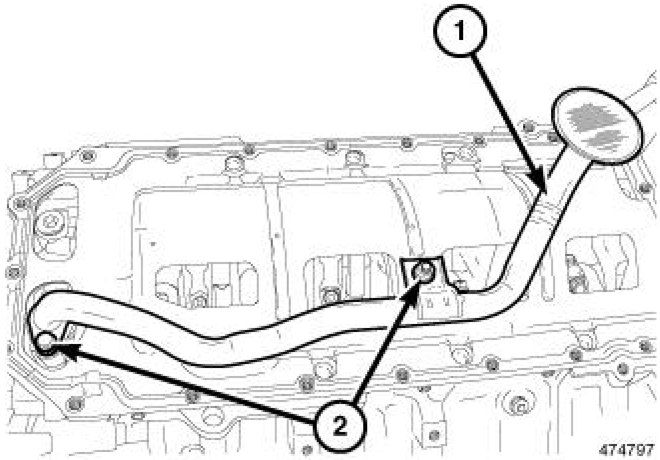


Fig. 230: Oil Pick Up Tube
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**When the oil pan is removed a NEW oil pan gasket and the integral windage tray assembly must be installed, the old gasket cannot be reused.**

3. Install a **NEW** oil pan gasket/windage tray.
4. Using a **NEW** O-ring, Install the oil pump pickup tube (1). Tighten bolt and nut (2) to the proper specification. Refer to TORQUE SPECIFICATIONS.

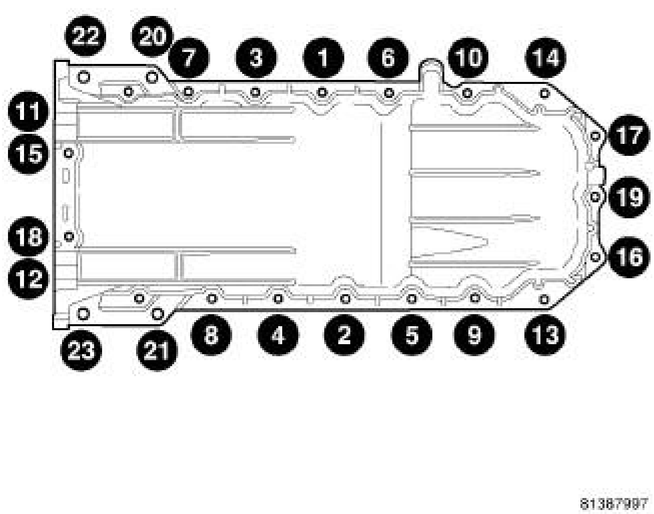


Fig. 231: Oil Pan Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The horizontal M10 bolts (11, 12, 15, 18) are 5 mm longer in length then the vertical M10 bolts (20, 21, 22, 23) and must be reinstalled in their original**

locations.

NOTE: **NEW M6 bolts must be used when reinstalling the oil pan. Do not reuse the old M6 bolts.**

5. Align the rear of the oil pan with the rear face of the engine block and install the **NEW** M6 and M10 bolts finger tight.
6. Using the sequence shown in illustration, tighten the M6 retaining bolts to 5 N.m (44 in. lbs.).
7. Using the sequence shown in illustration, tighten the M10 retaining bolts to 54 N.m (40 ft. lbs.).
8. Using the sequence shown in illustration, tighten the M6 retaining bolts to 12 N.m (106 in. lbs.).
9. Remove support and lower the vehicle.

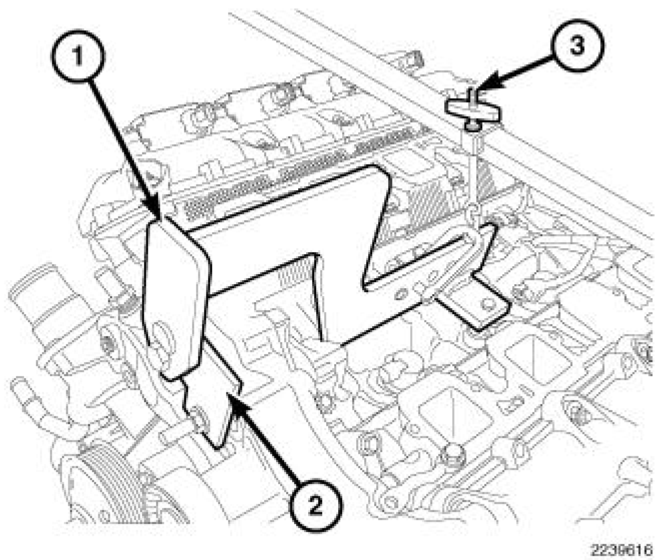


Fig. 232: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

10. Using the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3) lower the engine into position and remove.
11. Install the engine oil dipstick tube and dipstick.
12. Raise and support the vehicle.

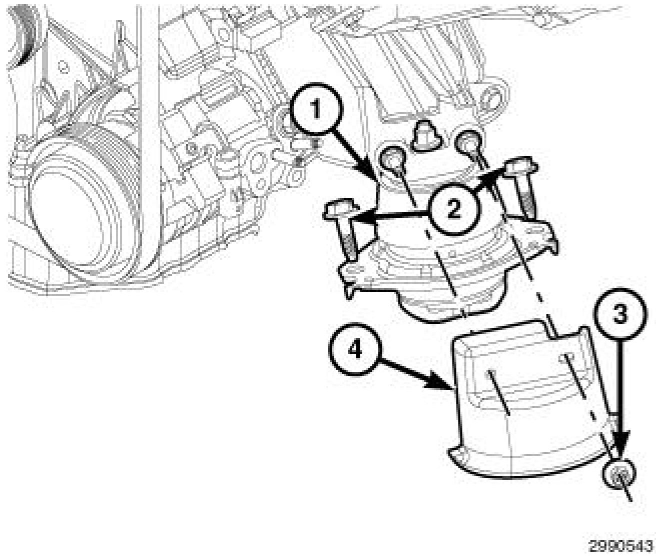


Fig. 233: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

13. Install both engine mount lower retaining bolts (2) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.
14. Install both engine mount heat shields (4). Tighten nuts (3) to the proper specification. Refer to TORQUE SPECIFICATIONS.

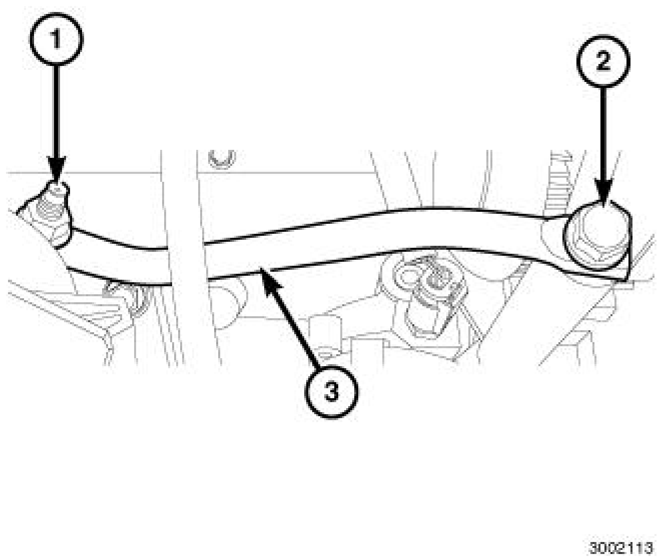


Fig. 234: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

15. Install the generator support bracket (3). Tighten fasteners (1, 2) to the proper specification. Refer to TORQUE SPECIFICATIONS.

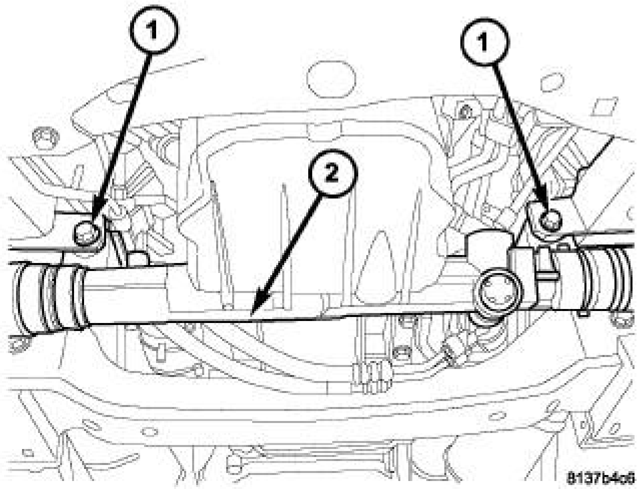


Fig. 235: Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

16. Position the steering gear (2), install mounting bolts (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
17. Lightly lubricate the oil filter gasket with clean engine oil.

NOTE: Do not over tighten the oil filter.

Install the oil filter. Refer to **FILTER, ENGINE OIL, INSTALLATION, 5.7L**.

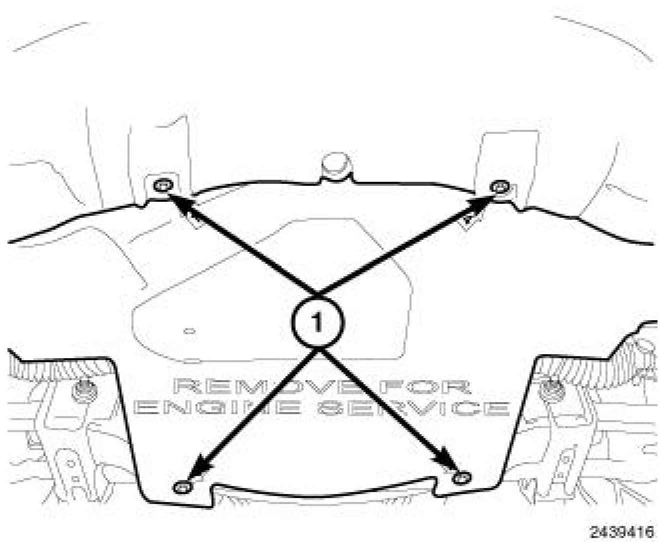


Fig. 236: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

18. Install the belly pan and securely tighten bolts (1).
19. Remove support and lower the vehicle.
20. Install the Variable Valve Timing Solenoid (2). Refer to **SOLENOID, VARIABLE VALVE TIMING**

(VVTS), EXHAUST, INSTALLATION, 5.7L.

21. Fill the crankcase with the specified type of engine oil. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .
22. Connect the negative battery cable.
23. Start engine and check for leaks.

PUMP, ENGINE OIL

REMOVAL

REMOVAL

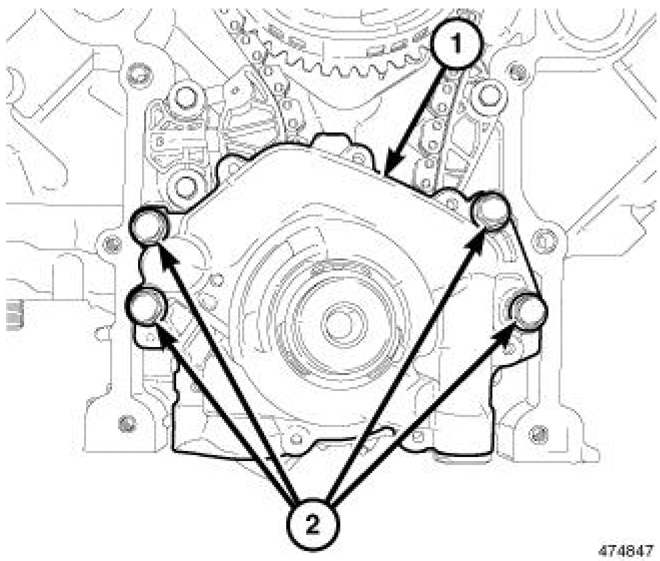


Fig. 237: Oil Pump Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the oil pan. Refer to PAN, OIL, REMOVAL, 5.7L.
2. Remove the timing cover. Refer to COVER(S), ENGINE TIMING, REMOVAL, 5.7L.
3. Remove the four bolts (2) and the oil pump (1).

CLEANING

CLEANING

1. Wash all parts in a suitable solvent.

INSPECTION

INSPECTION

CAUTION: The oil pump pressure relief valve and spring should not be removed from the oil pump. If these components are disassembled and or removed from the pump the entire oil pump assembly must be replaced.

1. Remove the pump cover.

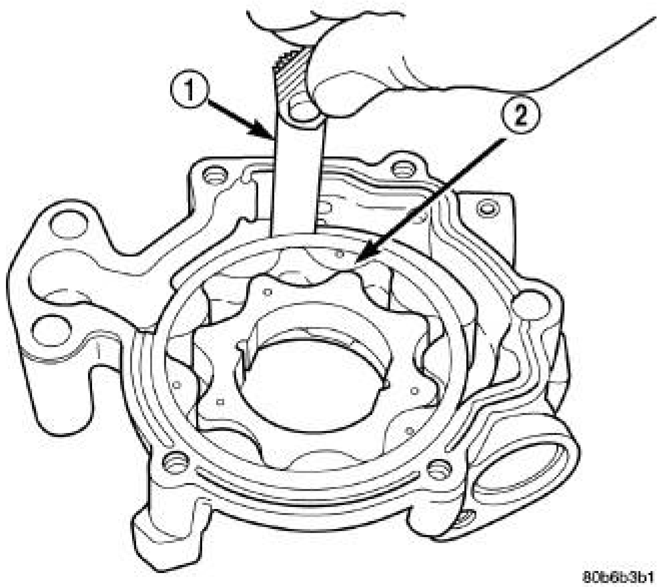


Fig. 238: Measuring Outer Rotor Clearance in Housing
Courtesy of CHRYSLER GROUP, LLC

2. Clean all parts thoroughly. Mating surface of the oil pump housing should be smooth. If the pump cover is scratched or grooved the oil pump assembly should be replaced.
3. Slide outer rotor into the body of the oil pump. Press the outer rotor to one side of the oil pump body and measure clearance between the outer rotor (2) and the body. If the measurement is 0.235 mm (0.009 in.) or more the oil pump assembly must be replaced.

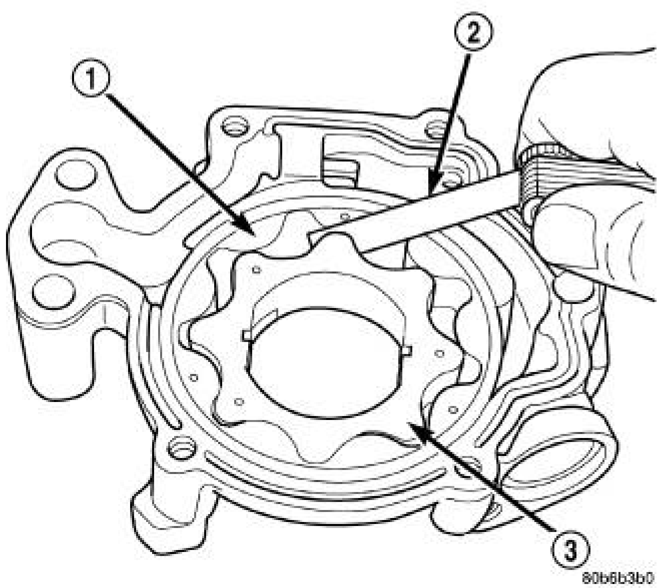


Fig. 239: Measuring Clearance Between Rotors
Courtesy of CHRYSLER GROUP, LLC

4. Install the inner rotor into the oil pump body. Measure the clearance between the inner (3) and outer rotors (1). If the clearance between the rotors is 0.150 mm (0.006 in.) or more the oil pump assembly must be replaced.

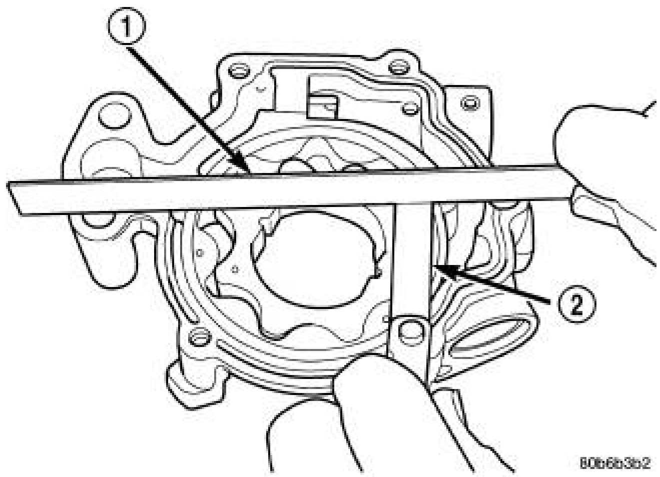


Fig. 240: Measuring Clearance Between Outer Rotor And Body
Courtesy of CHRYSLER GROUP, LLC

5. Place a straight edge (1) across the body of the oil pump (between the bolt holes), if a feeler gauge (2) of 0.095 mm (0.003 in.) or greater can be inserted between the straightedge and the rotors, the pump must be replaced.
6. Reinstall the pump cover. Tighten fasteners to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

NOTE: **The 5.7 Oil pump is serviced as an assembly. In the event the oil pump is not functioning or out of specification, it must be replaced as an assembly.**

INSTALLATION

INSTALLATION

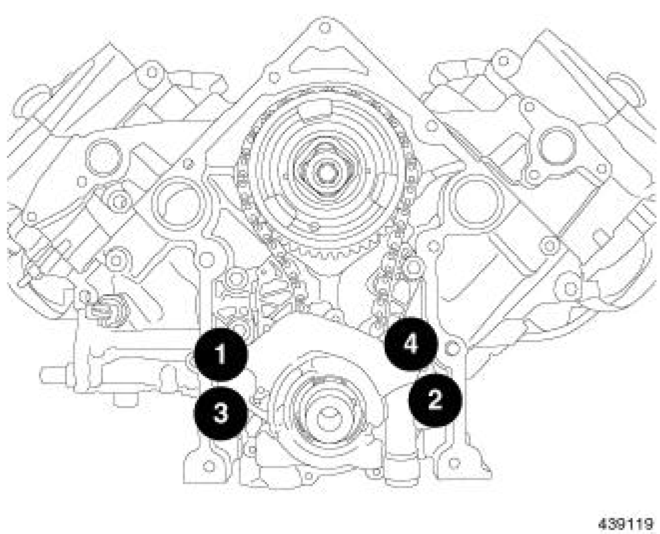


Fig. 241: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Position the oil pump on the crankshaft and install the oil pump retaining bolts finger tight.
2. Using the sequence shown in illustration, tighten the oil pump bolts to 28 N.m (21 ft. lbs.).

3. Install the timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.
4. Install the oil pan. Refer to **PAN, OIL, INSTALLATION, 5.7L**.

SENSOR, OIL PRESSURE

DESCRIPTION

DESCRIPTION

The oil pressure sensor uses the following three circuits:

- Signal circuit to the Powertrain Control Module (PCM)
- Sensor ground circuit through the PCM
- 5 volt reference circuit from the PCM

The oil pressure sensor returns a voltage signal back to the PCM with reference to oil pressure. Ground for the sensor is supplied by the PCM.

The oil pressure sensor is located on the right side of the engine block. The sensor screws into the engines main oil gallery.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the generator. Refer to **GENERATOR, REMOVAL** .

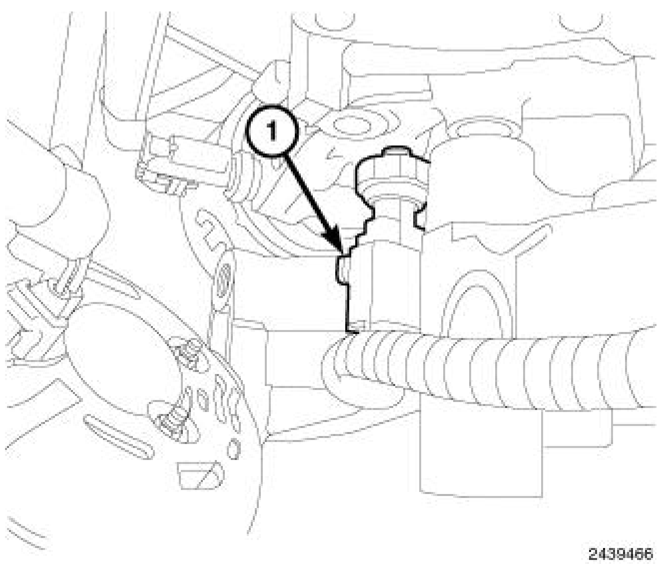


Fig. 242: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oil pressure sensor wire harness connector (1).

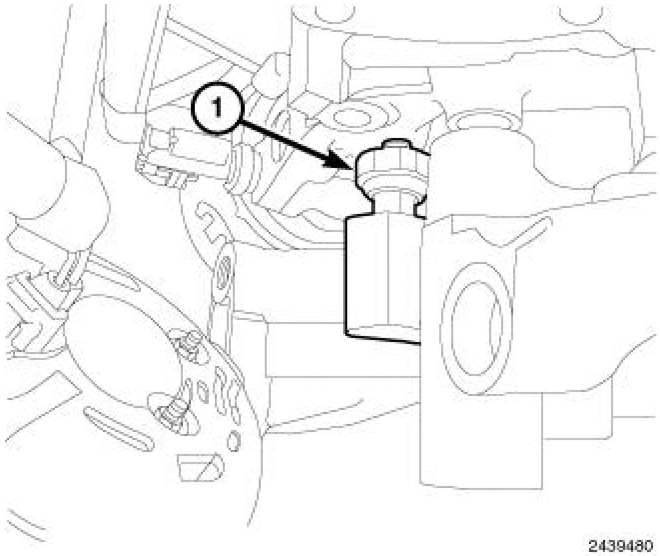


Fig. 243: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil pressure sensor (1).

INSTALLATION

INSTALLATION

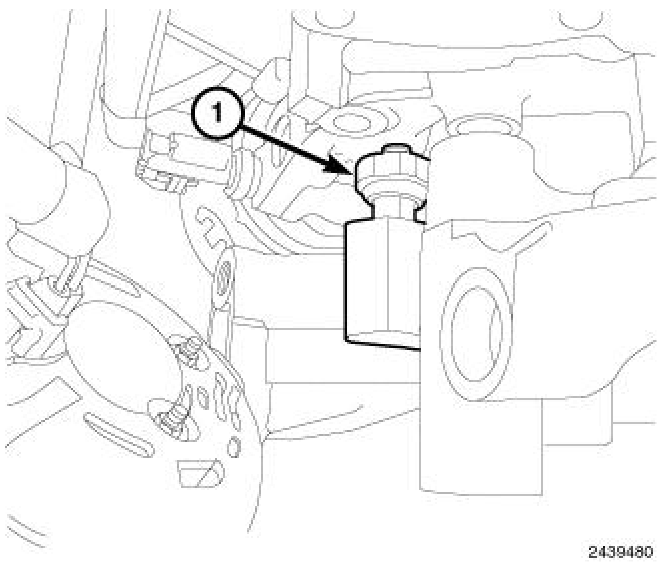


Fig. 244: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply MoparÃ® Thread Sealant with PTFE to the sensor threads before installing into the engine block.**

1. Install the oil pressure sensor (1) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.

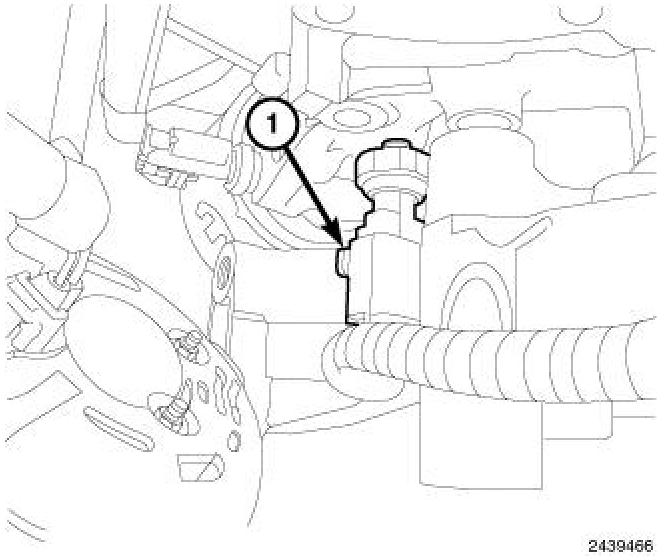


Fig. 245: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oil pressure sensor wire harness connector (1).
3. Install the generator. Refer to **GENERATOR, INSTALLATION** .
4. Connect the negative battery cable.

SENSOR, OIL TEMPERATURE

DESCRIPTION

DESCRIPTION

The oil temperature sensor uses the following two circuits:

- Signal circuit to the Powertrain Control Module (PCM)
- Ground circuit from the PCM

The oil temperature sensor is a Negative Thermal Coefficient (NTC) sensor. The resistance of the sensor changes as oil temperature changes. This results in different output voltages back to the PCM.

The oil temperature sensor is located on the right side of the engine block.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the generator. Refer to **GENERATOR, REMOVAL** .

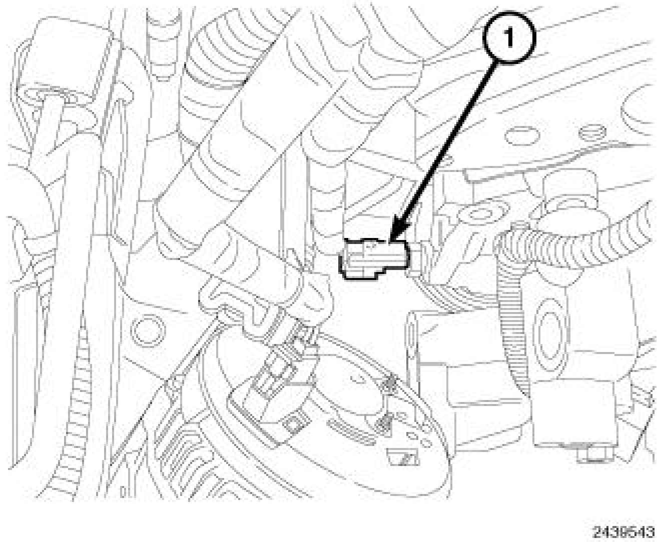


Fig. 246: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oil temperature sensor wire harness connector (1).

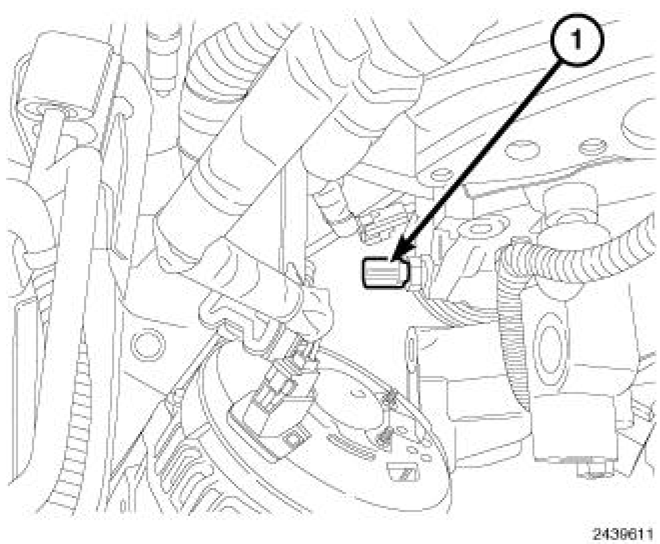


Fig. 247: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil temperature sensor (1).

INSTALLATION

INSTALLATION

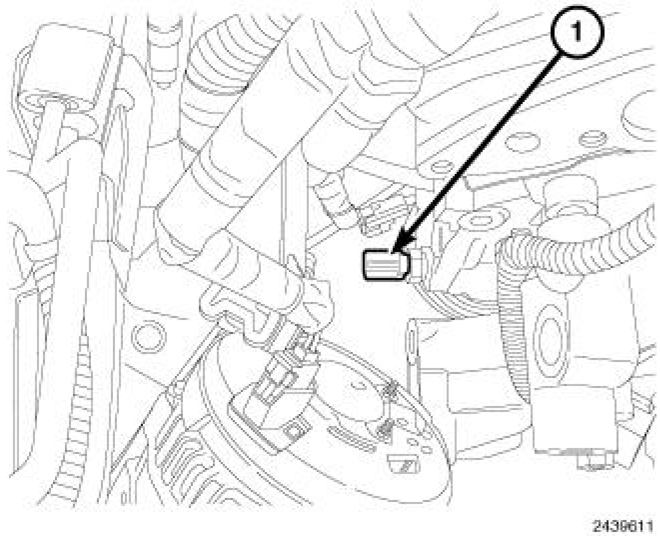


Fig. 248: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply MoparÃ® Thread Sealant with PTFE to the sensor threads before installing into the engine block.**

1. Install the oil temperature sensor (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

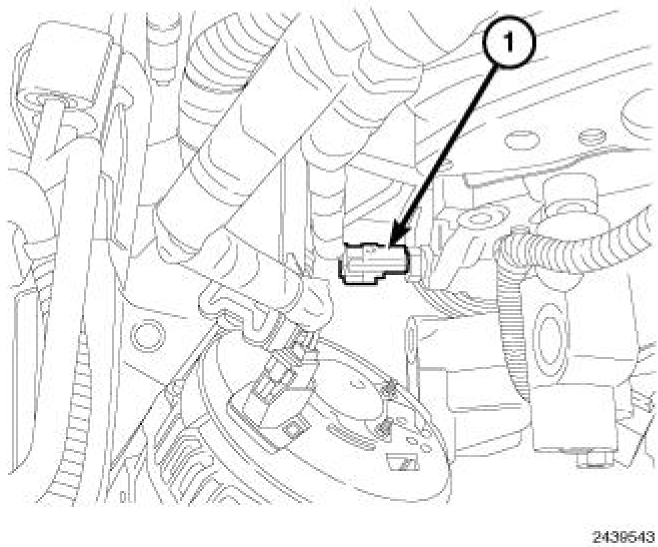


Fig. 249: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oil temperature sensor wire harness connector (1).
3. Install the generator. Refer to **GENERATOR, INSTALLATION** .
4. Connect the negative battery cable.

MANIFOLDS

MANIFOLD, EXHAUST

DESCRIPTION

DESCRIPTION

The exhaust manifolds are log style with a patented flow enhancing design to maximize performance. The exhaust manifolds are made of high silicon molybdenum cast iron. A multi-layer stainless steel exhaust manifold gasket is used to improve sealing to the cylinder head. The exhaust manifolds are covered by a three layer laminated heat shield for thermal protection and noise reduction. The heat shields are fastened with a torque prevailing nut that is backed off slightly to allow for the thermal expansion of the exhaust manifold, with the exception of the nut, which also secures the oil dipstick tube bracket. That nut should not be backed off.

OPERATION

OPERATION

The exhaust manifolds collect the engine exhaust exiting the combustion chambers, then channels the exhaust gases to the exhaust pipes attached to the manifolds.

CLEANING

CLEANING

Clean mating surfaces on cylinder head and manifold. Wash with solvent and blow dry with compressed air.

INSPECTION

INSPECTION

Inspect manifold for cracks.

Inspect mating surfaces of manifold for flatness with a straight edge. Gasket surfaces must be flat within 0.2 mm per 300 mm (0.008 inch per foot).

REMOVAL

REMOVAL

EXHAUST MANIFOLDS

NOTE: The left side shown in illustration. Right side similar.

1. Disconnect and isolate the negative battery cable.
2. Remove cylinder head. Refer to **CYLINDER HEAD, REMOVAL, 5.7L**.

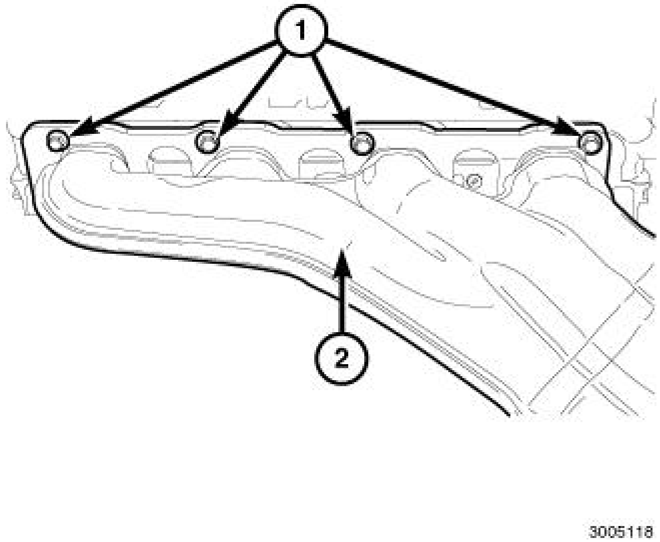


Fig. 250: Exhaust Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the exhaust manifold (2) top row of bolts (1).

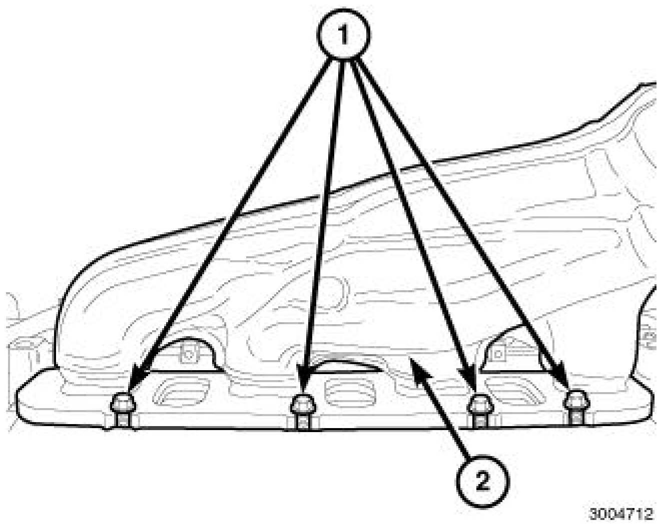


Fig. 251: Exhaust Manifold Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the exhaust manifold heat shield.
5. Remove the exhaust manifold bottom row of bolts (1).

INSTALLATION

INSTALLATION

EXHAUST MANIFOLDS

NOTE: **Left side shown in illustration. Right side similar.**

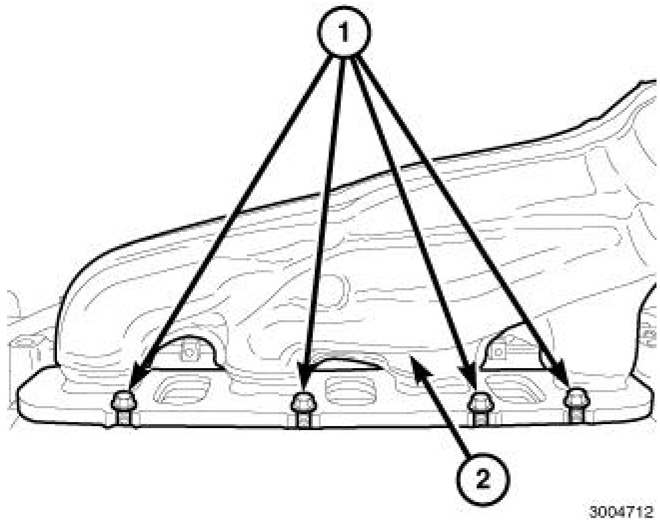


Fig. 252: Exhaust Manifold Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Clean the sealing surfaces of the exhaust manifold and cylinder head.
2. Using a **NEW** exhaust manifold gasket, position the exhaust manifold (2).
3. Install the exhaust manifold bottom row of bolts (1) finger tight.

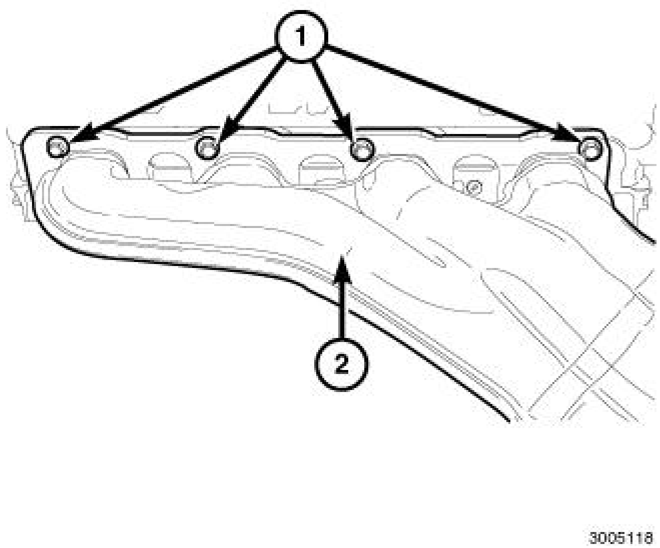


Fig. 253: Exhaust Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the exhaust manifold (2) top row of bolts (1) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.
5. Position the coolant bottle (1) and install the retaining bolts (2).
6. Raise and support the vehicle.

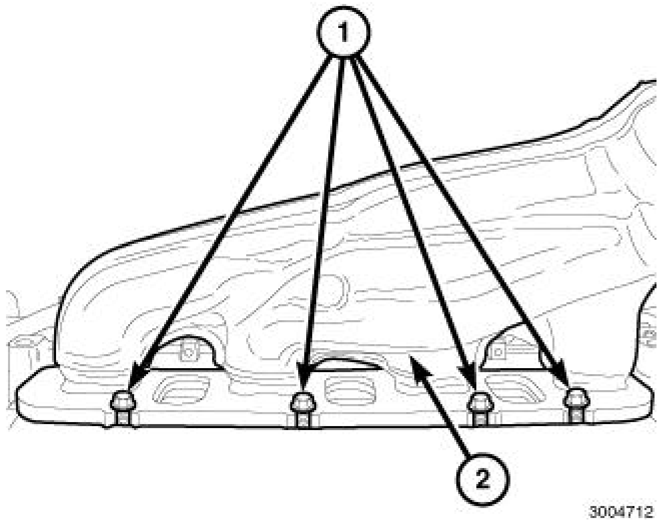


Fig. 254: Exhaust Manifold Heat Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Tighten the exhaust manifold bottom row of bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
8. Install the exhaust manifold heat shield.
9. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION, 5.7L**.
10. Connect the negative battery cable.
11. Start the engine and check for leaks.

MANIFOLD, INTAKE

DESCRIPTION

DESCRIPTION

CAUTION: If the engine has experienced a catastrophic failure, THE INTAKE MANIFOLD MUST BE REPLACED!

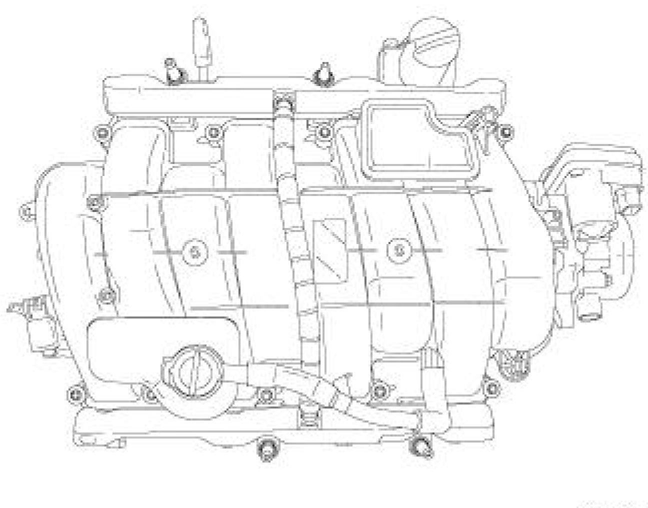


Fig. 255: Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

The intake manifold is made of a composite material with the runners tuned to give the best balance of power and torque. The manifold uses a single plane sealing system and separate Positive Crankcase Ventilation (PCV) port seals to prevent leaks. The screws connecting the manifold to the head use a thread lock patch, and must be replaced when the manifold is serviced.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - INTAKE MANIFOLD LEAKAGE

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

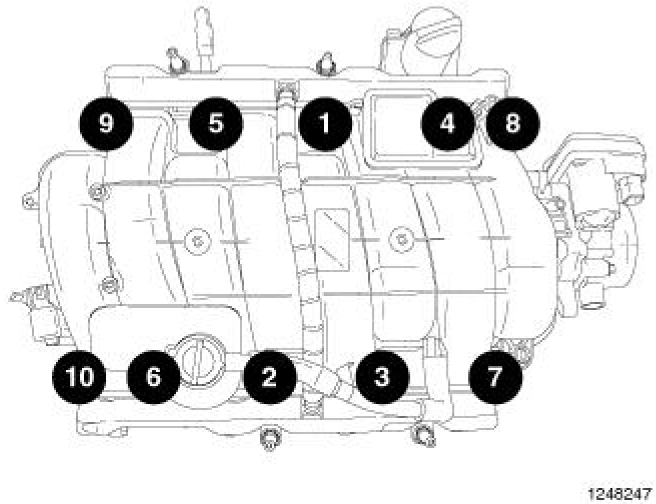
WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or the fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

1. Start the engine.
2. Spray a small stream of water at the suspected leak area.
3. If a change in RPM is observed the area of the suspected leak has been found.
4. Repair as required.

REMOVAL

REMOVAL

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Disconnect and isolate the negative battery cable.
3. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.
4. Disconnect the fuel supply line. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE** .
5. Disconnect the brake booster hose and the EVAP purge line.



[Fig. 256: Intake Manifold Removal & Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the following components wire harness connectors:
   - Manifold Absolute Pressure (MAP) Sensor
   - Fuel Injectors
   - Electronic Throttle Control (ETC).
7. Using the sequence shown in illustration, remove bolts and the intake manifold.

CLEANING

CLEANING

NOTE: **There is NO approved repair procedure for the intake manifold. If severe damage is found during inspection, the intake manifold must be replaced.**

Before installing the intake manifold thoroughly clean the mating surfaces. Use a suitable cleaning solvent, then air dry.

INSPECTION

INSPECTION

1. Inspect the intake sealing surface for cracks, nicks and distortion.
2. Inspect the intake manifold vacuum hose fittings for looseness or blockage.

INSTALLATION

INSTALLATION

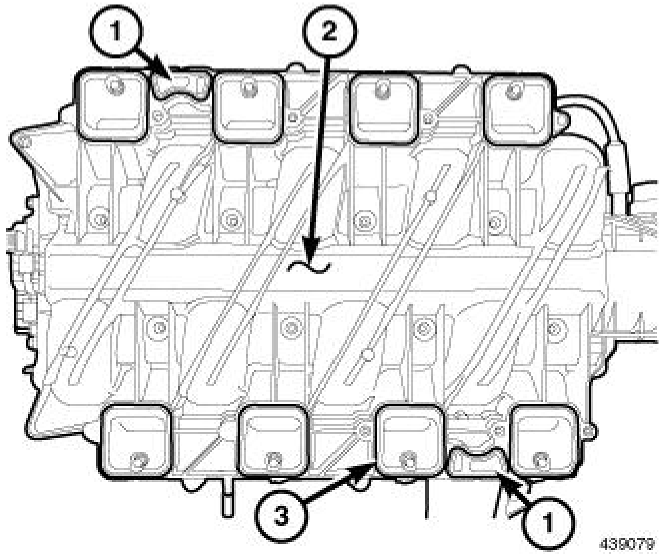


Fig. 257: Intake Manifold & PCV Seals
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The intake manifold seals (1, 3) may be used again, provided no cuts, tears, or deformation have occurred.**

1. Inspect the intake manifold seals and replace if necessary.

NOTE: **If reinstalling the original manifold, apply MoparÃ® Lock & Seal Adhesive to the intake manifold bolts. Not required when installing a new manifold.**

2. If required, apply MoparÃ® Lock & Seal Adhesive to the intake manifold bolts.
3. Position the intake manifold (2).

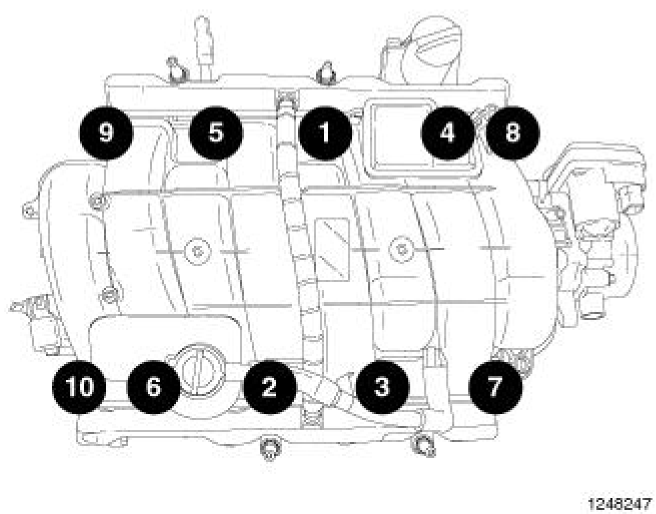


Fig. 258: Intake Manifold Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the sequence shown in illustration, tighten the bolts to 12 N.m (9 ft. lbs.).
5. Connect the fuel supply line. Refer to FITTING, QUICK CONNECT, STANDARD PROCEDURE .

6. Connect the brake booster hose and the EVAP purge line.
7. Connect the following components wire harness connectors:
    - Manifold Absolute Pressure (MAP) Sensor
    - Fuel Injectors
    - Electronic Throttle Control (ETC).
8. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION, 5.7L**.
9. Connect the negative battery cable.
10. Start the engine and check for leaks.

VALVE TIMING

CHAIN AND SPROCKETS, TIMING

REMOVAL

REMOVAL

1. Remove the timing chain cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL, 5.7L**.

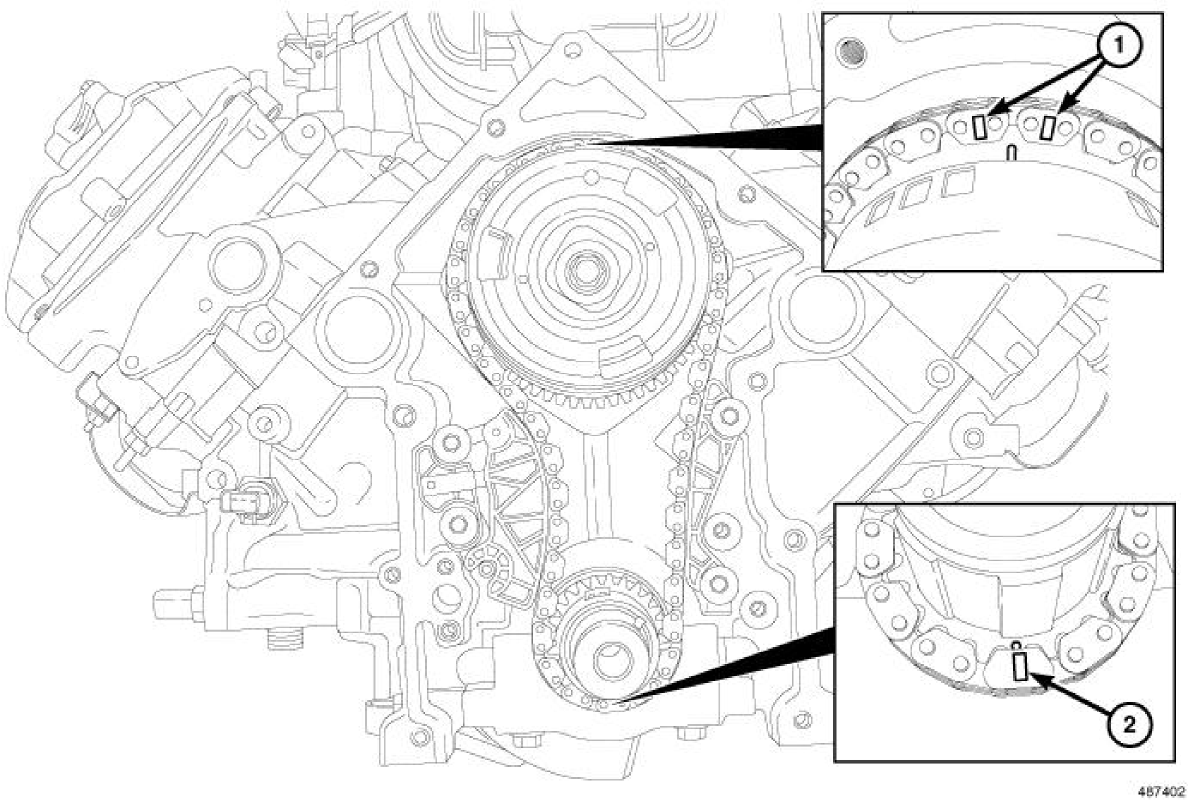


Fig. 259: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

2. Install the vibration damper bolt finger tight. Using a suitable socket and breaker bar, rotate the crankshaft to align the timing marks with the timing chain sprockets (1, 2).

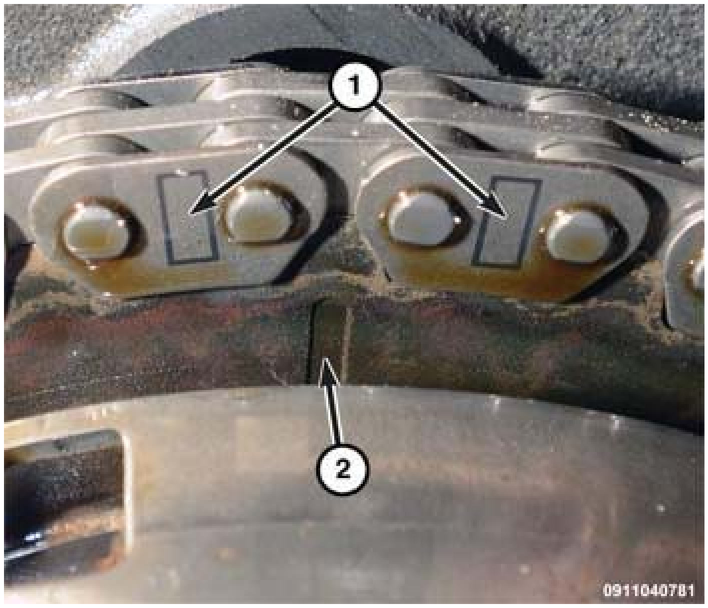


Fig. 260: Aligning Timing Marks With The Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

3. Ensure that the camshaft gear (2) is aligned with the camshaft timing chain marks (1) in the twelve O'clock position.

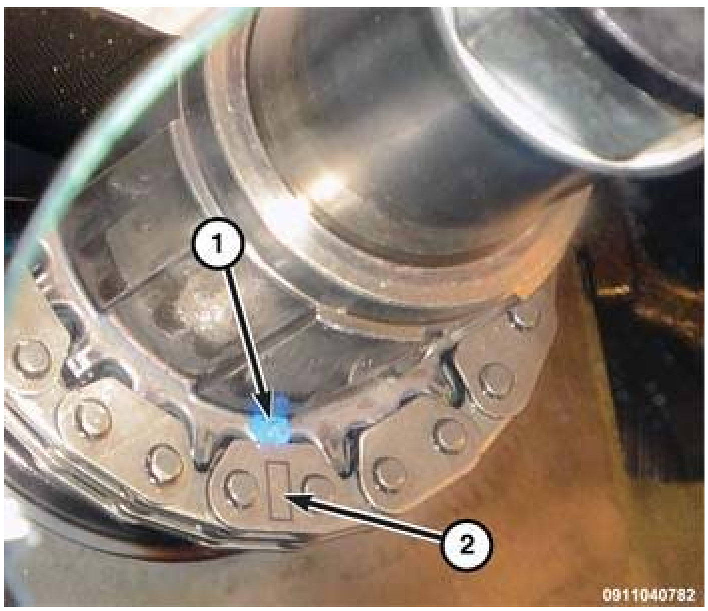
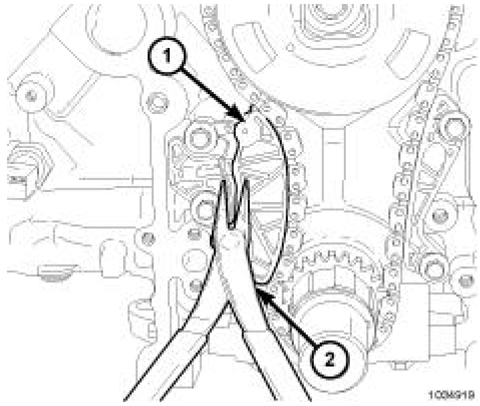


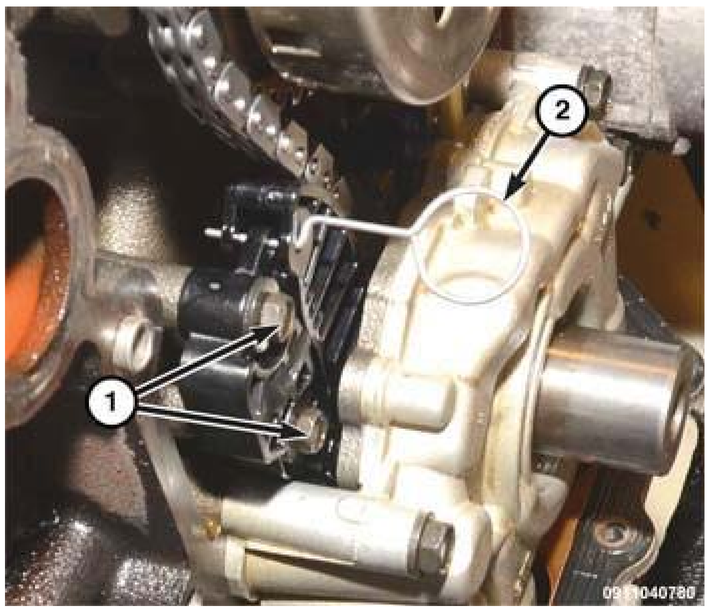
Fig. 261: Aligning Camshaft Timing Chain Marks
Courtesy of CHRYSLER GROUP, LLC

4. The crankshaft gear mark (1) should align with the timing chain mark (2) at the six O'clock position.



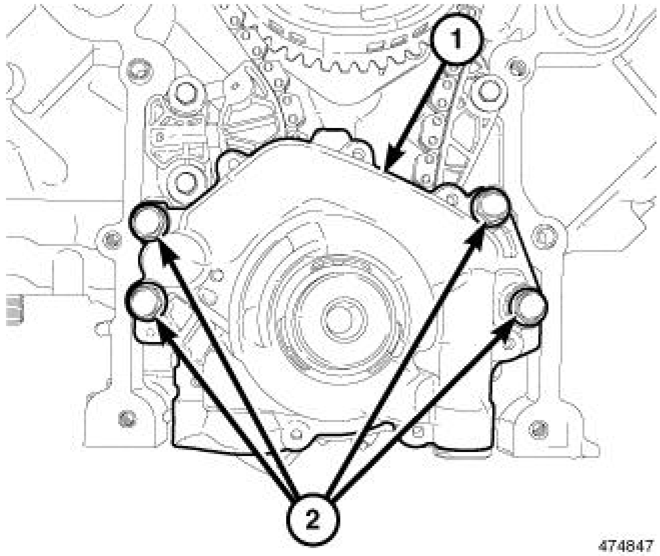
[Fig. 262: Chain Tensioner Arm](#)
Courtesy of CHRYSLER GROUP, LLC

5. Retract the chain tensioner arm (1) until the hole in the arm lines up with the hole in the bracket.



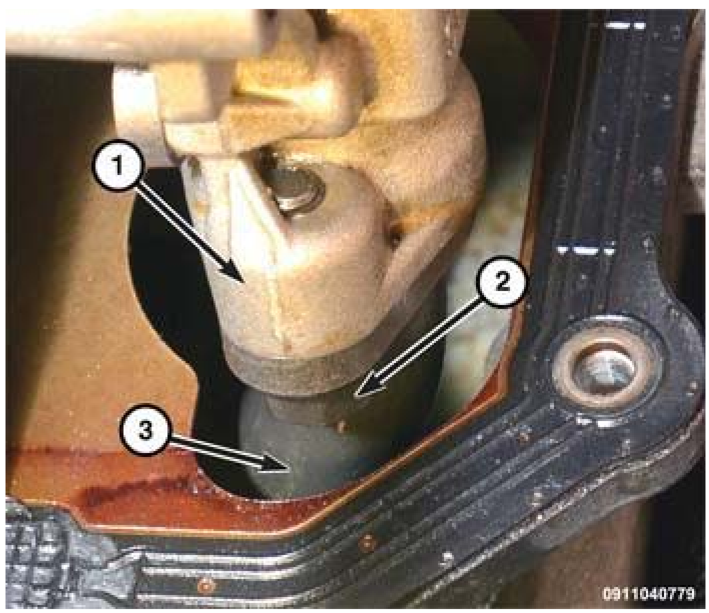
[Fig. 263: Crankshaft Gear Mark & Timing Chain Mark](#)
Courtesy of CHRYSLER GROUP, LLC

6. Install the Tensioner Pin (special tool #8514, Pins, Tensioner) (2) into the chain tensioner holes.
7. If the timing chain tensioner is being replaced, remove the retaining bolts (1) and remove the timing chain tensioner.



[Fig. 264: Oil Pump Retaining Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

8. Remove the four engine oil pump (1) retaining bolts (2).



[Fig. 265: Engine Oil Pump Body, Oil Pump Pickup Tube & Retaining Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

9. Rotate the engine oil pump body (1) clockwise to gain access to the oil pump pickup tube (3) retaining bolt (2).
10. Remove the engine oil pump pickup tube retaining bolt.
11. Remove the engine oil pump pickup tube from the engine oil pump body.

NOTE:	**There is an O-ring on the pickup tube. Be sure not to drop the O-ring into the engine oil pan.**

12. Remove the oil pump from the engine.

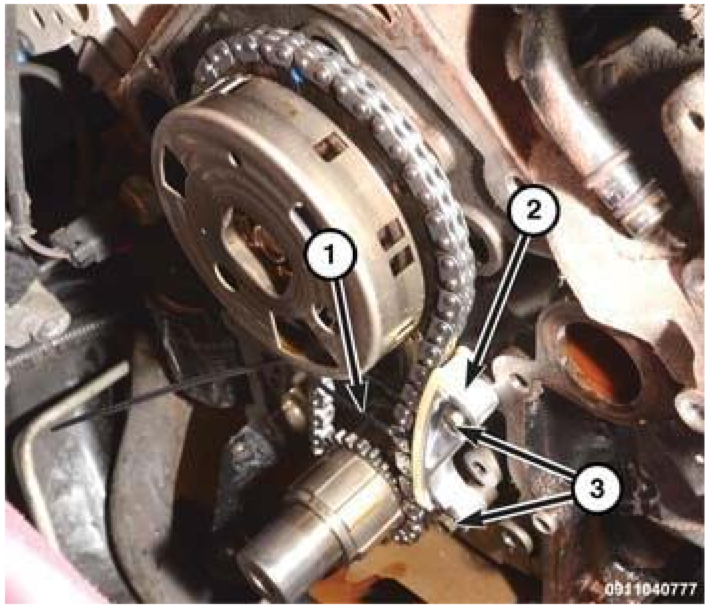


Fig. 266: Timing Chain Guide & Bolts
Courtesy of CHRYSLER GROUP, LLC

13. If the timing chain guide (2) is being replaced, remove the retaining bolts (3) and remove the timing chain guide.

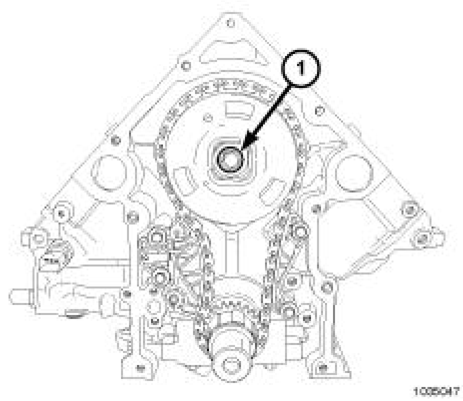


Fig. 267: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

14. Remove the camshaft phaser retaining bolt (1) and remove the timing chain with the camshaft phaser and crankshaft sprocket.

NOTE: **Do not rotate the crankshaft or camshaft after timing chain removal. The 5.7L engine has zero skipped tooth clearance. Catastrophic engine damage will result if the proper camshaft and crankshaft positions and not established during assembly.**

INSTALLATION

INSTALLATION

CAUTION: **This is a Zero-Tolerance engine. Failure to properly align the timing chain to the timing gears will cause severe engine damage. It is imperative that the Timing**

Marks shown in illustration in the subsequent steps be properly aligned during assembly.

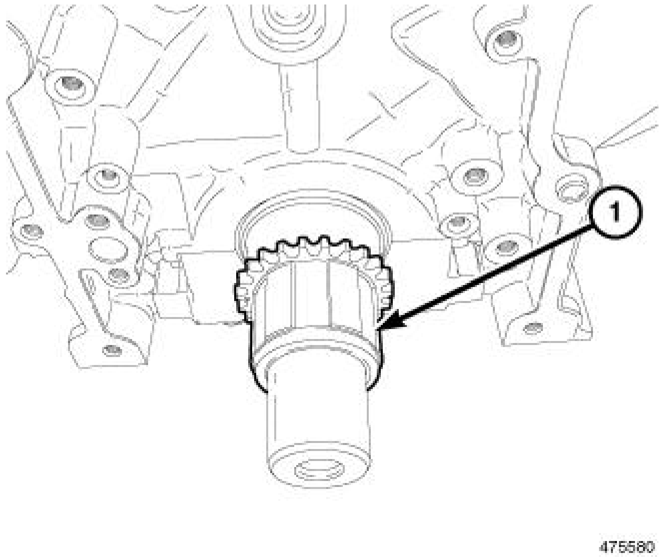


Fig. 268: Crankshaft Sprocket
Courtesy of CHRYSLER GROUP, LLC

1. Install the crankshaft sprocket (1) and position halfway onto the crankshaft.

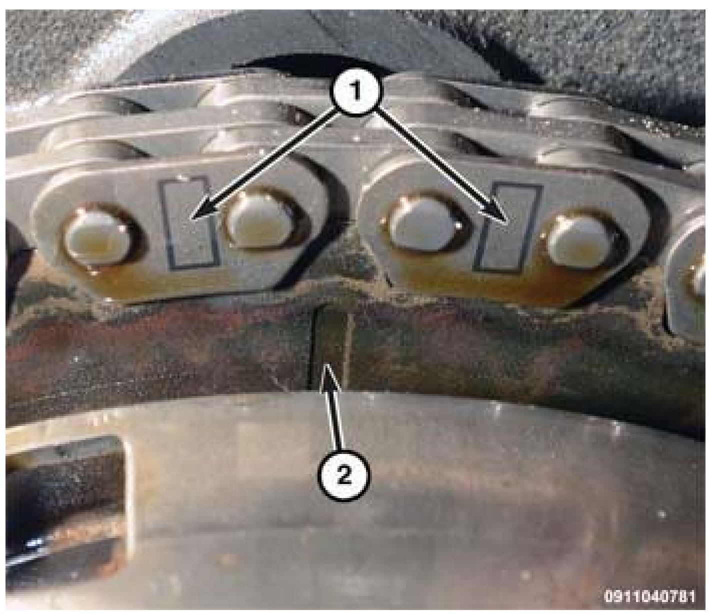


Fig. 269: Aligning Timing Marks With The Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

2. While holding the camshaft phaser in hand, position the timing chain on the camshaft phaser and align the timing marks as shown in illustration. Ensure that the camshaft gear (2) is aligned with the camshaft timing chain marks (1) in the twelve O'clock position.

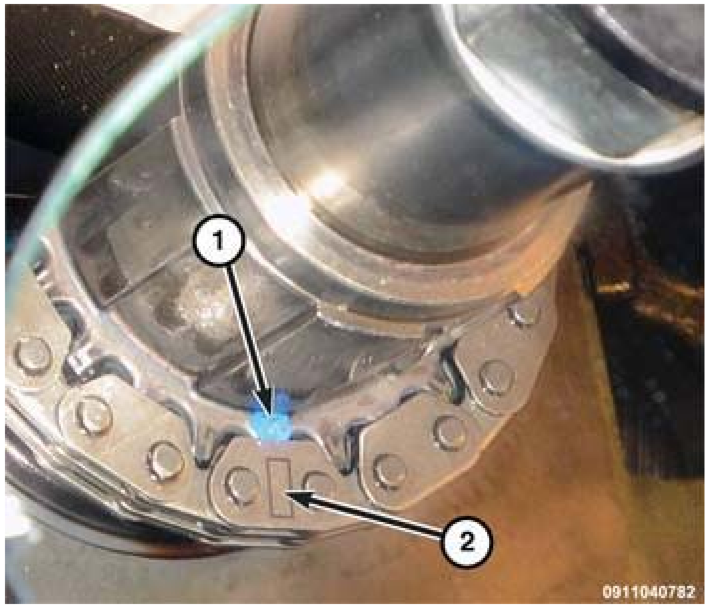


Fig. 270: Aligning Camshaft Timing Chain Marks
Courtesy of CHRYSLER GROUP, LLC

3. While holding the camshaft phaser and timing chain in hand, position the timing chain on the crankshaft sprocket and align the timing mark as shown in illustration. The crankshaft gear mark (1) should align with the timing chain mark (2) at the six O'clock position.
4. Align the slot in the camshaft phaser with the dowel on the camshaft and position the camshaft phaser on the camshaft while sliding the crankshaft sprocket into position.

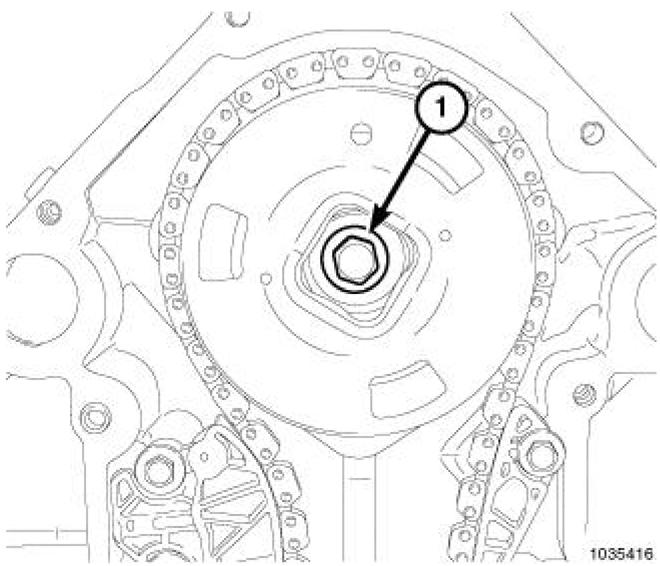
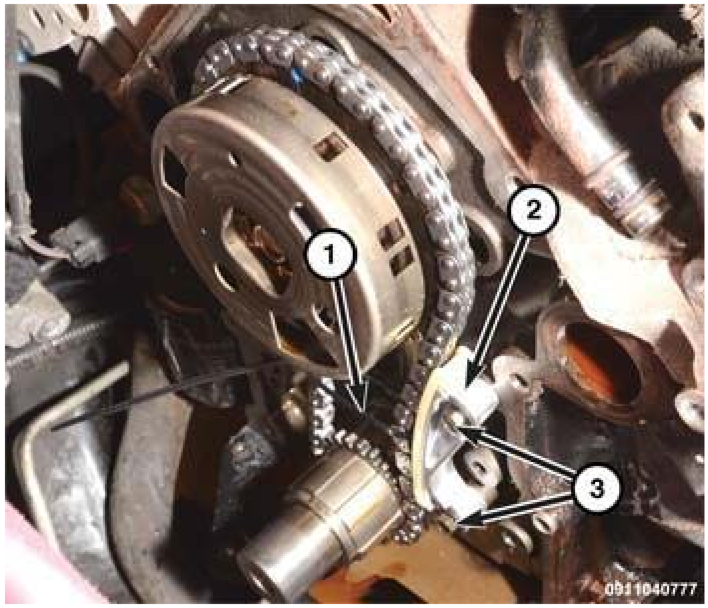


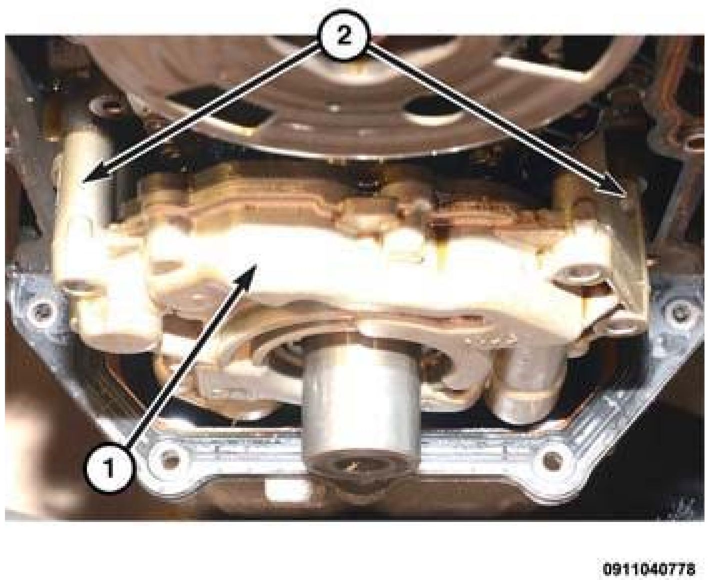
Fig. 271: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Install the camshaft phaser retaining bolt (1) finger tight.



[Fig. 272: Timing Chain Guide & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

6. If removed, install the timing chain guide (2) and tighten the bolts (3) to 11 N.m (8 ft. lbs.).
7. Install a plastic tie strap (1) around the timing chain to hold tension on the timing chain.
8. Install a new O-ring on the oil pickup tube.



[Fig. 273: Engine Oil Pump](#)
Courtesy of CHRYSLER GROUP, LLC

9. Install the engine oil pump (1) onto the crankshaft.

NOTE: **The engine oil pump drive hub and inner gerotor must be aligned while installing the engine oil pump.**

10. Ensure that the engine oil pump is flush (2) against the engine block.

NOTE: **Do not use the engine oil pump bolts to draw the engine oil pump onto the crankshaft.**

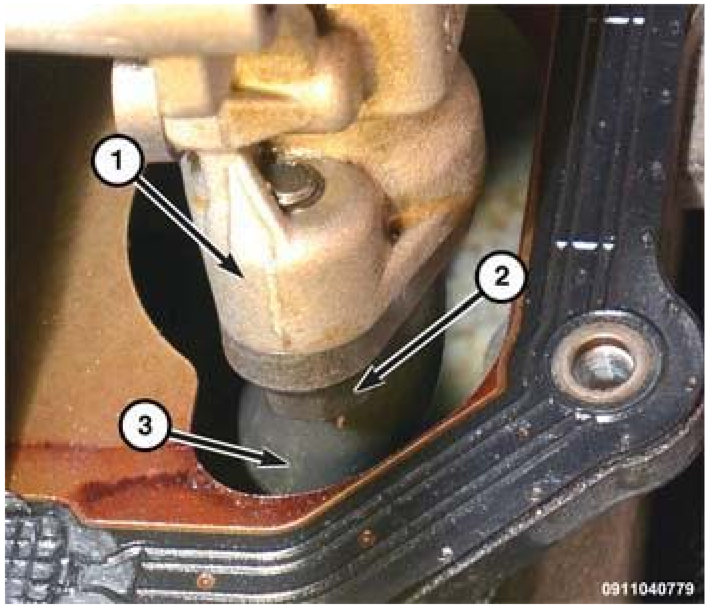


Fig. 274: Engine Oil Pump Body, Oil Pump Pickup Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Insert the engine oil pickup tube (3) into the engine oil pump body (1).

NOTE: **Be sure the engine oil pickup tube flange is flush with the body of the engine oil pump. The O-ring should not be visible when the engine oil pump tube is fully seated.**

12. Install the engine oil pickup tube retaining bolt (2) and tighten to 22 N.m (16 ft. in lbs.).
13. Turn the oil pump counter clockwise to align the oil pump body mounting holes to the engine bolt holes.

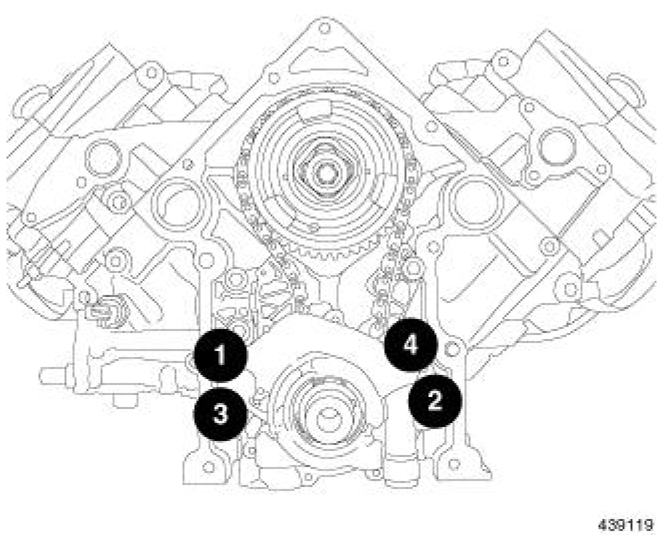


Fig. 275: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

14. Install the four engine oil pump retaining bolts.
15. Using the sequence shown in illustration, tighten the oil pump retaining bolts to 28 N.m (21 ft. lbs.).

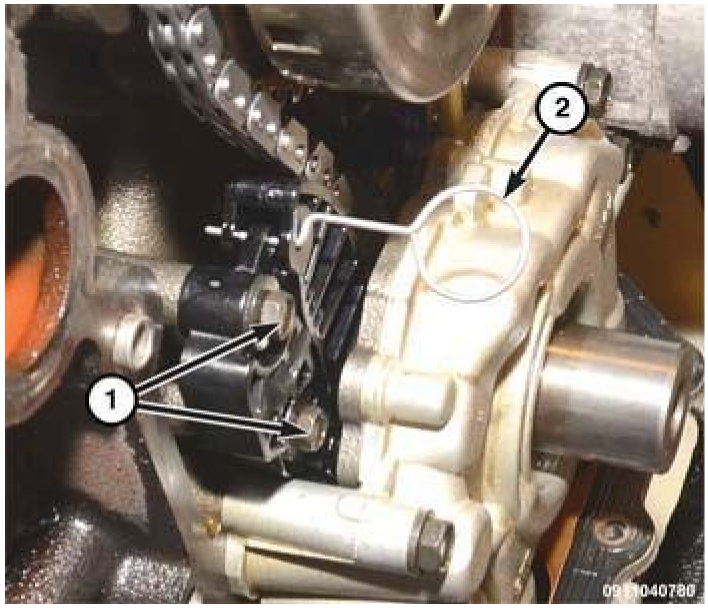


Fig. 276: Crankshaft Gear Mark & Timing Chain Mark
Courtesy of CHRYSLER GROUP, LLC

16. If removed, install the timing chain tensioner and tighten the bolts (1) to 11 N.m (8 ft. lbs.).
17. Remove the tensioner pin (special tool #8514, Pins, Tensioner) (2).
18. Cut off and discard the timing chain tensioning plastic tie strap.

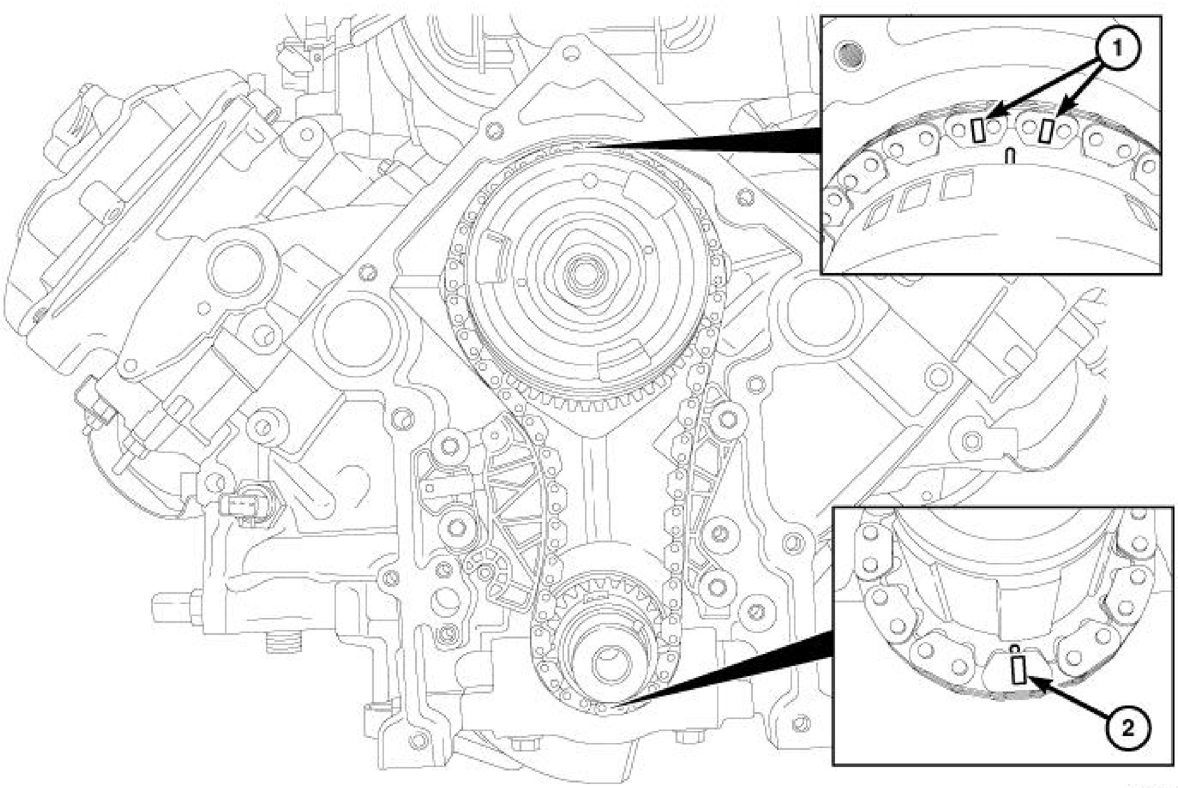


Fig. 277: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

19. **NOTE:** **The timing mark located on the camshaft phaser must be properly centered between the dual marks on the timing chain while at the 12 O'clock position (1). The timing mark located on the crankshaft must be properly aligned with the single mark on the timing chain while at the 6 O'clock position (2).**

20. Verify that the chains are operating smoothly. The chain must be replaced if:
    - Any kinks
    - Signs of binding
    - Damage to the links
    - Signs of wear or stretching

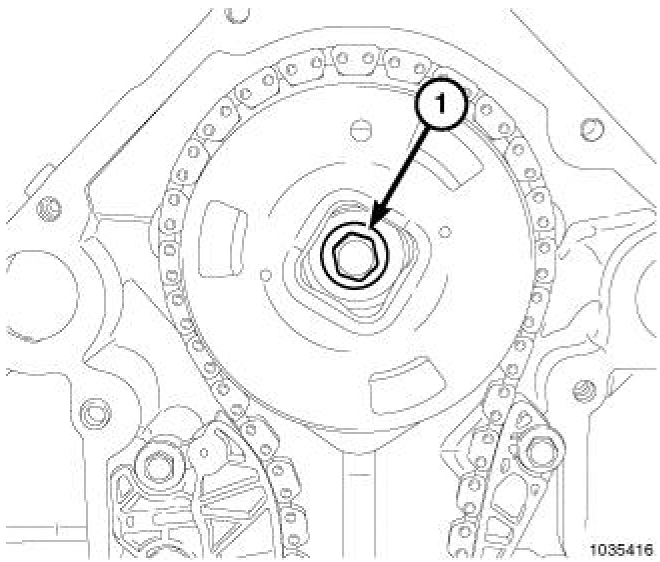


Fig. 278: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

21. Tighten the camshaft phaser bolt (1) to 98 N.m (72 ft. lbs.).
22. Install the timing chain cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.

COVER(S), ENGINE TIMING

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL, 5.7L**.
3. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
4. Remove the upper radiator hose.

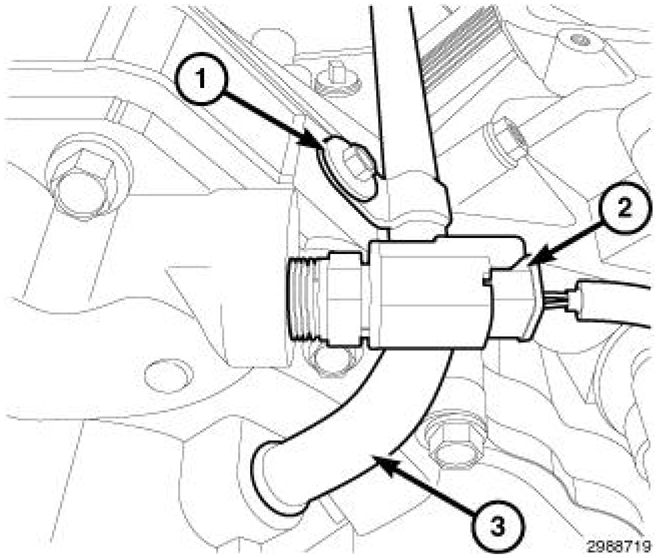


Fig. 279: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Remove the coolant temperature sensor wire harness connector (2).
6. Remove the left heater tube bracket bolt from the rear of the left cylinder head.
7. Remove the heater tube retaining bolt (1) from the timing cover.
8. Lift the heater tube (3) out of the water pump and position tube aside for clearance.

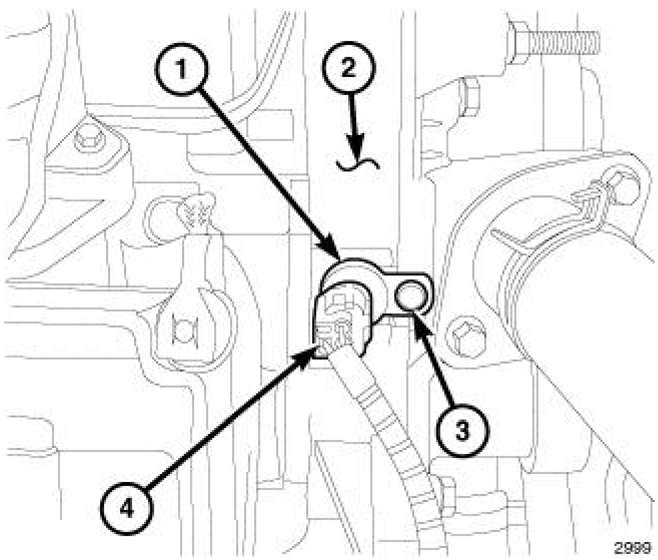


Fig. 280: Camshaft Position Sensor, Connector, Bolt & Timing Cover
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the camshaft position (CMP) sensor wire harness connector (4).

NOTE: **Install a piece of cardboard or equivalent to the radiator face to protect the radiator during the repair procedure.**

10. Remove the vibration damper. Refer to DAMPER, VIBRATION, REMOVAL, 5.7L.
11. Remove the accessory drive belt tensioner. Refer to TENSIONER, BELT, REMOVAL .

12. Remove the accessory drive idler pulley. Refer to **PULLEY, IDLER, REMOVAL** .
13. Disconnect the lower radiator hose from the water pump.
14. Remove the generator mounting bolts and set aside without disconnecting any of the electrical connections. Refer to **GENERATOR, REMOVAL** .
15. Remove the A/C compressor mounting bolts and set compressor aside without disconnecting A/C lines. Refer to **COMPRESSOR, A/C, REMOVAL** .
16. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

Fig. 281: Drain Plug
Courtesy of CHRYSLER GROUP, LLC

17. Remove drain plug (1) and allow oil to drain into pan. Inspect drain plug threads for stretching or other damage. Replace drain plug if damaged.
18. Install drain plug (1). Tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

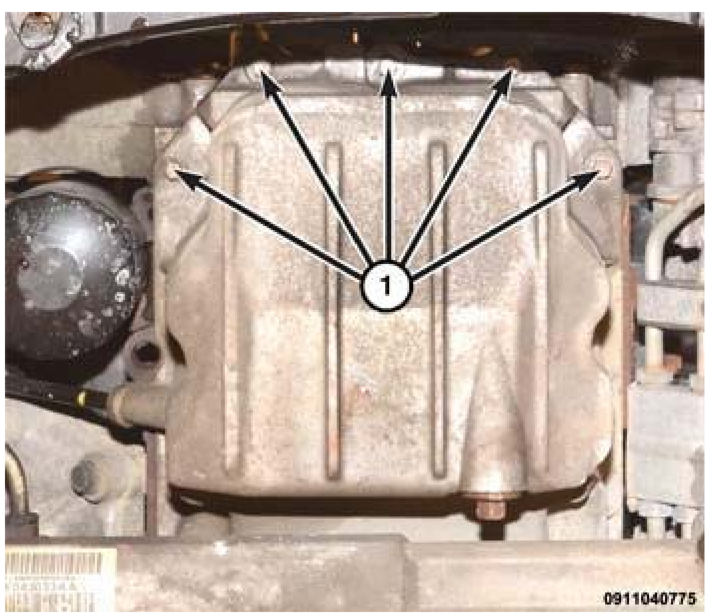


Fig. 282: Front Oil Pan Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

19. Remove the five front oil pan retaining bolts (1).
20. Remove support and lower the vehicle.

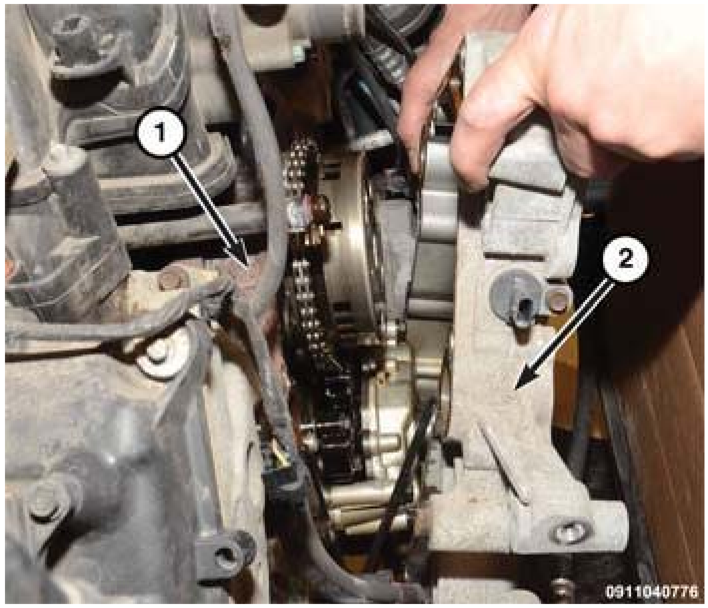


Fig. 283: Removing/Installing Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

21. Remove the six bolts and the engine timing cover (2).
22. Verify that the engine timing cover slide bushings remain located in the engine timing cover.

INSTALLATION

INSTALLATION

1. Place a shop towel over the engine oil pan opening to catch any debris created while cleaning the sealing surfaces on the engine block.
2. Clean the engine timing cover and engine block surface.

NOTE: **Always install new gaskets and seals when servicing the engine timing cover.**

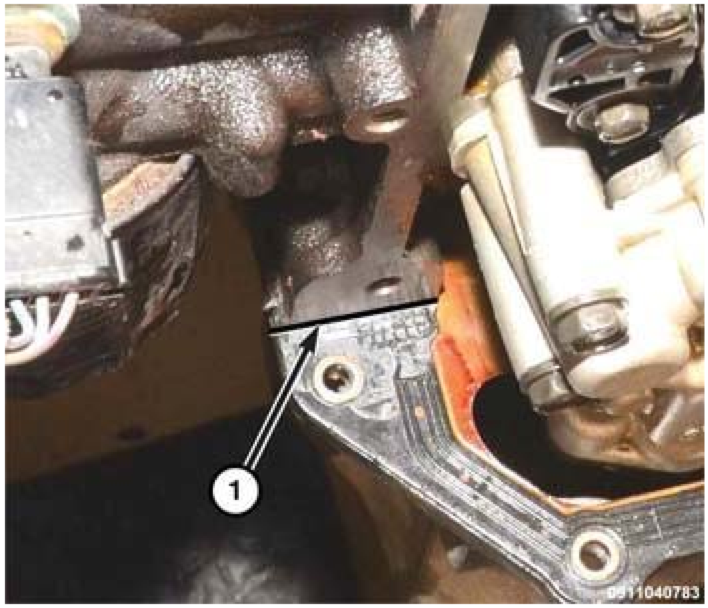


Fig. 284: RTV Sealant Application Area
Courtesy of CHRYSLER GROUP, LLC

3. Apply a small bead of RTV sealant to right edge of the engine block, where the engine block meets the oil pan (1).

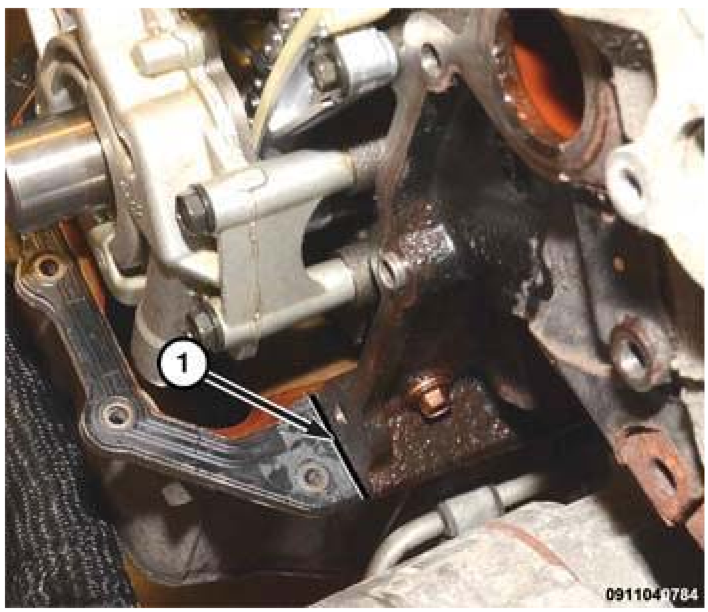


Fig. 285: RTV Sealant Application Area
Courtesy of CHRYSLER GROUP, LLC

4. Apply a small bead of RTV sealant to the left edge of the engine bock, where the engine meets the oil pan (1).
5. Verify that the engine timing cover slide bushings remain located in the engine timing cover.

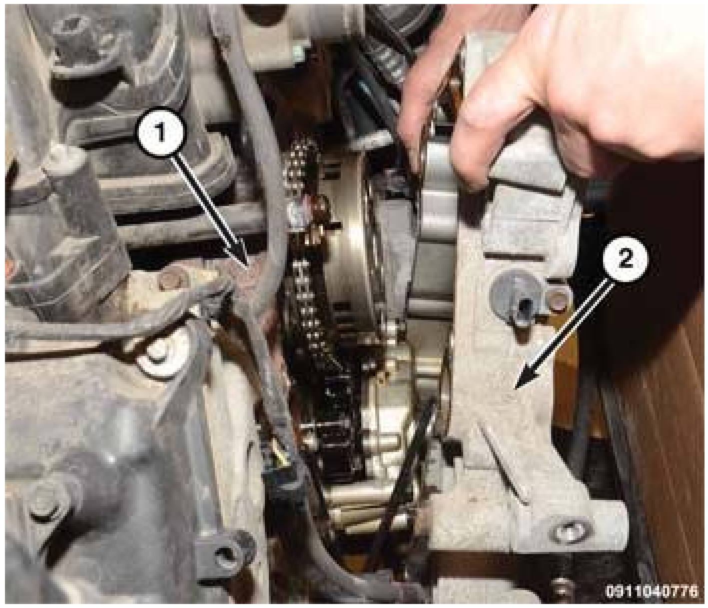


Fig. 286: Removing/Installing Engine Timing Cover
Courtesy of CHRYSLER GROUP, LLC

6. Using a **NEW** gasket, install the engine timing cover (2). Tighten the six bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
7. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

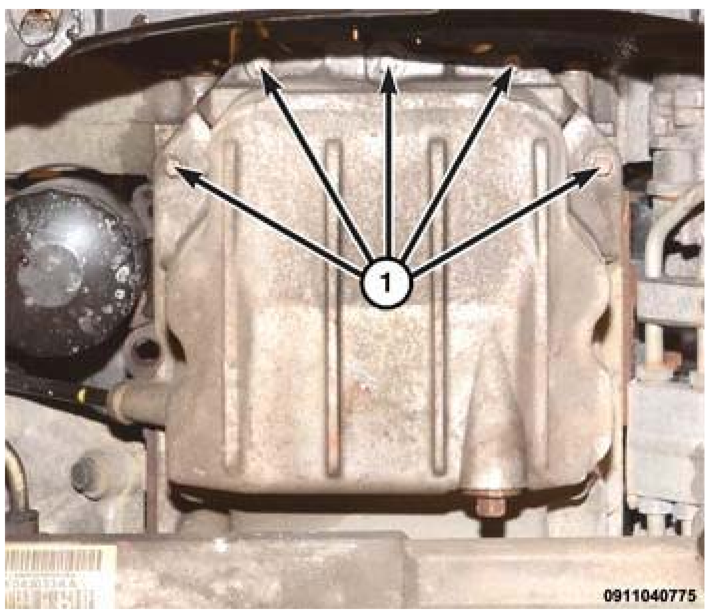


Fig. 287: Front Oil Pan Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install the five oil pan bolts and tighten bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
9. Replace the oil filter.
10. Install the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION** .
11. Install the lower radiator hose and clamp.

12. Install the generator. Refer to **GENERATOR, INSTALLATION** .
13. Remove support and lower the vehicle.
14. Install the accessory drive idler pulley. Refer to **PULLEY, IDLER, INSTALLATION** .
15. Install the accessory drive belt tensioner. Refer to **TENSIONER, BELT, INSTALLATION** .
16. Install the vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION, 5.7L**.

NOTE: Remove the protective cover from the radiator face.

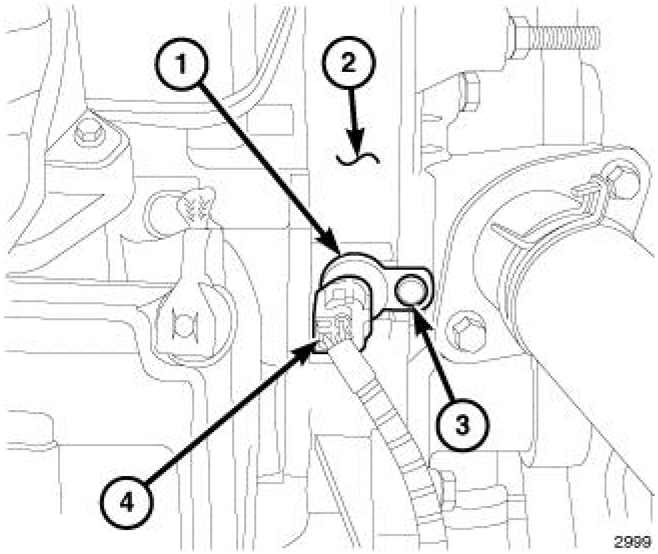


Fig. 288: Camshaft Position Sensor, Connector, Bolt & Timing Cover
Courtesy of CHRYSLER GROUP, LLC

17. Connect the Camshaft Position (CMP) sensor wire harness connector (4).

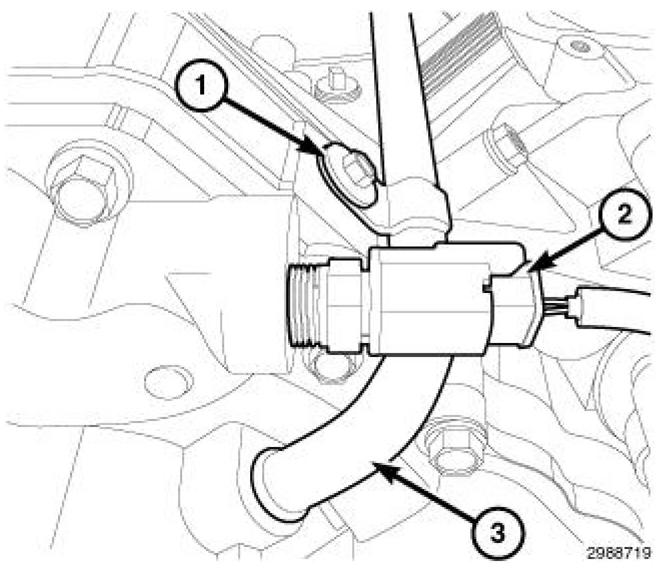


Fig. 289: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

18. Using a new O-ring seal, install the coolant tube (3) into of the water pump.
19. Install the heater tube bracket bolt located at the rear of the left cylinder head.

20. Using a **NEW** O-ring seal install the coolant tube bolt (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
21. Connect the coolant temperature sensor wire harness connector (2).
22. Install the upper radiator hose and clamp.
23. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .
24. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION, 5.7L**.
25. Connect the negative battery cable.
26. Fill the crankcase with the specified type and amount of engine oil. Refer to **STANDARD PROCEDURE**.
27. Start the engine and check for leaks.

TENSIONER, ENGINE TIMING

DESCRIPTION

DESCRIPTION

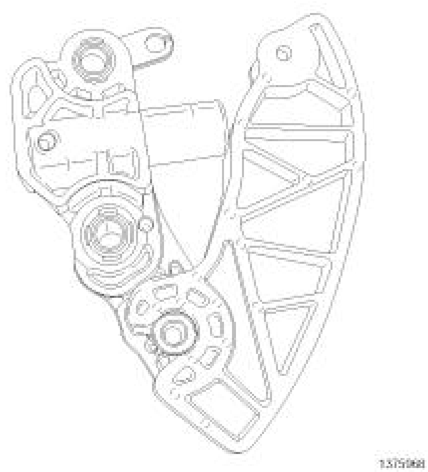


Fig. 290: Timing Chain Tensioner Arm
Courtesy of CHRYSLER GROUP, LLC

The timing chain tensioner is a spring loaded design. It consists of two chain guide shoes. One shoe is fixed in place and the other is spring loaded to keep tension on the chain.

OPERATION

OPERATION

The timing chain tension is maintained by routing the timing chain through the tensioner assembly. A nylon shoe presses on the timing chain maintaining the correct chain tension.

STANDARD PROCEDURE

STANDARD PROCEDURE - RESETTING TENSIONER

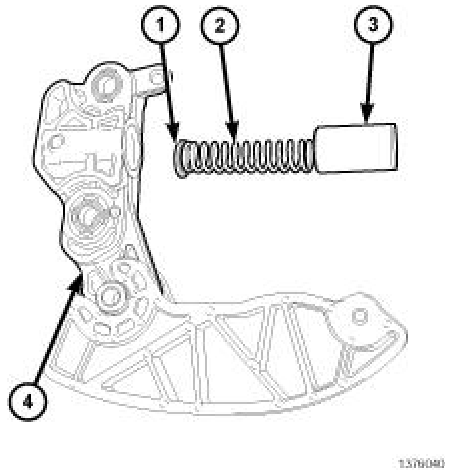


Fig. 291: Tensioner Body, Washer, Spring & Plunger
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Verify that the tensioner is assembled correctly.**

1. Install the washer (1), spring (2), and plunger (3) inside the tensioner body (4).

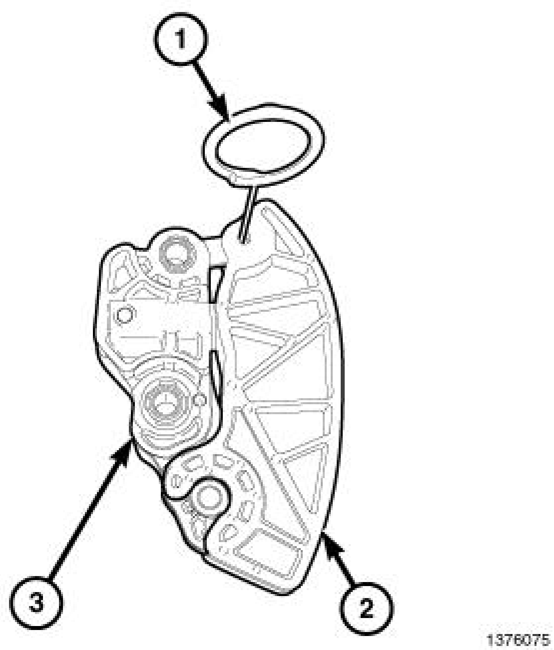


Fig. 292: Tensioner Pin, Guide Shoe & Tensioner Body
Courtesy of CHRYSLER GROUP, LLC

2. Squeeze the tensioner body (3) and movable guide shoe (2) together and install Tensioner Pin (special tool #8514, Pins, Tensioner) (1).

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the timing cover. Refer to COVER(S), ENGINE TIMING, REMOVAL, 5.7L.

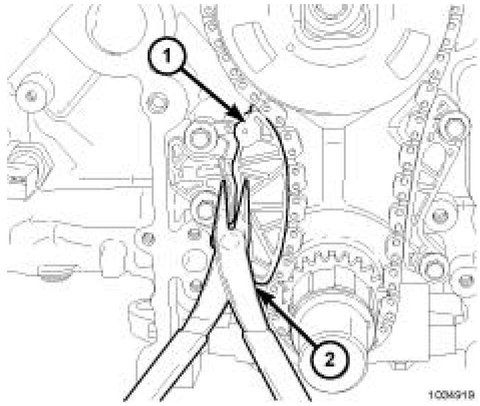


Fig. 293: Chain Tensioner Arm
Courtesy of CHRYSLER GROUP, LLC

3. Retract the chain tensioner arm (1) until the hole in the arm lines up with the hole in the bracket.

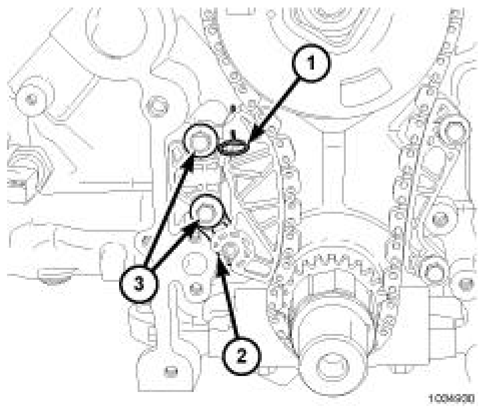


Fig. 294: Timing Chain Tensioner Pin
Courtesy of CHRYSLER GROUP, LLC

4. Install the Tensioner Pin (special tool #8514, Pins, Tensioner) (1) into the chain tensioner holes.
5. Remove bolts (3) and the timing chain tensioner (2).

INSTALLATION

INSTALLATION

1. Install the timing chain tensioner (2). Tighten bolts (3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

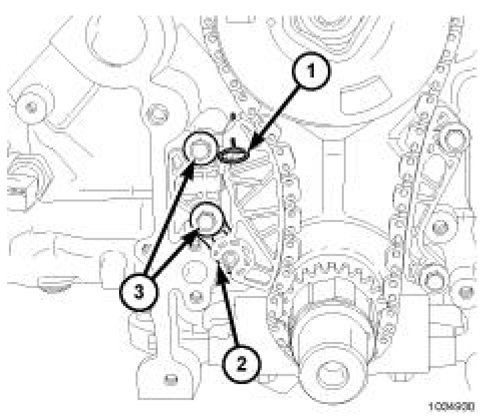


Fig. 295: Timing Chain Tensioner Pin
Courtesy of CHRYSLER GROUP, LLC

2. Remove the Tensioner Pin (special tool #8514, Pins, Tensioner) (1).
3. Install the lower timing cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION, 5.7L**.
4. Connect the negative battery cable.
5. Start the engine and inspect for leaks.

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Article GUID: A00735860

2015-16 ENGINE

6.2L - Service Information - Challenger

DESCRIPTION

DESCRIPTION

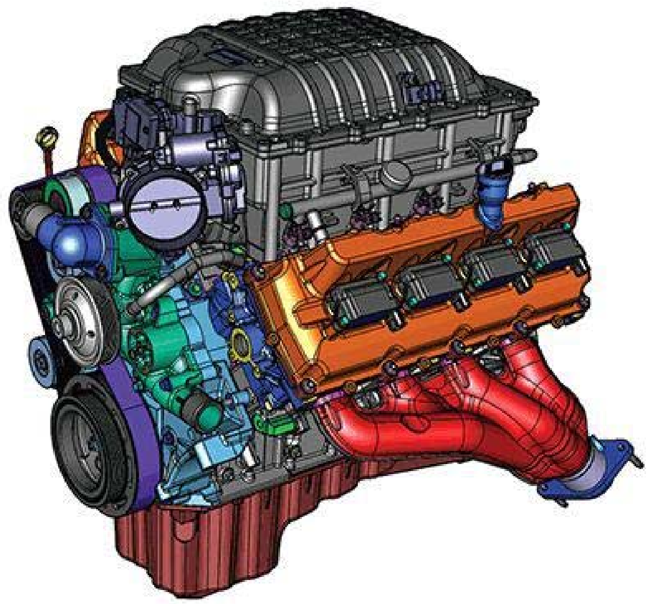


Fig. 1: 6.2L HEMIÂ® Eight-Cylinder SRT High Performance Engine
Courtesy of CHRYSLER GROUP, LLC

The supercharged 6.2L HEMI eight-cylinder SRT high performance engine is a 90Â° V-Type, deep skirt, lightweight cast iron block with forged aluminum pistons, forged steel crankshaft, aluminum heads, single cam, overhead valves, and hydraulic roller lifters. The heads incorporate splayed valves with a hemispherical style combustion chamber and dual spark plugs. The cylinders are numbered from front to rear; 1, 3, 5, 7 on the left bank and 2, 4, 6, 8 on the right bank. The firing order is 1-8-4-3-6-5-7-2.

DIAGNOSIS AND TESTING

CYLINDER COMBUSTION PRESSURE LEAKAGE

The combustion pressure leakage test provides an accurate means for determining engine condition.

Combustion pressure leakage testing will detect:

- Exhaust and intake valve leaks (improper seating)
- Leaks between adjacent cylinders or into water jacket
- Any causes for combustion pressure loss

1. Check the coolant level and fill as required. DO NOT install the radiator cap.

2. Start and operate the engine until it attains normal operating temperature.
3. Turn the engine OFF.
4. Remove one spark plug per cylinder.
5. Remove the oil filler cap.
6. Remove the air cleaner hose.
7. **Calibrate the tester according to the manufacturer's instructions.** The shop air source for testing should maintain a regulated air pressure at 552 kPa (80 psi).
8. Perform the test procedures on each cylinder according to the tester manufacturer's instructions. Set the piston of the cylinder to be tested at TDC compression.
9. During the testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the radiator coolant.

All gauge pressure indications should be equal, with **no more** than 25% leakage.

FOR EXAMPLE: Input air at 552 kPa (80 psi), the primary gauge factory set at 207 kPa (30 psi) input pressure. The secondary gauge should have no more than 176 kPa (25.5 psi) loss, when connected to the cylinder.

Refer to CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART.

CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
Air escapes through the throttle body	Intake valve bent, burnt, or not seated properly.	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
Air escapes through the tailpipe	Exhaust valve bent, burnt, or not seated properly.	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
Air escapes through the radiator	Cylinder head gasket leaking or cracked in cylinder head or engine block.	Remove cylinder head and inspect. Replace cylinder head gasket, cylinder head or engine block as necessary.
More than 50% leakage from adjacent cylinders	Cylinder head gasket leaking or crack in cylinder head or engine block between adjacent cylinders.	Remove cylinder head and inspect. Replace cylinder head gasket, cylinder head or engine block as necessary.
More than 25% leakage and air escapes through the oil filler cap opening only	Stuck or broken piston rings; cracked piston; worn rings or cylinder wall.	Remove cylinder head and inspect for broken rings or piston. Measure ring gap and cylinder diameter, taper and out-of-round. Replace defective part as necessary.

ENGINE MECHANICAL DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
ENGINE NOISE	1. Worn accessory drive belt	1. Check for belt damage and

CONDITION	POSSIBLE CAUSES	CORRECTION
		alignment Refer to **BELT, SERPENTINE, DIAGNOSIS AND TESTING** .
	2. Worn coolant pump	2. Check for possible coolant leak. If OK, Check the pulley and input shaft for wear. Replace as necessary.
	3. Worn generator	3. Check the pulley for wear. Spin the armature. Replace as necessary.
	4. Idler/Tensioner pulley	4. Check pulleys. Verify bearing noise. Replace as necessary.
	5. Power steering pump (if equipped)	5. Check the pulley and input shaft for wear. Replace as necessary.
	6. Flywheel/Flexplate	6. Check for wear or possible cracking. Check bolts. Repair as necessary.
NOISY VALVES/LIFTERS	1. High or low oil level in crankcase.	1. Check for correct oil level. Adjust oil level by draining or adding as needed.
	2. Thin or diluted oil.	2. Change oil. Refer to **STANDARD PROCEDURE**.
	3. Low oil pressure.	3. Check engine oil level. If OK, perform oil pressure test. Refer to **DIAGNOSIS AND TESTING**.
	4. Dirt in hydraulic lifters.	4. Clean/replace hydraulic lifters.
	5. Bent push rod(s).	5. Install new push rods.
	6. Worn rocker arms.	6. Inspect oil supply to rocker arms and replace worn arms as needed.
	7. Worn hydraulic lifters.	7. Install new hydraulic lifters.
	8. Worn valve guides.	8. Inspect all valve guides and replace as necessary.
	9. Excessive runout of valve seats or valve faces.	9. Grind valves and seats.
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. If OK, perform oil pressure test. Refer to **DIAGNOSIS AND TESTING**.
	3. Thin or diluted oil.	3. Change oil to correct viscosity. Refer to **STANDARD PROCEDURE**.

CONDITION	POSSIBLE CAUSES	CORRECTION
	4. Excessive connecting rod bearing clearance.	4. Measure bearings for correct clearance with plasti-gage. Repair as necessary.
	5. Connecting rod journal out of round.	5. Replace crankshaft or grind journals.
	6. Misaligned connecting rods.	6. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. If OK, perform oil pressure test. Refer to **DIAGNOSIS AND TESTING**.
	3. Thin or diluted oil.	3. Change oil to correct viscosity. Refer to **STANDARD PROCEDURE**.
	4. Excessive main bearing clearance.	4. Measure bearings for correct clearance. Repair as necessary.
	5. Excessive end play.	5. Check crankshaft thrust bearing for excessive wear on flanges.
	6. Crankshaft main journal out of round or worn.	6. Grind journals or replace crankshaft.
	7. Loose flexplate, flywheel or torque converter.	7. Inspect crankshaft, flexplate, flywheel and bolts for damage. Tighten to correct torque.
LOW OIL PRESSURE	1. Low oil level.	1. Check oil level and fill if necessary.
	2. Faulty oil pressure sending unit.	2. Install new sending unit.
	3. Clogged oil filter.	3. Install new oil filter.
	4. Worn oil pump.	4. Replace oil pump assembly.
	5. Thin or diluted oil.	5. Change oil to correct viscosity. Refer to **STANDARD PROCEDURE**.
	6. Excessive bearing clearance.	6. Measure bearings for correct clearance.
	7. Oil pump relief valve stuck.	7. Remove valve to inspect, clean and reinstall.
	8. Oil pickup tube loose, broken, bent or clogged.	8. Inspect oil pickup tube and pump, and clean or replace if necessary.
	9. Oil pump cover warped or cracked.	9. Install new oil pump.
	10. Faulty or missing piston cooling jets.	10. Replace piston cooling jets.

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL LEAKS	1. Misaligned or deteriorated gaskets.	1. Replace gasket.
	2. Loose fastener or broken or porous metal part.	2. Tighten, repair or replace the part.
	3. Front or rear crankshaft oil seal leaking.	3. Replace seal.
	4. Leaking oil gallery plug or cup plug.	4. Remove and reseal threaded plug. Replace cup style plug.
EXCESSIVE OIL CONSUMPTION OR SPARK PLUGS OIL FOULED	1. PCV System malfunction.	1. Refer to **VALVE, POSITIVE CRANKCASE VENTILATION (PCV), REMOVAL** .
	2. Defective valve stem seal(s).	2. Repair or replace seal(s).
	3. Worn or broken piston rings.	3. Hone cylinder bores. Install new rings.
	4. Scuffed pistons/cylinder walls.	4. Hone cylinder bores and replace pistons as required.
	5. Carbon in oil control ring groove.	5. Remove rings and de-carbon piston.
	6. Worn valve guides.	6. Inspect/replace valve guides as necessary.
	7. Piston rings fitted too tightly in grooves.	7. Remove rings and check ring end gap and side clearance. Replace if necessary.

Lifter Purge Guideline

1. Warm engine to standard idle conditions.

NOTE: **Engine noise may be in the form of a clicking, chatter, or clattering noise.**

2. Listen to the engine for 30 to 60 seconds with the hood up and the engine cover removed.
3. If noise is present, de-aeration of the lifters is required.
4. Run the engine between 2000 and 3000 RPM for three to five minutes.
5. Return the engine to standard idle speed for 30 to 60 seconds.
6. Evaluate noise. If noise is present, repeat the run an additional 4 cycles.

NOTE: **The standard drive cycle will be about 10-15 miles of non-stop, combined highway and city driving.**

7. If noise is present, take the vehicle on a standard drive cycle.
8. Evaluate the noise. If noise present, follow standard service procedure for lifter repairs or noise conditions.
9. Evaluate the lifters for sponginess, check valve defects, and clearance.

ENGINE LUBRICATION DIAGNOSTIC TABLE

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL LEAKS	1. Gaskets and O-rings • Misaligned or damaged • Loose fasteners, broken or porous metal parts 2. Crankshaft rear seal 3. Crankshaft seal flange damaged 4. Oil pan flange cracked 5. Front cover seal damaged/misaligned 6. Damaged vibration damper 7. Crankshaft rear flange microporosity	1. Verify condition • Replace as necessary • Tighten fasteners, repair or replace metal parts 2. Replace as necessary 3. Polish or replace crankshaft 4. Replace oil pan 5. Replace seal 6. Polish or replace damper 7. Replace crankshaft
OIL PRESSURE DROP	1. Low oil level 2. Faulty oil pressure sending unit 3. Low oil pressure 4. Clogged oil filter 5. Worn oil pump 6. Thin or diluted oil 7. Excessive bearing clearance 8. Oil pump relief valve stuck 9. Oil pickup tube loose or damaged 10. Faulty or missing piston cooling jets	1. Check and correct oil level 2. Replace sending unit 3. Check pump and bearing clearance 4. Replace oil filter 5. Replace as necessary 6. Change oil and filter 7. Replace as necessary 8. Replace oil pump 9. Replace as necessary 10. Replace piston cooling jets
OIL PUMPING AT RINGS; SPARK PLUGS FOULING	1. Worn or damaged rings 2. Carbon in oil ring slots 3. Incorrect ring size installed 4. Worn valve guides 5. Leaking intake gasket 6. Leaking valve guide seals	1. Hone cylinder bores and replace rings 2. Replace rings 3. Replace rings 4. Ream guides and replace valves 5. Replace intake gaskets 6. Replace valve guide seals

OIL CONSUMPTION TEST AND DIAGNOSIS

The following diagnostic procedures are used to determine the source of excessive internal oil consumption, these procedures and tests apply to vehicles with 50, 000 miles or less.

NOTE: **Engine oil consumption may be greater than normal during engine break-in.**

Repairs should be delayed until vehicle has been driven at least 7, 500 miles.

Severe service (high ambient temperature, short trips, heavy loading, trailer towing, taxi, off-road, or law enforcement use) may result in greater oil consumption than normal.

Sustained high speed driving and high engine RPM operation may result in increased oil consumption.

Failure to comply with the recommended oil type and viscosity rating, as outlined in the owner's manual, may impact oil economy as well as fuel economy.

Oil consumption may increase with vehicle age and mileage due to normal engine wear.

NOTE: **Because a few drops of external oil leakage per mile can quickly account for the loss of one quart of oil in a few hundred miles, verify that no external engine oil leaks are present.**

- **Oil leakage is not the same as oil consumption and all external leakage must be eliminated before any action can be taken to verify and correct oil consumption complaints.**
- **Verify that the engine has the correct oil level dipstick and dipstick tube installed.**
- **Verify that the engine is not being run in an overfilled condition. Check the oil level 15 minutes after a hot shutdown with the vehicle parked on a level surface. In no case should the level be above MAX or the FULL mark on the dipstick.**

OIL CONSUMPTION TEST

1. Check the oil level at least 15 minutes after a hot shutdown.
2. If the oil level is low, top off with the proper viscosity and API service level engine oil. Add one bottle of MOPARĀ® 4-In-1 Leak Detection Dye into the engine oil.
3. Tamper proof the oil pan drain plug, oil filter, dipstick and oil fill cap.
4. Record the vehicle mileage.
5. Instruct the customer to drive the vehicle as usual.
6. Ask the customer to return to the servicing dealer after accumulating 500 miles, Check the oil level at least 15 minutes after a hot shutdown. If the oil level is half way between the "FULL" and "ADD" mark continue with the next step.
7. Using a black light, recheck for any external engine oil leaks, repair as necessary, if no external engine oil leaks are present, continue with oil consumption diagnosis.

OIL CONSUMPTION DIAGNOSIS

1. Check the Positive Crankcase Ventilation (PCV) system. Make sure the system is not restricted and the PCV valve has the correct part number and correct vacuum source (18-20 in. Hg at idle below 3000 ft. above sea level is considered normal).
2. Perform a cylinder compression test and cylinder leak down test using the standard leak down gauge following manufacturers suggested best practices.

   NOTE: **Verify the spark plugs are not oil saturated. If the spark plugs are oil saturated and compression is good it can be assumed the valve seals or**

valve guides are at fault.

3. If one or more cylinders have more than 15% leak down further engine tear down and inspection will be required.

TOP 18 REASONS THAT MAY LEAD TO ENGINE OIL CONSUMPTION

1. **Tapered and Out-of-Round Cylinders**

   The increased piston clearances permit the pistons to rock in the worn cylinders. While tilted momentarily, an abnormally large volume of oil is permitted to enter on one side of the piston. The rings, also tilted in the cylinder, permit oil to enter on one side. Upon reversal of the piston on each stroke, some of this oil is passed into the combustion chamber.

2. **Distorted Cylinders**

   This may be caused by unequal heat distribution or unequal tightening of cylinder head bolts. This condition presents a surface which the rings may not be able to follow completely. In this case, there may be areas where the rings will not remove all of the excess oil. When combustion takes place, this oil will be burned and cause high oil consumption.

3. **Improper operation of the PCV system**

   The main purpose of the Positive Crankcase Ventilation (PCV) valve is to recirculate blow-by gases back from the crankcase area through the engine to consume unburned hydrocarbons. The PCV system usually has a one way check valve and a make up air source. The system uses rubber hoses that route crankcase blow by gases to the intake manifold. Vacuum within the engine intake manifold pulls the blow by gases out of the crankcase into the combustion chamber along with the regular intake air and fuel mixture.

   The PCV system can become clogged with sludge and varnish deposits and trap blow by gases in the crankcase. This degrades the oil, promoting additional formation of deposit material. If left uncorrected, the result is plugged oil rings, oil consumption, rapid ring wear due to sludge buildup, ruptured gaskets and seals due to crankcase pressurization.

4. **Worn Piston Ring Grooves**

   For piston rings to form a good seal, the sides of the ring grooves must be true and flat - not flared or shouldered. Piston rings in tapered or irregular grooves will not seal properly and, consequently, oil will pass around behind the rings into the combustion chamber.

5. **Worn, Broken or Stuck Piston Rings**

   When piston rings are broken, worn or stuck to such an extent that the correct tension and clearances are not maintained, this will allow oil to be drawn into the combustion chamber on the intake stroke and hot gases of combustion to be blown down the cylinder past the piston on the power stroke. All of these conditions will result in burning and carbon build up of the oil on the cylinders, pistons and rings.

6. **Cracked or Broken Ring Lands**

   Cracked or broken ring lands prevent the rings from seating completely on their sides and cause oil

pumping. This condition will lead to serious damage to the cylinders as well as complete destruction of the pistons and rings. Cracked or broken ring lands cannot be corrected by any means other than piston replacement.

7. **Worn Valve Stems and Guides**

   When wear has taken place on valve stems and valve guides, the vacuum in the intake manifold will draw oil and oil vapor between the intake valve stems and guides into the intake manifold and then into the cylinder where it will be burned.

8. **Bent or Misaligned Connecting Rods**

   Bent or misaligned connecting rods will not allow the pistons to ride straight in the cylinders. This will prevent the pistons and rings from forming a proper seal with the cylinder walls and promote oil consumption. In addition, it is possible that a bearing in a bent connect rod will not have uniform clearance on the connecting rod wrist pin. Under these conditions, the bearing will wear rapidly and throw off an excessive amount of oil into the cylinder.

9. **Fuel Dilution**

   If raw fuel is allowed to enter the lubrication system, the oil will become thinner and more volatile and will result in higher oil consumption. The following conditions will lead to higher oil consumption;

   - Excess fuel can enter and mix with the oil via a leaking fuel injector
   - Gasoline contaminated with diesel fuel
   - Restricted air intake
   - Excessive idling

10. **Contaminated Cooling Systems**

    Corrosion, rust, scale, sediment or other formations in the water jacket and radiator will prevent a cooling system from extracting heat efficiently. This is likely to cause cylinder distortion thus leading to higher oil consumption.

11. **Oil Viscosity**

    The use of oil with a viscosity that is too light may result in high oil consumption. Refer to the vehicle owner's manual for the proper oil viscosity to be used under specific driving conditions and ambient temperatures.

12. **Dirty Engine Oil**

    Failure to change the oil and filter at proper intervals may cause the oil to be so dirty that it will promote accumulation of sludge and varnish and restrict oil passages in the piston rings and pistons. This will increase oil consumption; dirty oil by nature is also consumed at a higher rate than clean oil.

13. **Crankcase Overfull**

    Due to an error in inserting the oil dip stick so that it does not come to a seat on its shoulder, a low reading may be obtained. Additional oil may be added to make the reading appear normal with the stick

in this incorrect position which will actually make the oil level too high. If the oil level is so high that the lower ends of the connecting rods touch the oil in the oil pan excessive quantities of oil will be thrown on the cylinder walls and some of it will work its way up into the combustion chamber.

14. **Excessively High Oil Pressure**

    A faulty oil pressure relief valve may cause the oil pressure to be too high. The result will be that the engine will be flooded with an abnormally large amount of oil in a manner similar to that which occurs with worn bearings. This condition may also cause the oil filter to burst.

15. **Aftermarket Performance Chips and Modification**

    Increasing performance through the use of performance/power enhancement products to a stock or factory engine will increase the chance of excessive oil consumption.

16. **Lugging Engine**

    Lugging is running the engine at a lower RPM in a condition where a higher RPM (more power/torque) should be implemented. Especially susceptible on vehicles equipped with a manual transmission. This driving habit causes more stress loading on the piston and can lead to increases in engine oil consumption.

17. **Turbocharged Engines**

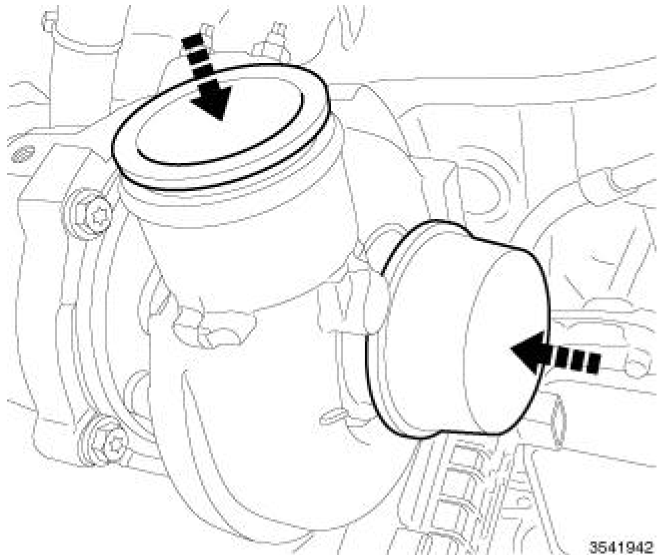
    There is a possibility for PCV "push-over" due to higher crankcase pressure (as compared to naturally aspirated engines) which is normal for turbocharged engines. This condition causes varying amounts of engine oil to enter the intake manifold, charge air cooler and associated plumbing to and from the charge air cooler, also a leaking turbocharger seal will draw oil into the combustion chamber where it will burn (blue smoke from the tail pipe may be present) and form carbon deposits which contribute to further oil consumption as they interfere with proper engine function.

18. **Restricted Air Intake**

    Excessive restriction in the air intake system will increase engine vacuum and can increase oil consumption. An extremely dirty air filter would be one example of this situation.

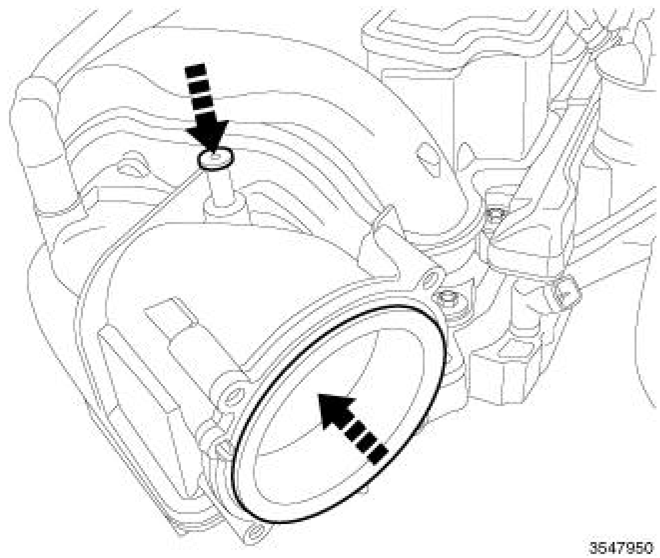
STANDARD PROCEDURE

DUST COVERS AND CAPS



[Fig. 2: Covers/Caps]
Courtesy of CHRYSLER GROUP, LLC

To avoid the possibility of dust, dirt, moisture and other foreign debris being introduced to the engine during service, cover or cap all openings when hoses and tubes are removed.



[Fig. 3: Opening Cover]
Courtesy of CHRYSLER GROUP, LLC

Covers installed over openings will reduce the possibility of foreign materials to entering the engine systems. Using miller tool Universal Protective Cap Set (special tool #10368, Set, Universal Protective Cap), select the appropriate cover needed for the procedure.

ENGINE GASKET SURFACE PREPARATION

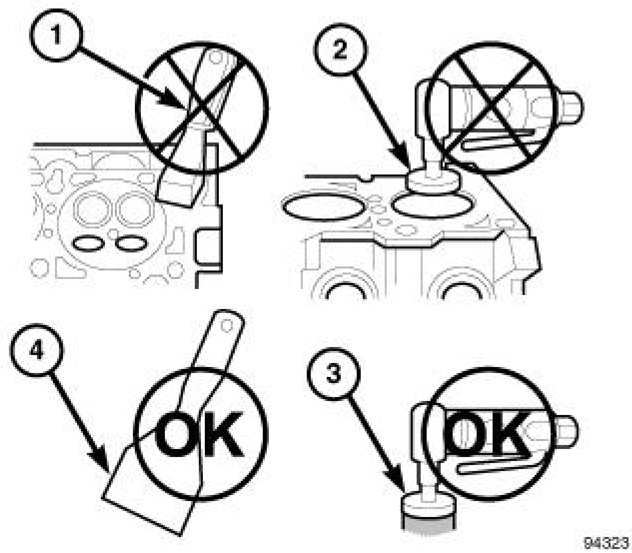


Fig. 4: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper (1).
- Abrasive pad or paper to clean cylinder block and head.
- High speed power tool with an abrasive pad or a wire brush (2).

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (4).
- Drill motor with 3M Roloc™ Bristle Disc (3), white is used for the aluminum heads and yellow is used for the iron block.

CAUTION: Excessive pressure or high RPM (beyond the recommended speed), can damage the sealing surfaces. The mild (white, 120 grit) bristle disc is recommended. If necessary, the medium (yellow, 80 grit) bristle disc may be used on cast iron surfaces with care.

REPAIR DAMAGED OR WORN THREADS

CAUTION: Always maintain the original center line when drilling and/or tapping holes.

Damaged or worn threads can be repaired. Essentially, this repair consists of:

- Drilling out worn or damaged threads

- Tapping the hole with a special Heli-CoilÂ® Tap or equivalent
- Installing a Heli-CoilÂ® insert into the tapped hole to bring the hole back to its original thread size

HYDROSTATIC LOCK

CAUTION: Do not attempt to run engine. Severe damage could occur.

When an engine is suspected of hydrostatic lock (regardless of what caused the problem), follow the steps below.

1. Disconnect and isolate the negative battery cable.
2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover.
3. Place a shop towel around the fuel supply line quick connect fitting to catch any fuel that may be under pressure, then disconnect the fuel supply line. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE** .
4. Loosen the air duct retaining clamp at the throttle body.
5. Disconnect the intake air temperature sensor electrical connector.
6. Remove the makeup air hose at the air cleaner housing.
7. Remove the air cleaner housing retaining bolt.
8. While lifting up the air cleaner housing, slide the air duct off the throttle body and remove the air cleaner housing from the vehicle.
9. Inspect the air duct, air cleaner housing and the intake manifold to make sure the system is dry and clear of any foreign material.
10. Place a shop towel around the spark plugs to catch any fluid that may possibly be under pressure in the cylinder head.
11. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .
12. With the spark plugs removed, rotate the crankshaft using a breaker bar and socket.
13. Identify the fluid in the cylinders (coolant, fuel, oil, etc.).
14. Make sure all fluid has been removed from the cylinders.
15. Repair engine or components as necessary to prevent this problem from occurring again.
16. Squirt a small amount of engine oil into the cylinders to lubricate the walls. This will help prevent engine damage on restart.
17. Install new spark plugs. Refer to **SPARK PLUG, INSTALLATION** .
18. Perform the Engine Oil Service procedure. Refer to **STANDARD PROCEDURE**.
19. Connect negative battery cable.
20. Start the engine and check for leaks.

SPECIFICATIONS

ENGINE SPECIFICATIONS

GENERAL DESCRIPTION

DESCRIPTION	SPECIFICATION

DESCRIPTION	SPECIFICATION
Engine Type	90Ā° V-8 OHV
Displacement	6.2 Liters
	378 (Cubic Inches)
Bore	103.9 mm (4.09 in.)
Stroke	90.9 mm (3.58 in.)
Compression Ht.	32.48
Firing Order	1-8-4-3-6-5-7-2
Lubrication	Pressure Feed - Full Flow Filtration
Cooling System	Liquid Cooled - Forced Circulation
Cylinder Block	Cast Iron
Cylinder Head	Aluminum
Crankshaft	Forged Steel
Camshaft	Cast Iron
Pistons	Forged Aluminum Alloy
Connecting Rods	Forged Powdered Metal

CYLINDER BLOCK

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Cam Bore 1 Diameter	61.71-61.73 mm	2.4295-2.4303 in.
Cam Bore 2 Diameter	57.85-57.87 mm	2.2776-2.2783 in.
Cam Bore 3 Diameter	57.44-57.46 mm	2.2614-2.2622 in.
Cam Bore 4 Diameter	57.05-57.07 mm	2.2461-2.2469 in.
Cam Bore 5 Diameter	43.673-43.693 mm	1.7194-1.7202 in.
Cylinder Bore Diameter	103.9 mm	4.09 in.
Out of Round (MAX)	0.008 mm	0.0003 in.
Taper (MAX)	0.014 mm	0.0006 in.
Lifter Bore Diameter	21.42 mm	0.8433 in.

PISTONS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Clearance Measured at 38.0 mm (1.5 in.) Below Deck	0.0425-0.0675 mm	0.001670-0.00266 in.
Ring Groove Diameter		
Groove #1	95.3-95.5 mm	3.752-3.760 in.
Groove #2	93.1-93.3 mm	3.665-3.673 in.
Weight	502 grams	17.71 oz.
Piston Length	52.33-52.63 mm	2.060-2.072 in.
Ring Groove Width		
No. 1	1.24 mm	0.0488 in

DESCRIPTION	SPECIFICATION	
	Metric	Standard
No. 2	1.24 mm	0.0488 in
No. 3	2.05 mm	0.0803 in.

PISTON RINGS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Ring Gap		
Top Compression Ring	0.35 - 0.50 mm	0.0138 - 0.0197 in.
Second Compression Ring	0.50- 0.76 mm	0.0197 - 0.0299 in.
Oil Control (Steel Rails)	0.15 - 0.45 mm	0.0059 - 0.0177 in.
Side Clearance		
Top Compression Ring	0.040 - 0.072 mm	0.0016 - 0.0028 in.
Second Compression Ring	0.040 - 0.072 mm	0.0016 - 0.0028 in.
Oil Ring (Steel Ring)	0.061 - 0.210 mm	0.0024 - 0.0083 in.
Ring Width		
Top Compression Ring	1.172 - 1.190 mm	0.0461 - 0.0468 in.
Second Compression Ring	1.172 - 1.190 mm	0.0461 - 0.0468 in.
Oil Ring (Steel Rails)	0.387 - 0.413 mm	0.0152 - 0.0163 in.

CONNECTING RODS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Side Clearance	0.07 - 0.35 mm	0.0028 - 0.0146 in.

CRANKSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Main Bearing Journal Diameter	64.978-65.002 mm	2.5582-2.5591 in.
Bearing Clearance	0.014 - 0.050 mm	0.0006 - 0.0020 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.
End Play	0.052 - 0.282 mm	0.002 - 0.011 in.
End Play (MAX)	0.282 mm	0.011 in.
Connecting Rod Journal Diameter	53.992-54.008 mm	2.1257-2.1263 in.
Bearing Clearance	0.016-0.056 mm	0.0006-0.0022 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.

CAMSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	Standard

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Bearing Journal Diameter		
No. 1	67.72 mm	2.67 in.
No. 2	57.8 mm	2.27 in.
No. 3	57.4 mm	2.26 in.
No. 4	57.0 mm	2.24 in.
No. 5	43.633 mm	1.72 in.
Bearing To Journal Clearance Standard		
No. 1	0.040 - 0.080 mm	0.0015 - 0.003 in.
No. 2	0.050 -0.090 mm	0.0019 - 0.0035 in.
No. 3	0.040 - 0.080 mm	0.0015 - 0.003 in.
No. 4	0.050 - 0.090 mm	0.0019 - 0.0035 in.
No. 5	0.040 - 0.080 mm	0.0015 - 0.003 in.
Camshaft End Play	.080 - 0.290 mm	0.0031 - 0.0114 in.
Duration	288.0Ā°	
Valve Lift (@ Zero Lash)		
Intake	15.0 mm	0.591 in.
Exhaust	14.2 mm	0.559 in.

VALVE TIMING

DESCRIPTION	SPECIFICATION
Intake	
Opens (BTDC)	25.0Ā°
Closes (ATDC)	253.0Ā°
Duration	278.0Ā°
Exhaust	
Opens (BTDC)	278Ā°
Closes (ATDC)	26Ā°
Duration	304Ā°
Valve Overlap	51Ā°

CYLINDER HEAD

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Valve Seat Angle	44.5Ā° - 45.0Ā°	
Valve Seat Runout (MAX)	0.04 mm	0.0016 in.
Valve Seat Width		
Intake	1.18 - 1.62 mm	0.046 - 0.065 in.
Exhaust	1.48 - 1.92 mm	0.058 - 0.076 in.
Guide Bore Diameter		
Intake	7.975 - 7.997 mm	0.314 - 0.315 in.

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Exhaust	7.975 - 7.990 mm	0.314 - 0.315 in.

HYDRAULIC TAPPETS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Body Diameter	21.387 - 21.405 mm	0.8420 - 0.8427 in.
Clearance (To Bore)	0.020 - 0.063 mm	0.0007 - 0.0024 in.
Dry Lash (at the valve)	3.0 mm	0.1181 in.

VALVES

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Face Angle		
Intake	45.5Ā° - 46.0Ā°	
Exhaust	45.0Ā° - 45.5Ā°	
Head Diameter		
Intake	54.3 mm	2.138
Exhaust	42.0 mm	1.654
Length (Overall From Gage Line)		
Intake	128.57	5.062
Exhaust	127.165	5.006
Stem Diameter		
Intake	7.934 - 7.954 mm	0.312 - 0.313 in.
Exhaust	7.930 - 7.950 mm	0.312 - 0.313 in.
Stem - to - Guide Clearance		
Intake	0.021 - 0.063 mm	0.0008 - 0.0025 in.
Exhaust	0.025 - 0.060 mm	0.0010 - 0.0024 in.

VALVE SPRING

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Spring Force - Gage (Valve Open)		
Intake	510.0 N Ā± 26.0 N @ 52.1 mm	114.7 lbs. Ā± 5.8 lbs. @ 2.051 in.
Exhaust	510.0 N Ā± 26.0 N @ 52.1 mm	114.7 lbs. Ā± 5.8 lbs. @ 2.051 in.
Spring Force - Gage (Valve Closed)		
Intake	1500.0 N Ā± 70.0 N @ 37.6 mm	337.2 lbs. Ā± 15.7 lbs. @ 1.480 in.
Exhaust	1500.0 N Ā± 70.0 N @ 37.6 mm	337.2 lbs. Ā± 15.7 lbs. @ 1.480 in.
Free Length (approx.)		
Intake	63.9 mm	2.516 in.

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Exhaust	63.9 mm	2.516 in.
Number of Coils		
Intake	8.55	
Exhaust	8.55	
Wire Diameter		
Intake and Exhaust	5.65 X 4.51 mm	0.222 - 0.178 in.
Installed Height (Spring Seat to Bottom of Retainer)		
Intake	52.1 mm	2.051 in.
Exhaust	51.2 mm	2.016 in.

OIL PUMP

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Clearance Over Rotors (MAX)	0.060 mm	0.002 in.
Outer Rotor to Pump Body Clearance (MAX)	0.306 mm	0.012 in.
Tip Clearance Between Rotors (MAX)	0.200 mm	0.008 in.

OIL PRESSURE

SPECIFICATION	SPECIFICATION
At Curb Idle Speed (min.)*	90 kPa (13 psi)
@ 3000 RPM	170 - 758 kPa (25 - 110 psi)
*** CAUTION: If pressure is zero at curb idle, DO NOT run engine**	

TORQUE SPECIFICATIONS

ENGINE BLOCK

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Camshaft Phaser Bolt	95	70	-	-
Camshaft Thrust Plate Bolts	13	-	115	-
Coolant Drain Plugs 1/4 x 18 NPT	34	25	-	-
Connecting Rod Cap Bolts	40 plus 90Â° Turn	30 plus 90Â° Turn	-	X
Crankshaft Main Bearing Cap Bolts	Specific torque and fastener pattern required; follow installation sequence. Refer to **CRANKSHAFT, INSTALLATION**.			-
Variable Valve Timing Solenoid Bolt	11	-	97	-
Lifter Guide Holder	12	9	-	-

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Oil Pan Bolts	Specific torque and fastener pattern required; follow installation sequence. Refer to **PAN, OIL, INSTALLATION**.			X
Oil Dipstick Tube	11	-	97	-
Oil Filter Adapter-Engine Oil Cooler	33	24	-	-
Oil Gallery Plugs 1/4 x 18 NPT	20	-	177	-
Oil Pan Drain Plug	27	20	-	-
Oil Pressure Sensor	14	-	124	-
Oil Pump to Engine Block Bolts	32	23	-	-
Oil Pump Cover Bolts.	15	-	133	-
Oil Pump Pickup Tube Bolt	28	21	-	-
Oil Pump Pickup Tube Nut	28	11	-	-
Oil Temperature Sensor	27	20	-	-
Piston Oil Cooler Jet Bolts	11	8	-	-
Plugs 3/8 x 18 NPT	27	20	-	-
Timing Chain Guide Bolts	11	Ā	97	-
Timing Chain Tensioner Bolts	11	-	97	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

CYLINDER HEAD

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Cylinder Head Bolts	Specific torque and fastener pattern required. Refer to **CYLINDER HEAD, INSTALLATION**.			-
Cylinder Head Cover Bolts	11	-	97	-
Exhaust Manifold Bolts	25	19	-	X
Ignition Coil Bolts	7	-	62	-
Supercharger to Cylinder Head Bolts	Specific torque and fastener pattern required. Refer to **SUPERCHARGER, INSTALLATION**.			-
Lifter Guide Holder Bolts	12	9	-	-
Rocker Arm Bolts	Specific torque and fastener pattern required; follow installation sequence. Refer to **ROCKER ARM, VALVE, INSTALLATION**.			-

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

FRONT ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Timing Chain Cover Bolts	28	21	-	-
Lifting Stud	55	41	-	-
Vibration Damper Bolt	324	239	-	X
Water Pump-to-Timing Chain Case Cover Bolts	28	21	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

REAR ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Flexplate Bolts	95	70	-	-
Inspection Cover to Transmission Bolt	11	-	97	-
Rear Crankshaft Oil Seal Retainer Bolts	13	-	115	-
Torque Convertor Bolts	42	31	-	-
Transmission to Oil Pan Bolts	45	33	-	-
Transmission Bell Housing to Engine Bolts	45	33	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

ENGINE MOUNTS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Engine Mount Bracket to Block Bolts	61	45	-	-
Engine Mount to Engine Mount Bracket	60	44	-	-
Engine Mount to Cradle Bolts	48	35	-	-
Engine Mount Heat Shield Nuts	25	18	-	-

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Transmission Crossmember Bolts - Automatic	65	48	-	-
Transmission Crossmember Bolts - Manual	61	45	-	-
Rear Isolator Bracket to Transmission Bolts (Automatic)	68	50	-	-
Rear Isolator to Bracket Bolts (Automatic)	31	23	-	-
Rear Isolator to Crossmember Bolts (Automatic)	61	45	-	-
Rear Isolator to Transmission Bolts (Manual)	54	40	-	-
Rear Isolator to Crossmember Bolts (Manual)	54	40	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

ACCESSORY DRIVE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Generator Support Bracket Bolt	65	48	-	-
Generator Support Bracket to Engine Mount Nut	25	18	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

MISCELLANEOUS COMPONENTS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Air Cleaner Body Bolt	4	-	35	-
Air Cleaner Cover	3	-	26	-
Air Cleaner Tube Clamps	4	-	35	-
Catalytic Converter to Exhaust Manifold Nuts	11	-	97	-
Oil Control Valve Bolt	11	-	97	-
Heater Tube Bolt	18	-	159	-

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Strut Tower Support Bolts	38	28	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

REMOVAL

REMOVAL

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
3. Drain the engine oil. Refer to **STANDARD PROCEDURE**.
4. Remove the supercharger assembly. Refer to **SUPERCHARGER, REMOVAL**.
5. Remove the cooling fan. Refer to **FAN, COOLING, REMOVAL** .

NOTE: The power steering lines do not need to be removed from the pump. Position pump to the side.

6. Remove the power steering pump. Refer to **PUMP, REMOVAL** .
7. Remove the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .

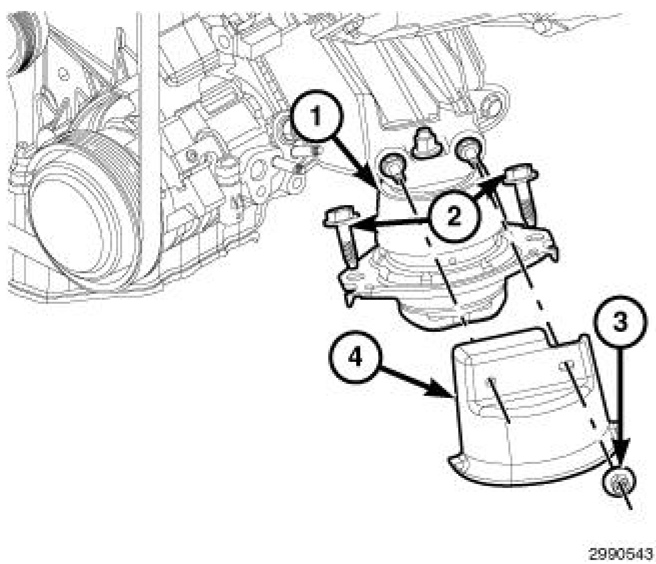


Fig. 5: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

8. Remove both left/right engine mount heat shield (4) retaining nuts (3) and remove the heat shields.
9. Remove both left/right engine mount to frame retaining bolts (2).

10. Disconnect the transmission oil cooler lines from their retainers at the oil pan.
11. Remove the lower radiator hose.

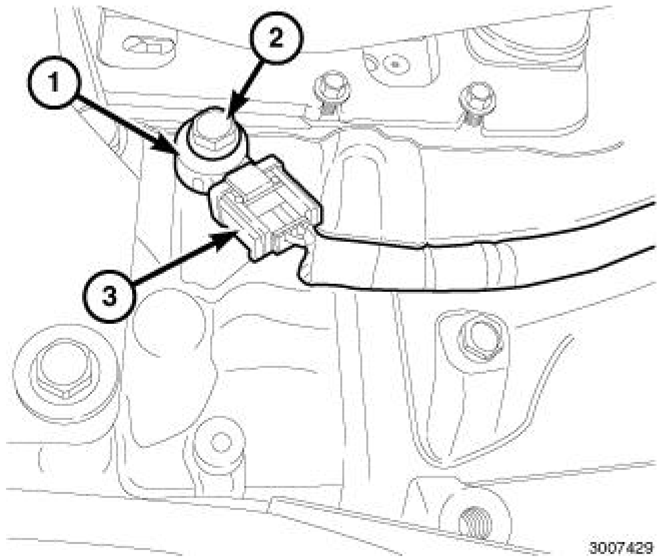


Fig. 6: Knock Sensor, Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Two knock sensors are used. Each sensor is bolted to the outside of the engine block below the exhaust manifold.**

NOTE: **Left side shown in illustration, right side similar.**

12. Remove the heat shields from both knock sensors (shield snaps on/off sensor).
13. Disconnect the knock sensor electrical connectors (3).
14. Remove both catalytic converters. Refer to **CONVERTER, CATALYTIC, REMOVAL** .

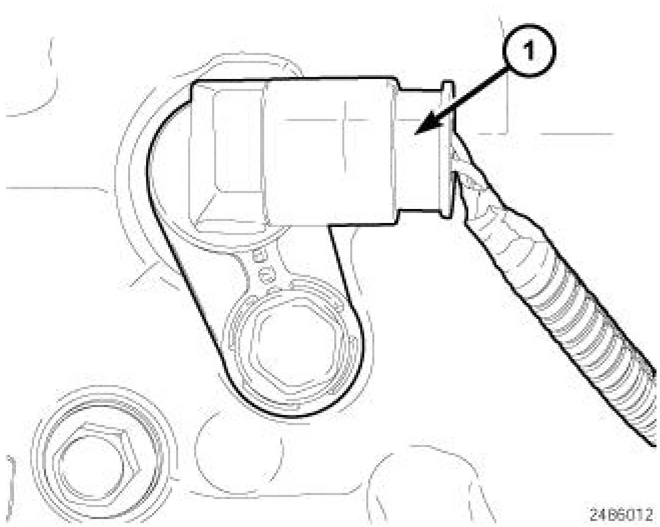


Fig. 7: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Crankshaft Position (CKP) sensor is located at the right-rear side of the engine block.**

15. Remove the CKP sensor wire harness connector (1).

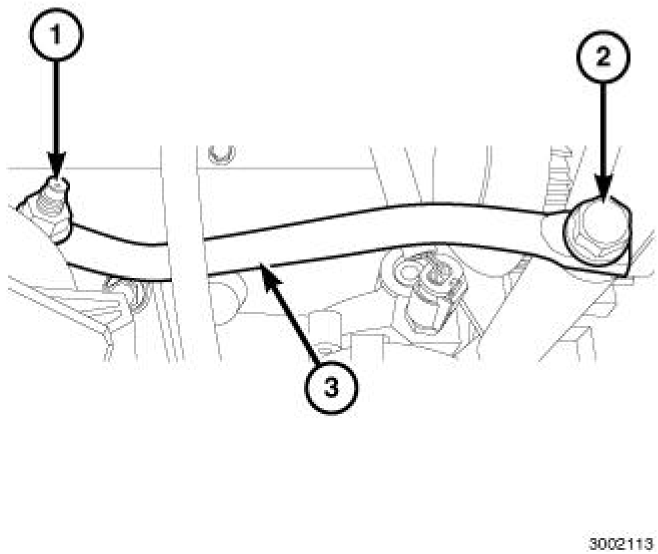


Fig. 8: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

16. Remove the generator support bracket to engine mount retaining nut (1).
17. Remove the generator support bracket retaining bolt (2) and remove the support bracket (3).
18. Lower the vehicle.
19. Remove the generator. Refer to GENERATOR, REMOVAL .
20. Remove the A/C liquid line. Refer to LINE, A/C LIQUID, REMOVAL .
21. Remove the A/C suction line. Refer to LINE, A/C SUCTION, REMOVAL .

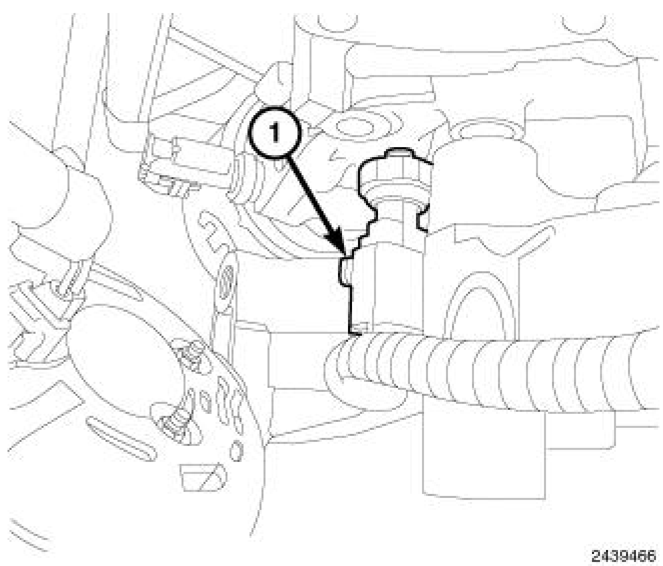
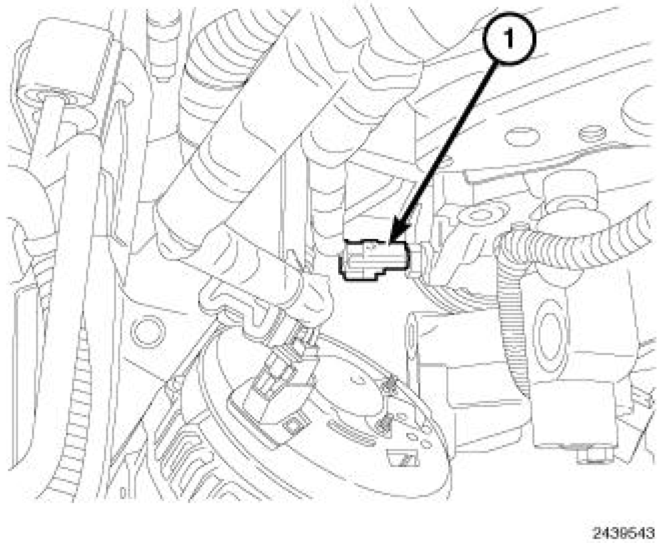


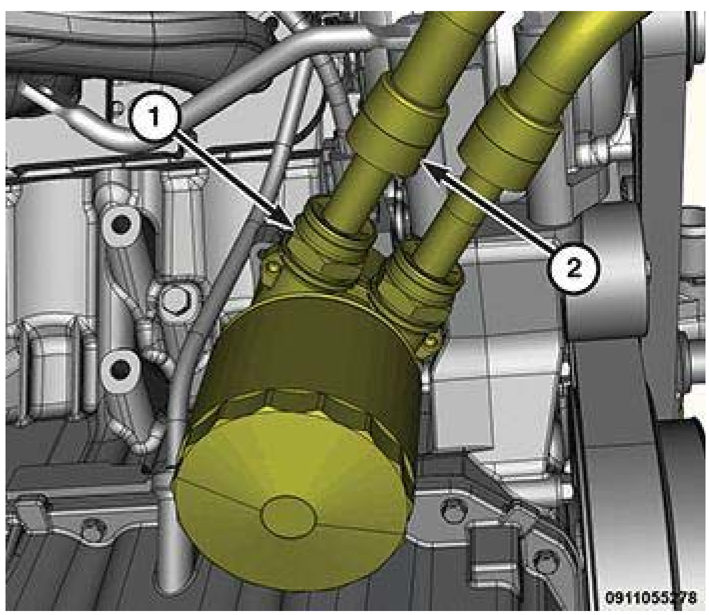
Fig. 9: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

22. Remove the oil pressure sensor electrical connector (1).



[Fig. 10: Oil Temperature Sensor Electrical Connector](#)
Courtesy of CHRYSLER GROUP, LLC

23. Remove the oil temperature wire harness connector (1).



[Fig. 11: Oil Filter Adapter Quick Connectors & Oil Cooler Hoses](#)
Courtesy of CHRYSLER GROUP, LLC

24. Disconnect the oil filter adapter quick connectors (1) and remove the oil cooler hoses (2) from the oil filter adapter.

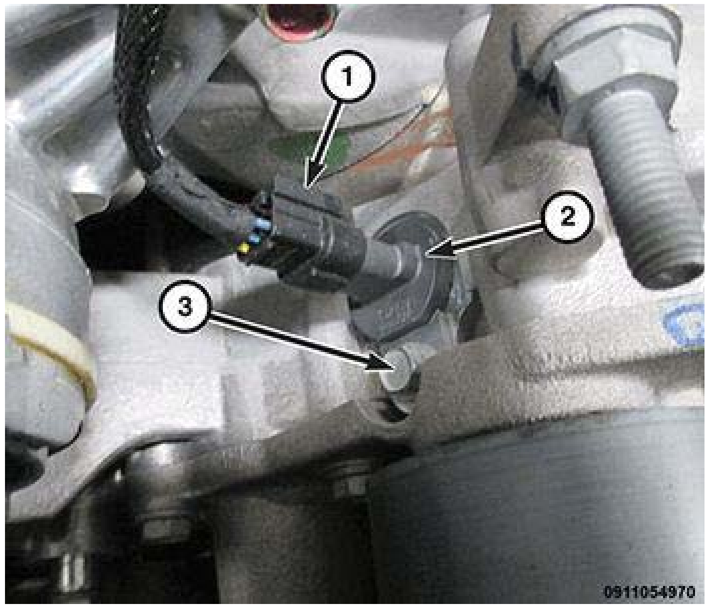


Fig. 12: Camshaft Position Sensor (CMP), Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

25. Disconnect the camshaft position sensor (2) wire harness connector (1).

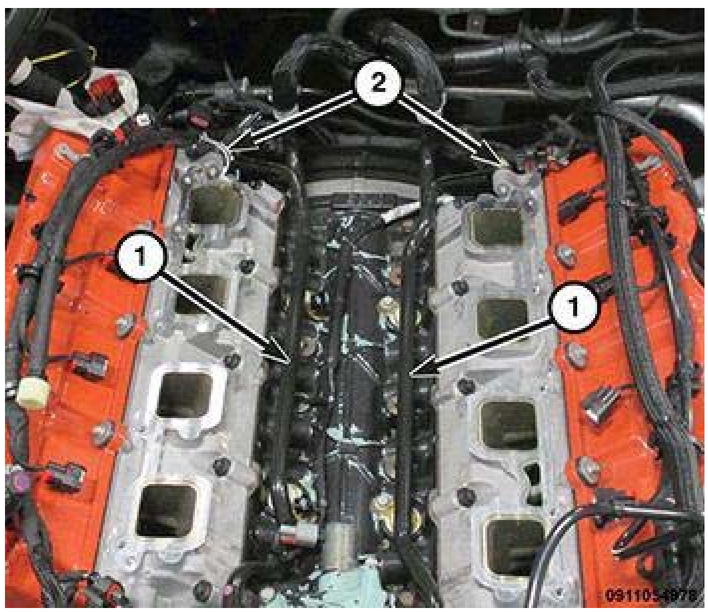


Fig. 13: Heater Tubes & Bolts
Courtesy of CHRYSLER GROUP, LLC

26. Remove the heater hoses from the coolant tubes (1).
27. Remove the Variable Valve Timing Solenoid (VVTS). Refer to **SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST, REMOVAL**.
28. Remove the pressurized coolant bottle. Refer to **BOTTLE, PRESSURIZED COOLANT, REMOVAL** .

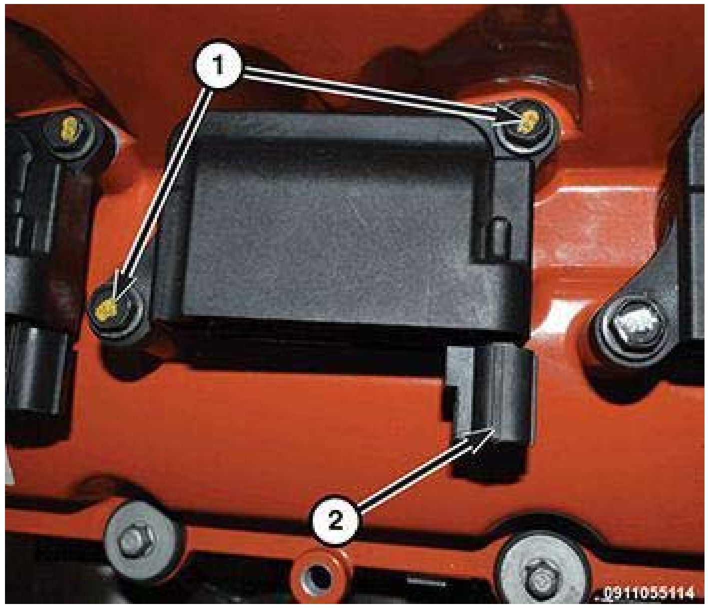


Fig. 14: Ignition Coil Wire Harness Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

29. Remove all ignition coil wire harness connectors (2) and position the harness aside.

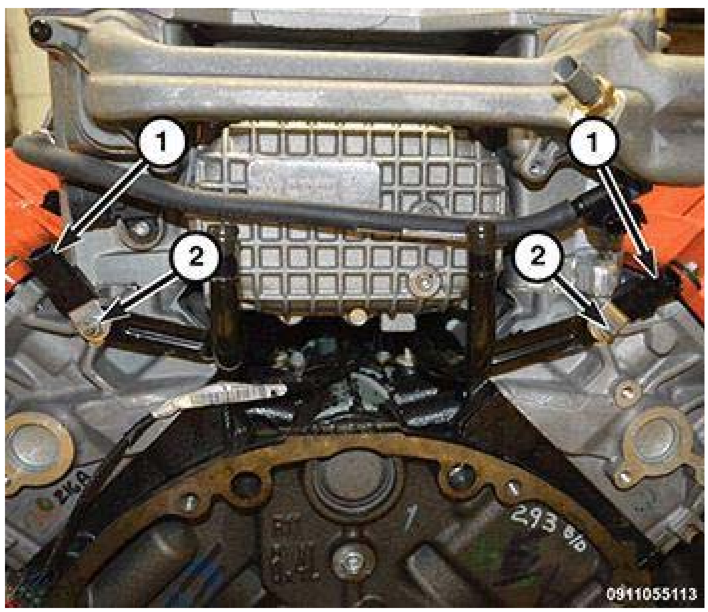


Fig. 15: Ignition Capacitors & Bolts
Courtesy of CHRYSLER GROUP, LLC

30. Remove the ignition capacitor (2) wire harness connectors (1).
31. Remove the ground wires from the rear of each cylinder head.
32. For manual transmission equipped vehicles, remove the transmission. Refer to **REMOVAL** . Then proceed to step 41.
33. For automatic transmission equipped vehicles, follow steps 34-40.
34. Remove the starter. Refer to **STARTER, REMOVAL** .

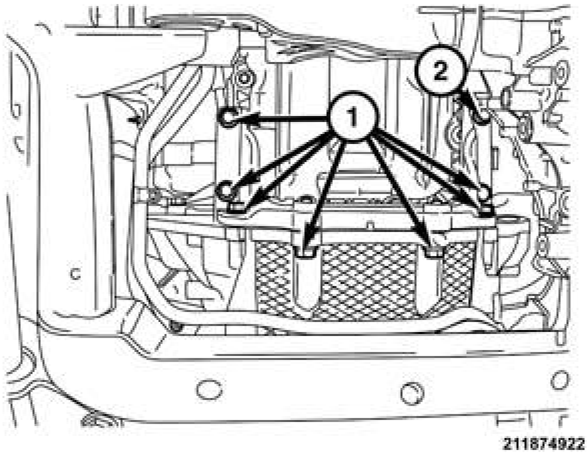


Fig. 16: Structural Cover Bolts
Courtesy of CHRYSLER GROUP, LLC

35. Remove the transmission to engine structural cover retaining bolts (1) and remove the cover.

NOTE: The left front bolt (2) must be removed with the structural cover.

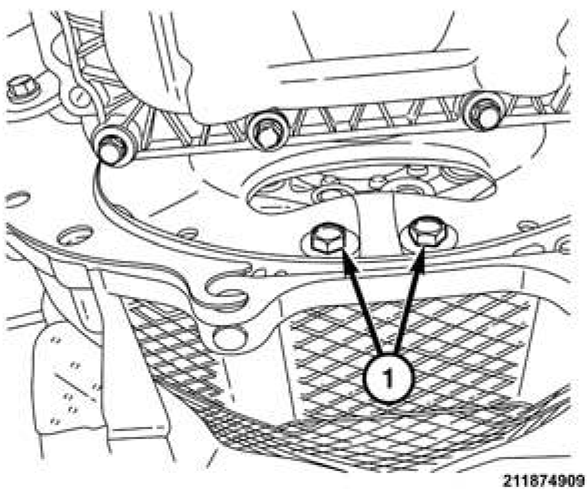


Fig. 17: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

36. Automatic transmission equipped vehicles, rotate the crankshaft in clockwise direction until the torque converter bolts (1) are accessible and remove the flexplate to torque converter bolts.

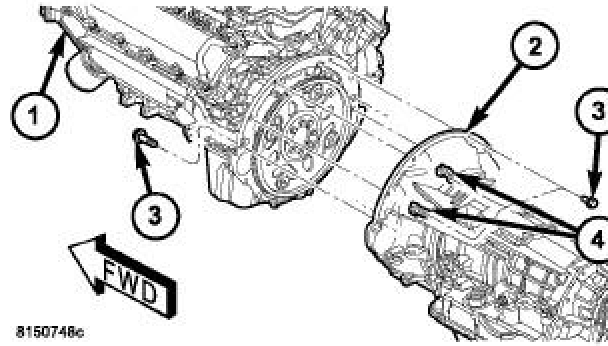


Fig. 18: Removing/Installing Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

37. Remove two engine to transmission bolts (3).
38. Remove remaining transmission to engine bolts (4).

CAUTION: **While carefully separating the engine from the transmission and removing the engine from the vehicle, constant checks must be made to ensure no damage to other components or wiring harnesses occur throughout the removal procedure.**

39. Lower the vehicle.

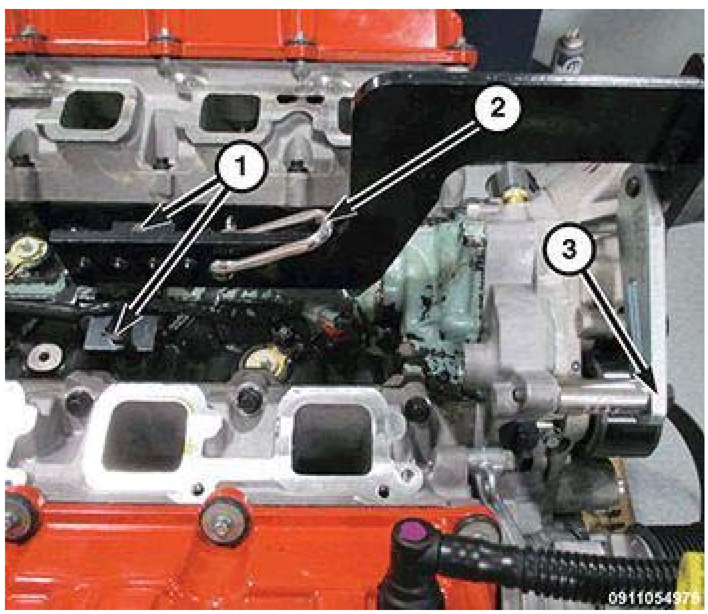


Fig. 19: Engine Lift Fixture
Courtesy of CHRYSLER GROUP, LLC

40. Using a suitable jack, support the transmission.

NOTE: **Do not use air tools to install engine lift fixture.**

41. Install the (special tool #8984B, Fixture, Engine Lifting) (1) and (special tool #8984-UPD, Adapter, Engine Lift) (3).

42. Using a suitable engine hoist, separate the engine from the transmission and remove the engine from the engine compartment.
43. Secure the engine onto a suitable engine stand.

INSTALLATION

INSTALLATION

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.

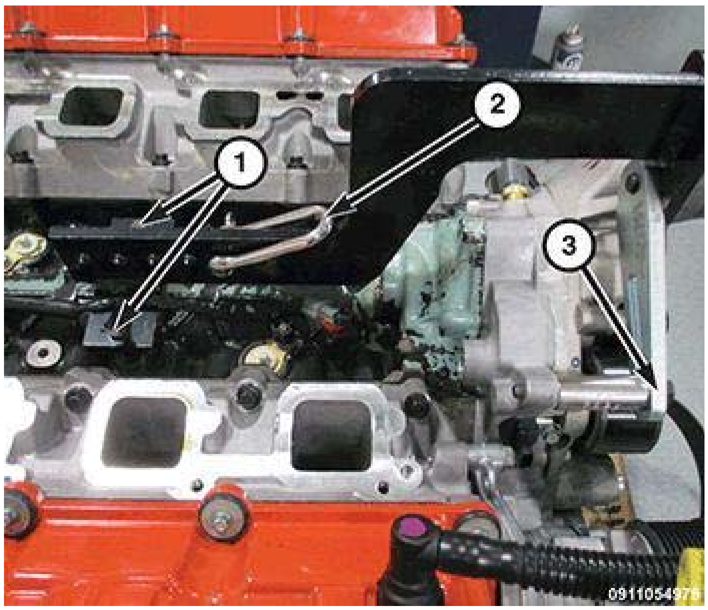


Fig. 20: Engine Lift Fixture
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not use air tools to install the (special tool #8984B, Fixture, Engine Lifting).

1. Install the engine lift fixture (1) (special tool #8984B, Fixture, Engine Lifting) and adapter (special tool #8984-UPD, Adapter, Engine Lift) (3).
2. Using a suitable engine hoist, lower the engine into the engine compartment.
3. Automatic transmission equipped vehicles, align the engine with the transmission.
4. Install two transmission bell housing to engine block bolts finger tight.
5. Lower the engine assembly until the engine mounts rest in the engine cradle crossmember.

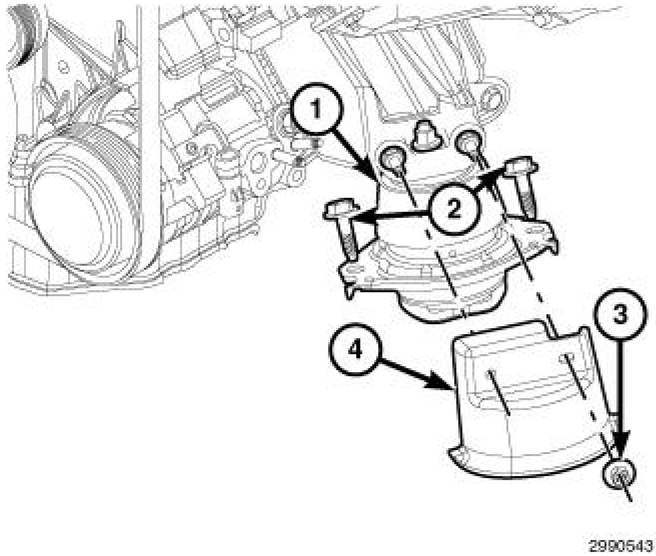


Fig. 21: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

6. Align the engine mounts, install both left/right engine mount to frame retaining bolts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
7. Position both left and right engine mount heat shields (4), install the retaining nuts (3) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
8. Remove the engine hoist and the jack supporting the transmission.
9. For manual transmission equipped vehicles, install the transmission. Refer to **INSTALLATION** . Then proceed to step 19.
10. For automatic transmission equipped vehicles, follow steps 11-18.
11. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
12. Carefully engage transmission to engine block dowels until converter hub is seated in crankshaft. Verify that no wires, or the transmission vent hose, have become trapped between the engine block and the transmission.
13. Install two bolts to attach the transmission to the engine.

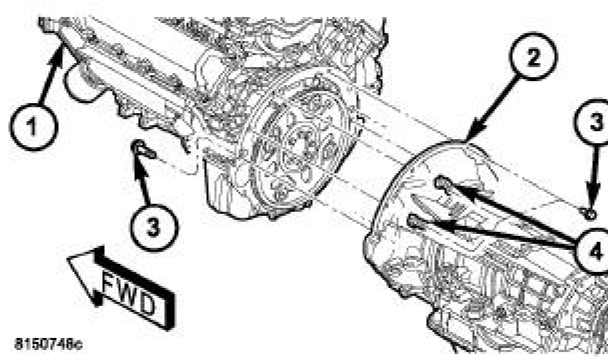


Fig. 22: Removing/Installing Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Install the remaining torque converter housing to engine bolts (3 and 4). Tighten all torque converter housing bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

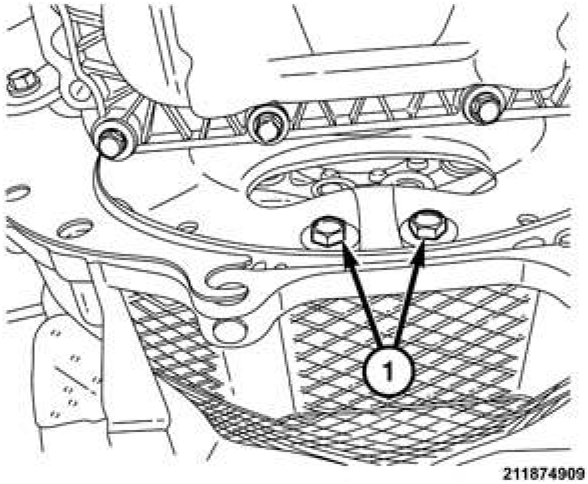


Fig. 23: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Install all torque converter bolts (1) by hand first. There are 3 sets of two bolts 120Â° apart.
16. Tighten all torque converter bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

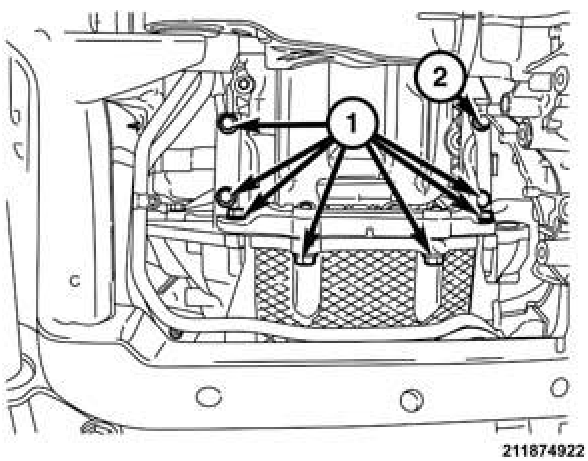


Fig. 24: Structural Cover Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Install the engine structural cover and tighten the bolts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

NOTE: The left front structural cover bolt (2) must be installed with the cover.

18. Install the starter. Refer to **STARTER, INSTALLATION** .

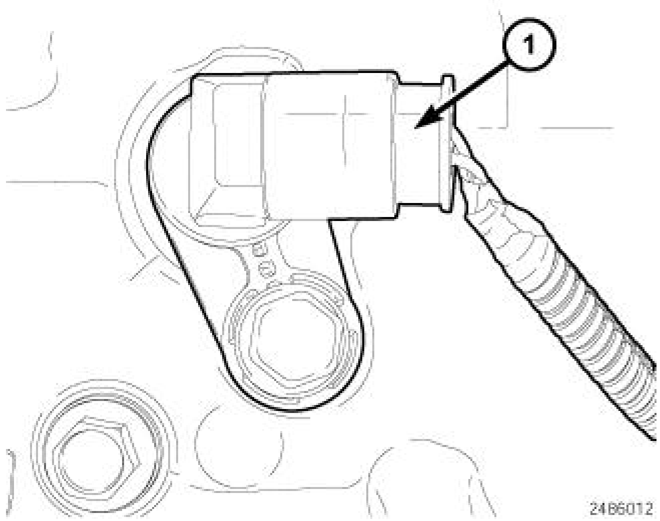


Fig. 25: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

19. Connect the CKP sensor electrical connector (1).
20. Install the catalytic converters. Refer to **CONVERTER, CATALYTIC, INSTALLATION** .

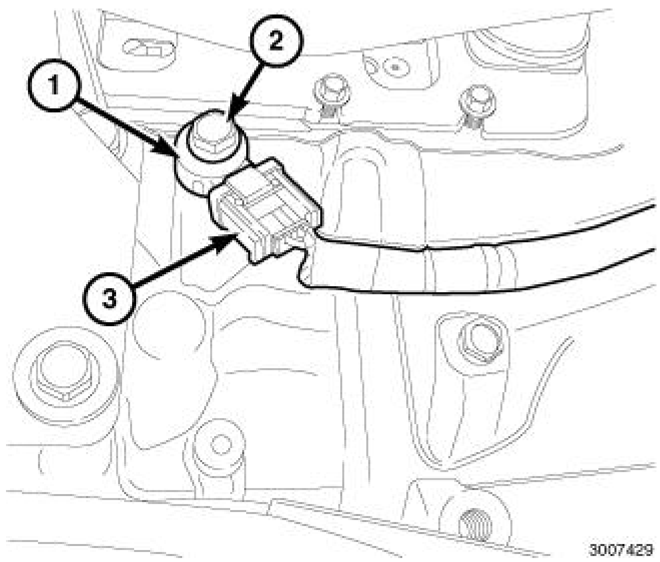


Fig. 26: Knock Sensor, Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

21. Connect the right and left knock sensor (1) electrical connectors (5).
22. Install the heat shields onto both knock sensors (shield snaps on/off sensor).
23. Connect the transmission oil cooler lines to their retainers at the oil pan.
24. Install the lower radiator hose.
25. Lower the vehicle.

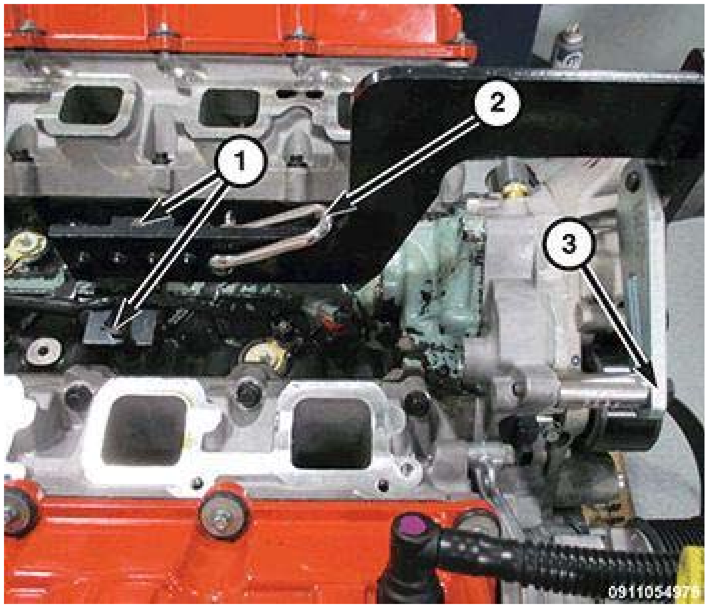


Fig. 27: Engine Lift Fixture
Courtesy of CHRYSLER GROUP, LLC

26. Remove the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) (1) and adapter (special tool #8984-UPD, Adapter, Engine Lift) (3).
27. Position the left and right side wiring harness.
28. Install the Variable Valve Timing Solenoid (VVTS). Refer to **SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST, INSTALLATION**.

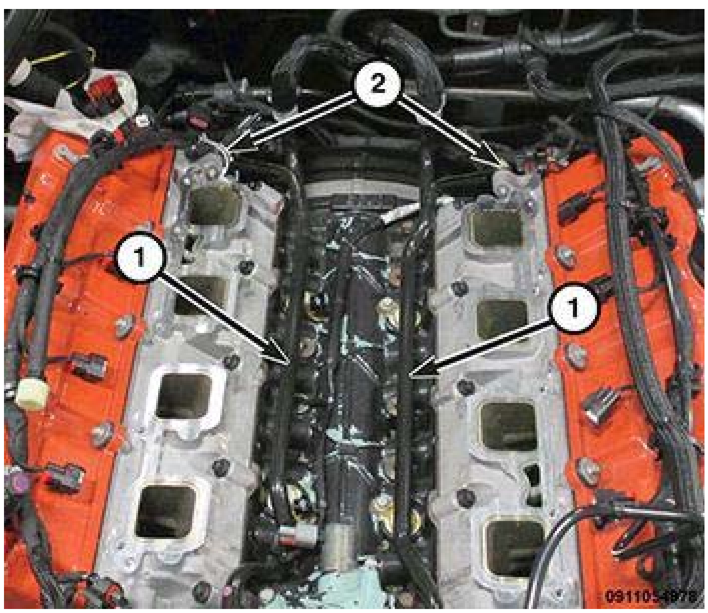
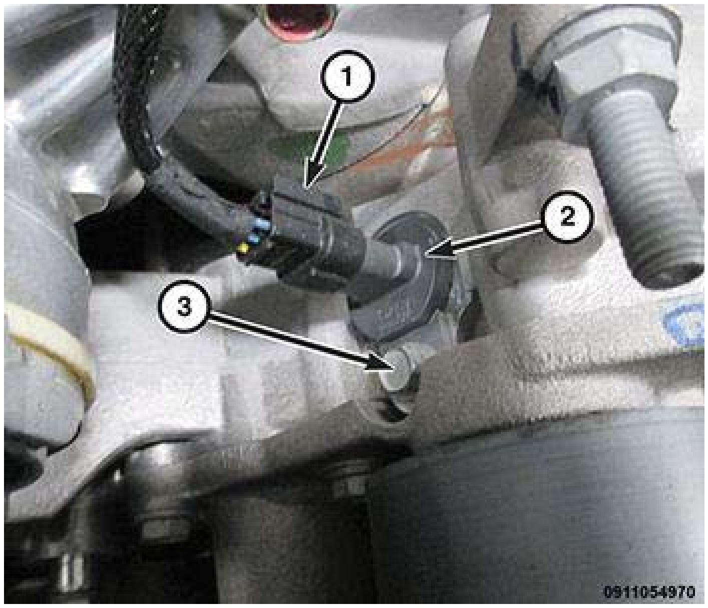


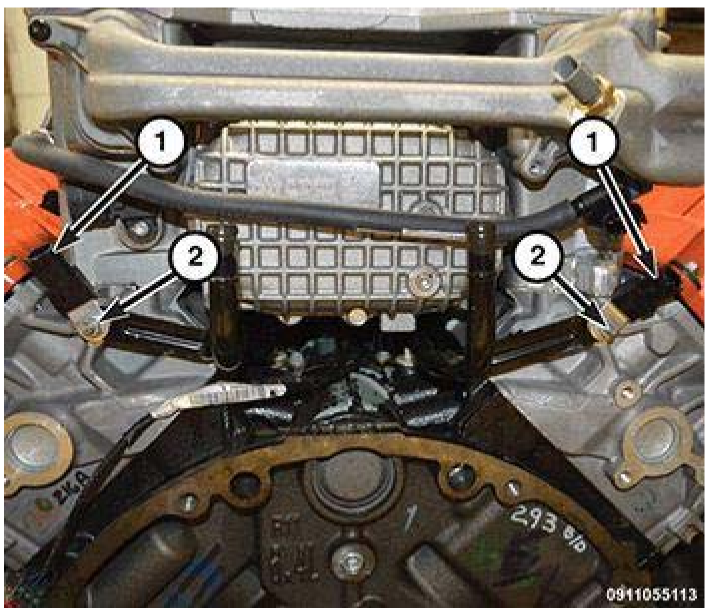
Fig. 28: Heater Tubes & Bolts
Courtesy of CHRYSLER GROUP, LLC

29. Install the heater core tubes (1) and hoses.
30. Install the heater core tube retaining bolts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 29: Camshaft Position Sensor (CMP), Connector & Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

31. Connect the camshaft position sensor electrical connector (1).
32. Connect the ground wires to the rear of each cylinder head.



[Fig. 30: Ignition Capacitors & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

33. Connect the ignition capacitor (2) electrical connectors (1).

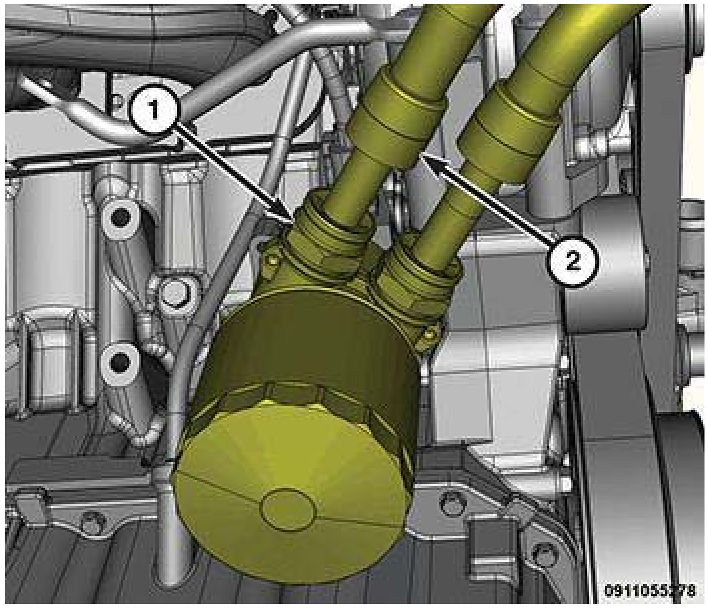


Fig. 31: Oil Filter Adapter Quick Connectors & Oil Cooler Hoses
Courtesy of CHRYSLER GROUP, LLC

34. Connect the oil cooler lines (2) to the oil filter adapter (1).

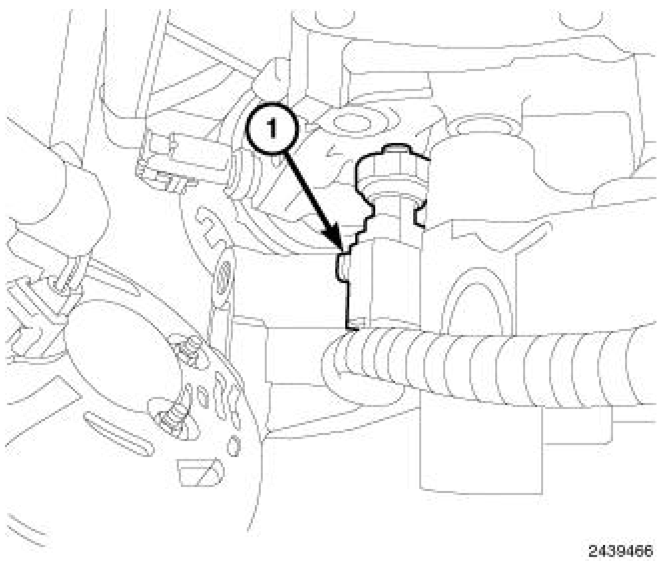


Fig. 32: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

35. Connect the oil pressure sensor wire harness connector (1).

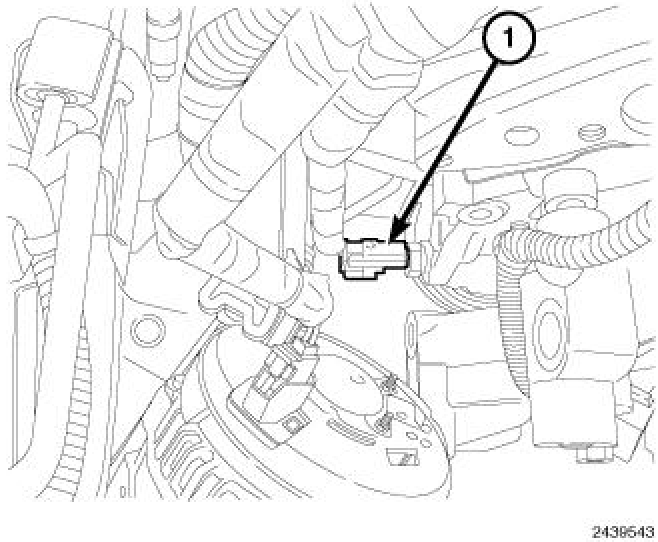


Fig. 33: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

36. Connect the oil temperature sensor wire harness connector (1).
37. Install the power steering pump. Refer to **PUMP, INSTALLATION** .
38. Install the generator. Refer to **GENERATOR, INSTALLATION** .
39. Raise and support the vehicle.

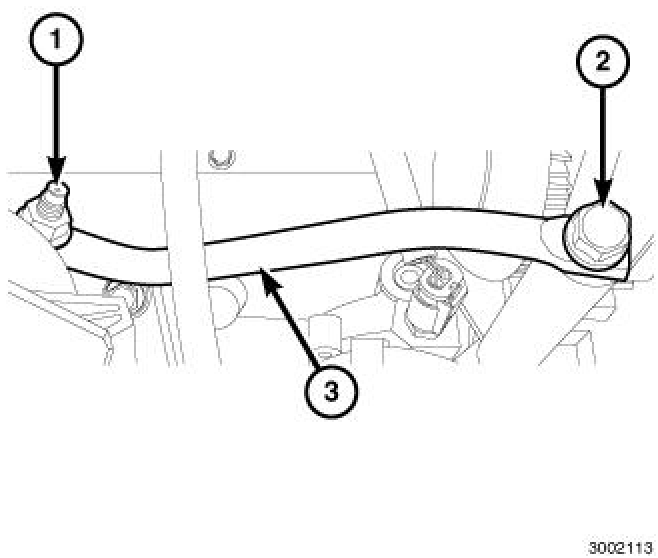


Fig. 34: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

40. Position the generator support bracket (3) to the engine mount, install the retaining nut (1) finger tight.
41. Position the generator support bracket (3) to the generator, install the retaining bolt (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
42. Tighten the generator support bracket (3) to engine mount retaining nut to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
43. Install the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .

44. Install the A/C liquid line. Refer to **LINE, A/C LIQUID, INSTALLATION** .
45. Install the A/C suction line. Refer to **LINE, A/C SUCTION, INSTALLATION** .

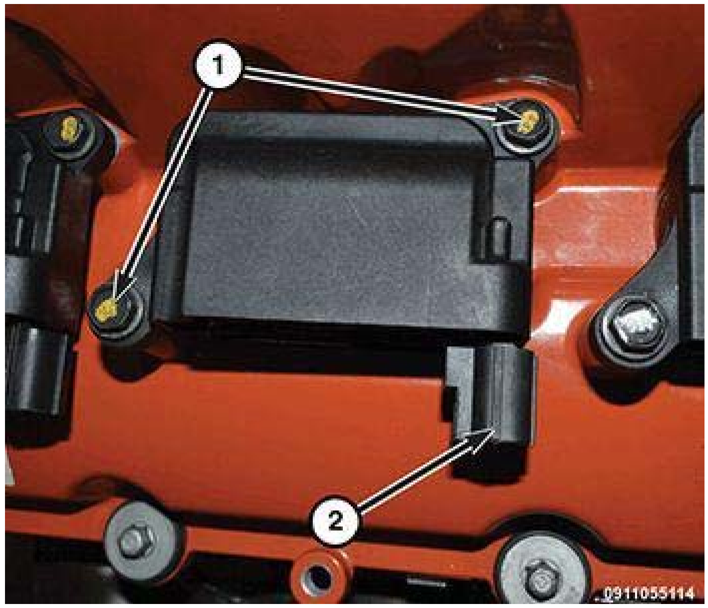


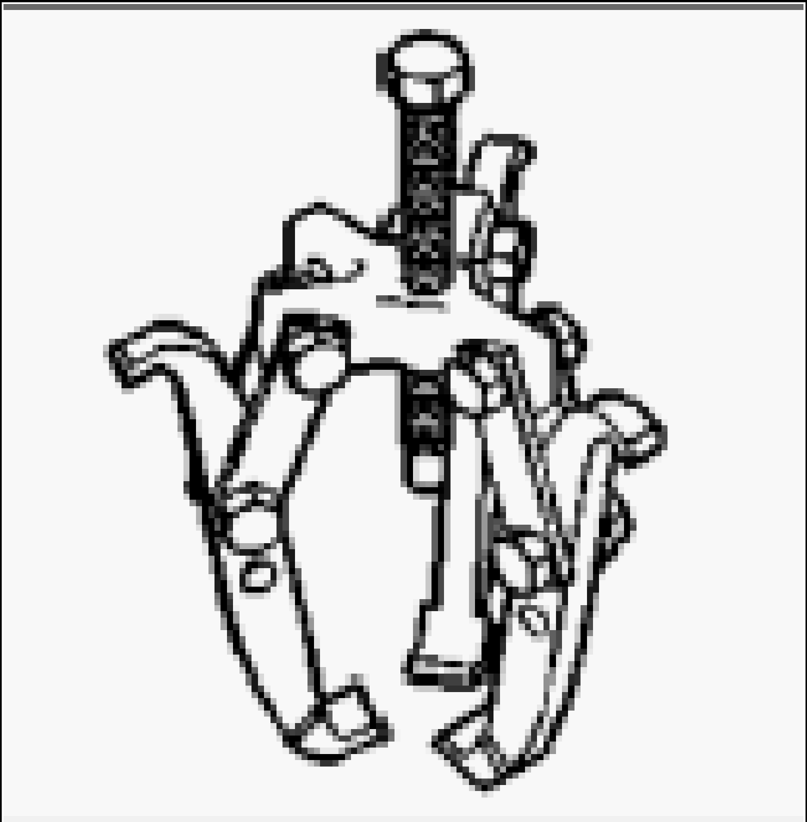
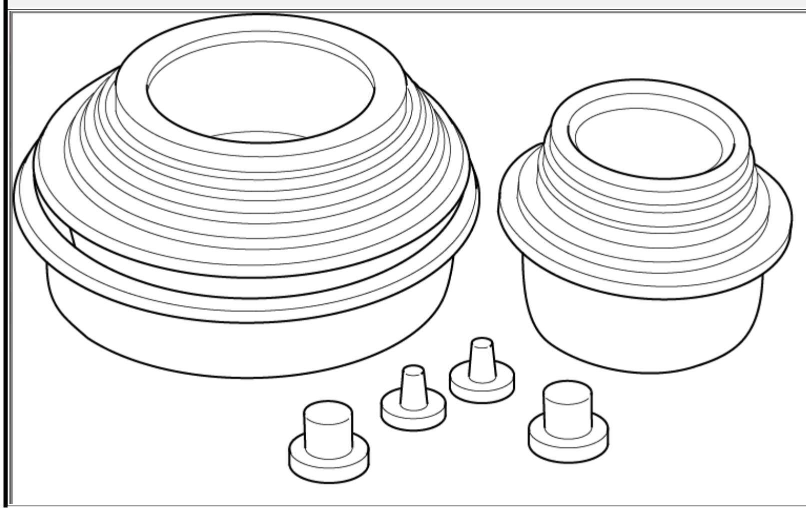
Fig. 35: Ignition Coil Wire Harness Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

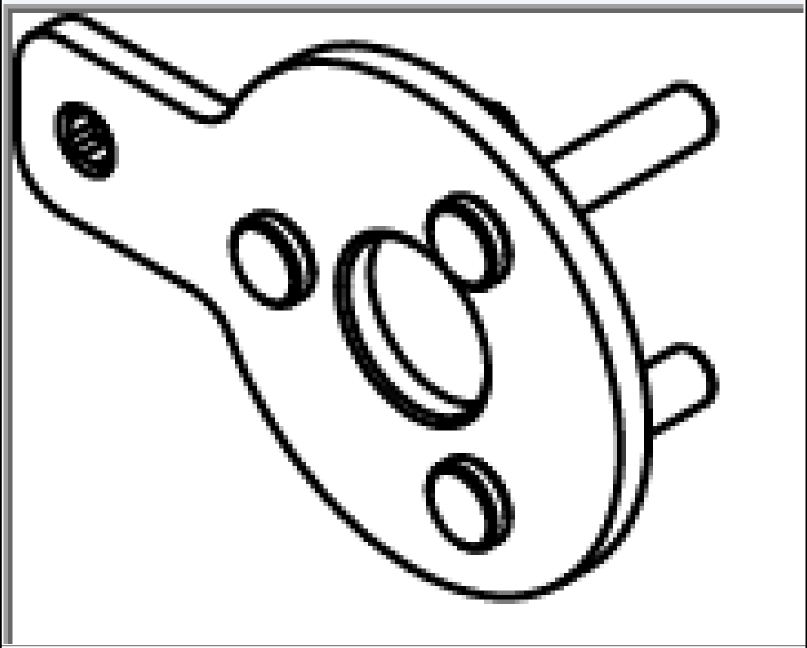
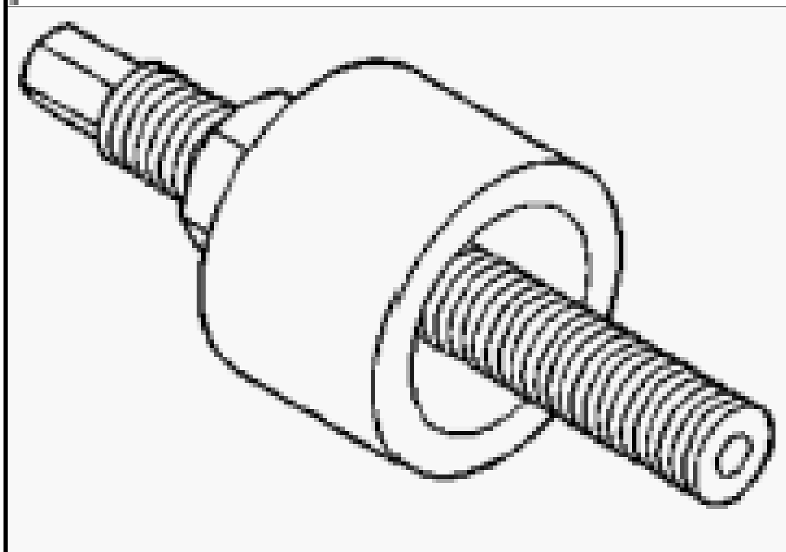
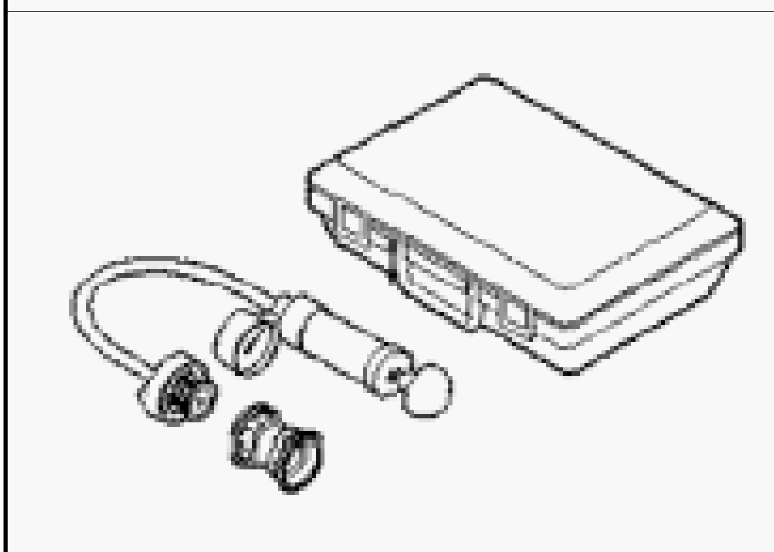
46. Position the ignition coil electrical harness and connect all ignition wire harness connectors (1).
47. Install the pressurized coolant bottle. Refer to **BOTTLE, PRESSURIZED COOLANT, INSTALLATION** .
48. Position the wire harness and secure to the right hand inner fender panel.
49. Install the cooling fan. Refer to **FAN, COOLING, INSTALLATION** .
50. Install the supercharger assembly. Refer to **SUPERCHARGER, INSTALLATION**.
51. Fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
52. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .
53. Connect the negative battery cable.
54. Perform the Refrigerant System Charge procedure. Refer to **PLUMBING, STANDARD PROCEDURE** .
55. Start the engine and inspect for leaks.

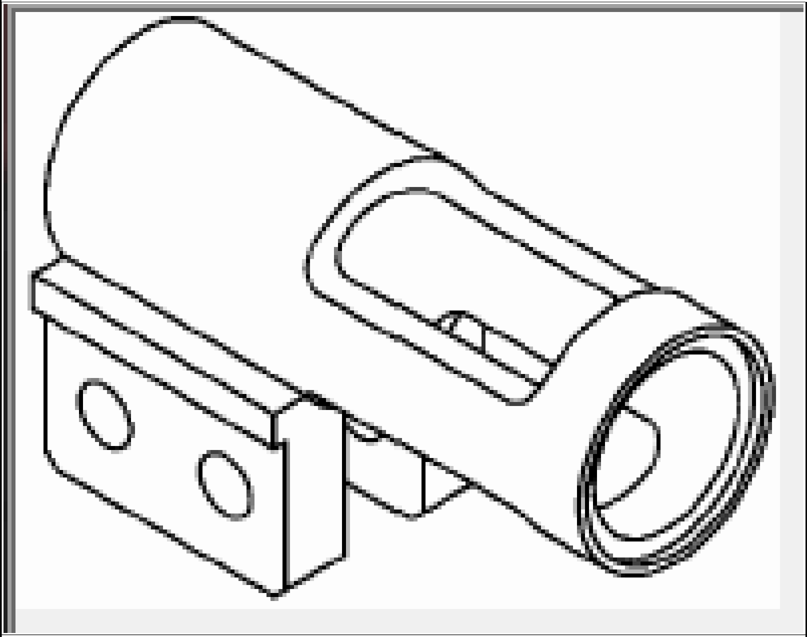
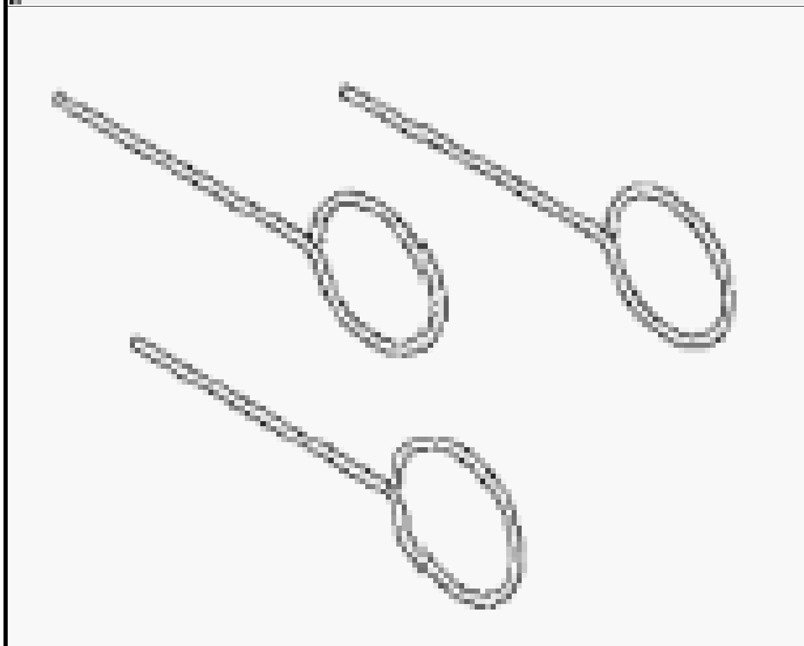
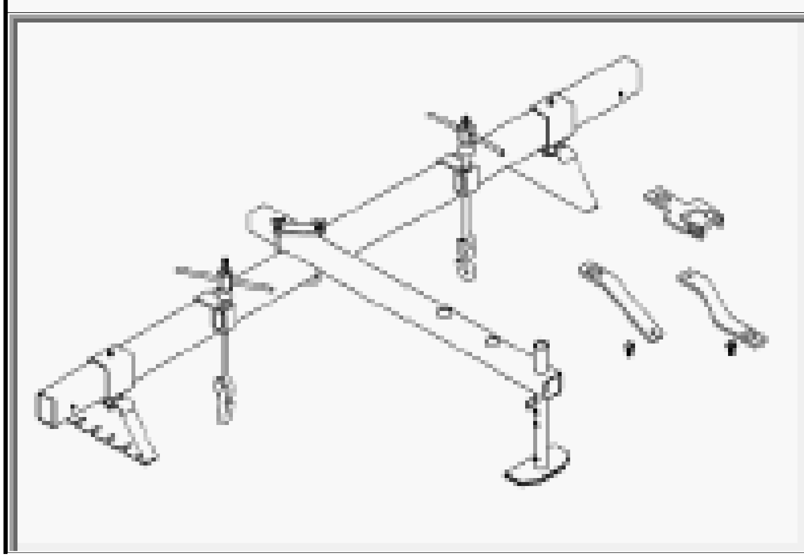
NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

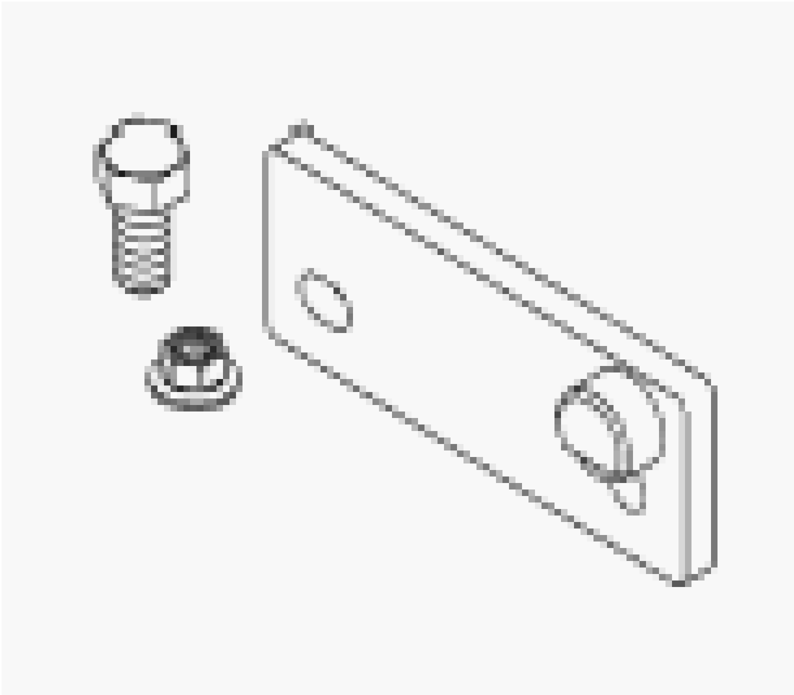
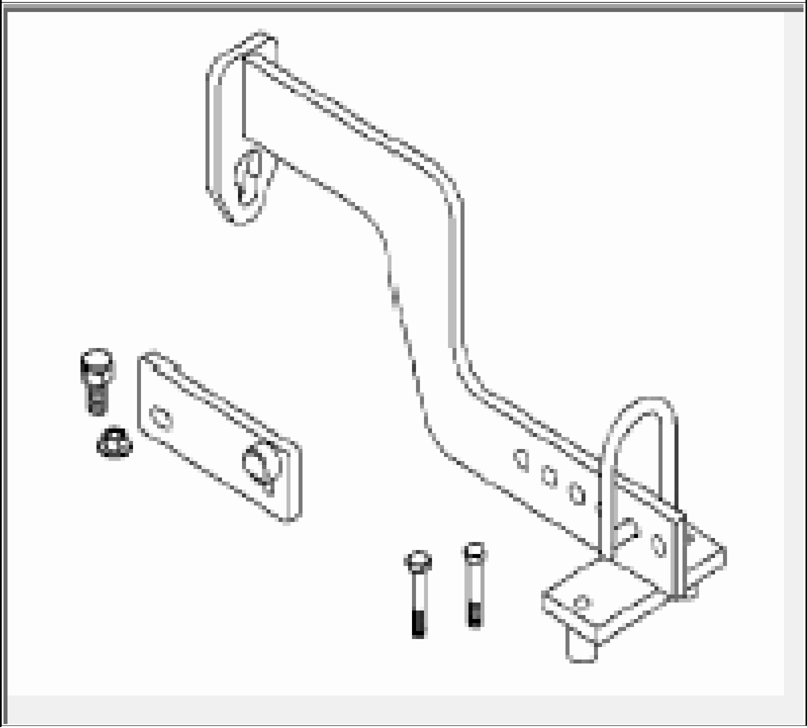
SPECIAL TOOLS

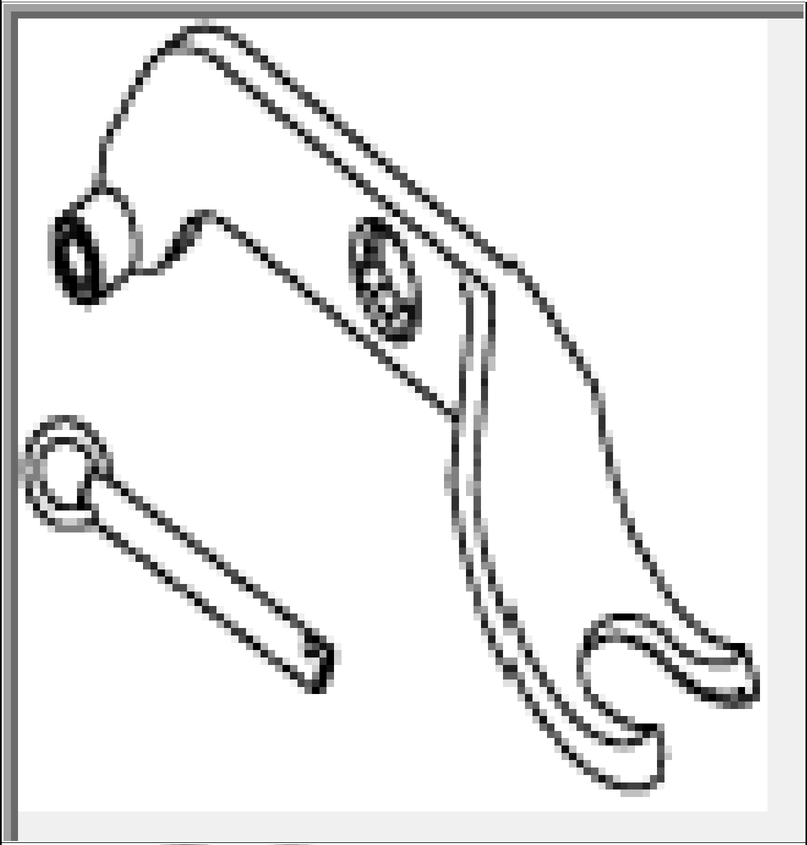
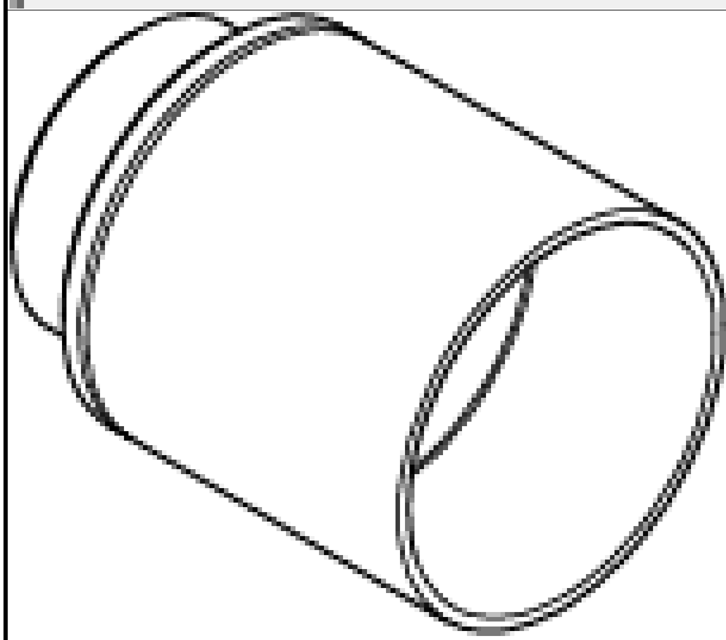
SPECIAL TOOLS

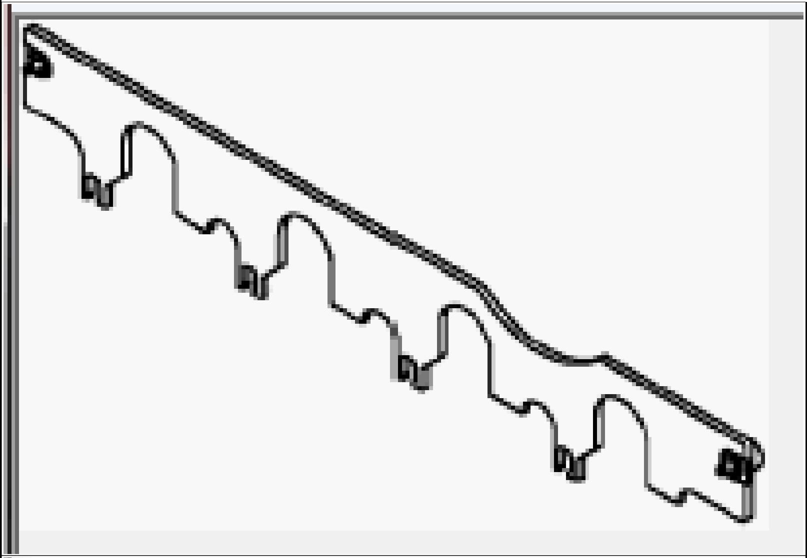
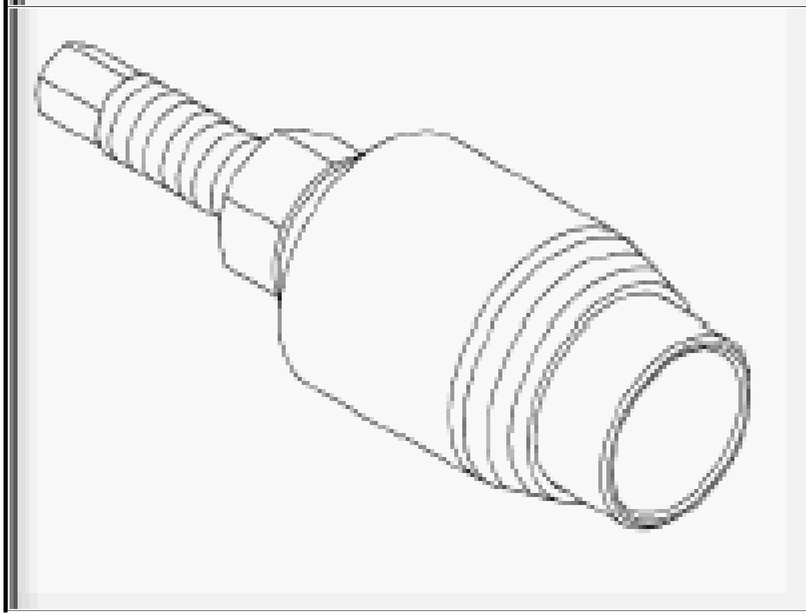
	1023 - Puller (Originally Shipped In Kit Number(s) 8678.)
	10368 - Set, Universal Protective Cap

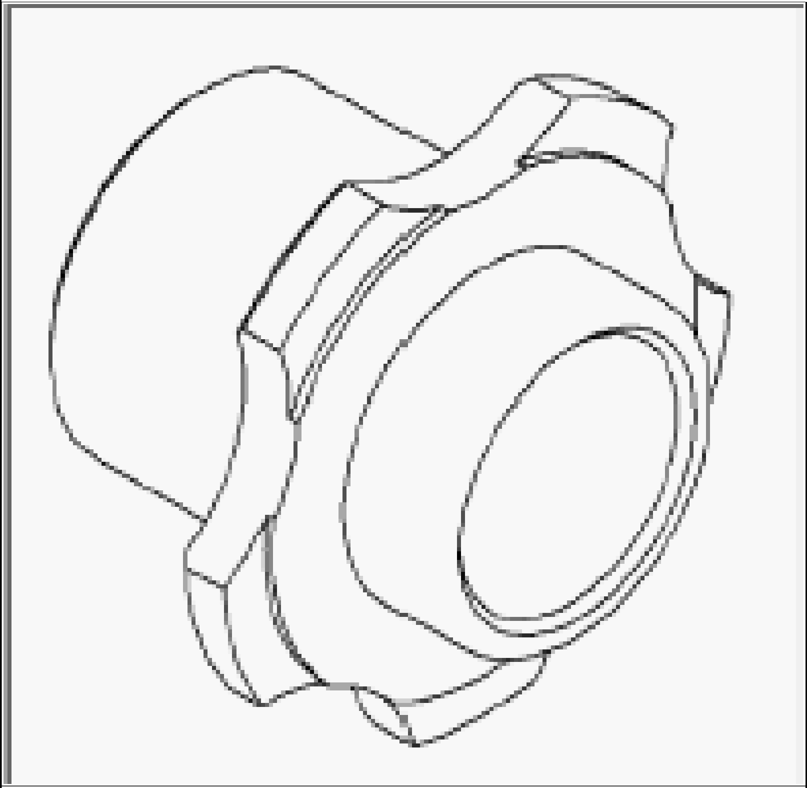
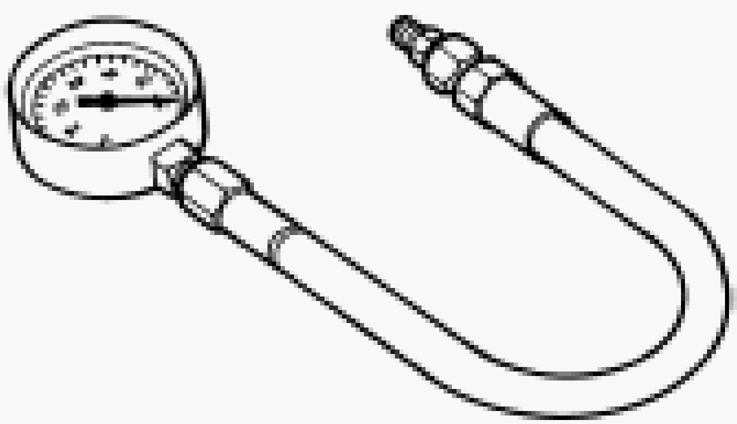
	10386 - Holder, Vibration Damper
	6871 - Installer, A/C Hub (Originally Shipped In Kit Number(s) 6896.)
	7700 - Tester, Cooling System (Originally Shipped In Kit Number(s) 7700-A.)

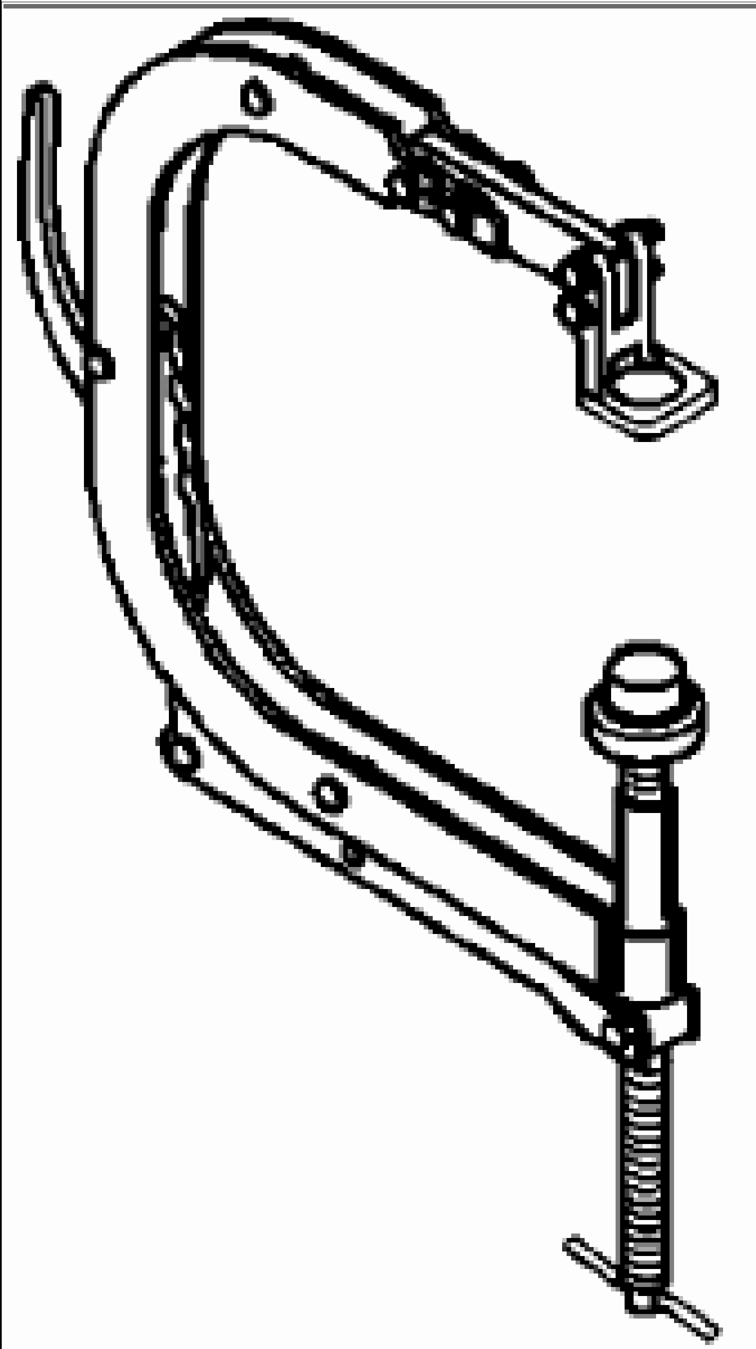
	8464 - Adapter, Valve Spring (Originally Shipped In Kit Number(s) 8664, 8665, 8665CC, 8702, 9577.)
	8514 - Pins, Tensioner (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.)
	8534B - Fixture, Driveline Support (Originally Shipped In Kit Number(s) 8534, 8534B, 8849, 9565.)

	8984-UPD - Adapter, Engine Lift (Originally Shipped In Kit Number(s) 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519.)
	8984B - Fixture, Engine Lifting (Originally Shipped In Kit Number(s) 8849CC, 9329, 9515, 9516, 9518, 9519, 9540, 9541, 9577.)

	9065-3 - Adapter, Valve Spring Compressor (Originally Shipped In Kit Number(s) 9516-CAN, 9517-CAN.)
	9065C - Compressor, Valve Spring (Originally Shipped In Kit Number(s).)

	9070 - Retainer, Push Rod (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.)
	9071 - Remover, Seal (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.)

	9072 - Installer, Seal (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577, 9975, 9976.)
	C-119 - Cylinder Indicator
	C-3292A - Gauge, Pressure

	C-3422-D - Compressor, Valve Spring

	C-3685-A - Bloc-Chek Kit

AIR INTAKE SYSTEM

AIR CLEANER

REMOVAL

REMOVAL

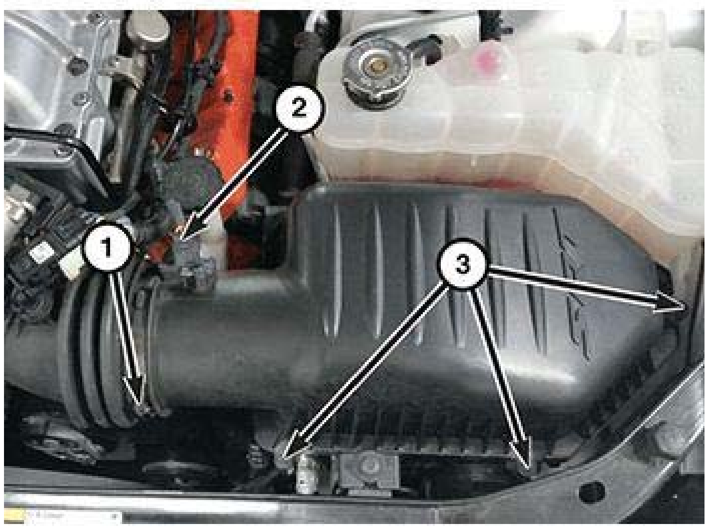


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Fig. 36: Clamp, MAF Sensor Wire Harness Connector & Air Cleaner Housing Cover Retaining Screws
Courtesy of CHRYSLER GROUP, LLC

1. Remove the air cleaner housing cover retaining screws (3).
2. Disconnect the Mass Air Flow (MAF) sensor wire harness connector (2).
3. Loosen the clamp (1) to remove air cleaner housing cover if necessary.

4. Lift the air cleaner housing cover while separating the locating tabs from the housing.
5. Remove the air cleaner element from the housing.
6. Clean the inside of air cleaner housing before replacing element.

INSTALLATION

INSTALLATION

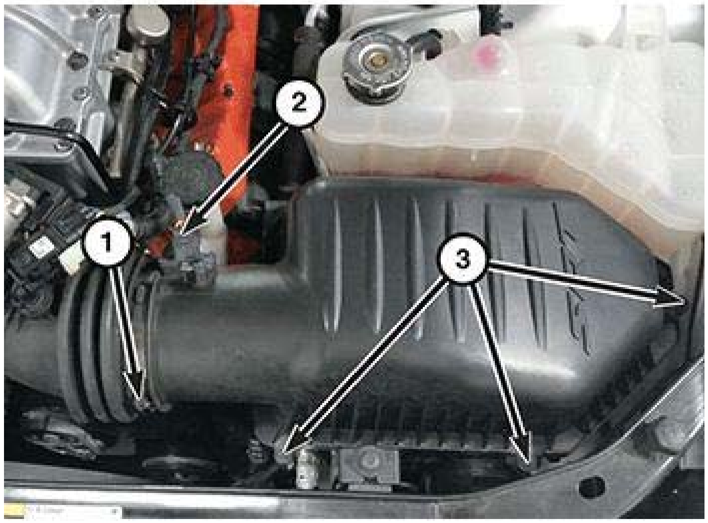


Fig. 37: Clamp, MAF Sensor Wire Harness Connector & Air Cleaner Housing Cover Retaining Screws
Courtesy of CHRYSLER GROUP, LLC

1. Install the air cleaner element into the housing.
2. Align the air cleaner housing cover locating tabs into the housing while lowering the cover into position.
3. If removed, insert air cleaner housing cover into the air inlet tube and tighten the clamp (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Install the air cleaner housing cover retaining screws (3) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
5. Connect the Mass Air Flow (MAF) sensor wire harness connector (2).

BODY, AIR CLEANER

REMOVAL

REMOVAL

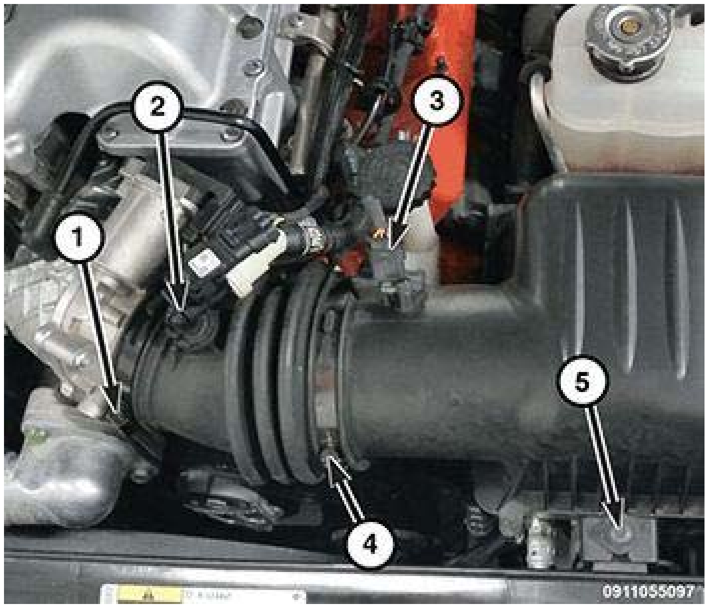


Fig. 38: Air Inlet Tube Retaining Clamps, Makeup Air Sensor, MAF Sensor & Air Cleaner Housing Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Loosen the air inlet tube retaining clamp (1) at the throttle body.
3. Disconnect the makeup air sensor wire harness connector.
4. Disconnect the makeup air hose and remove the makeup air sensor (2) from the air inlet duct.
5. Disconnect the Mass Air Flow (MAF) sensor (3).
6. Remove the air cleaner housing retaining bolt (5).
7. While lifting up the air cleaner housing, slide the air duct off the throttle body and remove the air cleaner housing from the vehicle.

NOTE: **There is a secondary air inlet duct to the front of the air cleaner housing, behind the headlamp, this must be disengaged for removal.**

8. If necessary, remove the air inlet tube clamp (4) from the air cleaner housing to remove the air inlet tube.

INSTALLATION

INSTALLATION

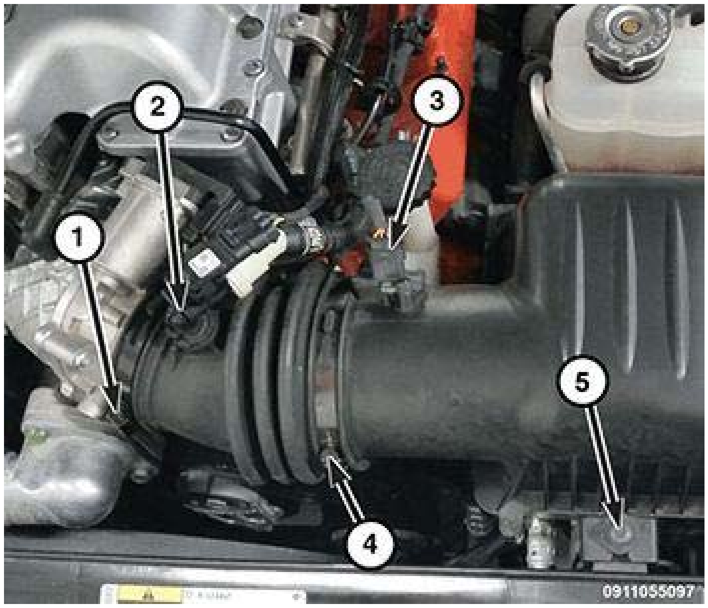


Fig. 39: Air Inlet Tube Retaining Clamps, Makeup Air Sensor, MAF Sensor & Air Cleaner Housing Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

1. If removed, insert the air inlet tube onto the air cleaner housing and tighten the clamp (4) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
2. While sliding the air duct onto the throttle body, lower the air cleaner housing into position, then align the air inlet and the locating pin on the bottom of the housing.
3. Align the secondary air inlet tube behind the headlamp, there are indexing tabs for orientation.
4. Install the air cleaner housing retaining bolt (5) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
5. Install the makeup air sensor (2) into the air inlet tube and connect the makeup air hose.
6. Connect the makeup air sensor wire harness connector.
7. Connect the Mass Air Flow (MAF) sensor wire harness connector (3).
8. Position the air inlet tube retaining clamp (1) at the throttle body and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

CYLINDER HEAD

OPERATION

OPERATION

The cylinder head closes the combustion chamber allowing the pistons to compress the air fuel mixture to the correct ratio for ignition. The valves located in the cylinder head open and close to either allow clean air into the combustion chamber or to allow the exhaust gases out, depending on the stroke of the engine.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - CYLINDER HEAD GASKET FAILURE

A cylinder head gasket leak can be located between adjacent cylinders or between a cylinder and the adjacent

water jacket.

Possible indications of the cylinder head gasket leaking between adjacent cylinders are:

- Loss of engine power
- Engine misfiring
- Poor fuel economy

Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:

- Engine overheating
- Loss of coolant
- Excessive steam (white smoke) emitting from exhaust
- Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, perform a Cylinder Compression Pressure Test. An engine cylinder head gasket leaking between adjacent cylinders will result in approximately a 50-70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: Use extreme caution when the engine is operating with coolant pressure cap removed. Failure to follow this warning may result in serious or fatal injury.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

WARNING: With cooling system tester in place, pressure will build up fast. Excessive pressure built up, by continuous engine operation, must be released to a safe pressure level. Never permit pressure to exceed 138 kPa (20 psi). Failure to follow this warning may result in serious or fatal injury.

Install Cooling System Tester (special tool #7700, Tester, Cooling System) or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Combustion leaks into the cooling system can also be checked by using Bloc-Chek Kit (special tool #C-3685-A, Bloc-Chek Kit) or equivalent. Perform test following the procedures supplied with the tool kit.

REMOVAL

REMOVAL

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Disconnect and isolate the negative battery cable.
3. Remove the supercharger assembly. Refer to **SUPERCHARGER, REMOVAL**.
4. Remove the catalytic converters. Refer to **CONVERTER, CATALYTIC, REMOVAL** .
5. Remove the power steering pump. Refer to **PUMP, REMOVAL** .

NOTE: It is not necessary to remove the power steering hoses.

6. Remove the rocker arms and push rods. Refer to **ROCKER ARM, VALVE, REMOVAL**.

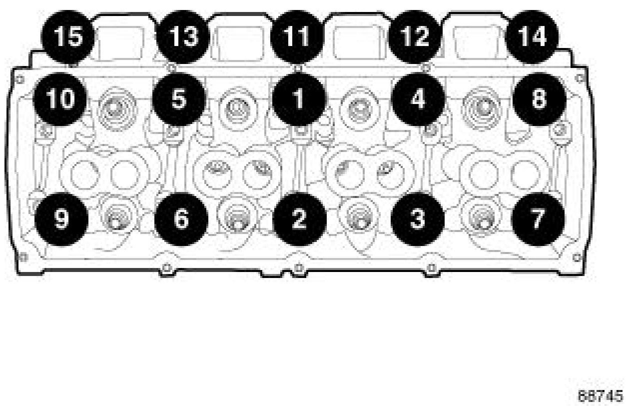


Fig. 40: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to remove the exhaust manifolds to remove the cylinder heads.

7. Using the sequence shown in illustration, remove the cylinder head bolts and remove the cylinder head(s).

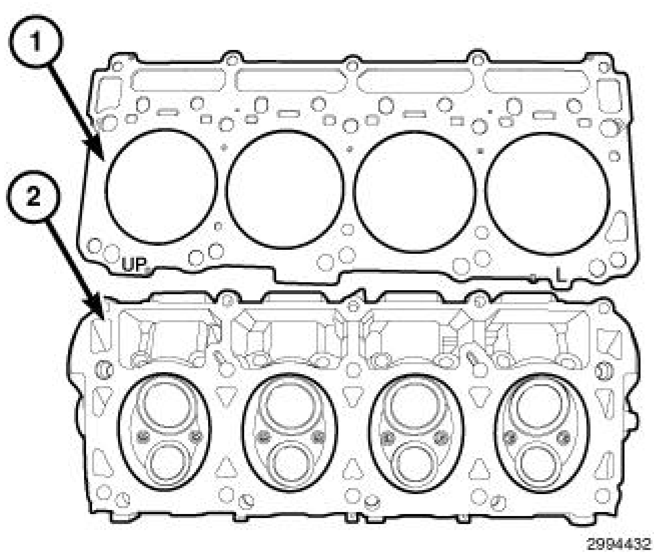


Fig. 41: Cylinder Head Gasket & Cylinder Head

Courtesy of CHRYSLER GROUP, LLC

8. Discard the cylinder head gasket (1).
9. Inspect and clean the cylinder head (2) mating surface.

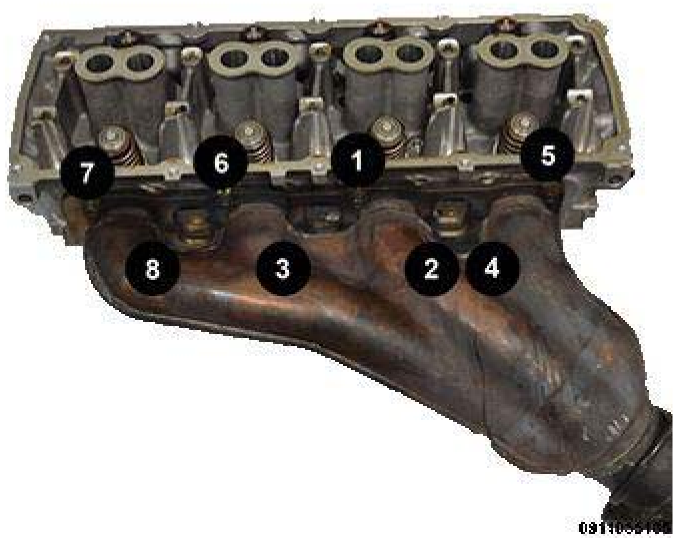


Fig. 42: Exhaust Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

10. If necessary, remove the exhaust manifold bolts using the sequence shown in illustration, starting at eight and going backwards.

CLEANING

CLEANING

Clean all surfaces of the cylinder block and cylinder heads.

Clean the cylinder block front and rear gasket surfaces using a suitable solvent.

INSPECTION

INSPECTION

1. Inspect the cylinder head for out-of-flatness using a straightedge and a feeler gauge. If tolerances exceed 0.0508 mm (0.002 in.) replace the cylinder head.
2. Inspect the valve seats for damage. Service the valve seats as necessary.
3. Inspect the valve guides for wear, cracks or looseness. If either condition exist, replace the cylinder head.
4. Inspect the push rods. Replace worn or bent push rods.
5. Inspect the rocker arm, push rod cups and pallets where they contact the valve tips. Any worn parts should be replaced with a new rocker shaft assembly.
6. Inspect the cylinder head bolts.

INSTALLATION

INSTALLATION

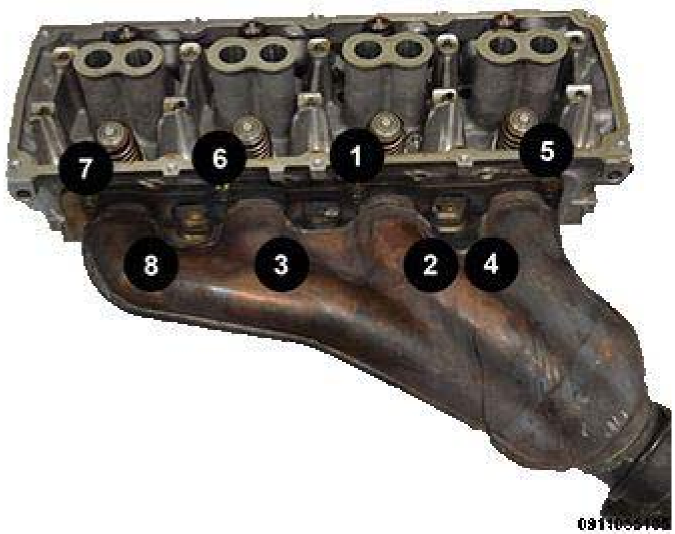


Fig. 43: Exhaust Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

1. If removed, using a new exhaust manifold gasket, position the exhaust manifold and install the retaining bolts finger tight.
2. Using the sequence shown in illustration, tighten the exhaust manifold retaining bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

NOTE: **The cylinder head gaskets are not interchangeable between left and right sides. They are marked "T" for top, "B" for bottom, "L" for left side and "R" for right side.**

3. Clean all sealing surfaces of the engine block and the cylinder head(s) (2).

NOTE: **Rotate crankshaft 45Ā° so that all pistons are 1/2 the way down the cylinder bore to avoid piston to valve contact.**

4. Position the new cylinder head gasket(s) (1) onto the engine block.
5. Position the cylinder head(s) (2) onto the engine block.
6. Install the cylinder head bolts finger tight.

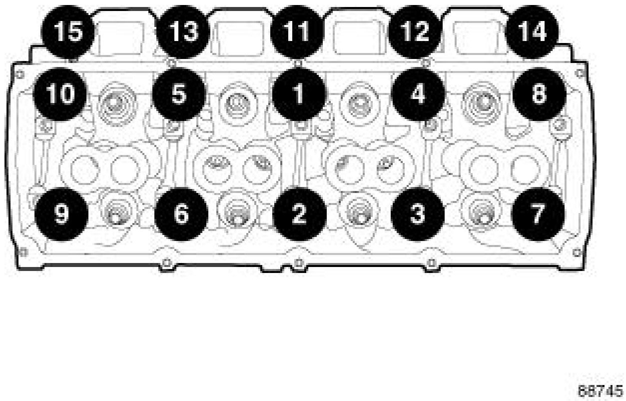


Fig. 44: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Using the sequence below, tighten the retaining bolts.
    a. Using the sequence shown in illustration, tighten bolts 1-10 to 34 N.m (25 ft. lbs.).
    b. Using the sequence shown in illustration, tighten bolts 11-15 to 20 N.m (15 ft. lbs.).
    c. Using the sequence shown in illustration, tighten bolts 1-10 to 54 N.m (40 ft. lbs.).
    d. Using the sequence shown in illustration, verify bolts 11-15 are 20 N.m (15 ft. lbs.).
    e. Using the sequence shown in illustration, tighten bolts 1-10 to 61 N.m (45 ft. lbs.).
    f. Using the sequence shown in illustration, rotate bolts 1-10 an additional 90 degrees.
    g. Using the sequence shown in illustration, tighten bolts 11-15 to 28 N.m (21 ft. lbs.).
8. Install the push rods and rocker arms. Refer to **ROCKER ARM, VALVE, INSTALLATION**.
9. Install the power steering pump. Refer to **PUMP, INSTALLATION** .
10. Install the catalytic converters. Refer to **CONVERTER, CATALYTIC, INSTALLATION** .
11. Lower the vehicle.
12. Install the supercharger assembly. Refer to **SUPERCHARGER, INSTALLATION**.
13. Fill cooling system. Refer to **STANDARD PROCEDURE** .

NOTE: **Evacuating or purging air from the charge air cooling system must be done with the use of a pressurized air operated vacuum generator.**

14. Connect the negative battery cable (1).
15. Start engine check for leaks.

COVER(S), CYLINDER HEAD

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the ignition coils. Refer to **COIL, IGNITION, REMOVAL** .

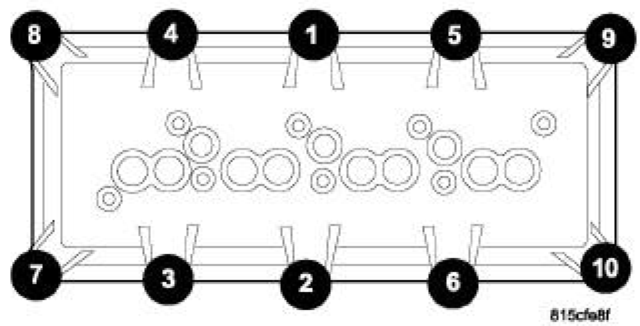


Fig. 45: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts.

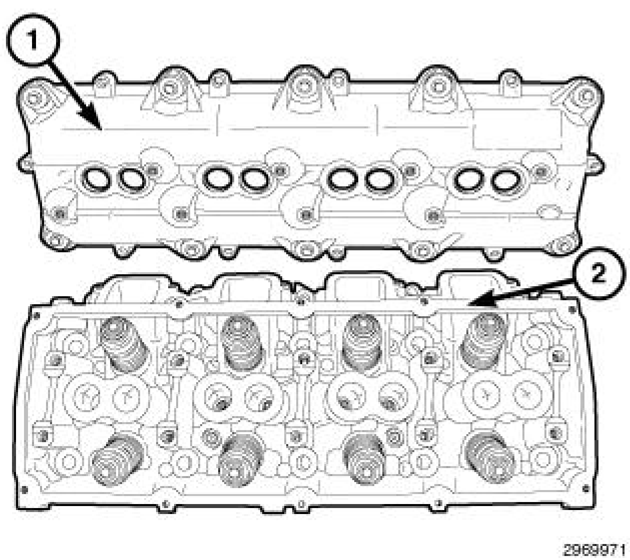


Fig. 46: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

4. Remove the cylinder head cover (1).
5. Clean the sealing surface of the cylinder head (2).

NOTE: **The cylinder head cover gasket may be used again, provided no cuts, tears, or deformation have occurred.**

INSTALLATION

INSTALLATION

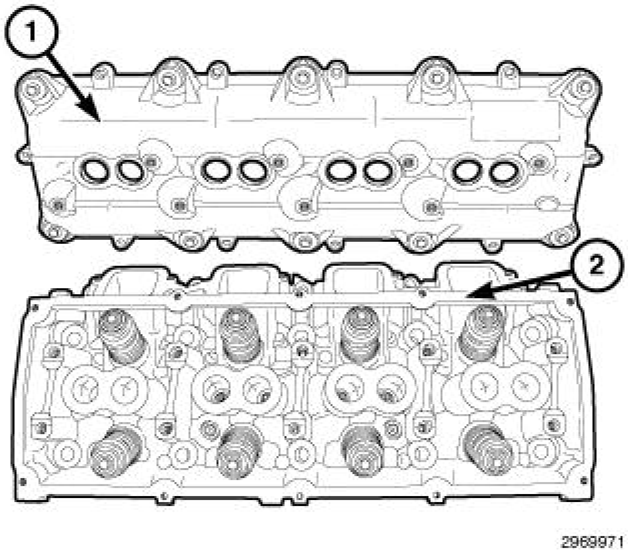


Fig. 47: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not use harsh cleaners to clean the cylinder head covers. Severe damage to covers may occur.**

CAUTION: **Do not allow other components including the wire harness to rest on or against the engine cylinder head cover. Prolonged contact with other objects may wear a hole in the cylinder head cover.**

NOTE: **The cylinder head cover gasket may be used again, provided no cuts, tears, or deformation have occurred.**

1. Clean the cylinder head cover (1) and the sealing surface of the cylinder head (2). Inspect the cylinder head cover gasket and the coil tower gaskets, replace if necessary.
2. Install the cylinder head cover and hand start all fasteners.

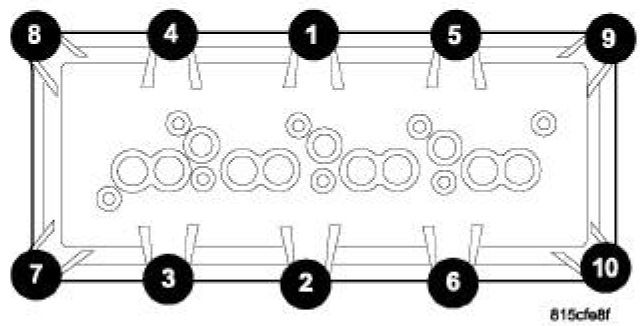


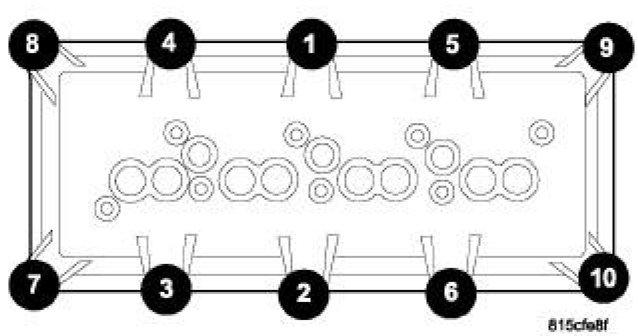
Fig. 48: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, tighten the cylinder head cover bolts to 11 N.m (97 lbs in.).
4. Install the ignition coils. Refer to **COIL, IGNITION, INSTALLATION** .
5. Connect the negative battery cable.

ROCKER ARM, VALVE

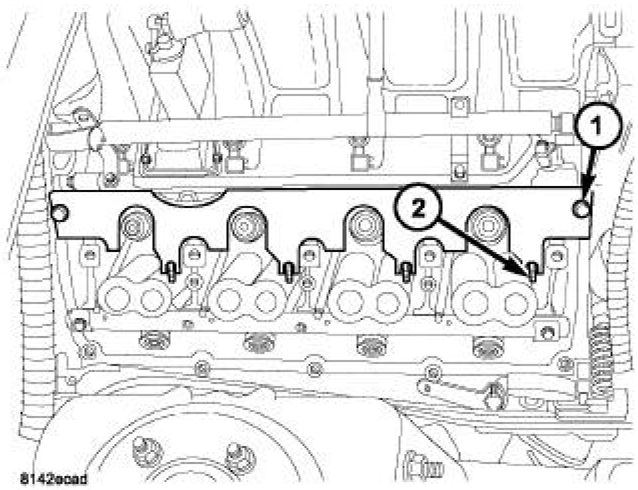
REMOVAL

REMOVAL



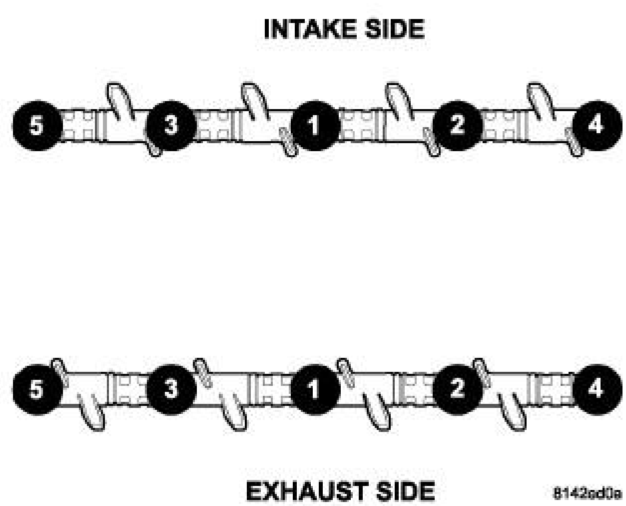
[Fig. 49: Cylinder Head Cover Removal/Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

1. Remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.



[Fig. 50: Pushrod Retaining Plate]
Courtesy of CHRYSLER GROUP, LLC

2. Install Push Rod Retainer (special tool #9070, Retainer, Push Rod) (1).



[Fig. 51: Rocker Shaft Torque Sequence]
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, loosen the rocker shaft assemblies.

CAUTION: The rocker shaft assemblies are not interchangeable between intake and exhaust. The intake rocker arms are marked with an "I".

4. Remove the rocker shaft assemblies. Note the location for reassembly.

CAUTION: The longer pushrods are for the exhaust side, and the shorter pushrods are for intake side.

5. Remove the push rods. Note the push rod location for reassembly.

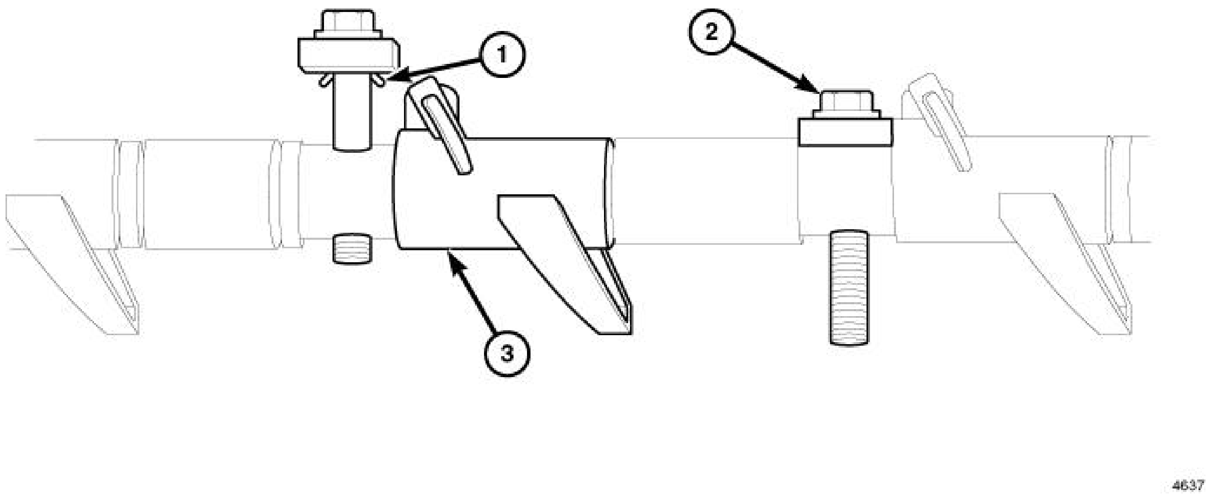
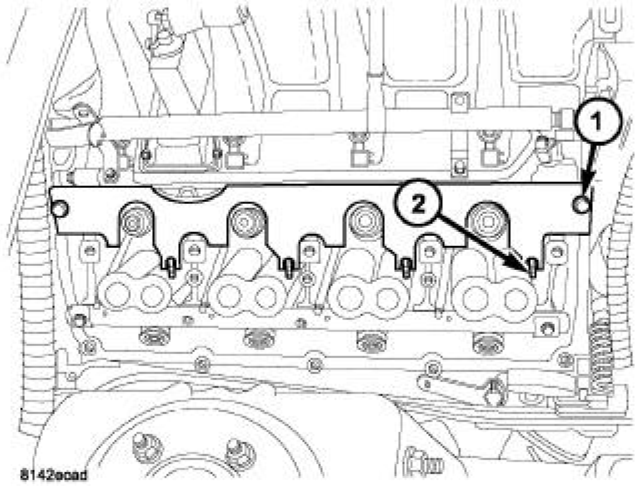


Fig. 52: Rocker Arm Retainers
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not remove the retainers from the rocker shaft assemblies. The assembly tangs (1) at the bottom of the retainers can be damaged, causing the assembly tangs to break off and get into the engine.

INSTALLATION

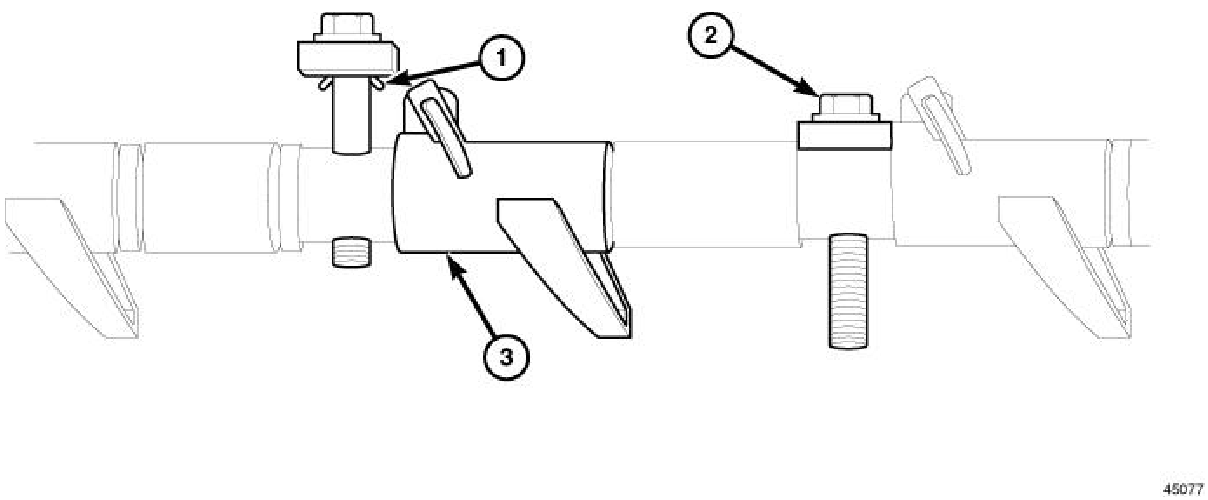
INSTALLATION



[Fig. 53: Pushrod Retaining Plate]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The longer pushrods are for the exhaust side, and the shorter pushrods are for intake side.

1. Install the push rods in the same order as removed.
2. Install the Push Rod Retainer (special tool #9070, Retainer, Push Rod) (1).



[Fig. 54: Rocker Arm Retainers]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Ensure the retainers (1) and rocker arms (3) are not overlapped when torquing bolts.

CAUTION: Verify the push rods are installed into the rocker arms (3) and lifters

correctly while installing the rocker shaft assembly. Recheck after the rocker shaft assembly has been torqued to specification.

3. Install the rocker shaft assemblies in the same order as removed.

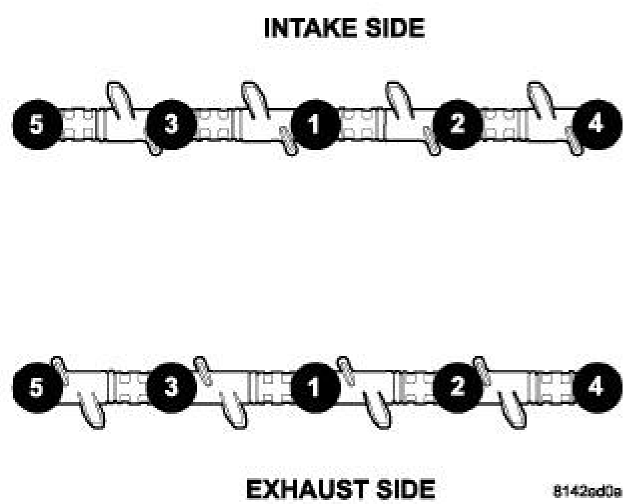


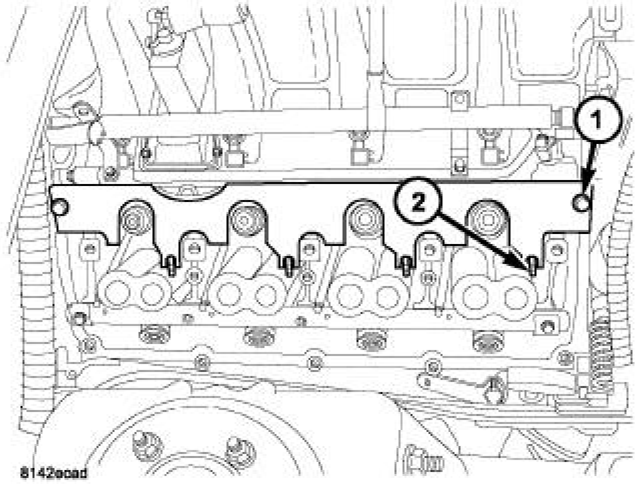
Fig. 55: Rocker Shaft Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The rocker shaft assemblies are not interchangeable between intake and exhaust. The intake rocker arms are marked with the letter "I".

4. Verify the rocker arms are installed in the correct location.

NOTE: Repeat torque sequence several times to ensure rocker shaft assembly is firmly seated.

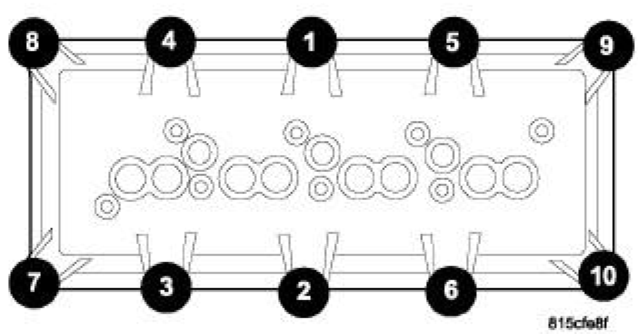
5. Using the sequence shown in illustration, tighten the rocker shaft bolts as follows:
   - Snug to 10 N.m (7 ft. lbs.)
   - Torque to 23 N.m (17 ft. lbs.)
   - Individually loosen by 1/2 turn and retorque to 23 N.m (17 ft. lbs.)
   - Finally, Rotate 30 degrees



[Fig. 56: Pushrod Retaining Plate]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not rotate or crank the engine during or immediately after rocker arm installation. Allow the hydraulic roller lifters adequate time to bleed down (about 5 minutes).

6. Remove the Push Rod Retainer (special tool #9070, Retainer, Push Rod) (1).



[Fig. 57: Cylinder Head Cover Removal/Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

7. Install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.

SEAL(S), VALVE GUIDE

DESCRIPTION

DESCRIPTION

The valve guide seals are made of black rubber and incorporate an integral steel garter spring. The integral garter spring maintains consistent lubrication control to the valve stems. The intake and exhaust stem seals are common with each other.

SPRING(S), VALVE

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.
3. Remove the cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.

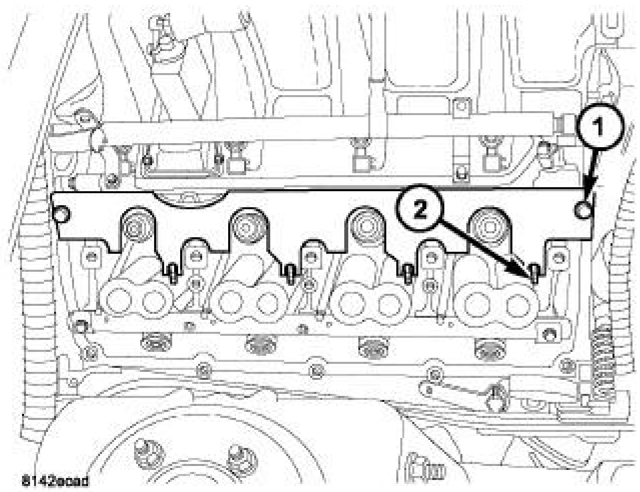


Fig. 58: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The piston must be at TDC, and both valves closed on the cylinder to be serviced.**

NOTE: **The intake push rods can fall into the engine and become lodged in the oil pan, if removing intake rocker arm shaft, install the push rod retainer (special tool #9070, Retainer, Push Rod) (1) to retain the intake push rods (2).**

4. Install the push rod retainer (special tool #9070, Retainer, Push Rod) (1) onto the cylinder head.
5. Clip the push rods (2) into the push rod retainer (1).

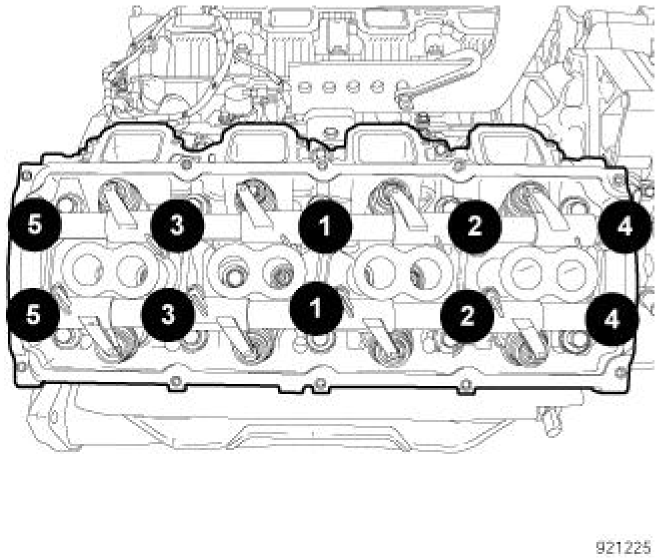


Fig. 59: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The rocker shaft assemblies are not interchangeable between intake and exhaust. The intake rocker arms are marked with an "I".

6. Using the sequence shown in illustration, remove the rocker arm shaft bolts and remove the rocker arm shaft.

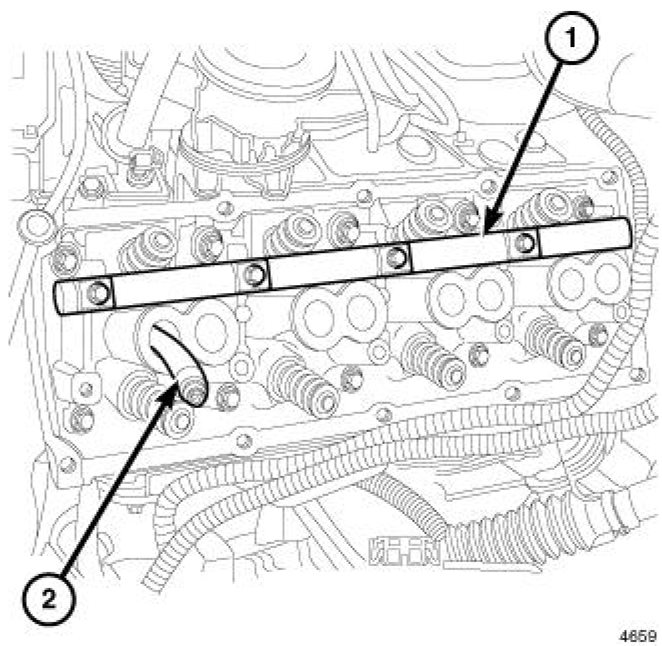


Fig. 60: Rocker Shaft
Courtesy of CHRYSLER GROUP, LLC

7. Install the rocker arm shaft adapter (special tool #9065C, Compressor, Valve Spring) (1).
8. Insert an air hose (2) into the spark plug hole and charge the cylinder with air.

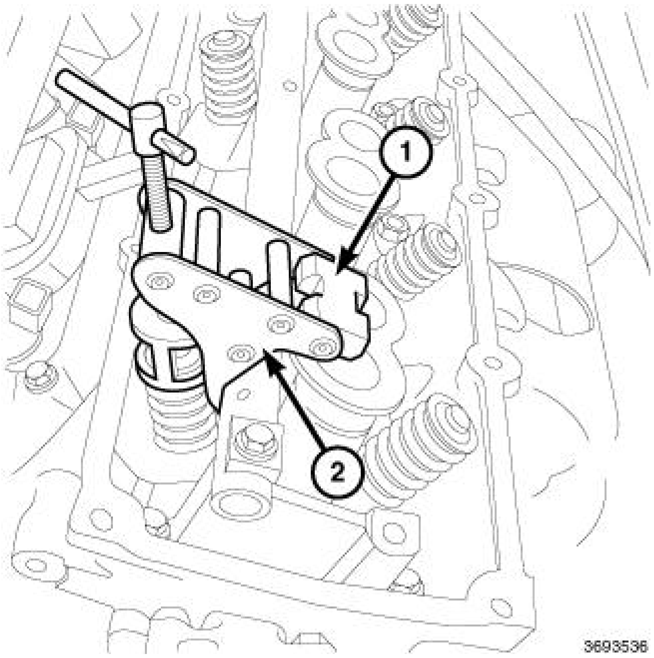


Fig. 61: Rotating Fulcrum Assembly
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**A fulcrum assembly (1) must be rotated to the appropriate setting as marked on the tool for proper valve spring alignment.**
NOTE:	**All valve springs and seals are removed in the same manner.**
NOTE:	**Tap the top of the valve spring retainer to loosen the spring retainer locks.**

9. Install the (special tool #9065C, Compressor, Valve Spring) (1) and remove the intake valve retainer locks.
10. Release the valve spring compressor and remove the valve springs.

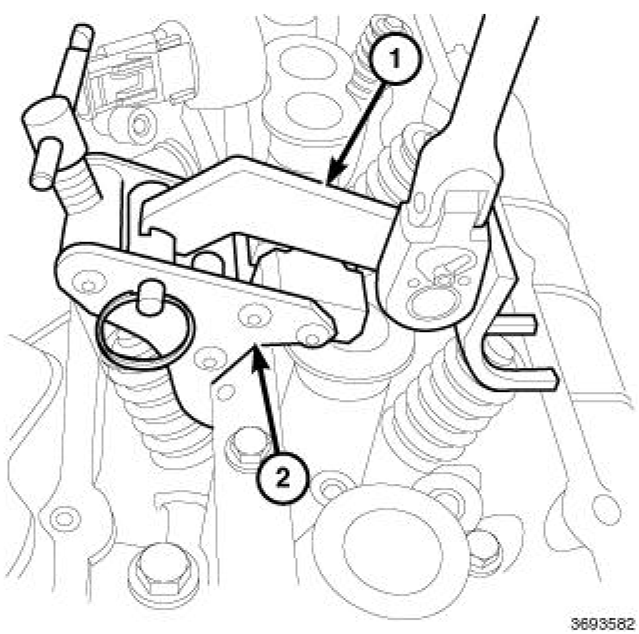


Fig. 62: Valve Spring Tool Adapter
Courtesy of CHRYSLER GROUP, LLC

11. Install the (special tool #9065C, Compressor, Valve Spring) (2) and the (special tool #9065-3, Adapter, Valve Spring Compressor) (1) and remove the exhaust valve retainer locks.
12. Release the valve spring compressor and remove the valve spring.

NOTE: The valve springs are interchangeable between intake and exhaust.

13. Remove and discard the valve guide seal.

INSTALLATION

INSTALLATION

NOTE: All valve springs and seals are installed in the same manner.

1. Install a new valve guide seal.

NOTE: The intake spring retainer has a longer free length compared to the exhaust spring retainer.

2. Install the valve spring.
3. Install the valve spring retainer.

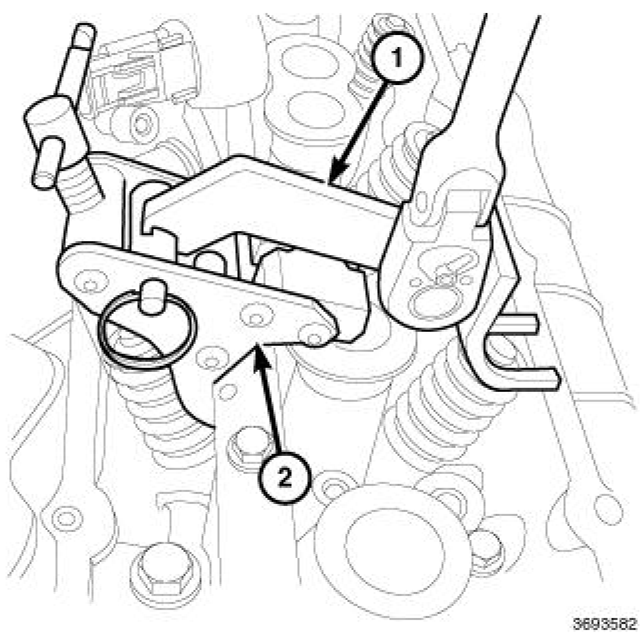


Fig. 63: Valve Spring Tool Adapter
Courtesy of CHRYSLER GROUP, LLC

4. Using the (special tool #9065C, Compressor, Valve Spring) (2) and the (special tool #9065-3, Adapter, Valve Spring Compressor) (1), compress the valve spring and install the valve spring retainer locks.

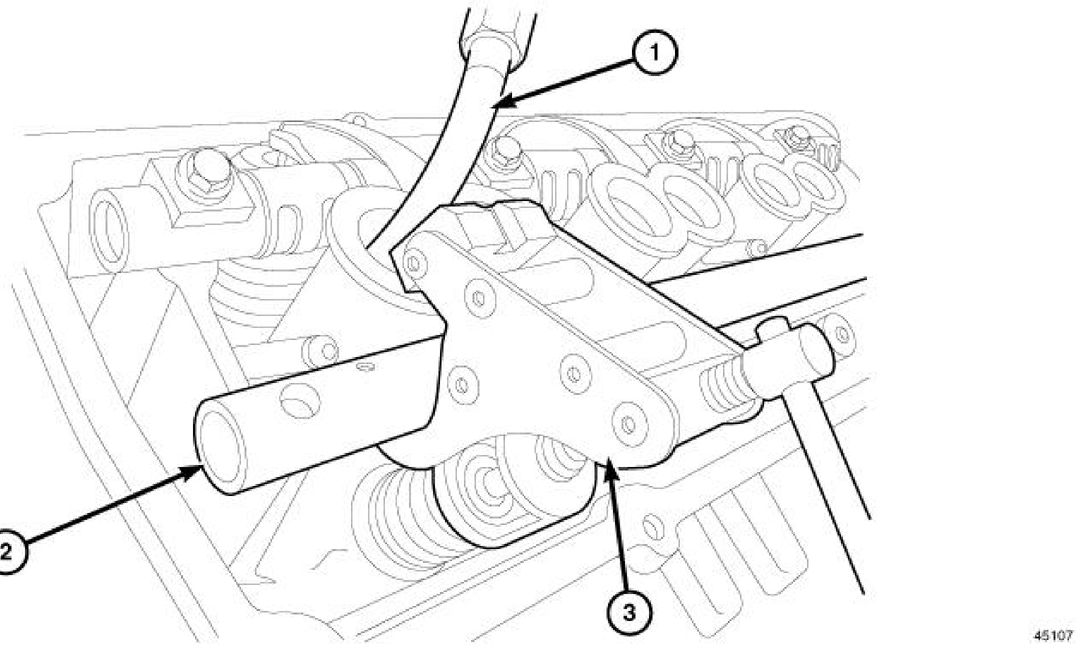


Fig. 64: Valve Spring Removal Tools
Courtesy of CHRYSLER GROUP, LLC

5. Remove the (special tool #9065C, Compressor, Valve Spring) (2) and the (special tool #9065-3, Adapter, Valve Spring Compressor).
6. Release the air charge (1) in the cylinder.

CAUTION: Verify that the pushrods are fully seated into the lifters and the rocker arms. Recheck after rocker arm shaft has been torqued to specification.

7. Install the rocker arm shaft and push rods. Refer to **ROCKER ARM, VALVE, INSTALLATION**.

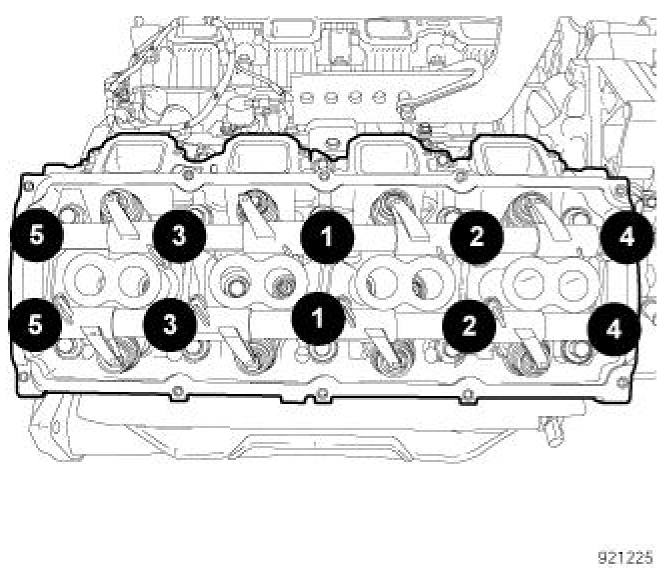


Fig. 65: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

8. Using the sequence shown in illustration, tighten the rocker shaft bolts as follows:

- Snug to 10 N.m (7 ft. lbs.)
- Torque to 23 N.m (17 ft. lbs.)
- Individually loosen by 1/2 turn and retorque to 23 N.m (17 ft. lbs.)
- Finally, Rotate 30 degrees

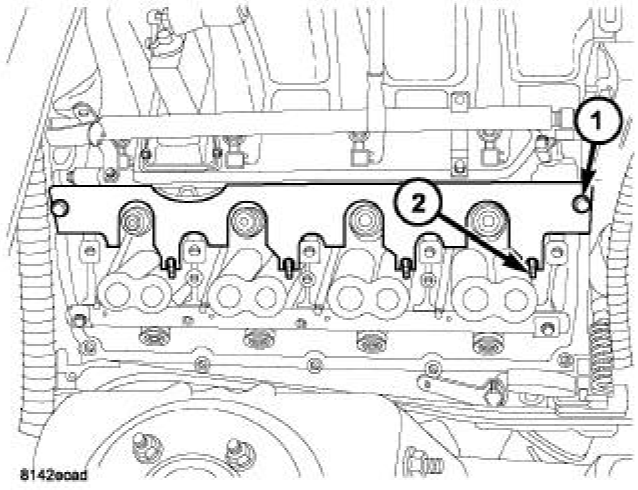


Fig. 66: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

9. Remove the (special tool #9070, Retainer, Push Rod) (1).
10. Install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.
11. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.
12. Connect the negative battery cable.

VALVES, INTAKE AND EXHAUST

DESCRIPTION

VALVES

Both the intake and exhaust valves are made of steel with full chrome plate on valve stems. The intake valve is 54.3 mm (2.14 in.) diameter and the exhaust valve is 42.0 mm (1.65 in.) diameter. All valves use three bead lock keepers and retainers to retain the springs and promote valve rotation.

VALVE GUIDES

The valve guides are made of powdered metal and are pressed into the cylinder head. The guides are not replaceable or serviceable, and valve guide reaming is not recommended. If the guides are worn beyond acceptable limits, replace the cylinder heads.

STANDARD PROCEDURE

STANDARD PROCEDURE - REFACING

NOTE: Valve seats that are worn or burned can be reworked, provided that the correct angle and seat width are maintained. Otherwise the cylinder head must be replaced.

NOTE: When refacing valves and valve seats, it is important that the correct size valve guide pilot be used for reseating stones. A true and complete surface must be obtained.

1. Measure the concentricity of the valve seat using a dial indicator. Total runout should not exceed 0.051 mm (0.002 inch.) total indicator reading.
2. Inspect the valve seat with Prussian blue to determine where the valve contacts the seat. To do this, coat the valve seat with Prussian blue then set the valve in place. Rotate the valve using light pressure. If the blue is transferred to the center of the valve face, contact is satisfactory. If the blue is transferred to the top edge of the valve face, lower the valve seat with a 15 degree stone. If the blue is transferred to the bottom edge of the valve face, raise the valve seat with a 65 degree stone.
3. Refer to the VALVE SEAT, VALVE FACE AND SPRING HEIGHT CHART for the proper valve seat width, valve seat angle, valve face angle and valve spring height.

VALVE SEAT, VALVE FACE AND SPRING HEIGHT CHART

DESCRIPTION	SPECIFICATION	
SEAT WIDTH		
INTAKE	0.94 - 1.04 mm	0.037 - 0.041 in.
EXHAUST	1.16 - 1.26 mm	0.046 - 0.050 in.
SEAT ANGLE		
(INT. AND EXT.)	44.5Â° - 45Â°	
FACE ANGLE		
INTAKE	45.5Â° - 46Â°	
EXHAUST	45Â° - 45.5Â°	
SPRING HEIGHT		
INTAKE	52.1 mm	2.051 in.
EXHAUST	51.2 mm	2.016 in.

4. The valve seat must maintain an angle of 44.5Â° - 45.0Â°.
5. The valve face must maintain an angle of 45.5Â° - 46.0Â° for the Intake and 45.0Â° - 45.5Â° for the exhaust.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL**.
3. Compress the valve springs using the valve spring compressor (special tool #C-3422-D, Compressor, Valve Spring) and adapter (special tool #8464, Adapter, Valve Spring).

4. Remove the valve spring retainer locks, valve spring retainers, valve stem seals and valve springs.
5. Before removing the valves, remove any burrs from the valve spring retainer lock grooves in the valve stems to prevent damage to the valve guides. Identify the valves to ensure installation in their original location.
6. Remove the valves.

INSTALLATION

INSTALLATION

1. Clean the valves thoroughly. Discard burned, warped, and cracked valves.
2. Remove carbon and varnish deposits from inside the valve guides with a reliable guide cleaner.
3. Measure the valve stems for wear. If wear exceeds 0.051 mm (0.002 inch), replace the valve.
4. Coat the valve stems with clean engine oil and insert them into the cylinder head.
5. If the valves or seats have been reground, check valve stem height. If the valve is too long, replace the cylinder head.
6. Install new seals on all valve guides. Install the valve springs and valve spring retainers.

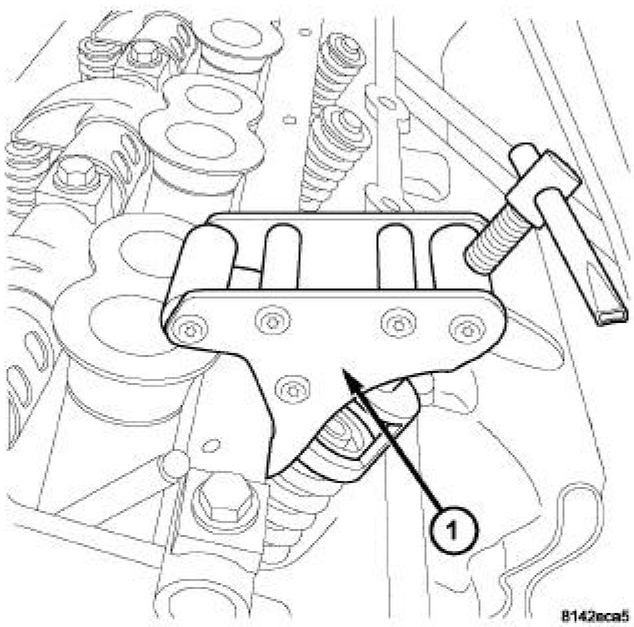


Fig. 67: Exhaust Valve Spring Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

7. Compress the valve springs with the Valve Spring Compressor (special tool #C-3422-D, Compressor, Valve Spring) (1) and Adapter (special tool #8464, Adapter, Valve Spring), install the valve spring retainer locks and release the tool. If the valves and/or seats have been ground, measure the installed height of the springs. Make sure the measurement is taken from the bottom of spring seat in the cylinder head to the bottom surface of valve spring retainer.
8. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION**.
9. Connect the negative battery cable.

ENGINE BLOCK

CLEANING

CLEANING

Thoroughly clean the oil pan and engine block gasket surfaces.

Use compressed air to clean the following:

- Gallery at the oil filter adaptor hole.
- Front and rear oil gallery holes.
- Feed holes for the crankshaft main bearings.

Once the block has been completely cleaned, apply Loctite PST pipe sealant with Teflon 592 to the threads of the front and rear oil gallery plugs. Tighten the 1/4 inch NPT plugs, 3/8 inch NPT plugs and the coolant drain plugs to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

INSPECTION

INSPECTION

ENGINE BLOCK

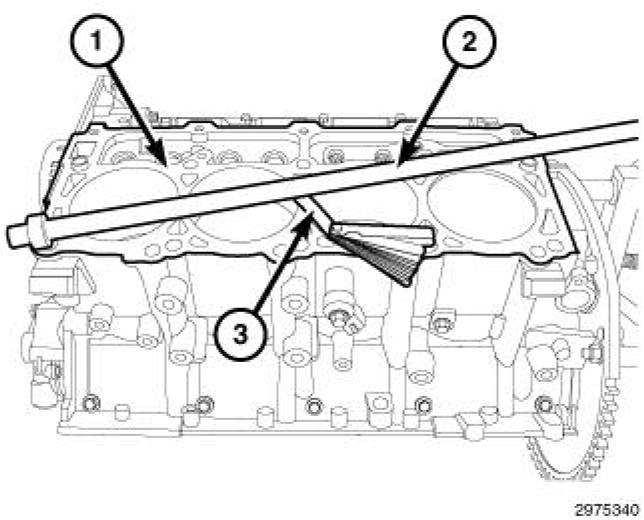


Fig. 68: Checking Engine Block Deck Surface With Precision Straightedge & Feeler Gauge
Courtesy of CHRYSLER GROUP, LLC

1. Clean the engine block thoroughly and check all core hole plugs for evidence of leaking and repair if necessary.
2. Examine the engine block and cylinder bores for cracks or fractures.

NOTE: **Check the engine block deck surface with a precision straightedge and feeler gauge. The surface irregularities should not exceed 0.09 mm (0.0035 in.). Check the deck surface from one end to the other with the precision straightedge positioned across corners and parallel to the block centerline**

up and down the deck.

3. Check the engine block deck (1) surfaces for flatness using a precision straightedge (2) and feeler gauge (3).

CYLINDER BORE

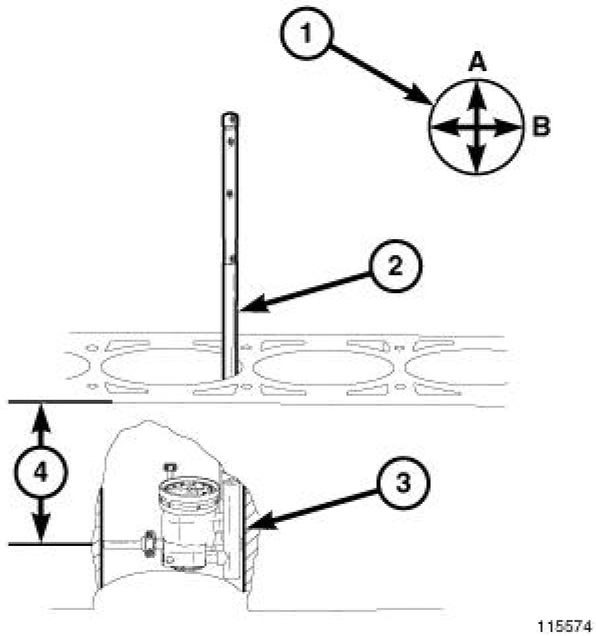
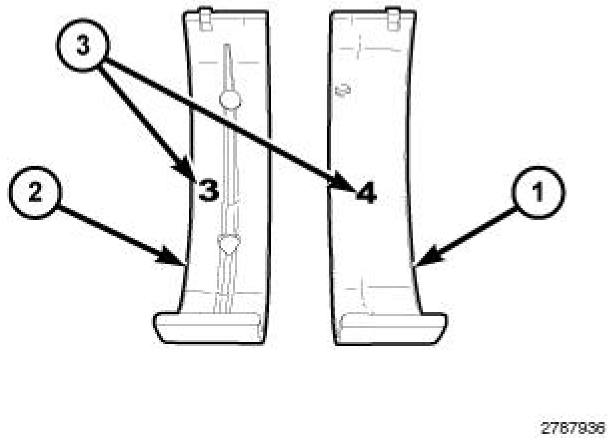


Fig. 69: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER GROUP, LLC

1. Use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to correctly measure the inside diameter of the cylinder bore (3). A cylinder bore gauge capable of reading in 0.003 mm (0.0001 in.) increments is required. If a bore gauge is not available, do not use an inside micrometer.
2. Measure the inside diameter of the cylinder bore at three levels below the top of the bore (4). Start at the top of the bore, perpendicular (across or at 90Ā°) to the axis of the crankshaft at point A (1).
3. Repeat the measurement near the middle of the bore then repeat the measurement near the bottom of the bore.
4. Determine the taper by subtracting the smaller diameter from the larger diameter.
5. Rotate the measuring device 90Ā° to point B (1) and repeat the three measurements. Verify that the maximum taper is within specifications.
6. Determine out-of-roundness by comparing the difference between each measurement.
7. If the cylinder bore taper does not exceed 0.0127 mm (0.0005 inch) and out-of-roundness does not exceed 0.008 mm (0.0003 inch) then the cylinder bore can be honed. If the cylinder bore taper or out- of-round condition exceeds the maximum limits, replace the engine block.

NOTE: **A slight amount of taper always exists in the cylinder bore after the engine has been in use for a period of time.**

MAIN BEARINGS



[Fig. 70: Main Bearing Inserts]
Courtesy of CHRYSLER GROUP, LLC

1. Wipe the main bearing inserts (1, 2) clean.
2. Inspect the inserts for abnormal wear patterns, scoring, grooving, fatigue, pitting and for metal or other foreign material imbedded in the lining.
3. Inspect the back of the inserts for fractures, scrapes or irregular wear patterns.
4. Inspect the insert locking tabs for damage.
5. Inspect the crankshaft thrust washers for scoring, scratches, bluing, discoloration or signs of wear.
6. Replace any bearing that shows abnormal wear.
7. Inspect the main bearing bores for signs of scoring, nicks and burrs.
8. If the engine block main bearing bores show damage, replace the engine block.

BEARING(S), CRANKSHAFT, MAIN

STANDARD PROCEDURE

STANDARD PROCEDURE - CRANKSHAFT MAIN BEARING - FITTING

MAIN BEARING JOURNAL DIAMETER (CRANKSHAFT REMOVED)

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.

Crankshaft removed from the cylinder block.

Clean the oil off the main bearing journal.

Determine the maximum diameter of the journal with a micrometer. Measure at two locations 90Ā° apart at each end of the journal.

The maximum allowable taper is 0.003 mm (0.00012 inch). The maximum out-of-round is 0.005 mm (0.0002 inch). Compare the measured diameter with the journal diameter specification (Main Bearing Fitting Chart). Select inserts required to obtain the specified bearing-to-journal clearance.

CRANKSHAFT MAIN BEARING SELECTION

The main bearings are "select fit" to achieve proper oil clearances. For main bearing selection, the crankshaft counterweight has grade identification marks stamped into it. These marks are read from left to right, corresponding with journal number 1, 2, 3, 4 and 5.

NOTE: **Service main bearings are coded. These codes identify what size (color) the bearing is.**

MAIN BEARING SELECTION CHART

GRADE	COLOR	mm	In	FOR USE WITH JOURNAL SIZE
-	**LOWER AND UPPER**	-	-	64.9780-64.9859 mm
A	**ORANGE**	0.008 mm U/S	(0.0004 in.) U/S	(2.442-2.447 in.)
-	**LOWER AND UPPER**	-	-	664.9860-64.9940 mm
B	**BLACK**	NOMINAL	NOMINAL	(2.438-2.443 in.)
-	**LOWER AND UPPER**	-	-	64.9941-65.0020 mm
C	**GREEN**	0.008 mm O/S	(0.0004 in.) O/S	(2.434-2.439 in.)

INSPECTION

INSPECTION

CAUTION: **If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.**

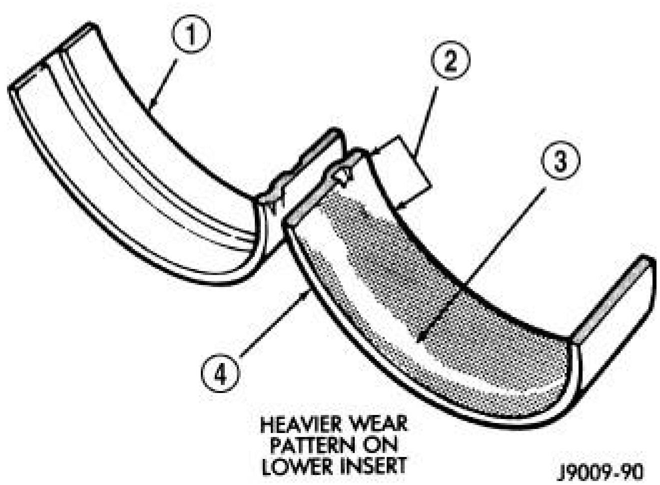


Fig. 71: Main Bearing Wear Patterns
Courtesy of CHRYSLER GROUP, LLC

Wipe the inserts clean and inspect for abnormal wear patterns and for metal or other foreign material imbedded in the lining. Normal main bearing insert wear patterns are illustrated.

NOTE: If any of the crankshaft journals are scored, the crankshaft must be repaired or replaced.

Inspect the back of the inserts for fractures, scoring or irregular wear patterns.

Inspect the upper insert locking tabs for damage.

Replace all damaged or worn bearing inserts.

CAMSHAFT, ENGINE

REMOVAL

CAMSHAFT CORE HOLE PLUG

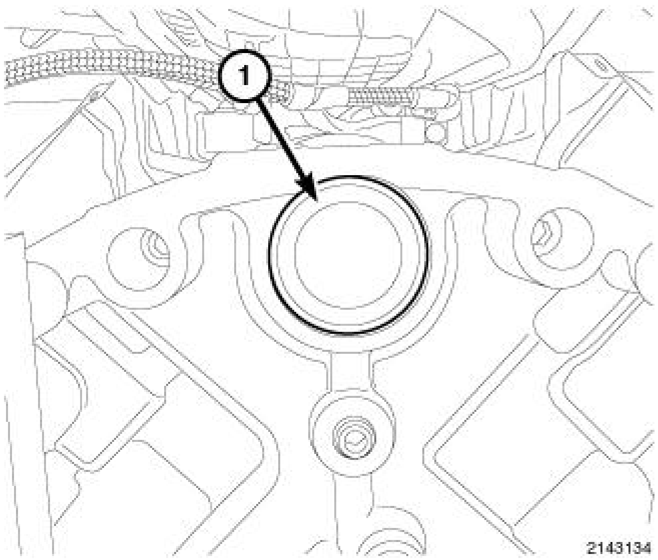


Fig. 72: Camshaft Core Hole Plug
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Remove the engine from the vehicle. Refer to **REMOVAL**.
3. On automatic transmission models, remove the flexplate. Refer to **FLEXPLATE, REMOVAL**.
4. On manual transmission models, remove the flywheel. Refer to **FLYWHEEL, REMOVAL** .

CAUTION: Do not damage the rear surface of the camshaft or the core plug sealing surface, when removing the core plug.

5. Using a suitable sharp punch, punch a small hole in the camshaft core hole plug (1).
6. Insert a short sheet metal screw into the small hole in the camshaft core hole plug.
7. Using a suitable slide hammer puller, remove the rear camshaft core hole plug.

CAMSHAFT

1. Remove both cylinder heads. Refer to **CYLINDER HEAD, REMOVAL**.

CAUTION: **Whenever the camshaft is replaced, all lifters must be replaced. If the lifter and retainer assemblies are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.**

CAUTION: **The lifter and retainer assembly must be installed as a unit.**

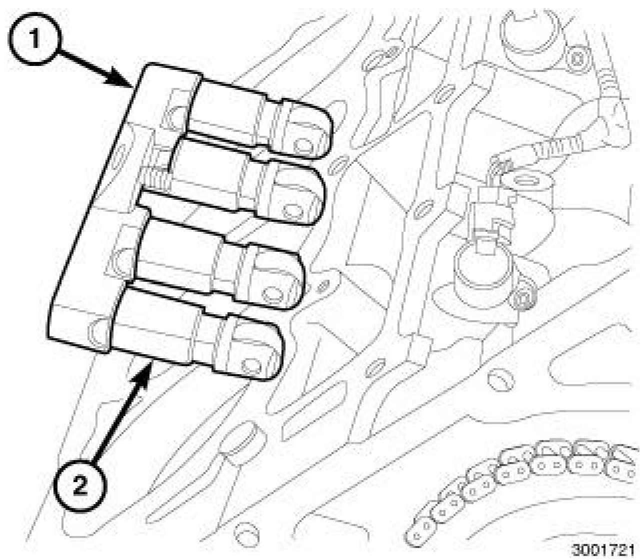


Fig. 73: Identifying Lifters & Retainers
Courtesy of CHRYSLER GROUP, LLC

2. Remove the lifters (2) and retainer (1) as an assembly. Refer to **LIFTER(S), HYDRAULIC, ROLLER, REMOVAL**.
3. Remove the radiator. Refer to **RADIATOR, ENGINE COOLING, REMOVAL** .
4. Remove the A/C condenser. Refer to **CONDENSER, A/C, REMOVAL** .
5. Remove the timing chain and camshaft phaser. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

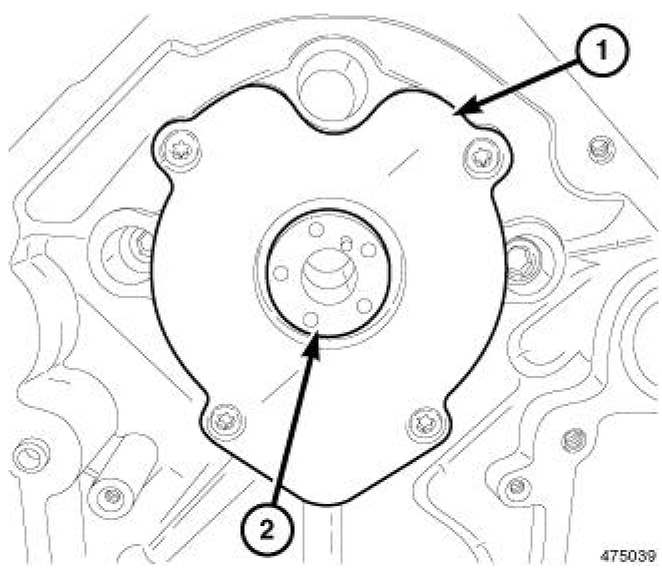


Fig. 74: Camshaft Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

6. Remove the camshaft thrust plate (1).

CAUTION: **Use care when removing the camshaft, do not damage the camshaft bearings with the camshaft lobes.**

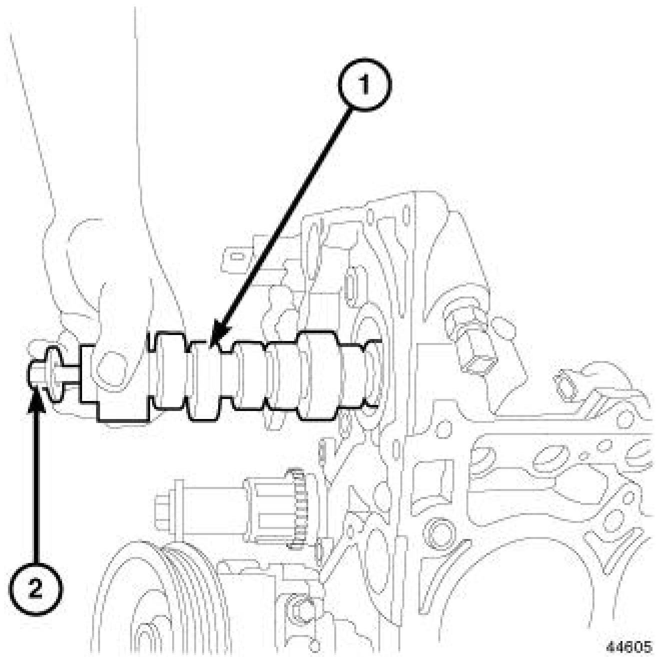


Fig. 75: Removing/Installing Camshaft
Courtesy of CHRYSLER GROUP, LLC

7. Install a long bolt (2) into the front of the camshaft to aid in removal.
8. Remove the camshaft using care not to damage the camshaft bearings with the camshaft lobes (1).

INSPECTION

INSPECTION

NOTE: **The cam bearings are not serviceable. Do not attempt to replace cam bearings for any reason.**

INSTALLATION

CAMSHAFT CORE HOLE PLUG

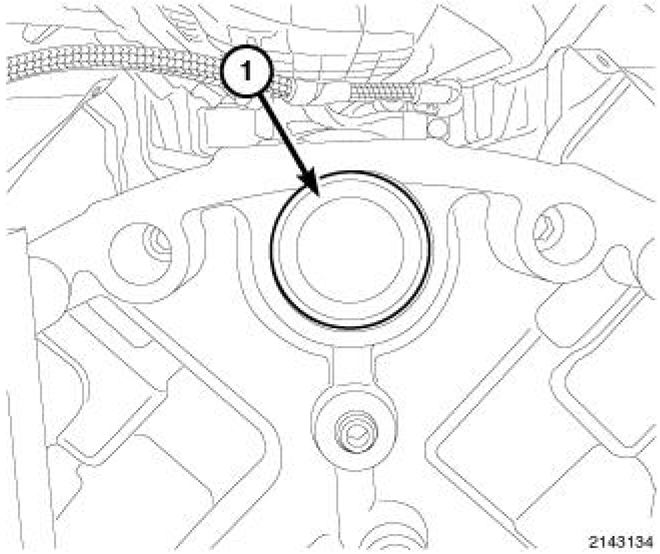


Fig. 76: Camshaft Core Hole Plug
Courtesy of CHRYSLER GROUP, LLC

1. Clean the core hole in the cylinder block.

NOTE: **Do not apply adhesive to the new camshaft core hole plug. A new plug has adhesive pre-applied.**

2. Install a new camshaft core hole plug (1) located at the rear of cylinder block, using a suitable flat faced tool. The plug must be fully seated on the cylinder block shoulder.
3. On manual transmission models, install the flywheel. Refer to **FLYWHEEL, INSTALLATION** .
4. On automatic transmission models, install the flexplate. Refer to **FLEXPLATE, INSTALLATION**.
5. Install the engine. Refer to **INSTALLATION**.

CAMSHAFT

CAUTION: **Use care when installing the camshaft into the engine block, do not damage the camshaft bearings with the camshaft lobes.**

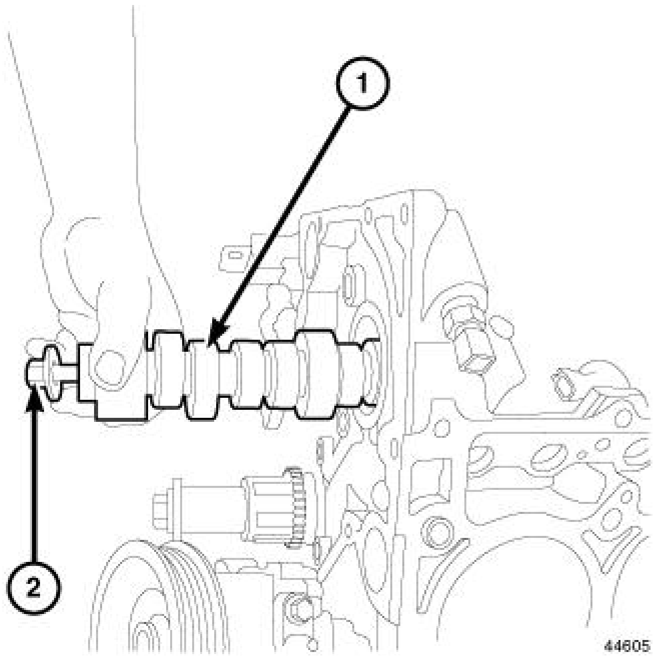


Fig. 77: Removing/Installing Camshaft
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the camshaft lobes (1) and the camshaft bearing journals with clean engine oil.
2. Install a long bolt (2) into the front of the camshaft to aid in the installation, carefully install the camshaft into the engine block.

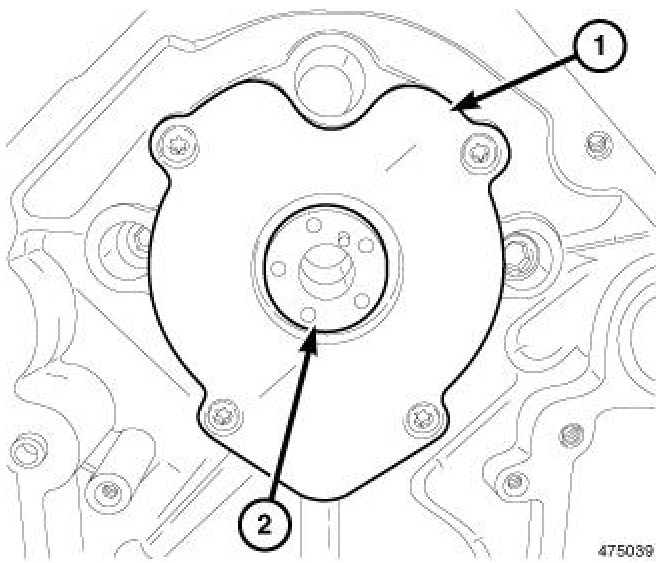


Fig. 78: Camshaft Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

3. Install the camshaft thrust plate (1) and tighten retaining bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Using a suitable dial indicator, measure the camshaft end play. Refer to **ENGINE SPECIFICATIONS**. If not within specification, install a new thrust plate.
5. Install the timing chain and camshaft phaser. Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION**.

6. Install the A/C condenser. Refer to **CONDENSER, A/C, INSTALLATION** .
7. Install the radiator. Refer to **RADIATOR, ENGINE COOLING, INSTALLATION** .

CAUTION: **Whenever the camshaft is replaced, all lifters must be replaced. If the lifter and retainer assemblies are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.**

CAUTION: **The lifter and retainer assembly must be installed as a unit.**

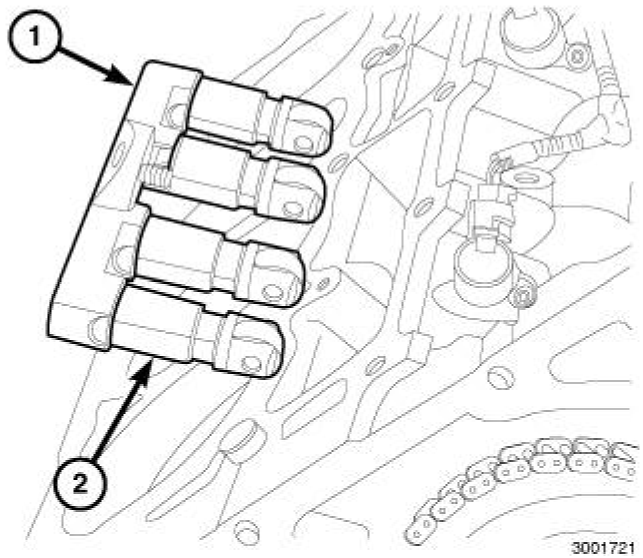


Fig. 79: Identifying Lifters & Retainers
Courtesy of CHRYSLER GROUP, LLC

8. Install the lifters (2) and retainer (1) as an assembly into their original location. Refer to **LIFTER(S), HYDRAULIC, ROLLER, INSTALLATION**.
9. Install both cylinder heads. Refer to **CYLINDER HEAD, INSTALLATION**.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

CRANKSHAFT

REMOVAL

REMOVAL

CAUTION: **If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.**

1. Remove the engine. Refer to **REMOVAL**.
2. Secure the engine onto a suitable engine stand.
3. Remove the crankshaft rear oil seal retainer. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL**.

4. Remove the oil pan and the oil pump pickup tube. Refer to **PAN, OIL, REMOVAL**.
5. Remove the timing chain, camshaft phaser and crankshaft sprocket. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

CAUTION: Do not use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur.

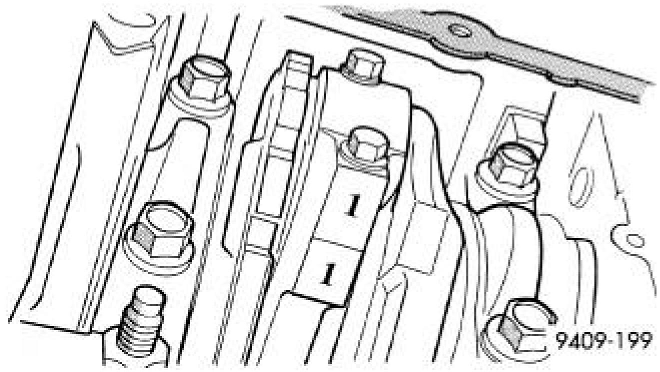


Fig. 80: Identifying Mark On Connecting Rod And Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: Connecting rods and bearing caps are not interchangeable and should be marked before removal to ensure correct reassembly.

6. Mark the connecting rod and bearing cap location using a permanent ink marker or scribe tool.
7. Remove the rod bearing caps and bearings.

CAUTION: Do not use a number stamp or a punch to mark main bearing caps as damage to bearing caps and/or bearings could occur.

NOTE: Main bearing caps are not interchangeable and should be marked before removal to ensure correct reassembly.

8. Mark the main bearing caps using a permanent ink marker or scribe tool.

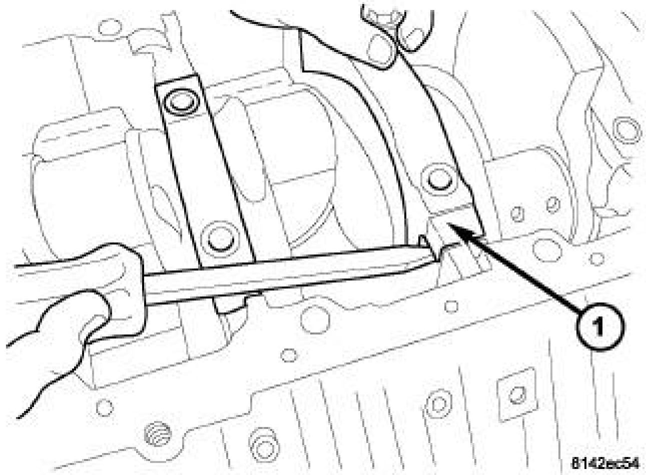


Fig. 81: Main Bearing Cap Removal
Courtesy of CHRYSLER GROUP, LLC

9. Remove the main bearing cap cross-bolts.
10. Remove the main bearing cap bolts.
11. Remove main bearing caps (1) and bearings one at a time.

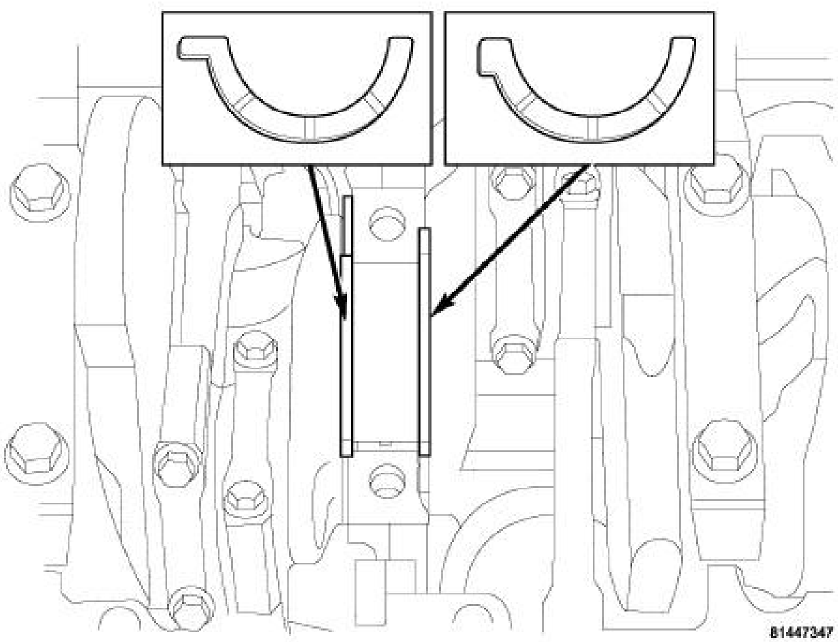


Fig. 82: Identifying Thrust Washer Locations
Courtesy of CHRYSLER GROUP, LLC

12. Remove the thrust bearings.

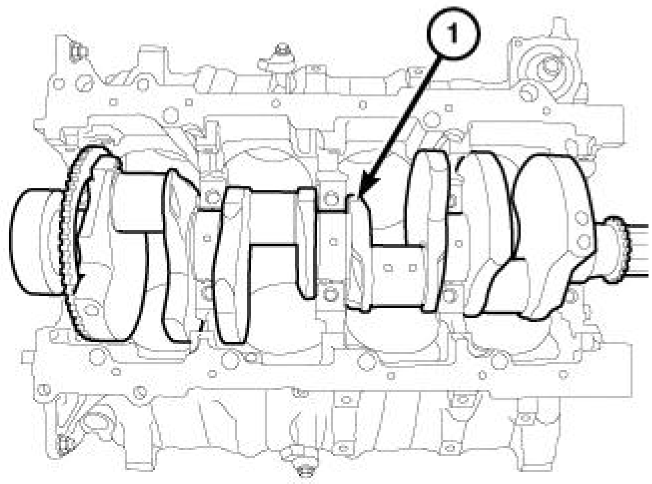


Fig. 83: Crankshaft
Courtesy of CHRYSLER GROUP, LLC

13. Remove the crankshaft (1) from the engine block.

INSTALLATION

INSTALLATION

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.

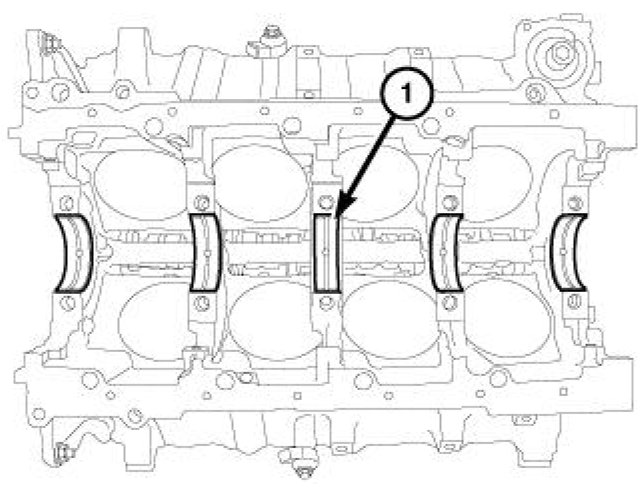


Fig. 84: Main Bearings
Courtesy of CHRYSLER GROUP, LLC

1. Select the proper main bearings (1). Refer to STANDARD PROCEDURE.
2. Lubricate the main bearing shells with clean engine oil.
3. Install the main bearings into the engine block.

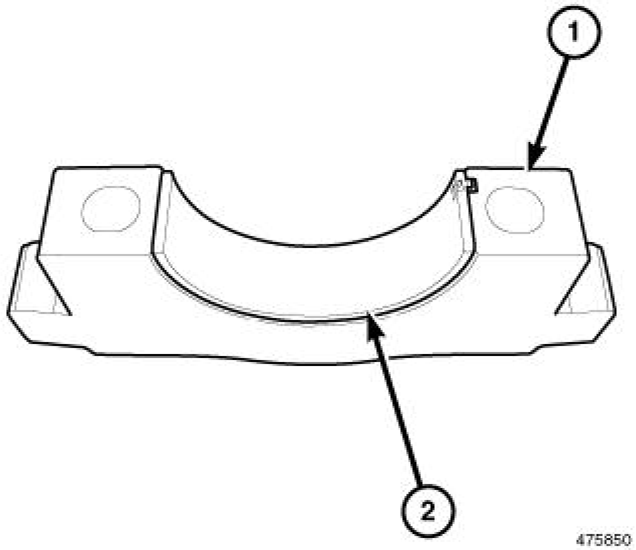


Fig. 85: Main Bearing Shells In The Bearing Caps
Courtesy of CHRYSLER GROUP, LLC

4. Install the main bearing shells (2) into the bearing caps (1).

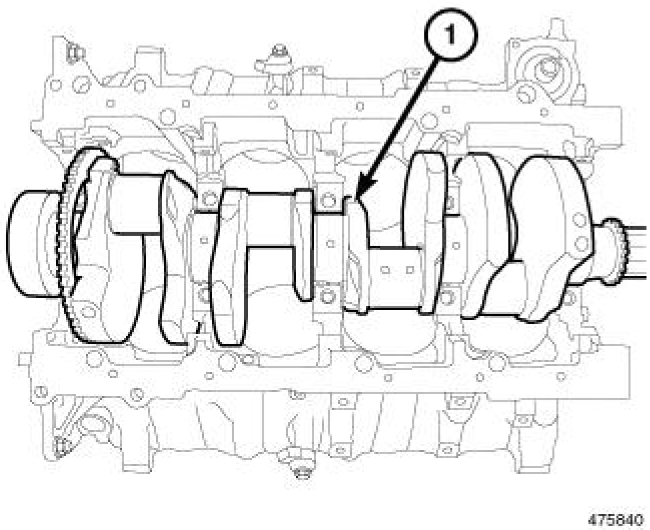


Fig. 86: Crankshaft
Courtesy of CHRYSLER GROUP, LLC

5. Position the crankshaft (1) into the engine block.

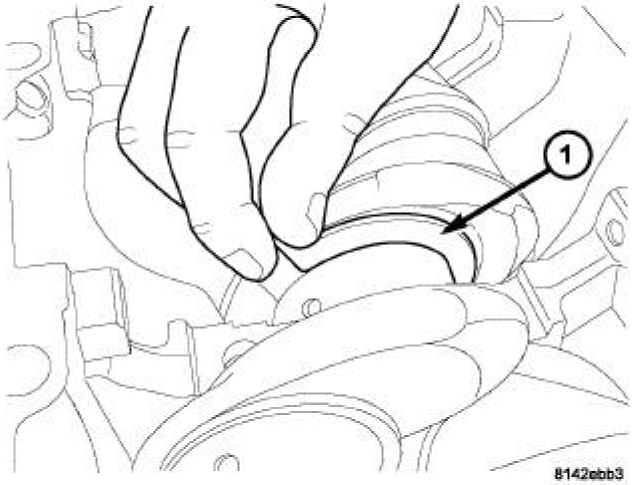


Fig. 87: Thrust Washer Installation
Courtesy of CHRYSLER GROUP, LLC

6. Lubricate and install the thrust bearings (1).
7. Install all main bearing caps in the location as noted during removal making sure the arrow faces forward.

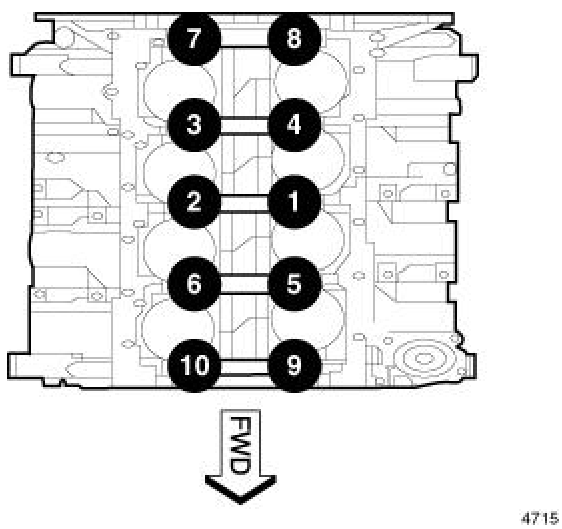
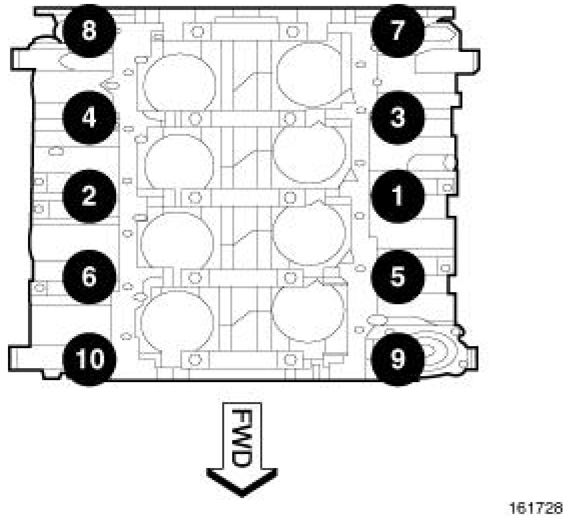


Fig. 88: Main Bearing Cap Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

8. Clean and oil all main cap bolts and install finger tight.
9. Using the sequence shown in illustration, tighten the main bearing cap bolts to 13 N.m (10 ft. lbs.).
10. Again, using the sequence shown in illustration, tighten the main bearing cap bolts to 28 N.m (21 ft. lbs.).
11. Using the sequence shown in illustration, rotate the main bearing cap bolts an additional 90Ā°.

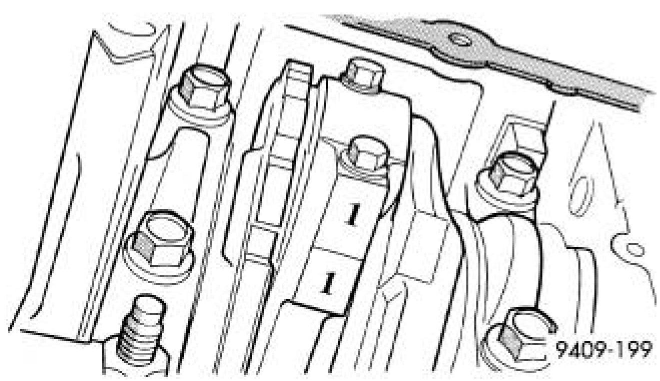


[Fig. 89: Crossbolt Tightening Sequence]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The main bearing cap cross-bolts are torqued after the final torque of the main cap bolts.**

12. Install the cross-bolts finger tight.
13. Using the sequence shown in illustration, tighten the cross-bolts to 34 N.m (25 ft. lbs.).
14. Again, using the sequence shown in illustration, repeat the cross-bolt tightening procedure using the same torque.
15. Measure the crankshaft end play. Refer to **STANDARD PROCEDURE**.

CAUTION: **The connecting rod bolts must not be reused. Always replace the connecting rod bolts whenever they are loosened or removed.**



[Fig. 90: Identifying Mark On Connecting Rod And Bearing Cap]
Courtesy of CHRYSLER GROUP, LLC

16. Wipe the connecting rod caps clean and install the rod bearings.
17. Lubricate the bearing surfaces with clean engine oil and install the bearings and connecting rod caps onto the connecting rod journals in the same location as noted during removal.
18. Install the **NEW** connecting rod bolts finger tight.
19. Tighten the connecting rod bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

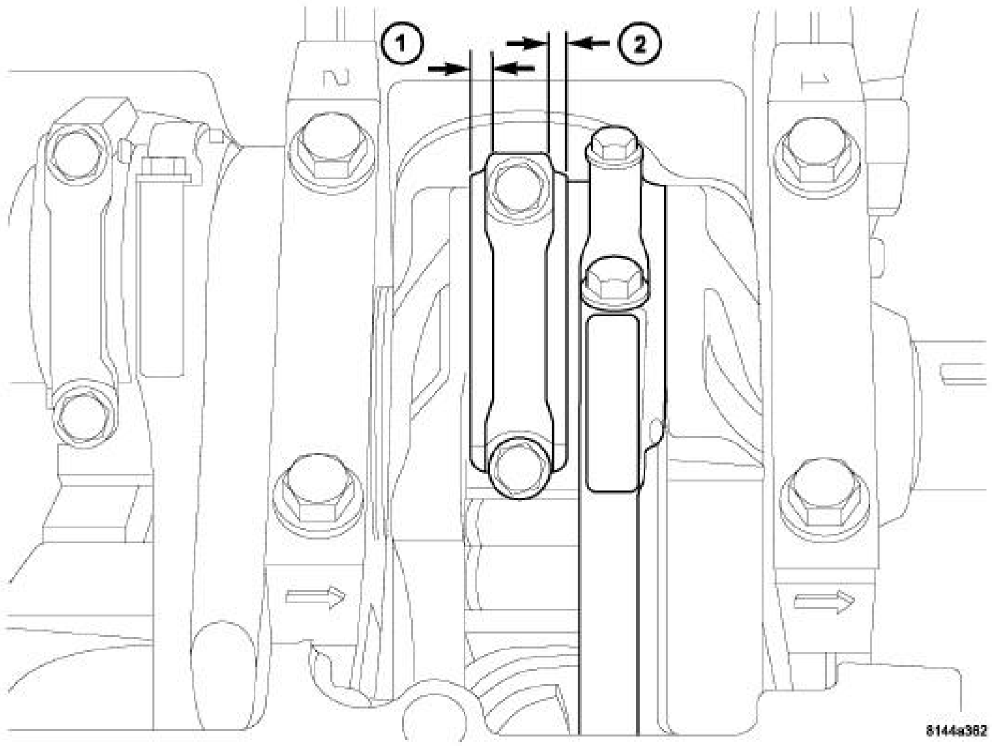


Fig. 91: Identifying Connecting Rod Proper Installation
Courtesy of CHRYSLER GROUP, LLC

20. If required, measure the connecting rod side clearance (1, 2). Refer to ENGINE SPECIFICATIONS.
21. Install the timing chain, camshaft phaser and crankshaft sprocket. Refer to CHAIN AND SPROCKETS, TIMING, INSTALLATION.
22. Install the crankshaft rear oil seal retainer. Refer to RETAINER, CRANKSHAFT REAR OIL SEAL, INSTALLATION.
23. Install the oil pump pickup tube and oil pan. Refer to PAN, OIL, INSTALLATION.
24. Install the engine. Refer to INSTALLATION.
25. Start the engine and check for leaks.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

DAMPER, VIBRATION

DESCRIPTION

DESCRIPTION

[Fig. 92: Crankshaft Damper](#)
Courtesy of CHRYSLER GROUP, LLC

The crankshaft damper is used to control the resonance that is produced by the engine. The Noise, Vibration, and Harshness (NVH) created from the crankshaft can be controlled by dissipating the torque energy through the damper.

The crankshaft damper is held to the crankshaft by means of a harden steel bolt. The damper is pressed onto a specific machined surface of the crankshaft.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the cooling fan assembly. Refer to **FAN, COOLING, REMOVAL** .

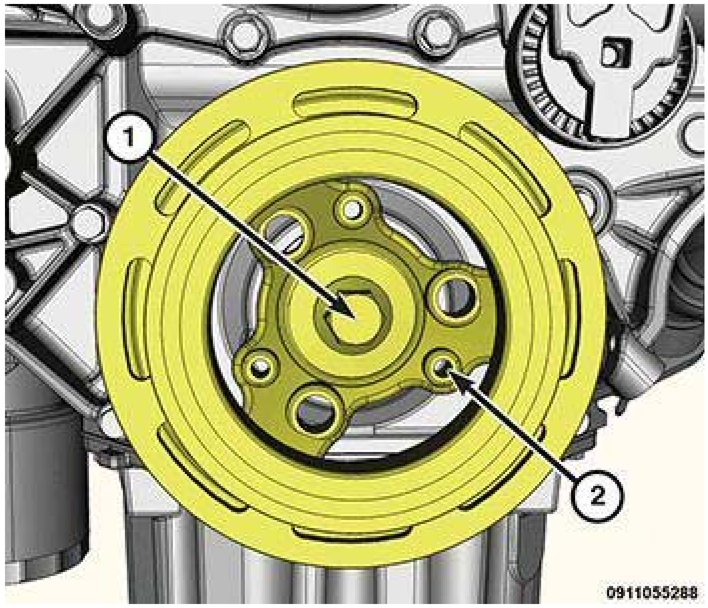


Fig. 93: Crankshaft Damper & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When installing the puller tool, ensure the bolts are fully threaded through the entire crankshaft damper (2).**

3. Remove the vibration damper bolt (1) and discard.
4. Install the crankshaft damper puller, making sure the bolts are fully threaded through the entire crankshaft damper.
5. Remove the crankshaft damper.

INSTALLATION

INSTALLATION

1. Using a commercially available damper installer, install the 16 mm threaded rod into the crankshaft.
2. Tighten the threaded rod until it is seated to the face of the crankshaft.

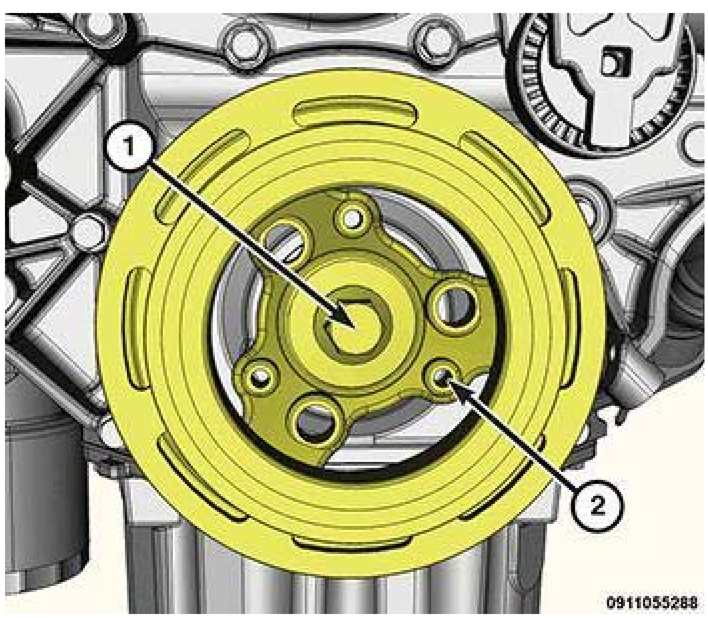


Fig. 94: Crankshaft Damper & Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Position the damper (2) on the crankshaft.
4. Install the press washer, bearing, washer, and the press nut onto the threaded rod.
5. Using Damper Installer and a deep well socket, press the damper onto the crankshaft until seated.
6. Install a New vibration damper bolt (1).
7. Position the (special tool #10386, Holder, Vibration Damper), onto the vibration damper pulley.
8. Tighten the bolt to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
9. Install the cooling fan. Refer to **FAN, COOLING, INSTALLATION** .
10. Connect the negative battery cable.

FLEXPLATE

REMOVAL

REMOVAL

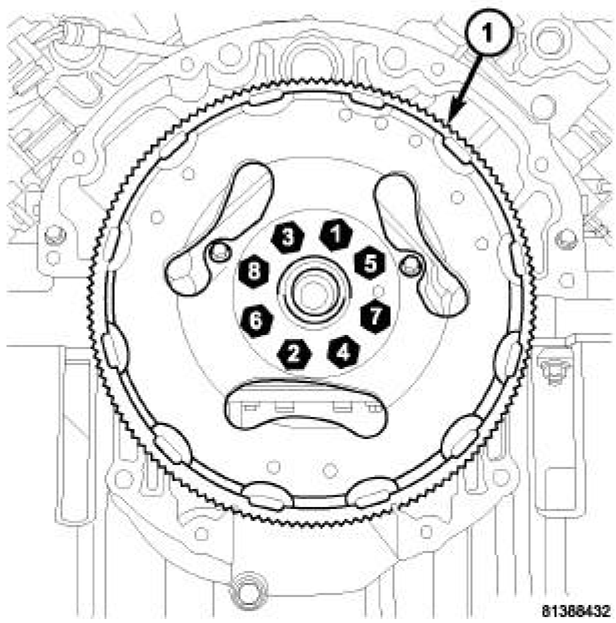


Fig. 95: Flex Plate Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transmission. Refer to **REMOVAL** .
2. Using the sequence shown in illustration, remove the flexplate (1) retaining bolts.
3. Remove the flexplate.

INSTALLATION

INSTALLATION

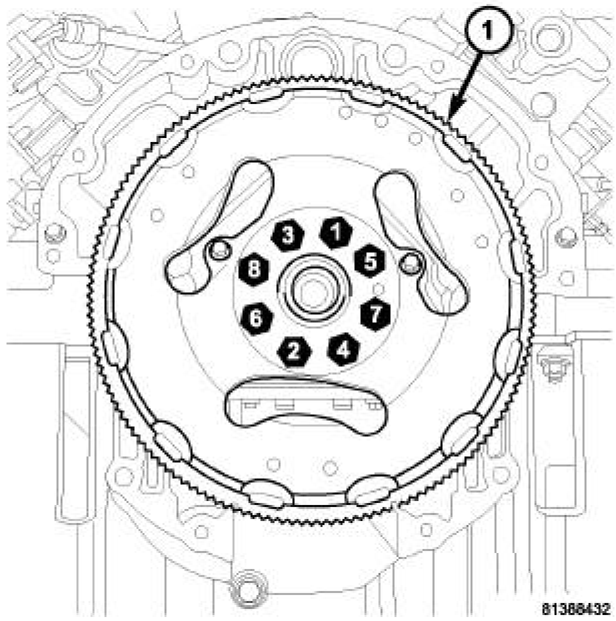


Fig. 96: Flex Plate Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Position the flexplate (1) onto the crankshaft and install the bolts finger tight.
2. Using the sequence shown in illustration, tighten the flexplate retaining bolts to the proper specification. Refer to **ENGINE SPECIFICATIONS**.
3. Install the transmission. Refer to **INSTALLATION** .

LIFTER(S), HYDRAULIC, ROLLER

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HYDRAULIC ROLLER LIFTERS

Before disassembling any part of the engine to correct lifter noise, check the oil pressure. If the vehicle has no oil pressure gauge, install a reliable gauge at the pressure sending-unit. The pressure should be between 207-552 kPa (30-70 psi) at 3, 000 RPM.

Check the oil level after the engine reaches normal operating temperature. Allow 5 minutes to stabilize oil level, check dipstick. The oil level in the pan should never be above the FULL mark or below the ADD OIL mark on the dipstick. Either of these two conditions could be responsible for noisy lifters.

OIL LEVEL

HIGH

If oil level is above the FULL mark, it is possible for the connecting rods to dip into the oil. With the engine running, this condition could create foam in the oil pan. Foam in oil pan would be fed to the hydraulic lifters by the oil pump causing them to lose length and allow valves to seat noisily.

LOW

Low oil level may allow oil pump to take in air. When air is fed to the lifters, they lose length, which allows valves to seat noisily. Any leaks on intake side of oil pump through which air can be drawn will create the same lifter action. Check the lubrication system from the intake strainer to the pump cover, including the relief valve retainer cap. When lifter noise is due to aeration, it may be intermittent or constant, and usually more than one lifter will be noisy. When oil level and leaks have been corrected, operate the engine at fast idle. Run engine for a sufficient time to allow all of the air inside the lifters to be bled out.

LIFTER NOISE DIAGNOSIS

1. To determine source of lifter noise, crank the engine with cylinder head covers removed.
2. Feel each valve spring or rocker arm to detect noisy lifter. The noisy lifter will cause the affected spring and/or rocker arm to vibrate or feel rough in operation.

NOTE: **Worn valve guides or cocked springs are sometimes mistaken for noisy lifters. If such is the case, noise may be dampened by applying side thrust on the valve spring. If noise is not noticeably reduced, it can be assumed the noise is in the lifter. Inspect the rocker arm push rod sockets and push rod ends for wear.**

3. Valve lifter noise ranges from light noise to a heavy click. A light noise is usually caused by excessive leak-down around the unit plunger or by the plunger partially sticking in the lifter body cylinder. The lifter should be replaced. A heavy click is caused by a lifter check valve not seating or by foreign particles wedged between the plunger and the lifter body. This will cause the plunger to stick in the down position. This heavy click will be accompanied by excessive clearance between the valve stem and rocker arm as the valve closes. In either case, lifter assembly should be removed for inspection and cleaning.
4. The valve train generates a noise very much like a light lifter noise during normal operation. Care must be taken to ensure that lifters are making the noise. If more than one lifter seems to be noisy, it's probably not the lifters.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL**.

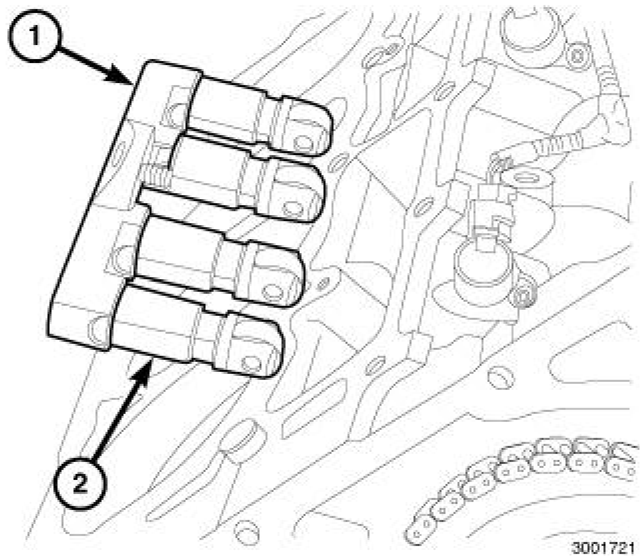


Fig. 97: Identifying Lifters & Retainers
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the lifter and retainer assembly are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

CAUTION: The lifter and retainer assembly must be installed as a unit.

3. Remove the lifters (2) and retainer (1) as an assembly.
4. Check the camshaft lobes for abnormal wear.

INSTALLATION

INSTALLATION

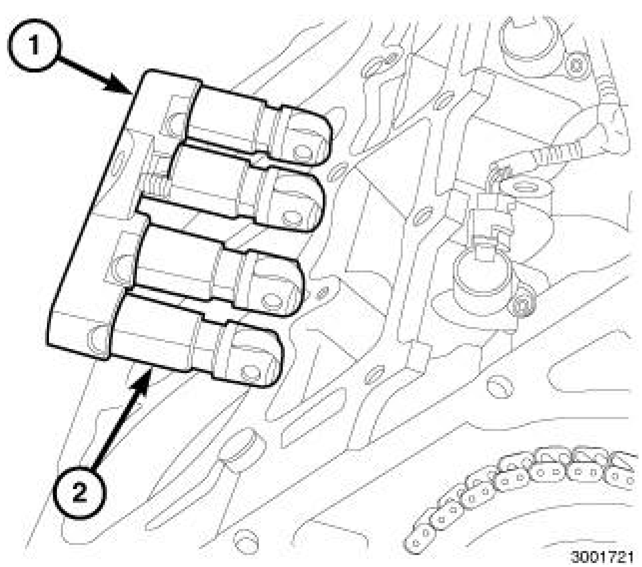


Fig. 98: Identifying Lifters & Retainers
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the lifters (2) and retainer (1) assembly with clean engine oil.

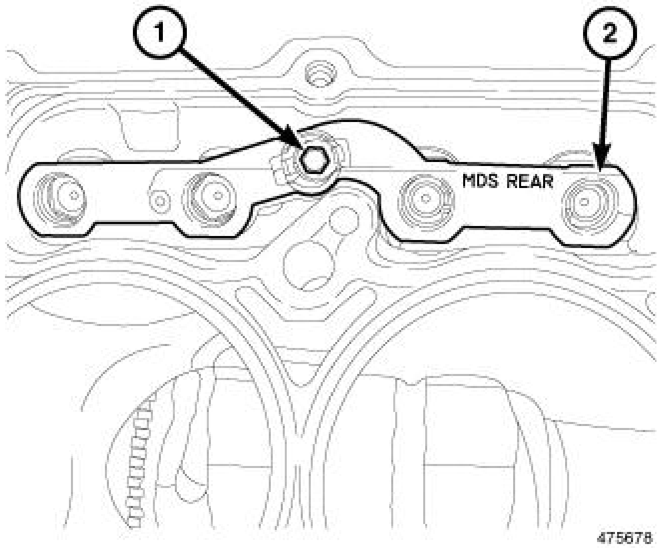


Fig. 99: Rear MDS Lifter Assembly
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the lifter and retainer assembly are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

CAUTION: The lifter and retainer must be installed as an assembly.

2. Install the lifters (2) and retainer (1) as an assembly into their original location.
3. Tighten the lifter retainer bolt (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION**.
5. Connect the negative battery cable.

CAUTION: To prevent damage to valve assemblies, do not run the engine above fast idle until all hydraulic lifters have filled with oil and have become quiet.

RETAINER, CRANKSHAFT REAR OIL SEAL

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - REAR SEAL AREA LEAKS

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and is serviced as an assembly.

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Raise and support the vehicle.
2. Remove the transmission inspection/torque converter access cover.
3. Inspect the rear of the cylinder block for evidence of oil leakage and note the following:
   - Circular spray pattern generally indicates seal leakage or crankshaft damage.

- Where leakage tends to run straight down, possible causes are a porous block, camshaft bore cup plugs, oil gallery pipe plugs, oil filter runoff and main bearing cap to cylinder block mating surfaces. See appropriate Engine component for proper repair procedures of these items.

4. If no leaks are detected, pressurize the crankcase as outlined in the **AIR LEAK DETECTION TEST METHOD**.

   CAUTION: Do not exceed 20.6 kPa (3 psi).

5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out using an emery cloth.

   CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks or scratches. The crankshaft seal flange is specially machined to complement the function of the rear oil seal.

6. For bubbles that remain steady with shaft rotation, no further inspection can be done. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL**.

REMOVAL

REMOVAL

NOTE: The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.

NOTE: The crankshaft rear oil seal retainer can not be reused after removal.

NOTE: This procedure can be performed in vehicle.

1. Disconnect the negative battery cable.
2. Remove the flexplate or flywheel. Refer to **FLEXPLATE, REMOVAL**.
3. Remove the oil pan. Refer to **PAN, OIL, REMOVAL**.

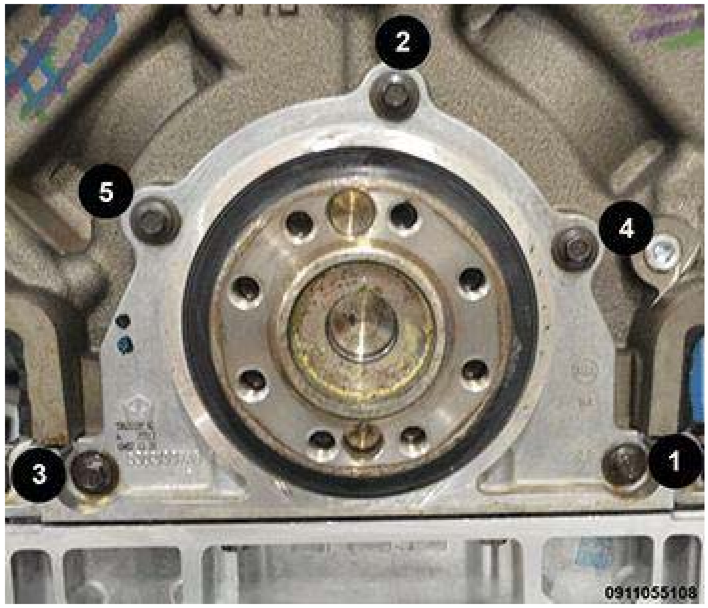


Fig. 100: Rear Oil Seal Retainer Mounting Bolts Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the sequence shown in illustration, remove the rear oil seal retainer mounting bolts.
5. Remove and discard the rear oil seal retainer.

INSTALLATION

INSTALLATION

NOTE: **The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.**

NOTE: **The crankshaft rear oil seal retainer can not be reused after removal.**

1. Thoroughly clean all gasket residue from the engine block.
2. Position the gasket onto the new crankshaft rear oil seal retainer.
3. Position the crankshaft rear oil seal retainer onto the engine block.

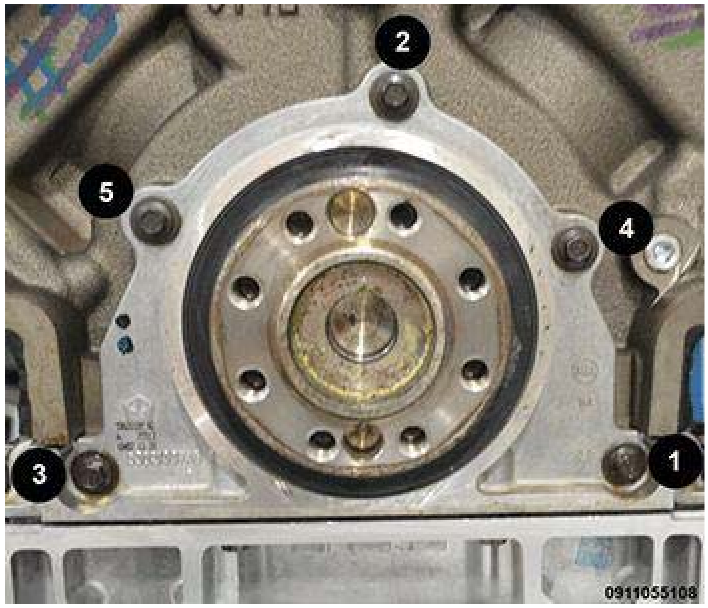


Fig. 101: Rear Oil Seal Retainer Mounting Bolts Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the sequence shown in illustration, install the crankshaft rear oil seal retainer mounting bolts and tighten to the proper specification. Refer to **ENGINE SPECIFICATIONS**.
5. Install the oil pan. Refer to **PAN, OIL, INSTALLATION**.
6. Install the flexplate or flywheel. Refer to **FLEXPLATE, INSTALLATION**.
7. Install a NEW oil filter and fill the crankcase with the specified type and amount of engine oil. Refer to **STANDARD PROCEDURE**.
8. Connect the negative battery cable.
9. Start the engine and check for leaks.

RING(S), PISTON

STANDARD PROCEDURE

STANDARD PROCEDURE

PISTON RING FITTING

CAUTION: Before reinstalling used piston rings or installing new piston rings, the piston ring clearances must be checked or engine damage may result.

1. Wipe the cylinder bore clean.
2. Insert the piston ring into the cylinder bore.

NOTE: The piston ring gap measurement must be made with the piston ring positioned at least 12 mm (0.50 inch) from bottom of cylinder bore.

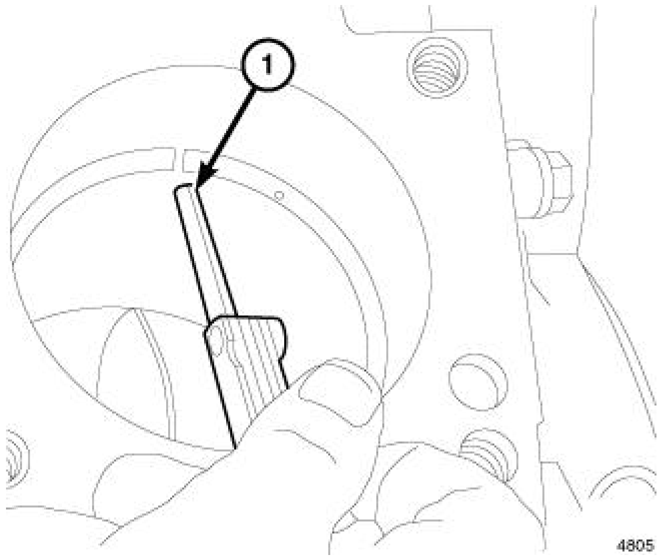


Fig. 102: Using Feeler Gauge To Check Ring End Gap
Courtesy of CHRYSLER GROUP, LLC

3. Using a piston, make sure that the piston ring is squared in the cylinder bore. Slide the piston ring downward into the cylinder.
4. Using a feeler gauge (1), check the piston ring end gap, replace any rings not within specification.

PISTON RING SIDE CLEARANCE

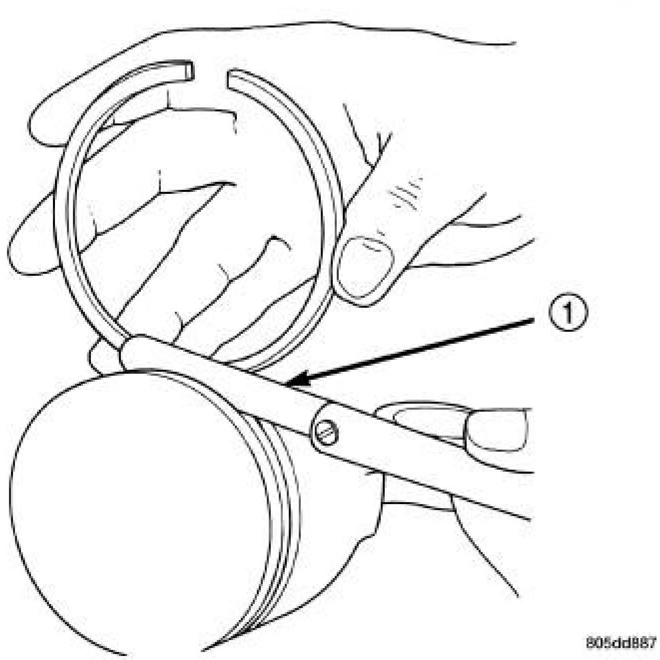


Fig. 103: Checking Piston Ring Grooves Clearances
Courtesy of CHRYSLER GROUP, LLC

NOTE: Make sure the piston ring grooves are clean and free of nicks and burrs.

1. Measure the piston ring side clearance with a feeler gauge (1) as shown in illustration. Make sure the

feeler gauge fits snugly between the piston ring land and the piston ring, replace any ring not within specification.

NOTE: **Make sure the marks on the compression rings face upward.**

2. Rotate the ring around the piston. The ring must rotate in the groove with out binding.

PISTON RING INSTALLATION

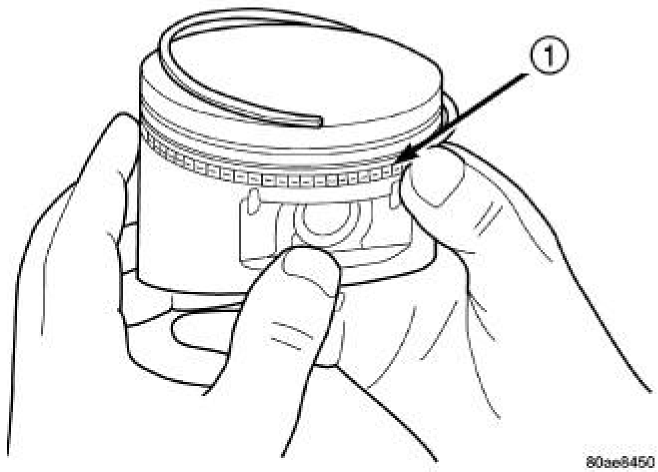


Fig. 104: Installing Piston Ring Side Rail
Courtesy of CHRYSLER GROUP, LLC

1. Install the oil ring expander.
2. Install the lower side rail by placing one end between the piston ring groove and the expander ring (1). Hold the lower side rail end firmly and press down the portion to be installed until the side rail is in position. Repeat this step for the upper side rail.

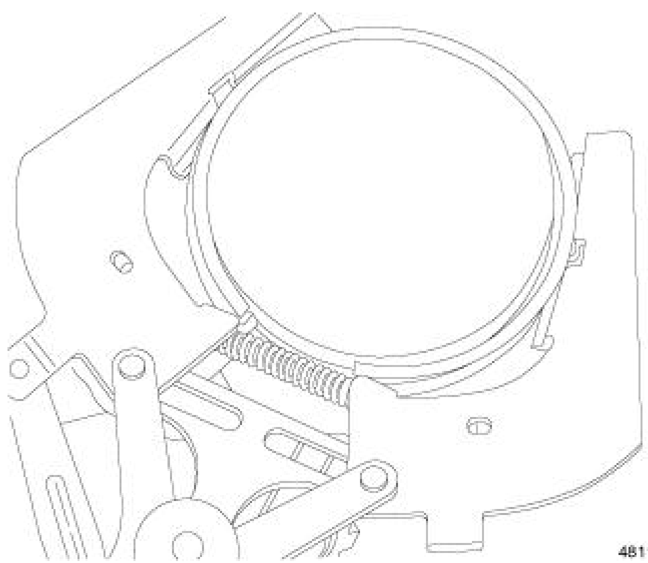


Fig. 105: Installing Upper & Intermediate Rings
Courtesy of CHRYSLER GROUP, LLC

3. Using a piston ring installer, install the No. 2 intermediate piston ring.

4. Using a piston ring installer, install the No. 1 upper piston ring.

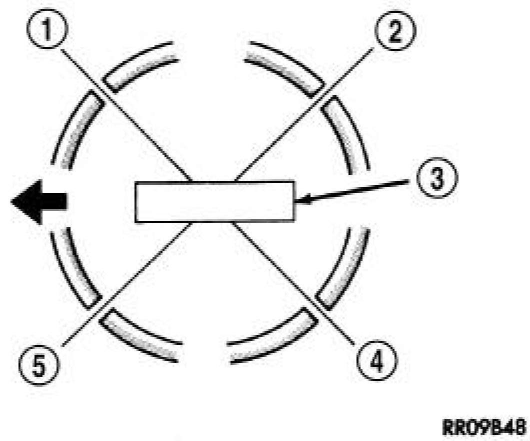


Fig. 106: Piston Ring End Gap Position
Courtesy of CHRYSLER GROUP, LLC

5. Install the oil ring expander gap at the (5) position.
6. Install the oil ring lower side rail gap at the (4) position.
7. Install the oil ring upper side rail gap at the (1) position.
8. Install the second compression ring gap at the (5) position.
9. Install the top compression ring gap at the (2) position.

ROD, PISTON AND CONNECTING

DESCRIPTION

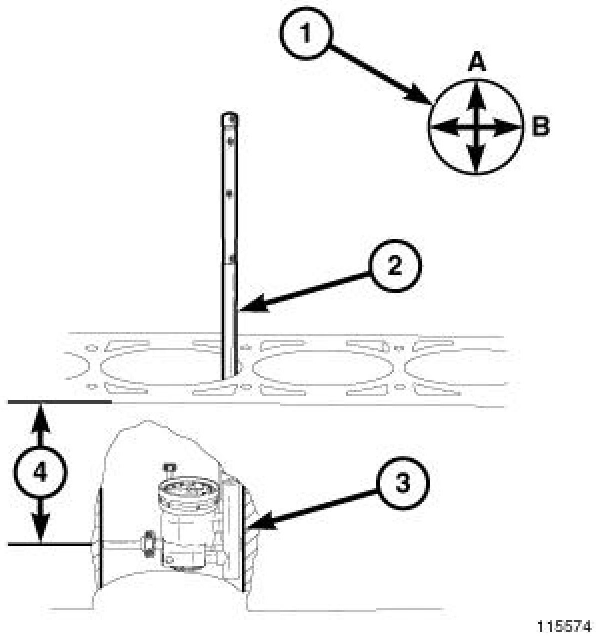
DESCRIPTION

CAUTION: Do not use a metal stamp to mark connecting rods as damage may result, instead use ink or a scratch awl.

The pistons are made of a high-strength forged aluminum alloy. Piston skirts are coated with a solid graphite lubricant to reduce friction and provide scuff resistance. The piston top ring groove and land is anodized. The connecting rods are made of forged powdered metal with a "fractured cap" design. A floating piston pin is used to attach the piston and connecting rod.

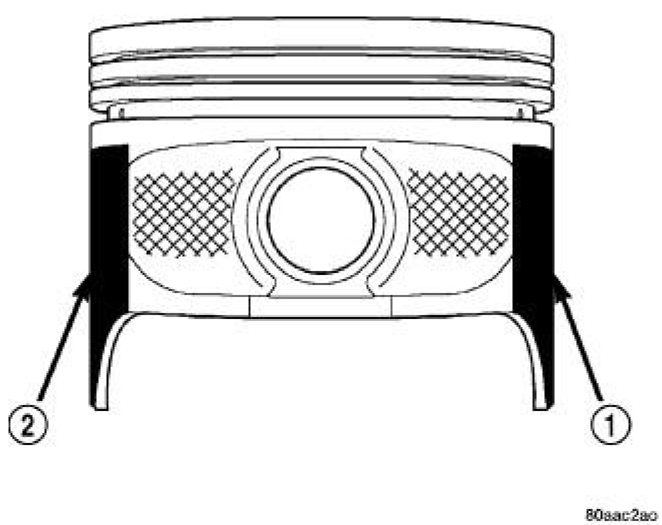
STANDARD PROCEDURE

STANDARD PROCEDURE - PISTON FITTING



[Fig. 107: Measuring Cylinder Bore Diameter](#)
Courtesy of CHRYSLER GROUP, LLC

1. Use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to correctly measure the inside diameter of the cylinder bore (3). A cylinder indicator capable of reading in 0.003 mm (0.0001 in.) increments is required. If a cylinder indicator is not available, do not use an inside micrometer.
2. Measure the inside diameter of the cylinder bore at a point 38.0 mm (1.5 inches) below top of bore (4). Start perpendicular (across or at 90Â°) to the axis of the crankshaft at point A and then take an additional bore reading 90Â° to that at point B.



[Fig. 108: Moly Coated Piston](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The coated pistons, piston pins and connecting rods are pre-assembled and serviced as an assembly.**

3. The piston and rod assembly is specific for the left cylinder bank (odd numbered) and the right cylinder bank (even numbered) and must not be interchanged.

4. The coating material (1, 2) is applied to the piston after the final piston machining process. Measuring the outside diameter of a coated piston will not provide accurate results. Therefore measuring the inside diameter of the cylinder bore with a cylinder indicator is **MANDATORY** . To correctly select the proper size piston, a cylinder indicator capable of reading in 0.003 mm (0.0001 in.) increments is required.
5. Piston installation into the cylinder bore requires slightly more pressure than that required for non-coated pistons. The bonded coating on the piston will give the appearance of a line-to-line fit with the cylinder bore.

REMOVAL

REMOVAL

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.

1. Remove the cylinder head(s). Refer to **CYLINDER HEAD, REMOVAL**.
2. Remove the oil pan. Refer to **PAN, OIL, REMOVAL**.
3. If necessary, remove the ridge on top of the cylinder bores with a reliable ridge reamer before removing pistons from engine block. **Be sure to keep the tops of the pistons covered during this operation.**

CAUTION: When removing and installing the pistons and connecting rods, do not damage the piston oil cooler jets. If the jets are bent, engine damage may occur.

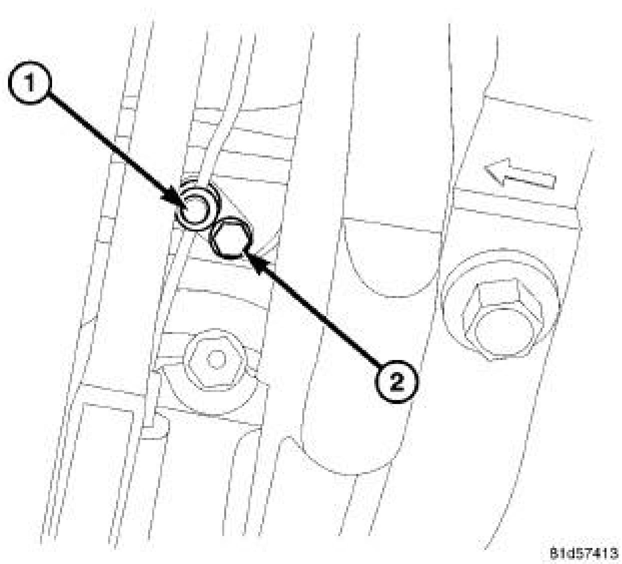


Fig. 109: Piston Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Remove the piston oil cooler jet(s) retaining bolt(s) (2) and remove the piston oil cooler jet(s) (1).

CAUTION: Do not use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur.

CAUTION: Care must be taken not to damage the fractured rod and cap joint face surfaces as engine damage may occur.

CAUTION: Care must be taken not to nick crankshaft journals as engine damage may occur.

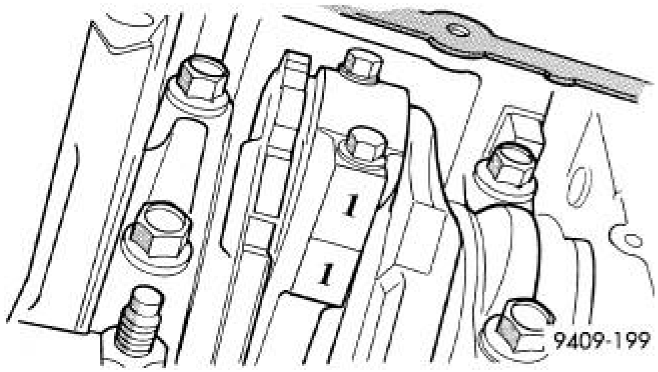


Fig. 110: Mark On Connecting Rod & Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: Connecting rods and bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.

5. Mark the connecting rod and bearing cap position using a permanent ink marker or scribe tool.

NOTE: Pistons and connecting rod assemblies must be removed from the top of the engine block. When removing the piston and connecting rod assemblies from the engine, rotate the crankshaft so each connecting rod is centered in the cylinder bore.

6. Remove the connecting rod cap and carefully remove the piston from the cylinder bore, repeat this procedure for each piston being removed.
7. Immediately after removing the piston and connecting rod, install the bearing cap on the mating connecting rod to prevent damage to the fractured cap and rod surfaces.
8. Carefully remove the piston rings from the piston(s), starting from the top ring down.

CLEANING

CLEANING

NOTE: DO NOT use a wire wheel or other abrasive cleaning devise to clean the pistons or connecting rods. The pistons have a graphite coating, this coating must not be damaged.

1. Using a suitable cleaning solvent clean the pistons in warm water and towel dry.
2. Use a wood or plastic scraper to clean the ring land grooves.

INSPECTION

INSPECTION

Check the connecting rod journal for excessive wear, taper and scoring.

Check the connecting rod for signs of twist or bending.

Check the piston for taper and elliptical shape before it is fitted into the cylinder bore. Refer to **STANDARD PROCEDURE**.

Check the piston for scoring, or scraping marks on the piston skirts. Check the ring lands for cracks and/or deterioration.

INSTALLATION

INSTALLATION

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.

NOTE: Before reinstalling used rings or installing new rings, the ring clearances must be checked.

NOTE: Make sure the piston ring grooves are clean and free of nicks and burrs.

1. Check piston ring clearance. Refer to **STANDARD PROCEDURE**.
2. Before installing piston and connecting rod assemblies into the bore, install the piston rings. Refer to **STANDARD PROCEDURE**.
3. Immerse the piston head and rings in clean engine oil and position a ring compressor over the piston and rings and tighten the ring compressor. **Make sure the position of rings do not change during this operation.**

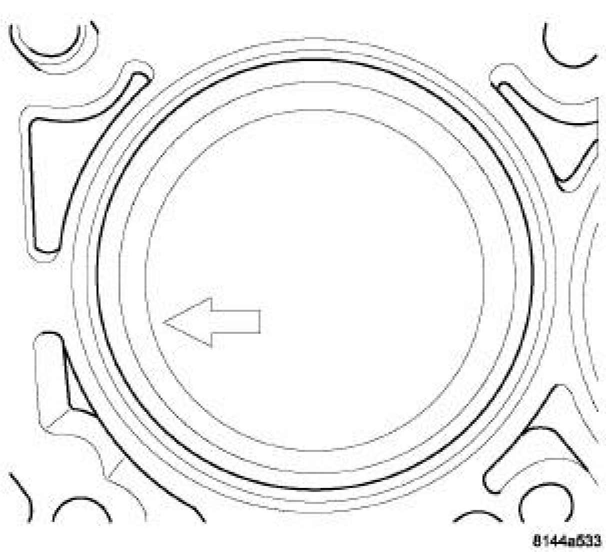


Fig. 111: Piston Direction Arrow
Courtesy of CHRYSLER GROUP, LLC

4. The pistons are marked on the piston pin bore surface with an etched "F" or arrow on top of piston indicating installation position. This mark must be pointing toward the front of the engine on both cylinder banks.
5. Wipe the cylinder bore clean and lubricate with clean engine oil.
6. Rotate the crankshaft until the connecting rod journal is centered with the cylinder bore.
7. Insert the piston and rod assembly into the cylinder bore and carefully position the connecting rod over the crankshaft journal.
8. Push the piston down in cylinder bore using a hammer handle. While at the same time, guide the connecting rod into position on crankshaft rod journal.
9. Perform the measure bearing clearance procedure. Refer to **ENGINE BLOCK, STANDARD PROCEDURE** .

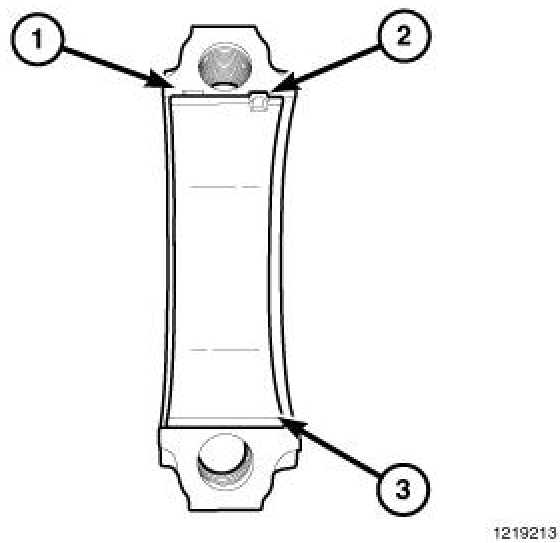


Fig. 112: Connecting Rod Cap
Courtesy of CHRYSLER GROUP, LLC

10. Wipe the connecting rod cap (1) clean and lubricate with clean engine oil and install the bearing (3).

NOTE: **The connecting rods and bearing caps are not interchangeable, line up the previously marked bearing caps and connecting rods to ensure assembly to their original location.**

11. Lubricate the bearing surfaces with clean engine oil and position the rod cap onto the connecting rod.

CAUTION: **When installing the connecting rods, make sure the wide side of the connecting rod faces the crankshaft and the narrow sides face each other.**

CAUTION: **Always replace the connecting rod bolts whenever they are loosened or removed.**

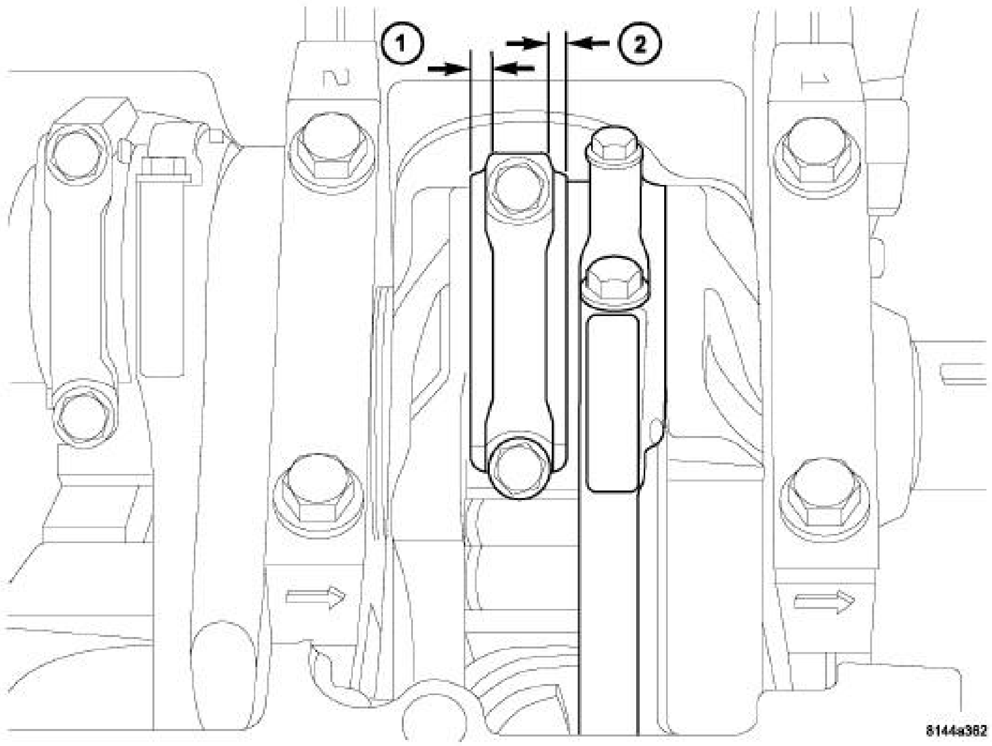


Fig. 113: Identifying Connecting Rod Proper Installation
Courtesy of CHRYSLER GROUP, LLC

12. Verify the connecting rods are properly installed, the wide side (1) of the connecting rod is facing towards the crankshaft and the narrow sides (2) of the connecting rods face each other.
13. Lubricate the new rod cap bolts with clean engine oil, install and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.

CAUTION: **When removing and installing the pistons and connecting rods, do not damage the piston oil cooler jets. If the jets are bent, engine damage may occur.**

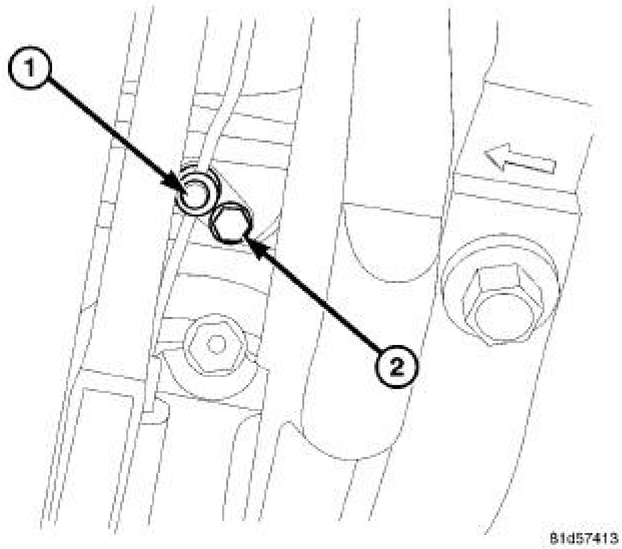


Fig. 114: Piston Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

14. Position the piston oil cooler jet(s) (1).
15. Install the piston oil cooler jet retaining bolt(s) (2) and tighten to proper specification. Refer to **TORQUE SPECIFICATIONS**.
16. Install the oil pan and oil pump pickup tube and oil pan. Refer to **PAN, OIL, INSTALLATION**.
17. Install the cylinder head(s). Refer to **CYLINDER HEAD, INSTALLATION**.
18. Connect the negative battery cable.
19. Start the engine and check for leaks.

SEAL, CRANKSHAFT OIL, FRONT

REMOVAL

REMOVAL

1. Remove the vibration damper. Refer to **DAMPER, VIBRATION, REMOVAL**.

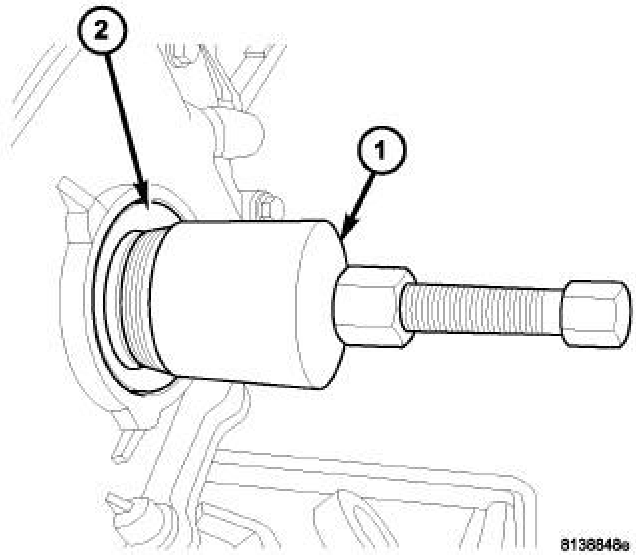


Fig. 115: Front Crankshaft Seal Removal
Courtesy of CHRYSLER GROUP, LLC

2. Using the Seal Remover (special tool #9071, Remover, Seal) (1), remove the crankshaft front seal (2).

INSTALLATION

INSTALLATION

CAUTION: The front crankshaft seal must be installed dry. Do not apply lubricant to sealing lip or to outer edge.

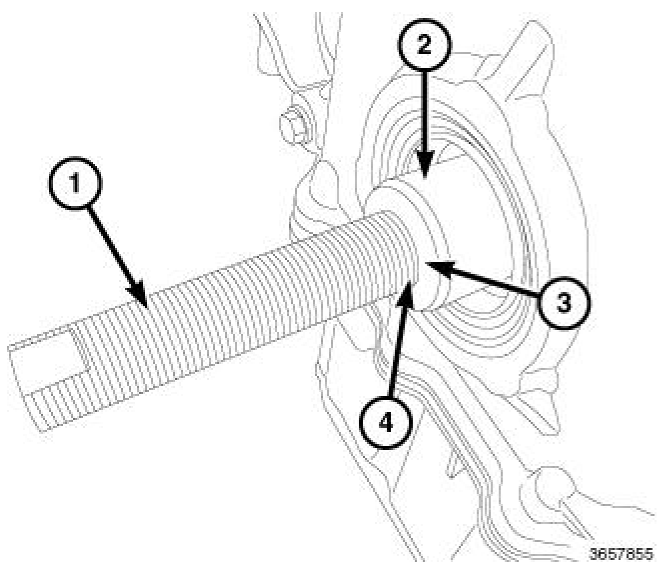


Fig. 116: Installing Vibration Damper Tool Onto Crankshaft
Courtesy of CHRYSLER GROUP, LLC

1. Install the threaded rod (1) from the (special tool #10387, Installer, Vibration Damper) into the crankshaft

(2) till seated.

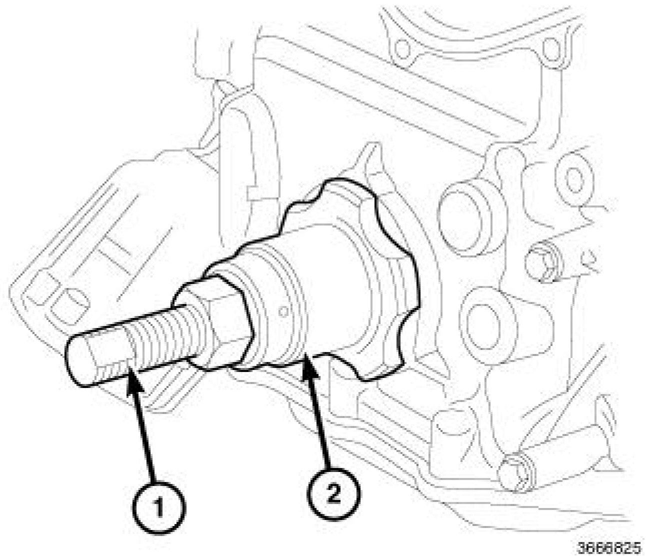


Fig. 117: Front Seal Installation
Courtesy of CHRYSLER GROUP, LLC

2. Using Seal Installer (special tool #9072, Installer, Seal) and (special tool #10387, Installer, Vibration Damper) (2), install the crankshaft front oil seal.
3. Install the vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION**.

SEAL, CRANKSHAFT OIL, REAR

DESCRIPTION

DESCRIPTION

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer. For more information, refer to the following;

- **Diagnosis and Testing:** Refer to **DIAGNOSIS AND TESTING**.
- **Removal:** Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL**.
- **Installation:** Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, INSTALLATION**.

ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, FRONT

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the supercharger assembly. Refer to **SUPERCHARGER, REMOVAL**.
3. Remove the engine oil dipstick tube retaining nut at the right exhaust manifold.
4. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

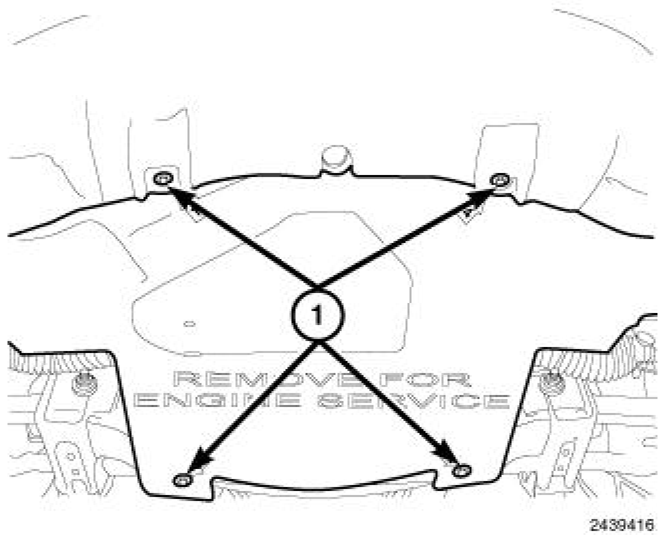


Fig. 118: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Remove the belly pan retainers (1) and remove the belly pan.

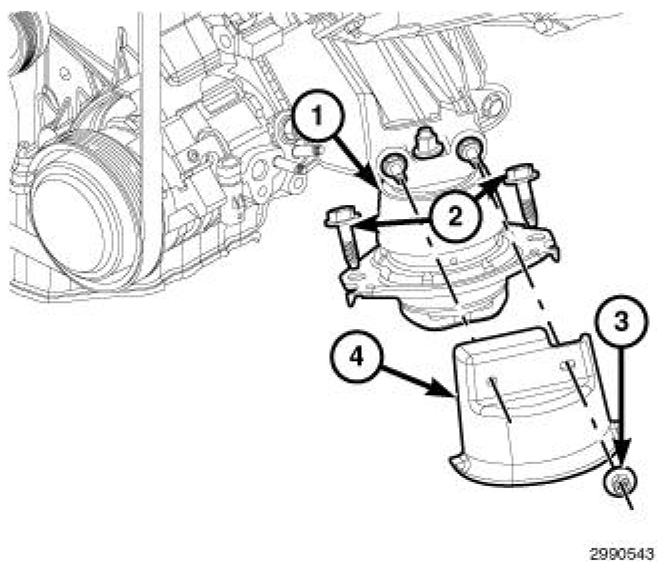


Fig. 119: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

6. Remove both left/right engine mount heat shield (4) retaining nuts (3) and remove the heat shields
7. Remove both left/right engine mount lower retaining bolts (2).
8. Lower the vehicle.
9. Remove the Variable Valve Timing Solenoid (VVTS).

Refer to **SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST, REMOVAL**.

NOTE: **Do not use air tools to install the engine lift fixture.**

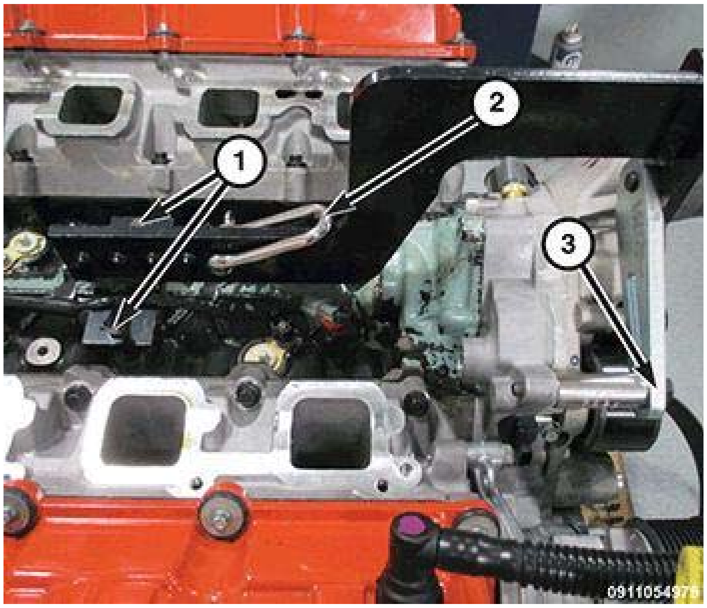


Fig. 120: Engine Lift Fixture
Courtesy of CHRYSLER GROUP, LLC

10. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (3) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (2).
11. Raise the engine to provide clearance to remove the engine mounts.
12. Raise and support the vehicle.

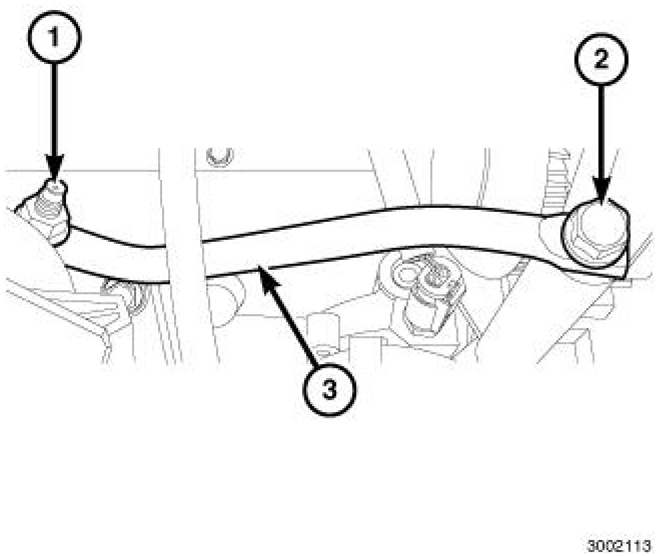


Fig. 121: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

13. Remove the generator support bracket to engine mount retaining nut (1).
14. Remove the generator support bracket retaining bolt (2) and remove the support bracket (3).

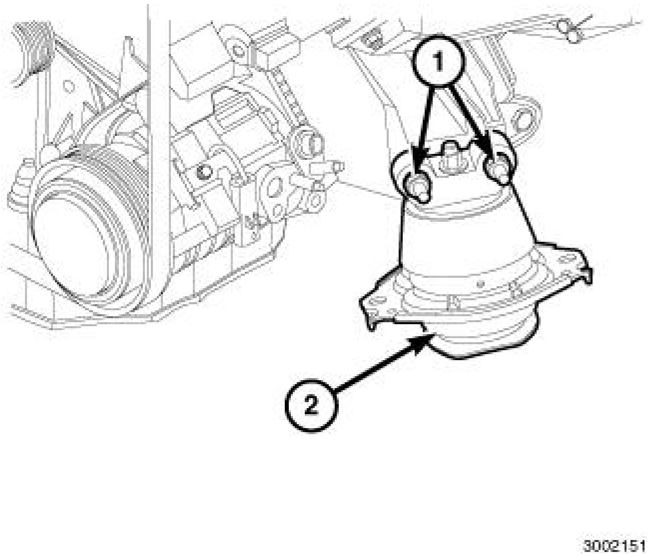


Fig. 122: Engine Mount & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Remove both left/right engine mount retaining bolts (1) and remove the engine mounts (2).

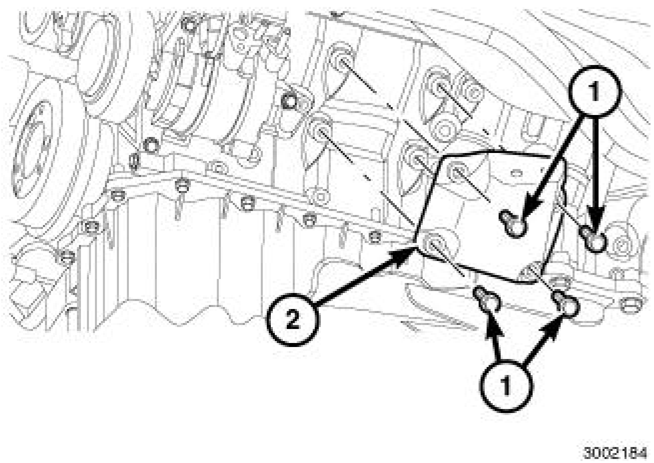


Fig. 123: Engine Mount-To-Engine Block Mounting Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

16. If necessary, remove both engine mount to engine block mounting bracket retaining bolts (1) and remove the mounting brackets (2).

INSTALLATION

INSTALLATION

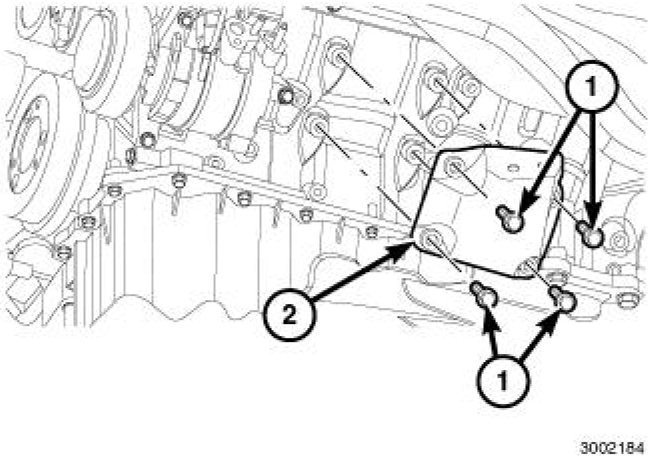


Fig. 124: Engine Mount-To-Engine Block Mounting Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If removed, position the engine mount to engine block mounting brackets, install the retaining bolts and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

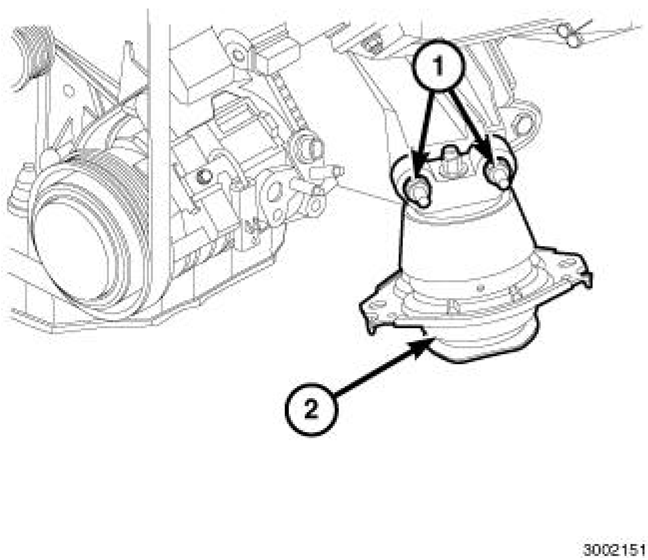
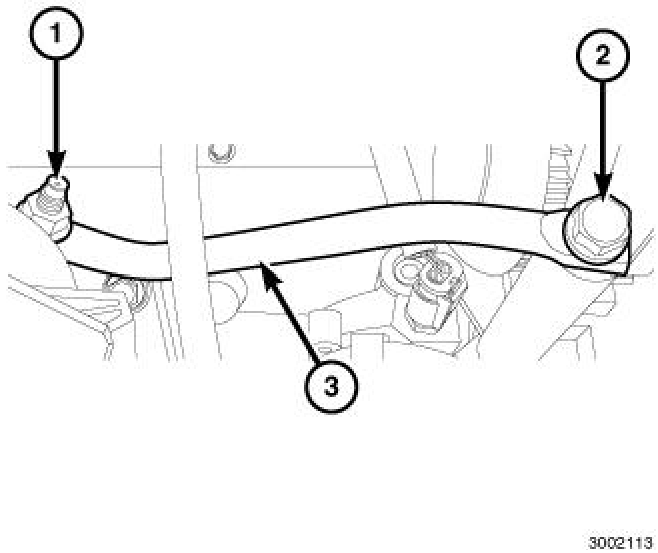


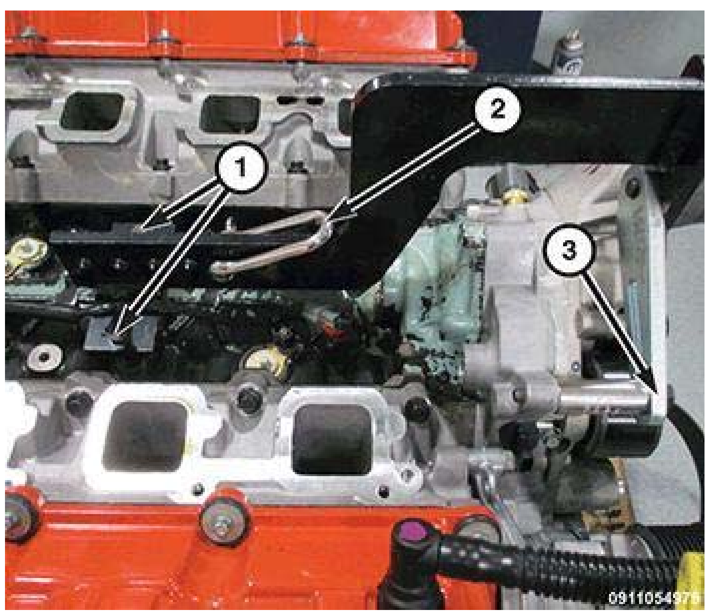
Fig. 125: Engine Mount & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Position the engine mounts (2), Install the retainers (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 126: Support Bracket, Bolt & Nut]
Courtesy of CHRYSLER GROUP, LLC

3. Position the generator support bracket (3) to the engine mount, install the retaining nut (1) and tighten finger tight.
4. Position the generator support bracket to the generator, install the retaining bolt (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
5. Tighten the generator support bracket to engine mount retaining nut to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
6. Lower the vehicle.



[Fig. 127: Engine Lift Fixture]
Courtesy of CHRYSLER GROUP, LLC

7. Lower the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3) until the engine mounts are seated in the engine cradle.
8. Remove the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter

(special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).

9. Install the Variable Valve Timing Solenoid (VVTS). Refer to **SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST, INSTALLATION**.
10. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

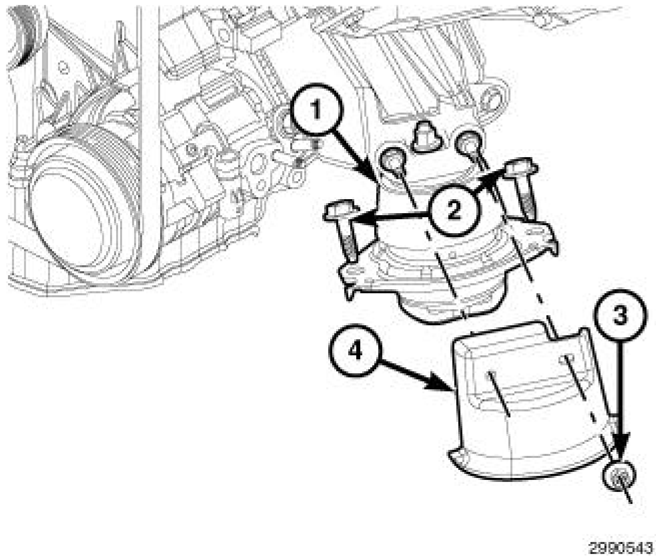


Fig. 128: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in illustration, right side similar.

11. Install both left/right engine mount lower retaining bolts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
12. Position both left/right engine mount heat shields (4), install the retaining nuts (3) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

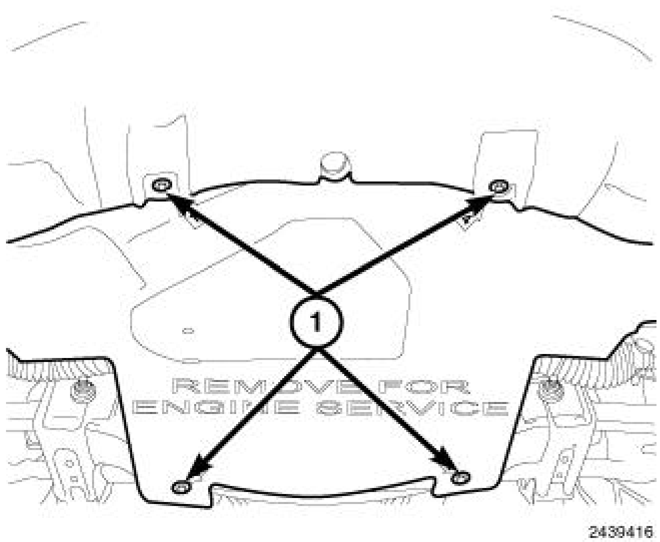


Fig. 129: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

13. Position the belly pan and install the belly pan retainers (1).
14. Lower the vehicle.
15. Position the engine oil dipstick tube, install the retaining nut at the right exhaust manifold.
16. Install the supercharger assembly. Refer to **SUPERCHARGER, INSTALLATION**.
17. Connect the negative battery cable.

INSULATOR, ENGINE MOUNT, REAR

REMOVAL

REMOVAL

AUTOMATIC TRANSMISSION

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

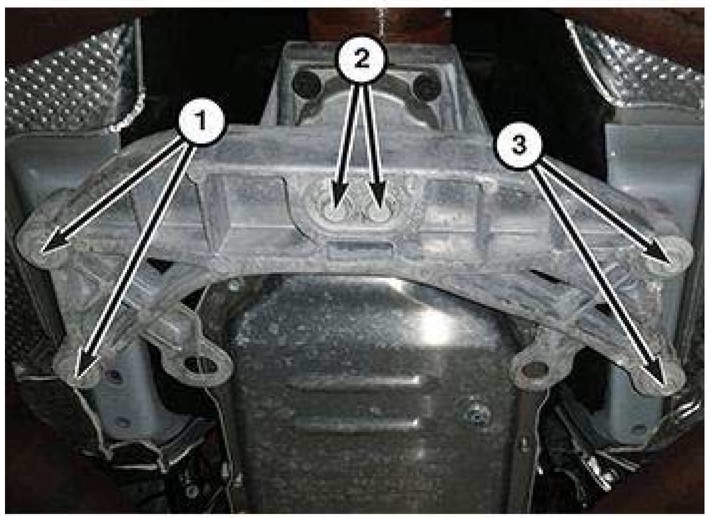


Fig. 130: Rear Support Isolator And Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Using a suitable jack, support the transmission.
3. Remove the rear transmission mount isolator bolts (2).
4. Remove the rear cross member retaining bolts (1, 3) and remove the cross member.

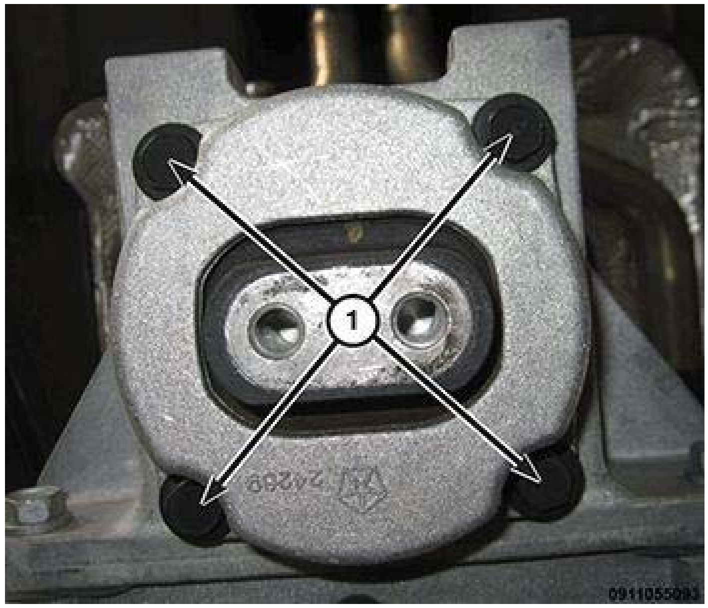


Fig. 131: Rear Transmission Mount Isolator Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear transmission mount isolator retaining bolts (1) and remove the isolator.

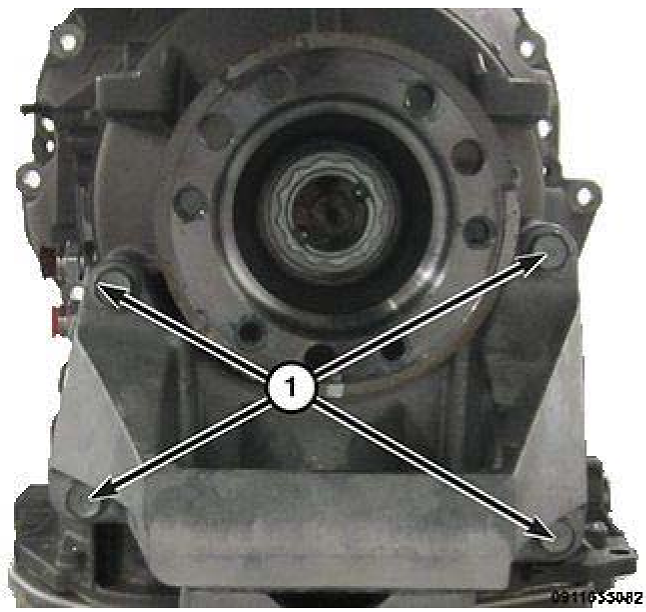


Fig. 132: Rear Transmission Mount Bracket Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

6. If required, remove the rear transmission mount bracket retaining bolts (1) from the transmission and remove the bracket.

MANUAL TRANSMISSION

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

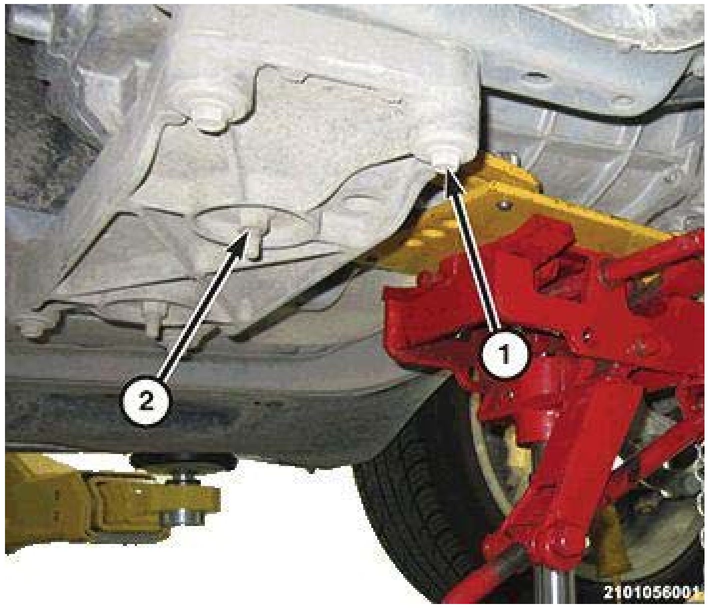


Fig. 133: Rear Cross Member & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Using a suitable jack, support the transmission.
3. Remove the rear transmission mount isolator nuts (2).
4. Remove the rear cross member retaining bolts (1) and remove the cross member.

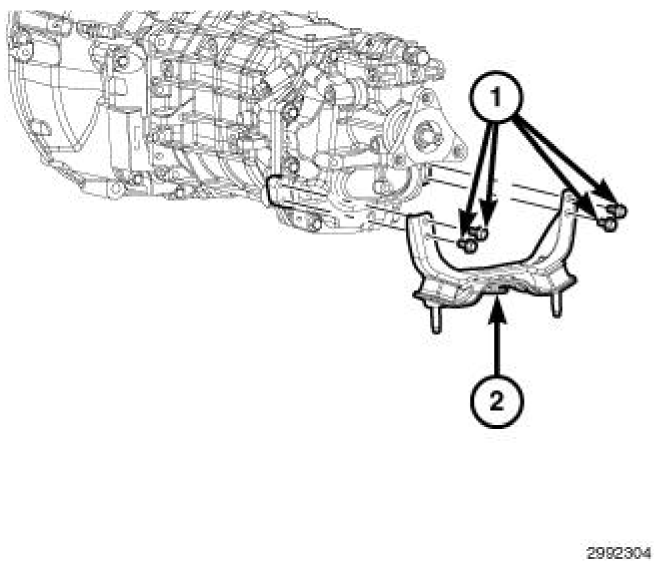


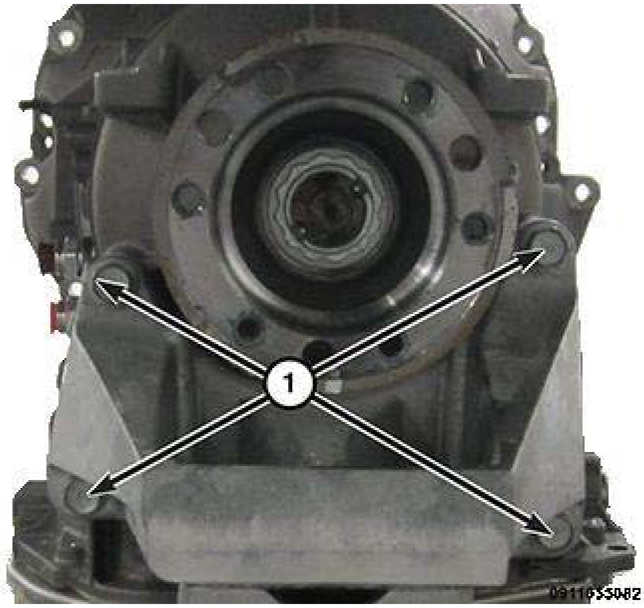
Fig. 134: Rear Transmission Mount Isolator & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove bolts (1) and the rear transmission mount isolator (2).

INSTALLATION

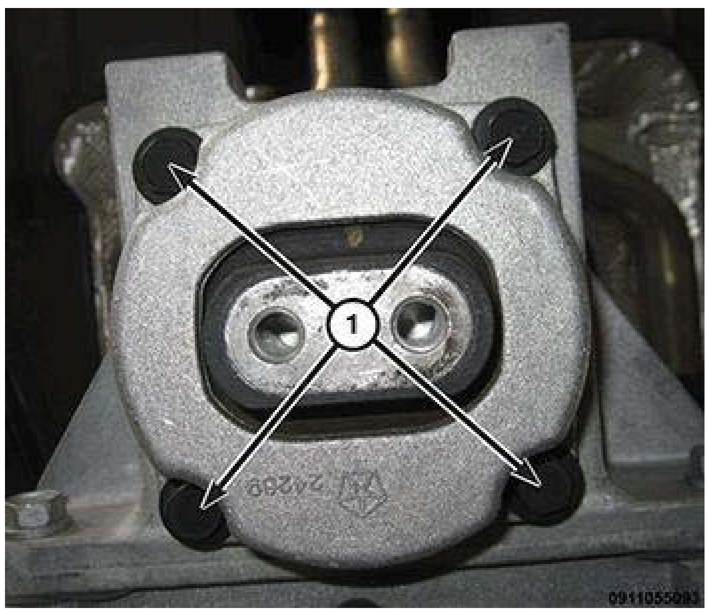
INSTALLATION

AUTOMATIC TRANSMISSION



[Fig. 135: Rear Transmission Mount Bracket Retaining Bolts]
Courtesy of CHRYSLER GROUP, LLC

1. If removed, position the rear transmission mount bracket to the transmission and tighten the retaining bolts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 136: Rear Transmission Mount Isolator Retaining Bolts]
Courtesy of CHRYSLER GROUP, LLC

2. Position the rear transmission mount isolator to the rear transmission mount bracket, install the retaining bolts (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

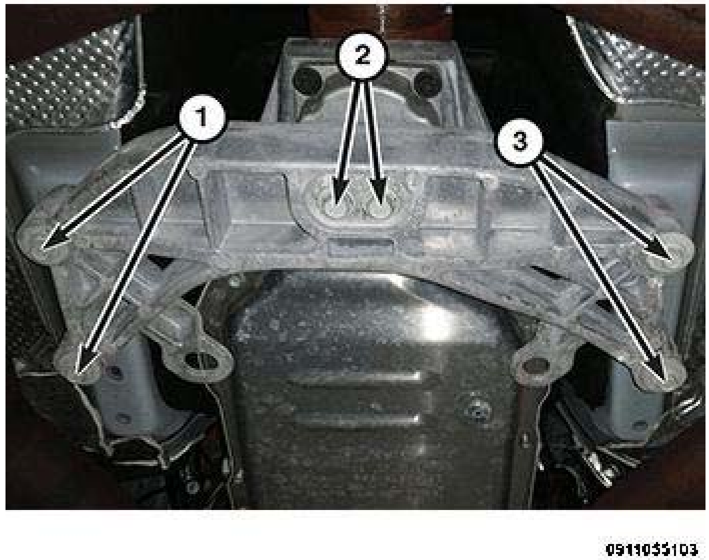


Fig. 137: Rear Support Isolator And Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Position the transmission crossmember, install the retaining bolts (1, 3) finger tight.
4. Install the rear transmission mount isolator retaining bolts (2) finger tight.
5. Tighten the transmission crossmember retaining bolts (1, 3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
6. Lower the transmission and remove the jack.
7. Tighten the rear transmission mount isolator retaining bolts (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

MANUAL TRANSMISSION

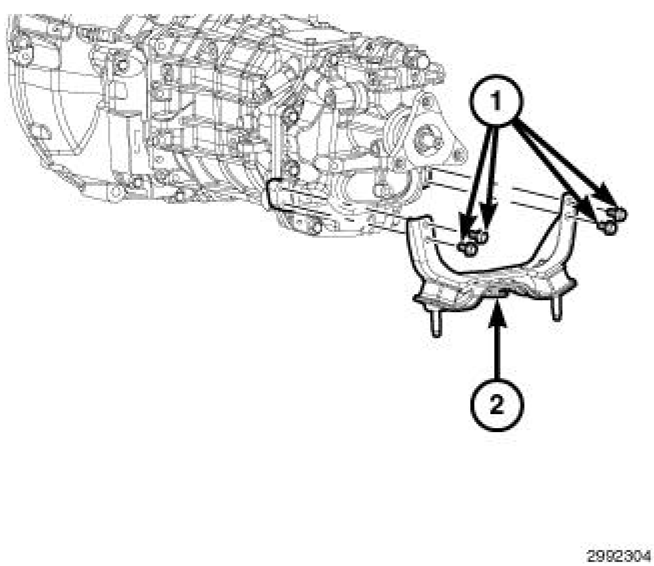


Fig. 138: Rear Transmission Mount Isolator & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the rear transmission mount isolator (2). Tighten the bolts (1) to the proper specification. Refer to

TORQUE SPECIFICATIONS.

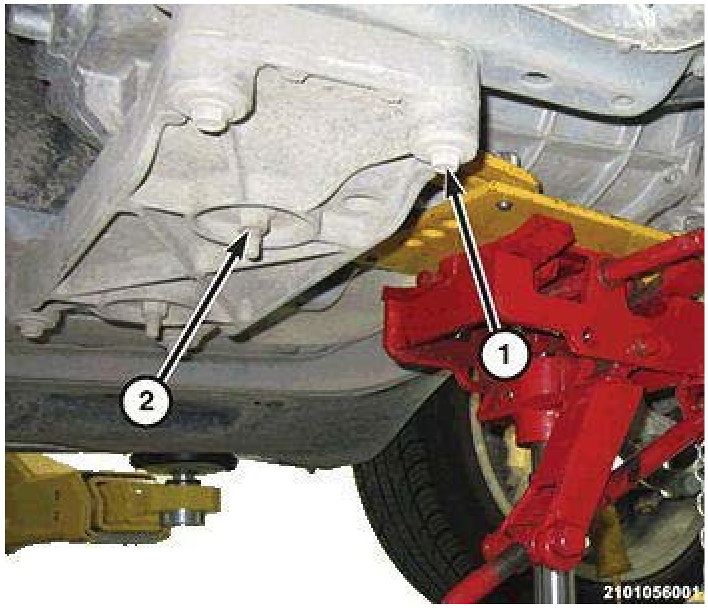


Fig. 139: Rear Cross Member & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the rear cross member and tighten bolts (1) finger tight.
3. Install the rear transmission mount isolator nuts (2) and tighten finger tight.
4. Tighten the transmission crossmember bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
5. Lower the transmission and remove the jack.
6. Tighten the rear transmission mount isolator retaining nuts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

LUBRICATION

DIAGNOSIS AND TESTING

CHECKING ENGINE OIL PRESSURE

1. Remove oil pressure sending unit and install gauge assembly (special tool #C-3292A, Gauge, Pressure).
2. Run engine until thermostat opens.
3. Check oil pressure gauge:
    - Curb Idle - 90 kPa (13 psi) minimum
    - 3000 RPM - 170 - 758 kPa (25 - 110 psi)
4. If oil pressure is 0 at idle, shut off engine. Check for a clogged oil pick-up screen or a pressure relief valve stuck open.

ENGINE OIL LEAK

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

1. Do not clean or degrease the engine at this time because some solvents may cause rubber to swell thus temporarily stopping the leak.
2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.
3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of oil leak. If the oil leak is found and identified, repair per service information procedures.
4. If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat inspection.

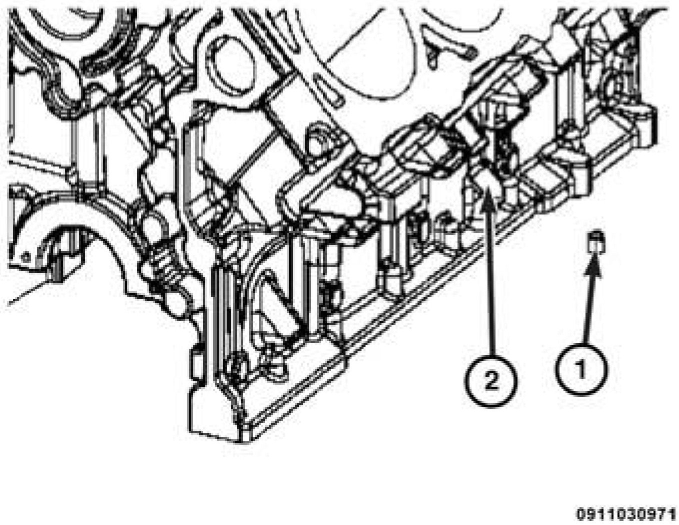


Fig. 140: Engine Oil Pan Plug Component Location
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the oil indicator tube is located in the engine oil pan. A plug (1) is inserted into the hole on the engine block (2). Validation of the plug is required when the engine block has been replaced.**

AIR LEAK DETECTION TEST METHOD

1. Remove the PCV valve, cap or plug the PCV valve port at the intake manifold.
2. Attach an air hose with a pressure gauge and regulator onto the dipstick tube.

CAUTION: **Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.**

3. Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provide the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service information procedures.
4. If the leakage occurs at the rear oil seal area, proceed with the **INSPECTION FOR REAR SEAL AREA LEAKS**.
5. If no leaks are detected, turn off the air supply and remove the air hose from the dipstick tube.

6. Remove the PCV port plug or cap at the intake manifold and install the PCV valve.
7. Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light. If the oil leak is found and identified, repair per service information procedures.

INSPECTION FOR REAR SEAL AREA LEAKS

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.
3. Remove torque converter or clutch housing inspection cover.
4. Using a black light and inspect the rear of the engine block for evidence of oil.

   Circular spray pattern on the rear of the engine block generally indicates:

   - Rear crankshaft oil seal
   - Damaged crankshaft

   Oil running straight down the back of the engine block generally indicates:

   - Porous engine block
   - Camshaft core hole plug
   - Oil gallery pipe plug
   - Oil pan gasket
5. If no leaks are detected, pressurize the crankcase as outlined in the **AIR LEAK DETECTION TEST METHOD**.

   CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.

6. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and crankshaft oil seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out with emery cloth.

   CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is machined specifically to complement the function of the rear oil seal.

7. For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled.

SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST

DESCRIPTION

DESCRIPTION

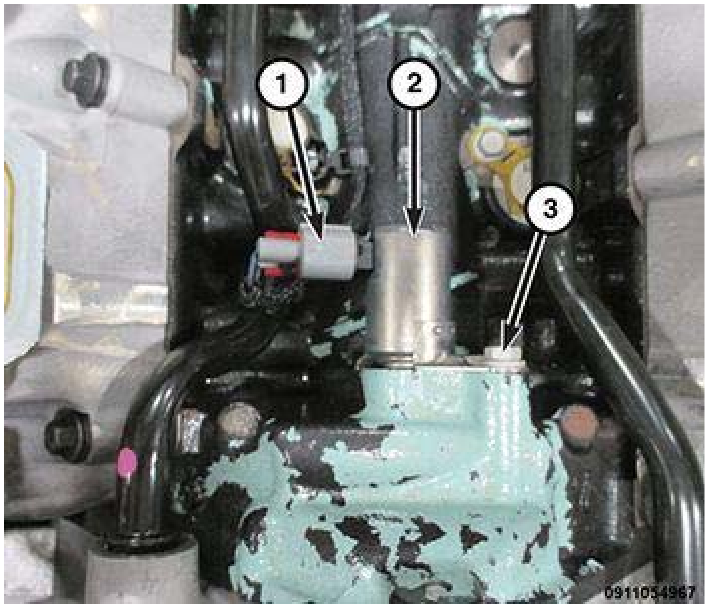


Fig. 141: Variable Valve Timing Solenoid, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

The 6.2L engine is equipped with Variable Valve Timing (VVT). This system uses a Variable Valve Timing Solenoid (VVTS) to control the oil pressure to direct oil pressure to the camshaft phaser assembly. The camshaft phaser assembly advances and/or retards camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy and reduce emissions. The VVTS (2) is located under the supercharger assembly.

OPERATION

OPERATION

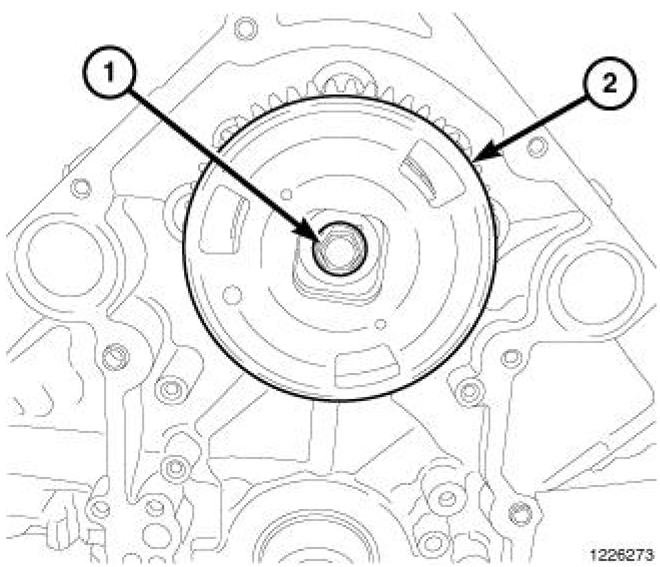


Fig. 142: Camshaft Phaser & Bolt
Courtesy of CHRYSLER GROUP, LLC

The Variable Cam Timing (VCT) assembly is actuated with engine oil pressure. The oil flow to the VCT

assembly is controlled by an Variable Valve Timing Solenoid (VVTS). The VVTS consists of a Pulse Width Modulated (PWM) solenoid and a spool valve. The Powertrain Control Module (PCM) actuates the VVTS to control oil flow through the spool valve into the VCT assembly. The VCT assembly consists of a rotor and a stator/sprocket. The stator/sprocket is connected to the timing chain. The rotor is connected to the camshaft. Oil flow into the VCT assembly rotates the rotor with respect to the stator, thus rotating the camshaft with respect to the stator/sprocket. This will rotate both the intake and exhaust lobes on the camshaft by the same amount. The intake and exhaust lobes can not be individually controlled with this VCT system. An infinitely variable valve timing position can be achieved within the limits of the hardware. The camshaft position sensor monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

REMOVAL

REMOVAL

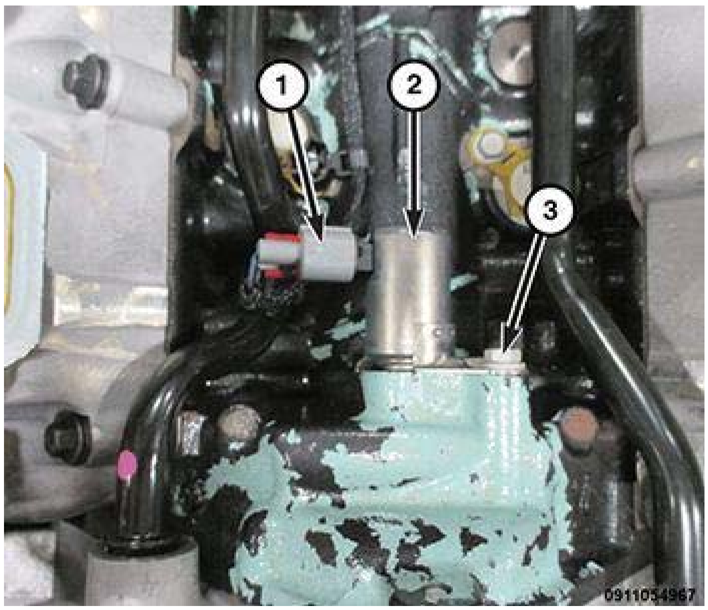


Fig. 143: Variable Valve Timing Solenoid, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Variable Valve Timing Solenoid (VVTS) (2) is located under the supercharger assembly.

1. Remove the supercharger. Refer to **SUPERCHARGER, INSTALLATION**.
2. Disconnect VVTS electrical connector (1).
3. Remove VVTS retaining bolt (3).

NOTE: To remove the VVTS, the engine must be at room temperature.

4. Rotate the VVTS to break the seal and remove.

INSTALLATION

INSTALLATION

1. Lubricate the Variable Valve Timing Solenoid (VVTS) rubber O-ring seal with clean engine oil.

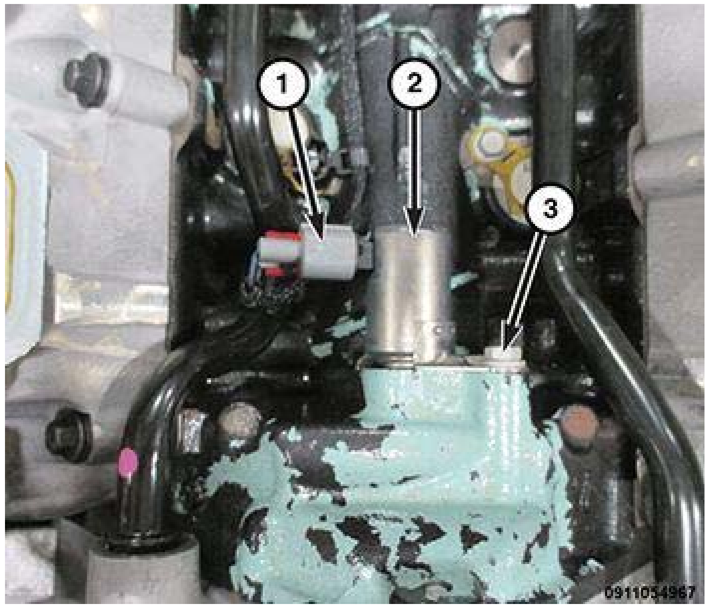


Fig. 144: Variable Valve Timing Solenoid, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Install the VVTS (2) and rotate into position.
3. Install the VVTS retaining bolt (3) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Connect VVTS electrical connector (1).
5. Install the supercharger. Refer to **SUPERCHARGER, INSTALLATION**.

COOLER, OIL

DESCRIPTION

DESCRIPTION

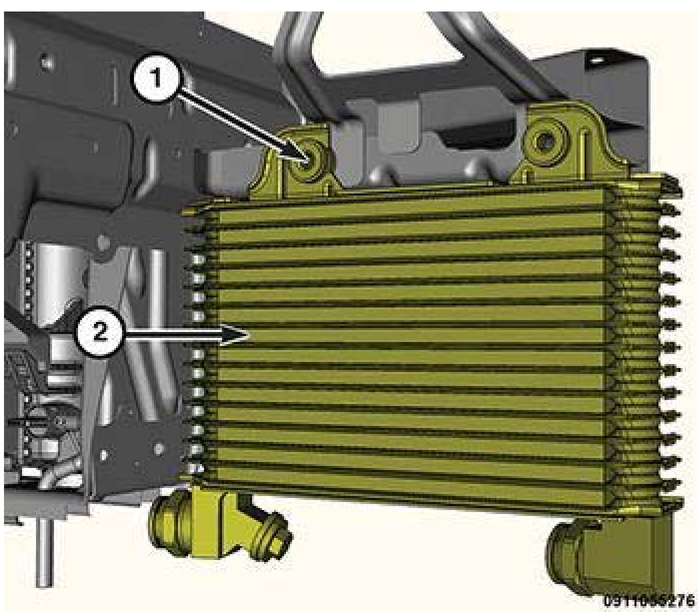


Fig. 145: Engine Oil Cooler & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

The engine oil cooler (2) is engineered for maximum cooling efficiency with no restriction in oil flow. The oil cooler is mounted (1) behind the front fascia, on the right side of the vehicle.

The engine oil cooler uses the external air flow across cooling fins, to maintain a consistent engine oil temperature.

NOTE: **The engine oil cooler contains an additional drain plug that must be removed when changing engine oil.**

REMOVAL

REMOVAL

CAUTION: **If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.**

1. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .

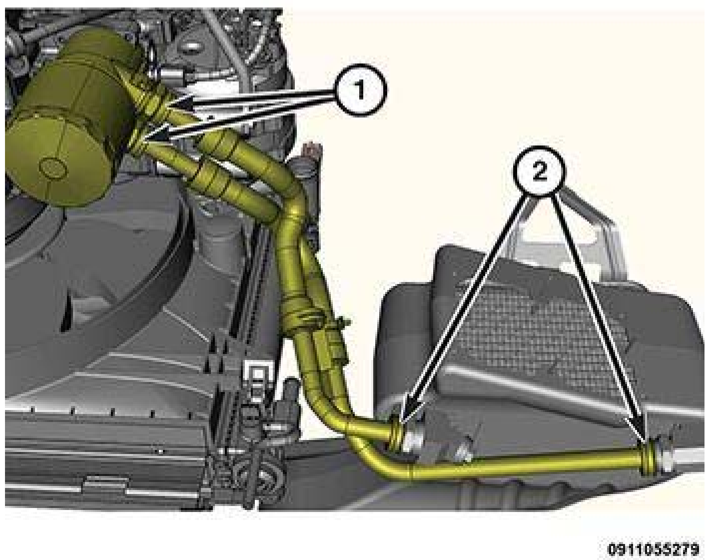


Fig. 146: Quick Connect Spring Clips & Quick Connect Spring Clips
Courtesy of CHRYSLER GROUP, LLC

2. Drain the engine oil from the oil cooler, using the drain plug located on the bottom of the oil cooler.
3. Disconnect the quick connect spring clips (2) from the oil cooler.
4. If replacing the oil cooler lines, disconnect the quick connect spring clips (1) from the oil filter adapter.

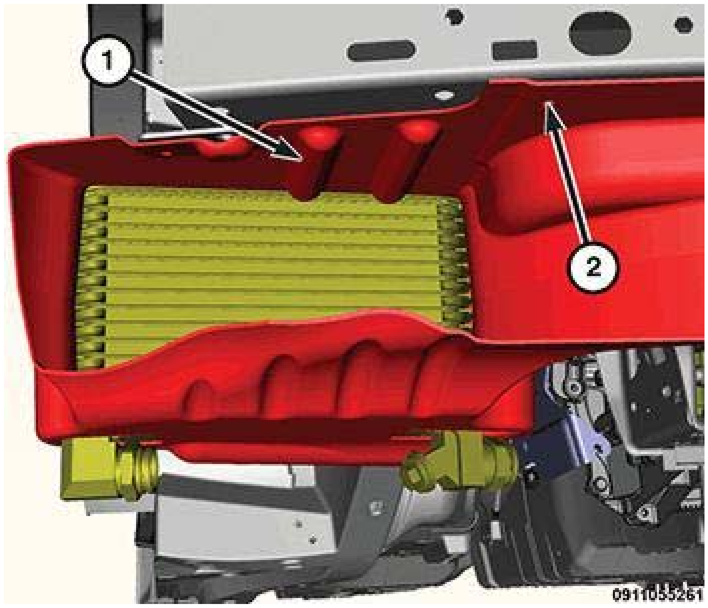


Fig. 147: Oil Cooler Shroud & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Remove the fasteners (2) from the oil cooler shroud (1) and remove the shroud.

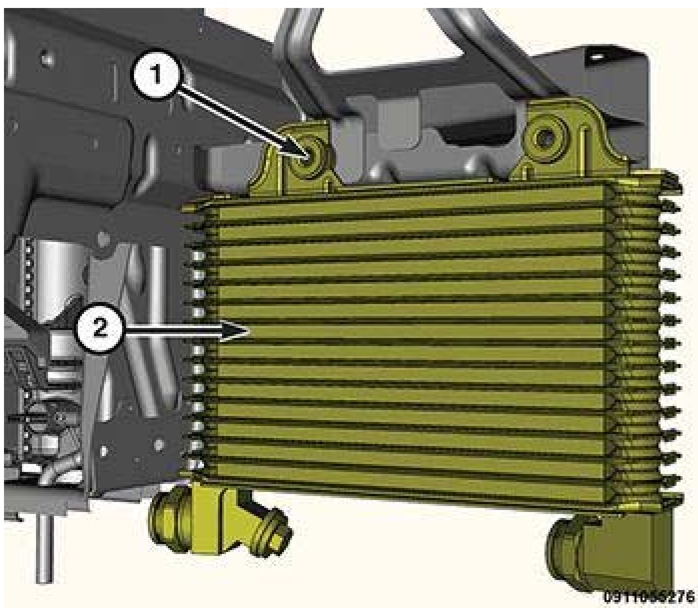


Fig. 148: Engine Oil Cooler & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the oil cooler retaining bolts (1) and remove the oil cooler (2).

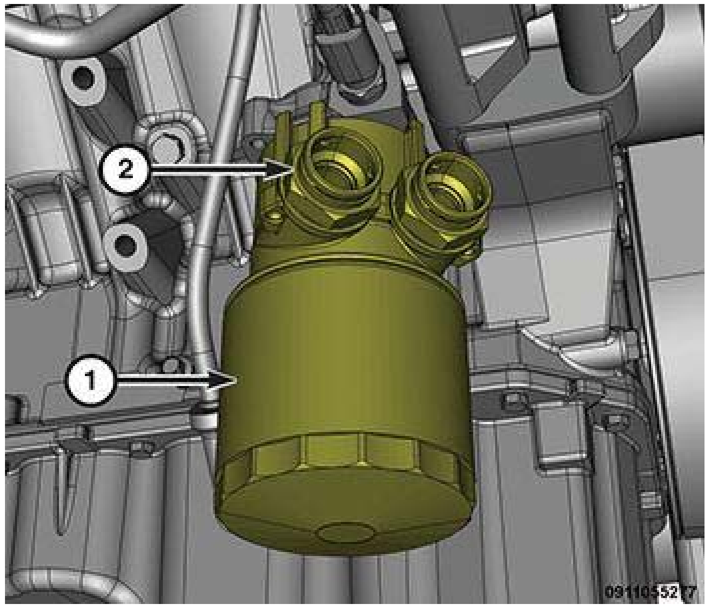


Fig. 149: Oil Filter & Oil Filter Adapter
Courtesy of CHRYSLER GROUP, LLC

7. If replacing the oil filter adapter (2), remove the oil filter (1) from the oil filter adapter.
8. Remove the oil filter adapter retaining screw.

NOTE: **Whenever the oil filter adapter is serviced, the rubber O-ring seal must be replaced.**

INSTALLATION

INSTALLATION

CAUTION: **If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.**

NOTE: **Whenever the oil filter adapter is serviced, the rubber O-ring seal must be replaced.**

1. Clean the sealing surface of the oil cooler and install a new rubber O-ring seal.
2. Lightly lubricate the oil cooler rubber O-ring seal with clean engine oil.

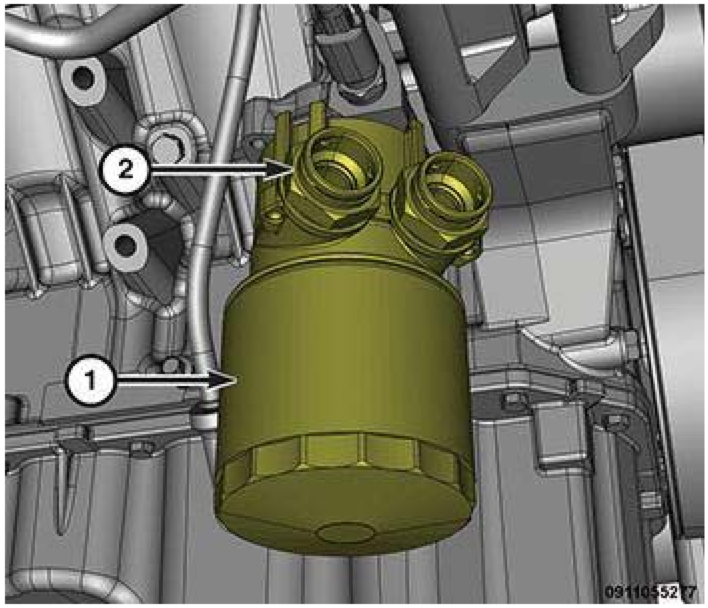


Fig. 150: Oil Filter & Oil Filter Adapter
Courtesy of CHRYSLER GROUP, LLC

3. Install the oil filter adapter retaining screw and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.
4. Lightly lubricate the oil filter gasket with clean engine oil.

NOTE: **Do not over tighten the oil filter.**

5. Thread the oil filter (1) onto the oil filter adapter (2) oil filter boss.
6. When the oil filter gasket makes contact with the oil cooler sealing surface, hand tighten the oil filter one half turn, or 180Ā°.

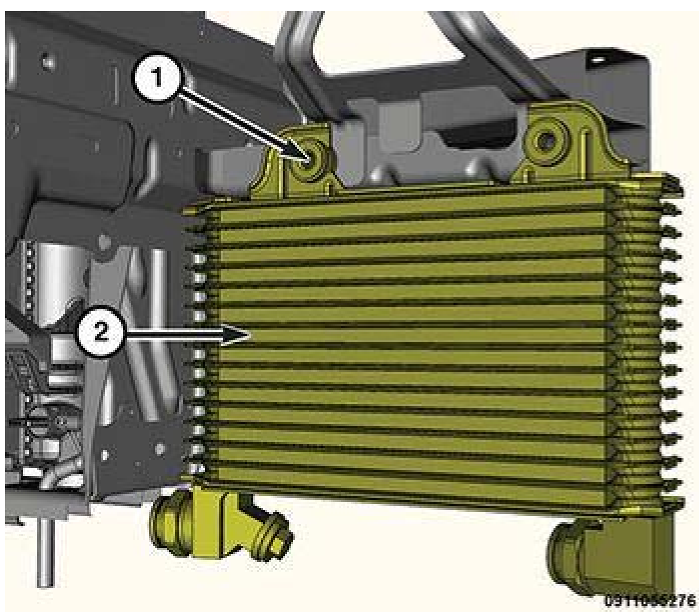


Fig. 151: Engine Oil Cooler & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Install the oil cooler (2) retaining bolts (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

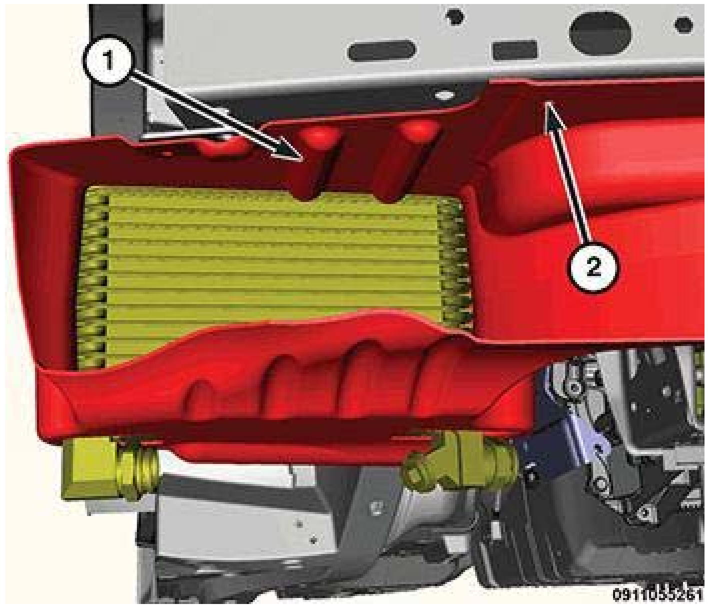


Fig. 152: Oil Cooler Shroud & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Position the oil cooler shroud (1) to the oil cooler and install the retainers (2).

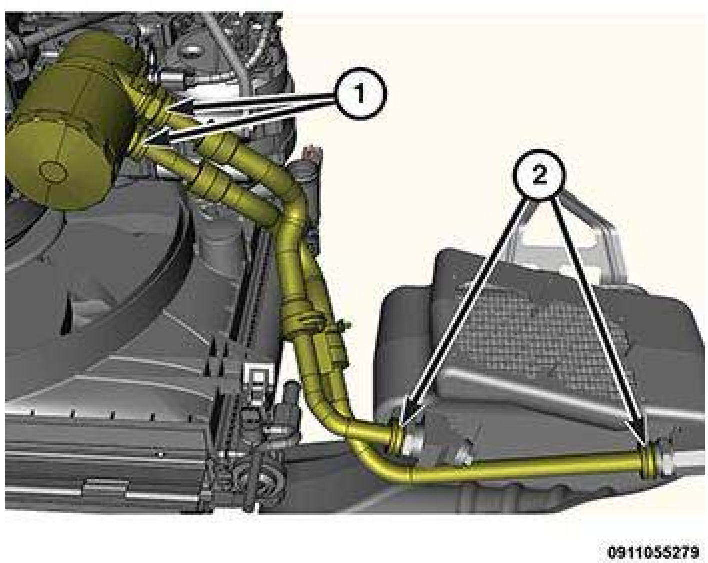


Fig. 153: Quick Connect Spring Clips & Quick Connect Spring Clips
Courtesy of CHRYSLER GROUP, LLC

9. Connect the oil cooler lines to the quick connect fittings on the oil filter adapter (1) and the oil cooler (2).

NOTE: **Gently pull outward on each line after connected to verify a secure connection.**

10. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .

11. Fill the engine oil. Refer to **STANDARD PROCEDURE**.
12. Start the engine and check for leaks.
13. Turn the engine off and check the oil level.

FILTER, ENGINE OIL

REMOVAL

REMOVAL

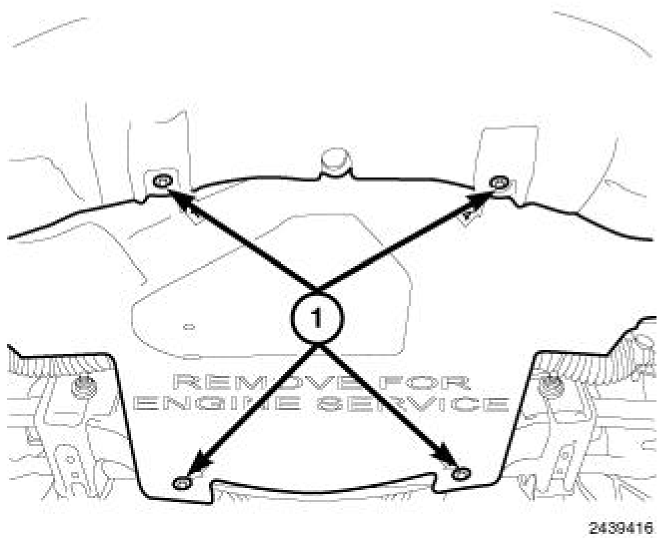


Fig. 154: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the belly pan retainers (1) and remove the belly pan.
3. Position a drain pan under the oil filter.

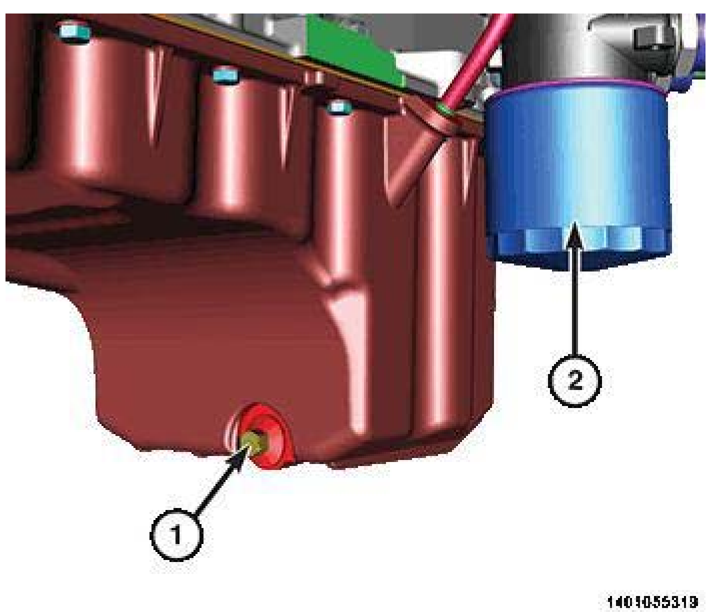


Fig. 155: Oil Pan Drain Plug & Oil Filter

Courtesy of CHRYSLER GROUP, LLC

4. Using a suitable oil filter wrench, rotate the oil filter (2) counterclockwise to remove it from the oil filter adapter.
5. When the oil filter separates from the oil filter adapter, keep the gasket end upward to minimize oil spill and remove the oil filter from vehicle.

NOTE: **Make sure the oil filter gasket was removed with the oil filter.**

6. Using a wiping cloth, clean the oil cooler gasket sealing surface of oil and grime.

INSTALLATION

INSTALLATION

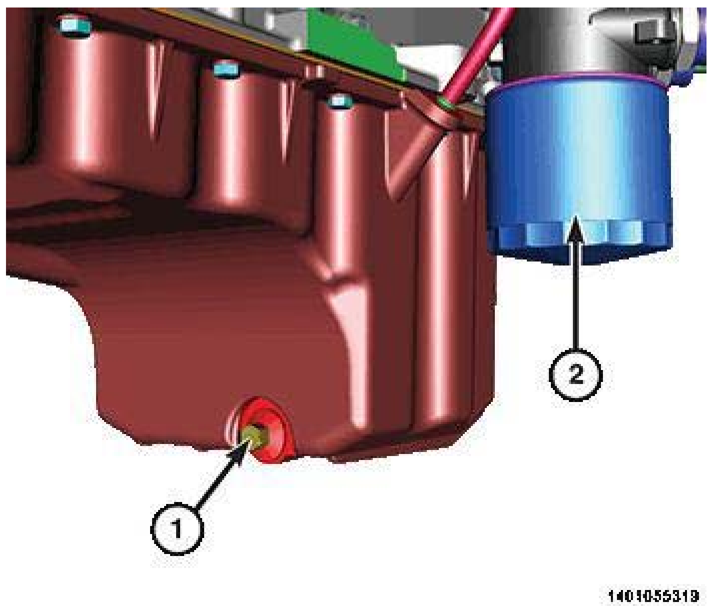


Fig. 156: Oil Pan Drain Plug & Oil Filter
Courtesy of CHRYSLER GROUP, LLC

1. Lightly lubricate the oil filter gasket with clean engine oil.

NOTE: **Do not over tighten the oil filter.**

2. Thread the oil filter (2) onto the oil filter adapter.
3. When the oil filter gasket makes contact with the oil filter adapter sealing surface, hand tighten the oil filter one half turn, or 180Ā°.

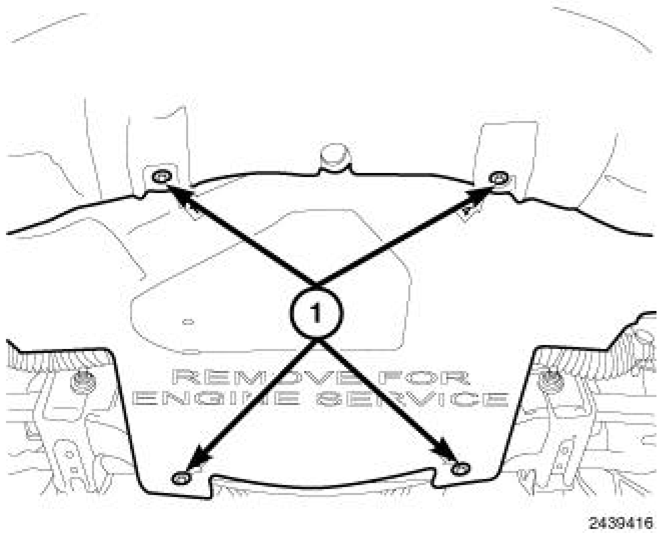


Fig. 157: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Position the belly pan to the under side of the vehicle and install the retainers (1).
5. Remove the support and lower the vehicle.
6. Fill the crankcase with the specified type and amount of engine oil. Refer to **STANDARD PROCEDURE**.
7. Install the oil fill cap.
8. Start the engine and check for leaks.
9. Turn the engine off and check the oil level.

JET, PISTON OIL COOLER

DESCRIPTION

DESCRIPTION

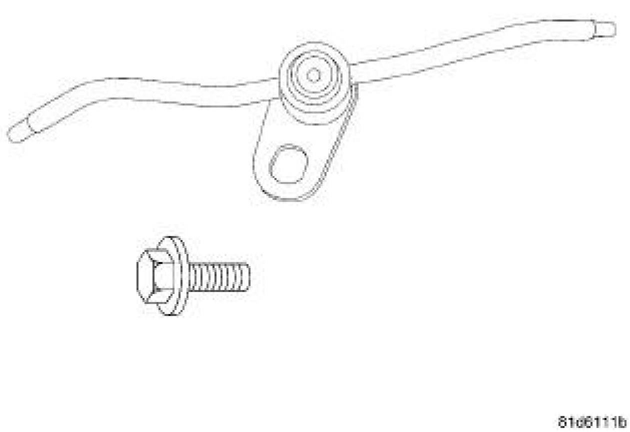


Fig. 158: Engine Oil Jet & Bolt

Courtesy of CHRYSLER GROUP, LLC

Four dual-nozzle oil jets are bolted to the cylinder block underneath the main oil gallery. The jets connect with an oil-tight fit to the main gallery through lubrication passages. Each oil jet helps cool the two opposing pistons.

REMOVAL

REMOVAL

1. Remove the oil pan and oil pump pickup tube. Refer to **PAN, OIL, REMOVAL**.

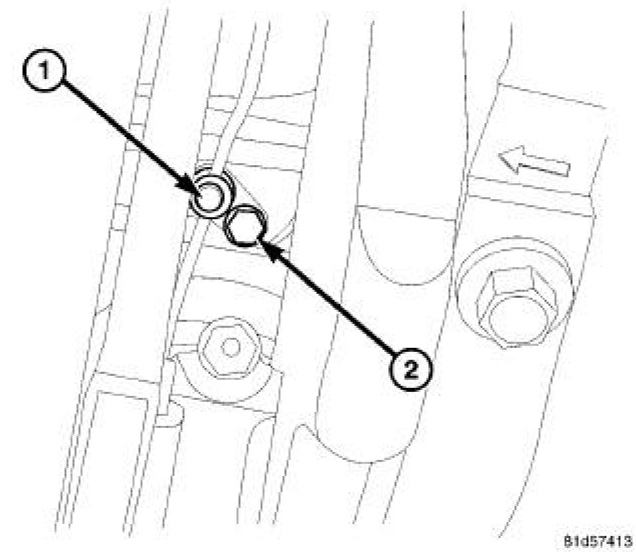


Fig. 159: Piston Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It may be necessary to rotate the engine crankshaft to access the piston oil cooler jet retaining bolts.**

2. Remove the piston oil cooler jet retaining bolt (2).
3. Remove the piston oil cooler jet (1).

INSTALLATION

INSTALLATION

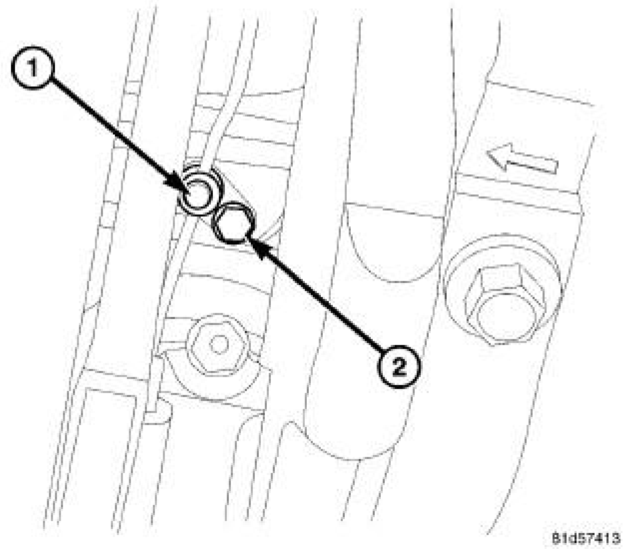


Fig. 160: Piston Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Position the piston oil cooler jet (1).
2. Install the piston oil cooler jet retaining bolt 2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
3. Install the engine oil pump pickup tube and oil pan. Refer to **PAN, OIL, INSTALLATION**.

OIL

STANDARD PROCEDURE

STANDARD PROCEDURE - ENGINE OIL SERVICE

CRANKCASE OIL LEVEL INSPECTION

The oil level indicator is located on the right side of the engine.

CAUTION: **Do not overfill crankcase with engine oil, pressure loss or oil foaming can result.**

Inspect the engine oil level approximately every 800 kilometers (500 miles). Unless the engine has exhibited loss of oil pressure, run the engine for about ten minutes before checking the oil level. Checking the engine oil level on a cold engine is not accurate.

To ensure proper lubrication of an engine, the engine oil must be maintained at an acceptable level. The acceptable levels are indicated between the ADD and SAFE marks on the engine oil level indicator.

1. Position the vehicle on the level surface.
2. With the engine off, allow approximately five minutes for the oil to settle to the bottom of the crankcase and then remove the engine oil level indicator.
3. Wipe the oil level indicator clean.
4. Install the oil level indicator and verify it is seated in the tube.

5. Remove the oil level indicator, with the handle held above the tip, observe the oil level reading.
6. Add oil only if the level is below the ADD mark on the oil level indicator.

ENGINE OIL CHANGE

Change the engine oil at the mileage and time intervals described in the Maintenance Schedules. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .

1. Run the engine until it reaches normal operating temperature, then shut off the engine.
2. Remove the oil fill cap.
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Remove the belly pan. Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL** .
5. Place a suitable drain pan under the oil pan drain.

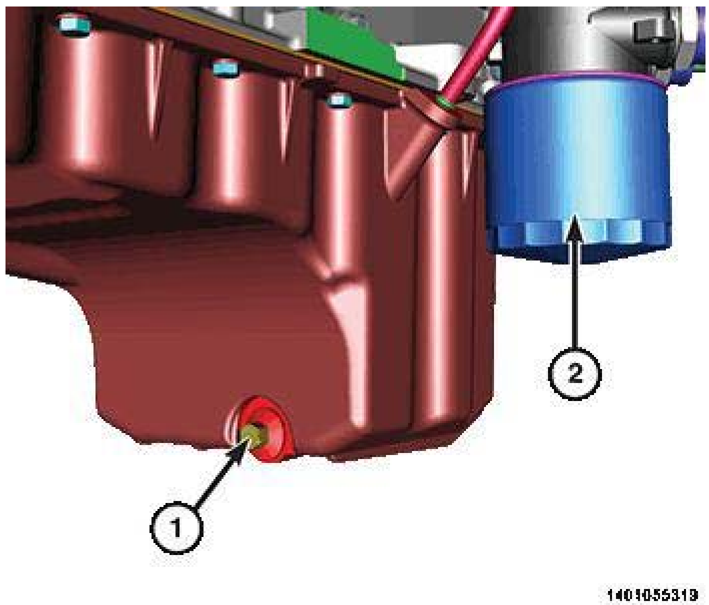


Fig. 161: Oil Pan Drain Plug & Oil Filter
Courtesy of CHRYSLER GROUP, LLC

6. Remove the drain plug (1) from the oil pan and allow the oil to drain.
7. Remove the oil filter (2).

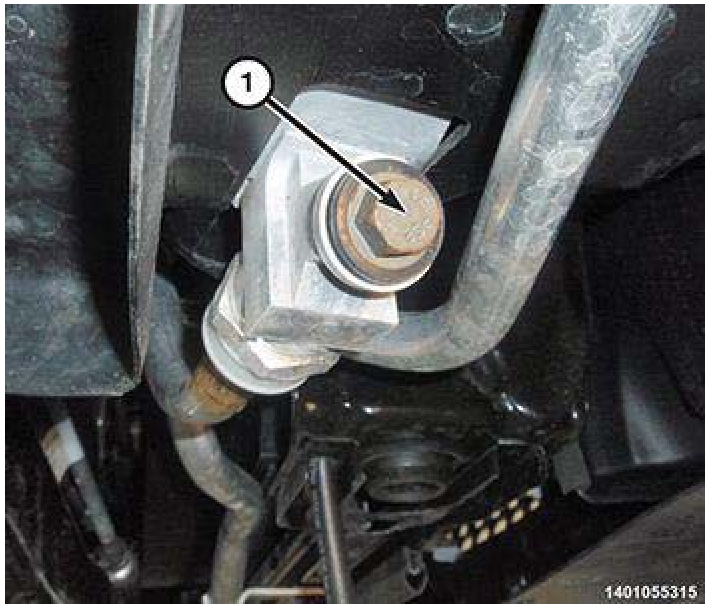


Fig. 162: Engine Oil Cooler Drain Plug
Courtesy of CHRYSLER GROUP, LLC

8. Place a suitable drain pan under the engine oil cooler.
9. Remove the drain plug (1) from the engine oil cooler and allow the oil to drain.

NOTE: **Allow oil to drain until there is only one drip every second, approximately five minutes.**

10. Lightly lubricate the NEW oil filter gasket with clean engine oil.
11. Fill the NEW oil filter with fresh engine oil.
12. Thread the oil filter onto the oil filter adapter.

NOTE: **Do not over tighten the oil filter.**

13. When the oil filter gasket makes contact with the oil filter adapter sealing surface, hand tighten the oil filter one half turn, or 180Â°.
14. Clean any residual oil that may have dripped onto the oil cooler hoses (3, 4).
15. Inspect the drain plug threads for stretching or other damage and replace if necessary.
16. Install both drain plugs and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
17. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** or **BELLY PAN, ENGINE, INSTALLATION** .
18. Lower the vehicle and fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
19. Install the oil fill cap.
20. Start the engine and check for leaks.
21. Stop the engine and after five minutes, check the oil level.

NOTE: **Care should be exercised when disposing of used engine oil.**

PAN, OIL

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the supercharger assembly. Refer to **SUPERCHARGER, REMOVAL**.

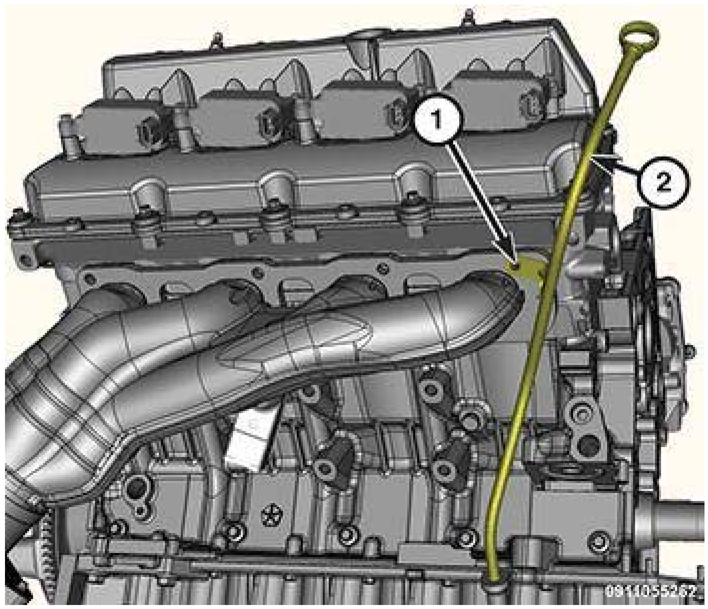


Fig. 163: Engine Oil Tube, Dipstick & Fastener
Courtesy of CHRYSLER GROUP, LLC

3. Remove the engine oil tube fastener (1) from the exhaust manifold.
4. Remove the engine oil dipstick and tube (2) from the oil pan.
5. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

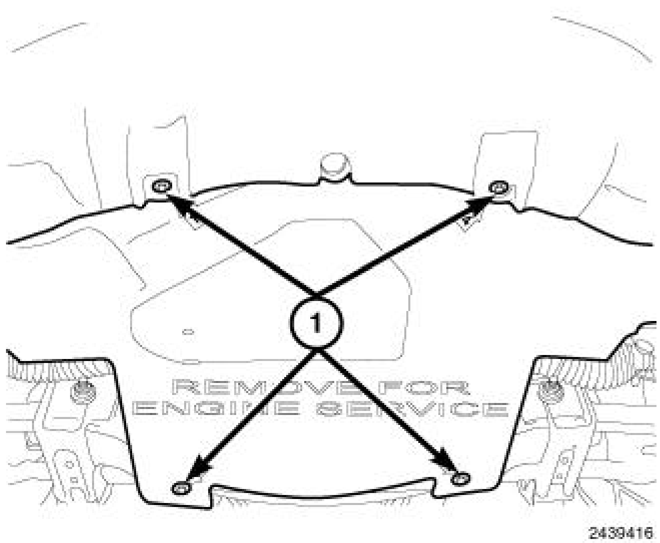


Fig. 164: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Remove the belly pan retainers (1) and remove the belly pan.

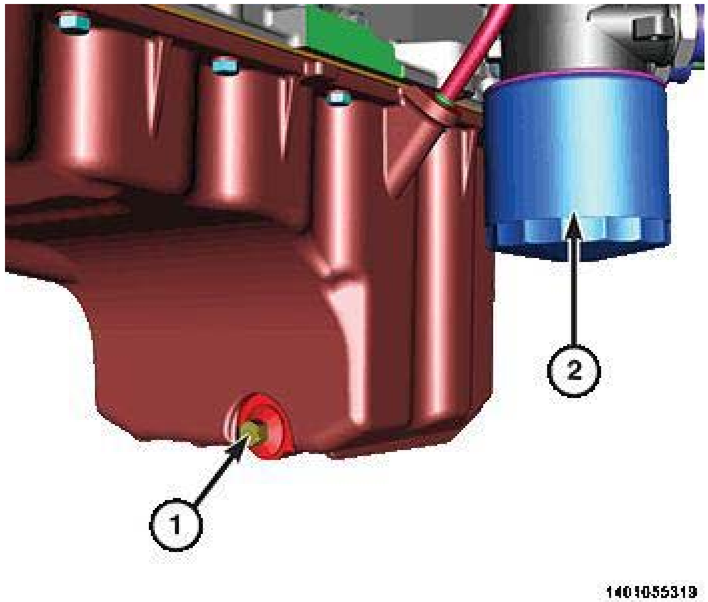


Fig. 165: Oil Pan Drain Plug & Oil Filter
Courtesy of CHRYSLER GROUP, LLC

7. Drain the engine oil (1) and remove the oil filter (2).

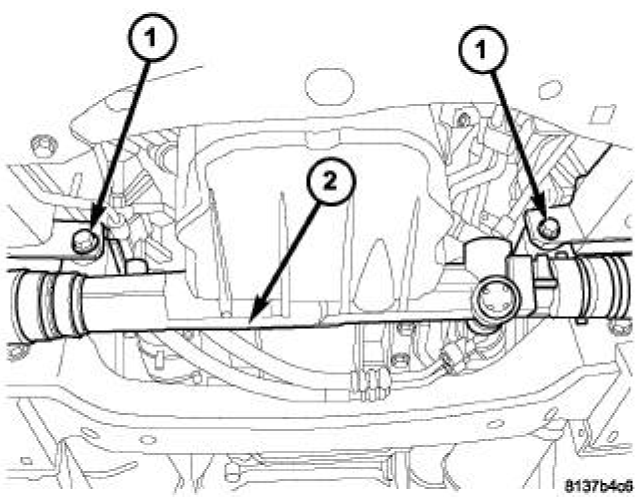


Fig. 166: Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not remove the tie rod ends or disconnect the steering column coupler.**

8. Remove the steering gear mounting bolts (1) and lower the steering gear (2) to provide clearance to remove the oil pan.

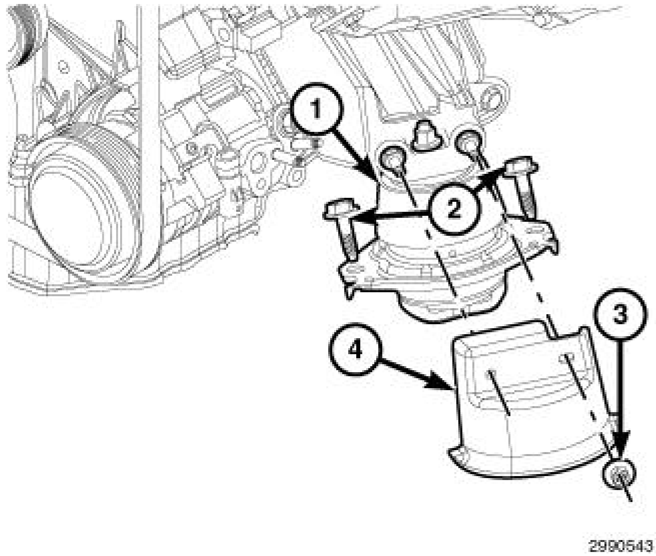


Fig. 167: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

9. Remove both left/right front engine mount heat shield retaining nuts (3) and remove the heat shields (4).
10. Remove both left/right front engine mount lower retaining bolts (2).
11. Lower the vehicle.

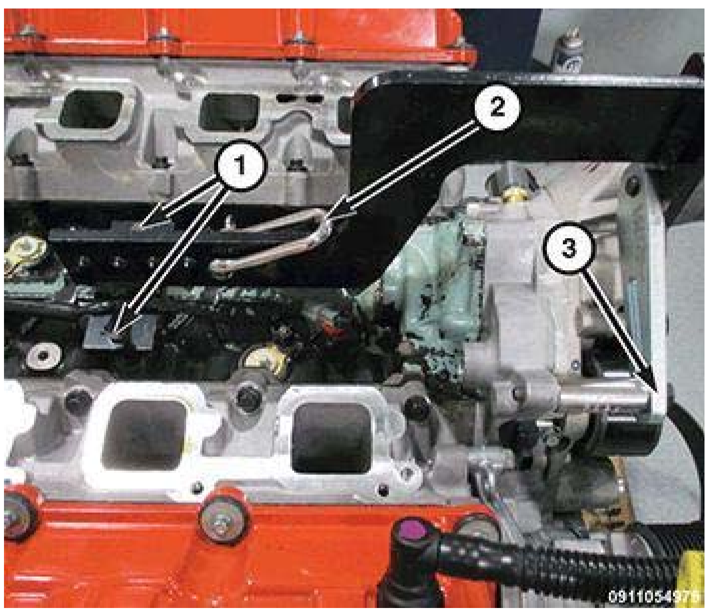


Fig. 168: Engine Lift Fixture
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not use air tools to install engine lift fixture.**

12. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (3) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (2).
13. Raise the engine to provide clearance to remove the oil pan.

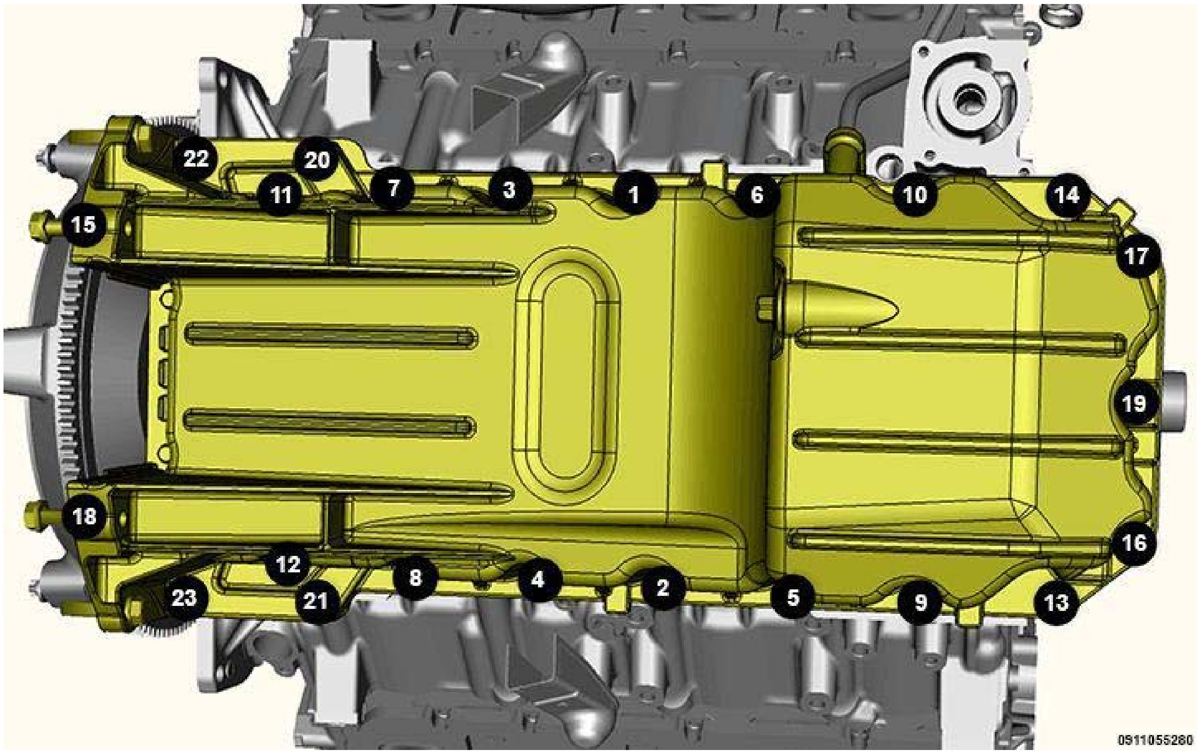


Fig. 169: Oil Pan Bolts Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not pry on the oil pan or oil pan gasket. The oil pan gasket is integral to the engine windage tray and does not come out with the oil pan.**

NOTE: **The horizontal M10 retaining bolts (11, 12, 15, 18) are 5 mm longer in length then the vertical M10 retaining bolts (20, 21, 22, 23) and must be reinstalled in their original locations.**

14. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
15. Remove the M10 retaining bolts (horizontal 11, 12, 15, 18 and vertical 20, 21, 22, 23) from the rear of the oil pan to the transmission.
16. Remove the M6 retaining bolts and remove the oil pan.

NOTE: **When the oil pan is removed, a new oil pan gasket and the integral windage tray assembly must be installed, the old gasket cannot be reused.**

17. Remove the oil pump pickup tube retaining bolt and nut.
18. Remove the oil pump pickup tube.
19. Remove and discard the oil pan gasket/windage tray.

INSTALLATION

INSTALLATION

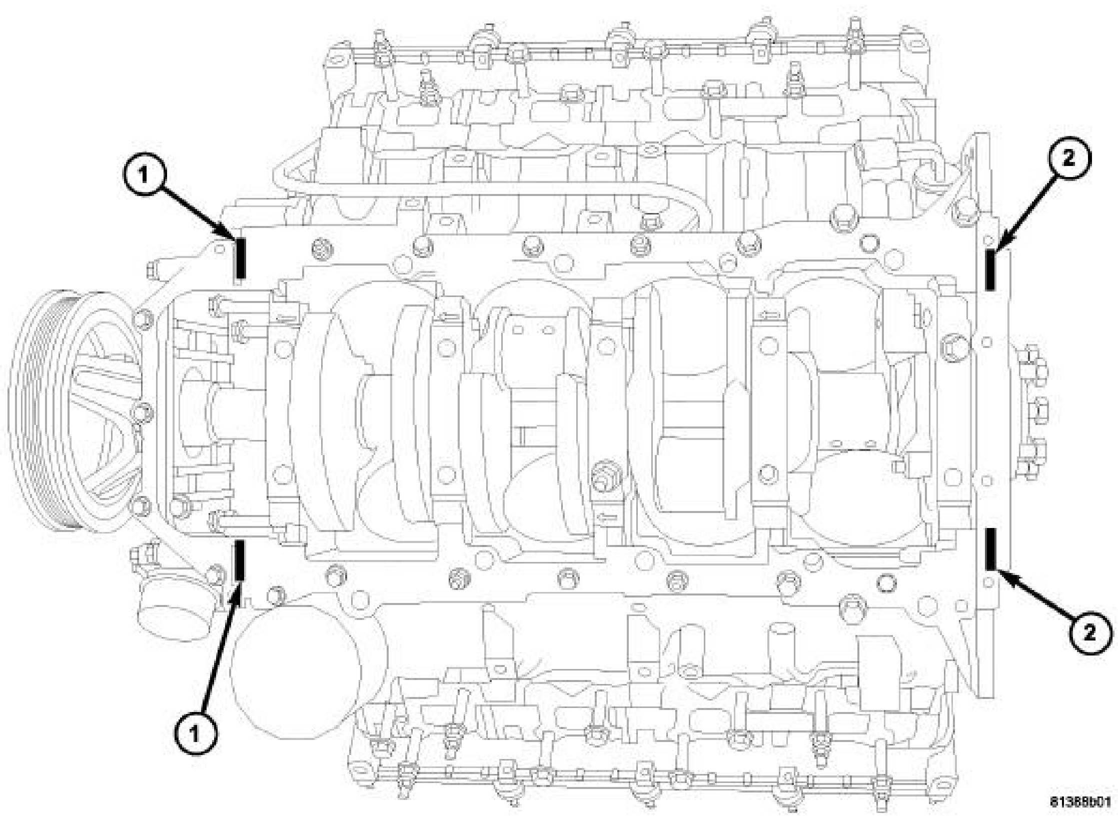


Fig. 170: T-Joint RTV Sealant Application
Courtesy of CHRYSLER GROUP, LLC

NOTE: **MoparÃ® Engine RTV must be applied to the 4 T-joints, the area where the front cover, rear retainer and oil pan gasket meet. The bead of RTV should cover the bottom of the gasket. This area is approximately 4.5 mm x 25 mm in each of the 4 T-joint locations.**

1. Clean the oil pan gasket mating surface of the engine block and oil pan.
2. Apply MoparÃ® Engine RTV at the 4 T- joints (1, 2).

   NOTE: **When the oil pan is removed a NEW oil pan gasket and the integral windage tray assembly must be installed, the old gasket cannot be reused.**

3. Install a NEW oil pan gasket/windage tray.
4. Using a NEW O-ring, position the oil pump pickup tube into the oil pump.
5. Install the oil pump pickup tube retaining bolt and nut and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.

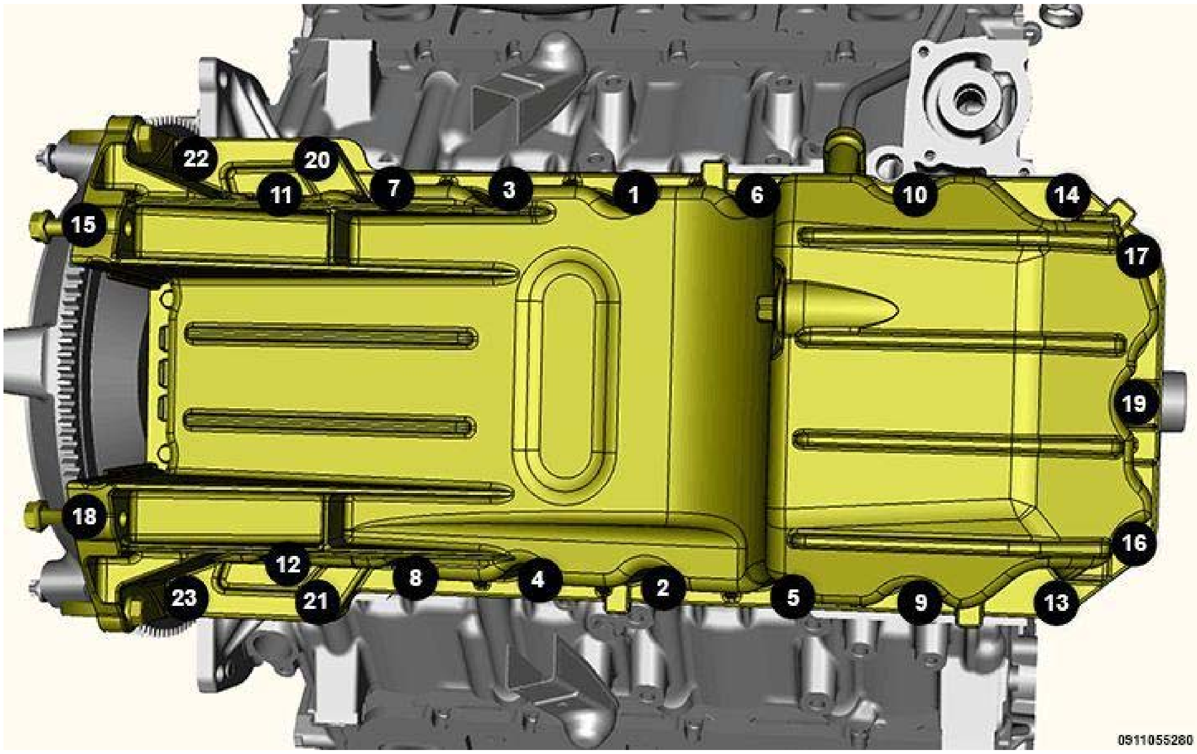


Fig. 171: Oil Pan Bolts Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The horizontal M10 retaining bolts (11, 12, 15, 18) are 5 mm longer in length then the vertical M10 retaining bolts (20, 21, 22, 23) and must be reinstalled in their original locations.**

NOTE: **NEW M6 retaining bolts must be used when reinstalling the oil pan. Do not reuse the old M6 retaining bolts.**

6. Align the rear of the oil pan with the rear face of the engine block and install the M10 and M6 retaining bolts finger tight.
7. Using the sequence shown in illustration, tighten the M6 retaining bolts to 5 N.m (44 in. lbs.).
8. Using the sequence shown in illustration, tighten the M10 retaining bolts to 54 N.m (40 ft. lbs.).
9. Using the sequence shown in illustration, tighten the M6 retaining bolts to 12 N.m (9 ft. lbs.).
10. Lower the vehicle.

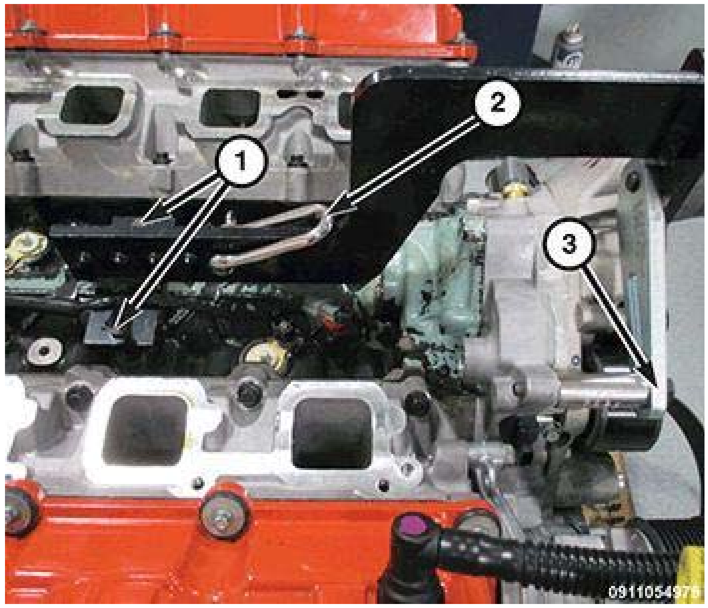


Fig. 172: Engine Lift Fixture
Courtesy of CHRYSLER GROUP, LLC

11. Using the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (3) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (2) lower the engine into position and remove.
12. Install the engine oil dipstick tube and dipstick.
13. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

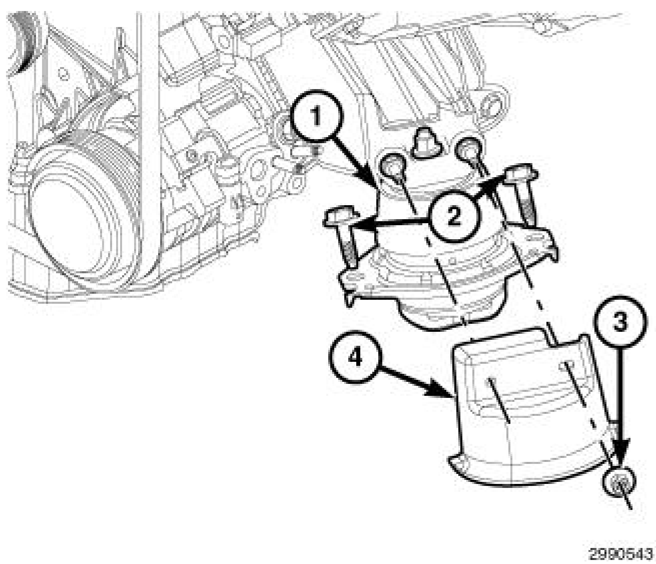


Fig. 173: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

14. Install both engine mount lower retaining bolts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
15. Position both engine mount heat shields (4) and install retaining nuts (3).

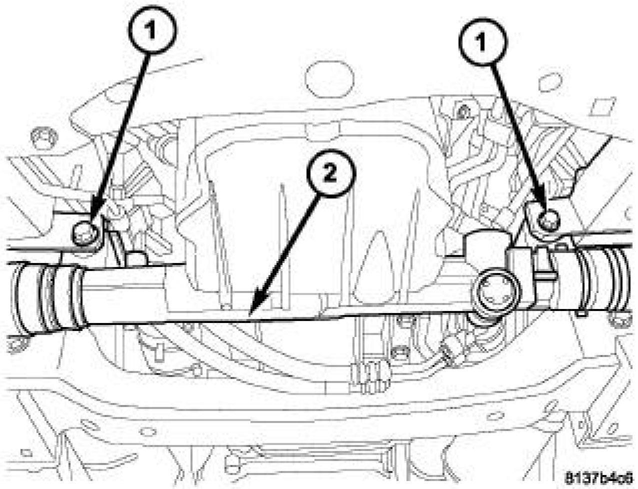


Fig. 174: Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

16. Position the steering gear (2), install mounting bolts (1) and tighten to the proper specification. Refer to **SPECIFICATIONS** .

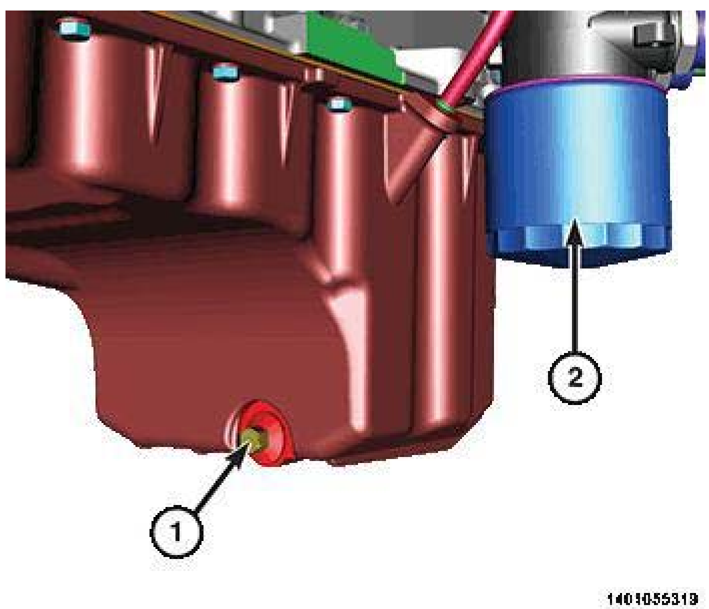


Fig. 175: Oil Pan Drain Plug & Oil Filter
Courtesy of CHRYSLER GROUP, LLC

17. Lightly lubricate the oil filter gasket with clean engine oil.

NOTE: **Do not over tighten the oil filter.**

18. Install the oil pan drain plug (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
19. Thread the oil filter (2) onto the oil filter adapter.

20. When the oil filter gasket makes contact with the oil cooler sealing surface, hand tighten the oil filter one half turn, or 180Â°.

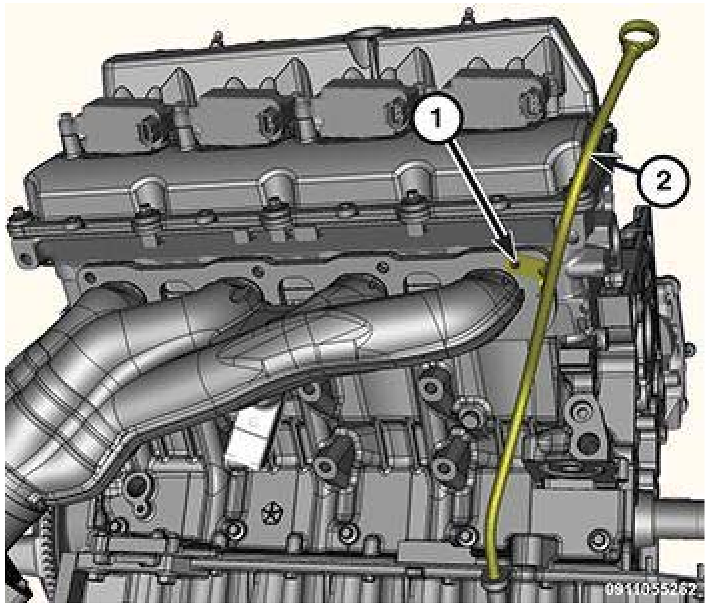


Fig. 176: Engine Oil Tube, Dipstick & Fastener
Courtesy of CHRYSLER GROUP, LLC

21. Install the oil dipstick and tube (2) into the oil pan and tighten the fastener to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

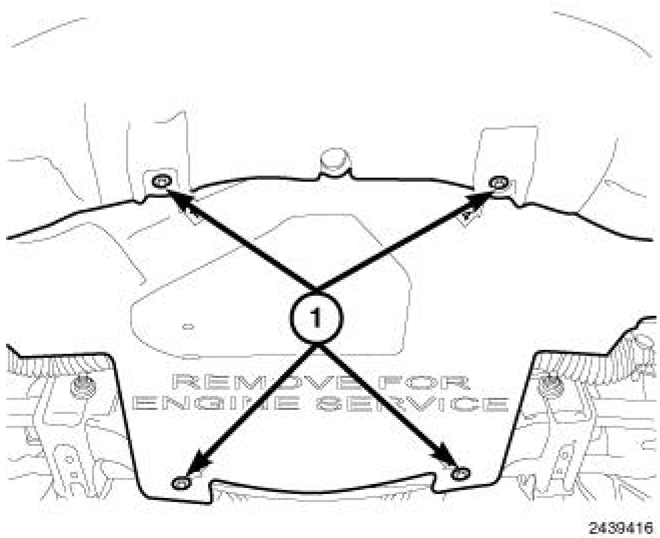


Fig. 177: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

22. Position the belly pan to the under side of the vehicle and install the belly pan retainers (1).
23. Lower the vehicle.
24. Install the supercharger assembly. Refer to **SUPERCHARGER, INSTALLATION**.
25. Fill the engine with oil. Refer to **STANDARD PROCEDURE**.
26. Connect the negative battery cable.

27. Start the engine and check for leaks.

PUMP, ENGINE OIL

REMOVAL

REMOVAL

1. Remove the engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.
2. Remove the oil pan and oil pump pickup tube. Refer to **PAN, OIL, REMOVAL**.

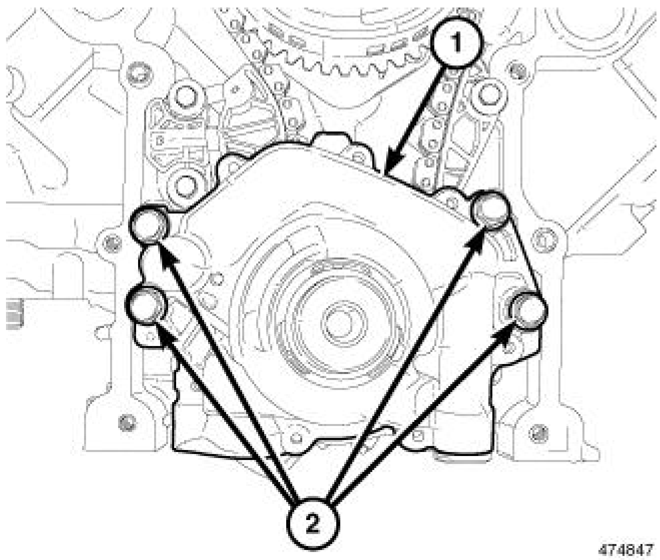


Fig. 178: Oil Pump Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the oil pump retaining bolts (2) and remove the oil pump (1).

INSPECTION

INSPECTION

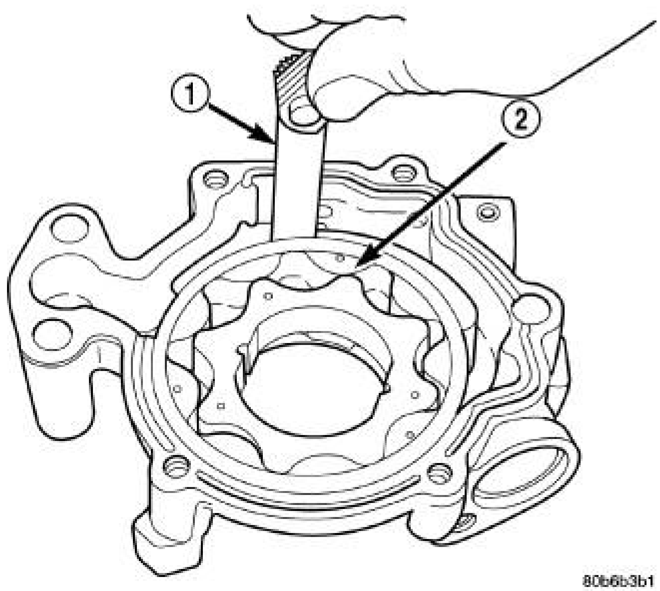


Fig. 179: Measuring Outer Rotor Clearance in Housing
Courtesy of CHRYSLER GROUP, LLC

1 - FEELER GAUGE	
2 - OUTER ROTOR	

CAUTION: Oil pump pressure relief valve and spring should not be removed from the oil pump. If these components are disassembled and or removed from the pump the entire oil pump assembly must be replaced.

1. Remove the pump cover.
2. Clean all parts thoroughly. The mating surface of the oil pump housing should be smooth. If the oil pump cover is scratched or grooved the oil pump assembly should be replaced.
3. Slide the outer rotor into the body of the oil pump. Press the outer rotor to one side of the oil pump body and measure the clearance between the outer rotor (2) and the body. If the measurement is 0.306 mm (0.012 in.) or greater the oil pump assembly must be replaced.

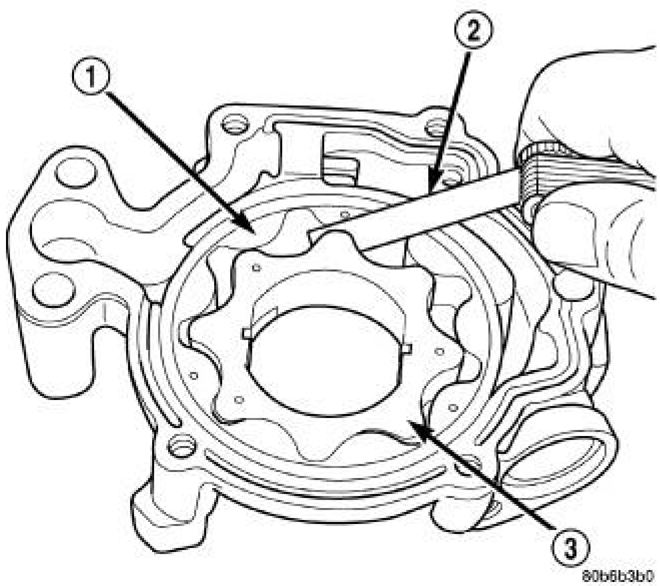


Fig. 180: Measuring Clearance Between Inner & Outer Rotors
Courtesy of CHRYSLER GROUP, LLC

1 - OUTER ROTOR	
2 - FEELER GAUGE	
3 - INNER ROTOR	

4. Install the inner rotor into the oil pump body. Measure the clearance between the inner (3) and outer (1) rotors. If the clearance between the rotors is.200 mm (0.008 in.) or greater the oil pump assembly must be replaced.

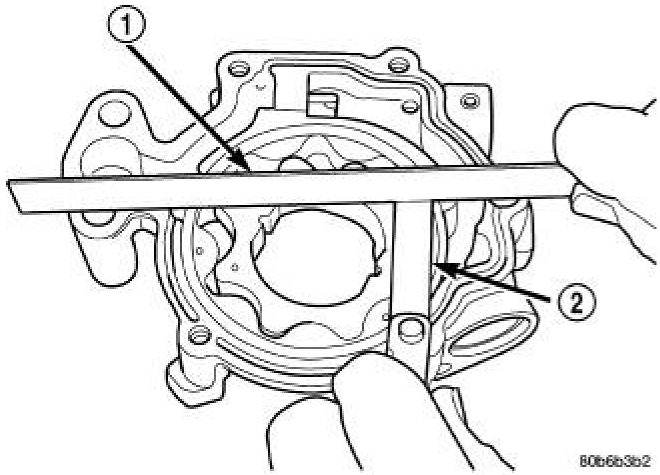


Fig. 181: Measuring Clearance Between Outer Rotor And Body
Courtesy of CHRYSLER GROUP, LLC

1 - STRAIGHT EDGE
2 - FEELER GAUGE

5. Place a straight edge (1) across the body of the oil pump (between the bolt holes), using a feeler gauge (2), measure the clearance between the straightedge and the rotors. If the clearance is.060 mm (0.002 in.) or greater the oil pump must be replaced.
6. Install the pump cover and tighten retainers to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

NOTE: **The oil pump is serviced as an assembly. In the event the oil pump is not functioning or out of specification it must be replaced as an assembly.**

INSTALLATION

INSTALLATION

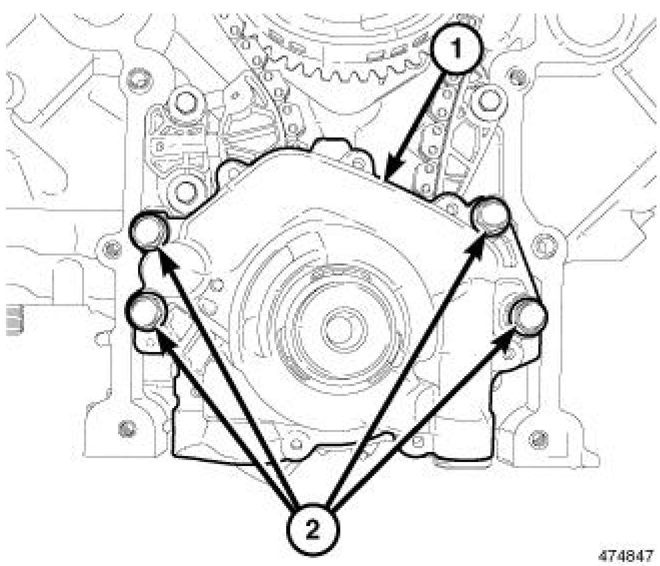


Fig. 182: Oil Pump Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the oil pump (1) onto the crankshaft, and install the retaining bolts (2).

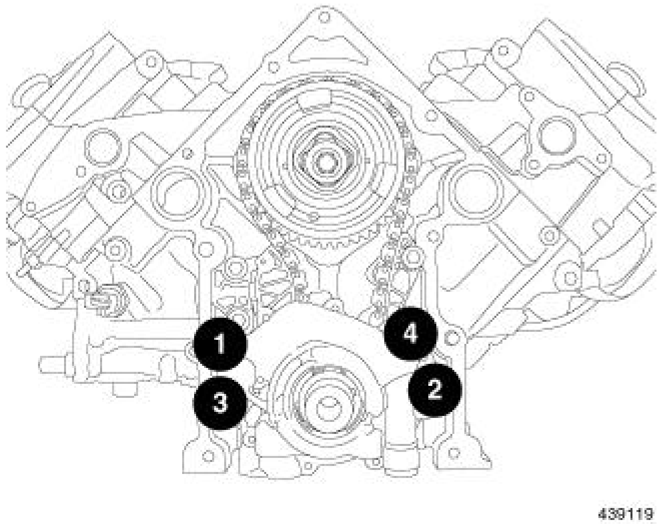


Fig. 183: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

2. Using the sequence shown in illustration, tighten the oil pump retaining bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
3. Install the timing chain cover. Refer to **.COVER(S), ENGINE TIMING, INSTALLATION**.
4. Install the oil pump pickup tube and oil pan. Refer to **PAN, OIL, INSTALLATION**.

SENSOR, OIL PRESSURE

DESCRIPTION

DESCRIPTION

The oil pressure sensor uses the following three circuits:

- Signal circuit to the PCM
- Sensor ground circuit through the PCM
- 5 volt reference circuit from the PCM

The oil pressure sensor returns a voltage signal back to the PCM with reference to oil pressure. Ground for the sensor is supplied by the PCM.

The oil pressure sensor is located on the right side of the engine block. The sensor screws into the engines main oil gallery.

REMOVAL

REMOVAL

1. Remove the generator. Refer to **GENERATOR, REMOVAL** .
2. Position the generator aside to gain access to the oil pressure sensor.

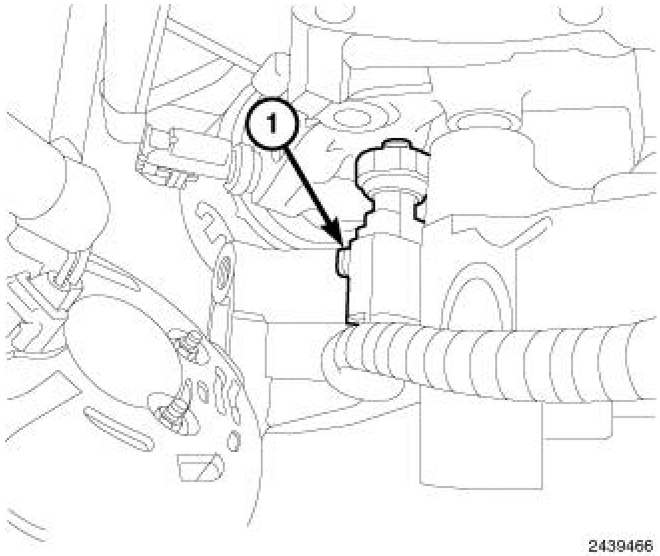


Fig. 184: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oil pressure sensor wire harness connector (1).

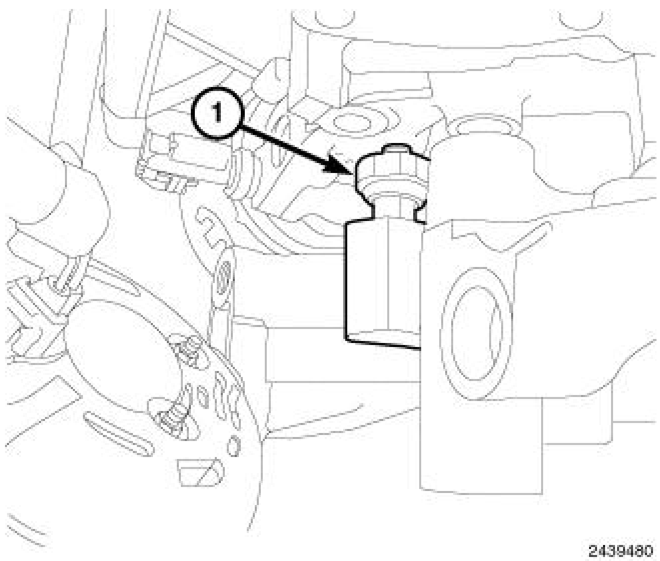


Fig. 185: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil pressure sensor (1).

INSTALLATION

INSTALLATION

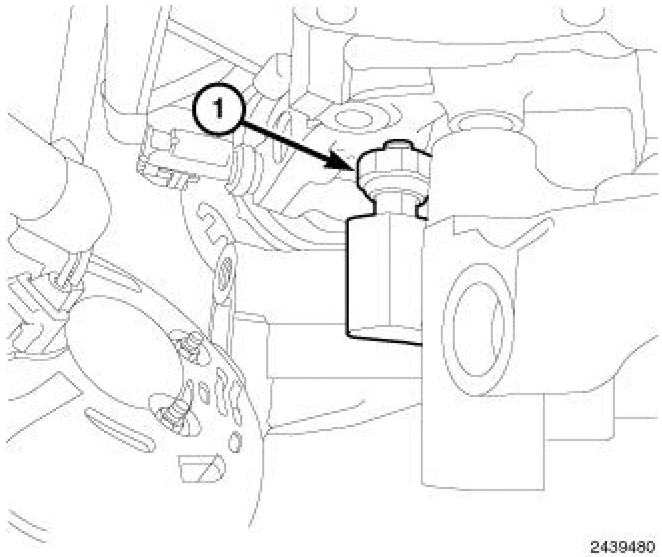


Fig. 186: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Apply MoparÂ® Thread Sealant with PTFE to the sensor threads before installing into the engine block.

1. Install the oil pressure sensor (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

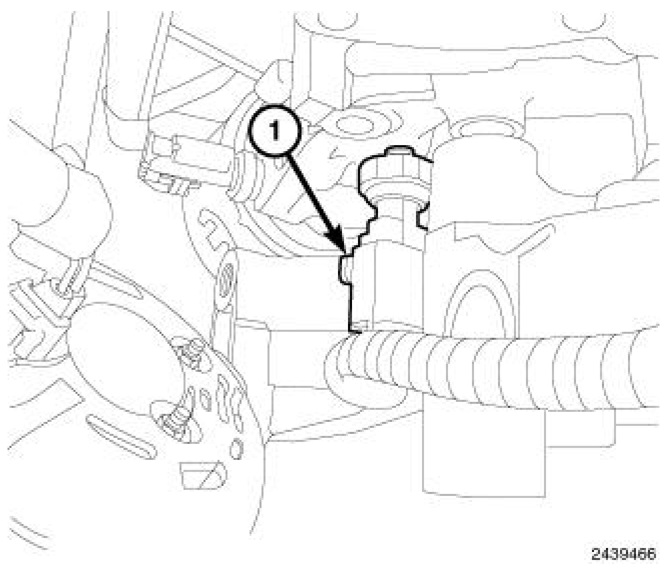


Fig. 187: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oil pressure sensor wire harness connector (1).
3. Install the generator. Refer to **GENERATOR, INSTALLATION** .

SENSOR, OIL TEMPERATURE

DESCRIPTION

DESCRIPTION

The oil temperature sensor uses the following two circuits:

- Signal circuit to the PCM
- Ground circuit from the PCM

The oil temperature sensor is a Negative Thermal Coefficient sensor. The resistance of the sensor changes as oil temperature changes. This results in different output voltages back to the PCM.

The oil temperature sensor is located on the right side of the engine block.

REMOVAL

REMOVAL

1. Remove the generator. Refer to **GENERATOR, REMOVAL** .
2. Position the generator aside to gain access to the oil temperature sensor.

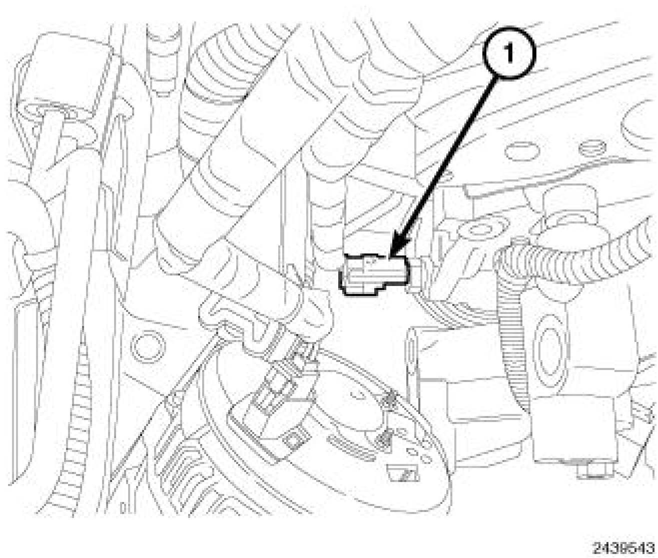


Fig. 188: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oil temperature sensor wire harness connector (1).

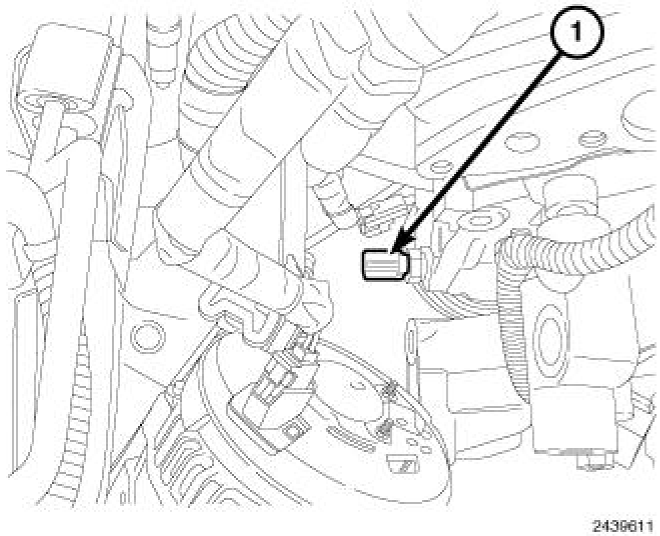


Fig. 189: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil temperature sensor (1).

INSTALLATION

INSTALLATION

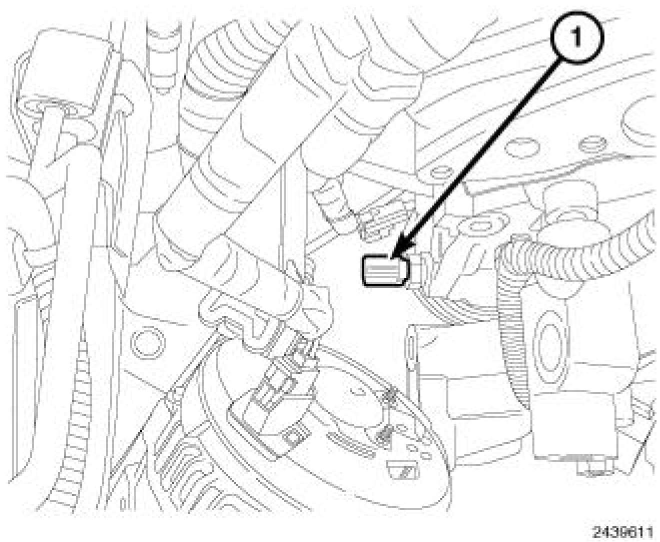


Fig. 190: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply MoparÂ® Thread Sealant with PTFE to the sensor threads before installing into the engine block.**

1. Install the oil temperature sensor (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

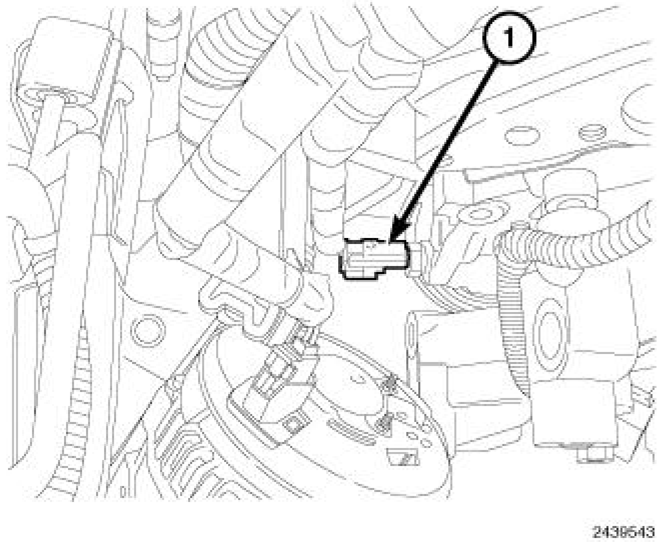


Fig. 191: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oil temperature sensor wire harness connector (1).
3. Install the generator. Refer to **GENERATOR, INSTALLATION** .

MANIFOLDS

MANIFOLD, EXHAUST

DESCRIPTION

DESCRIPTION

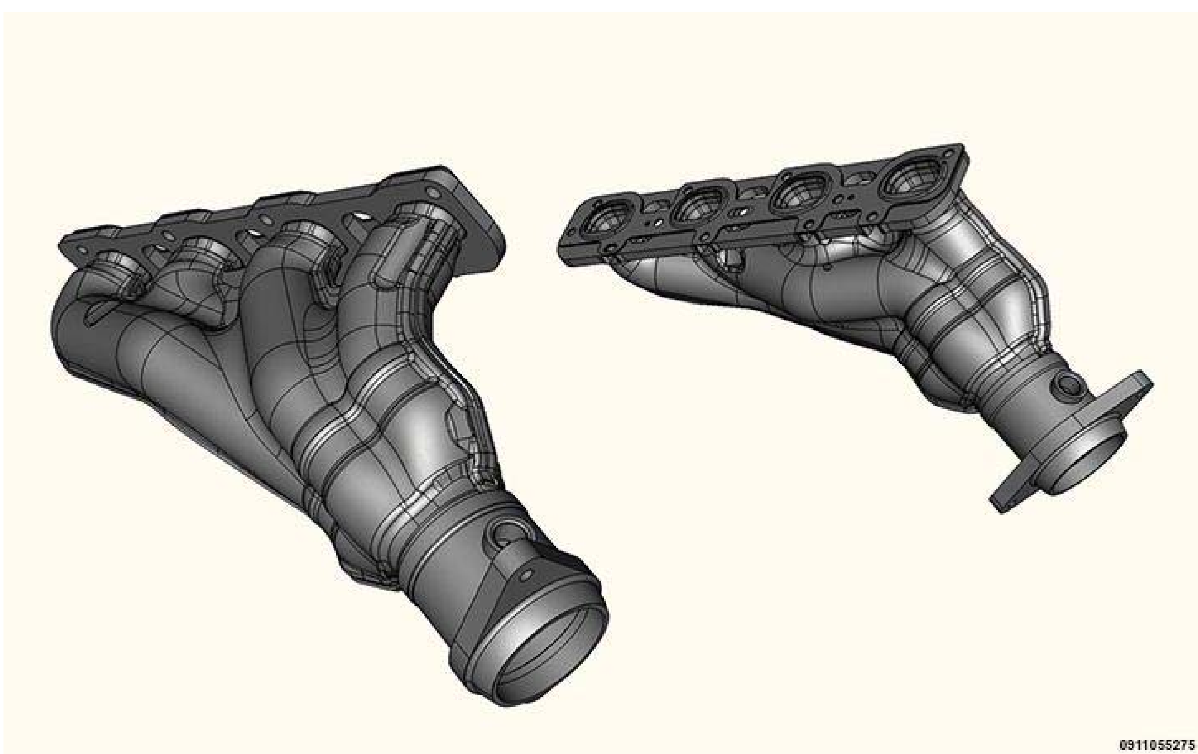


Fig. 192: Exhaust Manifolds

Courtesy of CHRYSLER GROUP, LLC

The exhaust manifolds are tube in shell air gap design to maximize durability and performance. The exhaust manifolds are made of stainless steel stamped shells and stainless steel tubes with a powdered metal outlet. A layered graphite over perforated steel manifold gasket is used to provide sealing to the cylinder head.

OPERATION

OPERATION

The exhaust manifolds collect the engine exhaust gases exiting the combustion chambers and then channels the exhaust gases to the exhaust pipes/catalytic converters.

REMOVAL

REMOVAL

NOTE: The left side shown in illustration. Right side similar.

1. Disconnect and isolate the negative battery cable.
2. Remove cylinder head. Refer to **CYLINDER HEAD, REMOVAL**.

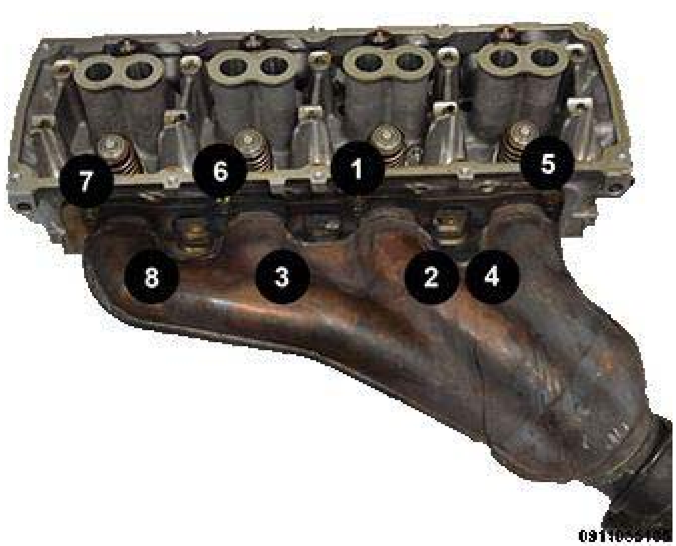


Fig. 193: Exhaust Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Remove the exhaust manifold bolts using the sequence shown in illustration, starting at eight and going backwards.

INSPECTION

INSPECTION

Inspect the exhaust manifold for cracks.

Inspect the mating surface of the exhaust manifold for flatness with a straight edge. The exhaust manifold gasket surface must be flat and within 0.67 mm (0.0264 in.) overall.

INSTALLATION

INSTALLATION

NOTE: Left side shown in illustration. Right side similar.

1. Clean the sealing surfaces of the exhaust manifold and cylinder head.
2. Using a new exhaust manifold gasket, position the exhaust manifold to the cylinder head.

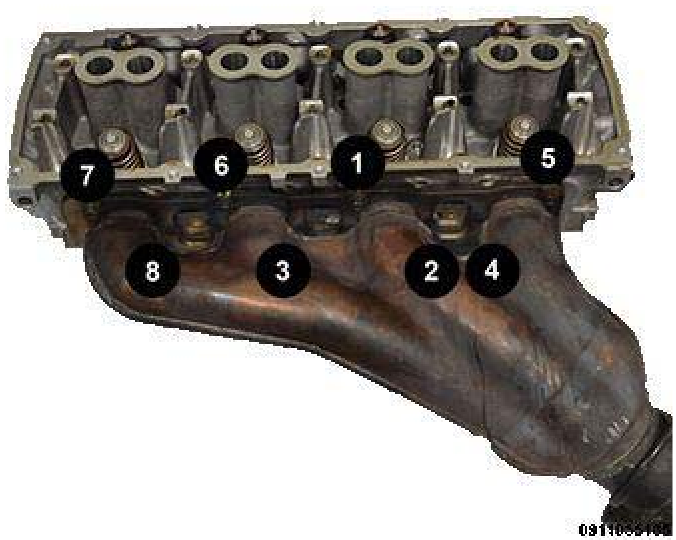


Fig. 194: Exhaust Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. First install the **NEW** exhaust manifold retaining bolts finger tight.
4. Using the sequence shown in illustration, tighten the retaining bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
5. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION**.
6. Connect the negative battery cable.
7. Start the engine and check for leaks.

SUPERCHARGER SYSTEM

BELT, DRIVE

DESCRIPTION

DESCRIPTION

The supercharger drive belt is a serpentine type belt. The supercharger drive belt is separate from the accessory drive belt. Satisfactory performance of these belts depends on belt condition and proper belt tension.

REMOVAL

REMOVAL

1. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .

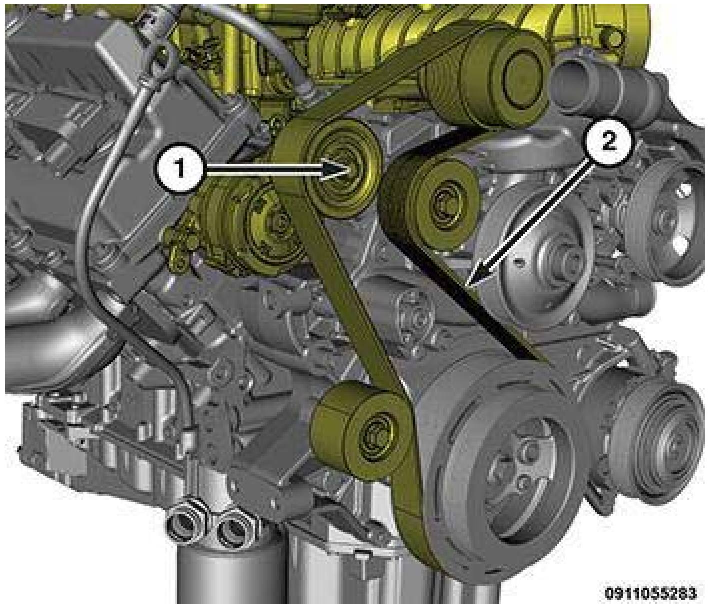


Fig. 195: Belt & Tensioner
Courtesy of CHRYSLER GROUP, LLC

2. Release the belt tension by rotating the tensioner (1) **clockwise** . Rotate the belt tensioner until the belt (2) can be removed from pulleys.
3. Remove the belt.
4. Gently release the tensioner.

INSTALLATION

INSTALLATION

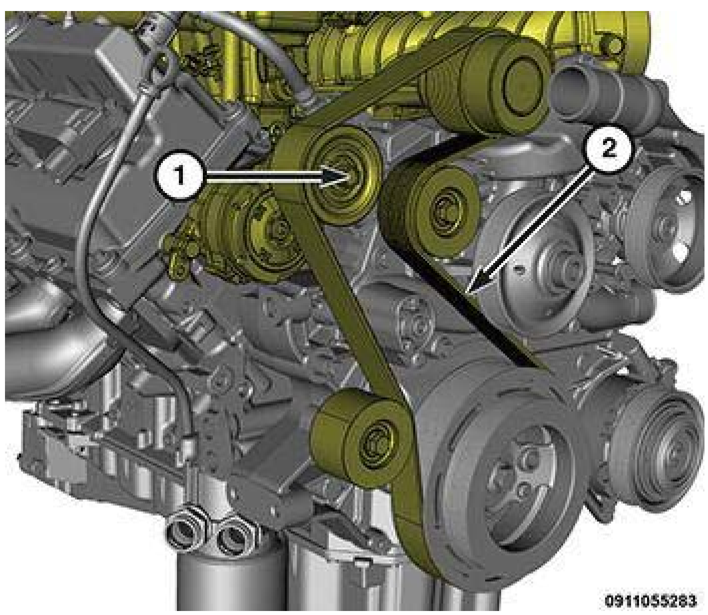


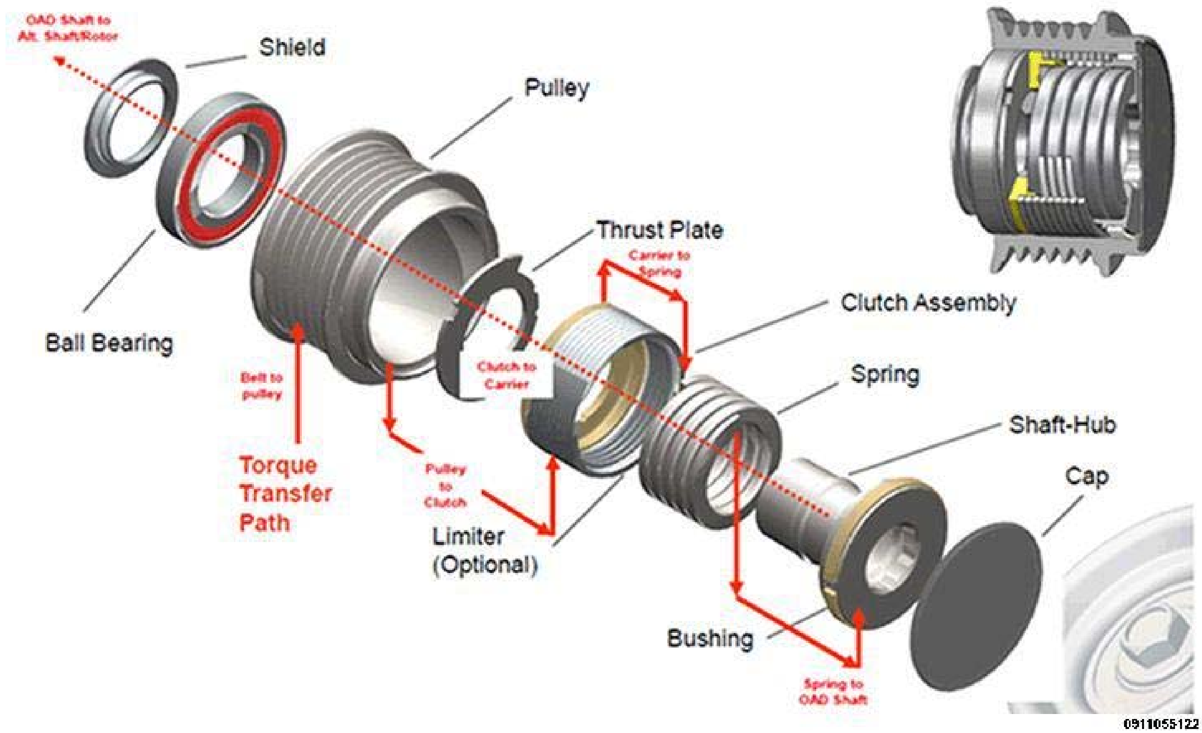
Fig. 196: Belt & Tensioner
Courtesy of CHRYSLER GROUP, LLC

1. Position the drive belt (2) over all pulleys, except for the idler pulley.
2. Rotate the tensioner (1) **clockwise** and slip the belt over the idler pulley.
3. Gently release tensioner.

DECOUPLER

DESCRIPTION

DESCRIPTION



[Fig. 197: Exploded View Of Decoupler](#)
Courtesy of CHRYSLER GROUP, LLC

The decoupler is the drive pulley assembly for the supercharger. It contains a one way clutch, engaged in the drive direction. Load impulses are isolated by driving through a heavy coil spring.

PULLEY, IDLER

REMOVAL

LOWER

1. Remove accessory drive belt. Refer to **TENSIONER, BELT, REMOVAL** .

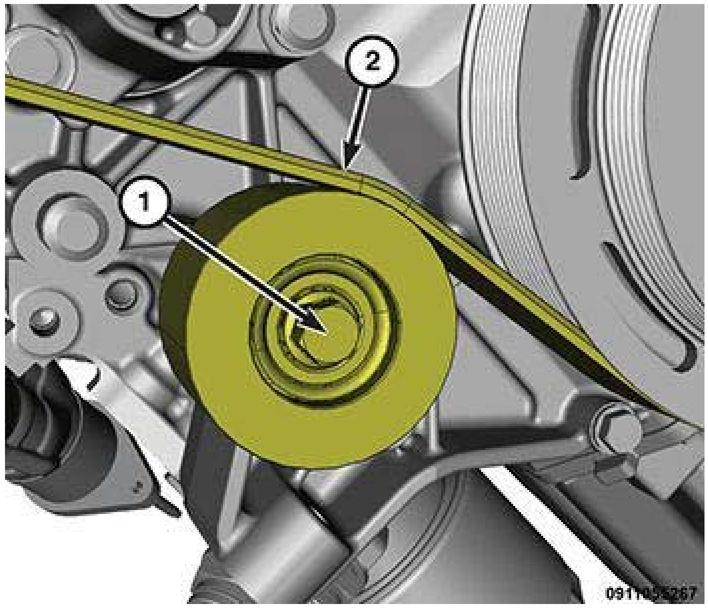


Fig. 198: Supercharger Drive Belt & Idler Pulley
Courtesy of CHRYSLER GROUP, LLC

2. Remove the supercharger drive belt (2). Refer to **BELT, DRIVE, REMOVAL**.
3. Remove the retaining bolt (1) and idler pulley.

UPPER

1. Remove accessory drive belt. Refer to **TENSIONER, BELT, REMOVAL** .

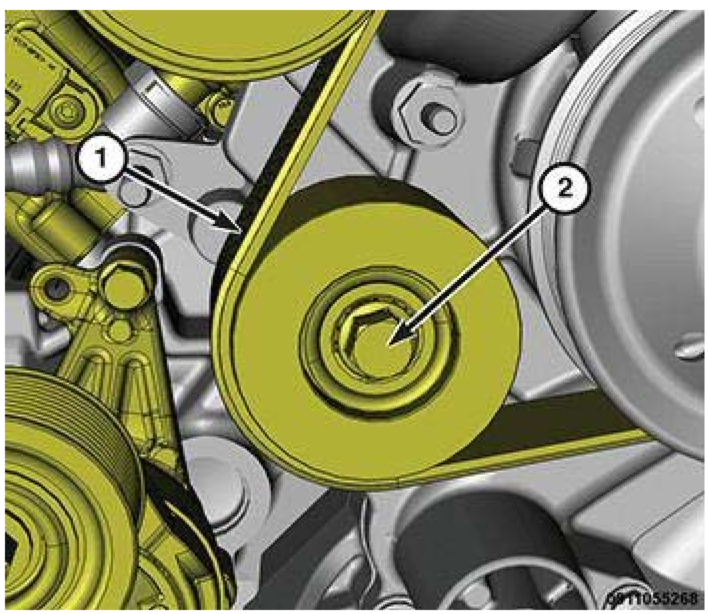


Fig. 199: Supercharger Drive Belt & Idler Pulley Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Remove the supercharger drive belt (1). Refer to **BELT, DRIVE, REMOVAL**.
3. Remove the retaining bolt (2) and idler pulley.

INSTALLATION

LOWER

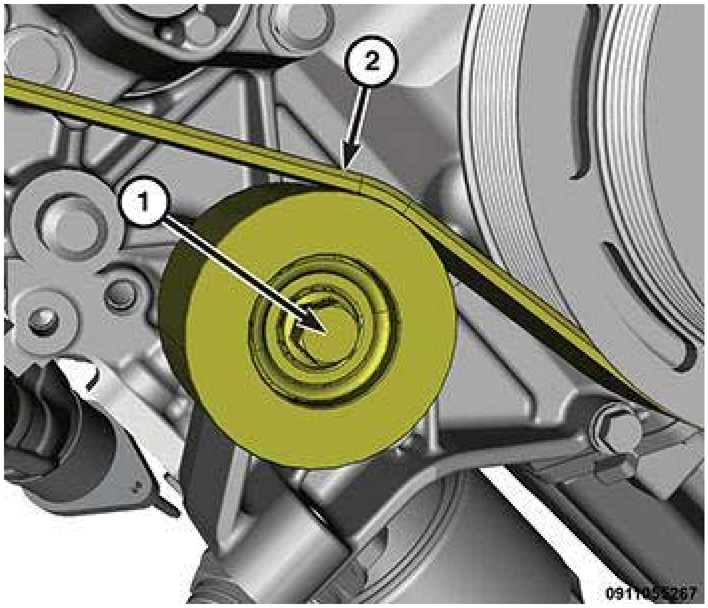


Fig. 200: Supercharger Drive Belt & Idler Pulley
Courtesy of CHRYSLER GROUP, LLC

1. Place the idler pulley into position.
2. Tighten the bolt (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
3. Install the supercharger drive belt (2). Refer to **BELT, DRIVE, INSTALLATION**.
4. Install accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

UPPER

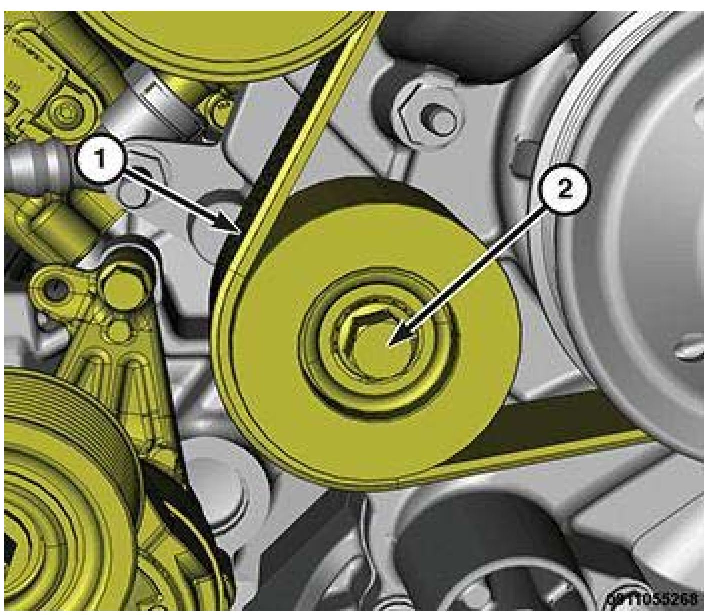


Fig. 201: Supercharger Drive Belt & Idler Pulley Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Place the idler pulley into position.

2. Tighten the retaining bolt (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
3. Install the supercharger drive belt (1). Refer to **BELT, DRIVE, INSTALLATION**.
4. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

SUPERCHARGER

DESCRIPTION

DESCRIPTION

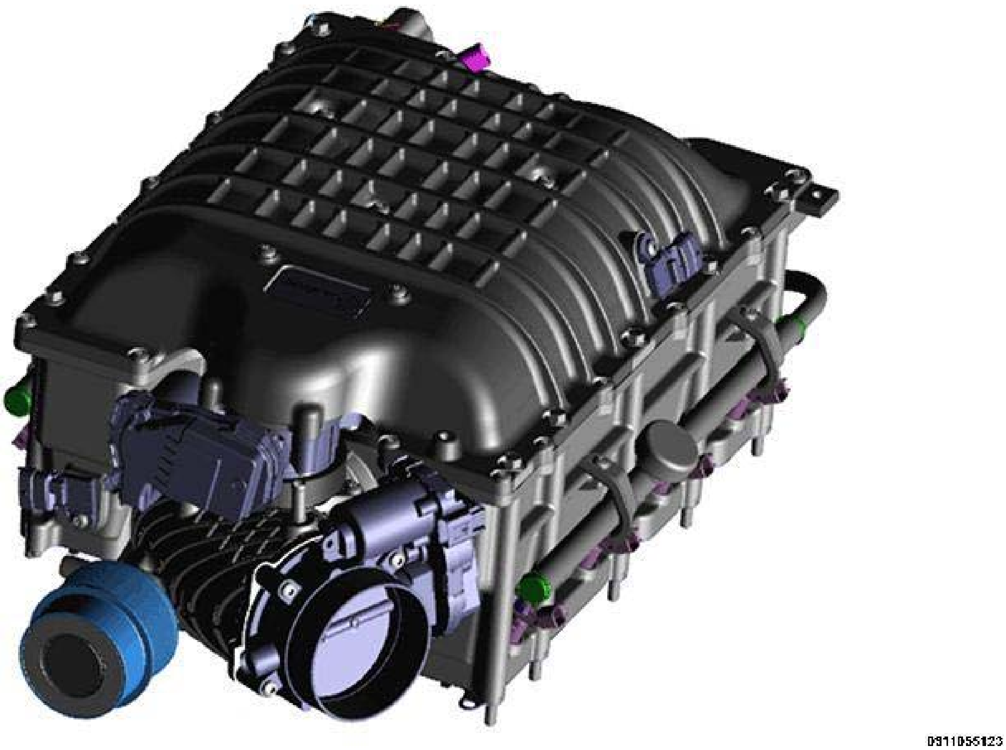


Fig. 202: Supercharger
Courtesy of CHRYSLER GROUP, LLC

The twin-screw supercharger has integral charge air coolers and an integrated 64 mm electronic bypass valve to regulate boost pressure. The supercharger is sealed for life with synthetic oil, has a drive ratio of 2.36:1 and a maximum speed of 14, 600 RPM. The one-way clutch de-coupler improves refinement without detracting from the engine noise. The supercharger intakes air through a 92 mm throttle body.

REMOVAL

REMOVAL

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Disconnect and isolate the negative battery cable.
3. Remove the cowl cover panel. Refer to **COVER, COWL PANEL, REMOVAL** .
4. Drain the low temperature cooling system. Refer to **STANDARD PROCEDURE** .
5. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL**.

Fig. 203: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

6. Remove the engine covers (1).
7. Remove the supercharger belt. Refer to **BELT, DRIVE, REMOVAL**.

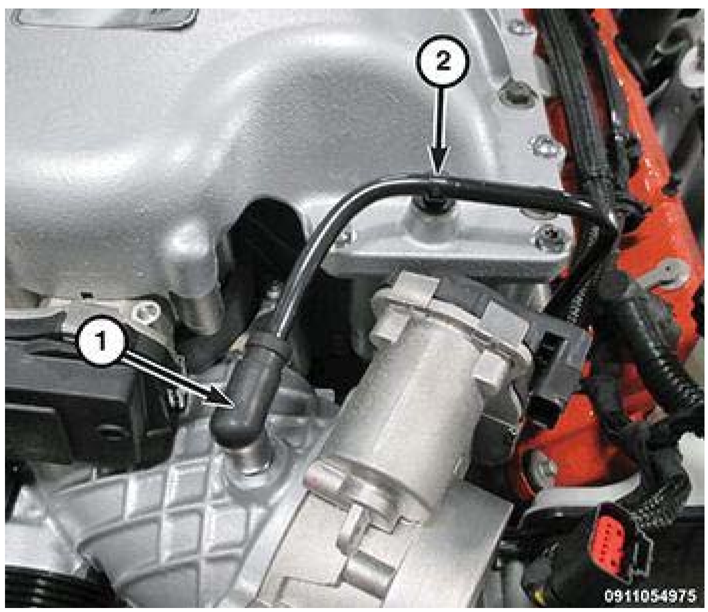


Fig. 204: Supercharger Nose & Fuel Purge Hose
Courtesy of CHRYSLER GROUP, LLC

8. Remove the fuel purge hose (2) from the top of the supercharger nose (1).
9. Remove the brake booster vacuum supply hose, located under the nose of the supercharger.

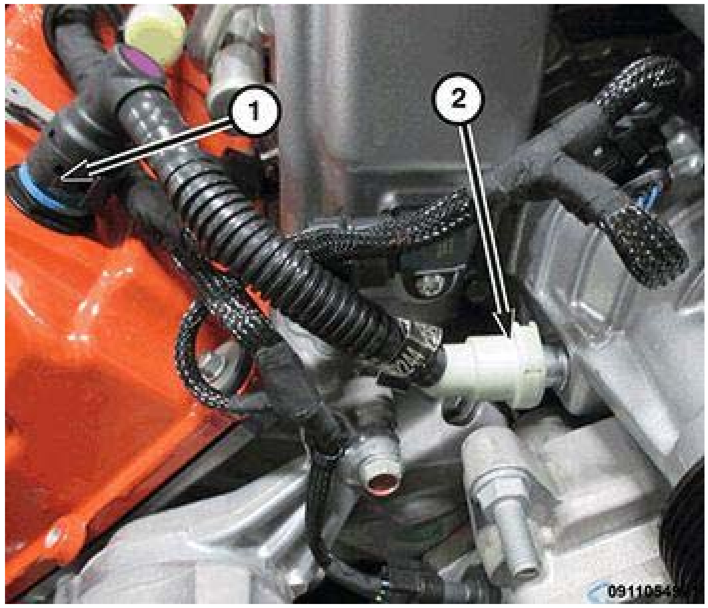


Fig. 205: Disconnecting/Connecting PCV Hose
Courtesy of CHRYSLER GROUP, LLC

10. Remove the Positive Crankcase Ventilation (PCV) hose (1) from the right side of the supercharger nose (2).

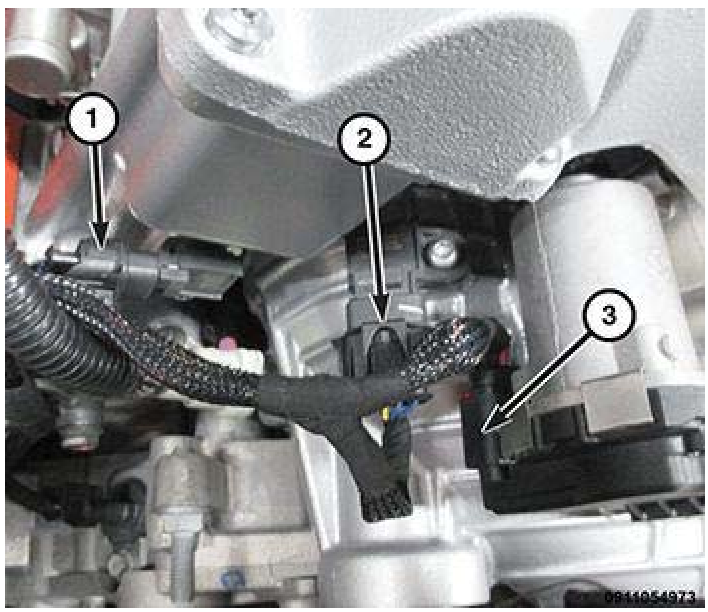
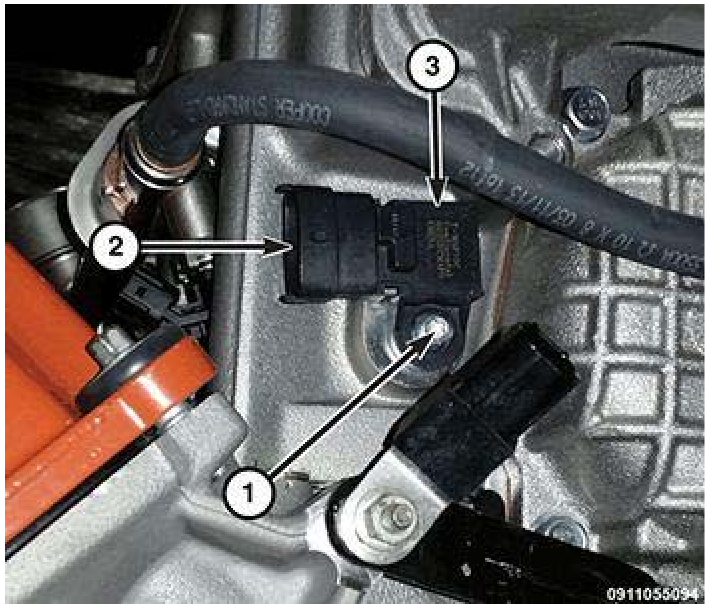


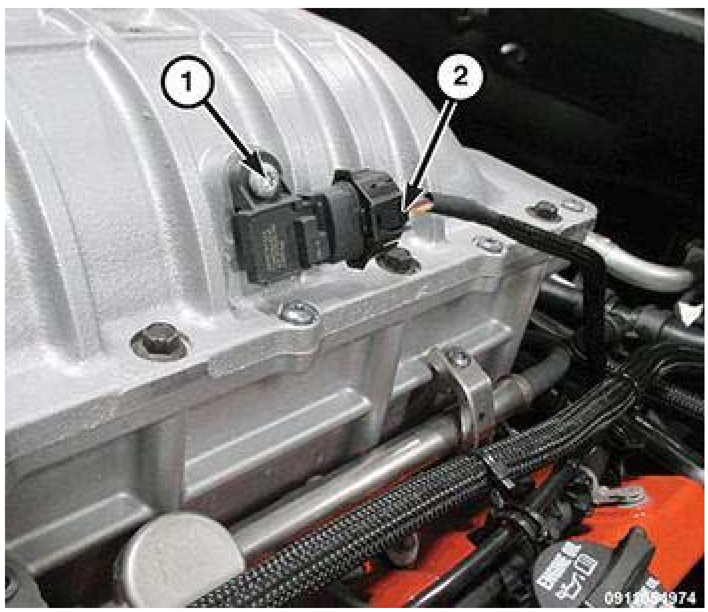
Fig. 206: Temperature-Manifold Absolute Pressure (TMAP) Sensor Wire Harness Connectors & Bypass Valve Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the throttle body wire harness connector at the nose of the supercharger.
12. Disconnect the bypass valve wire harness connector (3).
13. Disconnect the bank one (1) and throttle outlet (2) Temperature-Manifold Absolute Pressure (TMAP) sensor wire harness connectors.



[Fig. 207: TMAP Sensor, Connector & Screw]
Courtesy of CHRYSLER GROUP, LLC

14. Disconnect the wire harness connector (2) from the bank two TMAP sensor (3).



[Fig. 208: TMAP Sensor, Connector & Screw]
Courtesy of CHRYSLER GROUP, LLC

15. Disconnect the wire harness connector (2) from the intermediate TMAP sensor (1).

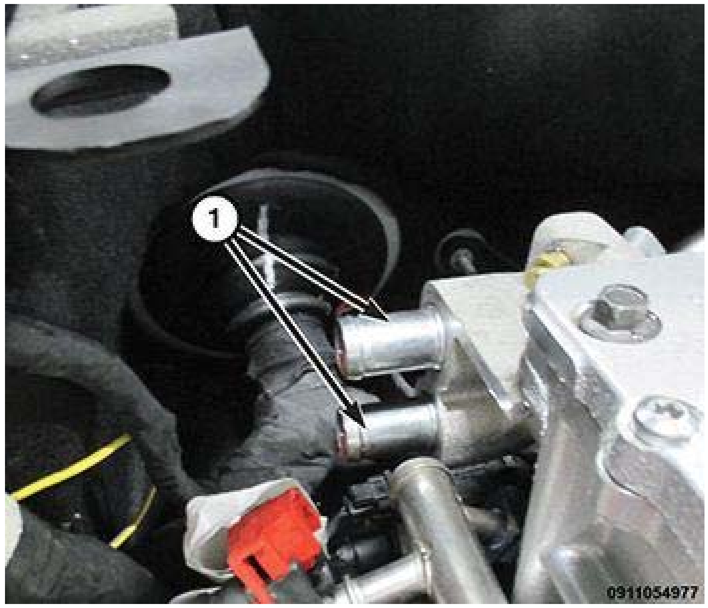


Fig. 209: Coolant Crossover
Courtesy of CHRYSLER GROUP, LLC

16. Disconnect the wire harness connect from the charge air cooler temperature sensor, located on the crossover tube.
17. Remove Low Temp Radiator (LTR) circuit hoses from coolant crossover (1).

NOTE: **Mark which hose connects to top and bottom of coolant crossover.**

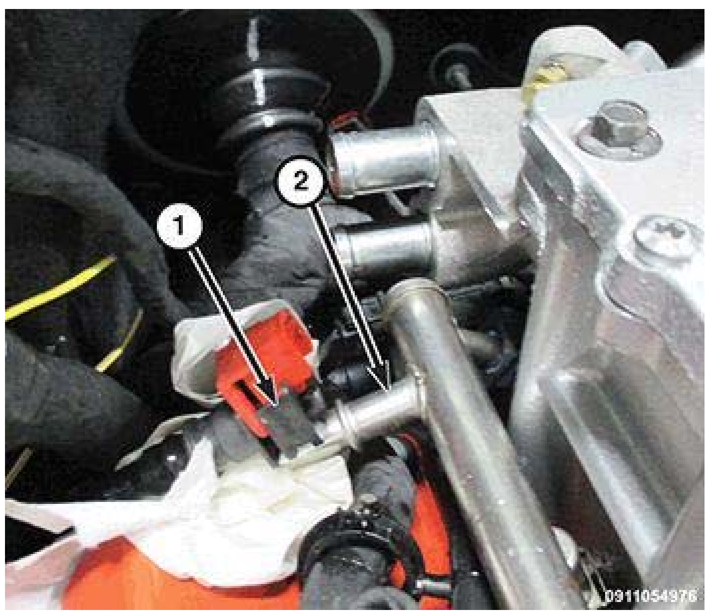


Fig. 210: Fuel Supply Line & Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

18. Disconnect the fuel supply line (1) from the fuel rail (2). Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE** .

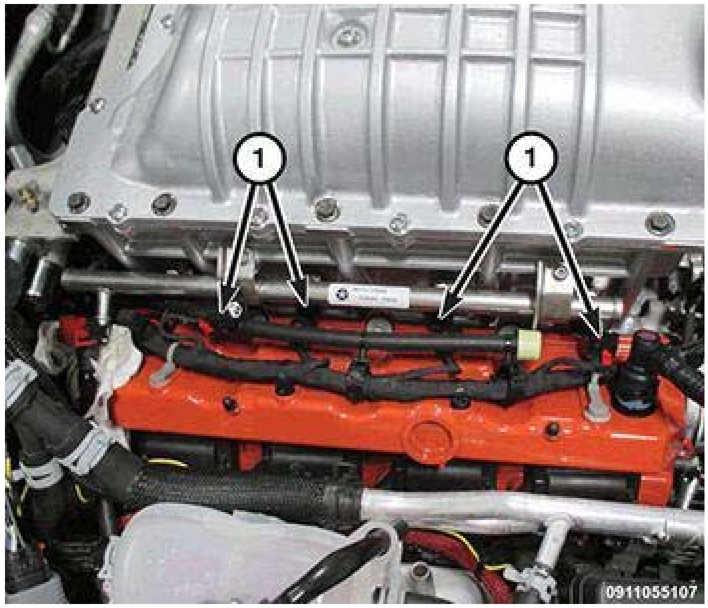


Fig. 211: Fuel Injector Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

19. Disconnect the fuel injector connectors (1) from both sides of supercharger.

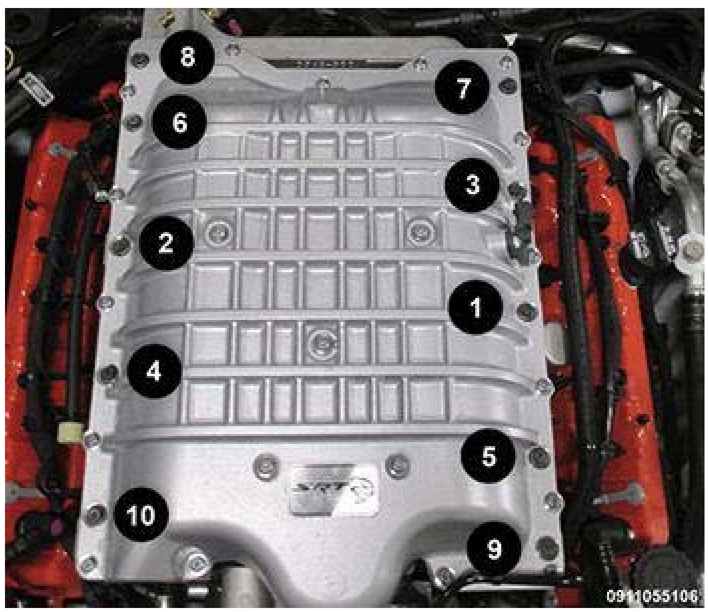


Fig. 212: Supercharger To Cylinder Head Retaining Bolts Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

20. Remove the supercharger to cylinder head retaining bolts, starting with number ten, going backwards to number one.

NOTE: **The supercharger assembly will require the help of an assistant(s) to lift from the engine compartment.**

21. Lift the supercharger upward to disengage the dowels which align the supercharger to the right cylinder head.

NOTE: **Take care not to damage supercharger to cylinder head intake gaskets during removal.**

INSTALLATION

INSTALLATION

NOTE: **The supercharger assembly will require the help of an assistant(s) to install the assembly into the engine compartment.**

1. Inspect the seals and replace if necessary.
2. Position the supercharger assembly onto the cylinder heads, aligning the dowels in the supercharger with the holes cylinder head.

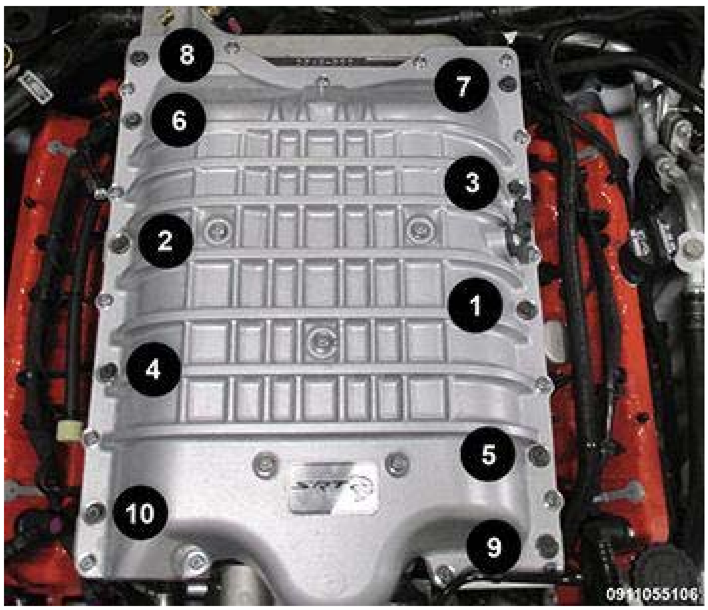


Fig. 213: Supercharger To Cylinder Head Retaining Bolts Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, Install the supercharger retaining bolts and tighten all retaining bolts as follows.
   - First tighten all bolts, using the sequence, to 5 N.m (4 ft. lbs.).
   - Next tighten all bolts, using the sequence, to 15 N.m (11 ft. lbs.).
   - Finally tighten all bolts, using the sequence, to 30 N.m (22 ft. lbs.).

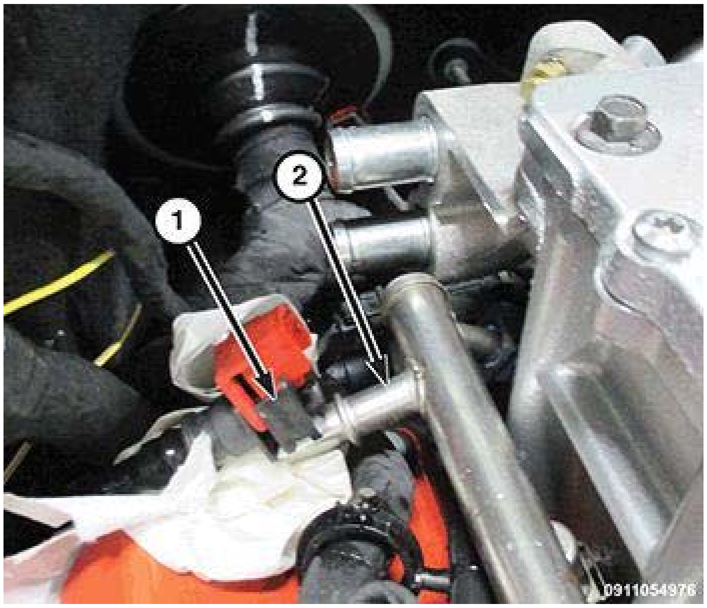


Fig. 214: Fuel Supply Line & Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

4. Connect the fuel supply line (1) to the fuel rail (2). Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE** .

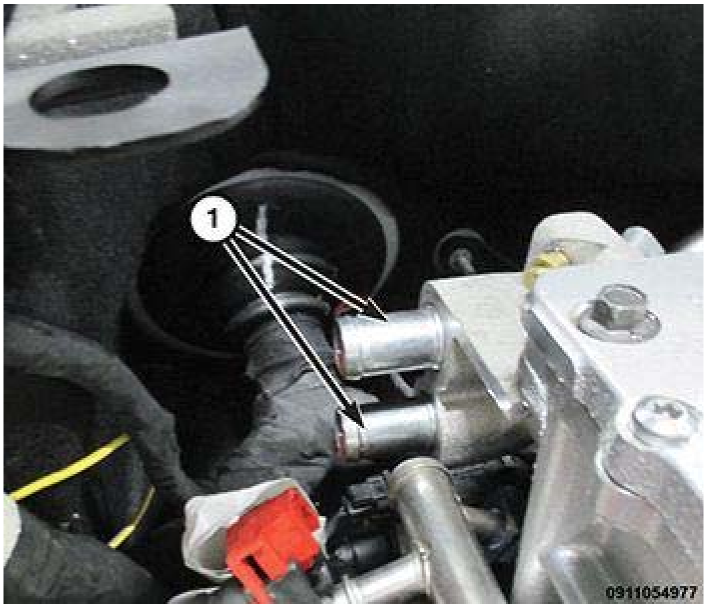


Fig. 215: Coolant Crossover
Courtesy of CHRYSLER GROUP, LLC

5. Install the Low Temperature Radiator (LTR) circuit hoses to coolant crossover (1).

NOTE: **Use previous markings to determine hose location.**

6. Connect the wire harness connector to the charger air cooler temperature sensor, located on the crossover tube.

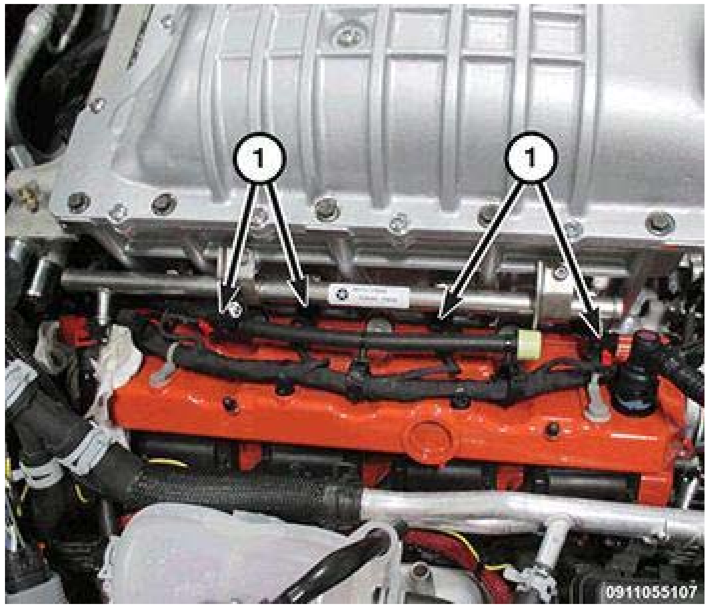


Fig. 216: Fuel Injector Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

7. Connect the fuel injector wire harness connectors (1) on both sides of supercharger.

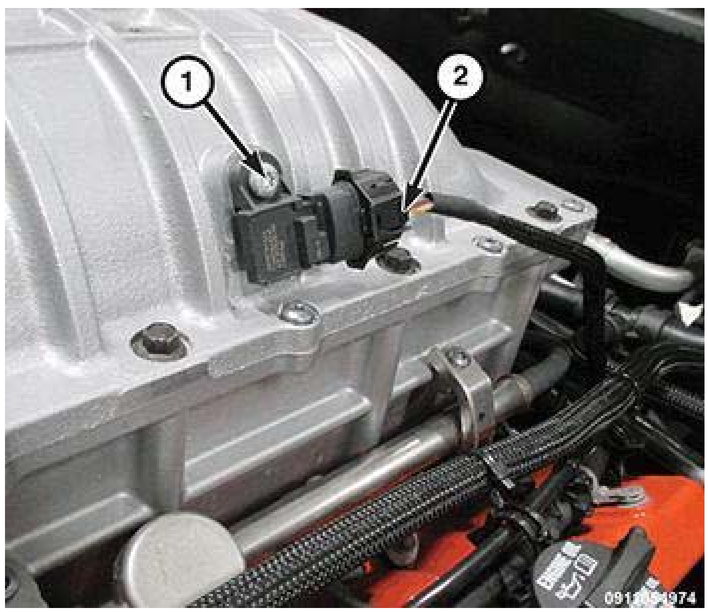
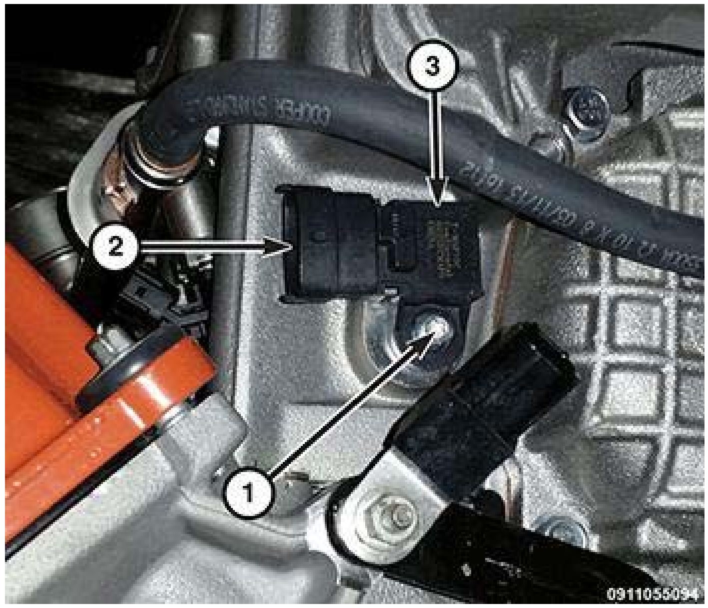


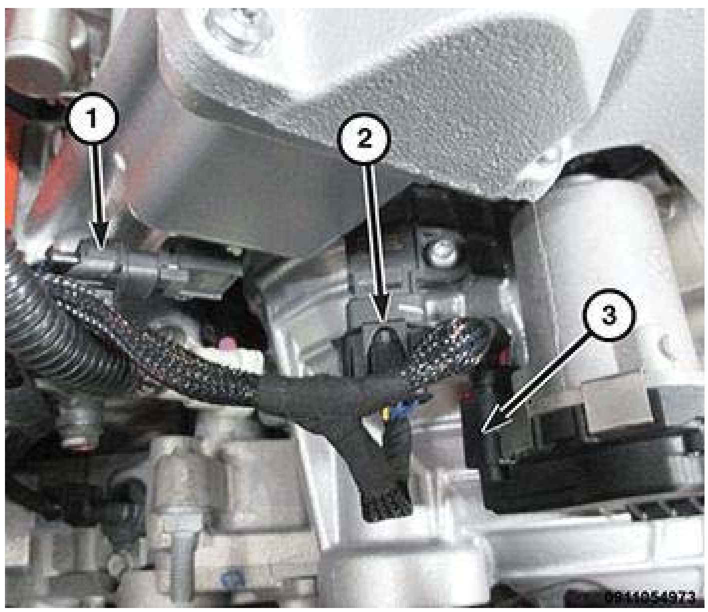
Fig. 217: TMAP Sensor, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

8. Connect the wire harness connector (2) to the intermediate Temperature-Manifold Absolute Pressure (TMAP) sensor (1).



[Fig. 218: TMAP Sensor, Connector & Screw]
Courtesy of CHRYSLER GROUP, LLC

9. Connect the wire harness connector (2) to the bank two TMAP sensor (3).



[Fig. 219: Temperature-Manifold Absolute Pressure (TMAP) Sensor Wire Harness Connectors & Bypass Valve Wire Harness Connector]
Courtesy of CHRYSLER GROUP, LLC

10. Connect bank one (1) and throttle outlet (2) TMAP sensor wire harness connectors.
11. Connect the wire harness connector to the throttle body at nose of supercharger.
12. Connect the bypass valve wire harness connector (3).

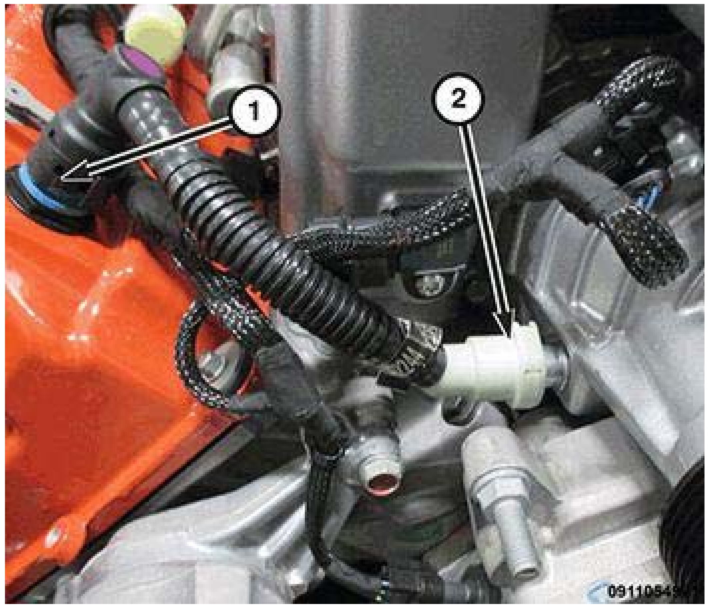


Fig. 220: Disconnecting/Connecting PCV Hose
Courtesy of CHRYSLER GROUP, LLC

13. Install the Positive Crankcase Ventilation (PCV) hose (1) to the right side of supercharger nose (2).

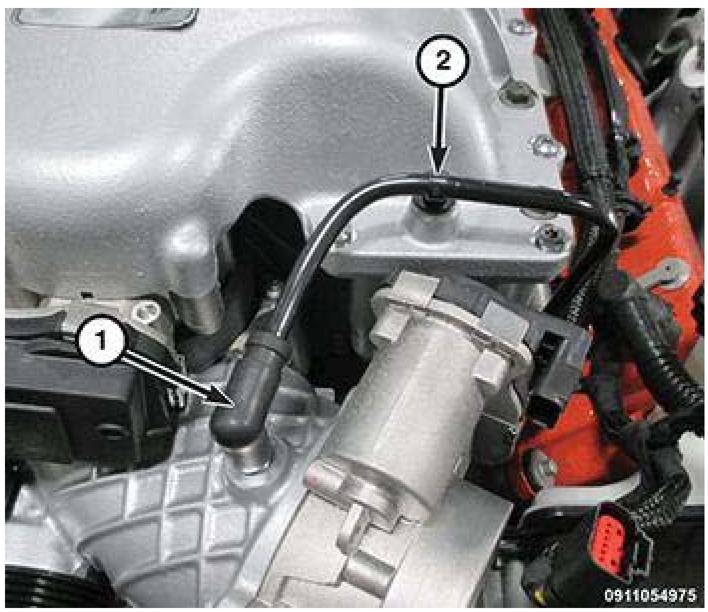


Fig. 221: Supercharger Nose & Fuel Purge Hose
Courtesy of CHRYSLER GROUP, LLC

14. Install the fuel purge hose (2) to the top of the supercharger nose (1).
15. Install the brake booster hose, located under the nose of the supercharger.
16. Install the supercharger belt. Refer to **BELT, DRIVE, INSTALLATION**.

Fig. 222: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

17. Install the engine covers.
18. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.
19. Install the cowl cover panel. Refer to **COVER, COWL PANEL, INSTALLATION** .
20. Fill the cooling system. Refer to **STANDARD PROCEDURE** .

NOTE: **Evacuating or purging air from the charge air cooling system must be done with the use of a pressurized air operated vacuum generator.**

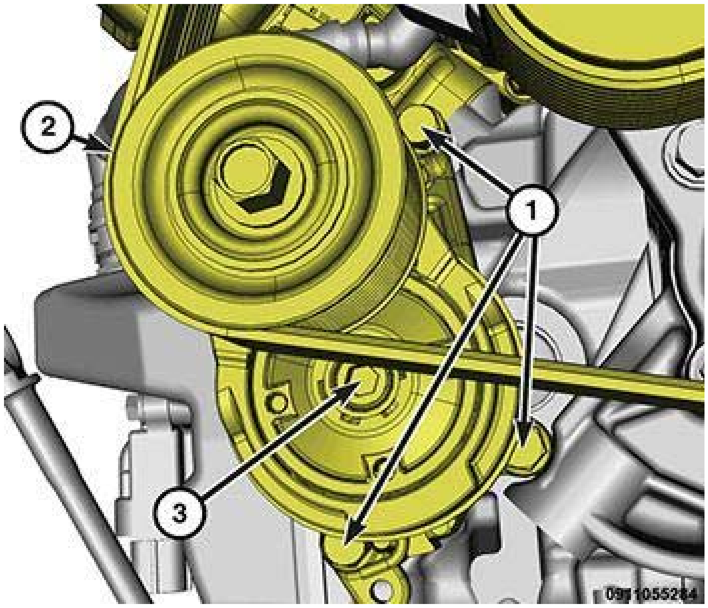
21. Connect the negative battery cable.

TENSIONER, DRIVE BELT

REMOVAL

REMOVAL

1. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .



[Fig. 223: Mounting Bracket Bolts, Supercharger Drive Belt & Belt Tensioner Retaining Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

2. Remove the supercharger drive belt (2). Refer to **BELT, DRIVE, REMOVAL**.
3. Remove belt tensioner retaining bolt (3) and the belt tensioner.
4. If necessary, remove the three mounting bracket bolts (1) and remove the bracket.

INSTALLATION

INSTALLATION

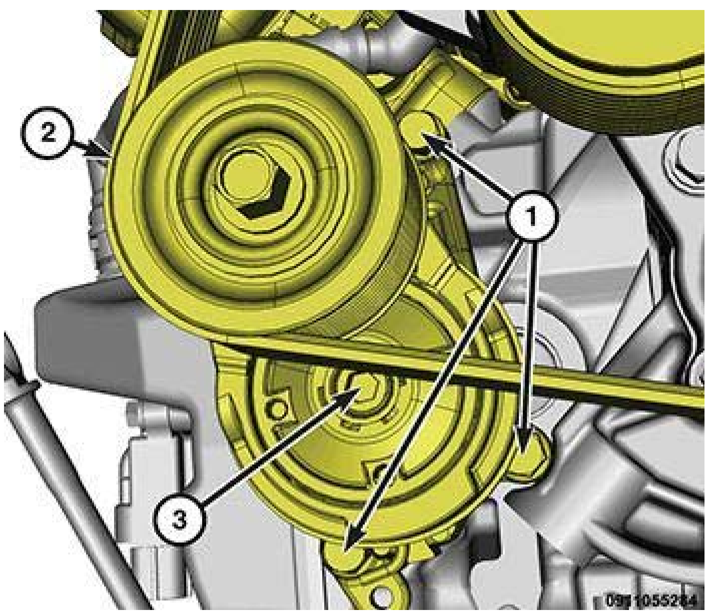


Fig. 224: Mounting Bracket Bolts, Supercharger Drive Belt & Belt Tensioner Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the mounting bracket and tighten the retaining bolts (1) to the proper specification. Refer to **SPECIFICATIONS** .
2. Install the belt tensioner retaining bolt (3) and tighten to the proper specification. Refer to

SPECIFICATIONS .

3. Install the supercharger drive belt (2). Refer to **BELT, DRIVE, INSTALLATION**.
4. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .

VALVE, BYPASS

DESCRIPTION

DESCRIPTION

The 64 mm bypass valve is located between the supercharger cover and the supercharger.

REMOVAL

REMOVAL

For removal, refer to **SUPERCHARGER, INSTALLATION**.

INSTALLATION

INSTALLATION

For installation, refer to **SUPERCHARGER, INSTALLATION**.

VALVE TIMING

CHAIN AND SPROCKETS, TIMING

REMOVAL

REMOVAL

1. Remove the engine oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.

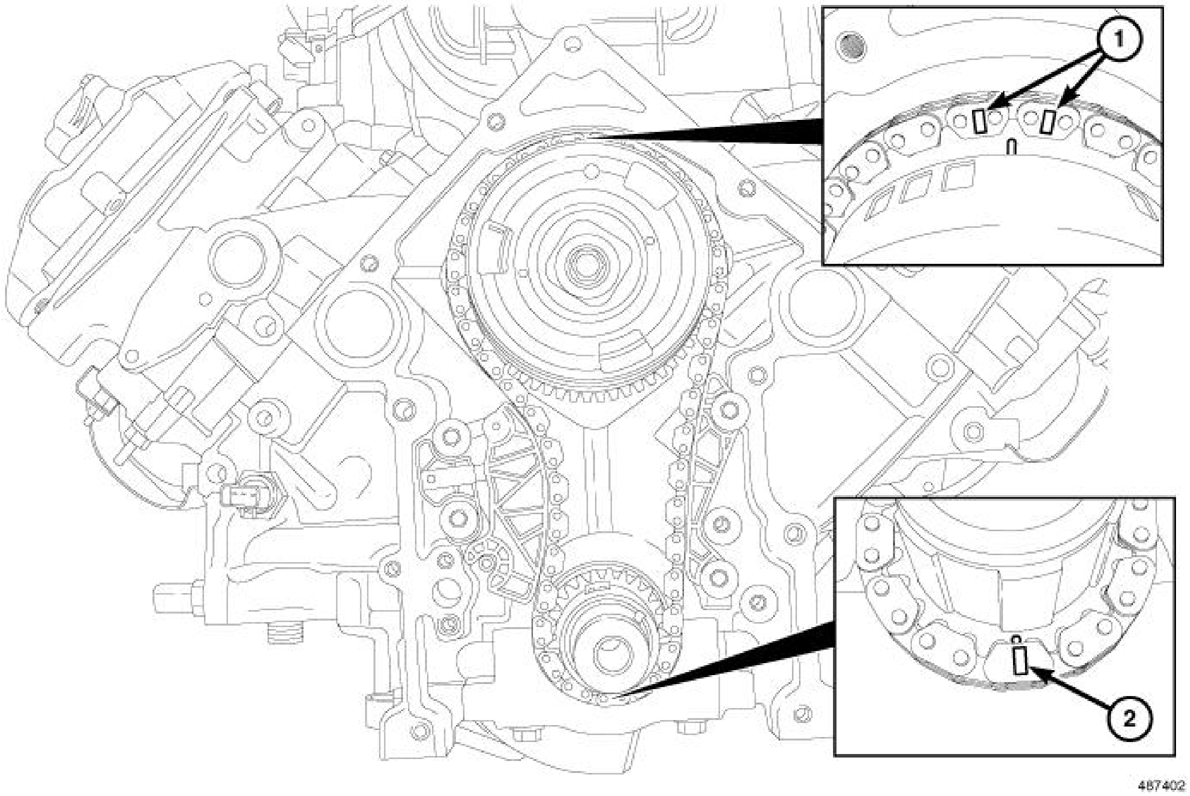


Fig. 225: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

2. Install the vibration damper bolt finger tight. Using a suitable socket and breaker bar, rotate the crankshaft to align the timing marks with the timing chain sprockets (1, 2).

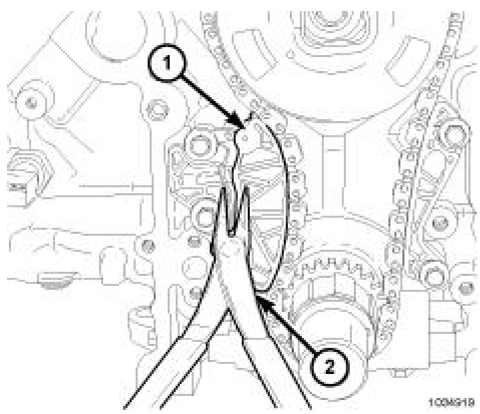
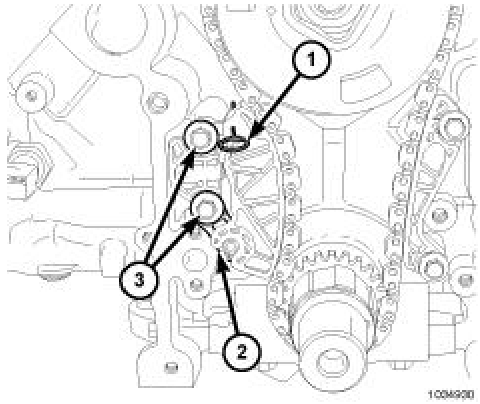


Fig. 226: Chain Tensioner Arm
Courtesy of CHRYSLER GROUP, LLC

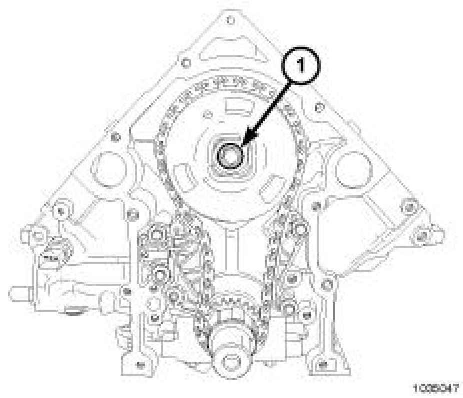
3. Retract the chain tensioner arm (1) until the hole in the arm lines up with the hole in the bracket.



[Fig. 227: Timing Chain Tensioner Pin & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

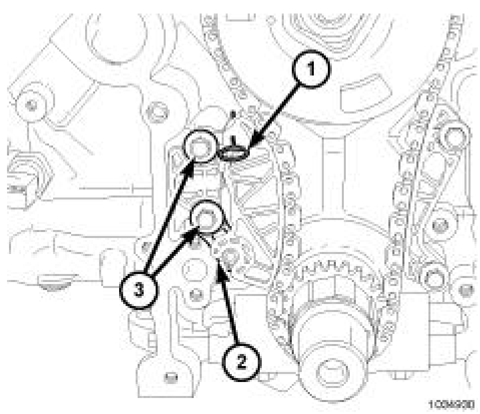
4. Install the Tensioner Pin (special tool #8514, Pins, Tensioner) (1) into the chain tensioner holes.

CAUTION: Never attempt to disassemble the camshaft phaser, severe engine damage could result.



[Fig. 228: Camshaft Phaser Retaining Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

5. Remove the camshaft phaser retaining bolt (1) and remove the timing chain with the camshaft phaser and crankshaft sprocket.



[Fig. 229: Timing Chain Tensioner Pin & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: Inspect the timing chain tensioner and timing chain guide shoes for wear and replace as necessary.

6. If the timing chain tensioner is to be replaced, remove the retaining bolts (3) and remove the timing chain tensioner (2).

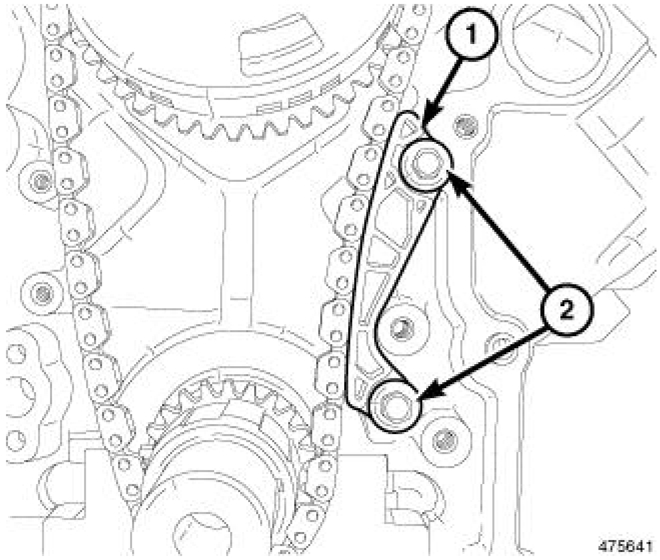


Fig. 230: Timing Chain Guide
Courtesy of CHRYSLER GROUP, LLC

7. If the timing chain guide (1) is to be replaced, remove the retaining bolts (2) and remove the timing chain guide (1).

INSTALLATION

INSTALLATION

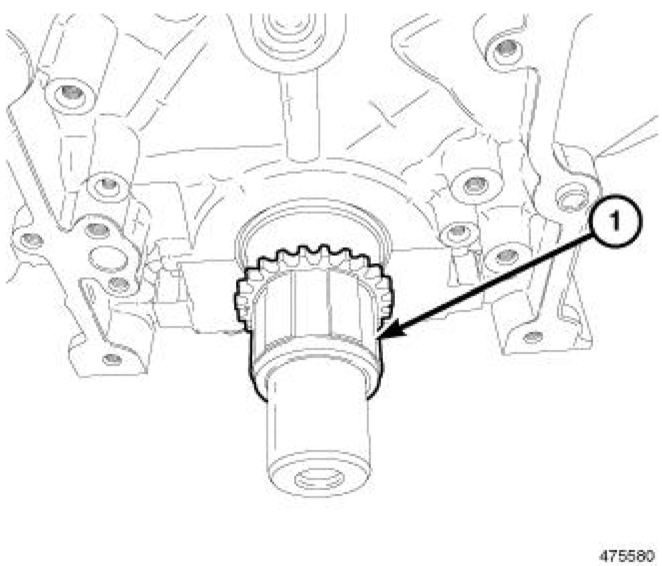


Fig. 231: Crankshaft Sprocket
Courtesy of CHRYSLER GROUP, LLC

1. Install the crankshaft sprocket (1) and position halfway onto the crankshaft.

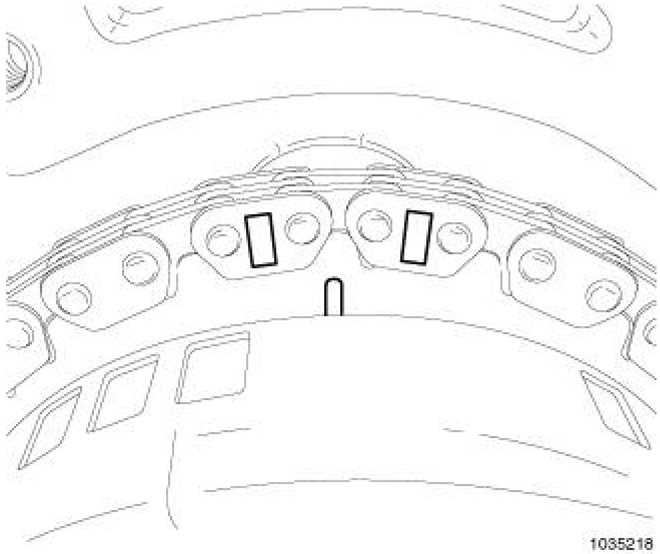


Fig. 232: Aligning Timing Chain & Camshaft Phaser Marks
Courtesy of CHRYSLER GROUP, LLC

2. While holding the camshaft phaser in hand, position the timing chain on the camshaft phaser and align the timing marks as shown in illustration.

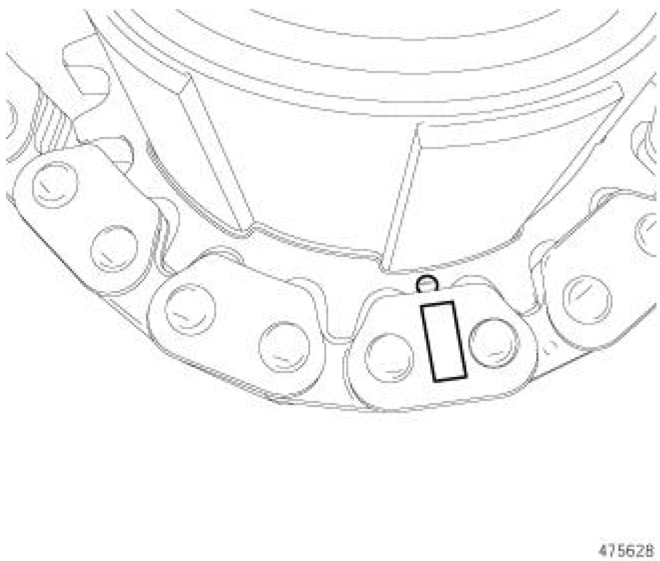


Fig. 233: Aligning Timing Chain & Crankshaft Sprocket Marks
Courtesy of CHRYSLER GROUP, LLC

3. While holding the camshaft phaser and timing chain in hand, position the timing chain on the crankshaft sprocket and align the timing mark as shown in illustration.

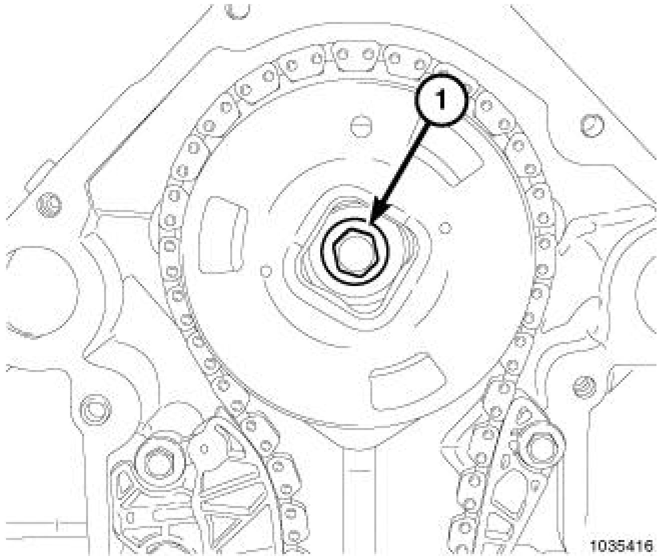


Fig. 234: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Align the slot in the camshaft phaser with the dowel on the camshaft and position the camshaft phaser on the camshaft while sliding the crankshaft sprocket into position.
5. Install the camshaft phaser retaining bolt (1) finger tight.

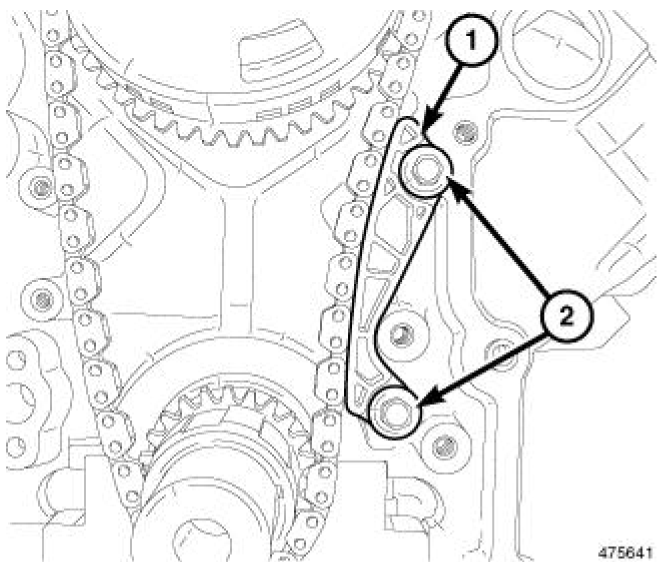


Fig. 235: Timing Chain Guide
Courtesy of CHRYSLER GROUP, LLC

6. If removed, install the timing chain guide (1) and tighten the bolts (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

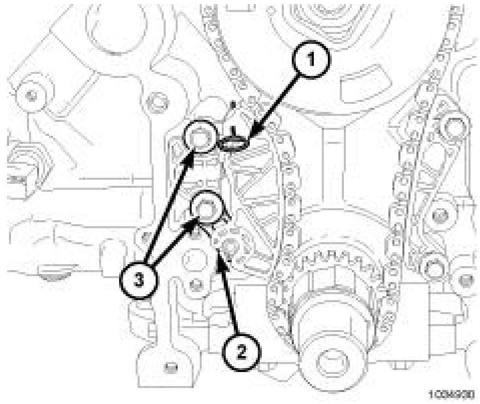


Fig. 236: Timing Chain Tensioner Pin & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. If removed, install the timing chain tensioner (2) and tighten the bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
8. If required, retract the chain tensioner arm and install the Tensioner Pin (special tool #8514, Pins, Tensioner) (1) into the holes of the chain tensioner arm.

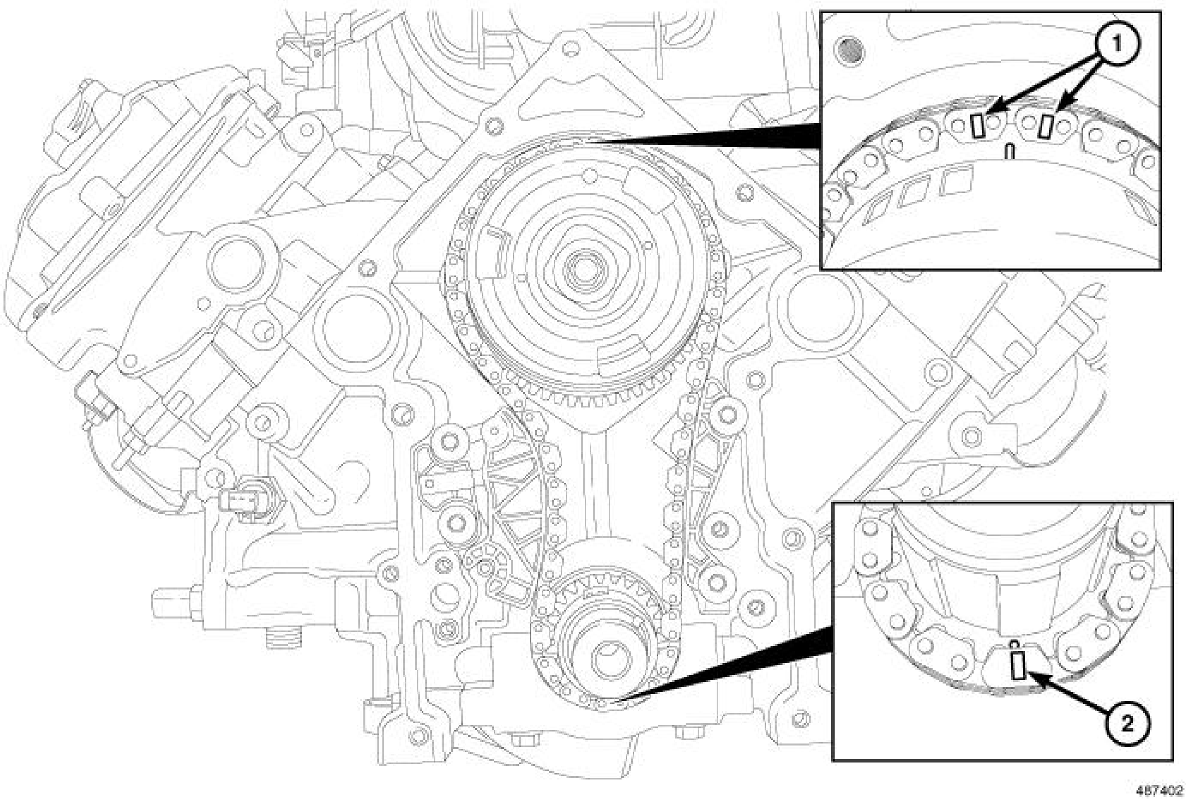


Fig. 237: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

9. Using care, rotate the crankshaft to verify the alignment of the timing marks (1, 2). If the timing marks do not line up, remove the camshaft sprocket and realign.

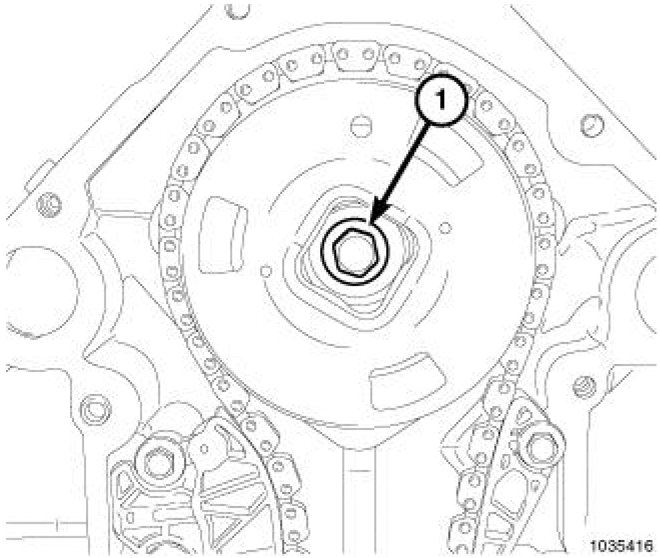


Fig. 238: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Tighten the camshaft phaser bolt (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
11. Install the engine oil pump. Refer to **PUMP, ENGINE OIL, INSTALLATION**.
12. Start the engine and check for leaks.

COVER(S), ENGINE TIMING

REMOVAL

REMOVAL

1. Remove the oil pan. Refer to **PAN, OIL, REMOVAL**.
2. Remove the support and lower the vehicle.
3. Remove the water pump. Refer to **PUMP, WATER, REMOVAL** .

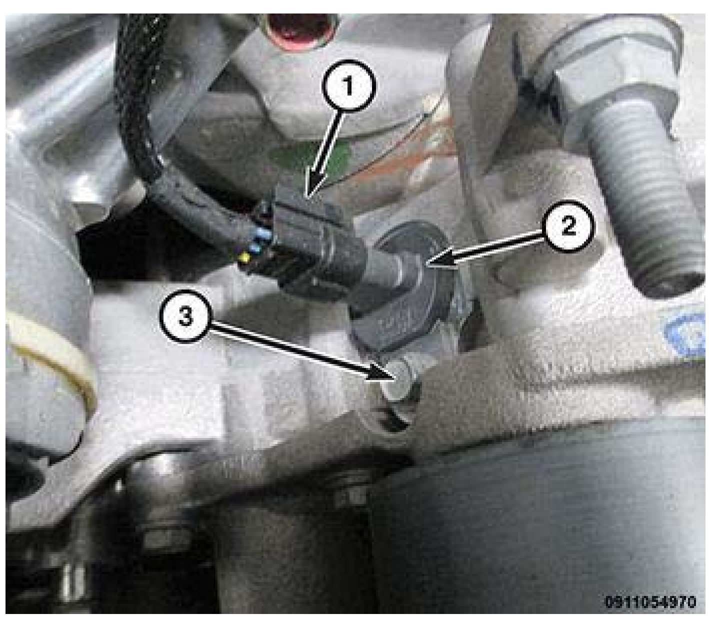


Fig. 239: Camshaft Position Sensor (CMP), Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the camshaft position sensor wire harness connector (1).
5. Remove A/C compressor from the front timing chain cover and position aside. Refer to **COMPRESSOR, A/C, REMOVAL** .
6. Remove the generator from the front timing chain cover and position aside. Refer to **GENERATOR, REMOVAL** .
7. Remove the vibration damper. Refer to **DAMPER, VIBRATION, REMOVAL**.

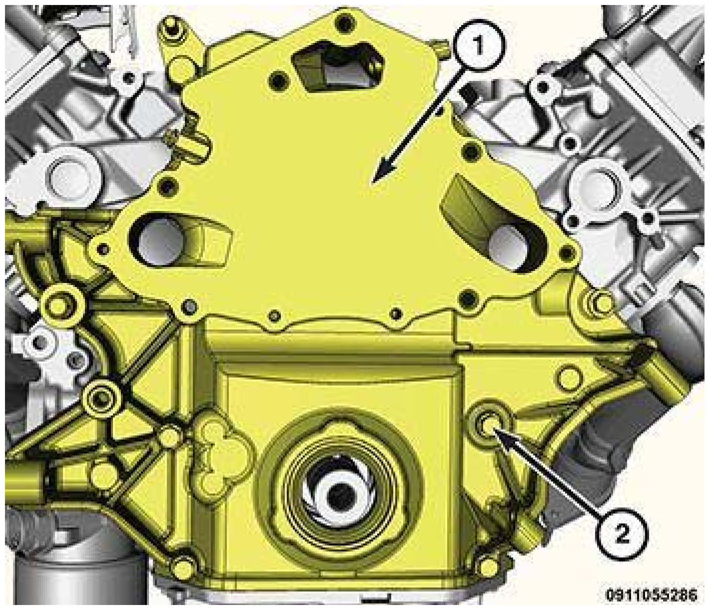


Fig. 240: Timing Chain Cover & Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Remove the engine timing cover retaining bolts (1) and remove the engine timing cover (1).

INSTALLATION

INSTALLATION

1. Clean the engine timing cover and engine block surface.

NOTE: **Always install a NEW gasket when servicing the engine timing cover.**

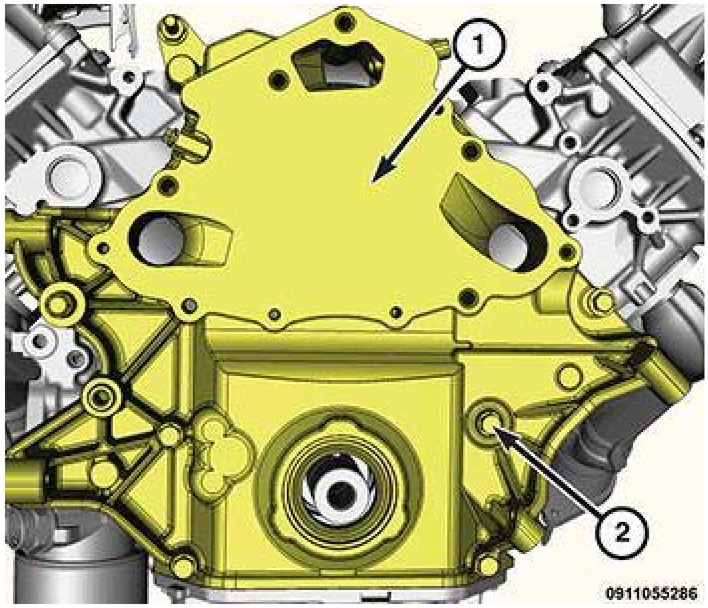


Fig. 241: Timing Chain Cover & Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Using a NEW gasket, install the engine timing cover (1) and tighten the retaining bolts (2) to the proper specification. Refer to TORQUE SPECIFICATIONS.
3. Install the vibration damper onto the crankshaft. Refer to DAMPER, VIBRATION, INSTALLATION.
4. Install the water pump. Refer to PUMP, WATER, INSTALLATION .
5. Install the oil pump pickup tube (2) and the oil pan. Refer to PAN, OIL, INSTALLATION.
6. Install the generator. Refer to GENERATOR, INSTALLATION .
7. Install the A/C compressor. Refer to COMPRESSOR, A/C, INSTALLATION .

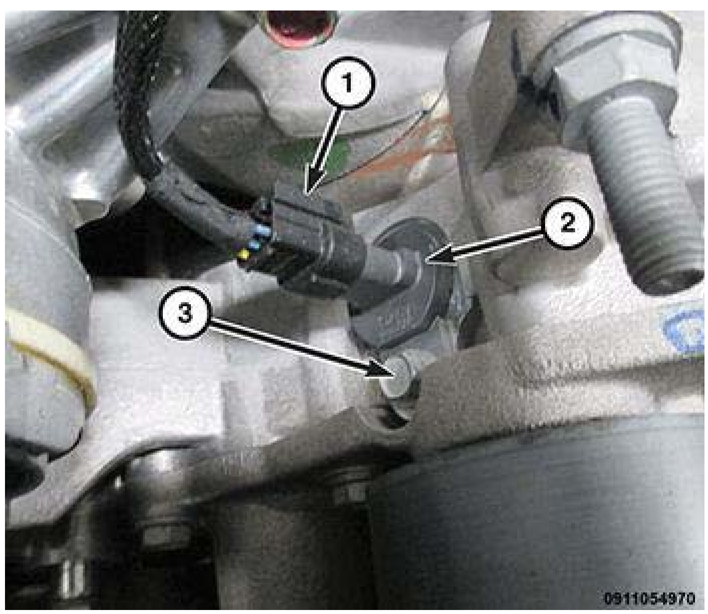


Fig. 242: Camshaft Position Sensor (CMP), Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Connect the camshaft position sensor (2) wire harness connector (1).

9. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .
10. Change the engine oil filter and fill the crankcase with the specified type and amount of engine oil. Refer to **STANDARD PROCEDURE**.
11. Connect the negative battery cable.
12. Perform the Refrigerant System Charge procedure. Refer to **PLUMBING, STANDARD PROCEDURE** .
13. Start the engine and check for leaks.

TENSIONER, ENGINE TIMING

DESCRIPTION

DESCRIPTION

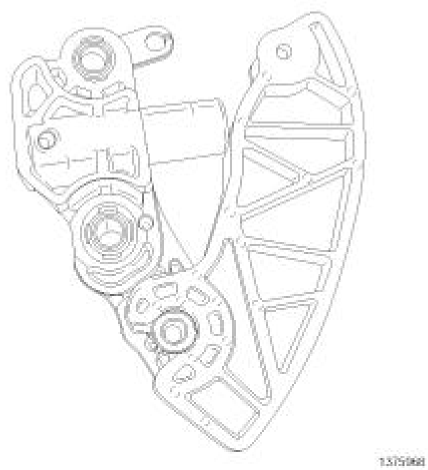


Fig. 243: Timing Chain Tensioner Arm
Courtesy of CHRYSLER GROUP, LLC

The timing chain tensioner is a spring loaded design. It consists of two chain guide shoes. One shoe is fixed in place and the other is spring loaded to keep tension on the chain.

OPERATION

OPERATION

The timing chain tension is maintained by routing the timing chain through the tensioner assembly. The tensioner assembly consists of two chain guide shoes. One shoe is fixed in place and the other is spring loaded to maintain the correct timing chain tension.

REMOVAL

For the removal procedure, refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

INSTALLATION

For the installation procedure, refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION** .

Article GUID: A00735861

2015-16 ENGINE

6.4L - Service Information - Challenger

DESCRIPTION

DESCRIPTION

CAUTION: If the engine has experienced a catastrophic failure, THE INTAKE MANIFOLD MUST BE REPLACED!

The 6.4L HEMI eight-cylinder SRT high performance engine is a 90Â° V-Type, deep skirt, lightweight cast iron block with aluminum heads, single cam, overhead valves, and hydraulic roller lifters. The heads incorporate splayed valves with a hemispherical style combustion chamber and dual spark plugs. The cylinders are numbered from front to rear; 1, 3, 5, 7 on the left bank and 2, 4, 6, 8 on the right bank. The firing order is 1-8-4-3-6-5-7-2. The 6.4L HEMI engine is a bored and stroked version of the 5.7L HEMI engine developed for SRT high performance vehicles.

DIAGNOSIS AND TESTING

CYLINDER COMBUSTION PRESSURE LEAKAGE

The combustion pressure leakage test provides an accurate means for determining engine condition.

Combustion pressure leakage testing will detect:

- Exhaust and intake valve leaks (improper seating)
- Leaks between adjacent cylinders or into water jacket
- Any causes for combustion pressure loss

1. Check the coolant level and fill as required. DO NOT install the radiator cap.
2. Start and operate the engine until it attains normal operating temperature.
3. Turn the engine OFF.
4. Remove one spark plug per cylinder.
5. Remove the oil filler cap.
6. Remove the air cleaner hose.
7. **Calibrate the tester according to the manufacturer's instructions.** The shop air source for testing should maintain a regulated air pressure at 552 kPa (80 psi).
8. Perform the test procedures on each cylinder according to the tester manufacturer's instructions. Set the piston of the cylinder to be tested at TDC compression.
9. During the testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the radiator coolant.

All gauge pressure indications should be equal, with **no more** than 25% leakage.

FOR EXAMPLE: Input air at 552 kPa (80 psi), the primary gauge factory set at 207 kPa (30 psi) input

pressure. The secondary gauge should have no more than 176 kPa (25.5 psi) loss, when connected to the cylinder.

Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART**.

CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
Air escapes through the throttle body	Intake valve bent, burnt, or not seated properly.	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
Air escapes through the tailpipe	Exhaust valve bent, burnt, or not seated properly.	Inspect valve and valve seat. Reface or replace, as necessary. Inspect valve springs. Replace as necessary.
Air escapes through the radiator	Cylinder head gasket leaking or cracked in cylinder head or engine block.	Remove cylinder head and inspect. Replace cylinder head gasket, cylinder head or engine block as necessary.
More than 50% leakage from adjacent cylinders	Cylinder head gasket leaking or crack in cylinder head or engine block between adjacent cylinders.	Remove cylinder head and inspect. Replace cylinder head gasket, cylinder head or engine block as necessary.
More than 25% leakage and air escapes through the oil filler cap opening only	Stuck or broken piston rings; cracked piston; worn rings or cylinder wall.	Remove cylinder head and inspect for broken rings or piston. Measure ring gap and cylinder diameter, taper and out-of-round. Replace defective part as necessary.

CYLINDER COMPRESSION PRESSURE LEAKAGE

NOTE: **The results of a cylinder compression pressure test can be utilized to diagnose several engine malfunctions.**

NOTE: **Ensure the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.**

1. Clean the spark plug recesses with compressed air.
2. Remove the spark plugs and record the cylinder number of each spark plug for future reference.
3. Inspect the spark plug electrodes for abnormal firing indicators such as fouled, hot, oily, etc.
4. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
5. Insert a compression pressure gauge and rotate the engine with the engine starter motor for three revolutions.
6. Record the compression pressure on the 3rd revolution. Continue the test for the remaining cylinders.

NOTE: **The recommended compression pressures are to be used only as a guide**

to diagnosing engine problems. An engine should not be disassembled to determine the cause of low compression unless some malfunction is present.

7. Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
8. If one or more cylinders have abnormally low compression pressures, repeat the compression test.

NOTE: **If the same cylinder or cylinders repeat an abnormally low reading on the second compression test, it could indicate the existence of a problem in the cylinder in question.**

9. If one or more cylinders continue to have abnormally low compression pressures, perform the cylinder combustion pressure leakage test. Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE**.

ENGINE MECHANICAL DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
ENGINE NOISE	1. Worn accessory drive belt	1. Check for belt damage and alignment Refer to **BELT, SERPENTINE, DIAGNOSIS AND TESTING** .
	2. Worn coolant pump	2. Check for possible coolant leak. If OK, Check the pulley and input shaft for wear. Replace as necessary.
	3. Worn generator	3. Check the pulley for wear. Spin the armature. Replace as necessary.
	4. Idler/Tensioner pulley	4. Check pulleys. Verify bearing noise. Replace as necessary.
	5. Power steering pump (if equipped)	5. Check the pulley and input shaft for wear. Replace as necessary.
	6. Flywheel/Flexplate	6. Check for wear or possible cracking. Check bolts. Repair as necessary.
NOISY VALVES/LIFTERS	1. High or low oil level in crankcase.	1. Check for correct oil level. Adjust oil level by draining or adding as needed.
	2. Thin or diluted oil.	2. Change oil. Refer to **STANDARD PROCEDURE**.
	3. Low oil pressure.	3. Check engine oil level. If OK, perform oil pressure test. Refer to **DIAGNOSIS AND TESTING**.
	4. Dirt in hydraulic lifters.	4. Clean/replace hydraulic lifters.

CONDITION	POSSIBLE CAUSES	CORRECTION
	5. Bent push rod(s).	5. Install new push rods.
	6. Worn rocker arms.	6. Inspect oil supply to rocker arms and replace worn arms as needed.
	7. Worn hydraulic lifters.	7. Install new hydraulic lifters.
	8. Worn valve guides.	8. Inspect all valve guides and replace as necessary.
	9. Excessive runout of valve seats or valve faces.	9. Grind valves and seats.
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. If OK, perform oil pressure test. Refer to **DIAGNOSIS AND TESTING**.
	3. Thin or diluted oil.	3. Change oil to correct viscosity. Refer to **STANDARD PROCEDURE**.
	4. Excessive connecting rod bearing clearance.	4. Measure bearings for correct clearance with plasti-gage. Repair as necessary.
	5. Connecting rod journal out of round.	5. Replace crankshaft or grind journals.
	6. Misaligned connecting rods.	6. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. If OK, perform oil pressure test. Refer to **DIAGNOSIS AND TESTING**.
	3. Thin or diluted oil.	3. Change oil to correct viscosity. Refer to **STANDARD PROCEDURE**.
	4. Excessive main bearing clearance.	4. Measure bearings for correct clearance. Repair as necessary.
	5. Excessive end play.	5. Check crankshaft thrust bearing for excessive wear on flanges.
	6. Crankshaft main journal out of round or worn.	6. Grind journals or replace crankshaft.
	7. Loose flexplate, flywheel or torque converter.	7. Inspect crankshaft, flexplate, flywheel and bolts for damage. Tighten to correct torque specification.
LOW OIL PRESSURE	1. Low oil level.	1. Check oil level and fill if necessary.
	2. Faulty oil pressure sending unit.	2. Install new sending unit.

CONDITION	POSSIBLE CAUSES	CORRECTION
	3. Clogged oil filter.	3. Install new oil filter.
	4. Worn oil pump.	4. Replace oil pump assembly.
	5. Thin or diluted oil.	5. Change oil to correct viscosity. Refer to **STANDARD PROCEDURE**.
	6. Excessive bearing clearance.	6. Measure bearings for correct clearance.
	7. Oil pump relief valve stuck.	7. Remove valve to inspect, clean and reinstall.
	8. Oil pickup tube loose, broken, bent or clogged.	8. Inspect oil pickup tube and pump, and clean or replace if necessary.
	9. Oil pump cover warped or cracked.	9. Install new oil pump.
	10. Faulty or missing piston cooling jets.	10. Replace piston cooling jets.
OIL LEAKS	1. Misaligned or deteriorated gaskets.	1. Replace gasket.
	2. Loose fastener or broken or porous metal part.	2. Tighten, repair or replace the part.
	3. Front or rear crankshaft oil seal leaking.	3. Replace seal.
	4. Leaking oil gallery plug or cup plug.	4. Remove and reseal threaded plug. Replace cup style plug.
EXCESSIVE OIL CONSUMPTION OR SPARK PLUGS OIL FOULED	1. PCV System malfunction.	1. Refer to **VALVE, POSITIVE CRANKCASE VENTILATION (PCV), REMOVAL** .
	2. Defective valve stem seal(s).	2. Repair or replace seal(s).
	3. Worn or broken piston rings.	3. Hone cylinder bores. Install new rings.
	4. Scuffed pistons/cylinder walls.	4. Hone cylinder bores and replace pistons as required.
	5. Carbon in oil control ring groove.	5. Remove rings and de-carbon piston.
	6. Worn valve guides.	6. Inspect/replace valve guides as necessary.
	7. Piston rings fitted too tightly in grooves.	7. Remove rings and check ring end gap and side clearance. Replace if necessary.

Lifter Purge Guideline

1. Warm engine to standard idle conditions.

NOTE: **Engine noise may be in the form of a clicking, chatter, or clattering noise.**

2. Listen to the engine for 30 to 60 seconds with the hood up and the engine cover removed.
3. If noise is present, de-aeration of the lifters is required.
4. Run the engine between 2000 and 3000 RPM for three to five minutes.
5. Return the engine to standard idle speed for 30 to 60 seconds.
6. Evaluate noise. If noise is present, repeat the run an additional 4 cycles.

NOTE: **The standard drive cycle will be about 10-15 miles of non-stop, combined highway and city driving.**

7. If noise is present, take the vehicle on a standard drive cycle.
8. Evaluate the noise. If noise present, follow standard service procedure for lifter repairs or noise conditions.
9. Evaluate the lifters for sponginess, check valve defects, and clearance.

ENGINE LUBRICATION DIAGNOSTIC TABLE

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL LEAKS	1. Gaskets and O-rings • Misaligned or damaged • Loose fasteners, broken or porous metal parts 2. Crankshaft rear seal 3. Crankshaft seal flange damaged 4. Oil pan flange cracked 5. Front cover seal damaged/misaligned 6. Damaged vibration damper 7. Crankshaft rear flange microporosity	1. Verify condition • Replace as necessary • Tighten fasteners, repair or replace metal parts 2. Replace as necessary 3. Polish or replace crankshaft 4. Replace oil pan 5. Replace seal 6. Polish or replace damper 7. Replace crankshaft
OIL PRESSURE DROP	1. Low oil level 2. Faulty oil pressure sending unit 3. Low oil pressure 4. Clogged oil filter 5. Worn oil pump 6. Thin or diluted oil 7. Excessive bearing clearance 8. Oil pump relief valve stuck 9. Oil pickup tube loose or damaged 10. Faulty or missing piston cooling jets	1. Check and correct oil level 2. Replace sending unit 3. Check pump and bearing clearance 4. Replace oil filter 5. Replace as necessary 6. Change oil and filter 7. Replace as necessary 8. Replace oil pump 9. Replace as necessary

CONDITION	POSSIBLE CAUSES	CORRECTION
		10. Replace piston cooling jets
OIL PUMPING AT RINGS; SPARK PLUGS FOULING	1. Worn or damaged rings 2. Carbon in oil ring slots 3. Incorrect ring size installed 4. Worn valve guides 5. Leaking intake gasket 6. Leaking valve guide seals	1. Hone cylinder bores and replace rings 2. Replace rings 3. Replace rings 4. Ream guides and replace valves 5. Replace intake gaskets 6. Replace valve guide seals

OIL CONSUMPTION TEST AND DIAGNOSIS

The following diagnostic procedures are used to determine the source of excessive internal oil consumption, these procedures and tests apply to vehicles with 50, 000 miles or less.

NOTE: **Engine oil consumption may be greater than normal during engine break-in. Repairs should be delayed until vehicle has been driven at least 7, 500 miles.**

Severe service (high ambient temperature, short trips, heavy loading, trailer towing, taxi, off-road, or law enforcement use) may result in greater oil consumption than normal.

Sustained high speed driving and high engine RPM operation may result in increased oil consumption.

Failure to comply with the recommended oil type and viscosity rating, as outlined in the owner's manual, may impact oil economy as well as fuel economy.

Oil consumption may increase with vehicle age and mileage due to normal engine wear.

NOTE: **Because a few drops of external oil leakage per mile can quickly account for the loss of one quart of oil in a few hundred miles, verify that no external engine oil leaks are present.**

- **Oil leakage is not the same as oil consumption and all external leakage must be eliminated before any action can be taken to verify and correct oil consumption complaints.**
- **Verify that the engine has the correct oil level dipstick and dipstick tube installed.**
- **Verify that the engine is not being run in an overfilled condition. Check the oil level 15 minutes after a hot shutdown with the vehicle parked on a level surface. In no case should the level be above MAX or the FULL mark on the dipstick.**

OIL CONSUMPTION TEST

1. Check the oil level at least 15 minutes after a hot shutdown.
2. If the oil level is low, top off with the proper viscosity and API service level engine oil. Add one bottle of MOPARĀ® 4-In-1 Leak Detection Dye into the engine oil.
3. Tamper proof the oil pan drain plug, oil filter, dipstick and oil fill cap.

4. Record the vehicle mileage.
5. Instruct the customer to drive the vehicle as usual.
6. Ask the customer to return to the servicing dealer after accumulating 500 miles, Check the oil level at least 15 minutes after a hot shutdown. If the oil level is half way between the "FULL" and "ADD" mark continue with the next step.
7. Using a black light, recheck for any external engine oil leaks, repair as necessary, if no external engine oil leaks are present, continue with oil consumption diagnosis.

OIL CONSUMPTION DIAGNOSIS

1. Check the Positive Crankcase Ventilation (PCV) system. Make sure the system is not restricted and the PCV valve has the correct part number and correct vacuum source (18-20 in. Hg at idle below 3000 ft. above sea level is considered normal).
2. Perform a cylinder compression test and cylinder leak down test using the standard leak down gauge following manufacturers suggested best practices. Refer to **CYLINDER COMPRESSION PRESSURE LEAKAGE** and **CYLINDER COMBUSTION PRESSURE LEAKAGE**.

NOTE: **Verify the spark plugs are not oil saturated. If the spark plugs are oil saturated and compression is good it can be assumed the valve seals or valve guides are at fault.**

3. If one or more cylinders have more than 15% leak down further engine tear down and inspection will be required.

TOP 18 REASONS THAT MAY LEAD TO ENGINE OIL CONSUMPTION

1. **Tapered and Out-of-Round Cylinders**

   The increased piston clearances permit the pistons to rock in the worn cylinders. While tilted momentarily, an abnormally large volume of oil is permitted to enter on one side of the piston. The rings, also tilted in the cylinder, permit oil to enter on one side. Upon reversal of the piston on each stroke, some of this oil is passed into the combustion chamber.

2. **Distorted Cylinders**

   This may be caused by unequal heat distribution or unequal tightening of cylinder head bolts. This condition presents a surface which the rings may not be able to follow completely. In this case, there may be areas where the rings will not remove all of the excess oil. When combustion takes place, this oil will be burned and cause high oil consumption.

3. **Improper operation of the PCV system**

   The main purpose of the Positive Crankcase Ventilation (PCV) valve is to recirculate blow-by gases back from the crankcase area through the engine to consume unburned hydrocarbons. The PCV system usually has a one way check valve and a make up air source. The system uses rubber hoses that route crankcase blow by gases to the intake manifold. Vacuum within the engine intake manifold pulls the blow by gases out of the crankcase into the combustion chamber along with the regular intake air and fuel mixture.

   The PCV system can become clogged with sludge and varnish deposits and trap blow by gases in the

crankcase. This degrades the oil, promoting additional formation of deposit material. If left uncorrected, the result is plugged oil rings, oil consumption, rapid ring wear due to sludge buildup, ruptured gaskets and seals due to crankcase pressurization.

4. **Worn Piston Ring Grooves**

   For piston rings to form a good seal, the sides of the ring grooves must be true and flat - not flared or shouldered. Piston rings in tapered or irregular grooves will not seal properly and, consequently, oil will pass around behind the rings into the combustion chamber.

5. **Worn, Broken or Stuck Piston Rings**

   When piston rings are broken, worn or stuck to such an extent that the correct tension and clearances are not maintained, this will allow oil to be drawn into the combustion chamber on the intake stroke and hot gases of combustion to be blown down the cylinder past the piston on the power stroke. All of these conditions will result in burning and carbon build up of the oil on the cylinders, pistons and rings.

6. **Cracked or Broken Ring Lands**

   Cracked or broken ring lands prevent the rings from seating completely on their sides and cause oil pumping. This condition will lead to serious damage to the cylinders as well as complete destruction of the pistons and rings. Cracked or broken ring lands cannot be corrected by any means other than piston replacement.

7. **Worn Valve Stems and Guides**

   When wear has taken place on valve stems and valve guides, the vacuum in the intake manifold will draw oil and oil vapor between the intake valve stems and guides into the intake manifold and then into the cylinder where it will be burned.

8. **Bent or Misaligned Connecting Rods**

   Bent or misaligned connecting rods will not allow the pistons to ride straight in the cylinders. This will prevent the pistons and rings from forming a proper seal with the cylinder walls and promote oil consumption. In addition, it is possible that a bearing in a bent connect rod will not have uniform clearance on the connecting rod wrist pin. Under these conditions, the bearing will wear rapidly and throw off an excessive amount of oil into the cylinder.

9. **Fuel Dilution**

   If raw fuel is allowed to enter the lubrication system, the oil will become thinner and more volatile and will result in higher oil consumption. The following conditions will lead to higher oil consumption;

   - Excess fuel can enter and mix with the oil via a leaking fuel injector
   - Gasoline contaminated with diesel fuel
   - Restricted air intake
   - Excessive idling

10. **Contaminated Cooling Systems**

Corrosion, rust, scale, sediment or other formations in the water jacket and radiator will prevent a cooling system from extracting heat efficiently. This is likely to cause cylinder distortion thus leading to higher oil consumption.

11. **Oil Viscosity**

    The use of oil with a viscosity that is too light may result in high oil consumption. Refer to the vehicle owner's manual for the proper oil viscosity to be used under specific driving conditions and ambient temperatures.

12. **Dirty Engine Oil**

    Failure to change the oil and filter at proper intervals may cause the oil to be so dirty that it will promote accumulation of sludge and varnish and restrict oil passages in the piston rings and pistons. This will increase oil consumption; dirty oil by nature is also consumed at a higher rate than clean oil.

13. **Crankcase Overfull**

    Due to an error in inserting the oil dip stick so that it does not come to a seat on its shoulder, a low reading may be obtained. Additional oil may be added to make the reading appear normal with the stick in this incorrect position which will actually make the oil level too high. If the oil level is so high that the lower ends of the connecting rods touch the oil in the oil pan excessive quantities of oil will be thrown on the cylinder walls and some of it will work its way up into the combustion chamber.

14. **Excessively High Oil Pressure**

    A faulty oil pressure relief valve may cause the oil pressure to be too high. The result will be that the engine will be flooded with an abnormally large amount of oil in a manner similar to that which occurs with worn bearings. This condition may also cause the oil filter to burst.

15. **Aftermarket Performance Chips and Modification**

    Increasing performance through the use of performance/power enhancement products to a stock or factory engine will increase the chance of excessive oil consumption.

16. **Lugging Engine**

    Lugging is running the engine at a lower RPM in a condition where a higher RPM (more power/torque) should be implemented. Especially susceptible on vehicles equipped with a manual transmission. This driving habit causes more stress loading on the piston and can lead to increases in engine oil consumption.

17. **Turbocharged Engines**

    There is a possibility for PCV "push-over" due to higher crankcase pressure (as compared to naturally aspirated engines) which is normal for turbocharged engines. This condition causes varying amounts of engine oil to enter the intake manifold, charge air cooler and associated plumbing to and from the charge air cooler, also a leaking turbocharger seal will draw oil into the combustion chamber where it will burn (blue smoke from the tail pipe may be present) and form carbon deposits which contribute to further oil consumption as they interfere with proper engine function.

18. **Restricted Air Intake**

    Excessive restriction in the air intake system will increase engine vacuum and can increase oil consumption. An extremely dirty air filter would be one example of this situation.

STANDARD PROCEDURE

DUST COVERS AND CAPS

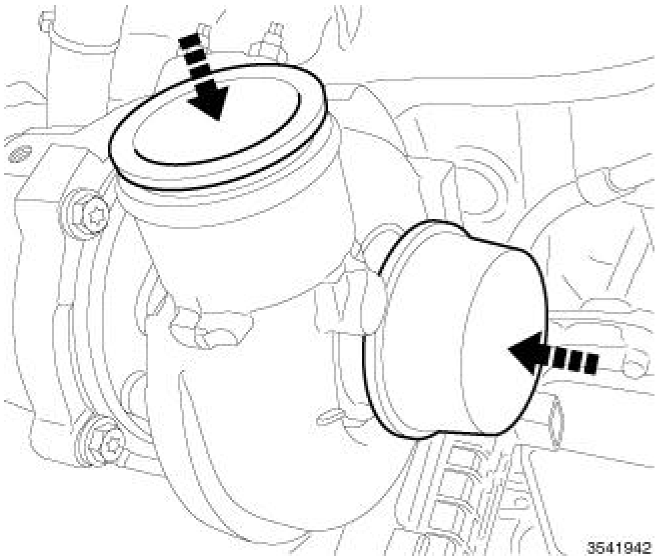


Fig. 1: Covers/Caps
Courtesy of CHRYSLER GROUP, LLC

To avoid the possibility of dust, dirt, moisture and other foreign debris being introduced to the engine during service, cover or cap all openings when hoses and tubes are removed.

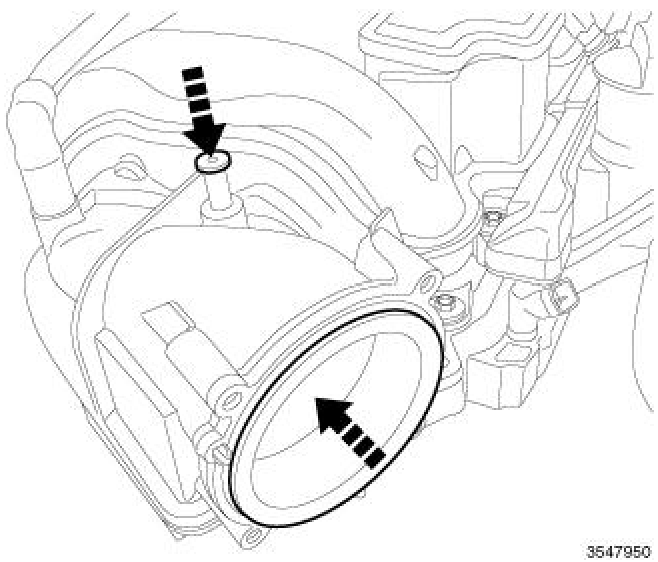


Fig. 2: Opening Cover
Courtesy of CHRYSLER GROUP, LLC

Covers installed over openings will reduce the possibility of foreign materials to entering the engine systems. Using miller tool Universal Protective Cap Set (special tool #10368, Set, Universal Protective Cap), select the

appropriate cover needed for the procedure.

ENGINE GASKET SURFACE PREPARATION

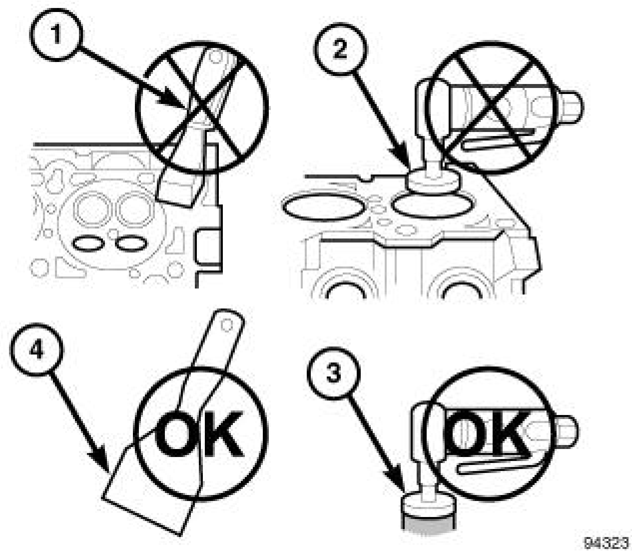


Fig. 3: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper (1).
- Abrasive pad or paper to clean cylinder block and head.
- High speed power tool with an abrasive pad or a wire brush (2).

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (4).
- Drill motor with 3M Roloc™ Bristle Disc (3), white is used for the aluminum heads and yellow is used for the iron block.

CAUTION: Excessive pressure or high RPM (beyond the recommended speed), can damage the sealing surfaces. The mild (white, 120 grit) bristle disc is recommended. If necessary, the medium (yellow, 80 grit) bristle disc may be used on cast iron surfaces with care.

HYDROSTATIC LOCK

CAUTION: Do not attempt to run engine. Severe damage could occur.

When an engine is suspected of hydrostatic lock (regardless of what caused the problem), follow the steps below.

1. Disconnect and isolate the negative battery cable.
2. Lift the engine cover retaining grommets off the ball studs and remove the engine cover.
3. Place a shop towel around the fuel supply line quick connect fitting to catch any fuel that may be under pressure, then disconnect the fuel supply line. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE** .
4. Loosen the air duct retaining clamp at the throttle body.
5. Disconnect the intake air temperature sensor electrical connector.
6. Remove the makeup air hose at the air cleaner housing.
7. Remove the air cleaner housing retaining bolt.
8. While lifting up the air cleaner housing, slide the air duct off the throttle body and remove the air cleaner housing from the vehicle.
9. Inspect the air duct, air cleaner housing and the intake manifold to make sure the system is dry and clear of any foreign material.
10. Place a shop towel around the spark plugs to catch any fluid that may possibly be under pressure in the cylinder head.
11. Remove the spark plugs. Refer to **SPARK PLUG, REMOVAL** .
12. With the spark plugs removed, rotate the crankshaft using a breaker bar and socket.
13. Identify the fluid in the cylinders (coolant, fuel, oil, etc.).
14. Make sure all fluid has been removed from the cylinders.
15. Repair engine or components as necessary to prevent this problem from occurring again.
16. Squirt a small amount of engine oil into the cylinders to lubricate the walls. This will help prevent engine damage on restart.
17. Install new spark plugs. Refer to **SPARK PLUG, INSTALLATION** .
18. Perform the Engine Oil Service procedure. Refer to **STANDARD PROCEDURE**.
19. Connect negative battery cable.
20. Start the engine and check for leaks.

REPAIR DAMAGED OR WORN THREADS

CAUTION: Always maintain the original center line when drilling and/or tapping holes.

Damaged or worn threads can be repaired. Essentially, this repair consists of:

- Drilling out worn or damaged threads
- Tapping the hole with a special Heli-CoilÂ® Tap or equivalent
- Installing a Heli-CoilÂ® insert into the tapped hole to bring the hole back to its original thread size

SPECIFICATIONS

ENGINE SPECIFICATIONS

GENERAL DESCRIPTION

DESCRIPTION	SPECIFICATION
Engine Type	90Ā° V-8 OHV
Displacement	6.4 Liters
	392 (Cubic Inches)
Bore	103.9 mm (4.09 in.)
Stroke	94.6 mm (3.72 in.)
Compression Ratio	10.9:1
Firing Order	1-8-4-3-6-5-7-2
Lubrication	Pressure Feed - Full Flow Filtration
Cooling System	Liquid Cooled - Forced Circulation
Cylinder Block	Cast Iron
Cylinder Head	Aluminum
Crankshaft	Forged Steel
Camshaft	Cast Iron
Pistons	Aluminum Alloy
Connecting Rods	Powdered Metal

CYLINDER BLOCK

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Cam Bore 1 Diameter	61.72 mm	2.4300 in.
Cam Bore 2 Diameter	57.86 mm	2.2780 in.
Cam Bore 3 Diameter	57.45 mm	2.2618 in.
Cam Bore 4 Diameter	57.06 mm	2.2465 in.
Cam Bore 5 Diameter	43.683 mm	1.7198 in.
Cylinder Bore Diameter	103.9 mm	4.09 in.
Out of Round (MAX)	0.008 mm	0.0003 in.
Taper (MAX)	0.0127 mm	0.0005 in.
Lifter Bore Diameter	21.45 - 21.425 mm	0.8444 - 0.8435 in.

PISTONS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Clearance Measured at 38.0 mm (1.5 in.) Below Deck	0.0245 - 0.0515 mm	0.00096 - 0.0020 in.
Ring Groove Diameter		
Groove #1	95.23 - 95.73 mm	3.7492 - 3.7689 in.
Groove #2	93.53 - 94.03 mm	3.6823 - 3.7020 in.
Weight	450 grams	15.87 oz.
Piston Length	54.70 - 55.30 mm	2.153 - 2.177 in.
Ring Groove Width		
No. 1	1.24 mm	0.0488 in

DESCRIPTION	SPECIFICATION	
	Metric	Standard
No. 2	1.24 mm	0.0488 in
No. 3	2.04 mm	0.0803 in.

PISTON RINGS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Ring Gap		
Top Compression Ring	0.35 - 0.50 mm	0.0138 - 0.0197 in.
Second Compression Ring	0.35 - 0.60 mm	0.0137 - 0.0236 in.
Oil Control (Steel Rails)	0.20 - 0.71 mm	0.0079 - 0.028 in.
Side Clearance		
Top Compression Ring	0.02 - 0.068 mm	0.0007 - 0.0026 in.
Second Compression Ring	0.02 - 0.058 mm	0.0007 - 0.0022 in.
Oil Ring (Steel Ring)	0.019 - 0.229 mm	0.0007 - 0.0091 in.
Ring Width		
Top Compression Ring	1.172 - 1.190 mm	0.0461 - 0.0469 in.
Second Compression Ring	1.472 - 1.490 mm	0.0579 - 0.0586 in.
Oil Ring (Steel Rails)	0.447 - 0.473 mm	0.0175 - 0.0186 in.

CONNECTING RODS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Side Clearance	0.10 - 0.35 mm	0.003 - 0.0137 in.

CRANKSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Main Bearing Journal Diameter	65 mm	2.6 in.
Main Bearing Clearance	0.013 - 0.041 mm	0.0005 - 0.0016 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.
End Play	0.052 - 0.282 mm	0.002 - 0.011 in.
End Play (MAX)	0.282 mm	0.011 in.
Connecting Rod Journal Diameter	54.00 mm	2.126 in.
Rod Bearing Clearance	0.041 - 0.066 mm	0.0016 - 0.0026 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.

CAMSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	Standard

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Bearing Journal Diameter		
No. 1	61.67 mm	2.4280 in.
No. 2	57.79 mm	2.2752 in.
No. 3	57.39 mm	2.2594 in.
No. 4	56.99 mm	2.2437 in.
No. 5	43.62 mm	1.7174 in.
Bearing To Journal Clearance Standard		
No. 1	0.030 - 0.070 mm	0.0012 - 0.0028 in.
No. 2	0.050 -0.090 mm	0.0019 - 0.0035 in.
No. 3	0.040 - 0.080 mm	0.0015 - 0.003 in.
No. 4	0.050 - 0.090 mm	0.0019 - 0.0035 in.
No. 5	0.040 - 0.080 mm	0.0015 - 0.003 in.
Camshaft End Play	.080 - 0.290 mm	0.0031 - 0.0114 in.
Duration	288.0Â°	
Valve Lift (@ Zero Lash)		
Intake	15.0 mm	0.591 in.
Exhaust	14.2 mm	0.559 in.

VALVE TIMING

DESCRIPTION	SPECIFICATION
Intake	
Opens (BTDC)	36.0Â°
Closes (ATDC)	250.0Â°
Duration	286.0Â°
Exhaust	
Opens (BTDC)	278Â°
Closes (ATDC)	10Â°
Valve Overlap	46Â°

CYLINDER HEAD

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Valve Seat Angle	44.5Â° - 45.0Â°	
Valve Guide Runout (MAX)	0.04 mm	0.0016 in.
Valve Seat Width		
Intake	0.94 - 1.04 mm	0.037 - 0.041 in.
Exhaust	1.16 - 1.26 mm	0.046 - 0.050 in.
Guide Bore Diameter		
Intake	7.975 - 7.997 mm	0.314 - 0.315 in.
Exhaust	7.975 - 7.990 mm	0.314 - 0.315 in.

HYDRAULIC TAPPETS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Body Diameter	21.387 - 21.405 mm	0.8420 - 0.8427 in.
Clearance (To Bore)	0.020 - 0.063 mm	0.0007 - 0.0024 in.
Dry Lash (at the valve)	3.0 mm	0.1181 in.

VALVES

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Face Angle		
Intake	45.5Â° - 46.0Â°	
Exhaust	45.0Â° - 45.5Â°	
Head Diameter		
Intake	54.3 mm	2.138
Exhaust	42.0 mm	1.654
Length (Overall From Gage Line)		
Intake	128.56	5.0614 in.
Exhaust	127.17	5.0067 in.
Stem Diameter		
Intake	7.934 - 7.954 mm	0.312 - 0.313 in.
Exhaust	7.930 - 7.950 mm	0.312 - 0.313 in.
Stem - to - Guide Clearance		
Intake	0.021 - 0.063 mm	0.0008 - 0.0025 in.
Exhaust	0.025 - 0.067 mm	0.0010 - 0.0026 in.

VALVE SPRING

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Spring Force (Valve Closed)		
Intake	510.0 N Â± 26.0 N @ 52.1 mm	114.7 lbs. Â± 5.8 lbs. @ 2.051 in.
Exhaust	510.0 N Â± 26.0 N @ 52.1 mm	114.7 lbs. Â± 5.8 lbs. @ 2.051 in.
Spring Force (Valve Open)		
Intake	1500.0 N Â± 70.0 N @ 37.6 mm	337.2 lbs. Â± 15.7 lbs. @ 1.480 in.
Exhaust	1500.0 N Â± 70.0 N @ 37.6 mm	337.2 lbs. Â± 15.7 lbs. @ 1.480 in.
Free Length (approx.)		
Intake	63.9 mm	2.516 in.
Exhaust	63.9 mm	2.516 in.
Number of Coils		
Intake	8.55	
Exhaust	8.55	

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Wire Diameter		
Intake and Exhaust	5.65 X 4.51 mm	0.222 - 0.178 in.
Installed Height (Spring Seat to Bottom of Retainer)		
Intake	52.1 mm	2.051 in.
Exhaust	51.2 mm	2.016 in.

OIL PUMP

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Clearance Over Rotors (MAX)	0.095 mm	0.0038 in.
Outer Rotor to Pump Body Clearance (MAX)	0.235 mm	0.009 in.
Tip Clearance Between Rotors (MAX)	0.150 mm	0.006 in.

OIL PRESSURE

SPECIFICATION	SPECIFICATION
At Curb Idle Speed (min.)*	25 kPa (4 psi)
@ 3000 RPM	170 - 758 kPa (25 - 110 psi)
*** CAUTION: If pressure is zero at curb idle, DO NOT run engine**	

TORQUE SPECIFICATIONS

ENGINE BLOCK

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Camshaft Phaser Bolt	122	90	-	-
Camshaft Thrust Plate Bolts	12	-	106	-
Coolant Drain Plugs 1/4 x 18 NPT	34	25	-	-
Connecting Rod Cap Bolts	40 plus 90Â° Turn	30 plus 90Â° Turn	-	-
Crankshaft Main Bearing Cap Bolts	Specific torque and fastener pattern required; follow installation sequence. Refer to **CRANKSHAFT, INSTALLATION**. .			-
Variable Valve Timing Solenoid Bolt	11	8	-	-
Lifter Guide Holder	12	9	-	-
Oil Pan Bolts	Specific torque and fastener pattern required; follow installation sequence. Refer to **PAN, OIL, INSTALLATION** .			X
Oil Dipstick Tube	12	9	-	-

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Oil Filter Adapter-Engine Oil Cooler	27	20	-	-
Oil Gallery Plugs 1/4 x 18 NPT	20	15	-	-
Oil Pan Drain Plug	27	20	-	-
MDS Solenoid - Bolts	11	8	-	-
Oil Pressure Sensor	15	11	-	-
Oil Pump to Engine Block Bolts	19	14	-	-
Oil Pump Cover Bolts.	15	11	-	-
Oil Pump Pickup Tube Bolt	28	21	-	-
Oil Pump Pickup Tube Nut	28	11	-	-
Oil Temperature Sensor	20	15	-	-
Piston Oil Cooler Jet Bolts	13	10	-	-
Plugs 3/8 x 18 NPT	27	20	-	-
Timing Chain Guide Bolts	12	9	-	-
Timing Chain Tensioner Bolts	12	9	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

CYLINDER HEAD

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Cylinder Head Bolts	Specific torque and fastener pattern required. Refer to **CYLINDER HEAD, INSTALLATION** .			-
Cylinder Head Cover Bolts	8	-	70	-
Exhaust Manifold Bolts	30	22	-	-
Exhaust Manifold Heat Shield Bolts	9	-	80	-
Ignition Coil Bolts	7	-	62	-
Intake Manifold Bolts	Specific torque and fastener pattern required. Refer to **MANIFOLD, INTAKE, INSTALLATION** .			-
Lifter Guide Holder Bolts	12	9	-	-
Rocker Arm Bolts	Specific torque and fastener pattern required. Refer to **ROCKER ARM, VALVE, INSTALLATION** .			-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

FRONT ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Timing Chain Cover Bolts	28	21	-	-
Lifting Stud	55	41	-	-
Vibration Damper Bolt	176	130	-	-
Water Pump-to-Timing Chain Case Cover Bolts	28	21	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

REAR ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Flexplate Bolts	95	70	-	-
Inspection Cover to Transmission Bolt	11	8	-	-
Rear Crankshaft Oil Seal Retainer Bolts	15	11	-	-
Torque Convertor Bolts	42	31	-	-
Transmission to Oil Pan Bolts	45	33	-	-
Transmission Bell Housing to Engine Bolts	45	33	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

ENGINE MOUNTS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Engine Mount Bracket to Block Bolts	61	45	-	-
Engine Mount to Engine Mount Bracket	60	44	-	-
Engine Mount to Cradle Bolts	48	35	-	-
Engine Mount Heat Shield Nuts	25	18	-	-
Transmission Crossmember Bolts - Automatic	65	48	-	-
Transmission Crossmember Bolts - Manual	61	45	-	-

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Rear Isolator Bracket to Transmission Bolts (Automatic)	68	50	-	-
Rear Isolator to Bracket Bolts (Automatic)	31	23	-	-
Rear Isolator to Crossmember Bolts (Automatic)	61	45	-	-
Rear Isolator to Transmission Bolts (Manual)	54	40	-	-
Rear Isolator to Crossmember Bolts (Manual)	54	40	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

ACCESSORY DRIVE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Generator Support Bracket Bolt	65	48	-	-
Generator Support Bracket to Engine Mount Nut	25	18	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

MISCELLANEOUS COMPONENTS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Air Cleaner Body Bolt	5	-	44	-
Air Cleaner Cover	3	-	30	-
Air Cleaner Tube Clamps	4	-	35	-
Catalytic Converter to Exhaust Manifold Nuts	11	8	-	-
Oil Control Valve Bolt	11	8	-	-
Heater Tube Bolt	18	13	-	-
Strut Tower Support Bolts	38	28	-	-
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

REMOVAL

REMOVAL

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.

CAUTION: If the original engine has experienced a catastrophic failure or an individual failure with the piston, cylinder bore, engine block, valve or valve seat, the intake manifold MUST be replaced with a new manifold.

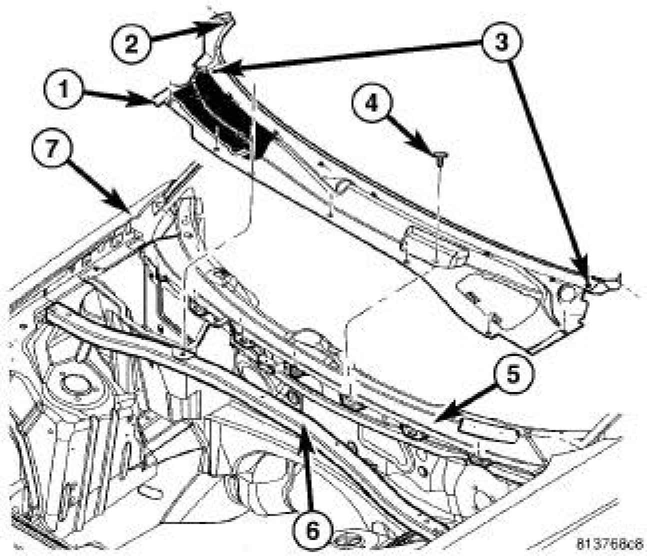


Fig. 4: Removing/Installing Cowl Panel
Courtesy of CHRYSLER GROUP, LLC

1. Remove the hood. Refer to **HOOD, REMOVAL** .
2. Remove the cowl panel cover (1). Refer to **COVER, COWL PANEL, REMOVAL** .
3. Remove the strut tower support (6).

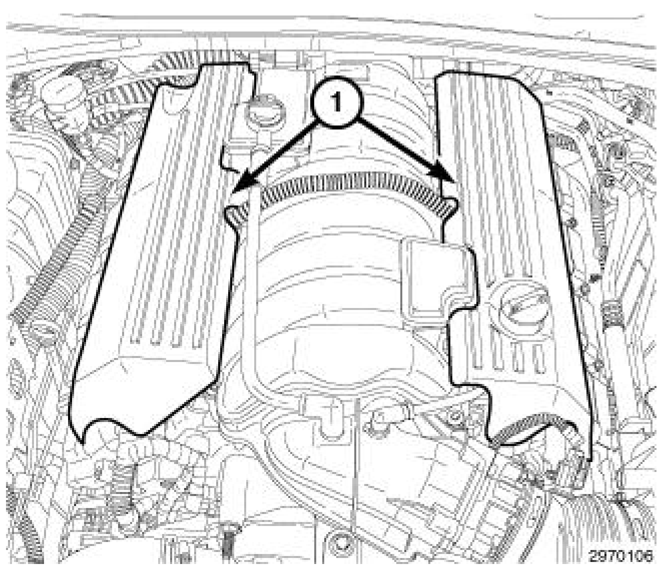


Fig. 5: Installing Engine Covers

Courtesy of CHRYSLER GROUP, LLC

4. Lift the engine cover retaining grommets off the ball studs and remove the engine covers (1).
5. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
6. Disconnect and isolate the negative battery cable.
7. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.

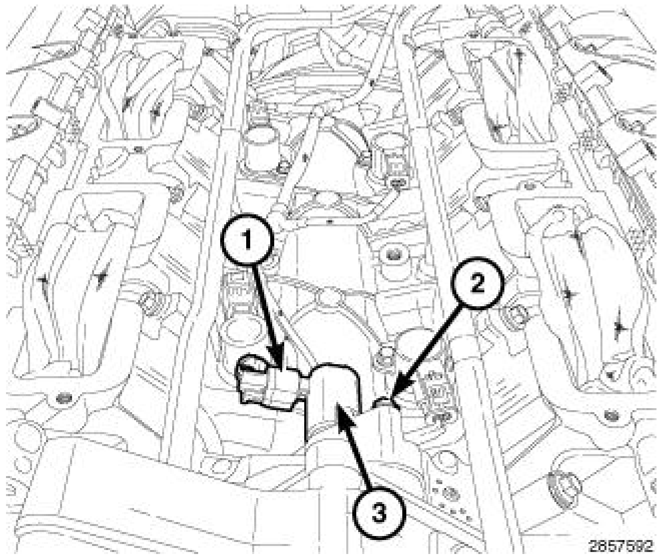


Fig. 6: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The engine must be at room temperature before removing the oil control valve.**

8. Disconnect the oil control valve wire harness connector (1).
9. Remove the oil control valve retaining bolt (2).
10. Rotate the oil control valve (3) to break the seal then pull the oil control valve straight out.

CAUTION: **Do not let the tensioner arm snap back to the freearm position, sever damage may occur to the tensioner.**

11. Remove the cooling fan (1). Refer to **FAN, COOLING, REMOVAL** .
12. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

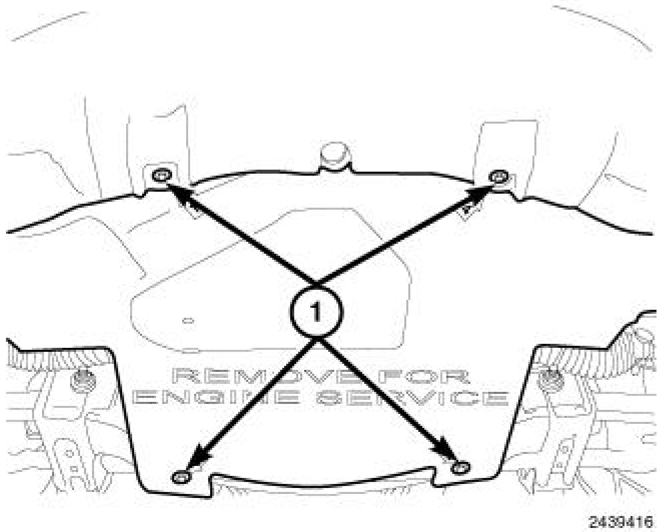


Fig. 7: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

13. Remove the belly pan retainers (1) and remove the belly pan.
14. Drain the cooling system. Refer to **STANDARD PROCEDURE** .
15. Drain the engine oil. Refer to **STANDARD PROCEDURE**.
16. Remove the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .

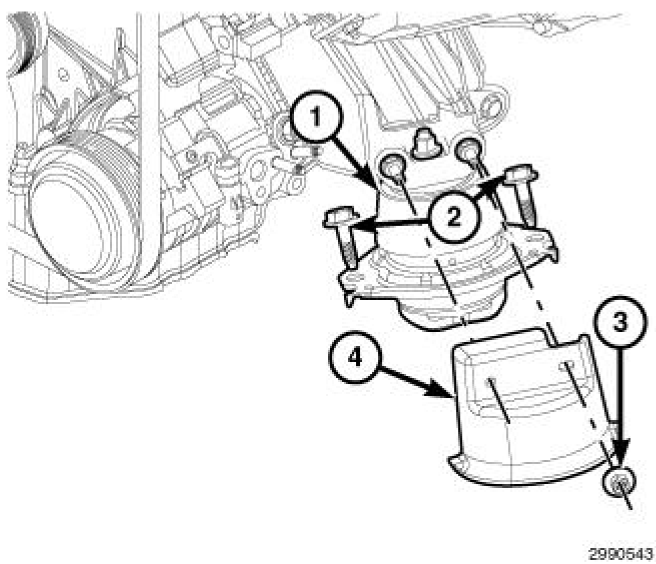


Fig. 8: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

17. Remove both left and right engine mount heat shield (4) retaining nuts (3) and remove the heat shields.
18. Remove both left and right engine mount to frame retaining bolts (2).
19. Disconnect the transmission oil cooler lines from their retainers at the oil pan.

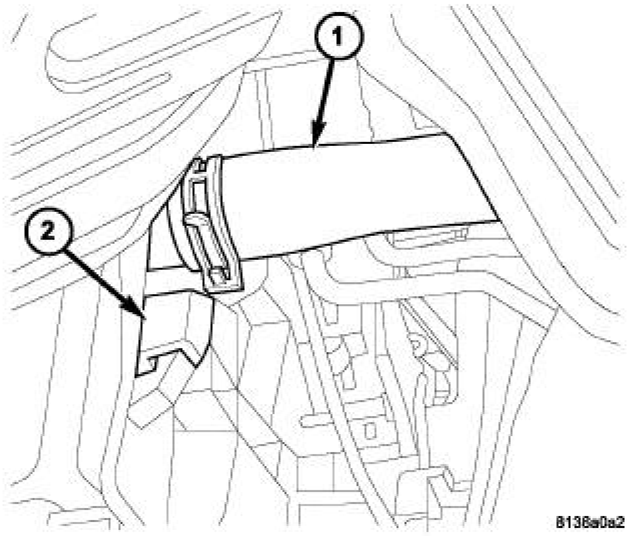


Fig. 9: Lower Radiator Hose
Courtesy of CHRYSLER GROUP, LLC

20. Remove the lower radiator hose (1).

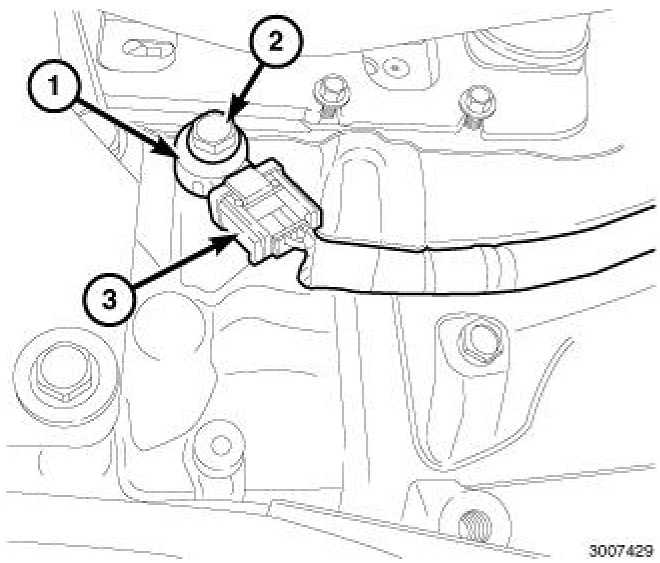


Fig. 10: Knock Sensor, Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Two knock sensors are used. Each sensor is bolted to the outside of the engine block below the exhaust manifold.**

21. Remove the heat shields from both knock sensors (shield snaps on/off sensor).
22. Disconnect the knock sensor wire harness connectors (3).

CAUTION: **When separating the catalytic converters from the manifolds, disconnect the oxygen sensor connectors. Allowing the catalytic converters to hang from the oxygen sensor wires damages the harness and/or sensors.**

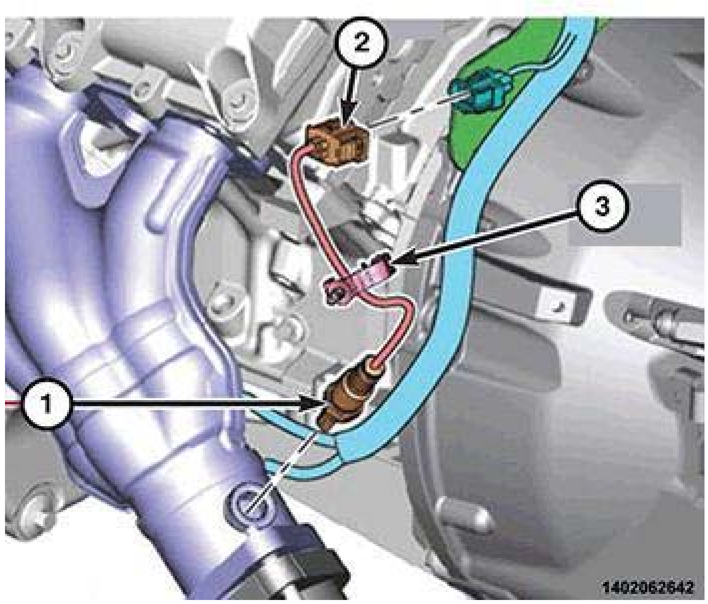


Fig. 11: Oxygen Sensor & Connector
Courtesy of CHRYSLER GROUP, LLC

23. Disconnect all oxygen sensor (1) wire harness connectors (2).

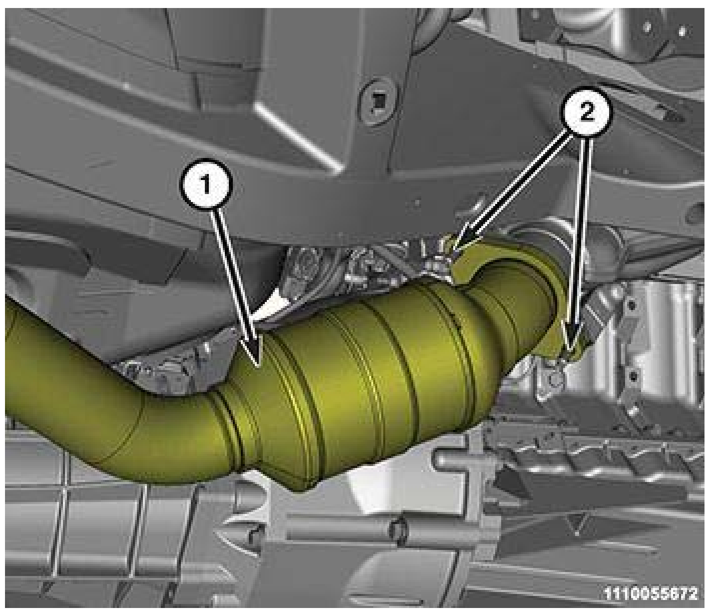


Fig. 12: Catalytic Converter & Manifold Flange Nuts
Courtesy of CHRYSLER GROUP, LLC

24. Saturate all exhaust bolts and nuts (2) with MoparÃ® Rust Penetrant. Allow five minutes for penetration.
25. Remove the both catalytic converter to manifold flange nuts and separate the catalytic converters (1) from the exhaust manifolds.
26. Remove the starter. Refer to **STARTER, REMOVAL** .

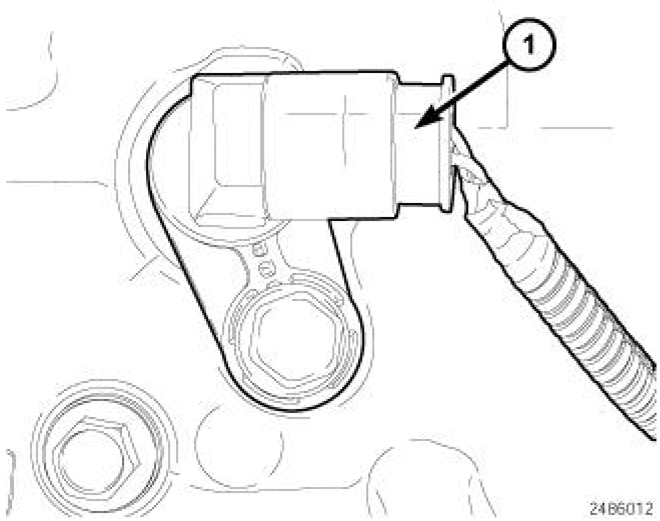


Fig. 13: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Crankshaft Position (CKP) sensor is located at the right-rear side of the engine block.**

27. Remove the CKP sensor wire harness connector (1).

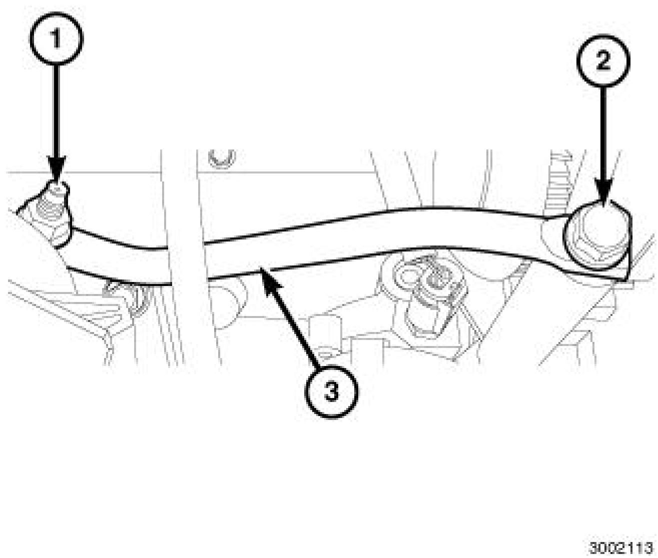


Fig. 14: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

28. Remove the generator support bracket to engine mount retaining nut (1).
29. Remove the generator support bracket retaining bolt (2) and remove the support bracket (3).
30. Lower the vehicle.
31. Remove the generator. Refer to **GENERATOR, REMOVAL** .
32. Remove the A/C liquid line. Refer to **LINE, A/C LIQUID, REMOVAL** .

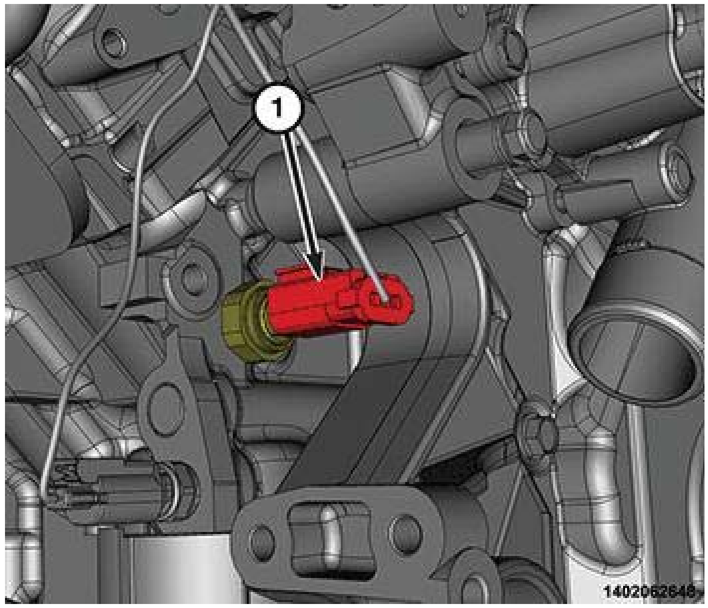


Fig. 15: Oil Pressure Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

33. Remove the oil pressure sensor wire harness connector (1).

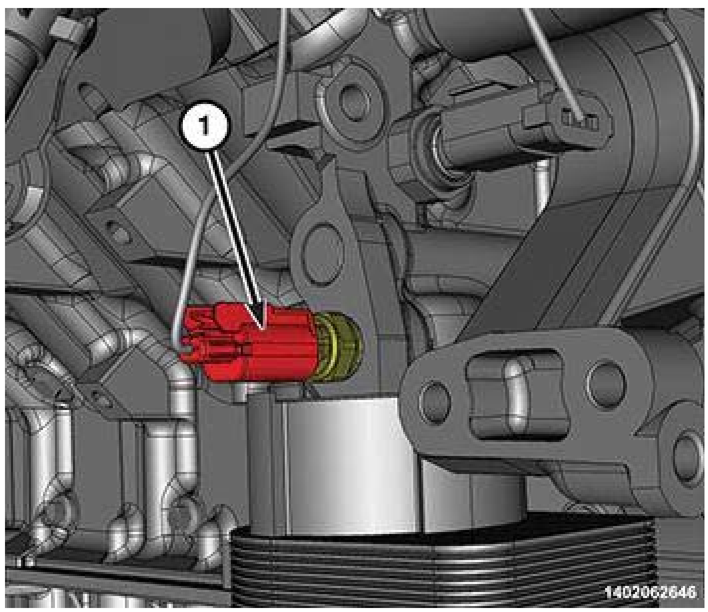


Fig. 16: Oil Temperature Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

34. Remove the oil temperature sensor wire harness connector (1).

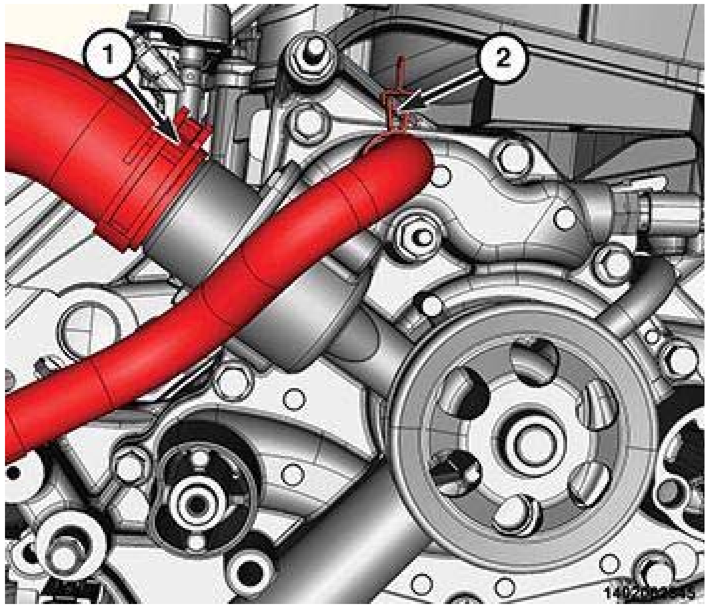


Fig. 17: Upper Radiator Hose Clamp & Oil Cooler Hose Clamp
Courtesy of CHRYSLER GROUP, LLC

35. Remove the upper radiator hose clamp (1) and remove the upper radiator hose.
36. Remove the oil cooler hose clamp (2) and remove the oil cooler hose.

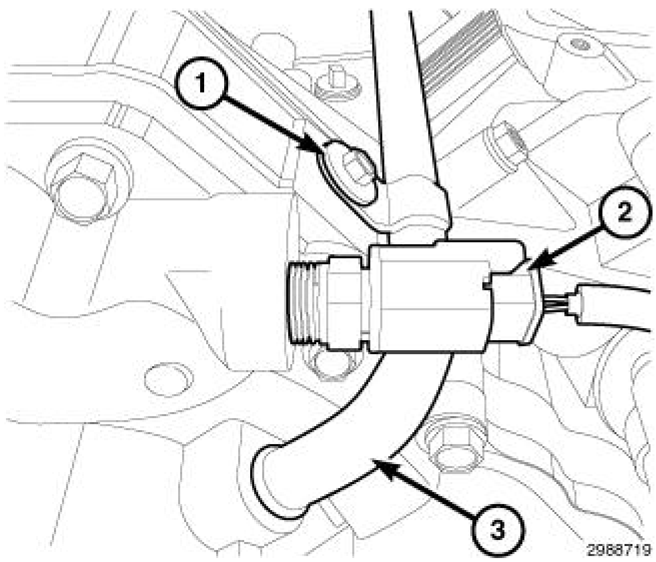
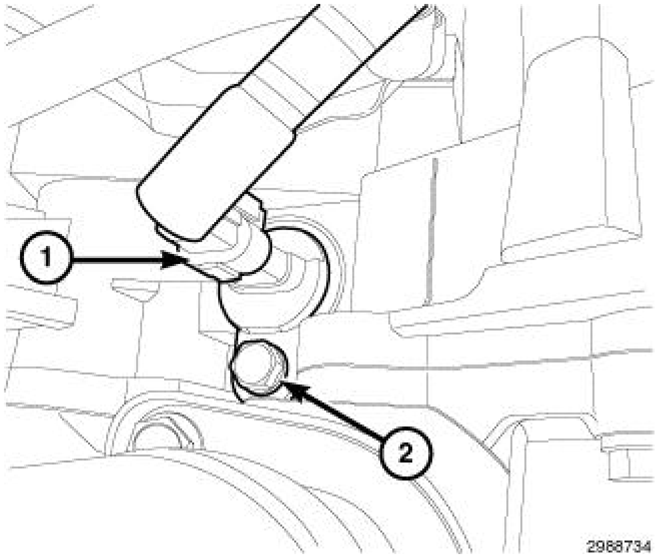


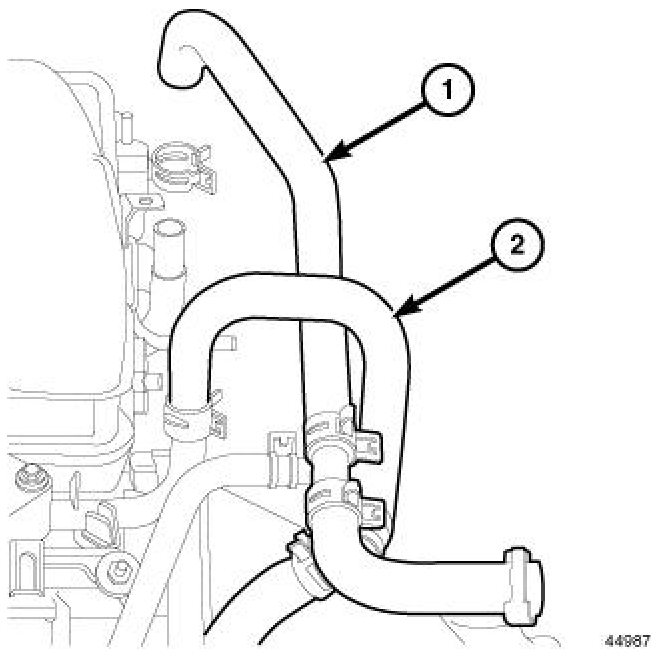
Fig. 18: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

37. Remove the heater tube retaining bolt (1).
38. Remove the coolant temperature sensor wire harness connector (2).
39. Lift the heater tube (3) out of the water pump.



[Fig. 19: Camshaft Position Sensor Electrical Connector & Bolt]
Courtesy of CHRYSLER GROUP, LLC

40. Disconnect the camshaft position sensor wire harness connector (1).



[Fig. 20: Heater Hose Supply]
Courtesy of CHRYSLER GROUP, LLC

41. Remove the heater hoses (1, 2).

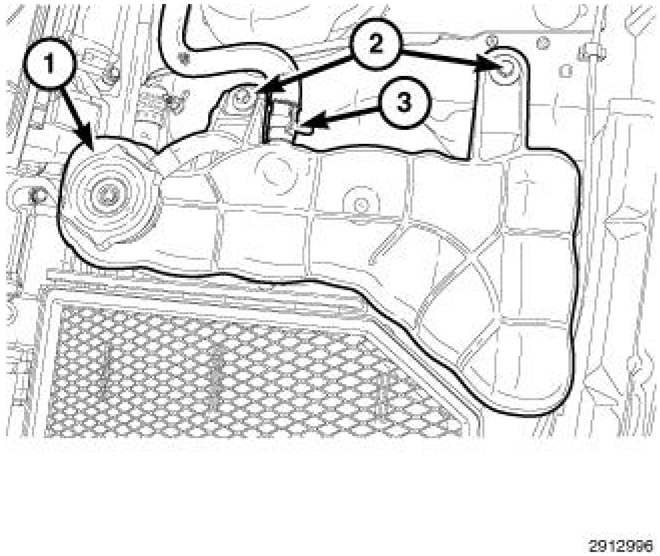


Fig. 21: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It is not necessary to remove the hoses from the coolant bottle for coolant bottle removal.**

42. Remove the coolant bottle retaining bolts (2) and position the coolant bottle (1) aside.

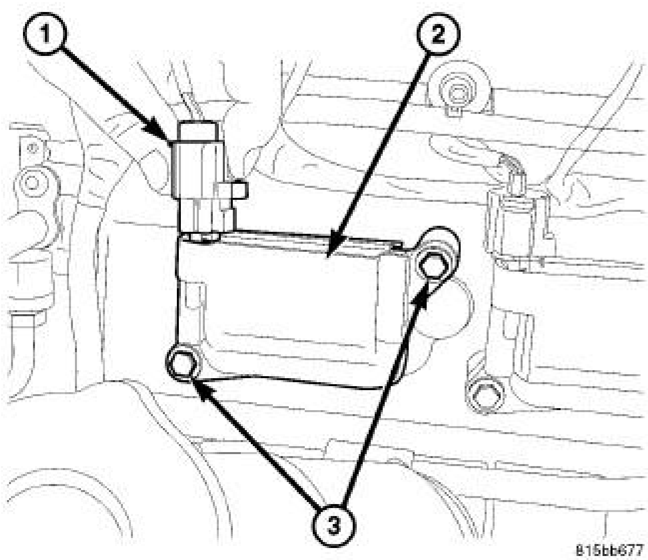


Fig. 22: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

43. Remove all ignition coil wire harness connectors (1) and position the harness aside.
44. Remove the Power Distribution Center (PDC) and mounting bracket. Refer to **POWER DISTRIBUTION** article.
45. Disengage the wire harness mounted on the right hand inner fender panel and position aside.

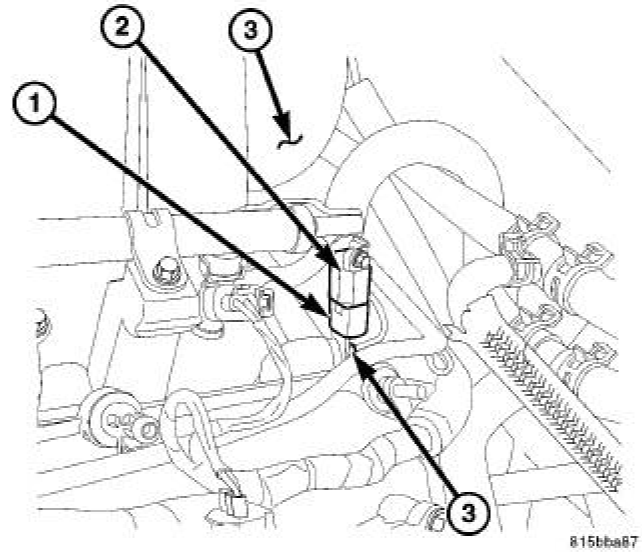


Fig. 23: Ignition Capacitor, Electrical Connector & Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The ignition capacitor (2) is located near the left rear corner of the intake manifold (3).**

46. Remove the ignition capacitor (1) wire harness connector (2).
47. Remove the ground wires from the rear of each cylinder head.
48. Manual transmission equipped vehicles, remove the transmission. Refer to **REMOVAL** .
49. For automatic transmission equipped vehicles, follow steps 50-56.
50. Remove the starter. Refer to **STARTER, REMOVAL** .

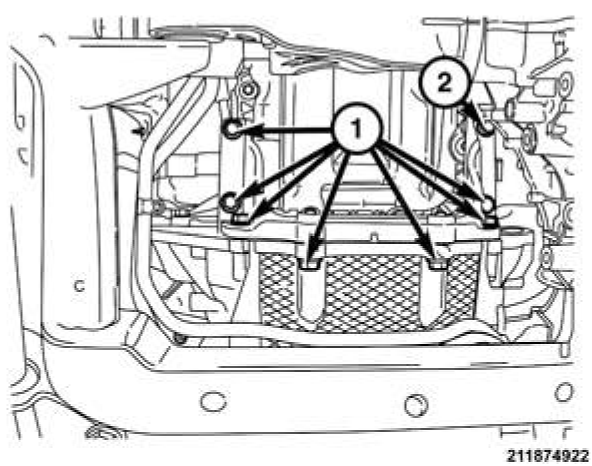


Fig. 24: Structural Cover Bolts
Courtesy of CHRYSLER GROUP, LLC

51. Remove the transmission to engine structural cover retaining bolts (1) and remove the cover.

NOTE: **The left front bolt (2) must be removed with the structural cover.**

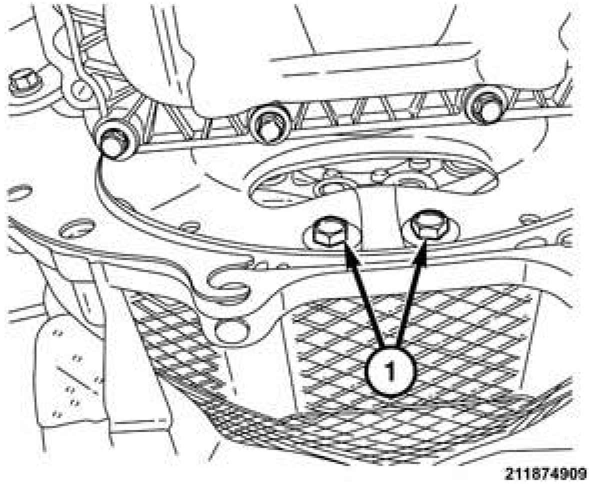


Fig. 25: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

52. Automatic transmission equipped vehicles, rotate the crankshaft in clockwise direction until the torque converter bolts (1) are accessible and remove the flexplate to torque converter bolts.

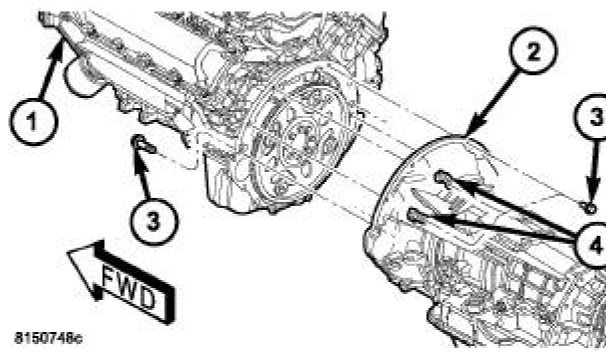


Fig. 26: Removing/Installing Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

53. Remove two engine to transmission bolts (3).
54. Remove remaining transmission to engine bolts (4).

CAUTION: **While carefully separating the engine from the transmission and removing the engine from the vehicle, constant checks must be made to ensure no damage to other components or wiring harnesses occur throughout the removal procedure.**

55. Lower the vehicle.
56. Using a suitable jack, support the transmission.

NOTE: **Do not use air tools to install engine lift fixture.**

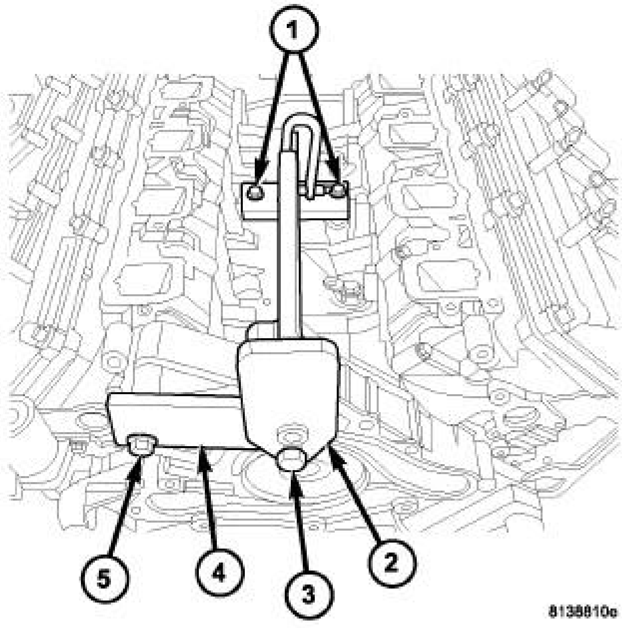


Fig. 27: Engine Lift Fixture And Adapter
Courtesy of CHRYSLER GROUP, LLC

57. Install the (special tool #8984B, Fixture, Engine Lifting) (2) and (special tool #8984-UPD, Adapter, Engine Lift) (4).
58. Using a suitable engine hoist, separate the engine from the transmission and remove the engine from the engine compartment.
59. Secure the engine onto a suitable engine stand.

INSTALLATION

INSTALLATION

CAUTION: **If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.**

CAUTION: **If the original engine has experienced a catastrophic failure or an individual failure with the piston, cylinder bore, engine block, valve or valve seat, the intake manifold MUST be replaced with a new manifold.**

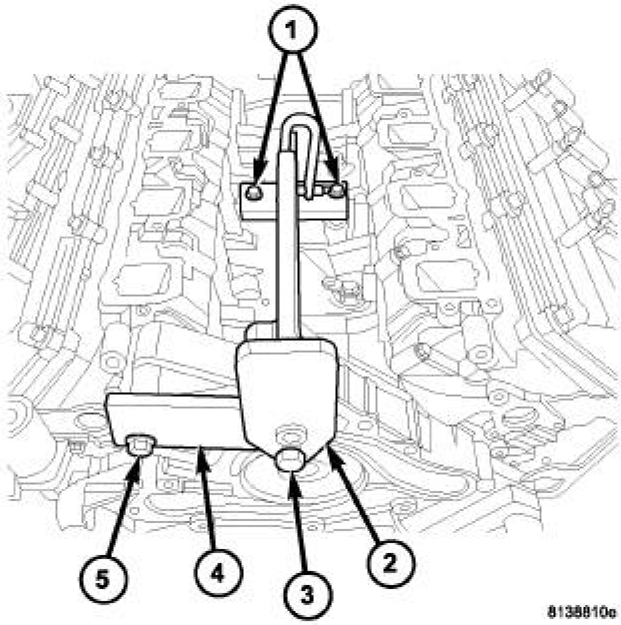


Fig. 28: Engine Lift Fixture And Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not use air tools to install (special tool #8984B, Fixture, Engine Lifting) (2, 3).

1. Install the engine lift fixture (2) (special tool #8984B, Fixture, Engine Lifting) and adapter (special tool #8984-UPD, Adapter, Engine Lift) (4).
2. Using a suitable engine hoist, lower the engine into the engine compartment.
3. Automatic transmission equipped vehicles, align the engine with the transmission.
4. Install two transmission bell housing to engine block bolts finger tight.
5. Lower the engine assembly until the engine mounts rest in the engine cradle crossmember.

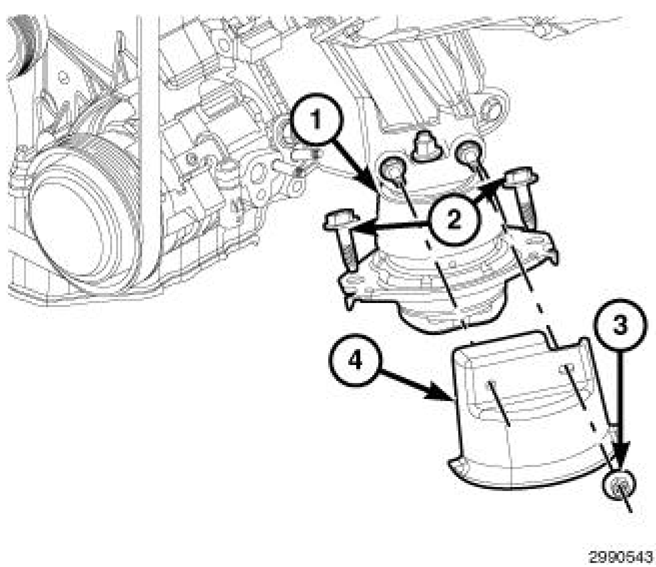


Fig. 29: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

6. Align the engine mounts, install both left/right engine mount to frame retaining bolts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
7. Position both left and right engine mount heat shields (4), install the retaining nuts (3) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
8. Remove the engine hoist and the jack supporting the transmission.
9. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
10. For manual transmission equipped vehicles, install the transmission. Refer to **INSTALLATION** . Then proceed to step 19.
11. For automatic transmission equipped vehicles, follow steps 12-18.
12. Carefully engage transmission to engine block dowels until converter hub is seated in crankshaft. Verify that no wires, or the transmission vent hose, have become trapped between the engine block and the transmission.
13. Install two bolts to attach the transmission to the engine.

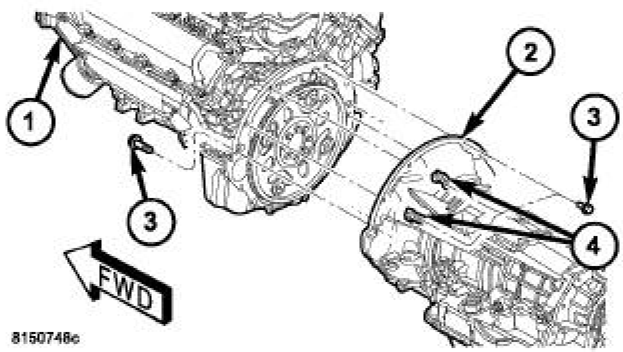


Fig. 30: Removing/Installing Transmission To Engine Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Install remaining torque converter housing to engine bolts (3 and 4). Tighten all torque converter housing bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

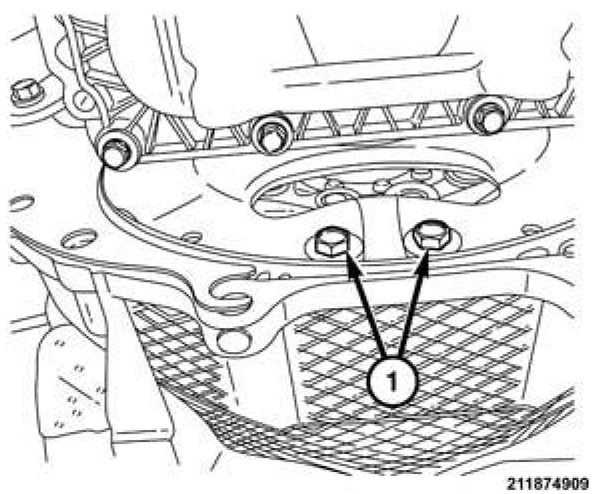


Fig. 31: Torque Converter Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Install all torque converter bolts (1) by hand first. There are 3 sets of two bolts 120Â° apart.
16. Tighten all torque converter bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

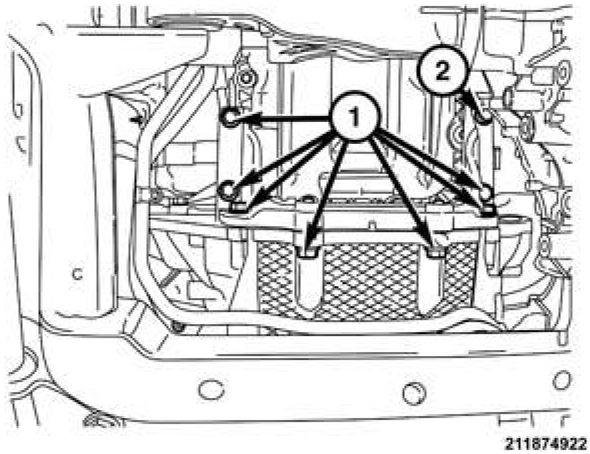


Fig. 32: Structural Cover Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Install the engine structural cover and tighten the bolts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

NOTE: **The left front structural cover bolt (2) must be installed with the cover.**

18. Install the starter. Refer to **STARTER, INSTALLATION** .

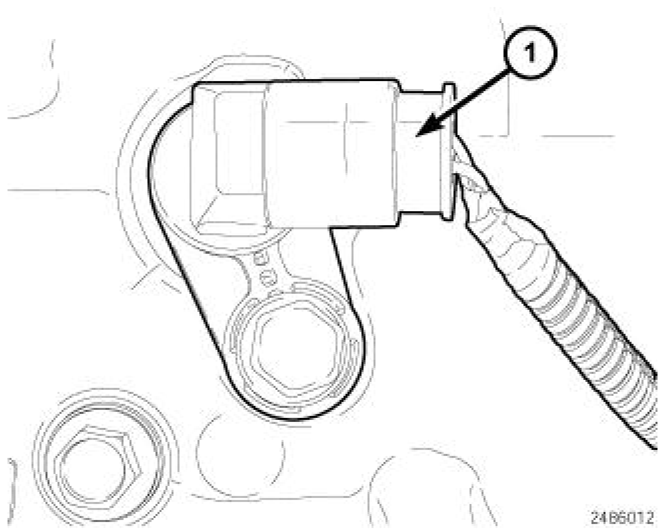


Fig. 33: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Crankshaft Position (CKP) sensor is located at the right rear side of the engine block.**

19. Connect the CKP sensor wire harness connector (1).

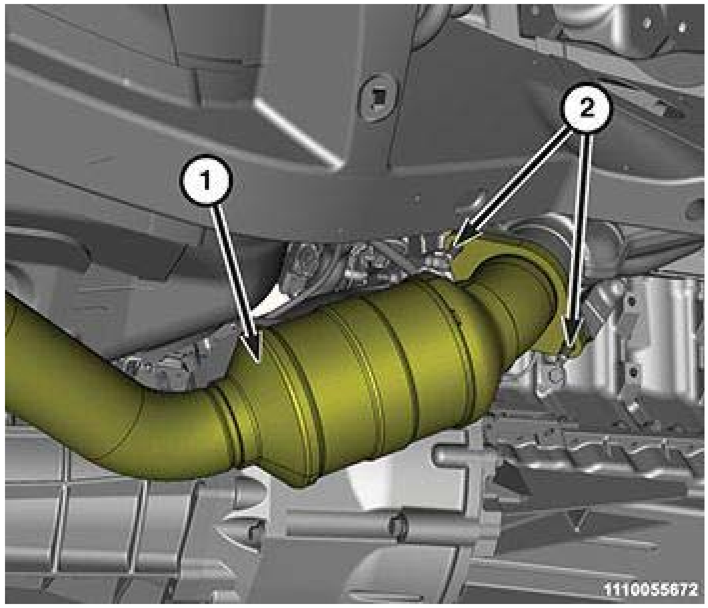


Fig. 34: Catalytic Converter & Manifold Flange Nuts
Courtesy of CHRYSLER GROUP, LLC

20. Position the catalytic converters (1) onto the exhaust manifold flanges, install the flange nuts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

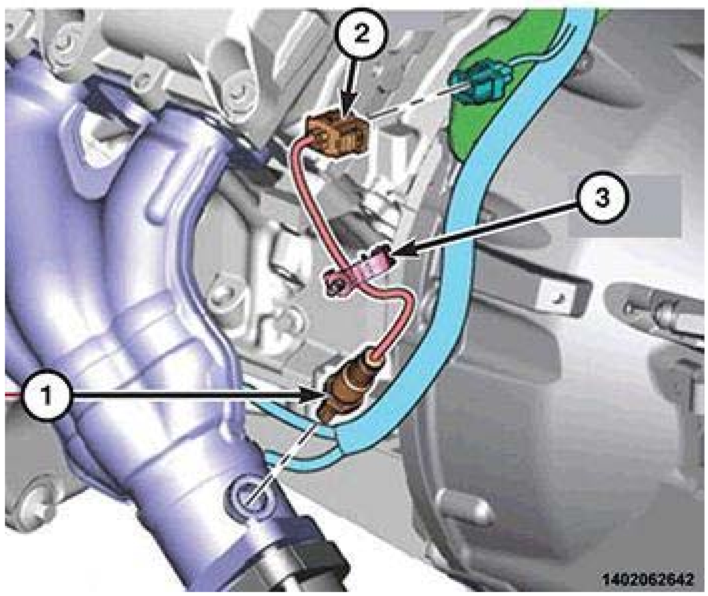
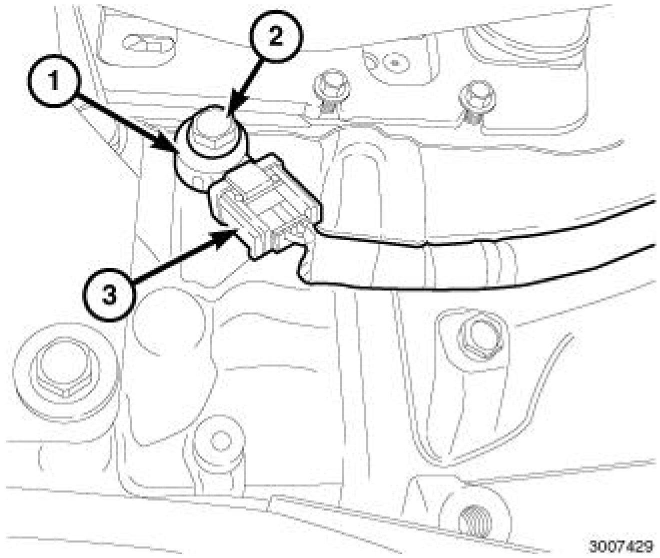


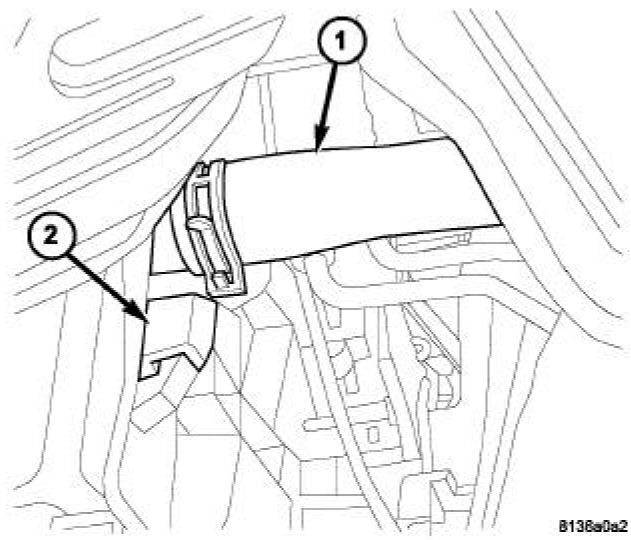
Fig. 35: Oxygen Sensor & Connector
Courtesy of CHRYSLER GROUP, LLC

21. Connect the oxygen sensor (1) wire harness connectors (2).



[Fig. 36: Knock Sensor, Electrical Connector & Bolt]
Courtesy of CHRYSLER GROUP, LLC

22. Connect the right and left knock sensor (1) wire harness connectors (5).
23. Install the heat shields onto both knock sensors (shield snaps on/off sensor).
24. Connect the transmission oil cooler lines to their retainers at the oil pan.



[Fig. 37: Lower Radiator Hose]
Courtesy of CHRYSLER GROUP, LLC

25. Install the lower radiator hose (1).
26. Lower the vehicle.

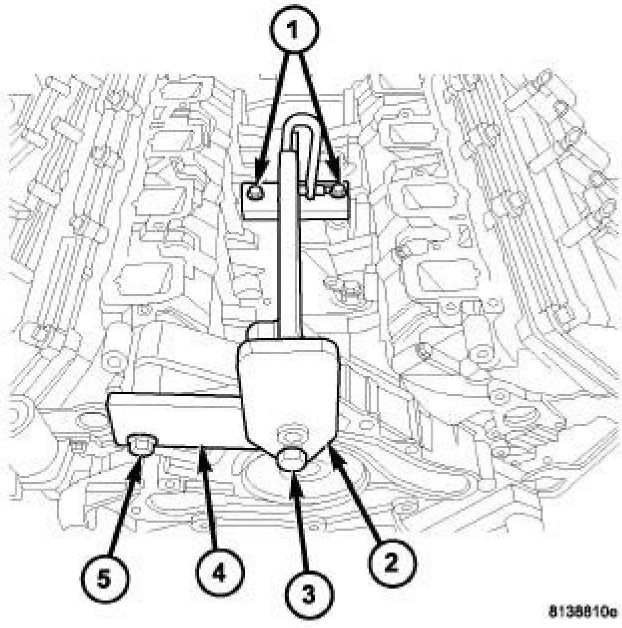


Fig. 38: Engine Lift Fixture And Adapter
Courtesy of CHRYSLER GROUP, LLC

27. Remove the engine lift fixture (special tool #8984B, Fixture, Engine Lifting) (2) and adapter (special tool #8984-UPD, Adapter, Engine Lift) (4).
28. Position the left and right side wiring harness.

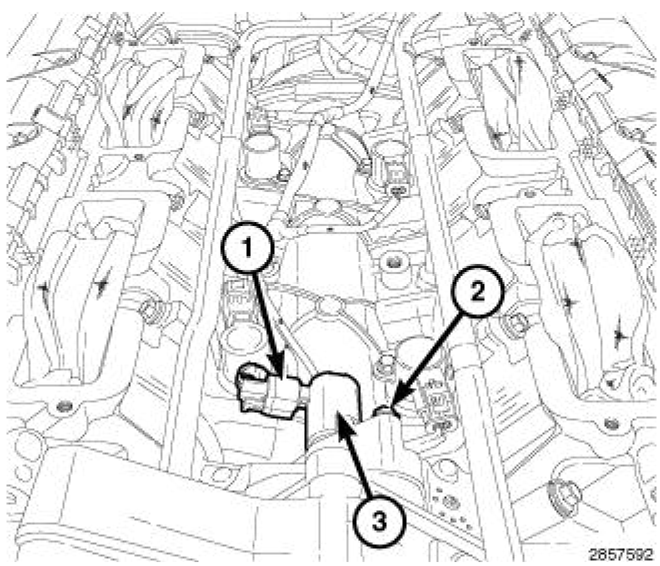


Fig. 39: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

29. Lubricate the Oil Control Valve (OCV) rubber O-ring seal with clean engine oil.
30. Install the OCV (3) and rotate into position.
31. Install the OCV retaining bolt (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

32. Connect the OCV wire harness connector (1).

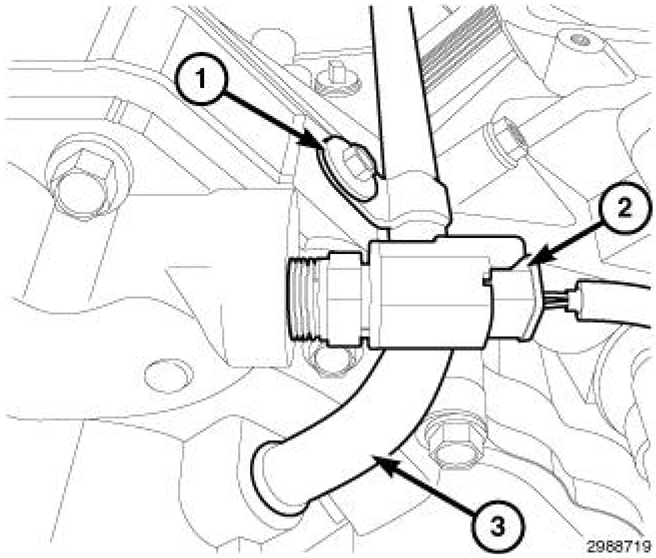


Fig. 40: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

33. Position the heater tube (3) into the water pump.
34. Install the heater tube retaining bolt (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
35. Connect the wire harness connector to the coolant temperature (ECT) sensor (2).

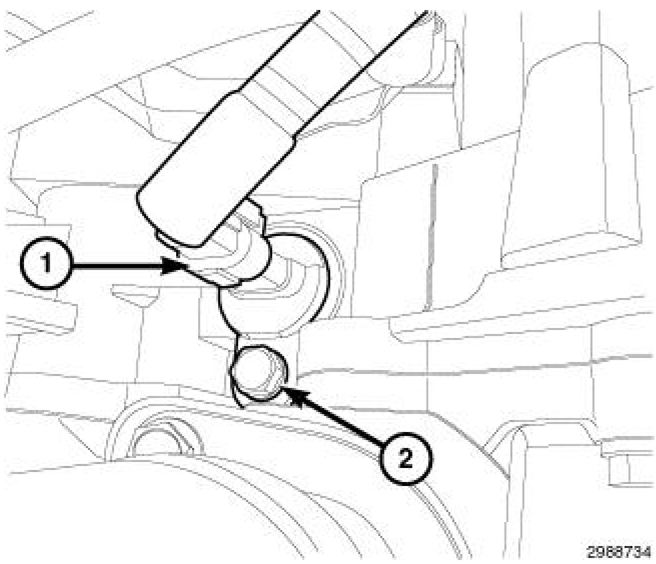


Fig. 41: Camshaft Position Sensor Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

36. Connect the camshaft position sensor wire harness connector (1).
37. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

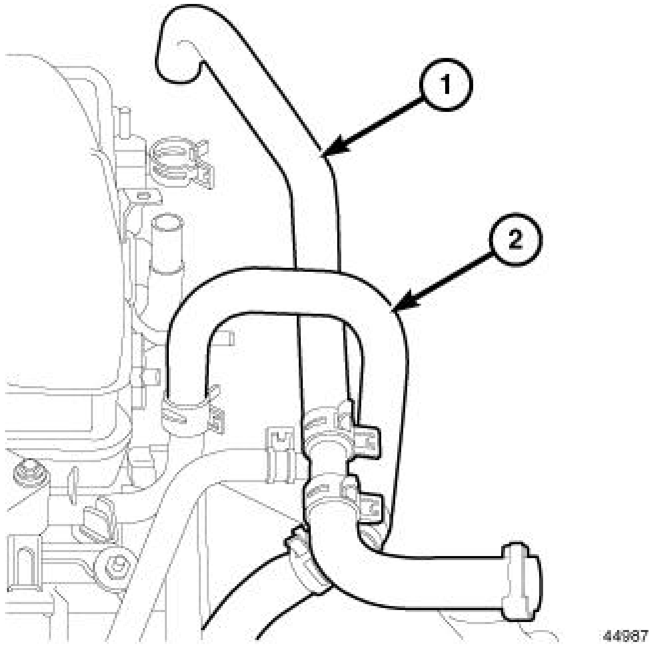


Fig. 42: Heater Hose Supply
Courtesy of CHRYSLER GROUP, LLC

38. Connect the heater hoses (1, 2).
39. Connect the ground wires to the rear of each cylinder head.

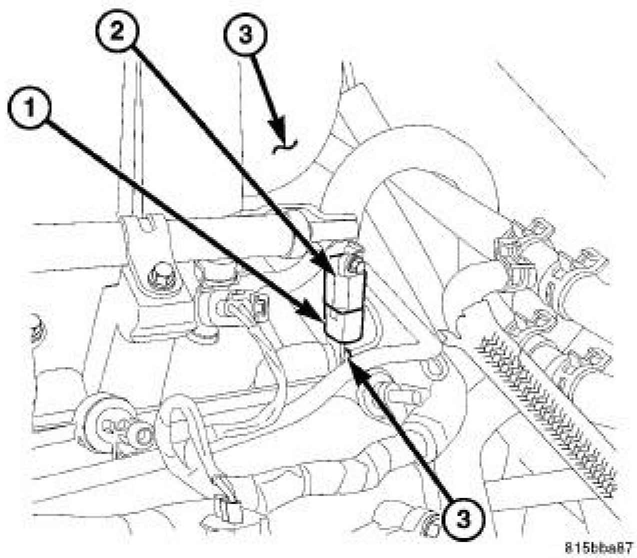


Fig. 43: Ignition Capacitor, Electrical Connector & Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The ignition capacitor (2) is attached to the rear of the left cylinder head.**

40. Connect the ignition capacitor (2) wire harness connector (1).

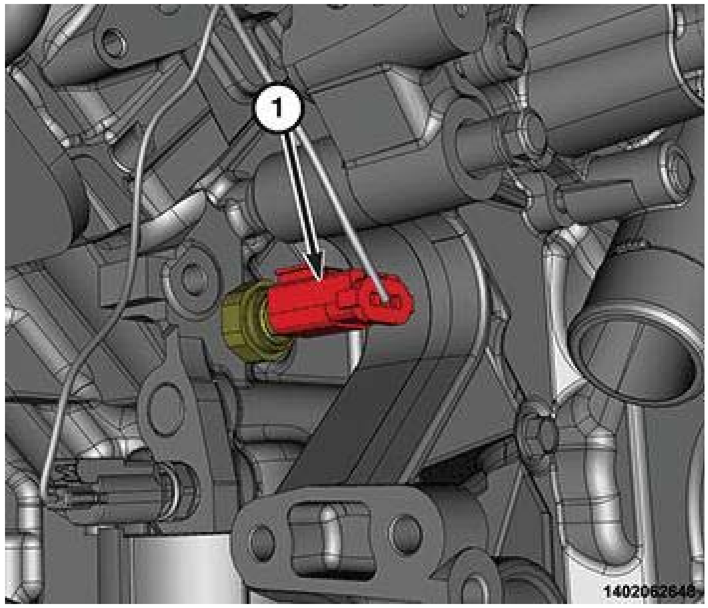


Fig. 44: Oil Pressure Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

41. Connect the oil pressure sensor wire harness connector (1).

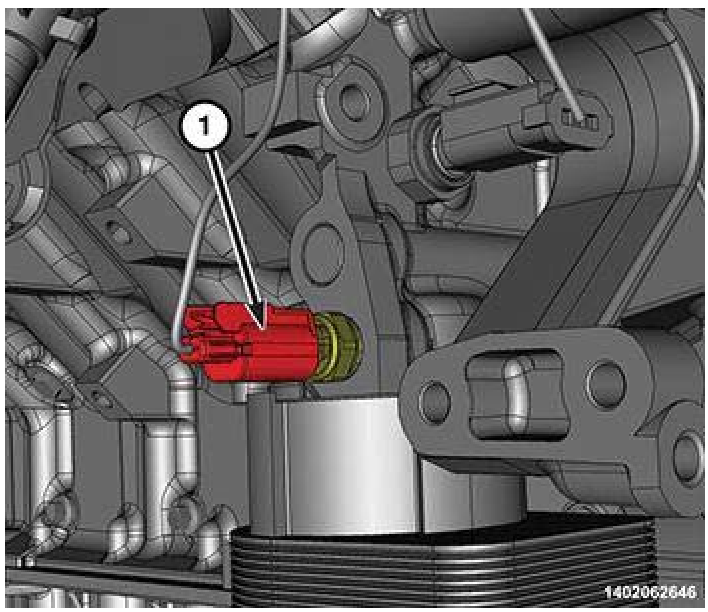


Fig. 45: Oil Temperature Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

42. Connect the oil temperature sensor wire harness connector (1).
43. Install the generator. Refer to **GENERATOR, INSTALLATION** .
44. Raise and support the vehicle.

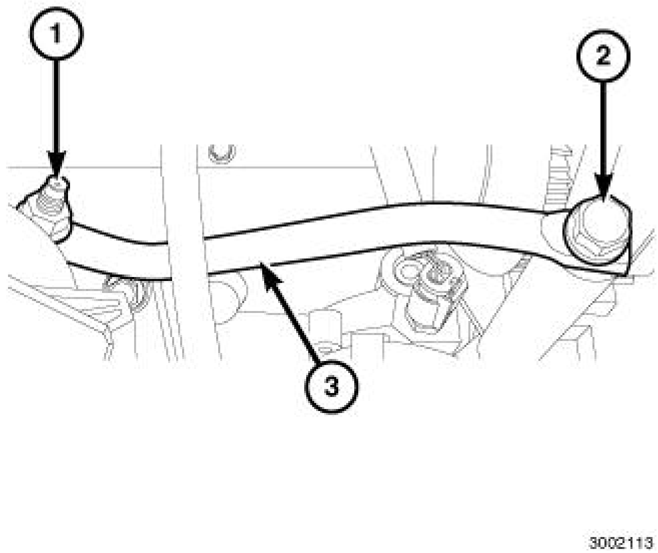


Fig. 46: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

45. Position the generator support bracket (3) to the engine mount, install the retaining nut (1) finger tight.
46. Position the generator support bracket to the generator, install the retaining bolt (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
47. Tighten the generator support bracket to engine mount retaining nut to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
48. Install the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL** .

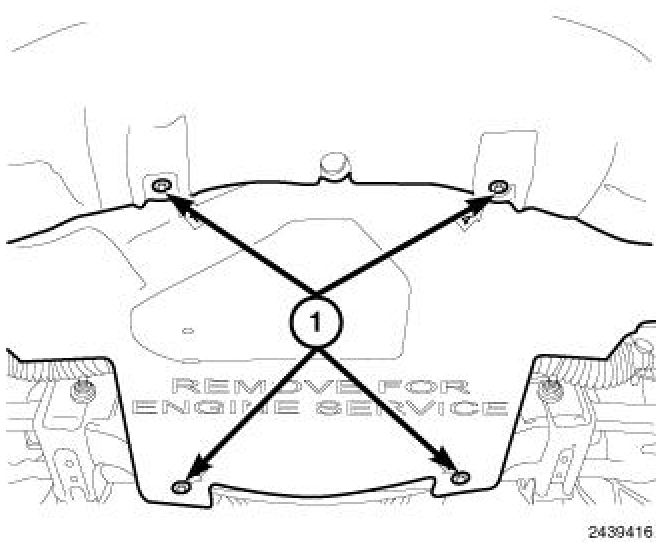


Fig. 47: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

49. Install the belly pan and securely tighten bolts (1).
50. Remove support and lower the vehicle.
51. Install the A/C liquid line. Refer to **LINE, A/C LIQUID, INSTALLATION** .

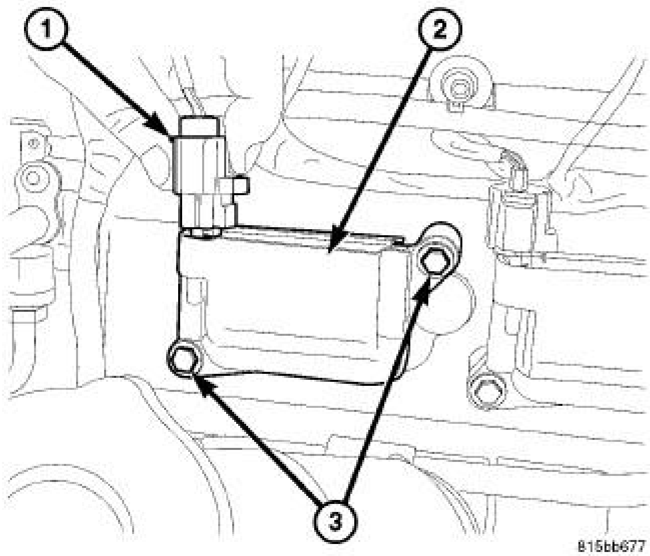


Fig. 48: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

52. Position the ignition coil wire harness and connect all ignition coil wire harness connectors (1).

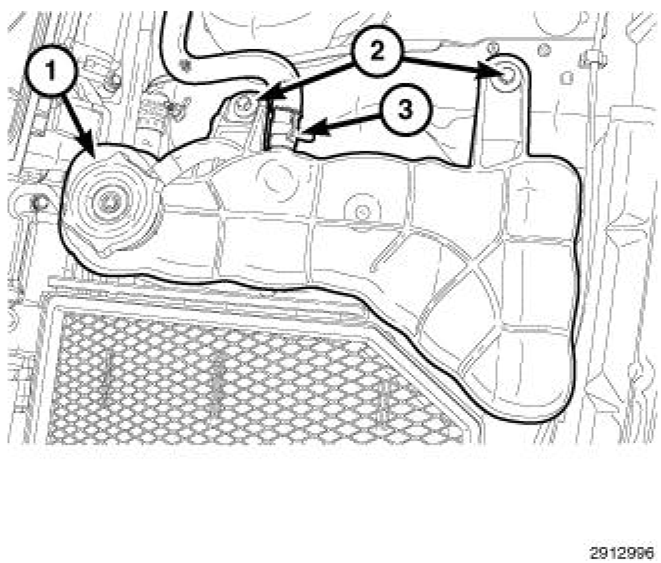


Fig. 49: Coolant Recovery Container Pressure Cap, Tube & Screws
Courtesy of CHRYSLER GROUP, LLC

53. Position the coolant bottle (1) and install the coolant bottle retaining bolts (2).
54. Install the Power Distribution Center (PDC) mounting bracket.
55. Install the PDC. Rerfer to **POWER DISTRIBUTION** article.
56. Position the wire harness and secure to the right hand inner fender panel.
57. Install the cooling fan. Refer to **FAN, COOLING, INSTALLATION** .

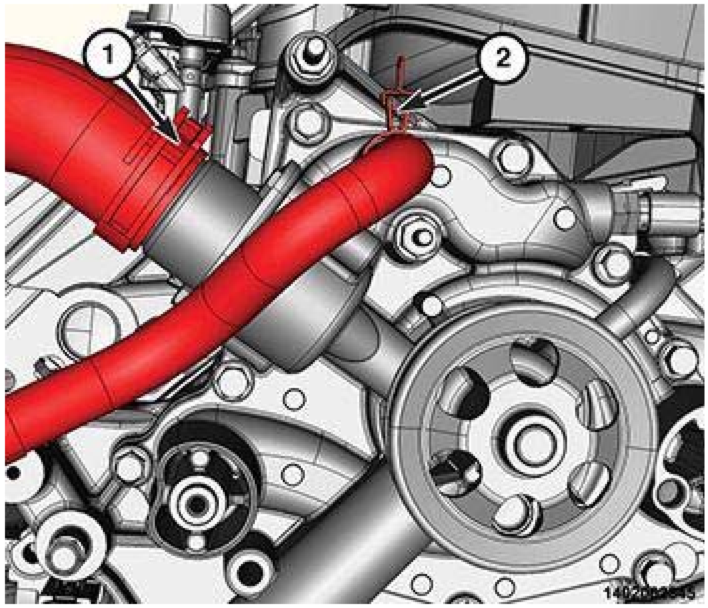


Fig. 50: Upper Radiator Hose Clamp & Oil Cooler Hose Clamp
Courtesy of CHRYSLER GROUP, LLC

58. Position the oil cooler hose and Install oil cooler hose clamp (2).
59. Position the upper radiator hose and Install the upper radiator hose clamp (1).

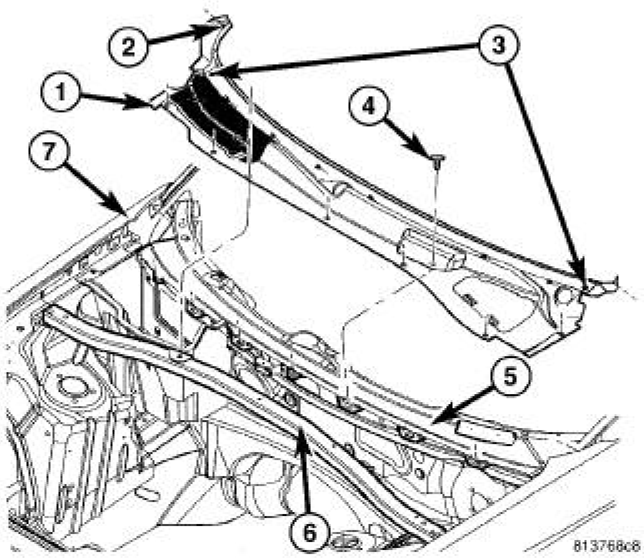


Fig. 51: Removing/Installing Cowl Panel
Courtesy of CHRYSLER GROUP, LLC

60. Install the strut tower support (6) and tighten the bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
61. Install the cowl panel cover (1). Refer to **COVER, COWL PANEL, INSTALLATION** .
62. Install a NEW engine oil filter and fill the crankcase with the specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
63. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .

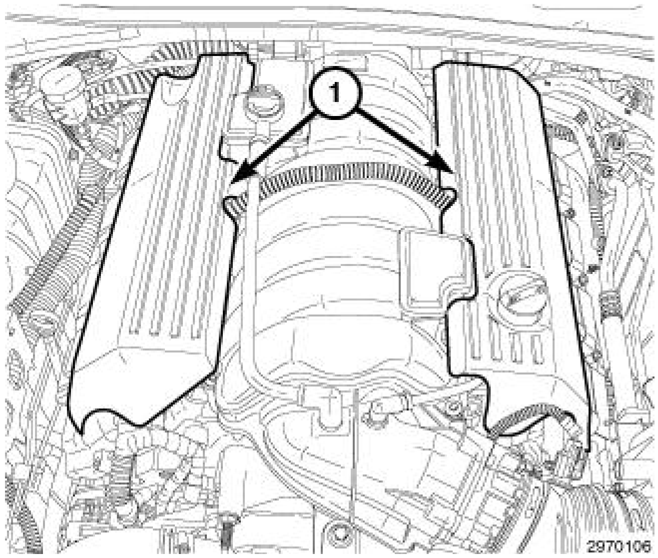


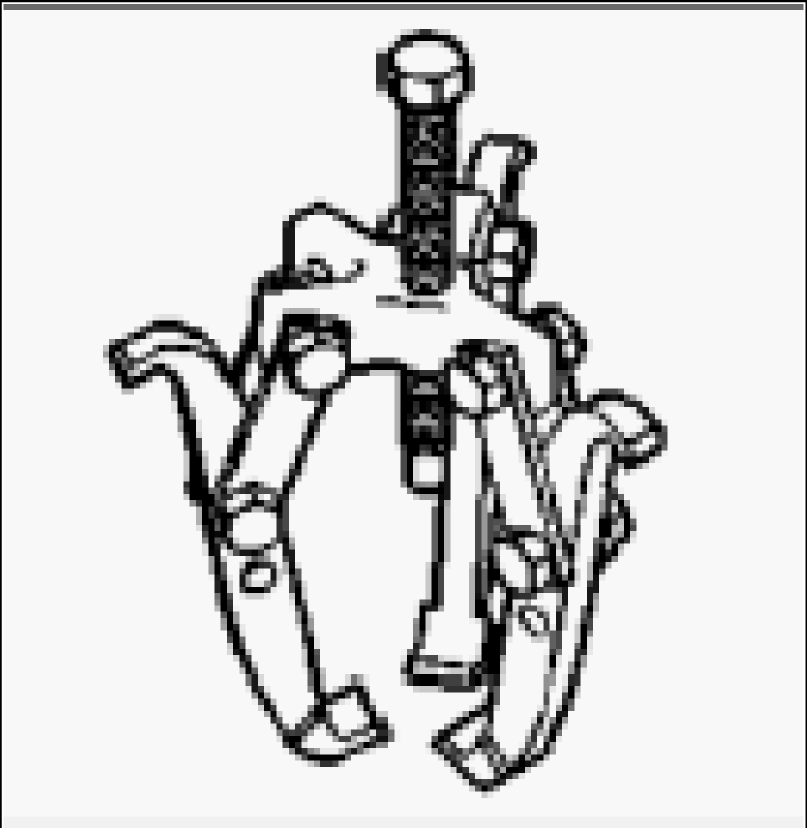
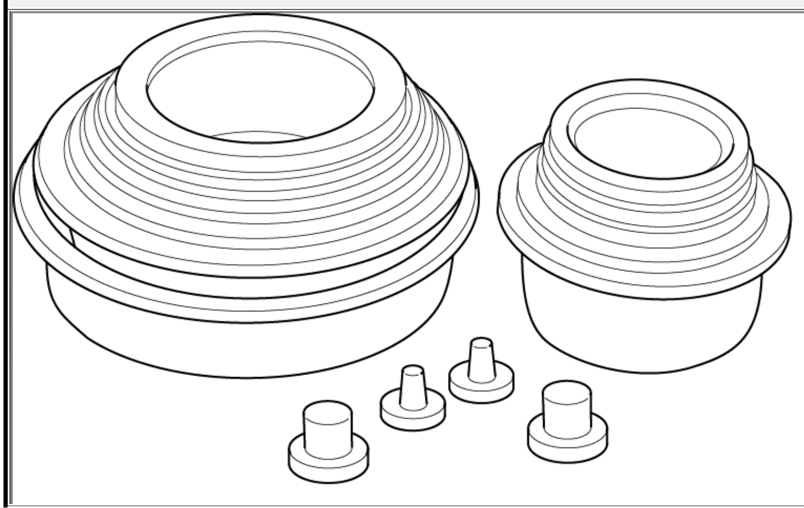
Fig. 52: Installing Engine Covers
Courtesy of CHRYSLER GROUP, LLC

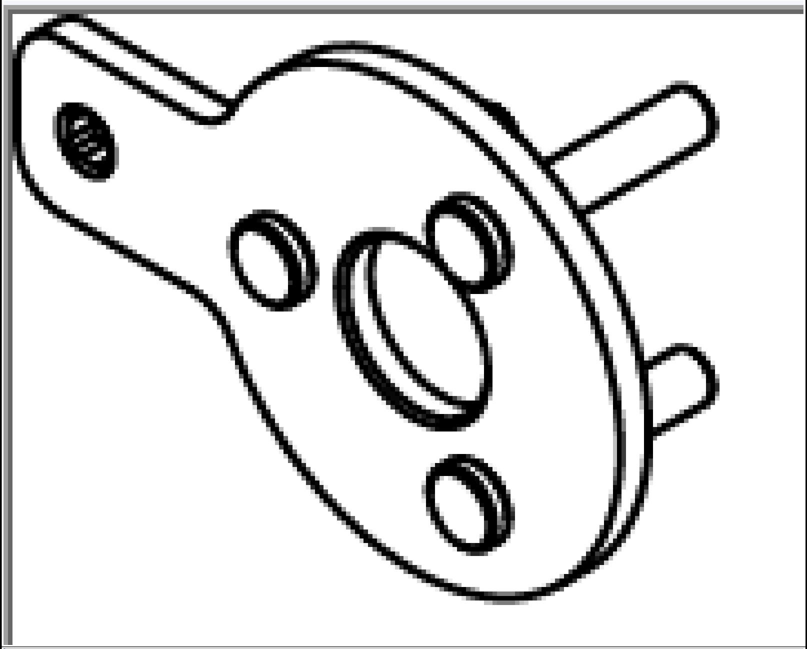
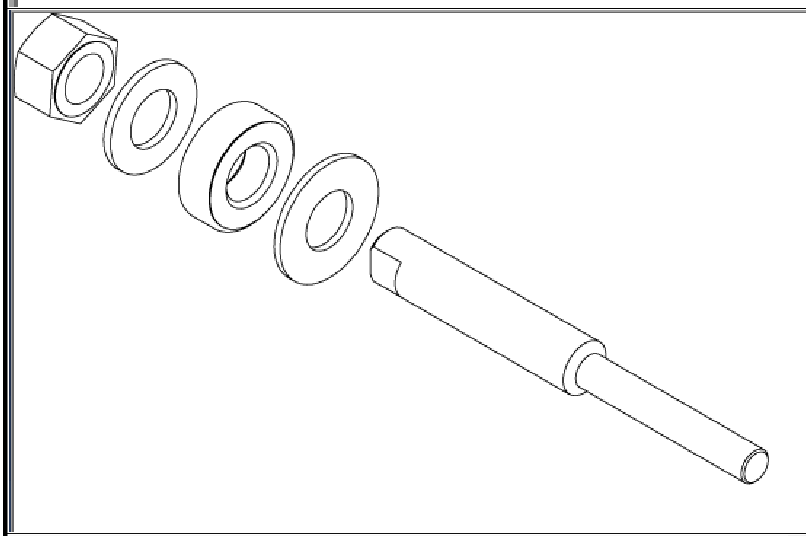
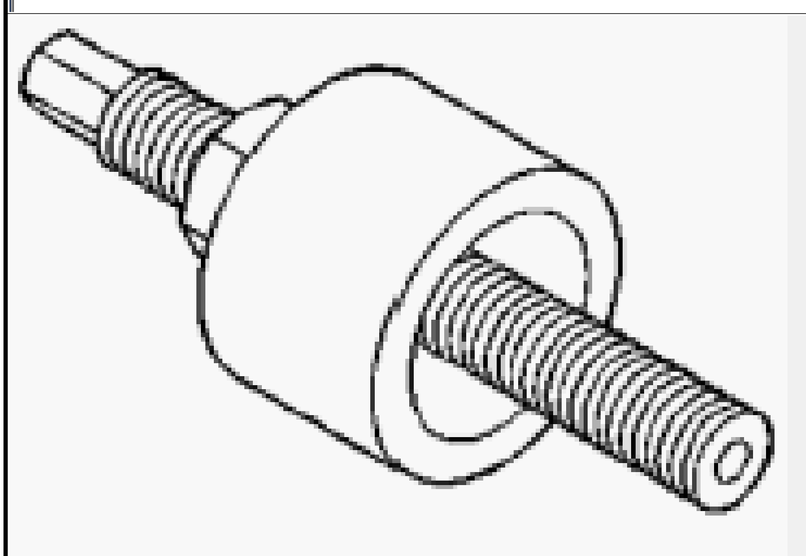
64. Install the engine covers (1) onto the ball studs.
65. Connect the negative battery cable.
66. Perform the Refrigerant System Charge procedure. Refer to **PLUMBING, STANDARD PROCEDURE** .
67. Start the engine and inspect for leaks.

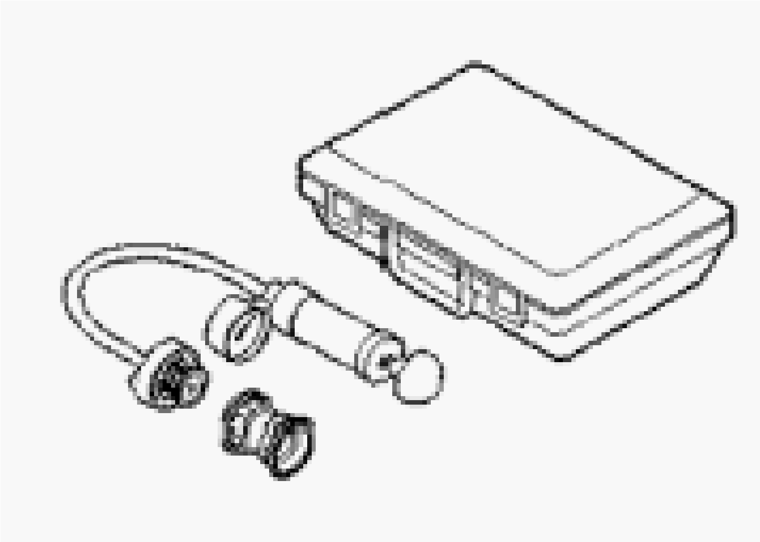
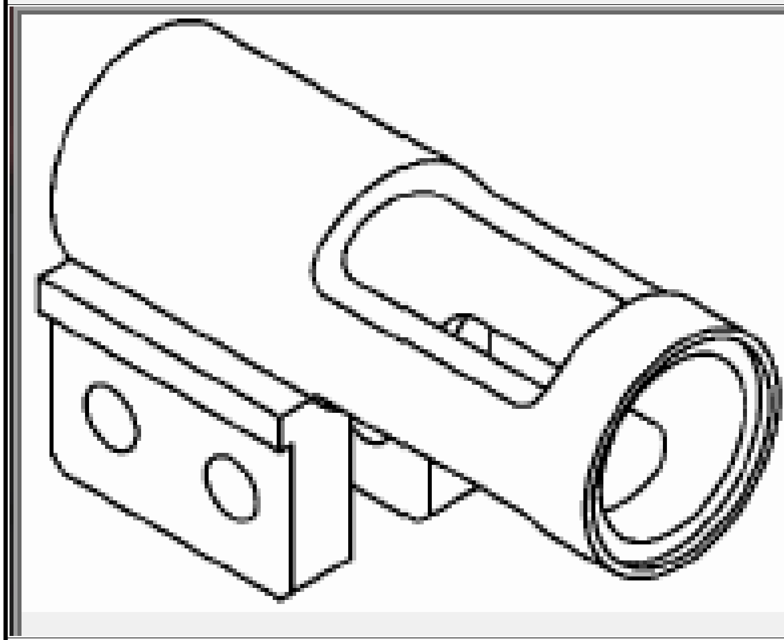
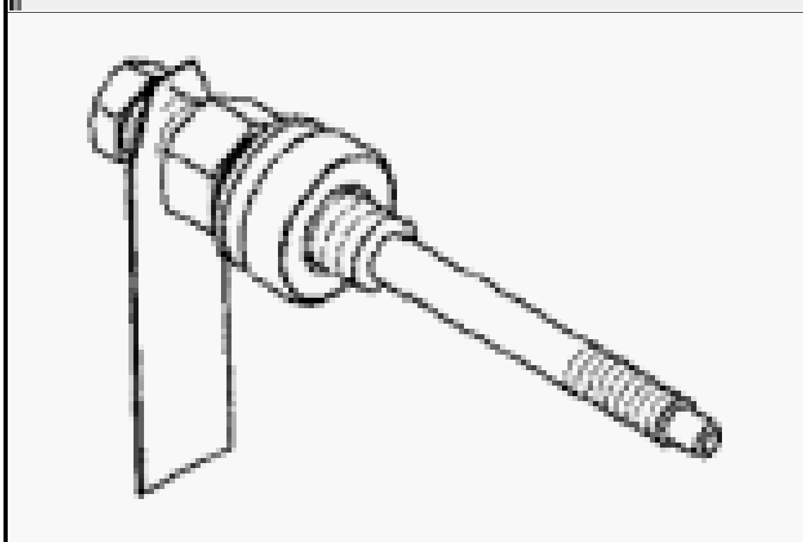
NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

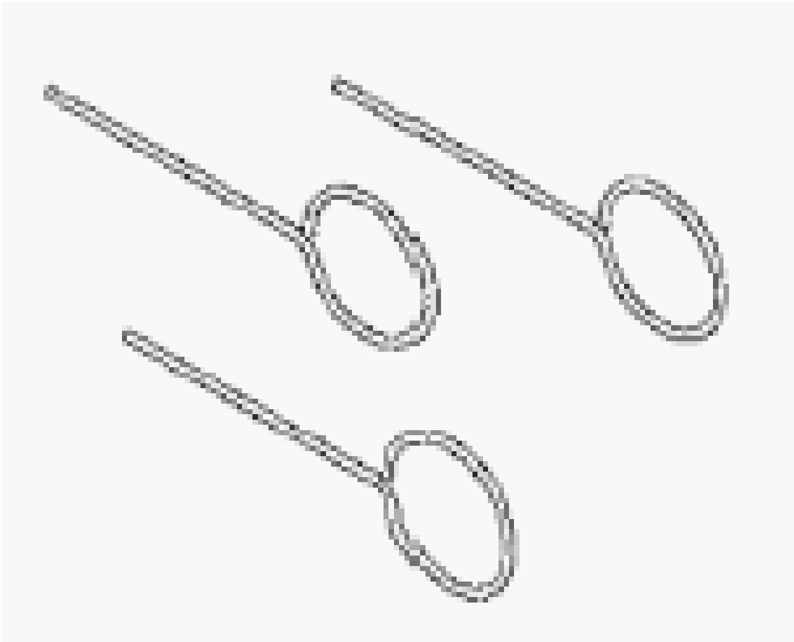
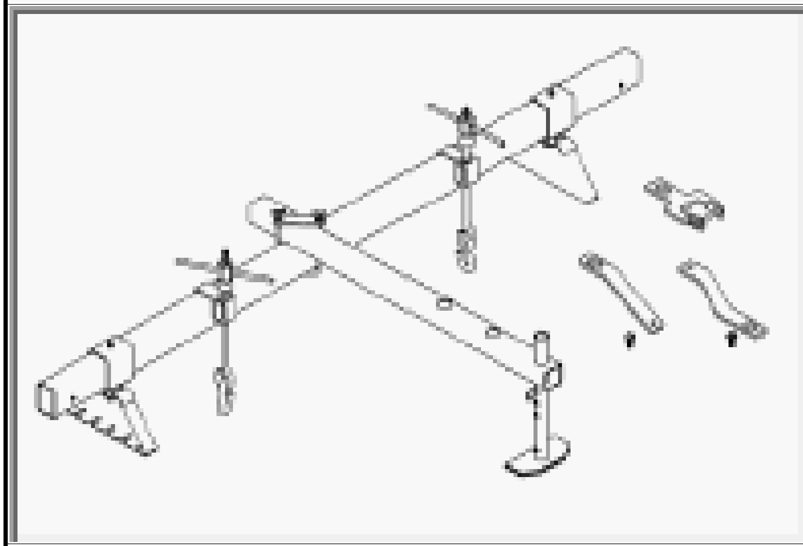
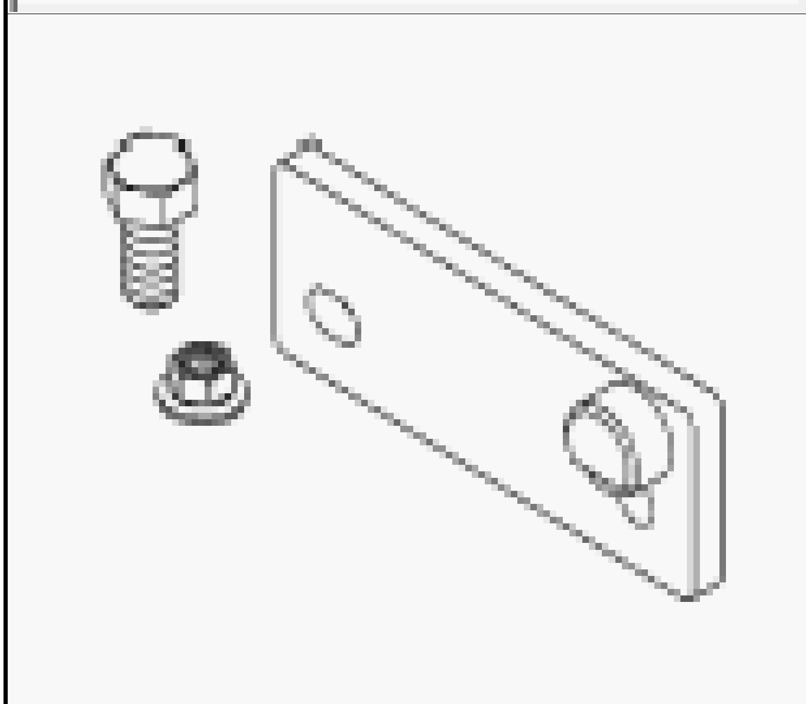
SPECIAL TOOLS

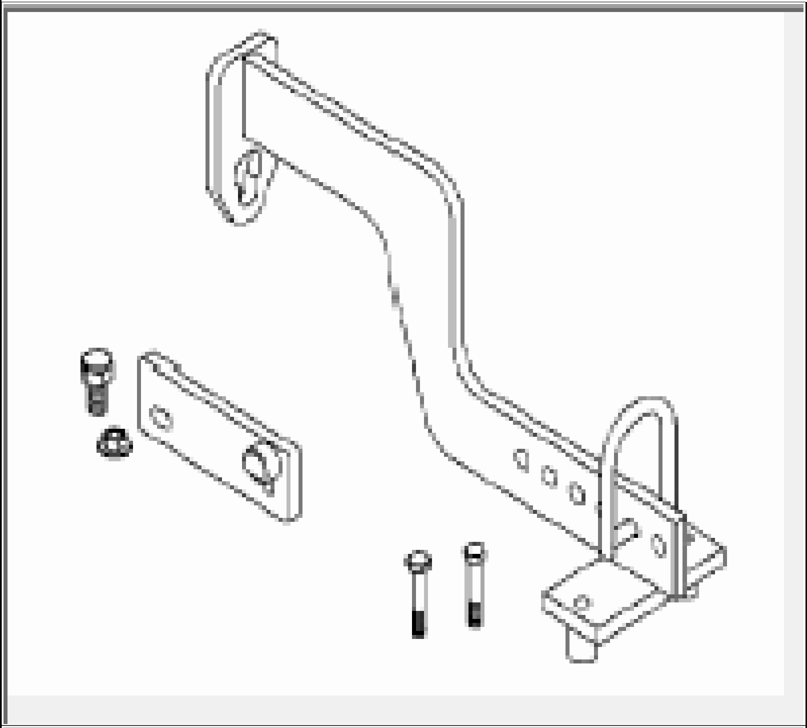
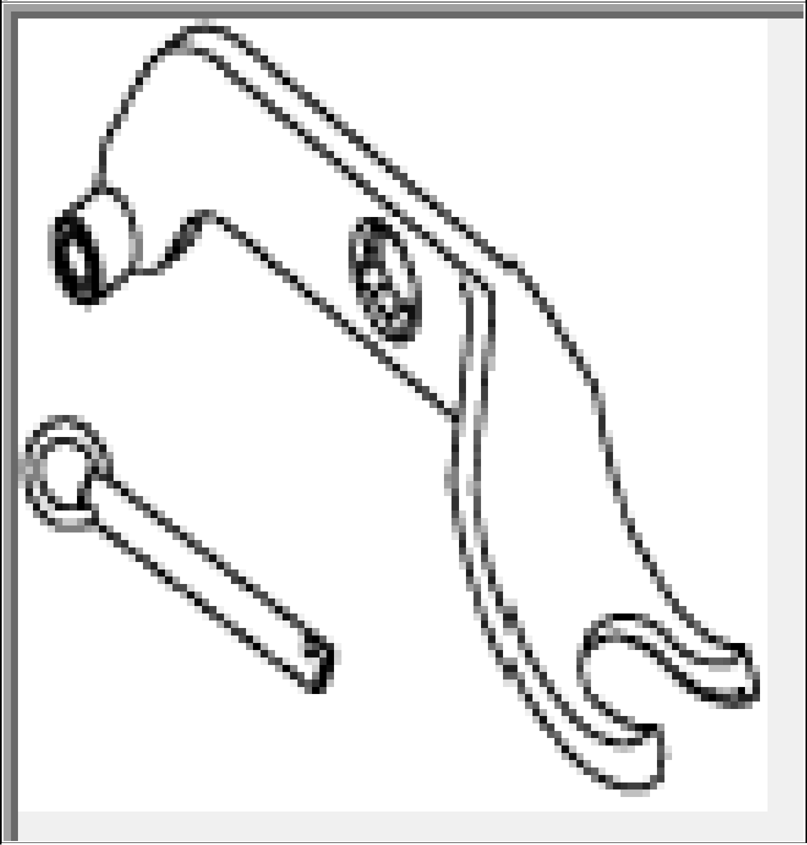
SPECIAL TOOLS

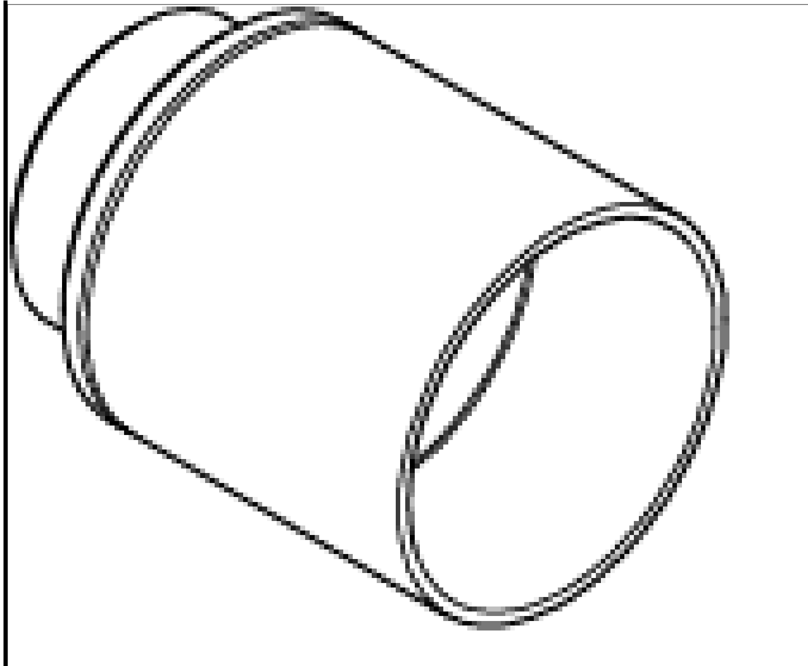
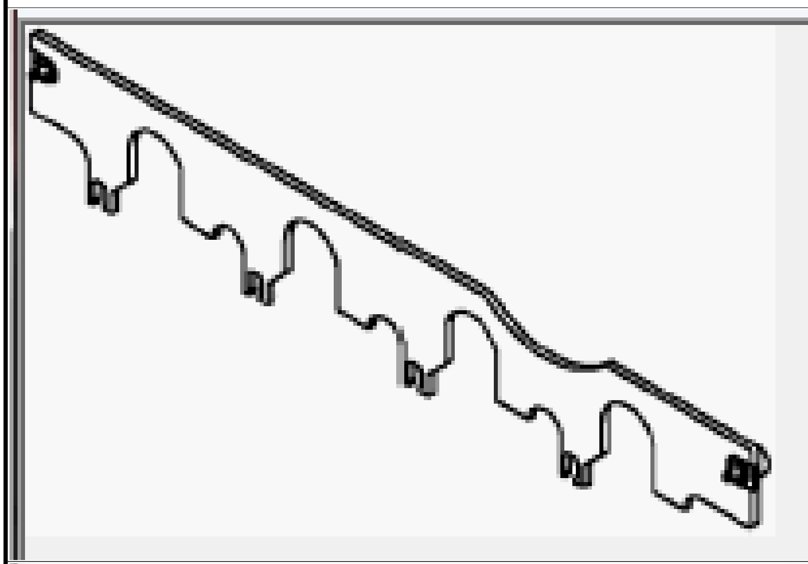
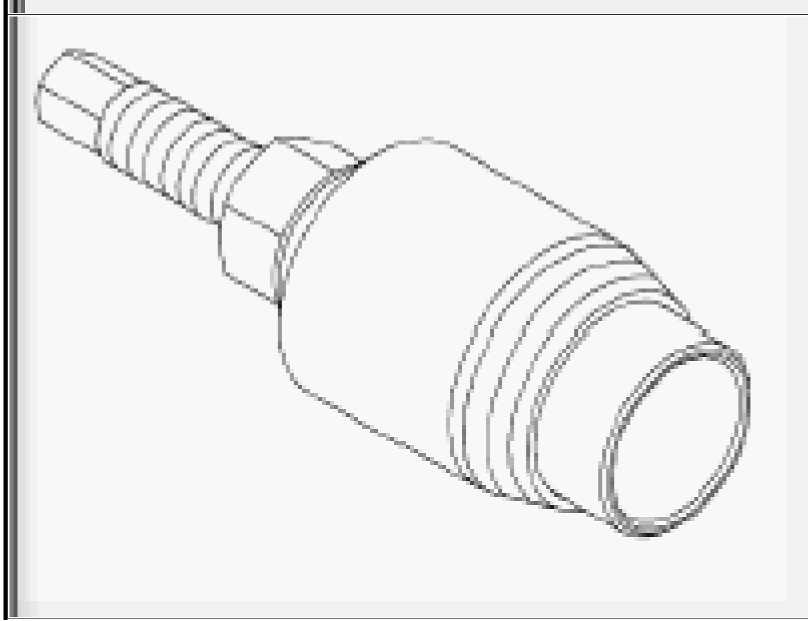
	1023 - Puller (Originally Shipped In Kit Number(s) 8678.)
	10368 - Set, Universal Protective Cap

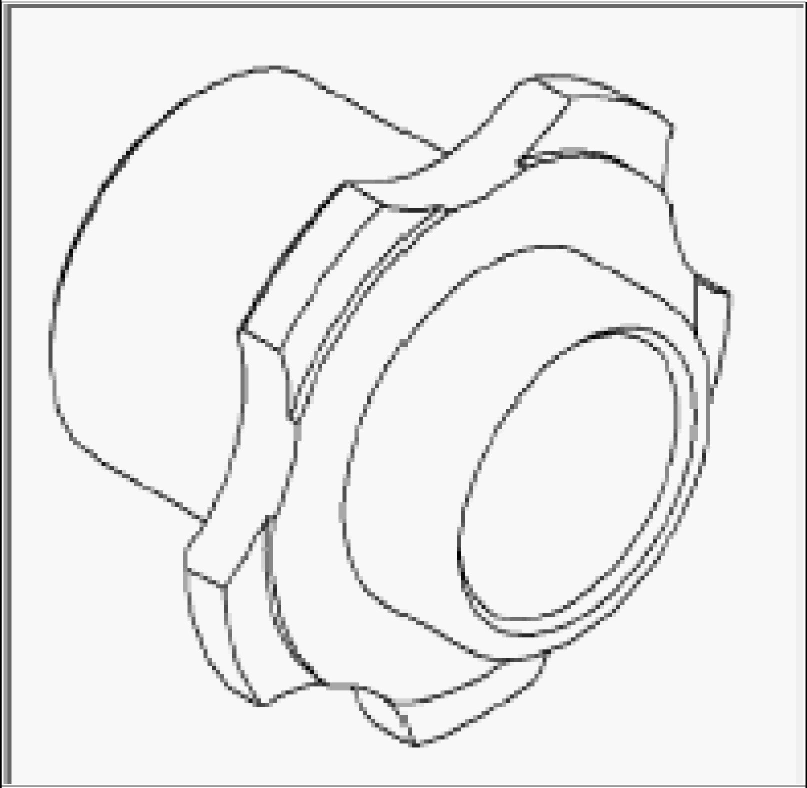
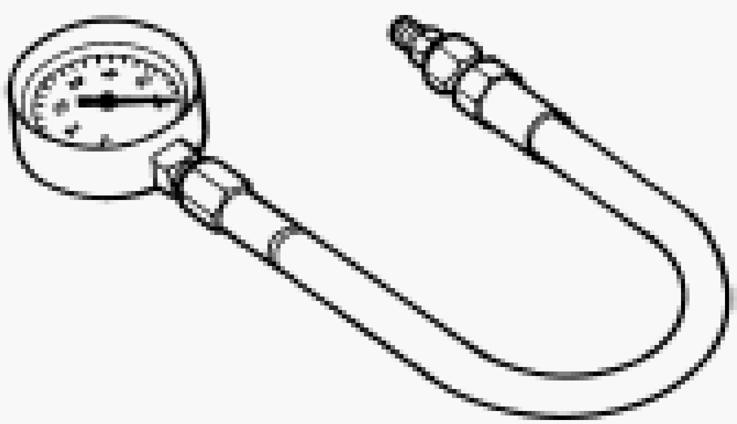
	10386 - Holder, Vibration Damper
	10387 - Installer, Vibration Damper
	6871 - Installer, A/C Hub (Originally Shipped In Kit Number(s) 6896.)

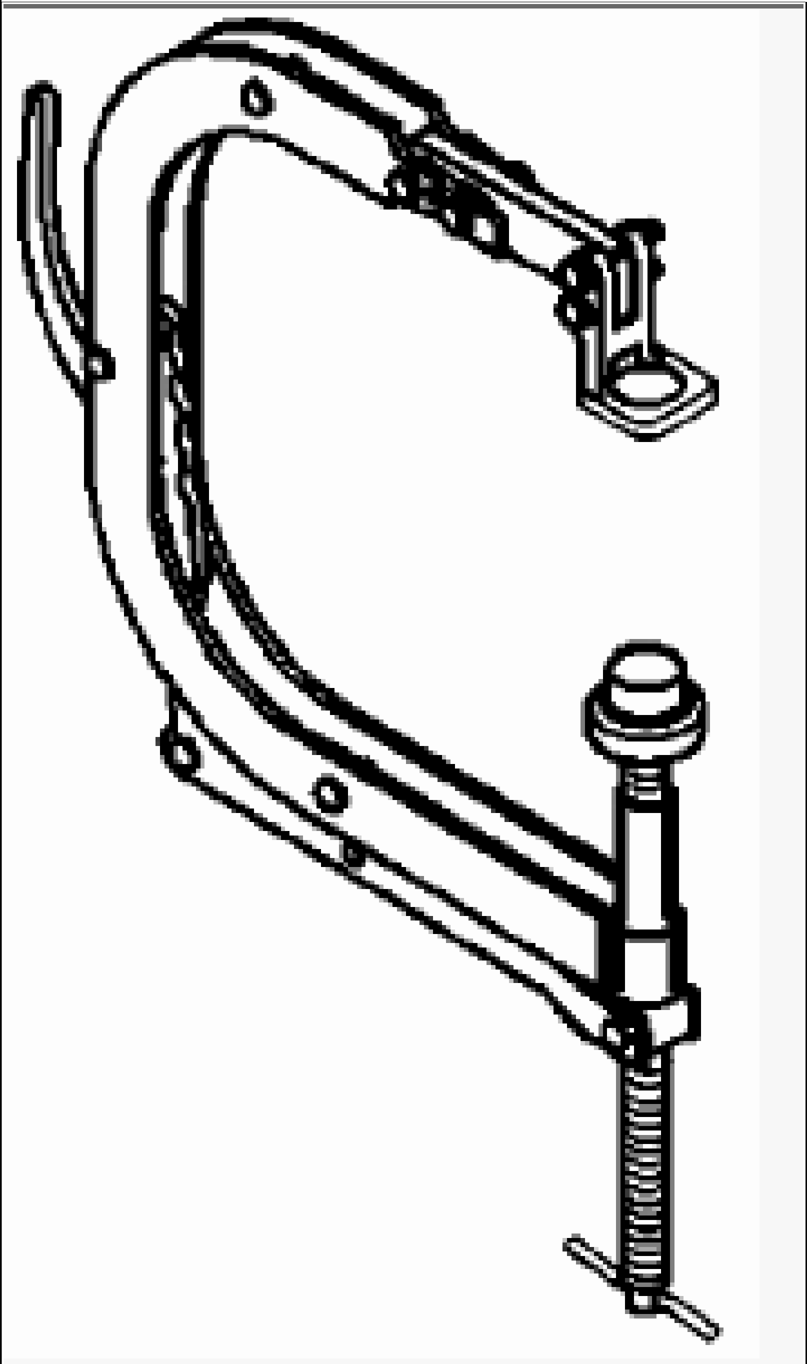
	7700 - Tester, Cooling System (Originally Shipped In Kit Number(s) 7700-A.)
	8464 - Adapter, Valve Spring (Originally Shipped In Kit Number(s) 8664, 8665, 8665CC, 8702, 9577.)
	10387 - Installer, Damper (Originally Shipped In Kit Number(s) 8283, 8527, 8575, 8575CC, 8660, 8661.)

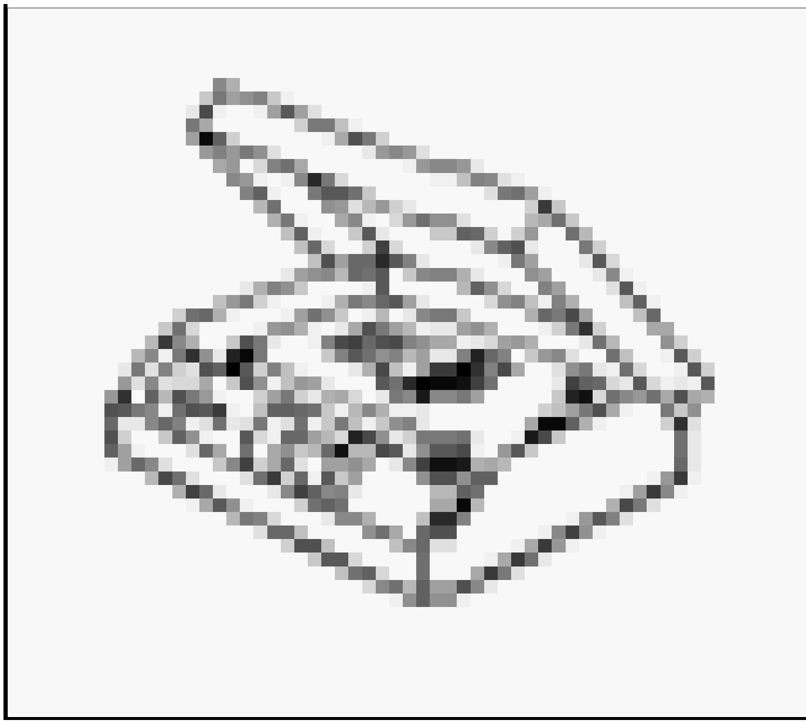
	8514 - Pins, Tensioner (Originally Shipped In Kit Number(s) 8283, 8283CC, 8527, 8527CC, 8575, 8575CC, 9975.)
	8534B - Fixture, Driveline Support (Originally Shipped In Kit Number(s) 8534, 8534B, 8849, 9565.)
	8984-UPD - Adapter, Engine Lift (Originally Shipped In Kit Number(s) 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519.)

	8984B - Fixture, Engine Lifting (Originally Shipped In Kit Number(s) 8849CC, 9329, 9515, 9516, 9518, 9519, 9540, 9541, 9577.)
	9065-3 - Adapter, Valve Spring Compressor (Originally Shipped In Kit Number(s) 9516-CAN, 9517-CAN.)

	9065C - Compressor, Valve Spring (Originally Shipped In Kit Number(s).)
	9070 - Retainer, Push Rod (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.)
	9071 - Remover, Seal (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577.)

	9072 - Installer, Seal (Originally Shipped In Kit Number(s) 8999, 8999CC, 9329, 9515, 9540, 9541, 9577, 9975, 9976.)
	C-119 - Cylinder Indicator
	C-3292A - Gauge, Pressure

	C-3422-D - Compressor, Valve Spring

	C-3685-A - Bloc-Chek Kit

MDS SYSTEM

DESCRIPTION

DESCRIPTION

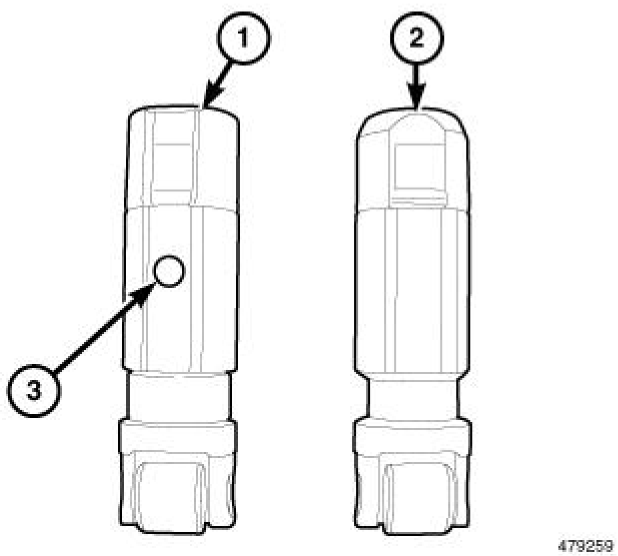


Fig. 53: MDS Lifter
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) selectively deactivates cylinders 1, 4, 6 and 7 during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy.

The MDS can provide a 5 to 20% fuel economy benefit when operating in four-cylinder mode. Depending on driving habits and vehicle usage. For EPA rating purposes the fuel economy is 8 to 15% higher than if the engine was operating on eight-cylinders at all times.

The MDS deactivating lifter (1) can be distinguished from the non-MDS lifter (2) by the disconnecting pin (3) on the side of the MDS lifter.

MDS is integrated into the basic engine architecture requiring these additional components:

- Unique MDS camshaft
- 8 deactivating roller lifters
- 4 MDS control valve solenoids
- MDS control valve solenoid wiring harness
- Oil temperature sensor

OPERATION

OPERATION

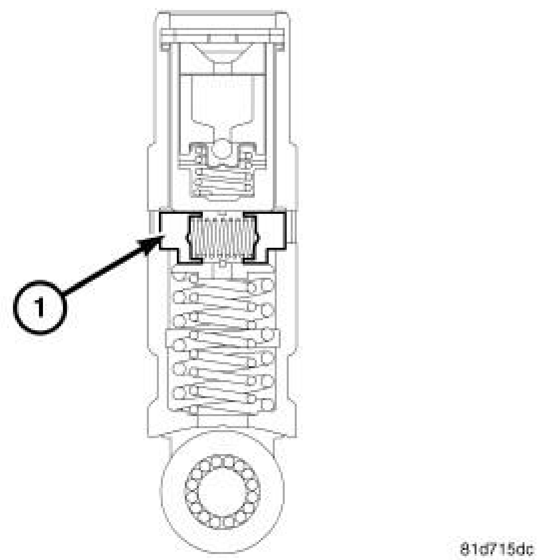


Fig. 54: MDS Lifter Cross-Section
Courtesy of CHRYSLER GROUP, LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy. Both four and eight cylinder configurations have even firing intervals to provide smooth operation. The MDS selectively deactivates cylinders 1, 4, 6, and 7, to improve fuel economy. All deactivated cylinders have unique hydraulic lifters that collapse when deactivated to prevent the valves from opening. Engine oil pressure is used to activate and deactivate the valves. Oil is delivered through special oil passages drilled into the cylinder block. The MDS solenoid valves control the flow. When activated, pressurized oil pushes a latching pin on each MDS lifter which becomes a lost motion link. The base of the MDS lifter follows the camshaft while the top remains stationary. The MDS lifter is held in place against the pushrod by light spring pressure but unable to move because of the much higher force of the valve spring.

NOTE: **It is critical to use the recommended oil viscosity in engines that use MDS.**

Deactivation occurs during the compression stroke of each cylinder, after air and fuel enter the cylinder. Ignition occurs, but the combustion products remain trapped in the cylinder under high pressure, because the valves no longer open. No fuel/air enters or leaves during subsequent piston strokes, this high pressure gas is repeatedly

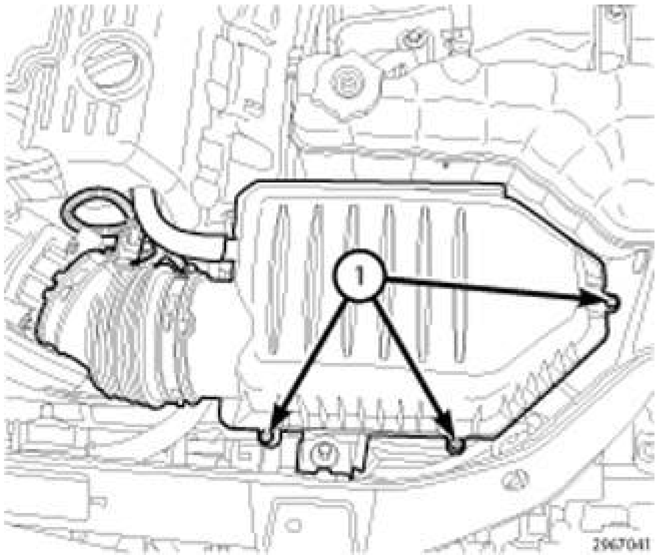
compressed and expanded like an air spring.

AIR INTAKE SYSTEM

AIR CLEANER

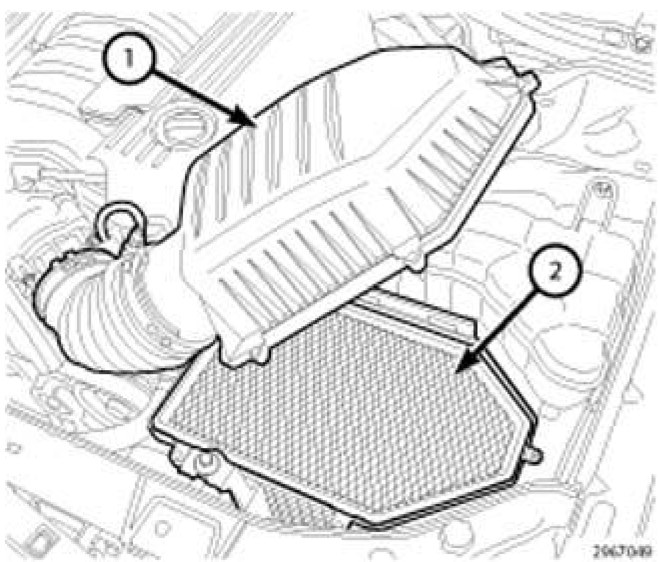
REMOVAL

REMOVAL



[Fig. 55: Air Cleaner Housing Cover Retaining Screws]
Courtesy of CHRYSLER GROUP, LLC

1. Remove the air cleaner housing cover retaining screws (1).



[Fig. 56: Air Cleaner Housing Cover & Air Cleaner Element]
Courtesy of CHRYSLER GROUP, LLC

2. Lift the air cleaner housing cover (1) while separating the locating tabs from the housing.
3. Remove air cleaner element (2) from the housing.

4. Clean the inside of air cleaner housing before replacing element.

INSTALLATION

INSTALLATION

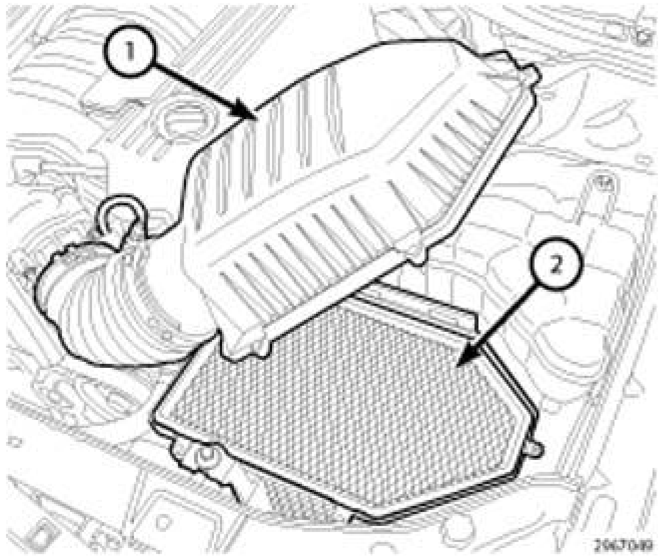


Fig. 57: Air Cleaner Housing Cover & Air Cleaner Element
Courtesy of CHRYSLER GROUP, LLC

1. Install the air cleaner element (2) into the housing.
2. Align the air cleaner housing cover (1) locating tabs into the housing while lowering the cover into position.

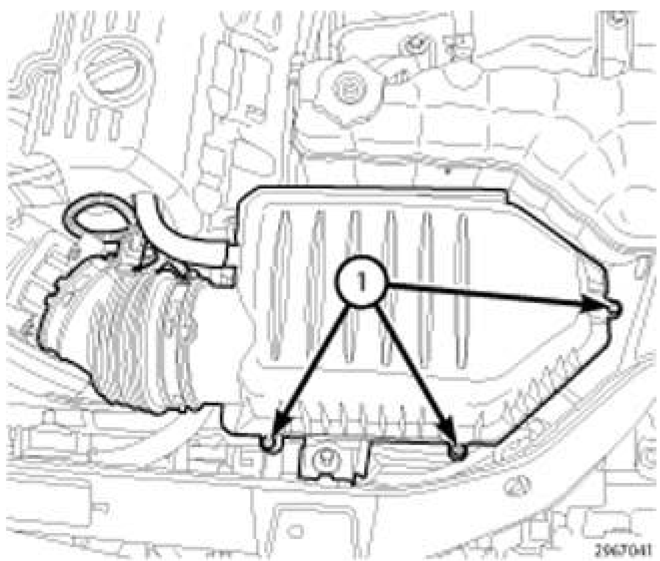


Fig. 58: Air Cleaner Housing Cover Retaining Screws
Courtesy of CHRYSLER GROUP, LLC

3. Install the air cleaner housing cover retaining screws (1) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.

BODY, AIR CLEANER

REMOVAL

REMOVAL

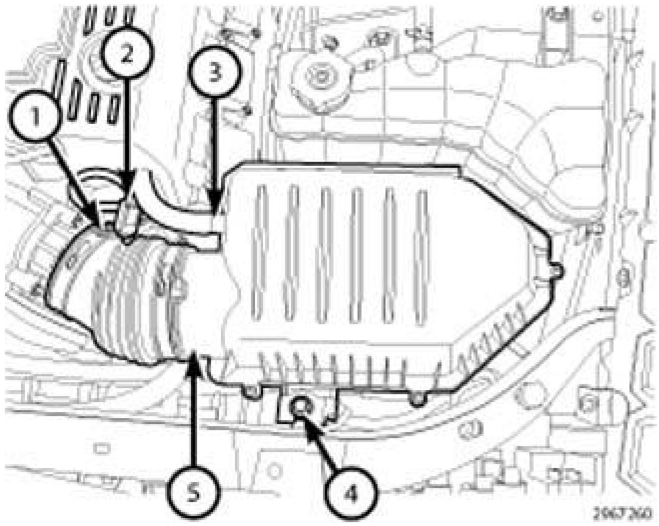


Fig. 59: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Loosen the air duct retaining clamp (1) at the throttle body.
3. Disconnect the intake air temperature sensor wire harness connector (2).
4. Remove the makeup air hose (3) at the air cleaner housing.
5. Remove the air cleaner body bolt (4).
6. While lifting up the air cleaner body (5), slide the air duct off the throttle body and remove the air cleaner housing from the vehicle.

INSTALLATION

INSTALLATION

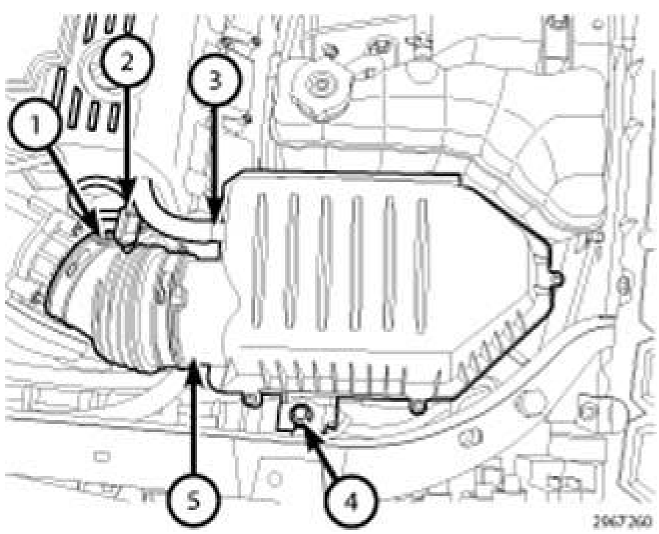


Fig. 60: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air

Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

1. While sliding the air duct onto the throttle body, lower the air cleaner housing (5) into position and align the locating pin on the bottom of the housing.
2. Install the air cleaner housing retaining bolt (4) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
3. Install the makeup air hose (3) at the air cleaner housing.
4. Connect the intake air temperature sensor electrical connector (2).
5. Position the air duct retaining clamp (1) at the throttle body and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

CYLINDER HEAD

OPERATION

OPERATION

The cylinder head closes the combustion chamber allowing the pistons to compress the air fuel mixture to the correct ratio for ignition. The valves located in the cylinder head open and close to either allow clean air into the combustion chamber or to allow the exhaust gases out, depending on the stroke of the engine.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - CYLINDER HEAD GASKET FAILURE

A cylinder head gasket leak can be located between adjacent cylinders or between a cylinder and the adjacent water jacket.

Possible indications of the cylinder head gasket leaking between adjacent cylinders are:

- Loss of engine power
- Engine misfiring
- Poor fuel economy

Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:

- Engine overheating
- Loss of coolant
- Excessive steam (white smoke) emitting from exhaust
- Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in Cylinder Compression Pressure Test. Refer to **CYLINDER COMPRESSION PRESSURE LEAKAGE**. An engine cylinder head gasket leaking between adjacent cylinders will result in approximately a 50-70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: Use extreme caution when the engine is operating with coolant pressure cap removed. Failure to follow this warning may result in serious or fatal injury.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

WARNING: With cooling system tester in place, pressure will build up fast. Excessive pressure built up, by continuous engine operation, must be released to a safe pressure level. Never permit pressure to exceed 138 kPa (20 psi). Failure to follow this warning may result in serious or fatal injury.

Install Cooling System Tester (special tool #7700, Tester, Cooling System) or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Combustion leaks into the cooling system can also be checked by using Bloc-Chek Kit (special tool #C-3685-A, Bloc-Chek Kit) or equivalent. Perform test following the procedures supplied with the tool kit.

REMOVAL

REMOVAL

1. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.
2. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

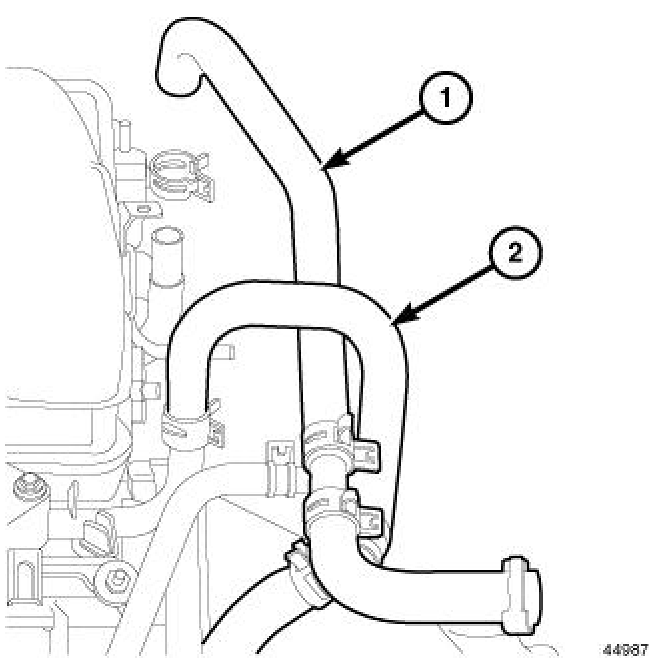


Fig. 61: Heater Hose Supply
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the heater hoses (1, 2).
4. Remove the catalytic converters. Refer to **CONVERTER, CATALYTIC, REMOVAL** .
5. Lower the vehicle.
6. If removing the right cylinder head, remove the engine oil dip stick tube retaining nut at the exhaust manifold and remove the oil dip stick tube.
7. Remove the rocker arms and push rods. Refer to **ROCKER ARM, VALVE, REMOVAL**.

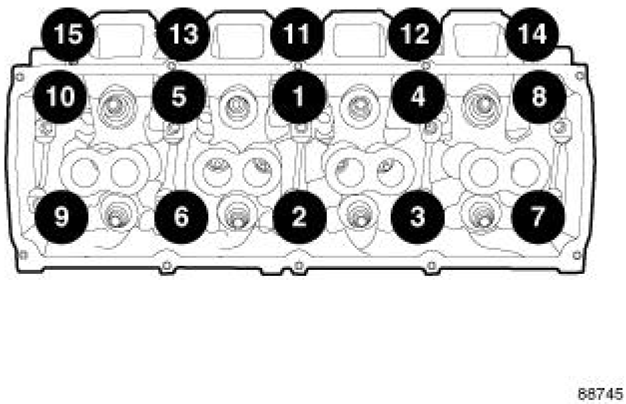


Fig. 62: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It is not necessary to remove the exhaust manifolds to remove the cylinder heads.**

8. Using the sequence shown in illustration, remove the cylinder head bolts and remove the cylinder head(s).

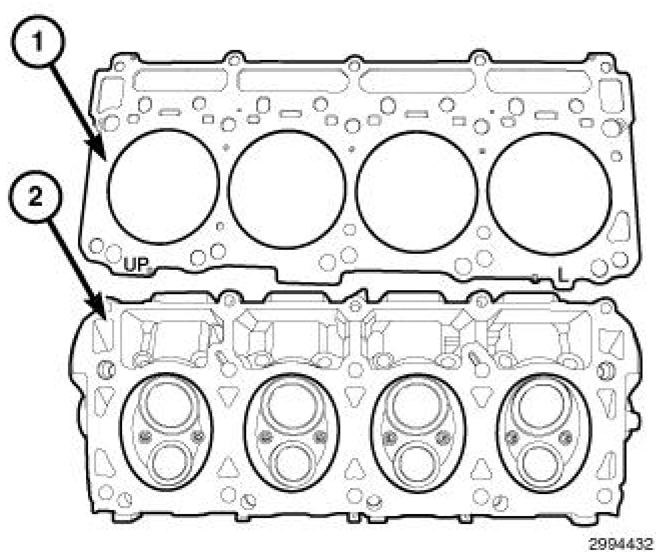


Fig. 63: Cylinder Head Gasket & Cylinder Head
Courtesy of CHRYSLER GROUP, LLC

9. Discard the cylinder head gasket (1).

10. Inspect and clean the cylinder head (2) mating surface.

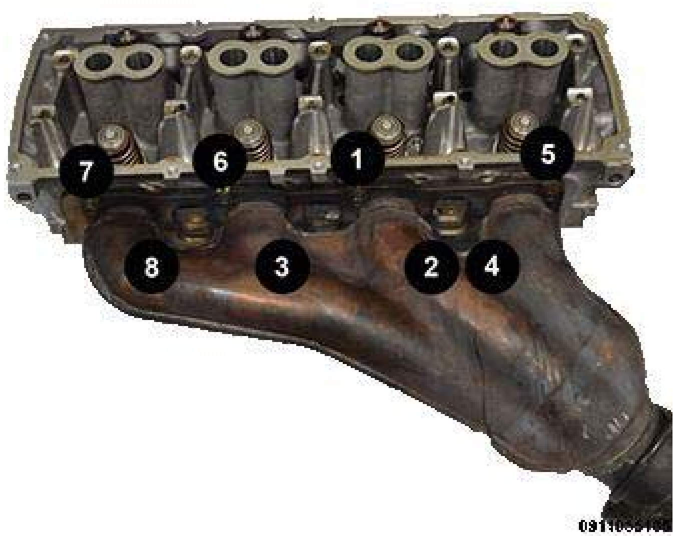


Fig. 64: Exhaust Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

11. If necessary, using the sequence shown in illustration, remove the exhaust manifold bolts and remove the manifold.

CLEANING

CLEANING

Clean all surfaces of the cylinder block and cylinder heads.

Clean the cylinder block front and rear gasket surfaces using a suitable solvent.

INSPECTION

INSPECTION

1. Inspect the cylinder head for flatness using a straightedge and a feeler gauge. If tolerances exceed 0.0508 mm (0.002 in.) replace the cylinder head.
2. Inspect the valve seats for damage. Service the valve seats as necessary.
3. Inspect the valve guides for wear, cracks or looseness. If any of these conditions exist, replace the cylinder head.
4. Inspect push rods. Replace worn or bent push rods.

INSTALLATION

INSTALLATION

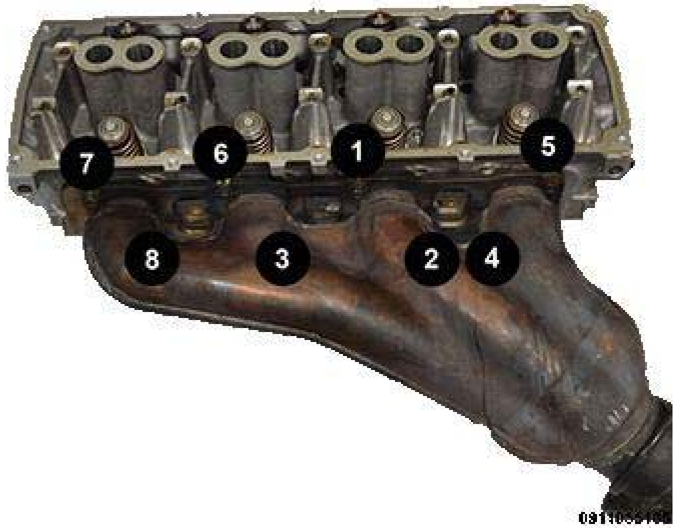


Fig. 65: Exhaust Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. If removed, using a **NEW** exhaust manifold gasket, position the exhaust manifold and install the retaining bolts finger tight.
2. Using the sequence shown in illustration, tighten the retaining bolts to the proper specification. Refer to TORQUE SPECIFICATIONS.

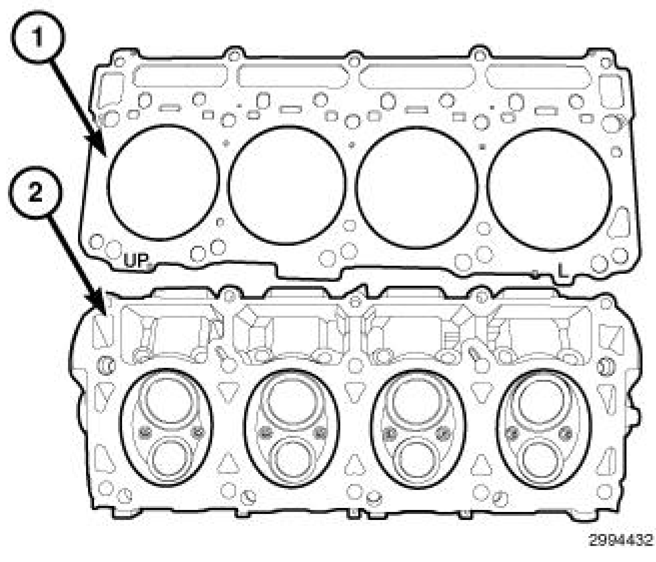


Fig. 66: Cylinder Head Gasket & Cylinder Head
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The cylinder head gaskets (1) are not interchangeable between left and right sides. They are marked "UP" to indicate direction to face up and "L" or "R" to indicate left side or right side of engine block.

3. Clean all sealing surfaces of the engine block and the cylinder head(s) (2).

NOTE: **Rotate crankshaft 45Â° so that all pistons are 1/2 the way down the cylinder bore to avoid piston to valve contact.**

4. Position the **NEW** cylinder head gasket(s) (1) onto the engine block.
5. Position the cylinder head(s) onto the engine block.
6. Install the cylinder head bolts finger tight.

CAUTION: **The 6.4L engine uses a unique 4 layer steel head gasket that must be compressed evenly and completely across the deck surface for proper sealing. The tightening sequence must be followed to ensure all layers are compressed before applying the additional 90 degree turn.**

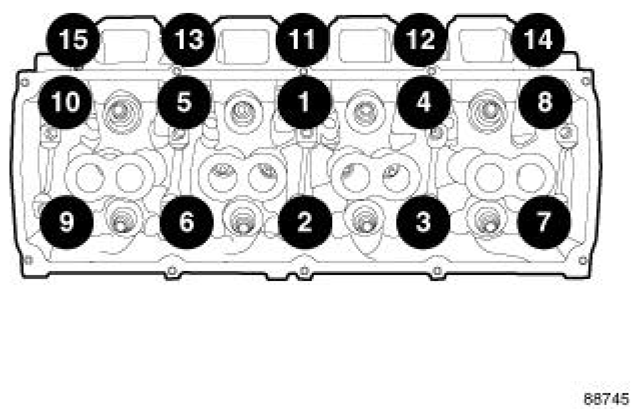


Fig. 67: Cylinder Head Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Using the sequence below, tighten the retaining bolts.
   a. Using the sequence shown in illustration, tighten bolts 1-10 to 34 N.m (25 ft. lbs.).
   b. Using the sequence shown in illustration, tighten bolts 11-15 to 20 N.m (15 ft. lbs.).
   c. Using the sequence shown in illustration, tighten bolts 1-10 to 54 N.m (40 ft. lbs.).
   d. Using the sequence shown in illustration, verify bolts 11-15 are 20 N.m (15 ft. lbs.).
   e. Using the sequence shown in illustration, tighten bolts 1-10 to 61 N.m (45 ft. lbs.).
   f. Using the sequence shown in illustration, rotate bolts 1-10 an additional 90 degrees.
   g. Using the sequence shown in illustration, tighten bolts 11-15 to 28 N.m (21 ft. lbs.).
8. Install the push rods and rocker arms. Refer to **ROCKER ARM, VALVE, INSTALLATION**.
9. If removed, install the oil dip stick tube and tighten the retaining nut to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
10. Install the catalytic converters. Refer to **CONVERTER, CATALYTIC, INSTALLATION** .

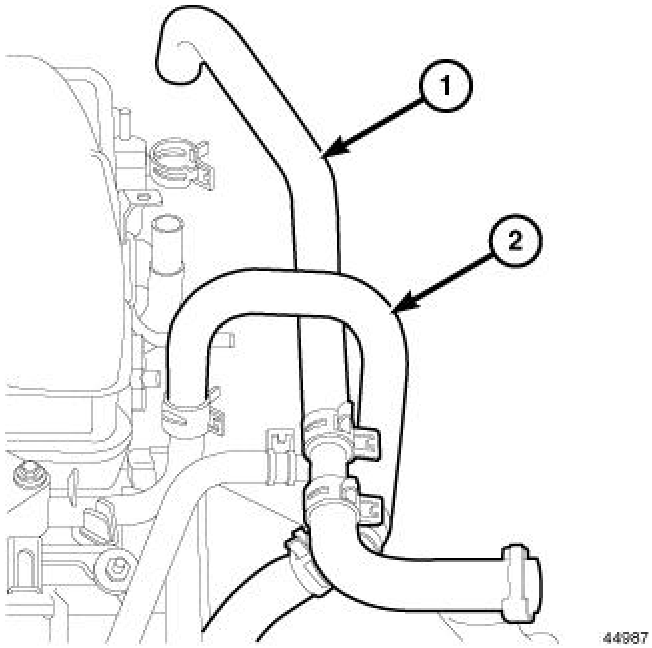


Fig. 68: Heater Hose Supply
Courtesy of CHRYSLER GROUP, LLC

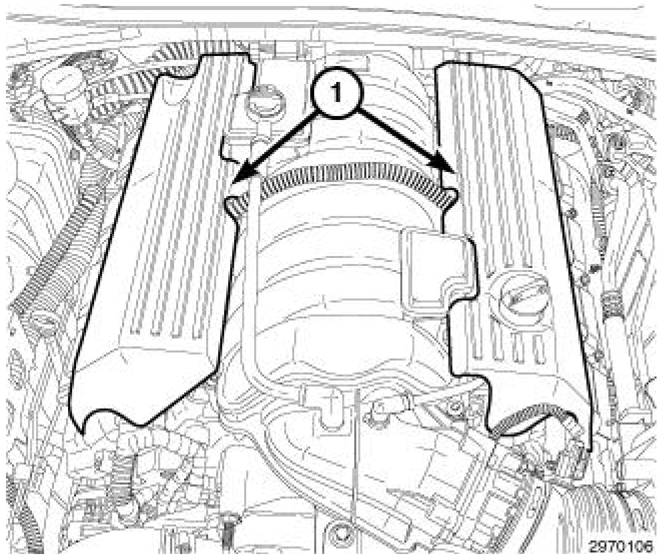
11. Lower the vehicle.
12. Connect the heater hoses (1, 2).
13. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
14. Connect the fuel supply line.
15. Change the engine oil and filter. Refer to **STANDARD PROCEDURE**.
16. Fill cooling system. Refer to **STANDARD PROCEDURE** .
17. Connect the negative battery cable.
18. Start the engine and check for leaks.

COVER(S), CYLINDER HEAD

REMOVAL

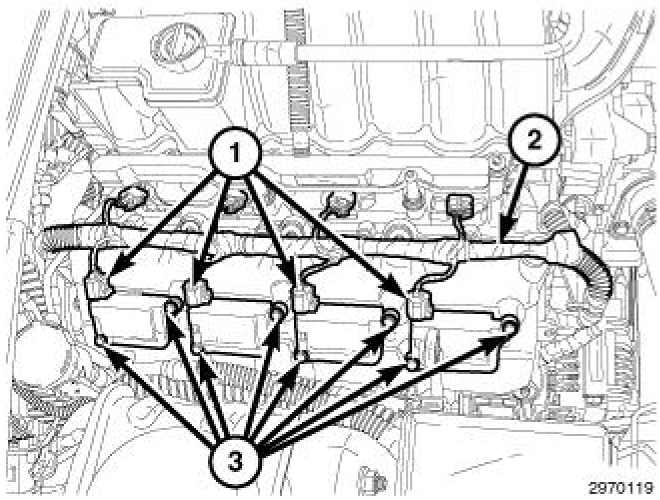
REMOVAL

1. Disconnect and isolate the negative battery cable.



[Fig. 69: Installing Engine Covers](#)
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine covers (1).



[Fig. 70: Ignition Coil Electrical Connectors, Harness & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the ignition coil wire harness connectors (1).
4. Position the electrical harness (2) aside.
5. Remove the ignition coil retaining bolts (3).

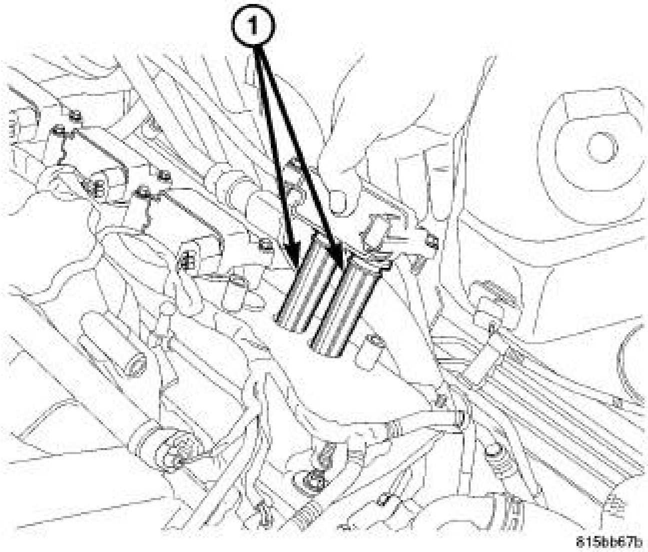


Fig. 71: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

6. Remove the ignition coils (1).

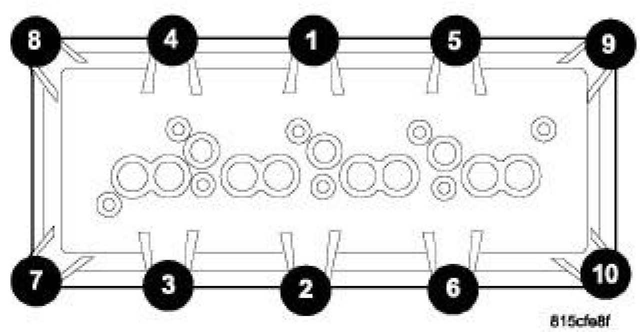


Fig. 72: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts.

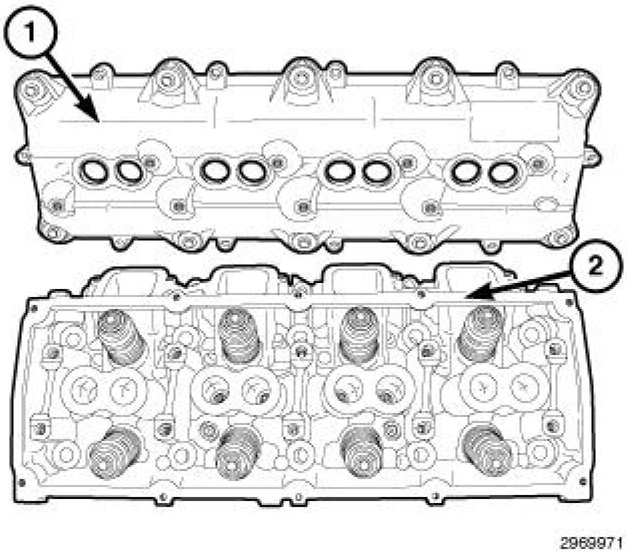


Fig. 73: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

8. Remove the cylinder head cover (1).
9. Clean the sealing surface of the cylinder head (2).

NOTE: **The cylinder head cover gasket may be used again, provided no cuts, tears, or deformation have occurred.**

INSTALLATION

INSTALLATION

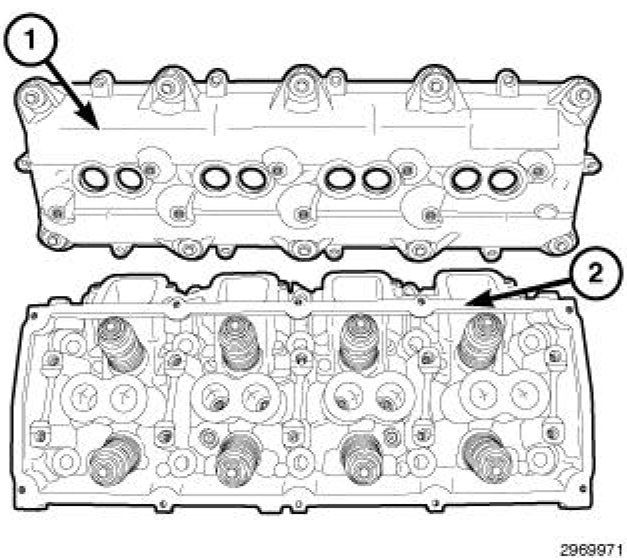


Fig. 74: Cylinder Head & Cover
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not use harsh cleaners to clean the cylinder head covers. Severe damage to covers may occur.**

CAUTION: **Do not allow other components including the wire harness to rest on or against the engine cylinder head cover. Prolonged contact with other objects may wear a hole in the cylinder head cover.**

NOTE: **The cylinder head cover gasket may be used again, provided no cuts, tears, or deformation have occurred.**

1. Clean the cylinder head cover (1) and the sealing surface of the cylinder head (2). Inspect and replace gasket if necessary.
2. Install the cylinder head cover and hand start all fasteners.

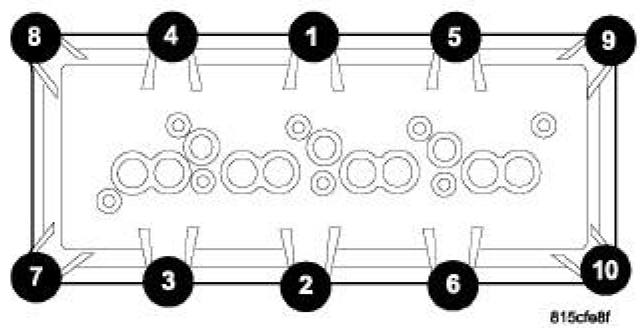


Fig. 75: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, tighten the cylinder head cover bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

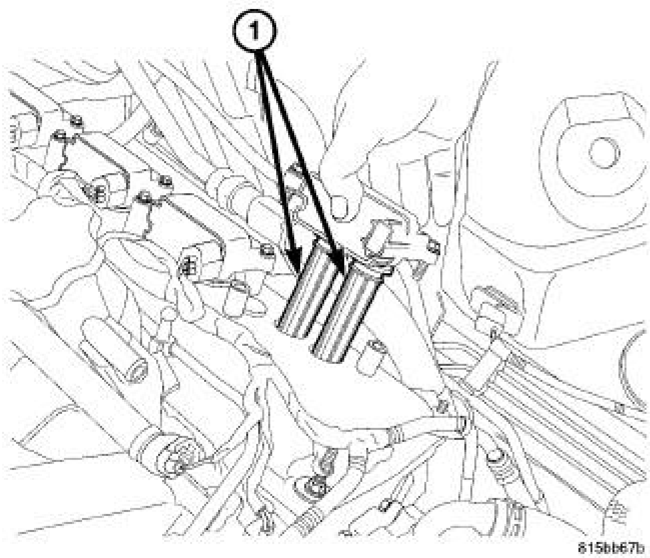


Fig. 76: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

4. Before installing the ignition coils, apply dielectric grease to the inside of the spark plug boots (1).
5. Install the ignition coils.

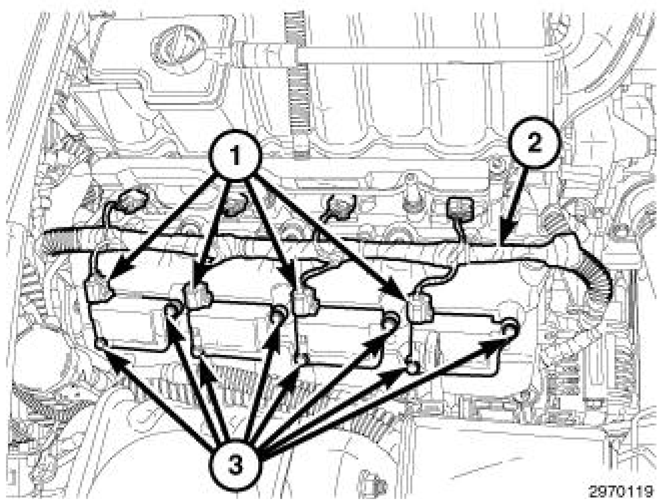


Fig. 77: Ignition Coil Electrical Connectors, Harness & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Tighten the ignition coil retaining bolts (3) to the proper specification. Refer to **SPECIFICATIONS** .
7. Position the wire harness (2).
8. Connect the ignition coil wire harness connectors (1).

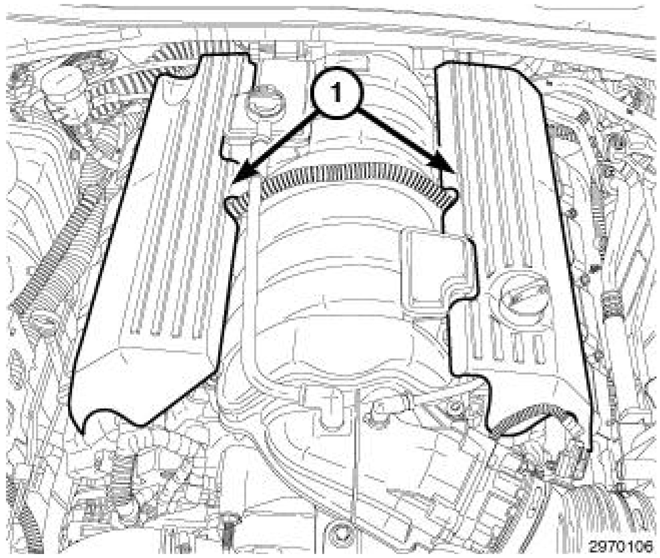


Fig. 78: Installing Engine Covers
Courtesy of CHRYSLER GROUP, LLC

9. Install the engine covers (1).
10. Connect the negative battery cable.

ROCKER ARM, VALVE

REMOVAL

REMOVAL

1. Remove the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL.

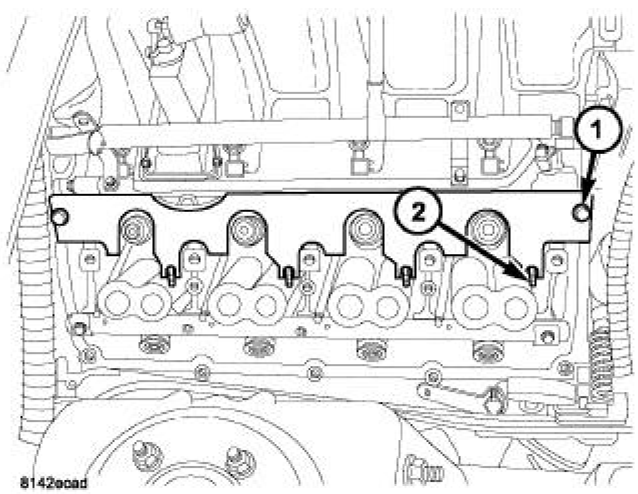


Fig. 79: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

2. Install Push Rod Retainer (special tool #9070, Retainer, Push Rod) (1).

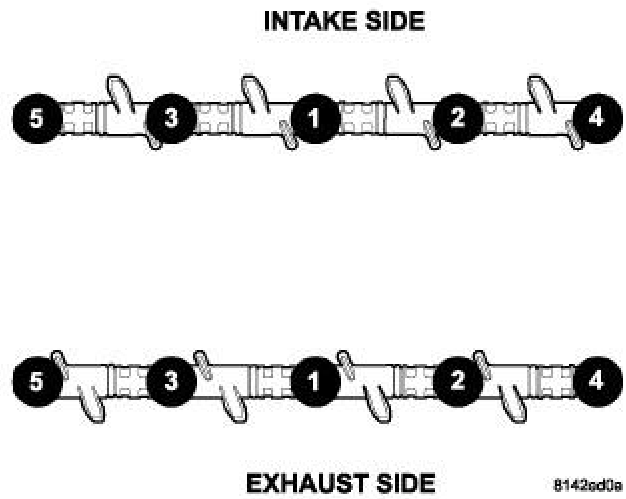


Fig. 80: Rocker Shaft Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Using the sequence shown in illustration, loosen the rocker shaft assemblies.

CAUTION: The rocker shaft assemblies are not interchangeable between intake and exhaust. The intake rocker arms are marked with an "I".

4. Remove the rocker shaft assemblies. Note the location for reassembly.

CAUTION: The longer pushrods are for the exhaust side, and the shorter pushrods are for intake side.

5. Remove the push rods. Note the push rod location for reassembly.

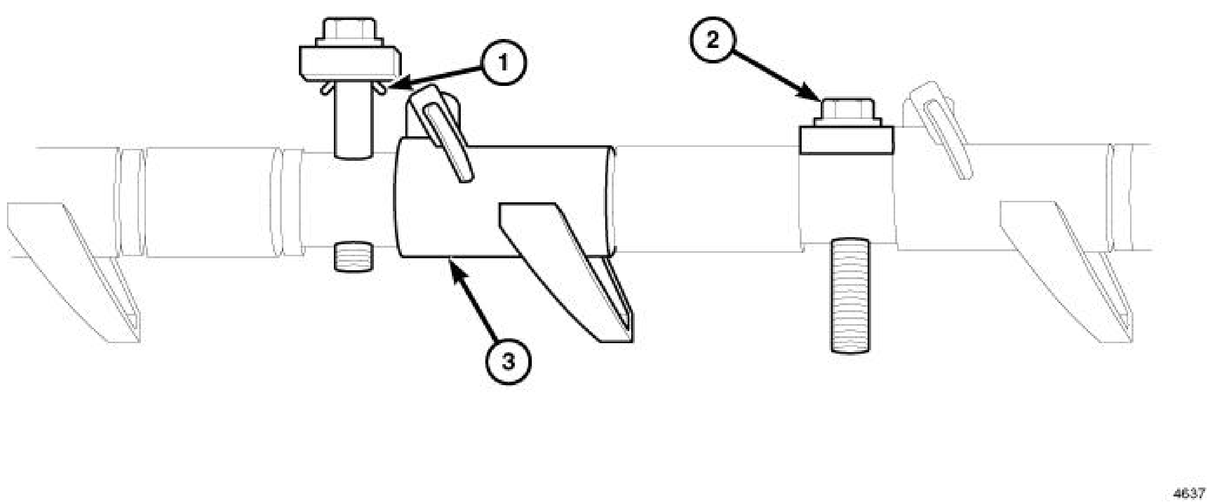


Fig. 81: Rocker Arm Retainers
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not remove the retainers from the rocker shaft assemblies. The assembly tangs (1) at the bottom of the retainers can be damaged, causing the assembly tangs to break off and get into the engine.

INSTALLATION

INSTALLATION

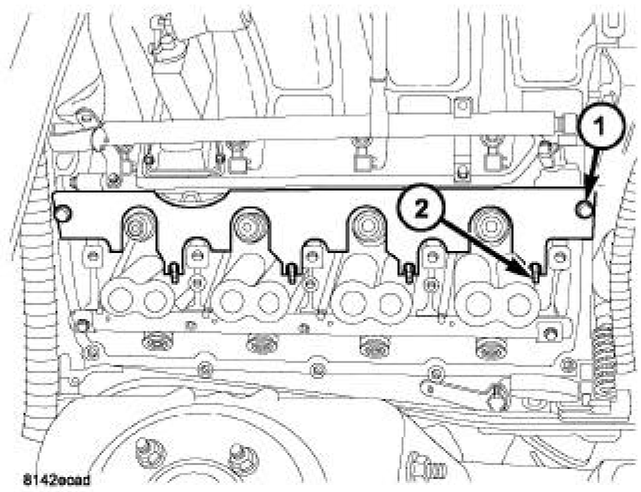
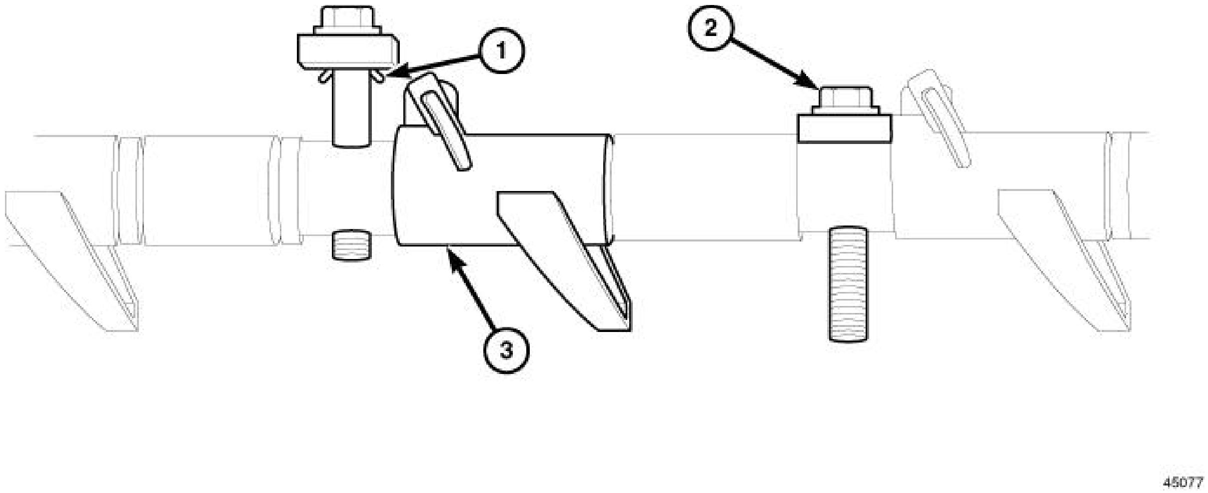


Fig. 82: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The longer pushrods are for the exhaust side, and the shorter pushrods are for intake side.

1. Install the push rods in the same order as removed.
2. Install the Push Rod Retainer (special tool #9070, Retainer, Push Rod) (1).

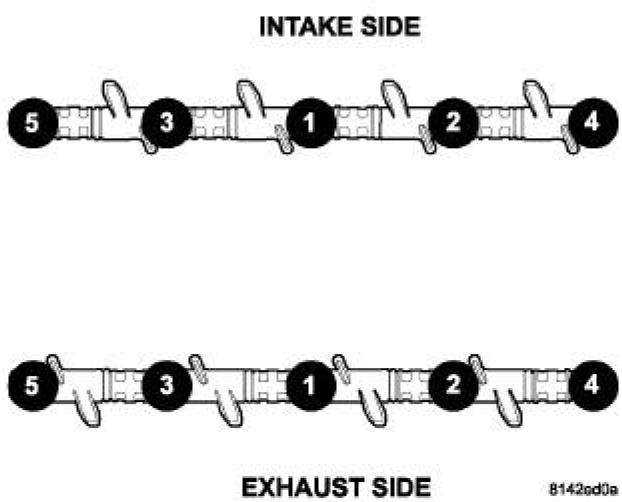


[Fig. 83: Rocker Arm Retainers]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Ensure the retainers (1) and rocker arms (3) are not overlapped when torquing bolts.**

CAUTION: **Verify the push rods are installed into the rocker arms (3) and lifters correctly while installing the rocker shaft assembly. Recheck after the rocker shaft assembly has been torqued to specification.**

3. Install the rocker shaft assemblies in the same order as removed.



[Fig. 84: Rocker Shaft Torque Sequence]
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The rocker shaft assemblies are not interchangeable between intake and exhaust. The intake rocker arms are marked with the letter "I".**

4. Verify the rocker arms are installed in the correct location.

NOTE:	**Repeat torque sequence several times to ensure rocker shaft assembly is firmly seated.**

5. Using the sequence shown in illustration, tighten the rocker shaft bolts as follows:
   - Snug to 10 N.m (7 ft. lbs.)
   - Torque to 23 N.m (17 ft. lbs.)
   - Individually loosen by 1/2 turn and re-torque to 23 N.m (17 ft. lbs.)
   - Finally, Rotate 30 degrees

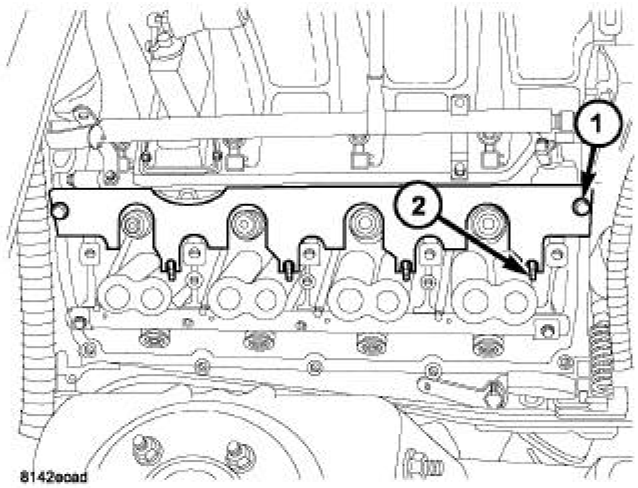


Fig. 85: Pushrod Retaining Plate
Courtesy of CHRYSLER GROUP, LLC

CAUTION:	**Do not rotate or crank the engine during or immediately after rocker arm installation. Allow the hydraulic roller lifters adequate time to bleed down (about 5 minutes).**

6. Remove the Push Rod Retainer (special tool #9070, Retainer, Push Rod) (1).

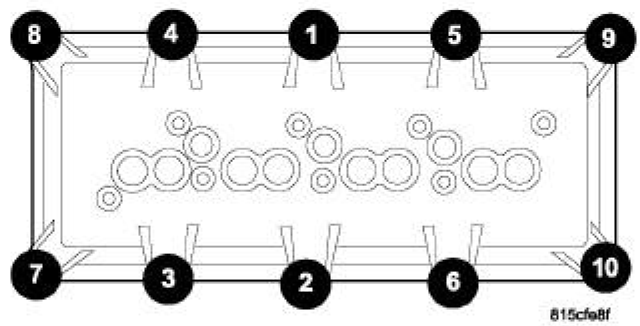


Fig. 86: Cylinder Head Cover Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.

SEAL(S), VALVE GUIDE

DESCRIPTION

DESCRIPTION

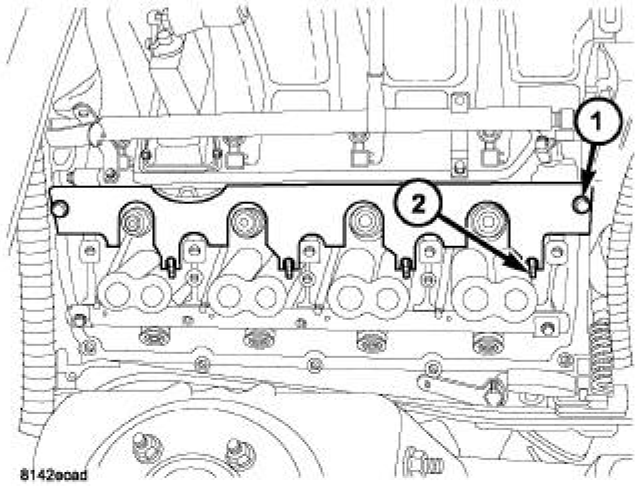
The valve guide seals are made of black rubber and incorporate an integral steel garter spring. The integral garter spring maintains consistent lubrication control to the valve stems. The intake and exhaust stem seals are common with each other.

SPRING(S), VALVE

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.
3. Remove the cylinder head covers. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.

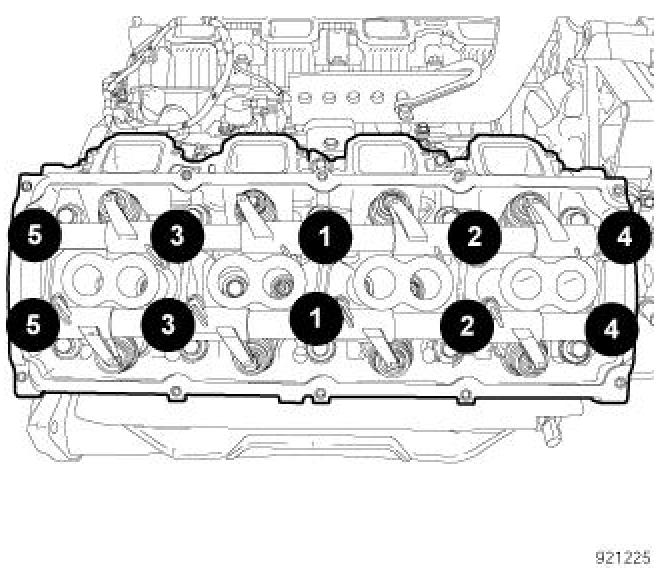


[Fig. 87: Pushrod Retaining Plate](#)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The piston must be at TDC, and both valves closed on the cylinder to be serviced.**

NOTE: **The intake push rods can fall into the engine and become lodged in the oil pan, if removing intake rocker arm shaft, install the push rod retainer (special tool #9070, Retainer, Push Rod) (1) to retain the intake push rods (2).**

4. Install the push rod retainer (special tool #9070, Retainer, Push Rod) (1) onto the cylinder head.
5. Clip the push rods (2) into the push rod retainer (1).



[Fig. 88: Rocker Shafts Retaining Bolt Removal & Tightening Sequence](#)

Courtesy of CHRYSLER GROUP, LLC

CAUTION: The rocker shaft assemblies are not interchangeable between intake and exhaust. The intake rocker arms are marked with an "I".

6. Using the sequence shown in illustration, remove the rocker arm shaft bolts and remove the rocker arm shaft.

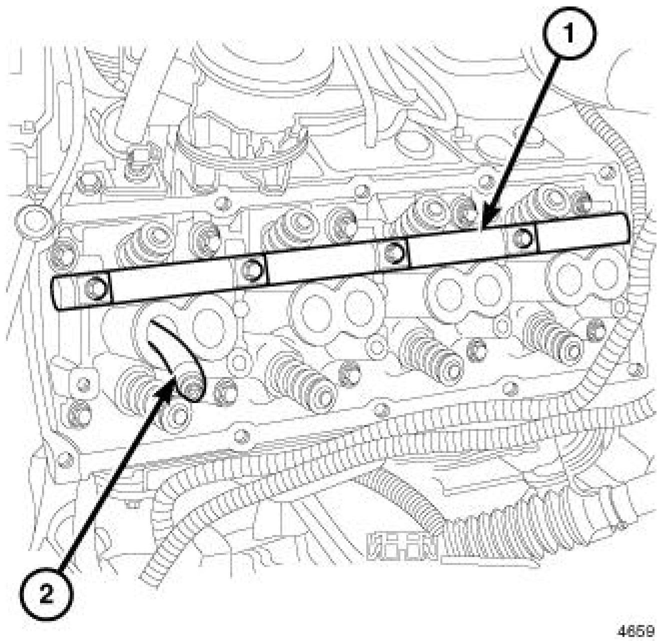


Fig. 89: Rocker Shaft
Courtesy of CHRYSLER GROUP, LLC

7. Install the rocker arm shaft adapter (special tool #9065C, Compressor, Valve Spring) (1).
8. Insert an air hose (2) into the spark plug hole and charge the cylinder with air.

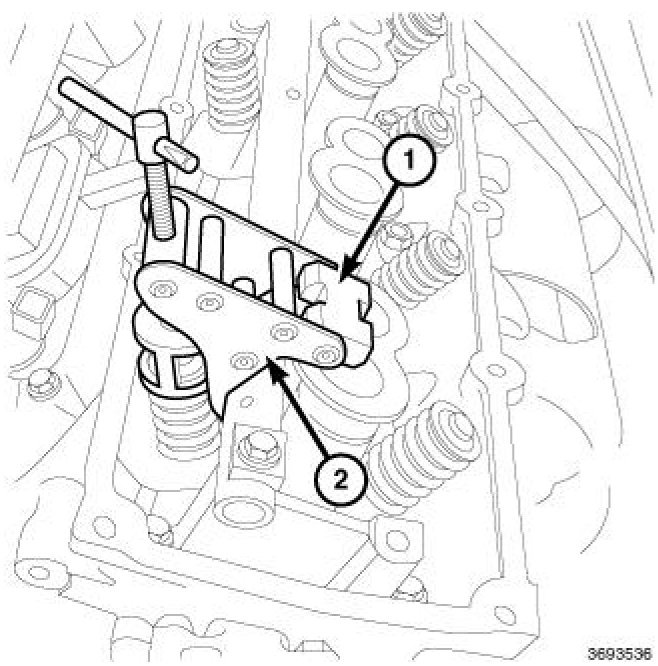


Fig. 90: Rotating Fulcrum Assembly
Courtesy of CHRYSLER GROUP, LLC

NOTE: **A fulcrum assembly (1) must be rotated to the appropriate setting as marked on the tool for proper valve spring alignment.**

NOTE: **All valve springs and seals are removed in the same manner.**

NOTE: **Tap the top of the valve spring retainer to loosen the spring retainer locks.**

9. Install the (special tool #9065C, Compressor, Valve Spring) (1) and remove the intake valve retainer locks.
10. Release the valve spring compressor and remove the valve springs.

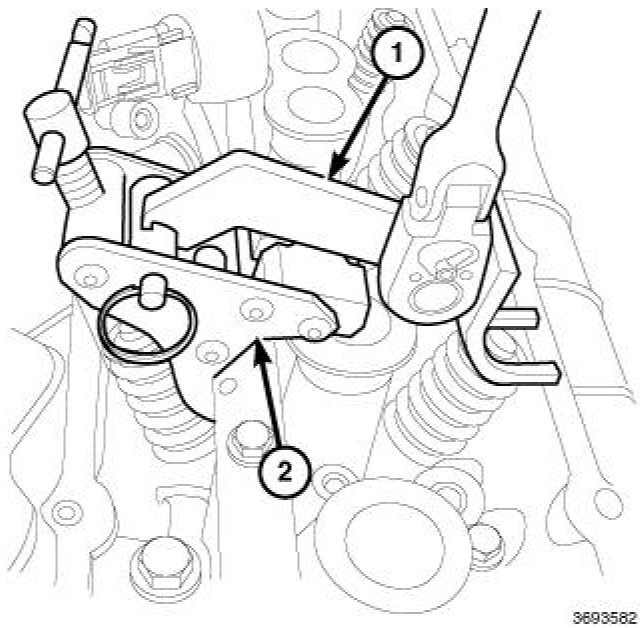


Fig. 91: Valve Spring Tool Adapter
Courtesy of CHRYSLER GROUP, LLC

11. Install the (special tool #9065C, Compressor, Valve Spring) (2) and the (special tool #9065-3, Adapter, Valve Spring Compressor) (1) and remove the exhaust valve retainer locks.
12. Release the valve spring compressor and remove the valve spring.

NOTE: **The valve springs are interchangeable between intake and exhaust.**

13. Remove and discard the valve guide seal.

INSTALLATION

INSTALLATION

NOTE: **All valve springs and seals are installed in the same manner.**

1. Install a new valve guide seal.

NOTE: **The intake spring retainer has a longer free length compared to the exhaust spring retainer.**

2. Install the valve spring.
3. Install the valve spring retainer.

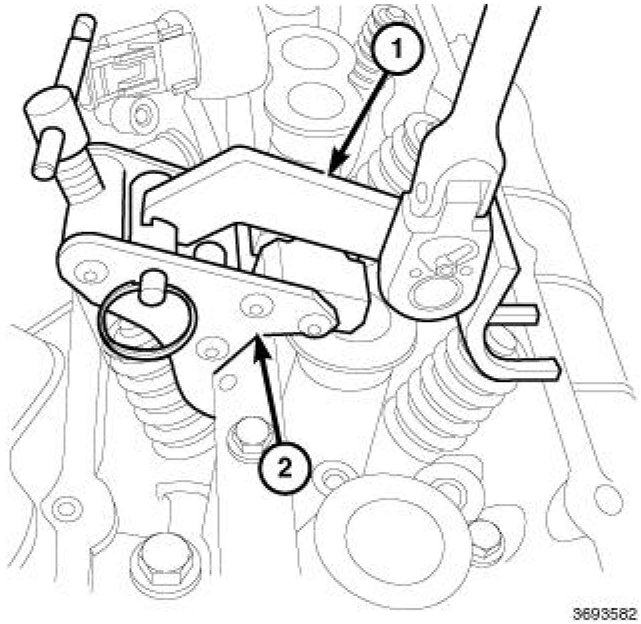


Fig. 92: Valve Spring Tool Adapter
Courtesy of CHRYSLER GROUP, LLC

4. Using the (special tool #9065C, Compressor, Valve Spring) (2) and the (special tool #9065-3, Adapter, Valve Spring Compressor) (1), compress the valve spring and install the valve spring retainer locks.

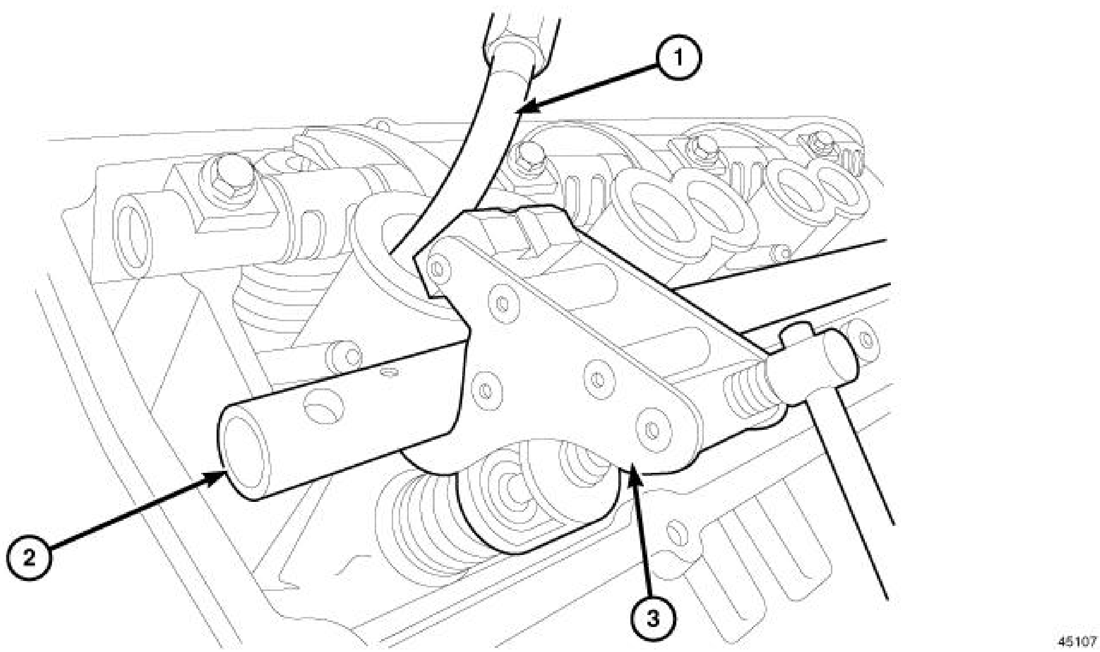


Fig. 93: Valve Spring Removal Tools
Courtesy of CHRYSLER GROUP, LLC

5. Remove the (special tool #9065C, Compressor, Valve Spring) (2) and the (special tool #9065-3, Adapter, Valve Spring Compressor).
6. Release the air charge (1) in the cylinder.

CAUTION: Verify that the pushrods are fully seated into the lifters and the rocker arms. Recheck after rocker arm shaft has been torqued to specification.

7. Install the rocker arm shaft and push rods. Refer to **ROCKER ARM, VALVE, INSTALLATION**.

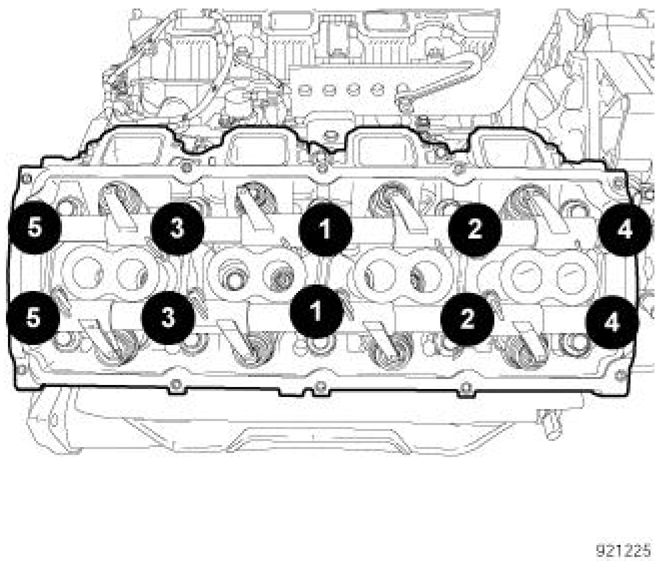
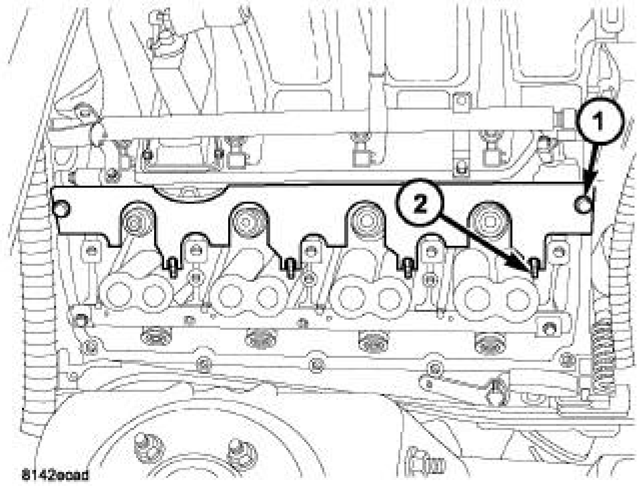


Fig. 94: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

8. Using the sequence shown in illustration, tighten the rocker shaft bolts as follows:
   - Snug to 10 N.m (7 ft. lbs.)
   - Torque to 23 N.m (17 ft. lbs.)
   - Individually loosen by 1/2 turn and re-torque to 23 N.m (17 ft. lbs.)
   - Finally, Rotate 30 degrees



[Fig. 95: Pushrod Retaining Plate]
Courtesy of CHRYSLER GROUP, LLC

9. Remove the (special tool #9070, Retainer, Push Rod) (1).
10. Install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION**.
11. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.
12. Connect the negative battery cable.

VALVES, INTAKE AND EXHAUST

DESCRIPTION

VALVES

Both the intake and exhaust valves are made of steel with full chrome plate on valve stems. The intake valve is 54.3 mm (2.14 in.) diameter and the exhaust valve is 42.0 mm (1.65 in.) diameter. All valves use three bead lock keepers and retainers to retain the springs and promote valve rotation.

VALVE GUIDES

The valve guides are made of powdered metal and are pressed into the cylinder head. The guides are not replaceable or serviceable, and valve guide reaming is not recommended. If the guides are worn beyond acceptable limits, replace the cylinder heads.

STANDARD PROCEDURE

STANDARD PROCEDURE - REFACING

NOTE: **Valve seats that are worn or burned can be reworked, provided that the correct angle and seat width are maintained. Otherwise the cylinder head must be replaced.**

NOTE: When refacing valves and valve seats, it is important that the correct size valve guide pilot be used for reseating stones. A true and complete surface must be obtained.

1. Measure the concentricity of the valve seat using a dial indicator. Total runout should not exceed 0.051 mm (0.002 inch.) total indicator reading.
2. Inspect the valve seat with Prussian blue to determine where the valve contacts the seat. To do this, coat the valve seat with Prussian blue then set the valve in place. Rotate the valve using light pressure. If the blue is transferred to the center of the valve face, contact is satisfactory. If the blue is transferred to the top edge of the valve face, lower the valve seat with a 15 degree stone. If the blue is transferred to the bottom edge of the valve face, raise the valve seat with a 65 degree stone.
3. Refer to the VALVE SEAT, VALVE FACE AND SPRING HEIGHT CHART for the proper valve seat width, valve seat angle, valve face angle and valve spring height.

VALVE SEAT, VALVE FACE AND SPRING HEIGHT CHART

DESCRIPTION	SPECIFICATION	
SEAT WIDTH		
INTAKE	0.94 - 1.04 mm	0.037 - 0.041 in.
EXHAUST	1.16 - 1.26 mm	0.046 - 0.050 in.
SEAT ANGLE		
(INT. AND EXT.)	44.5Ā° - 45Ā°	
FACE ANGLE		
INTAKE	45.5Ā° - 46Ā°	
EXHAUST	45Ā° - 45.5Ā°	
SPRING HEIGHT		
INTAKE	52.1 mm	2.051 in.
EXHAUST	51.2 mm	2.016 in.

4. The valve seat must maintain an angle of 44.5Ā° - 45.0Ā°.
5. The valve face must maintain an angle of 45.5Ā° - 46.0Ā° for the Intake and 45.0Ā° - 45.5Ā° for the exhaust.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL**.
3. Compress the valve springs using the valve spring compressor (special tool #C-3422-D, Compressor, Valve Spring) and adapter (special tool #8464, Adapter, Valve Spring).
4. Remove the valve spring retainer locks, valve spring retainers, valve stem seals and valve springs.
5. Before removing the valves, remove any burrs from the valve spring retainer lock grooves in the valve stems to prevent damage to the valve guides. Identify the valves to ensure installation in their original location.
6. Remove the valves.

INSTALLATION

INSTALLATION

1. Clean the valves thoroughly. Discard burned, warped, and cracked valves.
2. Remove carbon and varnish deposits from inside the valve guides with a reliable guide cleaner.
3. Measure the valve stems for wear. If wear exceeds 0.051 mm (0.002 inch), replace the valve.
4. Coat the valve stems with clean engine oil and insert them into the cylinder head.
5. If the valves or seats have been reground, check valve stem height. If the valve is too long, replace the cylinder head.
6. Install new seals on all valve guides. Install the valve springs and valve spring retainers.

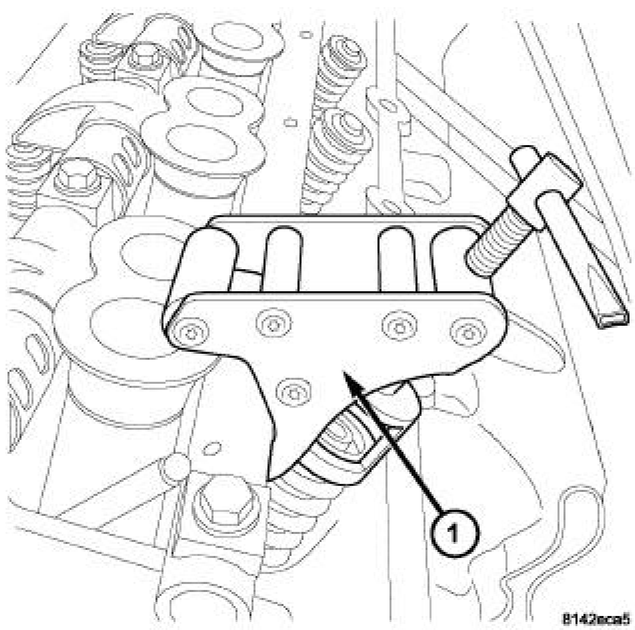


Fig. 96: Exhaust Valve Spring Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

7. Compress the valve springs with the Valve Spring Compressor (special tool #C-3422-D, Compressor, Valve Spring) (1) and Adapter (special tool #8464, Adapter, Valve Spring), install the valve spring retainer locks and release the tool. If the valves and/or seats have been ground, measure the installed height of the springs. Make sure the measurement is taken from the bottom of spring seat in the cylinder head to the bottom surface of valve spring retainer.
8. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION**.
9. Connect the negative battery cable.

ENGINE BLOCK

CLEANING

CLEANING

Thoroughly clean the oil pan and engine block gasket surfaces.

Use compressed air to clean the following:

- Gallery at the oil filter adaptor hole.
- Front and rear oil gallery holes.
- Feed holes for the crankshaft main bearings.

Once the block has been completely cleaned, apply Loctite PST pipe sealant with Teflon 592 to the threads of the front and rear oil gallery plugs. Tighten the 1/4 inch NPT plugs, 3/8 inch NPT plugs and the coolant drain plugs to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

INSPECTION

INSPECTION

ENGINE BLOCK

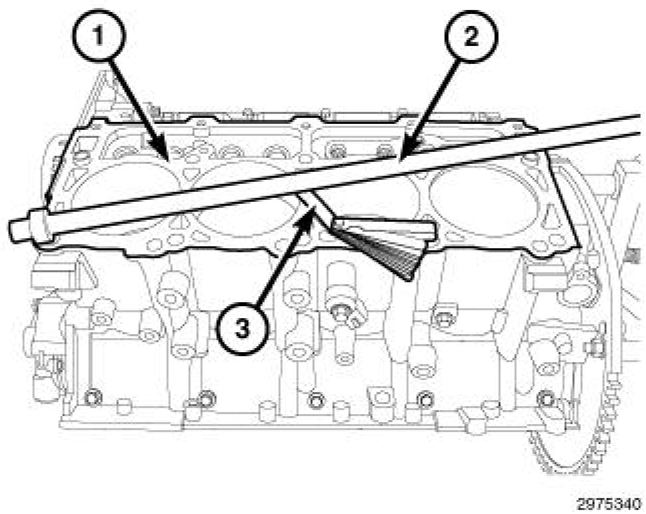


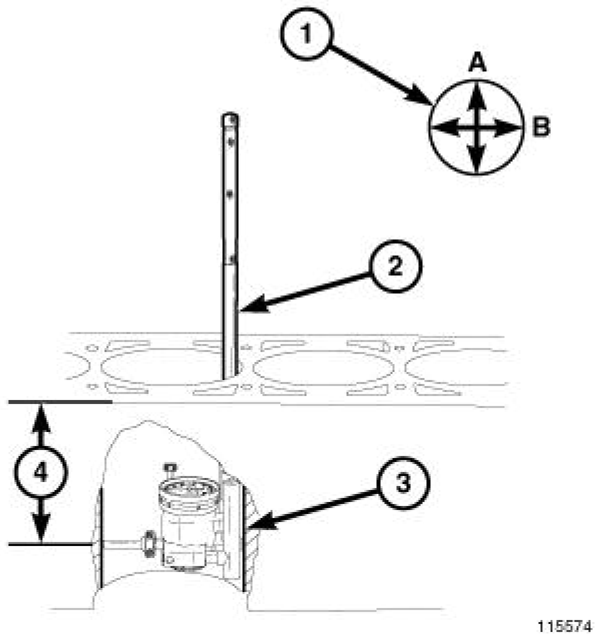
Fig. 97: Checking Engine Block Deck Surface With Precision Straightedge & Feeler Gauge
Courtesy of CHRYSLER GROUP, LLC

1. Clean the engine block thoroughly and check all core hole plugs for evidence of leaking and repair if necessary.
2. Examine the engine block and cylinder bores for cracks or fractures.

NOTE:	**Check the engine block deck surface with a precision straightedge and feeler gauge. The surface irregularities should not exceed 0.09 mm (0.0035 in.). Check the deck surface from one end to the other with the precision straightedge positioned across corners and parallel to the block centerline up and down the deck.**

3. Check the engine block deck (1) surfaces for flatness using a precision straightedge (2) and feeler gauge (3).

CYLINDER BORE



[Fig. 98: Measuring Cylinder Bore Diameter]
Courtesy of CHRYSLER GROUP, LLC

1. Use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to correctly measure the inside diameter of the cylinder bore (3). A cylinder bore gauge capable of reading in 0.003 mm (0.0001 in.) increments is required. If a bore gauge is not available, do not use an inside micrometer.
2. Measure the inside diameter of the cylinder bore at three levels below the top of the bore (4). Start at the top of the bore, perpendicular (across or at 90Â°) to the axis of the crankshaft at point A (1).
3. Repeat the measurement near the middle of the bore then repeat the measurement near the bottom of the bore.
4. Determine the taper by subtracting the smaller diameter from the larger diameter.
5. Rotate the measuring device 90Â° to point B (1) and repeat the three measurements. Verify that the maximum taper is within specifications.
6. Determine out-of-roundness by comparing the difference between each measurement.
7. If the cylinder bore taper does not exceed 0.0127 mm (0.0005 inch) and out-of-roundness does not exceed 0.008 mm (0.0003 inch) then the cylinder bore can be honed. If the cylinder bore taper or out- of-round condition exceeds the maximum limits, replace the engine block.

NOTE: **A slight amount of taper always exists in the cylinder bore after the engine has been in use for a period of time.**

MAIN BEARINGS

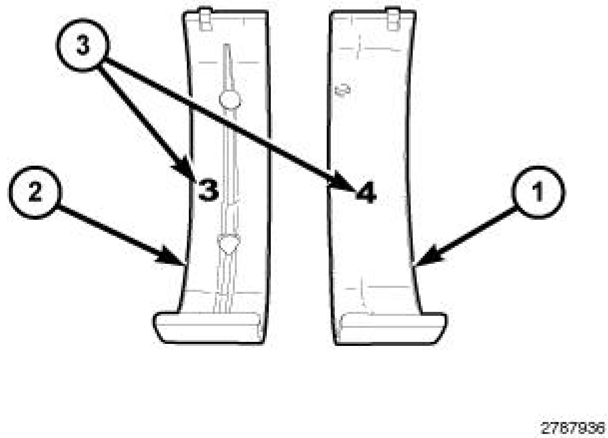


Fig. 99: Main Bearing Inserts
Courtesy of CHRYSLER GROUP, LLC

1. Wipe the main bearing inserts (1, 2) clean.
2. Inspect the inserts for abnormal wear patterns, scoring, grooving, fatigue, pitting and for metal or other foreign material imbedded in the lining.
3. Inspect the back of the inserts for fractures, scrapes or irregular wear patterns.
4. Inspect the insert locking tabs for damage.
5. Inspect the crankshaft thrust washers for scoring, scratches, bluing, discoloration or signs of wear.
6. Replace any bearing that shows abnormal wear.
7. Inspect the main bearing bores for signs of scoring, nicks and burrs.
8. If the engine block main bearing bores show damage, replace the engine block.

BEARING(S), CRANKSHAFT, MAIN

STANDARD PROCEDURE

STANDARD PROCEDURE - CRANKSHAFT MAIN BEARING - FITTING

MAIN BEARING JOURNAL DIAMETER (CRANKSHAFT REMOVED)

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.

Crankshaft removed from the cylinder block.

Clean the oil off the main bearing journal.

Determine the maximum diameter of the journal with a micrometer. Measure at two locations 90Â° apart at each end of the journal.

The maximum allowable taper is 0.008 mm (0.0004 inch). The maximum out-of-round is 0.005 mm (0.0002 inch). Compare the measured diameter with the journal diameter specification (MAIN BEARING SELECTION CHART). Select inserts required to obtain the specified bearing-to-journal clearance.

CRANKSHAFT MAIN BEARING SELECTION

The main bearings are "select fit" to achieve proper oil clearances. For main bearing selection, the crankshaft counterweight has grade identification marks stamped into it. These marks are read from left to right, corresponding with journal number 1, 2, 3, 4 and 5.

NOTE: **Service main bearings are coded. These codes identify what size (color) the bearing is.**

MAIN BEARING SELECTION CHART

GRADE	COLOR	mm	In	FOR USE WITH JOURNAL SIZE
-	**LOWER**	-	-	64.988-64.995 mm
A	**ORANGE**	0.008 mm U/S	(0.0004 in.) U/S	(2.5585- 2.5588 in.)
-	**LOWER**	-	-	64.996-65.004 mm
B	**BLACK**	NOMINAL	NOMINAL	(2.5588-2.5592 in.)
-	**LOWER**	-	-	65.005-65.012 mm
C	**GREEN**	0.008 mm O/S	(0.0004 in.) O/S	(2.5592-2.5595 in.)

INSPECTION

INSPECTION

CAUTION: **If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.**

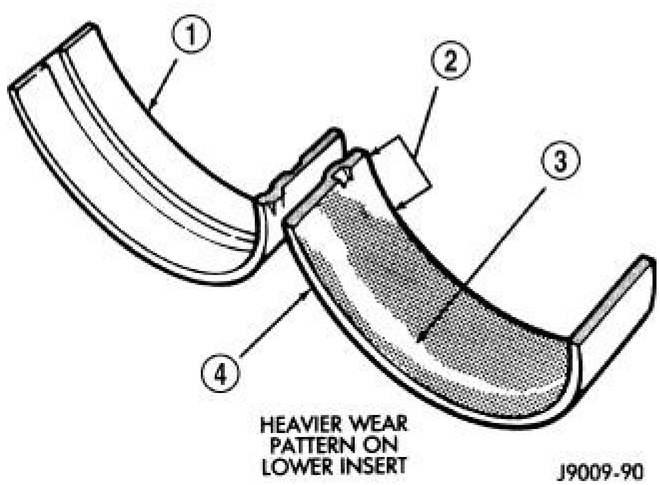


Fig. 100: Main Bearing Wear Patterns
Courtesy of CHRYSLER GROUP, LLC

Wipe the inserts clean and inspect for abnormal wear patterns and for metal or other foreign material imbedded in the lining. Normal main bearing insert wear patterns are illustrated.

NOTE: **If any of the crankshaft journals are scored, the crankshaft must be repaired or replaced.**

Inspect the back of the inserts for fractures, scoring or irregular wear patterns.

Inspect the upper insert locking tabs for damage.

Replace all damaged or worn bearing inserts.

CAMSHAFT, ENGINE

REMOVAL

CAMSHAFT CORE HOLE PLUG

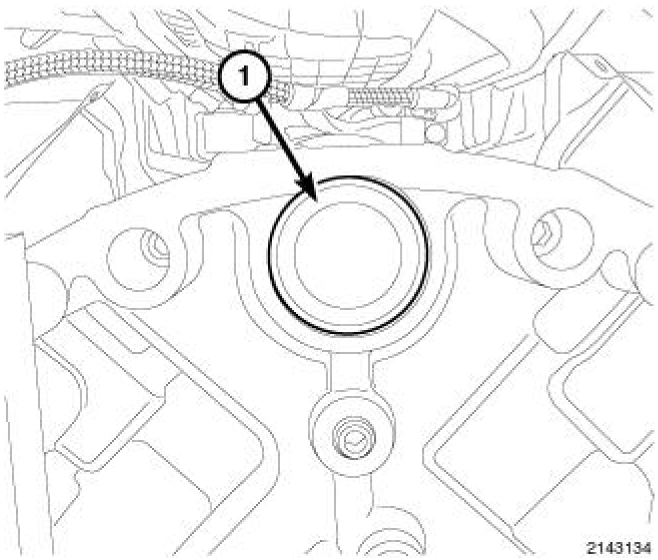


Fig. 101: Camshaft Core Hole Plug
Courtesy of CHRYSLER GROUP, LLC

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Remove the engine from the vehicle. Refer to **REMOVAL**.
3. On automatic transmission models, remove the flexplate. Refer to **FLEXPLATE, REMOVAL**.
4. On manual transmission models, remove the flywheel. Refer to **FLYWHEEL, REMOVAL** .

CAUTION: Do not damage the rear surface of the camshaft or the core plug sealing surface, when removing the core plug.

5. Using a suitable sharp punch, punch a small hole in the camshaft core hole plug (1).
6. Insert a short sheet metal screw into the small hole in the camshaft core hole plug.
7. Using a suitable slide hammer puller, remove the rear camshaft core hole plug.

CAMSHAFT

1. Remove both cylinder heads. Refer to **CYLINDER HEAD, REMOVAL**.

CAUTION: The 6.4L Multi Displacement System (MDS) engine uses both standard roller lifters and deactivating roller lifters. The deactivating roller lifters must be used in cylinders 1, 4, 6, 7. The deactivating lifters can be

identified by the two holes in the side of the lifter body, for the latching pins.

CAUTION: Whenever the camshaft is replaced, all lifters must be replaced. If the lifter and retainer assemblies are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

CAUTION: The lifter and retainer assembly must be installed as a unit.

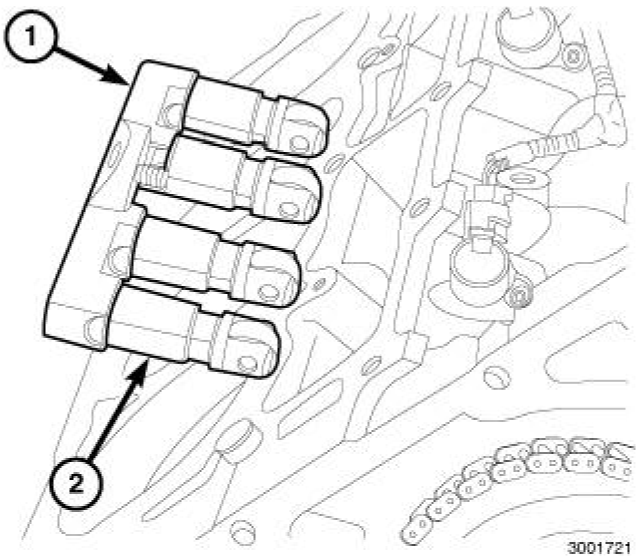


Fig. 102: Identifying Lifters & Retainers
Courtesy of CHRYSLER GROUP, LLC

2. Remove the lifters (2) and retainer (1) as an assembly. Refer to **LIFTER(S), HYDRAULIC, ROLLER, REMOVAL**.
3. Remove the radiator. Refer to **RADIATOR, ENGINE COOLING, REMOVAL** .
4. Remove the A/C condenser. Refer to **CONDENSER, A/C, REMOVAL** .
5. Remove the timing chain and camshaft phaser. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

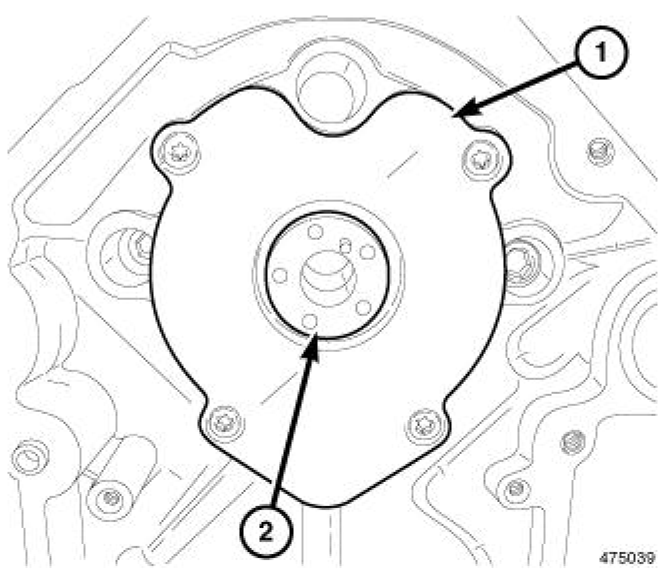


Fig. 103: Camshaft Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

6. Remove the camshaft thrust plate (1).

CAUTION: **Use care when removing the camshaft, do not damage the camshaft bearings with the camshaft lobes.**

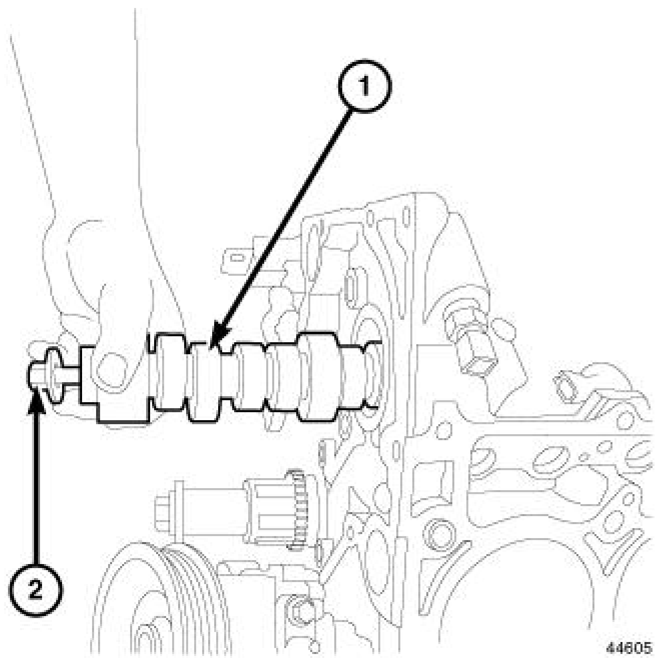


Fig. 104: Removing/Installing Camshaft
Courtesy of CHRYSLER GROUP, LLC

7. Install a long bolt (2) into the front of the camshaft to aid in removal.
8. Remove the camshaft using care not to damage the camshaft bearings with the camshaft lobes (1).

INSPECTION

INSPECTION

NOTE: **The cam bearings are not serviceable. Do not attempt to replace cam bearings for any reason.**

INSTALLATION

CAMSHAFT CORE HOLE PLUG

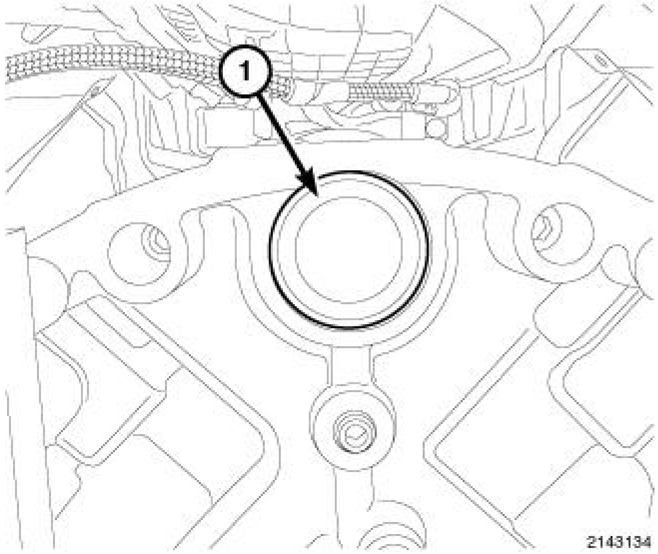


Fig. 105: Camshaft Core Hole Plug
Courtesy of CHRYSLER GROUP, LLC

1. Clean the core hole in the cylinder block.

NOTE: **Do not apply adhesive to the new camshaft core hole plug. A new plug has adhesive pre-applied.**

2. Install a new camshaft core hole plug (1) located at the rear of cylinder block, using a suitable flat faced tool. The plug must be fully seated on the cylinder block shoulder.
3. On manual transmission models, install the flywheel. Refer to **FLYWHEEL, INSTALLATION** .
4. On automatic transmission models, install the flexplate. Refer to **FLEXPLATE, INSTALLATION**.
5. Install the engine. Refer to **INSTALLATION**.

CAMSHAFT

CAUTION: **The 6.4L engine uses a unique camshaft for use with the Multi Displacement System (MDS). When installing a new camshaft, the replacement camshaft must be compatible with MDS.**

CAUTION: **Use care when installing the camshaft into the engine block, do not damage the camshaft bearings with the camshaft lobes.**

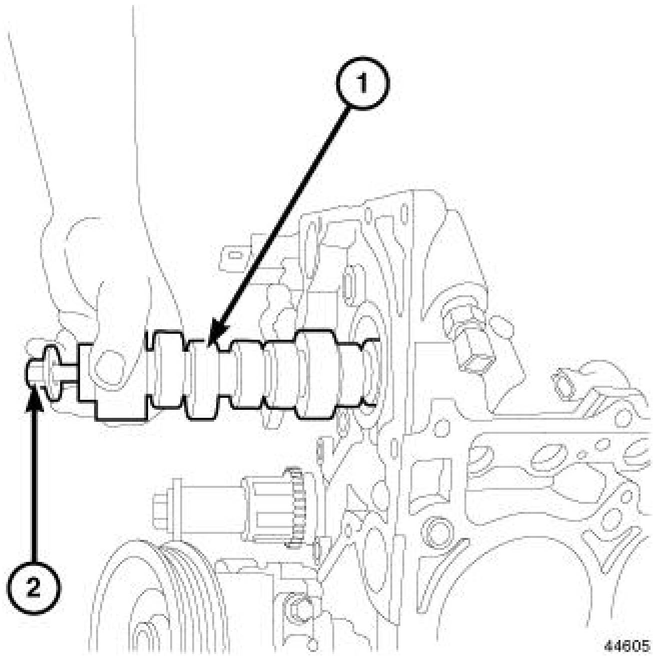


Fig. 106: Removing/Installing Camshaft
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the camshaft lobes (1) and the camshaft bearing journals with clean engine oil.
2. Install a long bolt (2) into the front of the camshaft to aid in the installation, carefully install the camshaft into the engine block.

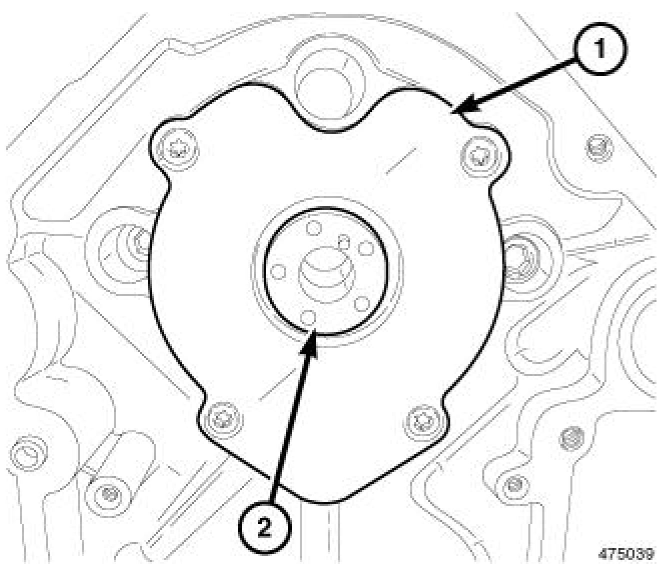


Fig. 107: Camshaft Thrust Plate
Courtesy of CHRYSLER GROUP, LLC

3. Install the camshaft thrust plate (1) and tighten retaining bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Using a suitable dial indicator, measure the camshaft end play. Refer to **ENGINE SPECIFICATIONS**. If not within specification, install a new thrust plate.
5. Install the timing chain and camshaft phaser. Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION**.

6. Install the A/C condenser. Refer to **CONDENSER, A/C, INSTALLATION** .
7. Install the radiator. Refer to **RADIATOR, ENGINE COOLING, INSTALLATION** .

CAUTION: **The 6.4L Multi Displacement System (MDS) engine uses both standard roller lifters and deactivating roller lifters. The deactivating roller lifters must be used in cylinders 1, 4, 6, 7. The deactivating lifters can be identified by the two holes in the side of the lifter body, for the latching pins.**

CAUTION: **Whenever the camshaft is replaced, all lifters must be replaced. If the lifter and retainer assemblies are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.**

CAUTION: **The lifter and retainer assembly must be installed as a unit.**

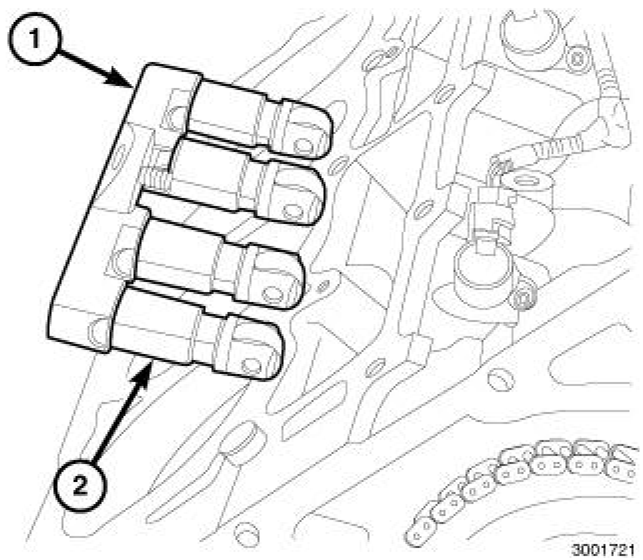


Fig. 108: Identifying Lifters & Retainers
Courtesy of CHRYSLER GROUP, LLC

8. Install the lifters (2) and retainer (1) as an assembly into their original location. Refer to **LIFTER(S), HYDRAULIC, ROLLER, INSTALLATION**.
9. Install both cylinder heads. Refer to **CYLINDER HEAD, INSTALLATION**.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

CRANKSHAFT

REMOVAL

REMOVAL

CAUTION: **If the engine encounters a catastrophic failure, the engine oil cooler and lines**

must be replaced or damage to the new engine and/or components could result.

1. Remove the engine. Refer to **REMOVAL**.
2. Secure the engine onto a suitable engine stand.
3. Remove the crankshaft rear oil seal retainer. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL**.
4. Remove the oil pan and the oil pump pickup tube. Refer to **PAN, OIL, REMOVAL**.
5. Remove the timing chain, camshaft phaser and crankshaft sprocket. Refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

CAUTION: Do not use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur.

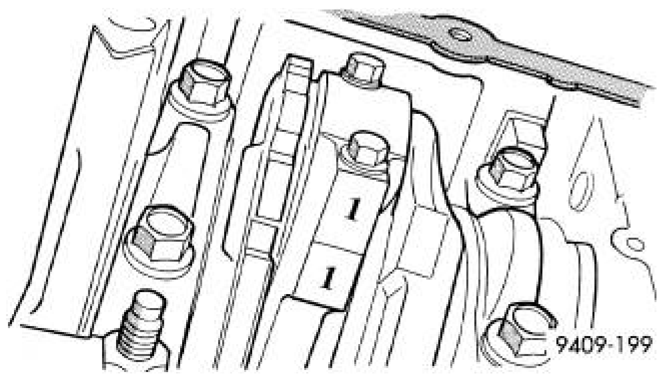


Fig. 109: Identifying Mark On Connecting Rod And Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: Connecting rods and bearing caps are not interchangeable and should be marked before removal to ensure correct reassembly.

6. Mark the connecting rod and bearing cap location using a permanent ink marker or scribe tool.
7. Remove the rod bearing caps and bearings.

CAUTION: Do not use a number stamp or a punch to mark main bearing caps as damage to bearing caps and/or bearings could occur.

NOTE: Main bearing caps are not interchangeable and should be marked before removal to ensure correct reassembly.

8. Mark the main bearing caps using a permanent ink marker or scribe tool.

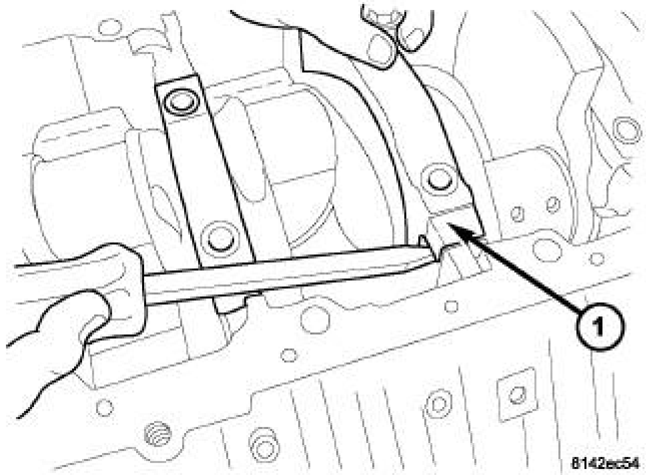


Fig. 110: Main Bearing Cap Removal
Courtesy of CHRYSLER GROUP, LLC

9. Remove the main bearing cap cross-bolts.
10. Remove the main bearing cap bolts.
11. Remove main bearing caps (1) and bearings one at a time.

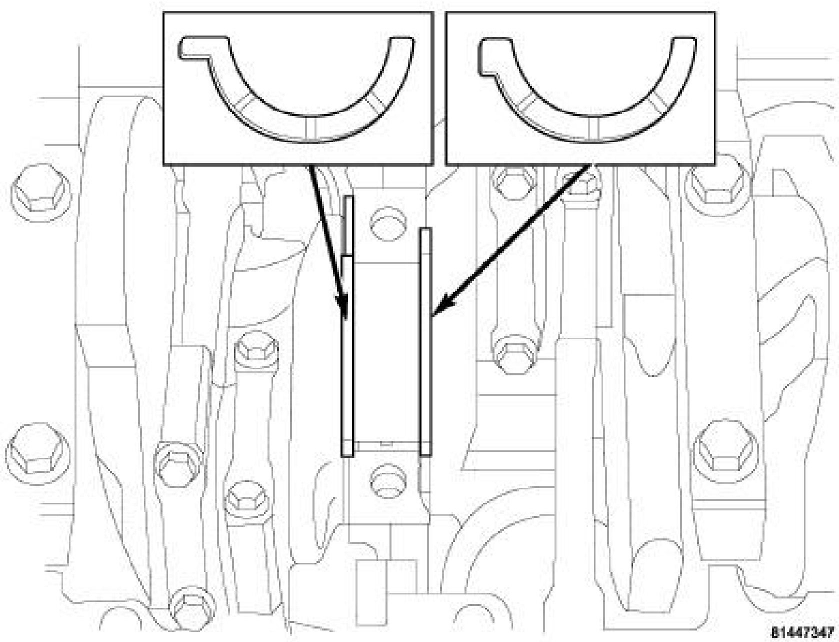
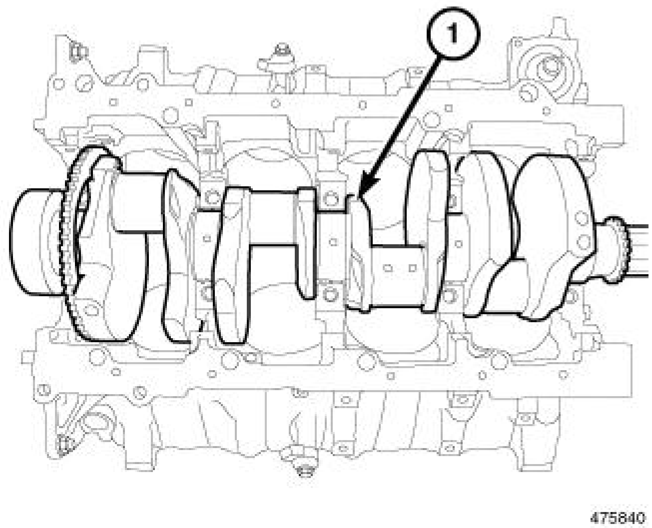


Fig. 111: Identifying Thrust Washer Locations
Courtesy of CHRYSLER GROUP, LLC

12. Remove the thrust bearings.



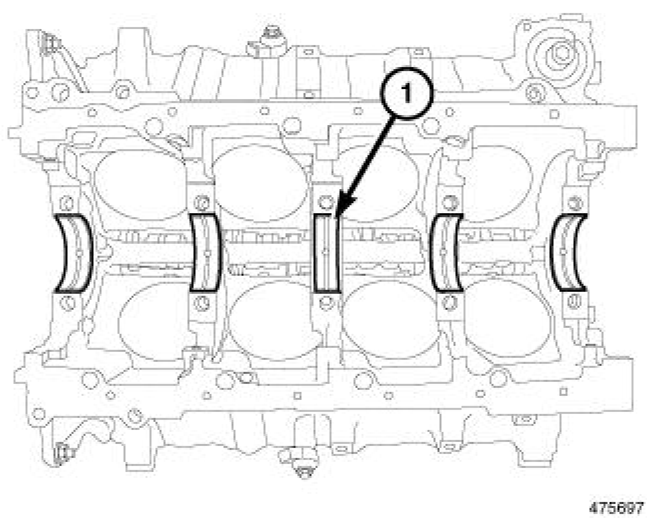
[Fig. 112: Crankshaft](#)
Courtesy of CHRYSLER GROUP, LLC

13. Remove the crankshaft (1) from the engine block.

INSTALLATION

INSTALLATION

CAUTION: **If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.**



[Fig. 113: Main Bearings](#)
Courtesy of CHRYSLER GROUP, LLC

1. Select the proper main bearings (1). Refer to **STANDARD PROCEDURE**.
2. Lubricate the main bearing shells with clean engine oil.
3. Install the main bearings into the engine block.

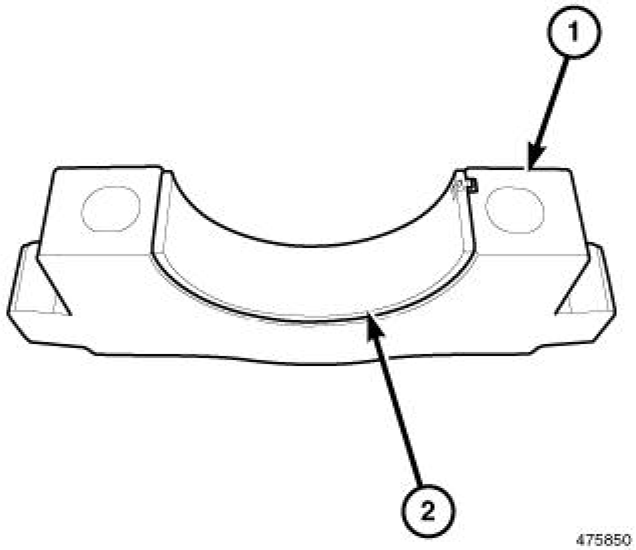


Fig. 114: Main Bearing Shells In The Bearing Caps
Courtesy of CHRYSLER GROUP, LLC

4. Install the main bearing shells (2) into the bearing caps (1).

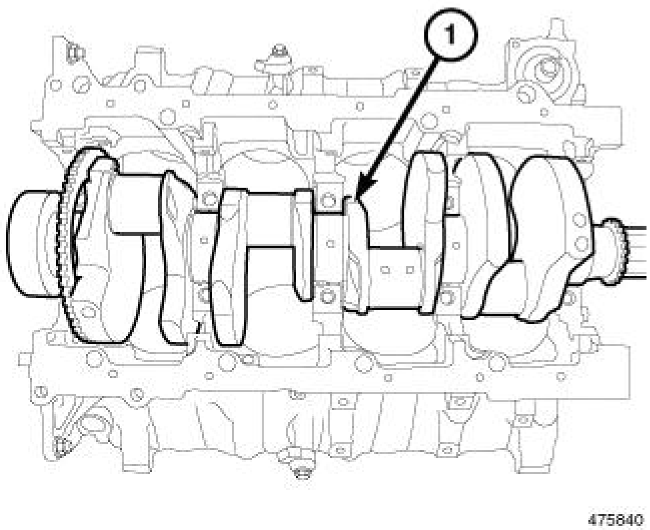
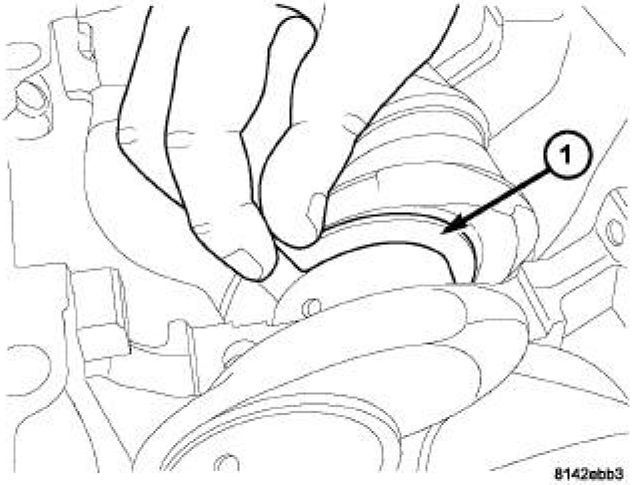


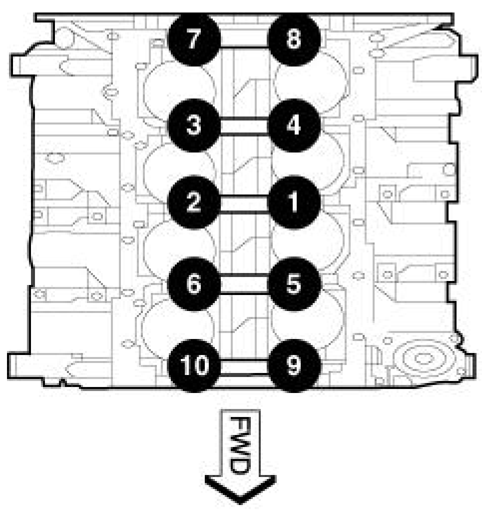
Fig. 115: Crankshaft
Courtesy of CHRYSLER GROUP, LLC

5. Position the crankshaft (1) into the engine block.



[Fig. 116: Thrust Washer Installation](#)
Courtesy of CHRYSLER GROUP, LLC

6. Lubricate and install the thrust bearings (1).
7. Install all main bearing caps in the location as noted during removal making sure the arrow faces forward.



[Fig. 117: Main Bearing Cap Bolt Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

8. Clean and oil all main cap bolts and install finger tight.
9. Using the sequence shown in illustration, tighten the main bearing cap bolts to 13 N.m (10 ft. lbs.).
10. Again, using the sequence shown in illustration, tighten the main bearing cap bolts to 28 N.m (21 ft. lbs.).
11. Using the sequence shown in illustration, rotate the main bearing cap bolts an additional 90Â°.

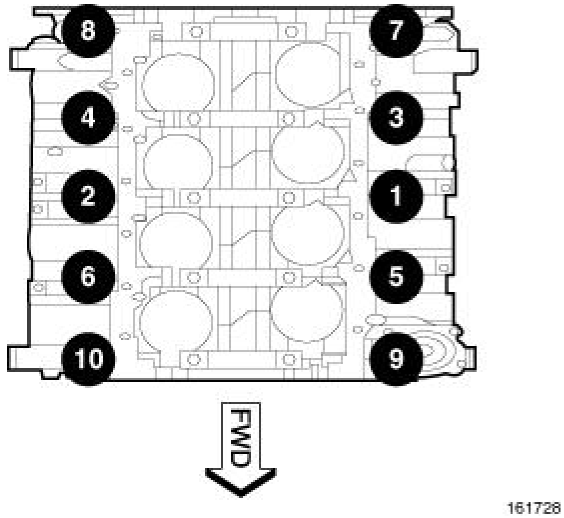


Fig. 118: Crossbolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The main bearing cap cross-bolts are torqued after the final torque of the main cap bolts.**

12. Install the cross-bolts finger tight.
13. Using the sequence shown in illustration, tighten the cross-bolts to 34 N.m (25 ft. lbs.).
14. Again, using the sequence shown in illustration, repeat the cross-bolt tightening procedure using the same torque.
15. Measure the crankshaft end play. Refer to **STANDARD PROCEDURE**.

CAUTION: **The connecting rod bolts must not be reused. Always replace the connecting rod bolts whenever they are loosened or removed.**

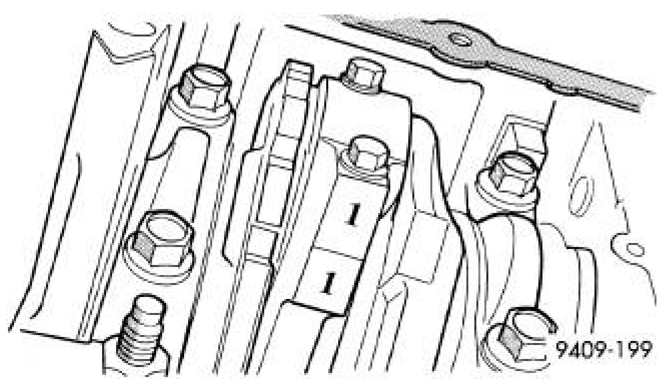


Fig. 119: Identifying Mark On Connecting Rod And Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

16. Wipe the connecting rod caps clean and install the rod bearings.
17. Lubricate the bearing surfaces with clean engine oil and install the bearings and connecting rod caps onto the connecting rod journals in the same location as noted during removal.
18. Install the **NEW** connecting rod bolts finger tight.
19. Tighten the connecting rod bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

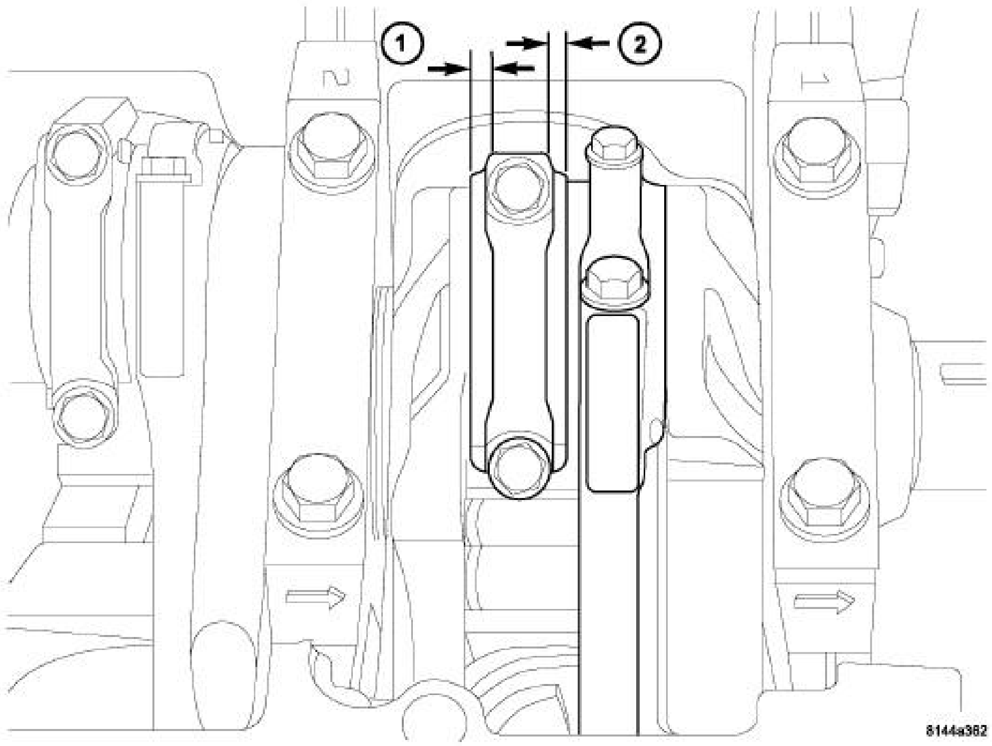


Fig. 120: Identifying Connecting Rod Proper Installation
Courtesy of CHRYSLER GROUP, LLC

20. If required, measure the connecting rod side clearance (1, 2). Refer to **ENGINE SPECIFICATIONS**.
21. Install the timing chain, camshaft phaser and crankshaft sprocket. Refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION**.
22. Install the crankshaft rear oil seal retainer. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, INSTALLATION**.
23. Install the oil pump pickup tube and oil pan. Refer to **PAN, OIL, INSTALLATION**.
24. Install the engine. Refer to **INSTALLATION**.
25. Start the engine and check for leaks.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system. For example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

DAMPER, VIBRATION

DESCRIPTION

DESCRIPTION

The crankshaft damper is used to control the resonance that is produced by the engine. The Noise, Vibration, and Harshness (NVH) created from the crankshaft can be controlled by dissipating the torque energy through the damper.

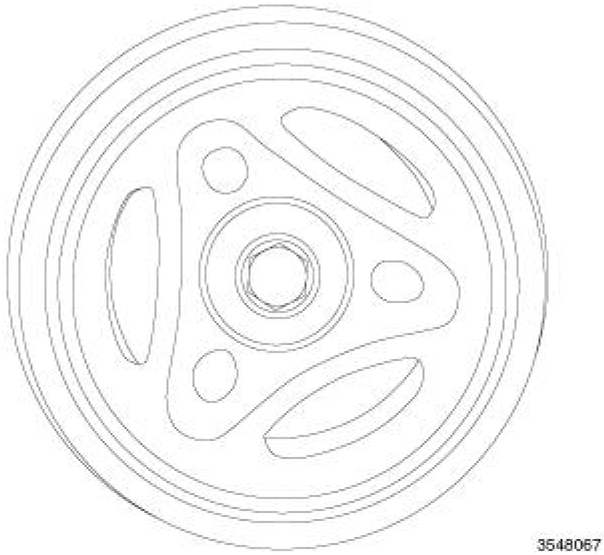


Fig. 121: Crankshaft Damper & Harden Steel Bolt
Courtesy of CHRYSLER GROUP, LLC

The crankshaft damper is held to the crankshaft by means of a harden steel bolt. The damper is pressed onto a specific machined surface of the crankshaft.

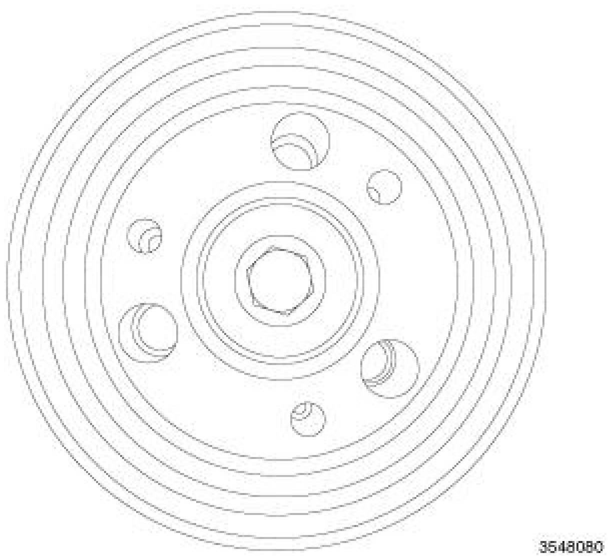


Fig. 122: HEMIÃ® Engine Crankshaft Damper
Courtesy of CHRYSLER GROUP, LLC

The HEMIÃ® Engines incorporate various crankshaft vibration dampers depending on the engine application.

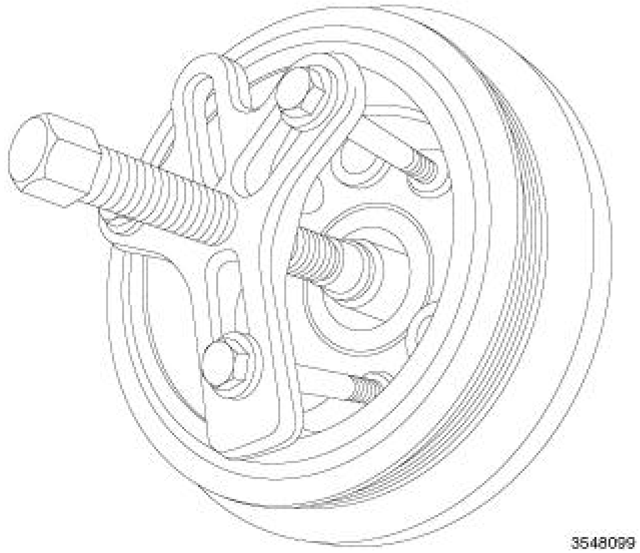


Fig. 123: Removing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

Finding the proper puller for the application will ensure no damage will come to the damper. The flange puller is used by installing 3 bolts into the pre-tapped holes in the damper.

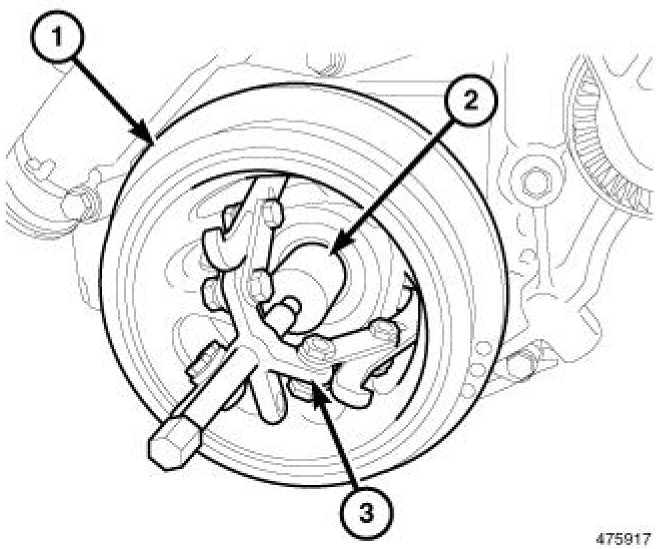


Fig. 124: Removing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

Some pulleys that do not have bolt holes can be removed with a three jaw style (special tool #1023, Puller).

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

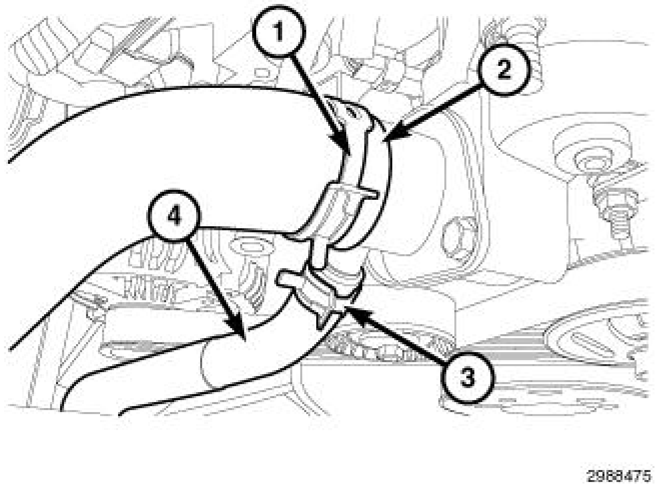


Fig. 125: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

3. Remove the upper radiator hose clamps (1) and remove the upper radiator hose (2).
4. Remove the oil cooler hose clamp (3) and remove oil cooler hose (4) and position aside.
5. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL** .
6. Remove the cooling fan assembly. Refer to **FAN, COOLING, REMOVAL** .

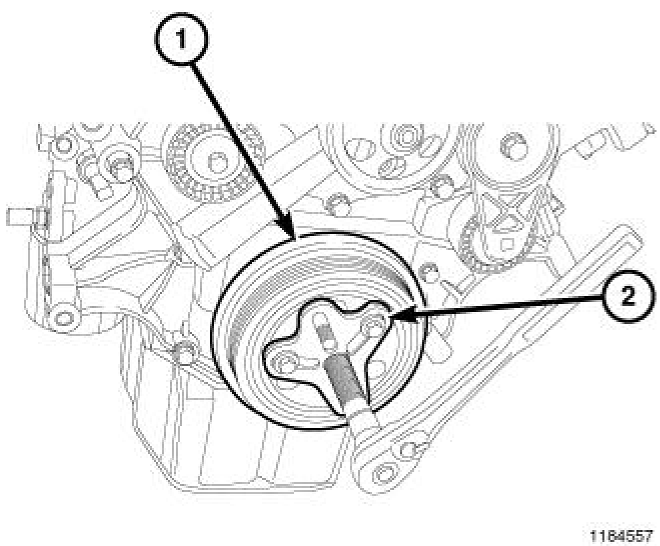


Fig. 126: Vibration Damper & Bolt Grip Puller
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When installing the puller tool, ensure the bolts are fully threaded through the entire crankshaft damper.**

7. Remove the vibration damper bolt and discard.
8. Install the puller tool (2) making sure the bolts are fully threaded through the entire crankshaft damper.
9. Remove the crankshaft damper (1).

INSTALLATION

INSTALLATION

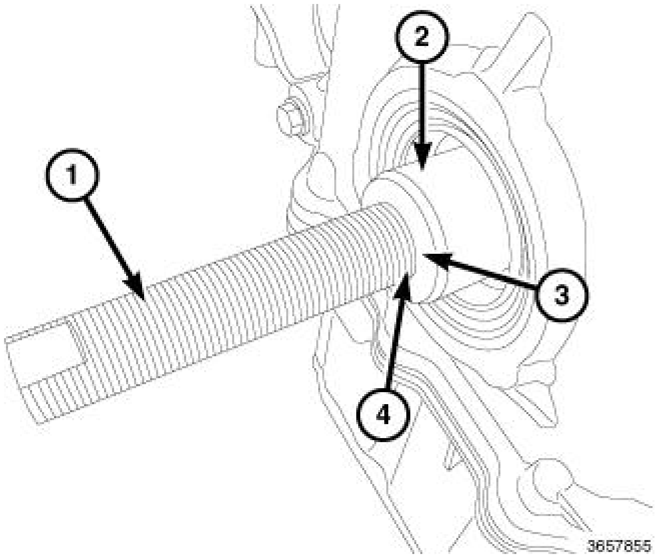


Fig. 127: Installing Vibration Damper Tool Onto Crankshaft
Courtesy of CHRYSLER GROUP, LLC

1. Using (special tool #10387, Installer, Vibration Damper), install the threaded rod (1) onto the crankshaft (2).
2. Tighten the threaded rod (4) until it is seated to the face (3) of the crankshaft.

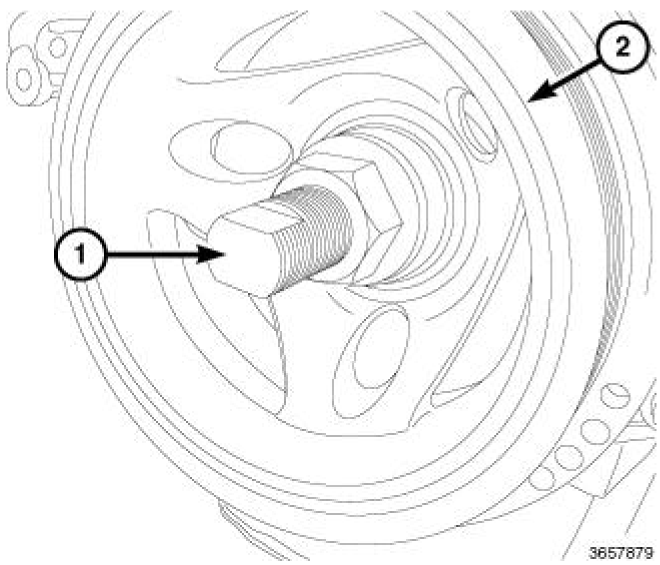


Fig. 128: Installing Vibration Damper
Courtesy of CHRYSLER GROUP, LLC

3. Position the damper (2) on the crankshaft.
4. Install the press washer, bearing, washer, and the press nut onto the threaded rod.
5. Using Damper Installer (1) and a deep well socket, press the damper onto the crankshaft till seated.

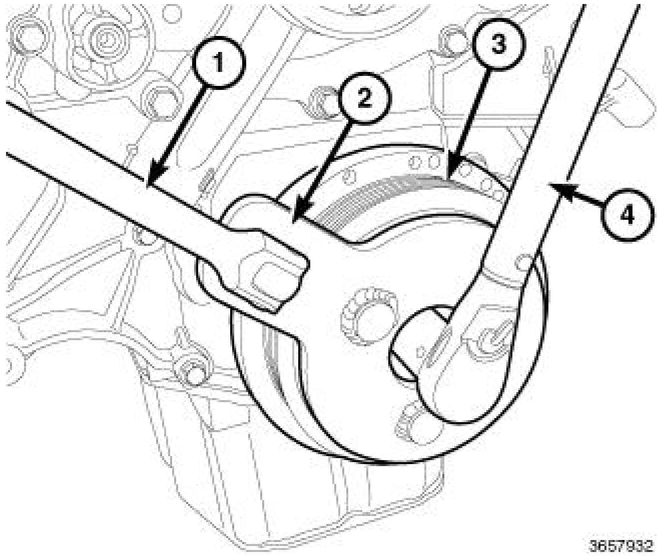


Fig. 129: Installing Vibration Damper Onto Vibration Pulley
Courtesy of CHRYSLER GROUP, LLC

6. Install a **new** vibration damper bolt.
7. Position the (special tool #10386, Holder, Vibration Damper) (2), onto the vibration damper pulley (3).
8. Tighten the bolt to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
9. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
10. Install the cooling fan. Refer to **FAN, COOLING, INSTALLATION** .

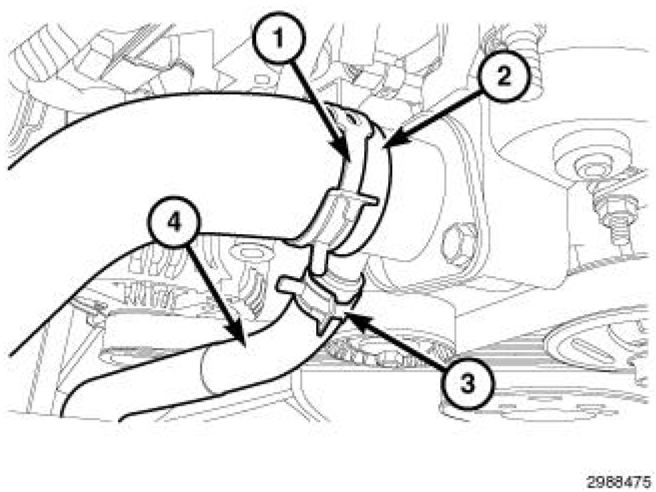


Fig. 130: Upper Radiator Hose, Clamp, Oil Cooler Return Line Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

11. Install the oil cooler hose (4) and clamp (3).
12. Install the upper radiator hose (2) and clamp (1).
13. Refill the cooling system. Refer to **STANDARD PROCEDURE** .
14. Connect the negative battery cable.

FLEXPLATE

REMOVAL

REMOVAL

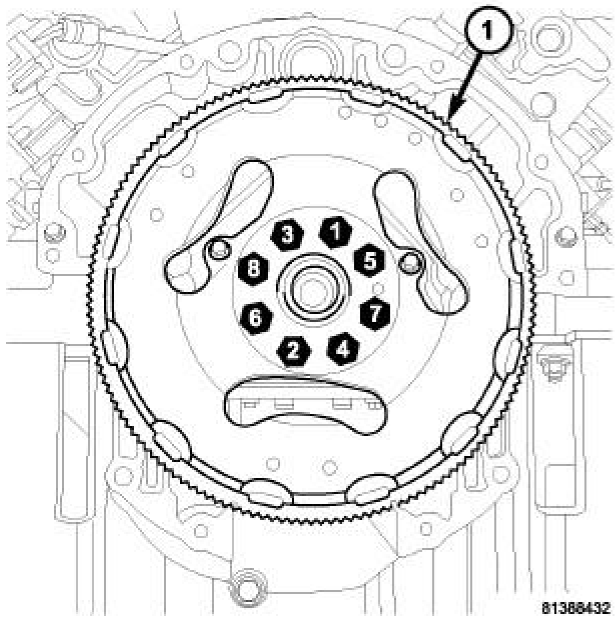


Fig. 131: Flex Plate Bolt Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Remove the transmission. Refer to **REMOVAL** .
2. Using the sequence shown in illustration, remove the flexplate (1) retaining bolts.
3. Remove the flexplate.

INSTALLATION

INSTALLATION

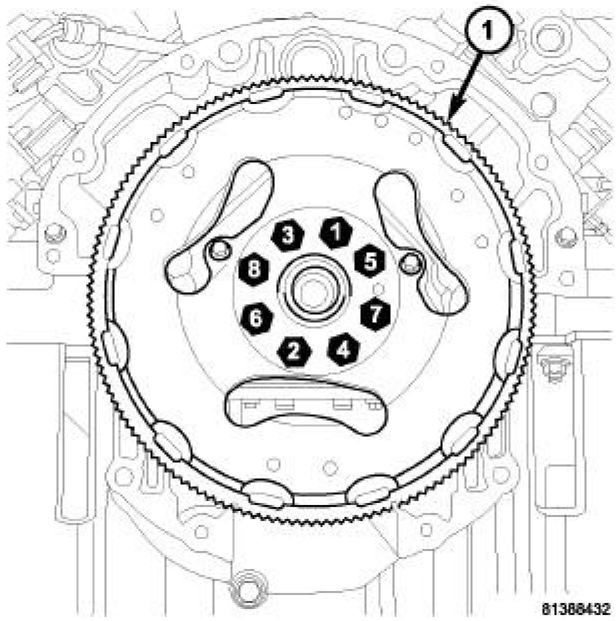


Fig. 132: Flex Plate Bolt Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

1. Position the flexplate (1) onto the crankshaft and install the bolts finger tight.
2. Using the sequence shown in illustration, tighten the flexplate retaining bolts to the proper specification. Refer to **ENGINE SPECIFICATIONS**.
3. Install the transmission. Refer to **INSTALLATION** .

LIFTER(S), HYDRAULIC, ROLLER

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HYDRAULIC ROLLER LIFTERS

Before disassembling any part of the engine to correct lifter noise, check the oil pressure. If the vehicle has no oil pressure gauge, install a reliable gauge at the pressure sending-unit. The pressure should be between 207-552 kPa (30-70 psi) at 3, 000 RPM.

Check the oil level after the engine reaches normal operating temperature. Allow 5 minutes to stabilize oil level, check dipstick. The oil level in the pan should never be above the FULL mark or below the ADD OIL mark on the dipstick. Either of these two conditions could be responsible for noisy lifters.

OIL LEVEL

HIGH

If oil level is above the FULL mark, it is possible for the connecting rods to dip into the oil. With the engine running, this condition could create foam in the oil pan. Foam in oil pan would be fed to the hydraulic lifters by the oil pump causing them to lose length and allow valves to seat noisily.

LOW

Low oil level may allow oil pump to take in air. When air is fed to the lifters, they lose length, which allows valves to seat noisily. Any leaks on intake side of oil pump through which air can be drawn will create the same lifter action. Check the lubrication system from the intake strainer to the pump cover, including the relief valve retainer cap. When lifter noise is due to aeration, it may be intermittent or constant, and usually more than one lifter will be noisy. When oil level and leaks have been corrected, operate the engine at fast idle. Run engine for a sufficient time to allow all of the air inside the lifters to be bled out.

LIFTER NOISE DIAGNOSIS

1. To determine source of lifter noise, crank the engine with cylinder head covers removed.
2. Feel each valve spring or rocker arm to detect noisy lifter. The noisy lifter will cause the affected spring and/or rocker arm to vibrate or feel rough in operation.

NOTE: **Worn valve guides or cocked springs are sometimes mistaken for noisy lifters. If such is the case, noise may be dampened by applying side thrust on the valve spring. If noise is not noticeably reduced, it can be assumed the noise is in the lifter. Inspect the rocker arm push rod sockets and push rod ends for wear.**

3. Valve lifter noise ranges from light noise to a heavy click. A light noise is usually caused by excessive leak-down around the unit plunger or by the plunger partially sticking in the lifter body cylinder. The lifter should be replaced. A heavy click is caused by a lifter check valve not seating or by foreign particles wedged between the plunger and the lifter body. This will cause the plunger to stick in the down position. This heavy click will be accompanied by excessive clearance between the valve stem and rocker arm as the valve closes. In either case, lifter assembly should be removed for inspection and cleaning.
4. The valve train generates a noise very much like a light lifter noise during normal operation. Care must be taken to ensure that lifters are making the noise. If more than one lifter seems to be noisy, it's probably not the lifters.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL**.

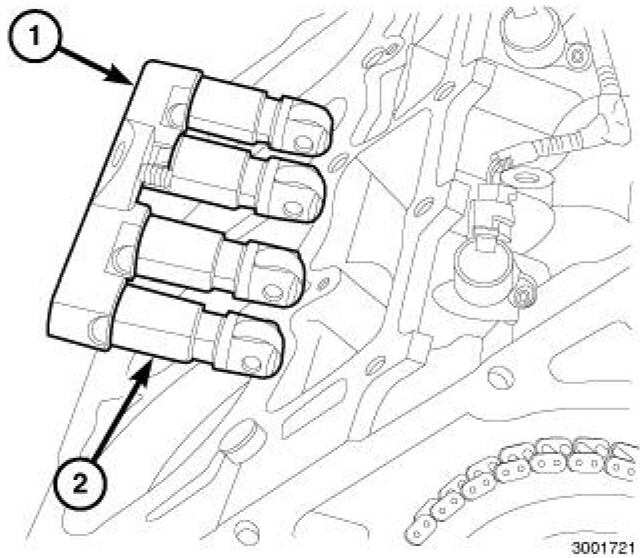


Fig. 133: Identifying Lifters & Retainers
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the lifter and retainer assembly are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

CAUTION: The lifter and retainer assembly must be installed as a unit.

3. Remove the lifters (2) and retainer (1) as an assembly.
4. Check the camshaft lobes for abnormal wear.

INSTALLATION

INSTALLATION

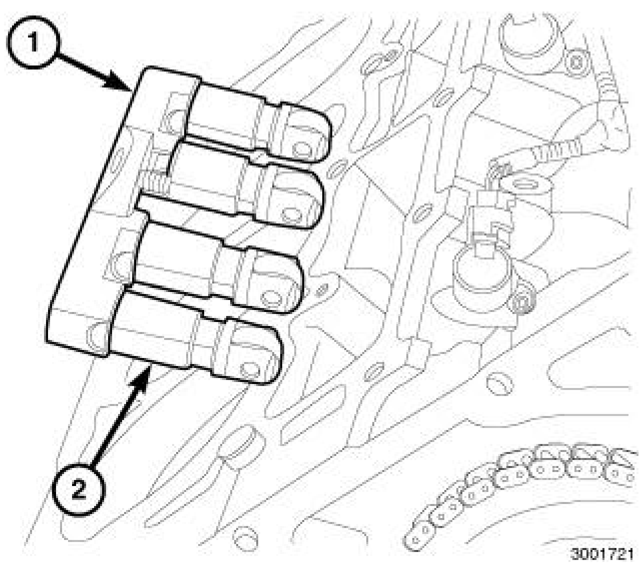


Fig. 134: Identifying Lifters & Retainers
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the lifters (2) and retainer (1) assembly with clean engine oil.

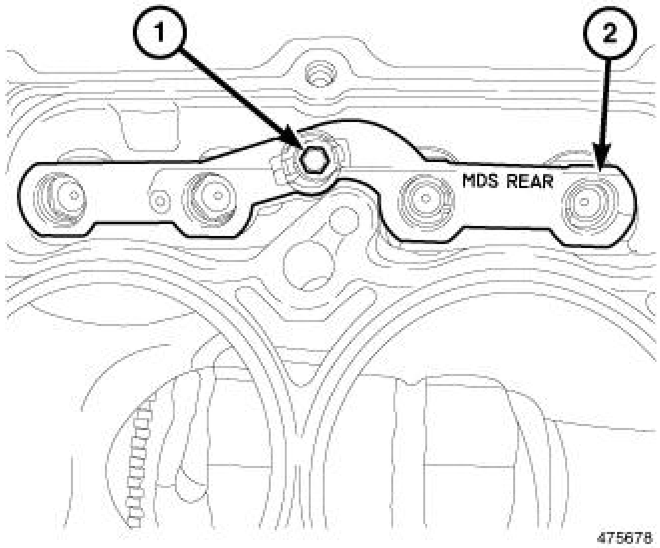


Fig. 135: Rear MDS Lifter Assembly
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the lifter and retainer assembly are to be reused, identify the lifters to ensure installation in their original location or engine damage could result.

CAUTION: The lifter and retainer must be installed as an assembly.

2. Install the lifters (2) and retainer (1) as an assembly into their original location.
3. Tighten the lifter retainer bolt (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION**.
5. Connect the negative battery cable.

CAUTION: To prevent damage to valve assemblies, do not run the engine above fast idle until all hydraulic lifters have filled with oil and have become quiet.

RETAINER, CRANKSHAFT REAR OIL SEAL

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - REAR SEAL AREA LEAKS

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and is serviced as an assembly.

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Raise and support the vehicle.
2. Remove the transmission inspection/torque converter access cover.
3. Inspect the rear of the cylinder block for evidence of oil leakage and note the following:
    - Circular spray pattern generally indicates seal leakage or crankshaft damage.

- Where leakage tends to run straight down, possible causes are a porous block, camshaft bore cup plugs, oil gallery pipe plugs, oil filter runoff and main bearing cap to cylinder block mating surfaces. See appropriate Engine component for proper repair procedures of these items.

4. If no leaks are detected, pressurize the crankcase as outlined in the **AIR LEAK DETECTION TEST METHOD**.

CAUTION: Do not exceed 20.6 kPa (3 psi).

5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out using an emery cloth.

CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks or scratches. The crankshaft seal flange is specially machined to complement the function of the rear oil seal.

6. For bubbles that remain steady with shaft rotation, no further inspection can be done. Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL**.

REMOVAL

REMOVAL

NOTE: The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.

NOTE: The crankshaft rear oil seal retainer can not be reused after removal.

NOTE: This procedure can be performed in vehicle.

1. Disconnect the negative battery cable.
2. Remove the flexplate or flywheel. Refer to **FLEXPLATE, REMOVAL**.
3. Remove the oil pan. Refer to **PAN, OIL, REMOVAL**.

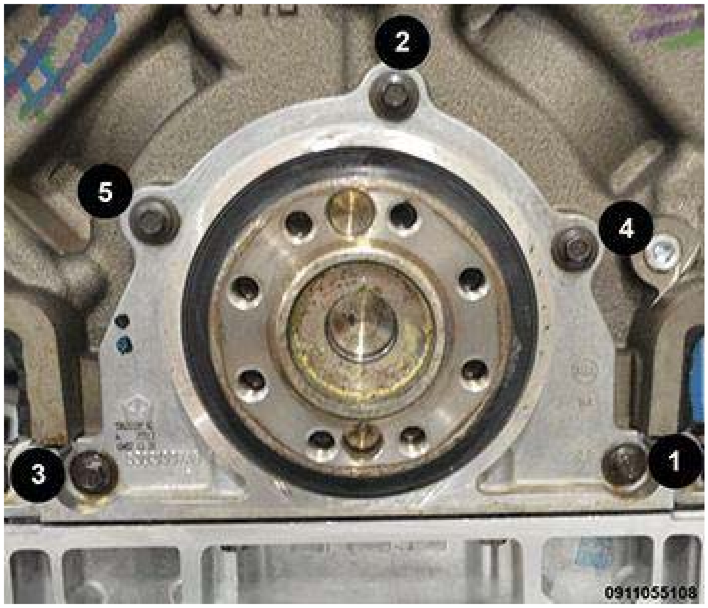


Fig. 136: Rear Oil Seal Retainer Mounting Bolts Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the sequence shown in illustration, remove the rear oil seal retainer mounting bolts.
5. Remove and discard the rear oil seal retainer.

INSTALLATION

INSTALLATION

NOTE: **The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.**

NOTE: **The crankshaft rear oil seal retainer can not be reused after removal.**

1. Thoroughly clean all gasket residue from the engine block.
2. Position the gasket onto the new crankshaft rear oil seal retainer.
3. Position the crankshaft rear oil seal retainer onto the engine block.

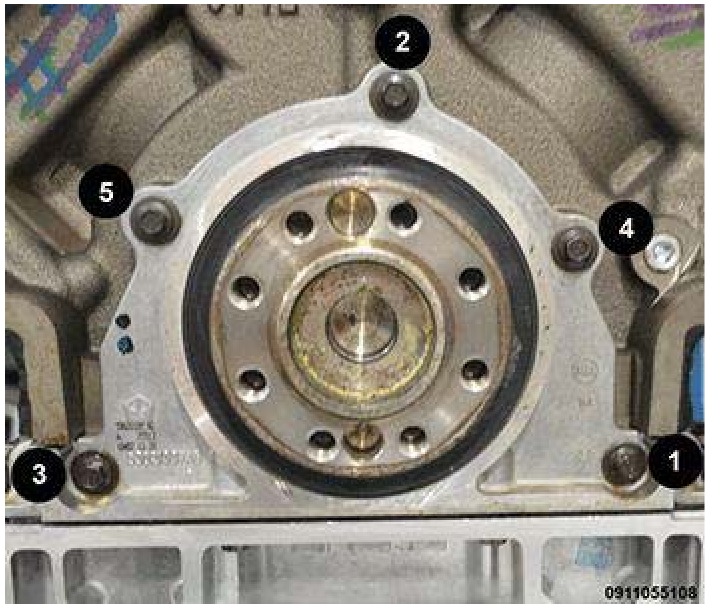


Fig. 137: Rear Oil Seal Retainer Mounting Bolts Removal/Installation Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the sequence shown in illustration, install the crankshaft rear oil seal retainer mounting bolts and tighten to the proper specification. Refer to **ENGINE SPECIFICATIONS**.
5. Install the oil pan. Refer to **PAN, OIL, INSTALLATION**.
6. Install the flexplate or flywheel. Refer to **FLEXPLATE, INSTALLATION**.
7. Install a NEW oil filter and fill the crankcase with the specified type and amount of engine oil. Refer to **STANDARD PROCEDURE**.
8. Connect the negative battery cable.
9. Start the engine and check for leaks.

RING(S), PISTON

STANDARD PROCEDURE

STANDARD PROCEDURE

PISTON RING FITTING

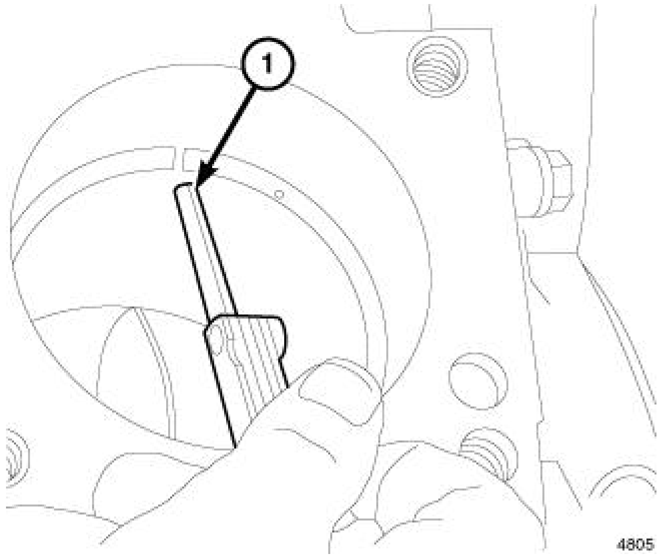


Fig. 138: Using Feeler Gauge To Check Ring End Gap
Courtesy of CHRYSLER GROUP, LLC

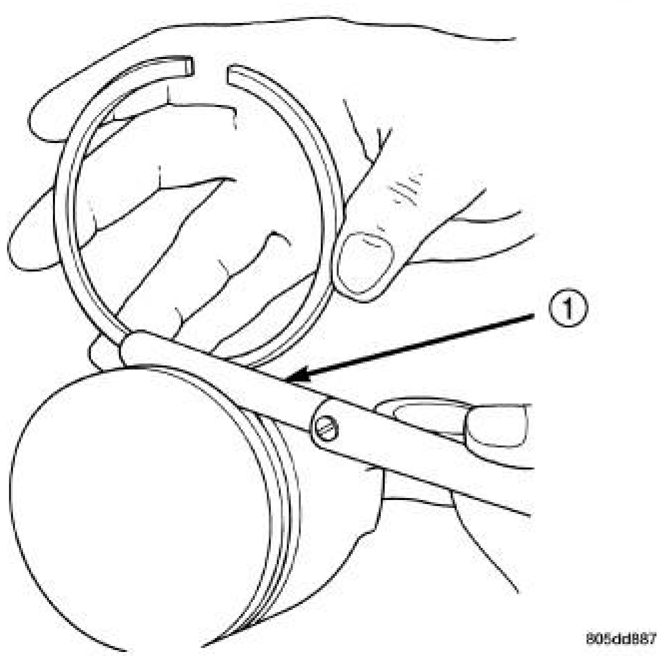
CAUTION: Before reinstalling used piston rings or installing new piston rings, the piston ring clearances must be checked or engine damage may result.

1. Wipe the cylinder bore clean.
2. Insert the piston ring into the cylinder bore.

NOTE: The piston ring gap measurement must be made with the piston ring positioned at least 12 mm (0.50 inch) from bottom of cylinder bore.

3. Using a piston, make sure that the piston ring is squared in the cylinder bore. Slide the piston ring downward into the cylinder.
4. Using a feeler gauge (1), check the piston ring end gap, replace any rings not within specification.

PISTON RING SIDE CLEARANCE



[Fig. 139: Measuring Piston Ring Side Clearance](#)
Courtesy of CHRYSLER GROUP, LLC

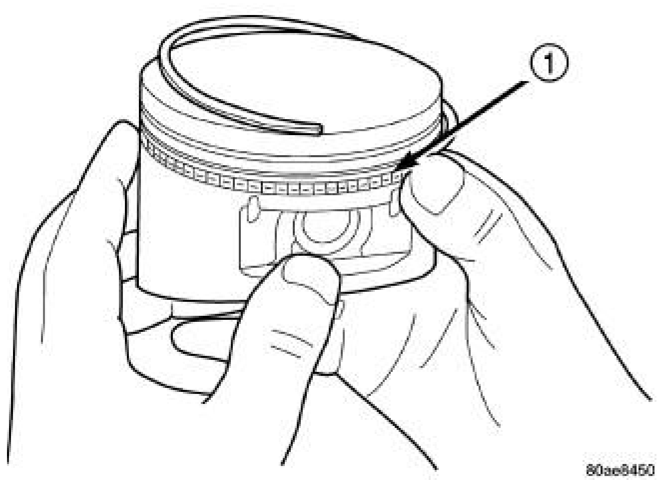
NOTE: Make sure the piston ring grooves are clean and free of nicks and burrs.

1. Measure the piston ring side clearance with a feeler gauge (1) as shown in illustration. Make sure the feeler gauge fits snugly between the piston ring land and the piston ring, replace any ring not within specification.

   NOTE: Make sure the marks on the compression rings face upward.

2. Rotate the ring around the piston. The ring must rotate in the groove with out binding.

PISTON RING INSTALLATION



[Fig. 140: Installing Piston Ring Side Rail](#)
Courtesy of CHRYSLER GROUP, LLC

1. Install the oil ring expander.
2. Install the lower side rail by placing one end between the piston ring groove and the expander ring (1). Hold the lower side rail end firmly and press down the portion to be installed until the side rail is in position. Repeat this step for the upper side rail.

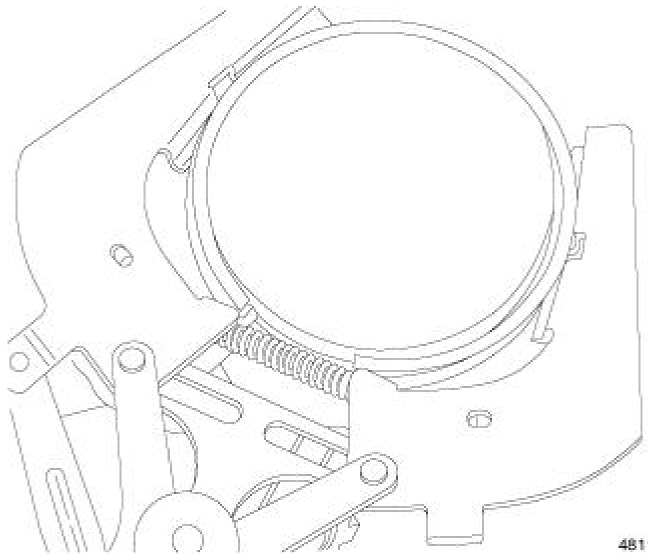


Fig. 141: Installing Upper & Intermediate Rings
Courtesy of CHRYSLER GROUP, LLC

3. Using a piston ring installer, install the No. 2 intermediate piston ring.
4. Using a piston ring installer, install the No. 1 upper piston ring.

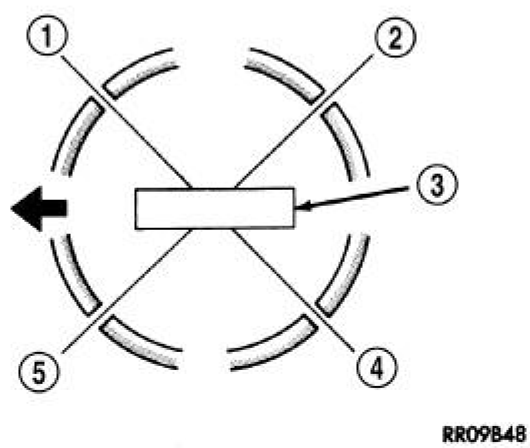


Fig. 142: Piston Ring End Gap Position
Courtesy of CHRYSLER GROUP, LLC

5. Install the oil ring expander gap at the (5) position.
6. Install the oil ring lower side rail gap at the (4) position.
7. Install the oil ring upper side rail gap at the (1) position.
8. Install the second compression ring gap at the (5) position.
9. Install the top compression ring gap at the (2) position.

ROD, PISTON AND CONNECTING

DESCRIPTION

DESCRIPTION

CAUTION: Do not use a metal stamp to mark connecting rods as damage may result, instead use ink or a scratch awl.

The pistons are made of a high-strength aluminum alloy. Piston skirts are coated with a solid lubricant (Molykote) to reduce friction and provide scuff resistance. The piston top ring groove and land is anodized. The connecting rods are made of forged powdered metal with a "fractured cap" design. A floating piston pin is used to attach the piston and connecting rod.

STANDARD PROCEDURE

STANDARD PROCEDURE - PISTON FITTING

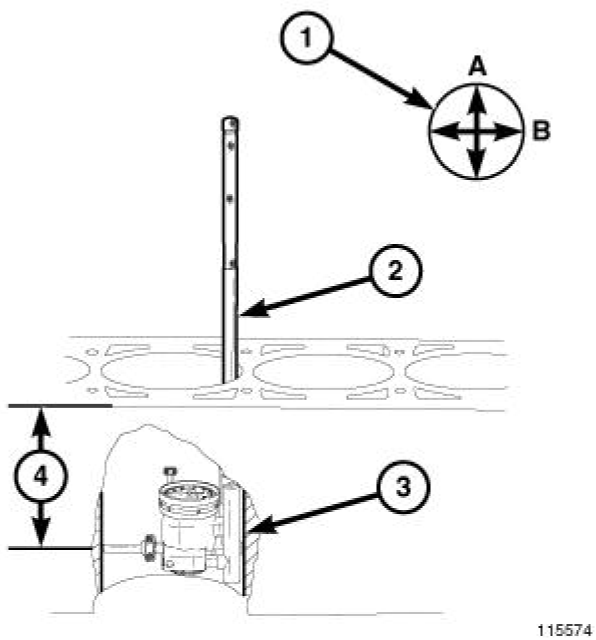


Fig. 143: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER GROUP, LLC

1. Use Cylinder Indicator (special tool #C-119, Cylinder Indicator) (2) to correctly measure the inside diameter of the cylinder bore (3). A cylinder indicator capable of reading in 0.003 mm (0.0001 in.) increments is required. If a cylinder indicator is not available, do not use an inside micrometer.
2. Measure the inside diameter of the cylinder bore at a point 38.0 mm (1.5 inches) below top of bore (4). Start perpendicular (across or at 90Â°) to the axis of the crankshaft at point A and then take an additional bore reading 90Â° to that at point B.

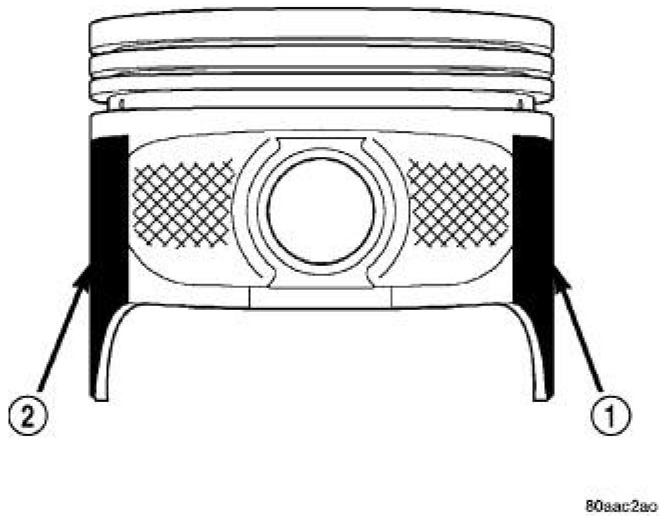


Fig. 144: Moly Coated Piston
Courtesy of CHRYSLER GROUP, LLC

NOTE: The coated pistons, piston pins and connecting rods are pre-assembled and serviced as an assembly.

3. The piston and rod assembly is specific for the left cylinder bank (odd numbered) and the right cylinder bank (even numbered) and must not be interchanged.
4. The coating material (1, 2) is applied to the piston after the final piston machining process. Measuring the outside diameter of a coated piston will not provide accurate results. Therefore measuring the inside diameter of the cylinder bore with a cylinder indicator is **MANDATORY** . To correctly select the proper size piston, a cylinder indicator capable of reading in 0.003 mm (0.0001 in.) increments is required.
5. Piston installation into the cylinder bore requires slightly more pressure than that required for non-coated pistons. The bonded coating on the piston will give the appearance of a line-to-line fit with the cylinder bore.

REMOVAL

REMOVAL

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.

1. Remove the cylinder head(s). Refer to **CYLINDER HEAD, REMOVAL**.
2. Remove the oil pan. Refer to **PAN, OIL, REMOVAL**.
3. If necessary, remove the ridge on top of the cylinder bores with a reliable ridge reamer before removing pistons from engine block. **Be sure to keep the tops of the pistons covered during this operation.**

CAUTION: When removing and installing the pistons and connecting rods, do not damage the piston oil cooler jets. If the jets are bent, engine damage may occur.

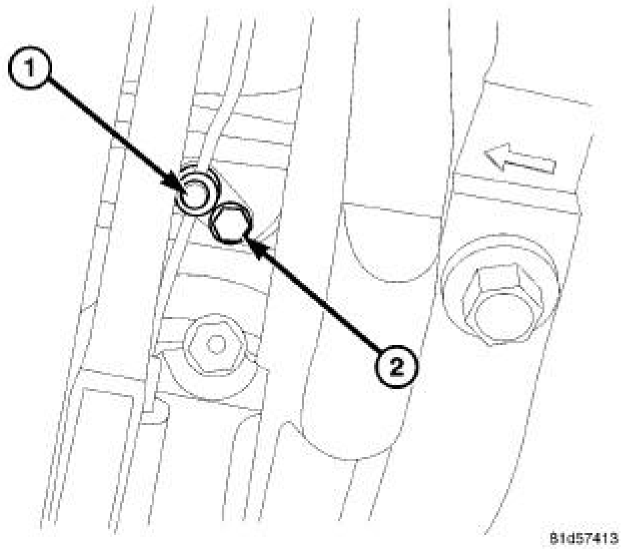


Fig. 145: Piston Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Remove the piston oil cooler jet(s) retaining bolt(s) (2) and remove the piston oil cooler jet(s) (1).

CAUTION: **Do not use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur.**

CAUTION: **Care must be taken not to damage the fractured rod and cap joint face surfaces as engine damage may occur.**

CAUTION: **Care must be taken not to nick crankshaft journals as engine damage may occur.**

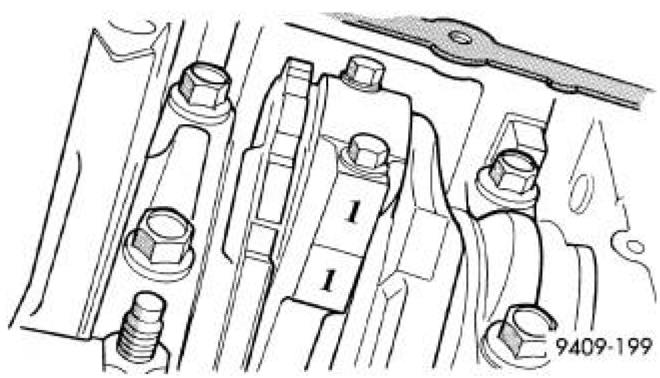


Fig. 146: Identifying Mark On Connecting Rod And Bearing Cap
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Connecting rods and bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.**

5. Mark the connecting rod and bearing cap position using a permanent ink marker or scribe tool.

NOTE: **Pistons and connecting rod assemblies must be removed from the top of the engine block. When removing the piston and connecting rod assemblies from the engine, rotate the crankshaft so each connecting rod is centered in the cylinder bore.**

6. Remove the connecting rod cap and carefully remove the piston from the cylinder bore, repeat this procedure for each piston being removed.
7. Immediately after removing the piston and connecting rod, install the bearing cap on the mating connecting rod to prevent damage to the fractured cap and rod surfaces.
8. Carefully remove the piston rings from the piston(s), starting from the top ring down.

CLEANING

CLEANING

CAUTION: **DO NOT use a wire wheel or other abrasive cleaning devise to clean the pistons or connecting rods. The pistons have a Moly coating, this coating must not be damaged.**

1. Using a suitable cleaning solvent clean the pistons in warm water and towel dry.
2. Use a wood or plastic scraper to clean the ring land grooves.

INSPECTION

INSPECTION

Check the connecting rod journal for excessive wear, taper and scoring.

Check the connecting rod for signs of twist or bending.

Check the piston for taper and elliptical shape before it is fitted into the cylinder bore. Refer to **STANDARD PROCEDURE**.

Check the piston for scoring, or scraping marks on the piston skirts. Check the ring lands for cracks and/or deterioration.

INSTALLATION

INSTALLATION

CAUTION: **If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.**

NOTE: **Before reinstalling used rings or installing new rings, the ring clearances must be checked.**

NOTE: **Make sure the piston ring grooves are clean and free of nicks and burrs.**

1. Check piston ring clearance. Refer to **STANDARD PROCEDURE**.
2. Before installing piston and connecting rod assemblies into the bore, install the piston rings. Refer to **STANDARD PROCEDURE**.

3. Immerse the piston head and rings in clean engine oil and position a ring compressor over the piston and rings and tighten the ring compressor. **Make sure the position of rings do not change during this operation.**

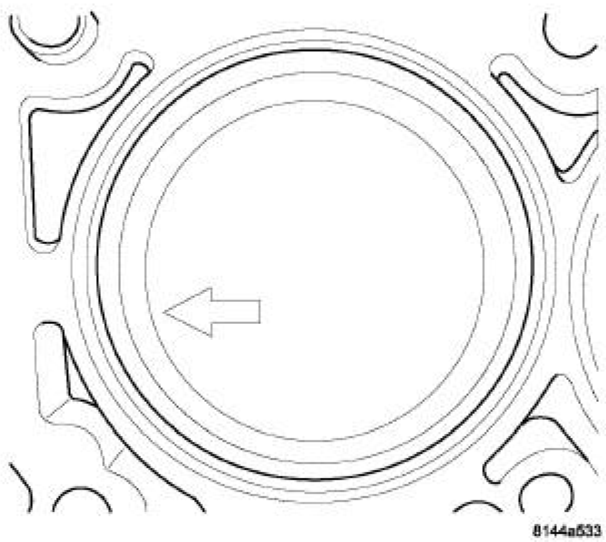
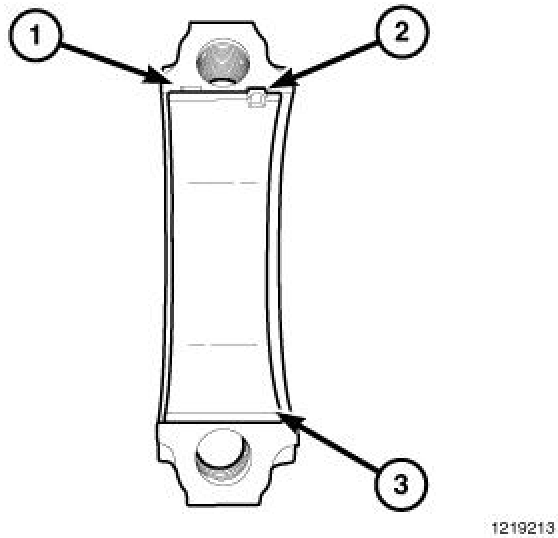


Fig. 147: Piston Direction Arrow
Courtesy of CHRYSLER GROUP, LLC

4. The pistons are marked on the piston pin bore surface with an raised "F" or arrow on top of piston indicating installation position. This mark must be pointing toward the front of the engine on both cylinder banks.
5. Wipe the cylinder bore clean and lubricate with clean engine oil.
6. Rotate the crankshaft until the connecting rod journal is centered with the cylinder bore.
7. Insert the piston and rod assembly into the cylinder bore and carefully position the connecting rod over the crankshaft journal.
8. Tap the piston down in cylinder bore using a hammer handle. While at the same time, guide the connecting rod into position on crankshaft rod journal.
9. Perform the measure bearing clearance procedure. Refer to **ENGINE BLOCK, STANDARD PROCEDURE** .



[**Fig. 148: Connecting Rod Cap**]
Courtesy of CHRYSLER GROUP, LLC

10. Wipe the connecting rod cap (1) clean and lubricate with clean engine oil and install the bearing (3).

NOTE: **The connecting rods and bearing caps are not interchangeable, line up the previously marked bearing caps and connecting rods to ensure assembly to their original location.**

11. Lubricate the bearing surfaces with clean engine oil and position the rod cap onto the connecting rod.

CAUTION: **When installing the connecting rods, make sure the wide side of the connecting rod faces the crankshaft and the narrow sides face each other.**

CAUTION: **Always replace the connecting rod bolts whenever they are loosened or removed.**

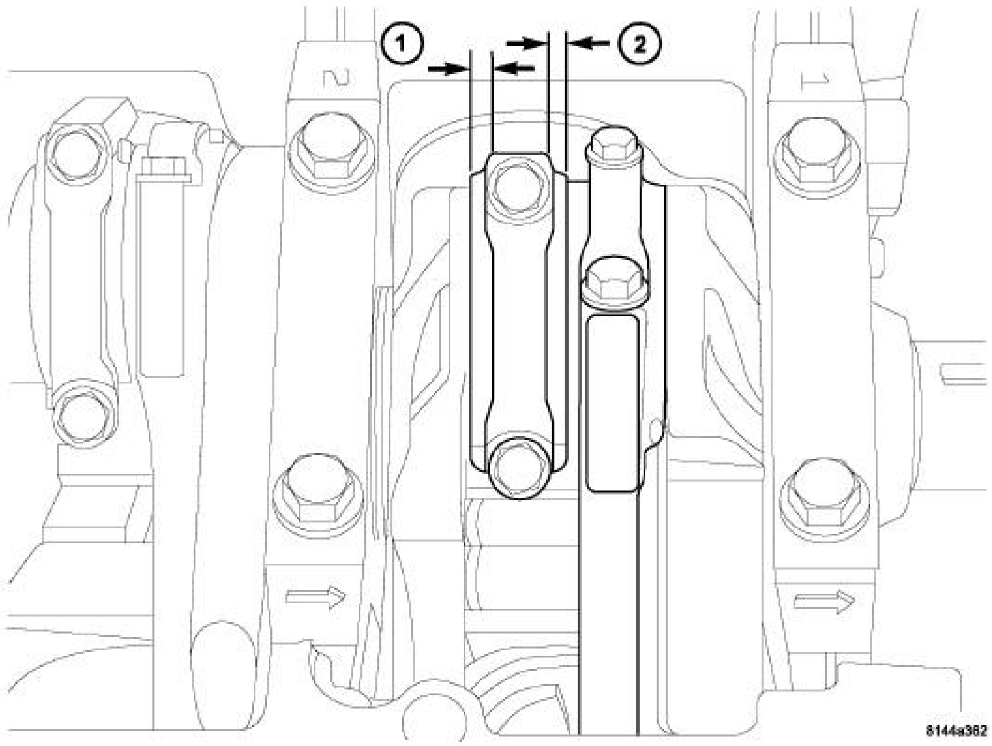


Fig. 149: Identifying Connecting Rod Proper Installation
Courtesy of CHRYSLER GROUP, LLC

12. Verify the connecting rods are properly installed, the wide side (1) of the connecting rod is facing towards the crankshaft and the narrow sides (2) of the connecting rods face each other.
13. Lubricate the new rod cap bolts with clean engine oil, install and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

CAUTION: **When removing and installing the pistons and connecting rods, do not damage the piston oil cooler jets. If the jets are bent, engine damage may occur.**

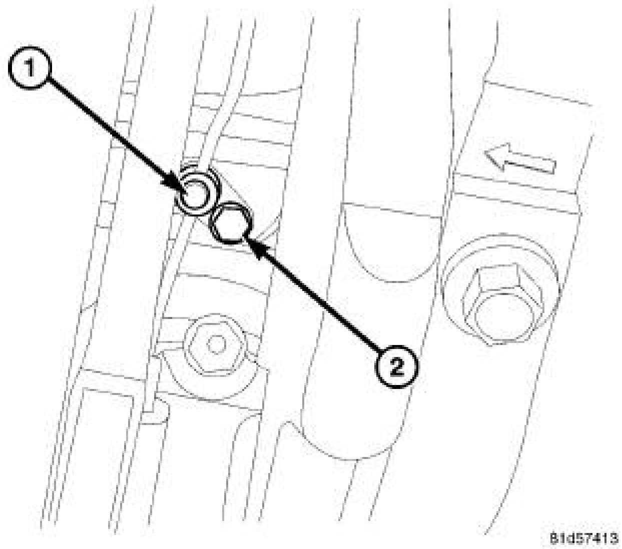


Fig. 150: Piston Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

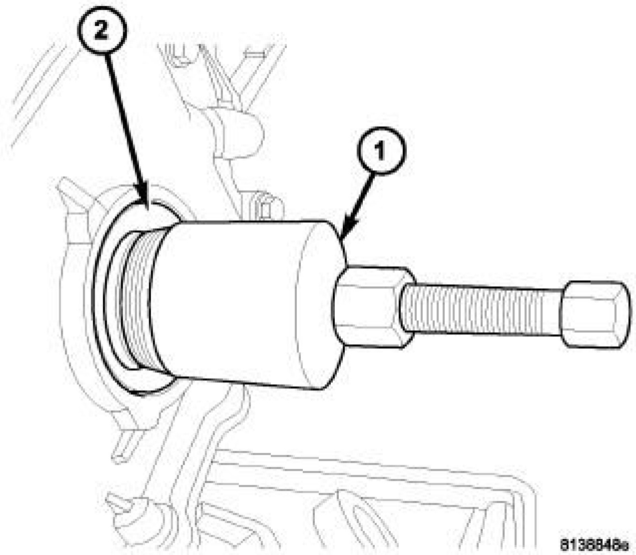
14. Position the piston oil cooler jet(s) (1).
15. Install the piston oil cooler jet retaining bolt(s) (2) and tighten to proper specification. Refer to **TORQUE SPECIFICATIONS**.
16. Install the oil pan and oil pump pickup tube and oil pan. Refer to **PAN, OIL, INSTALLATION**.
17. Install the cylinder head(s). Refer to **CYLINDER HEAD, INSTALLATION**.
18. Connect the negative battery cable.
19. Start the engine and check for leaks.

SEAL, CRANKSHAFT OIL, FRONT

REMOVAL

REMOVAL

1. Remove the vibration damper. Refer to **DAMPER, VIBRATION, REMOVAL**.



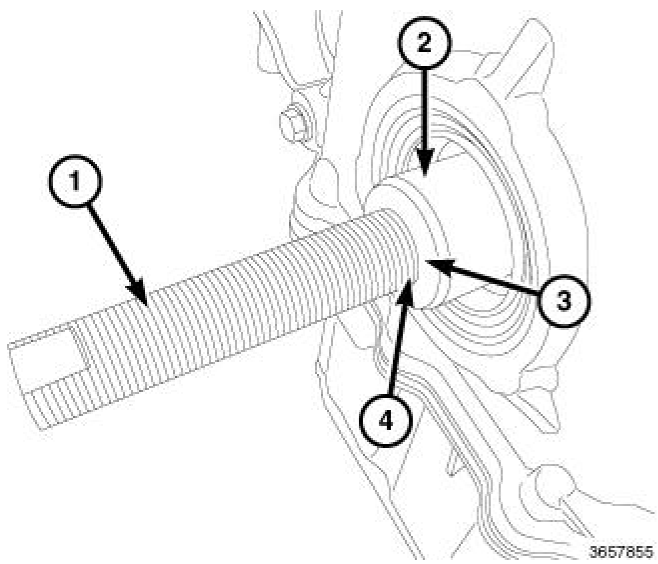
[Fig. 151: Front Crankshaft Seal Removal](#)
Courtesy of CHRYSLER GROUP, LLC

2. Using the Seal Remover (special tool #9071, Remover, Seal) (1), remove the crankshaft front seal (2).

INSTALLATION

INSTALLATION

CAUTION: **The front crankshaft seal must be installed dry. Do not apply lubricant to sealing lip or to outer edge.**



[Fig. 152: Installing Vibration Damper Tool Onto Crankshaft](#)
Courtesy of CHRYSLER GROUP, LLC

1. Install the threaded rod (1) from the (special tool #10387, Installer, Vibration Damper) into the crankshaft

(2) till seated.

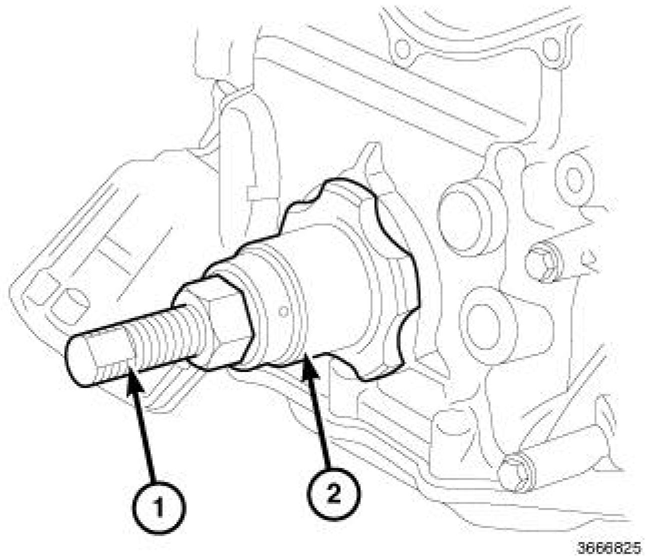


Fig. 153: Front Seal Installation
Courtesy of CHRYSLER GROUP, LLC

2. Using Seal Installer (special tool #9072, Installer, Seal) and (special tool #10387, Installer, Vibration Damper) (2), install the crankshaft front oil seal.
3. Install the vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION**.

SEAL, CRANKSHAFT OIL, REAR

DESCRIPTION

DESCRIPTION

The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer. For more information, refer to the following;

- **Diagnosis and Testing:** Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL**.
- **Removal:** Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, REMOVAL**.
- **Installation:** Refer to **RETAINER, CRANKSHAFT REAR OIL SEAL, INSTALLATION** .

SOLENOID, MULTIPLE DISPLACEMENT

DESCRIPTION

DESCRIPTION

The Multi Displacement System (MDS) selectively deactivates cylinders 1, 4, 6, and 7 to improve fuel economy. It has two modes of operation:

- 8 cylinders for acceleration and heavy loads
- 4 cylinders for cruising and city traffic

The main components of the Multi Displacement System are:

- Unique MDS camshaft
- Deactivating roller lifters
- 4 control valve solenoids
- Control valve solenoid wiring harness
- Oil temperature sensor

OPERATION

OPERATION

Cylinder Deactivation

- Trap an exhaust charge from a normal combustion event
- Normal combustion event
- Deactivate the exhaust valve
- Deactivate the intake valve
- Piston is an air spring
- Cylinders deactivated in firing sequence

Cylinder Reactivation

- Normal combustion event
- Activate the exhaust valve
- Activate the intake valve
- Empty the cylinder
- Cylinders reactivated in firing sequence

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - MDS SOLENOID

The Multi-Displacement System (MDS) has the following detectable issues:

- Solenoid circuit
- Fail to deactivate a cylinder(s)
- Fail to reactivate a cylinder(s)
- Low oil pressure

CONDITION	POSSIBLE CAUSES	CORRECTION
MDS does not activate	1. Low oil pressure	1. Check for proper oil pressure
	2. Bad oil temperature sensor	2. Replace the oil temperature sensor
-	3. Malfunctioning MDS solenoid	3. Replace the MDS solenoid
-	4. Malfunctioning MDS lifter	4. Replace lifter(s)
MDS does not deactivate	1. Low oil pressure	1. Check or proper oil pressure
	2. Bad oil temperature sensor	2. Replace the oil temp sensor

CONDITION	POSSIBLE CAUSES	CORRECTION
-	3. Malfunctioning MDS solenoid	3. Replace the MDS solenoid
-	4. Malfunctioning MDS lifter(s)	4. Replace lifter(s)

REMOVAL

REMOVAL

1. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.

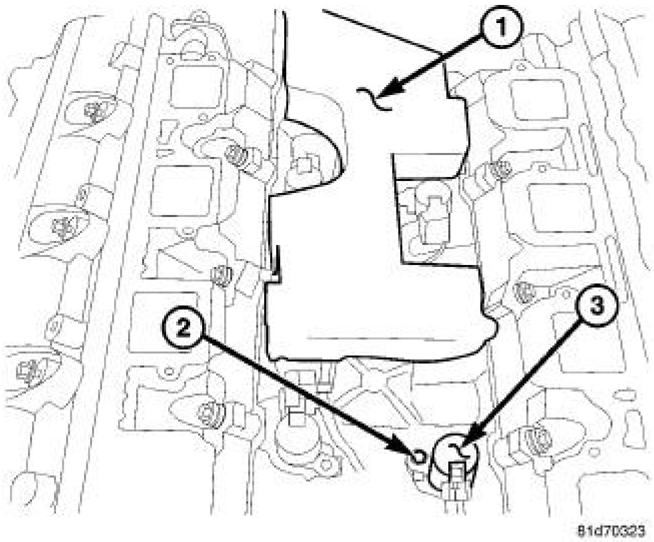


Fig. 154: Intake Manifold Foam Insulator Pad, MDS Solenoids & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Remove foam insulator pad (1).

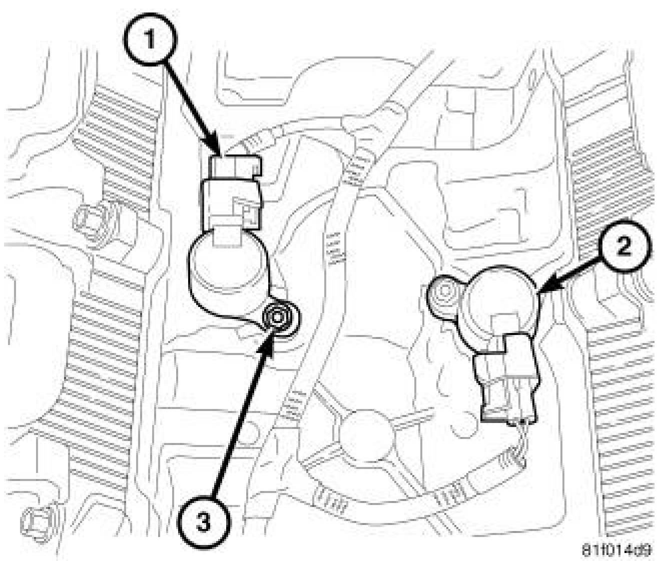


Fig. 155: MDS Solenoid Connector
Courtesy of CHRYSLER GROUP, LLC

3. Remove the Multiple Displacement Solenoid (MDS) (2) wire harness connector(s) (1).

4. Remove the MDS solenoid (2) retaining bolt(s) (3).

CAUTION: Do not try to pry the solenoid out. This could lead to breakage and contamination of the lubrication system.

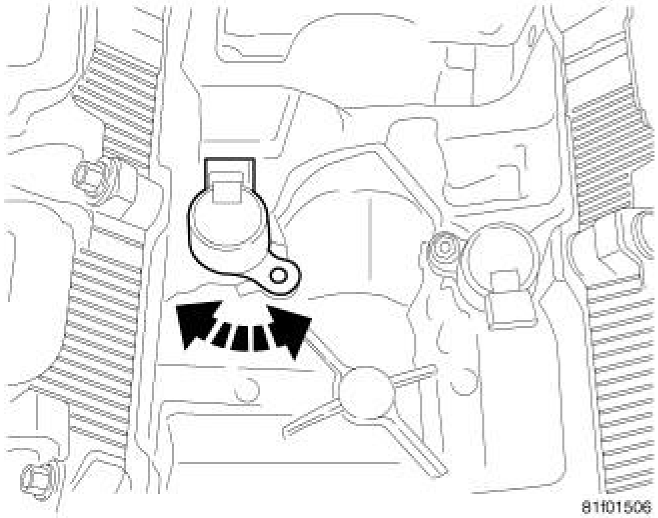


Fig. 156: Removing/Installing MDS Solenoid
Courtesy of CHRYSLER GROUP, LLC

5. Lightly tap on the MDS solenoid(s) with a rubber mallet. Rotate the MDS solenoid(s) from side to side to break the seal.
6. Remove the MDS solenoid(s).

INSTALLATION

INSTALLATION

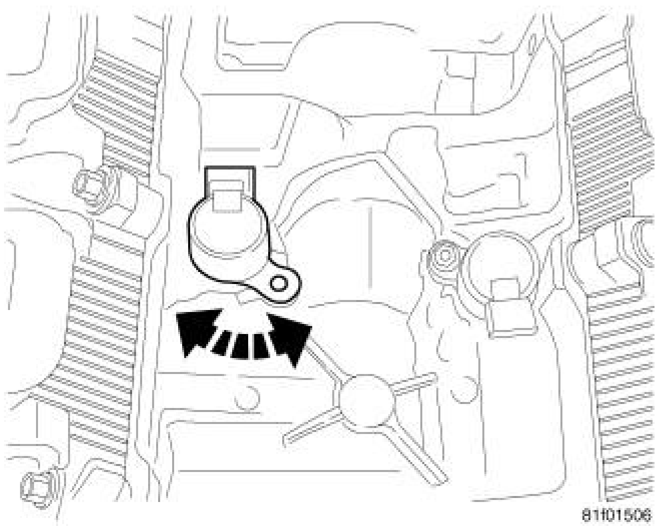


Fig. 157: Removing/Installing MDS Solenoid
Courtesy of CHRYSLER GROUP, LLC

1. Verify the Multiple Displacement Solenoids (MDS) bores are free of debris before installing the MDS

solenoid into the engine block.

2. Install the MDS solenoid(s) (3), ensure the seal is fully seated into the engine block.

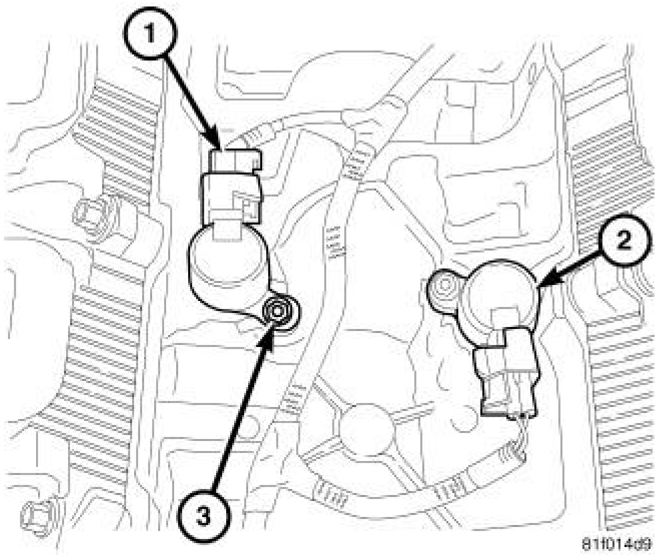


Fig. 158: MDS Solenoid Connector
Courtesy of CHRYSLER GROUP, LLC

3. Install the retaining bolt(s) (3) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Connect the MDS wire harness connector to the solenoid(s) (1).

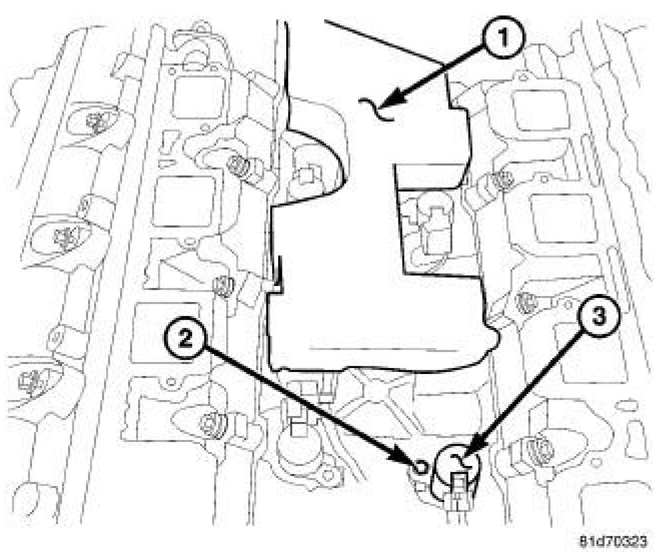


Fig. 159: Intake Manifold Foam Insulator Pad, MDS Solenoids & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the foam insulator pad (1).
6. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.

ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, REAR

REMOVAL

REMOVAL

AUTOMATIC TRANSMISSION

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

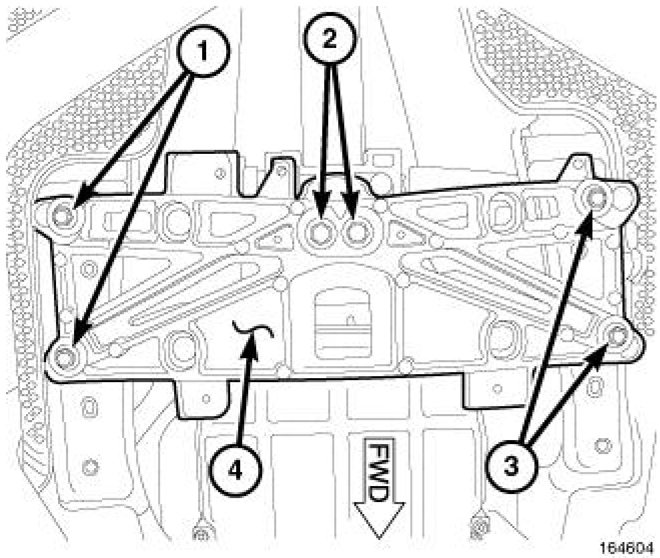


Fig. 160: Rear Cross Member Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Using a suitable jack, support the transmission.
3. Remove the rear transmission mount isolator bolts (2).
4. Remove the rear cross member retaining bolts (1, 3) and remove the cross member (4).

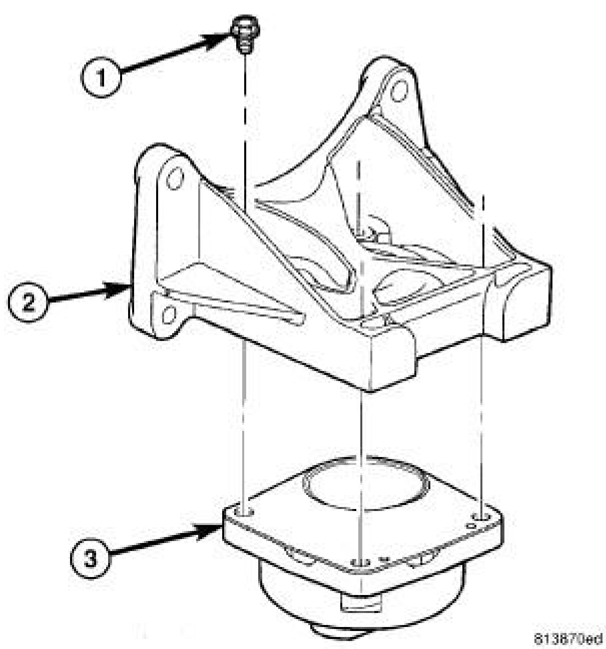


Fig. 161: Rear Transmission Mount Isolator
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear transmission mount isolator (3) retaining bolts (1) and remove the isolator.
6. If required, remove the rear transmission mount bracket (2) retaining bolts from the transmission and remove the bracket.

MANUAL TRANSMISSION

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

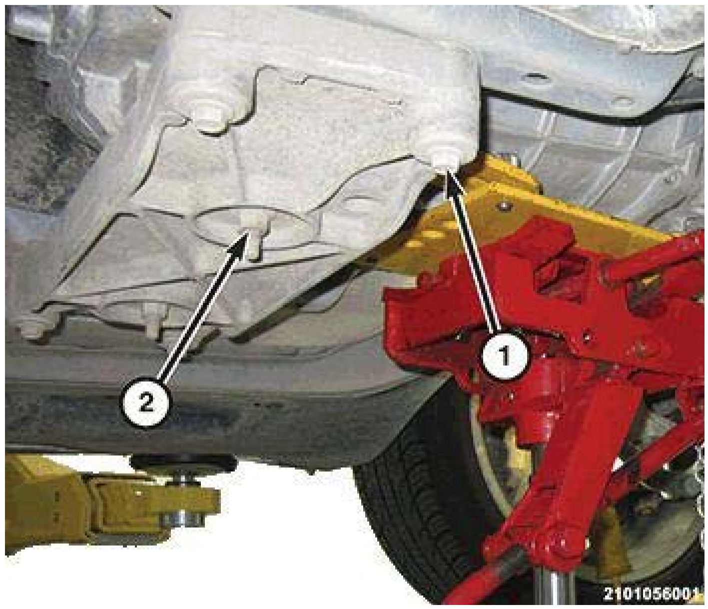


Fig. 162: Rear Cross Member & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Using a suitable jack, support the transmission.
3. Remove the rear transmission mount isolator nuts (2).
4. Remove the rear cross member retaining bolts (1) and remove the cross member.

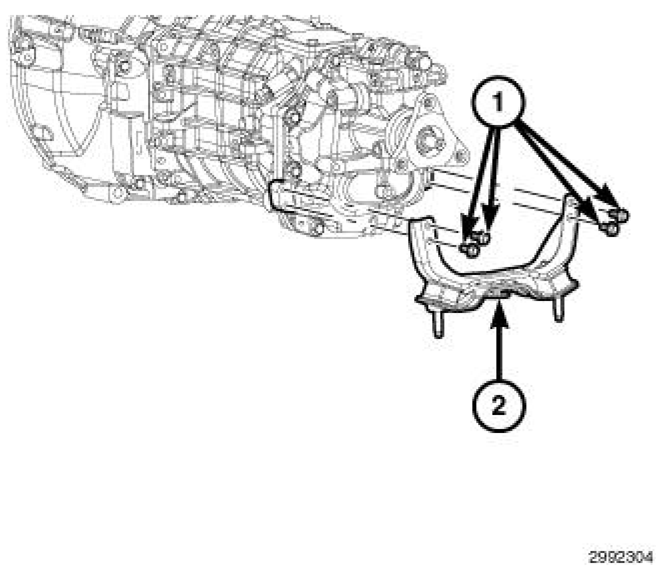


Fig. 163: Rear Transmission Mount Isolator & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove bolts (1) and the rear transmission mount isolator (2).

INSTALLATION

INSTALLATION

AUTOMATIC TRANSMISSION

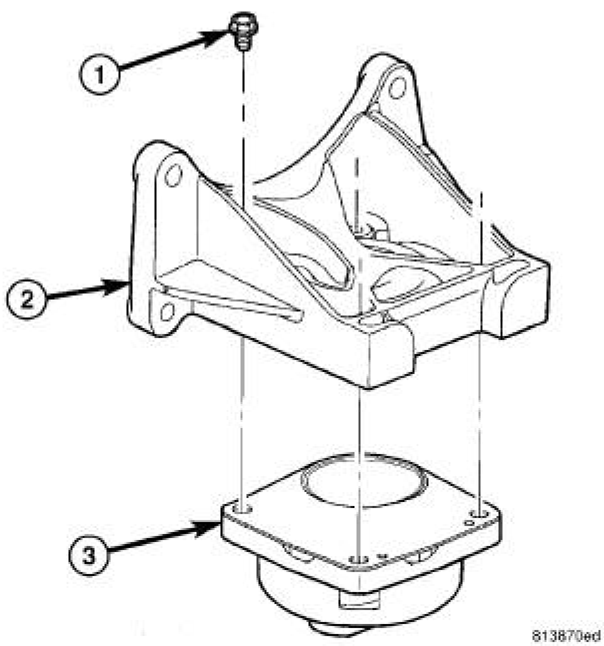
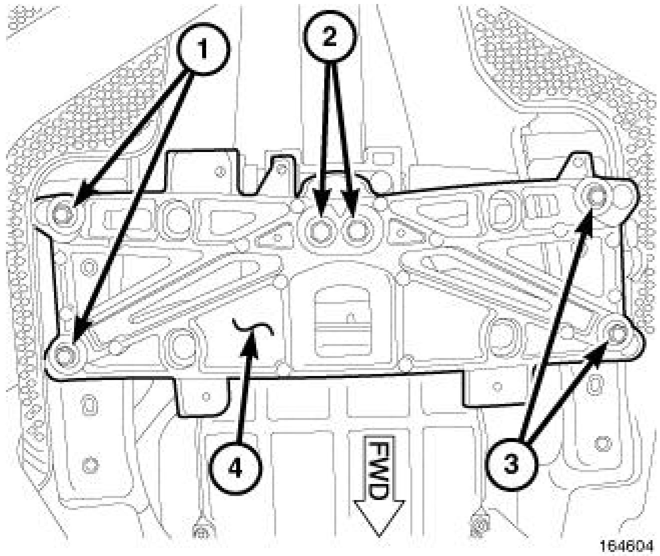


Fig. 164: Rear Transmission Mount Isolator
Courtesy of CHRYSLER GROUP, LLC

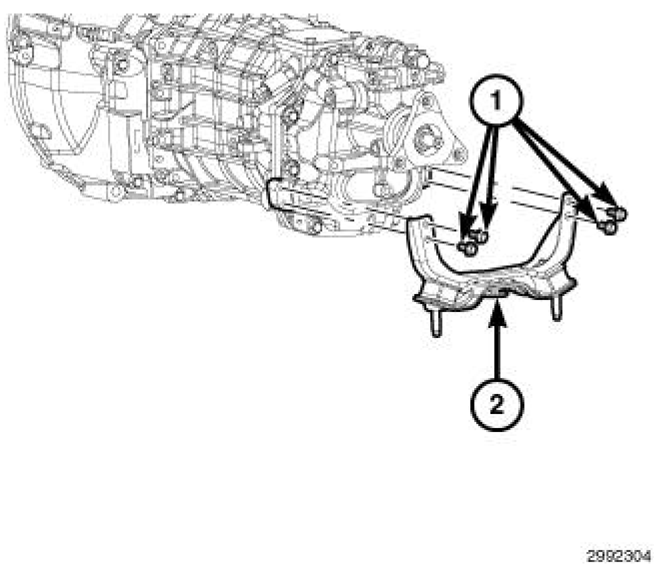
1. If removed, position the rear transmission mount bracket (2) to the transmission and tighten the retaining bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
2. Position the rear transmission mount isolator (3) to the rear transmission mount bracket, install the retaining bolts (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 165: Rear Cross Member Bolts]
Courtesy of CHRYSLER GROUP, LLC

3. Position the transmission crossmember (4), install the retaining bolts (1, 3) finger tight.
4. Install the rear transmission mount isolator retaining bolts (2) finger tight.
5. Tighten the transmission crossmember retaining bolts (1, 3) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
6. Lower the transmission and remove the jack.
7. Tighten the rear transmission mount isolator retaining bolts (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

MANUAL TRANSMISSION



[Fig. 166: Rear Transmission Mount Isolator & Retaining Bolts]
Courtesy of CHRYSLER GROUP, LLC

1. Install the rear transmission mount isolator (2). Tighten the bolts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

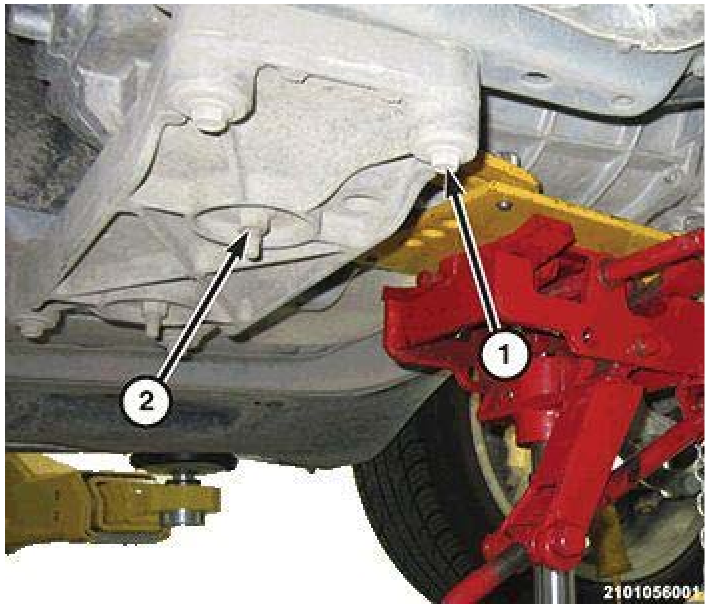


Fig. 167: Rear Cross Member & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the rear cross member and tighten bolts (1) finger tight.
3. Install the rear transmission mount isolator nuts (2) and tighten finger tight.
4. Tighten the transmission crossmember bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
5. Lower the transmission and remove the jack.
6. Tighten the rear transmission mount isolator retaining nuts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

INSULATOR, ENGINE MOUNT, FRONT

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.
3. Remove the engine oil dipstick tube retaining nut at the right exhaust manifold.
4. Raise and support the vehicle.

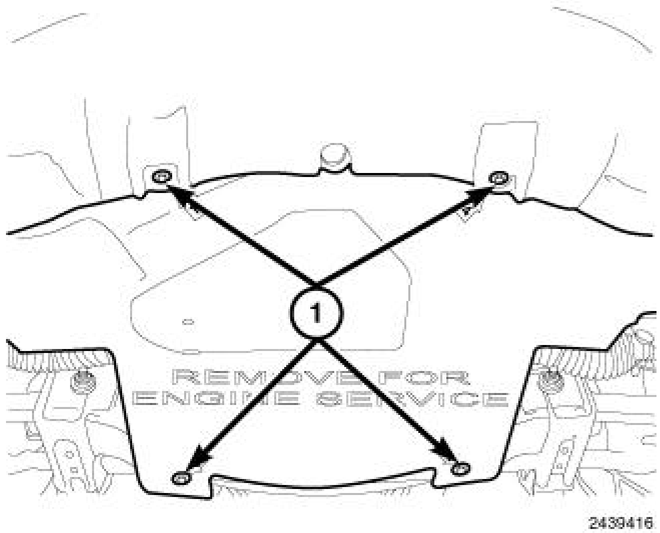


Fig. 168: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Remove the belly pan retainers (1) and remove the belly pan.

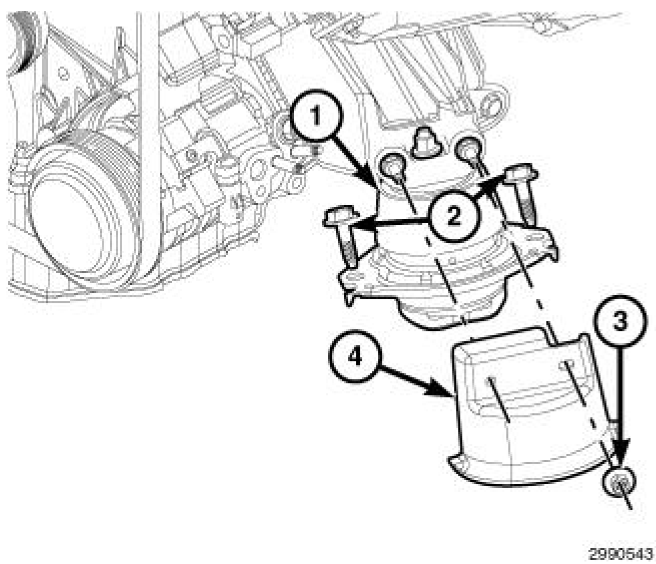
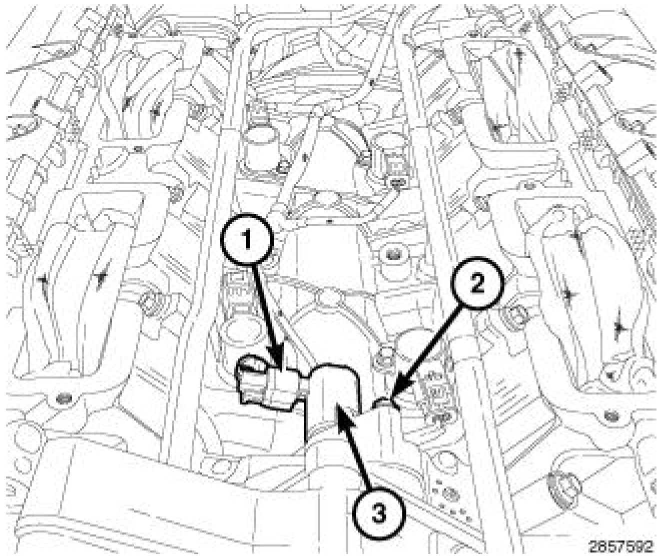


Fig. 169: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

6. Remove both left/right engine mount heat shield (4) retaining nuts (3) and remove the heat shields
7. Remove both left/right engine mount lower retaining bolts (2).
8. Lower the vehicle.
9. Remove the intake manifold. Refer to MANIFOLD, INTAKE, REMOVAL.



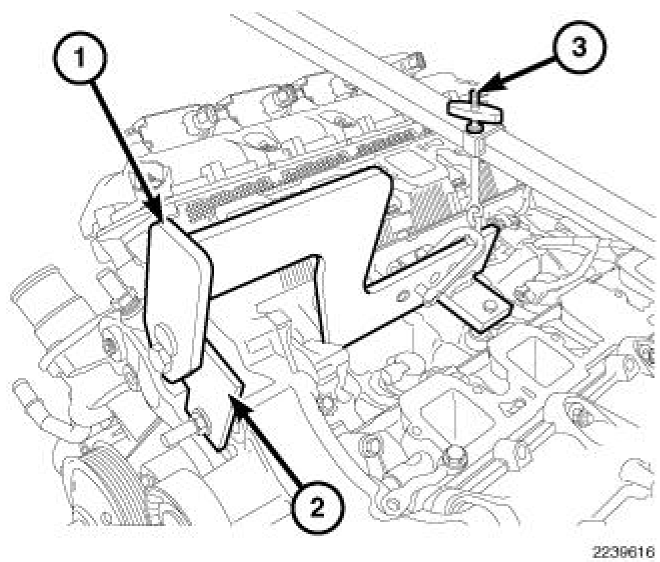
[Fig. 170: Oil Control Valve, Electrical Connector & Retaining Bolt]

Courtesy of CHRYSLER GROUP, LLC

10. Remove the Variable Valve Timing Solenoid (VVTS) (3).

    Refer to **SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST, REMOVAL**.

NOTE: **Do not use air tools to install the engine lift fixture.**



[Fig. 171: Engine Lift Fixture & Adapter]

Courtesy of CHRYSLER GROUP, LLC

11. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).
12. Raise the engine to provide clearance to remove the engine mounts.
13. Raise and support the vehicle.

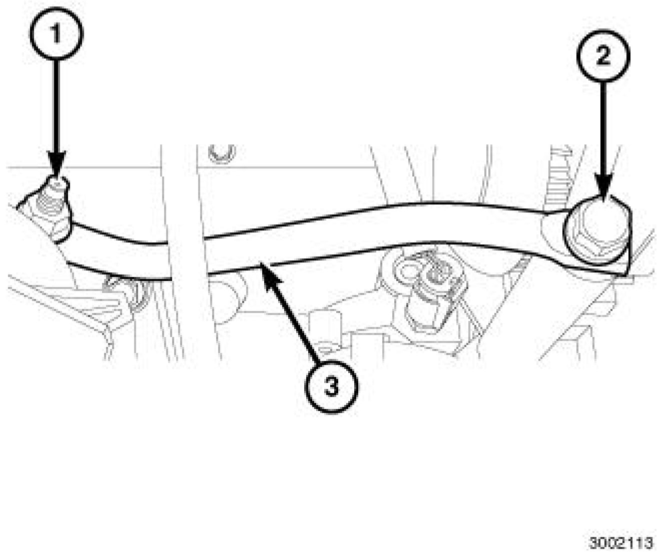


Fig. 172: Support Bracket, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

14. Remove the generator support bracket to engine mount retaining nut (1).
15. Remove the generator support bracket retaining bolt (2) and remove the support bracket (3).

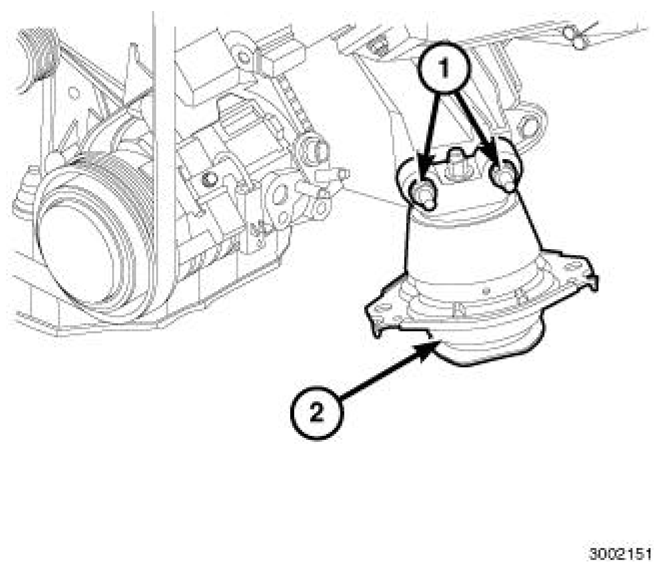


Fig. 173: Engine Mount & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

16. Remove both left/right engine mount retaining bolts (1) and remove the engine mounts (2).

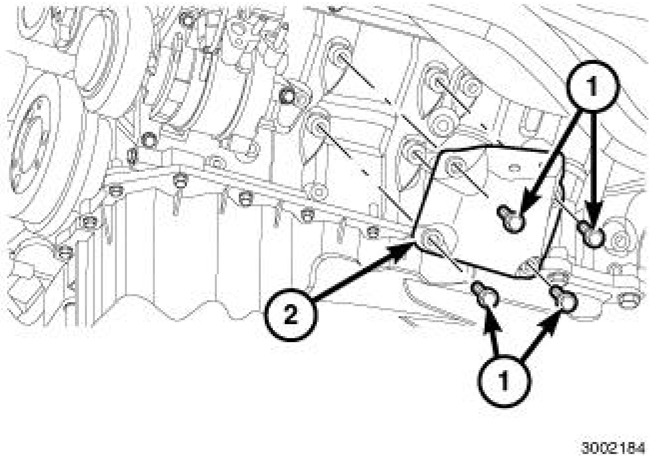


Fig. 174: Engine Mount-To-Engine Block Mounting Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

17. If necessary, remove both engine mount to engine block mounting bracket retaining bolts (1) and remove the mounting brackets (2).

INSTALLATION

INSTALLATION

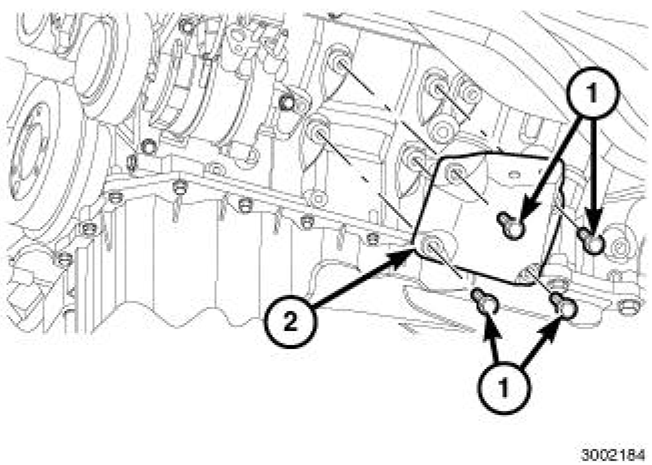
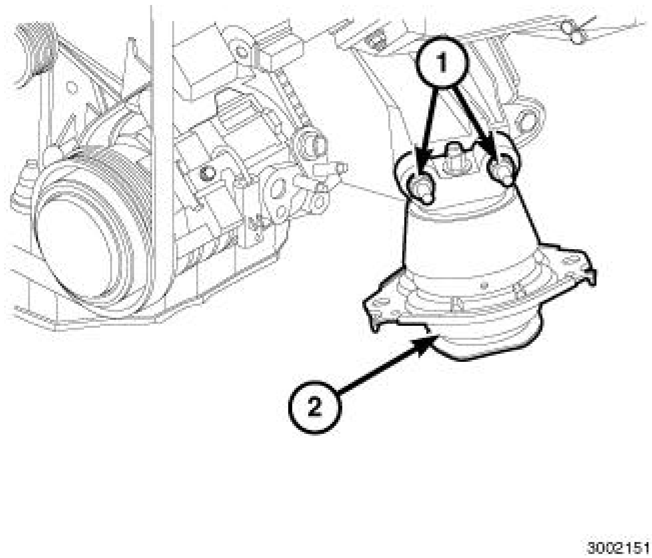


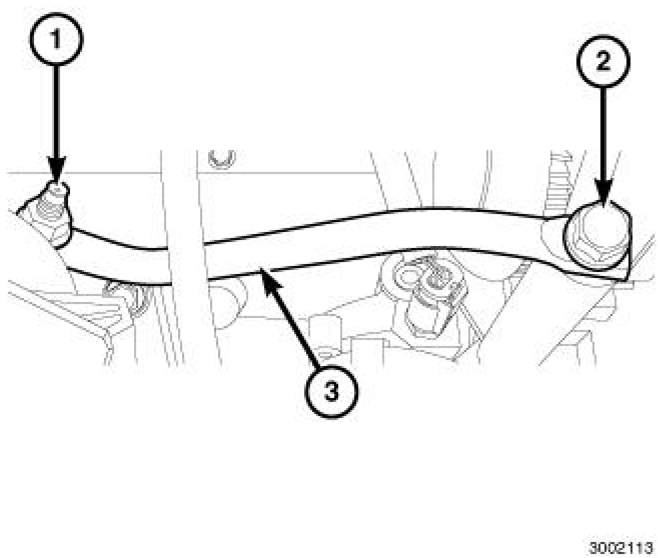
Fig. 175: Engine Mount-To-Engine Block Mounting Brackets & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If removed, position the engine mount to engine block mounting brackets, install the retaining bolts and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.



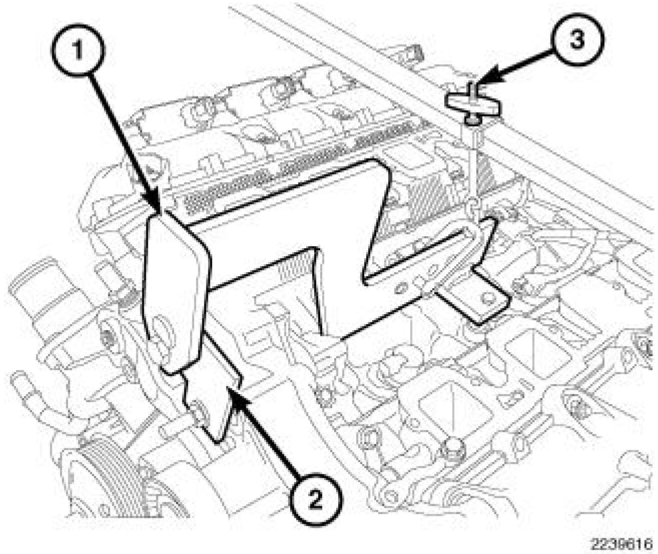
[Fig. 176: Engine Mount & Retaining Bolts]
Courtesy of CHRYSLER GROUP, LLC

2. Position the engine mounts (2), Install the retainers (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



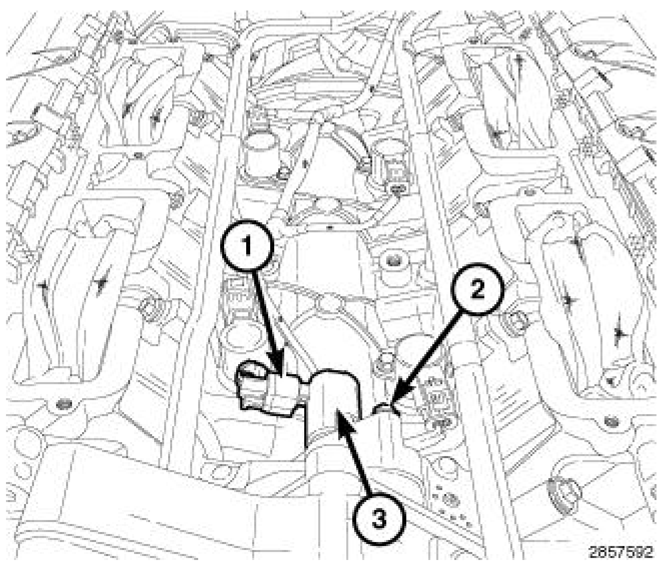
[Fig. 177: Support Bracket, Bolt & Nut]
Courtesy of CHRYSLER GROUP, LLC

3. Position the generator support bracket (3) to the engine mount, install the retaining nut (1) and tighten finger tight.
4. Position the generator support bracket to the generator, install the retaining bolt (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
5. Tighten the generator support bracket to engine mount retaining nut to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
6. Lower the vehicle.



[Fig. 178: Engine Lift Fixture & Adapter]
Courtesy of CHRYSLER GROUP, LLC

7. Lower the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3) until the engine mounts are seated in the engine cradle.
8. Remove the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).



[Fig. 179: Oil Control Valve, Electrical Connector & Retaining Bolt]
Courtesy of CHRYSLER GROUP, LLC

9. Install the Variable Valve Timing Solenoid (VVTS) (3). Refer to **SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST, INSTALLATION**.
10. Raise and support the vehicle.

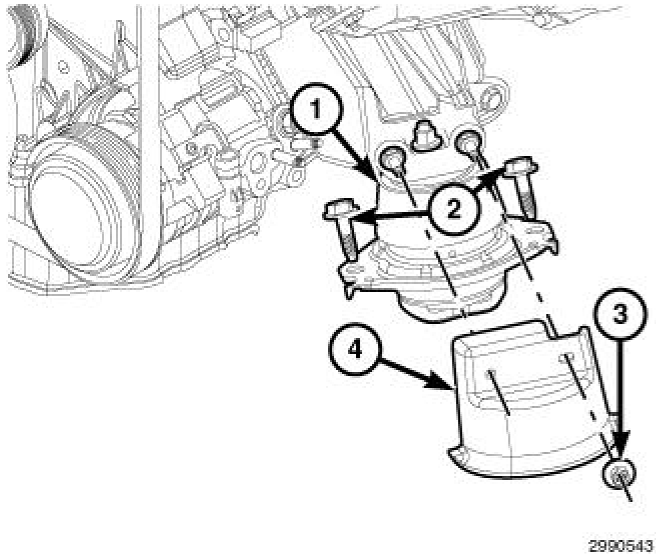


Fig. 180: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side similar.**

11. Install both left/right engine mount lower retaining bolts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
12. Position both left/right engine mount heat shields (4), install the retaining nuts (3) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

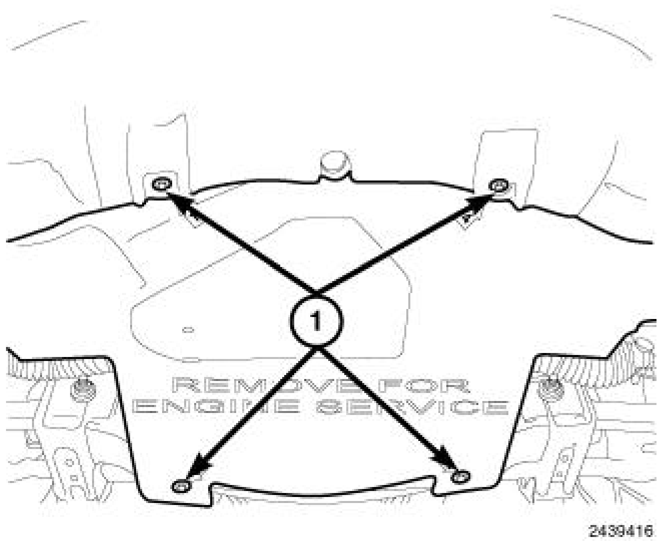


Fig. 181: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

13. Position the belly pan and install the belly pan retainers (1).
14. Lower the vehicle.
15. Position the engine oil dipstick tube, install the retaining nut at the right exhaust manifold.
16. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
17. Connect the negative battery cable.

LUBRICATION

DESCRIPTION

DESCRIPTION

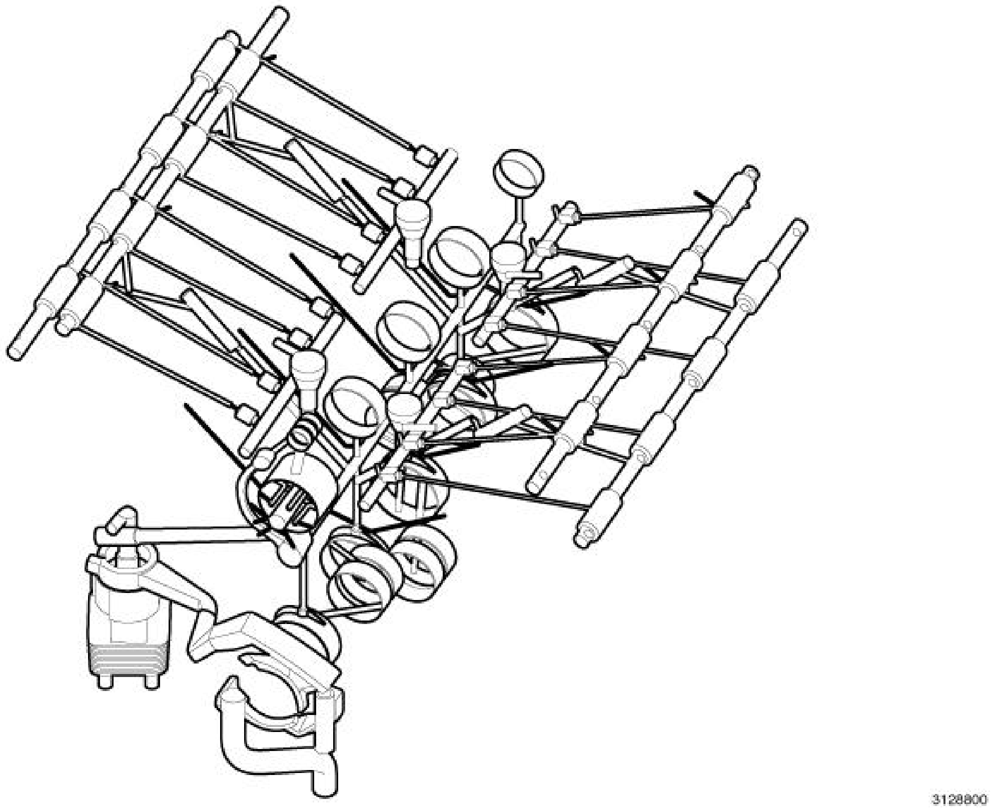


Fig. 182: 6.4L Lubrication System
Courtesy of CHRYSLER GROUP, LLC

The lubrication system is a full flow filtration pressure feed type system.

DIAGNOSIS AND TESTING

CHECKING ENGINE OIL PRESSURE

1. Remove oil pressure sending unit and install gauge assembly (special tool #C-3292A, Gauge, Pressure).
2. Run engine until thermostat opens.
3. Check oil pressure gauge:
    - Curb Idle - 25 kPa (4 psi) minimum
    - 3000 RPM - 170 - 758 kPa (25 - 110 psi)
4. If oil pressure is 0 at idle, shut off engine. Check for a clogged oil pick-up screen or a pressure relief valve stuck open.

ENGINE OIL LEAK

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

1. Do not clean or degrease the engine at this time because some solvents may cause rubber to swell thus temporarily stopping the leak.
2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.
3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of oil leak. If the oil leak is found and identified, repair per service information procedures.
4. If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat inspection.

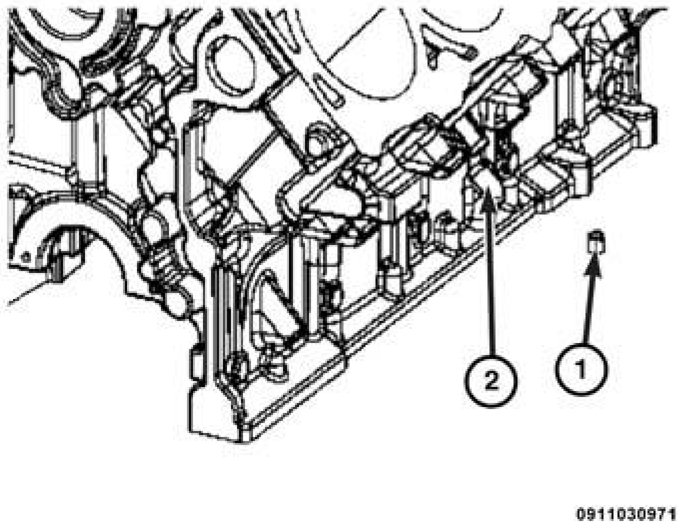


Fig. 183: Engine Oil Pan Plug Component Location
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If the oil indicator tube is located in the engine oil pan. A plug (1) is inserted into the hole on the engine block (2). Validation of the plug is required when the engine block has been replaced.**

AIR LEAK DETECTION TEST METHOD

1. Remove the PCV valve, cap or plug the PCV valve port at the intake manifold.
2. Attach an air hose with a pressure gauge and regulator onto the dipstick tube.

CAUTION: **Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.**

3. Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provide the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service information procedures.
4. If the leakage occurs at the rear oil seal area, proceed with the **INSPECTION FOR REAR SEAL AREA LEAKS**.
5. If no leaks are detected, turn off the air supply and remove the air hose from the dipstick tube.

6. Remove the PCV port plug or cap at the intake manifold and install the PCV valve.
7. Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light. If the oil leak is found and identified, repair per service information procedures.

INSPECTION FOR REAR SEAL AREA LEAKS

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.
3. Remove torque converter or clutch housing inspection cover.
4. Using a black light and inspect the rear of the engine block for evidence of oil.

   Circular spray pattern on the rear of the engine block generally indicates:

   - Rear crankshaft oil seal
   - Damaged crankshaft

   Oil running straight down the back of the engine block generally indicates:

   - Porous engine block
   - Camshaft core hole plug
   - Oil gallery pipe plug
   - Oil pan gasket
5. If no leaks are detected, pressurize the crankcase as outlined in the **AIR LEAK DETECTION TEST METHOD**.

   CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.

6. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and crankshaft oil seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out with emery cloth.

   CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is machined specifically to complement the function of the rear oil seal.

7. For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled.

SOLENOID, VARIABLE VALVE TIMING (VVTS), EXHAUST

DESCRIPTION

DESCRIPTION

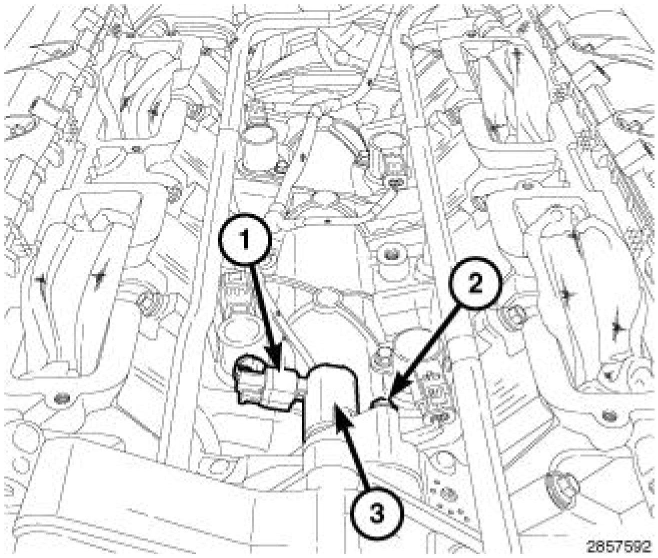


Fig. 184: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

The 6.4L engine is equipped with Variable Valve Timing (VVT). This system uses a Variable Valve Timing Solenoid (VVTS) to control the oil pressure to direct oil pressure to the camshaft phaser assembly. The camshaft phaser assembly advances and/or retards camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy and reduce emissions. The VVTS (3) is located under the intake manifold.

OPERATION

OPERATION

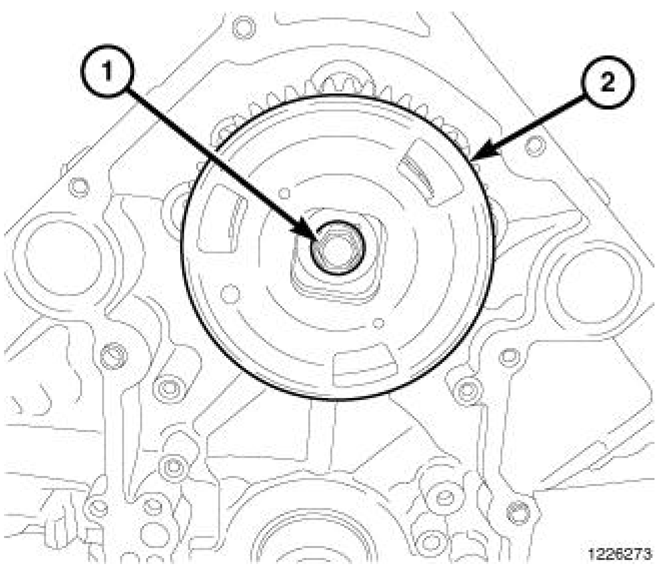


Fig. 185: Camshaft Phaser & Bolt
Courtesy of CHRYSLER GROUP, LLC

The Variable Cam Timing (VCT) assembly is actuated with engine oil pressure. The oil flow to the VCT assembly is controlled by an Variable Valve Timing Solenoid (VVTS). The VVTS consists of a Pulse Width Modulated (PWM) solenoid and a spool valve. The Powertrain Control Module (PCM) actuates the VVTS to

control oil flow through the spool valve into the VCT assembly. The VCT assembly consists of a rotor and a stator/sprocket. The stator/sprocket is connected to the timing chain. The rotor is connected to the camshaft. Oil flow into the VCT assembly rotates the rotor with respect to the stator, thus rotating the camshaft with respect to the stator/sprocket. This will rotate both the intake and exhaust lobes on the camshaft by the same amount. The intake and exhaust lobes can not be individually controlled with this VCT system. An infinitely variable valve timing position can be achieved within the limits of the hardware. The camshaft position sensor monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

REMOVAL

REMOVAL

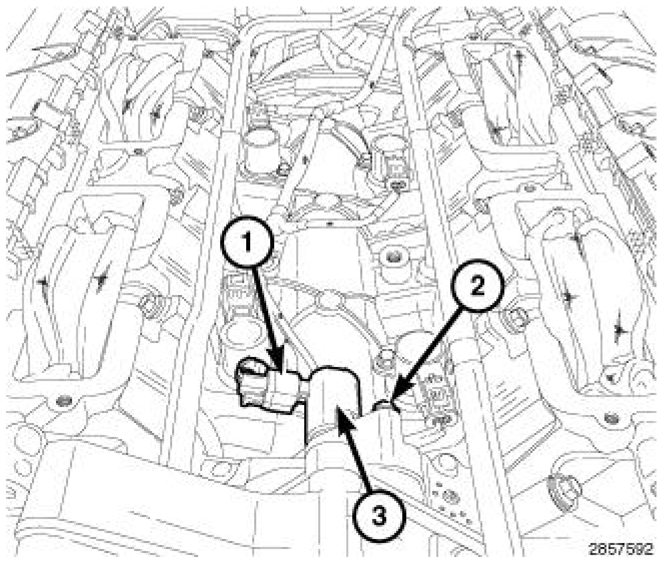


Fig. 186: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Variable Valve Timing Solenoid (VVTS) (3) is located under the intake manifold.

1. Remove intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.
2. Disconnect VVTS electrical connector (1).
3. Remove VVTS retaining bolt (2).

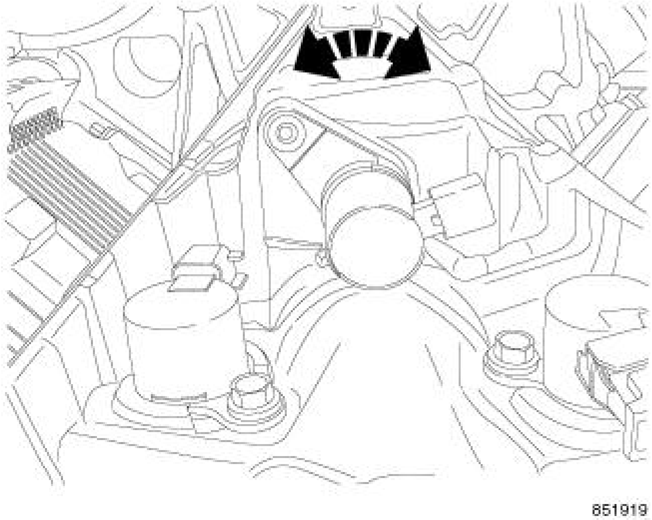


Fig. 187: Removing/Installing OCV
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To remove the VVTS, the engine must be at room temperature.**

4. Rotate the VVTS to break the seal and remove.

INSTALLATION

INSTALLATION

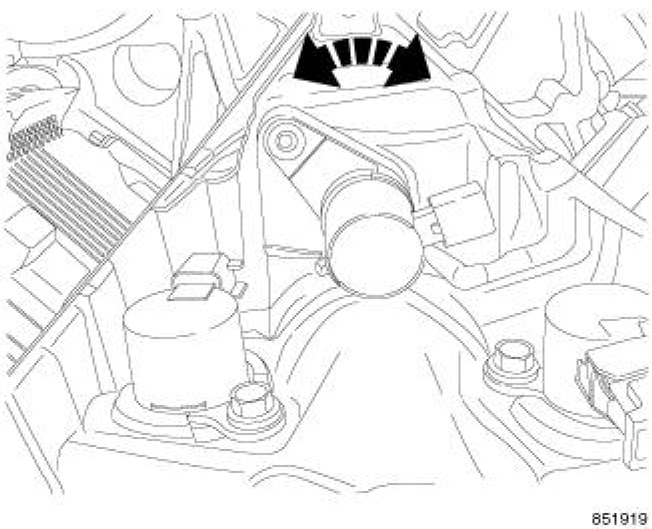


Fig. 188: Removing/Installing OCV
Courtesy of CHRYSLER GROUP, LLC

1. Lubricate the Variable Valve Timing Solenoid (VVTS) rubber O-ring seal with clean engine oil.
2. Install the VVTS and rotate into position.

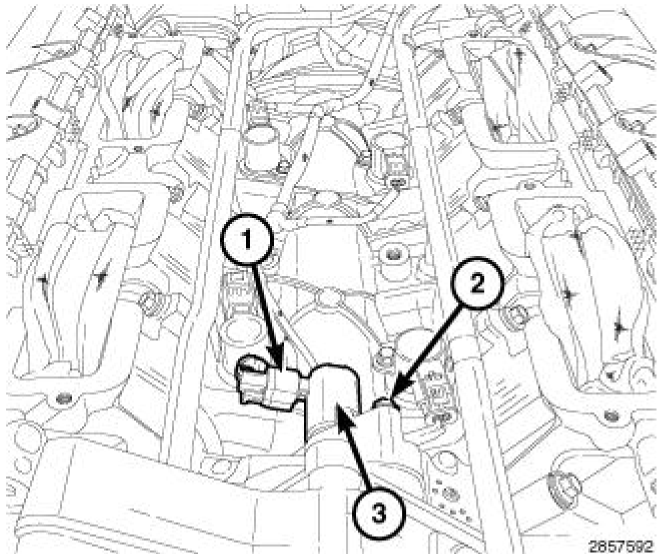


Fig. 189: Oil Control Valve, Electrical Connector & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Install the VVTS (3) retaining bolt (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
4. Connect VVTS electrical connector (1).
5. Install intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.

COOLER, OIL

DESCRIPTION

DESCRIPTION

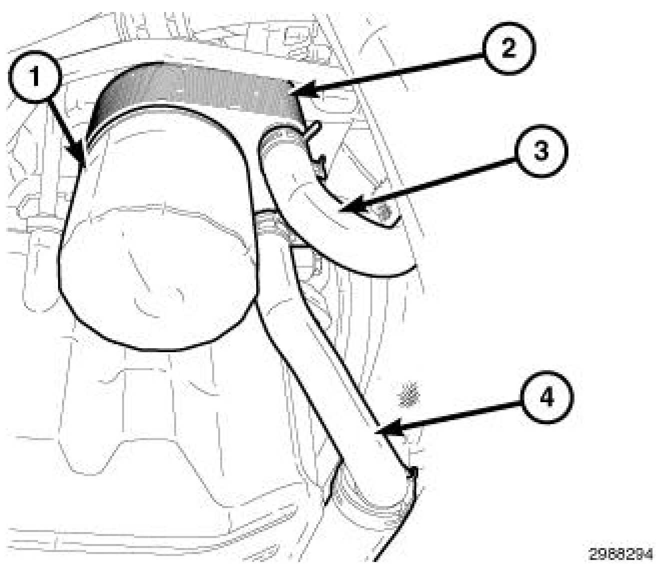


Fig. 190: Oil Filter, Oil Cooler & Hoses
Courtesy of CHRYSLER GROUP, LLC

The engine oil cooler (2) is engineered for maximum cooling efficiency with no restriction in oil flow. The oil cooler is a stack plate design coolant-to-oil heat exchanger.

The oil cooler (2) is mounted between the oil filter (1) and the engine block. The oil cooler uses the radiator coolant system; coolant is circulated through two coolant hoses to maintain a consistent engine oil temperature.

REMOVAL

REMOVAL

CAUTION: If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.

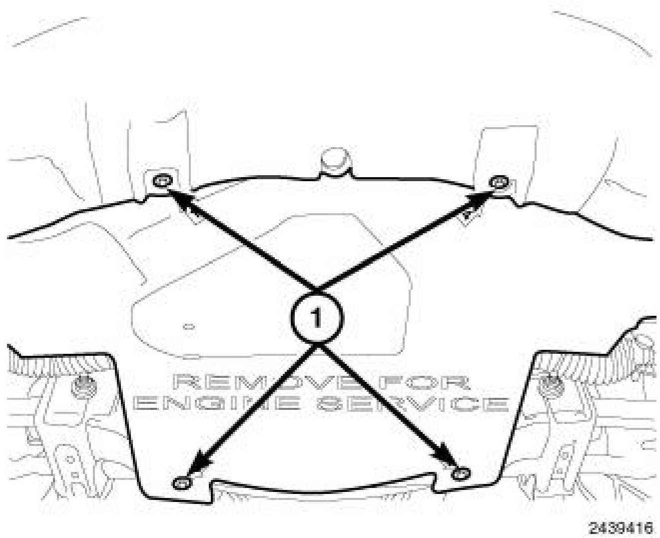


Fig. 191: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.
2. Remove the belly pan retainers (1) and remove the belly pan.
3. Drain the cooling system. Refer to **STANDARD PROCEDURE** .

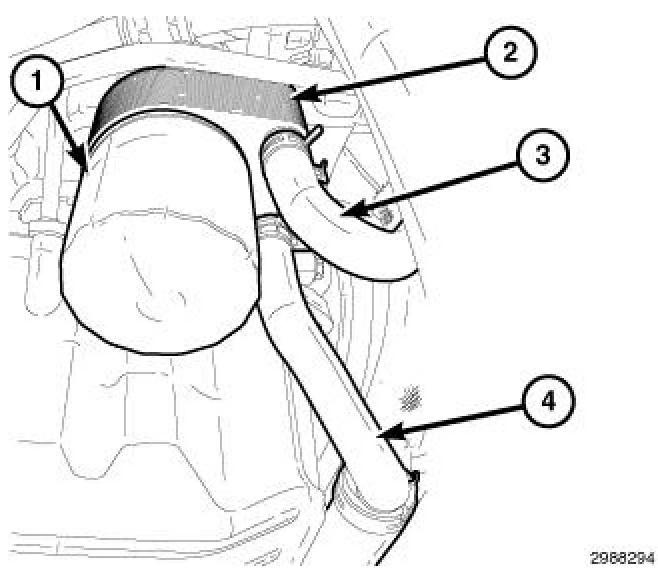


Fig. 192: Oil Filter, Oil Cooler & Hoses
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil filter (1) from the oil cooler (2).

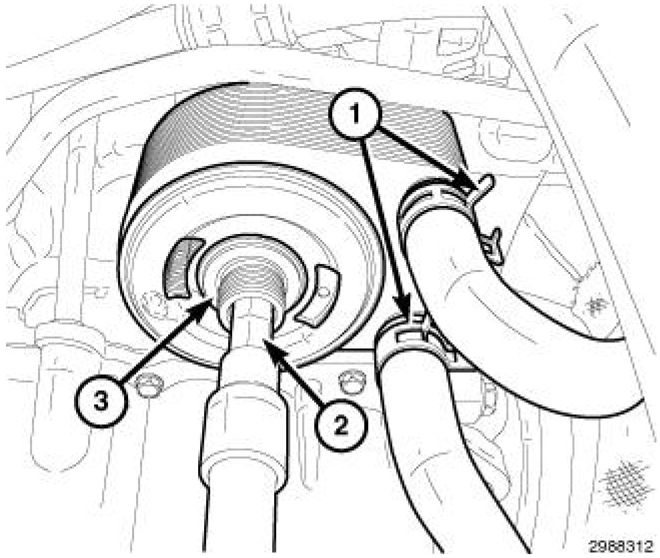


Fig. 193: Clamps, Allen Wrench Socket & Oil Cooler Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Remove the clamps (1) from the cooling hoses at the oil cooler and remove hoses.
6. Using a 12 mm Allen Wrench socket (2), remove the oil cooler retaining bolt (3).

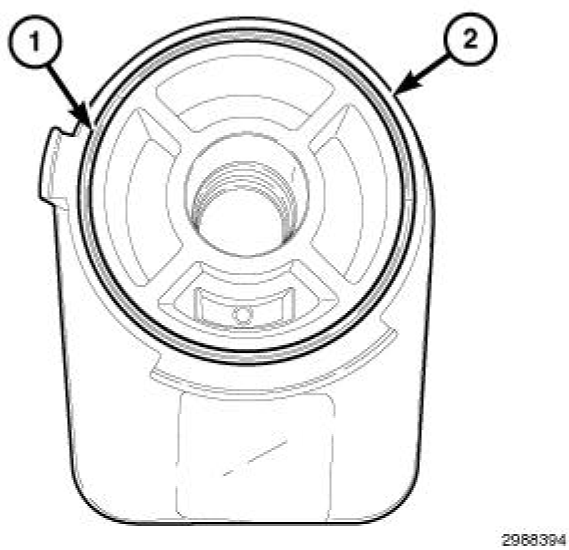


Fig. 194: O-Ring Seal & Oil Cooler
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Whenever the oil cooler is serviced, the rubber O-ring seal must be replaced.**

7. Remove and discard the oil cooler (2) rubber O-ring seal (1).

INSTALLATION

INSTALLATION

CAUTION: **If the engine encounters a catastrophic failure, the engine oil cooler and lines must be replaced or damage to the new engine and/or components could result.**

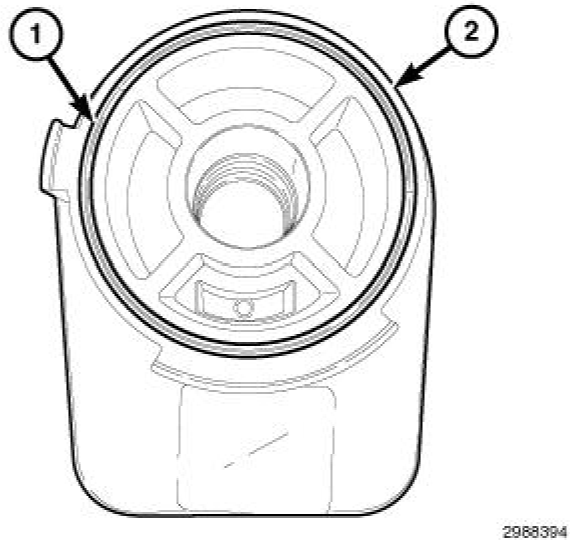


Fig. 195: O-Ring Seal & Oil Cooler
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Whenever the oil cooler is serviced, the rubber O-ring seal must be replaced.**

1. Clean the sealing surface of the oil cooler (2) and install a new rubber O-ring seal (1).
2. Lightly lubricate the oil cooler rubber O-ring seal (1) with clean engine oil.

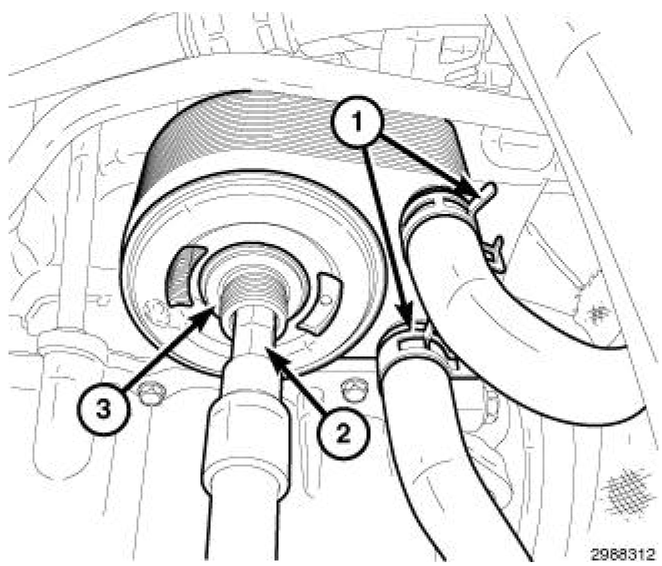


Fig. 196: Clamps, Allen Wrench Socket & Oil Cooler Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Using a 12 mm Allen Wrench socket (2), install the oil cooler retaining bolt (3) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.
4. Position the cooling hoses and install the clamps (1).

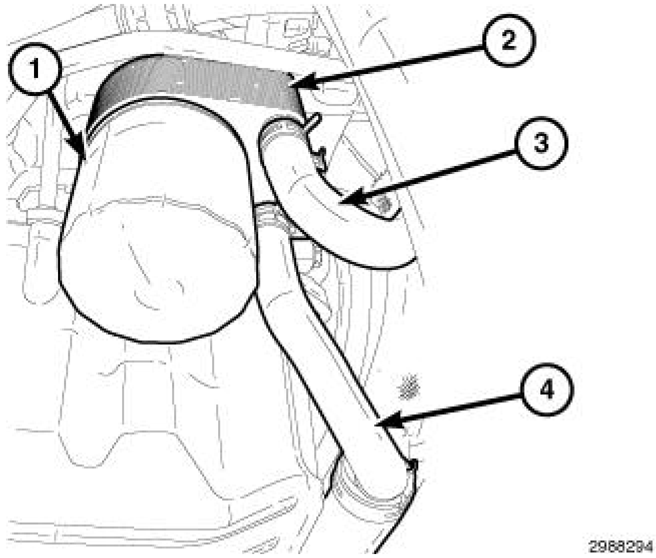


Fig. 197: Oil Filter, Oil Cooler & Hoses
Courtesy of CHRYSLER GROUP, LLC

5. Lightly lubricate the oil filter gasket with clean engine oil.

NOTE: **Do not over tighten the oil filter.**

6. Thread the oil filter (1) onto the oil cooler (2) oil filter boss.
7. When the oil filter gasket makes contact with the oil cooler sealing surface, hand tighten the oil filter one half turn, or 180Ā°.

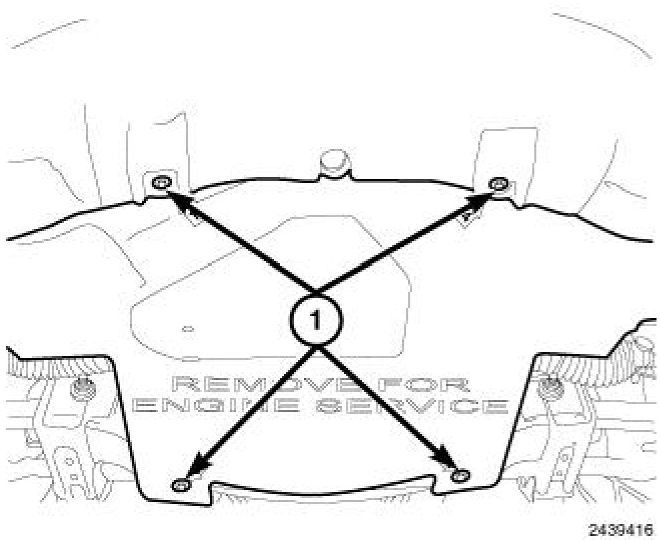


Fig. 198: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Position the belly pan to the under side of the vehicle and install the retainers (1).
9. Lower the vehicle.
10. Fill the cooling system. Refer to STANDARD PROCEDURE .
11. Start the engine and check for leaks.

12. Turn the engine off and check the oil level.

FILTER, ENGINE OIL

REMOVAL

REMOVAL

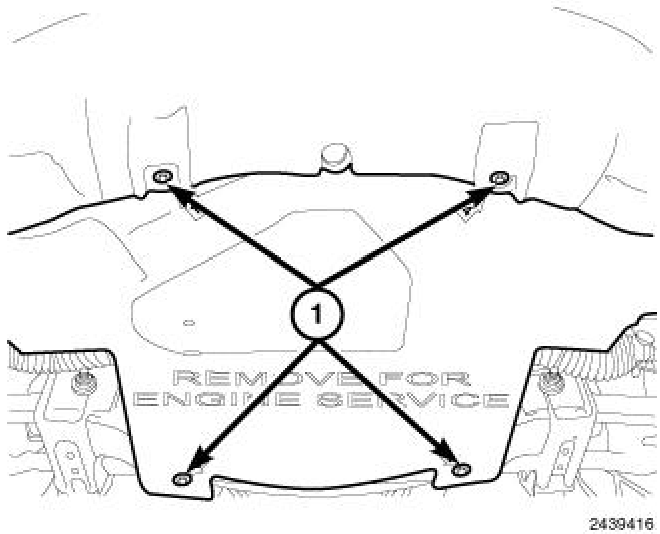


Fig. 199: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

All engines are equipped with a disposable oil filter.

1. Raise and support the vehicle.
2. Remove the belly pan retainers (1) and remove the belly pan.

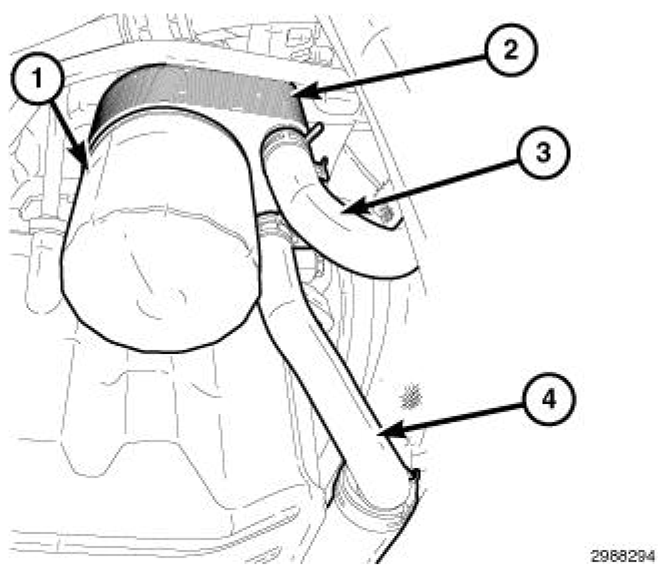


Fig. 200: Oil Filter, Oil Cooler & Hoses
Courtesy of CHRYSLER GROUP, LLC

3. Position a drain pan under the oil filter.

4. Using a suitable oil filter wrench, rotate the oil filter (1) counterclockwise to remove it from the oil cooler (2).
5. When the oil filter separates from the oil cooler, keep the gasket end upward to minimize oil spill and remove the oil filter from vehicle.

NOTE: **Make sure the oil filter gasket was removed with the oil filter.**

6. Using a wiping cloth, clean the oil cooler gasket sealing surface of oil and grime.

INSTALLATION

INSTALLATION

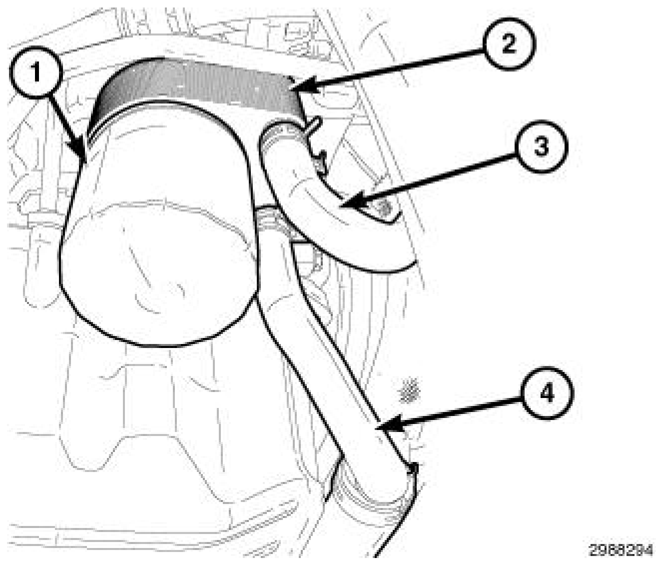


Fig. 201: Oil Filter, Oil Cooler & Hoses
Courtesy of CHRYSLER GROUP, LLC

1. Lightly lubricate the oil filter gasket with clean engine oil.

NOTE: **Do not over tighten the oil filter.**

2. Thread the oil filter (1) onto the oil cooler (2) oil filter boss.
3. When the oil filter gasket makes contact with the oil cooler sealing surface, hand tighten the oil filter one half turn, or 180Â°.

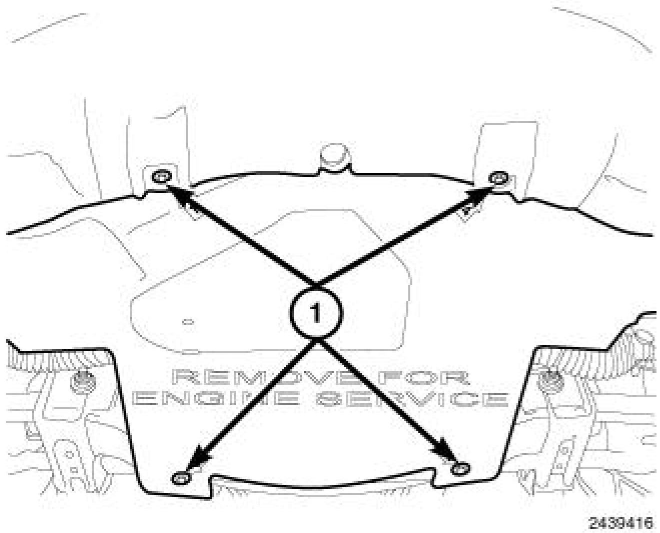


Fig. 202: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Position the belly pan to the under side of the vehicle and install the retainers (1).
5. Lower the vehicle.
6. Fill the crankcase with the specified type and amount of engine oil as described in **OIL**.
7. Install the oil fill cap.
8. Start the engine and check for leaks.
9. Turn the engine off and check the oil level.

JET, PISTON OIL COOLER

DESCRIPTION

DESCRIPTION

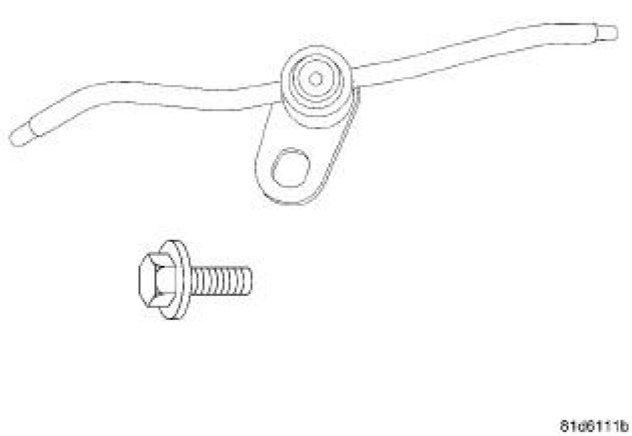


Fig. 203: Engine Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

Four dual-nozzle oil jets are bolted to the cylinder block underneath the main oil gallery. The jets connect with an oil-tight fit to the main gallery through lubrication passages. Each oil jet helps cool the two opposing pistons.

REMOVAL

REMOVAL

1. Remove the oil pan and oil pump pickup tube. Refer to **PAN, OIL, REMOVAL**.

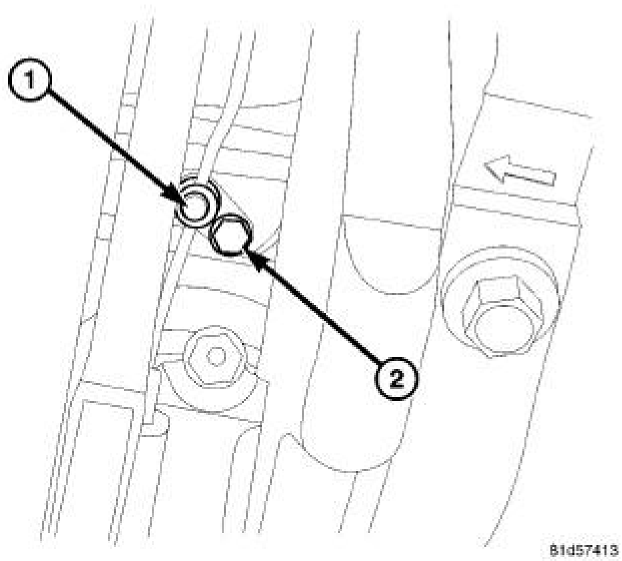


Fig. 204: Piston Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It may be necessary to rotate the engine crankshaft to access the piston oil cooler jet retaining bolts.**

2. Remove the piston oil cooler jet retaining bolt (2).
3. Remove the piston oil cooler jet (1).

INSTALLATION

INSTALLATION

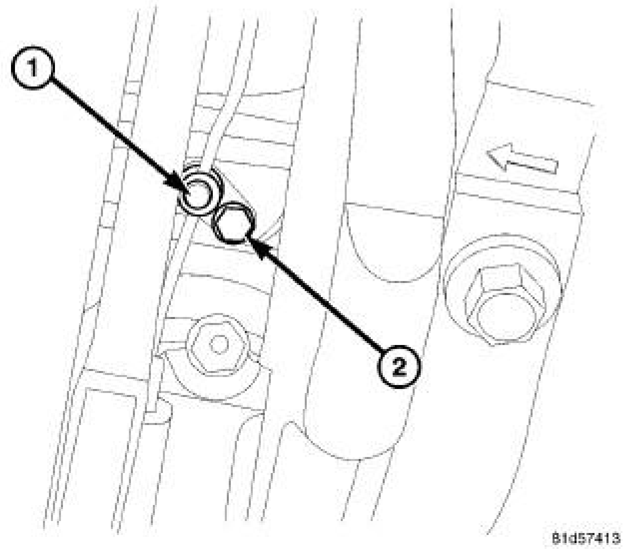


Fig. 205: Piston Oil Jet & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Position the piston oil cooler jet (1).
2. Install the piston oil cooler jet retaining bolt 2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
3. Install the engine oil pump pickup tube and oil pan. Refer to **PAN, OIL, INSTALLATION**.

OIL

STANDARD PROCEDURE

STANDARD PROCEDURE - ENGINE OIL SERVICE

CRANKCASE OIL LEVEL INSPECTION

The oil level indicator is located on the right side of the engine.

CAUTION: Do not overfill crankcase with engine oil, pressure loss or oil foaming can result.

Inspect the engine oil level approximately every 800 kilometers (500 miles). Unless the engine has exhibited loss of oil pressure, run the engine for about ten minutes before checking the oil level. Checking the engine oil level on a cold engine is not accurate.

To ensure proper lubrication of an engine, the engine oil must be maintained at an acceptable level. The acceptable levels are indicated between the ADD and SAFE marks on the engine oil level indicator.

1. Position the vehicle on the level surface.
2. With the engine off, allow approximately five minutes for the oil to settle to the bottom of the crankcase and then remove the engine oil level indicator.
3. Wipe the oil level indicator clean.
4. Install the oil level indicator and verify it is seated in the tube.

5. Remove the oil level indicator, with the handle held above the tip, observe the oil level reading.
6. Add oil only if the level is below the ADD mark on the oil level indicator.

ENGINE OIL CHANGE

Change the engine oil at the mileage and time intervals described in the Maintenance Schedules. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .

Run the engine until it reaches normal operating temperature.

1. Remove the oil fill cap.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the belly pan. Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL** .
4. Place a suitable drain pan under the oil pan drain.
5. Remove the drain plug from the oil pan and allow the oil to drain.

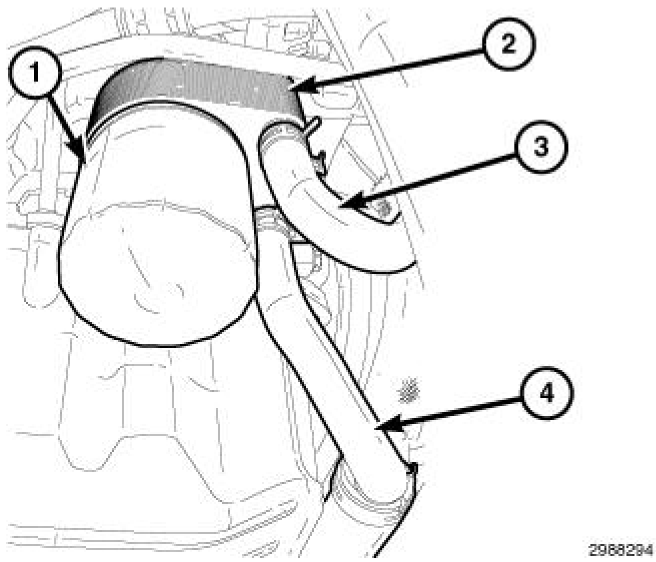


Fig. 206: Oil Filter, Oil Cooler & Hoses
Courtesy of CHRYSLER GROUP, LLC

6. Remove the oil filter (1).
7. Lightly lubricate the NEW oil filter gasket with clean engine oil.

NOTE: Do not over tighten the oil filter.

8. Thread the oil filter onto the oil cooler (2) oil filter boss.
9. When the oil filter gasket makes contact with the oil cooler sealing surface, hand tighten the oil filter one half turn, or 180Â°.
10. Clean any residual oil that may have dripped onto the oil cooler hoses (3, 4)

    .

11. Inspect the drain plug threads for stretching or other damage and replace if necessary.
12. Install the drain plug and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

13. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** or **BELLY PAN, ENGINE, INSTALLATION** .
14. Lower the vehicle and fill the crankcase with the specified type and amount of engine oil described in **OIL**.
15. Install the oil fill cap.
16. Start the engine and check for leaks.
17. Stop the engine and check the oil level.

NOTE: Care should be exercised when disposing of used engine oil.

PAN, OIL

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL**.
3. Remove the engine oil dipstick and tube from the oil pan.
4. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

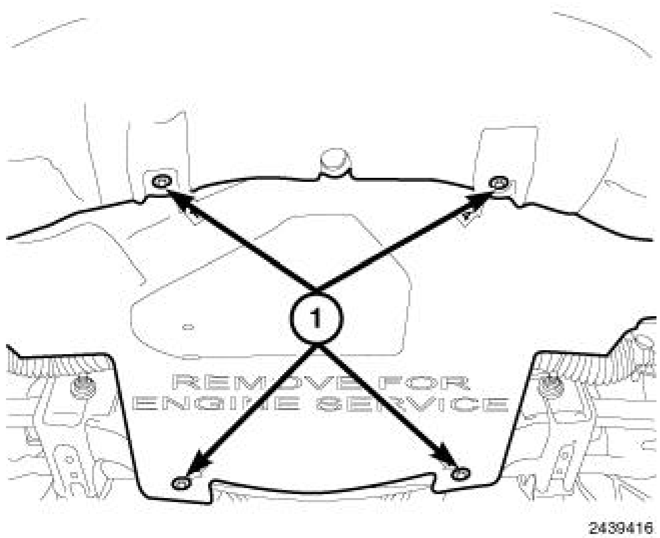


Fig. 207: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Remove the belly pan retainers (1) and remove the belly pan.
6. Drain the engine oil and remove the oil filter.

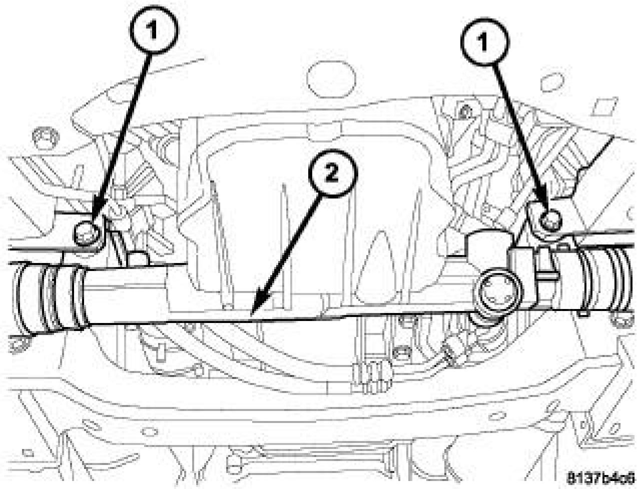


Fig. 208: Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not remove the tie rod ends or disconnect the steering column coupler.**

7. Remove the steering gear mounting bolts (1) and lower the steering gear (2) to provide clearance to remove the oil pan.

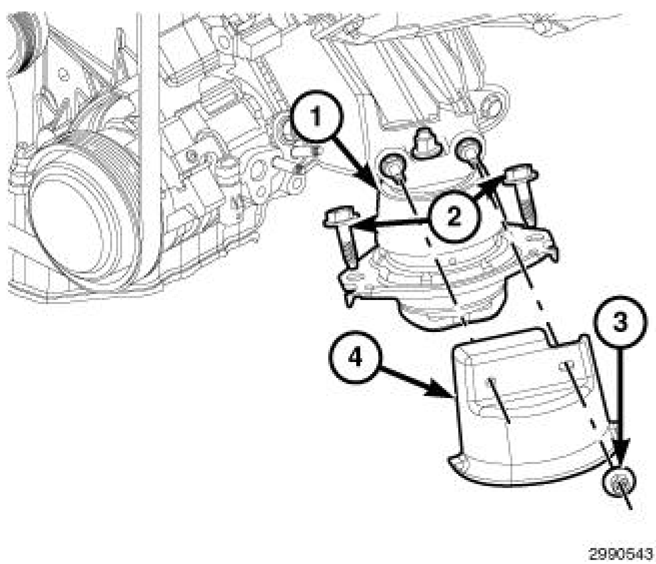


Fig. 209: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

8. Remove both left/right front engine mount heat shield retaining nuts (3) and remove the heat shields (4).
9. Remove both left/right front engine mount lower retaining bolts (2).
10. Lower the vehicle.

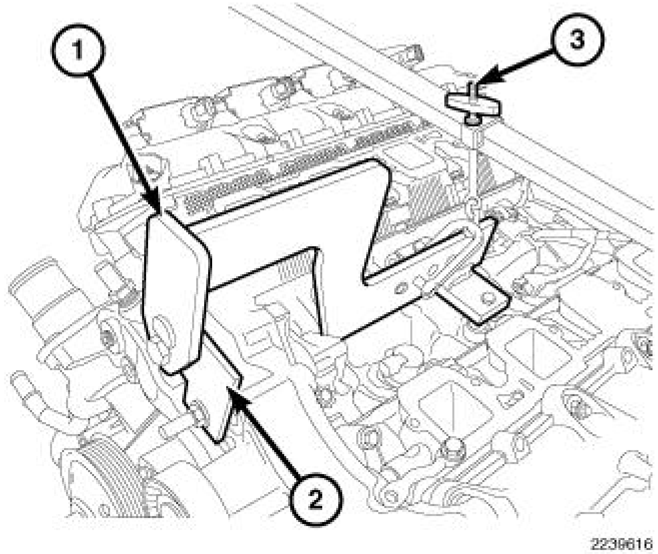


Fig. 210: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not use air tools to install engine lift fixture.**

11. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3).
12. Raise the engine to provide clearance to remove the oil pan.

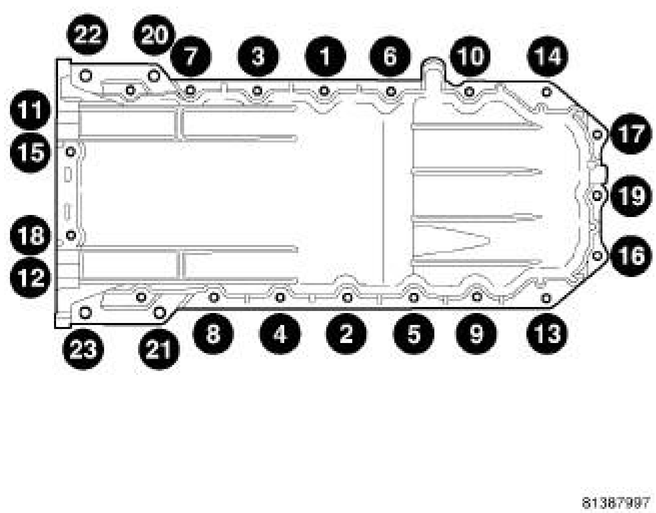


Fig. 211: Oil Pan Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not pry on the oil pan or oil pan gasket. The oil pan gasket is integral to the engine windage tray and does not come out with the oil pan.**

NOTE: **The horizontal M10 retaining bolts (11, 12, 15, 18) are 5 mm longer in length then the vertical M10 retaining bolts (20, 21, 22, 23) and must be reinstalled in their original locations.**

13. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
14. Remove the M10 retaining bolts (horizontal 11, 12, 15, 18 and vertical 20, 21, 22, 23) from the rear of the oil pan to the transmission.
15. Remove the M6 retaining bolts and remove the oil pan.

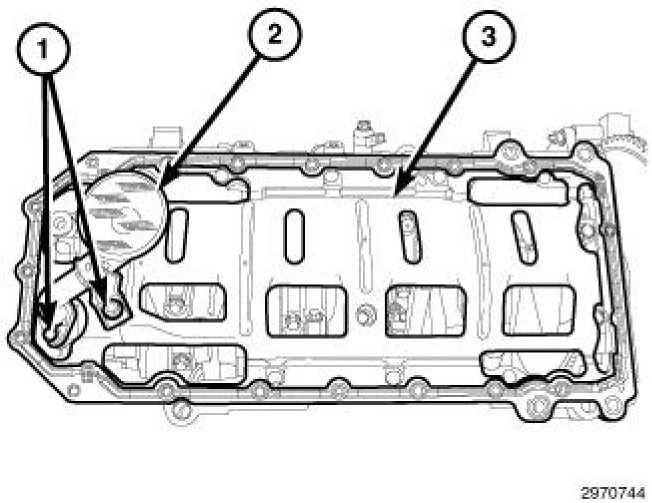


Fig. 212: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When the oil pan is removed, a new oil pan gasket and the integral windage tray assembly must be installed, the old gasket cannot be reused.**

16. Remove the oil pump pickup tube retaining bolt and nut (1).
17. Remove the oil pump pickup tube (2).
18. Remove and discard the oil pan gasket/windage tray (3).

INSTALLATION

INSTALLATION

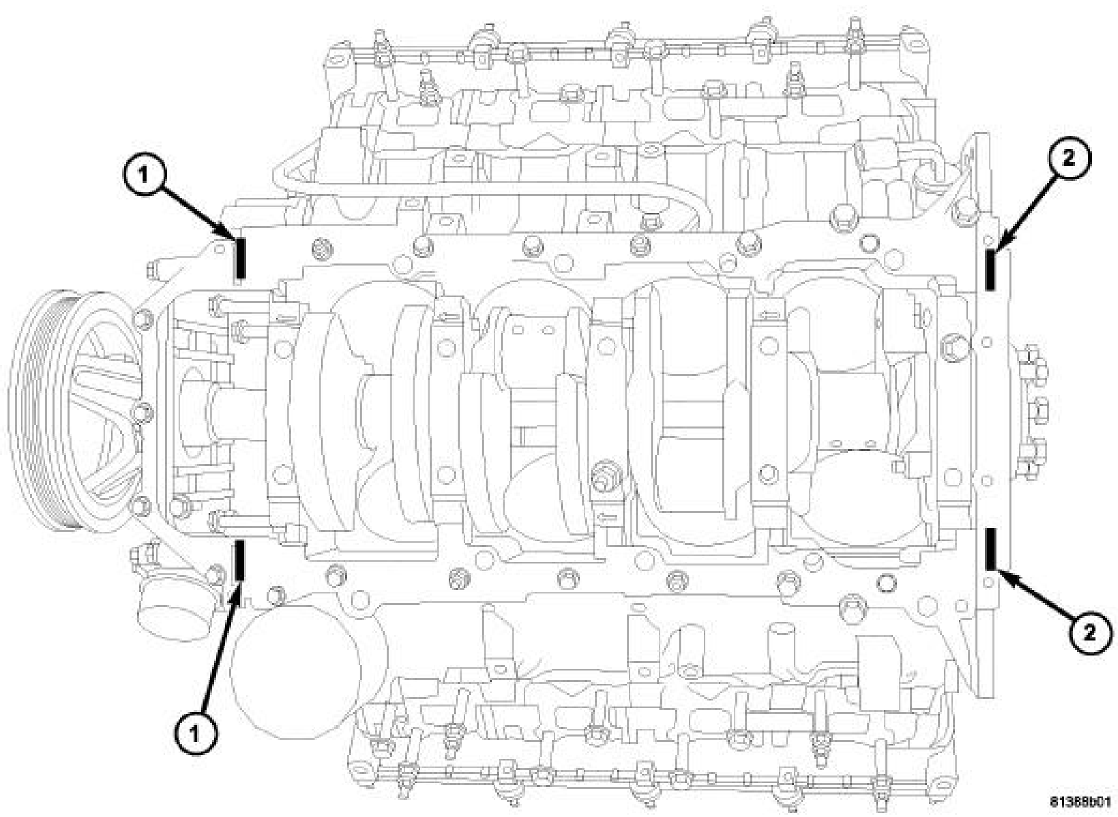


Fig. 213: T-Joint RTV Sealant Application
Courtesy of CHRYSLER GROUP, LLC

NOTE: **MoparĀ® Engine RTV must be applied to the 4 T-joints, the area where the front cover, rear retainer and oil pan gasket meet. The bead of RTV should cover the bottom of the gasket. This area is approximately 4.5 mm x 25 mm in each of the 4 T-joint locations.**

1. Clean the oil pan gasket mating surface of the engine block and oil pan.
2. Apply MoparĀ® Engine RTV at the 4 T- joints (1, 2).

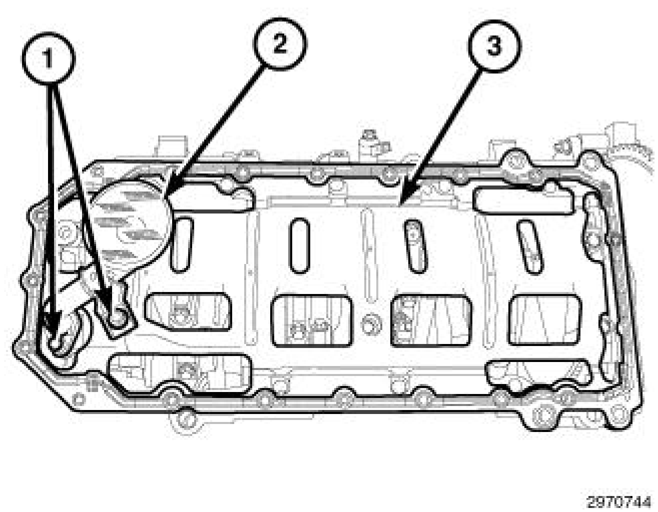


Fig. 214: Integral Windage Tray, Oil Pump Pickup Tube & Bolts

Courtesy of CHRYSLER GROUP, LLC

NOTE: **When the oil pan is removed a NEW oil pan gasket and the integral windage tray assembly must be installed, the old gasket cannot be reused.**

3. Install a NEW oil pan gasket/windage tray (3).
4. Using a NEW O-ring, position the oil pump pickup tube (2) into the oil pump.
5. Install the oil pump pickup tube retaining bolt and nut (1) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.

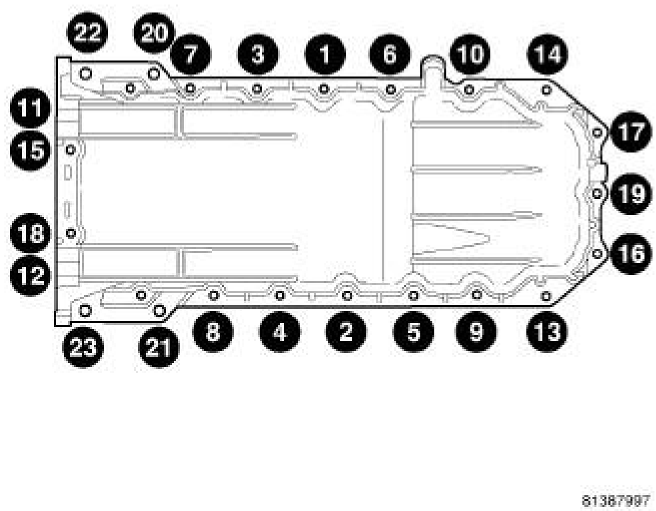


Fig. 215: Oil Pan Torque Sequence
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The horizontal M10 retaining bolts (11, 12, 15, 18) are 5 mm longer in length then the vertical M10 retaining bolts (20, 21, 22, 23) and must be reinstalled in their original locations.**

NOTE: **New M6 retaining bolts must be used when reinstalling the oil pan. Do not reuse the old M6 retaining bolts.**

6. Align the rear of the oil pan with the rear face of the engine block and install the M10 and M6 retaining bolts finger tight.
7. Using the sequence shown in illustration, tighten the M6 retaining bolts to 5 N.m (44 in. lbs.).
8. Using the sequence shown in illustration, tighten the M10 retaining bolts to 54 N.m (40 ft. lbs.).
9. Using the sequence shown in illustration, tighten the M6 retaining bolts to 12 N.m (9 ft. lbs.).
10. Lower the vehicle.

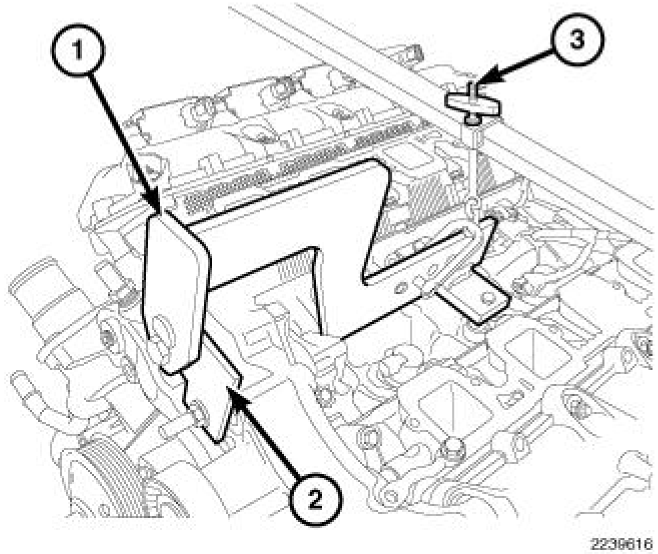


Fig. 216: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER GROUP, LLC

11. Using the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3) lower the engine into position and remove.
12. Install the engine oil dipstick tube and dipstick.
13. Raise the vehicle.

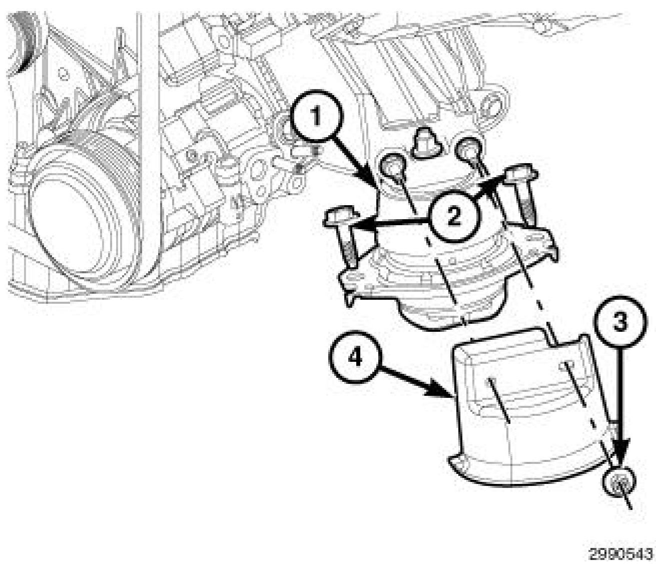
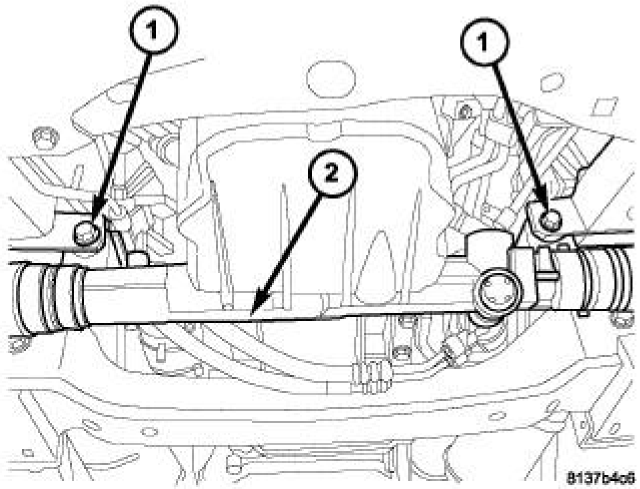


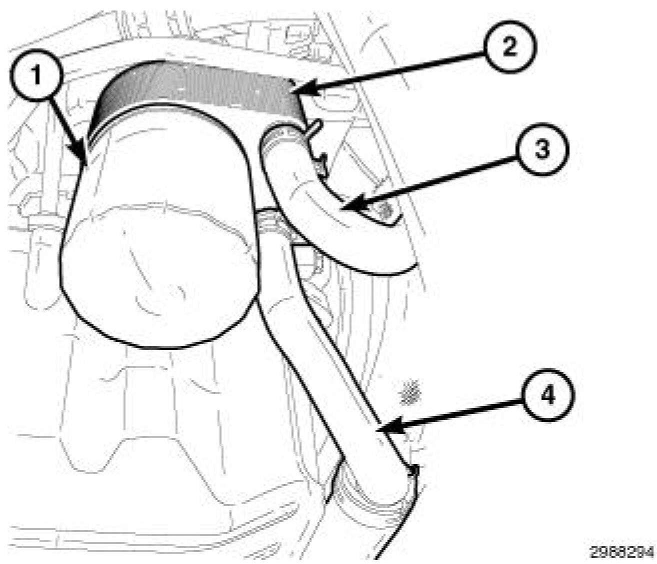
Fig. 217: Engine Mount Heat Shield Retaining Nuts, Lower Mount Retaining Bolts & Heat Shields
Courtesy of CHRYSLER GROUP, LLC

14. Install both engine mount lower retaining bolts (2) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
15. Position both engine mount heat shields (4) and install retaining nuts (3).



[Fig. 218: Gear Mounting Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

16. Position the steering gear (2), install mounting bolts (1) and tighten to the proper specification. Refer to **SPECIFICATIONS** .



[Fig. 219: Oil Filter, Oil Cooler & Hoses](#)
Courtesy of CHRYSLER GROUP, LLC

17. Lightly lubricate the oil filter gasket with clean engine oil.

NOTE: **Do not over tighten the oil filter.**

18. Thread the oil filter (1) onto the oil cooler (2) oil filter boss.
19. When the oil filter gasket makes contact with the oil cooler sealing surface, hand tighten the oil filter one half turn, or 180Ā°.

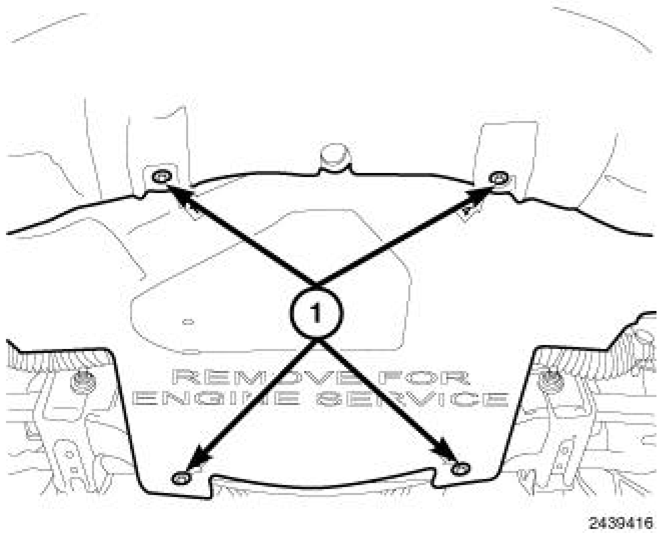


Fig. 220: Lower Splash Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

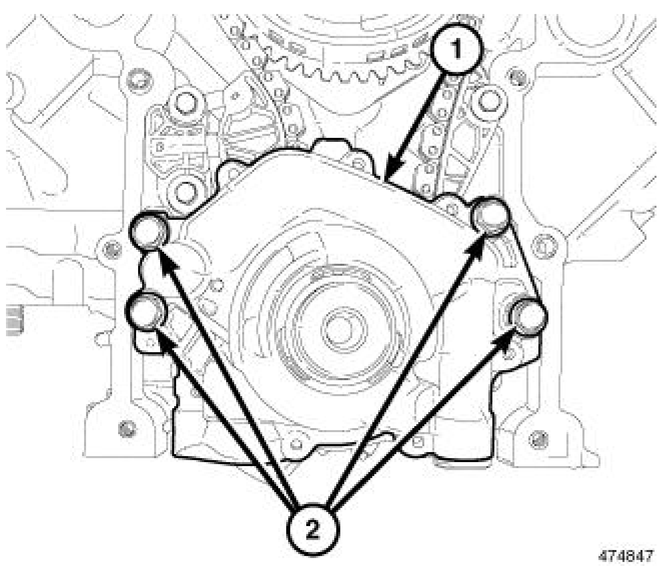
20. Position the belly pan to the under side of vehicle and install belly pan retainers (1).
21. Lower the vehicle.
22. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
23. Fill the engine with oil. Refer to **STANDARD PROCEDURE**.
24. Connect the negative battery cable.
25. Start the engine and check for leaks.

PUMP, ENGINE OIL

REMOVAL

REMOVAL

1. Remove the engine timing cover. Refer to **COVER(S), ENGINE TIMING, REMOVAL**.
2. Remove the oil pan and oil pump pickup tube. Refer to **PAN, OIL, REMOVAL**.



[Fig. 221: Oil Pump Retaining Bolts]
Courtesy of CHRYSLER GROUP, LLC

3. Remove the oil pump retaining bolts (2) and remove the oil pump (1).

INSPECTION

INSPECTION

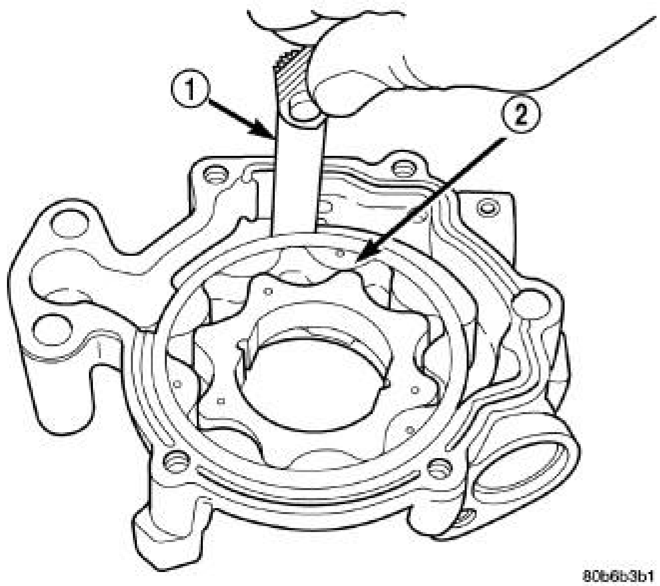


Fig. 222: Measuring Outer Rotor Clearance in Housing
Courtesy of CHRYSLER GROUP, LLC

1 - FEELER GAUGE	
2 - OUTER ROTOR	

CAUTION: Oil pump pressure relief valve and spring should not be removed from the oil pump. If these components are disassembled and or removed from the pump the entire oil pump assembly must be replaced.

1. Remove the pump cover.
2. Clean all parts thoroughly. The mating surface of the oil pump housing should be smooth. If the oil pump cover is scratched or grooved the oil pump assembly should be replaced.
3. Slide the outer rotor into the body of the oil pump. Press the outer rotor to one side of the oil pump body and measure the clearance between the outer rotor (2) and the body. If the measurement is 0.235 mm (0.009 in.) or greater the oil pump assembly must be replaced.

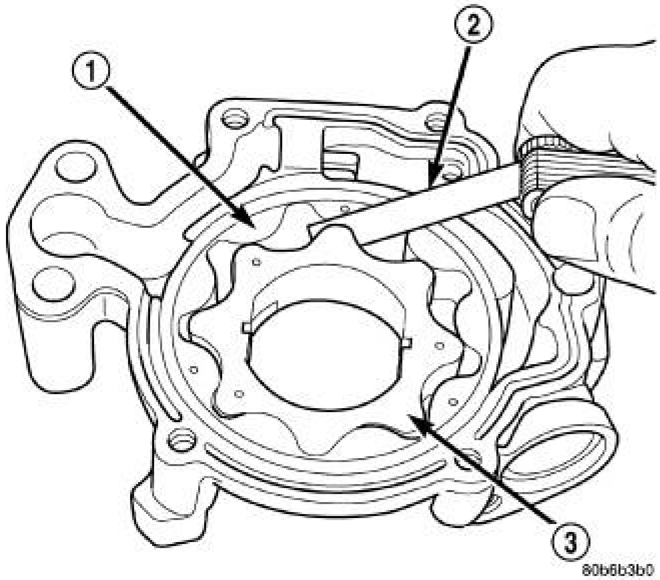


Fig. 223: Measuring Clearance Between Inner & Outer Rotors
Courtesy of CHRYSLER GROUP, LLC

1 - OUTER ROTOR	
2 - FEELER GAUGE	
3 - INNER ROTOR	

4. Install the inner rotor into the oil pump body. Measure the clearance between the inner (3) and outer (1) rotors. If the clearance between the rotors is.150 mm (0.006 in.) or greater the oil pump assembly must be replaced.

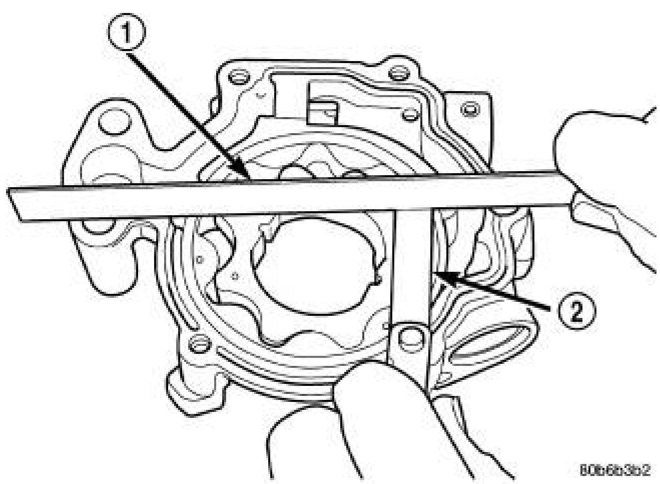


Fig. 224: Measuring Clearance Over Rotors
Courtesy of CHRYSLER GROUP, LLC

1 - STRAIGHT EDGE
2 - FEELER GAUGE

5. Place a straight edge (1) across the body of the oil pump (between the bolt holes), using a feeler gauge

(2), measure the clearance between the straightedge and the rotors. If the clearance is.095 mm (0.0038 in.) or greater the oil pump must be replaced.

6. Install the pump cover and tighten retainers to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

NOTE: **The oil pump is serviced as an assembly. In the event the oil pump is not functioning or out of specification it must be replaced as an assembly.**

INSTALLATION

INSTALLATION

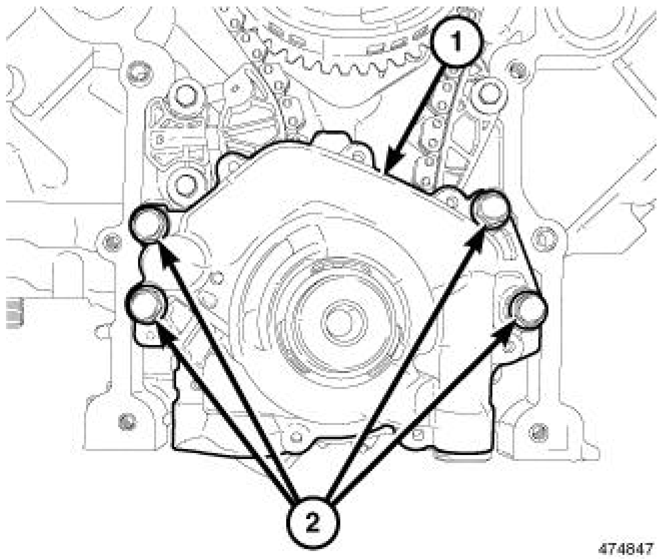


Fig. 225: Oil Pump Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the oil pump (1) onto the crankshaft, and install the retaining bolts (2).

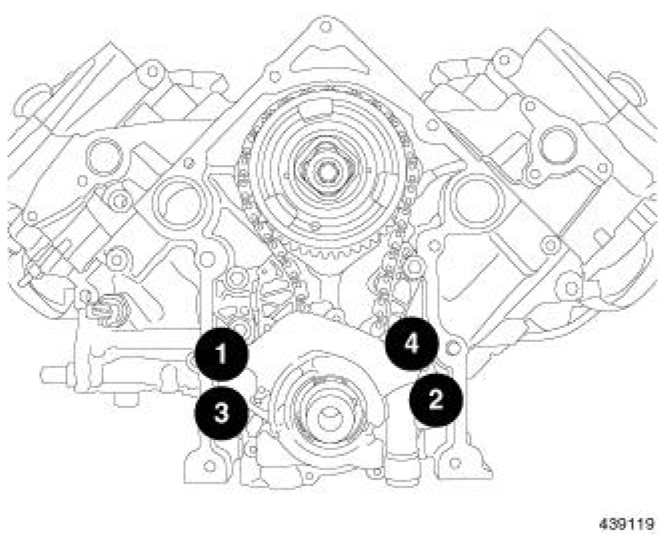


Fig. 226: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

2. Using the sequence shown in illustration, tighten the oil pump retaining bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
3. Install the timing chain cover. Refer to **COVER(S), ENGINE TIMING, INSTALLATION**.
4. Install the oil pump pickup tube and oil pan. Refer to **PAN, OIL, INSTALLATION**.

SENSOR, OIL PRESSURE

DESCRIPTION

DESCRIPTION

The oil pressure sensor uses the following three circuits:

- Signal circuit to the PCM
- Sensor ground circuit through the PCM
- 5 volt reference circuit from the PCM

The oil pressure sensor returns a voltage signal back to the PCM with reference to oil pressure. Ground for the sensor is supplied by the PCM.

The oil pressure sensor is located on the right side of the engine block. The sensor screws into the engines main oil gallery.

REMOVAL

REMOVAL

1. Remove the generator. Refer to **GENERATOR, REMOVAL** .
2. Position the generator aside to gain access to the oil pressure sensor.

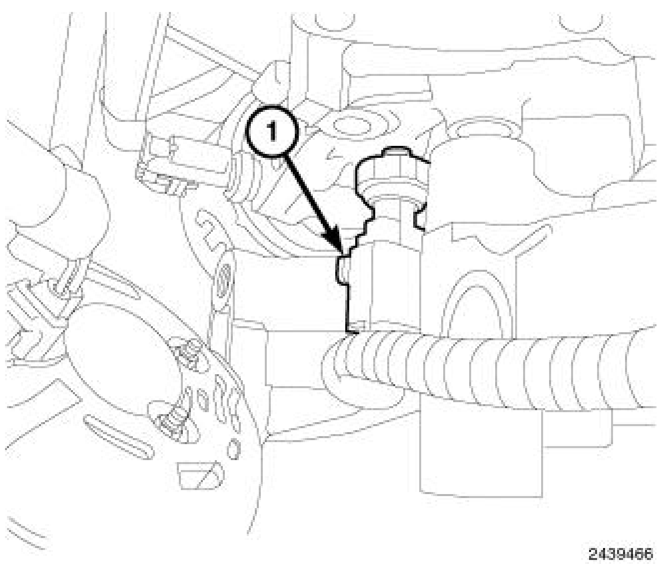


Fig. 227: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oil pressure sensor wire harness connector (1).

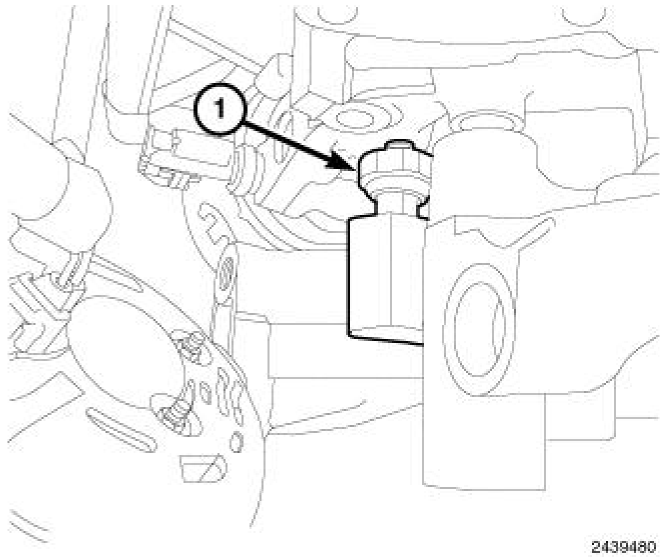


Fig. 228: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil pressure sensor (1).

INSTALLATION

INSTALLATION

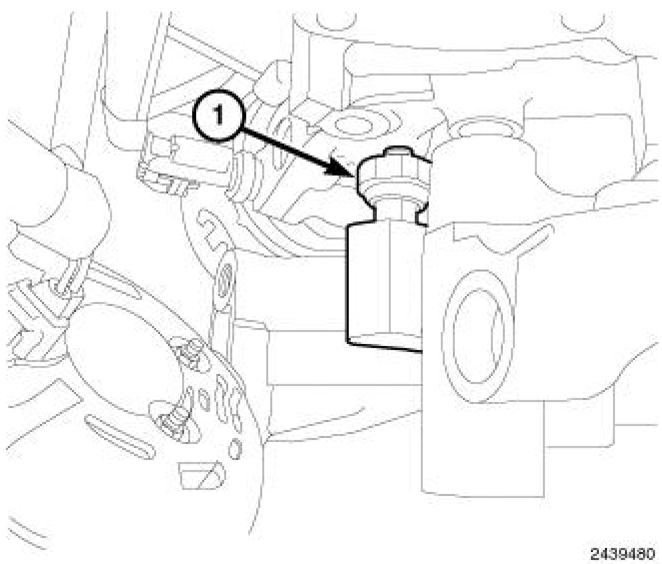


Fig. 229: Oil Pressure Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply MoparÃ® Thread Sealant with PTFE to the sensor threads before installing into the engine block.**

1. Install the oil pressure sensor (1) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS.

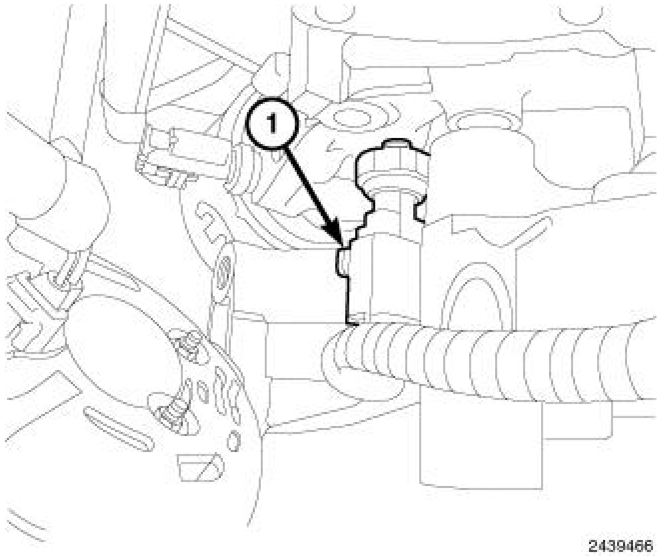


Fig. 230: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oil pressure sensor wire harness connector (1).
3. Install the generator. Refer to **GENERATOR, INSTALLATION** .

SENSOR, OIL TEMPERATURE

DESCRIPTION

DESCRIPTION

The oil temperature sensor uses the following two circuits:

- Signal circuit to the PCM
- Ground circuit from the PCM

The oil temperature sensor is a Negative Thermal Coefficient sensor. The resistance of the sensor changes as oil temperature changes. This results in different output voltages back to the PCM.

The oil temperature sensor is located on the right side of the engine block.

REMOVAL

REMOVAL

1. Remove the generator. Refer to **GENERATOR, REMOVAL** .
2. Position the generator aside to gain access to the oil temperature sensor.

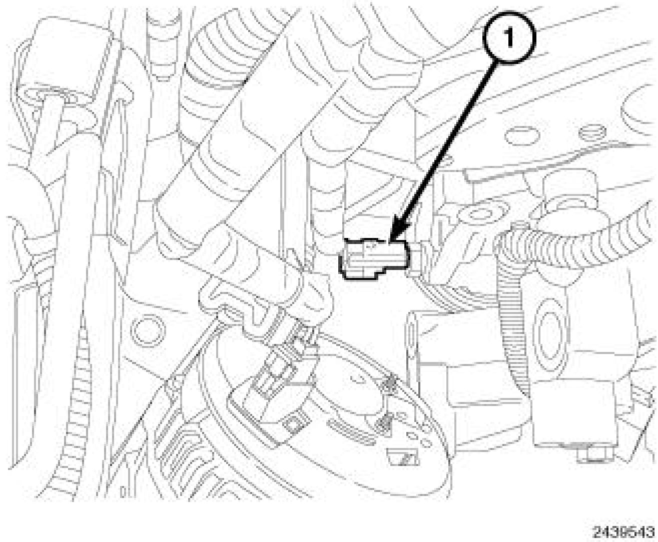


Fig. 231: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oil temperature sensor wire harness connector (1).

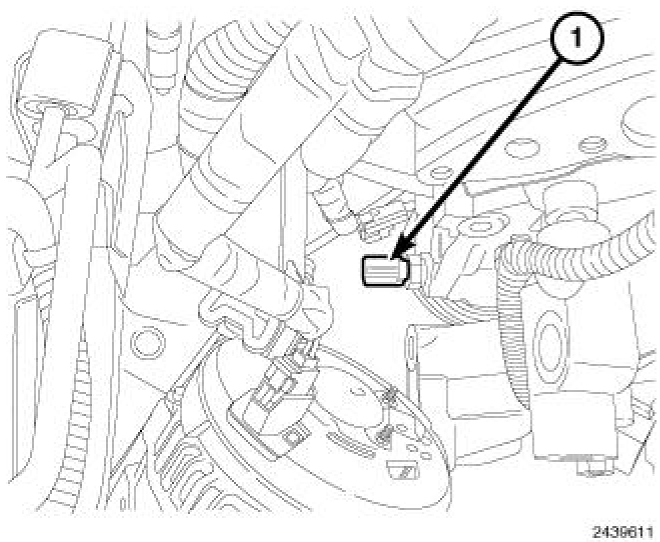


Fig. 232: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Remove the oil temperature sensor (1).

INSTALLATION

INSTALLATION

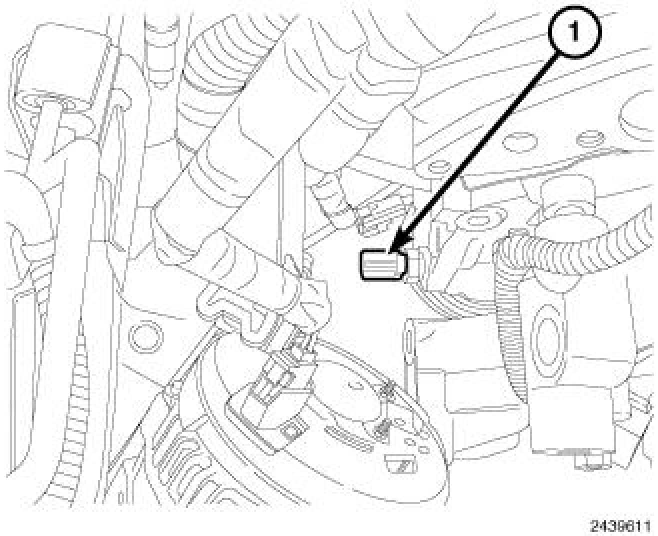


Fig. 233: Oil Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Apply MoparÃ® Thread Sealant with PTFE to the sensor threads before installing into the engine block.**

1. Install the oil temperature sensor (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.

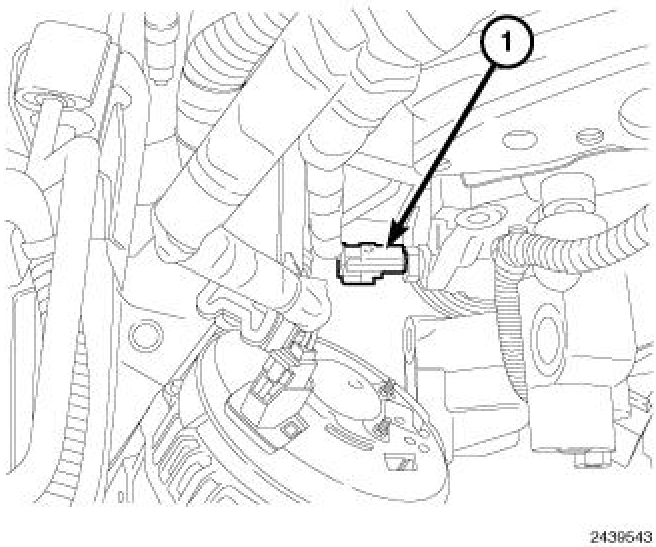


Fig. 234: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

2. Connect the oil temperature sensor wire harness connector (1).
3. Install the generator. Refer to **GENERATOR, INSTALLATION** .

MANIFOLDS

MANIFOLD, EXHAUST

DESCRIPTION

DESCRIPTION

The exhaust manifolds are tube in shell air gap design to maximize durability and performance. The exhaust manifolds are made of stainless steel stamped shells and stainless steel tubes with a powdered metal outlet. A layered graphite over perforated steel manifold gasket is used to provide sealing to the cylinder head.

OPERATION

OPERATION

The exhaust manifolds collect the engine exhaust gases exiting the combustion chambers and then channels the exhaust gases to the exhaust pipes/catalytic converters.

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.

NOTE: The left side shown in illustration. Right side similar.

2. Remove cylinder head. Refer to **CYLINDER HEAD, REMOVAL**.

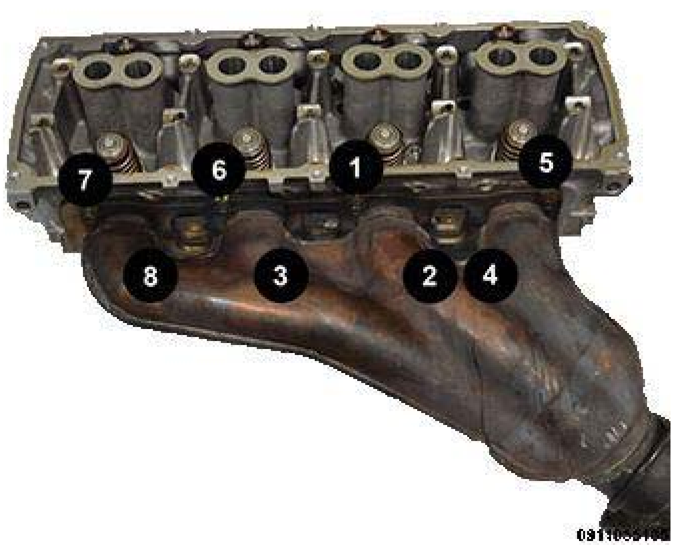


Fig. 235: Exhaust Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Remove the exhaust manifold bolts using the sequence shown in illustration, starting at eight and going backwards.

CLEANING

CLEANING

Clean the mating surfaces on cylinder head and manifold. Wash with solvent and blow dry with compressed air.

INSPECTION

INSPECTION

Inspect the exhaust manifold for cracks.

Inspect the mating surface of the exhaust manifold for flatness with a straight edge. The exhaust manifold gasket surface must be flat and within 0.67 mm (0.0264 in.) overall.

INSTALLATION

INSTALLATION

1. Clean the sealing surfaces of the exhaust manifold and cylinder head.

NOTE: **Left side shown in illustration. Right side similar.**

2. Using a new exhaust manifold gasket, position the exhaust manifold to the cylinder head.

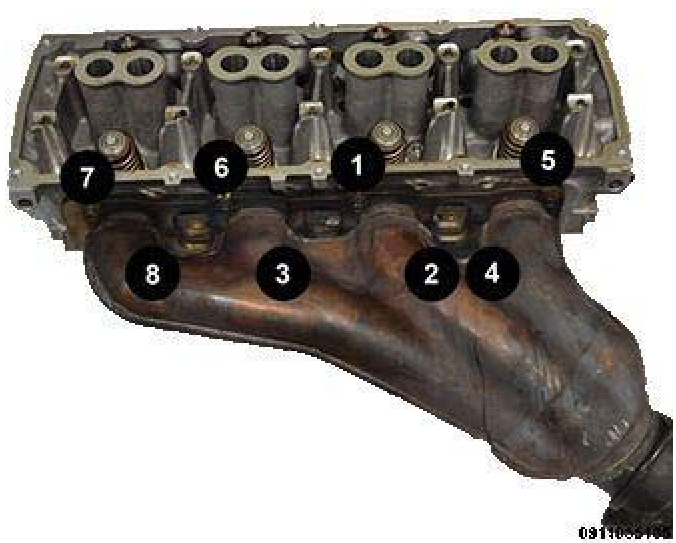


Fig. 236: Exhaust Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. First install the **NEW** exhaust manifold retaining bolts finger tight.
4. Using the sequence shown in illustration, tighten the retaining bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
5. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION**.
6. Connect the negative battery cable.
7. Start the engine and check for leaks.

MANIFOLD, INTAKE

DESCRIPTION

DESCRIPTION

CAUTION: If the engine has experienced a catastrophic failure, THE INTAKE MANIFOLD MUST BE REPLACED!

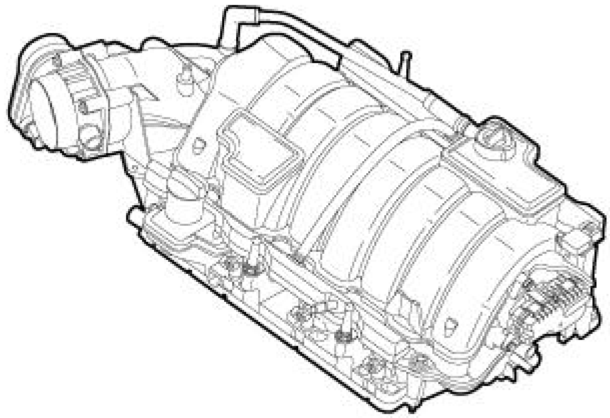


Fig. 237: Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

The intake manifold is made of a composite material and features a dual shaft Short Runner Valve (SRV) system to maximize both low end torque and peak power. The SRV is bolted to the rear of the intake manifold and can be service separately from the manifold. The manifold uses a single plane sealing system with individual port seals and a separate PCV port seal to prevent leaks.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - INTAKE MANIFOLD LEAKAGE

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or the fan. Do not wear loose clothing. Failure to follow this warning may result in serious or fatal injury.

1. Start the engine.
2. Spray a small stream of water at the suspected leak area.
3. If a change in RPM is observed the area of the suspected leak has been found.
4. Repair as required.

REMOVAL

REMOVAL

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Disconnect and isolate the negative battery cable.

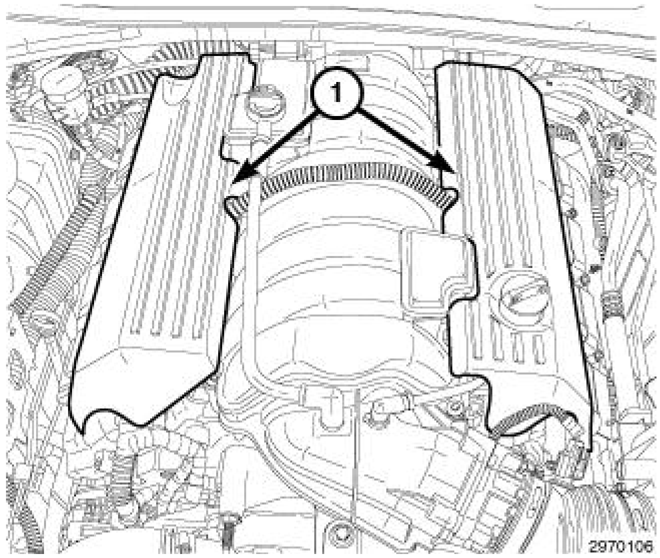


Fig. 238: Installing Engine Covers
Courtesy of CHRYSLER GROUP, LLC

3. Remove the engine covers (1).
4. Disconnect the fuel supply line. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**
.
5. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL**.
6. Disconnect the brake booster hose and the vapor purge hose.

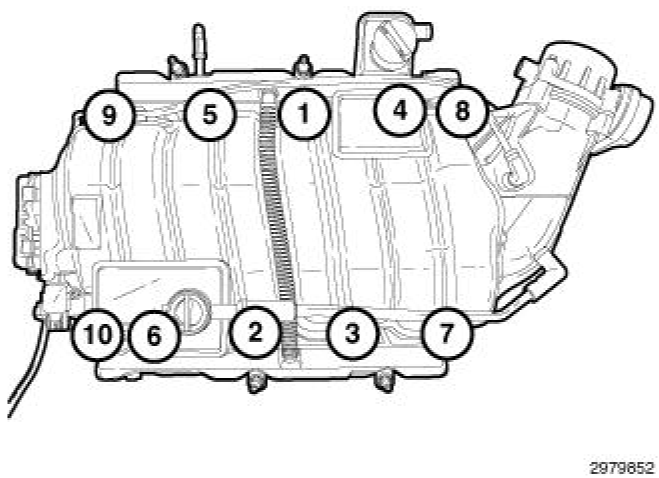


Fig. 239: Intake Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the wire harness connectors from the following components:
   - Manifold Absolute Pressure (MAP) Sensor
   - Short Runner Valve (SRV)
   - Fuel Injectors
   - Electronic Throttle Control (ETC)

8. Using the sequence shown in illustration, remove the intake manifold retaining bolts.
9. Remove the intake manifold and throttle body as an assembly from the vehicle.

CLEANING

CLEANING

NOTE: **There is NO approved repair procedure for the intake manifold. If severe damage is found during inspection, the intake manifold must be replaced.**

Before installing the intake manifold thoroughly clean the mating surfaces. Use a suitable cleaning solvent, then air dry.

INSPECTION

INSPECTION

1. Inspect the intake manifold sealing surface for cracks, nicks and distortion.
2. Inspect the intake manifold vacuum hose fittings for looseness or blockage.

INSTALLATION

INSTALLATION

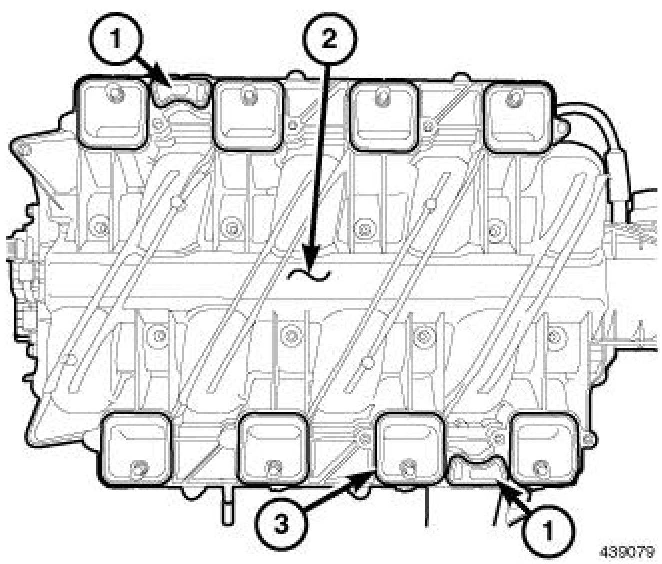


Fig. 240: Intake Manifold & PCV Seals
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The intake manifold seals (1, 3) may be used again, provided no cuts, tears, or deformation have occurred.**

1. Inspect the intake manifold seals and replace if necessary.

   NOTE: **If reinstalling the original manifold, apply MoparÃ® Lock & Seal Adhesive to the intake manifold bolts. Not required when installing a new manifold.**

2. If required, apply MoparÃ® Lock & Seal Adhesive to the intake manifold bolts.

3. Position the intake manifold (2).

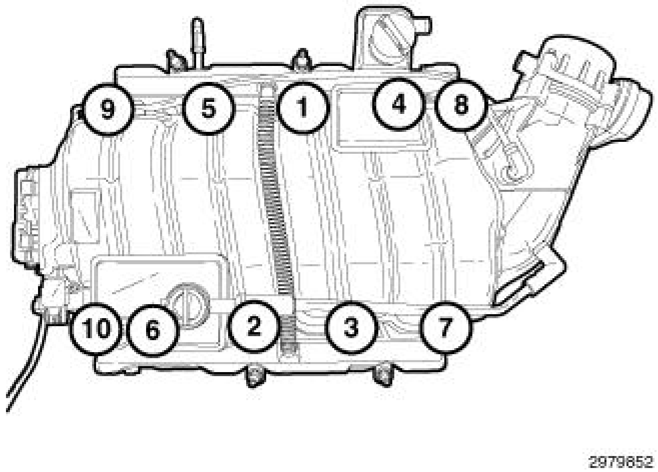


Fig. 241: Intake Manifold Removal/Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

4. Using the sequence shown in illustration, install the intake manifold retaining bolts and tighten to 12 N.m (9 ft. lbs.).
5. Connect the fuel supply line. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE** .
6. Connect the brake booster hose and the EVAP purge hose.
7. Connect the electrical connectors to the following components:
   - Manifold Absolute Pressure (MAP) Sensor
   - Short Runner Valve (SRV)
   - Fuel Injectors
   - Electronic Throttle Control (ETC)
8. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION**.

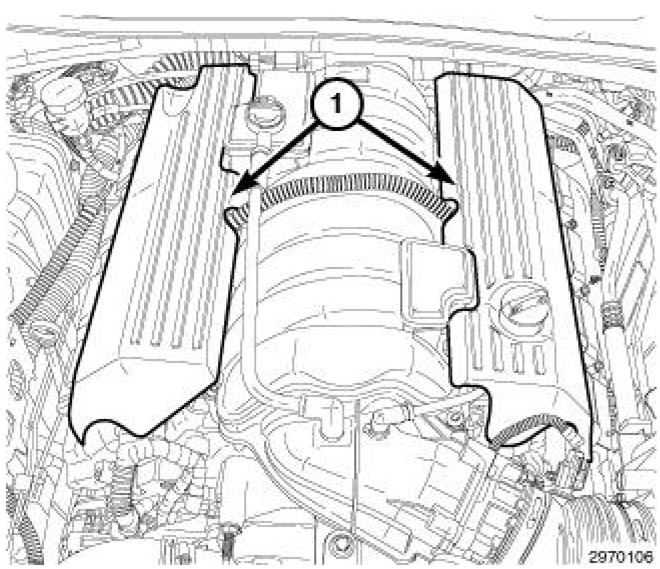


Fig. 242: Installing Engine Covers

Courtesy of CHRYSLER GROUP, LLC

9. Install the engine covers (1) on to the ball studs.
10. Connect the negative battery cable.

VALVE TIMING

CHAIN AND SPROCKETS, TIMING

REMOVAL

REMOVAL

1. Remove the engine oil pump. Refer to **PUMP, ENGINE OIL, REMOVAL**.

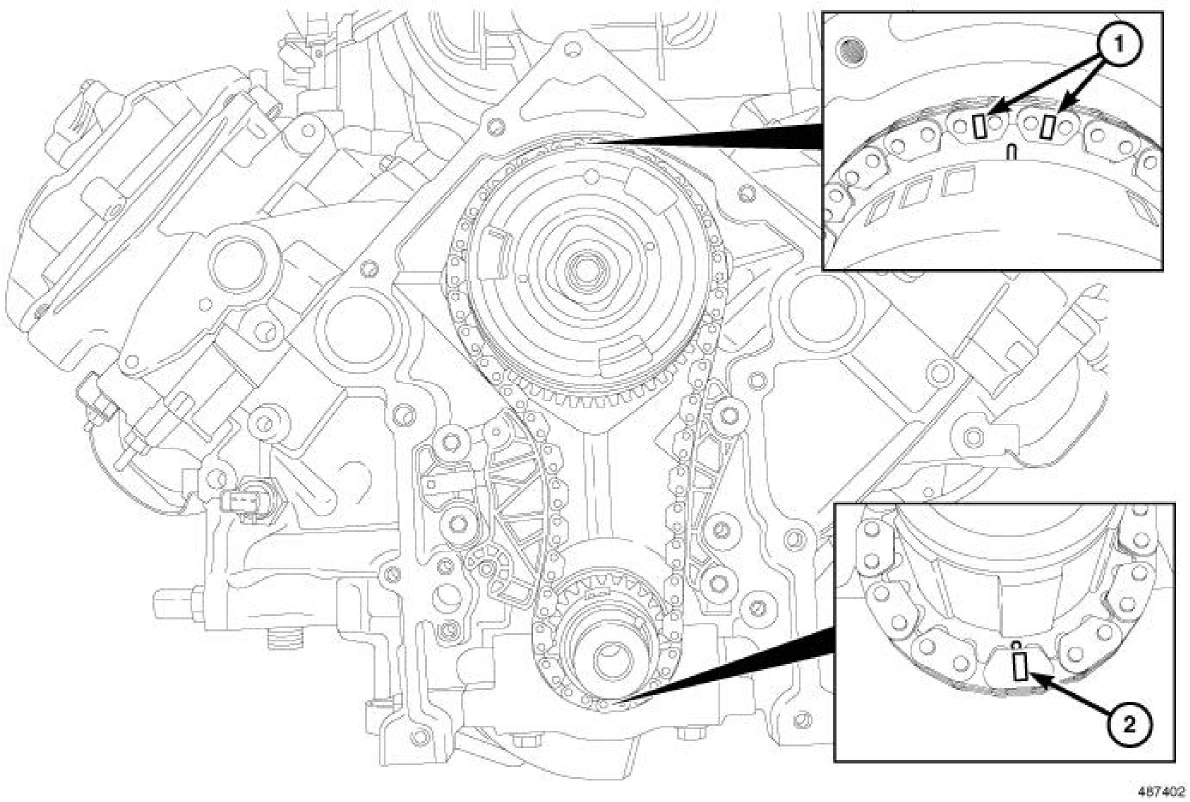
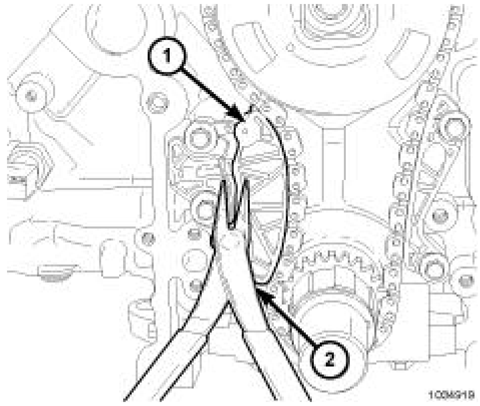


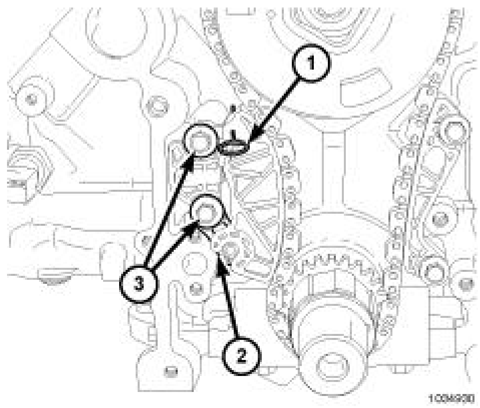
Fig. 243: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

2. Install the vibration damper bolt finger tight. Using a suitable socket and breaker bar, rotate the crankshaft to align the timing marks with the timing chain sprockets (1, 2).



[Fig. 244: Chain Tensioner Arm]
Courtesy of CHRYSLER GROUP, LLC

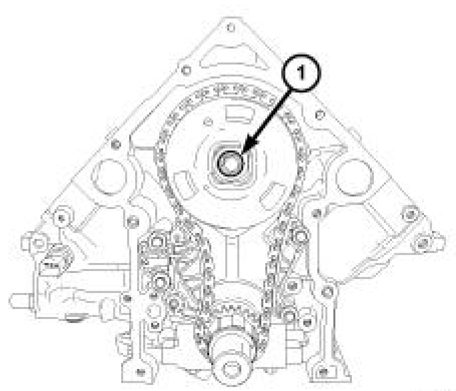
3. Retract the chain tensioner arm (1) until the hole in the arm lines up with the hole in the bracket.



[Fig. 245: Timing Chain Tensioner Pin]
Courtesy of CHRYSLER GROUP, LLC

4. Install the Tensioner Pin (special tool #8514, Pins, Tensioner) (1) into the chain tensioner holes.

CAUTION:	**Never attempt to disassemble the camshaft phaser, severe engine damage could result.**



[Fig. 246: Camshaft Phaser Retaining Bolt]
Courtesy of CHRYSLER GROUP, LLC

5. Remove the camshaft phaser retaining bolt (1) and remove the timing chain with the camshaft phaser and crankshaft sprocket.

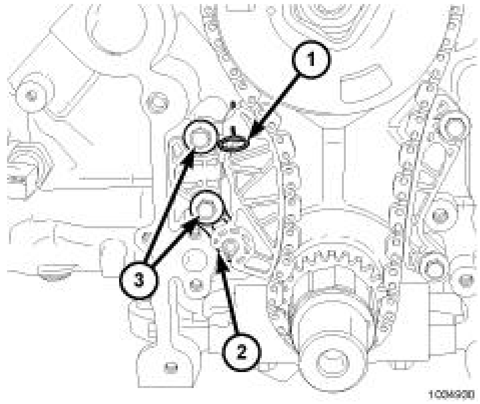


Fig. 247: Timing Chain Tensioner Pin
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Inspect the timing chain tensioner and timing chain guide shoes for wear and replace as necessary.**

6. If the timing chain tensioner is to be replaced, remove the retaining bolts (3) and remove the timing chain tensioner (2).

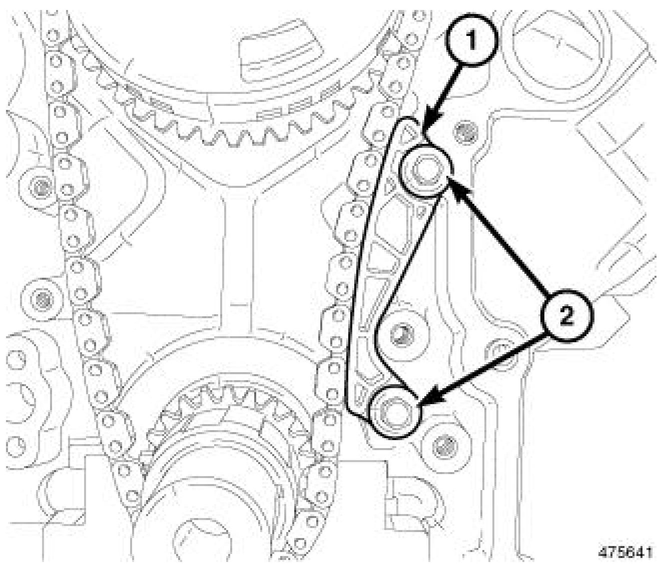


Fig. 248: Timing Chain Guide
Courtesy of CHRYSLER GROUP, LLC

7. If the timing chain guide (1) is to be replaced, remove the retaining bolts (2) and remove the timing chain guide (1).

INSTALLATION

INSTALLATION

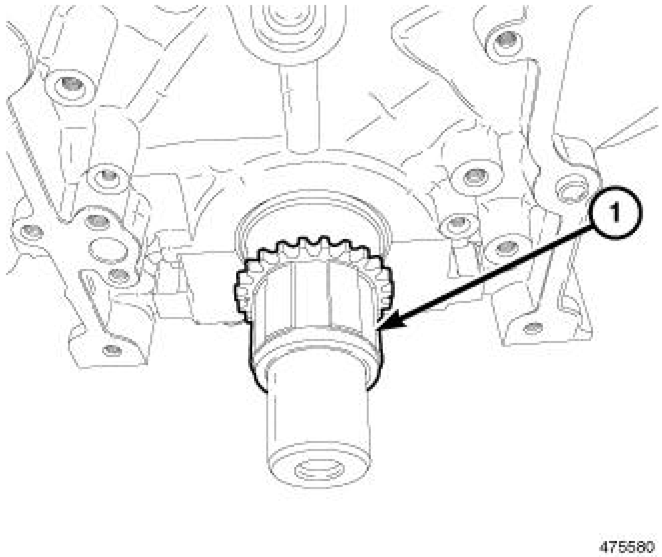


Fig. 249: Crankshaft Sprocket
Courtesy of CHRYSLER GROUP, LLC

1. Install the crankshaft sprocket (1) and position halfway onto the crankshaft.

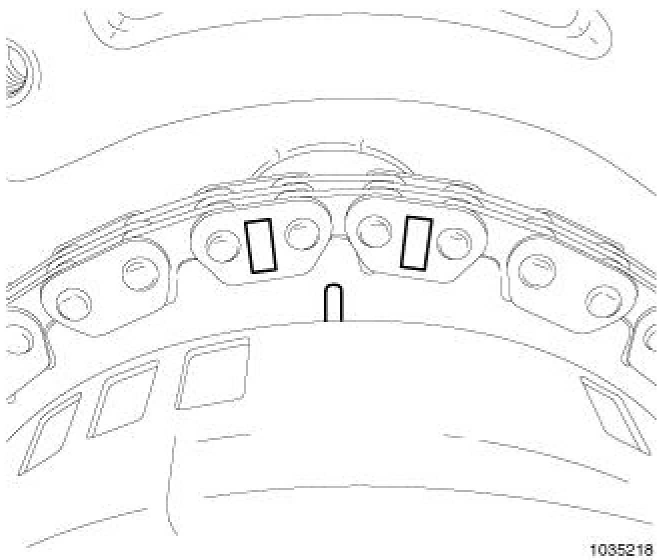


Fig. 250: Aligning Timing Chain & Camshaft Phaser Marks
Courtesy of CHRYSLER GROUP, LLC

2. While holding the camshaft phaser in hand, position the timing chain on the camshaft phaser and align the timing marks as shown in illustration.

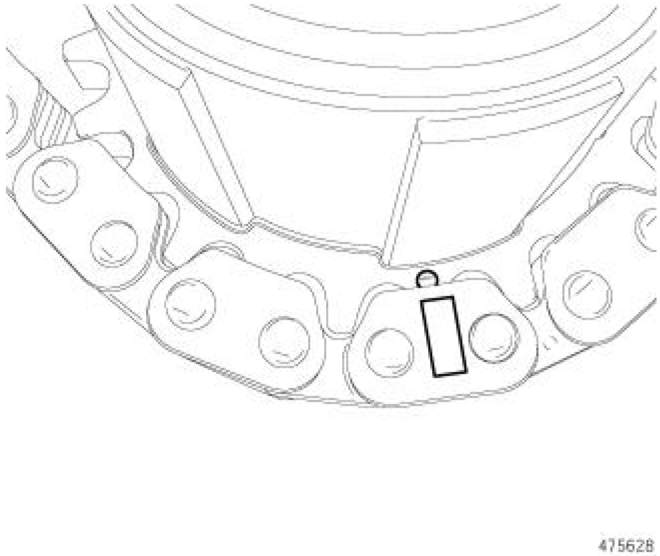


Fig. 251: Aligning Timing Chain & Crankshaft Sprocket Marks
Courtesy of CHRYSLER GROUP, LLC

3. While holding the camshaft phaser and timing chain in hand, position the timing chain on the crankshaft sprocket and align the timing mark as shown in illustration.

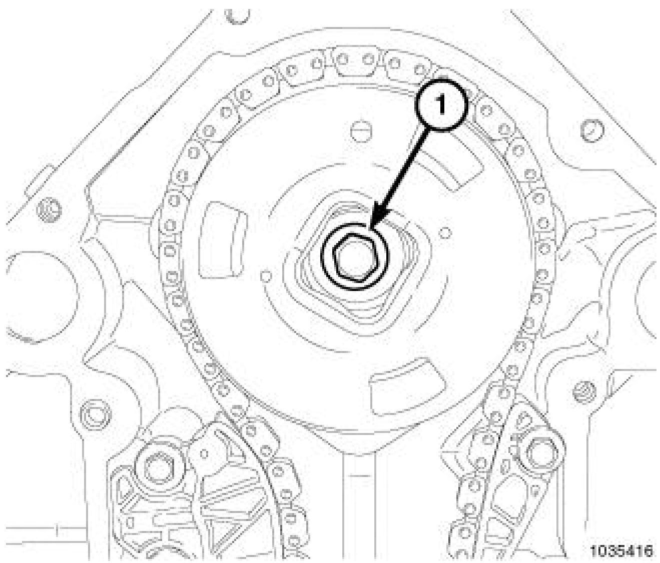
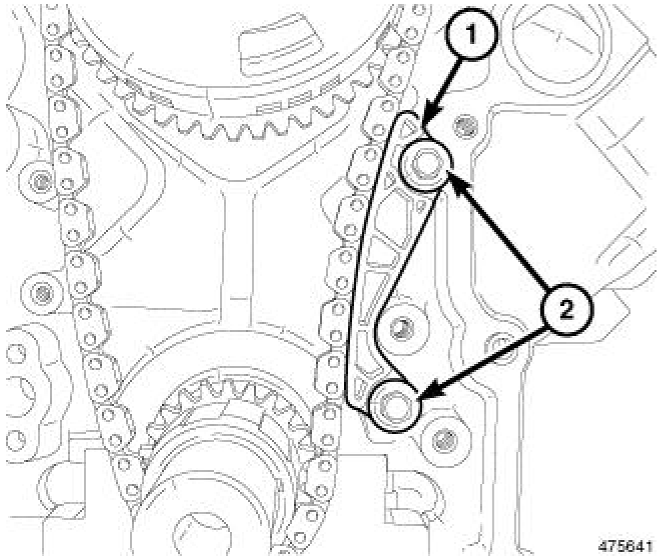


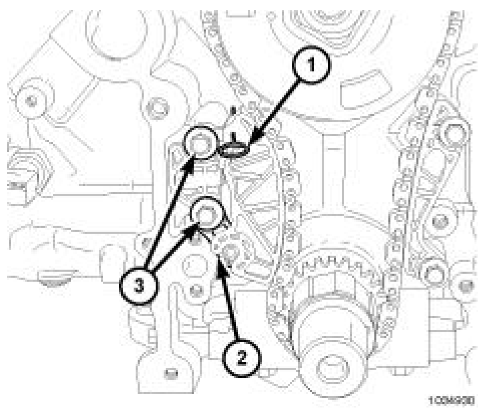
Fig. 252: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Align the slot in the camshaft phaser with the dowel on the camshaft and position the camshaft phaser on the camshaft while sliding the crankshaft sprocket into position.
5. Install the camshaft phaser retaining bolt (1) finger tight.



[Fig. 253: Timing Chain Guide]
Courtesy of CHRYSLER GROUP, LLC

6. If removed, install the timing chain guide (1) and tighten the bolts (2) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 254: Timing Chain Tensioner Pin]
Courtesy of CHRYSLER GROUP, LLC

7. If removed, install the timing chain tensioner (2) and tighten the bolts to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
8. If required, retract the chain tensioner arm and install the Tensioner Pin (special tool #8514, Pins, Tensioner) (1) into the holes of the chain tensioner arm.

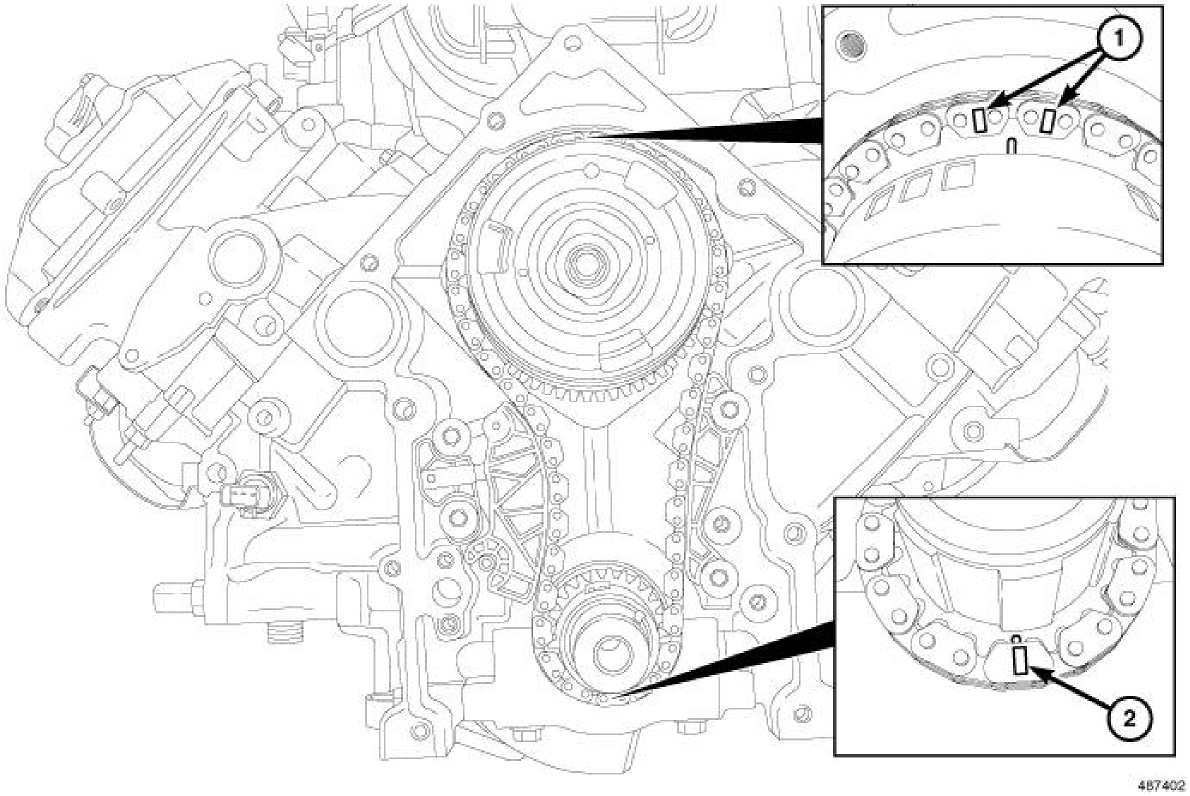


Fig. 255: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER GROUP, LLC

9. Using care, rotate the crankshaft to verify the alignment of the timing marks (1, 2). If the timing marks do not line up, remove the camshaft sprocket and realign.

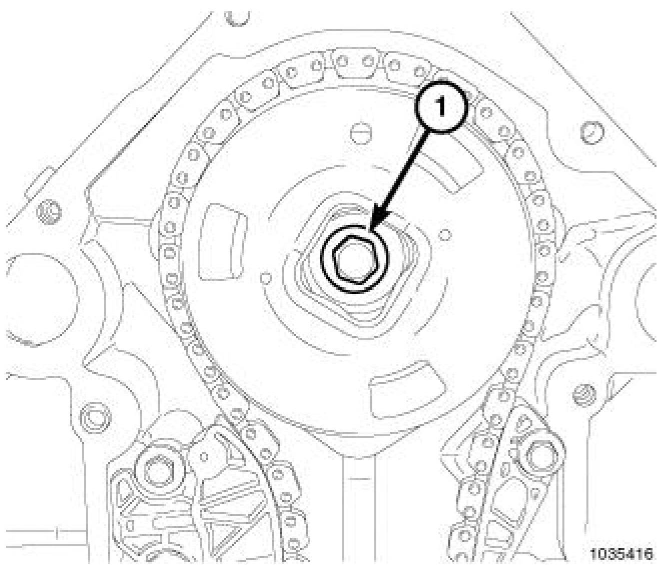


Fig. 256: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Tighten the camshaft phaser bolt (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
11. Install the engine oil pump. Refer to **PUMP, ENGINE OIL, INSTALLATION**.

12. Start the engine and check for leaks.

COVER(S), ENGINE TIMING

REMOVAL

REMOVAL

1. Perform the fuel pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Remove the oil pan. Refer to **PAN, OIL, REMOVAL**.

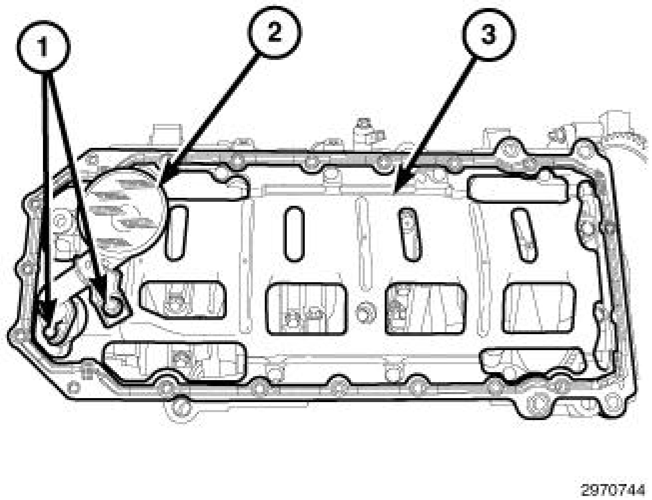


Fig. 257: Integral Windage Tray, Oil Pump Pickup Tube & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the oil pump pickup tube retaining bolt and nut (1).
4. Remove the oil pump pickup tube (2).
5. Remove and discard the oil pan gasket/windage tray (3).
6. Lower the vehicle.

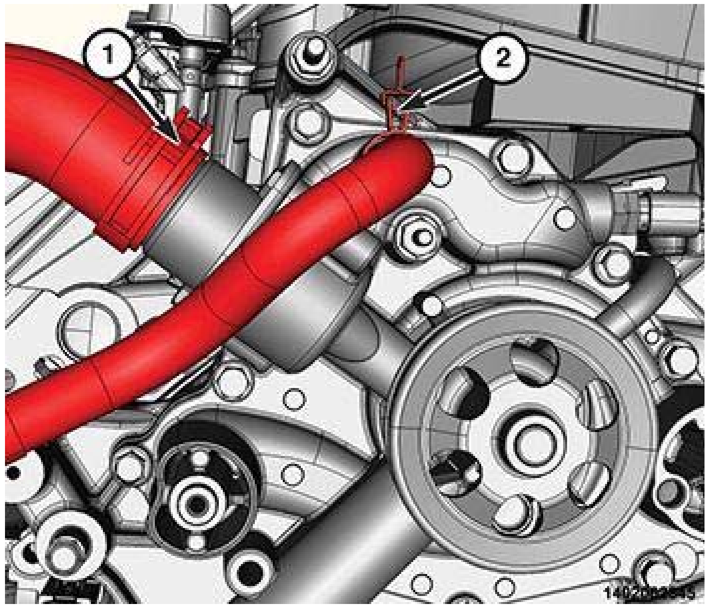


Fig. 258: Upper Radiator Hose Clamp & Oil Cooler Hose Clamp
Courtesy of CHRYSLER GROUP, LLC

7. Remove the upper radiator hose clamp (1) and remove the upper radiator hose.
8. Remove the oil cooler hose clamp (2) and remove oil cooler hose.

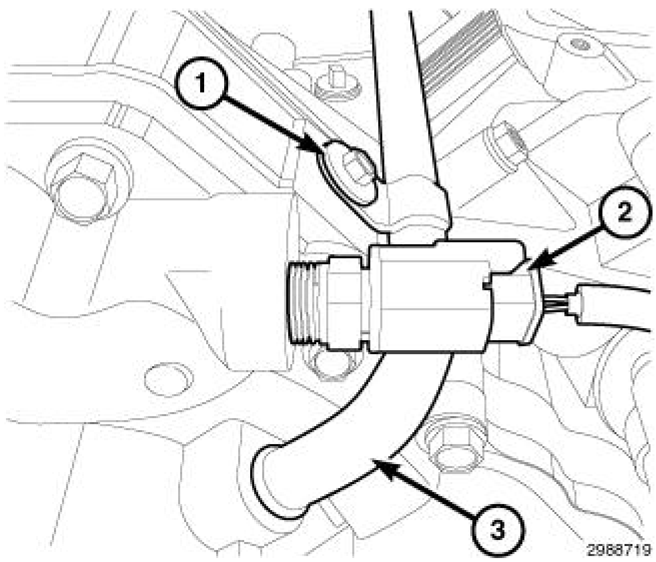


Fig. 259: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Remove the coolant temperature sensor wire harness connector (2).
10. Remove the heater tube retaining bolt (1).
11. Lift the heater tube (3) out of the water pump.

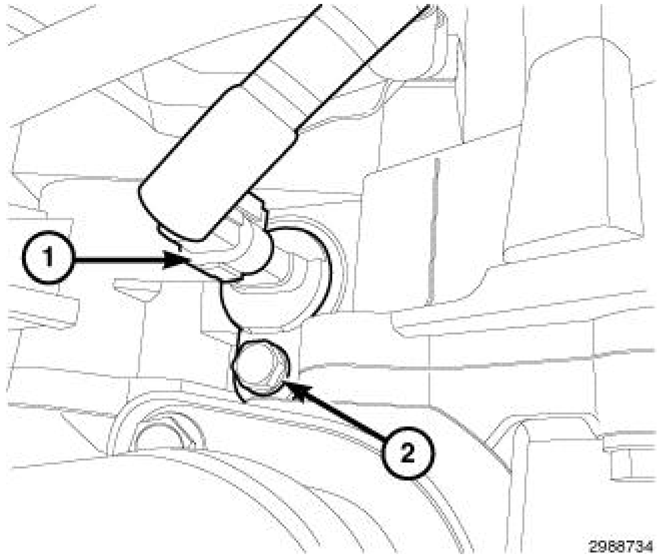


Fig. 260: Camshaft Position Sensor Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the camshaft position sensor wire harness connector (1).
13. Remove the lower radiator hose clamp and remove the lower radiator hose.
14. Remove the idler pulley. Refer to **PULLEY, IDLER, REMOVAL** .
15. Remove the belt tensioner. Refer to **TENSIONER, BELT, REMOVAL** .
16. Remove A/C compressor from the front timing chain cover and position aside. Refer to **COMPRESSOR, A/C, REMOVAL** .
17. Remove the generator from the front timing chain cover and position aside. Refer to **GENERATOR, REMOVAL** .
18. Remove the vibration damper. Refer to **DAMPER, VIBRATION, REMOVAL**.

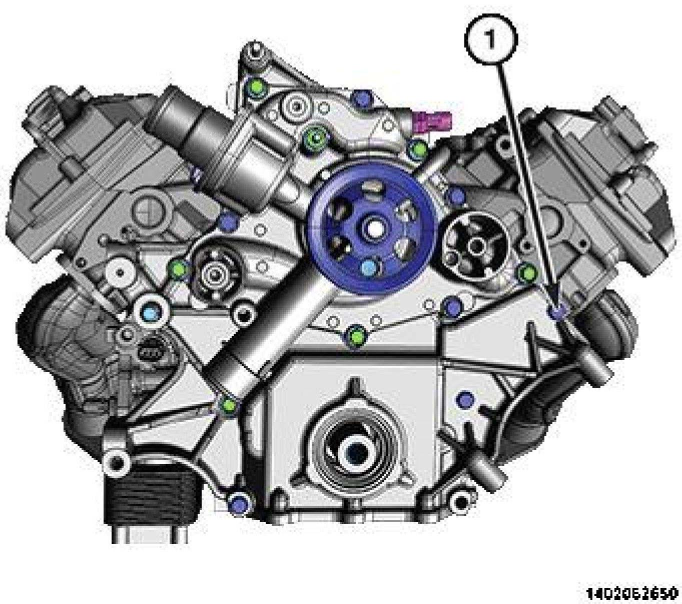


Fig. 261: Engine Timing Cover Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: It is not necessary to remove water pump for timing cover removal.

19. Remove the engine timing cover retaining bolts (1) and remove the engine timing cover.

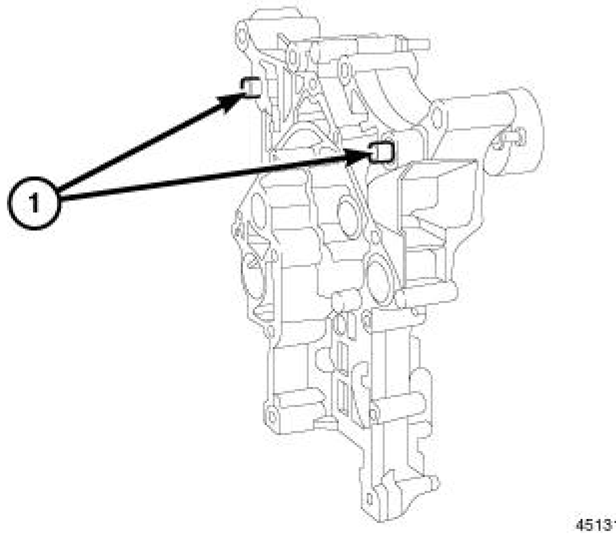


Fig. 262: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

20. Verify that the engine timing cover slide bushings (1) remain located in the engine timing cover.

INSTALLATION

INSTALLATION

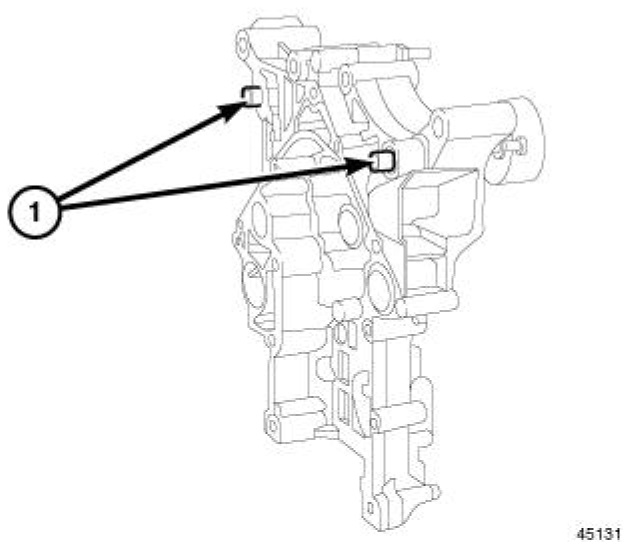
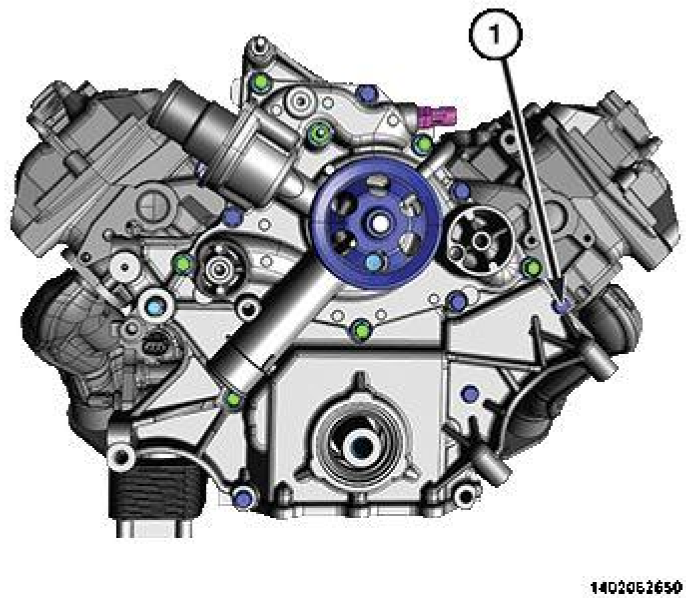


Fig. 263: Front Cover Slide Bushings
Courtesy of CHRYSLER GROUP, LLC

1. Clean the engine timing cover and engine block surface.

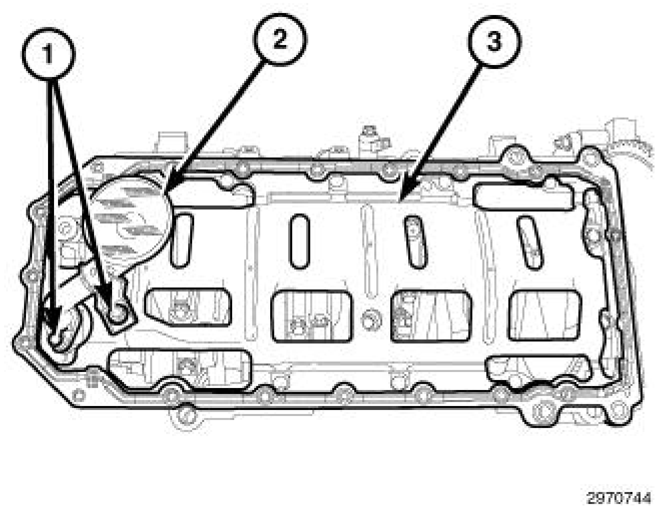
NOTE: Always install a NEW gasket when servicing the engine timing cover.

2. Verify that the engine timing cover slide bushings (1) remain located in the engine timing cover.



[Fig. 264: Engine Timing Cover Bolts]
Courtesy of CHRYSLER GROUP, LLC

3. Using a new gasket, install the engine timing cover and tighten the retaining bolts (1) to the proper specification. Refer to **TORQUE SPECIFICATIONS**.



[Fig. 265: Integral Windage Tray, Oil Pump Pickup Tube & Bolts]
Courtesy of CHRYSLER GROUP, LLC

4. Install the oil pump pickup tube (2) and the oil pan. Refer to **PAN, OIL, INSTALLATION**.
5. Install the lower radiator hose and clamp.
6. Install the vibration damper onto the crankshaft. Refer to **DAMPER, VIBRATION, INSTALLATION**.
7. Install the generator. Refer to **GENERATOR, INSTALLATION** .
8. Install the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION** .

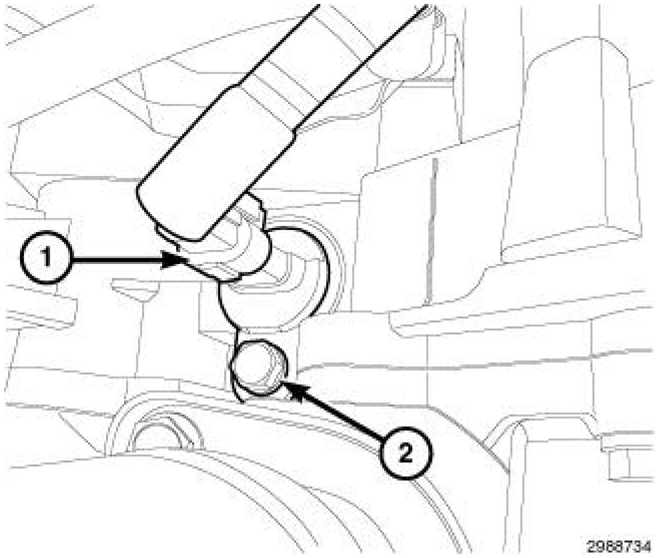


Fig. 266: Camshaft Position Sensor Electrical Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Connect the camshaft position sensor wire harness connector (1).

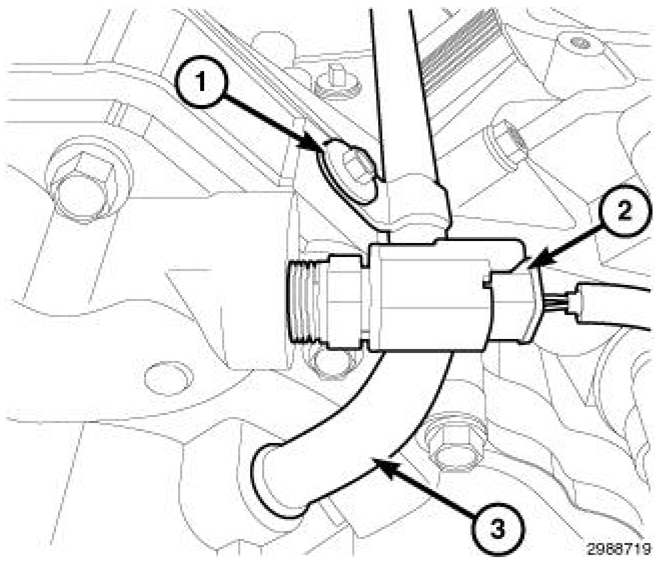


Fig. 267: Coolant Temperature (ECT) Sensor Electrical Connector, Heater Tube & Retaining Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Install the heater tube (3) into of the water pump.
11. Install the heater tube retaining bolt (1) and tighten to the proper specification. Refer to **TORQUE SPECIFICATIONS**.
12. Connect the coolant temperature sensor wire harness connector (2).

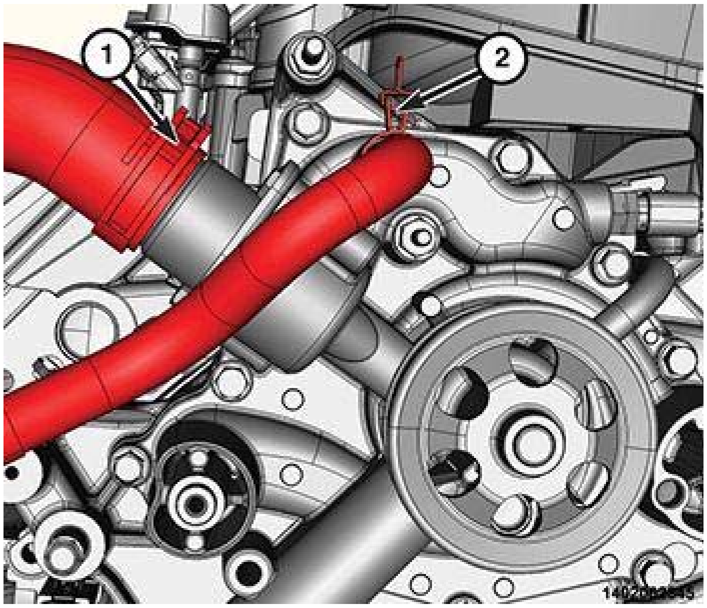


Fig. 268: Upper Radiator Hose Clamp & Oil Cooler Hose Clamp
Courtesy of CHRYSLER GROUP, LLC

13. Install the oil cooler hose and clamp (2).
14. Install the upper radiator hose and clamp (1).
15. Fill the cooling system with the specified type and amount of engine coolant. Refer to **STANDARD PROCEDURE** .
16. Change the engine oil filter and fill the crankcase with the specified type and amount of engine oil. Refer to **STANDARD PROCEDURE**.
17. Connect the negative battery cable.
18. Perform the Refrigerant System Charge procedure. Refer to **PLUMBING, STANDARD PROCEDURE** .
19. Start the engine and check for leaks.

TENSIONER, ENGINE TIMING

DESCRIPTION

DESCRIPTION

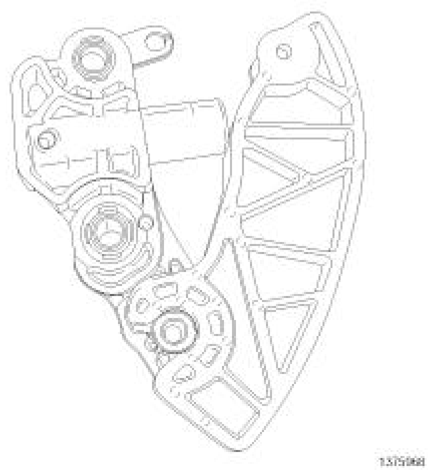


Fig. 269: Timing Chain Tensioner Arm
Courtesy of CHRYSLER GROUP, LLC

The timing chain tensioner is a spring loaded design. It consists of two chain guide shoes. One shoe is fixed in place and the other is spring loaded to keep tension on the chain.

OPERATION

OPERATION

The timing chain tension is maintained by routing the timing chain through the tensioner assembly. The tensioner assembly consists of two chain guide shoes. One shoe is fixed in place and the other is spring loaded to maintain the correct timing chain tension.

REMOVAL

For the removal procedure, refer to **CHAIN AND SPROCKETS, TIMING, REMOVAL**.

INSTALLATION

For the installation procedure, refer to **CHAIN AND SPROCKETS, TIMING, INSTALLATION**.

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Article GUID: A00735862

GENERAL INFORMATION

Engine Overhaul Procedures

* PLEASE READ THIS FIRST *

NOTE: **Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.**

Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

DESCRIPTION

Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of cleaning, inspection, and assembly processes are included.

ENGINE IDENTIFICATION

Engine may be identified from Vehicle Identification Number (VIN) stamped on a metal tab. Metal tab may be located in different locations depending on manufacturer. Engine identification number or serial number is located on cylinder block. Location varies with each manufacturer.

INSPECTION PROCEDURES

* PLEASE READ THIS FIRST *

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section for complete overhaul procedures and specifications for the vehicle being repaired.

Engine components must be inspected to meet manufacturer's specifications and tolerances during overhaul. Proper dimensions and tolerances must be met to obtain proper performance and maximum engine life.

Micrometers, depth gauges and dial indicator are used for checking tolerances during engine overhaul. Magnaflux, Magnaglo, dye-check, ultrasonic and x-ray inspection procedures are used for parts inspection.

MAGNETIC PARTICLE INSPECTION

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Magnaflux & Magnaglo

Magnaflux is an inspection technique used to locate material flaws and stress cracks. Component is subjected to a strong magnetic field. Entire component or a localized area can be magnetized. Component is coated with either a wet or dry material that contains fine magnetic particles.

Cracks which are outlined by the particles cause an interruption of magnetic field. Dry powder method of Magnaflux can be used in normal lighting and crack appears as a bright line.

Fluorescent liquid is used along with a Black light in the Magnaglo Magnaflux system. Darkened room is required for this procedure. The crack will appear as a glowing line. Complete demagnetizing of component upon completion is required on both procedures. Magnetic particle inspection applies to ferrous materials only.

PENETRANT INSPECTION

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Zyglo

The Zyglo process coats material with a fluorescent dye penetrant. Component is often warmed to expand cracks that will be penetrated by the dye. Using darkened room and Black light, component is inspected for cracks. Crack will glow brightly.

Developing solution is often used to enhance results. Parts made of any material, such as aluminum cylinder heads or plastics, may be tested using this process.

Dye Check

Penetrating dye is sprayed on the previously cleaned component. Dye is left on component for 5-45 minutes, depending upon material density. Component is then wiped clean and sprayed with a developing solution. Surface cracks will show up as a bright line.

ULTRASONIC INSPECTION

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If an expensive part is suspected of internal cracking, ultrasonic testing is used. Sound waves are used for component inspection.

X-RAY INSPECTION

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This form of inspection is used on highly stressed components. X-ray inspection may be used to detect internal and external flaws in any material.

PRESSURE TESTING

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Cylinder heads can be tested for cracks using a pressure tester. Pressure testing is performed by plugging all but one of the holes of cylinder head and injecting air or water into the open passage.

Leaks are indicated by the appearance of wet or damp areas when using water. When air is used, it is necessary to spray the head surface with a soap solution. Bubbles will indicate a leak. Cylinder head may also be submerged in water heated to specified temperature to check for cracks created during heat expansion.

CLEANING PROCEDURES

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All components of an engine do not have the same cleaning requirements. Physical methods include bead blasting and manual removal. Chemical methods include solvent blast, solvent tank, hot tank, cold tank and steam cleaning of components.

BEAD BLASTING

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Manual removal of deposits may be required prior to bead blasting, followed by some other cleaning method. Carbon, paint and rust may be removed using bead blasting method. Components must be free of oil and grease prior to bead blasting. Beads will stick to grease or oil soaked areas causing area not to be cleaned.

Use air pressure to remove all trapped residual beads from component after cleaning. After cleaning internal engine parts made of aluminum, wash thoroughly with hot soapy water. Component must be thoroughly cleaned as glass beads will enter engine oil resulting in bearing damage.

CHEMICAL CLEANING

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Solvent tank is used for cleaning oily residue from components. Solvent blasting sprays solvent through a siphon gun using compressed air.

The hot tank, using heated caustic solvents, is used for cleaning ferrous materials only. DO NOT clean aluminum parts such as cylinder heads, bearings or other soft metals using the hot tank. After cleaning, flush parts with hot water.

A non-ferrous part will be ruined and caustic solution will be diluted if placed in the hot tank. Always use eye protection and gloves when using the hot tank.

Use of a cold tank is for cleaning aluminum cylinder heads, carburetors and other soft metals. A less caustic and unheated solution is used. Parts may be left in the tank for several hours without damage. After cleaning, flush parts with hot water.

Steam cleaning, with boiling hot water sprayed at high pressure, is recommended as the final cleaning process when using either hot or cold tank cleaning.

COMPONENT CLEANING

* PLEASE READ THIS FIRST *

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SHEET METAL PARTS

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being repaired.

Examples of sheet metal parts are rocker covers, front and side covers, oil pan and bellhousing dust cover. Glass bead blasting or hot tank may be used for cleaning.

Ensure all mating surfaces are flat. Deformed surfaces should be straightened. Check all sheet metal parts for cracks and dents.

INTAKE & EXHAUST MANIFOLDS

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Using solvent cleaning or bead blasting, clean manifolds for inspection. If intake manifold has an exhaust crossover, all carbon deposits must be removed. Inspect manifolds for cracks, burned or eroded areas, corrosion and damage to fasteners.

Exhaust heat and products of combustion cause threads of fasteners to corrode. Replace studs and bolts as necessary. On "V" type intake manifolds, sheet metal oil shield must be removed for proper cleaning and inspection. Ensure all manifold parting surfaces are flat and free of burrs.

CYLINDER HEAD REPLACEMENT

* PLEASE READ THIS FIRST *

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REMOVAL

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Remove intake and exhaust manifolds and valve cover. Cylinder head and camshaft carrier bolts (if equipped) should be removed only when engine is cold. On many aluminum cylinder heads, removal while hot will cause cylinder head warpage. Mark rocker arm or overhead cam components for location.

Remove rocker arm components or overhead cam components. Components must be installed in original location. Individual design rocker arms may utilize shafts, ball-type pedestal mounts or no rocker arms. For all design types, wire components together and identify according to corresponding valve. Remove cylinder head bolts. Note length and location. Some applications require cylinder head bolts be removed in proper sequence to prevent cylinder head damage. See **Fig. 1**. Remove cylinder head.

INSTALLATION

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Ensure all surfaces and head bolts are clean. Check that head bolt holes of cylinder block are clean and dry to prevent block damage when bolts are tightened. Clean threads with tap to ensure accurate bolt torque.

Install head gasket on cylinder block. Some manufacturers may recommend sealant be applied to head gasket prior to installation. Note that all holes are aligned. Some gasket applications may be marked so that certain area faces upward. Install cylinder head using care not to damage head gasket. Ensure cylinder head is fully seated on cylinder block.

Some applications require head bolts be coated with sealant prior to installation. This is done if head bolts are exposed to coolant passages. Some applications require head bolts be coated with light coat of engine oil.

Install head bolts. Head bolts should be tightened in proper steps and sequence to specification. See **Fig. 1**. Install remaining components. Tighten all bolts to specification. Adjust valves if required. See VALVE ADJUSTMENT.

NOTE:	**Some manufacturers require that head bolts be retightened after specified amount of operation. This must be done to prevent head gasket failure.**

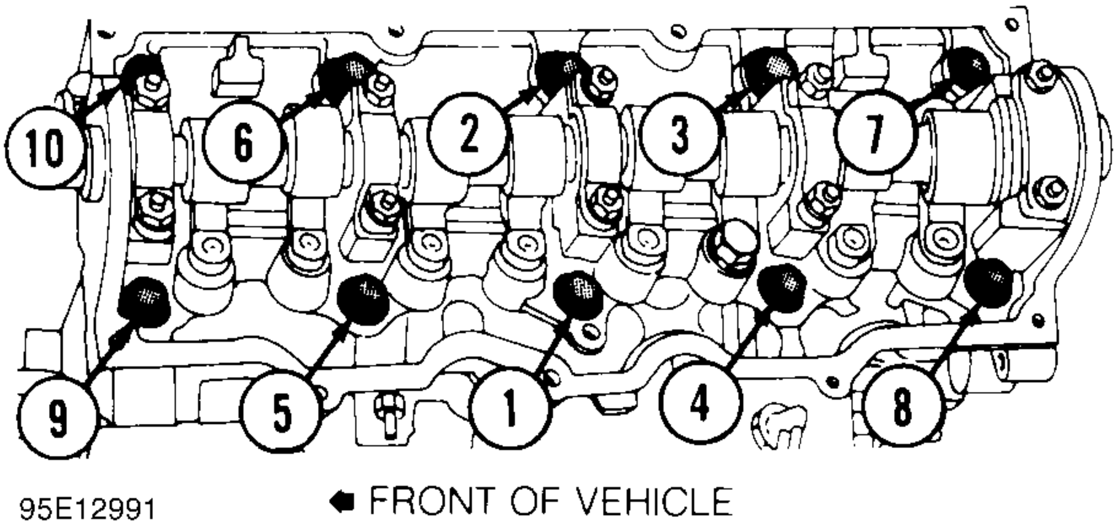

Fig. 1: Typical Cylinder Head Tightening or Loosening Sequence

VALVE ADJUSTMENT

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Engine specifications will indicate valve train clearance and temperature at which adjustment is to be made on most models. In most cases, adjustment will be made with a cold engine. In some cases, both a cold and a hot clearance will be given for maintenance convenience.

On some models, adjustment is not required. Rocker arms are tightened to specification and valve lash is automatically set. On some models with push rod actuated valve train, adjustment is made at push rod end of rocker arm while other models do not require adjustment.

Clearance will be checked between tip of rocker arm and tip of valve stem in proper sequence using a feeler gauge. Adjustment is made by rotating adjusting screw until proper clearance is obtained. Lock nut is then tightened. Engine will be rotated to obtain all valve adjustments to manufacturer's specifications.

Some models require hydraulic lifter to be bled down and clearance measured. Push rods of different length can be used to obtain proper clearance. Clearance will be checked between tip of rocker arm and tip of valve stem in proper sequence using a feeler gauge.

Overhead cam engines designed without rocker arms actuate valves directly on a cam follower. A hardened, removable disc is installed between the cam lobe and lifter. Clearance will be checked between cam heel and

adjusting disc in proper sequence using a feeler gauge. Engine will be rotated to obtain all valve adjustments.

On overhead cam engines designed with rocker arms, adjustment is made at valve end of rocker arm. Ensure valve to be adjusted is riding on heel of cam on all engines. Clearance will be checked between tip of rocker arm and tip of valve stem in proper sequence using a feeler gauge. Adjustment is made by rotating adjusting screw until proper clearance is obtained. Lock nut is then tightened. Engine will be rotated to obtain all valve adjustments to manufacturer's specifications.

CYLINDER HEAD OVERHAUL

* PLEASE READ THIS FIRST *

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CYLINDER HEAD DISASSEMBLY

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Mark valves for location. Using valve spring compressor, compress valve springs. Remove valve locks. Carefully release spring compressor. Remove retainer or rotator, valve spring, spring seat and valve. See **Fig. 2**.

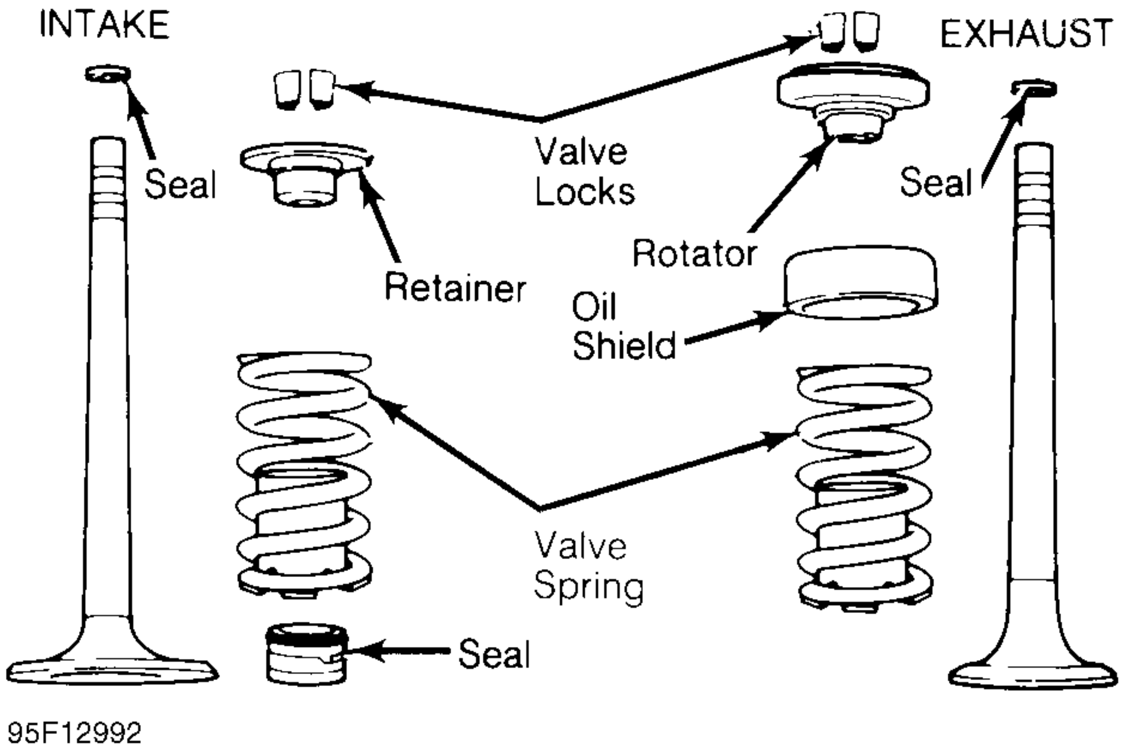

Fig. 2: Exploded View of Valve Assemblies

CYLINDER HEAD CLEANING & INSPECTION

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Clean cylinder head and valve components using approved cleaning methods. Inspect cylinder head for cracks, damage or warped gasket surface. Place straightedge across gasket surface. Determine clearance at center of straightedge. Measure across both diagonals, longitudinal center line and across cylinder head at several points. See **Fig. 3**.

On cast iron cylinder heads, if warpage exceeds .003" (.08 mm) in a 6" span, or .006" (.15 mm) over total length, cylinder head must be resurfaced. On most aluminum cylinder heads, if warpage exceeds .002" (.05 mm) in any area, cylinder head must be resurfaced. Warpage specification may vary by manufacturer. If warpage exceeds specification on some cylinder heads, cylinder head must be replaced.

Cylinder head thickness should be measured to determine amount of material which can be removed before replacement is required. Cylinder head thickness must not be less than the manufacturer's specification.

If cylinder head required resurfacing, it may not align properly with intake manifold. On "V" type engines, misalignment is corrected by machining intake manifold surface that contacts cylinder head. Cylinder head may be machined on surface that contacts intake manifold. Using oil stone, remove burrs or scratches from all sealing surfaces.

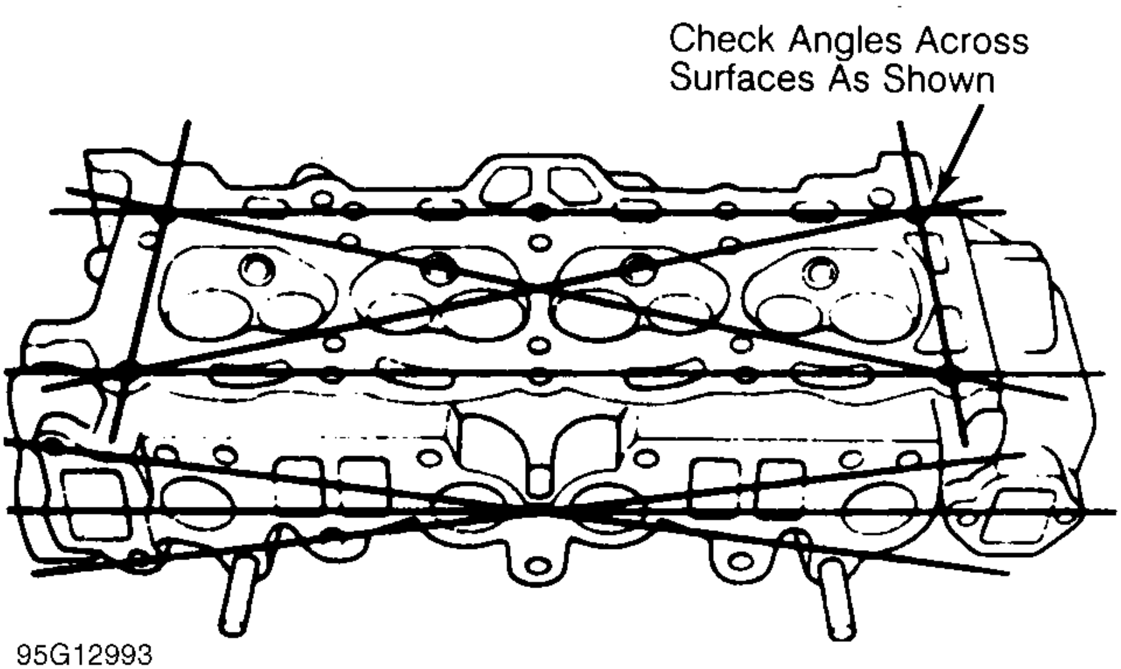

Fig. 3: Checking Cylinder Head for Warpage

VALVE SPRINGS

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Inspect valve springs for corroded or pitted valve spring surfaces which may lead to breakage. Polished spring ends caused by a rotating spring indicate that spring surge has occurred. Replace springs showing evidence of these conditions.

Inspect valve springs for squareness using a 90-degree straightedge. See **Fig. 4**. Replace valve spring if out-of-square exceeds manufacturer's specification.

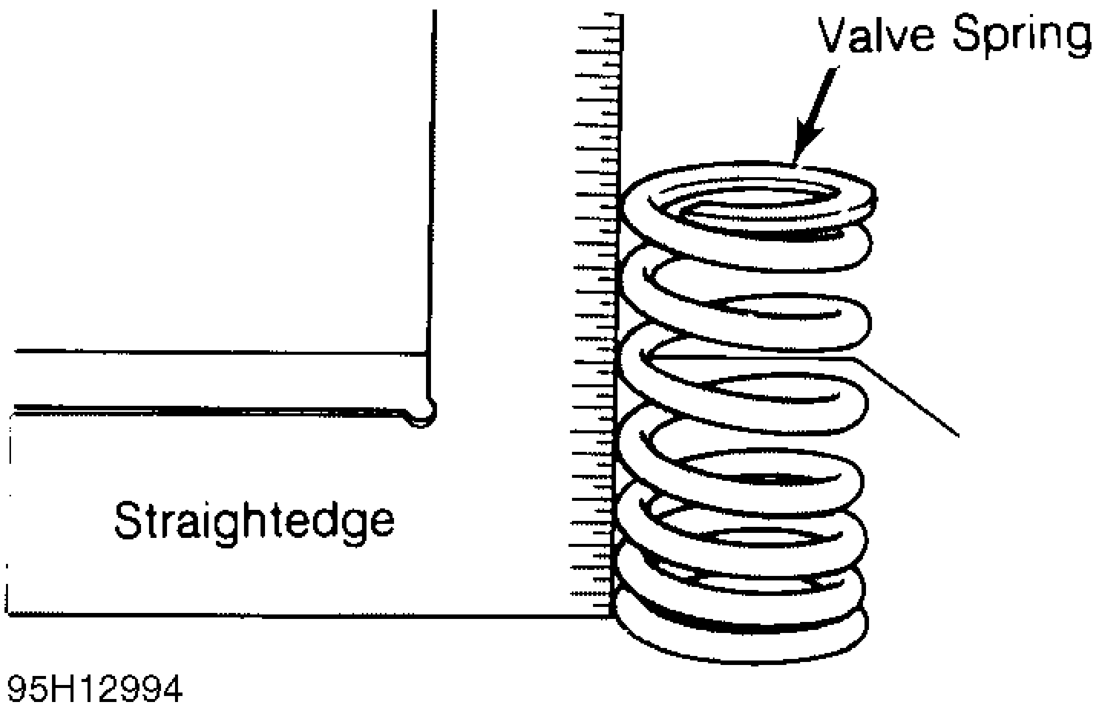

Fig. 4: Checking Valve Spring Squareness

Using vernier caliper, measure free length of all valve springs. Replace springs if not within specification. Using valve spring tester, test valve spring pressure at installed and compressed heights. See **Fig. 5**.

Usually compressed height is installed height minus valve lift. Replace valve spring if not within specification. It is recommended to replace all valve springs when overhauling cylinder head. Valve springs may need to be installed with color coded end or small coils at specified area according to manufacturer.

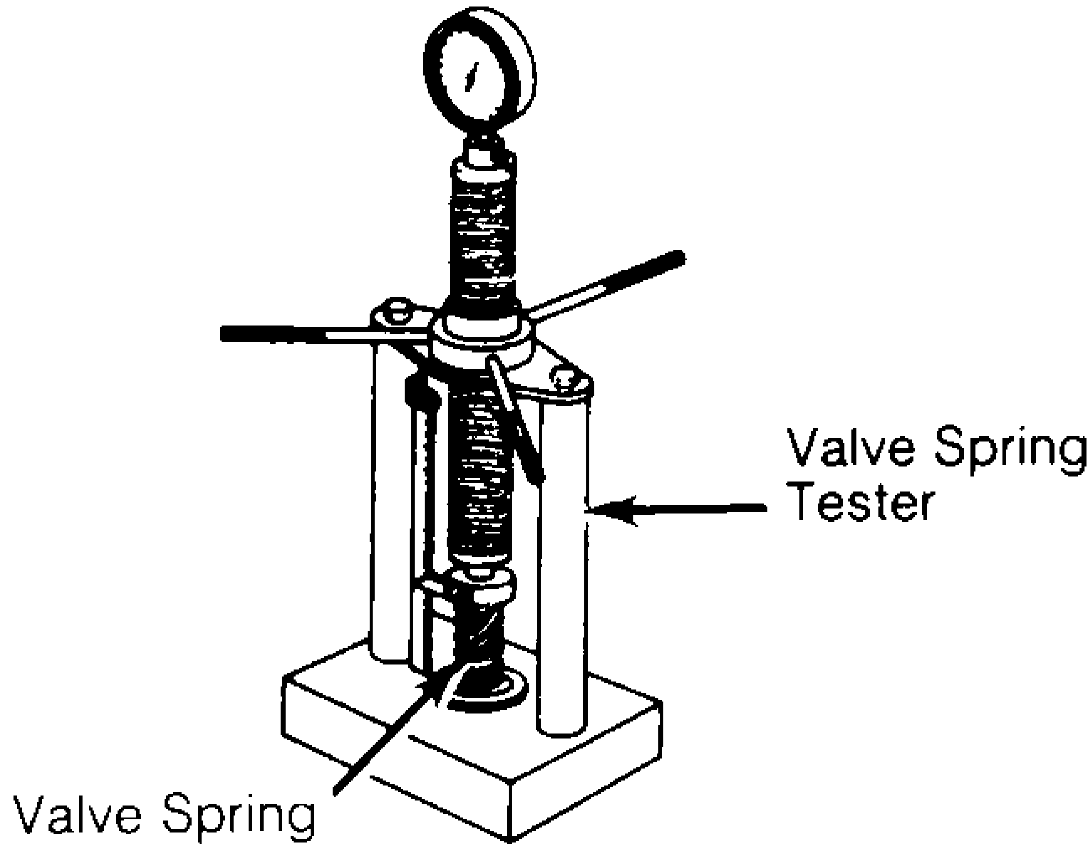

Fig. 5: Checking Valve Spring Pressure

VALVE GUIDE

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Measuring Valve Guide Clearance

Check valve stem-to-guide clearance. Ensure valve stem diameter is within specification. Install valve in valve guide. Install dial indicator assembly on cylinder head with tip resting against valve stem just above valve guide. See **Fig. 6**.

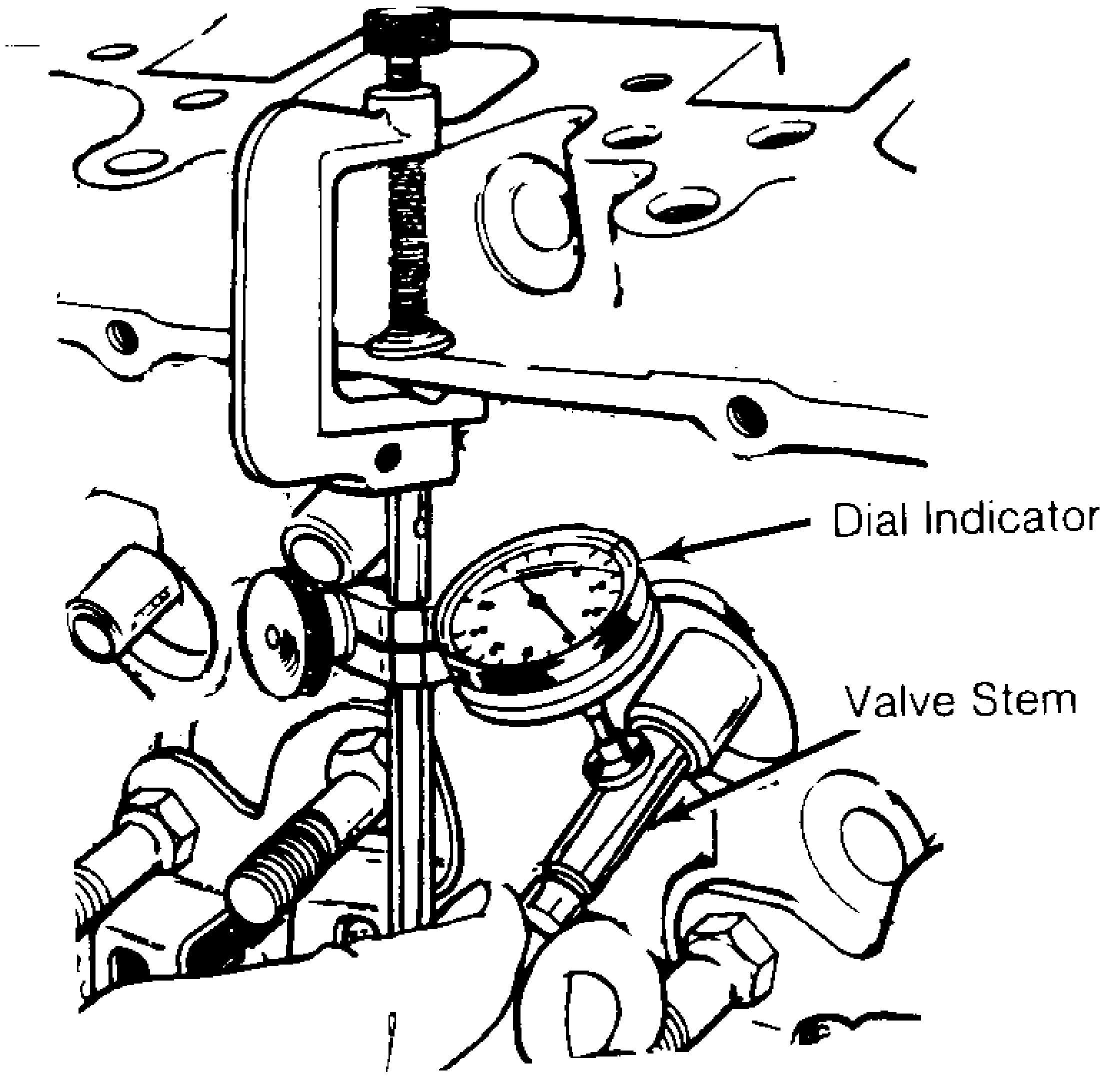

Fig. 6: Measuring Valve Stem-to-Guide Clearance

Lower valve approximately 1/16" below valve seat. Push valve stem against valve guide as far as possible. Adjust dial indicator to zero. Push valve stem in opposite direction and note reading. Clearance must be within specification.

If valve guide clearance exceeds specification, valves with oversize stems may be used and valve guides are reamed to larger size or valve guide must be replaced. On some applications, a false guide is installed, then reamed to proper specification. Valve guide reamer set is used to ream valve guide to obtain proper clearance for new valve.

Reaming Valve Guide

Select proper reamer for size of valve stem. Reamer must be of proper length to provide clean cut through entire

length of valve guide. Install reamer in valve guide and rotate to cut valve guide. See **Fig. 7**.

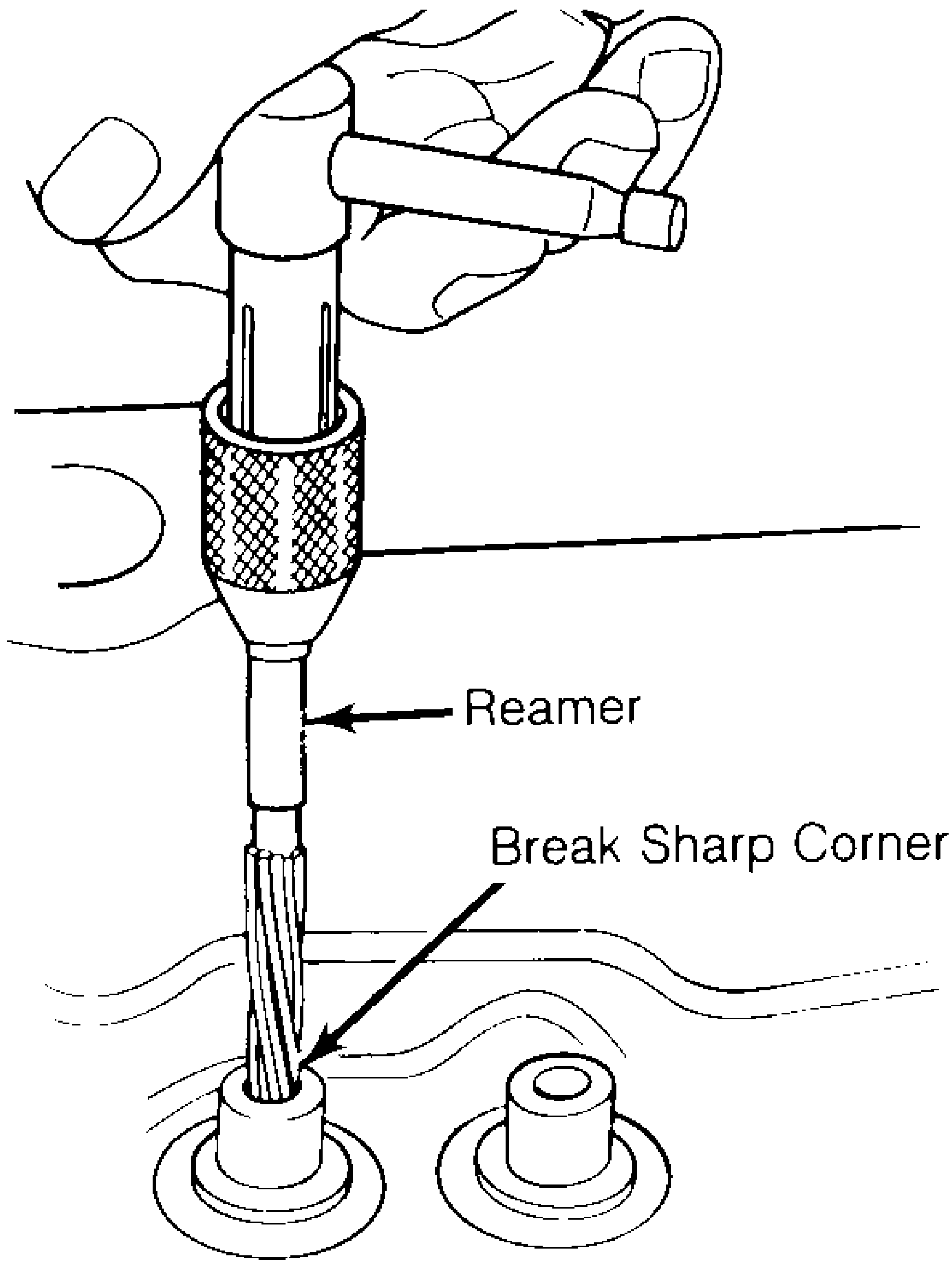

Fig. 7: Reaming Valve Guides

Replacing Valve Guide

Replace valve guide if clearance exceeds specification. Valve guides are either pressed, hammered or shrunk in

place, depending upon cylinder head design and type of metal used.

Remove valve guide from cylinder head by pressing or tapping on a stepped drift. See **Fig. 8**. Once valve guide is installed, distance from cylinder head to top of valve guide must be checked. This distance must be within specification.

Aluminum heads are often heated before installing valve guide. Valve guide is sometimes cooled in dry ice prior to installation. Combination of a heated cylinder head and cooled valve guide ensures a tight guide fit upon assembly. The new guide must be reamed to specification.

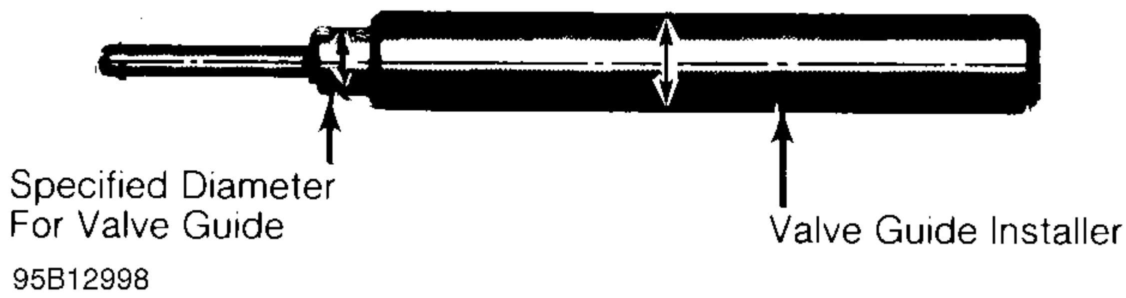

Fig. 8: Typical Valve Guide Remover & Installer

VALVES & VALVE SEATS

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Valve Grinding

Valve stem O.D. should be measured in several areas to indicate amount of wear. Replace valve if not within specification. Valve margin area should be measured to ensure that valve can be ground. See **Fig. 9**.

If valve margin is less than specification, the valves will be burned. Valve must be replaced. Due to minimum margin dimensions during manufacture, some new type valves cannot be reground. Some manufacturers use stellite coated valves that must NOT be machined. Valves can only be lapped into valve seat.

CAUTION:	**Some valves are sodium filled. Extreme care must be used when disposing of damaged or worn sodium-filled valves.**

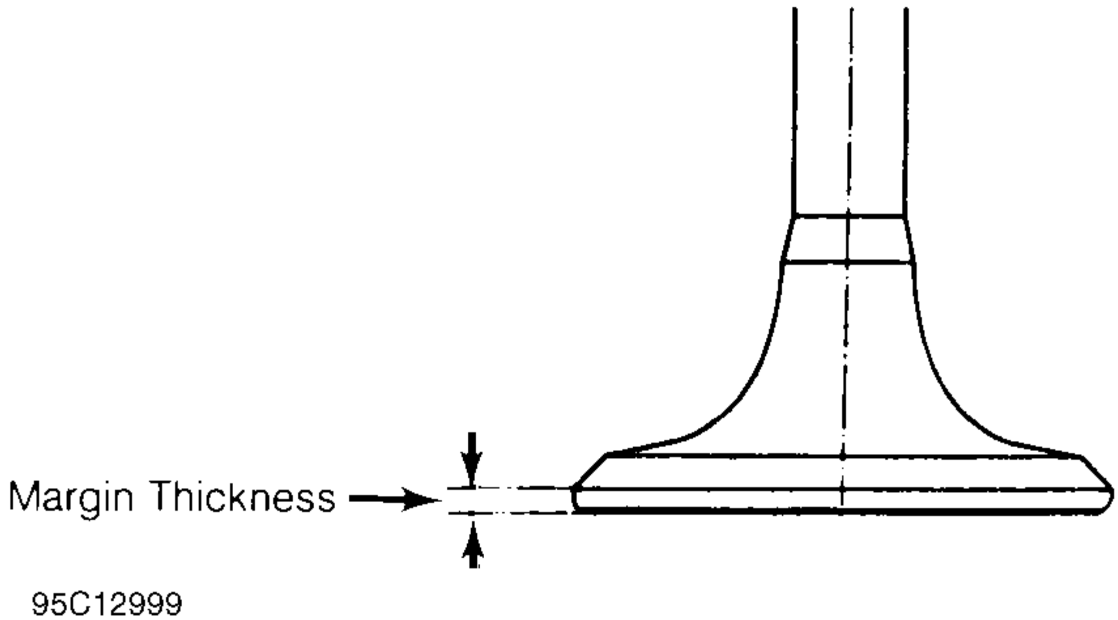

Fig. 9: Measuring Valve Head Margin

Resurface valve to proper angle specification using valve grinding machine. Follow manufacturer's instructions for valve grinding machine. Specifications may indicate a different valve face angle than seat angle. Measure valve margin after grinding. Replace valve if not within specification. Valve stem tip can be refinished using valve grinding machine.

Valve Lapping

During valve lapping of recently designed valves, be sure to follow manufacturer's recommendations. Surface hardening and materials used with some valves do not permit lapping. Lapping process will remove excessive amounts of the hardened surface.

Valve lapping is done to ensure adequate sealing between valve face and seat. Use either a hand drill or lapping stick with suction cup attached.

Moisten and attach suction cup to valve. Lubricate valve stem and guide. Apply a thin coat of fine valve grinding compound between valve and seat. Rotate lapping tool between the palms or with hand drill.

Lift valve upward off the seat and change position often. This is done to prevent grooving of valve seat. Lap valve until a smooth polished seat is obtained. Thoroughly clean grinding compound from components. Valve-to-valve seat concentricity should be checked. See **VALVE SEAT CONCENTRICITY**.

CAUTION: Valve guides must be in good condition and free of carbon deposits prior to valve seat grinding. Some engines contain an induction hardened valve seat. Excessive material removal will damage valve seats.

Valve Seat Grinding

Select coarse stone of correct size and angle for seat to be ground. Ensure stone is true and has a smooth surface. Select correct size pilot for valve guide dimension. Install pilot in valve guide. Lightly lubricate pilot shaft. Install stone on pilot. Move stone off and on the seat approximately 2 times per second during grinding operation.

Select a fine stone to finish grinding operation. Various angle grinding stones are used to center and narrow the valve seat as required. See **Fig. 10**.

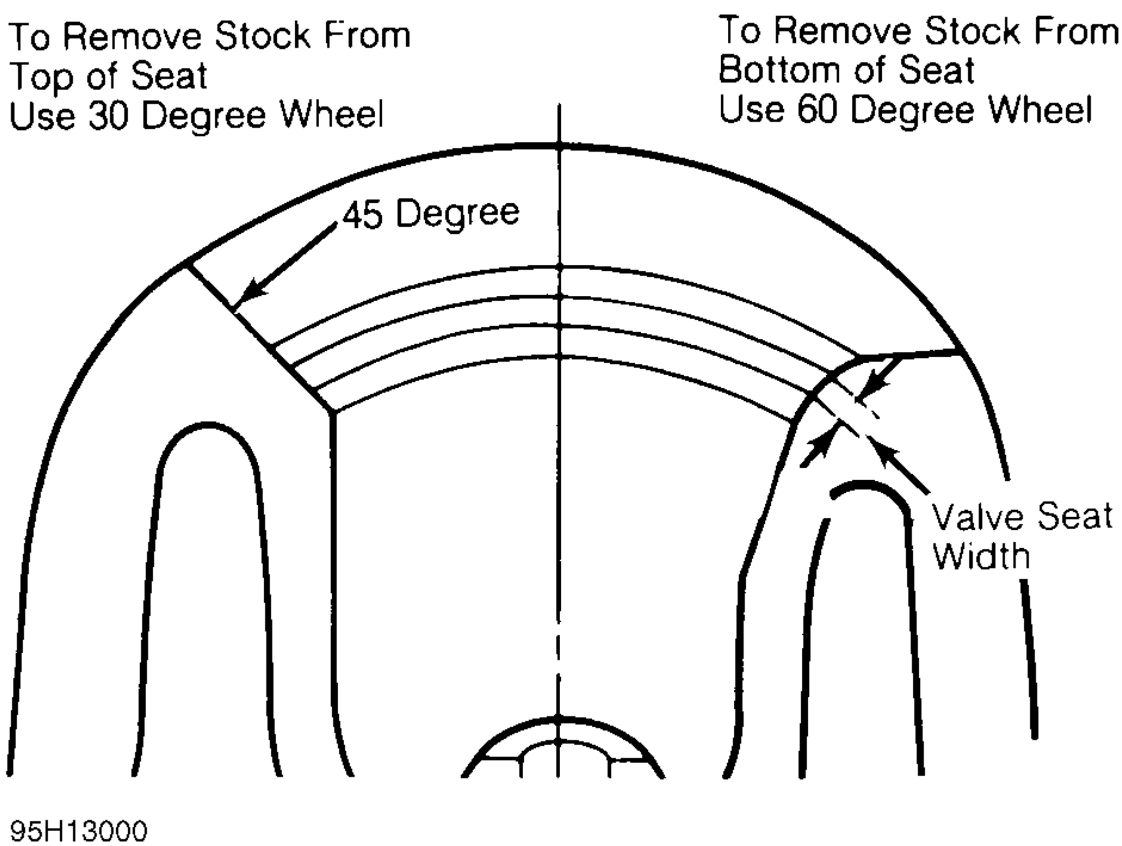

Fig. 10: Adjusting Valve Seat Width

Valve Seat Replacement

Replacement of valve seat inserts is done by cutting out the old insert and machining an oversize insert bore. Replacement oversize insert is usually cooled and the cylinder head is sometimes warmed. Valve seat is pressed into the head. This operation requires specialized machine shop equipment.

Valve Seat Concentricity

Using dial gauge, install gauge pilot in valve guide. Position gauge arm on the valve seat. Adjust dial indicator to zero. Rotate arm 360 degrees and note reading. Runout should not exceed specification.

To check valve-to-valve seat concentricity, coat valve face lightly with Prussian Blue dye. Install valve and rotate it on valve seat. If pattern is even and entire seat is coated at valve contact point, valve is concentric with

the valve seat.

CYLINDER HEAD REASSEMBLY

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Valve Stem Installed Height

Valve stem installed height must be checked when new valves are installed or when valves or valve seats have been ground. Install valve in valve guide. Measure distance from tip of valve stem to spring seat. See **Fig. 11**. Distance must be within specification to allow sufficient clearance for valve operation.

Remove valve and grind valve stem tip if height exceeds specification. Valve tips are surface hardened. DO NOT remove more than .010" (.25 mm) from tip. Chamfer sharp edge of reground valve tip. Recheck valve stem installed height.

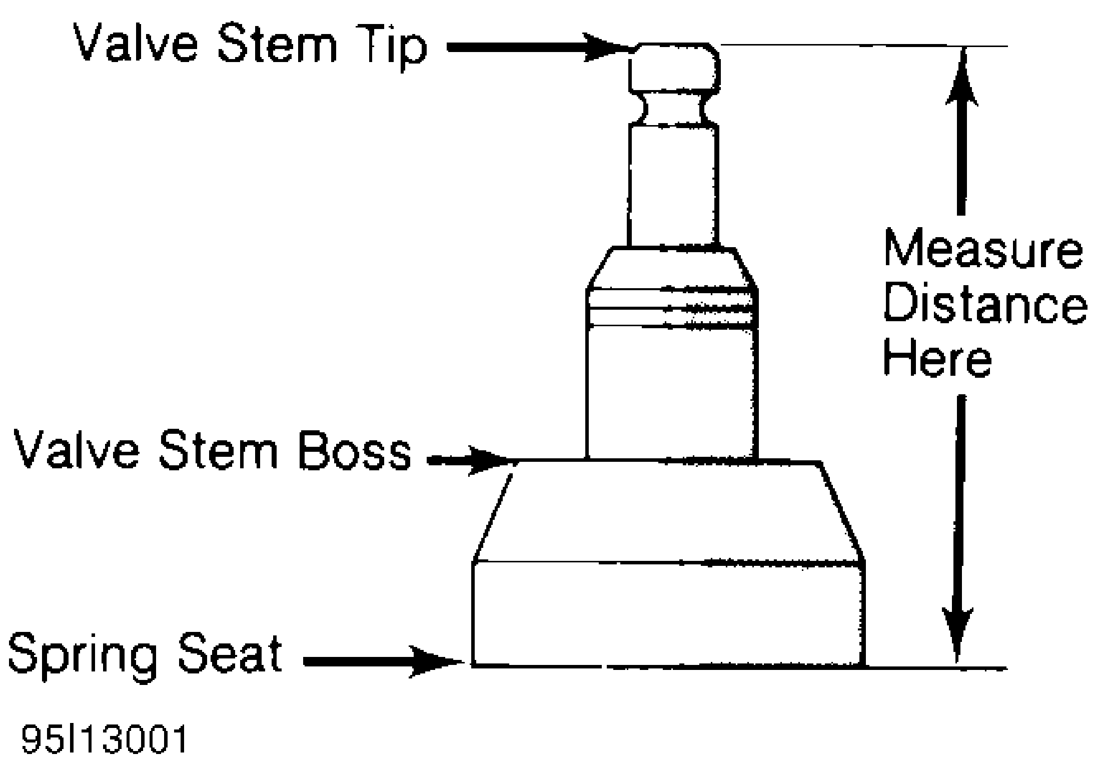

Fig. 11: Measuring Valve Stem Installed Height

VALVE STEM OIL SEALS

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Valve stem oil seals must be installed on valve stem. See **Fig. 2**. Seals are needed due to pressure differential at the ends of valve guides. Atmospheric pressure above intake guide, combined with manifold vacuum below guide, causes oil to be drawn into the cylinder.

Exhaust guides also have pressure differential created by exhaust gas flowing past the guide, creating a low pressure area. This low pressure area draws oil into the exhaust system.

Some manufacturers require that special color code or specified height valve stem oil seal be installed in designated area.

Replacement (On-Vehicle)

Mark rocker arm or overhead cam components for location. Remove rocker arm components or overhead cam components. Components must be installed in original location. Remove spark plugs. Valve stem oil seals may be replaced by holding valves against seats using air pressure.

Air pressure must be installed in cylinder using an adapter for spark plug hole. An adapter can be constructed by welding air hose connection to spark plug body with porcelain removed.

Rotate engine until piston is at top of stroke. Install adapter in spark plug hole. Apply a minimum of 140 psi (9.8 kg/cm^2) line pressure to adapter. Air pressure should hold valve closed. If air pressure does not hold valve closed, check for damaged or bent valve. Cylinder head must be removed for service.

Using valve spring compressor, compress valve springs. Remove valve locks. Carefully release spring compressor. Remove retainer or rotator and valve spring. Remove valve stem oil seal.

If oversize valves have been installed, oversize oil seals must be used. Coat valve stem with engine oil. Install protective sleeve over end of valve stem. Install new oil seal over valve stem and seat on valve guide. Remove protective sleeve. Install spring seat, valve spring and retainer or rotator. Compress spring and install valve locks. Remove spring compressor. Ensure valve locks are fully seated.

Install rocker arms or overhead cam components. Tighten all bolts to specification. Adjust valves if required. Remove adapter. Install spark plugs, valve cover and gasket.

VALVE SPRING INSTALLED HEIGHT

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Valve spring installed height should be checked during reassembly. Measure height from lower edge of valve spring to the upper edge. DO NOT include valve spring seat or retainer. Distance must be within specification. If valves and/or seats have been ground, a valve spring shim may be required to correct spring height. See **Fig. 12**.

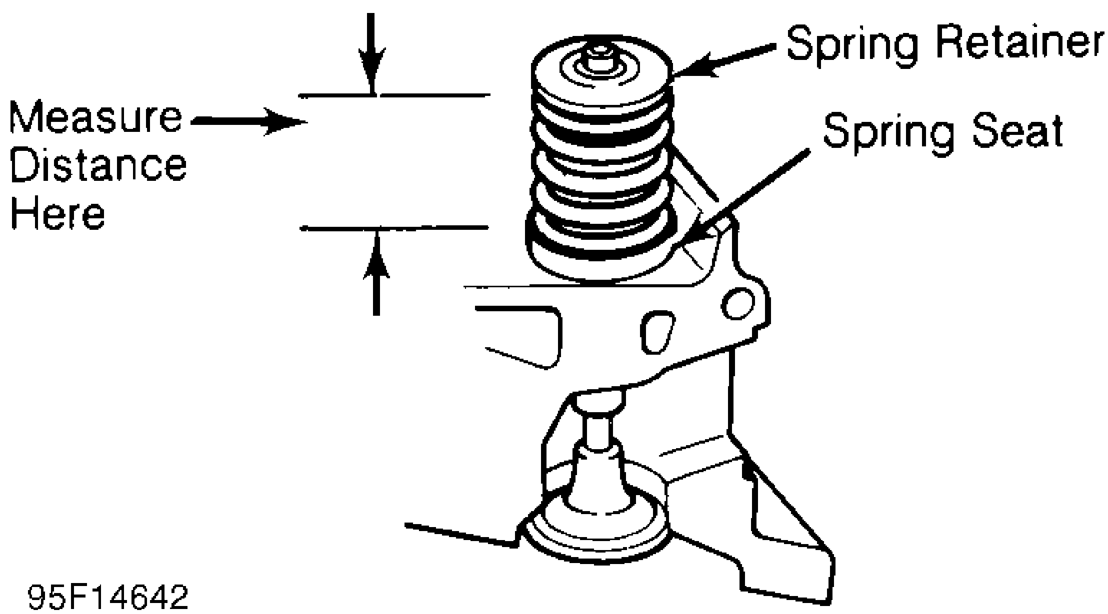

Fig. 12: Measuring Valve Spring Installed Height

ROCKER ARMS & ASSEMBLIES

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Rocker Studs

Rocker studs are either threaded or pressed in place. Threaded studs are removed by locking 2 nuts on the stud. Unscrew the stud by turning the jam nut. Coat new stud threads with Loctite and install. Tighten to

specification.

Pressed-in stud can be removed using a stud puller. Ream stud bore to proper specification and press in a new oversize stud. Pressed-in studs are often replaced by cutting threads in the stud bore to accept a threaded stud.

Rocker Arms & Shafts

Mark rocker arms for location. Remove rocker arm retaining bolts. Remove rocker arms. Inspect rocker arms, shafts, bushings and pivot balls (if equipped) for excessive wear. Inspect rocker arms for wear in valve stem contact area. Measure rocker arm bushing I.D. Replace bushings if excessively worn.

The rocker arm valve stem contact point may be reground, using special fixture for valve grinding machine. Remove minimum amount of material as possible. Ensure all oil passages are clear. Install rocker arm components in original location. Ensure rocker arm is properly seated in push rod. Tighten bolts to specification. Adjust valves if required. See **VALVE ADJUSTMENT**.

PUSH RODS

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Remove rocker arms. Mark push rods for location. Remove push rods. Push rods can be steel or aluminum, solid or hollow. Hollow push rods must be internally cleaned to ensure oil passage to rocker arms is cleaned. Check push rods for damage, such as loose ends on steel tipped aluminum types.

Check push rod for straightness. Roll push rod on a flat surface. Using feeler gauge, check clearance at center. Replace push rod if bent. The push rod can also be supported at each end and rotated. A dial indicator is used to detect a bent area in the push rod.

Lubricate ends of push rod and install push rod in original location. Ensure push rod is properly seated in lifter. Install rocker arm. Tighten bolts to specification. Adjust valves if required. See **VALVE ADJUSTMENT**.

LIFTERS

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Hydraulic Lifters

Before replacing a hydraulic lifter for noisy operation, ensure noise is not caused by worn rocker arms or valve tips. Also ensure sufficient oil pressure exists. Hydraulic lifters must be installed in original location. Remove rocker arm assembly and push rod. Mark components for location. Some applications require intake manifold, cylinder head or lifter cover removal. Remove lifter retainer plate (if used). To remove lifters, use a hydraulic lifter remover or magnet. Different type lifters are used. See **Fig. 13**.

On sticking lifters, disassemble and clean lifter. DO NOT mix lifter components or positions. Parts are select-fitted and are not interchangeable. Inspect all components for wear. Note amount of wear in lifter body-to-camshaft contact area. Surface must have smooth and convex contact face. If wear is apparent, carefully inspect cam lobe.

Inspect push rod contact area and lifter body for scoring or signs of wear. If body is scored, inspect lifter bore for damage and lack of lubrication. On roller type lifters, inspect roller for flaking, pitting, loss of needle bearings and roughness during rotation.

Measure lifter body O.D. in several areas. Measure lifter bore I.D. Ensure components or oil clearance is within specification. Some models offer oversize lifters. Replace lifter if damaged.

If lifter check valve is not operating, obstructions may be preventing it from closing or valve spring may be broken. Clean or replace components as necessary.

Check plunger operation. Plunger should drop to bottom of the body by its own weight when assembled dry. If plunger is not free, soak lifter in solvent to dissolve deposits.

Lifter leak-down test can be performed on lifter. Lifter must be filled with special test oil. New lifters contain special test oil. Using lifter leak-down tester, perform leak-down test following manufacturer's instructions. If leak-down time is not within specifications, replace lifter assembly.

Lifters should be soaked in clean engine oil several hours prior to installation. Coat lifter base, roller (if equipped) and lifter body with ample amount of Molykote or camshaft lubricant. See **Fig. 13**. Install lifter in original location. Install remaining components. Valve lash adjustment is not required on most hydraulic lifters. Preload of hydraulic lifter is automatic. Some models may require adjustment.

NOTE: **Some manufacturers require that a crankcase conditioner be added to engine oil and engine operated for specified amount of time to aid in lifter break-in procedure if new lifters or camshaft are installed.**

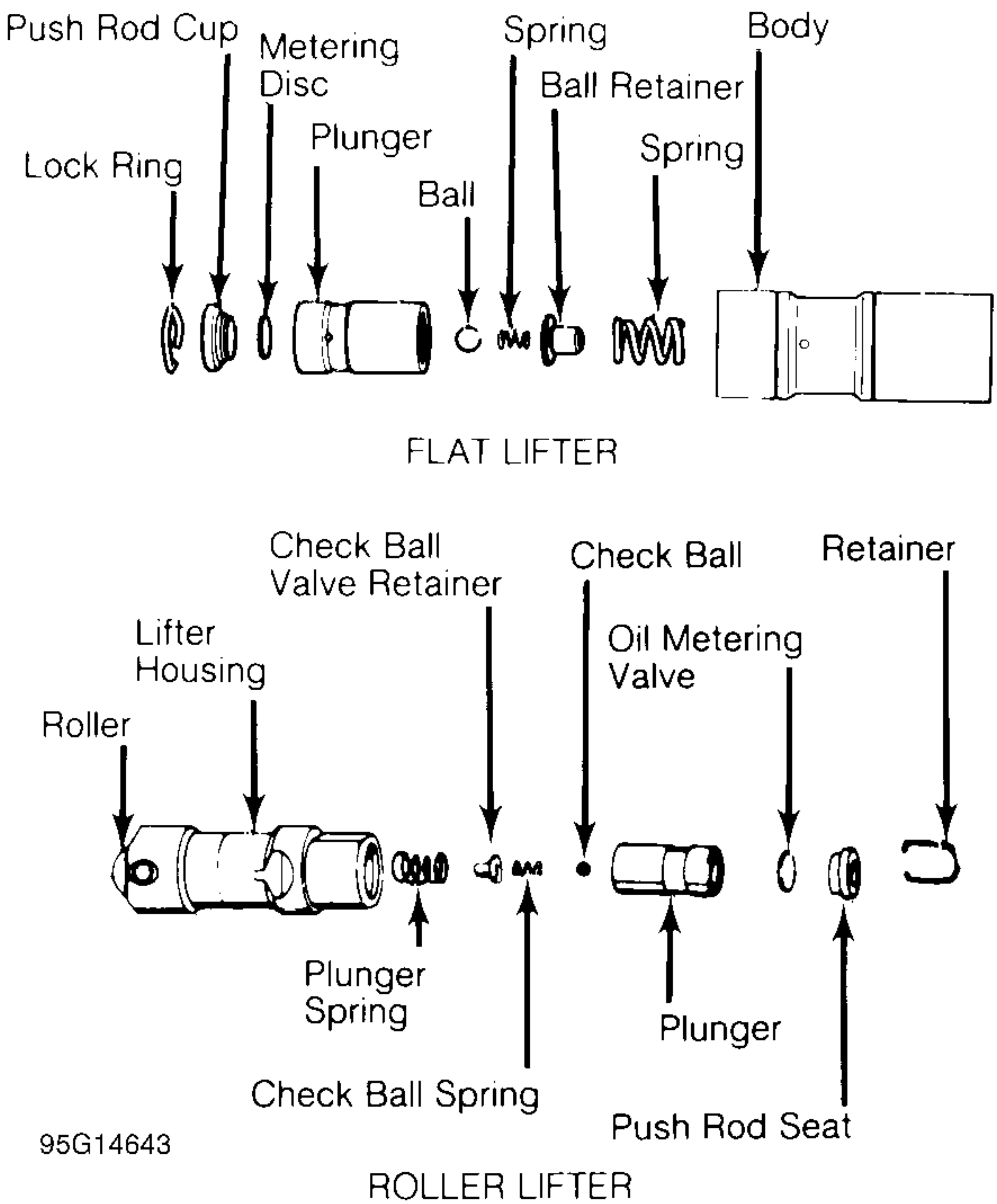

Fig. 13: Typical Hydraulic Valve Lifter Assemblies

Mechanical Lifters

Lifter assemblies must be installed in original locations. Remove rocker arm assembly and push rod. Mark components for location. Some applications require intake manifold or lifter cover removal. Remove lifter retainer plate (if used). To remove lifters, use lifter remover or magnet.

Inspect push rod contact area and lifter body for scoring or signs of wear. If body is scored, inspect lifter bore

for damage and lack of lubrication. Note amount of wear in lifter body-to-camshaft contact area. Surface must have smooth and convex contact face. If wear is apparent, carefully inspect cam lobe.

Coat lifter base, roller (if equipped) and lifter body with ample amount of Molykote or camshaft lubricant. Install lifter in original location. Install remaining components. Tighten bolts to specification. Adjust valves. See **VALVE ADJUSTMENT**.

PISTONS, CONNECTING RODS & BEARINGS

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RIDGE REMOVAL

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Ridge in cylinder wall must be removed prior to piston removal. Failure to remove ridge prior to removing pistons will cause piston damage in piston ring lands or grooves.

With piston at bottom dead center, place rag in bore to trap metal chips. Install ridge reamer in cylinder bore. Adjust ridge reamer using manufacturer's instructions. Remove ridge using ridge reamer. DO NOT remove an excessive amount of material. Ensure ridge is completely removed.

PISTON & CONNECTING ROD REMOVAL

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Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Note top of piston. Some pistons may contain a notch, arrow or be marked FRONT. Piston must be installed in

proper direction to prevent damage with valve operation.

Check that connecting rod and cap are numbered for cylinder location and which side of cylinder block the number faces. Proper cap and connecting rod must be installed together. Connecting rod cap must be installed on connecting rod in proper direction to ensure bearing lock procedure. Mark connecting rod and cap if necessary. Pistons must be installed in original location.

Remove cap retaining nuts or bolts. Remove bearing cap. Install tubing protectors on connecting rod bolts. This protects cylinder walls from scoring during removal. Ensure proper removal of ridge. Push piston and connecting rod from cylinder. Connecting rod boss can be tapped with a wooden dowel or hammer handle to aid in removal.

PISTON & CONNECTING ROD

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Disassembly

Using ring expander, remove piston rings. Remove piston pin retaining rings (if equipped). Note direction of piston installation on connecting rod. On pressed type piston pins, special fixtures and procedures according to manufacturer must be used to remove piston pins. Follow manufacturer's recommendations to avoid piston distortion or breakage.

Cleaning

Remove all carbon and varnish from piston. Pistons and connecting rods may be cleaned in cold type chemical tank. Using ring groove cleaner, clean all deposits from ring grooves. Ensure all deposits are cleaned from ring grooves to prevent ring breakage or sticking. DO NOT attempt to clean pistons with wire brush.

Inspection

Inspect pistons for nicks, scoring, cracks or damage in ring areas. Connecting rod should be checked for cracks using Magnaflux procedure. Piston diameter must be measured in manufacturer's specified area.

Using telescopic gauge and micrometer, measure piston pin bore of piston in 2 areas, 90 degrees apart. This is done to check diameter and out-of-round.

Install proper bearing cap on connecting rod. Ensure bearing cap is installed in proper location. Tighten bolts or nuts to specification. Using inside micrometer, measure inside diameter in 2 areas, 90 degrees apart.

Connecting rod I.D. and out-of-round must be within specification. Measure piston pin bore I.D. and piston pin O.D. All components must be within specification. Subtract piston pin diameter from piston pin bore in piston and connecting rod to determine proper fit.

Connecting rod length must be measured from center of crankshaft journal inside diameter to center of piston pin bushing using proper caliper. Connecting rods must be the same length. Connecting rods should be checked on an alignment fixture for bent or twisted condition. Replace all components which are damaged or not within specification.

PISTON & CYLINDER BORE FIT

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Ensure cylinder is checked for taper, out-of-round and properly honed prior to checking piston and cylinder bore fit. See **CYLINDER BLOCK**. Using dial bore gauge, measure cylinder bore.

Measure piston skirt diameter at 90 degree angle to piston pin at specified area by manufacturer. Subtract piston diameter from cylinder bore diameter to determine piston-to-cylinder clearance. Clearance must be within specification. Mark piston for proper cylinder location.

ASSEMBLING PISTON & CONNECTING ROD

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Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Install piston on connecting rod for corresponding cylinder. Ensure reference marking on top of piston corresponds with connecting rod and cap number. See **Fig. 14**.

Lubricate piston pin and install in connecting rod. Ensure piston pin retainers are fully seated (if equipped). On pressed type piston pins, follow manufacturer's recommended procedure to avoid distortion or breakage.

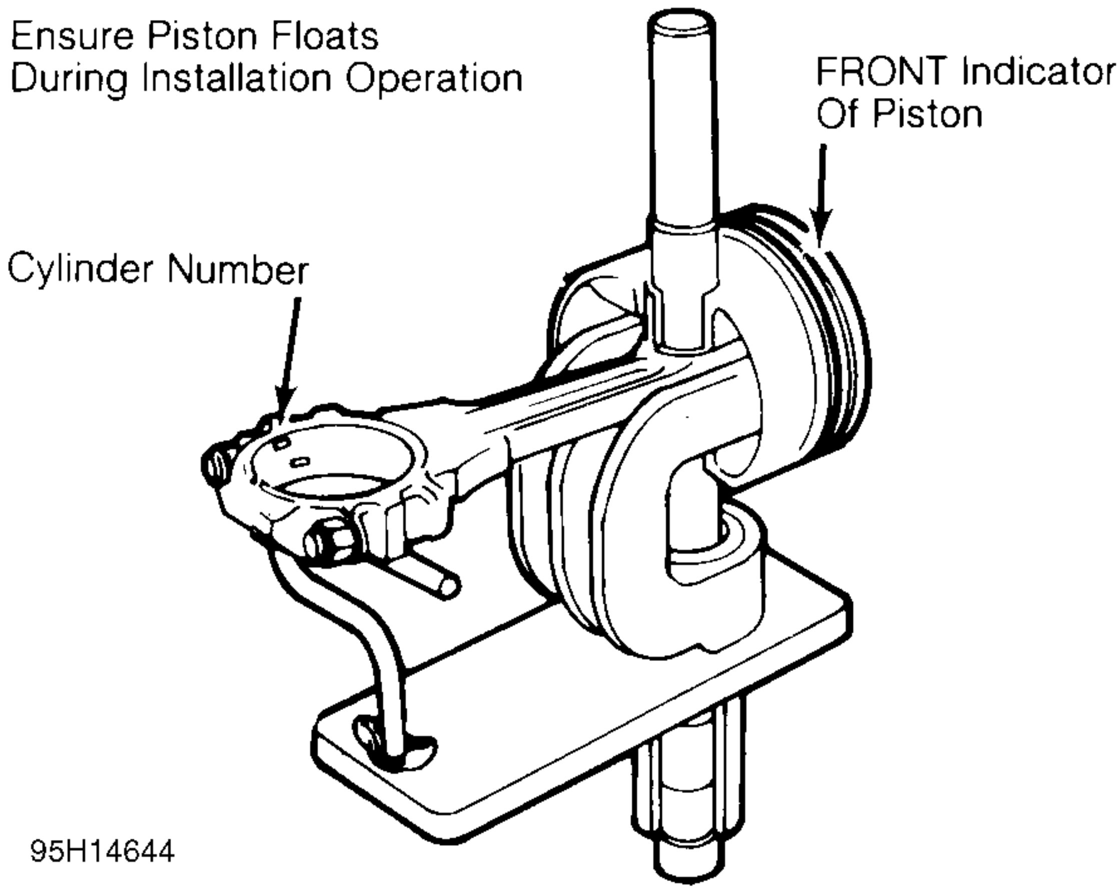

Fig. 14: Installing Typical Piston Pin

CHECKING PISTON RING CLEARANCES

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Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Piston rings must be checked for side clearance and end gap. To check end gap, install piston ring in cylinder in which it is to be installed. Using an inverted piston, push ring to bottom of cylinder in smallest cylinder diameter.

Using feeler gauge, check ring end gap. See **Fig. 15**. Piston ring end gap must be within specification. Ring breakage will occur if insufficient ring end gap exists.

Some manufacturers permit correcting insufficient ring end gap by using a fine file while other manufacturers

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recommend using another ring set. Mark rings for proper cylinder installation after checking end gap.

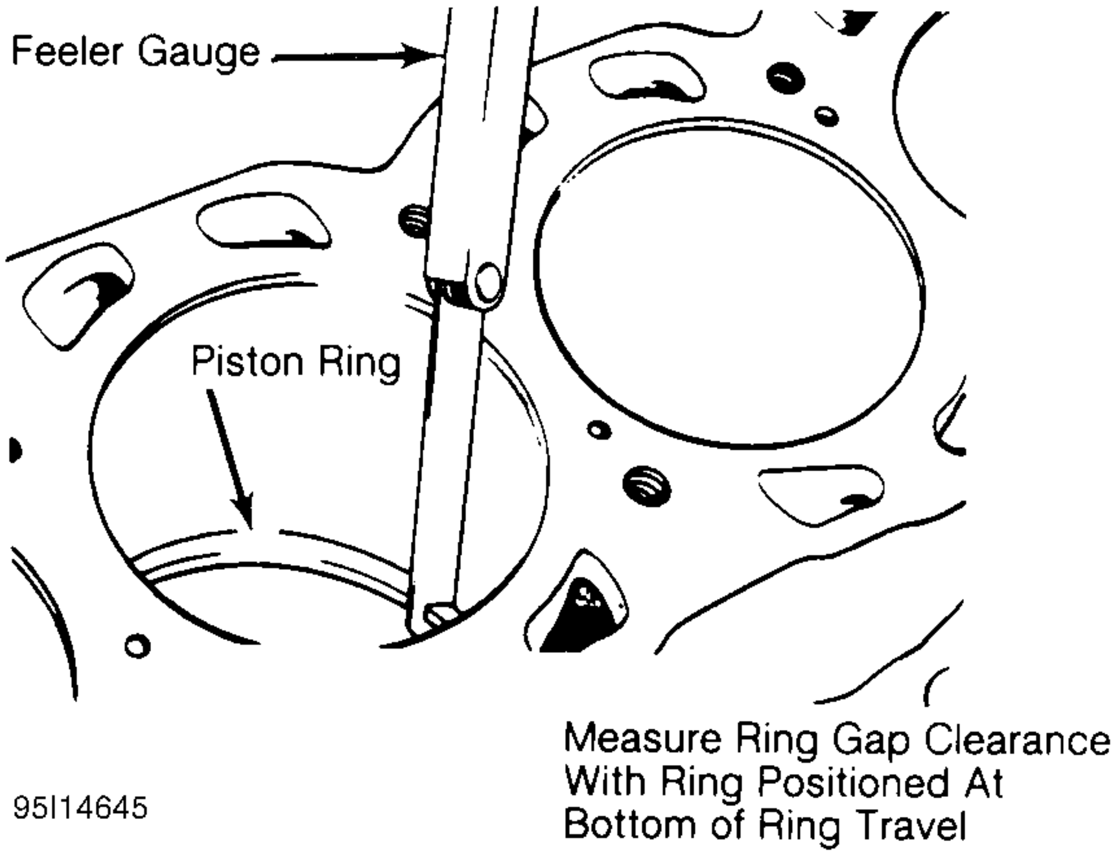

Fig. 15: Checking Piston Ring End Gap

For checking side clearance, install rings on piston. Using feeler gauge, measure clearance between piston ring and piston ring land. Check side clearance in several areas around piston. Side clearance must be within specification.

If side clearance is excessive, piston ring grooves can be machined to accept oversize piston rings (if available). Normal practice is to replace piston.

PISTON & CONNECTING ROD INSTALLATION

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Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Cylinders must be honed prior to piston installation. See **CYLINDER HONING** under CYLINDER BLOCK.

Install upper connecting rod bearings. Lubricate upper bearings with engine oil. Install lower bearings in rod caps. Ensure bearing tabs are properly seated. Position piston ring gaps according to manufacturer's recommendations. See **Fig. 16**. Lubricate pistons, rings and cylinder walls.

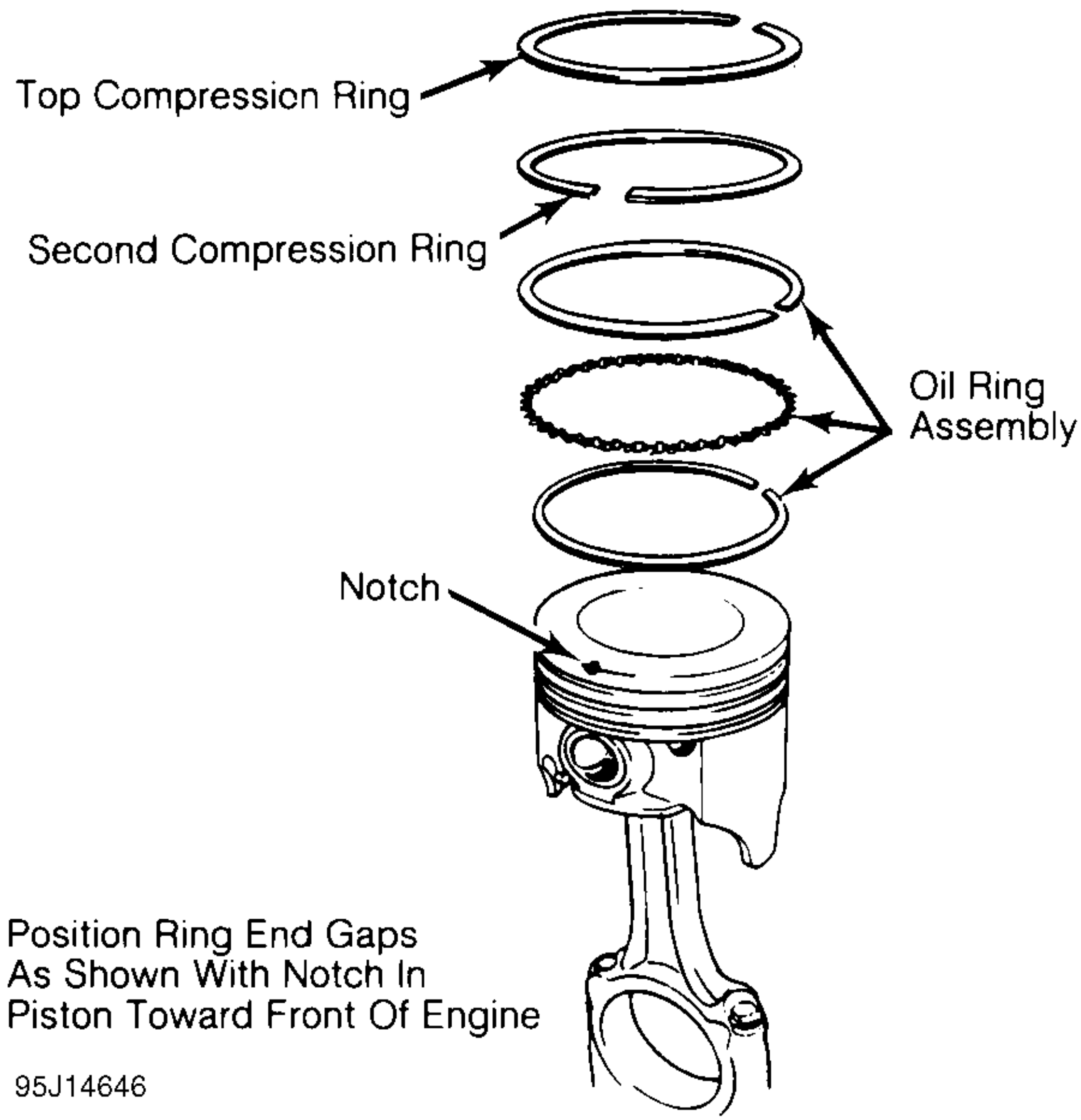

Fig. 16: Positioning Typical Piston Ring End Gap

Install ring compressor. Use care not to rotate piston rings. Compress rings with ring compressor. Install plastic tubing protectors over connecting rod bolts. Install piston and connecting rod assembly. Ensure piston notch, arrow or FRONT mark is toward front of engine. See **Fig. 17**.

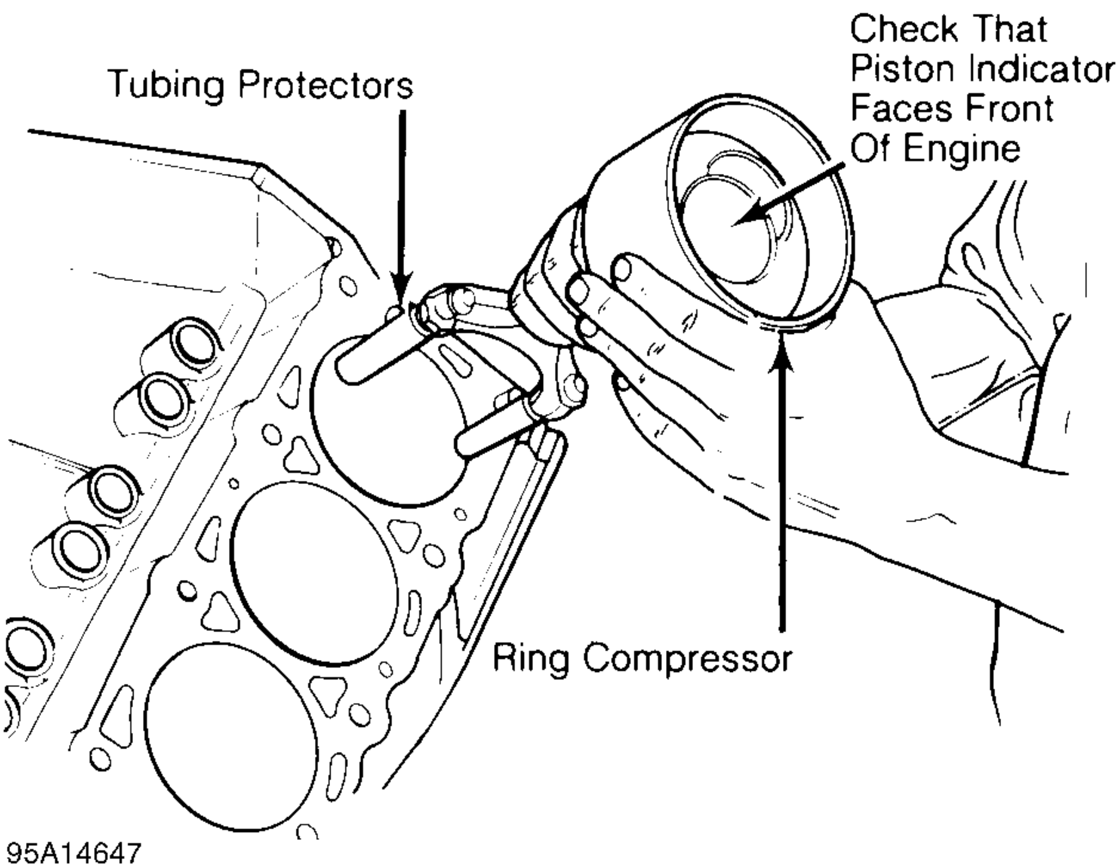

Fig. 17: Installing Piston & Connecting Rod Assembly

Carefully tap piston into cylinder until rod bearing is seated on crankshaft journal. Remove protectors. Install rod cap and bearing. Lightly tighten connecting rod bolts. Repeat procedure for remaining cylinders. Check bearing clearance. See **MAIN & CONNECTING ROD BEARING CLEARANCE**.

Once clearance is checked, lubricate journals and bearings. Install bearing caps. Ensure marks are aligned on connecting rod and cap. Tighten rod nuts or bolts to specification. Ensure rod moves freely on crankshaft. Check connecting rod side clearance. See **CONNECTING ROD SIDE CLEARANCE**.

CONNECTING ROD SIDE CLEARANCE

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Position connecting rod toward one side of crankshaft as far as possible. Using feeler gauge, measure clearance

between side of connecting rod and crankshaft. See **Fig. 18**. Clearance must be within specification.

Check for improper bearing installation, wrong bearing cap or insufficient bearing clearance if side clearance is insufficient. Connecting rod may require machining to obtain proper clearance. Excessive clearance usually indicates excessive wear at crankshaft. Crankshaft must be repaired or replaced.

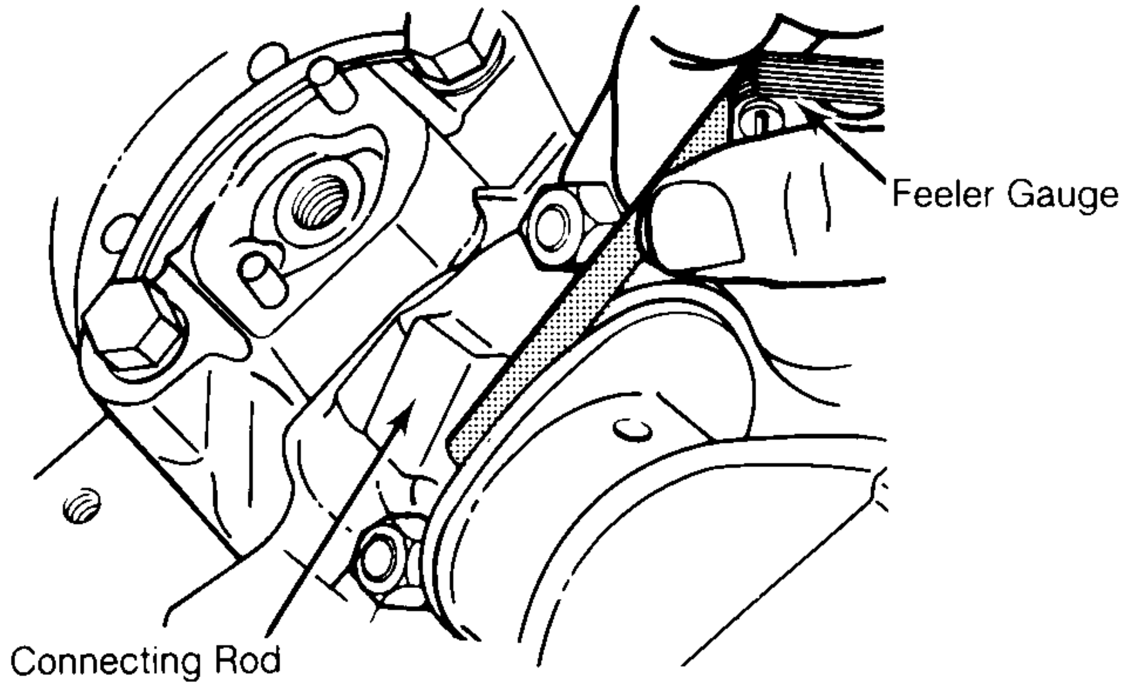

Fig. 18: Measuring Connecting Rod Side Clearance

MAIN & CONNECTING ROD BEARING CLEARANCE

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Plastigage Method

Plastigage method may be used to determine bearing clearance. Plastigage can be used with an engine in service or during reassembly. Plastigage material is oil soluble.

Ensure journals and bearings are free of oil or solvent. Oil or solvent will dissolve material and false reading will be obtained. Install small piece of Plastigage along full length of bearing journal. Install bearing cap in

original location. Tighten bolts to specification.

CAUTION: DO NOT rotate crankshaft while Plastigage is installed. Bearing clearance will not be obtained if crankshaft is rotated.

Remove bearing cap. Compare Plastigage width with scale on Plastigage container to determine bearing clearance. See **Fig. 19**. Rotate crankshaft 90 degrees. Repeat procedure. This is done to check journal eccentricity. This procedure can be used to check oil clearance on both connecting rod and main bearings.

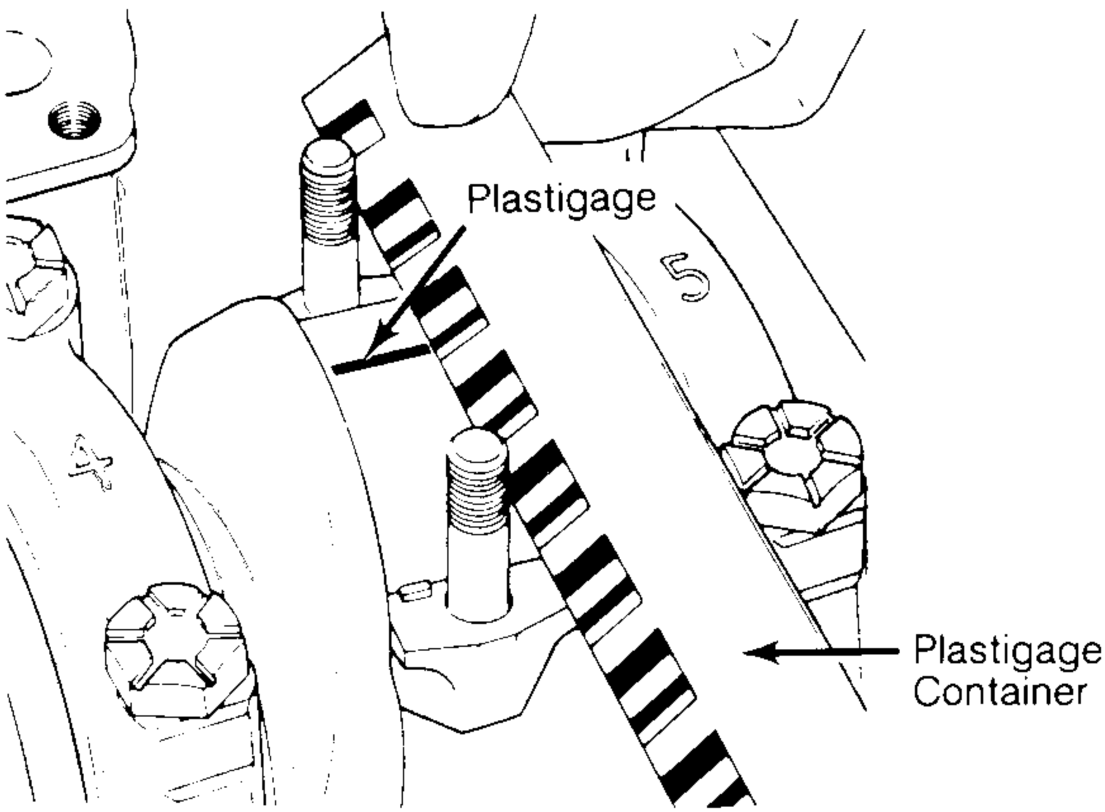

Fig. 19: Measuring Bearing Clearance

Micrometer & Telescopic Gauge Method

A micrometer is used to determine journal diameter, taper and out-of-round dimensions of the crankshaft. See **CLEANING & INSPECTION** under CRANKSHAFT & MAIN BEARINGS in this article.

With crankshaft removed, install bearings and caps in original location on cylinder block. Tighten bolts to specification. On connecting rods, install bearings and caps on connecting rods. Install proper connecting rod cap on corresponding rod. Ensure bearing cap is installed in original location. Tighten bolts to specification.

Using a telescopic gauge and micrometer or inside micrometer, measure inside diameter of connecting rod and main bearings bores. Subtract each crankshaft journal diameter from the corresponding inside bearing bore

diameter. This is the bearing clearance.

CRANKSHAFT & MAIN BEARINGS

* PLEASE READ THIS FIRST *

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REMOVAL

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Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Ensure all main bearing caps are marked for location on cylinder block. Some main bearing caps have an arrow stamped on them. The arrow must face timing belt or timing chain end of engine. Remove main bearing cap bolts. Remove main bearing caps. Carefully remove crankshaft. Use care not to bind crankshaft in cylinder block during removal.

CLEANING & INSPECTION

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Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Thoroughly clean crankshaft using solvent. Dry with compressed air. Ensure all oil passages are clear and free of sludge, rust, dirt and metal chips.

Inspect crankshaft for scoring and nicks. Inspect crankshaft for cracks using Magnaflux procedure. Inspect rear seal area for grooving or damage. Inspect bolt hole threads for damage. If pilot bearing or bushing is used, check pilot bearing or bushing fit in crankshaft. Inspect crankshaft gear for damaged or cracked teeth. Replace gear if damaged. Ensure oil passage plugs are tight (if equipped).

Using micrometer, measure all journals in 4 areas to determine journal taper, out-of-round and undersize. See **Fig. 20**. Some crankshafts can be reground to the next largest undersize, depending on the amount of wear or damage. Crankshafts with rolled fillet cannot be reground and must be replaced.

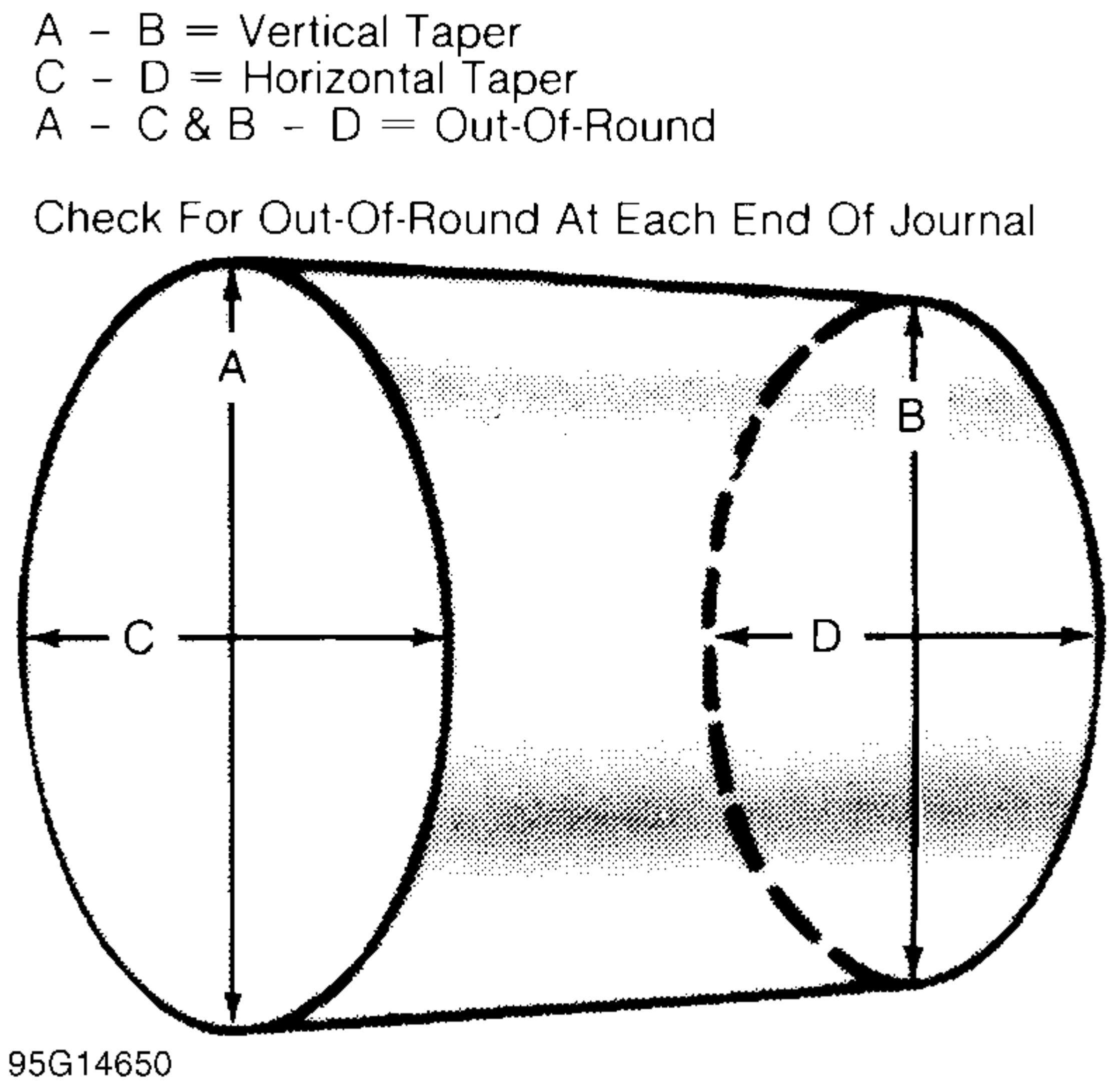

Fig. 20: Measuring Crankshaft Journals

Crankshaft journal runout should be checked. Install crankshaft in "V" blocks or bench center. Position dial indicator with tip resting on the main bearing journal area. See **Fig. 21**. Rotate crankshaft and note reading. Journal runout must not exceed specification. Repeat procedure on all main bearing journals. Crankshaft must be replaced if runout exceeds specification.

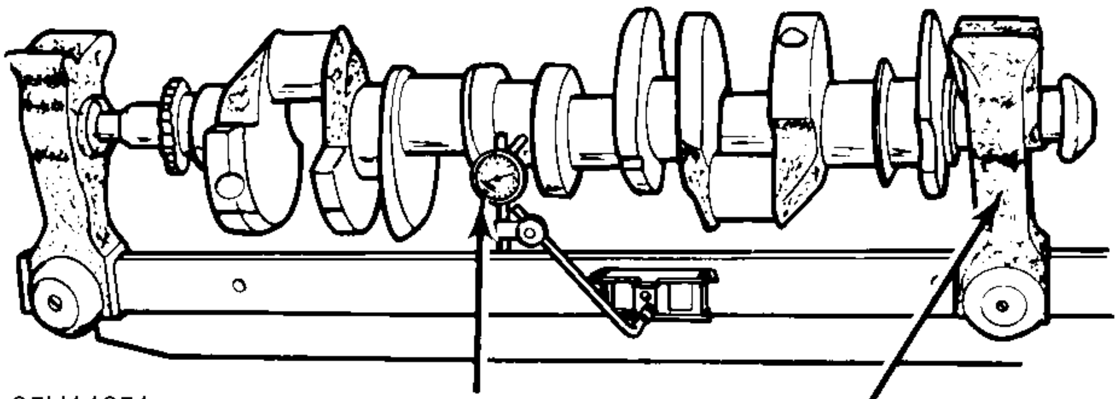

Fig. 21: Measuring Crankshaft Main Bearing Journal Runout

INSTALLATION

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Install upper main bearing in cylinder block. Ensure lock tab is properly located in cylinder block. Install bearings in main bearing caps. Ensure all oil passages are aligned. Install rear seal (if removed).

Ensure crankshaft journals are clean. Lubricate upper main bearings with clean engine oil. Carefully install crankshaft. Check each main bearing clearance using Plastigage method. See **MAIN & CONNECTING ROD BEARING CLEARANCE**.

Once clearance is checked, lubricate lower main bearing and journals. Install main bearing caps in original location. Install rear seal in rear main bearing cap (if removed). Some rear main bearing caps require sealant to be applied in corners to prevent oil leakage.

Install and tighten all bolts except thrust bearing cap to specification. Tighten thrust bearing cap bolts finger tight only. Some models require that thrust bearing be aligned. On most applications, crankshaft must be moved rearward then forward. Procedure may vary with manufacturer. Thrust bearing cap is then tightened to specification. Ensure crankshaft rotates freely. Crankshaft end play should be checked. See **CRANKSHAFT END PLAY**.

CRANKSHAFT END PLAY

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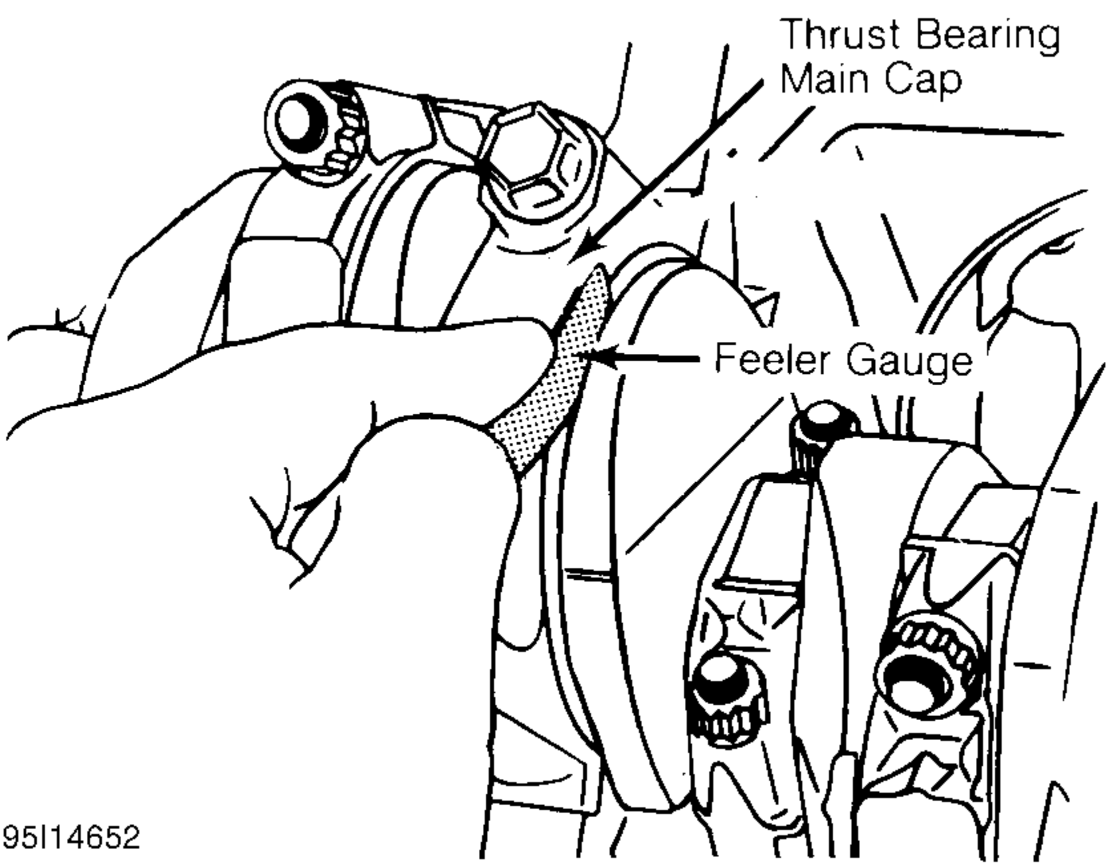
Dial Indicator Method

Crankshaft end play can be checked using dial indicator. Mount dial indicator on rear of cylinder block. Position dial indicator tip against rear of crankshaft. Ensure tip is resting against flat surface.

Pry crankshaft rearward. Adjust dial indicator to zero. Pry crankshaft forward and note reading. Crankshaft end play must be within specification. If end play is not within specification, check for faulty thrust bearing installation or worn crankshaft. Some applications offer oversize thrust bearings.

Feeler Gauge Method

Crankshaft end play can be checked using feeler gauge. Pry crankshaft rearward. Pry crankshaft forward. Using feeler gauge, measure clearance between crankshaft and thrust bearing surface. See **Fig. 22**.



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[Fig. 22: Checking Crankshaft End Play]

Crankshaft end play must be within specification. If end play is not within specification, check for faulty thrust bearing installation or worn crankshaft. Some applications offer oversize thrust bearings.

CYLINDER BLOCK

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Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Block Cleaning

Only cast cylinder blocks should be hot tank cleaned. Aluminum cylinder blocks should be cleaned using cold tank method. Cylinder block is cleaned in order to remove carbon deposits, gasket residue and water jacket scale. Remove oil gallery plugs, freeze plugs and cam bearings before cleaning block.

Block Inspection

Visually inspect the block. Check suspected areas for cracks using the Dye Penetrant inspection method. Block may be checked for cracks using the Magnaflux method.

Cracks are most commonly found at the bottom of cylinders, main bearing saddles, near expansion plugs and between cylinders and water jackets. Inspect lifter bores for damage. Inspect all head bolt holes for damaged threads. Threads should be cleaned using tap to ensure proper head bolt torque. Consult machine shop concerning possible welding and machining (if required).

Cylinder Bore Inspection

Inspect bore for scoring or roughness. Cylinder bore is dimensionally checked for out-of-round and taper using dial bore gauge. For determining out-of-round, measure cylinder parallel and perpendicular to the block center line. Difference in the 2 readings is the bore out-of-round. Cylinder bore must be checked at top, middle and bottom of piston travel area.

Bore taper is obtained by measuring bore at the top and bottom. If wear has exceeded allowable limits, block must be honed or bored to next available oversize piston dimension.

Cylinder Honing

Cylinder must be properly honed to allow new piston rings to properly seat. Cross-hatching at correct angle and depth is critical to lubrication of cylinder walls and pistons.

A flexible drive hone and power drill are commonly used. Drive hone must be lubricated during operation. Mix equal parts of kerosene and SAE 20W engine oil for lubrication.

Apply lubrication to cylinder wall. Operate cylinder hone from top to bottom of cylinder using even strokes to

produce 45 degree cross-hatch pattern on the cylinder wall. DO NOT allow cylinder hone to extend below cylinder during operation.

Recheck bore dimension after final honing. Wash cylinder wall with hot soapy water to remove abrasive particles. Blow dry with compressed air. Coat cleaned cylinder walls with lubricating oil.

Deck Warpage

Check deck for damage or warped gasket surface. Place a straightedge across gasket surface of the deck. Using feeler gauge, measure clearance at center of straightedge. Measure across width and length of cylinder block at several points.

If warpage exceeds specifications, deck must be resurfaced. If warpage exceeds manufacturer's maximum tolerance for material removal, replace block.

NOTE: **Some manufacturers recommend that a total amount of material (cylinder head and cylinder block) can only be removed before components must be replaced.**

Deck Height

Distance from crankshaft center line to block deck is called the deck height. Measure and record front and rear main journals of crankshaft. To compute this distance, install crankshaft and retain with center main bearing and cap only. Measure distance from crankshaft journal to block deck, parallel to cylinder center line.

Add one half of main bearing journal diameter to distance from crankshaft journal to block deck. This dimension should be checked at front and rear of cylinder block. Both readings should be the same.

If difference exceeds specification, cylinder block must be repaired or replaced. Deck height and warpage should be corrected at the same time.

Main Bearing Bore & Alignment

For checking main bearing bore, remove all bearings from cylinder block and main bearing caps. Install main bearing caps in original location. Tighten bolts to specification. Using inside micrometer, measure main bearing bore in 2 areas 90 degrees apart. Determine bore size and out-of-round. If diameter is not within specification, block must be align-bored.

For checking alignment, place a straightedge along center line of main bearing saddles. Check for clearance between straightedge and main bearing saddles. Block must be align-bored if clearance exists.

Expansion Plug Removal

Drill hole in center of expansion plug. Remove with screwdriver or punch. Use care not to damage sealing surface.

Expansion Plug Installation

Ensure sealing surface is free of burrs. Coat expansion plug with sealer. Using wooden dowel or pipe of slightly smaller diameter, install expansion plug. Ensure expansion plug is evenly located.

Oil Gallery Plug Removal

Remove threaded oil gallery plugs using appropriate wrench. Soft press-in plugs are removed by drilling into plug and installing a sheet metal screw. Remove plug with slide hammer or pliers.

Oil Gallery Plug Installation

Ensure threads or sealing surface is clean. Coat threaded oil gallery plugs with sealer and install. Replacement soft press-in plugs are installed with a hammer and drift.

CAMSHAFT

* PLEASE READ THIS FIRST *

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CLEANING & INSPECTION

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Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Clean camshaft with solvent. Ensure all oil passages are clear. Inspect cam lobes and bearing journals for pitting, flaking or scoring. Using micrometer, measure bearing journal O.D.

Support camshaft at each end with "V" blocks. Position dial indicator with tip resting on center bearing journal. Rotate camshaft and note camshaft runout reading. If reading exceeds specification, replace camshaft.

Check cam lobe lift by measuring base circle of camshaft using micrometer. Measure again at 90-degree angle to tip of cam lobe. Cam lift can be determined by subtracting base circle diameter from tip of cam lobe measurement.

Different lift dimensions are given for intake and exhaust cam lobes. Reading must be within specification. Replace camshaft if cam lobes or bearing journals are not within specification.

Inspect camshaft gear for chipped, eroded or damaged teeth. Replace gear if damaged. On camshafts using thrust plate, measure distance between thrust plate and camshaft shoulder. Replace thrust plate if not within specification.

CAMSHAFT BEARINGS

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Removal & Installation

Remove camshaft rear plug. Camshaft bearing remover is assembled with shoulder resting against bearing to be removed according to manufacturer's instructions. Tighten puller nut until bearing is removed. Remove remaining bearings, leaving front and rear bearings until last. These bearings act as a guide for camshaft bearing remover.

To install new bearings, puller is rearranged to pull bearings toward the center of block. Ensure all lubrication passages of bearing are aligned with cylinder block. Coat new camshaft rear plug with sealant. Install camshaft rear plug. Ensure plug is even in cylinder block.

CAMSHAFT INSTALLATION

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Lubricate bearing surfaces and cam lobes with ample amount of Molykote or camshaft lubricant. Carefully install camshaft. Use care not to damage bearing journals during installation. Install thrust plate retaining bolts (if equipped). Tighten bolts to specification. On overhead camshafts, install bearing caps in original location. Tighten bolts to specification. On all applications, check camshaft end play.

CAMSHAFT END PLAY

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Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Using dial indicator, check camshaft end play. Position dial indicator on front of engine block or cylinder head. Position indicator tip against camshaft. Push camshaft toward rear of cylinder head or engine and adjust indicator to zero.

Move camshaft forward and note reading. Camshaft end play must be within specification. End play may be adjusted by relocating gear, shimming thrust plate or replacing thrust plate depending on each manufacturer.

TIMING CHAINS & BELTS

* PLEASE READ THIS FIRST *

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TIMING CHAINS

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Timing chains will stretch during operation. Limits are placed upon amount of stretch before replacement is required. Timing chain stretch will alter ignition timing and valve timing.

To check timing chain stretch, rotate crankshaft to eliminate slack from one side of timing chain. Mark reference point on cylinder block. Rotate crankshaft in opposite direction to eliminate slack from remaining side of timing chain. Force other side of chain outward and measure distance between reference point and timing chain. See **Fig. 23**. Replace timing chain and gears if not within specification.

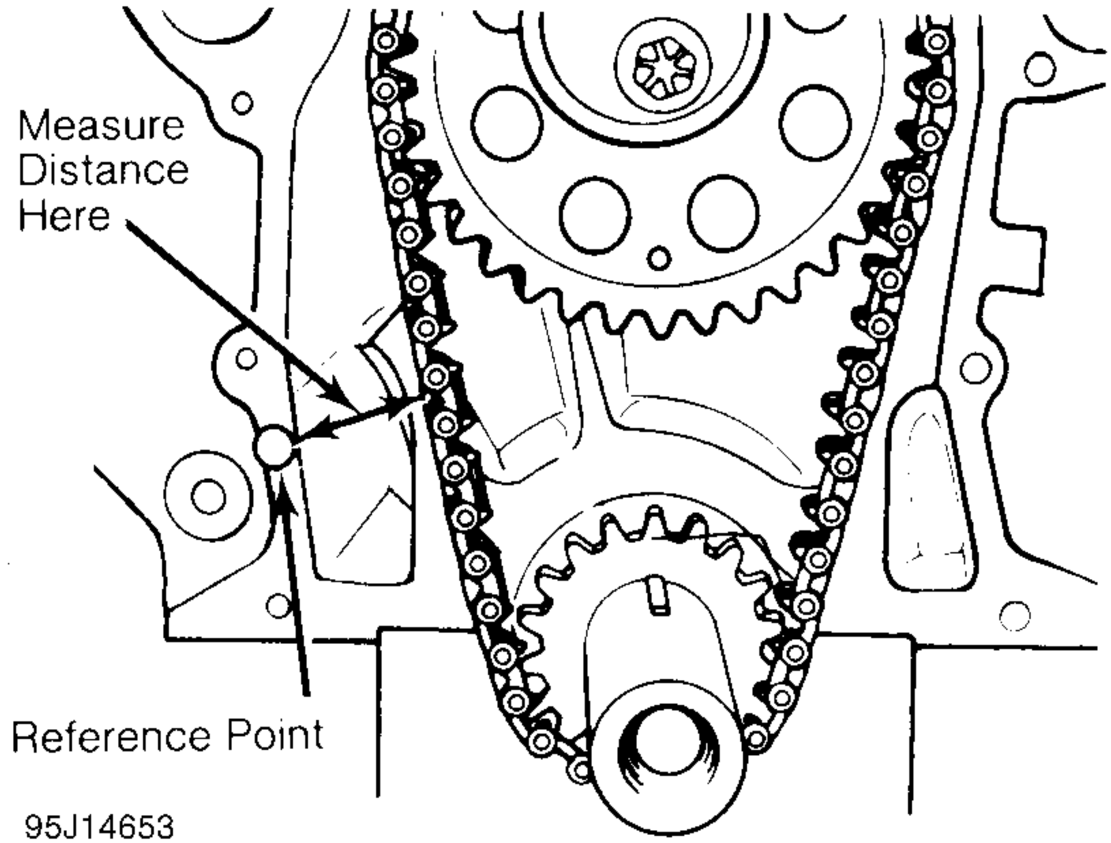

Fig. 23: Measuring Timing Chain Stretch

Timing chains must be installed so timing marks on camshaft gear and crankshaft gear are aligned according to manufacturer. See **Fig. 24**.

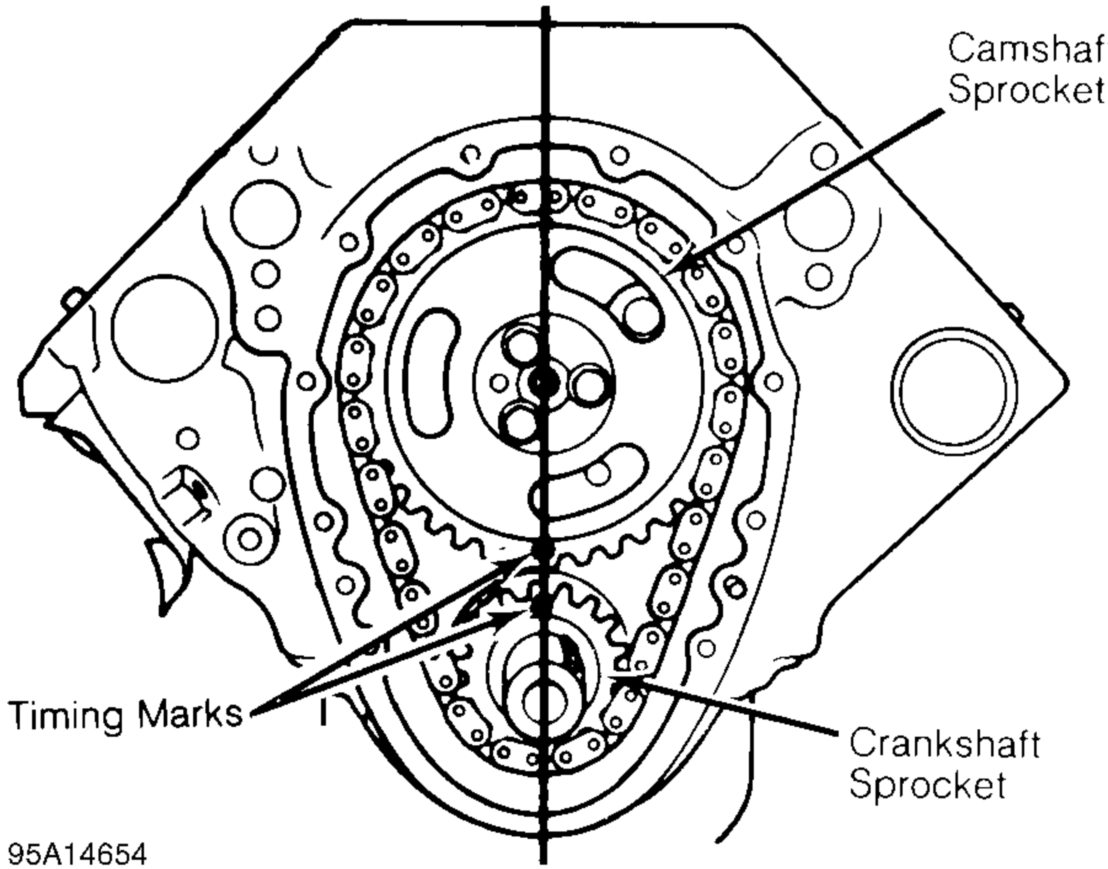

Fig. 24: Typical Gear Timing Mark Alignment

TIMING BELTS

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Cogged tooth belts are commonly used on overhead cam engines. Inspect belt teeth for rounded corners or cracking. Replace belt if it is cracked, damaged, missing teeth or oil soaked.

Used timing belt must be installed in original direction of rotation. Inspect all sprocket teeth for wear. Replace all worn sprockets. Sprockets are marked for timing purposes. Engine is positioned so that crankshaft sprocket mark will be upward. Camshaft sprocket is aligned with reference mark on cylinder head or timing belt cover and then timing belt can be installed. See **Fig. 25**.

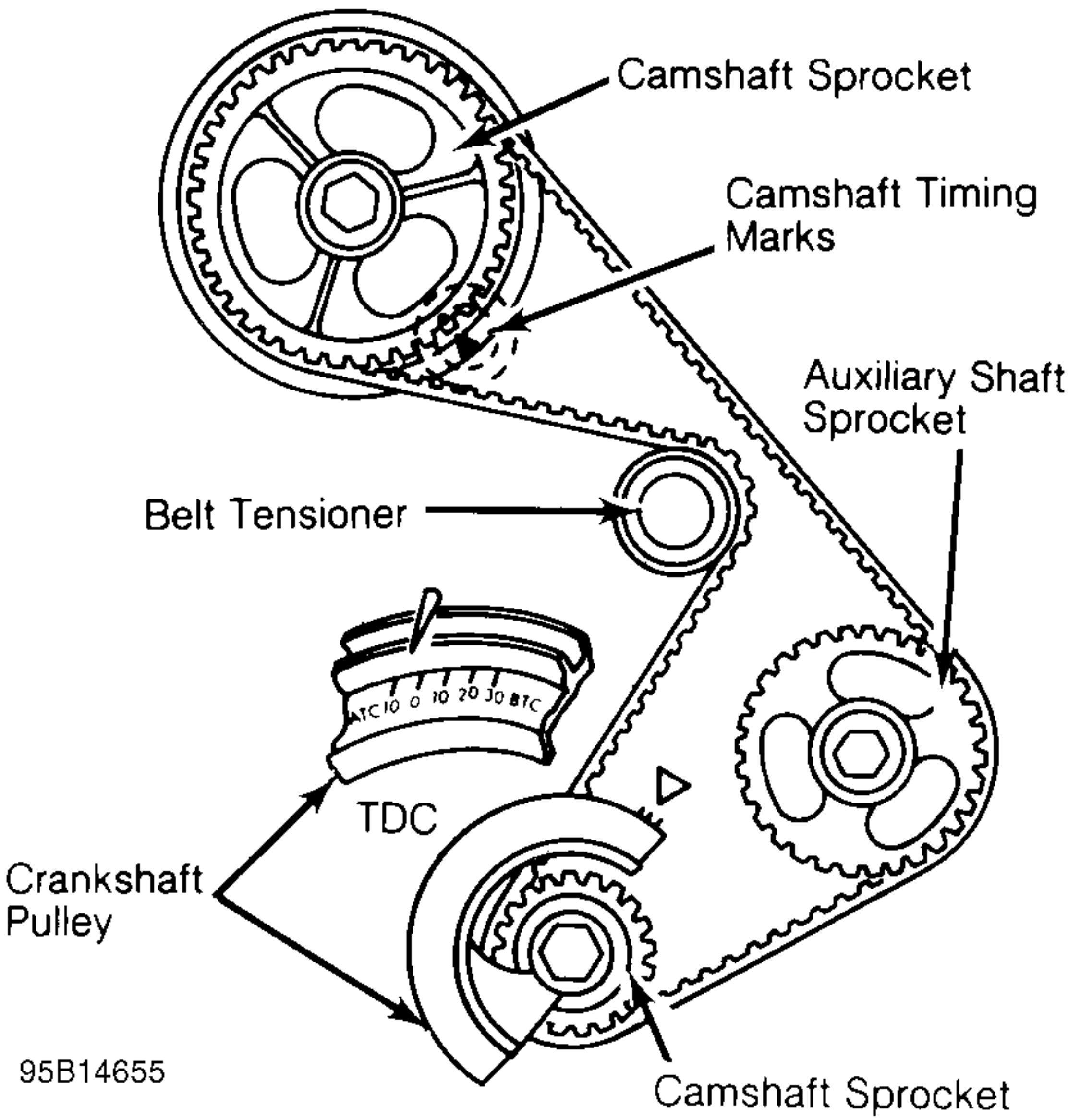

Fig. 25: Typical Camshaft Belt Sprocket Alignment

TENSION ADJUSTMENT

NOTE: **Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.**

Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

If guide rails are used with spring loaded tensioners, ensure at least half of original rail thickness remains.

Spring loaded tensioner should be inspected for damage.

Ensure all timing marks are aligned. Adjust belt tension using manufacturer's recommendations. Belt tension may require checking using tension gauge. See **Fig. 26**.

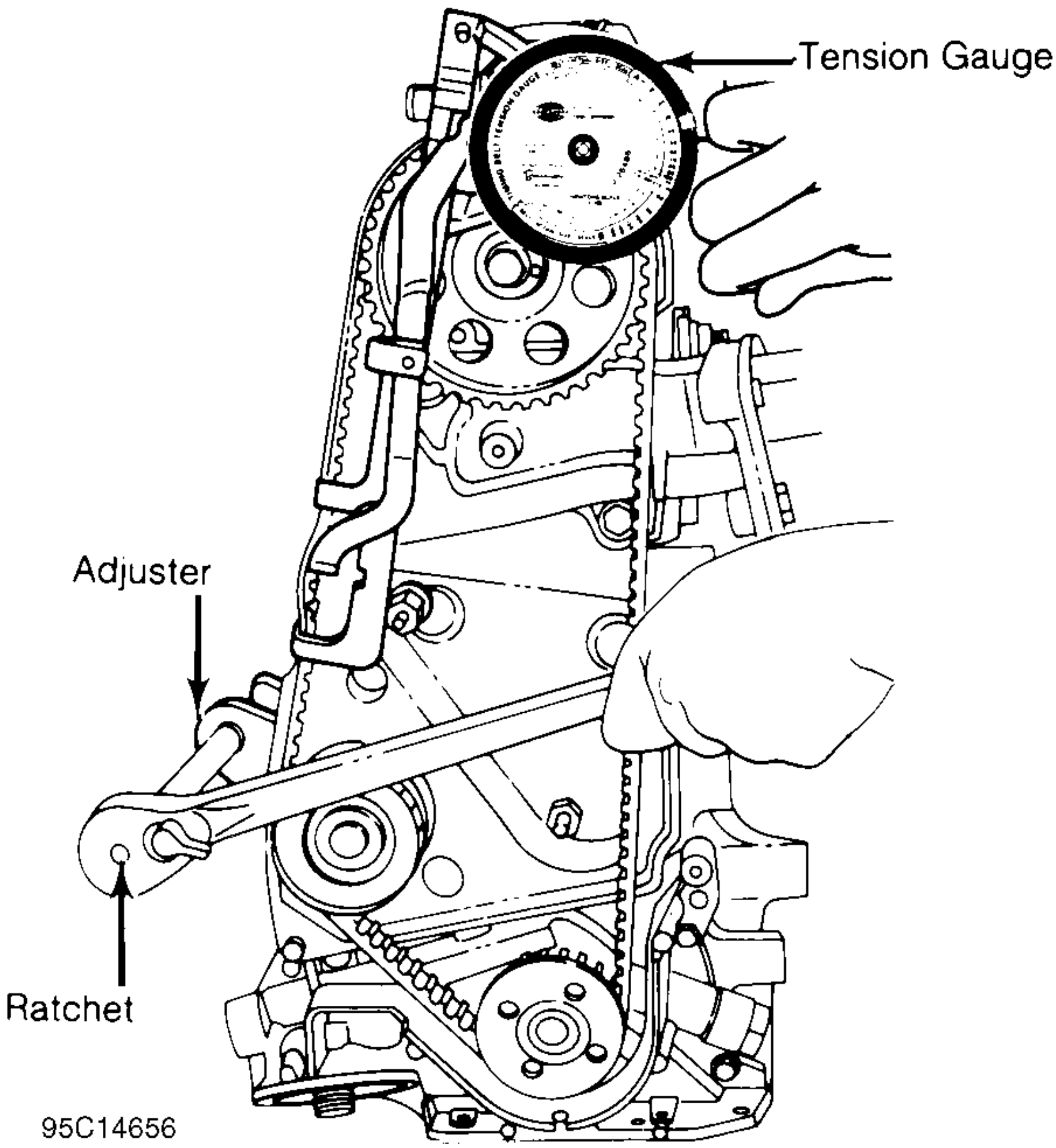

Fig. 26: Adjusting Typical Timing Belt Tension

TIMING GEARS

*** PLEASE READ THIS FIRST ***

NOTE: **Examples used in this article are general in nature and do not necessarily relate**

to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.

Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

TIMING GEAR BACKLASH & RUNOUT

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Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

On engines where camshaft gear operates directly on crankshaft gear, gear backlash and runout must be checked. To check backlash, install dial indicator with tip resting on tooth of camshaft gear. Rotate camshaft gear as far as possible. Adjust indicator to zero. Rotate camshaft gear in opposite direction as far as possible and note reading.

To determine timing gear runout, mount dial indicator with tip resting on face edge of camshaft gear. Adjust indicator to zero. Rotate camshaft gear 360 degrees and note reading. If backlash or runout exceeds specification, replace camshaft and/or crankshaft gear.

REAR MAIN OIL SEAL INSTALLATION

NOTE: **Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.**

Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

One-Piece Type Seal

For one-piece type oil seal installation, coat block contact surface of seal with sealer if seal is not factory coated. Ensure seal surface is free of burrs. Lubricate seal lip with engine oil and press seal into place using proper oil seal installer. See **Fig. 27**.

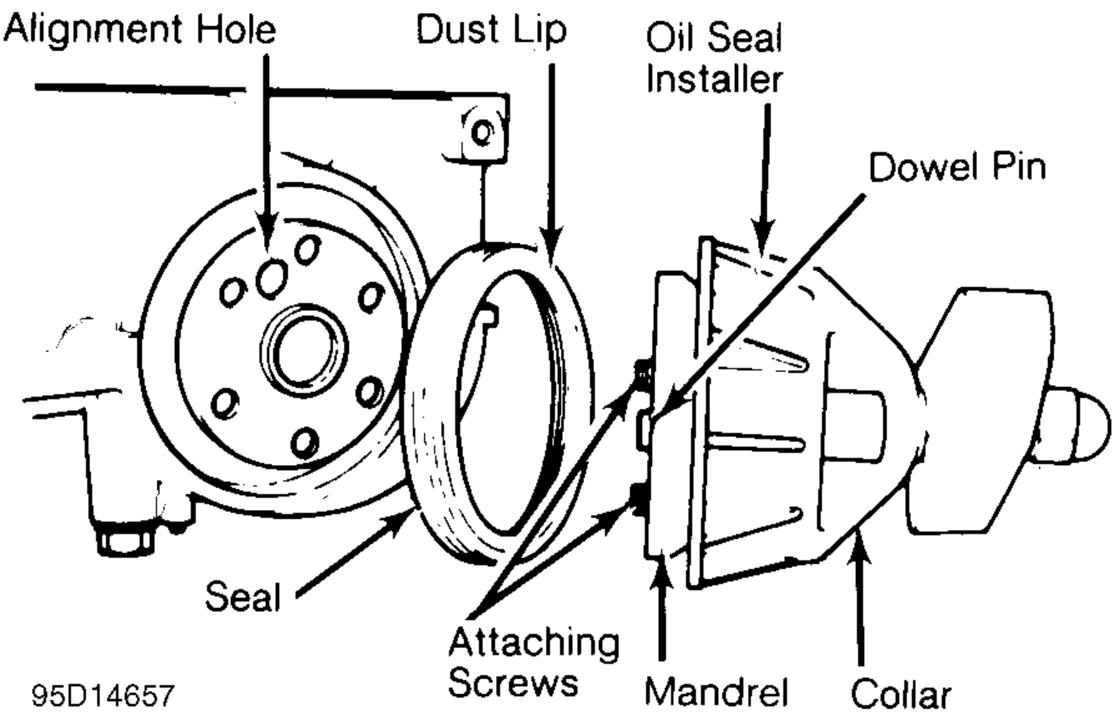

Fig. 27: Installing Typical One-Piece Oil Seal

Rope Type Seal

For rope type rear main oil seal installation, press seal lightly into seat area. Using seal installer, fully seat seal in bearing cap or cylinder block.

Trim seal ends even with cylinder block parting surface. Some applications require sealer to be applied on main bearing cap before installing. See **Fig. 28**.

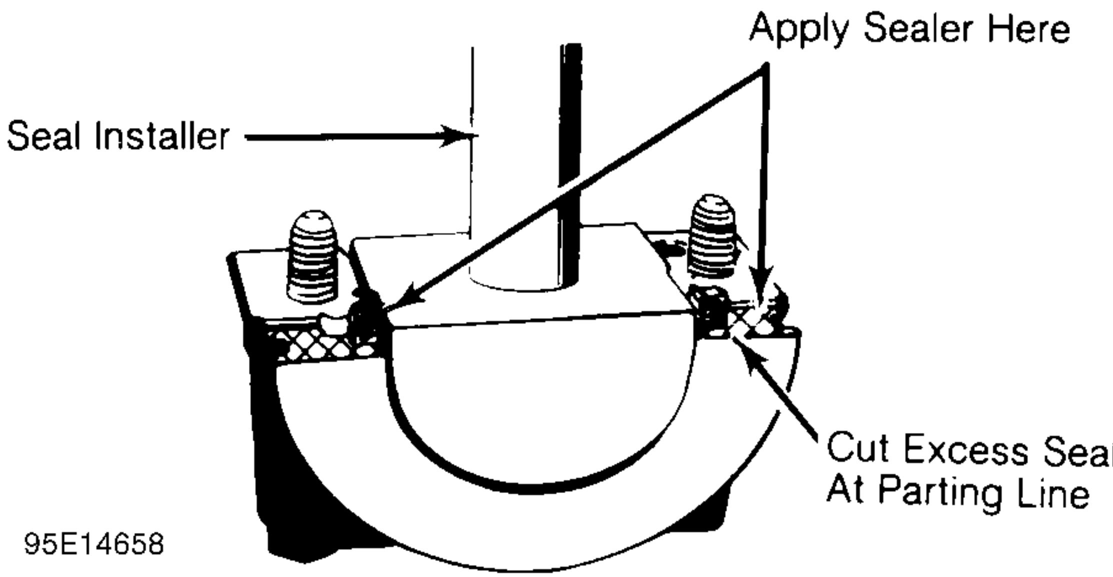

Fig. 28: Installing Typical Rope Seal

Split-Rubber Type Seal

Follow manufacturer's procedures when installing split-rubber type rear main oil seals. Installation procedures vary with manufacturer and engine type. See **Fig. 29**.

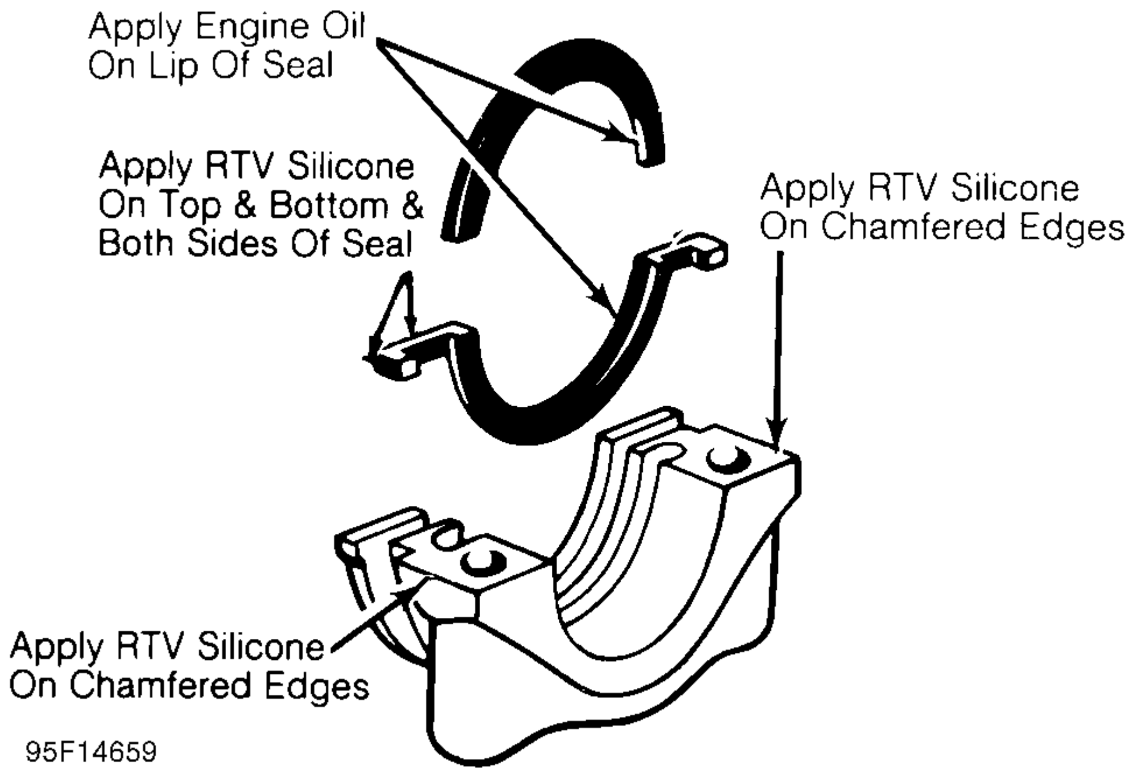

Fig. 29: Installing Typical Split-Rubber Seal

OIL PUMP

*** PLEASE READ THIS FIRST ***

NOTE: **Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.**

Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

ROTOR TYPE

NOTE: **Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.**

Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle

being repaired.

Mark oil pump rotor locations before removing. See **Fig. 30**. Remove outer rotor and measure thickness and diameter. Measure inner rotor thickness. Inspect shaft for scoring or wear. Inspect rotors for pitting or damage. Inspect cover for grooving or wear. Replace worn or damaged components.

Measure outer rotor-to-body clearance. Replace pump assembly if clearance exceeds specification. Measure clearance between rotors. See **Fig. 31**. Replace shaft and both rotors if clearance exceeds specification.

Install rotors in pump body. Position straightedge across pump body. Using feeler gauge, measure clearance between rotors and straightedge. Pump cover wear is measured using a straightedge and feeler gauge. Replace pump if clearance exceeds specification.

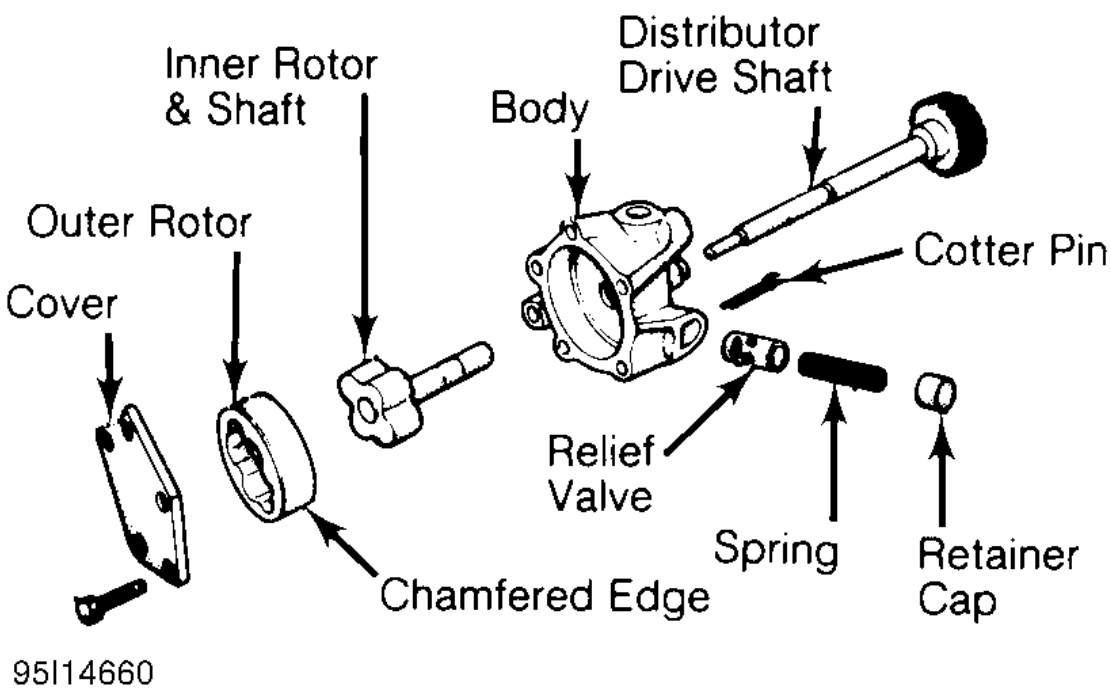

Fig. 30: Typical Rotor Type Oil Pump

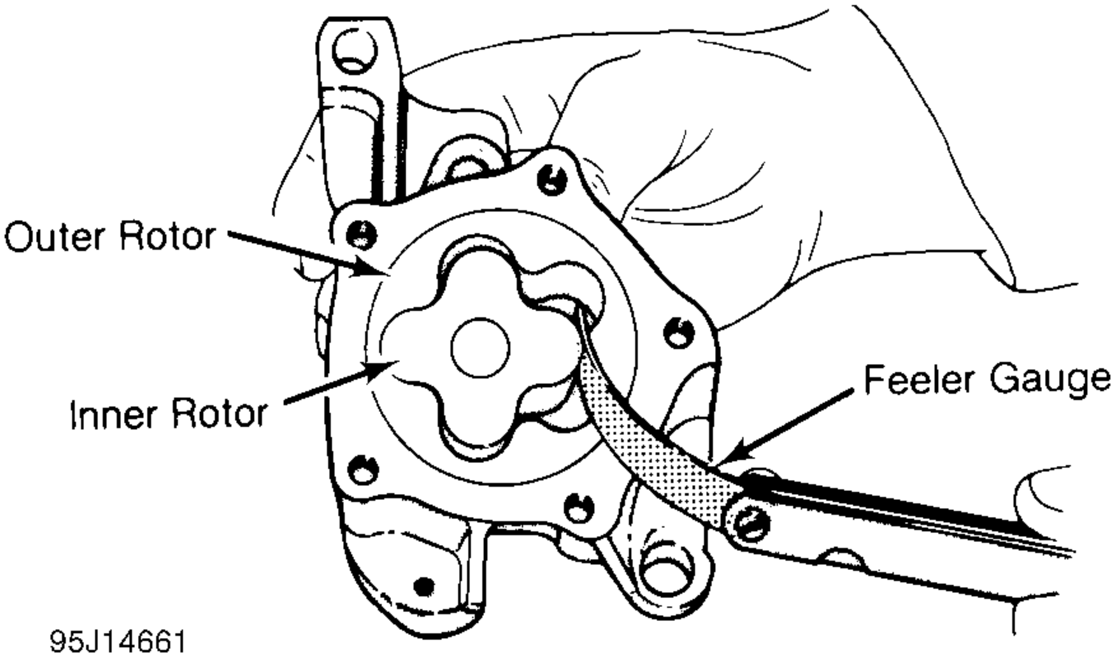

Fig. 31: Measuring Rotor Clearance

GEAR TYPE

NOTE: **Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.**

Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Mark oil pump gear location before removing. See **Fig. 32**. Remove gears from pump body. Inspect gears for pitting or damage. Inspect cover for grooving or wear. Measure gear diameter and length. Measure gear housing cavity depth and diameter. See **Fig. 33**. Replace worn or damaged components.

Pump cover wear is measured using a straightedge and feeler gauge. Replace pump or components if warpage or wear exceeds specification, or mating surface of pump cover is scratched or grooved.

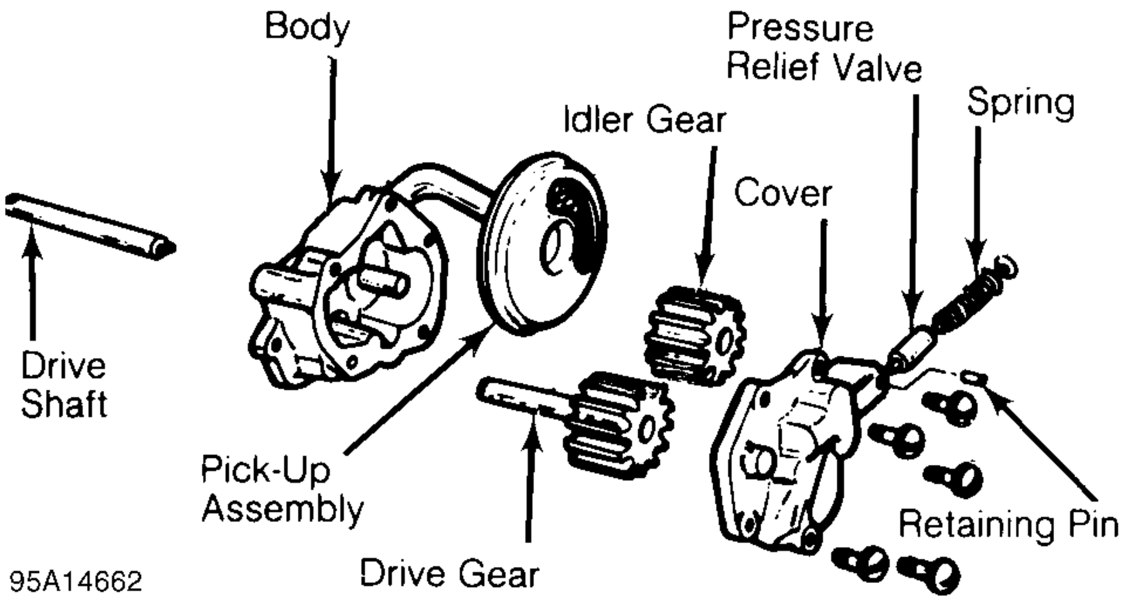

Fig. 32: Typical Gear Type Oil Pump

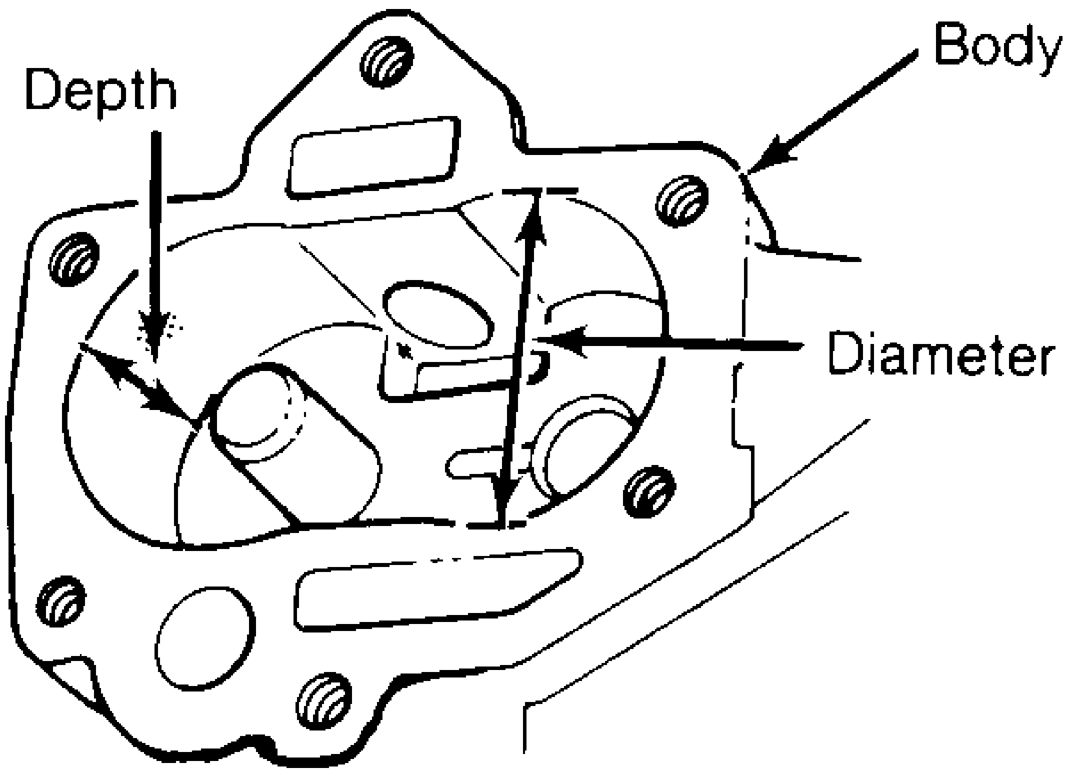

Fig. 33: Measuring Oil Pump Gear Cavity

BREAK-IN PROCEDURE

*** PLEASE READ THIS FIRST ***

NOTE:	**Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.** **Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.**

ENGINE PRE-OILING

NOTE:	**Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes**

of cleaning, inspection, assembly and machine shop practice are included.

Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Pre-oil engine prior to operation to prevent engine damage. Lightly oiled oil pump will cavitate unless oil pump cavities are filled with engine oil or petroleum jelly.

Engine pre-oiling can be done using pressure oiler (if available). Connect pressure oiler to cylinder block oil passage such as oil pressure sending unit. Operate pressure oiler long enough to ensure correct amount of oil has filled crankcase. Check oil level while pre-oiling.

If pressure oiler is not available, disconnect ignition system. Remove oil pressure sending unit and replace with oil pressure test gauge. Using starter motor, rotate engine starter until gauge shows normal oil pressure for several seconds. DO NOT crank engine for more than 30 seconds to avoid starter motor damage. Ensure oil pressure has reached the most distant point from the oil pump.

NOTE: **If new lifters or camshaft are installed, some manufacturers require that a crankcase conditioner be added to engine oil. The engine should be operated for specified amount of time to aid in lifter break-in procedure.**

INITIAL START-UP

NOTE: **Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.**

Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Start engine and operate engine at low speed while checking for coolant, fuel and oil leaks. Stop engine. Recheck coolant and oil level. Adjust if necessary.

CAMSHAFT

NOTE: **Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.**

Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Break-in procedure is required when new or reground camshaft has been installed. Operate and maintain engine speed between 1500-2500 RPM for approximately 30 minutes. Procedure may vary due to manufacturer's recommendations.

PISTON RINGS

NOTE: **Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.**

Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Piston rings require a break-in procedure to ensure seating of rings to cylinder walls. Serious damage may occur to rings if correct procedures are not followed.

Extremely high piston ring temperatures are obtained during break-in process. If rings are exposed to excessively high RPM or high cylinder pressures, ring damage can occur. Follow piston ring manufacturer's recommended break-in procedure.

FINAL ADJUSTMENTS

NOTE: **Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.**

Always refer to appropriate engine overhaul article, if available, in the ENGINES section for complete overhaul procedures and specifications for the vehicle being repaired.

Check or adjust ignition timing and dwell (if applicable). Adjust valves (if necessary). Adjust idle speed and mixture. Retighten cylinder heads (if required). If cylinder head or block is aluminum, retighten bolts when engine is cold. Follow the engine manufacturer's recommended break-in procedure and maintenance schedule for new engines.

NOTE: **Some manufacturers require that head bolts be retightened after specified amount of operation. This must be done to prevent head gasket failure.**

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Article GUID: A00025128

2015-16 ENGINE

Exhaust System - Challenger

DESCRIPTION

3.6L

WARNING: The normal operating temperature of the exhaust system is very high. Therefore, never work around or attempt to service any part of the exhaust system until it is cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operation time.

CAUTION: Avoid application of rust prevention compounds or undercoating materials to exhaust system floor pan heat shields. Light overspray near the edges is permitted. Application of coating will result in excessive floor pan temperatures and objectionable fumes.

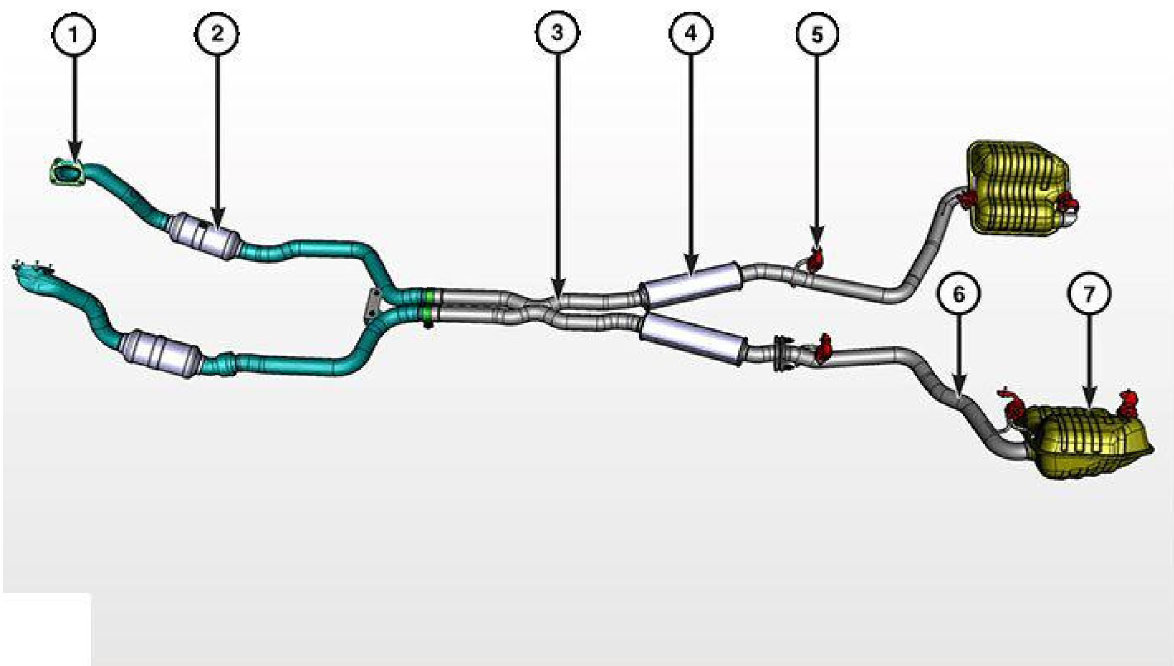

Fig. 1: Exhaust System - 3.6L
Courtesy of CHRYSLER GROUP, LLC

The 3.6L converters are mounted using a flange (1) to an integrated exhaust manifold. Refer to **DESCRIPTION** .

The system uses two catalytic converters (2) located in the front exhaust pipes, dual mufflers (4), with a dual tailpipe/resonator assembly (3).

The left side resonator assembly (7) can be serviced separately from the muffler assembly.

The exhaust system must be properly aligned to prevent stress, leakage and body contact. If the system contacts any body panel, it may amplify objectionable noises originating from the engine or body.

When inspecting an exhaust system, critically inspect for cracked or loose joints, stripped screw or bolt threads, corrosion damage and worn, cracked or broken hangers/isolators (5). Replace all components that are badly corroded or damaged. DO NOT attempt to repair.

When replacement is required, use original equipment parts (or their equivalent). This will assure proper alignment and provide acceptable exhaust noise levels.

5.7L

WARNING:	**The normal operating temperature of the exhaust system is very high. Therefore, never work around or attempt to service any part of the exhaust system until it is cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operation time.**
CAUTION:	**Avoid application of rust prevention compounds or undercoating materials to exhaust system floor pan heat shields. Light overspray near the edges is permitted. Application of coating will result in excessive floor pan temperatures and objectionable fumes.**

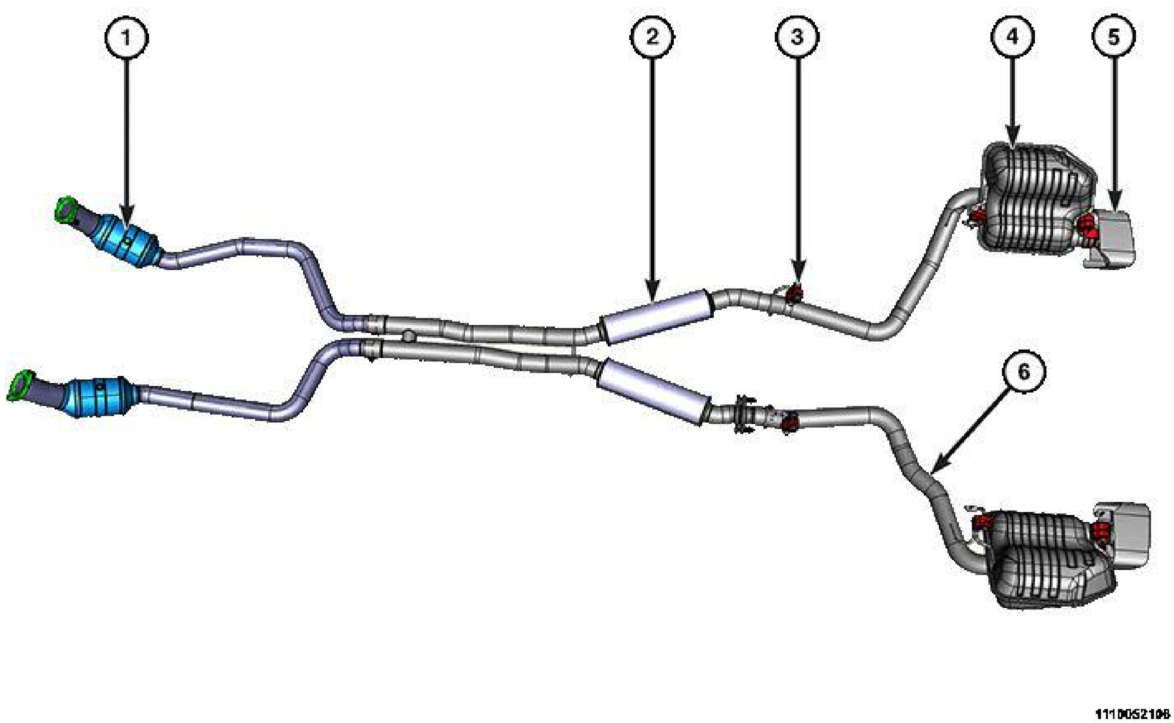

Fig. 2: Exhaust System - 5.7L
Courtesy of CHRYSLER GROUP, LLC

5.7L exhaust systems use two catalytic converters (1) located in the front exhaust pipes, and dual mufflers (2), a

muffler/resonator assembly (4), and dual tailpipes (5).

The left side resonator assembly (6) can be serviced separately from the muffler assembly.

The front exhaust pipe/catalytic converter assembly is a hydra-form thin wall air gap design. This design is used to reduce heat, noise and improve emissions. When replacement is required, use original equipment parts (or their equivalent).

The exhaust system must be properly aligned to prevent stress, leakage and body contact. If the system contacts any body panel, it may amplify objectionable noises originating from the engine or body.

When inspecting an exhaust system, critically inspect for cracked or loose joints, stripped screw or bolt threads, corrosion damage and worn, cracked or broken hangers/isolators (3). Replace all components that are badly corroded or damaged. DO NOT attempt to repair.

When replacement is required, use original equipment parts (or their equivalent). This will assure proper alignment and provide acceptable exhaust noise levels.

6.2L/6.4L

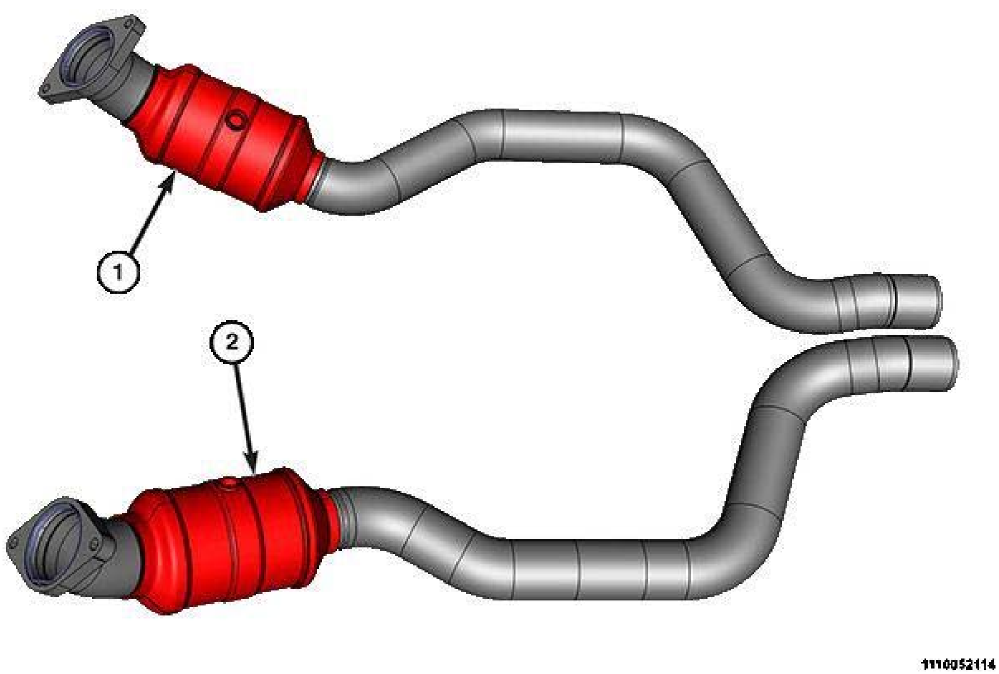

Fig. 3: Exhaust System - 6.4L/6.2L
Courtesy of CHRYSLER GROUP, LLC

The front exhaust pipe/catalytic converter assemblies (1, 2) are hydra-form thin wall air gap design. This design is used to reduce heat, noise and improve emissions. When replacement is required, use original equipment parts (or their equivalent).

On a 6.2L/6.4L, both catalytic converters attach directly to the exhaust manifold using studs and nuts.

The exhaust down pipes exit the converters and connect into the rear muffler and resonator assembly.

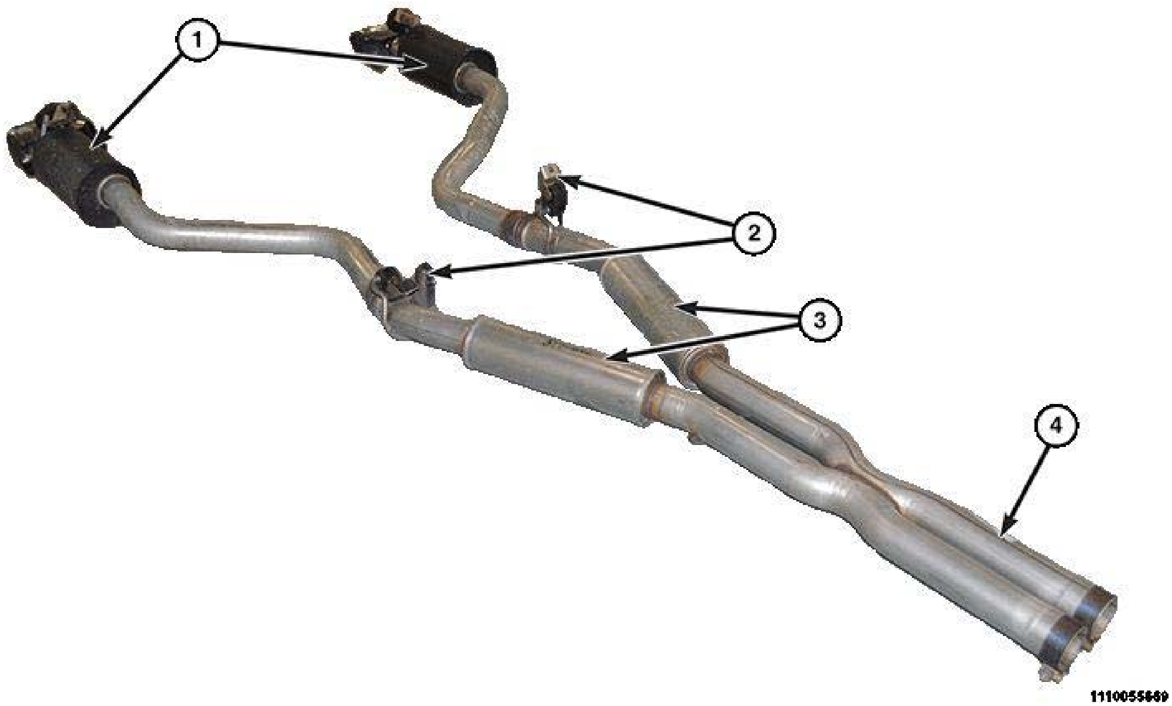

Fig. 4: Exhaust System - 6.4L/6.2L SRT
Courtesy of CHRYSLER GROUP, LLC

The SRT performance exhaust systems (4) use dual mufflers (3), dual resonator and tailpipes (1). Each exhaust bank contains an electronic active exhaust valve (2) located underneath the rear cradle.

The electronic active exhaust valves are comprised of two elements, an electronic actuator, which can be serviced separately and a mechanical valve, that is welded into the exhaust pipes and must be serviced with the exhaust assembly.

The exhaust system must be properly aligned to prevent stress, leakage and body contact. If the system contacts any body panel, it may amplify objectionable noises originating from the engine or body.

When inspecting an exhaust system, critically inspect for cracked or loose joints, stripped screw or bolt threads, corrosion damage and worn, cracked or broken hangers. Replace all components that are badly corroded or damaged. DO NOT attempt to repair.

When replacement is required, use original equipment parts (or their equivalent). This will assure proper alignment and provide acceptable exhaust noise levels.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING

EXHAUST SYSTEM DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
EXCESSIVE EXHAUST NOISE	1. Leaks at pipe joints.	1. Tighten flanges to specified torque at leaking joints. Refer to SPECIFICATIONS.

CONDITION	POSSIBLE CAUSE	CORRECTION
	2. Burned, rusted-out, or blown out muffler.	2. Replace muffler/tailpipe assembly. Refer to **MUFFLER, EXHAUST, REMOVAL**. Check exhaust system.
	3. Burned or rusted-out exhaust pipe.	Replace exhaust pipe.
	4. Exhaust pipe leaking at manifold flange.	4. Tighten connection attaching nuts. Refer to **SPECIFICATIONS**.
	5. Exhaust manifold cracked or broken.	5. Replace exhaust manifold. Refer to **MANIFOLD, EXHAUST, REMOVAL** for 5.7L, **MANIFOLD, EXHAUST, REMOVAL** for 6.2L or **MANIFOLD, EXHAUST, REMOVAL** 6.4L.
	6. Leak between exhaust manifold and cylinder head.	6. Tighten exhaust manifold to cylinder head stud nuts or bolts. Refer to **SPECIFICATIONS** for 3.6L, **SPECIFICATIONS** for 5.7L, **SPECIFICATIONS** for 6.2L or **SPECIFICATIONS** for 6.4L. .
	7. Restriction in muffler or tailpipe.	7. Remove restriction, if possible. Replace muffler or tailpipe, as necessary.
	8. Exhaust system contacting body or chassis.	8. Re-align exhaust system to clear surrounding components.
	9. Electronic active exhaust valve stuck open. **NOTE:** **DTC should set**	9. Requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic service information.
LEAKING EXHAUST GASES	1. Leaks at pipe joints.	1. Tighten flanges. Refer to **SPECIFICATIONS**.
LACK OF POWER	1. Electronic active exhaust valve stuck closed. **NOTE:** **DTC should set**	9. Requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic service information.
Ā	2. Restriction in muffler or tailpipe.	2. Remove restriction, if possible. Replace muffler or tailpipe, as necessary.
Ā	3. Restriction in catalytic converter.	3. Remove restriction, if possible. Replace catalytic converter.

ADJUSTMENTS

ADJUSTMENTS

A misaligned exhaust system is usually indicated by a vibration, rattling noise, or binding of exhaust system components. These noises are sometimes hard to distinguish from other chassis noises. Inspect exhaust system for broken or loose clamps, heat shields, isolators, and brackets. Replace or tighten as necessary. It is important that exhaust system clearances and alignment be maintained.

Perform the following procedures to align the exhaust system:

1. Loosen clamps and support brackets.
2. Align the exhaust system starting at the front, working rearward.
3. Tighten all clamps and brackets once alignment and clearances are achieved.

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Active Exhaust Valve Actuator Nuts	3	-	27	Ā
Band Clamp	50	37	-	Ā
Bracket to Converter - 3.6L	50	37	-	Ā
Catalytic Converter to Flange Nuts	30	22	-	Ā
Catalytic Converter to Manifold - 3.6L	21	15	-	Ā
Exhaust Support Bracket/isolator Bolt	20	15	-	Ā
Heat Shield to Converter	30	22	-	Ā
Fastener - Exhaust tips	28	24	-	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

INSPECTION

INSPECTION

Inspect the exhaust pipes, catalytic converters, muffler, and resonators for cracked joints, broken welds and corrosion damage that would result in a leaking exhaust system. Inspect the clamps, support brackets, and insulators for cracks and corrosion damage.

NOTE: **Slip joint band clamps are spot/tack welded to exhaust system. If a band clamp must be replaced, the spot/tack weld must be ground off.**

VALVE, ACTIVE EXHAUST

DESCRIPTION

DESCRIPTION

The SRT performance exhaust systems use two electronic active exhaust valves located underneath the rear cradle, between the mufflers and resonators.

The electronic exhaust valves are actuated by the Powertrain Control Module (PCM) and have been calibrated to refine the tailpipe and cabin exhaust noise while mitigating exhaust drone.

The electronic active exhaust valves are comprised of two elements: The electronic actuator and the mechanical valve.

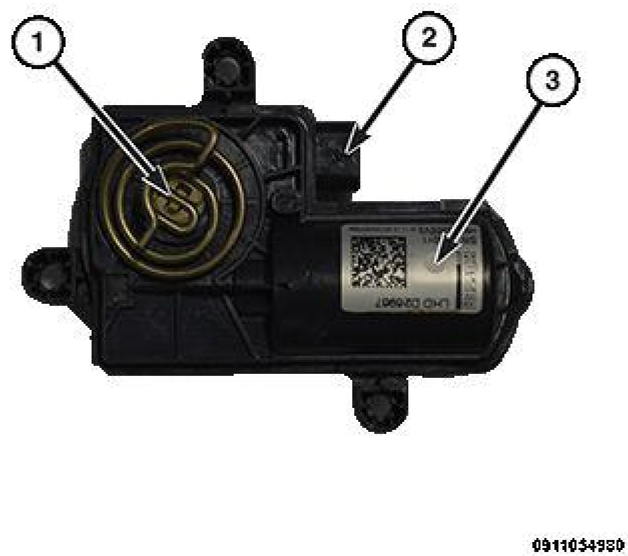

Fig. 5: Electronic Actuator Components
Courtesy of CHRYSLER GROUP, LLC

Each electronic actuator (3) has a transmission spring (1) and single wire harness connection (2) which connects to the vehicle harness above the rear cradle.

The electronic actuator can be serviced separately from the exhaust system.

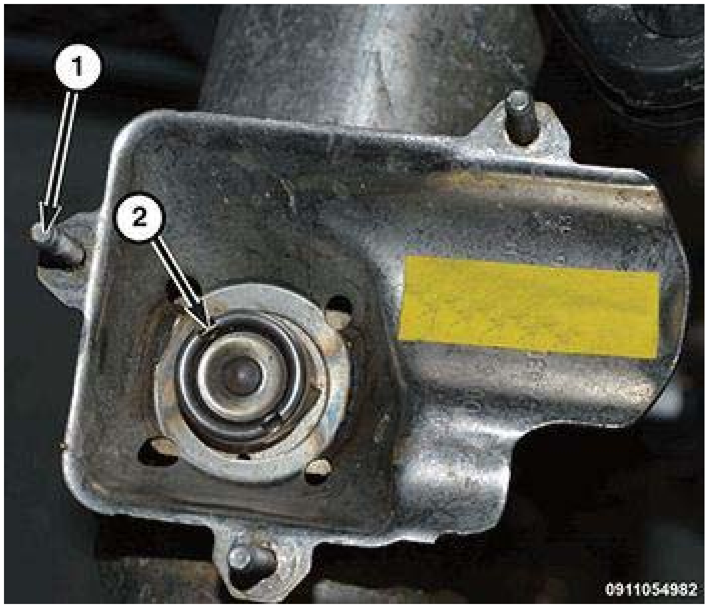

Fig. 6: Studs & Slots
Courtesy of CHRYSLER GROUP, LLC

Each mechanical valve is welded into the exhaust pipe and must be serviced with the exhaust assembly.

There are three studs (1) used to fasten the electronic actuator to the mechanical valve.

The mechanical valve contains slots (2) which must align with the electronic actuator transmission spring.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING

The hard wired circuits may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic active exhaust valve system or the electronic controls and communication between modules and other devices that provide some features of the system. The most reliable, efficient and accurate means to diagnose the system or the electronic controls and communication related to system operation requires the use of a diagnostic scan tool.

The electronic active exhaust valves will set an engine light if a problem is detected (i.e. stuck open or closed, become unplugged, etc.).

NOTE: **On vehicle key-on, the actuators will cycle from open to close to ensure they have the correct range of travel. If they are unattached from the valve body they will continue to cycle indefinitely and turn on an engine light after 7 seconds.**

REMOVAL

REMOVAL

1. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .

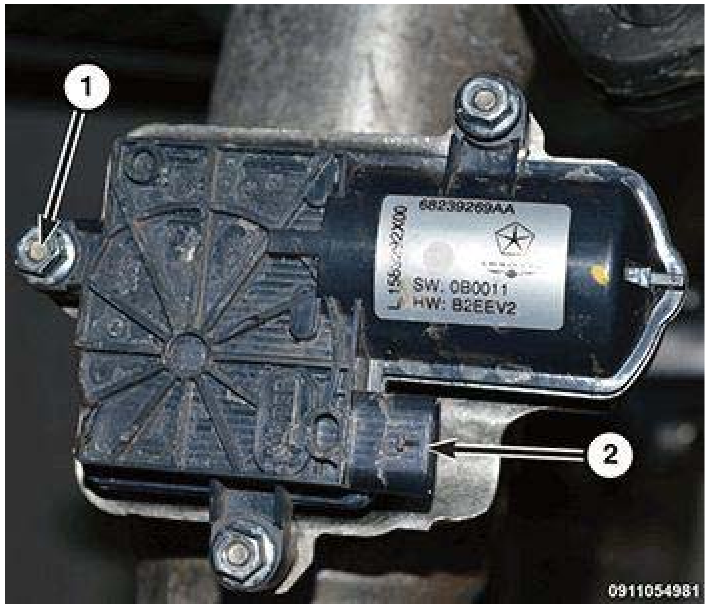

Fig. 7: Active Exhaust Valve Retaining Nuts & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the wire harness connector (2).
3. Remove the three electronic active exhaust valve retaining nuts (1).
4. Remove the electronic active exhaust valve from the exhaust pipe.

INSTALLATION

INSTALLATION

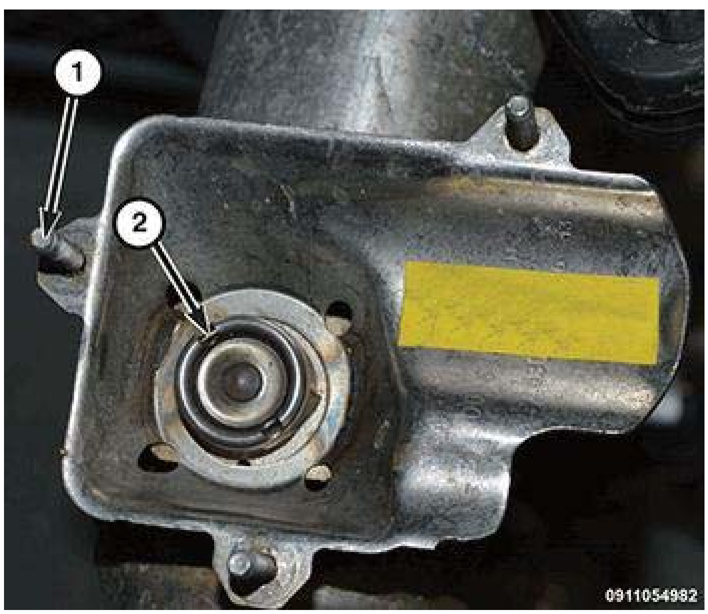

Fig. 8: Studs & Slots
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Installing the actuator requires the actuator spring to be seated into the slots (2) on the exhaust valve axle rod.**

1. Position the electronic active exhaust valve onto the three mounting studs (1).
2. If the actuator spring cannot be seated into the exhaust valve axle rod slots (2), install the actuator bolts hand tight.
3. With vehicle in the run position, and the engine off, plug in the actuator. The actuator will cycle and seat into the slots, then turn off the vehicle. If this step is not completed successfully, the actuator will continue to cycle every minute and an engine code will be illuminated.

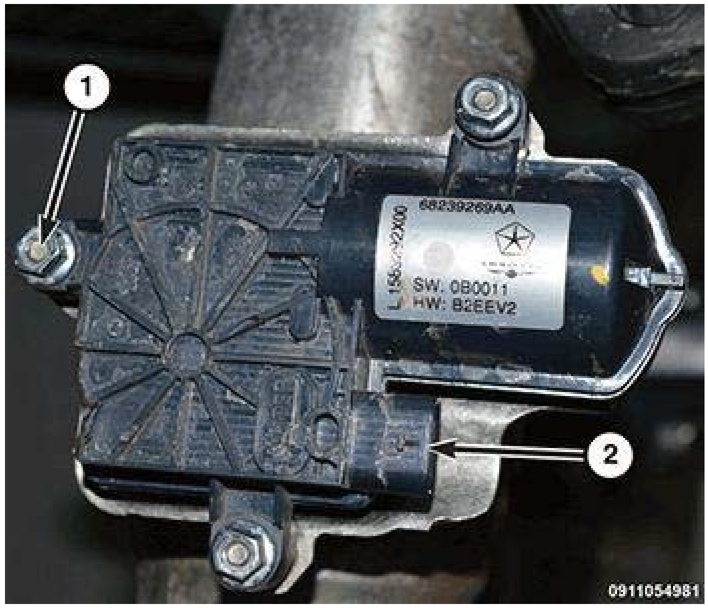

Fig. 9: Active Exhaust Valve Retaining Nuts & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

4. Tighten the retaining nuts (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
5. Connect the wire harness connector (2) to the electronic active exhaust valve.
6. Remove support and lower the vehicle.

CONVERTER, CATALYTIC

REMOVAL

3.6L

CAUTION: When separating the catalytic converters from the manifolds, disconnect the oxygen sensor connectors. Allowing the catalytic converters to hang from the oxygen sensor wires damages the harness and/or sensors.

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover.
3. Saturate the exhaust flange bolts with heat valve lubricant. Allow 5 minutes for penetration.

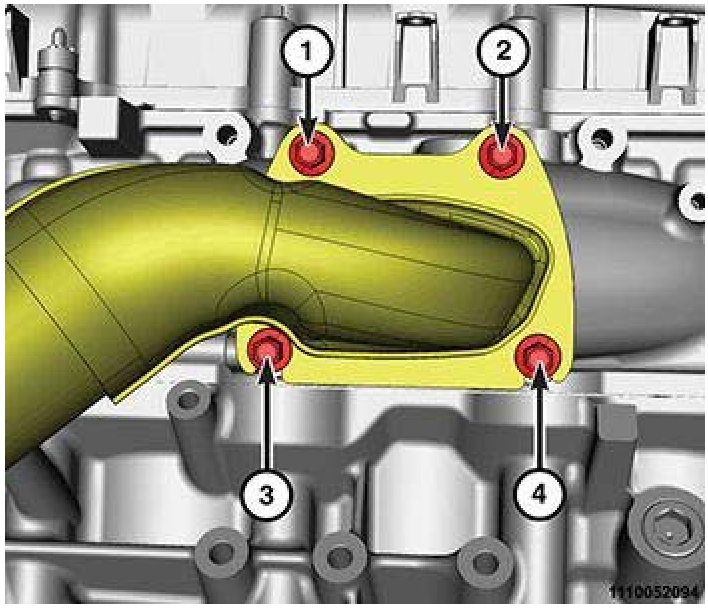

Fig. 10: Upper & Lower Catalytic Flange Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the upper catalytic flange bolts (1, 2).
5. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
6. Remove the lower catalytic flange bolts (3, 4).
7. Disconnect oxygen sensor electrical connectors.

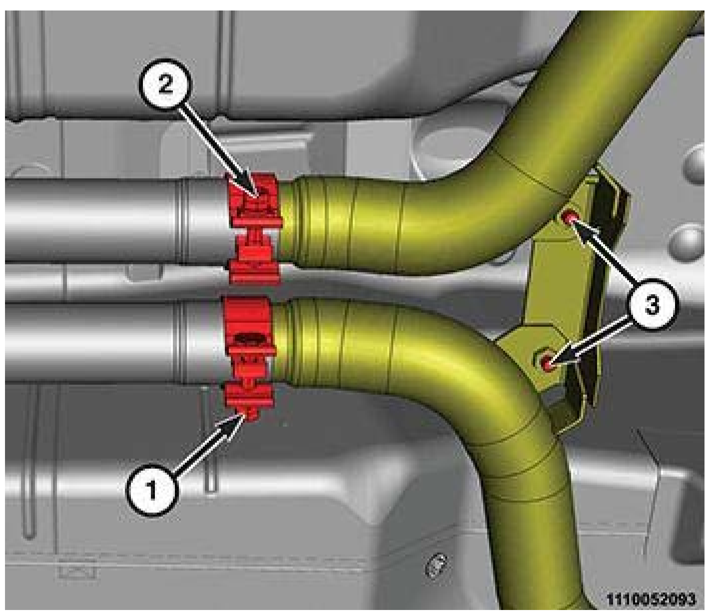

Fig. 11: Front Exhaust Pipe Band Clamps & Support Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Remove the front exhaust pipe band clamps (1, 2) on the exhaust pipe/muffler and resonator assembly.
9. Separate the exhaust pipe/muffler and resonator assembly from the exhaust pipe/catalytic converter assembly.
10. Remove the support bracket bolts (3).

11. Remove the front exhaust pipe/catalytic converter assembly from the vehicle.

5.7L

CAUTION: When separating the catalytic converters from the manifolds, disconnect the oxygen sensor connectors. Allowing the catalytic converters to hang from the oxygen sensor wires damages the harness and/or sensors.

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

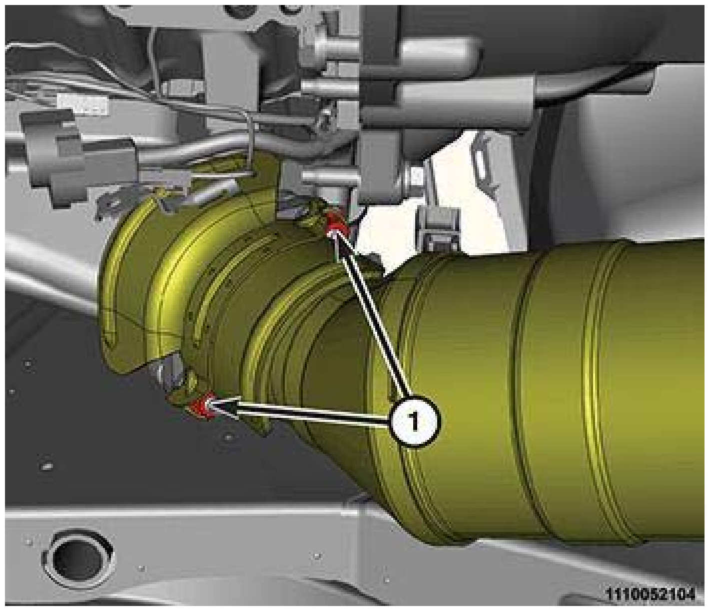

Fig. 12: Catalytic Converter To Manifold Heat Shield Nuts
Courtesy of CHRYSLER GROUP, LLC

3. Saturate all exhaust bolts and nuts with MoparÂ® Rust Penetrant. Allow five minutes for penetration.
4. Disconnect the oxygen sensor wire harness connectors.
5. Remove the catalytic converter to manifold heat shield nuts (1) and remove the heat shield.

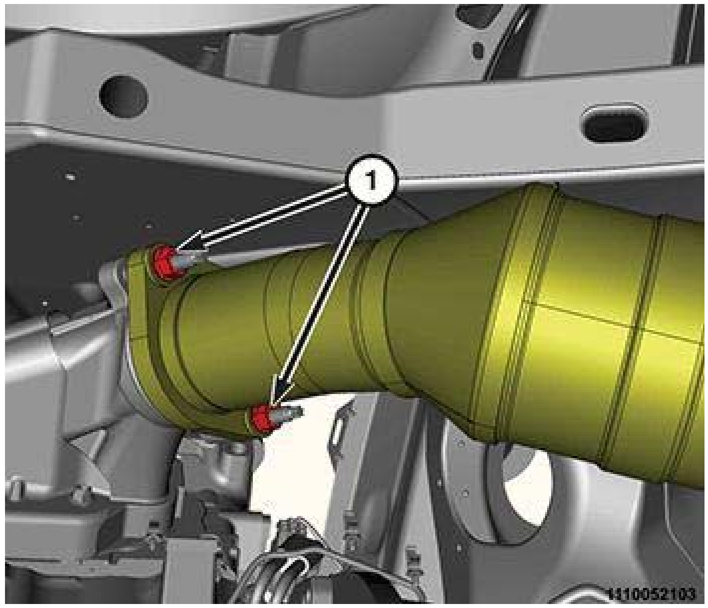

Fig. 13: Catalytic Converter To Manifold Flange Nuts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the catalytic converter to manifold flange nuts (1) and separate the catalytic converters from the exhaust manifolds.

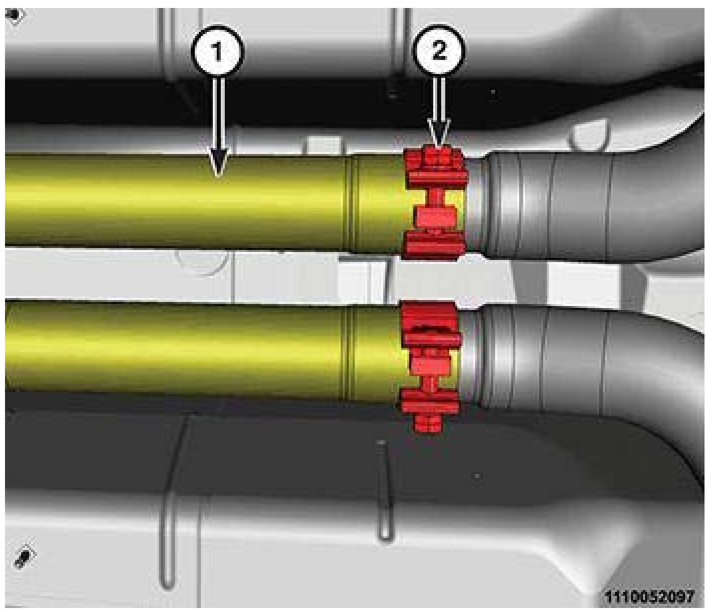

Fig. 14: Exhaust Pipe/Muffler, Resonator Assembly & Front Exhaust Pipe Band Clamps
Courtesy of CHRYSLER GROUP, LLC

7. Remove the front exhaust pipe band clamps (2) on the exhaust pipe/muffler and resonator assembly (1).
8. Separate the muffler and resonator assembly from the catalytic converters.
9. Remove the catalytic converters.

6.2L/6.4L

CAUTION: When separating the catalytic converters from the manifolds, disconnect the

oxygen sensor connectors. Allowing the catalytic converters to hang from the oxygen sensor wires damages the harness and/or sensors.

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Saturate all exhaust bolts and nuts with MoparÂ® Rust Penetrant. Allow five minutes for penetration.
4. Disconnect the oxygen sensor wire harness connector.

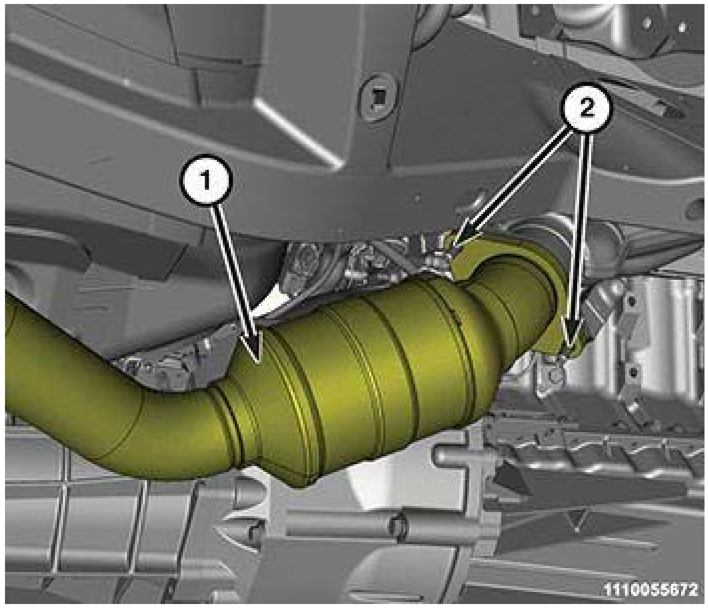

Fig. 15: Catalytic Converter & Manifold Flange Nuts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the catalytic converter to manifold flange nuts (2) and separate the catalytic converters (1) from the exhaust manifolds.

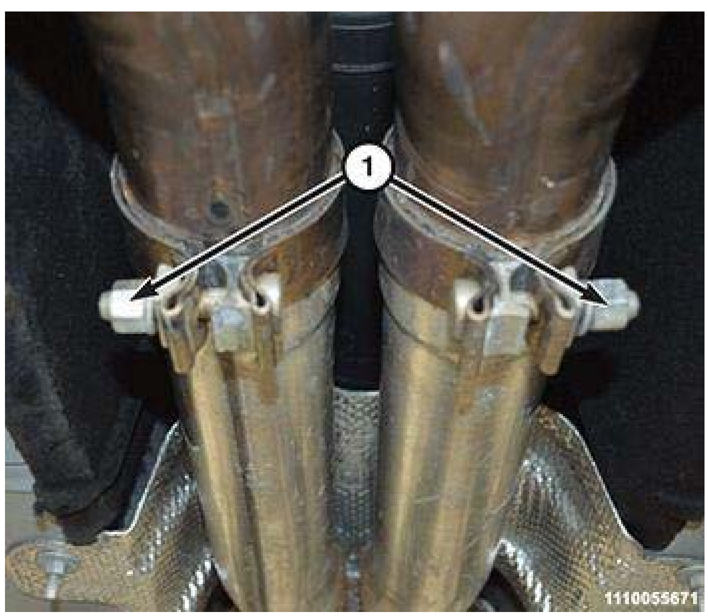

Fig. 16: Front Exhaust Pipe To Muffler And Resonator Assembly Band Clamps
Courtesy of CHRYSLER GROUP, LLC

6. Loosen the front exhaust pipe to muffler and resonator assembly band clamps (1).
7. Separate the muffler and resonator assembly from the catalytic converters.

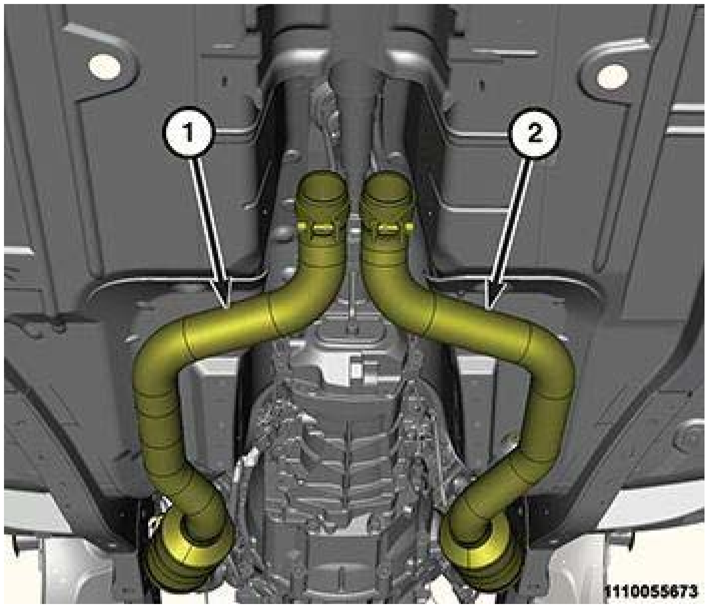

Fig. 17: Catalytic Converters
Courtesy of CHRYSLER GROUP, LLC

8. Remove the left (1) and/or right (2) catalytic converters.

INSPECTION

INSPECTION

WARNING: **The normal operating temperature of the exhaust system is very high. Therefore, never attempt to service any part of the exhaust system until it is cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operation time.**

Check the catalytic converter for a flow restriction. Exhaust System Restriction Check for procedure. Refer to **DIAGNOSIS AND TESTING**.

Visually inspect the catalytic converter element by using a borescope or equivalent. Remove oxygen sensor(s) and insert borescope. If borescope is not available, remove converter and inspect element using a flashlight. Inspect element for cracked or melted substrate.

NOTE: **Before replacing a catalytic converter, determine the root cause of failure. Most catalytic converter failures are caused by air, fuel or ignition problems. Refer to the appropriate diagnostic information for test procedures.**

INSTALLATION

3.6L

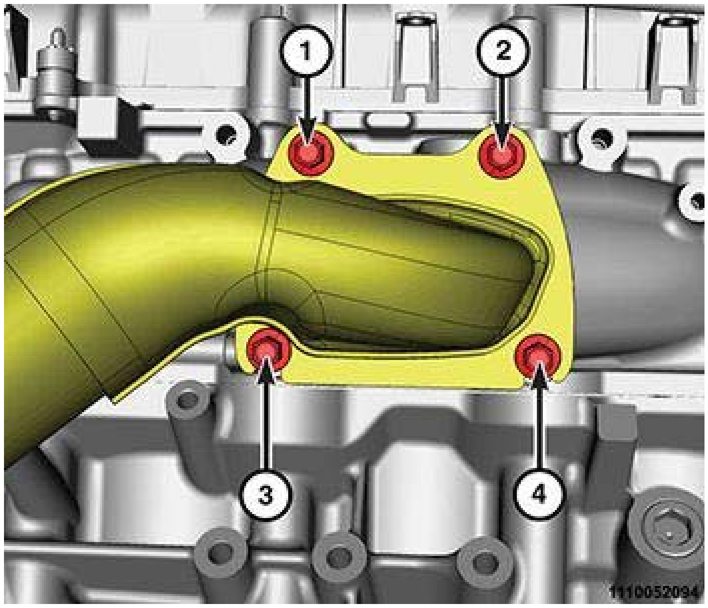

Fig. 18: Upper & Lower Catalytic Flange Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position new exhaust gasket onto flange.
2. Position the front exhaust pipe/catalytic converter assemblies into vehicle.
3. Install the lower bolts (3, 4) at the exhaust flange. Do not tighten.
4. Lower vehicle.
5. Install the upper exhaust flange bolts (1, 2) and tighten the flange bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
6. Tighten lower flange bolts to the proper torque specification. Refer to **SPECIFICATIONS**.

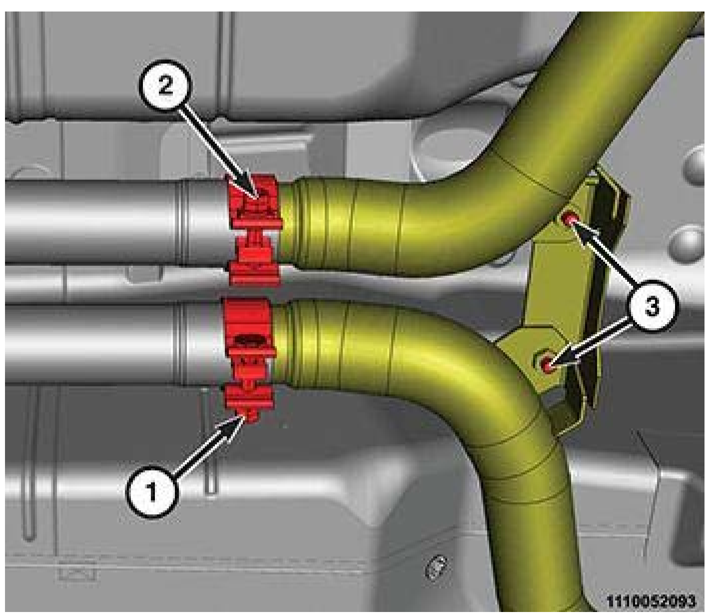

Fig. 19: Front Exhaust Pipe Band Clamps & Support Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Insert the front exhaust pipe/catalytic converter assembly into the exhaust pipe/muffler and resonator

assembly.

8. Position the exhaust system for proper clearance with the frame and underbody parts. A minimum clearance of 25.4 mm (1.0 in.) is required.
9. Tighten the band clamp nuts (1, 2) to the proper torque specification. Refer to **SPECIFICATIONS**.
10. Install the support bracket bolts (3) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
11. Connect oxygen sensor electrical connectors.
12. Lower the vehicle.
13. Start the vehicle and inspect for exhaust leaks. Repair exhaust leaks as necessary.

5.7L

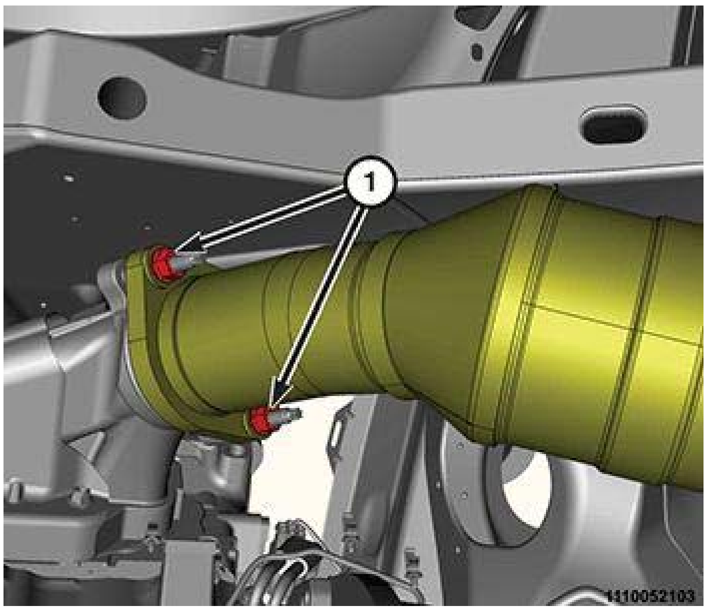

Fig. 20: Catalytic Converter To Manifold Flange Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Position the catalytic converter onto the exhaust manifold flange and install the flange nuts (1) finger tight.
2. Connect the oxygen sensor wire harness connectors.

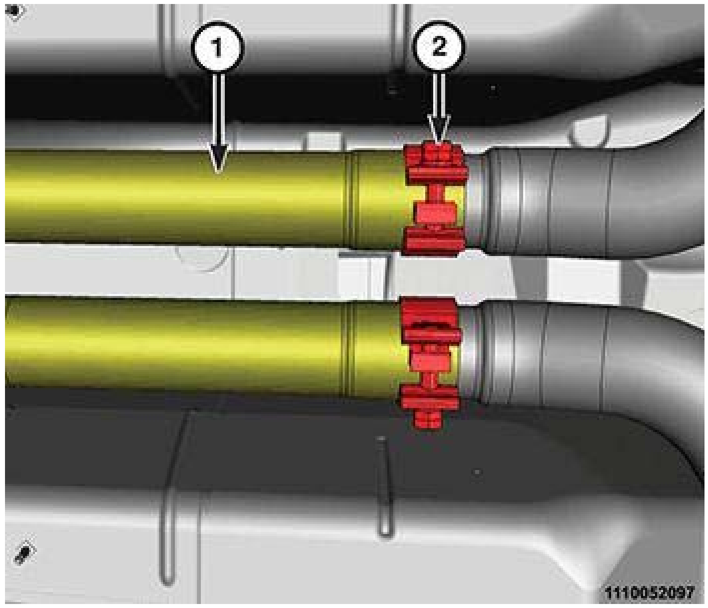

Fig. 21: Exhaust Pipe/Muffler, Resonator Assembly & Front Exhaust Pipe Band Clamps
Courtesy of CHRYSLER GROUP, LLC

3. Position the muffler and resonator assembly (1) onto the catalytic converters.
4. Tighten the exhaust manifold flange nuts to the proper torque specification. Refer to **SPECIFICATIONS**.
5. Tighten the band clamps (2) to the proper torque specification. Refer to **SPECIFICATIONS**.

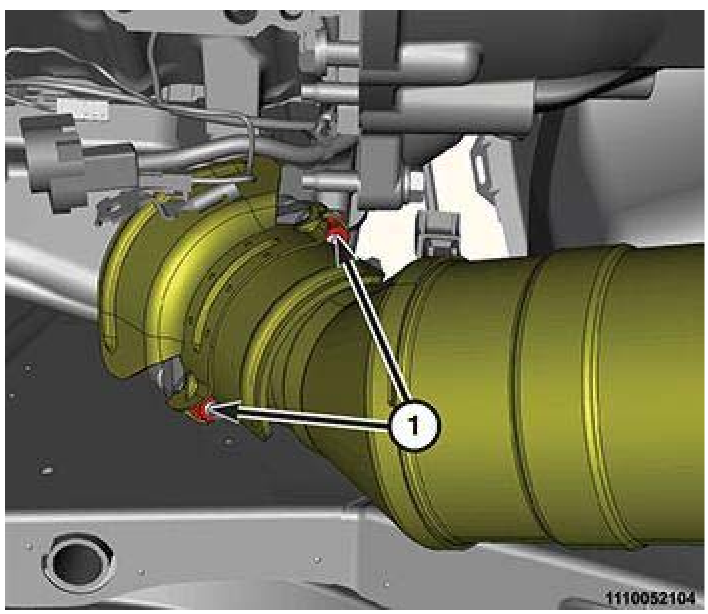

Fig. 22: Catalytic Converter To Manifold Heat Shield Nuts
Courtesy of CHRYSLER GROUP, LLC

6. Install the heat shield retaining nuts (1) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
7. Lower the vehicle.
8. Connect the negative battery cable.

9. Start the engine and check for exhaust leaks.

6.2L/6.4L

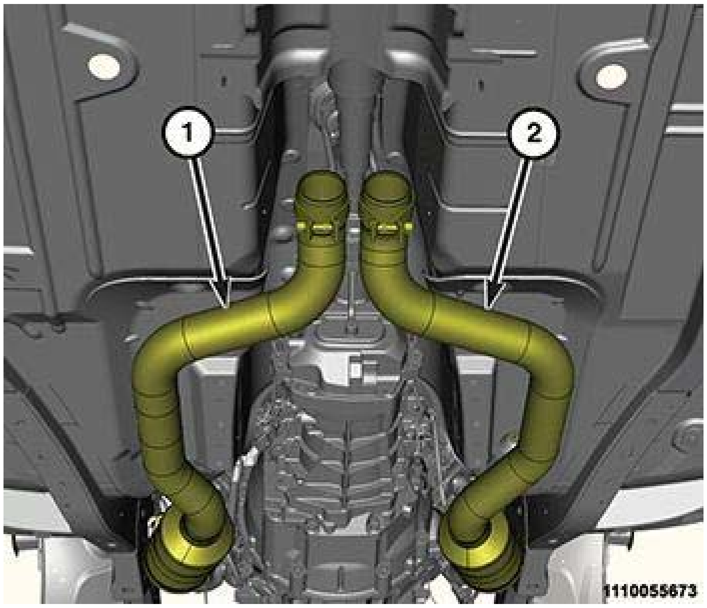

Fig. 23: Catalytic Converters
Courtesy of CHRYSLER GROUP, LLC

1. Position the left (1) and/or right (2) catalytic converter onto the exhaust manifold flange, and install the flange nuts finger tight.
2. Connect the oxygen sensor wire harness connectors.

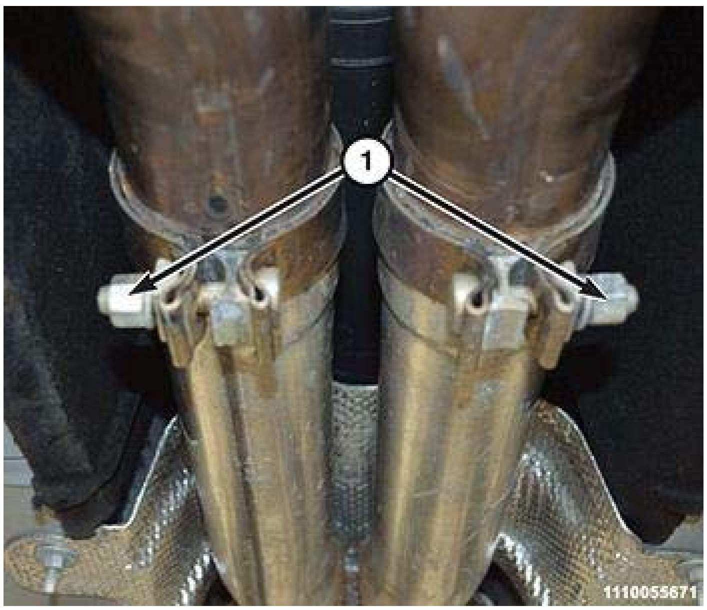

Fig. 24: Front Exhaust Pipe To Muffler And Resonator Assembly Band Clamps
Courtesy of CHRYSLER GROUP, LLC

3. Insert the muffler and resonator assembly onto the front exhaust pipe, without tightening the band clamps (1) at this time.

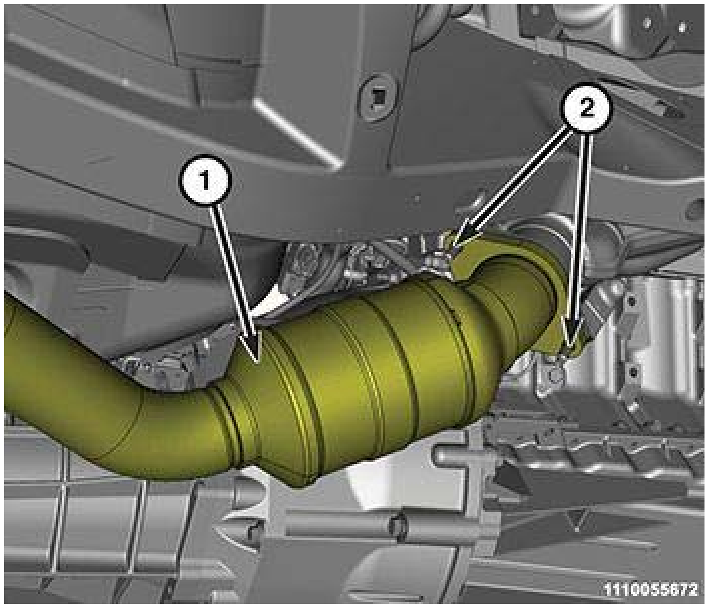

Fig. 25: Catalytic Converter & Manifold Flange Nuts
Courtesy of CHRYSLER GROUP, LLC

4. Tighten the catalytic converter (1) to exhaust manifold flange nuts (2) to the proper torque specification. Refer to **SPECIFICATIONS**.
5. Tighten the band clamps to the proper torque specification. Refer to **SPECIFICATIONS**.
6. Lower the vehicle.
7. Connect the negative battery cable.
8. Start the engine and check for exhaust leaks.

MUFFLER, EXHAUST

REMOVAL

3.6L/5.7L

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Apply penetrating oil to band clamps.

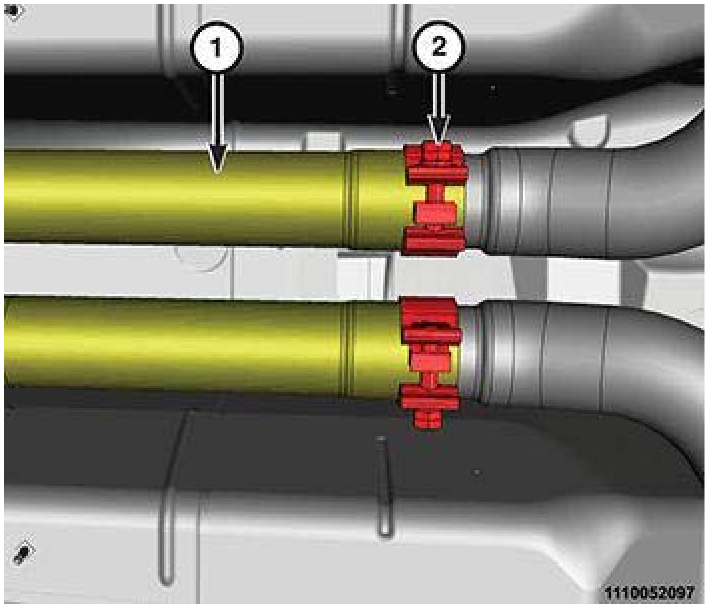

Fig. 26: Exhaust Pipe/Muffler, Resonator Assembly & Front Exhaust Pipe Band Clamps
Courtesy of CHRYSLER GROUP, LLC

3. Remove the catalytic converter to muffler/resonator (1) clamps (2).

NOTE: **The right side resonator is part of the muffler assembly and must be replaced with the mufflers.**

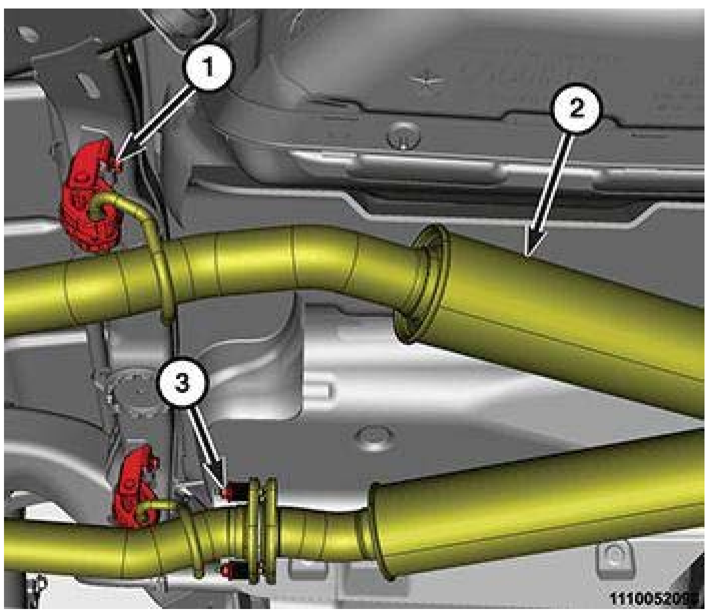

Fig. 27: Front Isolator Mounting Bolt, Left Side Resonator And Tailpipe Assembly Flange Nuts
Courtesy of CHRYSLER GROUP, LLC

4. Remove left side resonator and tailpipe assembly flange nuts (3).
5. Remove the front isolator mounting bolt (1).

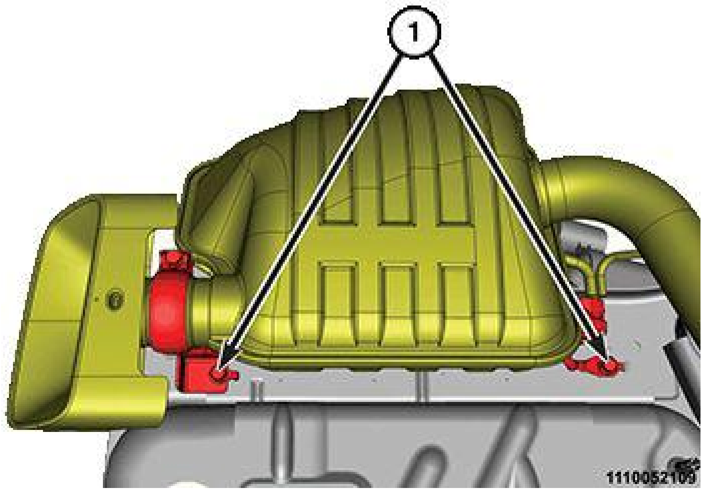

Fig. 28: Rear Isolator Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove both rear isolator mounting bolts (1).
7. Remove the muffler and tailpipe assembly by twisting/turning while pulling assembly out of catalytic converters.

6.2L/6.4L

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Saturate all exhaust bolts and nuts with MoparÂ® Rust Penetrant. Allow five minutes for penetration.

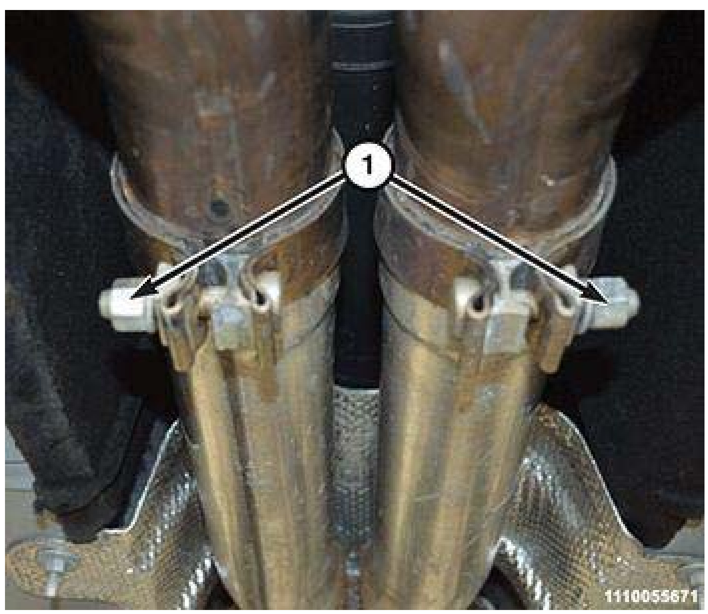

Fig. 29: Front Exhaust Pipe To Muffler And Resonator Assembly Band Clamps
Courtesy of CHRYSLER GROUP, LLC

4. Remove the catalytic converter to muffler/resonator clamps (1).

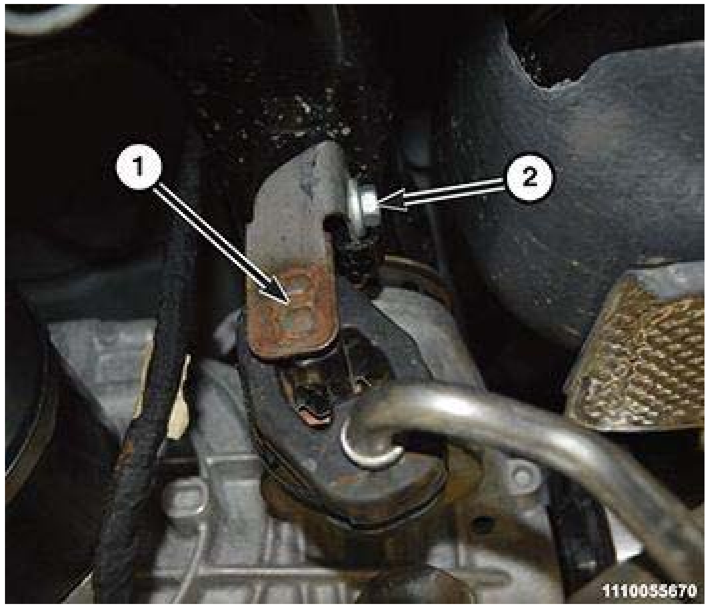

Fig. 30: Front Isolator & Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Remove the front isolator (1) mounting bolts (2).

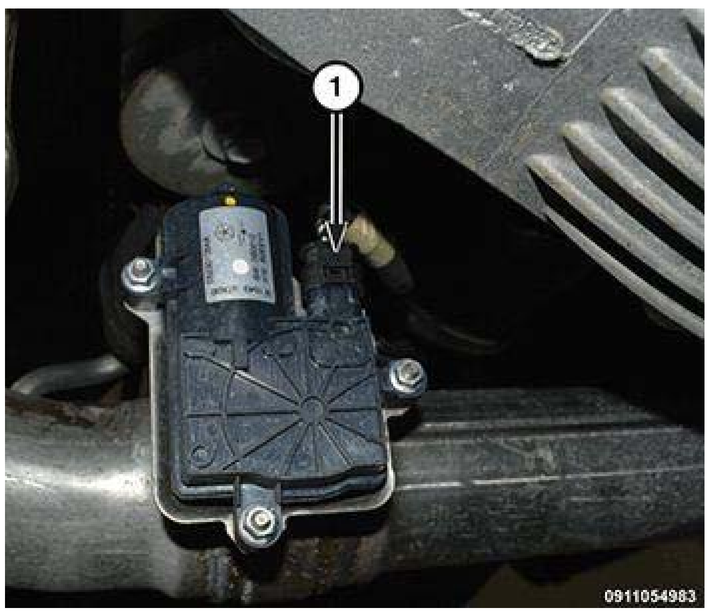

Fig. 31: Electronic Active Exhaust Valve Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the wire harness connectors (1) from both electronic active exhaust valves.

NOTE: **If the electronic exhaust valve is not being serviced, you do not need to remove the actuator from the exhaust pipe.**

7. Remove the both rear isolator mounting bolts at the rear of the resonators.

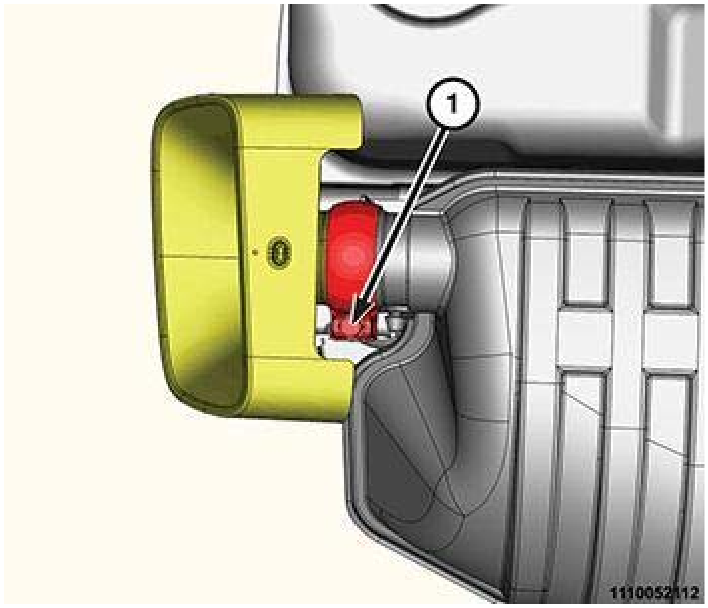

Fig. 32: Exhaust Tip Flange Clamp
Courtesy of CHRYSLER GROUP, LLC

8. If necessary, loosen the exhaust tip flange clamp (1) after the resonator.

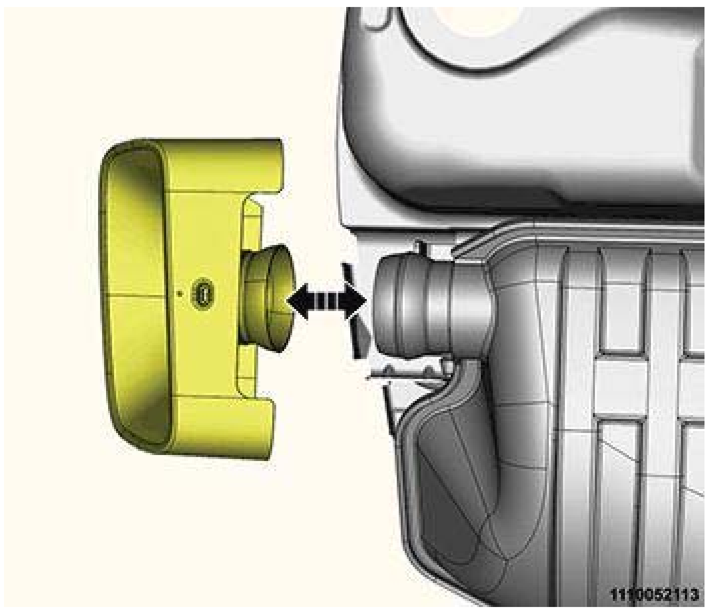

Fig. 33: Removing/Installing Exhaust Tip
Courtesy of CHRYSLER GROUP, LLC

9. Remove the exhaust tip from the resonator.
10. With the help of an assistant, lift the muffler and resonator assembly from the isolators/hangers and separate it from the catalytic converters.

INSTALLATION

3.6L/5.7L

NOTE: **When replacement is required on any component of the exhaust system, it is**

most important that original equipment parts (or their equivalent) be used.

1. Apply penetrating oil to band clamps.

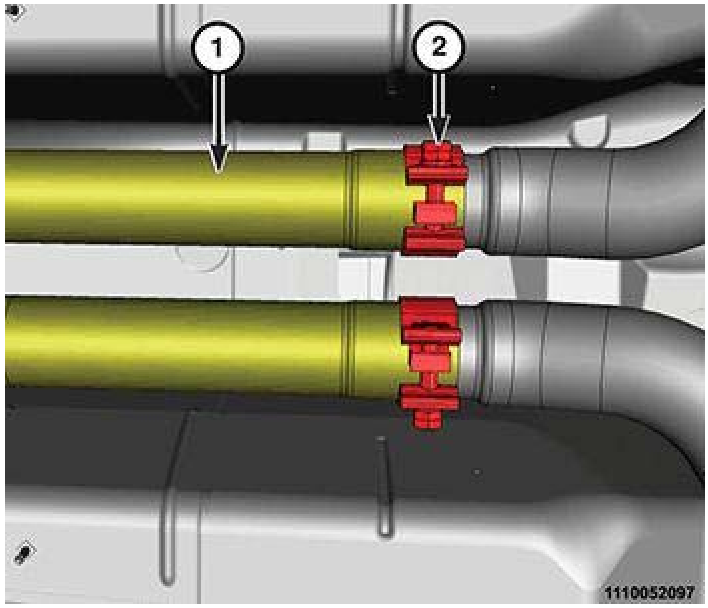

Fig. 34: Exhaust Pipe/Muffler, Resonator Assembly & Front Exhaust Pipe Band Clamps
Courtesy of CHRYSLER GROUP, LLC

2. Install the exhaust pipe assembly (1) into the catalytic converters, leaving the clamps (2) loose at this point.

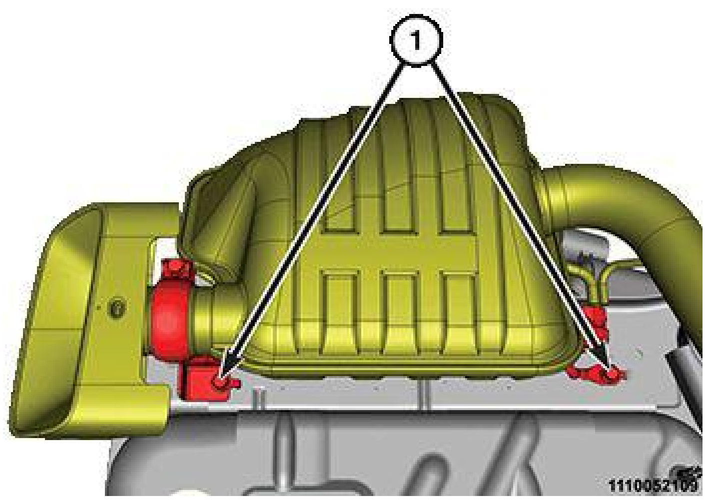

Fig. 35: Rear Isolator Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the two rear isolator mounting bolts (1).

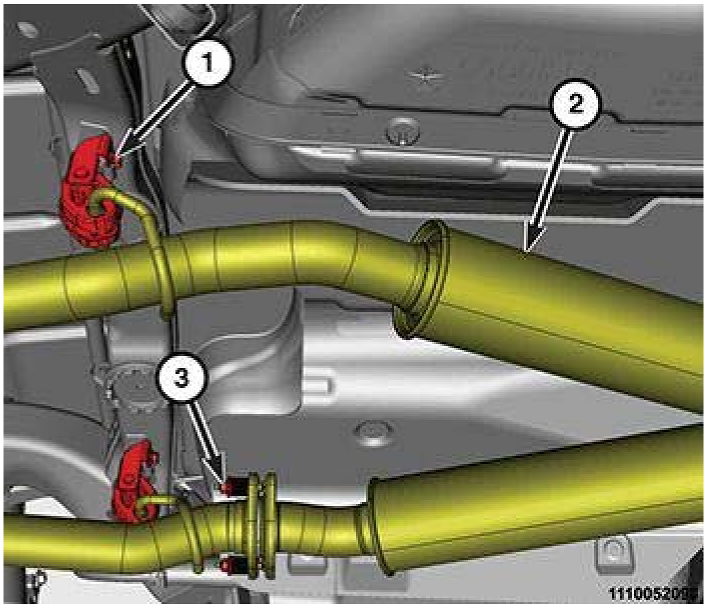

Fig. 36: Front Isolator Mounting Bolt, Left Side Resonator And Tailpipe Assembly Flange Nuts
Courtesy of CHRYSLER GROUP, LLC

4. Install the front isolator mounting bolt (1).
5. Install left side resonator and tailpipe assembly flange nuts (3).
6. Check for proper alignment and clearance to underbody and engine compartment components before tightening clamps.
7. Check the clearance between muffler and resonator assembly and fuel tank. Clearance is 14mm (.55 in.) for V8 engine.
8. Check the clearance at rear tunnel reinforcement. Clearance is 15 - 20mm (.59 -.78 in.).
9. The tailpipe should be centered in the rear fascia opening.
10. Tighten the band clamps to the proper torque specification. Refer to **SPECIFICATIONS**.
11. Lower the vehicle.
12. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary.

6.2L/6.4L

NOTE: **When replacement is required on any component of the exhaust system, it is most important that original equipment parts (or their equivalent) be used.**

1. Apply penetrating oil to band clamps.

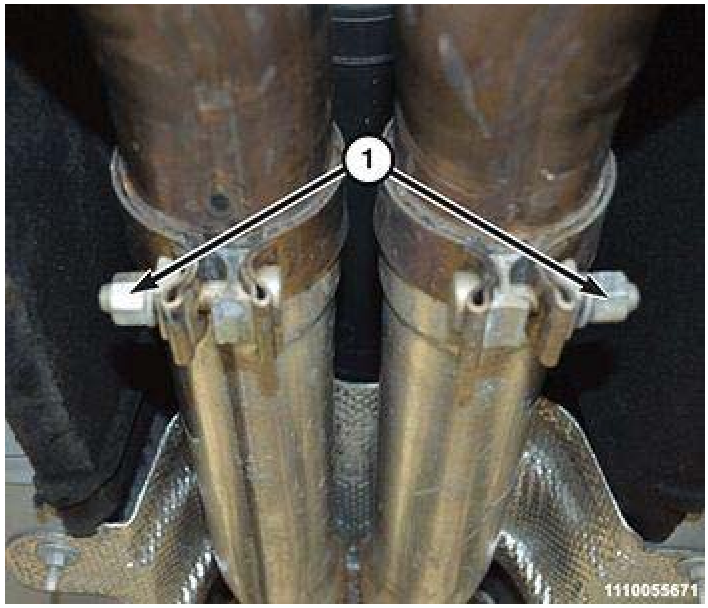

Fig. 37: Front Exhaust Pipe To Muffler And Resonator Assembly Band Clamps
Courtesy of CHRYSLER GROUP, LLC

2. With the help of an assistant, install the muffler/resonator assembly onto the catalytic converters, leaving the band clamps (1) loose at this point.

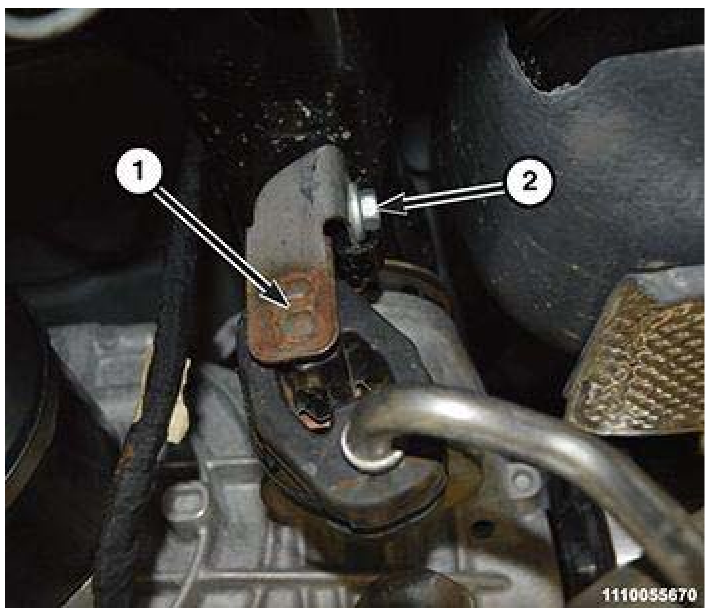

Fig. 38: Front Isolator & Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Install both front isolator (1) mounting bolts (2) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Install both rear isolator mounting bolts and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

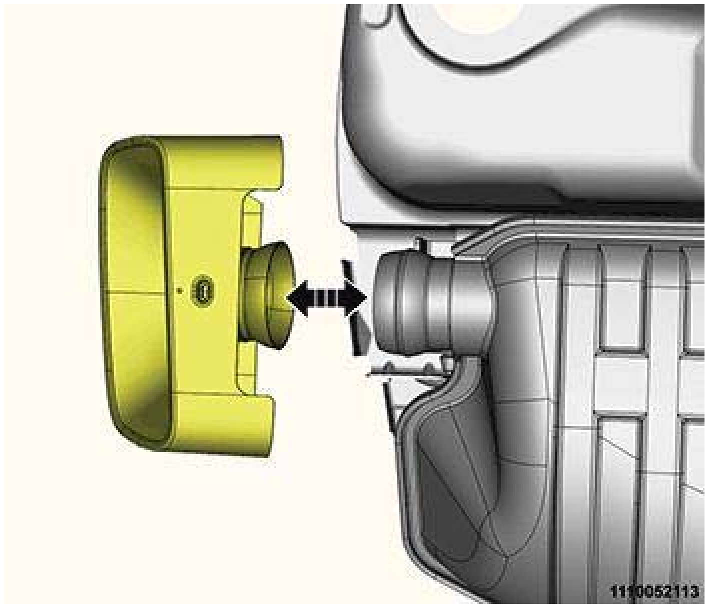

Fig. 39: Removing/Installing Exhaust Tip
Courtesy of CHRYSLER GROUP, LLC

5. If removed, position the exhaust tip onto the resonator.

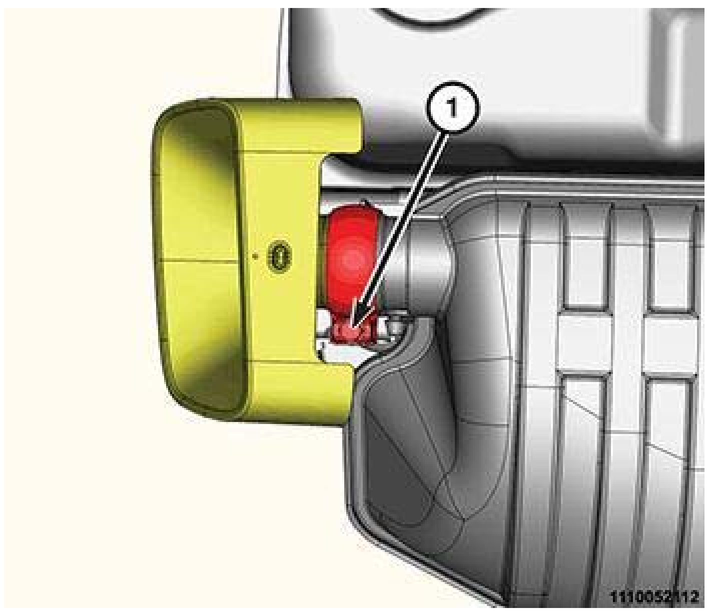

Fig. 40: Exhaust Tip Flange Clamp
Courtesy of CHRYSLER GROUP, LLC

6. Tighten the exhaust tip band clamp (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
7. Check for proper alignment and clearance to underbody and engine compartment components before tightening clamps.
8. Check the clearance between muffler and resonator assembly and fuel tank. Clearance is 14mm (.55 in.) for V8 engine.
9. The tailpipe should be centered in the rear fascia opening.
10. Tighten the band clamps to the proper torque specification. Refer to **SPECIFICATIONS**.

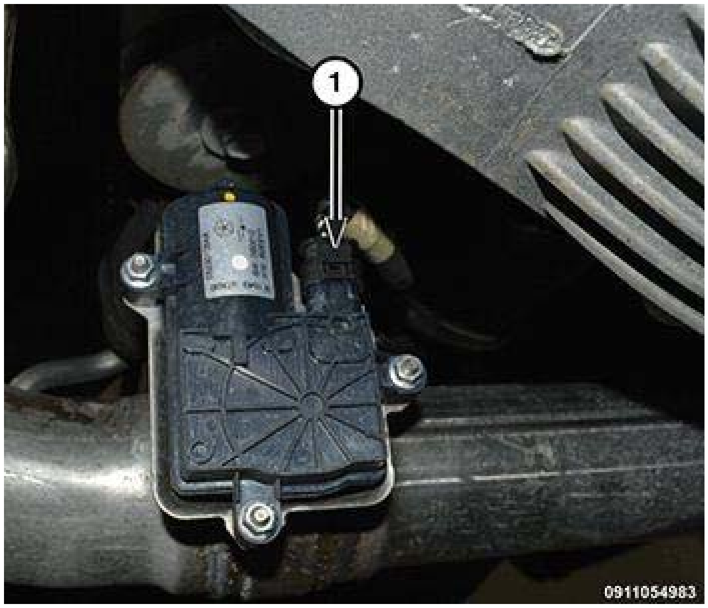

Fig. 41: Electronic Active Exhaust Valve Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

11. Connect the wire harness connector (1) to both electronic active exhaust valves.
12. Lower the vehicle.
13. Connect the negative battery cable.
14. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary.

RESONATOR, EXHAUST

REMOVAL

3.6L/5.7L

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

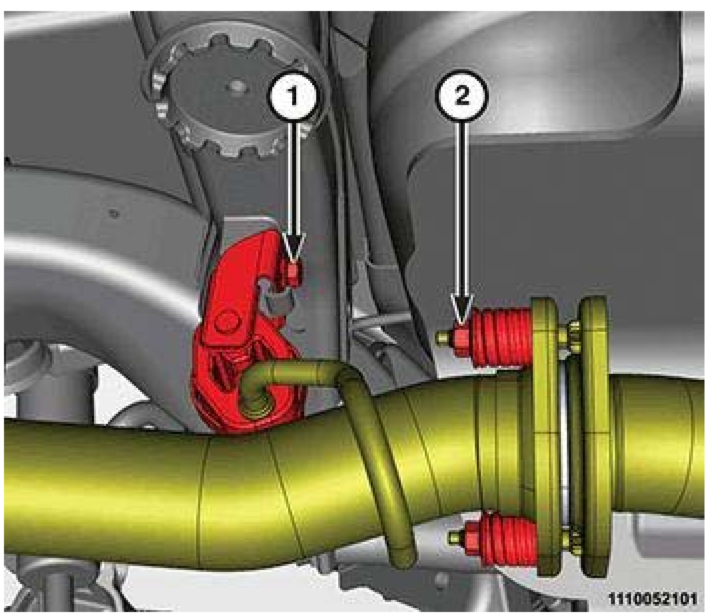

Fig. 42: Front Isolator Mounting Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

2. Remove the two mounting nuts (2) at the muffler flange.
3. Remove the front isolator mounting bolt (1).

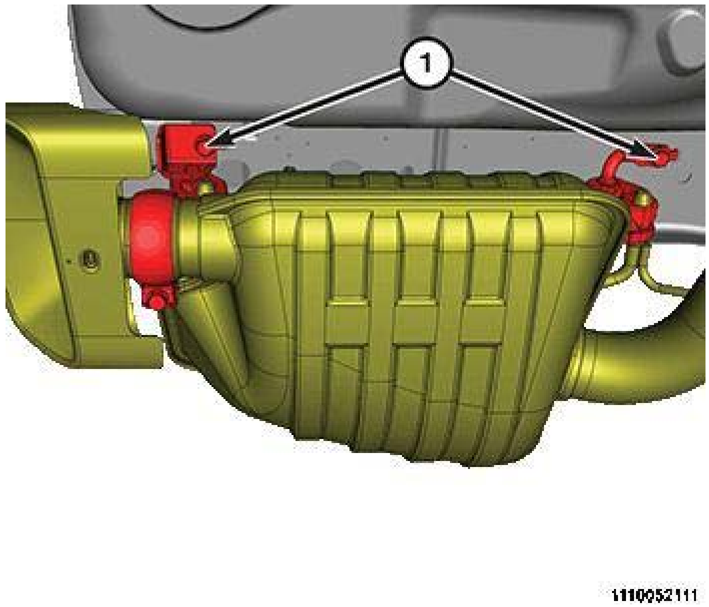

Fig. 43: Rear Isolator Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove two rear isolator mounting bolts (1).
5. Remove the left resonator/tailpipe assembly.

6.2L/6.4L

The resonators are serviced as an assembly with the muffler. For removal, refer to **MUFFLER, EXHAUST, REMOVAL**.

INSTALLATION

3.6L/5.7L

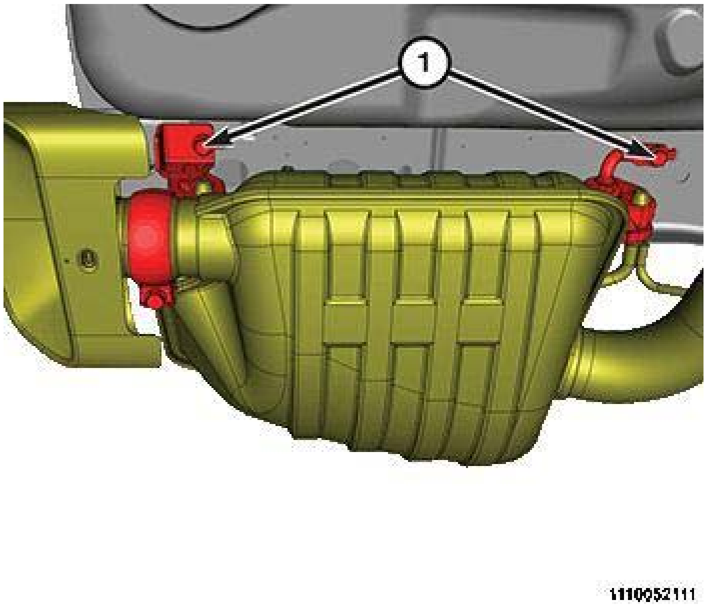

Fig. 44: Rear Isolator Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Place the resonator/tailpipe assembly into position.
2. Install the two rear isolator mounting bolts (1).

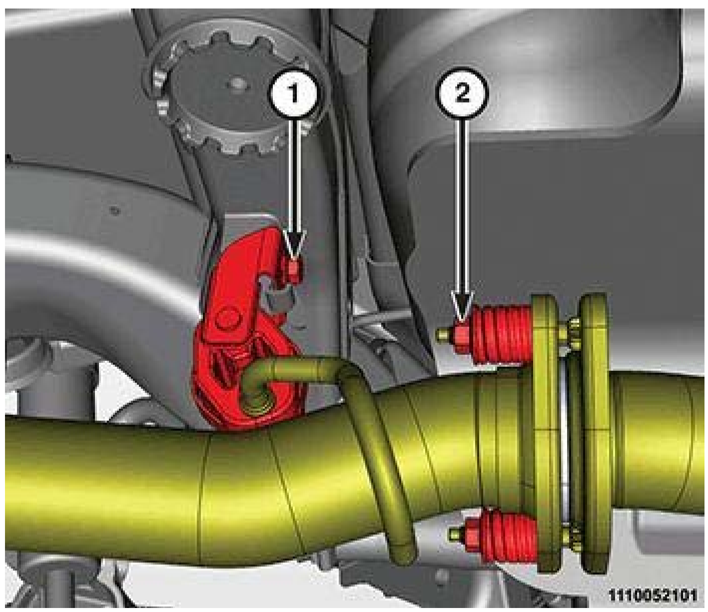

Fig. 45: Front Isolator Mounting Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

3. Install the front isolator mounting bolt (1).
4. Install the flange nuts (2) and tighten finger tight.
5. Check the clearance between muffler and tailpipe assembly and the fuel tank. Clearance is 14mm (.55 in.) for V8 engine and 16mm (.62 in.) for V6 engine.
6. Check the clearance at rear tunnel reinforcement. Clearance is 15 - 20mm (.59 -.78 in.).
7. The tailpipe should be centered in the rear fascia opening.

8. Tighten the flange nuts to the proper torque specification. Refer to **SPECIFICATIONS**.
9. Lower the vehicle.
10. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary.

6.2L/6.4L

The resonators are serviced as an assembly with the muffler. For installation, refer to **MUFFLER, EXHAUST, INSTALLATION**.

SHIELD, HEAT

REMOVAL

REMOVAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the resonator/muffler assembly. Refer to **MUFFLER, EXHAUST, REMOVAL**.

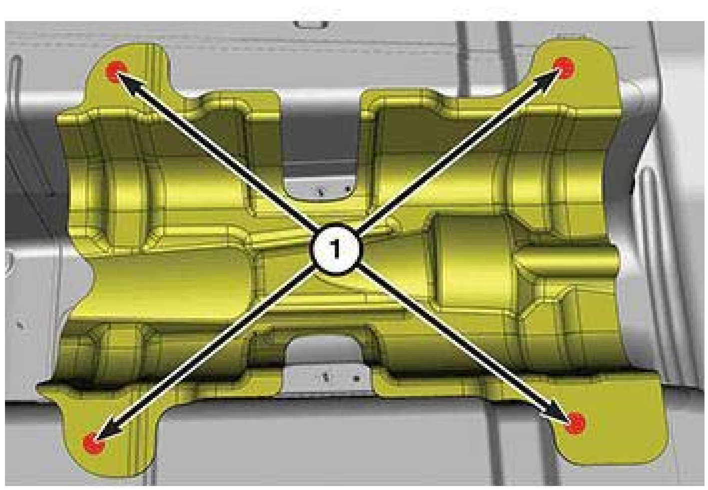

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Fig. 46: Heat Shield Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Remove the fasteners (1).
4. Remove the heat shields.

INSTALLATION

INSTALLATION

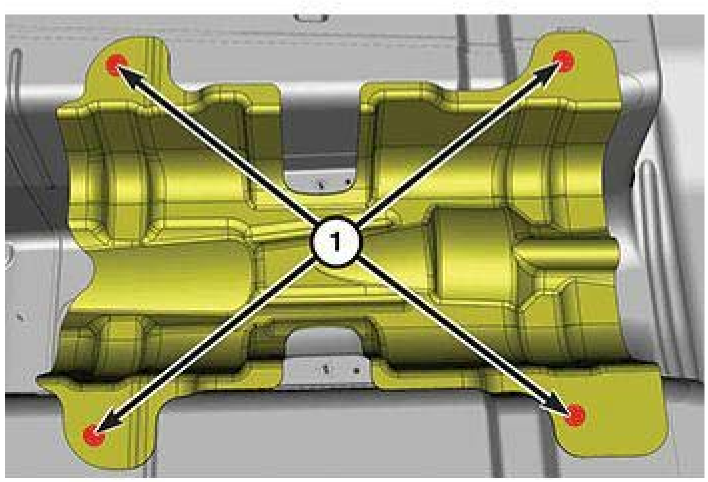

Fig. 47: Heat Shield Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Position the heat shields.
2. Install and securely tighten the fasteners (1).
3. Install the resonator/muffler assembly. Refer to **MUFFLER, EXHAUST, INSTALLATION**.

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Article GUID: A00735928

2015-16 ACCESSORIES AND EQUIPMENT

Frame and Bumpers - Challenger

SPECIFICATIONS

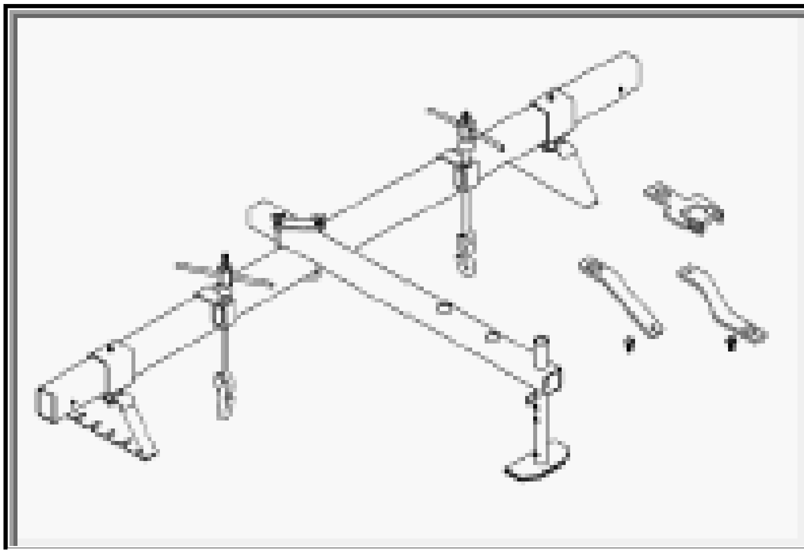
TORQUE SPECIFICATIONS

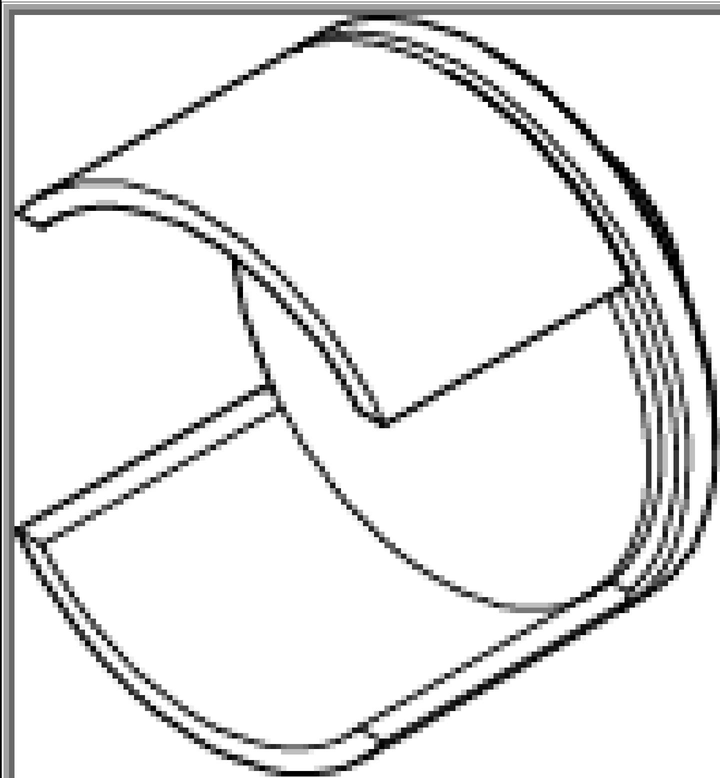
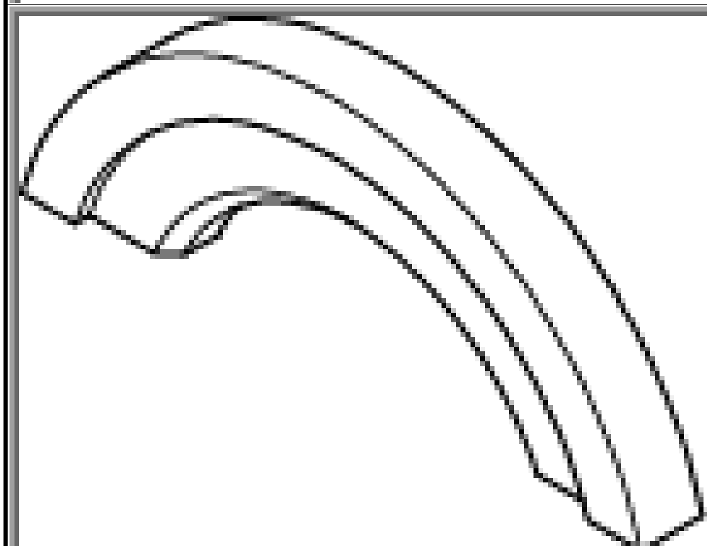
TORQUE SPECIFICATIONS

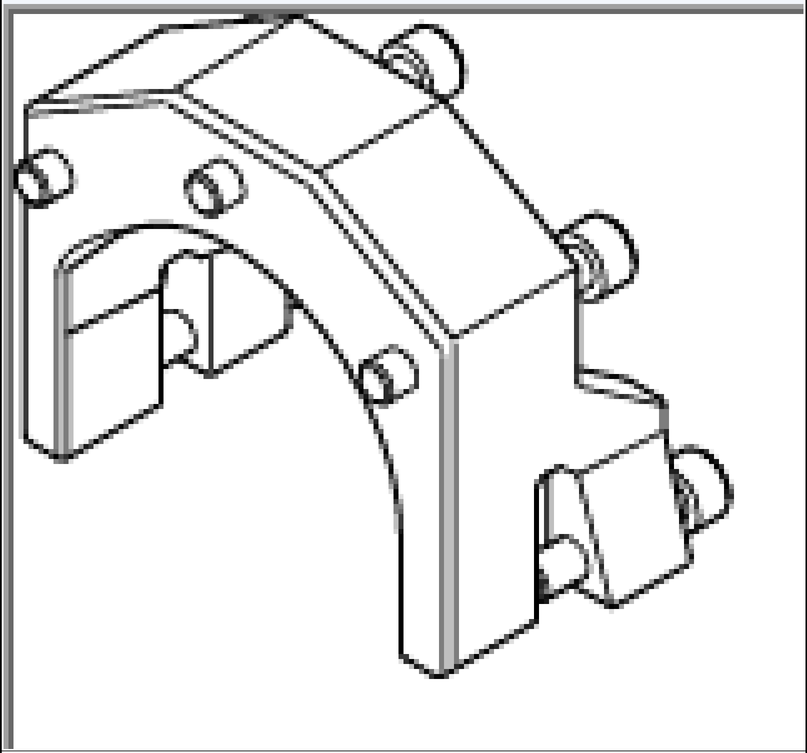
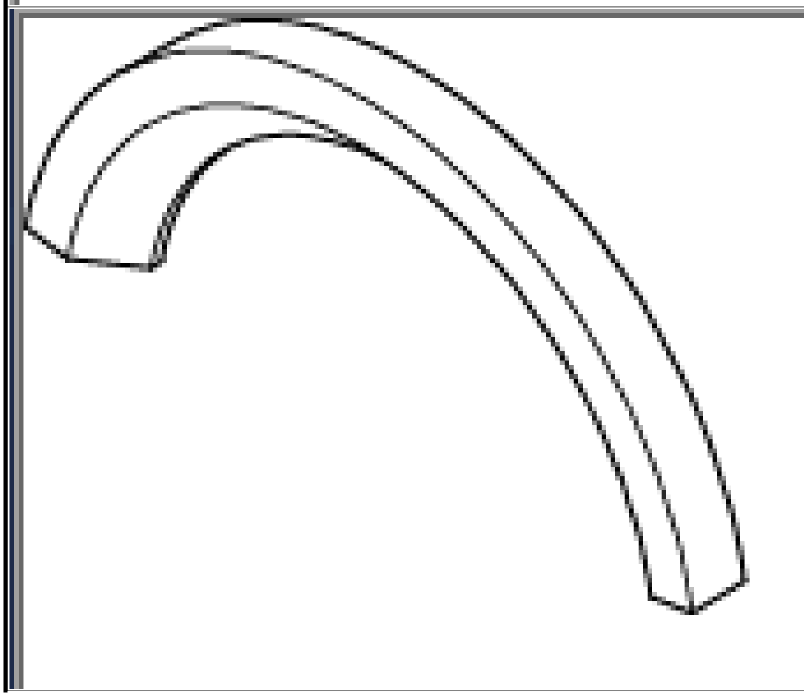
DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Engine cradle bolts	185	136	-	-
Front bumper bolts	28	21	-	-
Rear bumper nuts	27	20	-	-
Rear suspension crossmember to body bolts	185	136	-	-
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

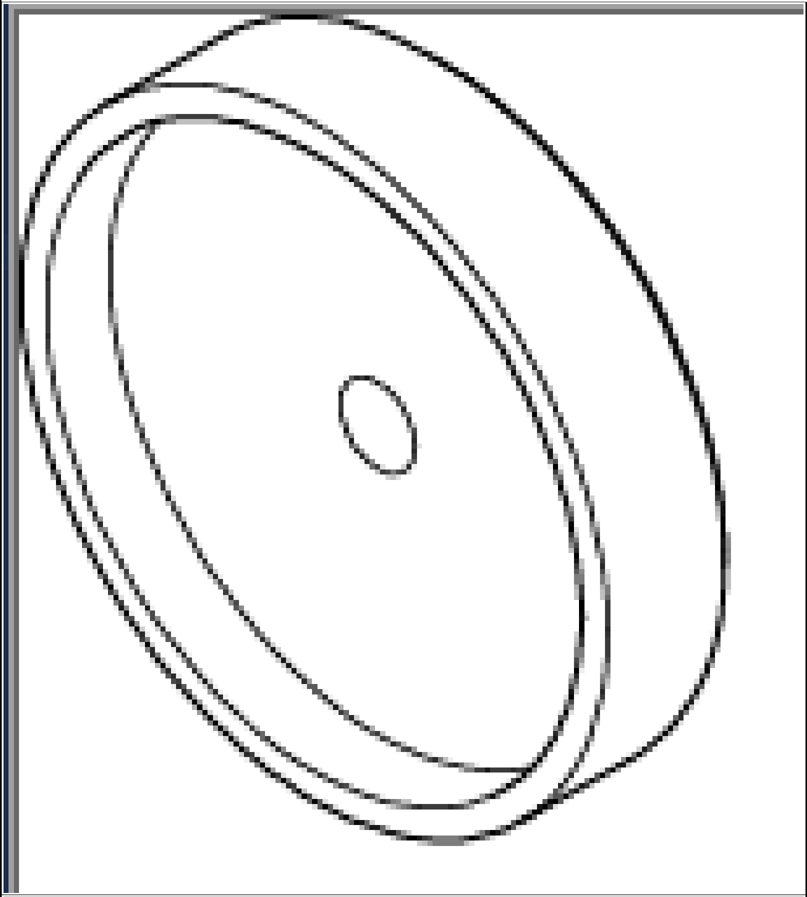
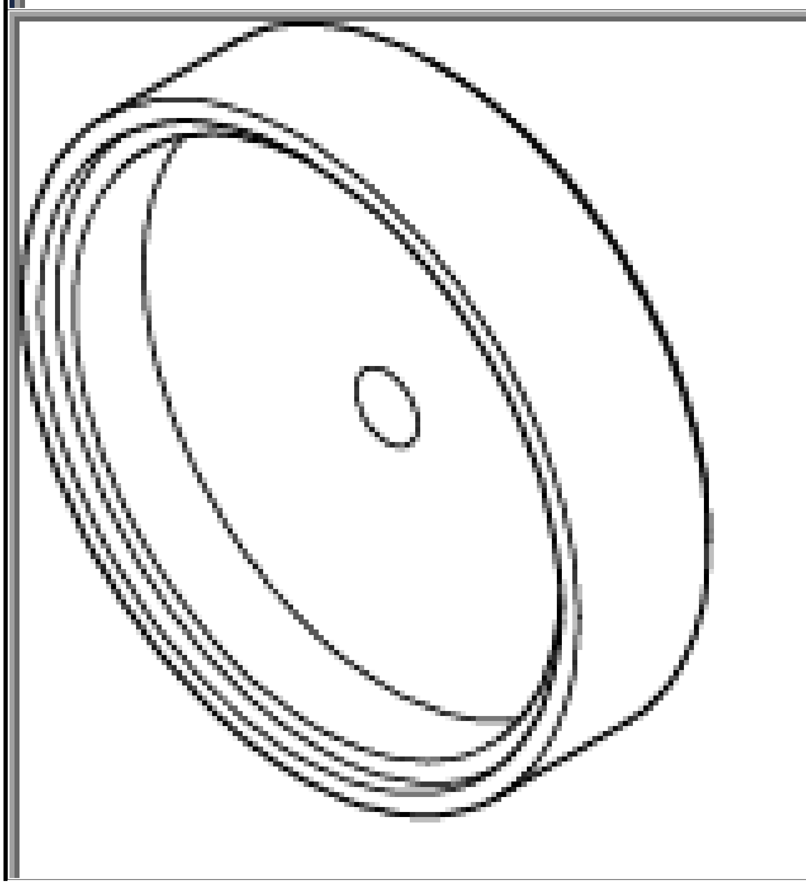
SPECIAL TOOLS

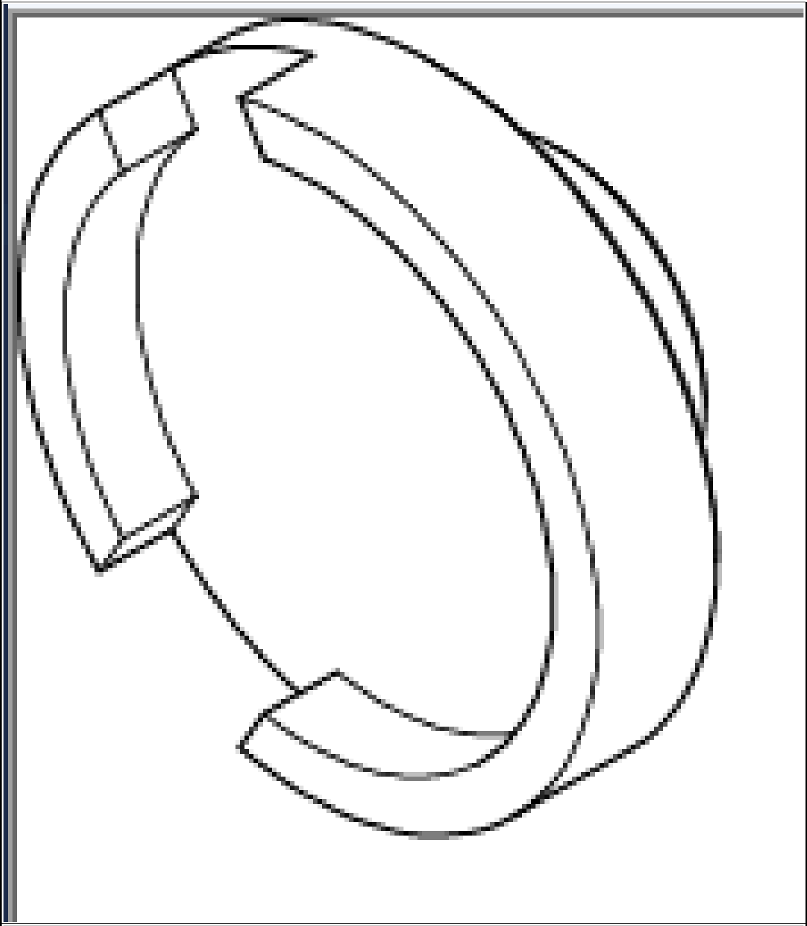
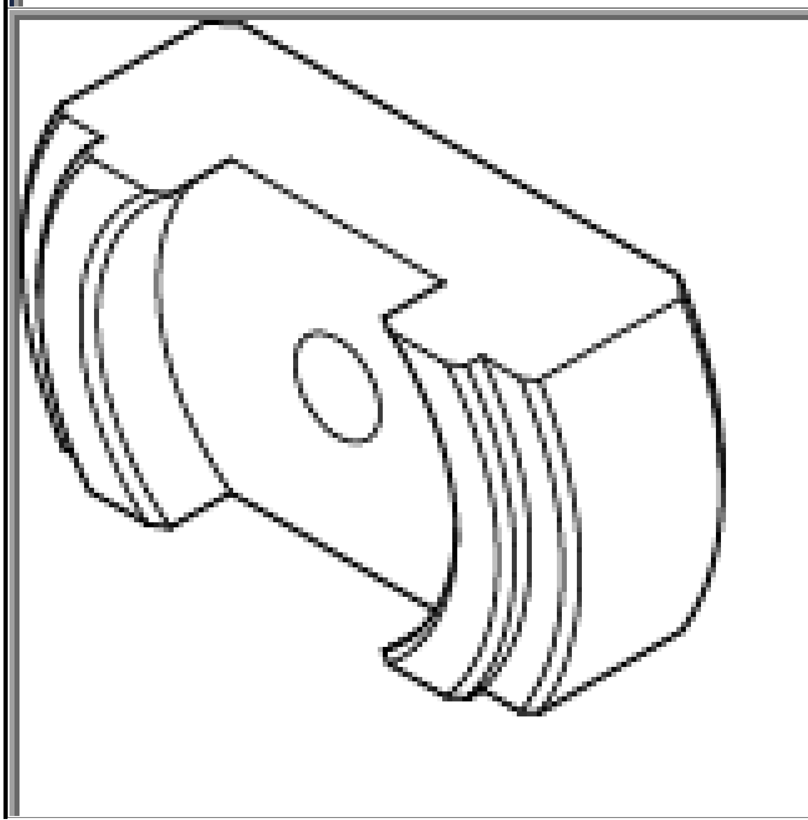
SPECIAL TOOLS

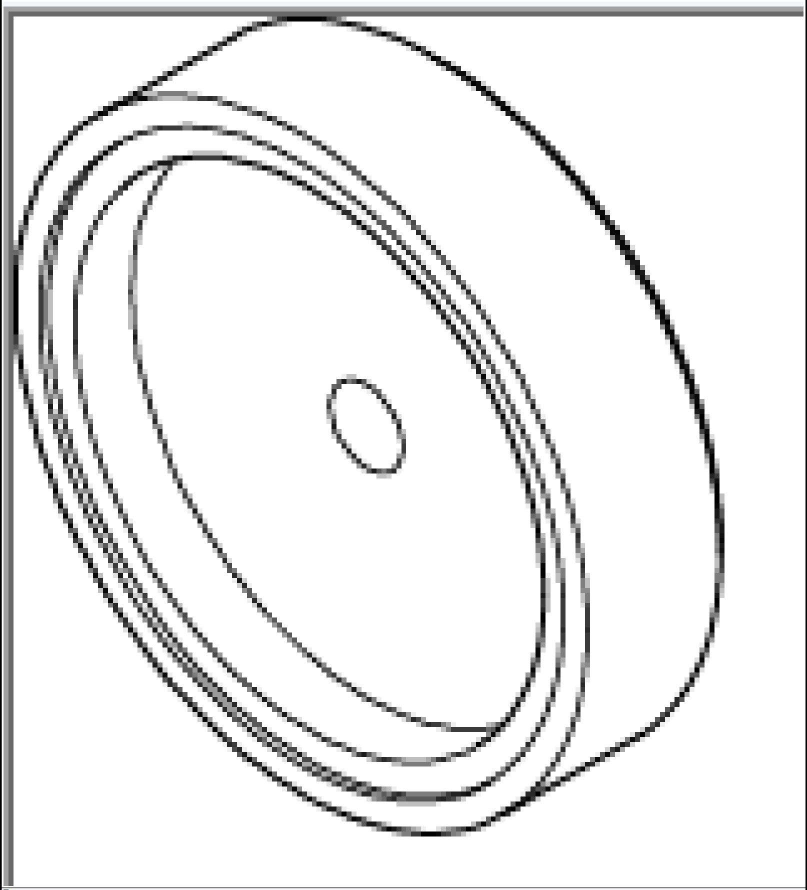
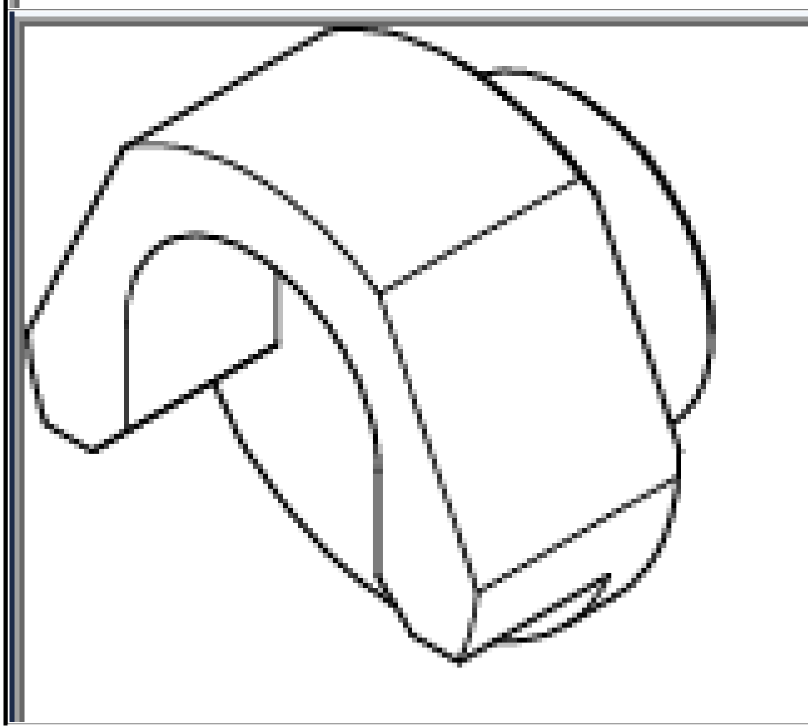
	8534B - Fixture, Driveline Support (Originally Shipped In Kit Number(s) 8534, 8534B, 8849, 9565.)

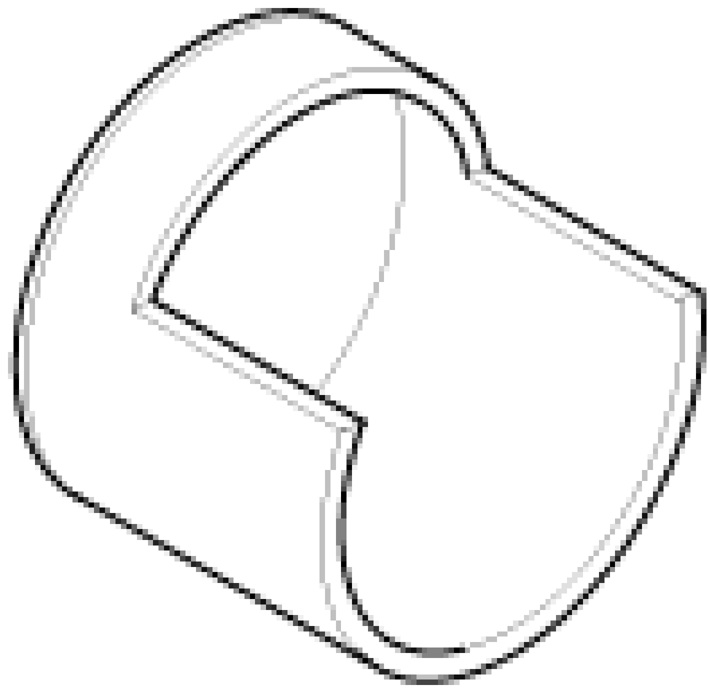
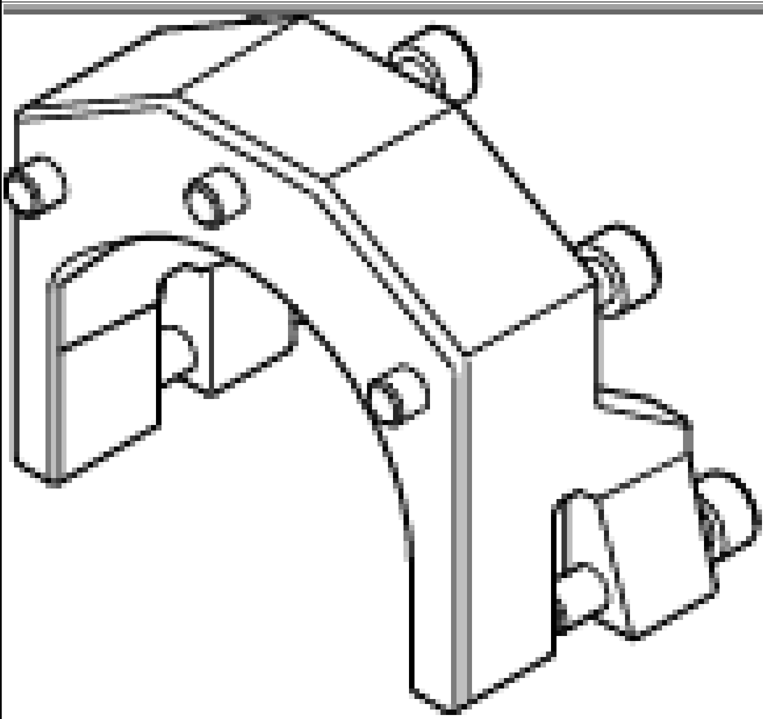
	9031-1 - Bushing Removal Receiver (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
	9031-10 - Brace (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)

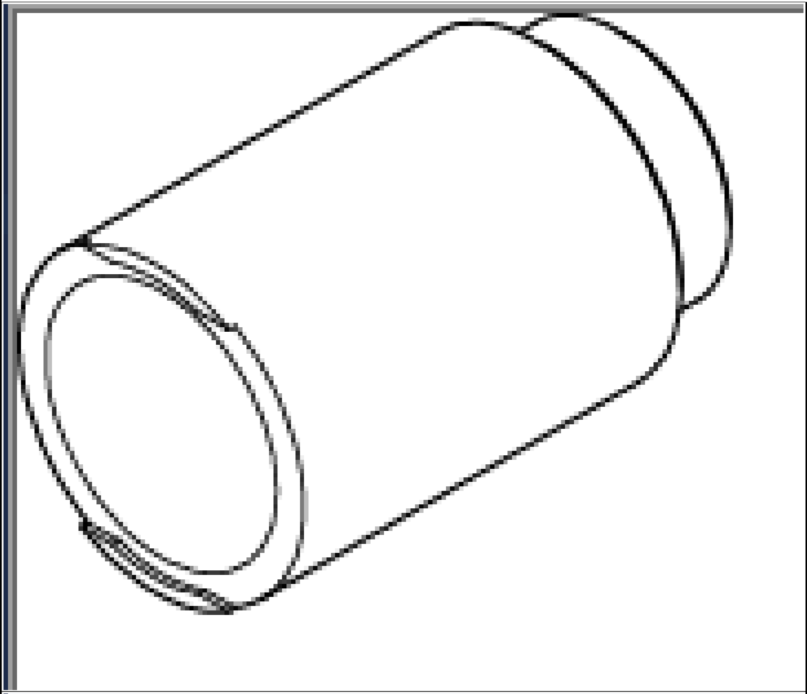
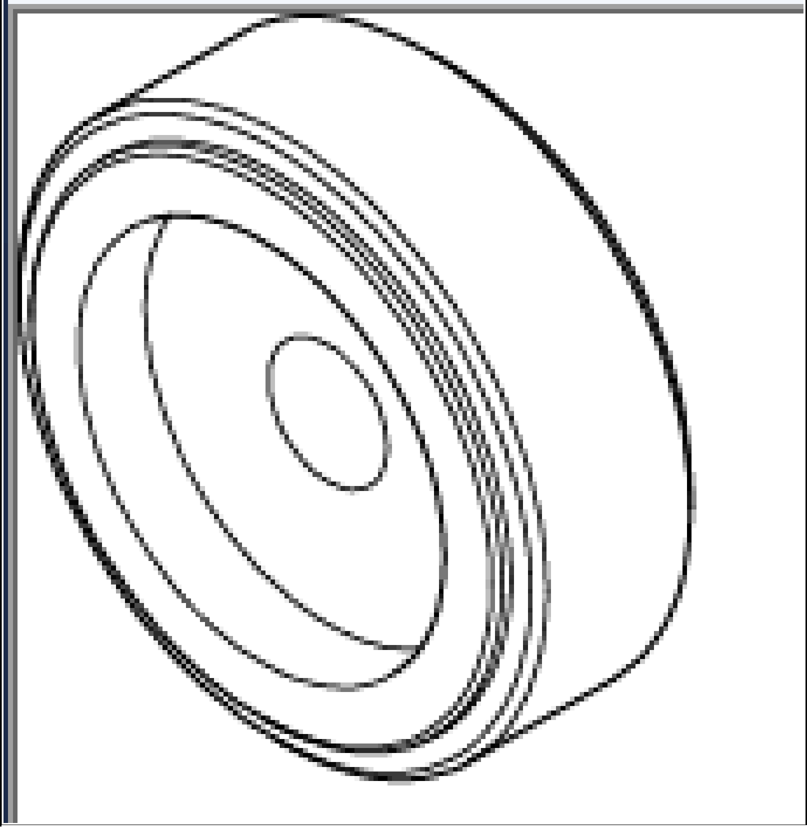
	9031-11 - Clamp (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
	9031-12 - Brace (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)

	9031-2 - Remover, Bushing (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
	9031-3 - Receiver, Bushing (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)

	9031-4 - Installer, Bushing (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
	9031-5A - Remover, Bushing (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)

	9031-6 - Receiver (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
	9031-7A - Installer, Bushing (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)

	9031-8A - Receiver, Bushing (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
	9031-9 - Clamp (Originally Shipped In Kit Number(s) 9074, 9076, 9090, 9329-SUP, 9396, 9515-SUP, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)

	9032-1 - Receiver, Bushing (Originally Shipped In Kit Number(s) 9076, 9090, 9090CC.)
	9032-2 - Receiver, Bushing (Originally Shipped In Kit Number(s) 9076, 9090, 9090CC.)

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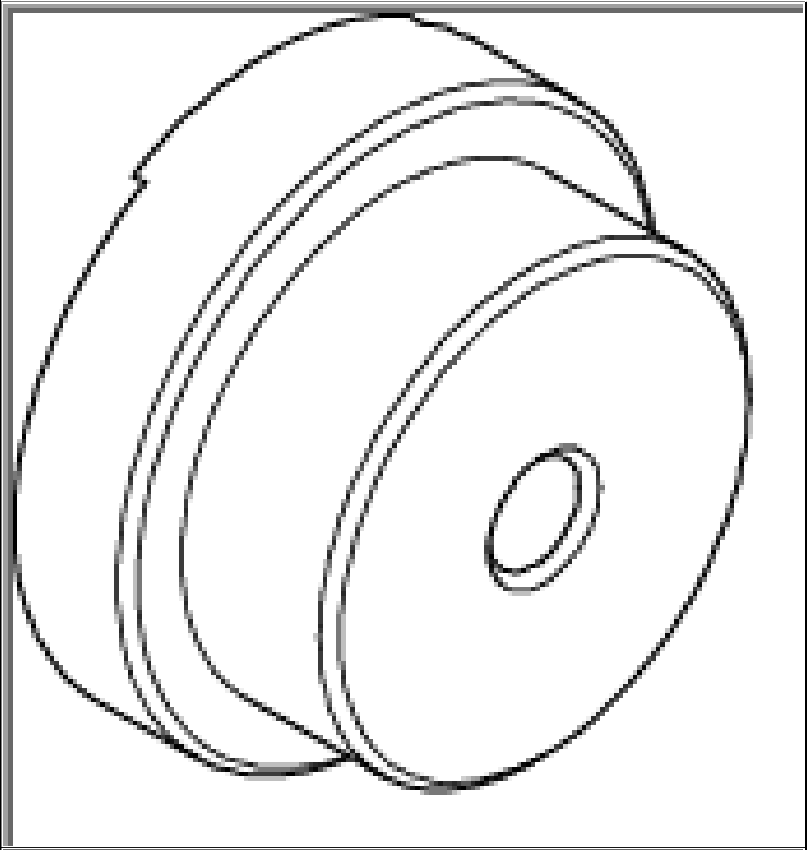
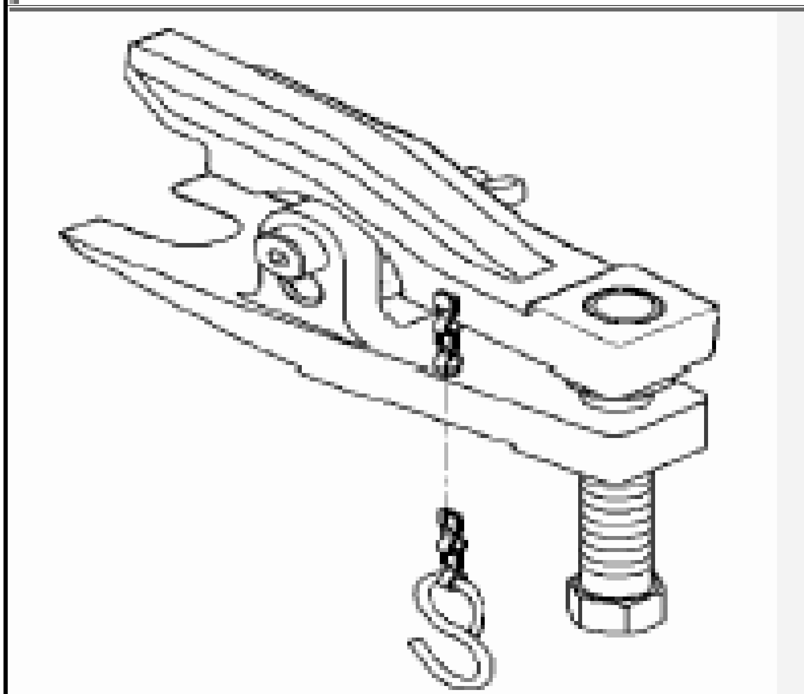
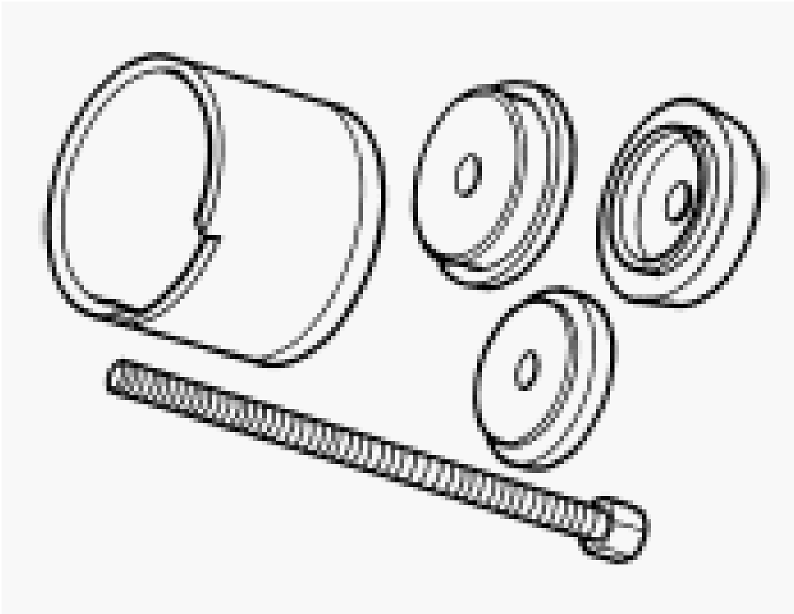
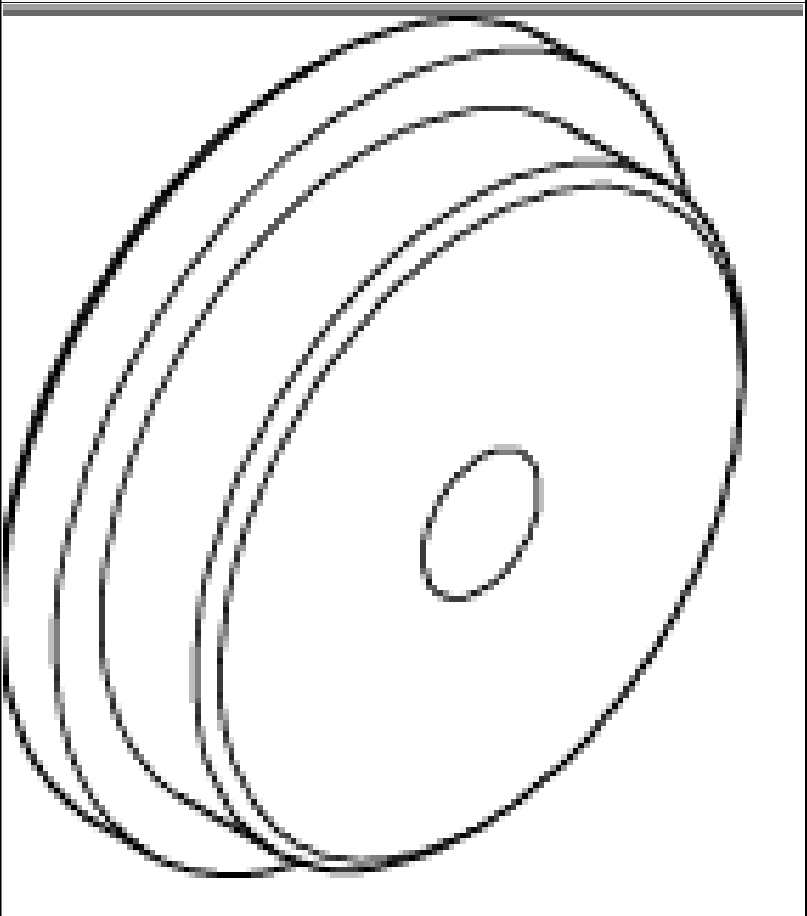
	9032-3 - Pusher, Bushing (Originally Shipped In Kit Number(s) 9076, 9090, 9090CC.)
	9360 - Remover, Ball Joint (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)

	9520 - Remover/Installer, Bushing (Originally Shipped In Kit Number(s) 9329, 9329-SUP, 9515-SUP, 9516, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
	9520-1 - Installer Disc (Originally Shipped In Kit Number(s) 9329, 9329-SUP, 9515-SUP, 9516, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)

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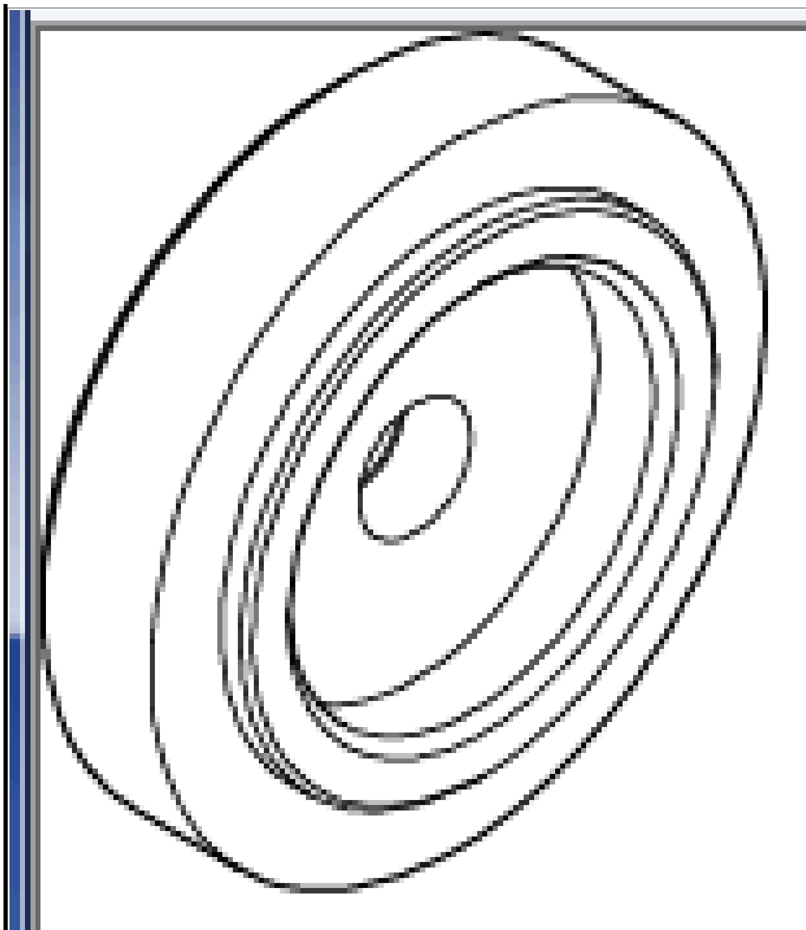
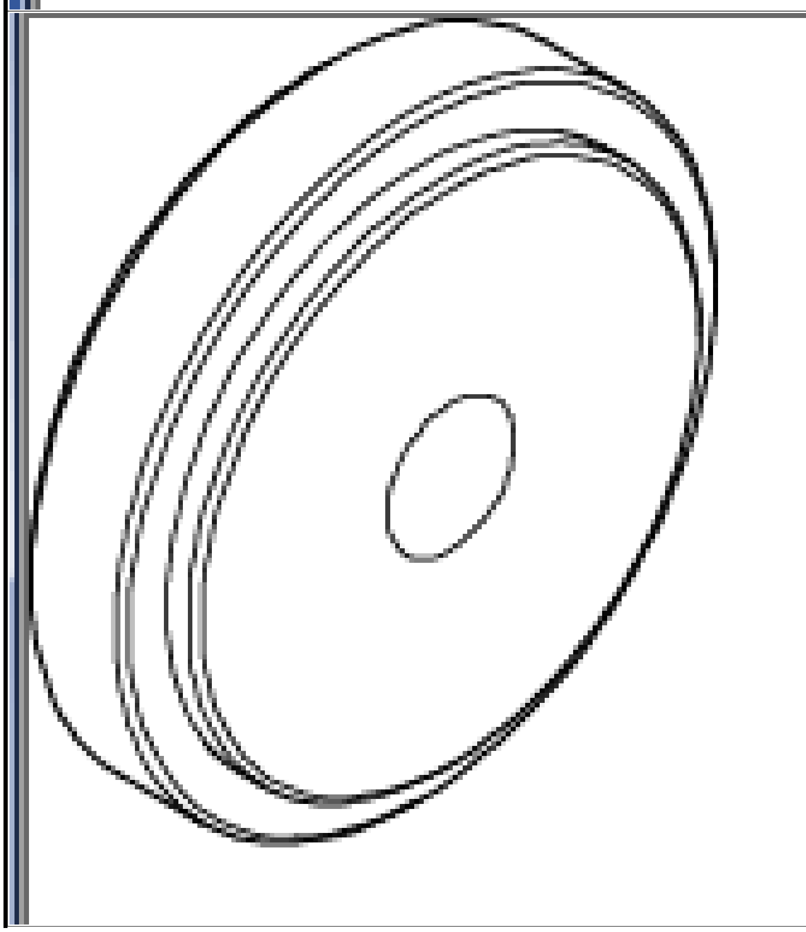
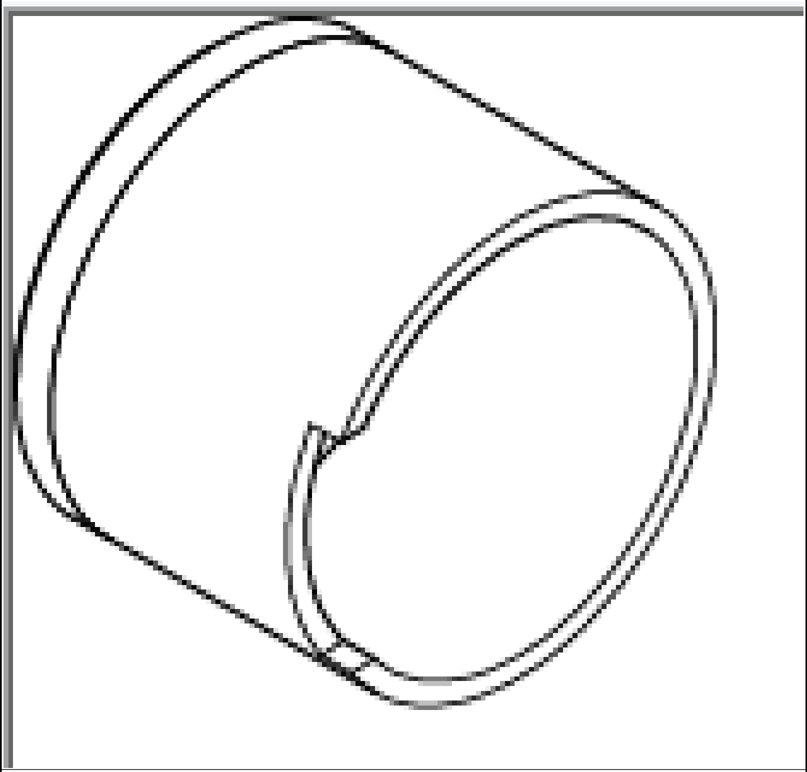
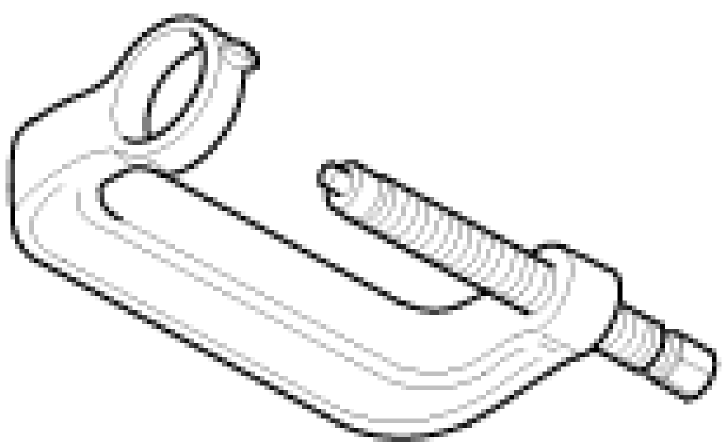
	9520-2A - Installer, Bushing (Originally Shipped In Kit Number(s) 9329, 9329-SUP, 9515-SUP, 9516, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
	9520-3 - Remover, Bushing (Originally Shipped In Kit Number(s) 9329, 9329-SUP, 9515-SUP, 9516, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)

	9520-4 - Cup, Receiver (Originally Shipped In Kit Number(s) 9329, 9329-SUP, 9515-SUP, 9516, 9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP.)
	C-4212F - Press, Ball Joint (Originally Shipped In Kit Number(s) 6745, 6880, 6881, MLR-C03.)

BUMPERS

ABSORBER, FRONT ENERGY

REMOVAL

REMOVAL

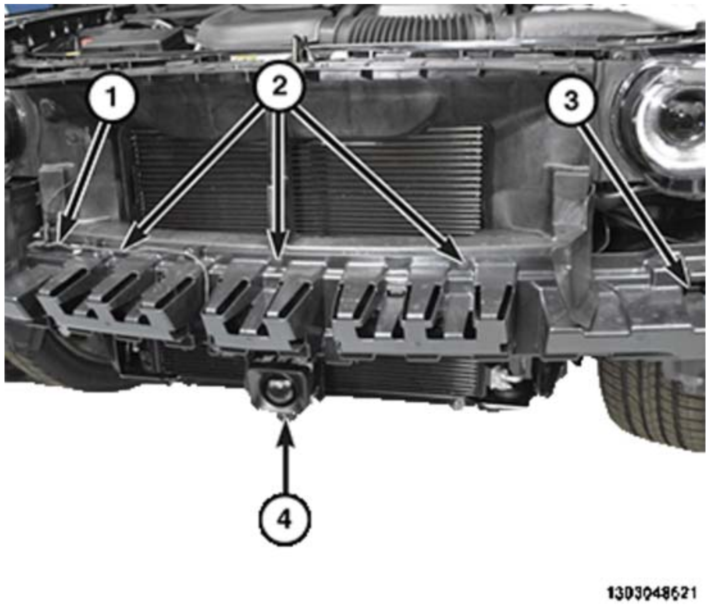


Fig. 1: Wire Harness, Connector, Push-Pin Fasteners & Clips
Courtesy of CHRYSLER GROUP, LLC

1. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL**.
2. Disconnect the wire harness connector (4) and separate the harness (1) from the absorber.
3. Remove the push pin fasteners (2).
4. Release the clips (3) and remove the absorber.

INSTALLATION

INSTALLATION

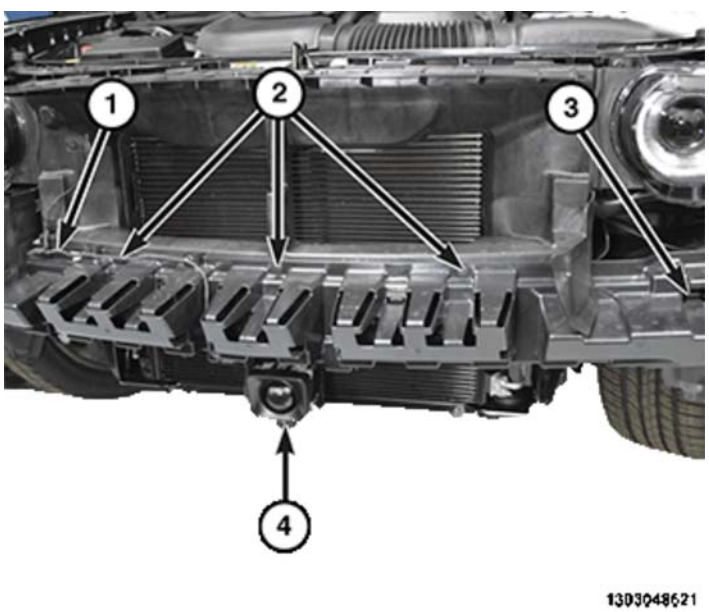


Fig. 2: Wire Harness, Connector, Push-Pin Fasteners & Clips
Courtesy of CHRYSLER GROUP, LLC

1. Install the absorber and seat the clips (3) fully.

2. Install the push pin fasteners (2).
3. Secure the wire harness (1) back and seat the fasteners fully.
4. Connect the

   Connect the wire harness connector (4).

5. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION**.

ABSORBER, REAR ENERGY

REMOVAL

REMOVAL

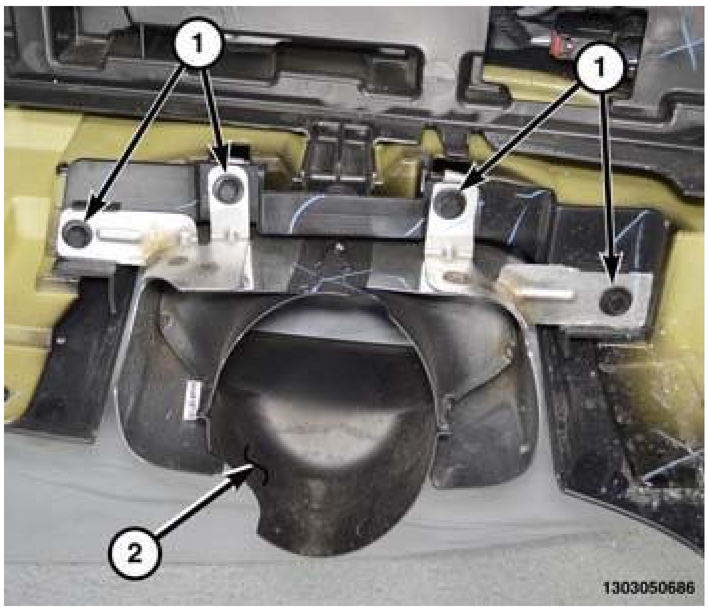


Fig. 3: Exhaust Tip & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear fascia. Refer to **FASCIA, REAR, REMOVAL** and **FASCIA, REAR, LOWER, REMOVAL**.
2. Remove the bolts (1) and remove both exhaust tips (2), if equipped.

Fig. 4: Rear Energy Absorber Push-Pin Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Remove the push pin fasteners (1).
4. Separate the wire harness from the absorber and remove the absorber.

INSTALLATION

INSTALLATION

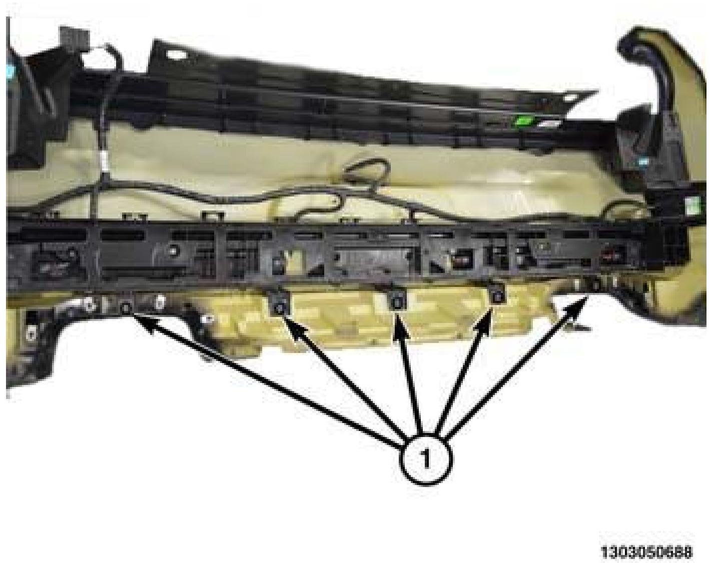


Fig. 5: Rear Energy Absorber Push-Pin Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Install the energy absorber and install the push pin fasteners (1)
2. Connect the wire harness back onto the absorber.

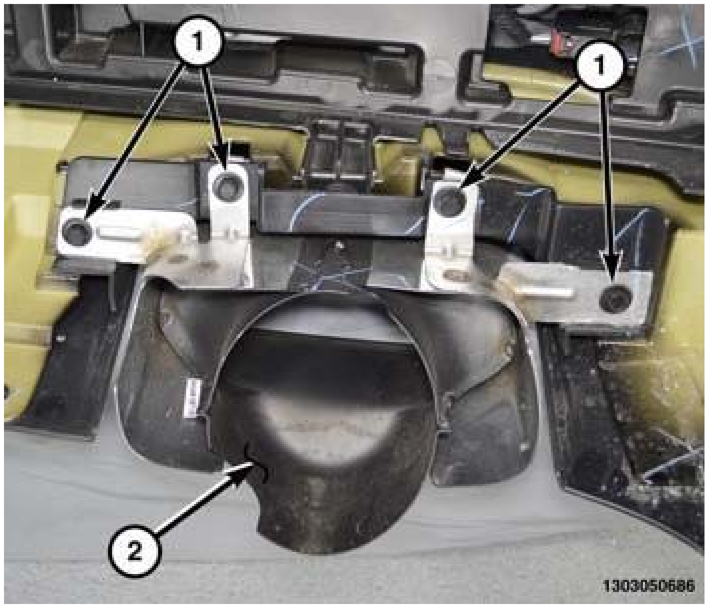


Fig. 6: Exhaust Tip & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. If equipped, instal the exhaust tips (2) and install the bolts (1).
4. Install the fascia. Refer to **FASCIA, REAR, INSTALLATION** and **FASCIA, REAR, LOWER, INSTALLATION**.

AIR DAM, FRONT

REMOVAL

REMOVAL

1. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL**.
2. Remove the front air dam retainers.
3. Remove the front air dam from the fascia.

INSTALLATION

INSTALLATION

1. Position the front air dam onto the front fascia.
2. Install the fasteners the secure the front air dam to the front fascia.
3. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION**.

BUMPER, FRONT

REMOVAL

REMOVAL

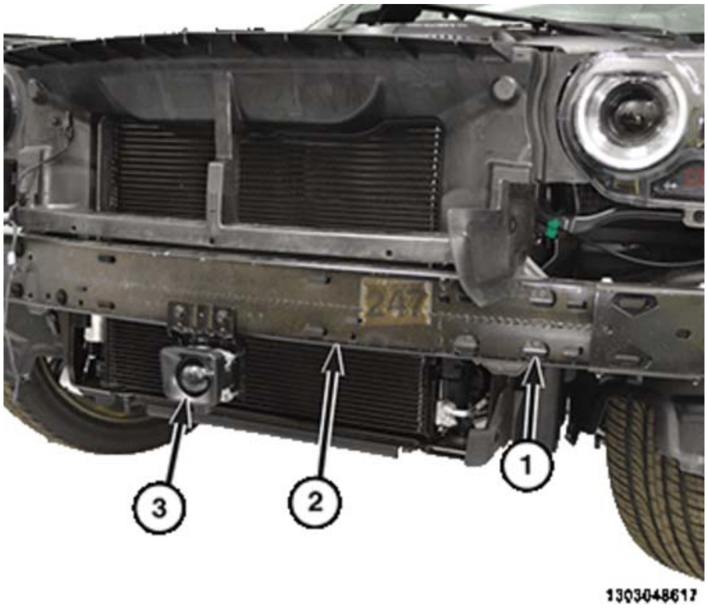


Fig. 7: Adaptive Cruise Control Module, Front Bumper Beam & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the front energy absorber. Refer to **ABSORBER, FRONT ENERGY, REMOVAL**.
2. Remove the adaptive cruise control module (3). Refer to **MODULE, ADAPTIVE CRUISE CONTROL, REMOVAL** .
3. Remove the eight bolts (1) (4 per side) and remove the front bumper beam (2).

INSTALLATION

INSTALLATION

Fig. 8: Adaptive Cruise Control Module, Front Bumper Beam & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the front bumper beam (2) and install the eight bolts (1) (4 per side).
2. Tighten the front bumper beam bolts to the proper torque specification. Refer to **SPECIFICATIONS**.

3. Install the adaptive cruise control module (3). Refer to **MODULE, ADAPTIVE CRUISE CONTROL, INSTALLATION** .
4. Install the front energy absorber. Refer to **ABSORBER, FRONT ENERGY, INSTALLATION**.

BUMPER, REAR

REMOVAL

REMOVAL

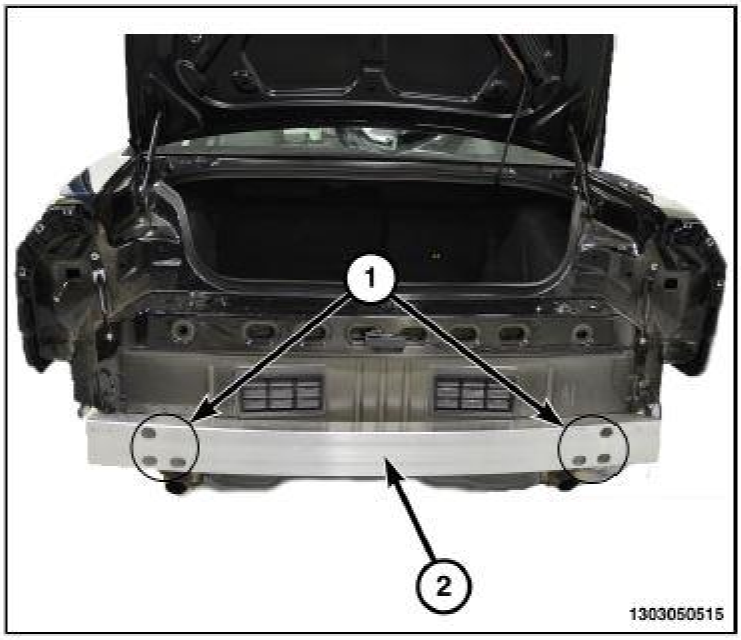


Fig. 9: Rear Bumper & Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear fascia. Refer to **FASCIA, REAR, REMOVAL** and **FASCIA, REAR, LOWER, REMOVAL**.
2. Remove the nuts (1) and the rear bumper (2).

INSTALLATION

INSTALLATION

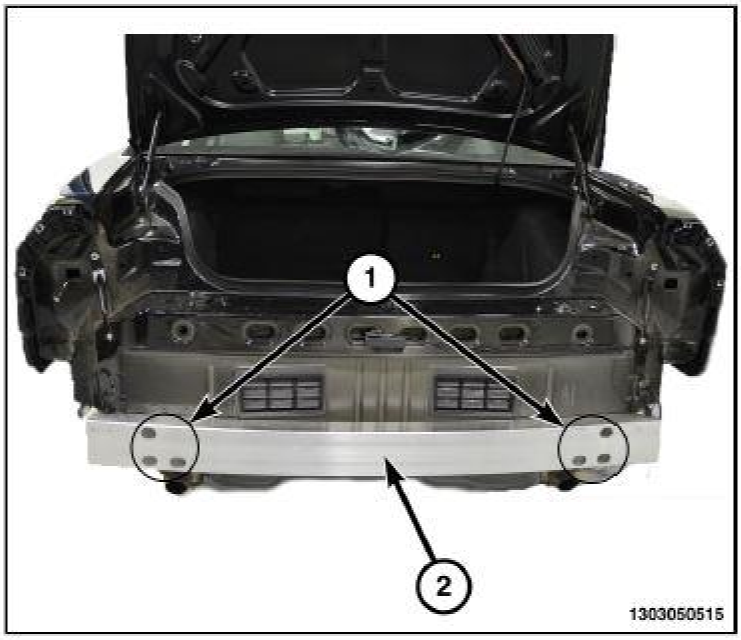


Fig. 10: Rear Bumper & Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Place the rear bumper (2) onto the vehicle.
2. Install the rear bumper nuts (1) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the rear fascia. Refer to **FASCIA, REAR, INSTALLATION** and **FASCIA, REAR, LOWER, INSTALLATION**.

FASCIA, FRONT

REMOVAL

REMOVAL

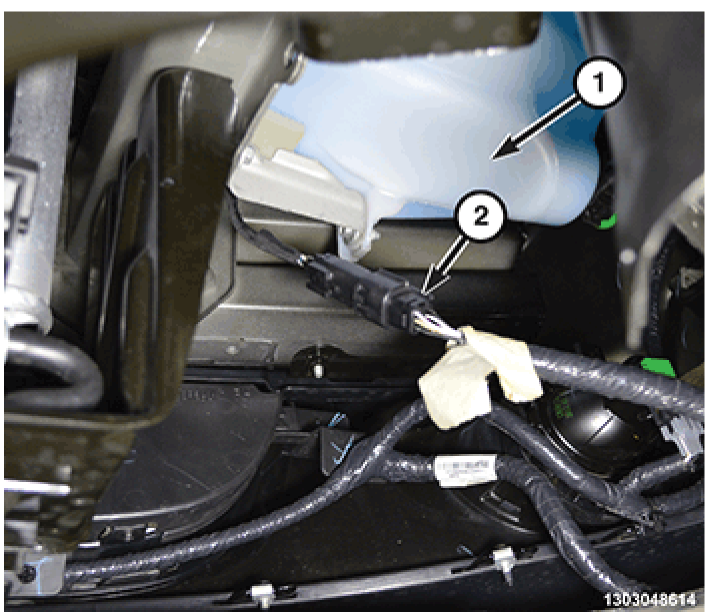


Fig. 11: Fascia Wire Harness Connector & Washer Fluid Bottle

Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle.
2. Remove the engine belly pan. Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL**.
3. Remove the front fascia lower closeout panel.
4. Disconnect the fascia wire harness connector (2) located under the washer fluid bottle (1) on the right side of vehicle.

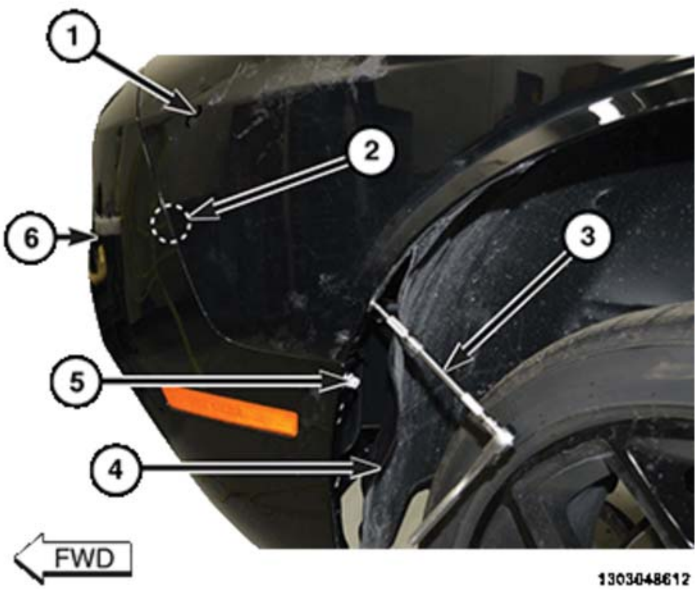


Fig. 12: Splash Shield, Tool, Hidden Nut & Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Remove the four plastic rivets from the front splash shields.
6. Pull back the splash shield (4) and remove the bolt (5).
7. Using a long suitable tool (3), remove the hidden nut that is at location indicated (2).

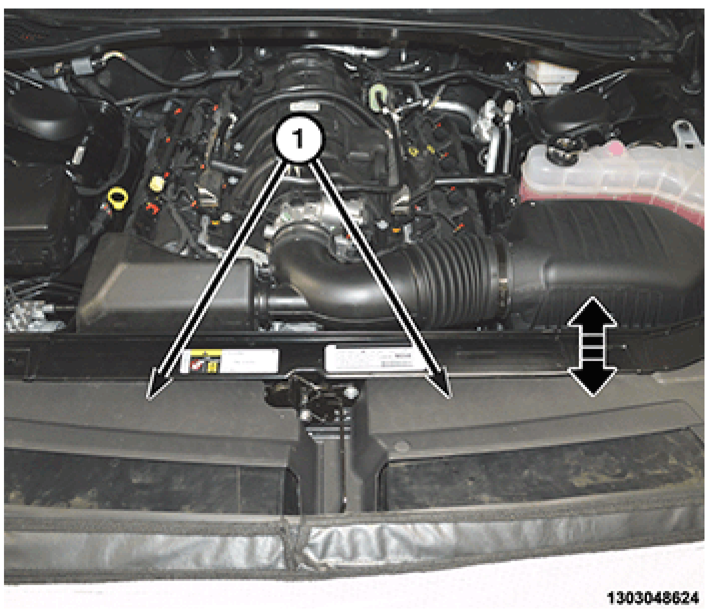


Fig. 13: Under Hood Appearance Panels
Courtesy of CHRYSLER GROUP, LLC

8. Lift out both front fascia upper closeout panels (1).

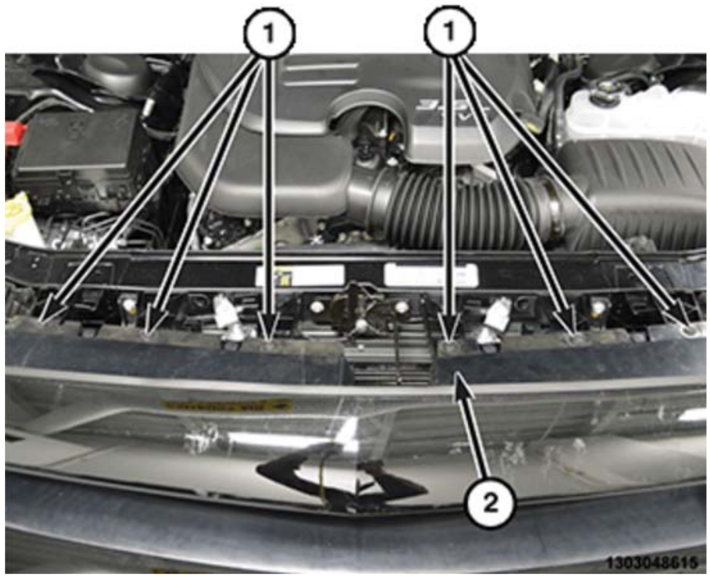


Fig. 14: Push Fasteners & Front Fascia
Courtesy of CHRYSLER GROUP, LLC

9. Remove the six push fasteners (1) at the top of the front fascia (2).

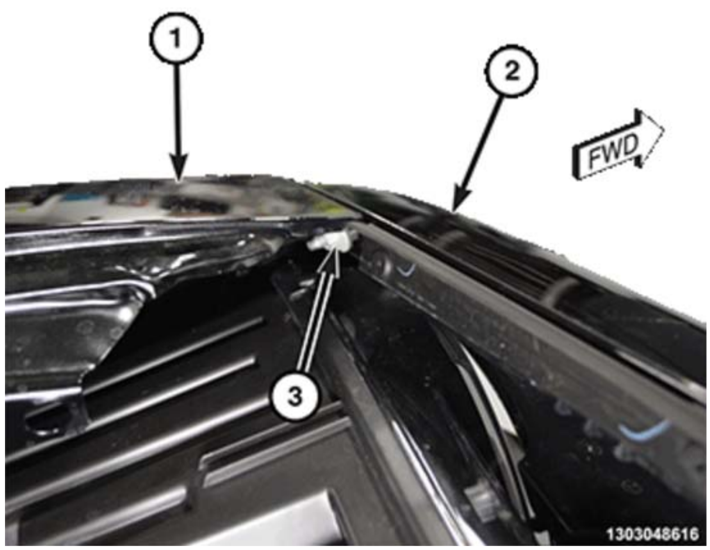
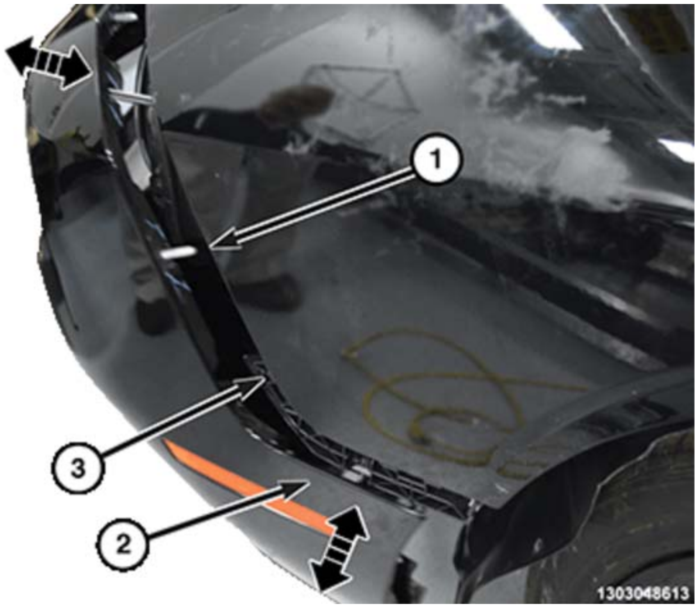


Fig. 15: Top Of Fender & Nut
Courtesy of CHRYSLER GROUP, LLC

10. Remove the nut (3) at the top of fender (1) on both sides of vehicle.

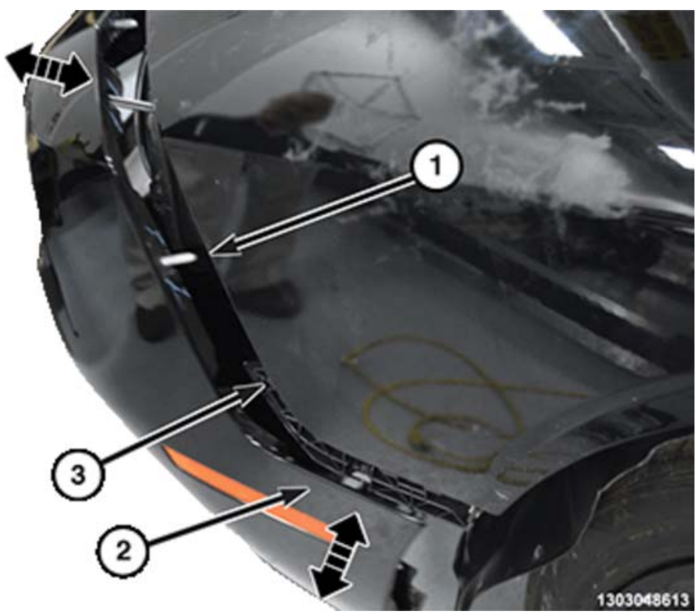


[Fig. 16: Stud, Front Fascia & Retainers]
Courtesy of CHRYSLER GROUP, LLC

11. Pull the sides of the front fascia (2) to disengage the retainers (3), then pull the front fascia forward and remove.

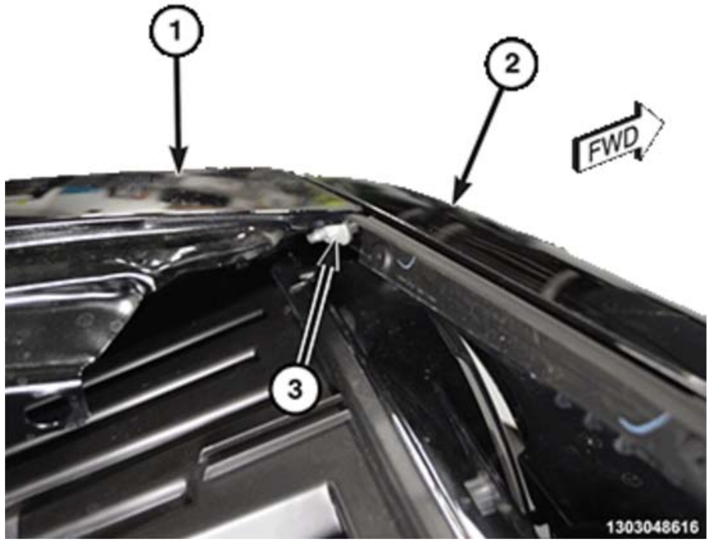
INSTALLATION

INSTALLATION



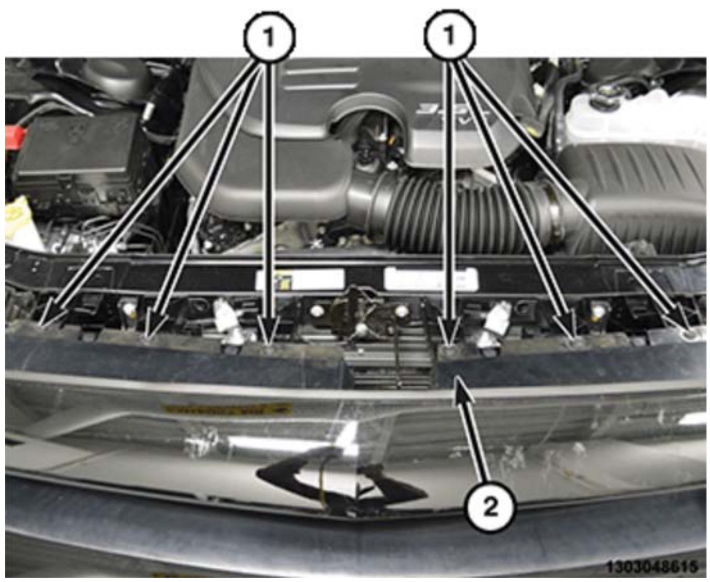
[Fig. 17: Stud, Front Fascia & Retainers]
Courtesy of CHRYSLER GROUP, LLC

1. Carefully position the front fascia (2) onto the vehicle, aligning the studs (1) as seating it fully.
2. Hand tap the front fascia to engage the retaining clips (3).



[Fig. 18: Top Of Fender & Nut](#)
Courtesy of CHRYSLER GROUP, LLC

3. Install the nuts (3) at the top of the fender (1) and tighten securely.



[Fig. 19: Push Fasteners & Front Fascia](#)
Courtesy of CHRYSLER GROUP, LLC

4. Install the six push fasteners (1) at the top of the front fascia (2).

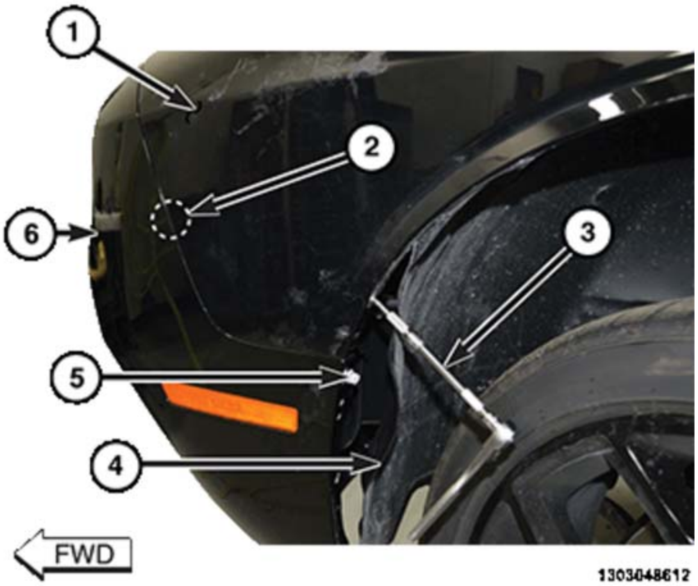


Fig. 20: Splash Shield, Tool, Hidden Nut & Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Install the hidden nut that is at the location indicated (2) and tighten securely.
6. Install the bolt (5) and tighten securely.
7. Position the splash shields (4) into place and install new plastic rivets.

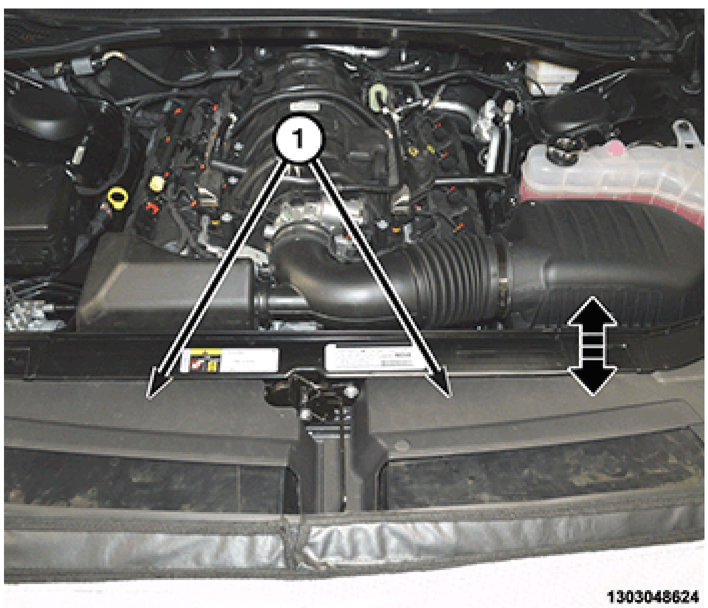
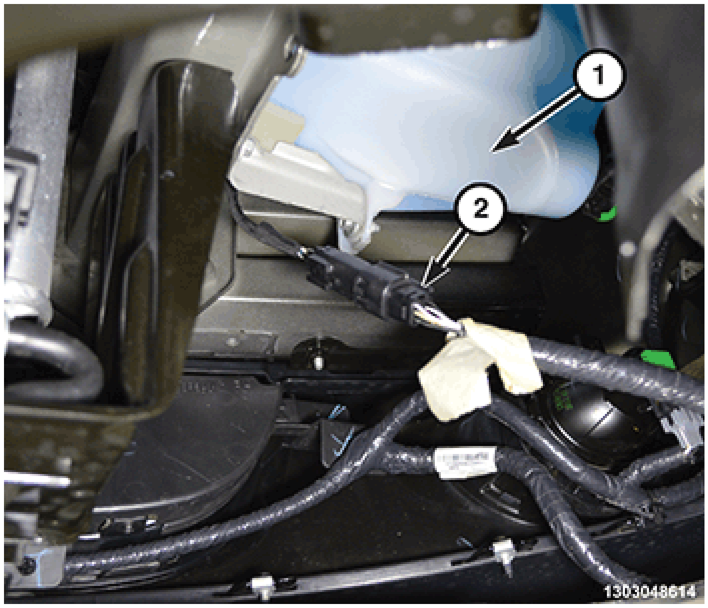


Fig. 21: Under Hood Appearance Panels
Courtesy of CHRYSLER GROUP, LLC

8. Install the upper closeout panels (1).



[Fig. 22: Fascia Wire Harness Connector & Washer Fluid Bottle](#)
Courtesy of CHRYSLER GROUP, LLC

9. Connect the fascia wire harness connector (2) located under the washer fluid bottle (1) on the right side of vehicle.
10. Install the front fascia lower closeout panels.
11. Install the engine belly pan. Refer to **BELLY PAN, INSTALLATION** or **BELLY PAN, ENGINE, INSTALLATION**.

FASCIA, REAR

REMOVAL

REMOVAL

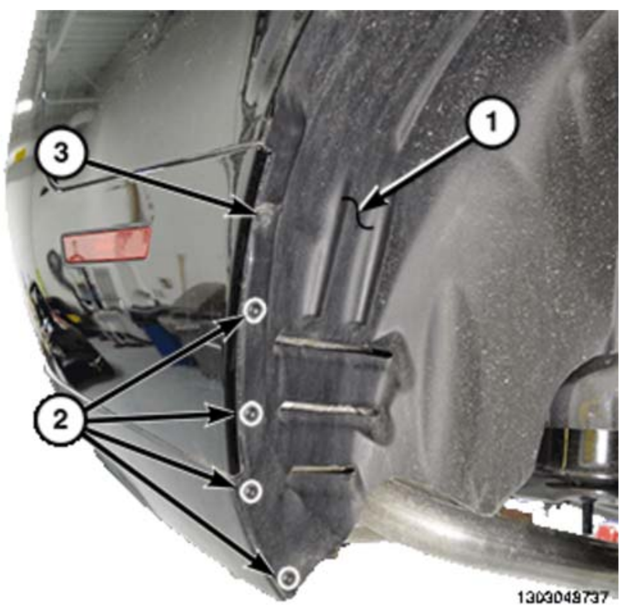


Fig. 23: Lower Plastic Rivets, Splash Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear wheels. Refer to **REMOVAL** .
2. Remove the lower plastic rivets (2) from the splash shields (1).
3. Remove the bolts (3) from both sides and position the splash shields aside.

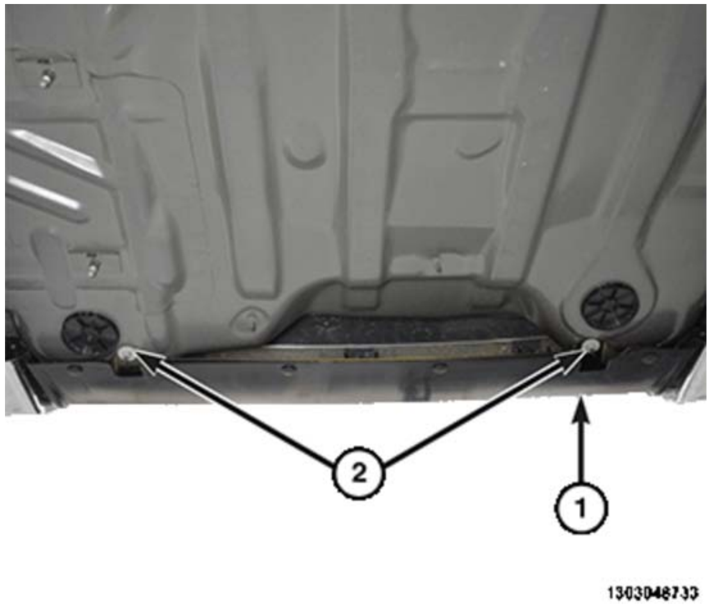


Fig. 24: Rear Fascia & Nuts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the two nuts (2) at the bottom of the rear fascia (1).

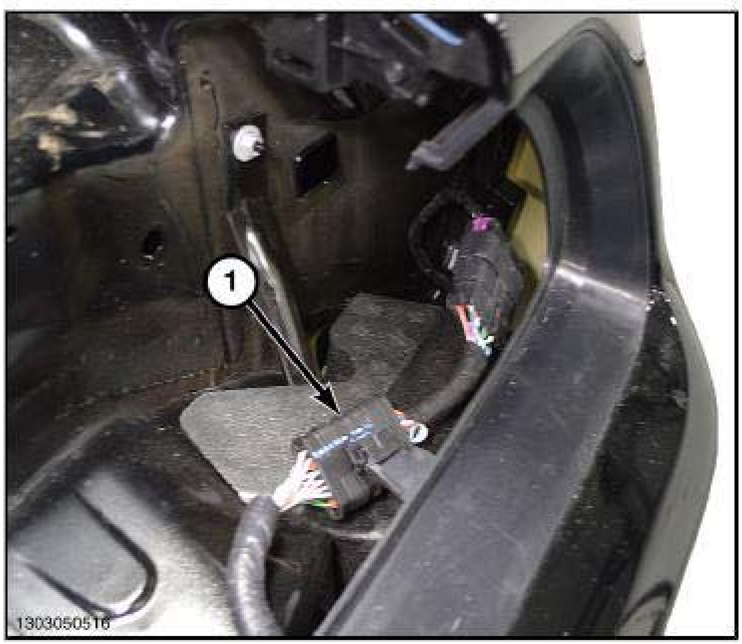


Fig. 25: Rear Fascia Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

5. Remove the tail lamp assemblies. Refer to **LAMP, REAR COMBINATION, REMOVAL** .
6. Disconnect the rear fascia wire harness connector (1).

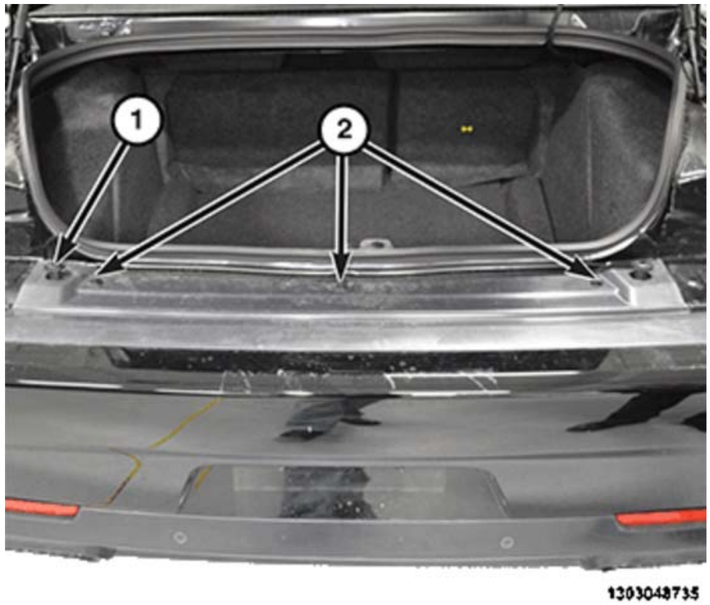


Fig. 26: Top Rear Fascia Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Remove the push fasteners (2) at the top of the rear fascia.

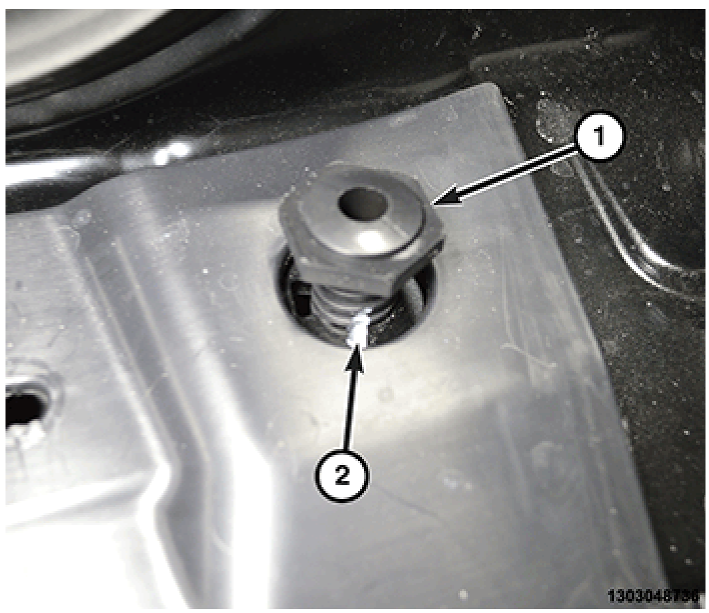


Fig. 27: Decklid Bumpers & Thread
Courtesy of CHRYSLER GROUP, LLC

8. Mark the threads (2) of the decklid bumpers (1) to aid installation then remove the decklid bumpers.

Fig. 28: Bolts Behind Tail Lamp
Courtesy of CHRYSLER GROUP, LLC

9. Remove the bolts (1) from behind each tail lamp and pull the fascia up and outboard above tail lamp to disengage the fascia from the upper retainer bracket on both sides of vehicle.

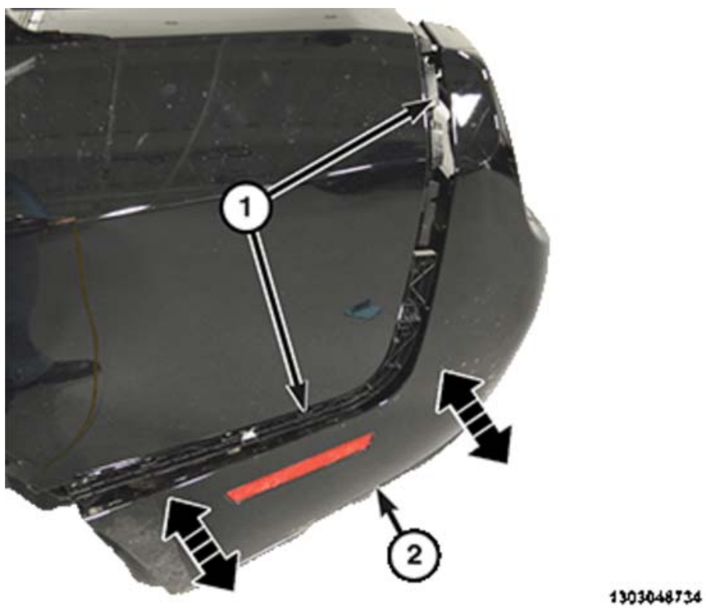


Fig. 29: Rear Fascia & Retaining Clips
Courtesy of CHRYSLER GROUP, LLC

10. Pull the fascia horn up and outboard above tail lamp to disengage the fascia from the upper retainer bracket on both sides of vehicle.
11. Pull the sides of the rear fascia (2) to disengage the retainers, then pull the rear fascia rearward and remove.

INSTALLATION

INSTALLATION

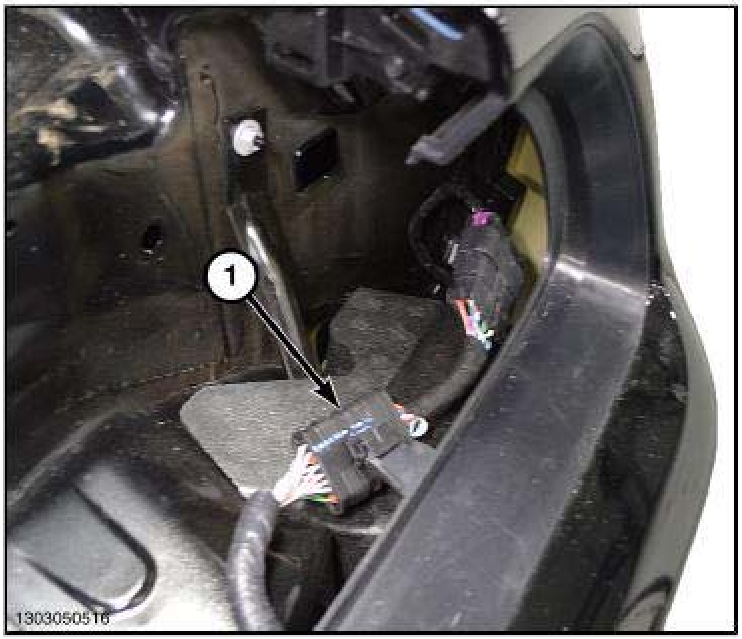


Fig. 30: Rear Fascia Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Carefully position the rear fascia onto the vehicle connect the rear fascia wire harness connector (1).

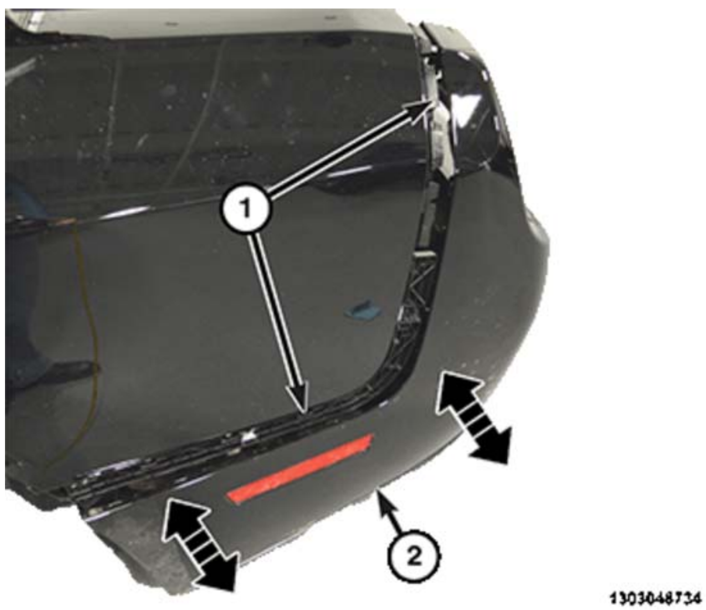


Fig. 31: Rear Fascia & Retaining Clips
Courtesy of CHRYSLER GROUP, LLC

2. Lift fascia horn up and over the upper retainer bracket to engage to retaining clips on both sides.
3. On both sides of the vehicle, hand tap the rear fascia to engage the retaining clips (1).

Fig. 32: Bolts Behind Tail Lamp
Courtesy of CHRYSLER GROUP, LLC

4. Install the bolts (1) behind the tail lamps and tighten securely.

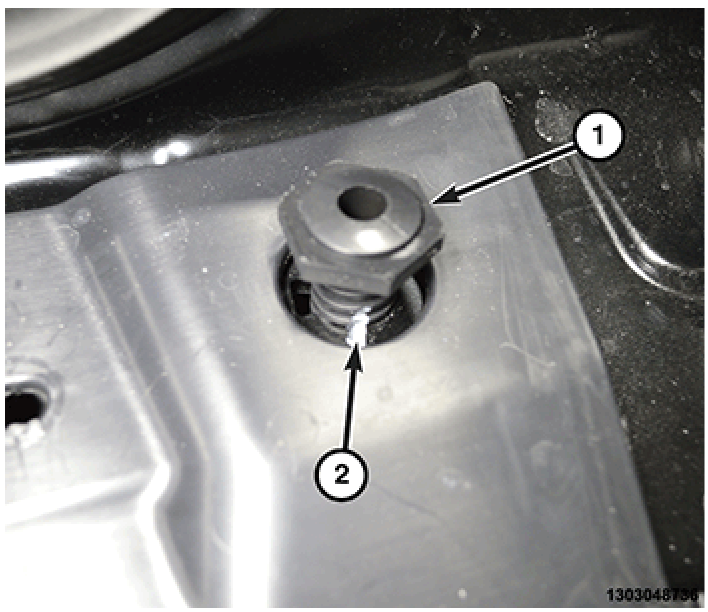


Fig. 33: Decklid Bumpers & Thread
Courtesy of CHRYSLER GROUP, LLC

5. Install the decklid bumpers (1) and adjust to marks (2) made during removal.

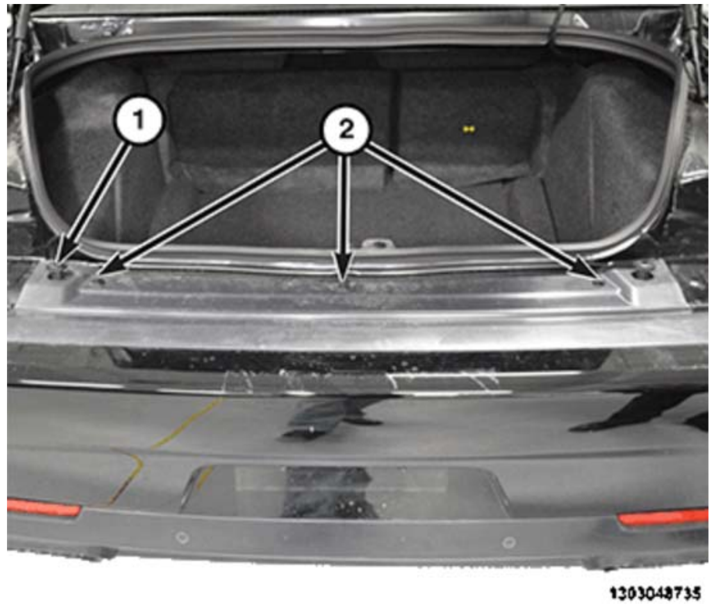


Fig. 34: Top Rear Fascia Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Install the push fasteners (2) at the top of the rear fascia.
7. Install the tail lamps. Refer to **LAMP, REAR COMBINATION, INSTALLATION** .

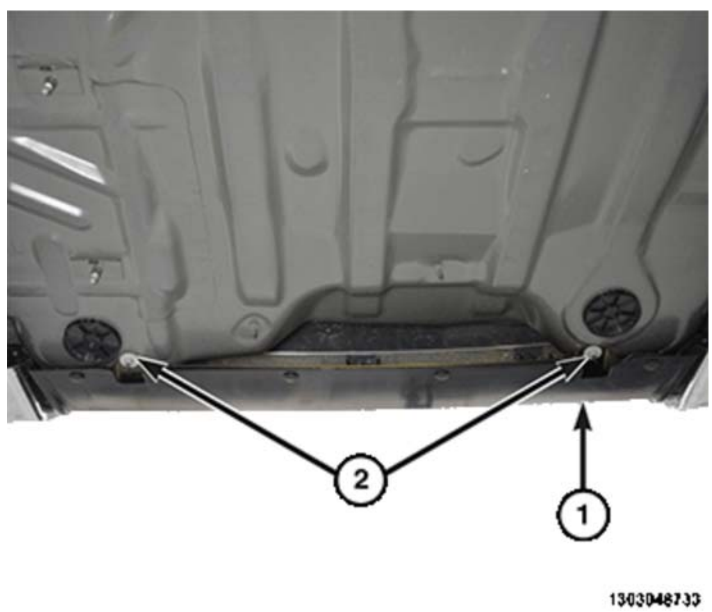


Fig. 35: Rear Fascia & Nuts
Courtesy of CHRYSLER GROUP, LLC

8. Install the lower nuts (2) and tighten securely.

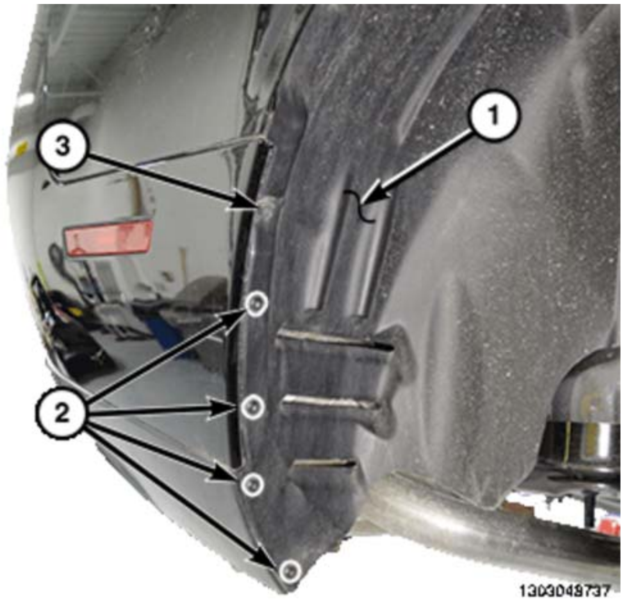


Fig. 36: Lower Plastic Rivets, Splash Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Position the splash shields (1) into place and install the bolts (3) at both sides.
10. Install the new plastic rivets (2) securing the lower portions of the splash shields.
11. Install the rear wheels. Refer to **INSTALLATION** .

FASCIA, REAR, LOWER

REMOVAL

REMOVAL

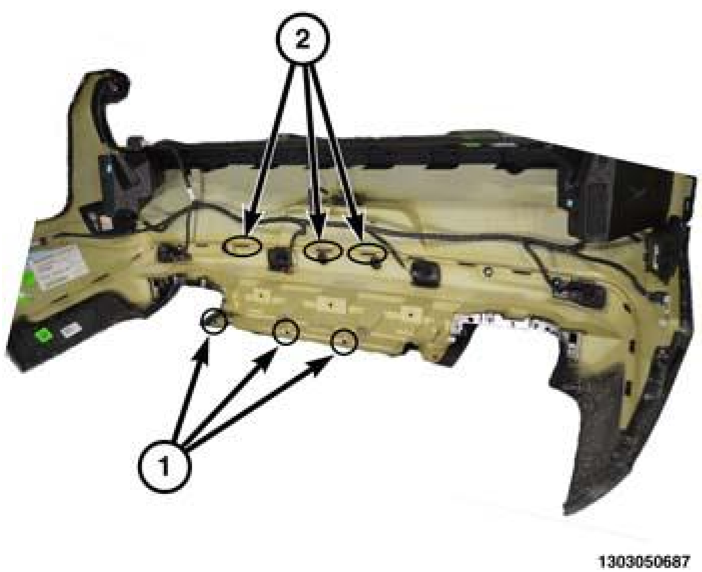


Fig. 37: Lower Fascia Push-Pin Fasteners & Upper Clips
Courtesy of CHRYSLER GROUP, LLC

1. Remove the energy absorber. Refer to **ABSORBER, REAR ENERGY, REMOVAL**.

2. Remove the plastic rivet at each end.
3. Remove the six lower push pin fasteners (1).
4. Release the 18 upper clips (2) and remove the lower fascia.

INSTALLATION

INSTALLATION

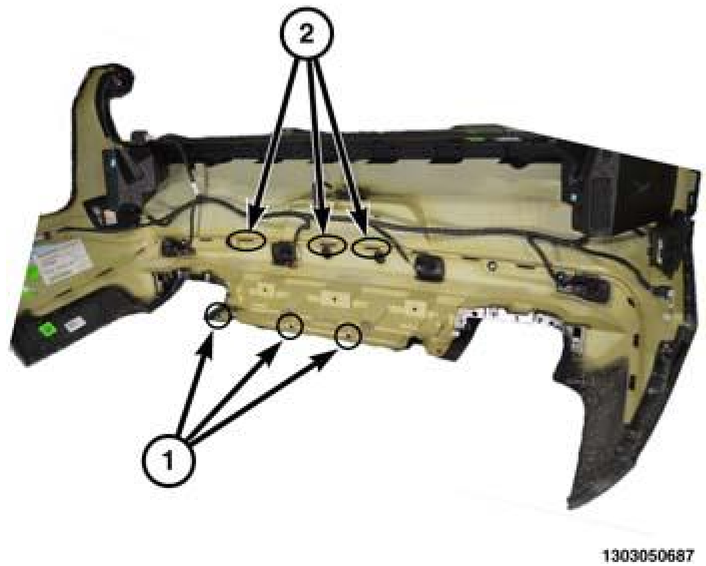


Fig. 38: Lower Fascia Push-Pin Fasteners & Upper Clips
Courtesy of CHRYSLER GROUP, LLC

1. Position the lower fascia back into place and seat the 18 upper clips (2) fully.
2. Install the six lower push pin fasteners (1).
3. Install the rivets at each end.
4. Install the energy absorber. Refer to **ABSORBER, REAR ENERGY, INSTALLATION**.

SUPPORT, FRONT FASCIA

REMOVAL

REMOVAL

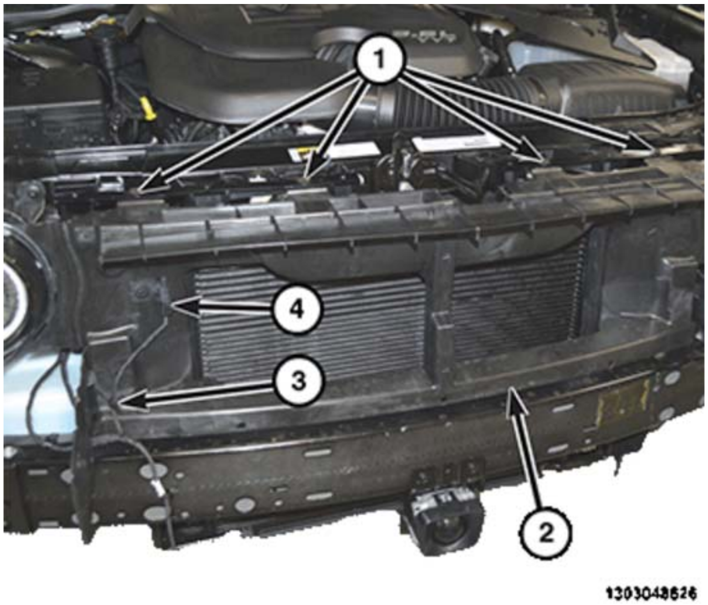


Fig. 39: Push-Pin Fasteners, Wire Harness, Support & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Remove the front energy absorber. Refer to ABSORBER, FRONT ENERGY, REMOVAL.
2. Disconnect the wire harness connector (4).
3. Separate the wire harness (3) and position aside.
4. Remove the push pin fasteners (1) and lift out the support (2).

INSTALLATION

INSTALLATION

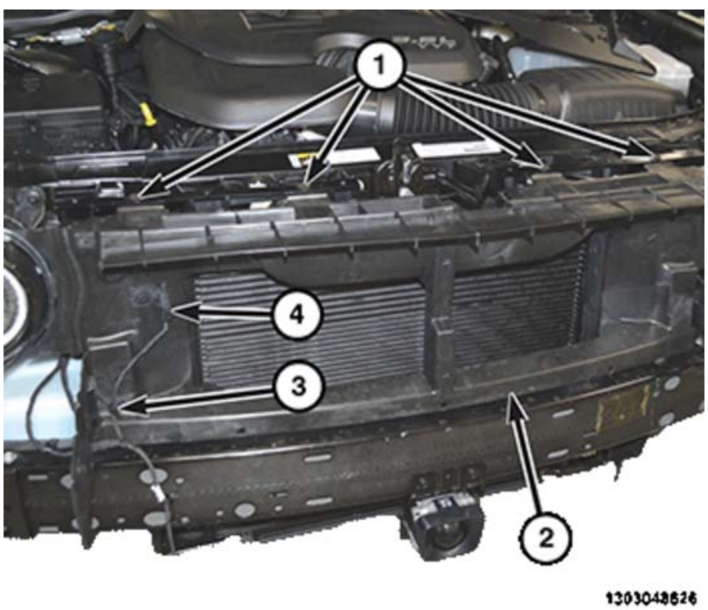


Fig. 40: Push-Pin Fasteners, Wire Harness, Support & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Position the support (2) back.

2. Install the push pin fasteners (1) and seat fully.
3. Position the ware harness (3) back and seat fully.
4. Connect the wire harness connector (4).
5. Install the front energy absorber. Refer to **ABSORBER, FRONT ENERGY, INSTALLATION**.

FRAME

WARNING

USE OF HEAT DURING REPAIR

WARNING: Chrysler Group LLC engineering's position on the use of heat during collision repair is as follows:

- **Any body panel or frame component damaged which is to be repaired and reused, must be repaired using the "cold straightening" method. No heat may be used during the straightening process.**
- **During rough straightening prior to panel replacement, damaged panels or frame components may be heated to assist in body/frame realignment. The application of heat must be constrained to the parts which will be replaced and not allowed to affect any other components.**

This "no heat" recommendation is due to the extensive use of high strength and advanced high strength steels in Chrysler Group LLC products. High-strength materials can be substantially and negatively affected from heat input which will not be obviously known to the repairer or consumer.

Ignoring these recommendations may lead to serious compromises in the ability to protect occupants in a future collision event, reduce the engineered qualities and attributes, or decrease the durability and reliability of the vehicle.

This statement supersedes any previously released information by the Chrysler Group LLC.

Failure to follow these instructions may result in serious or fatal injury.

WARNINGS

WARNING: Use an Occupational Safety and Health Administration (OSHA) approved breathing filter, when spraying paint or solvents in a confined area. Failure to follow these instructions may result in possible serious or fatal injury.

- **avoid prolonged skin contact with petroleum or alcohol based cleaning solvents.**
- **do not stand under a hoisted vehicle that is not properly supported on safety stands. Failure to follow these instructions may result in possible serious or fatal injury.**

CAUTION: When holes are drilled or punched in an inner body panel, verify the depth of space to the outer body panel, electrical wiring or other components. Damage to the vehicle can result.

- do not weld exterior panels unless combustible material on the interior of vehicle is removed from the repair area. Fire or hazardous conditions, can result.
- always have a fire extinguisher ready for use when welding.
- disconnect the negative (-) cable clamp from the battery when servicing electrical components that are live when the ignition is off. Damage to electrical system can result.
- do not use abrasive chemicals or compounds on painted surfaces. Damage to finish can result.
- do not use harsh alkaline based cleaning solvents on painted or upholstered surfaces. Damage to finish or color can result.
- do not hammer or pound on plastic trim panel when servicing interior trim. Plastic panels can break.

RESTRAINT WARNINGS

WARNING: To avoid serious or fatal injury on vehicles equipped with the Supplemental Restraint System (SRS), never attempt to repair the electrically conductive circuits or wiring components related to the SRS for which there is no MOPAR wiring repair kit. It is important to use ONLY the recommended splicing kit and procedure. For applicable and available MOPAR wiring repair kits, please visit the MOPAR Connector Web Site at the following address on the internet: (http://dto.vftis.com/mopar/disclaimer.asp). Inappropriate repairs can compromise the conductivity and current carrying capacity of those critical electrical circuits, which may cause SRS components not to deploy when required, or to deploy when not required. Only minor cuts or abrasions of wire and terminal insulation where the conductive material has not been damaged, or connector insulators where the integrity of the latching and locking mechanisms have not been compromised may be repaired using appropriate methods.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÃ® Parts Catalog. Failure to follow these instructions may result in possible

serious or fatal injury.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to **RESTRAINTS - SERVICE INFORMATION** before attempting any steering wheel, steering column, airbag, Occupant Classification System (OCS), seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to follow these instructions may result in accidental airbag deployment.

WARNING: To avoid potential physical injury or damage to sensitive electronic circuits and systems, always disconnect and isolate the battery negative (ground) cable and the positive cable, then ground the positive cable to discharge the Occupant Restraint Controller (ORC) capacitor before performing any welding operations on the vehicle. Failure to take the proper precautions could result in accidental airbag deployment, possible damage to the Supplemental Restraint System (SRS) circuits and components, and possible damage to other electronic circuits and components. Whenever a welding process is being performed within 12 inches (30 centimeters) of an electronic module or wiring harness, then that module or harness should be relocated out of the way, or disconnected. Always protect against component or vehicle damage from weld spatter by using weld blankets and screens.

WARNING: To avoid serious or fatal injury, do not attempt to dismantle an airbag unit or tamper with its inflator. Do not puncture, incinerate or bring into contact with electricity. Do not store at temperatures exceeding 93Â° C (200Â° F). An airbag inflator unit may contain sodium azide and potassium nitrate. These materials are poisonous and extremely flammable. Contact with acid, water, or heavy metals may produce harmful and irritating gases (sodium hydroxide is formed in the presence of moisture) or combustible compounds. An airbag inflator unit may also contain a gas canister pressurized to over 17.24 kPa (2500 psi). Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury when handling a seat belt tensioner retractor. Exercise proper care to keep fingers out from under the retractor cover and away from the seat belt webbing where it exits from the retractor cover. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury, replace all Supplemental Restraint System (SRS) components only with parts specified in the Chrysler MoparÂ® Parts Catalog. Substitute parts may appear interchangeable, but internal differences may result in inferior occupant protection.

WARNING: To avoid serious or fatal injury, the fasteners, screws, and bolts originally used for the Supplemental Restraint System (SRS) components must never be replaced with any substitutes. These fasteners have special coatings and are

specifically designed for the SRS. Anytime a new fastener is needed, replace it with the correct fasteners provided in the service package or specified in the Chrysler MoparÃ® Parts Catalog.

WARNING: **To avoid serious or fatal injury when a steering column has an airbag unit attached, never place the column on the floor or any other surface with the steering wheel or airbag unit face down. Failure to follow these instructions may result in possible serious or fatal injury.**

STANDARD PROCEDURE

REAR FRAME RAIL REPLACEMENT

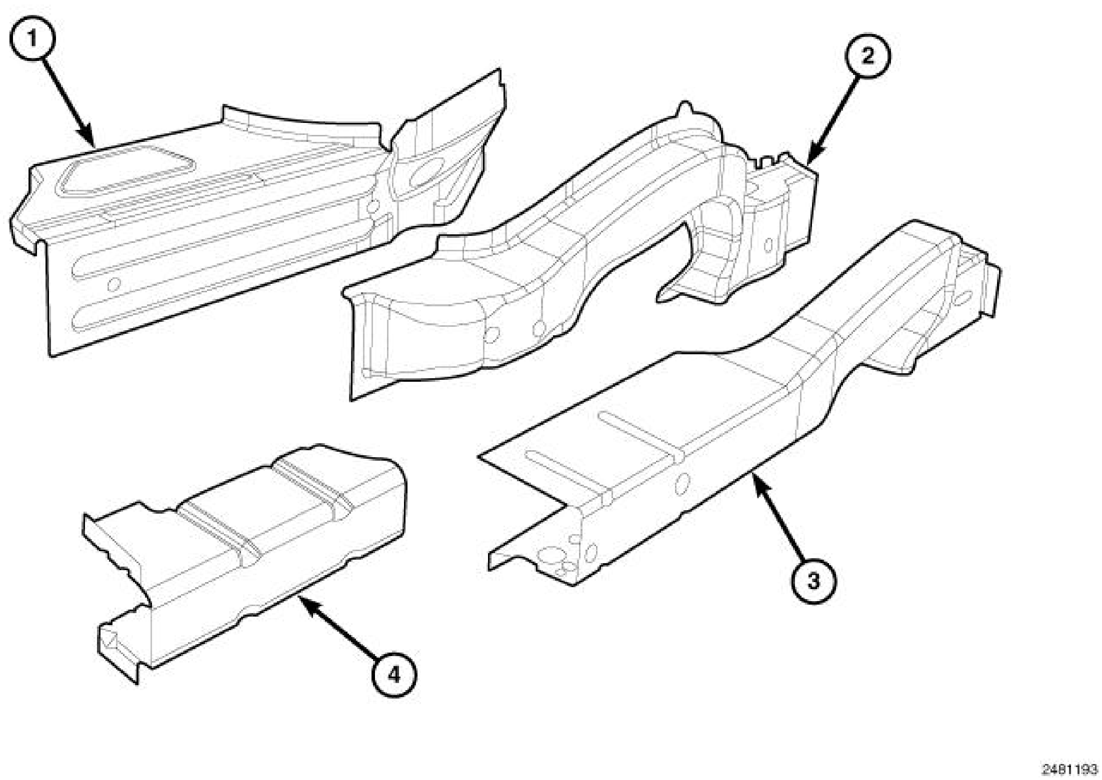
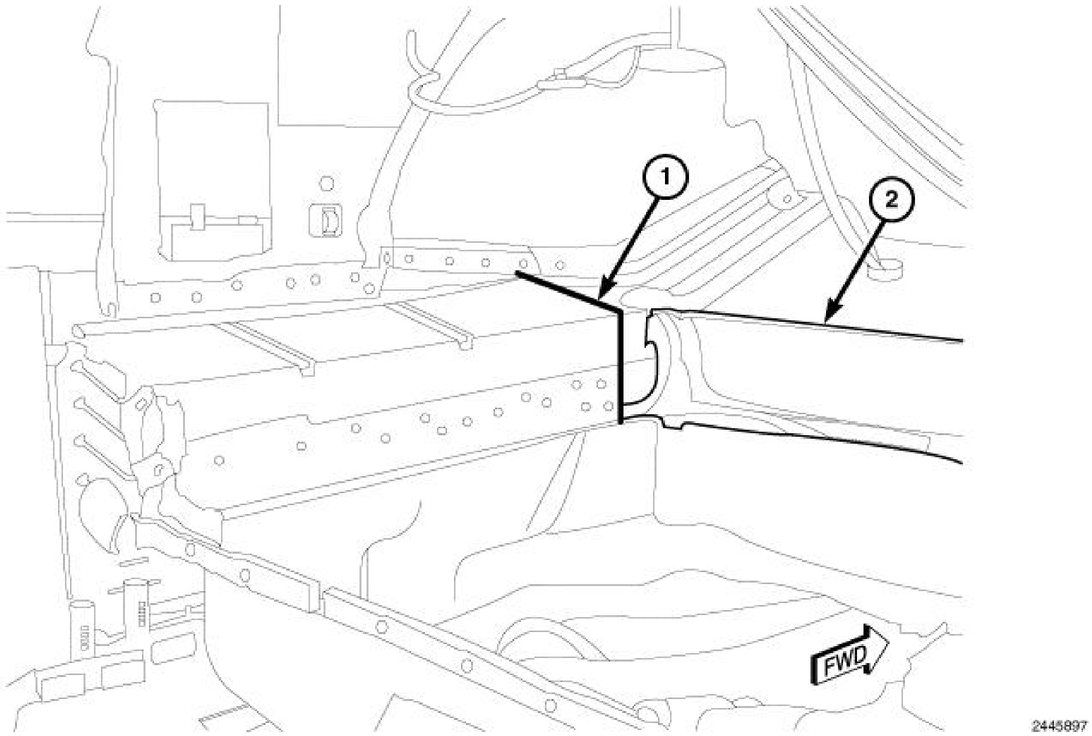


Fig. 41: Rear Frame Rail Replacement Components
Courtesy of CHRYSLER GROUP, LLC

1 - COVER PLATE	
2 - RAIL, REAR, OUTER	
3 - RAIL, REAR, INNER	
4 - REINFORCEMENT, REAR RAIL INNER, REAR	

"Rail, rear, outer" (2) - this portion of the rear rail assembly is not visible as it is gloved inside the "rail, rear, inner" (3) and the "cover plate, rear rail extension" (1). **This rail may not be sectioned!**

"Reinforcement, rear rail inner rear" (4) - welded inside of the "rail, rear, inner" (3) and extends from the end of that rail to the "panel, deck opening lower".



[Fig. 42: Rear Inner Rail & Crossmember]
Courtesy of CHRYSLER GROUP, LLC

"Rail, rear inner" may be sectioned at this location (1), greatly reducing vehicle disruption and repair costs.

This partial replacement procedure presumes that all damage to the "rail, rear inner" is aft of the crossmember (2).

The following procedure details key points of the repair. I-CAR training is presumed, and should be followed for best-practice repair procedures.

1. Mount the damaged vehicle onto a structural straightening bench and check/correct any body misalignment utilizing three dimensional measuring equipment.
2. Remove all components in area of repair allowing unimpeded access for cutting and welding operations.
3. Trunk floor should be removed if being replaced, or the necessary welds released and the weld flange bent inboard to provide access to the rail for the butt-joint.
4. Using the round hole in the "Rail, Rear, Inner" as a point of reference, measure 125 mm (5 in.) forward for the left rail, or 150 mm (6 in.) forward for the right rail, and scribe a vertical line on the rail.
5. With the vertical line just made as reference, cut off the damaged "Rail, Rear, Inner" taking care not to damage the "Rail, Rear, Outer", using a reciprocating saw or cut-off wheel, and remove the damaged portion.
6. Utilize the same measuring and cutting process above to remove the replacement portion from the service part.
7. Using a surface conditioning disk, remove all e-coat within 25 mm (1 in.) of the cut location and de-bur the cut edge.
8. If the "Rail, Rear, Outer" was damaged during the cutting operation, MIG-weld the damage and dress the weld.

9. Fabricate 19 mm (0.75 in.) weld backers from the damaged component, or the remains of the service part, and tack in place on the replacement rail section at the butt-joint location.
10. Position and clamp the replacement rail and confirm proper position with measuring equipment.
11. Weld the service part in position using a skip-stitch process.
12. Complete remaining repairs in the damaged area.
13. Clean and dress all welded areas.
14. Apply epoxy primer to the exterior of the rail at the repair location.
15. Apply quality body sealer to all areas previously sealed to duplicate the original appearance. Note that additional sealer may be applied to better protect the exterior exposed seams from road spray.
16. Refinish all exposed surfaces in trunk and on underbody using quality refinish materials.
17. Apply inner panel rust proofing, such as Mopar # 05093981AA, or equivalent, to the rail inner cavity areas in two applications with a 30-minute flash period between the applications. Pay particular attention to areas which have been welded.
18. Reassemble vehicle and complete repairs.

LEFT SIDE

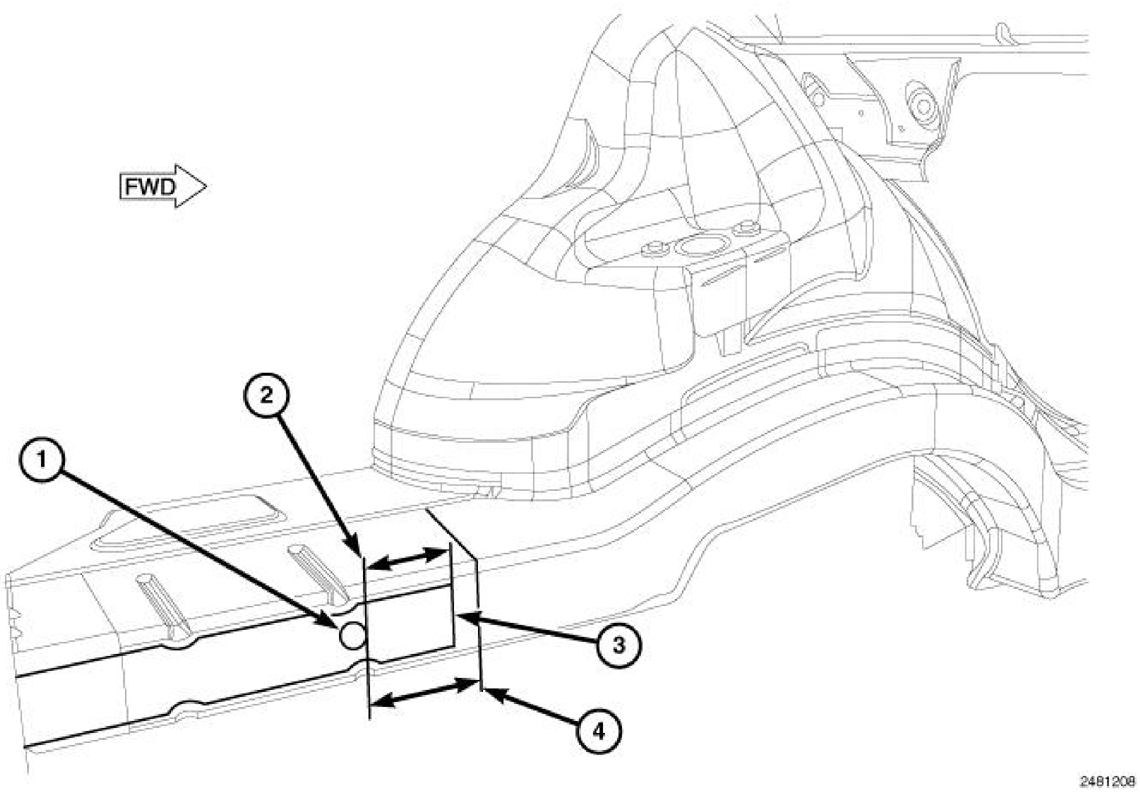


Fig. 43: Left Rear Rail Cut Locations
Courtesy of CHRYSLER GROUP, LLC

1 - HOLE
2 - 100 mm (4 in.)
3 - REINFORCEMENT, REAR RAIL INNER, REAR
4 - CUT LOCATION 125 mm (5 in.)

The "Reinforcement, Rear Rail Inner, Rear" (3) ends 100 mm (4 in.) (2) forward of round hole (1) on inner face of "Rail, Rear Inner" - recommended cut location is 125 mm (5 in.) (4) from forward edge of the hole (1).

RIGHT SIDE

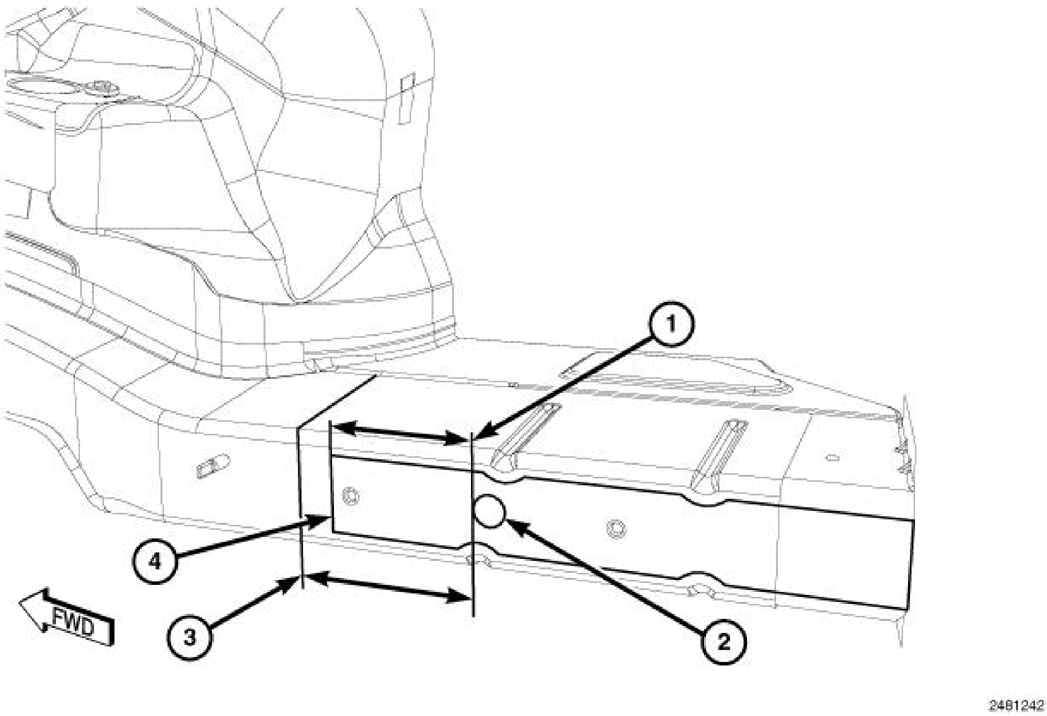


Fig. 44: Right Rear Rail Cut Locations
Courtesy of CHRYSLER GROUP, LLC

1 - 125 mm (5 in.)
2 - HOLE
3 - CUT LOCATION 150 mm (6 in.)
4 - REINFORCEMENT, REAR RAIL INNER, REAR

The "Reinforcement, Rear Rail Inner Rear" (4) ends 125 mm (5 in.) (1) forward of round hole (2) on inner face of "rail, rear inner" - recommended cut location (3) is 150 mm (6 in.) from forward edge of hole (2).

ADDITIONAL INFORMATION

Observe all cautions and warnings per the Chrysler service information . Refer to **FRAME, WARNING**.

Reference the Chrysler weld process chart. Refer to **FRAME, SPECIFICATIONS**.

Butt joint should be metal finished without thinning the base rail material or weldment. This is a cosmetic finishing process to disguise the repair and should have the surface coating (paint) duplicated as well.

Restore corrosion protection when complete with all welding operations.

SPECIFICATIONS

WELD PROCESS

COMPONENT PARTS	TRUCK FRAME		BODYSHELL EXTERIOR & UNDERBODY PANELS			
Ā	Zinc and Zinc Iron Alloy coated sheet steels					
WELDING PROCESS	GAS METAL ARC (Note: 1)	FLUX CORED ARC	GAS METAL ARC (Note: 1)	MIG BRAZE (Note: 2)	GAS METAL ARC (Note: 1)	FLUX CORED ARC
Material Type	High Strength and Structural Quality Steels which includes HSLA, Martensitic, and Dual Phase materials					
Material Thickness Range	2 mm - 4 mm		0.6 mm - 1.02 mm		>1.02 mm - 3.0 mm	
ELECTRODE TYPE (AWS SPEC. A5.18)	AWS CLASS. ER70S-6	AWS CLASS. E71T-11 (Note 3)	AWS CLASS. ER70S-6	AWS CLASS. ERCuSi - A Silicon Bronze	AWS CLASS. ER70S-6	AWS CLASS. E71T-11 (Note 3)
ELECTRODE SIZE	0.035	0.045	0.023 - 0.025	0.035	0.035	0.045
ELECTRODE MAKER	LincolnĀ®	LincolnĀ® NR-211-MP	LincolnĀ®	Ā	LincolnĀ®	LincolnĀ® NR-211-MP
WIRE FEED SPEED (in/min)	245-250 Vertical Down	110 Vertical Down	95-115 All Welds	150-155 Flat & Horizontal	245-250 Vertical Down	110 Vertical Down
Ā	70-90 Flat & Horizontal	70-90 Flat & Horizontal	Ā	Ā	70-90 Flat & Horizontal	70-90 Flat & Horizontal
TRAVEL SPEED (in/min)	Ā	Ā	10	Ā	Ā	Ā
VOLTAGE	19-20	15-18	16-19	18-19	19-20	15-18
POLARITY	DCEP	DCEN	DCEP	DCEP	DCEP	DCEN
GAS FLOW (cfh)	25-35	N/A	25-35	25-35	25-35	N/A
ELECTRICAL STICKOUT (in)	1/2 - 5/8	3/8 - 1/2	1/2 - 5/8	5/8 - 3/4	1/2- 5/8	3/8 - 1/2
GAS TYPE	75% Ar	N/A	75% Ar	100% Ar	75% Ar	N/A
Ā	25% CO2	Ā	25% CO2	Ā	25% CO2	Ā
TYPE OF ARC TRANSFER	Short Circuit	Ā	Short Circuit	Pulse	Short Circuit	Ā

These Procedure Specifications are appropriate as of this publication. Procedures may be superceeded with new spec's at a later date.

Always process to the thinner material thickness (TMT)

All persons performing welding must be qualified to weld in all positions.

NOTE:

1. **Must remove Zinc Coating on both sides of metal at the weld zone.**
2. **MIG Braze welding process requires use of Pulse ArcĀ® or STTĀ® welding machine.**
3. **Must use LincolnĀ® product since E 71T-11 product differs from other suppliers.**

FRAME DIMENSIONS

Frame dimensions are listed in metric scale then converted to inch scale listed in parenthesis. All dimensions are from center to center of Principal Locating Point (PLP), or from center to center of PLP and fastener location. Vertical dimensions can be taken from the work surface to the locations indicated.

INDEX

DESCRIPTION	FIGURE
FRAME DIMENSIONS - BOTTOM VIEW	Fig. 45
FRAME DIMENSIONS - SIDE VIEW	Fig. 46

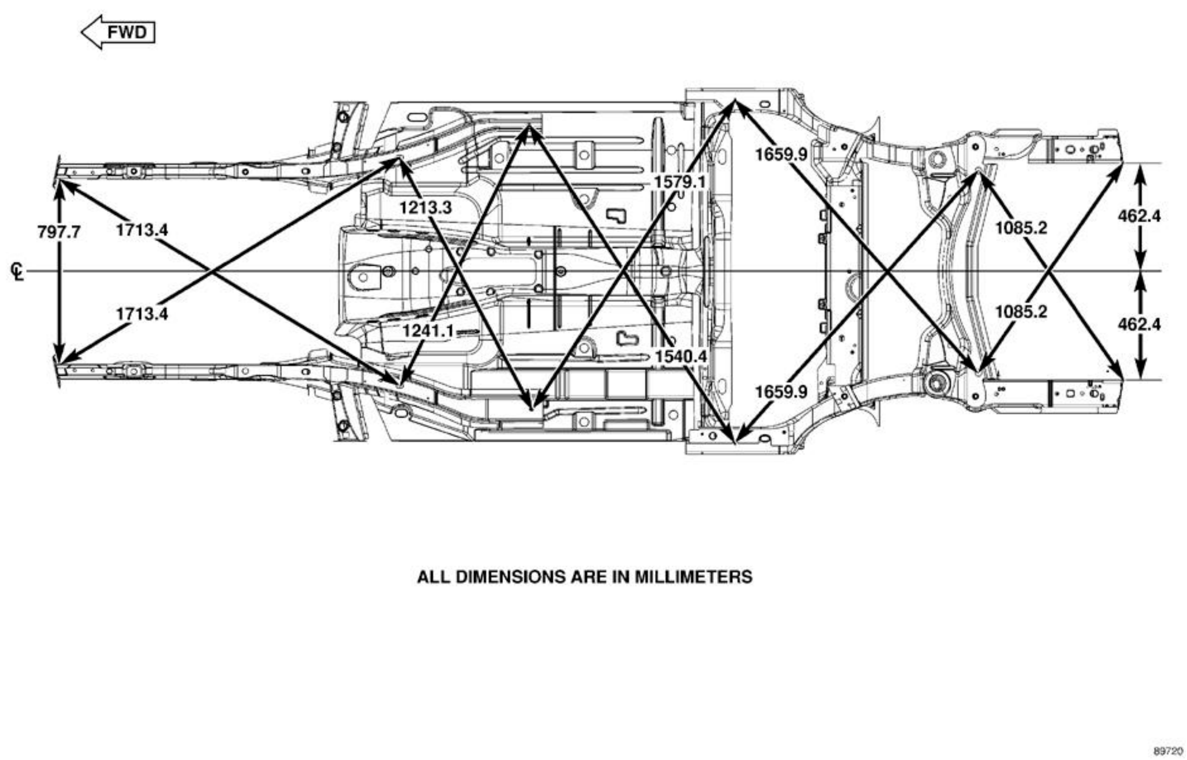
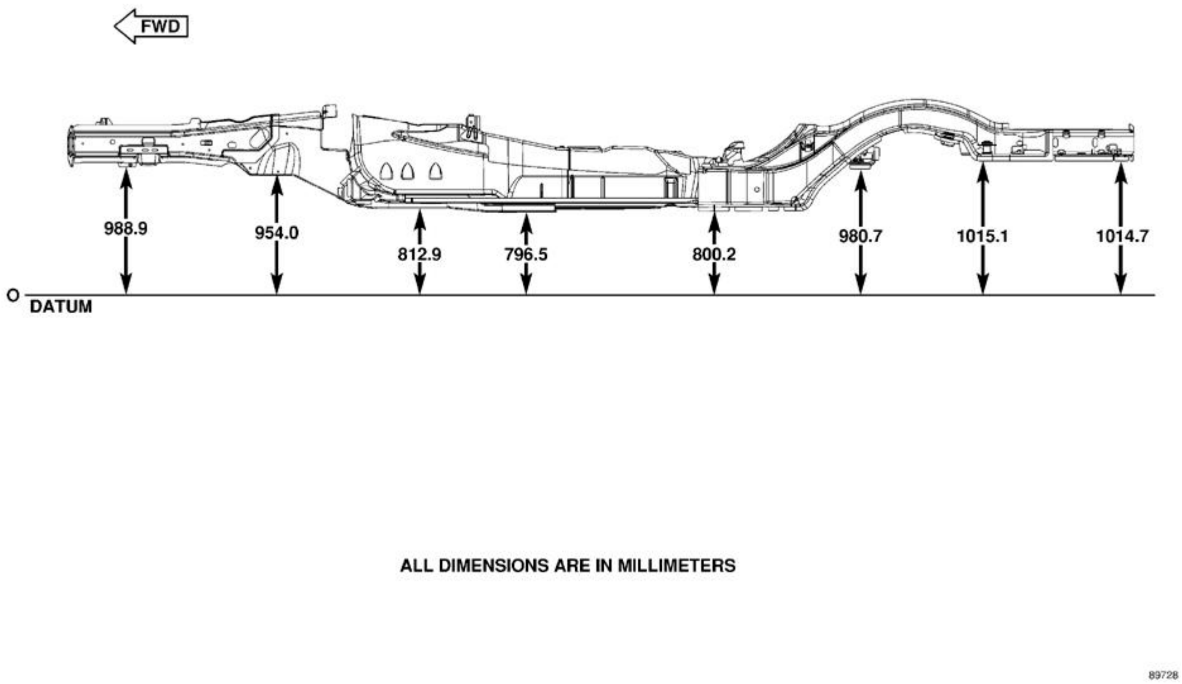


Fig. 45: Frame Dimensions - Bottom View
Courtesy of CHRYSLER GROUP, LLC

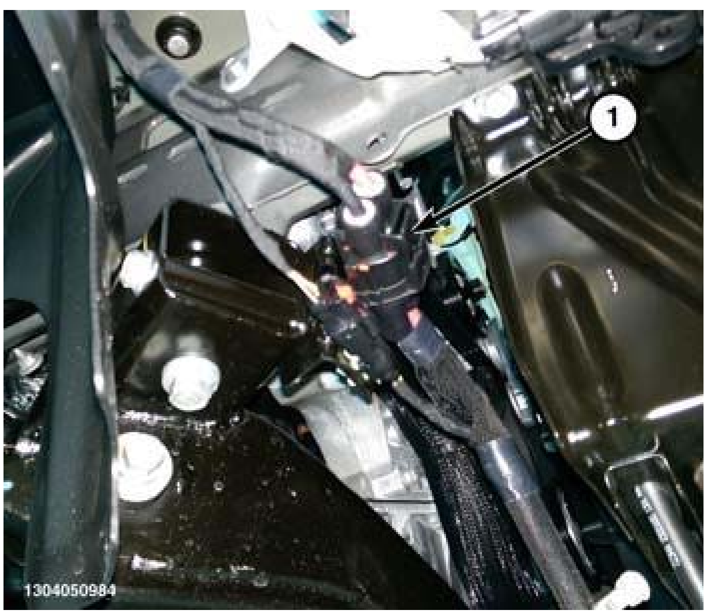


[Fig. 46: Frame Dimensions - Side View](#)
Courtesy of CHRYSLER GROUP, LLC

CROSSMEMBER, CRADLE, ENGINE

REMOVAL

REMOVAL



[Fig. 47: Crossmember Wire Harness](#)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the tire and wheel assemblies. Refer to **REMOVAL** .
4. Remove front belly pan. Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL**.
5. Install the Engine Lift Fixture (special tool #8984B, Fixture, Engine Lifting) (1), Engine Lift Adapter (special tool #8984-UPD, Adapter, Engine Lift) (2) and the Engine Support Fixture (special tool #8534B, Fixture, Driveline Support) (3) and remove the engine mount bolts securing the mount to the cradle. Refer to **INSULATOR, ENGINE MOUNT, LEFT, REMOVAL** , **INSULATOR, ENGINE MOUNT, RIGHT, REMOVAL** and **INSULATOR, ENGINE MOUNT, REAR, REMOVAL** for 3.6L. Refer to **INSULATOR, ENGINE MOUNT, FRONT, REMOVAL** and **INSULATOR, ENGINE MOUNT, REAR, REMOVAL** for 5.7L. Refer to **INSULATOR, ENGINE MOUNT, FRONT, REMOVAL** and **INSULATOR, ENGINE MOUNT, REAR, REMOVAL** for 6.2L. Refer to **INSULATOR, ENGINE MOUNT, REAR, REMOVAL** and **INSULATOR, ENGINE MOUNT, FRONT, REMOVAL** for 6.4L.
6. Remove the steering gear. Refer to **GEAR, REMOVAL** .
7. Remove the front brake rotors. Refer to **ROTOR, BRAKE, REMOVAL** .
8. Separate the stabilizer bar from the strut. Refer to **STABILIZER BAR, FRONT, REMOVAL** .
9. Separate the lower ball joints from the steering knuckle and the strut from the lower control arm. Refer to **ARM, UPPER CONTROL, REMOVAL** .
10. Separate the wire harness (1) on right front corner of crossmember.

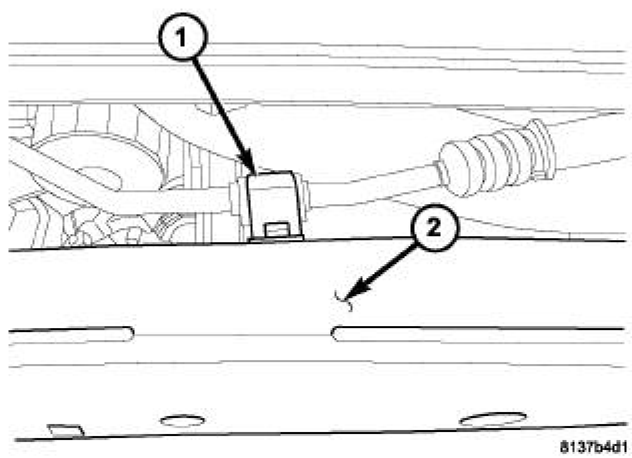
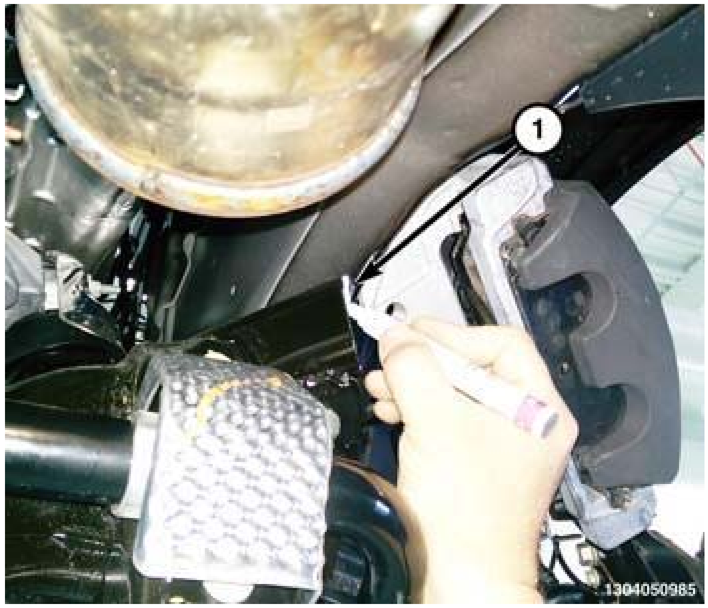


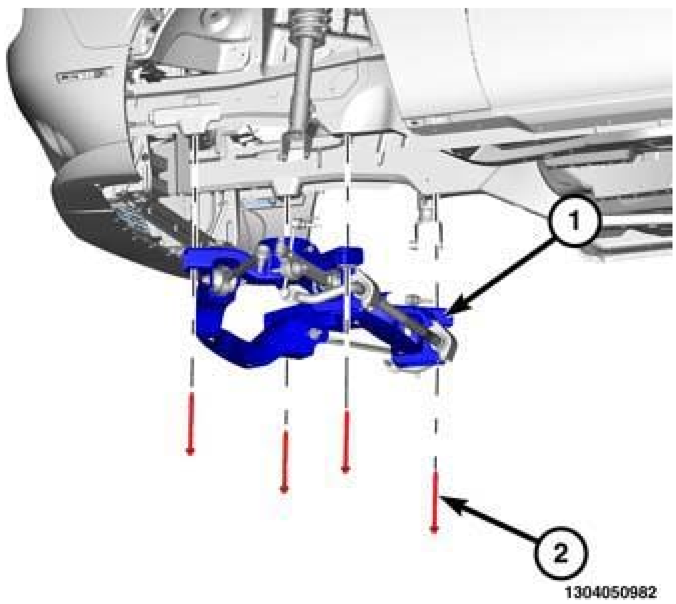
Fig. 48: Hose Mounting Bracket To Cradle
Courtesy of CHRYSLER GROUP, LLC

11. Separate the power steering hydraulic lines, if equipped.



[Fig. 49: Marking Cradle Position](#)
Courtesy of CHRYSLER GROUP, LLC

12. Mark the position of the cradle on the frame (1) using a grease pencil or equivalent to aid installation.



[Fig. 50: Cradle & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

13. Support the cradle with a suitable lifting device.
14. Remove the bolts (2) and remove the cradle (1).

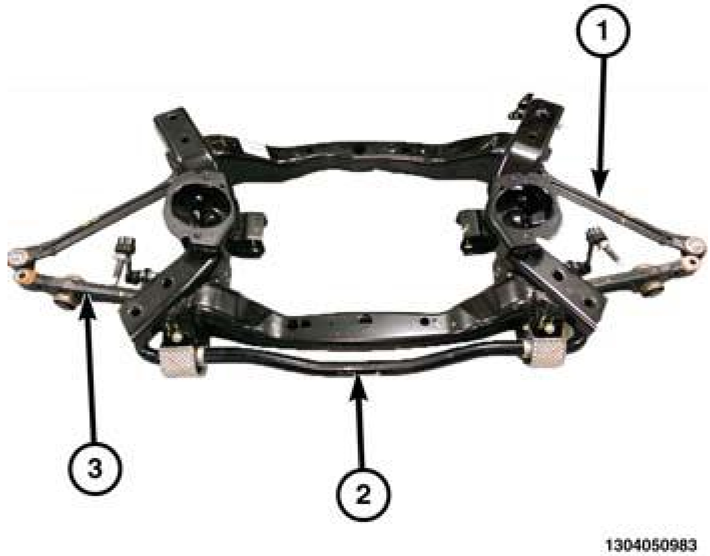


Fig. 51: Struts, Control Arms & Stabilizer Bar
Courtesy of CHRYSLER GROUP, LLC

15. If necessary, remove the front stabilizer bar (2). Refer to **STABILIZER BAR, FRONT, REMOVAL** .
16. If necessary, remove the lower control arms (3). Refer to **ARM, LOWER CONTROL, REMOVAL** .
17. If necessary, remove the tension struts (1). Refer to **STRUT, TENSION, REMOVAL** .

INSTALLATION

INSTALLATION

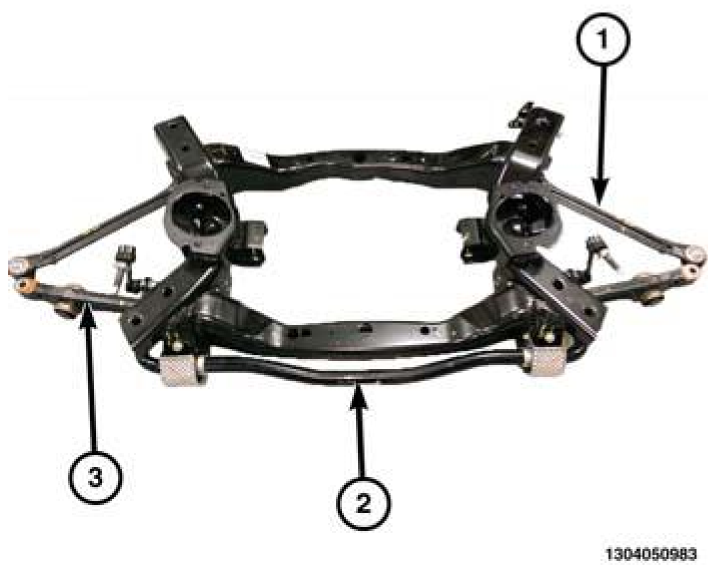


Fig. 52: Struts, Control Arms & Stabilizer Bar
Courtesy of CHRYSLER GROUP, LLC

1. If necessary, install the tension struts (1). Refer to **STRUT, TENSION, INSTALLATION** .
2. If necessary, install the lower control arms (3). Refer to **ARM, LOWER CONTROL, INSTALLATION** .

3. If necessary, install the front stabilizer bar (2). Refer to **STABILIZER BAR, FRONT, INSTALLATION** .

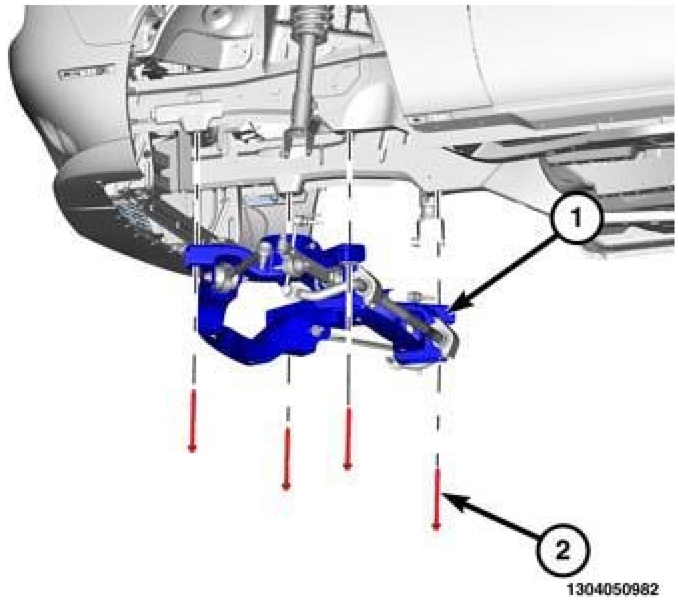


Fig. 53: Cradle & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Using a suitable lifting device, position the cradle (1) back onto the vehicle using the marks made during removal and install the bolts (2).
5. Tighten the bolts (2) to the proper torque specification. Refer to **SPECIFICATIONS**.

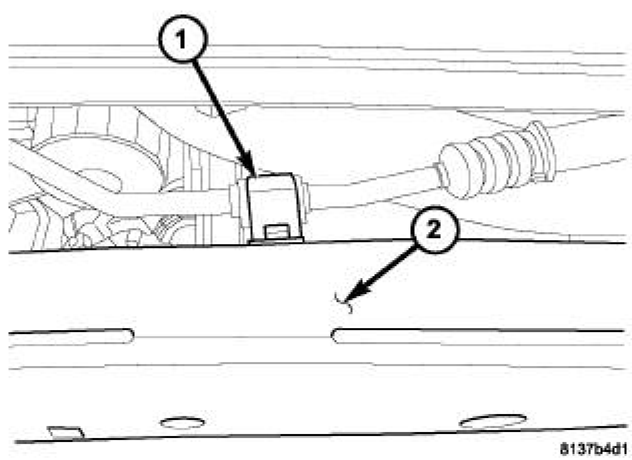


Fig. 54: Hose Mounting Bracket To Cradle
Courtesy of CHRYSLER GROUP, LLC

6. Position the power steering lines back into place, if equipped.

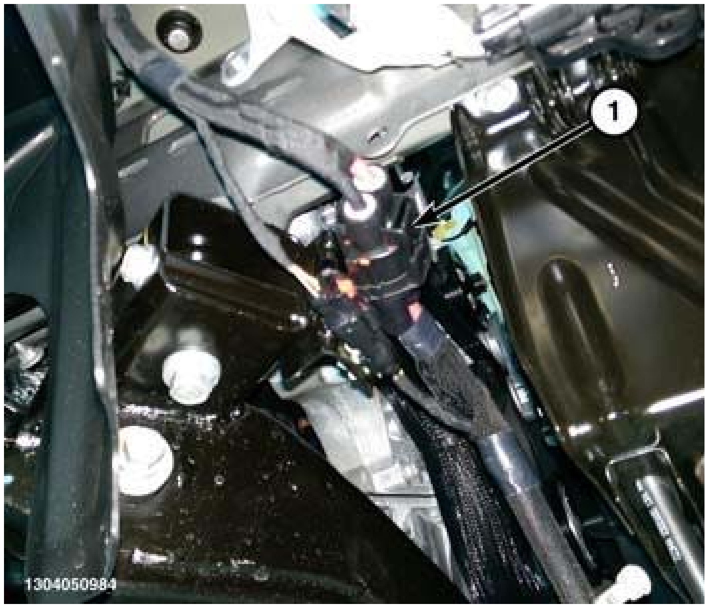


Fig. 55: Crossmember Wire Harness
Courtesy of CHRYSLER GROUP, LLC

7. Position the wire harness (1) back into place.
8. Connect the lower control arms to the struts and connect the lower ball joints to the steering knuckles. Refer to **ARM, LOWER CONTROL, INSTALLATION** .
9. Connect the stabilizer bar back onto the strut. Refer to **STABILIZER BAR, FRONT, INSTALLATION** .
10. Install the front brake rotors. Refer to **ROTOR, BRAKE, INSTALLATION** .
11. Install the steering gear. Refer to **GEAR, INSTALLATION** .
12. Install the engine mount bolts securing the mounts to the cradle and remove the engine lift fixture. Refer to **INSULATOR, ENGINE MOUNT, LEFT, INSTALLATION** , **INSULATOR, ENGINE MOUNT, RIGHT, INSTALLATION** and **INSULATOR, ENGINE MOUNT, REAR, INSTALLATION** for 3.6L. Refer to **INSULATOR, ENGINE MOUNT, FRONT, INSTALLATION** and **INSULATOR, ENGINE MOUNT, REAR, INSTALLATION** for 5.7L. Refer to **INSULATOR, ENGINE MOUNT, FRONT, INSTALLATION** and **INSULATOR, ENGINE MOUNT, REAR, INSTALLATION** for 6.2L. Refer to **INSULATOR, ENGINE MOUNT, REAR, INSTALLATION** and **INSULATOR, ENGINE MOUNT, FRONT, INSTALLATION** for 6.4L
13. Install the front belly pan. Refer to **BELLY PAN, INSTALLATION** or **BELLY PAN, ENGINE, INSTALLATION**.
14. Install the tire and wheel assemblies. Refer to **INSTALLATION** .
15. Lower the vehicle and connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector to the negative battery cable.
16. Perform vehicle alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

CROSSMEMBER, REAR

REMOVAL

REMOVAL

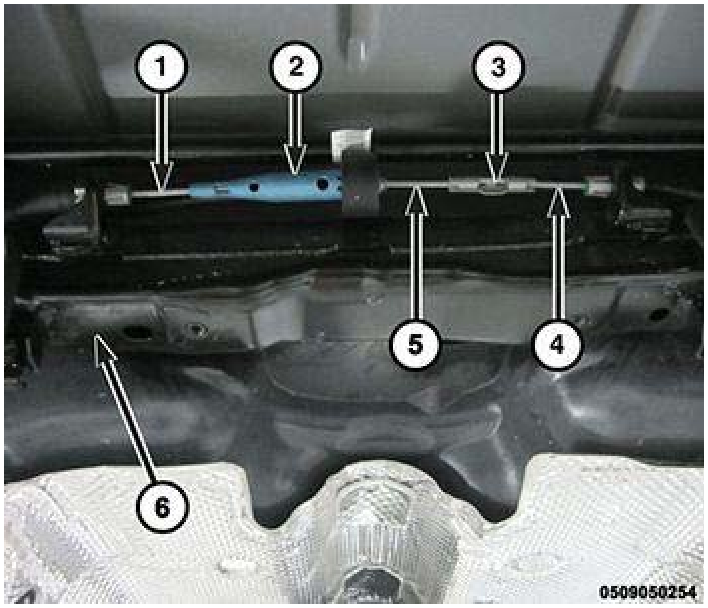


Fig. 56: Cables At Equalizer
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear axle differential. Refer to REMOVAL or REMOVAL .
2. Separate the rear brake cables from the front cable as necessary. Refer to CABLE, PARKING BRAKE, FRONT, REMOVAL or CABLE, PARKING BRAKE, REAR, REMOVAL .
3. Remove the bolt and the parking brake cable guide bracket.
4. Disconnect the shock wire harness and unclip the wire harness from the rear crossmember.
5. Remove fuel filler tube. Refer to TUBE, FUEL TANK FILLER, REMOVAL .

WARNING: Before opening fuel system, review all Warnings and Cautions.

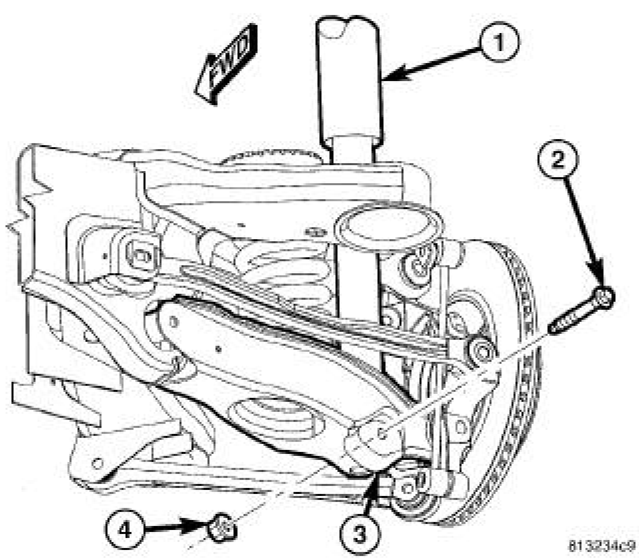


Fig. 57: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

6. On each side of vehicle, remove shock absorber lower bolt (2) and nut (4)

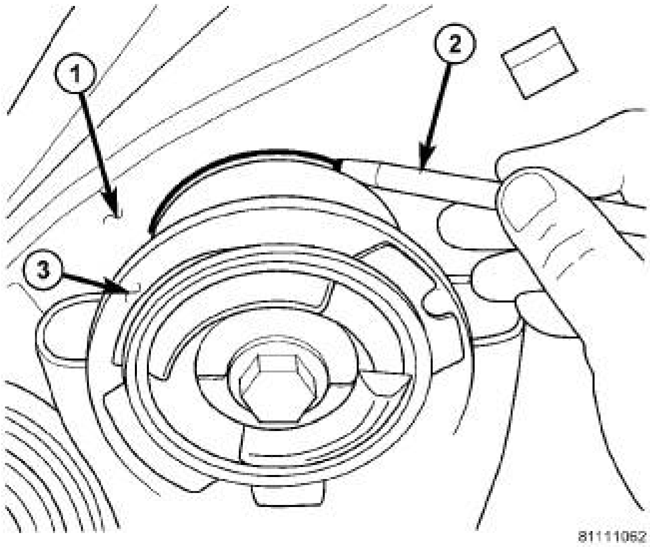


Fig. 58: Marking Location Of Crossmember Mount To Body
Courtesy of CHRYSLER GROUP, LLC

7. Using a grease pencil or equivalent, mark the position (2) of the rear suspension crossmember at all four isolator bushing (3) locations to aid in installation.
8. Position an extra pair of jack stands under and support forward end of engine cradle to help stabilize vehicle during rear suspension removal/installation.
9. Using a suitable lifting device, support the rear suspension crossmember.

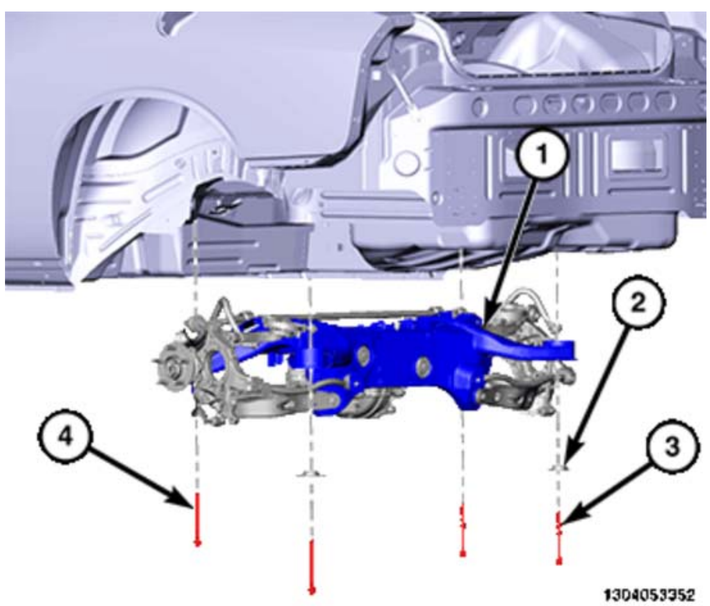


Fig. 59: Rear Suspension Crossmember, Retainer Plates & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The rear springs can be lowered with the rear suspension crossmember. Installation of the rear suspension crossmember will require the rear**

springs to be installed after the crossmember is bolted properly into the vehicle.

10. Remove the four bolts (3 and 4).
11. Remove the retainer plates (2).
12. Slowly lower the rear suspension crossmember and guide the brake calipers up through the suspension, following brake hose path. Support the calipers above the crossmember with wire when the crossmember is lowered.

NOTE: **The crossmember isolators can be serviced without removing any additional components.**

13. If necessary, remove the isolators from the crossmember. Refer to **ISOLATOR, REAR CROSSMEMBER, DIFFERENTIAL, REMOVAL**, **ISOLATOR, REAR CROSSMEMBER, FRONT MOUNT, REMOVAL**, **ISOLATOR, REAR CROSSMEMBER, REAR MOUNT, REMOVAL** or **ISOLATOR, REAR CROSSMEMBER, SPRING LINK, REMOVAL**.
14. If necessary, remove the rear stabilizer bar from the crossmember. Refer to **STABILIZER BAR, REAR SUSPENSION, REMOVAL** .
15. If necessary, remove the spring link from the crossmember. Refer to **LINK, SPRING, REMOVAL** .
16. If necessary, remove the toe link from the crossmember. Refer to **LINK, TOE, REMOVAL** .
17. If necessary, remove the camber link from the crossmember. Refer to **LINK, CAMBER, REMOVAL** .
18. If necessary remove the rear knuckle from the crossmember. Refer to **KNUCKLE, REAR, REMOVAL** .

INSTALLATION

INSTALLATION

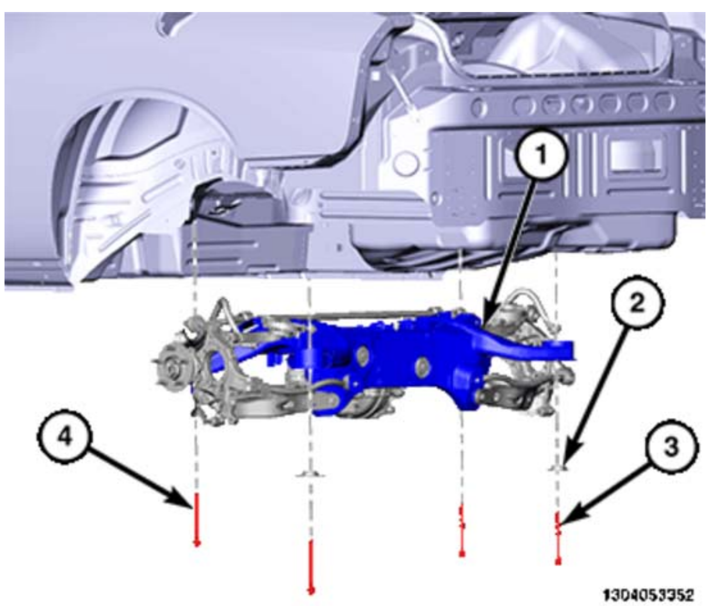


Fig. 60: Rear Suspension Crossmember, Retainer Plates & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not install the rear suspension crossmember with the rear springs attached.**

Install the rear springs after the rear suspension crossmember has been secured properly.

1. Guide the brake calipers up through the suspension and slowly position the rear suspension crossmember (1) into the vehicle. As crossmember is raised, align shocks with pockets in spring links.
2. Loosely install the front bolts (4).
3. Position the retainer plates (2) back into place and loosely install the rear bolts (3).

NOTE: **There are four crossmember mounting bolts. The rear bolts are longer than the front bolts. Do not interchange bolts.**

4. Align the rear suspension crossmember with the reference marks made previously and tighten the rear suspension crossmember to body bolts to the proper torque specification. Refer to **SPECIFICATIONS**.

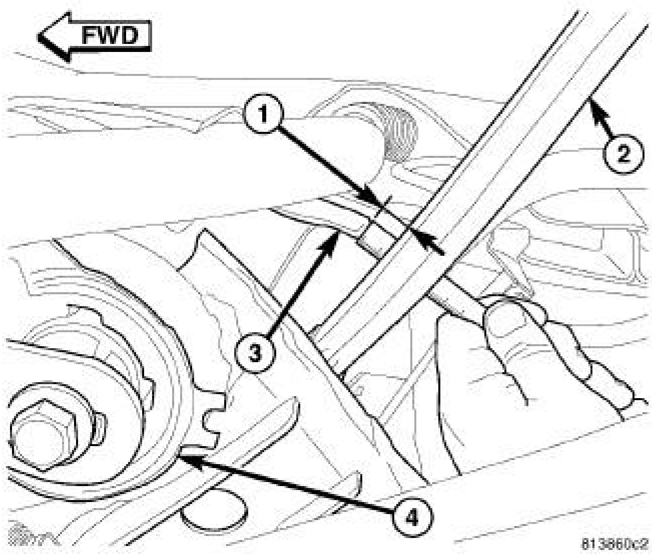


Fig. 61: Measuring Tension Link Clearance
Courtesy of CHRYSLER GROUP, LLC

5. Once mounts are lined up with location marks, on both sides of vehicle, measure distance (1) between the tension link (2) and weld flange (3) on body directly in front of it, just outboard of the front mount bushing (4). **This distance must be at least 12 mm to allow proper clearance for suspension movement.** If distance is less than 12 mm on either side of vehicle, shift that side of rear crossmember directly rearward until distance is 12 mm or greater. To do so, loosen 3 mounting bolts slightly, leaving one on opposite side of shift snugged to pivot off of. Shift crossmember rearward and snug loosened bolts. Remeasure opposite side to be sure it still maintains minimum 12 mm distance.

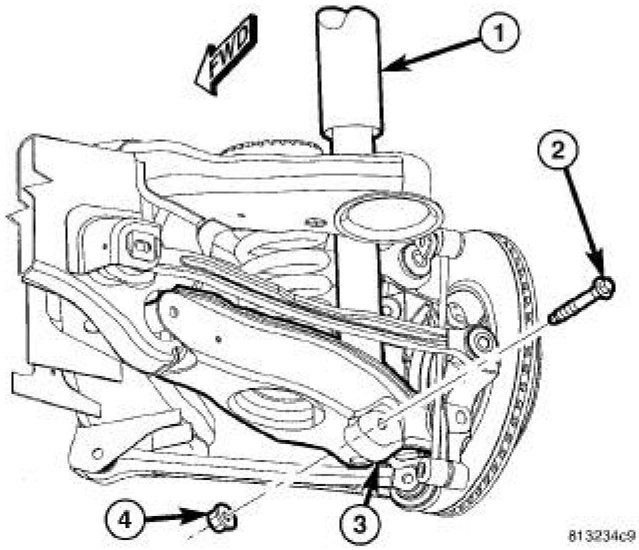


Fig. 62: Lower Shock Mount
Courtesy of CHRYSLER GROUP, LLC

6. Install the rear springs. Refer to **SPRING(S), INSTALLATION** .
7. Install the lower shock bolt (2) and nut (4) and tighten to the proper torque specification. Refer to **SPECIFICATIONS** .
8. Install the fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** .
9. Route the wire harness and connect all wire harness connectors.
10. Install the parking brake cable guide bracket and bolt.

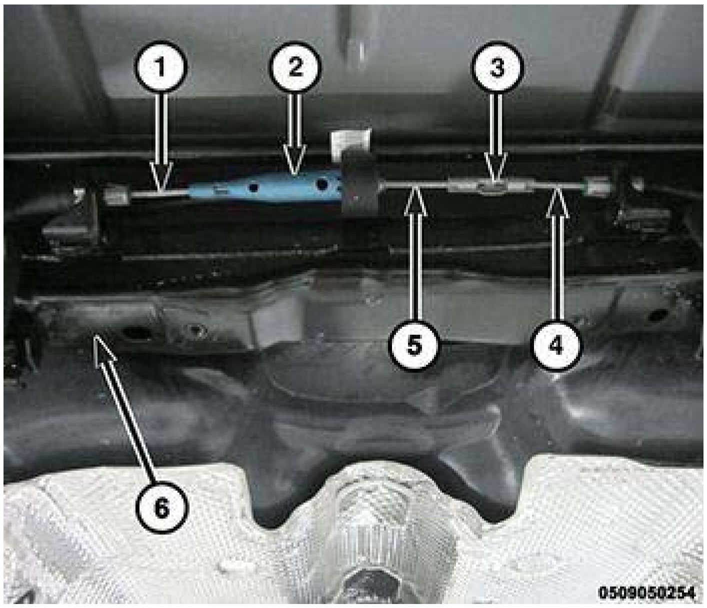


Fig. 63: Cables At Equalizer
Courtesy of CHRYSLER GROUP, LLC

11. Connect the rear brake cables back to the front as necessary. Refer to **CABLE, PARKING BRAKE, FRONT, INSTALLATION** or **CABLE, PARKING BRAKE, REAR, INSTALLATION** .

12. Install the rear axle differential. Refer to **INSTALLATION** or **INSTALLATION** .
13. Install the rear brake pads and calipers. Refer to **PADS, BRAKE, INSTALLATION** .
14. Install the muffler. Refer to **MUFFLER, EXHAUST, INSTALLATION** .
15. Install the tire and wheel assembly. Refer to **INSTALLATION** .
16. Check the wheel alignment and adjust if necessary. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

CROSSMEMBER, TRANSMISSION

REMOVAL

REMOVAL

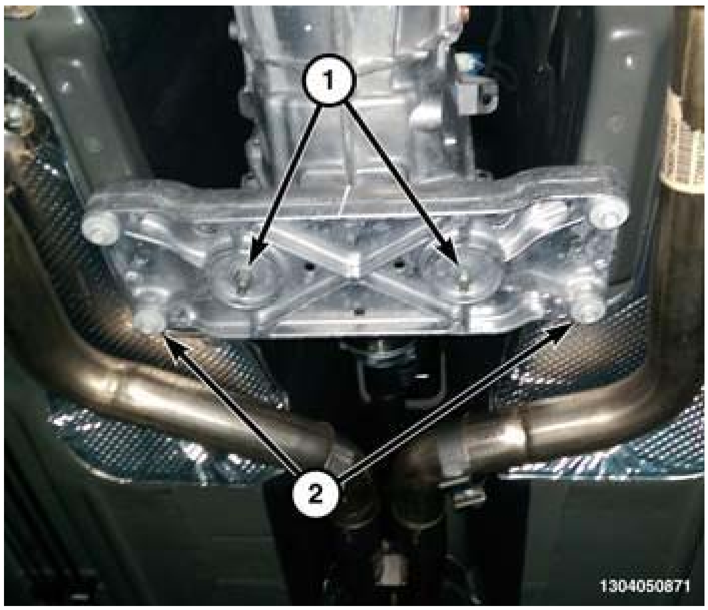


Fig. 64: Manual Transmission Crossmember Bolts & Fasteners
Courtesy of CHRYSLER GROUP, LLC

Manual Transmission

1. Support the transmission with a suitable lifting device.
2. Remove the mount fasteners (1).
3. Remove the frame bolts (2) and remove the crossmember.

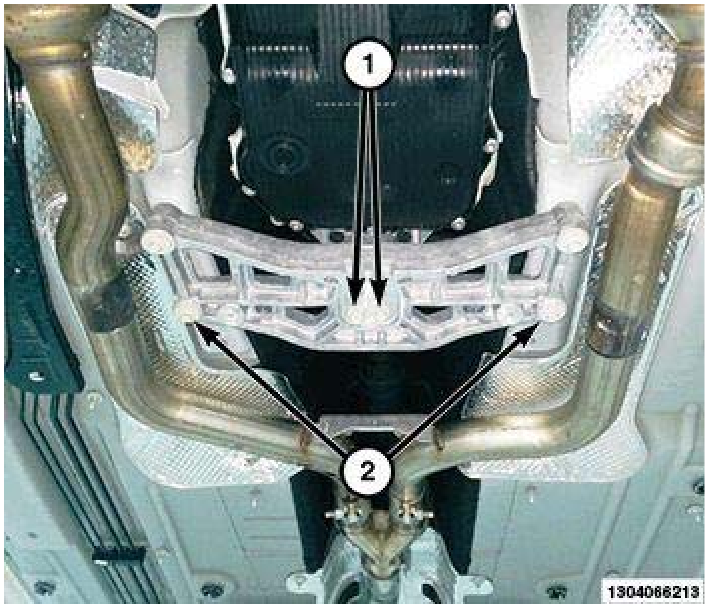


Fig. 65: Automatic Transmission Crossmember Bolts & Fasteners
Courtesy of CHRYSLER GROUP, LLC

Automatic Transmission

1. Support the transmission with a suitable lifting device.
2. Remove the mount fasteners (1).
3. Remove the frame bolts (2) and remove the crossmember.

INSTALLATION

INSTALLATION

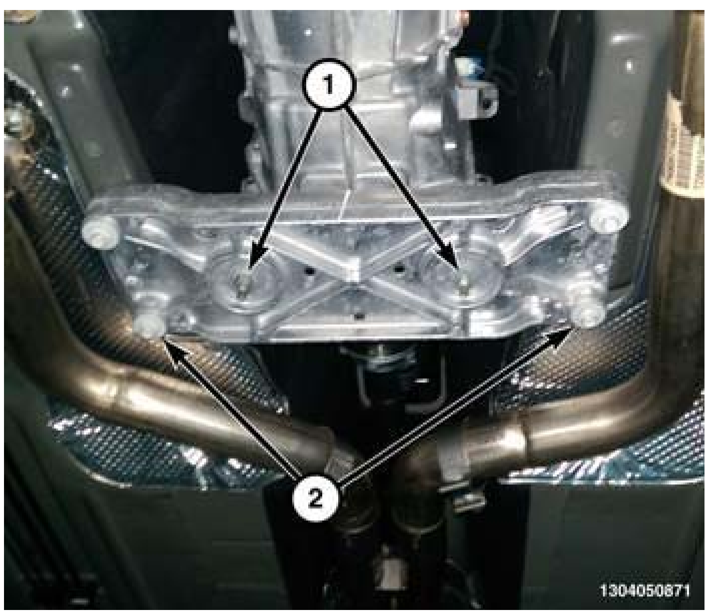


Fig. 66: Manual Transmission Crossmember Bolts & Fasteners
Courtesy of CHRYSLER GROUP, LLC

Manual Transmission

1. Install the crossmember and install the bolts (2) and tighten the bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Install the mount fasteners (1) and tighten the bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Remove the transmission support.

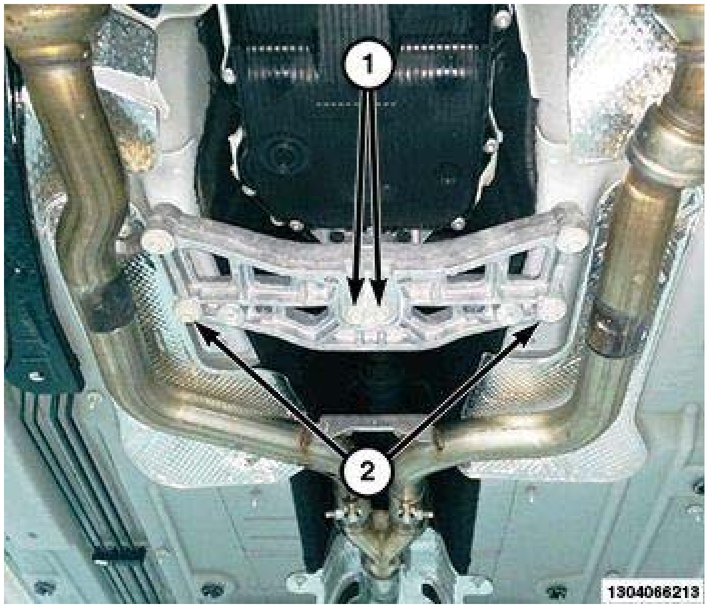


Fig. 67: Automatic Transmission Crossmember Bolts & Fasteners
Courtesy of CHRYSLER GROUP, LLC

Automatic Transmission

1. Install the crossmember and install the bolts (2) and tighten the bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Install the mount fasteners (1) and tighten the bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Remove the transmission support.

ISOLATOR, REAR CROSSMEMBER, DIFFERENTIAL

REMOVAL

REMOVAL

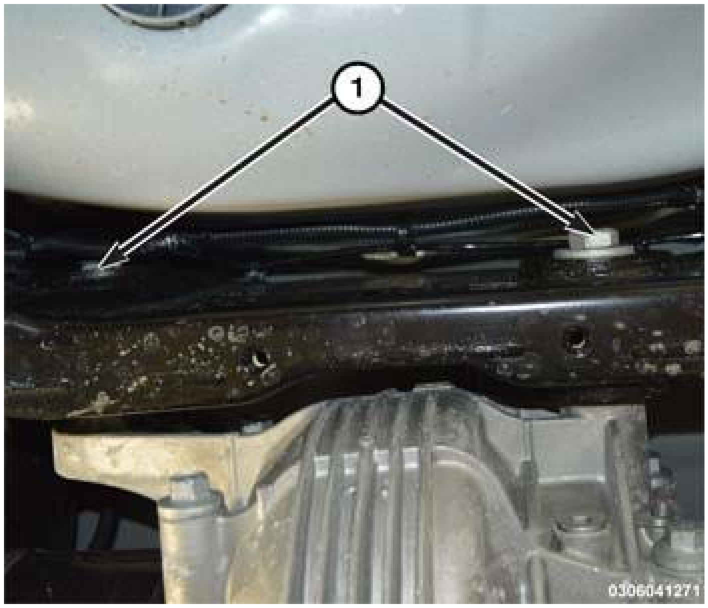


Fig. 68: Rear Axle To Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear crossmember. Refer to **CROSSMEMBER, REAR, REMOVAL** or **CROSSMEMBER, TRANSMISSION, REMOVAL**.
2. Remove bolts (1) from bushing prior to removal.

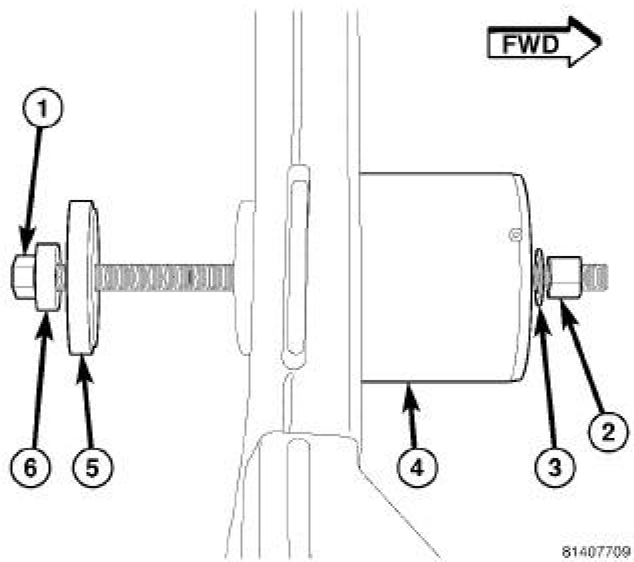


Fig. 69: Tools Assembled For Removal
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Prior to using (special tool #9520, Remover/Installer, Bushing), lubricate Bolt (1) threads to provide ease of use and promote tool longevity.**
NOTE:	**When installing Thrust Bearing (6), be sure to place hardened side toward Bolt head.**

3. Assemble tools (See following list) over bushing as shown in the illustration.
    - (1) Bolt
    - (2) Nut
    - (3) Washer
    - (4) Receiver (special tool #9520-4, Cup, Receiver)
    - (5) Remover (special tool #9520-3, Remover, Bushing)
    - (6) Thrust Bearing
4. While holding Nut (2) from rotating, **using hand tools** , tighten Bolt (1) until Remover (5) comes in contact with bushing and Receiver (4) sets squarely against crossmember.
5. Continue to tighten Bolt (1), pressing bushing out of crossmember.
6. Remove tools with bushing.

INSTALLATION

INSTALLATION

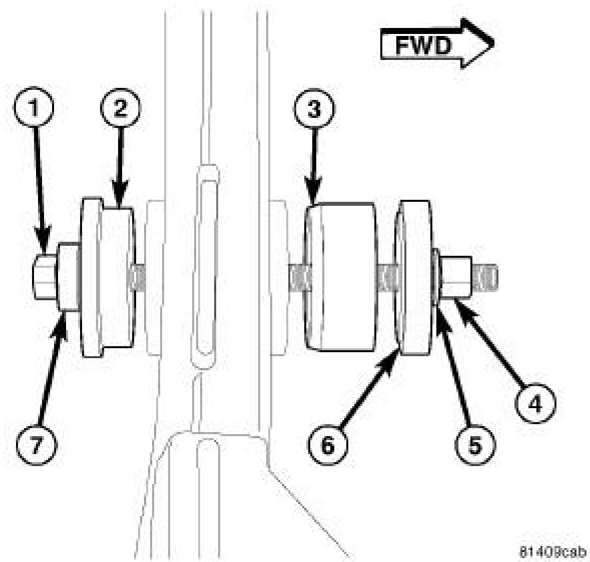


Fig. 70: Tools Assembled For Installation
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It is important that tapered end (3) of bushing be installed first into forward end of crossmember to ease installation.**

NOTE: **When installing Thrust Bearing (7), be sure to place hardened side toward Bolt head.**

1. Insert tapered end of NEW bushing (3) into forward end of crossmember bushing bore.
2. Assemble tools (See following list) through crossmember and bushing as shown in the illustration.
    - (1) Bolt
    - (2) Disc (special tool #9520-1, Installer Disc)
    - (3) Bushing

- (4) Nut
- (5) Washer
- (6) Installer (special tool #9520-2A, Installer, Bushing)
- (7) Thrust Bearing

3. Insert Installer (6) into end of bushing and Disc (2) into opposite end of crossmember bushing bore.
4. While holding Nut (4) from rotating, tighten Bolt (1) **using hand tools** , pressing bushing into crossmember. Stop when Installer (6) bottoms against bushing bore.
5. Remove tools.
6. Install the rear crossmember. Refer to **CROSSMEMBER, REAR, INSTALLATION** or **CROSSMEMBER, TRANSMISSION, INSTALLATION**.

ISOLATOR, REAR CROSSMEMBER, FRONT MOUNT

REMOVAL

REMOVAL

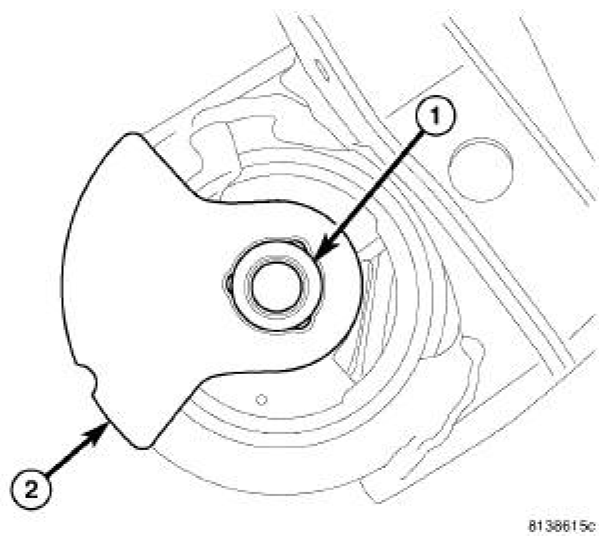


Fig. 71: Travel Limiter & Inner Metal Sleeve
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear crossmember. Refer to **CROSSMEMBER, REAR, REMOVAL** or **CROSSMEMBER, TRANSMISSION, REMOVAL**.
2. Remove travel limiter (2) from bushing inner metal sleeve (1). To do so, use an appropriate grinding tool to remove inner metal sleeve material until limiter can be safely removed.

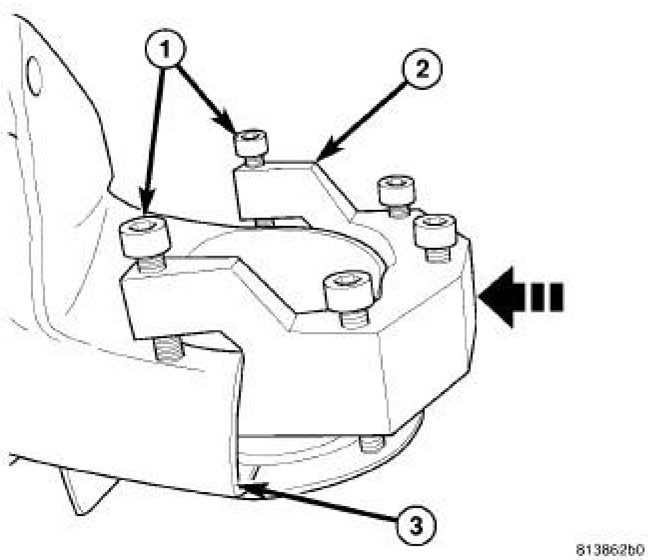


Fig. 72: Slide Support, Crossmember & Screws
Courtesy of CHRYSLER GROUP, LLC

3. Slide Support (2), (special tool #9031-9, Clamp), into end of crossmember (3) surrounding bushing bore as shown in the illustration.
4. Snug set-screws (1) securing Support (2) to crossmember.

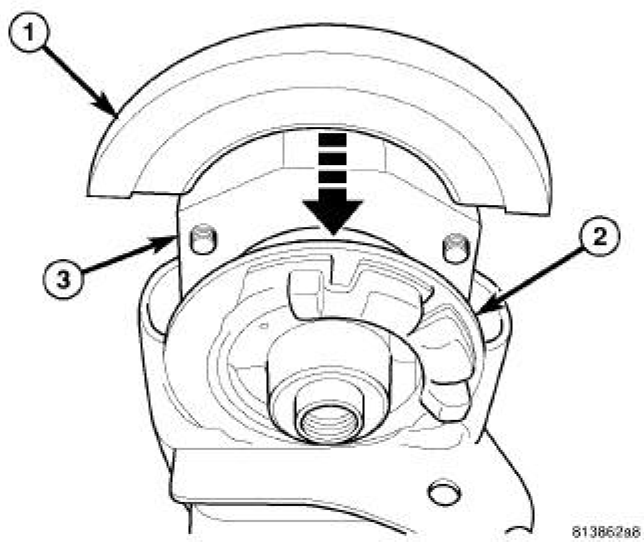


Fig. 73: Brace, Clamp & Bushing Bore Flange
Courtesy of CHRYSLER GROUP, LLC

5. Insert Brace (1), (special tool #9031-10, Brace), between Support (special tool #9031-9, Clamp) (3) and bushing bore flange (2) matching step in Brace to bore flange.

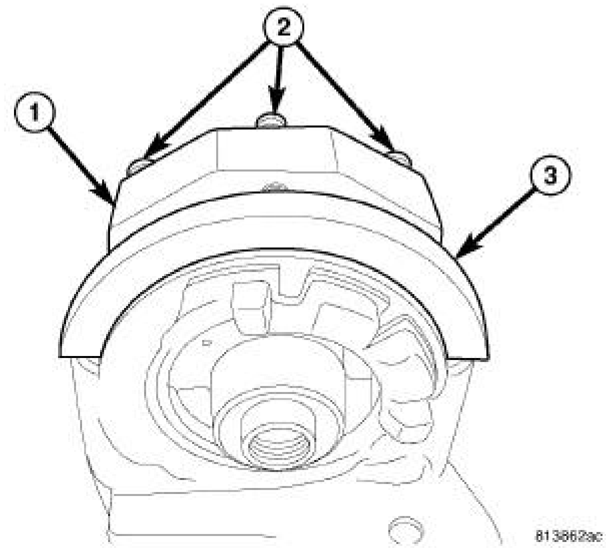


Fig. 74: Tighten Support 9031-9 Set Screws
Courtesy of CHRYSLER GROUP, LLC

6. Snug set-screws (2) against Brace (special tool #9031-10, Brace). **Do not overtighten set-screws as they will distort and bend bushing bore flange.**

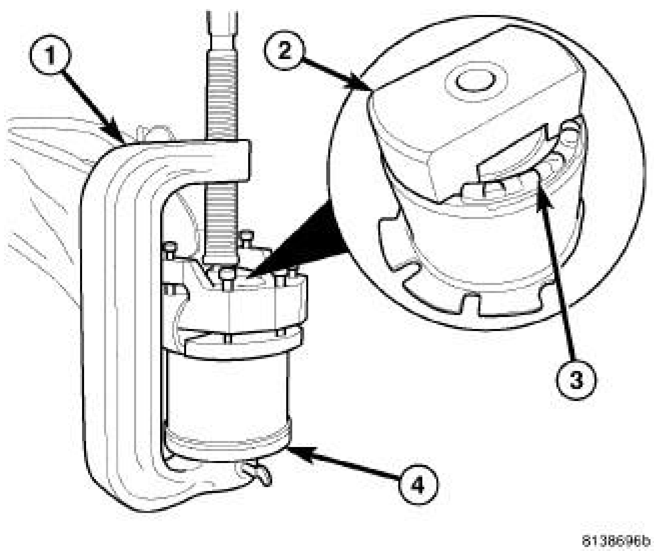


Fig. 75: Tools Positioned To Remove Front Bushing
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Prior to using Press (1), (special tool #C-4212F, Press, Ball Joint) Ball Joint Press Installer/Removal, lubricate screw-drive threads to provide ease of use and promote tool longevity.**

7. Assemble tools (See following list) over bushing as shown in the illustration. Ensure Remover lies between ridges (3) on bushing to properly contact bushing can.
   - (1) Press (special tool #C-4212F, Press, Ball Joint)

- (2) Remover (special tool #9031-5A, Remover, Bushing)
- (4) Receiver (special tool #9031-8A, Receiver, Bushing)

8. Tighten Press (1) screw-drive, pressing bushing out of crossmember.
9. Remove all tools.

INSTALLATION

INSTALLATION

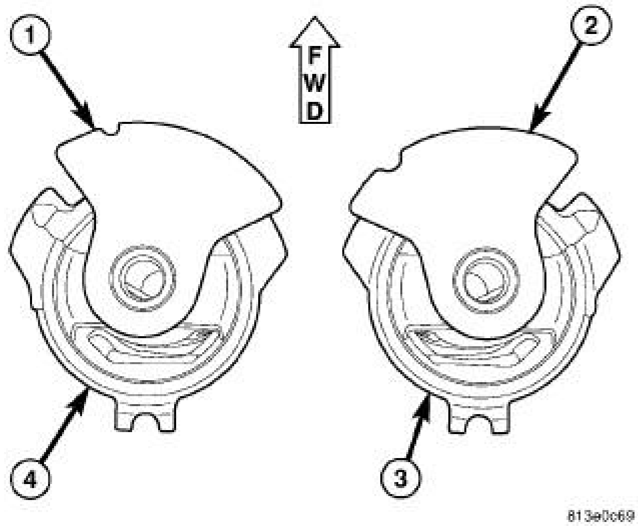


Fig. 76: Front Bushings - Left & Right
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Prior to bushing installation, inspect the bushing to make sure it is the correct side bushing for the job. Left side bushings have the travel limiter (1) tipped to the right in relationship to the bushing (4) can flange as shown in the illustration. Right side bushings have the travel limiter (2) tipped to the left in relationship to the bushing (3) can flange as shown in the illustration. Once installed, the travel limiters with face slightly outward from straight-ahead position.**

CAUTION: **It is very important that bushing be installed in same position as original to maintain vehicle ride quality and bushing longevity. That is why bushing, once installed, needs to closely match reference marks applied upon removal of original bushing.**

1. Position bushing on crossmember bushing bore aligning bushing can flange with reference marks applied during removal.

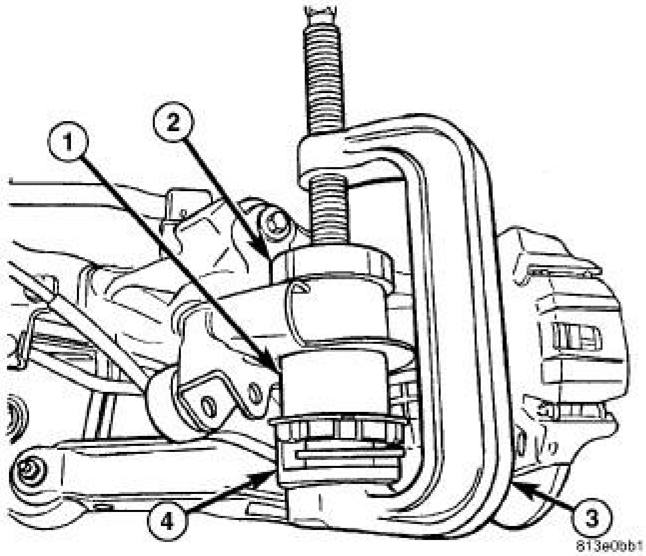


Fig. 77: Installing Front Bushing
Courtesy of CHRYSLER GROUP, LLC

2. Assemble tools (See following list) over bushing and crossmember as shown in the illustration.
   - (2) Receiver (special tool #9031-6, Receiver)
   - (3) Press (special tool #C-4212F, Press, Ball Joint)
   - (4) Installer (special tool #9031-7A, Installer, Bushing)

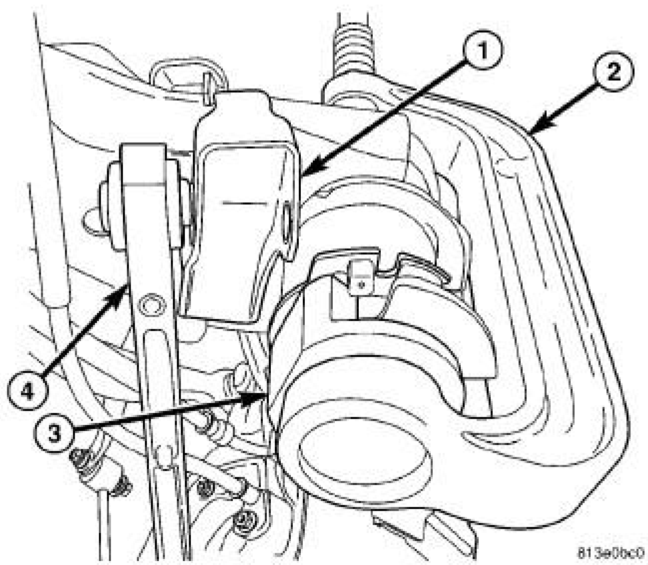


Fig. 78: Installer Positioned On Bushing
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Ensure Installer (3), (special tool #9031-7A, Installer, Bushing), is positioned that it will clear compression link bracket (1) while bushing is being installed.**

3. Tighten Press (2) screw-drive, pressing bushing into crossmember. Install bushing until bushing can

flange contacts surface of crossmember.

4. Remove tools.
5. Verify bushing closely lines up with reference marks applied during removal.
6. Install the rear crossmember. Refer to **CROSSMEMBER, REAR, INSTALLATION** or **CROSSMEMBER, TRANSMISSION, INSTALLATION**.

ISOLATOR, REAR CROSSMEMBER, REAR MOUNT

REMOVAL

REMOVAL

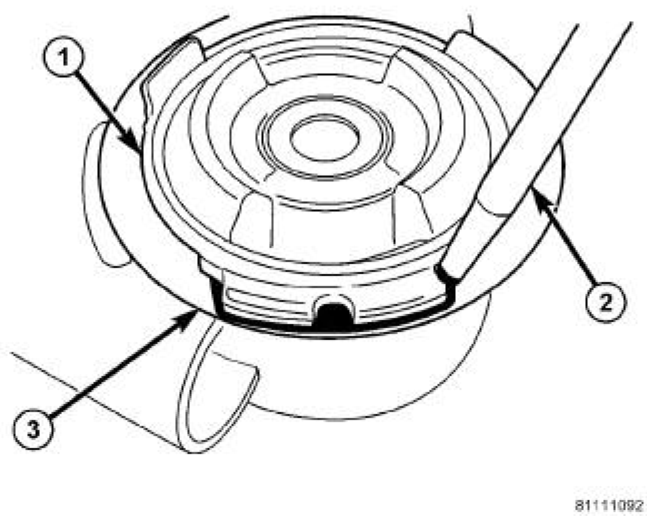
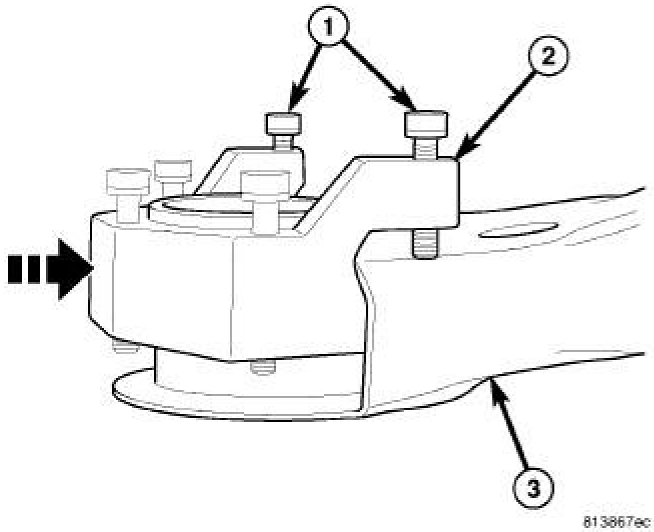


Fig. 79: Marking Location Of Rear Bushing
Courtesy of CHRYSLER GROUP, LLC

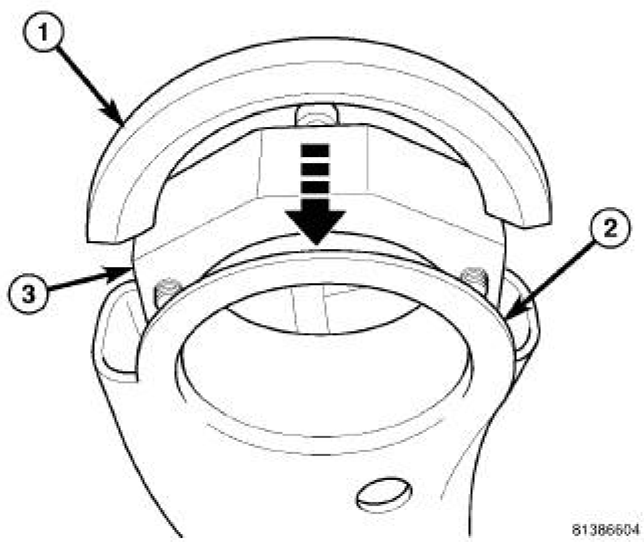
1 - BUSHING CAN FLANGE
2 - MARKER OR CRAYON
3 - CROSSMEMBER

1. Remove the rear crossmember. Refer to **CROSSMEMBER, REAR, REMOVAL** or **CROSSMEMBER, TRANSMISSION, REMOVAL**.
2. As an installation reference, carefully mark location of bushing requiring removal on crossmember (around bushing can flange) using a marker or crayon. **Do not use a scratch awl to mark location.**



[Fig. 80: Installing Support 9031-11](#)
Courtesy of CHRYSLER GROUP, LLC

3. Slide Support (2), (special tool #9031-11, Clamp), into end of crossmember (3) surrounding bushing bore as shown in the illustration.
4. Snug set-screws (1) securing Support (2) to crossmember.



[Fig. 81: Inserting Brace 9031-12](#)
Courtesy of CHRYSLER GROUP, LLC

5. Insert Brace (1), (special tool #9031-12, Brace), between Support (special tool #9031-11, Clamp) (3) and bushing bore flange (2) matching angle cut in Brace to bore flange.

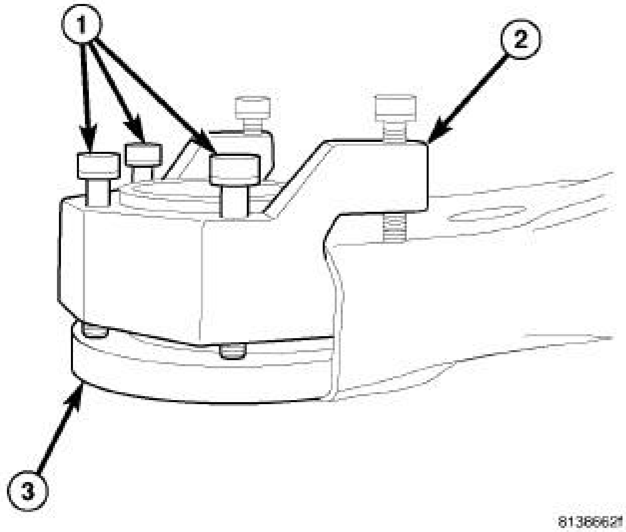


Fig. 82: Tighten Support 9031-11 Set Screws
Courtesy of CHRYSLER GROUP, LLC

6. Snug set-screws (1) against Brace (special tool #9031-12, Brace). **Do not overtighten set-screws as they will distort and bend bushing bore flange.**

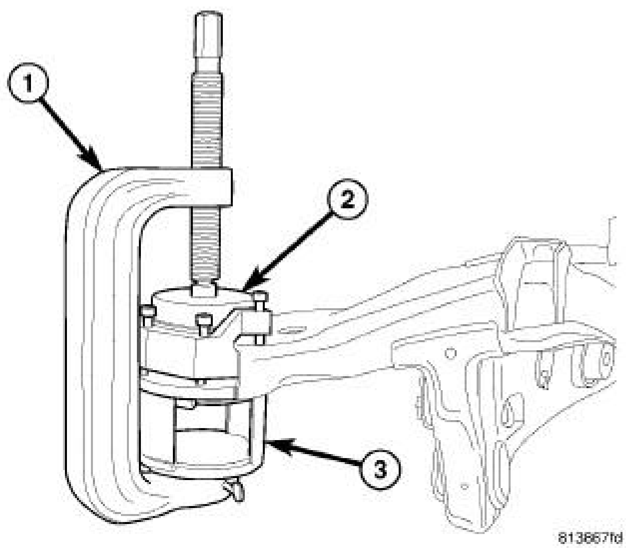


Fig. 83: Tools Positioned To Remove Rear Bushing
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Prior to using Press (1), (special tool #C-4212F, Press, Ball Joint), lubricate screw-drive threads to provide ease of use and promote tool longevity.**

7. Assemble tools over bushing as shown in the illustration (See following list).
   - (1) Press (special tool #C-4212F, Press, Ball Joint)
   - (2) Remover (special tool #9031-2, Remover, Bushing)
   - (3) Receiver (special tool #9031-1, Bushing Removal Receiver)

8. Tighten Press (1) screw-drive, pressing bushing out of crossmember.
9. Remove all tools.

INSTALLATION

INSTALLATION

CAUTION: It is very important that bushing be installed in same position as original to maintain vehicle ride quality and bushing longevity. That is why bushing, once installed, needs to closely match reference marks applied upon removal of original bushing.

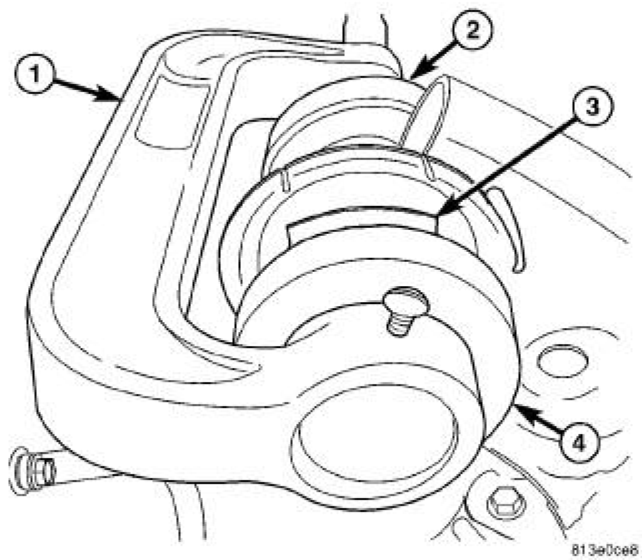


Fig. 84: Installing Rear Bushing
Courtesy of CHRYSLER GROUP, LLC

1. Position bushing on crossmember bushing bore aligning bushing can flange (3) with reference marks applied during removal.
2. Assemble tools (See following list) over bushing (3) and crossmember as shown in the illustration.
    - (1) Press (special tool #C-4212F, Press, Ball Joint)
    - (2) Receiver (special tool #9031-3, Receiver, Bushing)
    - (4) Installer (special tool #9031-4, Installer, Bushing)
3. Tighten Press (1) screw-drive, pressing bushing into crossmember. Install bushing until bushing can flange contacts surface of crossmember.
4. Remove tools.
5. Install the rear crossmember. Refer to CROSSMEMBER, REAR, INSTALLATION or CROSSMEMBER, TRANSMISSION, INSTALLATION.

ISOLATOR, REAR CROSSMEMBER, SPRING LINK

REMOVAL

REMOVAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Access and remove rear spring on side of repair. Refer to **SPRING(S), REMOVAL** .

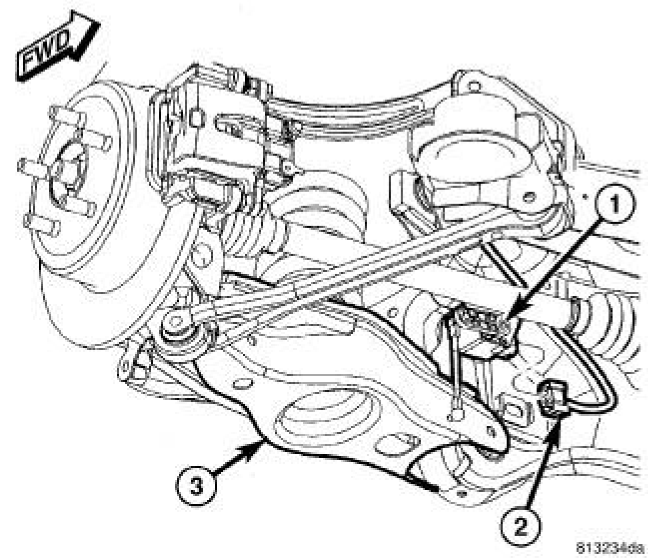


Fig. 85: Headlamp Leveling Sensor
Courtesy of CHRYSLER GROUP, LLC

3. If servicing right side bushing, disconnect headlamp leveling sensor (1) link at spring link (3), if equipped.

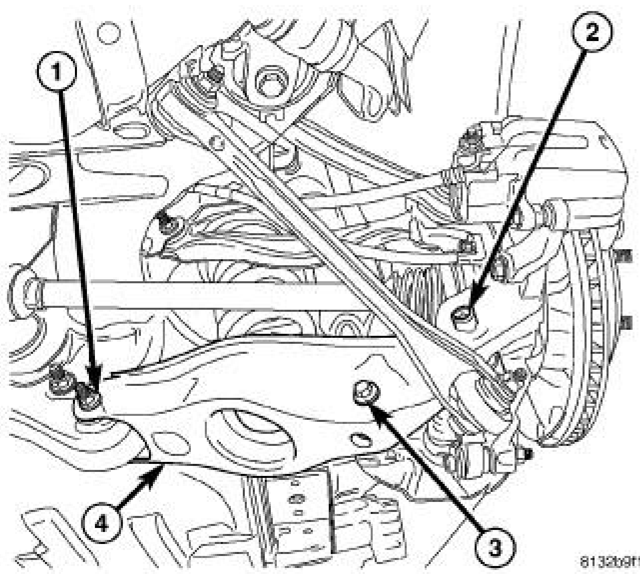


Fig. 86: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

4. Remove bolt and nut (1) fastening spring link (4) to crossmember.
5. Position spring link downward, away from bushing in crossmember.

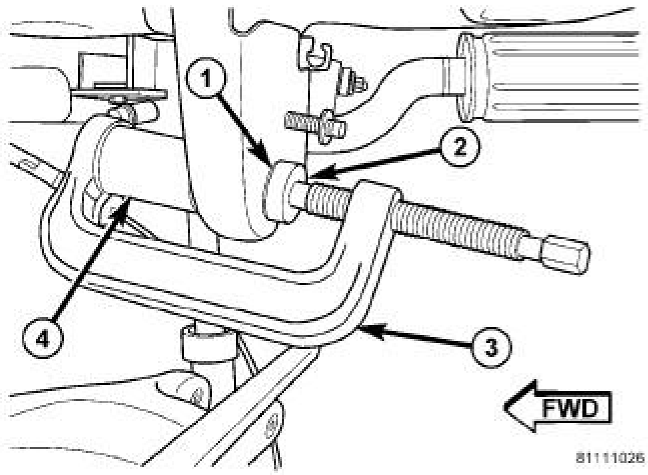


Fig. 87: Spring Link Bushing Removal
Courtesy of CHRYSLER GROUP, LLC

1 - BUSHING
2 - REMOVER 9032-2
3 - PRESS C-4212F
4 - RECEIVER 9032-1

NOTE: **Prior to using Press (3), (special tool #C-4212F, Press, Ball Joint), lubricate screw-drive threads to provide ease of use and promote tool longevity.**

6. Assemble tools over bushing as shown in the illustration (See list). Ensure Receiver, (special tool #9032-1, Receiver, Bushing), sets against crossmember and not welds.
   - (2) Remover (special tool #9032-2, Receiver, Bushing)
   - (3) Press (special tool #C-4212F, Press, Ball Joint)
   - (4) Receiver (special tool #9032-1, Receiver, Bushing)
7. Tighten Press screw-drive, pressing bushing out of crossmember.

INSTALLATION

INSTALLATION

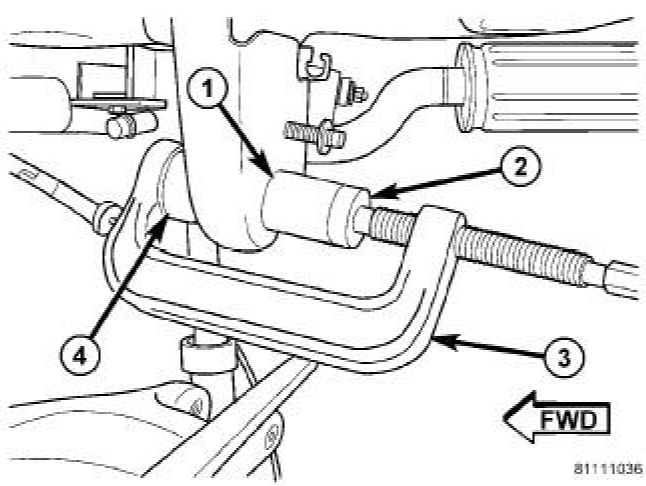


Fig. 88: Spring Link Bushing Installation
Courtesy of CHRYSLER GROUP, LLC

1 - BUSHING
2 - REMOVER/INSTALLER 9032-2
3 - PRESS C-4212F
4 - RECEIVER 9032-3

1. Position bushing (1) over rear of crossmember bushing bore.
2. Assemble tools over bushing and crossmember as shown in the illustration (See list). Ensure Receiver, (special tool #9032-3, Pusher, Bushing), is positioned to avoid welds on rear of crossmember bushing bore.
   - (2) Remover/Installer (special tool #9032-2, Receiver, Bushing)
   - (3) Press (special tool #C-4212F, Press, Ball Joint)
   - (4) Receiver (special tool #9032-3, Pusher, Bushing)
3. Tighten Press screw-drive, pressing bushing into crossmember. Install bushing until screw-drive stops, when bushing contacts Receiver on opposite side of crossmember.
4. Remove tools.

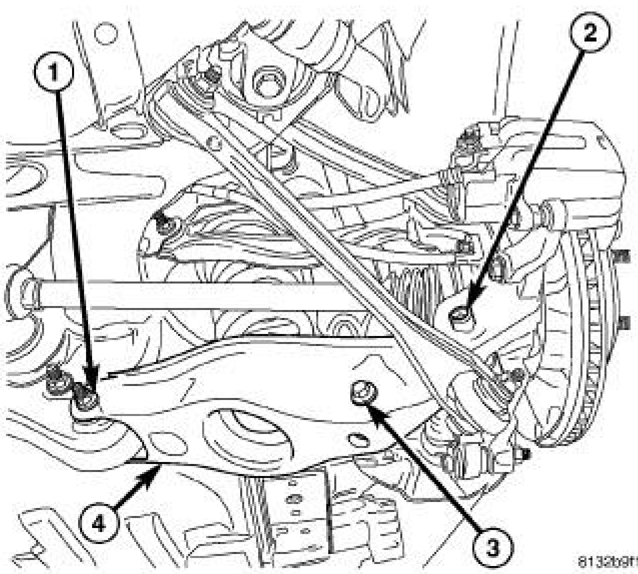


Fig. 89: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

5. Swing spring link up to bushing in crossmember and install bolt and nut (1) fastening spring link (4) to crossmember. **Do not tighten bolt at this time.**

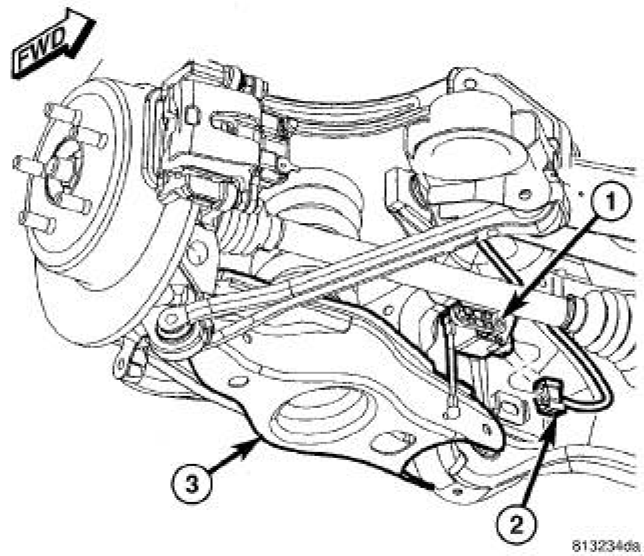


Fig. 90: Headlamp Leveling Sensor
Courtesy of CHRYSLER GROUP, LLC

6. If servicing right side bushing, connect headlamp leveling sensor (1) link at spring link (3), if equipped.
7. Install rear spring as well as all components necessary to access it. Refer to **SPRING(S), INSTALLATION** .
8. Remove the support and lower the vehicle.
9. Position vehicle on alignment rack/drive-on lift. Raise vehicle as necessary to access mounting bolt.

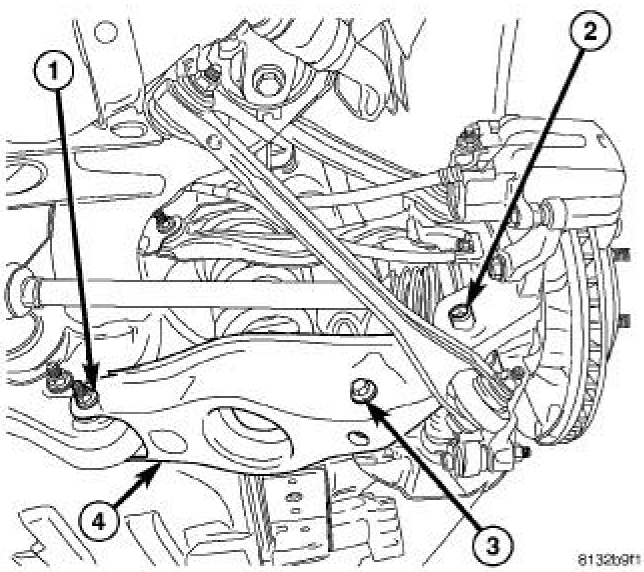


Fig. 91: Spring Link Mounting
Courtesy of CHRYSLER GROUP, LLC

10. Tighten spring link bolt (1) at crossmember to the proper torque specification. Refer to **SPECIFICATIONS** .
11. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

UNDER BODY PROTECTION

BELLY PAN

REMOVAL

REMOVAL

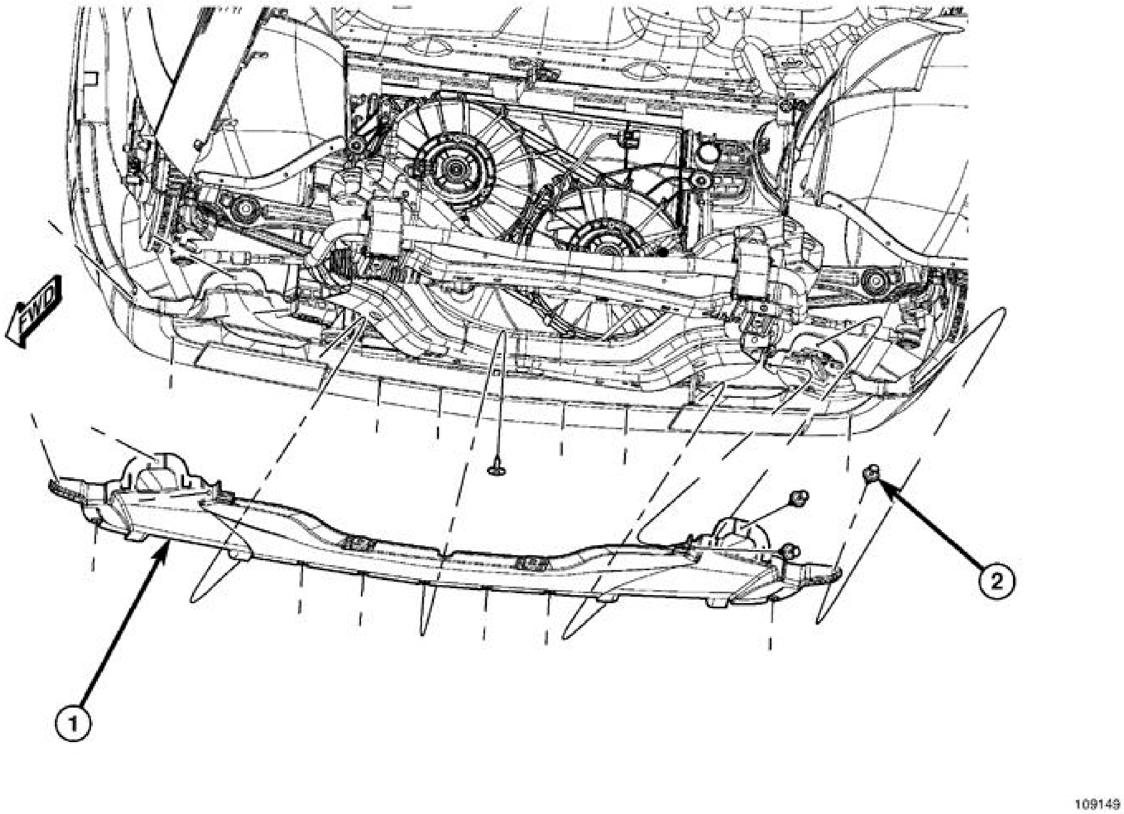
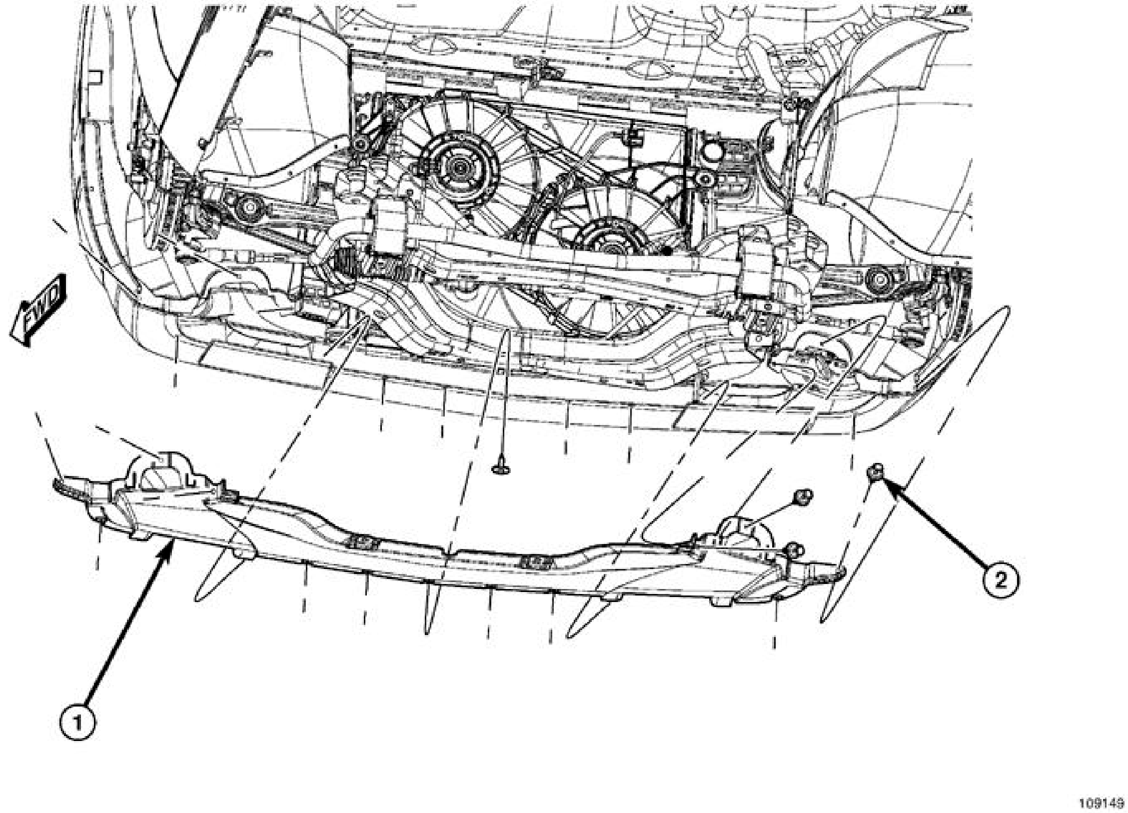


Fig. 92: Removing/Installing Front Belly Pan
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the engine belly pan. Refer to **BELLY PAN, REMOVAL** and **BELLY PAN, ENGINE, REMOVAL**.
3. Remove the fasteners that secure the front belly pan to the front fascia.
4. Remove the fasteners (2) that secure the front belly pan (1) to the underside of the vehicle.
5. Remove the push pins that connect the front belly pan to the front splash shields.
6. Remove the front belly pan from the underside of the vehicle.

INSTALLATION

INSTALLATION



[Fig. 93: Removing/Installing Front Belly Pan]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **During installation, ensure engine belly pan is shingled underneath front belly pan. Failure to do so may result in damage to belly pan.**

1. Position the front belly pan (1) to the underside of the vehicle.
2. Install the fasteners (2) that secure the front belly pan to the underside of the vehicle.
3. Install the fasteners that secure the front belly pan to the front fascia.
4. Install the push pins that connect the front belly pan to the front splash shields.
5. Install the engine belly pan. Refer to **BELLY PAN, INSTALLATION** and **BELLY PAN, ENGINE, INSTALLATION**.
6. Remove the support and lower the vehicle.

BELLY PAN, ENGINE

REMOVAL

REMOVAL

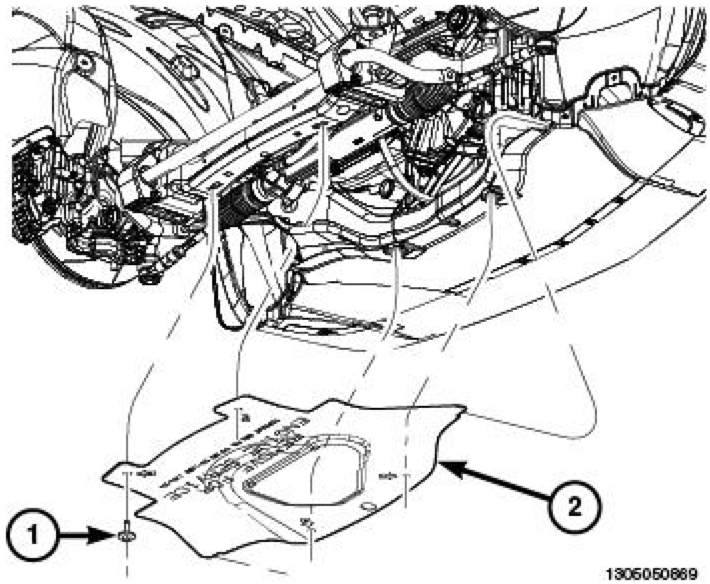


Fig. 94: Bellypan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Remove the fasteners (1) and remove the bellypan (2).

INSTALLATION

INSTALLATION

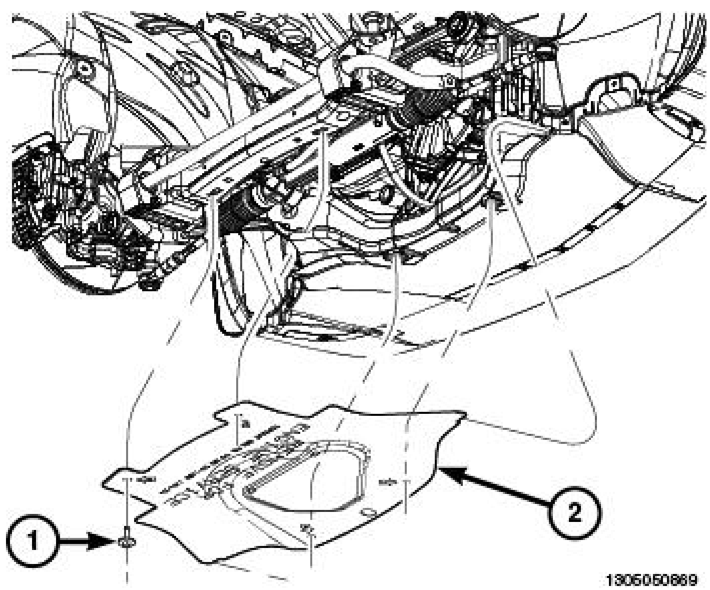


Fig. 95: Bellypan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Install the bellypan (2) and install the fasteners (1).

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Article GUID: A00735865

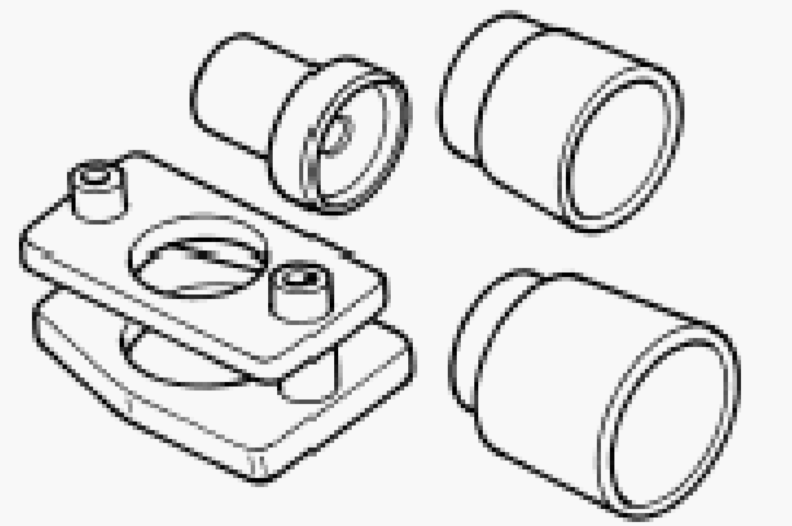
STANDARD PROCEDURE

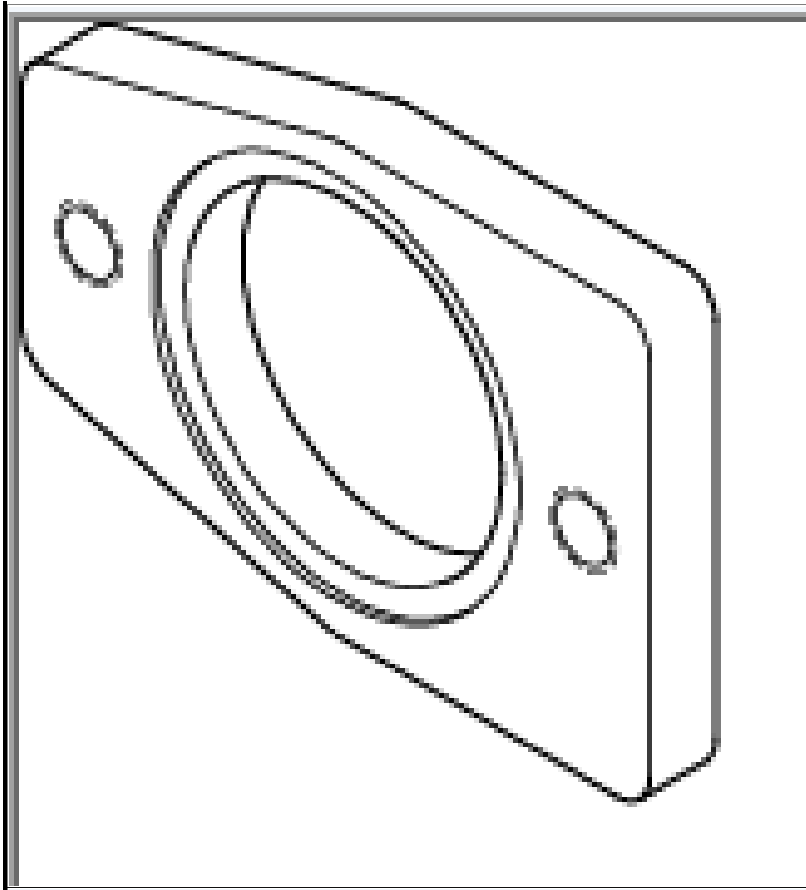
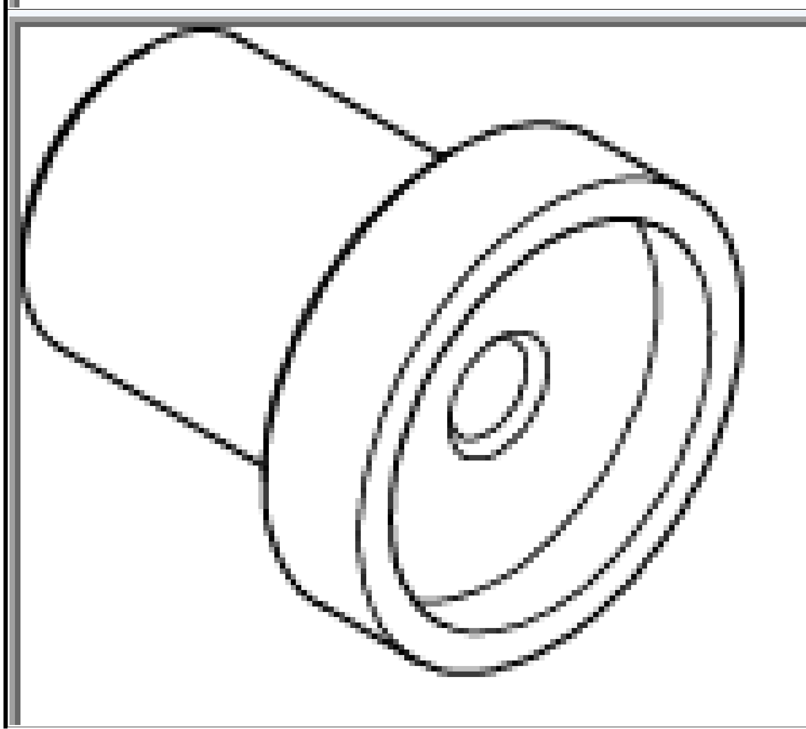
STANDARD PROCEDURE - LUBRICATION

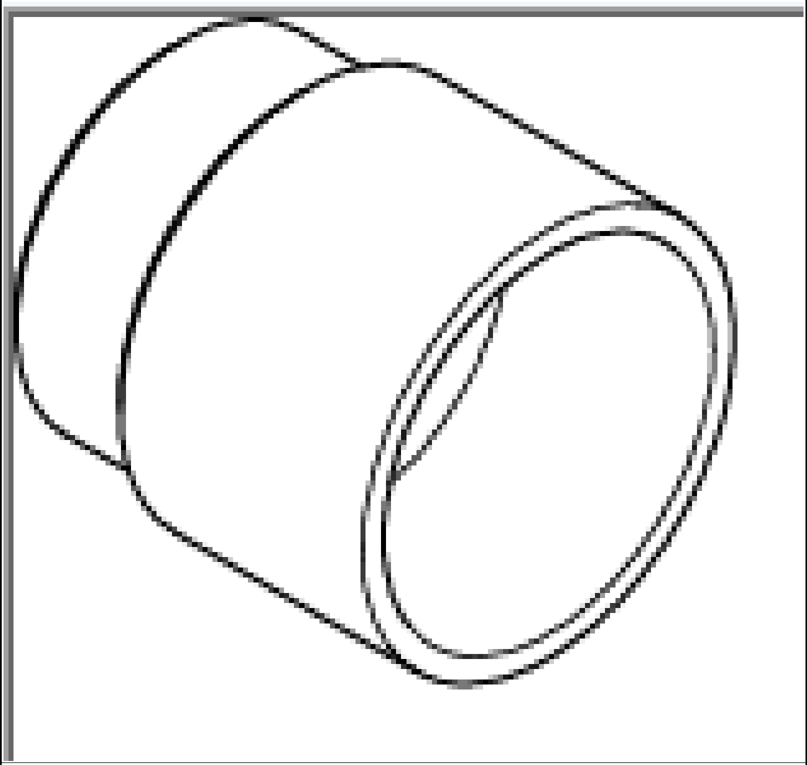
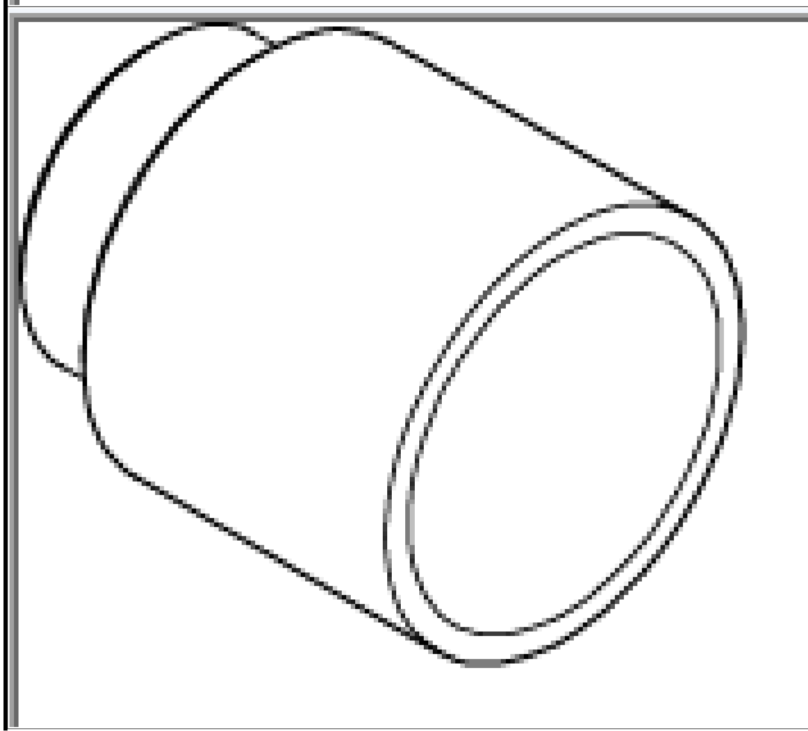
There are no serviceable lubrication points on the front or rear suspension. The ball joints are sealed-for-life and require no maintenance.

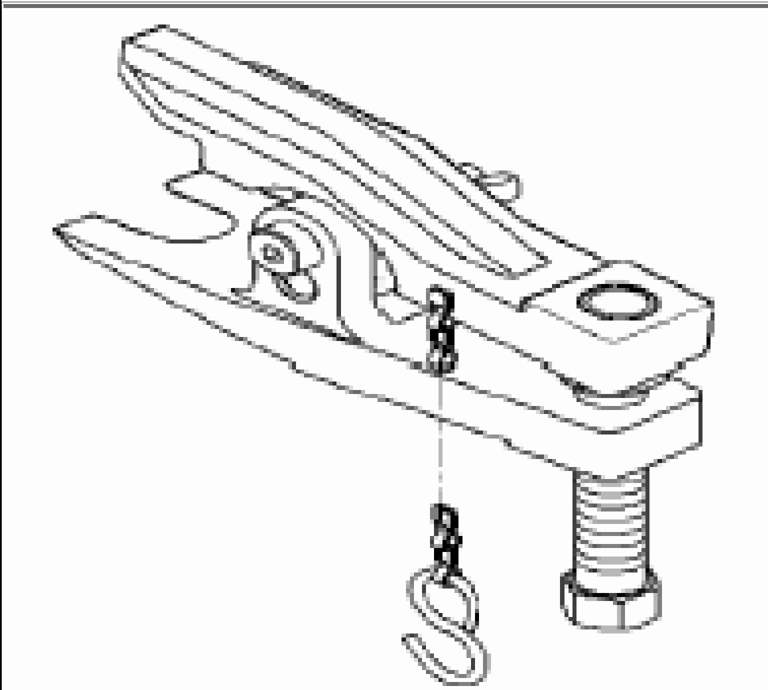
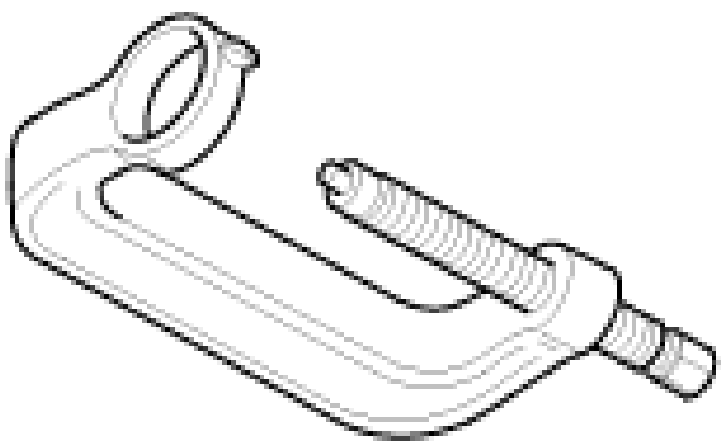
SPECIAL TOOLS

SPECIAL TOOLS

	9320 - Remover/Installer, Ball Joint (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)

	9320-1 - Plate, Ball Joint Remover (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
	9320-3 - Remover, Ball Joint (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)

	9320-4 - Installer Cup (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
	9320-5 - Receiver Cup (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)

	9360 - Remover, Ball Joint (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
	C-4212F - Press, Ball Joint (Originally Shipped In Kit Number(s) 6745, 6880, 6881, MLR-C03.)

FRONT

DESCRIPTION

NON SRT

Each side of the front suspension includes the following components:

- Hub And Bearing
- Knuckle
- Lower Control Arm
- Strut Assembly
- Stabilizer Bar and Link
- Tension Strut

- Upper Control Arm

SRT

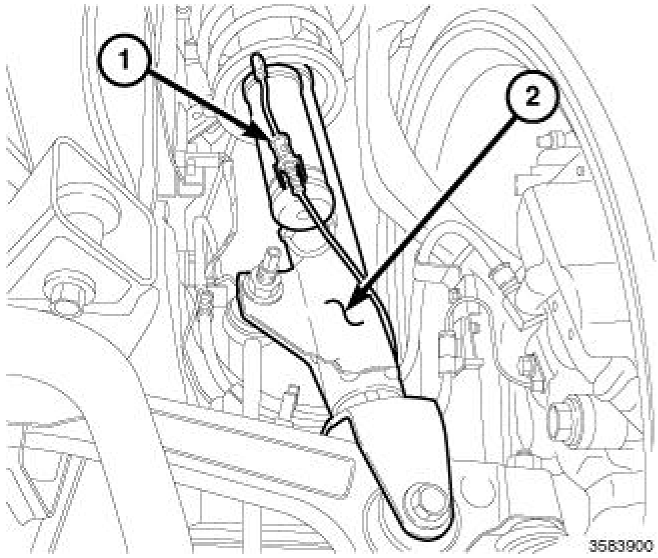


Fig. 1: Front Shock Assembly & Shock Solenoid Assembly
Courtesy of CHRYSLER GROUP, LLC

The SRT front suspension is part of an Active Damping System (ADS). The ADS includes unique shock absorbers, an Active Damping Control Module (ADCM), and three accelerometers that work together to modify the ride of the suspension over varying road conditions.

The Active Damping System (ADS) front shock assembly (2) is similar to a conventional coil over shock with the addition of a shock solenoid assembly (1) mounted on the side of its body with a three wire harness connector attached to it. The ADS shock assembly is serviced the same as a conventional shock absorber, with the addition of disconnecting the ADS harness connector from behind the splash shield.

SPECIFICATIONS

TORQUE SPECIFICATIONS

FRONT SUSPENSION TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Front Active Damping Sensor Bolt	10	-	89	Ā
Hub And Bearing Bolts	55	41	-	Ā
Lower Ball Joint to Knuckle Nut	37 + 180Ā° TURN	27 + 180Ā° TURN	-	X
Lower Control Arm to Cradle Bolt and Nut	185	136	-	Ā
Rear Active Damping Sensor Bolt	10	-	89	Ā
Shock Absorber Shaft Nut	100	74	-	Ā
Stabilizer Bar to Crossmember Bolts	65	48	-	Ā

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Stabilizer Bar Heat Shield to Crossmember Bolts	5	-	44	Ā
Stabilizer Link to Stabilizer Bar Nut	135	100	-	Ā
Stabilizer Link to Strut Nut	150	111	-	Ā
Strut Clevis to Lower Control Arm Bolt	170	125	-	Ā
Strut Clevis to Strut Pinch Bolt	61	45	-	Ā
Strut Mount to Body Nut	27	20	-	Ā
Strut to Lower Control Arm Bolt	174	128	-	Ā
Tension Strut to Cradle Bolt and Nut	185	136	-	Ā
Tension Strut to Knuckle Bolt and Nut	68 + 90Ā° TURN	50 + 90Ā° TURN	-	X
Upper Ball Joint to Knuckle Nut	47 + 95Ā°	35 + 95Ā°	-	Ā
Upper Control Arm to Body Bolt and Nut	90	66	-	Ā
* **NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

ARM, LOWER CONTROL

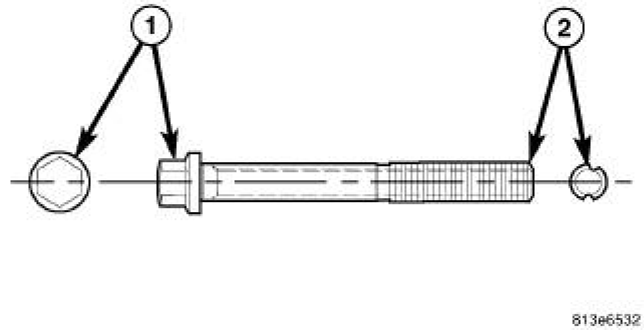
REMOVAL

REMOVAL

NOTE: Removal process is the same for both sides of the vehicle.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .
3. Remove belly pan. Refer to **BELLY PAN, REMOVAL** and **BELLY PAN, ENGINE, REMOVAL** .
4. Remove the front stabilizer bar. Refer to **STABILIZER BAR, FRONT, REMOVAL**.

NOTE: In the following step, the lower control arm to cradle bolt (3) is accessed through the opening created by removal of the bushing from the stabilizer bar.



[Fig. 2: Wheel Alignment Adjustment Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the lower control arm bolt at the engine cradle has a lengthwise grooved shaft (2), it is a special wheel alignment adjustment bolt and the bolt head (1) must not be rotated in the vehicle or damage to the bolt and engine cradle will result. While holding the bolt in place with a wrench, remove the nut, then slide the bolt out of the bushing and cradle taking note of bolt positioning in engine cradle for reassembly purposes. The bolt needs to be installed in the same position as removed to make sure wheel camber and caster return to adjusted position.

[Fig. 3: Lower Control Arm To Engine Cradle Bolt And Nut](#)
Courtesy of CHRYSLER GROUP, LLC

5. Remove bolt and nut (1) securing lower control arm to engine cradle. If bolt has a lengthwise grooved shaft (see above CAUTION), remove bolt and nut by holding the bolt in place with a wrench, removing nut, then sliding bolt out of bushing and cradle while taking note of bolt positioning in lower control arm bushing for reassembly purposes.

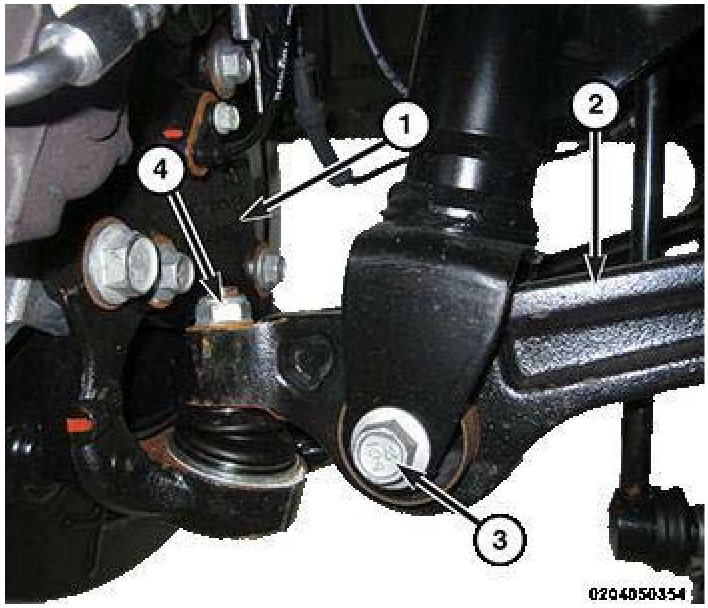


Fig. 4: Knuckle, Lower Control Arm, Strut To Lower Control Arm Bolt & Lower Ball Joint To Knuckle Nut
Courtesy of CHRYSLER GROUP, LLC

6. Remove the strut to lower control arm bolt (3).
7. Loosen the lower ball joint to knuckle nut (4). Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

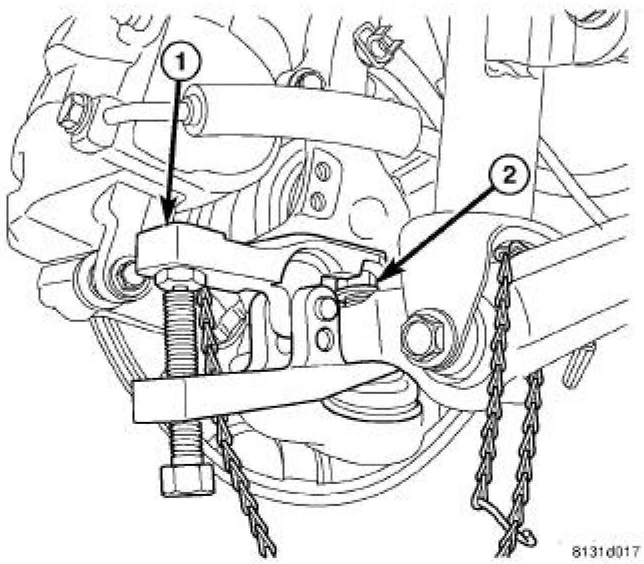


Fig. 5: Using Puller On Lower Control Arm Ball Joint
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding into place past seal boot.

8. Using Ball Joint Remover (special tool #9360, Remover, Ball Joint) (1), separate ball joint stud (2) from lower control arm.

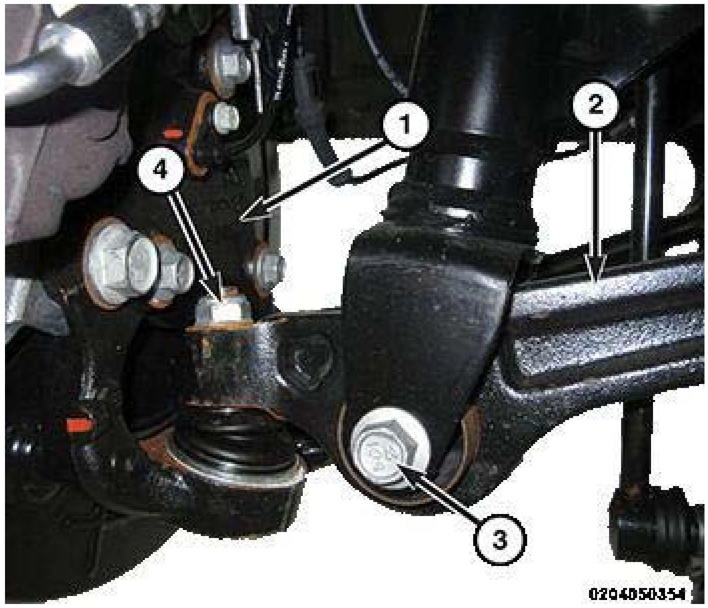


Fig. 6: Knuckle, Lower Control Arm, Strut To Lower Control Arm Bolt & Lower Ball Joint To Knuckle Nut
Courtesy of CHRYSLER GROUP, LLC

9. Remove the lower ball joint to knuckle nut (4).
10. Pry knuckle (1) downward and slide ball joint stud out of lower control arm (2). Position knuckle outward, away from lower control arm.
11. Slide lower control arm (2) out of engine cradle and remove from vehicle.

INSTALLATION

INSTALLATION

NOTE: **Installation process is the same for both sides of the vehicle.**

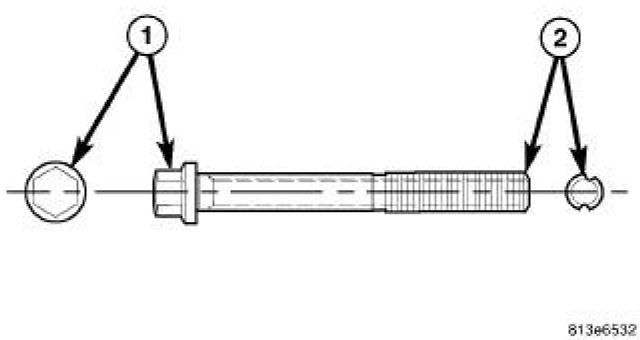


Fig. 7: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If installing a lower control arm engine cradle bolt that is a wheel alignment adjustment bolt (1) (lengthwise grooved shaft (2)), make sure to install it in the same position which it was in upon removal. For more details on installation of this special bolt. Refer to WHEEL ALIGNMENT, STANDARD PROCEDURE.**

Fig. 8: Lower Control Arm To Engine Cradle Bolt And Nut
Courtesy of CHRYSLER GROUP, LLC

1. Slide lower control arm into position in engine cradle.
2. Install the lower control arm to cradle bolt and nut (1), but **do not tighten at this time** .

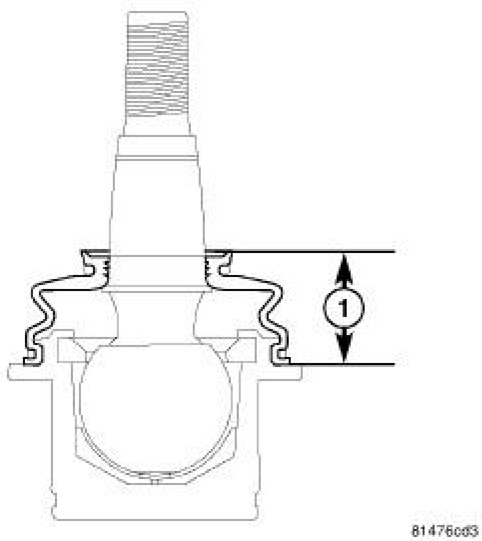


Fig. 9: Ball Joint Seal Boot Height
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Before installing knuckle on lower control arm, measure height of ball joint seal boot (1) mounted on knuckle. If seal boot height is above 25.5 mm, any air inside seal boot must be expelled. To do so, follow these steps.**

- **Tip ball joint stud completely to one side.**
- **Using thumb and index finger, gently squeeze seal boot together at center expelling any air. Do not allow grease to be release.**

- **Push down very top of seal boot.**
- **Return ball joint stud to original "centered" position.**
- **Measure ball joint seal boot height (1) making sure it is within specification.**
- **Wipe any grease from ball joint stud.**

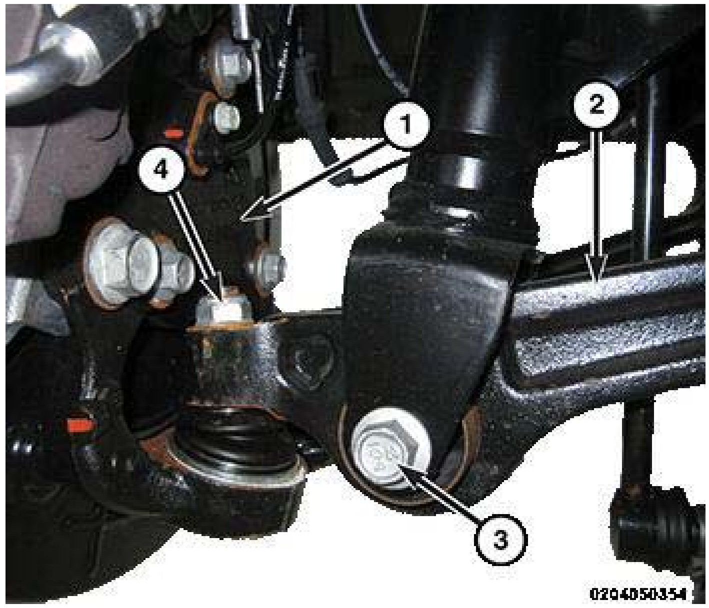


Fig. 10: Knuckle, Lower Control Arm, Strut To Lower Control Arm Bolt & Lower Ball Joint To Knuckle Nut
Courtesy of CHRYSLER GROUP, LLC

3. Pull knuckle (1) downward and position the lower control arm (2) over ball joint stud. Release knuckle, guiding stud into lower control arm. Install a **NEW** lower ball joint to knuckle nut (4). Tighten lower ball joint to knuckle nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten to the proper specification. Refer to **FRONT, SPECIFICATIONS**.
4. Install the strut to lower control arm bolt (3). **Do not tighten bolt at this time.**
5. Install the tire and wheel assembly. Refer to **INSTALLATION** .
6. Remove the support and lower the vehicle.

CAUTION: Because stabilizer bar is disconnected at cradle it is important to use extra care while moving vehicle to alignment rack/drive-on lift.

7. Position vehicle on an alignment rack/drive-on lift.
8. Tighten the strut to lower control arm bolt (3) to the proper specification. Refer to **FRONT, SPECIFICATIONS**.

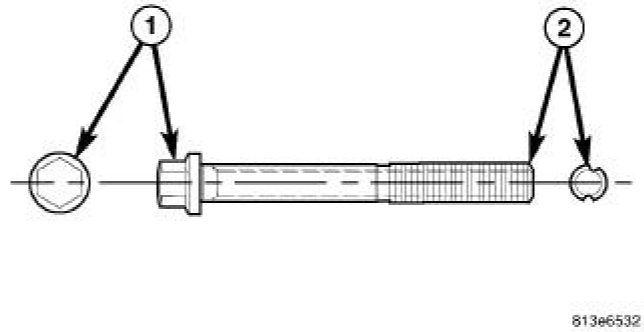


Fig. 11: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the control arm engine cradle bolt is a wheel alignment adjustment bolt (lengthwise grooved shaft (2)), be sure to only tighten the nut. Do not rotate the bolt head (1) or damage to the bushing will occur.

9. Install the front stabilizer bar. Refer to **STABILIZER BAR, FRONT, INSTALLATION**.
10. Install belly pan. Refer to **BELLY PAN, INSTALLATION** and **BELLY PAN, ENGINE, INSTALLATION** .
11. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE**.

Fig. 12: Lower Control Arm To Engine Cradle Bolt And Nut
Courtesy of CHRYSLER GROUP, LLC

12. Once camber is found to be within specifications, tighten the lower control arm to cradle bolt and nut (1) to the proper specification. Refer to **FRONT, SPECIFICATIONS**.

ARM, UPPER CONTROL

REMOVAL

REMOVAL

NOTE: Removal process is the same for both sides of the vehicle.

1. If removing left upper control arm, remove and reposition engine coolant recovery container. Refer to **BOTTLE, PRESSURIZED COOLANT, REMOVAL** .
2. If removing right upper control arm, remove and reposition supercharger coolant recovery container. Refer to **RESERVOIR, COOLANT, REMOVAL** .
3. If removing right upper control arm, remove the power distribution center (PDC) from mount and reposition.

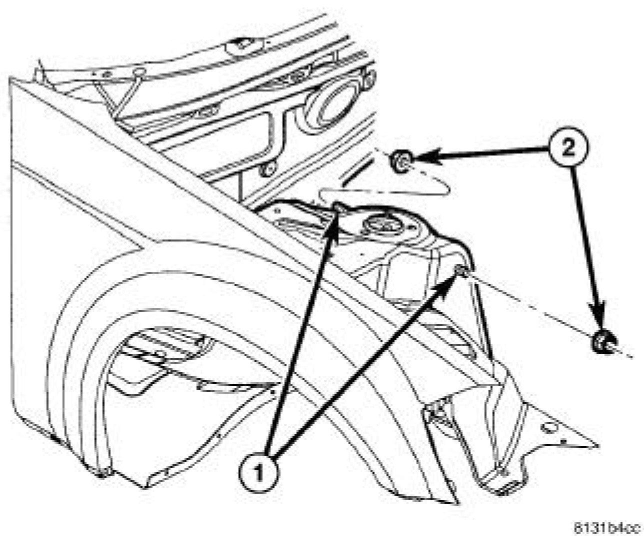


Fig. 13: Upper Control Arm Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the upper control arm to body nuts (2) from upper control arm to body bolts (1).
5. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
6. Remove the tire and wheel assembly. Refer to **REMOVAL** .
7. Remove the necessary strut from the vehicle. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, REMOVAL**.

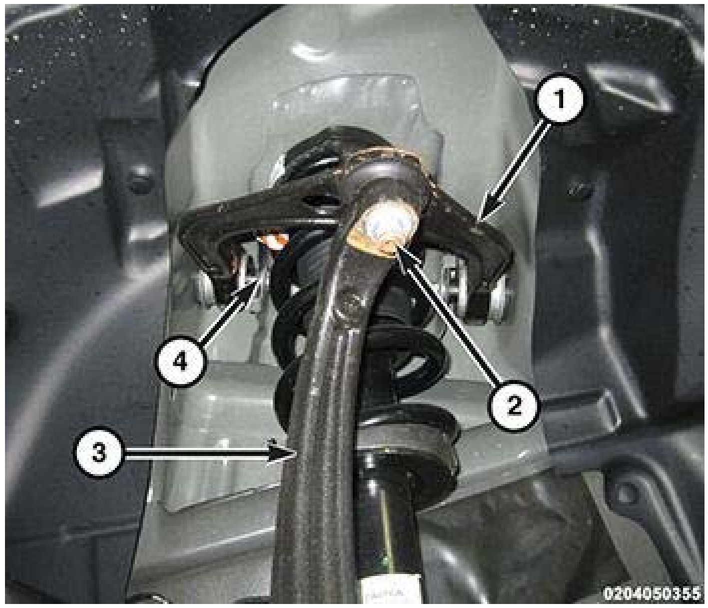


Fig. 14: Upper Control Arm, Upper Ball Joint To Knuckle Nut, Knuckle & Upper Control Arm To Body Flag Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Loosen the upper ball joint to knuckle nut (2). Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

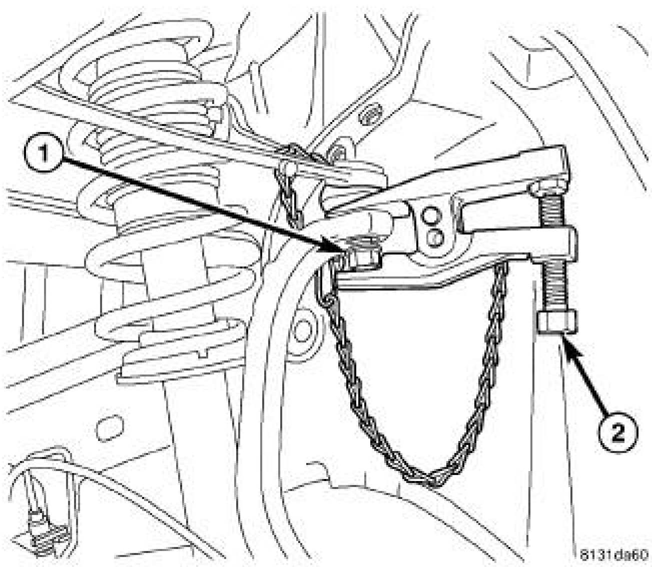


Fig. 15: Using Puller On Upper Ball Joint
Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding into place past seal boot.

9. Using Puller (special tool #9360, Remover, Ball Joint) (2), separate upper ball joint stud (1) from knuckle.

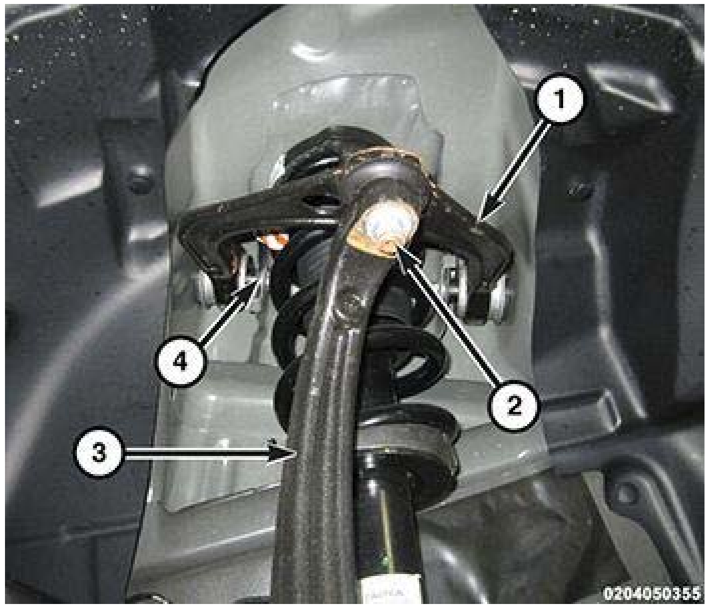


Fig. 16: Upper Control Arm, Upper Ball Joint To Knuckle Nut, Knuckle & Upper Control Arm To Body Flag Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Remove the upper ball joint to knuckle nut (2).
11. Remove upper control arm (flag) bolts (4).
12. Remove upper control arm (1).

INSTALLATION

INSTALLATION

NOTE: **Installation process is the same for both sides of the vehicle.**

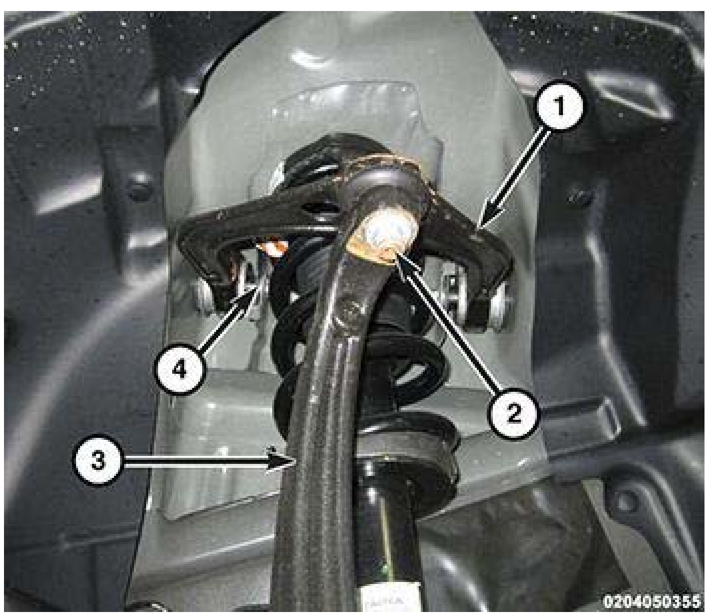


Fig. 17: Upper Control Arm, Upper Ball Joint To Knuckle Nut, Knuckle & Upper Control Arm To Body Flag Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Slide upper control arm (1) into position.
2. Install upper control arm to body (flag) bolts (4). Position flags on bolt heads outward, toward wheel opening.
3. Place upper ball joint stud through hole in top of knuckle and install the upper ball joint to knuckle nut (2). Tighten the upper ball joint to knuckle nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten to the proper specification. Refer to **FRONT, SPECIFICATIONS**.
4. Install the removed strut. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, INSTALLATION**.
5. Install the tire and wheel assembly. Refer to **INSTALLATION** .
6. Remove support and lower vehicle to curb height.

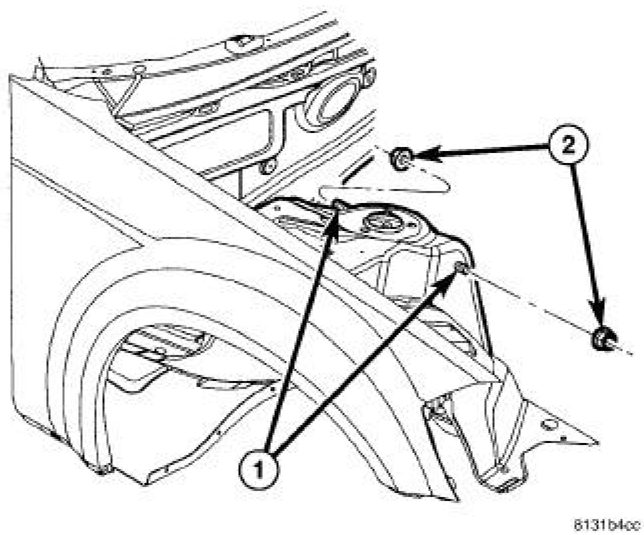


Fig. 18: Upper Control Arm Mounting Nuts
Courtesy of CHRYSLER GROUP, LLC

7. Install the upper control arm to body nuts (2). Tighten both upper control arm to body bolts and nuts to the proper specification. Refer to **FRONT, SPECIFICATIONS**.
8. If installing left upper control arm, install engine coolant recovery container. Refer to **BOTTLE, PRESSURIZED COOLANT, INSTALLATION** .
9. If installing right upper control arm, install the supercharger coolant recovery container. Refer to **RESERVOIR, COOLANT, INSTALLATION** .
10. If installing right upper control arm, install the power distribution center.

BALL JOINT, SUSPENSION, LOWER

DESCRIPTION

DESCRIPTION

There are two lower ball joints on this vehicle. One for the lower control arm and the other for the tension strut. The ball joint for the lower control arm is pressed into the knuckle and the ball joint for the tension strut is part of the tension strut. The ball joints are both "sealed for life" components and cannot be maintenance lubricated. **No attempt should ever be made to add any lubrication to these ball joints.**

The ball joint for the lower control arm is a ball joint and seal boot cartridge type and can be replaced as a separate component of the knuckle. The boot cannot be serviced separately. To service this ball joint, refer to **KNUCKLE, STEERING, DISASSEMBLY**.

Neither the ball joint, nor the seal boot for the tension strut can be serviced as a separate component. The entire tension strut must be replaced if either are damaged.

The ball joint connection to the lower control arm and the ball joint connection at the knuckle is achieved by an interference fit created by the tapered stud of the ball joint and a tapered hole in the steering knuckle. The ball joint stud is retained in the steering knuckle using a locking nut.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - LOWER BALL JOINT

1. Raise vehicle on a drive-on hoist.

NOTE: If a drive-on hoist is not available, use wooden blocks with jack stands to support the lower control arm in the ball joint area. Place the jack stands appropriately and lower the hoist placing weight on the lower control arm. The lower control arms should now be supporting the vehicle weight.

2. Using a jack, lift the front end off the hoist and position a wooden block underneath lower control arm supporting that portion of the vehicles weight.
3. Remove tire and wheel assembly. Refer to **REMOVAL** .
4. Attach a dial indicator as follows:
   a. Tension Strut - Attach a dial indicator to base of tension strut, then align dial indicator's contact pointer with direction of stud axis and touch machined flat on knuckle near ball joint. Zero dial indicator.
   b. Lower Control Arm - Attach a dial indicator to base of lower control arm, then align dial indicator's contact pointer with direction of stud axis and touch machined flat on knuckle near ball joint. Zero dial indicator.

NOTE: Use care when applying the load to the knuckle so as to not damage components of the suspension.

5. Insert a pry bar and rest it against lower control arm or tension strut (depending on which is being tested) and use lever principle to push knuckle upward until dial indicator no longer moves.
6. Record any ball joint movement. If movement in the lower control arm exceeds 1.5 mm (.059 in.), the ball joint is faulty.
7. If the ball joint for the lower control arm needs replaced, it can be serviced separately. Refer to **KNUCKLE, STEERING, DISASSEMBLY**.
8. If the tension strut ball joint needs replaced, the entire tension strut needs to be replaced. Refer to **STRUT, TENSION, REMOVAL**.

REMOVAL

REMOVAL

To service the lower ball joint for the lower control arm, the knuckle must be removed from the vehicle, then the ball joint can be removed. Refer to **KNUCKLE, STEERING, DISASSEMBLY**.

INSTALLATION

INSTALLATION

To install the ball joint for the lower control arm. Refer to **KNUCKLE, STEERING, ASSEMBLY**.

BALL JOINT, SUSPENSION, UPPER

DESCRIPTION

DESCRIPTION

The upper ball joint is pressed into the upper control arm. The ball joint is a "sealed for life" component and cannot be maintenance lubricated. This ball joint is lubricated for life at the time of assembly. **No attempt should be made to ever add any lubrication to this ball joint.**

Neither the upper ball joint, nor the seal boot can be serviced as a separate component. The entire upper control arm must be replaced if either are damaged.

The ball joint connection at the knuckle is achieved by an interference fit created by the tapered stud of the ball joint and a tapered hole in the steering knuckle. The ball joint stud is retained in the steering knuckle using a locking nut.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - UPPER BALL JOINT

1. Raise vehicle on a drive-on hoist.

NOTE: **If a drive-on hoist is not available, use wooden blocks with jack stands to support the lower control arm in the ball joint area. Place the jack stands appropriately and lower the hoist placing weight on the lower control arm. The lower control arms should now be supporting the vehicle weight.**

2. Using a jack, lift the front end off the hoist and position a wooden block underneath lower control arm supporting that corner of the vehicles weight.
3. Remove the tire and wheel assembly. Refer to **REMOVAL** .
4. Attach a dial indicator to body of upper control arm, then align dial indicator's contact pointer with direction of stud axis and touch machined flat on end of knuckle near ball joint. Zero dial indicator.

NOTE: **Use care when applying the load to the knuckle so as to not damage components of suspension.**

5. Insert a pry bar and rest it against bottom of upper control arm and use lever principle to push arm upward until dial indicator no longer moves.
6. Record any ball joint movement. If movement in the control arm exceeds 1.5 mm (.059 in.), the ball joint is faulty.
7. If the ball joint needs replaced, the entire upper control arm needs to be replaced. Refer to **ARM, UPPER**

CONTROL, REMOVAL.

HUB AND BEARING

DESCRIPTION

DESCRIPTION

Fig. 19: Hub & Bearing
Courtesy of CHRYSLER GROUP, LLC

The front wheel bearing and wheel hub of this vehicle are a one-piece sealed unit or hub and bearing unit type assembly.

On Rear-Wheel Drive SRT8 vehicles, the hub and bearing is mounted to the center of the knuckle using three bolts.

All front hub and bearings have five wheel mounting studs on the hub flange for mounting the wheel to the vehicle. The wheel mounting studs are the only replaceable components of the hub and bearing. Otherwise, the hub and bearing is serviced only as a complete assembly.

A magnetic encoder for the wheel speed sensor is pressed onto the hub and bearing.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HUB BEARING - NOISE

NOTE: **The wheel bearing is designed to last for the life of the vehicle and requires no type of periodic maintenance. If it becomes necessary to replace a faulty bearing, do not replace in pairs unless parts manual specifically states to do so.**

Bearings will produce noise if worn or damaged. The noise will generally change when the bearings are loaded. A road test of the vehicle is normally required to determine if there is a bearing noise, or if it is some other component. To assist in finding the location, the following procedure, together with the **DIAGNOSTIC TABLE** , should help determine if a bearing is causing the noise, and if so which one. Keep in mind that

bearing noises are not typically intermittent. If a particular vehicle road test maneuver results in noise only part of the time, it is not likely a faulty bearing.

NOTE: **Damaged bearing seals and the resulting excessive grease loss may also require bearing replacement. Moderate grease seepage from the bearing is considered normal and should not require replacement of the wheel bearing. To diagnose the hub, measure hub runout. Refer to ROTOR, BRAKE, DIAGNOSIS AND TESTING .**

DIAGNOSTIC PROCEDURE:

1. Perform a drive evaluation. Find a smooth level road surface void of traffic or obstructions. Turn off any accessories which may cause background noise. Evaluate for noise at 50 km/h (30 mph) and 100 km/h (60 mph) and with vehicle in neutral to eliminate potential drivetrain noises. With vehicle at a constant speed, steer back and forth to left and right. This will load and unload the bearings and may change the noise level. When bearing damage is slight, the noise is sometimes noticeable at lower speeds and at other times is more noticeable at higher speeds.
2. Drive evaluation results: Did the noise increase when turning right which may indicate a problem with the left bearing? Did the noise increase when turning left which may indicate a problem with the right bearing?
3. Put vehicle up on hoist. Grab the tire by pushing in on the top center and pulling out on the bottom center to check for excessive movement in the bearing.
4. Check for potential rubbing on rotating components, such as rotor splash shields, heat shields touching propshaft or halfshaft, wheel well liners contacting tire, wheel cover on wheel, etc. Any cyclic noise (once per wheel revolution for example) is not a wheel bearing fault.
5. Remove the wheel and tire assembly, disc brake caliper and brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .
6. Rotate the wheel hub, checking for resistance or roughness.
7. Any roughness or resistance to rotation may indicate dirt intrusion or a failed hub bearing. If the bearing exhibits any of these conditions, the hub & bearing will require replacement. Do not attempt to disassemble the bearing for repair.
8. Rotate the wheel hub, utilize Chassis Ears (or stethoscope) to check for noise.
9. If none of the above checks indicate a bearing failure, refer to the **DIAGNOSTIC TABLE** for other possible causes.

DIAGNOSTIC TABLE - HUB BEARING

CONDITION	POSSIBLE CAUSES	POTENTIAL CORRECTIONS
FRONT END WHINE ON TURNS	1. Low Power Steering Fluid Level (if applicable)	1. Fill power steering fluid reservoir to proper level, check for leaks (make sure all air is bled from system fluid)
	2. Worn Tires and/or Incorrect Wheel Alignment	2. Replace Tires, Check And Reset Wheel Alignment
	3. Defective Wheel Bearing	3. Replace Wheel Bearing

CONDITION	POSSIBLE CAUSES	POTENTIAL CORRECTIONS
	4. Wrong Power Steering Fluid (if applicable)	4. Replace With Correct Power Steering Fluid
FRONT END GROWL OR GRINDING ON TURNS	1. Loose Wheel Lug Nuts	1. Verify Wheel Lug Nut Torque
	2. Engine Mount Grounding Against Frame Or Body Of Vehicle	2. Check For Engine Mount Hitting Frame Rail And Reposition Engine As Required
	3. Worn Tires and/or Incorrect Wheel Alignment	3. Replace Tires, Check and Reset Wheel Alignment
	4. Defective Wheel Bearing	4. Replace Wheel Bearing
	5. Worn or Broken C/V Joint	5. Replace C/V Joint
	6. Engine Not Centered, Causing Axle Half Shaft to Bottom Out	6. Center the Engine
POPPING/CLICKING/SNAPPING DURING ACCELERATION AFTER DRIVE-TO-REVERSE SHIFT, REVERSE-TO-DRIVE SHIFT OR WHILE TURNING	1. Insufficient Hub Nut Torque	1. Torque Hub Nut to Spec
	2. Insufficient Grease on Mating Surface of Axle Half Shaft Outer C/V Joint to Wheel Hub/Bearing, or Worn/Damaged Gasket	2. Separate Half Shaft From Hub and Bearing and Wipe Mating Surfaces Clean. Apply Light Coating of Wheel Bearing Grease to C/V Joint Surface and Reassemble, or Replace Gasket. Torque Hub Nut to Spec
WHINE/HUM/ROAR WITH VEHICLE GOING STRAIGHT AT A CONSTANT SPEED	1. Worn Tires and/or Incorrect Wheel Alignment	1. Replace Tires and Reset Wheel Alignment
	2. Defective Wheel Bearing	2. Replace Wheel Bearing
GROWL OR GRINDING WITH VEHICLE GOING STRAIGHT AT A CONSTANT SPEED	1. Engine Mount Grinding Against Frame or Body	1. Check and Reposition Engine as Required
	2. Defective Wheel Bearing	2. Replace Wheel Bearing
	3. Worn or Broken C/V Joint	3. Replace C/V Joint

REMOVAL

REMOVAL

NOTE: Removal process is the same for both sides of the vehicle.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .
3. Remove front brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .

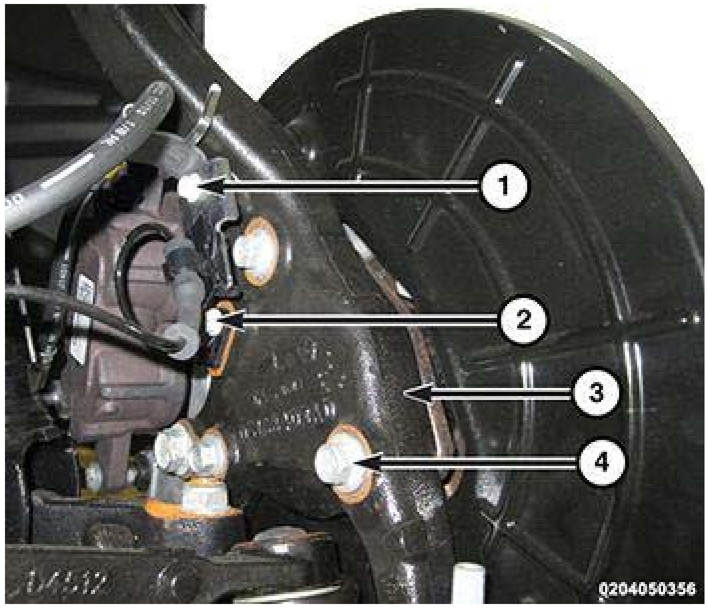


Fig. 20: Front Brake Hose Support Bracket Bolt & Front Hub And Bearing To Knuckle Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Remove the front brake hose support bracket bolt (1) and position bracket away from knuckle.
5. Remove the three front hub and bearing to knuckle bolts (4).

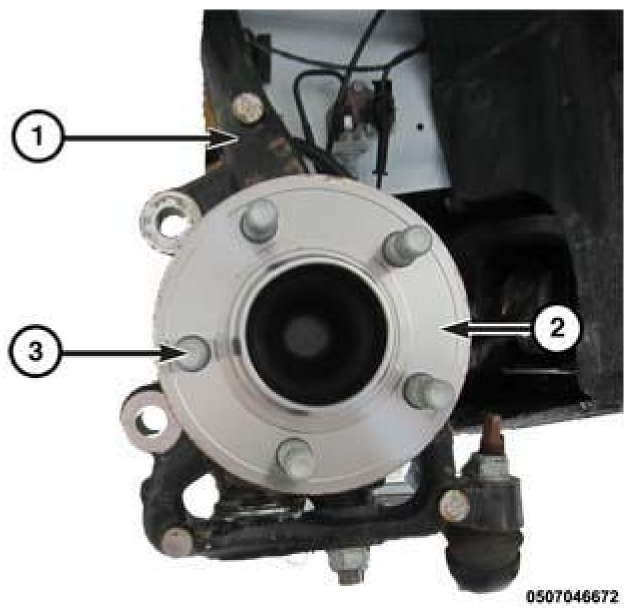


Fig. 21: Knuckle & Hub And Bearing
Courtesy of CHRYSLER GROUP, LLC

6. Slide hub and bearing (2) off the knuckle (1).

INSTALLATION

INSTALLATION

NOTE: **Installation process is the same for both sides of the vehicle.**

NOTE: **Prior to installation, inspect magnetic encoder (for wheel speed sensor) (2) for any damage and make sure any metal debris sticking to it is removed.**

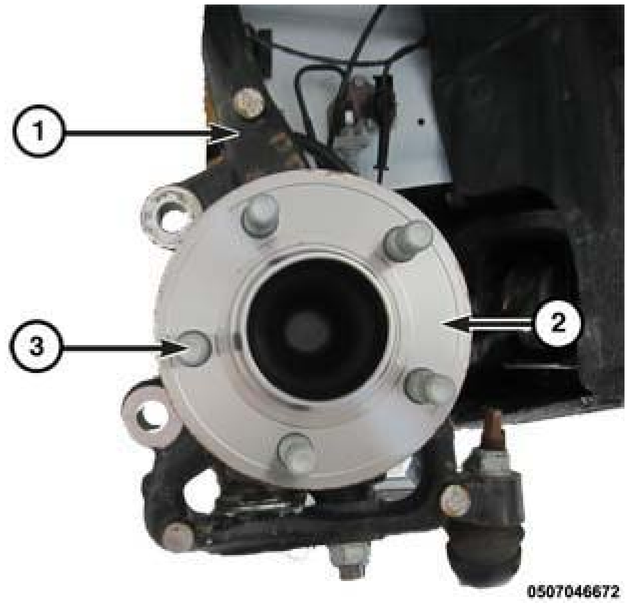


Fig. 22: Knuckle & Hub And Bearing
Courtesy of CHRYSLER GROUP, LLC

1. Slide hub and bearing (2) into the knuckle (1).

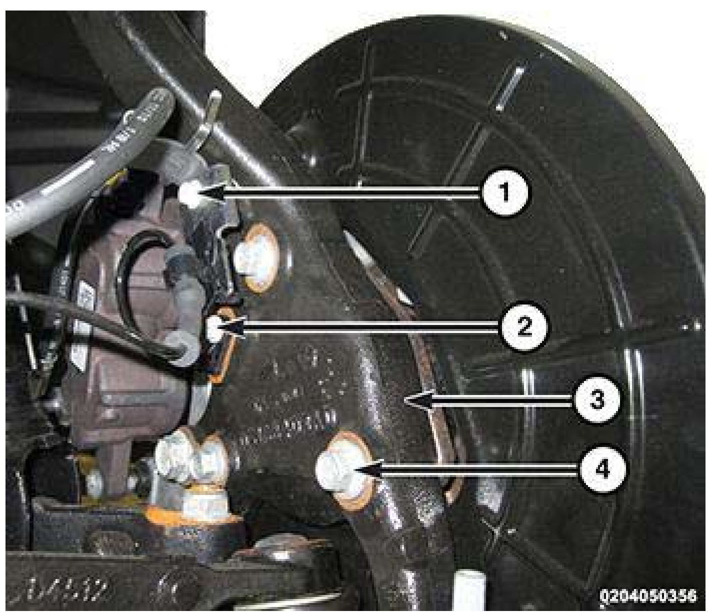


Fig. 23: Front Brake Hose Support Bracket Bolt & Front Hub And Bearing To Knuckle Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Install the three front hub and bearing mounting bolts (4), and tighten to the proper specification. Refer to **FRONT, SPECIFICATIONS** .
3. Install the front brake hose support bracket and bolt (1).
4. Install the front brake rotor. Refer to **ROTOR, BRAKE, INSTALLATION** .
5. Install the tire and wheel assembly. Refer to **INSTALLATION** .

6. Remove the support and lower the vehicle.

KNUCKLE, STEERING

REMOVAL

REMOVAL

NOTE: Removal process is the same for both sides of the vehicle.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .
3. Remove the front wheel speed sensor. Refer to **SENSOR, WHEEL SPEED, FRONT, REMOVAL** .

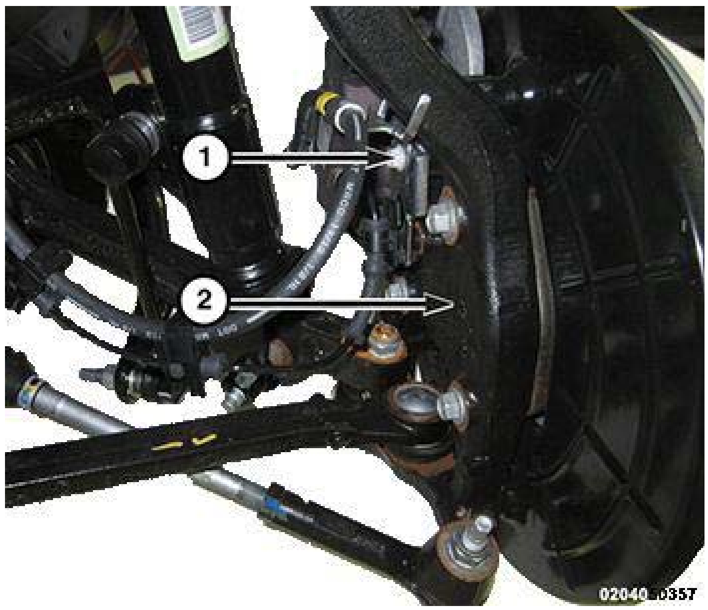


Fig. 24: Front Brake Hose Support Bracket Bolt & Knuckle
Courtesy of CHRYSLER GROUP, LLC

4. Remove the front brake hose support bracket bolt (1) and position bracket away from knuckle (2).
5. Remove front brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .
6. Remove outer tie rod end from knuckle. Refer to **TIE ROD, STEERING, REMOVAL** .
7. Remove the upper ball joint from the knuckle. Refer to **ARM, UPPER CONTROL, REMOVAL**.
8. Remove the tension strut from the knuckle. Refer to **STRUT, TENSION, REMOVAL**.
9. Remove the lower ball joint from the knuckle. Refer to **BALL JOINT, SUSPENSION, LOWER, REMOVAL**.
10. Remove knuckle (2) from vehicle.

DISASSEMBLY

DISASSEMBLY

NOTE: To perform this procedure, it works best to mount Ball Joint Press (special tool #C-4212F, Press, Ball Joint) in a vise.

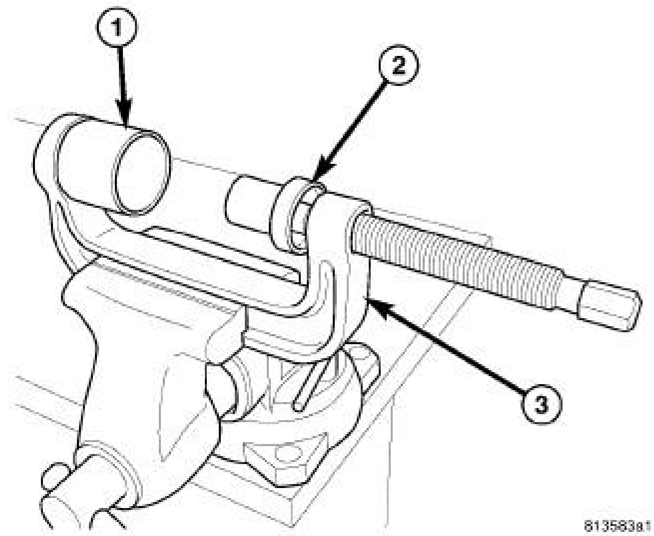


Fig. 25: Tools Assembled For Ball Joint Removal
Courtesy of CHRYSLER GROUP, LLC

1. Place Ball Joint Remover/Installer (special tool #9320, Remover/Installer, Ball Joint) (1) into cup area of Ball Joint Press (special tool #C-4212F, Press, Ball Joint) (3) as shown in illustration and tighten set screw.
2. Place Ball Joint Remover/Installer (special tool #9320-3, Remover, Ball Joint) (2) onto end of screw-drive of Ball Joint Press (special tool #C-4212F, Press, Ball Joint) (3) as shown in illustration.

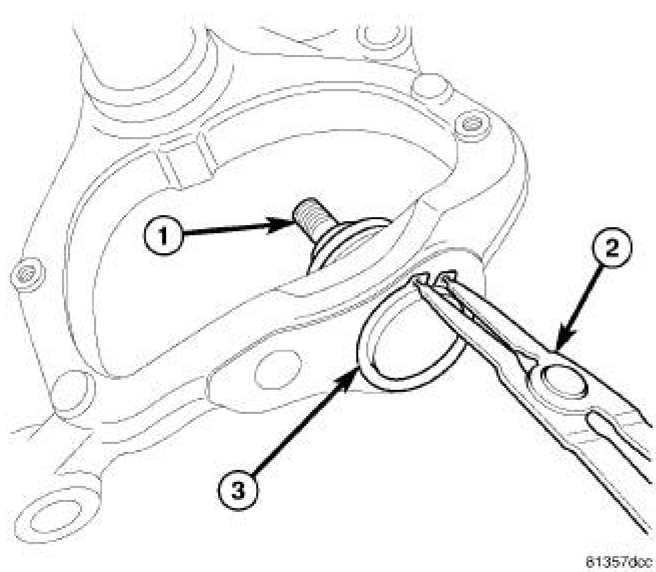


Fig. 26: Ball Joint Snap Ring
Courtesy of CHRYSLER GROUP, LLC

3. Using a pair of snap-ring pliers (2), remove snap-ring (3) from bottom of ball joint (1).

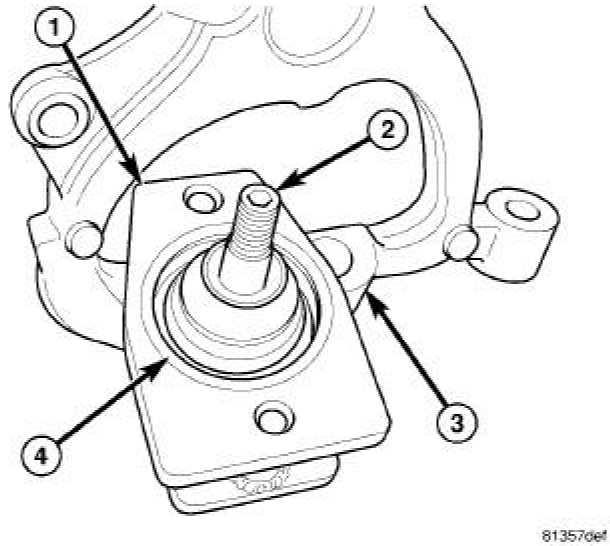


Fig. 27: Support Clamp Positioned Over Ball Joint
Courtesy of CHRYSLER GROUP, LLC

4. Install halves of Support Clamp (1), Ball Joint Remover/Installer (special tool #9320-1, Plate, Ball Joint Remover) (2) over ball joint (2) and around knuckle surface (3) as shown in illustration. Install and snug Support Clamp (1) screws from underside.

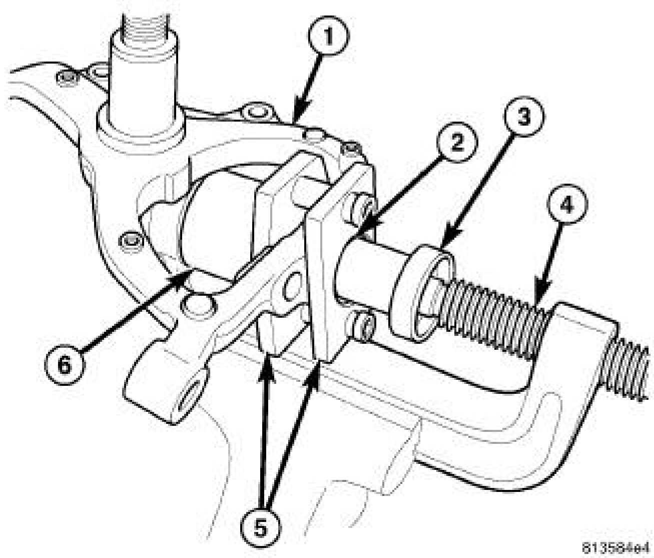


Fig. 28: Tools Positioned For Ball Joint Removal
Courtesy of CHRYSLER GROUP, LLC

5. Position knuckle (1) over tools guiding top of ball joint inside of Receiver (6), then hand tighten Press screw-drive (4) until Remover (3) comes into contact with bottom of ball joint (2).

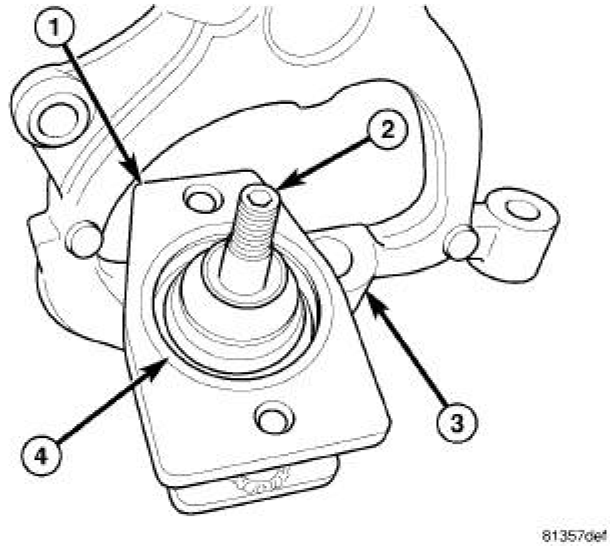


Fig. 29: Support Clamp Positioned Over Ball Joint
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When positioning knuckle over tools, make sure Receiver, Ball Joint Remover/Installer (special tool #9320-5, Receiver Cup), sets into recessed area (4) of Support Clamp, Ball Joint Remover/Installer (special tool #9320-1, Plate, Ball Joint Remover).**

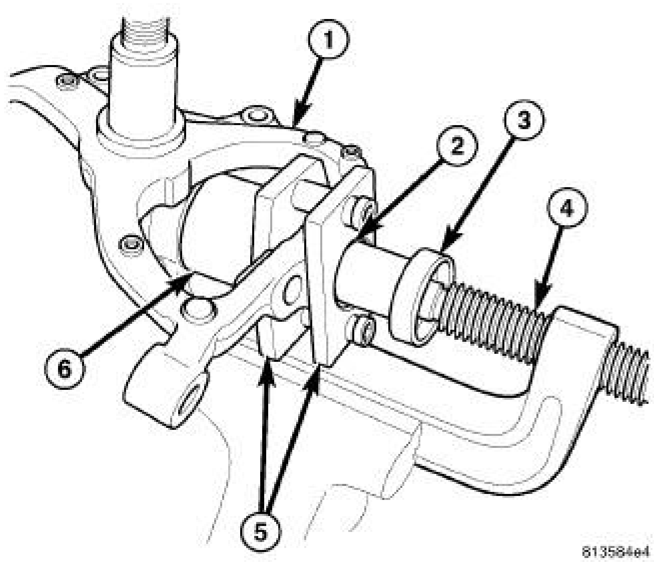
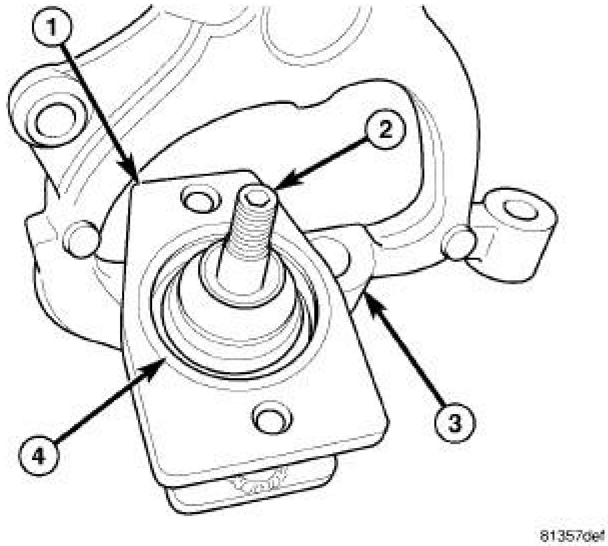


Fig. 30: Tools Positioned For Ball Joint Removal
Courtesy of CHRYSLER GROUP, LLC

6. Tighten Press screw-drive (4) forcing ball joint out of knuckle (1) and into Receiver (6).
7. Loosen screw-drive (4) and remove knuckle (1) from Press. Remove ball joint from Receiver (6).



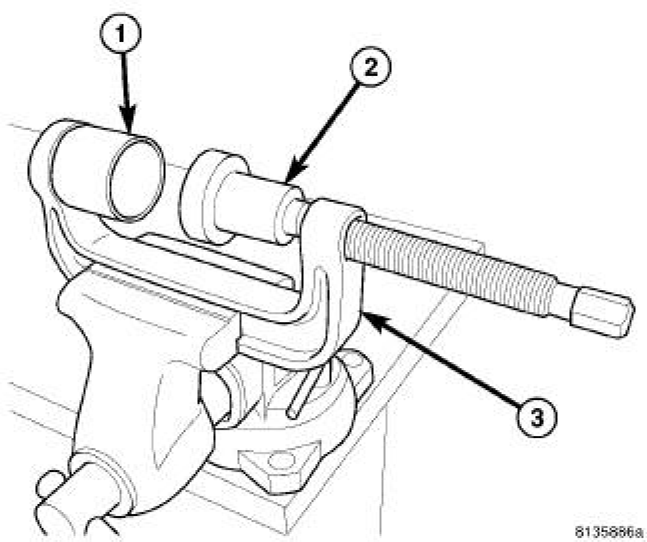
[Fig. 31: Support Clamp Positioned Over Ball Joint](#)
Courtesy of CHRYSLER GROUP, LLC

8. Remove Support Clamp (1) from knuckle (3).

ASSEMBLY

ASSEMBLY

NOTE: **To perform this procedure, it works best to mount Ball Joint Press (special tool #C-4212F, Press, Ball Joint) in a vise.**



[Fig. 32: Tools Assembled For Ball Joint Installation](#)
Courtesy of CHRYSLER GROUP, LLC

1. Place Ball Joint Remover/Installer (special tool #9320-4, Installer Cup) (1) into cup area of Ball Joint Press (special tool #C-4212F, Press, Ball Joint) (3) as shown in illustration and tighten set screw.

2. Place Ball Joint Remover/Installer (special tool #9320-3, Remover, Ball Joint), onto end of screw-drive of Ball Joint Press (special tool #C-4212F, Press, Ball Joint) (3) as shown in illustration.

   Note: This is the reverse of how Remover is installed on screw-drive for removal.

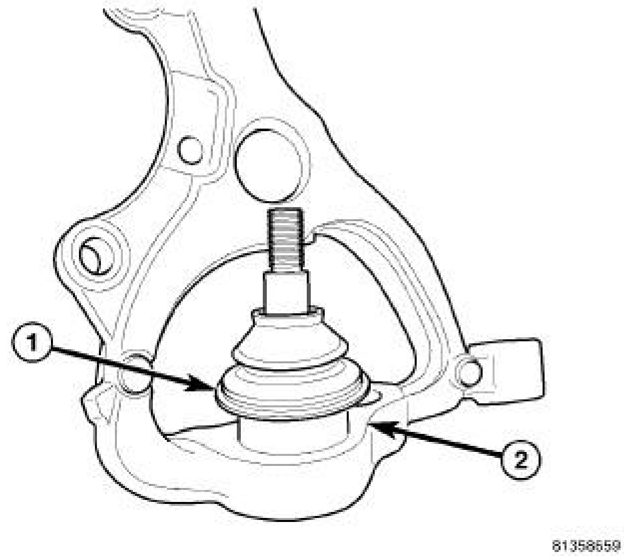


Fig. 33: Ball Joint & Knuckle Bore
Courtesy of CHRYSLER GROUP, LLC

3. Start NEW ball joint (1) into bore of knuckle (2).

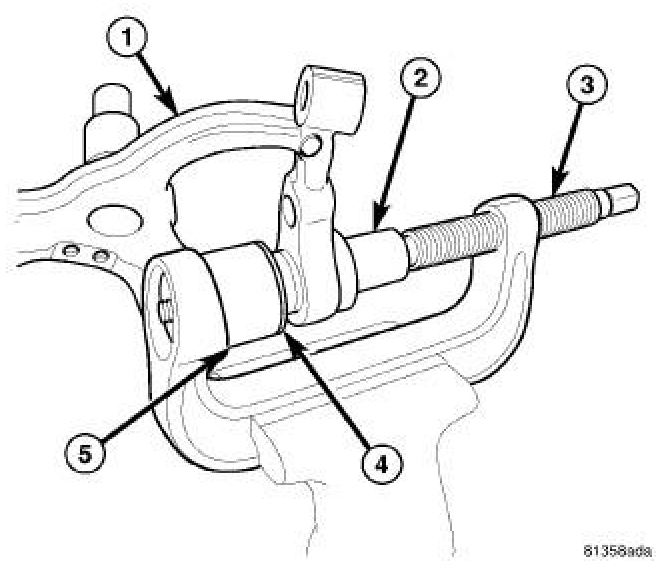


Fig. 34: Tools Positioned For Ball Joint Installation
Courtesy of CHRYSLER GROUP, LLC

4. Position knuckle (1) over tools guiding top of ball joint inside of Installer (5) until outside flange of ball joint (4) comes into contact with Installer, then hand tighten Press screw-drive (3) until Remover (2) comes into contact with bottom of knuckle (1).
5. Using hand tools, tighten screw-drive (3), pressing ball joint into knuckle until flange (4) comes to a stop

against the knuckle.

6. Loosen screw-drive and remove knuckle from Press.

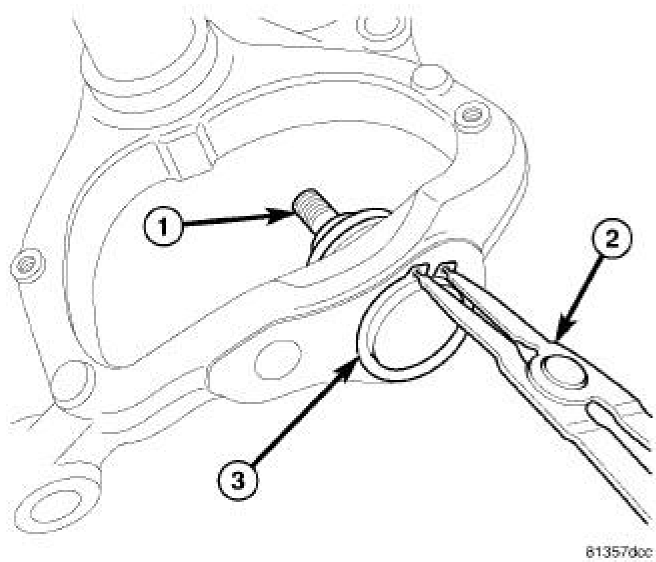


Fig. 35: Ball Joint Snap Ring
Courtesy of CHRYSLER GROUP, LLC

7. Install snap-ring (3) into groove on bottom of ball joint.
8. Inspect ball joint for proper fit. Make sure seal boot is uniform and wire rings are in place.
9. Install knuckle on vehicle. Refer to **KNUCKLE, STEERING, INSTALLATION**.

INSTALLATION

INSTALLATION

NOTE: **Installation process is the same for both sides of the vehicle.**

1. Install the knuckle onto the lower ball joint. Refer to **BALL JOINT, SUSPENSION, LOWER, INSTALLATION**.
2. Install the tension strut onto the knuckle. Refer to **STRUT, TENSION, INSTALLATION**.
3. Install the upper ball joint onto the knuckle. Refer to **ARM, UPPER CONTROL, INSTALLATION**.
4. Install the outer tie rod end to the knuckle. Refer to **TIE ROD, STEERING, INSTALLATION** .
5. Install brake rotor. Refer to **ROTOR, BRAKE, INSTALLATION** .

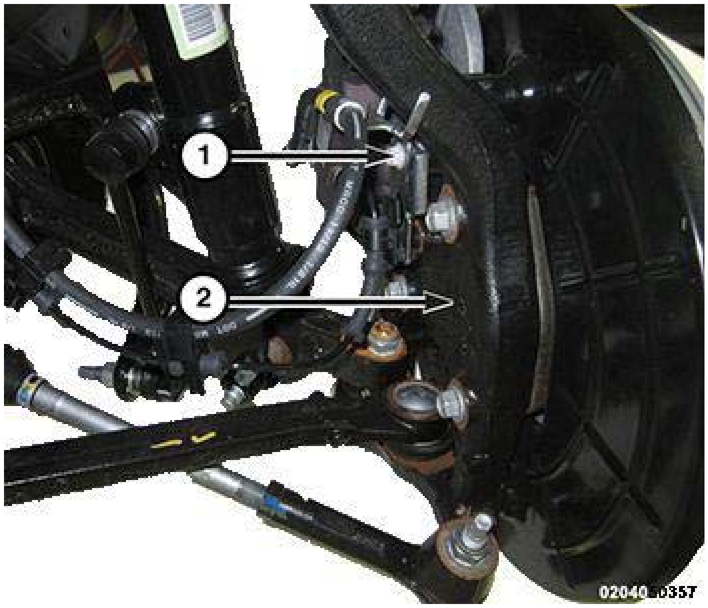


Fig. 36: Front Brake Hose Support Bracket Bolt & Knuckle
Courtesy of CHRYSLER GROUP, LLC

6. Install the front brake hose support bracket and bolt (1).
7. Install the wheel speed sensor. Refer to **SENSOR, WHEEL SPEED, FRONT, INSTALLATION** .
8. Install the tire and wheel assembly. Refer to **INSTALLATION** .
9. Remove the support and lower the vehicle.

SENSOR, ACTIVE DAMPING

DESCRIPTION

DESCRIPTION

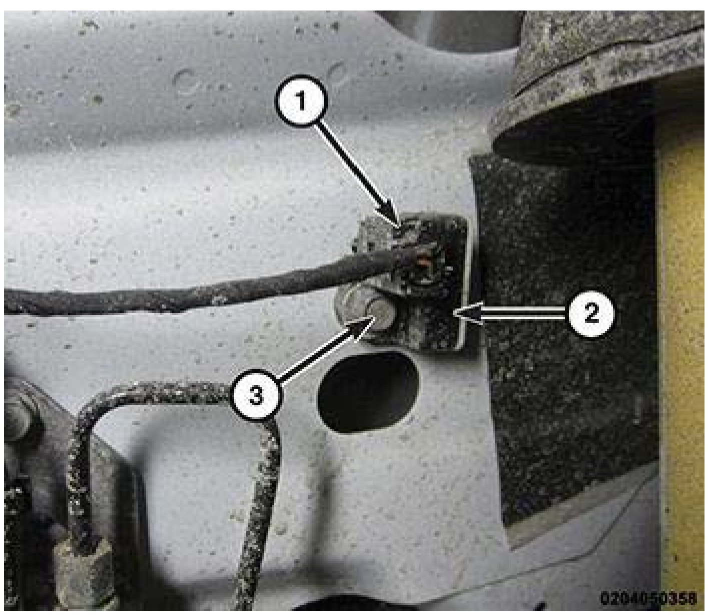


Fig. 37: Damping Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left front sensor shown in illustration.**

There are three active damping sensors (2). The front sensors are located in each front wheel well next to the brake line junction. The rear sensor is mounted in the right rear wheel well on the shock tower. The sensors are 3 wire, 5V reference sensors wired directly to the Active Damping Control Module (ADCM).

OPERATION

OPERATION

The Active Damping Control Module (ADCM) uses the CAN bus to communicate with multiple modules. The ADCM has the following inputs: Vehicle Speed, Steering Angle Sensor (SAS) position, Throttle Position Sensor (TPS), Active Damping System (ADS) Switch, and three active damping sensors.

There are two operating modes of the ADS, Auto and Sport. At each ignition key on cycle, the vehicle defaults to Auto mode. When Sport mode is selected, the suspension has unique handling characteristics.

The Active Damping Control Module (ADCM) controls the suspension and ride for the SRT version of this vehicle by adjusting the rebound and jounce of the shock assemblies using the above information and predetermined settings for maximum vehicle control. The shock absorbers are unique to the ADS. Each shock absorber has a valving unit that is external, but still part of the shock absorber. Inside each valving unit are two solenoids that control the damping valves to alter the ride of the vehicle. The shocks are replaced as an assembly, they cannot be disassembled for repair.

Additionally, there are three active damping sensors, two in the front of the vehicle and one in the rear. These sensors measure the plane of the vehicle.

REMOVAL

FRONT

NOTE: **Removal process is the same for both sides of the vehicle.**

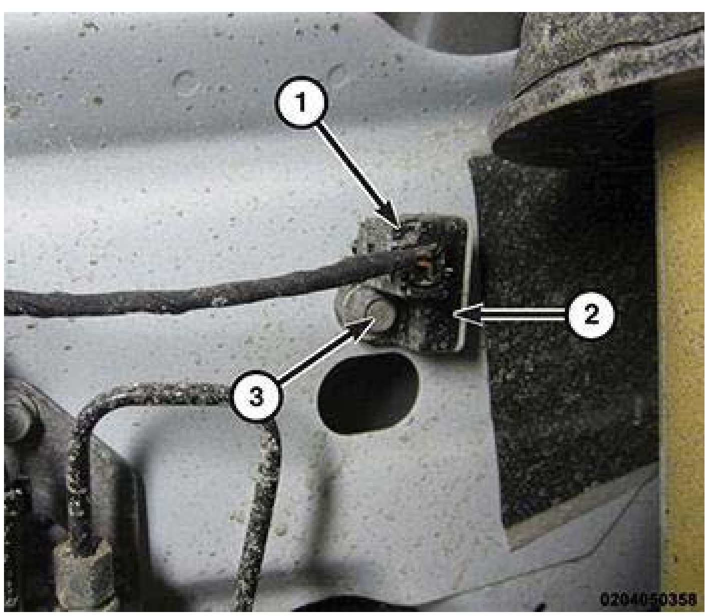


Fig. 38: Damping Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Release the terminal locking tab and disconnect the wiring harness connector (1).
3. Remove the front Active Damping System (ADS) sensor bolt (3) and sensor (2) from the vehicle.

REAR

NOTE: **Removal process is the same for both sides of the vehicle.**

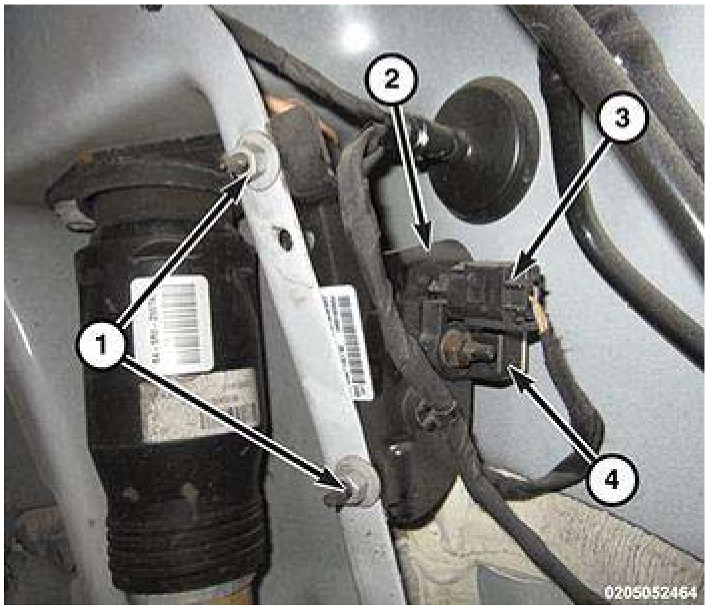


Fig. 39: Rear ADS Sensor Nuts, Connector & Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Release the terminal locking tab and disconnect the wiring harness connector (3) from the rear Active Damping System (ADS) sensor (4).
3. Remove the rear ADS sensor nut (1) and remove sensor (2) from the vehicle.

INSTALLATION

FRONT

NOTE: **Installation process is the same for both sides of the vehicle.**

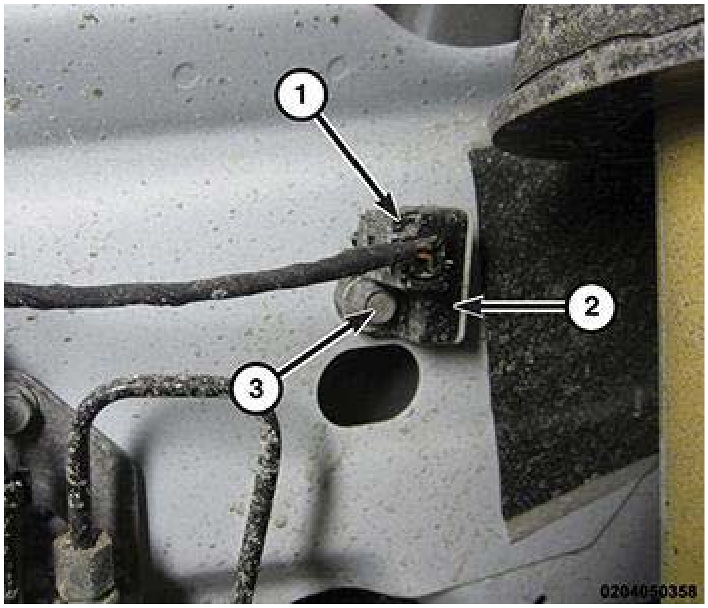


Fig. 40: Damping Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Position the sensor (2), install the front Active Damping System (ADS) sensor bolt (3) and tighten to the proper specification. Refer to **FRONT, SPECIFICATIONS**.
2. Connect the wiring harness connector (1) and seat the terminal locking tab.

REAR

NOTE: Installation process is the same for both sides of the vehicle.

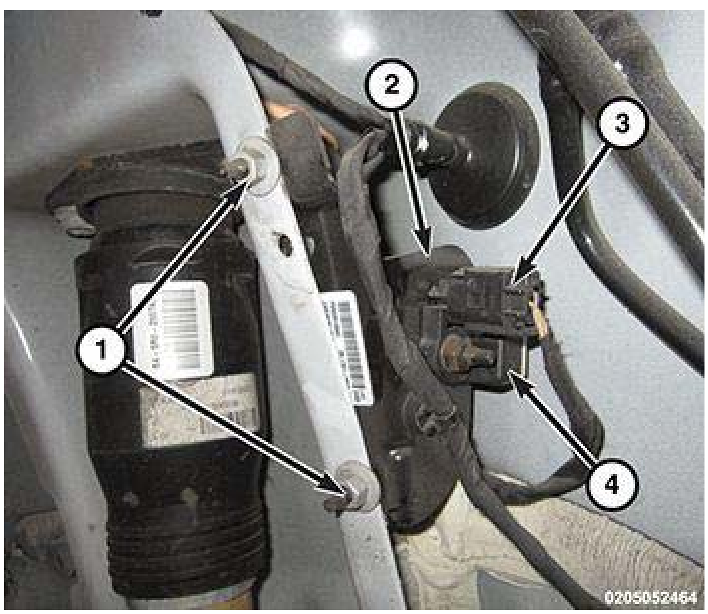


Fig. 41: Rear ADS Sensor Nuts, Connector & Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Install the bracket (2) and place the studs through the holes in the rear shock tower.
2. Install the rear Active Damping System (ADS) sensor nuts (1) and tighten to the proper specification.

Refer to **FRONT, SPECIFICATIONS**.

3. Connect the wiring harness connector (3) to the ADS sensor (4) and seat the terminal locking tab.

SHOCK ABSORBER, SUSPENSION, COIL-OVER

REMOVAL

NON SRT

NOTE: **Removal process is the same for both sides of the vehicle.**

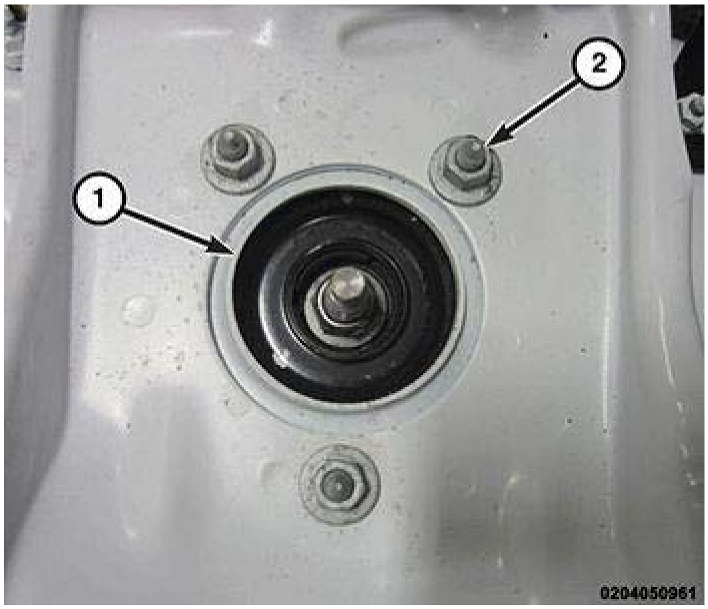


Fig. 42: Shock Tower & Nut
Courtesy of CHRYSLER GROUP, LLC

1. If equipped, remove front shock tower cap from top of shock assembly.
2. Remove three nuts (2) fastening shock assembly to shock tower (1).
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Remove the tire and wheel assembly. Refer to **REMOVAL** .

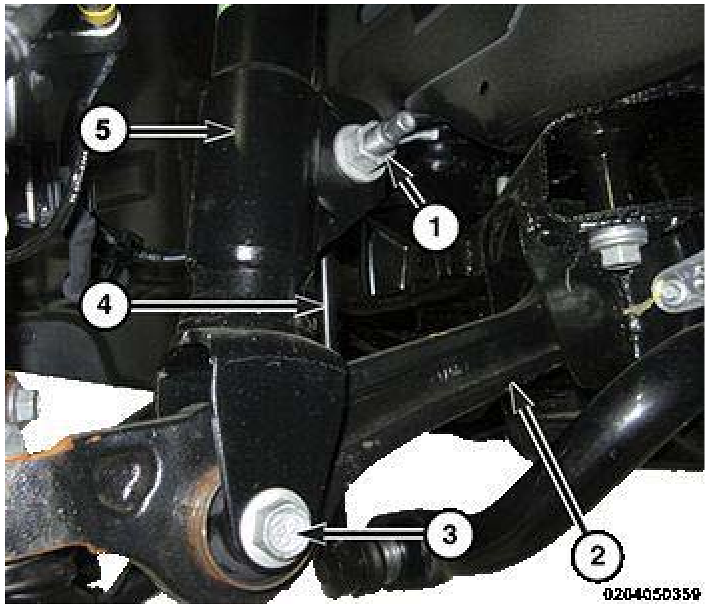


Fig. 43: Stabilizer Link To Strut Nut, Lower Control Arm, Lower Control Arm Bolt, Stabilizer Link & Shock/Strut Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Remove the stabilizer link to strut nut (1). Slide stabilizer link (4) from shock assembly (5).
6. Remove the strut to lower control arm bolt (3).
7. Remove the upper ball joint from the knuckle. Refer to **ARM, UPPER CONTROL, REMOVAL**.
8. Tip top of knuckle outward using care not to overextend brake flex hose.
9. Remove the strut assembly (5) from vehicle.

SRT

NOTE: **Removal process is the same for both sides of the vehicle.**

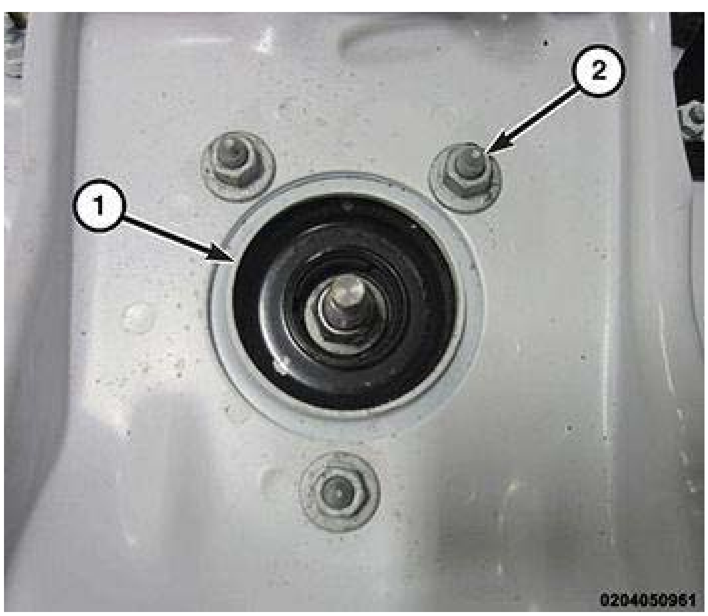


Fig. 44: Shock Tower & Nut
Courtesy of CHRYSLER GROUP, LLC

1. If removing right front strut, remove the supercharger coolant recovery reservoir. Refer to **RESERVOIR, COOLANT, REMOVAL** .
2. If equipped, remove front shock tower cap from top of shock assembly.
3. Remove three nuts (2) fastening shock assembly to shock tower (1).
4. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
5. Remove the tire and wheel assembly. Refer to **REMOVAL** .
6. Remove front splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .

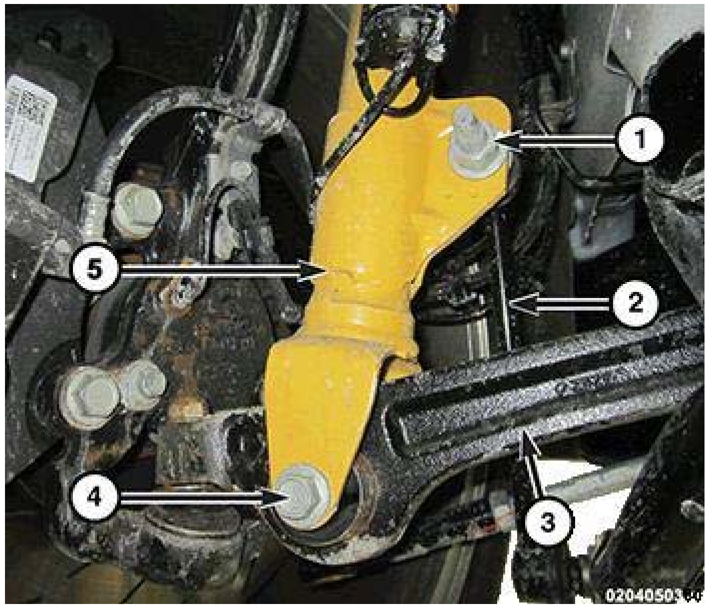


Fig. 45: Stabilizer Link To Strut Nut, Stabilizer Link, Lower Control Arm, Lower Control Arm Bolt & Shock/Strut Assembly
Courtesy of CHRYSLER GROUP, LLC

7. Remove the stabilizer link to strut nut (1). Slide stabilizer link (2) from shock assembly (5).
8. Remove the strut to lower control arm bolt (4).

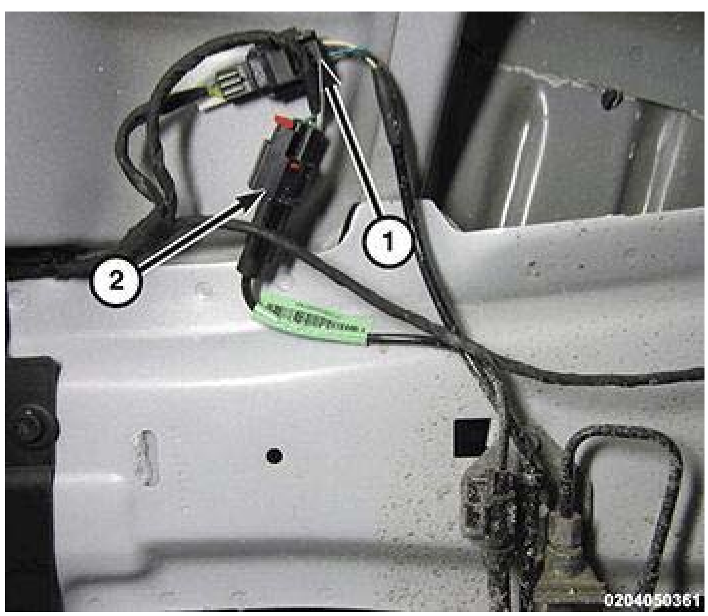


Fig. 46: Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the Active Damping System (ADS) shock connector (1) from the harness on the wheel well.
10. Remove the upper ball joint from the knuckle. Refer to **ARM, UPPER CONTROL, REMOVAL**.
11. Tip top of knuckle outward using care not to overextend brake flex hose.
12. Remove shock assembly from vehicle.

DISASSEMBLY

DISASSEMBLY

Fig. 47: Identifying Pliers On Chrome Machined Surface Of Shock/Strut Rod
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use any type of pliers on the chrome machined surface of shock/strut rod to assist in the disassembly/assembly of shocks or struts. Use only tools designed to hold the shock/strut rod stationary when servicing shock or strut components.

The shock assembly must be removed from vehicle for it to be disassembled and assembled.

For shock assembly disassembly and assembly, use of shock Spring Compressor, Mopar Service Equipment (MSE) tool W-7200, or equivalent, is recommended to compress coil spring. Follow manufacturer's instructions closely.

WARNING: Do not remove shock shaft nut before coil spring is compressed. Coil spring is held under pressure and must be compressed, removing spring tension from upper and lower mounts, before shock removal.

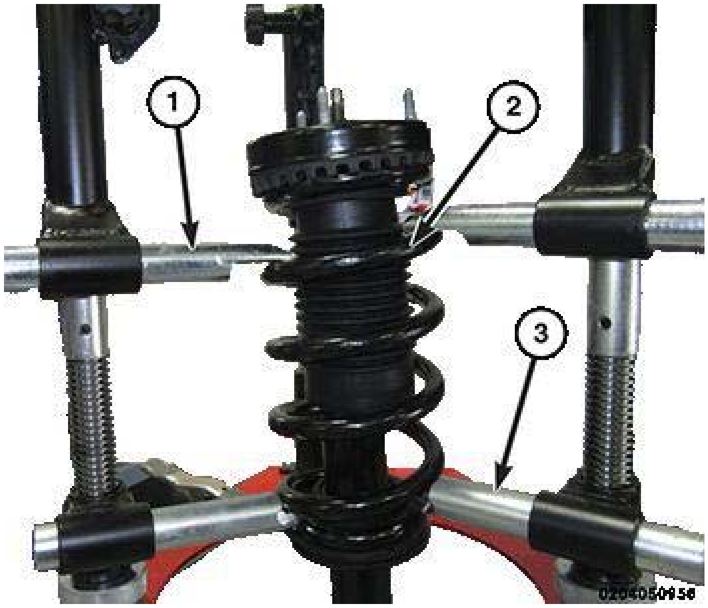


Fig. 48: Compressor Hooks & Coil Spring
Courtesy of CHRYSLER GROUP, LLC

1. Position shock assembly coil spring (2) on hooks (1, 3) of the compressor following manufacturers instructions. Install clamp securing shock to the upper and lower spring coil. To ease installation, rotate shock as necessary positioning shock in compressor so that upper spring coil ends (step in upper mount) at straight outward position from compressor.
2. Compress coil spring (2) until all spring tension is removed from upper mount.

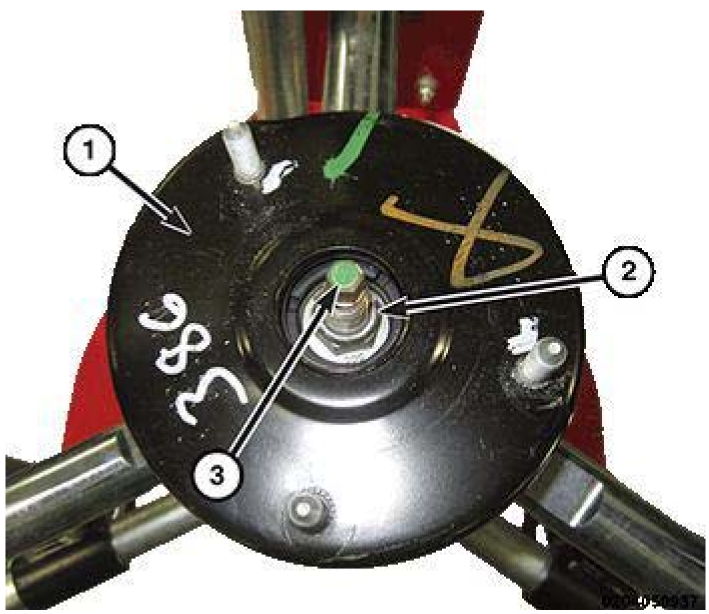


Fig. 49: Removing/Installing Shock Absorber Shaft Nut
Courtesy of CHRYSLER GROUP, LLC

3. Using the appropriate tool, remove the shock absorber shaft nut (3).
4. Remove clamp from bottom of coil spring and remove shock and lower isolator out through bottom of coil spring.
5. Remove upper mount (1) from shock shaft and coil spring if replaced is necessary.

NOTE: **Prior to removing spring from compressor, note location of lower spring coil end in relationship to compressor to ease assembly of components later.**

6. Back off compressor drive, releasing tension from coil spring. Push back compressor upper hooks and remove coil spring from compressor.

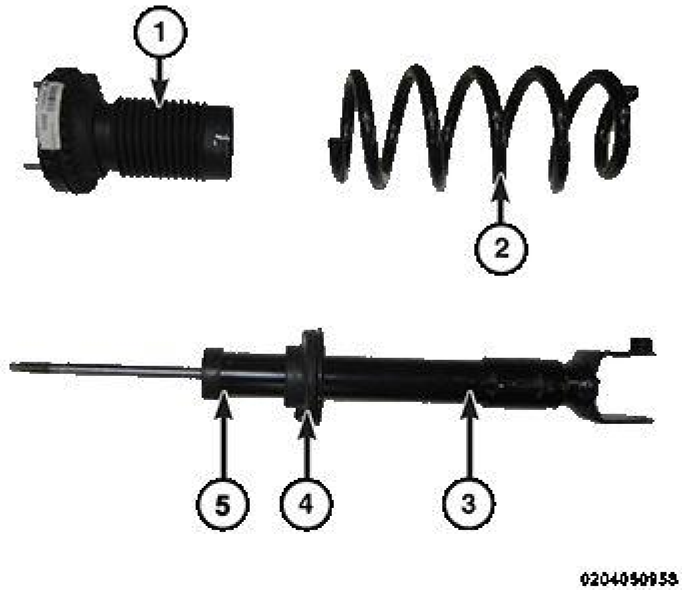


Fig. 50: Coil Spring Isolators, Coil Spring & Shock
Courtesy of CHRYSLER GROUP, LLC

7. Remove jounce bumper from shock shaft by pulling straight up and off.
8. Remove lower isolator (4) from shock body by pulling straight up and off shock shaft.
9. Inspect shock assembly components for following and replace as necessary:

- Inspect shock (3) for any condition of shaft binding over full stroke of shaft.
- Inspect upper mount (1) for cracks and distortion and its retaining studs for any sign of damage.
- Inspect upper spring isolator (1) for severe deterioration.
- Inspect lower spring isolator (4) for severe deterioration.
- Inspect dust shield for tears and deterioration.
- Inspect coil spring (2) for cracks in the coating and corrosion.
- Inspect jounce bumper for cracks and signs of deterioration.

ASSEMBLY

ASSEMBLY

Fig. 51: Identifying Pliers On Chrome Machined Surface Of Shock/Strut Rod
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use any type of pliers on the chrome machined surface of shock/strut rod to assist in the disassembly/assembly of shocks or struts. Use only tools designed to hold the shock/strut rod stationary when servicing shock or strut components.

CAUTION: Use care not to damage coil spring coating during spring assembly. Damage to coating will jeopardize its corrosion protection.

NOTE: Left and right springs must not be interchanged.

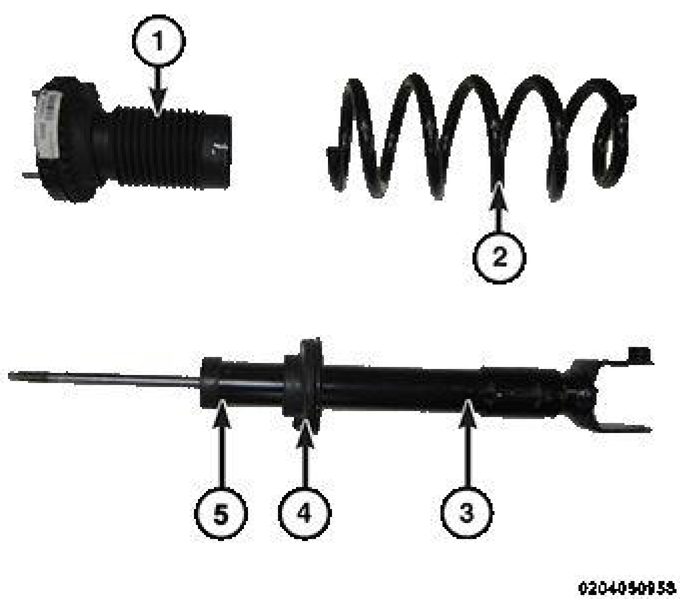


Fig. 52: Coil Spring Isolators, Coil Spring & Shock
Courtesy of CHRYSLER GROUP, LLC

1. Place coil spring (2) **(part number tag end upward)** in compressor lower hooks following manufacturers instructions. To ease shock reassembly, rotate coil spring around until upper coil ends at straight outward position from compressor. Proper orientation of spring to upper mount (once installed) is necessary.
2. Position compressor upper hooks over coil spring following manufacturers instructions.
3. Compress coil spring far enough to allow shock installation.

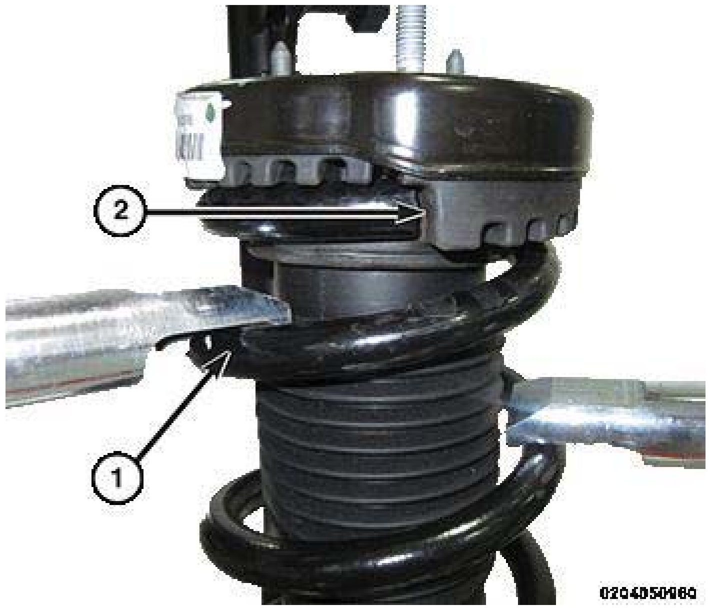


Fig. 53: Coil Spring & Upper Mount
Courtesy of CHRYSLER GROUP, LLC

4. If separated, install upper mount (1) onto coil spring (2). Match step in upper isolator to end of spring coil.

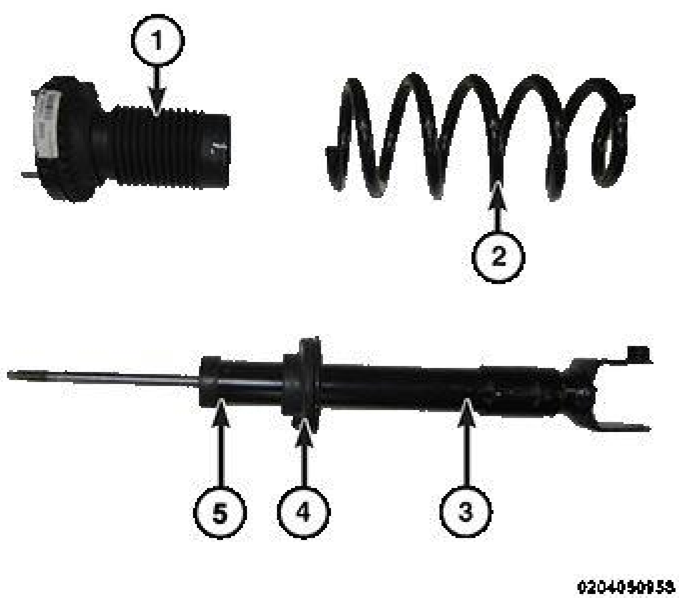


Fig. 54: Coil Spring Isolators, Coil Spring & Shock
Courtesy of CHRYSLER GROUP, LLC

5. Install lower spring isolator (4) on shock body (3).
6. Install jounce bumper on shock shaft, small end first.

Fig. 55: Matching Step Built Into Isolator To Lower Coil End
Courtesy of CHRYSLER GROUP, LLC

7. Install shock through bottom of coil spring until lower spring isolator (on shock) contacts lower end of coil spring. Match step built into isolator (1) to lower coil end.
8. Install clamp to hold shock and coil spring together.

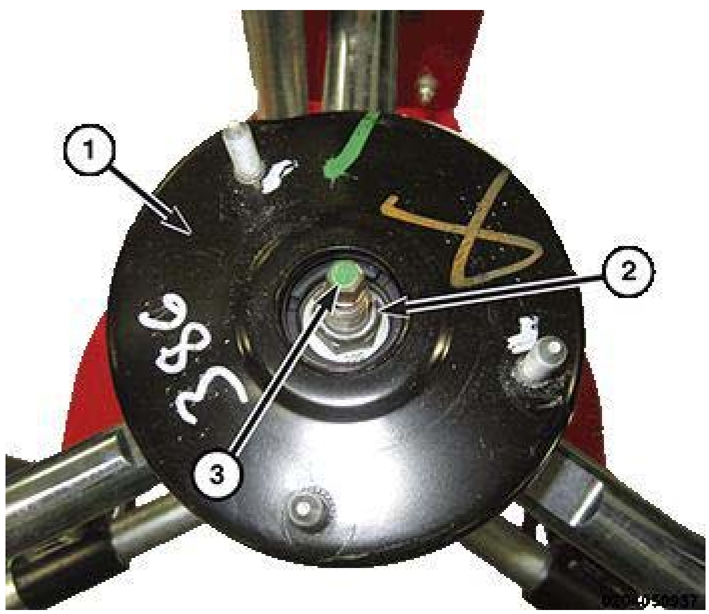


Fig. 56: Removing/Installing Shock Absorber Shaft Nut
Courtesy of CHRYSLER GROUP, LLC

9. Install the shock absorber shaft nut (2) on shock shaft (1). Tighten to the proper specification, while holding shock shaft from turning. Refer to FRONT, SPECIFICATIONS.
10. Slowly release tension from coil spring by backing off compressor drive fully. As tension is relieved,

make sure shock components are properly in place.

11. Remove clamp from lower end of coil spring and shock. Push back spring compressor upper and lower hooks, then remove shock assembly from spring compressor.
12. Install shock assembly on vehicle. Refer to **SHOCK ABSORBER, SUSPENSION, COIL-OVER, INSTALLATION**.

INSTALLATION

NON SRT

NOTE: Installation process is the same for both sides of the vehicle.

1. Place the strut assembly into front suspension using reverse direction in which it was removed.
2. Install the upper ball joint into the knuckle. Refer to **ARM, UPPER CONTROL, INSTALLATION**.

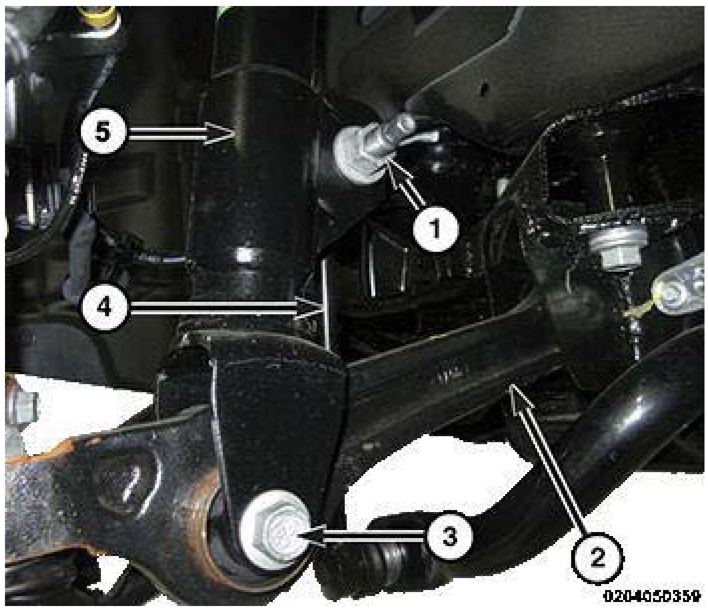


Fig. 57: Stabilizer Link To Strut Nut, Lower Control Arm, Lower Control Arm Bolt, Stabilizer Link & Shock/Strut Assembly
Courtesy of CHRYSLER GROUP, LLC

3. Install the strut to lower control arm bolt (3). **Do not tighten bolt at this time.**
4. Install the stabilizer link (4) into shock assembly from front. Install the stabilizer link to strut nut (1). Tighten by holding the stabilizer link stud while turning nut, tighten to the proper specification. Refer to **FRONT, SPECIFICATIONS**.
5. Install the tire and wheel assembly. Refer to **INSTALLATION** .
6. Remove the support and lower the vehicle.

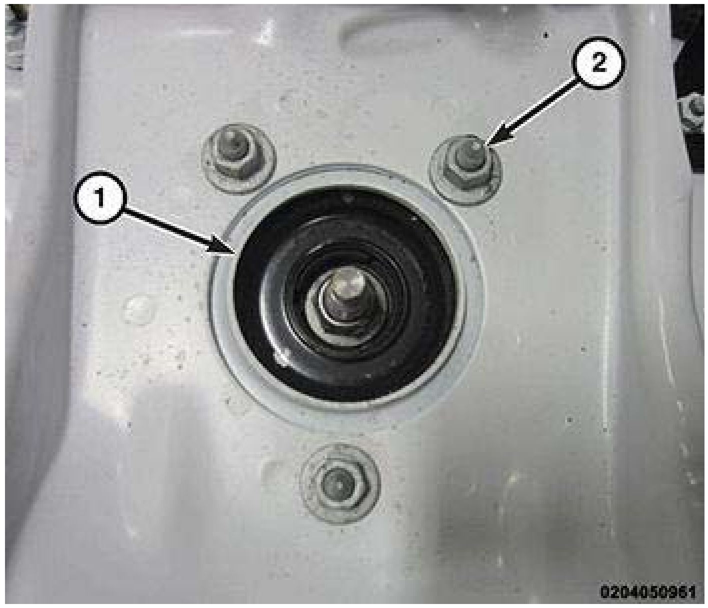


Fig. 58: Shock Tower & Nut
Courtesy of CHRYSLER GROUP, LLC

7. Install the three strut mount to body nuts (2), and tighten to the proper specification. Refer to **FRONT, SPECIFICATIONS**.
8. If equipped, align shock tower cap with shock mounting nuts and snap into place.

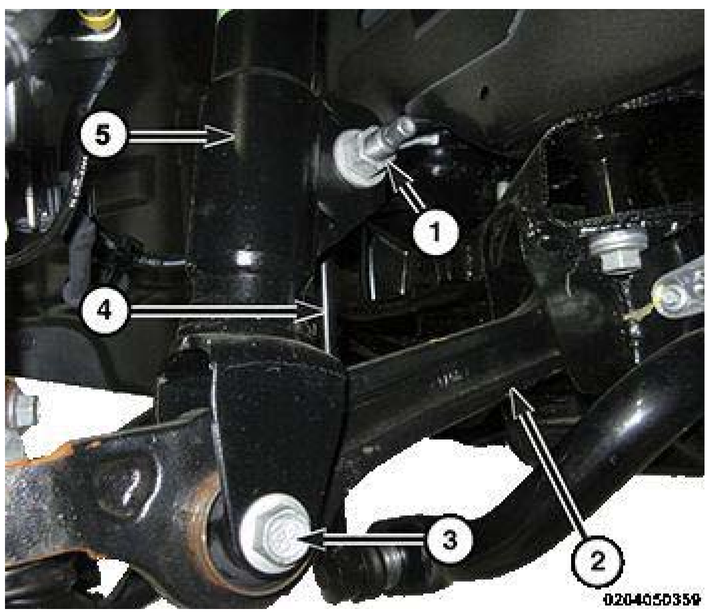


Fig. 59: Stabilizer Link To Strut Nut, Lower Control Arm, Lower Control Arm Bolt, Stabilizer Link & Shock/Strut Assembly
Courtesy of CHRYSLER GROUP, LLC

9. Tighten the strut to lower control arm bolt (3) to the proper specification. Refer to **FRONT, SPECIFICATIONS**.

SRT

NOTE: **Installation process is the same for both sides of the vehicle.**

1. Place shock assembly into front suspension using reverse direction in which it was removed.
2. Install the upper ball joint into the knuckle. Refer to **ARM, UPPER CONTROL, INSTALLATION**.

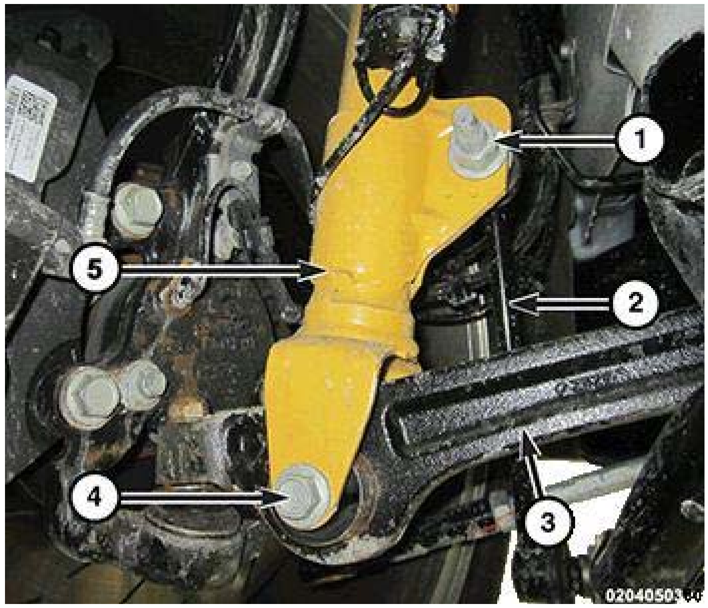


Fig. 60: Stabilizer Link To Strut Nut, Stabilizer Link, Lower Control Arm, Lower Control Arm Bolt & Shock/Strut Assembly
Courtesy of CHRYSLER GROUP, LLC

3. Install the strut to lower control arm bolt (4). **Do not tighten bolt at this time.**
4. Install the stabilizer link (2) into shock assembly from front. Install the stabilizer link to strut nut (1). Tighten by holding the stabilizer link stud while turning nut, tighten to the proper specification. Refer to **FRONT, SPECIFICATIONS**.

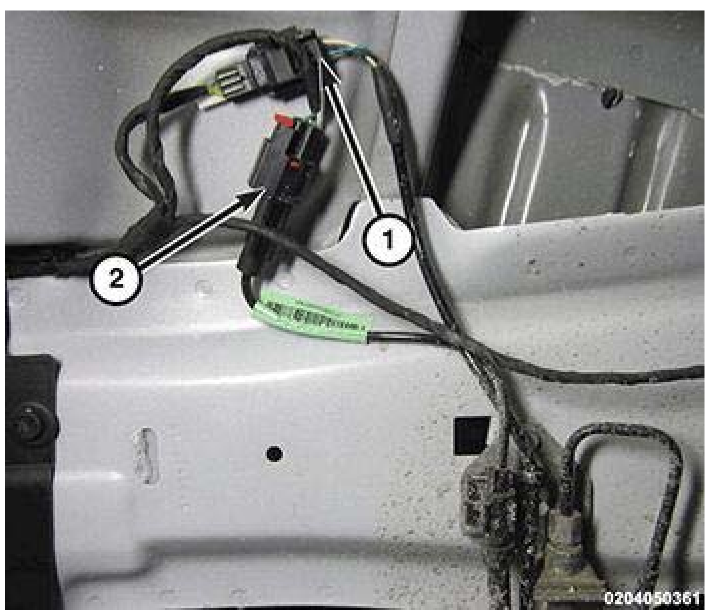


Fig. 61: Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

5. Connect the Active Damping System (ADS) shock wiring harness connector (1).

6. Install the splash shield. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION** .
7. Install the tire and wheel assembly. Refer to **INSTALLATION** .
8. Remove the support and lower the vehicle.

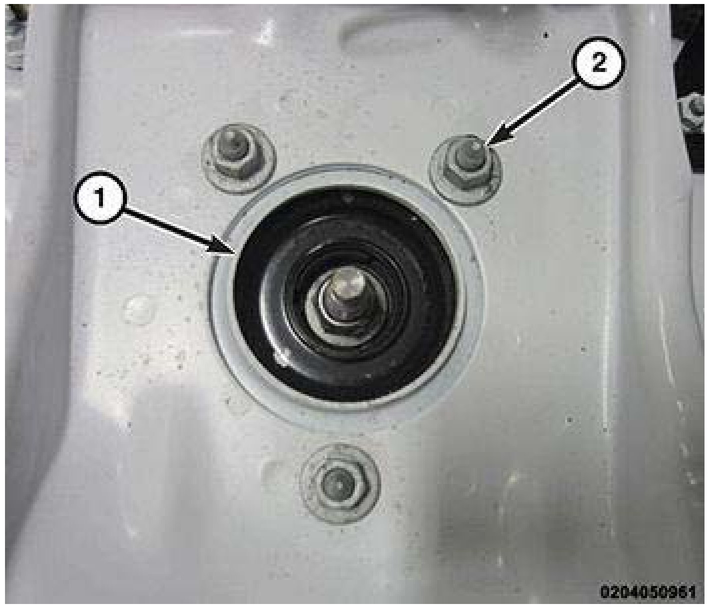


Fig. 62: Shock Tower & Nut
Courtesy of CHRYSLER GROUP, LLC

9. Install the three strut mount to body nuts (2), and tighten to the proper specification. Refer to **FRONT, SPECIFICATIONS**.
10. If equipped, align shock tower cap with shock mounting nuts and snap into place.
11. If right front strut was removed, install the supercharger coolant recovery container. Refer to **RESERVOIR, COOLANT, INSTALLATION** .

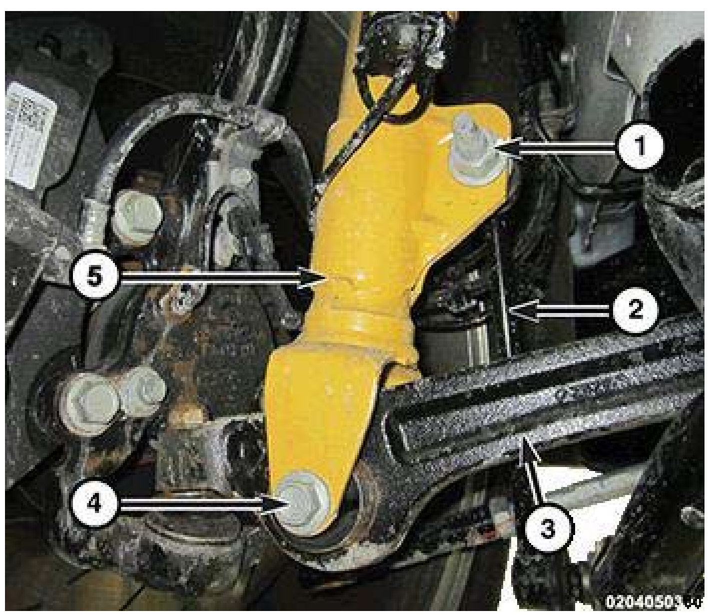


Fig. 63: Stabilizer Link To Strut Nut, Stabilizer Link, Lower Control Arm, Lower Control Arm Bolt & Shock/Strut Assembly
Courtesy of CHRYSLER GROUP, LLC

12. Tighten the strut to lower control arm bolt (4) to the proper specification. Refer to **FRONT, SPECIFICATIONS**.

STABILIZER BAR, FRONT

REMOVAL

REMOVAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove belly pan. Refer to **BELLY PAN, REMOVAL** and **BELLY PAN, ENGINE, REMOVAL** .

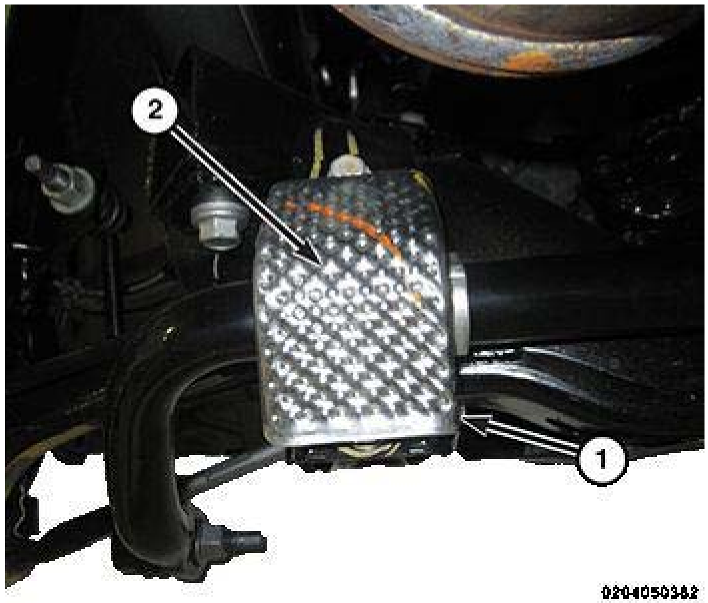


Fig. 64: Stabilizer Bar Heat Shield & Bolt
Courtesy of CHRYSLER GROUP, LLC

3. On each side of vehicle, remove the stabilizer bar heat shield to crossmember bolts (1). Remove heat shield (2).

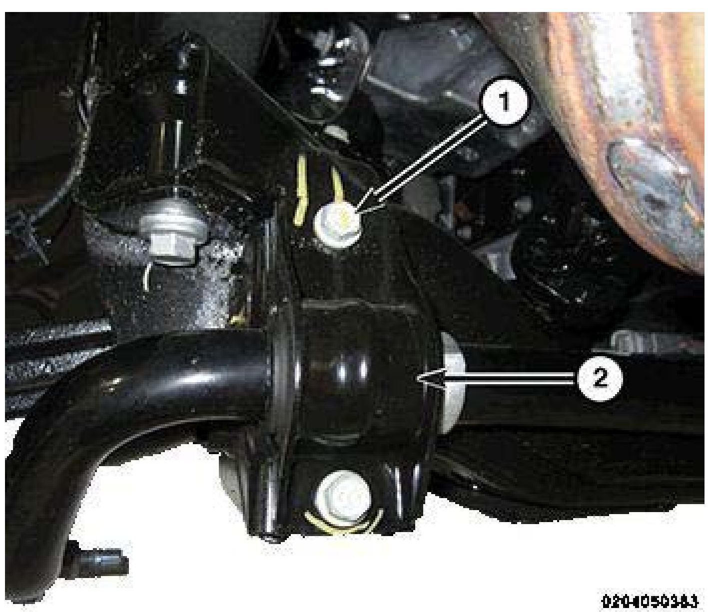


Fig. 65: Stabilizer Bar To Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

4. On each side of vehicle, remove the stabilizer bar to crossmember bolts (1).

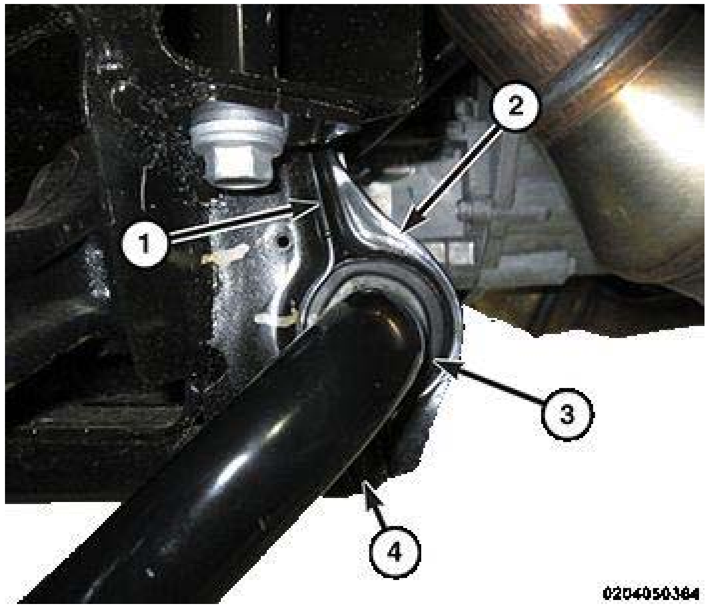
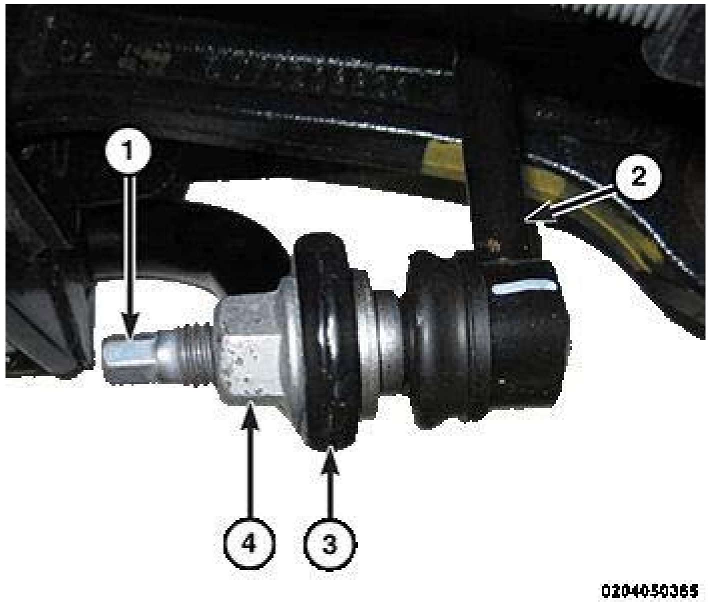


Fig. 66: Stabilizer Bar Isolator & Retainer Halves
Courtesy of CHRYSLER GROUP, LLC

5. On each side of vehicle, remove retainer halves (1, 2) from around stabilizer bar isolator (3).

Fig. 67: Stabilizer Bar & Isolator
Courtesy of CHRYSLER GROUP, LLC

6. Utilizing slit, remove each isolator (2) from stabilizer bar (1).

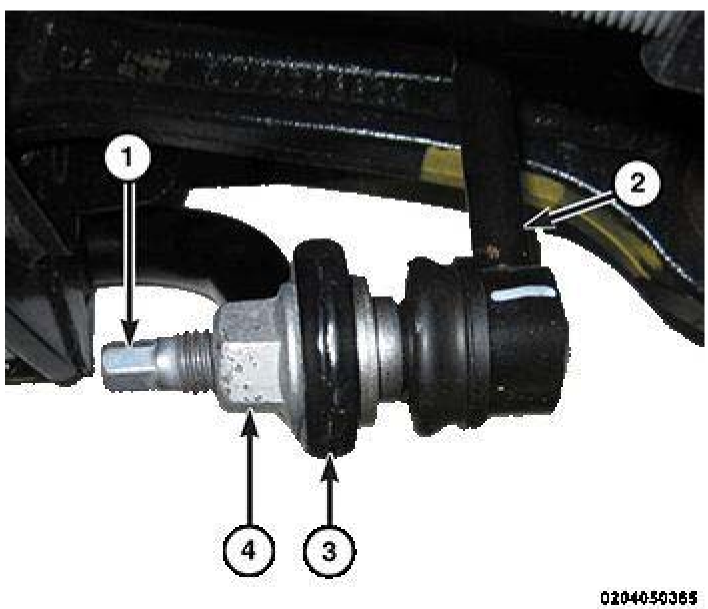


[Fig. 68: Ball Joint Stem, Stabilizer Link, Stabilizer Bar & Stabilizer Link to Stabilizer Bar Nut]
Courtesy of CHRYSLER GROUP, LLC

7. On each side of vehicle, remove the stabilizer link to stabilizer bar nut (4). Slide link ball joint stem (1) from bar (3), then remove bar from vehicle.

INSTALLATION

INSTALLATION



[Fig. 69: Ball Joint Stem, Stabilizer Link, Stabilizer Bar & Stabilizer Link to Stabilizer Bar Nut]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When attaching stabilizer link to stabilizer bar, make sure link ball joint stem is pointed inboard toward engine cradle.**

1. On each side of vehicle, raise stabilizer bar (3) to stabilizer link (2) and slide the stabilizer link stud (1)

through mounting hole in bar. Loosely install nut (4) at this time.

Fig. 70: Stabilizer Bar & Isolator
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Because of stabilizer isolator outer shape, it is very important to install isolators in position discussed in following step.

2. Utilizing slit in isolator, install each stabilizer bar isolator (2) on bar resting against locating collar (1) as shown in illustration. Make sure slit in isolator is positioned toward rear of vehicle.

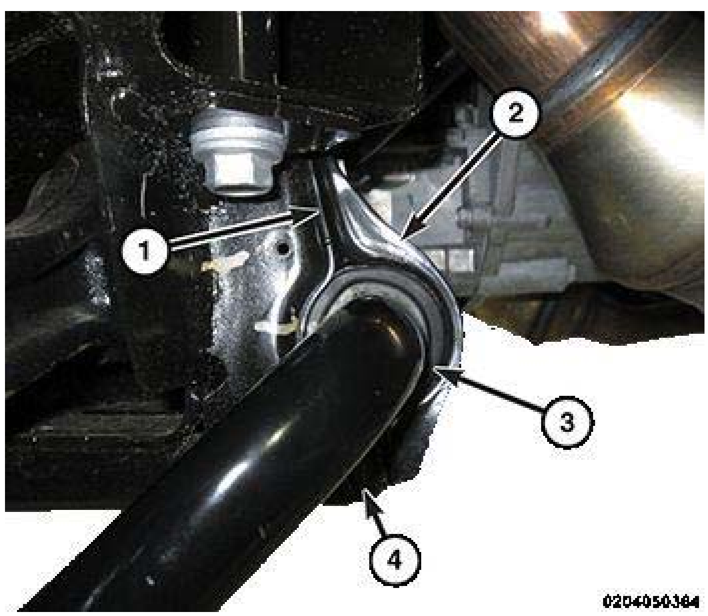
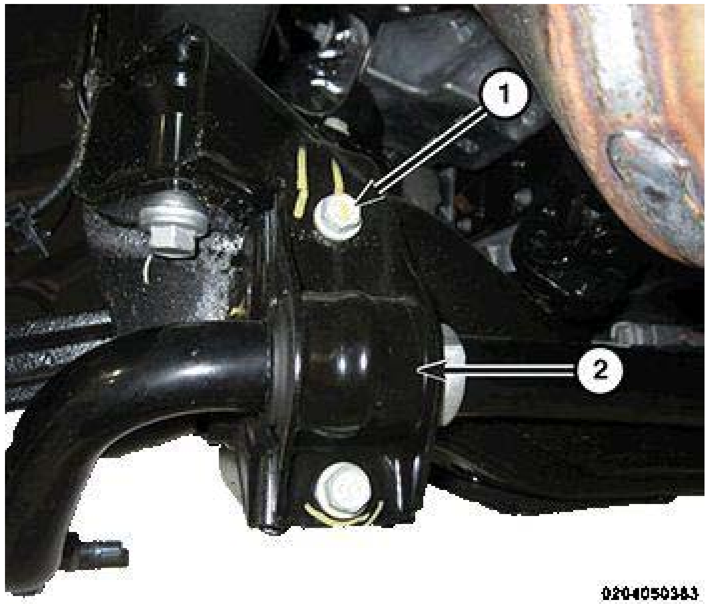


Fig. 71: Stabilizer Bar Isolator & Retainer Halves
Courtesy of CHRYSLER GROUP, LLC

3. On each side of vehicle, install stabilizer bar isolator retainer halves (1, 2) around isolator (3).



[**Fig. 72: Stabilizer Bar To Crossmember Bolts**](#)
Courtesy of CHRYSLER GROUP, LLC

4. On each side of vehicle, install the stabilizer bar to crossmember bolts (2). Tighten bolts to the proper specification. Refer to **FRONT, SPECIFICATIONS**.

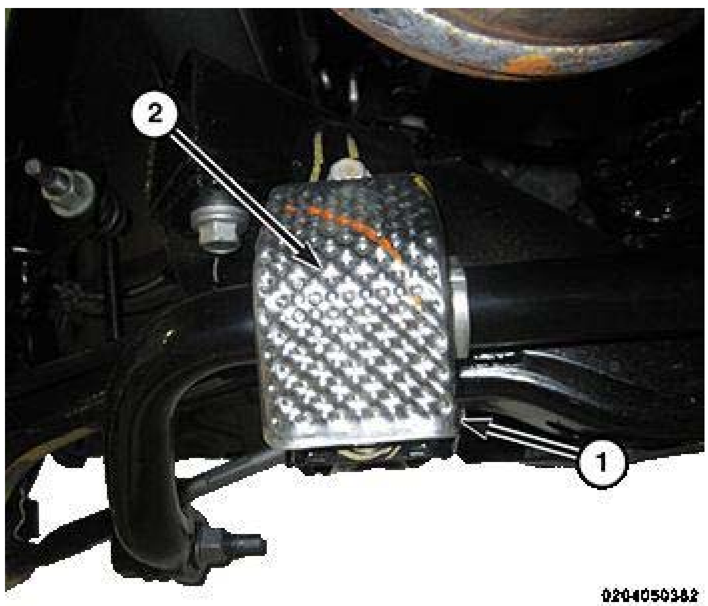


Fig. 73: Stabilizer Bar Heat Shield & Bolt
Courtesy of CHRYSLER GROUP, LLC

5. On each side of vehicle, install the stabilizer bar heat shield (2). Install the stabilizer bar heat shield to crossmember bolts (1), and tighten to the proper specification. Refer to **FRONT, SPECIFICATIONS**.

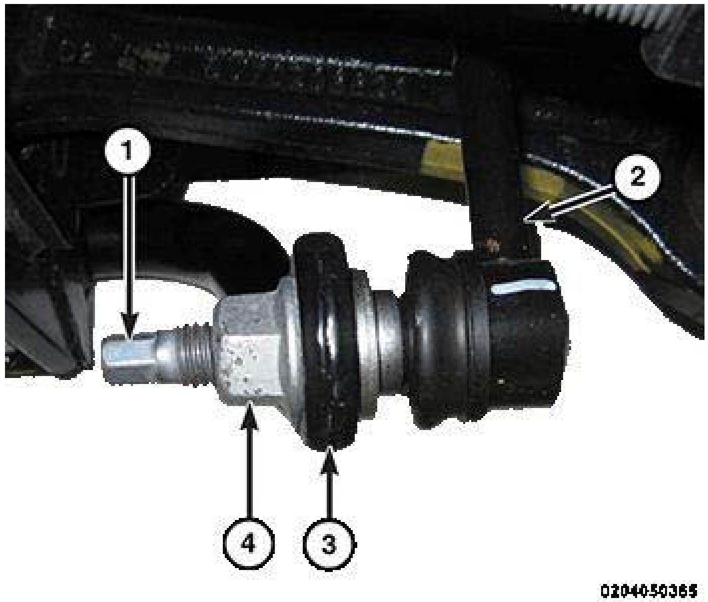


Fig. 74: Ball Joint Stem, Stabilizer Link, Stabilizer Bar & Stabilizer Link to Stabilizer Bar Nut
Courtesy of CHRYSLER GROUP, LLC

6. While holding the stabilizer link stud from rotating (1), tighten stabilizer link to stabilizer bar nut (4) to the proper specification. Refer to **FRONT, SPECIFICATIONS**.
7. Install belly pan. Refer to **BELLY PAN, INSTALLATION** and **BELLY PAN, ENGINE, INSTALLATION** .
8. Remove the support and lower the vehicle.

LINK, STABILIZER BAR

REMOVAL

REMOVAL

NOTE: **Removal process is the same for both sides of the vehicle.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

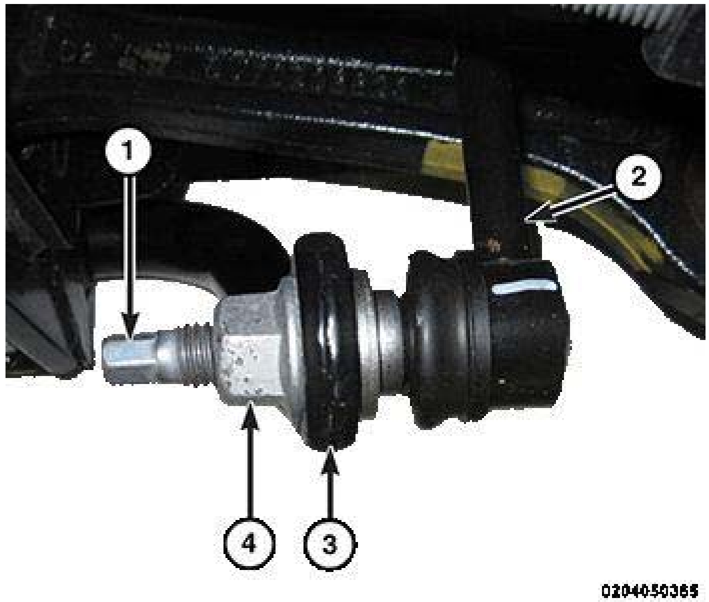


Fig. 75: Ball Joint Stem, Stabilizer Link, Stabilizer Bar & Stabilizer Link to Stabilizer Bar Nut
Courtesy of CHRYSLER GROUP, LLC

2. Remove the stabilizer link to stabilizer bar nut (4).

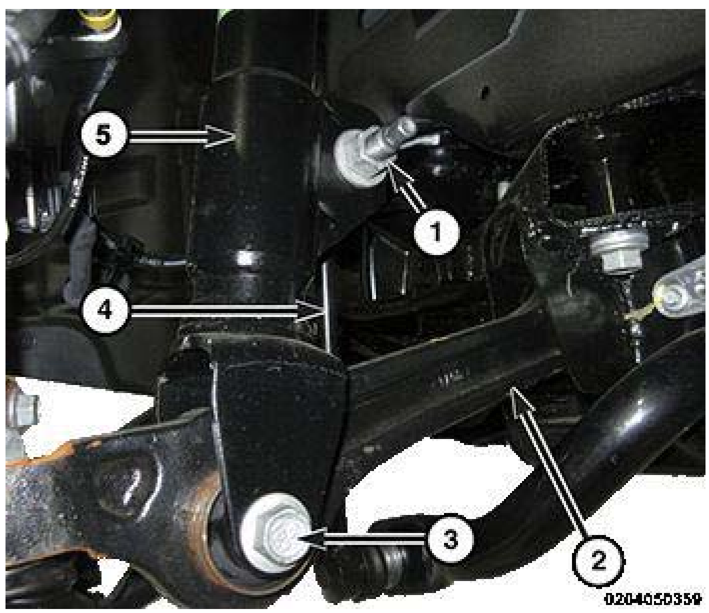


Fig. 76: Stabilizer Link To Strut Nut, Lower Control Arm, Lower Control Arm Bolt, Stabilizer Link & Shock/Strut Assembly
Courtesy of CHRYSLER GROUP, LLC

3. Remove the stabilizer link to strut nut (1).
4. Remove stabilizer link (4).

INSTALLATION

INSTALLATION

NOTE: **Installation process is the same for both sides of the vehicle.**

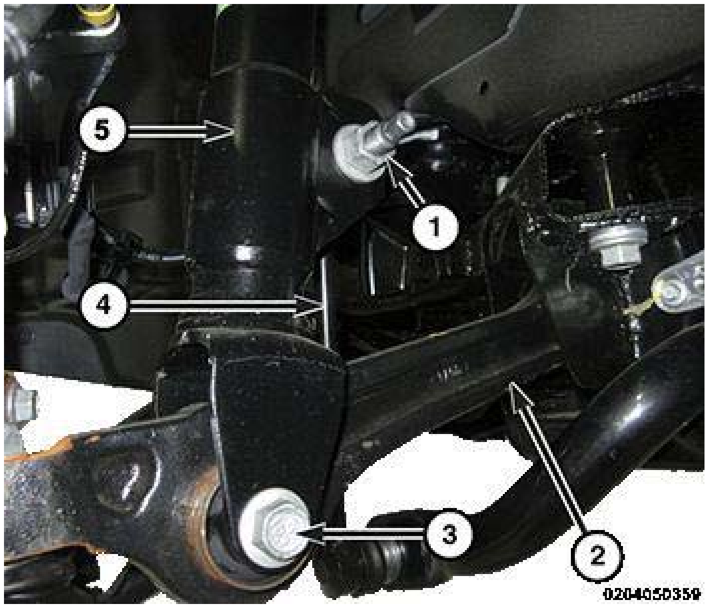


Fig. 77: Stabilizer Link To Strut Nut, Lower Control Arm, Lower Control Arm Bolt, Stabilizer Link & Shock/Strut Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Position stabilizer link (4) into position.
2. Install the stabilizer link to strut nut (1), and tighten to the proper specification. Refer to FRONT, SPECIFICATIONS.

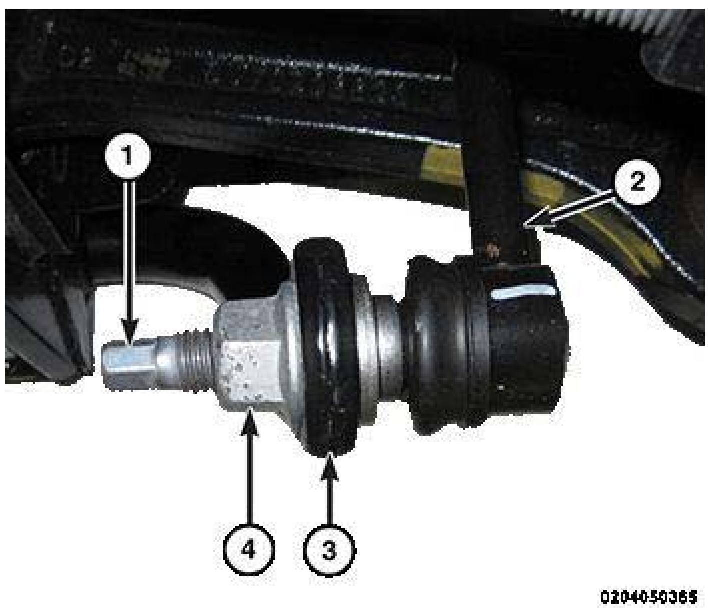


Fig. 78: Ball Joint Stem, Stabilizer Link, Stabilizer Bar & Stabilizer Link to Stabilizer Bar Nut
Courtesy of CHRYSLER GROUP, LLC

3. Install the stabilizer link to stabilizer bar nut (4), and tighten to the proper specification. Refer to FRONT, SPECIFICATIONS.
4. Remove the support and lower the vehicle.

STRUT, TENSION

REMOVAL

REMOVAL

NOTE: **Removal process is the same for both sides of the vehicle.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .
3. Remove belly pan. Refer to **BELLY PAN, REMOVAL** and **BELLY PAN, ENGINE, REMOVAL** .

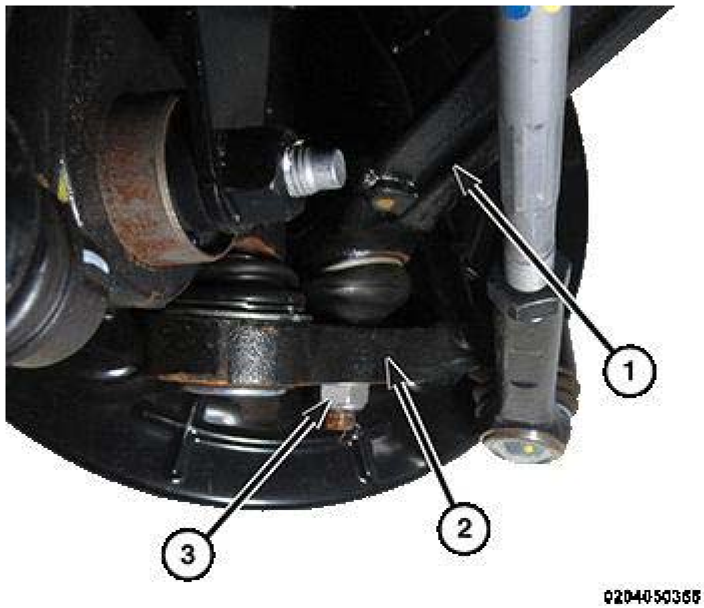


Fig. 79: Knuckle & Tension Strut To Knuckle Nut
Courtesy of CHRYSLER GROUP, LLC

4. Loosen tension strut to knuckle nut (3). Back nut off until nut is even with end of stud. **Keeping nut on at this location will help keep end of stud from distorting while using Puller in next step.**

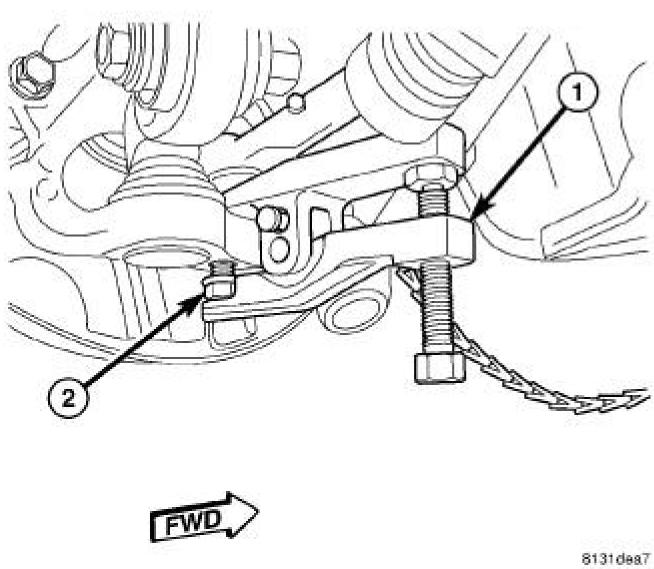


Fig. 80: Using Puller On Ball Joint

Courtesy of CHRYSLER GROUP, LLC

CAUTION: In following step, use care not to damage ball joint seal boot while sliding into place past seal boot.

5. Using Ball Joint Remover (special tool #9360, Remover, Ball Joint) (1) separate tension strut ball joint stud (2) from knuckle.

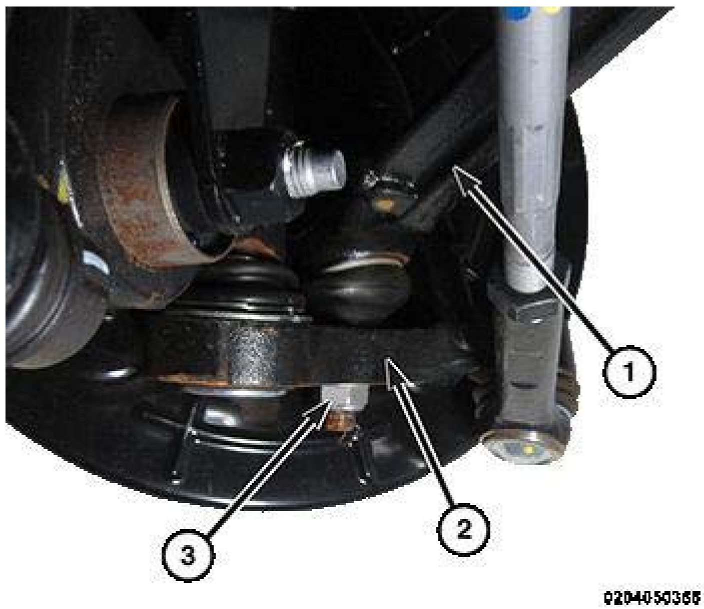


Fig. 81: Knuckle & Tension Strut To Knuckle Nut
Courtesy of CHRYSLER GROUP, LLC

6. Remove the tension strut to knuckle nut (3).
7. Rotate the knuckle (2) outward and push ball joint upward, out of knuckle.

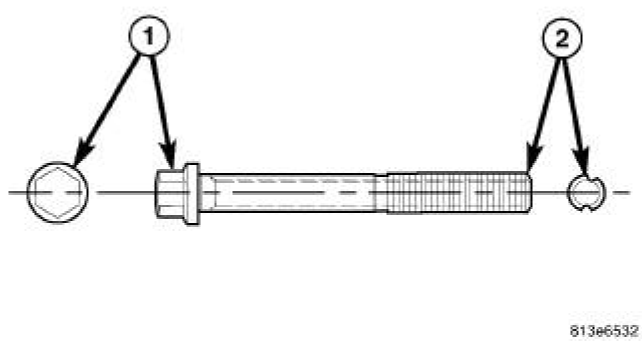


Fig. 82: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: If the tension strut bolt at the engine cradle has a lengthwise grooved shaft (2), it is a special wheel alignment adjustment bolt and the bolt head (1) must not be rotated in the vehicle or damage to the bolt and engine cradle will result. While holding the bolt in place with a wrench, remove the nut, then slide the bolt out of the bushing and cradle taking note of bolt

positioning in engine cradle for reassembly purposes. The bolt needs to be installed in the same position as removed to make sure wheel camber and caster return to adjusted position.**

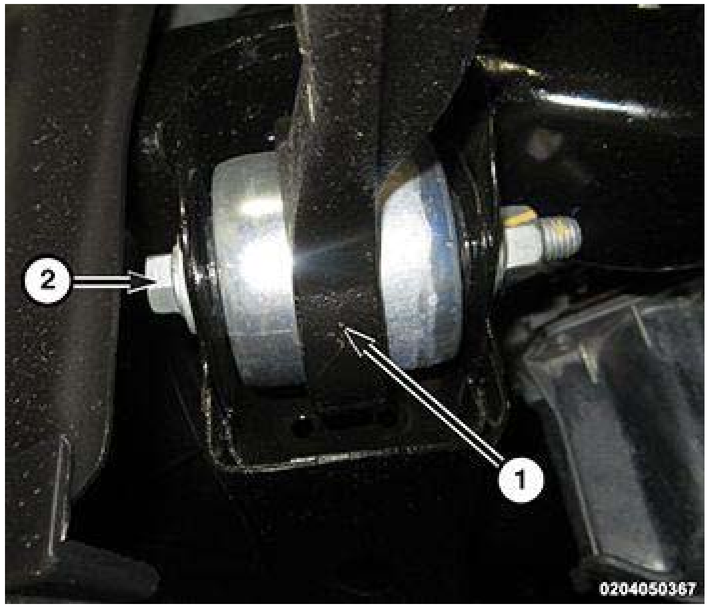


Fig. 83: Tension Strut & Tension Strut To Cradle Bolt And Nut
Courtesy of CHRYSLER GROUP, LLC

8. Remove the tension strut to cradle bolt and nut (2).
9. Slide tension strut (1) out of the cradle and remove from vehicle.

INSTALLATION

INSTALLATION

NOTE: **Installation process is the same for both sides of the vehicle.**

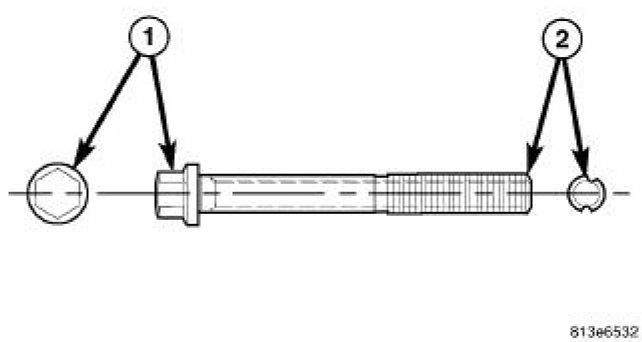


Fig. 84: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If installing a tension strut engine cradle bolt that is a wheel alignment adjustment bolt (lengthwise grooved shaft (2), make sure to install it in the same position which it was in upon removal. For more details on installation of**

this special bolt, refer to WHEEL ALIGNMENT, STANDARD PROCEDURE.

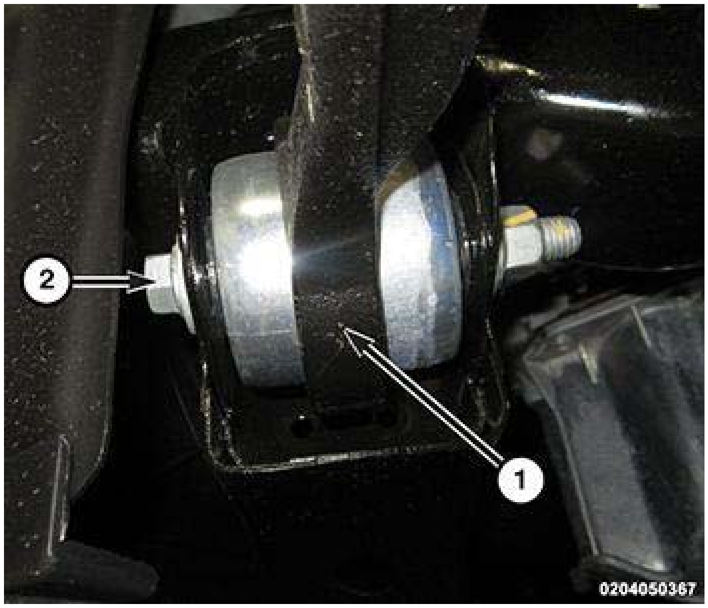


Fig. 85: Tension Strut & Tension Strut To Cradle Bolt And Nut
Courtesy of CHRYSLER GROUP, LLC

1. Position tension strut (1) into the cradle.
2. Install the tension strut to cradle bolt and nut (2), but **do not tighten at this time** .

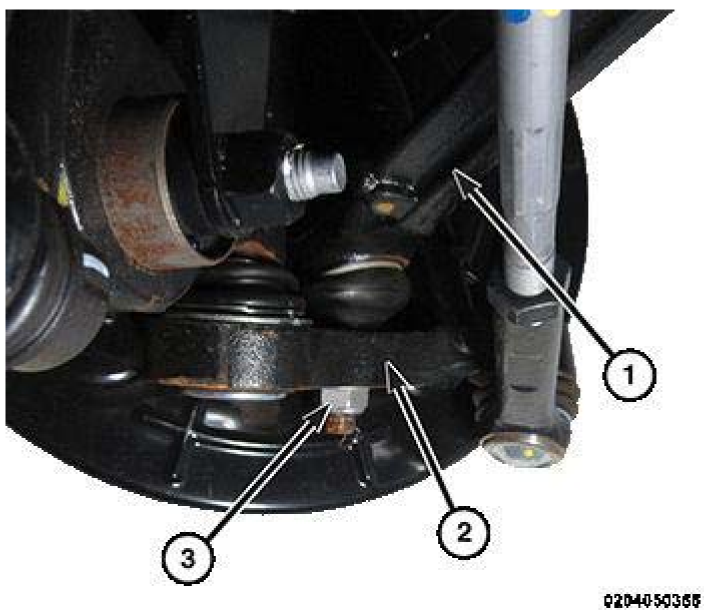


Fig. 86: Knuckle & Tension Strut To Knuckle Nut
Courtesy of CHRYSLER GROUP, LLC

3. Install the tension strut ball joint stud downward, into the knuckle (2).
4. Install a **NEW** tension strut to knuckle nut (3). Tighten tension strut to knuckle nut by holding ball joint stud with a hex wrench while turning nut with a wrench. Tighten to the proper specification. Refer to **FRONT, SPECIFICATIONS**.
5. Install the tire and wheel assembly. Refer to **INSTALLATION** .

6. Remove the support and lower the vehicle.
7. Position vehicle on an alignment rack/drive-on lift.

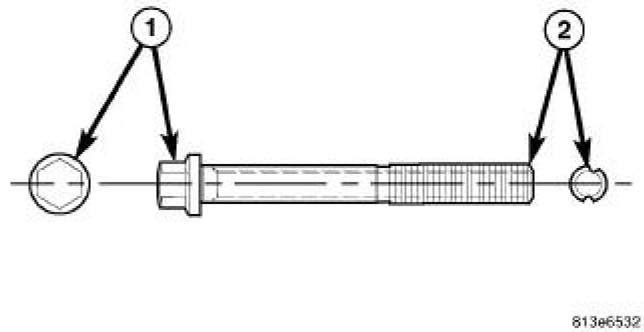


Fig. 87: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Perform front toe adjustment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE**.

CAUTION: If the tension strut engine cradle bolt is a wheel alignment adjustment bolt (lengthwise grooved shaft (2)), be sure to only tighten the nut. Do not rotate the bolt head (1) or damage to the bushing will occur.

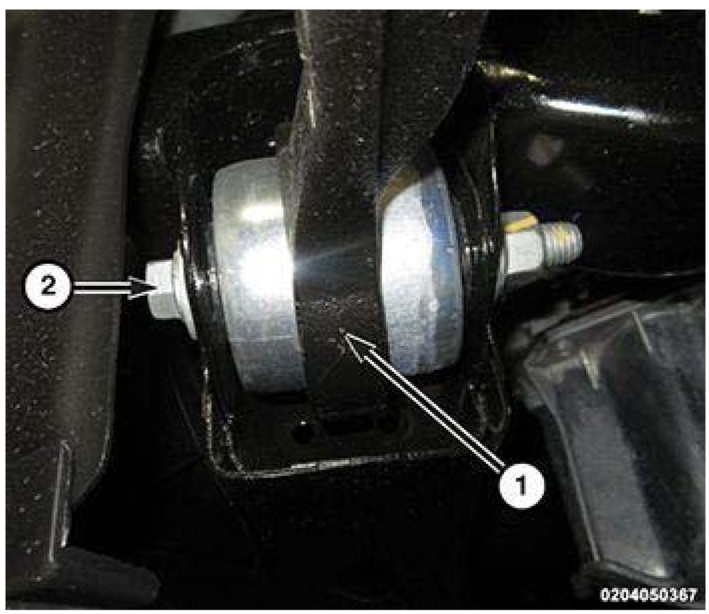


Fig. 88: Tension Strut & Tension Strut To Cradle Bolt And Nut
Courtesy of CHRYSLER GROUP, LLC

9. Once front toe is found to be within specifications, tighten tension strut to cradle bolt and nut (2) to the proper specification. Refer to **FRONT, SPECIFICATIONS**.
10. Install belly pan. Refer to **BELLY PAN, INSTALLATION** and **BELLY PAN, ENGINE, INSTALLATION** .

WHEEL ALIGNMENT

DIAGNOSIS AND TESTING

SUSPENSION AND STEERING

CONDITION	POSSIBLE CAUSES	CORRECTION
Front End Whine On Turns	1. Defective wheel bearing	1. Replace wheel bearing.
	2. Incorrect wheel alignment	2. Check and reset wheel alignment.
	3. Worn tires	3. Replace tires.
Front End Growl Or Grinding On Turns	1. Defective wheel bearing	1. Replace wheel bearing.
	2. Engine mount grounding	2. Check for motor mount hitting frame rail and reposition engine as required.
	3. Loose wheel lug nuts	3. Verify wheel lug nut torque.
	4. Incorrect wheel alignment	4. Check and reset wheel alignment.
	5. Worn tires	5. Replace tires.
Front End Clunk Or Snap On Turns	1. Loose lug nuts	1. Tighten wheel lug nuts to specifications.
	2. Worn or loose tie rod	2. Tighten or replace tie rod end.
	3. Worn or loose ball joint	3. Tighten or replace ball joint.
	4. Worn/loose control arm bushing	4. Replace control arm or bushing.
	5. Loose control arm fasteners	5. Tighten control arm fasteners to specified torque.
	6. Loose stabilizer bar	6. Tighten stabilizer bar fasteners to specified torque.
	7. Loose crossmember bolts	7. Tighten crossmember bolts to specified torque.
Front End Whine With Vehicle Going Straight At A Constant Speed	1. Defective wheel bearing	1. Replace hub and bearing assembly.
	2. Incorrect wheel alignment	2. Check and reset wheel alignment.
	3. Worn tires	3. Replace tires.
Front End Growl Or Grinding With Vehicle Going Straight At A Constant Speed	1. Engine mount grounding	1. Reposition engine/mount as required.
Front End Clunk When Accelerating Or Decelerating	1. Worn or broken engine mount	1. Replace engine mount.
	2. Loose lug nuts	2. Tighten wheel lug nuts to specified torque.
	3. Worn or loose ball joint	3. Replace ball joint/control arm.
	4. Worn or loose control arm bushing	4. Replace control arm or bushing.
	5. Loose control arm fasteners	5. Tighten fasteners to specified torque.
	6. Loose crossmember bolts	6. Tighten crossmember bolts to specified torque.
	7. Worn tie rod end	7. Replace tie rod end.

CONDITION	POSSIBLE CAUSES	CORRECTION
Road Wander	1. Incorrect tire pressure	1. Inflate tires to recommended pressure.
	2. Incorrect front or rear wheel toe	2. Check and reset wheel toe.
	3. Worn wheel bearing	3. Replace hub and bearing.
	4. Worn control arm bushings	4. Replace control arm or bushing.
	5. Excessive friction in steering gear	5. Replace steering gear.
	6. Excessive friction in steering shaft coupling	6. Replace steering intermediate shaft/coupler.
Lateral Pull	1. Unequal tire pressure	1. Inflate all tires to recommended pressure.
	2. Radial tire lead	2. Perform lead correction procedure.
	3. Incorrect front wheel camber	3. Check and reset front wheel camber.
	4. Power steering gear imbalance	4. Replace power steering gear.
	5. Wheel braking	5. Correct braking condition causing lateral pull.
Excessive Steering Free Play	1. Incorrect steering gear adjustment	1. Replace steering gear.
	2. Worn or loose tie rod ends	2. Replace tie rod ends.
	3. Loose steering gear mounting bolts	3. Tighten steering gear mounting bolts to specified torque.
	4. Loose or worn steering shaft coupler	4. Replace steering intermediate shaft/coupler.
Excessive Steering Effort	1. Low tire pressure	1. Inflate all tires to recommended pressure.
	2. Lack of lubricant in steering gear	2. Replace steering gear.
	3. Low power steering fluid level	3. Fill power steering fluid reservoir to correct level. Bleed as necessary.
	4. Loose drive belt	4. Replace adjuster or drive belt.
	5. Lack of lubricant in ball joints	5. Replace ball joints.
	6. Steering gear malfunction	6. Replace steering gear.
	7. Lack of lubricant in steering shaft coupler	7. Replace steering intermediate shaft/coupler.

VEHICLE LEAD/PULL

To assure correct diagnosis, it is important to follow the steps outlined below in the order shown. Road test the vehicle before and after each step to verify that the lead condition has been corrected. When evaluating a vehicle, always drive the same road in both directions to get a feel for the effect of road crown and cross wind. A neutral vehicle will exhibit a small amount of drift on both right and left crowned roads (normal crown sensitivity). A vehicle with pronounced lead/pull may have one or more of the following conditions:

1. UNEQUAL TIRE PRESSURE. Adjust tire pressure to the pressure stated on door placard. Make sure the tire pressure is equal on all four tires and evaluate the car. Also verify that the tire size and type are

correct and match each other. If the car still has a lead condition go to step 2.

2. TIRE CONICITY. Excessive tire conicity is one of the more frequent causes of vehicle lead. Cross-switch the front tires and evaluate the car. If the car still leads in the same direction or gets worse, return the front tires to their original position, then go to step 3.
3. SUSPENSION ALIGNMENT. Check and record the wheel alignment settings. Non-symmetrical front caster or camber can sometimes cause a lead condition or can be used to fix a lead condition. Adjust the wheel alignment as necessary to preferred settings. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE**. If the car still leads, go to step 4.
4. STEERING GEAR VALVE IMBALANCE. Steering gear valve imbalance can sometimes cause a vehicle lead. Although there is no quick test or measurement that can be performed to verify a good or bad steering gear valve, generally the steering efforts will feel much lighter in the lead direction and heavier in the opposite direction with an unbalanced valve. Replace the steering gear only as a "last resort" to solve the problem. To replace the steering gear, refer to **GEAR, REMOVAL** .

STANDARD PROCEDURE

WHEEL ALIGNMENT

PRE-WHEEL ALIGNMENT INSPECTION

Before any attempt is made to change or correct the wheel alignment, the following inspection and necessary corrections must be made to ensure proper alignment.

1. Verify that the fuel tank is full of fuel. If the tank is not full, the reduction in weight will affect the curb height of the vehicle and the alignment angles.
2. The vehicle's passenger and luggage compartments should be free of any load that is not factory equipment.
3. Check the tires on the vehicle. All tires must be the same size and in good condition with approximately the same amount of tread wear. Inflate all the tires to the recommended air pressure.
4. Check the wheel and tire assemblies for excessive radial runout.
5. Inspect lower ball joints and all steering linkage for looseness, binding, wear or damage. Repair as necessary.
6. Check suspension fasteners for proper torque and tighten as necessary. Refer to **FRONT, SPECIFICATIONS**.
7. Inspect all suspension component rubber bushings for signs of wear or deterioration. Replace any faulty bushings or components before aligning the vehicle.
8. Check the vehicle's curb height to verify it is within specifications. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE**.

WHEEL ALIGNMENT SETUP

NOTE: **Confirm the wheel alignment equipment is calibrated to the manufacturers requirements prior to attempting any wheel alignment.**

1. Position the vehicle on an alignment rack.
2. Install all required alignment equipment on the vehicle per the alignment equipment manufacturer's instructions. On this vehicle, a four-wheel alignment is recommended.

NOTE: **Prior to reading the vehicle's alignment readouts, the front and rear of vehicle should be jounced (suspension compressed/released). Induce jounce (rear first, then front) by grasping the center of the bumper and jouncing each end of vehicle an equal number of times. The bumper should always be released when vehicle is at the bottom of the jounce cycle.**

3. Read the vehicle's current front and rear alignment settings. Compare the vehicle's current alignment settings to the vehicle specifications for camber, caster and toe. Refer to **WHEEL ALIGNMENT, SPECIFICATIONS**.
4. If front camber and caster are not within specifications, proceed to **CAMBER AND CASTER**. If caster and camber are within specifications, proceed to **TOE**. Rear camber can be adjusted. Refer to **CAMBER AND CASTER**. Rear caster is not adjustable. If found not to be within specifications, reinspect for damaged suspension or body components and replace as necessary. If rear toe is not within specifications, adjust rear toe before proceeding to adjust front toe.

CAMBER AND CASTER

Camber and caster settings on this vehicle are determined at the time the vehicle is designed, by the location of the vehicle's suspension components. This is referred to as NET BUILD. The result is no required adjustment of camber and caster after the vehicle is built or when servicing the suspension components. Thus, when performing a wheel alignment, caster and camber are not normally considered adjustable angles. Camber and caster should be checked to ensure they meet vehicle specifications.

CAUTION: **Do not attempt to adjust a vehicles wheel alignment by heating, bending or by performing any other modification to the vehicle's suspension components or body.**

If individual front camber or caster is found not to meet alignment specifications, each can be adjusted by shifting the engine cradle if cross-camber and cross-caster are within specifications, or by using an available service adjustment bolt package. Always try to shift the cradle first **(if camber and caster are off slightly)** to correct the misalignment before installing an adjustment bolt package. If an adjustment bolt package installation is necessary, inspect the suspension components for any signs of damage or bending first. Refer to the following procedures for adjustments.

If individual rear camber is found not to meet alignment specifications, repair camber links are available in Plus or Minus One Millimeter (1 mm) lengths. A Plus or Minus 1 mm repair camber link will change camber approximately 0.5-0.7 degrees in the preferred direction. Before installing non-standard length camber links on a vehicle found to be outside the specifications, inspect the suspension components for any signs of damage or bending. To install either repair camber link. Refer to **LINK, CAMBER, INSTALLATION** .

ADJUSTMENT BY SHIFTING CRADLE

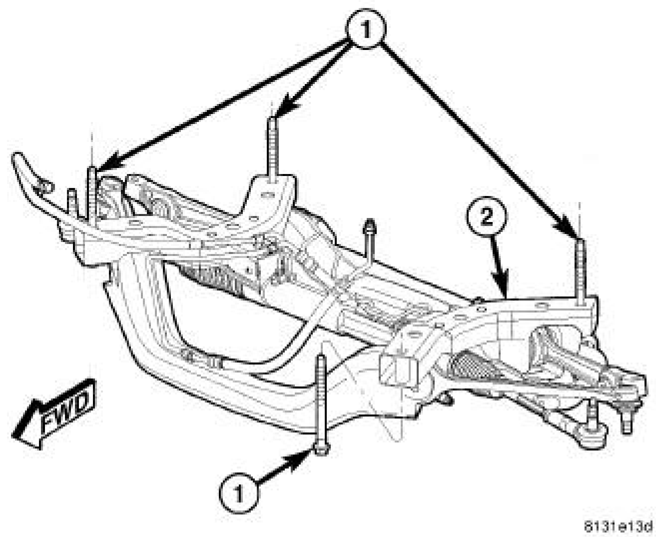


Fig. 89: Engine Cradle Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always use care when shifting cradle to avoid damaging other components on the vehicle.

1. Loosen the four bolts (1) fastening the engine cradle (2) to the frame just enough to allow movement of the cradle.
2. Shift cradle as necessary to bring camber or caster into specifications. When shifting cradle, use care not to move other angles (camber or caster) that are within specifications, out of specifications.
3. Tighten the four bolts (1) fastening the engine cradle (2) to the frame to the proper specification. Refer to **SPECIFICATIONS** .
4. Jounce the rear, then front of the vehicle an equal amount of times.
5. Measure camber and caster. If camber and caster are within specifications, proceed to **TOE**. If camber or caster cannot be brought into specifications, perform the **ADJUSTMENT BOLT PACKAGE INSTALLATION**.

ADJUSTMENT BOLT PACKAGE INSTALLATION

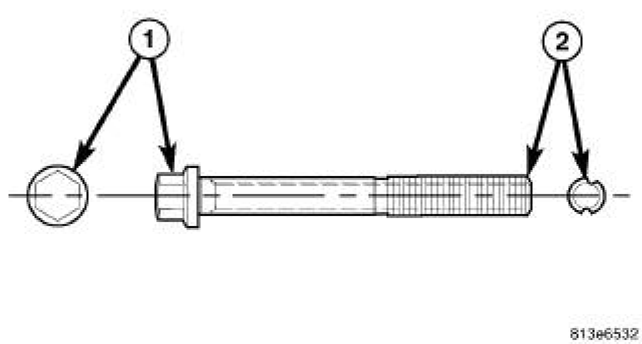


Fig. 90: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

The adjustment bolt package contains 2 special bolts (1). These bolts can be identified by the offset grooves cut into the thread section (2). These bolts are designed to replace the inboard mounting bolts of the lower control arm and tension strut. Each bolt allows approximately 0.3 degrees of movement. To adjust camber only, use both bolts, one at the tension strut and the other at the lower control arm. To adjust caster only, use one bolt at the tension strut only.

1. Raise the vehicle by the frame until the tires are not supporting the weight of the vehicle.
2. Remove the belly pan as necessary. Refer to **BELLY PAN, REMOVAL** and **BELLY PAN, ENGINE, REMOVAL** .
3. Lower control arm bolt only:
    a. Remove the screws fastening the heat shields covering the stabilizer bar bushing retainers to the cradle. Remove the heat shields.
    b. Remove the four bolts (two each) fastening the stabilizer bar bushing retainers to the cradle.
    c. Swing the stabilizer bar rearward and down out of the way of the control arm mounting bolts.

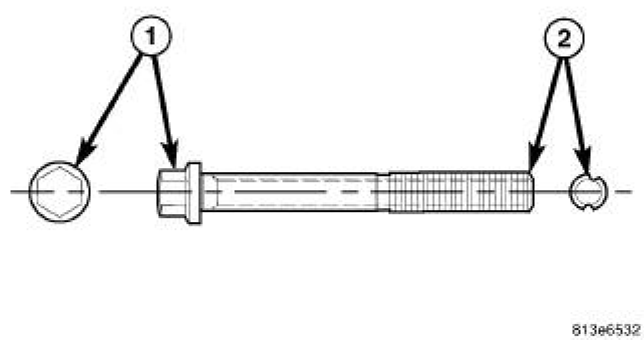


Fig. 91: Wheel Alignment Adjustment Bolt
Courtesy of CHRYSLER GROUP, LLC

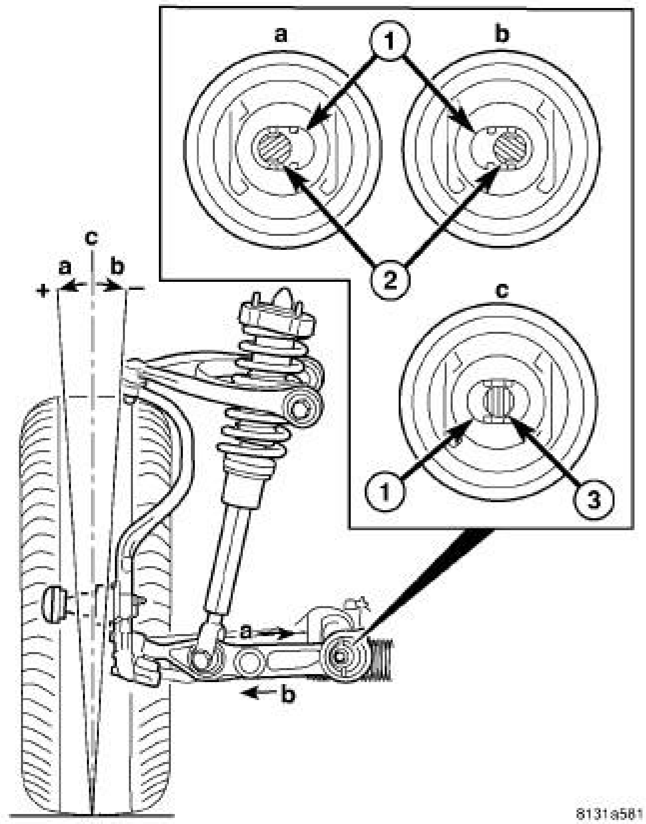
CAUTION: **Wheel alignment adjustment bolts have offset grooves cut into the length of the bolt (2). If removing or installing lower control arm or tension strut mounting bolts that have these grooves, DO NOT ROTATE THE BOLT. To remove the bolt, hold the bolt head stationary and rotate the nut, then slide the bolt straight out of the bushing. This is necessary to avoid damaging the bat wings in the bushing inner metal or cradle.**

4. Hold the head of the control arm or tension strut mounting bolt stationary and remove the nut. Slide the bolt straight out of the bushing and discard.

CAUTION: **When installing an adjustment bolt, be sure to install it in the correct direction. Lower control arm bolts must be installed from the rear-forward to avoid contact with the stabilizer bar upon installation. Tension strut bolts must be installed from the front-rearward.**

NOTE: **The grooves on the adjustment bolts are off-center forcing the bolt to be installed in one of two ways depending on whether more positive or negative camber or caster is necessary. The Bolts must be rotated 180Ā°**

to achieve either more positive or negative camber or caster. DO NOT force the adjustment bolt.



[Fig. 92: Installing Camber Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The original (non-grooved) mounting bolt (3) lies through the center of the hole (1), between the "bat wings" (c).**

5. Camber Adjustment - The adjustment bolts are designed to work in conjunction with "bat wing" holes that are formed into the inner metal of the lower control arm bushing (1) allowing for lower control arm movement approximately 0.3Ā° in either direction.
   - To achieve more positive camber, refer to (a) in the illustration. Move the control arm or tension strut in the desired direction, then insert the adjustment bolt (2) with a washer installed through the round hole in the engine cradle and bat wing hole (1) in the bushing inner metal.
   - To achieve more negative camber, refer to (b) in the illustration. Move the control arm or tension strut in the desired direction, then insert the adjustment bolt (2) with a washer installed through the round hole in the engine cradle and bat wing hole (1) in the bushing inner metal.

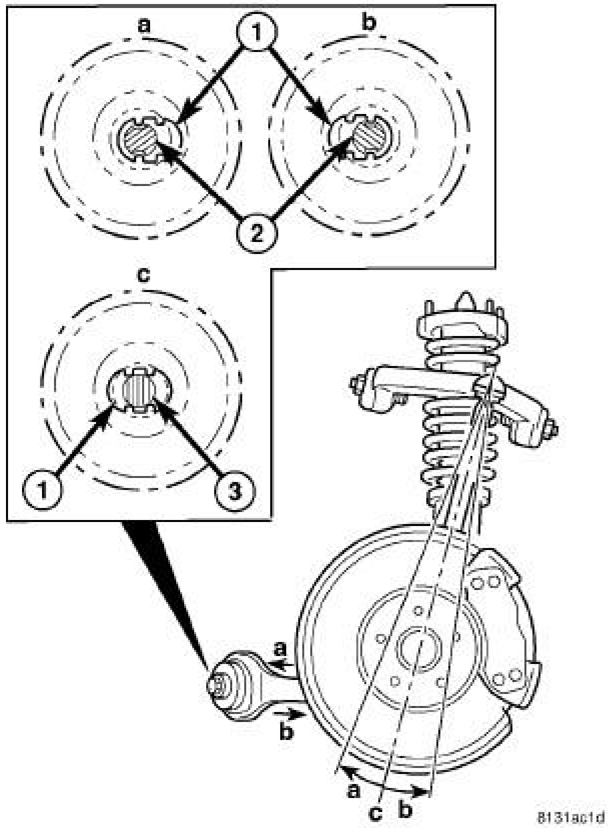


Fig. 93: Installing Caster Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The original (non-grooved) mounting bolt (3) lies through the center of the hole (1), between the "bat wings" (c).

6. Caster Adjustment - The adjustment bolts are designed to work in conjunction with "bat wings" that are formed into the engine cradle (1) allowing for tension strut movement approximately 0.3Â° in either direction.
   - To achieve more positive caster, refer to (a) in the illustration. Move the tension strut in the desired direction, then insert the adjustment bolt (2) with a washer installed through the bat wing hole in the engine cradle (1) and the round hole in the bushing inner metal.
   - To achieve more negative caster, refer to (b) in the illustration. Move the tension strut in the desired direction, then insert the adjustment bolt (2) with a washer installed through the bat wing hole in the engine cradle (1) and the round hole in the bushing inner metal.
7. Start a **NEW** nut and a washer on the end of the mounting bolt by hand, then while holding the head of the bolt stationary, install the nut. **Do not tighten the nut at this time.**
8. Lower the vehicle to curb position. Jounce the rear, then the front of the vehicle an equal amount of times.
9. Using a crowfoot wrench, tighten the adjustment bolt **nut** to the proper specification while holding the bolt stationary. Refer to **FRONT, SPECIFICATIONS**.
10. Lower control arm adjustment bolt only - Reinstall the stabilizer bar and heat shields.
11. Measure camber and caster. If camber and caster are not within specifications, inspect the suspension components for any signs of damage or bending. If camber and caster (and cross-camber and cross-caster)

are within specifications, proceed with **TOE** to check and adjust toe.

12. Install the belly pan. Refer to **BELLY PAN, INSTALLATION** and **BELLY PAN, ENGINE, INSTALLATION** .

TOE

CAUTION: If the steering wheel is excessively off-center while driving, outside of Chassis specifications, inadvertent ESC activations may occur on a vehicle so equipped.

1. Center the steering wheel and lock in place using a steering wheel clamp.

NOTE: When performing the toe adjustment procedure, set rear toe to specifications before setting front toe.

2. If rear toe is not within specifications, perform the **REAR TOE** procedure.
3. If front toe is not within specifications, perform the **FRONT TOE** procedure.
4. Remove the steering wheel clamp.
5. Remove the alignment equipment.
6. Road test the vehicle to verify the steering wheel is straight and the vehicle does not wander or pull.

REAR TOE

NOTE: Perform the following procedure to each side of the vehicle as necessary.

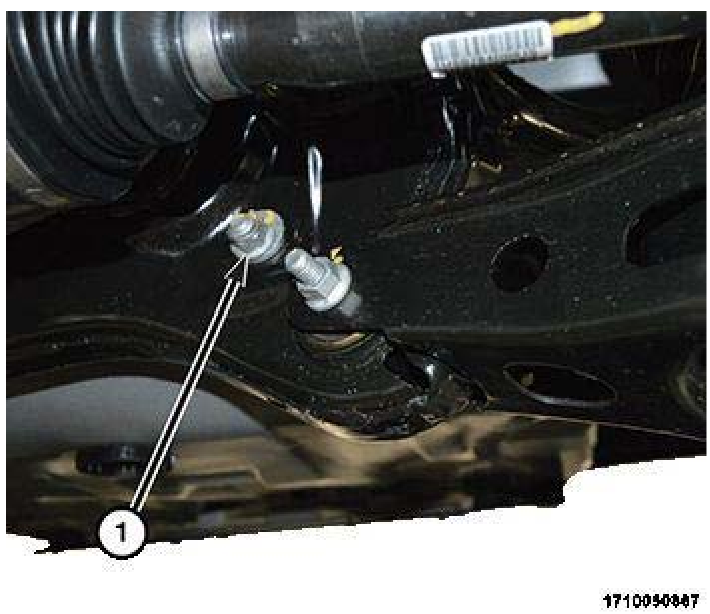


Fig. 94: Toe Link Nut
Courtesy of CHRYSLER GROUP, LLC

1. Loosen the cam bolt and nut (1) securing the toe link to the rear crossmember (front of rear crossmember) just enough to rotate the cam bolt.

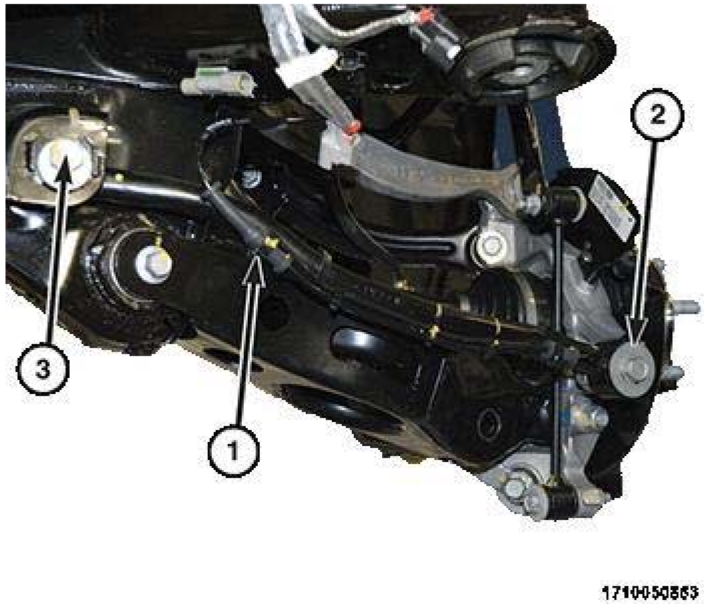


Fig. 95: Wheel Speed Sensor Cable, Toe Link To Knuckle Bolt & Adjustment Cam To Crossmember Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When adjusting rear toe, the eccentric lobes on the toe adjustment cam bolts and washers are not to be facing downward. The lobes should only be facing upward or up to 90Â° to one side or the other from the 12 O'clock position.**

2. Rotate the cam bolt head (3) on the opposite side (rear) of the crossmember in either direction until the preferred alignment specification is obtained. Refer to **WHEEL ALIGNMENT, SPECIFICATIONS**.
3. While holding the cam bolt (3) from turning, tighten the toe link to crossmember nut to the proper specification. Refer to **SPECIFICATIONS** .
4. Adjust rear toe on opposite side of vehicle using above procedure as necessary.
5. Once rear toe is set, proceed to **FRONT TOE** to set the vehicle's front toe.

FRONT TOE

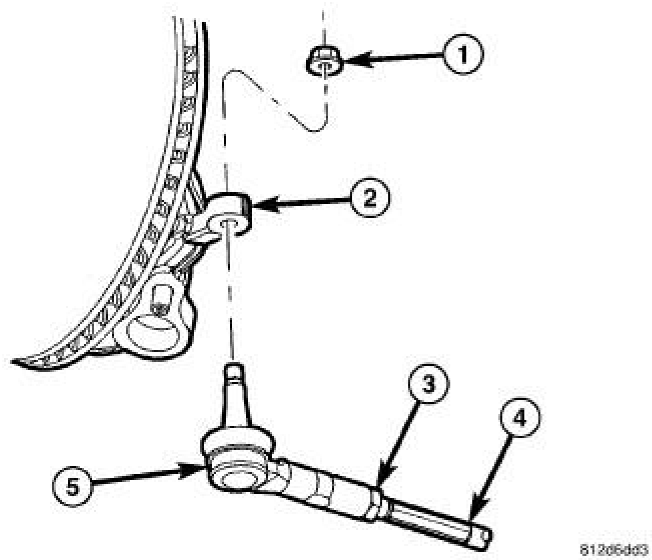


Fig. 96: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not twist the inner tie rod-to-steering gear boots during front wheel Toe adjustment. Remove the boot clamps (2) at the inner tie rods and make sure the boots move freely on the inner tie rods.**

NOTE: **Perform the following procedure to each side of the vehicle as necessary.**

1. Loosen the jam nut (3) at the inner-to-outer tie rod (4-5) connection.

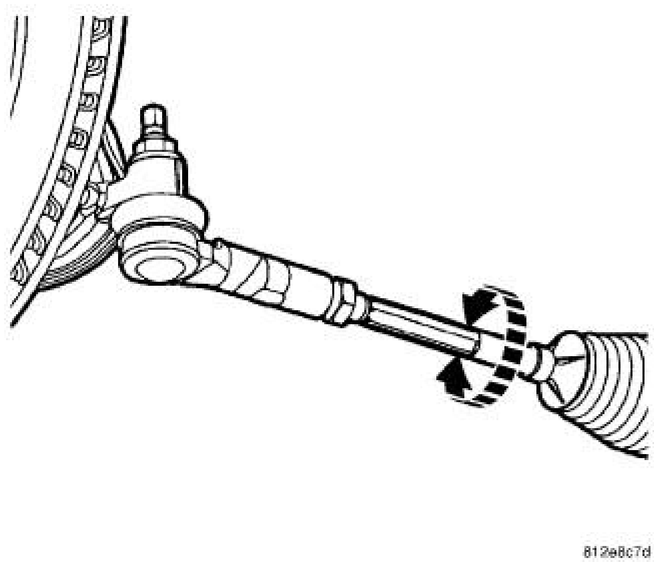


Fig. 97: Front Toe Adjustment
Courtesy of CHRYSLER GROUP, LLC

2. Grasp the inner tie rod at the hex and rotate as necessary to adjust front toe to the preferred toe specification. Refer to **WHEEL ALIGNMENT, SPECIFICATIONS**.

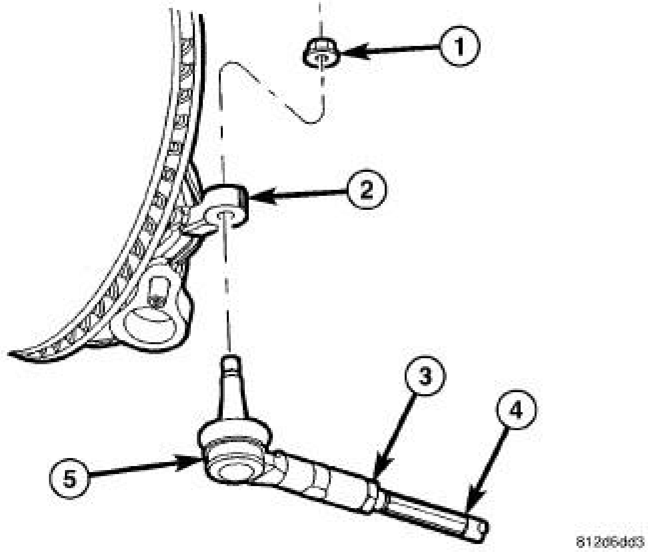


Fig. 98: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

3. Tighten the tie rod jam nut (3) to the proper specification using care not to lose adjustment. Refer to **SPECIFICATIONS** .
4. Make sure the inner tie rod-to-steering gear boot is not twisted, then reinstall the boot clamp at the inner tie rod.
5. Adjust front toe on opposite side of vehicle using the above procedure as necessary.

CURB HEIGHT MEASUREMENT

The wheel alignment is to be checked and all alignment adjustments made with the vehicle at its required curb height specification.

Vehicle height is to be checked with the vehicle on a flat, level surface, preferably a vehicle alignment rack. The tires are to be inflated to the recommended pressure. All tires are to be the same size as standard equipment. Vehicle height is checked with the fuel tank full, and no passenger or luggage compartment load.

Vehicle height is not adjustable. If the measurement is not within specifications, inspect the vehicle for bent or weak suspension components. Compare the parts tag on the suspect coil spring(s) to the parts book and the vehicle sales code, checking for a match. Once removed from the vehicle, compare the coil spring height to a correct new or known good coil spring. The heights should vary if the suspect spring is weak.

NOTE: **When measuring, the maximum left-to-right differential is not to exceed 12.5 mm (0.5 in.).**

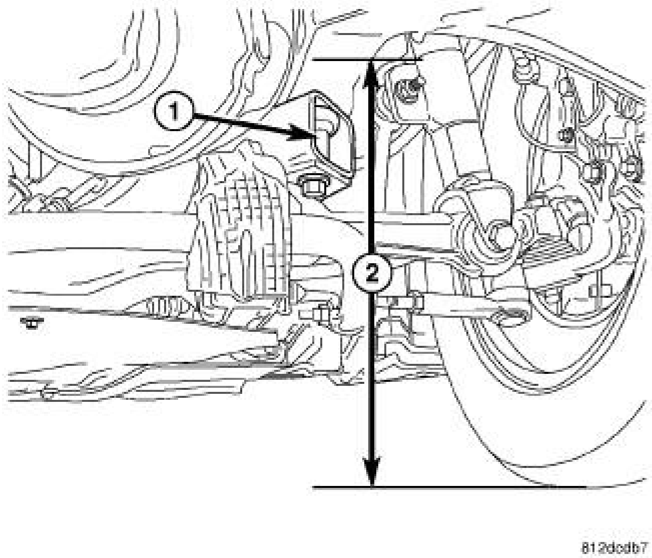


Fig. 99: Front Curb Height Measurement
Courtesy of CHRYSLER GROUP, LLC

1. Front - On each side of the vehicle, measure the distance (2) from the frame rail just behind the engine cradle rear mount (1) to the floor or alignment rack/lift runway surface. It may be necessary to measure to the bottom of a straight edge, placed from lift runway to runway, to get an accurate measurement.

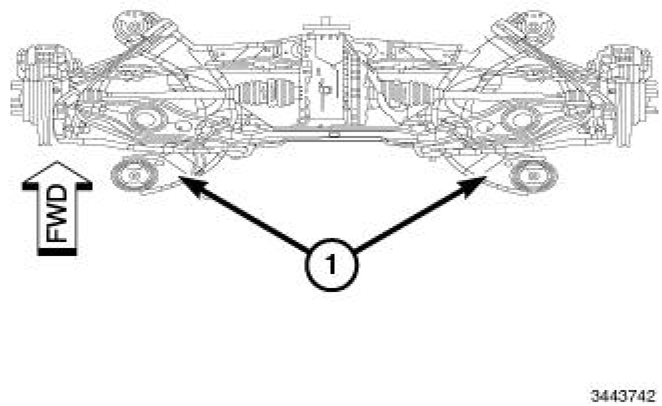


Fig. 100: Cradle Frame
Courtesy of CHRYSLER GROUP, LLC

2. Rear - On each side of the vehicle, measure the distance from the cradle frame (1) to the floor or alignment rack/lift runway surface. It may be necessary to measure to the bottom of a straight edge, placed from lift runway to runway, to get an accurate measurement.
3. Compare the measurements to the specifications listed in the following Curb Height Specifications chart.

CURB HEIGHT SPECIFICATIONS

MODEL	FRONT	REAR

MODEL	FRONT	REAR
Non-SRT and Non-Super Track Pak with 18 in. wheels	325 mm Â± 12 mm	352 mm Â± 12 mm
	12.80 in. Â± 0.47 in	13.86 in. Â± 0.47 in.
Non-SRT and Non-Super Track Pak with 20 in. wheels	331 mm Â± 12 mm	358 mm Â± 12 mm
	13.03 in. Â± 0.47 in	14.09 in. Â± 0.47 in.
SRT and Super Track Pak	307 mm Â± 12 mm	339 mm Â± 12 mm
	12.09 in. Â± 0.47 in	13.35 in. Â± 0.47 in

SPECIFICATIONS

SPECIFICATIONS

NOTE: **All specifications are given in degrees.**

NOTE: **All wheel alignments are to be set at curb height. Refer to WHEEL ALIGNMENT, STANDARD PROCEDURE.**

Front Wheel Alignment Specifications							
Â	Total Toe**	Caster - Left	Caster - Right	Cross Caster*	Camber - Left	Camber - Right	Cross Camber*
Base	0.20Â° +/- 0.10Â°	8.00Â° +/- 1.00Â°	8.70Â° +/- 1.00Â°	-0.70Â° +/- 0.60Â°	-0.85Â° +/- 0.55Â°	-1.25Â° +/- 0.55Â°	0.40Â° +/- 0.55Â°
SRT8	0.20Â° +/- 0.20Â°	8.30Â° +/- 1.00Â°	9.00Â° +/- 1.00Â°	-0.70Â° +/- 0.60Â°	-1.05Â° +/- 0.55Â°	-1.35Â° +/- 0.55Â°	0.30Â° +/- 0.55Â°
Notes:							
* Cross Alignment values are determined by taking the left side value minus the right side value.							
** TOTAL TOE is the sum of both left and right wheel toe setting. TOTAL TOE must be equally split between each wheel on the same axle to ensure the steering wheel is centered after setting toe. Positive toe is toe-in and negative toe is toe-out.							

Rear Wheel Alignment Specifications					
Â	Toe - Left	Toe - Right	Camber*	Cross Camber	Thrust Angle
Base	0.10Â° +/- 0.15Â°	0.10Â° +/- 0.15Â°	-1.75Â° +/- 0.55Â°	0.00Â° +/- 0.80Â°	0.00Â° +/- 0.15Â°
SRT8	0.10Â° +/- 0.15Â°	0.10Â° +/- 0.15Â°	-0.75Â° +/- 0.55Â°	0.00Â° +/- 0.80Â°	0.00Â° +/- 0.15Â°
Notes:					
* For reference only. These are non adjustable angles.					

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Article GUID: A00735958

FUEL DELIVERY, GAS

STANDARD PROCEDURE

FUEL SYSTEM PRESSURE RELEASE

WARNING: The fuel system is under constant high pressure even with engine off. Until the fuel pressure has been properly released from the system, do not attempt to open the fuel system. Do not smoke or use open flames/sparks when servicing the fuel system. Wear protective clothing and eye protection. Make sure the area in which the vehicle is being serviced is in a well ventilated area and free of flames/sparks. Failure to comply may result in serious or fatal injury.

1. Remove the fuel pump relay from the Power Distribution Center (PDC). Refer to **FUSE - RELAY LOCATIONS AND TYPES, SPECIFICATIONS** . A relay location label can also be found on the underside of the PDC cover.
2. Start and run the engine until it stalls.
3. Attempt restarting engine until it will no longer run.
4. Turn the ignition to the OFF position.
5. Return fuel pump relay to the Power Distribution Center (PDC).

NOTE: After servicing the fuel system, one or more Diagnostic Trouble Codes (DTC's) may have been stored in the Powertrain Control Module (PCM) memory due to disconnecting the fuel pump module circuit. A diagnostic scan tool must be used to erase a DTC.

DRAINING FUEL TANK

CONVENTIONAL PROCEDURE

WARNING: The fuel system is under constant high pressure even with engine off. Until the fuel pressure has been properly released from the system, do not attempt to open the fuel system. Do not smoke or use open flames/sparks when servicing the fuel system. Wear protective clothing and eye protection. Make sure the area in which the vehicle is being serviced is in a well ventilated area and free of flames/sparks. Failure to comply may result in serious or fatal injury.

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

CAUTION: If the electric fuel pump is not operating, and the fuel level is above 5/8 of a tank, the fuel tank must be removed prior to draining. If the fuel level is above

5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle.

CAUTION: **If the fuel level sending unit is not operating, and the fuel level cannot be determined the fuel tank must be removed prior to draining. If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle.**

NOTE: **Due to a one-way check valve installed into the fuel fill fitting at the tank, the tank cannot be drained at the fuel filler tube.**

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
2. Disconnect the fuel supply line from the fuel rail. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.

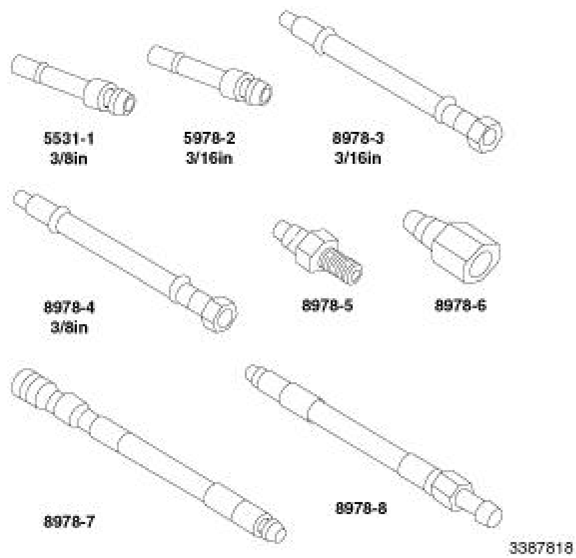


Fig. 1: Fuel Line Adapters
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Tool number 8978-2 is used on 5/16" fuel lines while tool number 8531-1 is used on 3/8" fuel lines.**

3. Install the appropriate fuel line adapter fitting from the (special tool #8978A, Decay Tool, Fuel) to the fuel supply line. Route the opposite end of this hose to an OSHA approved fuel storage tank such as the JohnDow Gas Caddy 320-FC-P30-A or equivalent.

NOTE: **Due to a built in time out feature of the diagnostic scan tool, the fuel pump may need to be reactivated several times before the fuel tank evacuation is complete.**

4. Using a diagnostic scan tool, activate the fuel pump until the fuel tank has been evacuated.

ALTERNATIVE PROCEDURE

WARNING: The fuel system is under constant high pressure even with engine off. Until the fuel pressure has been properly released from the system, do not attempt to open the fuel system. Do not smoke or use open flames/sparks when servicing the fuel system. Wear protective clothing and eye protection. Make sure the area in which the vehicle is being serviced is in a well ventilated area and free of flames/sparks. Failure to comply may result in serious or fatal injury.

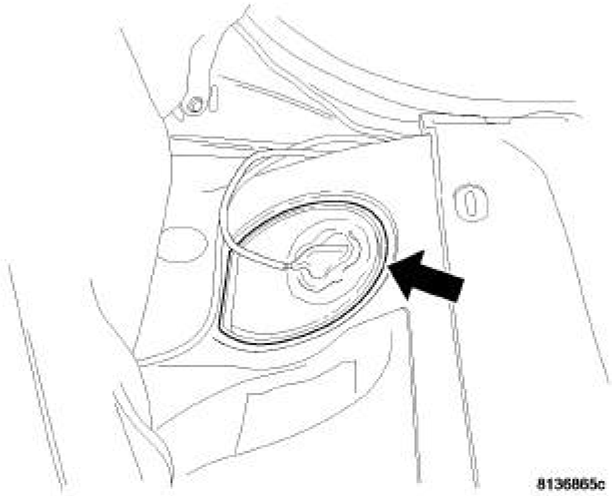
WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

CAUTION: The fuel level of the vehicle must be below 5/8 of a tank before using the "Alternative Procedure". If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle.

CAUTION: If the electric fuel pump is not operating, and the fuel level is above 5/8 of a tank, the fuel tank must be removed prior to draining. If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle.

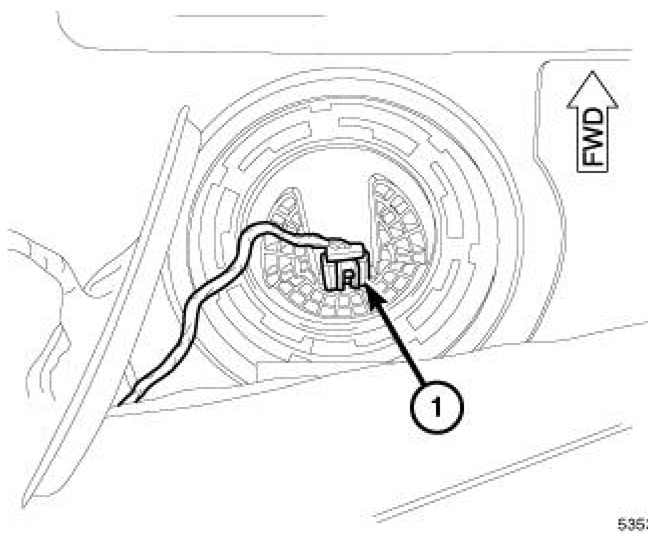
CAUTION: If the fuel level sending unit is not operating, and the fuel level cannot be determined the fuel tank must be removed prior to draining. If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle.

1. Verify the fuel level is below 5/8 of a tank.
2. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
3. Disconnect the negative battery cable.
4. Push the rear lower seat cushion up and back and remove the seat cushion.
5. Fold back the foam pad covering the fuel pump module plastic access covers.



[Fig. 2: Locating Plastic Access Cover](#)
Courtesy of CHRYSLER GROUP, LLC

6. Remove the left side fuel pump module plastic access cover.



[Fig. 3: Left Side Module Orientation](#)
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the electrical connector from the fuel pump module.

CAUTION: **An indexing arrow is located on top of the fuel pump module to clock its position into the fuel tank, note its location for reassembly.**

NOTE: **Prior to removing the fuel pump module, use compressed air to remove any accumulated dirt and debris from around fuel tank opening.**

8. Mark the fuel pump module orientation.
9. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring

Wrench) into the notches on the outside edge of the lock ring.

10. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench.
11. Rotate the breaker bar counterclockwise and remove the lock ring.

CAUTION: Do not spill fuel into the interior of the vehicle.

CAUTION: The lower reservoir of the fuel pump module must be drained before removal or fuel can spill into the interior of the vehicle.

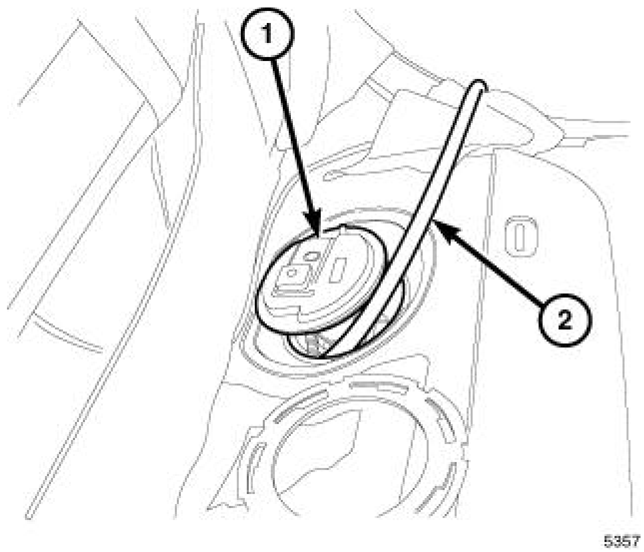


Fig. 4: Draining Left Side Fuel Tank
Courtesy of CHRYSLER GROUP, LLC

12. Lift the fuel pump module up enough to push a 3/8 inch hose into the fuel tank.
13. Attach the opposite end of this hose to an OSHA approved fuel storage tank such as the JohnDow Gas Caddy 320-FC-P30-A or equivalent.
14. Using the gas caddy, evacuate the left side of the fuel tank.
15. Remove the right side auxiliary fuel pump module plastic access cover.

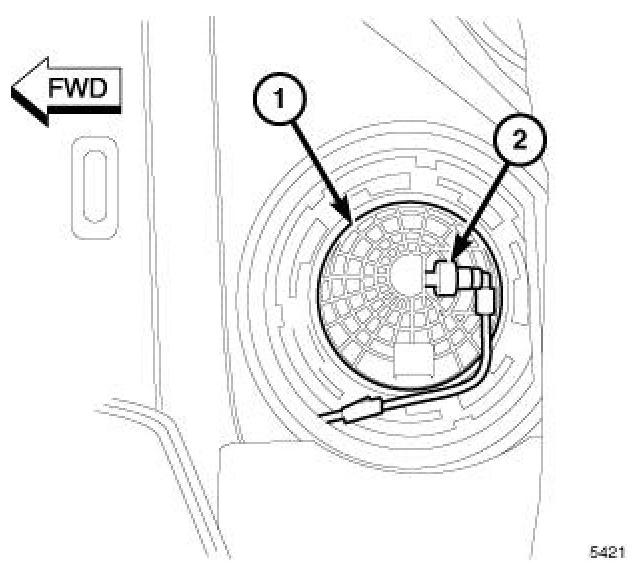


Fig. 5: Auxiliary Fuel Pump Module & Fuel Supply Line
Courtesy of CHRYSLER GROUP, LLC

16. Disconnect the fuel supply line (2) at the auxiliary fuel pump module (1).

CAUTION: An indexing arrow is located on top of the fuel pump module to clock its position into the fuel tank, note its location for reassembly.

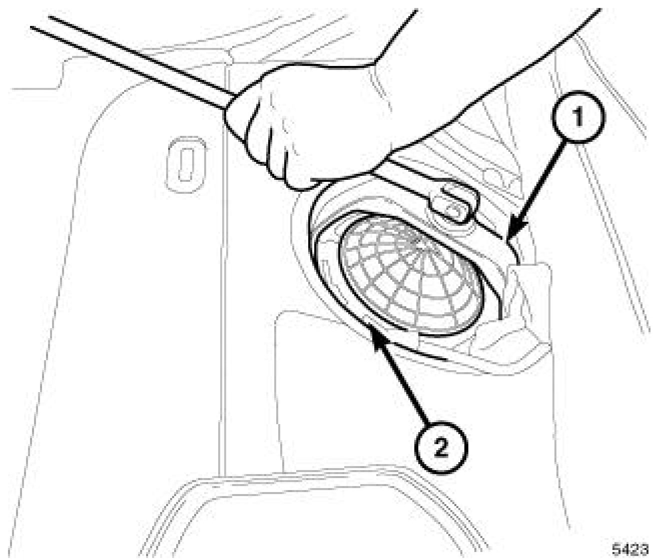


Fig. 6: Fuel Pump Lock Ring Wrench & Lock Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to removing the auxiliary fuel pump module, use compressed air to remove any accumulated dirt and debris from around fuel tank opening.

17. Mark the auxiliary fuel pump module orientation.
18. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the outside edge of the lock ring (2).
19. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1).
20. Rotate the breaker bar counterclockwise and remove the lock ring.

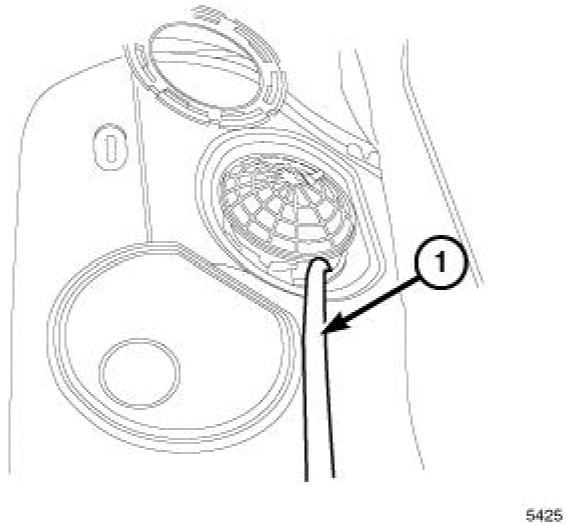


Fig. 7: Draining Right Side
Courtesy of CHRYSLER GROUP, LLC

21. Lift the auxiliary fuel pump module up enough to push a 3/8 inch hose (1) into the fuel tank.
22. Attach the opposite end of this hose to an OSHA approved fuel storage tank such as the JohnDow Gas Caddy 320-FC-P30-A or equivalent.
23. Using the gas caddy, evacuate the right side of the fuel tank.

SPECIFICATIONS

FUEL SYSTEM PRESSURE

DESCRIPTION	SPECIFICATION	
Fuel Pressure	400 kpa Ā±34 kpa	58 psi Ā± 5 psi

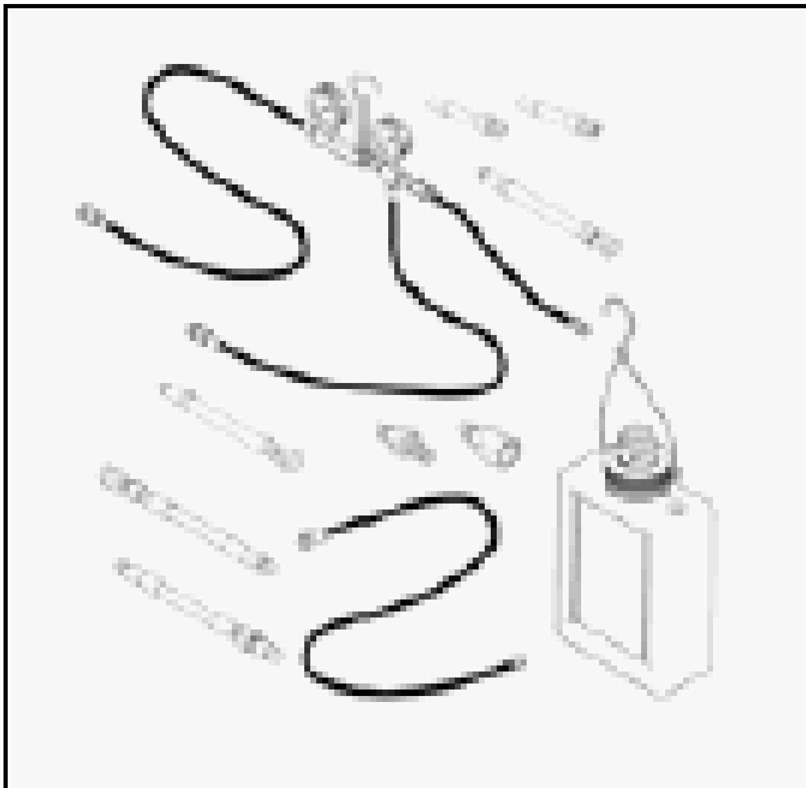
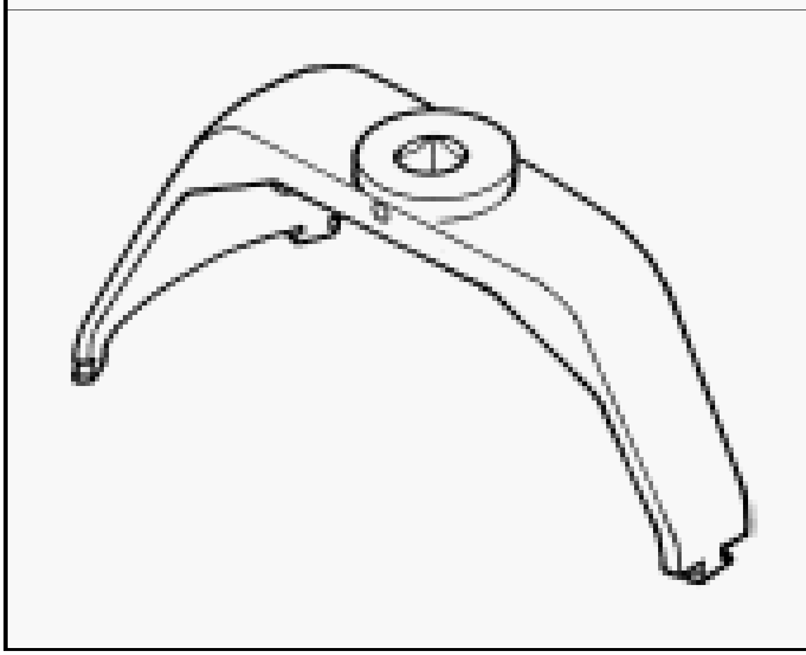
TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENERS *
Fuel Tank Filler Tube Nut	12	9	-	Ā
Fuel Rail Bolts (3.6L)	7	-	62	Ā
Fuel Rail Bolts (6.2L)	10	-	89	Ā
Fuel Rail Bolts (5.7L/6.4L)	11	8	-	Ā
Fuel Tank Strap Bolts	27	20	-	Ā
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

SPECIAL TOOLS

SPECIAL TOOLS

	8978A - Decay Tool, Fuel
	9340 - SAE Fuel Pump Lock Ring Wrench (Originally Shipped In Kit Number(s) 9327, 9327CC, 9397, 9575.)

FITTING, QUICK CONNECT

STANDARD PROCEDURE

QUICK-CONNECT FITTINGS

Different types of quick-connect fittings are used to attach the various fuel system components, lines and tubes. Some quick-connect fittings require the use of a special tool for disconnection and removal.

These are the quick-connect fittings:

- Redundant Latch Single Button Type Fitting

- Single Button Type Fitting
- Pinch Type Fitting
- Single Tab Type Fitting
- Two Tab Type Fitting
- Plastic Retainer Ring Type Fitting
- Latch Clip Type 1 Fitting
- Latch Clip Type 2 Fitting
- Wing Type Fitting

DISCONNECTING

WARNING: **The fuel system is under a constant pressure (even with engine off). Before servicing any fuel system hose, fitting or line, fuel system pressure must be released.**

CAUTION: **Before separating a Quick-Connect fitting, pay attention to what type of fitting is being used. This will prevent unnecessary fitting or fitting latch breakage.**

CAUTION: **The interior components (O-rings, clips) of quick-connect fittings are not serviced separately, but new plastic spacers and latches are available for some types. If service parts are not available, do not attempt to repair the damaged fitting or fuel line (tube). If repair is necessary, replace the complete fuel line (tube) assembly.**

REDUNDANT LATCH SINGLE BUTTON TYPE FITTING:

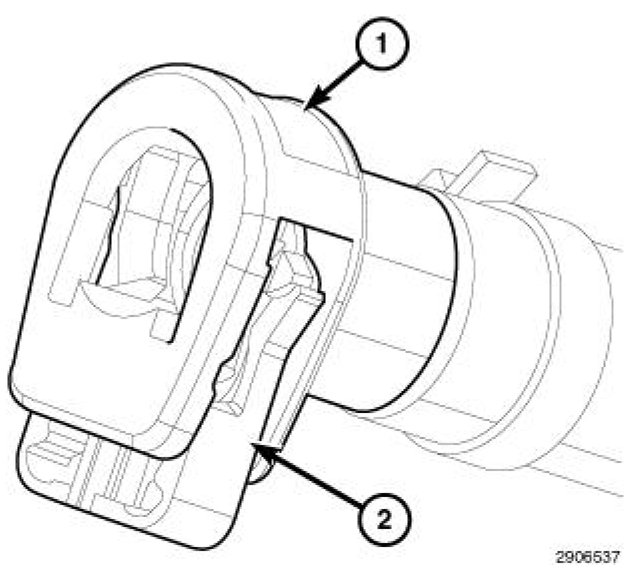


Fig. 8: Redundant Latch & Push Button
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting is equipped with a redundant latch (2) and a single push button (1) that releases two internal latches located in the quick-connect fitting. Special tools are not required for removal.

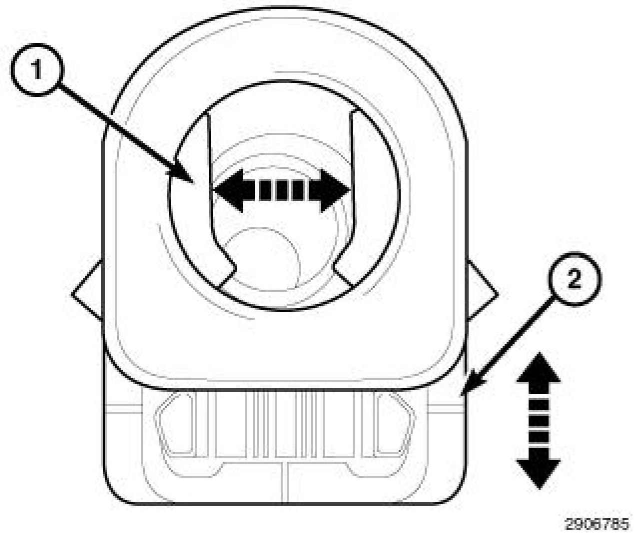


Fig. 9: Redundant Latch & Internal Latches
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not pry or pull up on the push button as damage to the latches of the quick-connect fitting will occur.

1. Pull the redundant latch (2) out, away from the quick-connect fitting.
2. Press on the push button with your thumb, which releases the internal latches (1) and remove the quick-connect fitting from the fuel system component.

SINGLE BUTTON TYPE FITTING:

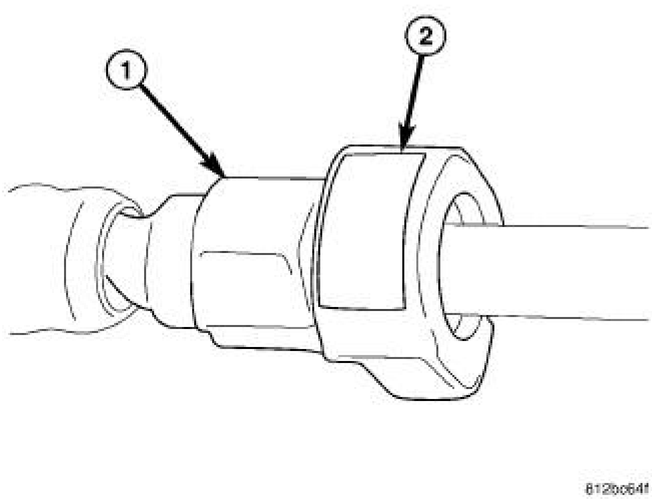


Fig. 10: Single Button Fitting
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not pry or pull up on the push button as damage to the latches of the quick-connect fitting will occur.

This type of quick-connect fitting is equipped with a single push button (2) that releases two internal latches located in the quick-connect fitting. Special tools are not required for removal.

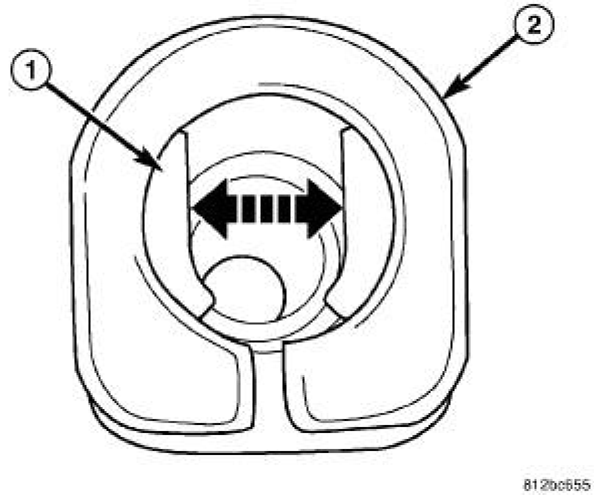


Fig. 11: Quick-Connect Fitting Latches
Courtesy of CHRYSLER GROUP, LLC

1. Press on the push button with your thumb, which releases the internal latches (1).
2. Remove the quick-connect fitting from the fuel system component.

2 BUTTON TYPE FITTING

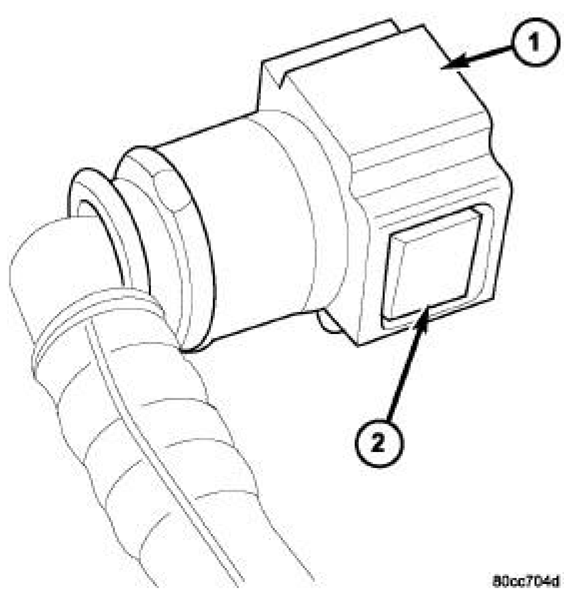


Fig. 12: 2-Button Type Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting (1) is equipped with two push buttons (2) that releases two internal latches located in the quick-connect fitting. Special tools are not required for removal.

1. Press on both push buttons with your thumb, which releases the internal latches.
2. While holding the two push buttons simultaneously, remove the quick-connect fitting from the fuel system component.

PINCH TYPE FITTING

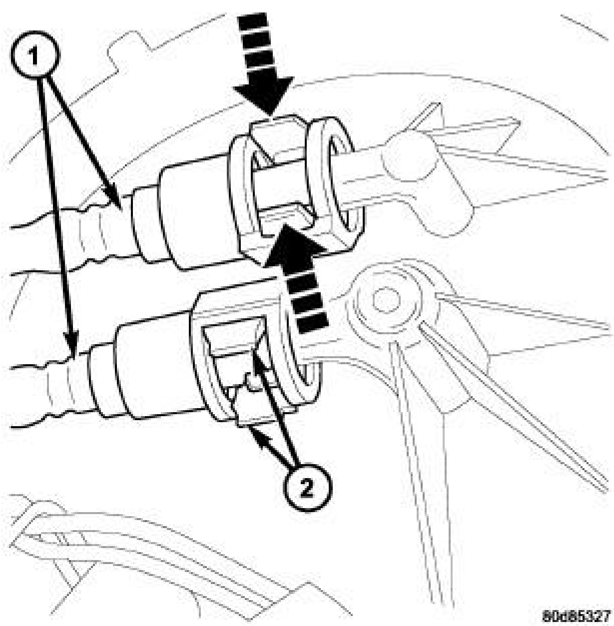


Fig. 13: View Of Pinch Type Quick-Connect Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting (1) is equipped with two finger tabs (2). Special tools are not required for removal.

1. Pinch both tabs (2) together and release the quick-connect fitting.
2. Remove the quick-connect fitting from the fuel system component.

SINGLE TAB TYPE FITTING

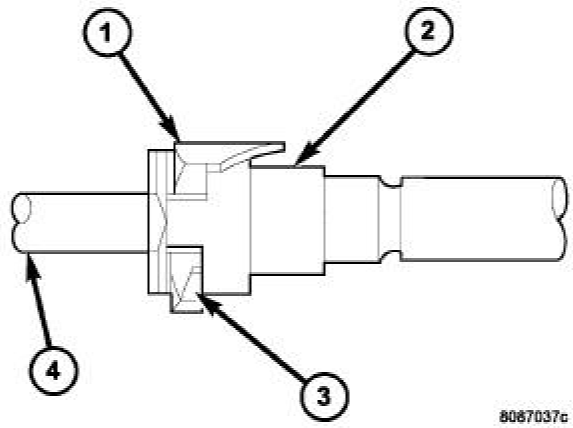


Fig. 14: View Of Single-Tab Type Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting (2) is equipped with a single pull tab (1). The tab is removable. After the tab is removed the quick-connect fitting can be separated from the fuel system component. Special tools are not required for removal.

NOTE: **If the release tab (3) is not pressed prior to releasing pull tab, the pull tab will be damaged**

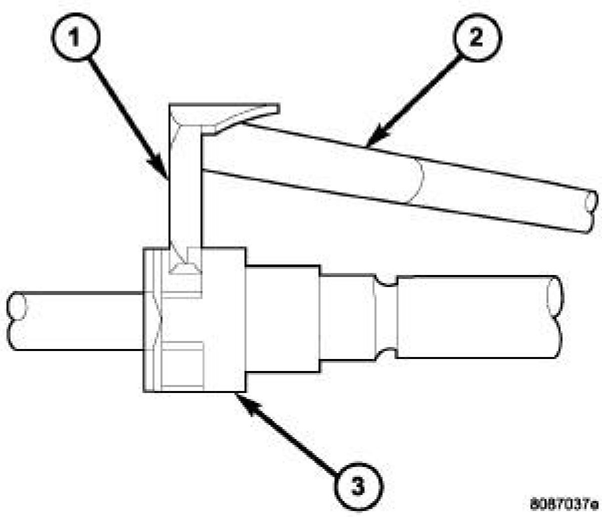


Fig. 15: Disconnecting Single-Tab Type Fitting
Courtesy of CHRYSLER GROUP, LLC

1. Press the release tab on the side of the fitting (3) to release the pull tab (1).
2. While pressing the release tab on the side of the quick-connect fitting use a screwdriver (2) to pry up the pull tab.
3. Raise the pull tab until it separates from the quick-connect fitting.
4. Remove the quick-connect fitting from the fuel system component.

TWO TAB TYPE FITTING

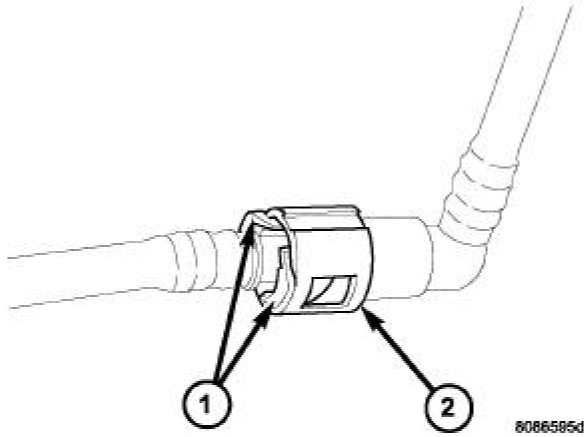


Fig. 16: Identifying Typical 2-Tab Type Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of quick-connect fitting (2) is equipped with tabs (1) located on both sides of the fitting (2). These tabs are integral to the fuel system component. The plastic tabs will remain on the component being serviced after the quick-connect fitting is removed. The O-ring and spacer will remain in the quick-connect fitting. Special tools are not required for removal.

1. Squeeze the plastic tabs (1) against the sides of component being serviced with your fingers.
2. Remove the quick-connect fitting from the fuel system component.

PLASTIC RETAINER RING TYPE FITTING

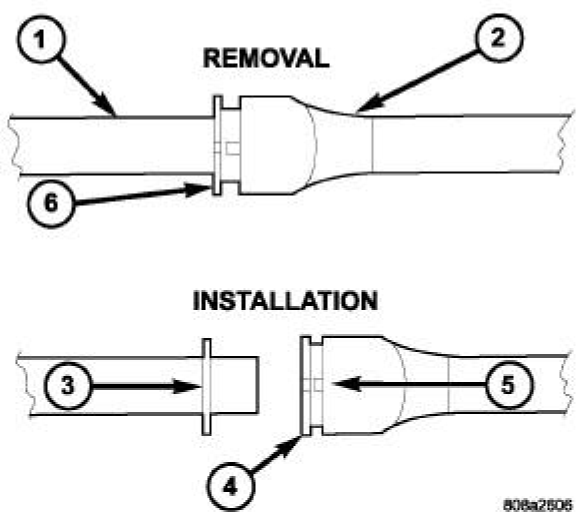


Fig. 17: Plastic Retainer Ring Type Fitting
Courtesy of CHRYSLER GROUP, LLC

This type of fitting can be identified by the use of a round plastic retainer ring (4, 6) usually black in color. Special tools are not required for removal.

NOTE: **The round plastic retainer ring must be pressed squarely into the quick-connect fitting body. If this retainer is cocked during removal it will be difficult to disconnect the quick-connect fitting. Use an open-end wrench on the shoulder of the plastic retainer ring to aid in disconnection.**

1. Firmly push the quick-connect fitting (5) towards the component being serviced while firmly pushing the round plastic retainer ring into the quick-connect fitting (6). With the round plastic ring depressed, remove the quick-connect fitting from the fuel system component.
2. After removal the plastic retainer ring will remain with the quick-connect fitting.

LATCH CLIP TYPE 1 FITTING

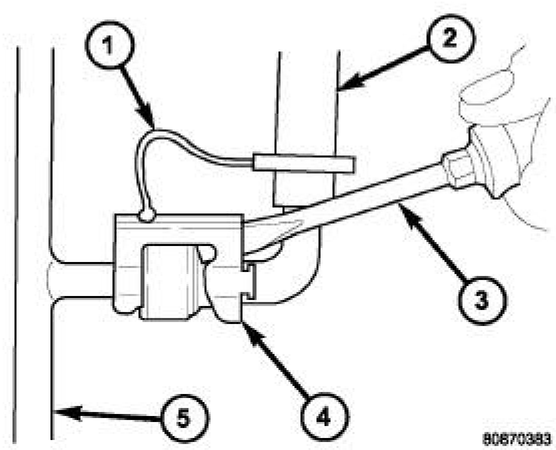


Fig. 18: Latch Clip Type 1 Fitting
Courtesy of CHRYSLER GROUP, LLC

Depending on vehicle model and engine, two different types of safety latch clips are used. One is tethered (1) to fuel line and the other is not. A special tool will be necessary to disconnect the fuel line after latch clip is removed. The latch clip may be used on certain fuel line and fuel rail connections or to join fuel lines together.

1. Pry up on the latch clip (4) with a screwdriver (3).
2. Slide the latch clip away from the quick-connect fitting while lifting the screwdriver and position aside.

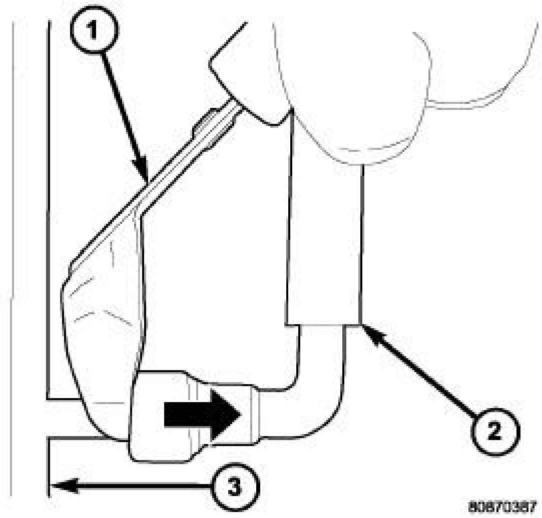


Fig. 19: Fuel Line Disconnection Using Special Tool
Courtesy of CHRYSLER GROUP, LLC

3. Insert an appropriate fuel line removal tool (1) into the quick-connect fitting and release the internal latches.

NOTE: **After removal the internal latches will remain in the quick-connect fitting.**

4. With the special tool still inserted, remove the quick-connect fitting from the fuel system component.

LATCH CLIP TYPE 2 FITTING

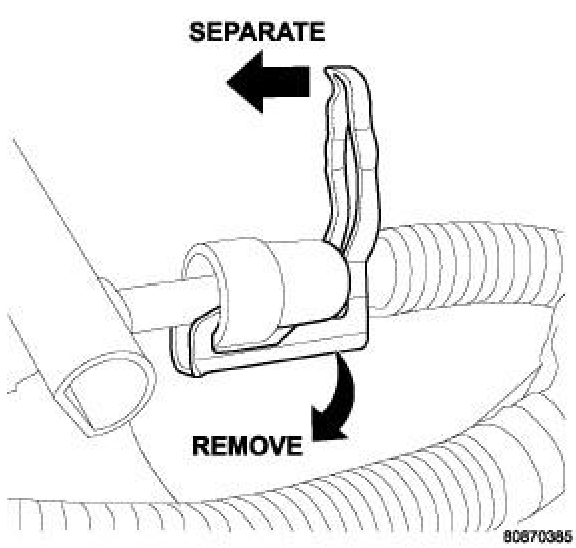


Fig. 20: Latch Clip Type 2 Fitting
Courtesy of CHRYSLER GROUP, LLC

Depending on vehicle model and engine, two different types of safety latch clips are used. One is tethered to the fuel line and the other is not. A special tool will be necessary to disconnect the fuel line after the latch clip is

removed. The latch clip may be used on certain fuel line and fuel rail connections or to join fuel lines together.

1. Unlatch the small arms on the end of clip, swing away and separate from the fuel system component.
2. Slide the latch clip away from the quick-connect fitting while lifting with a screwdriver and position aside.

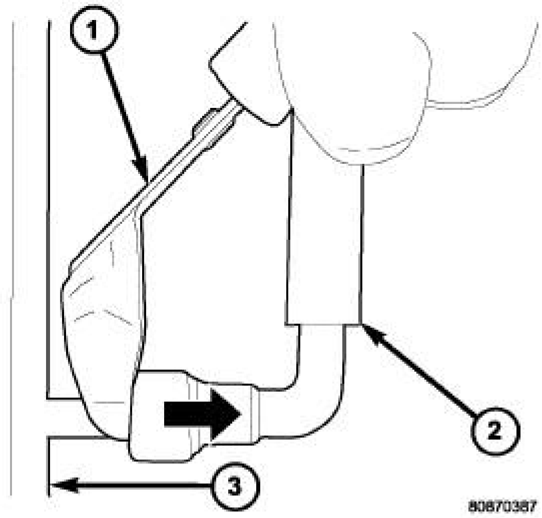


Fig. 21: Fuel Line Disconnection Using Special Tool
Courtesy of CHRYSLER GROUP, LLC

3. Insert an appropriate fuel line removal tool (1) into the quick-connect fitting and release the internal latches.

NOTE: **After removal the internal latches will remain in the quick-connect fitting.**

4. With the special tool still inserted, remove the quick-connect fitting from the fuel system component.

WING TYPE FITTING

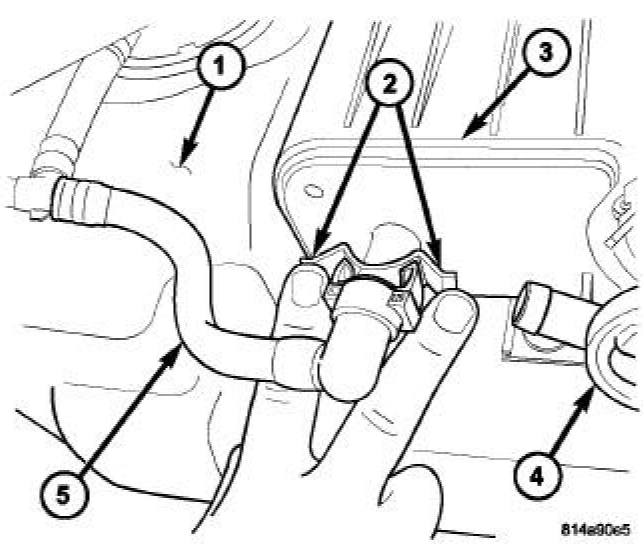


Fig. 22: EVAP Canister Vapor Hose
Courtesy of CHRYSLER GROUP, LLC

The wing type fitting is used on fuel system and emission components. The wing type fitting is most commonly used on the EVAP canister (3). Special tools are not required for removal.

1. Using two fingers, press both wings (2) and release the locking tabs.

NOTE: After removal the locking tabs will remain with the quick-connect fitting.

2. While holding the wings, remove the quick-connect fitting from the fuel system component.

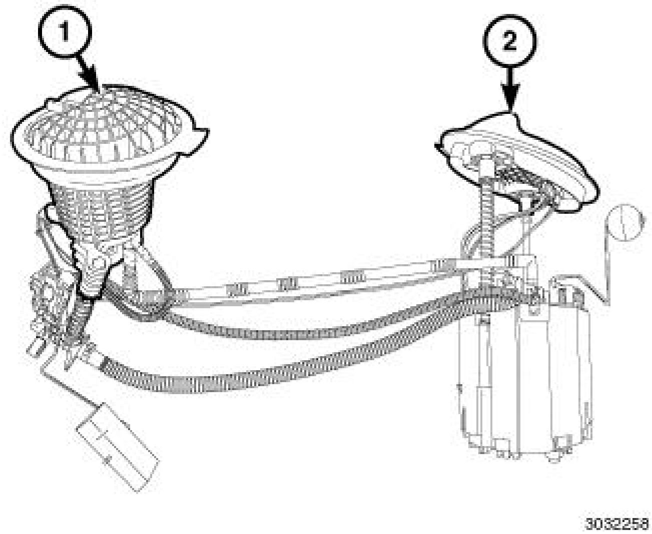
CONNECTING

1. Inspect the quick-connect fitting body and fuel system components for damage. Replace as necessary.
2. Prior to connecting any quick-connect fitting to components, check condition of fitting and components. Clean parts with a lint-free cloth. Lubricate with clean engine oil.
3. Insert the quick-connect fitting onto the fuel tube or fuel system component until the built-in stop on the fuel tube or component rests against the back of fitting.
4. Continue pushing until a click is felt.
5. If Equipped:
   - **Redundant Latch Single Button Type Fitting:** Push redundant latch until it locks into position in the quick-connect fitting.
   - **Single Tab Type Fitting:** Push new tab down until it locks into position in the quick-connect fitting.
   - **Latch Clip Type Fitting:** Install latch clip (snaps into position). **If latch clip will not snap into position, this indicates the quick-connect fitting is not properly installed onto fuel system component, recheck the connection.**
6. Verify a locked condition by firmly pulling on the quick-connect fitting connection of the fuel system component.

MODULE, FUEL PUMP

DESCRIPTION

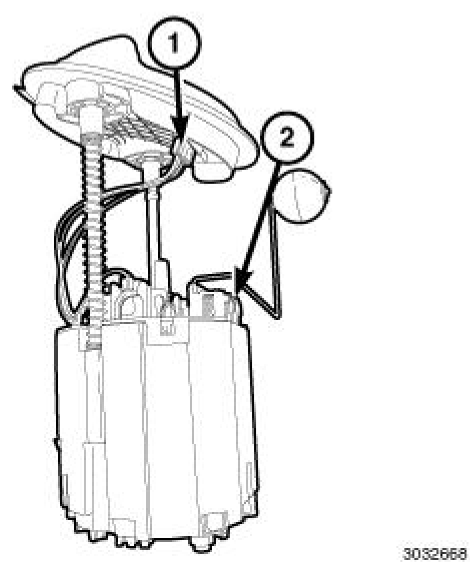
3.6L/5.7L/6.4L



[Fig. 23: Main Fuel Pump Module & Auxiliary Fuel Pump Module](#)
Courtesy of CHRYSLER GROUP, LLC

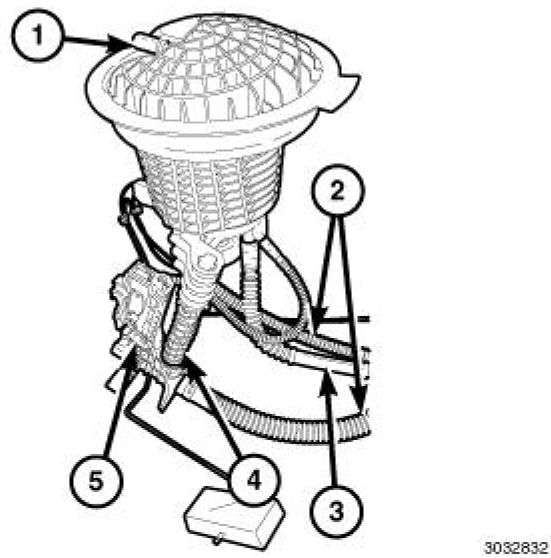
This vehicle uses a saddle type tank that has a reservoir on both sides of the rear drive shaft. The main fuel pump module (2) is located on the left side of the vehicle. The auxiliary fuel pump module (1) is located the right side of the vehicle. The fuel outlet or fuel supply line is on the auxiliary fuel pump module (right side) and supplies fuel to the engine. The electrical connector is on the main fuel pump module (left side) and controls both modules. The fuel pressure regulator is integrated into the auxiliary fuel pump module and is not a serviceable component.

Both modules have fuel level sending cards. The fuel level sending cards are not serviceable components. There are 3 hoses that connect the main and auxiliary fuel pump modules together, one is the fuel supply line the other two are fuel return lines. These lines are removed from the main fuel pump module when servicing either unit. One fuel filter is used and is located at the bottom of the main fuel pump module and is designed for extended life. A separate frame mounted fuel filter is not used with any engine. The fuel filter is not a serviceable component.



[Fig. 24: Electrical Connector And Fuel Level Sending Card](#)
Courtesy of CHRYSLER GROUP, LLC

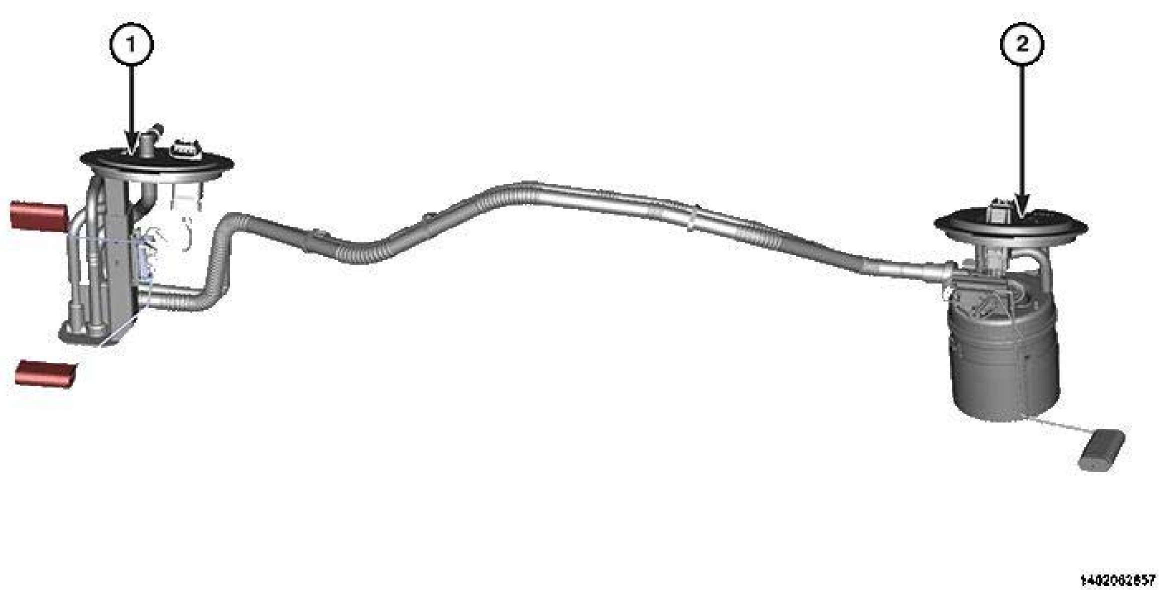
Left side main fuel pump module with wire harness connector (1) and fuel level sending card (2).



[Fig. 25: Fuel Supply Fitting, Fuel Return Lines, Fuel Supply Line, Fuel Pressure Regulator And Fuel Level Sending Card]
Courtesy of CHRYSLER GROUP, LLC

Right side auxiliary fuel pump module with the fuel supply fitting (1), fuel return lines (2), fuel supply line (3), fuel pressure regulator (4) and fuel level sending card (5).

6.2L



[Fig. 26: Auxiliary Fuel Pump Module & Main Fuel Pump Module]
Courtesy of CHRYSLER GROUP, LLC

This vehicle uses a saddle type tank that has a reservoir on both sides of the rear drive shaft. The main fuel pump module (2) is located on the left side of the vehicle. The auxiliary fuel pump module (1) is located the right side of the vehicle. The fuel outlet or fuel supply line is on the auxiliary fuel pump module (right side) and

supplies fuel to the engine. The electrical connector is on the main fuel pump module (left side) and controls both modules. The fuel pressure regulator is integrated into the auxiliary fuel pump module and is not a serviceable component.

Both modules have fuel level sending cards. The fuel level sending cards are not serviceable components. There are two hoses that connect the main and auxiliary fuel pump modules together, one is the fuel supply line the other two are fuel return lines. These lines are removed from the main fuel pump module when servicing either unit. One fuel filter is used and is located at the bottom of the main fuel pump module and is designed for extended life. A separate frame mounted fuel filter is not used with any engine. The fuel filter is not a serviceable component.

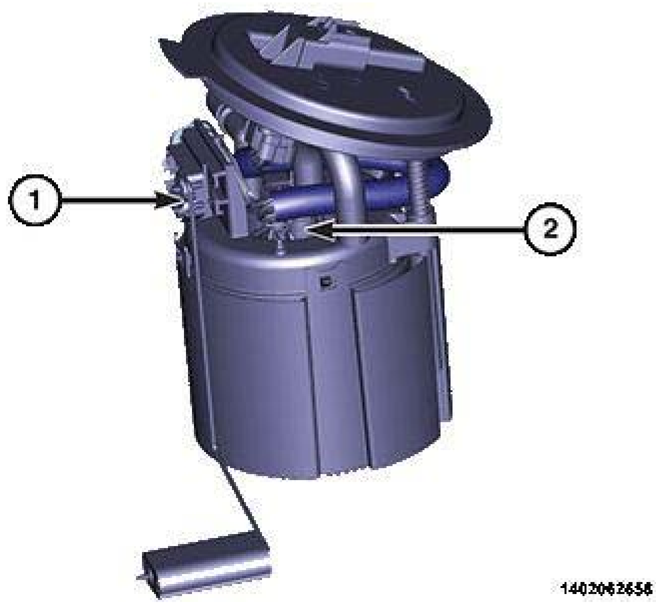


Fig. 27: Fuel Level Sending Unit & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

Left side main fuel pump module with wire harness connector (2) and fuel level sending unit (1).

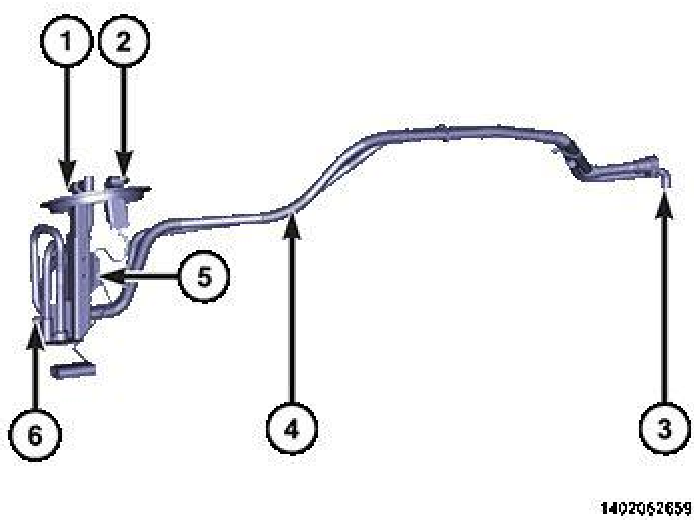


Fig. 28: Fuel Supply Port, Electrical Connection, Transfer Line, Supply Line, Pressure Relief & Fuel

Level Sending Unit
Courtesy of CHRYSLER GROUP, LLC

Right side auxiliary fuel pump module with the fuel supply port (1), electrical connection (2), fuel transfer line (3), fuel supply line (4), fuel pressure relief (6) and fuel level sending unit (5).

OPERATION

3.6L/5.7L/6.4L

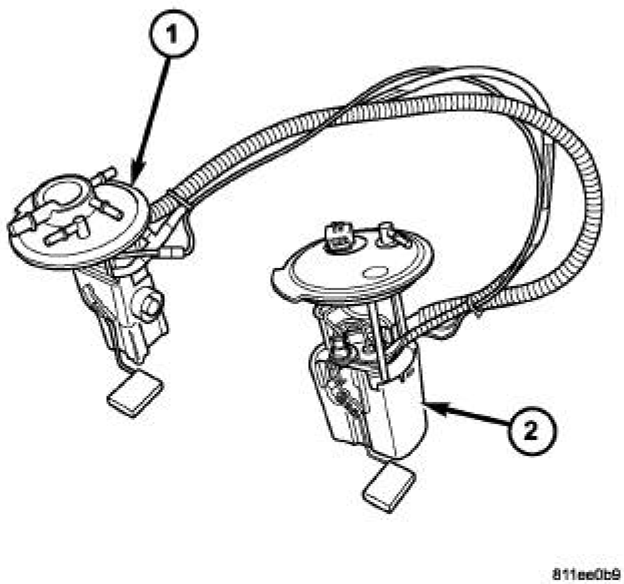


Fig. 29: Main Fuel Pump Module & Auxiliary Fuel Pump Module
Courtesy of CHRYSLER GROUP, LLC

Fuel enters the reservoir of the main fuel pump module (left side). The main fuel pump module (2) pumps the fuel through the filter to the auxiliary fuel pump module (1) (right side) through a supply line inside the fuel tank. The fuel pressure regulator inside the auxiliary fuel pump module regulates the pressure at 58 psi and sends fuel to the engine. All unused fuel that is not sent to the engine is fed through a venturi at the bottom of the auxiliary fuel pump module. This creates a low pressure siphoning effect and draws fuel from the passenger side of the tank and transfers it to the drivers side tank via a siphon hose inside the tank. While the vehicle is running the fuel in the right side of tank is continuously transferred to the left side. Fuel will continue to fill the left side tank till it reaches the bridge section and then starts to spill over to the right side.

Both main and auxiliary fuel pumps have fuel level sender cards and the reading of these senders are averaged out to give the fuel gauge reading. When diagnosing a fuel level sender concern, the right side reading should never be higher than the left side reading. However, it is possible, depending on fuel level and driving habit before diagnosing, to spill fuel over to the right side that might indeed show a lower resistance value than the left side.

The fuel gauge gives an indication to the vehicle operator the level of fuel in the fuel tank. This fuel gauge is controlled by the instrument cluster circuit board based upon cluster programming and hard wired inputs received by the cluster from the fuel level sending units integrated into the fuel pump modules.

The instrument cluster continually monitors both fuel pump sender cards to determine the level of fuel in the fuel tank. The cluster then sends the proper fuel level messages to other electronic modules in the vehicle over the Controller Area Network (CAN) data bus. For further diagnosis of the fuel gauge or the instrument cluster circuitry that controls the gauge. Refer to **DIAGNOSIS AND TESTING** . The fuel gauge is serviced as a unit with the instrument cluster.

6.2L

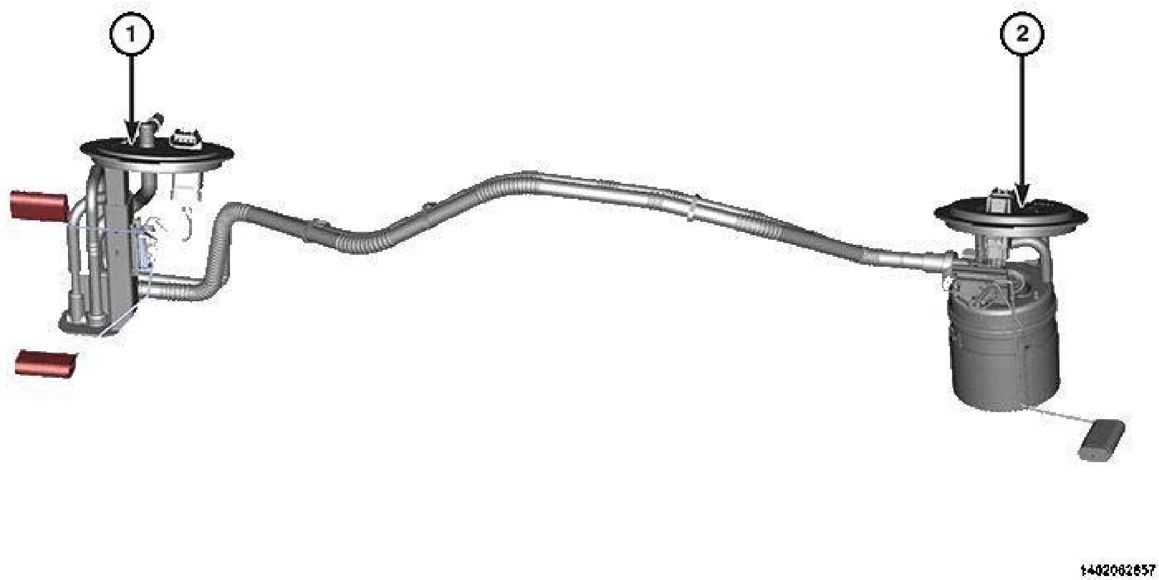


Fig. 30: Auxiliary Fuel Pump Module & Main Fuel Pump Module
Courtesy of CHRYSLER GROUP, LLC

Fuel enters the reservoir of the main fuel pump module (left side). The main fuel pump module (2) pumps the fuel through the filter to the auxiliary fuel pump module (1) (right side) through a supply line inside the fuel tank. The fuel pressure regulator inside the auxiliary fuel pump module regulates the pressure at 58 psi and sends fuel to the engine. All unused fuel that is not sent to the engine is fed through a venturi at the bottom of the auxiliary fuel pump module. This creates a low pressure siphoning effect and draws fuel from the passenger side of the tank and transfers it to the drivers side tank via a siphon hose inside the tank. While the vehicle is running the fuel in the right side of tank is continuously transferred to the left side. Fuel will continue to fill the left side tank till it reaches the bridge section and then starts to spill over to the right side.

Both main and auxiliary fuel pumps have fuel level sending units and the reading of these senders are averaged out to give the fuel gauge reading. When diagnosing a fuel level sender concern, the right side reading should never be higher than the left side reading. However, it is possible, depending on fuel level and driving habit before diagnosing, to spill fuel over to the right side that might indeed show a lower resistance value than the left side.

The fuel gauge gives an indication to the vehicle operator the level of fuel in the fuel tank. This fuel gauge is controlled by the instrument cluster circuit board based upon cluster programming and hard wired inputs received by the cluster from the fuel level sending units integrated into the fuel pump modules.

The instrument cluster continually monitors both fuel pump sending units to determine the level of fuel in the fuel tank. The cluster then sends the proper fuel level messages to other electronic modules in the vehicle over

the Controller Area Network (CAN) data bus. For further diagnosis of the fuel gauge or the instrument cluster circuitry that controls the gauge. Refer to **DIAGNOSIS AND TESTING** . The fuel gauge is serviced as a unit with the instrument cluster.

REMOVAL

3.6L/5.7L/6.4L

MAIN FUEL PUMP MODULE

WARNING: The fuel system is under constant high pressure even with engine off. Until the fuel pressure has been properly released from the system, do not attempt to open the fuel system. Do not smoke or use open flames/sparks when servicing the fuel system. Wear protective clothing and eye protection. Make sure the area in which the vehicle is being serviced is in a well ventilated area and free of flames/sparks. Failure to comply may result in serious or fatal injury.

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

CAUTION: If the electric fuel pump module is not operating or the fuel level sending unit is not operating and the fuel level cannot be determined, the fuel tank must be removed prior to draining. If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle

1. Verify the fuel level is below 5/8 of a tank.
2. Perform the fuel pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
3. If required, perform the draining fuel tank procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
4. Disconnect and isolate the negative battery cable.
5. Remove the rear seat cushion. Refer to **SEAT CUSHION, REMOVAL** .
6. Fold back the foam pad covering the fuel pump module plastic access covers.

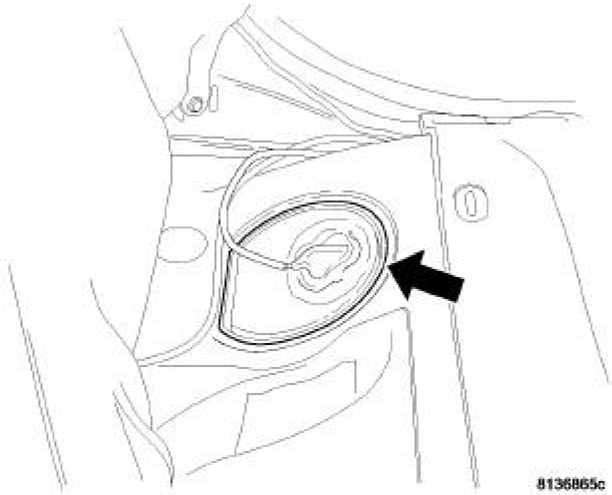


Fig. 31: Locating Plastic Access Cover
Courtesy of CHRYSLER GROUP, LLC

7. Remove the left side main fuel pump module plastic access cover.

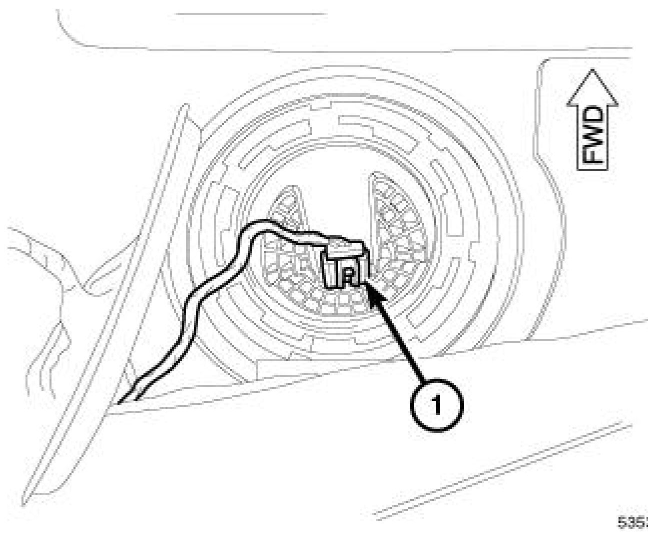


Fig. 32: Left Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the main fuel pump module wire harness connector.

CAUTION: **An indexing arrow is located on top of the fuel pump module to clock its position into the fuel tank, note its location for reassembly.**

NOTE: **Prior to removing the fuel pump module, use compressed air to remove any accumulated dirt and debris from around fuel tank opening.**

9. Mark the main fuel pump module orientation.
10. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring

Wrench) into the notches on the outside edge of the lock ring.

11. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench).

NOTE: **The main fuel pump module will spring up slightly when the lock ring is removed.**

12. Rotate the breaker bar counterclockwise and remove the lock ring.

CAUTION: **Do not allow the float arm of the main fuel pump module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.**

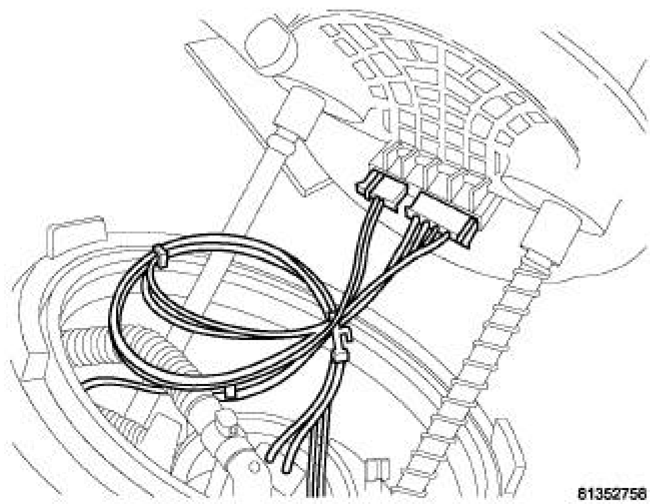


Fig. 33: Module Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

13. Raise and separate the top section from the bottom section of the main fuel pump module.
14. Disconnect the wire harness connectors from under the top section of the main fuel pump module.
15. Remove the top section of the main fuel pump module from the vehicle.

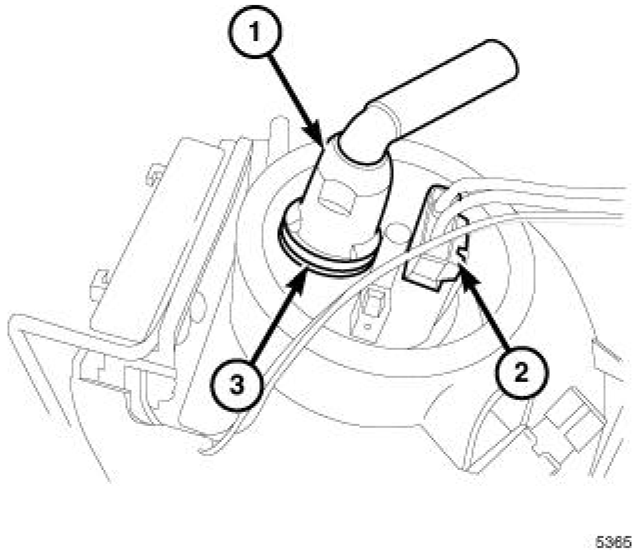


Fig. 34: Fuel Supply Line, Fuel Pump Module Electrical Connector & Quick Connect Release Tab
Courtesy of CHRYSLER GROUP, LLC

16. Press the quick connect release tab (3) and remove the fuel supply line (1) from the main fuel pump module.

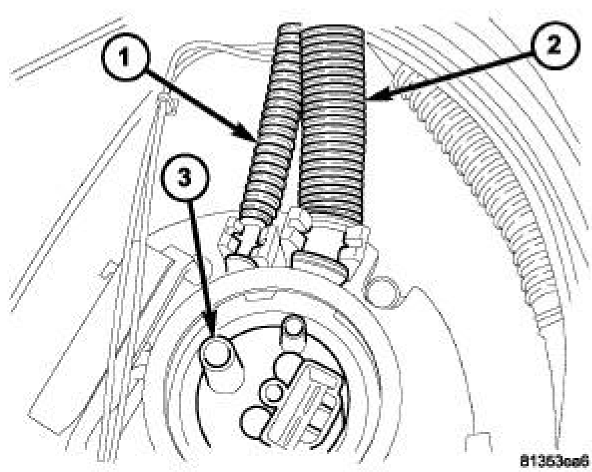


Fig. 35: Fuel Return Lines
Courtesy of CHRYSLER GROUP, LLC

17. Disconnect the fuel return lines (1, 2) from the main fuel pump module.

NOTE: **Do not spill fuel into the interior of the vehicle.**

18. Carefully lift the bottom section of the main fuel pump module out of the fuel tank, tip the bottom section on its side and drain the remaining fuel from the bottom reservoir into the fuel tank and remove from vehicle.

NOTE: **Whenever a fuel pump module is serviced, the rubber O-ring seal must be**

replaced.

19. Remove and discard the rubber O-ring seal.

AUXILIARY FUEL PUMP MODULE

NOTE: **The Main Fuel Pump Module must be removed for Auxiliary Fuel Pump Module removal.**

1. Remove the main fuel pump module, see **MAIN FUEL PUMP MODULE**. .
2. Remove the auxiliary fuel pump module plastic access cover from the floor pan.

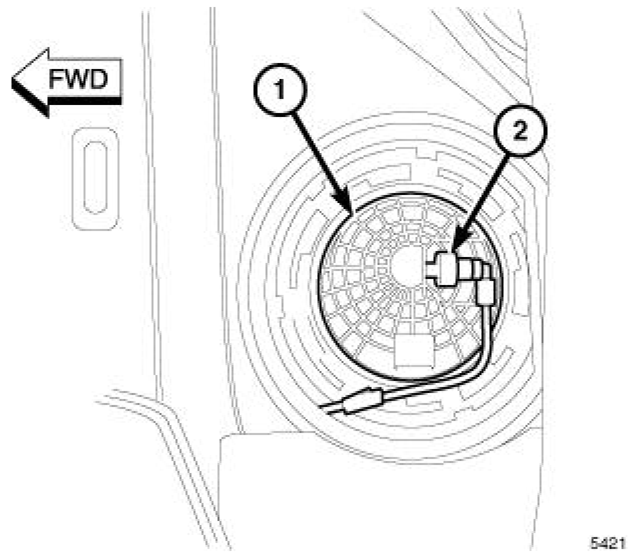


Fig. 36: Auxiliary Fuel Pump Module & Fuel Supply Line
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Prior to removing the fuel pump module, use compressed air to remove any accumulated dirt and debris from around fuel tank opening.**

3. Disconnect the fuel supply line (2) from the auxiliary fuel pump module (1).
4. Mark the auxiliary fuel pump module orientation.

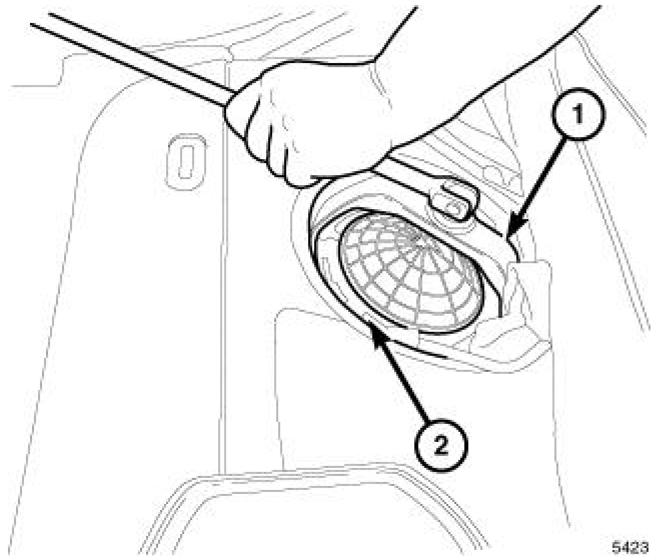


Fig. 37: Fuel Pump Lock Ring Wrench & Lock Ring
Courtesy of CHRYSLER GROUP, LLC

5. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the outside edge of the lock ring (2).
6. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1).
7. Rotate the breaker bar counterclockwise and remove the lock ring (2).

CAUTION: Do not allow the float arm of the auxiliary fuel pump module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.

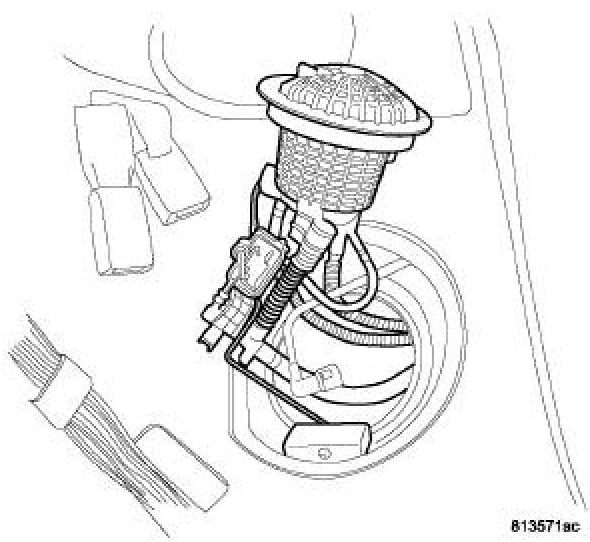


Fig. 38: Remove/Install Right Side Module
Courtesy of CHRYSLER GROUP, LLC

8. Lift the auxiliary fuel pump module up and out of fuel tank while guiding the fuel supply and return lines

out from the left side of the fuel tank.

NOTE: **Whenever a fuel pump module is serviced, the rubber O-ring seal must be replaced.**

9. Remove and discard the rubber O-ring seal.

6.2L

MAIN FUEL PUMP MODULE

WARNING: The fuel system is under constant high pressure even with engine off. Until the fuel pressure has been properly released from the system, do not attempt to open the fuel system. Do not smoke or use open flames/sparks when servicing the fuel system. Wear protective clothing and eye protection. Make sure the area in which the vehicle is being serviced is in a well ventilated area and free of flames/sparks. Failure to comply may result in serious or fatal injury.

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

CAUTION: If the electric fuel pump module is not operating or the fuel level sending unit is not operating and the fuel level cannot be determined, the fuel tank must be removed prior to draining. If the fuel level is above 5/8 of a tank and the fuel pump module lock-ring is removed, fuel will spill into the interior of the vehicle

1. Verify the fuel level is below 5/8 of a tank.
2. Perform the fuel pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
3. If required, perform the draining fuel tank procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
4. Disconnect and isolate the negative battery cable.
5. Remove the rear seat cushion. Refer to **SEAT CUSHION, REMOVAL** .
6. Fold back the foam pad covering the fuel pump module plastic access covers.

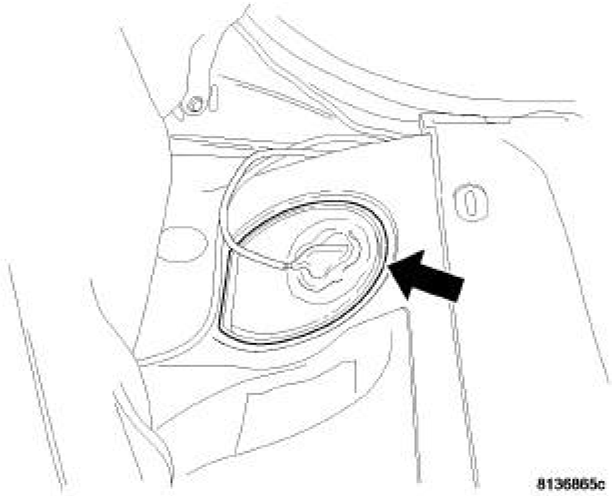


Fig. 39: Locating Plastic Access Cover
Courtesy of CHRYSLER GROUP, LLC

7. Remove the left side main fuel pump module plastic access cover.

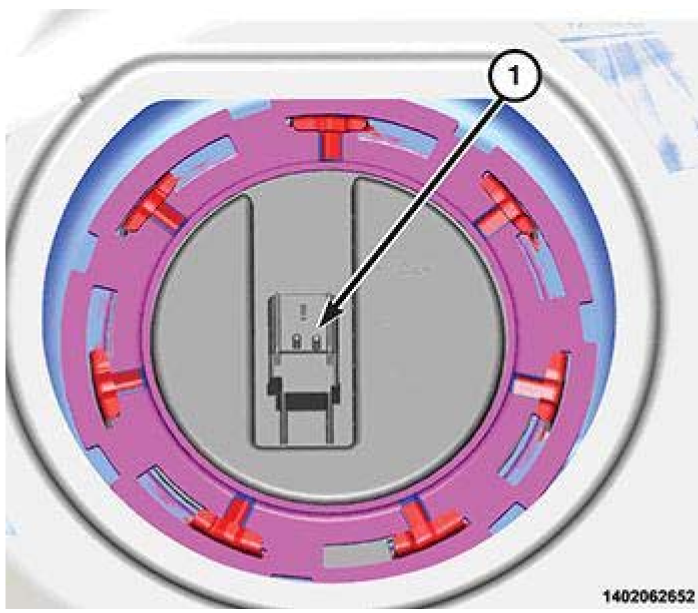


Fig. 40: Main Fuel Pump Module Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the main fuel pump module wire harness connector (1).

CAUTION: **An indexing arrow is located on top of the fuel pump module to clock its position into the fuel tank, note its location for reassembly.**

NOTE: **Prior to removing the fuel pump module, use compressed air to remove any accumulated dirt and debris from around fuel tank opening.**

9. Mark the main fuel pump module orientation.

10. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) into the notches on the outside edge of the lock ring.
11. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench).

NOTE: **The main fuel pump module will spring up slightly when the lock ring is removed.**

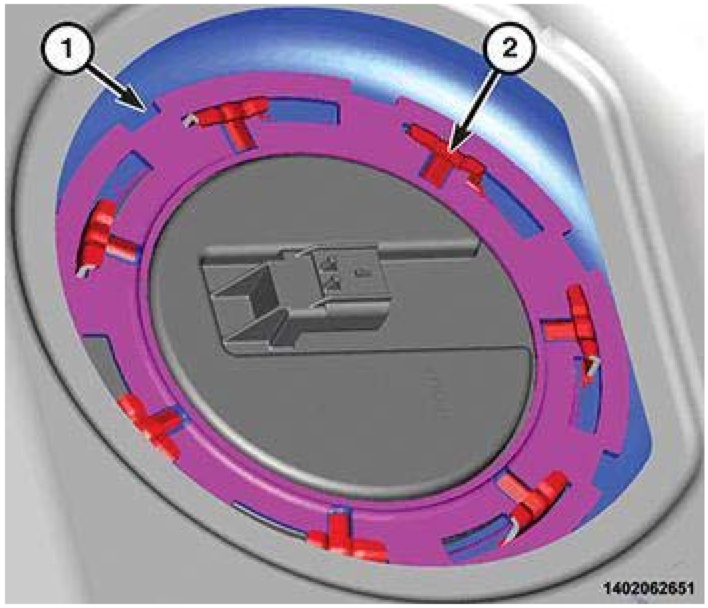


Fig. 41: Fuel Pump Module & Lock Ring
Courtesy of CHRYSLER GROUP, LLC

12. Rotate the breaker bar counterclockwise and remove the lock ring (1).

CAUTION: **Do not allow the float arm of the main fuel pump module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.**

Fig. 42: Wire Harness Connector & Main Fuel Pump Module Top Section
Courtesy of CHRYSLER GROUP, LLC

13. Raise and separate the top section (2) from the bottom section of the main fuel pump module.
14. Disconnect the wire harness connector (1) from under the top section of the main fuel pump module.
15. Remove the top section of the main fuel pump module from the vehicle.

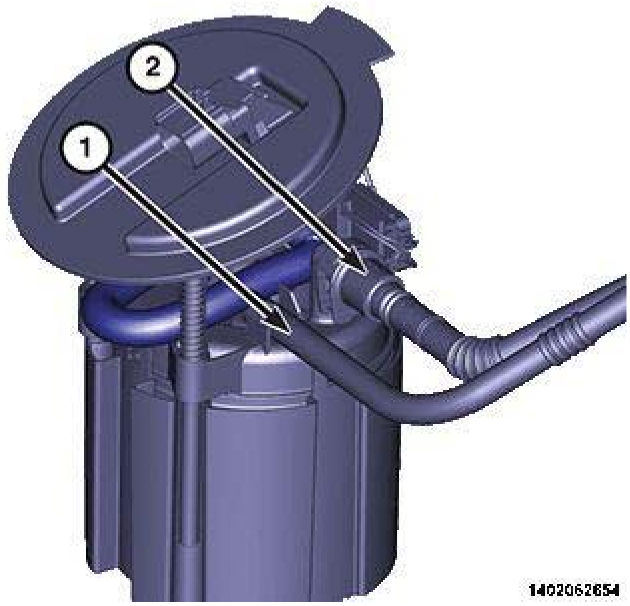


Fig. 43: Fuel Return Line & Quick Connect Release Tab
Courtesy of CHRYSLER GROUP, LLC

16. Press the quick connect release tab (2) and remove the fuel supply line from the main fuel pump module.
17. Disconnect the fuel return line (1) from the main fuel pump module.

NOTE: **Do not spill fuel into the interior of the vehicle.**

18. Carefully lift the bottom section of the main fuel pump module out of the fuel tank, tip the bottom section on its side and drain the remaining fuel from the bottom reservoir into the fuel tank and remove from vehicle.

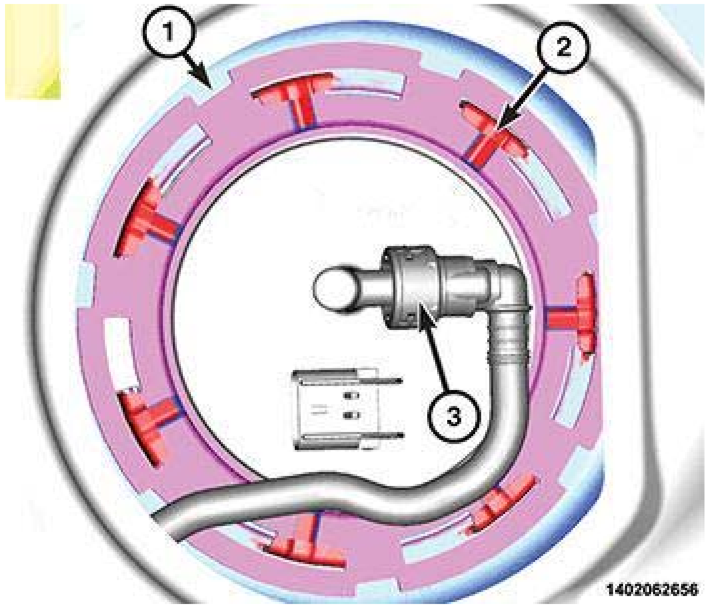
NOTE: **Whenever a fuel pump module is serviced, the rubber O-ring seal must be replaced.**

19. Remove and discard the rubber O-ring seal.

AUXILIARY FUEL PUMP MODULE

NOTE: **The Main Fuel Pump Module must be removed for Auxiliary Fuel Pump Module removal.**

1. Remove the main fuel pump module. Refer to **MODULE, FUEL PUMP, REMOVAL**.
2. Remove the auxiliary fuel pump module access cover from the floor pan.



[Fig. 44: Lock Ring, Fuel Pump & Fuel Supply Line](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Prior to removing the fuel pump module, use compressed air to remove any accumulated dirt and debris from around fuel tank opening.**

3. Disconnect the fuel supply line (3) from the auxiliary fuel pump module.
4. Mark the auxiliary fuel pump module orientation.
5. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) into the notches on the outside edge of the lock ring (1).
6. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench).
7. Rotate the breaker bar counterclockwise, disengaging the lock ring from the fuel pump (2).

CAUTION:	**Do not allow the float arm of the auxiliary fuel pump module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.**

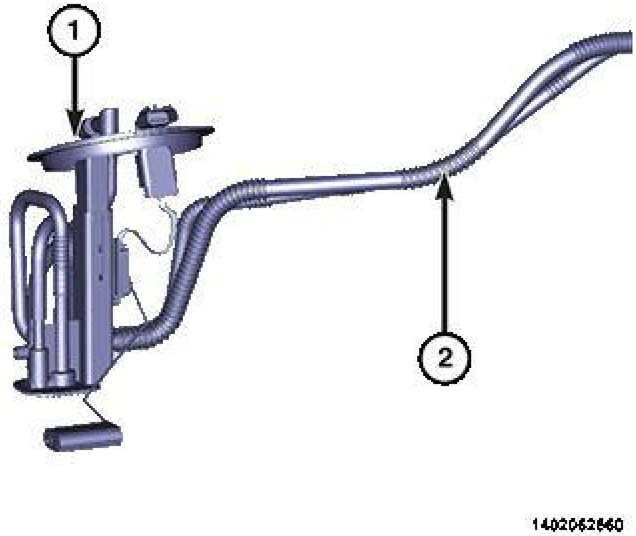


Fig. 45: Auxiliary Fuel Pump Module & Fuel Supply And Return Line
Courtesy of CHRYSLER GROUP, LLC

8. Lift the auxiliary fuel pump module (1) up and out of fuel tank while guiding the fuel supply and return lines (2) out from the left side of the fuel tank.

NOTE:	**Whenever a fuel pump module is serviced, the rubber O-ring seal must be replaced.**

9. Remove and discard the rubber O-ring seal.

INSTALLATION

3.6L/5.7L/6.4L

MAIN FUEL PUMP MODULE

WARNING:	**No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.**
CAUTION:	**Do not allow the float arm of the main fuel pump module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.**

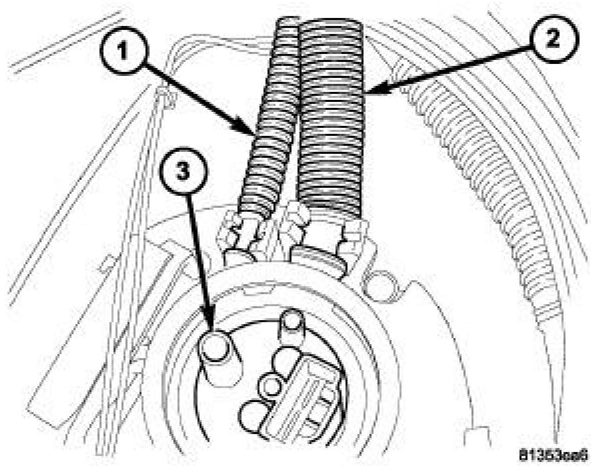


Fig. 46: Hose Connections Drivers Side
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Auxiliary Fuel Pump Module must be installed before the Main Fuel Pump Module.**

1. If the auxiliary fuel pump module is removed, see **AUXILIARY FUEL PUMP MODULE**. .

   NOTE: **Whenever the fuel pump module is serviced, the rubber O-ring seal must be replaced.**

2. Install a new rubber O-ring seal.
3. Using caution not to bend the float arm, lower the bottom section of the main fuel pump module into the fuel tank.
4. Connect the fuel return lines (1, 2) to the main fuel pump module.

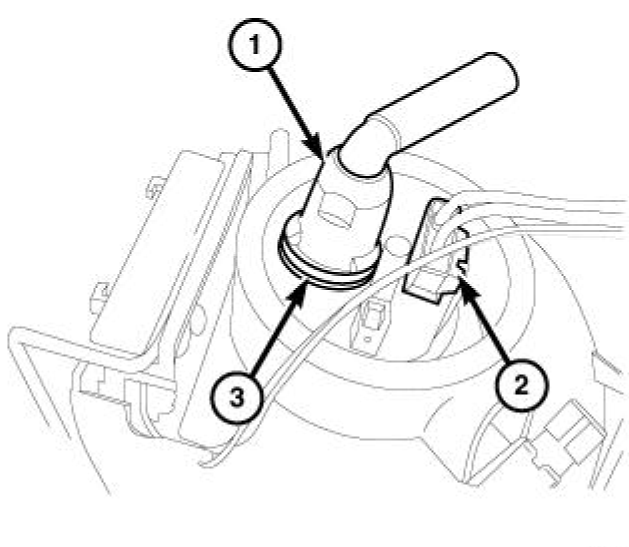


Fig. 47: Fuel Supply Line, Fuel Pump Module Electrical Connector & Quick Connect Release Tab

Courtesy of CHRYSLER GROUP, LLC

5. Connect the fuel supply line (1) to the main fuel pump module.

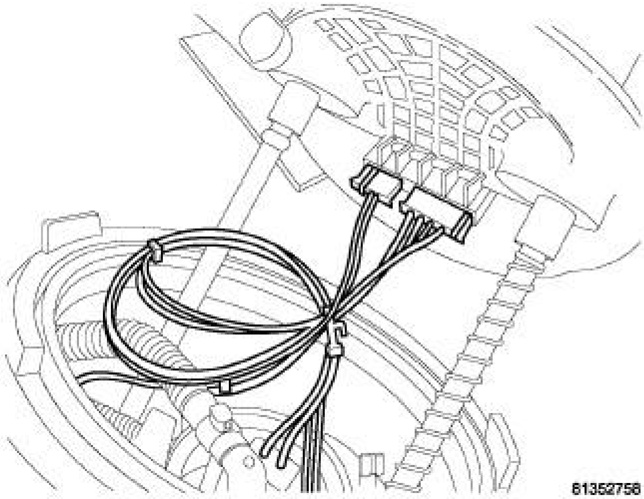


Fig. 48: Module Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

6. Connect the wire harness connectors at the top section of the main fuel pump module.
7. Join the upper section and lower section of the main fuel pump module together.
8. Position the main fuel pump module as noted during removal.

CAUTION: **Verify the electrical wires are tucked away into the fuel tank so they don't get pinched between the top of the fuel pump module and the rubber O-ring seal.**

CAUTION: **An indexing arrow is located on top of the fuel pump module to clock it's position into the fuel tank. The fuel pump module must be installed in the same position as removed.**

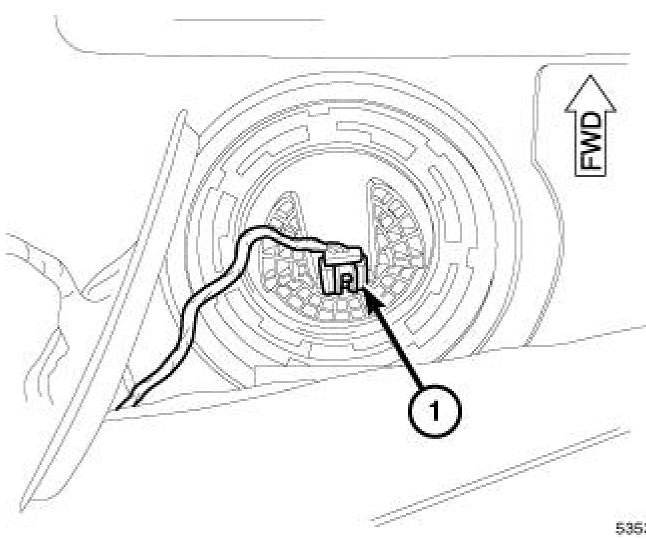


Fig. 49: Left Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

9. Align the rubber O-ring seal and lower the main fuel pump module into position.
10. Verify the main fuel pump module is in the same position as noted during removal. This step must be performed to prevent the float from contacting the side of the fuel tank.
11. Position the lock ring over top of the main fuel pump module.
12. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) into the notches on the outside edge of the lock ring.
13. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench).
14. Rotate the breaker bar clockwise until all seven notches of the lock ring have engaged.

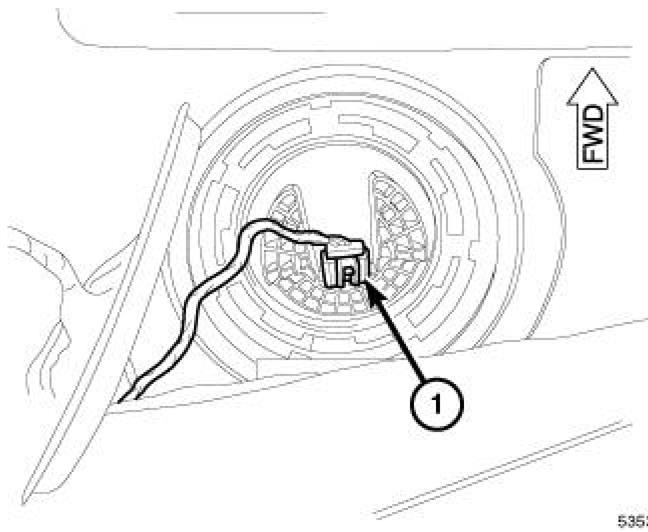


Fig. 50: Left Side Module Orientation
Courtesy of CHRYSLER GROUP, LLC

15. Connect the electrical connector (1) to the main fuel pump module.
16. Fill the fuel tank and check for leaks around the rubber O-ring seal.

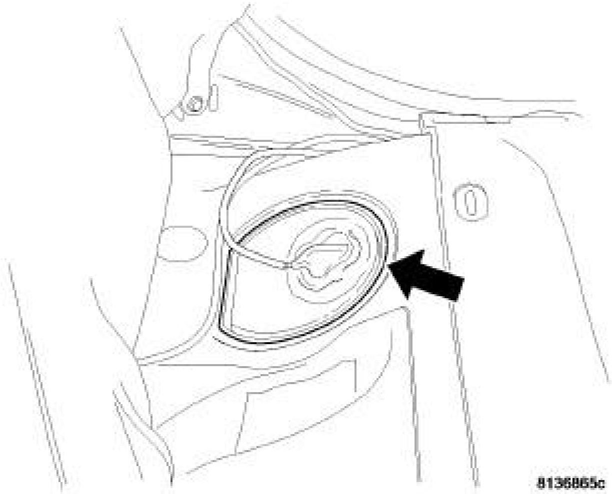


Fig. 51: Locating Plastic Access Cover
Courtesy of CHRYSLER GROUP, LLC

17. Install the main fuel pump module plastic access cover.
18. Lower the foam pad covering back into place.
19. Push the rear lower seat cushion back and down and install the seat cushion.
20. Connect the negative battery cable.

AUXILIARY FUEL PUMP MODULE

CAUTION: **An indexing arrow is located on top of the fuel pump module to clock it's position into the fuel tank. The fuel pump module must be installed in the same position as removed.**

CAUTION: **Do not allow the float arm of the auxiliary fuel pump module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.**

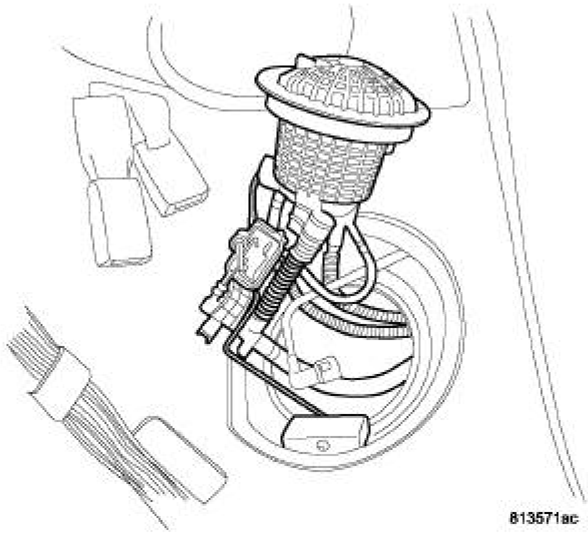


Fig. 52: Remove/Install Right Side Module
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Whenever the fuel pump module is serviced, the rubber O-ring seal must be replaced.**

1. Install a new rubber O-ring seal.
2. Using caution not to bend the float arm, lower the auxiliary fuel pump module into the fuel tank while guiding the fuel return lines, fuel supply line and electrical connector over to the left side of the fuel tank.
3. Align the rubber O-ring seal and lower the auxiliary fuel pump module into position as noted during removal.
4. Position the lock ring over top of the auxiliary fuel pump module.
5. Verify the auxiliary fuel pump module is in the same position as noted during removal. This step must be performed to prevent the float from contacting the side of the fuel tank.

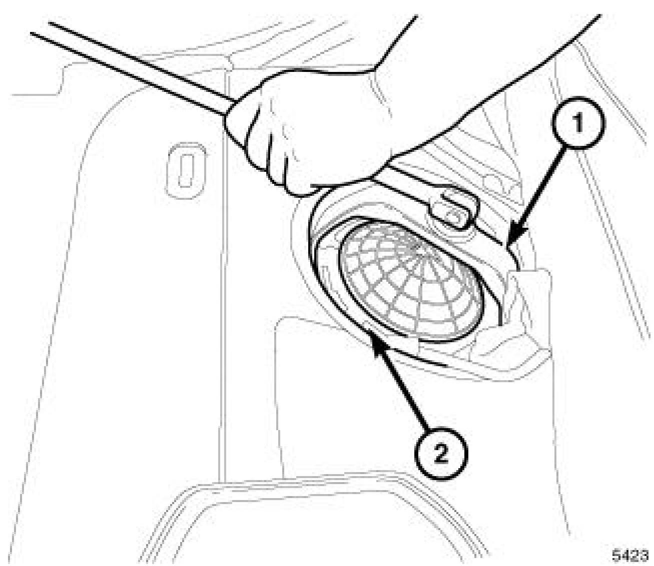


Fig. 53: Fuel Pump Lock Ring Wrench & Lock Ring
Courtesy of CHRYSLER GROUP, LLC

6. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1) into the notches on the outside edge of the lock ring (2).
7. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) (1).
8. Rotate the breaker bar clockwise until all seven notches of the lock ring have engaged.

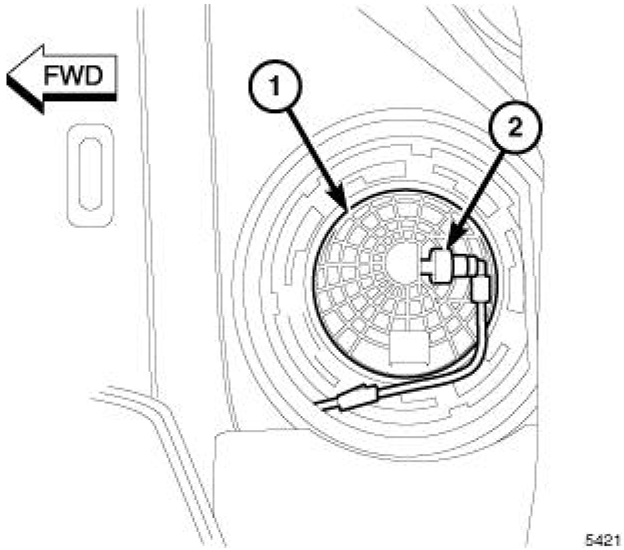


Fig. 54: Auxiliary Fuel Pump Module & Fuel Supply Line
Courtesy of CHRYSLER GROUP, LLC

9. Connect the fuel supply line (2) to auxiliary fuel pump module.
10. Install the auxiliary fuel pump module plastic access cover (1).
11. Install the main fuel pump module, see **MAIN FUEL PUMP MODULE**.

6.2L

MAIN FUEL PUMP MODULE

WARNING: **No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.**

CAUTION: **Do not allow the float arm of the main fuel pump module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.**

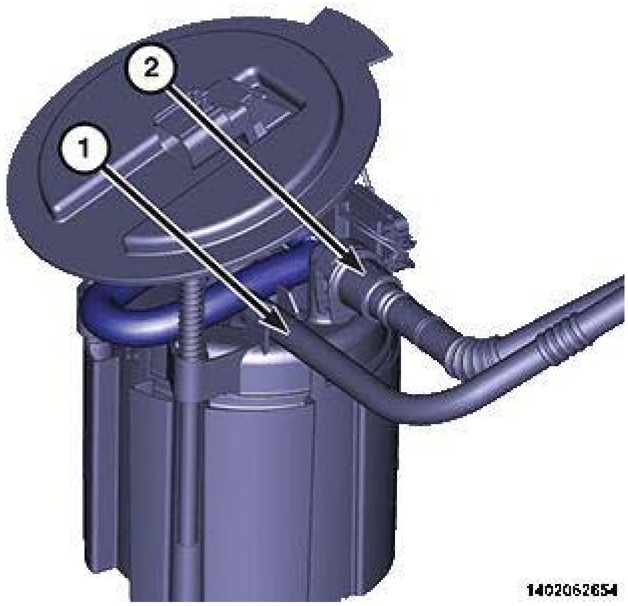


Fig. 55: Fuel Return Line & Quick Connect Release Tab
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Auxiliary Fuel Pump Module must be installed before the Main Fuel Pump Module.**

1. If the auxiliary fuel pump module is removed, see **AUXILIARY FUEL PUMP MODULE**. .

   NOTE: **Whenever the fuel pump module is serviced, the rubber O-ring seal must be replaced.**

2. Install a new rubber O-ring seal.
3. Using caution not to bend the float arm, lower the bottom section of the main fuel pump module into the fuel tank.
4. Connect the fuel return line (1) to the main fuel pump module.
5. Connect the fuel supply line (2) to the main fuel pump module.

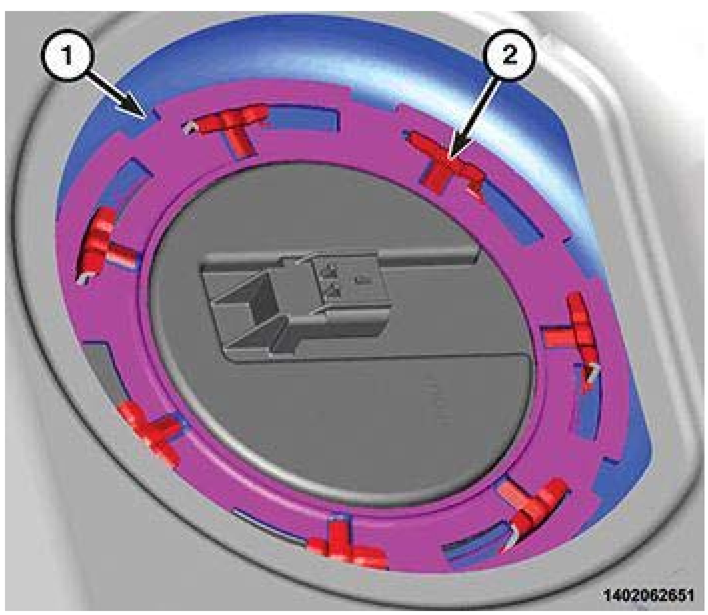
[Fig. 56: Wire Harness Connector & Main Fuel Pump Module Top Section]

Courtesy of CHRYSLER GROUP, LLC

6. Connect the wire harness connector (1) at the top section of the main fuel pump module.
7. Join the upper section (2) and lower section of the main fuel pump module together.
8. Position the main fuel pump module as noted during removal.

CAUTION: **Verify the electrical wires are tucked away into the fuel tank so they don't get pinched between the top of the fuel pump module and the rubber O-ring seal.**

CAUTION: **An indexing arrow is located on top of the fuel pump module to clock it's position into the fuel tank. The fuel pump module must be installed in the same position as removed.**



[Fig. 57: Fuel Pump Module & Lock Ring]

Courtesy of CHRYSLER GROUP, LLC

9. Align the rubber O-ring seal and lower the main fuel pump module into position.
10. Verify the main fuel pump module is in the same position as noted during removal. This step must be performed to prevent the float from contacting the side of the fuel tank.
11. Position the lock ring (1) over top of the main fuel pump module (2).
12. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) into the notches on the outside edge of the lock ring.
13. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench).
14. Rotate the breaker bar clockwise until all seven notches of the lock ring have engaged.

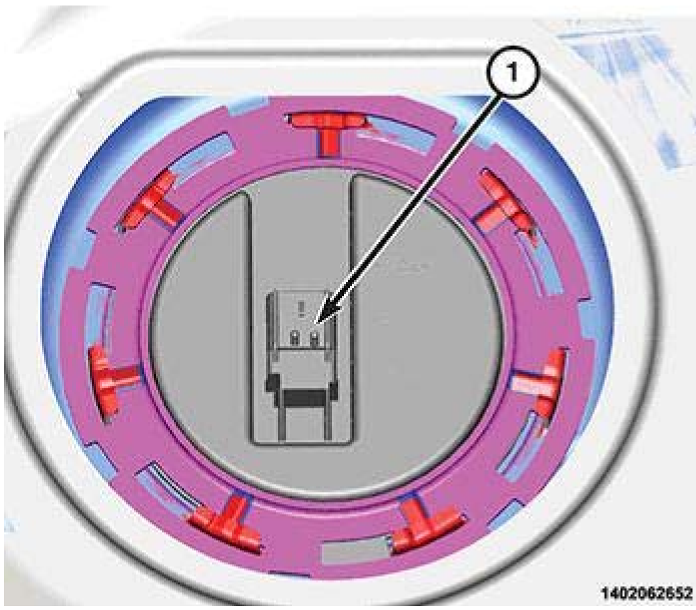


Fig. 58: Main Fuel Pump Module Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

15. Connect the electrical connector (1) to the main fuel pump module.
16. Fill the fuel tank and check for leaks around the rubber O-ring seal.

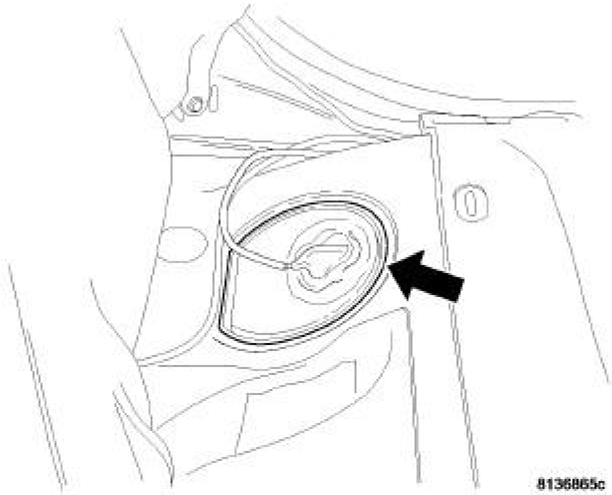


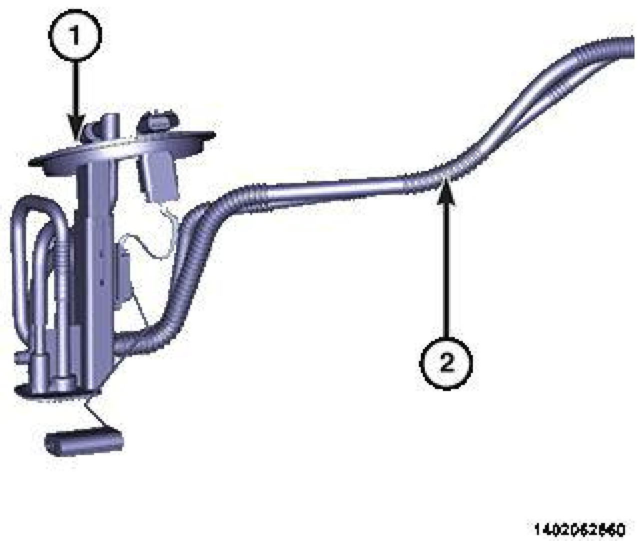
Fig. 59: Locating Plastic Access Cover
Courtesy of CHRYSLER GROUP, LLC

17. Install the main fuel pump module plastic access cover.
18. Lower the foam pad covering back into place.
19. Push the rear lower seat cushion back and down and install the seat cushion.
20. Connect the negative battery cable.

AUXILIARY FUEL PUMP MODULE

CAUTION: An indexing arrow is located on top of the fuel pump module to clock it's position into the fuel tank. The fuel pump module must be installed in the same position as removed.

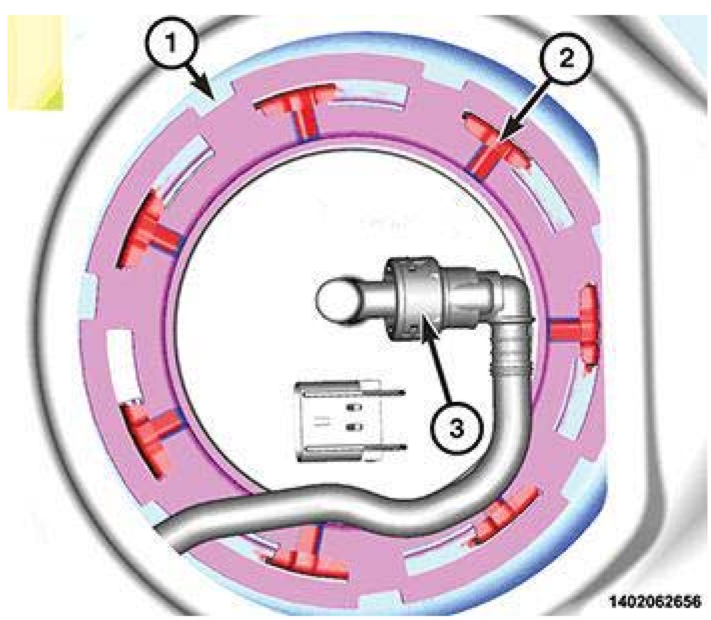
CAUTION: Do not allow the float arm of the auxiliary fuel pump module to come in contact with any part of the fuel tank during removal or installation, damage to the float arm and fuel level sending card may result.



[Fig. 60: Auxiliary Fuel Pump Module & Fuel Supply And Return Line](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Whenever the fuel pump module is serviced, the rubber O-ring seal must be replaced.**

1. Install a new rubber O-ring seal.
2. Using caution not to bend the float arm, lower the auxiliary fuel pump module (1) into the fuel tank while guiding the fuel return line and supply lines (2) over to the left side of the fuel tank.
3. Align the rubber O-ring seal and lower the auxiliary fuel pump module into position as noted during removal.



[Fig. 61: Lock Ring, Fuel Pump & Fuel Supply Line](#)
Courtesy of CHRYSLER GROUP, LLC

4. Position the lock ring over top of the auxiliary fuel pump module.

5. Verify the auxiliary fuel pump module is in the same position as noted during removal. This step must be performed to prevent the float from contacting the side of the fuel tank.
6. Position the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench) into the notches (1) on the outside edge of the lock ring.
7. Install a 1/2 inch drive breaker bar into the SAE Fuel Pump Lock Ring Wrench (special tool #9340, SAE Fuel Pump Lock Ring Wrench).
8. Rotate the breaker bar clockwise until all seven notches of the lock ring have engaged (2).
9. Connect the fuel supply line (3) to auxiliary fuel pump module.
10. Install the auxiliary fuel pump module access cover.
11. Install the main fuel pump module. Refer to **MODULE, FUEL PUMP, INSTALLATION**.

RAIL, FUEL

REMOVAL

3.6L

WARNING: The fuel system is under constant pressure even with engine off. Before servicing the fuel rail, fuel system pressure must be released.

1. Perform the fuel pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
2. Disconnect and isolate the negative battery cable.

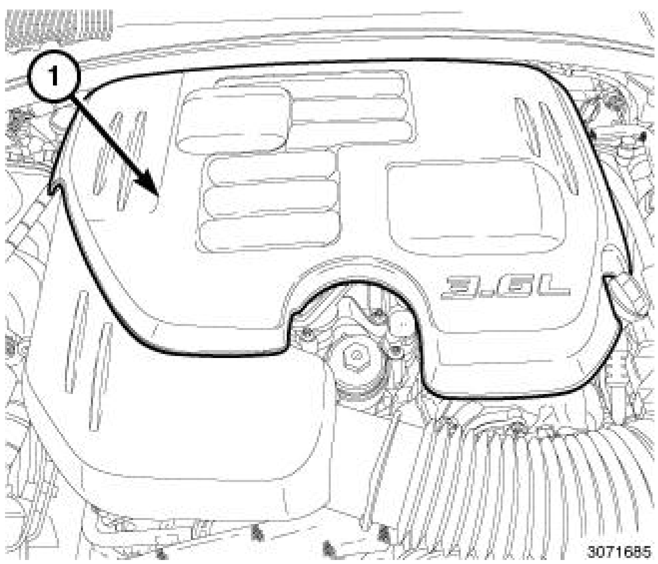


Fig. 62: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Remove the engine cover (1).
4. Remove the upper intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL** .

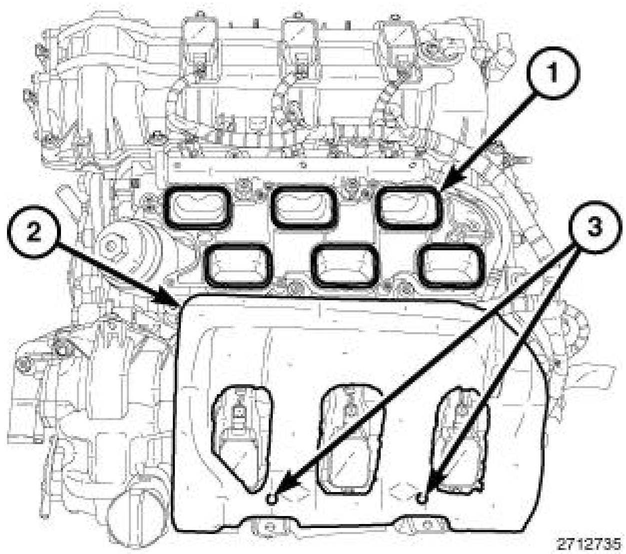


Fig. 63: Intake Ports, Insulator & Alignment Posts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the insulator (2) from the left cylinder head cover.

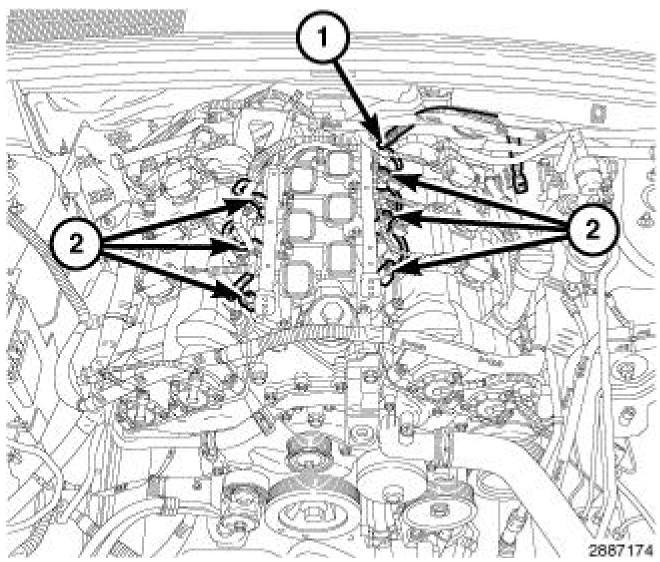


Fig. 64: Fuel Supply Hose & Fuel Injector Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the fuel injector wire harness connectors (2).
7. Disconnect the fuel supply hose (1) from the fuel rail. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.

CAUTION: The left and right fuel rails are replaced as an assembly. Do not attempt to separate the rail halves at the connector tube. Due to the design of this tube, it does not use any clamps. Never attempt to install a clamping device of any kind on the tube. When removing the fuel rail assembly for any reason, be careful not to bend or kink the tube.

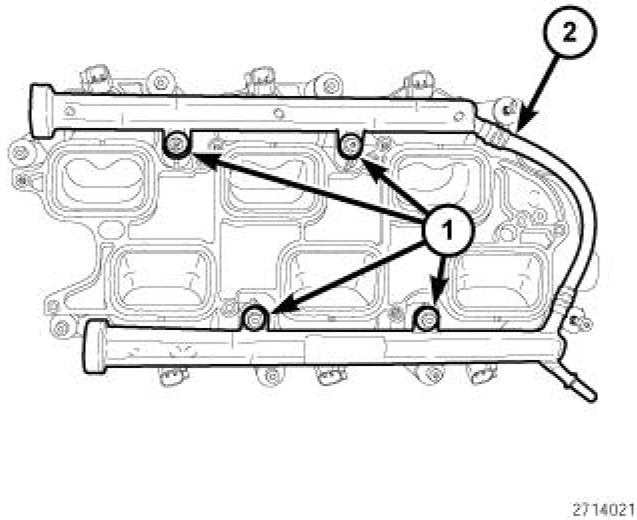


Fig. 65: Fuel Rail & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Remove bolts (1) and the fuel rail (2) with fuel injectors.

CAUTION: **When removing the fuel rail from the lower intake manifold, one or more fuel injectors may remain in the intake manifold resulting in residual fuel spilling onto the engine from the fuel rail.**

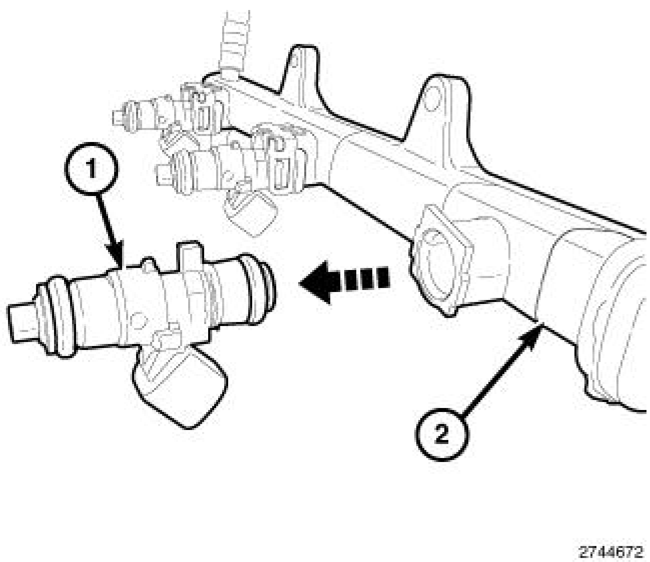


Fig. 66: Removing Fuel Injector From Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Number 2 fuel injector removal shown in the illustration, all other fuel injectors similar.**

9. If required, remove safety clips and the fuel injectors (1) from fuel rail (2).

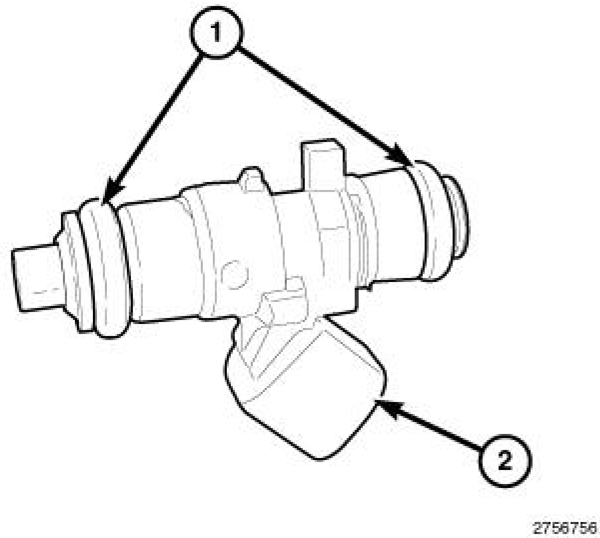


Fig. 67: O-Ring Seals
Courtesy of CHRYSLER GROUP, LLC

10. Remove and discard all fuel injector O-ring seals (1).

5.7L

WARNING: **The fuel system is under constant pressure even with engine off. Before servicing the fuel rail, fuel system pressure must be released.**

CAUTION: **The left and right fuel rails are replaced as an assembly. Do not attempt to separate fuel rail halves at connector tube. Due to design of the connector tube, it does not use any clamps. Never attempt to install a clamping device of any kind to the connector tube. When removing fuel rail assembly for any reason, be careful not to bend or kink the connector tube.**

1. Perform fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
2. Disconnect and isolate the negative battery cable.

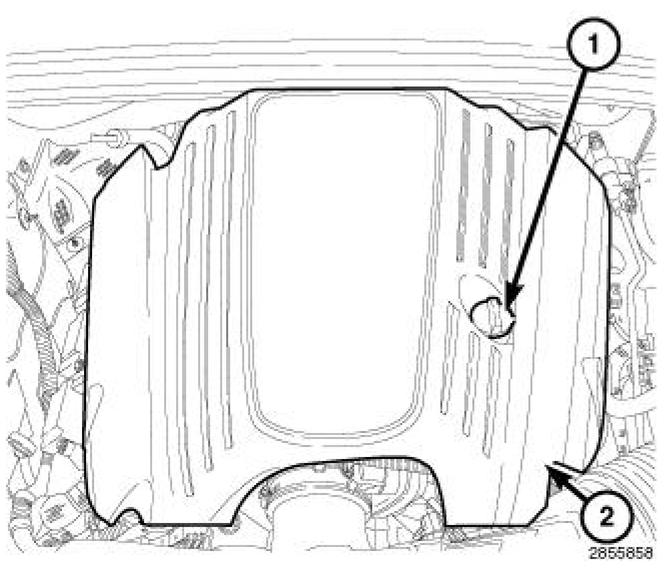


Fig. 68: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Remove the engine cover (2).
4. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
5. Disconnect the PCV hose.
6. Disconnect fuel injector wire harness connector from fuel injectors.

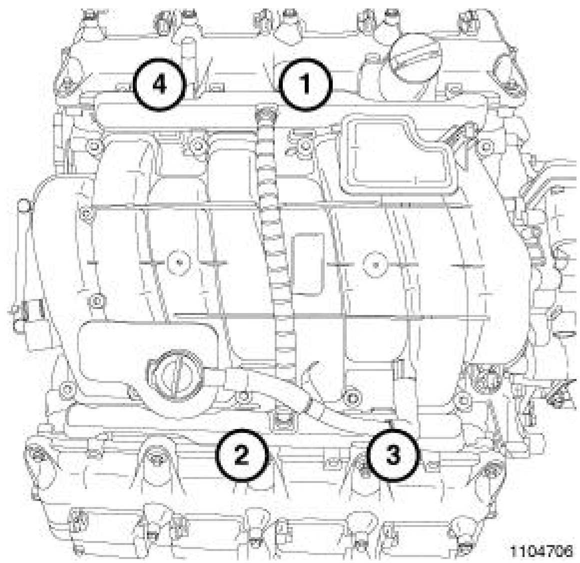


Fig. 69: Fuel Rail Mounting Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the fuel supply line at the fuel rail. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.
8. Using the sequence shown in the illustration, remove the four fuel rail bolts.
9. Gently rock and lift the left side fuel rail until the fuel injectors just start to clear the machined holes in the intake manifold.
10. Gently rock and lift the right side fuel rail until the fuel injectors just start to clear the machined holes in the intake manifold. Repeat this procedure (left/right) until all injectors have cleared the machined holes.
11. Remove the fuel rail with fuel injectors.
12. If required, removed safety clips and the fuel injectors from fuel rail.

6.2L

WARNING: The fuel system is under constant pressure even with engine off. Before servicing fuel rail, fuel system pressure must be released. Failure to follow this warning may result in serious or fatal injury.

CAUTION: The left and right fuel rails are replaced as an assembly. Do not attempt to separate fuel rail halves at connector tube. Due to design of the connector tube, it does not use any clamps. Never attempt to install a clamping device of any kind to the connector tube. When removing fuel rail assembly for any reason, be careful not to bend or kink the connector tube.

1. Perform Fuel System Pressure Release Procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
2. Disconnect and isolate the negative battery cable.

Fig. 70: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

3. Remove the engine covers (1).

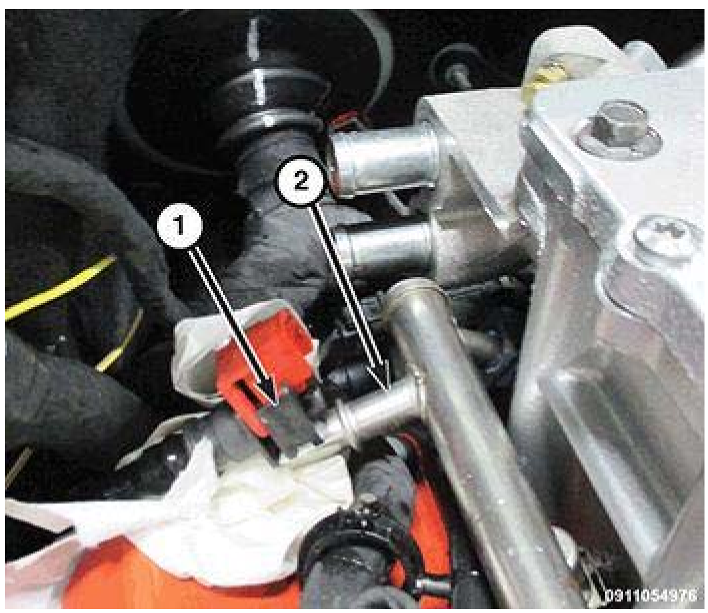
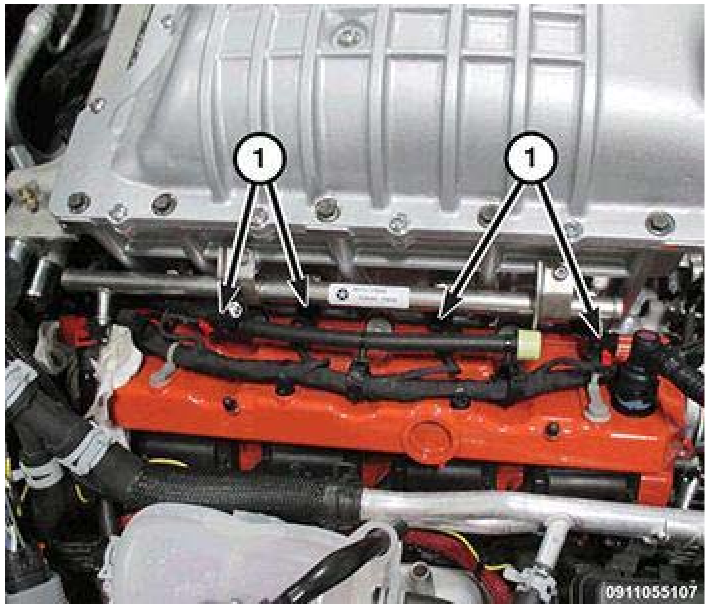


Fig. 71: Fuel Supply Line & Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

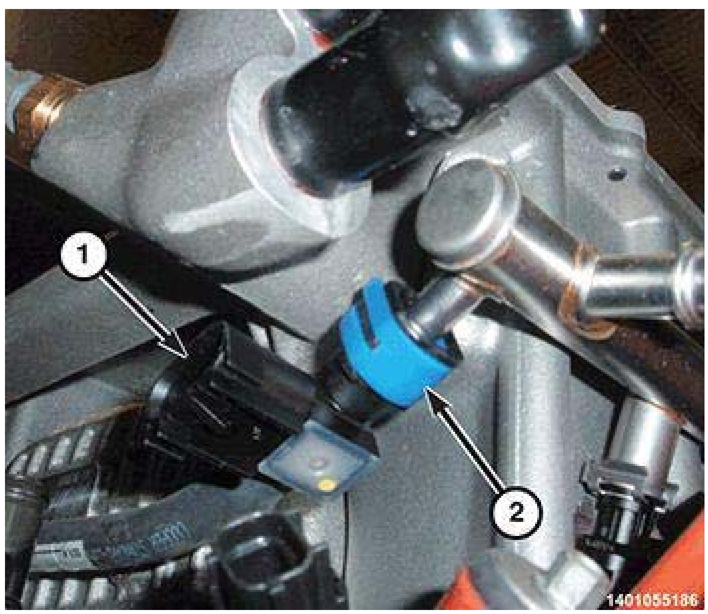
4. Disconnect the fuel supply line (1) from fuel rail (2). Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.



[Fig. 72: Fuel Injector Wire Harness Connectors](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Right side shown in the illustration, left side similar.**

5. Disconnect the left side fuel injector wire harness connectors (1) and position harness aside



[Fig. 73: Fuel Pressure Sensor Wire Harness Connector & Fuel Rail Supply Line](#)
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the fuel pressure sensor (1) wire harness connector.
7. Disconnect the left fuel rail supply line (2) from right fuel rail. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.

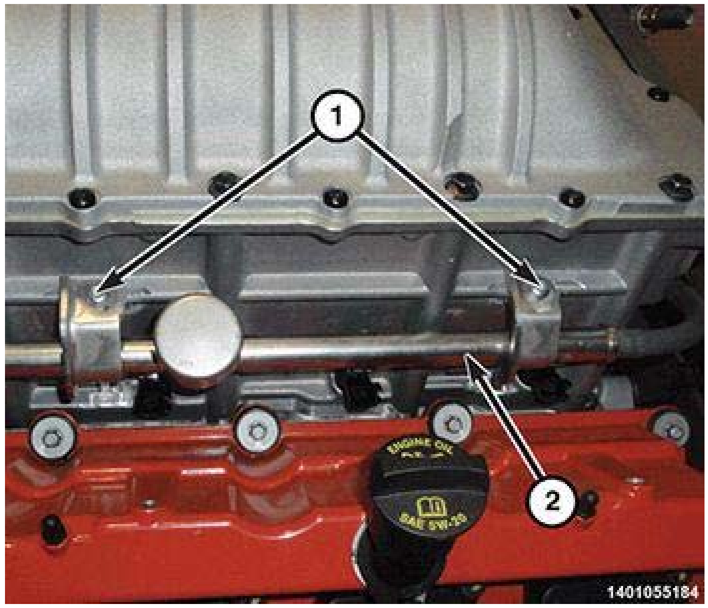


Fig. 74: Fuel Rail Bolts & Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

8. Remove the left fuel rail bolts (1).
9. Gently rock and lift the left fuel rail until the fuel injectors just start to clear machined holes in the supercharger.
10. Remove the left fuel rail (2), with injectors attached, from the engine.

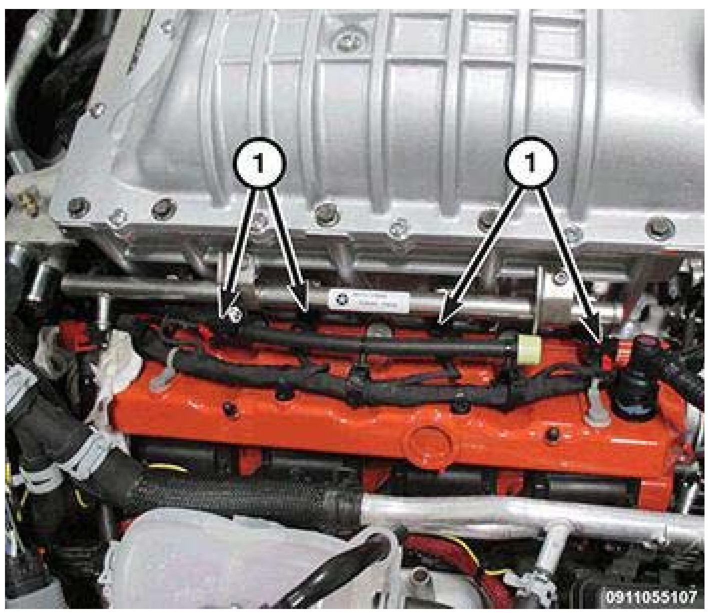


Fig. 75: Fuel Injector Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the right side fuel injector wire connectors (1) and position harness aside.

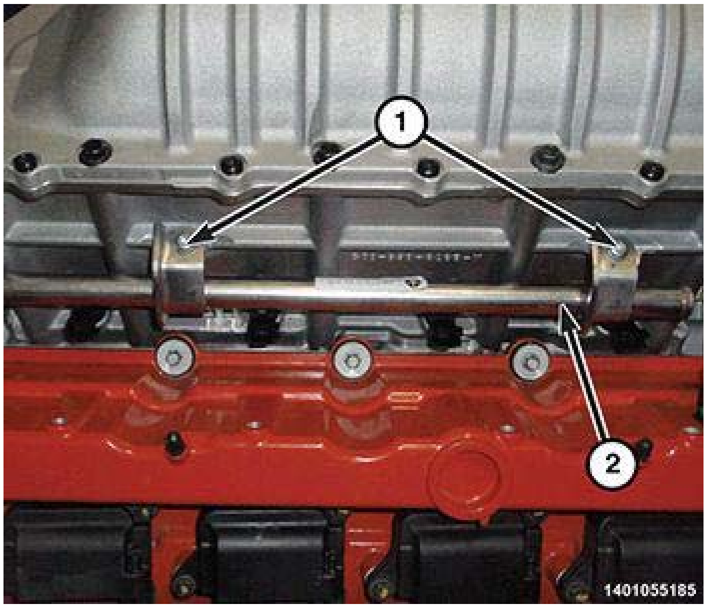


Fig. 76: Fuel Rail Bolts & Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

12. Remove the right fuel rail bolts (1).
13. Gently rock and lift the right fuel rail until the fuel injectors just start to clear machined holes in the supercharger.
14. Remove the right fuel rail (2), with injectors attached, from the engine.

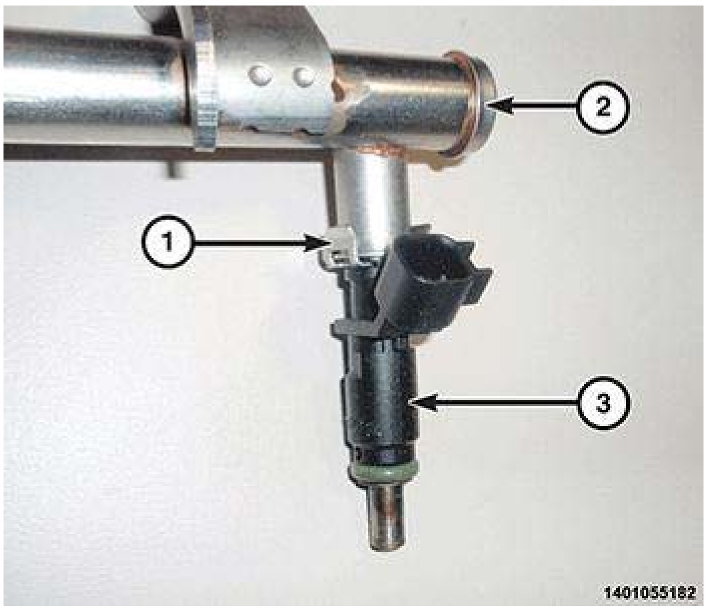


Fig. 77: Safety Clips, Fuel Rail & Fuel Injector
Courtesy of CHRYSLER GROUP, LLC

15. If required, remove safety clips (1) and the fuel injectors (3).

6.4L

WARNING: The fuel system is under constant pressure even with engine off. Before

servicing fuel rail, fuel system pressure must be released. Failure to follow this warning may result in serious or fatal injury.

CAUTION: **The left and right fuel rails are replaced as an assembly. Do not attempt to separate fuel rail halves at connector tube. Due to design of the connector tube, it does not use any clamps. Never attempt to install a clamping device of any kind to the connector tube. When removing fuel rail assembly for any reason, be careful not to bend or kink the connector tube.**

1. Perform Fuel System Pressure Release Procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
2. Disconnect and isolate the negative battery cable.

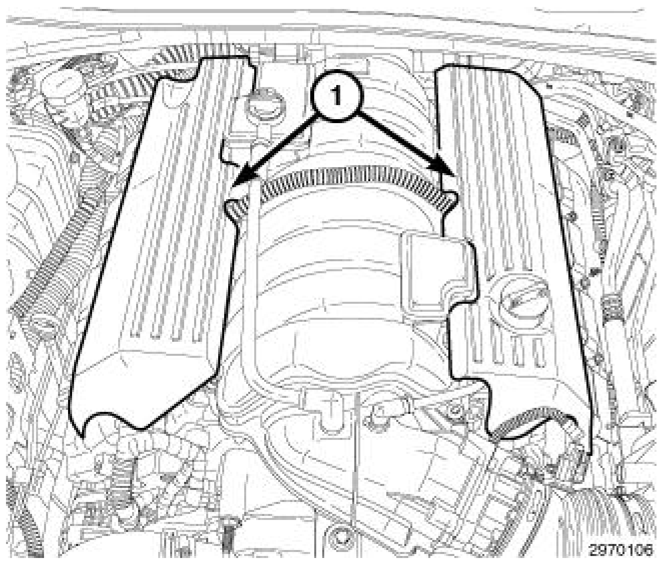


Fig. 78: Installing Engine Covers
Courtesy of CHRYSLER GROUP, LLC

3. Remove the engine covers (1).

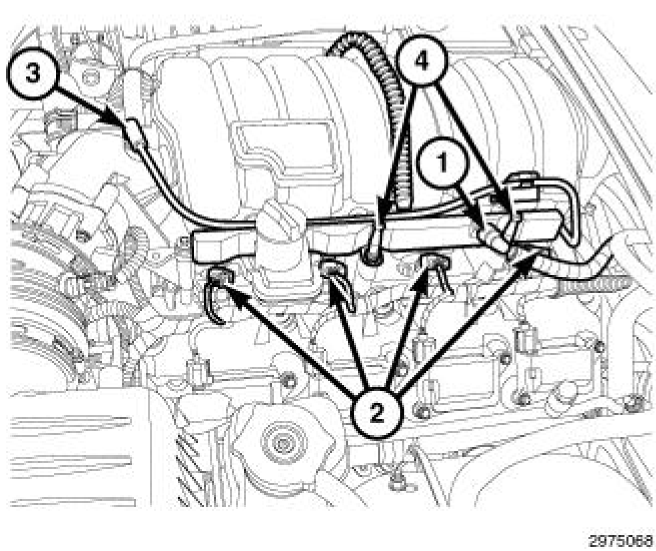


Fig. 79: Fuel Supply Line, Left Side Fuel Injector Electrical Connectors, EVAP Vacuum Line &

Left Fuel Rail Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the fuel supply line (1) from fuel rail. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.
5. Disconnect the left side fuel injector wire harness connectors (2) and position harness aside
6. Disconnect the EVAP vacuum line (3) and position aside.
7. Remove the left fuel rail bolts (4).

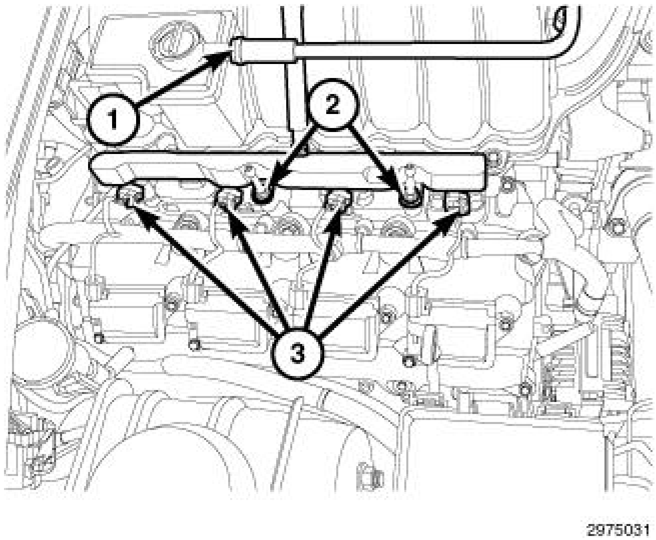
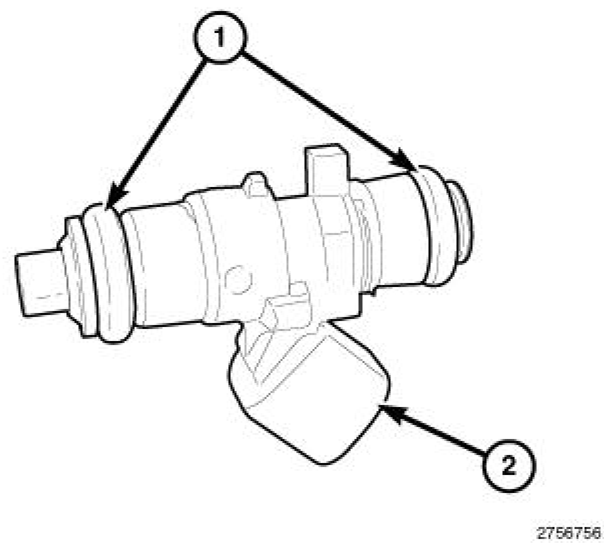


Fig. 80: PCV Hose, Right Fuel Rail Retaining Bolts & Right Side Fuel Injector Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the PCV hose (1) and position aside.
9. Remove the right fuel rail bolts (2).
10. Remove the right side fuel injector wire connectors (3) and position harness aside.
11. Gently rock and lift the right fuel rail until the fuel injectors just start to clear machined holes in intake manifold.
12. Gently rock and lift the left fuel rail until the fuel injectors just start to clear machined holes in intake manifold.
13. Repeat this procedure (left/right) until all fuel injectors have cleared the machined holes.
14. Remove both fuel rails (with injectors attached) from the engine.
15. If required, remove safety clips and the fuel injectors.

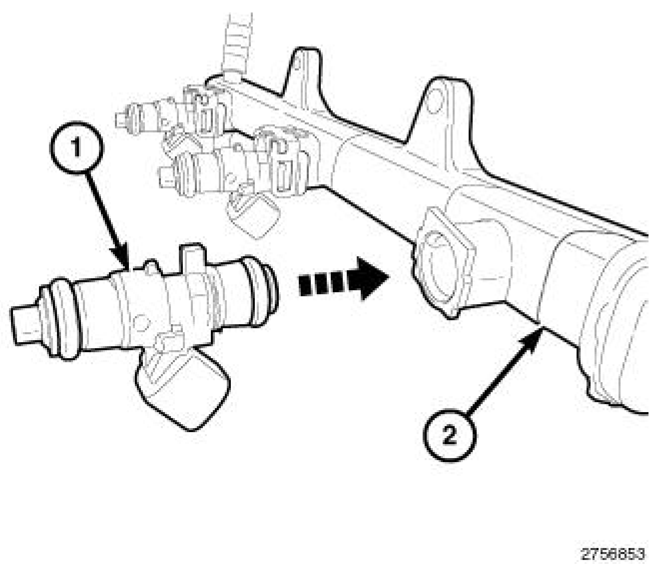
INSTALLATION

3.6L



[Fig. 81: O-Ring Seals]
Courtesy of CHRYSLER GROUP, LLC

1. Lightly lubricate the new O-ring seals (1) with clean engine oil and instal the O-ring seals onto the fuel injector (2).



[Fig. 82: Installing Fuel Injector To Fuel Rail]
Courtesy of CHRYSLER GROUP, LLC

2. If required, install the fuel injectors (1) into the fuel rail (2) and safety clips.

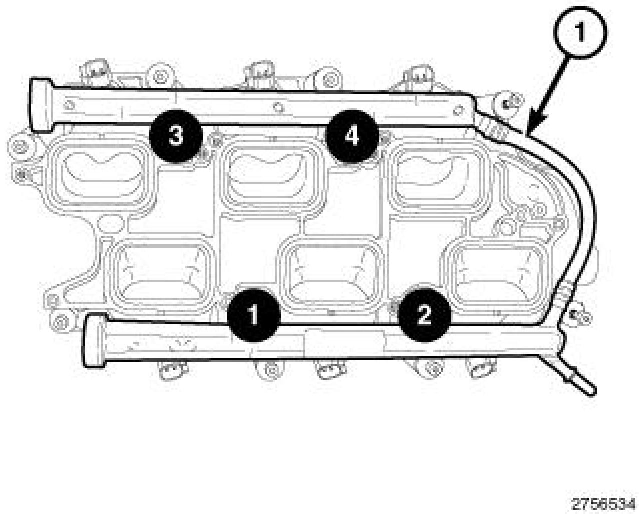


Fig. 83: Fuel Rail Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

3. Clean out the fuel injector bores in the lower intake manifold.
4. Install the fuel rail (1) onto the lower intake manifold. Using the sequence shown in the illustration, tighten bolts to the proper torque specification. Refer to **FUEL DELIVERY, GAS, SPECIFICATIONS**.

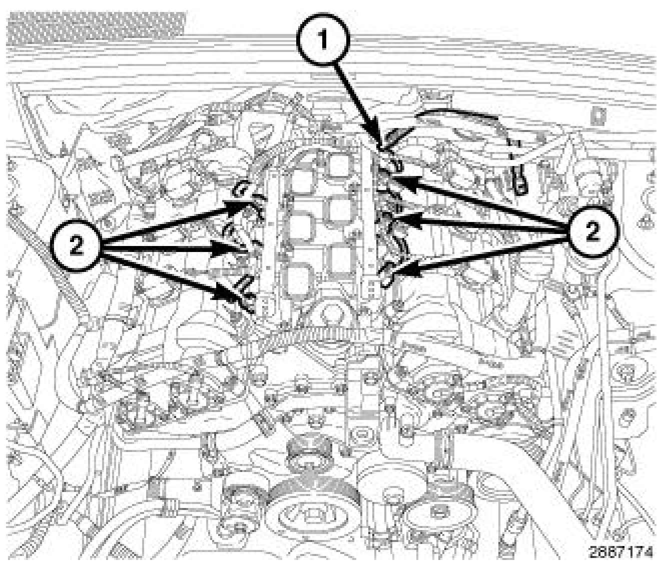
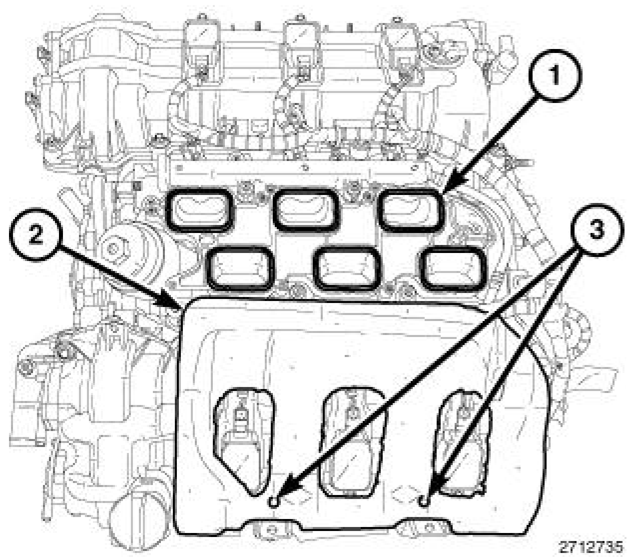


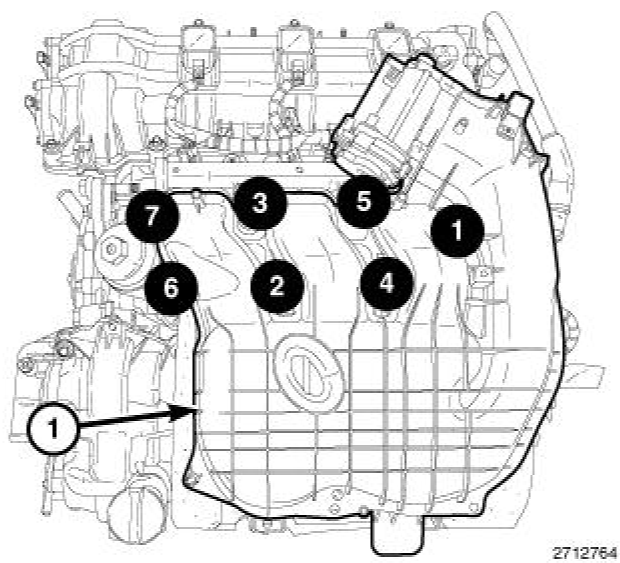
Fig. 84: Fuel Supply Hose & Fuel Injector Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

5. Connect the fuel injector wire harness connectors (2).
6. Connect the fuel supply hose to the fuel rail (1). Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.



[Fig. 85: Intake Ports, Insulator & Alignment Posts](#)
Courtesy of CHRYSLER GROUP, LLC

7. Install the insulator (2) to the two alignment posts (3) on top of the left cylinder head cover.



[Fig. 86: Upper Intake Manifold Bolt Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

8. Install the upper intake manifold (1) and support brackets. Refer to **MANIFOLD, INTAKE, INSTALLATION** .

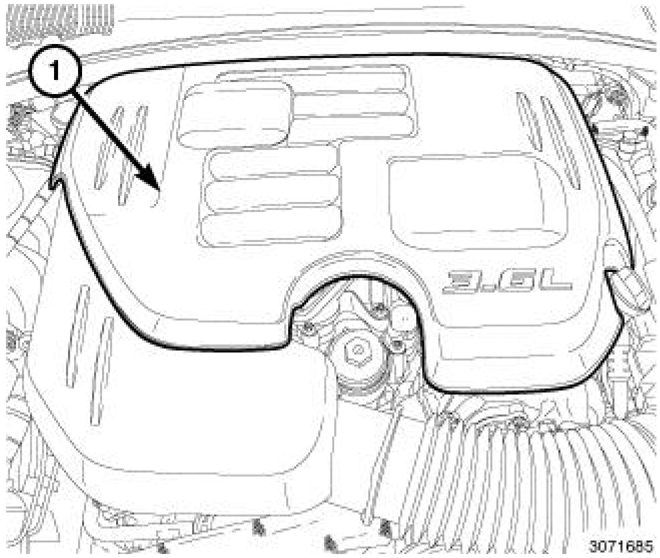


Fig. 87: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

9. Install the engine cover (1).
10. Connect the negative battery cable.
11. Start the engine and check for leaks.

5.7L

CAUTION: The left and right fuel rails are replaced as an assembly. Do not attempt to separate fuel rail halves at connector tube. Due to design of the connector tube, it does not use any clamps. Never attempt to install a clamping device of any kind to the connector tube. When removing fuel rail assembly for any reason, be careful not to bend or kink the connector tube.

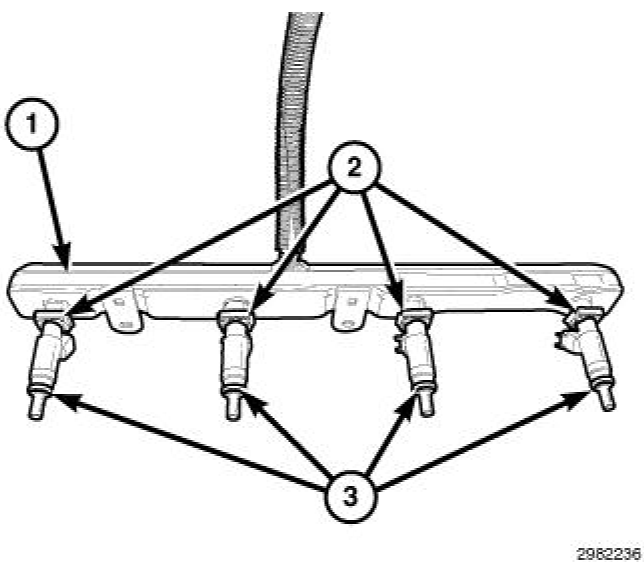


Fig. 88: Fuel Injector O-Rings, Fuel Rail/Fuel Injector Assembly & Four Fuel Rail Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. If required, inspect and lubricate the fuel injector O-rings.

2. If removed, install the fuel injectors into fuel rail.
3. Inspect the fuel injector O-rings (3) and replace if necessary.
4. Clean out the fuel injector machined bores in the intake manifold.
5. Apply a small amount of engine oil to each fuel injector O-ring (3).

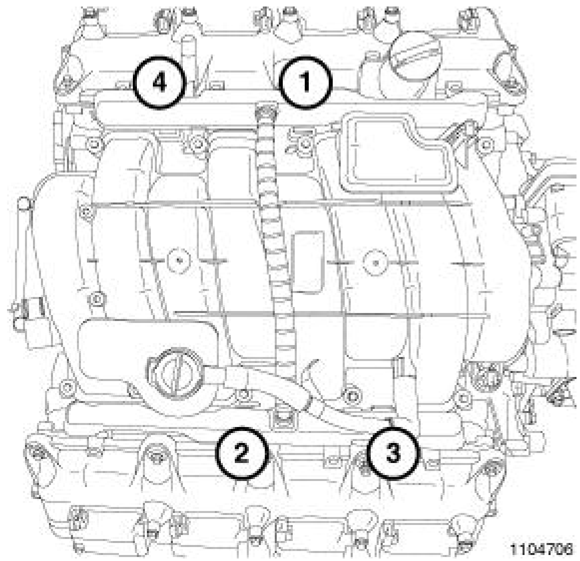


Fig. 89: Fuel Rail Mounting Bolts Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

6. Install the fuel rail/fuel injector assembly by guide each fuel injector into the intake manifold using care not to tear the O-ring seal.
7. Push the right fuel rail down until the fuel injectors have bottomed on shoulders.
8. Push the left fuel rail down until the injectors have bottomed on shoulders.
9. Using the sequence shown in the illustration, install the four fuel rail bolts and tighten to the proper torque specification. Refer to **FUEL DELIVERY, GAS, SPECIFICATIONS**.
10. Connect the fuel line to the fuel rail. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.
11. Connect the fuel injector wire harness connectors.
12. Connect the PCV hose.
13. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .

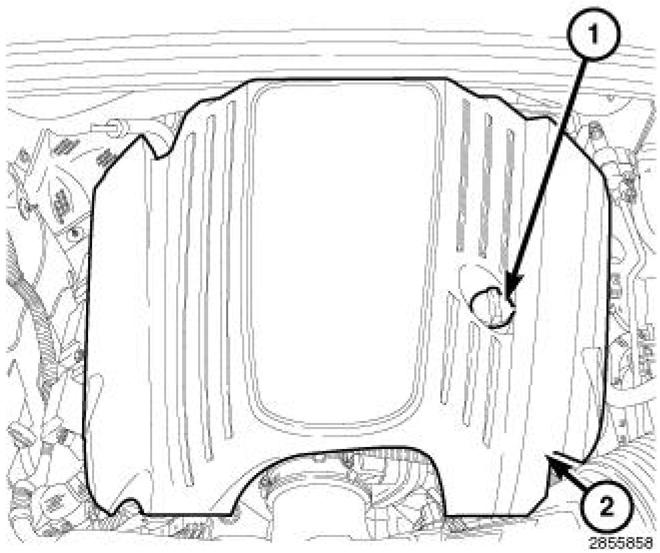


Fig. 90: Oil Fill Cap & Engine Cover
Courtesy of CHRYSLER GROUP, LLC

14. Install the engine cover (2).
15. Connect the negative battery cable.
16. Start the engine and check for leaks.

6.2L

CAUTION: **The left and right fuel rails are replaced as an assembly. Do not attempt to separate fuel rail halves at connector tube. Due to design of the connector tube, it does not use any clamps. Never attempt to install a clamping device of any kind to the connector tube. When removing fuel rail assembly for any reason, be careful not to bend or kink the connector tube.**

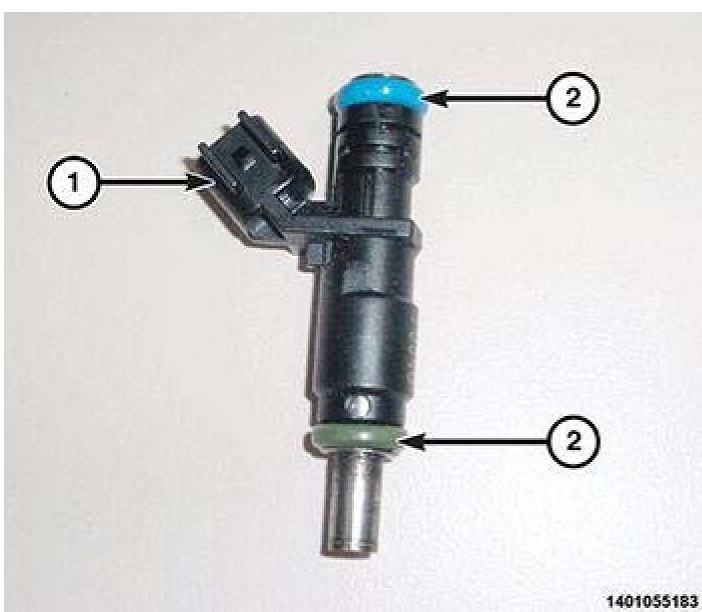


Fig. 91: Fuel Injector & O-Rings
Courtesy of CHRYSLER GROUP, LLC

1. Inspect the fuel injector (1) O-rings (2) and replace if necessary.
2. Apply a small amount of clean engine oil to each fuel injector O-ring (2).

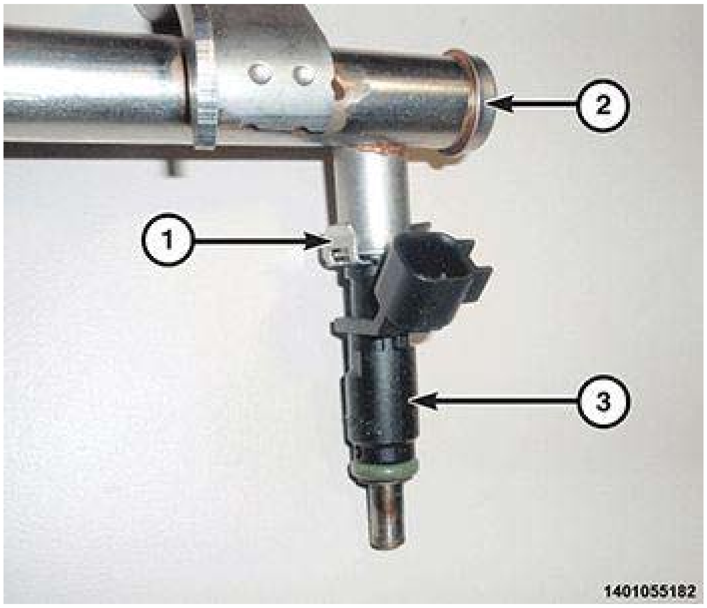


Fig. 92: Safety Clips, Fuel Rail & Fuel Injector
Courtesy of CHRYSLER GROUP, LLC

3. If removed, install the fuel injectors (3) and safety clips (1).
4. Clean out the fuel injector machined bores in the supercharger.

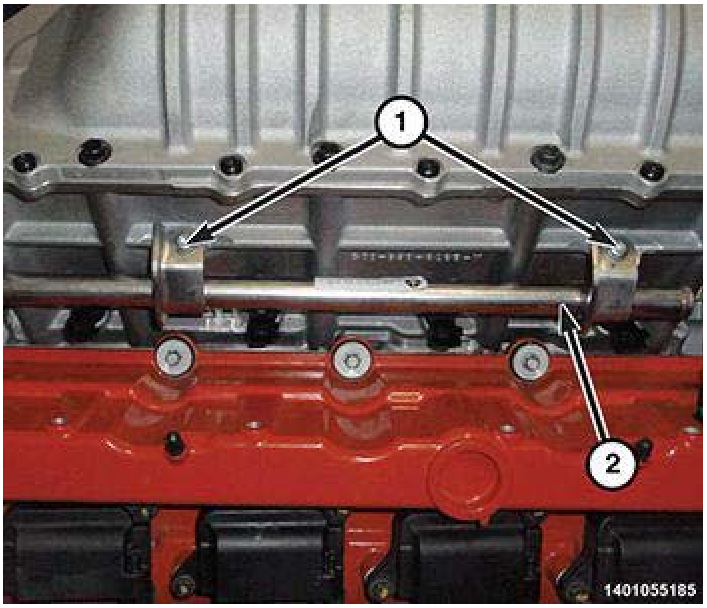


Fig. 93: Fuel Rail Bolts & Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

5. Position the right fuel rail/fuel injector assembly (2) into the machined bores of the supercharger.
6. Guide each injector into the supercharger using care not to tear the fuel injector O-ring seal.
7. Push the right fuel rail down until the fuel injectors have bottomed on shoulders.

8. Install the right fuel rail retaining bolts (1) and tighten to the proper torque specification. Refer to **FUEL DELIVERY, GAS, SPECIFICATIONS**.

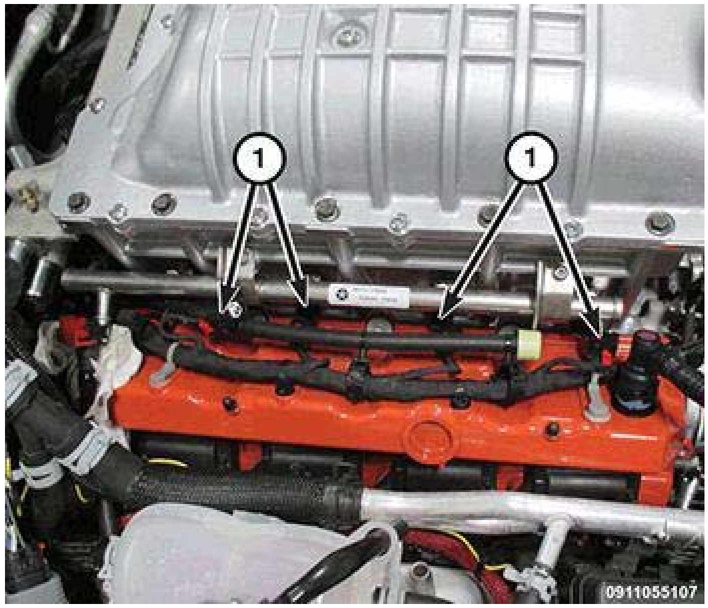


Fig. 94: Fuel Injector Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

9. Connect the right side fuel injector wire harness connectors (1).

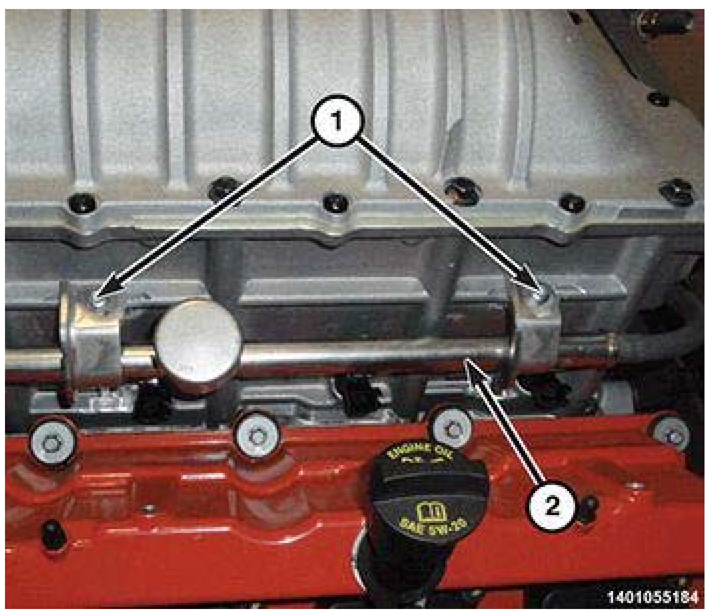


Fig. 95: Fuel Rail Bolts & Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

10. Position the left fuel rail/fuel injector assembly (2) into the machined bores of the supercharger and correctly route the fuel rail supply line.
11. Guide each injector into the supercharger using care not to tear the fuel injector O-ring seal.
12. Push the left fuel rail down until the fuel injectors have bottomed on shoulders.
13. Install the left fuel rail retaining bolts (1) and tighten to the proper torque specification. Refer to **FUEL**

DELIVERY, GAS, SPECIFICATIONS.

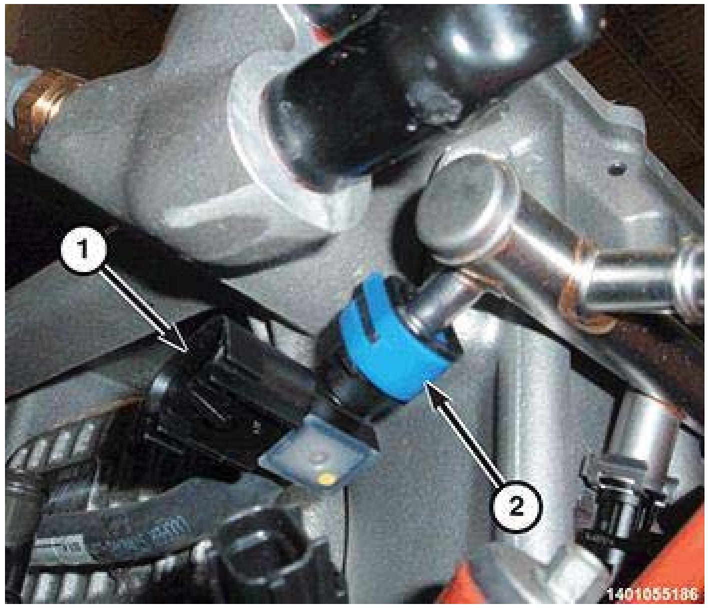


Fig. 96: Fuel Pressure Sensor Wire Harness Connector & Fuel Rail Supply Line
Courtesy of CHRYSLER GROUP, LLC

14. Connect the left fuel rail supply line (2) to the right fuel rail. Refer to FITTING, QUICK CONNECT, STANDARD PROCEDURE.
15. Connect the fuel pressure sensor (1) wire harness connector.

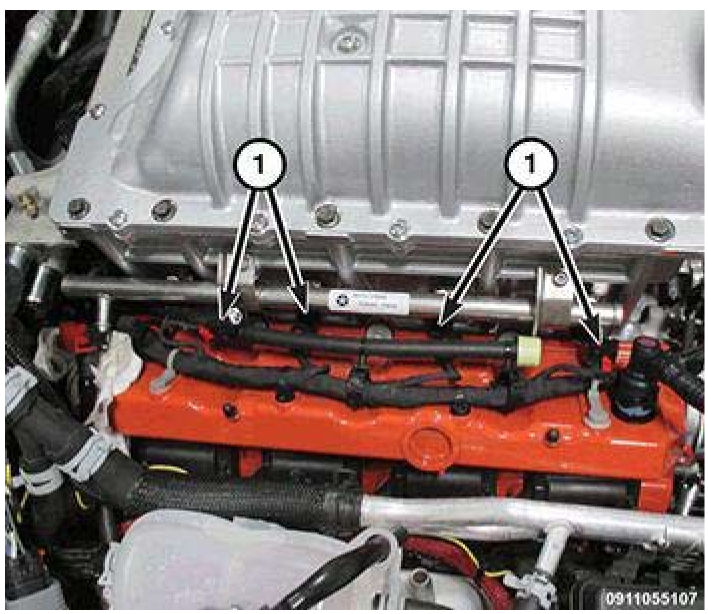


Fig. 97: Fuel Injector Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

NOTE: Right side shown in the illustration, left side similar.

16. Connect the left side fuel injector wire harness connectors (1).

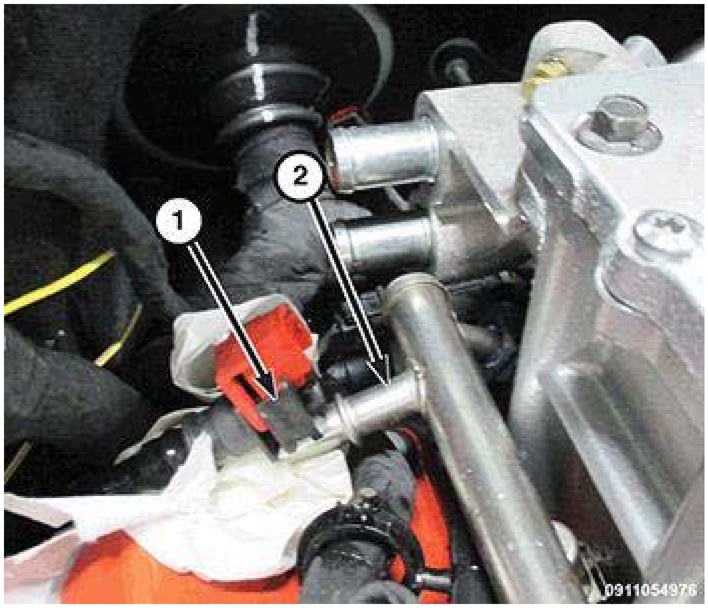


Fig. 98: Fuel Supply Line & Fuel Rail
Courtesy of CHRYSLER GROUP, LLC

17. Connect the fuel supply line (1) to the fuel rail (2). Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.

Fig. 99: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

18. Install the engine covers (1).
19. Connect the negative battery cable.
20. Start the engine and check for leaks.

6.4L

CAUTION: The left and right fuel rails are replaced as an assembly. Do not attempt to

separate fuel rail halves at connector tube. Due to design of the connector tube, it does not use any clamps. Never attempt to install a clamping device of any kind to the connector tube. When removing fuel rail assembly for any reason, be careful not to bend or kink the connector tube.

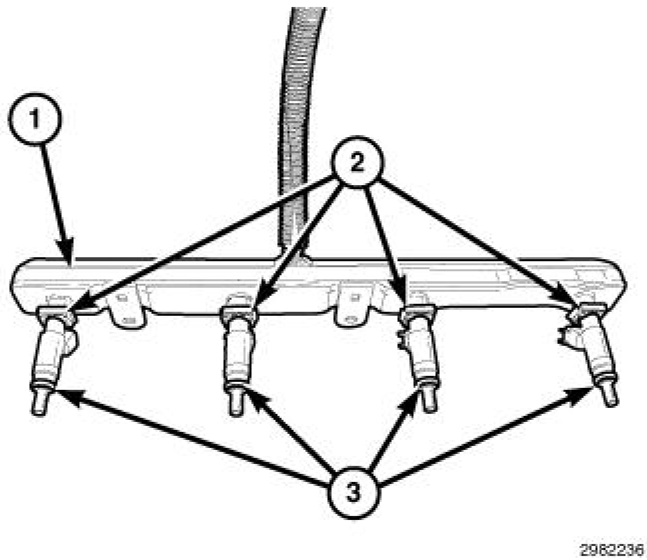


Fig. 100: Fuel Injector O-Rings, Fuel Rail/Fuel Injector Assembly & Four Fuel Rail Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Inspect the fuel injector O-rings and replace if necessary.
2. If removed, install the fuel injectors and safety clips (2).
3. Clean out the fuel injector machined bores in the intake manifold.
4. Apply a small amount of engine oil to each fuel injector O-ring (3).

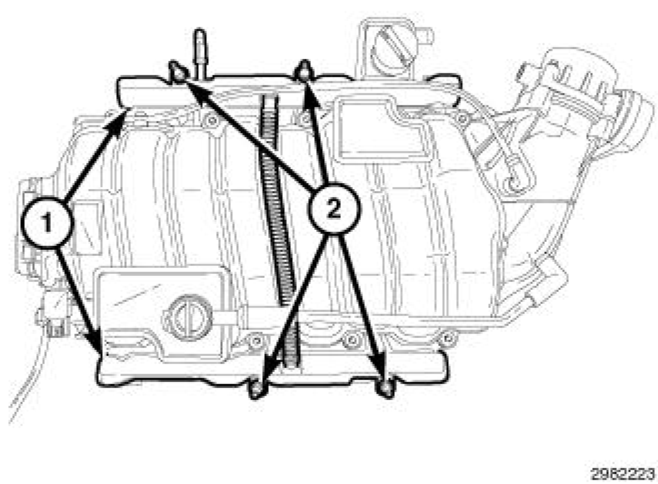


Fig. 101: Fuel Rail/Fuel Injector Assembly & Four Fuel Rail Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Position fuel rail/fuel injector assembly (1) into the machined fuel injector bores of the intake manifold.
6. Guide each injector into the intake manifold using care not to tear the fuel injector O-ring seal.

7. Push the right fuel rail down until the fuel injectors have bottomed on shoulders.
8. Push the left fuel rail down until the fuel injectors have bottomed on shoulders.
9. Install the four fuel rail retaining bolts (2) and tighten to the proper torque specification. Refer to **FUEL DELIVERY, GAS, SPECIFICATIONS**.

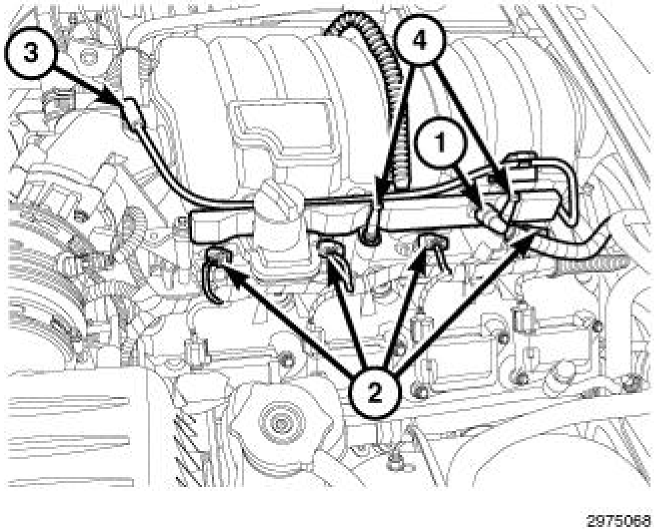


Fig. 102: Fuel Supply Line, Left Side Fuel Injector Electrical Connectors, EVAP Vacuum Line & Left Fuel Rail Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Connect the fuel line (1) to the fuel rail. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.
11. Connect the left side fuel injector wire harness connectors (2).
12. Connect the EVAP vacuum line (3).

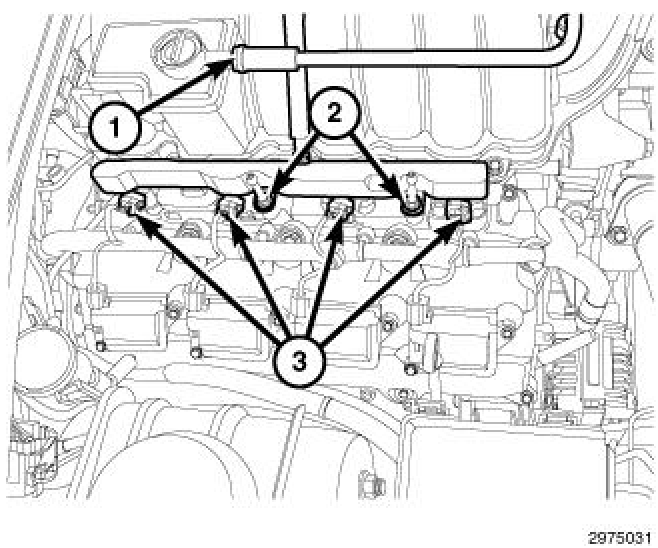


Fig. 103: PCV Hose, Right Fuel Rail Retaining Bolts & Right Side Fuel Injector Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

13. Connect the PCV hose (1).
14. Connect the right side fuel injector wire harness connectors (3).

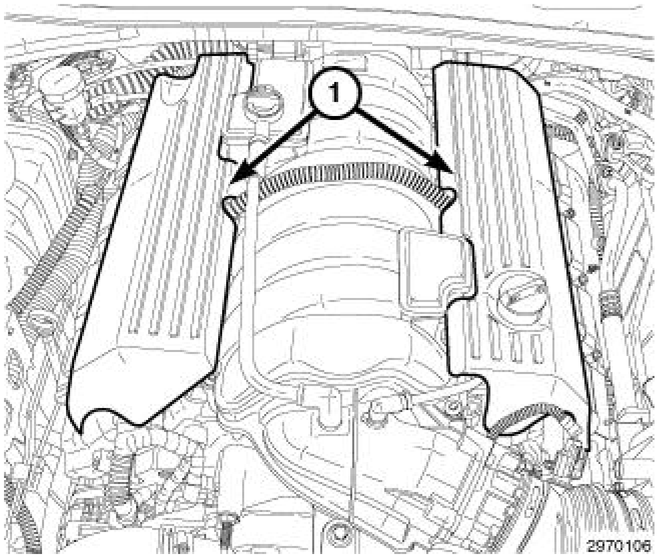


Fig. 104: Installing Engine Covers
Courtesy of CHRYSLER GROUP, LLC

15. Install the engine covers (1).
16. Connect the negative battery cable.
17. Start the engine and check for leaks.

REGULATOR, FUEL PRESSURE

DESCRIPTION

DESCRIPTION

The fuel pressure regulator is integrated with the auxiliary fuel pump module and is not serviced separately. The auxiliary fuel pump module must be replace if the fuel pressure regulator is to be replaced.

For auxiliary fuel pump module removal. Refer to **MODULE, FUEL PUMP, REMOVAL**.

SENDING UNIT AND SENSOR, FUEL LEVEL

DESCRIPTION

DESCRIPTION

The fuel level sending units and sensors are integrated with both the main fuel pump module and the auxiliary fuel pump module and are not serviced separately. The appropriate fuel pump module must be replace if either fuel level sending unit is to be replaced.

For fuel pump module removal. Refer to **MODULE, FUEL PUMP, REMOVAL**.

TANK, FUEL

REMOVAL

REMOVAL

WARNING: The fuel system is under constant high pressure even with engine off. Until the fuel pressure has been properly released from the system, do not attempt to open the fuel system. Do not smoke or use open flames/sparks when servicing the fuel system. Wear protective clothing and eye protection. Make sure the area in which the vehicle is being serviced is in a well ventilated area and free of flames/sparks. Failure to comply may result in serious or fatal injury.

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

1. Perform the draining fuel tank procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
2. Disconnect and isolate the negative battery cable.
3. Remove the left rear wheelhouse splash shield. Refer to **SHIELD, SPLASH, REAR WHEELHOUSE, REMOVAL** .

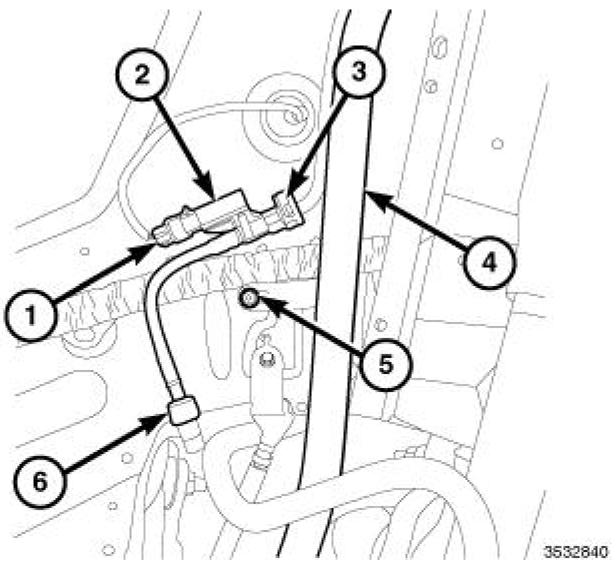
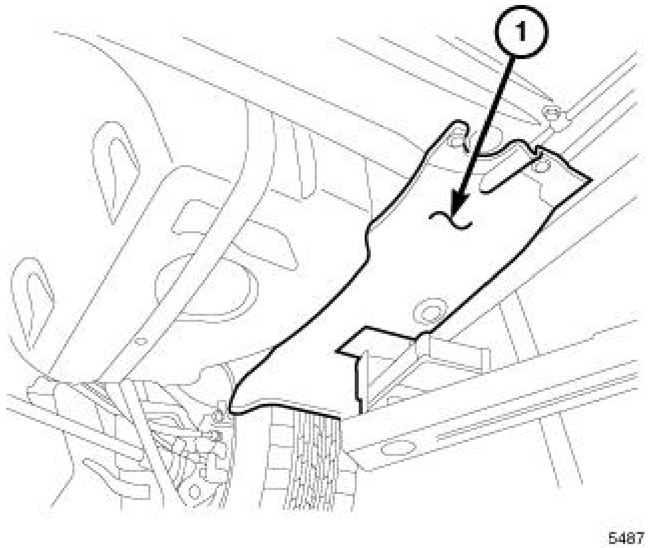


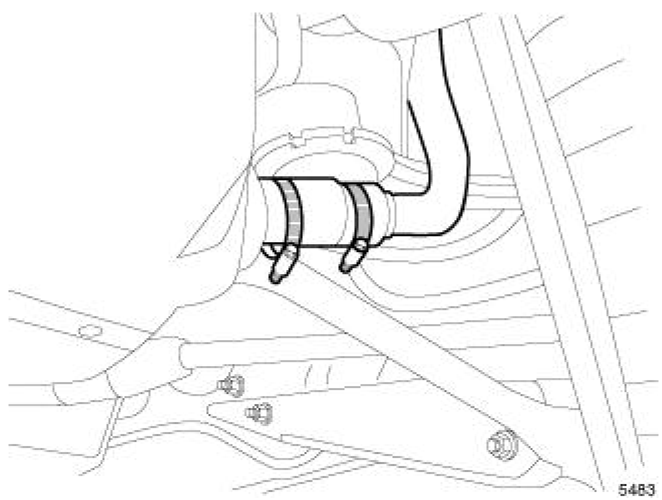
Fig. 105: Fuel Tank Pressure Sensor Electrical Connector, Filler Tube & Fuel Tank Vent Steel Line
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the fuel filler tube Onboard Refueling Vapor Recovery (ORVR) vent line (3).
5. Remove the fuel filler tube retaining nut (5).



[Fig. 106: Left Underbody Splash Shield](#)
Courtesy of CHRYSLER GROUP, LLC

6. Remove the under body splash shield (1).



[Fig. 107: Filler Tube Clamp Removed](#)
Courtesy of CHRYSLER GROUP, LLC

7. Remove the fuel filler tube hose clamp.

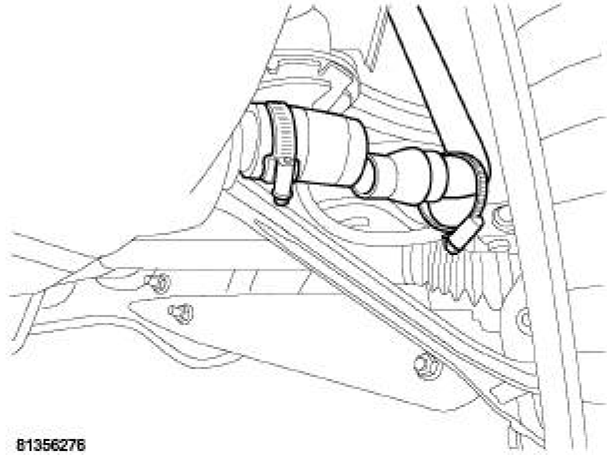


Fig. 108: Remove/Install Filler Tube
Courtesy of CHRYSLER GROUP, LLC

8. Remove fuel filler tube from the rubber hose on the fuel tank and position aside.

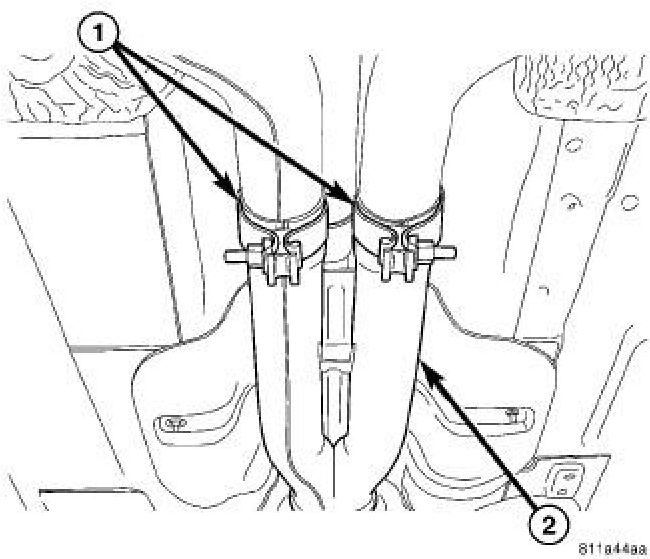


Fig. 109: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

9. Remove the muffler and tailpipe assembly (2). Refer to **MUFFLER, EXHAUST, REMOVAL** .

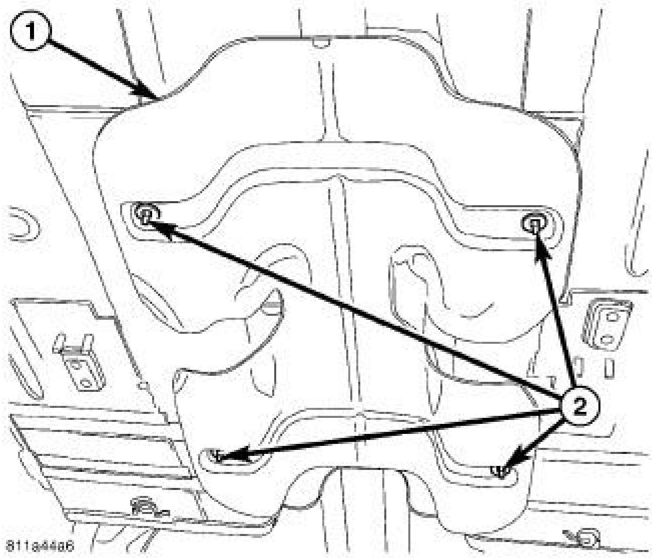


Fig. 110: Heat Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. Remove the propeller shaft. Refer to **REMOVAL** .
11. Remove fasteners (2) and remove the heat shield (1).

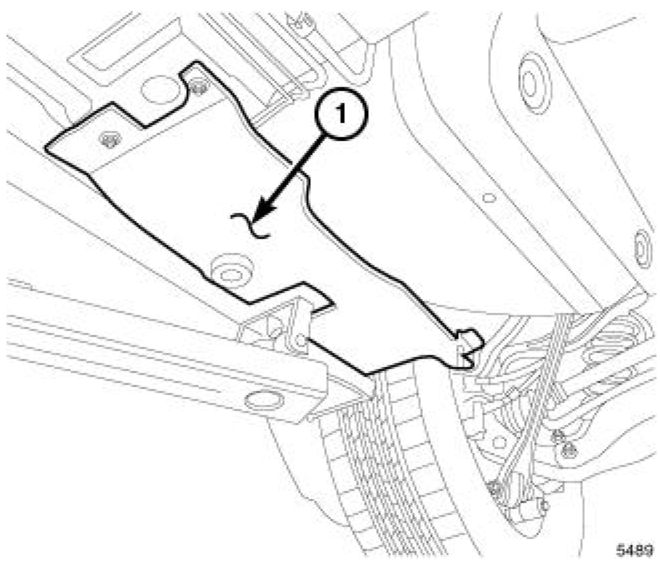


Fig. 111: Right Underbody Splash Shield
Courtesy of CHRYSLER GROUP, LLC

12. Remove the right underbody splash shield (1).

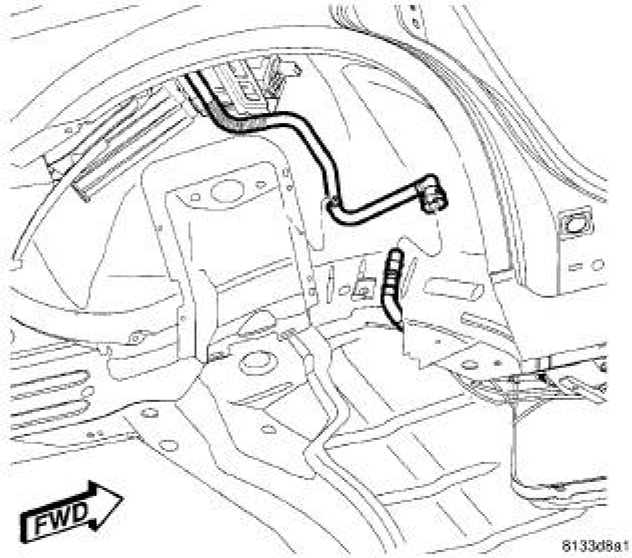


Fig. 112: EVAP Line
Courtesy of CHRYSLER GROUP, LLC

13. Disconnect the EVAP line in the right rear wheel well. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.

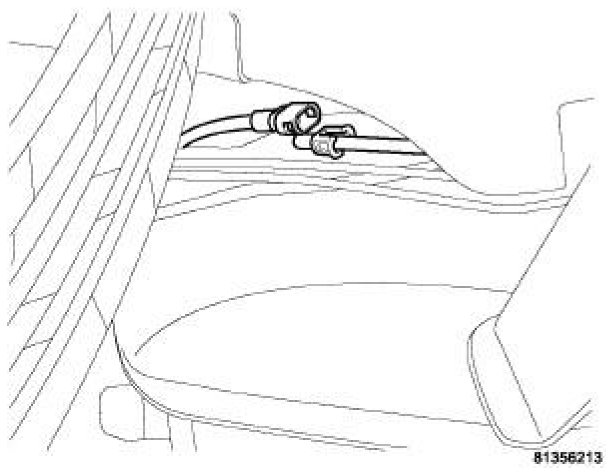


Fig. 113: Vapor Connection On Tank
Courtesy of CHRYSLER GROUP, LLC

14. Disconnect the vapor line. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.

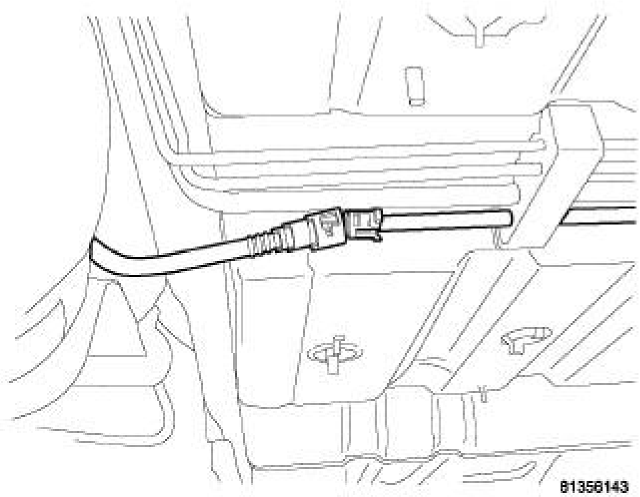


Fig. 114: Fuel Line Disconnected
Courtesy of CHRYSLER GROUP, LLC

15. Disconnect the fuel supply line. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE**.
16. Using a suitable hydraulic jack with a fuel tank adapter, support the fuel tank.

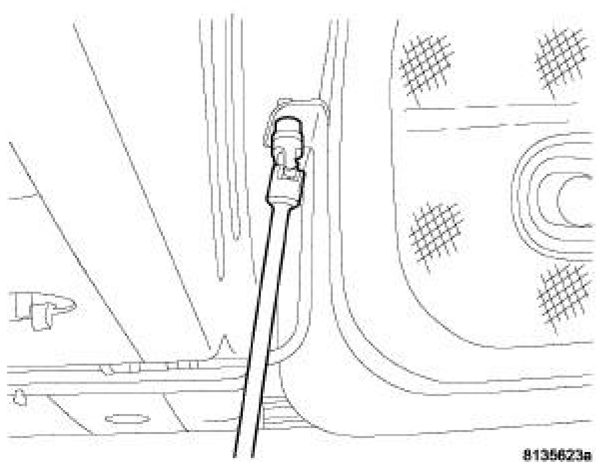


Fig. 115: Tank Strap Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Remove the fuel tank support strap retaining bolts.

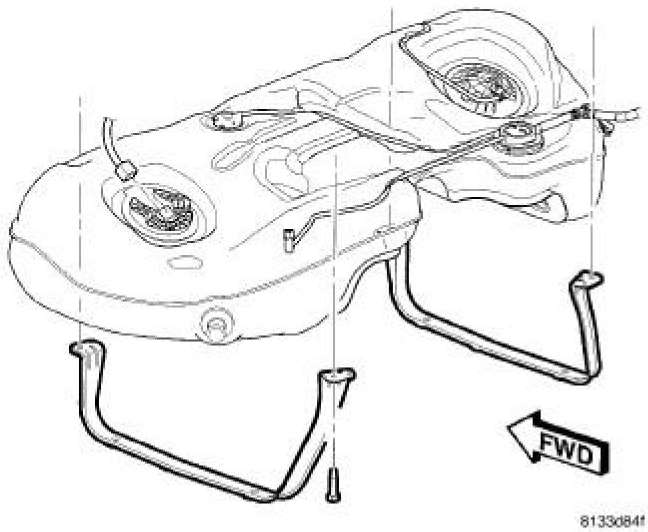


Fig. 116: Tank Straps
Courtesy of CHRYSLER GROUP, LLC

18. Remove the fuel tank support straps.

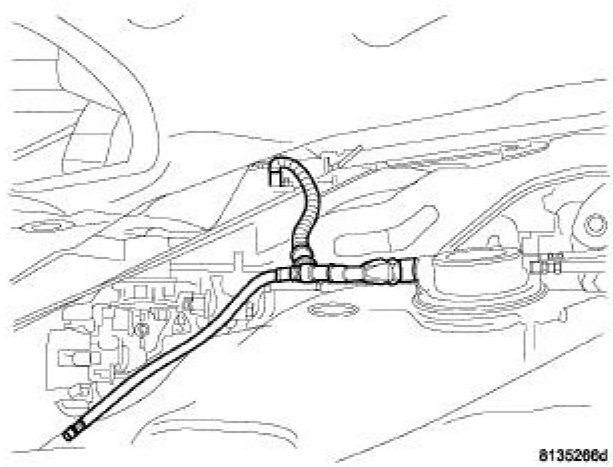


Fig. 117: Tank Vent Line Routing
Courtesy of CHRYSLER GROUP, LLC

19. Carefully lower the fuel tank and pull the ORVR vent line through bracket.
20. Lower and remove the fuel tank from the vehicle.

INSTALLATION

INSTALLATION

WARNING: No sparks, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Pour fuel only into appropriately marked OSHA approved

containers. Wear protective clothing. Risk of injury to eyes and skin from contact with fuel.

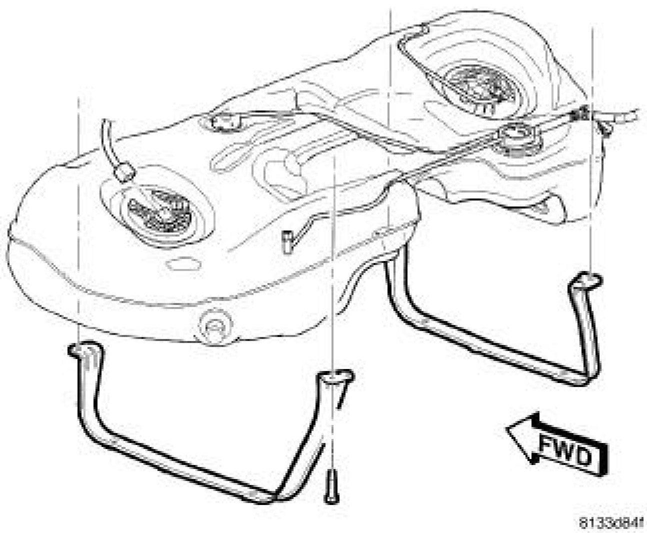


Fig. 118: Tank Straps
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the fuel pump modules. Refer to **MODULE, FUEL PUMP, INSTALLATION**.
2. Using a suitable hydraulic jack with a fuel tank adapter, support the fuel tank.
3. Carefully raise the fuel tank into position while guiding the Onboard Refueling Vapor Recovery (ORVR) vent line through bracket.
4. Install the fuel tank straps. Tighten bolts to the proper torque specification. Refer to **FUEL DELIVERY, GAS, SPECIFICATIONS**.

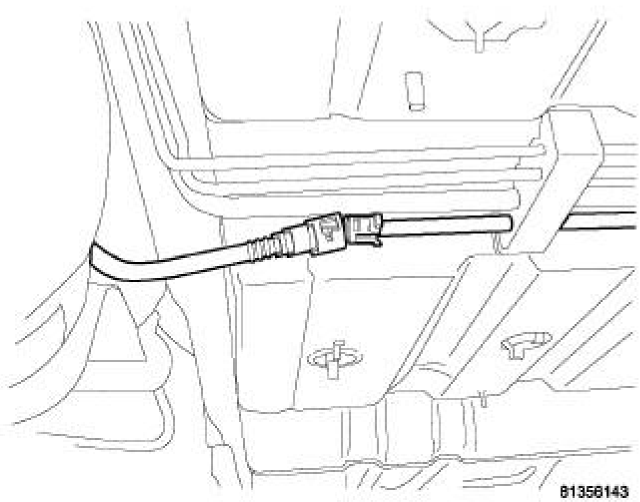


Fig. 119: Fuel Line Disconnected
Courtesy of CHRYSLER GROUP, LLC

5. Connect the fuel supply line.

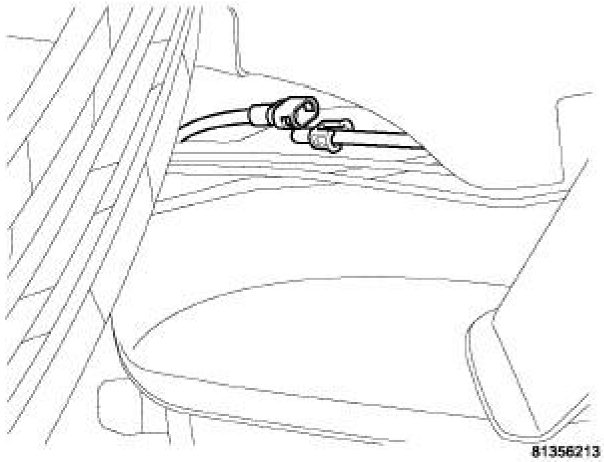


Fig. 120: Vapor Connection On Tank
Courtesy of CHRYSLER GROUP, LLC

6. Connect the vapor line.

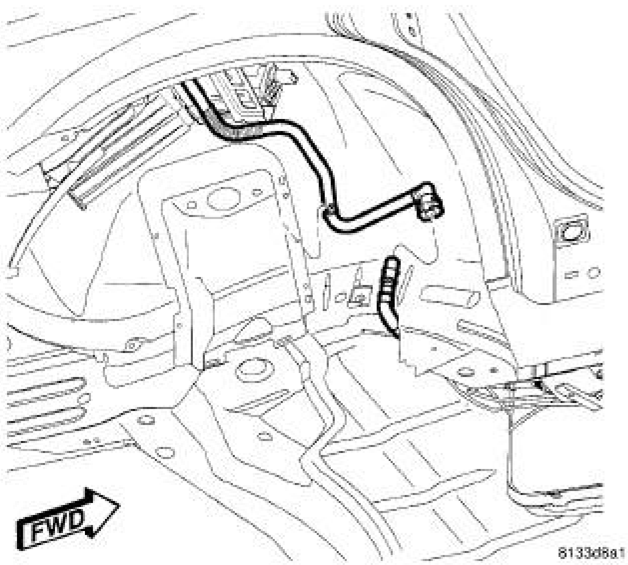


Fig. 121: EVAP Line
Courtesy of CHRYSLER GROUP, LLC

7. Connect the EVAP line in the right rear wheel well.

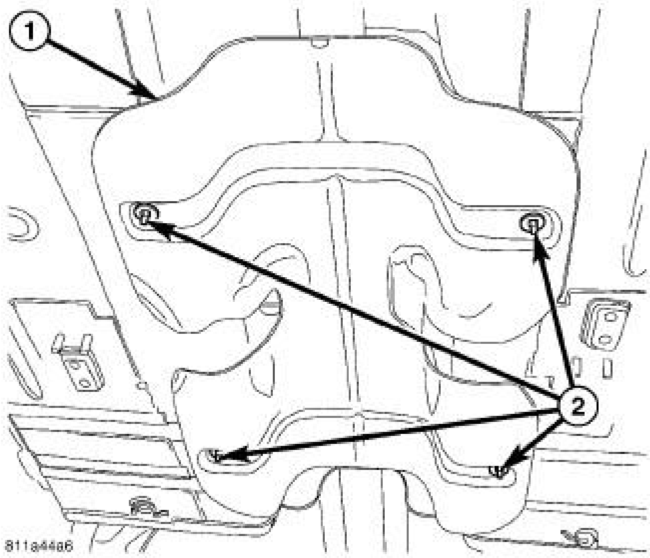


Fig. 122: Heat Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Install the heat shield (1) and fasteners (2).
9. Install the propeller shaft. Refer to **INSTALLATION** .

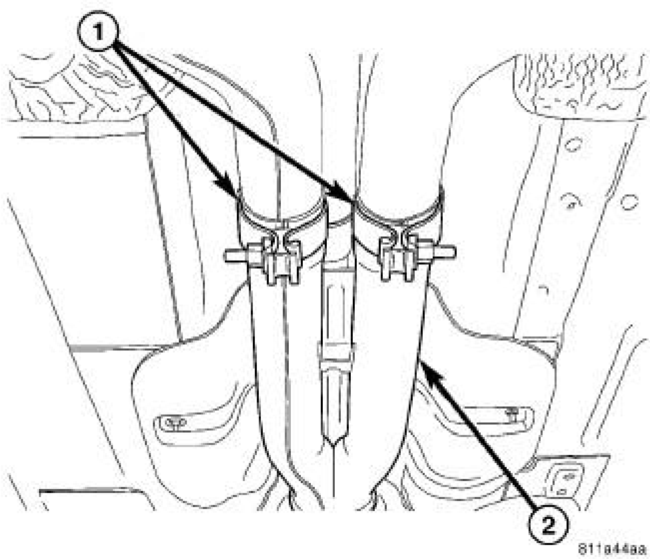


Fig. 123: Identifying Clamps & Rear Exhaust System
Courtesy of CHRYSLER GROUP, LLC

10. Install the muffler and tailpipe assembly (2). Refer to **MUFFLER, EXHAUST, INSTALLATION** .

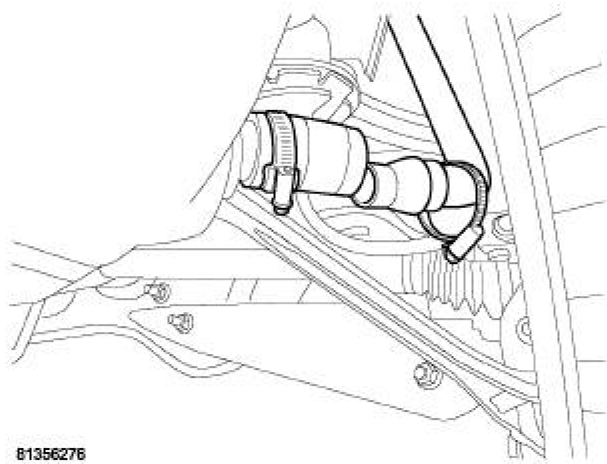


Fig. 124: Remove/Install Filler Tube
Courtesy of CHRYSLER GROUP, LLC

11. Connect the fuel filler tube to the rubber hose on the fuel tank.

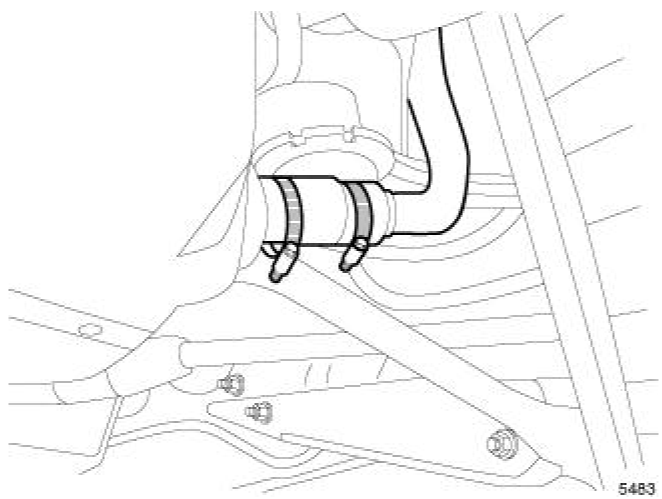


Fig. 125: Filler Tube Clamp Removed
Courtesy of CHRYSLER GROUP, LLC

12. Install the fuel filler tube hose clamp and securely tighten.

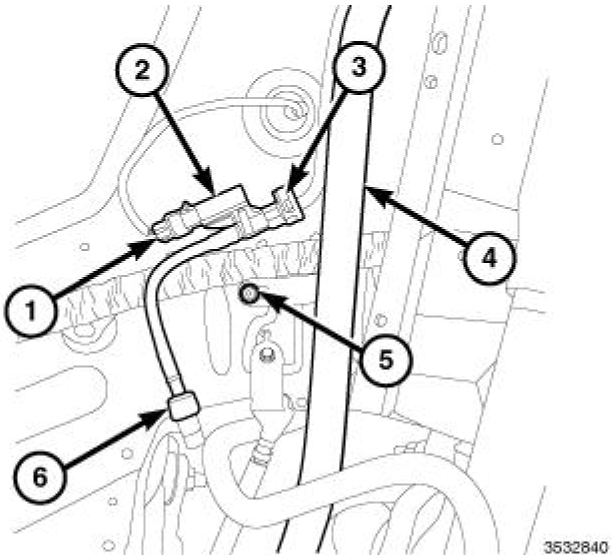


Fig. 126: Fuel Tank Pressure Sensor Electrical Connector, Filler Tube & Fuel Tank Vent Steel Line
Courtesy of CHRYSLER GROUP, LLC

13. Connect the ORVR vent line (3).
14. Install the fuel filler tube retaining nut (5) and tighten to the proper torque specification. Refer to **FUEL DELIVERY, GAS, SPECIFICATIONS**.
15. Install the left rear wheelhouse splash shield. Refer to **SHIELD, SPLASH, REAR WHEELHOUSE, INSTALLATION** .
16. Install the left rear tire.

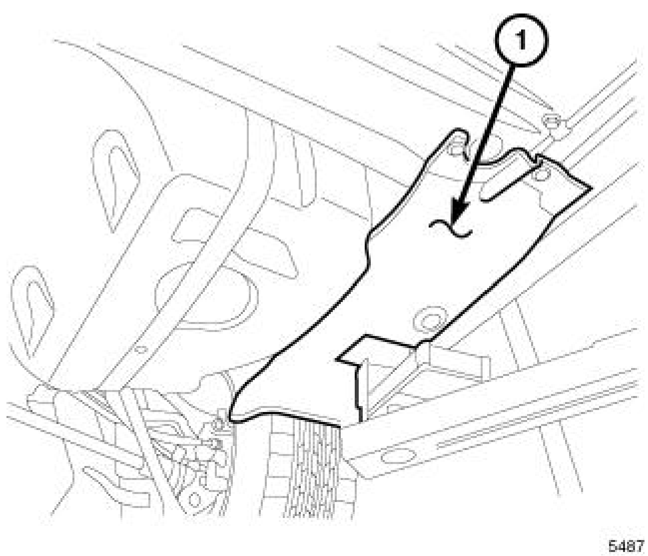


Fig. 127: Left Underbody Splash Shield
Courtesy of CHRYSLER GROUP, LLC

17. Install the left underbody splash shield (1).

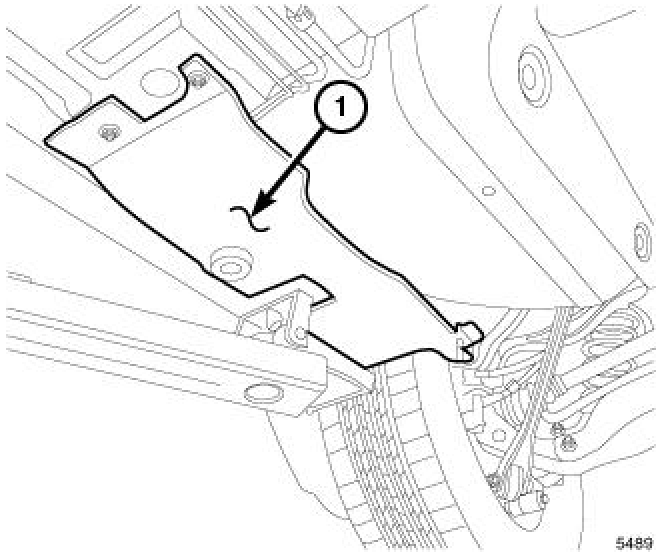


Fig. 128: Right Underbody Splash Shield
Courtesy of CHRYSLER GROUP, LLC

18. Install the right underbody splash shield (1).
19. Remove support and lower the vehicle.
20. Fill the fuel tank.
21. Connect the negative battery cable.
22. Use the scan tool to pressurize the fuel system and check for leaks.

TUBE, FUEL TANK FILLER

REMOVAL

REMOVAL

1. Perform the fuel tank draining procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
2. Disconnect the negative battery cable.

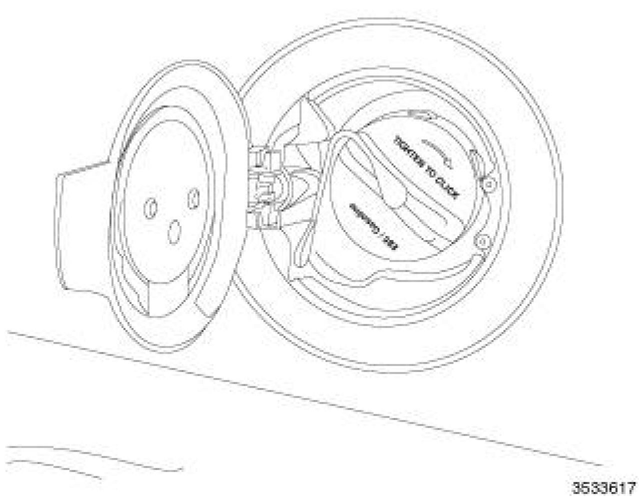


Fig. 129: Fuel Filler Door & Cap
Courtesy of CHRYSLER GROUP, LLC

3. Open the fuel filler door.
4. Remove the fuel filler cap.
5. Remove the left rear wheelhouse splash shield. Refer to **SHIELD, SPLASH, REAR WHEELHOUSE, REMOVAL** .

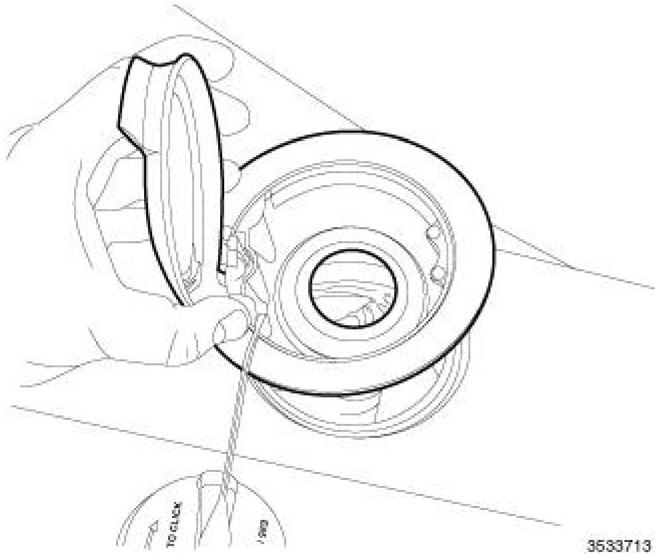


Fig. 130: Fuel Filler Tube Housing
Courtesy of CHRYSLER GROUP, LLC

6. Using your hand. Remove the fuel filler tube housing by squeezing the locking tabs located on the backside of the fender.
7. Remove the housing away from the fender allowing the filler tube to release from the rubber grommet.

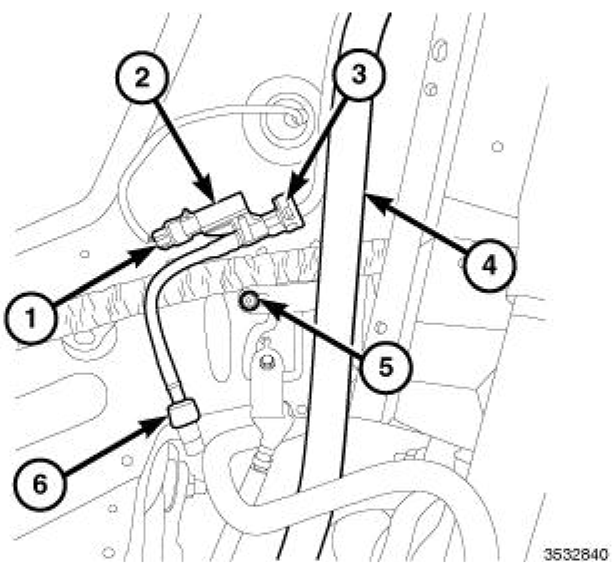


Fig. 131: Fuel Tank Pressure Sensor Electrical Connector, Filler Tube & Fuel Tank Vent Steel Line
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the Onboard Refueling Vapor Recovery (ORVR) line (3) at the filler tube. Refer to **FITTING,**

QUICK CONNECT, STANDARD PROCEDURE.

9. Remove the fuel filler tube retaining nut (5).

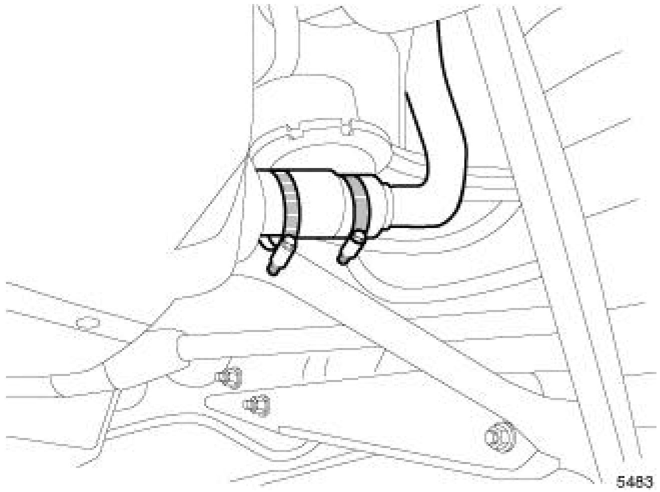


Fig. 132: Filler Tube Clamp Removed
Courtesy of CHRYSLER GROUP, LLC

NOTE: The filler tube connecting hose to the fuel tank is pressure fitted to the filler tube. To remove the hose. It must be removed from the fuel tank side.

10. Loosen the fuel filler tube hose clamp from the fuel tank.

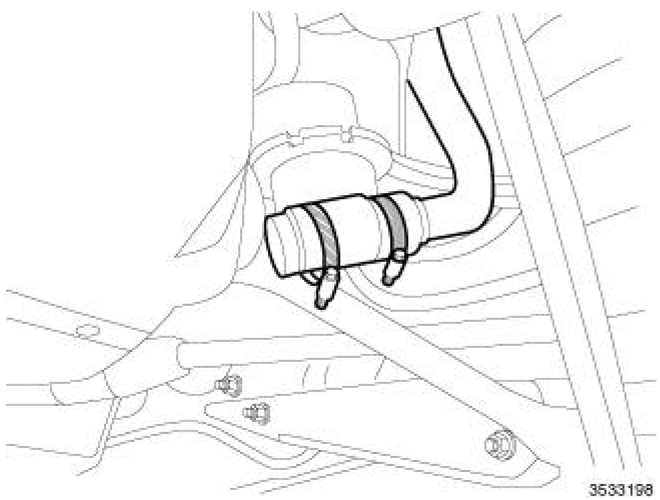
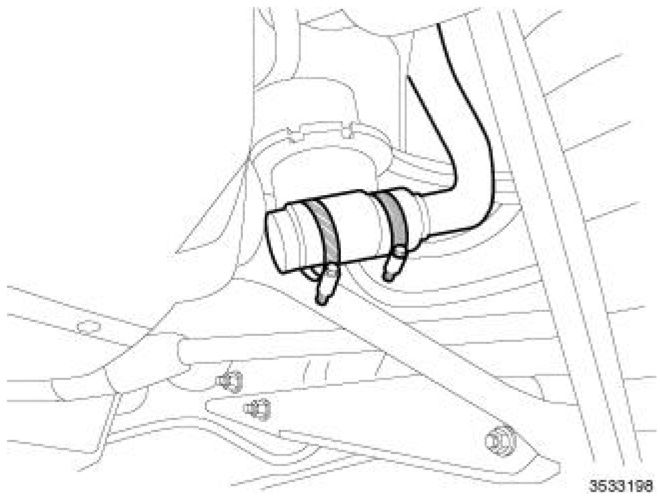


Fig. 133: Remove/Install Fuel Filler Tube Rubber Hose
Courtesy of CHRYSLER GROUP, LLC

11. Remove the fuel filler tube rubber hose from the fuel tank and remove the fuel filler tube from the vehicle.

INSTALLATION

INSTALLATION



[**Fig. 134: Remove/Install Fuel Filler Tube Rubber Hose**]
Courtesy of CHRYSLER GROUP, LLC

1. Position the fuel filler tube into the vehicle.
2. Insert the fuel filler tube rubber hose into the fuel tank filler neck.

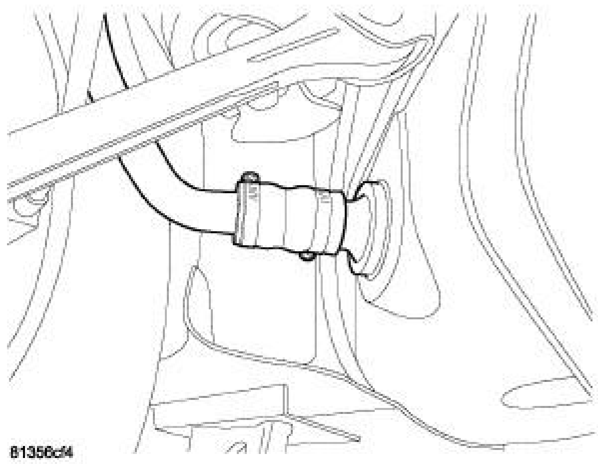


Fig. 135: Filler Tube Hose Clamp
Courtesy of CHRYSLER GROUP, LLC

3. Slide the fuel filler tube hose clamp into position and securely tighten.

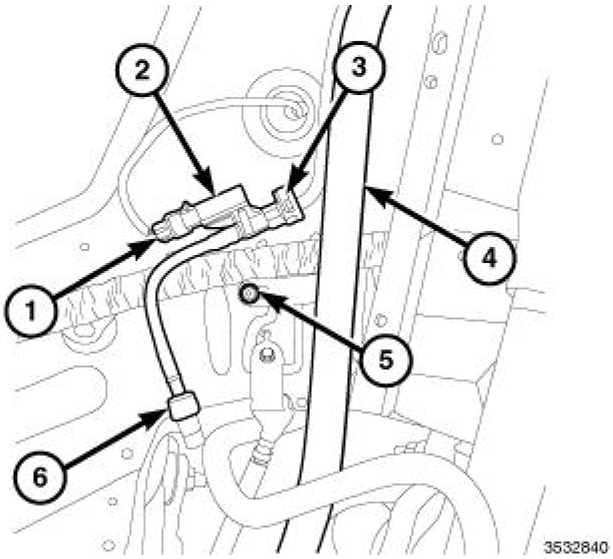


Fig. 136: Fuel Tank Pressure Sensor Electrical Connector, Filler Tube & Fuel Tank Vent Steel Line
Courtesy of CHRYSLER GROUP, LLC

4. Install the fuel filler tube retaining nut (5) and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS**.
5. Connect the fuel filler tube ORVR vent line (3) at the filler tube (4).

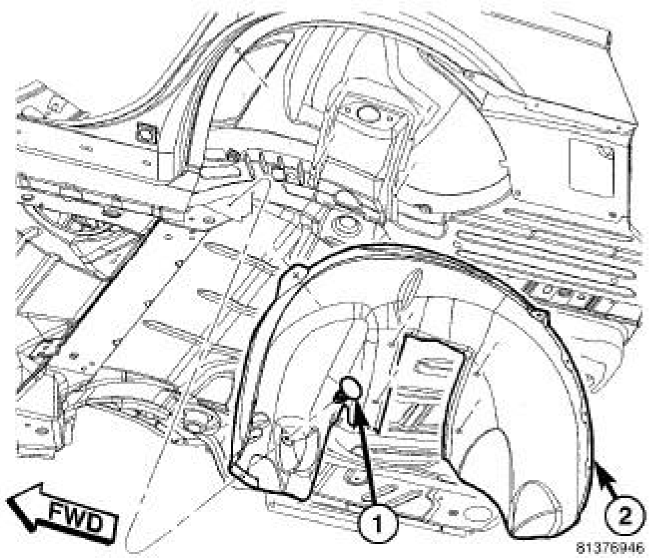
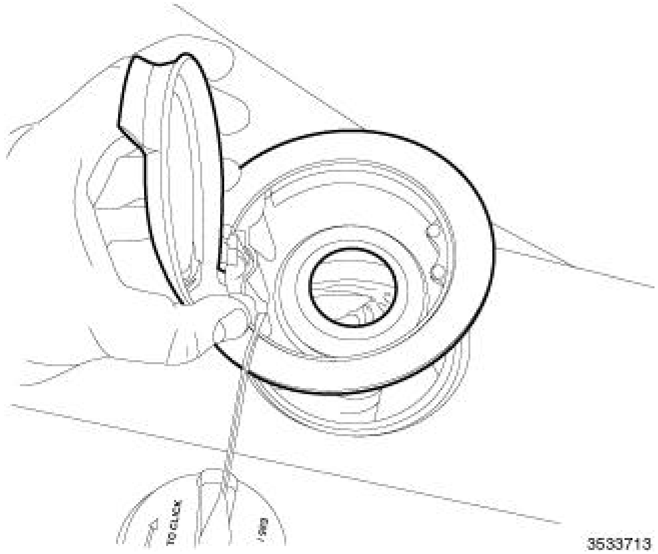


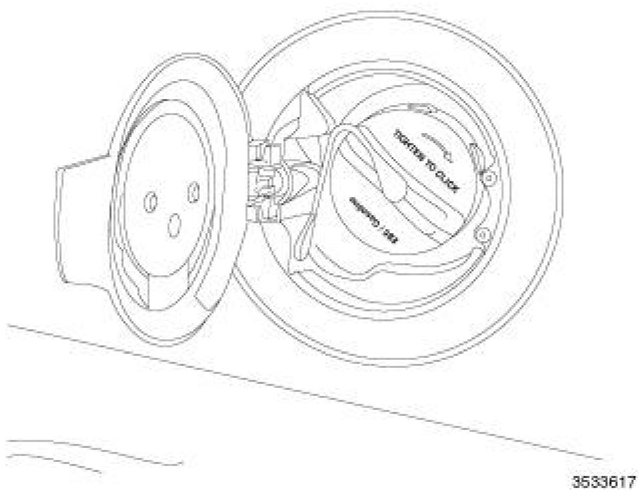
Fig. 137: Removing/Installing Rear Wheelhouse Shield
Courtesy of CHRYSLER GROUP, LLC

6. Install the rear wheelhouse splash shield (2) to the body and the push-pins (1).
7. Install the left rear tire.
8. Remove support and lower the vehicle.



[Fig. 138: Fuel Filler Tube Housing](#)
Courtesy of CHRYSLER GROUP, LLC

9. Align the fuel filler tube to the fuel filler housing rubber seal.
10. Firmly press the fuel filler housing into the fender till housing locks into place.



[Fig. 139: Fuel Filler Door & Cap](#)
Courtesy of CHRYSLER GROUP, LLC

11. Check the fuel filler tube housing for flushness to fender.
12. Install the fuel cap.
13. Connect the negative battery cable.
14. Fill the fuel tank and check for leaks.

FUEL INJECTION, GAS

OPERATION

INJECTION SYSTEM

All engines used in this service information have a sequential Multi-Port Electronic Fuel Injection system. The MPI system is computer regulated and provides precise air/fuel ratios for all driving conditions. The Powertrain Control Module (PCM) operates the fuel injection system.

The PCM regulates:

- Ignition timing
- Air/fuel ratio
- Emission control devices
- Cooling fan
- Charging system
- Idle speed
- Vehicle speed control

Various sensors provide the inputs necessary for the PCM to correctly operate these systems. In addition to the sensors, various switches also provide inputs to the PCM.

The PCM can adapt its programming to meet changing operating conditions.

Fuel is injected into the intake port above the intake valve in precise, metered amounts through electronically operated injectors. The PCM cycles the fuel injectors in a specific sequence. Under most operating conditions, the PCM maintains an air fuel ratio of 14.7 parts air to 1 part fuel by constantly adjusting injector pulse width. Injector pulse width is the length of time the injector is open.

The PCM adjusts injector pulse width by opening and closing the ground path to the injector. Engine RPM (speed) and manifold absolute pressure (air density) are the **primary** inputs that determine injector pulse width.

MODES OF OPERATION

As input signals to the PCM change, the PCM adjusts its response to output devices. For example, the PCM must calculate a different injector pulse width and ignition timing for idle than it does for Wide Open Throttle (WOT). There are several different modes of operation that determine how the PCM responds to the various input signals.

The multi-port fuel injection systems has the following modes of operation:

- Ignition switch ON (Zero RPM)
- Engine start-up
- Engine warm-up
- Cruise
- Idle
- Acceleration
- Deceleration
- Wide-Open-Throttle
- Ignition switch OFF

Within these modes of operation are two different functions, OPEN LOOP and CLOSED LOOP.

During OPEN LOOP operation the PCM receives input signals and responds according to preset PCM programming. Inputs from the upstream and downstream heated oxygen (O2) sensors are not monitored during OPEN LOOP operation, except for heated O2 sensor diagnostics (they are checked for shorted conditions at all times).

During CLOSED LOOP operation the PCM monitors the inputs from the upstream and downstream heated O2 sensors. The upstream heated oxygen sensor input tells the PCM if the calculated injector pulse width resulted in the ideal air-fuel ratio of 14.7 to one. By monitoring the exhaust oxygen content through the upstream heated oxygen sensor, the PCM can fine tune the injector pulse width. Fine tuning the injector pulse width allows the PCM to achieve optimum fuel economy combined with low emissions.

For the PCM to enter CLOSED LOOP operation, the following must occur:

1. Engine coolant temperature must be over 35Ā°F (1.7Ā°C).
    - If the coolant is over 35Ā°F (1.7Ā°C) the PCM will wait 38 seconds.
    - If the coolant is over 50Ā°F (10Ā°C) the PCM will wait 15 seconds.
    - If the coolant is over 167Ā°F (75Ā°C) the PCM will wait 3 seconds.
    - For other temperatures the PCM will interpolate the correct waiting time.
2. The O2 sensor must read either greater than 0.745 volts or less than 0.29 volt.

OPEN LOOP operation is used for engine start-up (crank), engine warm-up, deceleration with fuel shutoff and wide open throttle. Under most conditions, acceleration, deceleration (with A/C on), idle and cruise modes, **with the engine at operating temperature,** occur in CLOSED LOOP operation.

IGNITION SWITCH ON (ZERO RPM) MODE

When the ignition switch activates the fuel injection system, the following actions occur:

- The PCM monitors the engine coolant temperature sensor and throttle position sensor input. The PCM determines basic fuel injector pulse width from this input.
- The PCM determines atmospheric air pressure from the MAP sensor input to modify injector pulse width.

When the key is in the ON position and the engine is not running (zero rpm), the Auto Shutdown (ASD) and fuel pump relays de-energize after approximately 1 second. Therefore, battery voltage is not supplied to the fuel pump, ignition coil, fuel injectors and heated oxygen sensors.

ENGINE WARM-UP MODE

This is an OPEN LOOP mode. The following inputs are received by the PCM:

- Manifold Absolute Pressure (MAP)
- Crankshaft position (engine speed)
- Engine coolant temperature
- Inlet/Intake air temperature (IAT)
- Camshaft position
- Knock sensor

- Throttle position
- A/C switch status
- Battery voltage
- Vehicle speed
- Speed control
- O2 sensors

The PCM adjusts injector pulse width and controls injector synchronization by turning the individual ground paths to the injectors On and Off.

The PCM adjusts ignition timing and engine idle speed.

CRUISE OR IDLE MODE

When the engine is at operating temperature this is a CLOSED LOOP mode. During cruising or idle the following inputs are received by the PCM:

- Manifold absolute pressure
- Crankshaft position (engine speed)
- Inlet/Intake air temperature
- Engine coolant temperature
- Camshaft position
- Knock sensor
- Throttle position
- Exhaust gas oxygen content (O2 sensors)
- A/C switch status
- Battery voltage
- Vehicle speed

The PCM adjusts injector pulse width and controls injector synchronization by turning the individual ground paths to the injectors On and Off.

The PCM adjusts engine idle speed and ignition timing. The PCM adjusts the air/fuel ratio according to the oxygen content in the exhaust gas (measured by the upstream and downstream heated oxygen sensors).

The PCM monitors for engine misfire. During active misfire and depending on the severity, the PCM either continuously illuminates or flashes the malfunction indicator lamp (Check Engine light on instrument panel). Also, the PCM stores an engine misfire DTC in memory, during the 2nd trip with the fault.

The PCM performs several diagnostic routines. They include:

- Oxygen sensor monitor
- Downstream heated oxygen sensor diagnostics during open loop operation (except for shorted)
- Fuel system monitor
- EGR monitor (if equipped)

- Purge system monitor
- Catalyst efficiency monitor
- All inputs monitored for proper voltage range (rationality)
- All monitored components (refer to **ON-BOARD DIAGNOSTICS**).

The PCM compares the upstream and downstream heated oxygen sensor inputs to measure catalytic convertor efficiency. If the catalyst efficiency drops below the minimum acceptable percentage, the PCM stores a diagnostic trouble code in memory, after 2 trips.

During certain idle conditions, the PCM may enter a variable idle speed strategy. During variable idle speed strategy the PCM adjusts engine speed based on the following inputs.

- A/C status
- Battery voltage
- Battery temperature or Calculated Battery Temperature
- Engine coolant temperature
- Engine run time
- Inlet/Intake air temperature
- Vehicle mileage

ACCELERATION MODE

This is a CLOSED LOOP mode. The PCM recognizes an abrupt increase in Throttle Position sensor output voltage or MAP sensor output voltage as a demand for increased engine output and vehicle acceleration. The PCM increases injector pulse width in response to increased fuel demand.

DECELERATION MODE

This is a CLOSED LOOP mode. During deceleration the following inputs are received by the PCM:

- A/C status
- Battery voltage
- Inlet/Intake air temperature
- Engine coolant temperature
- Crankshaft position (engine speed)
- Exhaust gas oxygen content (upstream heated oxygen sensor)
- Knock sensor
- Manifold absolute pressure
- Throttle position sensor

The PCM may receive a closed throttle input from the Throttle Position Sensor (TPS) when it senses an abrupt decrease in manifold pressure. This indicates a hard deceleration (Open Loop). In response, the PCM may momentarily turn off the injectors. This helps improve fuel economy, emissions and engine braking.

WIDE-OPEN-THROTTLE MODE

This is an OPEN LOOP mode. During wide-open-throttle operation, the following inputs are used by the PCM:

- Inlet/Intake air temperature
- Engine coolant temperature
- Engine speed
- Knock sensor
- Manifold absolute pressure
- Throttle position

When the PCM senses a wide-open-throttle condition through the Throttle Position Sensor (TPS) it de-energizes the A/C compressor clutch relay. This disables the air conditioning system and disables EGR (if equipped).

The PCM adjusts injector pulse width to supply a predetermined amount of additional fuel, based on MAP and RPM.

IGNITION SWITCH OFF MODE

When the operator turns the ignition switch to the OFF position, the following occurs:

- All outputs are turned off unless the oxygen sensor heater monitor test is being run. Refer to ON-BOARD DIAGNOSTICS .
- No inputs are monitored except for the heated oxygen sensors. The PCM monitors the heating elements in the oxygen sensors and then shuts down.

FUEL ECONOMY AND MAINTENANCE

A vehicle that is not properly tuned and maintained cannot be expected to perform at its maximum efficiency and can have an adverse effect on fuel economy. The following recommendations will ensure that the vehicle is performing at its maximum efficiency:

- **Use the recommended motor oil grade.** Using the manufacturer's recommended grade of MoparĀ® motor oil can improve fuel mileage by 1-2%. MoparĀ® motor oil labeled "Energy Conserving" contains friction-reducing additives.
- **Check and replace air filters.** Replacing a clogged air filter with a new MoparĀ® air filter can improve fuel mileage.
- **Keep the engine tuned.** Repairing a vehicle that is noticeably out of tune can improve fuel mileage by an average of 4%. Maintaining a vehicle and repairing problems, such as a faulty oxygen sensor, can improve mileage by as much as 40%.
- **Keep tires properly inflated.** Under-inflated tires can lower fuel mileage by 0.4% for every 1 psi drop in pressure of all four tires.

FUEL CORRECTION OR ADAPTIVE MEMORIES

OPERATION

SHORT TERM

Short Term Adaptive or Short Term Fuel Trim (STFT) is an immediate correction to fuel injector pulse width. During Closed Loop operation, Short Term Adaptive makes immediate adjustments to fuel delivery in direct

response to the signal from the upstream oxygen sensor. The PCM infers air/fuel ratio by monitoring oxygen content measured by the upstream oxygen sensor.

This is an immediate response to the oxygen sensor signal that is consistently high or low. The PCM knows that the base pulse width calculation needs to be modified by adjusting the injector pulse width until the correct oxygen sensor voltage is achieved. The need to adjust the injector pulse width may be a result of vehicle operating conditions, engine wear, fuel quality, etc. The maximum range of authority for Short Term Adaptive is Ā±33%. Short Term Adaptive values are not stored when the ignition is off.

LONG TERM

The main function of Long Term Adaptive is to make fuel corrections that permit Short Term Adaptive to hover around zero. In order to maintain correct emissions throughout all operating ranges of the engines, a cell structure based on engine RPM and load (MAP) is used.

There are 26 cells used for the NGC. Two of the cells are used only during idle, as determined by throttle position and park/neutral switch input. The other cells each represent a given off-idle manifold pressure and RPM range.

After the vehicle has reached full operating temperature, short term correction factors will update Long Term Adaptive Memory cells based on vehicle load (RPM/MAP) to allow the Short Term Adaptive value to be brought back to near zero. Once this correction factor is updated in the memory, it will be used by the PCM under all operating conditions, open loop and closed loop. However, the values stored in the Long-term are updated only after the vehicle has entered long-term closed loop at full operating temperature. This is done to prevent any transition temperature or start-up compensation from corrupting long term fuel correction.

Long Term and Short Term Adaptive can each change the pulse width by as much as Ā±33% for a maximum total correction of Ā±66% from base pulse width calculation. Long Term Adaptive values are used during both Open Loop and Closed Loop operation.

SYSTEM DIAGNOSIS

OPERATION

The Powertrain Control Module (PCM) can test many of its own input and output circuits. If the PCM senses a fault in a major system, the PCM stores a Diagnostic Trouble Code (DTC) in memory.

For DTC information see On-Board Diagnostics. Refer to the **DTC INDEX** article. .

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENERS *
Accelerator Pedal Position Sensor Nuts	12	9	-	Ā
Crankshaft Position Sensor Bolt (3.6L)	12	9	-	Ā

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENERS *
Crankshaft Position Sensor Bolt (6.2L)	12	9	-	Ā
Crankshaft Position Sensor Bolt (5.7L/6.4L)	12	9	-	Ā
Oxygen Sensor (3.6L/5.7L /6.2L/6.4L)	52	38	-	Ā
Throttle Body Bolts (3.6L)	7	-	62	Ā
Throttle Body Bolts (6.2L)	10	-	89	Ā
Throttle Body Bolts (5.7L/6.4L)	5	-	44	Ā
Throttle Body Bracket Bolts (3.6L)	27	20	-	Ā
Short Runner Valve Bolts	8	-	71	Ā
* NEW FASTENERS: Do not reuse these fasteners. If removed, a new fastener must be installed and tighten to specifications.				

INJECTOR(S), FUEL

REMOVAL

3.6L

WARNING: The fuel system is under constant pressure even with engine off. Before servicing the fuel rail, fuel system pressure must be released.

1. Perform the fuel pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
2. Disconnect and isolate the negative battery cable.

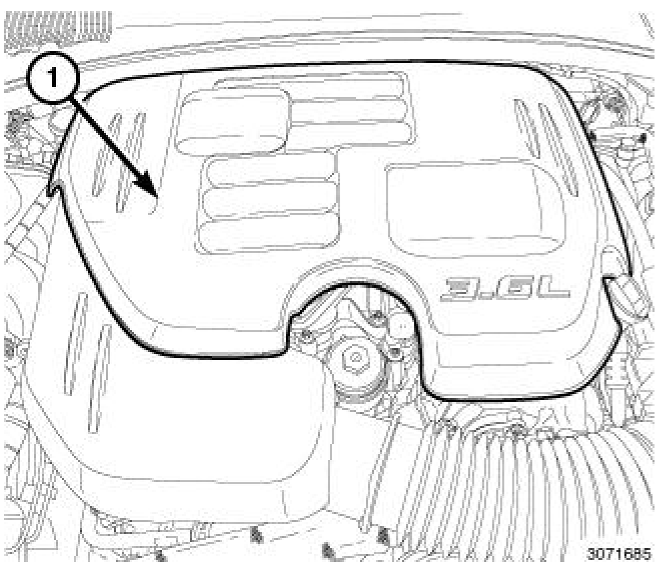


Fig. 140: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

3. Lift the engine cover retaining grommets off the ball studs and remove the engine cover (1).

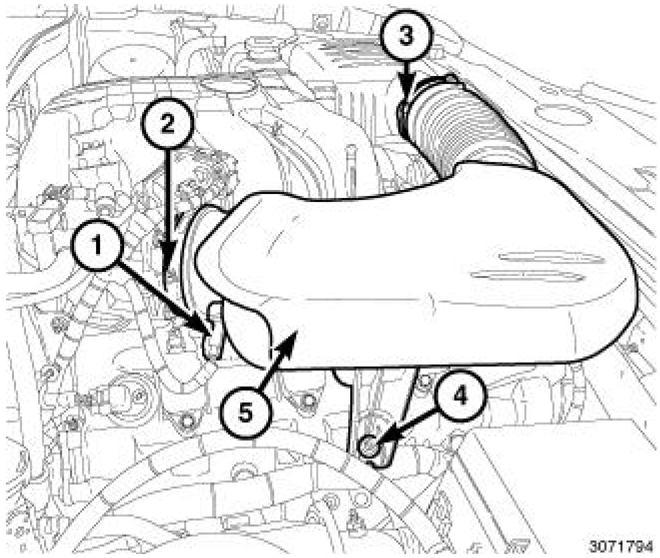


Fig. 141: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the electrical connector (1) from the Inlet Air Temperature (IAT) sensor.
5. Loosen the clamp (2) at the throttle body.
6. Loosen the clamp (3) at the air cleaner housing.
7. Lift the air inlet hose assembly retaining grommet off the ball stud (4).
8. Remove the air inlet hose assembly (5).

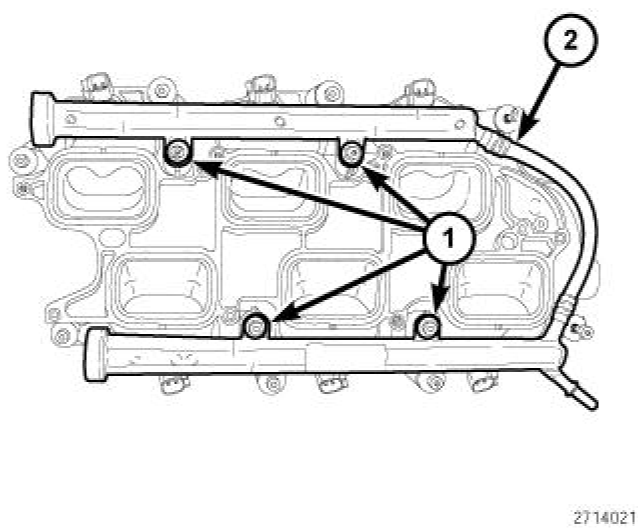
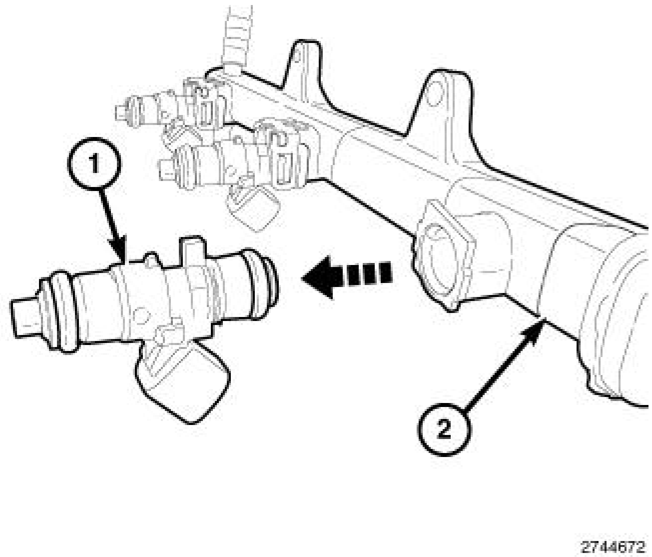


Fig. 142: Fuel Rail & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When removing the fuel rail from the lower intake manifold, one or more fuel injectors may remain in the intake manifold resulting in residual fuel spilling onto the engine from the fuel rail.

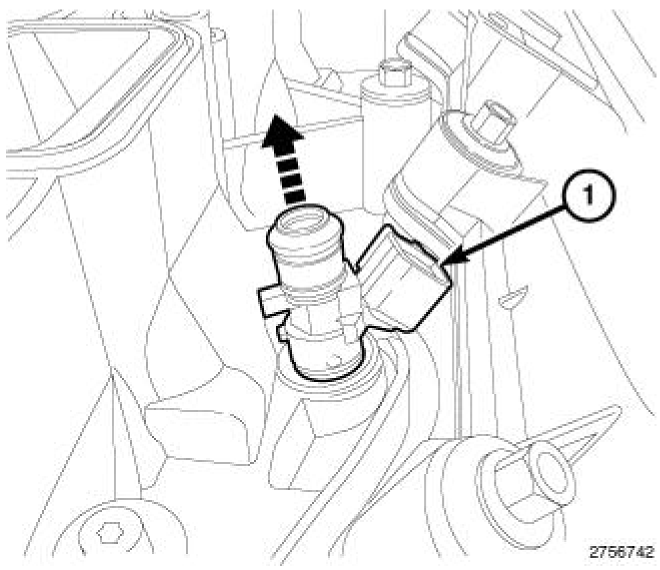
9. Remove the upper intake manifold and fuel rail (2). Refer to **RAIL, FUEL, REMOVAL**.



[Fig. 143: Removing Fuel Injector From Fuel Rail]
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Number 2 fuel injector removal shown in the illustration, all other fuel injectors similar.**

10. Remove the fuel injectors (1) from the fuel rail (2).



[Fig. 144: Removing Fuel Injector From Intake Manifold]
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Number 2 fuel injector removal shown in the illustration, all other fuel injectors similar.**

11. Remove the fuel injectors (1) from the lower intake manifold.

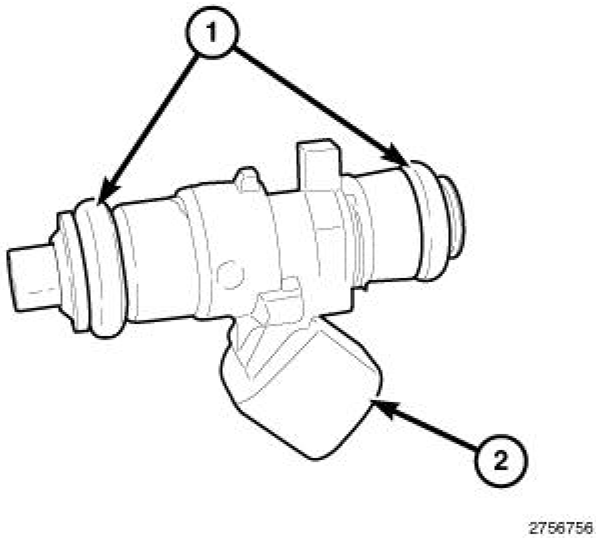


Fig. 145: O-Ring Seals
Courtesy of CHRYSLER GROUP, LLC

12. Remove and discard all fuel injector O-ring seals (1).

REMOVAL - 6.2L

WARNING: **The fuel system is under constant pressure even with engine off. Before servicing fuel injector(s), fuel system pressure must be released.**

NOTE: **To remove one or more fuel injectors, the fuel rail assembly must be removed from engine.**

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
2. Remove the fuel rail assembly. Refer to **RAIL, FUEL, REMOVAL**.

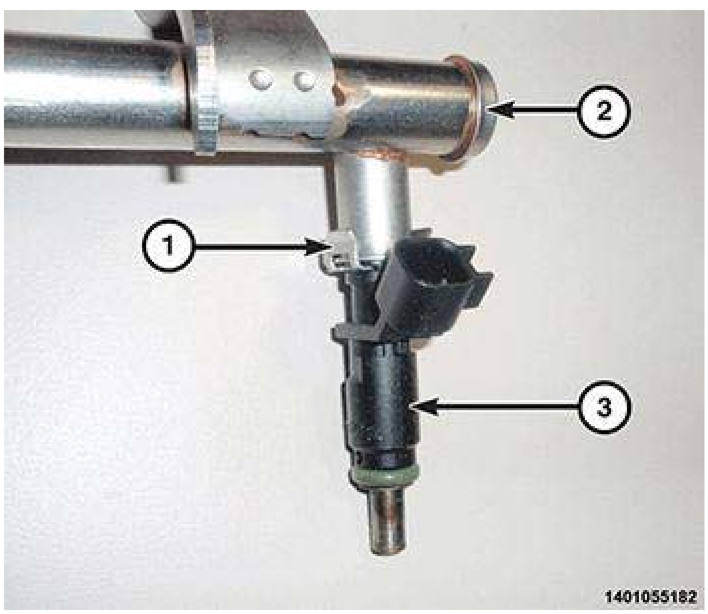


Fig. 146: Safety Clips, Fuel Rail & Fuel Injector

Courtesy of CHRYSLER GROUP, LLC

3. Remove the fuel injector retaining clip(s) (1) from the fuel rail (2).
4. Remove the injector(s) (3) from the fuel rail assembly (2).

REMOVAL - 5.7L/6.4L

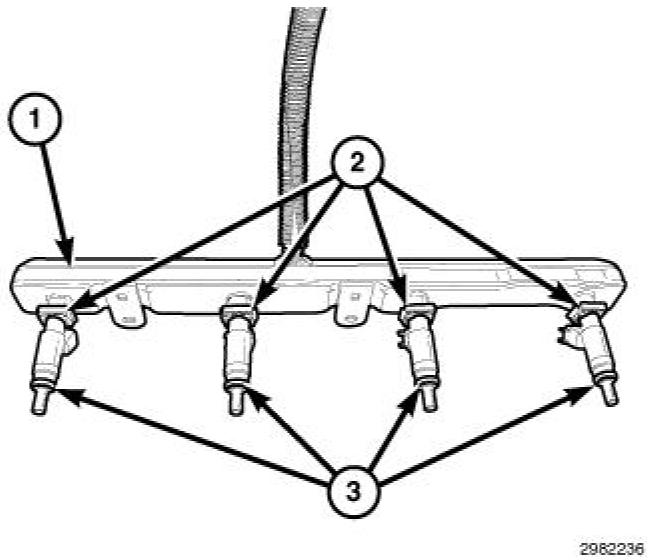


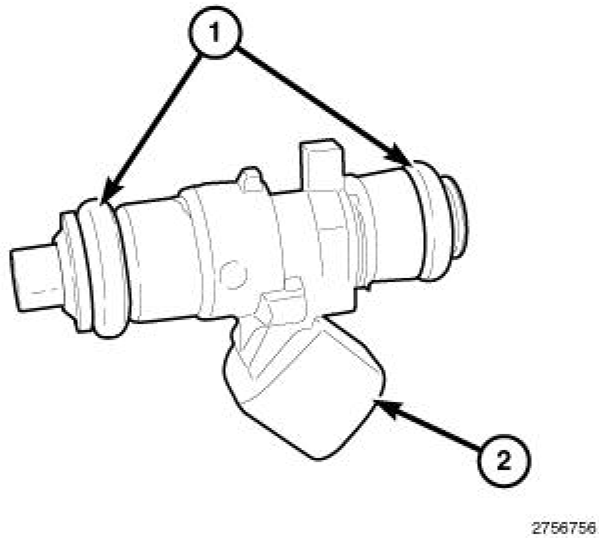
Fig. 147: Fuel Injector O-Rings, Fuel Rail/Fuel Injector Assembly & Four Fuel Rail Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Right side shown in the illustration, left side similar.**
WARNING:	**The fuel system is under constant pressure even with engine off. Before servicing fuel injector(s), fuel system pressure must be released.**
NOTE:	**To remove one or more fuel injectors, the fuel rail assembly must be removed from engine.**

1. Perform the fuel system pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE**.
2. Remove the fuel rail assembly (1). Refer to **RAIL, FUEL, REMOVAL**.
3. Remove the fuel injector retaining clip(s) (2) from the fuel rail (1).
4. Remove the injector(s) from the fuel rail assembly.

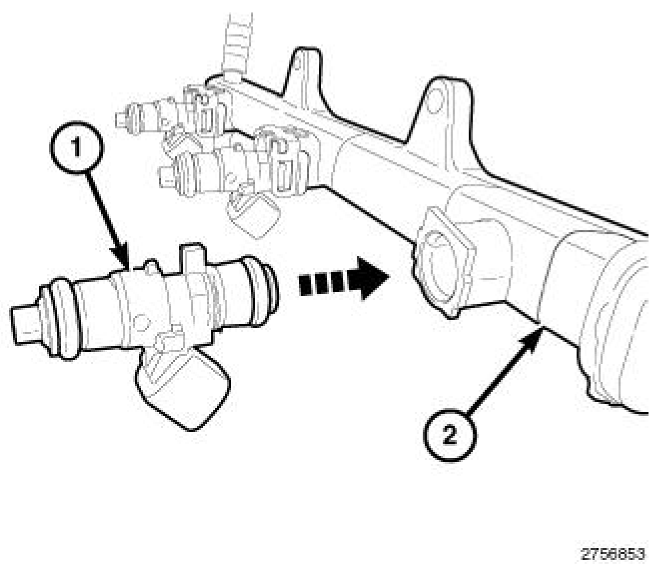
INSTALLATION

3.6L



[Fig. 148: O-Ring Seals](#)
Courtesy of CHRYSLER GROUP, LLC

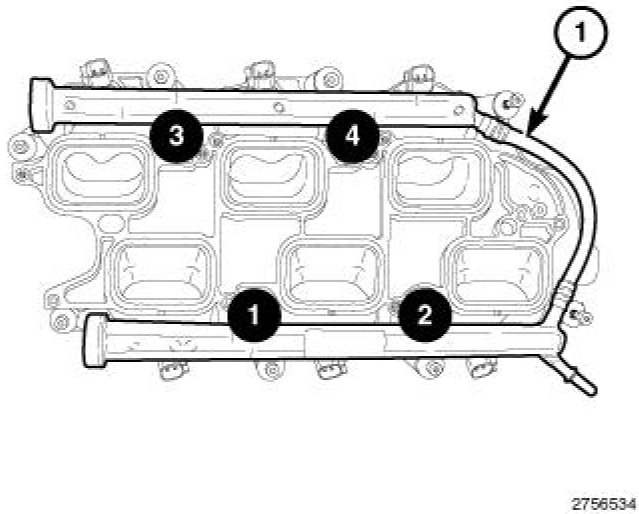
1. Lightly lubricate the new O-ring seals (1) with clean engine oil and position the seals onto the fuel injector (2).



[Fig. 149: Installing Fuel Injector To Fuel Rail](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Number 2 fuel injector installation shown in the illustration, all other fuel injectors similar.**

2. Install the fuel injectors (1) into the fuel rail (2).



[Fig. 150: Fuel Rail Bolt Tightening Sequence](#)
Courtesy of CHRYSLER GROUP, LLC

3. Install the fuel rail and upper intake manifold. Refer to **RAIL, FUEL, INSTALLATION**.

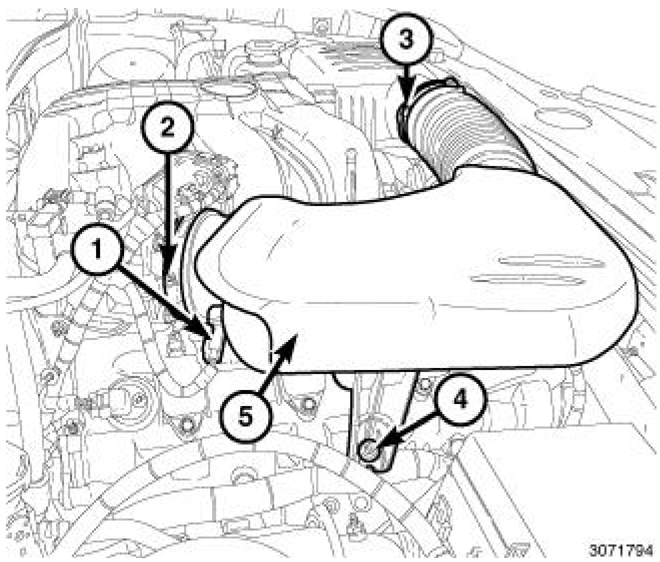
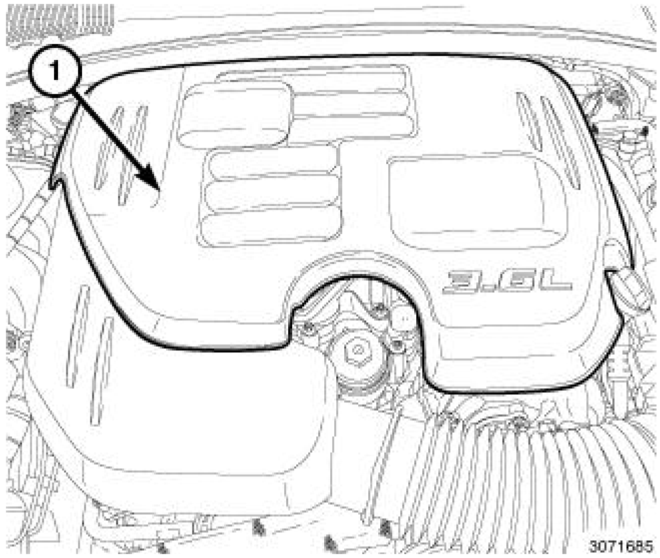


Fig. 151: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

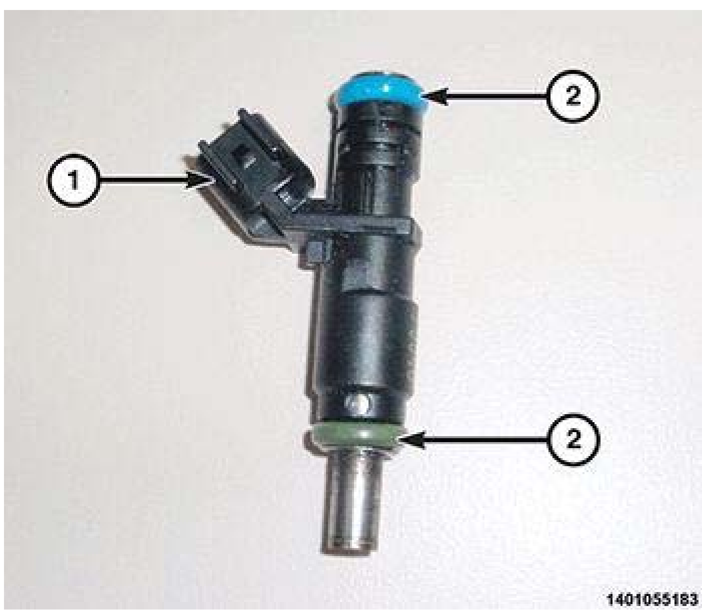
4. Position the air inlet hose assembly (5) onto the throttle body and the air cleaner housing.
5. Secure the air inlet hose assembly retaining grommet onto the ball stud (4).
6. Securely tighten the clamp at the air cleaner housing (3).
7. Securely tighten the clamp (2) at the throttle body.
8. Connect the Inlet Air Temperature (IAT) sensor wire harness connector (1).



[Fig. 152: Engine Cover](#)
Courtesy of CHRYSLER GROUP, LLC

9. Install the engine cover (1).
10. Connect the negative battery cable.
11. Start the engine and check for leaks.

INSTALLATION - 6.2L



[Fig. 153: Fuel Injector & O-Rings](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The fuel injector O-rings (2) may be used again, provided no cuts, tears, or deformation have occurred.**

1. Inspect the fuel injector O-rings (2) and replace if necessary.
2. Apply a small amount of clean engine oil to each fuel injector O-rings (2).

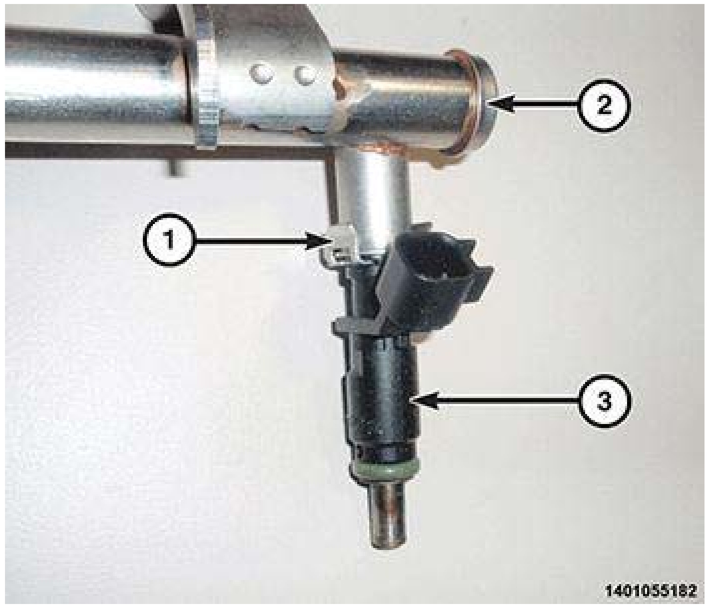


Fig. 154: Safety Clips, Fuel Rail & Fuel Injector
Courtesy of CHRYSLER GROUP, LLC

3. Install the fuel injector(s) (3) into the fuel rail (2) and install the retaining clip(s) (1).
4. Install the fuel rail assembly. Refer to **RAIL, FUEL, INSTALLATION**.
5. Start the engine and check for leaks.

INSTALLATION - 5.7L/6.4L

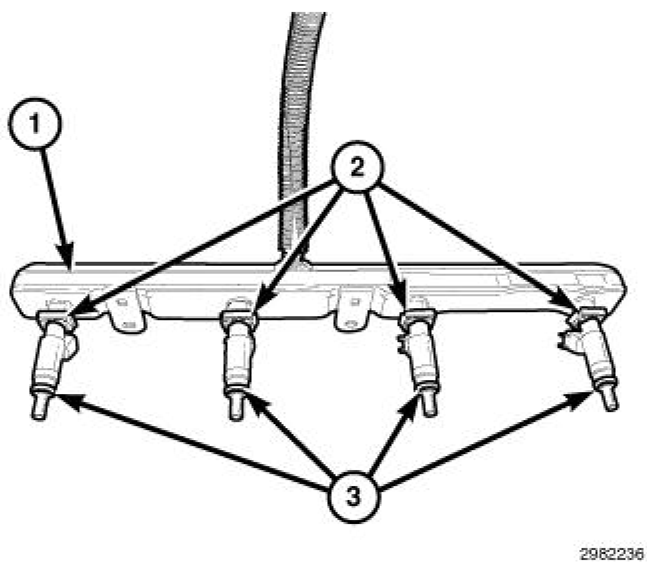


Fig. 155: Fuel Injector O-Rings, Fuel Rail/Fuel Injector Assembly & Four Fuel Rail Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Right side shown in the illustration, left side similar.**

NOTE: **The fuel injector O-rings may be used again, provided no cuts, tears, or deformation have occurred.**

1. Inspect the fuel injector O-rings (3) and replace if necessary.

2. Apply a small amount of engine oil to each fuel injector O-rings.
3. Install the fuel injector(s) into the fuel rail and install the retaining clip(s) (2).
4. Install the fuel rail assembly (1). Refer to **RAIL, FUEL, INSTALLATION**.
5. Start the engine and check for leaks.

PEDAL, ACCELERATOR

REMOVAL

REMOVAL

The Accelerator Pedal Position Sensor (APPS) and the accelerator pedal is serviced as a complete assembly including the bracket.

1. Disconnect and isolate the negative battery cable.

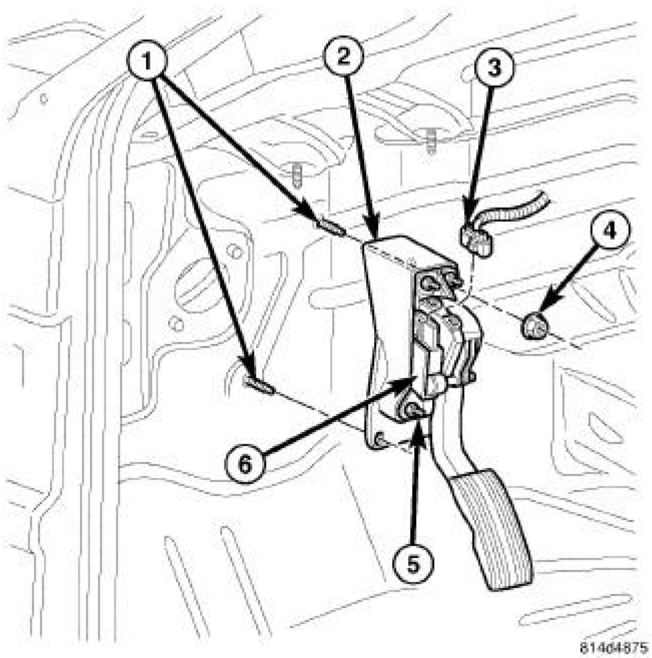


Fig. 156: Removal & Installation Of Accelerator Pedal W/Apps
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the APPS (6) wire harness connector (3).
3. Remove nuts (4) and the accelerator pedal assembly (2).

INSTALLATION

INSTALLATION

The Accelerator Pedal Position Sensor (APPS) and the accelerator pedal is serviced as a complete assembly including the bracket.

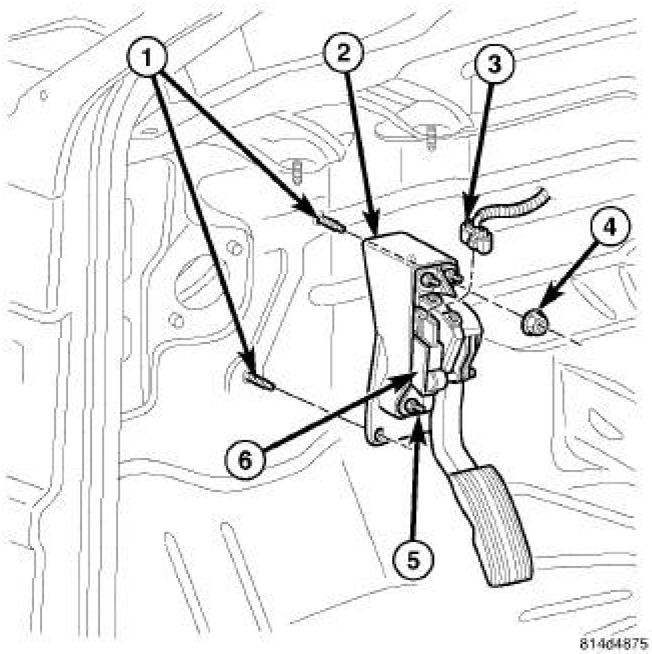


Fig. 157: Removal & Installation Of Accelerator Pedal W/Apps
Courtesy of CHRYSLER GROUP, LLC

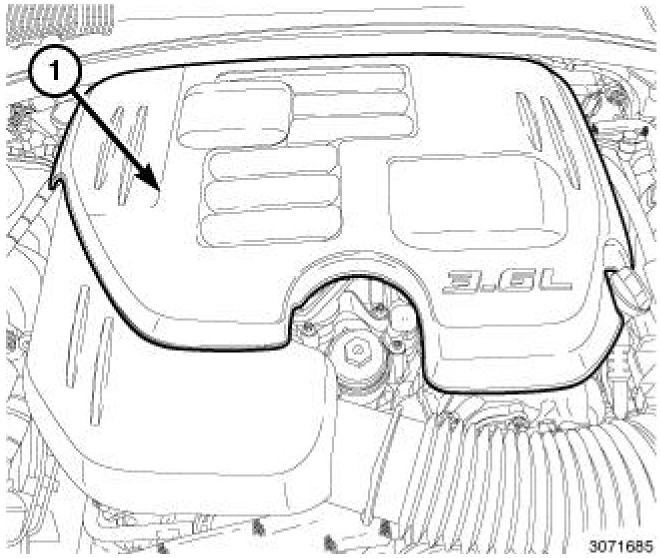
1. Install the accelerator pedal assembly on the two mounting studs (1). Tighten nuts (4) to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
2. Connect the APPS (6) wire harness connector (3).
3. Install the steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
4. Connect the negative battery cable.
5. Use a scan tool to learn electrical parameters. Go to the Miscellaneous menu, and then select ETC Learn.
6. If the previous step is not performed, a Diagnostic Trouble Code (DTC) will be set.
7. If necessary, also use a scan tool to erase any Diagnostic Trouble Codes (DTC's) from the PCM.
8. Before starting the engine, operate the accelerator pedal to check for any binding.

SENSOR, AIR TEMPERATURE, INLET

REMOVAL

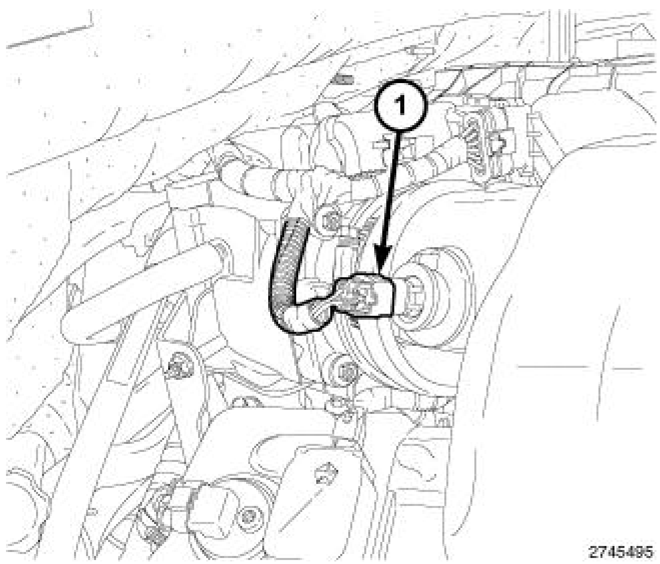
3.6L

1. Disconnect and isolate the negative battery cable.



[Fig. 158: Engine Cover](#)
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine cover (1).



[Fig. 159: Inlet Air Temperature Sensor Electrical Connector](#)
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the Inlet Air Temperature (IAT) sensor wire harness connector (1).

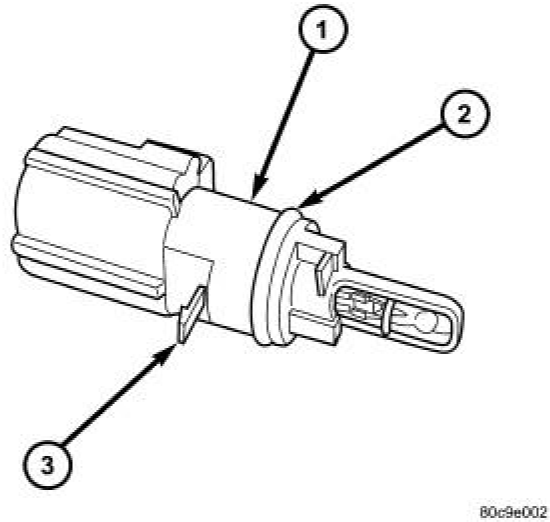


Fig. 160: IAT Sensor, O-Ring Seal & Release Tab
Courtesy of CHRYSLER GROUP, LLC

4. Clean any dirt from the air inlet tube at the IAT sensor base.
5. Gently lift the small plastic release tab (3), rotate the sensor about 1/4 turn counterclockwise and remove the sensor from the inlet air hose.
6. The IAT sensor O-ring (2) can be reused if not damaged.

5.7L

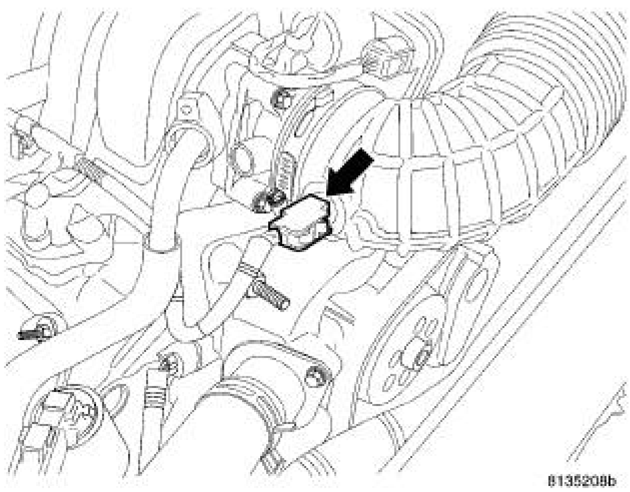


Fig. 161: Sensor Location
Courtesy of CHRYSLER GROUP, LLC

The Inlet Air Temperature (IAT) sensor is installed into the rubber air intake hose near front of throttle body.

1. Disconnect and isolate the negative battery cable.

2. Remove the engine cover
3. Disconnect IAT sensor wire harness connector.
4. Clean dirt from sensor base.
5. Pull sensor from rubber air hose.

6.4L

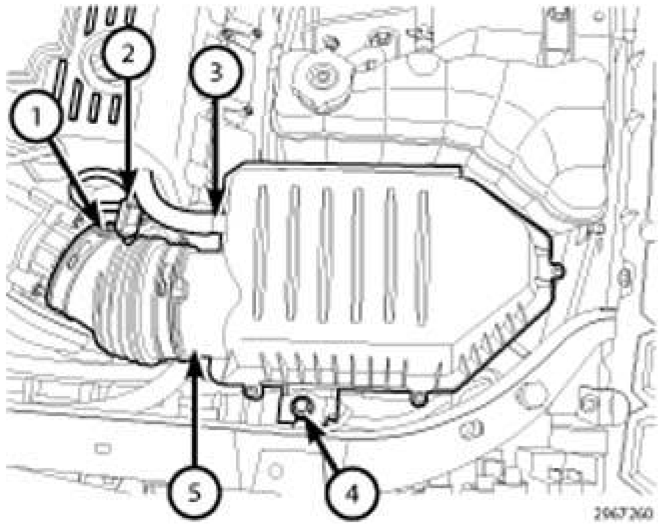


Fig. 162: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

The Inlet Air Temperature (IAT) sensor (2) is installed into the rubber air intake hose near the front of the throttle body.

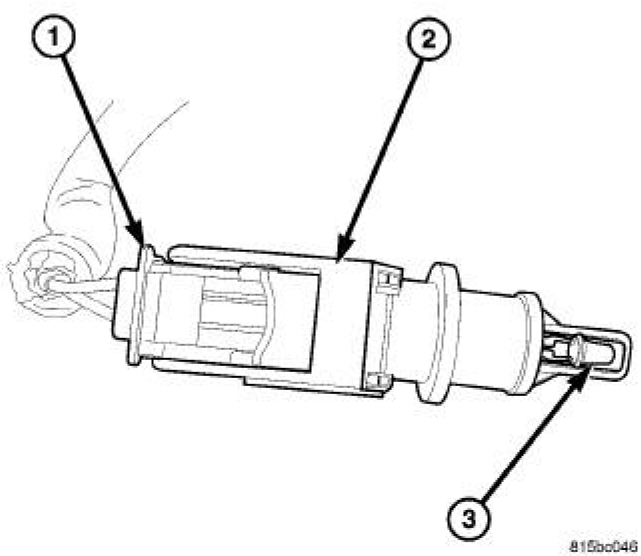


Fig. 163: IAT Sensor, Electrical Connector & Sensor Probe
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.

2. Disconnect the IAT sensor (2) wire harness connector (1).
3. Turn the IAT sensor 1/4 turn counterclockwise and remove the IAT sensor from the rubber air intake hose.
4. Inspect the sensor probe (3) for any damage.
5. Clean any dirt or debris from sensor base.

INSTALLATION

3.6L

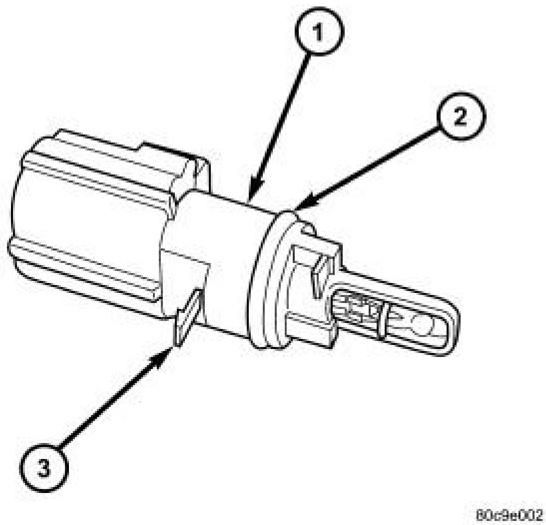


Fig. 164: IAT Sensor, O-Ring Seal & Release Tab
Courtesy of CHRYSLER GROUP, LLC

1. The Inlet Air Temperature (IAT) sensor O-ring seal (2) can be reused if not damaged.
2. Clean the IAT sensor mounting hole in the air inlet hose.
3. Install the IAT sensor into the air inlet hose and rotate clockwise until the release tab (3) engages.

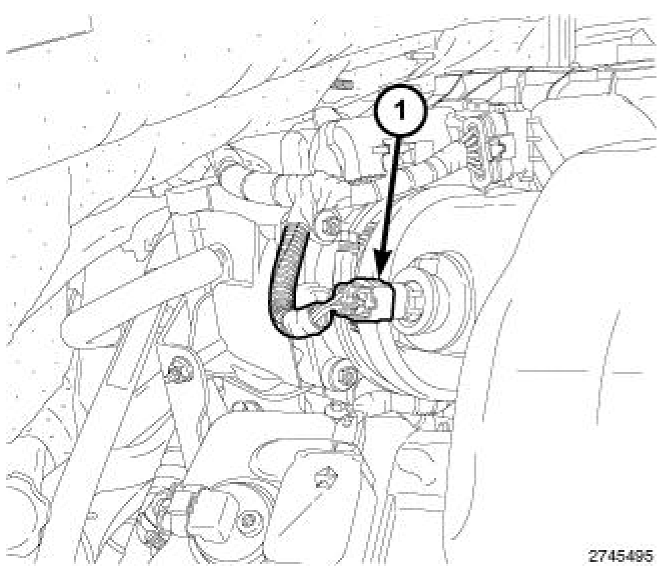


Fig. 165: Inlet Air Temperature Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

4. Install the IAT sensor wire harness connector (1).

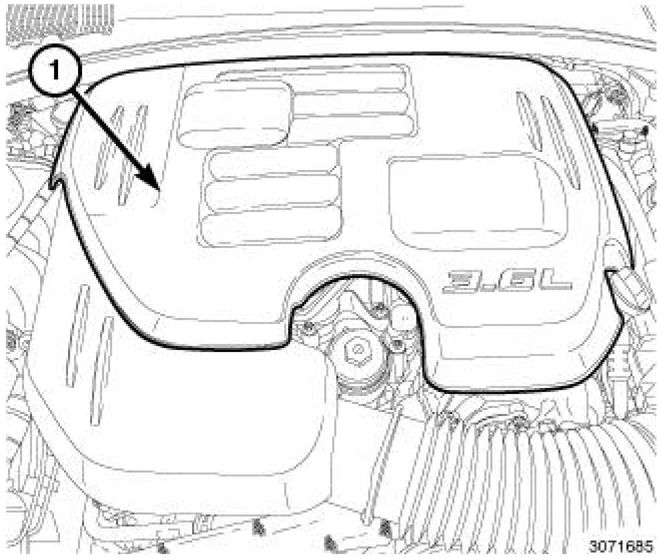


Fig. 166: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

5. Install the engine cover (1).
6. Connect the negative battery cable.

5.7L

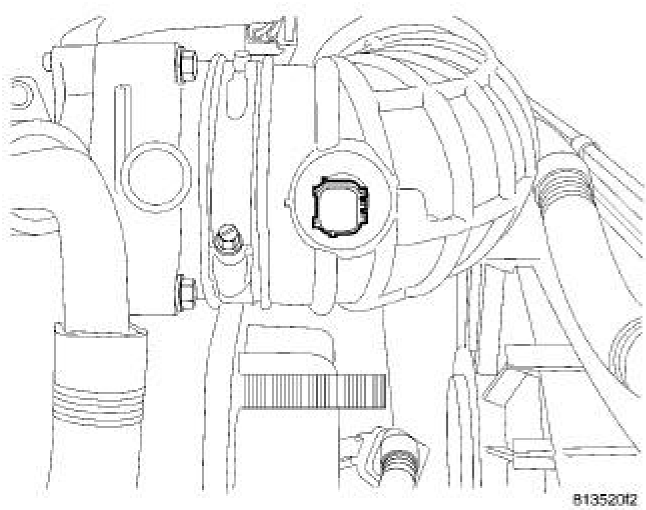
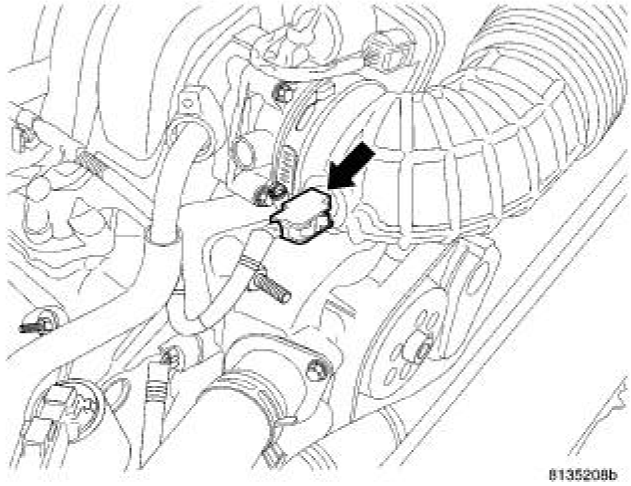


Fig. 167: Sensor Orientation
Courtesy of CHRYSLER GROUP, LLC

1. Install Inlet Air Temperature (IAT) sensor into rubber air hose.
2. Rotate sensor into position as shown. **For proper system operation, sensor must be positioned as**

shown in illustration.



[**Fig. 168: Sensor Location**]()
Courtesy of CHRYSLER GROUP, LLC

3. Connect IAT sensor wire harness connector.
4. Install the engine cover.
5. Connect the negative battery cable.

6.4L

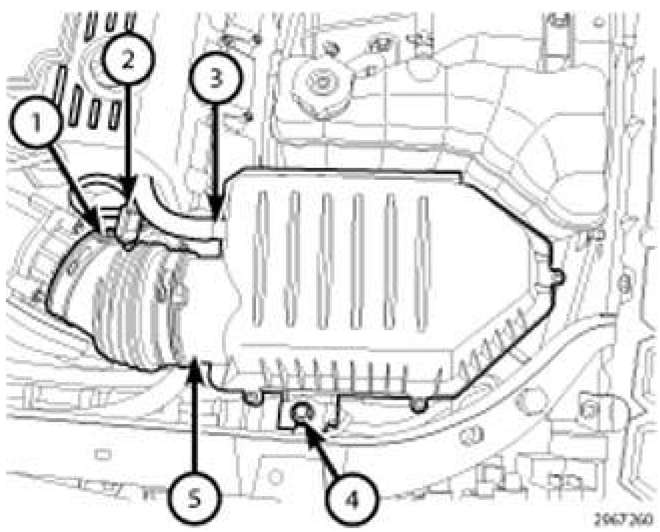


Fig. 169: Air Duct Retaining Clamp, Intake Air Temperature Sensor Electrical Connector, Makeup Air Hose, Bolt & Air Cleaner Housing
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Use care not to bend or damage the Inlet Air Temperature (IAT) sensor probe while installing.**

1. Install the IAT sensor (2) into the rubber air intake hose, turn the IAT sensor 1/4 turn clockwise and lock

into position.

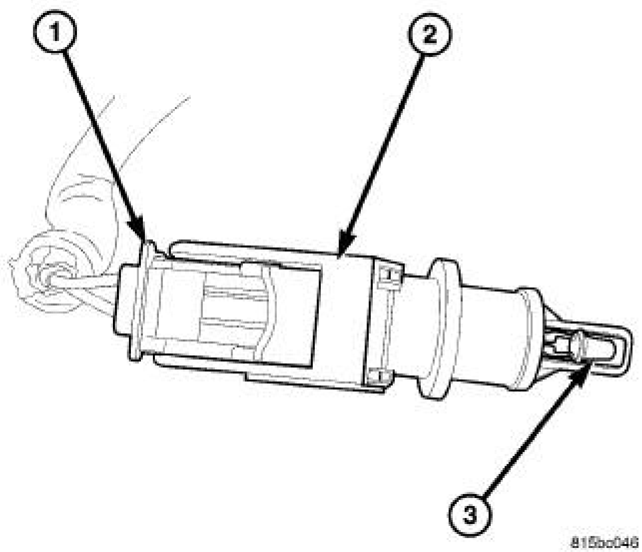


Fig. 170: IAT Sensor, Electrical Connector & Sensor Probe
Courtesy of CHRYSLER GROUP, LLC

2. Connect the IAT sensor (2) wire harness connector (1).

SENSOR, CRANKSHAFT POSITION

REMOVAL

3.6L

1. Disconnect and isolate the negative battery cable.

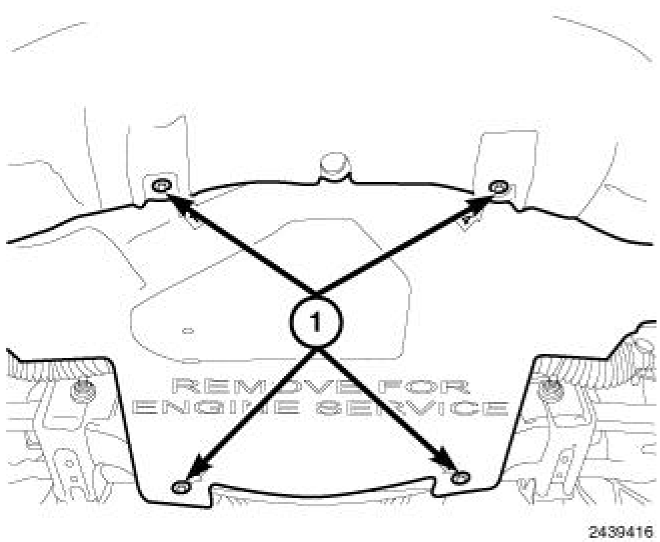


Fig. 171: Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

3. Remove bolts (1) and the belly pan.

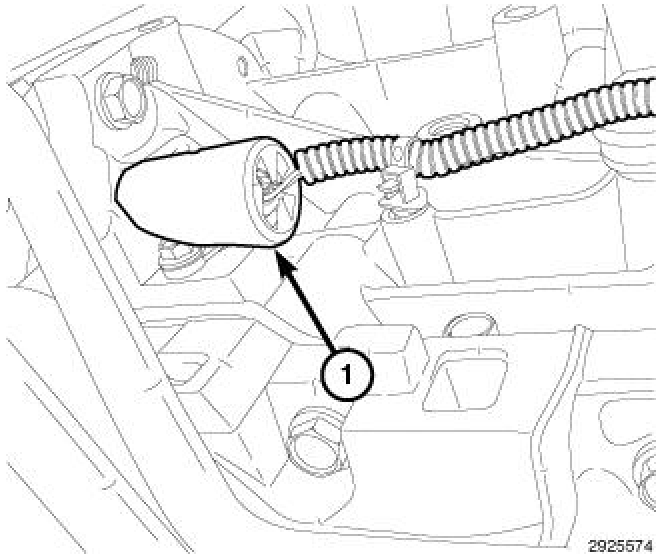


Fig. 172: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Crankshaft Position (CKP) sensor is mounted into the right rear side of the cylinder block.**

4. Push back the heat shield (1) from the crankshaft CKP sensor.

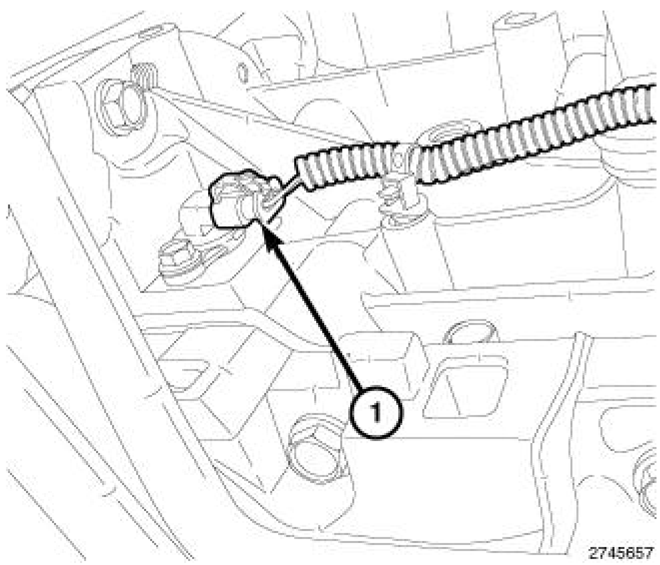


Fig. 173: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the CKP sensor wire harness connector (1).

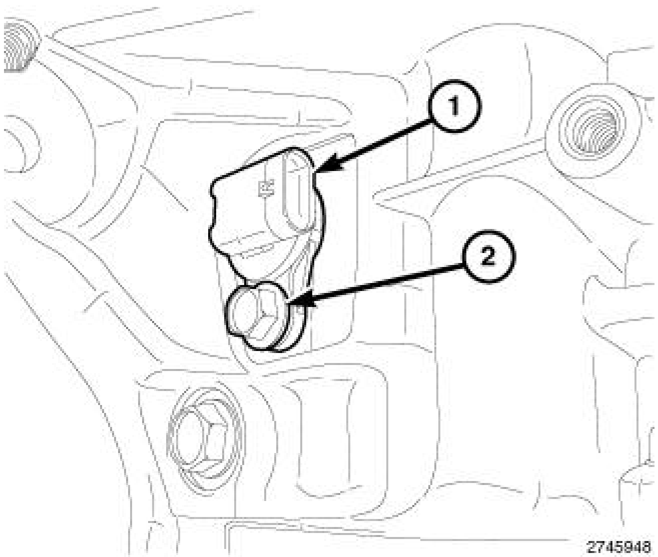


Fig. 174: CKP Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Remove bolt (2) the CKP sensor (1) from the cylinder block.

6.2L

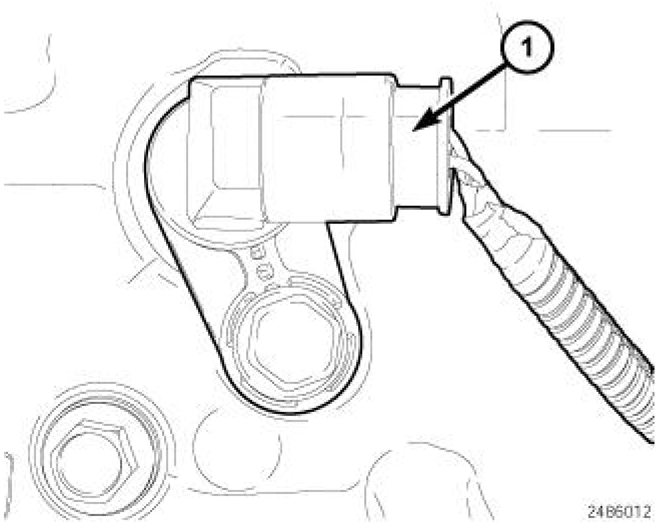
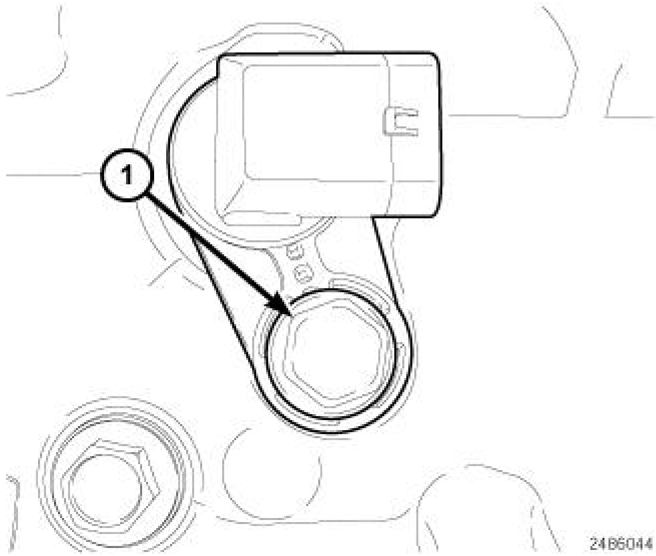


Fig. 175: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

The Crankshaft Position (CKP) sensor is located at the right-rear side of the engine block (1). It is positioned and bolted into a machined hole in the engine block.

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the starter. Refer to **STARTER, REMOVAL** .
4. Disconnect the CKP sensor wire harness connector (1).



[Fig. 176: Crankshaft Position Sensor Mounting Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

5. Remove bolt (1) and the CKP sensor from the engine block.

5.7L/6.4L

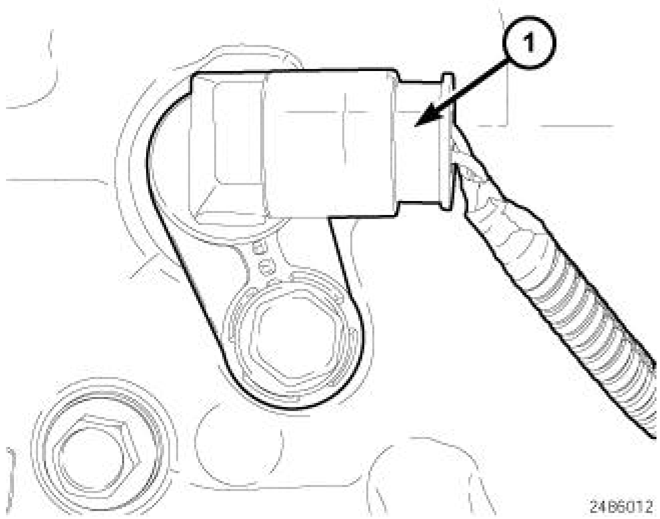


Fig. 177: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

The Crankshaft Position (CKP) sensor is located at the right-rear side of the engine block (1). It is positioned and bolted into a machined hole in the engine block.

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the starter. Refer to **STARTER, REMOVAL** .
4. Disconnect the CKP sensor wire harness connector (1).

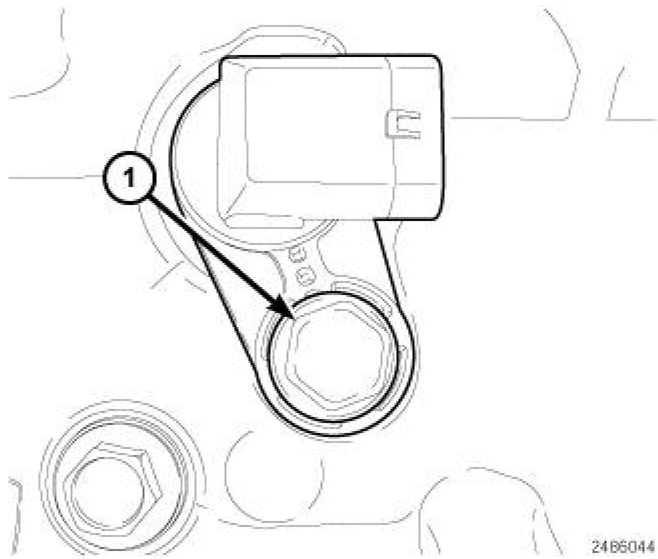


Fig. 178: Crankshaft Position Sensor Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Remove bolt (1) and the CKP sensor from the engine block.

INSTALLATION

3.6L

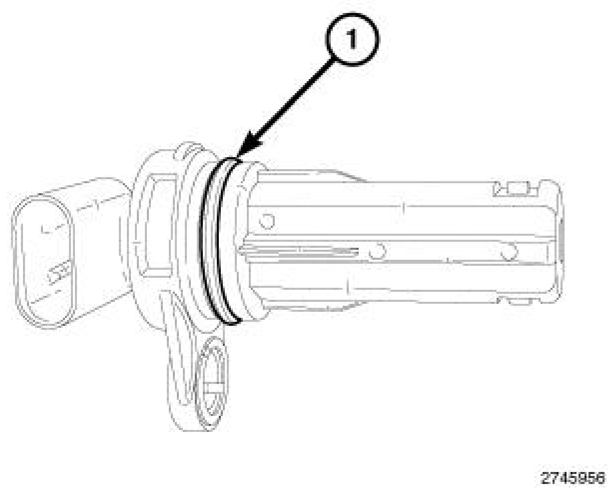
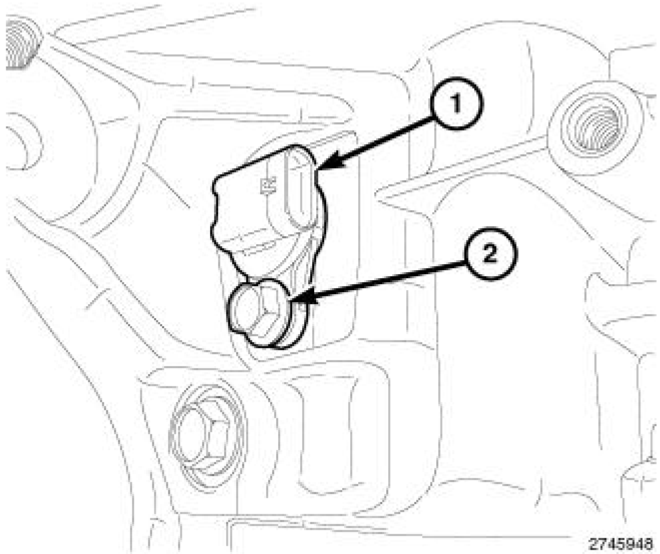


Fig. 179: CKP Sensor O-Ring
Courtesy of CHRYSLER GROUP, LLC

1. The Crankshaft Position (CKP) sensor O-ring (1) can be reused if not damaged.
2. Apply a small amount of engine oil to the CKP sensor O-ring (1).

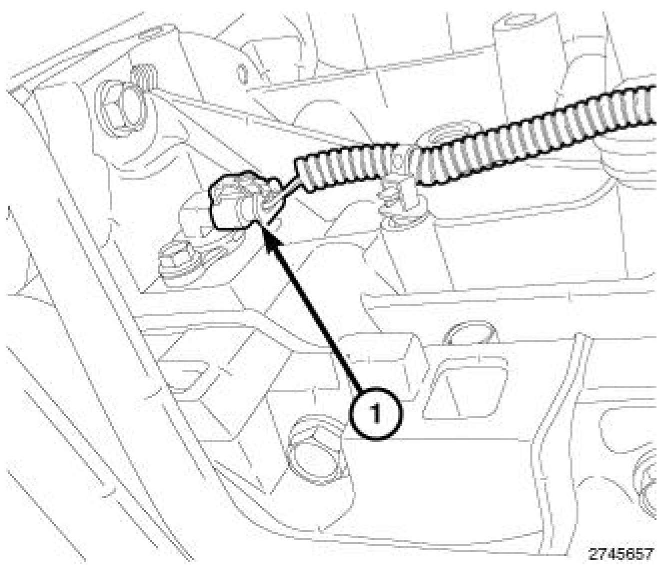


[Fig. 180: CKP Sensor & Bolt]
Courtesy of CHRYSLER GROUP, LLC

3. Clean out the CKP sensor mounting bolt hole in the engine block.

CAUTION: **Before tightening the CKP sensor mounting bolt, be sure the sensor is completely flush to the cylinder block. If the CKP sensor is not flush, damage to the sensor mounting tang may result.**

4. Install the CKP sensor (1) into the engine block. Tighten bolt (2) to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.



[Fig. 181: Crankshaft Position Sensor Electrical Connector]
Courtesy of CHRYSLER GROUP, LLC

5. Connect the CKP sensor wire harness connector (1).

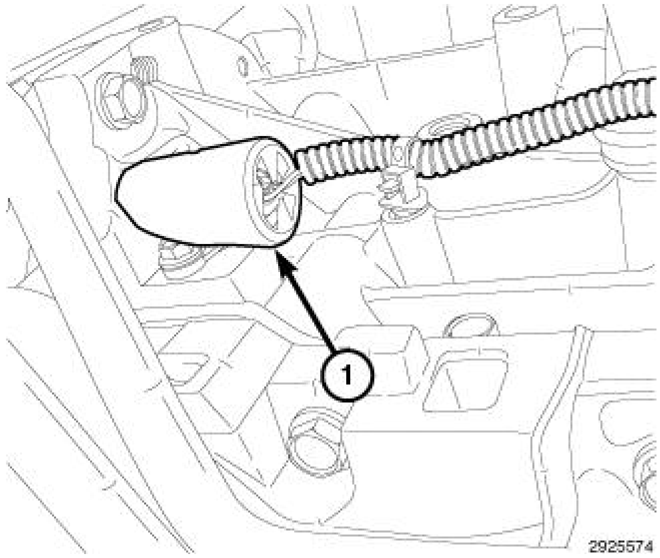


Fig. 182: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

6. Install the heat shield (1) over the CKP sensor.

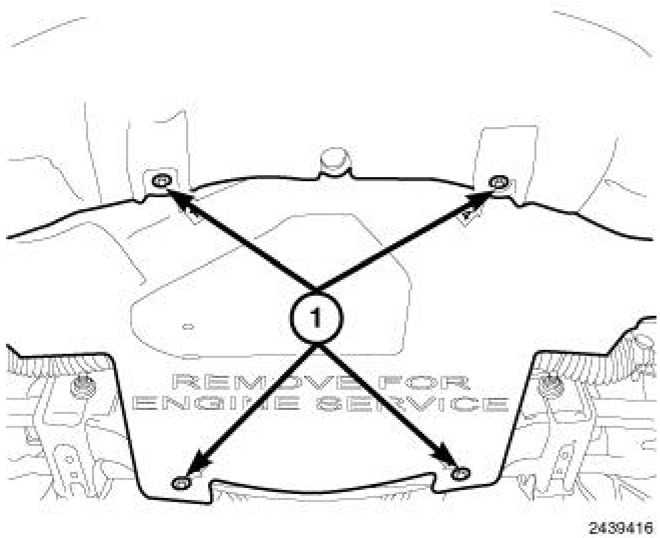


Fig. 183: Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Install the belly pan and securely tighten bolts (1).
8. Remove support and lower the vehicle.
9. Connect the negative battery cable.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

6.2L

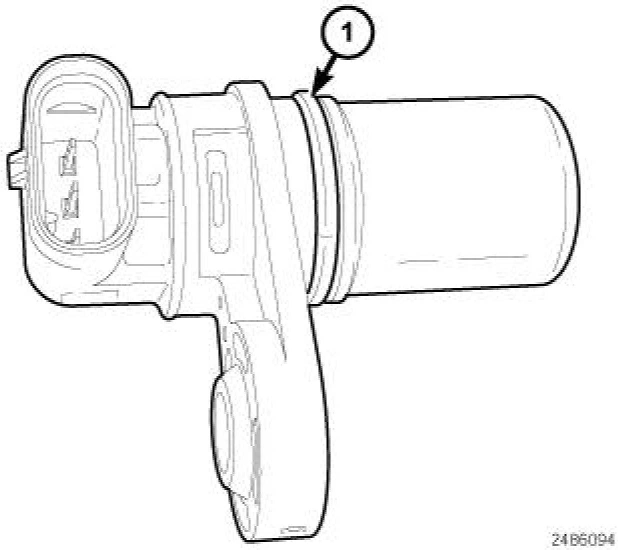


Fig. 184: Crankshaft Position Sensor O-Ring
Courtesy of CHRYSLER GROUP, LLC

1. Check the condition of the Crankshaft Position (CKP) sensor O-ring (1), and replace if necessary.
2. Clean the machined hole in the engine block.
3. Apply a small amount of engine oil to the CKP sensor O-ring (1).

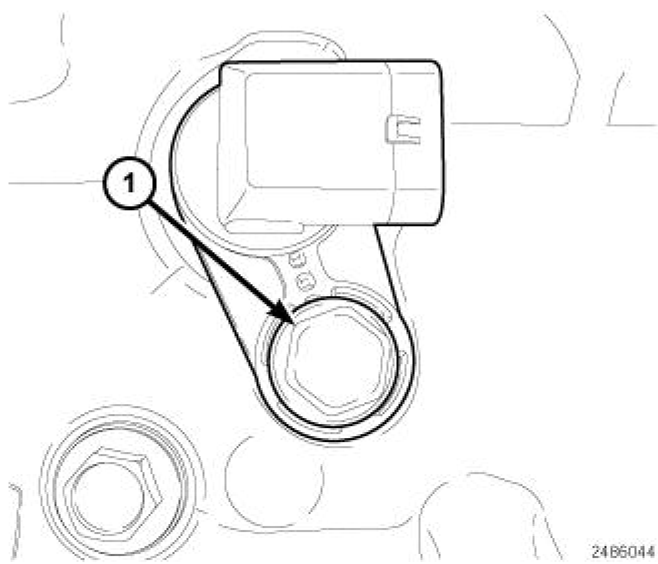


Fig. 185: Crankshaft Position Sensor Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Before tightening the CKP sensor mounting bolt (1), be sure the sensor is completely flush to the cylinder block. If sensor is not flush, damage to the sensor mounting tang may result.**

4. Install the CKP sensor into the engine block. Tighten bolt (1) to the proper torque specification. Refer to FUEL INJECTION, GAS, SPECIFICATIONS.

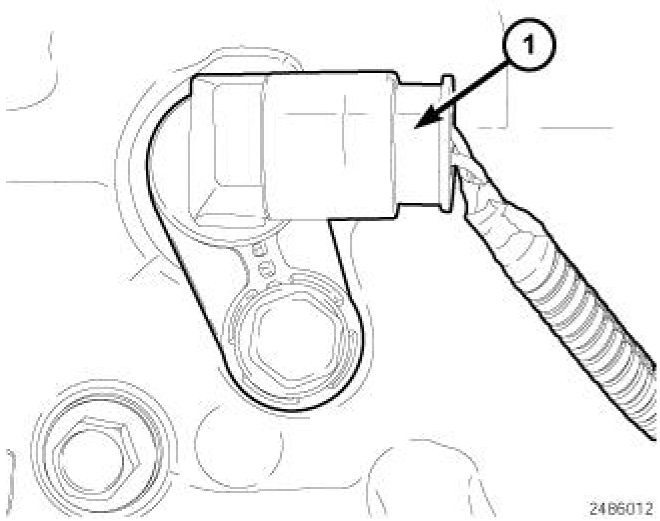


Fig. 186: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

5. Connect the CKP sensor wire harness connector (1).
6. Install the starter. Refer to **STARTER, INSTALLATION** .
7. Remove support and lower the vehicle.
8. Install the negative battery cable.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

5.7L/6.4L

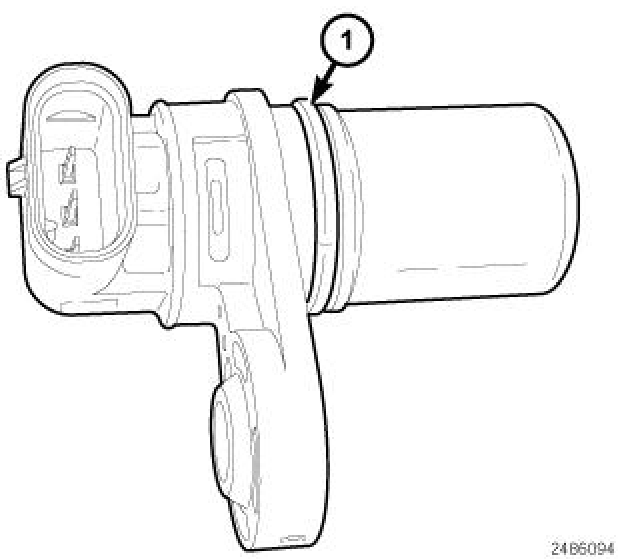


Fig. 187: Crankshaft Position Sensor O-Ring
Courtesy of CHRYSLER GROUP, LLC

1. Check the condition of the Crankshaft Position (CKP) sensor O-ring (1), and replace if necessary.

2. Clean the machined hole in the engine block.
3. Apply a small amount of engine oil to the CKP sensor O-ring (1).

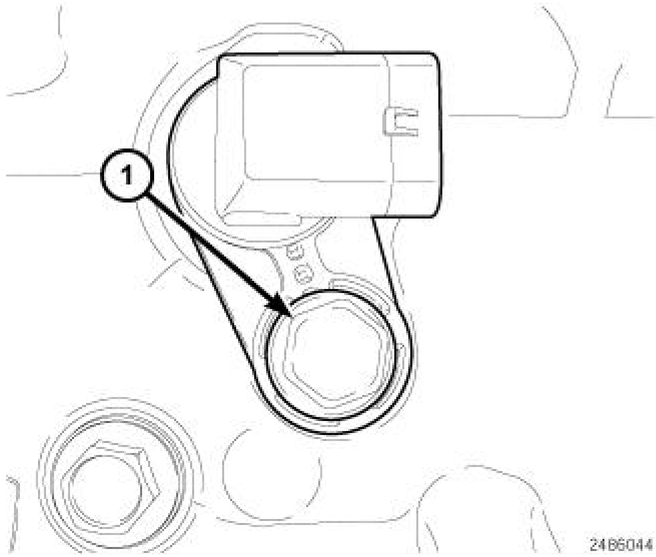


Fig. 188: Crankshaft Position Sensor Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before tightening the CKP sensor mounting bolt (1), be sure the sensor is completely flush to the cylinder block. If sensor is not flush, damage to the sensor mounting tang may result.

4. Install the CKP sensor into the engine block. Tighten bolt (1) to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.

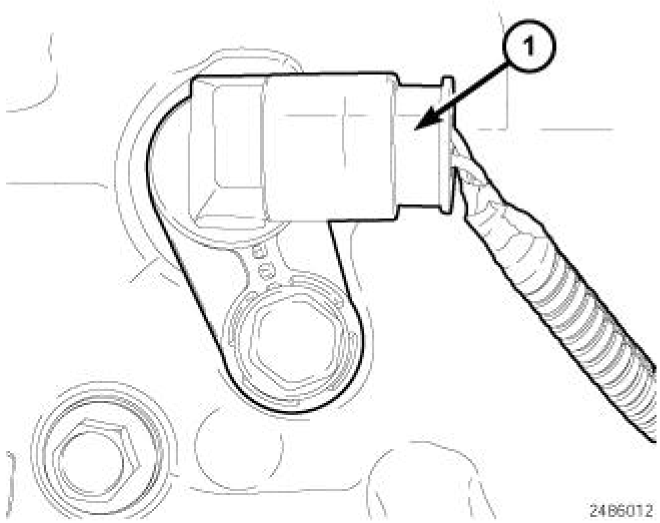


Fig. 189: Crankshaft Position Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

5. Connect the CKP sensor wire harness connector (1).
6. Install the starter. Refer to **STARTER, INSTALLATION** .

7. Remove support and lower the vehicle.
8. Install the negative battery cable.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

SENSOR, MASS AIRFLOW (MAF)

REMOVAL

6.2L

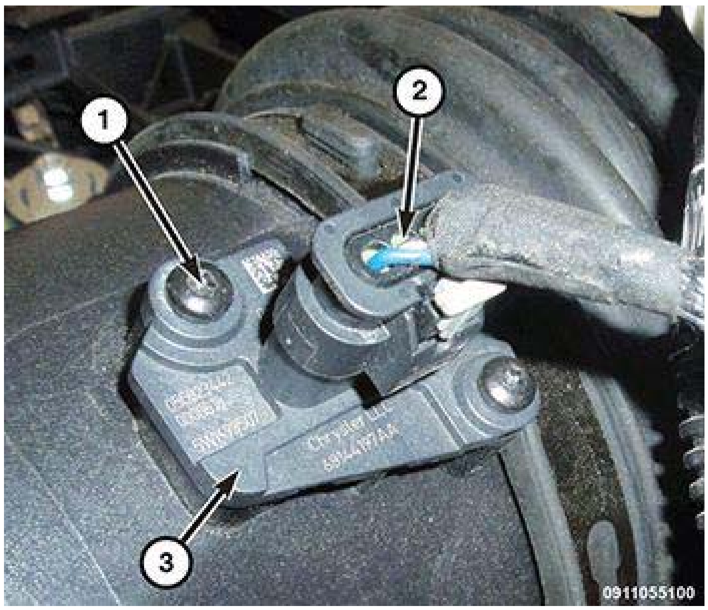
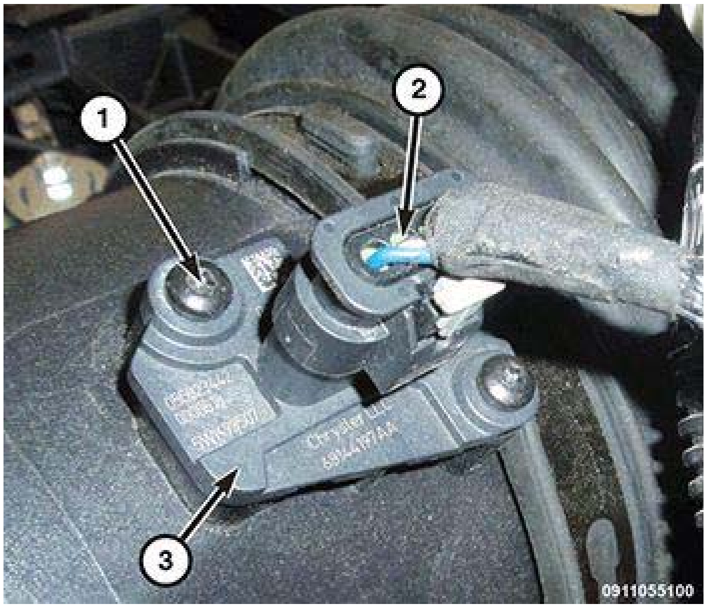


Fig. 190: MAF Sensor, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Disconnect the Mass Air Flow (MAF) sensor wire harness connector (2).
3. Remove the screws (1) and the MAF sensor (3).

INSTALLATION

6.2L



[Fig. 191: MAF Sensor, Connector & Screw]
Courtesy of CHRYSLER GROUP, LLC

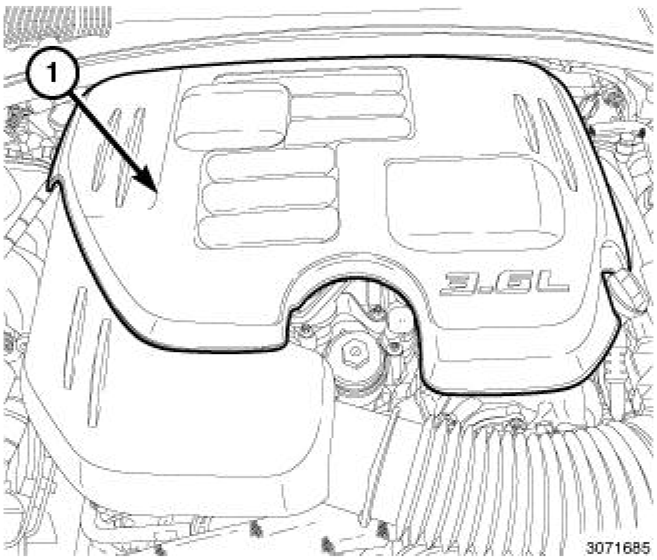
1. Install the Mass Air Flow (MAF) sensor (3) and securely tighten the screws (1).
2. Connect the MAF sensor wire harness connector (2).
3. Connect the negative battery cable.

SENSOR, MANIFOLD AIR PRESSURE (MAP)

REMOVAL

3.6L

1. Disconnect and isolate the negative battery cable.



[Fig. 192: Engine Cover]
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine cover (1).

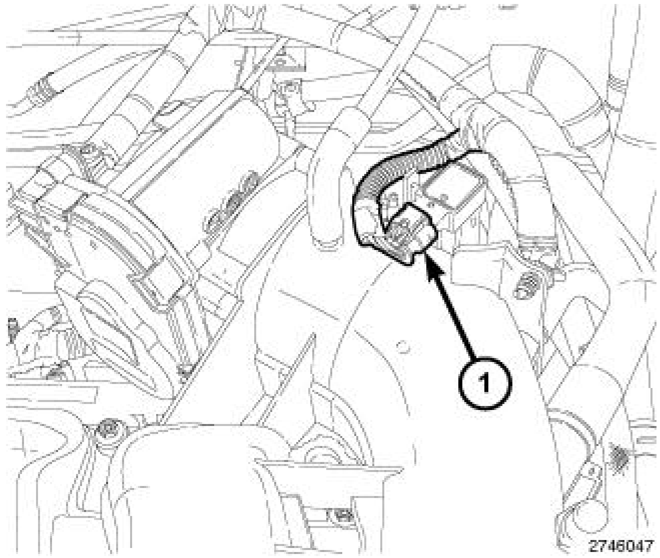


Fig. 193: MAP Sensor Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. Unlock and disconnect the MAP sensor wire harness connector (1).

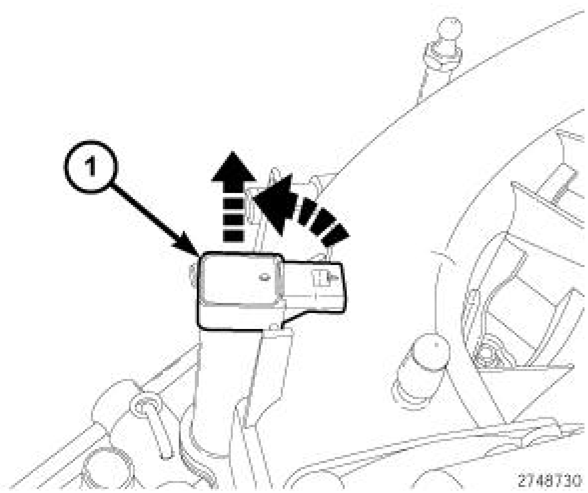


Fig. 194: Removing MAP Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Rotate the MAP sensor 1/4 turn counterclockwise and pull the sensor straight up and out of the upper intake manifold.

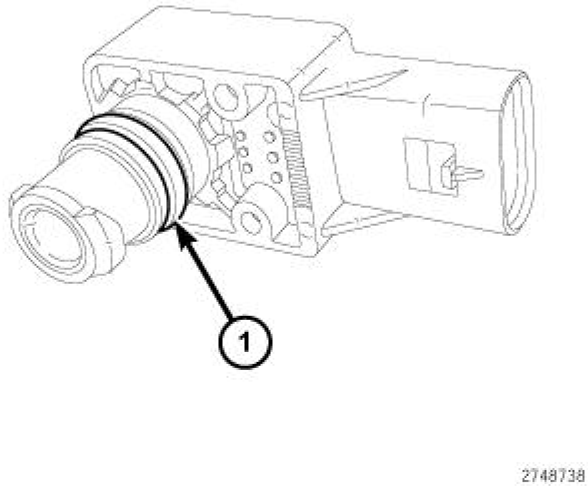


Fig. 195: O-Ring
Courtesy of CHRYSLER GROUP, LLC

5. The MAP sensor O-ring (1) can be reused if not damaged.

5.7L

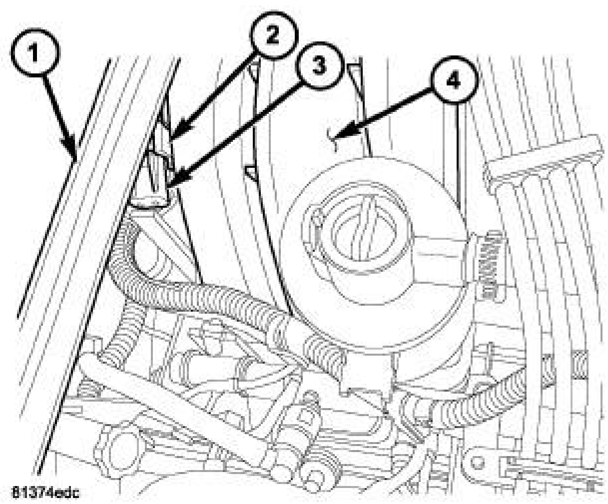
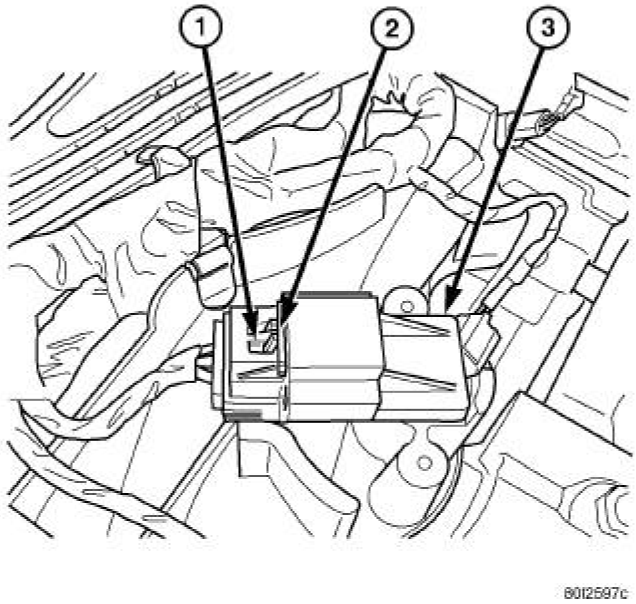


Fig. 196: Electrical Connector, Cowl/Hood Seal, Manifold Absolute Pressure (MAP) Sensor & Intake Manifold
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The Manifold Absolute Pressure (MAP) sensor (3) is mounted into the top/rear of the intake manifold (4) near the cowl/hood seal (1).**



[Fig. 197: Removing/Installing MAP Sensor](#)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Unlock and disconnect the MAP sensor wire harness connector (1).
3. Rotate the MAP sensor 1/4 turn counter-clockwise and remove.

6.4L

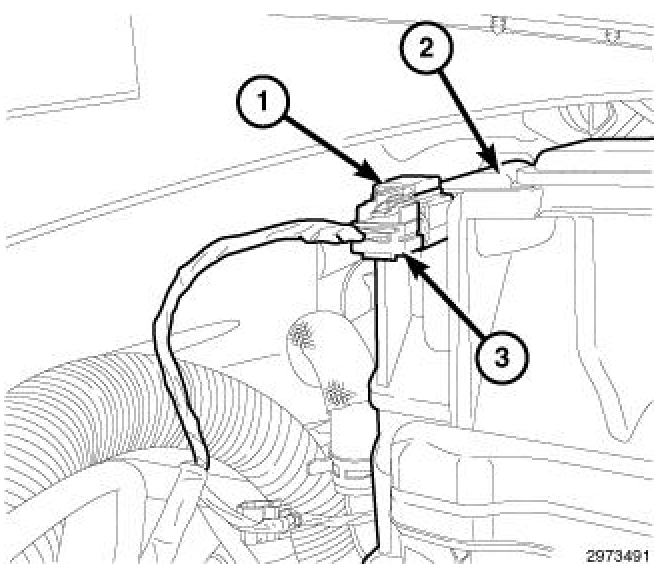


Fig. 198: Manifold Absolute Pressure (MAP) Sensor, Intake Manifold & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Manifold Absolute Pressure (MAP) sensor (1) is located at the right rear of the intake manifold (2).**

1. Disconnect the MAP sensor (1) wire harness connector (3).

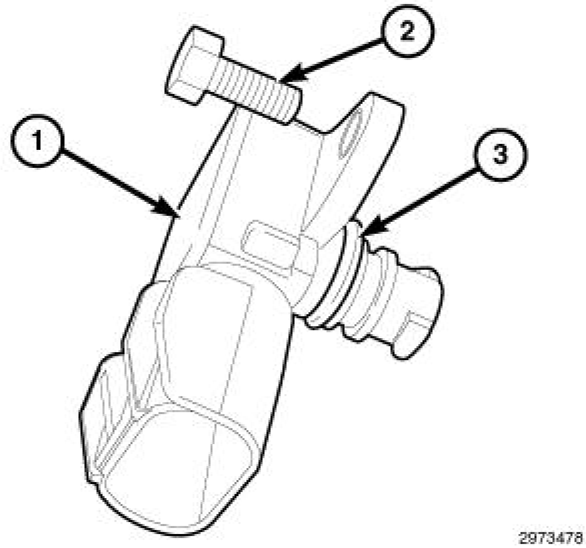


Fig. 199: MAP Sensor, Retaining Bolt & MAP Sensor O-Ring
Courtesy of CHRYSLER GROUP, LLC

2. Remove bolt (2) and the MAP sensor (1).

INSTALLATION

3.6L

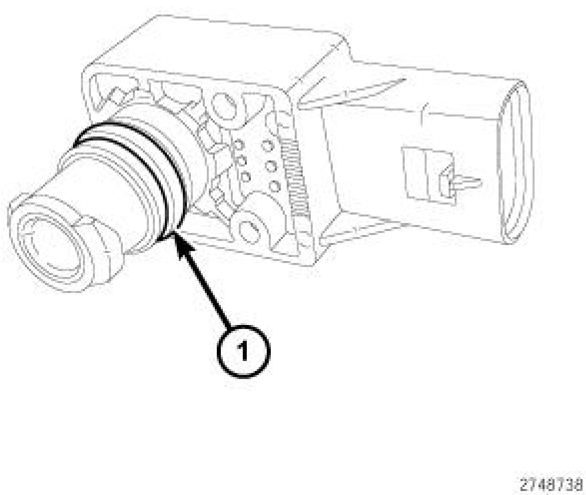
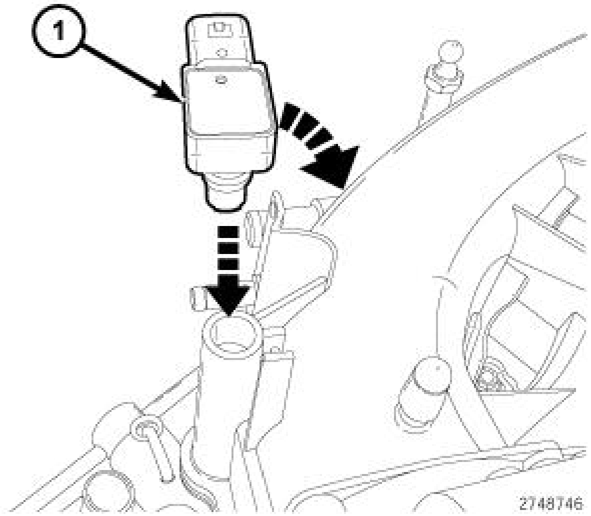


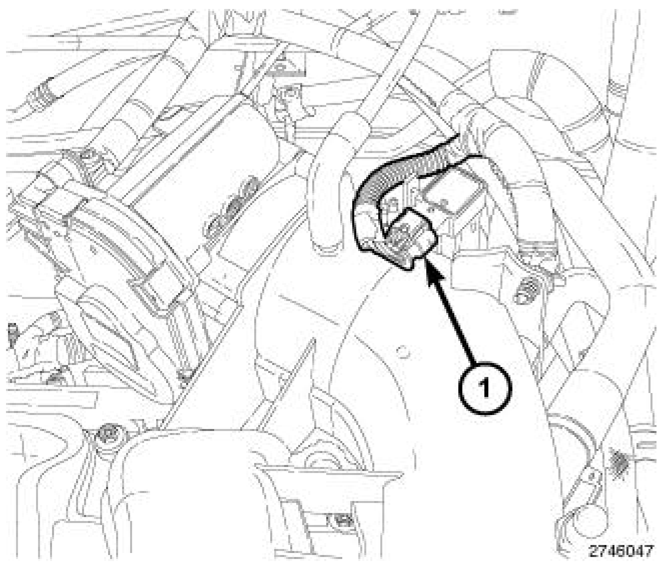
Fig. 200: O-Ring
Courtesy of CHRYSLER GROUP, LLC

1. The Manifold Air Pressure (MAP) sensor O-ring (1) can be reused if not damaged.
2. Apply a small amount of engine oil to the MAP sensor O-ring (1).



[Fig. 201: Installing MAP Sensor](#)
Courtesy of CHRYSLER GROUP, LLC

3. Install the MAP sensor (1) into the upper intake manifold and rotate 1/4 turn clockwise.



[Fig. 202: MAP Sensor Electrical Connector](#)
Courtesy of CHRYSLER GROUP, LLC

4. Connect and lock the MAP sensor wire harness connector (1).

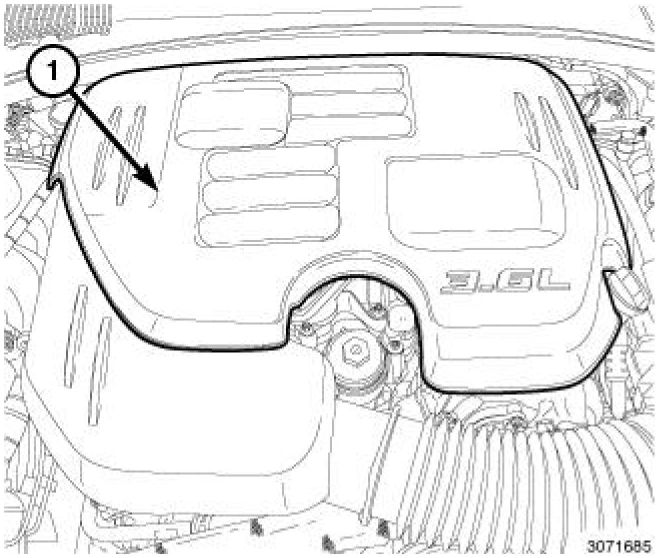


Fig. 203: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

5. Install the engine cover (1).
6. Connect the negative battery cable.

5.7L

1. Clean MAP sensor mounting hole at intake manifold.
2. Check MAP sensor O-ring seal for cuts or tears.
3. Install and rotate the MAP sensor 1/4 turn clockwise.

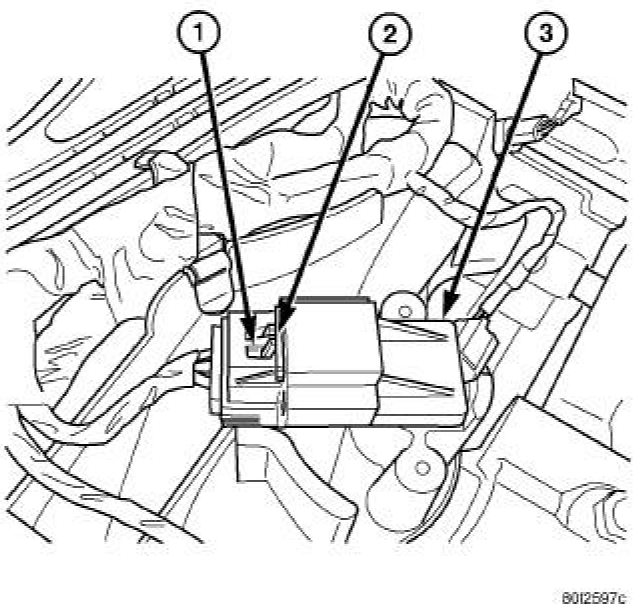


Fig. 204: Removing/Installing MAP Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Connect and lock the MAP sensor wire harness connector (1).

6.4L

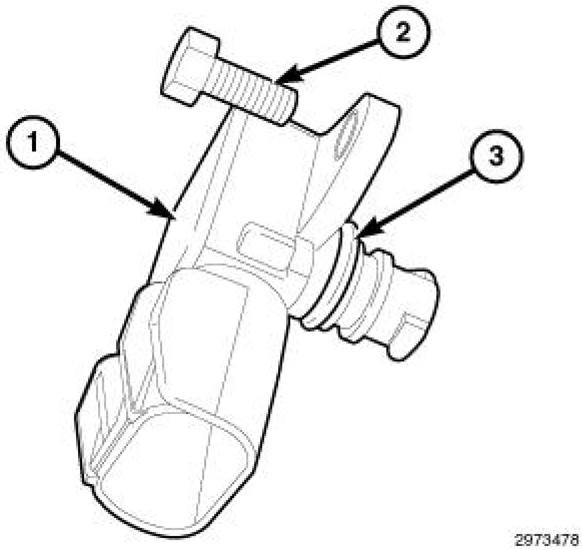


Fig. 205: MAP Sensor, Retaining Bolt & MAP Sensor O-Ring
Courtesy of CHRYSLER GROUP, LLC

1. Clean the Manifold Absolute Pressure (MAP) sensor mounting hole at rear of intake manifold.
2. Check the condition of the MAP sensor O-ring seal (3) and replace if necessary.
3. Install the MAP sensor (1) and securely tighten bolt (2).

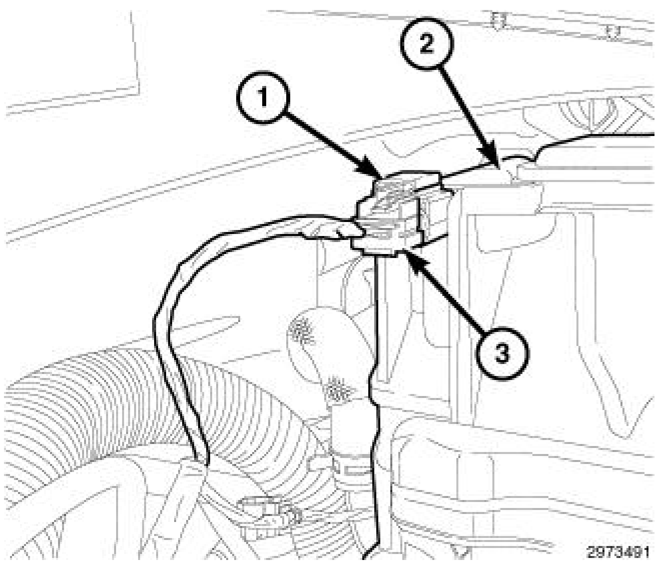


Fig. 206: Manifold Absolute Pressure (MAP) Sensor, Intake Manifold & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

4. Connect the MAP sensor (1) wire harness connector (3).

SENSOR, OXYGEN

DESCRIPTION

DESCRIPTION

3.6L

The engine is equipped with four heated oxygen sensors:

- The right upstream oxygen sensor is referred to as the 1/1 sensor.
- The right downstream oxygen sensor is referred to as the 1/2 sensor.
- The left upstream oxygen sensor is referred to as the 2/1 sensor.
- The left downstream oxygen sensor is referred to as the 2/2 sensor.

5.7L/6.2L/6.4L

The engine is equipped with four heated oxygen sensors:

- The left upstream oxygen sensor is referred to as the 1/1 sensor.
- The left downstream oxygen sensor is referred to as the 1/2 sensor.
- The right upstream oxygen sensor is referred to as the 2/1 sensor.
- The right downstream oxygen sensor is referred to as the 2/2 sensor.

REMOVAL

3.6L

UPSTREAM

WARNING: The exhaust pipes and catalytic converter become very hot during engine operation. Allow the engine to cool before removing the oxygen sensor.

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

   CAUTION: When disconnecting the oxygen sensor electrical connector, do not pull directly on the wire going into the sensor. The sensor wiring can be damaged resulting in sensor failure.

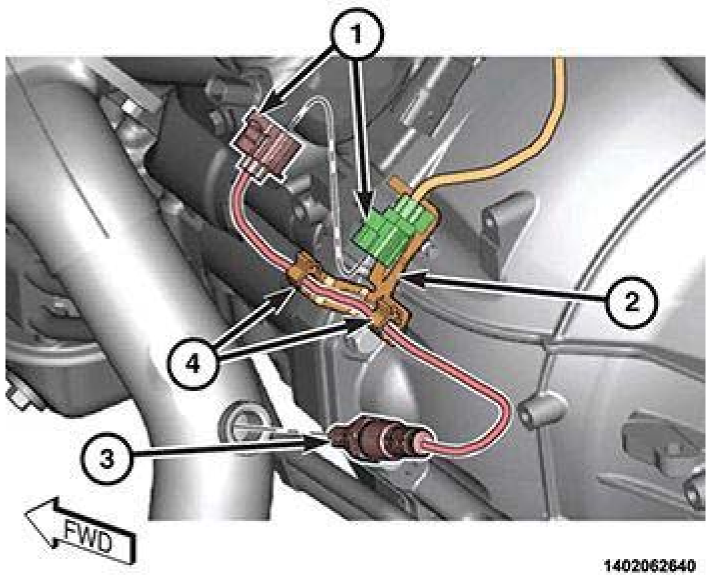


Fig. 207: Oxygen Sensor Wire Harness Connector, Retainer, Oxygen Sensor & Oxygen Sensor Wire Harness
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oxygen sensor wire harness connector (1).
4. Disengage the oxygen sensor wire harness (4) from the retainer (2).
5. Remove the oxygen sensor (3).
6. Clean the exhaust pipe threads using an appropriate tap.

DOWNSTREAM

WARNING: The exhaust pipes and catalytic converter become very hot during engine operation. Allow the engine to cool before removing the oxygen sensor.

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

CAUTION: When disconnecting the oxygen sensor electrical connector, do not pull directly on the wire going into the sensor. The sensor wiring can be damaged resulting in sensor failure.

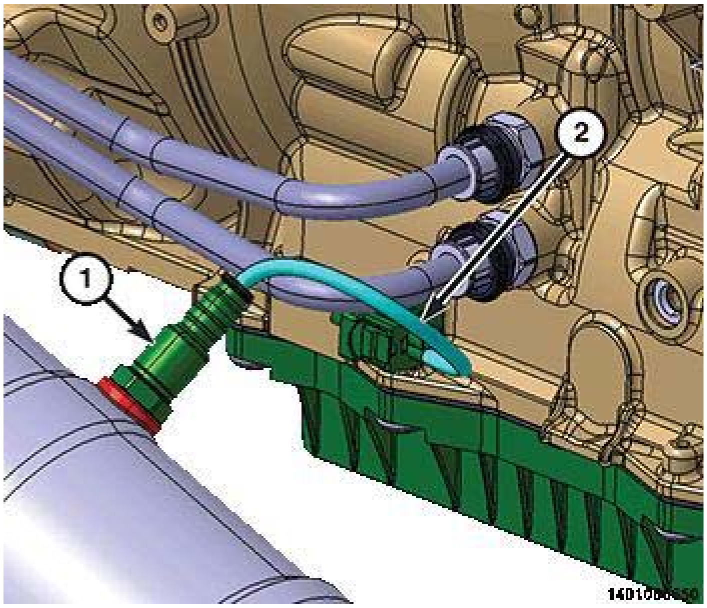


Fig. 208: Oxygen Sensor & Oxygen Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oxygen sensor wire harness connector (2).
4. Remove the oxygen sensor (1).
5. Clean the exhaust pipe threads using an appropriate tap.

5.7L

UPSTREAM

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

WARNING: **The exhaust pipes and catalytic converter become very hot during engine operation. Allow the engine to cool before removing the oxygen sensor.**

CAUTION: **When disconnecting the oxygen sensor electrical connector, do not pull directly on the wire going into the sensor. The sensor wiring can be damaged resulting in sensor failure.**

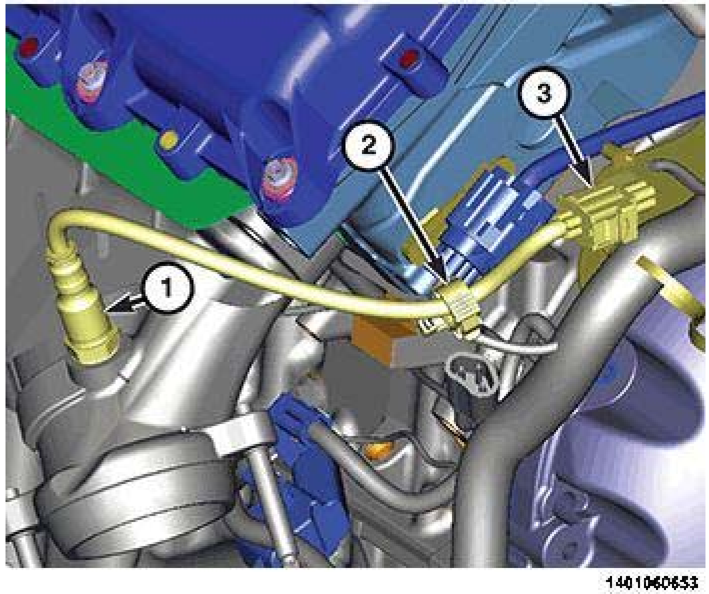


Fig. 209: Oxygen Sensor, Retainer & Oxygen Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oxygen sensor wire harness connector (3).
4. Disengage the oxygen sensor wire harness from the retainer (2).
5. Remove the oxygen sensor (1).
6. Clean the threads in the exhaust pipe using an appropriate tap.

DOWNSTREAM

1. Disconnect and Isolate the negative battery cable
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

CAUTION: **When disconnecting the oxygen sensor electrical connector, do not pull directly on the wire going into the sensor. The sensor wiring can be damaged resulting in sensor failure.**

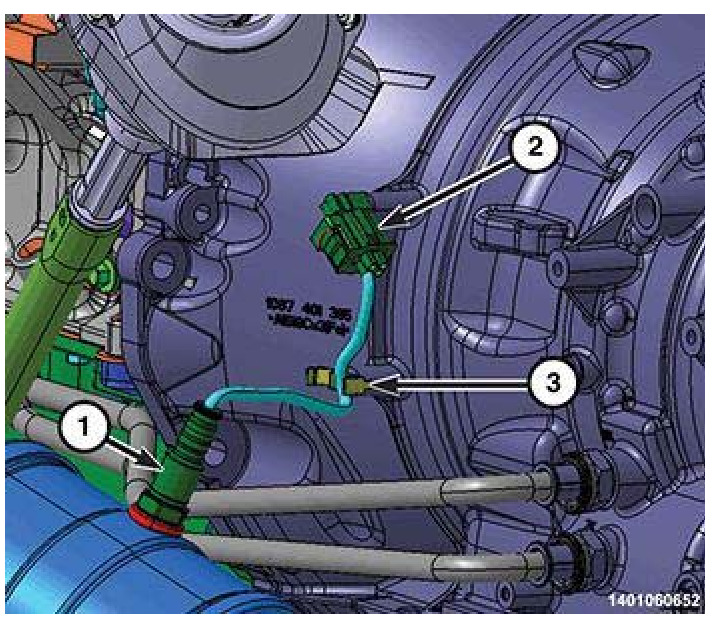


Fig. 210: Oxygen Sensor, Oxygen Sensor Wire Harness Connector & Retainer
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oxygen sensor wire harness connector (2).
4. Disengage the wire harness from the retainer (3).
5. Remove the oxygen sensor (1).
6. Clean the threads in the catalytic converters using an appropriate tap.

6.2L

UPSTREAM

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

WARNING: **The exhaust pipes and catalytic converter become very hot during engine operation. Allow the engine to cool before removing the oxygen sensor.**

CAUTION: **When disconnecting the oxygen sensor electrical connector, do not pull directly on the wire going into the sensor. The sensor wiring can be damaged resulting in sensor failure.**

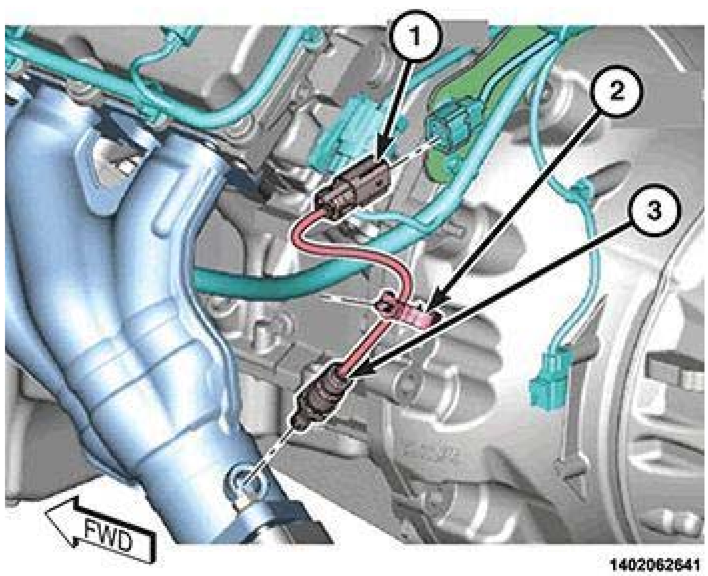


Fig. 211: Oxygen Sensor, Retainer & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oxygen sensor wire harness connector (1) and remove the harness from the retainer (2).
4. Remove the oxygen sensor (3) from the exhaust manifold.
5. Clean the threads in the exhaust pipes using an appropriate tap.

DOWNSTREAM

1. Disconnect and Isolate the negative battery cable

2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

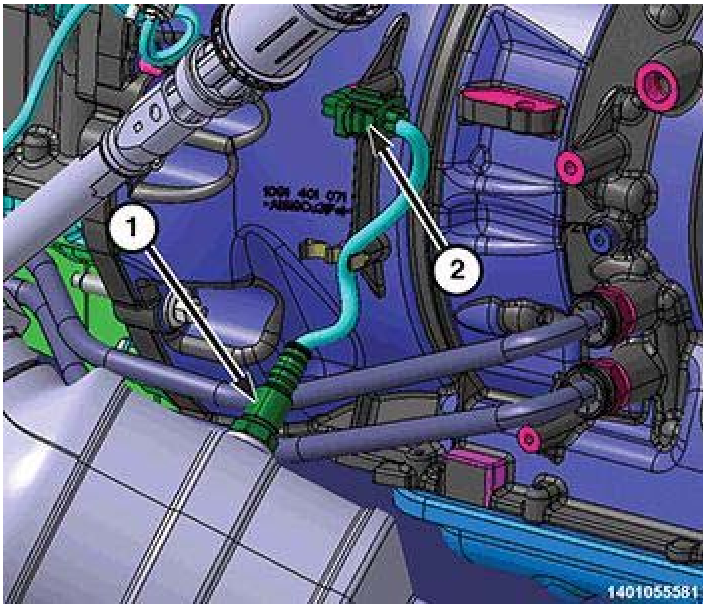


Fig. 212: Removing/Installing Oxygen Sensor
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oxygen sensor wire harness connector (2).

CAUTION: **When disconnecting the oxygen sensor electrical connector, do not pull directly on the wire going into the sensor. The sensor wiring can be damaged resulting in sensor failure.**

4. Remove the wire harness from the retainer.
5. Remove the oxygen sensor (1).
6. Clean the threads in the catalytic converters using an appropriate tap.

6.4L

UPSTREAM

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

WARNING: **The exhaust pipes and catalytic converter become very hot during engine operation. Allow the engine to cool before removing the oxygen sensor.**

CAUTION: **When disconnecting the oxygen sensor electrical connector, do not pull directly on the wire going into the sensor. The sensor wiring can be damaged resulting in sensor failure.**

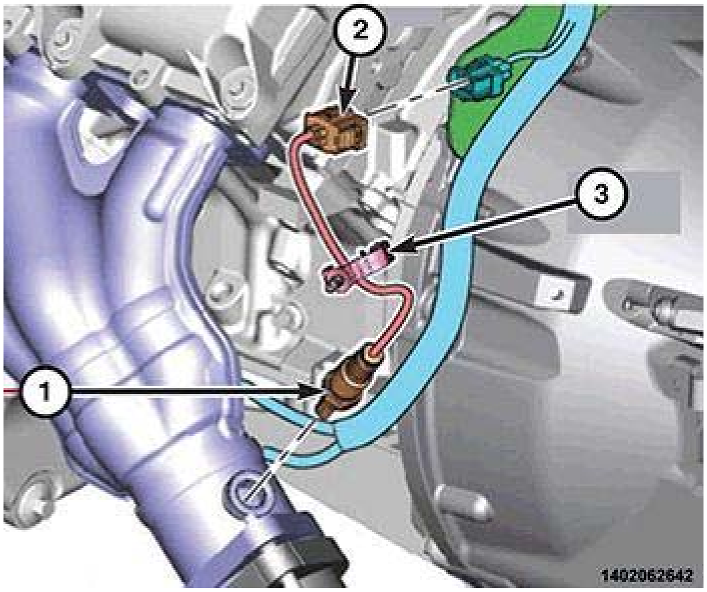


Fig. 213: Oxygen Sensor & Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oxygen sensor wire harness connector (2) and remove the harness from the retainer (3).
4. Remove the oxygen sensor (1) from the exhaust manifold.
5. Clean the threads in the exhaust pipes using an appropriate tap.

DOWNSTREAM

1. Disconnect and Isolate the negative battery cable
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

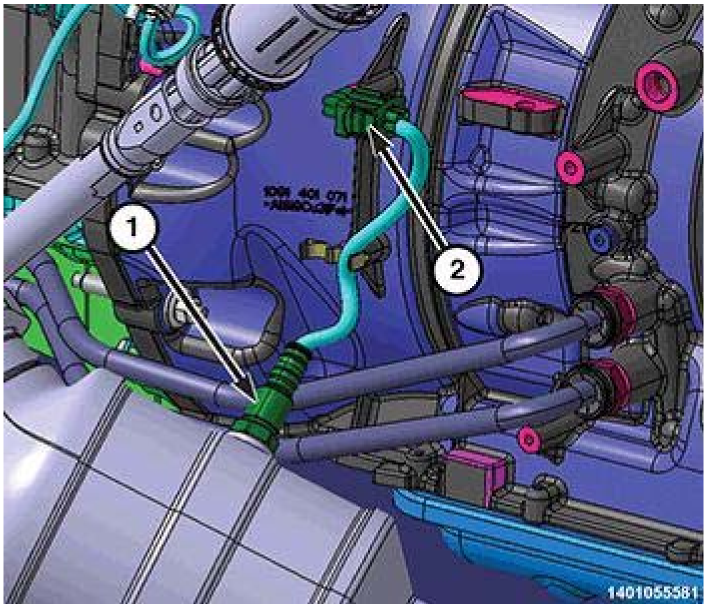


Fig. 214: Removing/Installing Oxygen Sensor
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oxygen sensor wire harness connector (2).

CAUTION: When disconnecting the oxygen sensor electrical connector, do not pull directly on the wire going into the sensor. The sensor wiring can be damaged resulting in sensor failure.

4. Remove the wire harness from the retainer.
5. Remove the oxygen sensor (1).
6. Clean the threads in the catalytic converters using an appropriate tap.

INSTALLATION

3.6L

UPSTREAM

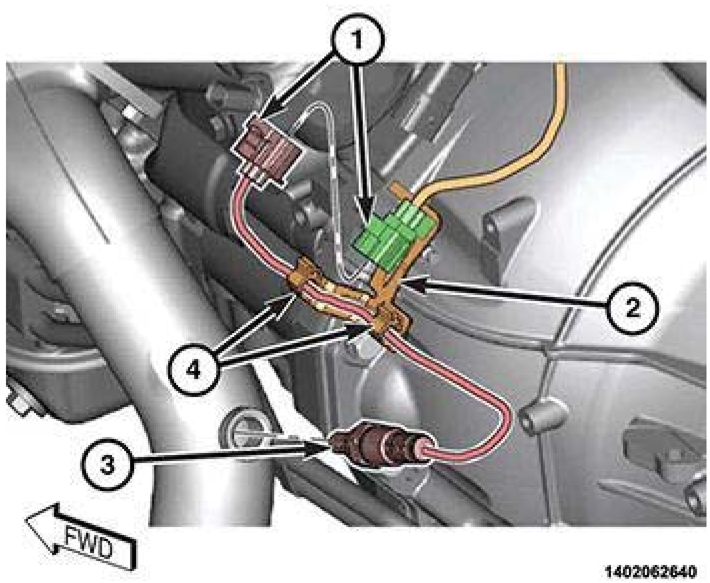


Fig. 215: Oxygen Sensor Wire Harness Connector, Retainer, Oxygen Sensor & Oxygen Sensor Wire Harness
Courtesy of CHRYSLER GROUP, LLC

1. If reinstalling the original oxygen sensor, coat the sensor threads with an anti-seize compound such as Loctite 771- 64 or equivalent. New sensors have compound on the threads and do not require an additional coating. **Do Not add any additional anti-seize compound to the threads of a new oxygen sensor.**
2. Install the oxygen sensor (3) and tighten to the proper torque specification. Refer to FUEL INJECTION, GAS, SPECIFICATIONS.

CAUTION: Never apply any type of grease to the oxygen sensor electrical connector, or attempt any repair of the sensor wiring harness.

3. Connect the oxygen sensor wire harness connector (1).
4. Position the oxygen sensor wire harness (4) into the retainer (2) and engage the retainer.
5. Remove support and lower the vehicle.
6. Connect the negative battery cable.

DOWNSTREAM

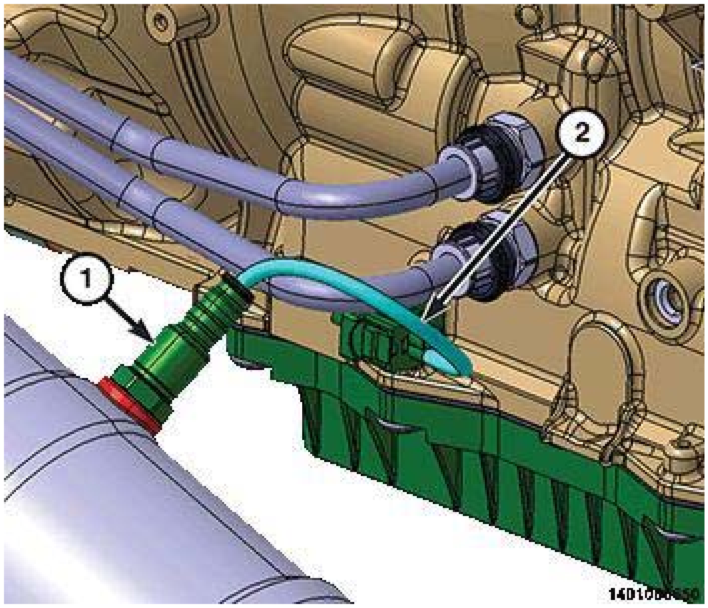


Fig. 216: Oxygen Sensor & Oxygen Sensor Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. If reinstalling the original oxygen sensor, coat the sensor threads with an anti-seize compound such as Loctite 771- 64 or equivalent. New sensors have compound on the threads and do not require an additional coating. **Do Not add any additional anti-seize compound to the threads of a new oxygen sensor.**
2. Install the oxygen sensor (1) and tighten to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.

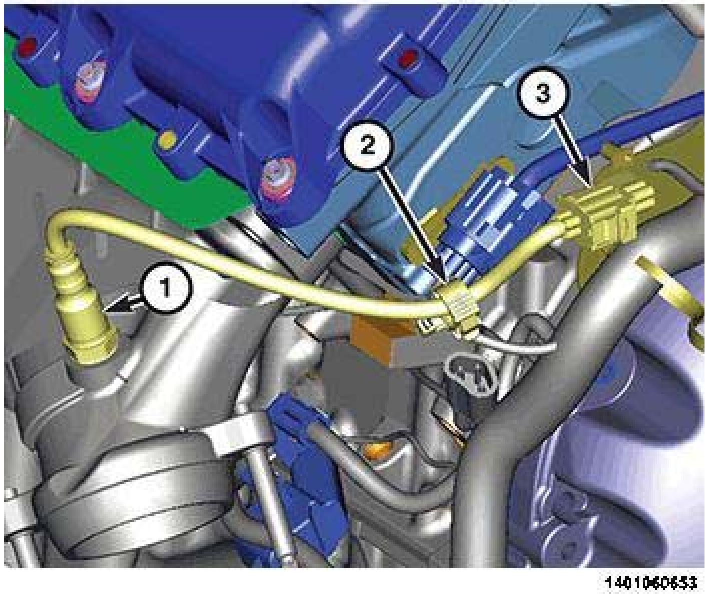
CAUTION: Never apply any type of grease to the oxygen sensor electrical connector, or attempt any repair of the sensor wiring harness.

3. Connect the oxygen sensor wire harness connector (2).
4. Remove support and lower the vehicle.
5. Connect the negative battery cable.

5.7L

UPSTREAM

Threads of new oxygen sensors are factory coated with anti-seize compound to aid in removal. **Do not add any additional anti-seize compound to threads of a new oxygen sensor.**



[Fig. 217: Oxygen Sensor, Retainer & Oxygen Sensor Wire Harness Connector](#)
Courtesy of CHRYSLER GROUP, LLC

1. Install the oxygen sensor (1) and tighten to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
2. Position the oxygen sensor wire harness into the retainer and engage the retainer.
3. Connect the oxygen sensor wire harness connector.
4. Remove support and lower the vehicle.
5. Connect the negative battery cable.

DOWNSTREAM

Threads of new oxygen sensors are factory coated with anti-seize compound to aid in removal. **Do not add any additional anti-seize compound to threads of a new oxygen sensor.**

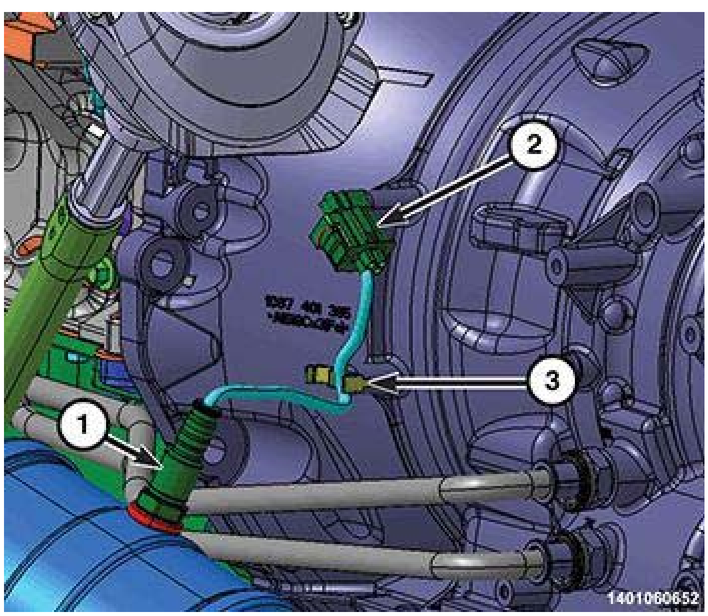


Fig. 218: Oxygen Sensor, Oxygen Sensor Wire Harness Connector & Retainer

Courtesy of CHRYSLER GROUP, LLC

1. Install the oxygen sensor (1) and tighten to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
2. Connect the oxygen sensor wire harness connector (2).
3. Position the wire harness into the retainer (3) and engage the retainer.
4. Remove support and lower the vehicle.
5. Connect the negative battery cable.

6.2L

UPSTREAM

The threads of the new oxygen sensors are factory coated with anti-seize compound to aid in removal. **Do not add any additional anti-seize compound to threads of a new oxygen sensor.**

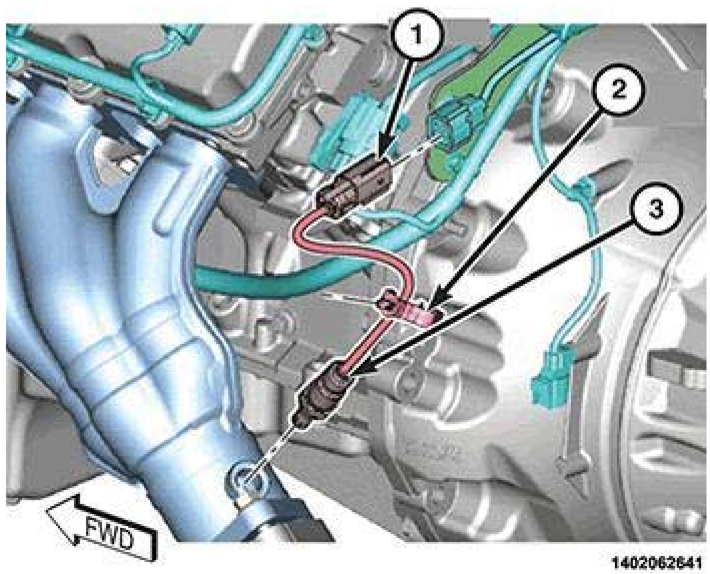


Fig. 219: Oxygen Sensor, Wire Harness Connector & Retainer
Courtesy of CHRYSLER GROUP, LLC

1. Install the oxygen sensor (3) into the exhaust manifold and tighten to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
2. Connect the oxygen sensor wire harness connector (1) and secure the wire harness in the retainer (2).
3. Remove support and lower the vehicle.
4. Connect the negative battery cable.

DOWNSTREAM

The threads of the new oxygen sensors are factory coated with anti-seize compound to aid in removal. **Do not add any additional anti-seize compound to threads of a new oxygen sensor.**

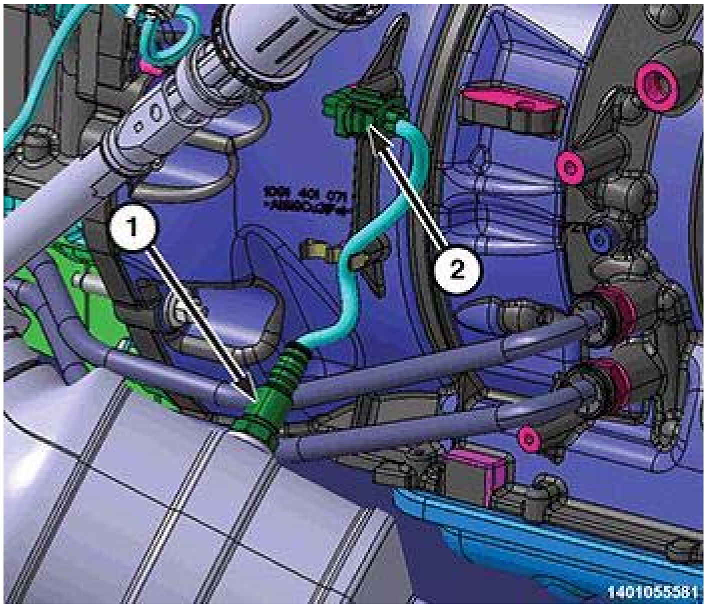


Fig. 220: Removing/Installing Oxygen Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Install the oxygen sensor (1) and tighten to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
2. Connect the oxygen sensors wire harness connector (2) and secure the wire harness in the retainer.
3. Remove support and lower the vehicle.
4. Connect the negative battery cable.

6.4L

UPSTREAM

The threads of the new oxygen sensors are factory coated with anti-seize compound to aid in removal. **Do not add any additional anti-seize compound to threads of a new oxygen sensor.**

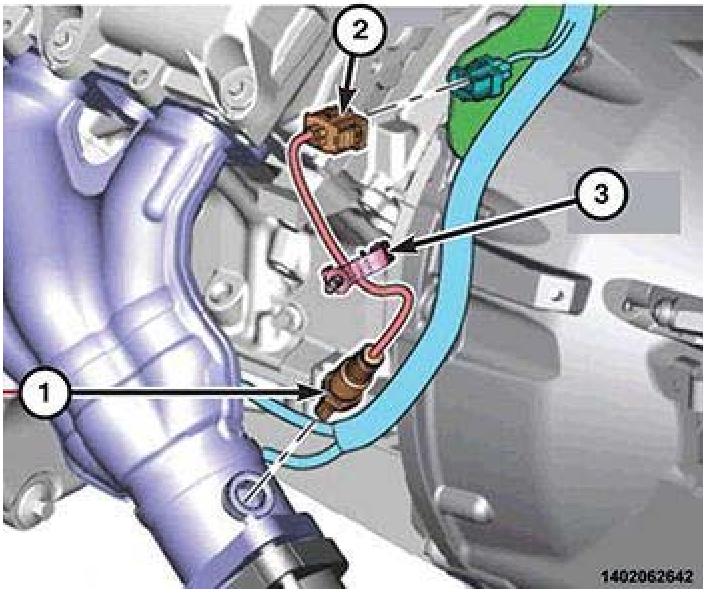


Fig. 221: Oxygen Sensor & Connector

Courtesy of CHRYSLER GROUP, LLC

1. Install the oxygen sensor (1) into the exhaust manifold and tighten to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
2. Connect the oxygen sensor wire harness connector (2) and secure the wire harness in the retainer (3).
3. Remove support and lower the vehicle.
4. Connect the negative battery cable.

DOWNSTREAM

The threads of the new oxygen sensors are factory coated with anti-seize compound to aid in removal. **Do not add any additional anti-seize compound to threads of a new oxygen sensor.**

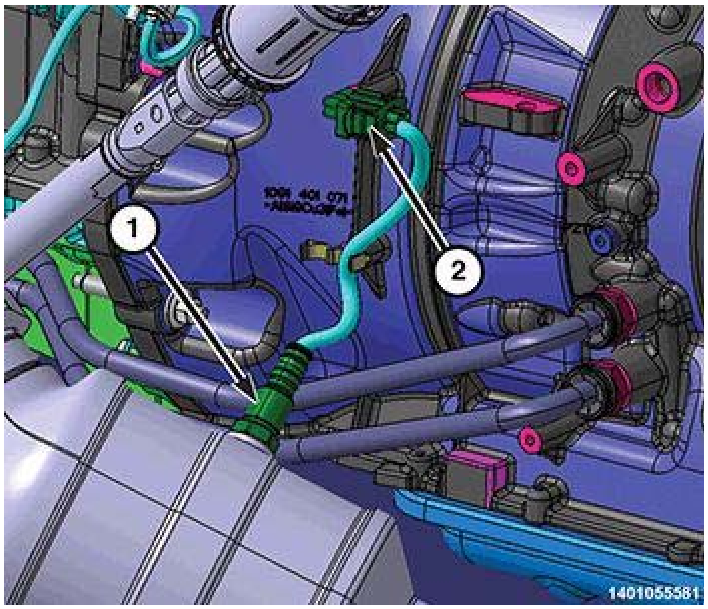


Fig. 222: Removing/Installing Oxygen Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Install the oxygen sensor (1) and tighten to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
2. Connect the oxygen sensors wire harness connector (2) and secure the wire harness in the retainer.
3. Remove support and lower the vehicle.
4. Connect the negative battery cable.

THROTTLE BODY

REMOVAL

3.6L

1. Disconnect and isolate the negative battery cable.

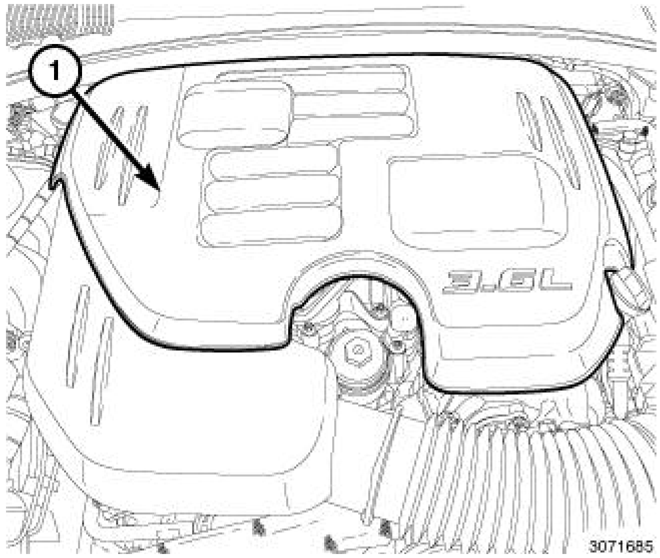


Fig. 223: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine cover (1).

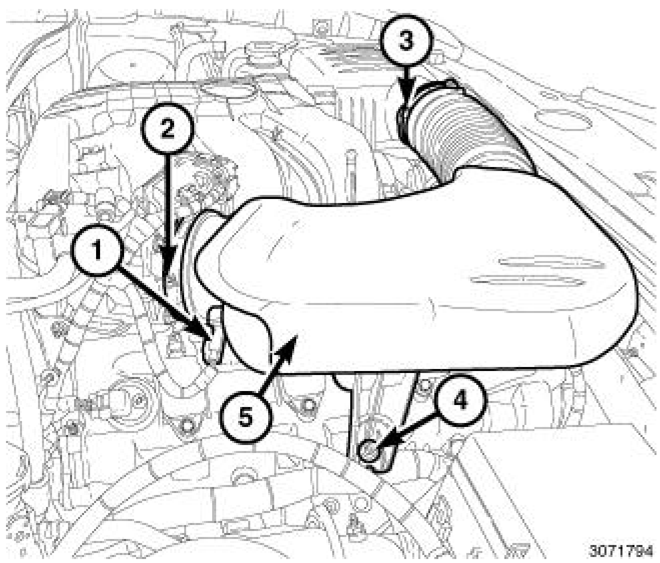


Fig. 224: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the Inlet Air Temperature (IAT) sensor wire harness connector (1).
4. Loosen the air inlet hose assembly clamp (2) and remove from throttle body.
5. Loosen the air inlet hose assembly clamp (3) and lift the air inlet hose assembly (5) retaining grommet off the ball stud (4) and remove from air cleaner body.

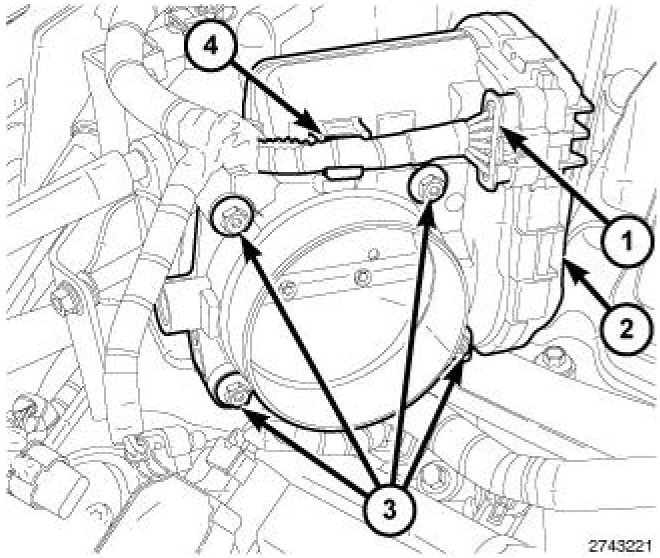


Fig. 225: Electrical Connector, Electronic Throttle Control, Clip & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Detach the Electronic Throttle Control (ETC) wire harness clip from the housing (4) and disconnect the ETC wire harness connector (1).
7. Remove bolts (3) and the ECT (2).

5.7L

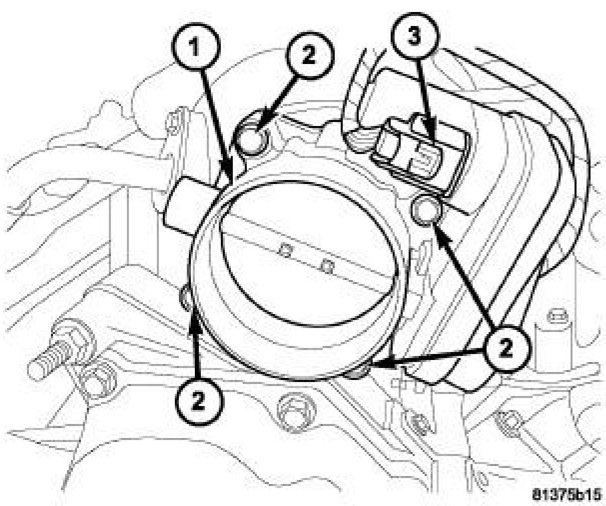


Fig. 226: Throttle Body, Throttle Body Mounting Bolts & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use spray (carb) cleaners on any part of the throttle body. Do not apply silicone lubricants to any part of the throttle body.

1. Disconnect and isolate the negative battery cable.
2. Loosen clamp and remove the air inlet hose from throttle body.

3. Disconnect throttle body (1) wire harness connector (3).
4. Remove bolts (2) and the throttle body (1).

6.2L

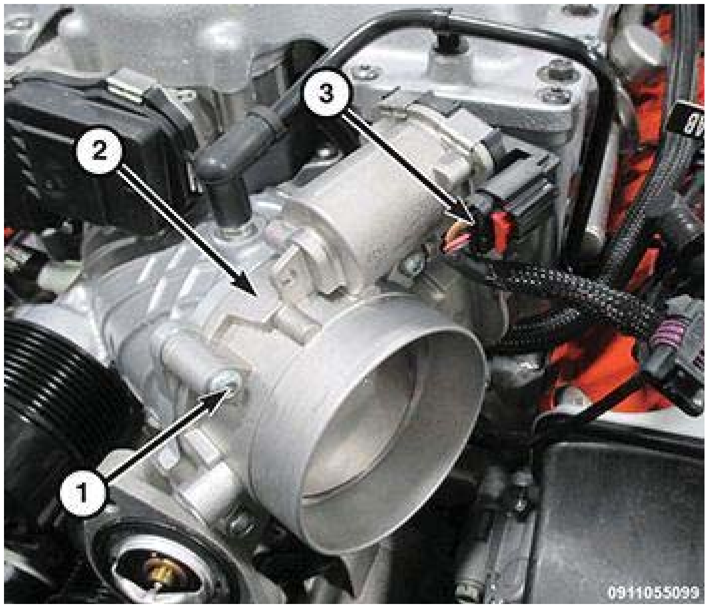


Fig. 227: Throttle Body, Throttle Body Mounting Bolts & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not use spray (carb) cleaners on any part of the throttle body. Do not apply silicone lubricants to any part of the throttle body.**

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
3. Disconnect the throttle body (2) wire harness connector (3).
4. Remove bolts (1) the throttle body (2) from the supercharger.

6.4L

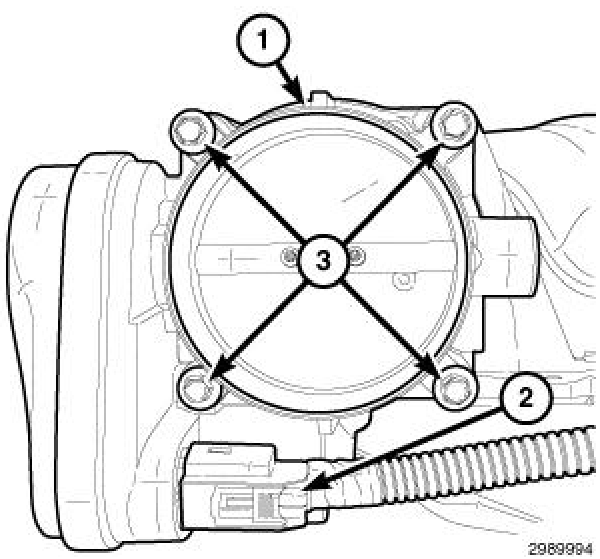


Fig. 228: Throttle Body, Throttle Body Mounting Bolts & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use spray (carb) cleaners on any part of the throttle body. Do not apply silicone lubricants to any part of the throttle body.

1. Disconnect and isolate the negative battery cable.
2. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** .
3. Disconnect the electrical connector (2) at the throttle body (1).
4. Remove bolts (3) the throttle body from the intake manifold.

INSTALLATION

3.6L

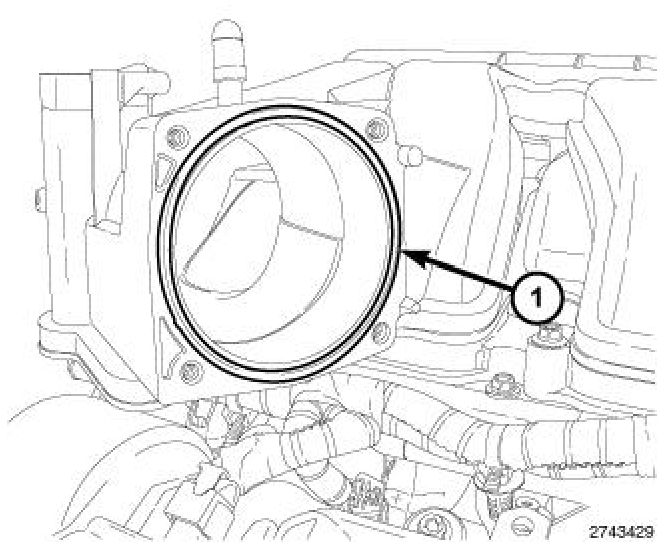


Fig. 229: Throttle Body-To-Intake Manifold Seal
Courtesy of CHRYSLER GROUP, LLC

1. Check the condition of the throttle body-to-intake manifold seal (1). The seal can be reused if not damaged.
2. Clean the mating surfaces of the throttle body and intake manifold.

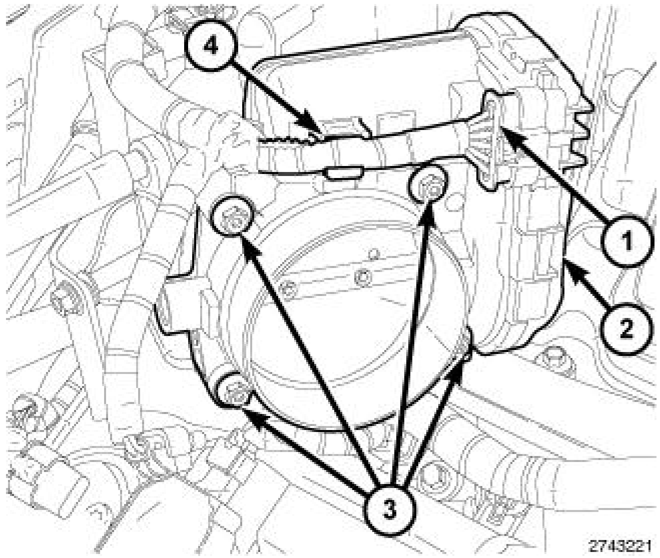


Fig. 230: Electrical Connector, Electronic Throttle Control, Clip & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the Electronic Throttle Control (ETC) (2). Tighten bolts (3) in a crisscross pattern sequence to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
4. Connect the ETC wire harness connector (1) and attach the ETC wire harness clip to the housing (4).

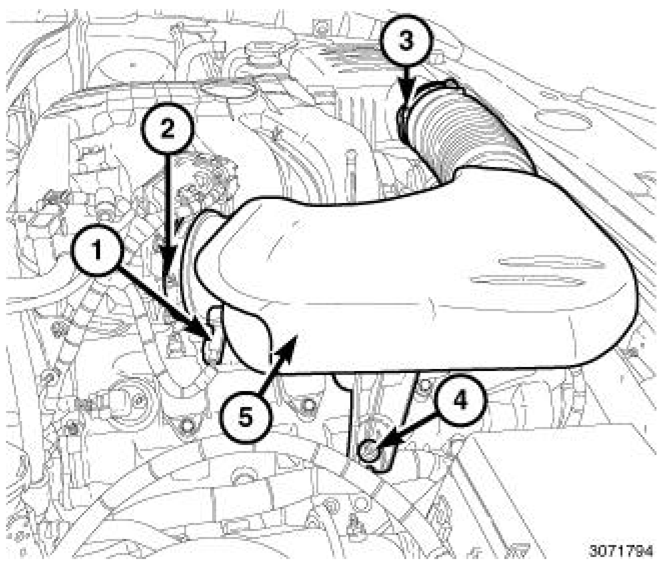


Fig. 231: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Install the air inlet hose assembly (5) onto the ECT (2) and securely tighten clamp.
6. Install the air inlet hose assembly (5) onto air cleaner housing (3). and seat retaining grommet onto the ball stud (4) then securely tighten clamp.
7. Connect the Inlet Air Temperature (IAT) sensor wire harness connector (1).

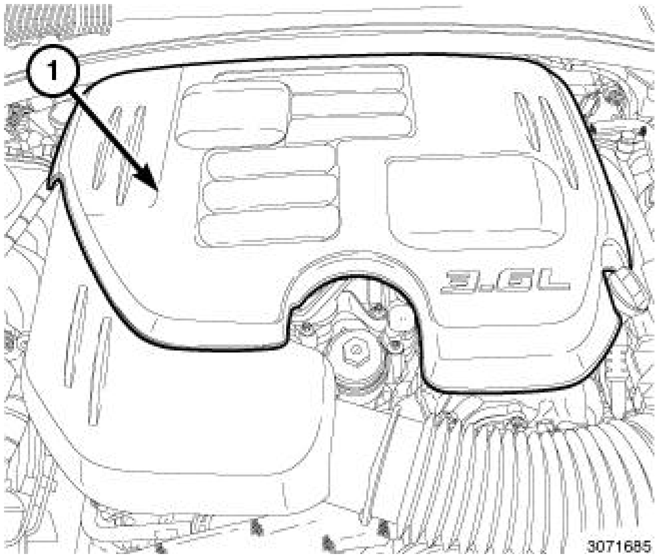


Fig. 232: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

8. Install the engine cover (1).
9. Connect the negative battery cable.

5.7L

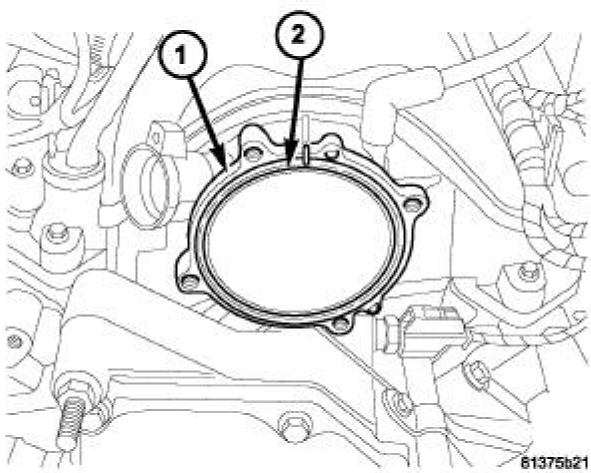


Fig. 233: Intake Manifold & Throttle Body O-Ring
Courtesy of CHRYSLER GROUP, LLC

1. Clean and check condition of throttle body-to-intake manifold O-ring (2).
2. Clean mating surfaces of throttle body and intake manifold (1).

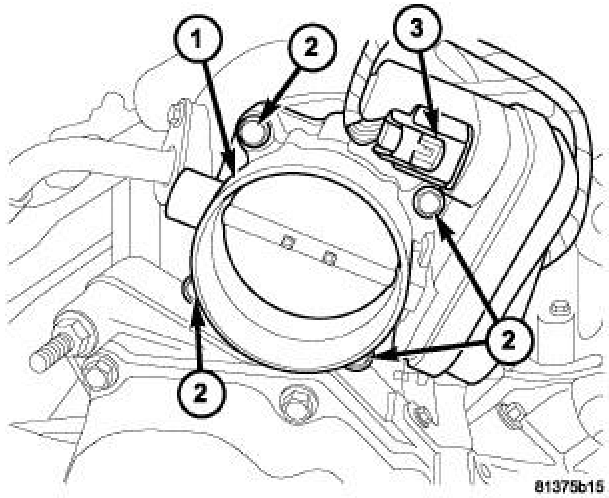


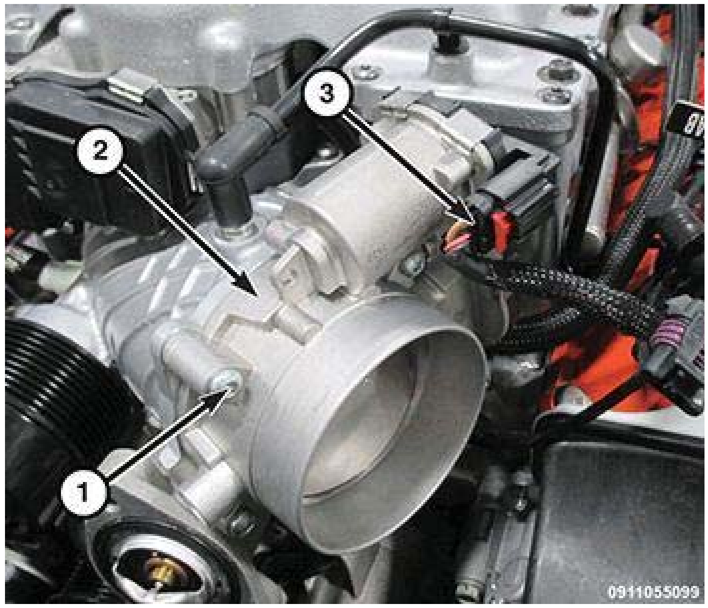
Fig. 234: Throttle Body, Throttle Body Mounting Bolts & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use spray (carb) cleaners on any part of the throttle body. Do not apply silicone lubricants to any part of the throttle body.

3. Install the throttle body. Tighten bolts (2) to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
4. Install the throttle body wire harness connector (3).
5. Install the air inlet hose to throttle body and securely tighten clamp.
6. A Scan Tool may be used to learn electrical parameters. Go to the Miscellaneous menu, and then select ETC Relearn. If the relearn is not performed, a Diagnostic Trouble Code (DTC) will be set. If necessary, use a scan tool to erase any Diagnostic Trouble Codes (DTC's) from PCM.

6.2L

1. Clean and inspect the throttle body-to-intake manifold rubber O-ring seal and replace if necessary.
2. Clean the sealing surface of throttle body and supercharger.



[**Fig. 235: Throttle Body, Throttle Body Mounting Bolts & Electrical Connector**]()
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use spray (carb) cleaners on any part of the throttle body. Do not apply silicone lubricants to any part of the throttle body.

3. Install the throttle body (2). Tighten bolts (1) to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
4. Connect the throttle body wire harness connector (3).
5. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .
6. Connect the negative battery cable.
7. A scan tool may be used to learn electrical parameters. Go to the Miscellaneous menu and then select ETC Relearn. If the relearn is not performed, a Diagnostic Trouble Code (DTC) will be set. If necessary, use a scan tool to erase any DTC's from the PCM.

6.4L

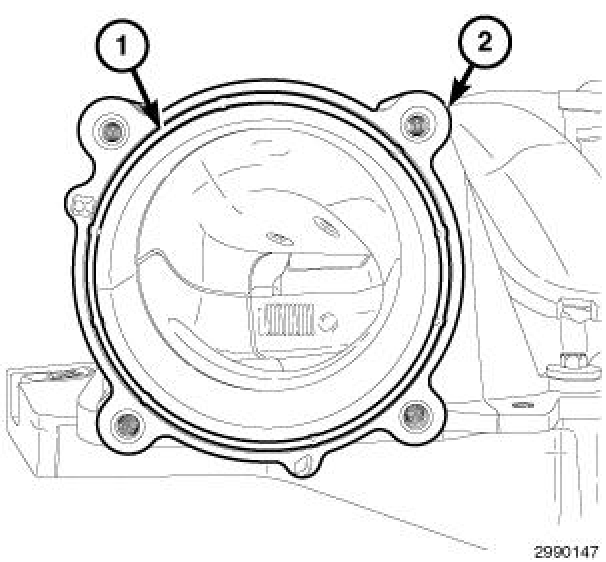


Fig. 236: Throttle Body O-Ring
Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect the throttle body-to-intake manifold rubber O-ring seal (1) and replace if necessary.
2. Clean the sealing surface of throttle body and intake manifold (2).

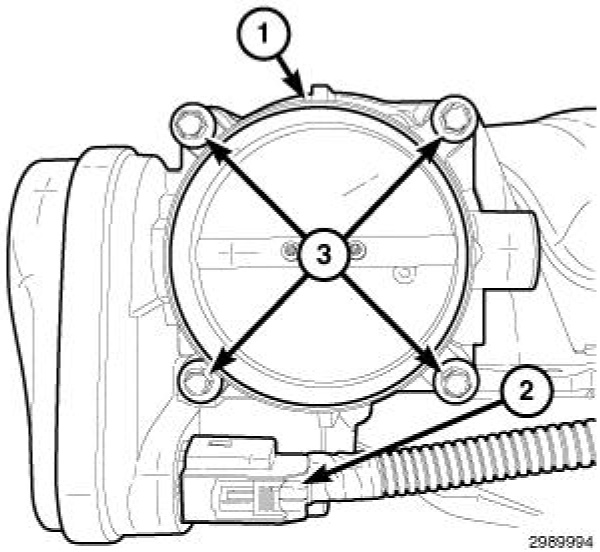


Fig. 237: Throttle Body, Throttle Body Mounting Bolts & Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not use spray (carb) cleaners on any part of the throttle body. Do not apply silicone lubricants to any part of the throttle body.

3. Install the throttle body (1). Tighten bolts (3) to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
4. Connect the throttle body wire harness connector (2).
5. Install the air cleaner housing. Refer to **BODY, AIR CLEANER, INSTALLATION** .
6. Connect the negative battery cable.
7. A scan tool may be used to learn electrical parameters. Go to the Miscellaneous menu and then select ETC Relearn. If the relearn is not performed, a Diagnostic Trouble Code (DTC) will be set. If necessary, use a scan tool to erase any DTC's from the PCM.

VALVE, SHORT RUNNER

DESCRIPTION

DESCRIPTION

The intake manifold features a dual shaft Short Runner Valve (SRV) system to maximize both low end torque and peak power. The SRV is bolted to the rear of the intake manifold and can be service separately from the manifold.

The SRV system operates under Wide Open Throttle conditions to maximize engine performance. When activated by the PCM, the SRV actuates a mechanical linkage to redirect the intake air flow to eight short runners. The PCM looks for a signal feedback when the actuator is activated. If the signal feedback is not

present, the PCM sets the DTC.

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL** for 3.6L, **MANIFOLD, INTAKE, REMOVAL, 5.7L** for 5.7L or **MANIFOLD, INTAKE, REMOVAL** for 6.4L.

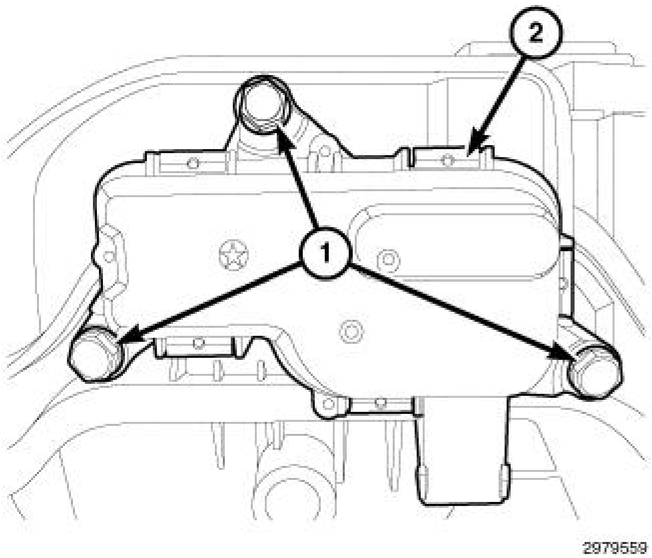


Fig. 238: Short Runner Valve (SRV) Actuator Retaining Bolts & SRV Actuator
Courtesy of CHRYSLER GROUP, LLC

3. Remove bolts (1) and the Short Runner Valve (SRV) actuator (2).

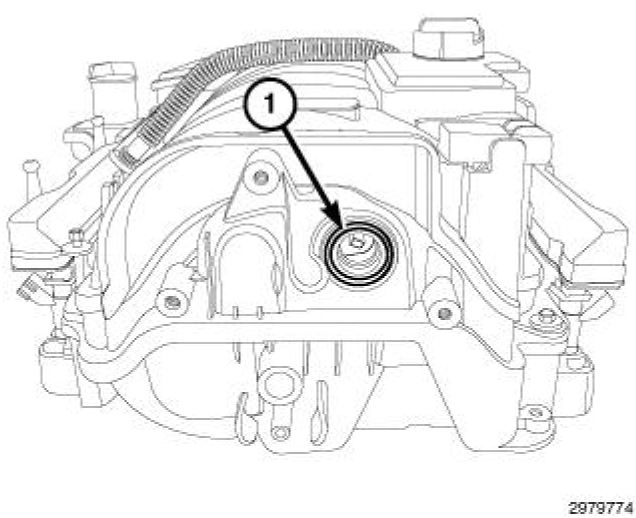


Fig. 239: Rubber O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

4. Remove and discard the SRV actuator rubber O-ring seal (1).

INSTALLATION

INSTALLATION

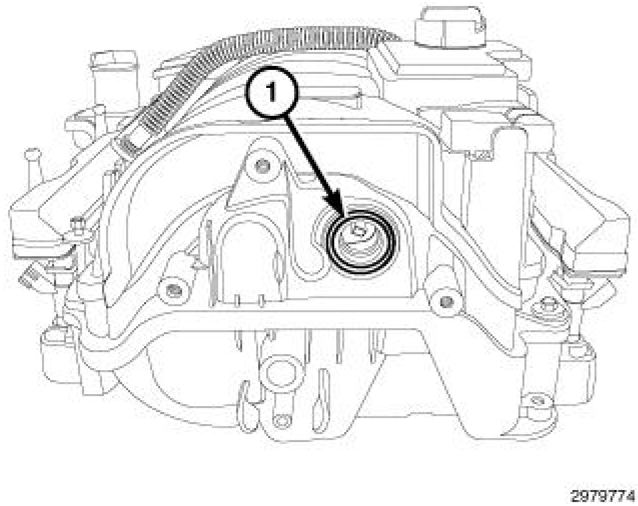


Fig. 240: Rubber O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not reuse the old Short Runner Valve (SRV) actuator O-ring seal (1).

1. Install a **new** SRV actuator rubber O-ring seal (1).

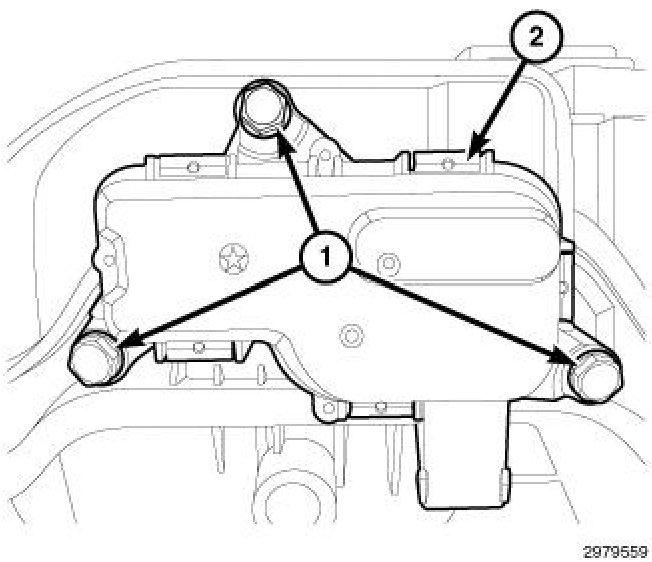


Fig. 241: Short Runner Valve (SRV) Actuator Retaining Bolts & SRV Actuator
Courtesy of CHRYSLER GROUP, LLC

2. Install the SRV actuator (2). tighten bolts (1) to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
3. Install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION** for 3.6L, **MANIFOLD, INTAKE, INSTALLATION** for 5.7L or **MANIFOLD, INTAKE, INSTALLATION** for 6.4L.
4. Connect the negative battery cable.

SENSOR, TMAP-INTAKE MANIFOLD

DESCRIPTION

DESCRIPTION

The 6.2L engine uses four Temperature and Manifold Absolute Pressure (TMAP) sensors.

- Bank 1 TMAP sensor is located on the right front bottom of the supercharger.
- Bank 2 TMAP sensor is located on the left rear bottom of the supercharger.
- The intermediate TMAP sensor is located on the upper left side of the supercharger.
- The throttle outlet TMAP sensor is located on the right front of the supercharger by the throttle body.

OPERATION

OPERATION

The air temperature portion of the sensor, provides an input voltage to the Powertrain Control Module (PCM) indicating air temperature at each of the four sensors. The Manifold Absolute Pressure (MAP) portion of the sensor provides an input voltage to the PCM indicating pressures from the four sensor locations.

REMOVAL

BANK 1

1. Disconnect and isolate the negative battery cable.

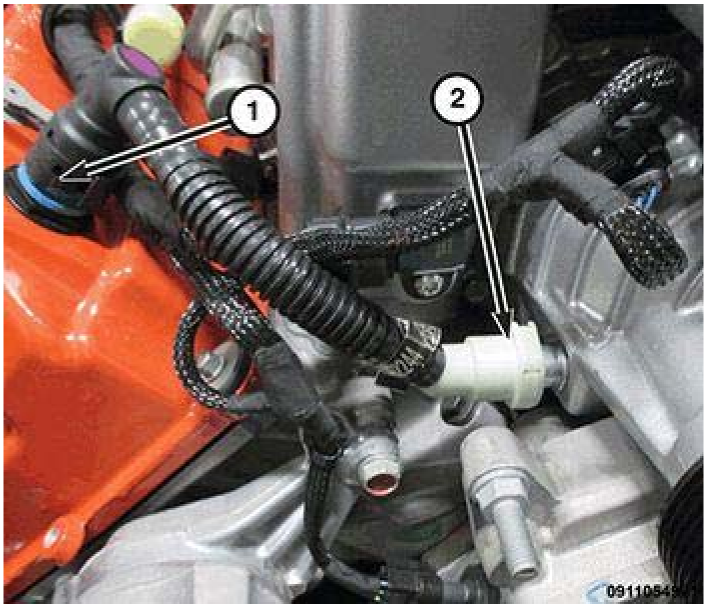
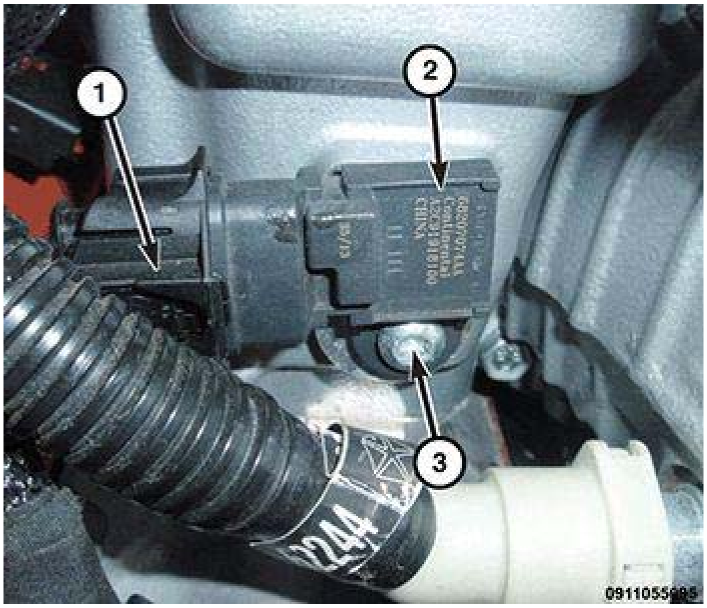


Fig. 242: Disconnecting/Connecting PCV Hose
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the right side PCV hose (2) from the supercharger and position aside.



[Fig. 243: TMAP Sensor, Connector & Screw]
Courtesy of CHRYSLER GROUP, LLC

3. Clean the area around Temperature and Manifold Absolute Pressure (TMAP) sensor (2).
4. Disconnect the TMAP sensor wire harness connector (1).
5. Remove screw (3) and the TMAP sensor (2) from supercharger.

BANK 2

[Fig. 244: Engine Covers]
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the left side engine cover (1).

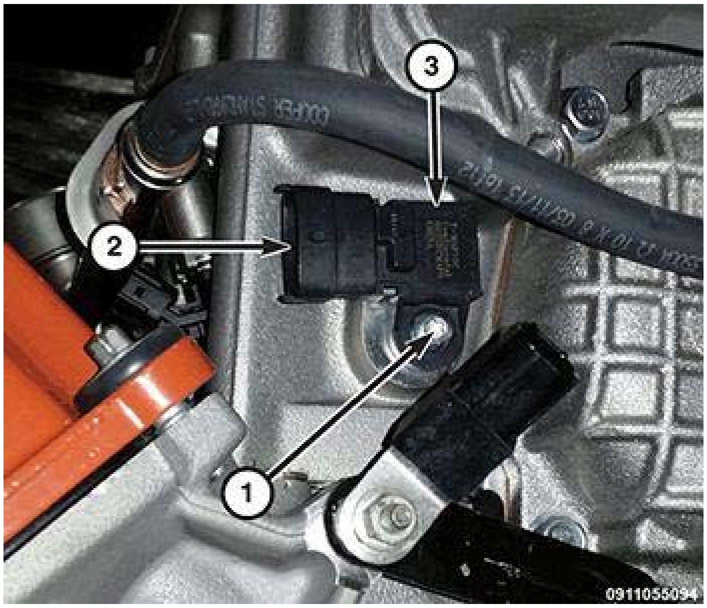


Fig. 245: TMAP Sensor, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

3. Clean the area around the Temperature and Manifold Absolute Pressure (TMAP) sensor (3).
4. Disconnect the TMAP sensor wire harness connector (2).
5. Remove the screw (1) and the TMAP sensor (3).

INTERMEDIATE

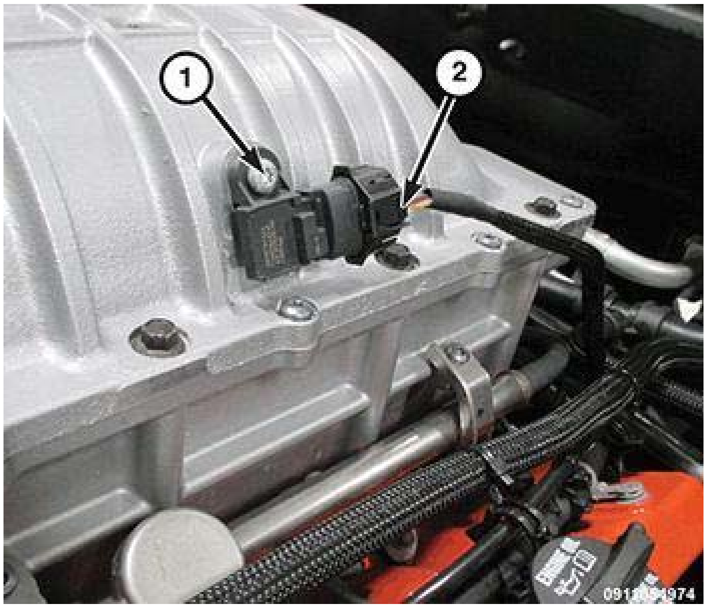


Fig. 246: TMAP Sensor, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Clean the area around the Temperature and Manifold Absolute Pressure (TMAP) sensor.
3. Disconnect the TMAP sensor wire harness connector (2).
4. Remove the screw (1) and the TMAP sensor.

THROTTLE OUTLET

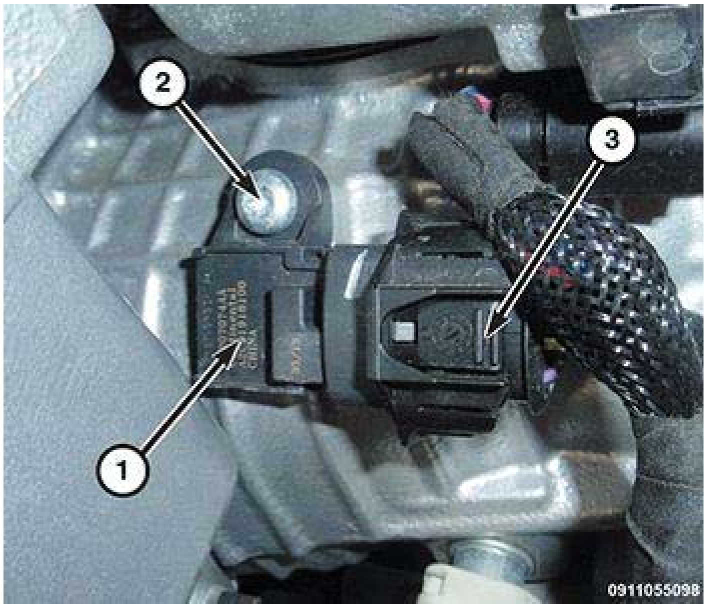


Fig. 247: TMAP Sensor, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Clean the area around Temperature and Manifold Absolute Pressure (TMAP) sensor (1).
3. Disconnect the TMAP sensor wire harness connector (3).
4. Remove the screw (2) and the TMAP sensor (1) from supercharger.

INSTALLATION

BANK 1

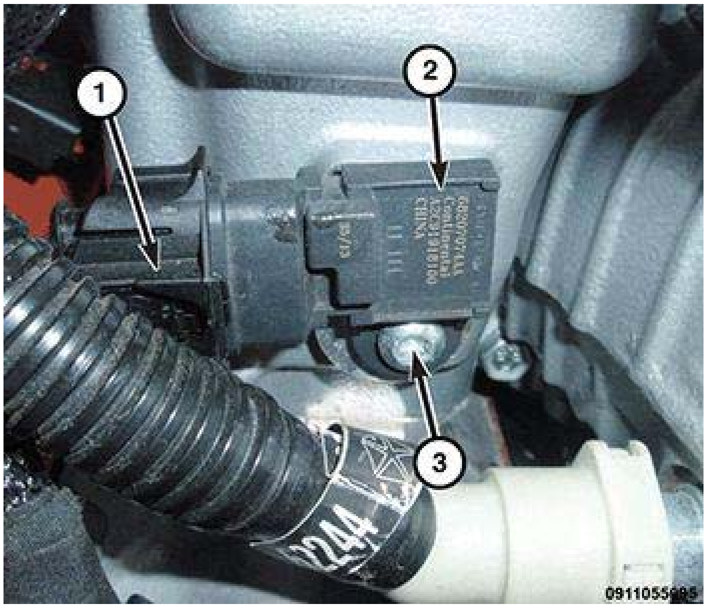


Fig. 248: TMAP Sensor, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Check condition of Temperature and Manifold Absolute Pressure (TMAP) sensor O-ring seal.
2. Clean the sealing area on the supercharger.
3. Lubricate the TMAP sensor O-ring seal with clean engine oil.
4. Install the TMAP sensor (2) into the supercharger. Tighten the screw (3) to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
5. Connect the TMAP sensor wire harness connector (1).

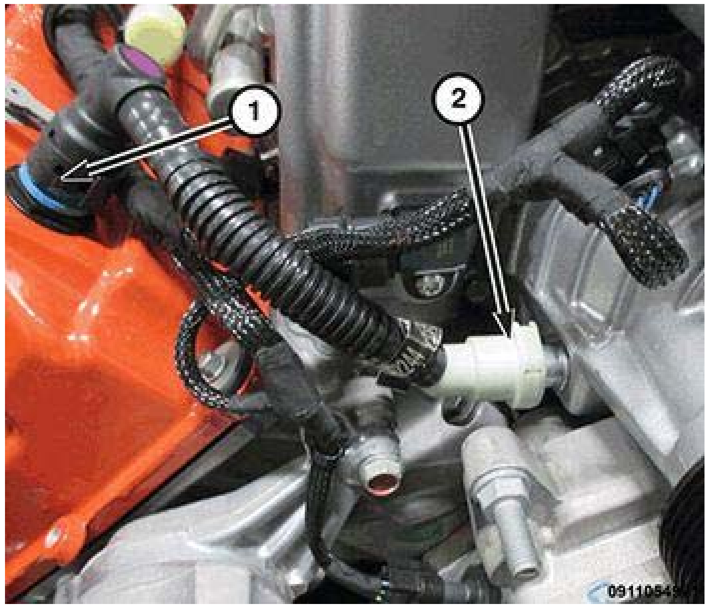


Fig. 249: Disconnecting/Connecting PCV Hose
Courtesy of CHRYSLER GROUP, LLC

6. Position the PCV hose (2) and connect it to the supercharger.
7. Connect the negative battery cable.

BANK 2

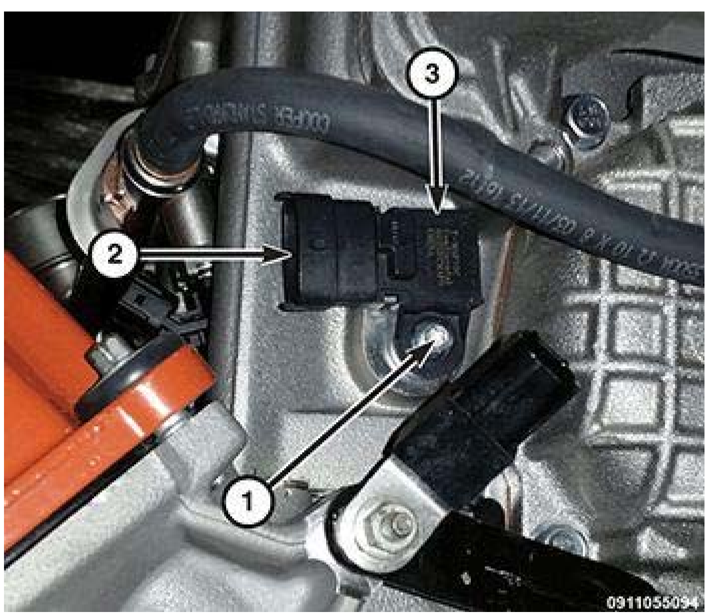


Fig. 250: TMAP Sensor, Connector & Screw

Courtesy of CHRYSLER GROUP, LLC

1. Check condition of Temperature and Manifold Absolute Pressure (TMAP) sensor O-ring seal.
2. Clean the sensor sealing area on the supercharger.
3. Lubricate the TMAP sensor O-ring seal with clean engine oil.
4. Install the TMAP sensor (3) into the supercharger. Tighten the screw (1) to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
5. Connect the TMAP sensor wire harness connector (2).

Fig. 251: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

6. Install the left side engine cover (1).
7. Connect the negative battery cable.

INTERMEDIATE

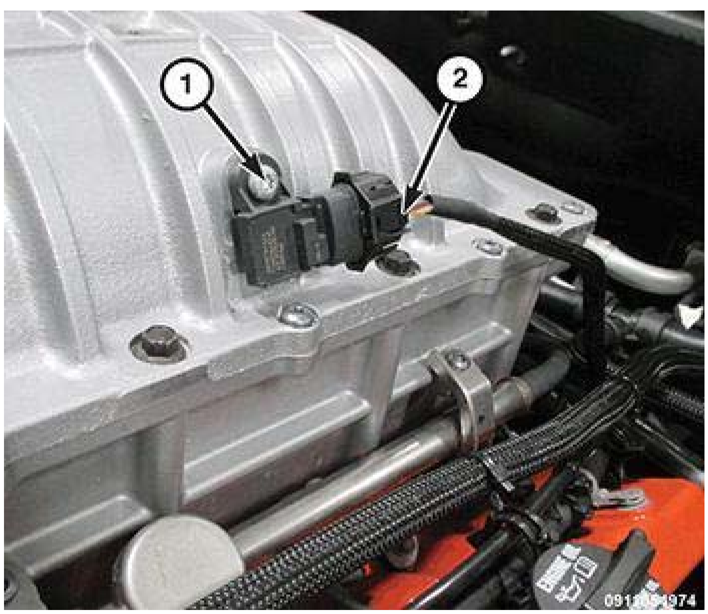


Fig. 252: TMAP Sensor, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Check the condition of Temperature and Manifold Absolute Pressure (TMAP) sensor O-ring.
2. Clean the sealing area on the supercharger.
3. Lubricate the TMAP sensor O-ring seal with clean engine oil.
4. Install the TMAP sensor into the supercharger. Tighten the screw (1) to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
5. Connect the TMAP sensor wire harness connector (2).
6. Connect the negative battery cable.

THROTTLE OUTLET

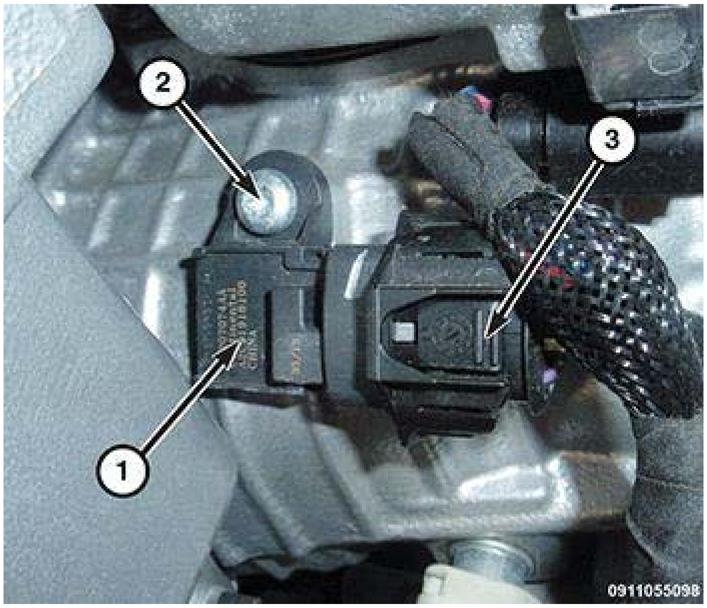


Fig. 253: TMAP Sensor, Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Check condition of the Temperature and Manifold Absolute Pressure (TMAP) sensor O-ring seal.
2. Clean the sealing area on the supercharger.
3. Lubricate the TMAP sensor O-ring seal with clean engine oil.
4. Install the TMAP sensor (1) into the supercharger. Tighten the screw (2) to the proper torque specification. Refer to **FUEL INJECTION, GAS, SPECIFICATIONS**.
5. Connect the TMAP sensor wire harness connector (3).
6. Connect the negative battery cable.

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Article GUID: A00735866

2015-16 DRIVELINE/AXLES

Half Shaft - Challenger

DESCRIPTION

DESCRIPTION

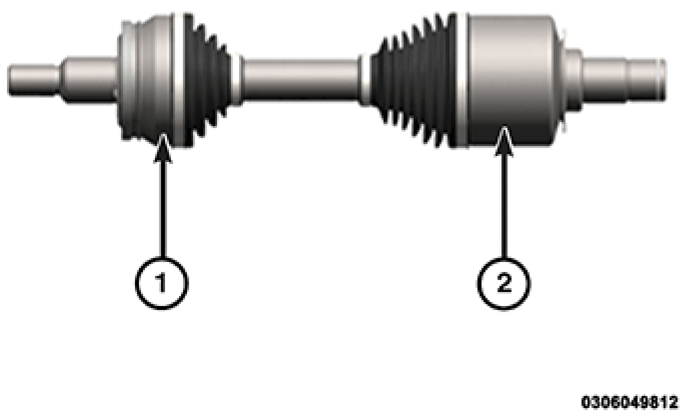


Fig. 1: Inner And Outer Half Shaft Joints
Courtesy of CHRYSLER GROUP, LLC

The inner joints of both halfshaft assemblies are inboard Double-Offset (DO) joints (2) and are splined to the differential side gears. The outer joints of both assemblies are Rzeppa joints (1).

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HALF SHAFT

VEHICLE INSPECTION

Check for grease in the vicinity of both the inboard and outboard joints. This is a sign of inner or outer joint seal boot or seal boot clamp damage.

NOISE AND/OR VIBRATION IN TURNS

A clicking noise and/or a vibration in turns could be caused by one of the following conditions:

- Damaged inner or outer boot or boot clamps. This will result in the loss and/or contamination of the joint grease, resulting in inadequate lubrication of the joint.
- Noise may also be caused by another component of the vehicle coming in contact with the half shafts.

CLUNKING NOISE DURING ACCELERATION

This noise may be a result of one of the following conditions:

- A torn boot on the inner or outer joint of the half shaft assembly.
- A loose or missing clamp on the inner or outer joint of the half shaft assembly.
- A damaged or worn half shaft joint.

SHUDDER OR VIBRATION DURING ACCELERATION

This problem could be a result of:

- A worn or damaged half shaft inner joint.
- Improper wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

VIBRATION AT HIGHWAY SPEEDS

This problem could be a result of:

- Foreign material (mud, etc.) packed on the backside of the wheel(s).
- Out of balance tires or wheels. Refer to **STANDARD PROCEDURE** .
- Improper tire and/or wheel runout. Refer to **DIAGNOSIS AND TESTING** .

REMOVAL

HALF SHAFT

NOTE: **This procedure requires the compression of the rear suspension to ride height. A drive-on hoist should be used. If a drive-on hoist is not used, screw-style under-hoist jack stands are required to compress the rear suspension, facilitating rear halfshaft removal.**

NOTE: **The halfshaft inner and outer boots are not serviceable separately. Boot replacement requires entire halfshaft assembly replacement.**

CAUTION: **Never grasp halfshaft assembly by the inner or outer boots. Doing so may cause the boot to pucker or crease, reducing the service life of the boot and joint. Avoid over angulating or stroking the C/V joints when handling the halfshaft.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the rear exhaust system. Refer to **MUFFLER, EXHAUST, REMOVAL** .
3. Remove the tire and wheel assembly. Refer to **REMOVAL** .

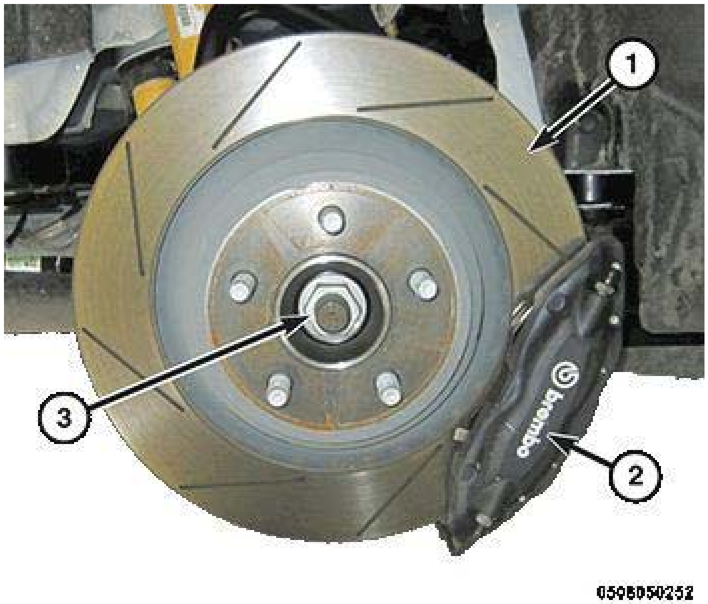


Fig. 2: Brake Rotor, Caliper & Hub Nut
Courtesy of CHRYSLER GROUP, LLC

4. Remove the hub nut (3) and discard.

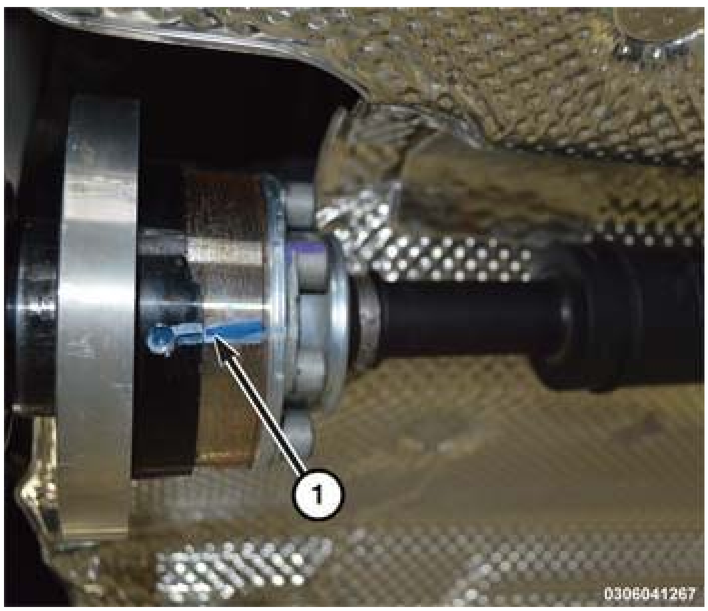
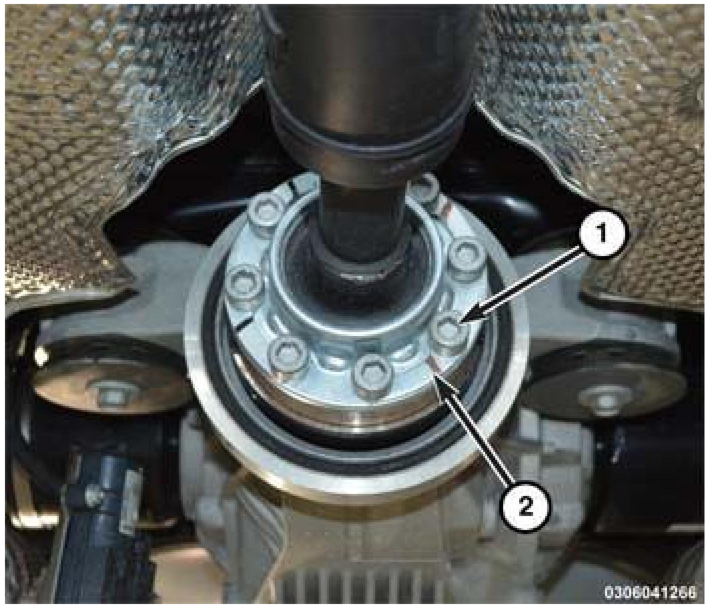


Fig. 3: Alignment Index Marks
Courtesy of CHRYSLER GROUP, LLC

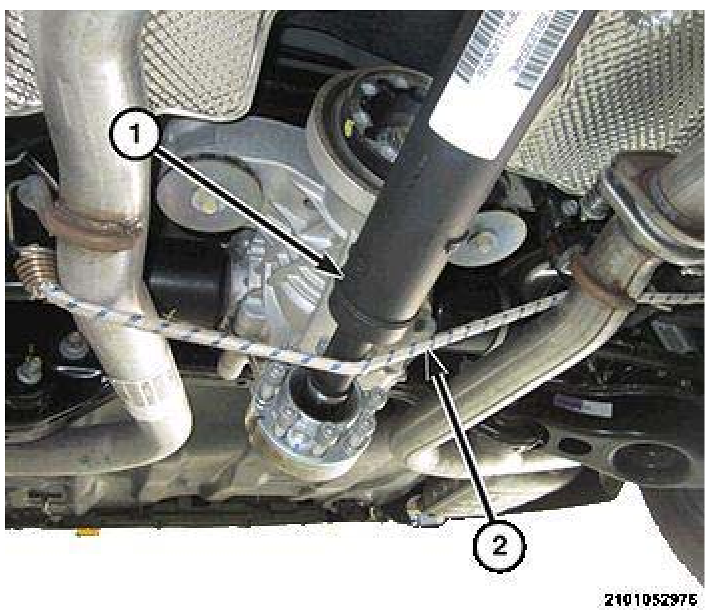
5. Apply alignment index marks (1) to the drive shaft and axle flanges (1).



[Fig. 4: Drive Shaft To Axle Flange Bolts & Washers](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The use of soft/blunt tools is recommend for removal of joints from the companion flanges. Use of sharp pry tools, such as a screwdriver, will damage the joint housing and could result in driveline imbalance.**

6. Remove and discard the drive shaft to axle flange bolts (1) and washers (2). Separate the drive shaft from the rear axle.



[Fig. 5: Supporting Drive Shaft With Strap](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Do not let the drive shaft hang unsupported, damage may occur to the shaft.**

7. Support the drive shaft (1) with a strap (2) or equivalent.

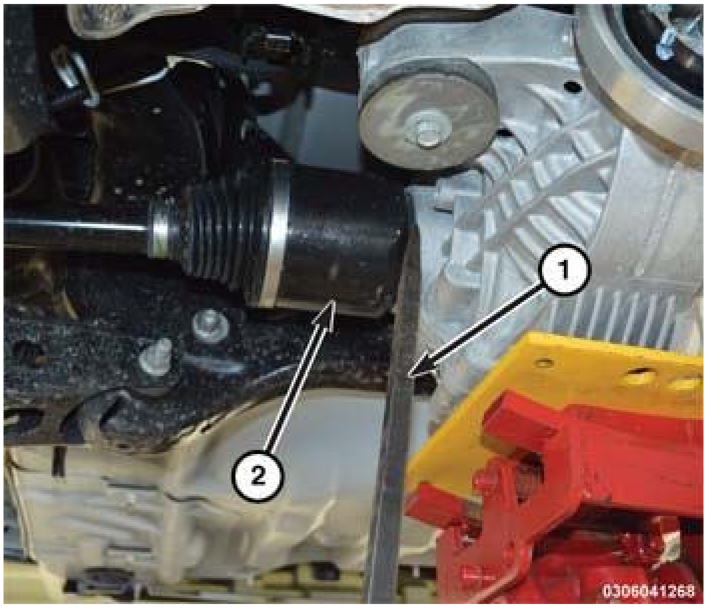


Fig. 6: Removing Halfshaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not damage the axle seal, axle seal dust cover, and halfshaft boot.**

NOTE: **Left Hand (LH) side shown in illustration, Right Hand (RH) side similar.**

8. Using a suitable screwdriver (1), partially disengage the halfshaft (2) from the rear axle assembly.

Fig. 7: Screw-Style Under-Hoist Jack Stand & Rear Suspension
Courtesy of CHRYSLER GROUP, LLC

9. If a drive-on hoist is not used, compress the rear suspension (2) using a screw-style under-hoist jack stand (1).

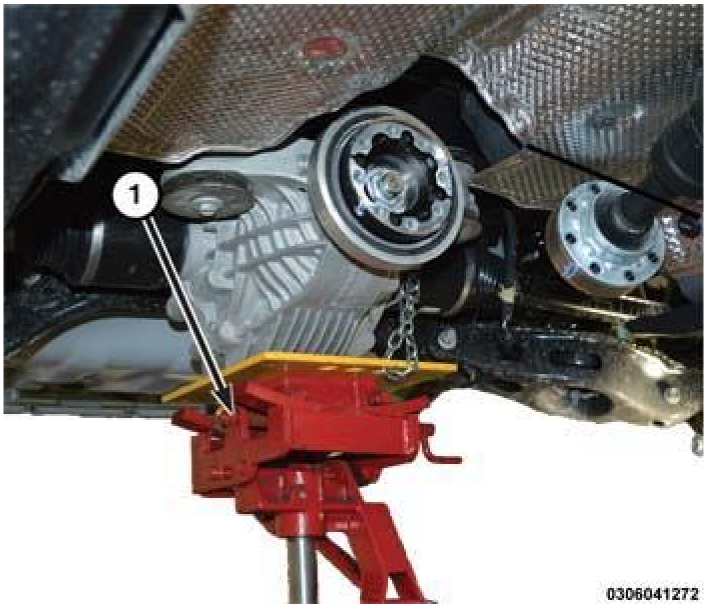


Fig. 8: Rear Axle Assembly On Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

10. Position the transmission jack (1) under the rear axle assembly.

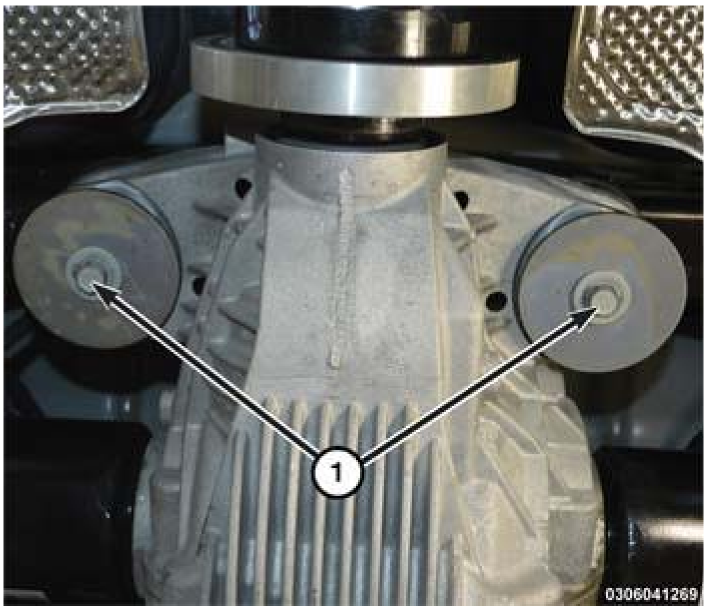
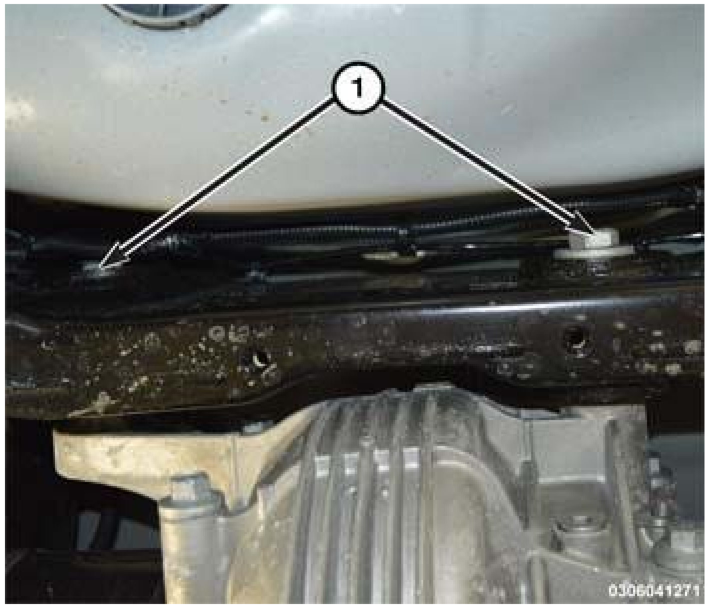


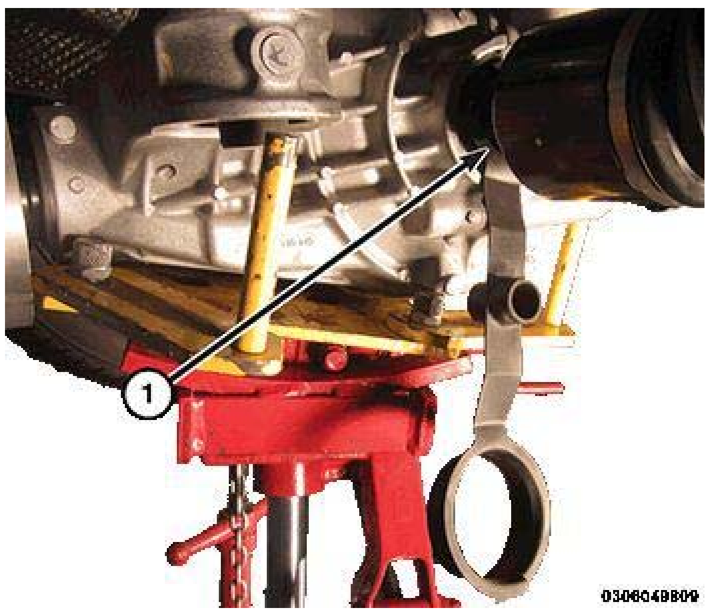
Fig. 9: Rear Axle Forward Mount Isolator Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Remove and discard the rear axle forward mount isolator bolts (1).



[Fig. 10: Rear Axle To Crossmember Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

12. Remove the two rear axle to crossmember bolts (1) from the rear axle.



[Fig. 11: Half Shaft Protector](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left Hand (LH) side shown in illustration, Right Hand (RH) side similar.

13. Install the Protector, Half Shaft, Drive (special tool #10270, Protector, Half Shaft, Drive) (1).

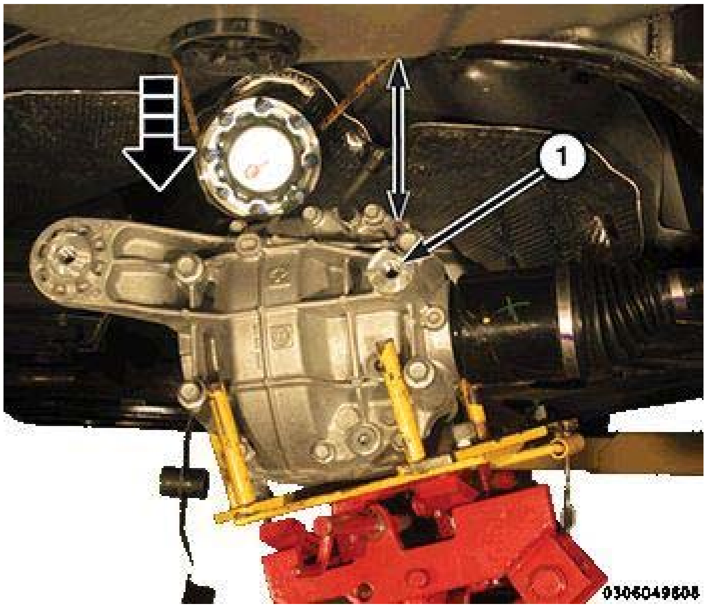


Fig. 12: Lowering Rear Axle
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left Hand (LH) side shown in illustration, Right Hand (RH) side similar.**

14. Lower the rear axle (1) approximately six inches and push the rear axle assembly towards the front of the vehicle.

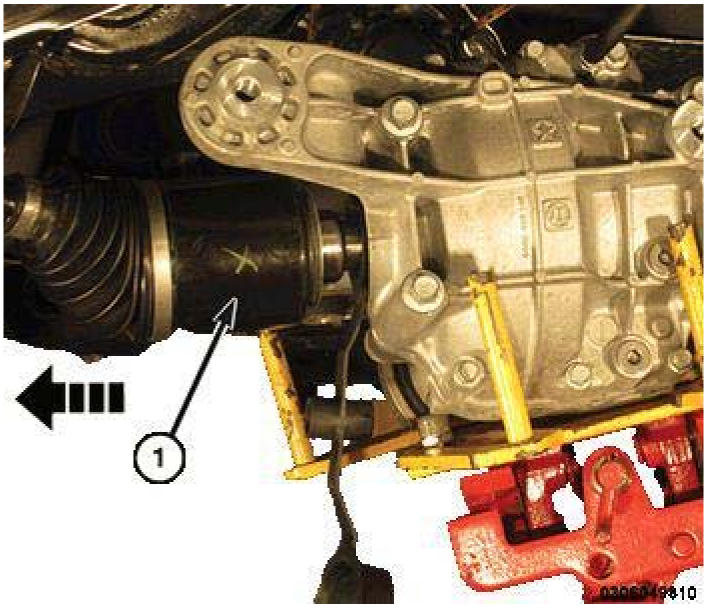


Fig. 13: Removing Halfshaft
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Never grasp halfshaft assembly by the inner or outer boots. Doing so may cause the boot to pucker or crease, reducing the service life of the boot and joint. Avoid over angulating or stroking the C/V joints when handling the halfshaft.**

CAUTION: **Use care while handling/storing halfshaft assembly. Damage to the slinger can result from improper handling. If slinger gets bent or damaged, straighten slinger to avoid contact with axle seal assembly.**

NOTE: **Do not allow the halfshaft splines to come in contact with the axle seal.**

15. With the aid of an assistant, shift the rear axle assembly in one direction and compress one halfshaft inner joint as far as possible while removing the other halfshaft (1).
16. Remove the halfshaft from the hub and the vehicle.

INSTALLATION

HALF SHAFT

CAUTION: **Never grasp halfshaft assembly by the inner or outer boots. Doing so may cause the boot to pucker or crease, reducing the service life of the boot and joint. Avoid over angulating or stroking the C/V joints when handling the halfshaft.**

NOTE: **The halfshaft inner and outer boots are not serviced separately. Boot replacement requires entire halfshaft assembly replacement.**

NOTE: **Always install a NEW hub nut. The original hub nut is one-time use only and should be discarded when removed.**

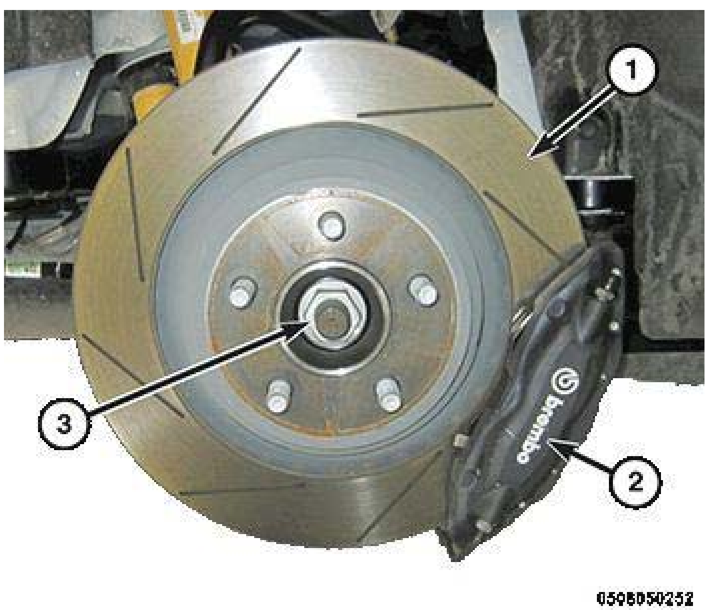
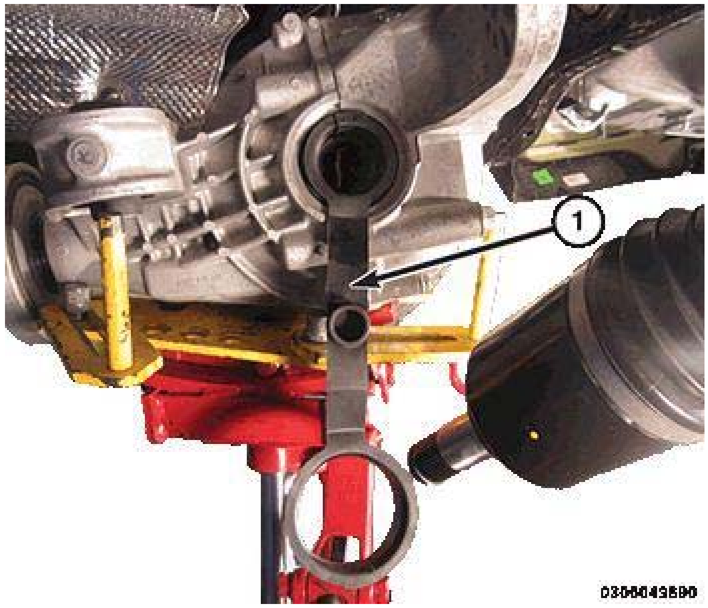


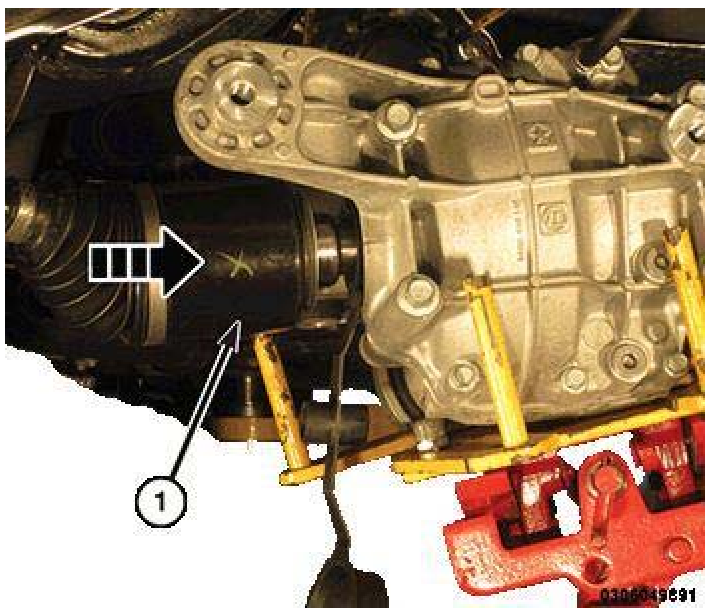
Fig. 14: Brake Rotor, Caliper & Hub Nut
Courtesy of CHRYSLER GROUP, LLC

1. Install the half shaft in the hub and install a **NEW** hub nut (3) hand tight.
2. Install **NEW** circlip(s), on the halfshaft(s).



[Fig. 15: Protector Installed In Rear Axle]
Courtesy of CHRYSLER GROUP, LLC

3. Install the Protector, Half Shaft, Drive (special tool #10270, Protector, Half Shaft, Drive) (1) in the rear axle.



[Fig. 16: Installing Halfshaft]
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Use care when installing halfshaft to axle assembly. The halfshaft installation angle should be minimized to avoid damage to seal upon installation.**

4. Apply a light film of axle lubricant to all of the machined halfshaft surfaces that go into the rear axle. With the Protector, Half Shaft, Drive (special tool #10270, Protector, Half Shaft, Drive) (1) installed and the aid of an assistant, shift the rear axle assembly in one direction and compress one halfshaft inner joint as much as possible while installing the other halfshaft (1).

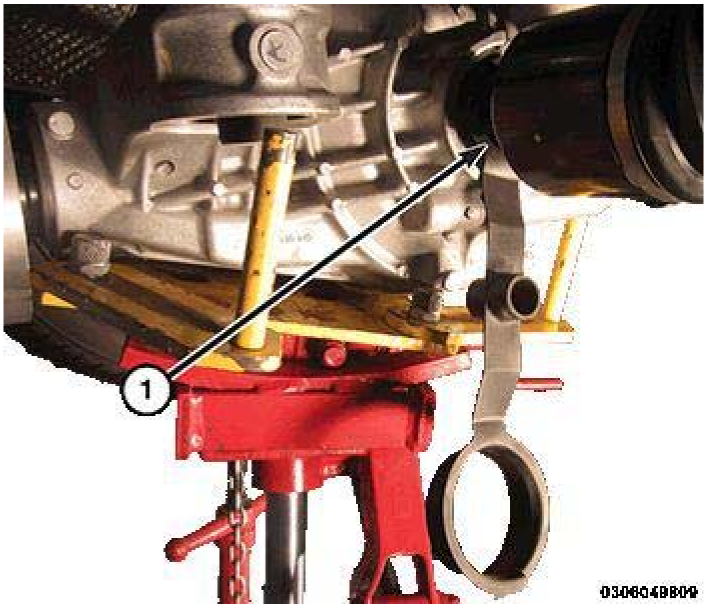


Fig. 17: Half Shaft Protector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Use care not to damage the axle seal or the seal dust cover.**

5. Remove the Protector, Half Shaft, Drive (special tool #10270, Protector, Half Shaft, Drive) (1) and fully install the halfshaft in the rear axle. Verify proper installation by pulling outward on the joint by hand.
6. Raise the rear axle into position.

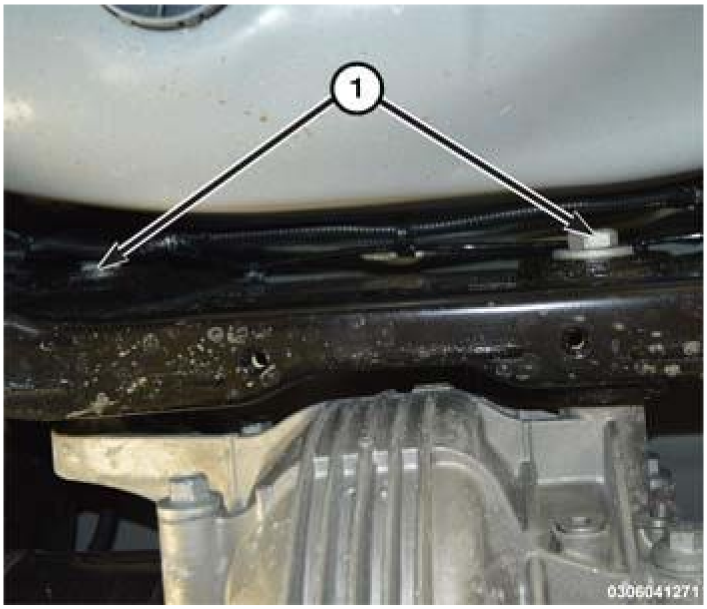


Fig. 18: Rear Axle To Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Install the rear axle to crossmember bolts (1) hand tight into the rear axle.

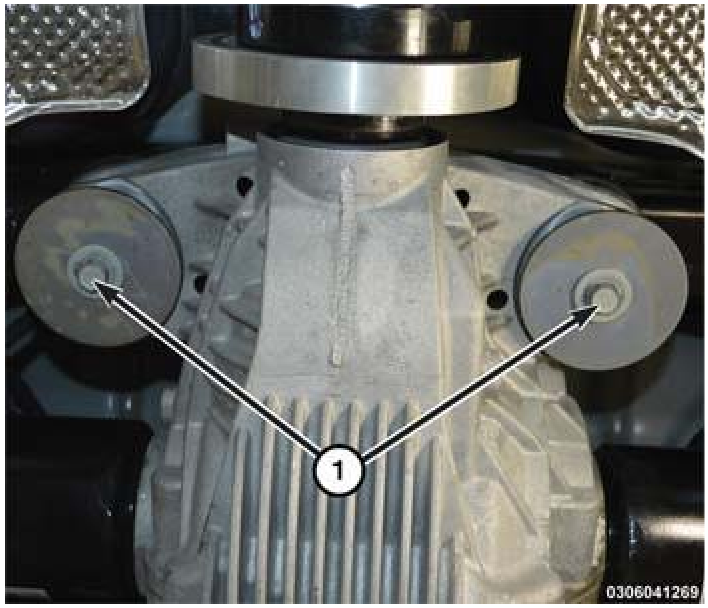


Fig. 19: Rear Axle Forward Mount Isolator Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install the **NEW** rear axle forward mount isolator bolts (1) hand tight.
9. Tighten the **NEW** rear axle forward mount isolator bolts and the rear axle to crossmember bolts to the proper specification. Refer to **SPECIFICATIONS** .
10. Verify halfshafts are fully engaged in the axle assembly.

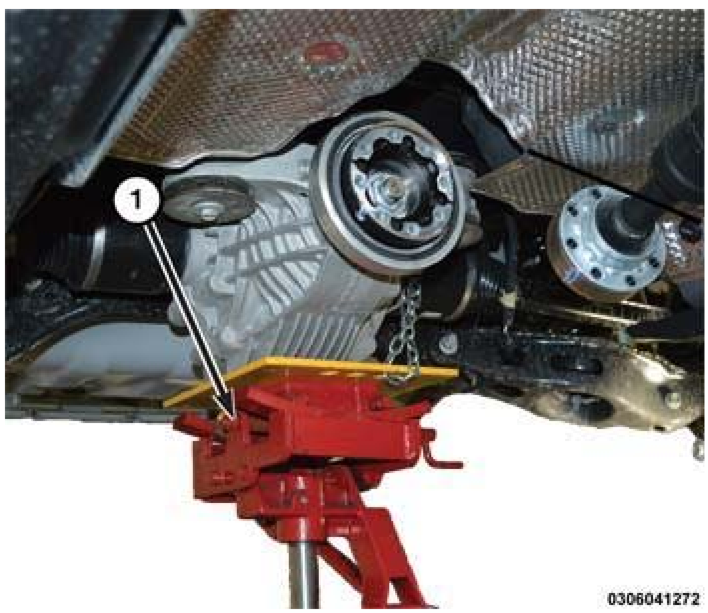


Fig. 20: Rear Axle Assembly On Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

11. Remove the transmission jack (1).

Fig. 21: Screw-Style Under-Hoist Jack Stand & Rear Suspension
Courtesy of CHRYSLER GROUP, LLC

12. If used, remove screw-type under-hoist jack stand (1).

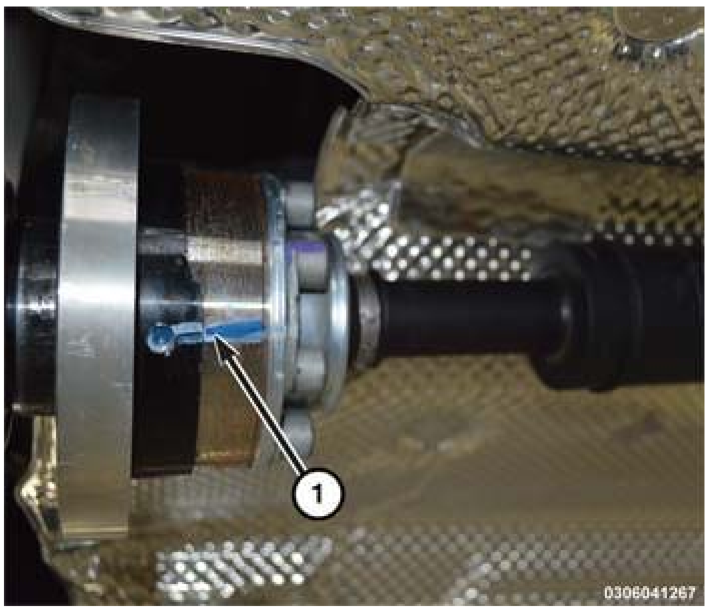


Fig. 22: Alignment Index Marks
Courtesy of CHRYSLER GROUP, LLC

13. Align the index marks (1) made during removal.

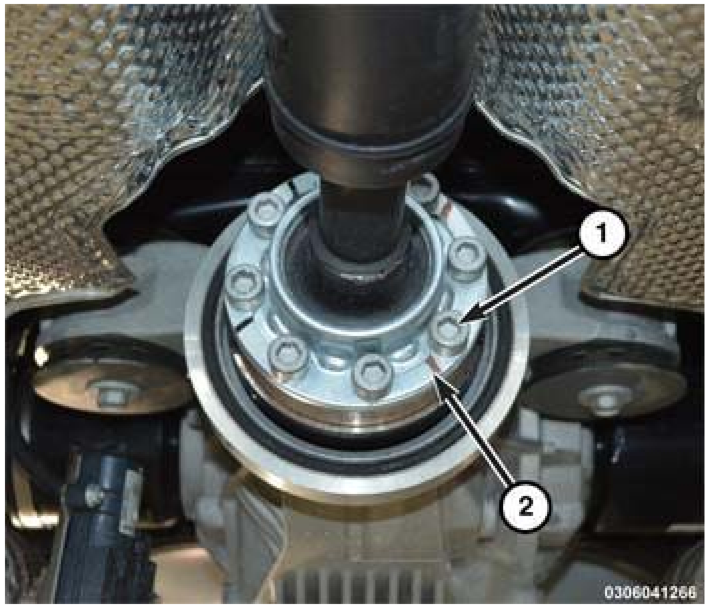


Fig. 23: Drive Shaft To Axle Flange Bolts & Washers
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Drive shaft bolts must be replaced with NEW . If NEW bolts are not available clean the old bolts and apply MoparÃ® Lock and Seal Adhesive or equivalent.**

14. Install the **NEW** drive shaft washers (2) and bolts (1) and tighten in a star pattern to 66 Nm (49 ft.-lbs.).
15. Check and fill the rear axle as needed. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

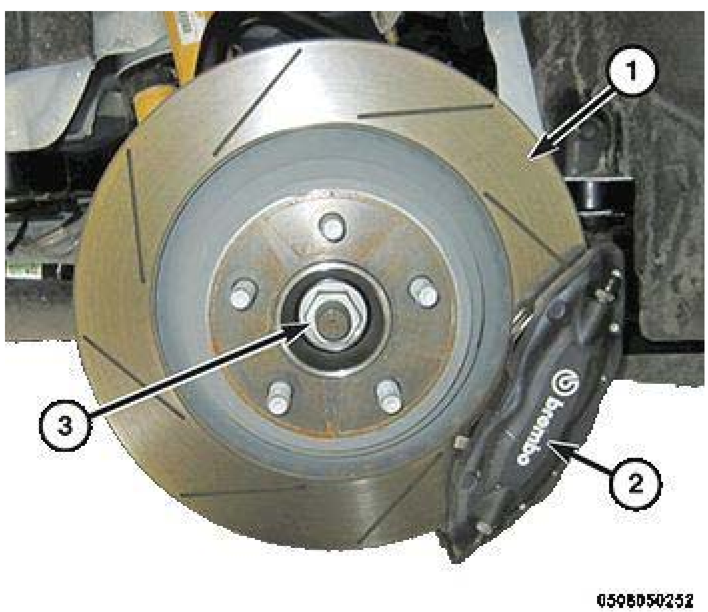
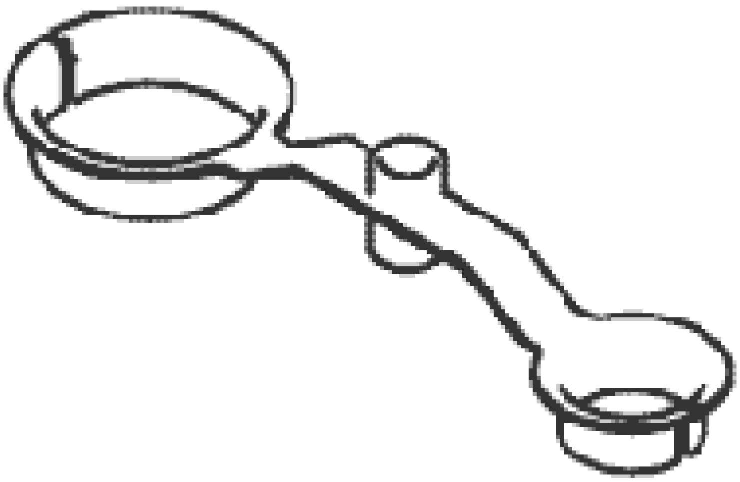


Fig. 24: Brake Rotor, Caliper & Hub Nut
Courtesy of CHRYSLER GROUP, LLC

16. Tighten the **NEW** hub nut (1) to the proper specification. Refer to **SPECIFICATIONS** .
17. Install the tire and wheel assembly. Refer to **INSTALLATION** .

SPECIAL TOOLS

SPECIAL TOOLS

	10270 - Protector, Half Shaft, Drive

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Article GUID: A00735944

2015-16 ACCESSORIES AND EQUIPMENT

Heated Glass - Service Information - Challenger

DESCRIPTION

DESCRIPTION

CAUTION: Grid lines can be damaged or scraped off with sharp instruments. Care should be taken in cleaning glass or removing foreign materials, decals or stickers. Normal glass cleaning solvents or hot water used with rags or toweling is recommended.

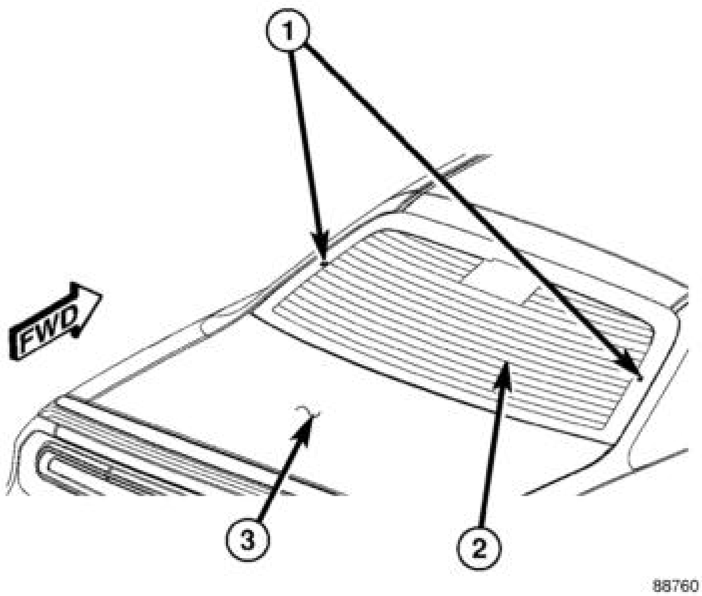

Fig. 1: Vertical Bus Bars, Grid Lines & Rear Window
Courtesy of CHRYSLER GROUP, LLC

- The rear window defogger system consists of two vertical bus bars and a series of grid lines fired onto the inside surface of the rear window.
- The defrost system is turned On or Off by push-button switches. The soft switch button is located in the U-Connect™ touch screen menu. The hard switch button is located on the center of the instrument panel center bezel.
- Circuit protection is provided by fuses located in the Power Distribution Center (PDC).

OPERATION

OPERATION

The rear window defogger (Electric Back Light) (EBL) system is actuated by a momentary switch located in the switchbank, or by using the control located in the U-Connect Touch ™ screen module. When a rear window defogger switch is pressed to on, the A/C heater module energizes the EBL relay in the Power Distribution Center (PDC), fused battery current is directed to the rear window defogger grid lines and to the heated outside

rear view mirrors, when equipped. The grid lines heat the glass to help clear the rear window and outside mirror surfaces of fog or frost.

An indicator lamp in the switchbank illuminates when the EBL system is on. The Heater, Ventilation and Air Conditioning Module (HVAC) contains the EBL system control circuitry, including the timer logic.

NOTE: **The EBL system turns off automatically after ten minutes of initial operation. Each following activation cycle of the EBL system will last five minutes.**

The EBL system automatically turns off after an initial programmed time interval of about ten minutes, as long as the ignition is left in the Run position. If a rear window defogger switch is pressed to on again after the initial time interval has expired, the EBL system will automatically turn off after about five minutes. The EBL system will also turn off if the ignition is set to any position other than Run, or by manually pressing the rear window defogger switch a second time.

Repair of the rear window defogger grid lines, bus bars, terminals or pigtail wires can be accomplished using the MoparÃ® Rear Window Defogger Repair Kit (Part Number 04549275) or equivalent. Refer to **GRID, DEFOGGER, STANDARD PROCEDURE**.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ELECTRIC BACKLIGHT (EBL) SYSTEM

NOTE: **Illumination of the defogger switch indicator lamp does not necessarily mean that electrical current is reaching the rear glass heating grid lines.**

NOTE: **See appropriate Wiring Information for circuit descriptions and diagrams of the rear window defogger system.**

Operation of the rear window defogger (Electric Back Light (EBL)) system can be confirmed by the following:

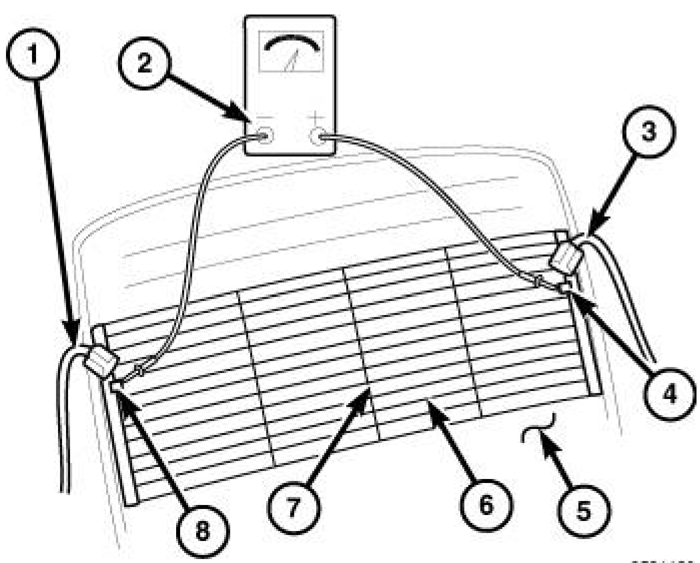

Fig. 2: Rear Window Glass Grid Test
Courtesy of CHRYSLER GROUP, LLC

1. Use the diagnostic scan tool to check for relevant codes to the EBL system. If no DTCs are found, go to 2. If any DTCs are found, repair as required, then proceed to step 2.
2. With the ignition in the Run position, press a rear window defogger switch to on.
3. Rear window defogger operation can be checked by feeling the rear window glass (5), or the heated outside rear view mirror glass, when equipped with heated mirrors. After three to four minutes of operation, a distinct difference in temperature should be detected between the clear glass area and the heated glass area, or the heated mirror glass.
4. If a temperature difference is not detected, use a 12 volt Direct Current (DC) voltmeter and contact the rear glass heating grid terminal A (8) with the negative lead, and terminal B (4) with the positive lead. The voltmeter should read battery voltage. If the voltmeter does not read battery voltage, check the following:
   - Confirm the ignition is in the Run position.
   - Confirm the rear window defogger switch is on.
   - Check the EBL fuse in the Power Distribution Center (PDC). The fuse must be tight in its receptacle and its electrical connections must be secure.
   - Confirm the EBL feed wire (3) is connected to the heating grid positive terminal and that there is continuity between the heating grid and the EBL relay in the PDC.
   - Confirm the EBL ground wire (1) is connected to the heating grid negative terminal and that there is continuity to ground.
5. Visually inspect the bus bars, horizontal defogger grid lines (6) and vertical defogger grid lines (7) for damage which could cause an open circuit condition. If a broken grid line or bus bar is found, repair as required. Refer to **GRID, DEFOGGER, STANDARD PROCEDURE**.
6. If the EBL system operation has been verified but the rear window defogger indicator lamp in the switchbank does not illuminate, replace the switchbank pod. Refer to **POD, SWITCH BANK, REMOVAL** .

GRID, DEFOGGER

STANDARD PROCEDURE

STANDARD PROCEDURE - GRID LINE AND TERMINAL REPAIR

WARNING: Materials contained in the Repair Kit (Part Number 04549275) may cause skin or eye irritation. The kit contains epoxy resin and amine type hardener, which are harmful if swallowed. Avoid contact with the skin and eyes. For skin contact, wash the affected areas with soap and water. For contact with the eyes, flush with plenty of water. Do not take internally. If taken internally, induce vomiting and call a physician immediately. Use with adequate ventilation. Do not use near fire or flame. Contains flammable solvents. Keep out of the reach of children. Failure to follow these instructions may result in serious or fatal injury.

Repair of the rear glass heating grid lines, bus bars, terminals or pigtail wires can be accomplished using the MoparÂ® Rear Window Defogger Repair Kit.

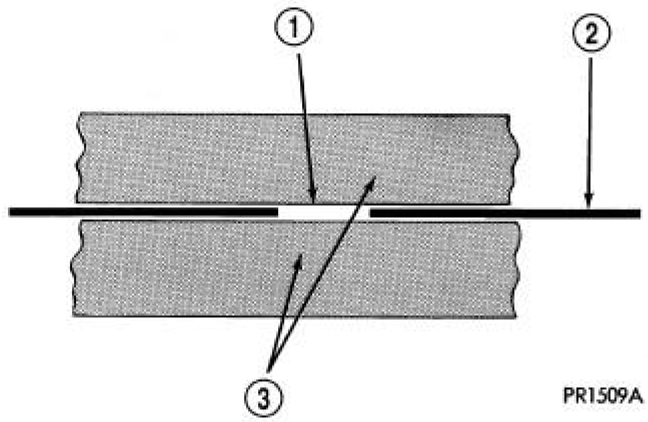

Fig. 3: Masking Tape, Grid Line & Break
Courtesy of CHRYSLER GROUP, LLC

1. Mask the repair area with masking tape (3) so that the conductive epoxy can be applied neatly. Extend the epoxy application onto the grid line (2) or the bus bar on each side of the break (1).
2. Follow the instructions in the repair kit for preparing the damaged area.
3. Remove the package separator clamp and mix the two conductive epoxy components thoroughly within the packaging. Fold the package in half and cut the center corner to dispense the epoxy.
4. Apply the epoxy through the slit in the masking tape or template. Overlap both ends of the break by at least 19 millimeters (0.75 inch).
5. For a terminal or pigtail wire replacement, mask the adjacent areas so the epoxy can be extended onto the adjacent grid line as well as the bus bar. Apply a thin layer of epoxy to the area where the terminal or pigtail wire was fastened and onto the adjacent grid line.
6. Apply a thin layer of conductive epoxy to the terminal or bare wire end of the pigtail and place it in the proper location on the bus bar. To prevent the terminal or pigtail wire from moving while the epoxy is curing, it must be wedged or clamped.
7. Carefully remove the masking tape or template.

CAUTION: Do not allow the glass surface to exceed 204Ā° C (400Ā° F) when using a heat gun, or the glass may fracture.

8. Allow the epoxy to cure 24 hours at room temperature, or carefully use a heat gun for 15 minutes. When using a heat gun, hold it approximately 25.4 centimeters (10 inches) from the repair and do not allow the glass surface to exceed 204Ā° C (400Ā° F).
9. After the conductive epoxy is properly cured, remove the wedge or clamp from the terminal or pigtail wire.
10. Connect the wire harness leads to the grid terminals or pigtail wires and verify EBL operation.

SWITCH, DEFOGGER

DESCRIPTION

DESCRIPTION

NOTE: Automatic Temperature Control (ATC) shown in illustration. Manual

Temperature Control (MTC) similar.

Fig. 4: Rear Window Defogger Controls
Courtesy of CHRYSLER GROUP, LLC

The controls (1) for the rear window defogger, also know as the Electric Back Light (EBL) system, are located in the switchbank and in the U-Connect Touch ™ screen module, at the center of the instrument panel. An amber indicator lamp in the switchbank illuminates when the EBL system is on.

OPERATION

OPERATION

The rear window defogger (Electric Back Light) (EBL) system is actuated by a momentary switch located in the switchbank, or by using the control located in the U-Connect Touch ™ screen module. When a rear window defogger switch is pressed to on, the HVAC module energizes the EBL relay in the Power Distribution Center (PDC) and fused battery current is directed to the rear window defogger grid lines and the heated outside rear view mirrors, when equipped. The grid lines heat the glass to help clear the rear window and outside mirror surfaces of fog or frost.

An amber indicator lamp in the switchbank illuminates when the EBL system is on. The Heater, Ventilation and Air Conditioning Module (HVAC) contains the EBL system control circuitry, including the timer logic.

NOTE: **The EBL system turns off automatically after ten minutes of initial operation. Each following activation cycle of the EBL system will last five minutes.**

The EBL system automatically turns off after an initial programmed time interval of about ten minutes, as long as the ignition is left in the Run position. If a rear window defogger switch is pressed to on again after the initial time interval has expired, the EBL system will automatically turn off after about five minutes. The EBL system will also turn off if the ignition is turned to any position other than run, or by manually pressing the rear window defogger switch a second time.

The individual rear window defogger switch located in the switchbank cannot be adjusted or repaired. If a rear

window defogger switch or indicator lamp is inoperative or damaged, the entire switchbank must be replaced.

The individual rear window defogger switch located in the U-Connect Touch ™ screen module cannot be adjusted or repaired. If a rear window defogger switch is inoperative or damaged, the entire U-Connect Touch ™ screen module must be replaced.

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Article GUID: A00735938

DESCRIPTION

DESCRIPTION

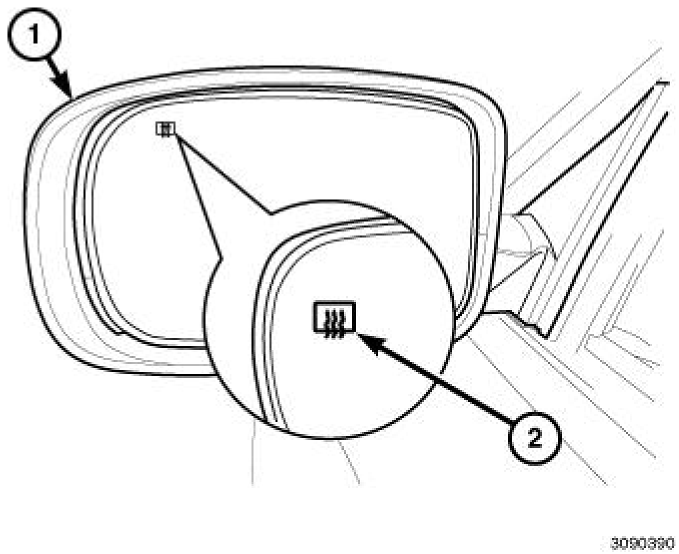

Fig. 1: Heated Outside Rear View Mirrors Defogger Symbol
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with electrically heated outside rear view mirrors (1) can be visually identified by the International Standards Organization (ISO) symbol for rear window defogger (2) on the mirror glass.

The heated mirror system operates in concert with the rear window defogger system, also known as the Electric Back Light (EBL) system, and is actuated by a momentary switch located in the switchbank, or by using the control located in the U-Connect Touch ™ screen module. When a rear window defogger switch is pressed to on, the Heater, Ventilation and Air Conditioning Module (HVAC) energizes the EBL relay in the Power Distribution Center (PDC), and fused battery current is directed to the rear window defogger grid lines and to the heated outside rear view mirrors. Heating the outside mirror glass helps clear the mirror surfaces of fog or frost.

An amber indicator lamp in the switchbank illuminates when the EBL system is on. The HVAC module contains the EBL system control circuitry, including the timer logic.

NOTE: **The EBL system turns off automatically after ten minutes of initial operation. Each following activation cycle of the EBL system will last five minutes.**

The EBL system automatically turns off after an initial programmed time interval of about ten minutes, as long as the ignition is left in the Run position. If a rear window defogger switch is pressed to on again after the initial time interval has expired, the EBL system will automatically turn off after about five minutes. The EBL system will also turn off if the ignition is set to any position other than Run, or by manually pressing the rear window defogger switch a second time.

Circuit protection for the heated mirror system is provided by a fuse in the Body Control Module (BCM).

OPERATION

OPERATION

When the rear window defogger switch is pressed, the rear window defogger (Electric Back Light) (EBL) system becomes activated and an electric heater grid located behind the glass of each of the outside rear view mirrors is energized. When energized, each of these heater grids produce heat to help clear the outside rear view mirrors of ice, snow, or fog.

If the outside mirror heating grids are both inoperative, refer to **DIAGNOSIS AND TESTING** . If only one of the outside mirror heating grids is inoperative, refer to **DIAGNOSIS AND TESTING** .

The heating grid behind each outside mirror glass cannot be repaired and the mirror glass must be replaced if inoperative or damaged. Refer to **MIRROR, OUTSIDE REARVIEW, GLASS, REMOVAL** .

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Article GUID: A00735971

2015-16 ACCESSORIES AND EQUIPMENT

Heated Seats - Service Information - Challenger

DESCRIPTION

DESCRIPTION

Vehicles with the optional heated seat system can be visually identified by the two heated seat switches located in the Radio Receiver Module (RRM), in the center of the instrument panel. The heated seat system allows the driver and front seat passenger to select from two different levels of electrical seat heating (HI and LO).

The heated seat system includes the following major components:

- **Heated Seat Switches** - Two heated seat switches are used, one for each front heated seat. Both switches are integral to the radio. Refer to **SWITCH, HEATED SEAT, DESCRIPTION**.
- **Heated Seat Module** - One Heated Seat Module (HSM) is used per vehicle. The HSM is mounted under the front passenger seat and contains the control logic and software for the heated seat system. The HSM communicates over the CAN data bus.
- **Heated Seat Elements** - Each front seat contains two heated seat elements, one on the seat back cushion and the other on the seat bottom cushion. The heated seat elements are hard-wired to the CSWM. Refer to **PAD, HEATER, DESCRIPTION**.

OPERATION

OPERATION

The Heated Seat Module (HSM) controls the heated seat system and the Heated Steering Wheel (HSW), when equipped. The HSM is secured to a mounting bracket located under the front passenger seat. The HSM responds to heated seat and steering wheel switch messages and ignition status inputs by controlling the 12 volt Direct Current (DC) output to the seat and steering wheel heating elements through high side drivers.

When either of the front heated seat switches in the U-Connect Touch™ screen module are pressed, the module sends a message over the Controller Area Network (CAN) data bus to the HSM, signaling the HSM to energize the heating elements for the front seat.

When the HSW switch in the U-Connect Touch™ screen module is pressed, the module sends a message over the Controller Area Network (CAN) data bus to the HSM, signaling the HSM to energize the heating element for the steering wheel.

The HSM energizes a high side driver to pulse width modulate the output to the heating elements. Heated seats turn off after approximately 45 minutes of continuous operation. If high-level heating is selected, the control system will remain at the high level for approximately 20 minutes and then drop to the low level. Normal heating cycle for the heated steering wheel is 52 minutes.

The heated seat and steering wheel system only operate when the engine is running. The heated seat and steering wheel system will turn off automatically whenever the ignition is set to any position other than Run.

The HSM is diagnosed using a scan tool and will automatically turn off the heating elements if it detects an open or low short in a heating element circuit. Refer to **DIAGNOSIS AND TESTING** .

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HEATED SEAT SYSTEM

NOTE:	**Vehicles equipped with the heated seat option utilize a low voltage cut-off feature. This feature turns off power to the heated seat system anytime vehicle voltage is below 9.0 volts or above 16.0 volts. Be certain to check the vehicle electrical system for proper voltage anytime the heated seat system appears inoperative.**

NOTE:	**If a Diagnostic Trouble Code (DTC) can not be verified, it is a good indication that an intermittent fault condition may be present. To help find an intermittent problem, sit in the seat in question and move around the heating elements within the seat while testing continuity. Wiggle the heated seat wire harness and electrical connectors while testing continuity.**

NOTE:	**For complete circuit diagrams, refer to appropriate SYSTEM WIRING DIAGRAMS article . Wiring Information includes wiring diagrams, connector pin-out and location views, details of wire harness routing and retention, splice and ground locations and proper wire and connector repair procedures.**

Before testing any individual components in the heated seat system, check the following:

- Check to see if the concern is isolated to only one seat. Operate the other heated seat.
- Check the ignition fuse in the Power Distribution Center (PDC) and repair if necessary.
- Using a scan tool, check for any Diagnostic Trouble Codes (DTCs) related to the Heated Seat Module (HSM) and the U-Connect Touch ™ screen module. If any DTCs are found, repair as necessary.
- Check the vehicles battery open-circuit voltage and charging system performance. If the vehicle's electrical system is defective or weak it may not be suppling sufficient energy to operate the heated seat system.
- If there are no DTCs and the front heated seat system functions properly, but a heated seat switch indicator does not illuminate, the entire U-Connect Touch ™ screen module must be replaced.

PAD, HEATER

DESCRIPTION

DESCRIPTION

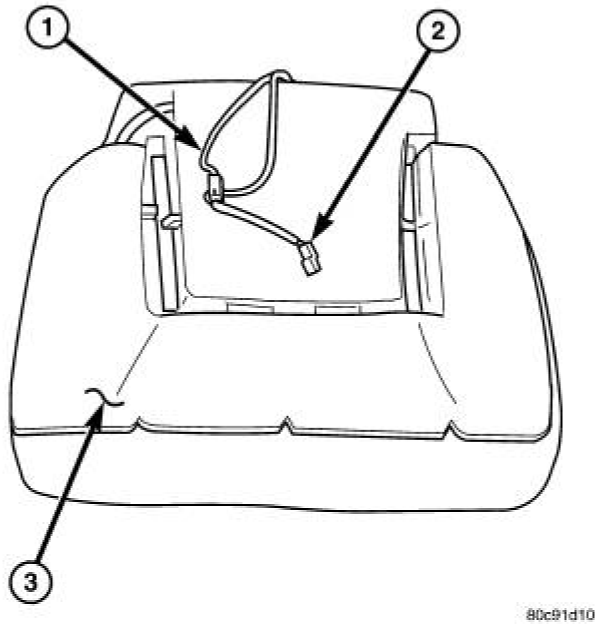


Fig. 1: Heated Seat Element, Seat Cushion & Connector
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the optional heated seat system have two heated seats. One heating element (1) is used for each seat bottom cushion and another heating element is used for each seat back cushion.

All of the heated seat elements consist of multiple heating circuits operating in parallel throughout the carbon fiber element and a wire lead and connector (2). The heated seat elements are captured between the seat cover and the seat cushion (3).

OPERATION

OPERATION

Battery current is directed to the heated seat elements by the Comfort Seat and Wheel Module (CSWM). The CSWM will energize the heated seat elements when a heated seat switch is pressed on.

As a Pulse Width Modulated (PWM) current passes through each heated seat element, the resistance of the wire used in the element disperse some of the electrical current in the form of heat. The heat produced by the heated seat element then radiates through the seat bottom and seat back covers, warming the seat covers and its occupant. The seat temperature is controlled/monitored by a signal to the CSWM from a Temperature Sensor thermistor which is part of the seat cushions. There is a thermistor in each heated seat.

The heated seat elements cannot be repaired and must be replaced if inoperative or damaged.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HEATED SEAT ELEMENT

NOTE:	**For a complete wiring diagram, refer to appropriate SYSTEM WIRING DIAGRAMS article . Wiring Information includes wiring diagrams, connector pin-out, and location views, details of wire harness routing and retention, splice**

and ground locations.

NOTE: **When checking heated seat elements for continuity, be certain to move the heating element being checked. Moving the element, such as sitting in the seat will eliminate the possibility of an intermittent open or short in the element which would only be evident if the element was in a certain position. Actual seat position can cause the wiring to stretch, pinch or short. Also not the proper routing of the wiring harness.**

1. Locate and disconnect the seat heating element electrical connectors as necessary.
2. Check the resistance between the circuits leading in and out of the suspect heated seat element. The resistance should be between the specifications listed in the following Heated Seat Element Resistance chart. If OK, refer to **DIAGNOSIS AND TESTING**. If not OK, replace the inoperative heated seat element. Refer to **PAD, HEATER, REMOVAL**.

HEATED SEAT ELEMENT RESISTANCE

Element Location	Acceptable Resistance Value
Driver Seat Bottom Cushion	7.8 - 9.6 ohms
Passenger Seat Bottom Cushion	8.4 - 10.4 ohms
Driver and Passenger Seat Back Cushion	8.5 - 10.6 ohms

REMOVAL

FRONT SEAT BACK

WARNING: **Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury. Refer to WARNING .**

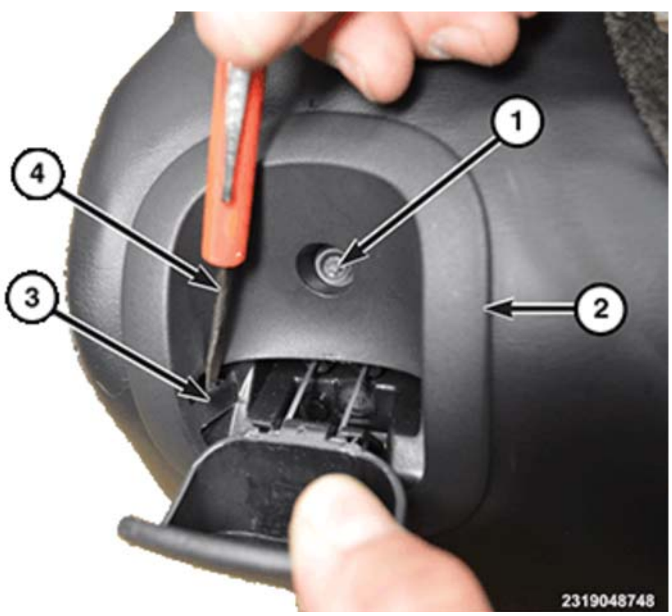


Fig. 2: Seat Back Release Cable Bezel, Tabs, Tool & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, FRONT, WARNING** .
2. Remove the front seat back. Refer to **SEAT BACK, FRONT, REMOVAL** .
3. Remove the front seat back panel. Refer to **PANEL, SEAT BACK, FRONT, REMOVAL** .
4. Remove the screw (1) from the seat back release cable bezel (2).
5. Using a small bladed tool (4), release the tabs (3) and remove the seat back release cable bezel.

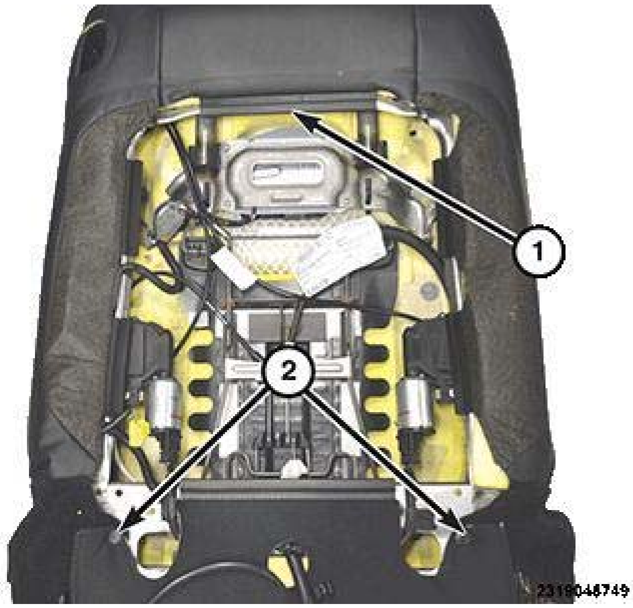


Fig. 3: J-Clip Retainers & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Remove the two push fasteners (2).
7. Release all the J-clip retainers (1).

Fig. 4: Headrest Sleeve & Tab
Courtesy of CHRYSLER GROUP, LLC

8. Reach up behind the seat back cover and push the tab (1) of the headrest sleeve (2) and pull out to remove.

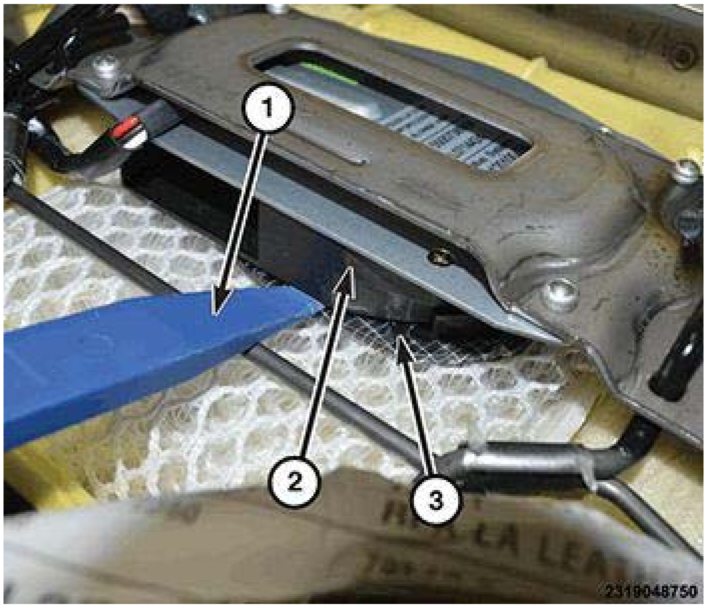


Fig. 5: Prying Seat Back Ventilation Plenum
Courtesy of CHRYSLER GROUP, LLC

9. Using a trim stick (1) or equivalent, pry the seat back ventilation plenum (3) from the seat back blower (2), if equipped.
10. Remove the seat back foam and seat back cover as an assembly, from the seat back frame.

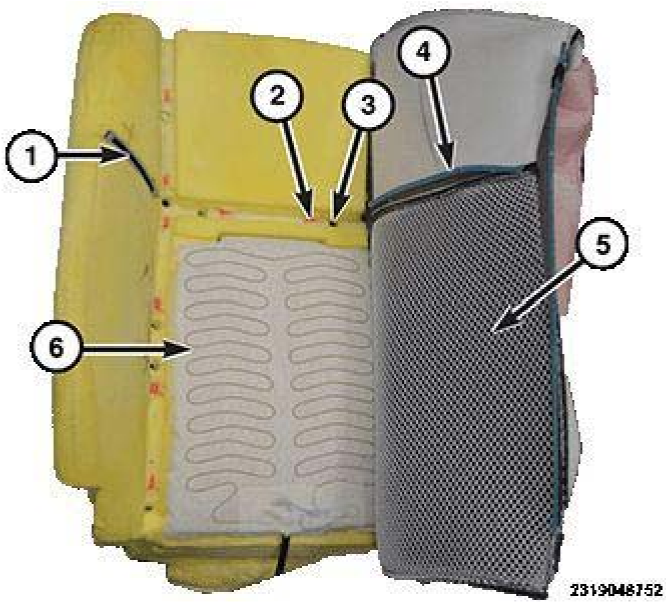


Fig. 6: Seat Back Cover, Fastener & Clips
Courtesy of CHRYSLER GROUP, LLC

11. Pull at the sides of the seat back cover (5) to release the hook and loop fastener (1).

12. Pull the seat back cover away from the foam and carefully release the clip strips (4) from the molded clips (2).
13. Remove the heated seat pad (6) from the foam.

FRONT SEAT BOTTOM

WARNING: **Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury. Refer to WARNING ..**

NOTE: **On all models, the front passenger seat contains an Occupant Detection Sensor (ODS) to provide information to the Occupant Restraint Controller (ORC). When servicing the front passenger seat, if required, remove the ODS from the seat bottom cushion and discard the sensor. Refer to SENSOR, OCCUPANT DETECTION, REMOVAL .**

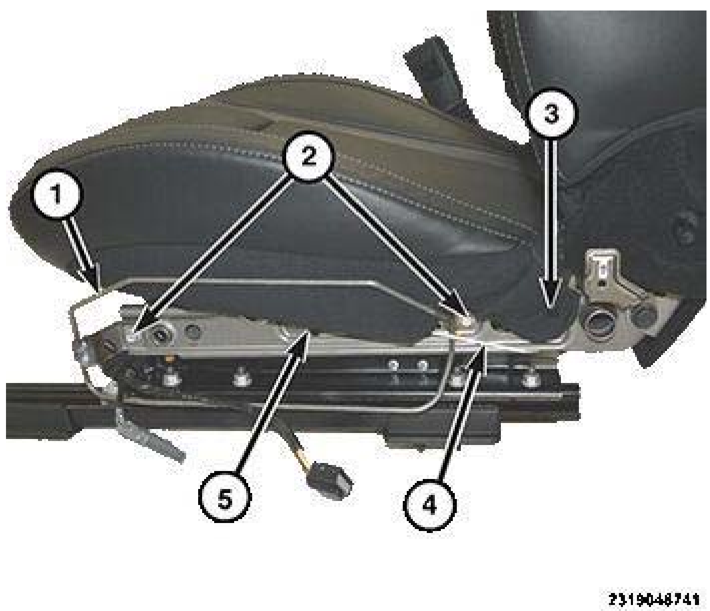


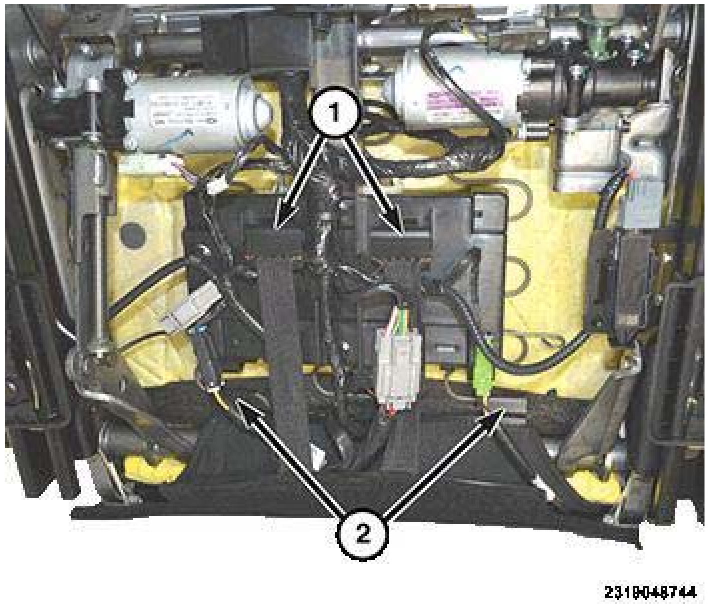
Fig. 7: Side Bracket, String, Fastener, Retainer & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to SEATS, FRONT, WARNING .
2. Remove the seat. Refer to SEAT, FRONT, REMOVAL .
3. Remove the seat side shields. Refer to SIDE SHIELDS, SEAT CUSHION, FRONT, REMOVAL .
4. Unhook the tether string (4) from the seat frame.

NOTE: **Note the routing of the tether string, for correct installation.**

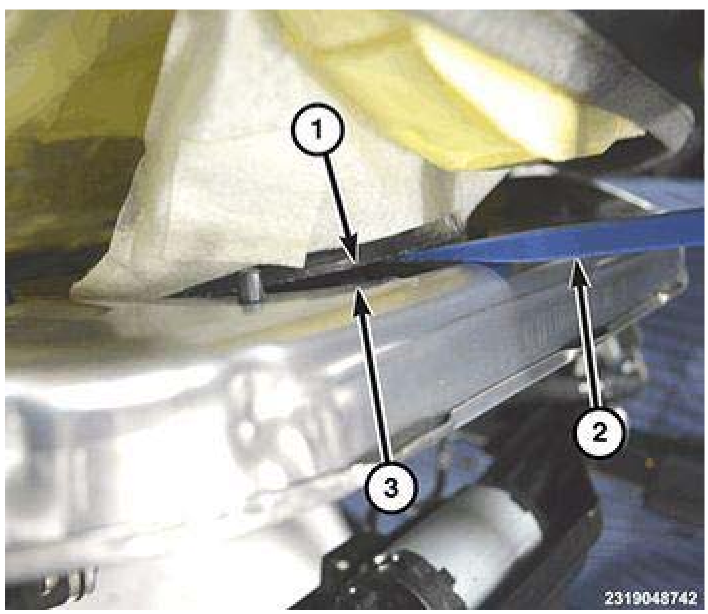
5. Remove the push fastener (3).
6. Remove the two bolts (2) and the seat side bracket (1). Position aside.

7. Release the J-hook retainer (5) from the side of the seat adjuster.



[Fig. 8: J-Hook Retainers](#)
Courtesy of CHRYSLER GROUP, LLC

8. Release the J-hook retainers (1) and (2) at the bottom of the seat.

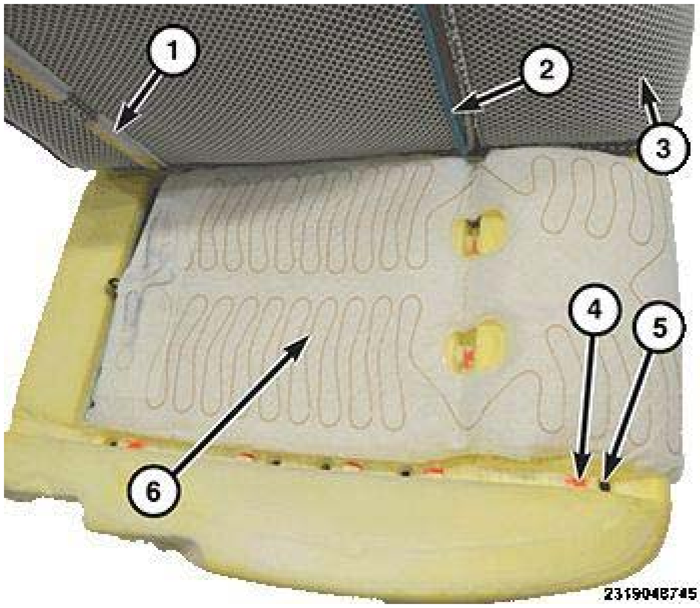


[Fig. 9: Prying Seat Cushion Ventilation Plenum From Seat Cushion Blower](#)
Courtesy of CHRYSLER GROUP, LLC

9. Carefully unwrap the cover and foam at the front of the seat cushion. Using a trim stick (2) or equivalent, pry the seat cushion ventilation plenum (1) from the seat cushion blower (3), if equipped.
10. Remove the seat cover and the seat foam as an assembly, from the seat adjuster.

NOTE: **Note the wire harness routing for correct installation.**

11. Disconnect the wire harness connector.



[Fig. 10: Seat Cushion Cover, Clips & Fastener](#)
Courtesy of CHRYSLER GROUP, LLC

12. Pull at the rear of the seat cushion cover (3) to release the hook and loop fastener (1).
13. Pull the seat cushion cover away from the foam and carefully release the clip strips (2) from the molded clips (4).
14. Remove the heated seat pad (6) from the seat cushion.

INSTALLATION

FRONT SEAT BACK

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury. Refer to WARNING .

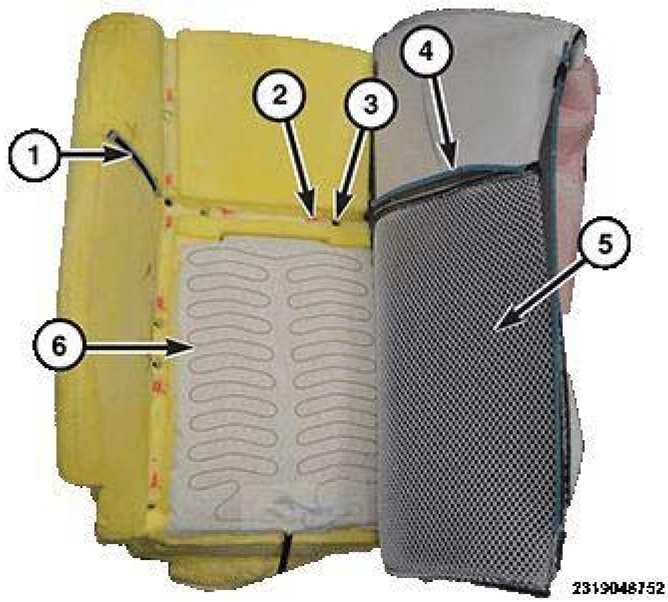


Fig. 11: Seat Back Cover, Fastener & Clips
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to SEATS, FRONT, WARNING .
2. Install the heated seat pad (6) to the seat back foam.
3. Position the seat back cover (3) onto the seat back foam and align the clip strips (4) to the molded clips (2).

NOTE: **Note that there is a hole (3) in the foam, next to each molded clip, to aid in clip strip alignment/installation.**

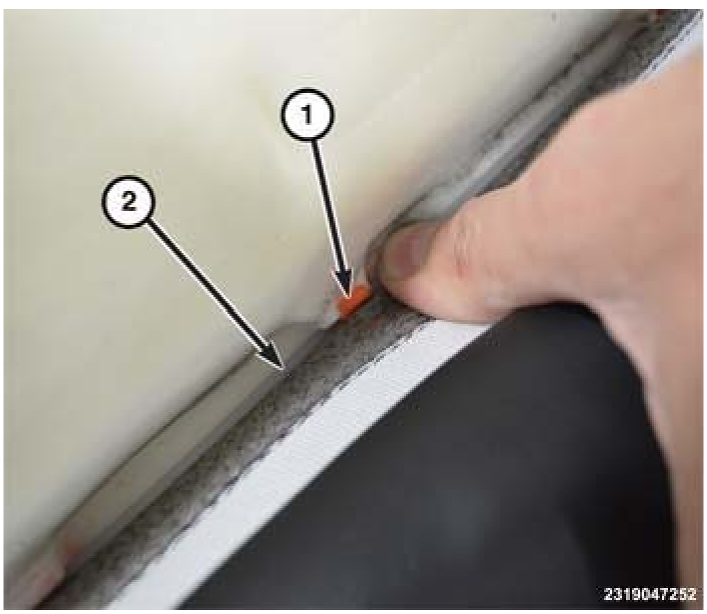


Fig. 12: Clip Strip & Molded Clip
Courtesy of CHRYSLER GROUP, LLC

4. Press the clip strip (2) into each molded clip (1).

5. Pull the seat back cover tight and fasten the hook and loop fastener on the seat back cushion.

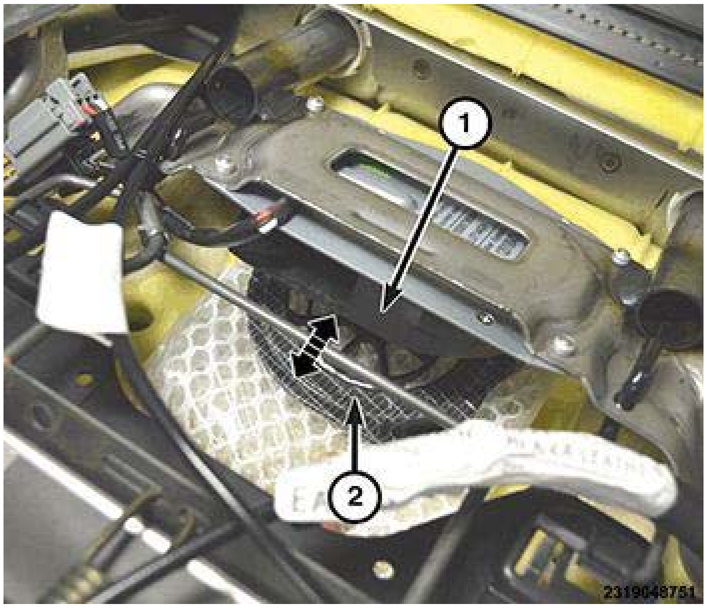


Fig. 13: Aligning Seat Back Ventilation Plenum
Courtesy of CHRYSLER GROUP, LLC

6. Position the seat back cushion assembly onto the seat back frame.
7. Align the seat cushion ventilation plenum (2) with the seat cushion blower (1) and snap into place, if equipped.

Fig. 14: Headrest Sleeve & Tab
Courtesy of CHRYSLER GROUP, LLC

8. Install the headrest sleeves (1) and hand tap to engage the tab (1).

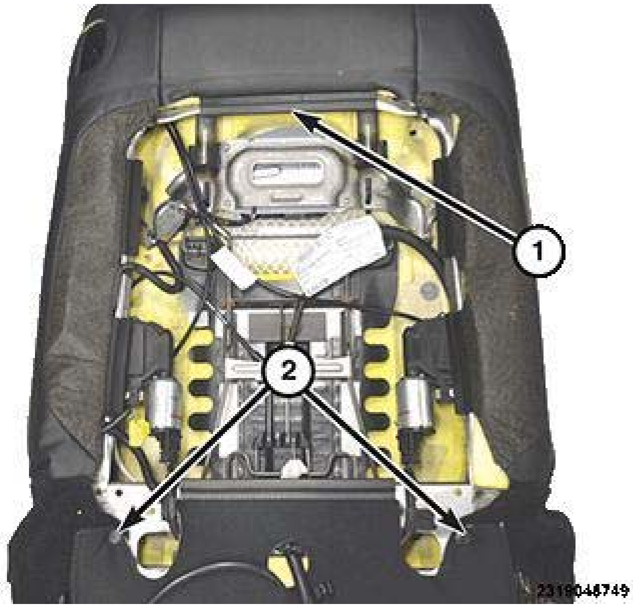


Fig. 15: J-Clip Retainers & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

9. Install all the J-clip retainers (1).
10. Install the two push fasteners (2).

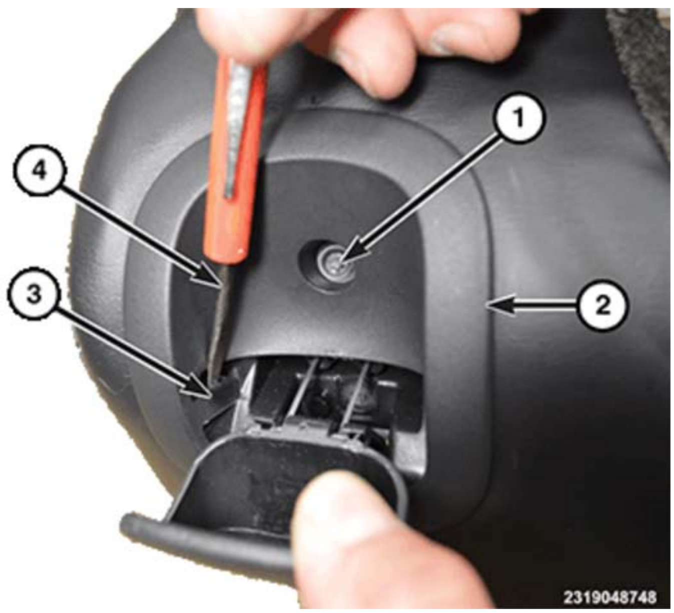


Fig. 16: Seat Back Release Cable Bezel, Tabs, Tool & Screw
Courtesy of CHRYSLER GROUP, LLC

11. Position the seat back release cable bezel (2) and push by hand to engage the tabs (3). Install the screw (1) and tighten securely.
12. Install the front seat back. Refer to **INSTALLATION** .
13. Install the front seat. Refer to **SEAT, FRONT, INSTALLATION** .

FRONT SEAT BOTTOM

WARNING: **Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury. Refer to WARNING .**

NOTE: **On all models, the front passenger seat contains an Occupant Detection Sensor (ODS) to provide information to the Occupant Restraint Controller (ORC).**

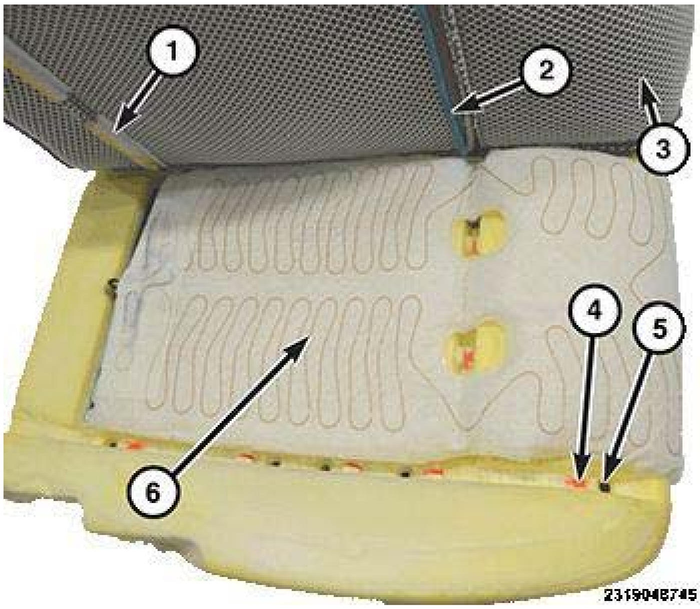
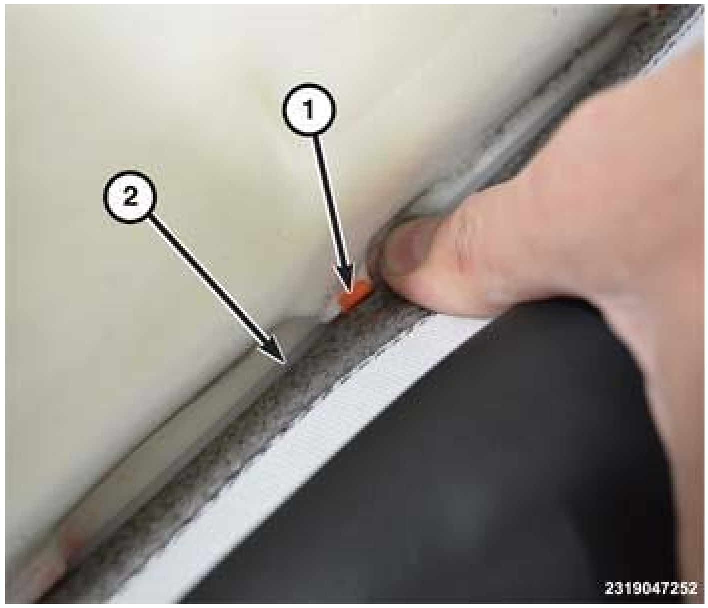


Fig. 17: Seat Cushion Cover, Clips & Fastener
Courtesy of CHRYSLER GROUP, LLC

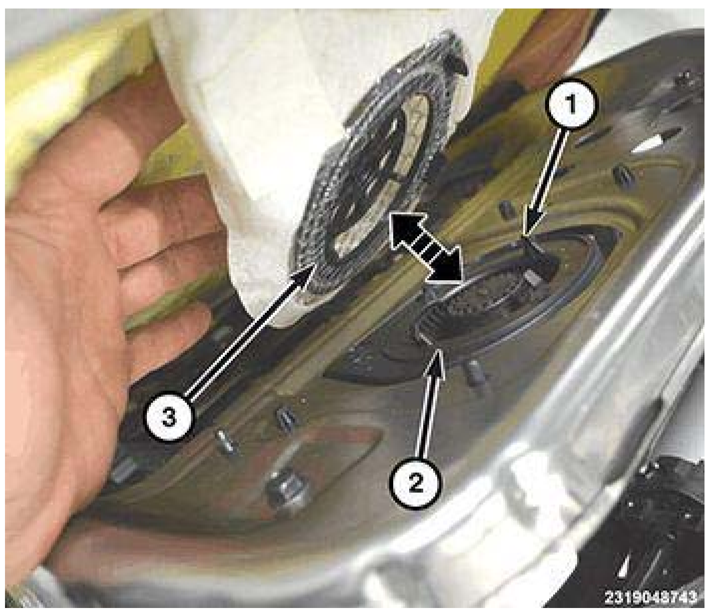
1. Insert the new heated seat pad (6) to the seat foam as shown in illustration.
2. Position the seat cover (3) onto the seat foam and align the clip strips (2) to the molded clips (4).

NOTE: **Note that there is a hole (5) in the foam, next to each molded clip, to aid in clip strip alignment/installation.**



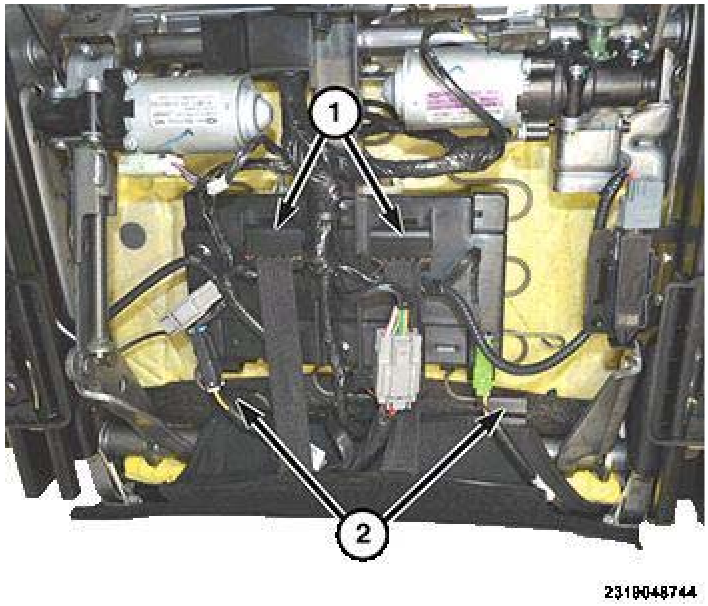
[Fig. 18: Clip Strip & Molded Clip](#)
Courtesy of CHRYSLER GROUP, LLC

3. Press the clip strip (2) into each molded clip (1).
4. Pull the seat cover tight and fasten the hook and loop fastener at the rear of the seat cushion.



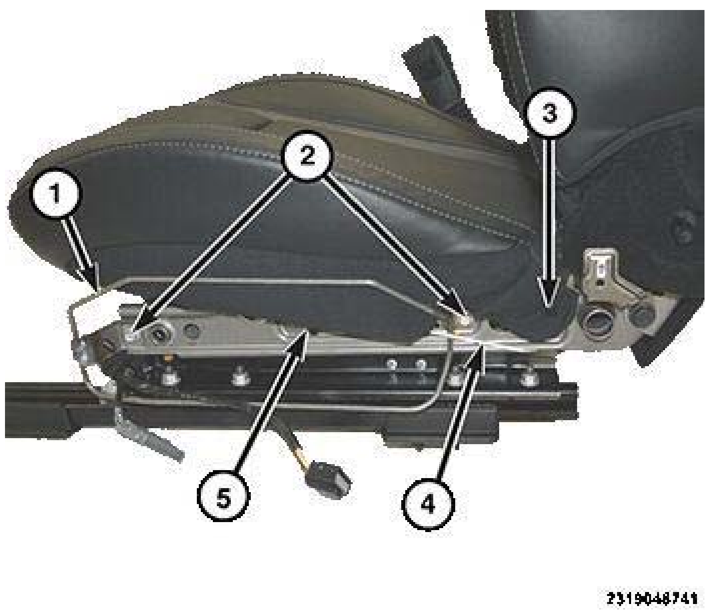
[Fig. 19: Aligning Seat Cushion Ventilation Plenum With Tabs](#)
Courtesy of CHRYSLER GROUP, LLC

5. Position the cushion assembly onto the seat adjuster.
6. Align the seat cushion ventilation plenum (3) with the tabs (1) on the seat cushion blower (2) and snap into place, if equipped.



[Fig. 20: J-Hook Retainers]
Courtesy of CHRYSLER GROUP, LLC

7. Route the wire harness, if equipped, and install the J-hook retainers (1) at the bottom of the seat.
8. When servicing the front passenger seat, if required, install the Occupant Detection Sensor (ODS) to the seat bottom cushion. Refer to **INSTALLATION** .



[Fig. 21: Side Bracket, String, Fastener, Retainer & Bolts]
Courtesy of CHRYSLER GROUP, LLC

9. Secure the J-hook retainer (5) to the side of the seat adjuster.
10. Install the seat side bracket (1) and tighten the bolts (2) securely.
11. Hook the tether string (4) to the seat. Make sure the tether string is routed as noted during removal.
12. Install the push fastener (3).
13. Install the seat side shields. Refer to **SIDE SHIELDS, SEAT CUSHION, FRONT, INSTALLATION** .

14. Install the seat. Refer to **SEAT, FRONT, INSTALLATION** .

SWITCH, HEATED SEAT

DESCRIPTION

DESCRIPTION

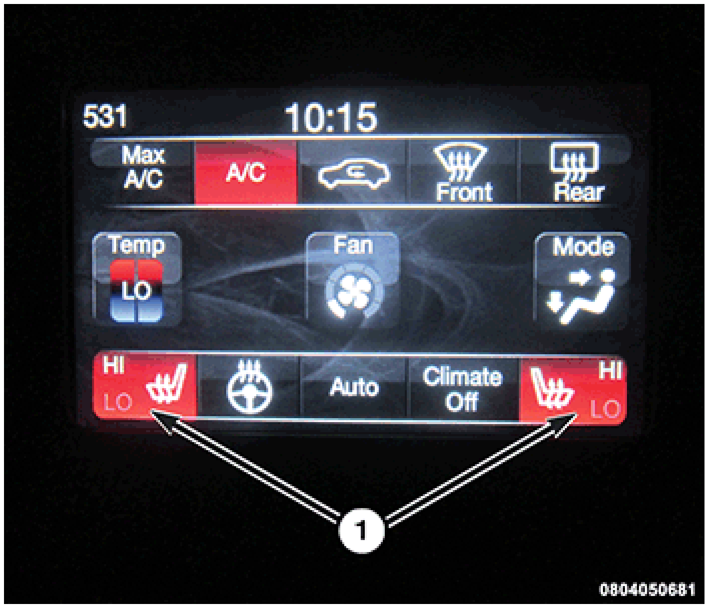


Fig. 22: Heated Seat Switches
Courtesy of CHRYSLER GROUP, LLC

The heated seat switches (1) for the optional front heated seat system are located in the U-Connect Touch ™ screen module, at the center of the instrument panel. The heated seat system allows the driver and front seat passenger to select from two different levels of electrical seat heating (HI and LO). When the heated seat switches are pressed on, each heated seat switch illuminates either HI or LO.

OPERATION

OPERATION

When either of the hard or soft front heated seat switches are pressed with the engine running, a signal is sent to the Comfort Seat and Wheel Module (CSWM) over the Controller Area Network (CAN) IHS data bus, signaling the module to energize the heating elements for the selected seat. Indicator lamps illuminate for each heated seat switch and indicate the level of heat in use (HI or LO). Pressing a heated seat switch once will select high-level heating and pressing the same switch a second time will select low-level heating. Pressing the switch a third time will shut the heating elements off.

The CSWM energizes the integral solid-state relays that supply Pulse Width Modulated (PWM) current to the heating elements. During high-temperature level operation, the HI indicator illuminates on the U-Connect Touch ™ screen. After 50 minutes of high-temperature level heating, the CSWM automatically lowers the heat level to low. At that time, the LO indicator illuminates on the U-Connect Touch ™ screen. Operation on the low-temperature level setting will automatically turn off after 45 minutes.

The individual front heated seat switches located in the U-Connect Touch ™ screen module cannot be adjusted

or repaired. If a front heated seat switch or indicator is inoperative or damaged, the entire U-Connect Touch ™ screen module must be replaced. Refer to **RADIO, REMOVAL** .

REMOVAL

REMOVAL

The individual front heated seat switches located in the U-Connect Touch ™ screen radio receiver module cannot be adjusted or repaired. If a front heated seat switch or indicator is inoperative or damaged, the entire radio must be replaced. Refer to **RADIO, REMOVAL** .

INSTALLATION

INSTALLATION

The individual front heated seat switches located in the U-Connect Touch ™ screen radio receiver module cannot be adjusted or repaired. If a front heated seat switch or indicator is inoperative or damaged, the entire radio must be replaced. Refer to **RADIO, INSTALLATION** .

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Article GUID: A00735949

2015-16 HVAC

Heating & Air Conditioning - Electrical Diagnostics - Dodge Challenger

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
B1030-11	EVAPORATOR TEMPERATURE SENSOR CIRCUIT - SHORT TO GROUND
B1030-15	EVAPORATOR TEMPERATURE SENSOR CIRCUIT - SHORT TO BATTERY OR OPEN
B1058-13	RECIRCULATION DOOR CONTROL CIRCUIT - OPEN
B1058-92	RECIRCULATION DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B105C-00	RECIRCULATION DOOR TRAVEL RANGE TOO SMALL
B105D-00	RECIRCULATION DOOR TRAVEL RANGE TOO LARGE
B106A-01	REAR-DEFROST-(EBL)-CONTROL CIRCUIT-GENERAL ELECTRICAL FAILURE
B10B2-00	A-C-COOL-DOWN-TEST-PERFORMANCE
B10E8-12	BLOWER MOTOR CONTROL CIRCUIT - SHORT TO BATTERY
B10E8-14	BLOWER MOTOR CONTROL CIRCUIT - SHORT TO GROUND OR OPEN
B1107-11	CABIN TEMPERATURE SENSOR 1 CIRCUIT - SHORT TO GROUND
B1107-15	CABIN TEMPERATURE SENSOR 1-CIRCUIT SHORT TO BATTERY OR OPEN
B11C2-13	FRONT MODE DOOR 1 CONTROL CIRCUIT - OPEN
B11C2-92	FRONT MODE DOOR 1 CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11C3-00	FRONT MODE DOOR 1 TRAVEL RANGE TOO SMALL
B11C4-00	FRONT MODE DOOR 1 TRAVEL RANGE TOO LARGE
B11C8-13	RIGHT TEMPERATURE DOOR CONTROL CIRCUIT -OPEN
B11C8-92	RIGHT TEMPERATURE DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11C9-00	RIGHT TEMPERATURE DOOR TRAVEL TOO SMALL
B11CA-00	RIGHT TEMPERATURE DOOR TRAVEL TOO LARGE
B11CB-13	MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT OPEN
B11CB-92	MAIN/LEFT TEMPERATURE DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11CC-00	MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO SMALL
B11CD-00	MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO LARGE
B11D3-00	A/C COOLDOWN TEST PERFORMANCE - COMPRESSOR NOT ENGAGED
B11D5-00	A/C COOLDOWN TEST PERFORMANCE - EVAP TEMP SENSOR ERROR
B11FE-11	VARIABLE A/C COMPRESSOR CONTROL - CIRCUIT SHORT TO GROUND
B11FE-12	VARIABLE A/C COMPRESSOR CONTROL - CIRCUIT SHORT TO BATTERY

DTC	Description
B11FE-13	VARIABLE A/C COMPRESSOR CONTROL - CIRCUIT OPEN
B1600-11	LEFT SOLAR SENSOR - CIRCUIT SHORT TO GROUND
B1600-15	LEFT SOLAR SENSOR - CIRCUIT SHORT TO BATTERY OR OPEN
B1603-11	RIGHT SOLAR SENSOR - CIRCUIT SHORT TO GROUND
B1603-15	RIGHT SOLAR SENSOR - CIRCUIT SHORT TO BATTERY OR OPEN
B160F-11	TWILIGHT/AMBIENT LIGHT SENSOR INPUT - CIRCUIT SHORT TO GROUND
B160F-15	TWILIGHT-AMBIENT LIGHT SENSOR - CIRCUIT SHORT TO BATTERY OR GROUND
B210A-84	SYSTEM VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE
B210B-85	SYSTEM VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE
B210D-84	BATTERY VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE
B210E-85	BATTERY VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE
B222A-00	VEHICLE LINE MISMATCH
B222D-00	ECU UNABLE TO CONFIGURE-CONFIGURATION NOT LEARNED
U0010-00	CAN INTERIOR BUS
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0147-00	LOST COMMUNICATION WITH TELEMATICS GATEWAY

DTC TROUBLESHOOTING

B1030-11-EVAPORATOR TEMPERATURE SENSOR CIRCUIT - SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

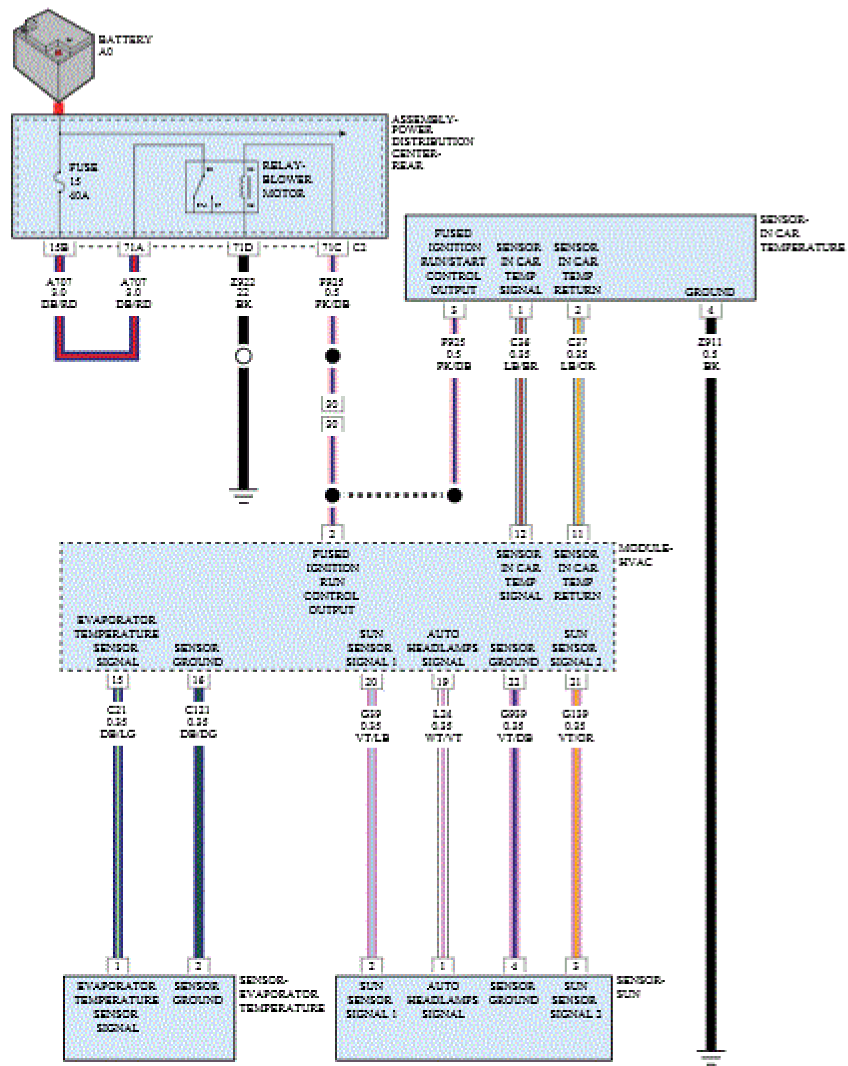


Fig. 1: HVAC Module - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Evaporator Temperature Sensor is a variable resistor that changes in conjunction with temperature, or otherwise known as a thermistor. The Evaporator Temperature Sensor is located in the HVAC housing downstream of the A/C evaporator. The HVAC Module monitors the evaporator temperature by monitoring the voltage change of the Evaporator Temperature Sensor Signal circuit. If the monitored voltage drops below or rises above a predetermined voltage, a Diagnostic Trouble Code (DTC) will set. For further information, refer to SENSOR, EVAPORATOR TEMPERATURE, OPERATION .

WHEN MONITORED

- This diagnostic runs continuously when the ignition is on.

SET CONDITION

- The HVAC Module detects less than 0.09 volts on the Evaporator Temperature Sensor Signal circuit for two seconds or more.

DEFAULT ACTION

- If the HVAC Module detects a valid voltage, the DTC will change from active to stored and will stay stored for 100 ignition cycles.

POSSIBLE CAUSES

Possible Causes
EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
EVAPORATOR TEMPERATURE SENSOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

        Did the DTC return?

        Yes

        - Go To 2

        No

        - Go To 5
2. **CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module C1 harness connector.
    3. Disconnect the Evaporator Temperature Sensor harness connector.
    4. Check for continuity between ground and the (C21) Evaporator Temperature Sensor Signal circuit at the HVAC Module C1 harness connector.

        Is there continuity between ground and the (C21) Evaporator Temperature Sensor Signal circuit?

        Yes

        - Repair the (C21) Evaporator Temperature Sensor Signal circuit for a short to ground.

- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO THE (C121) SENSOR GROUND CIRCUIT**
    1. Check for continuity between the (C21) Evaporator Temperature Sensor Signal circuit and the (C121) Sensor Ground circuit at the Evaporator Temperature Sensor harness connector.

    Is there continuity between the (C21) Evaporator Temperature Sensor Signal circuit and the (C121) Sensor Ground circuit?

    Yes

    - Repair the (C21) Evaporator Temperature Sensor Signal circuit for a short to the (C121) Sensor Ground circuit.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **CHECK THE EVAPORATOR TEMPERATURE SENSOR**
    1. Replace the Evaporator Temperature Sensor in accordance with the Service Information. Refer to **SENSOR, EVAPORATOR TEMPERATURE, REMOVAL** . Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
    2. Cycle the ignition off for 30 seconds then back on.
    3. With the scan tool, read HVAC DTCs.

    Does this DTC reset?

    Yes

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

5. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

Were any problems found?

Yes

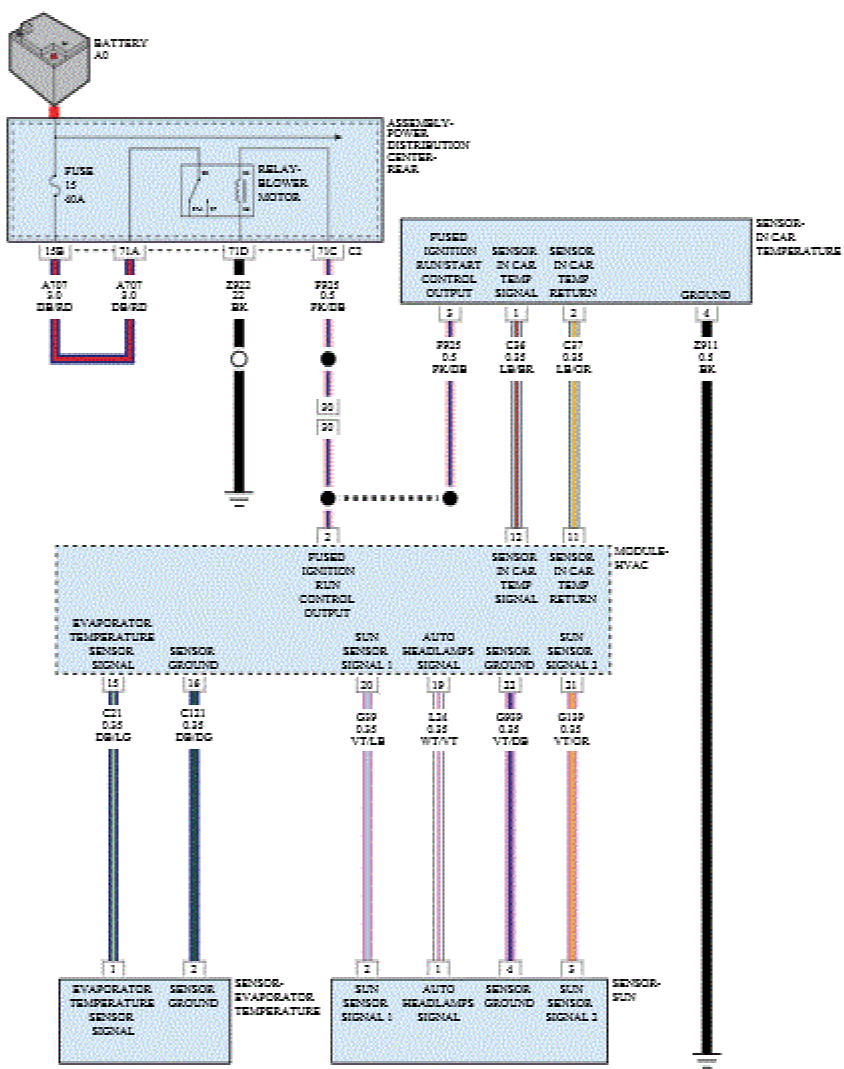
- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

B1030-15-EVAPORATOR TEMPERATURE SENSOR CIRCUIT - SHORT TO BATTERY OR OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 2: HVAC Module - Circuit Diagram]
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Evaporator Temperature Sensor is a variable resistor that changes in conjunction with temperature, or

otherwise known as a thermistor. The Evaporator Temperature Sensor is located in the HVAC housing downstream of the A/C evaporator. The HVAC Module monitors the evaporator temperature by monitoring the voltage change of the Evaporator Temperature Sensor Signal circuit. If the monitored voltage drops below or rises above a predetermined voltage, a Diagnostic Trouble Code (DTC) will set. For further information, refer to **SENSOR, EVAPORATOR TEMPERATURE, OPERATION** .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- The HVAC Module detects greater than 4.8 volts on the Evaporator Temperature Sensor Signal circuit for a period of two seconds or more.

Default Actions:

- If the HVAC Module detects a valid voltage, the DTC will change from active to stored and will stay stored for 100 ignition cycles.

Possible Causes
EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
EVAPORATOR TEMPERATURE SENSOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - Go To 6

2. **CHECK THE EVAPORATOR TEMPERATURE SENSOR**
    1. Turn the ignition off.
    2. Disconnect the Evaporator Temperature Sensor harness connector.

    NOTE: **Due to the small terminal and pin size of the Evaporator Temperature Sensor and harness connector, make sure to not damage the terminals in this process.**

    3. Connect a fused jumper wire between the (C21) Evaporator Temperature Sensor Signal circuit and the (C121) Sensor Ground circuit in the Evaporator Temperature Sensor harness connector.
    4. Turn the ignition on.
    5. With the scan tool, read the Evaporator Temperature Sensor voltage.

    Is the voltage below 0.2 volts?

    Yes

    - Replace the Evaporator Temperature Sensor in accordance with the Service Information. Refer to **SENSOR, EVAPORATOR TEMPERATURE, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 3
3. **CHECK THE (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the jumper wire from the previous step.
    3. Disconnect the HVAC Module C1 harness connector.
    4. Ignition on, engine not running.
    5. Measure the voltage of the (C21) Evaporator Temperature Sensor Signal circuit.

    Is voltage above 0.2 volts?

    Yes

    - Repair the (C21) Evaporator Temperature Sensor Signal circuit for a short to voltage.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4
4. **CHECK THE (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR AN OPEN**
    1. Turn the ignition off.
    2. Measure the resistance of the (C21) Evaporator Temperature Sensor Signal circuit between the

HVAC Module C1 harness connector and the Evaporator Temperature Sensor harness connector.

Is the resistance above 1.0 Ohm?

Yes

- Repair the (C21) Evaporator Temperature Sensor Signal circuit for an open.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 5

5. **CHECK THE (C121) SENSOR GROUND CIRCUIT FOR AN OPEN**
    1. Measure the resistance of the (C121) Sensor Ground circuit between the HVAC Module C1 harness connector and the Evaporator Temperature Sensor harness connector.

       Is the resistance above 1.0 Ohm?

       Yes

       - Repair the (C121) Sensor Ground circuit for an open.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

       Were any problems found?

       Yes

       - Repair as necessary.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Test complete.

B1058-13-RECIRCULATION DOOR CONTROL CIRCUIT - OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

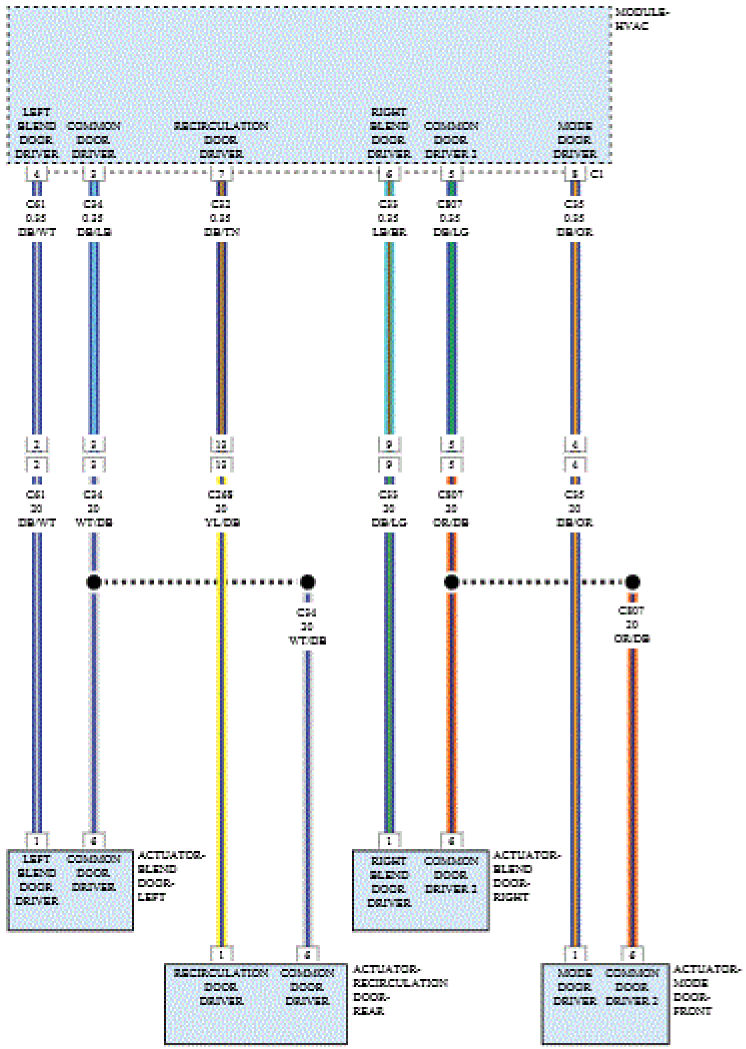


Fig. 3: HVAC Module - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to DESCRIPTION .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following conditions are are met:

- Ignition on.

Set Conditions:

- The HVAC Module detects an open in the Recirculation Door control circuit.

Default Actions:

- If the HVAC Module detects a valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RECIRCULATION DOOR DRIVER CIRCUIT OPEN
COMMON DOOR DRIVER CIRCUIT OPEN
RECIRCULATION DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 3

    No

    - Go To 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

    Did the DTC return while performing the HVAC ACTUATOR CALIBRATION TEST?

    Yes

    - Go To 3

    No

    - Go To 6

3. **CHECK THE (C32/C268) RECIRCULATION DOOR DRIVER CIRCUIT FOR AN OPEN**
    1. Turn the ignition off.
    2. Disconnect the Recirculation Door Actuator harness connector.
    3. Measure the resistance of the (C32/C268) Recirculation Door Driver circuits between the HVAC Module C1 harness connector and the Recirculation Door Actuator harness connector.

       Is the resistance above 1.0 Ohm?

       Yes

       - Repair the (C32/C268) Recirculation Door Driver circuit for an open or high resistance.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 4
4. **CHECK THE (C34/C68) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN**
    1. Measure the resistance of the (C34/C68) Common Door Driver circuits between the HVAC Module C1 harness connector and the Recirculation Door Actuator harness connector.

       Is the resistance above 1.0 Ohm?

       Yes

       - Repair the (C34/C68) Common Door Driver circuit for an open or high resistance.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 5
5. **CHECK THE RECIRCULATION DOOR ACTUATOR**
    1. Replace the Recirculation Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, RECIRCULATION DOOR, REMOVAL** .
    2. With the scan tool, erase HVAC DTCs and perform the HVAC ACTUATOR CALIBRATION TEST.

       Did this DTC reset?

       Yes

       - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Test complete.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B1058-92-RECIRCULATION DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

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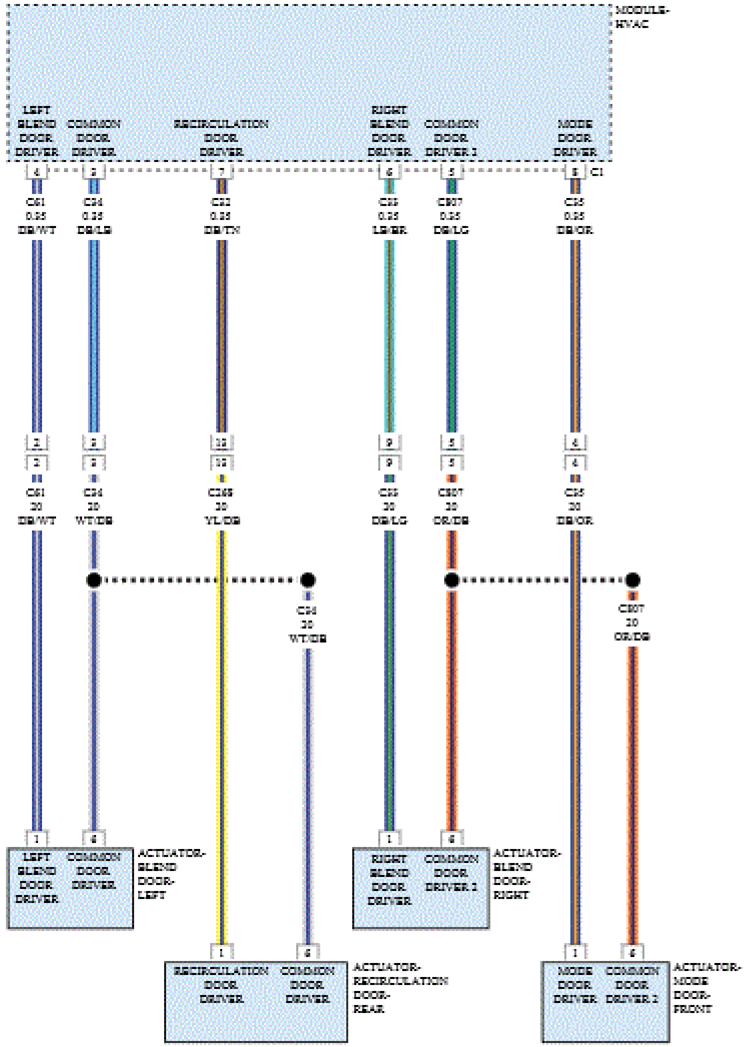


[Fig. 4: HVAC Module - Circuit Diagram](#)
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to DESCRIPTION .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following conditions are met:

- Ignition on.

Set Conditions:

- The HVAC Module detects no feedback pulses on the Recirculation Door Control circuits for 15 seconds or more.

Default Actions:

- If the HVAC Module detects a valid feedback pulse, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO GROUND
RECIRCULATION DOOR COMMON DRIVER CIRCUIT SHORTED TO VOLTAGE
RECIRCULATION DOOR COMMON DRIVER CIRCUIT SHORTED TO GROUND
RECIRCULATION DOOR BINDING
RECIRCULATION DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - Go To 9
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. Using the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

    Did any other HVAC DTCs set while performing the ACTUATOR CALIBRATION TEST?

    Yes

    - Diagnose those DTCs first. Refer to **DIAGNOSTIC CODE INDEX** .

No

- Go To 3

3. **CHECK THE (C32/C268) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module C1 harness connector.
    3. Disconnect the Recirculation Door Actuator harness connector.
    4. Ignition on, engine not running.
    5. Measure the voltage of the (C32/C268) Recirculation Door Driver circuit at the HVAC Module C1 harness connector.

    Is there any voltage present?

    Yes

    - Repair the (C32/C268) Recirculation Door Driver circuit for a short to voltage.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **CHECK THE (C34/C68) RECIRCULATION DOOR COMMON DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Measure the voltage of the (C34/C68) Recirculation Door Common Driver circuit at the HVAC Module C1 harness connector.

    Is there any voltage present?

    Yes

    - Repair the (C34/C68) Recirculation Door Common Driver circuit for a short to voltage.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5

5. **CHECK THE (C32/C268) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Check for continuity between ground and the (C32/C268) Recirculation Door Driver circuit at the HVAC Module C1 harness connector.

    Is there continuity between ground and the (C32/C268) Recirculation Door Driver circuit?

    Yes

- Repair the (C32/C268) Recirculation Door Driver circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 6

6. **CHECK THE (C34/C68) RECIRCULATION DOOR COMMON DRIVER CIRCUIT FOR A SHORT TO GROUND**
   1. Check for continuity between ground and the (C34/C68) Recirculation Door Common Driver circuit at the HVAC Module C1 harness connector.

      Is there continuity between ground and the (C34/C68) Recirculation Door Common Driver circuit?

      Yes

      - Repair the (C34/C68) Recirculation Door Common Driver circuit for a short to ground.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 7

7. **CHECK THE RECIRCULATION DOOR**
   1. Remove the Recirculation Door Actuator and check the Recirculation Door for binding and full travel. Refer to **ACTUATOR, RECIRCULATION DOOR, REMOVAL** .

      Were any problems found?

      Yes

      - Repair or replace the Recirculation Door as necessary in accordance with the Service Information. Refer to **HOUSING, HVAC, REMOVAL** .
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 8

8. **CHECK THE RECIRCULATION DOOR ACTUATOR**
   1. Replace the Recirculation Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, RECIRCULATION DOOR, REMOVAL** .
   2. Using the scan tool, erase HVAC DTCs and perform the HVAC ACTUATOR CALIBRATION TEST.

      Did this DTC reset?

      Yes

      - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .

- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

9. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B105C-00-RECIRCULATION DOOR TRAVEL RANGE TOO SMALL

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to **DESCRIPTION** .

WHEN MONITORED

- When ever an Actuator Calibration Test is performed.

SET CONDITION

- The HVAC Module uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is less than what the controller has stored in its memory, this DTC will set.

DEFAULT ACTION

- If an Actuator Calibration Test is performed and the HVAC Module detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

POSSIBLE CAUSES

Possible Causes
RELATED DTCS PRESENT
RECIRCULATION DOOR BINDING
RECIRCULATION DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR RELATED DTCS**
    1. Ignition on.
    2. Using the scan tool, read HVAC DTCs.

       Are there any Door Control Circuit Open, Performance, or Short to Ground or Voltage DTCs present?

       Yes

       - Perform the appropriate diagnostic procedure.

         Refer to **DIAGNOSTIC CODE INDEX** .

       No

       - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

       Did the DTC return?

       Yes

       - Go To 4

No

- Go To 3

3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. Using the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

    Did this DTC change from Stored to Active while performing the HVAC ACTUATOR CALIBRATION TEST?

    Yes

    - Go To 4

    No

    - Go To 6

4. **CHECK THE RECIRCULATION DOOR**
    1. Remove the Recirculation Door Actuator and check the Recirculation Door for binding and full travel. Refer to **ACTUATOR, RECIRCULATION DOOR, REMOVAL** .

    Were any problems found?

    Yes

    - Repair or replace the Recirculation Door as necessary in accordance with the Service Information. Refer to **HOUSING, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5

5. **CHECK THE RECIRCULATION DOOR ACTUATOR**
    1. Replace the Recirculation Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, RECIRCULATION DOOR, REMOVAL** .
    2. Using the scan tool, erase HVAC DTCs.
    3. Using the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

    Did this DTC reset during HVAC ACTUATOR CALIBRATION TEST?

    Yes

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

B105D-00-RECIRCULATION DOOR TRAVEL RANGE TOO LARGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to **DESCRIPTION** .

WHEN MONITORED

- When ever an Actuator Calibration Test is performed.

SET CONDITION

- The HVAC Module uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is greater than what the controller has stored in its memory, this DTC will set.

DEFAULT ACTION

- If an Actuator Calibration Test is performed or during normal operation and the HVAC Module detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

POSSIBLE CAUSES

Possible Causes
RELATED DTCS PRESENT
RECIRCULATION DOOR STOPS
RECIRCULATION DOOR
RECIRCULATION DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR RELATED DTCS**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

    Are there any Door Control Circuit Open, Performance, or Short to Ground or Voltage DTCs present?

    Yes

    - Perform the appropriate diagnostic procedure.

      Refer to **DIAGNOSTIC CODE INDEX** .

    No

    - Go To 2
2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

    Is this DTC active?

    Yes

    - Go To 4

    No

    - Go To 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

    Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

Yes

- Go To 4

No

- Go To 6

4. **CHECK THE RECIRCULATION DOOR**
    1. Remove the Recirculation Door Actuator and check the Recirculation Door stops, linkage (stripped or cracked) and door. Refer to **ACTUATOR, RECIRCULATION DOOR, REMOVAL** .

    Were there any problems found?

    Yes

    - Repair or replace the Recirculation Door as necessary in accordance with the Service Information. Refer to **HOUSING, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5

5. **CHECK THE RECIRCULATION DOOR ACTUATOR**
    1. Replace the Recirculation Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, RECIRCULATION DOOR, REMOVAL** .
    2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

    Did this DTC reset?

    Yes

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

Were there any problems found?

Yes

- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

B106A-01-REAR-DEFROST-(EBL)-CONTROL CIRCUIT-GENERAL ELECTRICAL FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- The HVAC Module detects an open or short to ground on the Defogger Relay Control circuit.

Default Actions:

- If the HVAC Module detects a valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
DEFOGGER RELAY CONTROL CIRCUIT OPEN
DEFOGGER RELAY CONTROL CIRCUIT SHORT TO GROUND
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

Yes

- Go To 2

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

2. **CHECK THE DEFOGGER RELAY CONTROL CIRCUIT FOR AN OPEN**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module Harness connector.
    3. Remove the Rear Defrost relay from the PDC.
    4. Measure the resistance of the Rear Defogger Relay Control circuit between the HVAC Module harness connector and the Rear Defrost Relay in the PDC.

    Is the resistance above 5.0 Ohms ?

    Yes

    - Repair the Defogger Relay Control circuit for an open.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 3
3. **CHECK THE DEFOGGER RELAY CONTROL CIRCUIT FOR A SHORT TO GROUND**
    1. Check for continuity between ground and the Rear Defogger Relay Control circuit at the HVAC Module Harness connector.

    Is there continuity between ground and the Rear Defogger Relay Control circuit?

    Yes

    - Repair the Defogger Relay Control circuit for a short to ground.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

B10B2-00-A-C-COOL-DOWN-TEST-PERFORMANCE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The HVAC Module has software to enable it to perform an A/C Cool Down Test by a command using a scan tool. This test checks for evaporator temperature drop over a predetermined time. If the test fails, this DTC will set. However, certain test conditions are required to perform this test. Failure to run this test within those parameters can result in failure of the test.

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Whenever an A/C Cooldown Test is performed.

Set Conditions:

- This DTC is set whenever the A/C Cooldown Test is performed and the desired temperature drop is not achieved by the system.

Default Actions:

- The DTC will go to stored after a successful A/C Cooldown Test.

Possible Causes
A/C SYSTEM WORKING IMPROPERLY

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

CONDITIONS FOR A/C COOLDOWN TEST

1. The following condition must be met before running the A/C Cooldown test.
    - No Powertrain Control Module (PCM) DTCs present.
    - No Communication DTCs present.
    - Condenser cooling fan working properly.
    - No active HVAC evaporator temperature sensor, sun sensor, recirculation, mode, or blend door actuator DTCs present.
    - The refrigerant system must be fully charged.
    - The blower motor must operate correctly in all speeds.
    - The evaporator temperature must be above 12.7Â° C (55Â° F).
    - The A/C compressor must be turned off.
    - Blower must be on high.

    Are all of the above conditions met before running the A/C Cooldown Test?

    Yes

    - Refer to **DIAGNOSIS AND TESTING** for additional Cooldown Test related diagnostic information and testing procedures and repair as necessary.

..

NOTE: **Run the Cooldown Test again after any repairs are performed.**

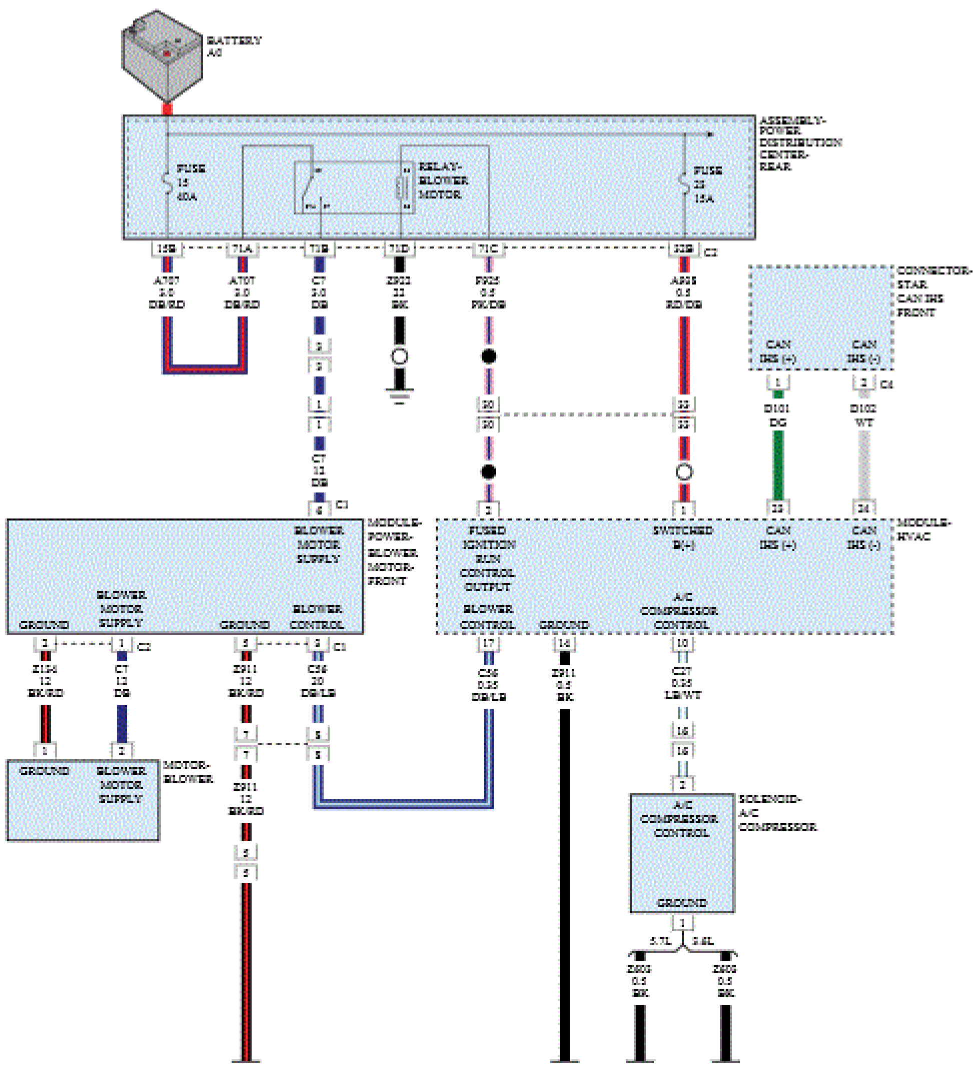
- If the Cooldown Test passes, testing is complete.

No

- Run the A/C Cooldown test again with the above test conditions.

B10E8-12-BLOWER MOTOR CONTROL CIRCUIT - SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 5: HVAC Module Circuit Diagram]

Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The HVAC Module constantly monitors the Blower Control circuit to the Blower Motor Power Module for proper operation. If the voltage or the Pulse Width Modulation (PWM) on that circuit drops below or rises above a predetermined value, a DTC will set. For further information, refer to [OPERATION] .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- If the HVAC Module detects the Blower Motor Control circuit Pulse Width Modulation (PWM) is less than 0% and or greater than 100% or PWM equals 0% for the period of 30 seconds.

Possible Causes
BLOWER CONTROL CIRCUIT SHORTED TO VOLTAGE
BLOWER MOTOR CONTROL MODULE
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

       Did the DTC return?

       Yes

       - Go To 2

       No

       - Go To 4
2. **CHECK THE (C56) BLOWER CONTROL CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the Blower Motor Power Module C1 harness connector.
    3. Disconnect the HVAC Module C1 harness connector.
    4. Ignition on, engine not running.
    5. Measure the voltage of the (C56) Blower Control circuit at the HVAC Module C1 harness connector.

       Is there any voltage present?

Yes

- Repair the (C56) Blower Control circuit for a short to voltage.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE BLOWER MOTOR POWER MODULE**
    1. Turn the ignition off.
    2. Replace the Blower Motor Power Module in accordance with the Service Information. Refer to **MODULE, POWER, BLOWER MOTOR, REMOVAL** .
    3. Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    Did the DTC return during or after the HVAC VERIFICATION TEST?

    Yes

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .

    No

    - Test complete.
4. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

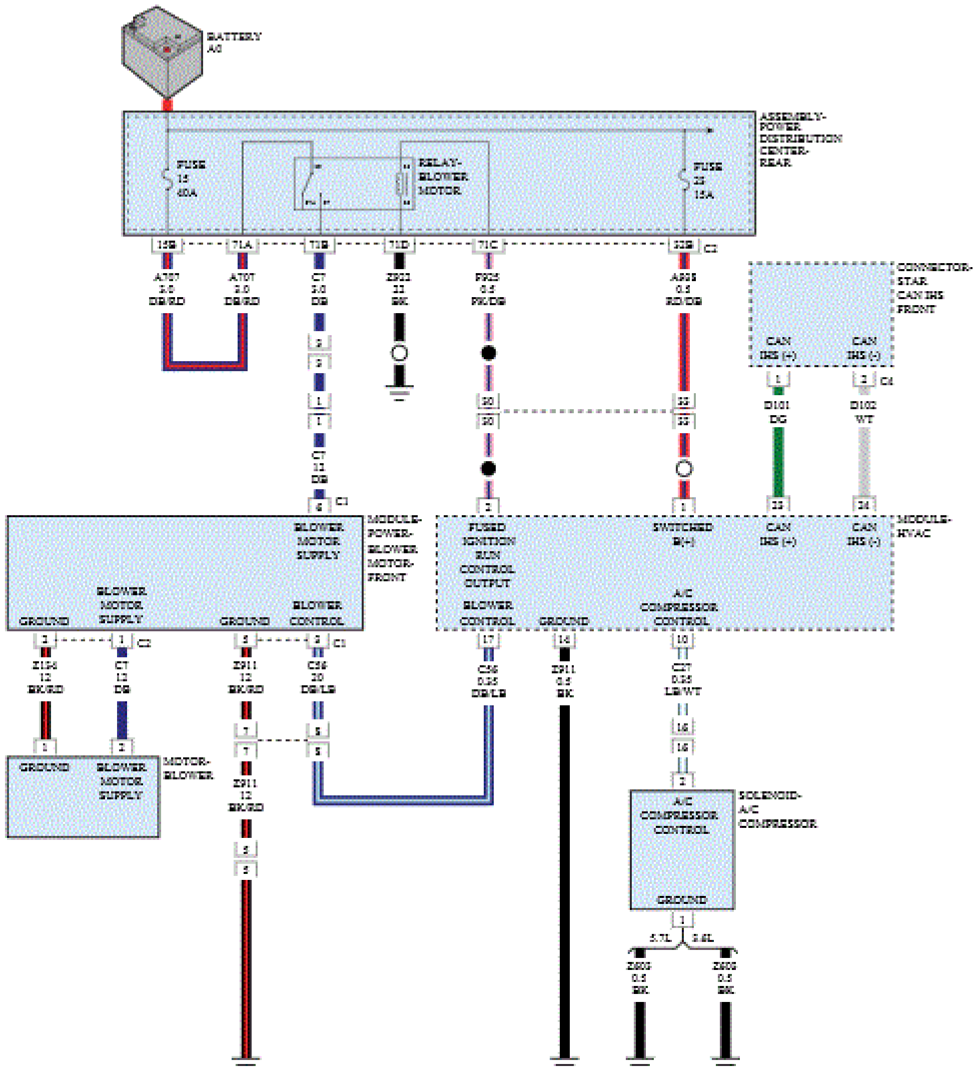
    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B10E8-14-BLOWER MOTOR CONTROL CIRCUIT - SHORT TO GROUND OR OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 6: HVAC Module Circuit Diagram](#)
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The HVAC Module constantly monitors the Blower Control circuit to the Blower Motor Power Module for proper operation. If the voltage or the Pulse Width Modulation (PWM) on that circuit drops below or rises above a predetermined value, a DTC will set. For further information, refer to **OPERATION** .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- If the HVAC Module detects the Blower Motor Control circuit Pulse Width Modulation (PWM) is less than 0% and or greater than 100% or PWM equals 100% for the period of 30 seconds.

Possible Causes
BLOWER CONTROL CIRCUIT SHORTED TO GROUND
BLOWER CONTROL CIRCUIT OPEN
GROUND CIRCUIT OPEN
BLOWER CONTROL MODULE
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

       Did the DTC return?

       Yes

       - Go To 2

       No

       - Go To 6
2. **CHECK THE (C56) BLOWER CONTROL CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the Blower Motor Power Module C1 harness connector
    3. Disconnect the HVAC Module C1 harness connector.
    4. Check for continuity between ground and the (C56) Blower Control circuit at the Blower Motor Power Module C1 harness connector.

       Is there continuity between ground and the (C56) Blower Control circuit?

       Yes

       - Repair the (C56) Blower Control circuit for an short to ground.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 3

3. **CHECK THE (C56) BLOWER CONTROL CIRCUIT FOR AN OPEN**
    1. Turn the ignition off.
    2. Measure the resistance of the (C56) Blower Control circuit between the HVAC Module harness connector and the Blower Motor Power Module harness connector.

       Is the resistance above 100k Ohms?

       Yes

       - Repair the (C56) Blower Control circuit for an open.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 4
4. **CHECK THE (Z911) GROUND CIRCUIT FOR AN OPEN**
    1. With a 12-volt test light connected to 12 volts, check the (Z911) Ground circuit at the HVAC Module C1 harness connector.

       NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

       Does the test light illuminate brightly?

       Yes

       - Repair the (Z911) Ground circuit for an open.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 5
5. **CHECK THE BLOWER MOTOR POWER MODULE**
    1. Turn the ignition off.
    2. Replace the Blower Motor Power Module in accordance with the Service Information. Refer to **MODULE, POWER, BLOWER MOTOR, REMOVAL** .
    3. Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       Did the DTC reset during or after the HVAC VERIFICATION TEST?

       Yes

       - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

- Test complete.

6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

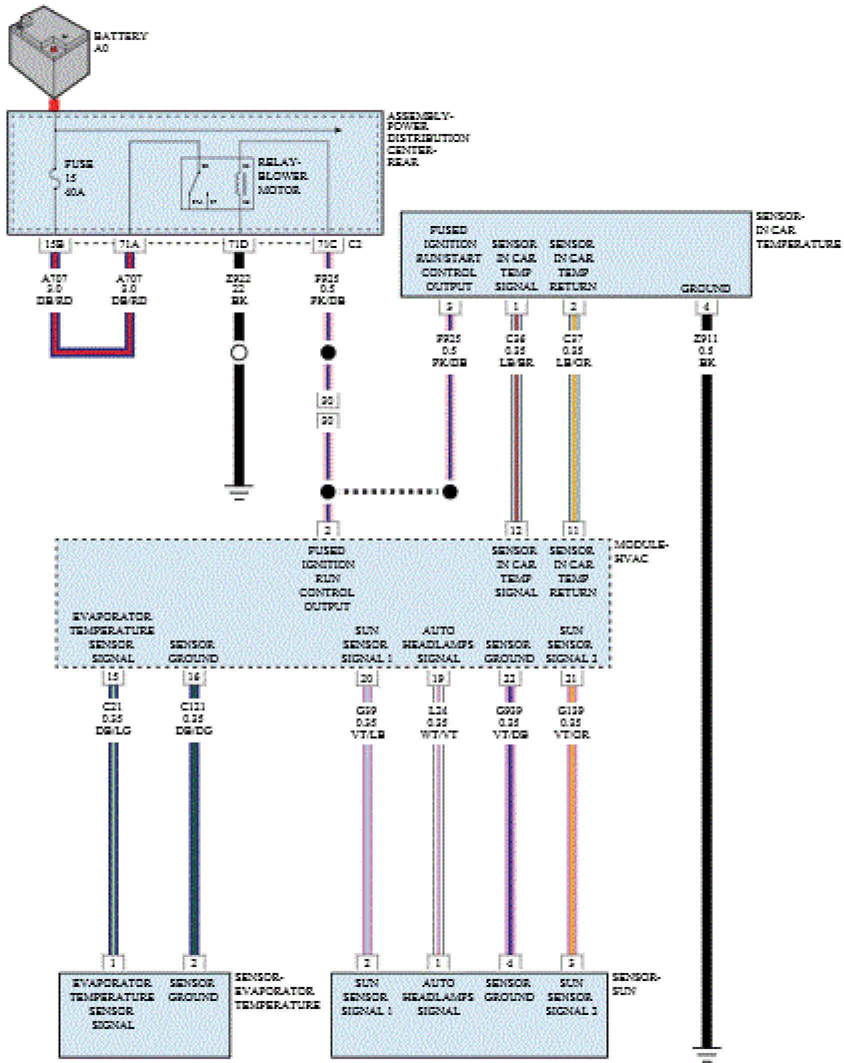
    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B1107-11-CABIN TEMPERATURE SENSOR 1 CIRCUIT - SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 7: HVAC Module - Circuit Diagram](#)

Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The HVAC Module uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the HVAC Module to assure that they are in range. An active Diagnostic trouble Code (DTC) indicates that a sensor is out of range. A stored DTC indicates that the sensor was out of range but is currently within range.

The Cabin Temperature Sensor (also known as the in car temperature sensor) uses a temperature thermistor which changes in its resistive value with differences in air temperature of the interior cabin. Air is drawn from the passenger compartment by an aspirator (small fan driven by a 12-volt electric motor) which circulates air over the temperature thermistor. The HVAC Module receives the resistance value over a two wire circuit that is used to calculate the temperature and make any adjustments to maintain the optimum passenger compartment comfort. The Cabin Temperature Sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged.

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- When the In Car Temperature Sensor signal to the HVAC Module is less than 0.5 volt for a continuous period of 1200 msec. or more.

Default Actions:

- If the HVAC Module detects a valid signal, the DTC will change from active to stored and will stay stored for 100 ignition cycles.

Possible Causes
IN CAR TEMPERATURE SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
IN CAR TEMPERATURE SENSOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

        Did the DTC return?

        Yes

        - Go To 2

        No

        - Go To 5
2. **CHECK IF THE CABIN TEMPERATURE SENSOR IS PROPERLY CONNECTED**
    1. Turn the ignition off.
    2. Check the connector to In Car Temperature Sensor for proper connection and the terminals for damage or corrosion.

        Is the In Car Temperature Sensor connector properly connected and terminals undamaged or corroded?

Yes

- Go To 3

No

- Repair connector and terminals as necessary.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

3. **CHECK THE (C36) IN CAR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND**
    1. Disconnect the HVAC Module C1 harness connector.
    2. Disconnect the In Car Temperature Sensor harness connector.
    3. Check for continuity between ground and the (C36) In Car Temperature Sensor Signal circuit at the HVAC Module C1 harness connector.

    Is there continuity between ground and the (C36) In Car Temperature Sensor Signal circuit?

    Yes

    - Repair the (C36) Cabin Temperature Sensor Signal circuit for a short to ground.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5
4. **CHECK THE CABIN TEMPERATURE SENSOR**
    1. Remove the Cabin Temperature Sensor. Refer to **SENSOR, TEMPERATURE, IN-CAR, REMOVAL** .
    2. Measure the resistance of the Cabin Temperature Sensor and compare the resistance to the Cabin Temperature Sensor Resistance Chart in the Service Information. Refer to **SENSOR, TEMPERATURE, IN-CAR, DIAGNOSIS AND TESTING** .

    Is the Cabin Temperature Sensor within the specified limits of Cabin Temperature Sensor Resistance Chart?

    Yes

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Replace the Cabin Temperature Sensor in accordance to the Service Information. Refer to **SENSOR, TEMPERATURE, IN-CAR, INSTALLATION** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
5. **CHECK THE WIRING AND CONNECTORS**

1. The conditions necessary to set the DTC are not present at this time.
2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

B1107-15-CABIN TEMPERATURE SENSOR 1-CIRCUIT SHORT TO BATTERY OR OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

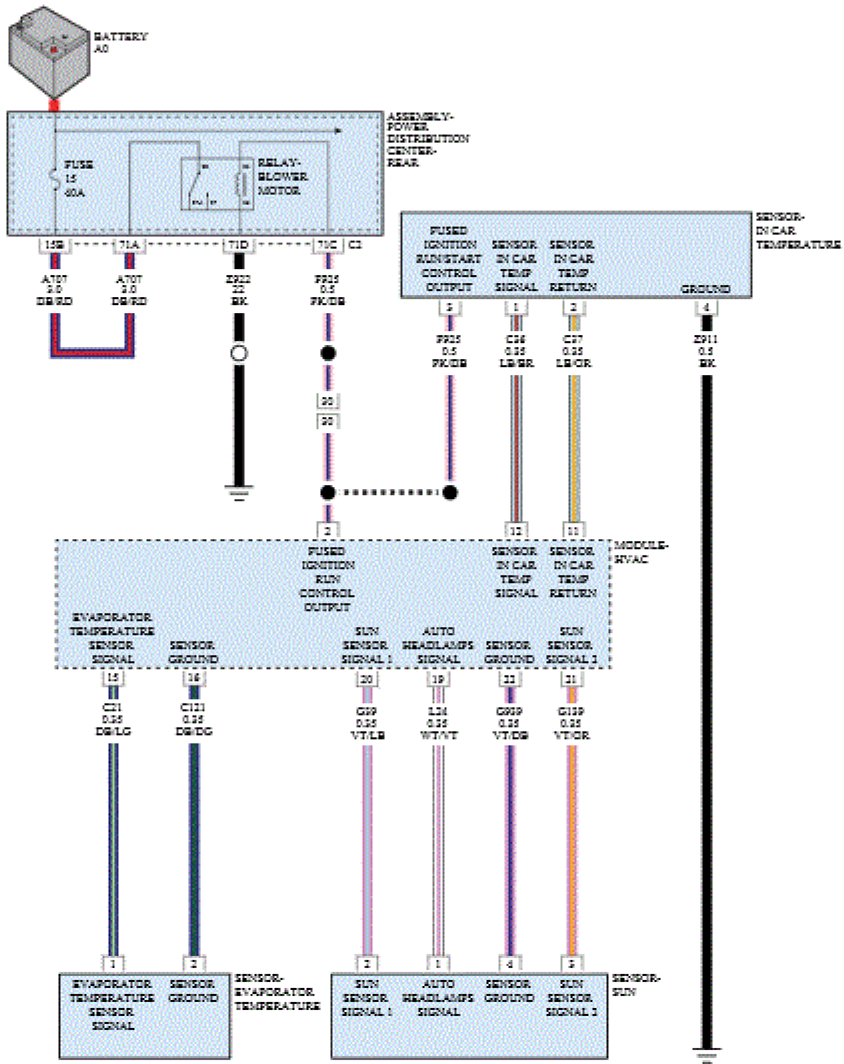


Fig. 8: HVAC Module - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The HVAC Module uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the HVAC Module to assure that they are in range. An active Diagnostic trouble Code (DTC) indicates that a sensor is out of range. A stored DTC indicates that the sensor was out of range but is currently within range.

The In-Car Temperature Sensor uses a temperature thermistor which changes in its resistive value with differences in air temperature of the interior cabin. Air is drawn from the passenger compartment by an aspirator (small fan driven by a 12-volt electric motor) which circulates air over the temperature thermistor. The HVAC Module receives the resistance value over a two wire circuit that is used to calculate the temperature and make any adjustments to maintain the optimum passenger compartment comfort. The In-Car Temperature Sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged.

WHEN MONITORED

SET CONDITION

- This DTC will set when the In-Car Temperature Sensor signal to the HVAC Module is greater than 4.9 volts for a continuous period of 1200 milliseconds or more.

DEFAULT ACTION

- If the HVAC Module detects a valid signal, the DTC will change from active to stored and will remain stored for 100 ignition cycles.

POSSIBLE CAUSES

Possible Causes
IN-CAR TEMPERATURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
IN-CAR TEMPERATURE SENSOR
HVAC MODULE

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - Go To 6
2. **CHECK IF THE IN-CAR TEMPERATURE SENSOR IS PROPERLY CONNECTED**
    1. Turn the ignition off.
    2. Check the connector to In-Car Temperature Sensor for proper connection and the terminals for damage or corrosion.

    Is the In-Car Temperature Sensor connector properly connected and terminals undamaged or corroded?

    Yes

    - Go To 3

No

- Repair connector and terminals as necessary.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

3. **CHECK THE (C36) IN-CAR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**
   1. Turn the ignition off.
   2. Disconnect the A/C Heater Module C1 harness connector.
   3. Disconnect the In-Car Temperature Sensor harness connector.
   4. Ignition on, engine not running.
   5. Measure the voltage of the (C36) In-Car Temperature Sensor Signal circuit at the In-Car Temperature Sensor harness connector.

   Is there any voltage present?

   Yes

   - Repair the (C36) In-Car Temperature Sensor Signal circuit for a short to voltage.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 4

4. **CHECK THE (C36) IN-CAR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR AN OPEN**
   1. Turn the ignition off.
   2. Measure the resistance of the (C36) In-Car Temperature Sensor Signal circuit between the HVAC Module C1 harness connector and the In-Car Temperature Sensor harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

   - Repair the (C36) In-Car Temperature Sensor Signal circuit for an open or high resistance.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 5

5. **CHECK THE IN-CAR TEMPERATURE SENSOR**
   1. Remove the In-Car Temperature Sensor. Refer to **SENSOR, TEMPERATURE, IN-CAR, REMOVAL** .
   2. Measure the resistance of the In-Car Temperature Sensor and compare the resistance to the In-Car Temperature Sensor Resistance Chart in the Service Information. Refer to **SENSOR, TEMPERATURE, IN-CAR, DIAGNOSIS AND TESTING** .

   Is the In-Car Temperature Sensor within the specified limits of In-Car Temperature Sensor

Resistance Chart?

Yes

- Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Replace the In-Car Temperature Sensor in accordance to the Service Information. Refer to **SENSOR, TEMPERATURE, IN-CAR, INSTALLATION** .
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B11C2-13-FRONT MODE DOOR 1 CONTROL CIRCUIT - OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

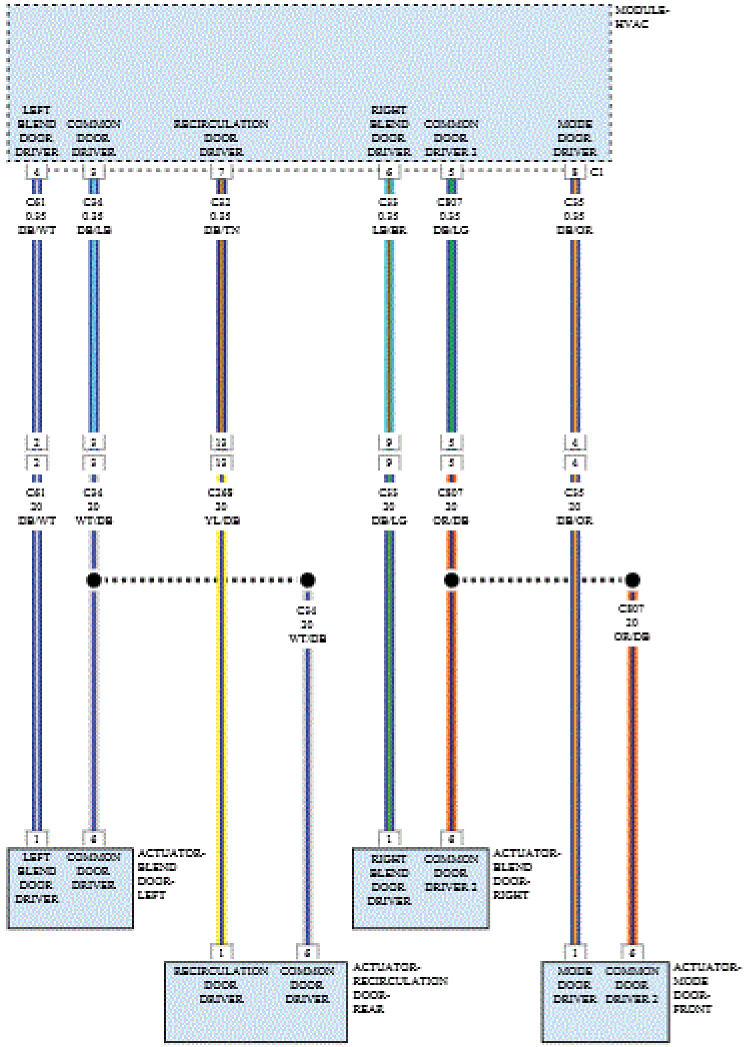


Fig. 9: HVAC Module - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to **DESCRIPTION** .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- The HVAC Module detects an open in the Mode Door control circuit.

Default Actions:

- If the HVAC Module detects a valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
MODE DOOR DRIVER CIRCUIT OPEN
COMMON DOOR DRIVER 2 CIRCUIT OPEN
MODE DOOR ACTUATOR
HVAC MODULE

Always perform the HVAC PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 3

    No

    - Go To 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

    Did this DTC change from Stored to Active while performing the HVAC ACTUATOR CALIBRATION TEST?

    Yes

    - Go To 3

    No

    - Go To 6

3. **CHECK THE (C35/C66) MODE DOOR DRIVER CIRCUIT FOR AN OPEN**
   1. Turn the ignition off.
   2. Disconnect the HVAC Module C1 harness connector.
   3. Disconnect the Mode Door Actuator harness connector.
   4. Measure the resistance of the (C35/C66) Mode Door Driver circuit between the HVAC Module C1 harness connector and the Mode Door Actuator harness connector.

      Is the resistance above 1.0 Ohm?

      Yes

      - Repair the (C35/C66) Mode Door Driver circuit for an open or high resistance.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4
4. **CHECK THE (C807/C266) COMMON DOOR DRIVER 2 CIRCUIT FOR AN OPEN**
   1. Measure the resistance of the (C807/C266) Common Door Driver 2 circuit between the HVAC Module C1 harness connector and the Mode Door Actuator harness connector.

      Is the resistance above 1.0 Ohm?

      Yes

      - Repair the (C807/C266) Common Door Driver 2 circuit for an open or high resistance.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 5
5. **CHECK THE MODE DOOR ACTUATOR**
   1. Replace the Mode Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, MODE DOOR, REMOVAL** .
   2. With the scan tool, erase HVAC DTCs and perform the HVAC ACTUATOR CALIBRATION TEST.

      Did this DTC reset?

      Yes

      - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete.

- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete.

B11C2-92-FRONT MODE DOOR 1 CONTROL - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

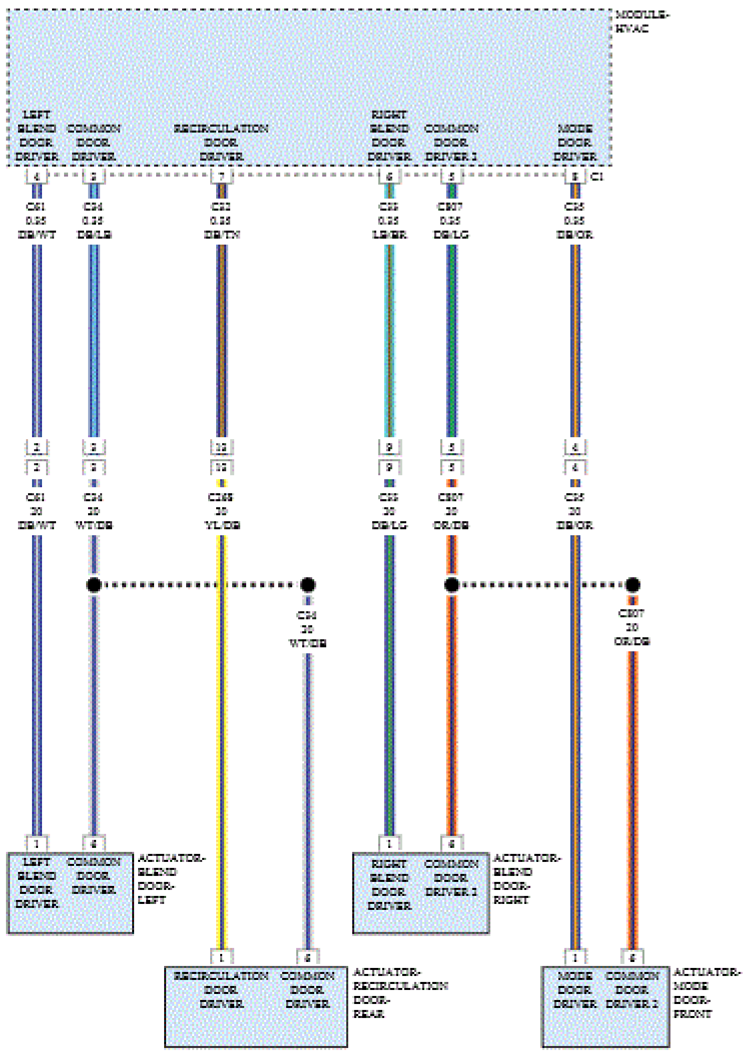


Fig. 10: HVAC Module - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to DESCRIPTION .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- The HVAC Module detects no feedback pulses on the Mode Door Control circuits for 15 seconds or more.

Default Actions:

- If the HVAC Module detects a valid feedback pulse, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
MODE DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
MODE DOOR DRIVER CIRCUIT SHORTED TO GROUND
MODE DOOR COMMON 2 DRIVER CIRCUIT SHORTED TO VOLTAGE
MODE DOOR COMMON 2 DRIVER CIRCUIT SHORTED TO GROUND
MODE DOOR BINDING
MODE DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - Go To 9
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

    Did any other HVAC DTCs set while performing the ACTUATOR CALIBRATION TEST?

    Yes

    - Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

No

- Go To 3

3. **CHECK THE (C35/C66) MODE DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module C1 harness connector.
    3. Disconnect the Mode Door Actuator harness connector.
    4. Ignition on, engine not running.
    5. Measure the voltage of the (C35/C66) Mode Door Driver circuit at the Mode Door Actuator harness connector.

    Is there any voltage present?

    Yes

    - Repair the (C35/C66) Mode Door Driver circuit for a short to voltage.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **CHECK THE (C807/C266) MODE DOOR COMMON 2 DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Measure the voltage of the (C807/C266) Mode Door Common 2 Driver circuit at the Mode Door Actuator harness connector.

    Is there any voltage present?

    Yes

    - Repair the (C807/C266) Mode Door Common 2 Driver circuit for a short to voltage.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5

5. **CHECK THE (C35/C66) MODE DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Check for continuity between ground and the (C35/C66) Mode Door Driver circuit at the Mode Door Actuator harness connector.

    Is there continuity between ground and the (C35/C66) Mode Door Driver circuit?

    Yes

    - Repair the (C35/C66) Mode Door Driver circuit for a short to ground.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 6

6. **CHECK THE (C807/C266) COMMON 2 DRIVER CIRCUIT FOR A SHORT TO GROUND**
    1. Check for continuity between ground and the (C807/C266) Common 2 Driver circuit at the Mode Door Actuator harness connector.

       Is there continuity between ground and the (C807/C266) Common 2 Driver circuit?

       Yes

       - Repair the (C807/C266) Common 2 Driver circuit for a short to ground.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 7
7. **CHECK THE MODE DOOR**
    1. Remove the Mode Door Actuator and check the Mode Door for binding and full travel. Refer to **ACTUATOR, MODE DOOR, REMOVAL** .

       Were any problems found?

       Yes

       - Repair or replace the Mode Door as necessary in accordance with the Service Information. Refer to **HOUSING, HVAC, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 8
8. **CHECK THE MODE DOOR ACTUATOR**
    1. Replace the Mode Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, MODE DOOR, REMOVAL** .
    2. Using the scan tool, erase HVAC DTCs and perform the HVAC ACTUATOR CALIBRATION TEST.

       Did this DTC reset?

       Yes

       - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

- Test complete.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

9. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B11C3-00-FRONT MODE DOOR 1 TRAVEL RANGE TOO SMALL

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to **ACTUATOR, MODE DOOR, OPERATION** .

WHEN MONITORED

- When ever an Actuator Calibration Test is performed.

SET CONDITION

- The HVAC Module uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is less than what the controller has stored in its memory, this DTC will set.

DEFAULT ACTION

- If an Actuator Calibration Test is performed and the HVAC Module detects a valid range of the door

movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

POSSIBLE CAUSES

Possible Causes
RELATED DTCS PRESENT
MODE DOOR BINDING
MODE DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR RELATED DTCS**
    1. Ignition on.
    2. With the scan tool, read HVAC DTCs.

       Are there any Door Control Circuit Open, Performance, or Short to Ground or Voltage DTCs present?

       Yes

       - Repair the HVAC DTCs.

         Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

       No

       - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

       Did the DTC return?

       Yes

       - Go To 4

       No

- Go To 3

3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

       Did this DTC change from Stored to Active while performing the HVAC ACTUATOR CALIBRATION TEST?

       Yes

       - Go To 4

       No

       - Go To 6

4. **CHECK THE MODE DOOR**
    1. Remove the Mode Door Actuator and check the Mode Door for binding and full travel. Refer to **ACTUATOR, MODE DOOR, REMOVAL** .

       Were any problems found?

       Yes

       - Repair or replace the Mode Door as necessary in accordance with the Service Information. Refer to **HOUSING, HVAC, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 5

5. **CHECK THE MODE DOOR ACTUATOR**
    1. Replace the Mode Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, MODE DOOR, REMOVAL** .
    2. With the scan tool, erase HVAC DTCs.
    3. With the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

       Did this DTC reset during HVAC Actuator Calibration Test?

       Yes

       - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Test complete.

6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.

2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

B11C4-00-FRONT MODE DOOR 1 TRAVEL RANGE TOO LARGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to **ACTUATOR, MODE DOOR, OPERATION** .

WHEN MONITORED

- When ever an Actuator Calibration Test is performed.

SET CONDITION

- The HVAC Module uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is greater than what the controller has stored in its memory, this DTC will set.

DEFAULT ACTION

- If an Actuator Calibration Test is performed or during normal operation and the HVAC Module detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

POSSIBLE CAUSES

Possible Causes

Possible Causes
RELATED DTCS PRESENT
MODE DOOR STOPS
MODE DOOR
MODE DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR RELATED DTCS**
    1. Ignition on.
    2. With the scan tool, read HVAC DTCs.

    Are there any Door Control Circuit Open, Performance, or Short to Ground or Voltage DTCs present?

    Yes

    - Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

    No

    - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 4

    No

    - Go To 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

    Did this DTC change from Stored to Active while performing the HVAC ACTUATOR

CALIBRATION TEST?

Yes

- Go To 4

No

- Go To 6

4. **CHECK THE MODE DOOR**
   1. Remove the Mode Door Actuator and check the Mode Door for binding and full travel. Refer to **ACTUATOR, MODE DOOR, REMOVAL** .

      Were any problems found?

      Yes

      - Repair or replace the Mode Door as necessary in accordance with the Service Information. Refer to **HOUSING, HVAC, REMOVAL** .
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 5
5. **CHECK THE MODE DOOR ACTUATOR**
   1. Replace the Mode Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, MODE DOOR, REMOVAL** .
   2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

B11C8-13-RIGHT TEMPERATURE DOOR CONTROL CIRCUIT -OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

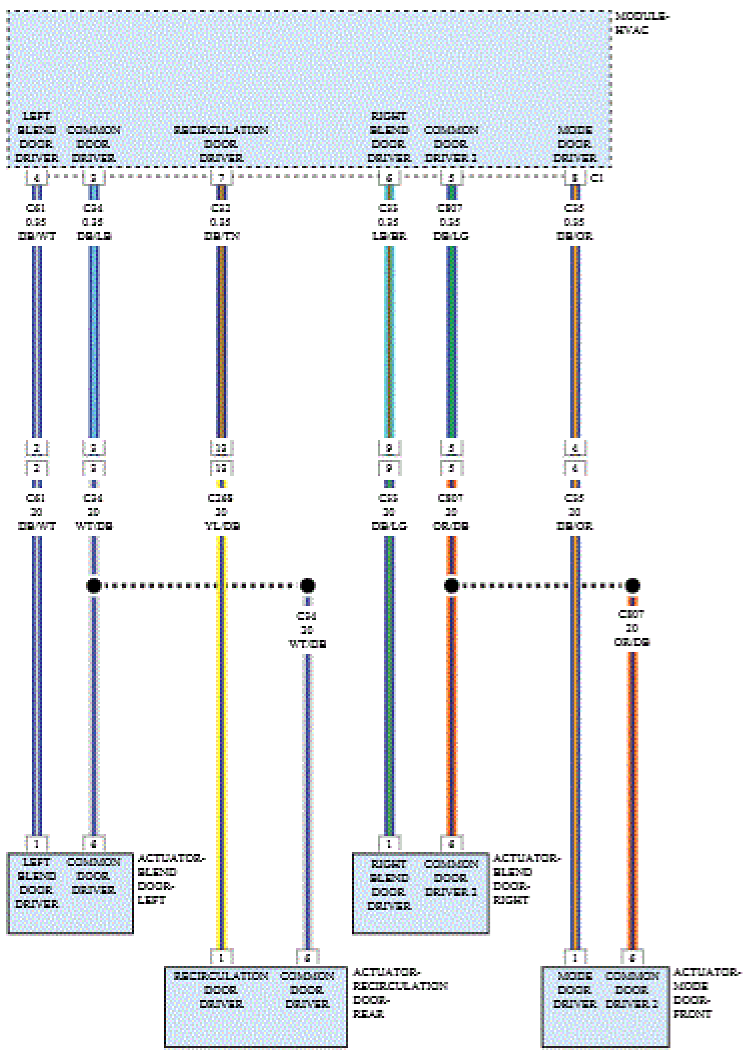


Fig. 11: HVAC Module - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to **DESCRIPTION** .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- The HVAC Module detects an open in the Passenger Blend Door control circuit.

Default Actions:

- If the HVAC Module detects a valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RIGHT BLEND DOOR DRIVER CIRCUIT OPEN
COMMON DOOR DRIVER 2 CIRCUIT OPEN
RIGHT BLEND DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 3

No

- Go To 2

2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

    Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

    Yes

    - Go To 3

    No

    - Go To 6

3. **CHECK THE (C33/52) RIGHT BLEND DOOR DRIVER CIRCUIT FOR AN OPEN**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module C1 harness connector.
    3. Disconnect the Right Blend Door Actuator harness connector.
    4. Measure the resistance of the (C33/52) Right Blend Door Driver circuit between the HVAC Module C1 harness connector and the Right Blend Door Actuator harness connector.

    Is the resistance above 1.0 Ohm?

    Yes

    - Repair the (C33/52) Right Blend Door Driver circuit for an open or high resistance.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **CHECK THE (C807/252) COMMON DOOR DRIVER 2 CIRCUIT FOR AN OPEN**
    1. Measure the resistance of the (C807/252) Common Door Driver 2 circuit between the HVAC Module C1 harness connector and the Right Blend Door Actuator harness connector.

    Is the resistance above 1.0 Ohm?

    Yes

    - Repair the (C807/252) Common Door Driver 2 circuit for an open or high resistance.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5

5. **CHECK THE RIGHT BLEND DOOR ACTUATOR**

1. Replace the Right Blend Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .
2. With the scan tool, erase HVAC DTCs and perform the HVAC ACTUATOR CALIBRATION TEST.

   Did this DTC reset?

   Yes

   - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were any problems found?

      Yes

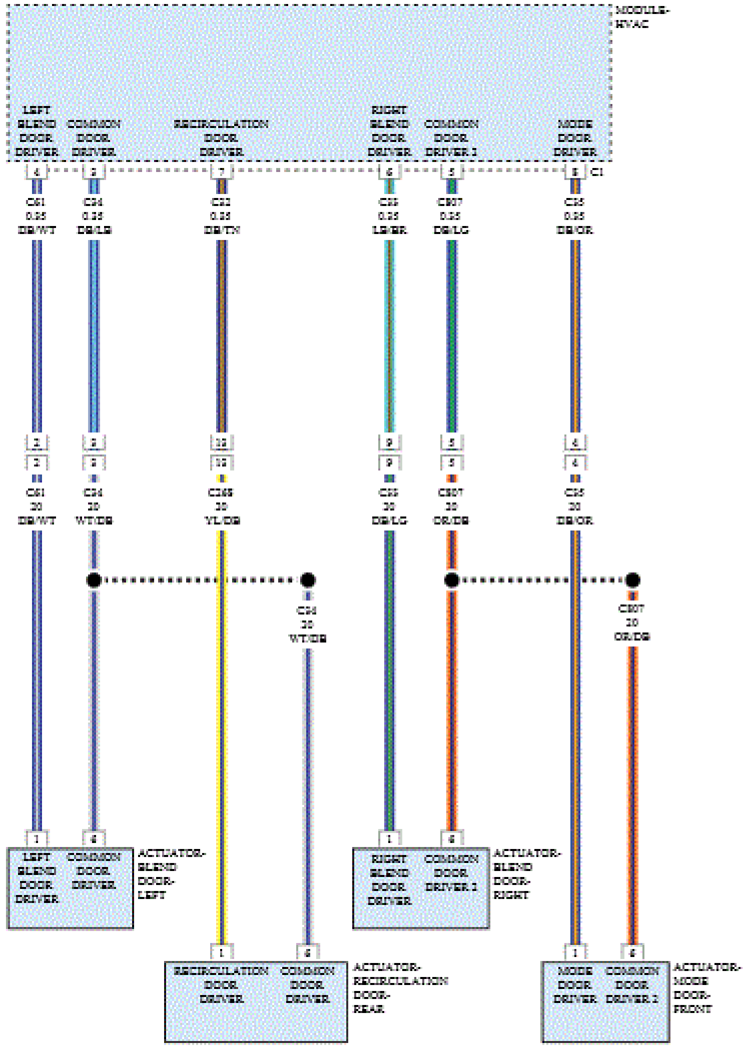
      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete.

B11C8-92-RIGHT TEMPERATURE DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 12: HVAC Module - Circuit Diagram](#)
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to **DESCRIPTION** .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- The HVAC Module detects no feedback pulses on the Right Blend Door Driver circuits for 15 seconds or more.

Default Actions:

- If the HVAC Module detects a valid feedback pulse, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RIGHT BLEND DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
RIGHT BLEND DOOR DRIVER CIRCUIT SHORTED TO GROUND
COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO VOLTAGE
COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO GROUND
RIGHT BLEND DOOR BINDING
RIGHT BLEND DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. With the scan tool, read HVAC DTCs and record on the repair order.
   2. Record the Environmental Data.
   3. With the scan tool, erase DTCs.
   4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
   5. With the scan tool, read HVAC DTCs.

      Did the DTC return?

      Yes

      - Go To 2

      No

      - Go To 9
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. With the scan tool, perform the HVAC Actuator Calibration Test.

      Did any other HVAC DTCs set while performing the Actuator Calibration Test?

      Yes

      - Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

No

- Go To 3

3. **CHECK THE (C33/52) RIGHT BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module C1 harness connector.
    3. Disconnect the Right Blend Door Actuator harness connector.
    4. Turn the ignition on.
    5. Measure the voltage of the (C33/52) Right Blend Door Driver circuit at the Passenger Blend Door Actuator harness connector.

    Is there any voltage present?

    Yes

    - Repair the (C33/52) Right Blend Door Driver circuit for a short to voltage.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4

4. **CHECK THE (C807/252) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Measure the voltage of the (C807/252) Common Door Driver 2 circuit at the Right Blend Door Actuator harness connector.

    Is there any voltage present?

    Yes

    - Repair the (C807/252) Common Door Driver 2 circuit for a short to voltage.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5

5. **CHECK THE (C33/52) RIGHT BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Check for continuity between ground and the (C33/52) Right Blend Door Driver circuit at the Right Blend Door Actuator harness connector.

    Is there continuity between ground and the (C33/52) Right Blend Door Driver circuit?

    Yes

- Repair the (C33/52) Right Blend Door Driver circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 6

6. **CHECK THE (C807/252) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO GROUND**
    1. Check for continuity between ground and the (C807/252) Common Door Driver 2 circuit at the Right Blend Door Actuator harness connector.

    Is there continuity between ground and the (C807/252) Common Door Driver 2 circuit?

    Yes

    - Repair the (C807/252) Common Door Driver 2 circuit for a short to ground.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 7

7. **CHECK THE RIGHT BLEND DOOR**
    1. Remove the Right Blend Door Actuator and check the Right Blend Door for binding and full travel. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .

    Were any problems found?

    Yes

    - Repair or replace the Right Blend Door as necessary in accordance with the Service Information. Refer to **HOUSING, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 8

8. **CHECK THE RIGHT BLEND DOOR ACTUATOR**
    1. Replace the Right Blend Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .
    2. With the scan tool, erase HVAC DTCs and perform the HVAC ACTUATOR CALIBRATION TEST.

    Did this DTC reset?

    Yes

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

9. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B11C9-00-RIGHT TEMPERATURE DOOR TRAVEL TOO SMALL

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to **DESCRIPTION** .

WHEN MONITORED

- When ever an Actuator Calibration Test is performed.

SET CONDITION

- The HVAC Module uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is less than what the controller has stored in its memory, this DTC will set.

DEFAULT ACTION

- If an Actuator Calibration Test is performed and the HVAC Module detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

POSSIBLE CAUSES

Possible Causes
RELATED DTCS PRESENT
RIGHT BLEND DOOR BINDING
RIGHT BLEND DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR RELATED DTCS**
    1. Turn the ignition on.
    2. With the scan tool, read HVAC DTCs.

    Are there any Door Control Circuit Open, Performance, or Short to Ground or Voltage DTCs present?

    Yes

    - Repair the HVAC DTCs in accordance with the service information.

      Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

    No

    - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 4

    No

- Go To 3

3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

    Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

    Yes

    - Go To 4

    No

    - Go To 6

4. **CHECK THE RIGHT BLEND DOOR**
    1. Remove the Right Blend Door Actuator and check the Right Blend Door for binding and full travel. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .

    Were there any problems found?

    Yes

    - Repair or replace the Right Blend Door as necessary in accordance with the Service Information. Refer to **HOUSING, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5

5. **CHECK THE RIGHT BLEND DOOR ACTUATOR**
    1. Replace the Right Blend Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .
    2. With the scan tool, erase HVAC DTCs.
    3. With the scan tool, perform the HVAC Actuator Calibration Test.

    Did this DTC reset during HVAC Actuator Calibration Test?

    Yes

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **CHECK THE WIRING AND CONNECTORS**

1. The conditions necessary to set the DTC are not present at this time.
2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

B11CA-00-RIGHT TEMPERATURE DOOR TRAVEL TOO LARGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to **DESCRIPTION** .

WHEN MONITORED

- When ever an Actuator Calibration Test is performed.

SET CONDITION

- The HVAC Module uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is greater than what the controller has stored in its memory, this DTC will set.

DEFAULT ACTION

- If an Actuator Calibration Test is performed or during normal operation and the HVAC Module detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

POSSIBLE CAUSES

Possible Causes
RELATED DTCS PRESENT
RIGHT BLEND DOOR STOPS
RIGHT BLEND DOOR
RIGHT BLEND DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR RELATED DTCS**
    1. Turn the ignition on.
    2. With the scan tool, read HVAC DTCs.

        Are there any Door Control Circuit Open, Performance, or Short to Ground or Voltage DTCs present?

        Yes

        - Repair the HVAC DTCs in accordance with the service information.

          Refer to **DIAGNOSTIC CODE INDEX** .

        No

        - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

        Did the DTC return?

        Yes

        - Go To 4

        No

        - Go To 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

Did this DTC change from Stored to Active while performing the HVAC System Test?

Yes

- Go To 4

No

- Go To 6

4. **CHECK THE RIGHT BLEND DOOR**
    1. Remove the Right Blend Door Actuator and check the Right Blend Door stops, linkage (stripped or cracked) and door. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .

       Were any problems found?

       Yes

       - Repair or replace the Right Blend Door as necessary in accordance with the Service Information. Refer to **HOUSING, HVAC, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 5
5. **CHECK THE RIGHT BLEND DOOR ACTUATOR**
    1. Replace the Right Blend Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .
    2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

       Did this DTC reset?

       Yes

       - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Test complete.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

B11CB-13-MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

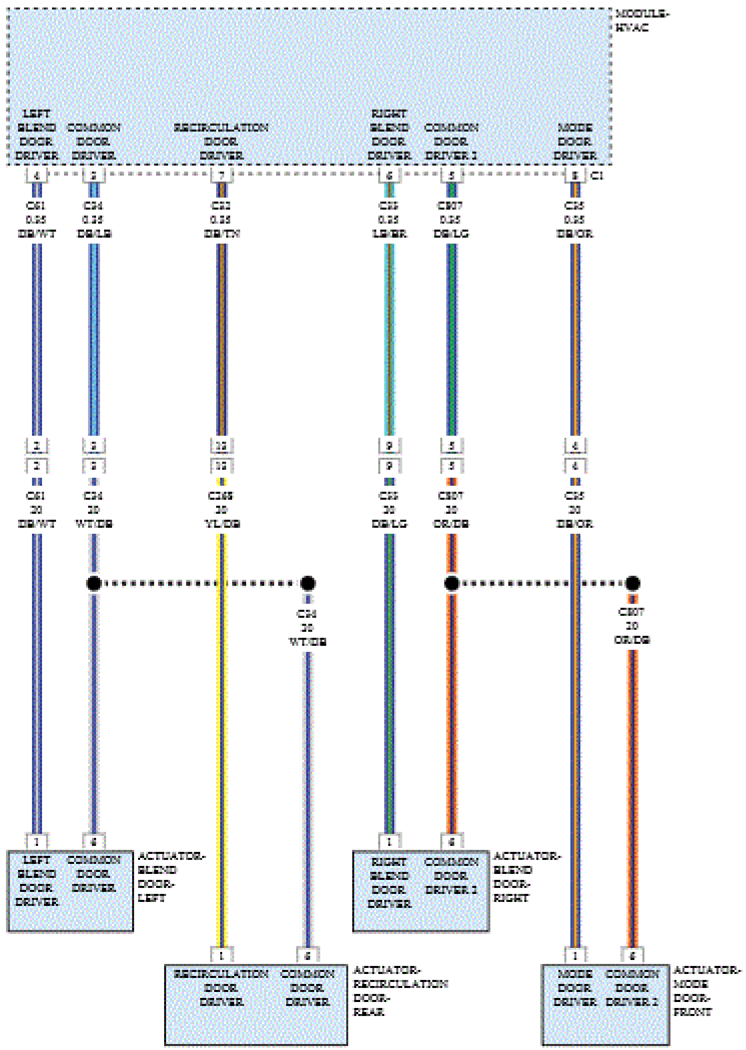


Fig. 13: HVAC Module - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to **DESCRIPTION** .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- The HVAC Module detects an open in the Left Blend Door control circuit.

Default Actions:

- If the HVAC Module detects a valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
LEFT BLEND DOOR DRIVER CIRCUIT OPEN
COMMON DOOR DRIVER CIRCUIT OPEN
LEFT BLEND DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 3

No

- Go To 2

2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

       Did this DTC change from Stored to Active while performing the HVAC ACTUATOR CALIBRATION TEST?

       Yes

       - Go To 3

       No

       - Go To 6

3. **CHECK THE (C61/C55) LEFT BLEND DOOR DRIVER CIRCUIT FOR AN OPEN**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module C1 harness connector.
    3. Disconnect the Left Blend Door Actuator harness connector.
    4. Measure the resistance of the (C61/C55) Left Blend Door Driver circuit between the HVAC Module C1 harness connector and the Left Blend Door Actuator harness connector.

       Is the resistance above 1.0 Ohm?

       Yes

       - Repair the (C61/C55) Left Blend Door Driver circuit for an open or high resistance.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 4

4. **CHECK THE (C34/C255) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN**
    1. Measure the resistance of the (C34/C255) Common Door Driver circuit between the HVAC Module C1 harness connector and the Left Blend Door Actuator harness connector.

       Is the resistance above 1.0 Ohm?

       Yes

       - Repair the (C34/C255) Common Door Driver circuit for an open or high resistance.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 5

5. **CHECK THE LEFT BLEND DOOR ACTUATOR**

1. Replace the Left Blend Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .
2. With the scan tool, erase HVAC DTCs and perform the HVAC ACTUATOR CALIBRATION TEST.

   Did this DTC reset?

   Yes

   - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete.

B11CB-92-MAIN/LEFT TEMPERATURE DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

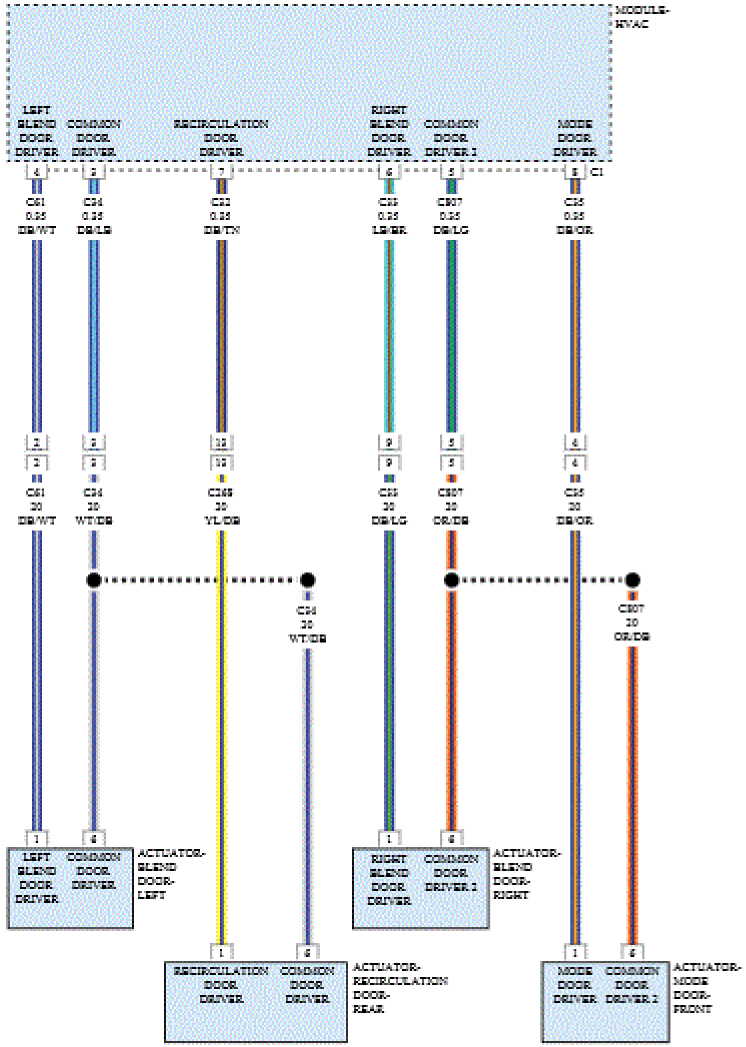


Fig. 14: HVAC Module - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to DESCRIPTION .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- The HVAC Module detects no feedback pulses on the Left Blend Door Driver circuits for 15 seconds or more.

Default Actions:

- If the HVAC Module detects a valid feedback pulse, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
LEFT BLEND DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
LEFT BLEND DOOR DRIVER CIRCUIT SHORTED TO GROUND
COMMON DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
COMMON DOOR DRIVER CIRCUIT SHORTED TO GROUND
LEFT BLEND DOOR BINDING
LEFT BLEND DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

       Did the DTC return?

       Yes

       - Go To 2

       No

       - Go To 9
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

       Did any other HVAC DTCs set while performing the Actuator Calibration Test?

       Yes

       - Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

No

- Go To 3

3. **CHECK THE (C61/C55) LEFT BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module C1 harness connector.
    3. Disconnect the Left Blend Door Actuator harness connector.
    4. Turn the ignition on.
    5. Measure the voltage of the (C61/C55) Left Blend Door Driver circuit at the Left Blend Door Actuator harness connector.

    Is there any voltage present?

    Yes

    - Repair the (C61/C55) Left Blend Door Driver circuit for a short to voltage.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4
4. **CHECK THE (C34/C255) COMMON DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Measure the voltage of the (C34/C255) Common Door Driver circuit at the Left Blend Door Actuator harness connector.

    Is there any voltage present?

    Yes

    - Repair the (C34/C255) Common Door Driver circuit for a short to voltage.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5
5. **CHECK THE (C61/C55) LEFT BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Check for continuity between ground and the (C61/C55) Left Blend Door Driver circuit at the Left Blend Door Actuator harness connector.

    Is there continuity between ground and the (C61/C55) Left Blend Door Driver circuit?

    Yes

    - Repair the (C61/C55) Left Blend Door Driver circuit for a short to ground.

- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 6

6. **CHECK THE (C34/C255) COMMON DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**
    1. Check for continuity between ground and the (C34/C255) Common Door Driver circuit at the Left Blend Door Actuator harness connector.

       Is there continuity between ground and the (C34/C255) Common Door Driver circuit?

       Yes

       - Repair the (C34/C255) Common Driver circuit for a short to ground.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 7

7. **CHECK THE LEFT BLEND DOOR**
    1. Remove the Left Blend Door Actuator and check the Left Blend Door for binding and full travel. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .

       Were any problems found?

       Yes

       - Repair or replace the Left Blend Door as necessary in accordance with the Service Information. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 8

8. **CHECK THE LEFT BLEND DOOR ACTUATOR**
    1. Replace the Left Blend Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .
    2. With the scan tool, erase HVAC DTCs and perform the HVAC ACTUATOR CALIBRATION TEST.

       Did this DTC reset?

       Yes

       - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

9. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B11CC-00-MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO SMALL

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to **DESCRIPTION** .

WHEN MONITORED

- When ever an Actuator Calibration Test is performed.

SET CONDITION

- The HVAC Module uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is less than what the controller has stored in its memory, this DTC will set.

DEFAULT ACTION

- If an Actuator Calibration Test is performed and the HVAC Module detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

POSSIBLE CAUSES

Possible Causes
RELATED DTCS PRESENT
LEFT BLEND DOOR BINDING
LEFT BLEND DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR RELATED DTCS**
    1. Turn the ignition on.
    2. With the scan tool, read HVAC DTCs.

    Are there any Door Control Circuit Open, Performance, or Short to Ground or Voltage DTCs present?

    Yes

    - Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

    No

    - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 4

    No

    - Go To 3

3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

       Did this DTC change from Stored to Active while performing the HVAC ACTUATOR CALIBRATION TEST?

       Yes

       - Go To 4

       No

       - Go To 6
4. **CHECK THE LEFT BLEND DOOR**
    1. Remove the Left Blend Door Actuator and check the Left Blend Door for binding and full travel. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .

       Were any problems found?

       Yes

       - Repair or replace the Left Blend Door as necessary in accordance with the Service Information. Refer to **HOUSING, HVAC, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 5
5. **CHECK THE LEFT BLEND DOOR ACTUATOR**
    1. Replace the Left Blend Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .
    2. With the scan tool, erase HVAC DTCs.
    3. With the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

       Did this DTC reset?

       Yes

       - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Test complete.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.

2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

B11CD-00-MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO LARGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

After the initial installation of the HVAC Module, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The HVAC Module drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present. For further information, refer to **DESCRIPTION** .

WHEN MONITORED

- When ever an Actuator Calibration Test is performed.

SET CONDITION

- The HVAC Module uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is greater than what the controller has stored in its memory, this DTC will set.

DEFAULT ACTION

- If an Actuator Calibration Test is performed or during normal operation and the HVAC Module detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

POSSIBLE CAUSES

Possible Causes

Possible Causes
RELATED DTCS PRESENT
LEFT BLEND DOOR STOPS
LEFT BLEND DOOR
LEFT BLEND DOOR ACTUATOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR RELATED DTCS**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

    Are there any Door Control Circuit Open, Performance, or Short to Ground or Voltage DTCs present?

    Yes

    - Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

    No

    - Go To 2
2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

    Is this DTC active?

    Yes

    - Go To 4

    No

    - Go To 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC ACTUATOR CALIBRATION TEST.

    Did this DTC change from Stored to Active while performing the HVAC ACTUATOR CALIBRATION TEST?

    Yes

    - Go To 4

No

- Go To 6

4. **CHECK THE LEFT BLEND DOOR**
    1. Remove the Left Blend Door Actuator and check the Left Blend Door stops, linkage (stripped or cracked) and door. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .

    Were there any problems found?

    Yes

    - Repair or replace the Left Blend Door as necessary in accordance with the Service Information. Refer to **HOUSING, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 5
5. **CHECK THE LEFT BLEND DOOR ACTUATOR**
    1. Replace the Left Blend Door Actuator in accordance with the Service Information. Refer to **ACTUATOR, BLEND DOOR, REMOVAL** .
    2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

    Did this DTC reset?

    Yes

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were there any problems found?

    Yes

- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

B11D3-00-A/C COOLDOWN TEST PERFORMANCE - COMPRESSOR NOT ENGAGED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

- Whenever an A/C Cooldown Test is performed.

SET CONDITION

- The HVAC Module receives a BUS message from the Powertrain Control Module (PCM) that the compressor is not engaged when it is requested.

POSSIBLE CAUSES

Possible Causes
LOSS OF COMMUNICATION WITH THE PCM OR MULTIPLE BUS PROBLEMS
PCM A/C COMPRESSOR DTCS
A/C SYSTEM LEAK
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR ACTIVE BUS COMMUNICATION DTCS**
    1. Turn the ignition on.
    2. With the scan tool, read BCM DTCs and record on the repair order.

    Are there any Active BUS Communication DTCs present?

    Yes

    - Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

    No

    - Go To 2
2. **CHECK FOR STORED BUS COMMUNICATION DTCS**
    1. Turn the ignition on.
    2. With the scan tool, read DTCs.

Are there any inactive or stored BUS Communication DTCs present?

Yes

- Refer to **STORED LOST COMMUNICATION DTCS** and perform the Stored Lost Communication DTCs diagnostic procedure.

No

- Go To 3

3. **CHECK FOR PCM A/C COMPRESSOR DTCS**
    1. Turn the ignition on.
    2. With the scan tool, read PCM DTCs and record on the repair order.

    Are there any PCM A/C Compressor DTCs present?

    Yes

    - Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Go To 4
4. **CHECK THE A/C COMPRESSOR**
    1. Start the Engine.
    2. Using the A/C heater Control, request A/C maximum cool.

    Does the A/C Compressor Clutch engage?

    Yes

    - Go To 5

    No

    - Diagnose and repair the A/C Compressor in accordance with the service information.

      Refer to **COMPRESSOR, A/C, DIAGNOSIS AND TESTING** .
5. **CHECK IF THE DTC RESETS**
    1. Turn the ignition off.
    2. Turn the ignition on.
    3. With the scan tool, erase HVAC DTCs.
    4. Turn the ignition off.
    5. Turn the ignition on.
    6. With the scan tool, perform the A/C Cooldown Test. Follow the instructions on the scan tool.

7. With the scan tool, read HVAC DTCs.

   Does this DTC reset?

   Yes

   - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 6

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete.

B11D5-00-A/C COOLDOWN TEST PERFORMANCE - EVAP TEMP SENSOR ERROR

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Evaporator Temperature Sensor is a variable resistor that changes in conjunction with temperature, or otherwise known as a thermistor. The Evaporator Temperature Sensor is located in the HVAC housing downstream of the A/C evaporator. The HVAC Module monitors the evaporator temperature by monitoring the voltage change of the Evaporator Temperature Sensor Signal circuit. If the monitored voltage drops below or rises above a predetermined voltage, a Diagnostic Trouble Code (DTC) will set. For further information, refer to **SENSOR, EVAPORATOR TEMPERATURE, OPERATION** .

WHEN MONITORED

- Whenever an A/C Cooldown Test is performed.

SET CONDITION

- The HVAC Module detects a circuit malfunction with the Evaporator Temperature Sensor during a Cooldown Test.

POSSIBLE CAUSES

Possible Causes
EVAPORATOR TEMPERATURE SENSOR DTC PRESENT
EVAPORATOR TEMPERATURE SENSOR
HVAC CONTROL

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

       Did the DTC return?

       Yes

       - Go To 2

       No

       - Go To 4
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

       Did any other HVAC DTCs set while performing the Actuator Calibration Test?

       Yes

       - Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

       No

       - Go To3
3. **CHECK THE EVAPORATOR TEMPERATURE SENSOR**
    1. Replace the Evaporator Temperature Sensor in Accordance with the Service Information. Refer to **SENSOR, EVAPORATOR TEMPERATURE, REMOVAL** .
    2. With the scan tool, erase HVAC DTCs.

3. Cycle the ignition off for 30 seconds then back on.
4. With the scan tool, perform an A/C Cooldown Test.
5. With the scan tool, read HVAC DTCs.

   Does this DTC reset?

   Yes

   - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

4. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

B11FE-11-VARIABLE A/C COMPRESSOR CONTROL - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

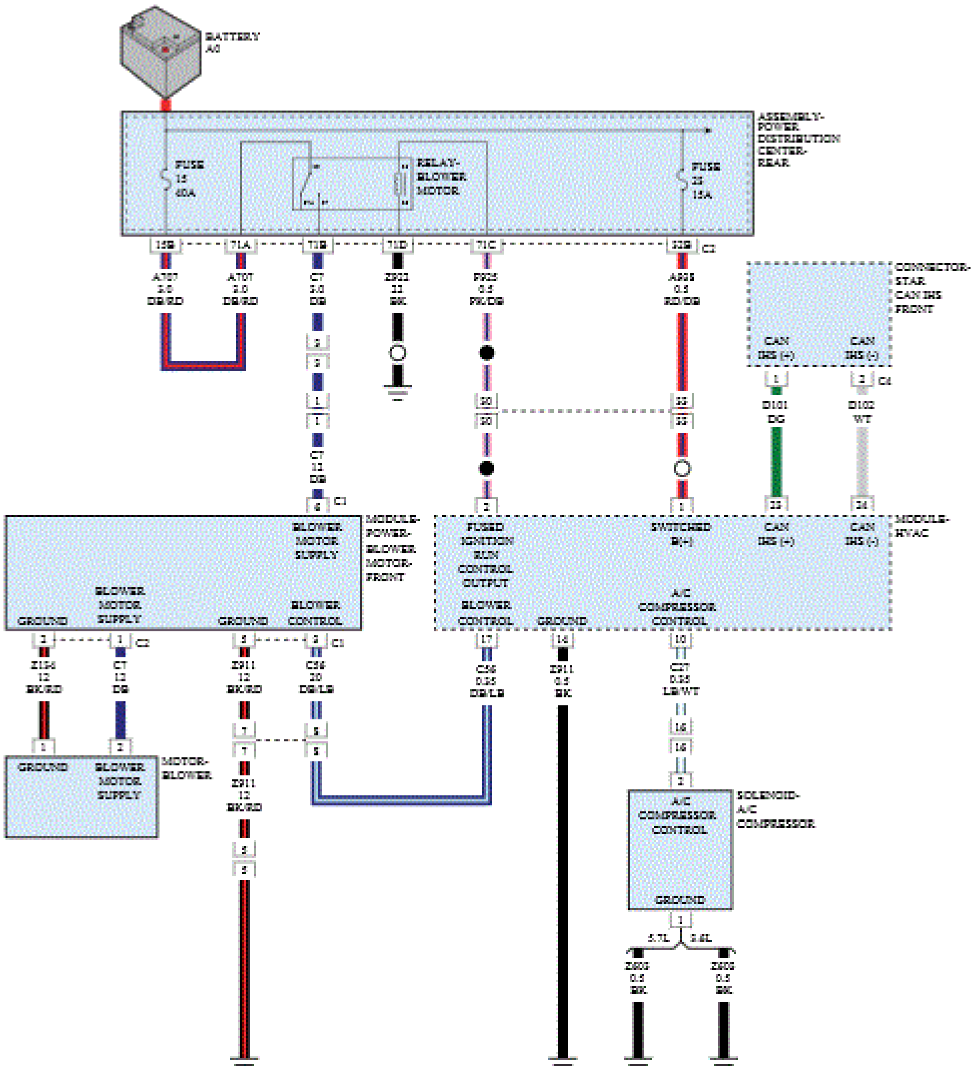


Fig. 15: HVAC Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on

Set Conditions:

- The HVAC Module detects a short to ground on the A/C compressor control circuit.

Default Actions:

- If the HVAC Module detects a valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
A/C COMPRESSOR CONTROL CIRCUIT SHORTED TO GROUND

Possible Causes
A/C COMPRESSOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 3

    No

    - Go To 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

    Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

    Yes

    - Go To 3

    No

    - Go To 5
3. **CHECK THE (C27) A/C CONTROL CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module C1 harness connector.
    3. Disconnect the A/C Compressor harness connector.
    4. Check for continuity between ground and the (C27) A/C Compressor control circuit at the A/C Compressor harness connector.

    Is there continuity between ground and the (C27) A/C Compressor control circuit?

Yes

- Repair the (C27) A/C Compressor control circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **CHECK THE A/C COMPRESSOR**
   1. Diagnose the A/C Compressor in accordance with the Service Information. Refer to **DIAGNOSIS AND TESTING** .
   2. With the scan tool, erase HVAC DTCs and perform the HVAC ACTUATOR CALIBRATION TEST.

   Did this DTC reset?

   Yes

   - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
5. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were any problems found?

   Yes

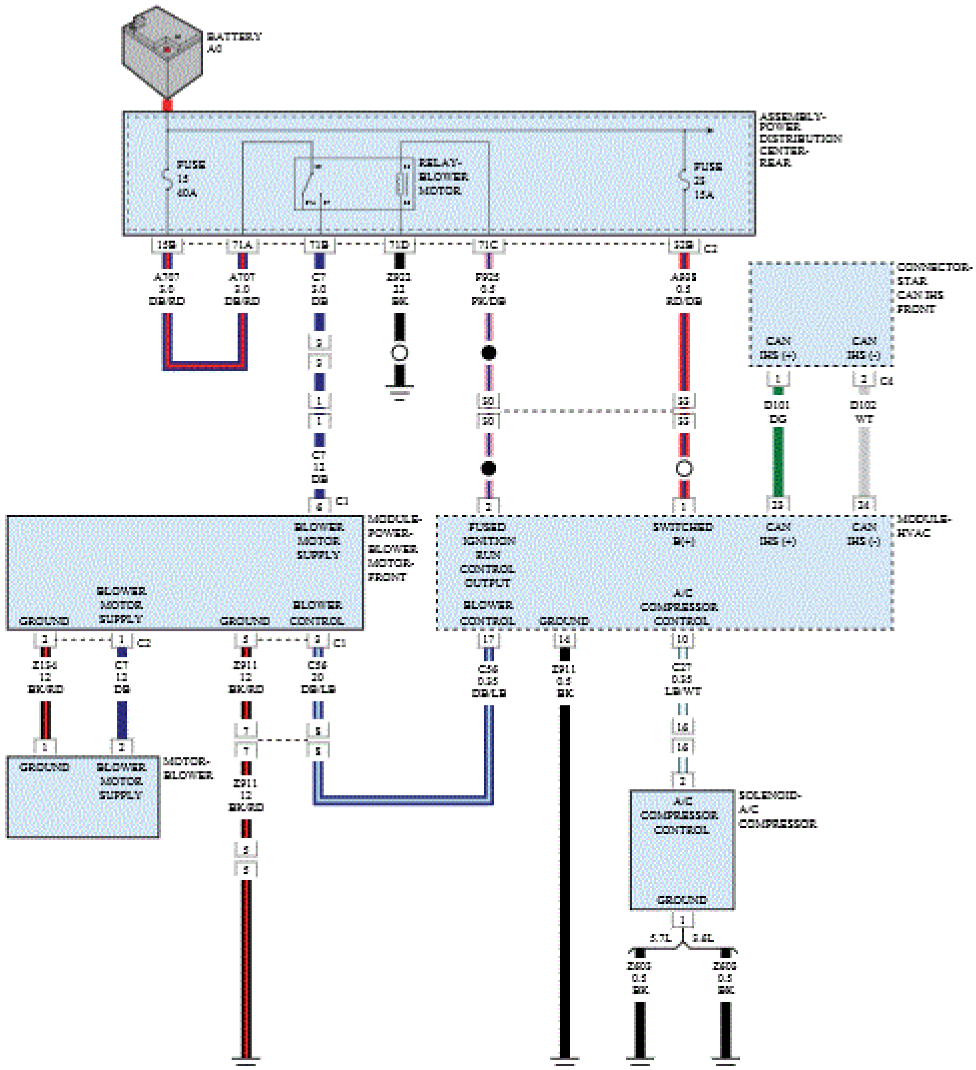
   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

B11FE-12-VARIABLE A/C COMPRESSOR CONTROL - CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 16: HVAC Module Circuit Diagram](#)
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following conditions are met:

- Ignition on.
- HVAC commanded on.

Set Conditions:

- The HVAC Module detects a short voltage on the A/C Compressor control circuit.

Default Actions:

- If the HVAC Module detects a valid voltage, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes

Possible Causes
A/C COMPRESSOR CONTROL CIRCUIT SHORTED TO VOLTAGE
A/C COMPRESSOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

       Did the DTC return?

       Yes

       - Go To 3

       No

       - Go To 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

       Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

       Yes

       - Go To 3

       No

       - Go To 5
3. **CHECK THE (C27) A/C COMPRESSOR CONTROL CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module C1 harness connector.
    3. Disconnect the A/C Compressor harness connector.
    4. Turn the ignition on.
    5. Measure the voltage of the (C27) A/C Compressor control circuit at the A/C Compressor harness

connector.

Is there any voltage present?

Yes

- Repair the (C27) A/C Compressor control circuit for a short to voltage.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 4

4. **CHECK THE A/C COMPRESSOR**
    1. Diagnose the A/C Compressor in accordance with the Service Information. Refer to **DIAGNOSIS AND TESTING** .
    2. With the scan tool, erase HVAC DTCs and perform the HVAC ACTUATOR CALIBRATION TEST.

    Did this DTC reset?

    Yes

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
5. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

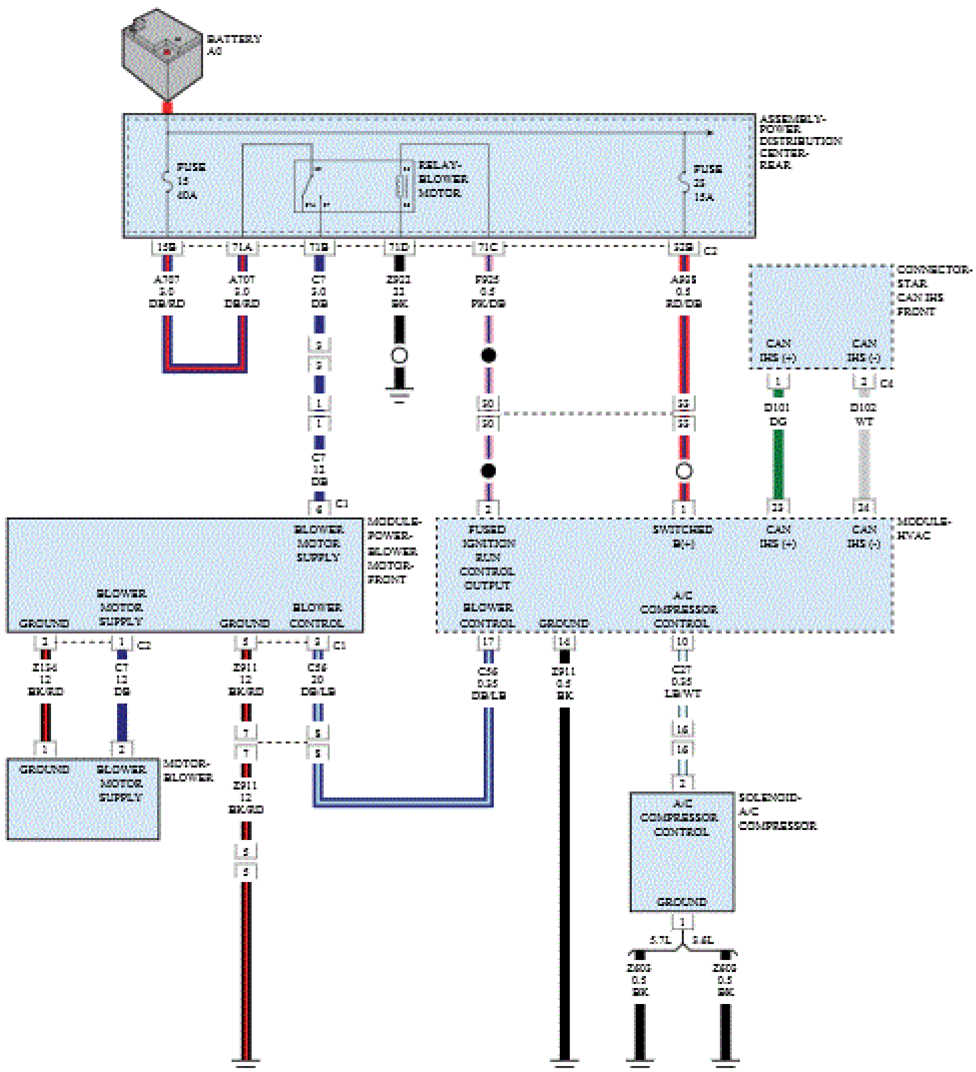
    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B11FE-13-VARIABLE A/C COMPRESSOR CONTROL - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 17: HVAC Module Circuit Diagram]()

Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following conditions are met:

- Ignition on.
- HVAC commanded off.

Set Conditions:

- The HVAC Module detects an open in the A/C Compressor control circuit.

Default Actions:

- If the HVAC Module detects a valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
A/C COMPRESSOR CONTROL CIRCUIT OPEN
A/C COMPRESSOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

       Did the DTC return?

       Yes

       - Go To 3

       No

       - Go To 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

       Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

       Yes

       - Go To 3

       No

       - Go To 6
3. **CHECK THE (C27) A/C COMPRESSOR CONTROL CIRCUIT FOR AN OPEN**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module C1 harness connector.
    3. Disconnect the A/C Compressor harness connector.

4. Measure the resistance of the (C27) A/C Compressor control circuit between the HVAC Module C1 harness connector and the A/C Compressor harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

   - Repair the (C27) A/C Compressor control circuit for an open or high resistance.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 5

4. **CHECK THE (Z603) A/C COMPRESSOR SOLENOID GROUND CIRCUIT FOR AN OPEN**
   1. Measure the resistance of the (Z603) A/C Compressor Solenoid ground circuit between the HVAC Module harness connector and the A/C Compressor harness connector.

      Is the resistance below 3.0 Ohms?

      Yes

      - Go To 5

      No

      - Repair the (Z603) A/C Compressor Solenoid ground circuit for an open
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
5. **CHECK THE A/C COMPRESSOR**
   1. Diagnose the A/C Compressor in accordance with the Service Information. Refer to **DIAGNOSIS AND TESTING** .
   2. With the scan tool, erase HVAC DTCs and perform the HVAC ACTUATOR CALIBRATION TEST.

      Did this DTC reset?

      Yes

      - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC

was set.

3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
4. Wiggle the wiring and connectors while checking for shorted and open circuits.

Were any problems found?

Yes

- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. Refer to STANDARD PROCEDURE.

No

- Test complete.

B1600-11-LEFT SOLAR SENSOR - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

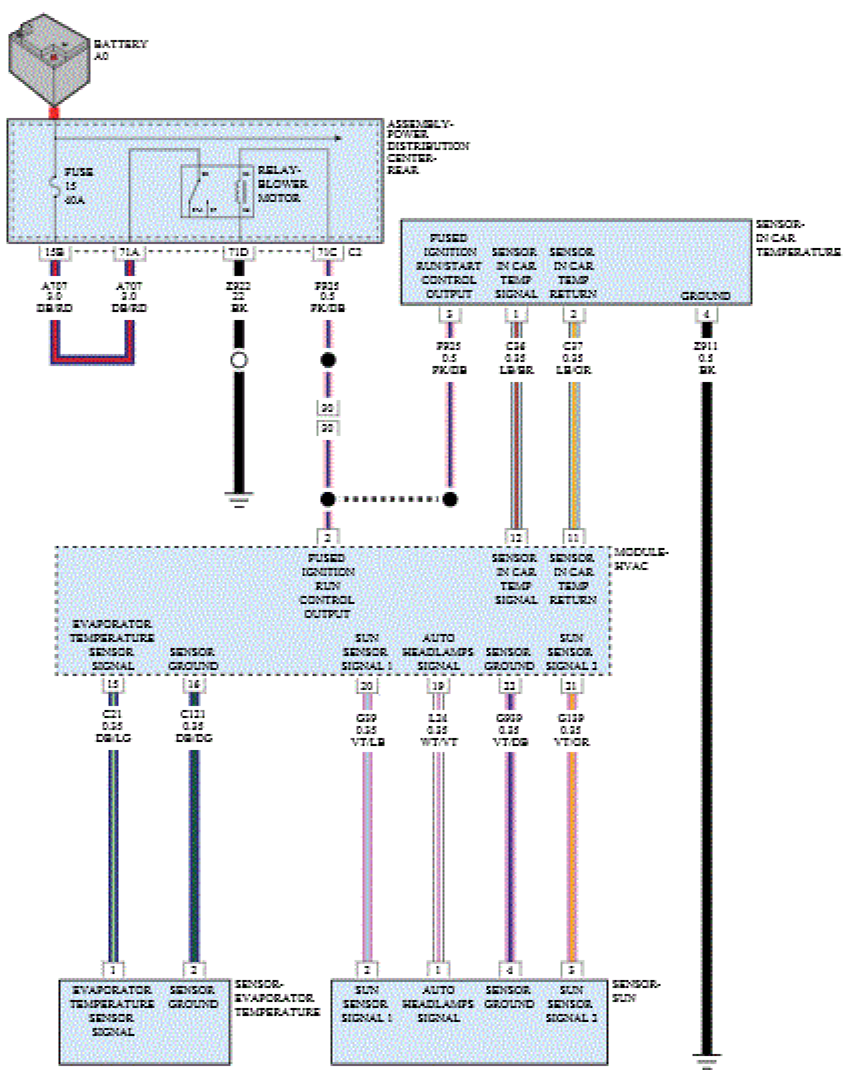


Fig. 18: HVAC Module - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The HVAC Module uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the HVAC Module to assure that they are in range. If those sensors fall out of predetermined ranges a Diagnostic Trouble Code (DTC) will set. For further information, refer to SENSOR, SUN, OPERATION .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- ignition on.

Set Conditions:

- If the HVAC Module detects on Sun Sensor Signal 1 circuit a voltage less than 0.5 volt for the period of two seconds or more.

Default Actions:

- This DTC has a de-maturing time of 20 msec. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
SUN SENSOR 1 SIGNAL CIRCUIT SHORTED TO GROUND
SUN SENSOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 2

No

- Go To 4

2. **CHECK (G39) SUN SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND**
   1. Turn the ignition off.
   2. Disconnect the HVAC Module C1 harness connector.
   3. Disconnect the Sun Sensor harness connector.
   4. Check for continuity between ground and the (G39) Sun Sensor 1 Signal circuit at the Sun Sensor harness connector.

   Is there continuity between ground and the (G39) Sun Sensor 1 Signal circuit?

   Yes

   - Repair the (G39) Sun Sensor 1 Signal circuit for a short to ground.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE SUN SENSOR AND HVAC MODULE**
   1. Replace the Sun Sensor in accordance with the Service Information. Refer to **SENSOR, SUN, REMOVAL** .
   2. Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   Did this DTC reset while performing the HVAC Verification Test?

   Yes

   - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

4. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were any problems found?

Yes

- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

B1600-15-LEFT SOLAR SENSOR - CIRCUIT SHORT TO BATTERY OR OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

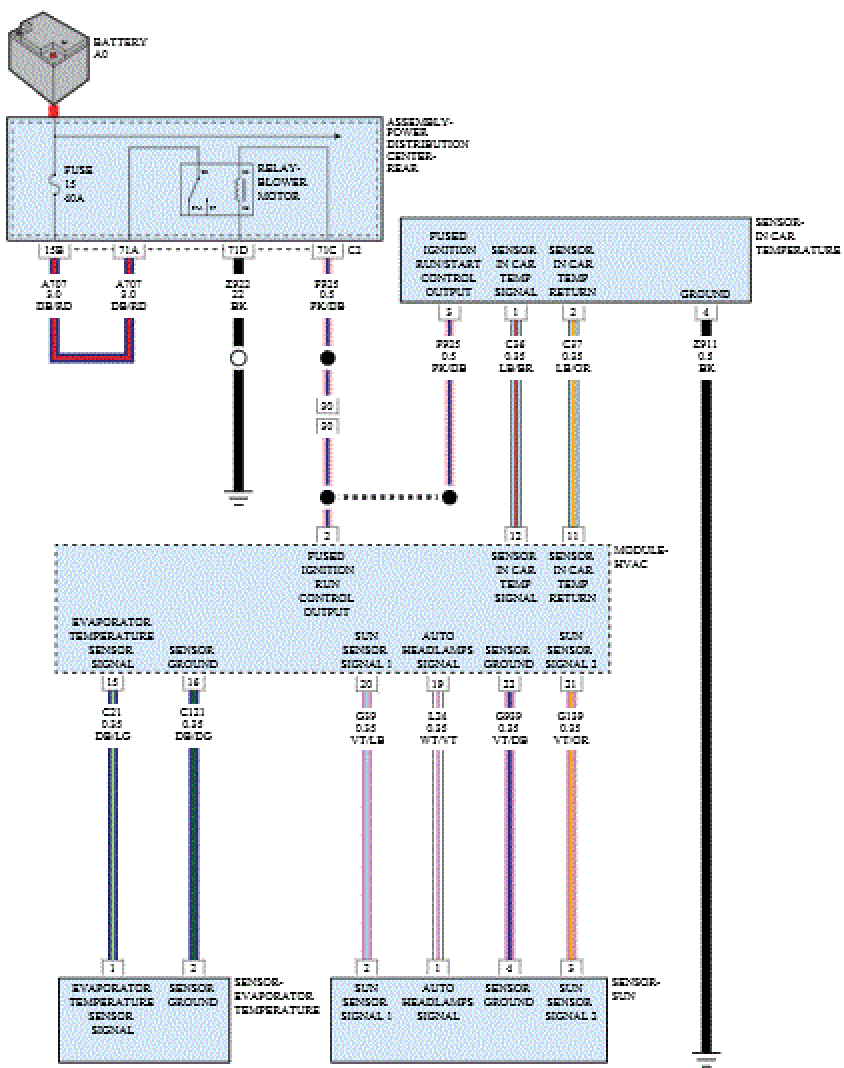


Fig. 19: HVAC Module - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The HVAC Module uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the HVAC Module to assure that they are in range. If those sensors fall

out of predetermined ranges a Diagnostic Trouble Code (DTC) will set. For further information, refer to **SENSOR, SUN, OPERATION** .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- If the HVAC Module detects on the Sun Sensor 1 Signal circuit a voltage greater than 4.8 volts for the period of two seconds or more.

Default Actions:

- This DTC has a de-maturing time of 20 msec. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
SUN SENSOR 1 SIGNAL CIRCUIT SHORTED TO VOLTAGE
SUN SENSOR 1 SIGNAL CIRCUIT OPEN
SUN SENSOR RETURN CIRCUIT OPEN
SUN SENSOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - Go To 6
2. **CHECK THE (G39) SUN SENSOR 1 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**

1. Turn the ignition off.
2. Disconnect the Sun Sensor harness connector.
3. Disconnect the HVAC Module C1 harness connector.

NOTE: **Check connectors - Clean/repair as necessary.**

4. Turn the ignition on.
5. Check the voltage of the (G39) Sun Sensor 1 Signal circuit at the Sun Sensor harness connector.

   Is there any voltage present?

   Yes

   - Repair the (G39) Sun Sensor 1 Signal circuit for an short to voltage.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 3

3. **CHECK THE (G39) SUN SENSOR 1 SIGNAL CIRCUIT FOR AN OPEN**
   1. Turn the ignition off.
   2. Measure the resistance of the (G39) Sun Sensor 1 Signal circuit between the HVAC Module C1 harness connector and the Sun Sensor harness connector.

      Is the resistance above 3.0 Ohms?

      Yes

      - Repair the (G39) Sun Sensor 1 Signal circuit for an open.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 4

4. **CHECK THE (C939) SUN SENSOR RETURN CIRCUIT FOR AN OPEN**
   1. Measure the resistance of the (G939) Sun Sensor Return circuit between the HVAC Module C1 harness connector and the Sun Sensor harness connector.

      Is the resistance above 3.0 Ohms?

      Yes

      - Repair the (C939) Sun Sensor Return circuit for an open.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Go To 5

5. **CHECK THE SUN SENSOR AND HVAC MODULE**
    1. Turn the ignition off.
    2. Replace the Sun Sensor in accordance with the Service Information. Refer to **SENSOR, SUN, REMOVAL** .
    3. Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    Did the DTC reset during or after the HVAC Verification Test?

    Yes

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.
6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

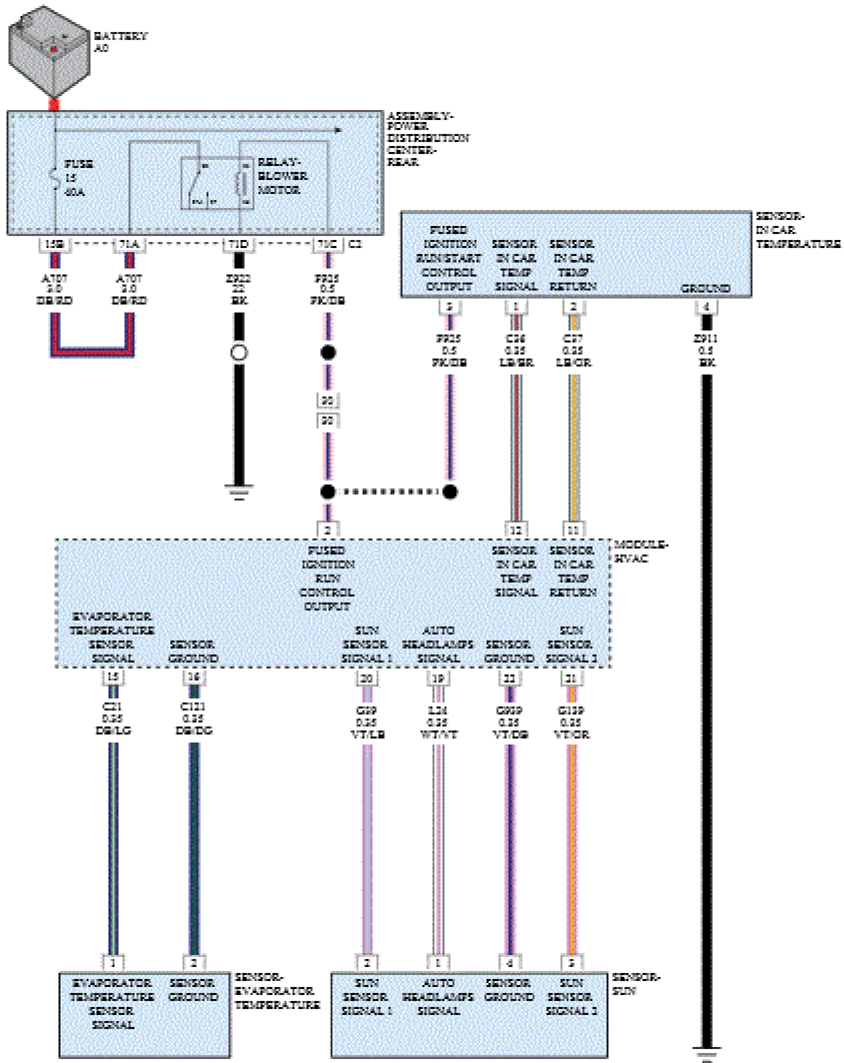
    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B1603-11-RIGHT SOLAR SENSOR - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 20: HVAC Module - Circuit Diagram](#)

Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The HVAC Module uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the HVAC Module to assure that they are in range. If those sensors fall out of predetermined ranges a Diagnostic Trouble Code (DTC) will set. For further information, refer to SENSOR, SUN, OPERATION .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- If the HVAC Module detects on Sun Sensor 2 Signal circuit a voltage less than 0.5 volts for the period of two seconds or more.

Default Actions:

- This DTC has a de-maturing time of 20 msec. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
SUN SENSOR 2 SIGNAL CIRCUIT SHORTED TO GROUND
SUN SENSOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - Go To 4
2. **CHECK (G139) SUN SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module C1 harness connector.
    3. Disconnect the Sun Sensor harness connector.
    4. Check for continuity between ground and the (G139) Sun Sensor 2 Signal circuit at the Sun Sensor harness connector.

    Is there continuity between ground and the (G139) Sun Sensor 2 Signal circuit?

    Yes

    - Repair the (G139) Sun Sensor 2 Signal circuit for a short to ground.
    - Perform the HVAC VERIFICATION TEST. Refer to STANDARD PROCEDURE.

    No

- Go To 3

3. **CHECK THE SUN SENSOR AND HVAC MODULE**
    1. Replace the Sun Sensor in accordance with the Service Information. Refer to **SENSOR, SUN, REMOVAL** .
    2. Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    Did this DTC reset while performing the HVAC Verification Test?

    Yes

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

4. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

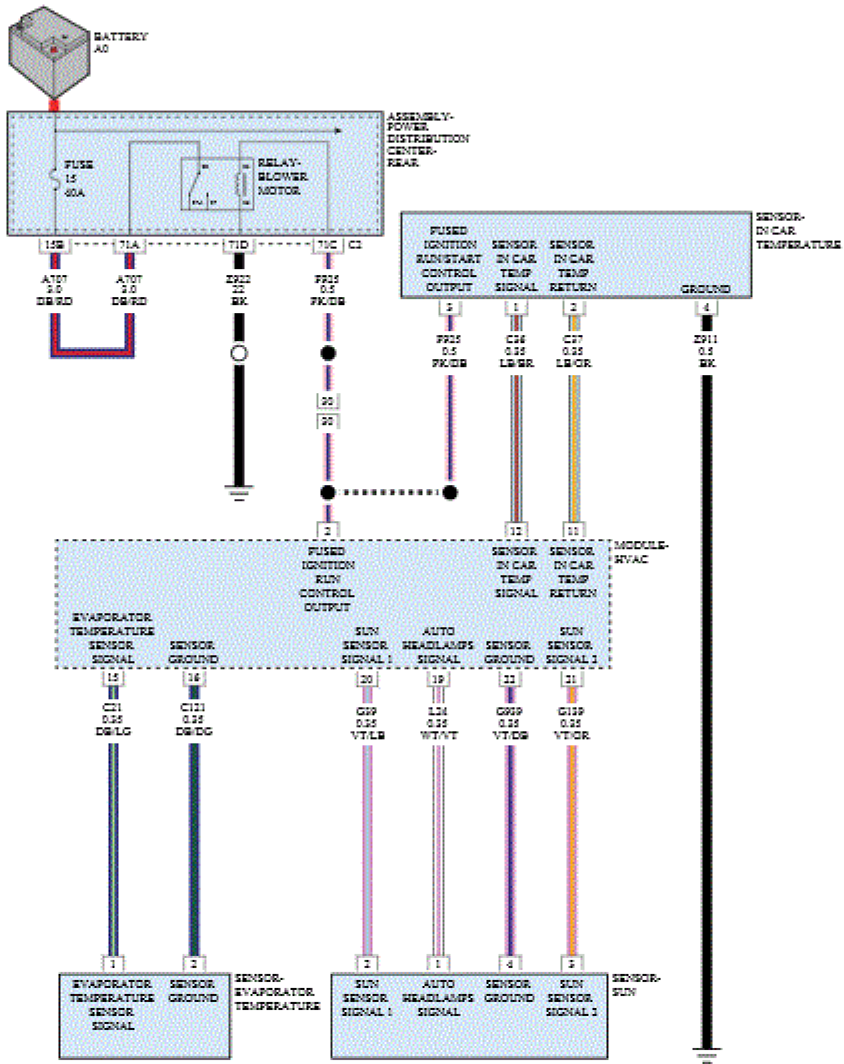
    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B1603-15-RIGHT SOLAR SENSOR - CIRCUIT SHORT TO BATTERY OR OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 21: HVAC Module - Circuit Diagram]

Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The HVAC Module uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the HVAC Module to assure that they are in range. If those sensors fall out of predetermined ranges a Diagnostic Trouble Code (DTC) will set. For further information, refer to SENSOR, SUN, OPERATION .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- If the HVAC Module detects on the Sun Sensor 2 Signal circuit a voltage greater than 4.8 volts for the period of two seconds or more.

Default Actions:

- This DTC has a de-maturing time of 20 msec. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
SUN SENSOR 2 SIGNAL CIRCUIT SHORTED TO VOLTAGE
SUN SENSOR 2 SIGNAL CIRCUIT OPEN
SUN SENSOR RETURN CIRCUIT OPEN
SUN SENSOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - Go To 6
2. **CHECK THE (G139) SUN SENSOR 2 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the Sun Sensor harness connector.
    3. Disconnect the HVAC Control C1 harness connector.

    NOTE: Check connectors - Clean/repair as necessary.

    4. Turn the ignition on.
    5. Check the voltage of the (G139) Sun Sensor 2 Signal circuit at Sun Sensor harness connector.

    Is there any voltage present?

    Yes

- Repair the (G139) Sun Sensor 2 Signal circuit for an short to voltage.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (G139) SUN SENSOR 2 SIGNAL CIRCUIT FOR AN OPEN**
    1. Turn the ignition off.
    2. Measure the resistance of the (G139) Sun Sensor 2 Signal circuit between the HVAC Control C1 harness connector and the Sun Sensor harness connector.

       Is the resistance above 3.0 Ohms?

       Yes

       - Repair the (G139) Sun Sensor 2 Signal circuit for an open.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 4

4. **CHECK THE (G939) SUN SENSOR RETURN CIRCUIT FOR AN OPEN**
    1. Measure the resistance of the (G939) Sun Sensor Return circuit between the HVAC Control C1 harness connector and the Sun Sensor harness connector.

       Is the resistance above 3.0 Ohms?

       Yes

       - Repair the (G939) Sun Sensor Return circuit for an open.
       - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       No

       - Go To 5

5. **CHECK THE SUN SENSOR AND HVAC CONTROL**
    1. Turn the ignition off.
    2. Replace the Sun Sensor in accordance with the Service Information. Refer to **SENSOR, SUN, REMOVAL** .
    3. Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

       Did the DTC reset during or after the HVAC Verification Test?

       Yes

       - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .

- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B160F-11-TWILIGHT/AMBIENT LIGHT SENSOR INPUT - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

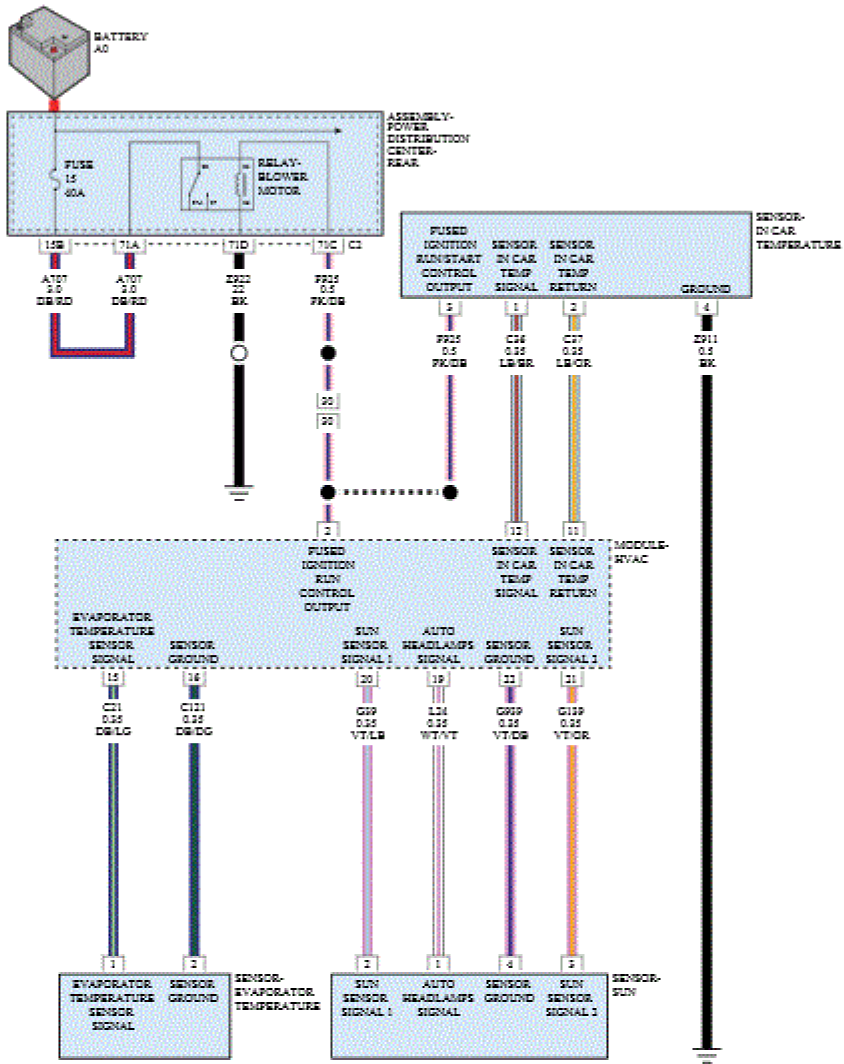


Fig. 22: HVAC Module - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The HVAC Module uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the HVAC Module to assure that they are in range. If those sensors fall out of predetermined ranges a Diagnostic Trouble Code (DTC) will set. For further information, refer to SENSOR, SUN, OPERATION .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- If the HVAC Module detects on the Auto Headlamps Signal circuit a voltage less than 0.25 volts for the period of two seconds or more.

Default Actions:

- This DTC has a de-maturing time of 20 msec. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
AUTO HEADLAMPS SIGNAL CIRCUIT SHORTED TO GROUND
SUN SENSOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. With the scan tool, read HVAC DTCs and record on the repair order.
   2. Record the Environmental Data.
   3. With the scan tool, erase DTCs.
   4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
   5. With the scan tool, read HVAC DTCs.

      Did the DTC return?

      Yes

      - Go To 2

      No

      - Go To 4
2. **CHECK (L24) AUTO HEADLAMPS SIGNAL CIRCUIT FOR A SHORT TO GROUND**
   1. Turn the ignition off.
   2. Disconnect the HVAC Module C1 harness connector.
   3. Disconnect the Sun Sensor harness connector.
   4. Check for continuity between ground and the (L24) Auto Headlamps Signal circuit at the HVAC Module C1 harness connector.

      Is there continuity between ground and the (L24) Auto Headlamps Signal circuit?

      Yes

      - Repair the (L24) Auto Headlamps Signal circuit for a short to ground.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

- Go To 3

3. **CHECK THE SUN SENSOR AND HVAC MODULE**
    1. Replace the Sun Sensor in accordance with the Service Information. Refer to **SENSOR, SUN, REMOVAL** .
    2. Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    Did this DTC reset while performing the HVAC Verification Test?

    Yes

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

4. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B160F-15-TWILIGHT-AMBIENT LIGHT SENSOR - CIRCUIT SHORT TO BATTERY OR GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

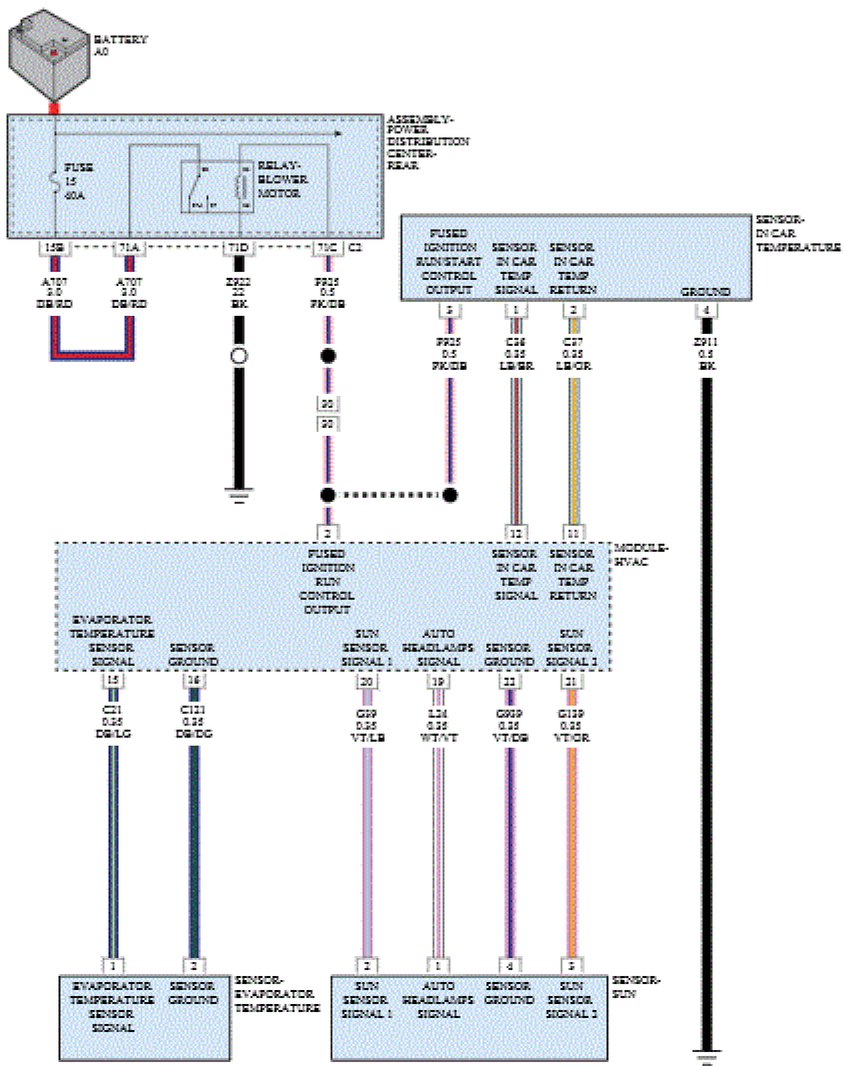


Fig. 23: HVAC Module - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The HVAC Module uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the HVAC Module to assure that they are in range. If those sensors fall out of predetermined ranges a Diagnostic Trouble Code (DTC) will set. For further information, refer to SENSOR, SUN, OPERATION .

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- ignition on.

Set Conditions:

- If the HVAC Module detects on the Auto Headlamps Signal circuit a voltage greater than 4.83 volts for the period of two seconds or more.

Default Actions:

- This DTC has a de-maturing time of 20 msec. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
AUTO HEADLAMPS SIGNAL CIRCUIT SHORTED TO VOLTAGE
AUTO HEADLAMPS SIGNAL CIRCUIT OPEN
SUN SENSOR RETURN CIRCUIT OPEN
SUN SENSOR
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - Go To 6
2. **CHECK THE (L24) AUTO HEADLAMPS SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the HVAC Module C1 harness connector.
    3. Disconnect the Sun Sensor harness connector.
    4. Turn the ignition on.
    5. Measure the voltage of the (L24) Auto Headlamps Signal circuit between the HVAC Module C1 harness connector and the Sun Sensor harness connector.

    Is there any voltage present?

    Yes

    - Repair the (L24) Auto Headlamps Signal circuit for a short to voltage.

- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Go To 3

3. **CHECK THE (L24) AUTO HEADLAMPS SIGNAL CIRCUIT FOR AN OPEN**
   1. Turn the ignition off.
   2. Measure the resistance of the (L24) Auto Headlamps Signal circuit between the HVAC Module C1 harness connector and the Sun Sensor harness connector.

      Is the resistance below 3.0 Ohms?

      Yes

      - Go To 4

      No

      - Repair the (L24) Auto Headlamps Signal circuit for an open.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
4. **CHECK THE (G939) SUN SENSOR RETURN CIRCUIT FOR AN OPEN**
   1. Measure the resistance of the (G939) Sun Sensor Return circuit between the HVAC Module C1 harness connector and the Sun Sensor harness connector.

      Is the resistance below 3.0 Ohms?

      Yes

      - Go To 5

      No

      - Repair the (G939) Sun Sensor Return circuit for an open.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.
5. **CHECK THE SUN SENSOR AND HVAC MODULE**
   1. Replace the Sun Sensor in accordance with the Service Information. Refer to **SENSOR, SUN, REMOVAL** .
   2. Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      Did this DTC reset while performing the HVAC Verification Test?

      Yes

      - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

- Test complete.

6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were any problems found?

    Yes

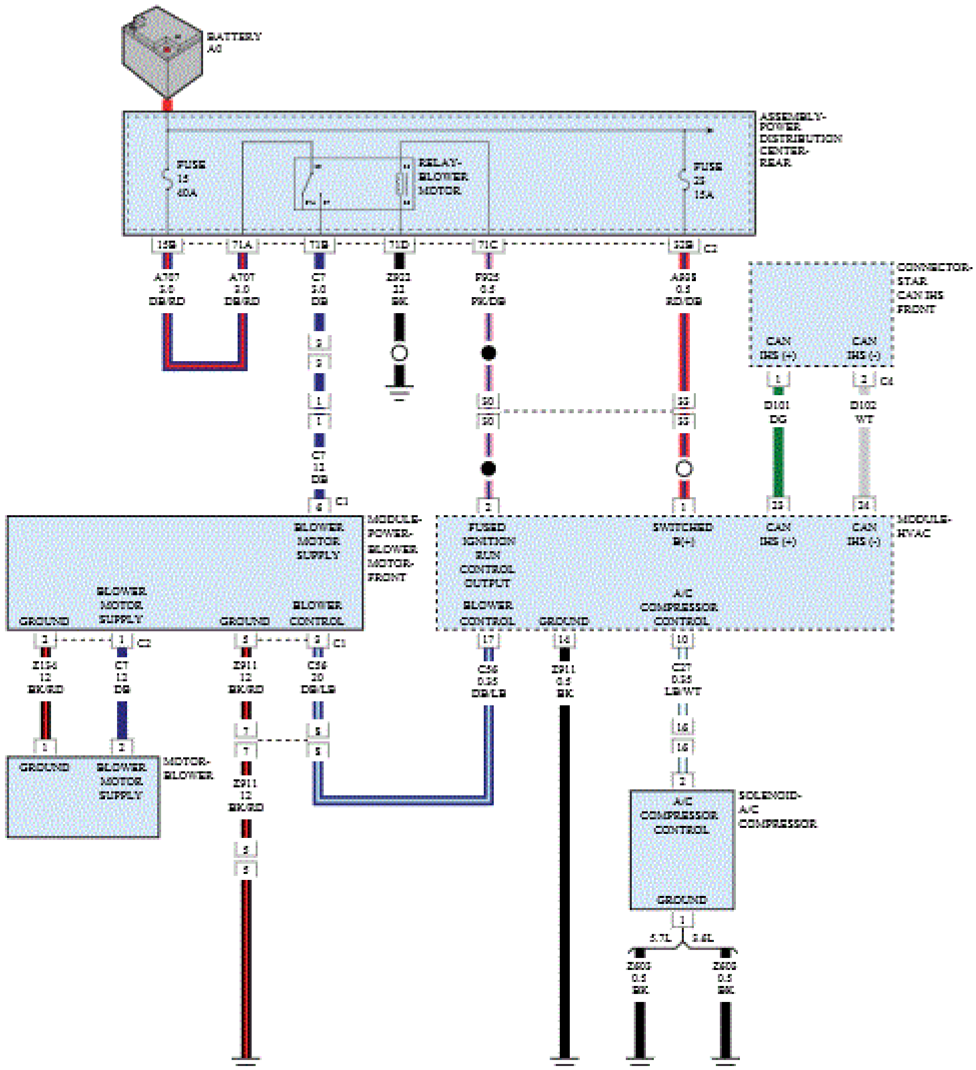
    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B210A-84-SYSTEM VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 24: HVAC Module Circuit Diagram]

Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The A/C Heater Module constantly monitors battery and ignition voltage as well as battery voltage derived from BUS communication to ensure proper operation. If the voltage to the controller is out of range, it could cause damage to the controller or its respective components. If the voltage of either circuit drops below or rises above a predetermined calibration a Diagnostic Trouble Code (DTC) will set.

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- If the system voltage or ignition voltage broadcast over the BUS is low for period of 15 seconds.

Possible Causes
RELATED BCM DTCS PRESENT
RELATED CHARGING SYSTEM DTCS PRESENT
RELATED HVAC DTCS PRESENT
OTHER CONTROLLERS REPORTING UNDER VOLTAGE CONDITION
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR BCM DTCS**
    1. Ignition on, engine not running.
    2. With the scan tool, read DTCs.

    Are there any Body Control Module (BCM) DTCs present?

    Yes

    - Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

    No

    - Go To 2
2. **CHECK FOR POWERTRAIN CONTROL MODULE DTCS**
    1. With the scan tool, read DTCs.

    Are there any Powertrain Control Module (PCM) charging system DTCs present?

    Yes

    - Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.

    No

    - Go To 3
3. **CHECK FOR HVAC DTCS**
    1. With the scan tool, read HVAC DTCs.

    Is the DTC B210D-84-Battery Voltage Low - Signal Below Allowable Range present also?

    Yes

    - Refer to **B210D-84-BATTERY VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE** and perform the diagnostic procedure .

    No

- Go To 4

4. **CHECK IF THE DTC IS ACTIVE**
    1. With the scan tool, read HVAC DTCs.

    NOTE: **It can take up to 15 seconds or more for this DTC to mature.**

    Is this DTC active?

    Yes

    - Go To 5

    No

    - Go To 6

5. **CHECK IF OTHER CONTROLLERS ARE REPORTING AN UNDER VOLTAGE CONDITION**
    1. With the scan tool, read DTCs.

    Are any other controllers reporting an under voltage condition?

    Yes

    - Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.

    No

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were there any problems found?

    Yes

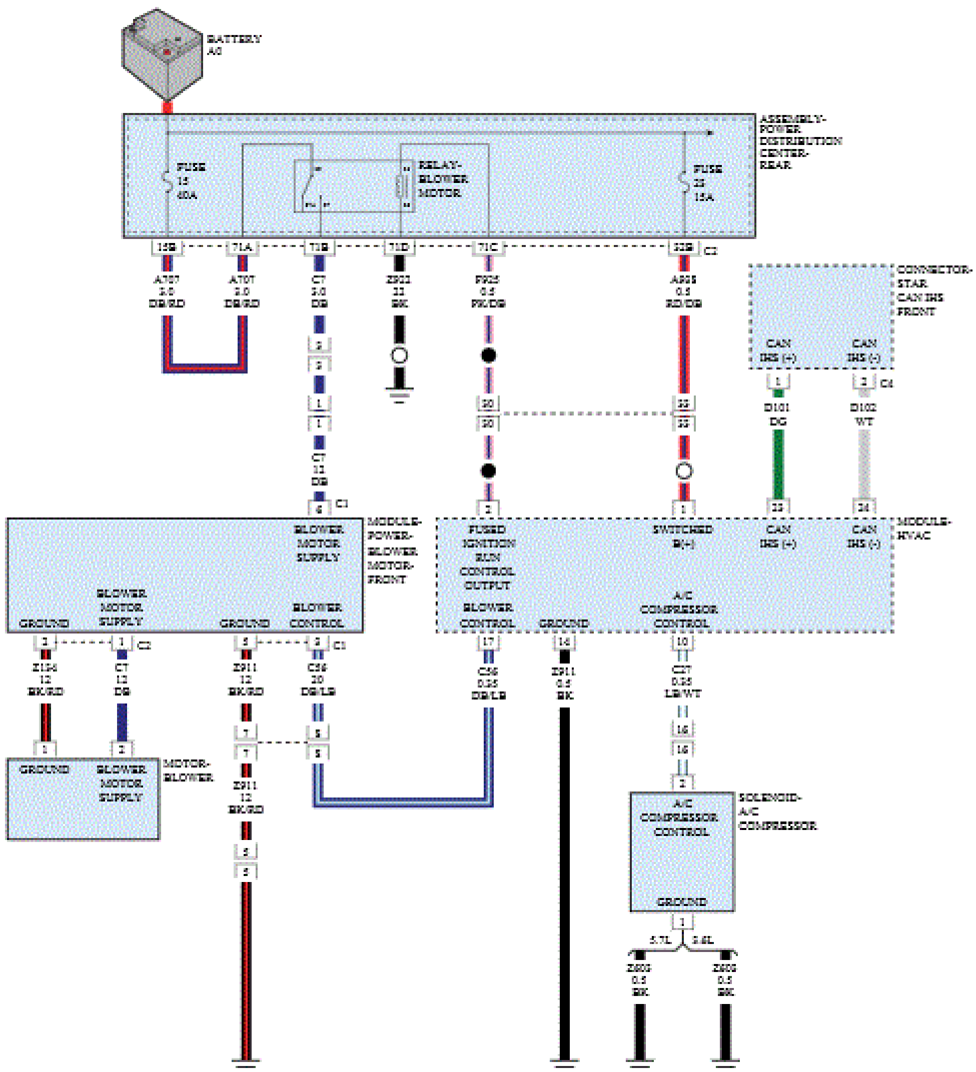
    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

    No

    - Test complete.

B210B-85-SYSTEM VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[**Fig. 25: HVAC Module Circuit Diagram**]()
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The A/C Heater Control constantly monitors battery and ignition voltage as well as battery voltage derived from BUS communication to ensure proper operation. If the voltage to the controller is out of range, it could cause damage to the controller or its respective components. If the voltage of either circuit drops below or rises above a predetermined calibration a Diagnostic Trouble Code (DTC) will set.

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- If the system voltage or ignition voltage broadcast over the BUS is higher than monitored controller voltage the for period of 15 seconds.

Possible Causes
RELATED BCM DTCS PRESENT
RELATED CHARGING SYSTEM DTCS PRESENT
RELATED HVAC DTCS PRESENT
OTHER CONTROLLERS REPORTING OVER VOLTAGE CONDITION
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR BCM DTCS**
    1. Ignition on, engine not running.
    2. With the scan tool, read DTCs.

    Are there any Body Control Module (BCM) DTCs present?

    Yes

    - Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

    No

    - Go To 2
2. **CHECK FOR POWERTRAIN CONTROL MODULE DTCS**
    1. With the scan tool, read DTCs.

    Are there any Powertrain Control Module (PCM) charging system DTCs present?

    Yes

    - Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.

    No

    - Go To 3
3. **CHECK FOR HVAC DTCS**
    1. With the scan tool, read HVAC DTCs.

    Is the DTC B210E-85-Battery Voltage High - Signal Above Allowable Range present also?

    Yes

    - Refer to **B210E-85-BATTERY VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE** and perform the diagnostic procedure .

No

- Go To 4

4. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read HVAC DTCs and record on the repair order.
    2. Record the Environmental Data.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read HVAC DTCs.

    Did the DTC return?

    Yes

    - Go To 5

    No

    - Go To 6

5. **CHECK IF OTHER CONTROLLERS ARE REPORTING AN OVER VOLTAGE CONDITION**
    1. With the scan tool, read DTCs.

    Are any other controllers reporting an over voltage condition?

    Yes

    - Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.

    No

    - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
    - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were there any problems found?

    Yes

    - Repair as necessary.

- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Test complete.

B210D-84-BATTERY VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

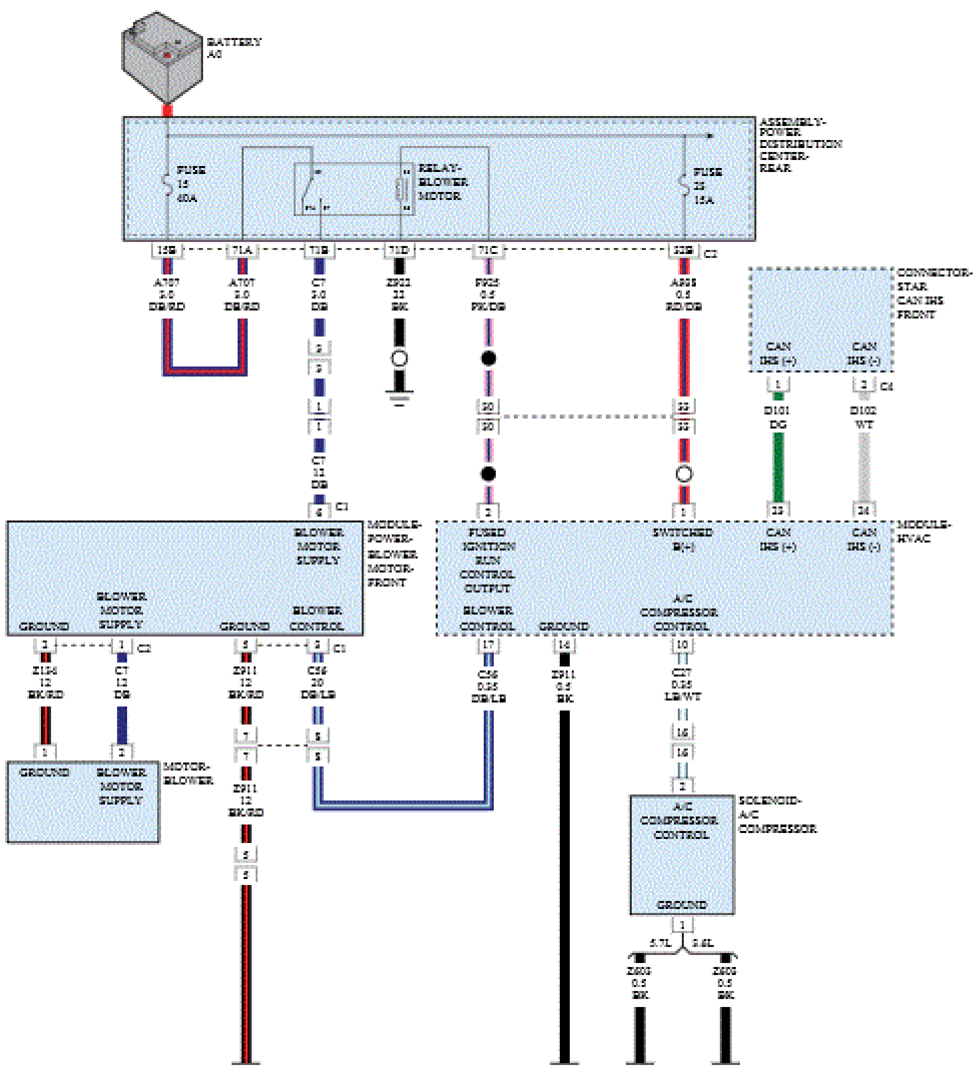


Fig. 26: HVAC Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The A/C Heater Module constantly monitors battery and ignition voltage as well as battery voltage derived from BUS communication to ensure proper operation. If the voltage to the controller is out of range, it could cause damage to the controller or its respective components. If the voltage of either circuit drops below or rises above a predetermined calibration a Diagnostic Trouble Code (DTC) will set.

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- If the HVAC Module detects a voltage less than 9.5 volts for the period of 15 seconds or more.

Default Actions:

- This DTC has a de-maturing time of 20 msec. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
RELATED CHARGING SYSTEM DTCS PRESENT
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
FUSED B(+) CIRCUIT OPEN
GROUND CIRCUIT OPEN
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR CHARGING SYSTEM DTCS**
    1. With the scan tool, read PCM DTCs and record on the repair order.

       Are there any charging system DTCs present in the Powertrain Control Module (PCM)?

       Yes

       - Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.

       No

       - Go To 2
2. **CHECK FOR BODY CONTROL MODULE DTCS**
    1. With the scan tool, read BCM DTCs and record on the repair order.

       Are there any BCM DTCS present?

       Yes

       - Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

       No

       - Go To 3
3. **CHECK FOR AN ACTIVE DTC**

1. With the scan tool, read HVAC DTCs.

   Is the DTC active?

   Yes

   - Go To 4

   No

   - Go To 7

4. **CHECK THE (F925) FUSED IGNITION SWITCH OUTPUT CIRCUIT FOR AN OPEN**
   1. Turn the ignition on.
   2. While back probing, measure the voltage of the (F925) Fused Ignition Switch Output circuit in the HVAC Module C1 harness connector.

   Is the voltage 9.5 volts or below?

   Yes

   - Repair the (F925) Fused Ignition Switch Output circuit for an open or high resistance.

     NOTE: **If the fuse is open, make sure to check for a short to ground on the (F925) Fused Ignition Switch Output circuit.**

   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 5

5. **CHECK THE (A938) FUSED B(+) CIRCUIT FOR AN OPEN**
   1. Turn the ignition on.
   2. While back probing, measure the voltage of the (A938) Fused B (+) circuit in the HVAC Module C1 harness connector.

   Is the voltage 9.5 volts or below?

   Yes

   - Repair the (A938) Fused B (+) circuit for an open or high resistance.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Go To 6

6. **CHECK THE (Z911) GROUND CIRCUIT FOR AN OPEN**
   1. Turn the ignition off.
   2. Disconnect the HVAC Module C1 harness connector.

3. With a 12-volt test light connected to 12 volts, check the (Z911) Ground circuit at the HVAC Module C1 harness connector.

NOTE: **The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.**

Does the test light illuminate brightly?

Yes

- Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Repair the (Z911) Ground circuit for an open.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

7. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were any problems found?

   Yes

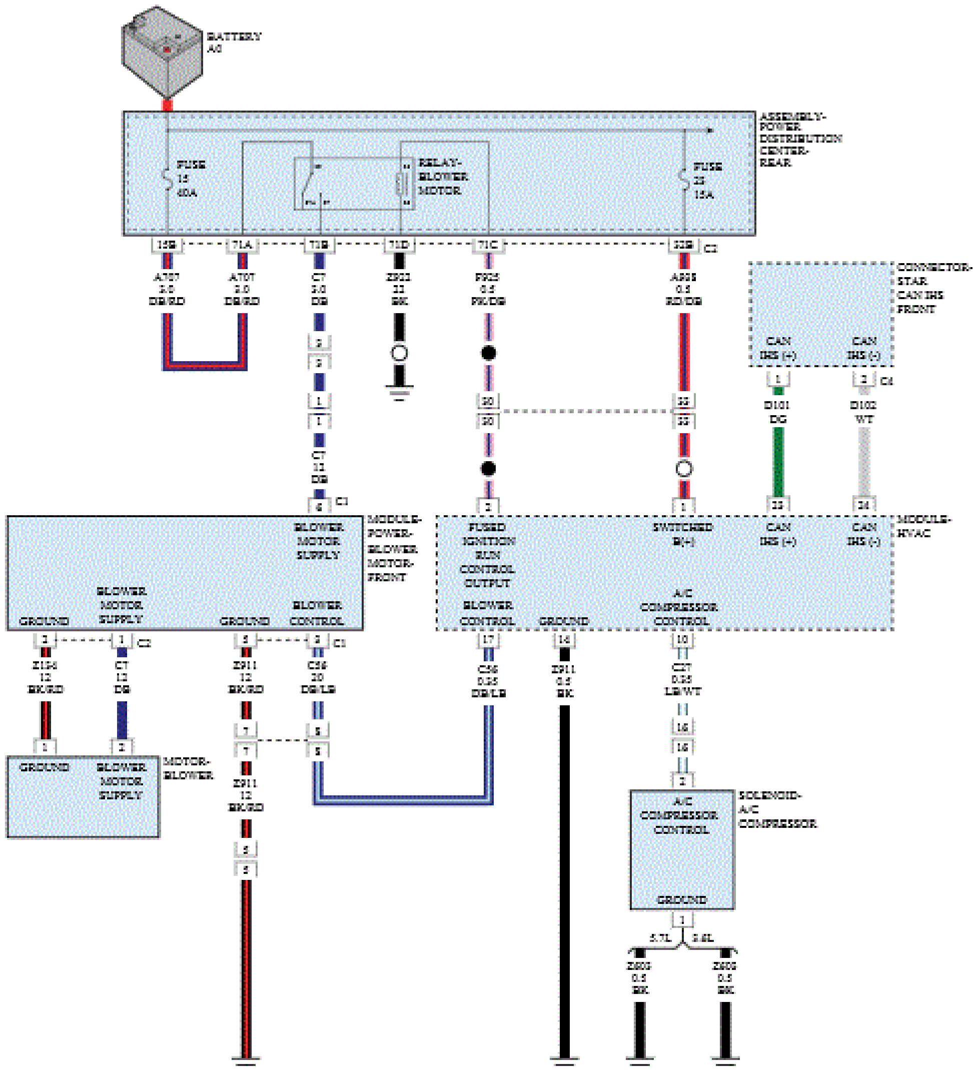
   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

   No

   - Test complete.

B210E-85-BATTERY VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 27: HVAC Module Circuit Diagram](#)

Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The A/C Heater Module constantly monitors battery and ignition voltage as well as battery voltage derived from BUS communication to ensure proper operation. If the voltage to the controller is out of range, it could cause damage to the controller or its respective components. If the voltage of either circuit drops below or rises above a predetermined calibration a Diagnostic Trouble Code (DTC) will set.

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- If the HVAC Module detects a voltage greater than 16.0 volts for the period of 15 seconds or more.

Default Actions:

- This DTC has a de-maturing time of 20 msec. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
RELATED CHARGING SYSTEM DTCS PRESENT
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

1. **CHECK FOR CHARGING SYSTEM DTCS**
   1. With the scan tool, read PCM DTCs and record on the repair order.

      Are there any charging system DTCs present in the Powertrain Control Module (PCM)?

      Yes

      - Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.

      No

      - Go To 2
2. **CHECK FOR BODY CONTROL MODULE DTCS**
   1. With the scan tool, read BCM DTCs and record on the repair order.

      Are there any BCM DTCS present?

      Yes

      - Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

      No

      - Go To 3
3. **CHECK FOR AN ACTIVE DTC**
   1. With the scan tool, read HVAC DTCs.

      Is the DTC active?

      Yes

      - Go To 4

      No

      - Go To 5
4. **CHECK IF OTHER CONTROLLERS ARE REPORTING AN OVER VOLTAGE CONDITION**

1. Turn the ignition on.
2. With the scan tool read DTCs.

   Are any other controllers reporting an over voltage condition?

   Yes

   - Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.

   No

   - Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
   - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

5. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

      No

      - Test complete.

B222A-00-VEHICLE LINE MISMATCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The A/C Heater Module checks for vehicle configuration using communication over the BUS. If the stored configuration does not match the configuration stored in the controller this DTC will set.

WHEN MONITORED AND SET CONDITIONS

When Monitored: continuously when the following condition is met:

- Ignition on.

Set Conditions:

- This DTC sets if the stored configuration does not match the configuration stored in the controller.

Possible Causes
VEHICLE CONFIGURATION NOT STORED IN THE BODY CONTROL MODULE (BCM)
CONTROL MODULE INSTALLED IN INCORRECT VEHICLE
HVAC MODULE

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

CHECK THE VEHICLE CONFIGURATION

NOTE: **The DTC must be active and no BUS communication DTCs present before performing this test. If BUS communication DTCs are present, perform there respective test first. If the DTC is stored, erase the DTC and cycle the ignition. If the DTC resets and changes to active, then proceed.**

1. With the scan tool, check the vehicle configuration stored in the Body Control Module (BCM).
2. With the scan tool, check the vehicle configuration stored in the HVAC Module (HVAC).

Pick the answer that best describes your findings:

BCM has wrong or no vehicle configuration.

- With the scan tool, program the proper vehicle configuration in the BCM.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

HVAC has wrong vehicle configuration but BCM has correct configuration.

- Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

HVAC and BCM have proper calibration and the DTC is active in the HVAC.

- Check if other modules such as the Powertrain Control Module (PCM) have the wrong configuration stored in the controller and reprogram or replace as necessary. If all other modules show the proper configuration, replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

B222D-00-ECU UNABLE TO CONFIGURE-CONFIGURATION NOT LEARNED

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

SET CONDITION

- A valid configuration is not detected for greater than 2 seconds after ignition on.

POSSIBLE CAUSES

Possible Causes
VEHICLE CONFIGURATION NOT STORED IN THE BODY CONTROL MODULE (BCM)
CONTROL MODULE INSTALLED IN INCORRECT VEHICLE
HVAC MODULE

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. Refer to STANDARD PROCEDURE.

DIAGNOSTIC TEST

CHECK THE VEHICLE CONFIGURATION

NOTE: **The DTC must be active and no BUS communication DTCs present before performing this test. If BUS communication DTCs are present, perform there respective test first. If the DTC is stored, erase the DTC and cycle the ignition. If the DTC resets and changes to active, then proceed.**

1. With the scan tool, check the vehicle configuration stored in the Body Control Module (BCM).
2. With the scan tool, check the vehicle configuration stored in the HVAC Module.

Pick the answer that best describes your findings:

BCM has wrong or no vehicle configuration

- With the scan tool, program the proper vehicle configuration in the BCM.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

HVAC Module has wrong vehicle configuration but BCM has correct configuration.

- Replace and program the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

HVAC Module and BCM have proper calibration and the DTC is active in the HVAC.

- Check if other modules such as the Powertrain Control Module (PCM) have the wrong configuration stored in the controller and reprogram or replace as necessary. If all other modules show the proper configuration, replace the HVAC Module in accordance with the Service Information. Refer to **MODULE, HVAC, REMOVAL** .
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

U0010-00-CAN INTERIOR BUS

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

DIAGNOSTIC TEST

CHECK FOR AN ACTIVE DTC

1. Turn the ignition on.
2. With the scan tool, create a Vehicle Scan Report and attach it to the repair order.
3. With the scan tool, read PDM DTCs.

   Is the DTC active?

   Yes

   - Perform the U0010-00 CAN Interior Bus diagnostic procedure in the BCM. Refer to **U0010-00-CAN INTERIOR BUS** .

   No

   - Perform the Stored Lost Communication DTCs diagnostic procedure. Refer to **STORED LOST COMMUNICATION DTCS** .

U0140-00-LOST COMMUNICATION WITH BODY CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0147-00-LOST COMMUNICATION WITH TELEMATICS GATEWAY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

SET CONDITION

- No BUS messages received from the Radio Receiver Module for approximately 10 seconds.

POSSIBLE CAUSES

Possible Causes
CAN-AT BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
RADIO RECEIVER MODULE NOT CONFIGURED CORRECTLY
RADIO RECEIVER MODULE (RRM)
MODULE THAT SET THIS DTC

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding.

DIAGNOSTIC TEST

VERIFY DTC IS ACTIVE

1. Turn the ignition on.
2. With the scan tool, read active DTCs.

   Is this DTC active?

Yes

- **Refer to DIAGNOSIS AND TESTING** and perform the Lost Communication with Radio Receiver Module diagnostic procedure.

No

- **Refer to STORED LOST COMMUNICATION DTCS** and perform the Stored Lost Communication DTCs diagnostic procedure.

STANDARD PROCEDURE

HVAC VERIFICATION TEST

Perform the following procedures to verify that the repair(s) are valid.

1. Make sure that all accessories are turned off.
2. Make sure that the battery is fully charged.
3. Turn the ignition off.
4. Disconnect all jumper wires and reconnect all previously disconnected components and connectors.
5. With the scan tool, record and erase all Diagnostic Trouble Codes (DTCs) from ALL modules.
6. Turn the ignition off, remove the scan tool from the DLC (Data Link Connector). Open the door and close the door. Wait a minimum 30 seconds, then turn the ignition on. Reconnect the scan tool.

NOTE: **Disconnecting the scan tool and opening and closing the door will allow the controller to enter into sleep mode.**

7. With the scan tool perform the HVAC ACTUATOR CALIBRATION TEST.
8. Start and run the engine for two minutes while operating all functions of the system that caused the original concern.
9. With the scan tool, check for DTCs in all modules.

Is the original condition still present or are there any other HVAC DTCs present?

Yes

- Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

No

- Repair is complete.

HVAC PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

Perform the following steps prior to any diagnostic procedure(s).

- Testing should only be performed with the battery fully charged to avoid false diagnosis.

- With the scan tool, read Powertrain Control Module (PCM) Diagnostic Trouble Codes (DTCs). If PCM DTCs are present, refer to **DTC INDEX** and perform the appropriate diagnostic procedure(s) before proceeding .
- Depending on the vehicle configuration, with the scan tool, read Body Control Module (BCM) DTCs. If BCM DTCs are present, refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure(s) before proceeding.
- With the scan tool, read HVAC DTCs. Record all Stored, Active, and Pending DTC information.
- With the scan tool, read the Environmental Data. Use this data to help identify the conditions in which the DTC was set.
- Refer to the When Monitored and Set Conditions for this DTC. DTCs can set at ignition on, at start up, or operating under specific conditions.
- Using the wiring diagram as a guide, inspect the wiring and connectors related to this circuit and clean/repair as necessary.
- Check for controller software updates if applicable. Some conditions can be corrected by upgrading the controller software.

NOTE: **If the controller is updated with new software, with the scan tool, perform a HVAC Actuator Calibration Test.**

- Check for Service Information Tune-ups or Service Bulletins for any possible causes that may apply.

Did any of the above procedures repair the vehicle?

Yes

- Testing is complete.
- Perform the HVAC VERIFICATION TEST. Refer to **STANDARD PROCEDURE**.

No

- Refer to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

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Article GUID: A00735879

2015-16 HVAC

Heating & Air Conditioning - Service Information - Challenger

DESCRIPTION

DESCRIPTION

A Manual Temperature Control (MTC) or an Automatic Temperature Control (ATC) Dual Zone heating and A/C system is available on this vehicle.

To maintain the performance level of the Heating, Ventilation and Air Conditioning (HVAC) system, the engine cooling system must be properly maintained. The use of a bug screen is not recommended. Any obstructions in front of the radiator or A/C condenser will reduce the performance of the A/C and engine cooling systems.

The engine cooling system includes the radiator, thermostat, radiator hoses and the engine coolant pump. Before opening or attempting any service to the engine cooling system. Refer to STANDARD PROCEDURE .

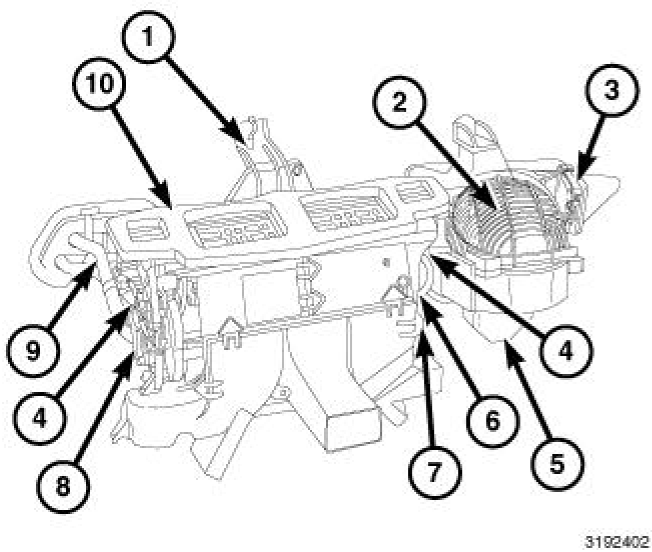


Fig. 1: HVAC Housing Components
Courtesy of CHRYSLER GROUP, LLC

All vehicles are equipped with a common front Dual Zone HVAC housing (1). The heating and A/C system combines heating, ventilating and A/C capabilities into a single unit mounted within the passenger compartment, behind the instrument panel. The HVAC housing includes:

- Recirculation-air door and actuator (2)
- Heater, Ventilation and Air Conditioning Module (HVAC) (3)
- Blend-air doors and actuators (4)
- Blower motor (5)
- Blower motor power module (6)
- Evaporator temperature sensor (7)
- Mode-air doors and actuator (8)

- Heater core (9)
- A/C evaporator (10)

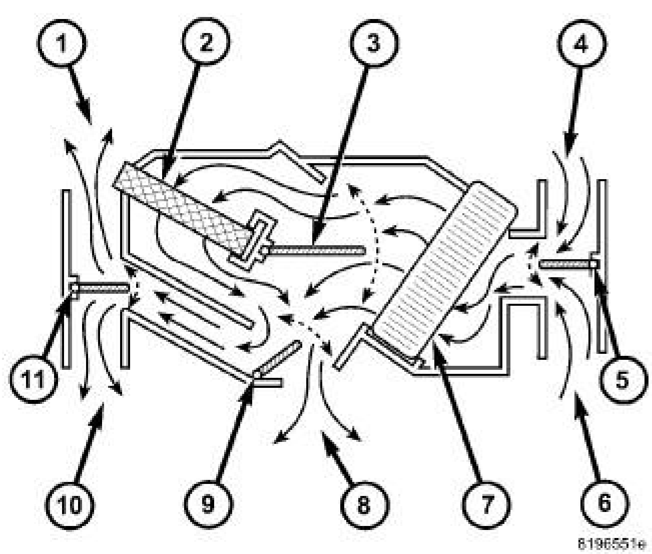
Based upon the system and selected mode, conditioned air can exit the HVAC housing through one or a combination of the three main housing outlets: defrost, panel or floor. The defrost and panel outlets are located on the top of the HVAC housing and the floor outlets are located on the bottom of the HVAC housing. Once the conditioned air exits the HVAC housing, it is further directed through molded plastic ducts to the outlets within the vehicle interior. These outlets and their locations are as follows:

- **Defroster Outlets** - Two large defroster outlets are located near the center of the instrument panel top cover, near the base of the windshield.
- **Side Window Demister Outlets** - Two front side window demister outlets, one located on each front door, near the A-pillars.
- **Panel Outlets** - There are four panel outlets in the instrument panel, one located near each outboard end of the instrument panel facing the rear of the vehicle and one located on each side of the touch screen interface, at the center of the instrument panel.
- **Floor Outlets** - There are four floor outlets, one located above each front footwell and one located under each front seat.
- **Console Outlets** - There are two console outlets located at the back of the center floor console, facing the rear of the vehicle.

OPERATION

OPERATION

The heating and A/C systems used in this vehicle are blend-air type systems. In a blend air system, a blend-air door controls the amount of conditioned air that is allowed to flow through, or around the heater core. In the Dual Zone system, separate blend-air doors are used to provide completely independent side-to-side temperature control of the discharge air. The temperature controls determine the discharge air temperatures by operating the blend door actuators, which move the blend-air doors. This design allows almost immediate control of output air temperatures.



[Fig. 2: Blend Air System Schematic](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical blend air system shown in the illustration.**

The heating and A/C system pulls outside (ambient) air through the fresh air intake (4) located at the cowl panel at the base of the windshield and into the air inlet housing above the Heating, Ventilation and Air Conditioning (HVAC) housing and passes through the A/C evaporator (7). Air flow is then directed either through or around the heater core (2). This is done by adjusting the position of the blend-air doors (3) with the temperature controls on the switchbank or the U-Connect Touch ™ screen module. Air flow is then directed out the floor outlet (8), instrument panel outlet (10) or the defroster outlet (1) in various combinations by adjusting the position of the mode-air doors (9 and 11) using the mode controls on the switchbank or the U-Connect Touch ™ screen module. The temperature and mode controls use electrical actuators to operate the air doors.

The velocity of the air flow out of the outlets can be manually or automatically adjusted, depending on the system. using the blower motor control on the switchbank or the U-Connect Touch ™ screen module.

The fresh air intake can be shut off by pressing the Recirculation button on the switchbank or the U-Connect Touch ™ screen module. This will operate the electrically actuated recirculation-air door (5), which closes off the fresh air intake. With the fresh air intake closed, the conditioned air within the vehicle is pulled back into the HVAC housing through the recirculation air intake (6).

The A/C compressor can be engaged by pressing the A/C (snowflake) button on the switchbank or the U-Connect Touch ™ screen module. The A/C compressor will automatically engage based on humidity sensor readings to help prevent windshield fogging.

The defroster outlets receive airflow from the HVAC housing through the molded plastic defroster duct, which is secured to the top of the HVAC housing. The airflow from the defroster duct is directed by fixed vanes in the defroster outlet grille and cannot be adjusted.

The side window demister outlets receive airflow from the HVAC housing through the defroster duct and molded plastic demister ducts, which are secured to the instrument panel support. The airflow from the side window demister outlets is directed by fixed vanes and cannot be adjusted. The demisters operate when the mode control is set in any Floor to Defrost position.

The instrument panel outlets receive airflow from the HVAC housing through a molded plastic center panel duct and two end panel ducts. The left and right side panel ducts are mounted directly on the HVAC unit. There is no intermediate ducts between them. The Left duct directs air to the driver inboard and outboard registers and right panel duct directs air to the passenger inboard and outboard registers. The two end panel ducts direct airflow to the left and right instrument panel outlets, while the center panel duct directs airflow to the two center panel outlets. Each of these outlets can be individually adjusted to direct or shut off the flow of air leaving the outlets.

The front and rear floor outlets receive airflow from the HVAC housing through the front and rear floor ducts which are secured to each side of the HVAC housing. The front floor ducts are in-molded to the close out panels and thy are not rigidly secured to the unit. The rear seat ducts direct airflow beneath the carpet to the outlets located near the front of each rear seat foot well. None of the floor outlets can be adjusted.

NOTE: **It is important to keep the air intake opening clear of debris. Leaf particles and other debris that is small enough to pass through the cowl opening screen can**

accumulate within the HVAC housing. The closed, warm, damp and dark environment created within the housing is ideal for the growth of certain molds, mildews and other fungi. Any accumulation of decaying plant matter provides an additional food source for fungal spores, which enter the housing with the fresh intake-air. Excess debris, as well as objectionable odors created by decaying plant matter and growing fungi can be discharged into the passenger compartment during heater-A/C operation if the air intake opening is not kept clear of debris.

The A/C system is designed for use of an A/C expansion valve (TXV) to meter the flow of refrigerant to the A/C evaporator. To maintain minimum evaporator temperature and prevent evaporator freezing, an evaporator temperature sensor input is supplied to the HVAC module. In turn, the Powertrain Control Module (PCM) cycles the A/C clutch on and off as necessary to optimize A/C system performance and to protect the A/C system from evaporator freezing.

DIAGNOSIS AND TESTING

A/C PERFORMANCE

The A/C system is designed to provide the passenger compartment with low temperature and low humidity air. The A/C evaporator, located in the Heating, Ventilation and Air Conditioning (HVAC) housing is cooled to temperatures near the freezing point. As warm damp air passes over the fins of the A/C evaporator, the air transfers its heat to the refrigerant in the evaporator coils and the moisture in the air condenses on the evaporator fins. During periods of high heat and humidity, an A/C system will be more effective in the Recirculation mode (max A/C). With the system in the Recirculation mode, only air from the passenger compartment passes through the A/C evaporator. As the passenger compartment air dehumidifies, the A/C system performance levels rise.

Humidity has an important bearing on the temperature of the air delivered to the interior of the vehicle. It is important to understand the effect that humidity has on the performance of the A/C system. When humidity is high, the A/C evaporator has to perform a double duty. It must lower the air temperature, and it must lower the temperature of the moisture in the air that condenses on the evaporator fins. Condensing the moisture in the air transfers heat energy into the evaporator fins and coils. This reduces the amount of heat the A/C evaporator can absorb from the air. High humidity greatly reduces the ability of the A/C evaporator to lower the temperature of the air.

However, evaporator capacity used to reduce the amount of moisture in the air is not wasted. Removing some of the moisture out of the air entering the vehicle adds to the comfort of the passengers. Although, an owner may expect too much from their A/C system on humid days. A performance test is the best way to determine whether the system is performing up to design standards. This test also provides valuable clues as to the possible cause of trouble with the A/C system.

A/C PERFORMANCE TEST

WARNING: **Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.**

CAUTION: **The use of an A/C recycling/charging station for purposes of determining the**

actual charge level of an A/C system is not recommended. Service recycling/charging stations do not reflect the correct amount of refrigerant charge in the A/C system after a single "reclaim" cycle. Tests have shown that it can take two or more "reclaim" cycles to remove all of the refrigerant charge, depending on the equipment being used. Use only the following procedure for determining the proper charge level.

NOTE: **The A/C Cool down test which can be initiated on the Manual Temperature Control (MTC) or Automatic Temperature Control (ATC) system is not a valid test to determine A/C performance. It is intended to be only used at the assembly plant and should not be used at a dealer or repair facility. Use only the following procedure to check A/C performance.**

1. Make sure the following conditions are met in the area where this test is to be performed:
   - Maximum ambient temperature: 43.3Â°C (110Â°F)
   - Minimum ambient temperature: 15.5Â°C (60Â°F)
   - Maximum relative humidity: 90%
   - Minimum relative humidity: 20%
2. Using a scan tool, check for Diagnostic Trouble Codes (DTCs) related to the Controller Area Network (CAN) data bus, Telematics Gateway (TGW), Heater, Ventilation and Air Conditioning Module (HVAC), Body Control Module (BCM) and Powertrain Control Module (PCM). If no DTCs are found, go to STEP 3. If any DTCs are found, repair as required, then proceed to STEP 3.
3. Operate the heating and A/C system under the following conditions.
   - Engine at normal operating temperature
   - Engine at normal idle speed
   - No sun-load in the cabin of the vehicle
   - Vehicle doors and windows closed
   - Transmission in Park or Neutral with the park brake On.
   - A/C heater controls set to Recirculation mode, full cool, panel mode, high blower and with A/C compressor engaged. If the A/C compressor does not engage, see the **A/C SYSTEM DIAGNOSIS TABLE**.
   - All panel outlet vanes open and positioned straight rearward

   NOTE: **If the following step is not performed, the results of this test will not be accurate.**

4. Using a scan tool, operate the engine cooling fans at high speed from the PCM View>Actuators.
5. Insert a thermometer in the driver side center panel air outlet and operate the A/C system until the thermometer temperature stabilizes or a minimum of five minutes.

   NOTE: **This procedure requires you to know what the temperature and relative humidity is in your location at the time of the test.**

6. With the A/C clutch engaged, compare the observed panel outlet air temperature along with the ambient temperature of the work area and the relative humidity to the Maximum Panel Outlet Temperature chart.

Refer to **Fig. 3**

7. If the air outlet temperature fails to meet the specifications shown in **Fig. 3** the Maximum Panel Outlet Temperature chart, see the A/C SYSTEM DIAGNOSIS table.

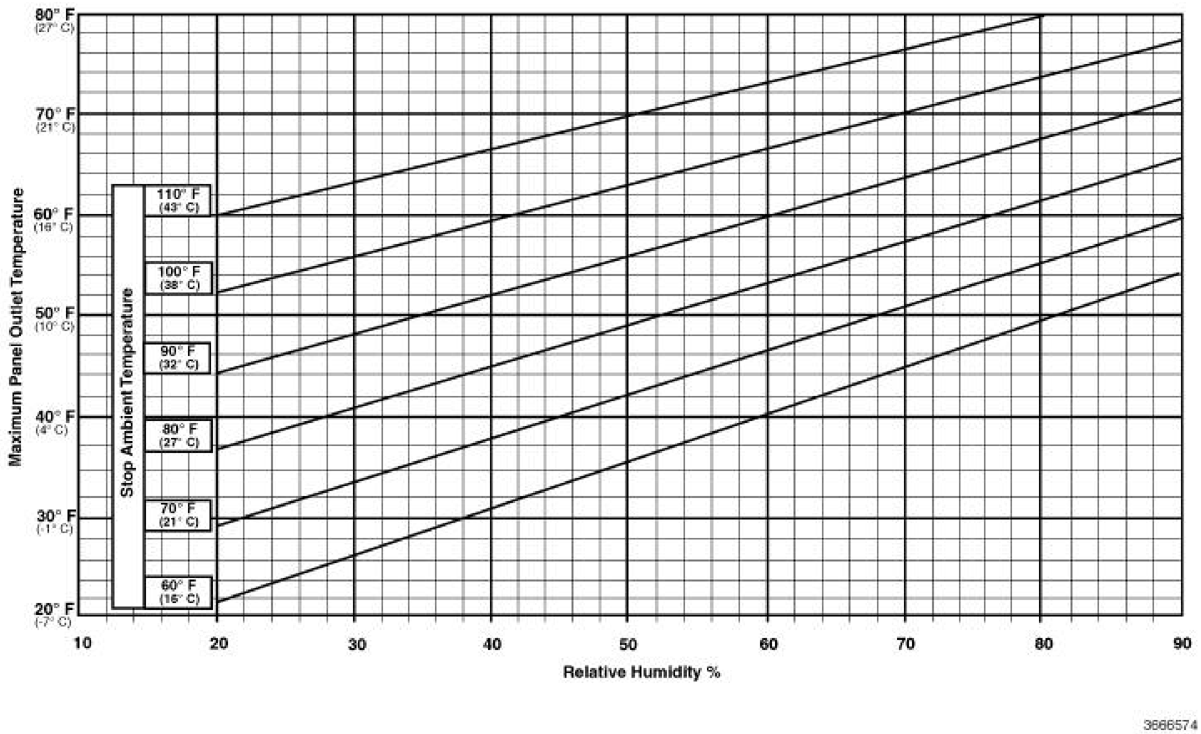


Fig. 3: Maximum Panel Outlet Temperature
Courtesy of CHRYSLER GROUP, LLC

A/C SYSTEM DIAGNOSIS

Condition	Possible Causes	Correction
Rapid A/C clutch cycling (ten or more cycles per minute).	1. Low refrigerant system charge.	1. See Refrigerant System Leaks in this service information, refer to **DIAGNOSIS AND TESTING** . Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
Equal pressures, but the A/C clutch does not engage.	1. No refrigerant in the refrigerant system.	1. See Refrigerant System Leaks in this service information, refer to **DIAGNOSIS AND TESTING** . Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
Ā	2. Open fuse.	2. See the appropriate Wiring Information. Check the fuses in the Power Distribution Center (PDC) and the Rear Power Distribution Center (PDC). Repair the shorted circuit or component and replace the fuse(s), if required.

Condition	Possible Causes	Correction
Ā	3. Inoperative A/C clutch.	3. See A/C Compressor in this service information, refer to **COMPRESSOR, A/C** . Test the A/C clutch and coil and replace, if required.
Ā	4. Improperly installed or inoperative evaporator temperature sensor.	4. See Evaporator Temperature Sensor in this service information, refer to **SENSOR, EVAPORATOR TEMPERATURE** . Test the sensor and replace, if required.
Ā	5. Inoperative A/C pressure transducer.	5. See A/C Pressure Transducer in this service information, refer to **TRANSDUCER, A/C PRESSURE** . Test the sensor and replace, if required.
Ā	6. Inoperative control module, CAN bus or wiring.	6. See the appropriate Electrical Diagnostic Procedures for testing of the modules and CAN bus, and see the appropriate Wiring Information for compressor control circuit repair, if required.
Normal pressures, but A/C Performance Test air temperatures at center panel outlet are too high.	1. Excessive refrigerant oil in system.	1. See Refrigerant Oil Level in this service information, refer to **STANDARD PROCEDURE**. Recover the refrigerant from the refrigerant system and inspect the refrigerant oil content. Restore the refrigerant oil to the proper level, if required.
Ā	2. Blend door actuator(s) improperly installed or inoperative.	2. See Blend Door Actuator in this service information, refer to **ACTUATOR, BLEND DOOR** . Inspect the actuator(s) for proper operation and replace, if required.
Ā	3. Blend-air door(s) inoperative or sealing improperly.	3. See HVAC Housing in this service information, refer to **HOUSING, HVAC** . Inspect the blend-air door(s) for proper operation and sealing. Repair if required.
The low side pressure is normal or slightly low, and the high side pressure is too low.	1. Low refrigerant system charge.	1. See Refrigerant System Leaks in this service information, refer to **DIAGNOSIS AND TESTING** . Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
Ā	2. Refrigerant flow through the A/C evaporator is restricted.	2. See A/C Evaporator in this service information, refer to **EVAPORATOR, A/C** . Replace the restricted A/C evaporator, if required.
Ā	3. Inoperative A/C compressor.	3. See A/C Compressor in this service information, refer to **COMPRESSOR, A/C** . Replace the A/C compressor, if required.

Condition	Possible Causes	Correction
The low side pressure is normal or slightly high, and the high side pressure is too high.	1. A/C condenser air flow restricted.	1. See A/C Condenser in this service information, refer to **CONDENSER, A/C** . Check the A/C condenser for damaged fins, foreign objects obstructing air flow through the condenser fins, and missing or improperly installed air seals. Clean, repair, or replace components as required.
Ā	2. Refrigerant flow through the A/C receiver/drier is restricted.	2. See A/C Receiver/Drier in this service information, refer to **DRIER, A/C RECEIVER** . Replace the restricted A/C receiver/drier, if required.
Ā	3. Inoperative radiator cooling fan.	3. See **ENGINE COOLING SYSTEM** . Test the radiator cooling fan and replace, if required.
Ā	4. Refrigerant system overcharged.	4. See Refrigerant System Charge in this service information, refer to **STANDARD PROCEDURE** . Recover the refrigerant from the refrigerant system. Charge the refrigerant system to the proper level, if required.
Ā	5. Air in the refrigerant system.	5. See Refrigerant System Leaks in this service information, refer to **DIAGNOSIS AND TESTING** . Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
Ā	6. Engine overheating.	6. See **ENGINE COOLING SYSTEM** . Test the engine cooling system and repair, if required.
The low side pressure is too high, and the high side pressure is too low.	1. Accessory drive belt slipping.	1. See **ENGINE COOLING SYSTEM** . Inspect the accessory drive belt condition and tension. Repair as required.
Ā	2. Inoperative A/C expansion valve.	2. See A/C Expansion Valve in this service information, refer to **VALVE, A/C EXPANSION** . Replace the valve, if required.
Ā	3. Inoperative A/C compressor.	3. See A/C Compressor in this service information, refer to **COMPRESSOR, A/C** . Replace the A/C compressor, if required.
The low side pressure is too low, and the high side pressure is too high.	1. Restricted refrigerant flow through the refrigerant lines.	1. See Liquid Line, Suction Line and Discharge Line in this service information, refer to **LINE, A/C DISCHARGE**, **LINE, A/C LIQUID** and **LINE, A/C SUCTION** . Inspect the refrigerant lines for kinks, tight bends or improper routing. Correct the routing or replace the refrigerant line, if

Condition	Possible Causes	Correction
		required.
Ā	2. Restricted refrigerant flow through the A/C expansion valve.	2. See A/C Expansion Valve in this service information, refer to **VALVE, A/C EXPANSION**. Replace the valve, if required.
Ā	3. Restricted refrigerant flow through the A/C condenser.	3. See A/C Condenser in this service information, refer to **CONDENSER, A/C** . Replace the restricted A/C condenser, if required.

HEATER PERFORMANCE

See **ENGINE COOLING SYSTEM** before performing the following tests. Check the engine coolant level and flow, engine coolant reserve/recovery system operation, accessory drive belt condition and tension, radiator air flow and the fan drive operation. Perform the A/C System Performance Test, which is found within the HVAC System Test. Refer to **STANDARD PROCEDURE** . If any Diagnostic Trouble Codes (DTCs) are found, repair as necessary. Refer to the **DTC INDEX** article.

MAXIMUM HEATER OUTPUT

Engine coolant is delivered to the heater core through two heater hoses. With the engine idling at normal operating temperature, set the temperature control to the full hot position, the mode control to the floor position, and the blower motor control to the highest speed position. Using a test thermometer, check the temperature of the air being discharged at the front floor outlets. Compare the test thermometer reading to the HEATER TEMPERATURE REFERENCE CHART.

HEATER TEMPERATURE REFERENCE

Ambient Air Temperature	**16Ā° C (60Ā° F)**	**21Ā° C (70Ā° F)**	**27Ā° C (80Ā° F)**	**32Ā° C (90Ā° F)**
Minimum Heater System Air Outlet Temperature	52Ā° C (125Ā° F)	56Ā° C (133Ā° F)	59Ā° C (139Ā° F)	62Ā° C (144Ā° F)

See **ENGINE COOLING SYSTEM** if the heater outlet air temperature is below the minimum specification. Both of the heater hoses should be hot to the touch. The coolant return heater hose should be slightly cooler than the coolant supply heater hose. If the return hose is much cooler than the supply hose, locate and repair the engine coolant flow obstruction in the cooling system.

OBSTRUCTED COOLANT FLOW

Possible locations or causes of obstructed coolant flow are as follows:

- Low coolant level
- Inoperative water pump
- Inoperative thermostat
- Pinched or kinked heater hoses
- Improper heater hose routing

- Plugged heater hoses or supply and return ports at the cooling system connections
- Plugged heater core

If proper coolant flow through the cooling system is verified, and heater outlet air temperature is low, a mechanical problem may exist.

MECHANICAL PROBLEMS

Possible locations or causes of insufficient heat due to mechanical problems are as follows:

- Obstructed cowl air intake
- Obstructed heater system outlets
- Inoperative engine thermostat
- Inoperative blower motor system
- Inoperative Heater, Ventilation and Air Conditioning Module (HVAC)
- Inoperative blend door actuator(s)
- Inoperative, obstructed or improperly installed blend-air door(s)
- Restricted cabin air filter

TEMPERATURE CONTROL

If the air outlet temperature cannot be adjusted with the temperature controls, the following may require service:

- Inoperative switchbank, U-Connect Touch ™ screen module or Heater, Ventilation and Air Conditioning Module (HVAC).
- Inoperative blend door actuator(s).
- Inoperative, obstructed or improperly installed blend-air door.
- Inoperative related wiring harness or connectors.

STANDARD PROCEDURE

STANDARD PROCEDURE - A/C EVAPORATOR CLEANING

Some vehicle operators may experience a musty odor from the A/C system, primarily at start up in hot and humid climates. This odor may be the result of microbial growth on the cooling coil. During normal A/C system operation, condensation forms in and around the A/C cooling coil. When airborne pollutants mix with this condensation, bacteria and fungi growth begins and odor may result.

If the vehicle operator experiences a musty odor when operating the A/C system, perform the following procedure.

WARNING: Always use eye protection, rubber gloves and protective clothing when performing the following procedure. Avoid continuous breathing of vapors from evaporator coil cleaning and sealing fluids. Avoid contact with skin and eyes. Failure to follow these instruction may result in possible serious or fatal injury.

1. On models equipped with a cabin air filter, remove the filter and inspect for dirt and debris. Refer to

FILTER, CABIN AIR, REMOVAL. Discard the used cabin filter if required.

2. Remove the cowl top panel. Refer to **COVER, COWL PANEL, REMOVAL** .
3. Clean any dirt and debris that may be present at the HVAC fresh air inlet screen and at the top of the cowl panel.
4. Install the cowl top panel. Refer to **COVER, COWL PANEL, INSTALLATION** .
5. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
6. Inspect the evaporator drain hose or tube (depending on application) for foreign material that may be blocking the drain and repair as necessary.
7. Once drain operation has been verified;
    - when equipped with a rubber drain hose, temporarily pinch the drain hose closed using an appropriate pair of heater hose pliers.
    - when equipped with a solid plastic drain tube, obtain an appropriate size rubber or plastic cap or plug and temporarily cap or plug the drain tube.
8. Remove the support and lower the vehicle.
9. Place a protective cover over the front passenger side floor and seat area.
10. Remove the blower motor. Refer to **MOTOR, BLOWER, REMOVAL**.
11. Remove the blower motor power module. Refer to **MODULE, POWER, BLOWER MOTOR, REMOVAL**.
12. Clean any dirt and debris that may be present inside the HVAC blower motor housing and all readily accessible areas inside the HVAC housing. If necessary, use a vacuum with a small flexible hose, and do not damage the evaporator core fins.
13. Using PSE Flex Spray Delivery Tool 534-62644 or equivalent, completely coat the entire surface of A/C evaporator with three bottles of MoparĀ® Cooling Coil Cleaner through the blower motor and power module or resistor openings. Be sure to use all of the coil cleaner in each container.
14. Allow the vehicle to sit for 30 minutes.
15. Raise and support the vehicle.

WARNING: Excess cooling coil cleaner will drain from the evaporator housing when the clamp, cap or plug is removed from the evaporator drain hose or tube. Always use eye protection, rubber gloves and protective clothing. Avoid continuous breathing of vapors from evaporator coil cleaning fluid. Avoid contact with skin and eyes. Failure to follow these instruction may result in possible serious or fatal injury.

16. Remove the previously installed clamp, cap or plug from the evaporator drain hose or tube and allow excess coil cleaner to drain from the HVAC housing.
17. Remove the support and lower the vehicle.
18. Refill the three empty coil cleaner bottles with clean tap water.
19. Using PSE Flex Spray Delivery Tool 534-62644 or equivalent, completely rinse the entire surface of A/C evaporator with the three bottles of clean tap water through the blower motor and power module openings. Be sure to use all of the water in each container.
20. Install the blower motor. Refer to **MOTOR, BLOWER, INSTALLATION**.
21. Install the blower motor power module. Refer to **MODULE, POWER, BLOWER MOTOR,**

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INSTALLATION.

22. Disconnect the wire harness connector from the A/C compressor to disable compressor operation. Refer to **COMPRESSOR, A/C, REMOVAL**.
23. Start the engine
24. Adjust all the windows so they are open approximately 8 mm (0.5 in).
25. Set the A/C heater controls to the following:
    - air distribution to Panel and Recirculation mode
    - temperature to full heat
26. Allow the vehicle to run for 20 minutes.
27. Turn the engine off.
28. Raise and support the vehicle.
29. Inspect the evaporator drain hose or tube (depending on application) for foreign material that may have blocked the drain during evaporator coil cleaning and repair as necessary.
30. Once drain operation has been verified;
    - when equipped with a rubber drain hose, temporarily pinch the drain hose closed using an appropriate pair of heater hose pliers.
    - when equipped with a solid plastic drain tube, obtain an appropriate size rubber or plastic cap or plug and temporarily cap or plug the drain tube.
31. Remove the support and lower the vehicle.
32. Remove the blower motor. Refer to **MOTOR, BLOWER, REMOVAL**.
33. Remove the blower motor power module. Refer to **MODULE, POWER, BLOWER MOTOR, REMOVAL**.
34. Using PSE Flex Spray Delivery Tool 534-62644 or equivalent, completely coat the entire surface of A/C evaporator with one bottle of MoparÂ® Cooling Coil Coating through the blower motor and power module openings. Be sure to use all of the coil coating in the container.

NOTE: Be sure to thoroughly clean out the spray delivery tool with warm water once coil coating is complete to prevent damage to the tool.

35. Refill the empty bottles with clean warm tap water and completely rinse out the PSE Flex Spray Delivery Tool 534-62644, or equivalent.
36. Allow the vehicle to sit for 30 minutes.
37. Install the blower motor. Refer to **MOTOR, BLOWER, INSTALLATION**.
38. Install the blower motor power module. Refer to **MODULE, POWER, BLOWER MOTOR, INSTALLATION**.
39. Raise and support the vehicle.

WARNING: Excess cooling coil coating will drain from the evaporator housing when the clamp, cap or plug is removed from the evaporator drain hose or tube. Always use eye protection, rubber gloves and protective clothing. Avoid continuous breathing of vapors from evaporator coil sealing fluid. Avoid contact with skin and eyes. Failure to follow these instruction may result in possible serious or fatal injury.

40. Remove the previously installed clamp, cap or plug from the evaporator drain hose or tube and allow excess coil coating to drain from the HVAC housing.
41. Lower the vehicle.
42. Start the engine
43. Adjust all the windows so they are open approximately 8 mm (0.5 in).
44. Set the A/C heater controls to the following:
    - air distribution to Panel and Recirculation mode
    - temperature to full heat
45. Allow the vehicle to run for 20 minutes.
46. Turn vehicle off.
47. Remove protective cover from front passenger side floor and seat area.
48. On models equipped with a cabin air filter, install the filter. Refer to **FILTER, CABIN AIR, INSTALLATION**.
49. Connect the wire harness connector to the A/C compressor. Refer to **COMPRESSOR, A/C, INSTALLATION**.
50. Verify proper heating and A/C system operation.

SPECIFICATIONS

A/C SYSTEM

Item	Description	Notes
A/C Clutch Air Gap	0.35 - 0.60 mm (0.014 - 0.024 in.)	All Engines
A/C Clutch Coil Draw	3.2 Max amps @ 12V Ā± 0.5V @ 21Ā° C (70Ā° F)	5.7L/6.4L Engines
	3.1 - 4.0 amps @ 12V Ā± 0.5V @ 21Ā° C (70Ā° F)	3.6L Engine
A/C Clutch Coil Resistance	3.3 - 3.5 ohms	5.7L/6.4L Engines
	3.0 - 4.0 ohms	3.6L Engine
Freeze-up Control	Evaporator Temperature Sensor	HVAC housing mounted
Pressure Control	A/C Pressure Transducer	A/C liquid line mounted
Refrigerant Charge Capacity - R-134a	681 g (1.50 lbs.)	See A/C Under hood Specification Label located in the engine compartment
Refrigerant Charge Capacity - R-1234yf	709 g (1.56 lbs.)	See A/C Under hood Specification Label located in the engine compartment

* Always use the type of PAG oil listed for the model being serviced. See A/C Under hood Specification Label located in the engine compartment. Do not mix different types of PAG oils. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.

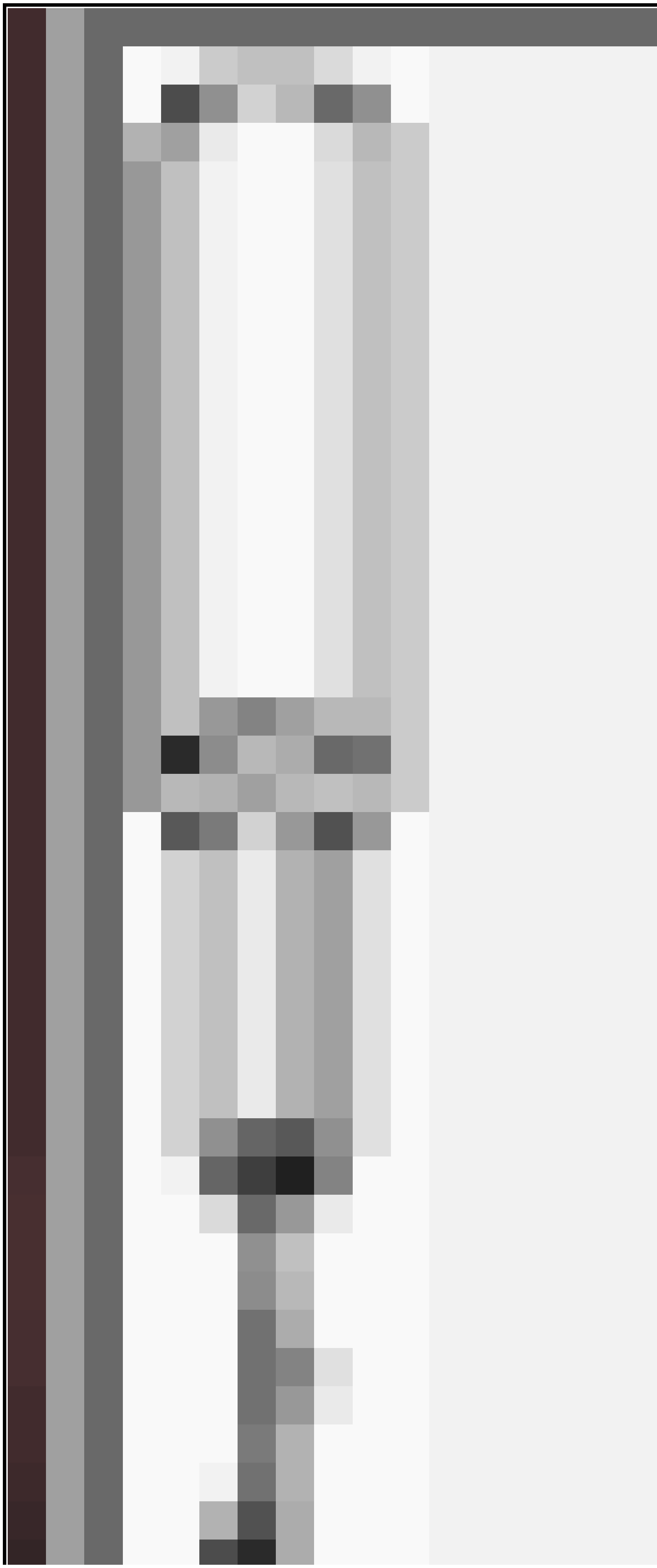
TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

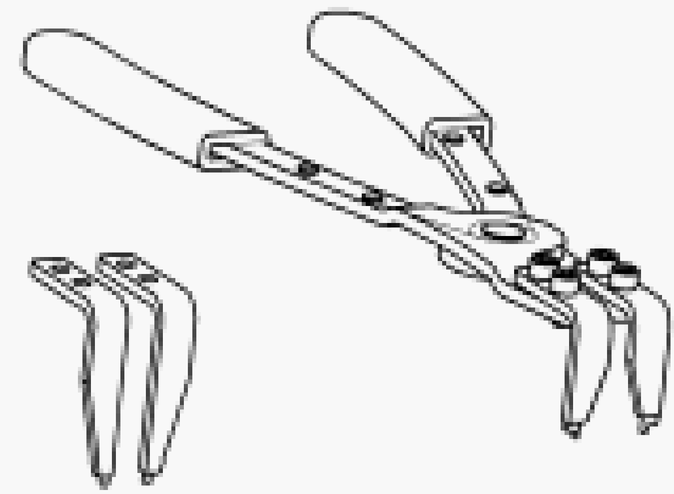
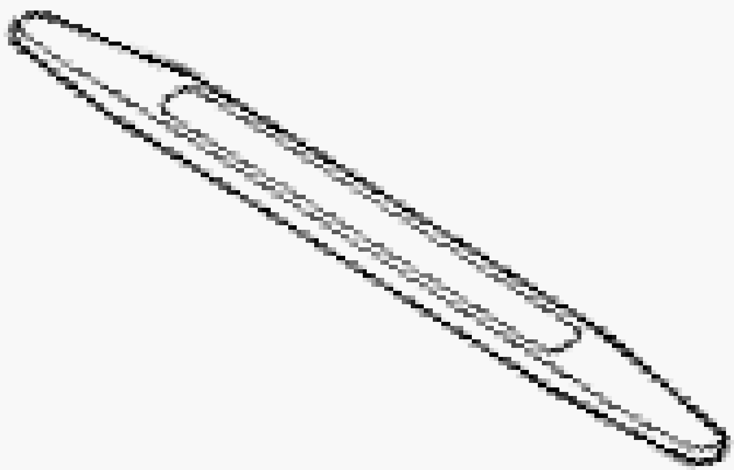
DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
A/C Compressor to Engine	Specific fastener placement and torque pattern required. Refer to **COMPRESSOR, A/C, INSTALLATION**.			Ā
A/C Condenser to Radiator Bolts	5	-	44	Ā
A/C Expansion Valve to Evaporator Tube Tapping Block Bolts	11	8	-	Ā
A/C Liquid Line to Internal Heat Exchanger (IHX) Nut	20	15	-	Ā
Compressor Shaft Bolt	19	14	-	Ā
Fresh Air Inlet Housing to Dash Panel Nuts	7	-	62	Ā
HVAC Housing to Engine Side of Dash Panel Nuts	7	-	62	Ā
Internal Heat Exchanger (IHX) Line to Expansion Valve Nut	20	15	-	Ā
Liquid Line Front to Rear Section Nut	22	16	-	Ā
Liquid Line Internal Heat Exchanger (IHX) Nut	20	15	-	Ā
Refrigerant Lines to A/C Expansion Valve Nut	23	17	-	Ā
Refrigerant Line to A/C Compressor Nut	23	17	-	Ā
Refrigerant Line to A/C Condenser Nut	22	16	-	Ā
Refrigerant Line Bracket to Strut Tower Bolt	11	8	-	Ā
Receiver/drier to A/C Condenser Bolt	22	16	-	Ā
Receiver/drier Bracket to A/C Condenser Screw	5	-	44	Ā
Suction Line to Internal Heat Exchanger (IHX) Nut	20	15	-	Ā
Suction Line Front to Rear Section Nut	22	16	-	Ā
Strut Support to Strut Tower Bolts	38	28	-	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

SPECIAL TOOLS

SPECIAL TOOLS



6801 - Terminal Probe
(Originally Shipped In Kit Number(s)
10190.)

	9764 - Pliers, A/C Snap Ring (Originally Shipped In Kit Number(s) 9909.)
	C-4755 - Trim Stick (Originally Shipped In Kit Number(s) 9299, 9299CC, 9299CC, 9300A-CAN.)

CONTROLS

ACTUATOR, BLEND DOOR

DESCRIPTION

DESCRIPTION

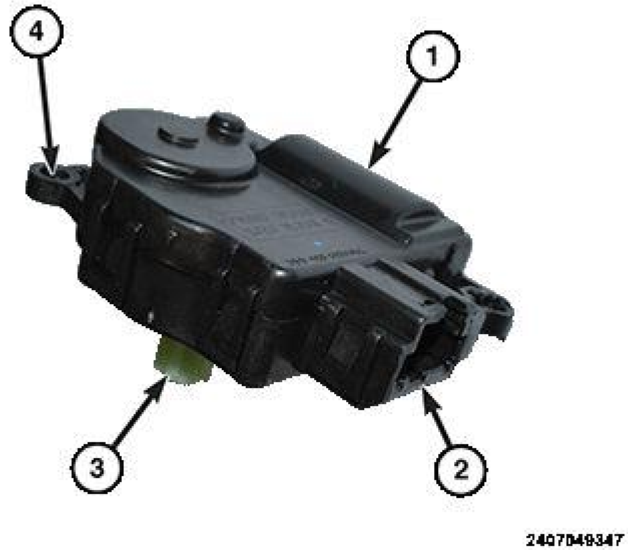


Fig. 4: Identifying Actuator Components
Courtesy of CHRYSLER GROUP, LLC

The two blend door actuators (1) for the Dual Zone heating and A/C system are reversible, 12 volt Direct Current (DC) servo motors. One blend door actuator is located on each side of the distribution housing.

The blend door actuators are contained within a black molded plastic case with an integral wire connector receptacle (2). An output shaft with splines (3) connect each blend door actuator to the respective blend door linkage. Three integral mounting tabs (4) allow each actuator to be secured to the air distribution housing.

The blend door actuators do not require mechanical indexing to the blend door linkage, as they are electronically calibrated by the Heater, Ventilation and Air Conditioning (HVAC) Module. The heating and A/C system must be re-calibrated each time an actuator motor is replaced. Refer to **STANDARD PROCEDURE** .

The blend door actuators are interchangeable with each other, and with the actuators for the recirculation and mode-air doors.

OPERATION

OPERATION

The two blend door actuators are connected to the Heater, Ventilation and Air Conditioning (HVAC) Module through the vehicle electrical system by dedicated two-wire lead and connectors of the HVAC wire harness. The blend door actuators can move the blend-air doors in two directions. When the HVAC module pulls the voltage on one side of the motor connection high and the other connection low, the blend-air door will move in one direction. When the HVAC module reverses the polarity of the voltage to the motor, the blend-air door moves in the opposite direction.

When the HVAC module makes the voltage to both connections high or both connections low, the blend-air doors stops and will not move. The HVAC module uses a pulse-count positioning system to monitor the operation and relative position of the blend door actuators and the blend-air doors. The HVAC module learns the blend-air doors stop positions during the calibration procedure and will store a Diagnostic Trouble Code (DTC) for any problems it detects in the blend door actuator circuits.

The blend door actuators are diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The blend door actuators cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

WARNING: Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: The Dual Zone heating and A/C system has two blend door actuators, one for the driver side and one for the passenger side.

LEFT SIDE

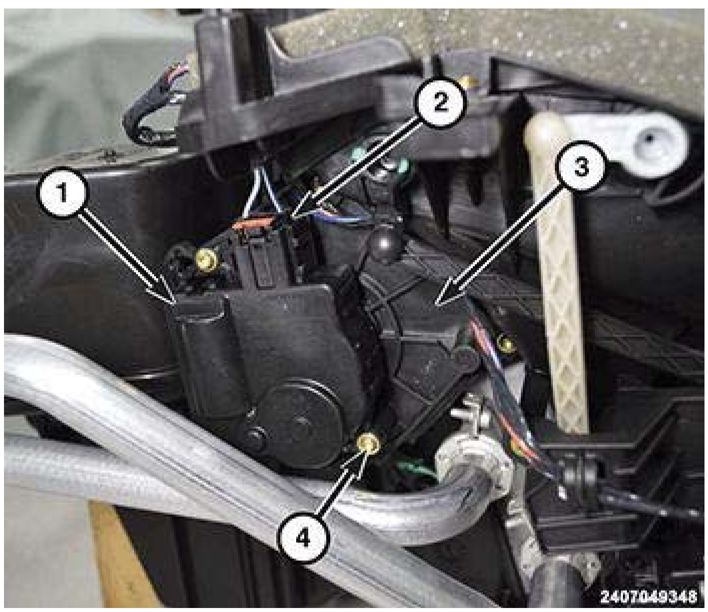


Fig. 5: Blend Door Actuator, Connector & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove the steering column. Refer to **COLUMN, REMOVAL** .
3. Remove the two screws (4) that secure the blend door actuator (1) to the left side of the HVAC air distribution housing (3).
4. Remove the blend door actuator from the air distribution housing. Disconnect the HVAC wire harness connector (2) and remove the actuator from the vehicle.

RIGHT SIDE

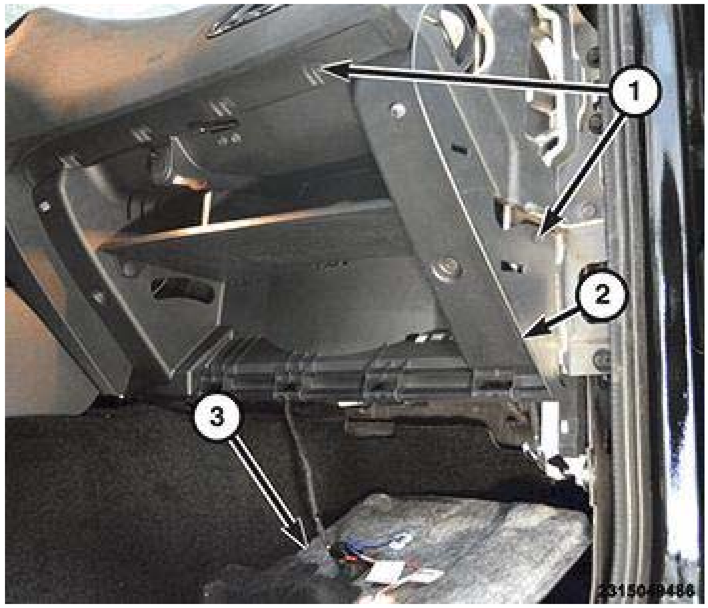


Fig. 6: Removing/Installing Instrument Panel Closeout
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove the push fasteners, disconnect the wire harness connector and remove the instrument panel closeout (3).
3. Remove the glove box and the glove box trim panel from the instrument panel. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .

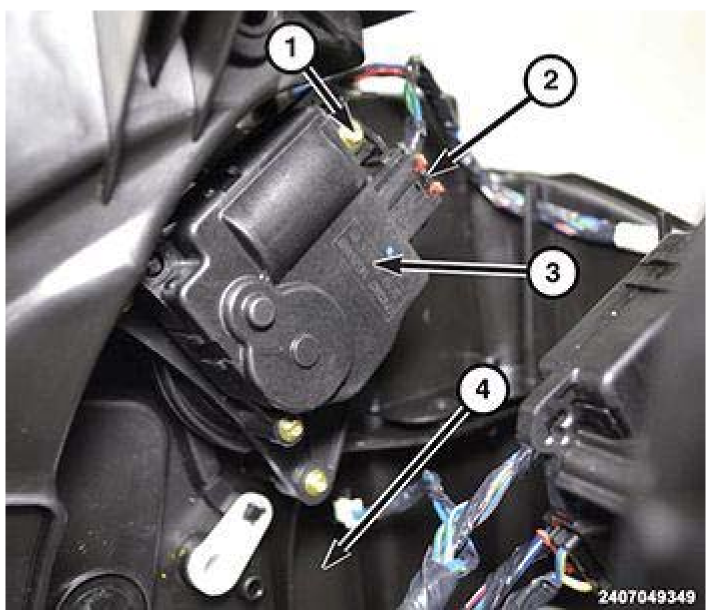


Fig. 7: Blend Door Actuator, Distribution Housing, Wire Harness Connector & Screws
Courtesy of CHRYSLER GROUP, LLC

4. Remove the two screws (1) that secure the blend door actuator (3) to the right side of the HVAC air distribution housing (4).
5. Remove the blend door actuator from the air distribution housing. Disconnect the HVAC wire harness

connector (2) and remove the actuator from the vehicle.

INSTALLATION

INSTALLATION

NOTE: **The Dual Zone heating and A/C system has two blend door actuators, one for the driver side and one for the passenger side.**

LEFT SIDE

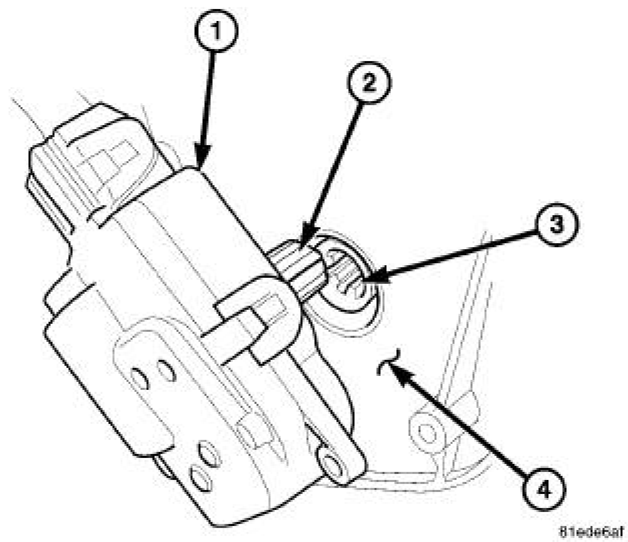


Fig. 8: Blend Door Actuator, Distribution Housing, Output Shaft & Cam
Courtesy of CHRYSLER GROUP, LLC

1. Position the blend door actuator (1) to the blend door cam (3).
2. Install the blend door actuator onto the left side of the HVAC air distribution housing (4). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (2) with those on the blend door cam (3).

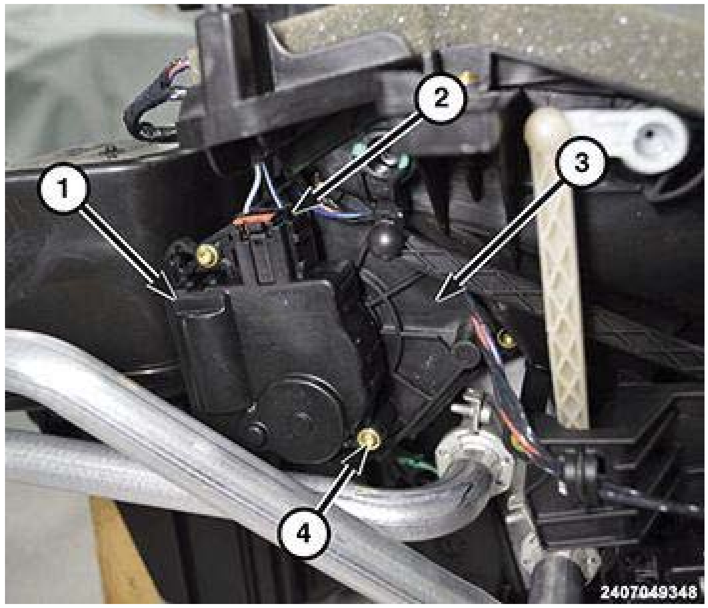


Fig. 9: Blend Door Actuator, Connector & Screws
Courtesy of CHRYSLER GROUP, LLC

3. Install the two screws (4) that secure the blend door actuator (1) to the air distribution housing (3) and securely tighten.
4. Connect the HVAC wire harness connector (2) to the blend door actuator.
5. Install the steering column. Refer to **COLUMN, INSTALLATION** .
6. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
7. Initiate the Actuator Calibration function using a scan tool. Refer to **STANDARD PROCEDURE** .

RIGHT SIDE

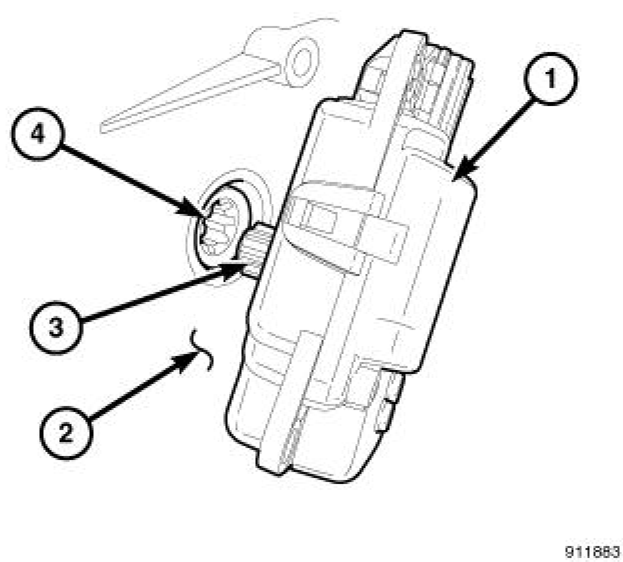


Fig. 10: Blend Door Actuator, Distribution Housing, Output Shaft & Cam
Courtesy of CHRYSLER GROUP, LLC

1. Position the blend door actuator (1) to the blend door cam (4).

2. Install the blend door actuator onto the right side of the HVAC air distribution housing (2). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (3) with those on the blend door cam (4).

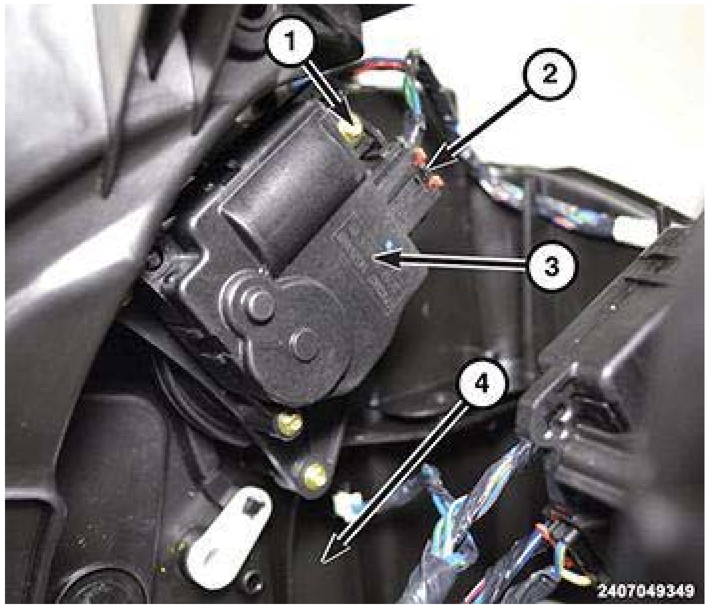


Fig. 11: Blend Door Actuator, Distribution Housing, Wire Harness Connector & Screws
Courtesy of CHRYSLER GROUP, LLC

3. Install the screws (1) that secure the blend door actuator (3) to the air distribution housing (4) and securely tighten the screws.
4. Connect the HVAC wire harness connector (2) to the blend door actuator.
5. Install the glove box trim panel and glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .

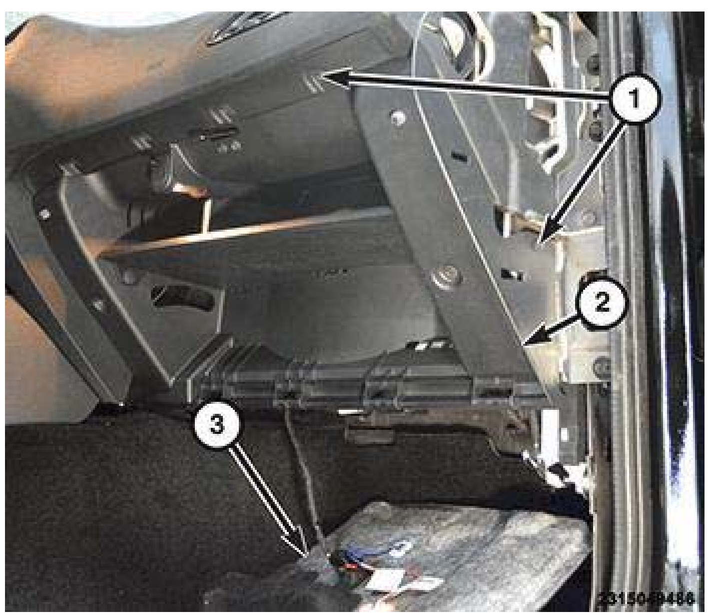


Fig. 12: Removing/Installing Instrument Panel Closeout
Courtesy of CHRYSLER GROUP, LLC

6. Install the push fasteners, connect the wire harness connector and install the instrument panel closeout (3).
7. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
8. Initiate the Actuator Calibration function using a scan tool. Refer to **STANDARD PROCEDURE** .

ACTUATOR, MODE DOOR

DESCRIPTION

DESCRIPTION

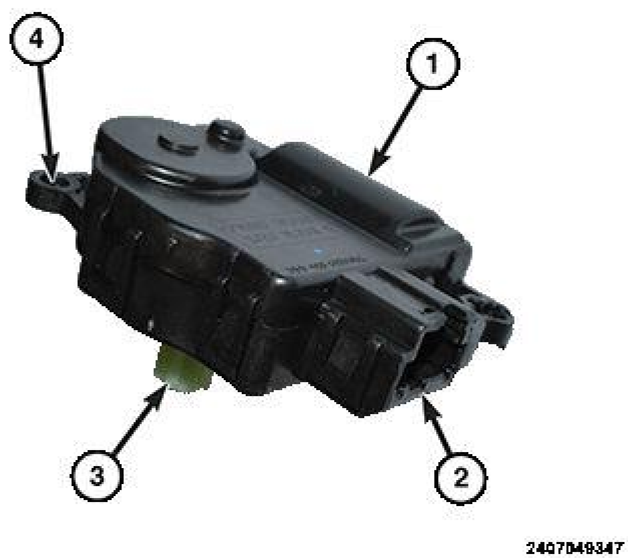


Fig. 13: Identifying Actuator Components
Courtesy of CHRYSLER GROUP, LLC

The mode door actuator (1) for the Dual Zone heating and A/C system is a reversible, 12 volt Direct Current (DC) servo motor, which is mechanically connected to the mode-air doors. The mode door actuator is located on the driver side end of the air distribution housing.

The mode door actuator is contained within a black molded plastic case with an integral wire connector receptacle (2). An output shaft with splines (3) connect it to mode door linkage and integral mounting tabs (4) allow the actuator to be secured to the air distribution housing.

The mode door actuator does not require mechanical indexing to the mode door linkage, as it is electronically calibrated by the Heater, Ventilation and Air Conditioning (HVAC) Module. The heating and A/C system must be re-calibrated each time an actuator motor is replaced. Refer to **STANDARD PROCEDURE** .

The mode door actuator is interchangeable with the actuators for the recirculation and blend-air doors.

OPERATION

OPERATION

The mode door actuator is connected to the Heater, Ventilation and Air Conditioning (HVAC) Module through the vehicle electrical system by a dedicated two-wire lead and connector of the HVAC wire harness.

The mode door actuator can move the floor, defrost/demist and the panel-air doors in two directions. When the HVAC module pulls the voltage on one side of the motor connection high and the other connection low, the mode-air doors will move in one direction. When the HVAC module reverses the polarity of the voltage to the motor, the mode-air doors moves in the opposite direction.

When the HVAC module makes the voltage to both connections high or both connections low, the mode-air doors stop and will not move. The HVAC module uses a pulse-count positioning system to monitor the operation and relative position of the mode door actuator and the mode-air doors. The HVAC module learns the mode-air doors stop position during the calibration procedure and will store a Diagnostic Trouble Code (DTC) for any problems it detects in the mode door actuator circuits.

The mode door actuator is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The mode door actuator cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

WARNING: Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

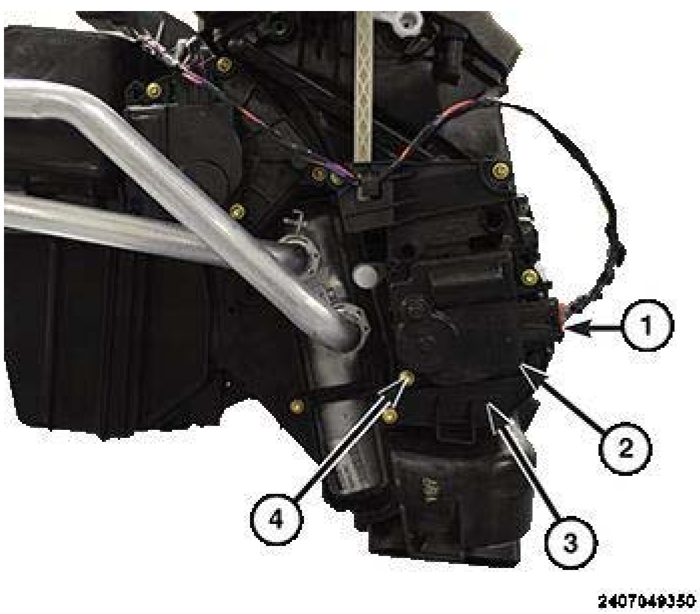


Fig. 14: HVAC Wire Harness Connector, Screws, Bracket & Mode Door Actuator
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove the steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, REMOVAL** .

3. Remove the left side instrument panel closeout.
4. Disconnect the HVAC wire harness connector (1) from the mode door actuator (2).
5. Remove the two screws (4) that secure the mode door actuator to the bracket (3) and remove the actuator.

INSTALLATION

INSTALLATION

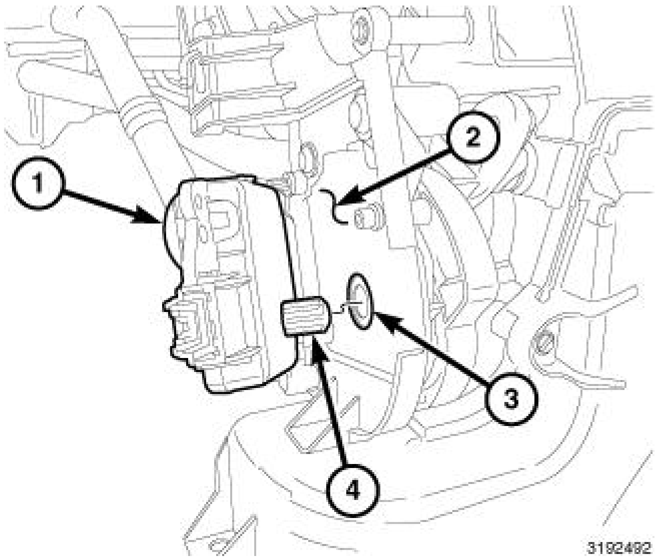


Fig. 15: Mode Door Actuator, Bracket, Actuator Output Shaft & Mode Door Cam
Courtesy of CHRYSLER GROUP, LLC

1. Position the mode door actuator (1) to the mode door cam (3).
2. Install the mode door actuator onto the bracket (2). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (4) with those on the mode door cam (3).

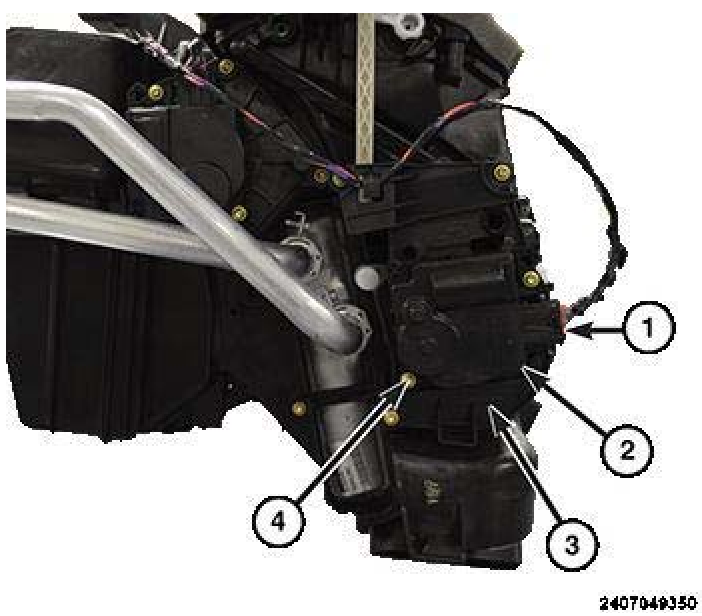


Fig. 16: HVAC Wire Harness Connector, Screws, Bracket & Mode Door Actuator
Courtesy of CHRYSLER GROUP, LLC

3. Install the two screws (4) that secure the mode door actuator (2) to the bracket (3) and securely tighten the screws.
4. Connect the HVAC wire harness connector (1) to the mode door actuator.
5. Install the steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
6. Install the left side instrument panel closeout.
7. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
8. Initiate the Actuator Calibration function using a scan tool. Refer to **STANDARD PROCEDURE** .

ACTUATOR, RECIRCULATION DOOR

DESCRIPTION

DESCRIPTION

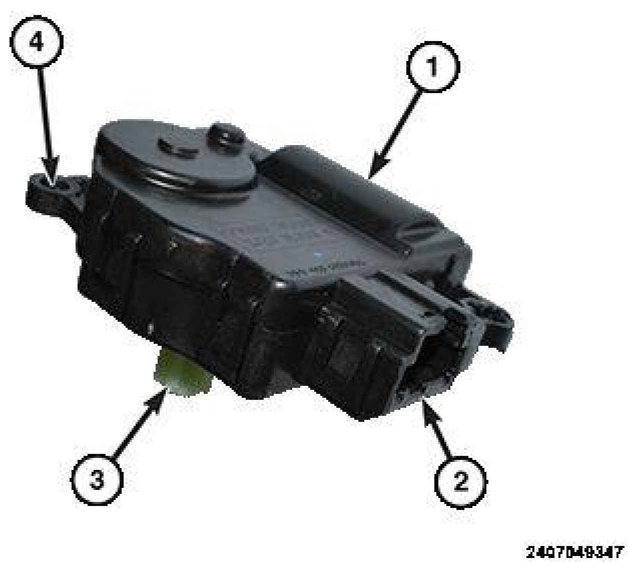


Fig. 17: Identifying Actuator Components
Courtesy of CHRYSLER GROUP, LLC

The recirculation door actuator (1) for the Dual Zone heating and A/C system is a reversible, 12 volt Direct Current (DC) servo motor, which is directly connected to the pivot shaft of the recirculation-air door. The recirculation door actuator is located on the left side of the air inlet housing.

The recirculation door actuator is contained within a black molded plastic case with an integral wire connector receptacle (2). An output shaft with splines (3) connect it to recirculation door shaft and integral mounting tabs (4) allow the actuator to be secured to the air inlet housing.

The recirculation door actuator does not require mechanical indexing to the recirculation-air door, as it is electronically calibrated by the Heater, Ventilation and Air Conditioning (HVAC) Module. The heating and A/C system must be re-calibrated each time an actuator motor is replaced. Refer to **STANDARD PROCEDURE** .

The recirculation door actuator is interchangeable with the actuators for the blend and mode air doors.

OPERATION

OPERATION

The recirculation door actuator is connected to the A/C heater control through the vehicle electrical system by a dedicated two-wire lead and connector of the HVAC wire harness.

The recirculation door actuator can move the recirculation-air door in two directions. When the Heater, Ventilation and Air Conditioning (HVAC) module pulls the voltage on one side of the motor connection high and the other connection low, the recirculation-air door will move in one direction. When the HVAC module reverses the polarity of the voltage to the motor, the recirculation-air door moves in the opposite direction. When the HVAC module makes the voltage to both connections high or both connections low, the recirculation-air door stops and will not move.

The HVAC module uses a pulse-count positioning system to monitor the operation and relative position of the recirculation door actuator and the recirculation-air door. The HVAC module learns the recirculation-air door stop positions during the calibration procedure and will store a Diagnostic Trouble Code (DTC) for any problems it detects in the recirculation door actuator circuits.

The recirculation door actuator is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The recirculation door actuator cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

WARNING: Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

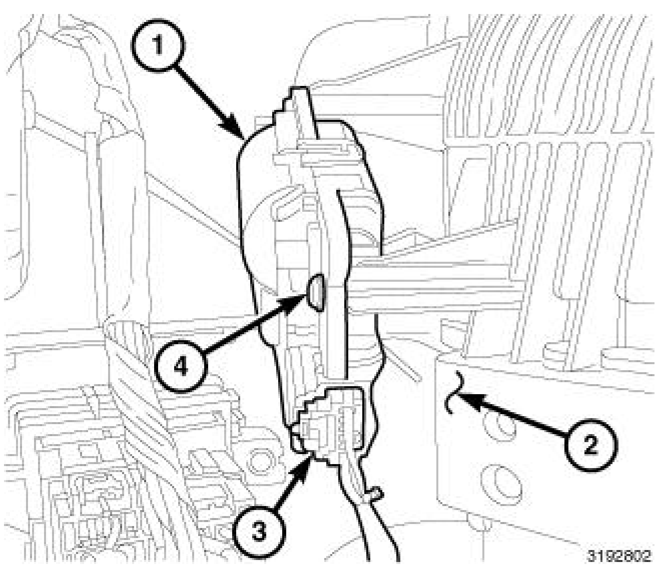


Fig. 18: Recirculation Door Actuator Removal/Installation

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove the glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .
3. Disconnect the HVAC wire harness connector (3) from the recirculation door actuator (1).
4. Remove the two screws (4) that secure the recirculation door actuator to the air inlet housing (2) and remove the actuator.

INSTALLATION

INSTALLATION

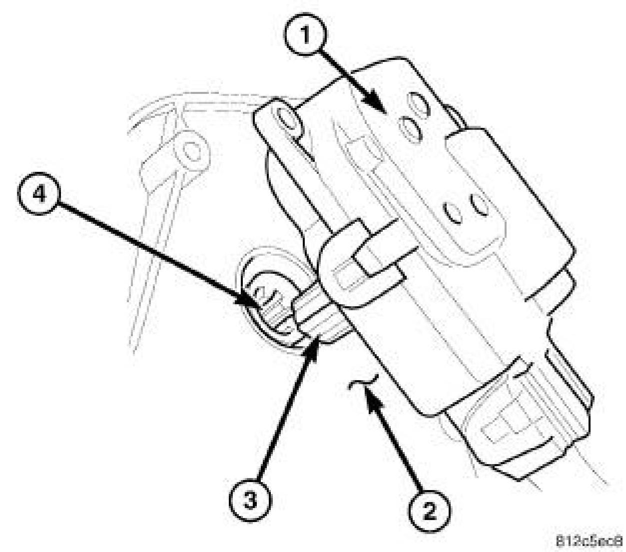


Fig. 19: Aligning Left Front Blend Door Actuator
Courtesy of CHRYSLER GROUP, LLC

1. Position the recirculation door actuator (1) to the recirculation door pivot shaft (4).
2. Install the recirculation door actuator onto the HVAC air inlet housing (2). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (3) with those on the recirculation door pivot shaft (4).

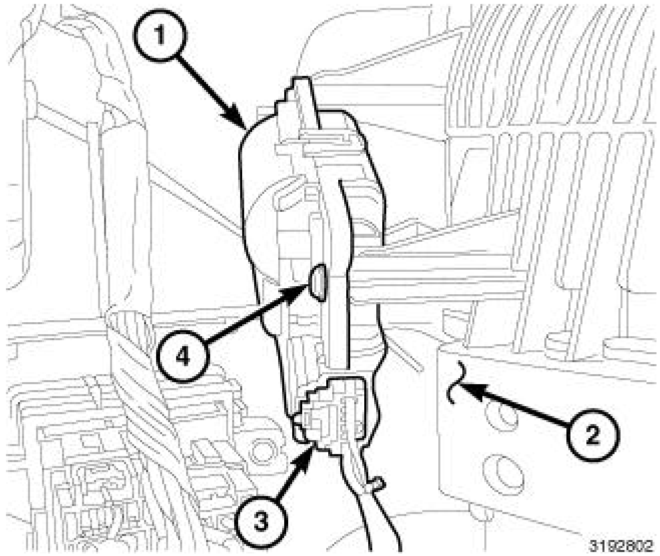


Fig. 20: Recirculation Door Actuator Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

3. Install the two screws (4) that secure the recirculation door actuator (1) to the air inlet housing (2) and securely tighten the screws.
4. Connect the HVAC wire harness connector (3) to the recirculation door actuator.
5. Install the glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
6. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
7. Initiate the Actuator Calibration function using a scan tool. Refer to **STANDARD PROCEDURE** .

CONTROL, A/C AND HEATER

DESCRIPTION

DESCRIPTION

A Manual Temperature Control (MTC) and an Automatic Temperature Control (ATC) Dual Zone heating and A/C system are available for this vehicle. The Dual Zone heating and A/C system allows both the driver and the front seat passenger the ability to individually regulate air temperature for their side of the vehicle. All controls are identified by International Standards Organization (ISO) graphic symbols.

The ATC heating and A/C system can automatically adjust the air temperature, airflow volume, airflow distribution and amount of inside air recirculation to maintain occupant comfort, even under changing outside weather conditions, and offers several manual override features, such as, fan speed, airflow distribution, defrost and recirculation modes.

Both heating and A/C systems provide the vehicle occupants with a number of options to help control climate and comfort within the vehicle (Refer to the Owner's Manual for more information on the features of the heating and A/C system).

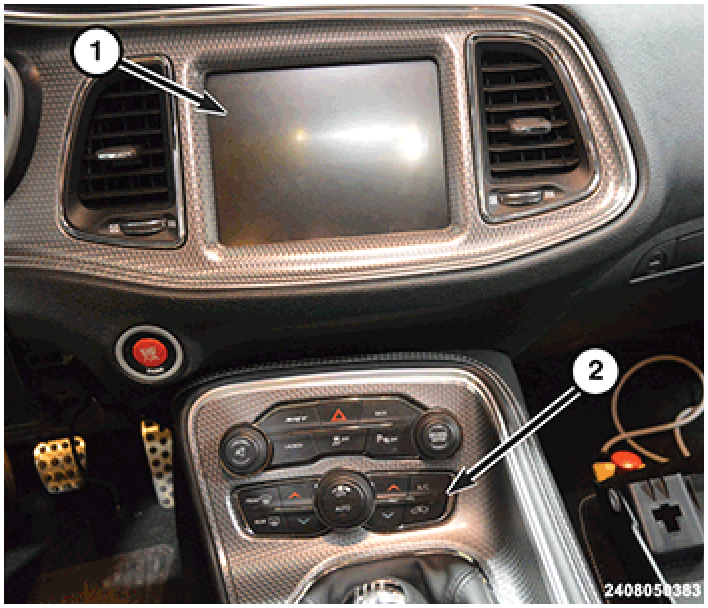


Fig. 21: Screen Module & Switch Bank
Courtesy of CHRYSLER GROUP, LLC

NOTE: Automatic Temperature Control (ATC) shown in the illustration. Manual Temperature Control (MTC) similar.

The controls for both of the Dual Zone heating and A/C systems are located in the U-Connect Touch ™ screen module (1) and on the switchbank (2) at the top of the center console.

OPERATION

AUTOMATIC TEMPERATURE CONTROL (ATC)

Each of the A/C heater controls in the front switchbank are resistor type controls. When a button is pushed, or a knob is turned, the switchbank sends a resistive signal over hard-wired circuits to the U-Connect Touch ™ screen module. The controls in the U-Connect Touch ™ screen module mimic the action selected on the switchbank. The U-Connect Touch ™ screen module communicates the heater and A/C control request signals to the Heater, Ventilation and Air Conditioning (HVAC) module.

The HVAC module is a dedicated microprocessor that automatically drives the electrically operated air-door actuators for the Dual Zone Automatic Temperature Control (ATC) heating and A/C systems. The ATC HVAC module obtains sun load, in-car temperature and evaporator temperature information through hard-wired circuits, and occupant heating and A/C settings and other required vehicle information over the Controller Area Network (CAN) data bus.

The Dual Zone ATC heating and A/C system is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

Prior to replacing an A/C heater control or HVAC module, check for any Diagnostic Trouble Codes (DTCs) related to the heating and A/C system, and run the calibration procedure to verify that the concern is not an air-door calibration issue. Refer to **STANDARD PROCEDURE** .

The individual A/C heater controls located in the switchbank cannot be adjusted or repaired. If an A/C heater control or control indicator lamp is inoperative or damaged, the entire switchbank pod must be replaced. Refer

to **POD, SWITCH BANK, REMOVAL** .

The individual A/C heater controls located in the U-Connect Touch ™ screen module cannot be adjusted or repaired. If an A/C heater control or control indicator lamp is inoperative or damaged, the entire U-Connect Touch ™ screen module must be replaced.

MANUAL TEMPERATURE CONTROL (MTC)

Each of the A/C heater controls in the front switchbank are resistor type controls. When a button is pushed, or a knob is turned, the switchbank sends a resistive signal over hard-wired circuits to the U-Connect Touch ™ screen module. The controls in the U-Connect Touch ™ screen module mimic the action selected on the switchbank. The U-Connect Touch ™ screen module communicates the heater and A/C control request signals to the Heater, Ventilation and Air Conditioning (HVAC) module.

The HVAC module is a dedicated microprocessor for the Dual Zone Manual Temperature Control (MTC) heating and A/C system. The MTC HVAC module obtains evaporator temperature information through hard-wired circuits, and occupant heating and A/C settings and other required vehicle information over the Controller Area Network (CAN) data bus.

The Dual Zone MTC heating and A/C system is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

Prior to replacing an A/C heater control or HVAC module, check for any Diagnostic Trouble Codes (DTCs) related to the heating and A/C system, and run the calibration procedure to verify that the concern is not an air-door calibration issue. Refer to **STANDARD PROCEDURE** .

The individual A/C heater controls located in the switchbank cannot be adjusted or repaired. If an A/C heater control or control indicator lamp is inoperative or damaged, the entire switchbank pod must be replaced. Refer to **POD, SWITCH BANK, REMOVAL** .

The individual A/C heater controls located in the U-Connect Touch ™ screen module cannot be adjusted or repaired. If an A/C heater control or control indicator lamp is inoperative or damaged, the entire U-Connect Touch ™ screen module must be replaced. .

MODULE, POWER, BLOWER MOTOR

DESCRIPTION

DESCRIPTION

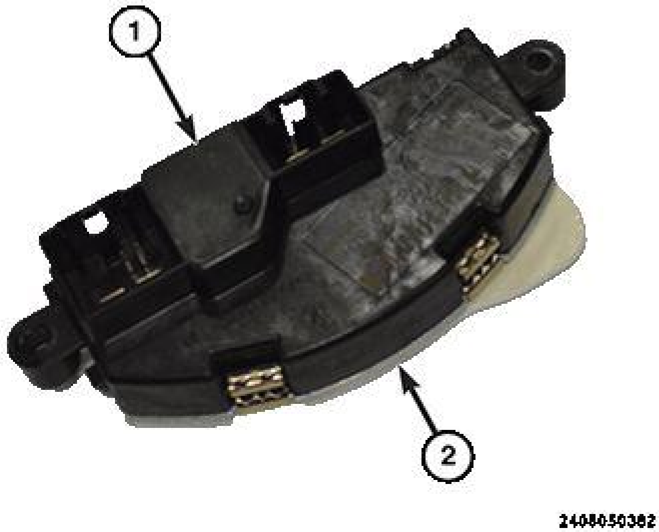


Fig. 22: Integral Connector Receptacles & Finned Aluminum Heat Sink
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Automatic Temperature Control (ATC) shown in the illustration. Manual Temperature Control (MTC) similar.**

Both the Automatic Temperature Control (ATC) and Manual Temperature Control (MTC) heating and A/C systems use a blower motor power module to control the blower motor speed.

The blower motor power module is mounted to the rear of the HVAC housing, directly behind the glove box. The blower motor power module consists of a molded plastic housing with integral wire connector receptacles (1) and mounting provisions. Concealed behind the housing is the power module electronic circuitry and a finned aluminum heat sink (2). The blower motor power module is located on the passenger side of the HVAC housing and is serviceable without removal of the HVAC housing.

The blower motor power module is accessed for service by removing the glove box.

OPERATION

OPERATION

The blower motor power module is connected to the vehicle electrical system through a dedicated lead and connector of the HVAC wire harness. A second lead and connector of the wire harness is connected to the blower motor.

On the Automatic Temperature Control (ATC) system, the blower motor power module allows the microprocessor-based Heater, Ventilation and Air Conditioning (HVAC) module to calculate and provide infinitely variable blower motor speeds based upon either manual blower switch input or the ATC programming.

On the Manual Temperature Control (MTC) system, the blower motor power module allows the HVAC module to provide a wide range of blower motor speeds throughout its operating range, based upon blower switch input.

Both the ATC and MTC systems use a Pulse Width Modulated (PWM) circuit strategy. PWM voltage is applied

to a comparator circuit which compares the PWM signal voltage to the blower motor feedback voltage. The resulting output drives the power module circuitry, which provides a linear output voltage to change or maintain the desired blower speed.

The blower motor power module is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The blower motor power module cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

WARNING: **Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.**

WARNING: **The heat sink for the blower motor power module may get very hot during normal operation. If the blower motor was turned on prior to servicing the blower motor power module, wait five minutes to allow the heat sink to cool before performing diagnosis or service. Failure to take this precaution may result in possible serious injury.**

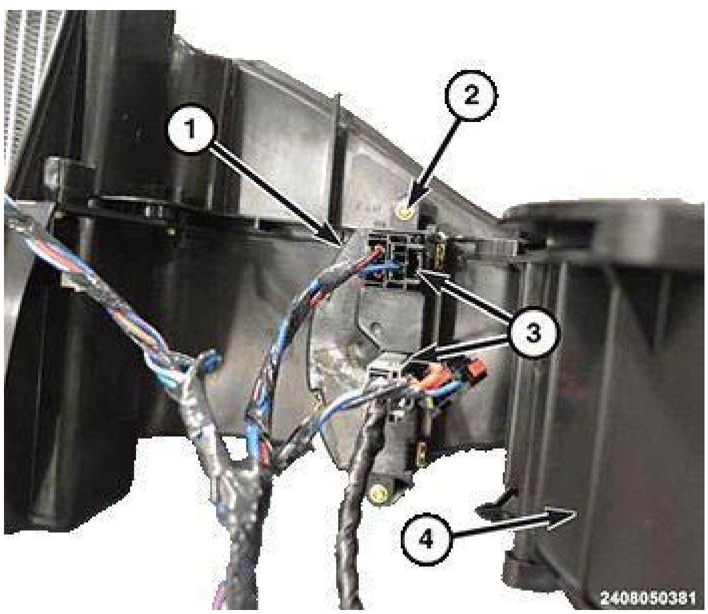


Fig. 23: Removing/Installing Blower Motor Power Module
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove the glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .

3. Disconnect the wire harness connectors (3) from the blower motor power module (1).
4. Remove the two screws (2) and the blower motor power module (1).

INSTALLATION

INSTALLATION

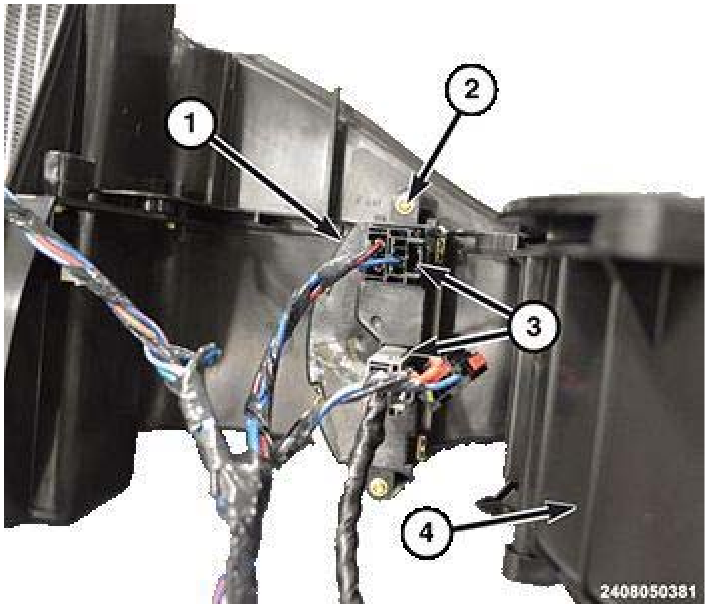


Fig. 24: Removing/Installing Blower Motor Power Module
Courtesy of CHRYSLER GROUP, LLC

1. Position the blower motor power module (1) into the HVAC housing (4).
2. Install the two screws (2) and securely tighten.
3. Connect the two wire harness connectors (3) to the blower motor power module.
4. Install the glove box. Refer to GLOVE BOX, INSTRUMENT PANEL, INSTALLATION .
5. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

SENSOR, AMBIENT TEMPERATURE

DESCRIPTION

DESCRIPTION

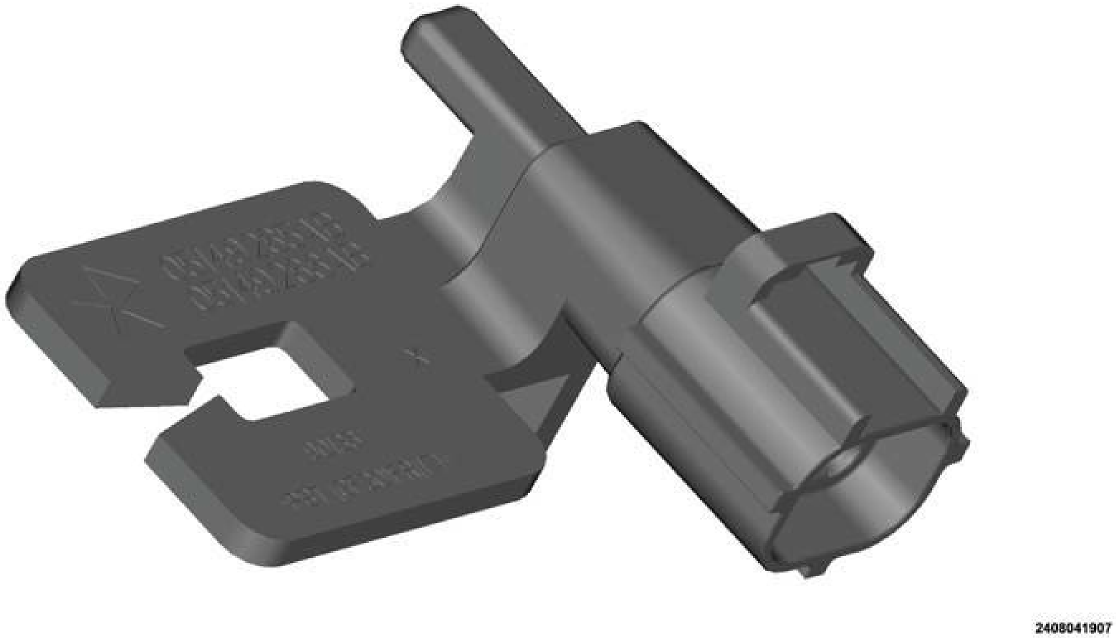


Fig. 25: Ambient Air Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

The ambient air temperature sensor is a variable resistor that monitors the air temperature outside of the vehicle. The Automatic Temperature Control (ATC) heating and A/C system uses the ambient air temperature sensor data to help maintain optimum passenger compartment temperature levels. The ambient air temperature sensor is mounted behind the grille on the right side.

OPERATION

OPERATION

The ambient air temperature sensor is a variable resistor that operates on a 5 volt Direct Current (DC) reference signal sent by the Body Control Module (BCM). The ambient air temperature sensor is connected to the BCM through a two-wire lead and connector of the vehicle wire harness. The ambient air temperature sensor changes its internal resistance in response to changes in the outside air temperature, which either increases or decreases the reference signal voltage read by the BCM. The BCM converts and broadcasts the sensor data over the Controller Area Network (CAN) data bus, where it is read by the A/C-heater control, Powertrain Control Module (PCM) and other vehicle control modules.

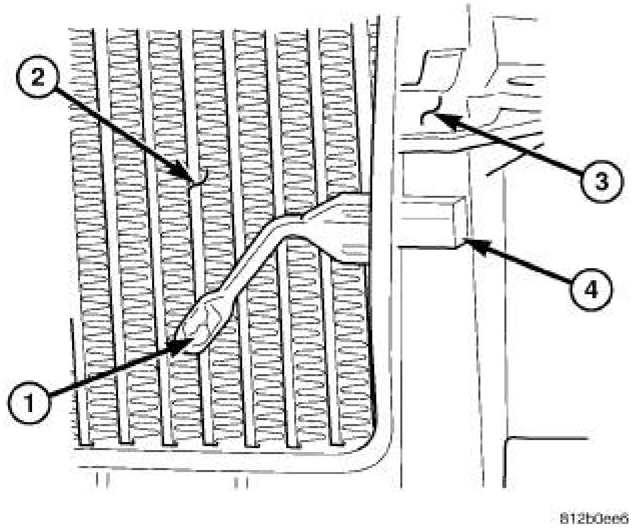
The ambient air temperature sensor is diagnosed using a scan tool. Refer to the **DTC INDEX** article. .

The ambient air temperature sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged. Refer to **SENSOR, AMBIENT TEMPERATURE, REMOVAL** .

SENSOR, EVAPORATOR TEMPERATURE

DESCRIPTION

DESCRIPTION



[Fig. 26: Evaporator Temperature Sensor, A/C Evaporator, HVAC Housing & Connector]
Courtesy of CHRYSLER GROUP, LLC

The evaporator temperature sensor (1) measures the temperature of the conditioned air downstream of the A/C evaporator (2). The evaporator temperature sensor is an electrical thermistor within a molded plastic case that is inserted into the HVAC housing (3) near the coldest point of the A/C evaporator. Two terminals within the connector receptacle (4) connect the sensor to the vehicle electrical system through a wire lead and connector of the HVAC wire harness.

The external location of the evaporator temperature sensor allows the sensor to be removed or installed without disturbing the refrigerant in the A/C system.

OPERATION

OPERATION

The evaporator temperature sensor monitors the temperature of the conditioned air downstream of the A/C evaporator and supplies an input signal to the HVAC module. The HVAC module uses the evaporator temperature sensor input signal to optimize A/C system performance and to protect the A/C system from evaporator freezing. The evaporator temperature sensor will change its internal resistance in response to the temperatures it monitors and is connected to the HVAC module through sensor ground circuit and a 5 volt Direct Current (DC) reference signal circuit. As the temperature of the A/C evaporator decreases, the internal resistance of the evaporator temperature sensor decreases.

The HVAC module uses the monitored voltage reading as an indication of evaporator temperature. The HVAC module is programmed to respond to this input by requesting the Powertrain Control Module (PCM) to cycle the A/C clutch as necessary to optimize A/C system performance and to protect the A/C system from evaporator freezing.

The evaporator temperature sensor is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The evaporator temperature sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

WARNING: Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

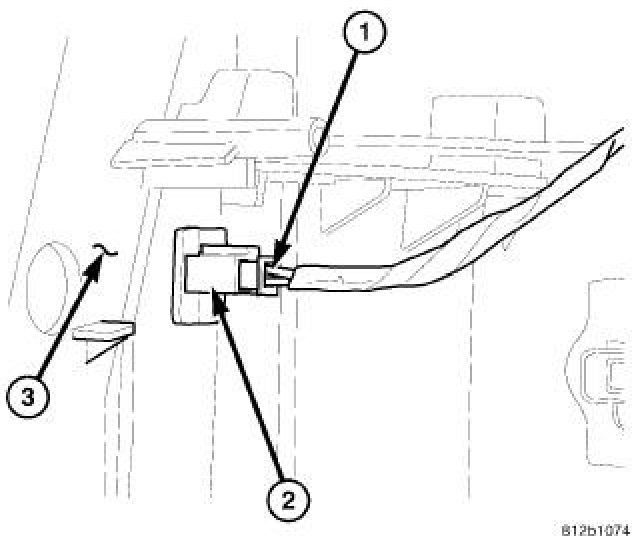


Fig. 27: Evap Temperature Sensor, Connector & HVAC Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove the glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL** .
3. Disconnect the HVAC wire harness connector (1) from the evaporator temperature sensor (2), twist and remove the sensor.

INSTALLATION

INSTALLATION

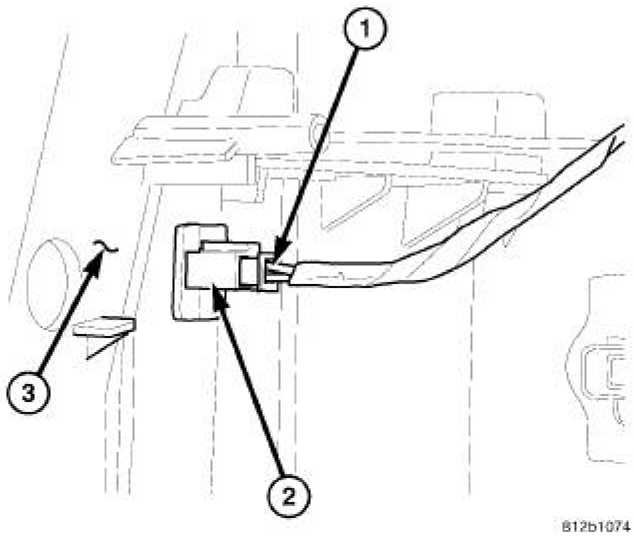


Fig. 28: Evap Temperature Sensor, Connector & HVAC Housing
Courtesy of CHRYSLER GROUP, LLC

1. Position the evaporator temperature sensor (2) into HVAC housing (3).
2. Connect the HVAC wire harness connector (1) to the evaporator temperature sensor (2).
3. Install the glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION** .
4. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

SENSOR, HUMIDITY

DESCRIPTION

DESCRIPTION

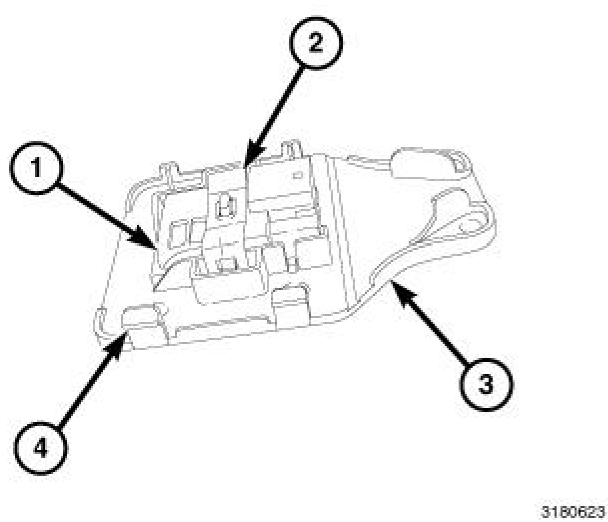


Fig. 29: Humidity Sensor, Bracket, Retaining Clip & Plastic Tabs
Courtesy of CHRYSLER GROUP, LLC

A humidity sensor (1) is used on Automatic Temperature Control (ATC) models to detect humidity levels inside the vehicle to optimize the dehumidifying effect of the A/C system. The humidity sensor is attached to a plastic bracket (3) by a metal retaining clip (2). The sensor bracket is attached to the inside of the windshield by an adhesive. A cover is attached to the sensor bracket by four plastic tabs (4). The humidity sensor is connected to the Body Control Module (BCM) by a dedicated three wire lead and connector that protrudes out from under the front of the headliner.

CAUTION: Use care when servicing the humidity sensor. The humidity sensor bracket cannot be serviced separately from the windshield. If the sensor bracket becomes damaged, the windshield will need to be replaced.

The humidity sensor can be serviced without the use of any special tools.

OPERATION

OPERATION

The humidity sensor detects humidity, dew point and windshield glass temperature, and sends this information to the Body Control Module (BCM) over a Local Interconnect Network (LIN) data bus connection. The BCM then broadcasts the message over the Controller Area Network (CAN) data bus to the HVAC module. The HVAC module automatically adjusts A/C clutch operation, amount of recirculated air, blower motor speeds and outlet modes to prevent fogging on the inside of the windshield glass. If the humidity sensor message is not received by the HVAC module, a Diagnostic Trouble Code (DTC) will set. The information the HVAC module receives from the humidity sensor can be viewed using a scan tool.

The humidity sensor is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The humidity sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

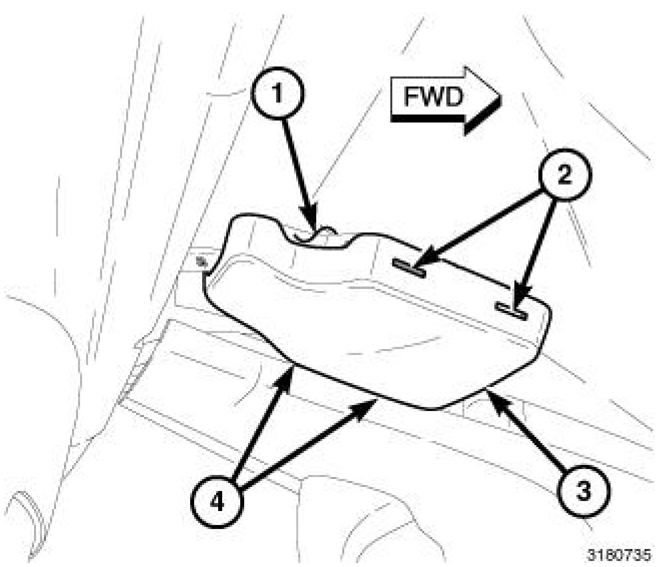


Fig. 30: Humidity Sensor Cover, Sensor Bracket & Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.

CAUTION: Use care when removing the humidity sensor cover. The humidity sensor bracket cannot be serviced separately from the windshield. If the sensor bracket becomes damaged, the windshield will need to be replaced.

2. Carefully disengage the four retaining tabs (2 and 4) that secure the cover (3) to the humidity sensor bracket (1) by pressing in on the right side of the cover, while rocking the left side of the cover off the bracket.

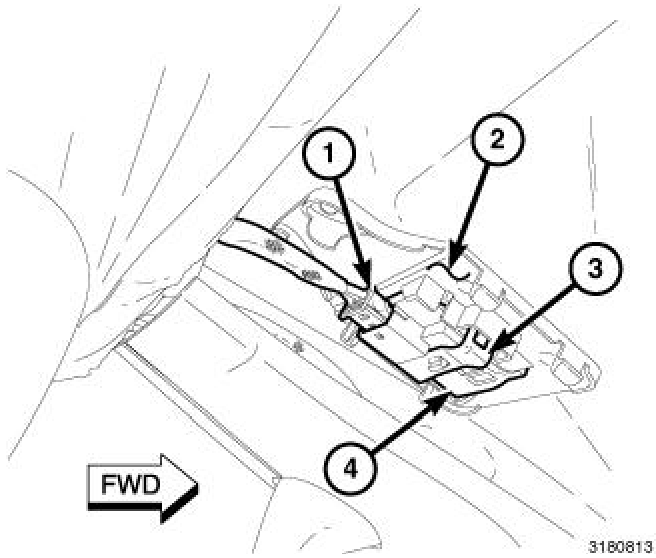


Fig. 31: Wire Harness Connector, Humidity Sensor, Bracket & Clip
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Use care when removing the humidity sensor. The humidity sensor bracket cannot be serviced separately from the windshield. If the sensor bracket becomes damaged, the windshield will need to be replaced.

3. Using a small screwdriver or similar tool, carefully disengage the metal retaining clip (3) from the sensor bracket (2) and remove the humidity sensor (4) and the clip as an assembly.
4. Disconnect the wire harness connector (1) from the humidity sensor.
5. If the humidity sensor bracket is damaged and cannot be reused, replace the windshield. Refer to **WINDSHIELD, REMOVAL** .

INSTALLATION

INSTALLATION

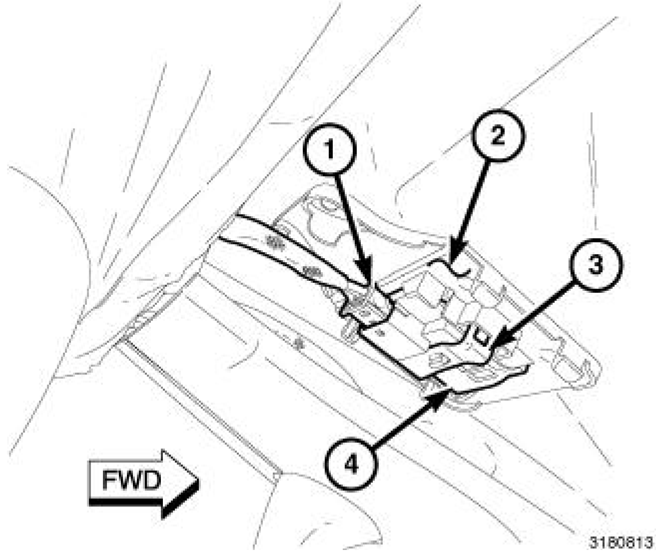


Fig. 32: Wire Harness Connector, Humidity Sensor, Bracket & Clip
Courtesy of CHRYSLER GROUP, LLC

1. If the humidity sensor bracket (1) is damaged and cannot be reused, install a new windshield. Refer to **WINDSHIELD, INSTALLATION** .
2. Connect the wire harness connector (1) to the humidity sensor (4).

CAUTION: Use care when installing the humidity sensor. The humidity sensor bracket cannot be serviced separately from the windshield. If the sensor bracket becomes damaged, the windshield will need to be replaced.

3. Position the humidity sensor to the sensor bracket (2) and engage the metal retaining clip (3) to the bracket. Make sure both sides of the retaining clip are fully engaged to the bracket.

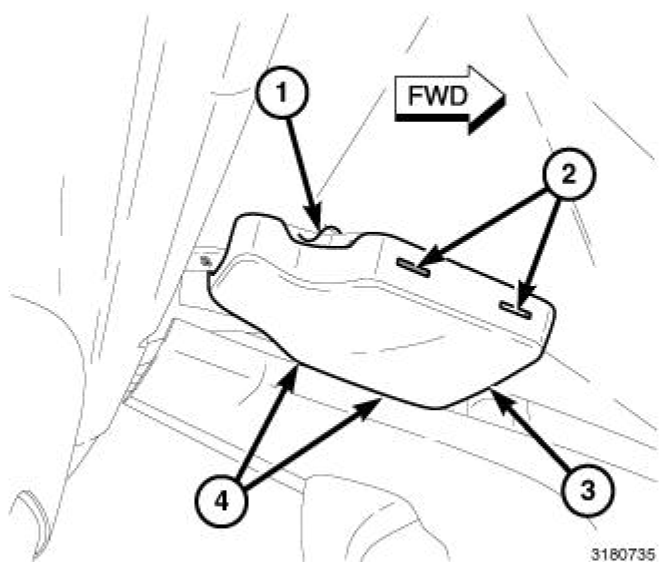


Fig. 33: Humidity Sensor Cover, Sensor Bracket & Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Use care when install the humidity sensor cover. The humidity sensor bracket cannot be serviced separately from the windshield. If the sensor

bracket becomes damaged, the windshield will need to be replaced.

4. Carefully install the humidity sensor cover (3) onto the sensor bracket (1). Make sure the four retaining tabs (2 and 4) are fully engaged to the bracket.
5. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

SENSOR, SUN

DESCRIPTION

DESCRIPTION

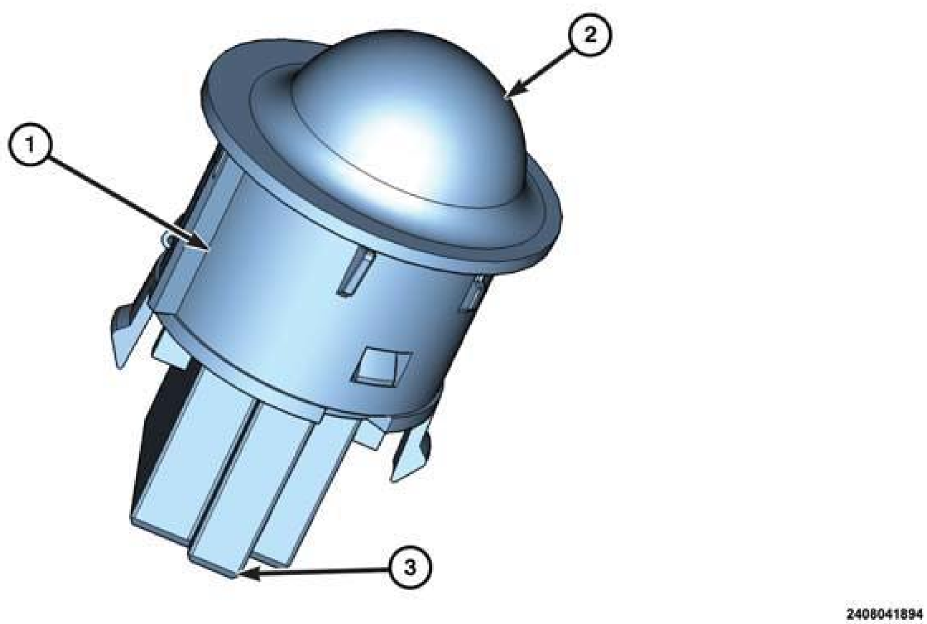


Fig. 34: Sun Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical sun sensor assembly shown in the illustration.

The Automatic Temperature Control (ATC) heating and A/C system uses a sun sensor assembly (1) to measure sun light intensity. The sun sensor assembly incorporates three sun sensors within a molded plastic case with a clear lens (2), that protrudes through the center of the defroster grille. The wire harness receptacle (3) connects the sun sensors to the vehicle electrical system through a wire lead and connector of the instrument panel wire harness.

OPERATION

OPERATION

The Automatic Temperature Control (ATC) Dual Zone heating and A/C system uses two sun sensors to balance the system in response to side-to-side variations of sun light intensity. Passengers in sun and shadow require different functional settings because they experience very different temperatures. The sun sensor assembly provides data to the HVAC module to help determine proper mode and blend-air door positions and blower motor speeds. The sun sensors are not thermistor type sensors, but rather photo diodes. For this reason the sun

sensors responds to sun light intensity rather than temperature. The sun sensor assembly is also used to sense day and night conditions for automatic headlight control, if equipped.

The sun sensor is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The sun sensor assembly cannot be adjusted or repaired and must be replaced if inoperative or damaged.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SUN SENSOR

WARNING: Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in possible serious or fatal injury.

The sun sensor assembly is located so that the sun rays will hit the sensors in the same way that it will hit the driver and the passenger. It is important that the area in front of the sun sensor assembly be unobstructed. If the vehicle exhibits a lack of passenger comfort in sunny weather such as in the early afternoon, check for the following:

- Any items laying on top of the instrument panel are not covering the sun sensor.
- Any stickers on the windshield are not directly in front of the sun sensor.
- Confirm that the windshield wipers are properly adjusted.
- Confirm that the sun sensor is properly installed. Refer to **SENSOR, SUN, INSTALLATION**.
- Confirm that the defroster grille is properly installed. Refer to **GRILLE, DEFROSTER, INSTALLATION** .

The HVAC module continually monitors the sun sensor circuits and will store Diagnostic Trouble Codes (DTCs) for any problem it detects. The sun sensor can be tested in the vehicle with a scan tool. Refer to **DIAGNOSIS AND TESTING** .

REMOVAL

REMOVAL

WARNING: Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in an accidental airbag deployment and possible serious or fatal injury.

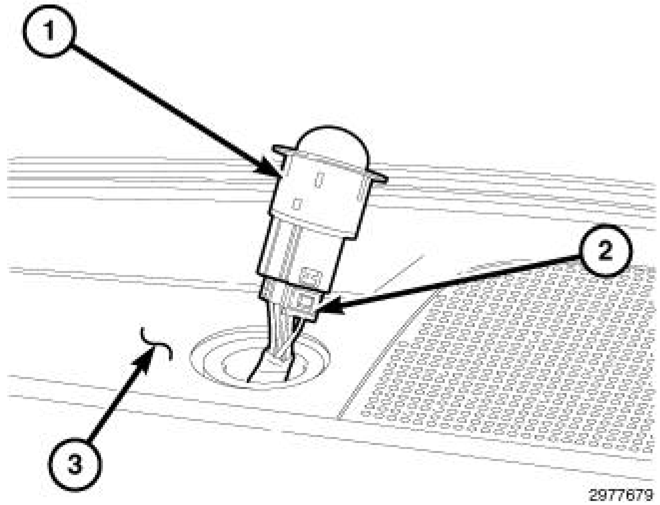


Fig. 35: Sun Sensor, Panel & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Using a small flat bladed tool, gently pry the sun sensor (1) out of the top of the instrument panel (3).
3. Disconnect the wire harness connector (2) and remove the sun sensor (1).

INSTALLATION

INSTALLATION

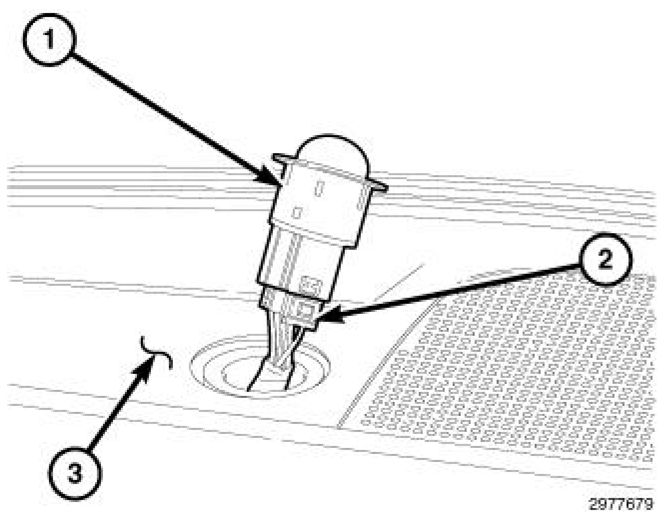


Fig. 36: Sun Sensor, Panel & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Position the sun sensor (1) near the instrument panel (3).
2. Connect the wiring harness connector (2) to the sun sensor (1).
3. Align the tab on the sun sensor with the slot in the opening of the instrument panel and gently push the sensor into the instrument panel. Make sure the sensor is fully engaged and lies flat in the instrument

panel.

4. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

SENSOR, TEMPERATURE, IN-CAR

DESCRIPTION

DESCRIPTION

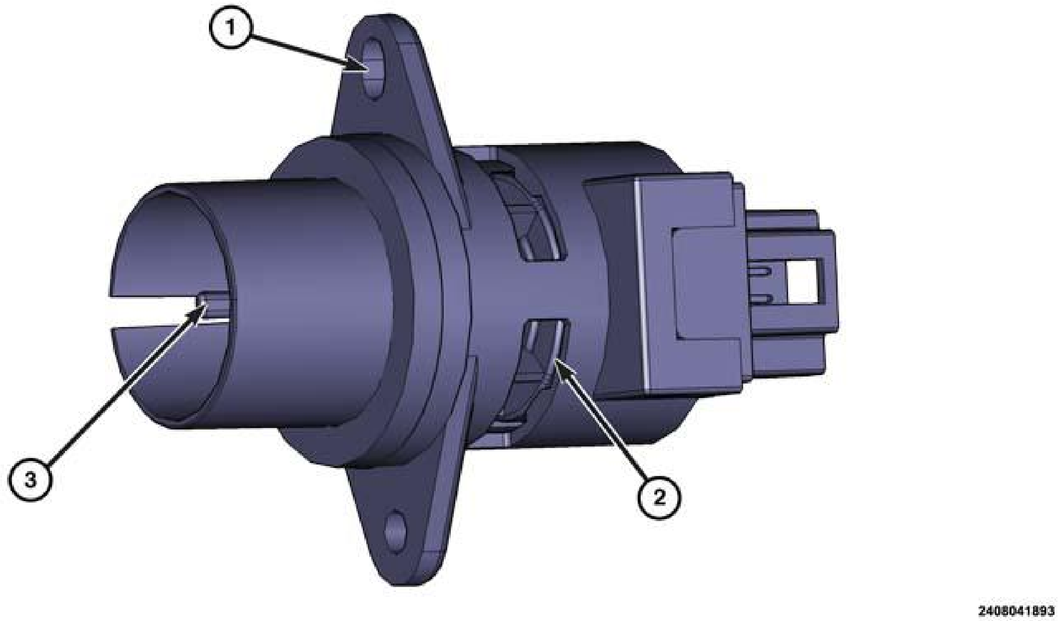


Fig. 37: In-Car Temperature Sensor, Aspirator Motor & Thermistor
Courtesy of CHRYSLER GROUP, LLC

The in-car temperature sensor is used in the Automatic Temperature Control (ATC) heating and A/C system. The in-car temperature sensor consists of an aspirator motor (2) and a temperature thermistor (3). The in-car temperature sensor sends a resistance signal to the HVAC module and is attached to the steering column cover, by integral mounting tabs (1).

OPERATION

OPERATION

Air is drawn from the passenger compartment by the aspirator motor and flows over the temperature thermistor. The thermistor changes resistance with air temperature. The Heater, Ventilation and Air Conditioning (HVAC) module for the Automatic Temperature Control (ATC) system receives the resistance signal over hard-wired circuits and calculates the temperature of the air in the passenger compartment. The ATC system then automatically makes adjustments to maintain the optimum passenger compartment comfort.

The in-car temperature sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - IN-CAR TEMPERATURE SENSOR

NOTE: **For complete circuit diagrams, refer to the appropriate Wiring Information. Wiring Information includes wiring diagrams, connector pin out and location views, details of wire harness routing and retention, splice and ground locations and proper wire and connector repair procedures.**

Using a scan tool, check for Diagnostic Trouble Codes (DTCs) related to the in-car temperature sensor and the A/C heater module. If any DTCs are found, repair as necessary. Refer to **DIAGNOSIS AND TESTING** . If no DTCs are found, perform the two following tests. Replace the in-car temperature sensor if the sensor fails either test.

ASPIRATOR MOTOR TEST

The in-car temperature sensor uses an aspirator motor to draw air from the passenger compartment and flow the air over the temperature thermistor. Test the motor as follows:

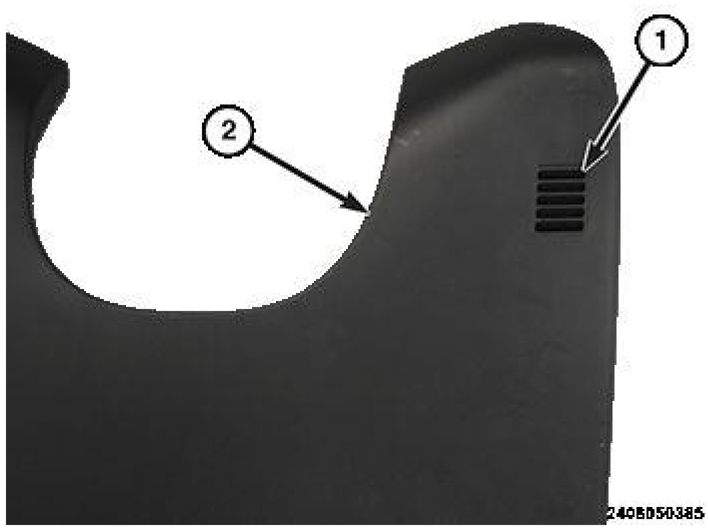


Fig. 38: Opening Grille & Opening Cover
Courtesy of CHRYSLER GROUP, LLC

1. Place the ignition in the Run position.
2. Place a small piece of newspaper in front of the aspirator motor opening grille (1), located on the steering column opening cover (2). If the paper sticks to the grille, the aspirator motor is operating properly. The piece of paper should be only large enough to cover the opening.
3. If the paper does not stick to the grille, check the in-car temperature sensor electrical connections and wiring. If connections and wiring are OK, replace the in-car temperature sensor.

TEMPERATURE THERMISTOR TEST

The in-car temperature sensor uses a temperature thermistor to provide resistance values that correlate with temperature change. Test the thermistor as follows:

1. Remove the in-car temperature sensor and place it on a workbench. Refer to **SENSOR, TEMPERATURE, IN-CAR, REMOVAL**.
2. Note the current ambient air temperature of the work area.

3. Use an ohm meter and check the resistance between pins 1 and 2 of the in-car temperature sensor. Compare the temperature of the work area to the found resistance value. The resistance should be within specifications as listed in the RESISTANCE AND TEMPERATURE CHART. If not OK, replace the in-car temperature sensor.

RESISTANCE AND TEMPERATURE		
AIR TEMPERATURE RANGE	LOW RESISTANCE RANGE (KILOHM)	HIGH RESISTANCE RANGE (KILOHM)
-21Ā° to -15Ā°C (-5Ā° to 5Ā°F)	292 Ā± 1.0	223 Ā± 0.9
-14Ā° to -9Ā°C (6Ā° to 15Ā°F)	198 Ā± 0.9	161 Ā± 0.8
-8Ā° to -4Ā°C (16Ā° to 25Ā°F)	144 Ā± 0.8	123 Ā± 0.8
-3Ā° to 1Ā°C (26Ā° to 35Ā°F)	111 Ā± 0.7	95 Ā± 0.7
2 to 7Ā°C (36Ā° to 45Ā°F)	86 Ā± 0.7	70 Ā± 0.6
8 to 12Ā°C (46Ā° to 55Ā°F)	64 Ā± 0.6	55 Ā± 0.5
13Ā° to 18Ā°C (56Ā° to 65Ā°F)	51 Ā± 0.5	42 Ā± 0.4
19Ā° to 23Ā°C (66Ā° to 75Ā°F)	39 Ā± 0.4	33 Ā± 0.3
24Ā° to 29Ā°C (76Ā° to 85Ā°F)	31 Ā± 0.3	26 Ā± 0.3
30Ā° to 35Ā°C (86Ā° to 95Ā°F)	24 Ā± 0.3	20 Ā± 0.3
36Ā° to 40Ā°C (96Ā° to 105Ā°F)	18 Ā± 0.3	16 Ā± 0.3
41Ā° to 46Ā°C (106Ā° to 115Ā°F)	15 Ā± 0.3	13 Ā± 0.3

REMOVAL

REMOVAL

WARNING: **Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.**

NOTE: **Take the proper precautions to protect the face of the steering column opening cover from cosmetic damage while performing this procedure.**

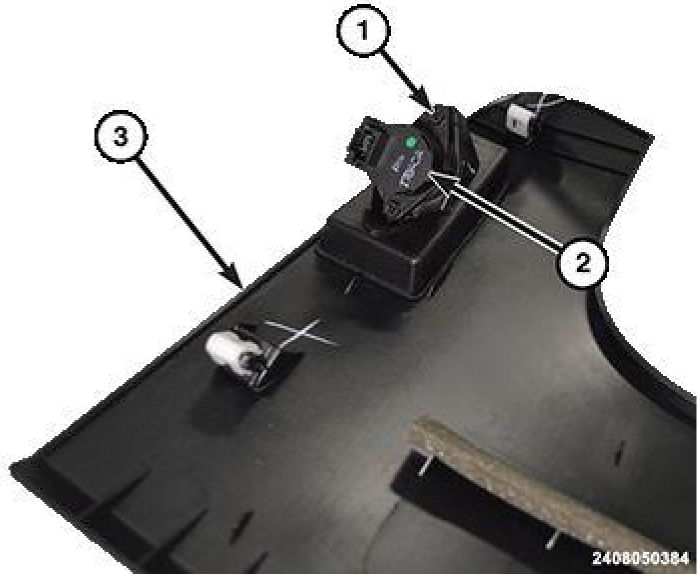


Fig. 39: Two Screws & In-Car Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove the steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, REMOVAL** .
3. Remove the two screws (1) and the in-car temperature sensor (2).

INSTALLATION

INSTALLATION

NOTE: **Take the proper precautions to protect the face of the steering column opening cover from cosmetic damage while performing this procedure.**

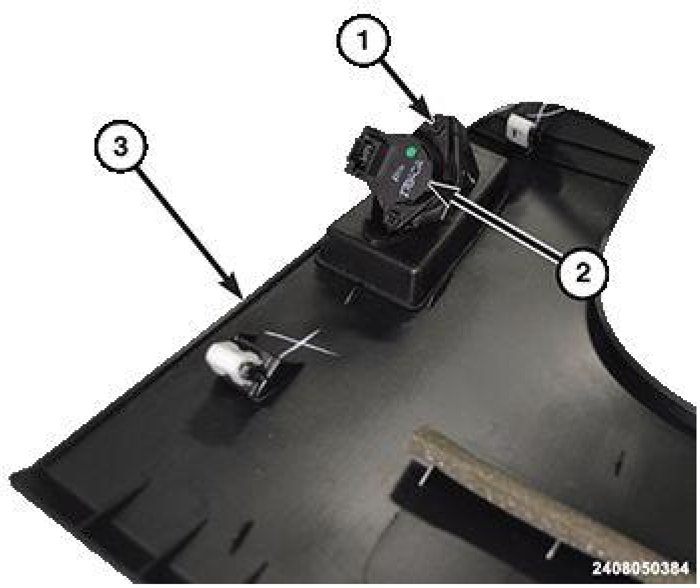


Fig. 40: Two Screws & In-Car Temperature Sensor

Courtesy of CHRYSLER GROUP, LLC

1. Position the in-car temperature sensor (2) onto the steering column opening cover (3).
2. Install the two screws (1) and securely tighten.
3. Install the steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
4. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

TRANSDUCER, A/C PRESSURE

DESCRIPTION

DESCRIPTION

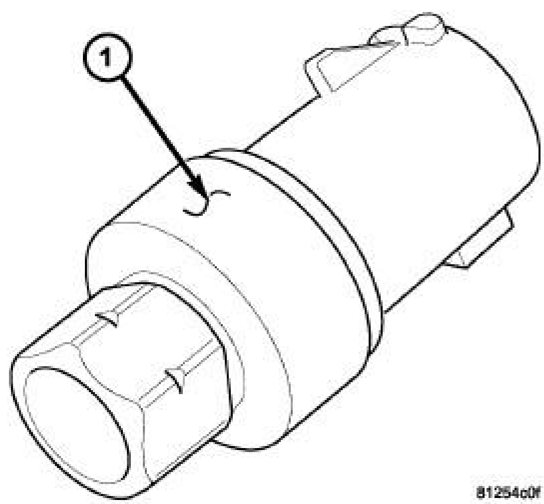


Fig. 41: A/C Pressure Transducer
Courtesy of CHRYSLER GROUP, LLC

The A/C pressure transducer (1) is a switch that is installed on a fitting located on the A/C liquid line. An internally threaded fitting on the A/C pressure transducer connects it to the externally threaded Schrader type fitting on the A/C liquid line. A rubber O-ring seals the connection between the A/C pressure transducer and the liquid line fitting. The A/C pressure transducer is connected to the vehicle electrical system by a molded plastic connector with three terminals.

OPERATION

OPERATION

The A/C pressure transducer monitors the pressures in the high side of the refrigerant system through its connection to a fitting on the A/C liquid line. The A/C pressure transducer will change its internal resistance in response to the pressures it monitors. A Schrader-type valve in the liquid line fitting permits the A/C pressure transducer to be removed or installed without disturbing the refrigerant in the A/C system.

The Powertrain Control Module (PCM) provides a five volt reference signal and a sensor ground to the A/C

pressure transducer, then monitors the output voltage of the A/C pressure transducer on a sensor return circuit to determine refrigerant pressure. The PCM is programmed to respond to the A/C pressure transducer and other sensor inputs and control the operation of the A/C clutch and the radiator cooling fan, to help optimize A/C system performance, and to protect the A/C system from damage.

The PCM will disengage the A/C clutch when high side pressure rises above 3082 kPa (447 psi) and reengage the clutch when high side pressure drops below 2937 kPa (426 psi). The A/C pressure transducer will also disengage the A/C clutch if the high side pressure drops below 110 kPa (16 psi) and will reengage the clutch when the high side pressure rises above 221 kPa (32 psi). If the refrigerant pressure rises above 1655 kPa (240 psi), the PCM will actuate the cooling fan. The A/C pressure transducer input to the PCM will also prevent the A/C clutch from engaging when ambient temperatures are below about 4.5Â°C (40Â°F) due to the pressure/temperature relationship of the refrigerant.

The A/C pressure transducer is tested using a scan tool. Refer to the **DTC INDEX** article. .

The A/C pressure transducer cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REMOVAL

REMOVAL

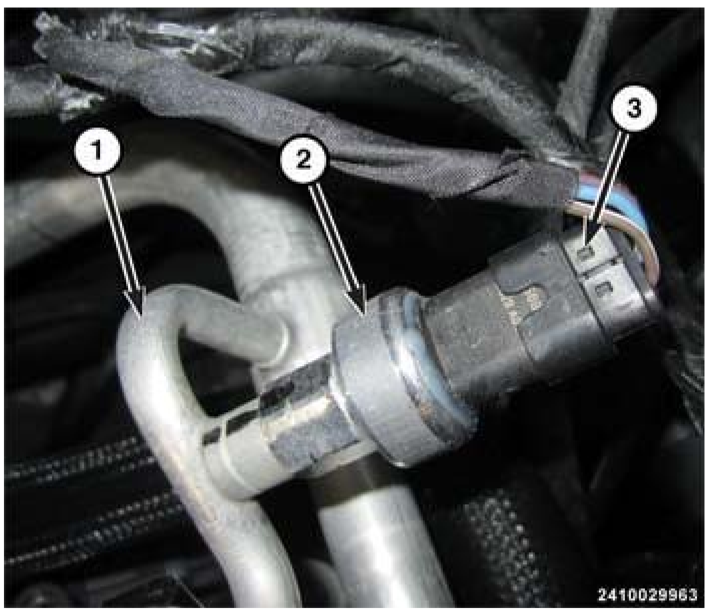


Fig. 42: Internal Heat Exchanger, Pressure Transducer & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It is not necessary to discharge the refrigerant system to replace the A/C pressure transducer.**

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Disconnect the wire harness connector (3) from the A/C pressure transducer (2).
3. Remove the A/C pressure transducer (2) from the Internal Heat Exchanger (1). Remove and discard the O-ring seal.

INSTALLATION

INSTALLATION

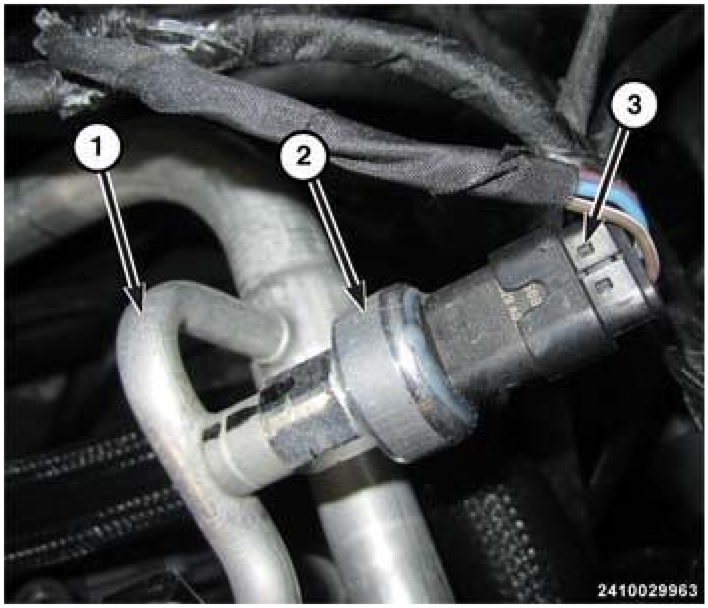


Fig. 43: Internal Heat Exchanger, Pressure Transducer & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Use only the specified O-ring as it is made of special material for this system. Use only refrigerant oil of the type required for the A/C compressor.**

1. Lubricate a new rubber O-ring seal with clean refrigerant oil and install it onto the liquid line fitting.
2. Install the A/C pressure transducer (2) onto the Internal Heat Exchanger (1) and securely tighten the A/C pressure transducer (2).
3. Connect the wire harness connector (3) to the A/C pressure transducer (2).
4. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

DISTRIBUTION

DUCT, DEFROSTER

REMOVAL

REMOVAL

WARNING: **On vehicles equipped with airbags, refer to RESTRAINTS - SERVICE INFORMATION . Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.**

NOTE: **Take the proper precautions to protect the front face of the instrument panel**

from cosmetic damage.

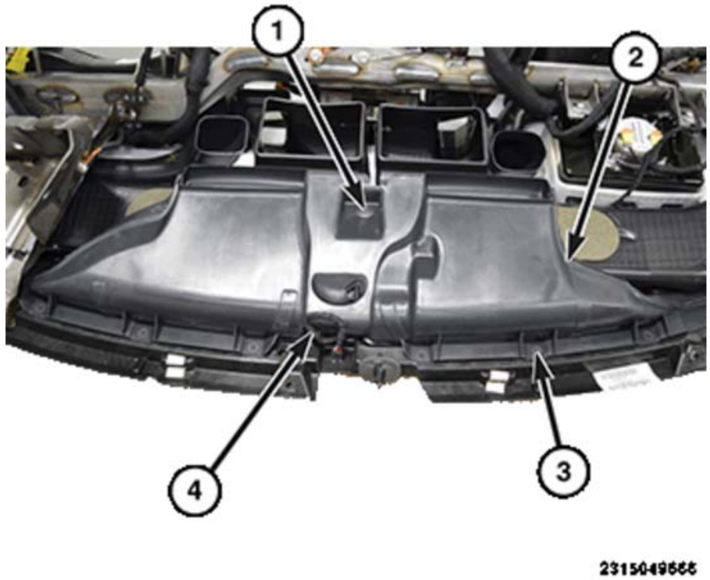


Fig. 44: Fastener, Wire Harness, Defroster Duct & Screws
Courtesy of CHRYSLER GROUP, LLC

NOTE:

1. Remove the instrument panel from the vehicle. Refer to PANEL, INSTRUMENT, REMOVAL .
2. Unclip the wire harness (4) from the defroster duct (2).
3. Remove the screws (3) and the push fastener (1), then the defroster duct.

INSTALLATION

INSTALLATION

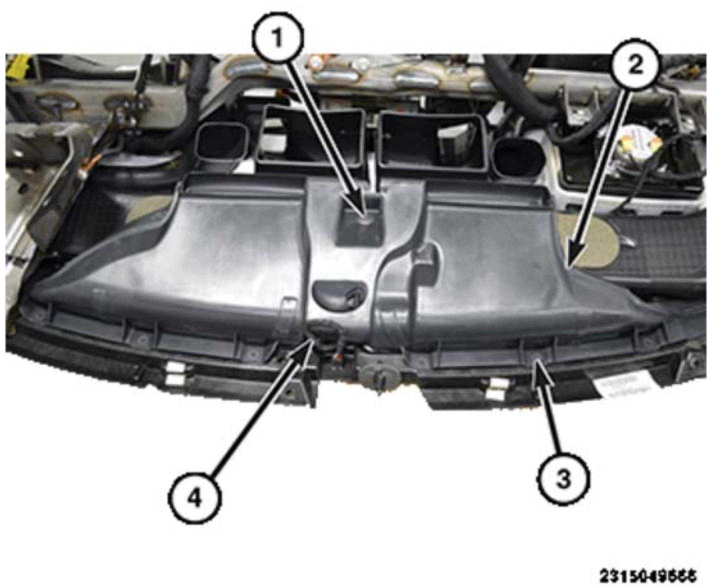


Fig. 45: Fastener, Wire Harness, Defroster Duct & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Position the defroster duct (2) and install the screws (3). Tighten the screws securely.
2. Install the push fastener (1) and clip the wire harness (4) to the defroster duct.
3. Install the instrument panel into the vehicle. Refer to **PANEL, INSTRUMENT, INSTALLATION** .

DUCT, FLOOR CONSOLE

REMOVAL

REMOVAL

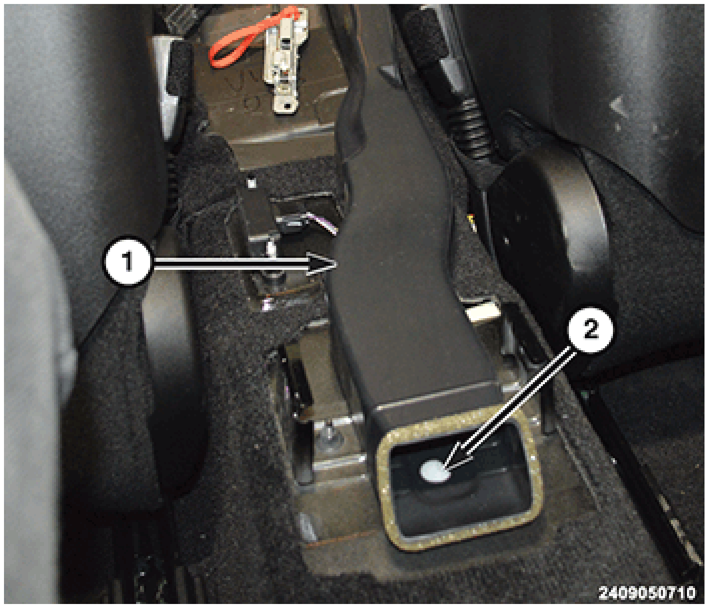


Fig. 46: Push-Pin Fastener & Floor Console Duct
Courtesy of CHRYSLER GROUP, LLC

1. Remove the floor console. Refer to **CONSOLE, FLOOR, REMOVAL** .
2. Remove the push-pin fastener (2), then disconnect the floor console duct (1) from the floor distribution duct and remove.

INSTALLATION

INSTALLATION

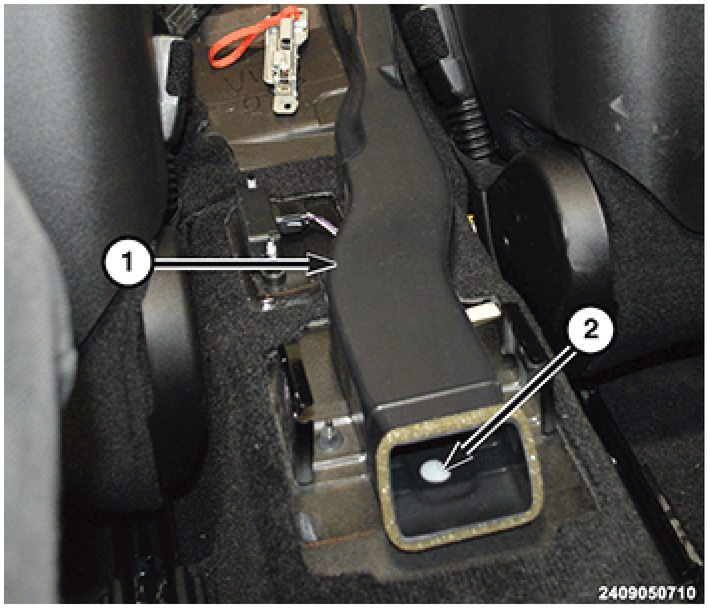


Fig. 47: Push-Pin Fastener & Floor Console Duct
Courtesy of CHRYSLER GROUP, LLC

1. Position the floor console duct (1) into the vehicle.
2. Connect the floor console duct to the floor distribution duct.
3. Install the push-pin fastener (2).
4. Install the floor console. Refer to **CONSOLE, FLOOR, INSTALLATION** .

DUCT, FLOOR DISTRIBUTION

REMOVAL

REMOVAL

WARNING: **On vehicles equipped with airbags, refer to RESTRAINTS - SERVICE INFORMATION . Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.**

NOTE: **Take the proper precautions to protect the front face of the instrument panel from cosmetic damage.**

FRONT FLOOR DISTRIBUTION DUCT

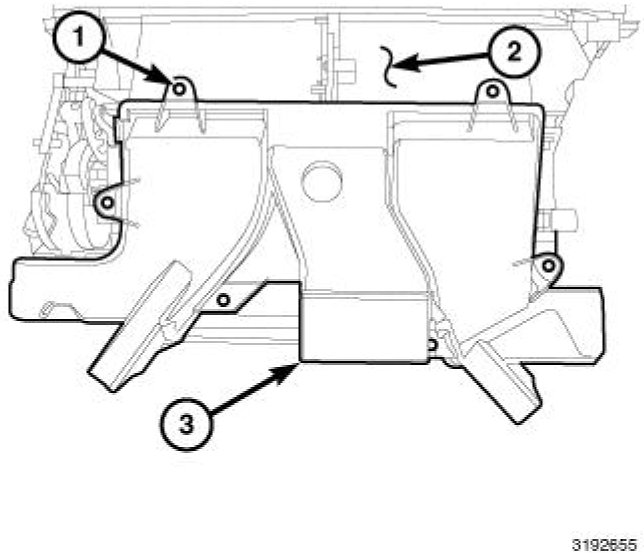


Fig. 48: Six Screws, Front Floor Distribution Duct & Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

1. Remove the HVAC air distribution housing. Refer to **HOUSING, HVAC, REMOVAL**.
2. Remove the six screws (1) that secure the front floor distribution duct (3) to the air distribution housing (2) and remove.

INTERMEDIATE FLOOR DISTRIBUTION DUCTS

1. Remove the floor console. Refer to **CONSOLE, FLOOR, REMOVAL** .
2. Remove the front seat. Refer to **SEAT, FRONT, REMOVAL** .

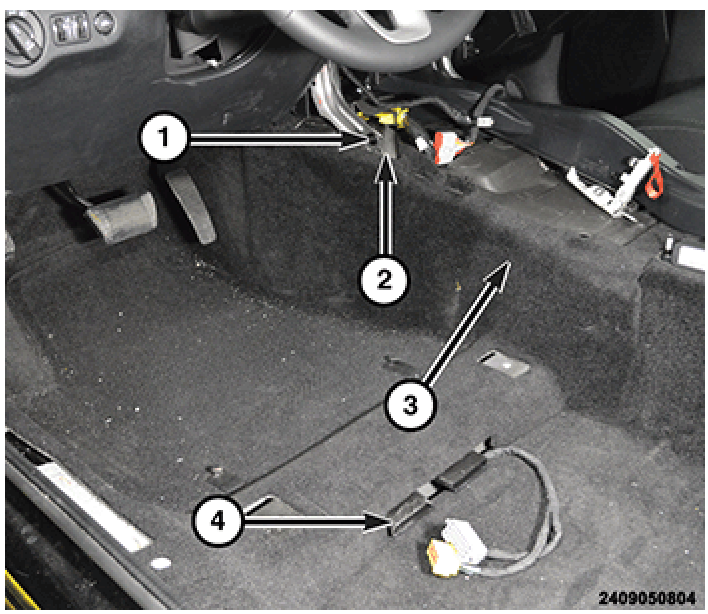


Fig. 49: Bolt, Instrument Panel Bracket & Front Floor Carpet
Courtesy of CHRYSLER GROUP, LLC

3. Remove the bolt (1) and lift the front floor carpet over the instrument panel bracket (2).
4. Roll back the front floor carpet from under the instrument panel toward the rear of the vehicle. Refer to **CARPET, REMOVAL** .

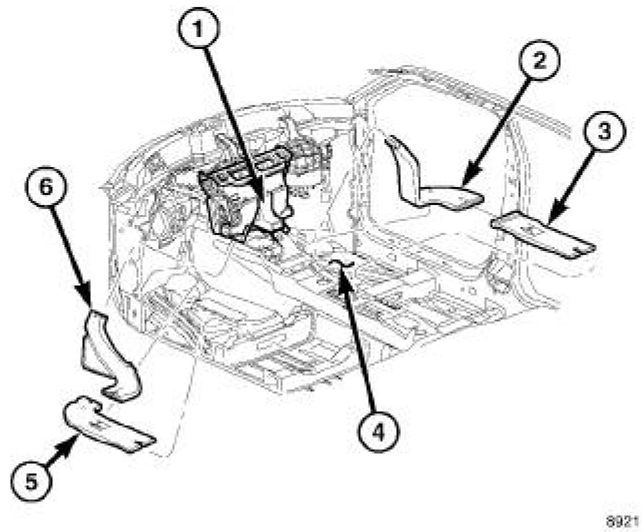


Fig. 50: Intermediate Floor Distribution Ducts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the push pin fastener that secures the passenger side front intermediate floor distribution duct (2) to the floor support (4).
6. Disconnect the passenger side front intermediate floor distribution duct (2) from the front floor distribution duct (1).
7. Disconnect the passenger side front intermediate floor distribution duct (2) from the passenger side rear intermediate floor distribution duct (3).
8. Remove the passenger side rear intermediate floor distribution duct (3) from the floor support (4).
9. Remove the push pin fastener that secures the driver side rear intermediate floor distribution duct (5) to the floor support (4).
10. Disconnect the driver side front intermediate floor distribution duct (6) from the front floor distribution duct (1).
11. Disconnect the driver side front intermediate floor distribution duct (6) from the driver side rear intermediate floor distribution duct (5).
12. Remove the driver side rear intermediate floor distribution duct (5) from the floor support (4).

INSTALLATION

INSTALLATION

FRONT FLOOR DISTRIBUTION DUCT

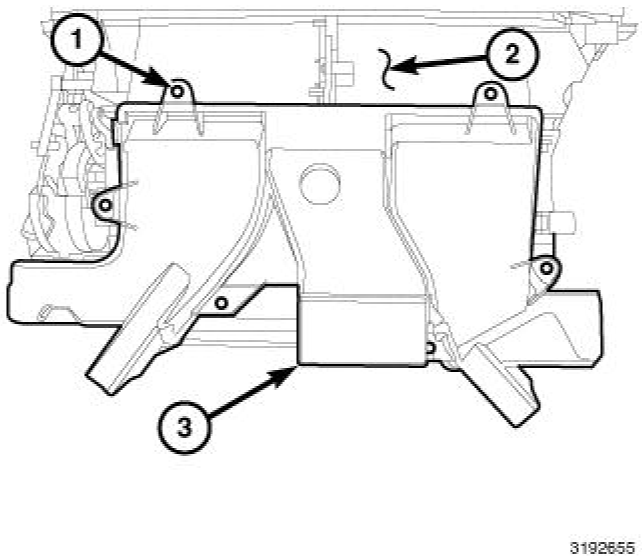


Fig. 51: Six Screws, Front Floor Distribution Duct & Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

1. Position the front floor distribution duct (3) to the bottom of the HVAC air distribution housing (2).
2. Install the six screws (1) that secure the front floor distribution duct to the air distribution housing and securely tighten.
3. Install the air distribution housing. Refer to **HOUSING, HVAC, INSTALLATION**.

INTERMEDIATE FLOOR DISTRIBUTION DUCTS

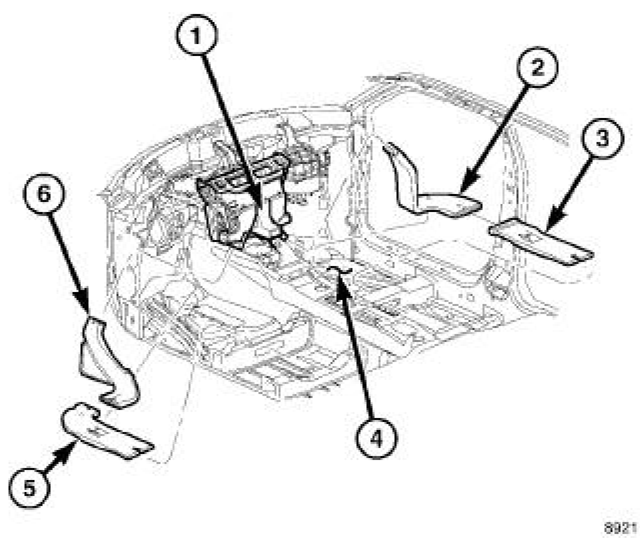


Fig. 52: Intermediate Floor Distribution Ducts
Courtesy of CHRYSLER GROUP, LLC

1. Install the driver side rear intermediate floor distribution duct (5) and the passenger side rear intermediate floor distribution duct (3) into the slots in the floor support (4).
2. Connect the driver side front intermediate floor distribution duct (6) to the driver side rear intermediate floor distribution duct (5).

3. Connect the driver side front intermediate floor distribution duct (6) to the front floor distribution duct (1).
4. Install the push-pin fastener that secures the driver side rear intermediate floor distribution duct (5) to the floor support (4).
5. Connect the passenger side front intermediate floor distribution duct (2) to the passenger side rear intermediate floor distribution duct (3).
6. Connect the passenger side front intermediate floor distribution duct (2) to the front floor distribution duct (1).
7. Install the push-pin fastener that secures the passenger side front intermediate floor distribution duct (2) to the floor support (4).
8. Install the carpet onto the front floor panel and under the instrument panel. Refer to **CARPET, INSTALLATION** .

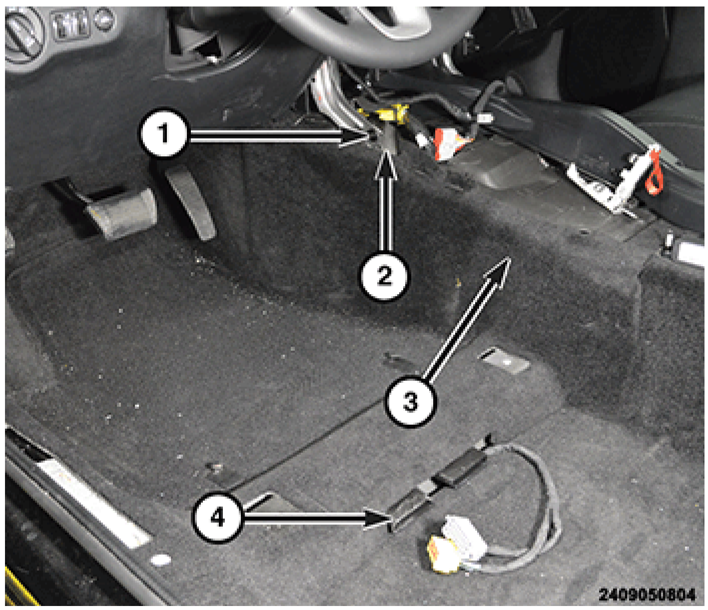


Fig. 53: Bolt, Instrument Panel Bracket & Front Floor Carpet
Courtesy of CHRYSLER GROUP, LLC

9. Position the front floor carpet (3) over the instrument panel bracket (2). Make sure the rear of the front floor carpet is fitted correctly over the floor panel crossmember and does not cover the rear floor air duct opening. Make sure the front of the front floor carpet is fitted under the instrument panel without interference with the steering column, the accelerator, nor the heater and air conditioner unit.
10. Install the instrument panel bracket bolt (1) and tighten securely.
11. Install the front seats. Refer to **SEAT, FRONT, INSTALLATION** .
12. Install the floor console. Refer to **CONSOLE, FLOOR, INSTALLATION** .

DUCT, INSTRUMENT PANEL

REMOVAL

REMOVAL

WARNING: On vehicles equipped with airbags, refer to RESTRAINTS - SERVICE

INFORMATION . Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

NOTE: **Take the proper precautions to protect the front face of the instrument panel from cosmetic damage.**

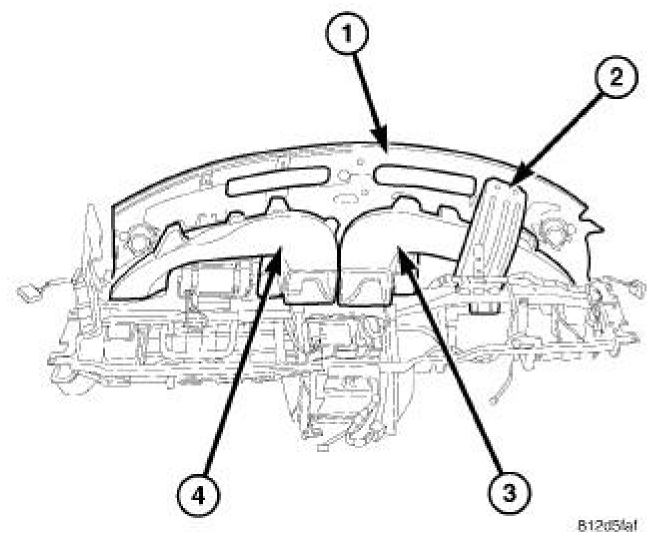


Fig. 54: Removing/Installing Instrument Panel Ducts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the instrument panel and place it on a workbench. Refer to **PANEL, INSTRUMENT, REMOVAL** .
2. Remove the screw that secures the instrument panel top pad (1) to the reinforcement bracket (2).
3. Remove the four screws that secure the driver side instrument panel duct and demister duct assembly (3) to the instrument panel and remove the duct assembly.
4. Remove the four screws that secure the passenger side instrument panel duct and demister duct assembly (4) to the instrument panel and remove the duct assembly.
5. Remove the push-pin fastener that secures the left side demister duct to the right side demister duct and remove the demisters.

INSTALLATION

INSTALLATION

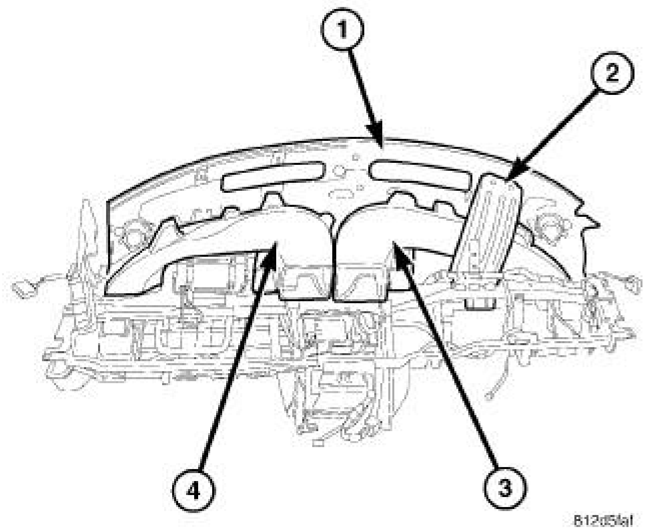


Fig. 55: Removing/Installing Instrument Panel Ducts
Courtesy of CHRYSLER GROUP, LLC

1. Position the passenger side instrument panel duct and demister duct assembly (4) into the instrument panel.
2. Install the passenger side instrument panel duct and demister duct assembly onto the outlets of the instrument panel. Make sure that the ducts are correctly installed over the instrument panel and demister outlet seals.
3. Install the four screws that secure the passenger side instrument panel duct and demister duct assembly to the instrument panel and securely tighten.
4. Position the driver side instrument panel duct and demister duct assembly (3) into the instrument panel.
5. Install the driver side instrument panel duct and demister duct assembly onto the outlets of the instrument panel. Make sure that the ducts are correctly installed over the instrument panel and demister outlet seals.
6. Install the four screws that secure the driver side instrument panel duct and demister duct assembly to the instrument panel and securely tighten.
7. Install the push-pin fastener that secures the left side demister duct to the right side demister duct.
8. Install the screw that secures the instrument panel top pad (1) to the reinforcement bracket (2) and securely tighten.
9. Install the instrument panel. Refer to **PANEL, INSTRUMENT, INSTALLATION** .

FILTER, CABIN AIR

DESCRIPTION

DESCRIPTION

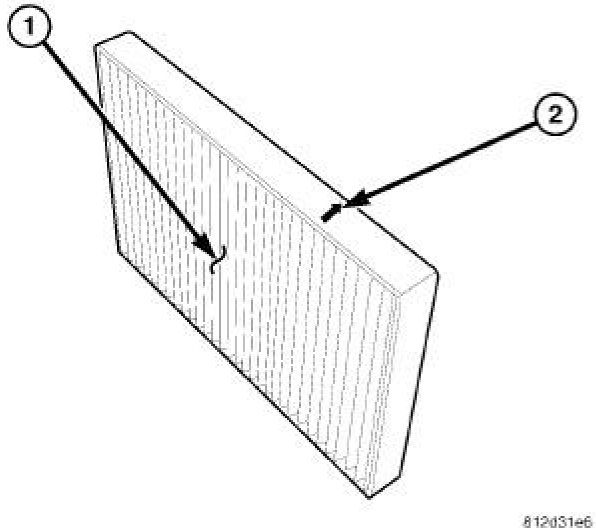


Fig. 56: Cabin Air Filter
Courtesy of CHRYSLER GROUP, LLC

All models are equipped with a cabin air filter (1) that helps purify the outside air entering the HVAC housing. The filter is mounted in the engine compartment, inside of the fresh air inlet housing of the heating-A/C system.

The filter should be replaced at least every 32, 000 km (20, 000 miles) or each year and checked if heating-A/C system performance seems lower than expected. The cabin air filter is labeled with "REAR OF VEHICLE" and an arrow (2) to indicate air flow direction through the filter.

REMOVAL

REMOVAL

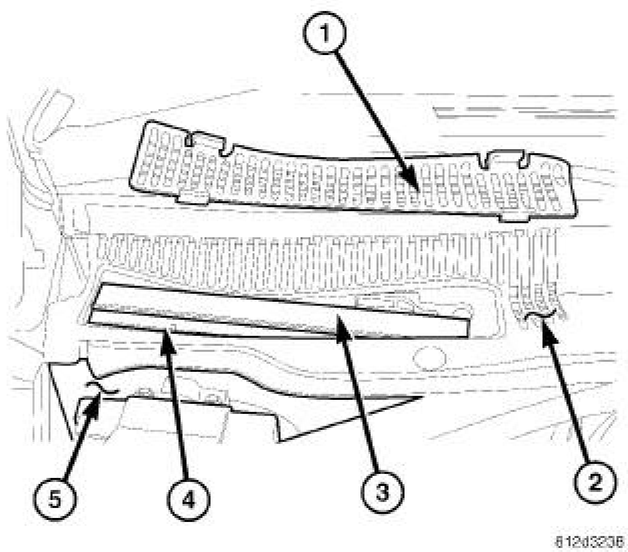


Fig. 57: Removing/Installing Particulate Air Filter
Courtesy of CHRYSLER GROUP, LLC

1. Remove the air inlet grille (1) from the wiper module screen (2) located near the dash panel in the engine

compartment.

2. Open the filter door (3) on the top of the cabin air filter housing (4) located inside of the dash panel plenum (5).

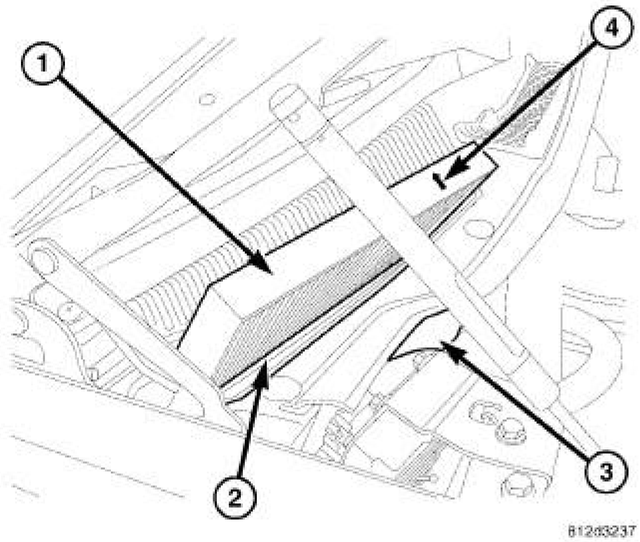


Fig. 58: Removing/Installing Particulate Air Filter
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To aid in reinstallation, note the installed position of the cabin air filter prior to removal of the filter.**

3. Remove the cabin air filter (1) from the cabin air filter housing (2) located inside of the dash panel plenum (3). Note the direction of air flow indicated by an arrow (4) on the filter.

INSTALLATION

INSTALLATION

NOTE: **The cabin air filter is labeled with "REAR OF VEHICLE" and an arrow to indicate air flow direction through the filter. Make sure to properly install the cabin air filter. Failure to properly install the filter will result in the need to replace the filter sooner than required by design.**

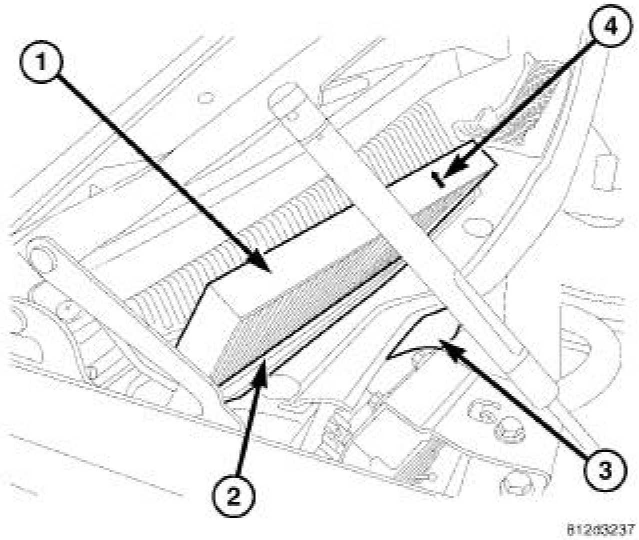


Fig. 59: Removing/Installing Particulate Air Filter
Courtesy of CHRYSLER GROUP, LLC

1. Install the cabin air filter (1) into the cabin air filter housing (2) located inside of the dash panel plenum (3). Insert the cabin air filter down directly into the filter housing with the arrow (4) on the filter pointing to the rear of the vehicle. The cabin air filter is held in place by friction between the filter element and the filter housing, so no fasteners are required.

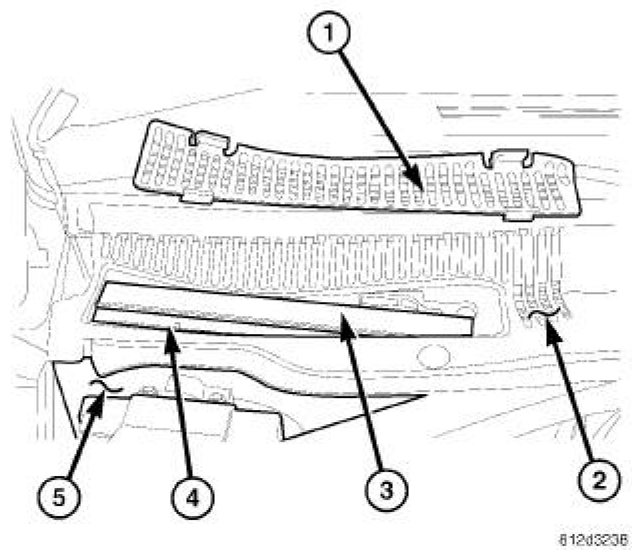


Fig. 60: Removing/Installing Particulate Air Filter
Courtesy of CHRYSLER GROUP, LLC

2. Close the filter door (3) on the top of the cabin air filter housing (4) located inside of the dash panel plenum (5).
3. Install the air inlet grille (1) onto the wiper module screen (2).

HOUSING, HVAC

REMOVAL

HOUSING - AIR DISTRIBUTION

WARNING: Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.

WARNING: Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

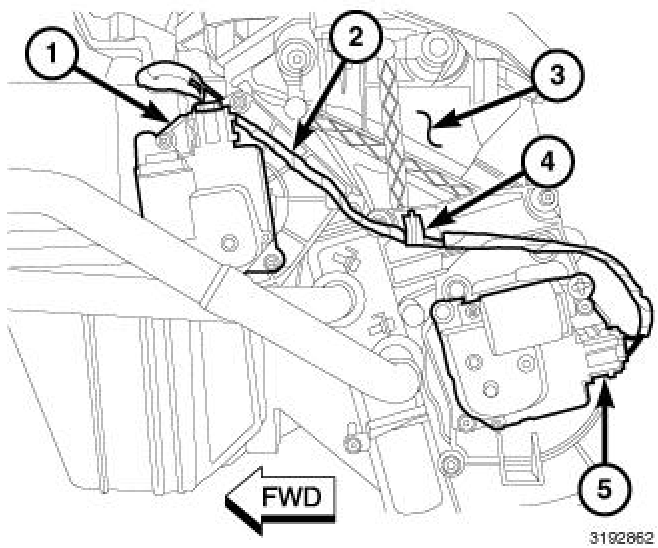
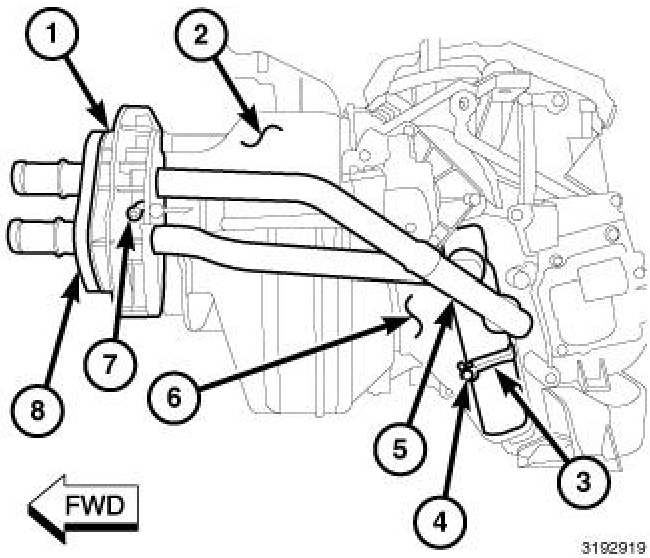


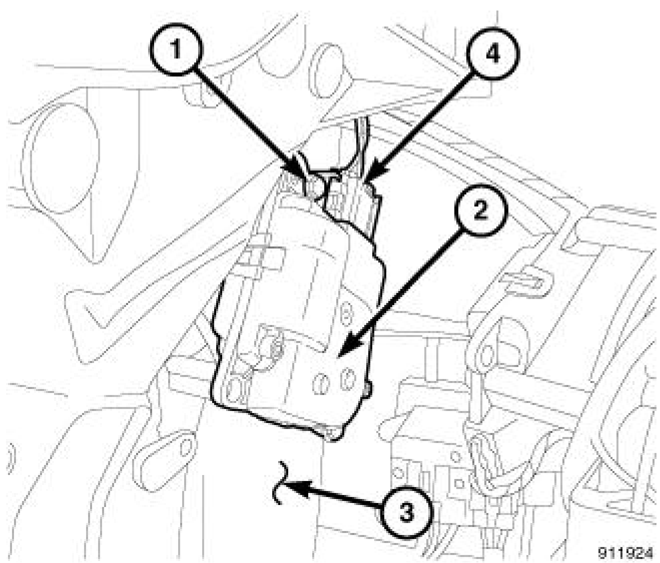
Fig. 61: HVAC Wire Harness, Mode Door Actuator, Blend Door Actuator & Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

1. Remove the HVAC housing assembly and place it on a suitable workbench. Refer to **HOUSING, HVAC, REMOVAL**.
2. Disconnect the HVAC wire harness (2) from the mode door actuator (5) and the blend door actuator (1), located on the left side of the air distribution housing (3).
3. Disengage the HVAC wire harness from the retaining tab (4).



[Fig. 62: Screw, Flange, HVAC Housing, Retaining Screw, Bracket & Housing]
Courtesy of CHRYSLER GROUP, LLC

4. Remove the screw (7) that secure the flange (1) to the front of the HVAC housing (2) and remove the flange.
5. Remove the retaining screw (4) that secures the heater core bracket (3) to the driver side of the air distribution housing (6) and remove the bracket.
6. Disengage the heater core tubes from the foam seal (8) and carefully pull the heater core (5) straight out of the side of the air distribution housing.



[Fig. 63: Blend Door Actuator, Distribution Housing, Wire Harness Connector & Screws]
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the HVAC wire harness (4) from the blend door actuator (2) located on the passenger side of the air distribution housing (3).

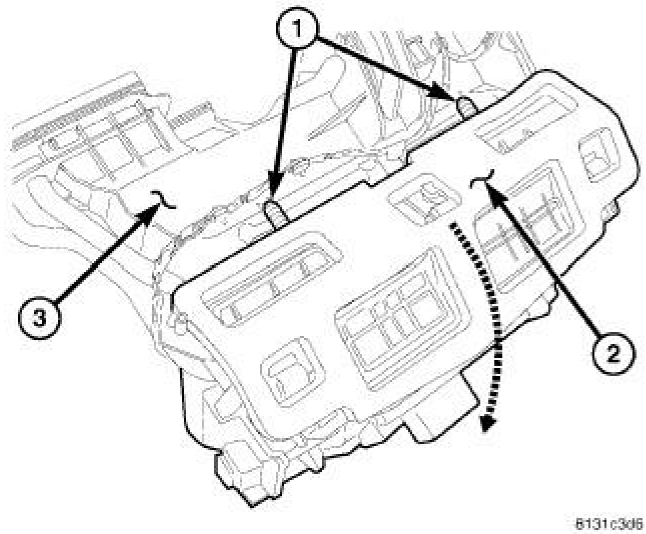


Fig. 64: HVAC Housing, Air Distribution Housing & Screws
Courtesy of CHRYSLER GROUP, LLC

8. Remove the two screws (1) and disengage the two tabs that secure the top of the air distribution housing (2) to the HVAC housing (3).
9. Tilt the top of the air distribution housing downward and disengage the two tab-and-slot type retainers, located at the bottom of the housing and remove.

HOUSING - AIR INLET

WARNING: Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.

WARNING: Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible serious or fatal inury.

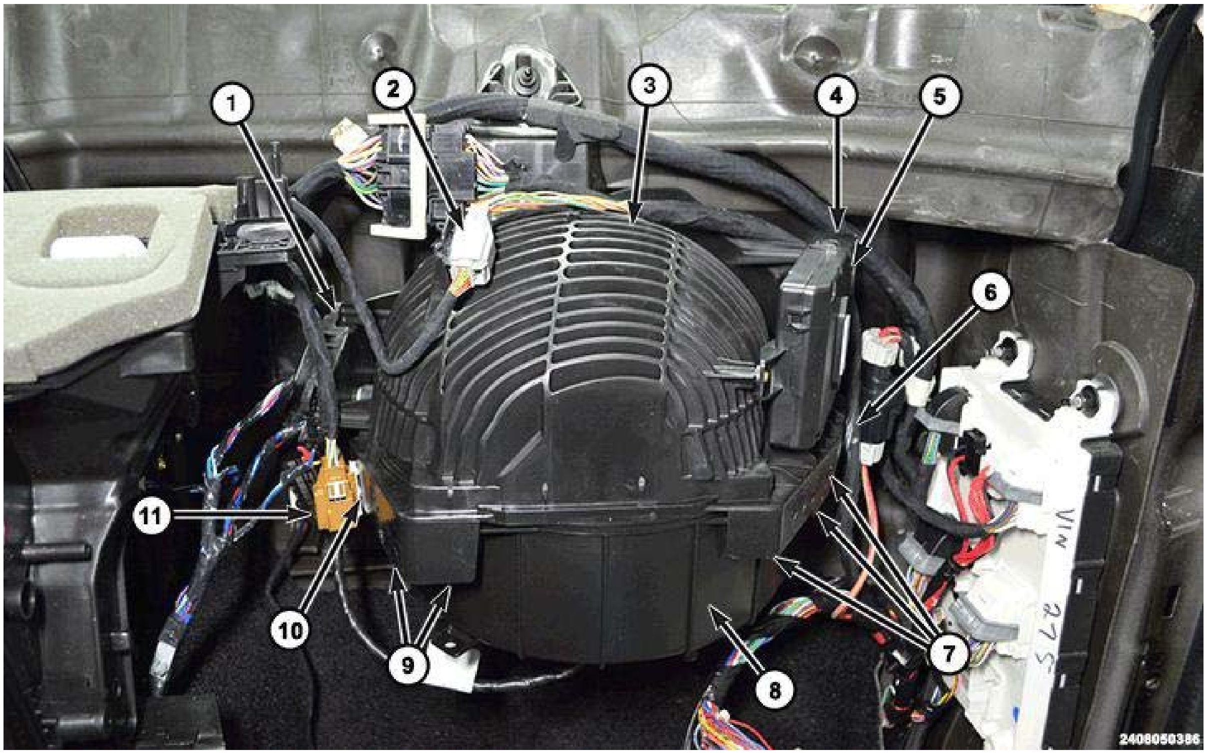


Fig. 65: Wire Harness Connector, Door Actuator, Wire Harness Connector & Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The air inlet housing must be removed from HVAC housing and disassembled for service of the recirculation-air door.**

1. Remove the HVAC housing assembly and place it on a workbench. Refer to **HOUSING, HVAC, REMOVAL**.
2. Remove the three screws and the HVAC module (4).
3. Remove the five screws (7 and 9) and separate the air inlet housing (3) from the HVAC housing (8).

HOUSING - FRESH AIR INLET

WARNING: **Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.**

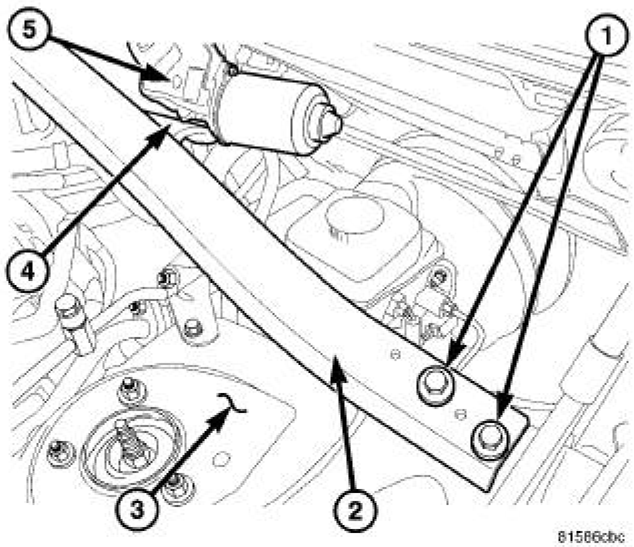


Fig. 66: Bolts, Strut Support, Driver Side Strut Tower, Bracket & Wiper Motor
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The fresh air inlet housing must be removed from the vehicle for removal of the HVAC housing.**

1. Disconnect and isolate the negative battery cable.
2. Remove the cowl top panel from the dash panel. Refer to COVER, COWL PANEL, REMOVAL .
3. Remove the two bolts (1) that secure the strut tower support (2) to the driver side strut tower (3).
4. Disengage the wiper motor (5) from the bracket (4) located on the strut tower support.

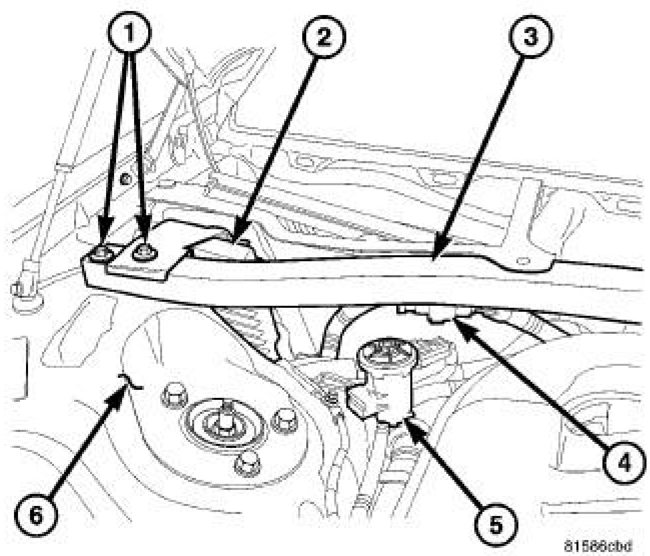


Fig. 67: Bolts, PCM, Strut Support, Wire Harness, Purge Solenoid & Passenger Side Strut Tower
Courtesy of CHRYSLER GROUP, LLC

5. Disengage the retainer that secures the wire harness (4) to the bottom of the strut tower support (3).
6. Remove the purge solenoid (5) from its mounting bracket and position the solenoid out of the way.

7. Remove the two bolts (1) that secure the strut tower support to the passenger side strut tower (6) and remove the support from the engine compartment.
8. Position the Powertrain Control Module (PCM) or the Engine Control Module (ECM) (2) (depending on engine application) out of the way.

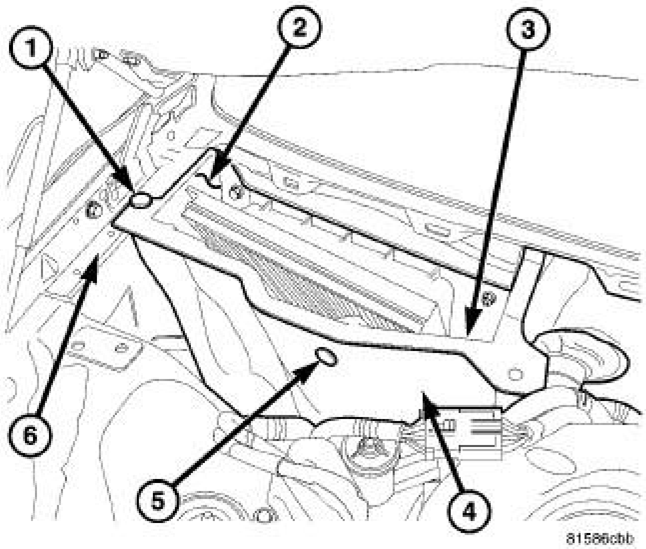


Fig. 68: Push Pins-Fresh Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

9. Remove the push-pin retainer (1) that secures the fresh air inlet housing (2) to the passenger side inner fender (6).
10. Disengage the wire harness retainer (3) from inside the bottom of the fresh air inlet housing, if equipped.
11. Remove the push-pin retainer (5) that secures the insulator (4) to the front of the fresh air inlet housing and position the insulator out of the way.

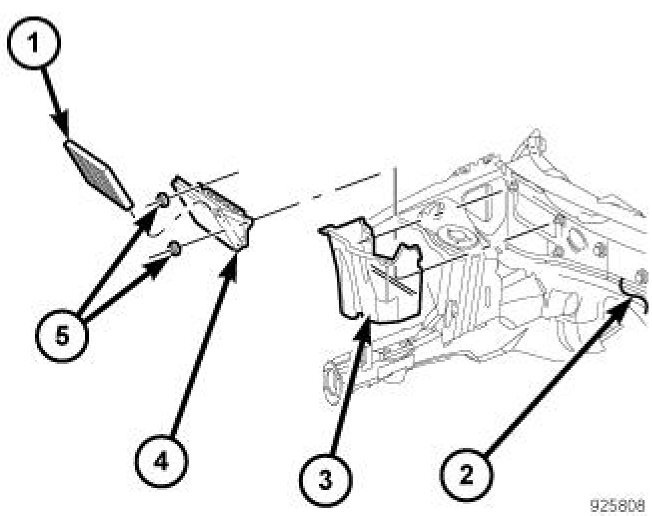


Fig. 69: Air Inlet Housing, Cabin Air Filter, Filter Housing, Dash Panel & Nuts
Courtesy of CHRYSLER GROUP, LLC

12. Remove the two nuts (5) that secure the fresh air inlet housing (3), cabin air filter (1) and filter housing (4) to the dash panel (2).
13. Remove the fresh air inlet housing, cabin air filter and filter housing as an assembly from the dash panel.

HOUSING - HVAC ASSEMBLY

WARNING: Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.

WARNING: On vehicles equipped with airbags, refer to RESTRAINTS - SERVICE INFORMATION . Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

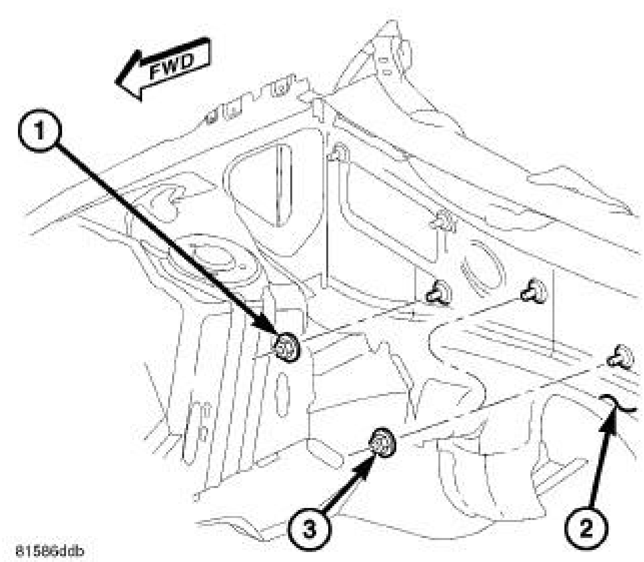


Fig. 70: Dash Panel & Nuts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The HVAC housing must be removed from the vehicle and disassembled for service of the A/C evaporator.

1. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
2. Drain the engine cooling system. Refer to **STANDARD PROCEDURE** .
3. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
4. Remove the fresh air inlet housing from the dash panel. Refer to **HOUSING, HVAC, REMOVAL**.

5. Disconnect the A/C liquid line and the A/C suction line from the A/C evaporator. Refer to **LINE, A/C LIQUID, REMOVAL**.
6. Disconnect the heater hoses from the heater core tubes.
7. Remove the three nuts (1 and 3) that secure the HVAC housing to the engine compartment side of the dash panel (2).

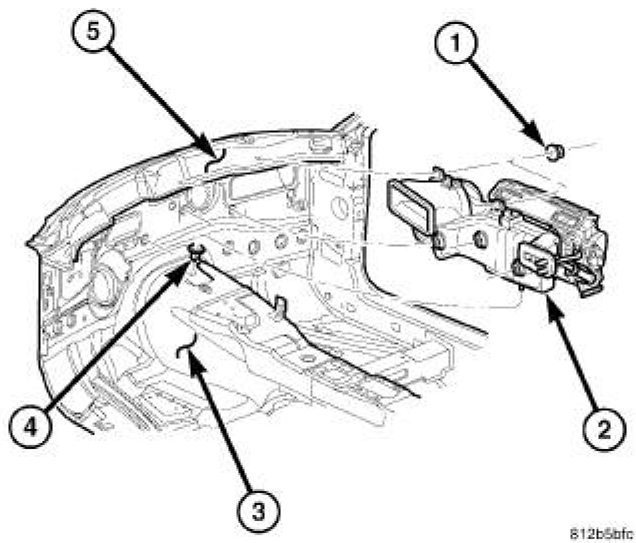


Fig. 71: HVAC Housing, Dash Panel, Nuts, Grommet & Floor Panel
Courtesy of CHRYSLER GROUP, LLC

8. Remove the instrument panel from the passenger compartment. Refer to **PANEL, INSTRUMENT, REMOVAL** .
9. Disconnect the floor console duct. Refer to **DUCT, FLOOR CONSOLE, REMOVAL**.
10. Disconnect the rear floor distribution ducts. Refer to **DUCT, FLOOR DISTRIBUTION, REMOVAL**.
11. Remove the defroster ducts. Refer to **DUCT, DEFROSTER, REMOVAL**.
12. Remove the two nuts (1) that secure the HVAC housing (2) to the passenger compartment side of the dash panel (5).
13. Pull the HVAC housing assembly rearward so that the mounting studs clear the dash panel.
14. Lift the HVAC housing assembly upwards so that the condensate drain tube clears the grommet (4) in the floor panel (3) and remove the HVAC housing assembly from the passenger compartment.

INSTALLATION

HOUSING - AIR DISTRIBUTION

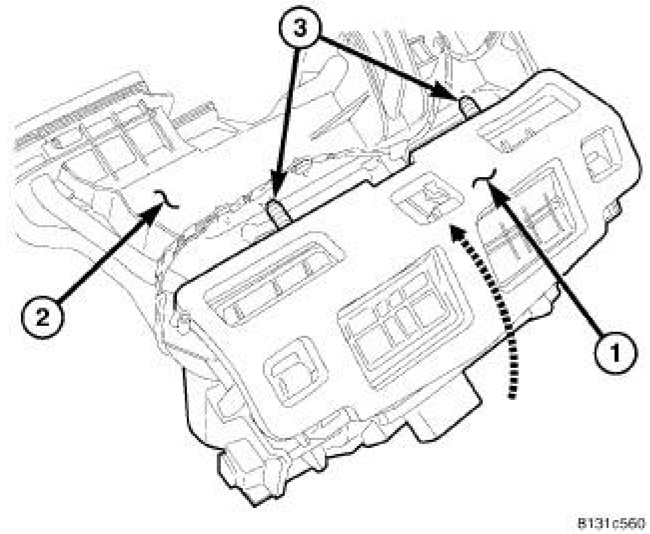


Fig. 72: Installing Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

1. Install the air distribution housing onto the rear of the HVAC housing (2) by inserting the tabs on the bottom of the distribution housing into the slots located on the bottom of the HVAC housing and tipping the distribution housing upward until it is properly aligned with the HVAC housing.
2. Install the two screws (3) that secure the air distribution housing to the HVAC housing and tighten securely.

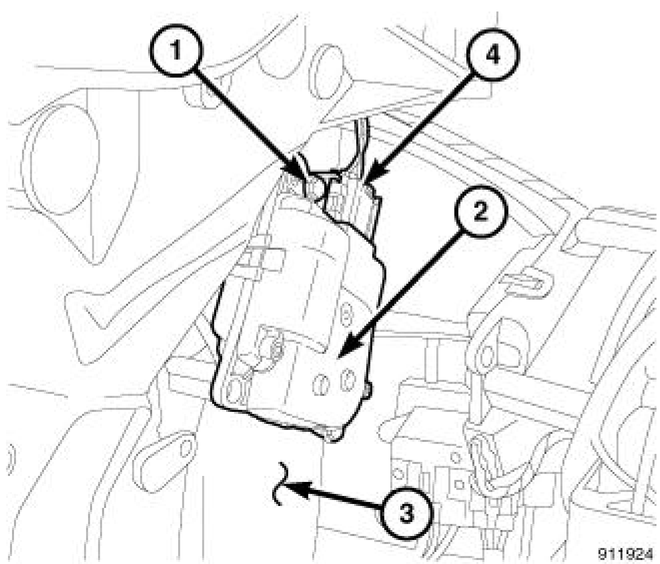


Fig. 73: Blend Door Actuator, Distribution Housing, Wire Harness Connector & Screws
Courtesy of CHRYSLER GROUP, LLC

3. Connect the HVAC wire harness (4) to the blend door actuator (2) located on the passenger side of the air distribution housing (3).

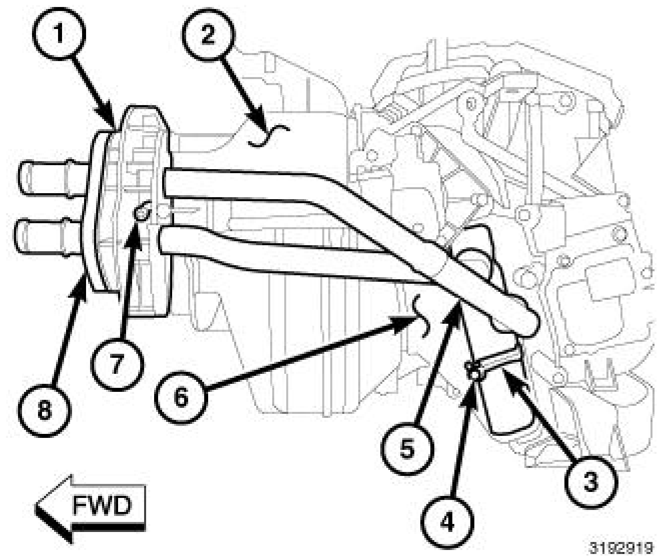


Fig. 74: Screw, Flange, HVAC Housing, Retaining Screw, Bracket & Housing
Courtesy of CHRYSLER GROUP, LLC

4. Install the heater core (5) into the driver side of the air distribution housing (6) and engage the heater core tubes to the foam seal (8).
5. Install heater core bracket (3) and retaining screw (4) and tighten securely.
6. Install the flange (1) over the heater core tubes and onto the HVAC housing (2).
7. Install the screw (7) that secure the flange to the front of the HVAC housing and tighten securely.

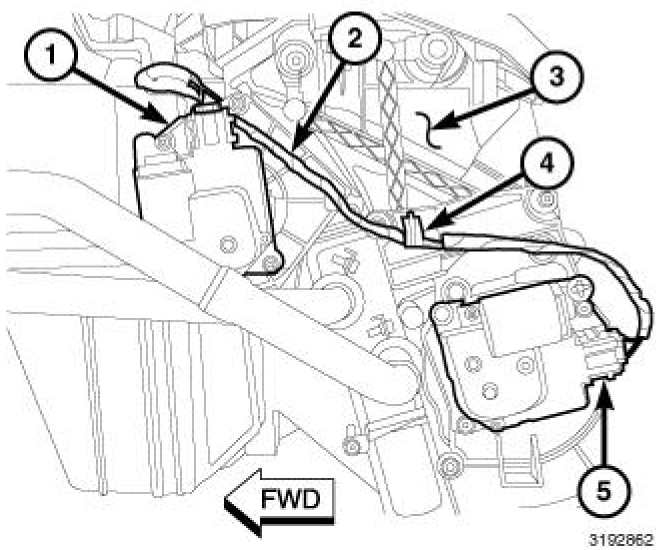


Fig. 75: HVAC Wire Harness, Mode Door Actuator, Blend Door Actuator & Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

8. Connect the HVAC wire harness (2) to the mode door actuator (5) and the blend door actuator (1), located on the driver side of the air distribution housing (3).
9. Engage the HVAC wire harness to the retaining tab (4).
10. Install the HVAC housing assembly. Refer to **HOUSING, HVAC, INSTALLATION**.

HOUSING - AIR INLET

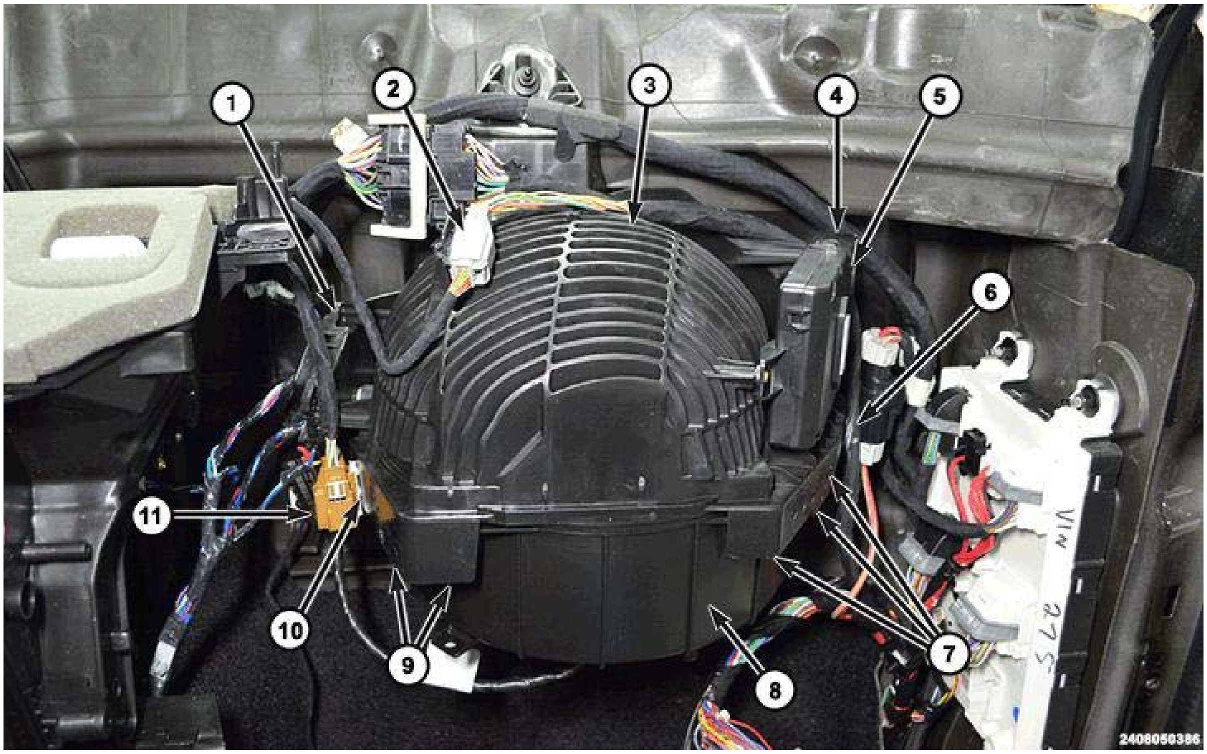


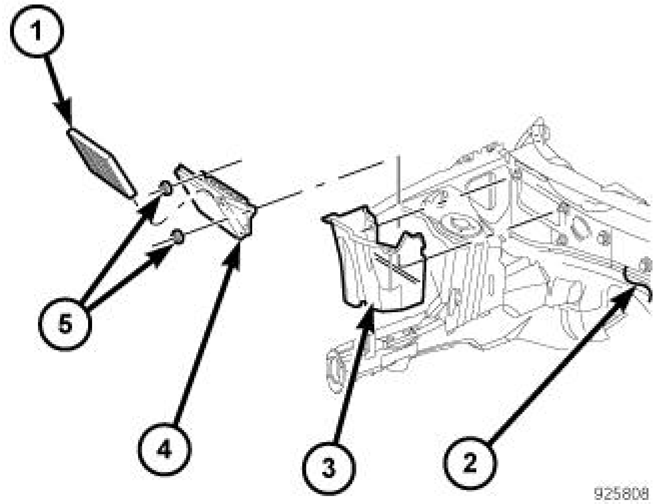
Fig. 76: Wire Harness Connector, Door Actuator, Wire Harness Connector & Air Inlet Housing
Courtesy of CHRYSLER GROUP, LLC

1. Position the air inlet housing (3) onto the HVAC housing (8).

CAUTION: Make sure that the recirculation-air door pivot shaft is properly seated in the pivot seats located on the top of the HVAC housing.

2. Install the five screws (7 and 9) that secure the air inlet housing to the HVAC housing and tighten securely.
3. Position the HVAC module and install the screws. Tighten the screws securely.
4. Install the HVAC housing assembly. Refer to **HOUSING, HVAC, INSTALLATION**.

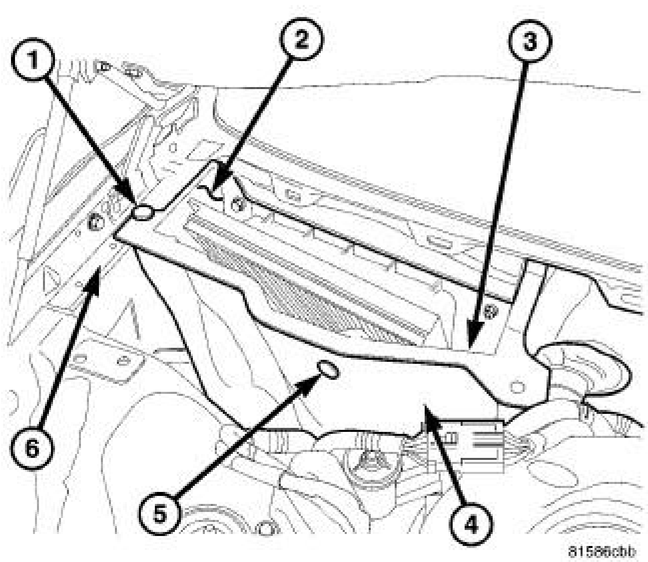
HOUSING - FRESH AIR INLET



[Fig. 77: Air Inlet Housing, Cabin Air Filter, Filter Housing, Dash Panel & Nuts]
Courtesy of CHRYSLER GROUP, LLC

NOTE: The fresh air inlet housing must be removed from the vehicle for removal of the HVAC housing.

1. Position the fresh air inlet housing (3), cabin air filter (1) and filter housing (4) as an assembly onto the engine compartment side of the dash panel (2).
2. Install the two nuts (5) that secure the fresh air inlet housing and filter housing to the dash panel and tighten securely.



[Fig. 78: Push Pins-Fresh Air Inlet Housing]
Courtesy of CHRYSLER GROUP, LLC

3. Position the insulator (4) into its installed location and install the push-pin retainer (5) that secures the insulator to the front of the fresh air inlet housing (2).
4. Install the push-pin retainer (1) that secures the fresh air inlet housing to the right inner fender (6).

5. Reach under the fresh air inlet housing and install the wire harness retainer (3) into the bottom of the air inlet housing, if equipped.

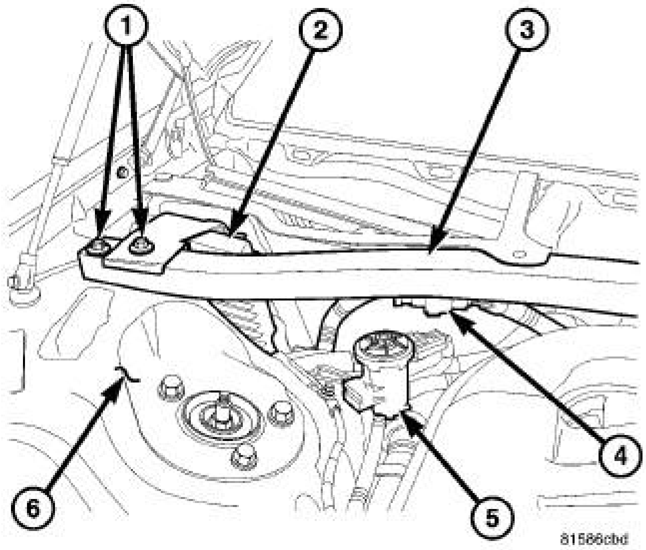


Fig. 79: Bolts, PCM, Strut Support, Wire Harness, Purge Solenoid & Passenger Side Strut Tower
Courtesy of CHRYSLER GROUP, LLC

6. Position the Powertrain Control Module (PCM) or the Engine Control Module (ECM) (2) (depending on engine application) into its installed location.
7. Position the strut tower support (3) into the engine compartment and loosely install the two bolts (1) that secure the strut tower support and the ECM/PCM to the passenger side strut tower (6).
8. Install the purge solenoid (5) onto its mounting bracket located on the right strut tower.
9. Engage the retainer that secures the wire harness (4) to the bottom of the strut tower support.

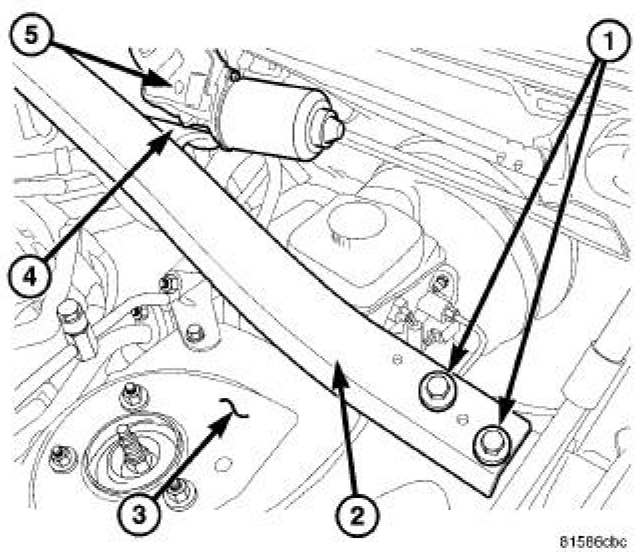


Fig. 80: Bolts, Strut Support, Driver Side Strut Tower, Bracket & Wiper Motor
Courtesy of CHRYSLER GROUP, LLC

10. Engage the wiper motor (5) to the bracket (4) located on the strut tower support (2).
11. Position the strut tower support to the driver side and loosely install the two bolts (1) that secure the support to the strut tower.
12. Tighten the strut tower support bolts to the appropriate torque specifications. Refer to **TORQUE SPECIFICATIONS** for 6.4L, **TORQUE SPECIFICATIONS** for 6.2L, **TORQUE SPECIFICATIONS** for 5.7L and **TORQUE SPECIFICATIONS** for 3.6L. .
13. Install the cowl top panel onto the dash panel. Refer to **COVER, COWL PANEL, INSTALLATION** .
14. Connect the negative battery cable.

HOUSING - HVAC ASSEMBLY

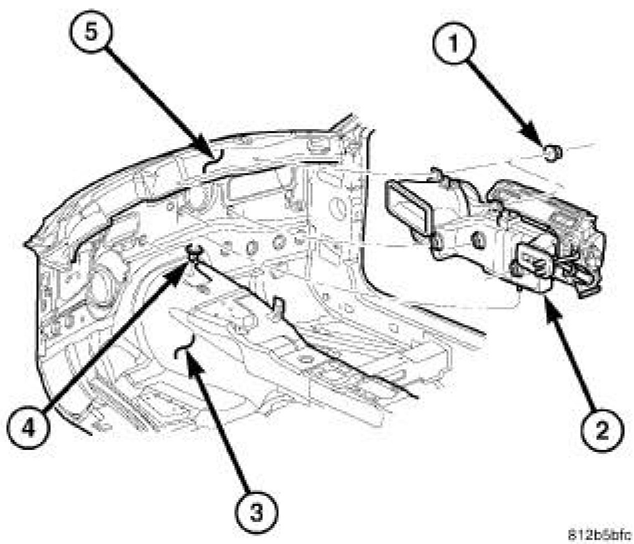


Fig. 81: HVAC Housing, Dash Panel, Nuts, Grommet & Floor Panel
Courtesy of CHRYSLER GROUP, LLC

NOTE: The HVAC housing must be removed from the vehicle and disassembled for service of the A/C evaporator.

1. Position the HVAC housing (2) into the passenger compartment with the mounting studs in their proper locations in the dash panel (5) and the condensate drain tube into the grommet (4) on the floor panel (3).
2. Install the two nuts (1) that secure the HVAC housing to the passenger compartment side of the dash panel and tighten securely.
3. Install the defroster ducts. Refer to **DUCT, DEFROSTER, INSTALLATION**.
4. Connect the floor distribution ducts. Refer to **DUCT, FLOOR DISTRIBUTION, INSTALLATION**.
5. Connect the floor console duct. Refer to **DUCT, FLOOR CONSOLE, INSTALLATION**.
6. Install the instrument panel. Refer to **PANEL, INSTRUMENT, INSTALLATION** .

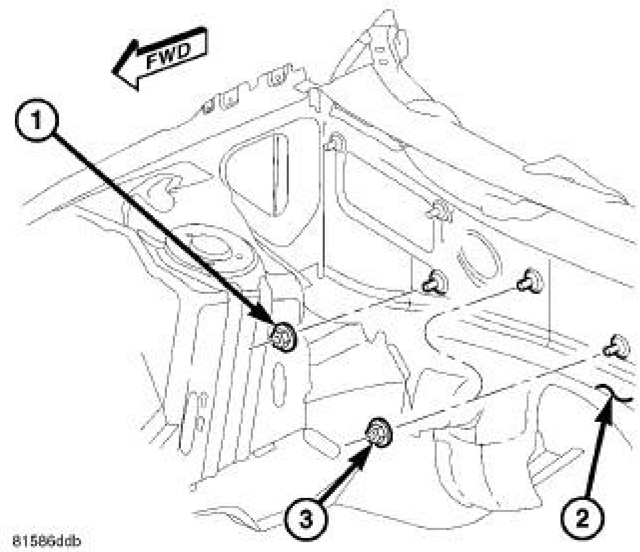


Fig. 82: Dash Panel & Nuts
Courtesy of CHRYSLER GROUP, LLC

7. Install the three nuts (1 and 3) that secure the HVAC housing to the engine compartment side of the dash panel (2) and tighten securely.
8. Connect the heater hoses to the heater core tubes.
9. Connect the A/C suction line and A/C liquid line to the A/C evaporator. Refer to **LINE, A/C LIQUID, INSTALLATION**.
10. Install the fresh air inlet housing to the engine compartment side of the dash panel. Refer to **HOUSING, HVAC, INSTALLATION**.
11. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
12. If the heater core is being replaced, flush the cooling system. Refer to **STANDARD PROCEDURE** .
13. Refill the engine cooling system. Refer to **STANDARD PROCEDURE** .
14. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
15. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
16. Initiate the Actuator Calibration function using a scan tool. Refer to **STANDARD PROCEDURE** .

MOTOR, BLOWER

DESCRIPTION

DESCRIPTION

Fig. 83: Blower Motor
Courtesy of CHRYSLER GROUP, LLC

The blower motor is mounted to the bottom of the HVAC housing, on the passenger side of the vehicle. The blower motor assembly is a squirrel type blower cage (2) connected to a 12 volt Direct Current (DC) motor, located within a plastic housing (5). The blower motor has an integral wire harness bracket (1), three mounting provisions (3) and a wire connector receptacle (4).

The blower motor can be accessed for service from underneath the instrument panel.

OPERATION

OPERATION

The blower motor controls the velocity of air moving through the HVAC housing by spinning the blower wheel within the HVAC air inlet housing at the selected speed.

Both the Manual Temperature Control (MTC) and the Automatic Temperature Control (ATC) heating and A/C system use an electronic blower motor power module to control blower motor speed. The power module uses a Pulse Width Modulated (PWM) input from the Heater, Ventilation and Air Conditioning (HVAC) module and a feedback signal from the blower motor to regulate the blower motor ground path. On both systems, the blower motor receives battery current through a relay in the Power Distribution Center (PDC) whenever the ignition is in the Run position.

The blower motor control system is diagnosed using a scan tool. Refer to DIAGNOSIS AND TESTING .

The blower motor and wheel are factory balanced as an assembly and cannot be adjusted or repaired and must be replaced if inoperative or damaged.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - BLOWER MOTOR

WARNING: Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, or instrument panel

component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: **See the appropriate Wiring Information for circuit descriptions and diagrams.**

OPERATION

Possible causes of an inoperative blower motor include:

- Open fuse
- Inoperative A/C heater module
- Inoperative blower motor
- Inoperative blower motor power module
- Inoperative blower motor relay
- Inoperative blower motor switch
- Inoperative blower motor wiring or wire harness connectors

NOISE

To determine if the blower motor is the source of the noise, simply switch the blower motor on and off. To verify that the blower motor is the source of the noise, unplug the blower motor wire harness connector and operate the heating and A/C system. If the noise goes away, possible causes include:

- Deformed or damaged blower wheel
- Foreign material in blower wheel
- Foreign material in the HVAC housing
- Foreign material on fresh air inlet screen
- Improper blower motor mounting
- Worn blower motor bearings or brushes

VIBRATION

Possible causes of blower motor vibration include:

- Deformed or damaged blower wheel
- Foreign material in blower wheel
- Improper blower motor mounting
- Worn blower motor bearings

REMOVAL

REMOVAL

WARNING: **Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION**

before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible serious or fatal injury.

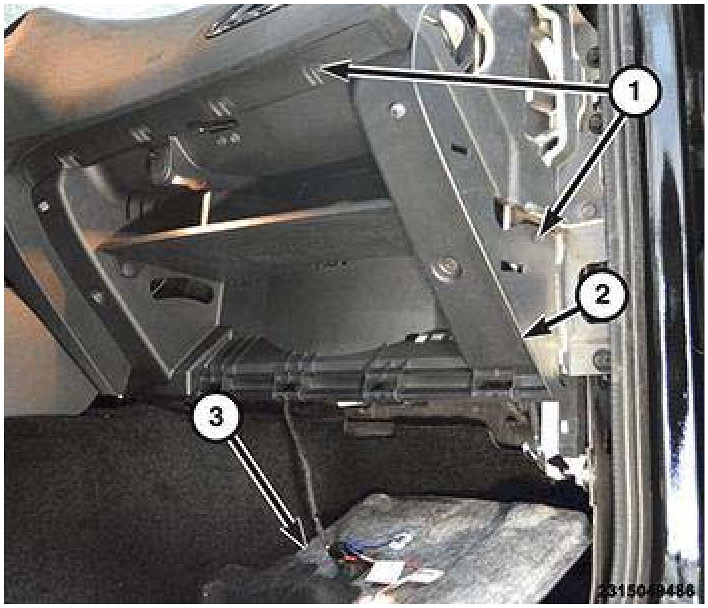


Fig. 84: Removing/Installing Instrument Panel Closeout
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove the push fasteners, disconnect the wire harness connector and remove the instrument panel closeout (3).

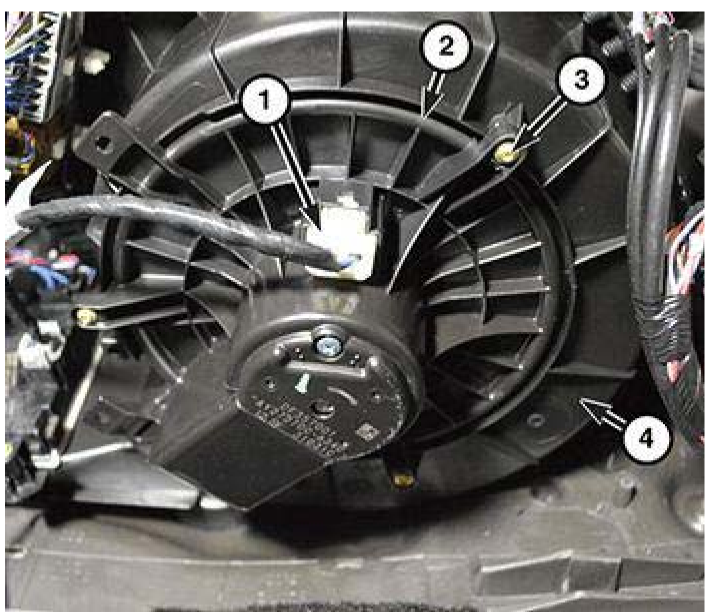


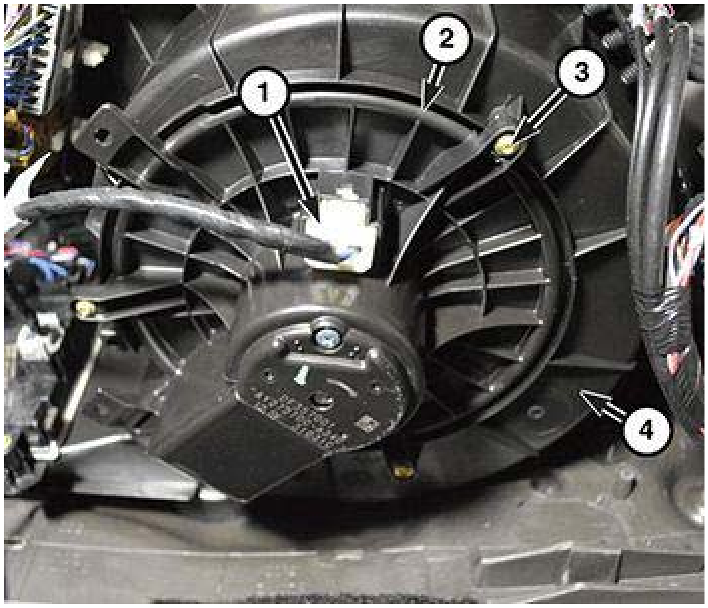
Fig. 85: Wire Harness Connector, Blower Motor, Screws & HVAC Housing

Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the wire harness connector (1) from the blower motor (2).
4. Remove the three screws (3) that secure the blower motor to the HVAC housing (4) and remove the blower motor.

INSTALLATION

INSTALLATION



[Fig. 86: Wire Harness Connector, Blower Motor, Screws & HVAC Housing]
Courtesy of CHRYSLER GROUP, LLC

1. Position the blower motor (2) into the HVAC housing (4).
2. Install the three screws (3) that secure the blower motor to the HVAC housing and securely tighten the screws.
3. Connect the wire harness connector (1) to the blower motor (2).

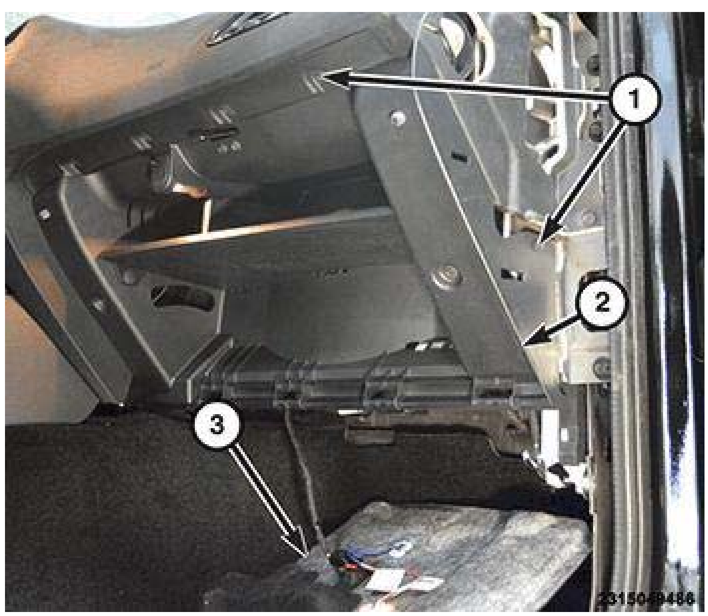


Fig. 87: Removing/Installing Instrument Panel Closeout
Courtesy of CHRYSLER GROUP, LLC

4. Install the push fasteners, connect the wire harness connector and install the instrument panel closeout (3).
5. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

OUTLET, AIR

REMOVAL

AIR-OUTLETS

CENTER OUTLETS

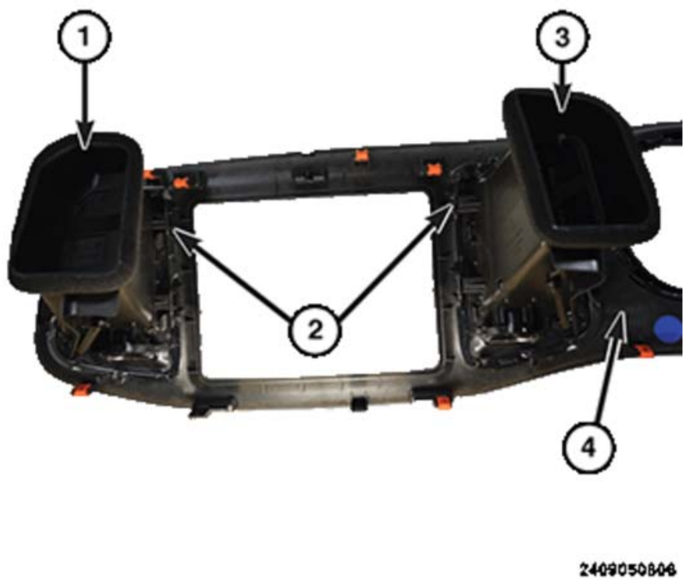


Fig. 88: Center Air Outlets, Instrument Cluster Bezel & Tabs
Courtesy of CHRYSLER GROUP, LLC

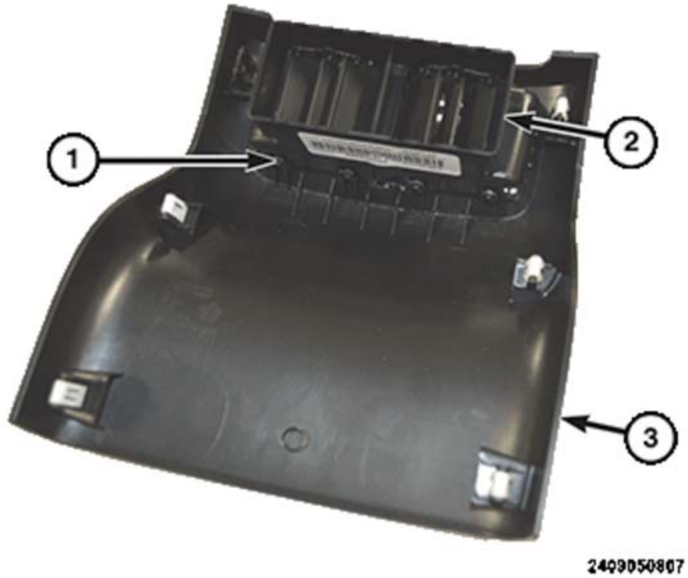
NOTE: **Take the proper precautions to protect the face of center bezel from cosmetic damage while performing this procedure.**

NOTE: **If the foam seal on the center air outlet is deformed or damaged, the seal must be replaced.**

1. When servicing the center air outlet, remove the instrument cluster bezel. Refer to **BEZEL, INSTRUMENT CLUSTER, REMOVAL** .
2. Release the tabs (2) that secure the center air outlet (1 and 3) to the instrument cluster bezel (4), then remove.

FLOOR CONSOLE OUTLETS

NOTE: **Take the proper precautions to protect the face of the floor console end cap from cosmetic damage while performing this procedure.**



[Fig. 89: Air Outlet, End Cap & Retaining Tabs](#)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the end cap (3) from the back of the floor console and place it on a workbench. Refer to **CONSOLE, FLOOR, REMOVAL** .
3. Using Trim Stick (special tool #C-4755, Trim Stick) or equivalent, disengage the retaining tabs (1) that secure the air outlet (2) to the end cap (3) and remove.

LEFT OUTBOARD OUTLET

NOTE:	**Take the proper precautions to protect the face of center bezel from cosmetic damage while performing this procedure.**
NOTE:	**If the foam seal on the left air outlet (2) is deformed or damaged, the seal must be replaced.**

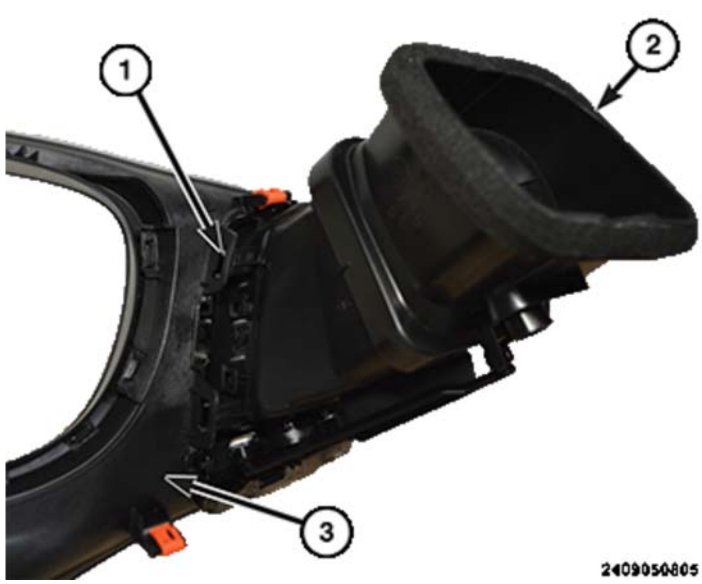


Fig. 90: Air Outlet, Retaining Tabs & Instrument Panel Bezel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. When servicing the driver side air outlet, remove the instrument cluster bezel. Refer to **BEZEL, INSTRUMENT CLUSTER, REMOVAL** .
3. Release the tabs (1) that secure the air outlet to the instrument cluster bezel (3), then remove.

RIGHT OUTBOARD OUTLET

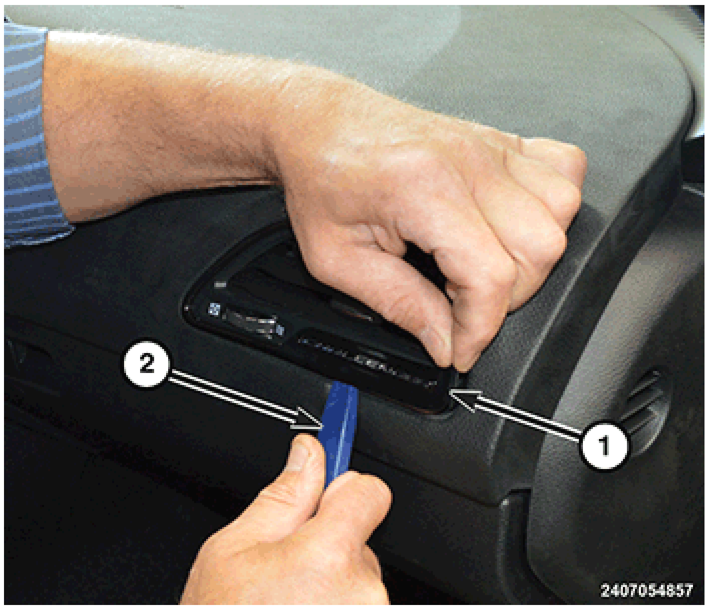
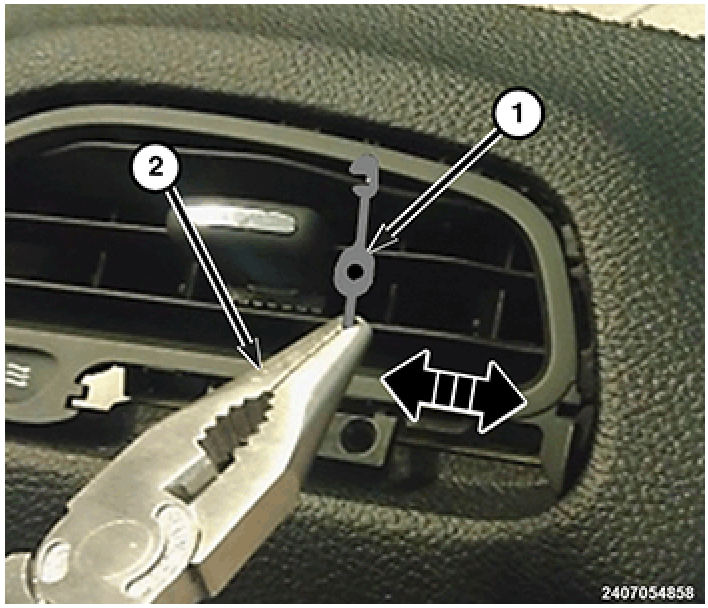


Fig. 91: Trim Stick & Trim Ring
Courtesy of CHRYSLER GROUP, LLC

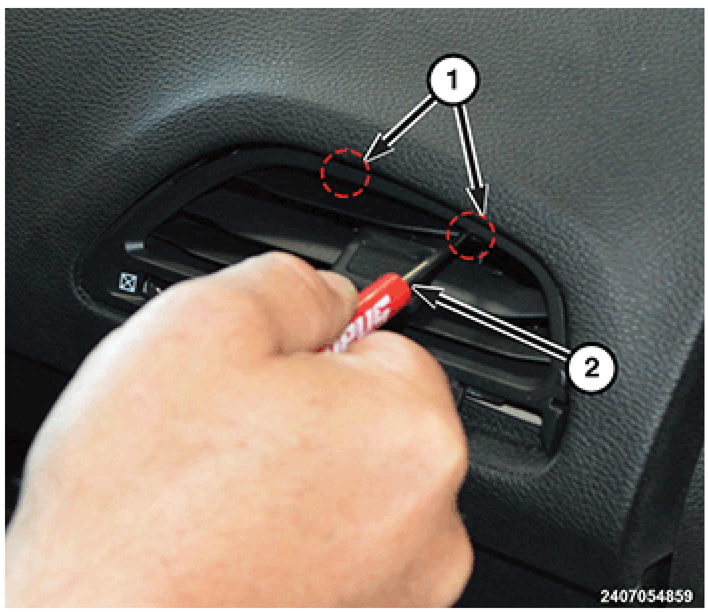
NOTE:	**Take the proper precautions to protect the instrument panel cover from damage while performing this procedure.**
NOTE:	**If the foam seal on the outlet is deformed or damaged, the seal must be replaced.**

1. Using a trim stick (2) release the trim ring (1) working around the perimeter. Once started, the trim ring can be grasped and pulled off.



[Fig. 92: Metal Link & Pliers](#)
Courtesy of CHRYSLER GROUP, LLC

2. Grasp the metal link (1) with pliers (2) and slide to the right to remove. Slight wiggle may be necessary.



[Fig. 93: Upper Tabs & Tool](#)
Courtesy of CHRYSLER GROUP, LLC

3. Locate the two tabs (1) and pry downward with a small flat bladed tool (2) to release. Ensure the tabs hold in the downward position.

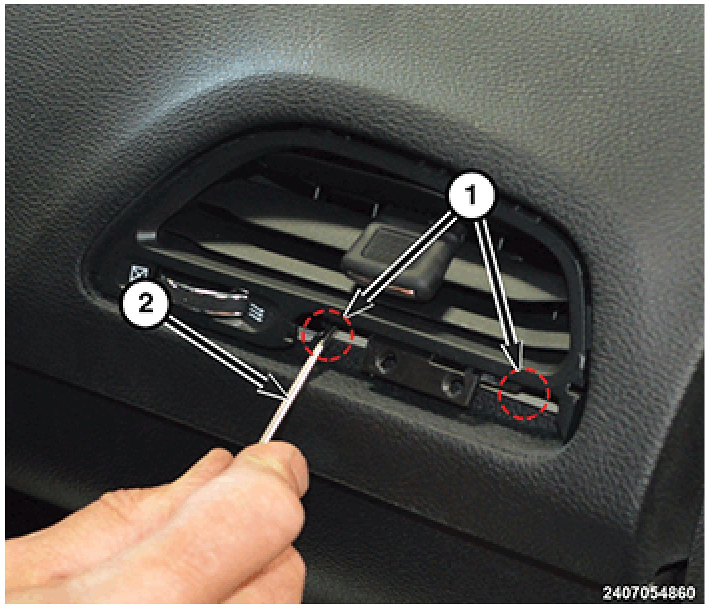


Fig. 94: Lower Tabs & Tool
Courtesy of CHRYSLER GROUP, LLC

4. Locate the two tabs (1) at the bottom and pry upward with a small flat bladed tool (2) to release. After releasing, the tab should rest on the retainer to prevent engagement.

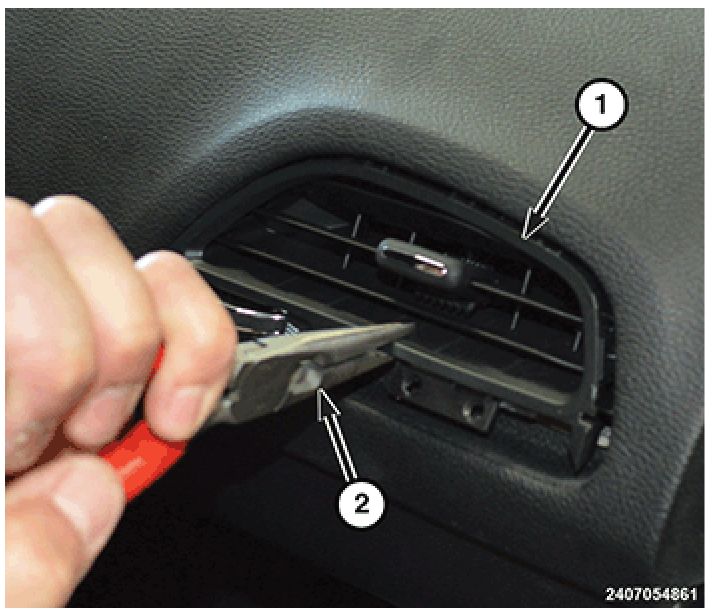


Fig. 95: Outlet & Pliers
Courtesy of CHRYSLER GROUP, LLC

5. Grasp the front edge of the outlet (1) with pliers (2) and remove.

INSTALLATION

AIR-OUTLETS

CENTER OUTLETS

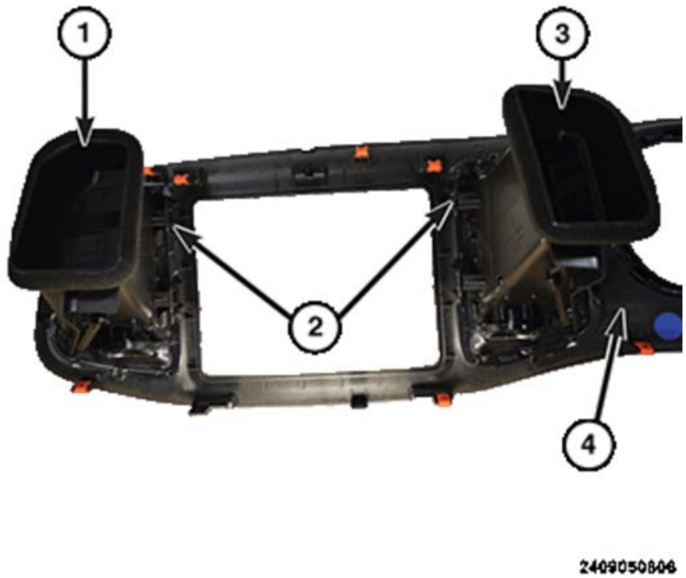


Fig. 96: Center Air Outlets, Instrument Cluster Bezel & Tabs
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Take the proper precautions to protect the face of center bezel from cosmetic damage while performing this procedure.**

NOTE: **If the foam seal on the center air outlet is deformed or damaged, the seal must be replaced.**

1. Position each air outlet (1 and 3) into the instrument cluster bezel (4).
2. Engage the retaining tabs (2) that secure each air outlet to the bezel. Make sure the retaining tabs are fully engaged.

   NOTE: **Make sure that the center air outlets are properly aligned to the ducts within the instrument panel and that the foam seals on the outlets are properly installed.**

3. Install the instrument cluster bezel. Refer to BEZEL, INSTRUMENT CLUSTER, INSTALLATION .

FLOOR CONSOLE OUTLETS

NOTE: **Take the proper precautions to protect the face of the floor console end cap from cosmetic damage while performing this procedure.**

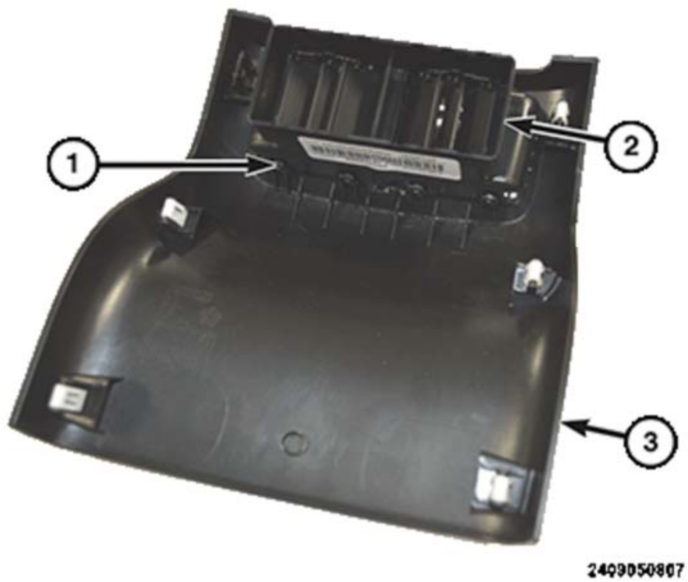


Fig. 97: Air Outlet, End Cap & Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Position the air outlet (2) onto the floor console end cap (3).
2. Engage the retaining tabs (1) that secure the air outlet to the end cap. Make sure the retaining tabs are fully engaged.

NOTE: **Make sure that the air outlet is properly aligned to the duct within the floor console.**

3. Install the floor console end cap (3) onto the back of the floor console. Refer to CONSOLE, FLOOR, INSTALLATION .
4. Connect the negative battery cable.

LEFT OUTBOARD OUTLET

NOTE: **Driver side outer outboard outlet shown in the illustration.**

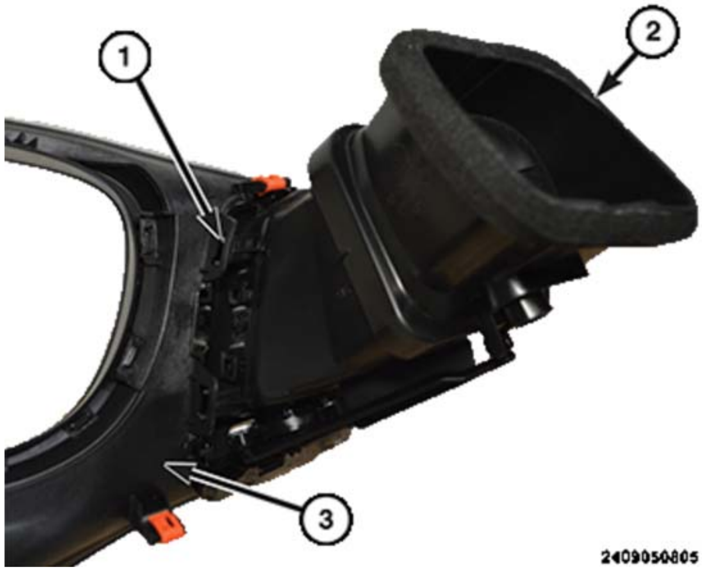


Fig. 98: Air Outlet, Retaining Tabs & Instrument Panel Bezel
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Make sure that the air outlet is properly aligned to the instrument panel bezel and that the foam seal on the outlet is properly installed.**

1. Position the air outlet (2) into the instrument panel bezel.
2. Engage the retaining tabs (1) that secure the air outlet to the instrument panel bezel (3). Make sure the retaining tabs are fully engaged.
3. Connect the negative battery cable.

RIGHT OUTBOARD OUTLET

Fig. 99: Air Outlet
Courtesy of CHRYSLER GROUP, LLC

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1. Locate the **NEW** outlet into the instrument panel and carefully guide it into the duct. Firmly push the outlet until an audible clip noise is heard and the outlet is seated flush into the instrument panel.

PLUMBING

WARNING

WARNING

WARNING: **The A/C system contains refrigerant under high pressure. Repairs should only be performed by qualified service personnel. Serious or fatal injury may result from improper service procedures.**

WARNING: **Avoid breathing the refrigerant and refrigerant oil vapor or mist. Exposure may irritate the eyes, nose, and/or throat. Wear eye protection when servicing the A/C refrigerant system. Serious eye injury can result from direct contact with the refrigerant. If eye contact occurs, seek medical attention immediately.**

WARNING: **Do not expose the refrigerant to open flame. Poisonous gas is created when refrigerant is burned. An electronic leak detector is recommended. Serious or fatal injury may result from improper service procedures.**

WARNING: **If accidental A/C system discharge occurs, ventilate the work area before resuming service. Large amounts of refrigerant released in a closed work area will displace the oxygen and cause suffocation and serious or fatal injury.**

WARNING: **The evaporation rate of R-134a refrigerant at average temperature and altitude is extremely high. As a result, anything that comes in contact with the refrigerant will freeze. Always protect the skin or delicate objects from direct contact with the refrigerant.**

WARNING: **The R-134a service equipment or the vehicle refrigerant system should not be pressure tested or leak tested with compressed air. Some mixtures of air and R-134a have been shown to be combustible at elevated pressures. These mixtures are potentially dangerous, and may result in fire or explosion causing property damage and serious or fatal injury.**

WARNING: **The engine cooling system is designed to develop internal pressures up to 145 kPa (21 psi). Do not remove or loosen the coolant pressure cap, cylinder block drain plugs, radiator drain, radiator hoses, heater hoses, or hose clamps while the engine cooling system is hot and under pressure. Allow the vehicle to cool for a minimum of 15 minutes before opening the cooling system for service. Failure to observe this warning can result in serious burns from the heated engine coolant.**

CAUTION

CAUTION

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CAUTION: Never add R-12 to a refrigerant system designed to use R-134a. Do not use R-12 equipment or parts on an R-134a A/C system. These refrigerants are not compatible and damage to the A/C system will result.

CAUTION: Never use R-12 refrigerant oil in an A/C system designed to use R-134a refrigerant oil. These refrigerant oils are not compatible and damage to the A/C system will result.

CAUTION: The use of A/C system sealers may result in damage to A/C refrigerant recovery/evacuation/recharging equipment and/or A/C system. Many federal, state/provincial and local regulations prohibit the recharge of A/C systems with known leaks. Chrysler LLC recommends the detection of A/C system leaks through the use of approved leak detectors and fluorescent leak detection dyes. Vehicles found with A/C system sealers should be treated as contaminated and replacement of the entire A/C refrigerant system is recommended. A/C systems found to be contaminated with A/C system sealers, A/C stop-leak products or seal conditioners voids the warranty for the A/C system.

CAUTION: Recover the refrigerant before opening any fitting or connection. Open the fittings with caution, even after the system has been discharged. Never open or loosen a connection before recovering the refrigerant.

CAUTION: If equipped, do not remove the secondary retention clip from any spring-lock coupler connection while the refrigerant system is under pressure. Recover the refrigerant before removing the secondary retention clip. Open the fittings with caution, even after the system has been discharged. Never open or loosen a connection before recovering the refrigerant.

CAUTION: The internal parts of the A/C system will remain stable as long as moisture-free refrigerant and refrigerant oil is used. Abnormal amounts of dirt, moisture or air can upset the chemical stability. This may cause operational troubles or even serious damage if present in more than very small quantities. Before disconnecting a component, clean the outside of the fittings thoroughly to prevent contamination from entering the refrigerant system. Keep service tools and the work area clean. Do not open the refrigerant system or uncap a replacement component until you are ready to service the system. Immediately after disconnecting a component from the refrigerant system, seal the open fittings with a cap or plug. This will prevent contamination from entering the A/C system.

CAUTION: Refrigerant oil will absorb moisture from the atmosphere if left uncapped. Do not open a container of refrigerant oil until you are ready to use it. Replace the cap on the oil container immediately after using. Store refrigerant oil only in a clean, airtight, and moisture-free container.

CAUTION: Do not overcharge the refrigerant system. Overcharging will cause excessive compressor head pressure and can cause compressor noise and A/C system failure.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - REFRIGERANT SYSTEM LEAKS

WARNING: Review the safety precautions and warnings in this group before performing this procedure. Failure to follow these instructions may result in serious injury or death.

WARNING: Do not expose the refrigerant to open flame. Poisonous gas is created when refrigerant is burned. An electronic leak detector is recommended. Serious or fatal injury may result from improper service procedures.

WARNING: Use extreme care when working around a running engine. Keep hands and fingers clear of the radiator fan, accessory drive belt and all other moving components. Keep away when wearing loose clothing, jewelry or long hair that is not properly secured. Underhood components may become hot to the touch. Be careful not to come into contact with hot engine, A/C and engine cooling system components. Failure to follow these instructions may result in serious or fatal injury.

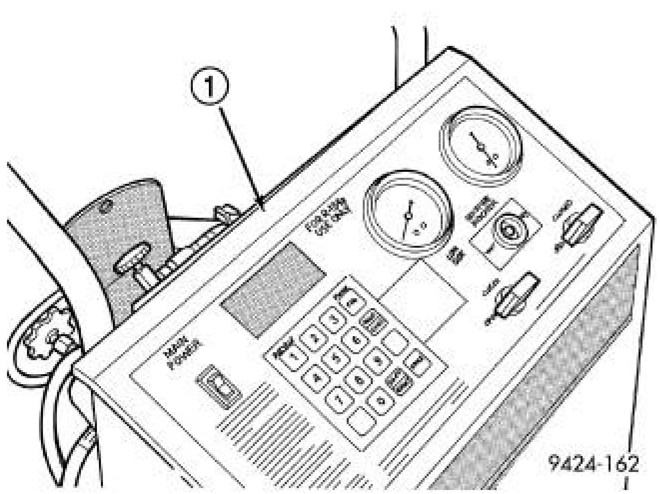
NOTE: Always conduct the A/C Performance Test as outlined in this group prior to searching for an A/C refrigerant leak. Refer to DIAGNOSIS AND TESTING.

NOTE: The A/C system in this vehicle comes equipped from the factory with fluorescent refrigerant leak detection dye installed in the refrigerant system.

When searching for a refrigerant leak in the A/C system, use an Ultra Violet (UV) light and an electronic leak detector that is designed for refrigerant used on this vehicle. It is important to use only high-quality refrigerant leak detection equipment to properly locate refrigerant system leaks, such as the equipment listed in the team PSE Service Equipment Catalog. When the use of additional leak detection dye is required, use only Chrysler LLC approved refrigerant leak detection dye, available through MoparĀ®.

STANDARD PROCEDURE

R-134A REFRIGERANT SYSTEM RECOVERY



[Fig. 100: Identifying R-134a Refrigerant Recovery/Recycling/Charging Station]
Courtesy of CHRYSLER GROUP, LLC

The R-134a refrigerant must be recovered from the A/C system prior to performing any repairs that require disconnection of an A/C refrigerant line.

When recovering the A/C refrigerant system, use an R-134a refrigerant recovery/recycling/charging station (1) that meets SAE standard J2788. Per SAE standard J2788, refrigerant recovery stations must recover 95% of the refrigerant system within 30 minutes at 21.1Ā°C (70Ā°F) and be able to measure the amount of refrigerant removed from the system to an accuracy of 28 grams (1 oz.). See the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

NOTE:	**A/C system should be tested prior to refrigerant recovery if the use of A/C system sealants are suspected. These sealants have the potential to clog refrigerant recovery equipment and cause vehicle A/C component damage. Various tool manufacturers make tool kits that detect A/C system sealants. See the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.**

If sealants are detected in an A/C system, the system should be treated as contaminated and replacement of the entire A/C refrigerant system is recommended. A/C systems found to be contaminated with A/C system sealers, A/C stop-leak products or seal conditioners void the warranty for the A/C system.

RECOVERY PROCEDURE

WARNING:	**Review the safety precautions and warnings in this group before performing this procedure. Failure to follow these instructions may result in serious injury or death.**

CAUTION:	**Various aftermarket manufacturers produce A/C system sealants that are designed to stop A/C refrigerant system leaks. The use of A/C system sealants may result in damage to A/C refrigerant recovery/evacuation/recharging equipment and/or the vehicle A/C system and are not recommended for use by Chrysler LLC.**

CAUTION:	**A small amount of refrigerant oil is removed from the A/C system each time the refrigerant system is recovered and evacuated. Before charging the A/C system, you MUST replenish any oil lost during the recovery process. See the equipment manufacturer instructions for more information.**

1. If use of aftermarket A/C system sealant is suspected, the A/C system should be tested for sealant prior to refrigerant system recovery. See the operating instructions supplied by the equipment manufacturer for proper use and care of this equipment.
2. Connect an R-134a refrigerant recovery/recycling/charging station that meets SAE standard J2788 to the refrigerant system.
3. Recover the A/C refrigerant system following the operating instructions supplied by the recovery/recycling/charging station manufacturer.
4. Disconnect the refrigerant recovery/recycling/charging station from the refrigerant system service ports.

5. Reinstall the caps onto the refrigerant system service ports.

R-1234YF REFRIGERANT SYSTEM RECOVERY

WARNING: **Review the safety precautions and warnings in this group before performing this procedure. Failure to follow these instructions may result in serious injury or death.**

CAUTION: **Various aftermarket manufacturers produce A/C system sealants that are designed to stop A/C refrigerant system leaks. The use of A/C system sealants may result in damage to A/C refrigerant recovery/evacuation/recharging equipment and/or the vehicle A/C system and are not recommended for use by Chrysler LLC.**

Fig. 101: R-1234YF Refrigerant Recovery/Recycling/Charging Station
Courtesy of CHRYSLER GROUP, LLC

When servicing the A/C system, an R-1234YF refrigerant recovery/recycling/charging station that meets SAE standard must be used. Per SAE standard, refrigerant recovery stations must recover 95% of the refrigerant system within 30 minutes at 21.1Ā° C (70Ā° F) and be able to measure the amount of refrigerant removed from the system to an accuracy of 28 grams (1 oz.). See the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

NOTE: **A/C system should be tested prior to refrigerant recovery if the use of A/C system sealants are suspected. These sealants have the potential to clog refrigerant recovery equipment and cause vehicle A/C component damage. Various tool manufacturers make tool kits that detect A/C system sealants. See the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.**

If sealants are detected in an A/C system, the system should be treated as contaminated and replacement of the entire A/C refrigerant system is recommended. A/C systems found to be contaminated with A/C system sealers, A/C stop-leak products or seal conditioners void the warranty for the A/C system.

R-134A REFRIGERANT SYSTEM EVACUATE

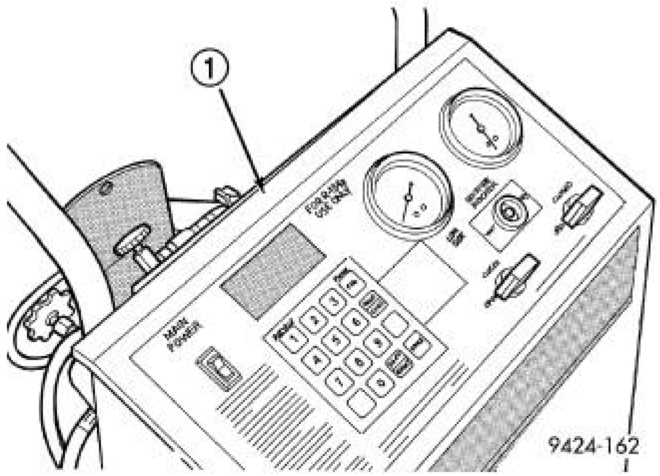


Fig. 102: Identifying R-134a Refrigerant Recovery/Recycling/Charging Station
Courtesy of CHRYSLER GROUP, LLC

If the A/C refrigerant system has been open to the atmosphere, it must be evacuated before the A/C system can be recharged with R-134a refrigerant.

NOTE: **Special effort must be used to prevent moisture from entering the A/C system oil. Moisture in the oil is very difficult to remove and will cause a reliability problem with the A/C compressor.**

Moisture and air in the A/C refrigerant system will raise the compressor head pressure above acceptable operating levels. This will reduce the performance of the A/C system and damage the A/C compressor. Moisture will boil at near room temperature when exposed to vacuum. Always use an R-134a refrigerant recovery/recycling/charging station with a vacuum pump (1) that meets SAE standard J2788, or an R-134a compatible manifold gauge set and a stand alone vacuum pump.

If an A/C compressor is left open to the atmosphere for an extended period of time, it is recommended that the refrigerant oil in the compressor be drained and replaced with new refrigerant oil to reduce the possibility of contaminating the refrigerant system. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.

R-134A EVACUATION PROCEDURE

WARNING: **Review the safety precautions and warnings in this group before performing this procedure. Failure to follow these instructions may result in serious injury or death.**

CAUTION: **A small amount of refrigerant oil is removed from the A/C system each time the refrigerant system is recovered and evacuated. Before charging the A/C system, you MUST replenish any oil lost during the recovery process. See the equipment manufacturer instructions for more information.**

1. Recover the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

   NOTE: **When connecting service equipment couplers to refrigerant line service**

ports, verify that the valve of each coupler is fully closed prior to connecting. This will reduce the amount of effort required to make the connections.

2. Connect an R-134a refrigerant recovery/recycling/charging station with a vacuum pump that meets SAE standard J2788 to the refrigerant system, or an R-134a compatible manifold gauge set and a stand alone vacuum pump (depending on available equipment).
3. Open the refrigerant recovery/recycling/charging station or manifold gauge set valves and start the vacuum pump. The vacuum pump should run a minimum of 45 minutes prior to recharge to eliminate all moisture in system. When the low-side gauge reads to the lowest degree of vacuum possible (approximately -88 kPa (-26 in. Hg or greater) for 30 minutes, close all valves and turn off vacuum pump. If the refrigerant system fails to reach specified vacuum, the refrigerant system likely has a leak that must be corrected. If the refrigerant system maintains specified vacuum for at least 30 minutes, start the vacuum pump, open the valves and allow the refrigerant system to evacuate an additional 10 minutes.
4. Close the refrigerant recovery/recycling/charging station or manifold gauge set valves. Turn off and disconnect the vacuum pump.
5. Disconnect the refrigerant recovery/recycling/charging station or manifold gauge set from the refrigerant system service ports.
6. Install the caps onto the refrigerant system service ports.

R-1234YF REFRIGERANT SYSTEM EVACUATE

Fig. 103: R-1234YF Refrigerant Recovery/Recycling/Charging Station
Courtesy of CHRYSLER GROUP, LLC

If the A/C refrigerant system has been open to the atmosphere, it must be evacuated before the A/C system can be recharged with R-1234yf refrigerant.

NOTE: **Special effort must be used to prevent moisture from entering the A/C system oil. Moisture in the oil is very difficult to remove and will cause a reliability problem with the A/C compressor.**

Moisture and air in the A/C refrigerant system will raise the compressor head pressure above acceptable operating levels. This will reduce the performance of the A/C system and damage the A/C compressor. Moisture will boil at near room temperature when exposed to vacuum. Always use an R-1234yf refrigerant recovery/recycling/charging station with a vacuum pump that meets SAE standard J2843, or an R-1234yf compatible manifold gauge set and a stand alone vacuum pump.

If an A/C compressor is left open to the atmosphere for an extended period of time, it is recommended that the refrigerant oil in the compressor be drained and replaced with new refrigerant oil to reduce the possibility of contaminating the refrigerant system. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.

R-1234YF EVACUATION PROCEDURE

WARNING: Review the safety precautions and warnings in this group before performing this procedure. Failure to follow these instructions may result in serious injury or death.

CAUTION: A small amount of refrigerant oil is removed from the A/C system each time the refrigerant system is recovered and evacuated. Before charging the A/C system, you MUST replenish any oil lost during the recovery process. See the equipment manufacturer instructions for more information.

1. Recover the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

   NOTE: When connecting service equipment couplers to refrigerant line service ports, verify that the valve of each coupler is fully closed prior to connecting. This will reduce the amount of effort required to make the connections.

2. Connect an R-1234yf refrigerant recovery/recycling/charging station with a vacuum pump that meets SAE standard J2843 to the refrigerant system, or an R-1234yf compatible manifold gauge set and a stand alone vacuum pump (depending on available equipment).
3. Open the refrigerant recovery/recycling/charging station or manifold gauge set valves and start the vacuum pump. The vacuum pump should run a minimum of 45 minutes prior to recharge to eliminate all moisture in system. When the low-side gauge reads to the lowest degree of vacuum possible (approximately -88 kPa (-26 in. Hg or greater) for 30 minutes, close all valves and turn off vacuum pump. If the refrigerant system fails to reach specified vacuum, the refrigerant system likely has a leak that must be corrected. If the refrigerant system maintains specified vacuum for at least 30 minutes, start the vacuum pump, open the valves and allow the refrigerant system to evacuate an additional 10 minutes.
4. Close the refrigerant recovery/recycling/charging station or manifold gauge set valves. Turn off and disconnect the vacuum pump.
5. Disconnect the refrigerant recovery/recycling/charging station or manifold gauge set from the refrigerant system service ports.
6. Install the caps onto the refrigerant system service ports.

R-134A REFRIGERANT SYSTEM CHARGE

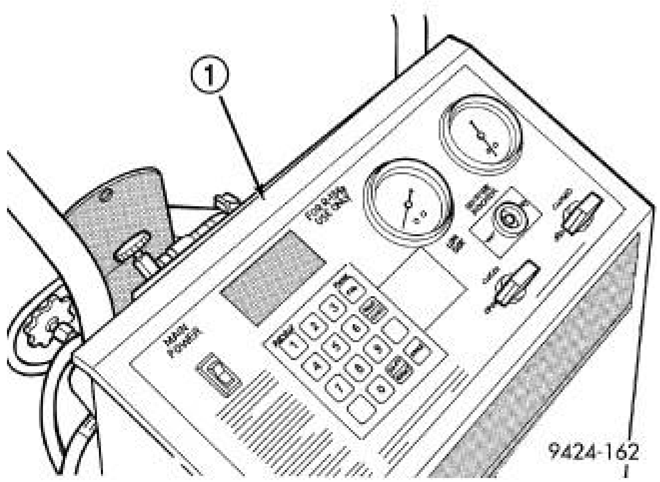


Fig. 104: Identifying R-134a Refrigerant Recovery/Recycling/Charging Station
Courtesy of CHRYSLER GROUP, LLC

After all A/C refrigerant system repairs have been completed and the refrigerant system has been evacuated, the A/C system can be recharged with R-134a refrigerant.

When charging the A/C system, use an R-134a refrigerant recovery/recycling/charging station (1) that meets SAE standard J2788. Per SAE standard J2788, refrigerant recovery stations must charge the system to an accuracy of 14 grams (0.5 oz.). See the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

R-134A CHARGING PROCEDURE

WARNING: **Review the safety precautions and warnings in this group before performing this procedure. Failure to follow these instructions may result in serious injury or death.**

CAUTION: **A small amount of refrigerant oil is removed from the A/C system each time the refrigerant system is recovered and evacuated. Before charging the A/C system, you MUST replenish any oil lost during the recovery process. See the equipment manufacturer instructions for more information.**

1. Recover and evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
2. Connect an R-134a refrigerant recovery/recycling/charging station that meets SAE standard J2788 to the refrigerant system.
3. When required, adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.

   NOTE: **A/C system refrigerant capacity can be found on the HVAC Specification Label, located in the engine compartment.**

4. Measure the proper amount of refrigerant and heat it to 52Ā°C (125Ā°F) with the charging station. Refer to **REFRIGERANT, SPECIFICATIONS**. See the operating instructions supplied by the equipment manufacturer for proper use of this equipment.
5. Open both the low and high side valves, then open the charge valve to allow the heated refrigerant to flow

into the refrigerant system.

6. When the transfer of refrigerant has stopped, close the valves.

WARNING: Take care not to open the high side (high pressure) valve while performing STEP 7. Failure to follow these instructions may result in possible serious or fatal injury.

7. Perform the following if all of the refrigerant charge did not transfer from the dispensing device.
   - Open all of the windows in the vehicle.
   - Set the heating and A/C system so that the A/C compressor is operating and the blower motor is operating at its lowest speed setting.
   - Run the engine at a steady high idle (about 1400 rpm).
   - If the A/C compressor does not operate, test the compressor control circuits and repair as required.
   - Open the low side valve and the charge valve to allow the remaining refrigerant to flow into the refrigerant system.
   - When the transfer of refrigerant has stopped, close the valves.
8. Disconnect the refrigerant recovery/recycling/charging station from the refrigerant system service ports.
9. Reinstall the caps onto the refrigerant system service ports.

R-1234YF REFRIGERANT SYSTEM CHARGE

WARNING: Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.

NOTE: The Underhood HVAC Specification Label contains the refrigerant fill specification of the vehicle being serviced.

Fig. 105: R-1234YF Refrigerant Recovery/Recycling/Charging Station
Courtesy of CHRYSLER GROUP, LLC

After all refrigerant system leaks have been repaired and the refrigerant system has been evacuated, a refrigerant charge can be injected into the system. Refer to **PLUMBING, STANDARD PROCEDURE**.

When charging the A/C system, use an R-1234yf refrigerant recovery/recycling/charging station that meets SAE standard J2843. Per SAE standard J2843, refrigerant recovery stations must charge the system to an accuracy of 14 grams (0.5 oz.). See the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

R-1234YF CHARGING PROCEDURE

WARNING: Review the safety precautions and warnings in this group before performing this procedure. Failure to follow these instructions may result in serious injury or death.

CAUTION: A small amount of refrigerant oil is removed from the A/C system each time the refrigerant system is recovered and evacuated. Before charging the A/C system, you MUST replenish any oil lost during the recovery process. See the equipment manufacturer instructions for more information.

1. Recover and evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
2. Connect an R-1234yf refrigerant recovery/recycling/charging station that meets SAE standard J2843 to the refrigerant system.
3. When required, adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.

   NOTE: A/C system refrigerant capacity can be found on the HVAC Specification Label, located in the engine compartment.

4. Open both the low and high side valves, then open the charge valve to allow the refrigerant to flow into the refrigerant system.
5. When the transfer of refrigerant has stopped, close the valves.

   WARNING: Take care not to open the high side (high pressure) valve while performing STEP 7. Failure to follow these instructions may result in possible serious or fatal injury.

6. Perform the following if all of the refrigerant charge did not transfer from the dispensing device.
   - Open all of the windows in the vehicle.
   - Set the heating and A/C system so that the A/C compressor is operating and the blower motor is operating at its lowest speed setting.
   - Run the engine at a steady high idle (about 1400 rpm).
   - If the A/C compressor does not operate, test the compressor control circuits and repair as required.
   - Open the low side valve and the charge valve to allow the remaining refrigerant to flow into the refrigerant system.
   - When the transfer of refrigerant has stopped, close the valves.
7. Disconnect the refrigerant recovery/recycling/charging station from the refrigerant system service ports.

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8. Install the caps onto the refrigerant system service ports.

COMPRESSOR, A/C

DESCRIPTION

A/C CLUTCH

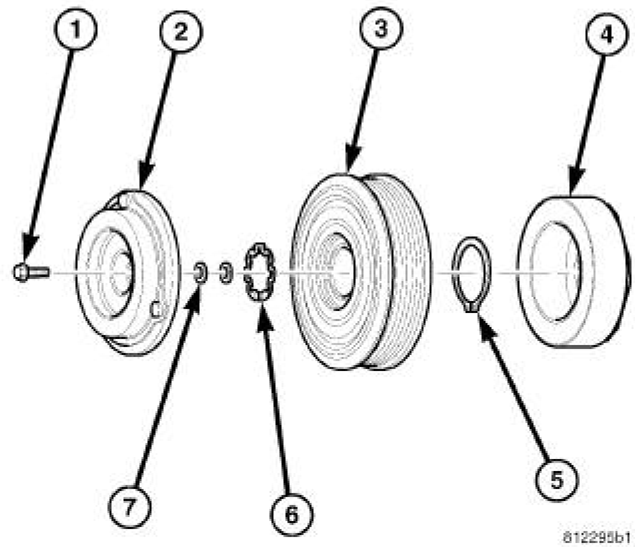

Fig. 106: A/C Compressor Clutch Components
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C clutch assembly shown in the illustration.

The A/C compressor clutch assembly consists of a stationary electromagnetic A/C clutch field coil (4), pulley bearing and pulley assembly (3), clutch plate (2) and shims (7). These components provide the means to engage and disengage the A/C compressor from the engine accessory drive belt.

The A/C clutch field coil and the pulley bearing and pulley assembly are both retained on the nose of the A/C compressor with snap rings (5 and 6). The clutch plate is splined to the compressor shaft and secured with a bolt (1).

A/C COMPRESSOR

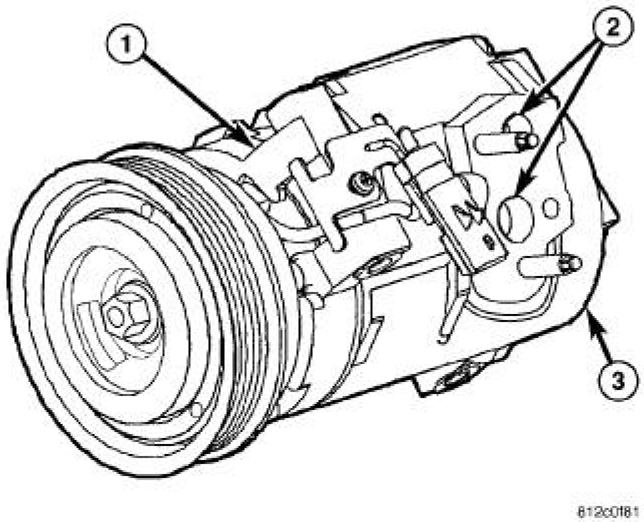

Fig. 107: A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor shown in the illustration.

Models equipped with the 3.6L and 5.7L engine, use a Denso 10SBH17 A/C compressor. Models equipped with the 6.4L and 6.2L engine, use a Denso 10SRE18 A/C compressor.

Both A/C compressors have a variable displacement of 170 cubic centimeters (10 cubic inches) and have the suction and discharge ports (2) located on the compressor cylinder head (3), along with a label identifying the proper refrigerant.

HIGH PRESSURE RELIEF VALVE

A high pressure relief valve is located on the compressor cylinder head at the rear of the A/C compressor. Refer to **COMPRESSOR, A/C, DESCRIPTION**. This mechanical valve is designed to vent refrigerant from the A/C system to protect against damage to the A/C compressor and other A/C system components caused by condenser air flow restriction or an overcharge of refrigerant.

OPERATION

A/C CLUTCH

The A/C clutch components provide the means to engage and disengage the A/C compressor from the moving engine accessory drive belt. A/C clutch engagement is controlled by the Powertrain Control Module (PCM). When the PCM energizes the electromagnetic A/C clutch coil, it magnetically draws the clutch plate into contact with the clutch pulley and drives the compressor shaft. When the coil is not energized, the pulley freewheels on the clutch hub bearing, which is part of the pulley assembly.

A/C clutch components cannot be repaired and must be replaced if inoperative or damaged.

A/C COMPRESSOR

The A/C compressor is driven by the engine through an electric clutch, drive pulley and belt arrangement. The A/C compressor is lubricated by refrigerant oil that is circulated throughout the refrigerant system with the

refrigerant.

The A/C compressor draws in low-pressure refrigerant vapor from the A/C evaporator through its suction port. It then compresses the refrigerant into a high-pressure, high-temperature refrigerant vapor, which is then pumped to the A/C condenser through the compressor discharge port.

CAUTION: Be certain to adjust the refrigerant system oil level when replacing an A/C compressor. Failure to properly adjust the refrigerant oil level can prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

The A/C compressor cannot be repaired and must be replaced if inoperative or damaged. The compressor clutch, pulley and bearing assembly, and clutch field coil are available for service. If an internal failure of the A/C compressor has occurred, the A/C receiver/drier must also be replaced. Refer to **DRIER, A/C RECEIVER, REMOVAL**.

HIGH PRESSURE RELIEF VALVE

The high pressure relief valve vents refrigerant from the A/C system when a discharge pressure of 3445 to 4135 kPa (500 to 600 psi) or above is reached. The high pressure relief valve closes with a minimum discharge pressure of 2756 kPa (400 psi) is reached.

The high pressure relief valve should not open when the A/C system is operating correctly. If the high pressure relief valve vents refrigerant, there is most likely a problem within the A/C refrigerant system. The high pressure relief valve vents only enough refrigerant to reduce the A/C system pressure, and then re-seats itself. If the high pressure relief valve vents refrigerant, see the A/C System Diagnosis chart. Refer to **DIAGNOSIS AND TESTING**.

The high pressure relief valve is factory calibrated and cannot be adjusted or repaired, and must not be removed or otherwise disturbed. The valve is only serviced as a part of the A/C compressor.

DIAGNOSIS AND TESTING

A/C CLUTCH COIL

The A/C clutch coil electrical circuit is controlled by the Powertrain Control Module (PCM), through a relay in the Power Distribution Center (PDC). See the appropriate Wiring Information for complete HVAC wiring diagrams. Begin testing of a suspected A/C clutch coil problem by performing the preliminary checks.

PRELIMINARY CHECKS

1. Using a scan tool, check for Diagnostic Trouble Codes (DTCs) related to the A/C heater module, Body Control Module (BCM), PCM and PDC. If no DTCs are found, go to STEP 2. If any DTCs are found, repair as required.
2. Check the A/C clutch fuse in the PDC. If OK, go to STEP 3. If not OK, repair the shorted circuit and replace the fuse.
3. If the A/C clutch still will not engage, verify the refrigerant charge level by conducting the A/C Performance test. Refer to **DIAGNOSIS AND TESTING**. If the refrigerant charge level is OK, go to COIL RESISTANCE TEST and COIL CURRENT DRAW TEST. If the refrigerant charge level is not OK, adjust the refrigerant charge as required.

COIL RESISTANCE TEST

1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector from the A/C clutch coil connector.
3. Use an ohm meter and Back Probe Tool (special tool #6801, Terminal Probe) and measure the resistance of the A/C clutch coil at the coil connector terminals.
4. See A/C CLUTCH COIL SPECIFICATIONS TABLE for acceptable A/C clutch coil resistance. Specifications apply for a work area temperature of 21Â° C (70Â° F).
   a. If the A/C clutch coil reading is below specifications, the coil is shorted and must be replaced.
   b. If the A/C clutch coil reading is above specifications, the coil is open and must be replaced.

A/C CLUTCH COIL SPECIFICATIONS

Application	Coil Resistance	Coil Current Draw
5.7L/6.4L Engines	3.3 - 3.5 ohms	3.2 amps Max @ 12V Â± 0.5V @ 21Â° C (70Â° F)
3.6L Engine	3.0 - 4.0 ohms	3.1 - 4.0 amps @ 12V Â± 0.5V @ 21Â° C (70Â° F)

COIL CURRENT DRAW TEST

1. Verify the battery state of charge. Refer to **BATTERY, DIAGNOSIS AND TESTING** .
2. Connect an ammeter (0 to 10 ampere scale selected) in series with the A/C clutch coil feed terminal using Back Probe Tool (special tool #6801, Terminal Probe). Connect a voltmeter (0 to 20 volt scale selected) to measure voltage across the battery and the A/C clutch coil.
3. With the A/C heater control in the A/C mode and the blower motor at low speed, start the engine and allow it to run at a normal idle speed.
4. The A/C clutch should engage immediately and the clutch coil supply voltage should be within two volts of the battery voltage. If the clutch coil supply voltage is OK, go to 5. If the coil supply voltage is not within two volts of battery voltage, test the clutch coil feed circuit for excessive voltage drop and repair as necessary.
5. See **A/C CLUTCH COIL SPECIFICATIONS** table for acceptable A/C clutch coil current draw. Specifications apply for a work area temperature of 21Â° C (70Â° F). If voltage is more than 12.5 volts, add electrical loads by turning on electrical accessories until voltage reads below 12.5 volts.
   a. If the A/C clutch coil current reading is zero, the coil is open and must be replaced.
   b. If the A/C clutch coil current reading is above specifications, the coil is shorted and must be replaced.

A/C SYSTEM NOISE TESTING

When investigating an A/C system related noise, you must first know the conditions under which the noise occurs. These conditions include: weather, vehicle speed, transmission in gear or neutral, engine speed, engine temperature, and any other special conditions. Noises that develop during A/C operation can often be misleading. For example: What sounds like a failed front engine bearing or connecting rod, may be caused by loose bolts, nuts, mounting brackets or a loose compressor clutch assembly.

Drive belts are speed sensitive. At different engine speeds and depending upon drive belt tension, drive belts

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can develop noises that are mistaken for an A/C compressor noise. Improper drive belt tension can cause a misleading noise when the compressor clutch is engaged, which may not occur when the compressor clutch is disengaged. Check the accessory drive belt condition and tension as described in Cooling before beginning this procedure.

1. Select a quiet area for testing. Duplicate the complaint conditions as much as possible. Turn the A/C compressor On and Off several times to clearly identify the compressor noise. Listen to the A/C compressor while the clutch is engaged and disengaged. Probe the A/C compressor with an engine stethoscope or a long screwdriver with the handle held to your ear to better localize the source of the noise.
2. Loosen all of the compressor mounting hardware and retighten. Check the compressor clutch retainer. Be certain that the clutch field coil is mounted securely to the A/C compressor, and that the clutch plate and pulley are properly aligned and have the correct air gap. Refer to **COMPRESSOR, A/C, INSTALLATION**.
3. To duplicate high-ambient temperature conditions (high head pressure), restrict the air flow through the A/C condenser. Install a manifold gauge set or a scan tool to be certain that the discharge pressure does not exceed 2760 kPa (400 psi).
4. Check the refrigerant system plumbing for incorrect routing, rubbing or interference, which can cause unusual noises. Also check the refrigerant lines and hoses for kinks or sharp bends that will restrict refrigerant flow, which can cause noises.
5. If the noise is from opening and closing of the high pressure relief valve, recover, evacuate and recharge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
6. If the high pressure relief valve still does not seat properly, replace the A/C compressor. Refer to **COMPRESSOR, A/C, REMOVAL**.

STANDARD PROCEDURE

STANDARD PROCEDURE - A/C CLUTCH PLATE INSPECTION

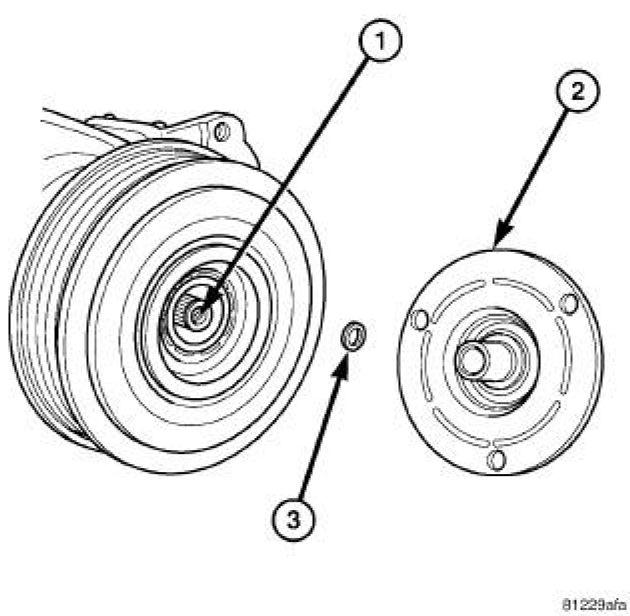


Fig. 108: Identifying Compressor Shaft, Clutch Plate & Shim
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The A/C clutch can be serviced in the vehicle. The refrigerant system can remain fully-charged during compressor clutch, pulley and bearing assembly, or coil replacement.**

Examine the friction surfaces of the pulley and the clutch plate (2) for wear. The pulley and clutch plate should be replaced if excessive wear or scoring is found.

If the friction surfaces are oily, inspect the shaft and nose area of the A/C compressor (1) for refrigerant oil. If refrigerant oil is found, the compressor shaft seal is leaking and the A/C compressor must be replaced.

Check the pulley bearing for roughness or excessive leakage of grease. The pulley and clutch plate should be replaced if bearing roughness or excessive leakage is found.

REMOVAL

A/C CLUTCH

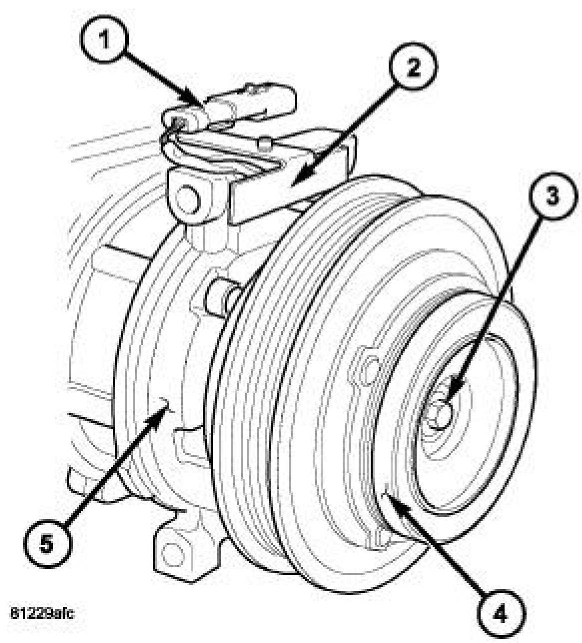


Fig. 109: A/C Compressor, Field Coil Connectors, Bracket, Clutch Plate & Shaft Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The compressor clutch assembly can be serviced with the refrigerant system fully-charged and with the A/C compressor installed on the engine.**

NOTE: **Typical A/C compressor and clutch assembly shown in illustrations.**

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. On 5.7L and 6.4L engine equipped models, remove the air intake hose and the air cleaner housing. Refer

to **BODY, AIR CLEANER, REMOVAL** for 5.7L or **BODY, AIR CLEANER, REMOVAL** for 6.4L.

3. Remove the radiator fan and shroud assembly. Refer to **FAN, COOLING, REMOVAL** .
4. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
5. Disconnect the engine wire harness from the compressor clutch field coil connector (1) located on the top of the A/C compressor (5).

NOTE: **Some vehicles (depending on engine application) may require the A/C compressor to be removed from its installed location to gain access to the compressor shaft bolt and/or pulley and field coil snap rings. However, the refrigerant system can still remain fully charged.**

6. Carefully remove the A/C clutch coil connector and wire lead from the connector bracket (2).
7. Remove the compressor shaft bolt (3). A band-type oil filter wrench or a strap wrench may be used to hold the clutch plate (4) from rotating during bolt removal.

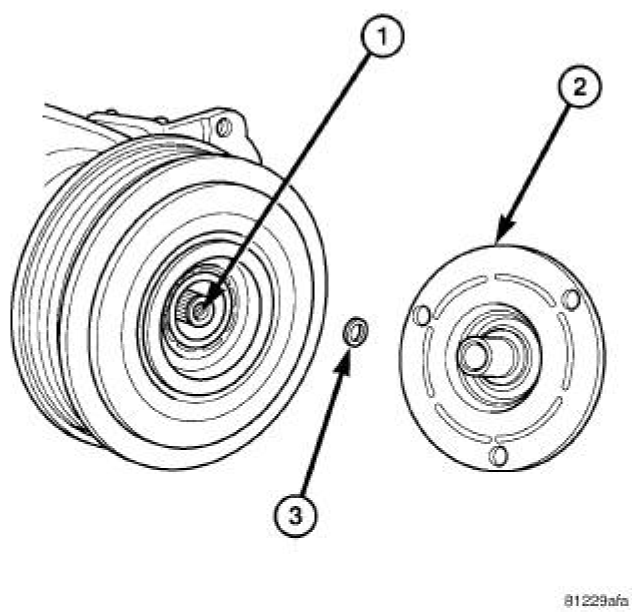
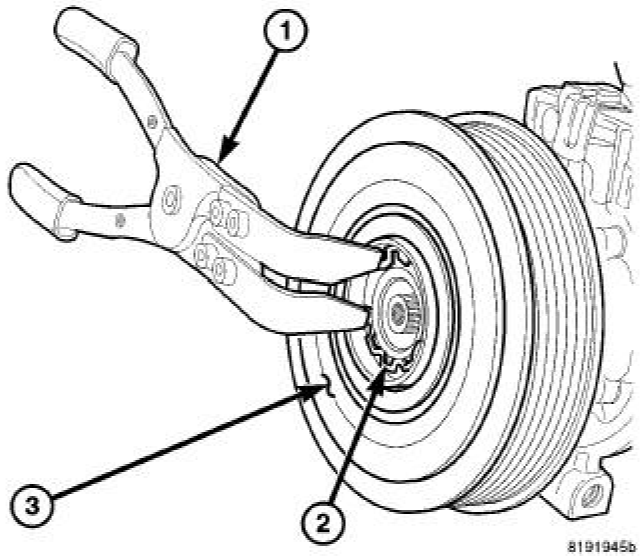


Fig. 110: Identifying Compressor Shaft, Clutch Plate & Shim
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not pry between the clutch plate and the pulley and bearing assembly to remove the clutch plate from the compressor shaft as this may damage the clutch plate.**

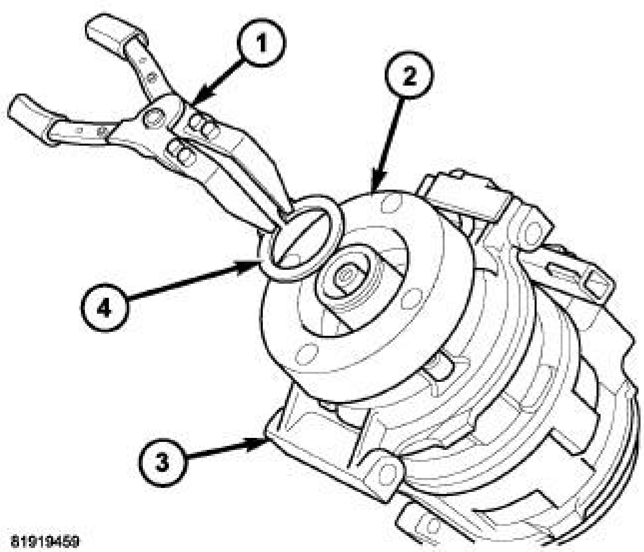
NOTE: **Use care not to lose any clutch shim(s) during removal of the clutch plate, as they may be reused during the clutch plate installation process.**

8. Tap the clutch plate (2) lightly with a plastic mallet to release it from the splines on the compressor shaft (1) and remove the clutch plate and shim(s) (3).



[**Fig. 111: Clutch Pulley & Snap Ring**]
Courtesy of CHRYSLER GROUP, LLC

9. Using A/C Snap Ring Pliers (special tool #9764, Pliers, A/C Snap Ring) (1) or equivalent, remove the snap ring (2) that secures the pulley and bearing assembly (3) to the front of the A/C compressor and remove the pulley and bearing assembly.



[**Fig. 112: Clutch Coil And Snap Ring**]
Courtesy of CHRYSLER GROUP, LLC

10. Using A/C Snap Ring Pliers (special tool #9764, Pliers, A/C Snap Ring) (1) or equivalent, remove the snap ring (4) that secures the A/C clutch coil (2) to the front of the A/C compressor (3) and remove the coil.

3.6L ENGINE

WARNING: Review the warnings and cautions for this system before performing the

procedure. Failure to follow these instructions may result in serious injury or death.

CAUTION: **The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor.**

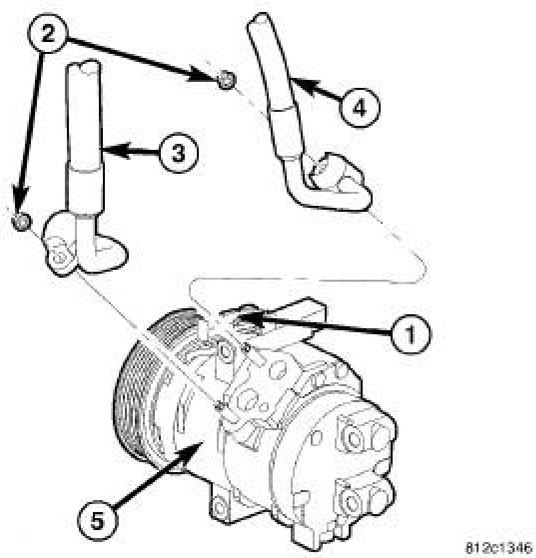


Fig. 113: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The A/C compressor may be removed and repositioned without disconnecting the refrigerant lines or discharging the refrigerant system. Discharging is not necessary if servicing the A/C clutch, clutch coil or engine.**

NOTE: **Typical A/C compressor and refrigerant lines show.**

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** .
4. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
5. Disconnect the engine wire harness from the A/C clutch connector (1).
6. Remove the nuts (2) that secure the A/C suction line (3) and A/C discharge line (4) to the A/C compressor (5).
7. Disconnect the suction and discharge lines from the A/C compressor and remove and discard the dual plane seals.
8. Install plugs in, or tape over all of the opened refrigerant line fittings and the compressor ports.

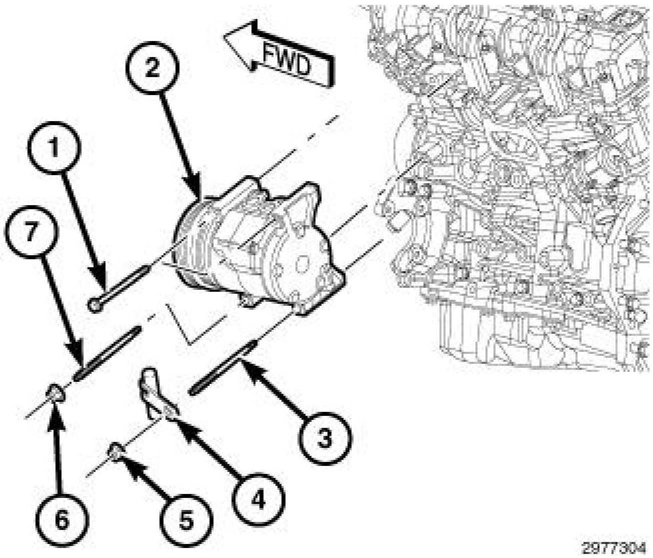


Fig. 114: Typical A/C compressor Mounting
Courtesy of CHRYSLER GROUP, LLC

9. Remove the front belly pan. Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL** .
10. Remove the two nuts (5 and 6) and two studs (3 and 7).

CAUTION: Use care not to deform or damage the heater tube and bracket when servicing the A/C compressor.

11. Carefully position the heater tube and bracket (4) out of the way.
12. Support the A/C compressor and remove the two bolts (1).
13. Remove the A/C compressor from the engine compartment.

5.7L/6.4L ENGINES

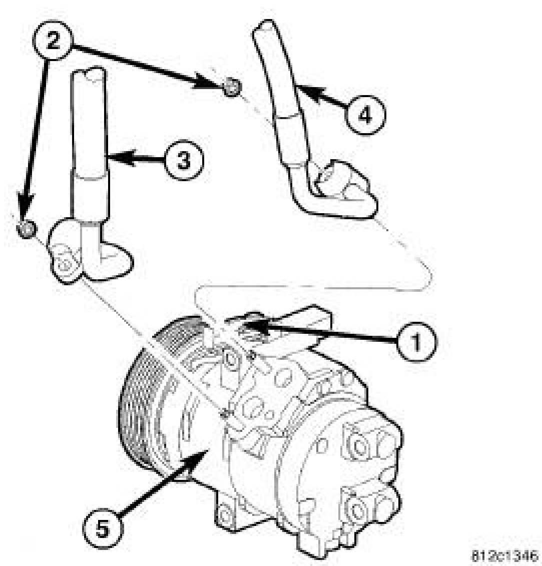


Fig. 115: Remove/Install A/C Compressor Lines

Courtesy of CHRYSLER GROUP, LLC

WARNING: Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor.

NOTE: The A/C compressor may be removed and repositioned without disconnecting the refrigerant lines or discharging the refrigerant system. Discharging is not necessary if servicing the A/C clutch, clutch coil or engine.

NOTE: Typical A/C compressor and refrigerant lines shown in the illustration.

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** for 5.7L or **BODY, AIR CLEANER, REMOVAL** for 6.4L. .
4. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .
5. On SRT models, position the power steering pump and reservoir out of the way. Refer to **RESERVOIR, POWER STEERING PUMP, REMOVAL** .
6. Remove the nuts (2) that secure the A/C suction line (3) and A/C discharge line (4) to the A/C compressor (5).
7. Disconnect the suction and discharge lines from the A/C compressor and remove and discard the dual plane seals.
8. Disconnect the engine wire harness from the A/C clutch connector (1).
9. Install plugs in, or tape over all of the opened refrigerant line fittings and the compressor ports.
10. Remove the front belly pan. Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL** .

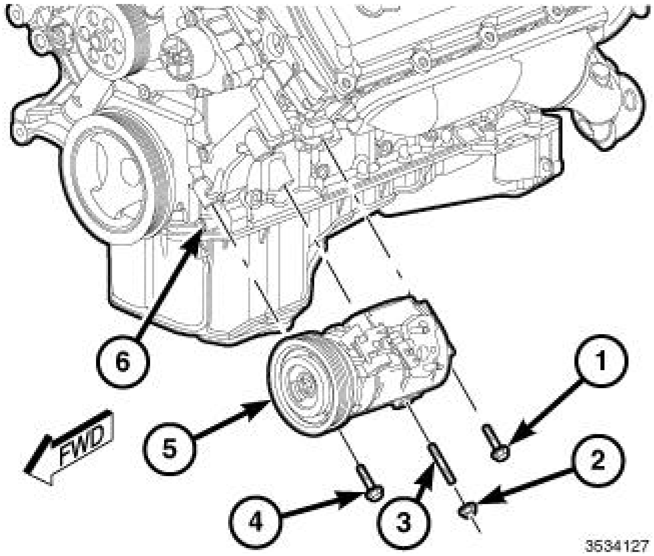


Fig. 116: Removing/Installing A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

11. Remove the two bolts (1 and 4) that secure the A/C compressor (5) to the engine (6).
12. Support the A/C compressor and remove the nut (2) and stud (3).
13. Remove the A/C compressor from the engine compartment.

INSTALLATION

A/C CLUTCH

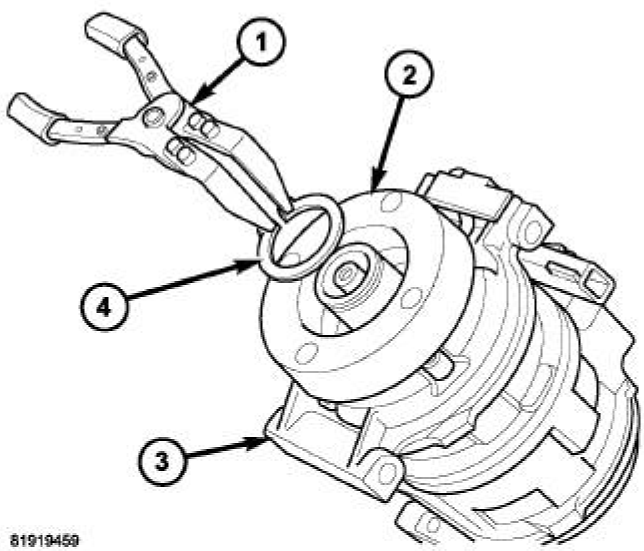


Fig. 117: Clutch Coil And Snap Ring
Courtesy of CHRYSLER GROUP, LLC

NOTE: Typical A/C compressor and clutch assembly shown in illustrations.

1. Align the dowel pin on the back of the A/C clutch coil (2) with the hole in the front of the A/C compressor (3) and position the coil onto the compressor. Be certain that the A/C clutch coil wire lead is

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properly routed so that it is not pinched between the compressor housing and the coil.

CAUTION: **The snap ring must be fully and properly seated in the groove or it will vibrate out, resulting in a clutch failure and severe damage to the A/C compressor.**

NOTE: **A new snap ring must be used to secure the A/C clutch coil to the A/C compressor. The bevel side of the snap ring must face outward and both snap ring eyelets must be oriented to the right or to the left of the coil dowel pin location on the A/C compressor.**

2. Using A/C Snap Ring Pliers (special tool #9764, Pliers, A/C Snap Ring) (1) or equivalent, install the snap ring (4) that secures the A/C clutch coil to the front of the A/C compressor. Be certain that the snap ring is fully and properly seated in the groove and oriented correctly.

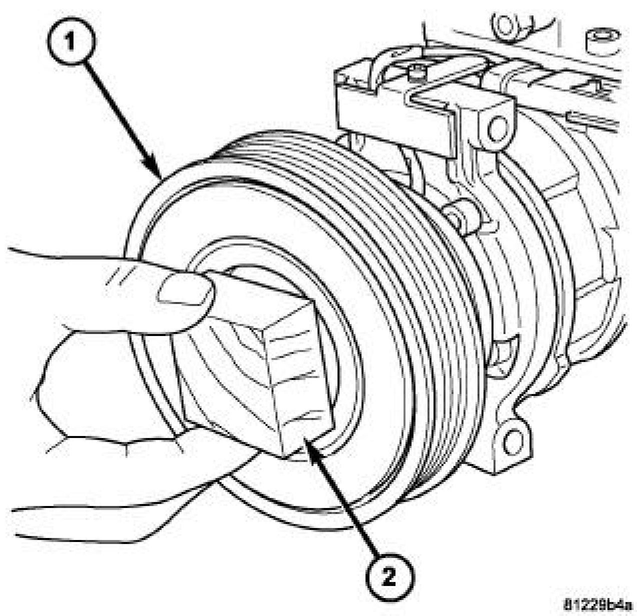
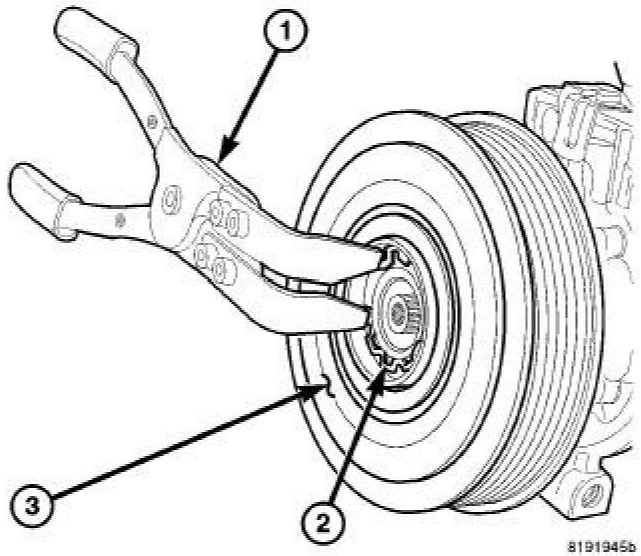


Fig. 118: Identifying Pulley & Bearing Assembly
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Be certain to position the A/C clutch coil wire lead so that it is not damaged during A/C compressor pulley and bearing installation.**

CAUTION: **When installing the pulley and bearing assembly, DO NOT mar the friction surfaces of the pulley or premature failure of the clutch will result.**

3. Install the pulley and bearing assembly (1) onto the front of the A/C compressor. If necessary, tap the pulley gently with a block of wood (2) placed on the pulley friction surface.



[Fig. 119: Clutch Pulley & Snap Ring](#)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The snap ring must be fully and properly seated in the groove or it will vibrate out, resulting in a clutch failure and severe damage to the A/C compressor.**

NOTE: **A new snap ring must be used to secure the pulley and bearing assembly to the A/C compressor. The bevel side of the snap ring must face outward.**

4. Using A/C Snap Ring Pliers (special tool #9764, Pliers, A/C Snap Ring) (1) or equivalent, install the snap ring (2) that secures the pulley and bearing assembly (3) to the front of the A/C compressor. Be certain that the snap ring is fully and properly seated in the groove.

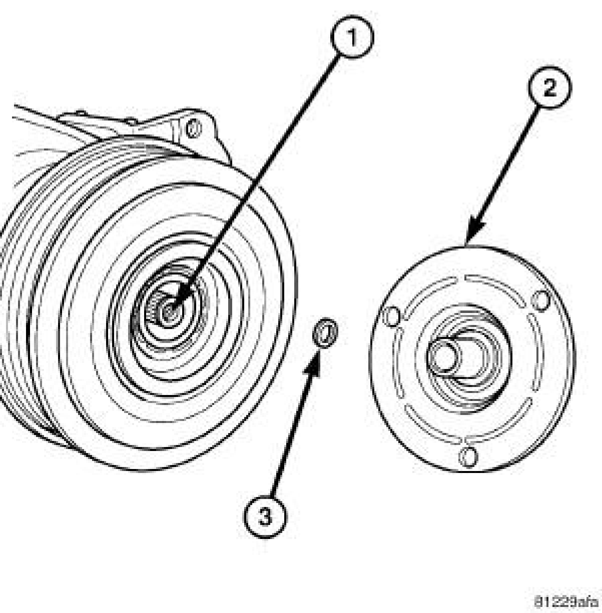


Fig. 120: Identifying Compressor Shaft, Clutch Plate & Shim
Courtesy of CHRYSLER GROUP, LLC

5. If the original clutch plate (2) and pulley and bearing assembly are to be reused, reinstall the original shim(s) (3) onto the compressor shaft (1). If a new clutch plate and pulley and bearing assembly are being used, install a trial stack of shims 2.54 mm (0.010 in.) thick onto the compressor shaft.

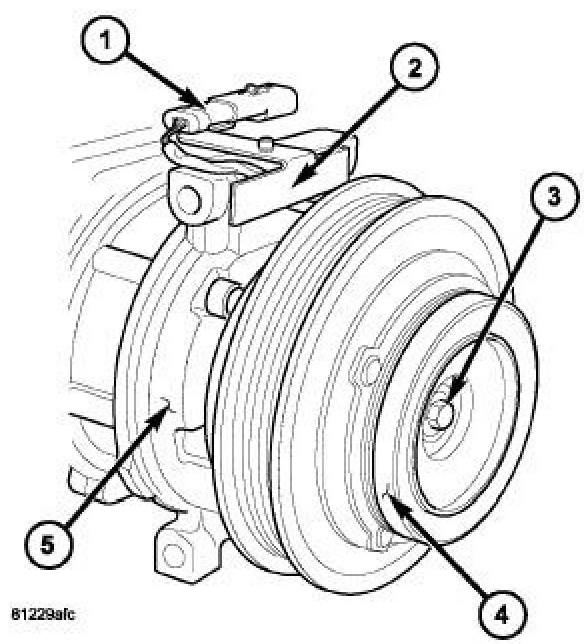


Fig. 121: A/C Compressor, Field Coil Connectors, Bracket, Clutch Plate & Shaft Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Install the clutch plate (4) onto the front of the A/C compressor (5).
7. Install the compressor shaft bolt (3) and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS**. .

NOTE:	**The shims may compress after tightening the shaft bolt. Check the air gap in four or more places to verify the air gap is correct. Spin the pulley before performing a final check of the air gap.**
NOTE:	**On vehicles with the clutch plate recessed into the pulley, use a 90Â° wire gap gauge to measure the clutch air gap. On other vehicles, use a blade type feeler gauge to measure the air gap.**

8. With the clutch plate assembled tight against the shim(s), measure the air gap between the clutch plate and the pulley and bearing assembly. The air gap should be between 0.35 - 0.60 mm (0.014 - 0.024 in.). If the air gap is not between specifications, add or subtract shims as needed until the correct air gap is obtained.

CAUTION:	**Be certain that the A/C clutch coil wire lead is routed so that it is not pinched between the compressor housing and the coil connector bracket.**

9. Carefully route the A/C clutch coil wire lead behind the connector bracket (2).
10. Install the A/C clutch coil connector (1) onto the connector bracket.
11. Connect the engine wire harness to the A/C clutch coil connector.
12. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
13. Install the radiator fan and shroud assembly. Refer to **FAN, COOLING, INSTALLATION** .
14. On 5.7L and 6.4L engine equipped models, install the air cleaner housing and air intake hose. Refer to **BODY, AIR CLEANER, INSTALLATION** for 5.7L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L. .
15. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
16. Verify proper A/C clutch operation.

3.6L ENGINE

CAUTION: If the A/C compressor is being replaced, be certain to adjust the refrigerant system oil level. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor.

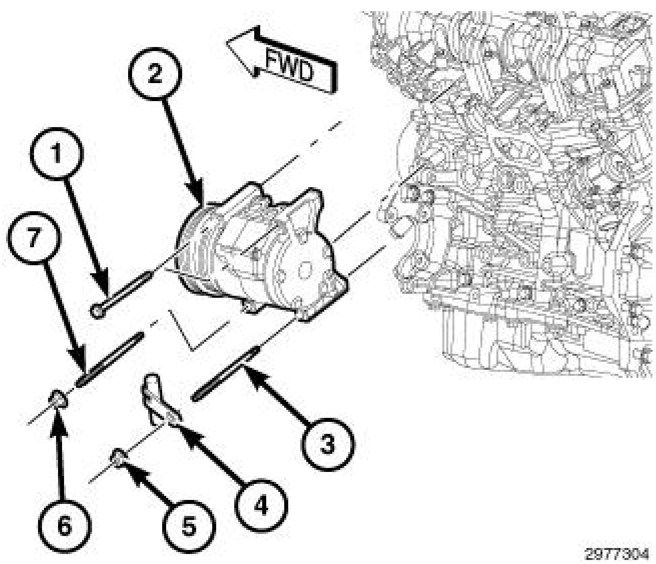


Fig. 122: Typical A/C compressor Mounting
Courtesy of CHRYSLER GROUP, LLC

NOTE: When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be removed from the new A/C compressor. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and

metal gaskets could result in a refrigerant system leak.

1. If the A/C compressor (2) is being replaced, the refrigerant oil in the old compressor must be first drained and measured. Then the oil in the new A/C compressor must be drained. Finally, the new compressor must be refilled with the same amount of new refrigerant oil that was drained out of the old compressor. When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
2. Position the A/C compressor to the engine and install the two studs (3 and 7). Tighten the studs to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
3. Loosely install the two bolts (1).
4. Reposition the heater tube and bracket (4) and loosely install the two nuts (5 and 6).
5. Tighten the bolts and nuts to 28 N.m (21 ft. lbs.) using the following sequence:
   - Bolt at front compressor.
   - Nut at front compressor.
   - Bolt at rear compressor.
   - Nut at rear compressor.
6. Install the front belly pan. Refer to **BELLY PAN, INSTALLATION** or **BELLY PAN, ENGINE, INSTALLATION** .

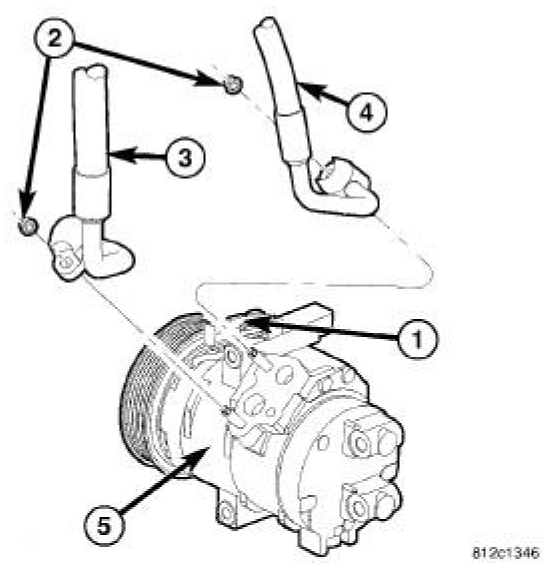


Fig. 123: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical A/C compressor and refrigerant lines show.**

7. Remove the tape or plugs from the opened fittings on the A/C suction line (3) and the A/C discharge line (4) and the compressor ports.
8. Lubricate new dual plane seals with clean refrigerant oil and install them onto the suction and the discharge line fittings. Use only the specified seals as they are made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the

vehicle.

9. Connect the suction and discharge lines onto the A/C compressor (5).
10. Install the nuts (2) that secure the suction and discharge lines to the A/C compressor and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
11. Connect the engine wire harness to the A/C clutch connector (1).
12. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
13. Replace the A/C receiver/drier if the A/C compressor is being replaced due to an internal failure. Refer to **DRIER, A/C RECEIVER, REMOVAL**.
14. Install the air cleaner housing. Refer to **BODY, AIR CLEANER, INSTALLATION** .
15. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
16. Evacuate and charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

5.7L/6.4L ENGINES

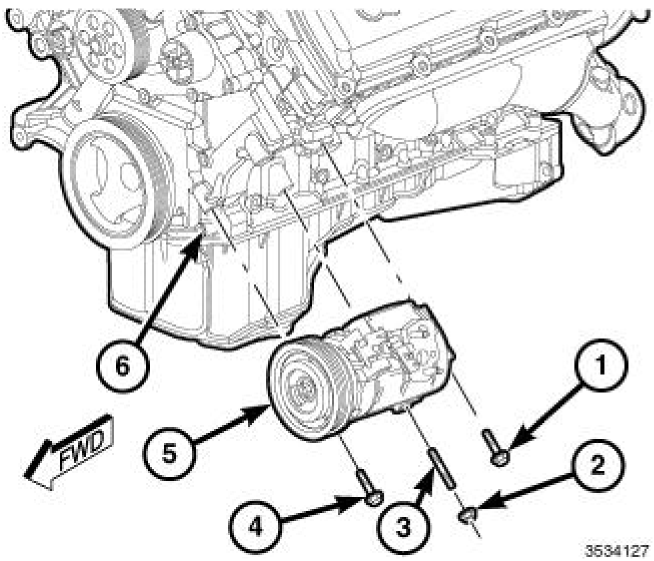


Fig. 124: Removing/Installing A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **If the A/C compressor is being replaced, be certain to adjust the refrigerant system oil level. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.**

CAUTION: **The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor.**

NOTE: **When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be removed from the new A/C compressor. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.**

NOTE: **Replacement of the refrigerant line O-ring seals and gaskets is required anytime**

a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

1. If the A/C compressor (5) is being replaced, the refrigerant oil in the old compressor must be first drained and measured. Then the oil in the new A/C compressor must be drained. Finally, the new compressor must be refilled with the same amount of new refrigerant oil that was drained out of the old compressor. When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
2. Position the A/C compressor to the engine (6) and install the stud (3). Tighten the stud to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
3. Loosely install the two bolts (1 and 4) and one nut (2) that secure the A/C compressor to the engine.
4. Tighten the nut and bolts to 28 N.m (21 ft. lbs.) using the following sequence:
    - Nut at front of compressor.
    - Bolt at front of compressor.
    - Bolt at rear of compressor.
5. Install the front belly pan. Refer to **BELLY PAN, INSTALLATION** or **BELLY PAN, ENGINE, INSTALLATION** .

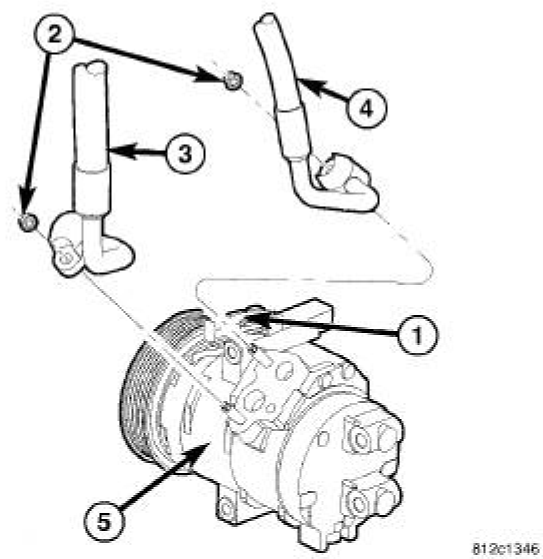


Fig. 125: Remove/Install A/C Compressor Lines
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical A/C compressor and refrigerant lines shown in the illustration.**

6. Connect the engine wire harness to the A/C clutch connector (1).
7. Remove the tape or plugs from the opened fittings on the A/C suction line (3) and the A/C discharge line (4) and the compressor ports.
8. Lubricate new dual plane seals with clean refrigerant oil and install them onto the suction and the discharge line fittings. Use only the specified seals as they are made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the

vehicle.

9. Connect the A/C suction and discharge lines onto the A/C compressor (5).
10. Install the nuts (2) that secure the A/C suction and discharge lines to the A/C compressor and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
11. On SRT models, reposition the power steering pump and reservoir. Refer to **RESERVOIR, POWER STEERING PUMP, INSTALLATION** .
12. Install the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
13. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** for 5.7L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L. .
14. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
15. Evacuate and charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

CONDENSER, A/C

DESCRIPTION

DESCRIPTION

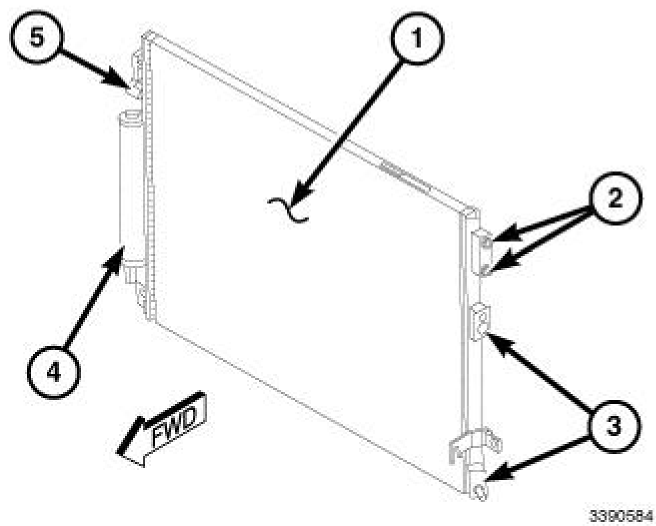


Fig. 126: A/C Condenser, A/C Refrigerant Lines, Receiver/Drier, Brackets & Integral Automatic Transmission Cooler
Courtesy of CHRYSLER GROUP, LLC

The A/C condenser (1) is located in the front of the engine compartment behind the front fascia. The A/C condenser is a heat exchanger that allows the high-pressure refrigerant gas being discharged by the A/C compressor to give up its heat to the air passing over the condenser fins, which causes the refrigerant to cool and change to a liquid state.

The A/C condenser is equipped with tapping blocks for the A/C refrigerant lines (3) and for the receiver/drier (4), mounting brackets (5) and fittings for the integral automatic transmission cooler (2).

OPERATION

OPERATION

..

When air passes through the fins of the A/C condenser, the high-pressure refrigerant gas within the A/C condenser gives up its heat. The refrigerant then condenses as it leaves the A/C condenser and becomes a high-pressure liquid. The volume of air flowing over the condenser fins is critical to the proper cooling performance of the A/C system. Therefore, it is important that there are no objects placed in front of the radiator grille openings at the front of the vehicle or foreign material on the condenser fins that might obstruct proper air flow. Also, any factory-installed air seals or shrouds must be properly reinstalled following radiator or A/C condenser service.

NOTE: **Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.**

The A/C condenser has no serviceable parts. The O-ring seals used on the connections are made from a special type of rubber not affected by refrigerant. The O-ring seals and gaskets must be replaced whenever a refrigerant line is disconnected from the A/C condenser.

The A/C condenser cannot be repaired and must be replaced if leaking or damaged.

REMOVAL

REMOVAL

WARNING: **Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.**

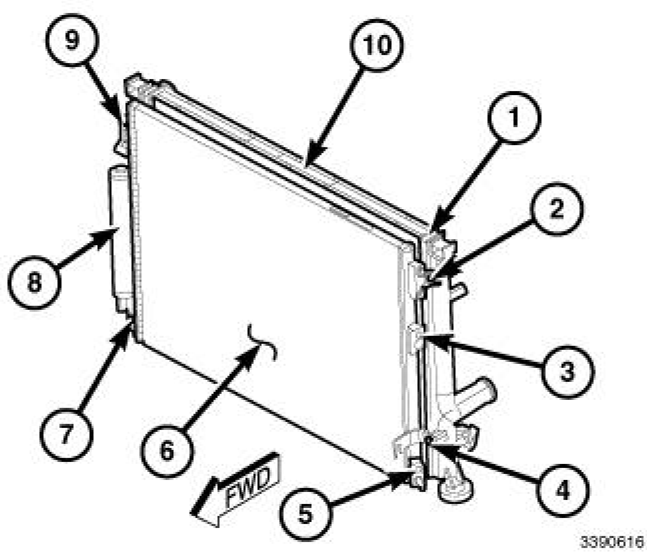


Fig. 127: Transmission Cooler Ports, Refrigerant Line Fittings, Four Bolts, Secure A/C Condenser & Radiator
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Illustration shown with A/C condenser and radiator removed from vehicle for clarity.**

1. Disconnect and isolate the negative battery cable.

2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .
4. Disconnect the automatic transmission cooler lines from the automatic transmission cooler ports (1) and install plugs in the cooler ports.
5. Disconnect the A/C discharge line and A/C liquid line from refrigerant line fittings (3 and 5). Refer to **LINE, A/C LIQUID, REMOVAL** and **LINE, A/C DISCHARGE, REMOVAL**.
6. Install plugs in, or tape over, the opened refrigerant line fittings and condenser ports.
7. Remove the four bolts (2, 4, 7 and 9) that secure A/C condenser (6) to the radiator (10).
8. Carefully tilt the bottom of the A/C condenser forward and lower the condenser out of the vehicle.
9. If required, place the A/C condenser onto a workbench and remove the A/C receiver/drier (8). Refer to **DRIER, A/C RECEIVER, REMOVAL**.

INSTALLATION

INSTALLATION

CAUTION: **Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.**

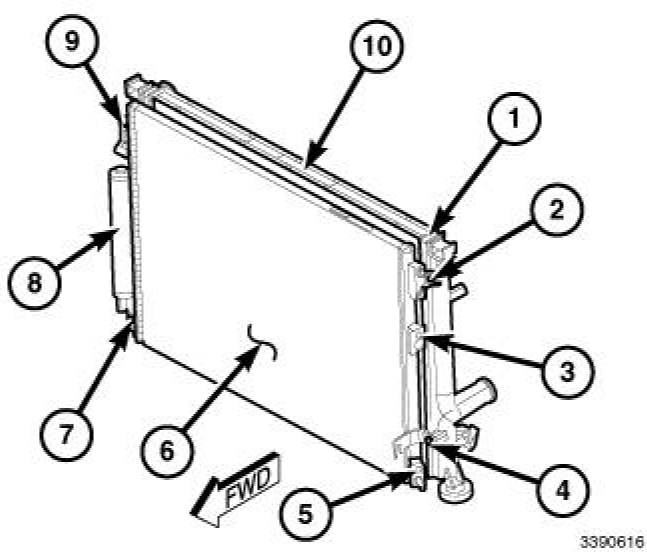


Fig. 128: Transmission Cooler Ports, Refrigerant Line Fittings, Four Bolts, Secure A/C Condenser & Radiator
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Illustration shown with A/C condenser and radiator removed from vehicle for clarity.**

NOTE: **When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.**

NOTE: **If the A/C condenser is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.**

NOTE: **Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets may result in a refrigerant system leak.**

NOTE: **Be certain that each of the radiator and condenser air seals are installed in their proper locations. These air seals are required for the A/C and engine cooling systems to perform as designed.**

1. If required, install the A/C receiver/drier (8) onto the A/C condenser (6). Refer to **DRIER, A/C RECEIVER, INSTALLATION**.
2. Carefully position the A/C condenser to the radiator (10).
3. Install the four bolts (2, 4, 7 and 9) that secure the A/C condenser to the radiator and securely tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Remove the tape or plugs from the opened refrigerant line fittings and condenser ports.
5. Connect the A/C discharge line and the A/C liquid line to the refrigerant line tapping blocks (3 and 5). Refer to **LINE, A/C DISCHARGE, INSTALLATION** and **LINE, A/C LIQUID, INSTALLATION**.
6. Remove the plugs and connect the automatic transmission cooler lines to the cooler ports (1).
7. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
8. Connect the negative battery cable.
9. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
10. If the A/C condenser is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
11. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
12. Check the automatic transmission fluid level and fill as required. Refer to **FLUID AND FILTER, STANDARD PROCEDURE** .

CORE, HEATER

DESCRIPTION

DESCRIPTION

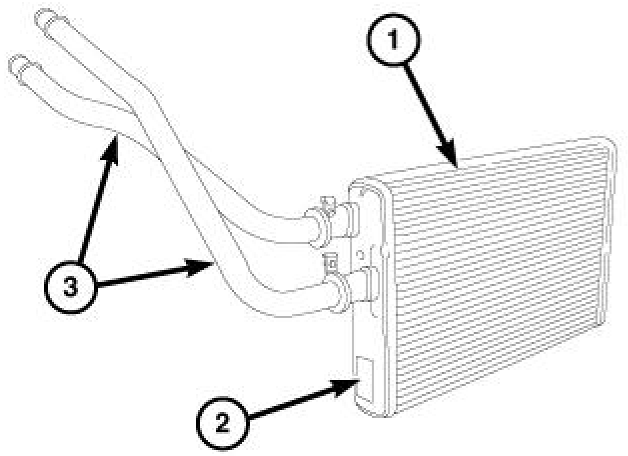


Fig. 129: Heater Core, Tubes & Tank
Courtesy of CHRYSLER GROUP, LLC

The heater core (1) is mounted into the left side of the air distribution housing, which is located behind the instrument panel. The heater core is a heat exchanger made of rows of tubes with fins. The heater core is positioned within the air distribution housing so that only the selected amount of air entering the housing passes through the heater core, before being distributed through the heating and A/C system ducts and outlets. One end of the heater core has a tank (2) that includes fittings for the heater core tubes (3) and O-ring seals.

The heater core can be serviced without removing the HVAC housing from the vehicle.

OPERATION

OPERATION

Engine coolant is circulated through the heater hoses to the heater core at all times. As the coolant flows through the heater core, heat is removed from the engine and is transferred to the heater core tubes and fins. Air directed through the heater core picks up the heat from the heater core fins. The blend-air door(s) allows control of the heater output air temperature by regulating the amount of air flowing through the heater core. The blower motor speed controls the volume of air flowing through the HVAC housing.

The heater core cannot be repaired and must be replaced if restricted, leaking or damaged.

REMOVAL

REMOVAL

WARNING: Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.

WARNING: Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure

way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

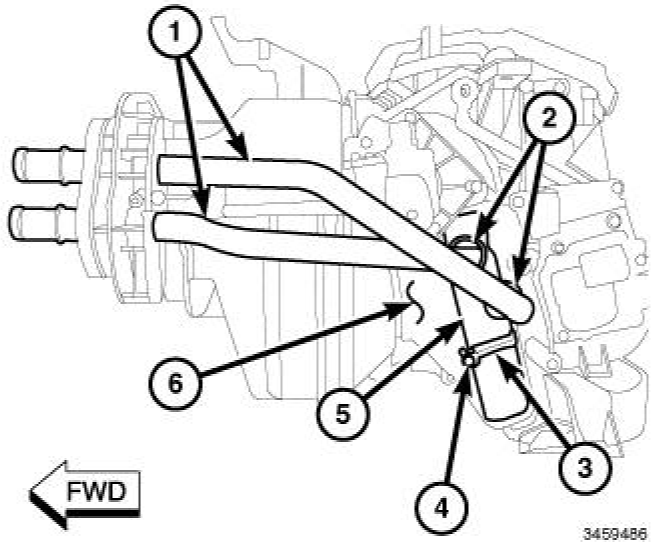


Fig. 130: Two Clamps, Heater Core Tubes, Heater Core, Screw, Heater Core Bracket & HVAC Air Distribution Housing
Courtesy of CHRYSLER GROUP, LLC

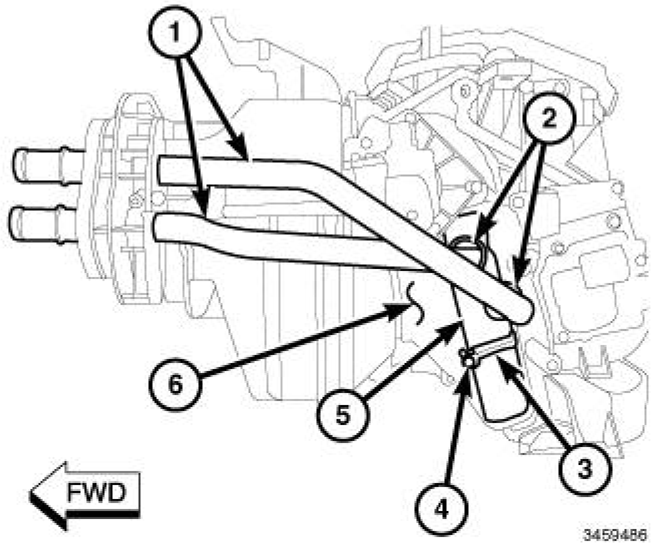
1. Remove the HVAC housing assembly. Refer to **HOUSING, HVAC, REMOVAL**.
2. Remove the two clamps (2) that secure the heater core tubes (1) to the heater core (5).

NOTE: **If required, use your fingers to rotate the clamps to gain access to the clamp retaining screws.**

3. Disconnect the heater core tubes from the heater core and position the tubes out of the way.
4. Remove and discard the heater core tube O-ring seals and install plugs in, or tape over, the opened tubes and heater core ports.
5. Remove the retaining screw (4) that secures the heater core bracket (3) to the driver side of the HVAC air distribution housing (6) and remove the bracket.
6. Carefully pull the heater core straight out of the air distribution housing.

INSTALLATION

INSTALLATION



[Fig. 131: Two Clamps, Heater Core Tubes, Heater Core, Screw, Heater Core Bracket & HVAC Air Distribution Housing]

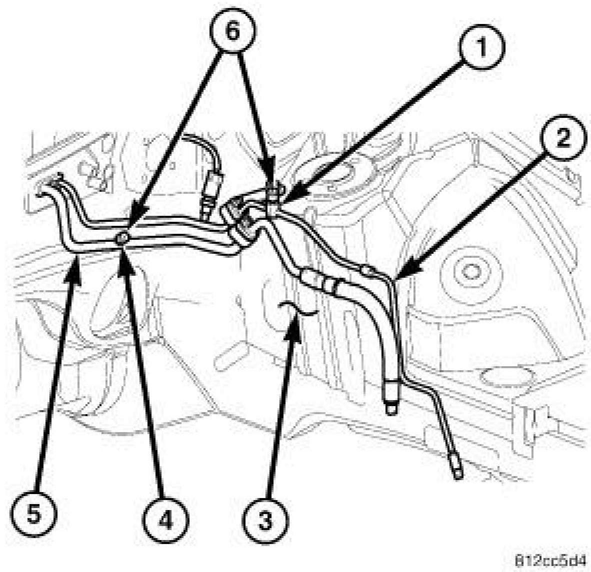
Courtesy of CHRYSLER GROUP, LLC

1. Carefully install the heater core (5) into the driver side of the HVAC air distribution housing (6).
2. Install the heater core bracket (3) and retaining screw (4) and securely tighten.
3. Remove the tape or plugs from the heater core tubes (1) and the heater core ports.
4. Lubricate new O-ring seals with clean engine coolant and install them onto the heater core tubes. Use only the specified O-ring seals as they are made of a special material for the engine cooling system.
5. Connect the heater core tubes to the heater core.
6. Install the two clamps (2) that secure the heater core tubes to the heater core and tighten securely.
7. Install the HVAC housing assembly. Refer to **HOUSING, HVAC, INSTALLATION**.

CORE, SERVICE PORT VALVE

DESCRIPTION

DESCRIPTION



[Fig. 132: Refrigerant System Service Ports Description]
Courtesy of CHRYSLER GROUP, LLC

Refrigerant system service ports are used to recover, recycle, evacuate, charge and test the A/C refrigerant system. Unique sizes are used on the two service ports to ensure the system is not accidentally contaminated with refrigerant or by service equipment used for another refrigerant.

The high side service port (1) is located on the liquid line (2) near the left shock tower (3). The low side service port (4) is located on the suction line (5) near the left shock tower. Both the high side and low side A/C service port valve cores are serviceable.

NOTE: **The protective cap aids in service port sealing and helps protect the refrigerant system from contamination. Remember to always reinstall the protective cap onto the service port when refrigerant system service is complete.**

Each of the service ports has a threaded plastic protective cap (6) installed over it from the factory. The service port caps are serviceable items.

REMOVAL

REMOVAL

WARNING: **Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.**

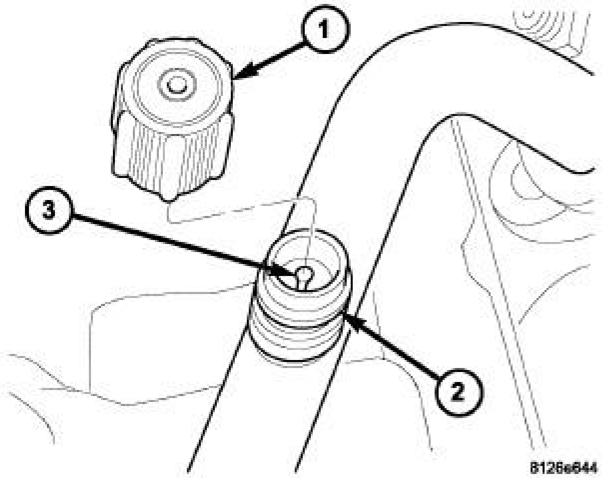


Fig. 133: Identifying A/C Service Port Components
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Typical A/C service port shown in the illustration.**

1. Remove the protective cap (1) from the service port (2).
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Using a Schrader type valve core tool, remove the valve core (3) from the service port.
4. Install a plug in, or tape over the opened service port(s).

INSTALLATION

INSTALLATION

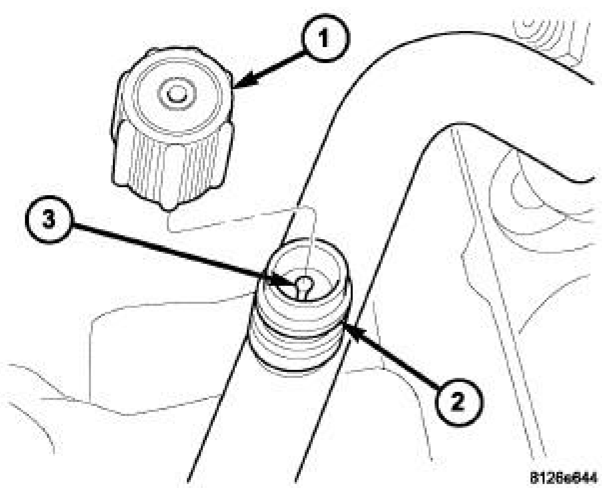


Fig. 134: Identifying A/C Service Port Components

NOTE: **Typical A/C service port shown in the illustration.**

1. Lubricate the valve core (3) with clean refrigerant oil prior to installation. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
2. Remove the tape or plug from the service port (2).

CAUTION: **Damage may result to a service port valve core if the valve core is not fully seated in the A/C service port. Such damage can result in a loss of refrigerant.**

3. Install and tighten the valve core into the service port(s) using a Schrader type valve core tool.
4. Evacuate and charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

NOTE: **The protective cap helps aid in service port sealing and helps protect the refrigerant system from contamination. Remember to always reinstall the protective cap onto the service port when refrigerant system service is complete.**

5. Install the protective cap (1) onto the service port.

DRIER, A/C RECEIVER

DESCRIPTION

DESCRIPTION

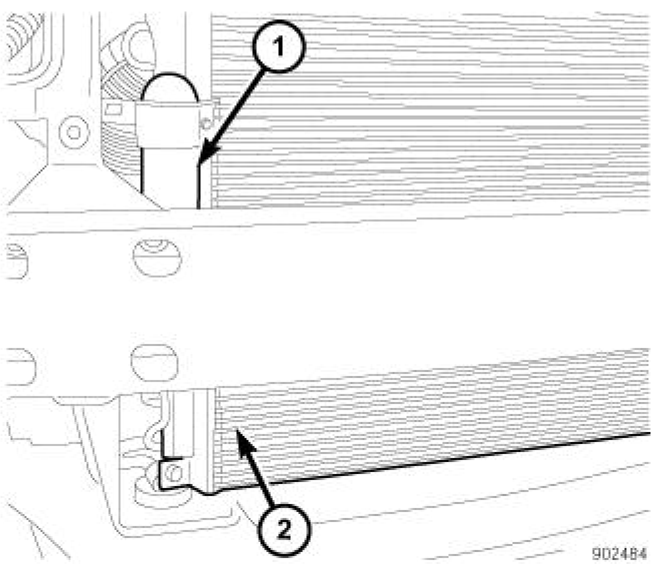


Fig. 135: Receiver/Drier & Condenser

The receiver/drier (1) stores unnecessary refrigerant, filters the refrigerant, helps remove moisture from the refrigerant and retains any refrigerant vapor that may leave the A/C condenser (2) until it becomes a liquid. The receiver/drier is installed on the high-side of the A/C system and is connected directly to the right end of the A/C condenser. The receiver/drier can be easily serviced by removing the front fascia.

OPERATION

OPERATION

The A/C receiver/drier performs a filtering action to prevent foreign material in the refrigerant from contaminating the A/C expansion valve. Refrigerant enters the A/C receiver/drier as a high-pressure, low temperature liquid. Desiccant inside the A/C receiver/drier absorbs any moisture which may have entered and become trapped within the refrigerant system. In addition, during periods of high demand operation of the A/C system, the A/C receiver/drier acts as a reservoir to store surplus refrigerant.

NOTE: **Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.**

The A/C receiver/drier has no serviceable parts except for the O-ring seals, gaskets and the high side service port valve and cap. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals and gaskets must be replaced whenever the A/C receiver/drier is removed.

The A/C receiver/drier cannot be repaired and must be replaced if leaking or damaged, or if an internal failure of the A/C compressor has occurred.

REMOVAL

REMOVAL

WARNING: **Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.**

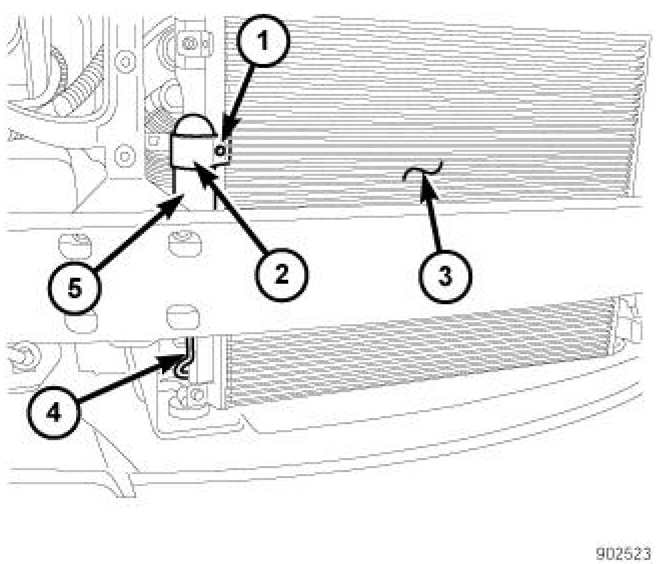


Fig. 136: Reciever/Drier, Mounting Bracket, A/C Condenser, Bolt & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD**

PROCEDURE.

3. Remove the front fascia. Refer to FASCIA, FRONT, REMOVAL .
4. Remove the screw (1) that secures the receiver/drier mounting bracket (2) to the right end of the A/C condenser (3).
5. Remove the bolt (4) that secures the receiver/drier (5) to the A/C condenser.
6. Disconnect the receiver/drier from the A/C condenser and remove and discard the dual-plane seal.
7. Install plugs in, or tape over the opened receiver/drier fitting and the condenser ports.

INSTALLATION

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. Failure to properly adjust the refrigerant oil level prevents the A/C system from operating as designed and can cause serious A/C compressor damage.

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor.

NOTE: When replacing multiple A/C system components, refer to the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.

NOTE: If only the A/C receiver/drier is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

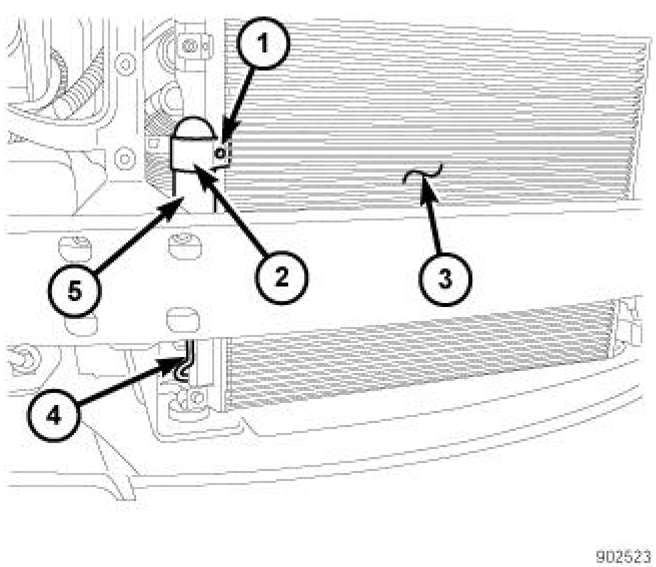


Fig. 137: Reciever/Drier, Mounting Bracket, A/C Condenser, Bolt & Screw

Courtesy of CHRYSLER GROUP, LLC

1. Position the receiver/drier (5) into the engine compartment.
2. Remove the tape or plugs from the receiver/drier fitting and the ports of the A/C condenser (3).
3. Lubricate a new dual-plane seal with clean refrigerant oil and install it onto the receiver/drier fitting. Use only the specified seal, as it is made of a special material for the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Connect the receiver/drier to the right end of the A/C condenser.
5. Install the bolt (4) that secures the receiver/drier to the A/C condenser and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
6. Install the receiver/drier mounting bracket (2) onto the A/C condenser.
7. Install the screw (1) securing the receiver/drier mounting bracket onto the A/C condenser and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
8. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
9. Connect the negative battery cable.
10. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
11. If the A/C receiver/drier is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. When replacing multiple A/C system components, refer to the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
12. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

EVAPORATOR, A/C

DESCRIPTION

DESCRIPTION

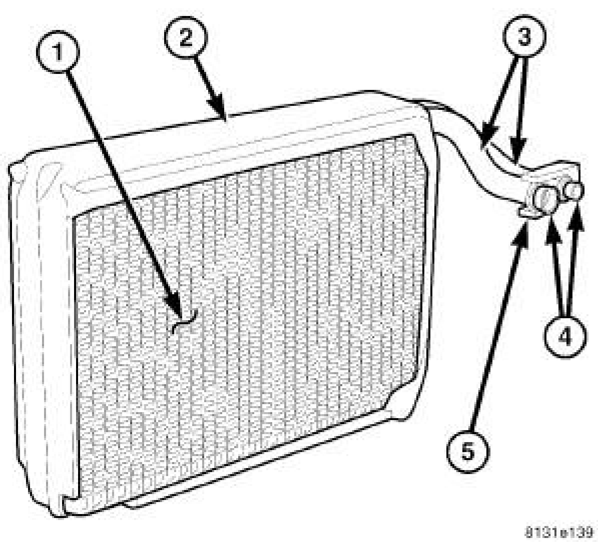


Fig. 138: A/C Evaporator, Insulator, Tubes, O-Rings, & Tapping Block

Courtesy of CHRYSLER GROUP, LLC

The A/C evaporator (1) for the heating-A/C system is located within the HVAC housing, behind the instrument panel. The A/C evaporator and its insulator (2) are positioned in the HVAC housing so that all air entering the housing must pass over the evaporator fins before it is distributed through the heating-A/C system ducts and outlets. However, air passing over the evaporator fins will only be conditioned when the A/C compressor is engaged and circulating refrigerant through the A/C evaporator.

The A/C evaporator tubes (3) are connected and sealed to the A/C expansion valve by use of rubber O-rings (4) and a tapping block (5).

The A/C evaporator can only be serviced by removing and disassembling the HVAC housing assembly.

OPERATION

OPERATION

Refrigerant enters the A/C evaporator from the A/C expansion valve as a low temperature, low pressure mixture of liquid and gas. As air flows over the fins of the A/C evaporator, the humidity in the air condenses on the fins, and the heat from the air is absorbed by the refrigerant. Heat absorption causes the refrigerant to boil and vaporize. The refrigerant becomes a low pressure gas when it leaves the A/C evaporator.

NOTE: **Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line or expansion valve is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.**

The A/C evaporator has no serviceable parts except for the O-ring seals. The O-ring seals used on the connections are made from a special type of rubber not affected by refrigerant. The O-ring seals must be replaced whenever the A/C expansion valve is removed from the A/C evaporator.

The A/C evaporator cannot be repaired and must be replaced if leaking or damaged.

REMOVAL

REMOVAL

WARNING: **Disable the airbag system. Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.**

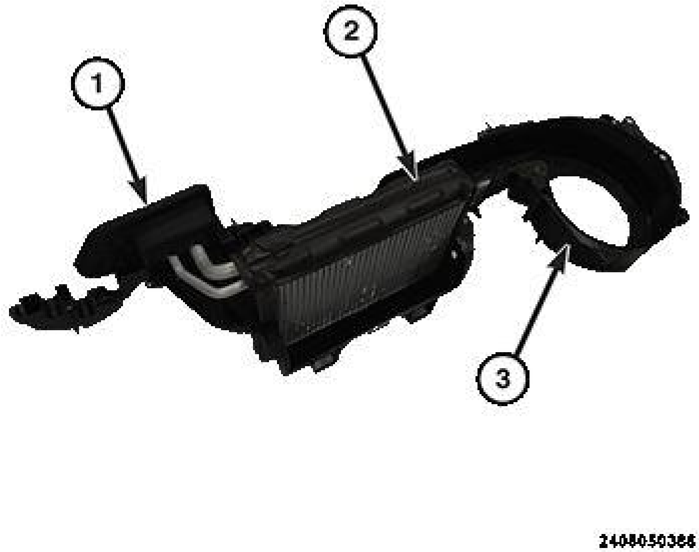


Fig. 139: A/C Evaporator, Foam Seal & HVAC Housing
Courtesy of CHRYSLER GROUP, LLC

1. Remove the HVAC housing assembly. Refer to **HOUSING, HVAC, REMOVAL**.
2. Disassemble the HVAC housing as necessary to access the A/C evaporator (1).
3. Carefully lift the A/C evaporator and the foam seal (2) out of the lower half of the HVAC housing (3).

NOTE: **If the foam seal at the front of the HVAC housing is deformed or damaged, the seal must be replaced.**

4. Remove the A/C expansion valve, tapping block and foam seal from the A/C evaporator. Refer to **VALVE, A/C EXPANSION, REMOVAL**.

INSTALLATION

INSTALLATION

CAUTION: **Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.**

NOTE: **When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.**

NOTE: **If the A/C evaporator is being replaced, add 60 milliliters (2 fluid ounces) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.**

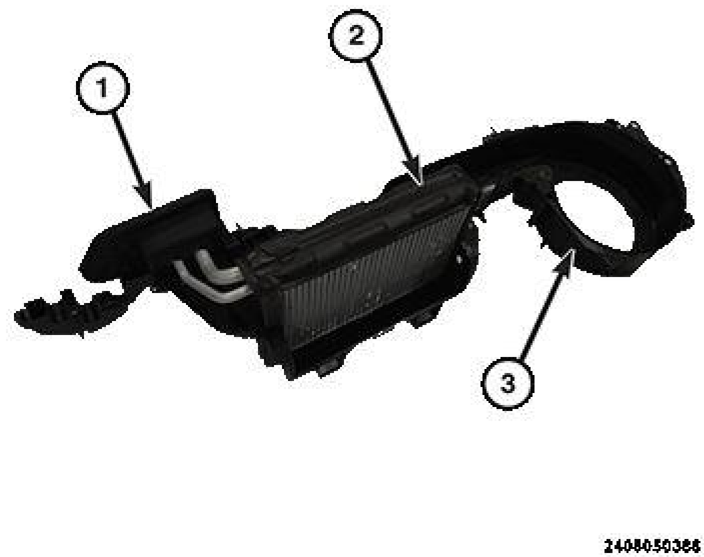


Fig. 140: A/C Evaporator, Foam Seal & HVAC Housing
Courtesy of CHRYSLER GROUP, LLC

1. Install the foam seal (2), tapping block and A/C expansion valve onto the A/C evaporator (1). Refer to **VALVE, A/C EXPANSION, INSTALLATION**.
2. Install the A/C evaporator into the lower half of the HVAC housing (3). Make sure that the evaporator drain within the HVAC housing is clean and unrestricted and that the insulator around the A/C evaporator is properly installed.
3. Assemble the HVAC housing.

NOTE: **If the A/C evaporator is being replaced, add 60 milliliters (2 fluid ounces) of refrigerant oil to the refrigerant system. When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.**

4. Install the HVAC housing assembly. Refer to **HOUSING, HVAC, INSTALLATION**.

LINE, A/C DISCHARGE

REMOVAL

REMOVAL

WARNING: **Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.**

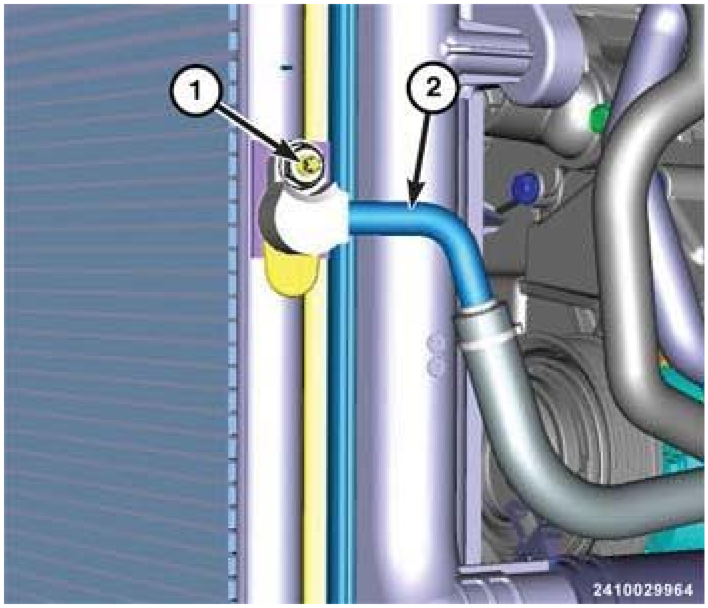


Fig. 141: A/C Discharge Line & Nut
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** for 3.6L, **BODY, AIR CLEANER, REMOVAL** for 5.7L, **BODY, AIR CLEANER, REMOVAL** for 6.2L or **BODY, AIR CLEANER, REMOVAL** for 6.4L.
4. Reach through the headlamp opening in the upper radiator support and remove the nut (1) that secures the A/C discharge line (2) to the A/C condenser.
5. Disconnect the A/C discharge line from the A/C condenser and remove and discard the dual plane seal.
6. Install plugs in, or tape over the discharge line fitting and condenser inlet port.

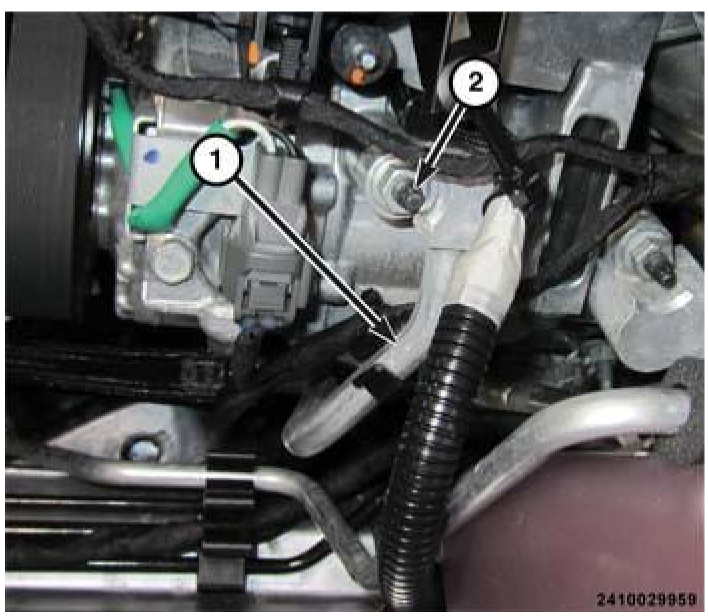


Fig. 142: A/C Discharge Line & Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: **3.6L A/C compressor and refrigerant lines shown in the illustration.**

7. Remove the nut (2) that secures the A/C discharge line (1) to the A/C compressor.
8. Disconnect the A/C discharge line from the A/C compressor and remove and discard the dual plane seal.
9. Install plugs in, or tape over the opened refrigerant line fitting and the compressor port.
10. Remove the A/C discharge line from the engine compartment.

INSTALLATION

INSTALLATION

CAUTION: **Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.**

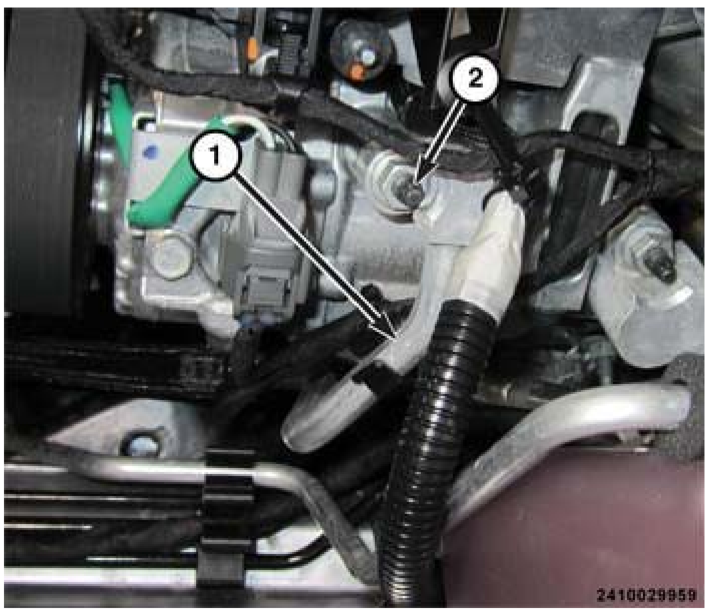


Fig. 143: A/C Discharge Line & Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When replacing multiple A/C system components, refer to the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.**

NOTE: **Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.**

1. Position the A/C discharge line (1) into the engine compartment.
2. Remove the tape or plugs from the opened fitting on the A/C discharge line and the outlet port on the A/C

compressor.

3. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the discharge line fitting. Use only the specified seal as it is made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Install the A/C discharge line onto the A/C compressor.
5. Install the nut (2) that secures the A/C discharge line to the A/C compressor and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .

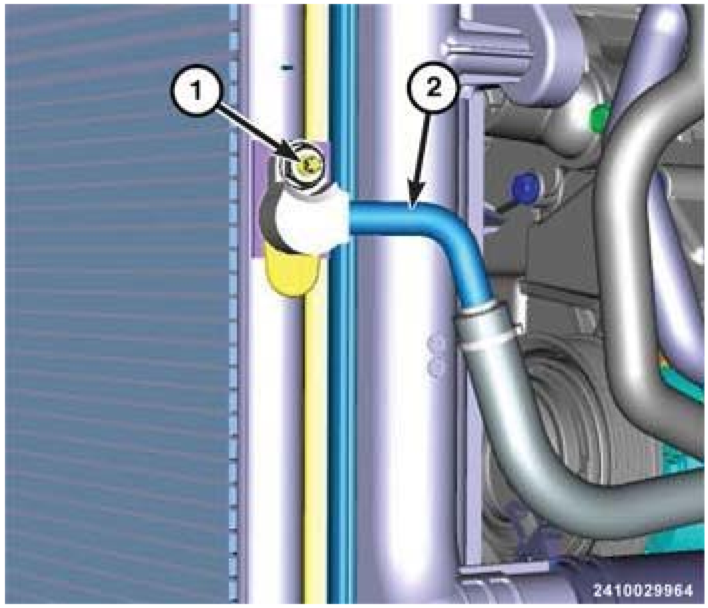


Fig. 144: A/C Discharge Line & Nut
Courtesy of CHRYSLER GROUP, LLC

6. Remove the tape or plugs from the opened discharge line fitting and the inlet port on the A/C condenser.
7. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the discharge line fitting. Use only the specified seal as it is made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
8. Install the A/C discharge line (2) onto the A/C condenser.
9. Reach through the headlamp opening in the upper radiator support and install the nut (1) that secures the A/C discharge line to the A/C condenser and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
10. Install the air cleaner housing. Refer to **BODY, AIR CLEANER, INSTALLATION** for 3.6L, **BODY, AIR CLEANER, INSTALLATION** for 5.7L, **BODY, AIR CLEANER, INSTALLATION** for 6.2L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L.
11. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
12. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
13. Adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.
14. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

LINE, A/C LIQUID

REMOVAL

LIQUID LINE

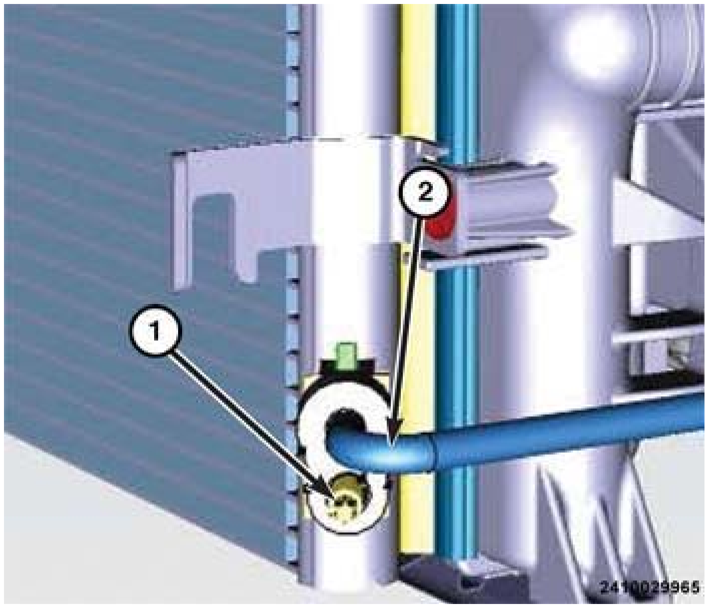


Fig. 145: A/C Liquid Line & Nut
Courtesy of CHRYSLER GROUP, LLC

1. Remove the front belly pan. Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL** .
2. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
3. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
4. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** for 3.6L, **BODY, AIR CLEANER, REMOVAL** for 5.7L, **BODY, AIR CLEANER, REMOVAL** for 6.2L or **BODY, AIR CLEANER, REMOVAL** for 6.4L.
5. Raise and support the vehicle.
6. Remove the nut (1) that secures the A/C liquid line (2) to the A/C condenser.
7. Disconnect the A/C liquid line from the A/C condenser and remove and discard the dual plane seal.
8. Install plugs in, or tape over the opened liquid line fitting and condenser outlet port.

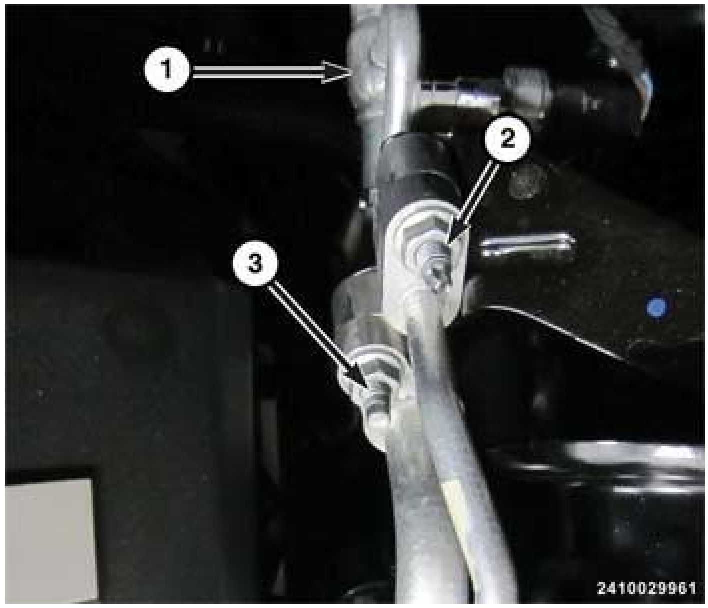


Fig. 146: A/C Suction Line & Nut
Courtesy of CHRYSLER GROUP, LLC

9. Lower the vehicle.
10. Remove the nut (2) that secures the A/C liquid line to the Internal Heat Exchanger (1).

    Disconnect the A/C liquid line from the Internal Heat Exchanger and remove and discard the dual plane seal.

11. Install plugs in, or tape over the opened liquid line fittings.
12. Remove the A/C liquid line from the engine compartment.

INTERNAL HEAT EXCHANGER

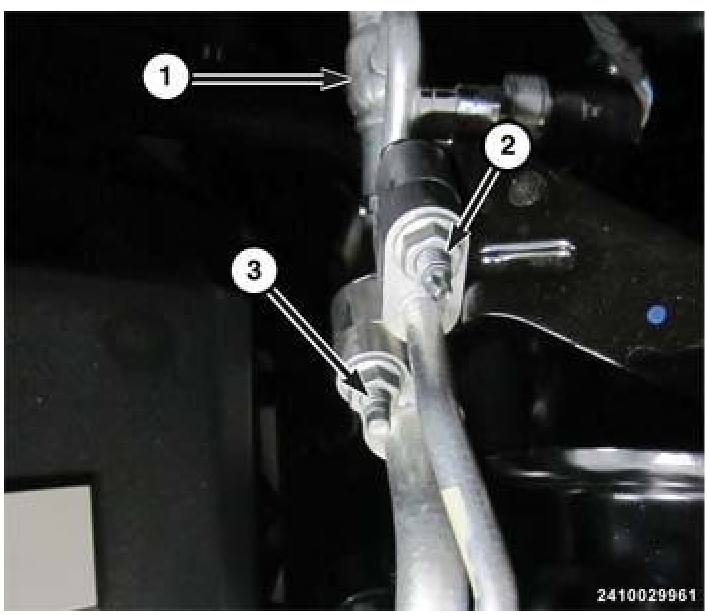


Fig. 147: A/C Suction Line & Nut
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** for 3.6L, **BODY, AIR CLEANER, REMOVAL** for 5.7L, **BODY, AIR CLEANER, REMOVAL** for 6.2L or **BODY, AIR CLEANER, REMOVAL** for 6.4L.
4. Remove the nuts (2 and 3) that secure the suction and liquid lines to the Internal Heat Exchanger (IHX) (1).
5. Disconnect the suction and liquid lines from the IHX and remove and discard the dual plane seal.
6. Install plugs in, or tape over the opened line fittings.

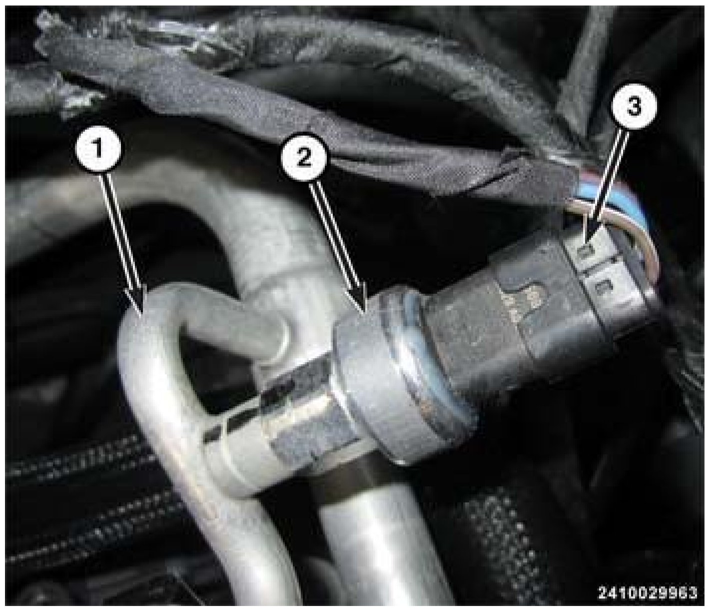


Fig. 148: Internal Heat Exchanger, Pressure Transducer & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the wire harness (3) from the A/C pressure transducer (2).

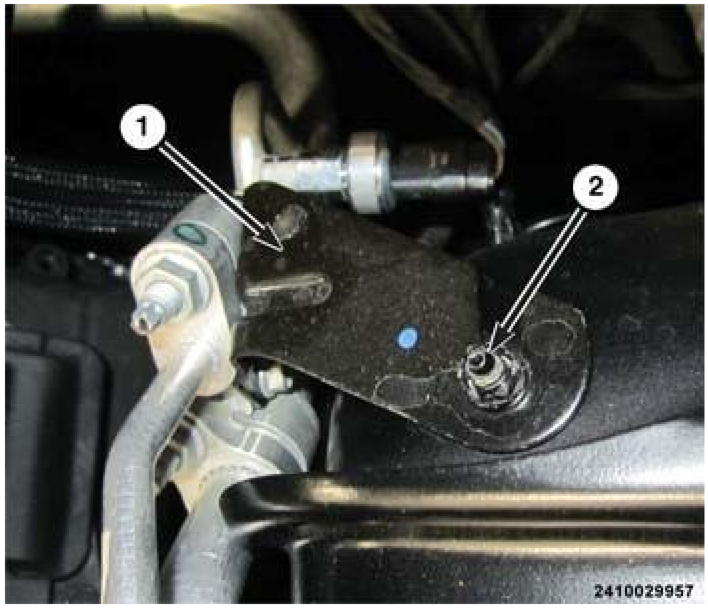


Fig. 149: Refrigerant Line Mounting Bracket & Nut
Courtesy of CHRYSLER GROUP, LLC

8. Remove the nut (2) that secures the refrigerant line mounting bracket (1) to the left front shock tower.

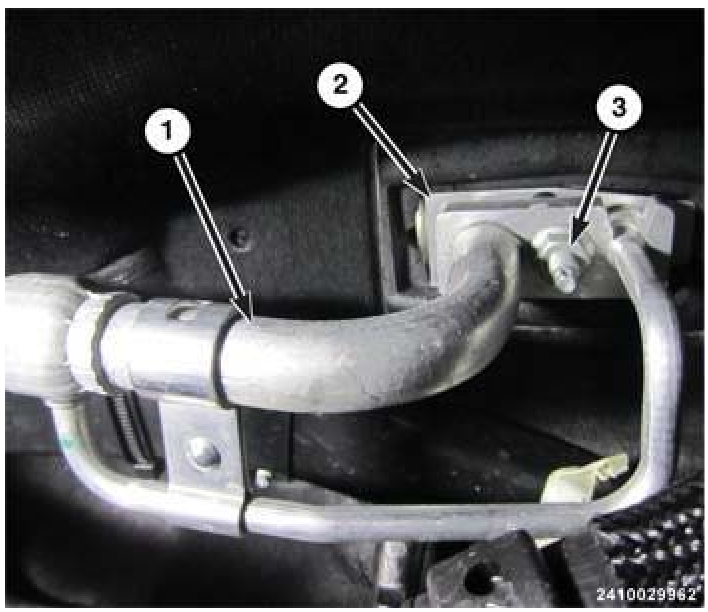


Fig. 150: IHX, A/C Expansion Valve & Nut
Courtesy of CHRYSLER GROUP, LLC

9. Remove the nut (3) that secures the IHX (1) to the A/C expansion valve (2).
10. Disconnect the IHX from the A/C expansion valve.
11. Remove the dual plane seal from the suction and liquid line fittings and discard.
12. Install plugs in, or tape over the opened line fittings and the expansion valve ports.
13. Remove the IHX from the engine compartment.
14. If required, remove the A/C pressure transducer from the IHX. Refer to **TRANSDUCER, A/C PRESSURE, REMOVAL**.

INSTALLATION

LIQUID LINE

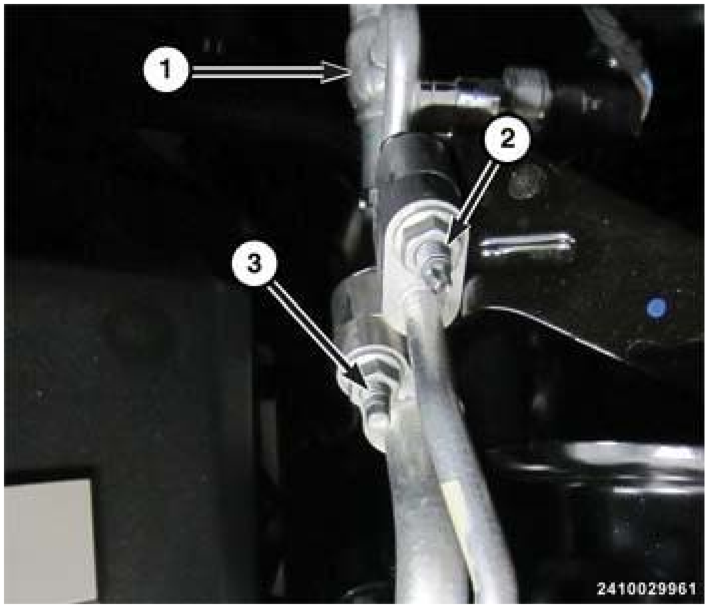


Fig. 151: A/C Suction Line & Nut
Courtesy of CHRYSLER GROUP, LLC

1. Position the liquid line into the engine compartment.
2. Remove the tape or plugs from the fittings that connect the liquid line to the Internal Heat Exchanger (1).
3. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the liquid line fitting. Use only the specified seal as it is made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Connect the A/C liquid line to the Internal Heat Exchanger.
5. Install the nut (2) that secures the A/C liquid line to the Internal Heat Exchanger and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .

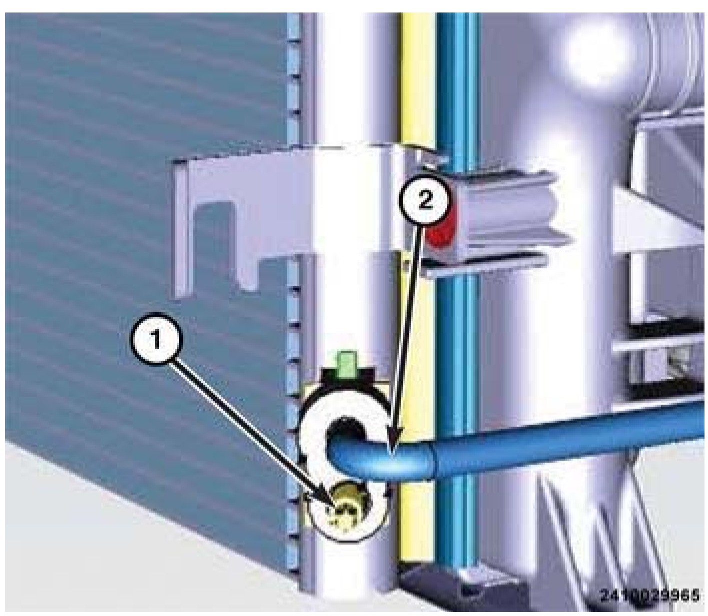


Fig. 152: A/C Liquid Line & Nut
Courtesy of CHRYSLER GROUP, LLC

6. Raise and support the vehicle.
7. Remove the tape or plugs from the fitting on the liquid line (2) and the outlet port of the A/C condenser.
8. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the liquid line fitting. Use only the specified seal as it is made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
9. Connect the A/C liquid line to the A/C condenser.
10. Install the nut (1) that secures the front section of the A/C liquid line to the A/C condenser and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
11. Install the front belly pan. Refer to **BELLY PAN, INSTALLATION** or **BELLY PAN, ENGINE, INSTALLATION** .
12. Lower the vehicle.
13. Install the air cleaner housing. Refer to **BODY, AIR CLEANER, INSTALLATION** for 3.6L, **BODY, AIR CLEANER, INSTALLATION** for 5.7L, **BODY, AIR CLEANER, INSTALLATION** for 6.2L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L.
14. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
15. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
16. Adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.
17. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

INTERNAL HEAT EXCHANGER

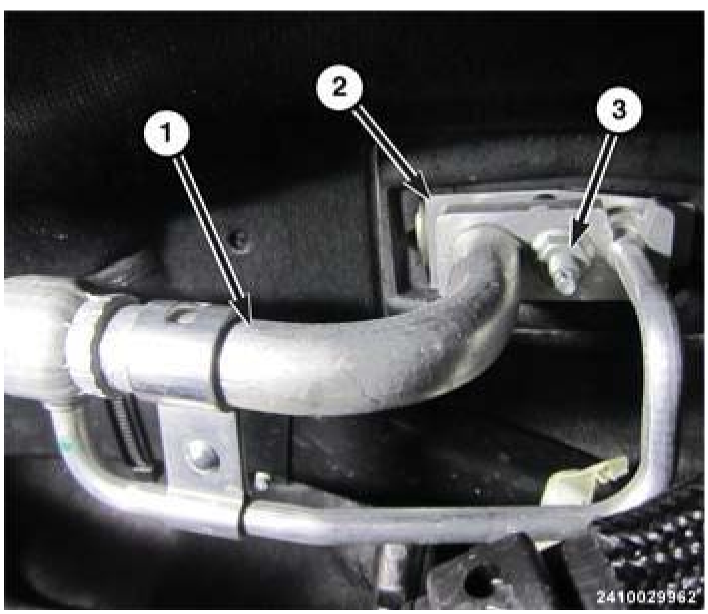


Fig. 153: IHX, A/C Expansion Valve & Nut
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the A/C pressure transducer onto the A/C liquid line. Refer to **TRANSDUCER, A/C PRESSURE, INSTALLATION**.

2. Position the Internal Heat Exchanger (IHX) into the engine compartment.
3. Remove the tape or plugs from the line fittings and the ports in the A/C expansion valve.
4. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the suction and liquid line fittings. Use only the specified seal as it is made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Connect the IHX to the A/C expansion valve.
6. Install the nut (3) that secures the IHX (1) to the A/C expansion valve (2) and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .

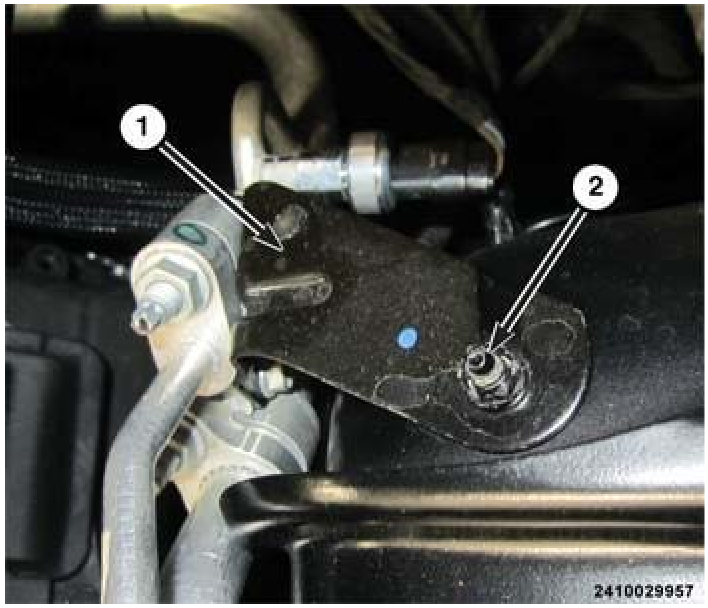


Fig. 154: Refrigerant Line Mounting Bracket & Nut
Courtesy of CHRYSLER GROUP, LLC

7. Install the nut (2) that secures the refrigerant line mounting bracket (1) to the left front shock tower and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .

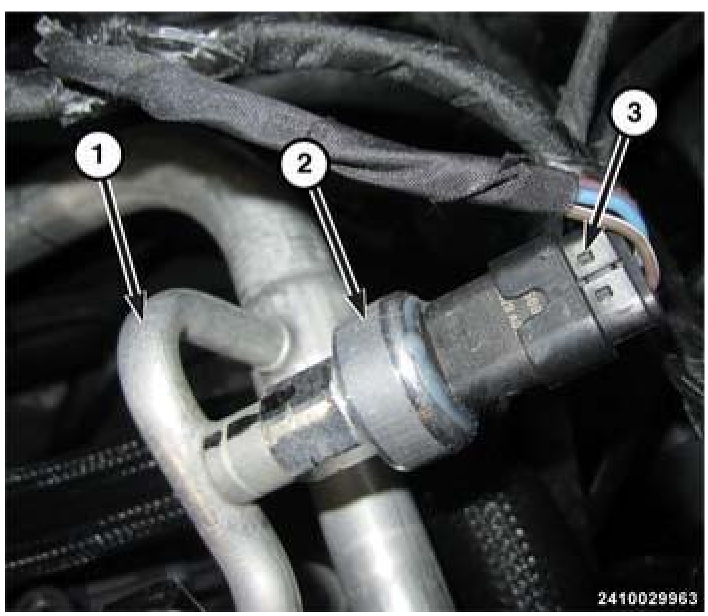


Fig. 155: Internal Heat Exchanger, Pressure Transducer & Harness Connector

Courtesy of CHRYSLER GROUP, LLC

8. Connect the wire harness (3) to the A/C pressure transducer (2).
9. Remove the tape or plugs from the fittings that connect the suction and liquid lines to the IHX.
10. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the liquid line fitting. Use only the specified seal as it is made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

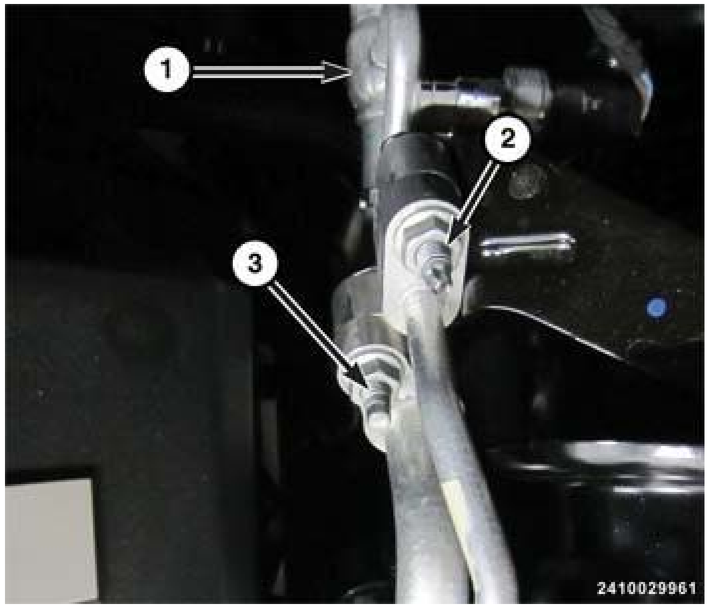


Fig. 156: A/C Suction Line & Nut
Courtesy of CHRYSLER GROUP, LLC

11. Connect the suction and liquid lines to the IHX.
12. Install the nuts (2 and 3) that secure the suction and liquid lines to the IHX and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
13. Install the air cleaner housing. Refer to **BODY, AIR CLEANER, INSTALLATION** for 3.6L, **BODY, AIR CLEANER, INSTALLATION** for 5.7L, **BODY, AIR CLEANER, INSTALLATION** for 6.2L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L.
14. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
15. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
16. Adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.
17. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

LINE, A/C SUCTION

REMOVAL

SUCTION LINE

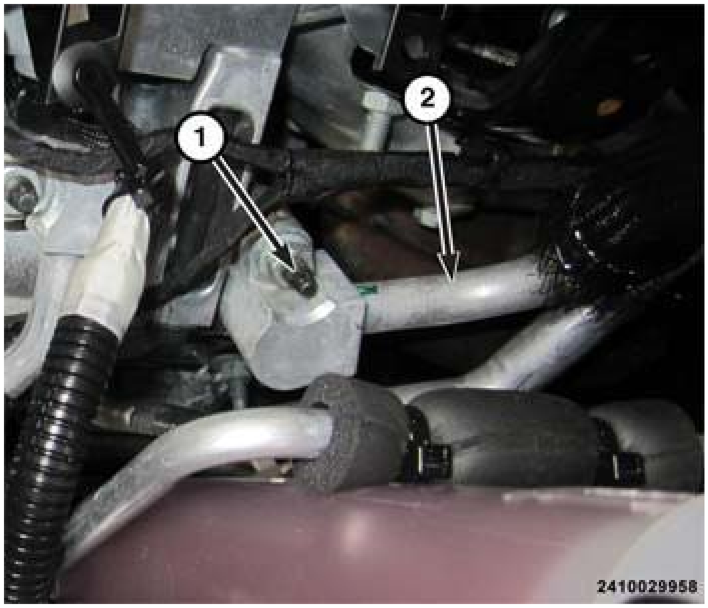


Fig. 157: Suction Line & Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: **3.6L compressor and refrigerant lines shown in the illustration.**

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** for 3.6L, **BODY, AIR CLEANER, REMOVAL** for 5.7L, **BODY, AIR CLEANER, REMOVAL** for 6.2L or **BODY, AIR CLEANER, REMOVAL** for 6.4L.
4. Remove the nut (1) that secures the suction line (2) to the A/C compressor.
5. Disconnect the A/C suction line from the A/C compressor and remove and discard the dual plane seal.
6. Install plugs in, or tape over the opened suction line fitting and compressor inlet port.

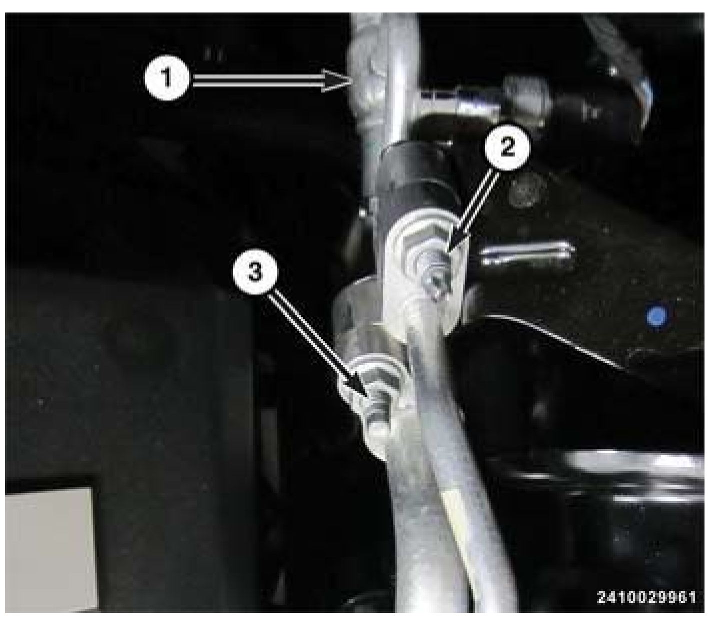


Fig. 158: A/C Suction Line & Nut
Courtesy of CHRYSLER GROUP, LLC

7. Remove the nut (3) that secures the suction line to the Internal Heat Exchanger (IHX) (1).
8. Disconnect the suction line from the IHX and remove and discard the dual plane seal.
9. Install plugs in, or tape over the opened line fittings.
10. Remove the suction line from the engine compartment.

INTERNAL HEAT EXCHANGER

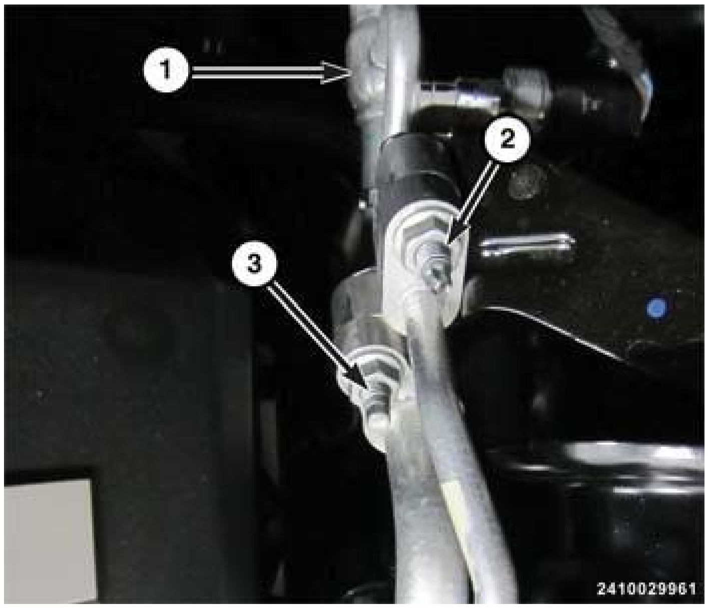


Fig. 159: A/C Suction Line & Nut
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the air cleaner housing. Refer to **BODY, AIR CLEANER, REMOVAL** for 3.6L, **BODY, AIR CLEANER, REMOVAL** for 5.7L, **BODY, AIR CLEANER, REMOVAL** for 6.2L or **BODY, AIR CLEANER, REMOVAL** for 6.4L.
4. Remove the nuts (2 and 3) that secure the suction and liquid lines to the Internal Heat Exchanger (IHX) (1).
5. Disconnect the suction and liquid lines from the IHX and remove and discard the dual plane seal.
6. Install plugs in, or tape over the opened line fittings.

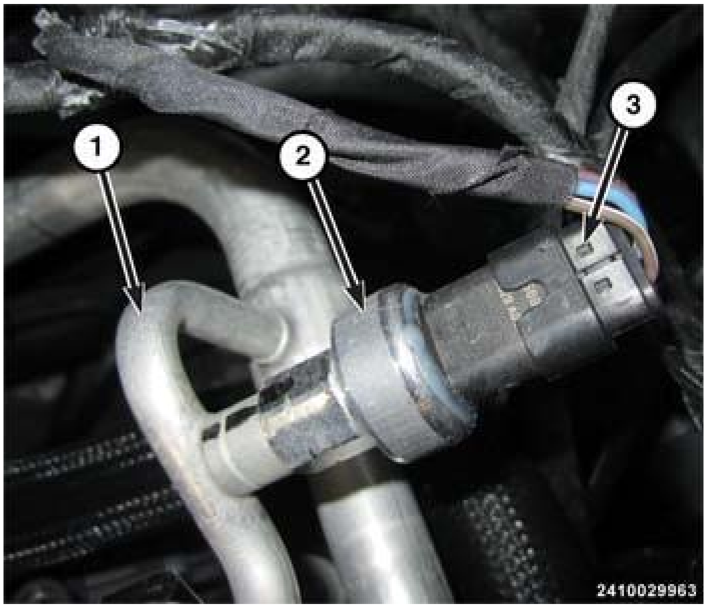


Fig. 160: Internal Heat Exchanger, Pressure Transducer & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the wire harness (3) from the A/C pressure transducer (2).

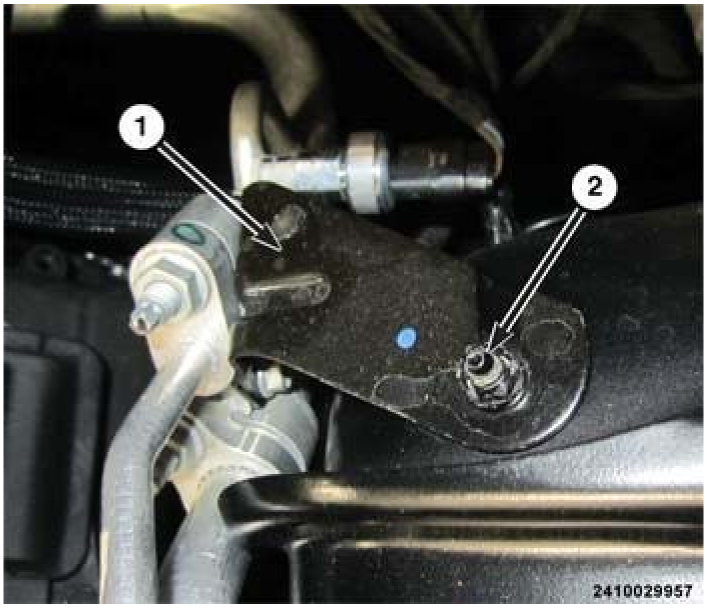


Fig. 161: Refrigerant Line Mounting Bracket & Nut
Courtesy of CHRYSLER GROUP, LLC

8. Remove the nut (2) that secures the refrigerant line mounting bracket (1) to the left front shock tower.

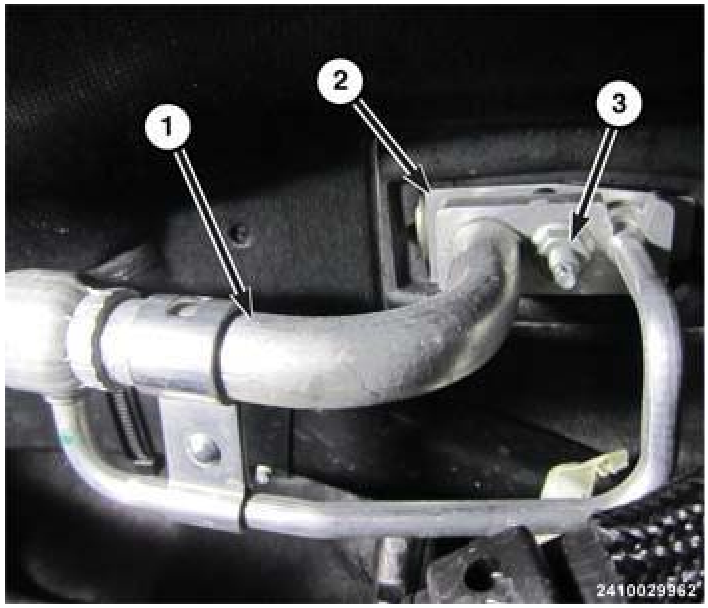


Fig. 162: IHX, A/C Expansion Valve & Nut
Courtesy of CHRYSLER GROUP, LLC

9. Remove the nut (3) that secures the IHX (1) to the A/C expansion valve (2).
10. Disconnect the IHX from the A/C expansion valve.
11. Remove the dual plane seal from the suction and liquid line fittings and discard.
12. Install plugs in, or tape over the opened line fittings and the expansion valve ports.
13. Remove the IHX from the engine compartment.
14. If required, remove the A/C pressure transducer from the IHX. Refer to **TRANSDUCER, A/C PRESSURE, REMOVAL**.

INSTALLATION

SUCTION LINE

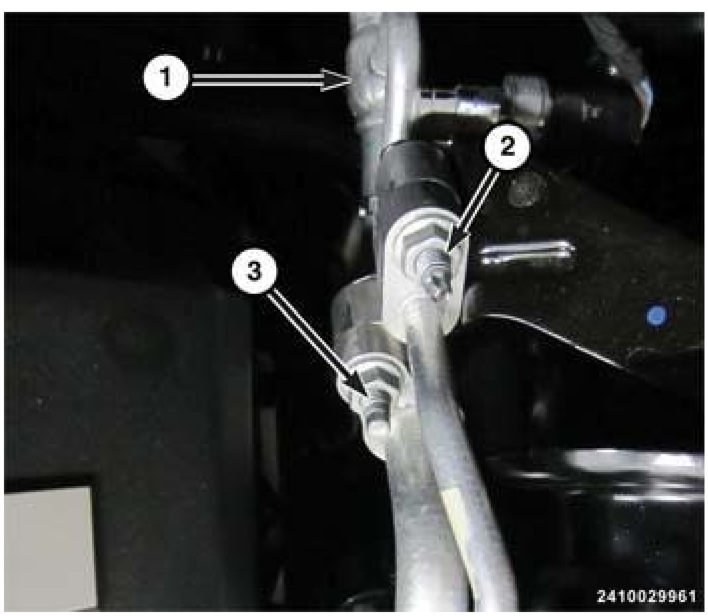


Fig. 163: A/C Suction Line & Nut

Courtesy of CHRYSLER GROUP, LLC

1. Position the front section of the suction line into the engine compartment.
2. Remove the tape or plugs from the fittings that connect the suction line to the Internal Heat Exchanger (IHX).
3. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the suction line fitting. Use only the specified seal as it is made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Connect the suction line to the Internal IHX (1).
5. Install the nut (3) that secures the suction line to the IHX and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS**. .
6. Remove the tape or plugs from the fitting on the suction line and the inlet port of the A/C compressor.
7. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the suction line fitting. Use only the specified seal as it is made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

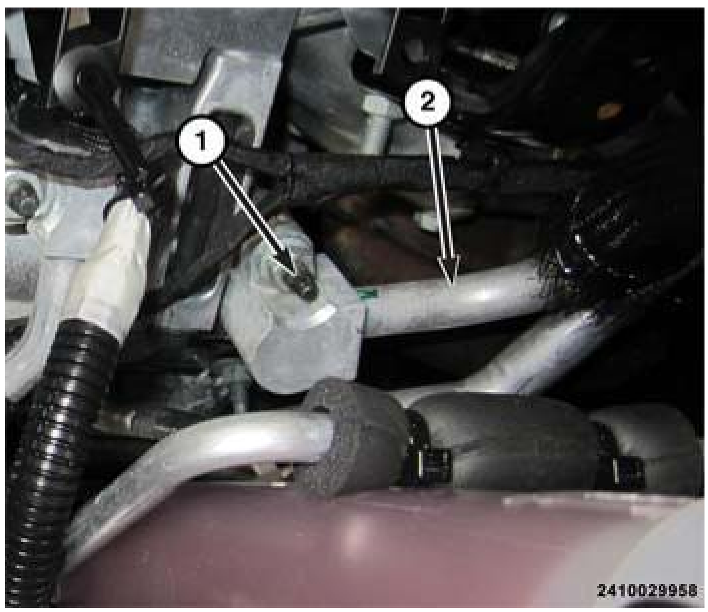


Fig. 164: Suction Line & Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: **3.6L compressor and refrigerant lines shown in the illustration.**

8. Connect the suction line (2) to the A/C compressor.
9. Install the nut (1) that secures the suction line to the A/C compressor and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
10. Install the air cleaner housing. Refer to **BODY, AIR CLEANER, INSTALLATION** for 3.6L, **BODY, AIR CLEANER, INSTALLATION** for 5.7L, **BODY, AIR CLEANER, INSTALLATION** for 6.2L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L.
11. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
12. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

13. Adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.
14. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

INTERNAL HEAT EXCHANGER

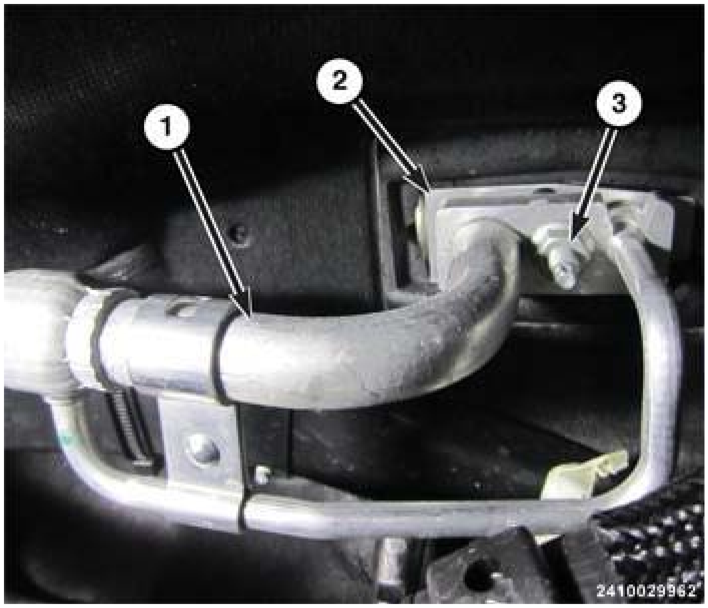


Fig. 165: IHX, A/C Expansion Valve & Nut
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install the A/C pressure transducer onto the A/C liquid line. Refer to **TRANSDUCER, A/C PRESSURE, INSTALLATION**.
2. Position the Internal Heat Exchanger (IHX) into the engine compartment.
3. Remove the tape or plugs from the line fittings and the ports in the A/C expansion valve.
4. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the suction and liquid line fittings. Use only the specified seal as it is made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Connect the IHX to the A/C expansion valve.
6. Install the nut (3) that secures the IHX (1) to the A/C expansion valve (2) and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .

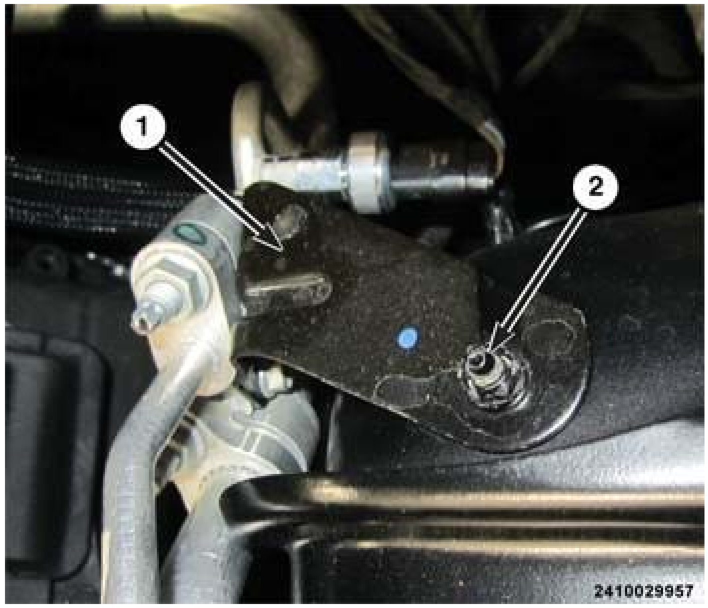


Fig. 166: Refrigerant Line Mounting Bracket & Nut
Courtesy of CHRYSLER GROUP, LLC

7. Install the nut (2) that secures the refrigerant line mounting bracket (1) to the left front shock tower and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .

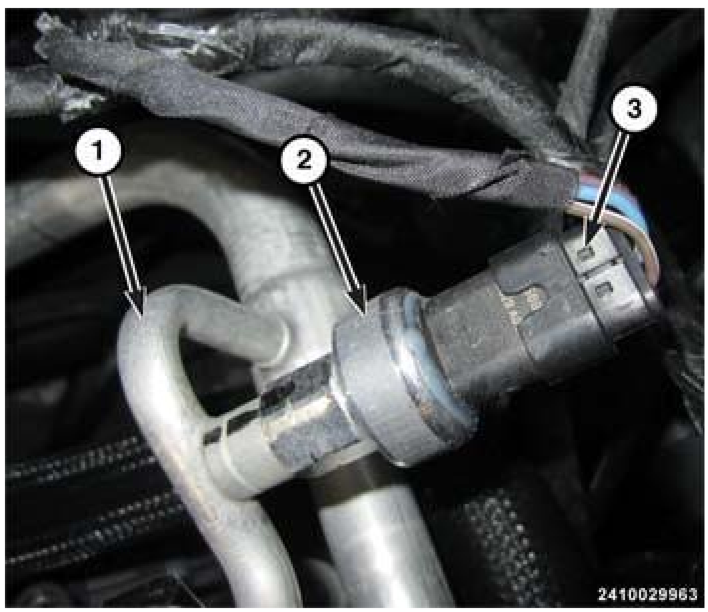


Fig. 167: Internal Heat Exchanger, Pressure Transducer & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

8. Connect the wire harness (3) to the A/C pressure transducer (2).
9. Remove the tape or plugs from the fittings that connect the suction and liquid lines to the IHX.
10. Lubricate a new dual plane seal with clean refrigerant oil and install it onto the liquid line fitting. Use only the specified seal as it is made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

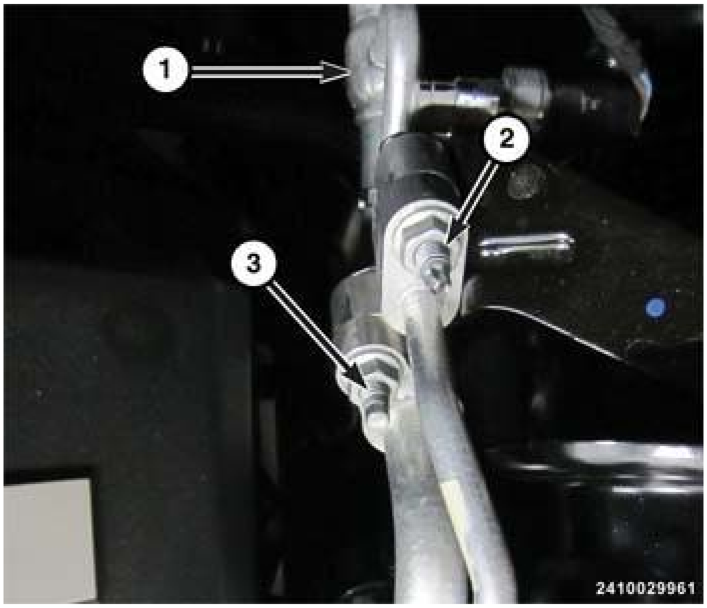


Fig. 168: A/C Suction Line & Nut
Courtesy of CHRYSLER GROUP, LLC

11. Connect the suction and liquid lines to the IHX.
12. Install the nuts (2 and 3) that secure the suction and liquid lines to the IHX and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
13. Install the air cleaner housing. Refer to **BODY, AIR CLEANER, INSTALLATION** for 3.6L, **BODY, AIR CLEANER, INSTALLATION** for 5.7L, **BODY, AIR CLEANER, INSTALLATION** for 6.2L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L.
14. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
15. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
16. Adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.
17. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

OIL, REFRIGERANT

STANDARD PROCEDURE

STANDARD PROCEDURE-REFRIGERANT OIL LEVEL

When an A/C system is assembled at the factory, all components except the A/C compressor are refrigerant oil free. After the refrigerant system has been charged and operated, the refrigerant oil in the A/C compressor is dispersed throughout the refrigerant system. The receiver/drier, A/C evaporator, A/C condenser and the A/C compressor will each retain a significant amount of the needed refrigerant oil.

It is important to have the correct amount of refrigerant oil in the A/C system. This ensures proper lubrication of the A/C compressor. Too little oil will result in damage to the A/C compressor, while too much oil will reduce the cooling capacity of the A/C system and consequently result in higher discharge air temperatures.

NOTE: **The refrigerant oil in the A/C system is unique depending on the A/C compressor used. Use only PAG oils that are designed to work with the**

refrigerant type and A/C compressor in the vehicle. Always refer to the A/C Underhood Specification Label for the correct oil designation. The refrigerant oil container should be kept tightly capped until it is ready for use, and then tightly recapped after use to prevent contamination from dirt and moisture. Refrigerant oil will quickly absorb any moisture it comes in contact with, therefore, special effort must be used to keep all system components moisture-free. Moisture in the refrigerant oil is very difficult to remove and will cause a reliability problem with the A/C compressor.

NOTE: **Most reclaim/recycling equipment will measure the lubricant being removed during recovery. This amount of lubricant should be added back into the system. Refer to the reclaim/recycling equipment manufacturers instructions.**

It will not be necessary to check the oil level in the A/C compressor or to add oil, unless there has been an oil loss. An oil loss may occur due to a rupture or leak from a refrigerant line, a connector fitting, a component, or a component seal. If a leak occurs, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system after the repair has been made. Refrigerant oil loss will be evident at the leak point by the presence of a wet, shiny surface around the leak.

Refrigerant oil must be added when an A/C condenser, A/C evaporator or A/C receiver/drier is replaced. See the REFRIGERANT OIL CAPACITIES chart.

The refrigerant oil level in a new A/C compressor must first be adjusted prior to compressor installation. See the COMPRESSOR OIL DRAIN PROCEDURE

REFRIGERANT OIL TYPE

A/C Compressor	Oil Type
Denso Variable Displacement- 3.6L/5.7L/6.4L Engines	* Use only ND-12 PAG oil

* Always use the type of PAG oil listed for the model being serviced. See A/C Underhood Specification Label located in the engine compartment. Do not mix different types of PAG oils.

REFRIGERANT OIL CAPACITIES

COMPONENT	ml.	oz.
A/C Condenser	30	1.0
A/C Evaporator	60	2.0
A/C Receiver/drier	30	1.0
A/C Compressor	Drain and measure the oil from the old compressor (See COMPRESSOR OIL DRAIN PROCEDURE below)	

COMPRESSOR OIL DRAIN PROCEDURE

CAUTION: **Be certain to adjust the refrigerant system oil level when replacing an A/C compressor. Failure to properly drain and measure the refrigerant oil from the A/C compressor can prevent the A/C system from operating as designed and**

cause serious compressor damage.

The A/C compressor is filled with refrigerant oil from the factory. Use the following procedure to drain and measure refrigerant oil from the A/C compressor.

1. Drain all of the refrigerant oil from the old A/C compressor into a clean measured container.
2. Drain all of the refrigerant oil from the new A/C compressor into a clean measured container.
3. Refill the new A/C compressor with the same amount of refrigerant oil that was drained out of the old compressor. Use only clean refrigerant oil of the type specified for the A/C compressor in the vehicle.
4. Install the new A/C compressor onto the engine. Refer to **COMPRESSOR, A/C, INSTALLATION**.

REFRIGERANT

SPECIFICATIONS

REFRIGERANT SPECIFICATIONS

REFRIGERANT CHARGE CAPACITY	
APPLICATION	**CAPACITY**
R-134a	681 g (1.50 lbs.)
R-1234yf	709 g (1.56 lbs.)

VALVE, A/C EXPANSION

DESCRIPTION

DESCRIPTION

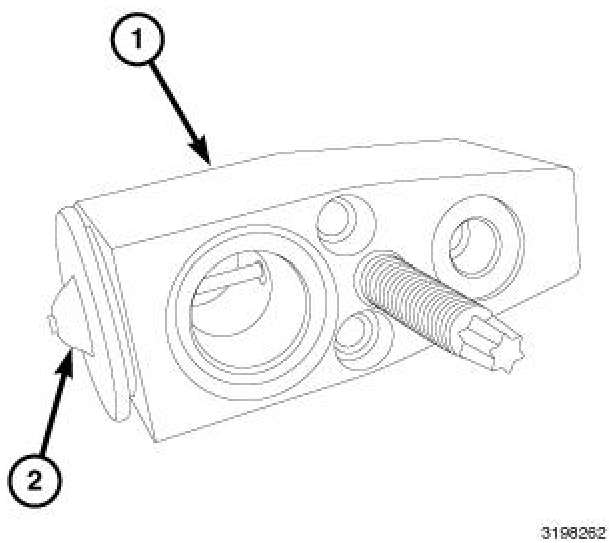


Fig. 169: H-valve Type Body & Thermal Sensor
Courtesy of CHRYSLER GROUP, LLC

The A/C expansion valve controls the amount of refrigerant entering the A/C evaporator. The A/C expansion valve is of a thermostatic expansion valve (TXV) design and consists of an aluminum H-valve type body (1), with an integral thermal sensor (2). The A/C expansion valve is located at the dash panel between the A/C refrigerant lines and the A/C evaporator.

OPERATION

OPERATION

The A/C expansion valve controls the high-pressure, low temperature liquid refrigerant from the A/C liquid line and converts it into a low-pressure, low-temperature mixture of liquid and gas before it enters the A/C evaporator. A mechanical sensor in the A/C expansion valve monitors the temperature and pressure of the refrigerant leaving the A/C evaporator through the A/C suction line, and adjusts the orifice size at the liquid line port to let the proper amount of refrigerant into the evaporator to meet the vehicle A/C cooling requirements. Controlling the refrigerant flow through the A/C evaporator ensures that none of the refrigerant leaving the A/C evaporator is still in a liquid state, which could damage the A/C compressor.

NOTE: **Replacement of the refrigerant line O-ring seals is required anytime a refrigerant line is disconnected from the expansion valve. Failure to replace the rubber O-ring seals could result in a refrigerant system leak.**

The A/C expansion valve is factory calibrated and cannot be adjusted or repaired and must be replaced if inoperative or damaged.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - A/C EXPANSION VALVE

WARNING: **Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.**

NOTE: **The A/C expansion valve should only be tested following testing of the A/C compressor.**

NOTE: **Liquid CO^2 is required to test the A/C expansion valve. This material is available from most welding supply facilities. Liquid CO^2 is also available from companies which service and sell fire extinguishers.**

When testing the A/C expansion valve, the work area and the vehicle temperature must be 21Ā° to 27Ā°C (70Ā° to 85Ā°F). To test the expansion valve:

1. Connect a charging station or manifold gauge set to the refrigerant system service ports. Refer to **PLUMBING, STANDARD PROCEDURE**.
2. Verify the refrigerant system charge level by conducting the A/C Performance Test. Refer to **DIAGNOSIS AND TESTING**.
3. Close all doors, windows and vents to the passenger compartment.
4. Set the A/C-heater controls so that the A/C compressor is operating, the temperature control is in the highest temperature position, the mode-air doors is directing air output to the floor and the blower motor operating is operating at the highest speed.
5. Start the engine and allow it to idle. After the engine has reached normal operating temperature, allow the passenger compartment to heat up. This will create the need for maximum refrigerant flow into the A/C evaporator.

6. If the refrigerant charge is sufficient, the discharge (high pressure) gauge should read 827 kPa to 1655 kPa (120 psi to 240 psi). The suction (low pressure) gauge should read 207 kPa to 345 kPa (30 psi to 50 psi). If OK, go to 7. If not OK, replace the inoperative A/C expansion valve.

WARNING: Protect the skin and eyes from exposure to liquid CO^2 or personal injury can result.

7. If the suction (low pressure) gauge reads within the specified range, freeze the A/C expansion valve for 30 seconds using liquid CO^2 or another suitable super-cold material. **Do not spray R-134a or R-12 refrigerant on the A/C expansion valve for this test.** The suction (low pressure) gauge reading should drop by 69 kPa (10 psi). If OK, go to 8. If not OK, replace the inoperative A/C expansion valve. Refer to **VALVE, A/C EXPANSION, REMOVAL**.
8. Allow the A/C expansion valve to thaw. The suction (low pressure) gauge reading should stabilize at 207 kPa to 345 kPa (30 psi to 50 psi). If not OK, replace the inoperative A/C expansion valve. Refer to **VALVE, A/C EXPANSION, REMOVAL**.

REMOVAL

REMOVAL

WARNING: Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious injury or death.

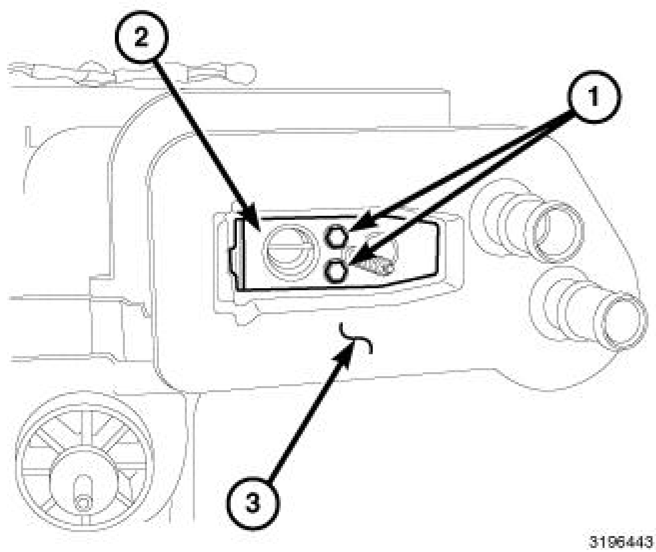


Fig. 170: A/C Expansion Valve, Bolts & Seal
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
3. Remove the Internal Heat Exchanger (IHX). Refer to **LINE, A/C LIQUID, REMOVAL**.
4. Install plugs in, or tape over the opened suction and liquid line fittings.

5. Remove the two bolts (1) that secure the A/C expansion valve (2) to the evaporator tube tapping block located within the seal (3).
6. Remove the A/C expansion valve from the evaporator tube tapping block.
7. Remove the O-ring seals from the evaporator tube fittings and discard.
8. Install plugs in, or tape over the opened evaporator tube fittings.

INSTALLATION

INSTALLATION

CAUTION: **Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.**

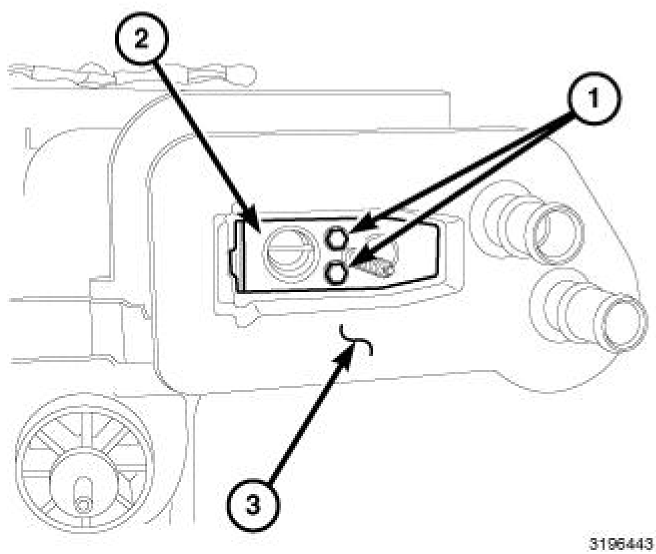


Fig. 171: A/C Expansion Valve, Bolts & Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: **When replacing multiple A/C system components, see the Refrigerant Oil Capacities chart to determine how much oil should be added to the refrigerant system. Refer to OIL, REFRIGERANT, STANDARD PROCEDURE.**

NOTE: **Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.**

1. Remove the tape or plugs from the evaporator tube fittings and all of the expansion valve ports.
2. Lubricate new O-ring seals with clean refrigerant oil and install them onto the evaporator tube fittings. Use only the specified O-ring seals as they are made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
3. Install the A/C expansion valve (2) onto the evaporator tube tapping block.
4. Install the two bolts (1) that secure the A/C expansion valve to the evaporator tube tapping block and tighten to the proper torque specification. Refer to SPECIFICATIONS.

5. Remove the tape or plugs from the suction and liquid line fittings.
6. Lubricate a new seal with clean refrigerant oil and install onto the suction and liquid line fittings. Use only the specified seal as it is made of a special material for the specific refrigerant in the system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
7. Install the Internal Heat Exchanger (IHX). Refer to **LINE, A/C LIQUID, INSTALLATION**.
8. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
9. Evacuate the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.
10. Adjust the refrigerant oil level. Refer to **OIL, REFRIGERANT, STANDARD PROCEDURE**.
11. Charge the refrigerant system. Refer to **PLUMBING, STANDARD PROCEDURE**.

Article GUID: A00735863

DESCRIPTION

DESCRIPTION

An electrically-operated horn system is standard factory-installed equipment in this vehicle. Depressing the Driver AirBag (DAB) trim cover in the center of the steering wheel actuates the horn switch contacts, which provides the vehicle operator with a convenient, audible signaling device that can be used to alert pedestrians or the operators of other vehicles in near proximity.

The Body Control Module (BCM) (also known as the Common Body Controller/CBC) serves as the controller for the horn system, which also allows the BCM to utilize the horn system when providing audible outputs to support other vehicle features such as the horn chirp verification of the Remote Keyless Entry (RKE) and Remote Start systems, as well as the pulsing horn deterrent feature of the optional Vehicle Theft Alarm (VTA) and the RKE Panic mode.

The horn system includes the following major components, which are described in further detail elsewhere in this service information:

- **Horn Relay** - The horn relay is an International Standards Organization (ISO) micro relay located within the front Power Distribution Center (PDC). The front PDC is located on the top of the right front wheel house forward of the right strut tower within the engine compartment.
- **Horns** - The horns are each located on an integral mounting bracket secured to the right or left forward-facing surface of the Front End Module (FEM) carrier, just in front of the upper radiator cross member. The front fascia does not need to be removed to gain access to the horns for service.
- **Horn Switch Plate** - The floating horn switch plate is secured to the back of the DAB module within the steering wheel hub cavity and also serves as the mounting bracket between the DAB and the steering wheel.

Certain functions and features of the horn system rely upon resources shared with other electronic modules in the vehicle over the Controller Area Network (CAN) data bus. Other electronic modules in the vehicle that may affect horn system operation are:

- **Body Control Module** - The Body Control Module (BCM) is located on the right cowl side inner (kick) panel within the passenger compartment, where it is concealed behind the cowl side inner trim and the instrument panel. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Radio Frequency Hub Module** - The Radio Frequency Hub Module (RFHM) (also known as the RF Hub) is located near the center of the shelf support behind the rear seat back and is concealed beneath the package tray interior trim. Refer to **MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION** .
- **Steering Column Control Module** - The Steering Column Control Module (SCCM) is located near the top of the steering column directly below the steering wheel. Refer to **MODULE, STEERING COLUMN CONTROL, DESCRIPTION** .

The BCM, the RFHM and the SCCM each contain a microcontroller and programming that allow them to

communicate with each other and other electronic modules in the vehicle using the Controller Area Network (CAN) data bus. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the various horn system components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention as well as pin out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

The horn system components operate on battery current received through non-switched fused B(+) circuits so that the system will remain operational, regardless of the status of the ignition switch (also known as the Keyless Ignition Node/KIN). The Body Control Module (BCM) controls the output of battery current to the horns through a horn relay located within the front Power Distribution Center (PDC). The BCM controls the relay based upon internal programming as well as electronic message inputs received from the Steering Column Control Module (SCCM) or the Radio Frequency Hub Module (RFHM) (also known as the RF Hub) over the Controller Area Network (CAN) data bus.

The vehicle operator can control typical horn system signaling through the horn switch contacts within the hub cavity of the steering wheel. When the Driver AirBag (DAB) trim cover in the center of the steering wheel is depressed, it provides a hard wired analog input to the SCCM. The SCCM then sends an electronic **horn switch status** message to the BCM over the CAN data bus.

In addition, the RFHM sends electronic **horn request** messages to the BCM over the CAN data bus in response to inputs received from the FOB with Integrated Key (FOBIK) Remote Keyless Entry (RKE) transmitter in vehicles with the PEKG system. Lastly, as the Vehicle Theft Security System (VTSS) controller, the BCM can activate the horn system based upon programming and both hard wired and electronic message inputs from the various VTSS components.

The horns can be activated by the BCM to support each of the following features:

- **Remote Keyless Entry System** - Remote Keyless Entry (RKE) system **Lock** request audible verification.
- **Remote Keyless Entry System** - Remote Keyless Entry (RKE) system **Panic** mode audible alert.
- **Remote Start System** - Remote Start System **Start** request audible verification.
- **Vehicle Theft Alarm** - Vehicle Theft Alarm (VTA) audible alarm.

The RKE system **Lock** request audible verification is a customer programmable feature, which allows the feature to be enabled or disabled to suit individual preferences. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, OPERATION** .

The hard wired circuits between components related to the horn system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes

wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the horn system or the electronic controls and communication between modules and other devices that provide some features of the horn system. The most reliable, efficient and accurate means to diagnose the horn system or the electronic controls and communication related to horn system operation requires the use of a diagnostic scan tool.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HORN SYSTEM

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Refer to WARNING . Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

NOTE: **A continuously sounding horn is immediately resolved by removing the horn relay from the front Power Distribution Center (PDC).**

HORN SYSTEM DIAGNOSIS		
CONDITION	POSSIBLE CAUSES	CORRECTION
HORNS SOUND CONTINUOUSLY	1. Ineffective horn feed circuit.	1. Test and repair shorted horn feed circuit if required.
	2. Ineffective horn switch return circuit.	2. Test and repair shorted horn switch return circuit if required.
	3. Ineffective horn relay.	3. Test and replace the horn relay in the front Power Distribution Center (PDC), if required.
	4. Ineffective horn switch.	4. Test and replace the shorted horn switch (Driver AirBag/DAB) if required.
	5. Ineffective Body Control Module (BCM) inputs or outputs.	5. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
HORNS SOUND INTERMITTENTLY AS THE STEERING WHEEL IS ROTATED	1. Ineffective horn switch return circuit.	1. Test and repair intermittently shorted horn switch return circuit if required.
	2. Ineffective horn switch.	2. Test and replace the intermittently open or shorted horn switch (Driver AirBag/DAB) if required.
HORNS DO NOT SOUND	1. Ineffective horn ground circuit.	1. Test and repair open horn ground circuit if required.
	2. Ineffective horn feed circuit.	2. Test and repair open horn feed circuit if required.

HORN SYSTEM DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
	3. Ineffective horn relay.	3. Test and replace the horn relay, which is integral to the front Power Distribution Center (PDC), if required.
	4. Ineffective horns.	4. Test and replace open horns if required.
	5. Ineffective horn switch feed circuit.	5. Test and repair open horn switch feed circuit if required.
	6. Ineffective horn switch return circuit.	6. Test and repair open horn switch return circuit if required.
	7. Ineffective horn switch.	7. Test and replace the open horn switch (Driver AirBag/DAB) if required.
	8. Ineffective BCM inputs or outputs.	8. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

SPECIFICATIONS

TORQUE SPECIFICATIONS

HORN TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Horn Mounting Bracket Screw	9	-	80	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

HORN

DESCRIPTION

DESCRIPTION

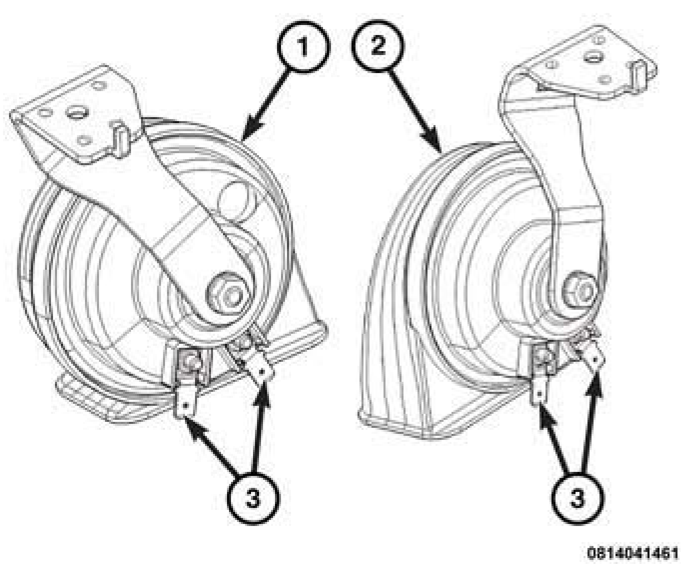


Fig. 1: High Note And Low Note Horns & Terminals
Courtesy of CHRYSLER GROUP, LLC

Dual electromagnetic diaphragm-type horns are standard equipment on this vehicle. A low note (2) and a high note (1) trumpet-style horn are each secured to a dedicated mounting bracket. Each horn and mounting bracket unit is then secured by a single screw to the upper Front End Module (FEM) carrier. The mounting bracket fastening provision is concealed beneath an appearance shield. Internally the two horns are identical in construction and the external horn trumpets are symmetrically opposite.

The two male spade terminals (3) of each horn are connected to the vehicle electrical system through two dedicated take outs and connectors of the headlamp and dash wire harness.

The two horn and the mounting bracket units are each factory-tuned as a unit and; therefore, are serviced only as a unit. These horns cannot be adjusted or repaired. If either horn or mounting bracket is ineffective or damaged, that entire horn and mounting bracket unit must be replaced.

OPERATION

OPERATION

Each horn has a path to ground at all times through its wire harness connection to an eyelet terminal secured to the body sheet metal. The horns are completely controlled by a fused B(+) output received through a relay within the front Power Distribution Center (PDC) and controlled by the Body Control Module (BCM) (also known as the Common Body Controller/CBC).

Within the two halves of the horn housing are a flexible diaphragm, a plunger, an electromagnetic coil and a set of contact points. The diaphragm is secured in suspension around its perimeter by the mating surfaces of the horn housing. The plunger is secured to the center of the diaphragm and extends into the center of the electromagnetic coil. The contact points control the current flow through the windings of the electromagnetic coil.

When the horn is energized, electrical current flows through the closed contact points to the electromagnetic coil. The resulting electromagnetic field draws the plunger and diaphragm toward it until that movement mechanically opens the contact points. When the contact points open, the electromagnetic field collapses allowing the plunger and diaphragm to return to their relaxed positions and closing the contact points again. This cycle continues repeating at a very rapid rate producing the vibration and movement of air that creates the sound that is directed through the horn trumpet outlet.

The horns as well as the hard wired input circuits for the horns may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HORN

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

1. Disconnect the headlamp and dash wire harness connectors from the two horn terminals. Check for continuity between the horn ground circuit connector and a good ground. There should be continuity. If

OK, go to Step 2. If not OK, repair the open ground circuit to ground as required.

2. Check for battery voltage at the horn circuit connector of the headlamp and dash wire harness connector for the horn. There should be zero volts. If OK, go to Step 3. If not OK, repair the shorted horn circuit between the horn and the front Power Distribution Center (PDC) as required.
3. Depress the horn switch. There should now be battery voltage at the horn circuit connector of the headlamp and dash wire harness wire harness. If OK, replace the ineffective horn and mounting bracket unit. If not OK, use a diagnostic scan tool and the appropriate diagnostic information for further diagnosis of the Body Control Module (BCM) (also known as the Common Body Controller/CBC), the front PDC, the Controller Area Network (CAN) data bus and the horn switch.

REMOVAL

REMOVAL

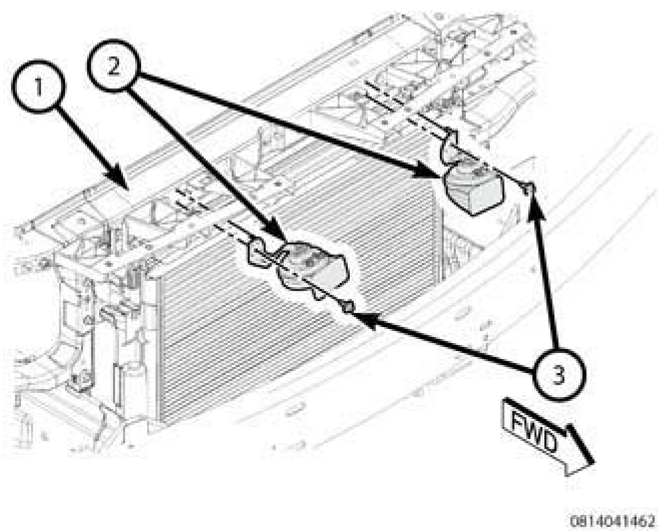


Fig. 2: Front End Module, Horns & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the front fascia from the vehicle. Refer to **FASCIA, FRONT, REMOVAL** .
3. Disconnect the headlamp and dash wire harness connectors from the terminals on the horn (2).
4. Remove the screw (3) that secures the horn mounting bracket to the Front End Module (FEM) (1) carrier.
5. Remove the horn and mounting bracket from the vehicle as a unit.

INSTALLATION

INSTALLATION

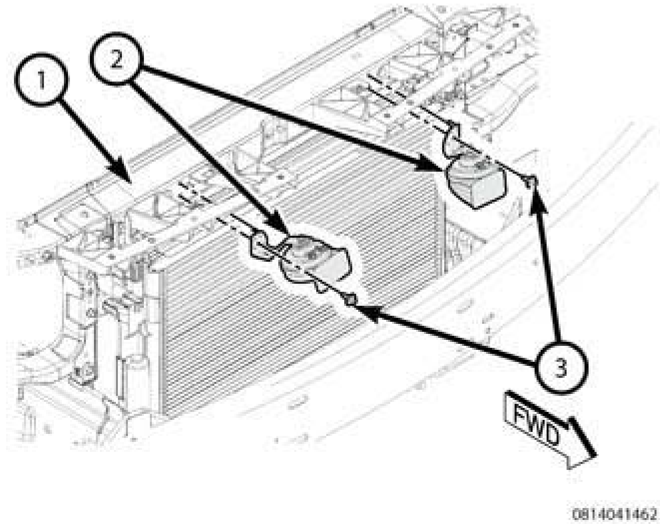


Fig. 3: Front End Module, Horns & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Position the horn (2) and mounting bracket as a unit to the Front End Module (FEM) carrier (1).
2. Install and tighten the screw (3) that secures the horn mounting bracket to the FEM carrier. Tighten the screw to specification. Refer to **SPECIFICATIONS**.
3. Reconnect the headlamp and dash wire harness connectors to the terminals on the horn.
4. Reinstall the front fascia assembly onto the vehicle. Refer to **FASCIA, FRONT, INSTALLATION** .
5. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

RELAY, HORN

DESCRIPTION

DESCRIPTION

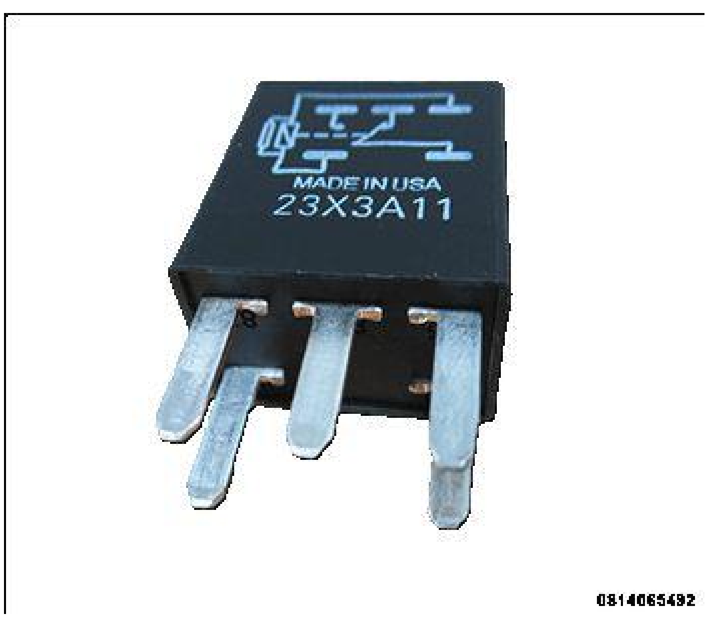


Fig. 4: Horn Relay
Courtesy of CHRYSLER GROUP, LLC

The horn relay is a conventional International Standards Organization (ISO) micro relay. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns and terminal functions. This relay is contained within a small, rectangular, molded plastic housing and is connected to all of the required inputs and outputs through five integral male terminals that extend from the relay base plate.

Internally, the horn relay is a electromechanical device that consists of an electromagnetic coil, a resistor and a pair of normally open electrical contacts. One of the two electrical contacts is fixed, while the other contact is movable. The movable relay contact is held away from the fixed contact by spring pressure. The horn relay for this vehicle is installed in a cavity within the front Power Distribution Center (PDC), which is located on the top of the right front wheel house ahead of the strut tower within the engine compartment. Refer to the layout label on the underside of the PDC cover for specific relay cavity assignment information.

The horn relay cannot be repaired or adjusted and, if ineffective or damaged, the relay unit must be replaced.

OPERATION

OPERATION

The horn relay within the front Power Distribution Center (PDC) switches battery current to the horns when the Body Control Module (BCM) (also known as the Common Body Controller/CBC) energizes the electromagnetic coil of the relay. When the electromagnetic relay coil is energized, it draws and holds the normally open movable contact of the relay against the fixed relay contact. The closed relay contacts supply fused battery current from the front PDC to energize the horns.

When the BCM de-energizes the electromagnetic relay coil, spring pressure returns the movable contact to the normally open position, which de-energizes the horns. The resistor within the relay is connected in parallel with the electromagnetic coil, and helps to dissipate voltage spikes that are produced when the coil is de-energized.

The hard wired inputs and outputs of the horn relay within the front PDC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the BCM or the electronic controls and communication between modules and other devices that provide some features of the BCM-controlled horn relay. The most reliable, efficient and accurate means to diagnose the BCM or the electronic controls and communication related to BCM-controlled horn relay operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HORN RELAY

The hard wired inputs and outputs of the horn relay within the front Power Distribution Center (PDC) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the Body Control Module (BCM) (also known as the Common Body Controller/CBC) or the electronic controls and communication between modules and other devices that provide some features of the BCM-controlled horn relay. The most reliable, efficient and accurate means to diagnose the BCM or the electronic controls and communication related to BCM-controlled horn relay operation requires the use of a diagnostic scan tool. Refer

to the appropriate diagnostic information.

REMOVAL

REMOVAL

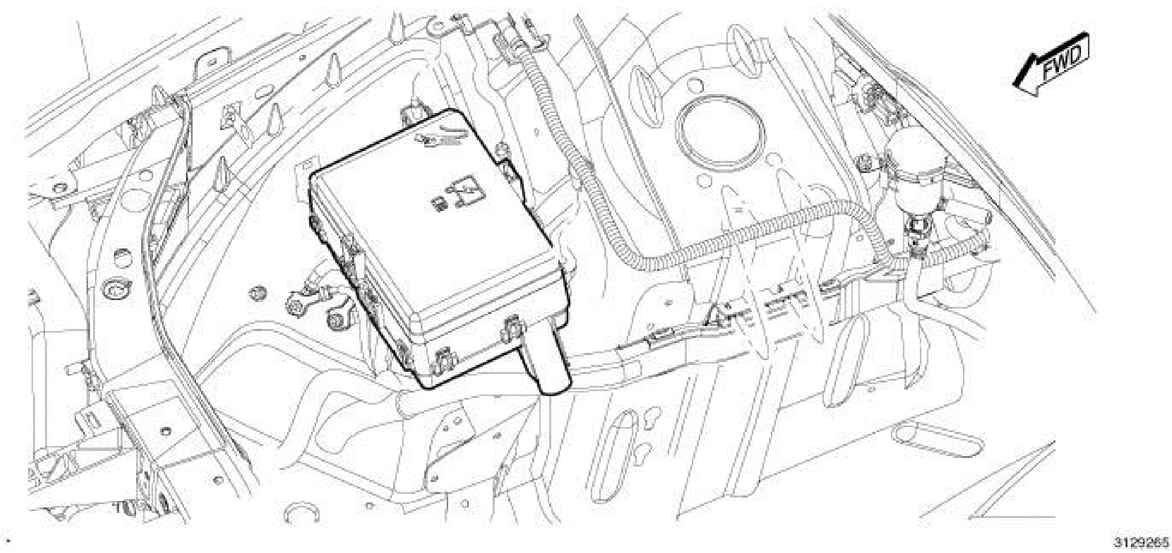


Fig. 5: Identifying Front PDC
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the cover from the front Power Distribution Center (PDC) located ahead of the right strut tower on the right front wheel house splash shield in the engine compartment.
3. Refer to the fuse and relay layout map on the underside of the PDC cover for horn relay identification and cavity location.
4. Remove the horn relay by grasping it firmly and pulling it straight out from the cavity within the front PDC.

INSTALLATION

INSTALLATION

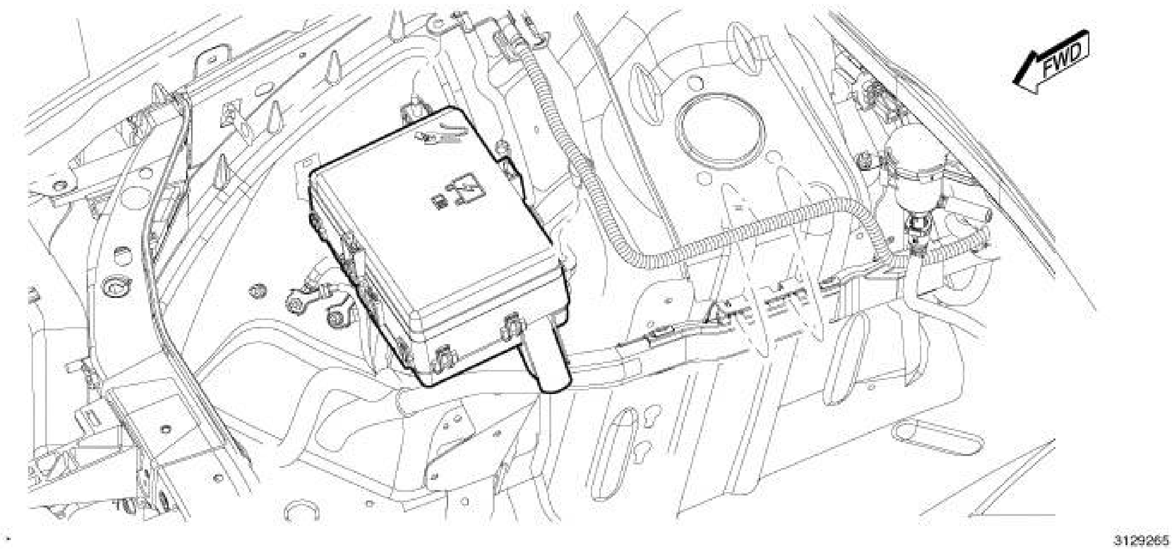


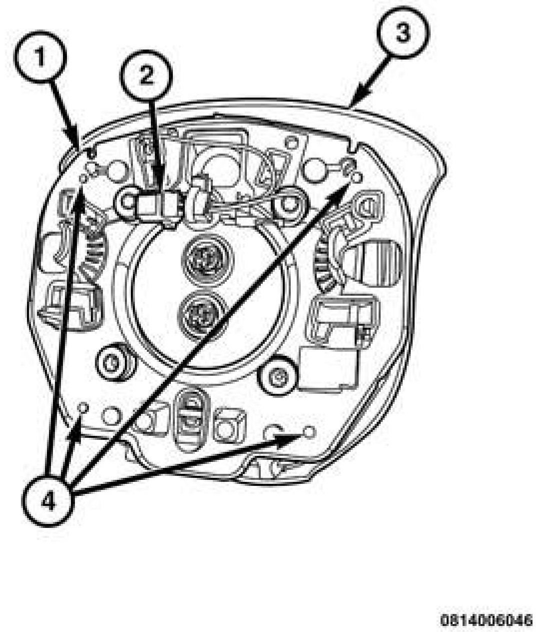
Fig. 6: Identifying Front PDC
Courtesy of CHRYSLER GROUP, LLC

1. Refer to the fuse and relay layout map on the underside of the front Power Distribution Center (PDC) cover for the proper horn relay identification and cavity location.
2. Position the horn relay in the proper cavity within the front PDC.
3. Align the relay terminals with the terminal cavities in the PDC.
4. Push firmly and evenly on the top of the relay until the terminals are fully seated in the terminal cavities in the PDC.
5. Reinstall the cover onto the front PDC.
6. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

SWITCH, HORN

DESCRIPTION

DESCRIPTION



[Fig. 7: Horn Switch & Driver Airbag](#)
Courtesy of CHRYSLER GROUP, LLC

The horn switch for this vehicle consists of four individual sets of normally open contacts wired in parallel so that all four sets of contacts operate as one switch. The horn switch contacts (4) are secured to, but insulated from a stamped metal floating horn switch plate (1) that also serves as the mounting plate for the Driver AirBag (DAB) (3). The horn switch plate is over-molded with integral plastic insulators for the horn contacts and routing clips for the contact wiring.

The horn switch plate is secured to but isolated from the DAB housing with four sleeved screws and insulating washers. Each sleeved screw passes through a small coiled spring retained by an interference fit within an isolator on the switch plate. A dedicated take out and connector of the steering wheel wire harness connects the horn switch plate to the vehicle electrical system through a connector (2) on the upper edge of the switch plate. A mounting spring on each outboard side of the horn switch plate is secured within the hub of the steering wheel under a hook formation in the steering wheel hub armature adjacent to each horizontal steering wheel spoke.

The components that make up the horn switch plate cannot be adjusted or repaired. If damaged or ineffective, the entire DAB and horn switch plate must be replaced as a unit.

OPERATION

OPERATION

The floating horn switch allows the vehicle operator to actuate the horns by depressing anywhere on the upper surface of the Driver AirBag (DAB) trim cover in the center of the steering wheel. When the DAB trim cover is depressed, the DAB housing compresses the coil springs isolating one or more of the horn switch contact sets causing at least one of the four pairs of electrically conductive contacts to close. When the DAB trim cover is released, the coil springs on the switch plate return the DAB to its at rest position and open the horn switch contacts, which opens the horn switch circuit.

The four sets of horn switch contacts are wired in parallel so they perform as a single switch. One contact from each switch receives source current through an internal pull-up of the microcontroller within the Steering Column Control Module (SCCM). When the switch contacts are closed the SCCM input is pulled down to ground. The SCCM microcontroller then sends an electronic **horn switch status** message to the Body Control Module (BCM) over the Controller Area Network (CAN) data bus. The BCM then controls the output to the horn relay within the front Power Distribution Center (PDC) accordingly.

The hard wired circuits between components related to the horn switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HORN SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Refer to WARNING . Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

1. Remove the Driver AirBag (DAB) from the steering wheel. Refer to **AIR BAG, DRIVER, REMOVAL** .
2. Disconnect the steering wheel wire harness connector from the horn switch wire harness connector.
3. With the horn switch plate released, check for continuity between the two terminals in the horn switch pigtail wire harness connector. There should be no continuity. If OK, go to Step 4. If not OK, replace the ineffective horn switch plate (DAB) unit.
4. With the horn switch plate depressed, check for continuity between the two terminals in the horn switch pigtail wire harness connector. There should now be continuity. If OK, go to Step 5. If not OK, replace the ineffective horn switch plate (DAB) unit.
5. Check the steering wheel wire harness for shorts or opens between the horn switch connector and the clockspring connector. If not OK, repair or replace the steering wheel wire harness as required.

REMOVAL

REMOVAL

The horn switch is serviced only as a unit with the Driver AirBag (DAB). Refer to **AIR BAG, DRIVER, REMOVAL** .

INSTALLATION

INSTALLATION

The horn switch is serviced only as a unit with the Driver AirBag (DAB). Refer to **AIR BAG, DRIVER, INSTALLATION** .

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Article GUID: A00735982

2015-16 ENGINE

Ignition System - Service Information - Challenger

DESCRIPTION

DESCRIPTION

NOTE: **All engines use a fixed ignition timing system. Basic ignition timing is not adjustable. All spark advance is determined by the Powertrain Control Module (PCM).**

The ignition system used on these engines is referred to as coil on plug. The system's four main components are the coils, spark plugs, camshaft position sensors, and the crankshaft position sensor. Refer to **SENSOR, CRANKSHAFT POSITION** . The coil on plug ignition system utilizes an ignition coil for every cylinder. The ignition coils are mounted directly over the each spark plug.

OPERATION

OPERATION

The crankshaft position sensor and camshaft position sensor are hall effect devices. The camshaft position sensor and crankshaft position sensor generate square wave pulses that are inputs to the Powertrain Control Module (PCM). The PCM determines engine position from these sensors. The PCM calculates injector sequence and ignition timing from crankshaft AND camshaft position.

SPECIFICATIONS

FIRING ORDER

3.6L

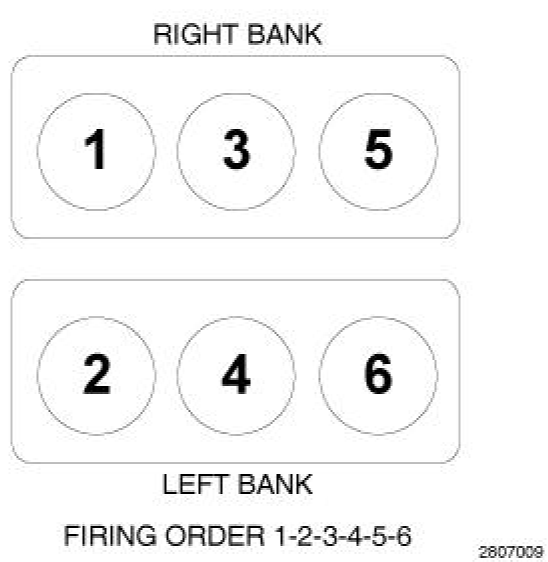


Fig. 1: Firing Order - 3.6L
Courtesy of CHRYSLER GROUP, LLC

The firing order for the 3.6L V6 is 1-2-3-4-5-6.

6.2L

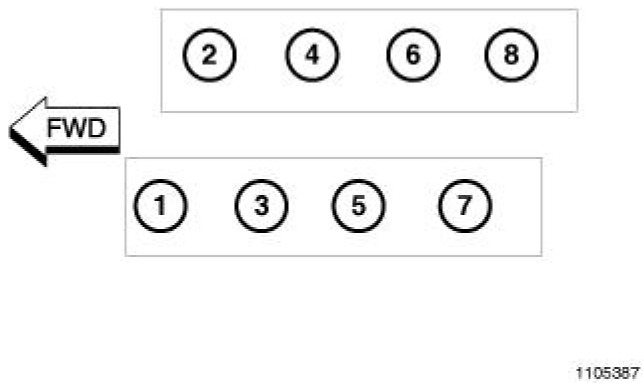


Fig. 2: Engine Cylinder Arrangement
Courtesy of CHRYSLER GROUP, LLC

The firing order for the 6.2L V-8 is 1-8-4-3-6-5-7-2.

5.7L/6.4L

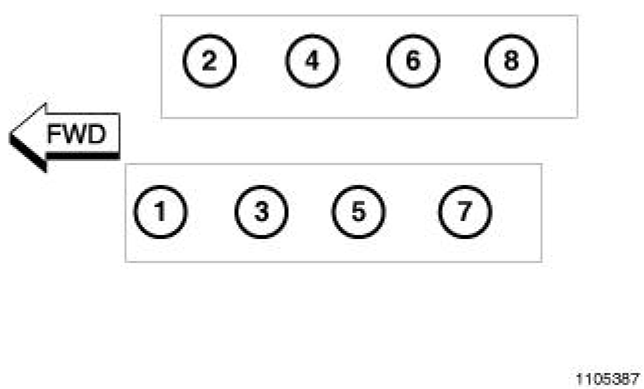


Fig. 3: Engine Cylinder Arrangement
Courtesy of CHRYSLER GROUP, LLC

The firing order for the 5.7L and 6.4L V-8 is 1-8-4-3-6-5-7-2.

IGNITION COIL RESISTANCE

Engine	Primary Resistance 21Â°C - 27Â°C (70Â°F - 80Â°F)	Secondary Resistance 21Â°C - 27Â°C (70Â°F - 80Â°F)

Engine	Primary Resistance 21Ā°C - 27Ā°C (70Ā°F - 80Ā°F)	Secondary Resistance 21Ā°C - 27Ā°C (70Ā°F - 80Ā°F)
3.6L	0.6 to 0.9 ohms	6.0K to 9.0K ohms
5.7L	0.540 to 0.660 ohms	* 9.24K to 11.76K ohms
6.2L	0.540 to 0.660 ohms	* 9.24K to 11.76K ohms
6.4L	0.540 to 0.660 ohms	* 9.24K to 11.76K ohms
* Not directly measurable due to diode in circuit.		

SPARK PLUGS

For spark plug specifications. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Camshaft Position Sensor Bolt (CMP) - 3.6L	9	-	80	Ā
Camshaft Position Sensor - 5.7L	12	9	-	Ā
Camshaft Position Sensor - 6.2L	12	9	-	Ā
Camshaft Position Sensor - 6.4L	12	9	-	Ā
Ignition Capacitor	10	-	89	Ā
Ignition Coil Mounting - 3.6L	7	-	62	Ā
Ignition Coil Mounting - 5.7L	7	-	62	Ā
Ignition Coil Mounting - 6.2L	7	-	62	Ā
Ignition Coil Mounting - 6.4L	7	-	62	Ā
* Knock Sensor - 3.6L	22	16	-	Ā
* Knock Sensor - 5.7L	20	15	-	Ā
* Knock Sensor - 6.2L	20	15	-	Ā
* Knock Sensor - 6.4L	20	15	-	Ā
Spark Plugs - 3.6L	18	13	-	Ā
Spark Plugs - 5.7L	27	20	-	Ā
Spark Plugs - 6.2L	27	20	-	Ā
** Spark Plugs - 6.4L	18	13	-	Ā
Variable Valve Timing Solenoids - 3.6L	4	-	35	Ā
Negative Battery Cable Nut	5	-	45	Ā
* Do not apply any sealant, thread-locker or adhesive to bolts. Poor sensor performance may result.				
** Torque critical tapered design. Do not exceed 21 N.m (15 ft. lbs.).				
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specification.				

CAPACITOR, IGNITION

REMOVAL

3.6L

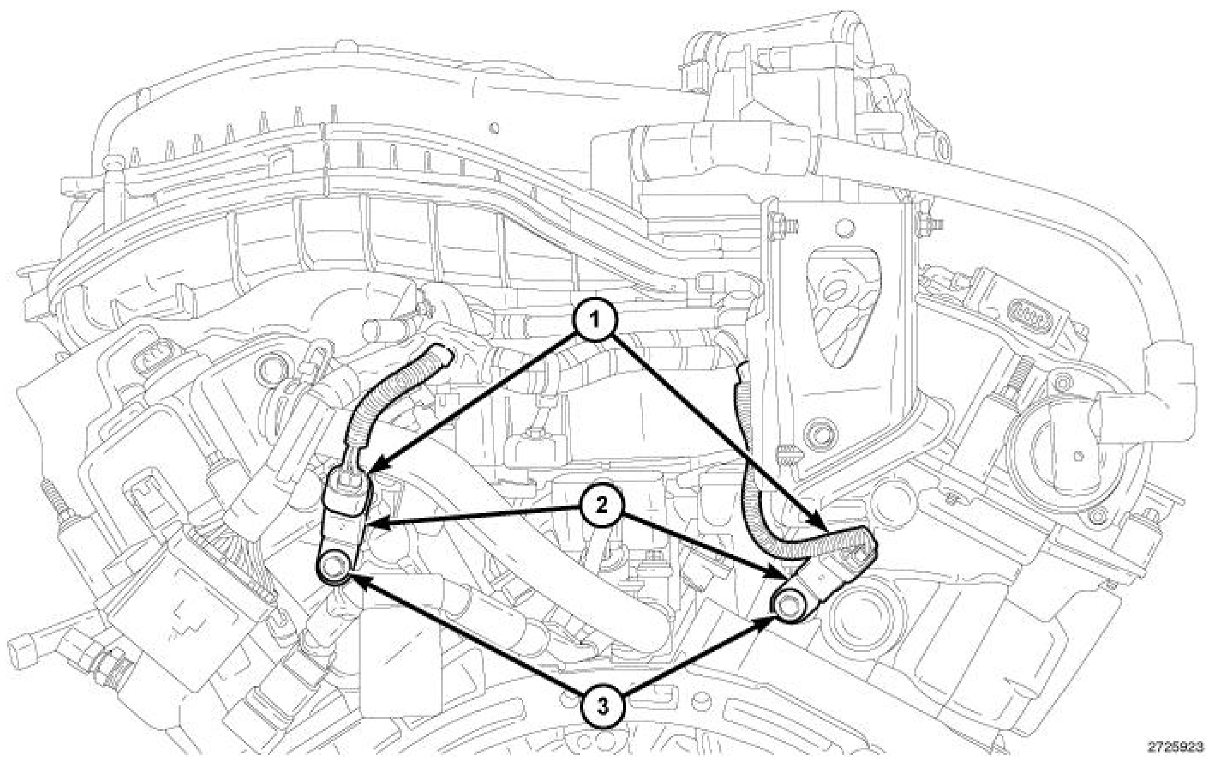


Fig. 4: Electrical Connector, Mounting Bolt & Ignition Coil Capacitor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover.
3. Remove the ignition capacitor wire harness connector (1).
4. Remove bolt (3) and the ignition capacitor (2).

6.2L

Fig. 5: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover(s) (1).

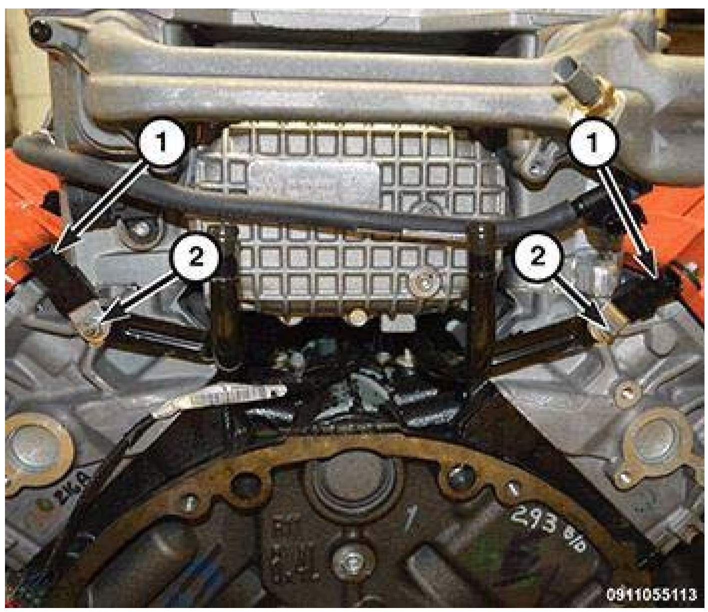


Fig. 6: Ignition Capacitors & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The left ignition capacitor (1) is attached at rear cylinder head and the right ignition capacitor (1) is attached at rear of the cylinder head.**

3. Remove the ignition capacitor wire harness connector.
4. Remove bolt (2) and the ignition capacitor (1).

5.7L/6.4L

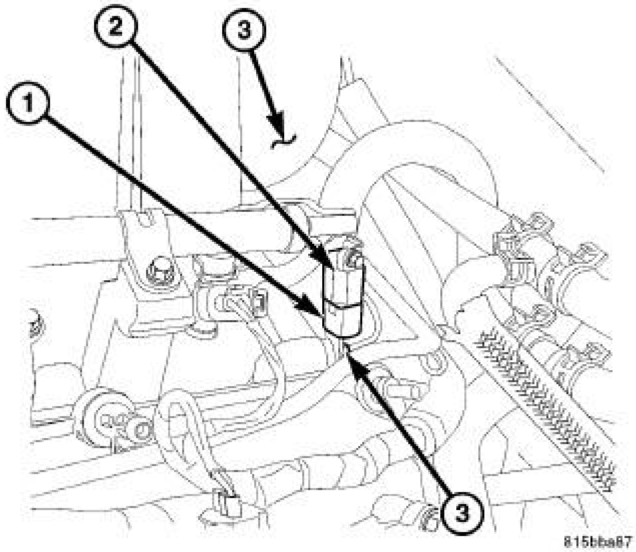


Fig. 7: Ignition Capacitors, Intake Manifold & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

The ignition capacitor (2) is attached at the left rear corner of the intake manifold (3).

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover.
3. Remove the ignition capacitor wire harness connector (1).
4. Remove bolt and the ignition capacitor (2).

INSTALLATION

3.6L

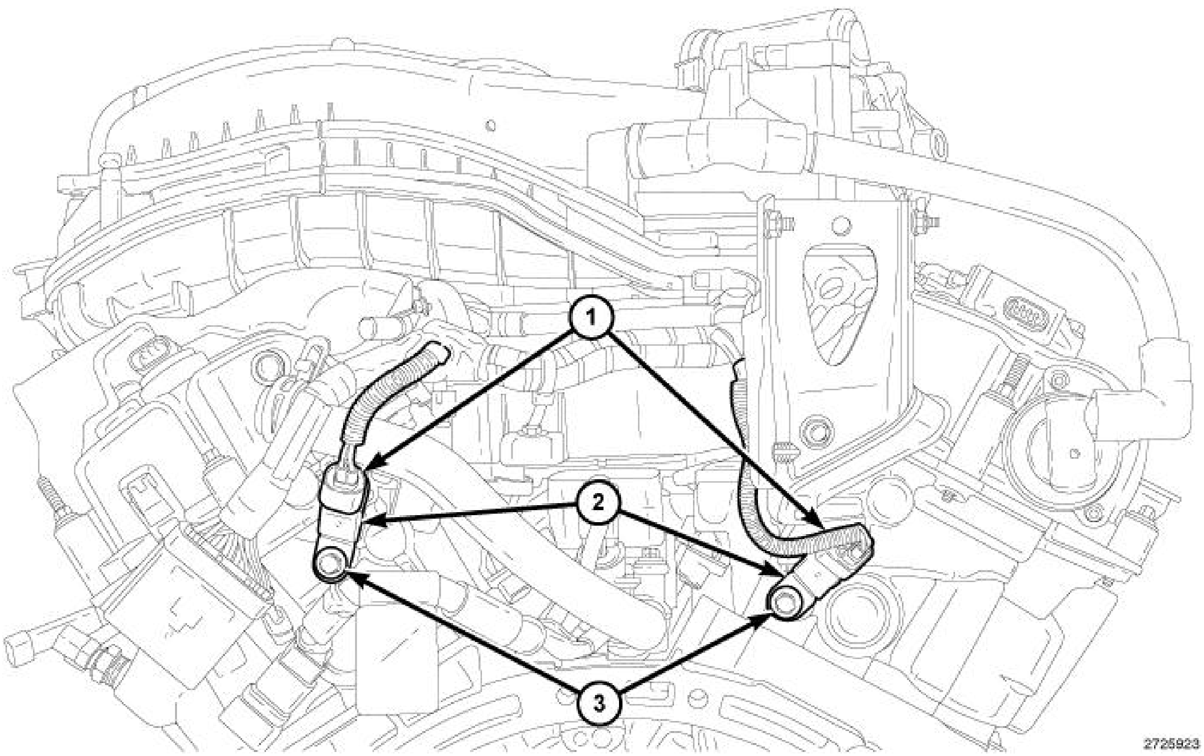


Fig. 8: Electrical Connector, Mounting Bolt & Ignition Coil Capacitor
Courtesy of CHRYSLER GROUP, LLC

1. Install the ignition capacitor (2). Tighten bolt (3) to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
2. Connect the ignition capacitor wire harness connector (1).
3. Install the engine cover.
4. Connect the negative battery cable.

6.2L

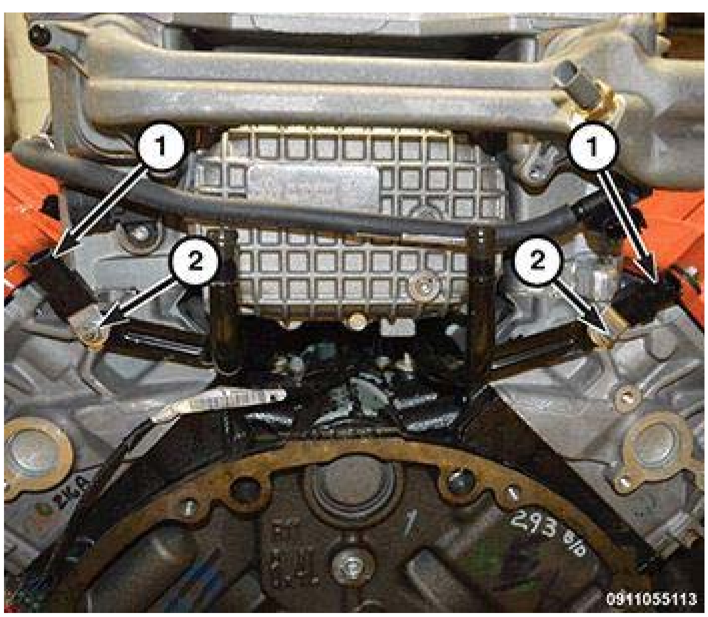


Fig. 9: Ignition Capacitors & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the ignition capacitor (1). Tighten bolt (2) to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
2. Install the ignition capacitor wire harness connector.

Fig. 10: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

3. Install the engine cover(s) (1).
4. Connect the negative battery cable.

5.7L / 6.4L

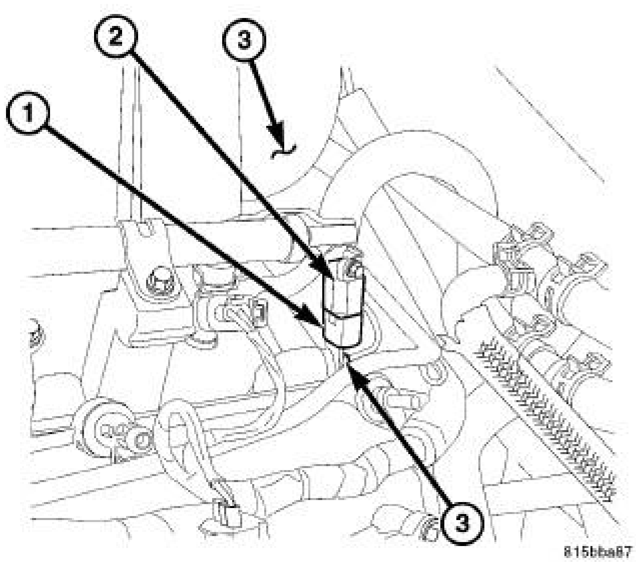


Fig. 11: Ignition Capacitors, Intake Manifold & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Install the ignition capacitor (2). Tighten bolt to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
2. Install the ignition capacitor wire harness connector (1).
3. Install the engine cover.
4. Connect the negative battery cable.

COIL, IGNITION

REMOVAL

3.6L

1. Disconnect and isolate the negative battery cable.

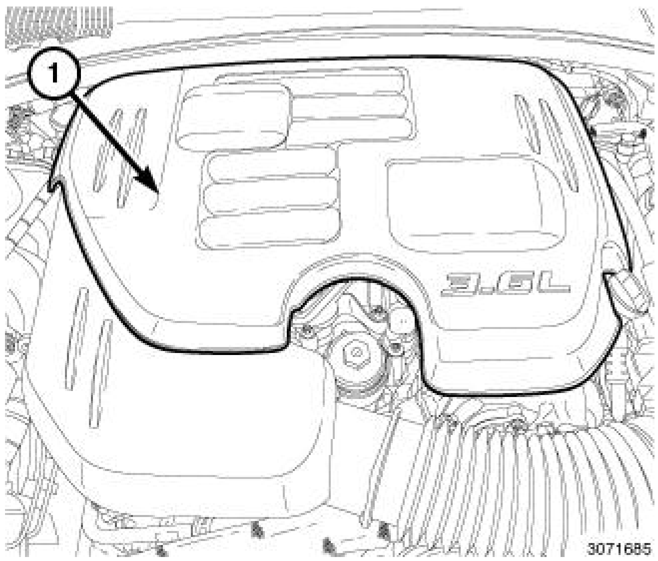
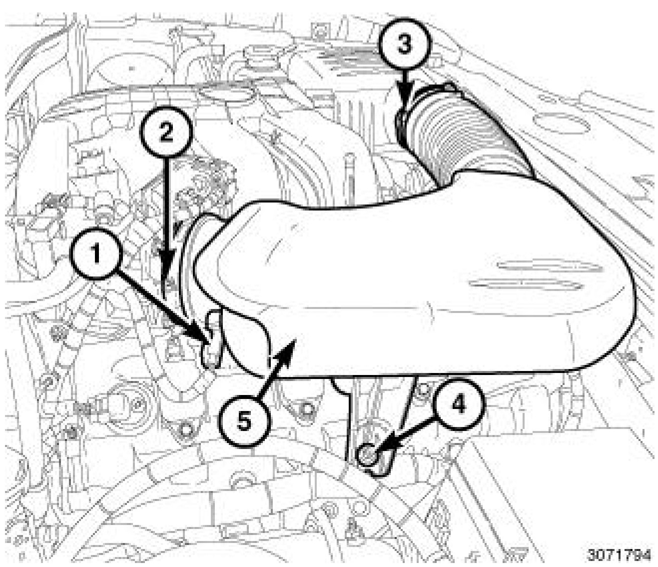


Fig. 12: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine cover (1).



[Fig. 13: Inlet Air Temperature (IAT) Sensor Electrical Connector, Air Inlet Hose Assembly & Fasteners]

Courtesy of CHRYSLER GROUP, LLC

3. If removing the ignition coils from cylinders 1, 3 or 5 on the right side of the engine, first remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .

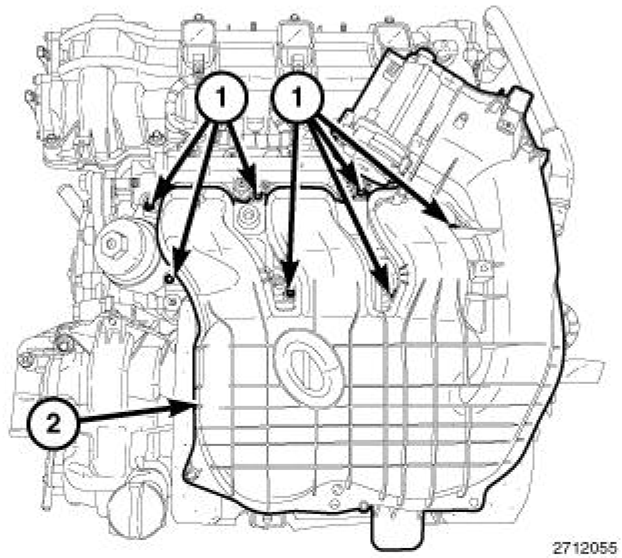


Fig. 14: Upper Intake Manifold & Bolts

Courtesy of CHRYSLER GROUP, LLC

4. If removing the ignition coils from cylinders 2, 4 or 6 on the left side of the engine, first remove the upper intake manifold (2) and insulator. Refer to **MANIFOLD, INTAKE, REMOVAL** .

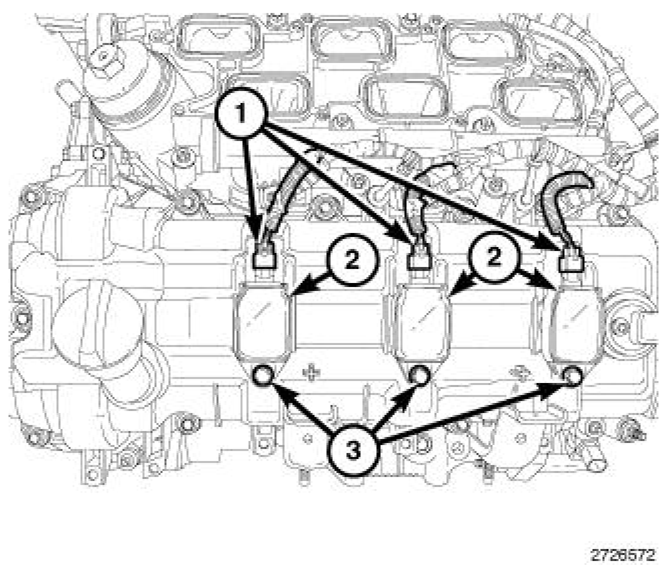


Fig. 15: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts

Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The left side ignition coils are shown in the illustration, the right side ignition coils are similar.**

5. Unlock and disconnect the wire harness connector (1) from the ignition coil.
6. Remove bolt (3) and pull the ignition coil (2) from cylinder head cover opening with a slight twisting action.

6.2L

Fig. 16: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover(s) (1).

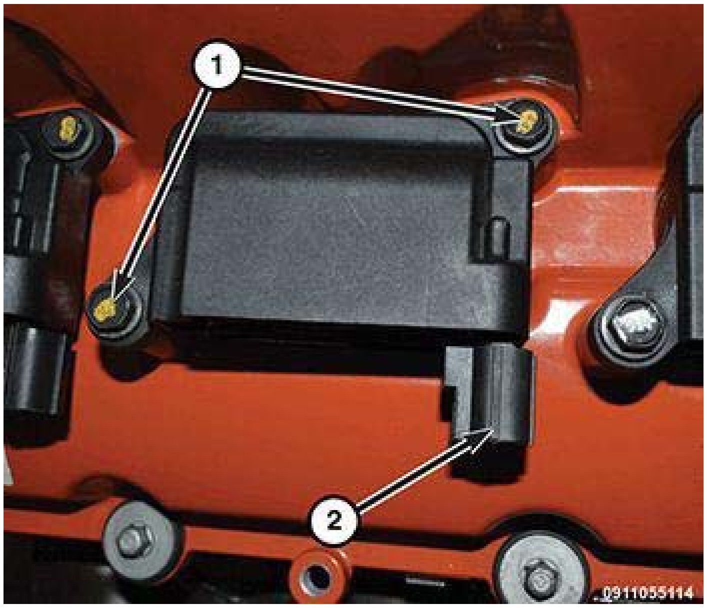


Fig. 17: Ignition Coil Wire Harness Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the ignition coil wire harness connector (2).

4. Remove the two ignition coil bolts (1).
5. Using a slight rocking motion, carefully lift the ignition coil from the cylinder head opening.

5.7L/6.4L

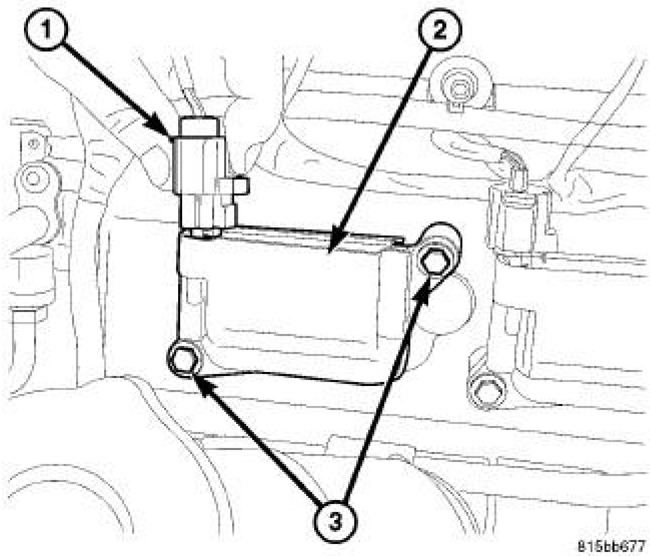


Fig. 18: Ignition Coil Connector, Ignition Coil & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover.
3. Disconnect the ignition coil wire harness connector (1).
4. Remove the two ignition coil bolts (3).

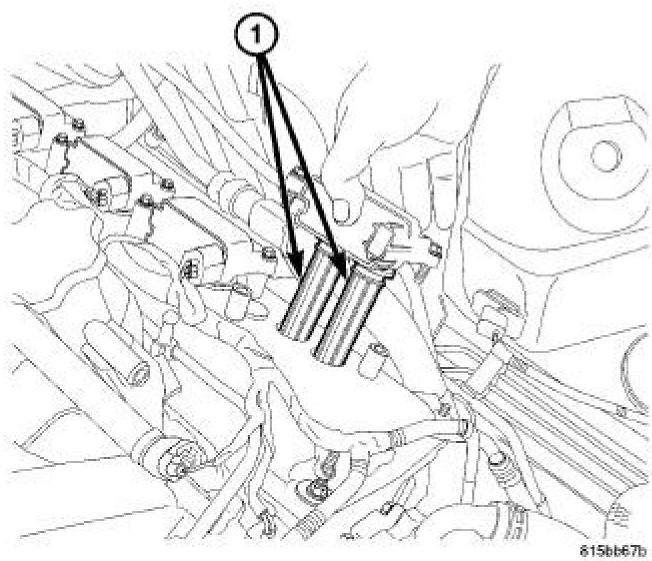


Fig. 19: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

5. Using a slight rocking motion, carefully lift the ignition coil (1) from the cylinder head opening.

INSTALLATION

3.6L

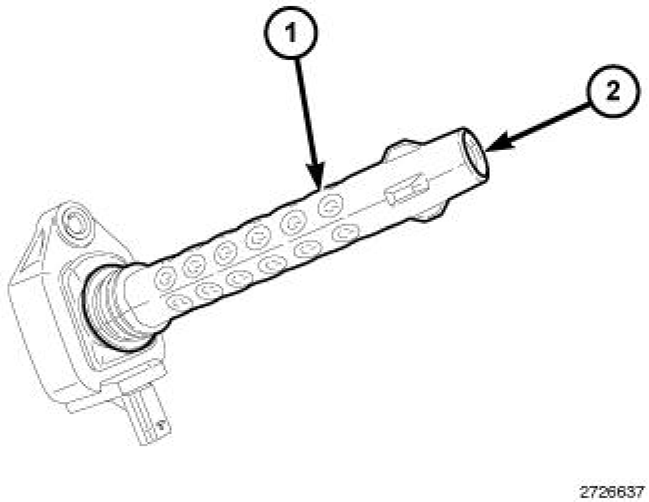


Fig. 20: Ignition Coil Rubber Boot & Opening Of The Boot
Courtesy of CHRYSLER GROUP, LLC

1. Using compressed air, blow out any dirt or contaminants from around the top of spark plug.
2. Check the condition of the ignition coil rubber boot (1). Inspect the opening of the boot (2) for any debris, tears or rips. Carefully remove any debris with a lint free cloth.

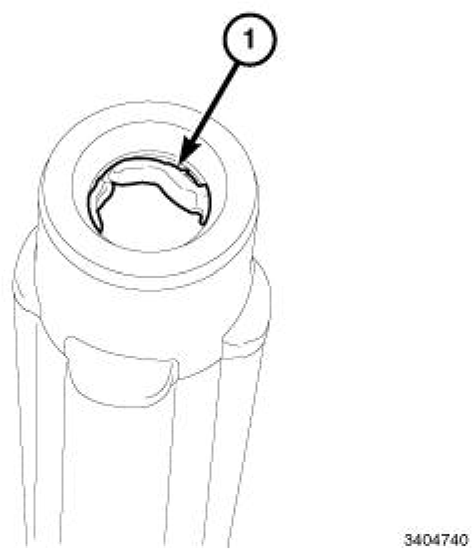


Fig. 21: Uniflor 8172 Lubricant
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not apply a silicone based grease such as MoparÂ® Dielectric Grease to the ignition coil rubber boot. The silicone based grease will absorb into the boot causing it to stick and tear.

3. Place a small, 360Â° bead of **Uniflor 8172** lubricant (1) along the inside opening of the coil boot approximately 1 to 2 mm from the chamfer edge but not on the chamfered surface.

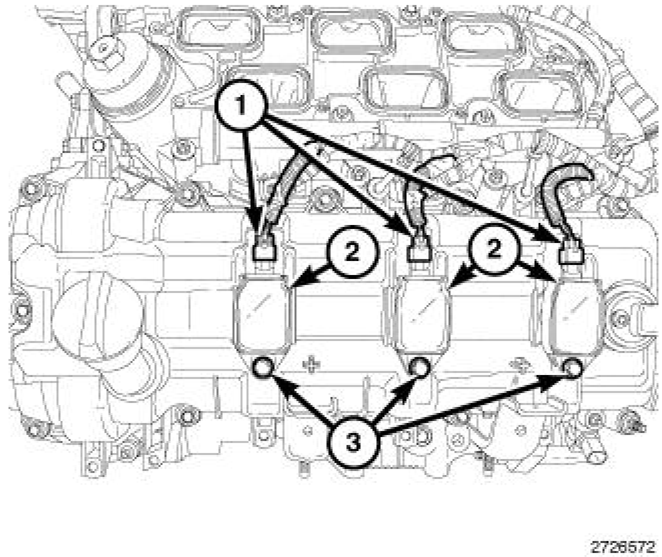


Fig. 22: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The LH ignition coils are shown in the illustration, the RH ignition coils are similar.**

4. Install the ignition coil (2) into the cylinder head cover opening. Using a twisting action, push the ignition coil onto the spark plug. Tighten bolt(s) to the proper torque specifications. Refer to **SPECIFICATIONS**.
5. Connect the ignition coil wire harness connector (1) and lock connector.
6. If removed, install the intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION** .
7. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .

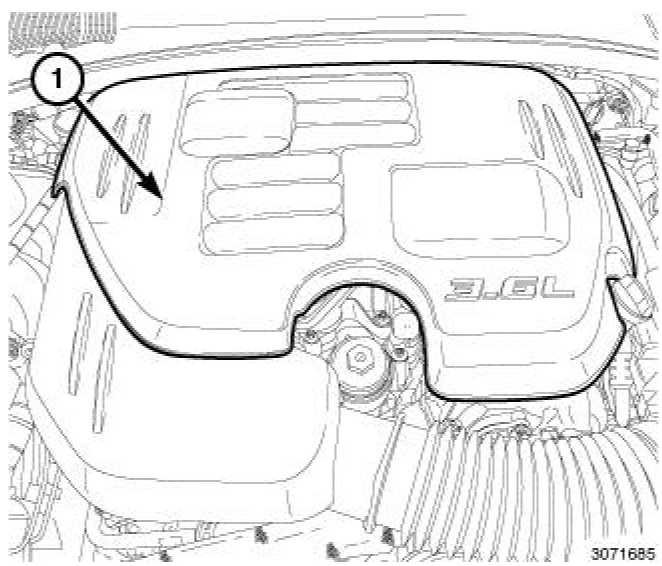


Fig. 23: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

8. Install the engine cover (1).
9. Connect the negative battery cable.

6.2L

CAUTION: **Do not apply a silicone based grease such as MoparÂ® Dielectric Grease to the ignition coil rubber boot. The silicone based grease will absorb into the boot causing it to stick and tear.**

1. Place a small, 360Â° bead of **Uniflor 8172** lubricant (1) along the inside opening of the coil boot approximately 1 to 2 mm from the chamfer edge but not on the chamfered surface.

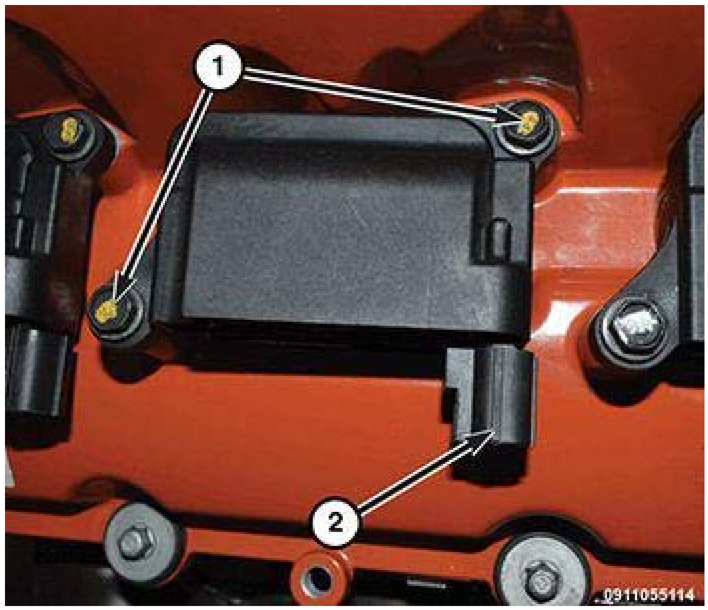


Fig. 24: Ignition Coil Wire Harness Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the ignition coil into cylinder head and push both spark plug boots onto each spark plug.
3. Install the two coil mounting bolts (1) and tighten to the proper torque specification. Refer to **TORQUE SPECIFICATIONS** .
4. Connect the ignition coil wire harness connector (2) to the coil and lock the connector.

Fig. 25: Engine Covers
Courtesy of CHRYSLER GROUP, LLC

5. Install the engine cover(s) (1).
6. Connect the negative battery cable.

5.7L/6.4L

CAUTION: **Do not apply a silicone based grease such as MoparÂ® Dielectric Grease to the ignition coil rubber boot. The silicone based grease will absorb into the boot causing it to stick and tear.**

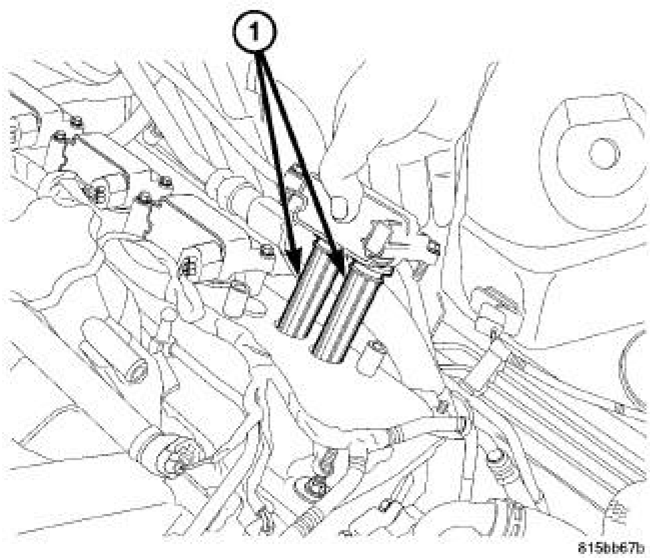
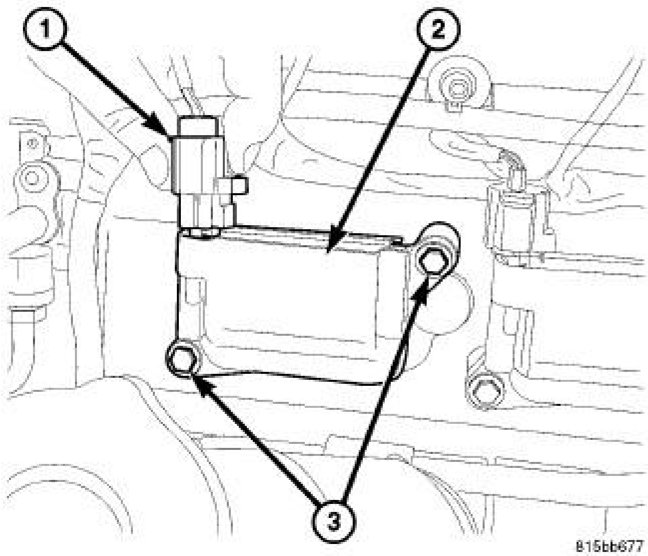


Fig. 26: Removing/Installing Ignition Coil
Courtesy of CHRYSLER GROUP, LLC

1. Before installing coil(s), place a small, 360Â° bead of **Uniflor 8172** lubricant (1) along the inside opening of the spark plug boots (1).



[**Fig. 27: Ignition Coil Connector, Ignition Coil & Mounting Bolts**]
Courtesy of CHRYSLER GROUP, LLC

2. Install the ignition coil into cylinder head and push both spark plug boots onto each spark plug.
3. Install the two coil mounting bolts (3) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Connect the ignition coil wire harness connector (1) to the coil and lock the connector.
5. Install the engine cover.
6. Connect the negative battery cable.

SENSOR, CAMSHAFT POSITION

DESCRIPTION

3.6L

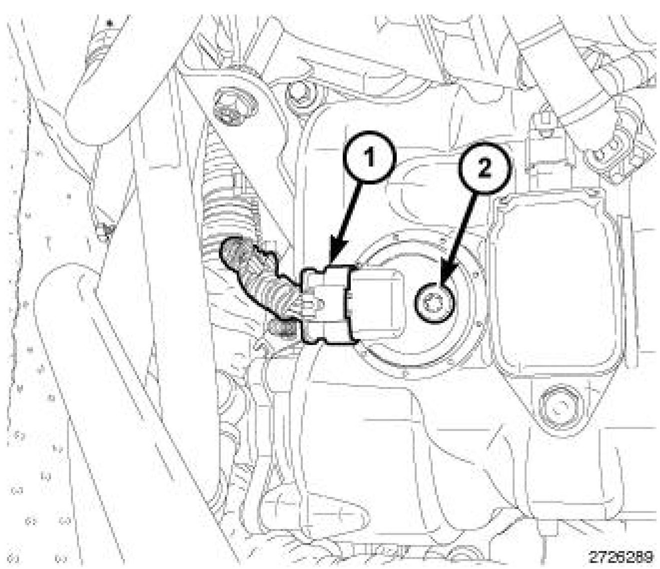


Fig. 28: CMP Sensor Connector & Bolt

Courtesy of CHRYSLER GROUP, LLC

The two Camshaft Position (CMP) sensors are located at the rear of the cylinder head covers. The sensors are bolted to the cylinder head and utilize a radial lip seal where they protrude through the covers. The attaching bolt (2) has an O-ring seal and is captured in the sensor.

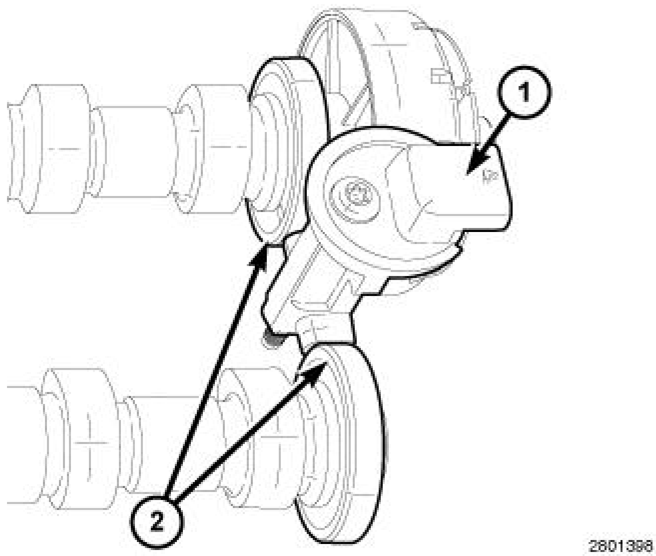


Fig. 29: Camshaft Position Sensors (CMP) Sensors & Encoded Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

The Camshaft Position Sensors (CMP) sensors (1) are dual read, single element hall effect sensors mounted between the magnetic encoded timing wheels. The magnetic timing wheels are used because of their small diameter allowing for a compact cylinder head design.

6.2L

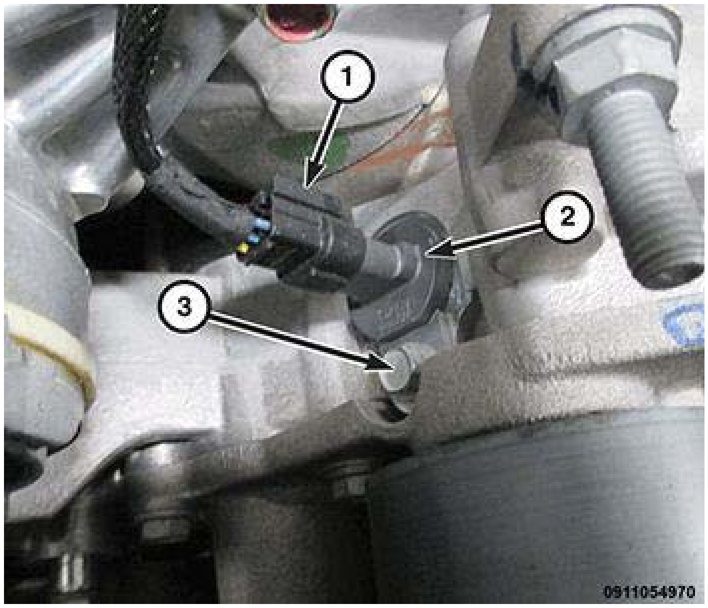


Fig. 30: Camshaft Position Sensor (CMP), Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

The Camshaft Position Sensor (CMP) (2) is located in the timing cover near the supercharger belt tensioner.

5.7L/6.4L

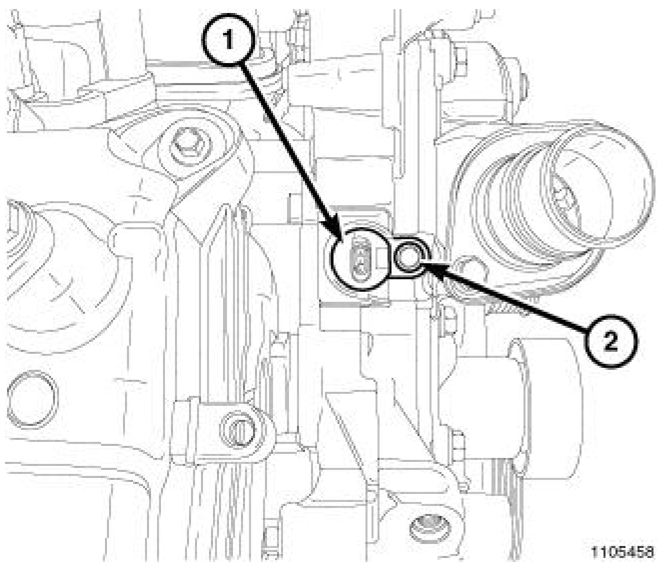


Fig. 31: Camshaft Position Sensor & Bolt
Courtesy of CHRYSLER GROUP, LLC

The Camshaft Position Sensor (CMP) (1) is located in the timing cover near the thermostat housing.

OPERATION

3.6L

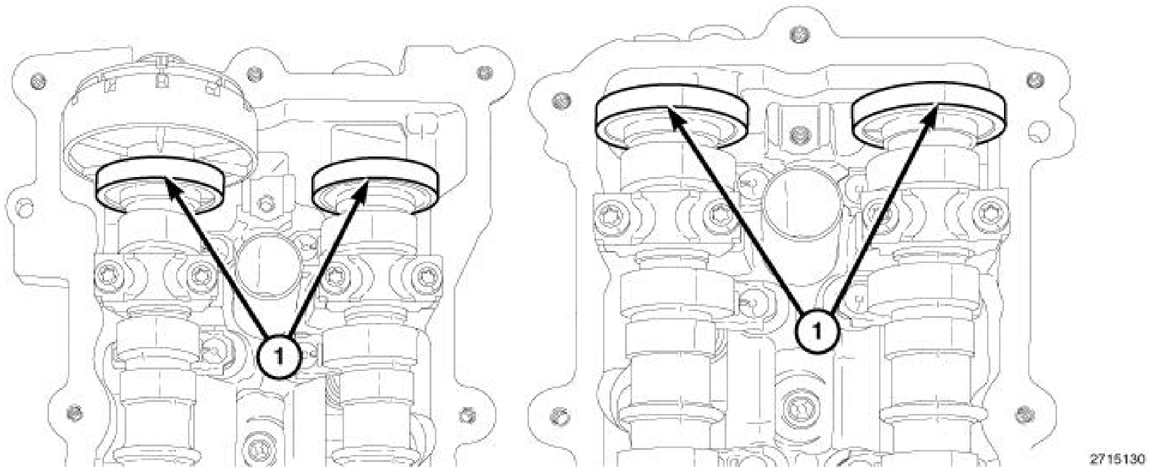


Fig. 32: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The magnetic timing wheels must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.

The 3.6 liter engine uses a Dual Over Head Camshaft (DOHC) configuration. The camshafts are a nodular cast iron design and have two pressed on magnetic timing wheels (1) that are magnetically encoded.

The Camshaft Position Sensors (CMP) are mounted between the timing wheels (1).

6.2L

The Camshaft Position (CMP) sensor is used in conjunction with the Crankshaft Position (CKP) sensor to differentiate between fuel injection and spark events. It is also used to synchronize the fuel injectors with their respective cylinders. The sensor generates electrical pulses. These pulses (signals) are sent to the Powertrain Control Module (PCM). The PCM will then determine crankshaft position from both the CMP sensor and CKP sensor.

The tone wheel is located at the front of the camshaft. As the tone wheel rotates, notches pass through the sync signal generator.

When the cam gear is rotating, the sensor will detect the notches. Input voltage from the sensor to the PCM will then switch from a low (approximately 0.3 volts) to a high (approximately 5 volts). When the sensor detects a notch has passed, the input voltage switches back low to approximately 0.3 volts.

5.7L/6.4L

The Camshaft Position (CMP) sensor is used in conjunction with the crankshaft position sensor to differentiate between fuel injection and spark events. It is also used to synchronize the fuel injectors with their respective cylinders. The sensor generates electrical pulses. These pulses (signals) are sent to the Powertrain Control Module (PCM). The PCM will then determine crankshaft position from both the CMP sensor and Crankshaft Position (CKP) sensor.

The tone wheel is located at the front of the camshaft. As the tone wheel rotates, notches pass through the sync

signal generator.

When the cam gear is rotating, the sensor will detect the notches. Input voltage from the sensor to the PCM will then switch from a low (approximately 0.3 volts) to a high (approximately 5 volts). When the sensor detects a notch has passed, the input voltage switches back low to approximately 0.3 volts.

REMOVAL

3.6L

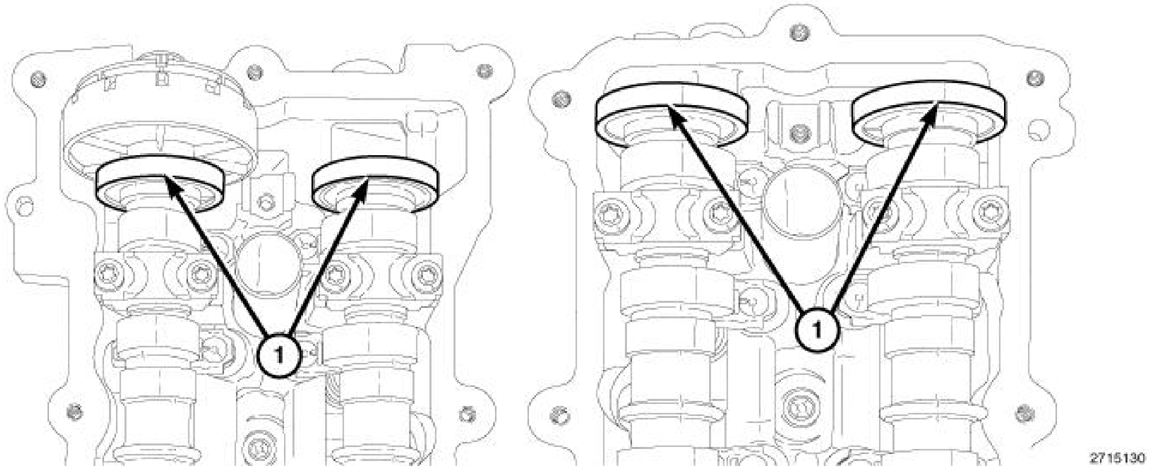


Fig. 33: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.**

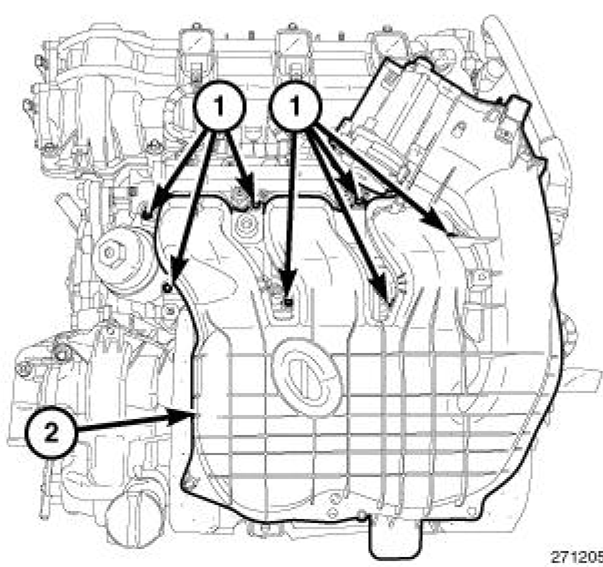


Fig. 34: Upper Intake Manifold & Bolts
Courtesy of CHRYSLER GROUP, LLC

The Camshaft Position (CMP) sensors are located at the rear of the cylinder head covers and are bolted to the

cylinder head.

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover.
3. If removing the left CMP sensor, first remove the air inlet hose and upper intake manifold (2). Refer to **MANIFOLD, INTAKE, REMOVAL** .

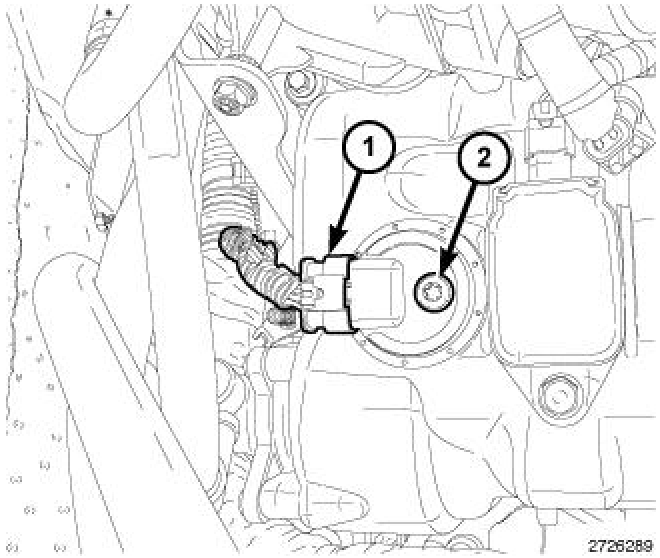


Fig. 35: CMP Sensor Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The right CMP sensor is shown in the illustration, the left CMP sensor is similar. If removing both right and left CMP sensors, mark the sensors so they can be installed in their original locations.**

4. Disconnect the CMP sensor wire harness connector (1).

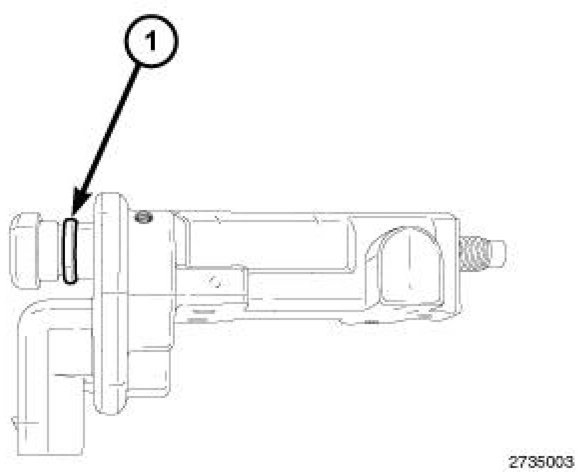


Fig. 36: O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

5. Loosen bolt (2) and Pull the sensor and mounting bolt from the cylinder head cover.
6. The O-ring seal (1) can be reused if not damaged.

6.2L

1. Disconnect and isolate the negative battery cable.

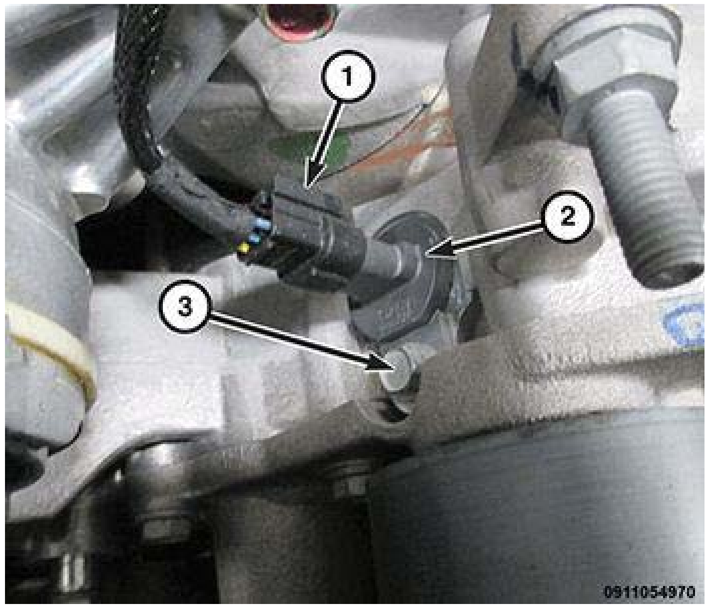


Fig. 37: Camshaft Position Sensor (CMP), Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the Camshaft Position (CMP) sensor wire harness connector (1).
3. Remove the CMP sensor retaining bolt (3).
4. Remove the CMP sensor (2) from the timing cover.

5.7L/6.4L

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover.

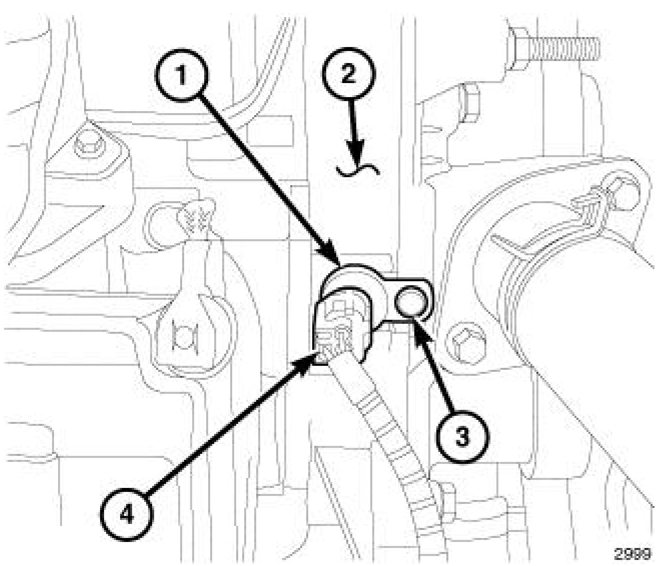


Fig. 38: Camshaft Position Sensor, Connector, Bolt & Timing Cover
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the Camshaft Position (CMP) sensor wire harness connector (4).

NOTE: **Using a slight rotating motion, to carefully remove the CMP sensor from the timing cover (2).**

4. Remove bolt (3) and the CMP sensor (1).

INSTALLATION

3.6L

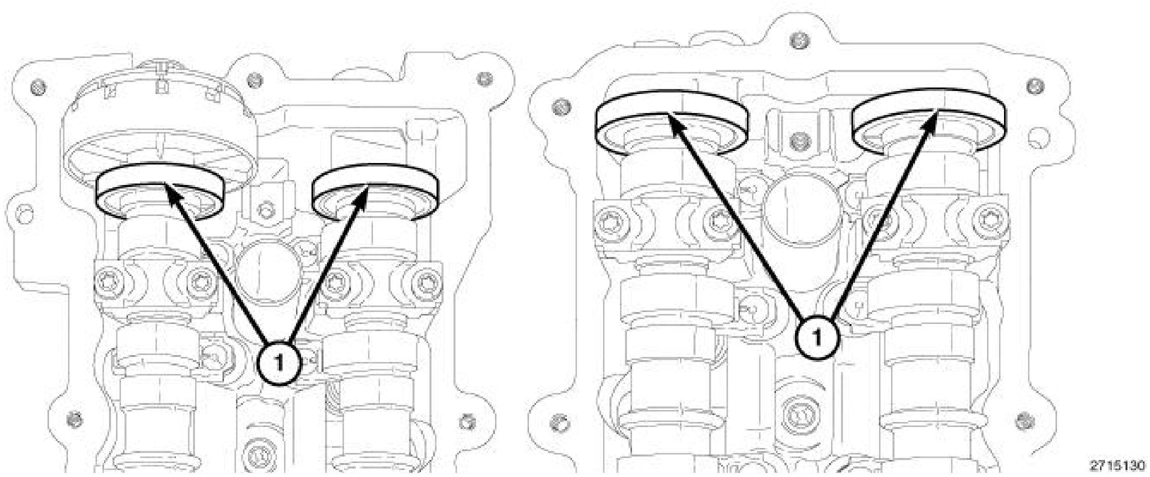


Fig. 39: Magnetic Timing Wheels
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The magnetic timing wheels (1) must not come in contact with magnets (pickup tools, trays, etc.) or any other strong magnetic field. This will destroy the timing wheels ability to correctly relay camshaft position to the camshaft position sensor.**

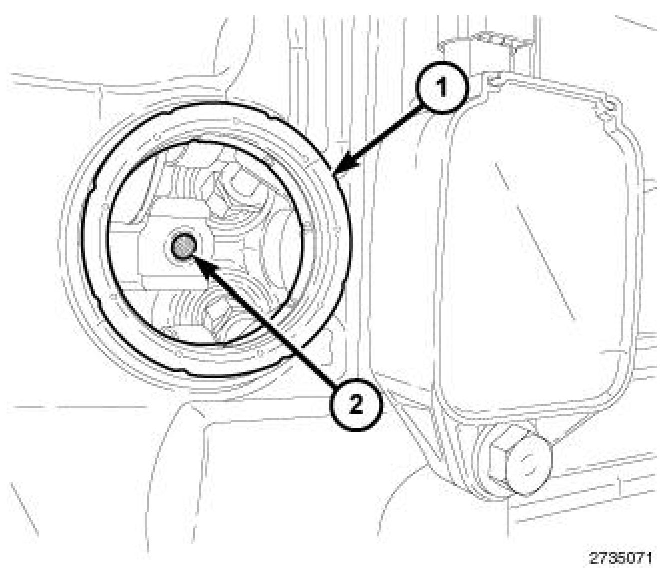


Fig. 40: CMP Sensor Seal & Mounting Bolt Hole
Courtesy of CHRYSLER GROUP, LLC

1. Clean out the camshaft position (CMP) sensor mounting bolt hole (2) in cylinder head.
2. The CMP sensor seal (1) can be reused if not damaged.

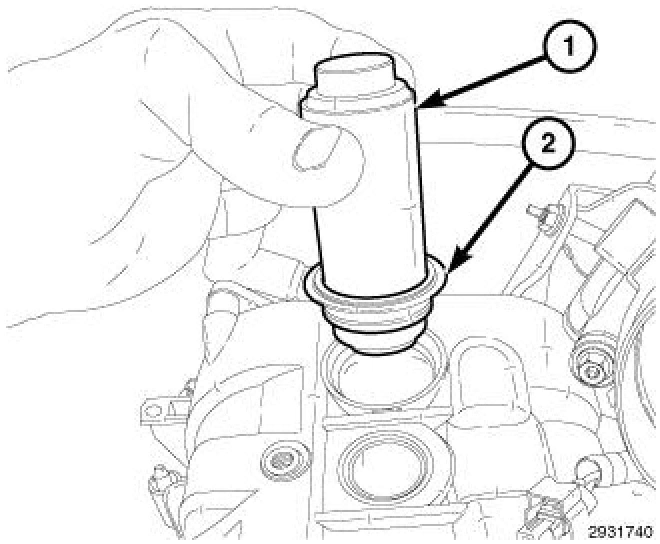


Fig. 41: Installing CMP Sensor Seal
Courtesy of CHRYSLER GROUP, LLC

3. If required, install a new CMP sensor seal (2) in the cylinder head cover:
   - Lubricate the CMP sensor seal inner and outer diameters with clean engine oil.
   - Place the CMP sensor seal (2) on the Cam Sensor/Spark Plug Tube Seal Installer (special tool #10256, Installer, Cam Installer, Cam Sensor/ Spark Plug Tube Seal) (1).
   - Push the seal into the cylinder head cover until the base of the seal is seated.
   - Remove the tool (1).

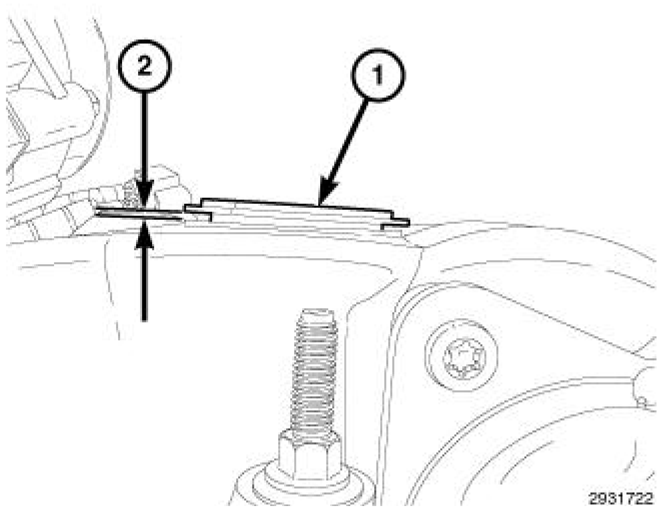


Fig. 42: Gap & CMP Sensor Seal
Courtesy of CHRYSLER GROUP, LLC

NOTE: **A properly installed CMP sensor seal (1) will have a 1.5 - 2.0 mm (0.06 - 0.08 in.) gap (2) between the cylinder head cover and the seal upper flange.**

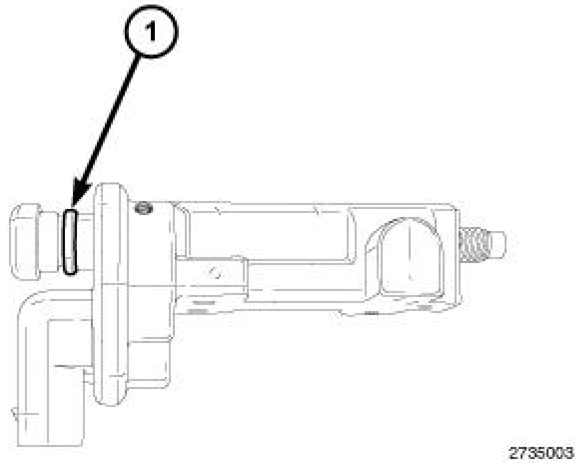


Fig. 43: O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

4. The sensor mounting bolt O-ring (1) can be reused if not damaged.
5. Apply a small amount of engine oil to the sensor mounting bolt O-ring (1).

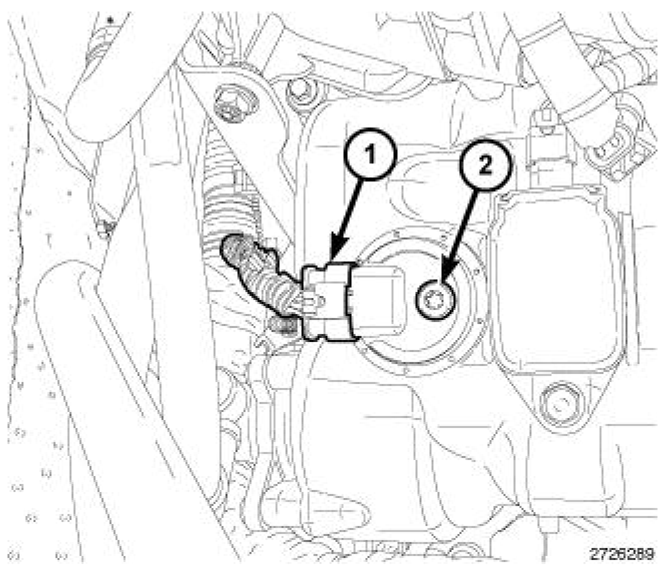


Fig. 44: CMP Sensor Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The right CMP sensor is shown in the illustration, the left CMP sensor is similar. If both right and left CMP sensors where removed, install them into their original locations.**

6. Install the CMP sensor to the cylinder head. Tighten the mounting bolt (2) to the proper torque specification. Refer to **SPECIFICATIONS**.

7. Connect the CMP sensor wire harness connector (1).

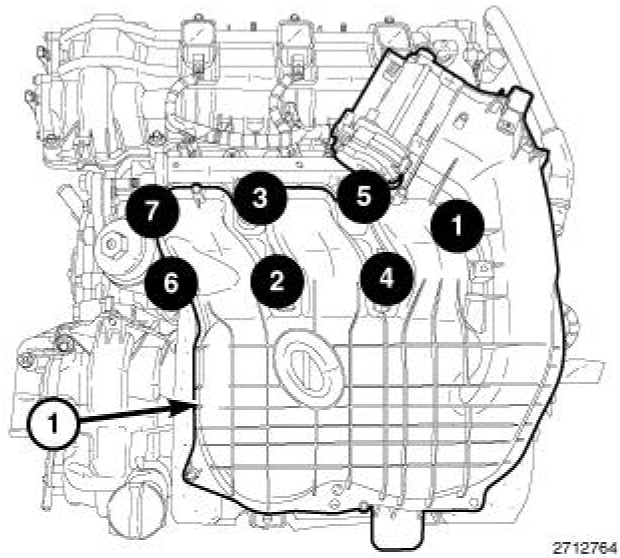


Fig. 45: Upper Intake Manifold Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

8. If required, install the upper intake manifold (1) and air inlet hose. Refer to **MANIFOLD, INTAKE, INSTALLATION** .
9. Install the engine cover.
10. Connect the negative battery cable.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

6.2L

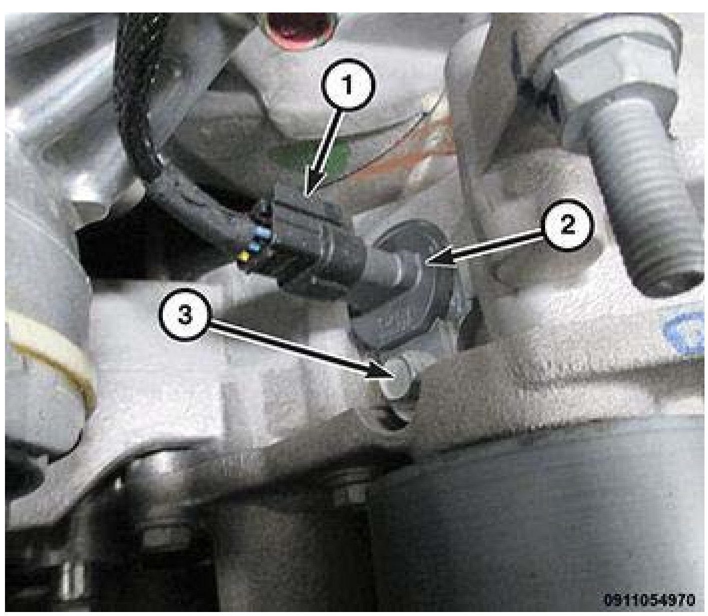


Fig. 46: Camshaft Position Sensor (CMP), Connector & Bolt

Courtesy of CHRYSLER GROUP, LLC

CAUTION: Before tightening the sensor mounting bolt, be sure the sensor is completely flush to the timing cover. If the sensor is not flush, damage to the sensor mounting tang may result.

1. Check the condition of the Camshaft Position (CMP) sensor O-ring seal.
2. Install the CMP sensor (2) into the timing cover.
3. Tighten the retaining bolt (3) to the proper torque specification. Refer to SPECIFICATIONS.
4. Connect the CMP sensor wire harness connector (1).
5. Connect the negative battery cable.

NOTE: The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.

5.7L/6.4L

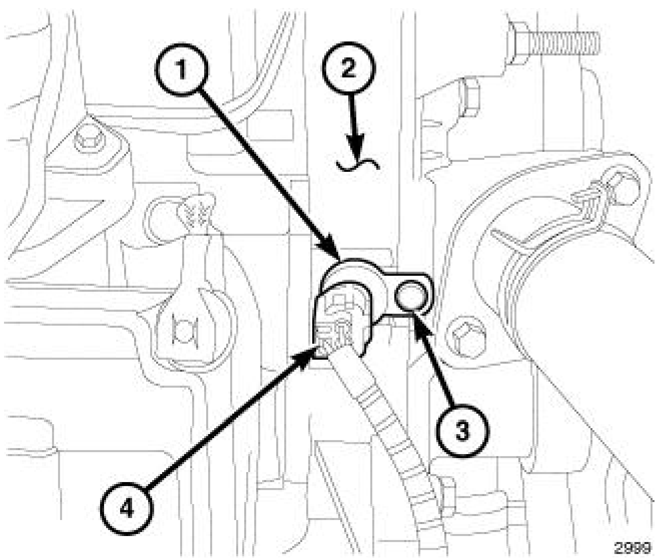


Fig. 47: Camshaft Position Sensor, Connector, Bolt & Timing Cover
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Install the Camshaft Position (CMP) sensor using a slight rotating motion (side to side). Make sure the CMP sensor is fully seated. Do not drive the CMP sensor into the bore with the mounting screw. This may cause the CMP sensor to be incorrectly seated causing a faulty signal or no signal at all.

CAUTION: Before tightening the sensor mounting bolt, be sure the sensor is completely flush to the timing cover. If the sensor is not flush, damage to the sensor mounting tang may result.

1. Check the condition of the CMP sensor O-ring.
2. Using a slight rotating motion, carefully install the CMP sensor (1) into the timing cover (2). Tighten bolt

(3) to the proper torque specification. Refer to **SPECIFICATIONS**.

3. Connect the CMP sensor wire harness connector (4).
4. Install the engine cover.
5. Connect the negative battery cable.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

SENSOR, KNOCK

DESCRIPTION

3.6L

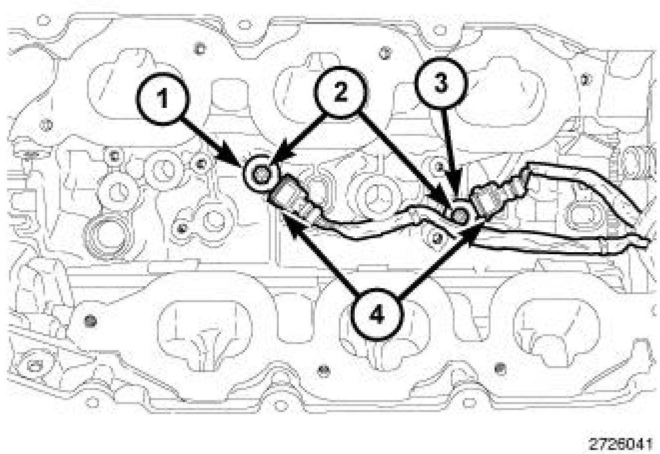
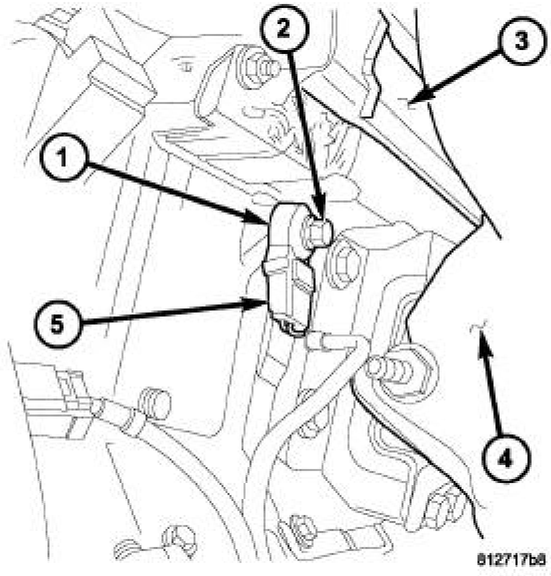


Fig. 48: Forward Knock Sensor & Rear Knock Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The forward knock sensor (1) is known to the Powertrain Control Module (PCM) as Knock Sensor 1. The rear knock sensor (3) is known to the PCM as Knock Sensor 2.**

The 3.6L engine uses two knock sensors (1, 3) and are bolted to the cylinder block under the intake manifold.

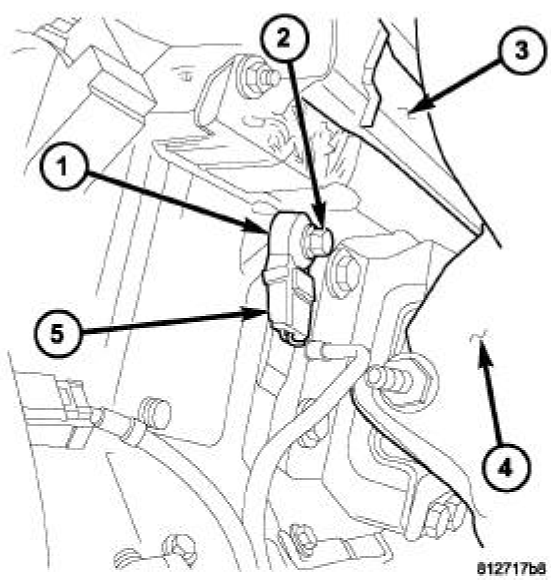
6.2L



[Fig. 49: Locating Knock Sensor]
Courtesy of CHRYSLER GROUP, LLC

The 6.2L engines use two knock sensors (1) and are bolted to each side of the cylinder block (outside) under each exhaust manifold (3).

5.7L/6.4L



[Fig. 50: Locating Knock Sensor]
Courtesy of CHRYSLER GROUP, LLC

The 5.7L and 6.4L engines use two knock sensors (1) and are bolted to each side of the cylinder block (outside)

under each exhaust manifold (3).

OPERATION

OPERATION

When the knock sensor detects a knock in one of the cylinders on the corresponding bank, it sends an input signal to the Powertrain Control Module (PCM). In response, the PCM retards ignition timing for all cylinders by a scheduled amount.

Knock sensors contain a piezoelectric crystal which constantly vibrates and sends an input voltage (signal) to the PCM while the engine operates. As the intensity of the crystal's vibration increases, the knock sensor output voltage also increases.

The voltage signal produced by the knock sensor increases with the amplitude of vibration. The PCM receives the knock sensor voltage signal as an input. If the signal rises above a predetermined level, the PCM will store that value in memory and retard ignition timing to reduce engine knock. If the knock sensor voltage exceeds a preset value, the PCM retards ignition timing for all cylinders. It is not a selective cylinder retard.

The PCM ignores knock sensor input during engine idle conditions. Once the engine speed exceeds a specified value, knock retard is allowed.

Knock retard uses its own short term and long term memory program.

Long term memory stores previous detonation information in its battery-backed RAM. The maximum authority that long term memory has over timing retard can be calibrated.

Short term memory is allowed to retard timing up to a preset amount under all operating conditions (as long as rpm is above the minimum rpm) except at Wide Open Throttle (WOT). The PCM, using short term memory, can respond quickly to retard timing when engine knock is detected. Short term memory is lost any time the ignition key is turned off.

NOTE: **Over or under tightening the sensor mounting bolts will affect knock sensor performance, possibly causing improper spark control. Always use the specified torque when installing the knock sensors.**

REMOVAL

3.6L

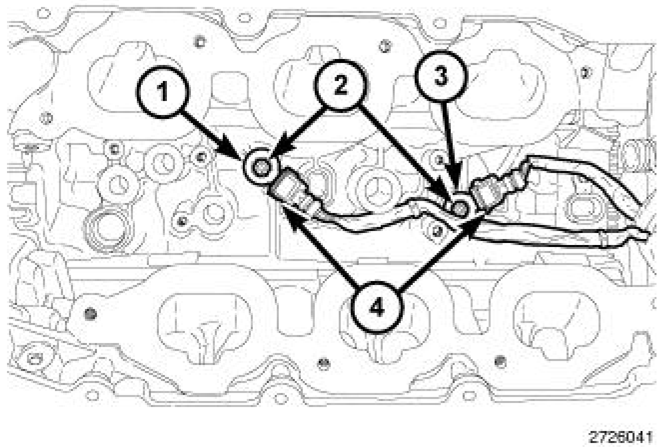


Fig. 51: Forward Knock Sensor & Rear Knock Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The forward sensor (1) is known to the powertrain control module (PCM) as knock sensor 1. The rear sensor (3) is known to the PCM as knock sensor 2.**

1. Perform the fuel pressure release procedure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Disconnect and isolate the negative battery cable.
3. Remove the oil filter housing. Refer to **HOUSING, OIL FILTER, REMOVAL** .
4. Disconnect the knock sensor wire harness connector (4).

NOTE: **There may be a foam strip on the bolt threads. This foam is used only to retain the bolts to the sensors for plant assembly. It is not used as a sealant. Do not apply any adhesive, sealant or thread locking compound to these bolts.**

5. Remove bolt (2) and knock sensor 1 (1) or knock sensor 2 (3).

6.2L

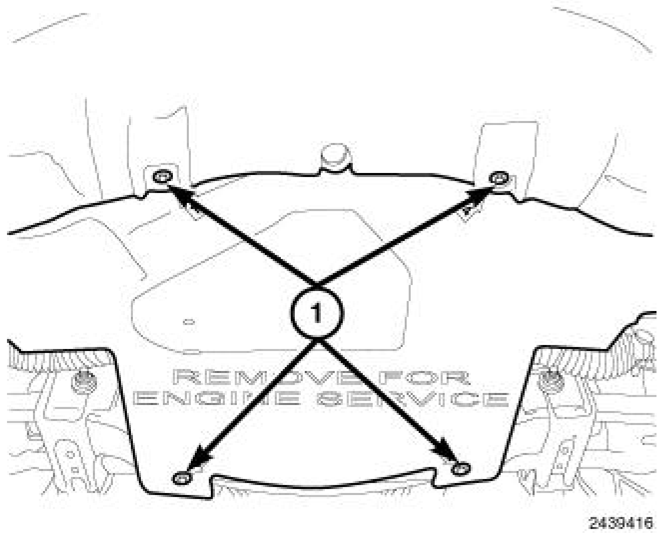


Fig. 52: Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

Two knock sensors are used. Each sensor is bolted to the outside of cylinder block below the exhaust manifold.

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the fasteners (1) and the belly pan.

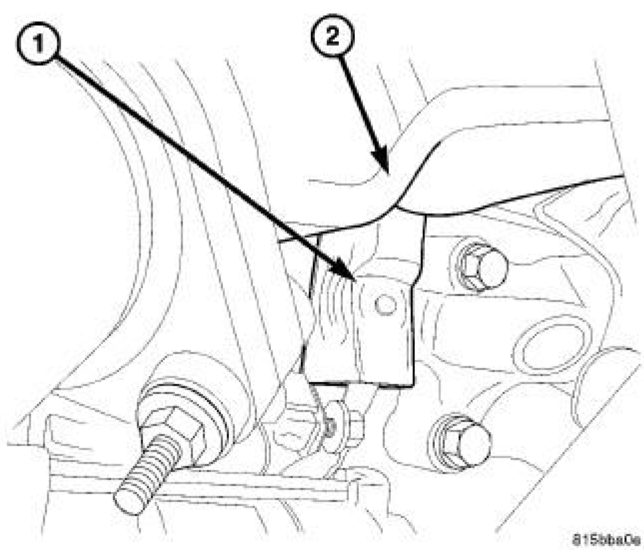


Fig. 53: Knock Sensor Heat Shield
Courtesy of CHRYSLER GROUP, LLC

4. Remove the heat shield (1) from knock sensor (shield snaps onto sensor).

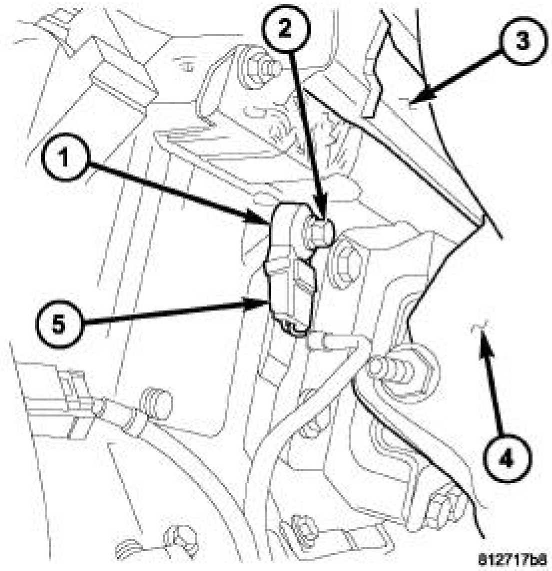


Fig. 54: Locating Knock Sensor
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the knock sensor wire harness connector (5).

NOTE: **Note the foam strip on the knock sensor retaining bolt threads. This foam is only used to retain the bolts to the knock sensors for plant assembly. It is not used as a sealant. Do not apply any adhesive, sealant or thread locking compound to these bolts.**

6. Remove bolt (2) and the knock sensor from the cylinder block.

5.7L/6.4L

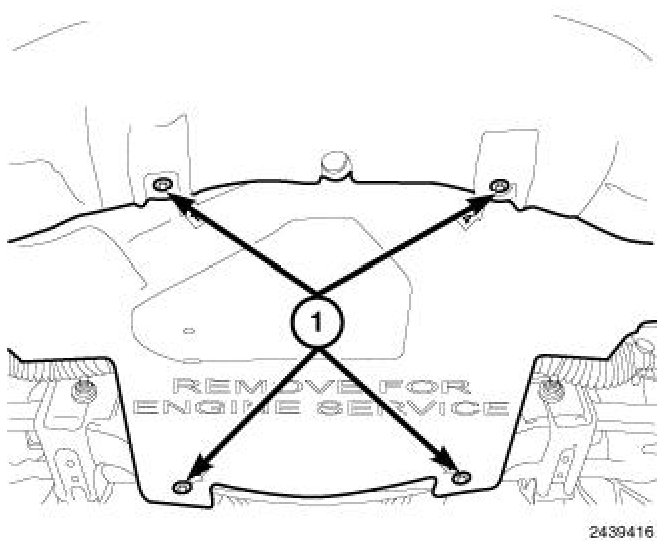


Fig. 55: Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

Two knock sensors are used. Each sensor is bolted to the outside of cylinder block below the exhaust manifold.

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove bolts (1) and the belly pan.

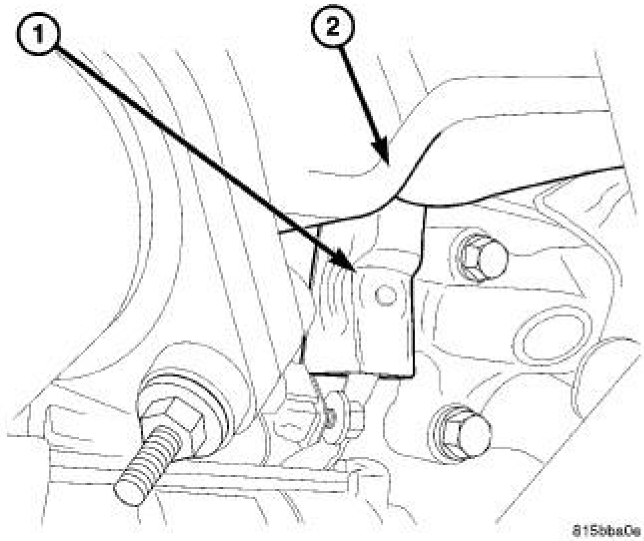


Fig. 56: Knock Sensor Heat Shield
Courtesy of CHRYSLER GROUP, LLC

4. Remove the heat shield (1) from knock sensor (shield snaps onto sensor).

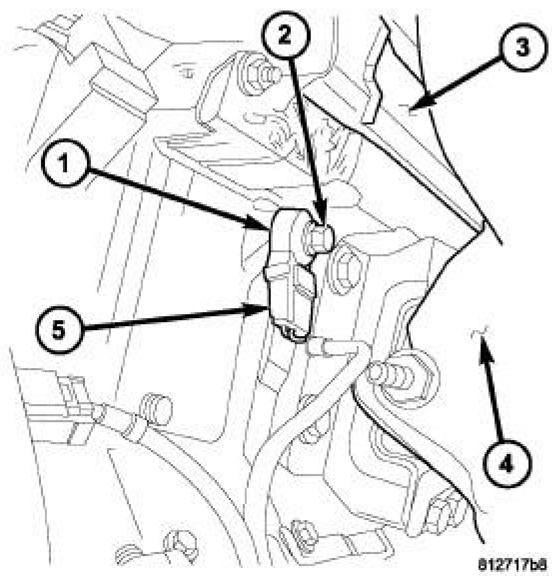


Fig. 57: Locating Knock Sensor
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the knock sensor wire harness connector (5).

NOTE: Note the foam strip on the knock sensor retaining bolt threads. This foam is only used to retain the bolts to the knock sensors for plant assembly. It is not used as a sealant. Do not apply any adhesive, sealant or thread locking compound to these bolts.

6. Remove bolt (2) and the knock sensor from the cylinder block.

INSTALLATION

3.6L

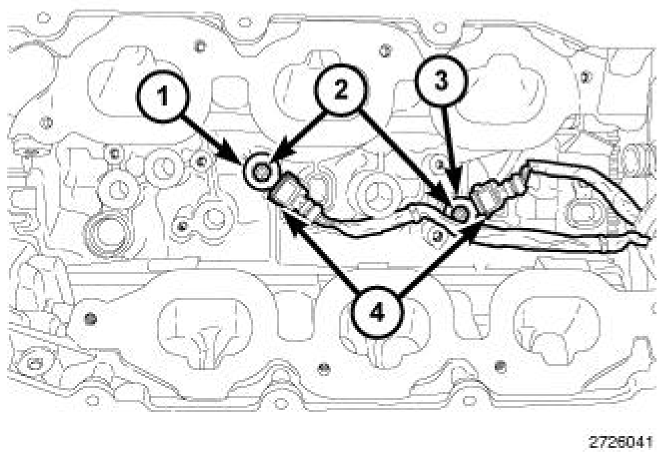


Fig. 58: Forward Knock Sensor & Rear Knock Sensor
Courtesy of CHRYSLER GROUP, LLC

NOTE: The forward sensor (1) is known to the powertrain control module (PCM) as knock sensor 1. The rear sensor (3) is known to the PCM as knock sensor 2.

1. Thoroughly clean the knock sensor mounting holes.

NOTE: Over or under tightening the sensor mounting bolts will affect knock sensor performance, possibly causing improper spark control. Always use the specified torque when installing the knock sensors. The torque specification for the knock sensor bolt is less than the typical 8 mm bolt.

NOTE: There may be a foam strip on the bolt threads. This foam is used only to retain the bolts to the sensors for plant assembly. It is not used as a sealant. Do not apply any adhesive, sealant or thread locking compound to these bolts.

2. Install knock sensor 1 (1) or knock sensor 2 (3). Tighten bolt (2) to the proper torque specification. Refer to SPECIFICATIONS.
3. Connect the knock sensor wire harness connector (4).

4. Install the oil filter housing. Refer to **HOUSING, OIL FILTER, INSTALLATION** .
5. Connect the negative battery cable.
6. Operate the engine until it reaches normal operating temperature. Check cooling system for correct fluid level or leaks. Refer to **STANDARD PROCEDURE** .

6.2L

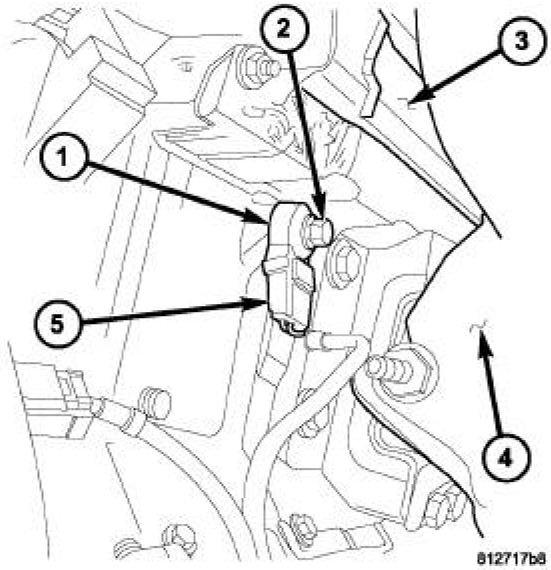


Fig. 59: Locating Knock Sensor
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Over or under tightening the knock sensor mounting bolts will affect knock sensor performance, possibly causing improper spark control.**

1. Install the knock sensor (1) onto the cylinder block.
2. Tighten the bolt (2) to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Connect the knock sensor wire harness connector (5).

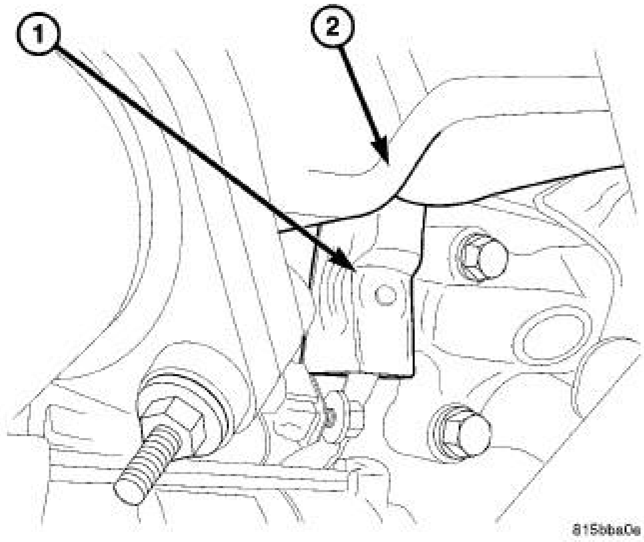


Fig. 60: Knock Sensor Heat Shield
Courtesy of CHRYSLER GROUP, LLC

4. Snap the heat shield (1) onto the knock sensor.

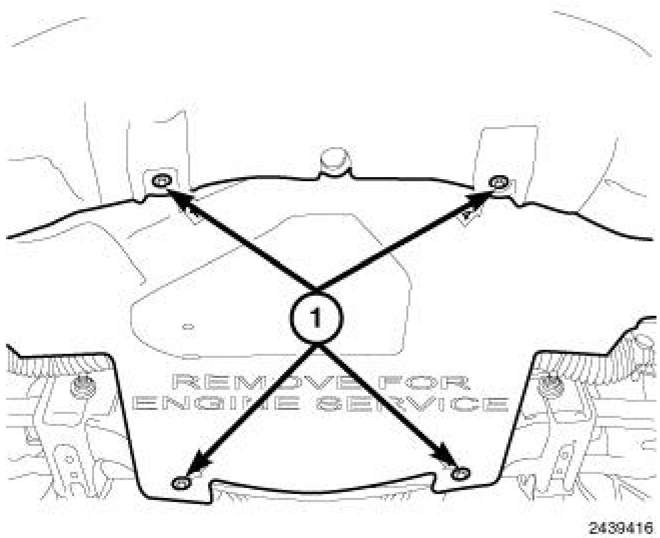
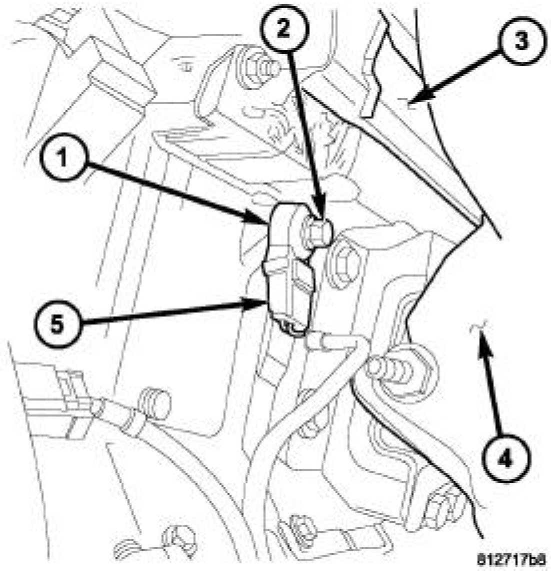


Fig. 61: Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Install the belly pan and securely tighten the fasteners (1).
6. Connect the negative battery cable.

5.7L/6.4L



[Fig. 62: Locating Knock Sensor](#)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Over or under tightening the knock sensor mounting bolts will affect knock sensor performance, possibly causing improper spark control.**

NOTE: **The foam strip used on bolt threads is used only to retain the bolts to the sensors for plant assembly. It is not used as a sealant. Do not apply any adhesive, sealant or thread locking compound to these bolts.**

1. Install the knock sensor (1) onto cylinder block. Tighten bolt (2) to the proper torque specification. Refer to **SPECIFICATIONS**.
2. Connect the knock sensor wire harness connector (5).

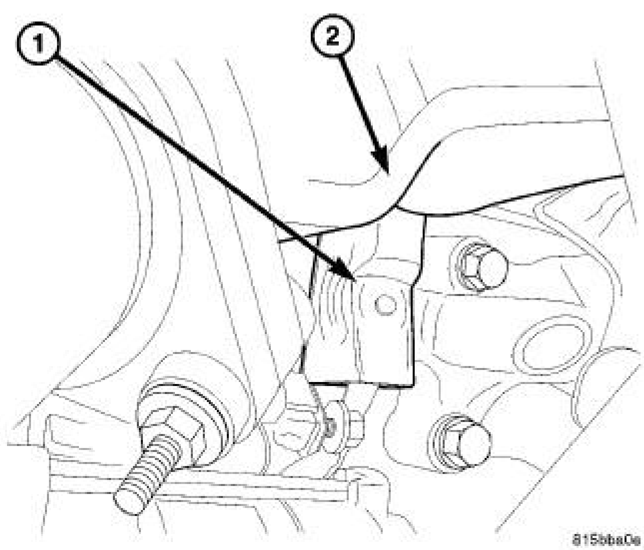


Fig. 63: Knock Sensor Heat Shield
Courtesy of CHRYSLER GROUP, LLC

3. Snap the heat shield (1) onto the knock sensor.

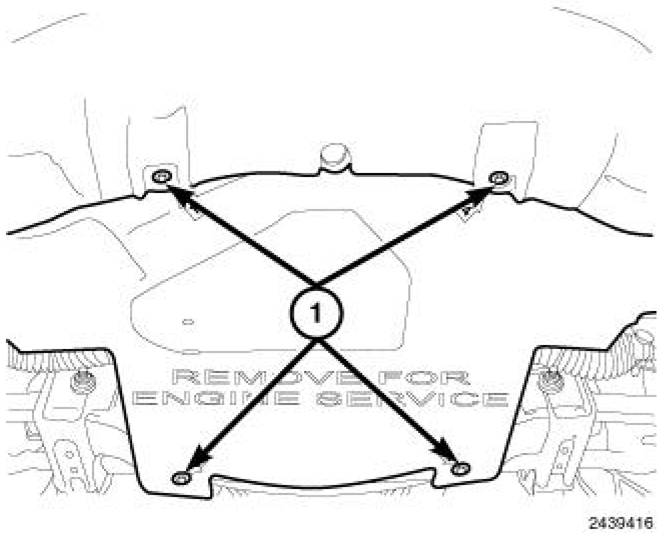


Fig. 64: Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Install the belly pan and securely tighten bolts (1).
5. Connect the negative battery cable.

SOLENOID, VARIABLE VALVE TIMING

DESCRIPTION

DESCRIPTION

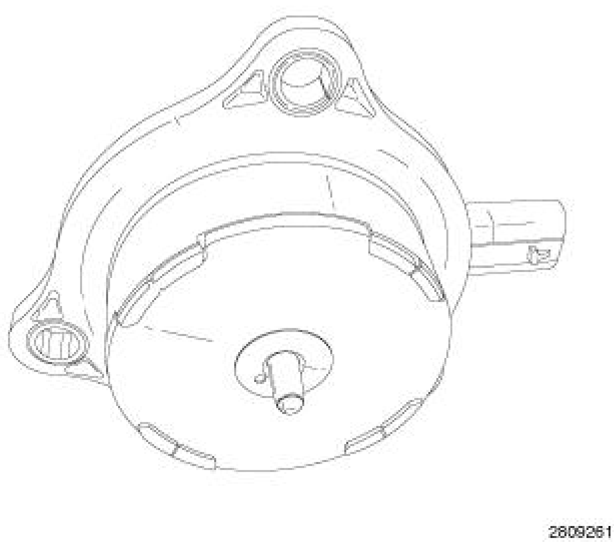


Fig. 65: Variable Valve Timing Solenoid
Courtesy of CHRYSLER GROUP, LLC

The 3.6L engine is equipped with Variable Valve Timing (VVT). This system adjusts the timing of all four camshafts independently using solenoids and oil control valves to direct oil pressure into the camshaft phaser assemblies. The camshaft phaser assembly advances and/or retards camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy, and reduce emissions. The four VVT solenoids are located on the front of the cylinder head covers. The pintle should move freely within the solenoid body. Do not attempt to disassemble the solenoids, they are not serviceable. The solenoids are identical but should be installed in the same location as removed.

OPERATION

OPERATION

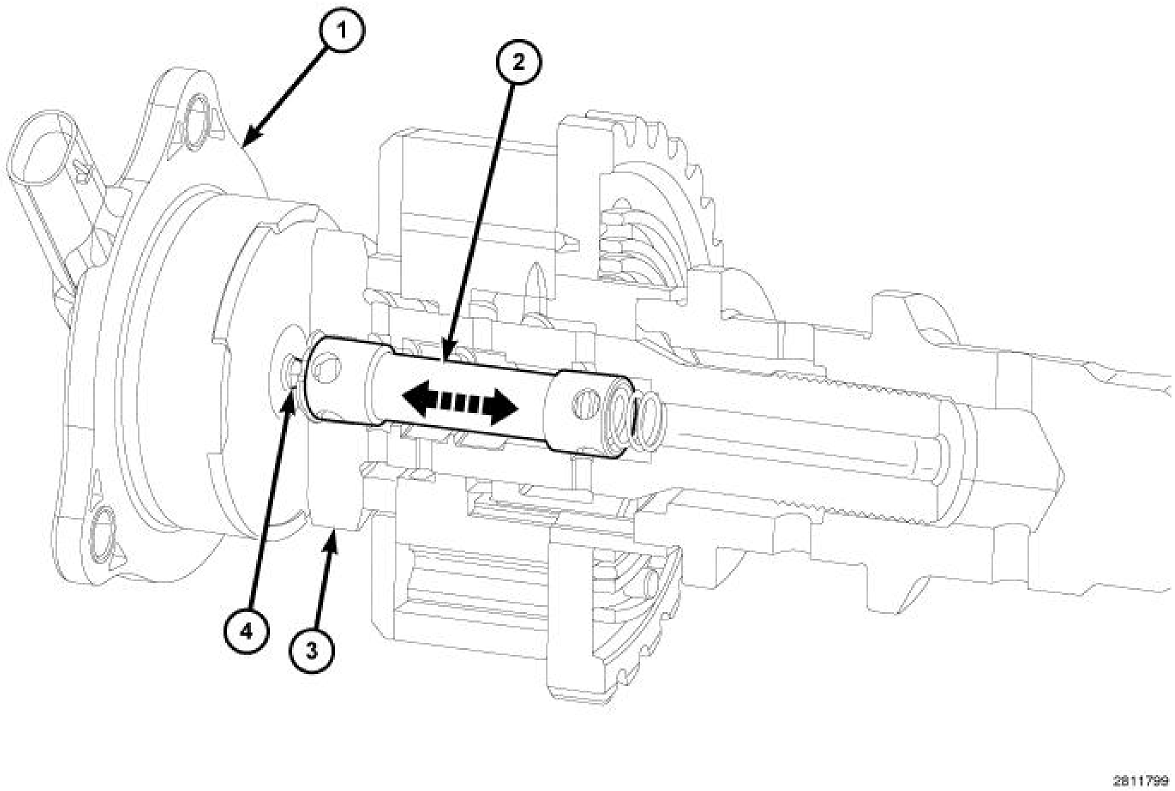


Fig. 66: Oil Control Valve (OCV), VVT Solenoid, Solenoid Pintle & Internal Spool Valve
Courtesy of CHRYSLER GROUP, LLC

Camshaft phaser position is adjusted using regulated oil pressure through an Oil Control Valve (OCV) (3). To begin Phaser movement, the Powertrain Control Module (PCM) applies a pulse-width modulated voltage signal to the VVT solenoid (1) to extend or retract the solenoid pintle (4). The pintle pushes against an internal spool valve (2) within the OCV moving the valve forwards and backwards to direct oil flow. The position of the spool inside the OCV determines which ports and chambers inside the phaser are being fed, either to advance the timing of the phaser sprocket relative to the camshaft, retard it, or hold a desired position. Refer to **ASSEMBLY, VARIABLE VALVE TIMING, PHASER / OIL CONTROL VALVE, OPERATION** .

The Camshaft Position (CMP) sensor monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

The debris crush mode will only occur with the key on and the engine off (KOEO). If the ignition is cycled to the start position without a momentary pause (immediate crank), the debris crush mode will not occur. In this

instance the procedure will be performed at the next key off cycle.

REMOVAL

LEFT

1. Disconnect and isolate the negative battery cable.

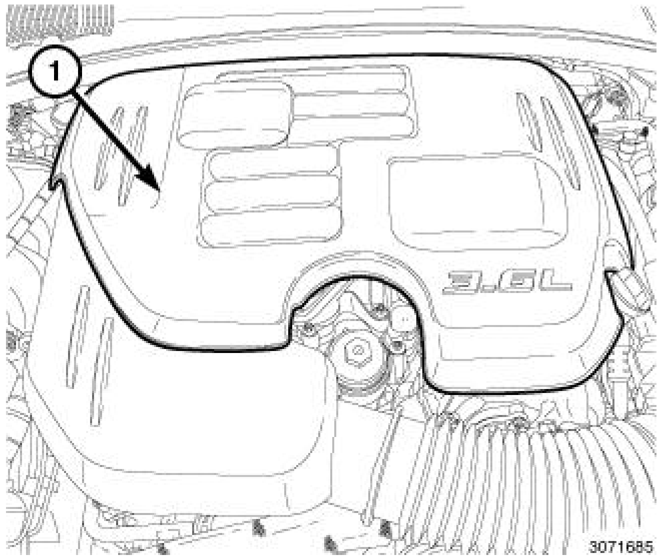


Fig. 67: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine cover (1).
3. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** for 3.6L, **BODY, AIR CLEANER, REMOVAL** for 5.7L, **BODY, AIR CLEANER, REMOVAL** for 6.2L or **BODY, AIR CLEANER, REMOVAL** for 6.4L.

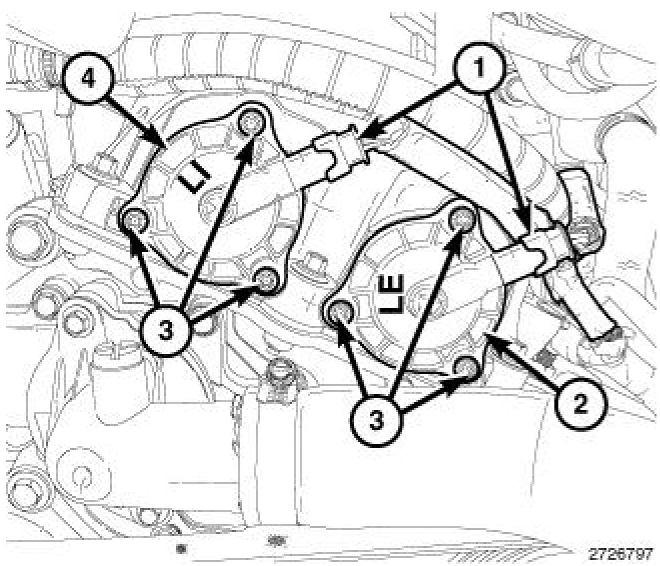


Fig. 68: Variable Valve Timing Solenoids, Connectors & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Mark the Variable Valve Timing Solenoid (VVTS) wire harness connectors**

(1) with a paint pen or equivalent so that they may be reinstalled in their original locations.

4. Mark the intake VVTS (4) and the VVTS (2) with a paint pen or equivalent so that they may be reinstalled in their original locations.
5. Disconnect the VVTS wire harness connector (1).
6. Remove the bolts (3) and pull the VVTS from the cylinder head cover.

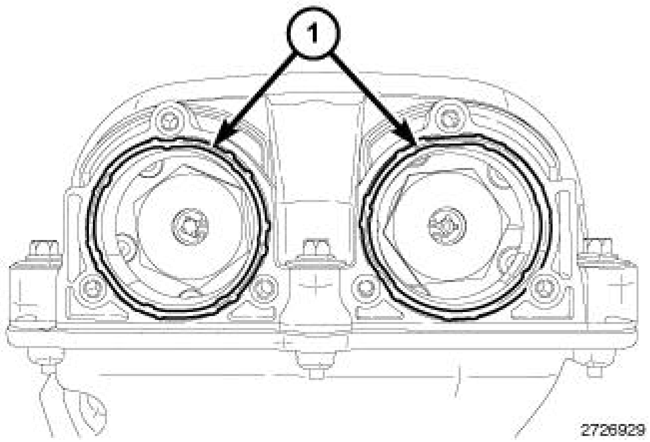


Fig. 69: VVT Seal
Courtesy of CHRYSLER GROUP, LLC

7. The seal (1) can be reused if not damaged.

RIGHT

1. Disconnect and isolate the negative battery cable.

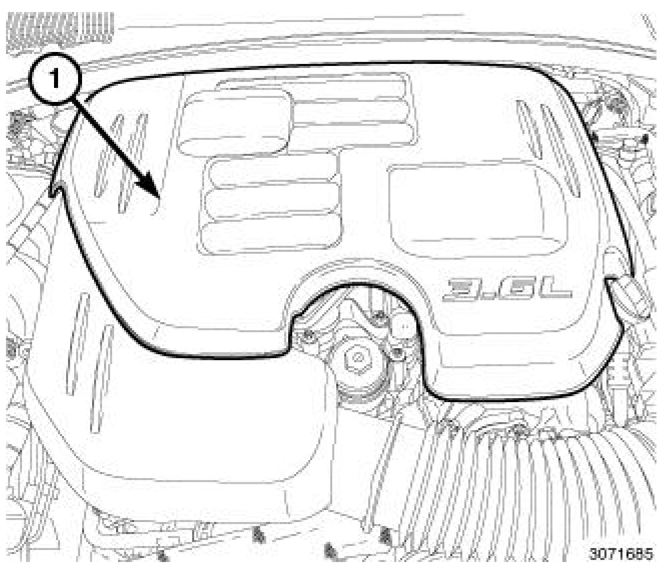


Fig. 70: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the engine cover (1).
3. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** for 3.6L,**BODY, AIR CLEANER, REMOVAL** for 5.7L, **BODY, AIR CLEANER, REMOVAL** for 6.2L or **BODY, AIR CLEANER, REMOVAL** for 6.4L.
4. **NOTE:** **Mark the Variable Valve Timing Solenoid (VVTS) connectors (1) with a paint pen or equivalent so that they may be reinstalled in their original locations.**
5. Mark the intake VVTS (2) and the exhaust VVTS solenoid (4) with a paint pen or equivalent so that they may be reinstalled in their original locations.

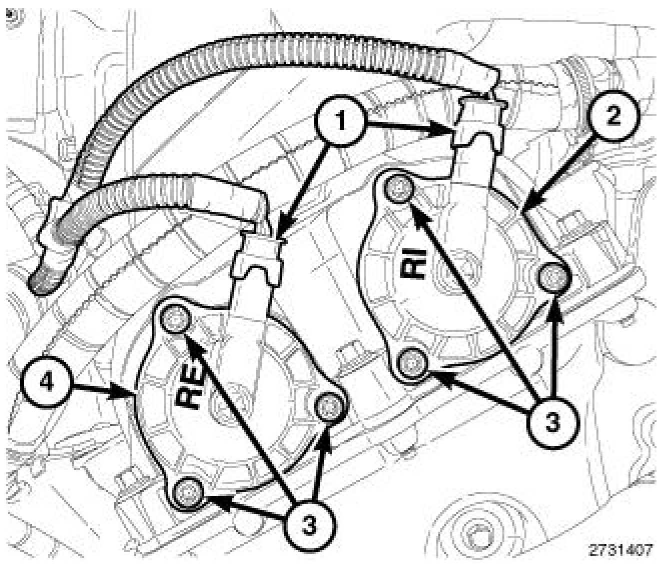


Fig. 71: Variable Valve Timing Solenoids, Connectors & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the VVTS wire harness connector (1).
7. Remove bolts (3) and pull the VVTS from the cylinder head cover.

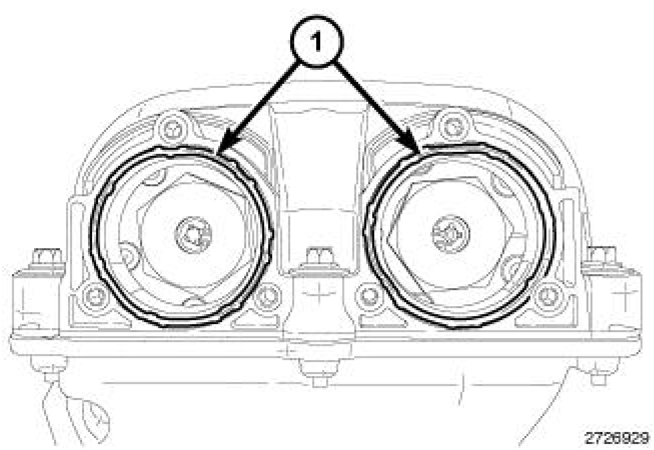


Fig. 72: VVT Seal
Courtesy of CHRYSLER GROUP, LLC

8. The seal (1) can be reused if not damaged.

INSTALLATION

LEFT

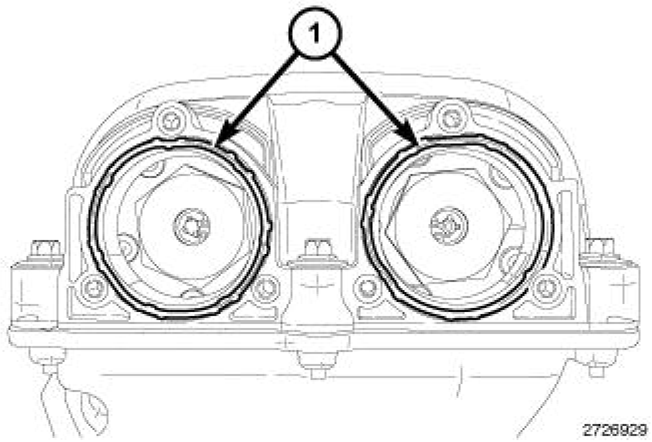


Fig. 73: VVT Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install the Variable Valve Timing Solenoid (VVTS) seals (1). The seals can be reused if not damaged.

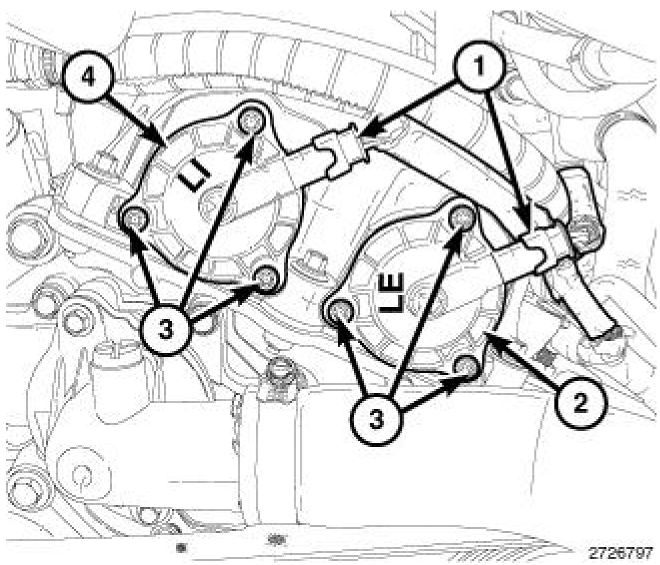


Fig. 74: Variable Valve Timing Solenoids, Connectors & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Refer to the markings made at disassembly and install the intake VVTS (4) and the exhaust VVTS (2) in their original locations.
3. Install the VVTS. Tighten bolts (3) to the proper torque specifications. Refer to **SPECIFICATIONS**.
4. Connect the VVTS wire harness connector (1).
5. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** for 3.6L, **BODY, AIR**

CLEANER, INSTALLATION for 5.7L, BODY, AIR CLEANER, INSTALLATION for 6.2L or BODY, AIR CLEANER, INSTALLATION for 6.4L.

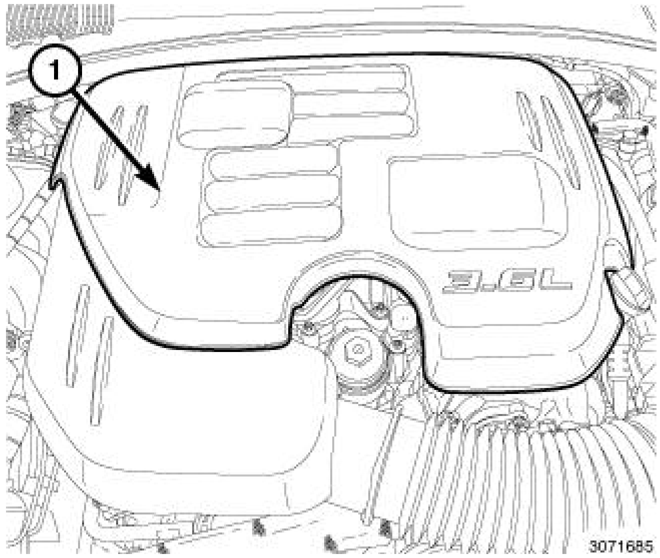


Fig. 75: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

6. Install the engine cover (1).
7. Connect the negative battery cable.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

RIGHT

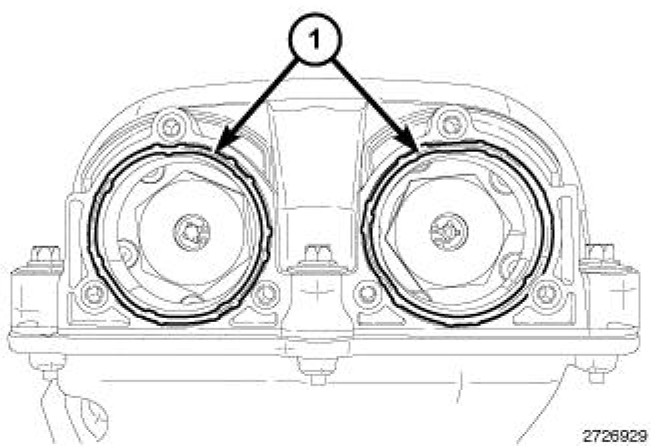


Fig. 76: VVT Seal
Courtesy of CHRYSLER GROUP, LLC

1. Install the Variable Valve Timing Solenoid (VVTS) seals (1). The seals can be reused if not damaged.

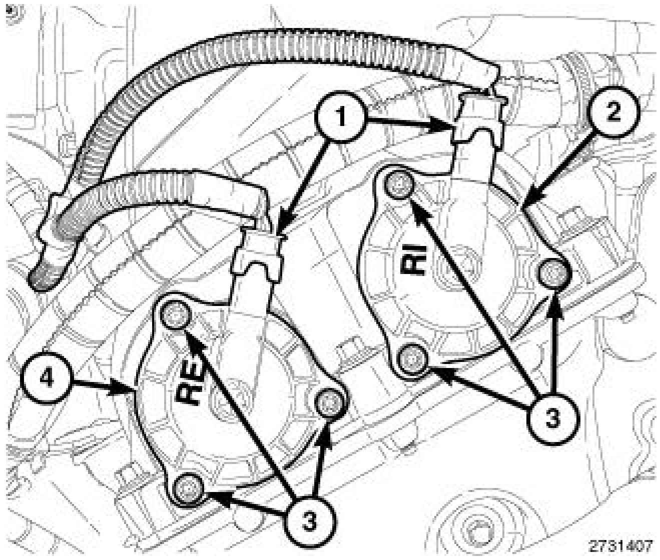


Fig. 77: Variable Valve Timing Solenoids, Connectors & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Refer to the markings made during disassembly and install the intake VVTS (2) and the exhaust VVTS (4) in their original locations.
3. Tighten the VVTS bolts (3) to the proper torque specification. Refer to **SPECIFICATIONS**.
4. Connect the VVTS wire harness connector (1).
5. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** for 3.6L, **BODY, AIR CLEANER, INSTALLATION** for 5.7L, **BODY, AIR CLEANER, INSTALLATION** for 6.2L or **BODY, AIR CLEANER, INSTALLATION** for 6.4L.

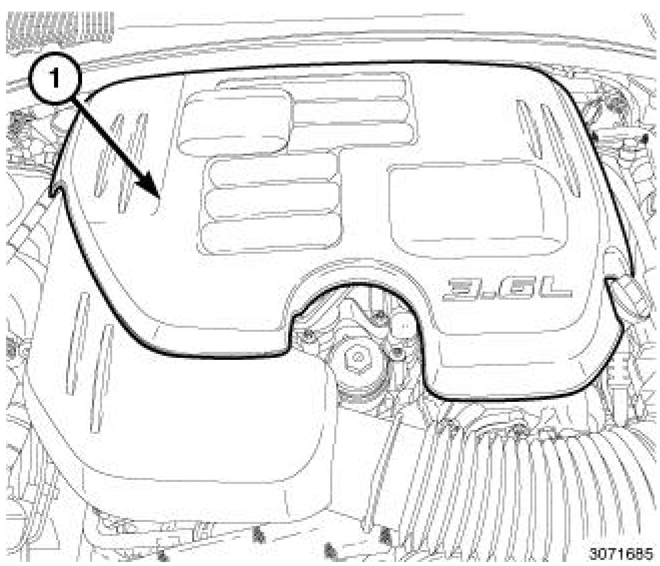


Fig. 78: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

6. Install the engine cover (1).
7. Connect the negative battery cable.

NOTE: **The Cam/Crank Variation Relearn procedure must be performed using the scan tool anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components.**

SPARK PLUG

DESCRIPTION

DESCRIPTION

CAUTION: **Cleaning platinum plugs may damage the platinum center electrode or the thin platinum pad.**

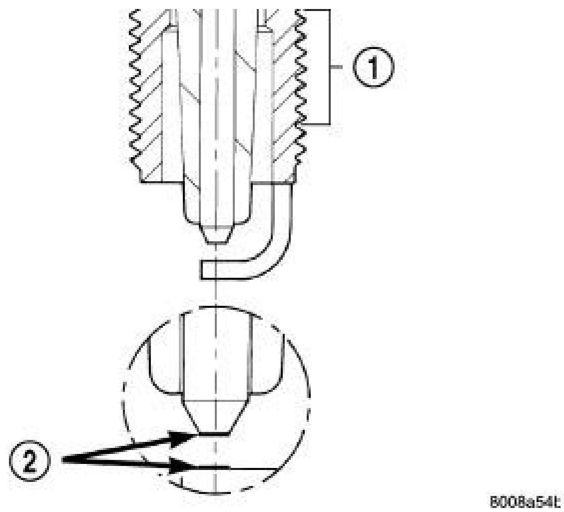


Fig. 79: Platinum Pads
Courtesy of CHRYSLER GROUP, LLC

1 - APPLY ANTI-SEIZE COMPOUND HERE ONLY	
2 - PLATINUM SPARK SURFACE	

The spark plugs are platinum resistor design. They have resistance values of 3, 500 to 20, 000 ohms when checked with at least a 1000 volt tester. For spark plug identification and specifications. Refer to SPECIFICATIONS.

Do not use an ohm meter to check the resistance of the spark plugs. This will give an inaccurate reading.

A thin platinum pad (2) is welded to both or just the center electrode end(s). Extreme care must be used to prevent spark plug cross threading, incorrect gapping and ceramic insulator damage during plug removal and installation.

MoparĀ® Nickel-Graphite Anti-Seize compound is applied to the thread area (1) to prevent damage to the spark plug during removal and installation.

REMOVAL

3.6L

NOTE: The left side ignition coils are shown in the illustration, the right side ignition coils are similar.

1. Remove the ignition coil(s). Refer to COIL, IGNITION, REMOVAL.

CAUTION: The spark plug tubes (1) are a thin wall design. Avoid damaging the spark plug tubes. Damage to the spark plug tube can result in oil leaks.

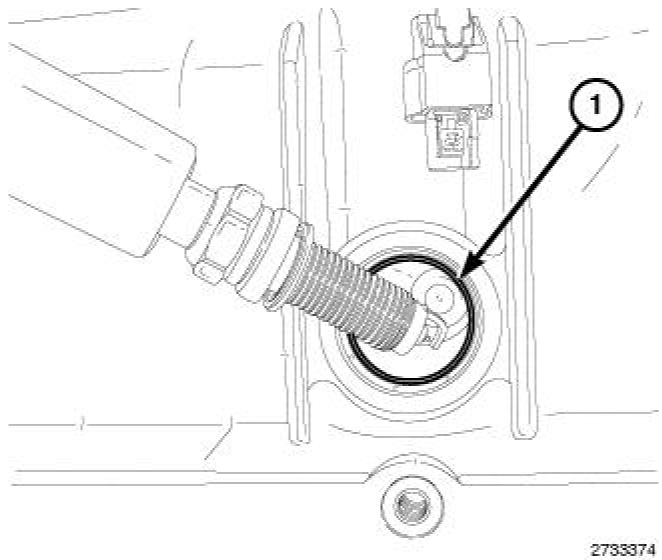


Fig. 80: Spark Plug Tubes
Courtesy of CHRYSLER GROUP, LLC

2. Prior to removing the spark plug, spray compressed air into the cylinder head opening. This will help prevent foreign material from entering combustion chamber.
3. Remove the spark plug(s) from the cylinder head.
4. Inspect the spark plug condition.

6.2L

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover.
3. Remove the ignition coil(s). Refer to COIL, IGNITION, REMOVAL.
4. Remove the spark plug(s) from the cylinder head.

5.7L/6.4L

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover.
3. Remove the ignition coil(s). Refer to COIL, IGNITION, REMOVAL.
4. Remove the spark plug(s) from the cylinder head.

INSTALLATION

3.6L

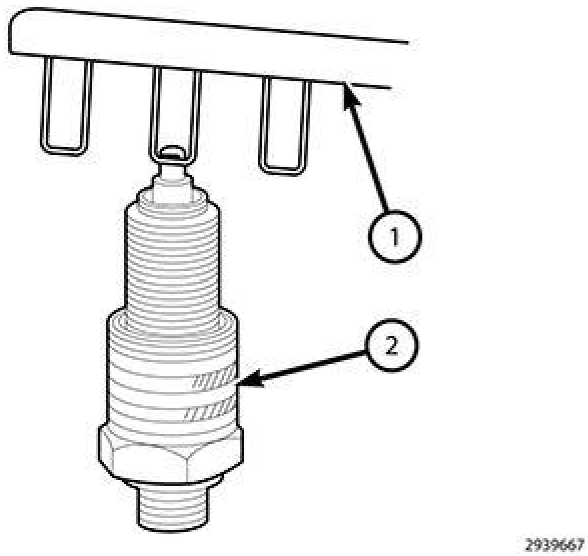


Fig. 81: Setting Spark Plug Gap - Typical
Courtesy of CHRYSLER GROUP, LLC

1. Check and adjust the spark plug gap with a gap gauging tool (1). Refer to SPECIFICATIONS.

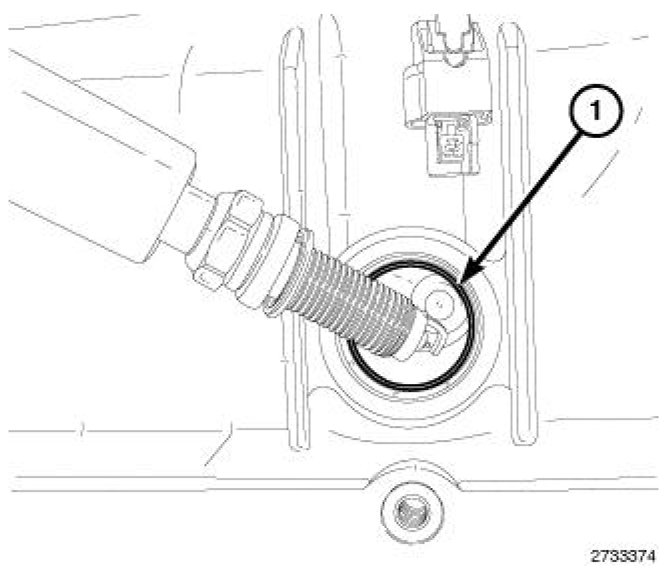


Fig. 82: Spark Plug Tubes
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Special care should be taken when installing spark plugs into the cylinder head spark plug wells. Be sure the plugs do not drop into the plug wells as electrodes can be damaged.

CAUTION: The spark plug tubes (1) are a thin wall design. Avoid damaging the spark plug tubes. Damage to the spark plug tube can result in oil leaks.

2. Start the spark plug into the cylinder head by hand to avoid cross threading.

CAUTION: Spark plug torque is critical and must not exceed the specified value. Overtightening stretches the spark plug shell reducing its heat transfer

capability resulting in possible catastrophic engine failure.

3. Tighten the spark plugs to the proper torque specification. Refer to SPECIFICATIONS.

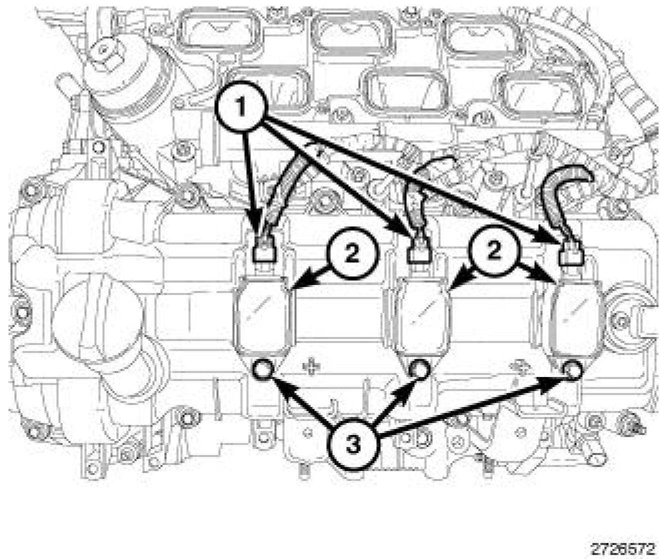


Fig. 83: Electrical Connector, Ignition Coils & Ignition Coil Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The left side ignition coils are shown in the illustration, the right side ignition coils are similar.**

4. Install the ignition coil (2). Refer to COIL, IGNITION, INSTALLATION.

6.2L

CAUTION: **Handle the spark plugs with care. Do not drop or force the spark plugs into the wells, damage to the electrodes and/or porcelain body may occur. Always start each spark plug by hand in order to avoid cross-threading the spark plug in the cylinder head.**

Always tighten spark plugs to the specified torque. Too much or not enough torque will cause damage to the cylinder head and/or spark plug and may lead to poor engine performance.

1. To avoid cross threading, start the spark plug(s) into the cylinder head by hand.
2. Tighten the spark plugs to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
3. Install the ignition coil(s). Refer to COIL, IGNITION, INSTALLATION.
4. Install the engine cover.
5. Connect negative battery cable.

5.7L/6.4L

CAUTION: **Handle the spark plugs with care. Do not drop or force the spark plugs into the wells, damage to the electrodes and/or porcelain body may occur. Always start**

..

each spark plug by hand in order to avoid cross-threading the spark plug in the cylinder head.

Always tighten spark plugs to the specified torque. Too much or not enough torque will cause damage to the cylinder head and/or spark plug and may lead to poor engine performance.

1. To avoid cross threading, start the spark plug(s) into the cylinder head by hand.
2. Tighten the spark plugs as follows:
   - 5.7L Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
   - 6.4L Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Install the ignition coil(s). Refer to **COIL, IGNITION, INSTALLATION**.
4. Install the engine cover.
5. Connect negative battery cable.

SWITCH, IGNITION

DESCRIPTION

DESCRIPTION

For more information on the ignition system, refer to **MODULE, KEYLESS IGNITION NODE, DESCRIPTION** or **MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION** .

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Article GUID: A00735936

2015-16 ACCESSORIES AND EQUIPMENT

Instrument Cluster - Service Information - Challenger

DESCRIPTION

DESCRIPTION

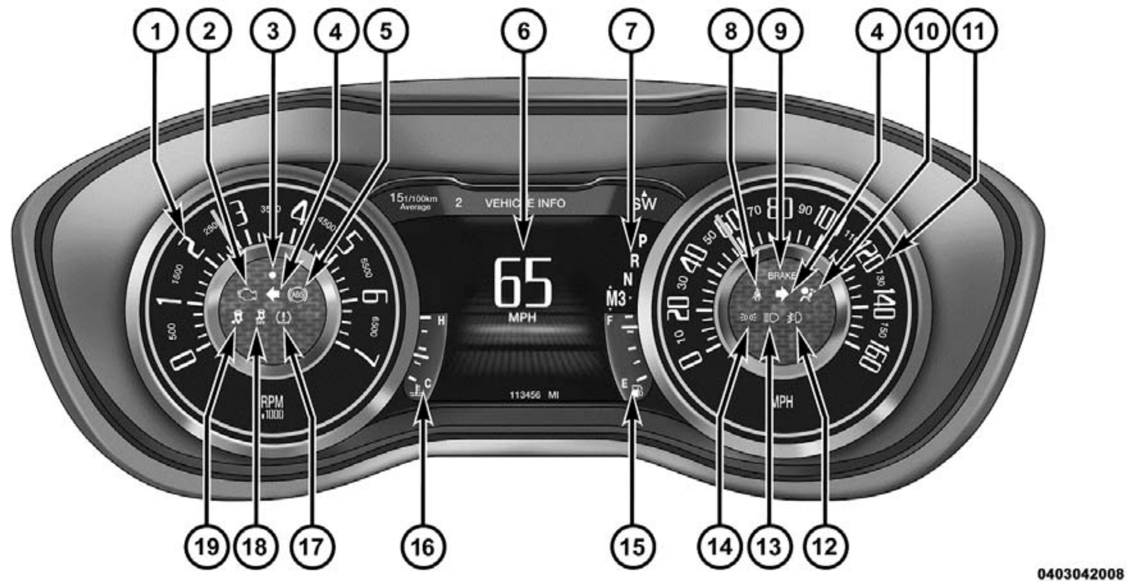

Fig. 1: Instrument Cluster
Courtesy of CHRYSLER GROUP, LLC

The Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) for this vehicle is located directly in front of the driver, above the steering column opening. Only the face of the IC is visible. The remainder of the IC including the mounting provisions and electrical connections are concealed within the instrument panel behind the IC housing and the instrument panel cluster bezel.

The IC gauges and indicators are visible through a dedicated opening in the instrument panel below the cluster hood and are protected by a clear plastic cluster lens. A cluster hood and mask serves as a visor and shields the face of the cluster from ambient light and reflections to reduce glare. The IC has two integral mounting tabs on the sides near the top of the unit as well as two on the bottom which are used to secure the IC to the molded plastic instrument panel cluster carrier with screws.

Besides analog gauges and Light Emitting Diode (LED) unit indicators, the IC incorporates a multicolor Thin Film Transistor (TFT) display unit. The TFT will display odometer information and automatic transmission gear selection. The TFT may also display numerous indications, textual messages, both static and animated graphics and certain diagnostic information, some of which are model and equipment dependent. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, DESCRIPTION** .

Several versions of the IC module are offered for this vehicle. These versions accommodate all of the variations of optional equipment and regulatory requirements for the various markets in which the vehicle is offered. The microcontroller-based IC utilizes integrated circuitry and information carried on the Controller Area Network (CAN) data bus along with several hard wired analog and multiplexed inputs to monitor sensors and switches

throughout the vehicle. Refer to **COMMUNICATION, DESCRIPTION** .

The IC gauges, indicators and electronic circuitry along with the cluster housing are only serviced as an assembly, and cannot be adjusted or repaired. If a gauge, a LED unit, the TFT display unit, the electronic circuit board and hardware, the cluster overlay or the cluster housing is damaged or ineffective, the entire IC unit must be replaced. The cluster lens and the cluster hood and mask are available for separate service replacement.

OPERATION

OPERATION

The Instrument Panel Cluster (IPC) is designed to allow the vehicle operator to monitor the conditions of many of the vehicle components and operating systems. The gauges and indicators in the IPC provide valuable information about the various standard and optional power trains, fuel and emissions systems, cooling systems, lighting systems, safety systems and many other convenience items. The IPC is installed in the instrument panel so that the operator of the vehicle can view all of these monitors easily, yet still allow relative ease of access for service.

The microcontroller-based IPC hardware and software uses various inputs to control the gauges and indicators visible on the face of the cluster. Some of these inputs are hard wired, but most are in the form of electronic messages that are transmitted by other electronic modules over the Controller Area Network (CAN) data bus. Refer to **COMMUNICATION, OPERATION** .

The IPC microcontroller smooths the input data using algorithms to provide gauge readings that are accurate, stable and responsive to operating conditions. These algorithms are designed to provide gauge readings during normal operation that are consistent with customer expectations. However, when abnormal conditions exist such as high coolant temperature, the algorithm can drive the gauge pointer to an extreme position and the microcontroller can sound a chime warning to provide distinct visual and audible indications of a problem to the vehicle operator. The IPC may also produce audible warnings for other electronic modules in the vehicle based upon electronic chime request messages received over the CAN data bus. Each audible warning is intended to provide the vehicle operator with an audible alert to supplement a visual indication.

The IPC circuitry operates on battery current received through a fused B(+) fuse on a non-switched fused B(+) circuit, and on battery current received through a fused ignition switch output (run-start) fuse on a fused ignition switch output (run-start) circuit. This arrangement allows the IPC to provide some features regardless of the ignition switch position, while other features will operate only with the ignition switch in the ON or START positions. The circuitry is grounded through a ground circuit of the instrument panel wire harness.

The IPC also has a self-diagnostic test capability that tests each of the CAN bus message-controlled functions of the cluster. This test illuminates the appropriate indicators, positions the gauge needles at several predetermined calibration points across the gauge faces and illuminates all segments of the Electronic Vehicle Information Center (EVIC). The EVIC will display the hardware/software version and the CAN Vehicle Maintenance Monitor (VMM) used in the IPC within the Thin Film Transistor (TFT) display unit. Refer to **DIAGNOSIS AND TESTING**.

Cluster Illumination

Instrument cluster illumination is supplied by several Light Emitting Diode (LED) units controlled by the IPC. The illumination intensity of these LED units can be adjusted only when the exterior lighting is turned ON by

rotating the panel dimmer switch thumbwheel (down to dim, up to brighten) of the dimmer module to one of five available minor detent positions. The illumination intensity of the LED units is controlled by the IPC circuitry based upon electronic **dimming level** messages received from the Body Control Module (BCM) (also known as the Common Body Controller/CBC) over the Controller Area Network (CAN) data bus. The BCM monitors an input from the headlamp switch and a dimming level input received from the panel dimmer switch of the dimmer module.

The hard-wired headlamp switch and dimmer module inputs to the BCM may be diagnosed using conventional diagnostic methods. However, proper testing of the electronic communication and processing of the IPC and the electronic **dimming level** messages sent by the BCM over the CAN data bus requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

Thin Film Transistor Display

The Thin Film Transistor (TFT) display unit is soldered to the IPC electronic circuit board. With the ignition switch in the OFF or ACCESSORY positions, the TFT display is activated when the driver door is opened (Rental Car mode) and deactivated when the driver door is closed.

The illumination intensity of the TFT unit is controlled by the IPC circuitry based upon electronic **dimming level** messages received from the Body Control Module (BCM) (also known as the Common Body Controller/CBC) over the Controller Area Network (CAN) data bus. The BCM monitors an input from the headlamp switch and a dimming level input received from the panel dimmer switch of the dimmer module. The BCM synchronizes the illumination intensity of other display units with that of the unit in the IPC by sending electronic **dimming level** messages to other electronic modules in the vehicle over the CAN data bus.

The IPC TFT display unit has several display capabilities. The TFT unit displays odometer, trip odometer, gear selector indication (PRNDL) for models with an automatic transmission, both static and animated graphics, several warning or reminder indications and various diagnostic information when certain fault conditions exist. Steering wheel mounted switches are used to control some of the display modes of the TFT. For more information, refer to CENTER, ELECTRONIC VEHICLE INFORMATION, OPERATION .

The TFT display unit is diagnosed using the IPC self-diagnostic actuator test. Refer to DIAGNOSIS AND TESTING. Proper testing of the CAN data bus and the electronic data bus message inputs to the IPC that control some of the TFT display functions requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information. Specific operation details for the odometer, the trip odometer, the gear selector indicator and the various warning and reminder indicator functions of the TFT display unit may be found elsewhere in this service information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - INSTRUMENT CLUSTER

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Refer to WARNING . Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions

could result in accidental airbag deployment.

If all of the Instrument Cluster (IC) (also known as Common Instrument Cluster/CIC) gauges and indicators are ineffective, be certain to check the IC fused B(+) fuse and the IC fused B(+) and ground circuits for shorts or opens. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

If an individual hard-wired gauge or indicator is ineffective, refer to the appropriate diagnosis and testing service information for that specific gauge or indicator. If an individual Controller Area Network (CAN) data bus message-controlled gauge or indicator is ineffective, perform the Self-Diagnostic Test.

CAUTION: **Instrument clusters used in this vehicle automatically configure themselves for compatibility with the features and optional equipment in the vehicle in which they are initially installed. The instrument cluster is programmed to do this by embedding the Vehicle Identification Number (VIN) and other information critical to proper cluster operation into electronic memory. This embedded information is learned through electronic messages received from other electronic modules in the vehicle over the Controller Area Network (CAN) data bus and through certain hard-wired inputs received when the cluster is connected to the vehicle electrically. Once configured, the instrument cluster memory may be irreparably damaged and certain irreversible configuration errors may occur if the cluster is connected electrically to another vehicle; or, if an electronic module from another vehicle is connected that provides data to the instrument cluster (including odometer values) that conflicts with that which was previously learned and stored. Therefore, the practice of exchanging (swapping) instrument clusters and other electronic modules in this vehicle with those removed from another vehicle must always be avoided. Failure to observe this caution may result in instrument cluster damage, which is not reimbursable under the terms of the product warranty. Service replacement instrument clusters are provided with the correct VIN and the certified odometer values embedded into cluster memory, but will otherwise be automatically configured for compatibility with the features and optional equipment in the vehicle in which they are initially installed.**

NOTE: **Certain indicators in this instrument cluster are automatically configured. This feature allows those indicators to be activated or deactivated for compatibility with certain optional equipment. If the problem being diagnosed involves improper illumination of an indicator for equipment options the vehicle does not have, disconnect and isolate the battery negative cable. After about five minutes, reconnect the battery negative cable and turn the ignition switch to the ON position. The instrument cluster should automatically relearn the equipment in the vehicle and properly configure the indicators accordingly.**

SELF TEST

The self-diagnostic test will put the IC into its test mode. In this mode the IC can perform an actuator test that will confirm that the circuitry, the gauges and the indicators are capable of operating as designed. During the test the IC circuitry will position each of the gauge needles at various calibration points, illuminate each of the

segments in the Thin Film Transistor (TFT) display unit and turn all of the indicators ON and OFF again.

Successful completion of the self-diagnostic test will confirm that the IC is operational. However, there may still be a problem with the Controller Area Network (CAN) data bus or another electronic control module that provides electronic message inputs to the IC, or the inputs to one of these electronic control modules. Use a diagnostic scan tool to diagnose these components. Refer to the appropriate diagnostic information.

1. Begin the test with the ignition switch in the OFF position.
2. Depress the Electronic Vehicle Information Center (EVIC) **Down / Scroll** switch button on the left steering wheel spoke.
3. While still holding the **Down / Scroll** switch button depressed, turn the ignition switch to the ON position, but do not start the engine.
4. Release the **Down / Scroll** switch button.
5. The IC will simultaneously begin to illuminate all of the operational segments in the TFT display unit and perform a bulb check of each operational LED unit indicator. The TFT display segments and LED unit indicators remain illuminated as each gauge needle is swept to several calibration points and back. If a TFT display segment or an LED unit indicator fails to illuminate, or if a gauge needle fails to sweep through the calibration points and back during this test, the IC must be replaced.
6. The self-diagnostic test is now complete. The IC will automatically exit the self-diagnostic test mode and return to normal operation at the completion of the test. The self-diagnostic test will be aborted if the ignition switch is turned to the OFF position, or if an electronic **vehicle speed** message indicating that the vehicle is moving is received over the CAN data bus during the test.
7. Repeat the test, if necessary.

STANDARD PROCEDURE

STANDARD PROCEDURE - ENHANCED SEATBELT REMINDER PROGRAMMING

The seatbelt indicator also includes a programmable enhanced seatbelt reminder or "BeltAlertÂ®" feature that is enabled when the vehicle is shipped from the factory. This BeltAlertÂ® feature provides extended, and modified visual seatbelt indicator, and audible chime warning responses to an unbuckled driver, or front passenger seat belt. For front passenger seats equipped with the BeltAlertÂ® feature, the warning system may be triggered when an animal or heavy object is on the front passenger seat, or when the seat is folded flat (if equipped). The beltminder feature may be disabled or enabled by the customer using the programming sequence that follows, or by the dealer using a diagnostic scan tool. The following sequence of events must occur within sixty (60) seconds of the ignition switch being placed in the On position in order for the programming to be completed successfully.

1. With the ignition switch in any position except On or Start, buckle the driver side front seat belt.
2. Turn the ignition switch to the On position and wait for the seatbelt indicator reminder function to conclude (about six seconds).
3. Unbuckle and buckle the driver side front seat belt three or more times, ending with the belt buckled.
4. Turn the ignition switch to any position except On or Start to toggle the BeltAlertÂ® feature from its current setting (from active to inactive, or from inactive to active). A single chime tone will provide an audible confirmation that the programming sequence has been successfully completed.

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove the instrument cluster bezel. Refer to **BEZEL, INSTRUMENT CLUSTER, REMOVAL** .

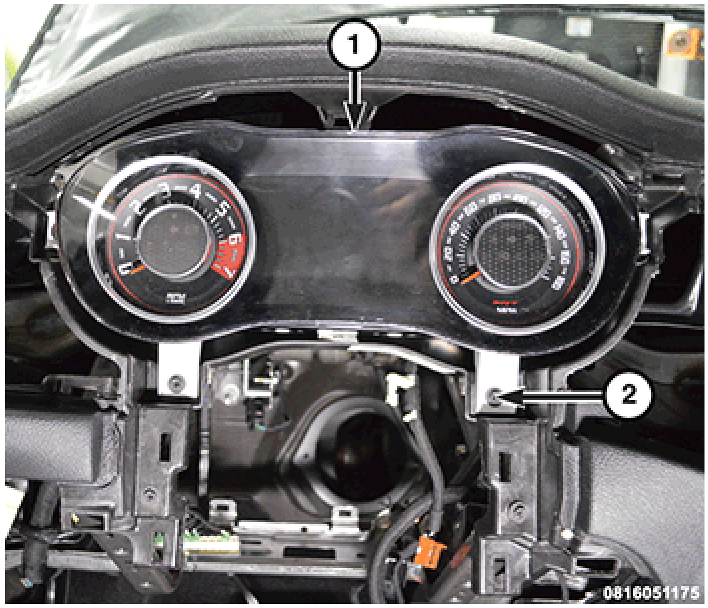

Fig. 2: Instrument Cluster & Screws
Courtesy of CHRYSLER GROUP, LLC

3. Remove the four (2) screws securing the instrument cluster (1) to the instrument panel.
4. Tilt the cluster forward, and disconnect the electrical connector.

INSTALLATION

INSTALLATION

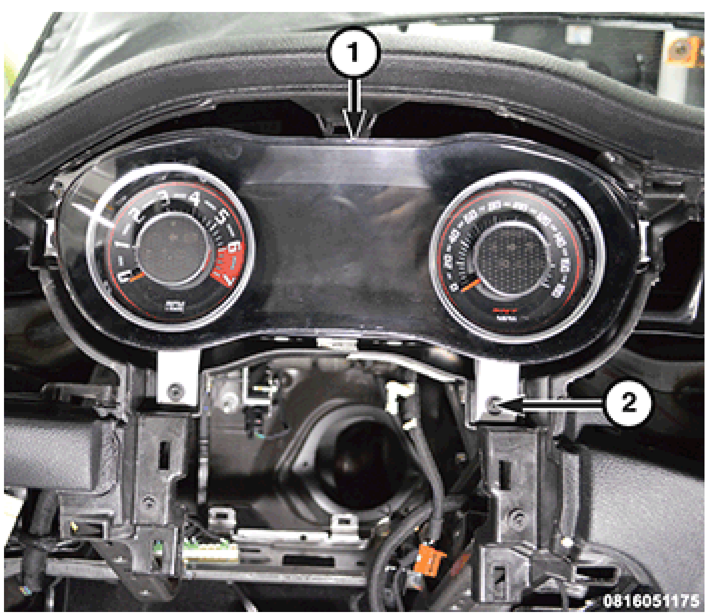

Fig. 3: Instrument Cluster & Screws

Courtesy of CHRYSLER GROUP, LLC

1. Position the cluster (1) into instrument panel opening and connect the electrical connector.
2. Install the four (2) screws that secure the instrument cluster (1) to the instrument panel.
3. Install the instrument cluster bezel. Refer to **BEZEL, INSTRUMENT CLUSTER, INSTALLATION** .
4. Connect the negative battery cable.

NOTE: **If the cluster has been replaced, the replacement cluster should be programmed with the correct mileage. Verify the correct mileage via Scan Tool.**

GAUGE PACK, INSTRUMENT CLUSTER

DESCRIPTION

DESCRIPTION

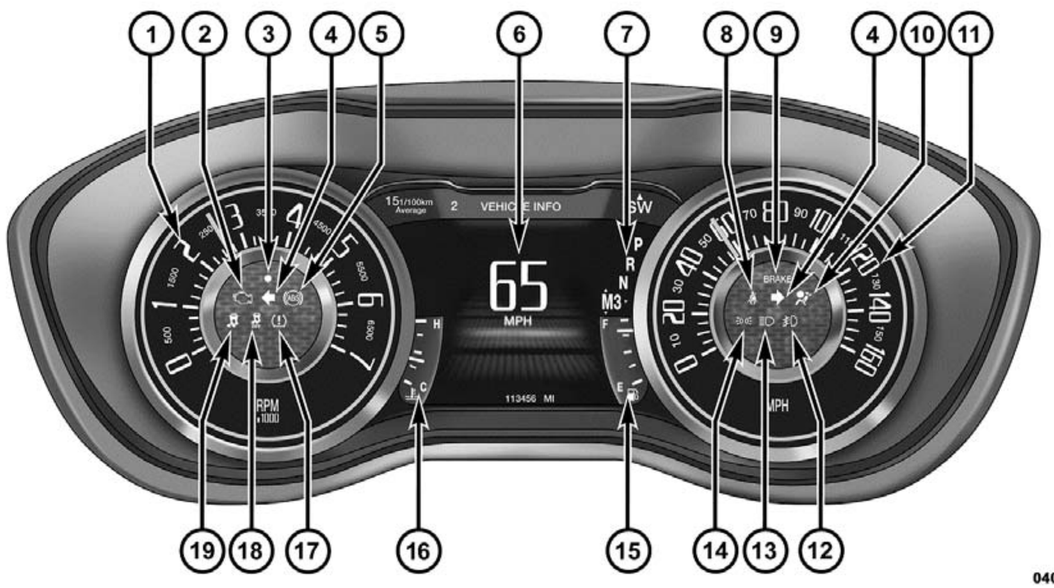

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Fig. 4: Instrument Cluster

Courtesy of CHRYSLER GROUP, LLC

The gauge pack found within the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) for this vehicle houses 2 analog gauges that are each controlled by the IC electronic circuitry.

Gauge illumination is provided by dimmer controlled Light Emitting Diode (LED) units soldered onto the IC circuit board. The gauge pack is an integral part of the IC unit. If any gauge is damaged or ineffective, the entire IC must be replaced with a new unit.

The IC includes the following analog gauges:

- **Speedometer (11)**
- **Tachometer (1)**

SPEEDOMETER

The standard equipment speedometer is the gauge located on the right side of the IC. The speedometer consists of a movable gauge needle or pointer controlled by the IC circuitry and reads clockwise from left-to-right either from 0 to an upper numerical value that varies by model in either miles-per-hour or kilometers-per-hour, depending upon the market destination. MPH or km/h text appears on the cluster overlay.

TACHOMETER

The standard equipment tachometer is the gauge located on the left side of the IC. The tachometer consists of a movable gauge needle or pointer controlled by the IC circuitry and a gauge dial face that reads clockwise from left-to-right. The text **RPM X 1000** is imprinted on the cluster overlay near the bottom of the gauge scale and identifies that each number on the tachometer scale is to be multiplied by 1000 Revolutions-Per-Minute

OPERATION

OPERATION

All analog gauges in the Instrument Panel Cluster (IPC) receive battery current on the IPC printed circuit board only when the status of the ignition switch is ON. When the status of the ignition switch is OFF, battery current is not supplied to any gauges and the IPC is programmed to move all of the gauge needles back to the low end of their respective scales. Therefore, the gauges do not accurately indicate any vehicle condition unless the status of the ignition switch is ON.

Each of the analog IPC gauges contains an electronically controlled stepper motor unit. The IPC circuitry completely controls the activation and deactivation of these stepper motors to position each gauge needle in the appropriate position based upon IPC programming and electronic messages received from other electronic modules in the vehicle over the Controller Area Network (CAN) data bus.

The analog gauges are diagnosed using the self-diagnostic IPC actuator test. Proper testing of the CAN data bus and the electronic message inputs that the IPC uses to control each gauge requires the use of a diagnostic scan tool. Refer to DIAGNOSIS AND TESTING .

INDICATORS, INSTRUMENT CLUSTER

DESCRIPTION

DESCRIPTION

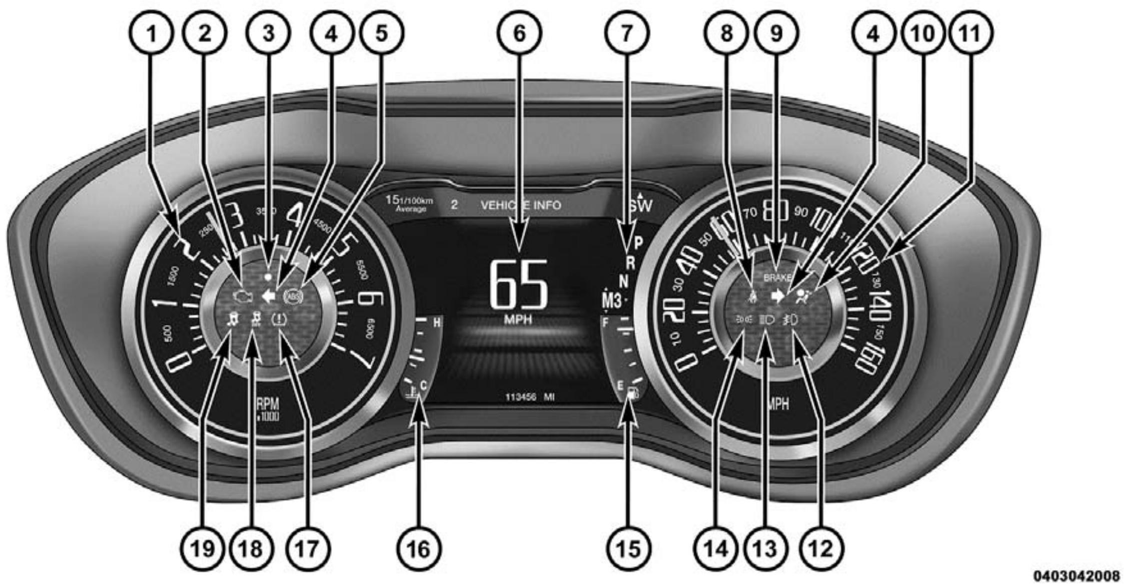


Fig. 5: Instrument Cluster
Courtesy of CHRYSLER GROUP, LLC

The Instrument Panel Cluster (IPC) has provisions for International Control and Display Symbol icon indicators, as well as two analog gauges standard on all models. Refer to **GAUGE PACK, INSTRUMENT CLUSTER, DESCRIPTION**. Some of the indicators are automatically configured when connected to the vehicle electrical system for compatibility with certain optional equipment or equipment required for regulatory purposes in certain markets. While each IPC may have provisions for indicators to support every available option, the configurable indicators will not function in vehicles that do not have the equipment that an indicator supports.

The IPC includes provisions for the following indicators:

- **Airbag Warning Light** - (10). Refer to **DESCRIPTION** .
- **Antilock Brake System (ABS)** - service required if light remains on beyond four seconds (5). Refer to **DESCRIPTION** .
- **Brake Warning Light** - (9). Refer to **DESCRIPTION** .
- **Electronic Stability Control (ESC) Activation/Malfunction** - indicates system activated or malfunction (19). Refer to **DESCRIPTION** .
- **Electronic Stability Control (ESC) OFF** - light on when system is off (if equipped) (18).
- **Engine Temperature** indicates high engine temperature (16).
- **Electronic Vehicle Information Center** - features an interactive display (6).
- **Front Fog Lamp Indicator** - indicates that the fog lamps are on (if equipped) (12).
- **Fuel Gauge** - fuel tank level (15).
- **Gear Status Indicator** - displays the gear position of the automatic transmission. Automatic Transmission Only (7).
- **High Beam Indicator** - indicates that headlights are on high beam (13).
- **Malfunction Indicator Lamp (MIL)** - indicates service required (2).
- **Park/Headlight ON** - (position lights) indicates when the park lights or headlights are turned on (if

equipped) (14).

- **Seat Belt Reminder Light** - (8). Refer to **DESCRIPTION** .
- **Speedometer** - Indicates vehicle speed (11).
- **Tachometer** - indicates the engine speed in revolutions per minute (RPM x 1000) (1).
- **Temperature Gauge** - indicates engine coolant temperature (16).
- **Tire Pressure Monitor (TPM)** - (17). Refer to **TIRE PRESSURE MONITORING, DESCRIPTION** .
- **Turn Signal** - may also include icon and **TURN SIGNAL ON** reminder textual message in electronic display (4).
- **Vehicle Security Light** - (3). Refer to **DESCRIPTION** .

Each indicator in the IPC, except those located within an electronic display unit, is illuminated by a dedicated Light Emitting Diode (LED) that is soldered onto the electronic circuit board. IPC illumination is accomplished by several dimmable LED units, which illuminate each of the gauge dial faces for visibility when the exterior lighting is turned ON. These LED units are serviced only as a complete unit with the IPC, and if damaged or ineffective, the entire IPC assembly must be replaced. The IPC lens is the only component of the instrument cluster assembly that can be serviced separately.

OPERATION

OPERATION

Indicators are located in various positions within the Instrument Panel Cluster (IPC) and are all connected to the electronic circuit board of the IPC. Some indicators operate based upon hard-wired inputs to the IPC, but most are controlled by Controller Area Network (CAN) data bus messages from other electronic modules in the vehicle. If the IPC loses CAN data bus communication, the IPC circuitry will automatically turn on the Malfunction Indicator Lamp (MIL) until CAN data bus communication is restored.

The various IPC indicators are controlled by different strategies; some require fused ignition output to the IPC circuitry and have a switched ground, while others are grounded through the IPC circuitry and have a switched battery feed. However, all indicators are completely controlled by the IPC microcontroller based upon various hard-wired and electronic message inputs. A few, non-critical indicators are dimmable, but most indicators are illuminated at a fixed intensity, which is not affected by the selected illumination intensity of the IPC general illumination Light Emitting Diode (LED) units. The illumination intensity of the dimmable indicators is synchronized with that of the general illumination lighting.

In addition, certain indicators in this IPC are automatically or self-configured. This feature allows the configurable indicators to be enabled by the IPC circuitry for compatibility with certain optional equipment. These indicators are enabled or disabled by an electronic configuration message sent to the IPC by the Body Control Module (BCM). The defaults for some indicators may be enabled, and these configuration settings must be programmatically disabled in the BCM using a diagnostic scan tool for vehicles that do not have the equipment the indicator supports. The automatically or self-configured indicators remain latent in each IPC at all times and will be active only when the IPC receives the appropriate CAN bus message inputs for that optional system or equipment.

The hard-wired indicator inputs may be diagnosed using conventional diagnostic tools and procedures. However, the IPC circuitry and electronic CAN data bus message controlled indicators are diagnosed using the self-diagnostic test. Proper testing of the CAN data bus and the electronic data bus message inputs to the IPC

that control each indicator requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information. Specific details of the operation for each indicator may be found elsewhere in this service information.

POD, SWITCH BANK

DESCRIPTION

DESCRIPTION

Fig. 6: Floor Console Panel & Center Stack
Courtesy of CHRYSLER GROUP, LLC

The vehicle feature controls center stack (2) is located on the floor console panel (1). This switch is available in multiple configurations, which vary depending upon the equipment in the vehicle. However, every available configuration includes the hazard warning push button switch.

The switch housing and the push buttons are constructed of molded plastic. Each push button has a smooth finish and is clearly identified with the appropriate text and International Control and Display Symbol icons. Refer to **INTERNATIONAL VEHICLE CONTROL AND DISPLAY SYMBOLS, DESCRIPTION** . Several of the push buttons feature Light Emitting Diode (LED) units to give the vehicle operator an indication when the function of that switch is currently active. The back of the switch housing has an integral connector receptacle containing terminal pins that connect the switch to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness. Panel lamps dimmer controlled illumination lamps integral to the circuit board within the switch provide back lighting for visibility at night, but these lamps are not serviceable. The individual switches cannot be repaired and are not serviced individually. If any component within the switch pod is ineffective or damaged, the entire switch pod must be replaced.

OPERATION

OPERATION

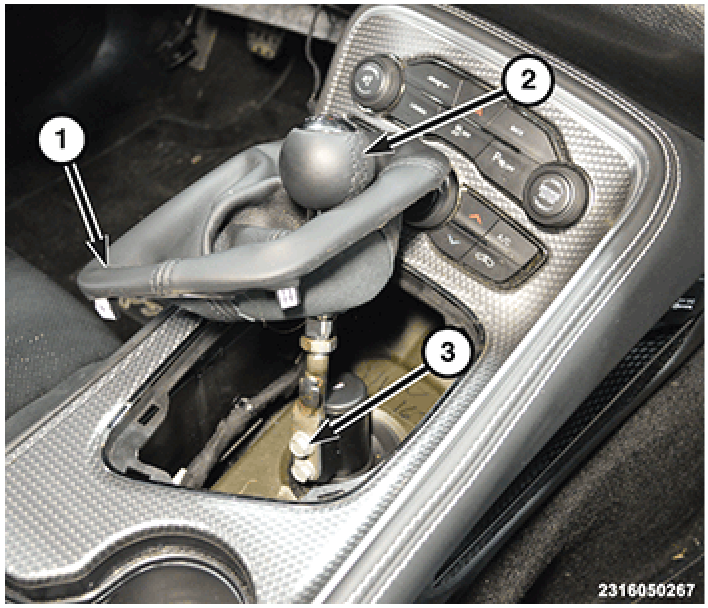
For information covering details of operation for the individual switches or indicator contained within the vehicle feature controls center stack, refer to the specific service information covering the system to which that

switch or indicator belongs.

REMOVAL

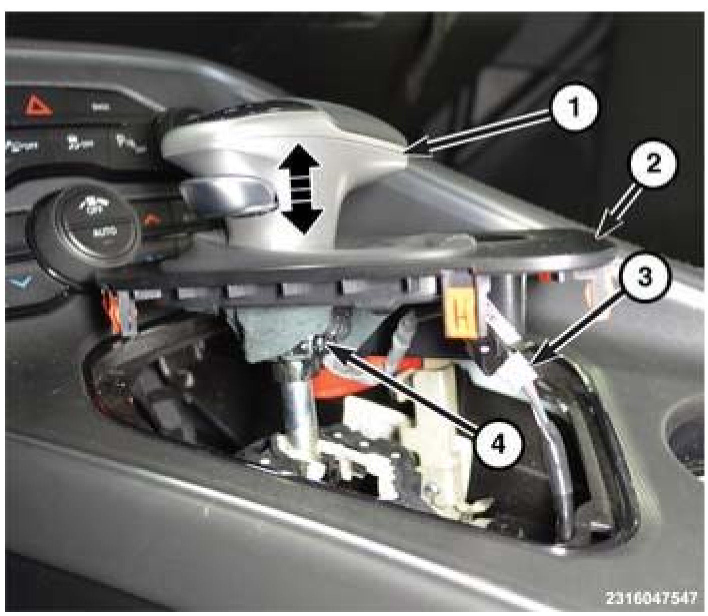
REMOVAL

1. Disconnect and isolate the negative battery cable.



[Fig. 7: Shifter Boot, Shift Lever & Bolts]
Courtesy of CHRYSLER GROUP, LLC

2. For manual shifter using a trim stick or equivalent, carefully release the retaining clips and lift the shifter boot (1).
3. Remove the bolts (3) then the shift lever (2).



[Fig. 8: Shifter Knob, Shifter Bezel, Wire Harness Connector & Screw]
Courtesy of CHRYSLER GROUP, LLC

4. For automatic shifter, place the shifter in the Neutral position.
5. Using a trim stick or equivalent, carefully release the retaining clips and lift the shifter bezel (2).
6. Remove the screw (4) then lift the shifter knob (1) and remove.

Fig. 9: Removing/Install Console Bezel Panel
Courtesy of CHRYSLER GROUP, LLC

7. Using a trim stick or equivalent, starting at the rear carefully release the retaining clip and lift the shifter bezel panel (1). Disconnect the wire harness connectors and remove.

Fig. 10: Instrument Panel Switch Pod & Screws
Courtesy of CHRYSLER GROUP, LLC

8. Remove the four screws (2) from the instrument panel switch pod (1) to the shifter bezel panel.

INSTALLATION

INSTALLATION

Fig. 11: Instrument Panel Switch Pod & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Position the instrument panel switch pod (1) to the shifter bezel panel and install the four screws (2).

Fig. 12: Removing/Install Console Bezel Panel
Courtesy of CHRYSLER GROUP, LLC

2. Connect the wire harness connectors and install the shifter bezel panel (1).

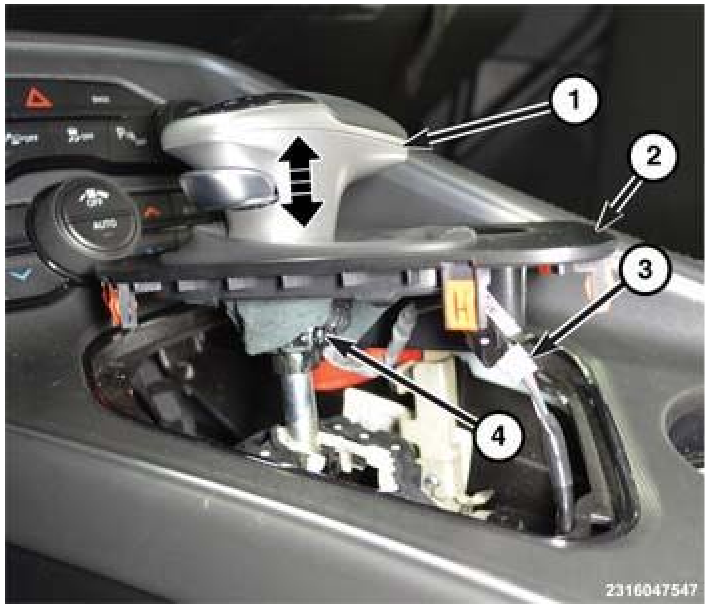


Fig. 13: Shifter Knob, Shifter Bezel, Wire Harness Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

3. For automatic shifter, install the shifter knob and install the screw (4). Tighten the screw securely.
4. Connect the wire harness connector (3).
5. Position the shifter bezel (2) and engage the retaining clips.

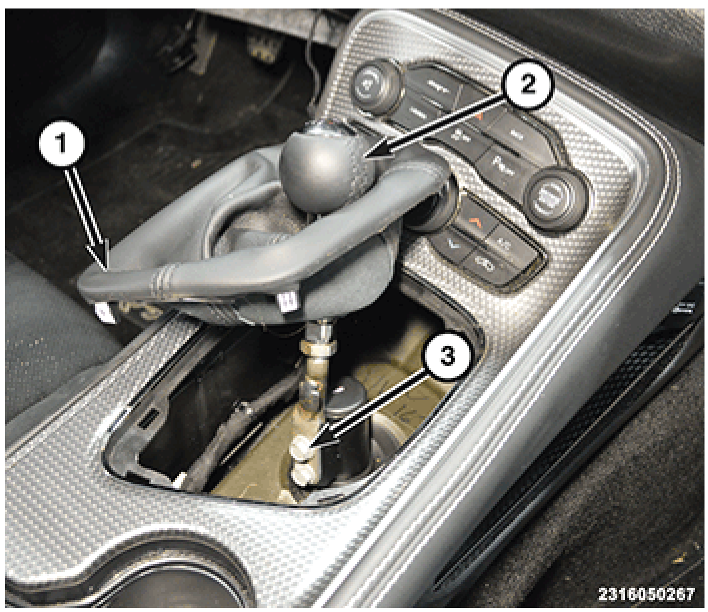


Fig. 14: Shifter Boot, Shift Lever & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. For manual shifter, install the shift lever (2) and the bolts (3). Tighten the shift lever bolts to the proper specification. For 5.7L & 6.4L, refer to **SPECIFICATIONS** . For 6.2L, refer to **SPECIFICATIONS** . .
7. Position the shifter boot (1) and engage the retaining clips.
8. Connect the battery negative cable.

Article GUID: A00735851

WARNING

USE OF HEAT DURING REPAIR

WARNING: **Chrysler Group LLC engineering's position on the use of heat during collision repair is as follows:**

- **Any body panel or frame component damaged which is to be repaired and reused, must be repaired using the "cold straightening" method. No heat may be used during the straightening process.**
- **During rough straightening prior to panel replacement, damaged panels or frame components may be heated to assist in body/frame realignment. The application of heat must be constrained to the parts which will be replaced and not allowed to affect any other components.**

This "no heat" recommendation is due to the extensive use of high strength and advanced high strength steels in Chrysler Group LLC products. High-strength materials can be substantially and negatively affected from heat input which will not be obviously known to the repairer or consumer.

Ignoring these recommendations may lead to serious compromises in the ability to protect occupants in a future collision event, reduce the engineered qualities and attributes, or decrease the durability and reliability of the vehicle.

This statement supersedes any previously released information by the Chrysler Group LLC.

Failure to follow these instructions may result in serious or fatal injury.

WARNINGS

WARNING: **Use an Occupational Safety and Health Administration (OSHA) approved breathing filter, when spraying paint or solvents in a confined area. Failure to follow these instructions may result in possible serious or fatal injury.**

- **avoid prolonged skin contact with petroleum or alcohol based cleaning solvents.**
- **do not stand under a hoisted vehicle that is not properly supported on safety stands. Failure to follow these instructions may result in possible serious or fatal injury.**

CAUTION: **When holes are drilled or punched in an inner body panel, verify the depth of space to the outer body panel, electrical wiring or other components. Damage to the vehicle can result.**

- **do not weld exterior panels unless combustible material on the interior of vehicle is removed from the repair area. Fire or hazardous conditions, can result.**
- **always have a fire extinguisher ready for use when welding.**
- **disconnect the negative (-) cable clamp from the battery when servicing electrical components that are live when the ignition is off. Damage to electrical system can result.**
- **do not use abrasive chemicals or compounds on painted surfaces. Damage to finish can result.**
- **do not use harsh alkaline based cleaning solvents on painted or upholstered surfaces. Damage to finish or color can result.**
- **do not hammer or pound on plastic trim panel when servicing interior trim. Plastic panels can break.**

RESTRAINT WARNINGS

WARNING: To avoid serious or fatal injury on vehicles equipped with the Supplemental Restraint System (SRS), never attempt to repair the electrically conductive circuits or wiring components related to the SRS for which there is no MoparÃ® wiring repair kit. It is important to use ONLY the recommended splicing kit and procedure. For applicable and available MoparÃ® wiring repair kits, please visit the MoparÃ® Connector Web Site at the following address on the Internet: (http://dto.vftis.com/mopar/disclaimer.asp). Inappropriate repairs can compromise the conductivity and current carrying capacity of those critical electrical circuits, which may cause SRS components not to deploy when required, or to deploy when not required. Only minor cuts or abrasions of wire and terminal insulation where the conductive material has not been damaged, or connector insulators where the integrity of the latching and locking mechanisms have not been compromised may be repaired using appropriate methods.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÃ® Parts Catalog. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel,

steering column, airbag, Occupant Classification System (OCS), seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to follow these instructions may result in accidental airbag deployment.

WARNING: To avoid potential physical injury or damage to sensitive electronic circuits and systems, always disconnect and isolate the battery negative (ground) cable and the positive cable, then ground the positive cable to discharge the Occupant Restraint Controller (ORC) capacitor before performing any welding operations on the vehicle. Failure to take the proper precautions could result in accidental airbag deployment, possible damage to the Supplemental Restraint System (SRS) circuits and components, and possible damage to other electronic circuits and components. Whenever a welding process is being performed within 12 inches (30 centimeters) of an electronic module or wiring harness, then that module or harness should be relocated out of the way, or disconnected. Always protect against component or vehicle damage from weld spatter by using weld blankets and screens.

WARNING: To avoid serious or fatal injury, do not attempt to dismantle an airbag unit or tamper with its inflator. Do not puncture, incinerate or bring into contact with electricity. Do not store at temperatures exceeding 93Â° C (200Â° F). An airbag inflator unit may contain sodium azide and potassium nitrate. These materials are poisonous and extremely flammable. Contact with acid, water, or heavy metals may produce harmful and irritating gases (sodium hydroxide is formed in the presence of moisture) or combustible compounds. An airbag inflator unit may also contain a gas canister pressurized to over 17.24 kPa (2500 psi). Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury when handling a seat belt tensioner retractor. Exercise proper care to keep fingers out from under the retractor cover and away from the seat belt webbing where it exits from the retractor cover. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury, replace all Supplemental Restraint System (SRS) components only with parts specified in the Chrysler MoparÂ® Parts Catalog. Substitute parts may appear interchangeable, but internal differences may result in inferior occupant protection.

WARNING: To avoid serious or fatal injury, the fasteners, screws, and bolts originally used for the Supplemental Restraint System (SRS) components must never be replaced with any substitutes. These fasteners have special coatings and are specifically designed for the SRS. Anytime a new fastener is needed, replace it with the correct fasteners provided in the service package or specified in the Chrysler MoparÂ® Parts Catalog.

WARNING: To avoid serious or fatal injury when a steering column has an airbag unit

attached, never place the column on the floor or any other surface with the steering wheel or airbag unit face down. Failure to follow these instructions may result in possible serious or fatal injury.

DIAGNOSIS AND TESTING

WATER LEAKS

Water leaks can be caused by poor sealing, improper body component alignment, body seam porosity, missing plugs, or blocked drain holes. Centrifugal and gravitational force can cause water to drip from a location away from the actual leak point, making leak detection difficult. All body sealing points should be water tight in normal wet-driving conditions. Water flowing downward from the front of the vehicle should not enter the passenger or luggage compartment. Moving sealing surfaces will not always seal water tight under all conditions. At times, side glass or door seals will allow water to enter the passenger compartment during high pressure washing or hard driving rain (severe) conditions. Overcompensating on door or glass adjustments to stop a water leak that occurs under severe conditions can cause premature seal wear and excessive closing or latching effort. After completing a repair, water test vehicle to verify leak has stopped before returning vehicle to use.

VISUAL INSPECTION BEFORE WATER LEAK TESTS

Verify that floor and body plugs are in place, body drains are clear, and body components are properly aligned and sealed. If component alignment or sealing is necessary, refer to the appropriate Service Information for proper procedures.

WATER LEAK TESTS

WARNING: Do not use electric shop lights or tools in water test area. Personal injury can result.

When the conditions causing a water leak have been determined, simulate the conditions as closely as possible.

- If a leak occurs with the vehicle parked in a steady light rain, flood the leak area with an open-ended garden hose.
- If a leak occurs while driving at highway speeds in a steady rain, test the leak area with a reasonable velocity stream or fan spray of water. Direct the spray in a direction comparable to actual conditions.
- If a leak occurs when the vehicle is parked on an incline, hoist the end or side of the vehicle to simulate this condition. This method can be used when the leak occurs when the vehicle accelerates, stops or turns. If the leak occurs on acceleration, hoist the front of the vehicle. If the leak occurs when braking, hoist the back of the vehicle. If the leak occurs on left turns, hoist the left side of the vehicle. If the leak occurs on right turns, hoist the right side of the vehicle. For hoisting recommendations. Refer to **HOISTING, STANDARD PROCEDURE** .

WATER LEAK DETECTION

To detect a water leak point-of-entry, do a water test and watch for water tracks or droplets forming on the inside of the vehicle. If necessary, remove interior trim covers or panels to gain visual access to the leak area. If the hose cannot be positioned without being held, have someone help do the water test.

Some water leaks must be tested for a considerable length of time to become apparent. When a leak appears, find the highest point of the water track or drop. The highest point usually will show the point of entry. After leak point has been found, repair the leak and water test to verify that the leak has stopped.

Locating the entry point of water that is leaking into a cavity between panels can be difficult. The trapped water may splash or run from the cavity, often at a distance from the entry point. Most water leaks of this type become apparent after accelerating, stopping, turning, or when on an incline.

MIRROR INSPECTION METHOD

When a leak point area is visually obstructed, use a suitable mirror to gain visual access. A mirror can also be used to deflect light to a limited-access area to assist in locating a leak point.

BRIGHT LIGHT LEAK TEST METHOD

Some water leaks in the luggage compartment can be detected without water testing. Position the vehicle in a brightly lit area. From inside the darkened luggage compartment inspect around seals and body seams. If necessary, have a helper direct a drop light over the suspected leak areas around the luggage compartment. If light is visible through a normally sealed location, water could enter through the opening.

PRESSURIZED LEAK TEST METHOD

When a water leak into the passenger compartment cannot be detected by water testing, pressurize the passenger compartment and soap test exterior of the vehicle. To pressurize the passenger compartment, close all doors and windows, start engine, and set heater control to high blower in HEAT position. If engine can not be started, connect a charger to the battery to ensure adequate voltage to the blower. With interior pressurized, apply dish detergent solution to suspected leak area on the exterior of the vehicle. Apply detergent solution with spray device or soft bristle brush. If soap bubbles occur at a body seam, joint, seal or gasket, the leak entry point could be at that location.

WIND NOISE

Wind noise is the result of most air leaks. Air leaks can be caused by poor sealing, improper body component alignment, body seam porosity, or missing plugs in the engine compartment or door hinge pillar areas. All body sealing points should be airtight in normal driving conditions. Moving sealing surfaces will not always seal airtight under all conditions. At times, side glass or door seals will allow wind noise to be noticed in the passenger compartment during high cross winds. Over compensating on door or glass adjustments to stop wind noise that occurs under severe conditions can cause premature seal wear and excessive closing or latching effort. After a repair procedure has been performed, test vehicle to verify noise has stopped before returning vehicle to use.

VISUAL INSPECTION BEFORE TESTS

Verify that floor and body plugs are in place, body drains are clear, and body components are properly aligned and sealed. If component alignment or sealing is necessary, refer to the appropriate Service Information for proper procedures.

ROAD TESTING WIND NOISE

1. Drive the vehicle to verify the general location of the wind noise.
2. Apply 50 mm (2 in.) masking tape in 150 mm (6 in.) lengths along weatherstrips, weld seams or

moldings. After each length is applied, drive the vehicle. If noise goes away after a piece of tape is applied, remove tape, locate, and repair defect.

POSSIBLE CAUSE OF WIND NOISE

- Moldings standing away from body surface can catch wind and whistle.
- Gaps in sealed areas behind overhanging body flanges can cause wind-rushing sounds.
- Misaligned movable components.
- Missing or improperly installed plugs in pillars.
- Weld burn through holes.

STANDARD PROCEDURE

BODY LUBRICATION

LUBRICATION REQUIREMENTS

Locks and all body pivot points, including such items as seat tracks, door hinge pivot points and rollers, liftgate, tailgate, sliding doors and hood hinges, should be lubricated periodically with a lithium based grease such as MoparÃ® Spray White Lube to ensure quiet, easy operation and to protect against rust and wear. Prior to the application of any lubricant, wipe the parts clean, to remove dust and grit. After lubricating, excess oil and grease should be removed. Particular attention should also be given to hood latching components to make sure they function properly. When performing other underhood services, clean and lubricate the hood latch release mechanism and safety catch.

The external lock cylinders should be lubricated twice a year, preferably in the fall and spring. Apply a small amount of a high quality lubricant such as MoparÃ® Lock Cylinder Lubricant directly into the lock cylinder.

LUBRICANT APPLICATION

DOOR LOCK CYLINDERS

1. Apply a small amount of lubricant directly into the lock cylinder.
2. Apply a small amount of lubricant to the key.
3. Insert key into lock cylinder and cycle the mechanism from the locked to the unlocked position.

NOTE: Do not add more lubricant.

4. Cycle the lock cylinder mechanism several times to allow the lubricant to flow throughout the cylinder.
5. Wipe all lubricant from exterior of lock cylinder and key.

ALL OTHER BODY MECHANISMS

1. Clean component as described above.
2. Apply specified lubricant to all pivoting and sliding contact areas of component.

LUBRICANT USAGE

Engine Oil

- door hinges - hinge pin and pivot contact areas
- hood hinges - pivot points
- liftgate hinges

MoparÂ® Spray White Lube or Equivalent

- door check straps
- liftgate latches
- liftgate prop pivots
- ash receiver
- fuel filler door remote control latch mechanism
- parking brake mechanism
- sliding seat tracks
- liftgate latch

MoparÂ® Multipurpose Grease or Equivalent

- all other hood mechanisms

MoparÂ® Lock Cylinder Lubricant or Equivalent

- door lock cylinders
- liftgate lock cylinder

BUZZ, SQUEAKS AND RATTLES

Buzz, Squeaks and Rattles (BSRs) may be caused by any one or more of the following and may be corrected as indicated:

- Loose fasteners should be tightened to specifications.
- Damaged or missing clips should be replaced.
- Damaged trim panels should be replaced.
- Incorrectly installed trim panels should be reinstalled properly.

Many BSR complaints such as loose trim, can be serviced using various tapes or lubricants. Tapes including foam, flock and anti-squeak, can be used to eliminate noises caused by metal, plastic and vinyl components. Long life lubricants and greases can also be used on a variety of components. Refer to the table for materials and usage. Refer to BUZZ, SQUEAKS AND RATTLES.

BUZZ, SQUEAKS AND RATTLES

ITEM	FEATURES	APPLICATIONS	SERVICE TEMP
ITCH AND SQUEAK TAPE	An abrasion resistant material thin enough to conform to most irregular surfaces. Stops most itches and squeaks.	Between metal and metal, metal and plastic, metal and vinyl, vinyl and plastic. Interior. Examples: Trim panels and bezels.	-40Â° to 107Â°C (-40Â° to 225Â°F)

ITEM	FEATURES	APPLICATIONS	SERVICE TEMP
BLACK NYLON FLOCK	Nylon Flock with an aggressive acrylic adhesive. Provides for cushioning and compression fit, also isolates components. Water-resistant.	Between metal and metal, metal and plastic, vinyl and plastic. Examples: Pull cups, bezels, clips, ducts, top cover to glass, cowl panel.	-40Â° to 82Â°C (-40Â° to 180Â°F)
HIGH DENSITY URETHANE FOAM	Tear resistant, highly resilient and durable.	Between metal and metal, metal and plastic. Water-resistant. Examples: I/P, heavy metal rattles, isolating brackets.	-40Â° to 82Â°C (-40Â° to 180Â°F)
OPEN CELL FOAM TAPE	Soft foam conforms to irregular surfaces.	Wire harness and connector wrap. Examples: Seals, gasket, wiring, heat ducts.	-40Â° to 82Â°C (-40Â° to 180Â°F)
CLOSED CELL LOW DENSITY FOAM TAPE	Soft, conformable. Water-resistant.	Wherever bulk is needed. Prevents closing flutters and rattles when applied to door watershield. Examples: Door, I/P.	-40Â° to 82Â°C (-40Â° to 180Â°F)
NYEÂ® GREASE 880	Long life.	Suspensions. Examples: Strut bushings, sway bars.	-40Â° to 200Â°C (-40Â° to 390Â°F)
KRYTOXÂ® OIL	Long life. Will not dry out or harm plastics or rubber.	When access is not possible, oil will migrate to condition. Vinyl, rubber, plastic, metal. Examples: Convertible top bushings, pull cups trim panel inserts.	-34Â° to 205Â°C (-30Â° to 400Â°F)
KRYTOXÂ® GREASE	Long life. Will not dry out or harm plastics or rubber.	Vinyl, rubber, plastic, metal, glass. Examples: Weather-strips, backlite and windshield moldings.	-34Â° to 205Â°C (-30Â° to 400Â°F)

HEAT STAKING

1. Remove the trim panel.
2. Bend or move the trim panel components at the heat staked joints. Observe the heat staked locations and/or component seams for looseness.
3. Heat stake the components.
    a. If the heat staked or component seam location is loose, hold the two components tightly together and using a soldering gun with a flat tip, melt the material securing the components together. Do not overly heat the affected area, damage to the exterior of the trim panel may occur.
    b. If the heat staked material is broken or missing, use a hot glue gun to apply new material to the area to be repaired. The panels that are being heat staked must be held together while applying the glue. Once the new material is in place, it may be necessary to use a soldering gun to melt the newly

applied material. Do not overly heat the affected area, damage to the exterior of the trim panel may occur.

4. Allow the repaired area to cool and verify the repair.
5. Install the trim panel.

NET, FORM AND PIERCE REPAIR

CAUTION: Failure to follow these recommendations could result in damage or failure to the part and the related parts.

Net, form and pierce is a manufacturing process which takes place during the original build of the vehicle. The original part will have a beveled platform that will decrease toward the fastener location mounting hole. Replacement parts in these areas may not include bevel (form) or fastener hole (pierce) and will need to be adapted for proper fit and finish.

The primary locations which may utilize net, form and pierce are:

- fender reinforcement (at front end module mount)
- fender tower mounts
- hood hinge (lower half)
- rear body header (liftgate hinge mounts)
- strut tower (at upper control arm mount)

NOTE: Shock tower is net, pierce only.

NOTE: The thickness of shims is not to exceed the original thickness of the factory bevel. If more shims are needed damage is still present and must be repaired properly.

If the replacement part did not come with a fastener hole, one of equal size and location will have to be drilled. Body shims should be used in the fender reinforcement to front end module. The hood hinge area, fender tower mounts, and rear body header will utilize washers as spacers where a specific spacer does not exist. The shims and spacers should be sealed between each other and to the stationary surface. Care should be taken when smoothing sealer around washers to give an undetectable repair. Refinish the repair area per the paint manufacturer's recommendations for corrosion resistance and appearance purposes.

PLASTIC BODY PANEL REPAIR

There are many different types of plastics used in today's automotive environment. We group plastics in three different categories: Rigid, Semi-Rigid, and Flexible. Any of these plastics may require the use of an adhesion promoter for repair. These types of plastic are used extensively on Chrysler Group LLC vehicles. Always follow repair material manufacturer's plastic identification and repair procedures.

RIGID PLASTICS:

Examples of rigid plastic use: Fascias, Hoods, Doors, and other Body Panels, which include Sheet Moulding Compound (SMC), Acrylonitrile Butadiene Styrene (ABS), and Polycarbonates.

SEMI-RIGID PLASTICS:

Examples of semi-rigid plastic use: Interior Panels, Under Hood Panels, and other Body Trim Panels.

FLEXIBLE PLASTICS:

Examples of flexible plastic use: Fascias, Body Moldings, and upper and lower Fascia Covers.

REPAIR PROCEDURE:

The repair procedure for all three categories of plastics is basically the same. The one difference is the material used for the repair. The materials must be specific for each substrate: rigid repair material for rigid plastic repair, semi-rigid repair material for semi-rigid plastic repair and flexible repair material for flexible plastic repair.

ADHESION PROMOTER/SURFACE MODIFIER:

Adhesion Promoters/Surface Modifiers are required for certain plastics. All three categories may have plastics that require the use of adhesion promoter/surface modifiers. Always follow repair material manufacturer's plastic identification and repair procedures.

SAFETY PRECAUTION AND WARNINGS

WARNING:

- **Eye protection should be used when servicing components. Personal injury can result.**
- **Use an OSHA approved breathing mask when mixing epoxy, grinding, and spraying paint or solvents in a confined area. Personal injury can result.**
- **Avoid prolonged skin contact with resin, petroleum, or alcohol based solvents. Personal injury can result.**
- **Do not venture under a hoisted vehicle that is not properly supported on safety stands. Personal injury can result.**

NOTE:

- **When holes must be drilled or cut in body panels, verify locations of internal body components and electrical wiring. Damage to vehicle can result.**
- **Do not use abrasive chemicals or compounds on undamaged painted surfaces around repair areas. Damage to finish can result.**

RIGID, SEMI-RIGID, AND FLEXIBLE PLASTIC PARTS TYPES

CODE	FAMILY NAME	COMMON TRADE NAME	TYPICAL APPLICATION
ASA	ACRYLONITRILE STYRENE ACRYLITE	LURAN S	CONSOLES, GRILLES
ABS	ACRYLONITRILE BUTADIENE STYRENE	TERLURAN	"A" PILLARS, CONSOLES, GRILLES

CODE	FAMILY NAME	COMMON TRADE NAME	TYPICAL APPLICATION
ABS/PC	ABS/PC ALLOY	PULSE, PROLOY, BAYBLEND	DOORS, INSTRUMENT PANELS
ABS/PVC	ABS/PV ALLOY	PROLOY, PULSE, LUSTRAN, CYCLOVIN	DOOR PANELS, GRILLES, TRIM
BMC	BULK MOLDING COMPOUND	BMC	FENDER EXTENSIONS
EMA	EHTYLENE METHYL ACRYLATE/IONOMER	SURLYN, EMA, IONOMER	BUMPER GUARDS, PADS
METTON	METTON	METTON	GRILLES, KICK PANELS, RUNNING BOARDS
MPPO	MODIFIED POLYPHENYLENE OXIDE	MPPO	SPOILER ASSEMBLY
PA	POLYAMID	ZYTEL, VYDYNE, PA, MINLON	FENDERS, QUARTER PANELS
PET	THERMOPLASTIC POLYESTER	RYNITE	TRIM
PBT/PPO	PBT/PPO ALLOY	GERMAX	CLADDINGS
PBTP	POLYBUTYLENE THEREPTHALATE	PBT, PBTP, POCAN, VALOX	WHEEL COVERS, FENDERS, GRILLES
PBTP/EEBC	POLYBUTYLENE THEREPTHALATE/EEBC ALLOY	BEXLOY, "M", PBTP/EEBC	FASCIAS, ROCKER PANEL, MOLDINGS
PC	POLYCARBONATE	LEXAN, MERLON, CALIBRE, MAKROLON PC	TAIL LIGHT LENSES, IP TRIM, VALANCE PANELS
PC/ABS	PC/ABS ALLOY	GERMAX, BAY BLENDS, PULSE	DOORS, INSTRUMENT PANELS
PPO	POLYPHENYLENE OXIDE	AZDEL, HOSTALEN, MARLEX, PRFAX, NORYL, GTX, PPO	INTERIOR TRIM, DOOR PANELS, SPLASH SHIELDS, STEERING COLUMN SHROUD
PPO/PA	POLYPHENYLENE/POLYAMID	PPO/PA, GTX 910	FENDERS, QUARTER PANELS
PR/FV	FIBERGLASS REINFORCED PLASTIC	FIBERGLASS, FV, PR/FV	BODY PANELS
PS	POLYSTYRENE	LUSTREX, STYRON, PS	DOOR PANELS, DASH PANELS
RTM	RESIN TRANSFER MOLDING COMPOUND	RTM	BODY PANELS
SMC	SHEET MOLDED COMPOUND	SMC	BODY PANELS

CODE	FAMILY NAME	COMMON TRADE NAME	TYPICAL APPLICATION
TMC	TRANSFER MOLDING COMPOUND	TMC	GRILLES
UP	UNSATURATED POLYESTER (THERMOSETTING)	SMC, BMC, TMC, ZMC, IMC, XSMC, UP	GRILLE OPENING PANEL, LIFTGATES, FLARESIDE FENDERS, FENDER EXTENSIONS
EEBC	ETHER/ESTER BLOCKED CO-POLYMER	EEBC	BUMPERS
EEBC/PBTP	EEBC/POLYBUTYLENE TEREPTHALATE	EEBC, PBTP, BEXLOY	BUMPER, ROCKER PANELS
EMPP	ETHYLENE MODIFIED POLYPROPYLENE	EMPP	BUMPER COVERS
EPDM	ETHYLENE/PROPROPYLENE DIENE MONOMER	EPDM, NORDEL, VISTALON	BUMPERS
EPM	ETHYLENE/PROPROPYLENE CO-POLYMER	EPM	FENDERS
MPU	FOAM POLYURETHANE	MPU	SPOILERS
PE	POLYETHYLENE	ALATHON, DYLAN, LUPOLEN, MARLEX	-
PP	POLYPROPYLENE (BLENDS)	NORYL, AZDEL, MARLOX, DYLON, PRAVEX	INNER FENDER, SPOILERS, KICK PANELS
PP/EPDM	PP/EPDM ALLOY	PP/EPDM	SPOILERS, GRILLES
PUR	POLYURETHANE	COLONELS, PUR, PU	FASCIAS, BUMPERS
PUR/PC	PUR/PC ALLOY	TEXIN	BUMPERS
PVC	POLYVINYL CHLORIDE	APEX, GEON, VINYLITE	BODY MOLDINGS, WIRE INSULATION, STEERING WHEELS
RIM	REACTION INJECTED MOLDED POLYURETHANE	RIM, BAYFLEX	FRONT FASCIAS, MODULAR WINDOWS
RRIM	REINFORCED REACTION INJECTED MOLDED	PUR, RRIM	FASCIAS, BODY PANELS, BODY TRIMS
TPE	THERMO POLYETHYLENE	TPE, HYTREL, BEXLOY-V	FASCIAS, BUMPERS, CLADDINGS
TPO	THERMOPOLYOLEFIN	POLYTROPE, RENFLEX, SANTOPRENE, VISAFLEX, ETA, APEX, TPO, SHIELDS,	BUMPERS, END CAPS, TELCAR, RUBBER, STRIPS, SIGHT, INTERIOR B POST

CODE	FAMILY NAME	COMMON TRADE NAME	TYPICAL APPLICATION
		CLADDINGS	
TPP	THERMO-POLYPROPYLENE	TPP	BUMPERS
TPU	THERMOPOLYURETHANE, POLYESTER	TPU, HYTREL, TEXIN, ESTANE	BUMPERS, BODY SIDE, MOLDINGS, FENDERS, FASCIAS

PANEL SECTIONING

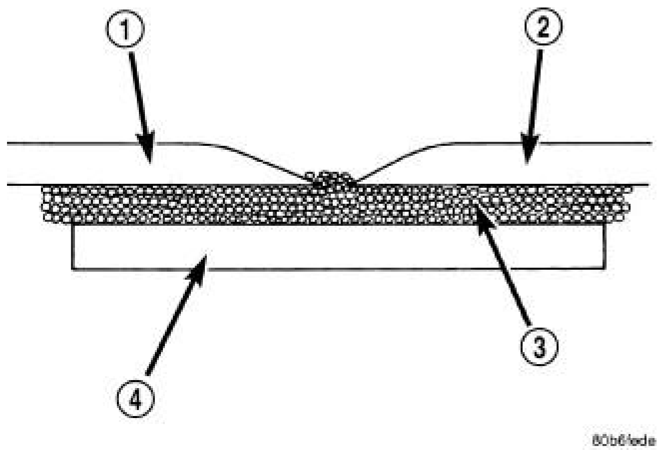


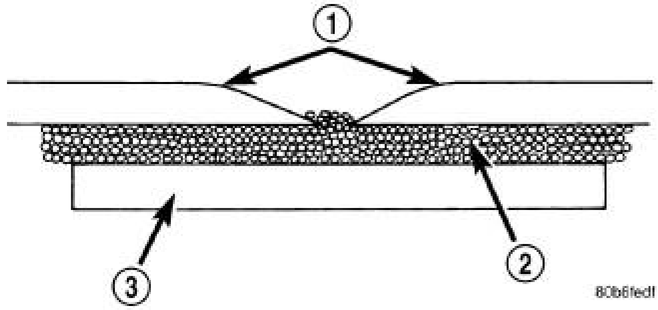
Fig. 1: Identifying Panel Sectioning
Courtesy of CHRYSLER GROUP, LLC

1 - EXISTING PANEL
2 - NEW PANEL
3 - PANEL ADHESIVE
4 - BONDING STRIP

If it is required to section a large panel for a plastic repair, it will be necessary to reinforce the panel. To bond two plastic panels together, a reinforcement must overlap both panels. The edges of the panels to be joined must be beveled to a 20 degree angle to form a V-shaped seam. The area to be reinforced should be washed, then sanded. Be sure to wipe off any excess soap and water when finished. Lightly sand or abrade the plastic with an abrasive pad or sandpaper. Blow off any dust with compressed air or wipe with a clean dry rag.

When bonding plastic panels, follow repair material manufacturers recommendations. Be sure that enough adhesive has been applied to allow squeeze out and to fill the full bond line. Once the pieces have been brought together, do not move them until the adhesive is cured. The assembly can be held together with clamps, rivets, etc. A faster cure can be obtained by heating with a heat lamp or heat gun. After the parts have been bonded and have had time to cure, rough sand the seam and apply the final adhesive filler to the area being repaired. Smooth the filler with a spreader, wooden tongue depressor, or squeegee. For fine texturing, a small amount of water can be applied to the filler surface while smoothing. The cured filler can be sanded as necessary and, as a final step, cleanup can be done with soapy water. Wipe the surface clean with a dry cloth allowing time for the panel to dry before moving on with the repair.

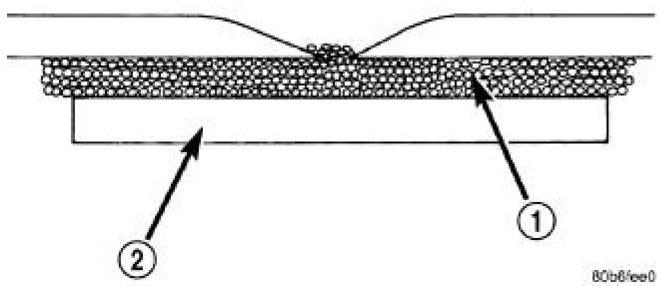
PANEL REINFORCEMENT



[Fig. 2: Identifying Panel Reinforcement]
Courtesy of CHRYSLER GROUP, LLC

1 - SOFTENED EDGES
2 - PANEL ADHESIVE
3 - BONDING STRIP

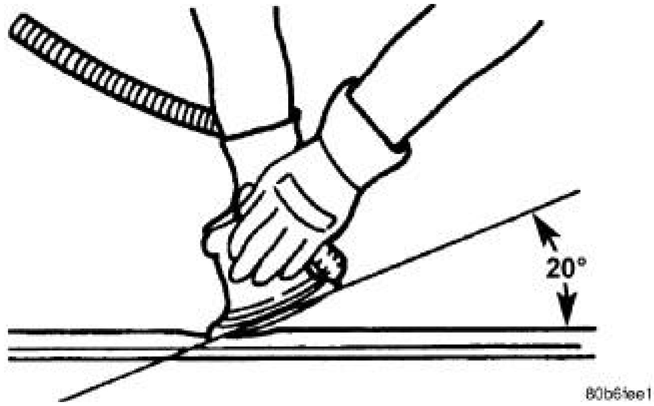
Structural repair procedures for rigid panels with large cracks and holes will require a reinforcement backing. Reinforcements can be made with several applications of glass cloth saturated with structural adhesive. Semi-rigid or flexible repair materials should be used for semi-rigid or flexible backing reinforcement and open meshed fiberglass drywall tape can be used to form a reinforcement. The drywall tape allows the resin to penetrate through and make a good bond between the panel and the adhesive. Structurally, the more drywall tape used, the stronger the repair.



[Fig. 3: Identifying Panel Reinforcement]
Courtesy of CHRYSLER GROUP, LLC

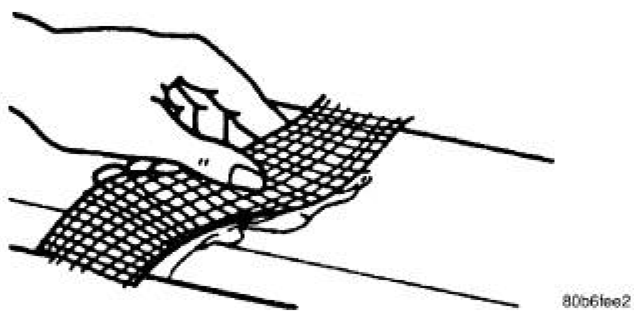
1 - PANEL ADHESIVE
2 - REINFORCEMENT

Another kind of repair that can be done to repair large cracks and holes is to use a scrap piece of similar plastic and bond with structural adhesive. The reinforcement should cover the entire break and should have a generous amount of overlap on either side of the cracked or broken area.



[Fig. 4: Beveling Area Around Crack At 20 Degree Angle](#)
Courtesy of CHRYSLER GROUP, LLC

When repairing plastic, the edges of the panels to be joined must be beveled to a 20 degree angle to form a V-shaped seam. Large bonding areas are desirable when repairing plastic because small repairs are less likely to hold permanently. Beveling the area around a crack at a 20Â° angle will increase the bonding surface for a repair. It is recommended that sharp edges be avoided because the joint may show through after the panel is refinished.



[Fig. 5: Identifying Bonding Surface Repair Area](#)
Courtesy of CHRYSLER GROUP, LLC

- Panel repair for both flexible and rigid panels are basically the same. The primary difference between flexible panel repair and rigid panel repair is in the adhesive materials used.
- The technician should first decide what needs to be done when working on any type of body panel. One should determine if it is possible to return the damage part to its original strength and appearance without exceeding the value of the replacement part.
- When plastic repairs are required, it is recommended that the part be left on the vehicle when ever possible. That will save time, and the panel will remain stationary during the repair. Misalignment can cause stress in the repair areas and can result in future failure.

VISUAL INSPECTION

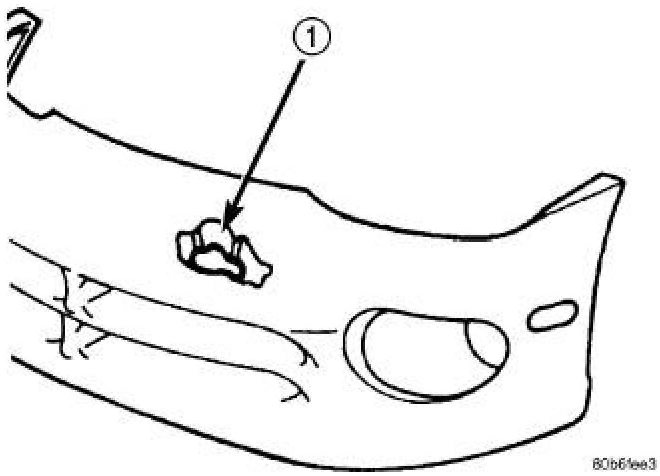


Fig. 6: Identifying Damaged Component
Courtesy of CHRYSLER GROUP, LLC

1 - PUNCTURE

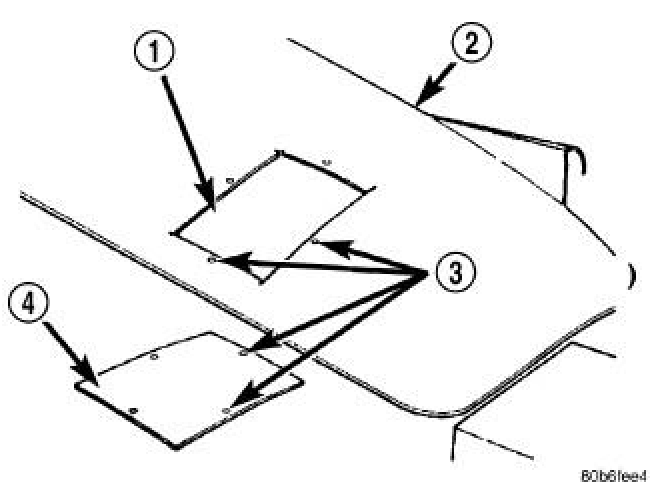
Composite materials can mask the severity of an accident. Adhesive bond lines, interior structure of the doors, and steel structures need to be inspected carefully to get a true damage assessment. Close inspection may require partial removal of interior trim or inner panels.

Identify the type of repair: Puncture or Crack - Damage that has penetrated completely through the panel. Damage is confined to one general area; a panel section is not required. However, a backer panel, open fiberglass tape, or matted material must be bonded from behind.

PANEL SURFACE PREPARATION

If a body panel has been punctured, cracked, or crushed, the damaged area must be removed from the panel to achieve a successful repair. All spider web cracks leading away from a damaged area must be stopped or removed. To stop a running crack in a panel, drill a 6 mm (0.250 in.) hole at the end of the crack farthest away from the damage. If spider web cracks can not be stopped, the panel would require replacement. The surfaces around the damaged area should be stripped of paint and freed from wax and oil. Scuff surfaces around repair area with 360 grit wet/dry sandpaper, or equivalent, to assure adhesion of repair materials.

PATCHING PANELS

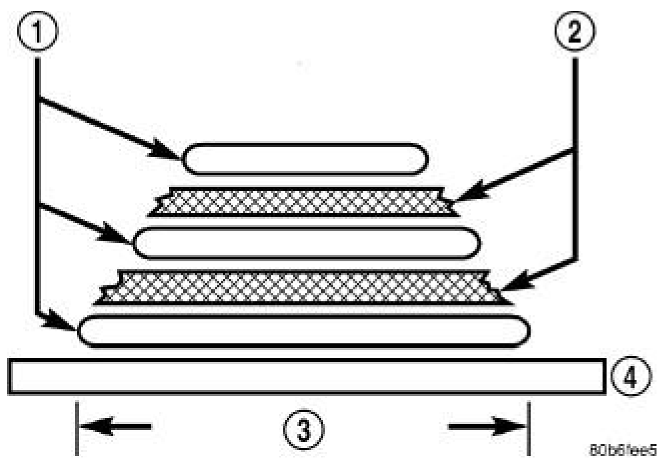


[Fig. 7: Identifying Damaged Panel Cutout And Patch]
Courtesy of CHRYSLER GROUP, LLC

1 - CUTOUT
2 - DAMAGED BODY PANEL
3 - 4 MM (0.160 IN.) HOLES
4 - PATCH CUT TO SIZE

A panel that has extensive puncture type damage can be repaired by cutting out the damaged material. Use a suitable reciprocating saw or cut off wheel to remove the section of the panel that is damaged. The piece cut out can be used as a template to shape the new patch. It is not necessary to have access to the back of the panel to install a patch. Bevel edges of cutout at 20Â° to expose a larger bonding area on the outer side. This will allow for an increased reinforcement areas.

PANEL PATCH FABRICATIONS



[Fig. 8: Identifying Fabricated Panel]
Courtesy of CHRYSLER GROUP, LLC

1 - STRUCTURAL ADHESIVE
2 - FIBERGLASS CLOTH OR FIBERGLASS MESH TAPE
3 - WIDTH OF V-GROOVE
4 - WAXED PAPER

A patch can be fabricated from any rigid fiberglass panel that has comparable contour with the repair area. Lift gates and fenders can be used to supply patch material. If existing material is not available or compatible, a patch can be constructed with adhesive and reinforcement mesh (drywall tape). Perform the following operation if required:

1. Cover waxed paper or plastic with adhesive backed nylon mesh (drywall tape) larger than the patch required.
2. Tape waxed paper or plastic sheet with mesh to a surface that has a compatible contour to the repair area.
3. Apply a liberal coat of adhesive over the reinforcement mesh. If necessary apply a second or third coat of adhesive and mesh after first coat has cured. The thickness of the patch should be the same as the repair area.

4. After patch has cured, peel waxed paper or plastic from the back of the patch.
5. If desired, a thin film coat of adhesive can be applied to the back of the patch to cover mesh for added strength.

PANEL PATCH INSTALLATION

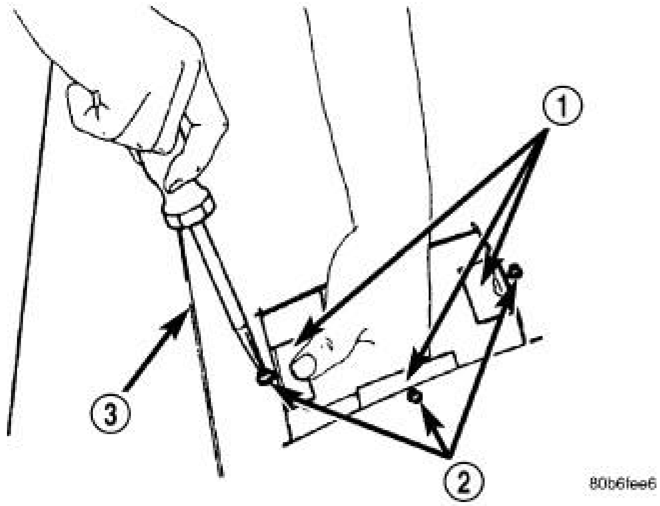
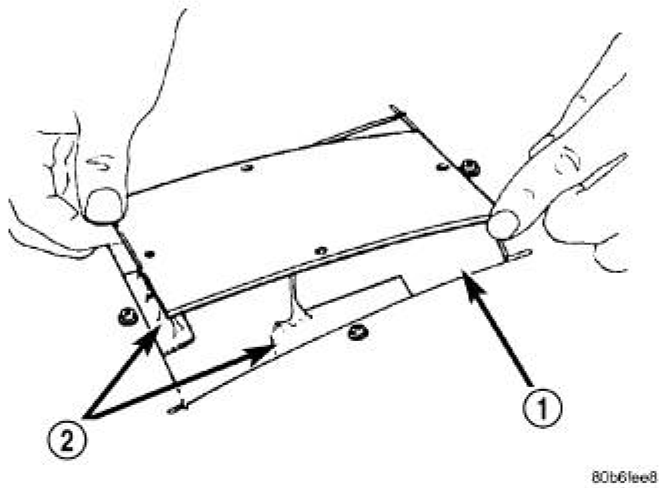


Fig. 9: Securing Support Squares To Body Panel
Courtesy of CHRYSLER GROUP, LLC

1 - SUPPORT SQUARES
2 - SCREWS
3 - DAMAGED BODY PANEL

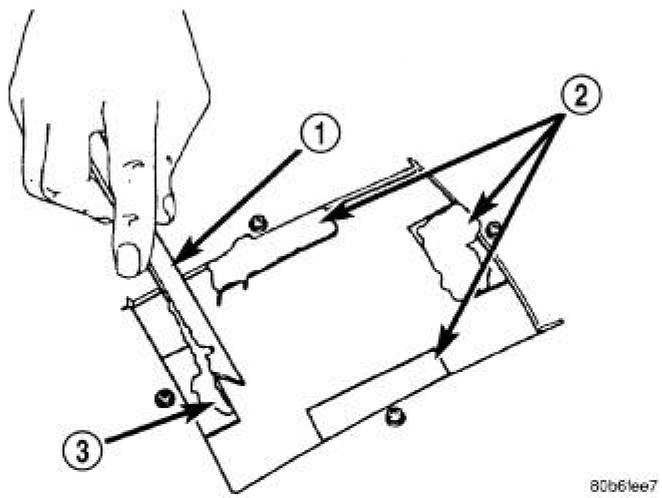
1. Make a paper or cardboard pattern the size and shape of the cutout hole in the panel.
2. Trim 3 mm (0.125 in.) from edges of pattern so patch will have a gap between connecting surfaces.
3. Using the pattern as a guide, cut the patch to size.
4. Cut scrap pieces of patch material into 50 mm (2 in.) squares to use as patch supports to sustain the patch in the cutout.
5. Drill 4 mm (0.160 in.) holes 13 mm (0.5 in.) in from edge of cutout hole.
6. Drill 4 mm (0.160 in.) holes 13 mm (0.5 in.) away from edge of patch across from holes drilled around cutout.
7. Drill 3 mm (0.125 in.) holes in the support squares 13 mm (0.5 in.) from the edge in the center of one side.
8. Scuff the backside of the body panel around the cutout hole with a scuff pad or sandpaper.
9. Mix enough adhesive to cover one side of all support squares.
10. Apply adhesive to cover one side of all support squares.
11. Using number 8 sheet metal screws, secure support squares to back side of body panel with adhesive sandwiched between the panel and squares.



[Fig. 10: Identifying Cutout And Support Squares](#)
Courtesy of CHRYSLER GROUP, LLC

1 - CUTOUT
2 - SUPPORT SQUARES

12. Position patch in cutout against support squares and adjust patch until the gap is equal along all sides.
13. Drill 3 mm (0.125 in.) holes in the support squares through the pre-drilled holes in the patch.



[Fig. 11: Applying Adhesive](#)
Courtesy of CHRYSLER GROUP, LLC

1 - APPLICATOR
2 - SUPPORT SQUARES
3 - ADHESIVE

14. Apply a coat of adhesive to the exposed ends of the support squares.

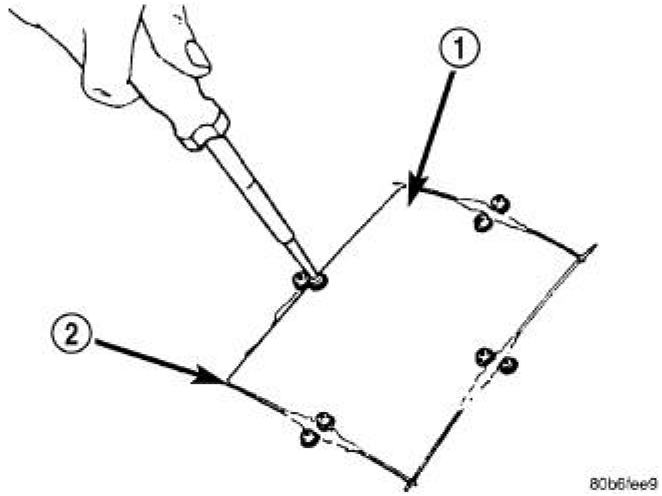


Fig. 12: Applying Coat Of Adhesive To Exposed Ends Of Support Squares
Courtesy of CHRYSLER GROUP, LLC

1 - PATCH	
2 - GAP	

15. Install screws to hold the patch to support squares. Tighten screws until patch surface is flush with panel surface.
16. Allow adhesive to cure, and remove all screws.

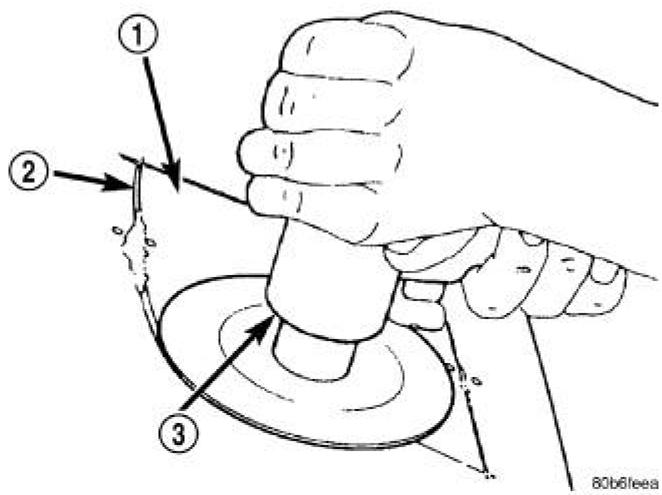


Fig. 13: Grinding Surface
Courtesy of CHRYSLER GROUP, LLC

1 - PATCH	
2 - GAP	
3 - DISC GRINDER	

17. Using a 125 mm (5 in.) 24 grit disc grinder, grind a 50 mm (2 in.) to 75 mm (3 in.) wide and 2 mm (0.080 in.) deep path across the gaps around the patch. With compressed air, blow dust from around patch.

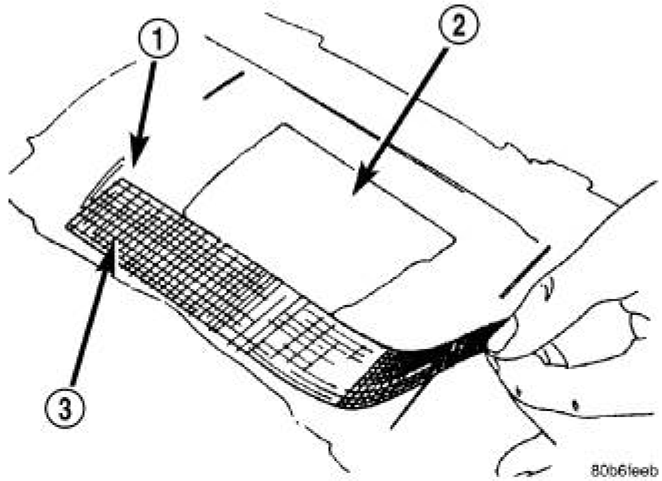


Fig. 14: Covering Gaps With Mesh
Courtesy of CHRYSLER GROUP, LLC

1 - GROUND DOWN AREA
2 - PATCH
3 - MESH

18. Apply adhesive backed nylon mesh (drywall tape) over gaps around patch.
19. Mix enough adhesive to cover the entire patch area.

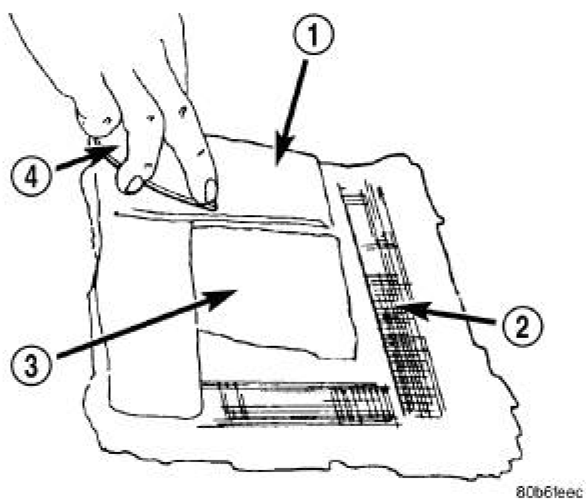


Fig. 15: Applying Adhesive Over Mesh Around Patch
Courtesy of CHRYSLER GROUP, LLC

1 - ADHESIVE
2 - MESH
3 - PATCH
4 - SPREADER

20. Apply adhesive over the mesh around patch, and smooth epoxy with a wide spreader to reduce finish grinding. Use two to three layers of mesh and adhesive to create a stronger repair.

PATCHED PANEL SURFACING

After patch panel is installed, the patch area can be finished using the same methods as finishing other types of body panels. If mesh material is exposed in the patched area, grind surface down, and apply a coat of high quality rigid plastic body filler. Prime, block sand, and paint as required.

SPECIFICATIONS

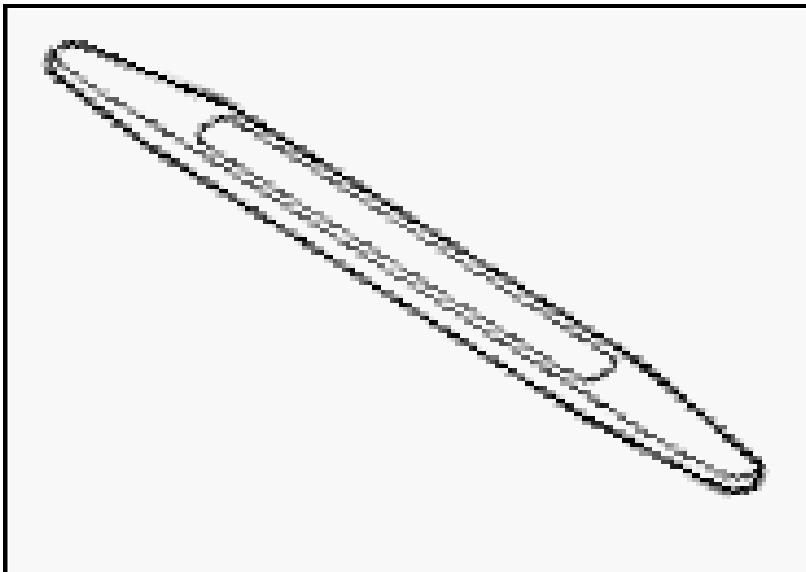
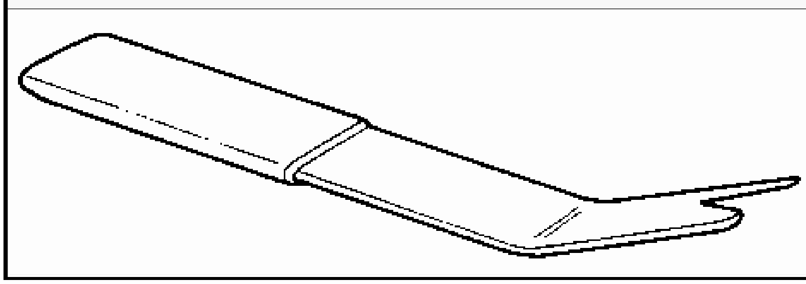
TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Decklid hinge to decklid bolts	27	20	-	Ā
Decklid hinge to body bolts	24	18	-	Ā
Decklid latch bolts	10	7	-	Ā
Decklid striker bolts	8	-	52	Ā
Door glass bolts	13	10	-	Ā
Door hinge to body bolts	29	21	-	Ā
Door hinge to door nuts	30	22	-	Ā
Door hinge swing stop bolts	29	21	-	Ā
Door latch bolts	9	-	80	Ā
Door latch striker bolts	23	17	-	Ā
Fender bolts	9	-	80	Ā
Front seat back bolts	50	37	-	Ā
Front seat bolts	70	52	-	Ā
Headlamp mounting crossmember bolts	24	18	-	Ā
Hood gas prop rod to body	10	7	-	Ā
Hood hinge to body bolts	28	21	-	Ā
Hood hinge to hood bolts	28	21	-	Ā
Hood latch bolts	11	8	-	Ā
Hood striker bolts	28	21	-	Ā
Horn bolts	12	9	-	Ā
Instrument panel side bolts	16	12	-	Ā
Instrument panel to cowl bolts	16	12	-	Ā
Rear seat armrest pivot bolt	-	-	-	Ā
Rear seat nuts	55	41	-	Ā
Rear seat striker bolts	12	9	-	Ā
Sunroof to body bolts	9	-	53	Ā
Window regulator nuts	11	8	-	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

SPECIAL TOOLS

SPECIAL TOOLS

	C-4755 - Trim Stick (Originally Shipped In Kit Number(s) 9299, 9299CC, 9299CC, 9300A-CAN.)
	C-4829A - Remover, Trim

BODY STRUCTURE

GAP AND FLUSH

SPECIFICATIONS

SPECIFICATIONS

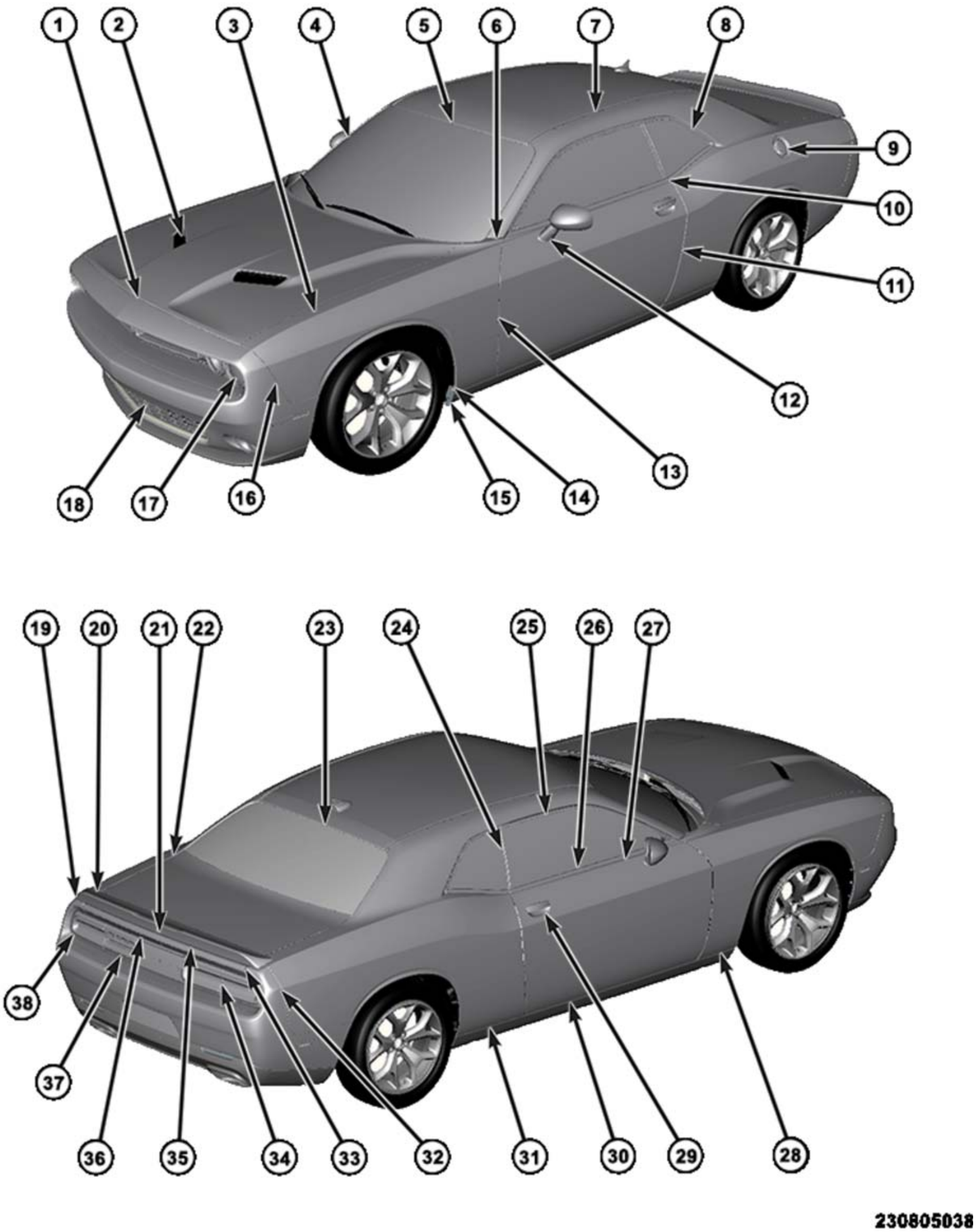


Fig. 16: Gap & Flush
Courtesy of CHRYSLER GROUP, LLC

> **NOTE:**
> **All measurements are in millimeters.**

O/F = Over Flush		U/F = Under Flush	
U/D = Up/Down		F/A = Fore/Aft	
DIMENSION	**DESCRIPTION**	**GAP**	**FLUSH**
1	Hood to Fascia	3.5 +/- 1.5	Hood U/F 0.5+/- 1.0
Ā	Ā	Parallel within 1.5	Consistent within 1.5
2	Hood Scoop to Hood (Base and RT models)	Top 0.0 +/- 1.0	Scoop U/F 0.5 +/- 0.5 (at front only)
Ā	Ā	Bottom 0.5 +/- 0.5	Ā
Ā	Ā	Sides 0.5 +/- 0.5	Ā
3	Hood to Fender	3.5 +/- 1.5	Hood U/F 1.0 +/- 1.5
Ā	Ā	Parallel within 1.5	Side to side within 1.5
Ā	Ā	Side to side within 1.5	Ā
4	Windshield Trim Lace to A-pillar	No Gap 0.0	Trim Lace must be U/F to A-pillar and Roof
5	Windshield Trim Lace to Roof	No Gap 0.0	Windshield U/F 2.0 +/- 2.0
Ā	Ā	Ā	Consistent within 2.0
6	Fender to Body Side Aperture (at A-pillar)	3.0 +/- 1.0	--
Ā	Ā	Ā	Ā
7	Ditch Molding to Roof	No Gap 0.0	Molding U/F 2.0 +/- 1.5
Ā	Ā	Ā	Consistent within 1.5
8	Quarter Glass Belt to Body Side Aperture	No Gap 0.0	--
9	Fuel Door Assembly to Body Side Aperture	1.0 +/- 1.0	--
10	Belt Molding to Quarter Glass	4.0 +/- 2.0	Belt Molding O/F 0.5 +/- 1.5
11	Door to Body Side Aperture	4.0 +/- 1.0	0.0 +/- 1.0
Ā	Feature Line U/D 0.0 +/- 1.5	Parallel within 1.0	Parallel within 1.0
12	Mirror to Door	No Gap 0.0	--
13	Door to Fender	4.5 +/- 1.0	Door (above Feature Line) + 0.0/- 2.0 U/F
Ā	Feature Line U/D 0.0 +/- 1.5	Parallel within 1.0	Door (below Feature Line) 1.0 +/- 1.0
Ā	Ā	Ā	Consistent within 1.0
14	Spat to Fender	0.0 +/- 0.5	--
15	Spat to Sill Molding	2.0 +/- 2.0	--
Ā	Ā	Consistent within 2.0	Ā
16	Fascia to Fender	0.0 +/- 1.0	Fascia U/F 0.5 +/- 1.5
Ā	Ā	Ā	Consistent within 1.0
17	Headlamp Bezel to Headlamp Lens	F\A 6.0 +/- 2.0	--
Ā	Ā	Consistent within 1.0	Ā

18	Adaptive Cruise Control Bezel to Lower Grille	6.0 +/- 1.0	--
Ā	Ā	Parallel within 1.0	Ā
19	Spoiler to Rear Fascia	8.0 +/- 1.5	--
Ā	Ā	Parallel within 1.5	Ā
20	Spoiler to Body Side Aperture	8.0 +/- 1.5	--
Ā	Ā	Parallel within 1.5 (Outboard)	Ā
21	Back-up Camera to Spoiler	0.5 +/- 0.5	--
22	Decklid to Body Side Aperture	4.0 +/- 1.0	Decklid U/F 1.0 +/- 1.5
Ā	Ā	Parallel within 1.5	Ā
23	Backlight to Roof	No Gap 0.0	Backlight U/F 2.0 +/- 2.0
Ā	Ā	Ā	Consistent within 2.0
24	Quarter Glass to Door Glass	6.0 +/- 2.0	Quarter Glass Flush + 0.0 /- 3.0
Ā	Ā	Parallel within 2.0	Ā
25	Glass Run Retainer Lip	No Gap 0.0	--
26	Outer Belt Molding Lip to Glass	No Gap 0.0	--
27	Outer Belt Molding to Door	0.0 + 1.0	--
28	Sill Molding to Fender	0.0 + 1.5	Sill Molding O\F 2.5 +/- 1.5 at front
Ā	Ā	Ā	Transitioning to 3.0 at rear
29	Door Handle to Door	0.0 +/- 0.5	Door Handle O\F by design
30	Sill Molding to Door	6.0 +/- 1.5	Sill Molding O\F 2.5 +/- 1.5
Ā	Ā	Parallel within 1.5	Consistent within 1.5
31	Sill Molding to Body Side Aperture	0.0 + 1.5	Sill Molding O/F 3.0 +/- 1.5
32	Rear Fascia to Body Side Aperture	0.0 + 1.0	0.0 +/- 1.0
Ā	Ā	Ā	Consistent within 1.0
33	Decklid to Rear Fascia	Cross car 4.0 + 1.0	U\D Decklid U\F 1.0 +/- 1.0
Ā	Ā	Parallel within 1.0	F\A 1.0 +/- 1.0
Ā	Ā	Ā	Consistent within 1.0
34	Center Taillamp to Outer Taillamp	4.0 +/- 2.0	0.0 +/- 2.0
Ā	Ā	Parallel within 2.0	Ā
Ā	Ā	Side to side within 2.0	Ā
35	Spoiler to Decklid	1.0 +/- 1.0	--
Ā	Ā	Parallel within 1.0	Ā
36	Decklid to Decklid Surround	0.0 +/- 0.5	Decklid U\F 0.5 +/- 0.5

37	Center Taillamp to Rear Fascia Surround	8.0 +/- 1.5	--
Ā	Ā	Parallel within 1.5	Ā
38	Outer Taillamp to Fascia Surround	8.0 +/- 1.0	--
Ā	Ā	Parallel within 1.0	Ā
Ā	Ā	Side to side within 1.0	Ā

DECKLID/HATCH/LIFTGATE/TAILGATE

DECKLID

REMOVAL

REMOVAL

Fig. 17: Decklid Trim Cover & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the push fasteners (2) and the decklid trim cover (1).
3. Remove the inner combination lamp. Refer to **LAMP, REAR COMBINATION, REMOVAL** .
4. Unclip the wire harness from the decklid and disconnect all harness connectors.

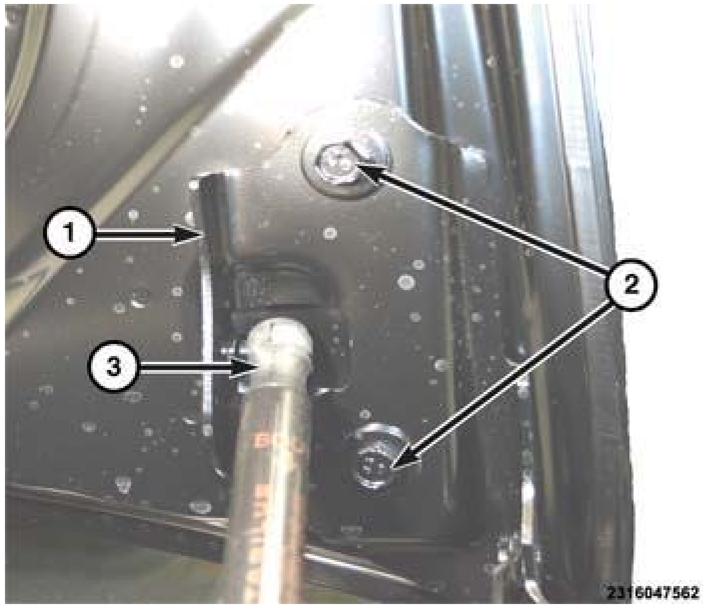


Fig. 18: Hinge, Bolts & Gas Prop
Courtesy of CHRYSLER GROUP, LLC

5. Using a grease pencil or equivalent, mark the position of the hinge (1) on the decklid to aid in installation.
6. With the aid of an assistant supporting the decklid, remove the bolts (2) and the decklid.

INSTALLATION

INSTALLATION

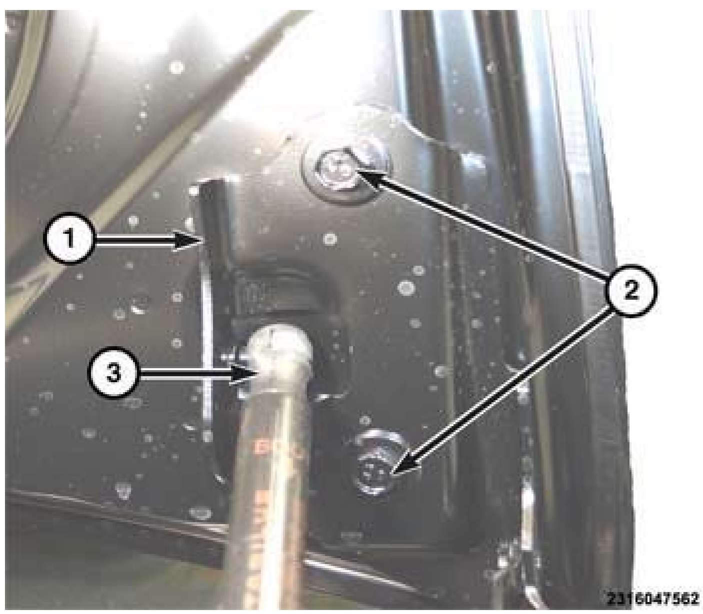


Fig. 19: Hinge, Bolts & Gas Prop
Courtesy of CHRYSLER GROUP, LLC

1. With aid of an assistant holding the decklid, position the decklid and loosely install the bolts (2).
2. Align the decklid hinge (1) with the reference mark made previously and tighten the decklid hinge to decklid bolts to the proper specification. Refer to SPECIFICATIONS.
3. Clip the wire harness to the decklid and connect all harness connectors.

4. Install the inner combination lamp. Refer to **LAMP, REAR COMBINATION, INSTALLATION** .
5. Connect the negative battery cable.
6. Verify fit of decklid and adjust if necessary. Refer to **GAP AND FLUSH, SPECIFICATIONS**.

Fig. 20: Decklid Trim Cover & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Position the decklid trim cover (1) and install the push fasteners (2).

HINGE

REMOVAL

REMOVAL

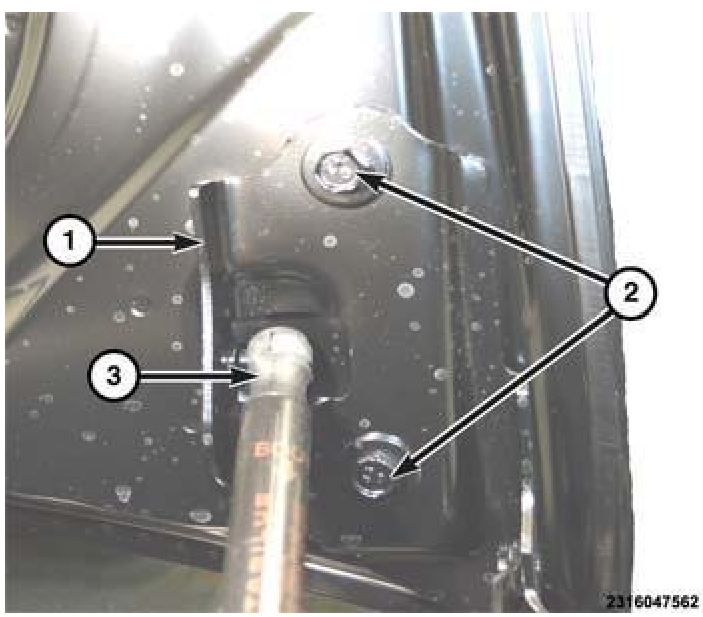


Fig. 21: Hinge, Bolts & Gas Prop
Courtesy of CHRYSLER GROUP, LLC

1. Using a grease pencil or equivalent, mark the position of the decklid hinge (1) to aid in installation.
2. With the help of an assistant holding the decklid, remove the gas prop (3). Refer to **PROP, GAS, REMOVAL**.
3. Remove the bolts (2).

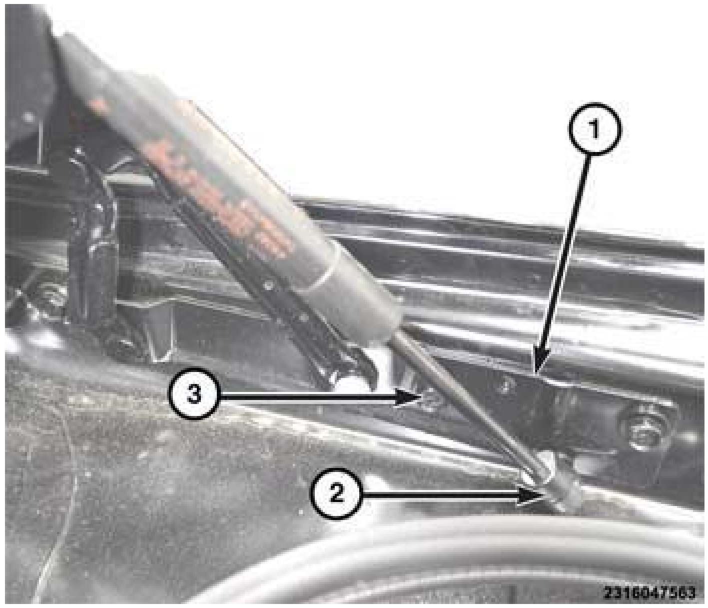


Fig. 22: Hood Hinge, Gas Prop & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Using a grease pencil or equivalent, mark the position of the hood hinge (1) to aid in installation.
5. Remove the bolts (3) and the decklid hinge.

INSTALLATION

INSTALLATION

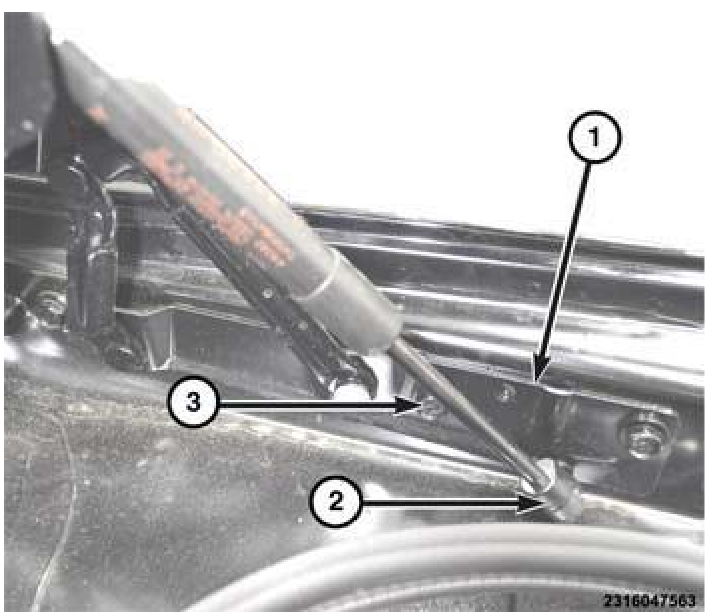


Fig. 23: Hood Hinge, Gas Prop & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Align the decklid hinge with the reference mark made previously and tighten the decklid hinge to body bolts to the proper specification. Refer to **SPECIFICATIONS**.

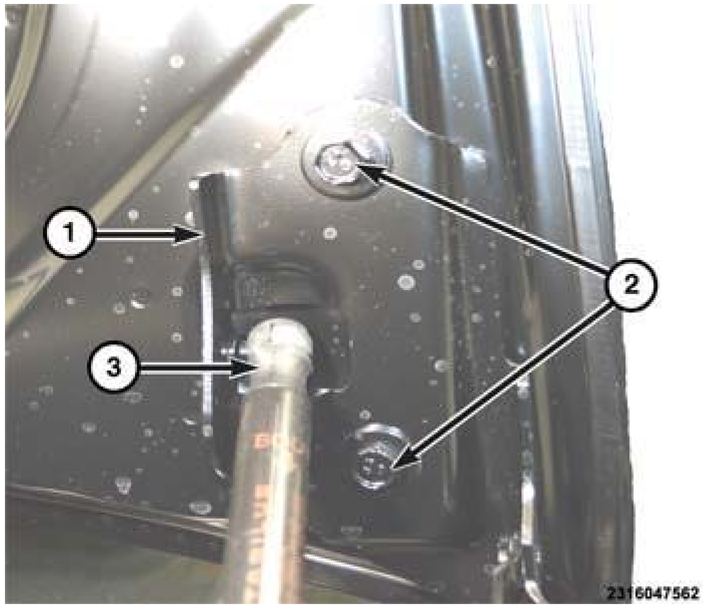


Fig. 24: Hinge, Bolts & Gas Prop
Courtesy of CHRYSLER GROUP, LLC

3. With aid of an assistant holding the decklid, position the decklid and loosely install the bolts (2).
4. Align the decklid hinge with the reference mark made previously and tighten the decklid hinge to decklid bolts to the proper specification. Refer to **SPECIFICATIONS**.
5. Install the gas prop (3). Refer to **PROP, GAS, INSTALLATION**.
6. Verify fit of decklid and adjust if necessary. Refer to **GAP AND FLUSH, SPECIFICATIONS**.

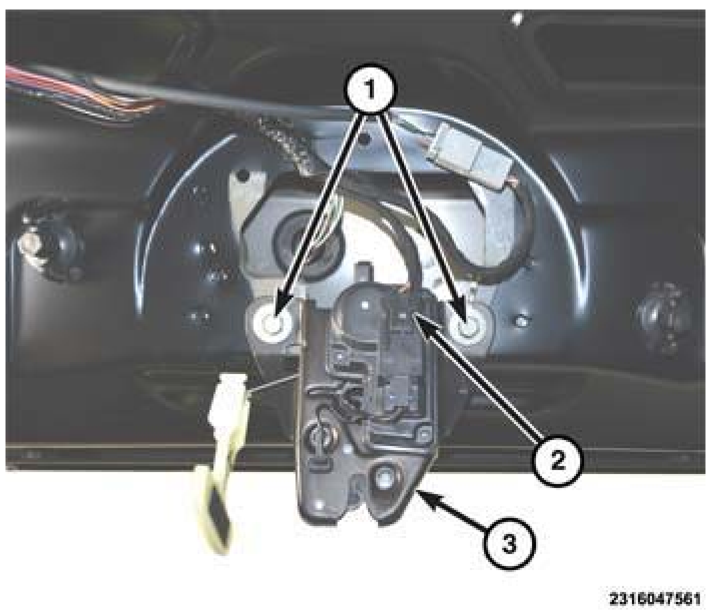
LATCH

REMOVAL

REMOVAL

[Fig. 25: Decklid Trim Cover & Push Fasteners]
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the push fasteners (2) and the decklid trim cover (1).



[Fig. 26: Bolts, Harness Connector & Decklid Latch]
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the harness connector (2).
4. Remove the bolts (1) and the decklid latch (3).

INSTALLATION

INSTALLATION

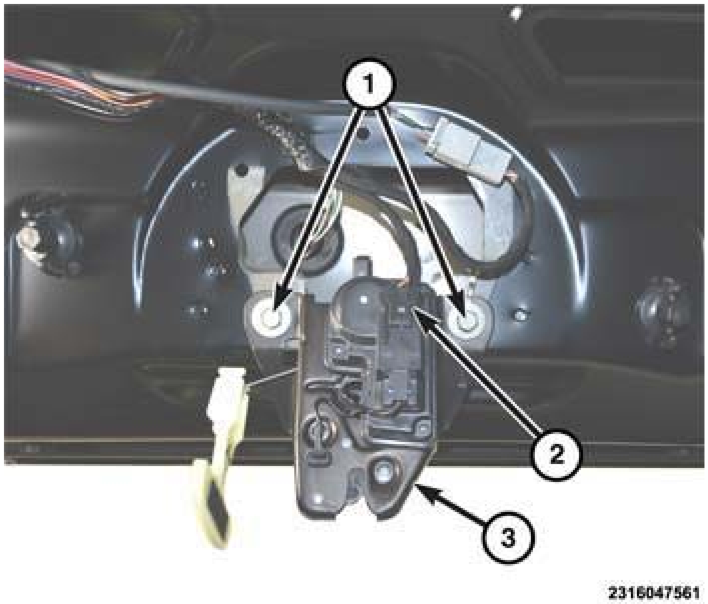


Fig. 27: Bolts, Harness Connector & Decklid Latch
Courtesy of CHRYSLER GROUP, LLC

1. Position the decklid latch (3) and install the bolts (1). Tighten the decklid latch bolts to the proper specification. Refer to **SPECIFICATIONS**.
2. Connect the harness connector (2).
3. Connect the negative battery cable.
4. Verify function of the decklid latch.

Fig. 28: Decklid Trim Cover & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Position the decklid trim cover (1) and install the push fasteners (2).

PROP, GAS

REMOVAL

REMOVAL

CAUTION: Do not use any type of pliers on the machined surface of the gas prop to assist in supporting the hood or decklid. Use a proper device for support, or the help of an assistant.

Fig. 29: Incorrect Way To Prop Hood
Courtesy of CHRYSLER GROUP, LLC

1. Open and support the decklid with a suitable prop or block.

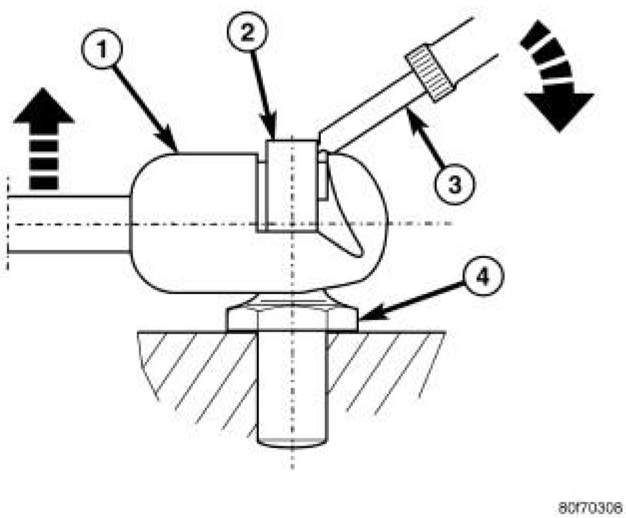


Fig. 30: Prying Retaining Clip Outward
Courtesy of CHRYSLER GROUP, LLC

2. Insert a small flat-bladed tool (3) into the notch on the outer face of one ball socket end (1) of the gas

prop and carefully pry the retaining clip (2) outward while pulling the ball socket away from the ball stud (4) on the decklid hinge.

WARNING: During service lift the ball socket end retaining clip only far enough to release the socket from the ball stud. Excessive prying or removal of the clip may result in improper clip spring tension. Improper clip tension may result in the support cylinder separating from the ball stud causing sudden, unexpected loss of decklid support. Failure to do so may result in serious or fatal injury.

3. Release the retaining clip to its installed position.

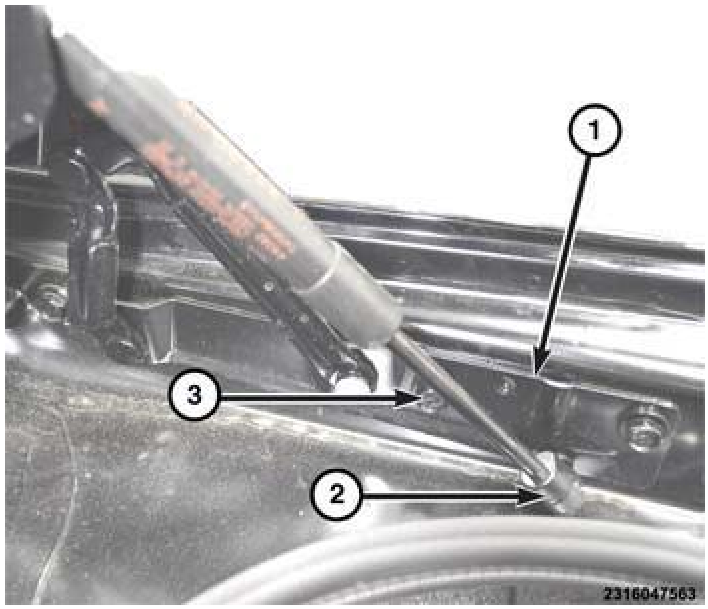
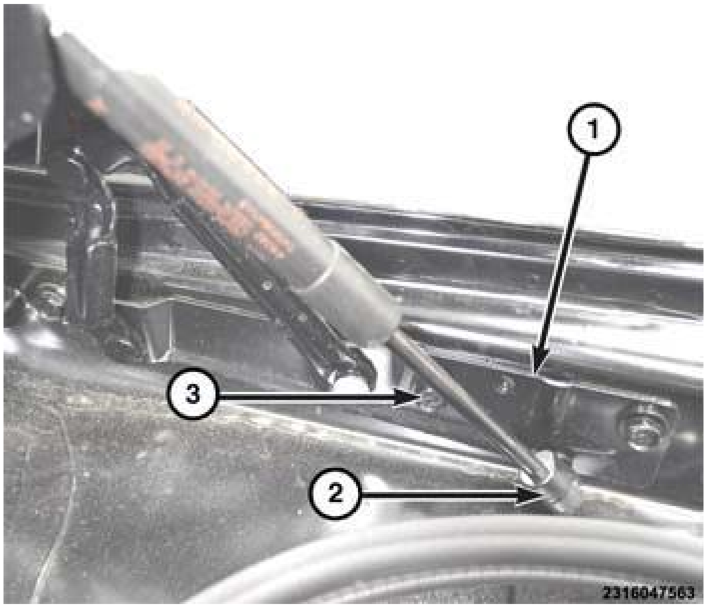


Fig. 31: Hood Hinge, Gas Prop & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Repeat for the opposite end of the gas prop (2) and remove.

INSTALLATION

INSTALLATION



[Fig. 32: Hood Hinge, Gas Prop & Bolts]
Courtesy of CHRYSLER GROUP, LLC

1. Position the ball socket of the gas prop (2) onto the ball stud on the decklid hinge (1).
2. Using hand pressure, press the gas prop onto the ball stud until the retainer clip snaps into place.
3. Repeat for the opposite end of the gas prop.

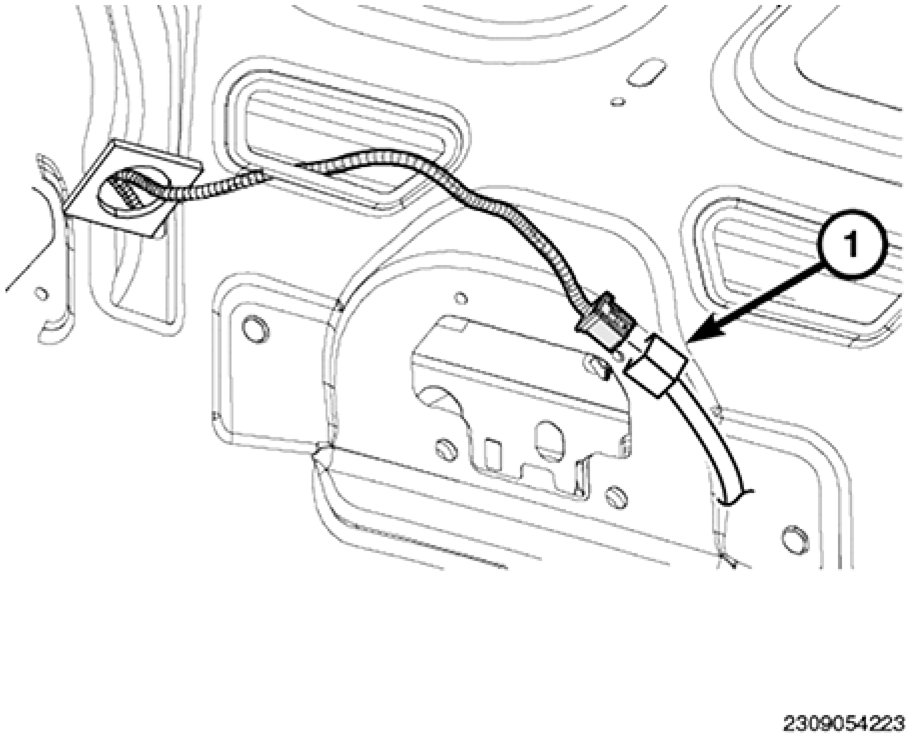
SPOILER, DECKLID

REMOVAL

REMOVAL

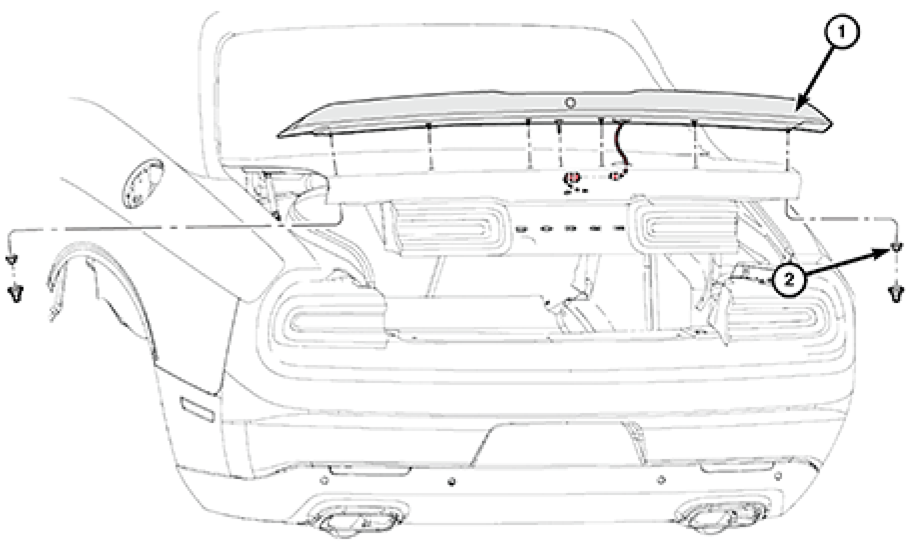
[Fig. 33: Decklid Trim Cover & Push Fasteners]
Courtesy of CHRYSLER GROUP, LLC

1. Remove the push fasteners (2) and the decklid trim cover (1).



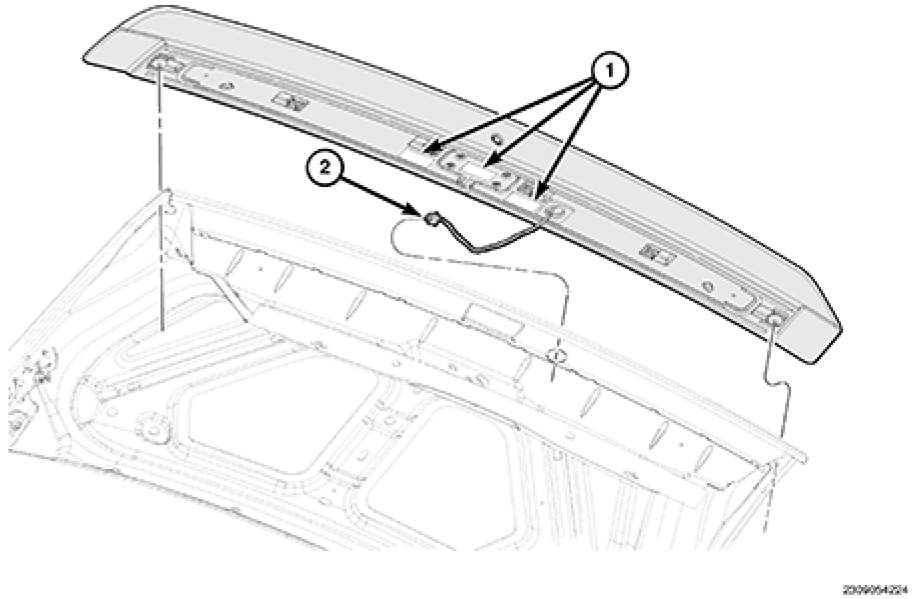
[Fig. 34: Rear Camera Electrical Connector]
Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the rear camera electrical connector (1), if equipped.



[Fig. 35: Cover & Nut]
Courtesy of CHRYSLER GROUP, LLC

3. Remove the covers and remove the nuts (2) securing the spoiler to the decklid.

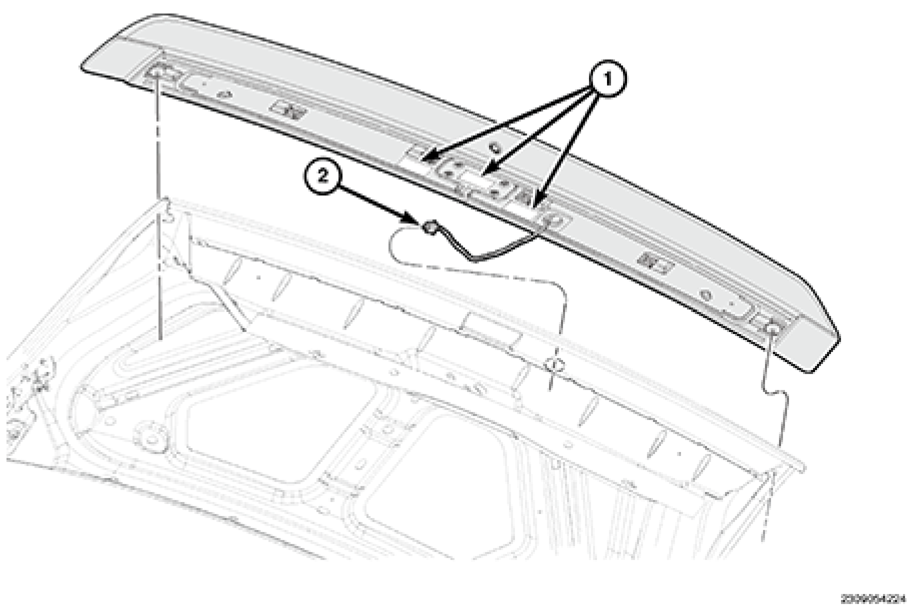


[Fig. 36: Two Way Tape & Wire Harness](#)
Courtesy of CHRYSLER GROUP, LLC

4. Carefully separate the two sided tape (1) and remove the spoiler.

INSTALLATION

INSTALLATION



[Fig. 37: Two Way Tape & Wire Harness](#)
Courtesy of CHRYSLER GROUP, LLC

1. After the spoiler has been removed, **remove any tape residue off the sheet metal by using 3M General Purpose Adhesive Cleaner #08984 or equivalent.**
2. Wipe the attachment area with a clean, lint-free cloth, moistened with a 50% solution of water and isopropylic alcohol.
3. Wait 30 seconds for the alcohol to flash off.

4. Install new two way tape (1) if required.
5. Remove the paper backing from the two way tape (1) and position the spoiler onto the decklid.
6. Position the wire harness (2) back through the hole in the decklid, if equipped.
7. Seat the retainer clips and tape (1) fully.

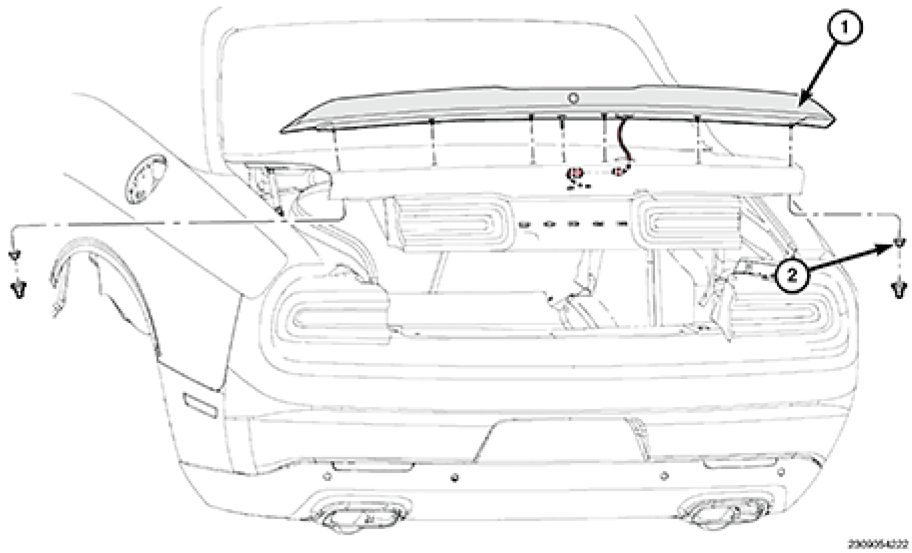


Fig. 38: Cover & Nut
Courtesy of CHRYSLER GROUP, LLC

8. Install the nuts (2) and tighten securely.
9. Install the covers over the attachment nuts.

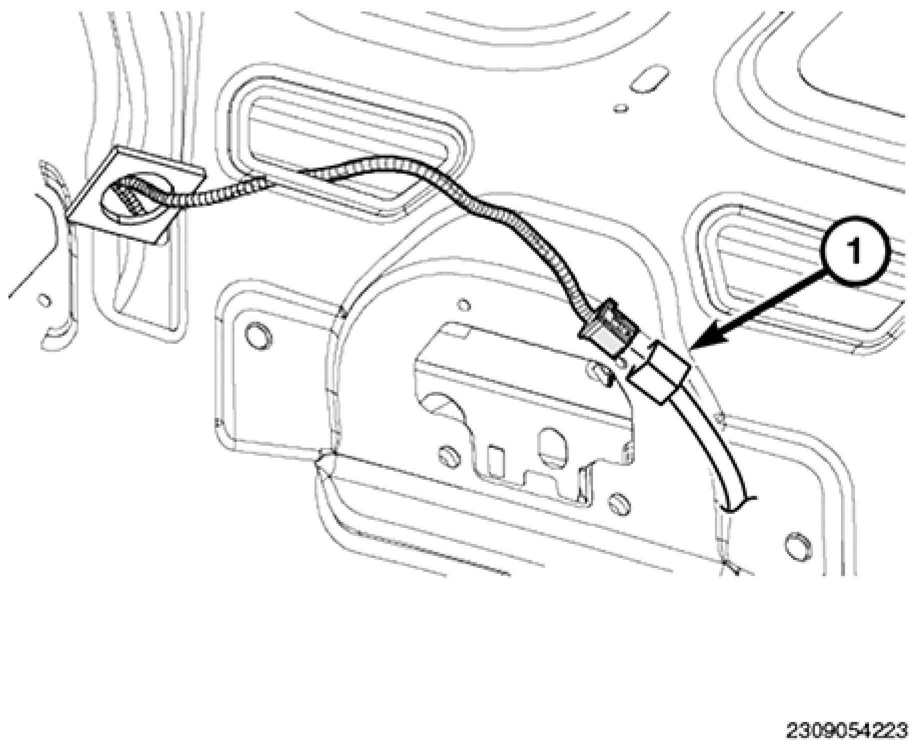


Fig. 39: Rear Camera Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

10. Connect the rear camera electrical connector (1), if equipped.

[Fig. 40: Decklid Trim Cover & Push Fasteners](#)
Courtesy of CHRYSLER GROUP, LLC

11. Install the decklid trim cover (1) and install the push pin fasteners (2).
12. Seat the fasteners fully.

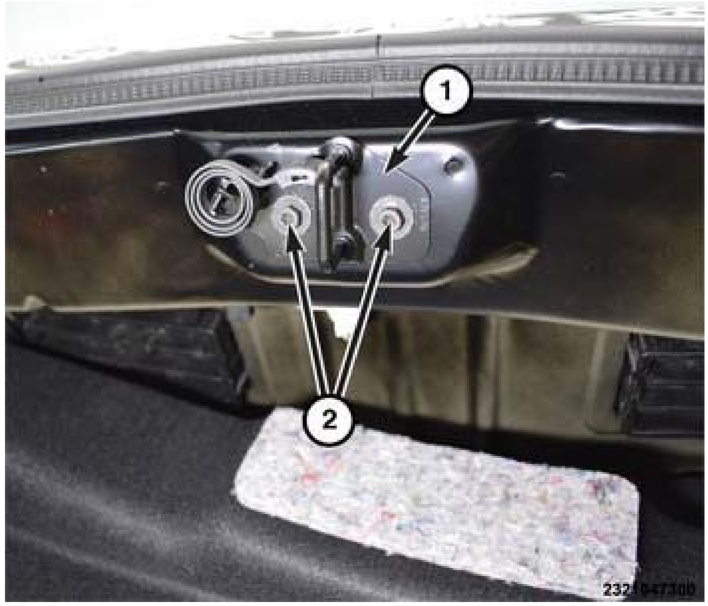
STRIKER, LATCH

REMOVAL

REMOVAL

[Fig. 41: Push Fasteners & Trunk Carpet](#)
Courtesy of CHRYSLER GROUP, LLC

1. Remove the push fasteners (1) and the trunk carpet (2).

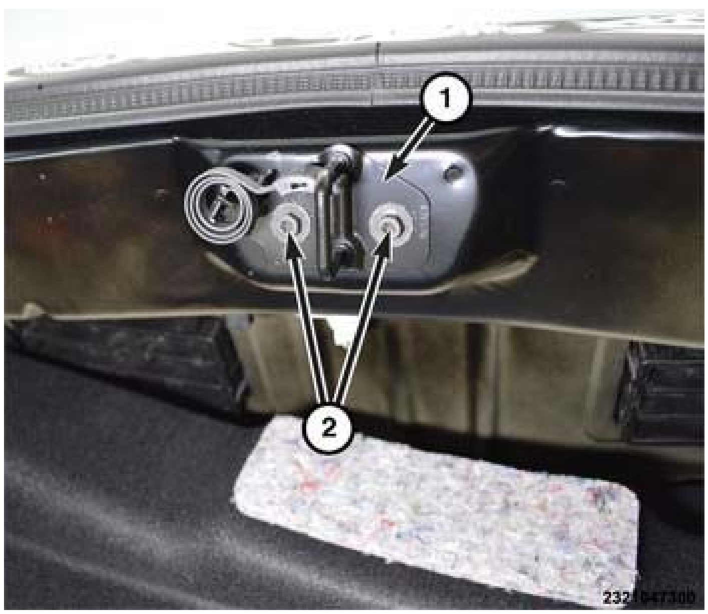


[Fig. 42: Decklid Latch Striker & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

2. Using a grease pencil or equivalent, mark the position of the decklid latch striker (1) to aid in installation.
3. Remove the bolts (2) and the decklid latch striker.

INSTALLATION

INSTALLATION



[Fig. 43: Decklid Latch Striker & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

1. Position the decklid latch striker (1) and loosely install the bolts (2).
2. Align the decklid latch striker with the reference mark made previously and tighten the decklid striker bolts to the proper specification. Refer to **SPECIFICATIONS**.
3. Verify the decklid fit, and operation of the decklid latch. Adjust the decklid latch striker if necessary.

Refer to GAP AND FLUSH, SPECIFICATIONS.

Fig. 44: Push Fasteners & Trunk Carpet
Courtesy of CHRYSLER GROUP, LLC

4. Position the trunk carpet (2) and install the push fasteners (1).

DOOR - FRONT

STANDARD PROCEDURE

STANDARD PROCEDURE

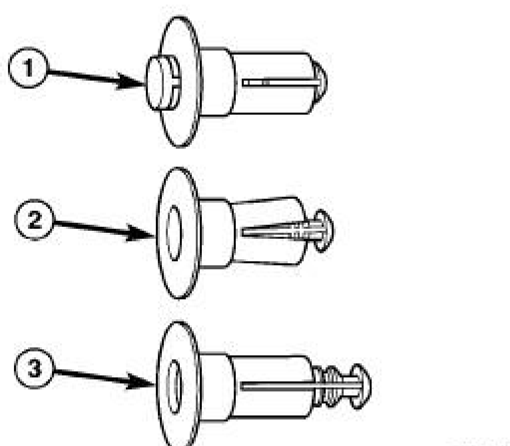


Fig. 45: Push Pin Fastener
Courtesy of CHRYSLER GROUP, LLC

1 - OPEN POSITION	
2 - LOCK POSITION	
3 - RELEASE POSITION	

1. The push pin fastener is in the open position (1) when the center pin is pull outward approximately 2 mm. Then the push pin fastener is ready to be used.
2. To install push pin place it into position, and push the center pin in flush with the head of the push pin to lock it into position (2).
3. To remove the push pin fastener, push the center pin inward approximately 2 mm to release push pin fastener (3).

CYLINDER, DOOR LOCK

REMOVAL

REMOVAL

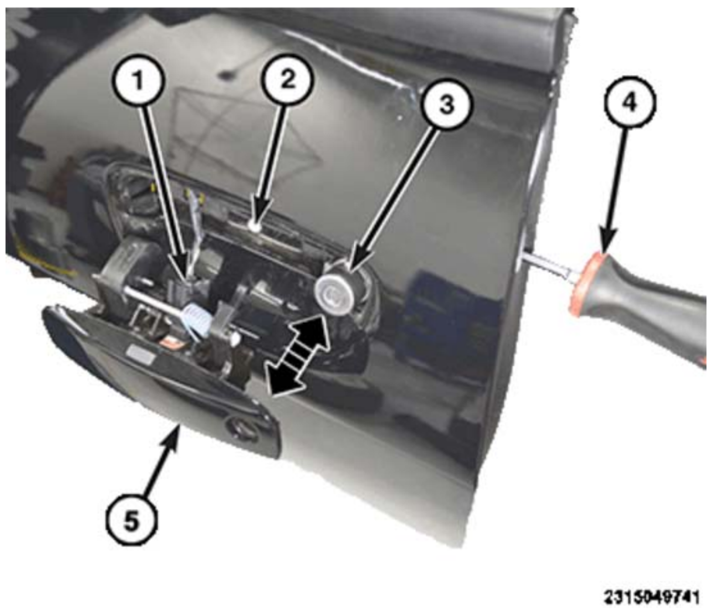


Fig. 46: Wire Harness Connector, Screw, Lock Cylinder, Suitable Tool & Exterior Door Handle
Courtesy of CHRYSLER GROUP, LLC

1. Remove the exterior door handle (5). Refer to HANDLE, EXTERIOR, REMOVAL.
2. Pull the lock cylinder (3) out of the door handle bracket.

INSTALLATION

INSTALLATION

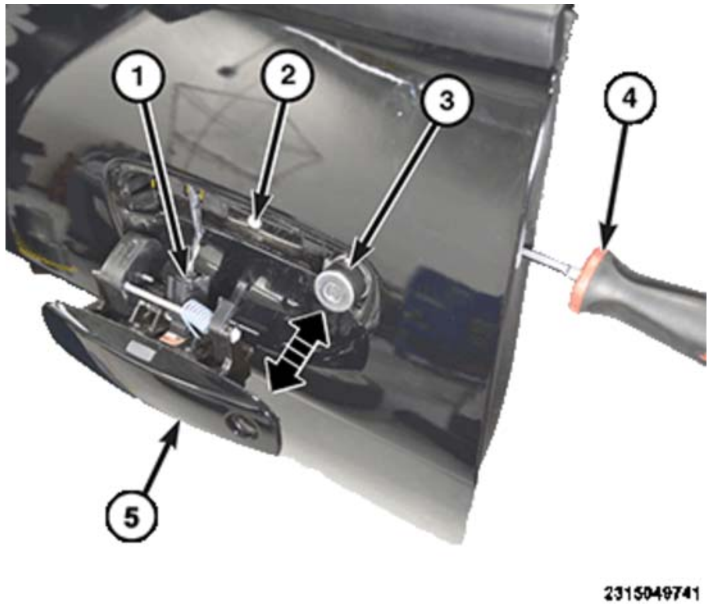


Fig. 47: Wire Harness Connector, Screw, Lock Cylinder, Suitable Tool & Exterior Door Handle
Courtesy of CHRYSLER GROUP, LLC

1. Insert the lock cylinder (3) into the door handle bracket.
2. Install the exterior door handle (5). Refer to **HANDLE, EXTERIOR, INSTALLATION**.

DOOR

ADJUSTMENTS

ADJUSTMENTS

NOTE:

- **Door adjustment measurements should be taken from stationary or welded body panels like the roof, rocker or quarter panels.**
- **During adjustment procedures, it is recommended that all the hinge fasteners be loosened except for the upper most fasteners. Adjustments can be made using the upper bolts to hold the door with final torque of the fasteners occurring after correct door positioning is achieved.**
- **A suitable body sealant should be used when removing or moving the hinges.**

FORE/AFT

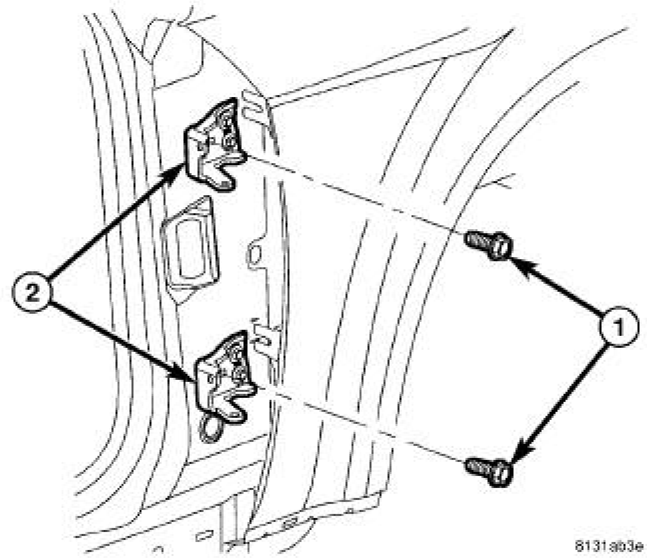


Fig. 48: Hinge Bracket
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Fore/aft (lateral) door adjustment is done by loosening the door hinge to the body bolts one door hinge at a time and moving the door to the correct position.**

1. Support the door with a suitable lifting device.
2. Loosen the upper and lower hinge to body bolts (1).
3. Adjust the door to the correct specifications. Refer to **GAP AND FLUSH, SPECIFICATIONS**.
4. Tighten the upper door hinge to body bolt to the proper specification. Refer to **SPECIFICATIONS**.
5. Tighten the lower door hinge to body bolt to the proper specification. Refer to **SPECIFICATIONS**.
6. Tighten the remaining door hinge to body bolts to the proper specification. Refer to **SPECIFICATIONS**.

UP/DOWN

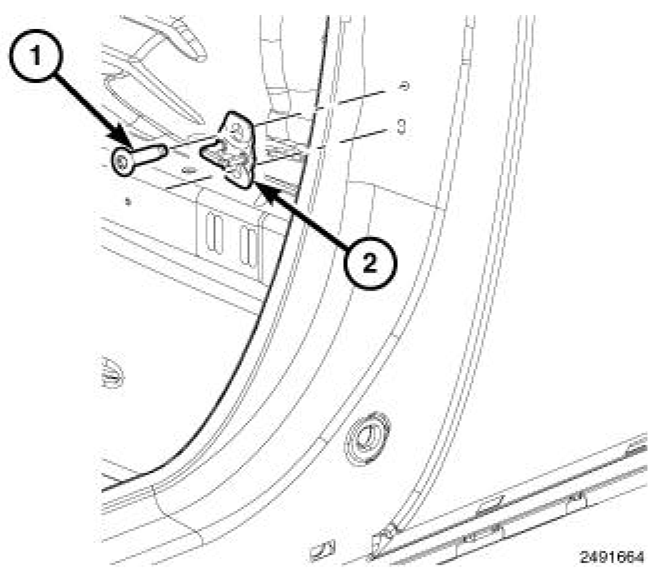


Fig. 49: Door Latch Striker

Courtesy of CHRYSLER GROUP, LLC

NOTE: **Up/down door adjustment is done by loosening either the hinge to body bolts or the hinge to door nuts and moving the door to the correct position.**

1. Support the door with a suitable lifting device.
2. Loosen the door latch striker bolts (1)

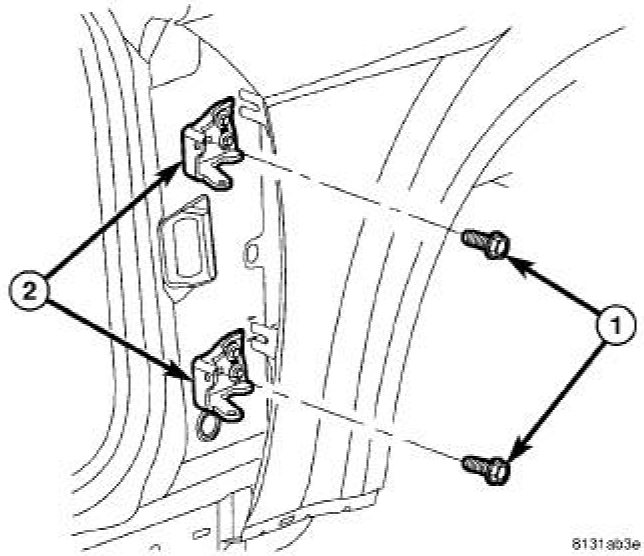


Fig. 50: Hinge Bracket
Courtesy of CHRYSLER GROUP, LLC

3. If necessary, loosen the door hinge to body bolts (1).

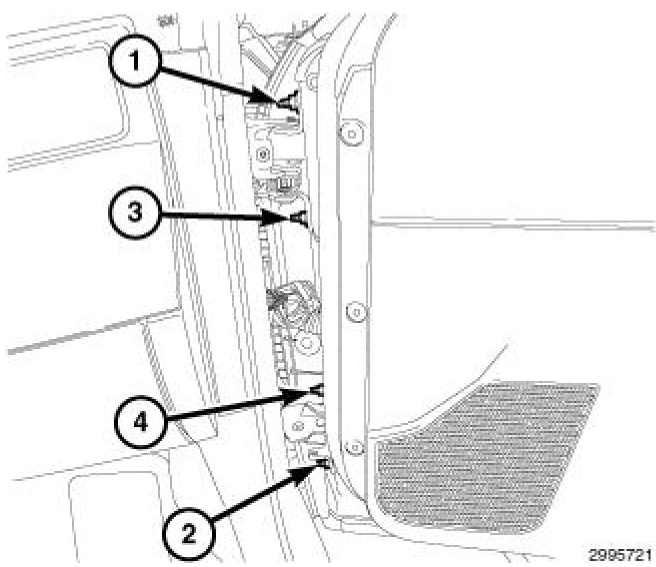


Fig. 51: Hinge Door Nuts
Courtesy of CHRYSLER GROUP, LLC

4. If necessary, loosen the door hinge to door nuts (1). Refer to **DOOR, REMOVAL**.
5. Adjust the door to the correct position. Refer to **GAP AND FLUSH, SPECIFICATIONS**.

6. Tighten the door hinge to door nuts to the proper specification. Refer to **SPECIFICATIONS**.

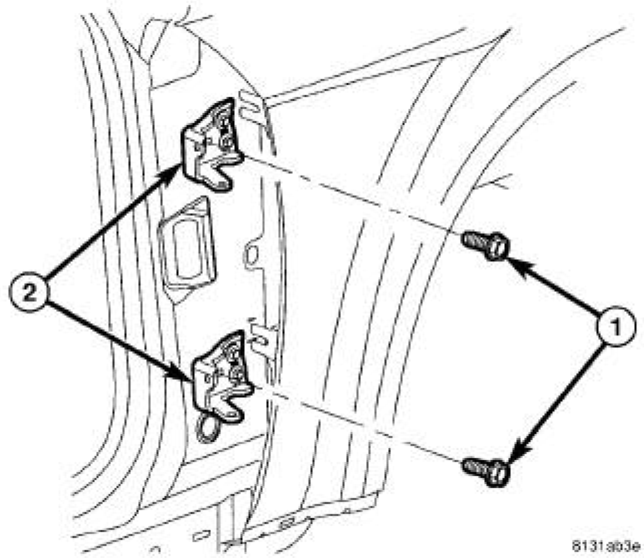


Fig. 52: Hinge Bracket
Courtesy of CHRYSLER GROUP, LLC

7. Tighten the upper door hinge to body bolt (1) to the proper specification. Refer to **SPECIFICATIONS**.
8. Tighten the lower door hinge to body bolt to the proper specification. Refer to **SPECIFICATIONS**.
9. Tighten the remaining door hinge to body bolts to the proper specification. Refer to **SPECIFICATIONS**.

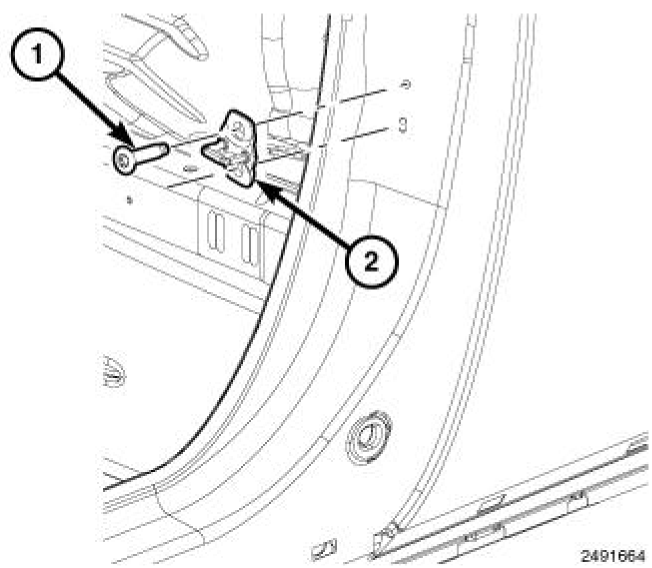
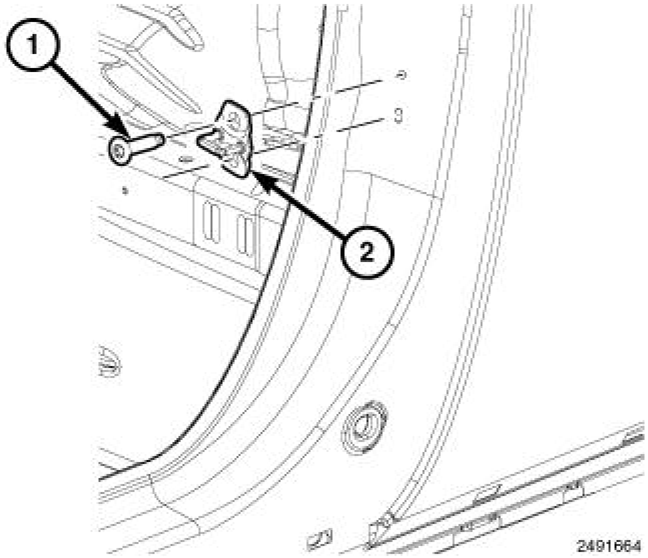


Fig. 53: Door Latch Striker
Courtesy of CHRYSLER GROUP, LLC

10. Tighten the door latch striker bolts to the proper specification. Refer to **SPECIFICATIONS**.

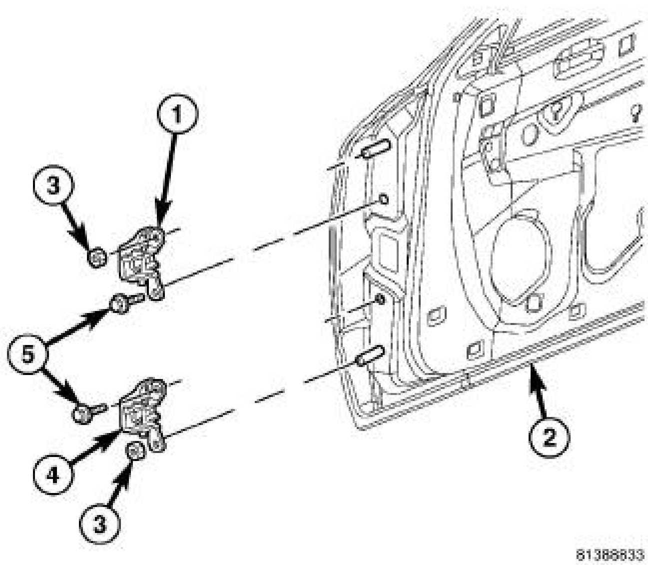
IN/OUT



[Fig. 54: Door Latch Striker]
Courtesy of CHRYSLER GROUP, LLC

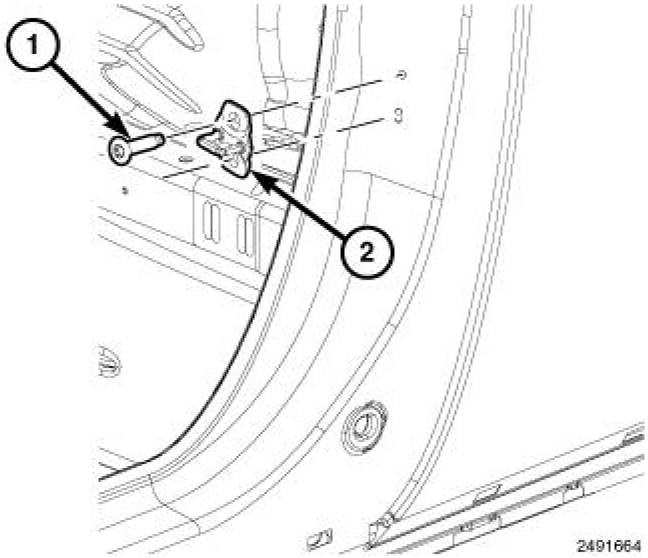
NOTE: **In/out door adjustment is done by loosening the hinge to door fasteners one hinge at a time and moving the door to the correct position.**

1. Support the door with a suitable lifting device.
2. Loosen the door latch striker bolts (2).



[Fig. 55: Door Hinge]
Courtesy of CHRYSLER GROUP, LLC

3. Loosen the door hinge to door fasteners.
4. Adjust the door to the correct position. Refer to GAP AND FLUSH, SPECIFICATIONS.
5. Tighten the door hinge to door nuts to the proper specification. Refer to SPECIFICATIONS.



[Fig. 56: Door Latch Striker](#)
Courtesy of CHRYSLER GROUP, LLC

6. Tighten the door latch striker bolts to the proper specification. Refer to **SPECIFICATIONS**.

REMOVAL

REMOVAL

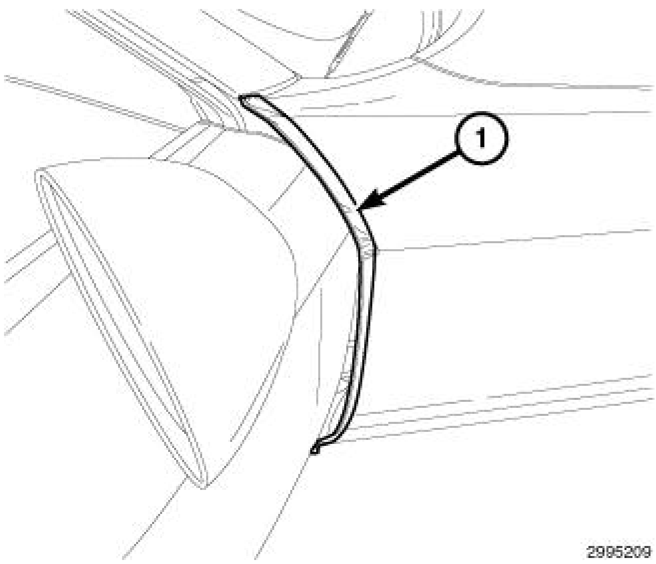
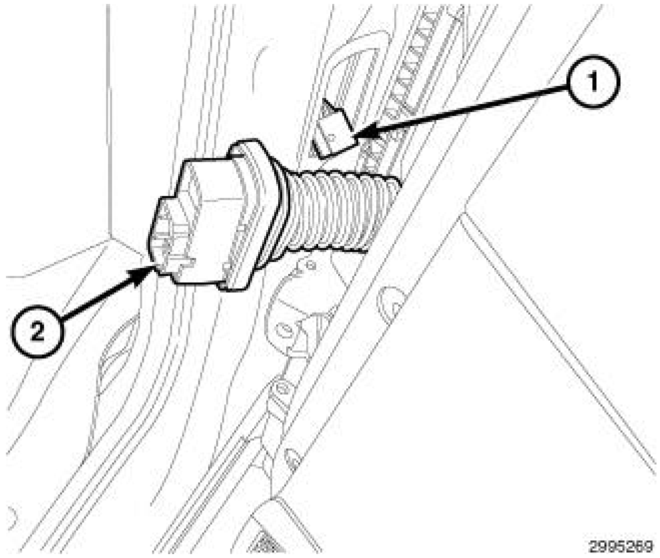


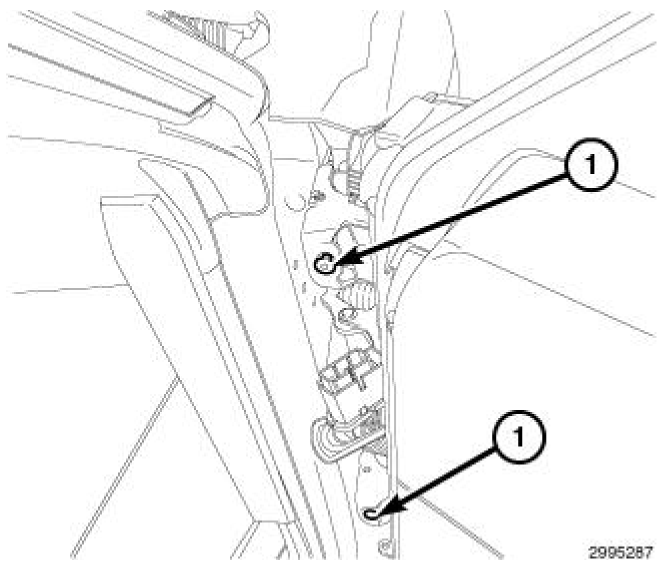
Fig. 57: Strip Of Tape On Rear Fender Edge
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Using masking tape or equivalent, apply a strip of tape (1) to the rear fender edge near the door for protection.
3. Support the door with a suitable lifting device.



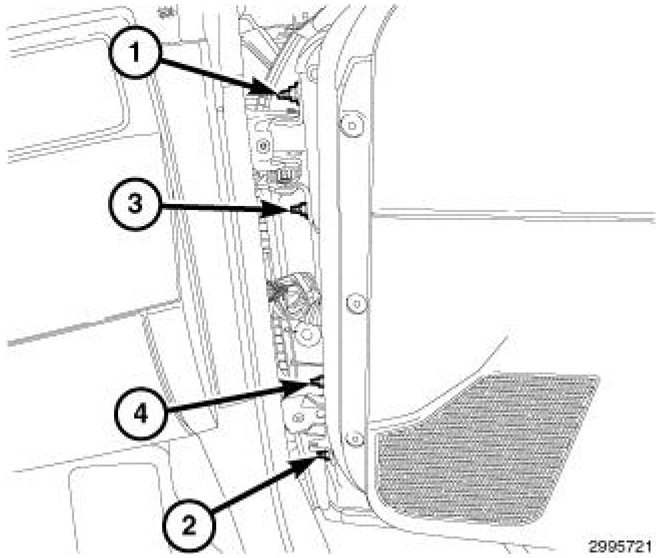
[Fig. 58: Body Wire Harness Connectors]
Courtesy of CHRYSLER GROUP, LLC

4. Disengage the front door wire harness boot and connector (1) from the outside of the lower A-pillar.
5. Carefully pull the door wire harness boot and connector out from the A-pillar far enough to access and disconnect the body wire harness connectors (1 & 2).



[Fig. 59: Hinge Swing Stop Bolts]
Courtesy of CHRYSLER GROUP, LLC

6. Remove the hinge swing stop bolts (1) from both the upper and lower front door hinges.

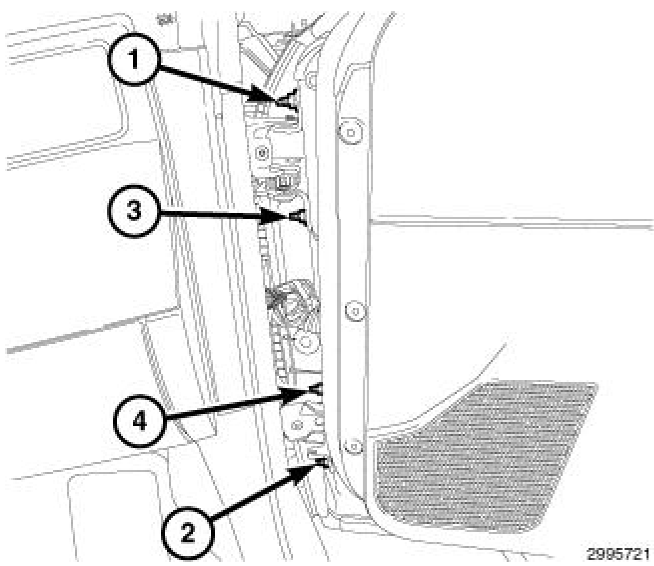


[Fig. 60: Hinge Door Nuts]
Courtesy of CHRYSLER GROUP, LLC

7. Using a grease pencil or equivalent, mark the position of the door hinge on the door to aid installation.
8. Remove the hinge to door nuts (1, 2) from the door.
9. Remove the hinge to door nuts (3, 4) from the door.
10. Remove the door from the hinges by pulling straight out.

INSTALLATION

INSTALLATION



[Fig. 61: Hinge Door Nuts]
Courtesy of CHRYSLER GROUP, LLC

1. Support the door with a suitable lifting device.
2. Position the door onto the door hinges and loosely install the nuts (1).
3. Align the door hinge to the reference marks made previously and tighten the door hinge to door nuts (3 and 4) to the proper specification. Refer to **SPECIFICATIONS**.

4. Align the door hinge to the reference marks made previously and tighten the door hinge to door nuts (1 and 2) to the proper specification. Refer to **SPECIFICATIONS**.
5. Remove the lifting device supporting the door.

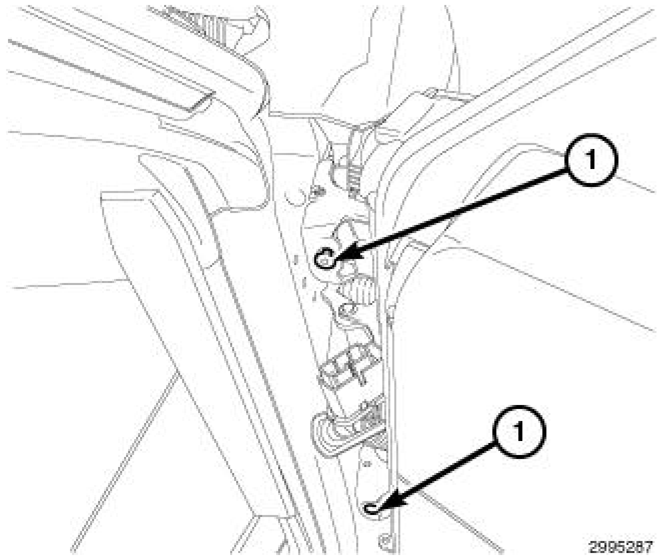


Fig. 62: Hinge Swing Stop Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install the door hinge swing stop bolts (1) and tighten to the proper specification. Refer to **SPECIFICATIONS**.

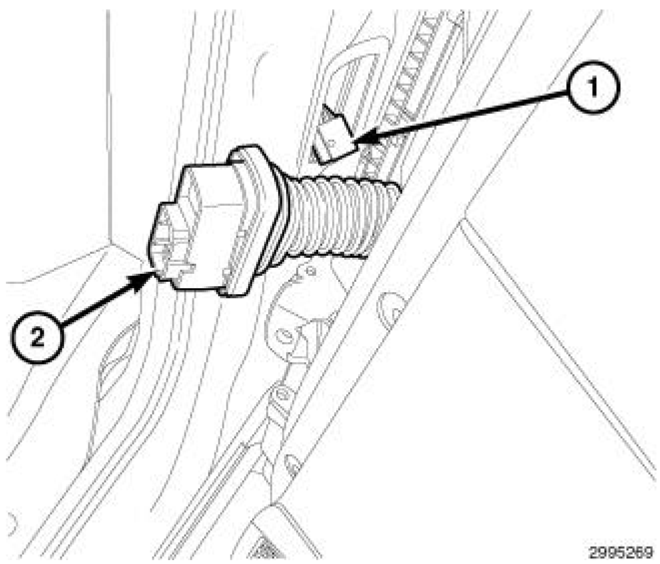


Fig. 63: Body Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

7. Connect the body wire harness connectors (1 and 2).
8. Position the door wire harness boot and connector into the opening in the A-pillar. Install the door wire harness boot over the connector. Make sure the boot is fully installed over the harness and connector.

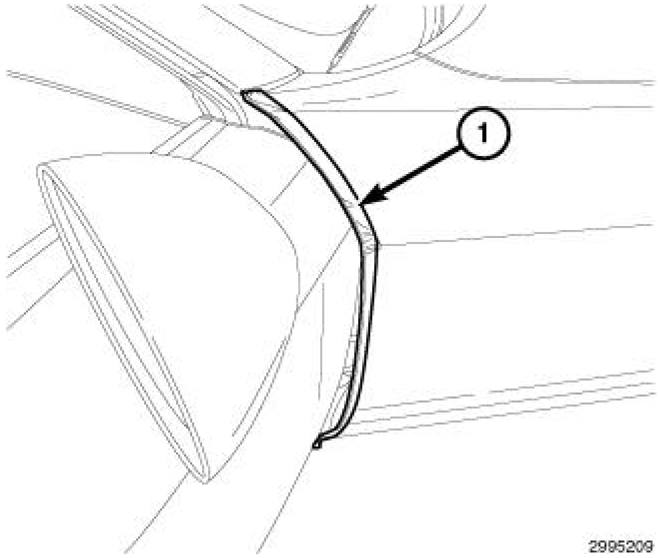


Fig. 64: Strip Of Tape On Rear Fender Edge
Courtesy of CHRYSLER GROUP, LLC

9. Remove the tape strip (1) from the fender edge.
10. Connect the negative battery cable.

NOTE: **For vehicles equipped with the optional Automatic Express Up power window feature, calibration of this feature is required whenever power to the door module is disrupted.**

11. If necessary, adjust the door. Refer to **DOOR, ADJUSTMENTS**.

GLASS, DOOR

ADJUSTMENTS

ADJUSTMENTS

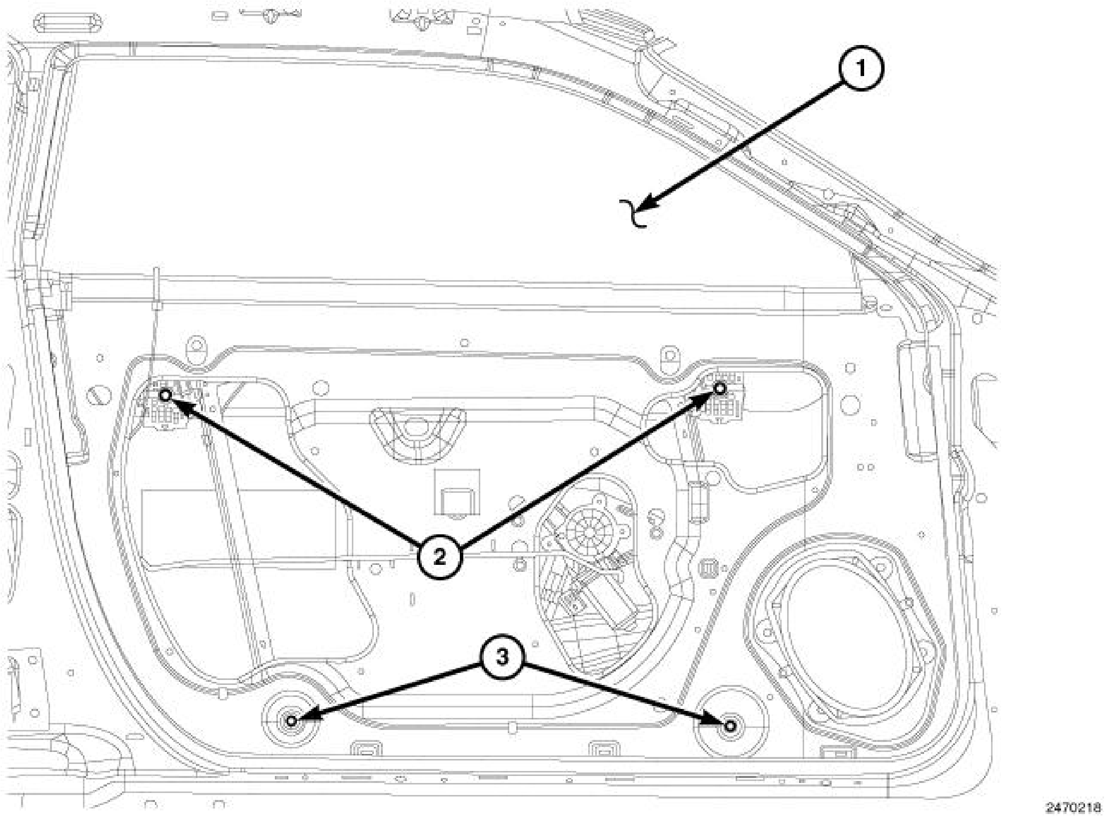


Fig. 65: Front Door Glass Adjustments
Courtesy of CHRYSLER GROUP, LLC

1 - DOOR GLASS	
2 - DOOR GLASS BOLTS	
3 - JACK SCREWS	

1. Check and adjust the door if necessary. Refer to **DOOR, ADJUSTMENTS**.
2. Remove the door trim panel and the watershield to gain access to the window regulator. Refer to **WATERSHIELD, REMOVAL**.

NOTE: **Partially loosening the door glass bolts (2) allows the door glass to stay in place while the door glass is being adjusted. If the bolts are too loose, the door glass will lose all position adjustments completely.**

3. With the door glass (1) in the full up position, partially loosen the door glass bolts (2).

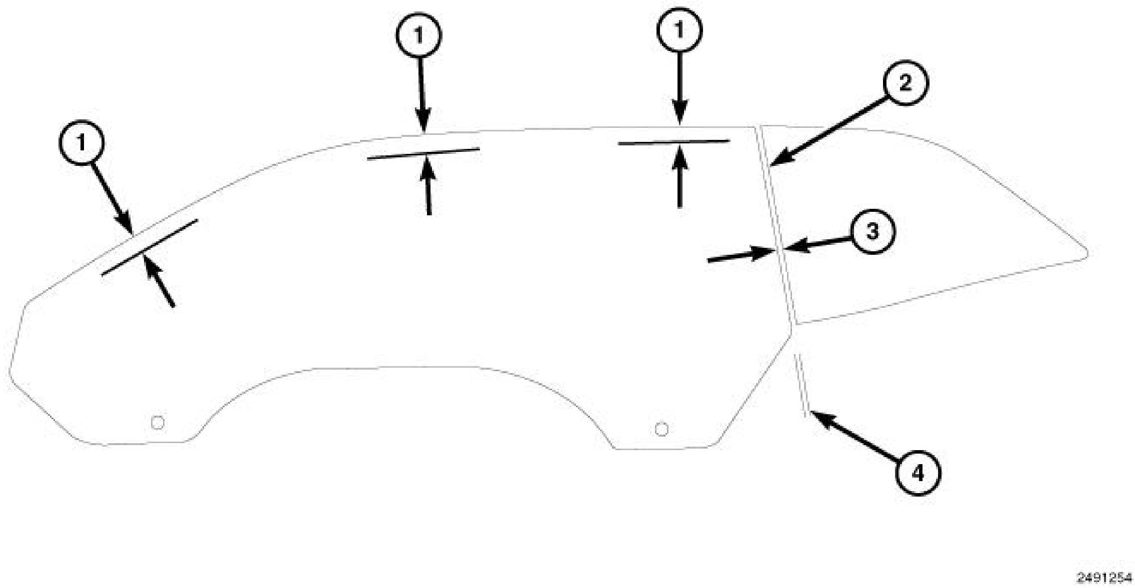


Fig. 66: Door Glass Alignment (1 Of 2)
Courtesy of CHRYSLER GROUP, LLC

1 - SEAL ENGAGEMENT 7.5 mm +/- 2.0 mm	
2 - DOOR GLASS TO QUARTER GLASS FLUSH 0 mm - 3.0 mm	
3 - DOOR GLASS TO QUARTER GLASS GAP 6.0 mm +/- 2.0 mm	
4 - DOOR GLASS TO QUARTER GLASS PARALLEL WITHIN 2.0 mm	

4. Place a piece of tape onto the door glass and mark a line 7.5 mm (0.30 in.) minimum down from the upper edge in the three places shown in illustration (1).
5. From the outside of the vehicle, with the door closed, use a suction cup or equivalent and simultaneously slide the door glass to achieve the three minimum glass engagement tape marks (1) and the door glass to quarter glass gap (3) and parallel measurements (4).

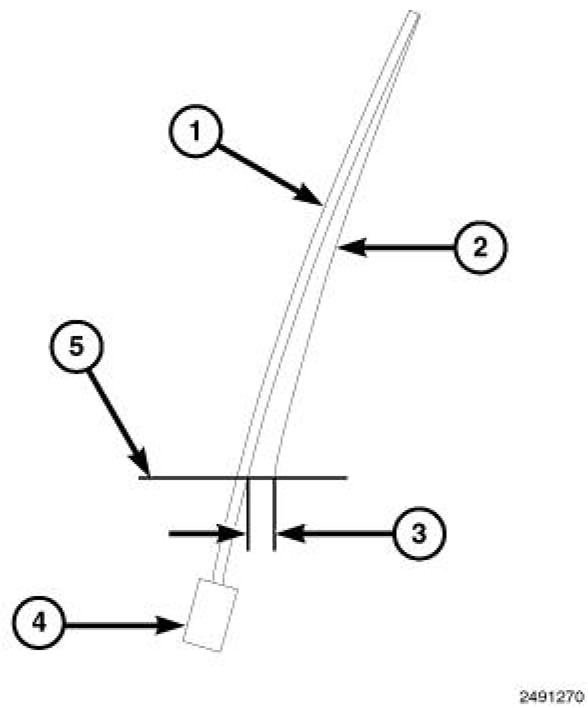


Fig. 67: Door Glass Alignment (2 Of 2)
Courtesy of CHRYSLER GROUP, LLC

1 - DOOR GLASS
2 - SASH SEAL
3 - OBSERVED BELT LINE PRE-LOAD 6.0 mm
4 - LIFT PLATE PIVOT
5 - BELT LINE

NOTE: **It is sometimes helpful to tighten or loosen the bolt at the rear of the door glass during this process.**

NOTE: **The jack screws work for minor cross car adjustments and should only be used if there is a minimal adjustment cross car required.**

6. Open the door and then carefully close the door until the B-pillar top of glass (1) just touches the quarter glass sash seal (2) and check the B-pillar glass to sash seal gap near the belt line (3). This gap (3) should be adjusted to 6 mm (0.24 in.) to put a cross car preload on the door glass. To adjust the gap open the door and push the top edge of the door glass inboard or outboard as needed. Close the door and check the gap as needed. Check that the door glass to quarter glass is flush to +3 mm (0.11 in.) over flush.

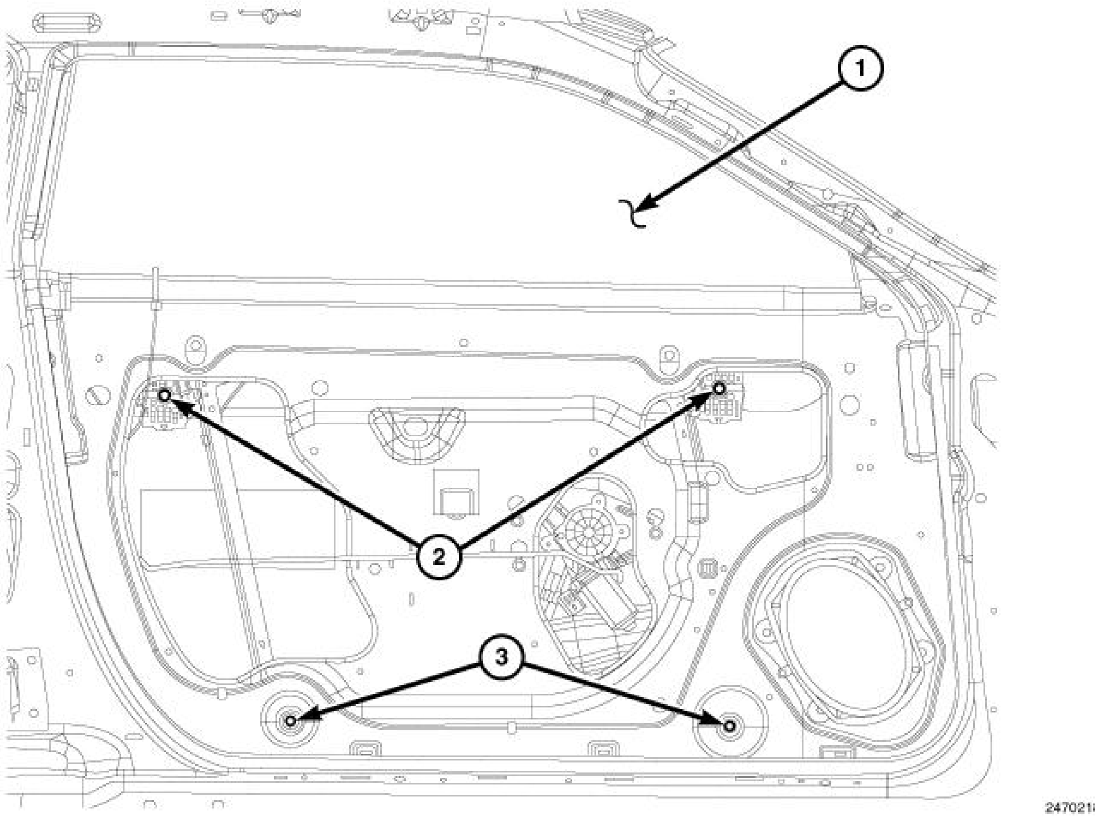


Fig. 68: Front Door Glass Adjustments
Courtesy of CHRYSLER GROUP, LLC

1 - DOOR GLASS
2 - DOOR GLASS BOLTS
3 - JACK SCREWS

7. Tighten the door glass bolts (2) to 10 N.m (89 in. lbs.).
8. From inside the vehicle with the door closed, run the door glass full down and then jog it upwards to insure the door glass does not scissor and travel inboard of the quarter glass sash seal or crush the seal and dislodge it from the retainer. If the door glass travels inboard of the sash seal, you will need to reduce the door glass preload.
9. From outside the vehicle, open and close the door and make sure the A-pillar section of the door glass travels properly into the A-pillar seal. If the door glass crushes or pinches the A-pillar seal, the door glass will need more preload and/or shifted rearward.
10. Install the watershield and door trim panel. Refer to **WATERSHIELD, INSTALLATION**.

REMOVAL

REMOVAL

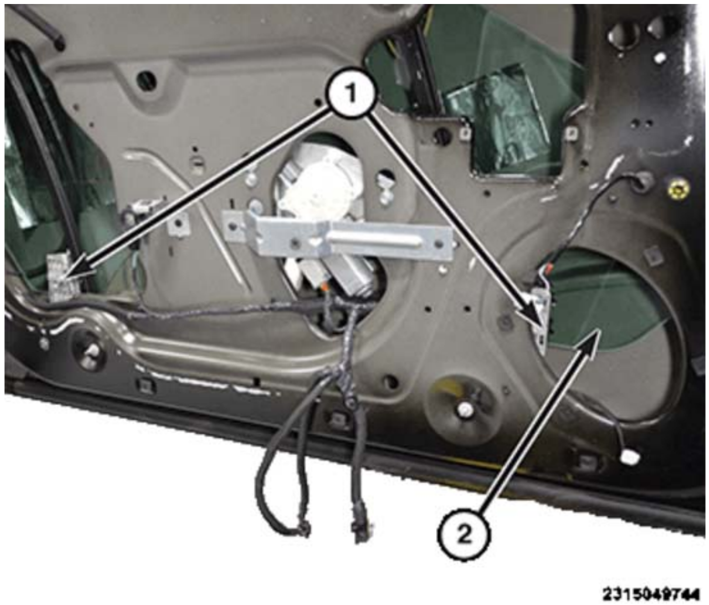
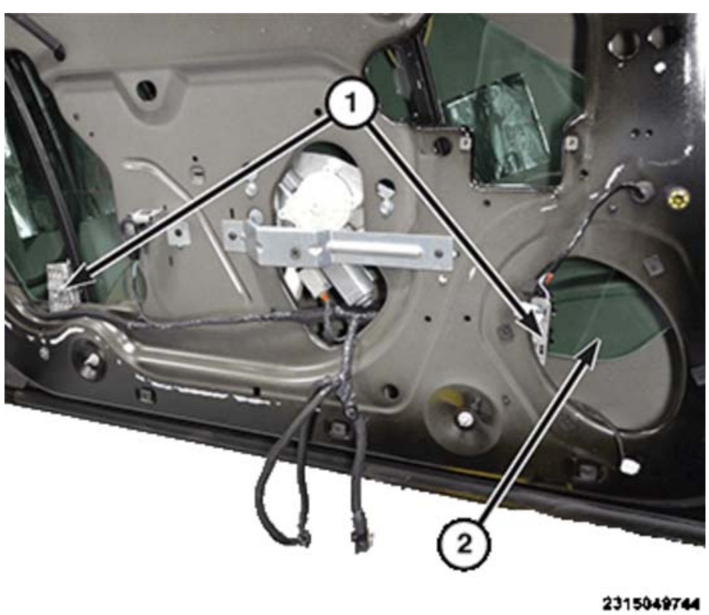


Fig. 69: Door Glass Bolts & Door Glass
Courtesy of CHRYSLER GROUP, LLC

1. Position the door glass to the lowest position.
2. Remove the door trim panel. Refer to **PANEL, DOOR TRIM, REMOVAL**.
3. Remove the door speaker. Refer to **SPEAKER, REMOVAL** .
4. Remove the watershield at the bottom of the door to access the door glass bolts (1).
5. Using a grease pencil or equivalent, mark the position of the door glass where it is fastened to the window regulator, to aid installation.
6. Remove the door glass bolts.
7. Lift the door glass up and out of the door.

INSTALLATION

INSTALLATION



[Fig. 70: Door Glass Bolts & Door Glass](#)
Courtesy of CHRYSLER GROUP, LLC

1. Lower the door glass (2) into the top of the door.
2. Make sure the door glass is positioned correctly into the glass channel and loosely install the door glass bolts (1).
3. Align the door glass to the reference marks made previously and tighten the door glass bolts to the proper specification. Refer to **SPECIFICATIONS**.
4. Connect the window switch and check the door glass operation and adjustment. Refer to **GLASS, DOOR, ADJUSTMENTS**.
5. Press the watershield firmly to the door.
6. Install the door speaker. Refer to **SPEAKER, INSTALLATION** .
7. Install the door trim panel. Refer to **PANEL, DOOR TRIM, INSTALLATION**.

HANDLE, EXTERIOR

REMOVAL

REMOVAL

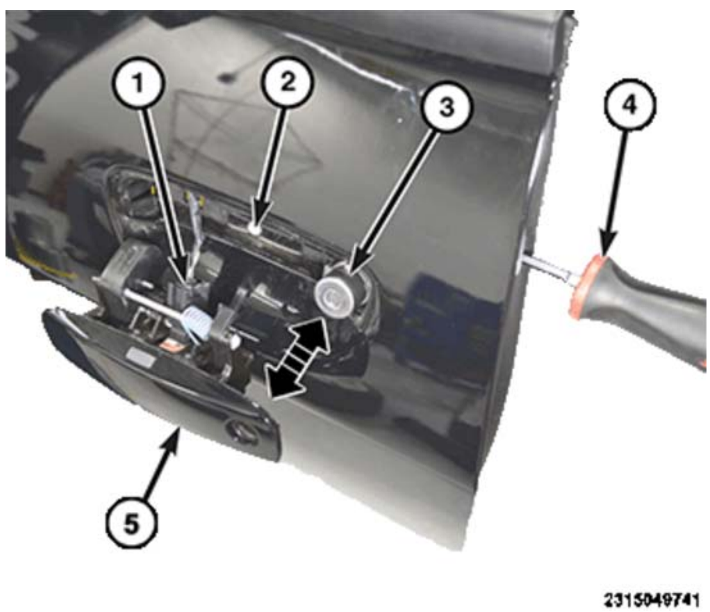


Fig. 71: Wire Harness Connector, Screw, Lock Cylinder, Suitable Tool & Exterior Door Handle
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not use power tools when loosening the screw (2).**

Carefully loosen the screw while lightly pulling on the exterior door handle. Only loosen enough so the exterior door handle can be removed.

The threads will be damaged if turned beyond the stop point.

1. Disconnect the negative battery cable.
2. Locate the screw access hole on door jamb.

3. Using a suitable tool (4), turn the screw counter clockwise. Carefully loosen the screw while lightly pulling on the exterior door handle (5). **Do not attempt to remove the screw.**
4. Pull the exterior door handle outward and disconnect the wire harness connector (1). Use an appropriate device to prevent the wire connector from falling inside the door.

NOTE: **Important, do not let the exterior door handle connector fall inside the door after it is disconnected .**

INSTALLATION

INSTALLATION

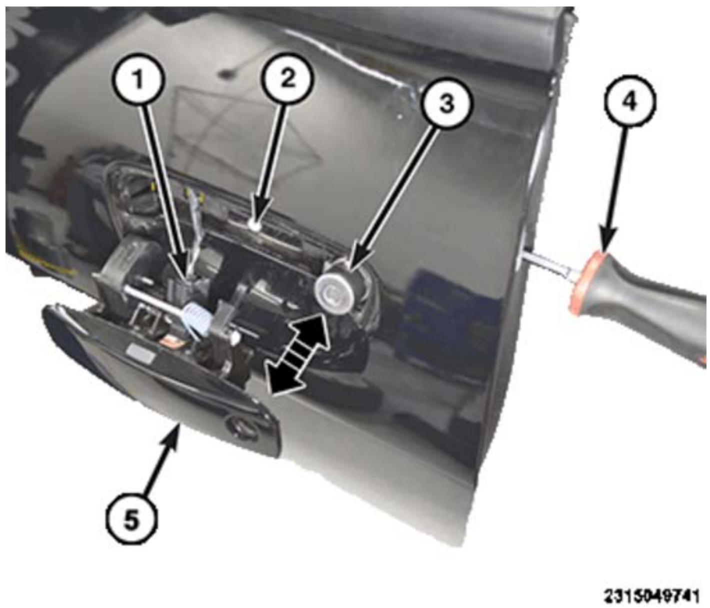


Fig. 72: Wire Harness Connector, Screw, Lock Cylinder, Suitable Tool & Exterior Door Handle
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not use power tools when installing the exterior door handle.**

Do not tighten the screw more than 3 N.m (27 in. lbs.). The threads can be damaged if tightened beyond specification.

1. Connect the wire harness connector (1).
2. Position the exterior door handle (5) into the bracket.
3. Insert a suitable tool (4) into the access hole and turn the screw clockwise to engage the exterior door handle. The threads may be damaged if tightened more than 3 N.m (27 in. lbs.).
4. Connect the negative battery cable.

HINGE, DOOR

REMOVAL

REMOVAL

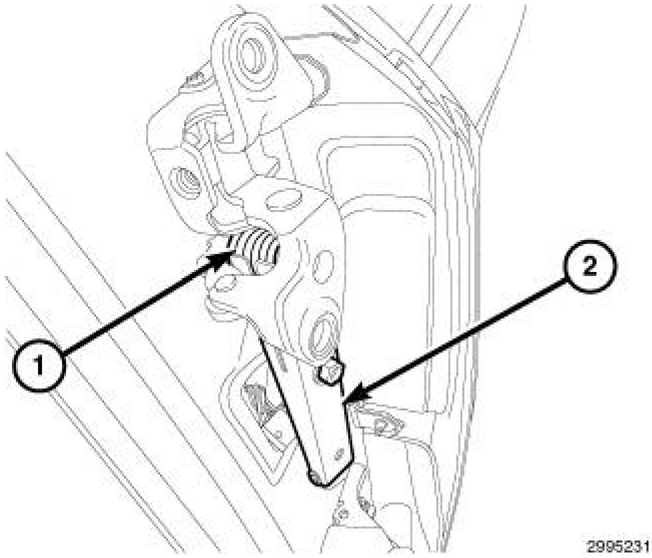


Fig. 73: Door Spring & Compression Tool
Courtesy of CHRYSLER GROUP, LLC

NOTE: Upper hinge shown in illustration, lower hinge similar.

1. Using a grease pencil or equivalent, mark the position of the door hinge on the door and on the body to aid installation.
2. Remove the door. Refer to **DOOR, REMOVAL**.
3. Using a door spring compression tool (2), remove the door spring (1) from the upper hinge.

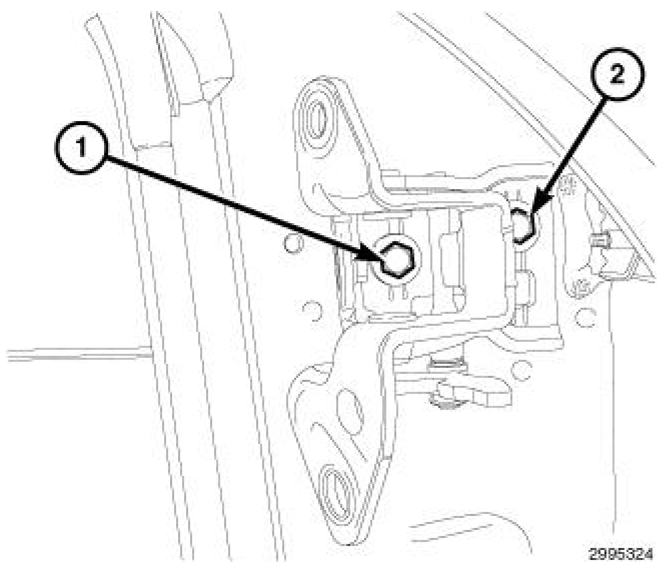
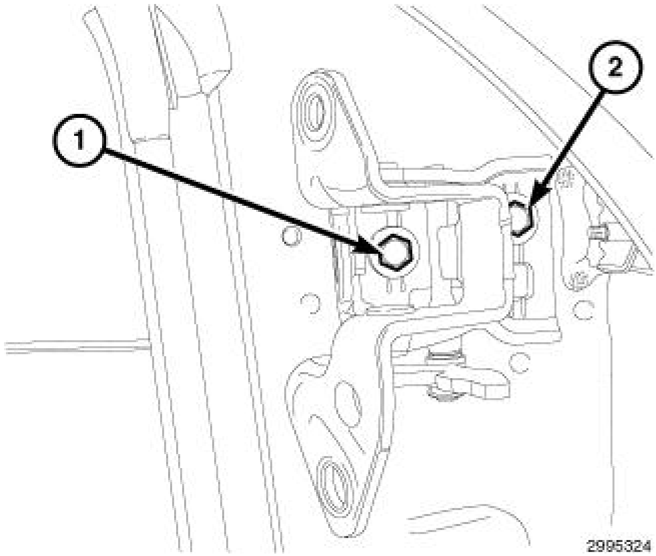


Fig. 74: Hinge Bracket Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Remove the bolts (1, 2) and the door hinge.

INSTALLATION

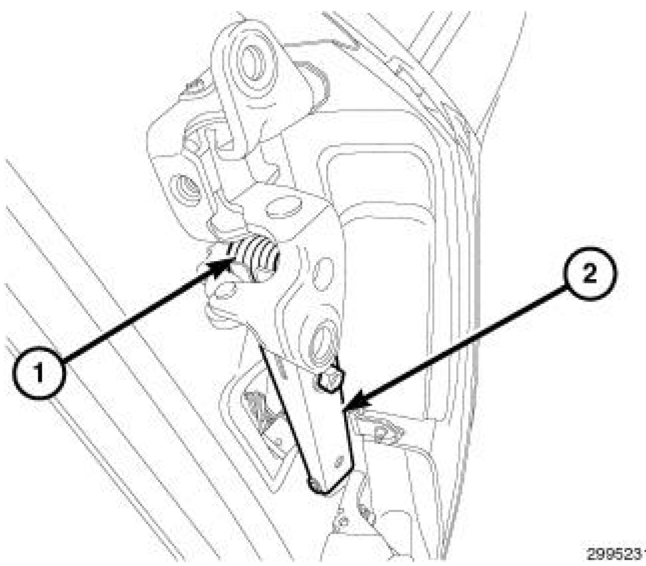
INSTALLATION



[Fig. 75: Hinge Bracket Fasteners]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Upper hinge shown in illustration, lower hinge similar.**

1. Position the door hinge onto the body and loosely install the bolts.
2. Align the door hinge to the reference marks made previously and tighten the door hinge to body bolts to the proper specification. Refer to **SPECIFICATIONS**.



[Fig. 76: Door Spring & Compression Tool]
Courtesy of CHRYSLER GROUP, LLC

3. Using a door spring compression tool (2), install the door spring (1) to the upper hinge.
4. Install the door. Refer to **DOOR, INSTALLATION**.

LATCH, DOOR

REMOVAL

REMOVAL

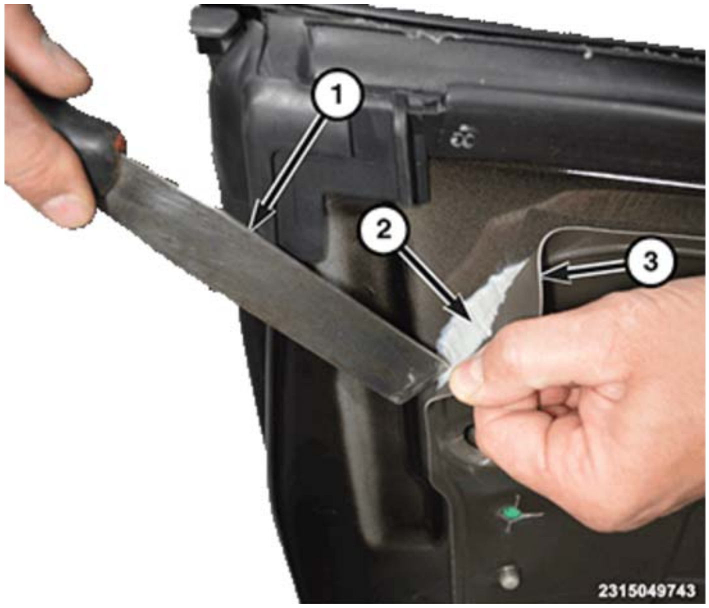


Fig. 77: Flat Bladed Tool, Adhesive Bead & Watershield
Courtesy of CHRYSLER GROUP, LLC

1. Raise the door glass to the fully closed position.
2. Remove the door trim panel. Refer to **PANEL, DOOR TRIM, REMOVAL**.
3. Pull the watershield (3) back and release the adhesive bead (2) using a flat bladed tool (1). Remove enough to access the door latch.

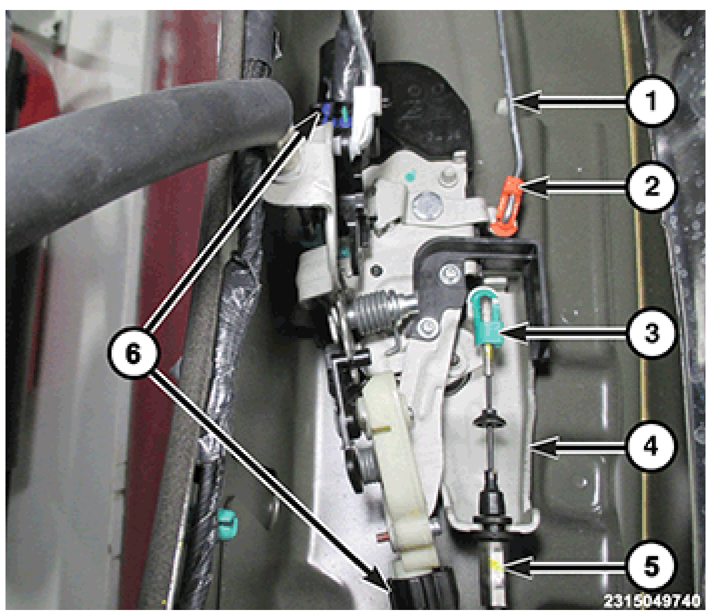


Fig. 78: Door Lock Cylinder Link, Clips), Exterior Handle Release Cable & Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

4. Reach into the door and release the clip (2) and remove the door lock cylinder link (1), if equipped.
5. Release the clip (3) and remove the exterior handle release cable (5)
6. Disconnect the wire harness connectors (6).

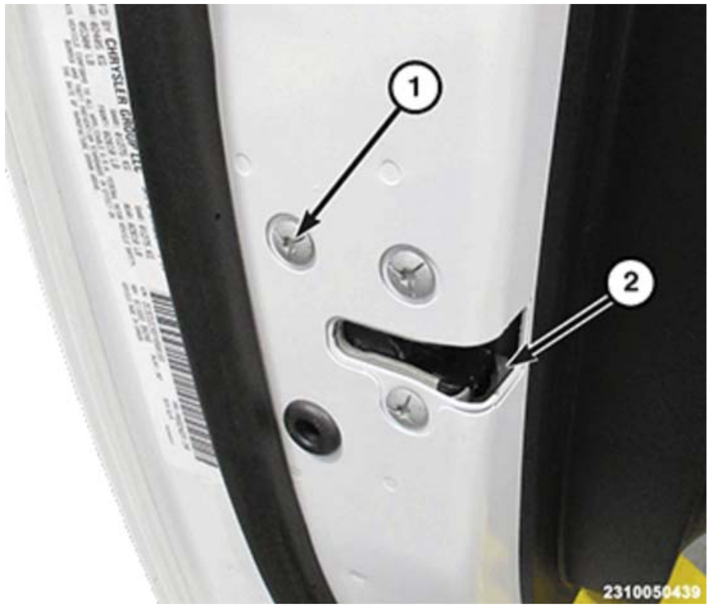


Fig. 79: Bolts & Door Latch
Courtesy of CHRYSLER GROUP, LLC

7. Remove the three bolts (1) and the door latch (2).

INSTALLATION

INSTALLATION

Fig. 80: Bolts & Door Latch
Courtesy of CHRYSLER GROUP, LLC

1. Position the door latch (2) into the door and install the three bolts (1).
2. Tighten the door latch bolts to the proper specification. Refer to **SPECIFICATIONS**.

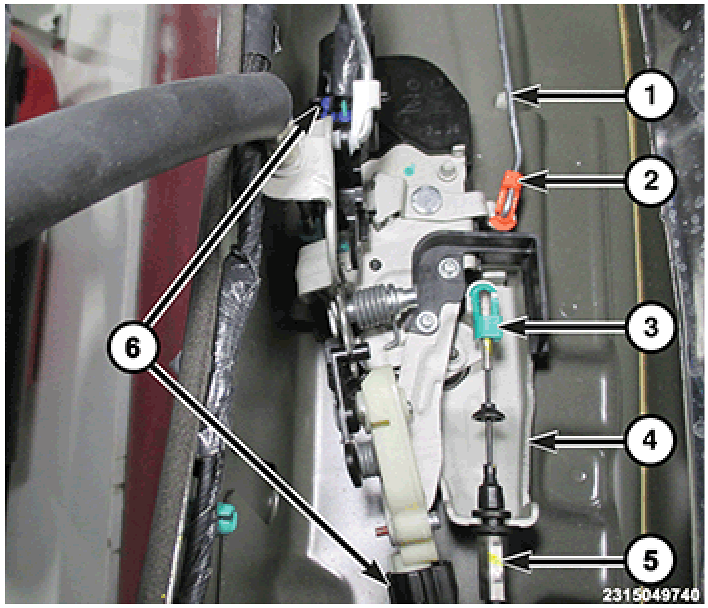


Fig. 81: Door Lock Cylinder Link, Clips), Exterior Handle Release Cable & Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

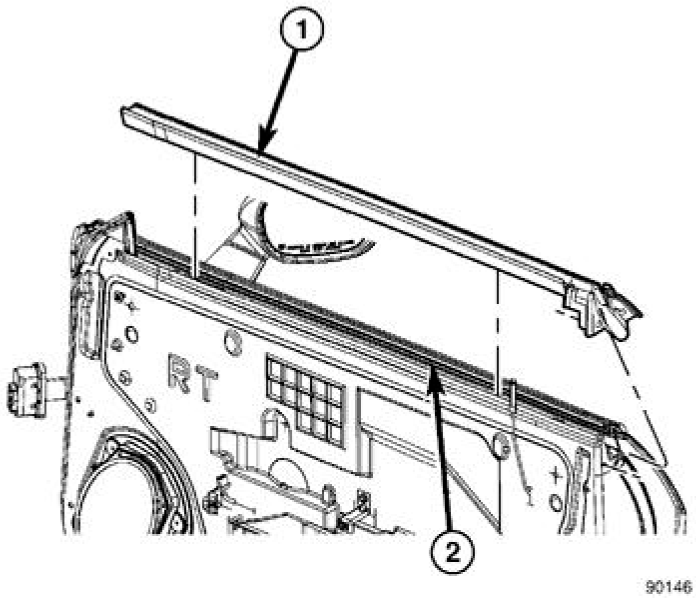
3. Connect the wire harness connectors (6).
4. Install the door lock cylinder link (1) and snap the plastic clip (2) in place, if equipped.
5. Install the exterior handle release cable (5), and snap the plastic clip (3) in place.
6. Apply firm and even pressure around the perimeter of the watershield to seal the adhesive bead to the door.
7. Using a wrench inserted through the access slot on the outer latch face of the door, loosen the hex socket adjusting screw.
8. Cycle the exterior door handle through its full travel two or three times.
9. Tighten the adjusting screw securely.
10. Install the door trim panel. Refer to **PANEL, DOOR TRIM, INSTALLATION**.

MOLDING

REMOVAL

REMOVAL

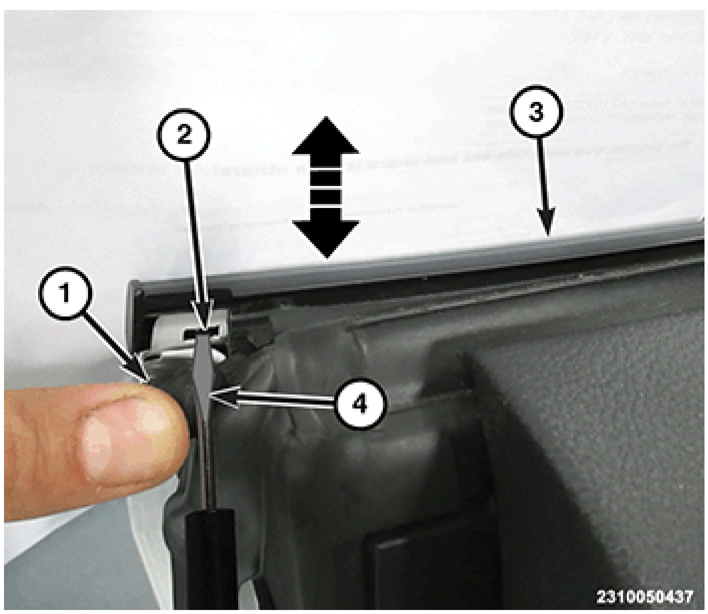
MOLDING-INNER BELT



[Fig. 82: Removing/Installing Inner Belt Molding - Door]
Courtesy of CHRYSLER GROUP, LLC

1. Remove the door trim panel. Refer to **PANEL, DOOR TRIM, REMOVAL**.
2. Starting at the front of the inner belt molding, carefully pry up on the molding and work towards the rear of the door to remove.

MOLDING-OUTER BELT



[Fig. 83: Door Seal, Tab, Outer Belt Molding & Flat Bladed Tool]
Courtesy of CHRYSLER GROUP, LLC

1. At the rear of the door, hold the door seal (1) back.
2. Using a small flat bladed tool (4), press the tab (2) and carefully pry up on the outer belt molding (3). Work towards the front of the door and remove.

INSTALLATION

INSTALLATION

MOLDING-INNER BELT

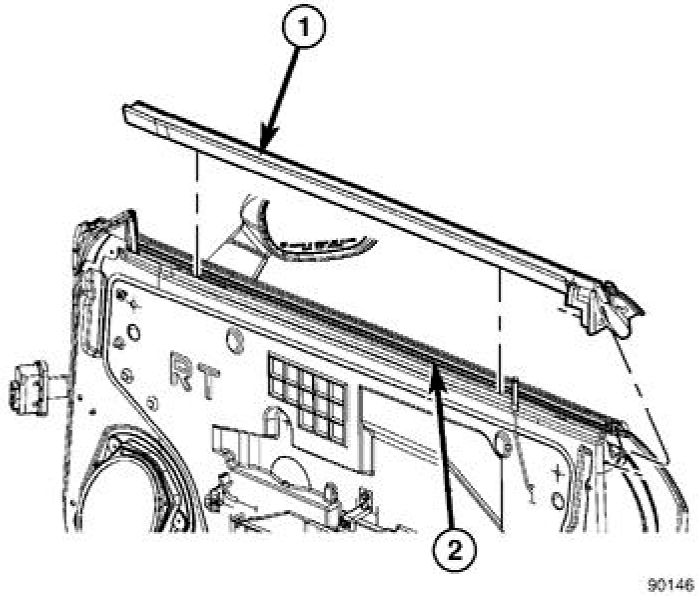


Fig. 84: Removing/Installing Inner Belt Molding - Door
Courtesy of CHRYSLER GROUP, LLC

1. Starting from the rear of the door, install the inner belt molding (1) to the door (2).
2. Continue to firmly press down working towards the front of the door.
3. Install the door trim panel. Refer to **PANEL, DOOR TRIM, INSTALLATION**.

MOLDING-OUTER BELT

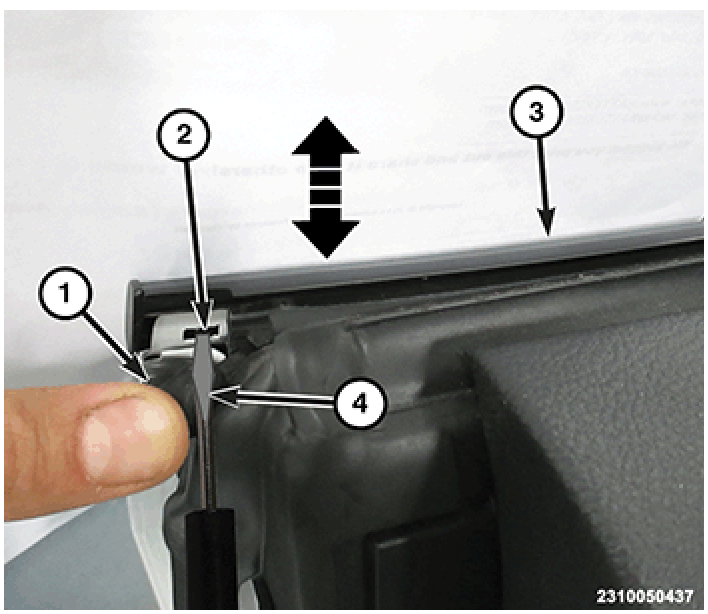


Fig. 85: Door Seal, Tab, Outer Belt Molding & Flat Bladed Tool
Courtesy of CHRYSLER GROUP, LLC

1. Starting from the front of the door, install the outer belt molding (3) to the door by firmly pressing down.

2. Make sure the tab (2) at the rear of the outer belt molding is fully engaged.

PANEL, DOOR TRIM

REMOVAL

REMOVAL

Fig. 86: Mat, Screw & Window Switch
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Using a trim stick or equivalent, remove and disconnect the window switch (3).
3. Lift the mat (1) and remove the screw (2).

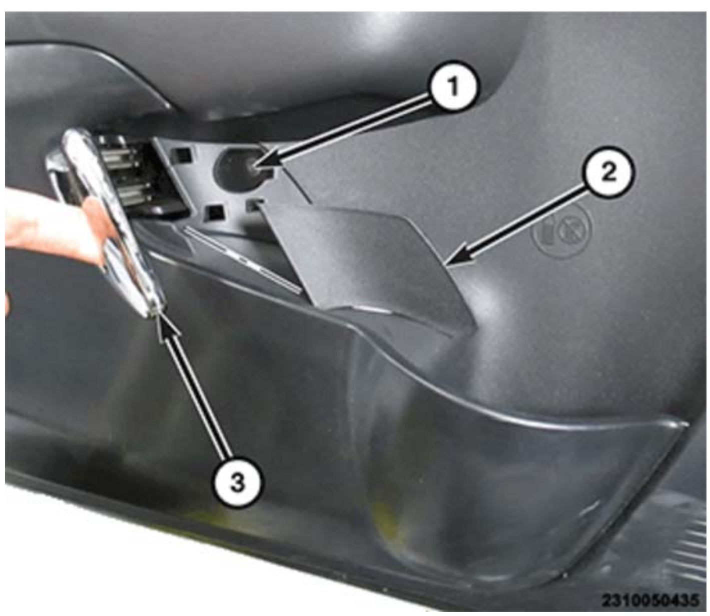


Fig. 87: Cover & Screw
Courtesy of CHRYSLER GROUP, LLC

4. Using a trim stick or equivalent, remove the cover (2) then the screw (1).

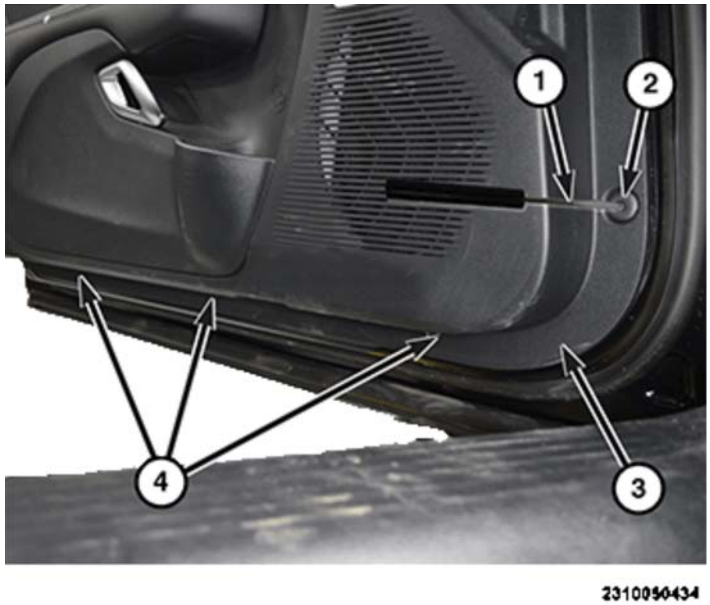


Fig. 88: Tool, Fastener, Door Trim Panel & Screws
Courtesy of CHRYSLER GROUP, LLC

5. Remove the three screws (4) at the bottom of the door trim panel (3).
6. Using a suitable tool (1), push the center of the fastener (2) then remove. Refer to **DOOR - FRONT, STANDARD PROCEDURE**.
7. Using a trim stick or equivalent, release the door trim panel starting at the lower edge and working around the perimeter to disengage the retainer clips. Position the door trim panel slightly away, do not remove.
8. Disconnect the wire harness connectors.

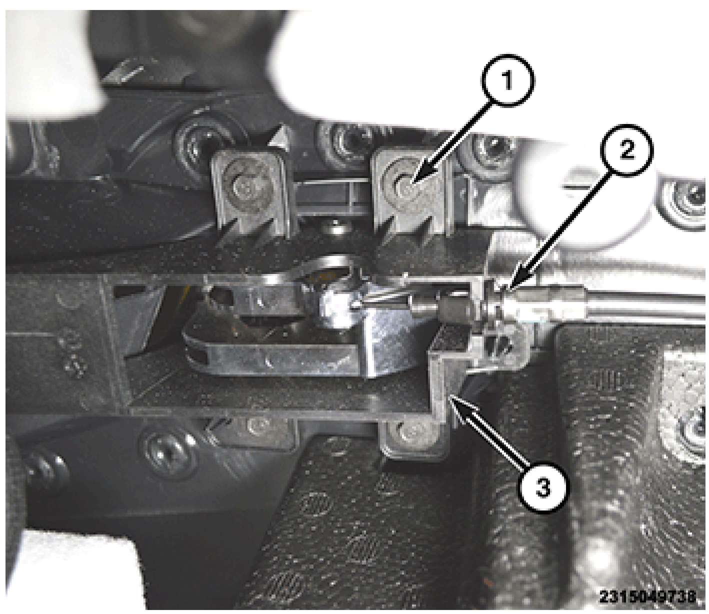
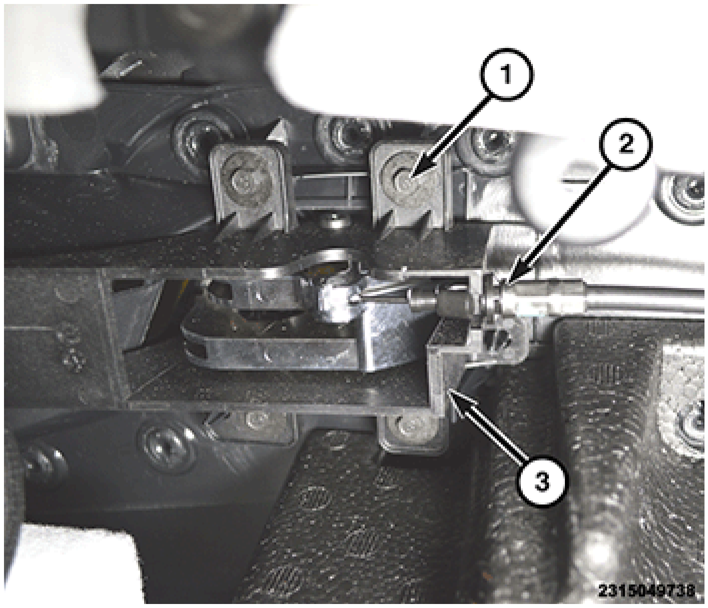


Fig. 89: Bolts, Door Latch Release Cable & Interior Door Handle
Courtesy of CHRYSLER GROUP, LLC

9. Remove the door latch release cable (2) from the interior door handle (3).

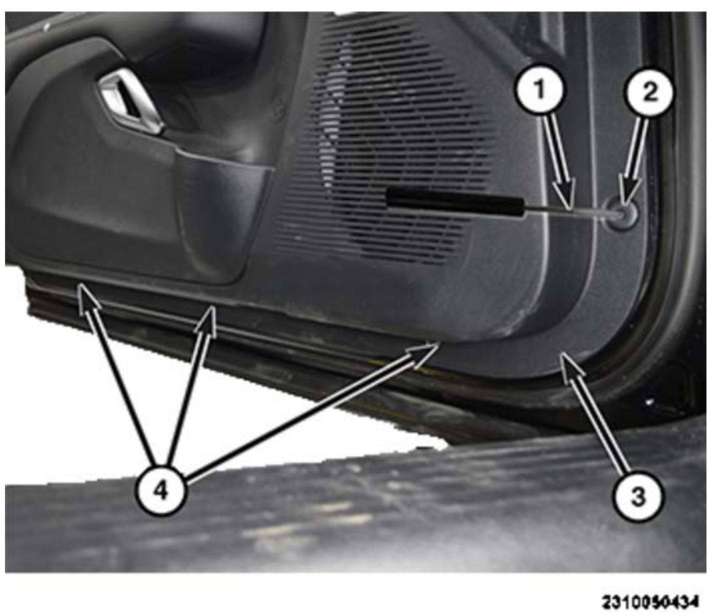
INSTALLATION

INSTALLATION



[Fig. 90: Bolts, Door Latch Release Cable & Interior Door Handle]
Courtesy of CHRYSLER GROUP, LLC

1. Position the door trim panel near the door and install the door latch release cable (2) to the interior door handle (3).
2. Connect the wire harness connectors.
3. Feed the window switch harness through the cavity in the door trim panel.



[Fig. 91: Tool, Fastener, Door Trim Panel & Screws]
Courtesy of CHRYSLER GROUP, LLC

4. Install the lock knob through the door trim panel (3). Align the door trim panel retaining clips to the door and hand tap around the perimeter to engage the retaining clips.

5. Install the push fastener (2). Refer to **DOOR - FRONT, STANDARD PROCEDURE**.
6. Install the screws (4) at the bottom of the door trim panel.

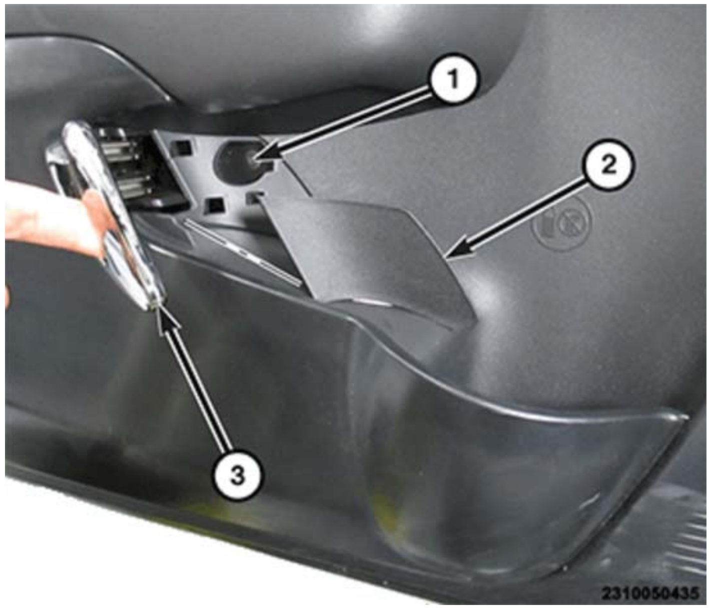


Fig. 92: Cover & Screw
Courtesy of CHRYSLER GROUP, LLC

7. Install the screw (1) and tighten securely.
8. Install the cover (2).

Fig. 93: Mat, Screw & Window Switch
Courtesy of CHRYSLER GROUP, LLC

9. Connect the window switch connector and install the window switch (3) into the door trim panel.
10. Install the screw (2) and tighten securely. Set the mat (1) in place.
11. Connect the negative battery cable.

12. Perform the door module learn procedure. Refer to **STANDARD PROCEDURE** .

REGULATOR, WINDOW

REMOVAL

REMOVAL

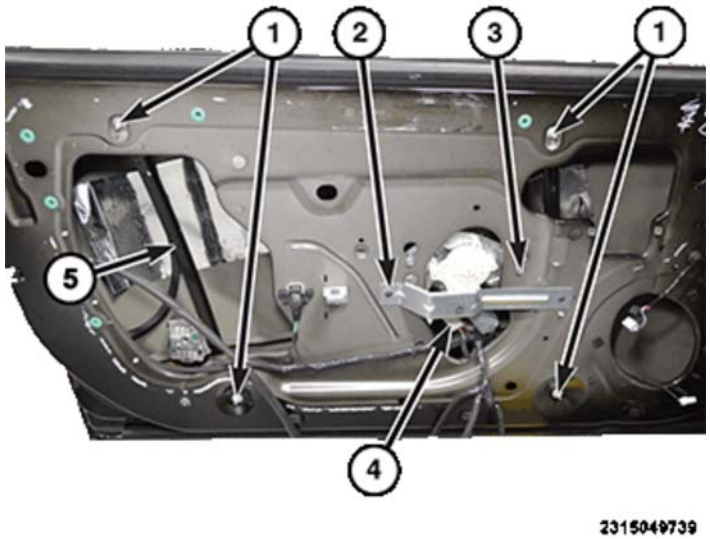


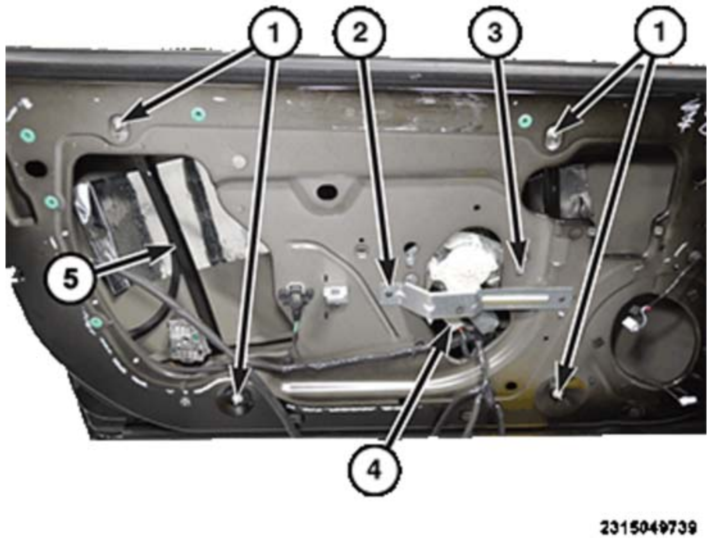
Fig. 94: Window Regulator Components
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It is not necessary to completely remove the power window motor bolts (3).**

1. Remove the door glass. Refer to **GLASS, DOOR, REMOVAL**.
2. Remove the two screws (2) and the door panel bracket.
3. Disconnect the power window motor connector (4).
4. Loosen the three power window motor bolts (3).
5. Remove the window regulator nuts (1).
6. Carefully remove the window regulator (5) through the large access hole at the rear of the door.

INSTALLATION

INSTALLATION



[Fig. 95: Window Regulator Components]

Courtesy of CHRYSLER GROUP, LLC

1. Install the window regulator (5) into the door through the large access hole at the rear of the door.
2. Align the power window motor into the slots on the door and tighten the power window motor bolts (3) to the proper specification. Refer to **SPECIFICATIONS**.
3. Install the window regulator nuts (1) and tighten to the proper specification. Refer to **SPECIFICATIONS**.
4. Position the door panel bracket and install the two screws (2). Tighten the screws securely.
5. Connect the power window motor connector (4).
6. Install the door glass. Refer to **GLASS, DOOR, INSTALLATION**.

STRIKER, DOOR LATCH

REMOVAL

REMOVAL

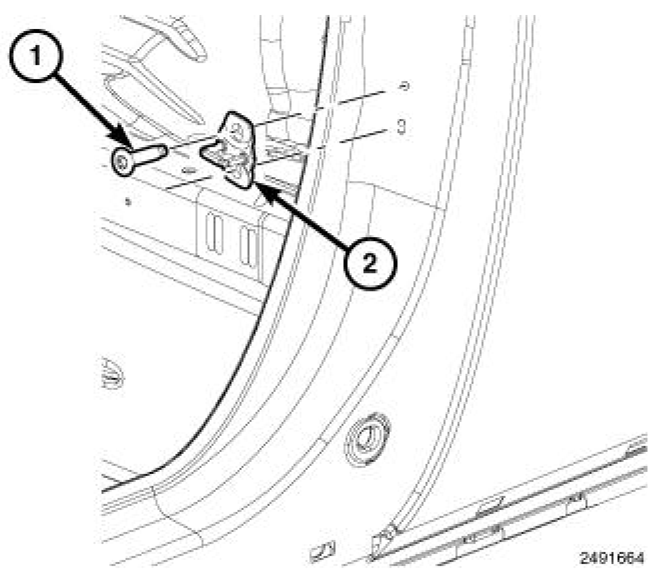


Fig. 96: Door Latch Striker
Courtesy of CHRYSLER GROUP, LLC

1. Using a grease pencil or equivalent, mark the position of the door latch striker (2) on the B-pillar to aid installation.
2. Remove the bolts (1) and the door latch striker.

INSTALLATION

INSTALLATION

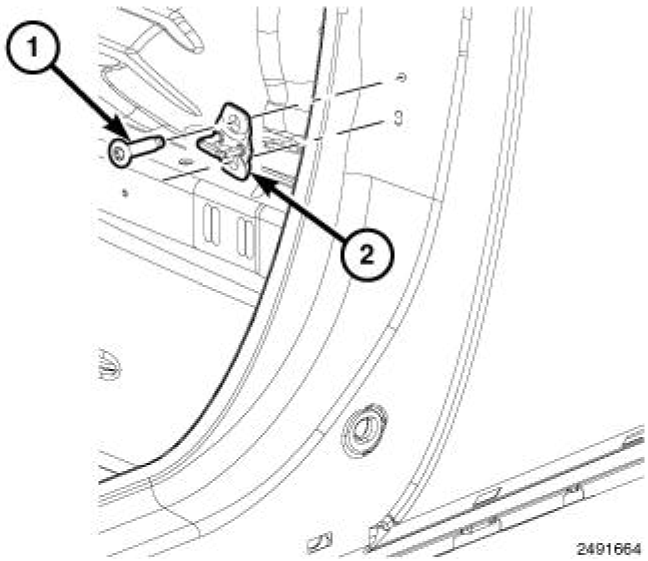


Fig. 97: Door Latch Striker
Courtesy of CHRYSLER GROUP, LLC

1. Position the door latch striker (2) and loosely install the bolts (1).
2. Align the door latch striker with the reference mark made previously and tighten the door latch striker bolts to the proper specification. Refer to SPECIFICATIONS.
3. Verify door fit and operation. Adjust the door latch striker if necessary. Refer to GAP AND FLUSH, SPECIFICATIONS.

WATERSHIELD

REMOVAL

REMOVAL

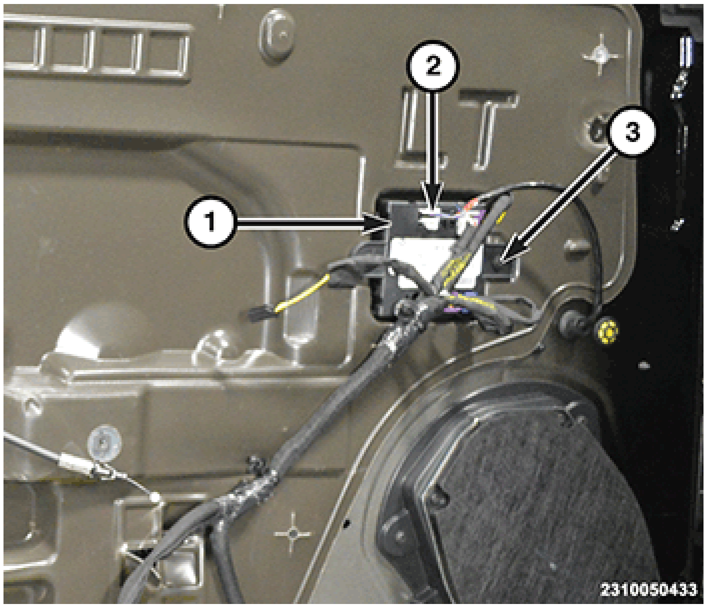


Fig. 98: Door Control Module, Wire Harness Connectors & Screw
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not allow the watershield or adhesive to become contaminated with dirt or other foreign substances.**

Do not damage the watershield during removal and installation.

If the watershield becomes contaminated or damaged, replace the watershield.

1. Remove the door trim panel. Refer to **PANEL, DOOR TRIM, REMOVAL**.
2. Disconnect the wire harness connectors (2). Remove the screws (3) and the door control module (1).

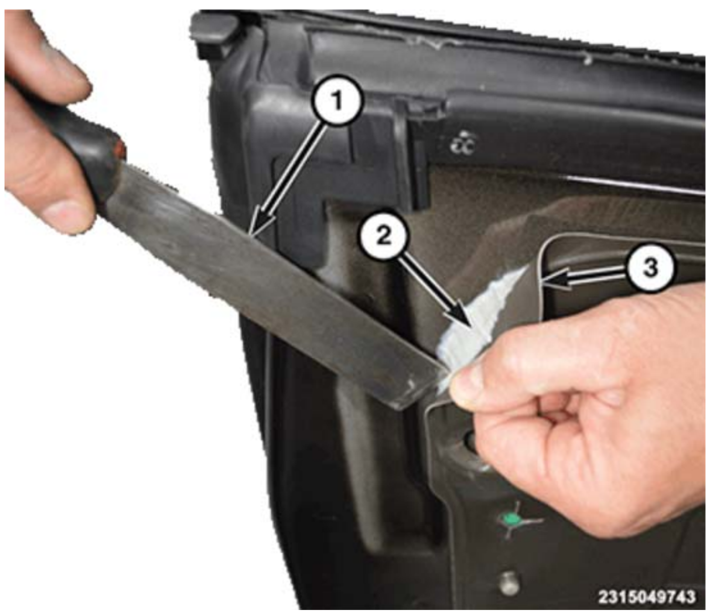


Fig. 99: Flat Bladed Tool, Adhesive Bead & Watershield
Courtesy of CHRYSLER GROUP, LLC

3. Pull the watershield (3) back and release the adhesive bead (2) using a flat bladed tool (1).

4. Carefully work around the perimeter of the watershield until fully removed.

INSTALLATION

INSTALLATION

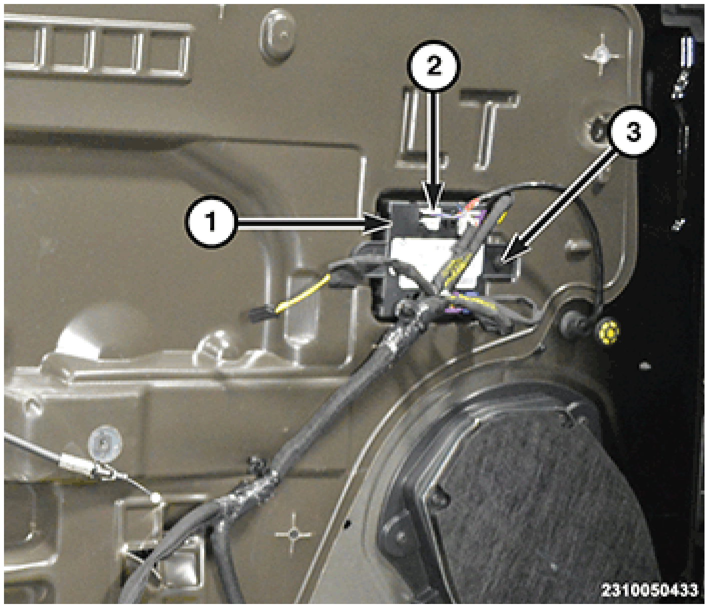


Fig. 100: Door Control Module, Wire Harness Connectors & Screw
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not allow the watershield or adhesive to become contaminated with dirt or other foreign substances.

Do not damage the watershield during removal and installation.

If the watershield becomes contaminated or damaged, replace the watershield.

1. Align the watershield to the door.
2. Apply firm and even pressure around the perimeter of the watershield to seal the adhesive bead to the door.
3. Position the door control module (1) and install the screws (3). Tighten the screws securely.
4. Connect the wire harness connectors (2).
5. Install the door trim panel. Refer to PANEL, DOOR TRIM, INSTALLATION.

EXTERIOR

CLADDING, BODY

REMOVAL

REMOVAL

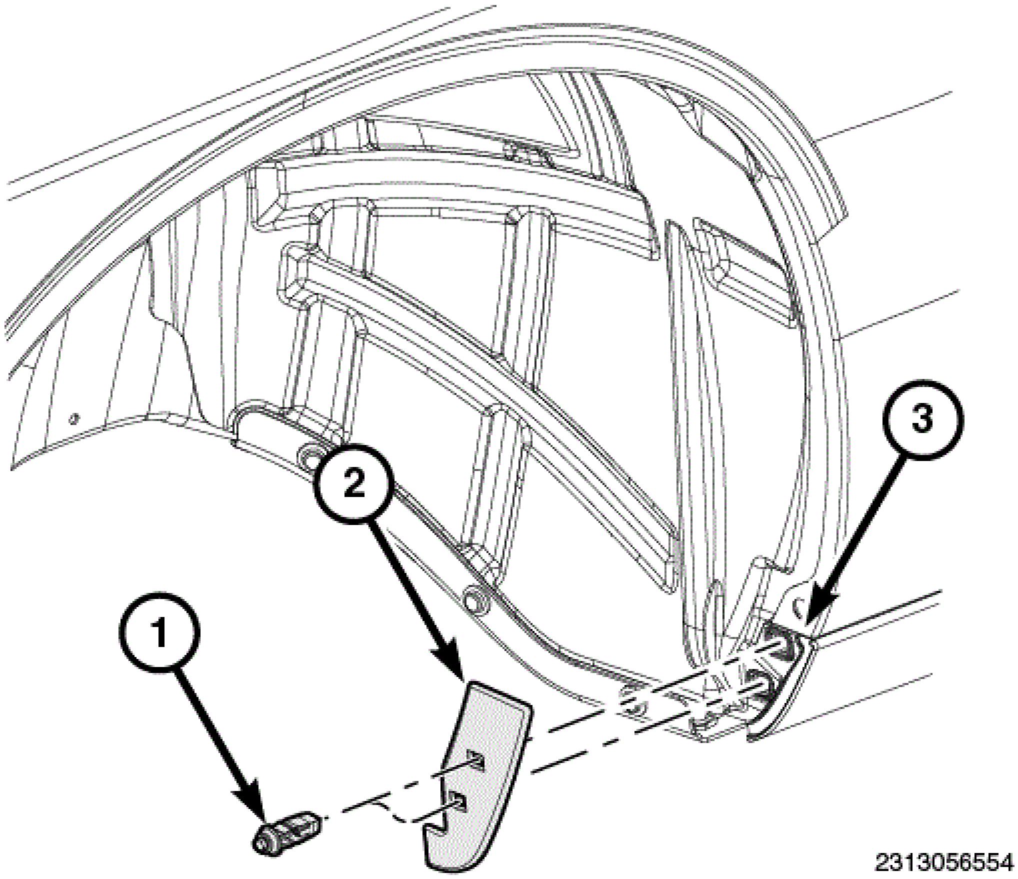
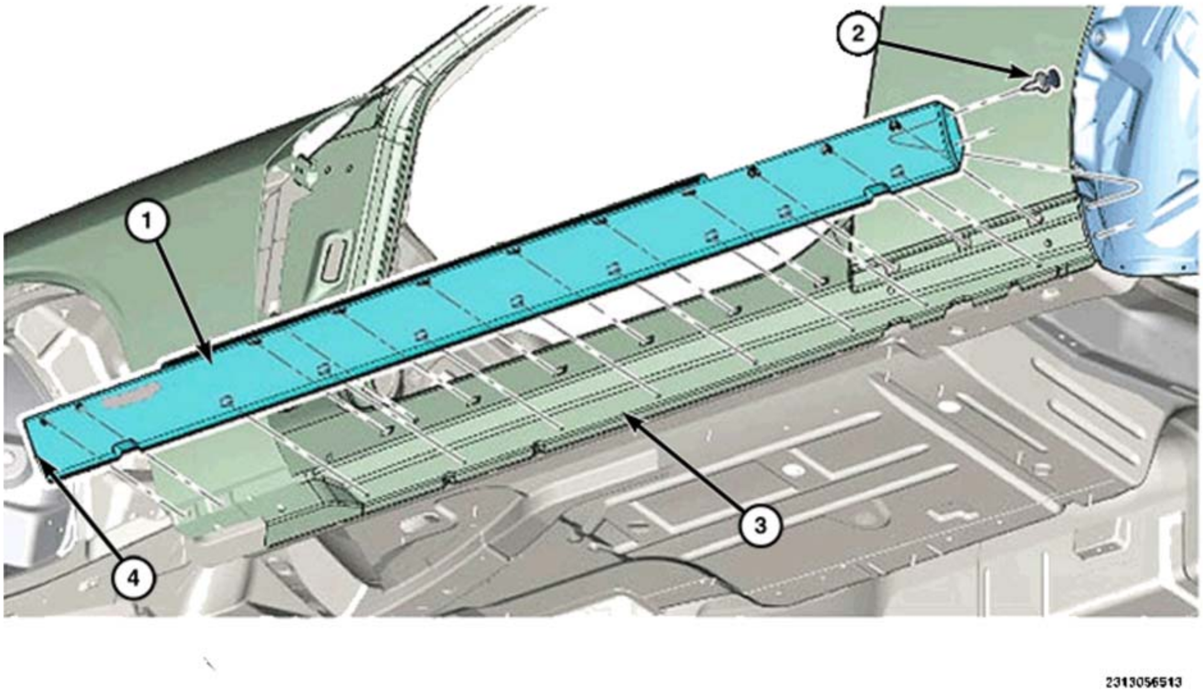


Fig. 101: Specialty Nut, Front Spat & Sill Cladding
Courtesy of CHRYSLER GROUP, LLC

1. As a guide for installation, apply a length of masking tape on the body side, parallel to the top edge of the body side cladding.
2. Raise and support the vehicle Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the wheels from the side of the vehicle being serviced Refer to **REMOVAL** .
4. Remove the two specialty nuts (1) and remove the front spats (2).



[**Fig. 102: Sill Cladding, Fastener, Body & Front Foam**]
Courtesy of CHRYSLER GROUP, LLC

5. Remove the fasteners (2) from the rear wheelhouse.
6. Pull sill cladding (1) from one end and beneath until all the cross car pins are disengaged and front foam (4) is detached form the body (3).
7. Remove the sill cladding (1) and remove any clips that might be trapped in the holes to avoid falling inside the sheet metal and creating any noises.

INSTALLATION

INSTALLATION

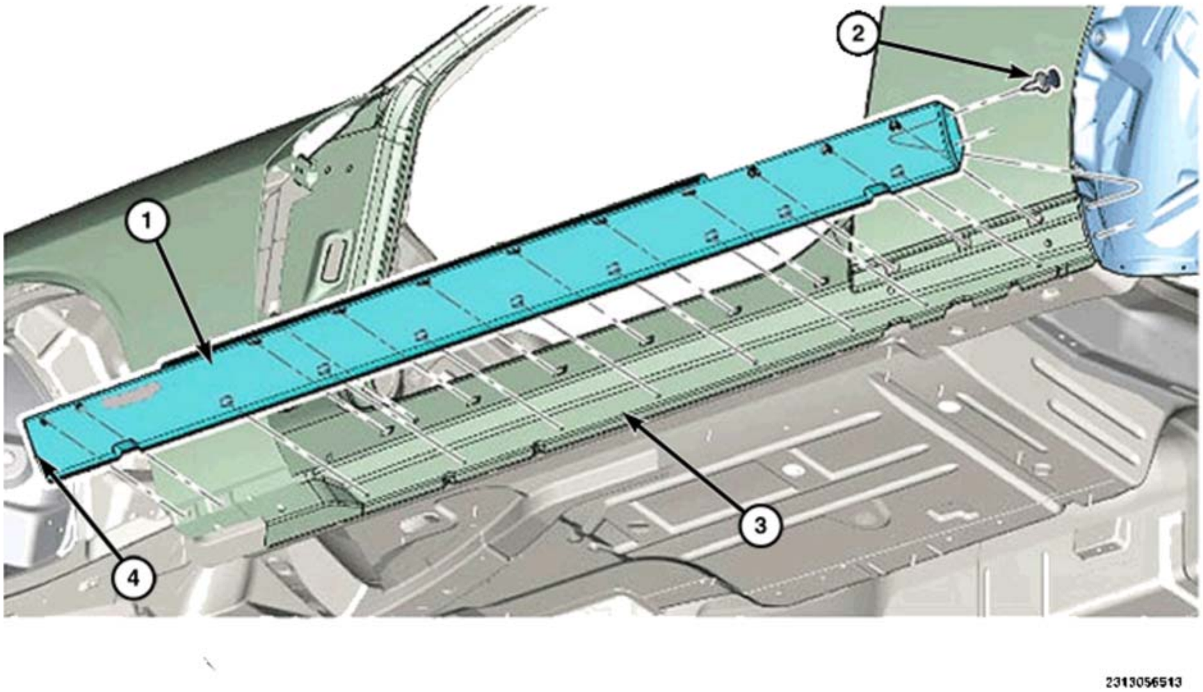


Fig. 103: Sill Cladding, Fastener, Body & Front Foam
Courtesy of CHRYSLER GROUP, LLC

1. After the sill cladding has been removed, **remove any tape residue off the sheet metal by using 3M General Purpose Adhesive Cleaner #08984 or equivalent.**
2. Wipe the attachment area (4) with a clean, lint-free cloth, moistened with a 50% solution of water and isopropylic alcohol
3. Wait 30 seconds for the alcohol to flash off.
4. Obtain sill cladding and verify that the part is not damaged and verify that it has the correct number of cross car clips and replace as necessary.

NOTE: **At the time of installation of the sill cladding, the body surface and cladding temperature shall be a minimum of 21 degrees Celsius (70 degrees Fahrenheit) and a maximum of 35 degrees Celsius (95 degrees Fahrenheit).**

5. Removing the protective tape from the foam block located at the front of the sill cladding (4).
6. Position cladding to body side aperture (3) and push cladding onto vehicle. Make sure clips are aligned with attaching holes in the body and install into holes. Starting from the center holes and working outward.
7. Apply pressure to the base of the cladding where the w-clips fasteners are located and seat fully.
8. Align cladding with rear wheelhouse and install the push pin fasteners (2).

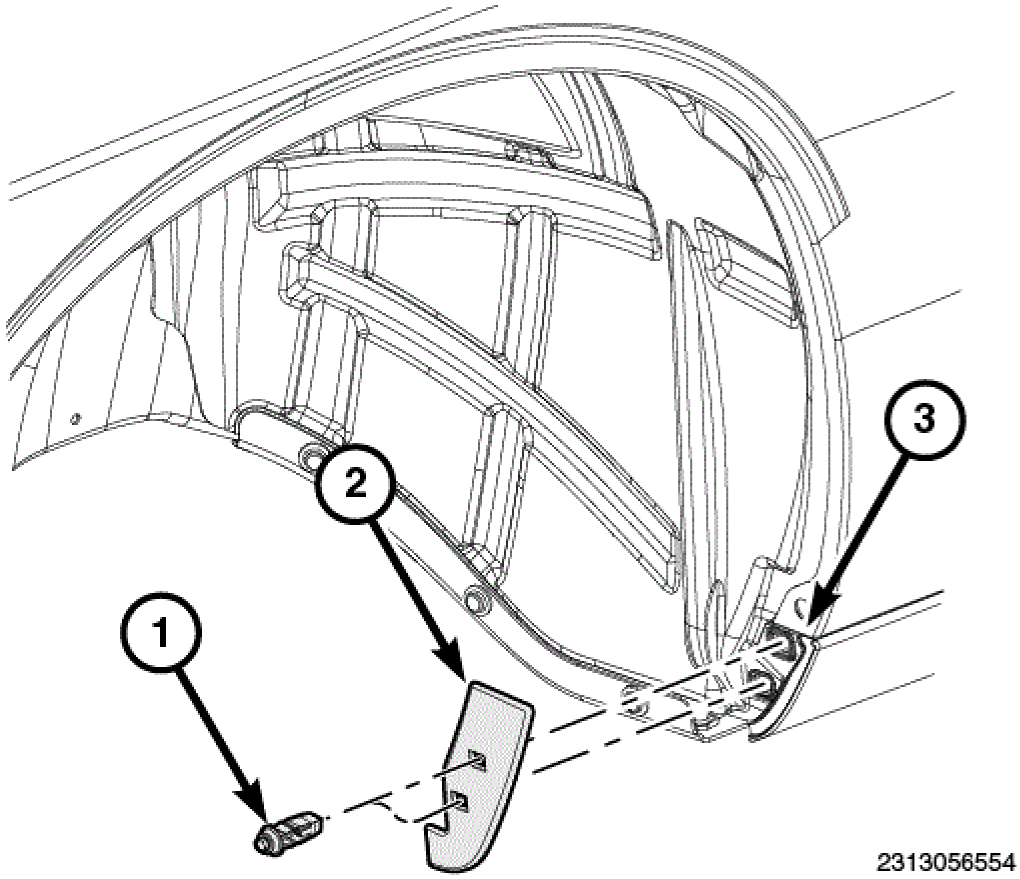


Fig. 104: Specialty Nut, Front Spat & Sill Cladding
Courtesy of CHRYSLER GROUP, LLC

9. Install the spats (2) to the front of the sill cladding (3) and install the two fasteners (1).
10. Install the wheels. Refer to **INSTALLATION** .
11. Lower the vehicle.

COVER, COWL PANEL

REMOVAL

REMOVAL

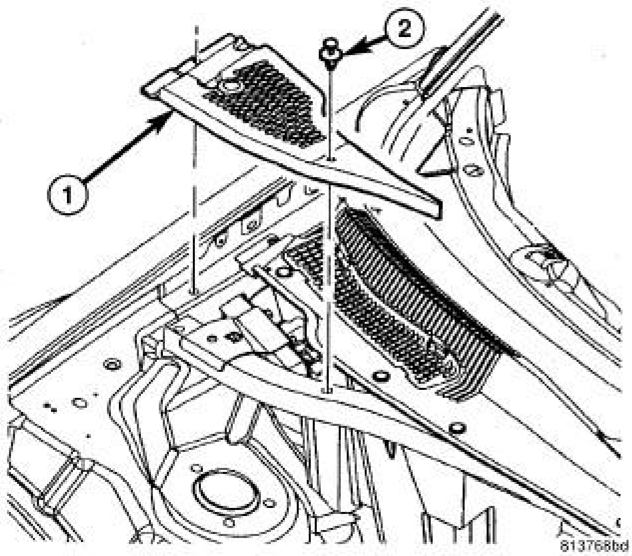


Fig. 105: Cowl Panel & Push Pins
Courtesy of CHRYSLER GROUP, LLC

1. Remove the windshield wiper arms. Refer to **ARM, WIPER, REMOVAL** .
2. Remove the push fastener and the right side seal.
3. Remove the two push fasteners (2) and the cowl top panel (1).

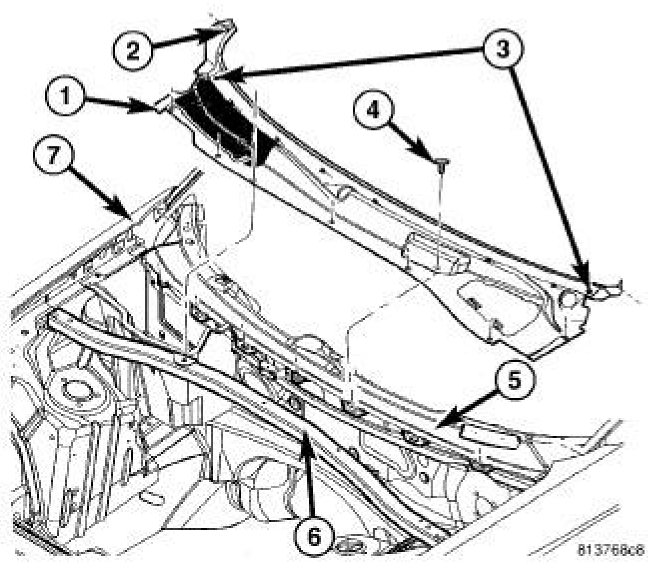
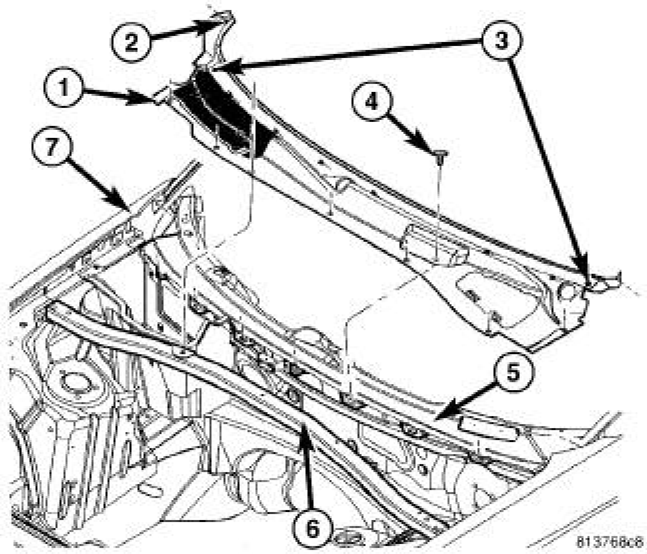


Fig. 106: Removing/Installing Cowl Panel
Courtesy of CHRYSLER GROUP, LLC

4. Disengage the two 1/4-turn fasteners (3) that secure the cowl top panel to the dash panel (5).
5. Remove the eight push fasteners.
6. Release the retaining clips and remove the cowl top panel.

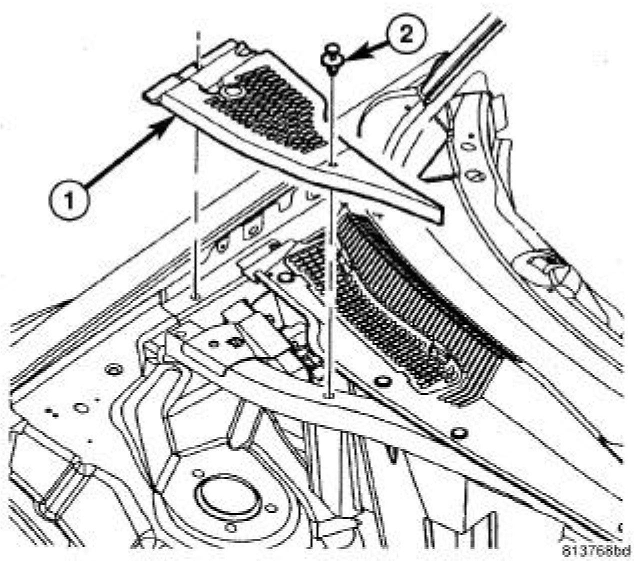
INSTALLATION

INSTALLATION



[Fig. 107: Removing/Installing Cowl Panel](#)
Courtesy of CHRYSLER GROUP, LLC

1. Position the cowl cover panel (1) and engage the retainer clips.
2. Fasten the 1/4-turn fasteners (3).
3. Install the eight push fasteners.
4. Install the windshield wiper arms. Refer to **ARM, WIPER, INSTALLATION** .



[Fig. 108: Cowl Panel & Push Pins](#)
Courtesy of CHRYSLER GROUP, LLC

5. Position the cowl top panel (1) and install the push fasteners (2).
6. Install the right side seal and the push fastener.

CROSSMEMBER, HEADLAMP MOUNTING

REMOVAL

REMOVAL

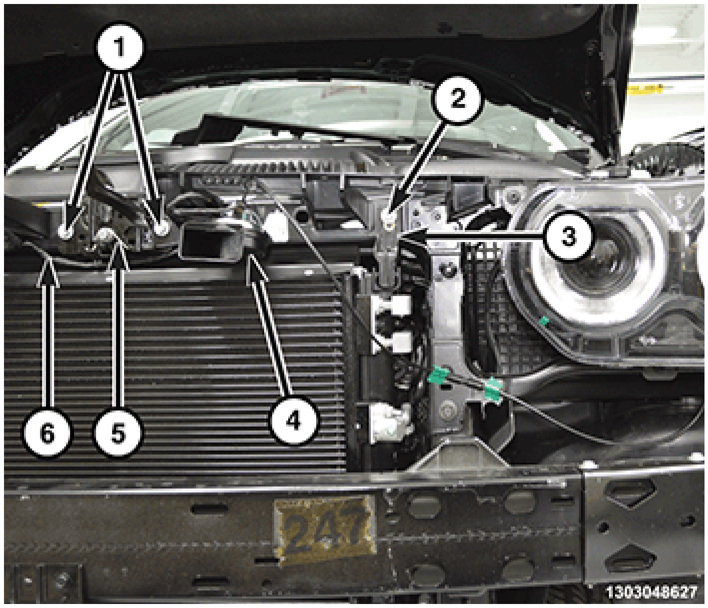
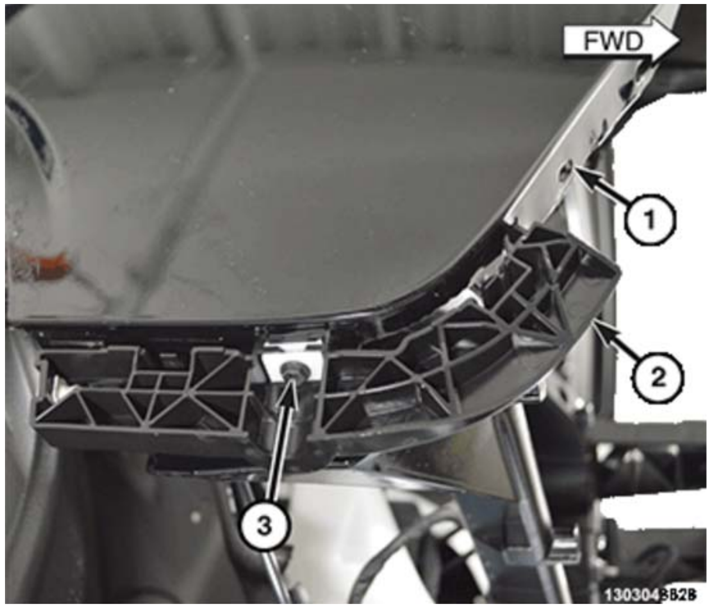


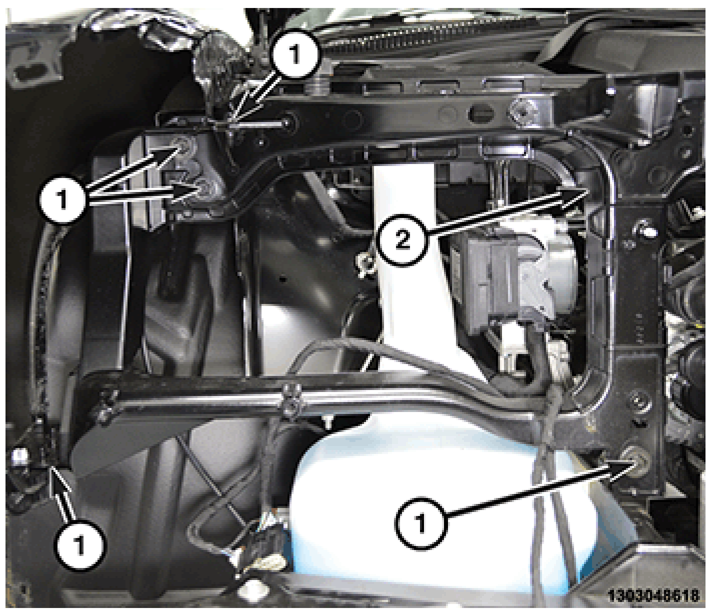
Fig. 109: Bolts, Upper Radiator Isolator, Horn, Hood Latch & Wire Harness
Courtesy of CHRYSLER GROUP, LLC

1. Remove the front fascia support. Refer to **SUPPORT, FRONT FASCIA, REMOVAL** .
2. Using a grease pencil or equivalent, mark the position of the hood latch (5) to aid installation.
3. Remove the bolts (1) and the hood latch. Unclip the hood release cable from the headlamp mounting crossmember and position aside.
4. Disconnect the wire harness connectors and remove the horns (4).
5. Remove the bolts (2) and upper radiator isolators (3).
6. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL, 3.6L** , **BODY, AIR CLEANER, REMOVAL, 5.7L** , **BODY, AIR CLEANER, REMOVAL, 6.2L** or **BODY, AIR CLEANER, REMOVAL, 6.4L** .
7. Unclip the wire harness (6) from the headlamp mounting crossmember.
8. Unclip the brake lines from the backside of the headlamp mounting crossmember.
9. Remove the headlamps. Refer to **UNIT, FRONT LAMP, REMOVAL** .



[Fig. 110: Fender, Fascia Support Bracket & Screw](#)
Courtesy of CHRYSLER GROUP, LLC

10. At the bottom of each fender (1) remove the screw (3) and the fascia support bracket (2).



[Fig. 111: Bolts & Headlamp Mounting Crossmember](#)
Courtesy of CHRYSLER GROUP, LLC

11. Using a grease pencil, mark the position of the headlamp mounting crossmember (2) to the other body components prior to removal aid in installation.
12. Remove the bolts (1) on both side of the headlamp mounting crossmember and carefully remove it from the vehicle.

INSTALLATION

INSTALLATION

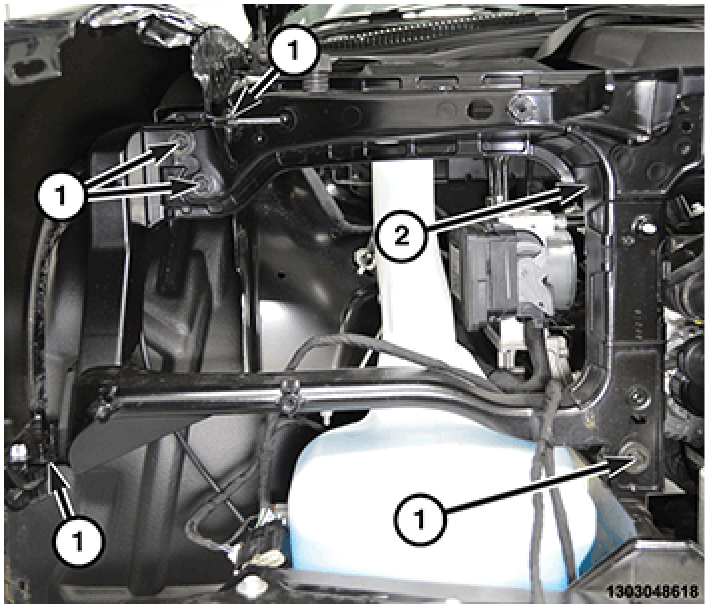


Fig. 112: Bolts & Headlamp Mounting Crossmember
Courtesy of CHRYSLER GROUP, LLC

NOTE: The Vehicle Emission Control Information (VECI) label(s) must be in place for the life of the vehicle. When replacing the component to which the VECI label is adhered, a new VECI label must also be adhered to the new component.

1. Position the headlamp mounting crossmember (2) onto the vehicle and loosely install all the bolts (1) on both sides of vehicle.
2. Align the headlamp mounting crossmember using the marks previously made and tighten the headlamp mounting crossmember bolts to the proper specification. Refer to SPECIFICATIONS.

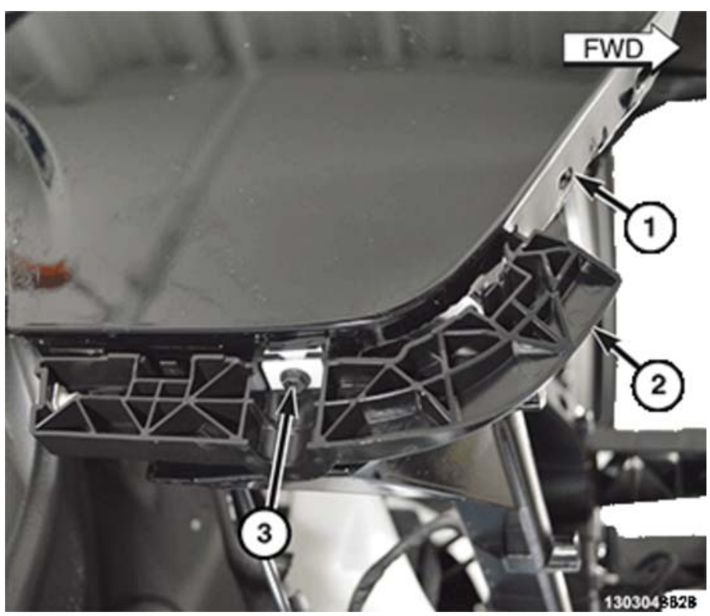


Fig. 113: Fender, Fascia Support Bracket & Screw
Courtesy of CHRYSLER GROUP, LLC

3. Install the fascia support bracket (2) at the bottom of each fender (1) and tighten the screw (3) securely.

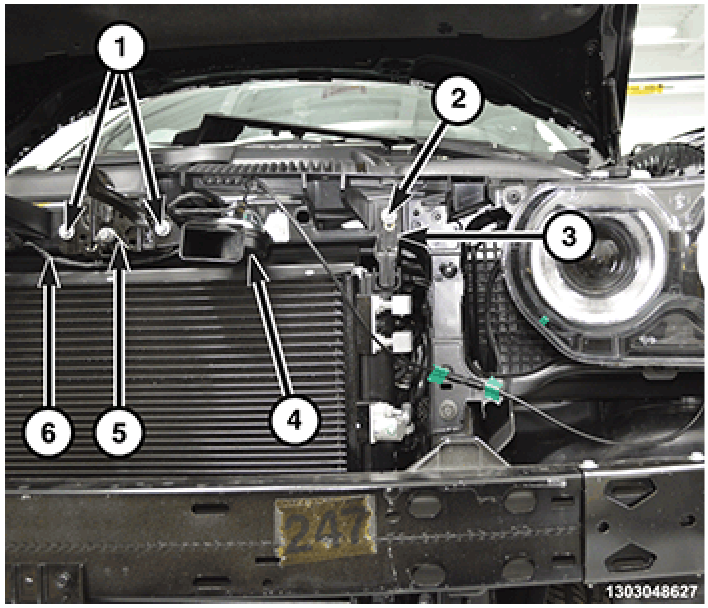


Fig. 114: Bolts, Upper Radiator Isolator, Horn, Hood Latch & Wire Harness
Courtesy of CHRYSLER GROUP, LLC

4. Route the wiring harness (6) and clip it to the headlamp mounting crossmember.
5. Clip the brake lines to the backside of the headlamp mounting crossmember.
6. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION, 3.6L** , **BODY, AIR CLEANER, INSTALLATION, 5.7L** , **BODY, AIR CLEANER, INSTALLATION, 6.2L** or **BODY, AIR CLEANER, INSTALLATION, 6.4L** .
7. Position the upper radiator isolators (3) and install the bolts (2). Tighten the bolts securely.
8. Install the horns and tighten the horn bolts to the proper specification. Refer to **SPECIFICATIONS**.
9. Connect the horn wire harness connectors.
10. Position the hood latch (5) and install the bolts (1).
11. Align the hood latch with the reference mark made previously and tighten the hood latch bolts to the proper specification. Refer to **SPECIFICATIONS**.
12. Install the headlamps. Refer to **UNIT, FRONT LAMP, INSTALLATION** .
13. Install the front fascia support. Refer to **SUPPORT, FRONT FASCIA, INSTALLATION** .
14. Verify proper hood latch operation and fit of hood. Adjust if necessary. Refer to **GAP AND FLUSH, SPECIFICATIONS**.

GRILLE

REMOVAL

REMOVAL

LOWER GRILLE

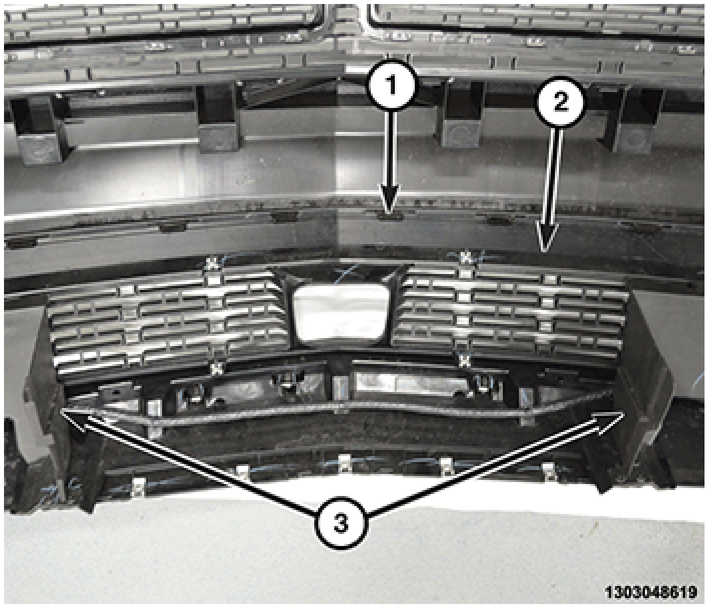


Fig. 115: Tabs, Lower Grille & Close Out Panels
Courtesy of CHRYSLER GROUP, LLC

1. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .
2. Remove the plastic rivets and the close out panels (3).
3. Using a flat bladed tool or equivalent, release the tabs (1) and remove the lower grille (2) from the front fascia.

RADIATOR GRILLE

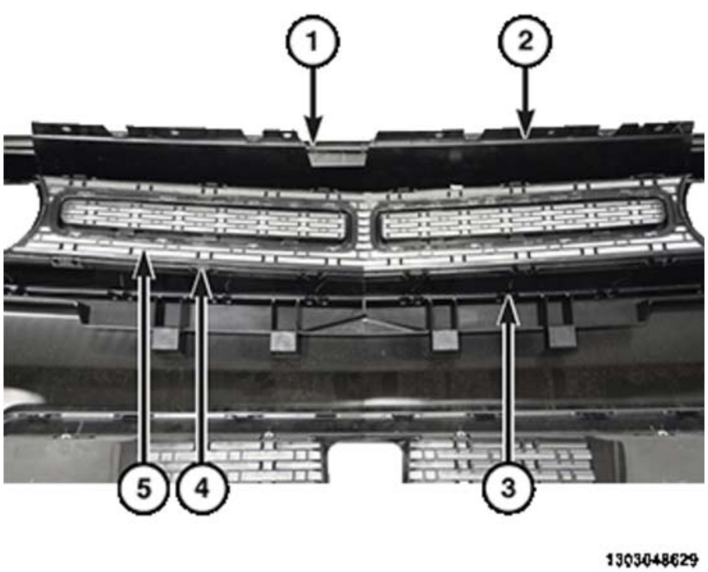


Fig. 116: Rivet, Radiator Grille & Tab
Courtesy of CHRYSLER GROUP, LLC

1. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .
2. Remove the necessary rivets (1) at the top of the radiator grille (2).
3. Using a flat bladed tool or equivalent, release the tabs (3) and remove the radiator grille from the front

fascia.

INSTALLATION

INSTALLATION

LOWER GRILLE

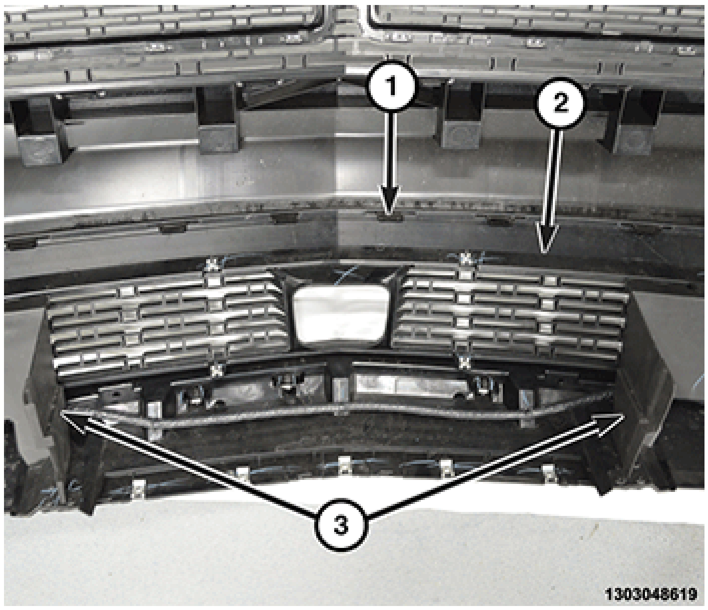


Fig. 117: Tabs, Lower Grille & Close Out Panels
Courtesy of CHRYSLER GROUP, LLC

1. Position the lower grille (2) into the front fascia and engage the tabs (1).
2. Position the close out panels (3) and install new plastic rivets.
3. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .

RADIATOR GRILLE

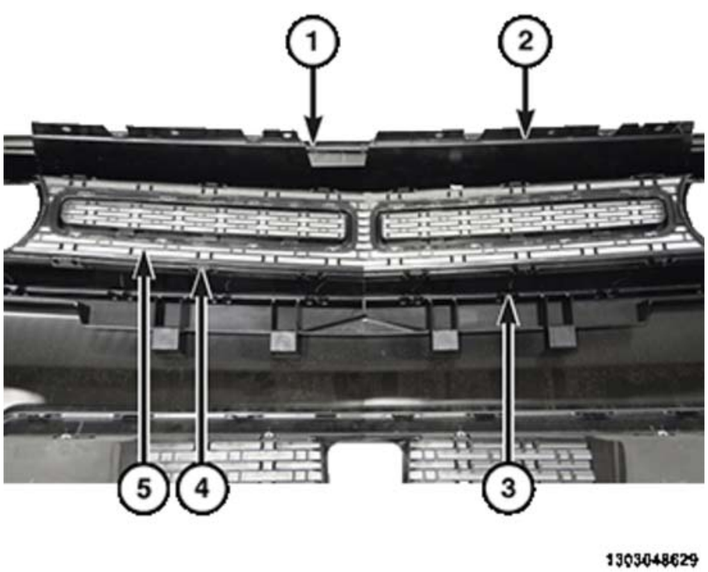


Fig. 118: Rivet, Radiator Grille & Tab

Courtesy of CHRYSLER GROUP, LLC

1. Position the radiator grille (2) onto the front fascia and engage the tabs (3).
2. Install new plastic rivets (1) at the top of the radiator grille.
3. Install the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .

MIRROR, OUTSIDE REARVIEW

REMOVAL

REMOVAL

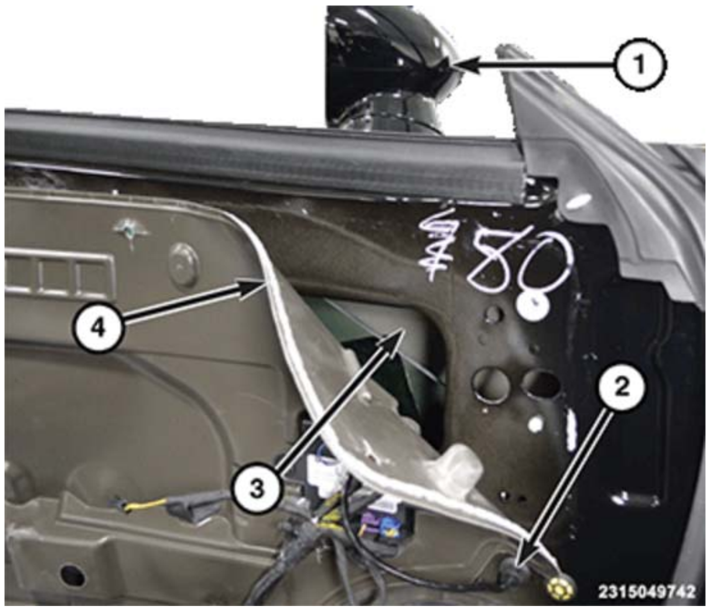


Fig. 119: Outside Rearview Mirror, Wire Harness Grommet, Opening & Watershield
Courtesy of CHRYSLER GROUP, LLC

1. Lower the door glass to the fully open position.
2. Remove the door trim panel. Refer to **PANEL, DOOR TRIM, REMOVAL**.
3. Pull the watershield (4) back and release the adhesive bead using a flat bladed tool. Release enough to access the outside rearview mirror nuts through the opening (3).
4. Disconnect the mirror wire harness connector and push the Wire Harness Grommet (2) through the door.
5. Remove the three nuts and the outside rearview mirror (1).

INSTALLATION

INSTALLATION

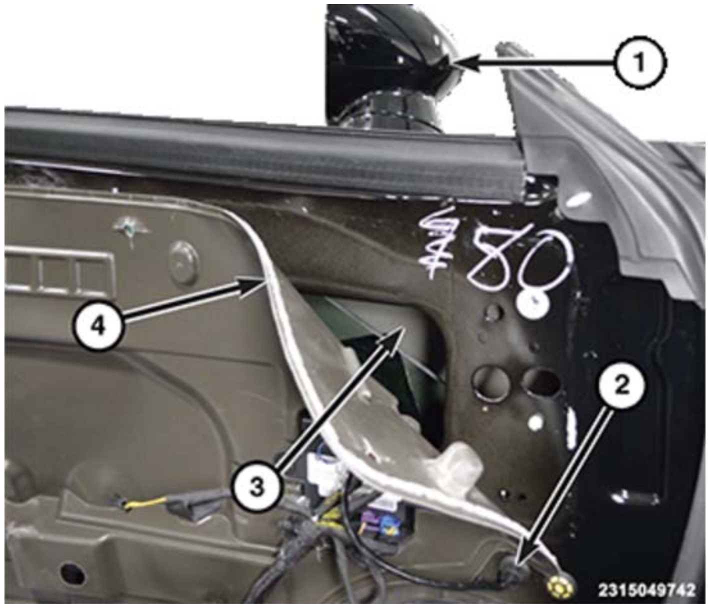


Fig. 120: Outside Rearview Mirror, Wire Harness Grommet, Opening & Watershield
Courtesy of CHRYSLER GROUP, LLC

1. Route the wire harness through the door and position the outside rearview mirror (1) onto the doors.
2. Install the three nuts and tighten securely.
3. Install the wire harness grommet (2) into the door and connect the mirror wire harness connector.
4. Apply firm and even pressure around the perimeter of the watershield (4) to seal the adhesive bead to the door.
5. Install the door trim panel. Refer to **PANEL, DOOR TRIM, INSTALLATION**.

MIRROR, OUTSIDE REARVIEW, GLASS

REMOVAL

REMOVAL

WARNING: Always wear eye and hand protection when servicing the mirror glass. Failure to observe these warnings may result in personal injury from broken glass.

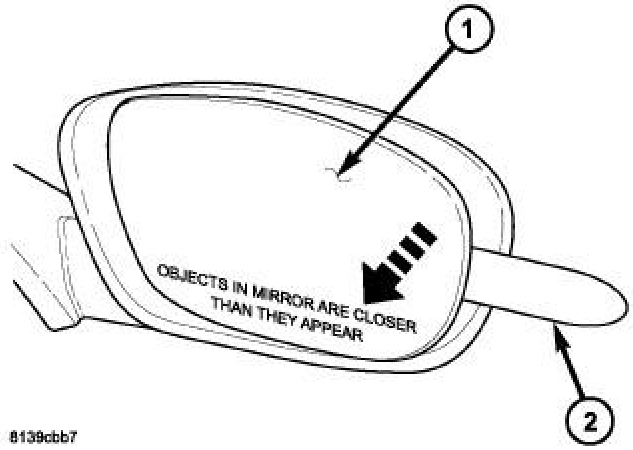


Fig. 121: Removing Glass-Outside Rearview Mirror
Courtesy of CHRYSLER GROUP, LLC

1. Position the mirror glass (1) so that it is facing in toward the vehicle as far as possible.
2. Disconnect and isolate the negative battery cable.
3. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent flat bladed tool (2), release the two outer mirror glass holder retaining clips from the mirror motor by inserting the trim stick between the mirror glass holder and the mirror motor.

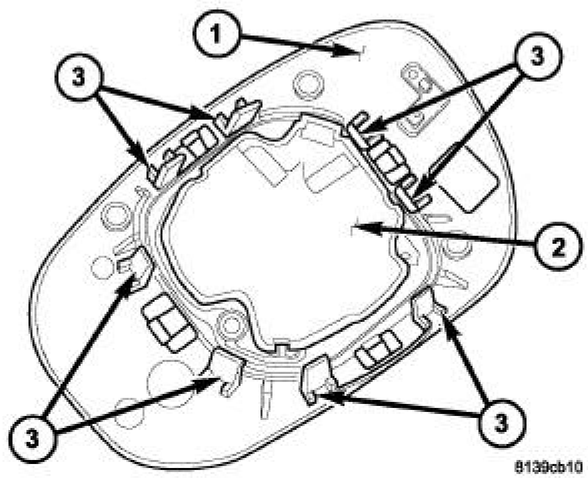


Fig. 122: Mirror Glass Holder, Retaining Clips & Motor
Courtesy of CHRYSLER GROUP, LLC

4. Carefully pull/pry the outside edges of the mirror glass holder (1) away from the mirror motor (2) to disengage the remaining six mirror glass retaining clips (3) from the mirror motor.
5. Separate the mirror glass holder from the mirror motor and disconnect the mirror wire harness from the heated glass electrical connector, if equipped.

INSTALLATION

INSTALLATION

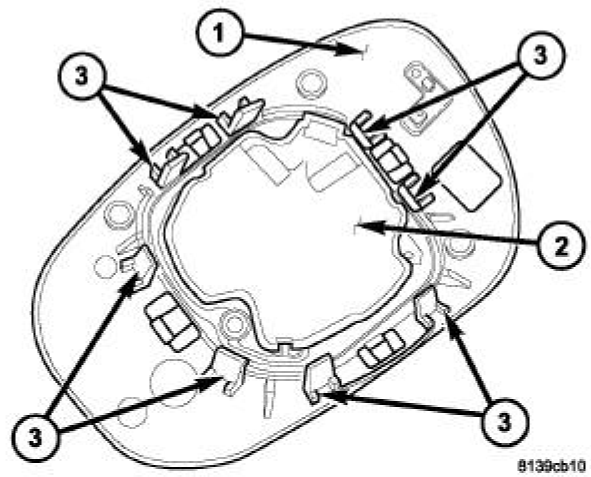


Fig. 123: Mirror Glass Holder, Retaining Clips & Motor
Courtesy of CHRYSLER GROUP, LLC

1. Connect the mirror wire harness to the heated glass electrical connector, if equipped.
2. Position the mirror glass holder (1) to the mirror assembly and align the eight mirror glass retaining clips (3) to the mirror motor (2).

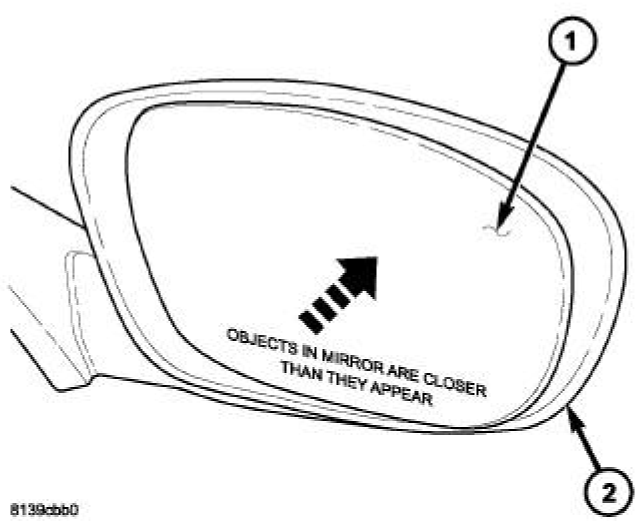


Fig. 124: Installing Outside Rearview Mirror Glass
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Pressure must be applied equally over the center portion of the mirror glass to fully engage the mirror glass retaining clips to the mirror motor.**

3. Using one hand, carefully push the mirror glass holder (1) onto the mirror motor, while at the same time supporting the mirror housing (2) from the backside with the other hand. Firmly push on the mirror glass holder until all eight mirror glass retaining clips are fully engaged.
4. Verify retention of the mirror glass holder by gently pulling outward on the glass.
5. Reconnect the negative battery cable.

NOTE: **For vehicles equipped with the optional Automatic Express Up power window feature, recalibration of this feature is required whenever power to the door module is disrupted.**

SHIELD, SPLASH, FRONT WHEELHOUSE

REMOVAL

REMOVAL

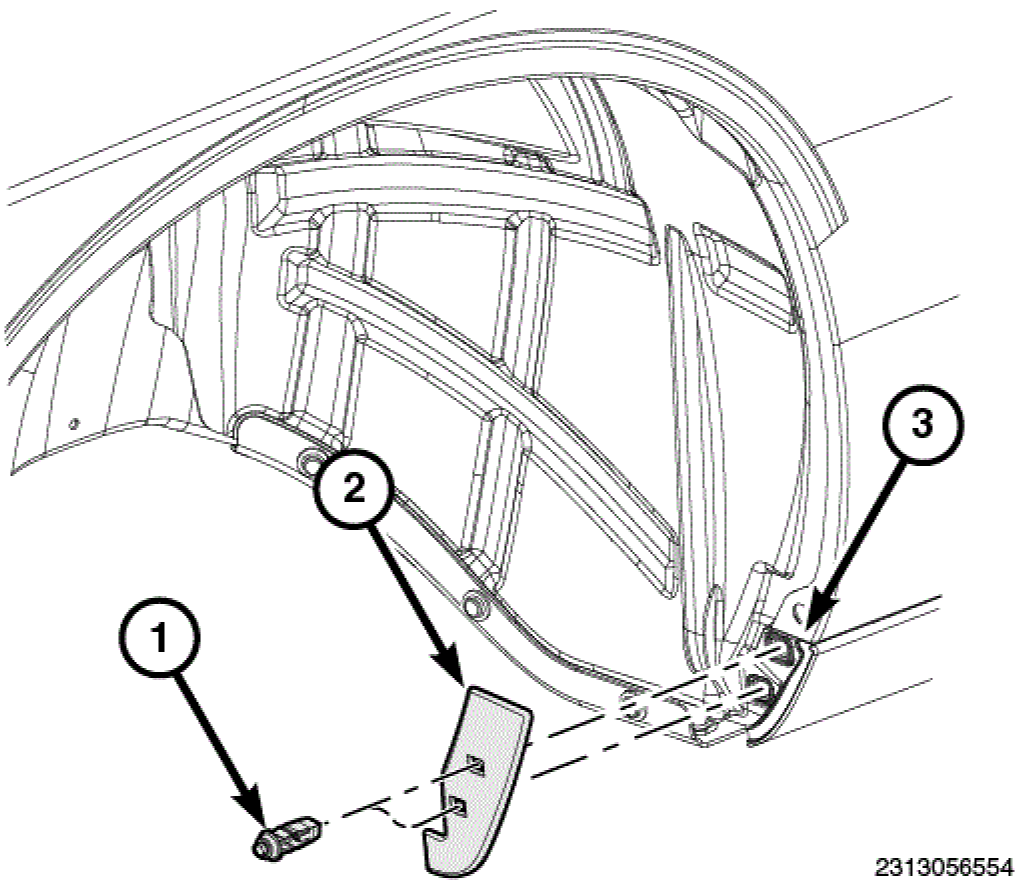
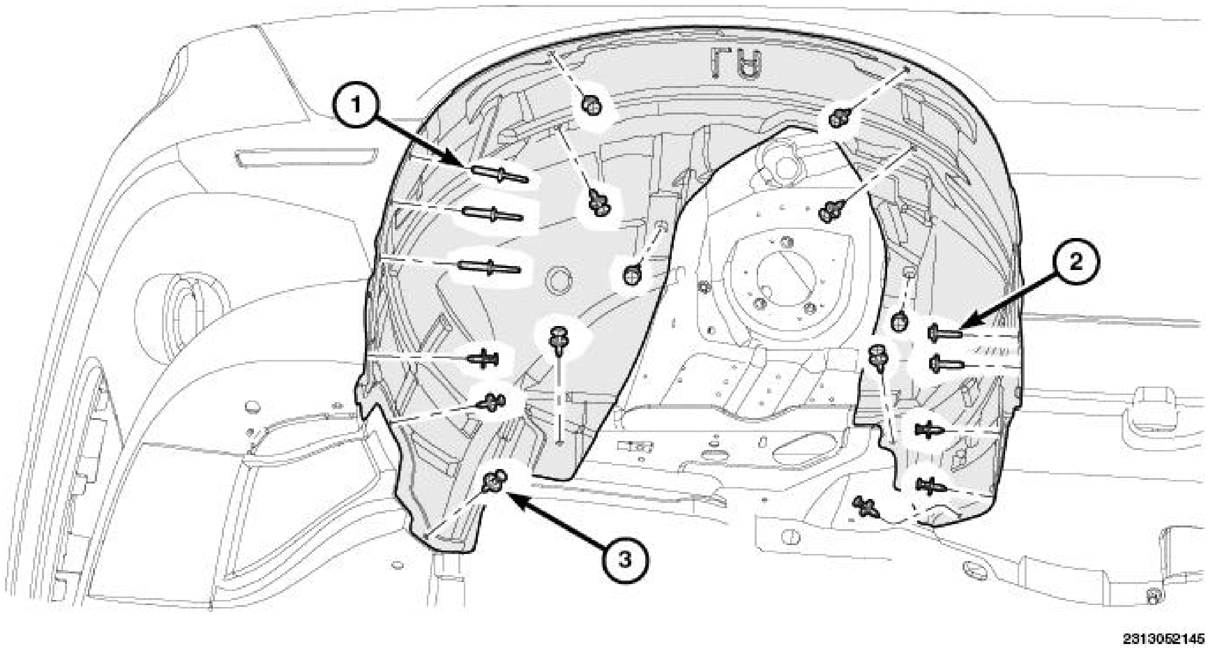


Fig. 125: Specialty Nut, Front Spat & Sill Cladding
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the wheel from the side of the vehicle being serviced. Refer to **REMOVAL** .
3. Remove the two specialty nuts (1) and remove the front spats (2).

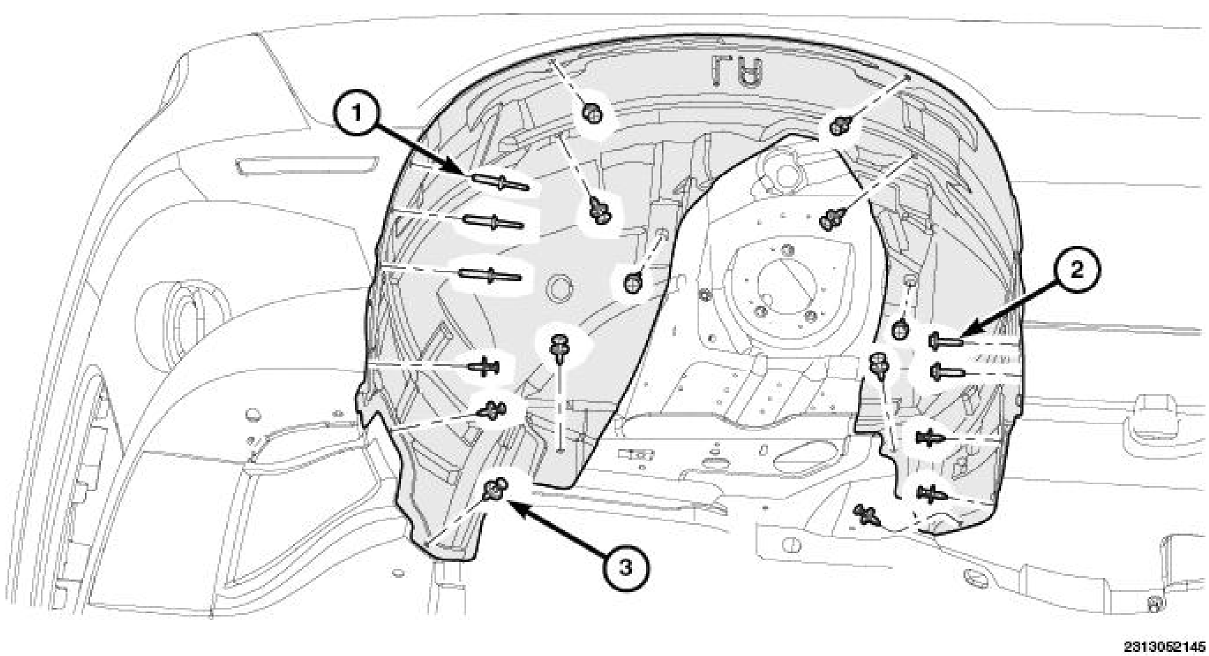


[Fig. 126: Front Wheelhouse Shield Fasteners]
Courtesy of CHRYSLER GROUP, LLC

4. Remove the plastic rivets (1) from the splash shield and discard.
5. Remove the 14 push-pins (3) that secure the front wheelhouse shield to the vehicle.
6. Remove the front wheelhouse shield from the vehicle.

INSTALLATION

INSTALLATION



[Fig. 127: Front Wheelhouse Shield Fasteners]
Courtesy of CHRYSLER GROUP, LLC

1. Position the front wheelhouse shield into the front fender well.

2. Install the 14 push-pins (3) that secure the front wheelhouse shield to the vehicle.
3. Install the new plastic rivets (1) to the splash shield.

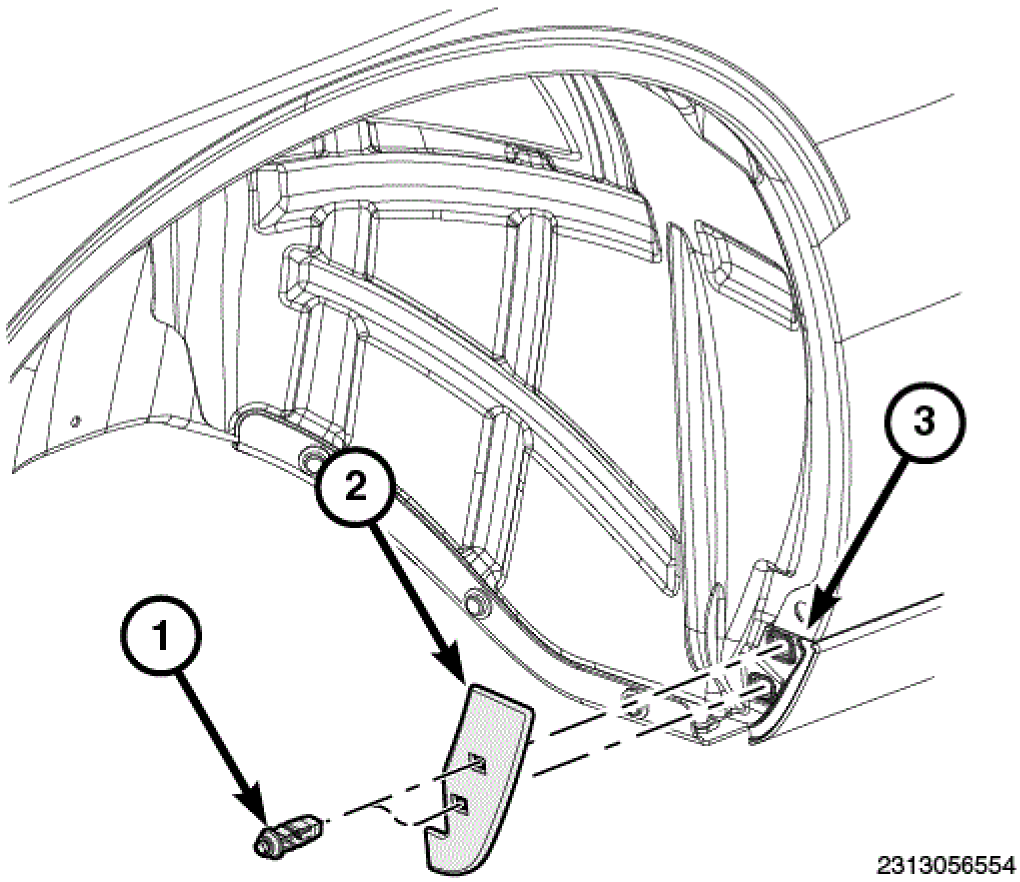


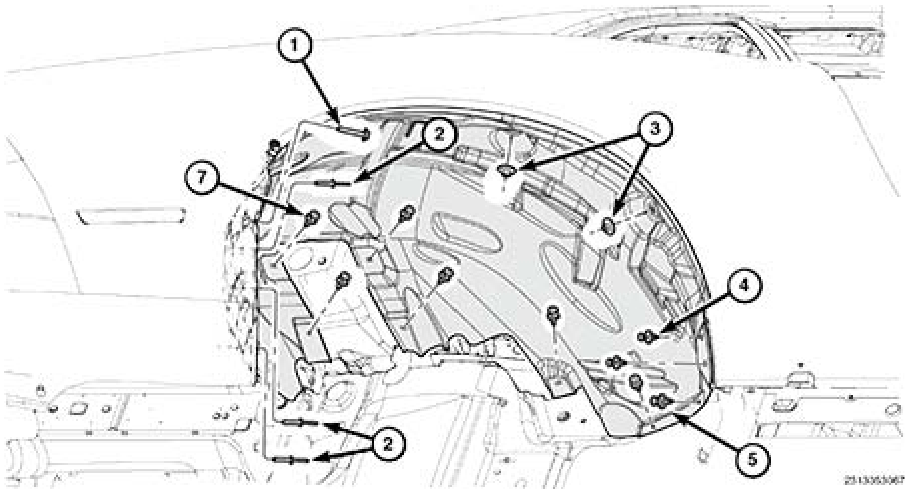
Fig. 128: Specialty Nut, Front Spat & Sill Cladding
Courtesy of CHRYSLER GROUP, LLC

4. Install the spats (2) to the front of the sill cladding (3) and install the two fasteners (1).
5. Install the front wheel. Refer to **INSTALLATION** .
6. Remove the support and lower the vehicle.

SHIELD, SPLASH, REAR WHEELHOUSE

REMOVAL

REMOVAL

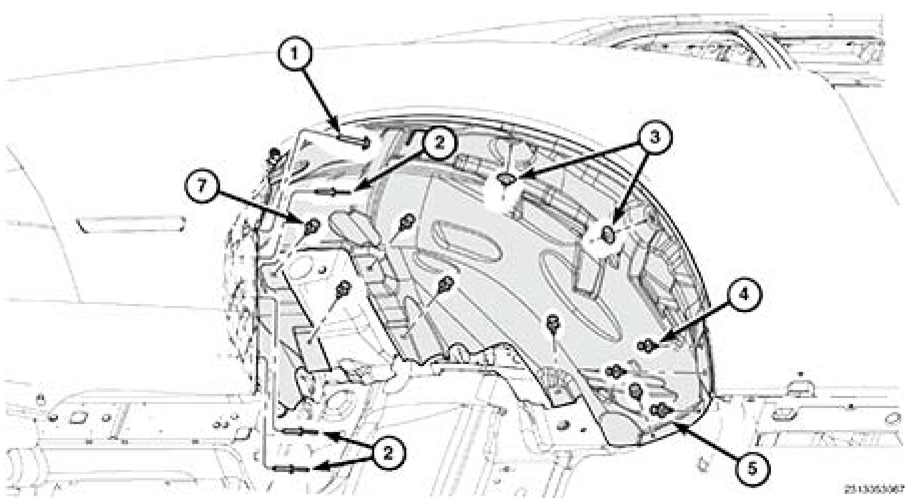


[Fig. 129: Rear Wheelhouse Shield Fasteners](#)
Courtesy of CHRYSLER GROUP, LLC

1. Remove the tire and wheel assembly. Refer to **REMOVAL** .
2. Remove the screw (1).
3. Remove the plastic rivets (2) at the lower rear, and discard.
4. Remove the seven push pin fasteners (5, 7).
5. Remove the two specialty fasteners (4) securing the sill cladding.
6. Remove the nuts (3) and remove the splash shield.

INSTALLATION

INSTALLATION



[Fig. 130: Rear Wheelhouse Shield Fasteners](#)
Courtesy of CHRYSLER GROUP, LLC

1. Install the splash shield.
2. Install the nuts (3).
3. Install the five push pin fasteners (7)
4. Install three new rivets (2).

5. Install the two push pin fasteners (5).
6. Install the screw (1).
7. Install the two specialty fasteners (4) into the sill cladding.
8. Install the tire and wheel assembly. Refer to **INSTALLATION** .

HOOD

BEZEL, HOOD

REMOVAL

REMOVAL

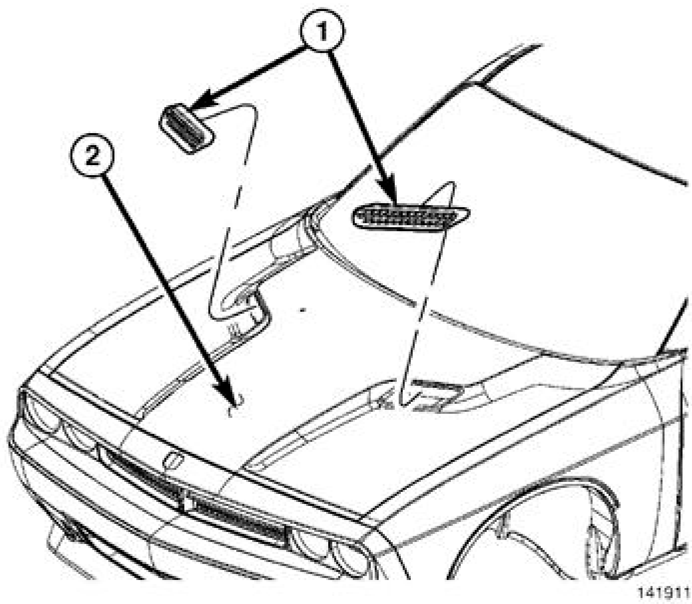
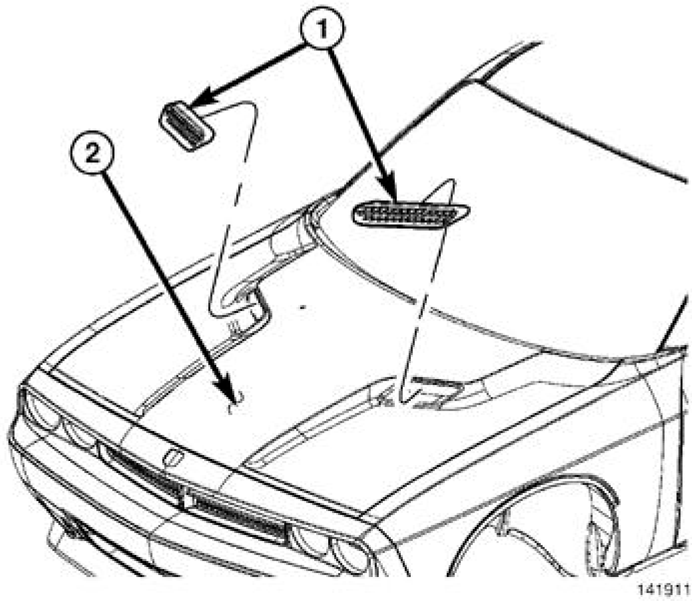


Fig. 131: Removing/Installing Hood Bezel
Courtesy of CHRYSLER GROUP, LLC

1. Using a trim stick or equivalent, release the clips at the bottom of the hood bezel (1), then lift and remove from the hood (2).

INSTALLATION

INSTALLATION



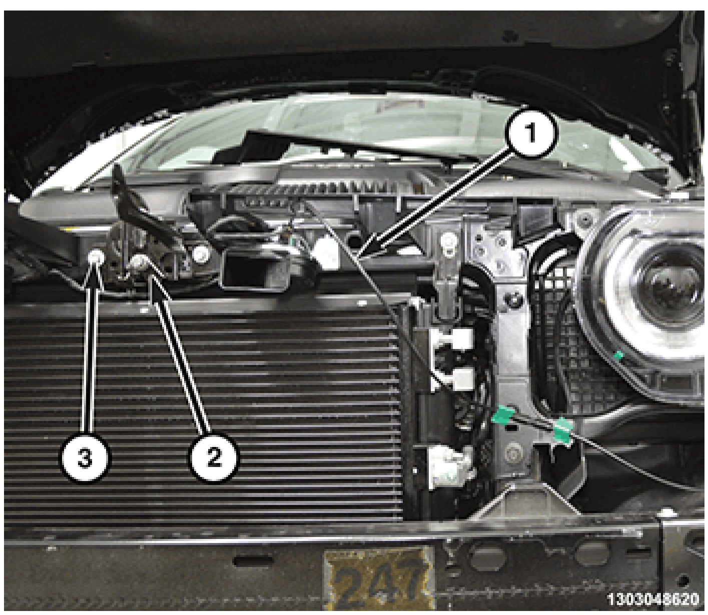
[Fig. 132: Removing/Installing Hood Bezel](#)
Courtesy of CHRYSLER GROUP, LLC

1. Insert the top of the hood bezel (1) into the hood (2).
2. Push at the bottom of hood bezel to engage the retaining clips.

CABLE, HOOD RELEASE

REMOVAL

REMOVAL



[Fig. 133: Latch Release, Cable Hood Latch & Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Take note of the cable routing for correct installation.**

1. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .
2. Remove hood latch (2). Refer to **LATCH, HOOD, REMOVAL**.
3. Unclip the hood latch release cable (1) from the body.

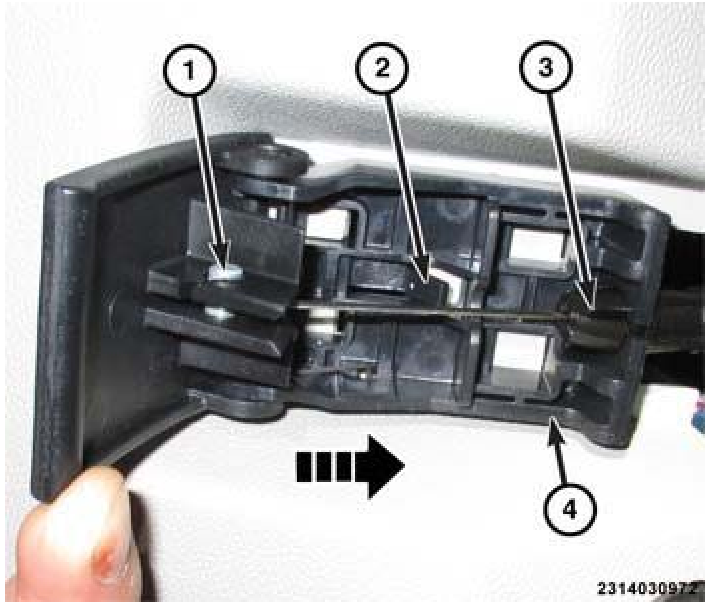


Fig. 134: Retaining Tab, Hood Release Cable, Cable End & Handle
Courtesy of CHRYSLER GROUP, LLC

4. From the passenger compartment, remove the hood release handle (4) from the steering column opening cover by lifting the retaining tab (2) and slide the hood release handle forward.
5. Press the tabs (3) and remove the hood latch release cable from the handle, then remove the cable end (1).
6. Remove the hood latch release cable grommet from the dash panel and remove the hood latch release cable.

INSTALLATION

INSTALLATION

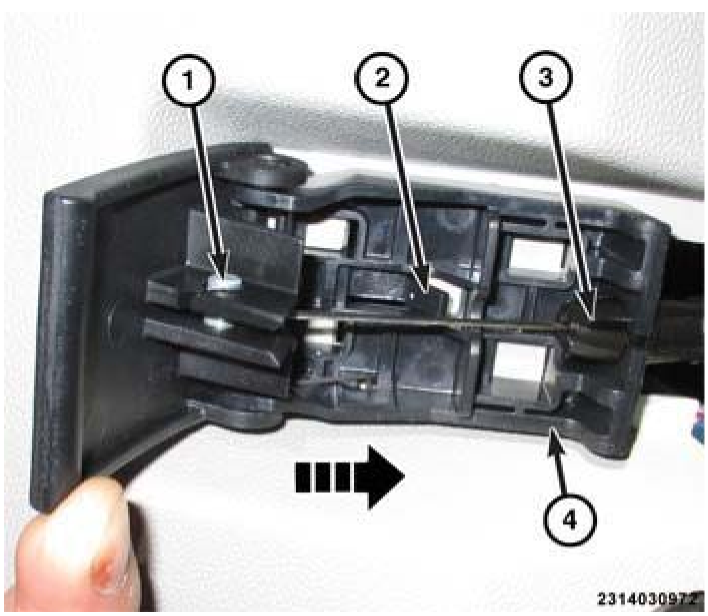


Fig. 135: Retaining Tab, Hood Release Cable, Cable End & Handle
Courtesy of CHRYSLER GROUP, LLC

1. Install the hood latch release cable through the hole in the dash panel and seat the hood latch release cable grommet.
2. Install the cable end (1) then engage the cable (3) into the hood release handle (4).
3. Position the hood release handle on the steering column opening cover and slide it rearward until the retaining tab (2) snaps into place.

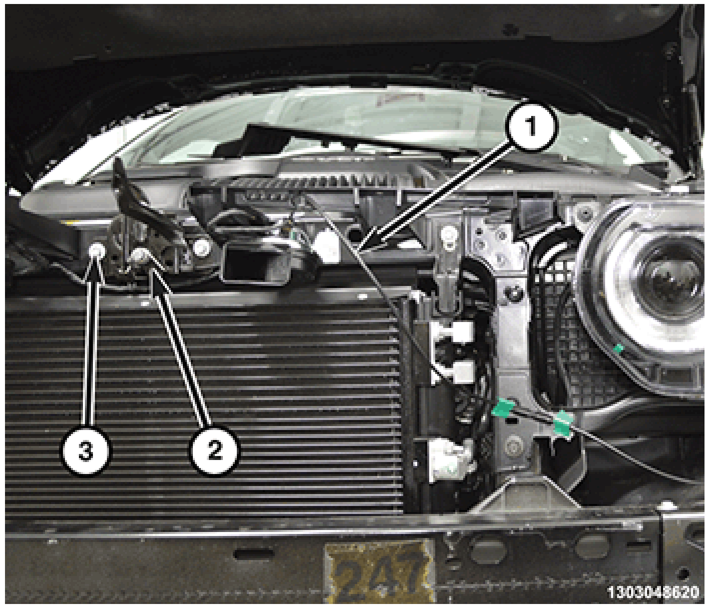


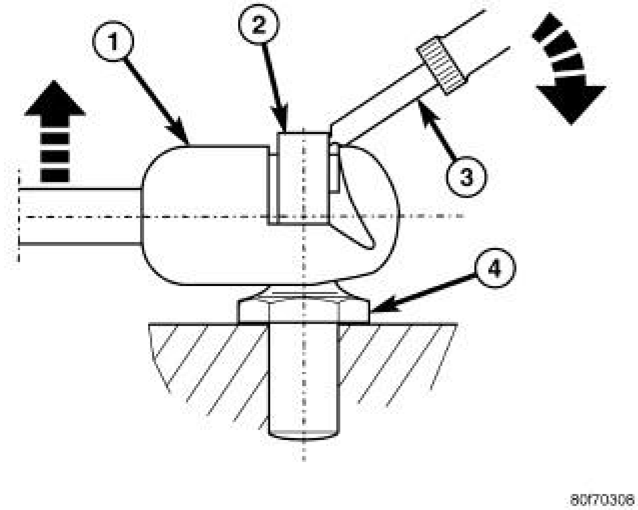
Fig. 136: Latch Release, Cable Hood Latch & Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Route the hood latch release cable (1) and clip into place.
5. Install the hood latch. Refer to **LATCH, HOOD, INSTALLATION**.
6. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .

HINGE, HOOD

REMOVAL

REMOVAL



[Fig. 137: Prying Retaining Clip Outward]
Courtesy of CHRYSLER GROUP, LLC

1. Open and support the hood with a suitable prop or block.

NOTE: **During service lift the ball socket end retaining clip only far enough to release the socket from the ball stud. Excessive prying or removal of the clip may result in improper clip spring tension. Improper clip tension may result in the support cylinder separating from the ball stud causing sudden, unexpected loss of hood support. Failure to do so may result in serious or fatal injury.**

2. Insert a small flat-bladed tool (3) into the notch on the outer face of one ball socket end (1) of the gas prop and carefully pry the retaining clip (2) outward while pulling the ball socket away from the ball stud (4) on the decklid hinge.
3. Release the retaining clip to its installed position.

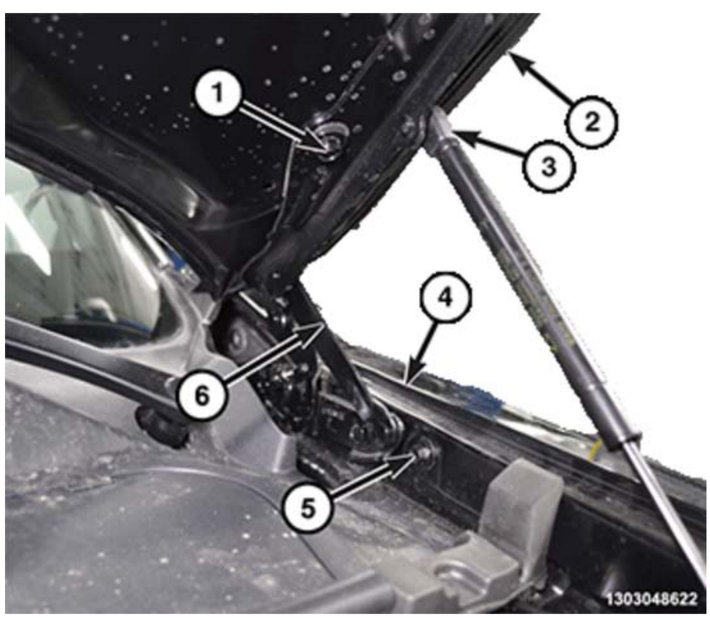


Fig. 138: Bolts, Hood, Gas Prop, Body & Hood Hinge
Courtesy of CHRYSLER GROUP, LLC

4. Using a grease pencil or equivalent, mark the position of the hood hinge (6) to aid in installation.
5. Remove the bolts (1) to hood (2).
6. Remove the bolts (5) to body (4) and the hood hinge.

INSTALLATION

INSTALLATION

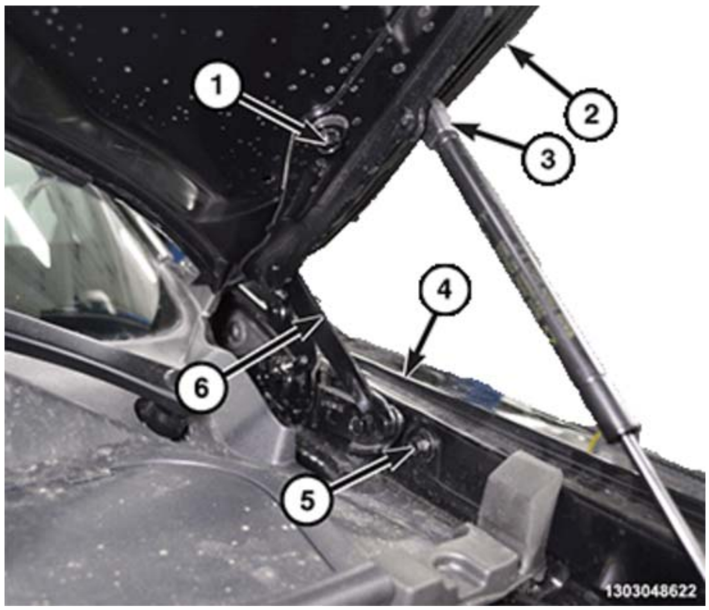


Fig. 139: Bolts, Hood, Gas Prop, Body & Hood Hinge
Courtesy of CHRYSLER GROUP, LLC

1. With the help of an assistant, position the hood hinge (6) onto the vehicle and loosely install the bolts (5).
2. Align the hood hinge with the reference mark made previously and tighten the hood hinge to body bolts to the proper specification. Refer to **SPECIFICATIONS**.
3. Position the hood to the hood hinge and loosely install the bolts (1).
4. Align the hood hinge with the reference mark made previously and tighten the hood hinge to hood bolts to the proper specification. Refer to **SPECIFICATIONS**.
5. Position the ball socket of the gas prop (3) onto the ball stud on the hood hinge.
6. Using hand pressure, press the gas prop onto the ball stud until the retainer clip snaps into place.
7. Repeat for the opposite end of the gas prop.
8. Verify proper hood latch operation and fit of hood. Adjust if necessary. Refer to **GAP AND FLUSH, SPECIFICATIONS**.

HOOD

REMOVAL

REMOVAL

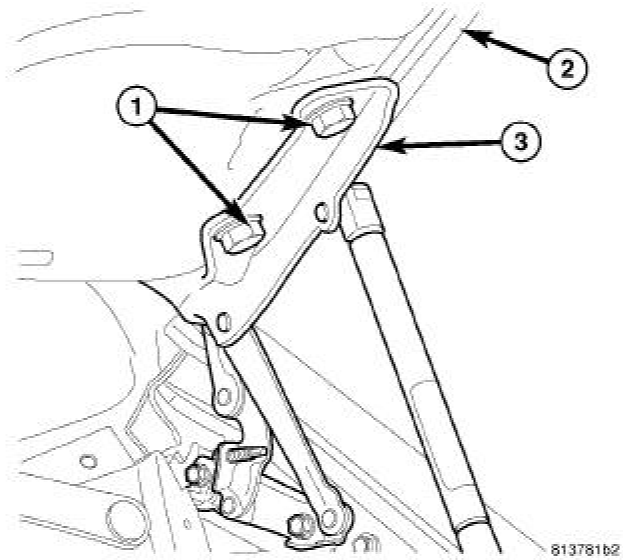


Fig. 140: Upper Hinge Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Using a grease pencil or equivalent, mark the position of the hood hinge bracket (3) to aid in installation.
2. Remove the push fasteners and lower the hood silencer enough to disconnect the windshield washer hose from the T-connector.
3. Unclip the windshield washer hose from the hood.
4. With the help of an assistant holding the hood (2), remove the bolts (1) and the hood.

INSTALLATION

INSTALLATION

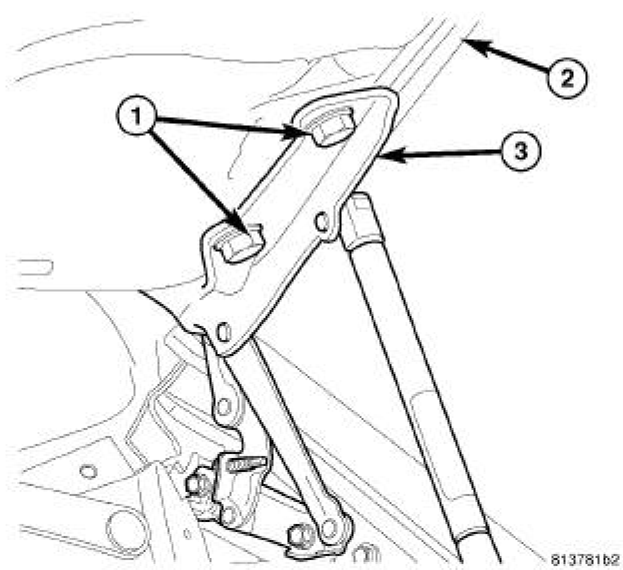


Fig. 141: Upper Hinge Bracket
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The Vehicle Emission Control Information (VECI) label(s) must be in place for**

the life of the vehicle. When replacing the component to which the VECI label is adhered, a new VECI label must also be adhered to the new component.

1. With assistance from a helper, position the hood onto the hood hinge bracket and loosely install the bolts (1).
2. Align the hood with the reference mark made previously and tighten the hood hinge to hood bolts to the proper specification. Refer to **SPECIFICATIONS**.
3. Clip the windshield washer hose to the hood.
4. Connect the windshield washer hose to the T-connector.
5. Install the hood silencer and push fasteners.
6. Verify proper hood latch operation and fit of hood. Adjust if necessary. Refer to **GAP AND FLUSH, SPECIFICATIONS**.

LATCH, HOOD

REMOVAL

REMOVAL

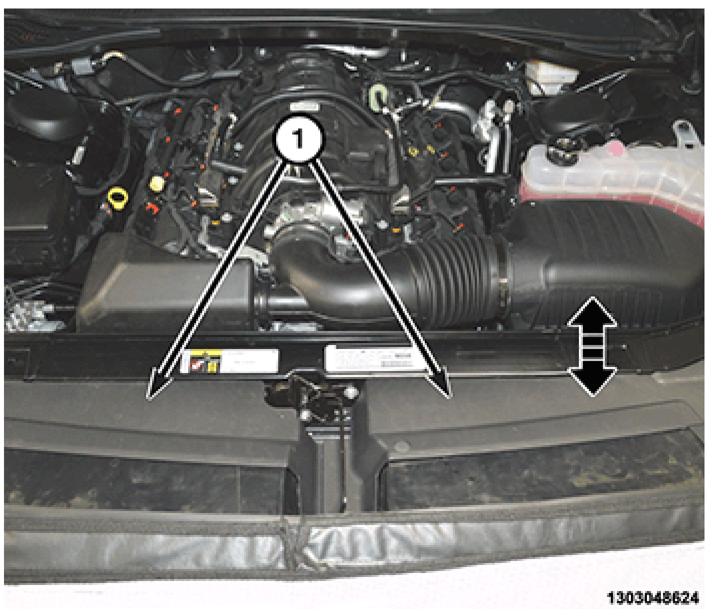


Fig. 142: Under Hood Appearance Panels
Courtesy of CHRYSLER GROUP, LLC

1. Lift and remove the under hood appearance panels (1).

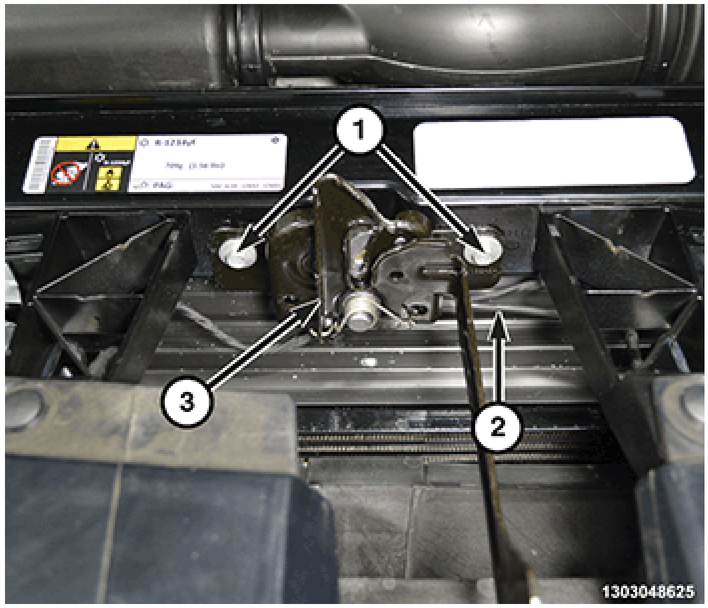


Fig. 143: Hood Latch Release Cable, Hood Latch & Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Using a grease pencil or equivalent, mark the position of the hood latch (3) to aid in installation.
3. Remove the bolts (1).
4. Turn the hood latch over and remove the hood latch release cable (2) from the hood latch.

INSTALLATION

INSTALLATION

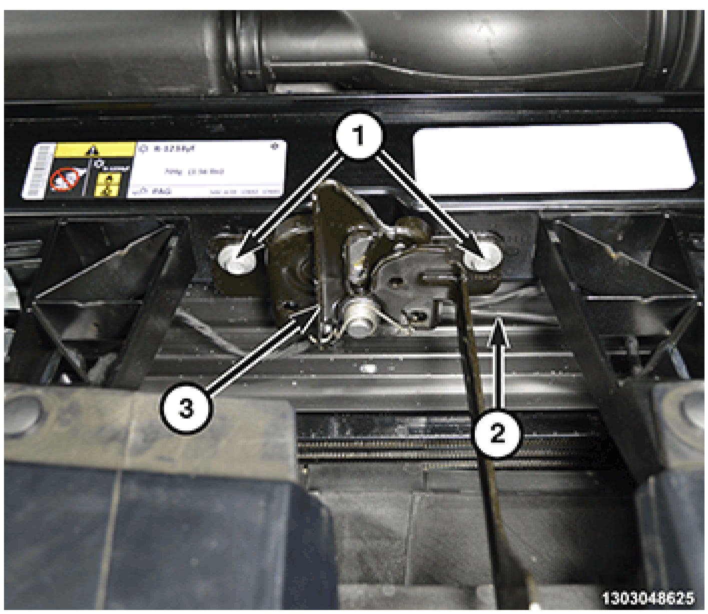


Fig. 144: Hood Latch Release Cable, Hood Latch & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the hood latch release cable (2) into the hood latch (3).
2. Position the hood latch and loosely install the bolts (1).

3. Align the hood latch with the reference mark made previously and tighten the hood latch bolts to the proper specification. Refer to **SPECIFICATIONS**.
4. Verify proper hood latch operation and fit of hood. Adjust if necessary. Refer to **GAP AND FLUSH, SPECIFICATIONS**.

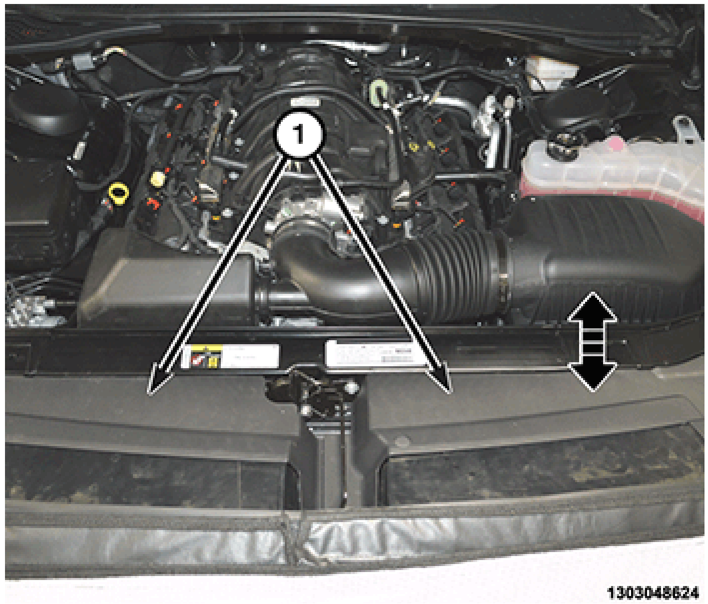


Fig. 145: Under Hood Appearance Panels
Courtesy of CHRYSLER GROUP, LLC

5. Install the under hood appearance panels (1).

STRIKER, HOOD

REMOVAL

REMOVAL

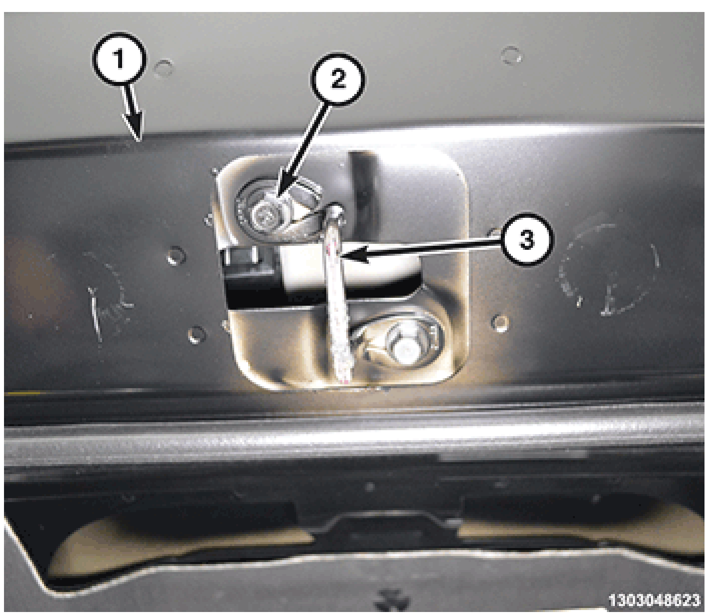


Fig. 146: Hood, Bolt & Hood Striker
Courtesy of CHRYSLER GROUP, LLC

1. Using a grease pen or equivalent, mark the position of the hood striker (3) to aid in installation.
2. Remove the bolts (2) and the hood striker from the hood (1).

INSTALLATION

INSTALLATION

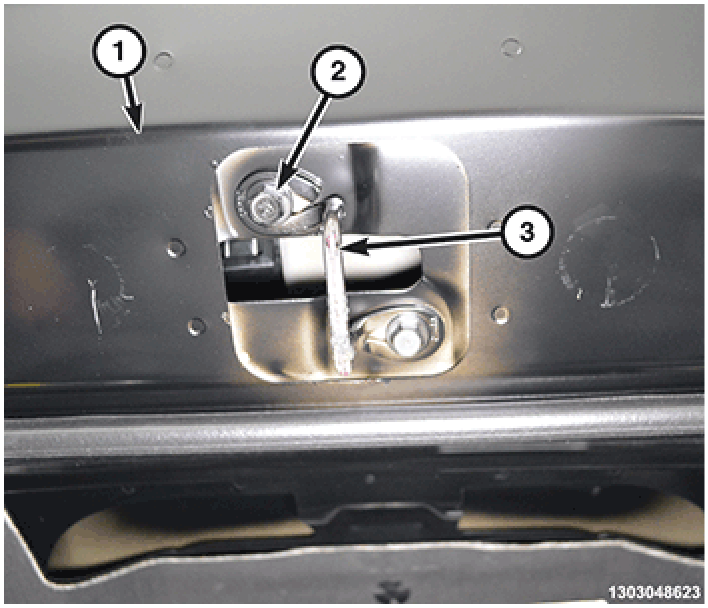


Fig. 147: Hood, Bolt & Hood Striker
Courtesy of CHRYSLER GROUP, LLC

1. Position the hood striker (3) onto the hood (1) and loosely install the bolts (2).
2. Align the hood striker with the reference mark made previously and tighten the hood striker bolts to the proper specification. Refer to **SPECIFICATIONS**.
3. Verify the operation of the hood latch. Adjust if necessary.

INSTRUMENT PANEL

BEZEL, INSTRUMENT CLUSTER

REMOVAL

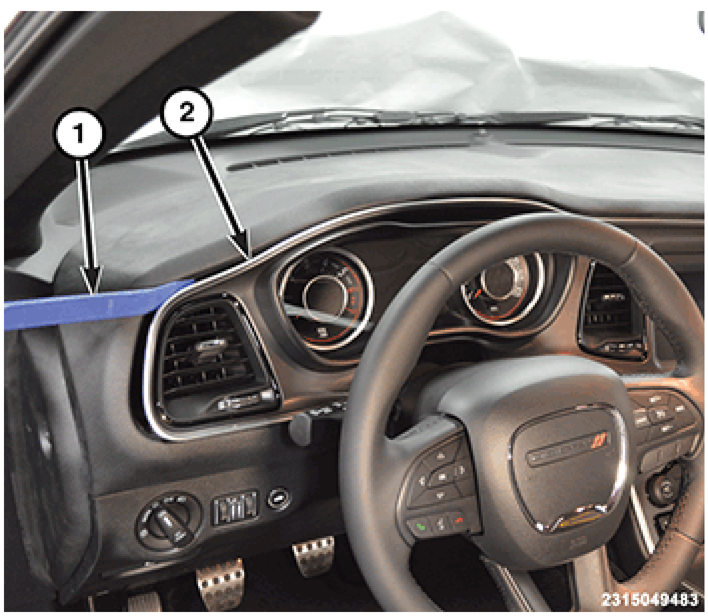
REMOVAL

[Fig. 148: Instrument Cluster Bezel & Trim Stick](#)
Courtesy of CHRYSLER GROUP, LLC

1. Lower the steering column to the lowest position.
2. Using a trim stick (1) or equivalent, carefully remove the instrument cluster bezel (2).

INSTALLATION

INSTALLATION



[Fig. 149: Instrument Cluster Bezel & Trim Stick](#)
Courtesy of CHRYSLER GROUP, LLC

1. Position the instrument cluster bezel (2) and hand tap to engage the retaining clips.

COVER, INSTRUMENT PANEL

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, Occupant Classification System (OCS), seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to follow these instructions may result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the passenger airbag, or becoming entrapped between the passenger airbag cushion and the instrument panel top pad. Failure to observe this warning could result in occupant injuries upon airbag deployment.

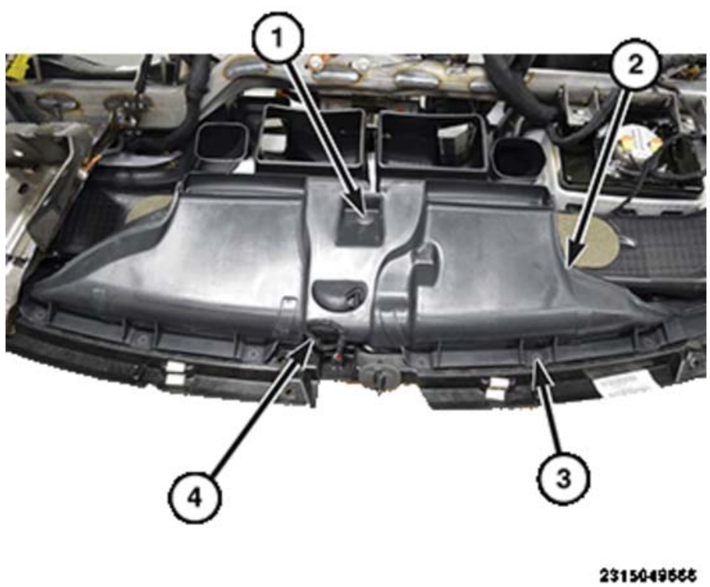


Fig. 150: Push Fastener, Defroster Duct, Screws & Wire Harness
Courtesy of CHRYSLER GROUP, LLC

1. Remove the instrument panel from the vehicle. Refer to PANEL, INSTRUMENT, REMOVAL.
2. Unclip the wire harness (4) from the defroster duct (2).
3. Remove the screws (3) and the push fastener (1), then the defroster duct.

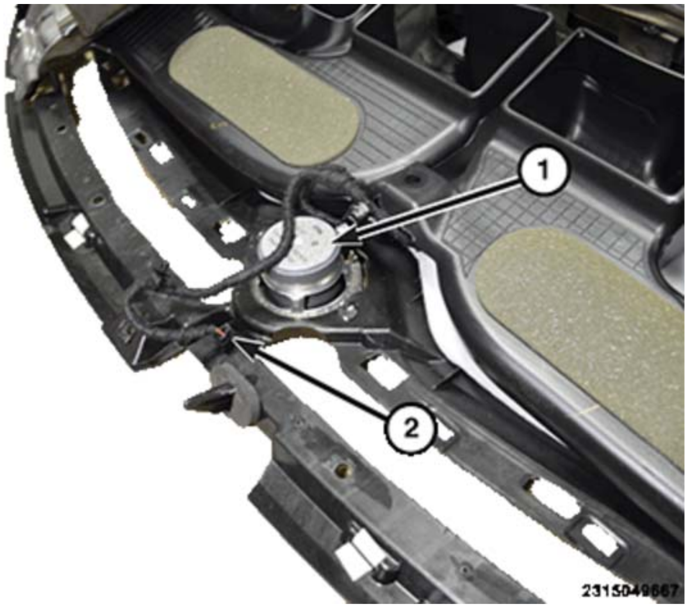


Fig. 151: Instrument Panel Speaker & Sun Sensor
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect and remove the instrument panel speakers (1).
5. Disconnect and remove the sun sensor (2).

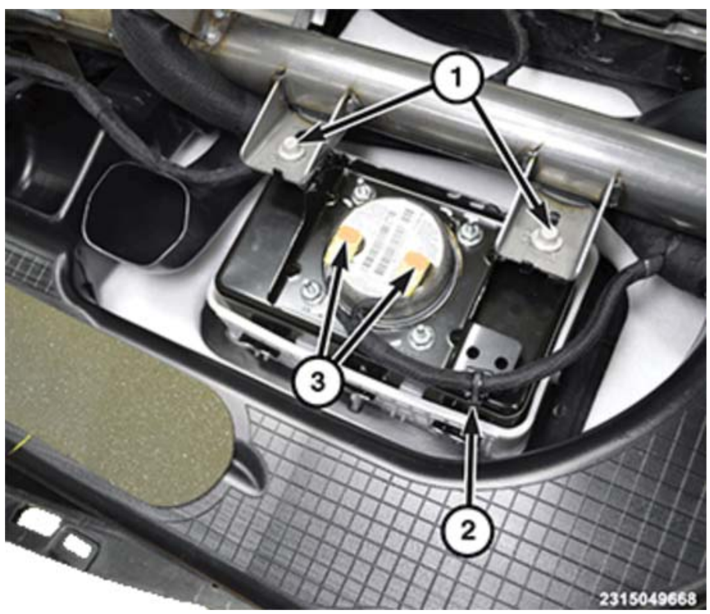


Fig. 152: Passenger Airbag Bolts, Wire Harness & Connectors
Courtesy of CHRYSLER GROUP, LLC

6. Unclip the wire harness (2) and disconnect the passenger airbag wire harness connectors (3).
7. Remove the two passenger airbag bolts (1).

Fig. 153: Defroster Duct Opening & Screw
Courtesy of CHRYSLER GROUP, LLC

8. Remove the screw (1) at the top of the instrument panel, left of the defroster duct opening (2).

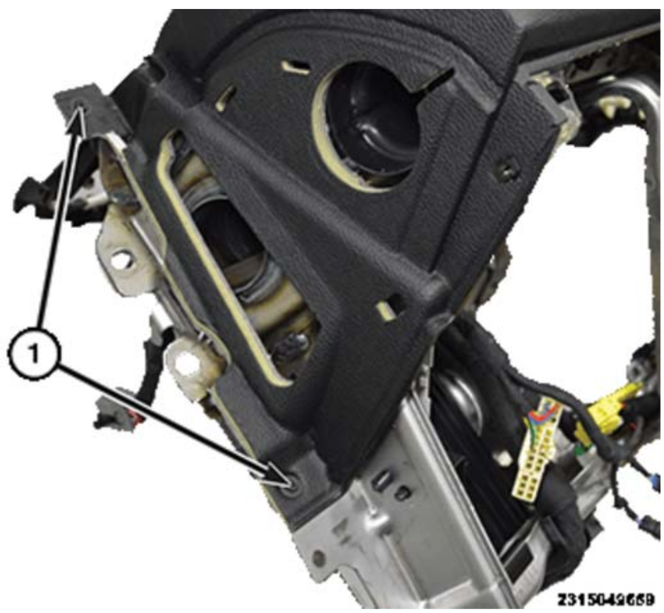
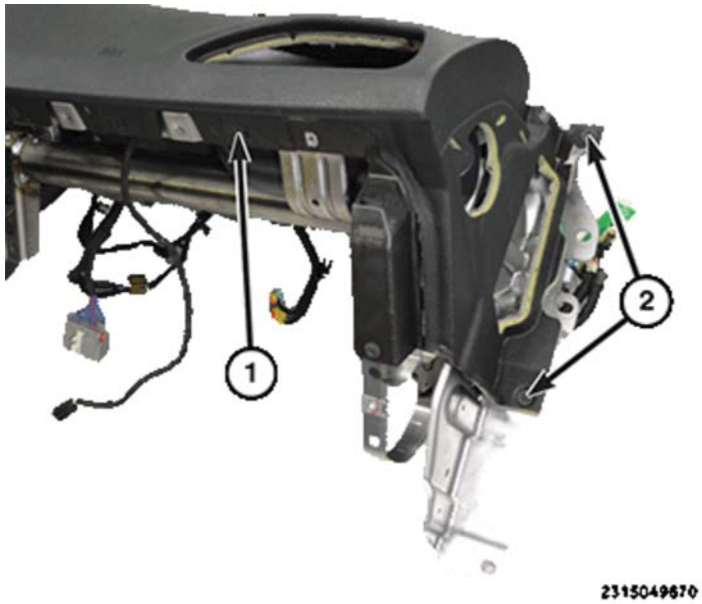


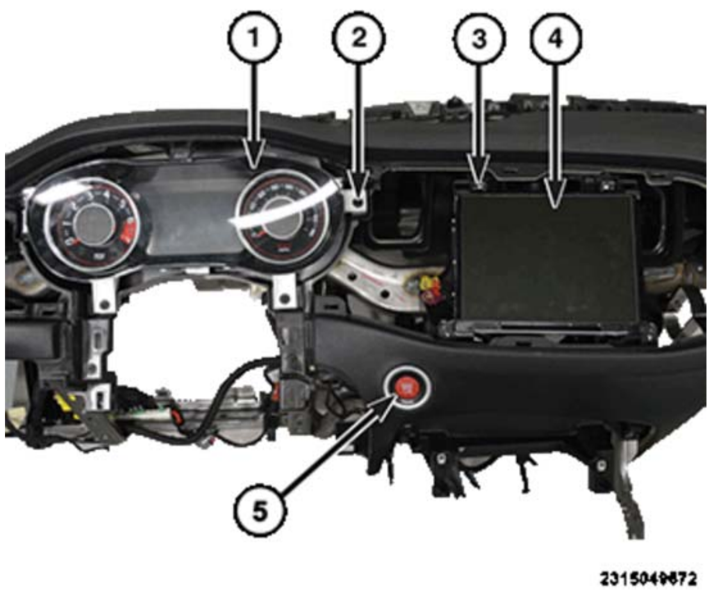
Fig. 154: Left Side Of The Instrument Panel Screws
Courtesy of CHRYSLER GROUP, LLC

9. Remove the two screws (1) on the left side of the instrument panel.



[Fig. 155: Right Side Of The Instrument Panel Screws & Glove Box Opening Screws]
Courtesy of CHRYSLER GROUP, LLC

10. Remove the two screws (2) on the right side of the instrument panel.
11. Remove the seven screws (1) around the glove box opening.



[Fig. 156: Instrument Cluster, Screws, Touch Screen Display & Keyless Ignition Node]
Courtesy of CHRYSLER GROUP, LLC

12. Remove the screws (2) and the instrument cluster (1).
13. Remove the screws (3) and the radio, or touch screen display (4) if equipped.
14. Remove the right air outlet. Refer to **OUTLET, AIR, REMOVAL** .
15. Remove the keyless ignition node (5). Refer to **MODULE, KEYLESS IGNITION NODE, REMOVAL** .

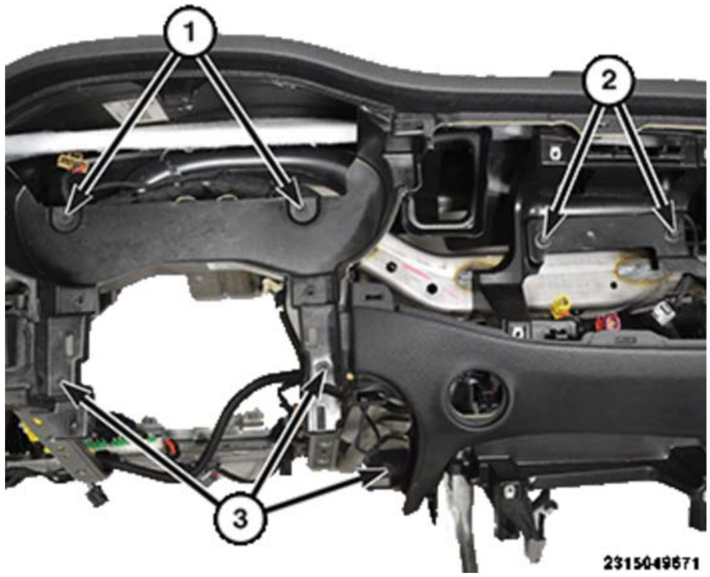


Fig. 157: Bolts & Screws
Courtesy of CHRYSLER GROUP, LLC

16. Remove the two bolts (2) located behind the radio.
17. Remove the two screws (1) located behind the instrument cluster.
18. Remove the three screws (3) located at the steering column opening.
19. Carefully remove the instrument panel cover from the support structure.
20. If necessary, remove the passenger air bag from the instrument panel cover. Refer to **AIR BAG, PASSENGER, REMOVAL** .

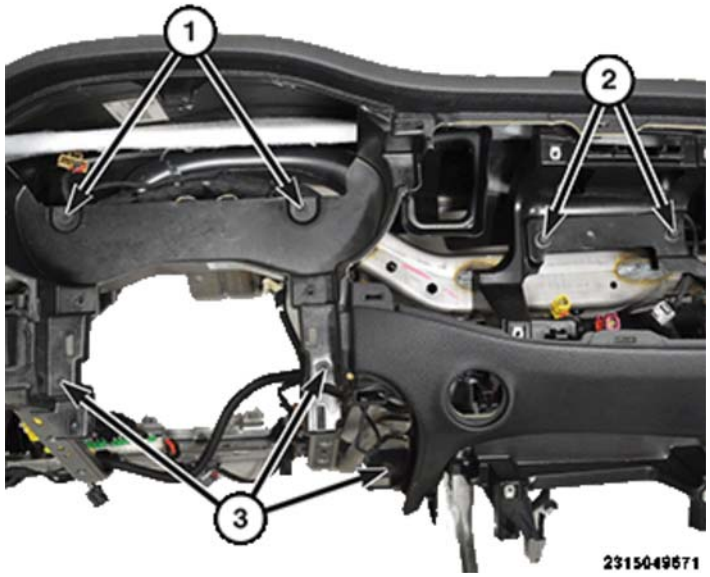
INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, Occupant Classification System (OCS), seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to follow these instructions may result in accidental airbag deployment.

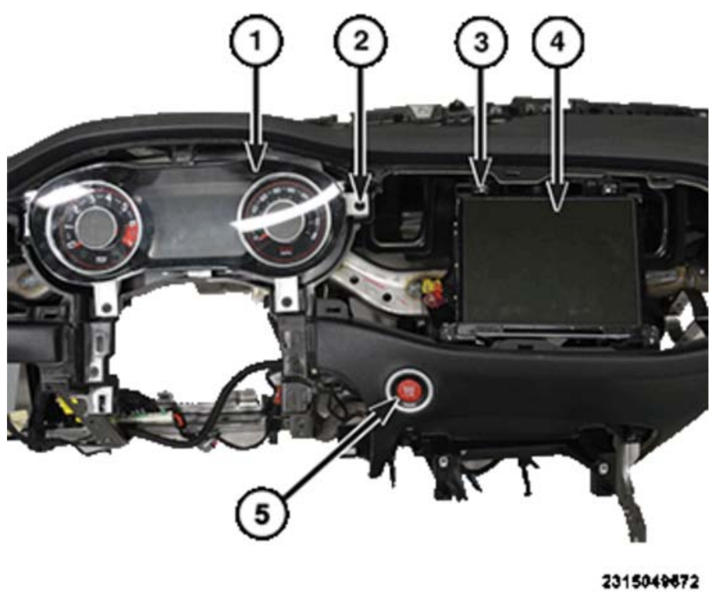
WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the passenger airbag, or becoming entrapped between the passenger airbag cushion and the instrument panel top pad. Failure to observe this warning could result in occupant injuries upon airbag deployment.



[Fig. 158: Bolts & Screws](#)
Courtesy of CHRYSLER GROUP, LLC

1. If necessary, install the passenger air bag into the instrument panel cover. Refer to **AIR BAG, PASSENGER, INSTALLATION** .
2. Carefully position the instrument panel cover onto the support structure.
3. Install the two bolts (2) located behind the radio and tighten securely.
4. Install the two screws (1) located behind the instrument cluster and tighten securely.
5. Install the three screws (3) located at the steering column opening and tighten securely.



[Fig. 159: Instrument Cluster, Screws, Touch Screen Display & Keyless Ignition Node](#)
Courtesy of CHRYSLER GROUP, LLC

6. Install the instrument cluster (1). Refer to **INSTALLATION** .
7. Install the radio, or touch screen display (4) if equipped. Refer to **RADIO, INSTALLATION** .

8. Install the right side air outlet. Refer to **OUTLET, AIR, INSTALLATION** .
9. Install the keyless ignition node (5). Refer to **MODULE, KEYLESS IGNITION NODE, INSTALLATION** .

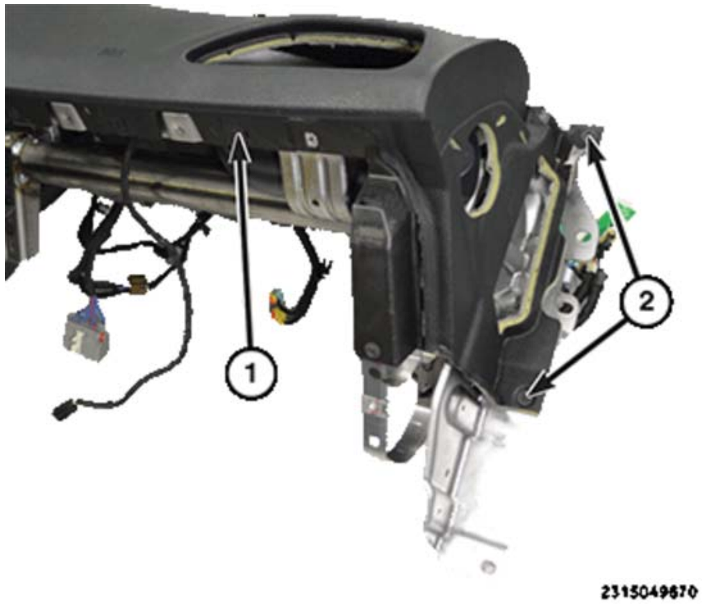


Fig. 160: Right Side Of The Instrument Panel Screws & Glove Box Opening Screws
Courtesy of CHRYSLER GROUP, LLC

10. Install the two screws (2) on the right side of the instrument panel and tighten securely.
11. Install the seven screws (1) around the glove box opening and tighten securely.

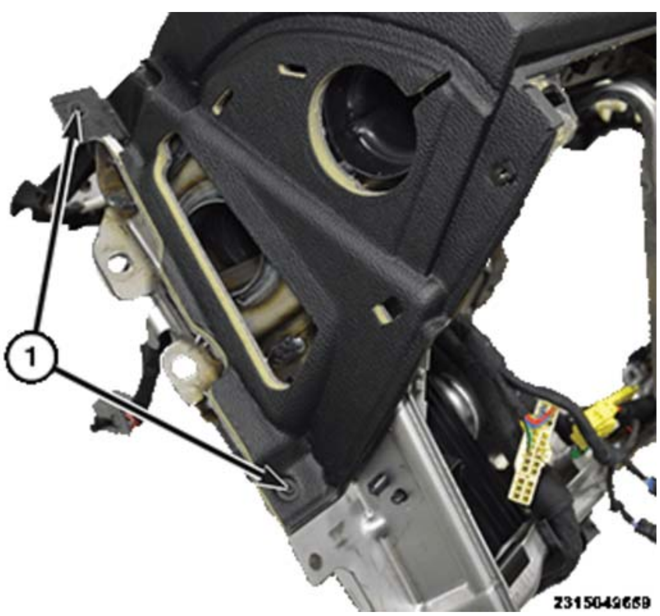


Fig. 161: Left Side Of The Instrument Panel Screws
Courtesy of CHRYSLER GROUP, LLC

12. Install the two screws (1) on the left side of the instrument panel and tighten securely.

Fig. 162: Defroster Duct Opening & Screw
Courtesy of CHRYSLER GROUP, LLC

13. Install the screw (1) at the top of the instrument panel, left of the defroster duct opening (2) and tighten securely.

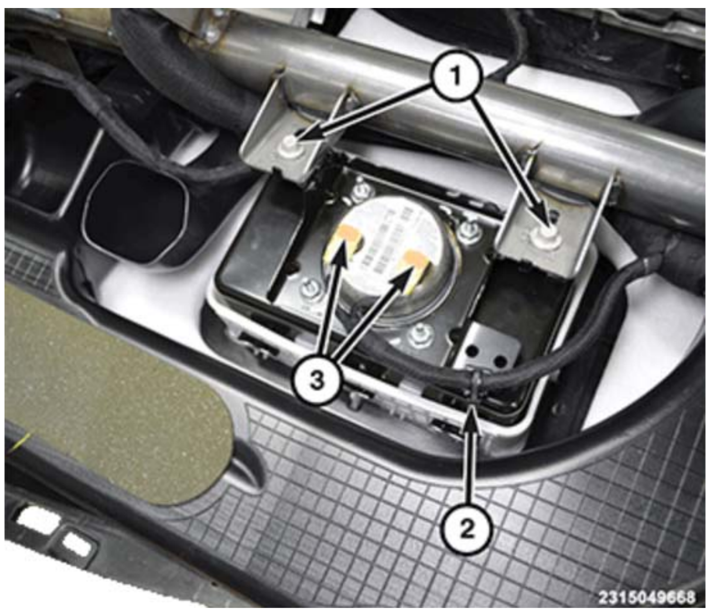


Fig. 163: Passenger Airbag Bolts, Wire Harness & Connectors
Courtesy of CHRYSLER GROUP, LLC

14. Clip the wire harness (2) into place and connect the passenger airbag wire harness connectors (3).
15. Install the two passenger airbag bolts (1) and tighten to the proper specification. Refer to **SPECIFICATIONS** .

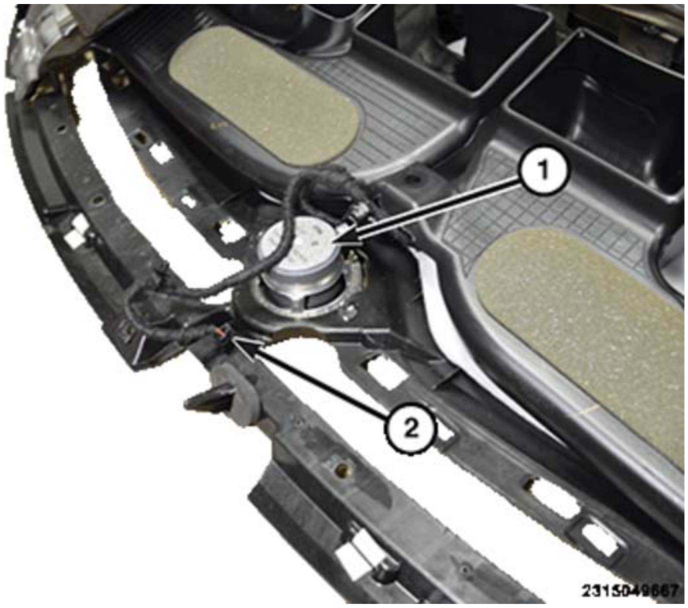


Fig. 164: Instrument Panel Speaker & Sun Sensor
Courtesy of CHRYSLER GROUP, LLC

16. Connect and install the instrument panel speakers (1). Tighten the screws securely.
17. Connect and install the sun sensor (2).

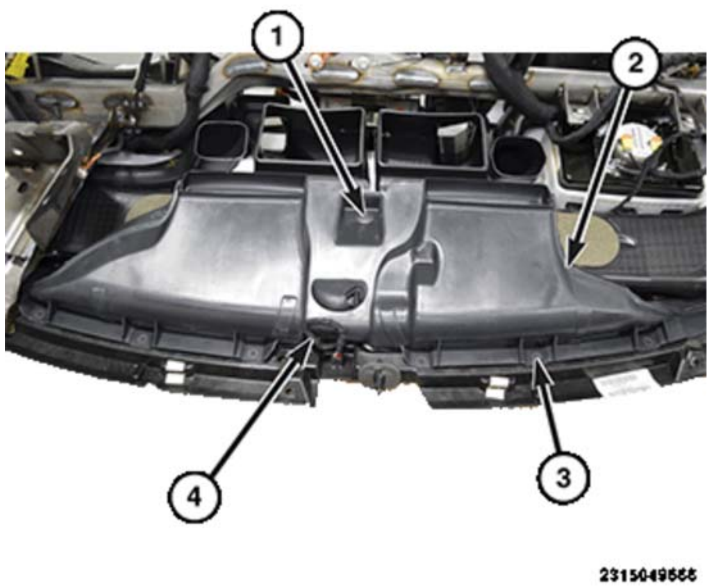


Fig. 165: Push Fastener, Defroster Duct, Screws & Wire Harness
Courtesy of CHRYSLER GROUP, LLC

18. Position the defroster duct (2) and install the screws (3). Tighten the screws securely.
19. Install the push fastener (1) and clip the wire harness (4) to the defroster duct.
20. Install the instrument panel into the vehicle. Refer to **PANEL, INSTRUMENT, INSTALLATION**.
21. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE** .

COVER, STEERING COLUMN OPENING

REMOVAL

REMOVAL

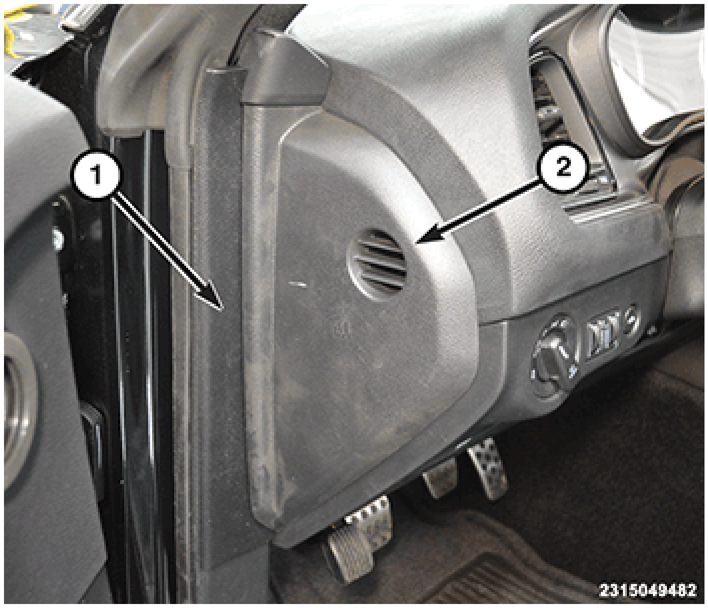


Fig. 166: A-Pillar Extension & Instrument Panel End Cap
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Using a trim stick or equivalent, remove the instrument panel end cap (2) then the A-pillar extension (1).

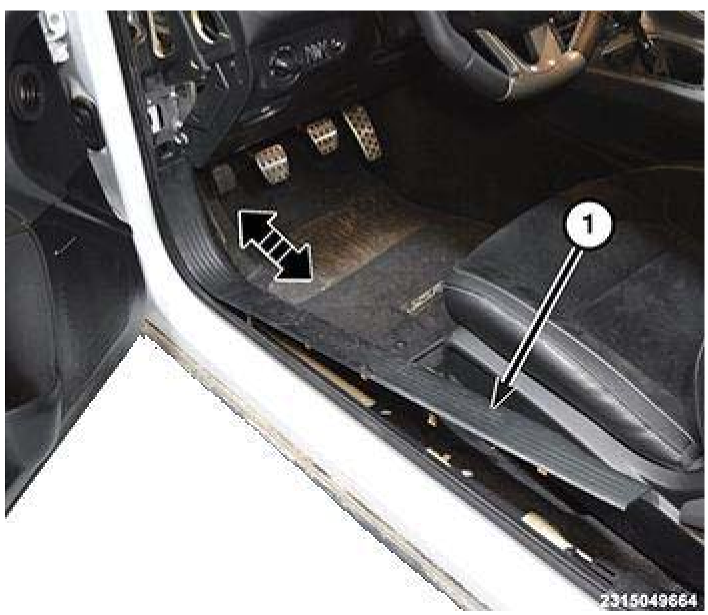


Fig. 167: Cowl Side Trim Panel
Courtesy of CHRYSLER GROUP, LLC

3. Lift the cowl side trim panel (1) at the rear, then pull rearward and remove.

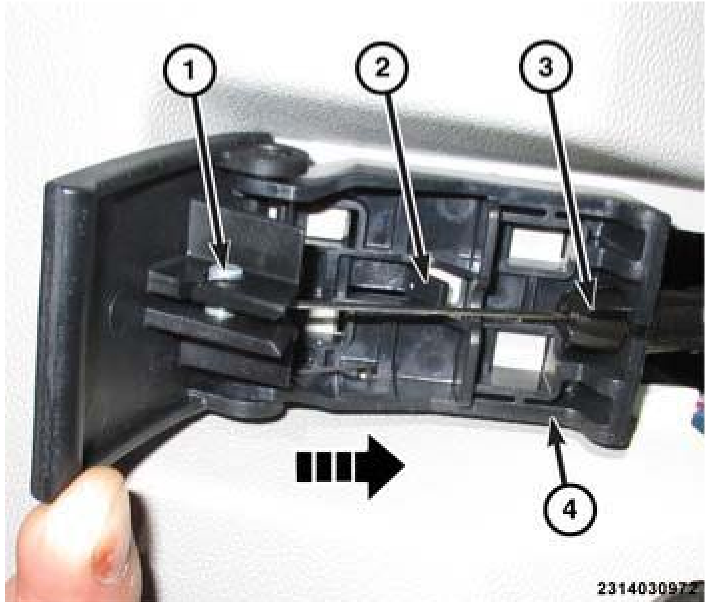


Fig. 168: Retaining Tab, Hood Release Cable, Cable End & Handle
Courtesy of CHRYSLER GROUP, LLC

4. Remove the hood release handle. Lift the retaining tab (2) and slide the handle (4) forward to remove it from the steering column opening cover.

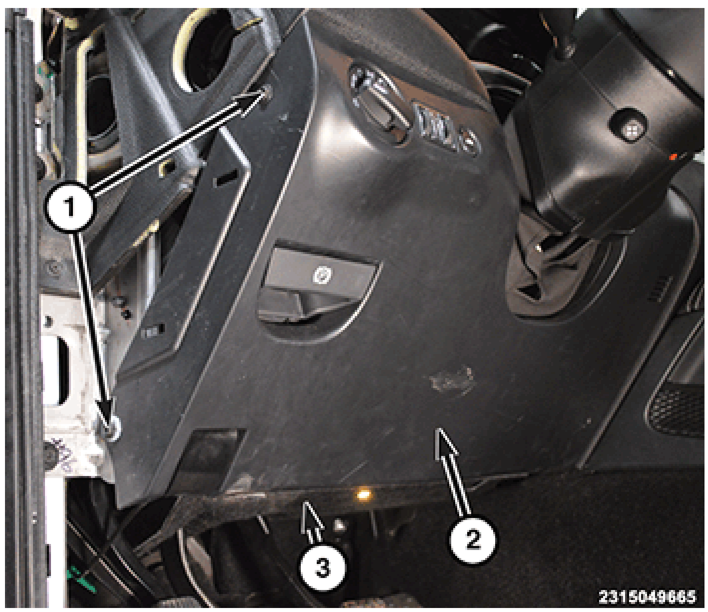


Fig. 169: Screws, Steering Column Opening Cover & Instrument Panel Closeout
Courtesy of CHRYSLER GROUP, LLC

5. Remove the push fasteners and the instrument panel closeout (3).
6. Remove the two screws (1) on the side of the steering column opening cover (2).
7. Using a trim stick or equivalent, remove the steering column opening cover and disconnect the wire harness connectors.
8. Lower the steering column opening cover and separate the parking brake release cable from the parking brake handle, if equipped.

INSTALLATION

INSTALLATION

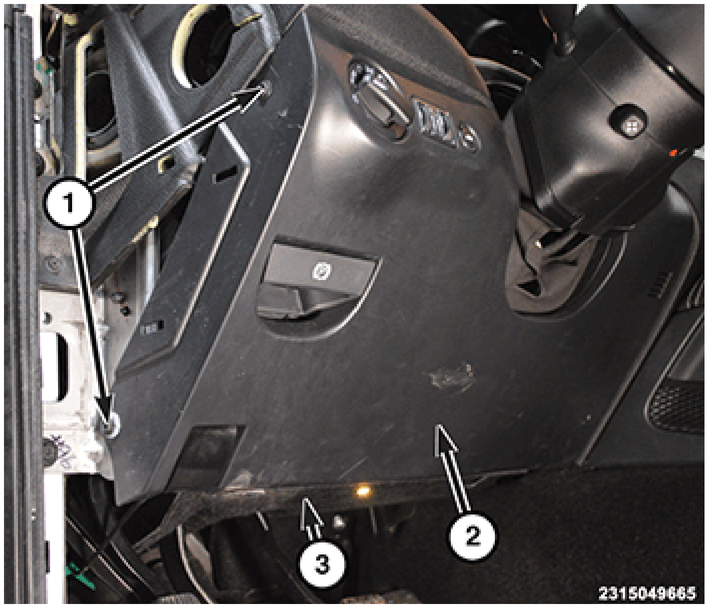


Fig. 170: Screws, Steering Column Opening Cover & Instrument Panel Closeout
Courtesy of CHRYSLER GROUP, LLC

1. Position the steering column opening cover (2) near the instrument panel and connect the wire harness connectors.
2. Install the parking brake release cable to the parking brake handle, if equipped.
3. Install the steering column opening cover onto the instrument panel and hand tap to engage the retaining clips.
4. Install the instrument panel closeout (3) and the push fasteners.
5. Install the two screws (1) and tighten securely.

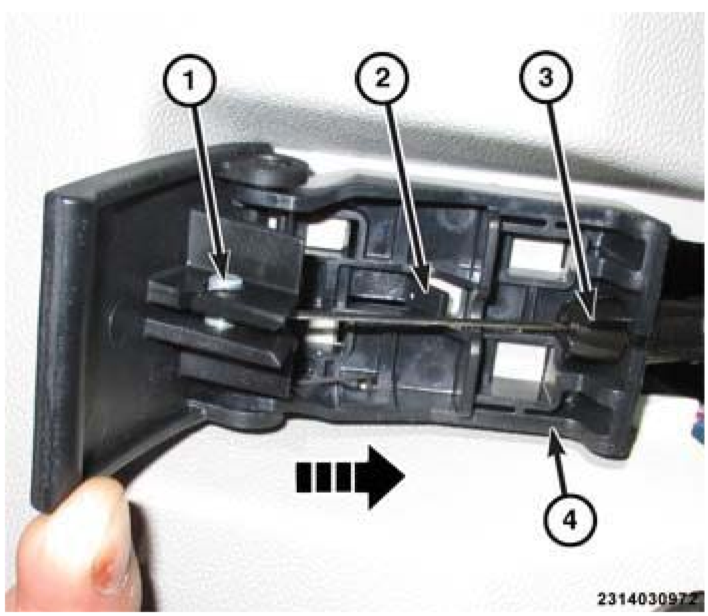


Fig. 171: Retaining Tab, Hood Release Cable, Cable End & Handle

Courtesy of CHRYSLER GROUP, LLC

6. Position the hood release handle (4) onto the steering column opening cover and slide rearward until the retaining tab (2) snaps into place.

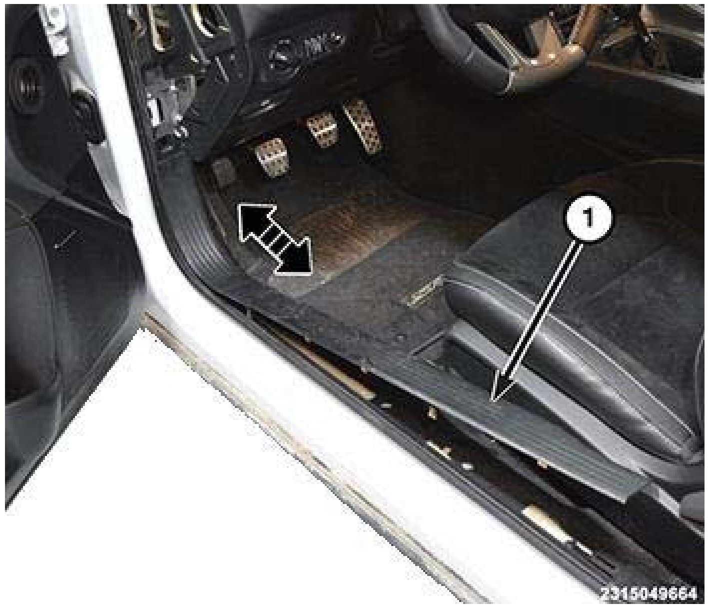


Fig. 172: Cowl Side Trim Panel
Courtesy of CHRYSLER GROUP, LLC

7. Install the cowl side trim panel (1) at the front, then hand tap the rear to install the retaining clips.

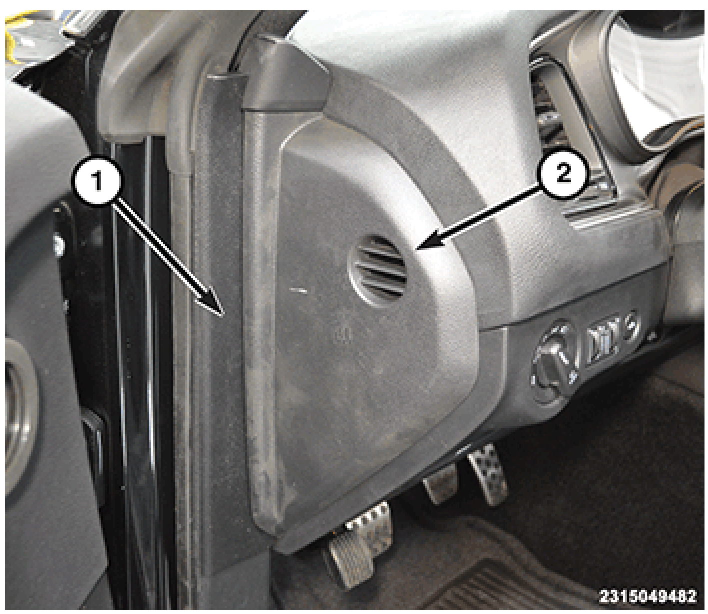


Fig. 173: A-Pillar Extension & Instrument Panel End Cap
Courtesy of CHRYSLER GROUP, LLC

8. Position the A-pillar extension (1) and hand tap to engage the retaining clips.
9. Position the instrument panel end cap (2) and hand tap to engage the retaining clips.
10. Connect the negative battery cable.

CYLINDER, GLOVE BOX LOCK

REMOVAL

REMOVAL

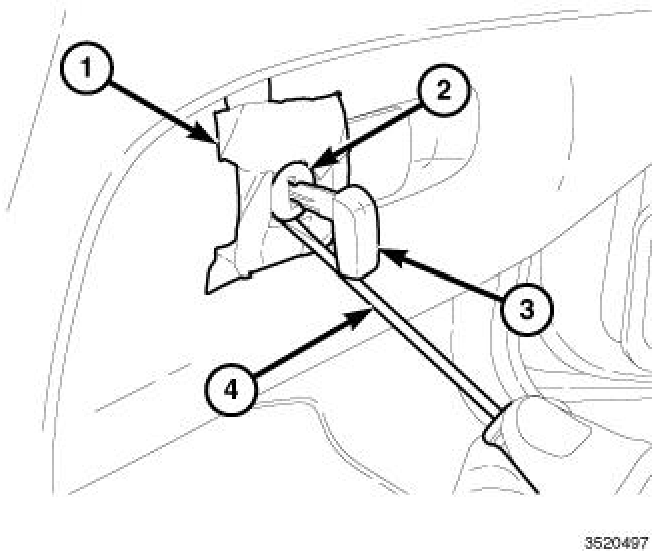


Fig. 174: Masking Tape, Lock Cylinder, Key & Screwdriver
Courtesy of CHRYSLER GROUP, LLC

1. Prior to removal, place masking tape (1) or equivalent around the perimeter of the lock cylinder (2).
2. Insert the key (3) into the lock cylinder (2) and turn the key into the locked position.
3. Insert a small flat bladed screwdriver (4) into the opening between the lock cylinder and bezel at the "6 o'clock position".
4. Apply downward pressure on the screwdriver while turning the key clockwise approximately 45Â°.

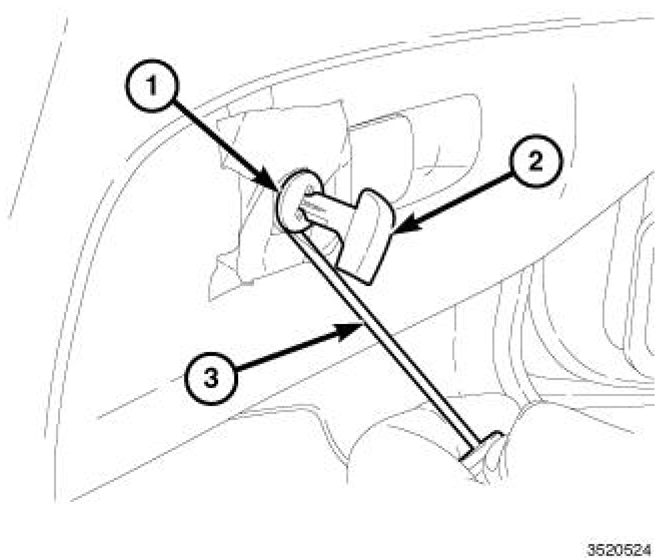


Fig. 175: Lock Cylinder, Key & Screwdriver
Courtesy of CHRYSLER GROUP, LLC

5. Remove the lock cylinder (1), key (2) and screwdriver (3) together.

INSTALLATION

INSTALLATION

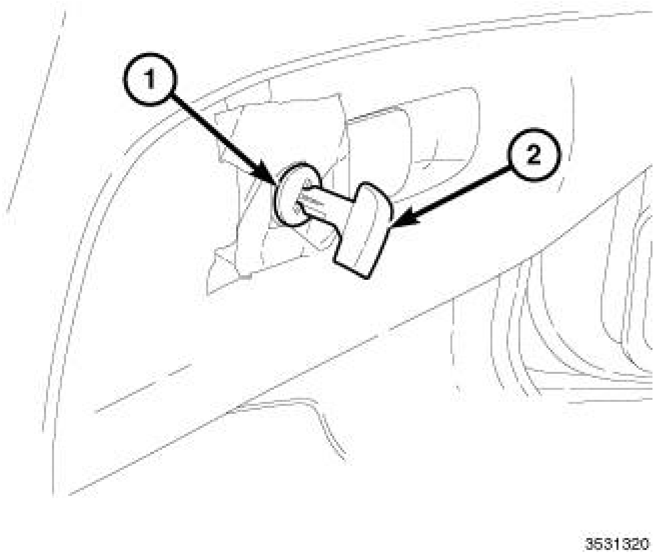


Fig. 176: Glove Box Lock Cylinder
Courtesy of CHRYSLER GROUP, LLC

1. Install the lock cylinder (1) and key (2) into the glove box door together in a position approximately 45Ā° clockwise from the locked position.

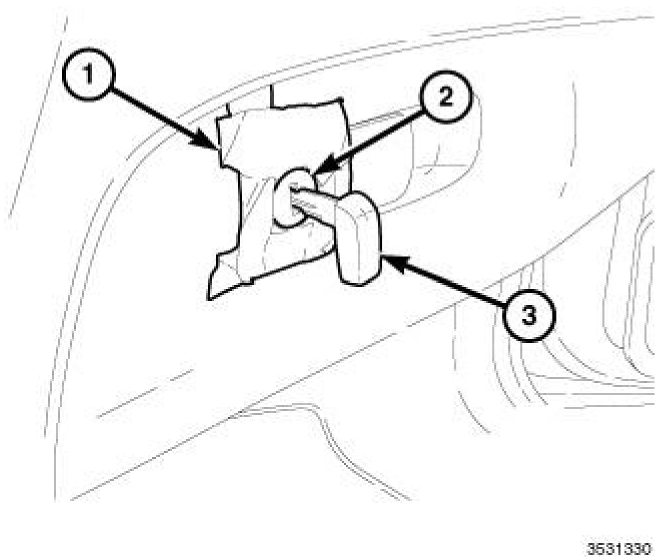


Fig. 177: Key, Lock Cylinder & Masking Tape
Courtesy of CHRYSLER GROUP, LLC

2. Turn the key (3) counter clockwise to the locked position.
3. Remove the key from the lock cylinder (2).
4. Reinsert the key and verify the lock cylinder is functioning properly.
5. Remove the masking tape (1) from the lock cylinder perimeter.

GLOVE BOX, INSTRUMENT PANEL

REMOVAL

REMOVAL

GLOVE BOX

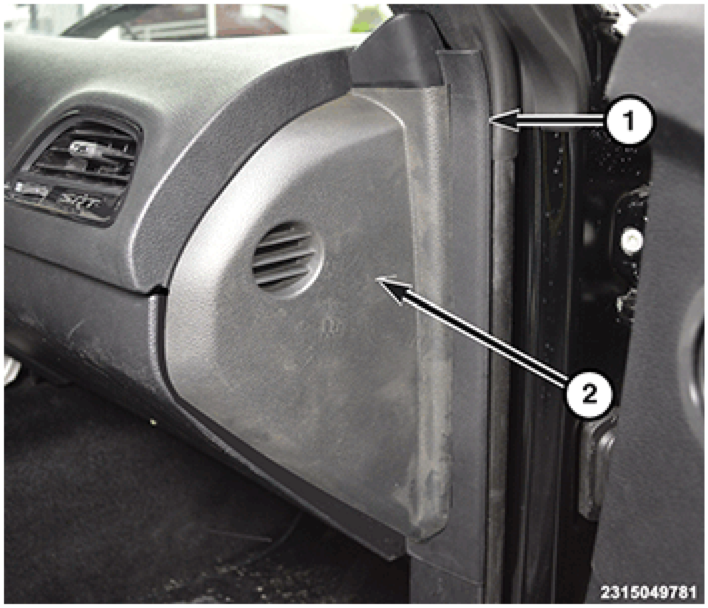


Fig. 178: A-Pillar Extension & Instrument Panel End Cap
Courtesy of CHRYSLER GROUP, LLC

1. Using a trim stick or equivalent, remove the instrument panel end cap (2) then the A-pillar extension (1).

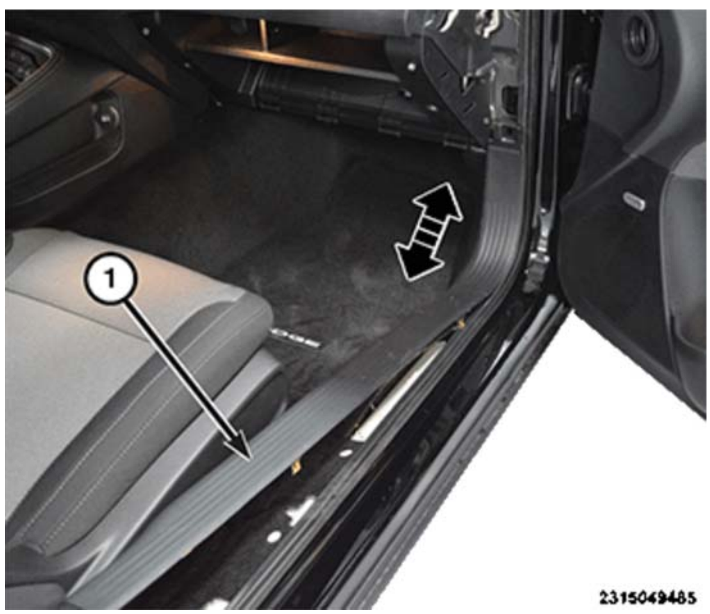
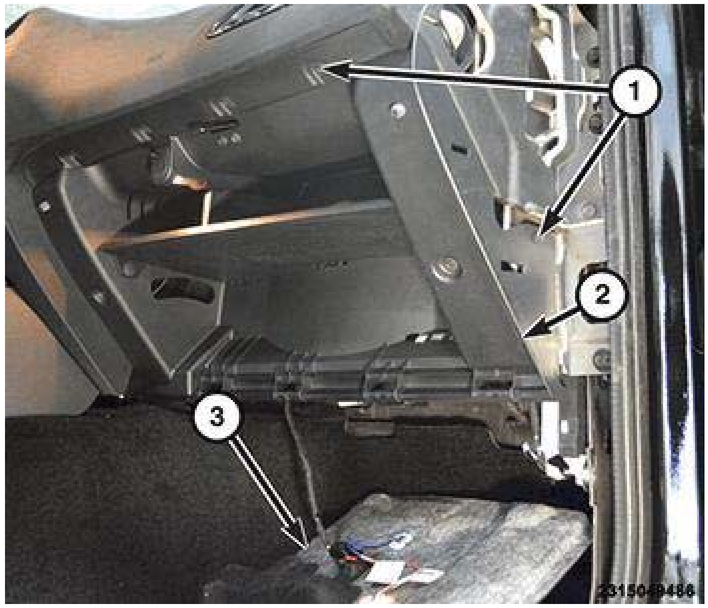


Fig. 179: Cowl Side Trim Panel
Courtesy of CHRYSLER GROUP, LLC

2. Lift the cowl side trim panel (1) at the rear, then pull rearward and remove.

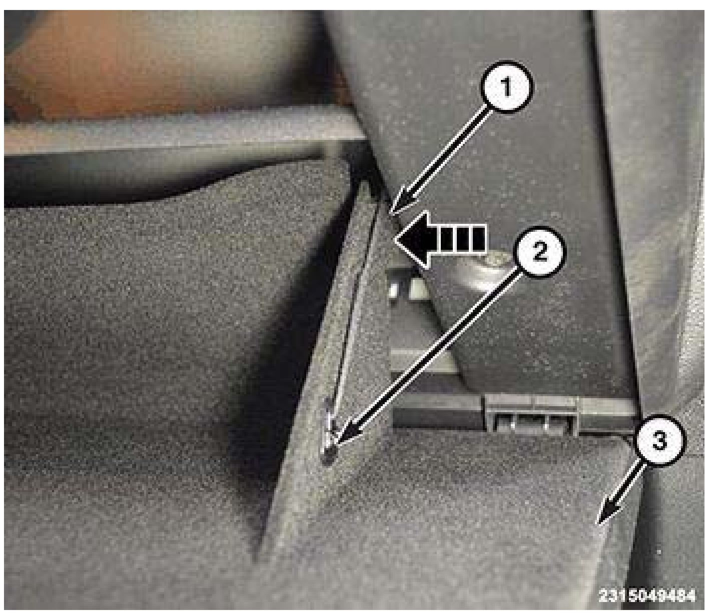


[Fig. 180: Glove Box, Instrument Panel Closeout & Screws]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Shown in illustration with the glove box door removed, but not necessary.**

3. Remove the push fasteners, disconnect the wire harness connector and remove the instrument panel closeout (3).
4. Remove the eight screws (1).
5. Disconnect the wiring harness connectors from the glove box and remove.

GLOVE BOX DOOR



[Fig. 181: Glove Box Door, Support Strap And Retainer & Stops]
Courtesy of CHRYSLER GROUP, LLC

1. Open the glove box door (3).

2. Remove the support strap and retainer (2) from glove box door.
3. Push in on the glove box door stops (1) to disengage, then rotate the glove box door downward and remove.

INSTALLATION

INSTALLATION

GLOVE BOX

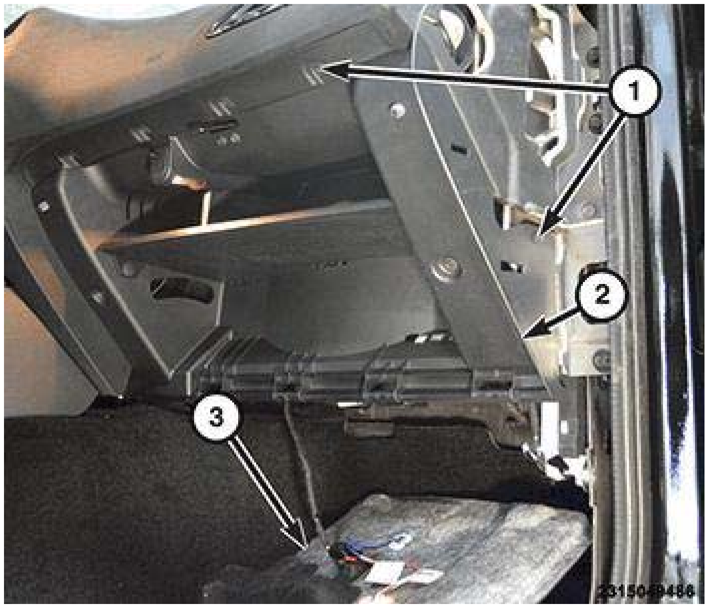


Fig. 182: Glove Box, Instrument Panel Closeout & Screws
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Shown in illustration with the glove box door removed, but not necessary.**

1. Connect the wiring harness and position the glove box (2) into the instrument panel.
2. Install the eight screws (1) and tighten securely.
3. Connect the wiring harness connector and install the instrument panel closeout (3).

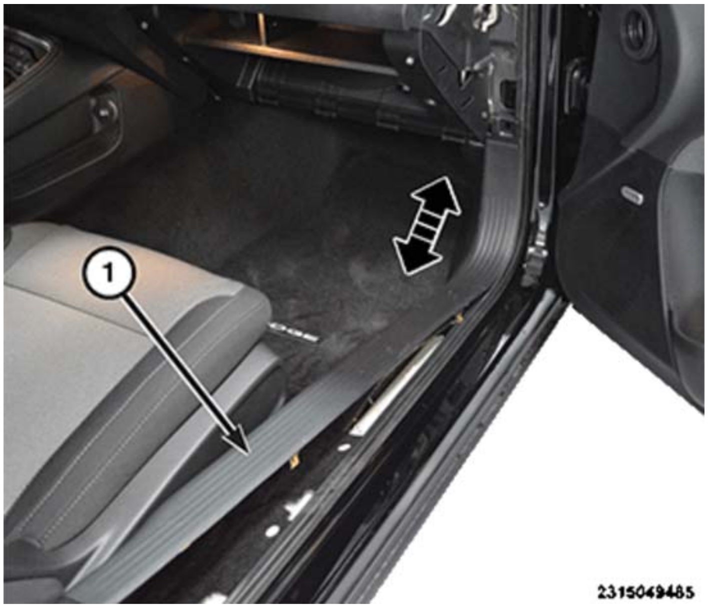


Fig. 183: Cowl Side Trim Panel
Courtesy of CHRYSLER GROUP, LLC

4. Install the cowl side trim panel (1) at the front, then hand tap the rear to install the retaining clips.

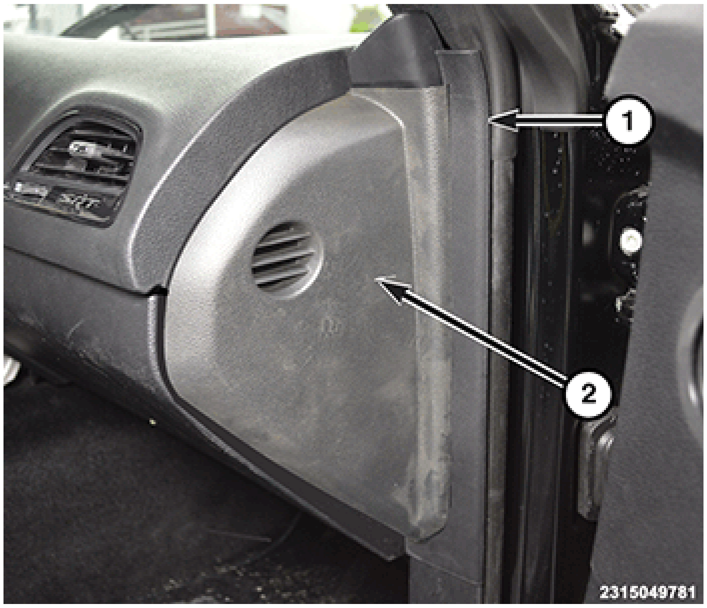


Fig. 184: A-Pillar Extension & Instrument Panel End Cap
Courtesy of CHRYSLER GROUP, LLC

5. Position the A-pillar extension (1) and hand tap to engage the retaining clips.
6. Position the instrument panel end cap (2) and hand tap to engage the retaining clips.

GLOVE BOX DOOR

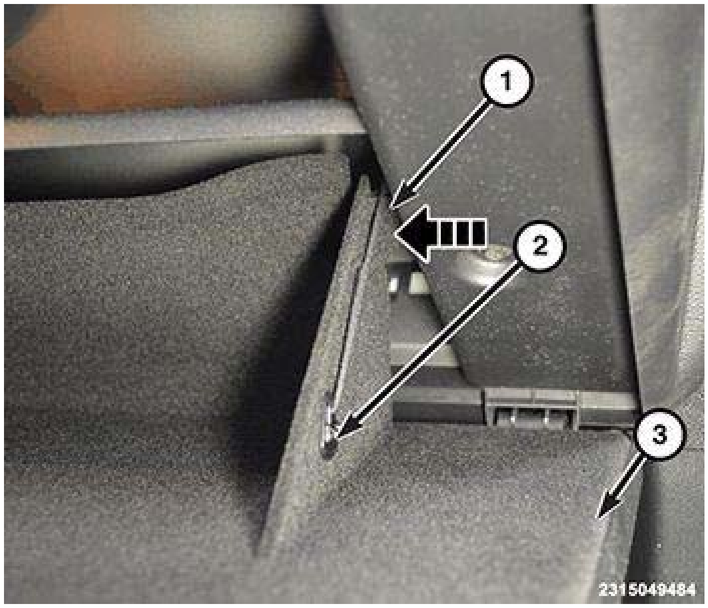


Fig. 185: Glove Box Door, Support Strap And Retainer & Stops
Courtesy of CHRYSLER GROUP, LLC

1. Align the glove box door (3) in the lower hinge slots.
2. Install the support strap and retainer (2) into the slot on the glove box door.
3. Push in on the glove box door stops (1) and rotate the glove box door upward.

GRILLE, DEFROSTER

REMOVAL

REMOVAL

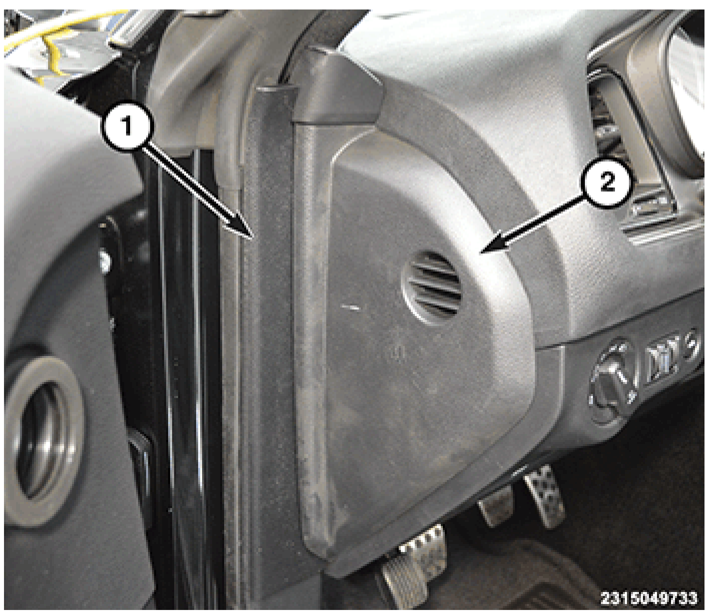


Fig. 186: A-Pillar Extension & Instrument Panel End Cap
Courtesy of CHRYSLER GROUP, LLC

1. Remove the A-pillar trim panels. Refer to PANEL, A-PILLAR TRIM, REMOVAL.

2. Using a trim stick or equivalent, remove the instrument panel end cap (2) and the A-pillar extension (1), on both sides of vehicle.

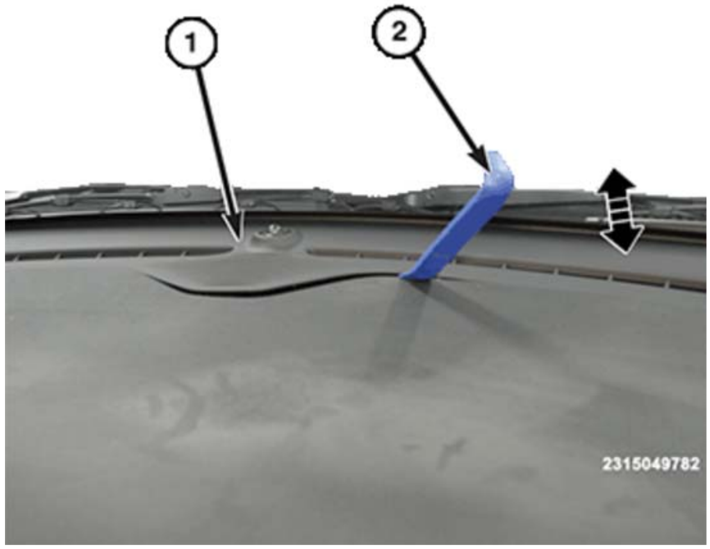


Fig. 187: Defroster Grille & Trim Stick
Courtesy of CHRYSLER GROUP, LLC

3. Using a trim stick (2) or equivalent, lift the rear of the defroster grille (1) to release the retaining clip.
4. Pull the defroster grille rearward and remove.

INSTALLATION

INSTALLATION

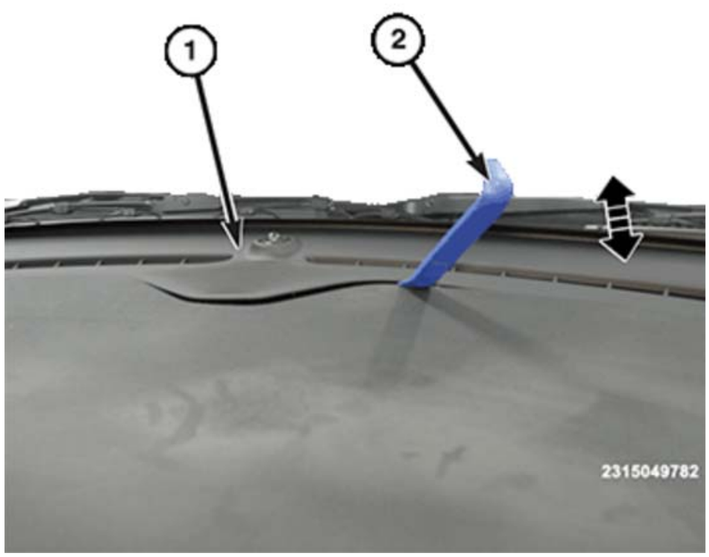


Fig. 188: Defroster Grille & Trim Stick
Courtesy of CHRYSLER GROUP, LLC

1. Position the defroster grille (1) onto the top of the instrument panel.

2. Hand tap the defroster grille to engage the retaining clips.

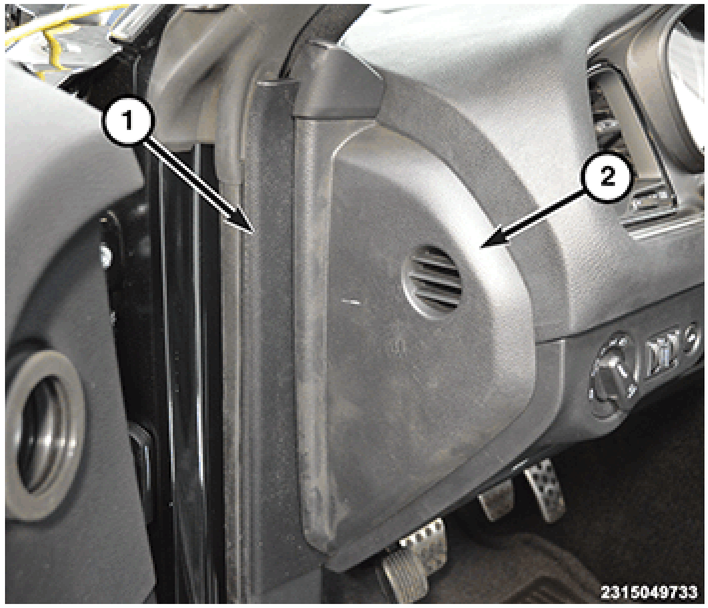


Fig. 189: A-Pillar Extension & Instrument Panel End Cap
Courtesy of CHRYSLER GROUP, LLC

3. Position the and the A-pillar extension (1) and hand tap to engage the retaining clips.
4. Position the and the instrument panel end cap (2) and hand tap to engage the retaining clips.

PANEL, INSTRUMENT

REMOVAL

REMOVAL

WARNING: Disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, Occupant Classification System (OCS), seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the Supplemental Restraint System (SRS). Failure to take the proper precautions could result in accidental airbag deployment and serious or fatal injury.

WARNING: Never strike or drop the Occupant Restraint Controller (ORC), as it can damage the impact sensor or affect its calibration. The occupant restraint controller contains the impact sensor, which enables the system to deploy the supplemental restraints. If an airbag control module is accidentally dropped during service, the module must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper supplemental restraint deployment and serious or fatal injury.

CAUTION: On vehicles equipped with the Occupant Classification System (OCS), never replace both the Occupant Restraint Controller (ORC) and the Occupant

Classification Module (OCM) at the same time. If both require replacement, replace one. Then perform the supplemental restraint verification test before replacing the other. Both the ORC and the OCM store OCS calibration data, which they transfer to one another when one of them is replaced. If both are replaced at the same time, an irreversible fault will be set in both modules.

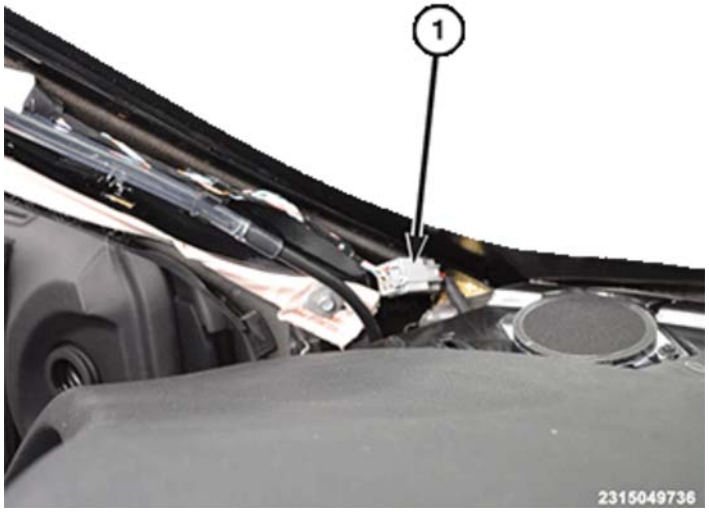


Fig. 190: Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions.
2. Remove the floor console. Refer to **CONSOLE, FLOOR, REMOVAL**.
3. Remove the steering column. Refer to **COLUMN, REMOVAL** .
4. Remove the glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, REMOVAL**.
5. Remove the defroster grille. Refer to **GRILLE, DEFROSTER, REMOVAL**.
6. Disconnect the wire harness connectors (1) at the A-pillar, on both sides of vehicle.

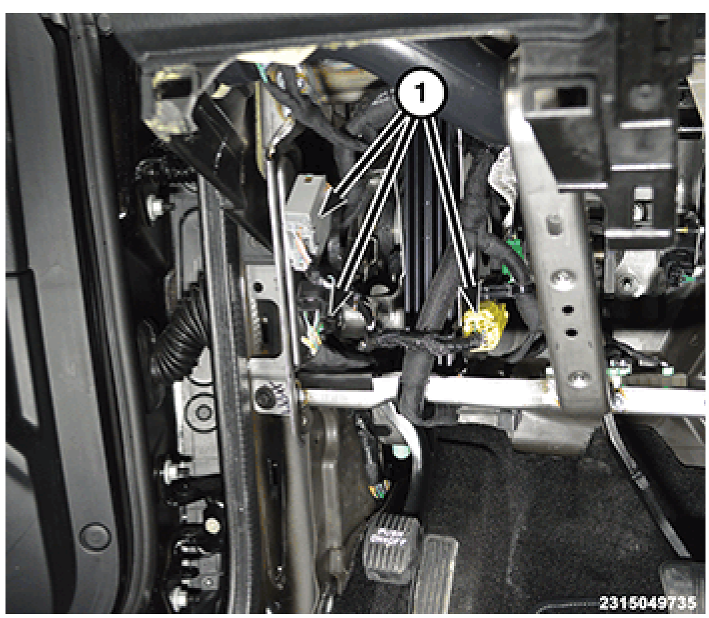


Fig. 191: Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

7. Under the left side of the instrument panel disconnect the wire harness connectors (1).

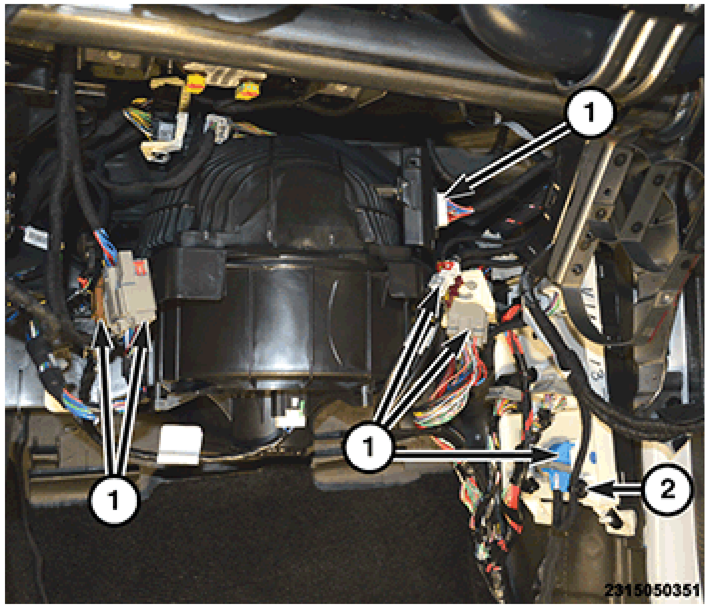


Fig. 192: Wire Harness Connectors & Harness
Courtesy of CHRYSLER GROUP, LLC

8. Under the right side of the instrument panel unclip the harness (2) and disconnect the wire harness connectors (1).

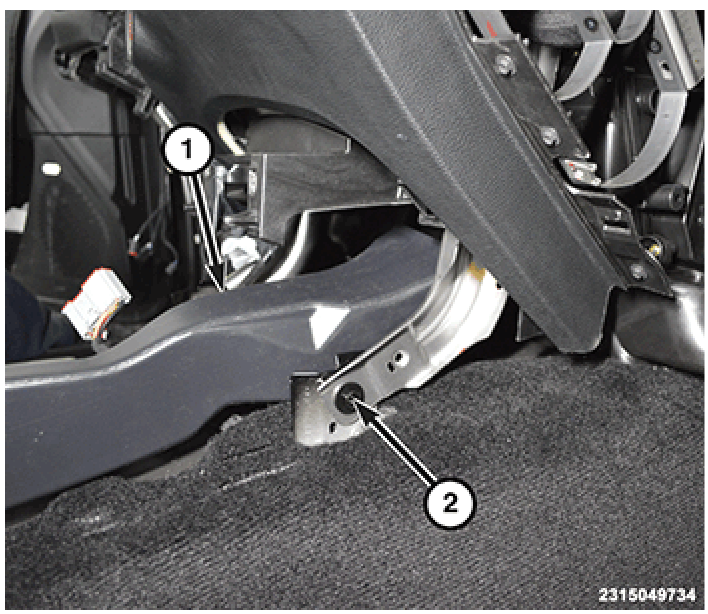


Fig. 193: Floor Duct & Instrument Panel Center Bracket Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Remove the push fastener and the floor duct (1).
10. Remove the two instrument panel center bracket bolts (2).

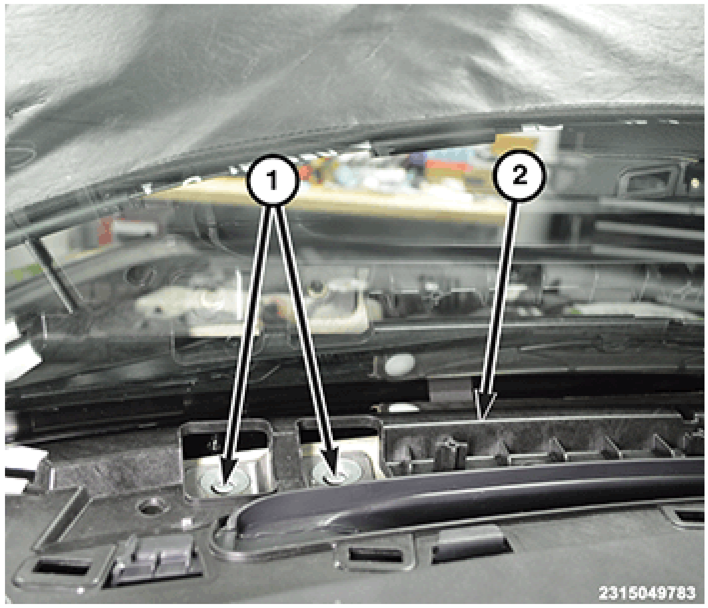


Fig. 194: Instrument Panel & Top Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Remove the two bolts (1) at the front of the instrument panel (2) on left side.

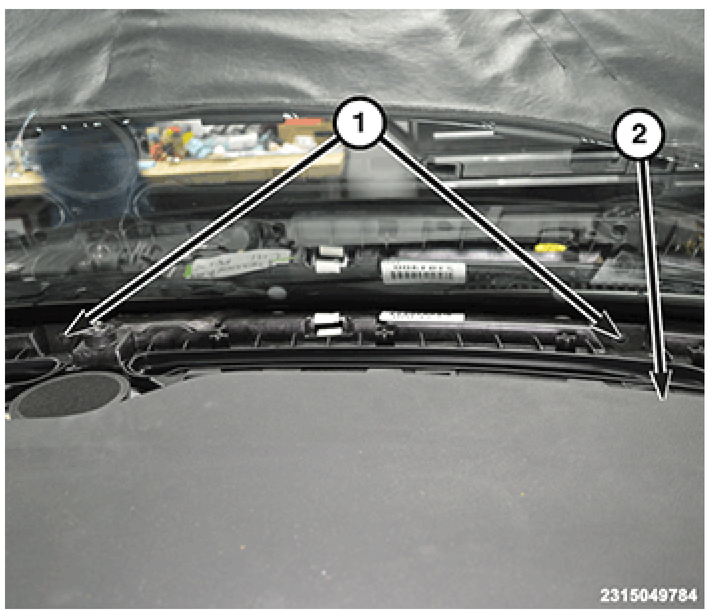


Fig. 195: Instrument Panel & Screws
Courtesy of CHRYSLER GROUP, LLC

12. Remove the two screws (1) at the front of the instrument panel (2) near the center and on right side.

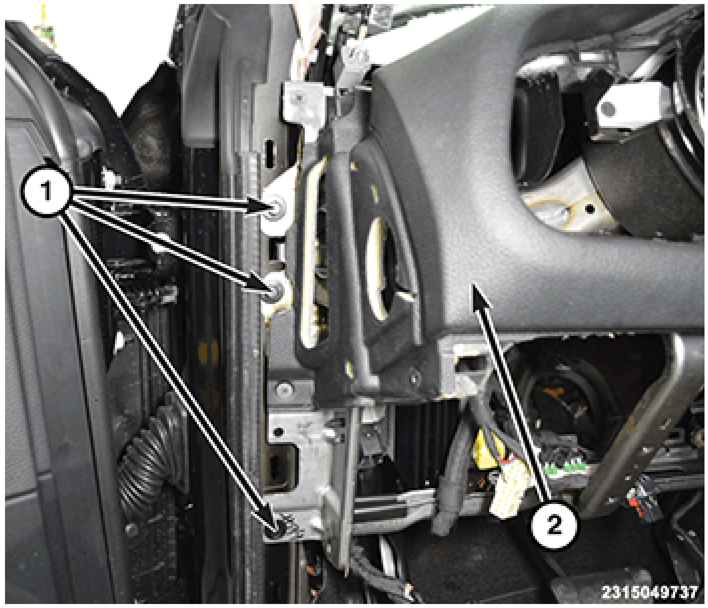


Fig. 196: Instrument Panel Assembly & Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Remove the instrument panel side bolts (1) on both sides of the vehicle.
14. Lift the instrument panel assembly (2) off of the supports. Carefully roll the instrument panel rearward to make sure there is nothing attached, then remove it from the vehicle.

INSTALLATION

INSTALLATION

WARNING: **Disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, Occupant Classification System (OCS), seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the Supplemental Restraint System (SRS). Failure to take the proper precautions could result in accidental airbag deployment and serious or fatal injury.**

WARNING: **Never strike or drop the Occupant Restraint Controller (ORC), as it can damage the impact sensor or affect its calibration. The occupant restraint controller contains the impact sensor, which enables the system to deploy the supplemental restraints. If an airbag control module is accidentally dropped during service, the module must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper supplemental restraint deployment and serious or fatal injury.**

CAUTION: **On vehicles equipped with the Occupant Classification System (OCS), never replace both the Occupant Restraint Controller (ORC) and the Occupant Classification Module (OCM) at the same time. If both require replacement, replace one. Then perform the supplemental restraint verification test before replacing the other. Both the ORC and the OCM store OCS calibration data,**

which they transfer to one another when one of them is replaced. If both are replaced at the same time, an irreversible fault will be set in both modules.

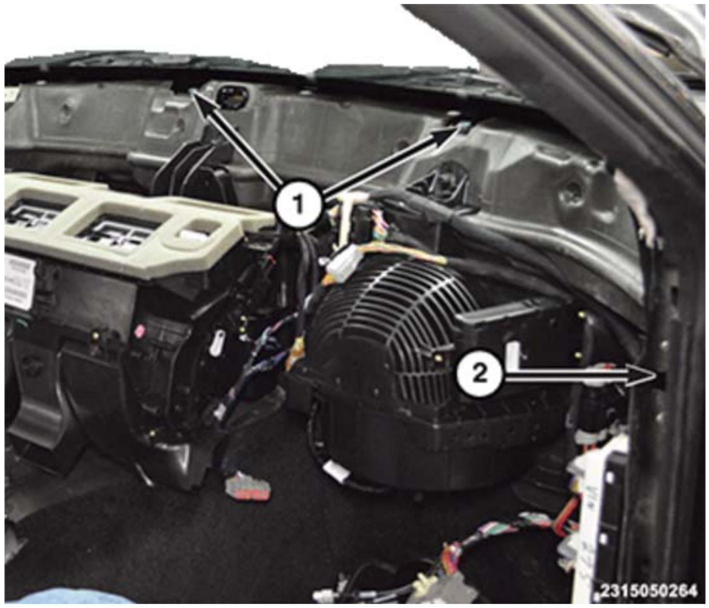


Fig. 197: Spring Nuts & Slot
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions.
2. If required, install new spring nuts (1) into the dash panel.
3. Carefully position the instrument panel in the vehicle through the drivers door. Hook the instrument panel into the slots (2) on both sides.
4. Loosely install all the instrument panel bolts and screws.

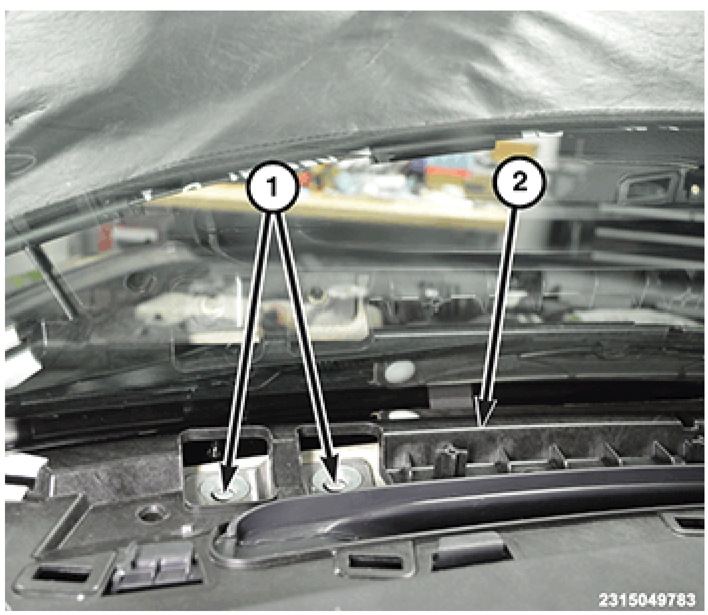


Fig. 198: Instrument Panel & Top Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Tighten the instrument panel top bolts (1) to the proper specification. Refer to **SPECIFICATIONS**.

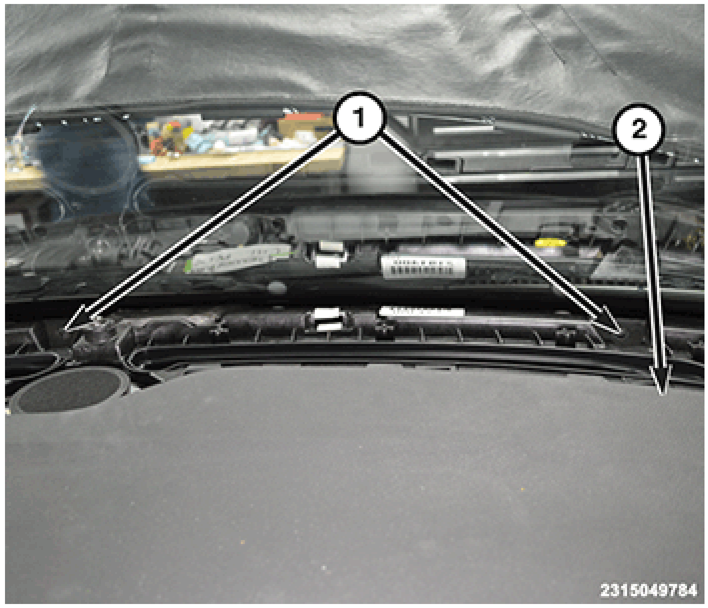


Fig. 199: Instrument Panel & Screws
Courtesy of CHRYSLER GROUP, LLC

6. Tighten the instrument panel top screws (1) to the proper specification. Refer to SPECIFICATIONS.

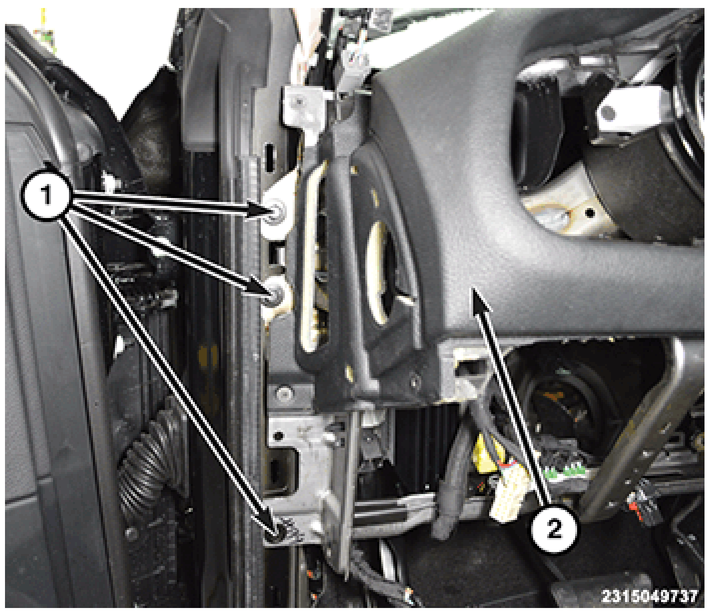


Fig. 200: Instrument Panel Assembly & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Tighten the instrument panel side bolts (1) to the proper specification. Refer to SPECIFICATIONS.

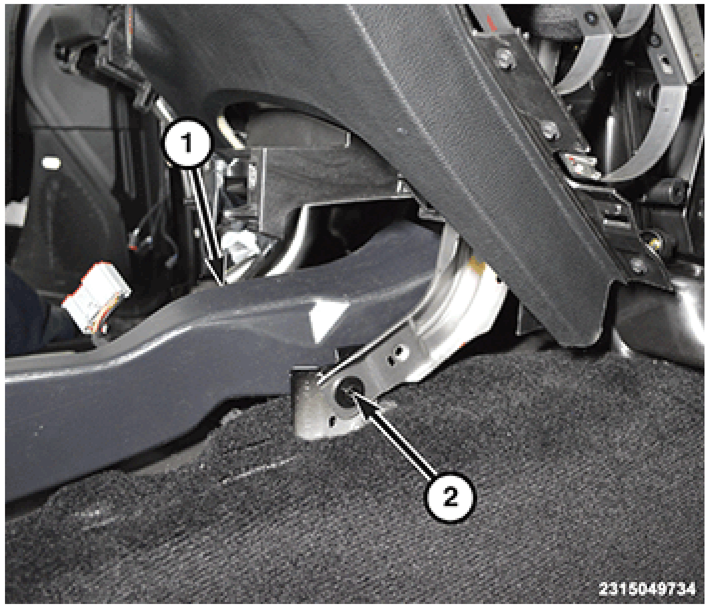


Fig. 201: Floor Duct & Instrument Panel Center Bracket Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Tighten the instrument panel center bracket bolts (2) to the proper specification. Refer to **SPECIFICATIONS**.
9. Install the floor duct (1) and push fastener.

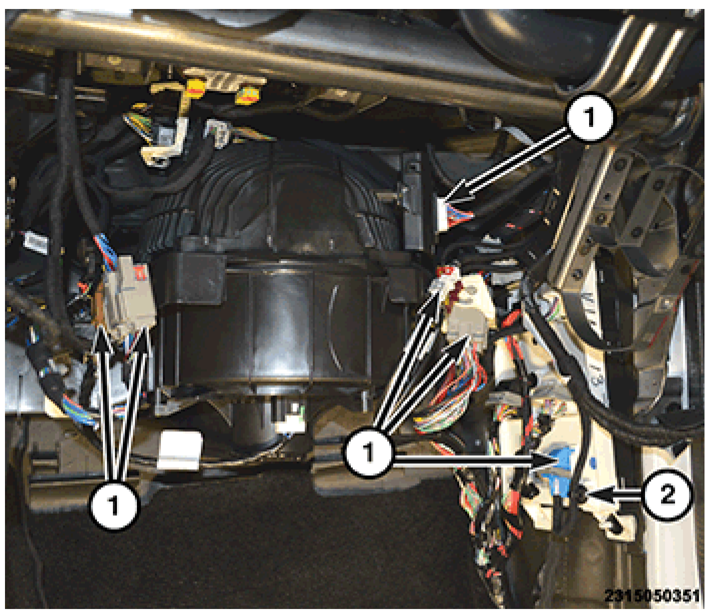


Fig. 202: Wire Harness Connectors & Harness
Courtesy of CHRYSLER GROUP, LLC

10. Under the right side of the instrument panel connect the wire harness connectors (1) and clip the harness (2) in place.

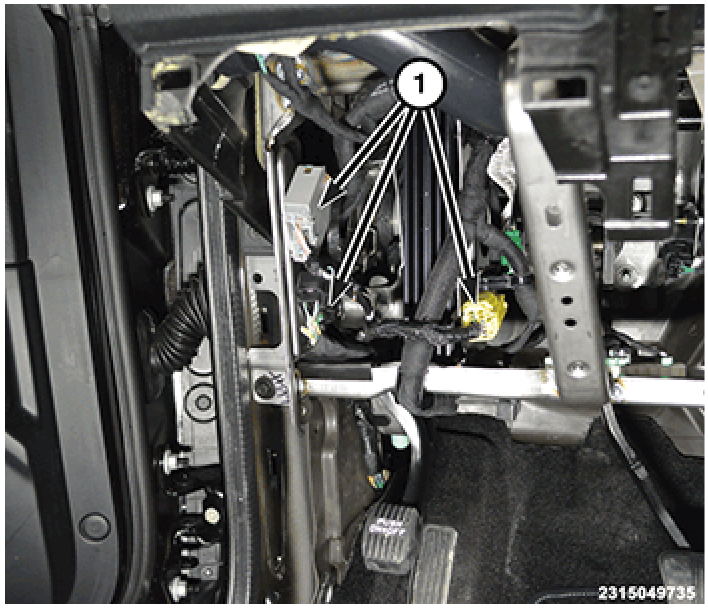


Fig. 203: Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

11. Under the left side of the instrument panel connect the wire harness connectors (1).

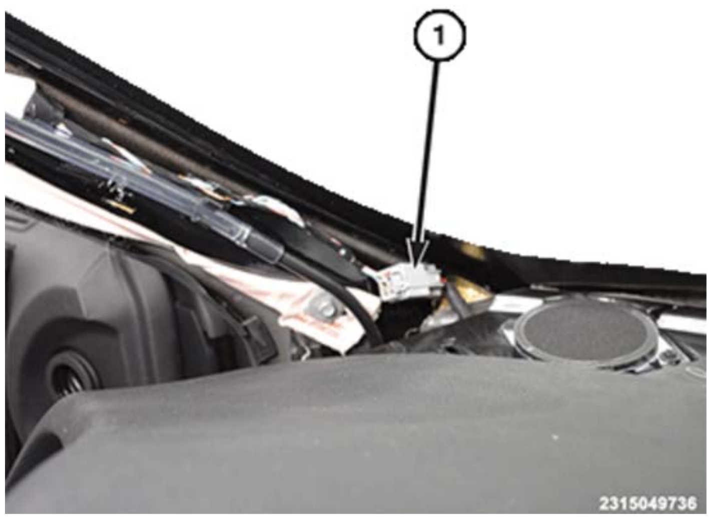


Fig. 204: Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

12. Connect the wire harness connectors (1) at the A-pillar, on both sides of vehicle.
13. Install the defroster grille. Refer to **GRILLE, DEFROSTER, INSTALLATION**.
14. Install the glove box. Refer to **GLOVE BOX, INSTRUMENT PANEL, INSTALLATION**.
15. Install the steering column. Refer to **COLUMN, INSTALLATION** .
16. Install the floor console. Refer to **CONSOLE, FLOOR, INSTALLATION**.

INTERIOR

CARPET

REMOVAL

REMOVAL

FRONT FLOOR CARPET

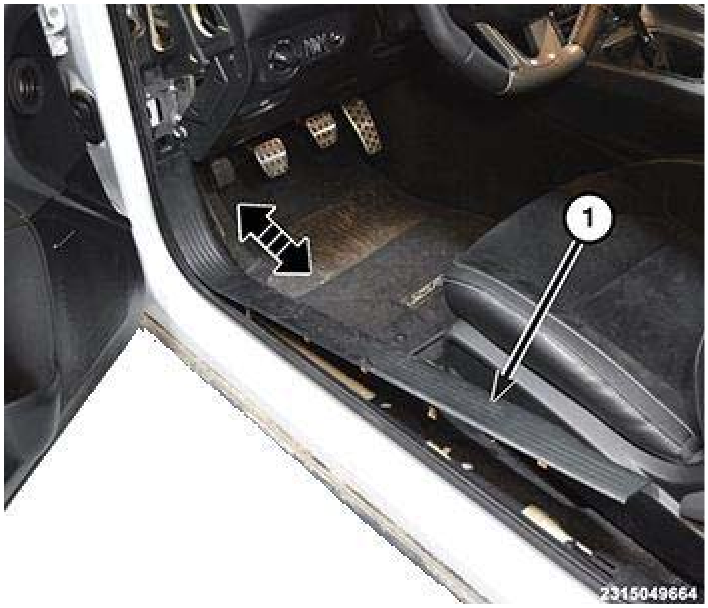
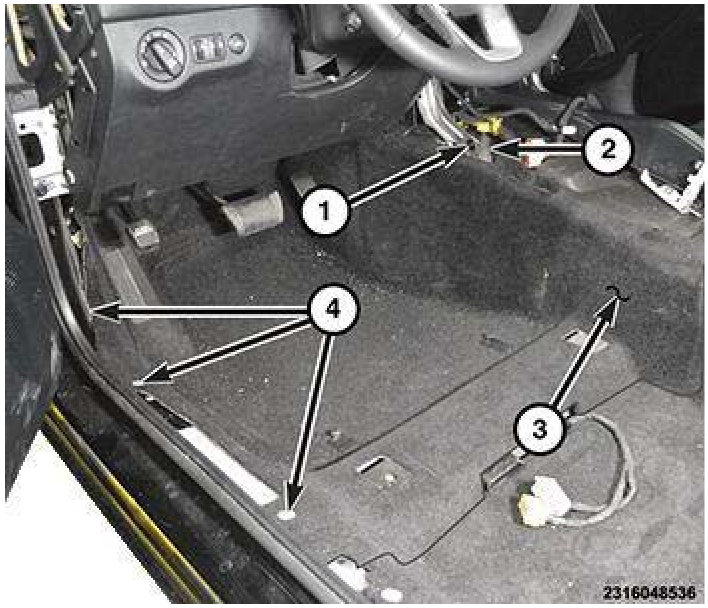


Fig. 205: Cowl Side Trim Panel
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The front floor carpet consists of two components, one for the driver side and one for the passenger side. These carpets can be removed and installed separately.**

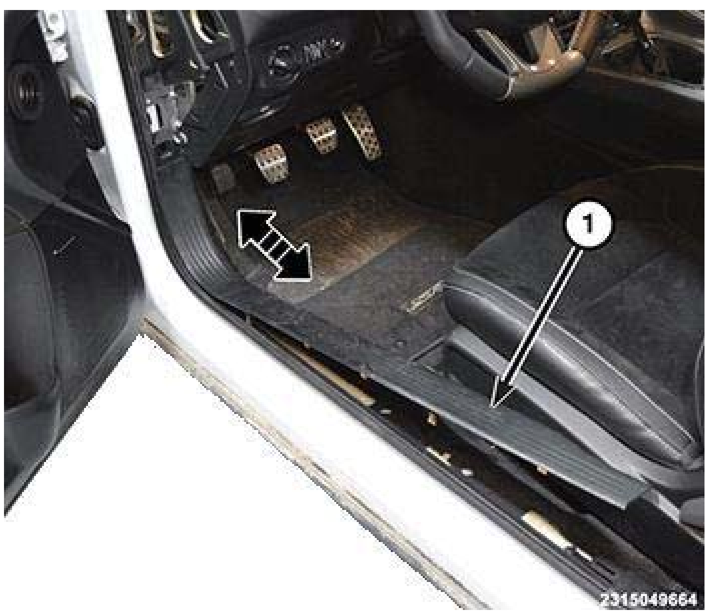
1. Lift the cowl side trim panel (1) at the rear, then pull rearward and remove.
2. Remove the driver or passenger front seat from the vehicle as necessary. Refer to **SEAT, FRONT, REMOVAL**.
3. Remove the floor console. Refer to **CONSOLE, FLOOR, REMOVAL**.



[Fig. 206: Instrument Panel Bracket, Bolt, Front Floor Carpet & Push Fasteners]
Courtesy of CHRYSLER GROUP, LLC

4. Remove the push fasteners (4).
5. Remove the bolt (1) and lift the front floor carpet over the instrument panel bracket (2).
6. Lift the front floor carpet (3) at the rear and remove.

REAR FLOOR CARPET



[Fig. 207: Cowl Side Trim Panel]
Courtesy of CHRYSLER GROUP, LLC

1. Lift the door scuff plate (1) at the rear, then pull rearward and remove. Remove the door sill scuff plate from opposite side of vehicle.
2. Remove both front seats. Refer to **SEAT, FRONT, REMOVAL**.
3. Remove the floor console. Refer to **CONSOLE, FLOOR, REMOVAL**.

4. Remove the rear seat cushion. Refer to **COVER, SEAT CUSHION, REAR, REMOVAL**.

Fig. 208: Quarter Trim Panel & Screw
Courtesy of CHRYSLER GROUP, LLC

5. Remove the screw (2), then pull the quarter trim panel (1) out to release the lower retaining clip. Perform this on both sides of vehicle.

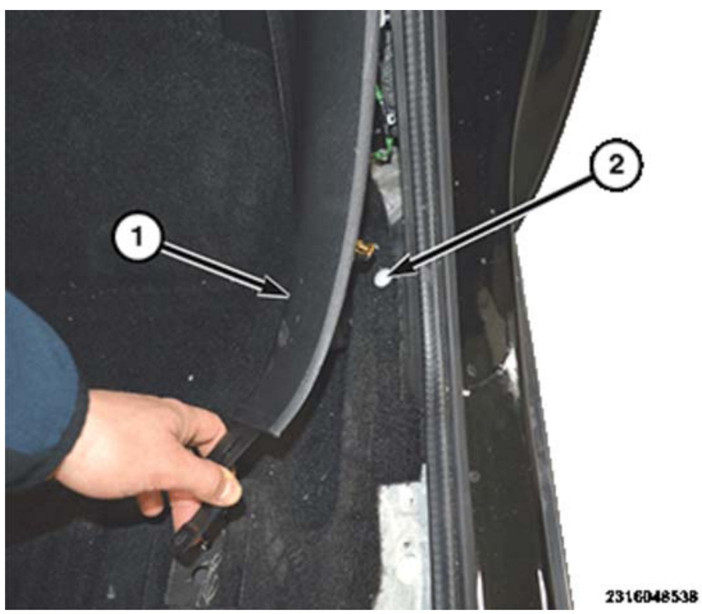


Fig. 209: Quarter Trim Panel & Push Fastener
Courtesy of CHRYSLER GROUP, LLC

6. Pull back the quarter trim panel (1) and remove the push fastener (2), on both sides of the vehicle.

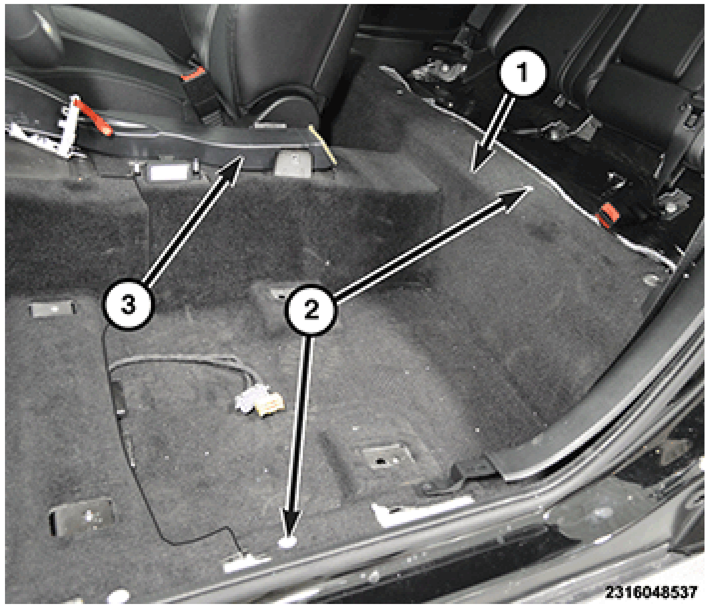


Fig. 210: Carpet, Push Fasteners & Floor Duct
Courtesy of CHRYSLER GROUP, LLC

7. Lift and remove the floor duct (3).
8. Remove the push fasteners (2).
9. Lift the rear floor carpet enough to remove the wire harness through the openings.

WHEEL WELL CARPET

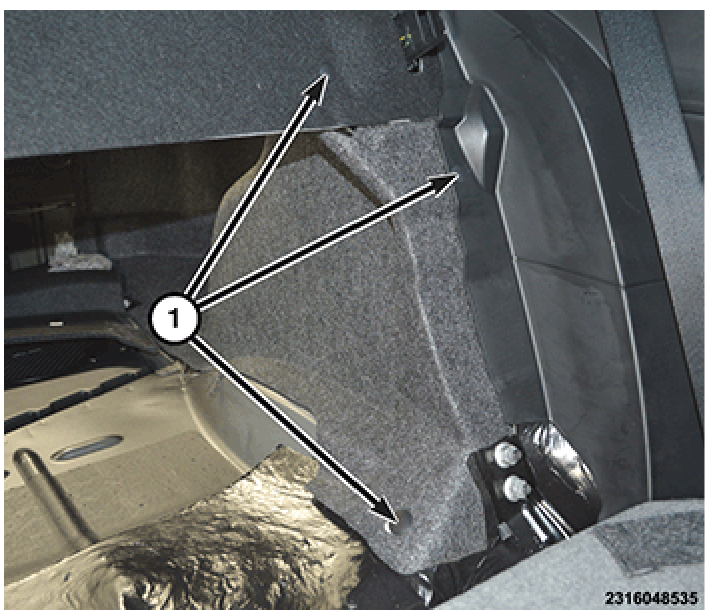


Fig. 211: Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Open the decklid and lift out the luggage floor carpet.
2. Fold the rear seats forward.
3. Remove the push fasteners (1).

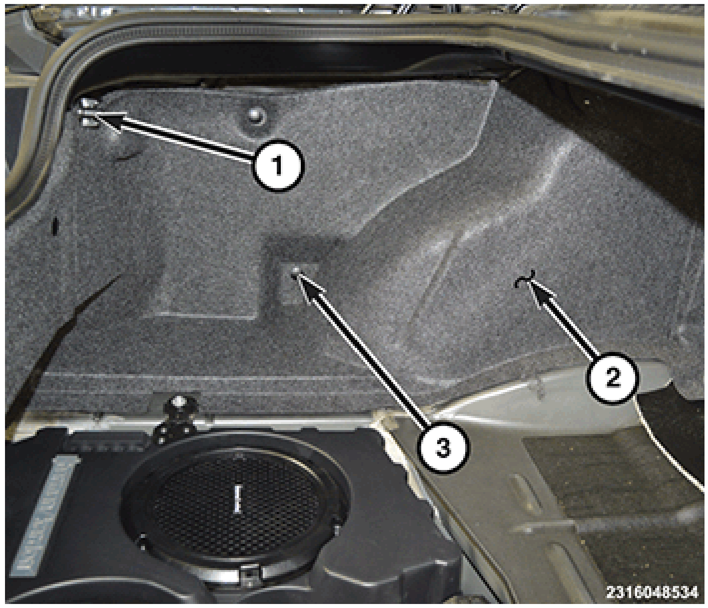


Fig. 212: Plastic Nut, Wheel Well Carpet & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Remove the plastic nut (1) by hand.
5. Remove the push fasteners (3) and the wheel well carpet (2).

INSTALLATION

INSTALLATION

FRONT FLOOR CARPET

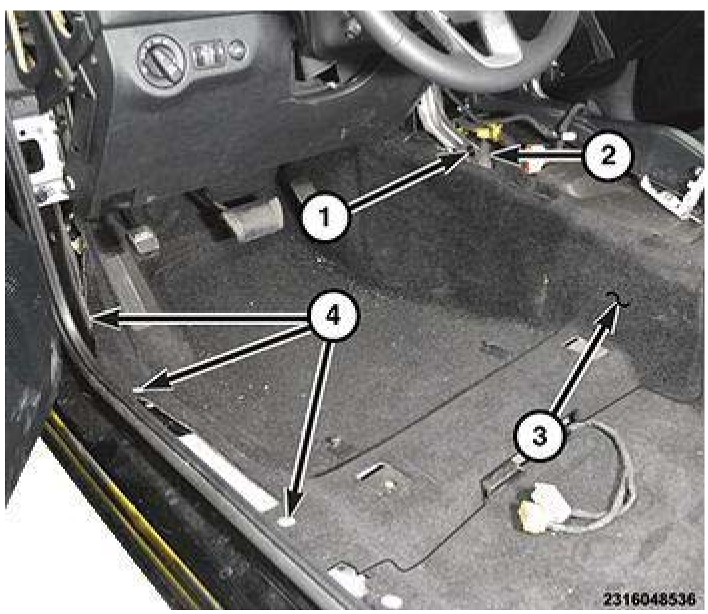


Fig. 213: Instrument Panel Bracket, Bolt, Front Floor Carpet & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Position the front floor carpet (3) over the instrument panel bracket (2). Make sure the rear of the front floor carpet is fitted correctly over the floor panel crossmember and does not cover the rear floor air duct opening. Make sure the front of the front floor carpet is fitted under the instrument panel without

interference with the steering column, the accelerator, nor the heater and air conditioner unit.

2. Install the push fasteners (4).
3. Install the instrument panel bracket bolt (1) and tighten securely.

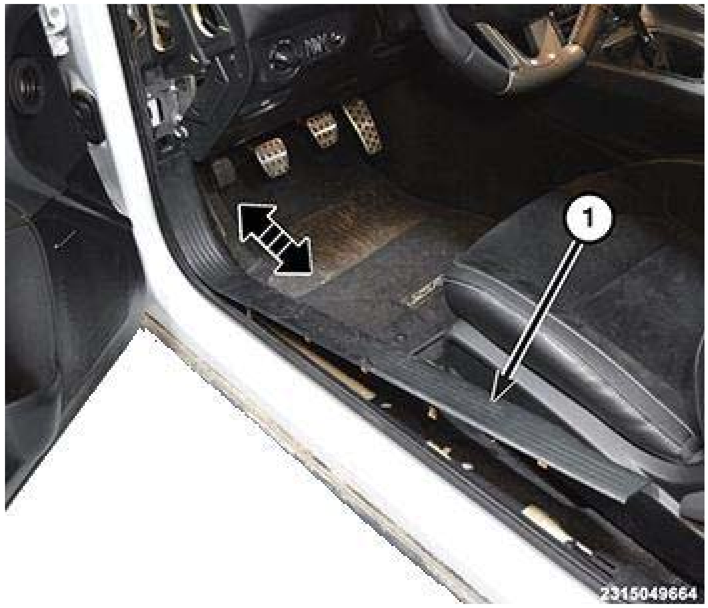


Fig. 214: Cowl Side Trim Panel
Courtesy of CHRYSLER GROUP, LLC

4. Install the cowl side trim panel (1) at the front, then hand tap the rear to install the retaining clips.
5. Install the floor console. Refer to **CONSOLE, FLOOR, INSTALLATION**.
6. Install the front seat. Refer to **SEAT, FRONT, INSTALLATION**.

REAR FLOOR CARPET

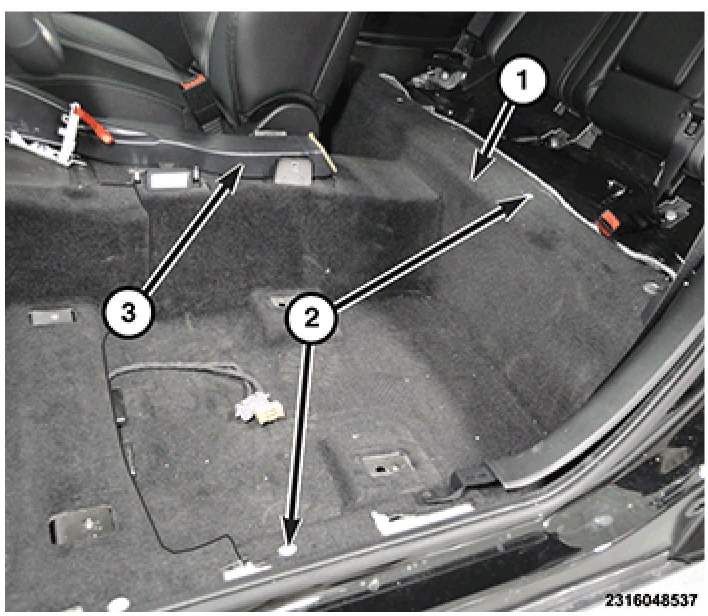


Fig. 215: Carpet, Push Fasteners & Floor Duct
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear floor carpet (1) into the vehicle. Route the wire harness through the openings in the carpet as necessary.
2. Install the push fasteners (2).
3. Install the floor duct (3).

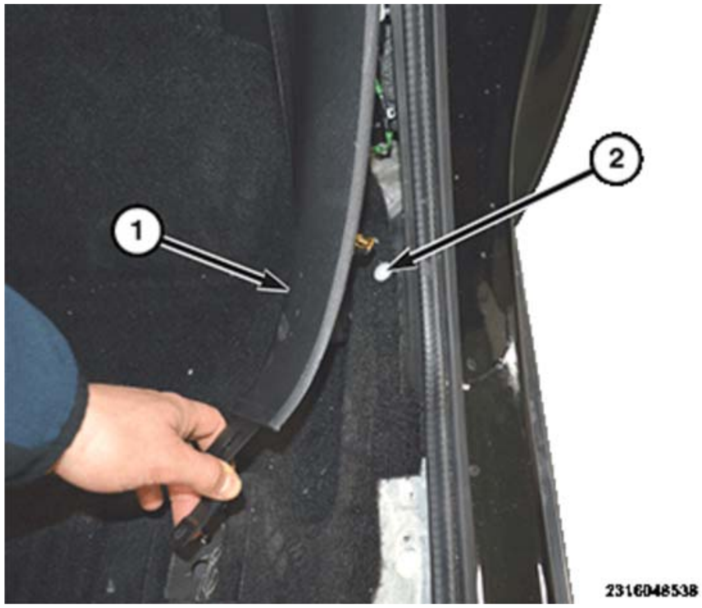
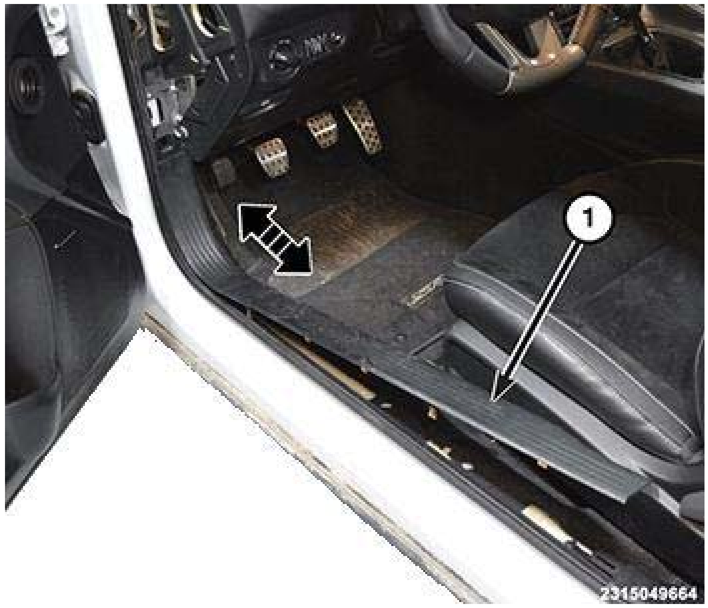


Fig. 216: Quarter Trim Panel & Push Fastener
Courtesy of CHRYSLER GROUP, LLC

4. Pull back the quarter time panel (1) and install the push fastener (2), on both sides of the vehicle.

Fig. 217: Quarter Trim Panel & Screw
Courtesy of CHRYSLER GROUP, LLC

5. Push the quarter trim panel (1) to engage the retaining clip. Install the screw (2) and tighten securely.



[Fig. 218: Cowl Side Trim Panel](#)
Courtesy of CHRYSLER GROUP, LLC

6. Install the cowl side trim panel (1) at the front, then hand tap the rear to install the retaining clips. Install both cowl side trim panels.
7. Install the rear seat cushion. Refer to **SEAT CUSHION, INSTALLATION**.
8. Install the floor console. Refer to **CONSOLE, FLOOR, INSTALLATION**.
9. Install the front seats. Refer to **SEAT, FRONT, INSTALLATION**.

WHEEL WELL CARPET

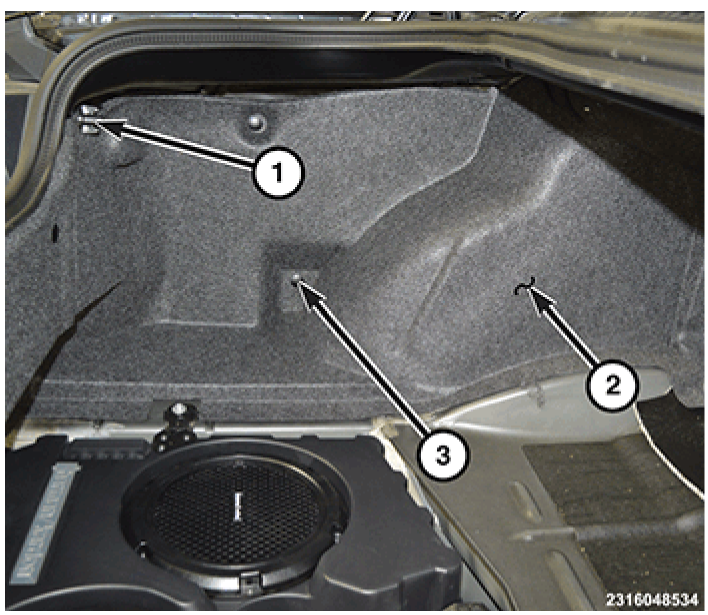


Fig. 219: Plastic Nut, Wheel Well Carpet & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Position the wheel well carpet (2) into the vehicle.
2. Install the plastic nut (1) by hand.

3. Install the push fasteners (3).

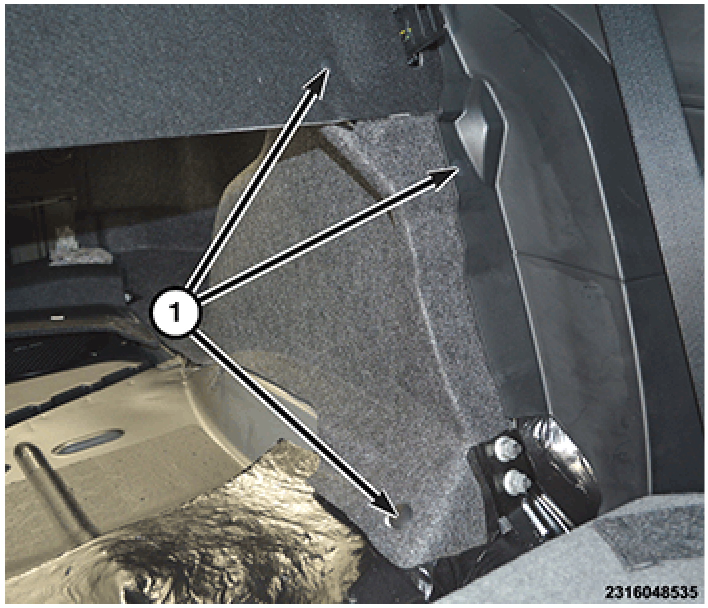


Fig. 220: Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Maker sure the wheel well carpet is positioned under the rear shelf panel and the quarter trim panel, then install the push fasteners (1).
5. Position the luggage floor carpet into the vehicle.

CONSOLE, FLOOR

REMOVAL

REMOVAL

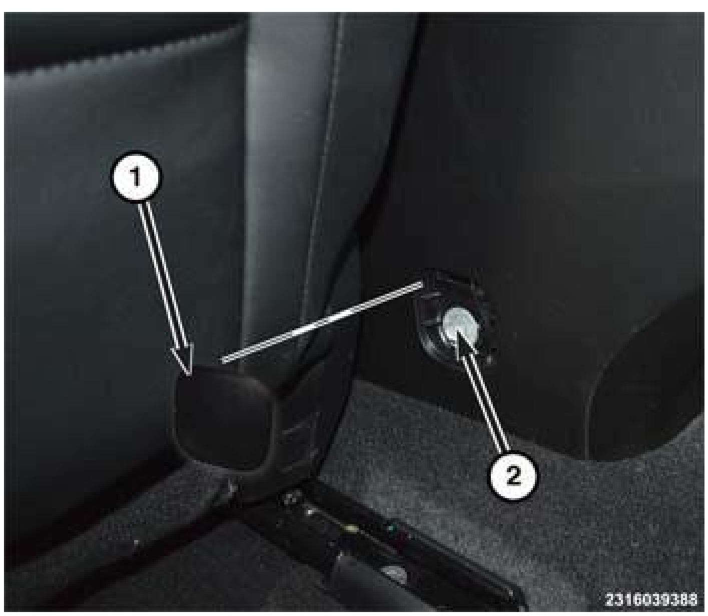


Fig. 221: Bolt Cover & Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Move the front seats to the full forward position.
3. On both sides of the floor console, remove the bolt covers (1) and the bolts (2) at the rear of the floor console.
4. Move the seats to the full rear position.
5. Disconnect and isolate the negative battery cable.

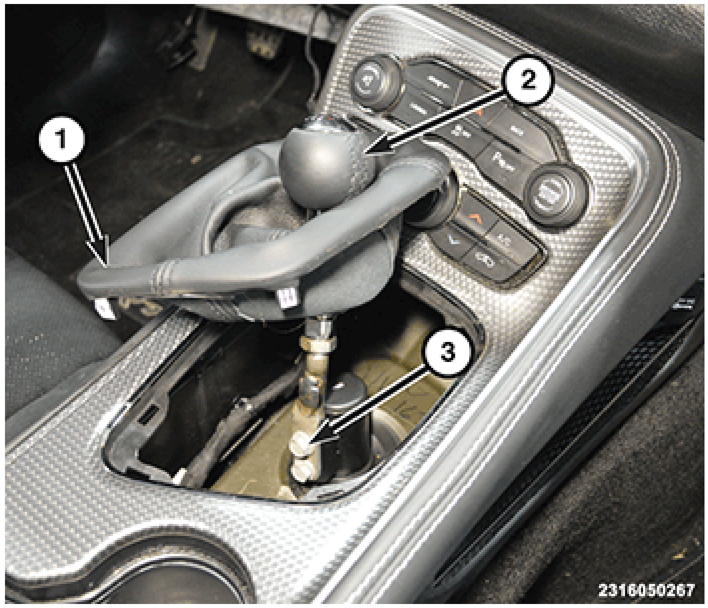


Fig. 222: Shifter Boot, Shift Lever & Bolts
Courtesy of CHRYSLER GROUP, LLC

6. For manual shifter, using a trim stick or equivalent, carefully release the retaining clips and lift the shifter boot (1).
7. Remove the bolts (3) then the shift lever (2).

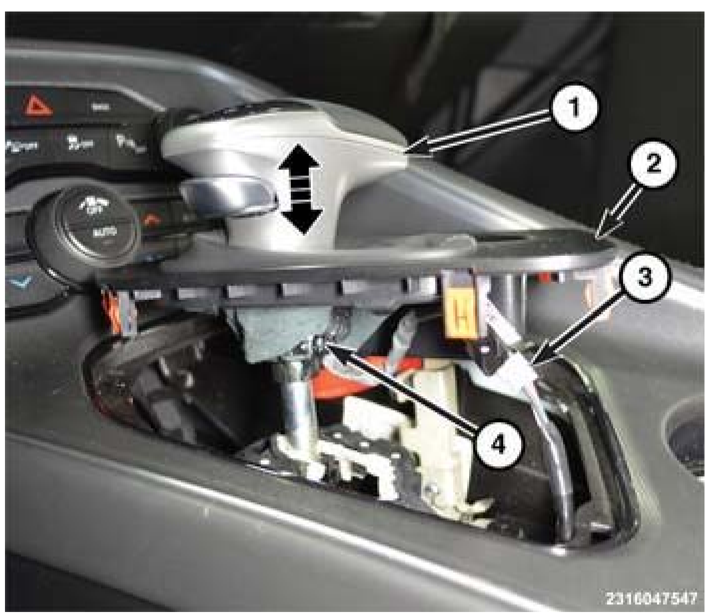


Fig. 223: Shifter Knob, Shifter Bezel, Wire Harness Connector & Screw

Courtesy of CHRYSLER GROUP, LLC

8. For automatic shifter, place the shifter in the Neutral position.
9. Using a trim stick or equivalent, carefully release the retaining clips and lift the shifter bezel (2).
10. Remove the screw (4) then lift the shifter knob (1) and remove.

Fig. 224: Floor Console Panel
Courtesy of CHRYSLER GROUP, LLC

11. Using a trim stick or equivalent, starting at the rear carefully release the retaining clip and lift the floor console panel (1). Disconnect the wire harness connectors and remove.

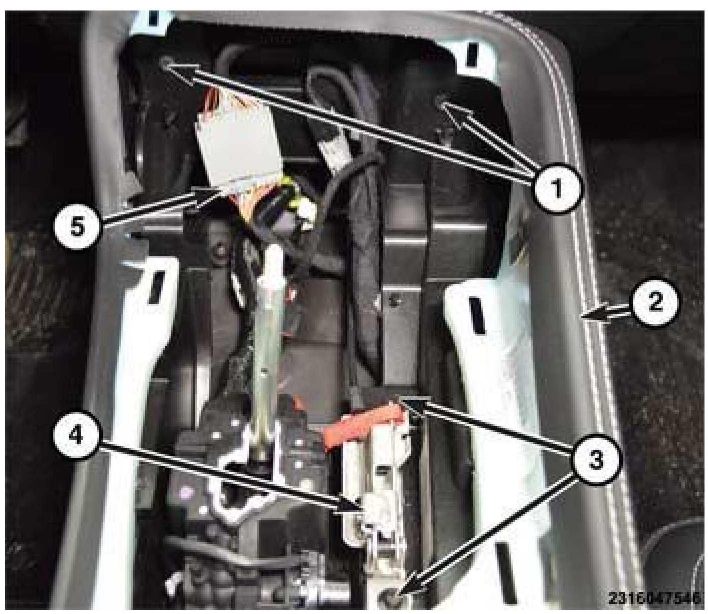


Fig. 225: Floor Console, Manual Park Release, Wire Harness Connector & Screws
Courtesy of CHRYSLER GROUP, LLC

12. Remove the two screws (1) at the front of the floor console (2).

13. Remove the two screws (3) and position the manual park release (4) aside, if equipped.
14. Disconnect the wire harness connector (5).
15. Slide the floor console rearward and remove.

INSTALLATION

INSTALLATION

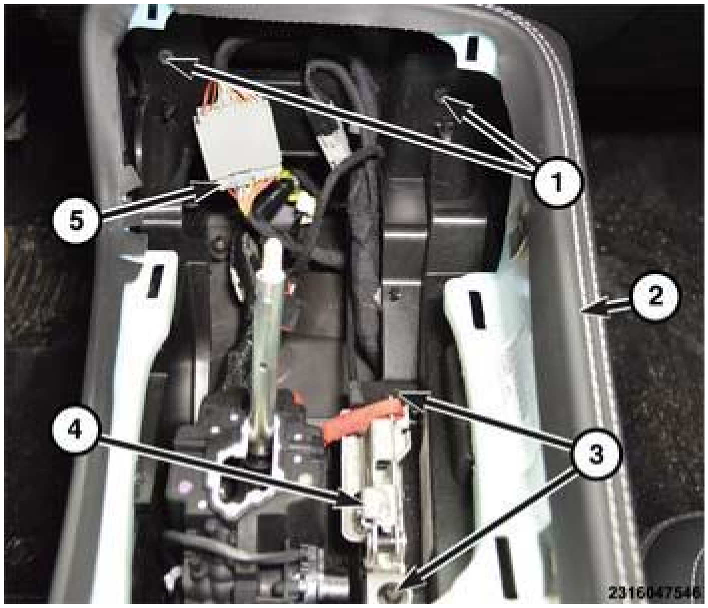
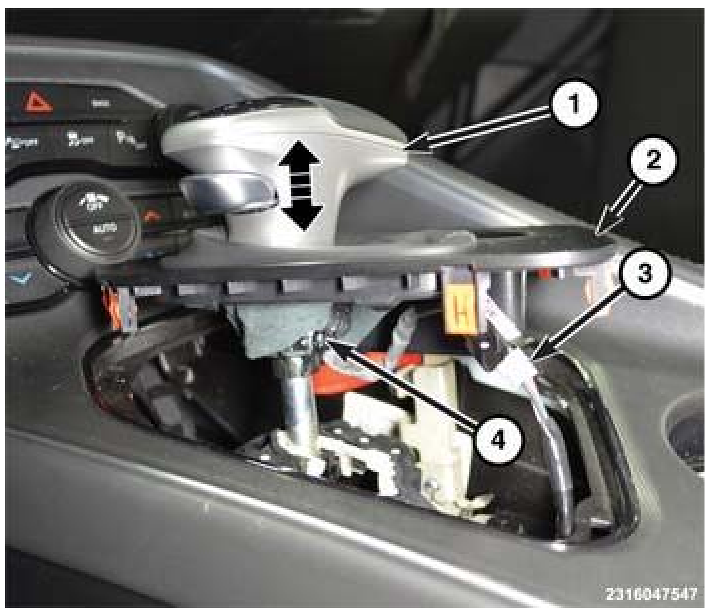


Fig. 226: Floor Console, Manual Park Release, Wire Harness Connector & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Position the floor console into the vehicle and connect the electrical connector (5).
2. Align the floor duct at the rear of the floor console. Slide the floor console forward to the instrument panel.
3. Install the two screws (1) and tighten securely.
4. Position the manual park release (4) and install the two screws (3), if equipped. Tighten the screws securely.

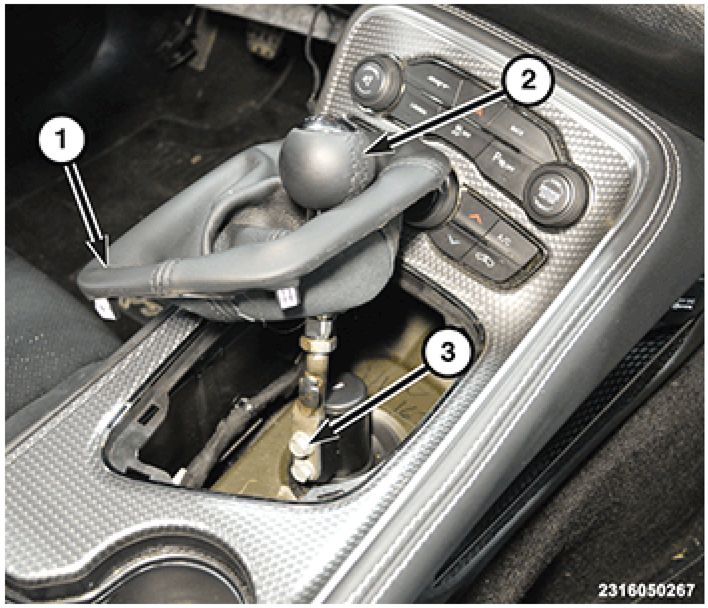
[Fig. 227: Floor Console Panel]
Courtesy of CHRYSLER GROUP, LLC

5. Connect the wire harness connectors and install the floor console panel (1).



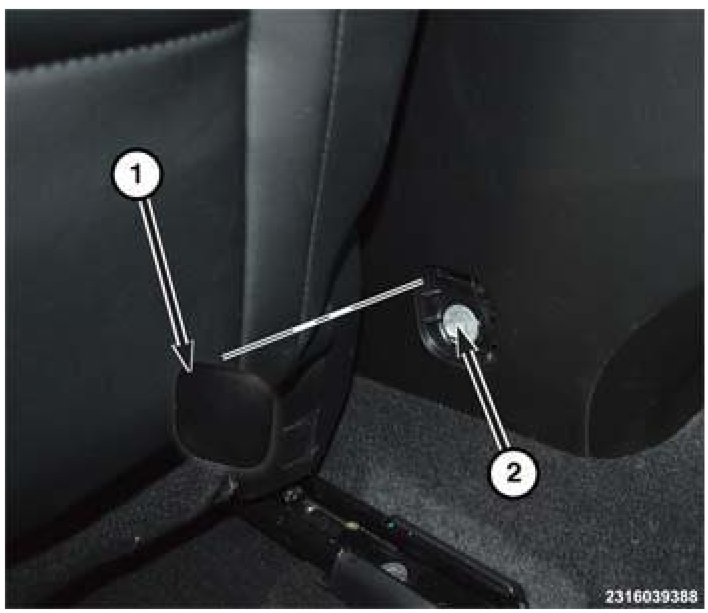
[Fig. 228: Shifter Knob, Shifter Bezel, Wire Harness Connector & Screw]
Courtesy of CHRYSLER GROUP, LLC

6. For automatic shifter, install the shifter knob and install the screw (4). Tighten the screw securely.
7. Connect the wire harness connector (3).
8. Position the shifter bezel (2) and engage the retaining clips.



[Fig. 229: Shifter Boot, Shift Lever & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

9. For manual shifter, install the shift lever (2) and the bolts (3). Tighten the shift lever bolts to 19 N.m (168 in. lbs.). .
10. Position the shifter boot (1) and engage the retaining clips.
11. Connect the battery negative cable.



[Fig. 230: Bolt Cover & Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

12. Move the seats to the full forward position.
13. Install the bolts (2) and tighten securely.
14. Install the bolt covers (1).

CONSOLE, OVERHEAD, FRONT

DESCRIPTION

DESCRIPTION

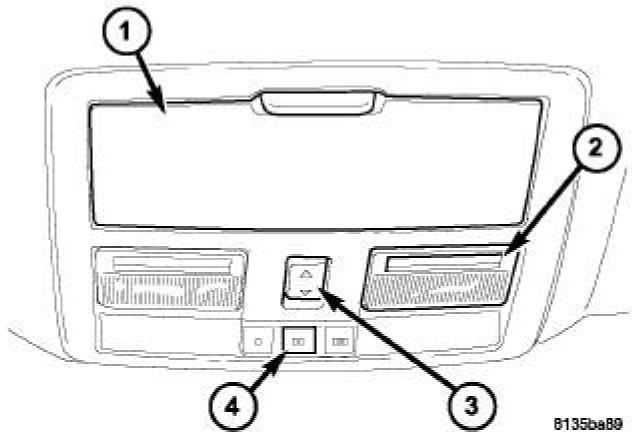


Fig. 231: Identifying Overhead Console Components
Courtesy of CHRYSLER GROUP, LLC

An overhead console is standard on this vehicle and includes the following components:

- Overhead storage compartment (1)
- Front map/reading lamps (2)
- Power sunroof switch (3) - if equipped
- Universal transmitter (4)
- Electronic Overhead Module

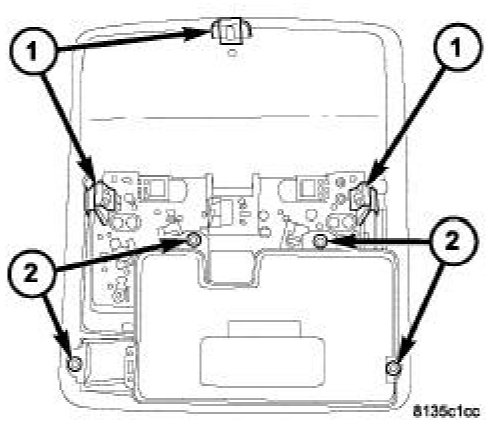


Fig. 232: Retaining Screws
Courtesy of CHRYSLER GROUP, LLC

The overhead console assembly is mounted by three snap clips (1) securing it to a molded plastic retainer bracket located above the headliner. The Electronic Overhead Module is secured to the overhead console with screws (2).

REMOVAL

REMOVAL

Fig. 233: Overhead Console & Clips

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Using a trim stick or equivalent, release the three retaining clips at the locations (1) and lower the overhead console (2).
3. Disconnect the wire harness connectors from the overhead console and remove.

INSTALLATION

INSTALLATION

Fig. 234: Overhead Console & Clips

Courtesy of CHRYSLER GROUP, LLC

1. Connect the wire harness connectors to the overhead console (2).
2. Align the three retaining clips (1) to the overhead console bracket.
3. Push firmly and evenly on the sides of the overhead console to engage the retaining clips.
4. Connect the negative battery cable.

HEADLINER

REMOVAL

REMOVAL

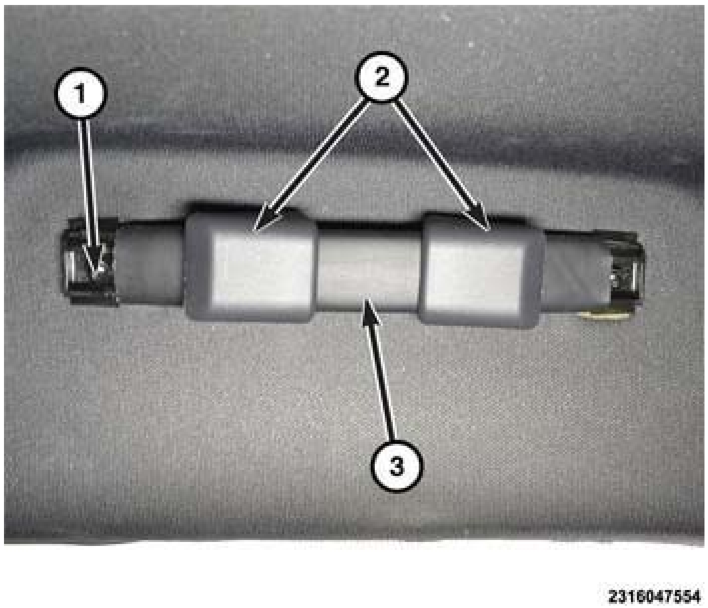
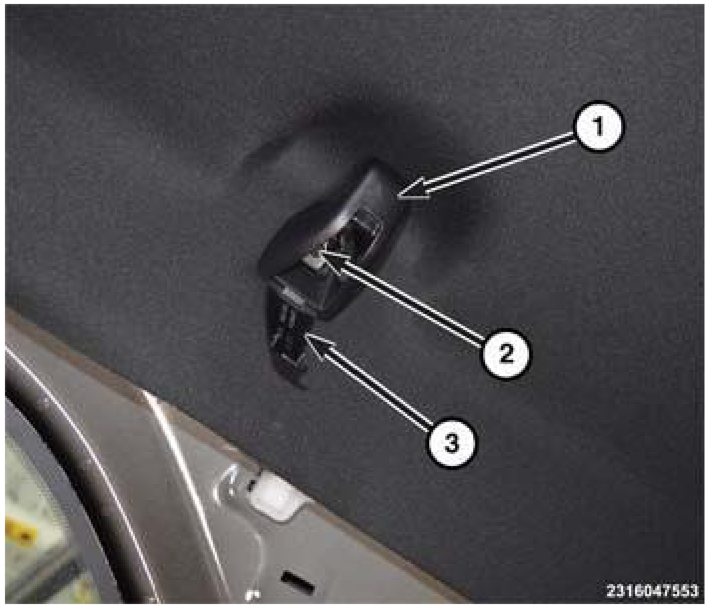


Fig. 235: Grab Handle, Screw Cover & Screw
Courtesy of CHRYSLER GROUP, LLC

NOTE: **In the event the headliner is damaged or creased during removal, it will need to be replaced with a new headliner.**

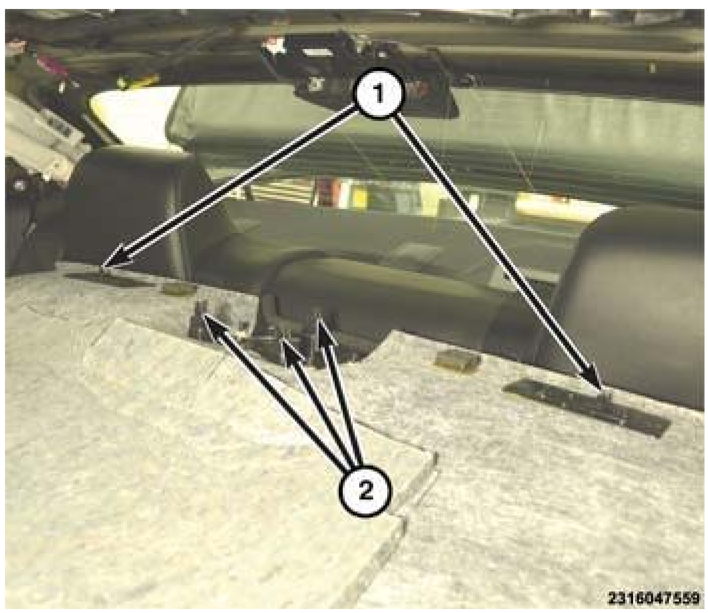
Use clean gloves or make sure your hands are clean before removing the headliner.

1. Disconnect and isolate the negative battery cable.
2. If removing the headliner from the vehicle first remove the windshield. Refer to **WINDSHIELD, REMOVAL**.
3. Using a trim stick or equivalent, position the screw covers (2) inward on the grab handle (3). Remove the two screws (1) and the grab handle. Remove all grab handles.



[Fig. 236: Coat Hook, Screw & Screw Cover]
Courtesy of CHRYSLER GROUP, LLC

4. Using a small pry tool, open the coat hook screw cover (3). Remove the screw (2) and the coat hook (1). Remove all coat hooks.
5. Remove the upper quarter trim panels. Refer to **PANEL, QUARTER TRIM, REMOVAL**.



[Fig. 237: Push Fasteners & Retainer Clips]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The headliner is shown in illustration removed for clarification.**

6. Using a trim stick or equivalent, release the push fasteners (1) and retainer clips (2) at the rear of the headliner.
7. Carefully pull the headliner downward near the center to release the magnetic fastener.

NOTE: **The rear of the headliner can now be lowered slightly to service the center high mount stop lamp.**

8. If lowering the headliner fully or removing the headliner, continue with the procedure.
9. Remove A-pillar trim panels. Refer to **PANEL, A-PILLAR TRIM, REMOVAL**.

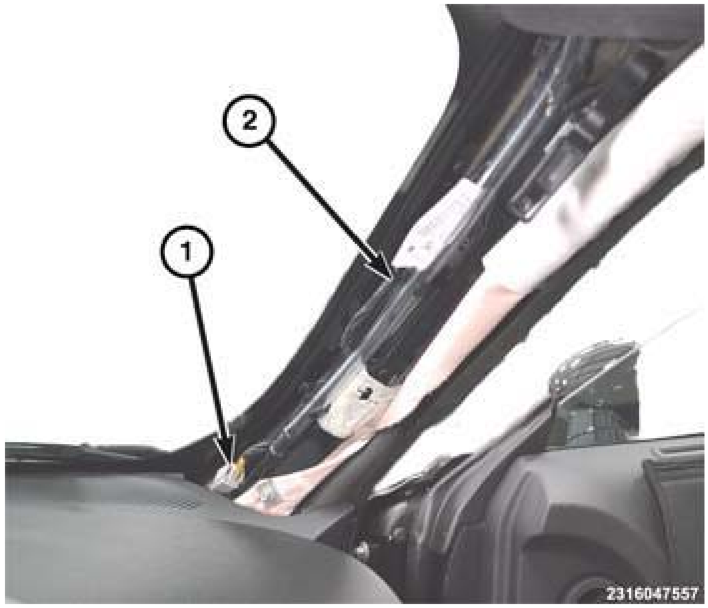


Fig. 238: Wire Harness & Connector
Courtesy of CHRYSLER GROUP, LLC

10. Unclip the headliner wire harness (2) and disconnect the headliner wire harness connector (1) at the right side A-pillar.

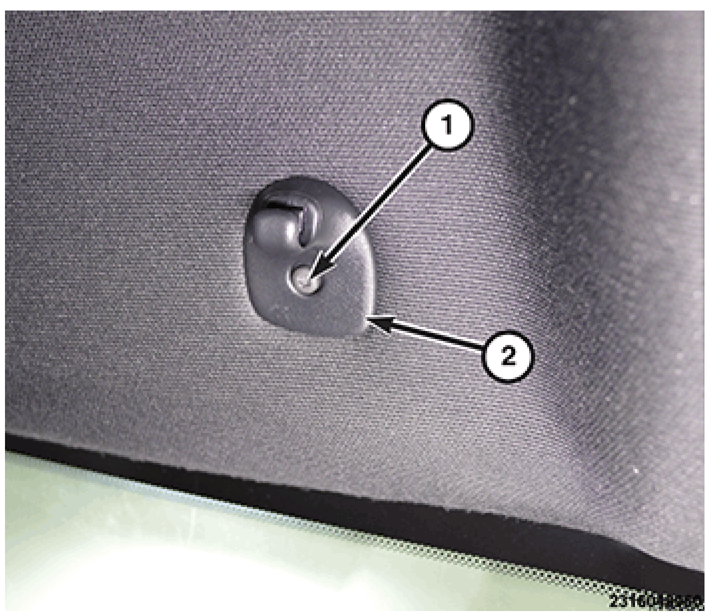


Fig. 239: Visor Support & Screw
Courtesy of CHRYSLER GROUP, LLC

11. Remove the screw (1) and the visor support (2).

12. Remove both visors. Refer to **VISOR, REMOVAL**.
13. If equipped, remove the overhead console. Refer to **CONSOLE, OVERHEAD, FRONT, REMOVAL**.
14. Recline both front seat backs.
15. Carefully pull the headliner downward near the center to release the magnetic fastener.

Fig. 240: Headliner
Courtesy of CHRYSLER GROUP, LLC

16. If the headliner is to be lowered for curtain airbag service or sunroof removal, recline both front seats to the farthest back position and move them to the farthest rearward position.
17. Lower the headliner (1) as shown in illustration.
18. If removing the headliner, carefully remove the headliner through the windshield opening.

INSTALLATION

INSTALLATION

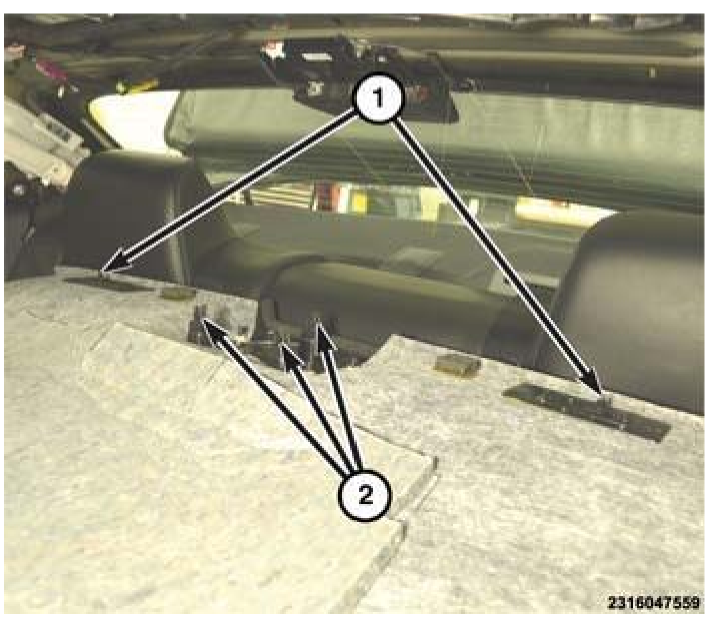


Fig. 241: Push Fasteners & Retainer Clips
Courtesy of CHRYSLER GROUP, LLC

NOTE: **In the event the headliner is damaged or creased during installation, it will need to be replaced with a new headliner.**

Use clean gloves or make sure your hands are clean before removing the headliner.

1. Carefully insert the headliner through the windshield opening.
2. With the help of an assistant, position the headliner and engage the retaining clips (2) into the roof structure. Engage the push fasteners (1).
3. Push up in the center of the headliner to engage the magnetic fastener.
4. Tuck the headliner under the trim lace around the sunroof opening.

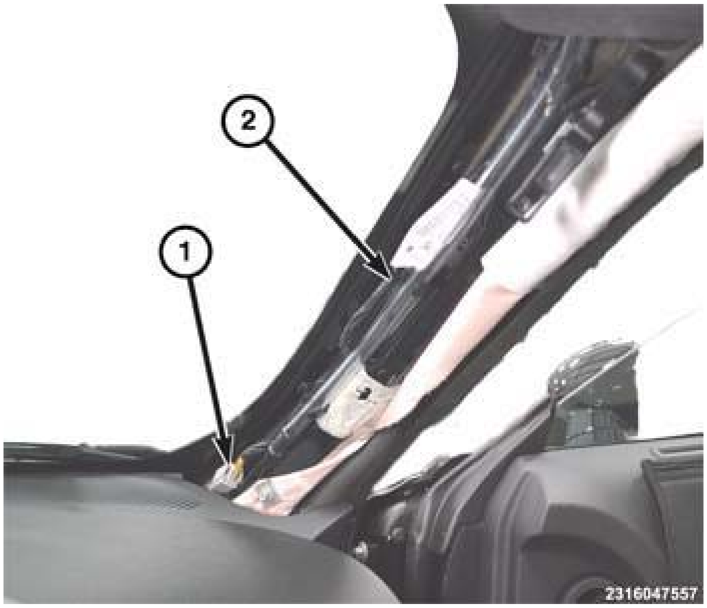


Fig. 242: Wire Harness & Connector
Courtesy of CHRYSLER GROUP, LLC

5. Route the headliner harness (2) and connect the electrical connector (1) at the A-pillar.
6. If equipped, install the overhead console. Refer to **CONSOLE, OVERHEAD, FRONT, INSTALLATION**.
7. Install both visors. Refer to **VISOR, INSTALLATION**.

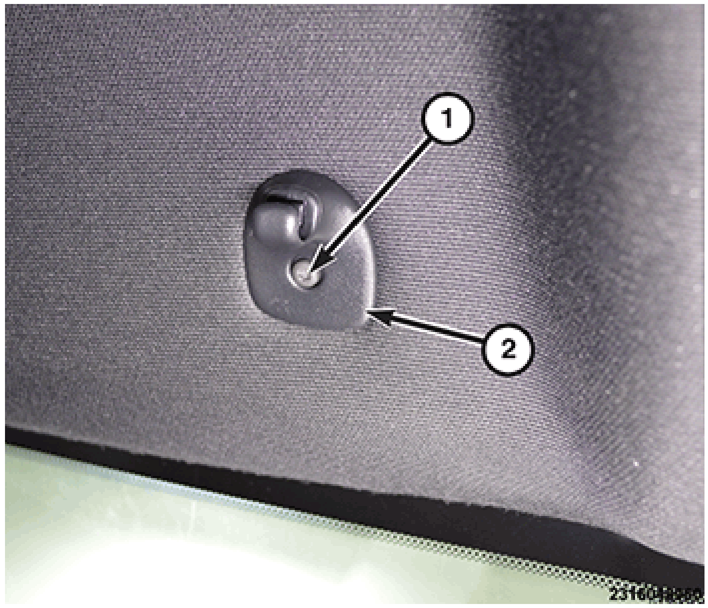
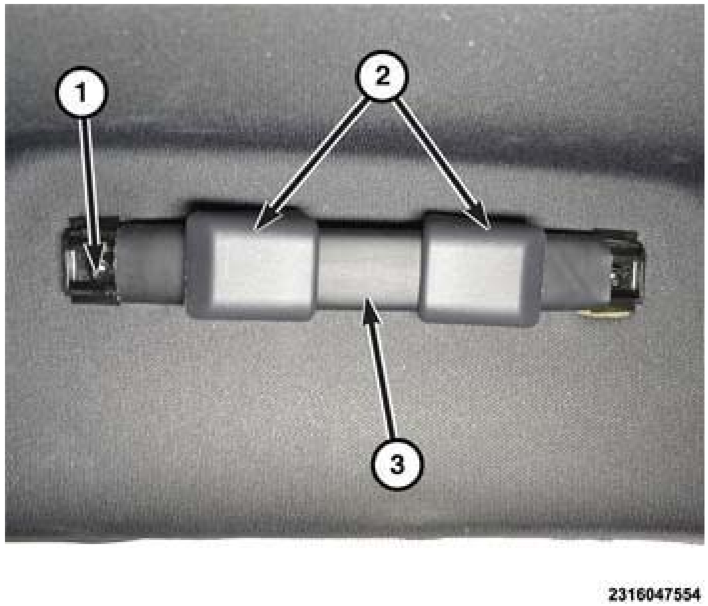


Fig. 243: Visor Support & Screw
Courtesy of CHRYSLER GROUP, LLC

8. Position the visor support (2) and install the screw (1). Tighten the screw securely.

Fig. 244: Coat Hook, Screw & Screw Cover
Courtesy of CHRYSLER GROUP, LLC

9. Position the coat hook (1) and install the screw (2). Tighten the screw securely and close the screw cover (3).



[Fig. 245: Grab Handle, Screw Cover & Screw](#)
Courtesy of CHRYSLER GROUP, LLC

10. Position the grab handle (3) and install the two screws (1). Tighten the screws securely then slide the screw covers (2) outward till they snap into place.
11. Install the upper quarter trim panels. Refer to **PANEL, QUARTER TRIM, INSTALLATION**.
12. Install the A-pillar trim panels. Refer to **PANEL, A-PILLAR TRIM, INSTALLATION**.
13. If removed, install the windshield. Refer to **WINDSHIELD, INSTALLATION**.
14. Connect the negative battery cable.

MIRROR, REARVIEW

REMOVAL

REMOVAL

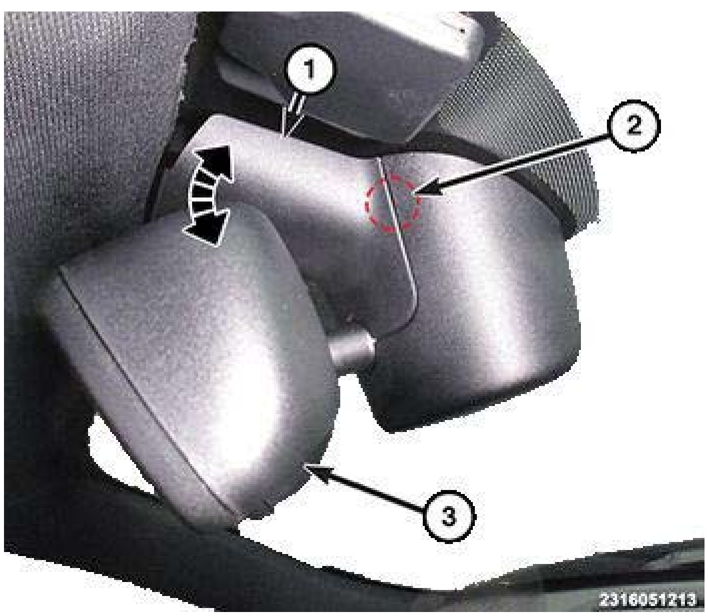


Fig. 246: Upper Mirror Trim & Clips

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Using a small flat bladed tool, release the clips (2) on each side of the upper mirror trim (1) and rotate the upper mirror trim downward to remove.

Fig. 247: Lower Mirror Trim Tabs
Courtesy of CHRYSLER GROUP, LLC

3. Using a small flat bladed tool, release the tabs (2) and lower the lower mirror trim and remove.

Fig. 248: Prying Lower Mirror Trim Tabs
Courtesy of CHRYSLER GROUP, LLC

4. The lower mirror trim (2) is shown in illustration removed, pry both tabs (1) outward to release.

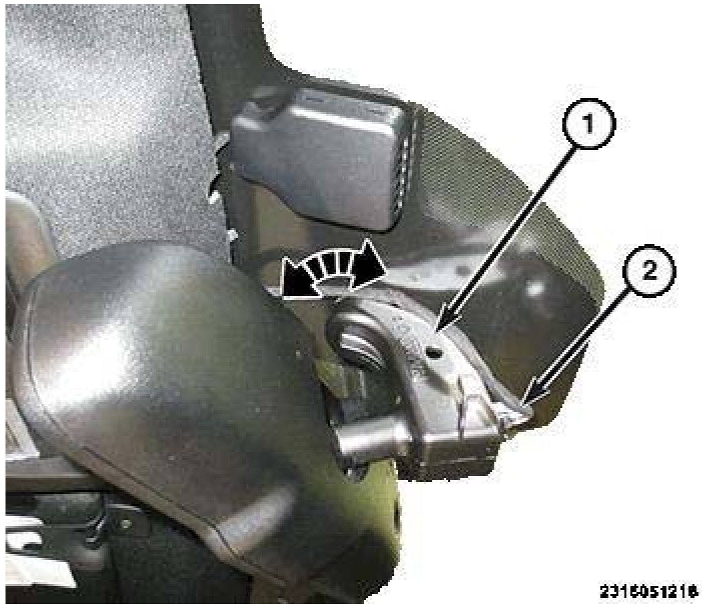


Fig. 249: Mirror & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the wire harness connector (2) from the mirror.
6. Grasp the mirror (1) by the base and rotate it clockwise approximately 90 degrees and remove.

INSTALLATION

INSTALLATION

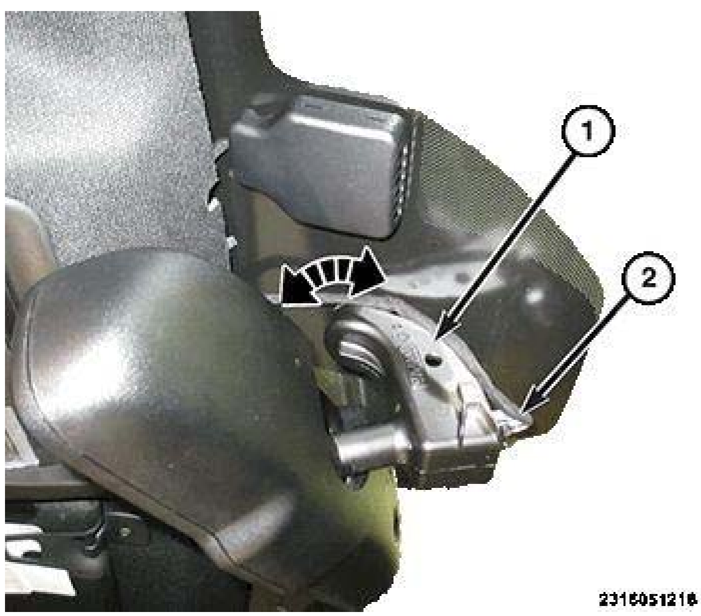


Fig. 250: Mirror & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Place the rear view mirror (1) onto the mirror button.
2. Grasp the mirror by the base and rotate it approximately 90 degrees counter-clockwise until the mirror locks into place.

NOTE: The mirror must be fully seated onto the button before rotating.

3. Connect the wire harness connector (2).

Fig. 251: Lower Mirror Trim Tabs
Courtesy of CHRYSLER GROUP, LLC

4. Install the lower mirror trim (1) from the bottom. Make sure the tabs (2) engage fully.

Fig. 252: Upper Mirror Trim & Clips
Courtesy of CHRYSLER GROUP, LLC

5. Insert the bottom of the upper mirror trim (1) and rotate upward to engage the tabs (2).

SUPPORT BRACKET

NOTE: The rear view mirror support bracket (or button) is permanently bonded to the

inside of the windshield glass. If the bracket should become separated from the glass, it may be re-bonded using the following procedure. This procedure requires the use of a Rear View Mirror Adhesive kit that is available through MoparÂ® in single application packages that include a two-part adhesive and an accelerant with applicator.

1. Mark the proper position for the mirror bracket on the outside of the windshield glass with a wax pencil. The residual adhesive on the inside of the glass from the prior mirror bracket installation can be used as a guide.
2. Clean the bracket contact area on the inside of the glass. Use a mild powdered cleanser on a cloth saturated with isopropyl (rubbing) alcohol. Finally, clean the glass with a paper towel dampened with alcohol.
3. Sand the bonding surface (the smaller side) of the support bracket with fine grit-sandpaper. Wipe the bracket surface clean with a paper towel.
4. Apply accelerant to the bonding surface of the bracket according to the following instructions:
   - Crush the accelerant vial to saturate the felt applicator.
   - Remove the paper sleeve.
   - Apply accelerant to the bonding surface of the bracket.
   - Allow the accelerant to dry for five minutes.
   - Do not touch the bracket bonding surface after the accelerant has been applied.
5. Apply adhesive accelerant to the bracket contact area on the inside of the windshield glass. Allow the accelerant to dry for one minute. Do not touch the bracket contact area of the glass after the accelerant has been applied.
6. Install the bracket according to the following instructions:
   - Apply one drop of adhesive at the center of the bracket contact area on the inside of the windshield glass.
   - Apply an even coat of adhesive to the bonding surface of the bracket.
   - Align the bracket with the marked position on the windshield glass.
   - Press and hold the bracket in place for at least one minute.

NOTE: **Verify that the mirror support bracket is correctly aligned, because the adhesive will cure rapidly.**

7. Allow the adhesive to cure for 8-10 minutes. Remove any excess adhesive with an alcohol-dampened cloth.
8. Allow the adhesive to cure for an additional 8-10 minutes before reinstalling the mirror.

PANEL, A-PILLAR TRIM

REMOVAL

REMOVAL

Fig. 253: Removing/Installing A-Pillar Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. By hand pull at the top of the A-pillar trim panel (1) and release it from the body. Do not remove the A-pillar trim.
2. Pull the A-pillar trim panel upward to separate it from the instrument panel.

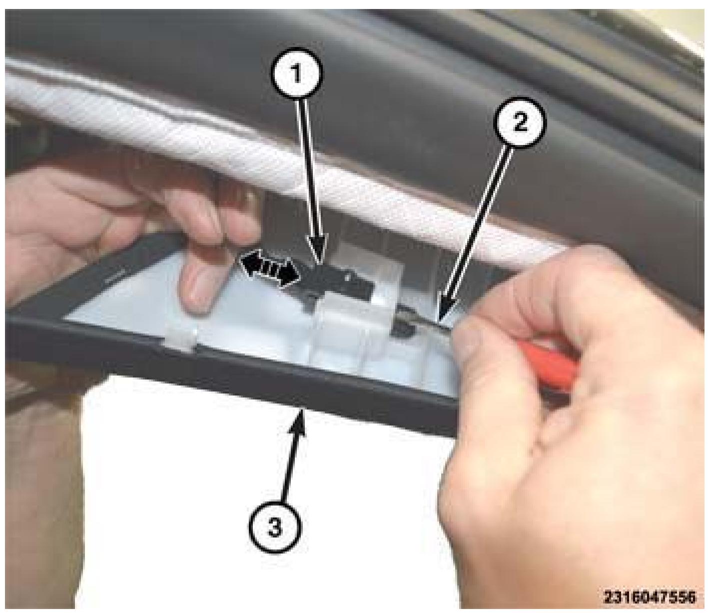


Fig. 254: Pillar Trim Panel & Tether
Courtesy of CHRYSLER GROUP, LLC

3. Using a flat bladed tool (2), press the tab to disengage the tether (1) and slide it out of A-pillar trim panel (3).

INSTALLATION

INSTALLATION

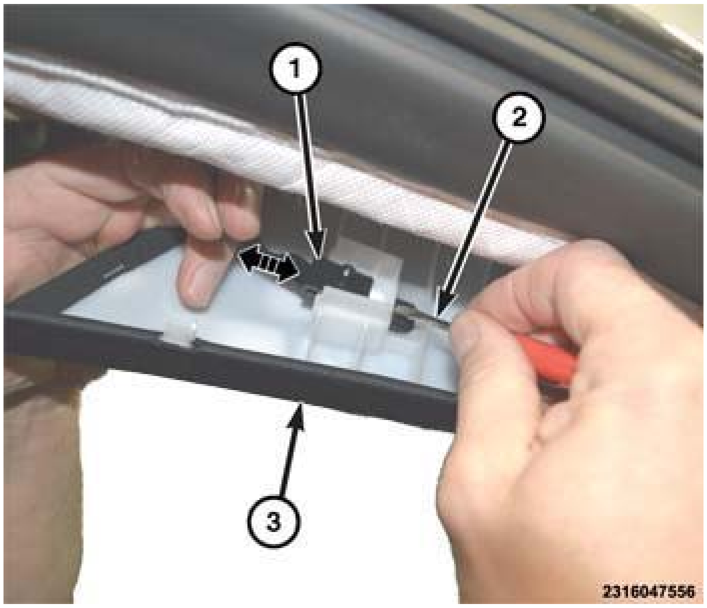


Fig. 255: Pillar Trim Panel & Tether
Courtesy of CHRYSLER GROUP, LLC

1. Insert the tether (1) into the A-pillar trim panel (3). Make sure the tab is fully engaged, and the tether is secured properly.

Fig. 256: Removing/Installing A-Pillar Trim Panel
Courtesy of CHRYSLER GROUP, LLC

2. Position the A-pillar trim panel (1) down into the top of the instrument panel.
3. Starting at the bottom of the A-pillar trim panel, align the retaining clips and hand tap to engage.

PANEL, C-PILLAR TRIM

REMOVAL

REMOVAL

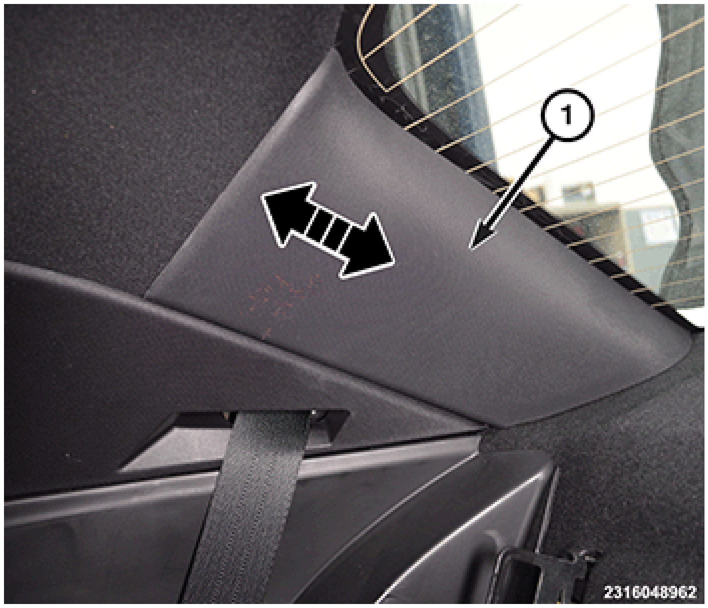


Fig. 257: C-Pillar Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. By hand pull at the top of the C-pillar trim panel (1) to release the retaining clips. Do not remove the C-pillar trim panel.

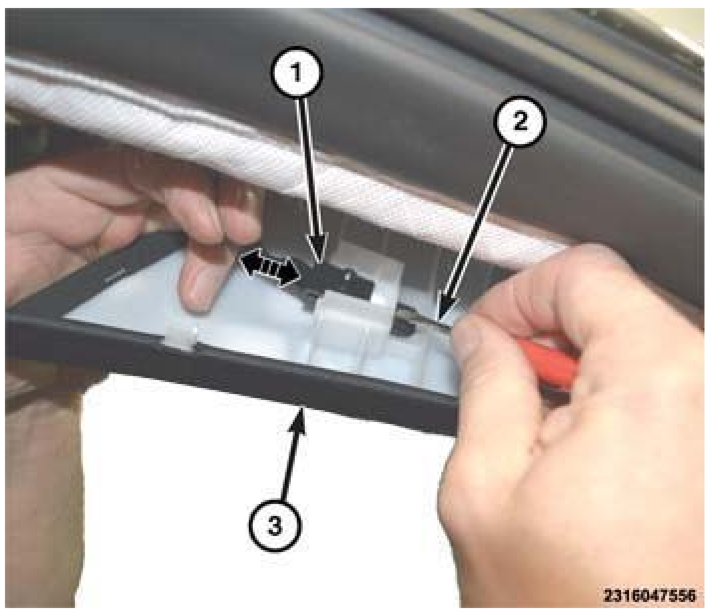


Fig. 258: Pillar Trim Panel & Tether
Courtesy of CHRYSLER GROUP, LLC

2. Using a flat bladed tool (2), press the tab to disengage the tether (1) and slide it out of the C-pillar trim panel (3).

INSTALLATION

INSTALLATION

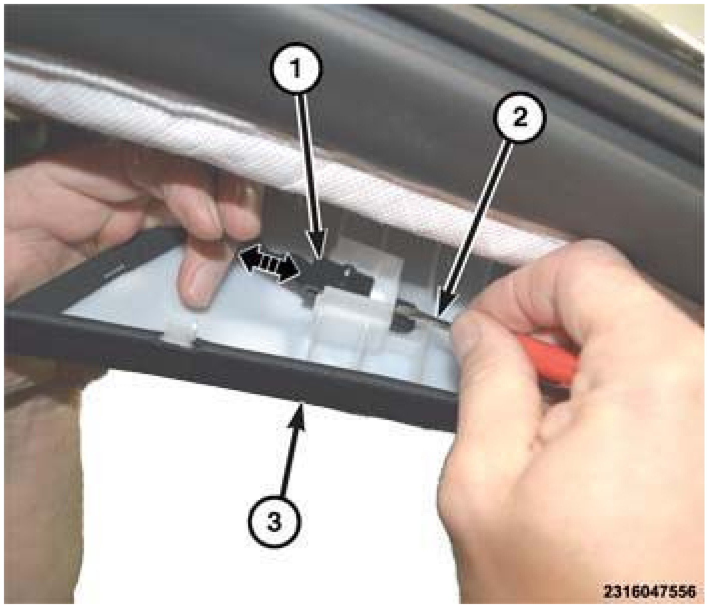


Fig. 259: Pillar Trim Panel & Tether
Courtesy of CHRYSLER GROUP, LLC

1. Insert the tether (1) into the C-pillar trim panel (3). Make sure the tab is fully engaged, and the tether is secured properly.
2. Position the C-pillar trim panel (1) and hand tap to engage the retaining clips.

PANEL, COWL TRIM

REMOVAL

REMOVAL

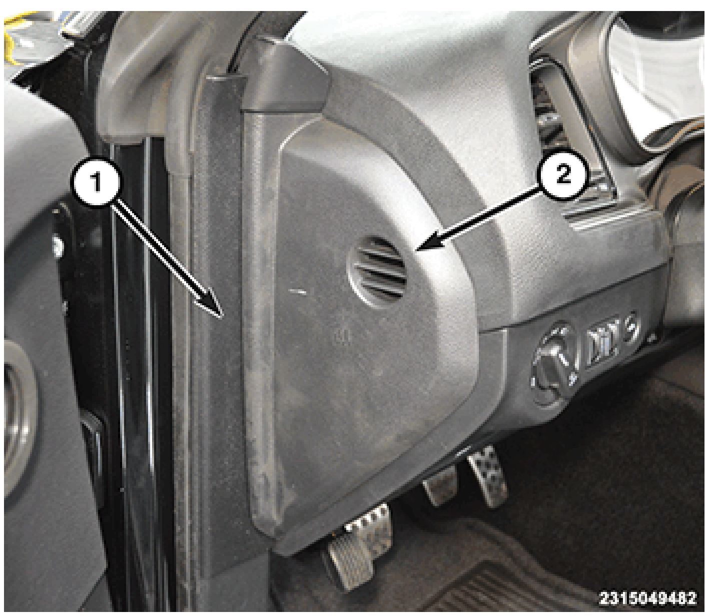


Fig. 260: A-Pillar Extension & Instrument Panel End Cap
Courtesy of CHRYSLER GROUP, LLC

1. Using a trim stick or equivalent, remove the instrument panel end cap (2) then the A-pillar extension (1).

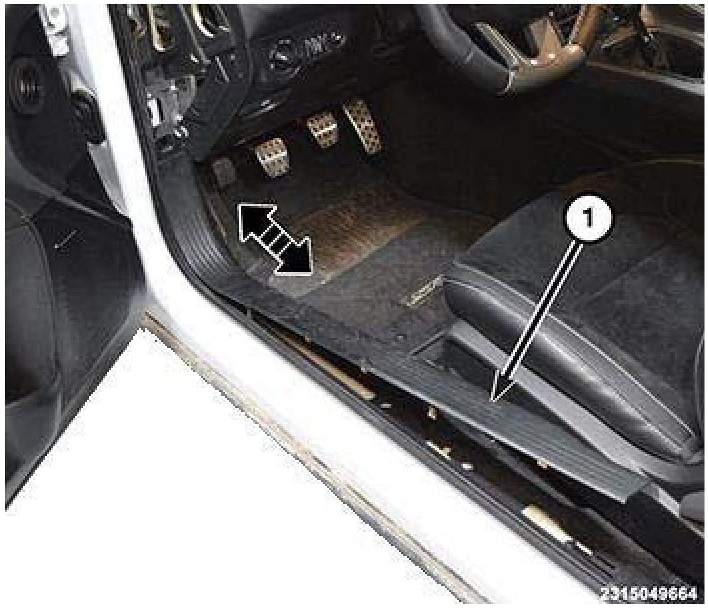


Fig. 261: Cowl Side Trim Panel
Courtesy of CHRYSLER GROUP, LLC

2. Lift the cowl side trim (1) at the rear, then pull rearward and remove.

INSTALLATION

INSTALLATION

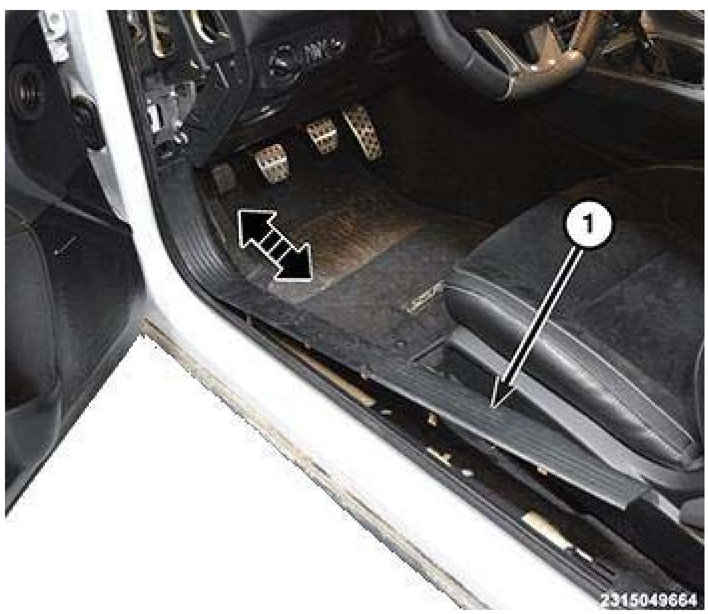


Fig. 262: Cowl Side Trim Panel
Courtesy of CHRYSLER GROUP, LLC

1. Install the cowl side trim (1) at the front, then hand tap the rear to install the retaining clips.

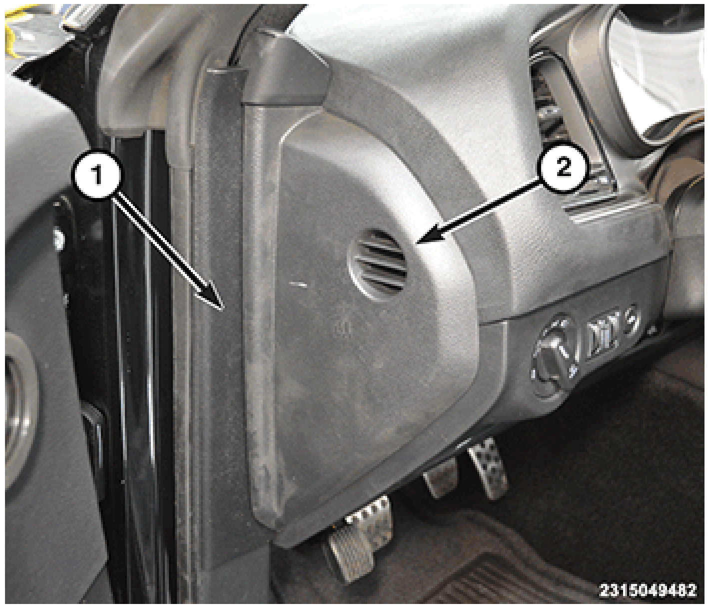


Fig. 263: A-Pillar Extension & Instrument Panel End Cap
Courtesy of CHRYSLER GROUP, LLC

2. Position the A-pillar extension (1) and hand tap to engage the retaining clips.
3. Position the instrument panel end cap (2) and hand tap to engage the retaining clips.

PANEL, QUARTER TRIM

REMOVAL

REMOVAL

QUARTER TRIM - LOWER

Fig. 264: Quarter Trim Panel & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear seat cushion. Refer to SEAT CUSHION, REMOVAL.

2. Remove the cowl trim panel. Refer to **PANEL, COWL TRIM, REMOVAL**.
3. Remove the screw (2), then pull the lower quarter trim panel (1) out to release the lower retaining clip.

Fig. 265: Seat Belt Trim Bezel, Seat Belt Trim Panel & Seat Belt Lower Anchor Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the seat belt lower anchor bolts (2) and (3). Refer to **RETRACTOR, SEAT BELT, REMOVAL**
.
5. Remove the seat belt trim bezel (1).
6. Using a trim stick or equivalent, carefully pry the lower quarter trim panel (4) away to release the retaining clips.
7. If equipped with quarter panel speakers, disconnect the speaker wire harness connector and remove the lower quarter trim panel.

QUARTER TRIM UPPER PANEL

Fig. 266: Screws
Courtesy of CHRYSLER GROUP, LLC

1. Remove the C-pillar trim panel. Refer to **PANEL, C-PILLAR TRIM, REMOVAL**.
2. Remove the screw covers and remove the screws (1) and (2).
3. Remove the quarter trim lower panel. Refer to **PANEL, QUARTER TRIM, REMOVAL**.

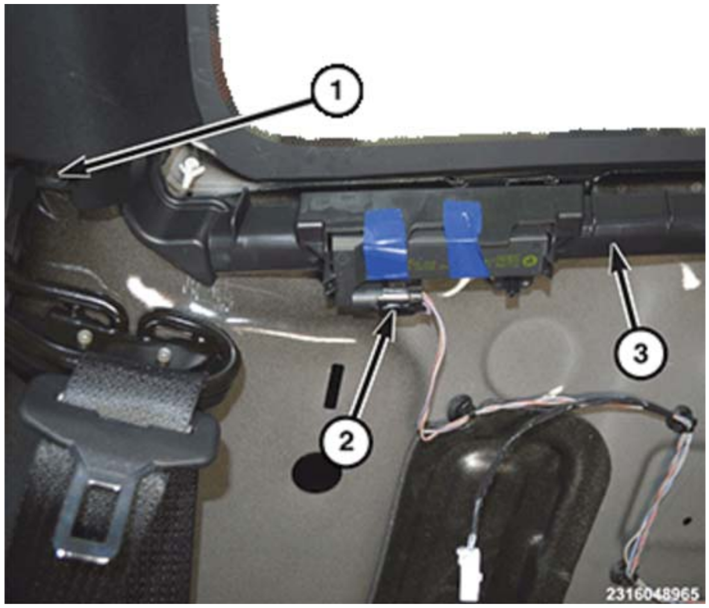


Fig. 267: Screw, Wire Harness Connector & Quarter Trim Upper Panel
Courtesy of CHRYSLER GROUP, LLC

4. Remove the screw (1).
5. Disconnect the wire harness connector (2).
6. Using a trim tool or equivalent, release the retaining clips and remove the quarter trim upper panel (3).

INSTALLATION

INSTALLATION

QUARTER TRIM - LOWER

Fig. 268: Seat Belt Trim Bezel, Seat Belt Trim Panel & Seat Belt Lower Anchor Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Route the seat belts through the openings in the lower quarter trim panel (4).
2. If equipped with quarter panel speakers, connect the speaker wire harness connector.
3. Position the lower quarter trim panel and push to engage the retaining clips.
4. Install the one push fastener at the rear of the lower quarter trim panel.
5. Install the seat belt trim bezel (1).
6. Install the seat belt lower anchor bolts (2) and (3). Refer to **RETRACTOR, SEAT BELT, INSTALLATION** .

Fig. 269: Quarter Trim Panel & Screw
Courtesy of CHRYSLER GROUP, LLC

7. Install the screw (2) and tighten securely.

8. Install the cowl trim panel. Refer to **PANEL, COWL TRIM, INSTALLATION**.
9. Install the rear seat cushion. Refer to **SEAT CUSHION, INSTALLATION**.

QUARTER TRIM UPPER PANEL

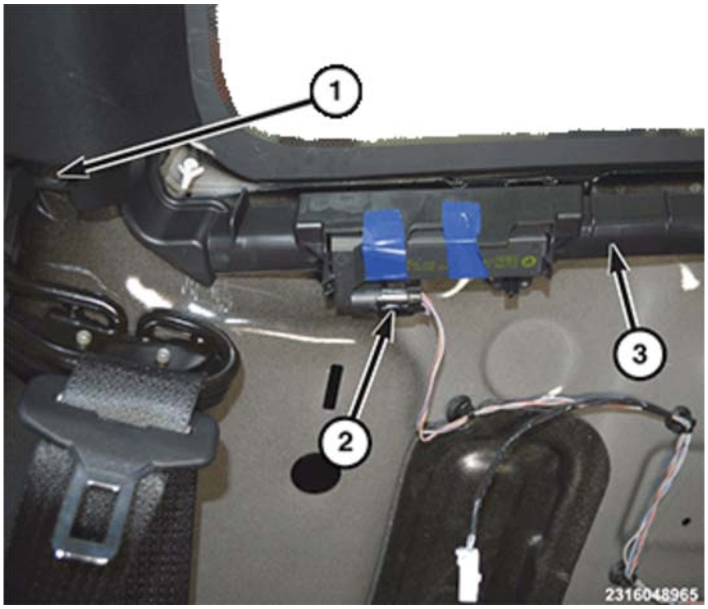


Fig. 270: Screw, Wire Harness Connector & Quarter Trim Upper Panel
Courtesy of CHRYSLER GROUP, LLC

1. Route the seat belt through the opening in the quarter trim upper panel (3).
2. Position the quarter trim upper panel and push to engage the retaining clips.
3. Connect the wire harness connector (2).
4. Install the screw (1) and tighten securely.

Fig. 271: Screws
Courtesy of CHRYSLER GROUP, LLC

5. Install the screws (1) and (2) and tighten securely, then install the screw covers.
6. Install the quarter trim lower panel. Refer to **PANEL, QUARTER TRIM, INSTALLATION**.
7. Install the C-pillar trim panel. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION**.

PANEL, REAR SHELF

REMOVAL

REMOVAL

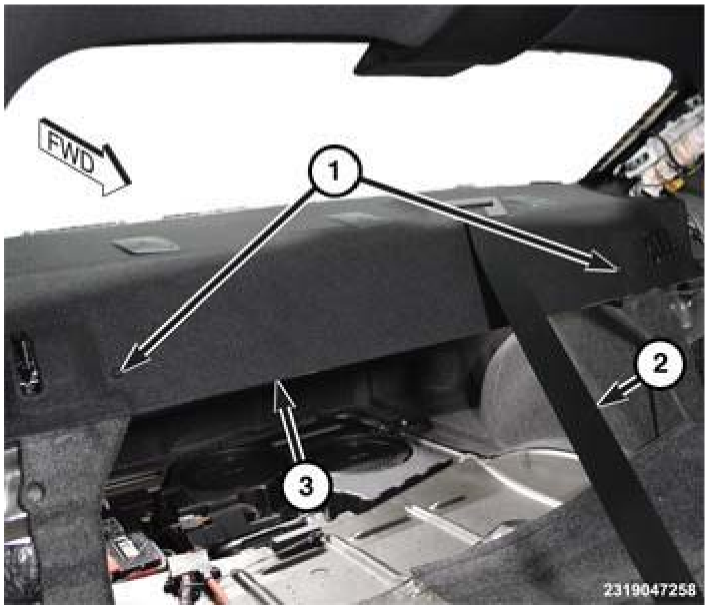


Fig. 272: Push Fasteners, Rear Seat Belt & Rear Shelf Trim
Courtesy of CHRYSLER GROUP, LLC

1. Remove the quarter trim lower panels. Refer to **PANEL, QUARTER TRIM, REMOVAL**.
2. Remove the rear seat belt (2) anchor nut. Refer to **RETRACTOR, SEAT BELT, REMOVAL** .
3. Remove the two push fasteners (1).
4. Pull the rear shelf trim (3) forward to disengage the retaining hooks from the rear shelf.
5. Feed the rear seat belt through the openings in the rear shelf panel and remove.

INSTALLATION

INSTALLATION

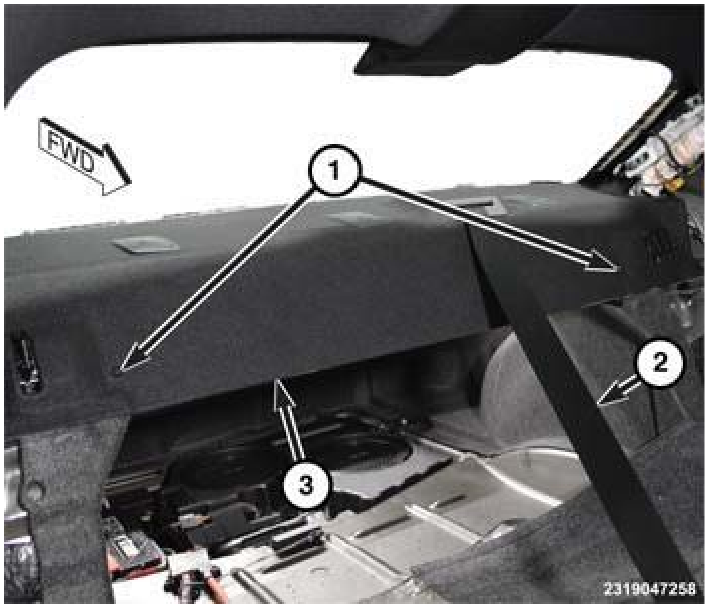


Fig. 273: Push Fasteners, Rear Seat Belt & Rear Shelf Trim
Courtesy of CHRYSLER GROUP, LLC

1. Feed the rear seat belt (2) through the opening in the rear shelf panel (3).
2. Position the rear shelf trim on the rear shelf, then push the rear shelf panel rearward to engage the retaining hooks into shelf panel.
3. Install the two push fasteners (1).
4. Install the rear seat belt anchor. Refer to **RETRACTOR, SEAT BELT, INSTALLATION** .
5. Install the quarter trim lower panels. Refer to **PANEL, QUARTER TRIM, INSTALLATION**.

VISOR

REMOVAL

REMOVAL

Fig. 274: Visor & Screw

Courtesy of CHRYSLER GROUP, LLC

CAUTION: When removing or installing the screws (1), be certain to avoid any wiring or drain tube interference.

1. Remove the three screws (1).
2. Carefully lower the visor (2) from the headliner and disconnect the wire harness connector, if equipped.

INSTALLATION

INSTALLATION

Fig. 275: Visor & Screw
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When removing or installing the screws (1), be certain to avoid any wiring or drain tube interference.

1. If equipped, connect the wire harness connector.
2. Position the visor (2) into the headliner.
3. Install the screws (1) and tighten securely.

PAINT

SPECIFICATIONS

SPECIFICATIONS

Exterior vehicle body color(s) are identified on the Vehicle Certification Label or the Body Code Plate.

The first digit of the paint code listed on the vehicle indicates the sequence of application, i.e.: P = primary coat, Q = secondary coat. The color names provided in the Paint and Trim Code Description chart are the same color names used on most repair product containers.

EXTERIOR COLORS

EXTERIOR COLOR	CHRYSLER CODE
Pitch Black Clear Coat	DX8
Sublime Peal Coat	FFB
B5 Blue Pearl Coat	FQD
Bright White Clear Coat	GW7
Red Line Tri-Coat Peal	JRY
Billet Silver Metallic Clear Coat	JSC
Ivory White Tri-Coat Pearl	JWD
Jazz Blue Pearl Coat	KBX
Granite Crystal Pearl Coat	LAU
Phantom Black Tri-Coat Pearl	LXT
Torred Clear Coat	ZR3

INTERIOR COLORS

INTERIOR COLOR	CHRYSLER CODE
Black/Sepia	VX
Black / Ruby Red	XC
Black Tungsten	XG
Black Pearl	XW
Black	X9

R/T CLASSIC BODYSIDE STRIPE

STRIPE COLOR	CHRYSLER CODE
Black Satin Gloss	RXF
Stone White High Gloss	SW1
Red High Gloss	PR4

R/T AND R/T PLUS HOOD GRAPHIC

STRIPE COLOR	CHRYSLER CODE
Black Satin Gloss	RXF

SHAKER CENTER STRIPE

STRIPE COLOR	CHRYSLER CODE
Black Satin Gloss	RXF

SCAT PACK DECKLID STRIPE

STRIPE COLOR	CHRYSLER CODE
Black Satin Gloss	RXF

V6 BODYSIDE STRIPE

STRIPE COLOR	CHRYSLER CODE
Black Satin Gloss	RXF

SEATS, FRONT

WARNING

WARNING

WARNING: **During and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or inoperative buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or faulty seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÃ® parts catalog. Failure to follow these instructions may result in personal injury or death.**

WARNING: **On vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, occupant classification system, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment. Failure to follow these instructions may result in personal injury or death.**

WARNING: **On vehicles equipped with airbags, before performing any welding operations disconnect and isolate the battery negative (ground) cable and disconnect all wire harness connectors from the Airbag Control Module (ACM). Failure to take the proper precautions could result in accidental airbag deployment and other possible damage to the supplemental restraint system circuits and components. Failure to follow these instructions may result in personal injury or death.**

WARNING: **Replace all restraint system components only with parts specified in the Chrysler MoparÃ® parts catalog. Substitute parts may appear interchangeable, but internal differences may result in inferior occupant protection. Failure to follow these instructions may result in personal injury or death.**

WARNING: **The fasteners, screws, and bolts originally used for the restraint system components must never be replaced with any substitutes. These fasteners have special coatings and are specifically designed for the restraint system. Any time a new fastener is needed, replace it with the correct fasteners provided in the service package or specified in the Chrysler MoparÃ® parts catalog. Failure to follow these instructions may result in personal injury or death.**

WARNING: **On vehicles equipped with the Occupant Classification System (OCS) do not hang any after market devices from the front passengers seat back. Do not install a front drivers seat back cover with map pocket onto the passenger seat. Failure to follow these instructions may result in personal injury or death.**

WARNING: **The Seat Weight Sensor is a sensitive, calibrated unit and must be handled carefully. Do not drop or handle roughly. If dropped or damaged, replace with another sensor. Failure to follow these instructions may result in personal injury or death.**

WARNING: **The front passenger seat must be handled carefully as well. When removing the seat, be careful when setting on floor not to drop. If dropped, the sensor may be inoperative. Failure to follow these instructions may result in personal injury or death.**

WARNING: **When the seat is on the floor, no one should sit in the front passenger seat. This uneven force may damage the sensing ability of the seat weight sensors. If sat on and damaged, the sensor may be inoperative. Failure to follow these instructions may result in personal injury or death.**

CABLE, SEAT BACK RELEASE

REMOVAL

REMOVAL

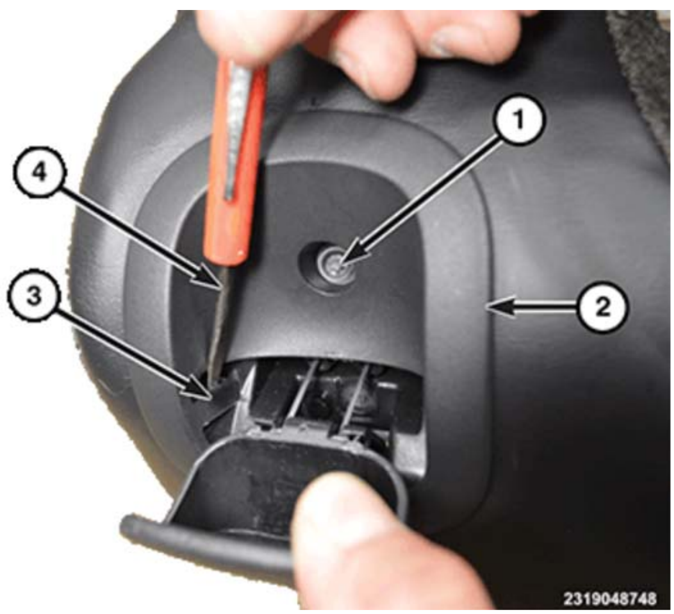


Fig. 276: Seat Back Release Cable Bezel, Tabs, Tool & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to SEATS, FRONT, WARNING.
2. Remove the front seat back. Refer to SEAT BACK, FRONT, REMOVAL .
3. Remove the front seat back panel. Refer to PANEL, SEAT BACK, FRONT, REMOVAL.

4. Remove the screw (1) from the seat back release cable bezel (2).
5. Using a small bladed tool (4), release the tabs (3) and remove the seat back release cable bezel.

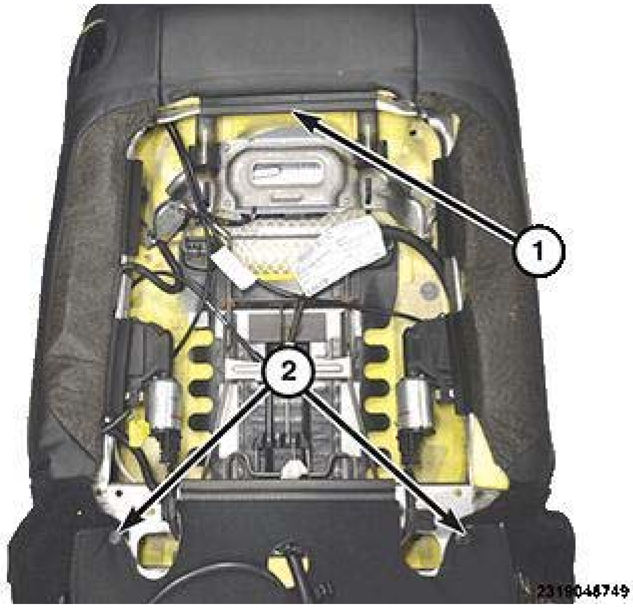


Fig. 277: J-Clip Retainers & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Remove the two push fasteners (2).
7. Release all the J-clip retainers (1).

Fig. 278: Headrest Sleeve & Tab
Courtesy of CHRYSLER GROUP, LLC

8. Reach up behind the seat back cover and push the tab (1) of the headrest sleeve (2) and pull out to remove.

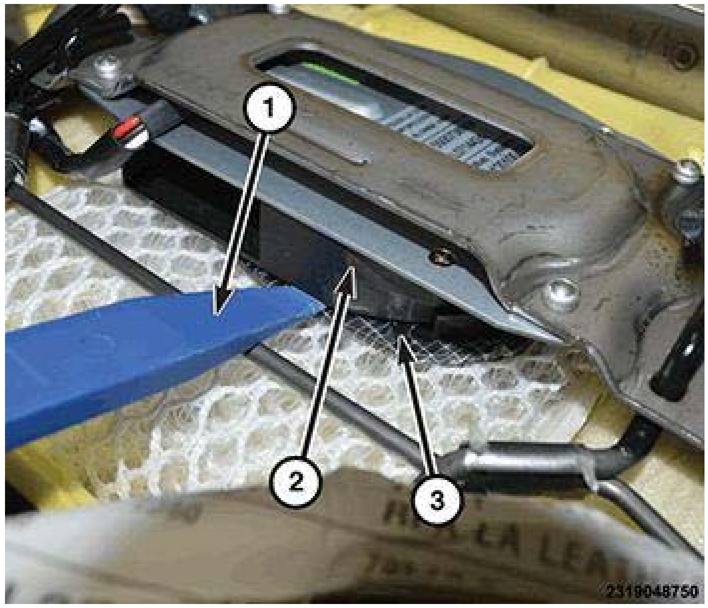


Fig. 279: Prying Seat Back Ventilation Plenum
Courtesy of CHRYSLER GROUP, LLC

9. Using a trim stick (1) or equivalent, pry the seat back ventilation plenum (3) from the seat back blower (2), if equipped.
10. Remove the seat back foam and seat back cover as an assembly, from the seat back frame.

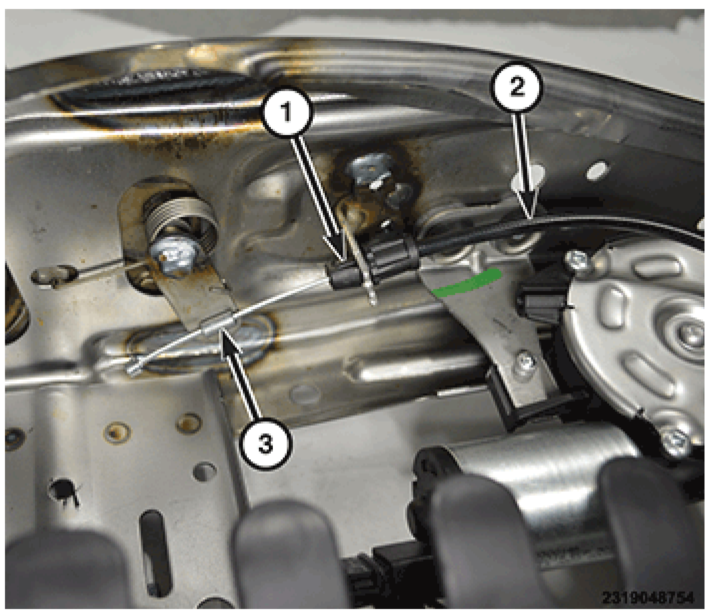
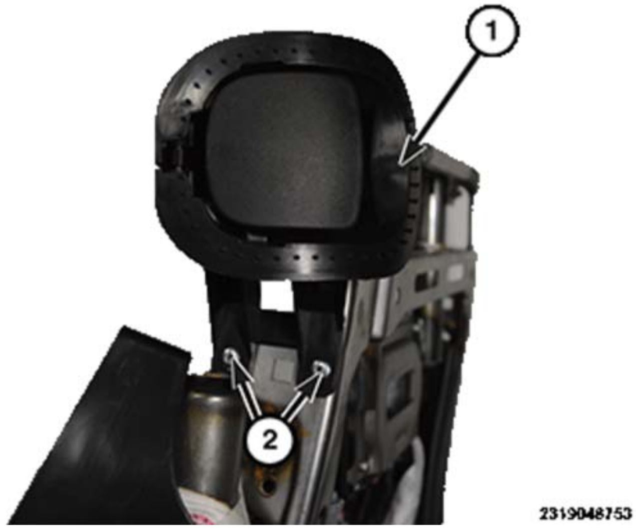


Fig. 280: Cable, Pinch Tabs & Cable End
Courtesy of CHRYSLER GROUP, LLC

NOTE: Take note of the cable routing for correct installation.

11. Pinch the tabs (1) and release the cable from the seat back frame.
12. Remove the cable end (3) from the lever.

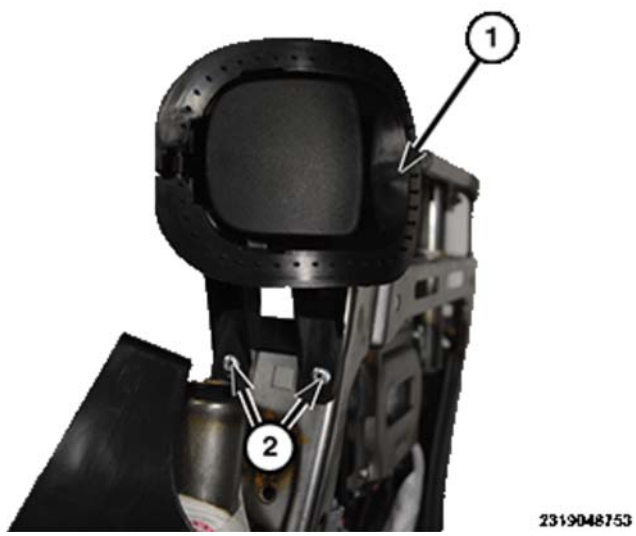


[Fig. 281: Seat Back Release Cable Assembly & Rivets]
Courtesy of CHRYSLER GROUP, LLC

13. Drill out the two rivets (2) and remove the seat back release cable assembly (1).

INSTALLATION

INSTALLATION



[Fig. 282: Seat Back Release Cable Assembly & Rivets]
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to [SEATS, FRONT, WARNING].
2. Position the seat back release cable assembly (1) and install new rivets (2).

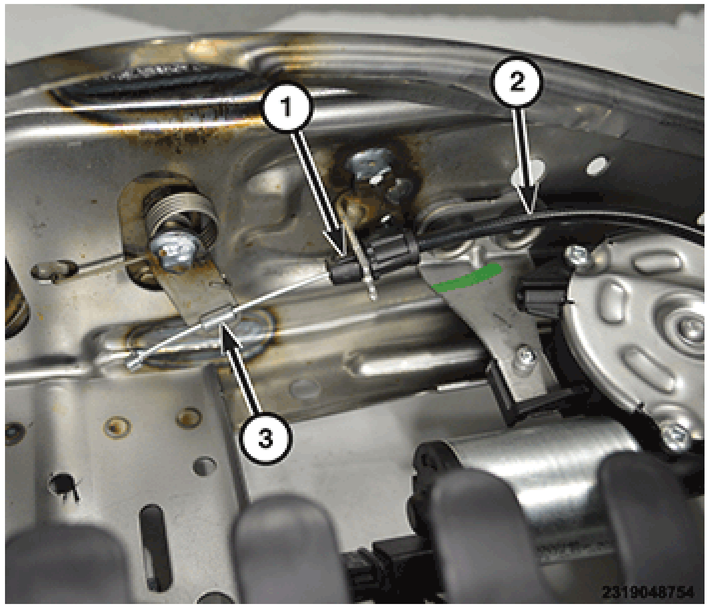


Fig. 283: Cable, Pinch Tabs & Cable End
Courtesy of CHRYSLER GROUP, LLC

3. Route the cables (2) and install the cable ends (3) into the lever.
4. Snap the cable into the seat back frame bracket (1).

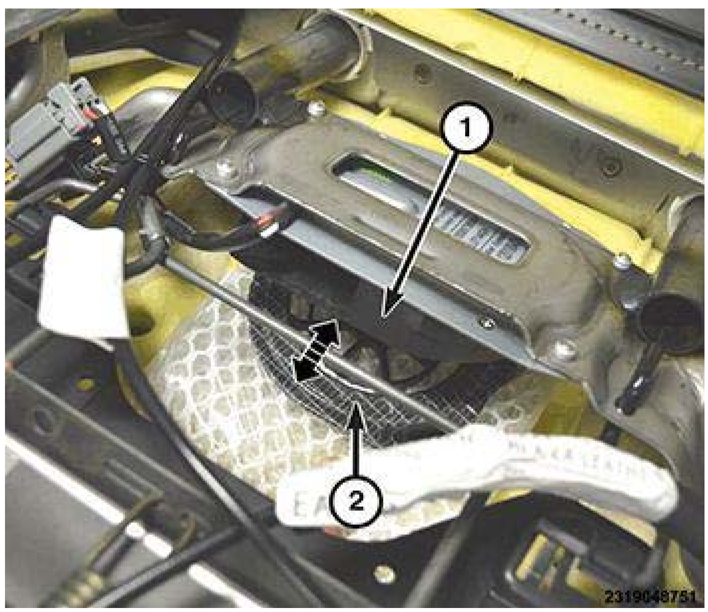


Fig. 284: Aligning Seat Back Ventilation Plenum
Courtesy of CHRYSLER GROUP, LLC

5. Position the seat back cushion assembly onto the seat back frame.
6. Align the seat cushion ventilation plenum (2) with the seat cushion blower (1) and snap into place, if equipped.

Fig. 285: Headrest Sleeve & Tab
Courtesy of CHRYSLER GROUP, LLC

7. Install the headrest sleeves (1) and hand tap to engage the tab (1).

Fig. 286: J-Clip Retainers & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Install all the J-clip retainers (1).
9. Install the two push fasteners (2).

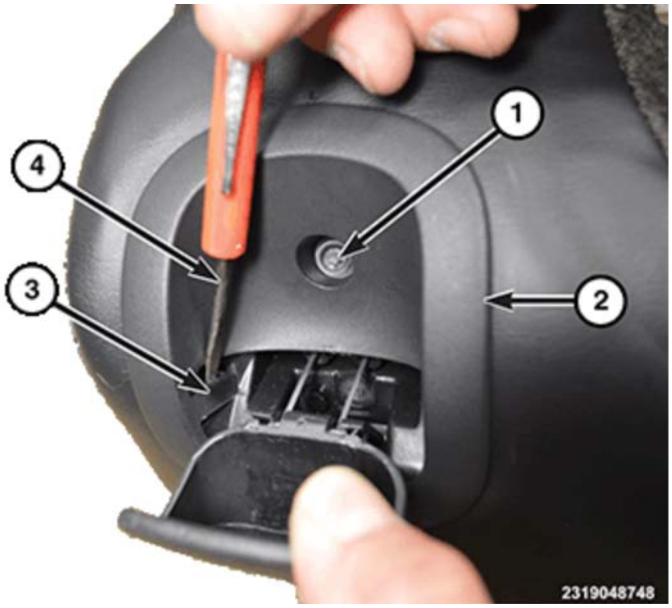


Fig. 287: Seat Back Release Cable Bezel, Tabs, Tool & Screw
Courtesy of CHRYSLER GROUP, LLC

10. Position the seat back release cable bezel (2) and push by hand to engage the tabs (3). Install the screw (1) and tighten securely.
11. Install the front seat back. Refer to **SEAT BACK, FRONT, INSTALLATION** .
12. Install the front seat. Refer to **SEAT, FRONT, INSTALLATION**.

COVER, SEAT BACK, FRONT

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

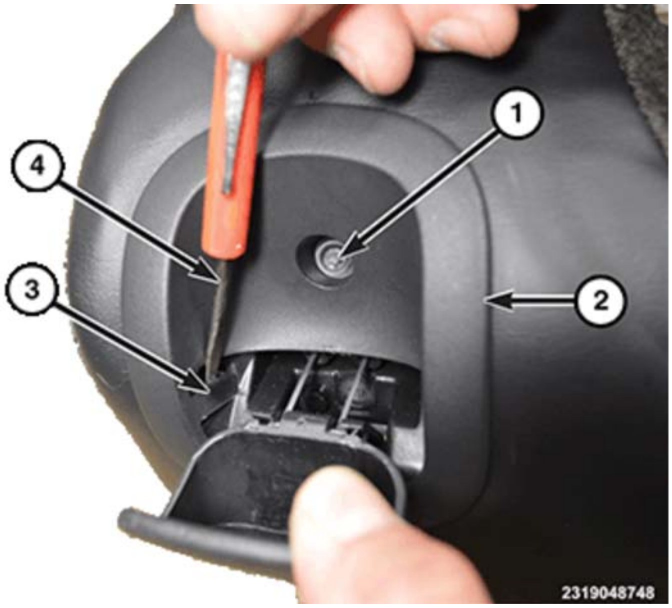


Fig. 288: Seat Back Release Cable Bezel, Tabs, Tool & Screw
Courtesy of CHRYSLER GROUP, LLC

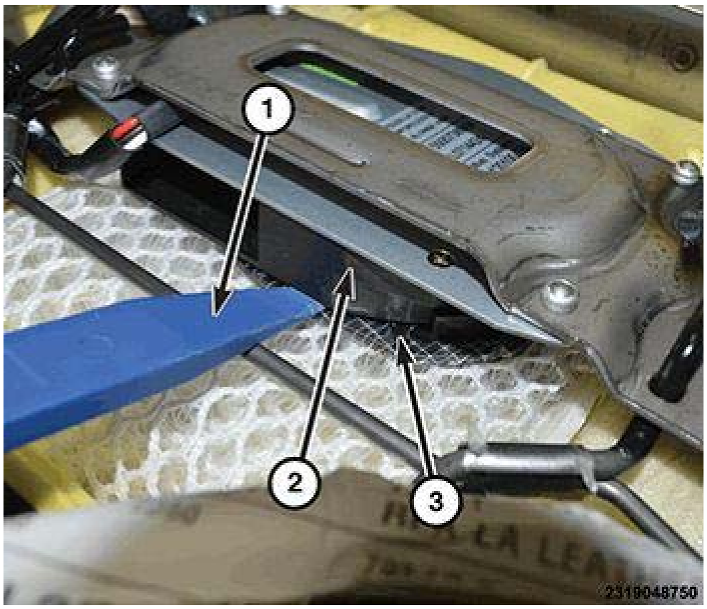
1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to SEATS, FRONT, WARNING.
2. Remove the front seat back. Refer to SEAT BACK, FRONT, REMOVAL .
3. Remove the front seat back panel. Refer to PANEL, SEAT BACK, FRONT, REMOVAL.
4. Remove the screw (1) from the seat back release cable bezel (2).
5. Using a small bladed tool (4), release the tabs (3) and remove the seat back release cable bezel.

Fig. 289: J-Clip Retainers & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Remove the two push fasteners (2).
7. Release all the J-clip retainers (1).

[Fig. 290: Headrest Sleeve & Tab](#)
Courtesy of CHRYSLER GROUP, LLC

8. Reach up behind the seat back cover and push the tab (1) of the headrest sleeve (2) and pull out to remove.



[Fig. 291: Prying Seat Back Ventilation Plenum](#)
Courtesy of CHRYSLER GROUP, LLC

9. Using a trim stick (1) or equivalent, pry the seat back ventilation plenum (3) from the seat back blower (2), if equipped.
10. Remove the seat back foam and seat back cover as an assembly, from the seat back frame.

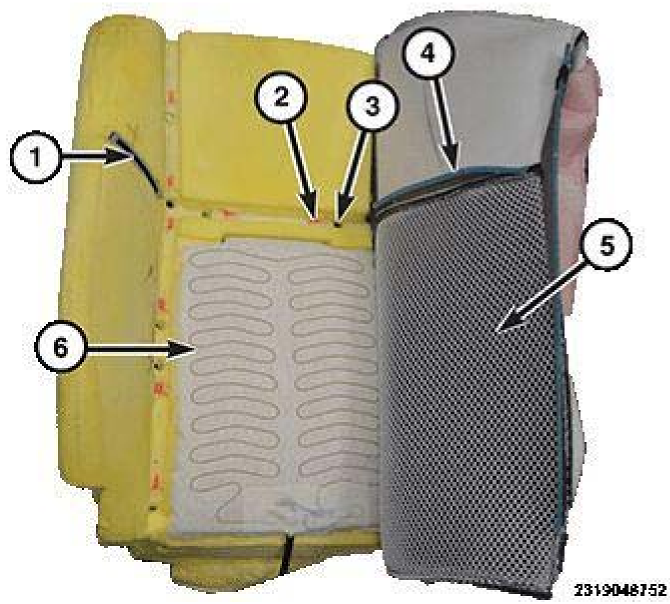


Fig. 292: Seat Back Cover, Fastener, Strips & Clips
Courtesy of CHRYSLER GROUP, LLC

11. Pull at the sides of the seat back cover (5) to release the hook and loop fastener (1).
12. Pull the seat back cover away from the foam and carefully release the clip strips (4) from the molded clips (2).

INSTALLATION

INSTALLATION

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

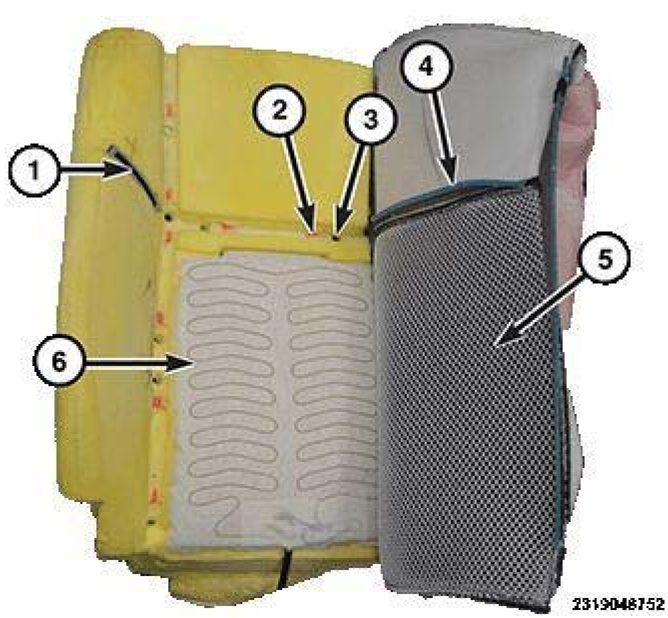


Fig. 293: Seat Back Cover, Fastener, Strips & Clips
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, FRONT, WARNING**.
2. Position the seat back cover (3) onto the seat back foam and align the clip strips (4) to the molded clips (2).

NOTE: **Note that there is a hole (3) in the foam, next to each molded clip, to aid in clip strip alignment/installation.**

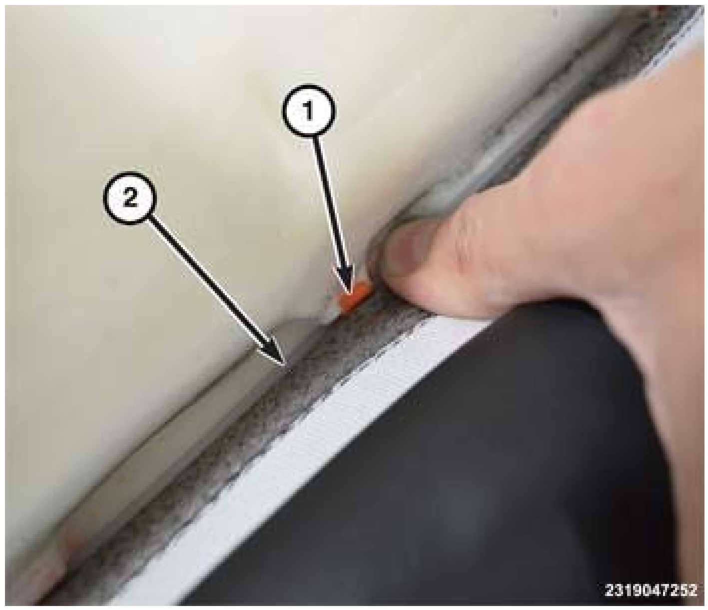


Fig. 294: Clip Strip & Molded Clip
Courtesy of CHRYSLER GROUP, LLC

3. Press the clip strip (2) into each molded clip (1).
4. Pull the seat back cover tight and fasten the hook and loop fastener on the seat back foam.

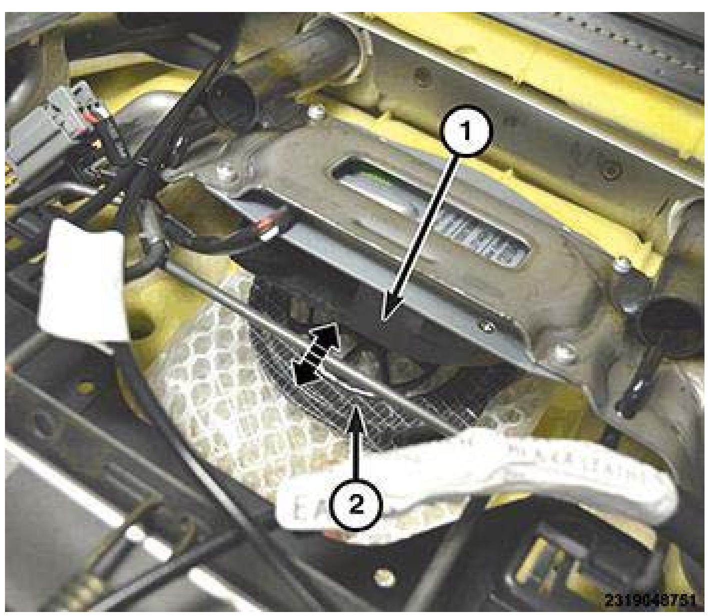


Fig. 295: Aligning Seat Back Ventilation Plenum
Courtesy of CHRYSLER GROUP, LLC

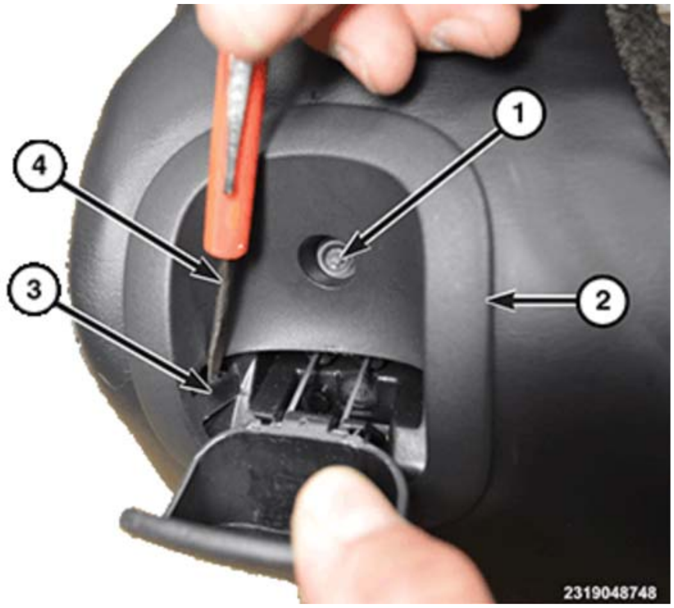
5. Position the seat back foam assembly onto the seat back frame.
6. Align the seat back ventilation plenum (2) with the seat back blower (1) and snap into place, if equipped.

Fig. 296: Headrest Sleeve & Tab
Courtesy of CHRYSLER GROUP, LLC

7. Install the headrest sleeves (1) and hand tap to engage the tab (1).

Fig. 297: J-Clip Retainers & Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

8. Install all the J-clip retainers (1).
9. Install the two push fasteners (2).



[Fig. 298: Seat Back Release Cable Bezel, Tabs, Tool & Screw](#)
Courtesy of CHRYSLER GROUP, LLC

10. Position the seat back release cable bezel (2) and push by hand to engage the tabs (3). Install the screw (1) and tighten securely.
11. Install the front seat back. Refer to **SEAT BACK, FRONT, INSTALLATION** .
12. Install the front seat. Refer to **SEAT, FRONT, INSTALLATION**.

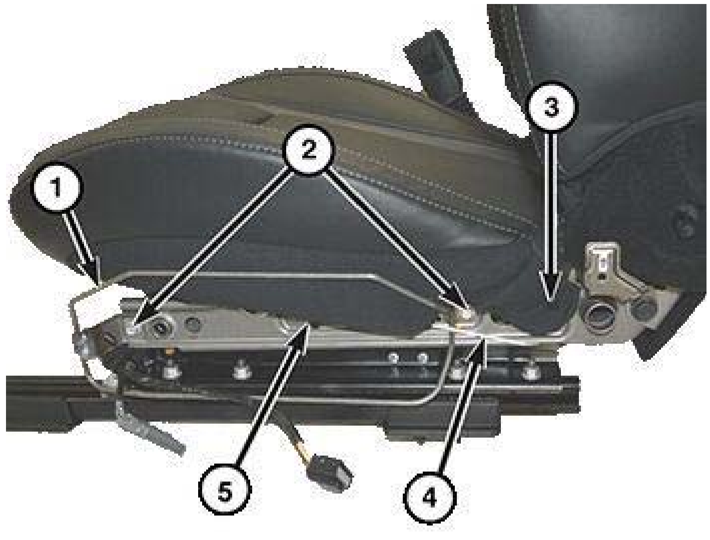
COVER, SEAT CUSHION, FRONT

REMOVAL

REMOVAL

WARNING: **Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.**

NOTE: **On all models, the front passenger seat contains an Occupant Detection Sensor (ODS) to provide information to the Occupant Restraint Controller (ORC). When servicing the front passenger seat, if required, remove the ODS from the seat bottom cushion and discard the sensor. Refer to SENSOR, OCCUPANT DETECTION, REMOVAL .**



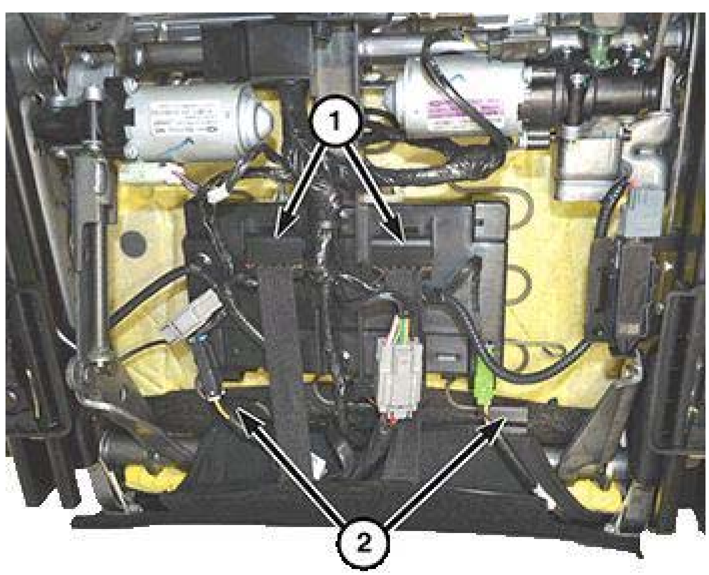
2319048741

[Fig. 299: Side Bracket, String, Fastener, Retainer & Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, FRONT, WARNING**.
2. Remove the seat. Refer to **SEAT, FRONT, REMOVAL**.
3. Remove the seat side shields. Refer to **SIDE SHIELDS, SEAT CUSHION, FRONT, REMOVAL**.
4. Unhook the tether string (4) from the seat frame.

NOTE: **Note the routing of the tether string, for correct installation.**

5. Remove the push fastener (3).
6. Remove the two bolts (2) and the seat side bracket (1). Position aside.
7. Release the J-hook retainer (5) from the side of the seat adjuster.



2319048744

Fig. 300: J-Hook Retainers
Courtesy of CHRYSLER GROUP, LLC

8. Release the J-hook retainers (1) and (2) at the bottom of the seat.

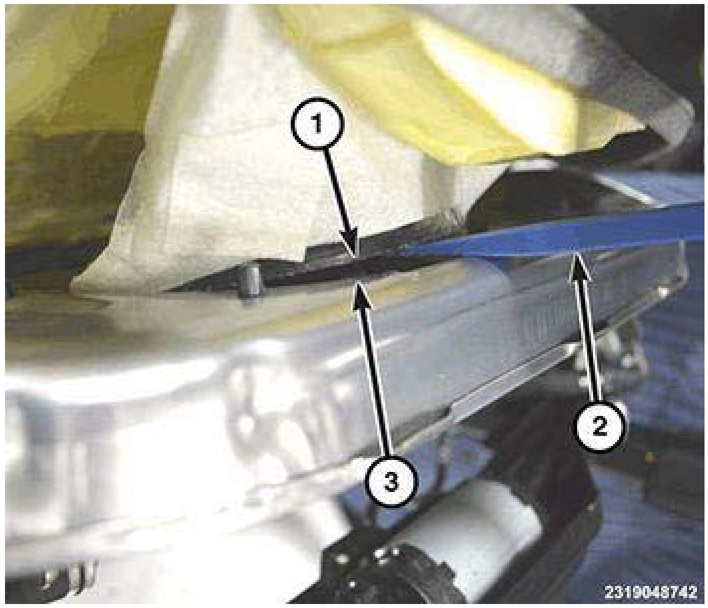


Fig. 301: Prying Seat Cushion Ventilation Plenum From Seat Cushion Blower
Courtesy of CHRYSLER GROUP, LLC

9. Carefully unwrap the cover and foam at the front of the seat cushion. Using a trim stick (2) or equivalent, pry the seat cushion ventilation plenum (1) from the seat cushion blower (3), if equipped.
10. Remove the seat cover and the seat foam as an assembly, from the seat adjuster.

NOTE: **Note the wire harness routing for correct installation.**

11. Disconnect the wire harness connector.

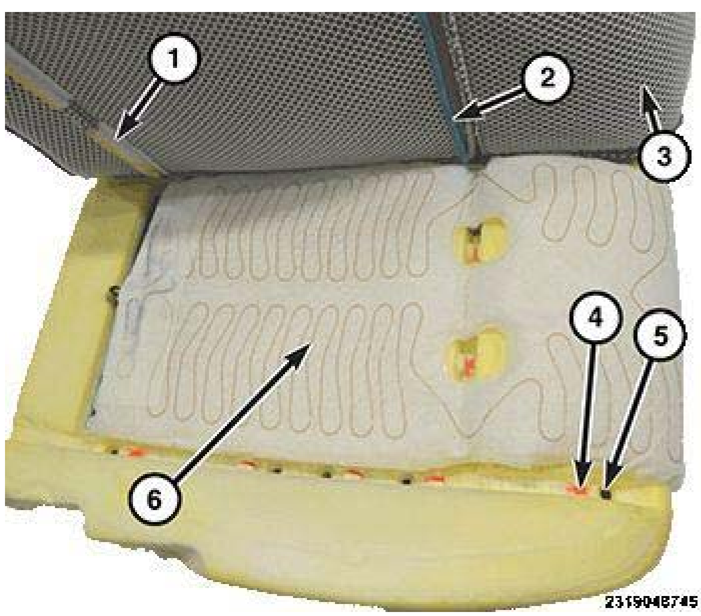


Fig. 302: Seat Cushion Cover, Clips & Fastener

Courtesy of CHRYSLER GROUP, LLC

12. Pull at the rear of the seat cushion cover (3) to release the hook and loop fastener (1).
13. Pull the seat cushion cover away from the foam and carefully release the clip strips (2) from the molded clips (4).

INSTALLATION

INSTALLATION

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: On all models, the front passenger seat contains an Occupant Detection Sensor (ODS) to provide information to the Occupant Restraint Controller (ORC).

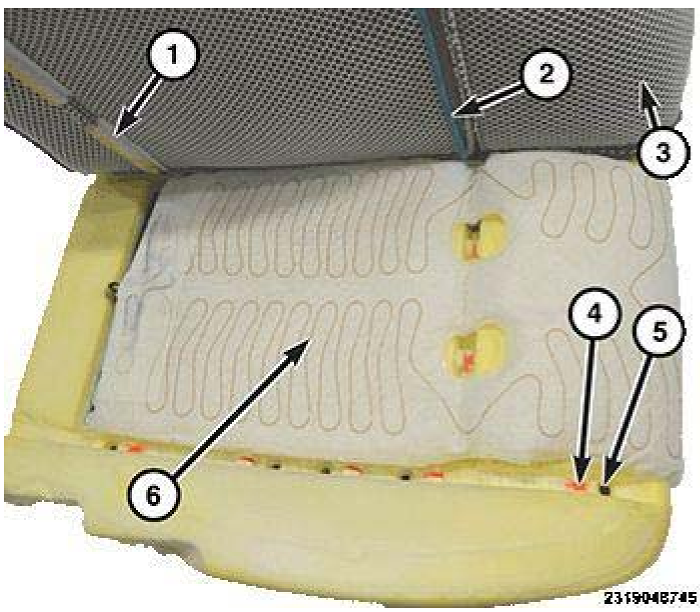


Fig. 303: Seat Cushion Cover, Clips & Fastener
Courtesy of CHRYSLER GROUP, LLC

1. Position the seat cover (3) onto the seat foam and align the clip strips (2) to the molded clips (4).

NOTE: Note that there is a hole (5) in the foam, next to each molded clip, to aid in clip strip alignment/installation.

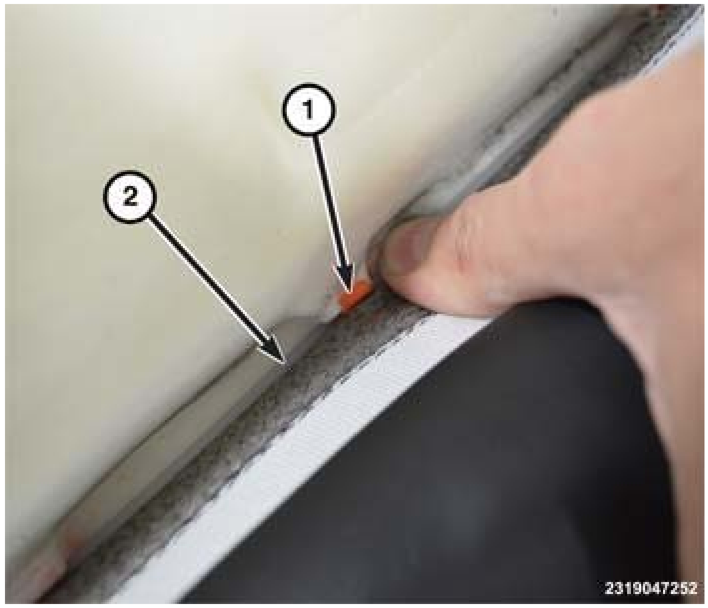


Fig. 304: Clip Strip & Molded Clip
Courtesy of CHRYSLER GROUP, LLC

2. Press the clip strip (2) into each molded clip (1).
3. Pull the seat cover tight and fasten the hook and loop fastener at the rear of the seat cushion.

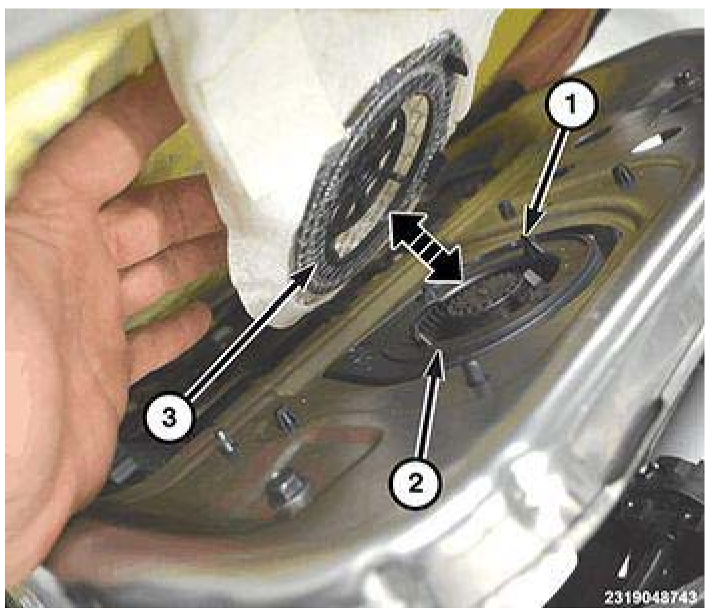


Fig. 305: Installing Seat Cushion Blower
Courtesy of CHRYSLER GROUP, LLC

4. Position the cushion assembly onto the seat adjuster.
5. Align the seat cushion ventilation plenum (3) with the tabs (1) on the seat cushion blower (2) and snap into place, if equipped.

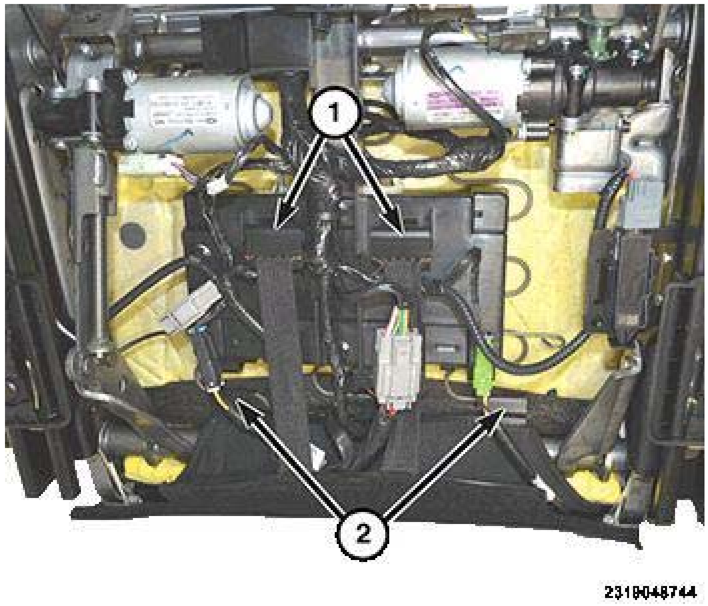


Fig. 306: J-Hook Retainers
Courtesy of CHRYSLER GROUP, LLC

6. Route the wire harness, if equipped, and install the J-hook retainers (1) at the bottom of the seat.
7. When servicing the front passenger seat, if required, install the Occupant Detection Sensor (ODS) to the seat bottom cushion. Refer to **SENSOR, OCCUPANT DETECTION, INSTALLATION** .

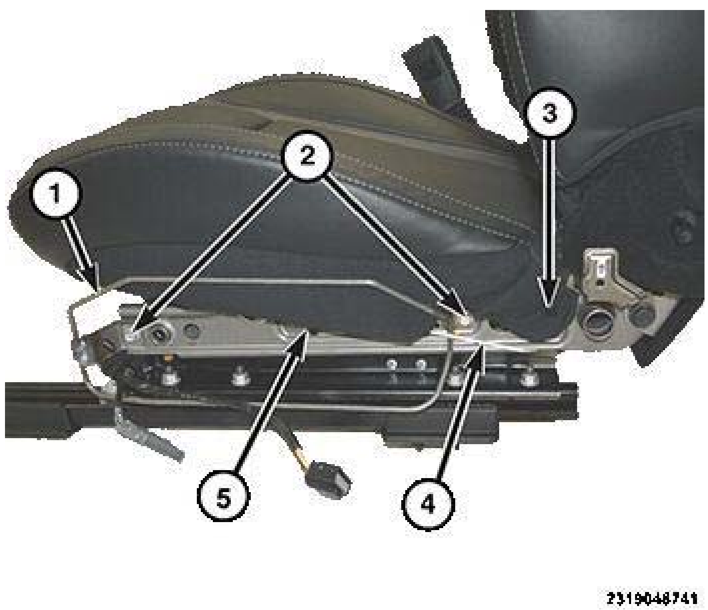


Fig. 307: Side Bracket, String, Fastener, Retainer & Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Secure the J-hook retainer (5) to the side of the seat adjuster.
9. Install the seat side bracket (1) and tighten the bolts (2) securely.
10. Hook the tether string (4) to the seat. Make sure the tether string is routed as noted during removal.
11. Install the push fastener (3).
12. Install the seat side shields. Refer to **SIDE SHIELDS, SEAT CUSHION, FRONT, INSTALLATION**.

13. Install the seat. Refer to **SEAT, FRONT, INSTALLATION**.

PANEL, SEAT BACK, FRONT

REMOVAL

REMOVAL

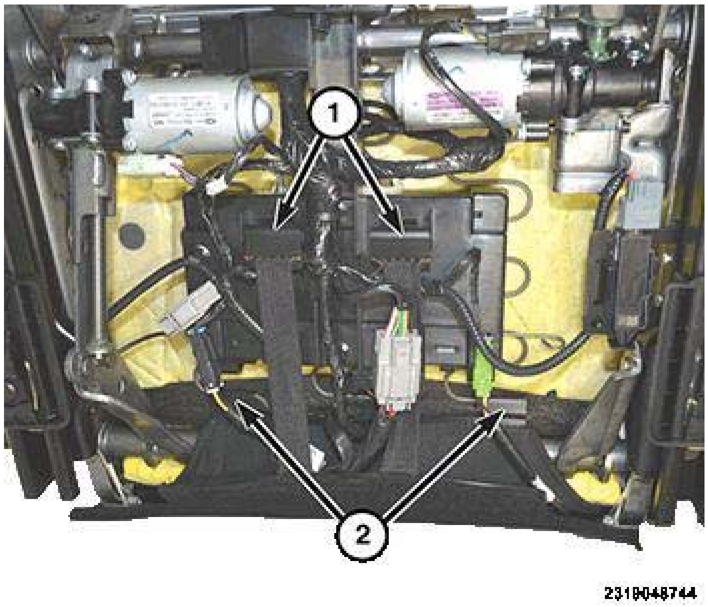


Fig. 308: J-Hook Retainers
Courtesy of CHRYSLER GROUP, LLC

WARNING: **Review all warnings and cautions prior to servicing the seats. Failure to follow these instructions may result in serious or fatal injury.**

Refer to **SEATS, FRONT, WARNING**.

1. Position the seat fully forward.
2. Disconnect the negative battery cable.
3. Release the two J-hooks (1) at the bottom of the seat.

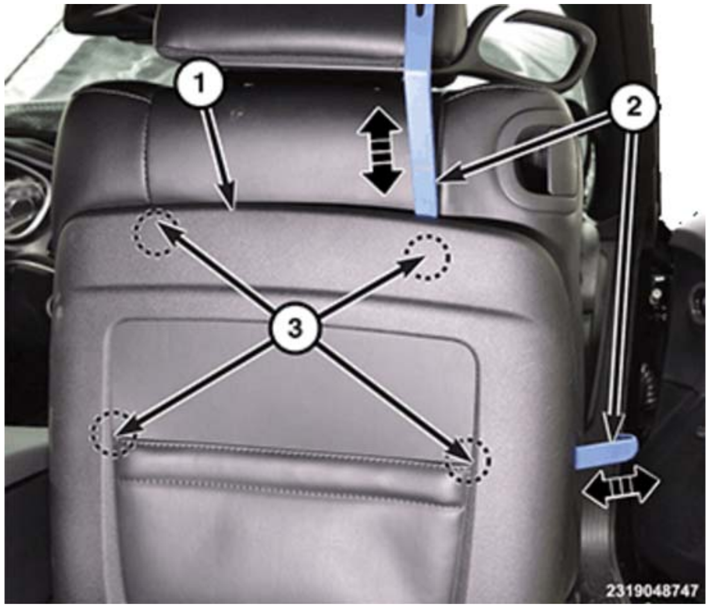


Fig. 309: Seat Back Panel, Retaining Tab Locations & Trim Sticks
Courtesy of CHRYSLER GROUP, LLC

4. Starting at one side of the seat back panel (1), use a trim stick (2) or equivalent to push at the locations shown in illustration (3) to release the retaining tabs, and pull rearward on the seat back panel.
5. Release the retaining tabs on both sides of the seat back panel, then lift the seat back panel to remove.

INSTALLATION

INSTALLATION

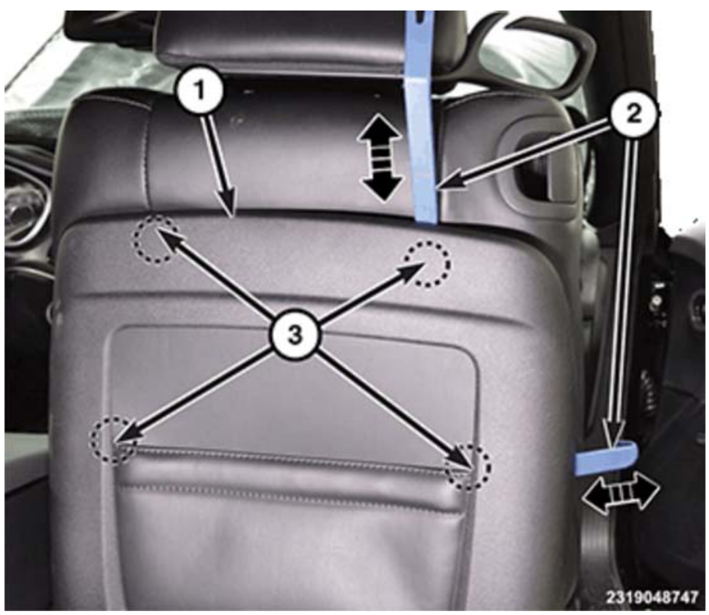
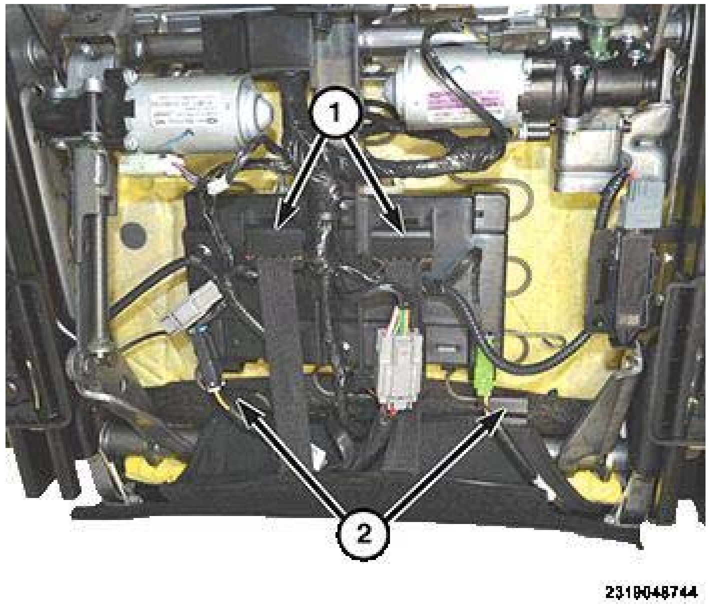


Fig. 310: Seat Back Panel, Retaining Tab Locations & Trim Sticks
Courtesy of CHRYSLER GROUP, LLC

1. Position the seat back panel (1) bottom hooks and slide down into the seat back frame.
2. Hand tap at the locations shown in illustration (3) to engage the retaining tabs.



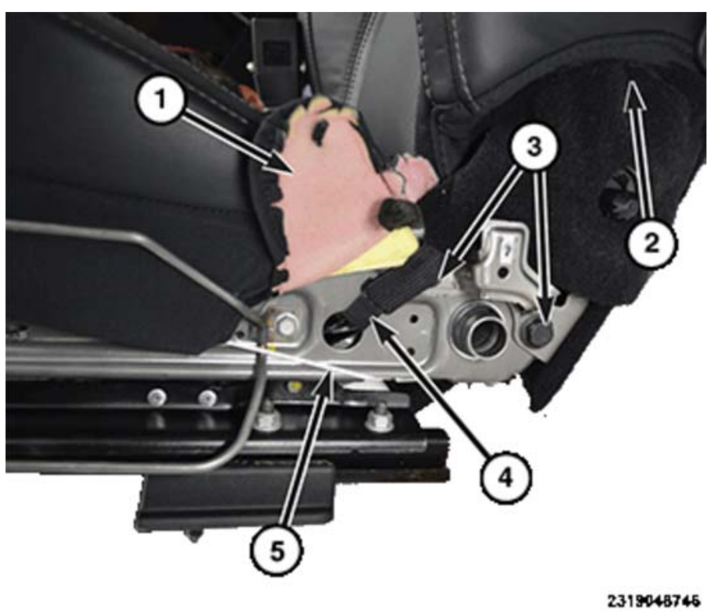
[Fig. 311: J-Hook Retainers](#)
Courtesy of CHRYSLER GROUP, LLC

3. Secure the J-hooks (1) under the seat.
4. Connect the negative battery cable.

SEAT BACK, FRONT

REMOVAL

REMOVAL



[Fig. 312: Removing/Installing Front Seat Back](#)
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to [SEATS, FRONT, WARNING](#).

2. Remove the front seat. Refer to **SEAT, FRONT, REMOVAL**.
3. Remove the front seat back panel. Refer to **PANEL, SEAT BACK, FRONT, REMOVAL**.
4. Remove the side shields. Refer to **SIDE SHIELDS, SEAT CUSHION, FRONT, REMOVAL**.
5. Disconnect the front seat back wire harness connector.

NOTE: **Take note of the wire harness routing for correct installation.**

6. Using a trim stick or equivalent, remove the push fastener and position the seat cushion cover (1) aside.
7. Release the tether string (5).
8. Release the J-hook fastener (4).
9. Remove the bolts (3) from both sides of the front seat back and remove.

INSTALLATION

INSTALLATION

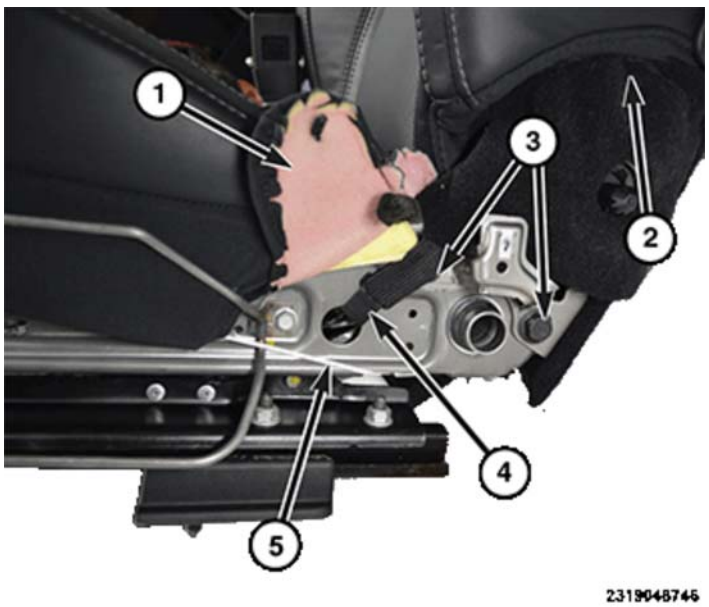


Fig. 313: Removing/Installing Front Seat Back
Courtesy of CHRYSLER GROUP, LLC

1. Position the front seat back onto the seat adjuster. Install the front eat back bolts (3) and tighten to the proper specification. Refer to **SPECIFICATIONS**.

NOTE: **Before tightening the front seat back bolts, make sure the wire harness routing is correct.**

2. Connect the seat back wire harness connector.
3. Install the side shields. Refer to **SIDE SHIELDS, SEAT CUSHION, FRONT, INSTALLATION**.
4. Install the front seat back panel. Refer to **PANEL, SEAT BACK, FRONT, INSTALLATION**.
5. Install the front seat. Refer to **SEAT, FRONT, INSTALLATION**.

SEAT, FRONT

REMOVAL

REMOVAL

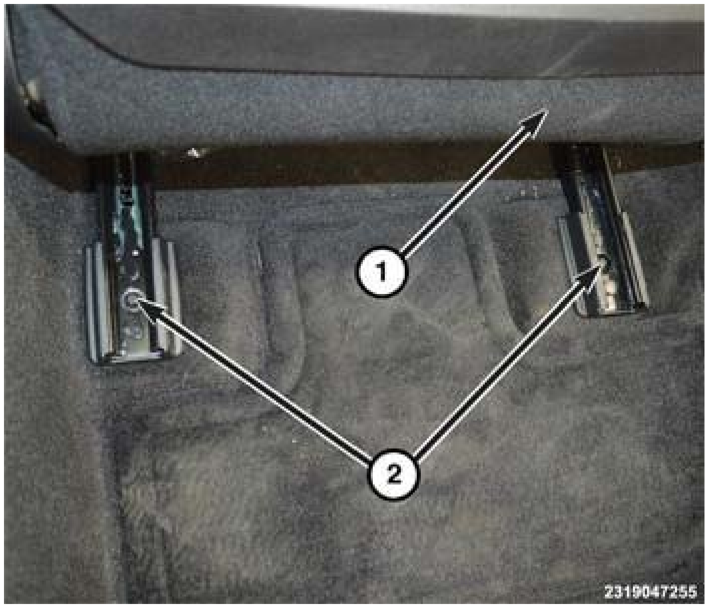


Fig. 314: Rear Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Removal process is the same for both sides of the vehicle.

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to SEATS, FRONT, WARNING.
2. Move the front seat (1) to the full forward position.
3. Remove the seat rear bolts (2).

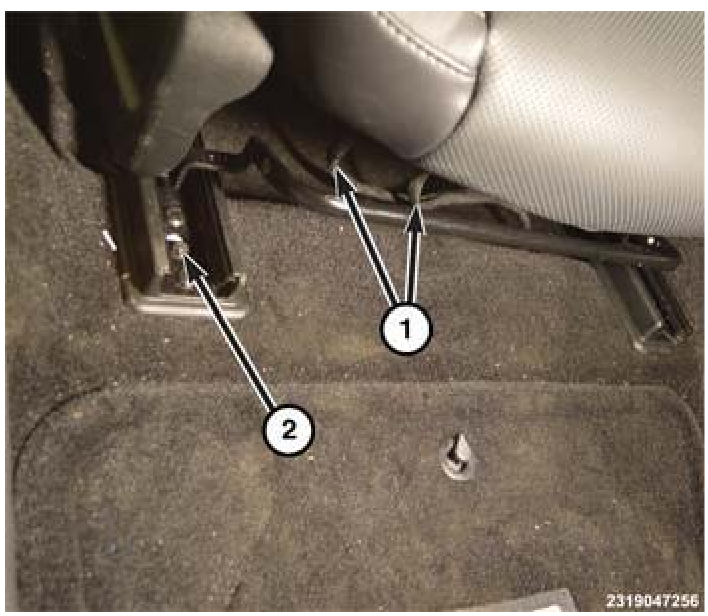


Fig. 315: Front Bolts & Connectors
Courtesy of CHRYSLER GROUP, LLC

4. Move the front seat to the full rearward position.
5. Remove the seat front bolts (2).
6. Disconnect and isolate the negative battery cable.
7. Disconnect all electrical connectors (1).

CAUTION: Do not use the adjuster release bar as a handle when removing or installing the front seat.

8. Remove the front seat from the vehicle.

INSTALLATION

INSTALLATION

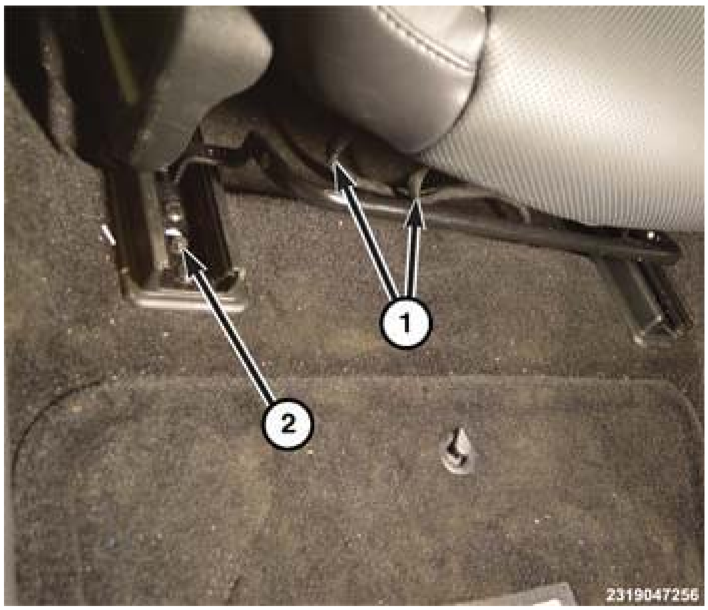


Fig. 316: Front Bolts & Connectors
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **SEATS, FRONT, WARNING**.
2. Position the front seat into the vehicle.

CAUTION: Do not use the adjuster release bar as a handle when removing or installing the front seat.

3. Connect all electrical connectors.
4. Install the seat front bolts (2) and tighten to the proper specification. Refer to **SPECIFICATIONS**.
5. Connect the negative battery cable.

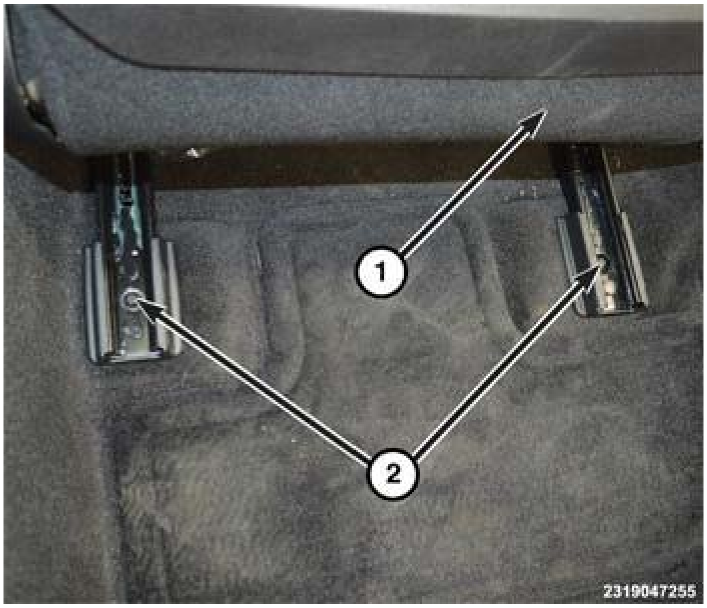


Fig. 317: Rear Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Move the front seat (1) to the full forward position.
7. Install the seat rear bolts (2) and tighten to the proper specification. Refer to **SPECIFICATIONS**.
8. The supplemental restraint system verification test procedure should be performed following service of any supplemental restraint system component. Refer to **STANDARD PROCEDURE** .
9. All of the components that make up the OCS are a factory-calibrated and assembled unit. The OCS components cannot be adjusted or repaired and, if damaged or ineffective, they must be replaced as a calibrated unit. Any time the OCS is removed or replaced for any reason, the new OCS data must be configured within the Occupant Restraint Controller (ORC) using a diagnostic scan tool. Refer to the appropriate diagnostic information.

SIDE SHIELDS, SEAT CUSHION, FRONT

REMOVAL

REMOVAL

Fig. 318: Recliner Handle
Courtesy of CHRYSLER GROUP, LLC

1. Remove the front seat. Refer to **SEAT, FRONT, REMOVAL**.
2. Using a hook tool or equivalent, remove the clip then the recliner handle (1).

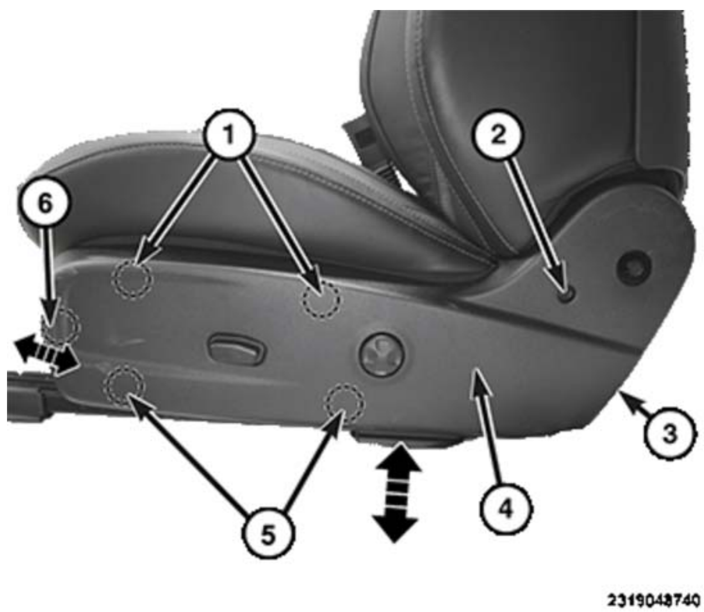


Fig. 319: Retaining Clips Location, Screws & Retaining Clips
Courtesy of CHRYSLER GROUP, LLC

3. Remove the screws (2) and (3).
4. Pull out at the bottom to release the retaining clips (5).
5. Push forward to release the front retaining clip (6) and lift up to release the top retaining clips (1) and remove. Disconnect the wire harness connectors, if equipped.

[Fig. 320: Side Shield & Screws](#)
Courtesy of CHRYSLER GROUP, LLC

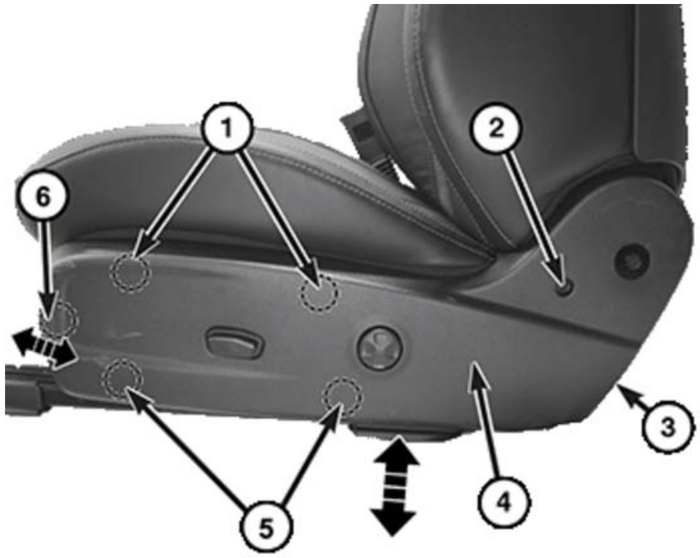
6. Remove the screws (2) and (3).
7. Lift the side shield (1) and remove.

INSTALLATION

INSTALLATION

[Fig. 321: Side Shield & Screws](#)
Courtesy of CHRYSLER GROUP, LLC

1. Position the side shield (1) and install screws (2) and (3). Tighten the screw securely.



2319048740

Fig. 322: Retaining Clips Location, Screws & Retaining Clips
Courtesy of CHRYSLER GROUP, LLC

2. Connect the wire harness connectors, if equipped.
3. Position the side shield (4) slightly forward and push down to engage the top retaining clips (1), then push rearward to engage the front retaining clip (6).
4. Push at the bottom to engage the retaining clips (5).
5. Install the screws (3) and (4). Tighten the screws securely.

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Fig. 323: Recliner Handle
Courtesy of CHRYSLER GROUP, LLC

6. Install the clip into the recliner handle (1) then install it onto the recliner shaft by hand.

SEATS, REAR

COVER, SEAT BACK, REAR

REMOVAL

REMOVAL

Fig. 324: Armrest, Pivot Bolt & Retainer
Courtesy of CHRYSLER GROUP, LLC

NOTE: 40% seat back service is similar to the 60% seat back unless otherwise noted.

1. Remove the rear seat back from vehicle. Refer to SEAT BACK, REAR, REMOVAL.
2. Remove the armrest pivot bolt (2) and retainer (3).
3. Pivot the armrest (1) out and remove.

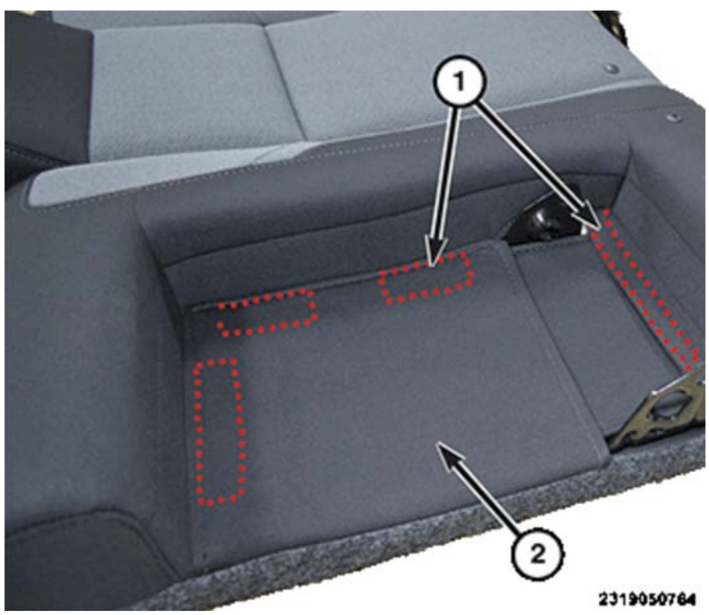


Fig. 325: Hook And Loop Fasteners & Cover
Courtesy of CHRYSLER GROUP, LLC

4. Release the hook and loop fasteners (1) in the armrest pocket and pull the cover (2) open.

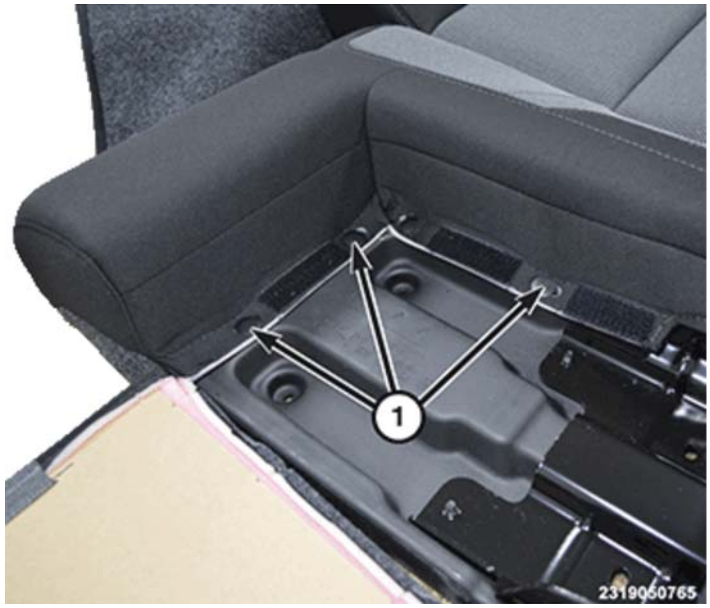


Fig. 326: Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Remove the three push fasteners (1) in the armrest pocket.

Fig. 327: Cover Zippers, Seat Back Cover & Retaining Strip
Courtesy of CHRYSLER GROUP, LLC

6. Separate the retainer strip (3) at the bottom of the seat back cover (2).
7. Unzip the seat back cover zippers (1).

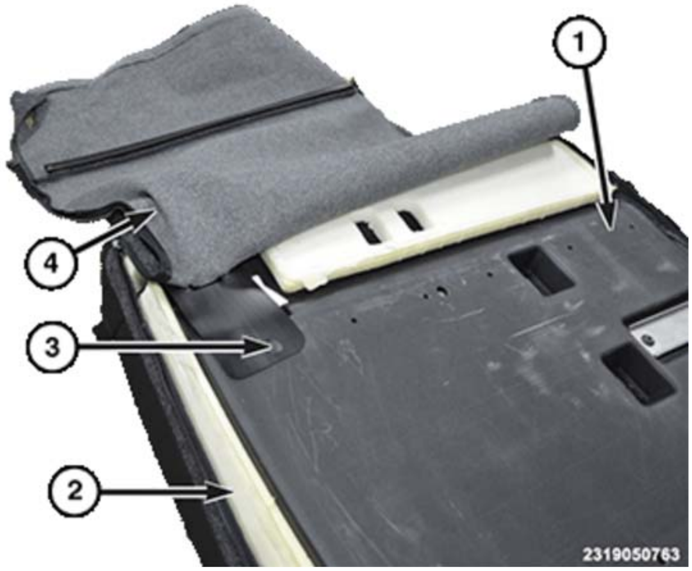


Fig. 328: Seat Back Frame, Seat Back Foam, Push Retainers & Seat Back Cover
Courtesy of CHRYSLER GROUP, LLC

8. Open the seat back cover (4) and remove the push fastener (3).
9. Remove the seat back cover and seat back foam (2), as an assembly, from the seat back frame (1).

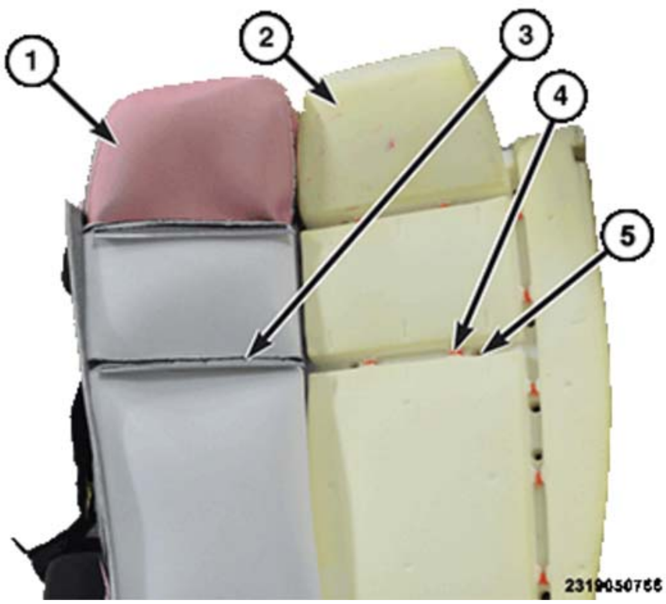


Fig. 329: Seat Cushion Cover, Clip Strips, Molded Clips & Hole
Courtesy of CHRYSLER GROUP, LLC

10. Pull the seat cushion cover (1) away from the foam (2) and carefully release the Clip Strips (3) from the molded clips (4).

INSTALLATION

INSTALLATION

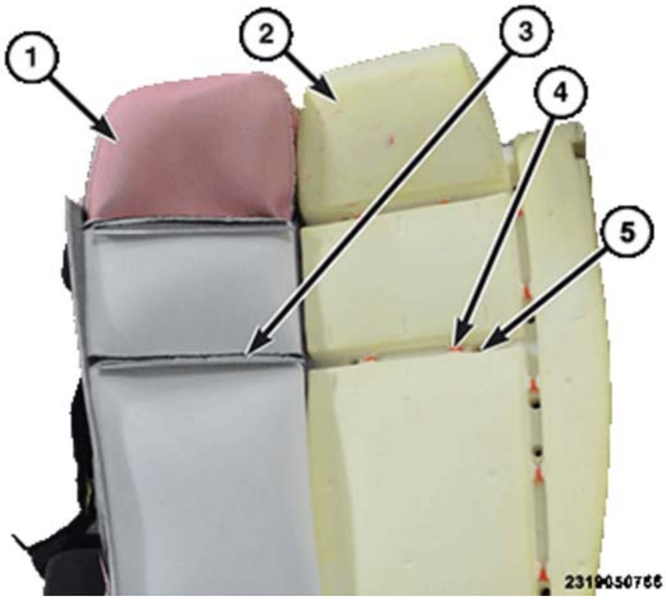


Fig. 330: Seat Cushion Cover, Clip Strips, Molded Clips & Hole
Courtesy of CHRYSLER GROUP, LLC

NOTE: **40% seat back service is similar to the 60% seat back unless otherwise noted.**

There is a hole (5) in the foam next to each molded clip (4) to aid in clip strip installation.

1. Position the seat back cover (1) onto the sea back foam (2) and align the clip strips (3) to the molded clips (4).

   NOTE: **Note that there is a hole (5) in the foam, next to each molded clip, to aid in clip strip alignment/installation.**

Fig. 331: Clip Strip & Molded Clip
Courtesy of CHRYSLER GROUP, LLC

2. Press the clip strip (2) into each molded clip (1).

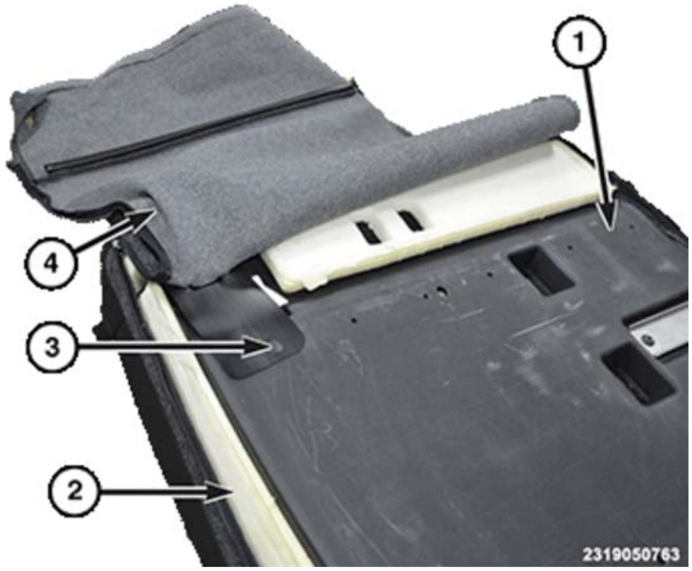


Fig. 332: Seat Back Frame, Seat Back Foam, Push Retainers & Seat Back Cover
Courtesy of CHRYSLER GROUP, LLC

3. Position the seat back assembly (2) onto the seat back frame (1) and install the push fastener (3).

Fig. 333: Cover Zippers, Seat Back Cover & Retaining Strip
Courtesy of CHRYSLER GROUP, LLC

4. Fasten the retainer strip (3) at the bottom of the seat back cover (2).
5. Close the zippers (1) on both sides of the seat back and tuck the zipper up into the seat back cover.

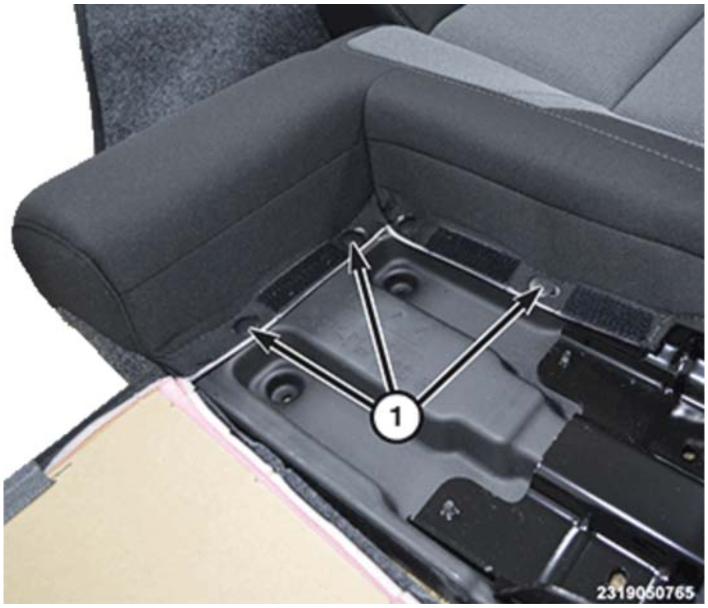


Fig. 334: Push Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Install the three push fasteners (1) in the armrest pocket.

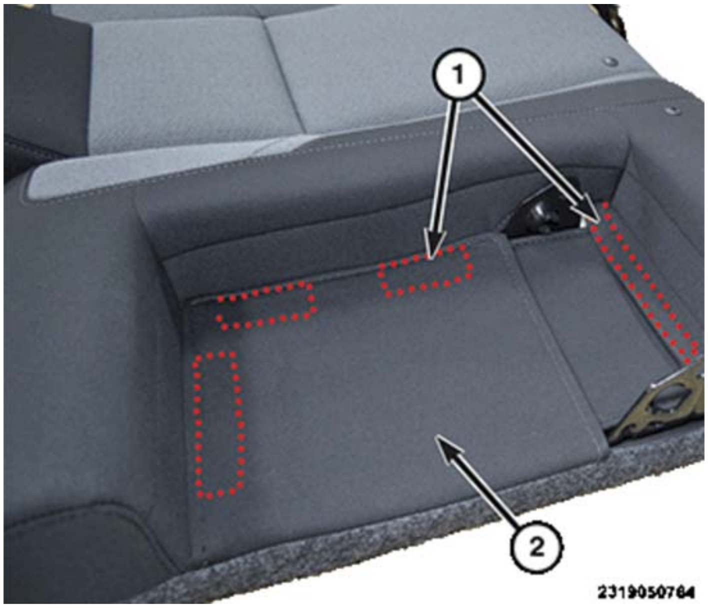


Fig. 335: Hook And Loop Fasteners & Cover
Courtesy of CHRYSLER GROUP, LLC

7. Fasten the hook and loop fasteners (1) in the armrest pocket (2).

Fig. 336: Armrest, Pivot Bolt & Retainer
Courtesy of CHRYSLER GROUP, LLC

8. Align the armrest pivot pin and rotate the armrest into position.
9. Install the armrest retainer (3) and pivot bolt (2). Tighten the armrest pivot bolt to the proper specification. Refer to **SPECIFICATIONS**.
10. Install the rear seat back into the vehicle. Refer to **SEAT BACK, REAR, INSTALLATION**.

COVER, SEAT CUSHION, REAR

REMOVAL

REMOVAL

Fig. 337: J-Hook Retainers & Seat Cushion Frame
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear seat cushion. Refer to **SEAT CUSHION, REMOVAL**.
2. Release the J-hook retainers (1) to release the seat cushion cover from the seat cushion frame (2).

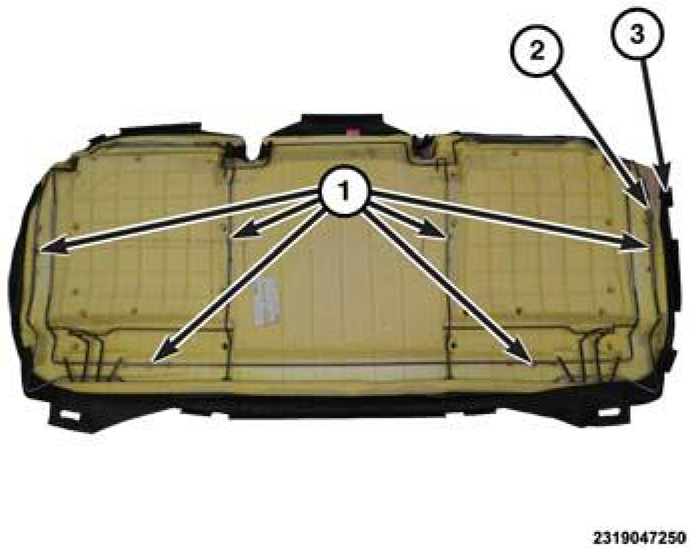


Fig. 338: Hog Rings, Seat Cushion Frame & Seat Cushion Cover
Courtesy of CHRYSLER GROUP, LLC

3. If necessary to remove the seat cushion frame (2), pull the seat cushion cover (3) back and remove the six hog rings (1).

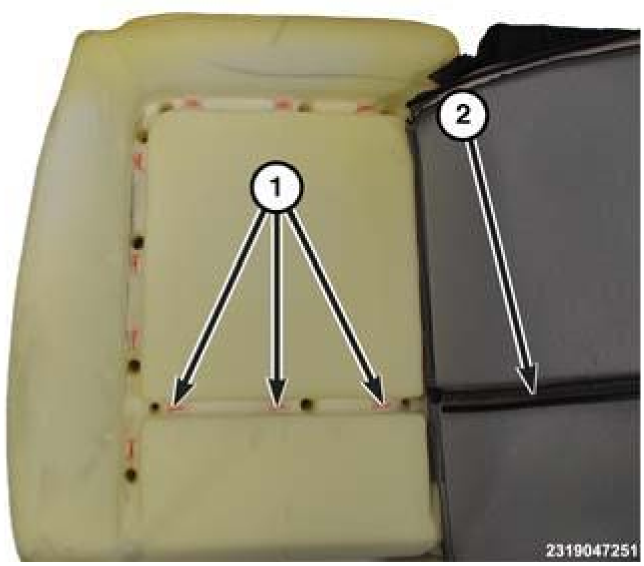


Fig. 339: Clips & Clip Strip
Courtesy of CHRYSLER GROUP, LLC

4. Pull the seat cushion cover away from the foam and carefully release the clip strips (2) from the molded clips (1).

INSTALLATION

INSTALLATION

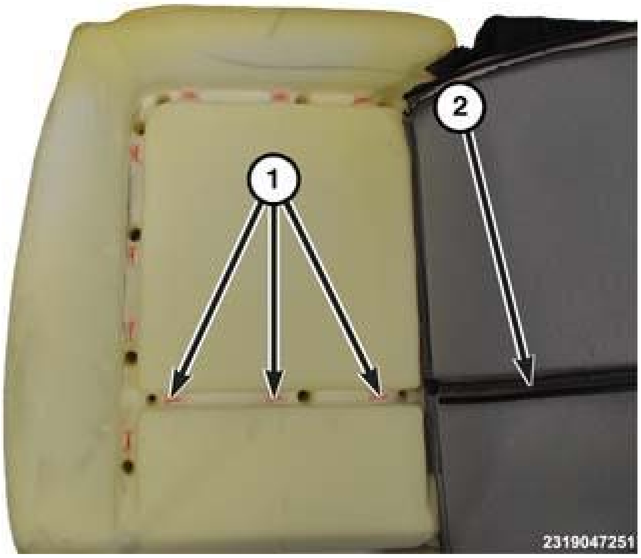


Fig. 340: Clips & Clip Strip
Courtesy of CHRYSLER GROUP, LLC

1. Position the seat cushion cover onto the seat cushion foam and align the clip strips (2) to the molded clips (1).

NOTE: **Note that there is a hole in the foam, next to each molded clip, to aid in clip strip alignment/installation.**

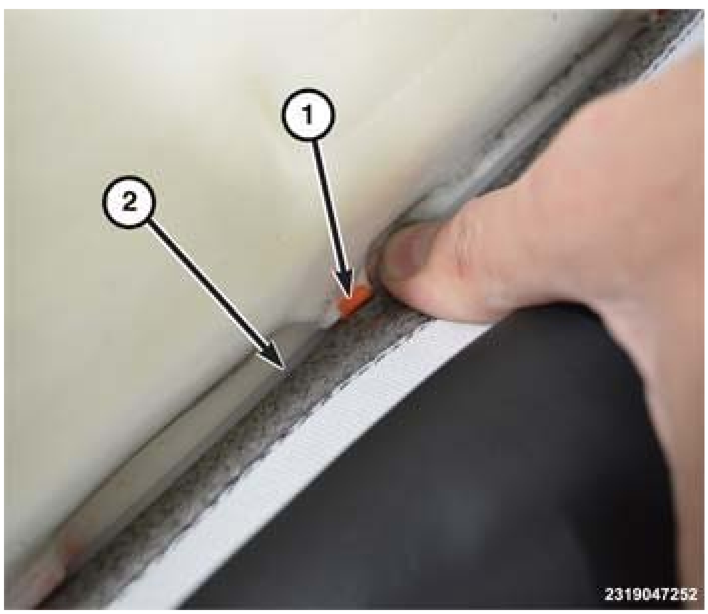
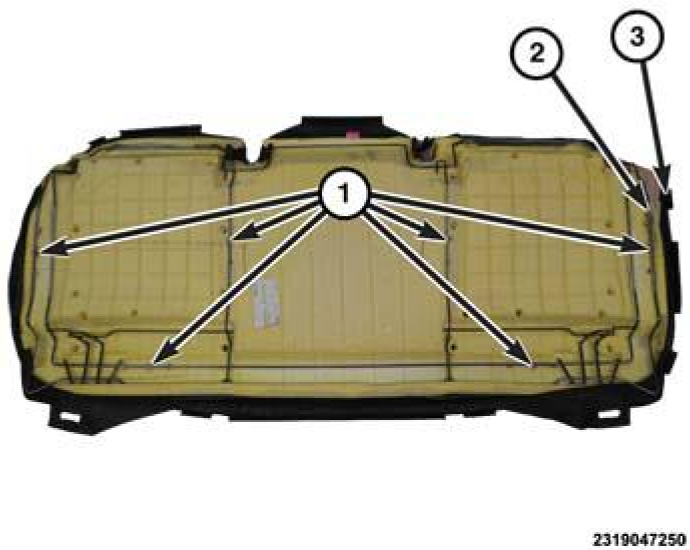


Fig. 341: Clip Strip & Molded Clip
Courtesy of CHRYSLER GROUP, LLC

2. Press the clip strip (2) into each molded clip (1).



[Fig. 342: Hog Rings, Seat Cushion Frame & Seat Cushion Cover]()
Courtesy of CHRYSLER GROUP, LLC

3. Position the seat cushion frame (2) and install new hog rings (1).

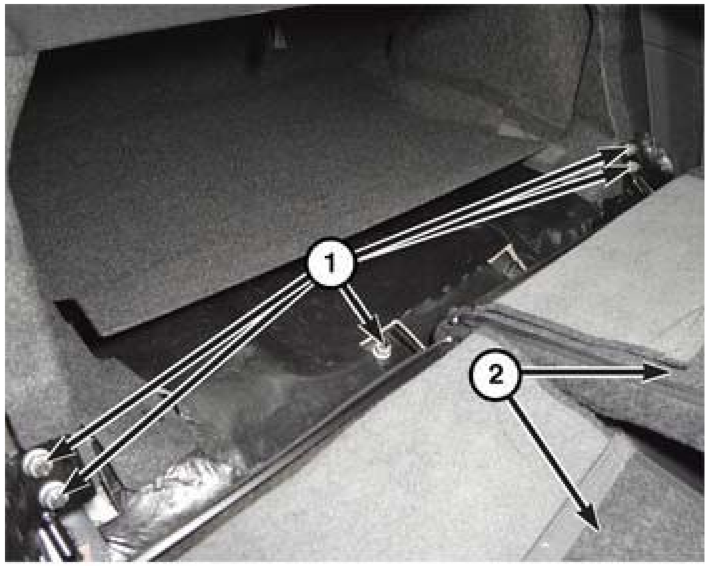
[Fig. 343: J-Hook Retainers & Seat Cushion Frame]()
Courtesy of CHRYSLER GROUP, LLC

4. Secure all the J-hook retainers (1) to the seat cushion frame (2).
5. Install the rear seat cushion. Refer to **SEAT CUSHION, INSTALLATION**.

SEAT BACK, REAR

REMOVAL

REMOVAL



[Fig. 344: Seat Backs & Outboard Nuts](#)
Courtesy of CHRYSLER GROUP, LLC

1. Fold both seat backs (2) to full down position.
2. Remove the outboard nuts (1) on the 40% split seat back.
3. Rotate the 40% split seat back forward and slide off from guide post and remove.
4. Remove the center and outboard nuts on the 60% split seat back and remove.

INSTALLATION

INSTALLATION

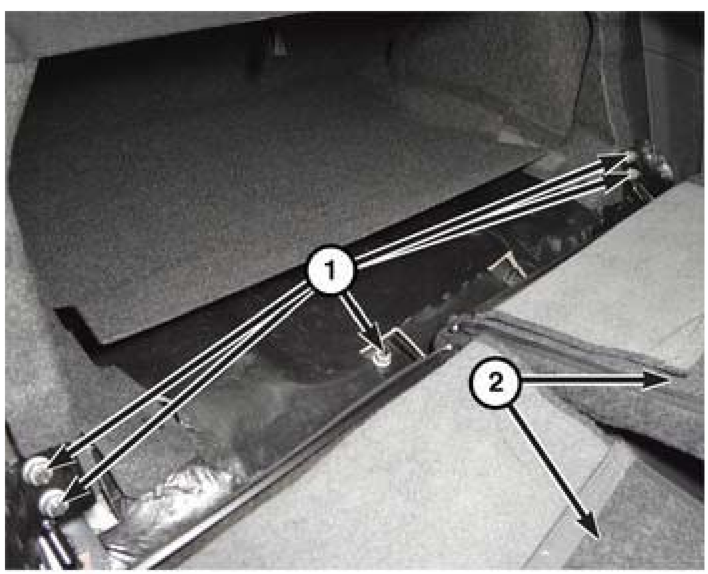


Fig. 345: Seat Backs & Outboard Nuts
Courtesy of CHRYSLER GROUP, LLC

1. Place the 60% split seat back into the vehicle and install the center and outboard nuts (1).

2. Tighten the rear seat nuts to the proper specification. Refer to **SPECIFICATIONS**.
3. Install the 40% seat back onto the guide post of the 60% split seat back bracket and rotate into position.
4. Install the outboard nuts. Tighten the rear seat nuts to the proper specification. Refer to **SPECIFICATIONS**.

SEAT CUSHION

REMOVAL

REMOVAL

1. Push rearward then pull upward, at the front edge of the rear seat cushion, to release the it from the two seat cushion retainers.
2. Lift up and forward to remove.

INSTALLATION

INSTALLATION

1. Position the rear seat cushion under the rear seat back. Route the seat belt buckles through the rear seat cushion.
2. Push downward at the forward edge of the rear seat cushion and engage the retainers.

STRIKER, SEAT BACK, SECOND ROW

REMOVAL

REMOVAL

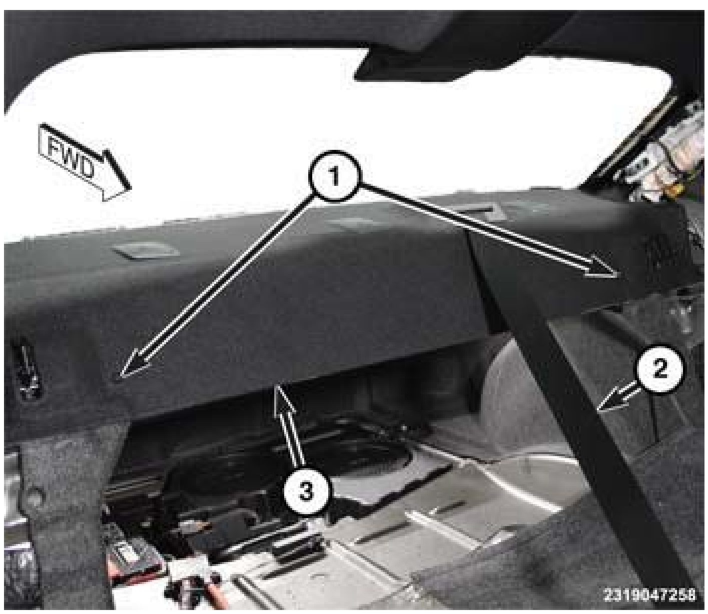


Fig. 346: Push Fasteners, Rear Seat Belt & Rear Shelf Trim
Courtesy of CHRYSLER GROUP, LLC

1. Fold the rear seat back down.
2. Remove the two push fasteners (1) from the rear shelf panel.
3. Position the rear shelf panel to gain access to the rear seat striker.

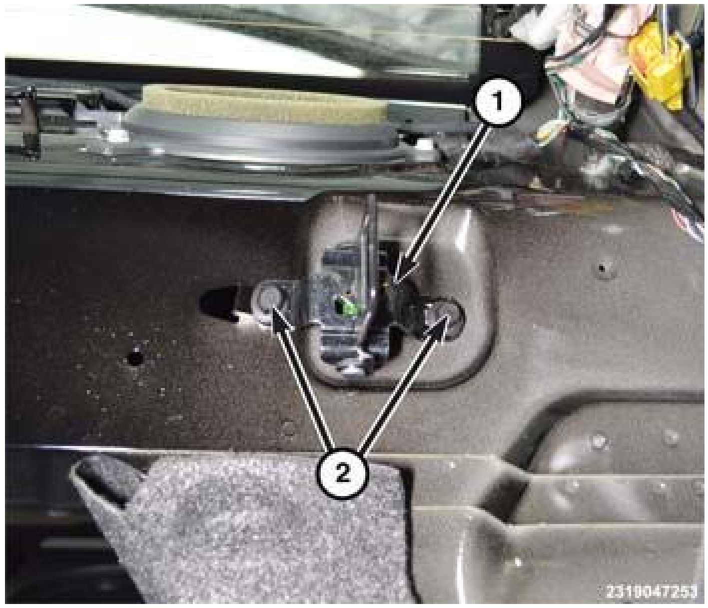


Fig. 347: Rear Seat Striker & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the bolts (2) and the rear seat striker (1).

INSTALLATION

INSTALLATION

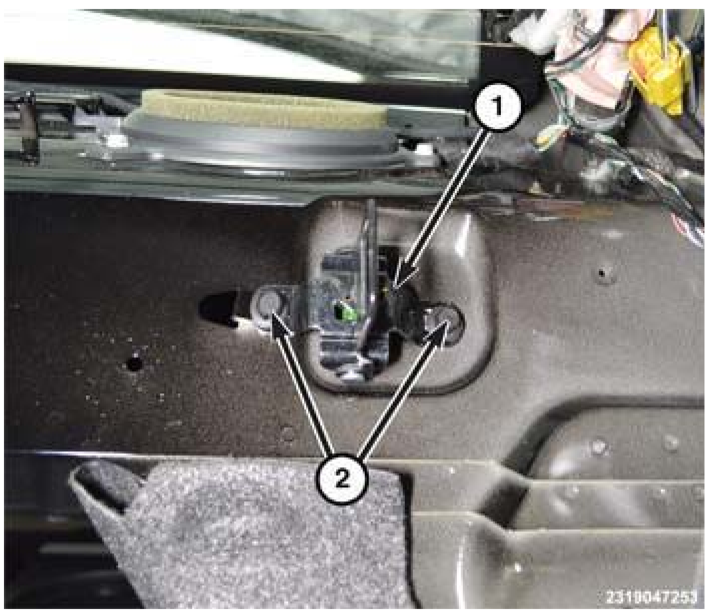


Fig. 348: Rear Seat Striker & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear seat striker (1) and install the bolts (2). Tighten the rear seat striker bolts to the proper specification. Refer to SPECIFICATIONS.

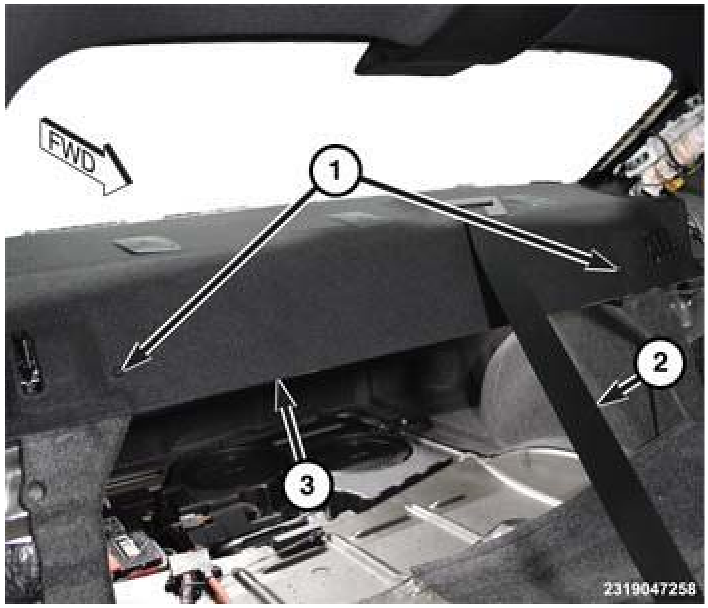


Fig. 349: Push Fasteners, Rear Seat Belt & Rear Shelf Trim
Courtesy of CHRYSLER GROUP, LLC

2. Position the rear shelf panel and install the two push fasteners (1).
3. Raise the rear seat back and verify rear seat striker fit and operation.

STATIONARY GLASS

WARNING

WARNING

WARNING: **Do not operate the vehicle within 24 hours of windshield installation. It takes at least 24 hours for urethane adhesive to cure. If it is not cured, the windshield may not perform properly in an accident.**

- **Urethane adhesives are applied as a system. Use glass cleaner, glass prep solvent, glass primer, PVC (vinyl) primer and pinch weld (fence) primer provided by the adhesive manufacturer. If not, structural integrity could be compromised.**
- **Chrysler does not recommend glass adhesive by brand. Technicians should review product labels and technical data sheets, and use only adhesives that their manufactures warrant will restore a vehicle to the requirements of FMVSS 212. Technicians should also insure that primers and cleaners are compatible with the particular adhesive used.**
- **Be sure to refer to the urethane manufacturer's directions for curing time specifications, and do not use adhesive after its expiration date.**
- **Vapors that are emitted from the urethane adhesive or primer could cause personal injury. Use them in a well-ventilated area.**
- **Skin contact with urethane adhesive should be avoided. Personal injury may result.**
- **Always wear eye and hand protection when working with glass.**

CAUTION: Protect all painted and trimmed surfaces from coming in contact with urethane or primers.

Be careful not to damage painted surfaces when removing moldings or cutting urethane around windshield.

BACKLITE

REMOVAL

REMOVAL

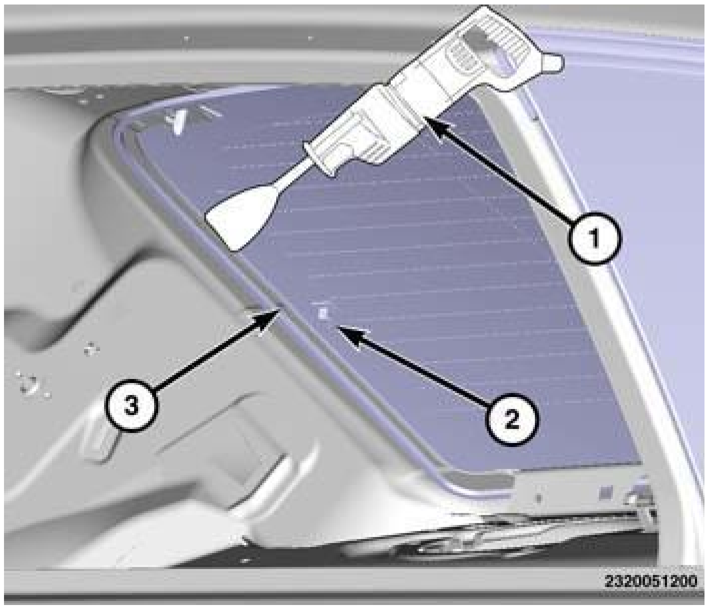


Fig. 350: Adhesive Separation
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to STATIONARY GLASS, WARNING.
2. Open the decklid.
3. Remove the C-pillar trim panel. Refer to PANEL, C-PILLAR TRIM, REMOVAL.
4. Remove the rear shelf panel. Refer to PANEL, REAR SHELF, REMOVAL.
5. Disconnect the wire connectors from rear window defogger terminals (2) and, rear window mounted radio antenna, if equipped.

CAUTION: Be careful not to damage painted surfaces when cutting urethane around the backlite.

6. Using an assistant and a glass extraction tool (1) or equivalent, cut and separate the urethane adhesive securing the backlite (2) to the backlite fence.

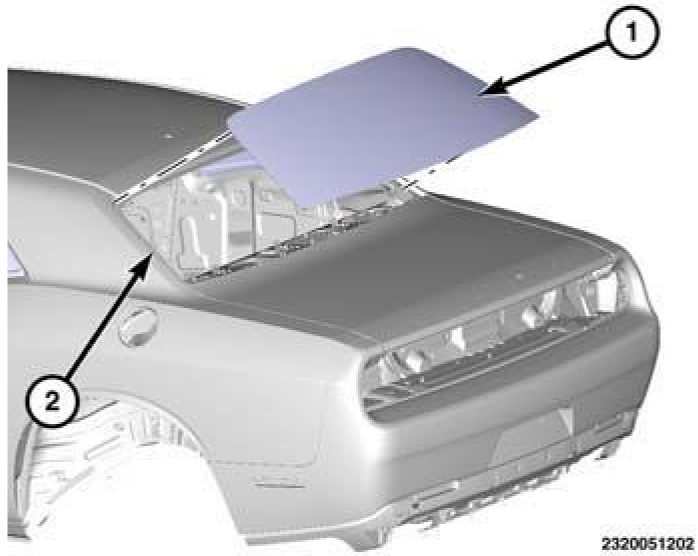


Fig. 351: Removing/Installing Backlite
Courtesy of CHRYSLER GROUP, LLC

7. Carefully remove the backlite (1) from the vehicle (2).

INSTALLATION

INSTALLATION

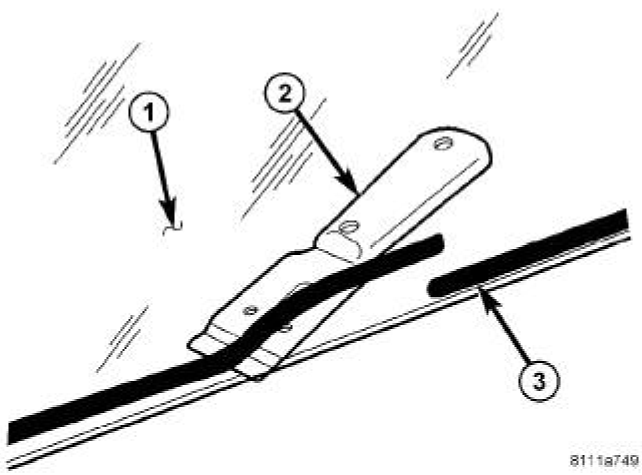


Fig. 352: Glass Adhesive Preparation
Courtesy of CHRYSLER GROUP, LLC

WARNING: **Do not operate the vehicle within 24 hours of windshield installation. It takes at least 24 hours for urethane adhesive to cure. If it is not cured, the windshield may not perform properly if the vehicle is in an accident.**

CAUTION: **To help prevent water leaks, partially roll down the left and right door glass before installing the backlite. This avoids pressurizing the passenger compartment if a door is slammed before the urethane is cured.**

CAUTION: Protect all painted and trimmed surfaces from coming in contact with urethane or primers.

1. If the backlite (1) is being reused, remove as much original urethane (3) as possible from the glass surface using a razor knife (2).

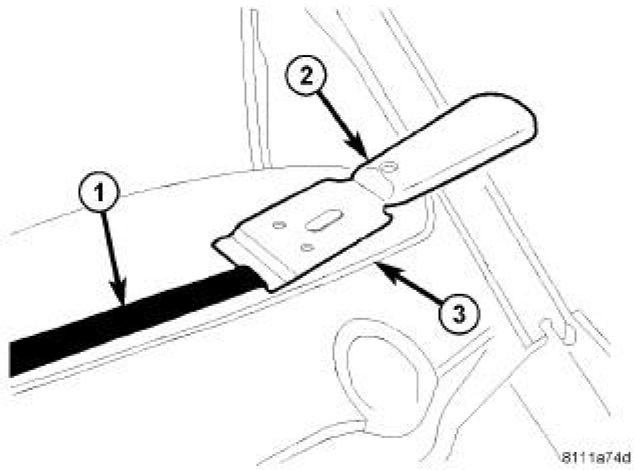
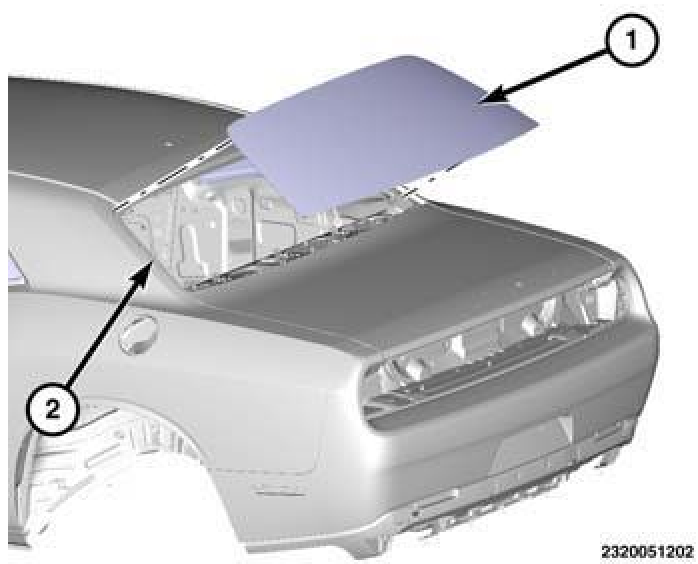


Fig. 353: Smoothing Windshield Adhesive
Courtesy of CHRYSLER GROUP, LLC

NOTE: To prevent corrosion, do not damage paint on the backlite fence when removing original urethane.

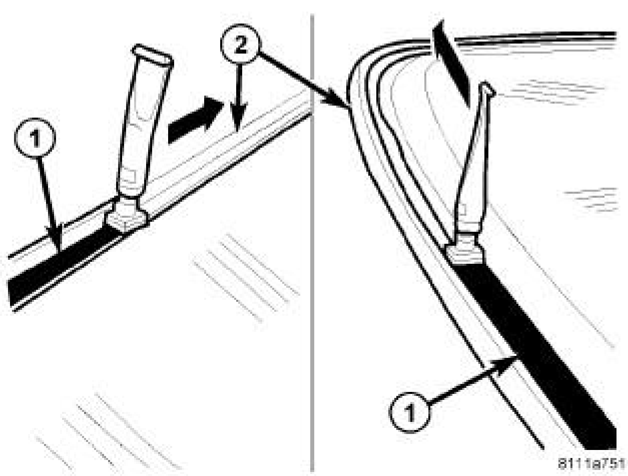
NOTE: The backlite fence should be cleaned of most of its old urethane adhesive. A small amount of old urethane, approximately 1 mm in height should remain on the fence. Do not completely remove all old urethane from the fence, the paint finish and bonding strength will be adversely affected. Replace any missing or damaged spacers around the perimeter of the backlite fence.

2. Using a razor knife (2), level the original bead of urethane (1) on the backlite fence (3) to a thickness of approximately 1 mm (0.04 in.) and remove the loose adhesive.
3. Install a new rubber seal (1) around the top and bottom edges of the backlite (3).



[Fig. 354: Removing/Installing Backlite]
Courtesy of CHRYSLER GROUP, LLC

4. Install new spacers along the backlite fence as required.
5. Using an assistant, position the backlite (1) into the backlite opening and against the backlite fence.
6. Verify the backlite (2) lays evenly against the fence at the top, bottom and sides of the opening. If not, the fence must be formed to the shape of the backlite.
7. Mark the backlite (2) and fence with a grease pencil or pieces of masking tape to use as a reference for installation.
8. Using an assistant, remove the backlite from the backlite opening and place it on a suitable padded work surface.



[Fig. 355: Windshield Primer]
Courtesy of CHRYSLER GROUP, LLC

WARNING: Do not use solvent based glass cleaners to clean the backlite before applying glass prep and primer or poor glass adhesion may result.

9. Clean the inside of the backlite with an ammonia based glass cleaner and a lint-free cloth.
10. Apply glass prep adhesion promoter 25 mm (1 in.) wide (1) around the perimeter of the backlight (2) and 5 mm (0.2 in.) from the edge of the glass and wipe dry with a clean lint-free cloth until no streaks are visible.
11. Apply glass primer 25 mm (1 in.) wide around the perimeter of the backlight and 5 mm (0.2 in.) from the edge of the glass. Allow at least three minutes drying time.
12. Using a flashlight, verify that the primer is completely and evenly installed along the perimeter of the backlite.
13. Re-prime any area that is not fully and evenly primed.

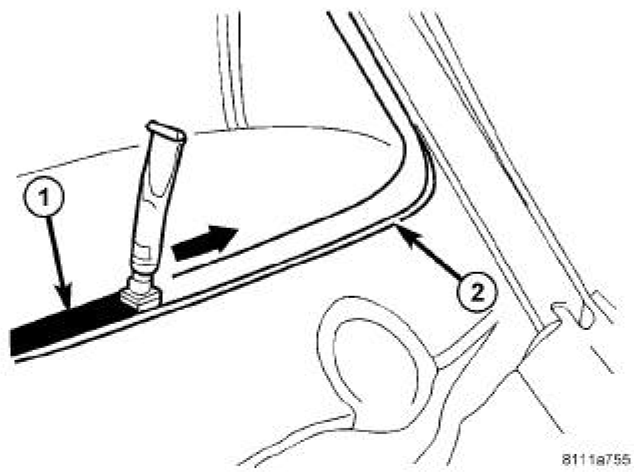


Fig. 356: Applying Windshield Primer
Courtesy of CHRYSLER GROUP, LLC

14. Clean the backlite fence with an ammonia based glass cleaner and a lint-free cloth.
15. Apply pinch weld primer 15 mm (0.75 in.) wide (1) around the backlite fence (2). Allow at least three minutes drying time.
16. Using a flashlight, verify that the primer is completely and evenly installed along the backlite fence.
17. Re-prime any area that is not fully and evenly primed.

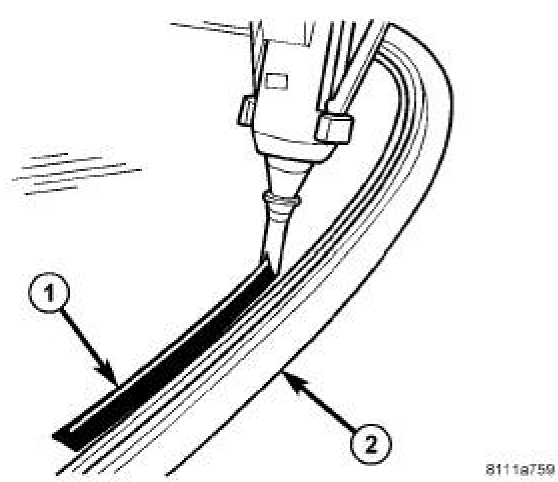


Fig. 357: Applying Windshield Adhesive

Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Always apply the bead of adhesive to the backlite. Always install the backlite within 5 minutes after applying the adhesive.**

NOTE: **If the original urethane adhesive has been exposed for more than 12 hours, the entire adhesive area will need to be re-primed prior to installing new adhesive.**

18. Apply approximately a 10 mm (0.4 in.) wide bead of adhesive (1) with a triangular nozzle approximately 6 mm (0.230 in.) from the edge of the glass (2) starting at the bottom center of the backlite.
19. Run the end of the adhesive bead (2) on the backlite (3) parallel to the start of the bead and smooth the ends flush.

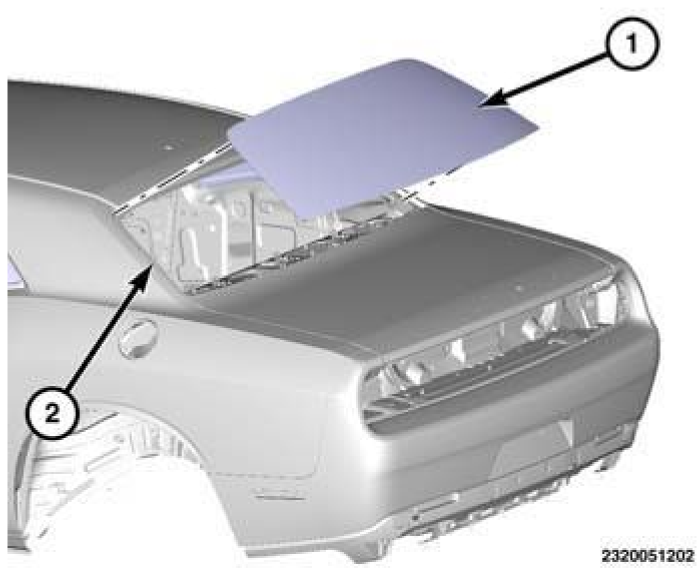


Fig. 358: Removing/Installing Backlite
Courtesy of CHRYSLER GROUP, LLC

20. Using an assistant, position the backlite (1) over the backlite opening.
21. Using the grease pencil marks or tape as reference points, align the backlite (1) to the opening (2).
22. Carefully lower the backlite (1) onto the backlite fence. Guide the backlite and the rubber seal around the backlite into its proper location.

CAUTION: **It is not possible to move the backlite after installation. The backlite should never be pressed into place by more than one person, because the backlite can break if pressed simultaneously on both sides.**

23. Push the backlite (1) inward until the backlite comes into contact with the spacers located on the backlite fence.
24. Connect the wire connectors to the rear window defogger terminals and, rear window mounted radio antenna, if equipped.
25. Install the rear shelf panel. Refer to PANEL, REAR SHELF, INSTALLATION.

26. Install the C-pillar trim. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION**.

GLASS, QUARTER

REMOVAL

REMOVAL

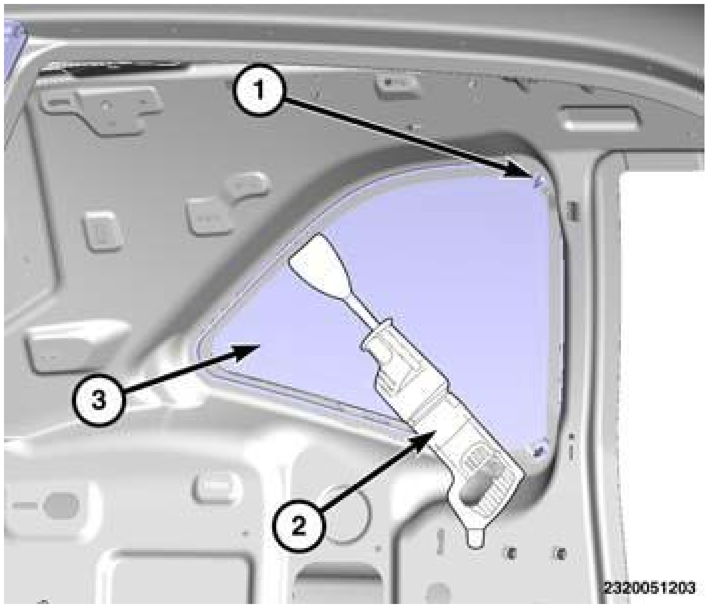


Fig. 359: Adhesive Separation
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **STATIONARY GLASS, WARNING**.
2. Remove the C-pillar trim panel. Refer to **PANEL, C-PILLAR TRIM, REMOVAL**.
3. Using a glass extraction tool (2) or equivalent, cut and separate the urethane adhesive and the alignment pins (1) that secure the quarter glass (3) to window fence.

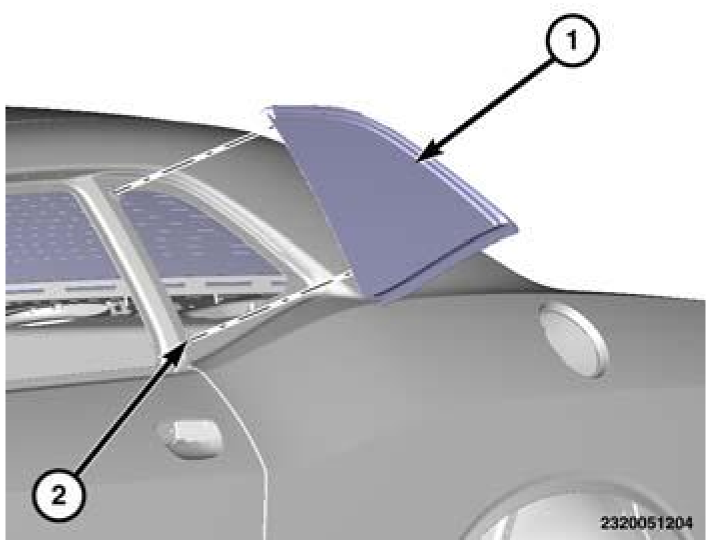


Fig. 360: Removing/Installing Quarter Glass
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Be careful not to damage painted surfaces when removing moldings or cutting urethane around the fixed glass/windshield.

4. Carefully push the quarter window glass (1) from the opening.

INSTALLATION

INSTALLATION

WARNING: Do not operate the vehicle within 24 hours of quarter glass installation. It takes at least 24 hours for urethane adhesive to cure. If it is not cured, the quarter glass may not perform properly if the vehicle is in an accident.

CAUTION: To help prevent water leaks, partially roll down the left and right door glass before installing the quarter glass. This avoids pressurizing the passenger compartment if a door is slammed before the urethane is cured.

CAUTION: Protect all painted and trimmed surfaces from coming in contact with urethane or primers.

NOTE: To prevent corrosion, do not damage paint on the quarter glass fence when removing original urethane.

NOTE: The quarter glass fence should be cleaned of most of its old urethane adhesive. A small amount of old urethane, approximately 1 mm (.04 in) in height should remain on the fence. Do not completely remove all old urethane from the fence, the paint finish and bonding strength will be adversely affected.

1. Using a razor knife, level the original bead of urethane on the fence to a thickness of approximately 1 mm (0.04 in).
2. If the quarter glass (2) is being reused, remove as much of the original urethane as possible from the glass surface using a razor knife.

WARNING: Do not use solvent based glass cleaners to clean the quarter glass before applying glass prep and primer or poor glass adhesion may result.

3. Clean the inside of the quarter glass (2) with an ammonia based glass cleaner and a lint-free cloth.
4. Apply glass prep adhesion promoter 25 mm (1 in) wide around the perimeter of the glass and 5 mm (0.2 in) from the edge of the glass and wipe dry with a clean lint-free cloth until no streaks are visible.
5. Apply glass primer 25 mm (1 in) wide around the perimeter of the glass and 5 mm (0.2 in) from the edge of the glass. Allow at least three minutes drying time.
6. Using a flashlight, verify that the primer is completely and evenly installed along the perimeter of the quarter glass.
7. Re-prime any area that is not fully and evenly primed.

8. Clean the quarter glass fence with an ammonia based glass cleaner and a lint-free cloth.
9. Apply pinch weld primer 15 mm (0.75 in) wide around the quarter glass fence. Allow at least three minutes drying time.
10. Using a flashlight, verify that the primer is completely and evenly installed along the quarter glass fence.
11. Re-prime any area that is not fully and evenly primed.

CAUTION: Always apply the bead of adhesive to the quarter glass. Always install the quarter glass within 5 minutes after applying the adhesive.

NOTE: If the original urethane adhesive has been exposed for more than 12 hours, the entire adhesive area will need to be re-primed prior to installing new adhesive.

12. Apply approximately a 10 mm (0.4 in) wide bead of adhesive with a triangular nozzle approximately 6 mm (0.230 in) from the edge of the glass starting at the bottom center of the quarter glass.
13. Run the end of the adhesive bead on the quarter glass parallel to the start of the bead and smooth the ends flush.

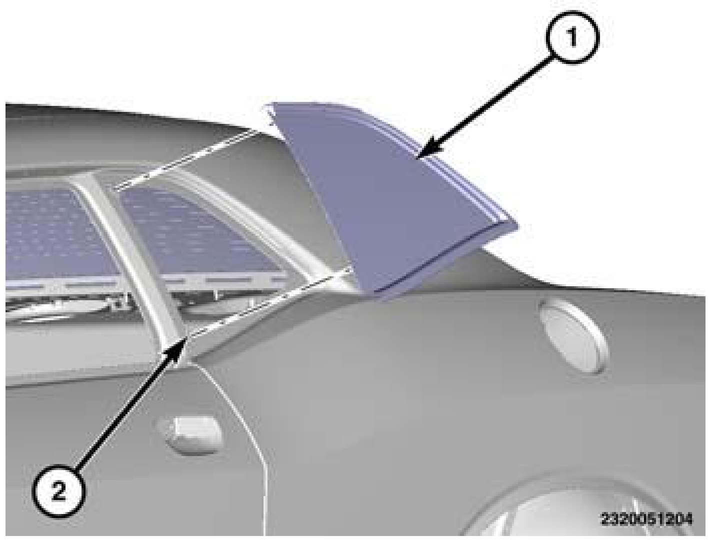


Fig. 361: Removing/Installing Quarter Glass
Courtesy of CHRYSLER GROUP, LLC

14. Place the quarter glass (1) into the window opening (2) and insert mounting studs through the holes in the window fence.
15. Install the C-pillar trim panel. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION**.

WINDSHIELD

DESCRIPTION

DESCRIPTION

The windshield is attached to the window frame (fence) with urethane adhesive. The urethane adhesive is applied cold and seals the surface area between the window opening and the glass. The primer adheres the

urethane adhesive to the windshield.

It is difficult to salvage a windshield during the removal operation. The windshield is part of the structural support for the roof. The urethane bonding used to secure the windshield to the fence is difficult to cut or clean from any surface. If the rubber seals are set in urethane, it would also be unlikely they could be salvaged. Before removing the windshield, check the availability of the windshield and seals from the parts supplier.

REMOVAL

REMOVAL

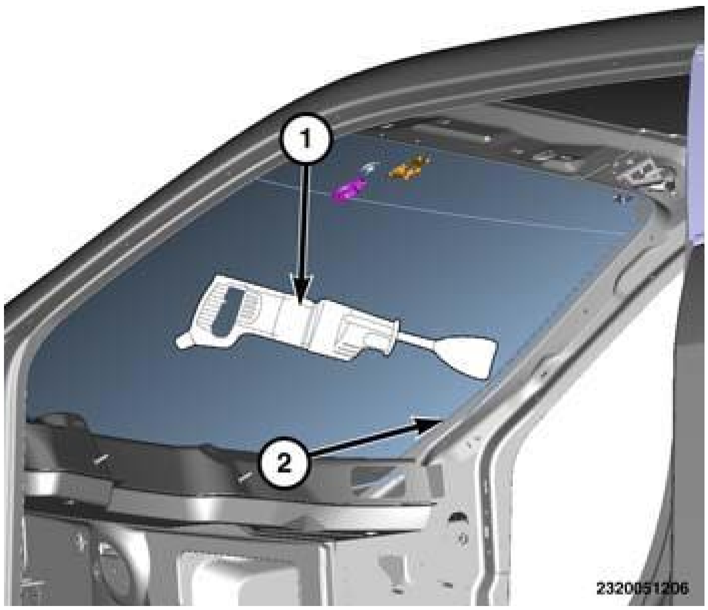
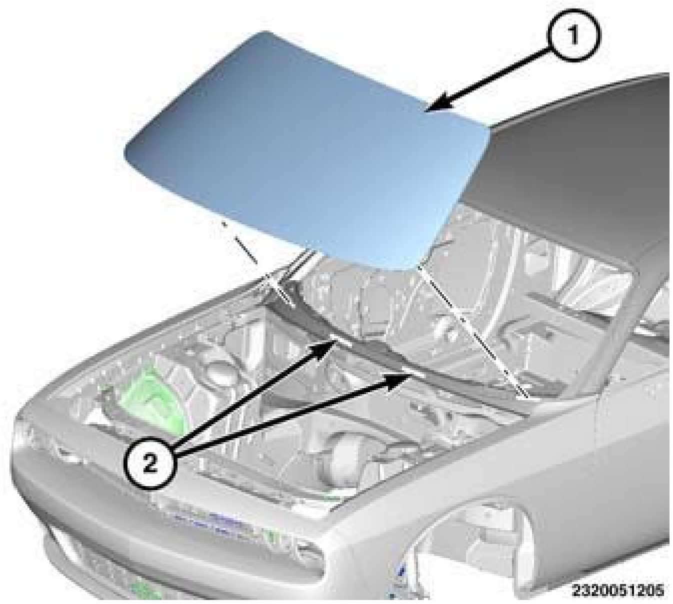


Fig. 362: Adhesive Separation
Courtesy of CHRYSLER GROUP, LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. Refer to **STATIONARY GLASS, WARNING**.
2. Disconnect and isolate the negative battery cable.
3. Remove the rear view mirror. Refer to **MIRROR, REARVIEW, REMOVAL**.
4. Remove the rain sensor module from the windshield. Refer to **MODULE, LIGHT RAIN SENSOR, REMOVAL** .
5. Remove the forward facing camera, if equipped.
6. Remove the humidity sensor. Refer to **SENSOR, HUMIDITY, REMOVAL** .
7. Remove the A-pillar trim panels. Refer to **PANEL, A-PILLAR TRIM, REMOVAL**.
8. Remove the cowl cover panel. Refer to **COVER, COWL PANEL, REMOVAL**.
9. Lower the front of the headliner if necessary. Refer to **HEADLINER, REMOVAL**.
10. Using an assistant and a glass extraction tool (1) or equivalent, cut and separate the urethane adhesive securing the windshield (2) to the windshield fence.



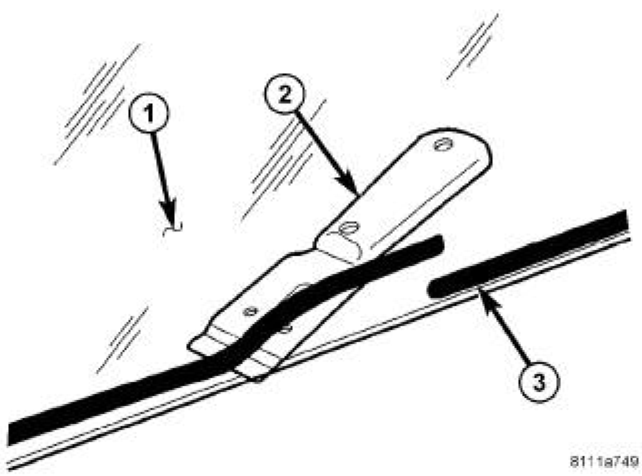
[Fig. 363: Removing/Installing Windshield](#)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Be careful not to damage painted surfaces when removing moldings or cutting urethane around the windshield.

11. Using appropriate tools, carefully remove the windshield (1) from the vehicle.

INSTALLATION

INSTALLATION



[Fig. 364: Removing Old Windshield Adhesive](#)
Courtesy of CHRYSLER GROUP, LLC

WARNING: Do not operate the vehicle within 24 hours of windshield installation. It takes at least 24 hours for urethane adhesive to cure. If it is not cured, the windshield may not perform properly if the vehicle is in an accident.

CAUTION: To help prevent water leaks, partially roll down the left and right door glass

before installing the windshield. This avoids pressurizing the passenger compartment if a door is slammed before the urethane is cured.

CAUTION: **Protect all painted and trimmed surfaces from coming in contact with urethane or primers.**

1. If the windshield (1) is being reused, remove as much of the original urethane (3) as possible from the glass surface using a razor knife (2).

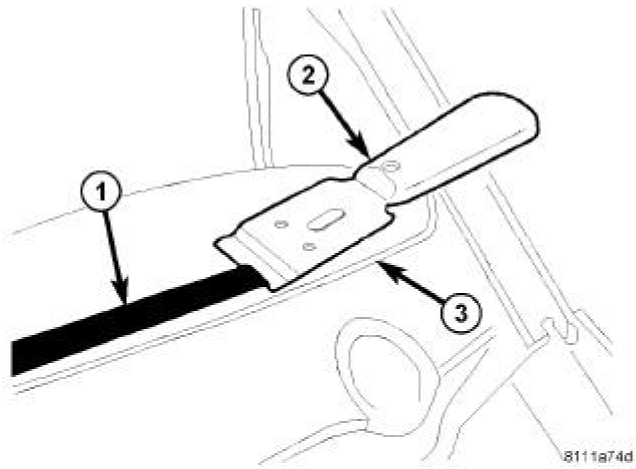
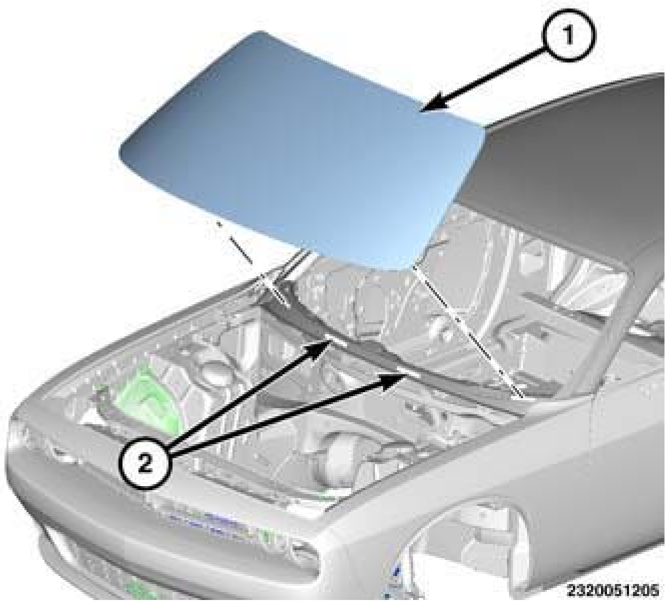


Fig. 365: Leveling Windshield Adhesive
Courtesy of CHRYSLER GROUP, LLC

NOTE: **To prevent corrosion, do not damage paint on windshield fence when removing original urethane.**

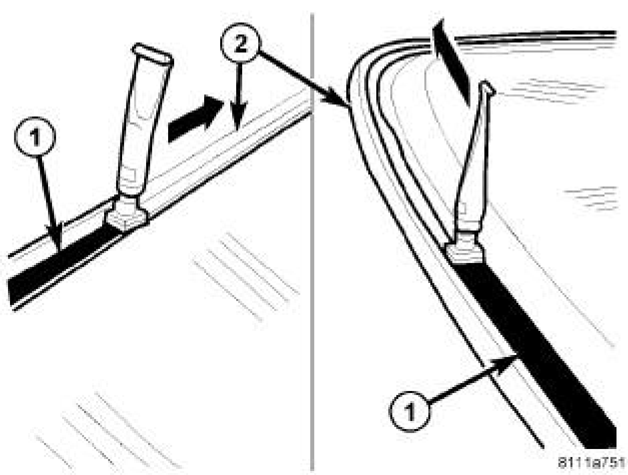
NOTE: **The windshield fence should be cleaned of most of its old urethane adhesive. A small amount of old urethane, approximately 1 mm (.04 in) in height should remain on the fence. Do not completely remove all old urethane from the fence, the paint finish and bonding strength will be adversely affected. Support spacers located near the cowl at the bottom of the windshield fence should be replaced with new spacers. Replace any missing or damaged spacers around the perimeter of the windshield fence.**

2. Using a razor knife (2), level the original bead of urethane (1) on the windshield fence (3) to a thickness of approximately 1 mm (0.04 in) and remove any damaged adhesive backed spacers.



[Fig. 366: Removing/Installing Windshield](#)
Courtesy of CHRYSLER GROUP, LLC

3. Install new spacers (2) along the windshield fence as required.
4. Install a new rubber seal along the top of the windshield (1).
5. Using an assistant, position the windshield into the windshield opening and against the windshield fence and spacers (2).
6. Verify the windshield lays evenly against the fence at the top, bottom and sides of the opening. If not, the fence must be formed to the shape of the windshield.
7. Mark the windshield and the windshield fence with a grease pencil or pieces of masking tape to use as a reference for installation.
8. Using an assistant, remove the windshield from the windshield opening and place it on a suitable padded work surface.



[Fig. 367: Applying Primer To Gluing Surface Of Windshield Seal](#)
Courtesy of CHRYSLER GROUP, LLC

WARNING: Do not use solvent based glass cleaners to clean the windshield before applying glass prep and primer or poor glass adhesion may result.

9. Clean the inside of the windshield with an ammonia based glass cleaner and a lint-free cloth.
10. Apply glass prep adhesion promoter 25 mm (1 in) wide (1) around the perimeter of the windshield (2) and 5 mm (0.2 in) from the edge of the glass and wipe dry with a clean lint-free cloth until no streaks are visible.
11. Apply glass primer 25 mm (1 in) wide (1) around the perimeter of the windshield (2) and 5 mm (0.2 in) from the edge of the glass. Allow at least three minutes drying time.
12. Using a flashlight, verify that the primer is completely and evenly installed along the perimeter of the windshield.
13. Re-prime any area that is not fully and evenly primed.

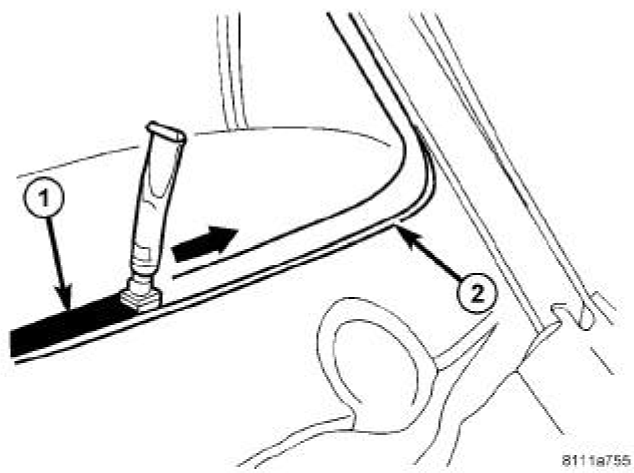
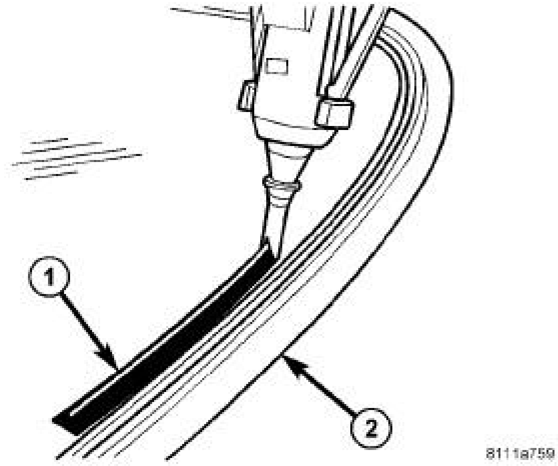


Fig. 368: Applying Windshield Primer
Courtesy of CHRYSLER GROUP, LLC

14. Clean the windshield fence with an ammonia based glass cleaner and a lint-free cloth.
15. Apply pinch weld primer 15 mm (0.75 in) wide (1) around the windshield fence (2). Allow at least three minutes drying time.
16. Using a flashlight, verify that the primer is completely and evenly installed along the windshield fence.
17. Re-prime any area that is not fully and evenly primed.

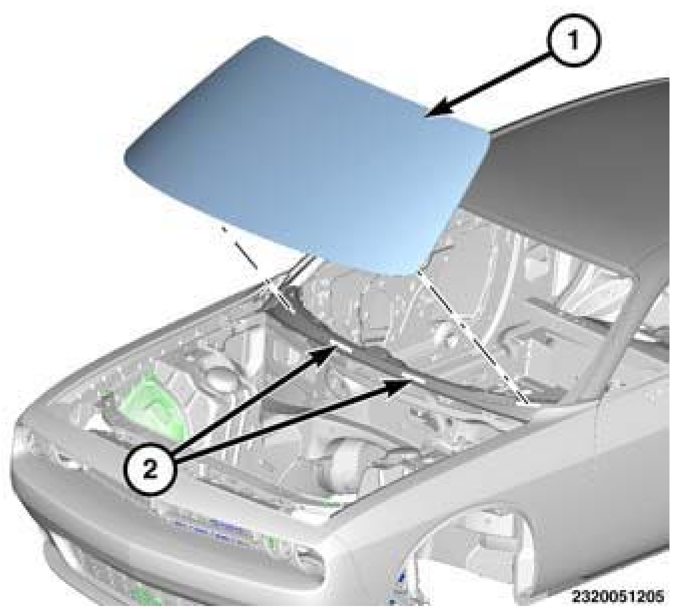


[Fig. 369: Applying Windshield Adhesive](#)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Always apply the bead of adhesive to the windshield. Always install the windshield within 5 minutes after applying the adhesive.**

NOTE: **If the original urethane adhesive has been exposed for more than 12 hours, the entire adhesive area will need to be re-primed prior to installing new adhesive.**

18. Apply approximately a 10 mm (0.4 in) wide bead of adhesive (1) with a triangular nozzle approximately 6 mm (0.230 in) from the edge of the glass starting at the bottom center of the windshield.
19. Run the end of the adhesive bead on the windshield parallel to the start of the bead and smooth the ends flush.



[Fig. 370: Removing/Installing Windshield](#)
Courtesy of CHRYSLER GROUP, LLC

20. Using an assistant, position the windshield (1) over the windshield opening.

21. Using the grease pencil marks or tape as reference points, align the windshield to the windshield opening.
22. Carefully lower the windshield into the windshield opening. Guide the windshield and the rubber seal at the top of the windshield into its proper location.

CAUTION: It is not possible to move the windshield after installation. The windshield should never be pressed into place by more than one person, because the windshield can break if pressed simultaneously on both sides.

23. Push the windshield inward until the windshield comes into contact with the retainers (3) located on the windshield fence.
24. Install the cowl cover panel. Refer to **COVER, COWL PANEL, INSTALLATION**.
25. Install the rear view mirror onto the windshield. Refer to **MIRROR, REARVIEW, INSTALLATION**.
26. Install the A-pillar trim panels. Refer to **PANEL, A-PILLAR TRIM, INSTALLATION**.
27. Install the rain sensor module onto the windshield. Refer to **MODULE, LIGHT RAIN SENSOR, INSTALLATION** .
28. Install the humidity sensor. Refer to **SENSOR, HUMIDITY, INSTALLATION** .
29. Install the forward facing camera, if equipped.
30. Connect the negative battery cable.

SUNROOF

DESCRIPTION

DESCRIPTION

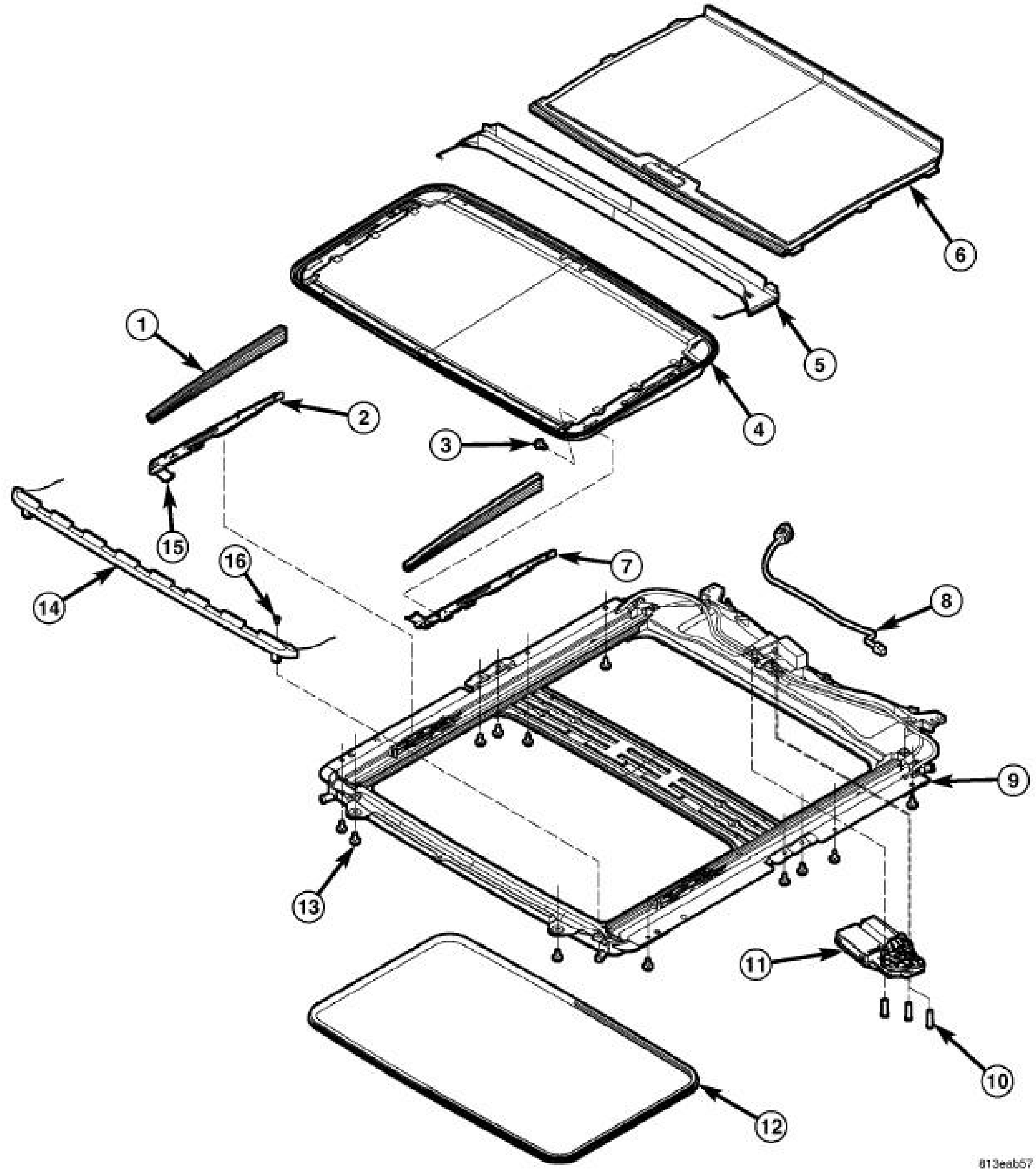


Fig. 371: Exploded View Of Power Sunroof System
Courtesy of CHRYSLER GROUP, LLC

1 - MECHANISM COVERS (2)
2 - RIGHT HAND GLASS GUIDE
3 - GLASS FASTENERS (4)
4 - GLASS ASSEMBLY
5 - DRAIN CHANNEL
6 - SUNSHADE
7 - LEFT SUNROOF GLASS GUIDE
8 - WIRE HARNESS
9 - SUNROOF ASSEMBLY
10 - MOTOR FASTENERS (3)

11 - SUNROOF MOTOR/MODULE ASSEMBLY
12 - TRIM LACE
13 - ASSEMBLY FASTENERS (12)
14 - WIND DEFLECTOR
15 - RIGHT SUNROOF GLASS GUIDE
16 - WIND DEFLECTOR STRAP SCREWS (2)

The power sunroof system allows the sunroof to be opened, closed or placed in the vent position electrically by actuating a switch in the overhead console. The sunroof system receives battery feed through a fuse in the Power Distribution Center (PDC). The sunroof will operate normally with the key in any position while the Accessory Delay system is active.

The sunroof glass panel tilts upward at the rear for ventilation and slides rearward under the roof when open. The panel seals flush with the roof in the closed position to eliminate wind noise. The sunroof includes a manual-sliding sunshade to cover the deep-tinted glass panel.

In addition to the standard power sunroof operation, this vehicle offers several additional features. There is an express (one-touch) opening and closing feature as well as Excessive Force Limitation (EFL). The EFL function detects obstacles trapped between the glass and the vehicle roof during a closing motion. Upon sensing an obstacle the EFL function will reverse direction of the glass to allow removal of the obstacle.

The main components of the power sunroof system are:

- The motor/module assembly
- The power sunroof glass and frame assembly
- The power sunroof switch
- The manual-sliding sunshade

OPERATION

OPERATION

This vehicle has a vent, tilt and slide power sunroof system with express (one-touch) open and closing feature. The sunroof system receives constant battery feed through a fuse in the Power Distribution Center (PDC). The sunroof will operate normally with the ignition in any position while the Accessory Delay system is active. If the sunroof is moving when the ignition is turned to the START position (crank engine), all motion stop. A new ignition press is required to start sunroof motion. The sunroof will stop a requested motion if the Accessory Delay system goes inactive while the motion is in progress.

A combination push-button and rocker switch module mounted in the overhead console controls sunroof operation. The sunroof switch is a rocker design with a push button in the center of the two halves of the rocker. Pressing the rocker towards the front of the car commands the sunroof closed. Pressing the rocker towards the rear of the car commands the sunroof open. Pressing the center push button commands the sunroof up into the vent position (Rear of sunroof glass raises above the vehicle roof with glass still covering the sunroof opening). All switch commands operate with the glass starting in any position. For additional information. Refer to **OPERATION** .

An electronic control system, integral to the motor/module assembly, provides the express and manual modes of

operation for the open and close functions. Manual operation is activated when by pressing and holding the open, close or vent rocker switch. In manual mode operation the glass will stop operation as soon as the switch is released or when the full closed or full open position is reached. Express operation is activated by pressing and releasing the "open" or "closed" rocker switch within one half second. In express operation the glass will automatically open/close to the full open, vent open or closed position and automatically stop. During express closing, anytime an obstacle is detected in the way of the glass, the motor will stop and reverse travel to avoid pinching an occupant's finger, ice in the track, etc. This function is called Excessive Force Limitation (EFL). There are two methods of overriding the EFL function.

1. When three EFL events occur without the glass being allowed to fully close, the next close attempt will only move while the close switch is continuously actuated. This allows the sunroof to be forced closed if multiple close attempts fail.
2. EFL is not active during manual close operation (press and hold switch).

While in EFL override, the closing motion will cease if the sunroof switch is released at any time.

The sunroof is calibrated to stop the glass in the correct open, close and vent positions. If the sunroof becomes uncalibrated, it will only respond to the vent switch. If the vent switch is pressed, the glass will move toward vent; if the switch is released, all motion stops. In the event that the sunroof system becomes uncalibrated perform the sunroof position calibration procedure. Refer to **MOTOR, SUNROOF, STANDARD PROCEDURE** .

DIAGNOSIS AND TESTING

POWER TOP - SUNROOF

For complete circuit diagrams, refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

SUNROOF

Refer to the **SUNROOF DIAGNOSIS CHART** for possible symptoms. Before beginning sunroof diagnostics verify that all other power accessories are in proper operating condition. If not, a common electrical problem may exist. Refer to appropriate Wiring Diagrams for circuit, splice and component descriptions. Check the condition of the circuit protection (20 amp circuit breaker in the power distribution block). Inspect all wiring connector pins for proper engagement and continuity. Check for battery voltage at the power sunroof controller, refer to appropriate Wiring Diagrams, for circuit information. If battery voltage of more than 10 volts is detected at the controller, proceed with the following tests (the controller will not operate at less than 10 volts):

Before beginning diagnosis for wind noise or water leaks, verify that the problem was not caused by releasing the control switch before the sunroof was fully closed. The sunroof module has a water-management system. If however, the sunroof glass is in a partial closed position, high pressure water may be forced beyond the water management system boundaries and onto the headlining.

SUNROOF DIAGNOSIS CHART

SYMPTOM	POSSIBLE CAUSE

SYMPTOM	POSSIBLE CAUSE
Sunroof motor inoperative.	Faulty control switch.
	Faulty circuit ground between sunroof module, control switch, and body harness.
	Faulty power circuit between sunroof module, control switch, and body harness.
	Faulty sunroof drive motor.
	Faulty sunroof module.
Audible whine when switch is depressed, sunroof does not operate.	Faulty sunroof drive motor.
	Binding cable.
Audible clicking or ratcheting when switch is pressed, sunroof does not operate.	Broken or worn drive cable.
	Worn drive motor gear.
	Mechanisms not synchronized.
Sunroof vents and opens, but does not close.	Broken or disengaged drain channel
	Binding cable.
	Faulty circuit.
	Faulty control switch.
	Faulty sunroof module.
	Faulty drive motor.
Sunroof vents, but does not open.	Binding cable or mechanism.
	Faulty circuit.
	Faulty switch.
	Faulty sunroof module.
Sunroof does not vent	Binding cable or mechanism.
	Faulty circuit.
	Faulty control switch.
	Faulty sunroof module.
Sunroof water leak.	Drain tubes clogged or kinked or disconnected from the sunroof.
	Glass panel improperly adjusted.
	Faulty glass panel seal.
Gurgling sound from sunroof	Low spot in drain hose routing, allowing water to stand.
Wind noise from sunroof.	Glass panel compression to the roof opening not consistent.
	Wind deflector not deploying properly.
	Glass not installed or adjusted properly.
	Faulty glass panel seal.
Buzz, Squeak, Rattles from sunroof	Loose or broken attaching hardware.
	No lubrication in track.
	Worn or broken mechanism.
	Cables bunched or kinked.
Sunshade will not function or does not operate smoothly	Sunshade feet are broken.
	Sunshade feet are in the wrong track.
	Track obstructions or interference.

SYMPTOM	POSSIBLE CAUSE
	Trim lace incorrectly installed in track.
Glass movement not consistent or glass does not operate smoothly	Glass and Track timing.
	Glass and Track alignment.
	Cables and Guide alignment.
	Excessive dirt or debris in tracks.
Broken or jammed guide mechanism	Mechanism cover was not installed correctly.

WATER DRAINAGE AND WIND NOISE DIAGNOSIS

The sliding glass panel is designed to seal water entry with a snug fit between the roof and the seal. The fit can be checked by inserting a business card or equivalent, between the roof and the seal. The piece of paper should have some resistance when pulled out when the glass panel is in the closed position. The sunroof housing will drain off a minimum amount of water. Excessive wind noise could result if the gap clearances are exceeded. The sunroof glass panel may need to be adjusted. Refer to **GLASS, SUNROOF, ADJUSTMENTS**.

Adequate drainage is provided by a drain trough in the sunroof housing which encircles the sliding glass panel and leads to drain hoses. If a wet headliner or other water leak complaints are encountered, before performing any adjustments, first ensure that the drainage system is not plugged or disconnected. Use a pint container to pour water into the sunroof housing drain trough. If water flow is restricted, use compressed air to blow out any material plugging the drain system. Retest system again.

To further check for a disconnected drain hose:

NOTE: Care must be taken not to fold or kink the headliner upon removal.

1. Lower headliner as necessary to gain access to sunroof housing drain tube. Refer to **HEADLINER, REMOVAL**.
2. Repair as necessary.

REMOVAL

REMOVAL

WARNING: The Excessive Force Limitation (EFL) feature must be calibrated any time a sunroof motor/module is replaced with a new component. Failure to perform this procedure could result in vehicle damage and/or personal injury.

Refer to **MOTOR, SUNROOF, STANDARD PROCEDURE** .

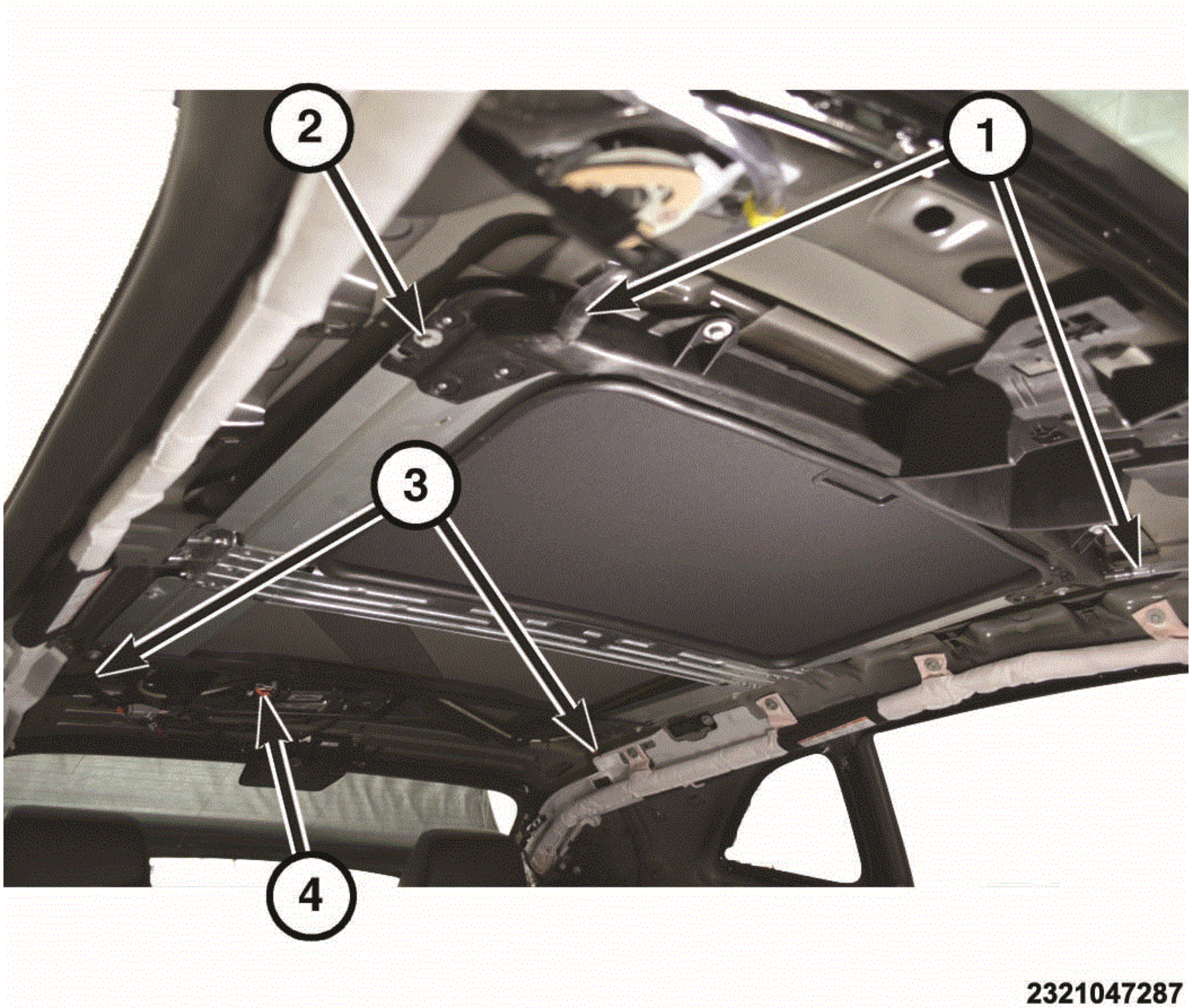


Fig. 372: Drain Tubes, Harness Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Lower the headliner in the vehicle. Refer to **HEADLINER, REMOVAL**.
2. Detach the rear drain tubes (3) from the sunroof.
3. Detach the front drain tubes (1) from the sunroof.
4. Disconnect the sunroof harness connector (4).
5. With the help of an assistant holding the sunroof, remove all the sunroof bolts (2).
6. With the help of an assistant, carefully remove the sunroof through the front door opening.
7. Check the sunroof's guide tracks for any excessive dirt and debris. If necessary, clean the guide tracks and lubricate with MoparÂ® White Lithium Grease or equivalent.

INSTALLATION

INSTALLATION

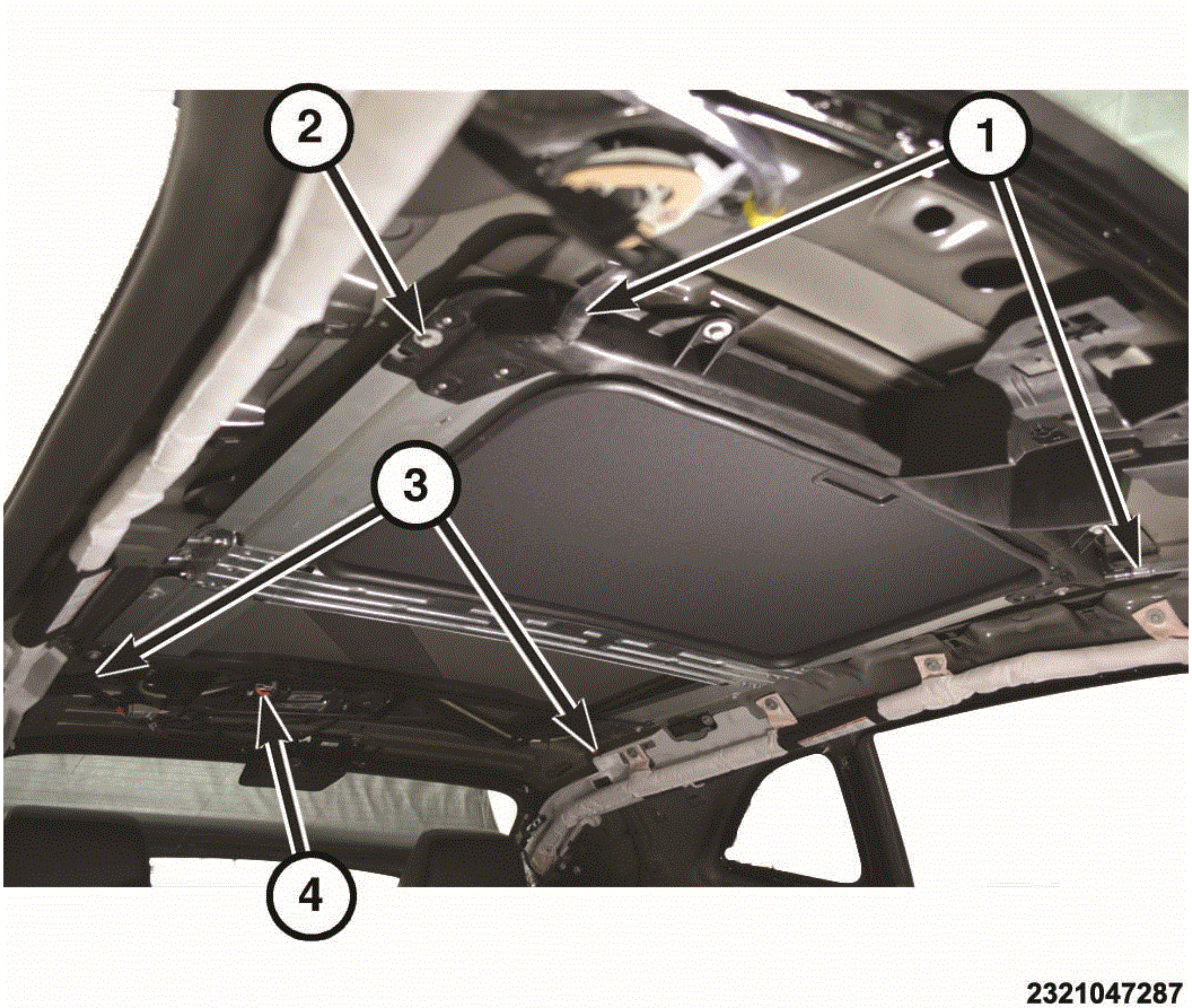


Fig. 373: Drain Tubes, Harness Connector & Bolts
Courtesy of CHRYSLER GROUP, LLC

WARNING: The Excessive Force Limitation (EFL) feature must be calibrated any time a sunroof motor/module is replaced with a new component. Failure to perform this procedure could result in vehicle damage and/or personal injury.

Refer to **MOTOR, SUNROOF, STANDARD PROCEDURE** .

1. With the help of an assistant, position the sunroof into the vehicle and loosely install the sunroof to body bolts (2). Make sure the seal around the perimeter of the sunroof glass is seated evenly around the roof opening.
2. Tighten the sunroof to body bolts to the proper specification. Refer to **SPECIFICATIONS**.
3. Attach the front drain tubes (1) to the sunroof.
4. Connect the sunroof harness connector (4).
5. Attach the rear drain tubes (3) to the sunroof.
6. Verify proper operation of the power sunroof system.
7. If necessary, adjust the sunroof glass. Refer to **GLASS, SUNROOF, ADJUSTMENTS**.
8. Raise and install the headliner. Refer to **HEADLINER, INSTALLATION**.

9. Perform the sunroof position calibration. Refer to **MOTOR, SUNROOF, STANDARD PROCEDURE** .
10. Perform the Excessive Force Limitation (EFL) calibration. Refer to **MOTOR, SUNROOF, STANDARD PROCEDURE** .

CHANNEL, SUNROOF DRAIN

REMOVAL

REMOVAL

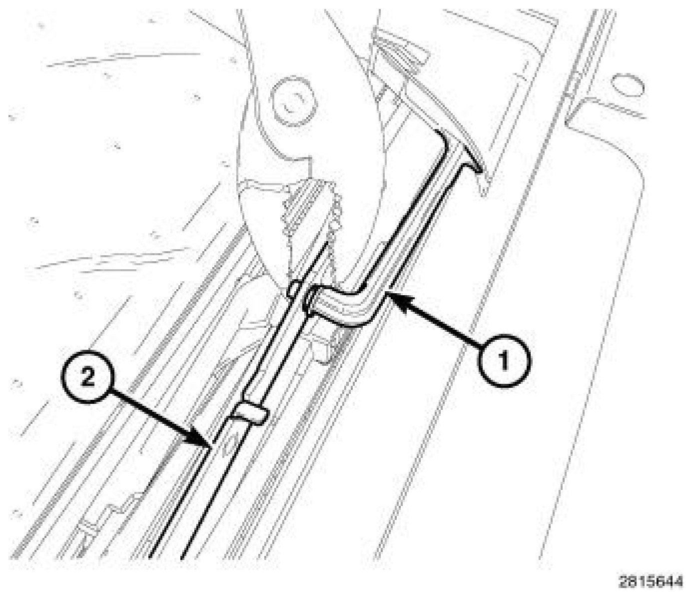


Fig. 374: Identifying Drain Channel Arm & Guide Mechanisms
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side typical.**

1. Remove glass panel. Refer to **GLASS, SUNROOF, REMOVAL**.
2. Using pliers, disengage the drain channel arm (1) from the guide mechanisms (2) one at a time by pushing the drain channel arm retaining tab through the retention hole located in the guide mechanism. **Do not use excessive force to remove.**

CAUTION: **Disengage the drain channel arms one at a time. Do not disengage both sides at the same time.**

CAUTION: **Do not pull or pry the channel arms. Doing so will result in breaking the channel arms. Only disengage the channel arms as shown in illustration.**

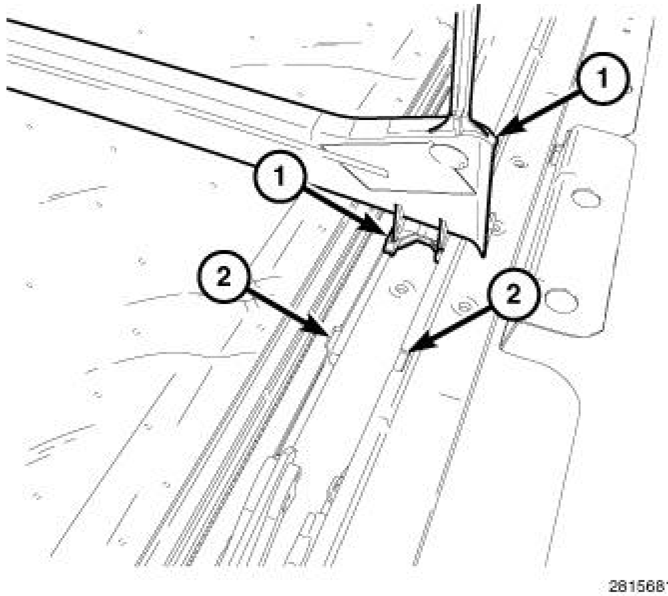


Fig. 375: Drain Channel & Notches
Courtesy of CHRYSLER GROUP, LLC

3. Carefully slide the drain channel (1) forward to the notches (2) in the track assembly. Pull up on one side to disengage, repeat on the opposite side and remove the drain channel.

INSTALLATION

INSTALLATION

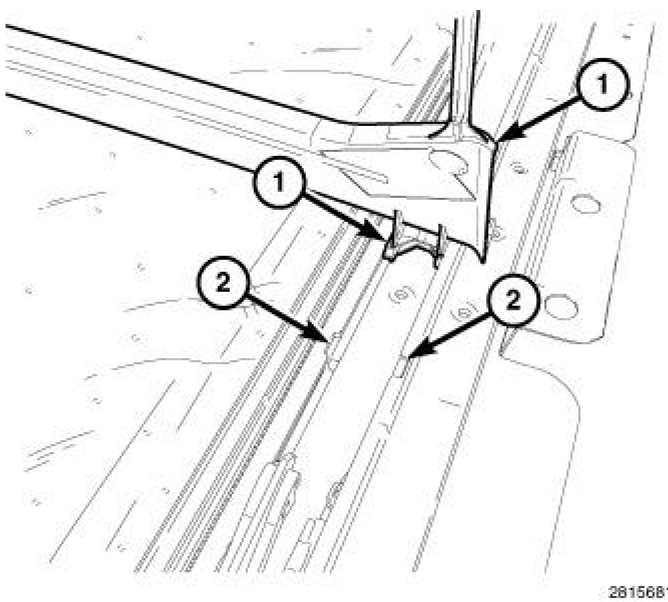
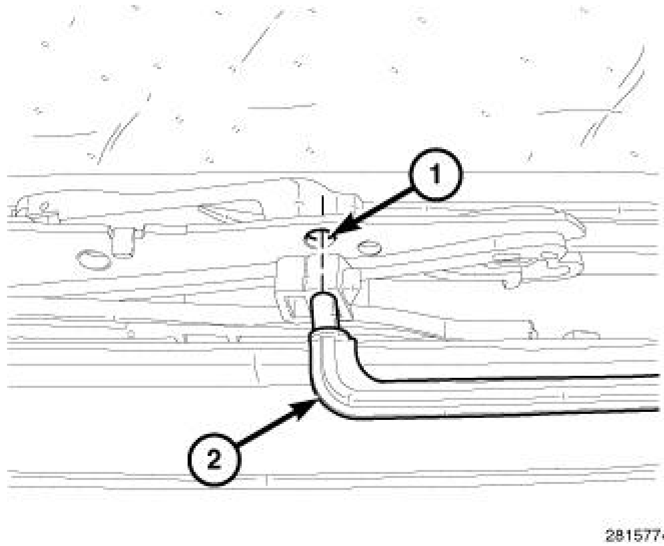


Fig. 376: Drain Channel & Notches
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in illustration, right side typical.**

1. Carefully position the drain channel (1) one side at a time into the notches (2) in the track assembly. Once positioned, push down until it engages into the track assembly. Repeat steps on the opposite side and slide the drain channel rearward.



[Fig. 377: Installing Drain Channel Arms Into Mechanism Holes]
Courtesy of CHRYSLER GROUP, LLC

2. Install the drain channel arms (2) into the mechanism holes (1) one at a time.

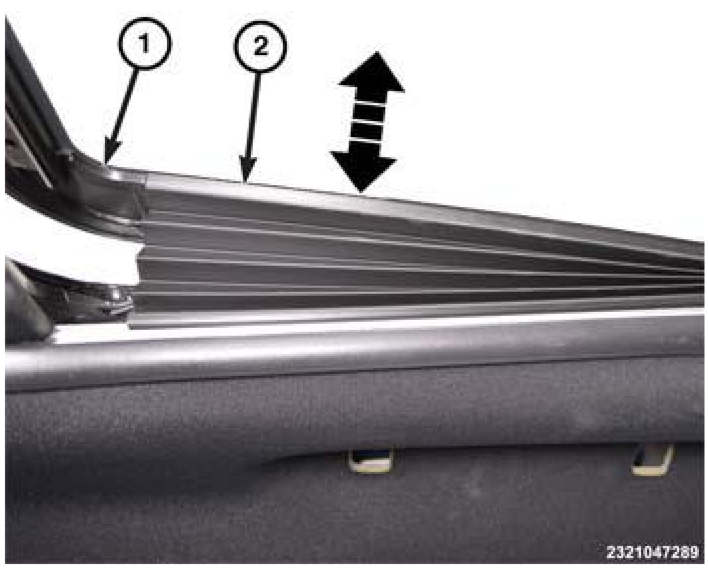
CAUTION: **Do not push the guide arms at the same time or you could break the guide mechanism. Do not use excessive force to install.**

3. Install the sunroof glass. Refer to **GLASS, SUNROOF, INSTALLATION**.

COVER, SUNROOF MECHANISM

REMOVAL

REMOVAL



[Fig. 378: Sunroof Glass & Mechanism Cover]
Courtesy of CHRYSLER GROUP, LLC

1. Slide sunshade rearward to the open position.

2. Move the sunroof glass (1) to the vent position.
3. Separate the mechanism cover (2) from the sunroof glass by pulling the top edge inboard, starting at the rear.

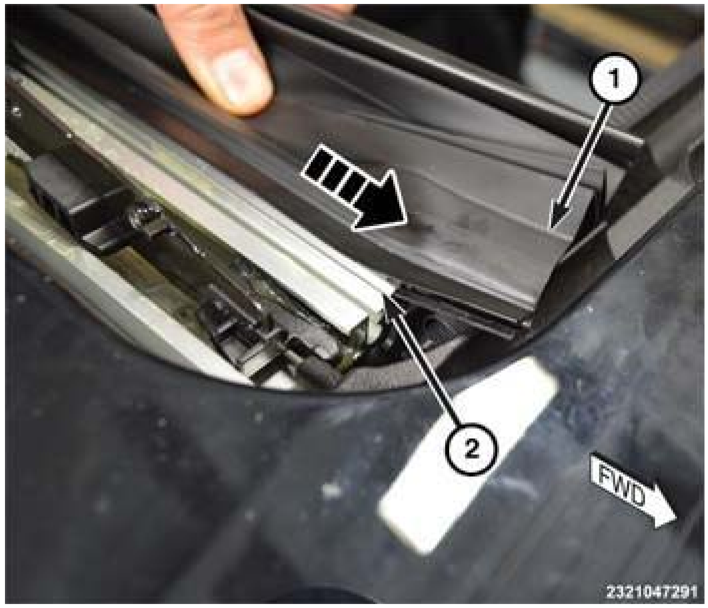


Fig. 379: Mechanism Cover & Guide
Courtesy of CHRYSLER GROUP, LLC

4. Slide the mechanism cover (1) forward and out of the guide in the frame (2).

INSTALLATION

INSTALLATION

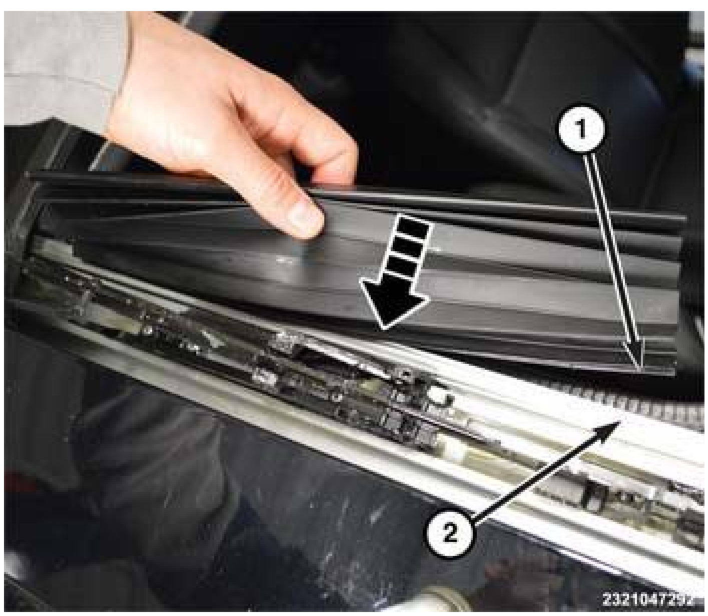


Fig. 380: Mechanism Cover & Guide
Courtesy of CHRYSLER GROUP, LLC

1. With the sunroof in the open position, snap the mechanism cover (1) into the upper guide (2).

2. Close the sunroof.

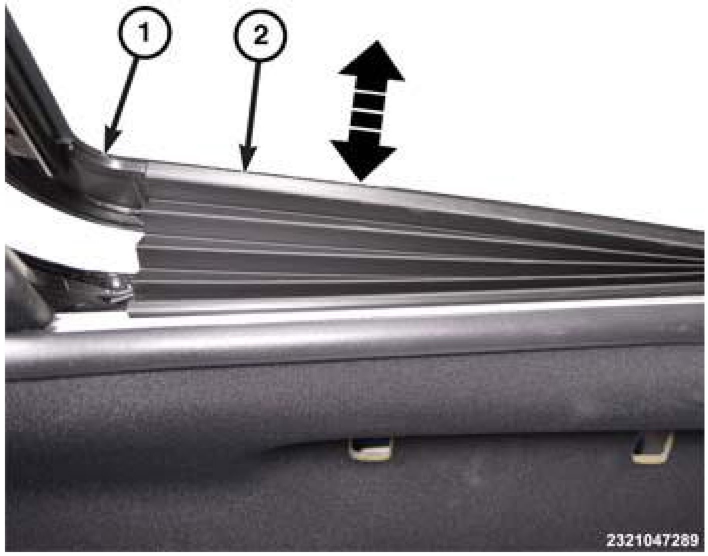


Fig. 381: Sunroof Glass & Mechanism Cover
Courtesy of CHRYSLER GROUP, LLC

3. Push the mechanism cover (2) onto the sunroof glass (1) between the locating features.

DEFLECTOR, WIND

REMOVAL

REMOVAL

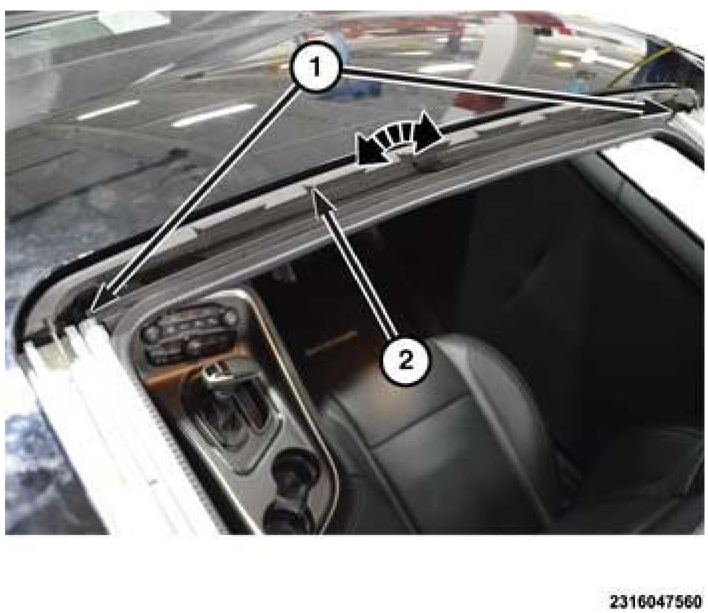


Fig. 382: Strap Screws & Wind Deflector
Courtesy of CHRYSLER GROUP, LLC

1. Open the sunroof fully.
2. Remove the strap screws (1) from the wind deflector (2).

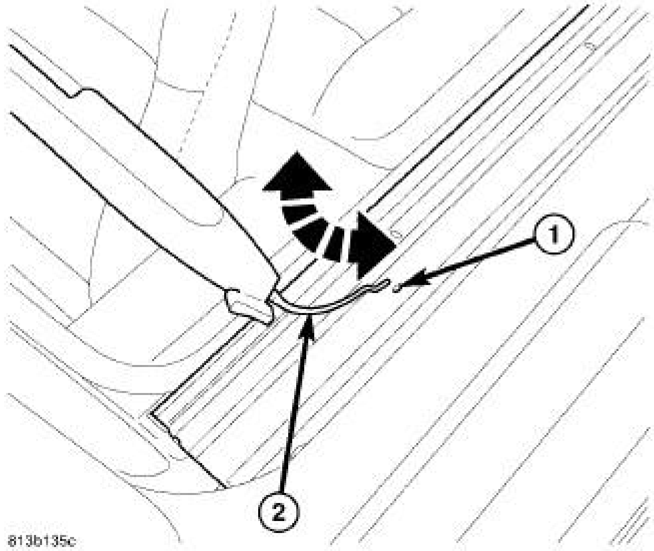


Fig. 383: Holes In Frame & Springs
Courtesy of CHRYSLER GROUP, LLC

3. Rotate the wind deflector up and remove the springs (2) from the holes in the sunroof frame (1).

INSTALLATION

INSTALLATION

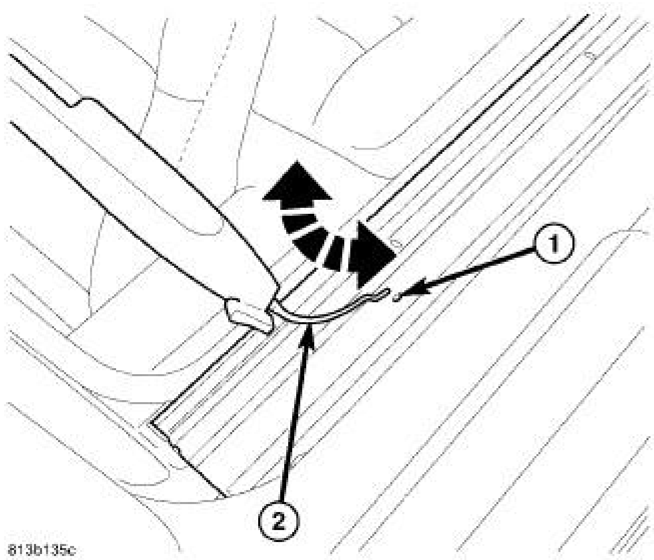


Fig. 384: Holes In Frame & Springs
Courtesy of CHRYSLER GROUP, LLC

1. Position the wind deflector spring arms (2) into the holes of the frame (1).

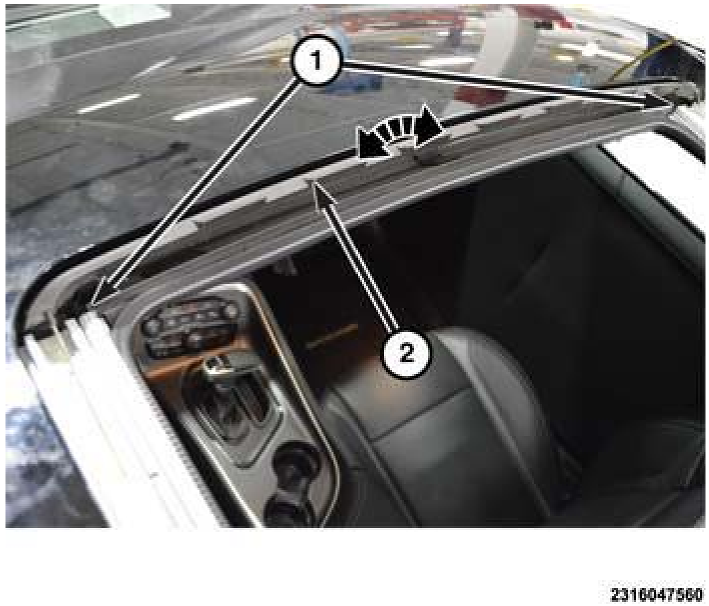


Fig. 385: Strap Screws & Wind Deflector
Courtesy of CHRYSLER GROUP, LLC

2. Rotate the wind deflector (2) down and install the two strap screws (1). Tighten the strap screws securely.
3. Verify sunroof operation.

GLASS, SUNROOF

ADJUSTMENTS

ADJUSTMENTS

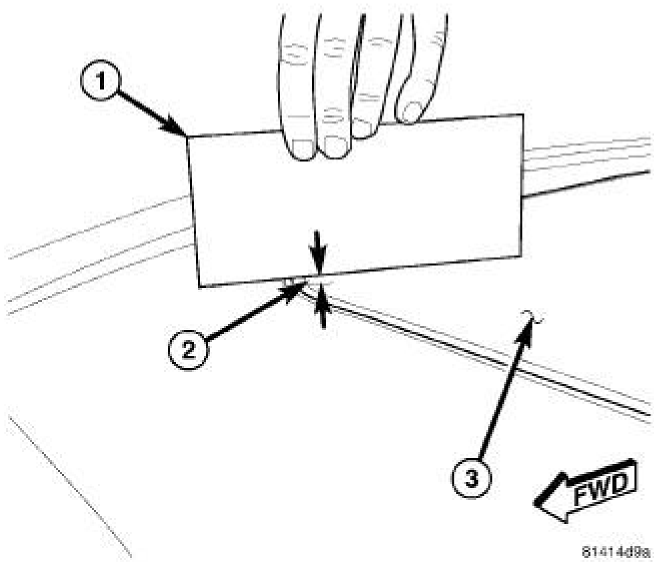


Fig. 386: Checking Sunroof Front Height
Courtesy of CHRYSLER GROUP, LLC

1. Remove the mechanism covers. Refer to COVER, SUNROOF MECHANISM, REMOVAL.
2. Move the sunroof glass to the fully closed position.

3. Loosen the four sunroof glass screws so that the sunroof glass can be adjusted in the vertical and fore-aft directions.

NOTE: **Before making adjustments, tape a line at 300 mm (11.8 inches) outboard from the center of vehicle. This is where flush measurements are taken.**

4. Standing outside the vehicle (one side at a time with one hand supporting the front corner of the sunroof glass) lift the front glass corner (3) until it is between flush and slightly under flush (0.00 to -2.0 mm / 0.00 to -0.080 inches) (2). Use your free hand to snug up the screw with sufficient force (finger tight) that the weight of the glass is supported. Repeat this process on the other side of the vehicle.

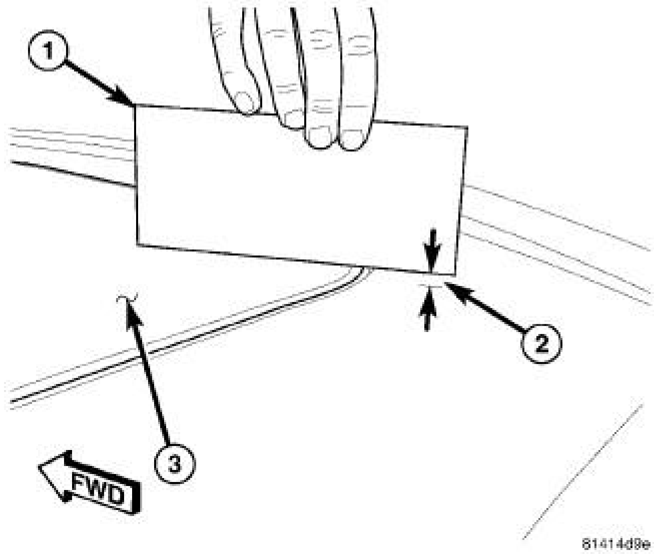


Fig. 387: Checking Sunroof Rear Height
Courtesy of CHRYSLER GROUP, LLC

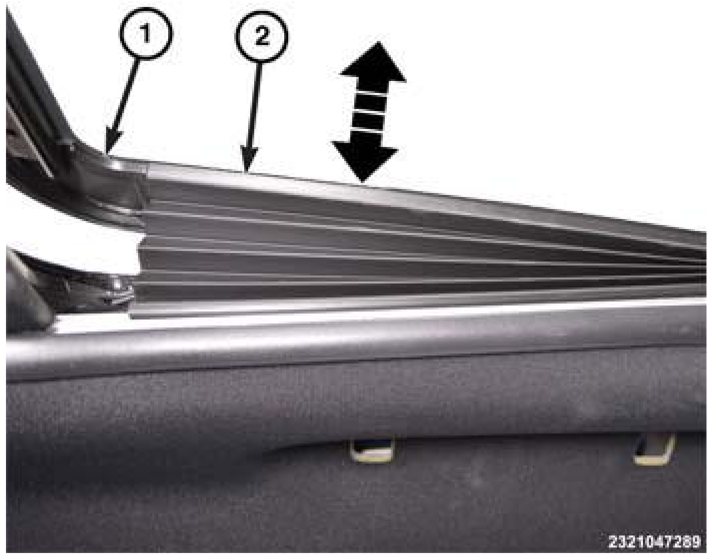
NOTE: **Before making adjustments, tape a line at 300 mm (11.8 inches) outboard from the center of vehicle. This is where flush measurements are taken.**

5. Move to the rear of the sunroof glass. Standing outside of the vehicle (one side at a time with one hand supporting the rear corner of the glass) lift the rear glass corner (3) until it is between flush and slightly over flush (0.00 to +2.0 mm / 0.00 to +0.080 inches) (2). Use your free hand to snug up the glass screw with sufficient force (finger tight) that the weight of the glass corner is supported. Repeat this process on the other side of the vehicle.
6. Check the flushness of the sunroof glass in the corners with a business card (1) (or other straight edged tool that won't scratch the glass or roof) held at a 45 degree angle to the vehicle's for/aft centerline. The preferred sunroof glass placement for blockage of water/air leaks is flush at all the corners. If this is not possible, adjust the sunroof glass' vertical placement within the tolerance ranges described above towards the flush position.
7. Check for proper fit by inserting a business card between the sunroof glass seal and the roof. Slide the business card around the entire perimeter of the sunroof glass. The effort to slide the card should be uniform around the entire perimeter. If the effort is not uniform, repeat the sunroof glass adjustment.
8. Once the proper sunroof glass position has been achieved, tighten the four screws to 5 N.m (35 in. lbs.).

9. Check for proper fit. If not OK, repeat sunroof glass adjustment.

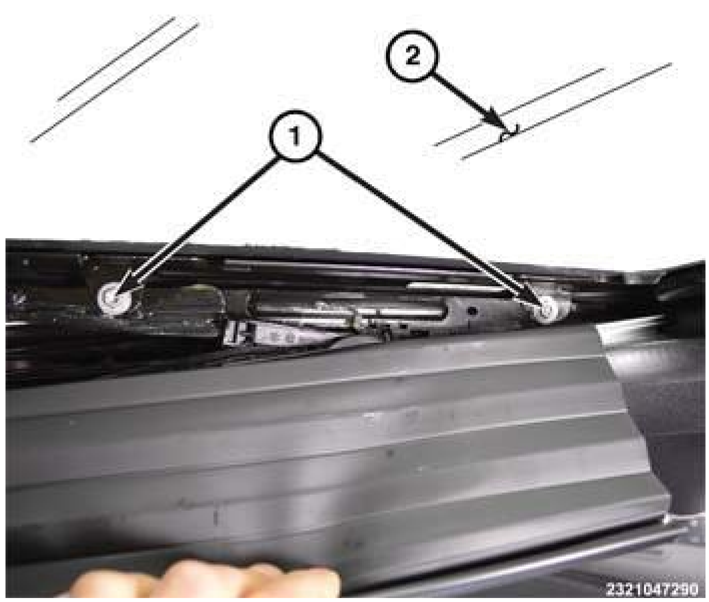
REMOVAL

REMOVAL



[**Fig. 388: Sunroof Glass & Mechanism Cover**]
Courtesy of CHRYSLER GROUP, LLC

1. Slide the sunshade rearward to the open position.
2. Move the sunroof glass (1) to the vent position.
3. Separate the mechanism covers (2) from the sunroof glass by pulling the top edge inboard, starting at the rear.

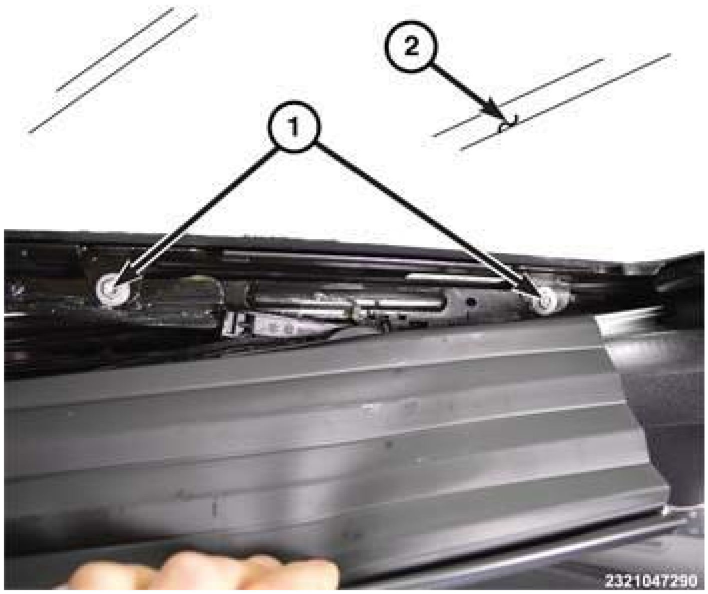


[**Fig. 389: Sunroof Glass & Screws**]
Courtesy of CHRYSLER GROUP, LLC

4. Remove the four screws (1), two on each side.
5. Lift off the sunroof glass (2) and remove.

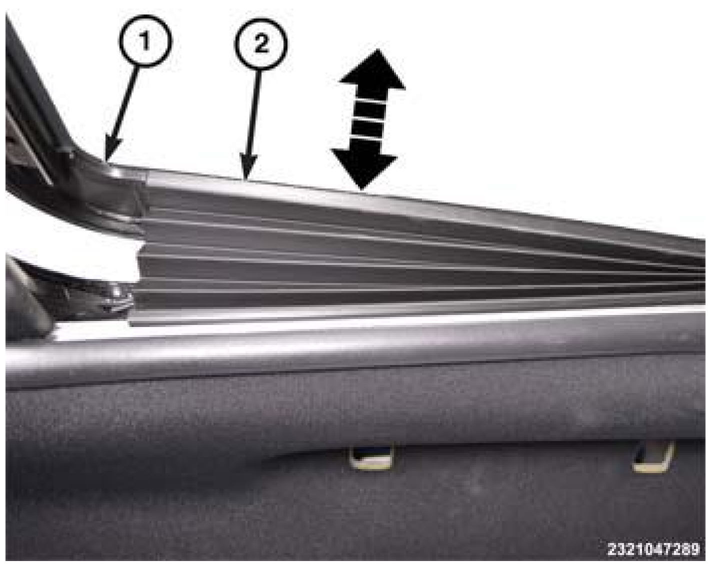
INSTALLATION

INSTALLATION



[Fig. 390: Sunroof Glass & Screws]
Courtesy of CHRYSLER GROUP, LLC

1. Position the sunroof glass (2) and loosely install the four screws (1).
2. Connect the negative battery cable and verify that the sunroof is in the fully closed position.
3. Adjust the sunroof glass. Refer to GLASS, SUNROOF, ADJUSTMENTS.



[Fig. 391: Sunroof Glass & Mechanism Cover]
Courtesy of CHRYSLER GROUP, LLC

4. Push the mechanism covers (2) onto the sunroof glass (1) between the locating features.
5. Verify the sunroof operation.

GUIDE, SUNROOF, GLASS

REMOVAL

REMOVAL

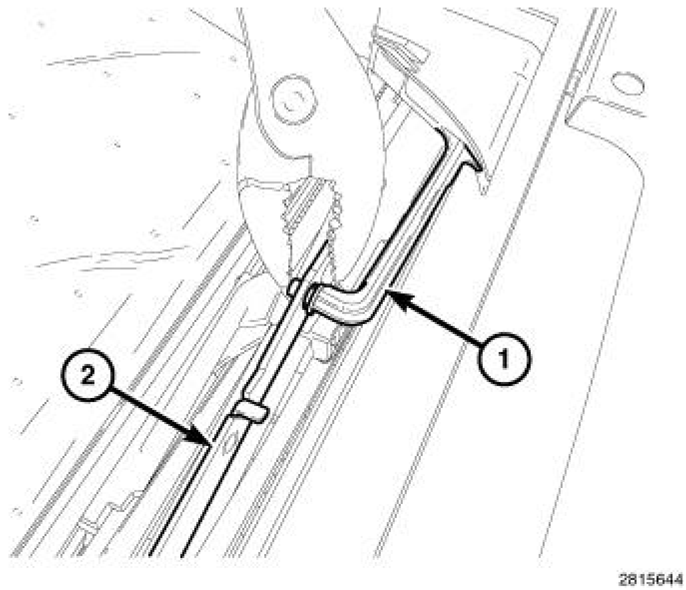


Fig. 392: Identifying Drain Channel Arm & Guide Mechanisms
Courtesy of CHRYSLER GROUP, LLC

1. Remove the sunroof glass. Refer to GLASS, SUNROOF, REMOVAL.
2. Separate the drain channel arms (1) from the guide mechanisms (2) one at a time.

CAUTION: Disengage the drain channel arms one at a time. Do not disengage both sides at the same time.

CAUTION: Do not pry the guide arms apart at the same time, damage to the guide mechanism may occur.

3. Slide the drain channel rearward out of the way.

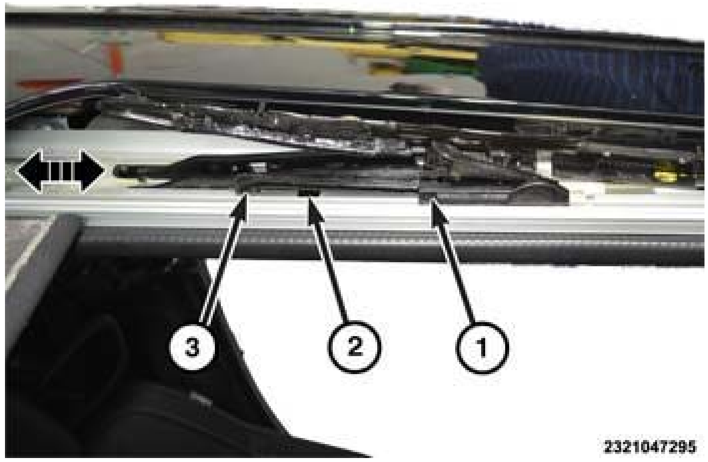


Fig. 393: Glass Guide/Guide Carriage Assembly, Notch & Locking Tab
Courtesy of CHRYSLER GROUP, LLC

4. Using a small flat bladed tool, pry or lift the locking tab (3) out of the notch (2) and slide the glass guide/guide carriage assembly (1) rearward approximately 25-30 mm (0.98-1.18 inches) in the track.

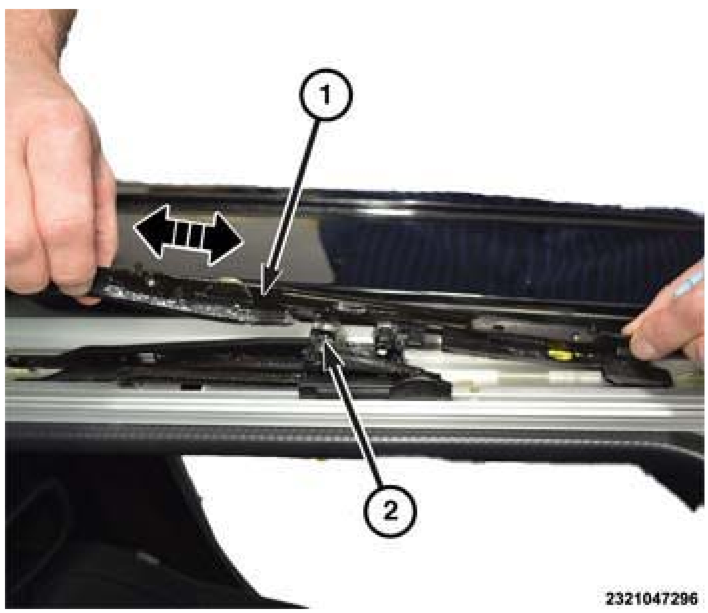


Fig. 394: Glass Guide & Locking Lever
Courtesy of CHRYSLER GROUP, LLC

5. Lift the glass guide (1) from the locking lever (2) and slide rearward to remove.

INSTALLATION

INSTALLATION

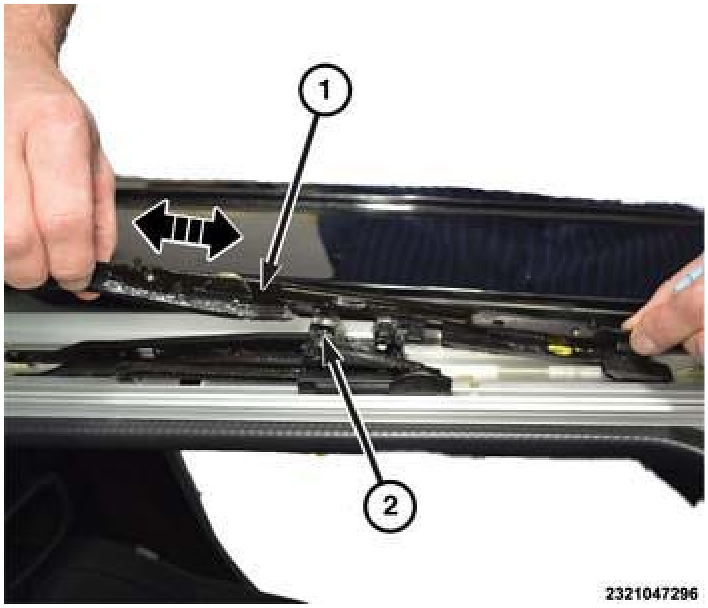


Fig. 395: Glass Guide & Locking Lever
Courtesy of CHRYSLER GROUP, LLC

1. Insert the front foot of the glass guide (1) into the track assembly and slide it forward until it sits into the locking lever (2).

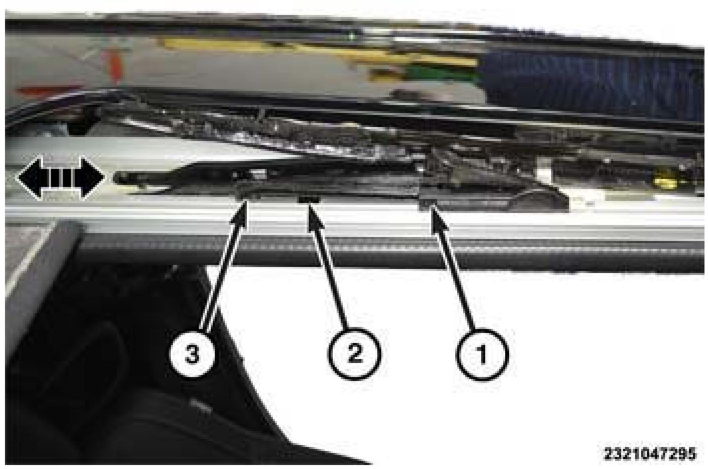


Fig. 396: Glass Guide/Guide Carriage Assembly, Notch & Locking Tab
Courtesy of CHRYSLER GROUP, LLC

2. Slide the glass guide/guide carriage assembly (1) forward until the locking tab (3) it fully engaged into the notch (2).

NOTE: **The guide carriage assembly should move together with the glass guide. If the guide carriage assembly does not move with the glass guide, repeat the alignment procedure in step 1.**

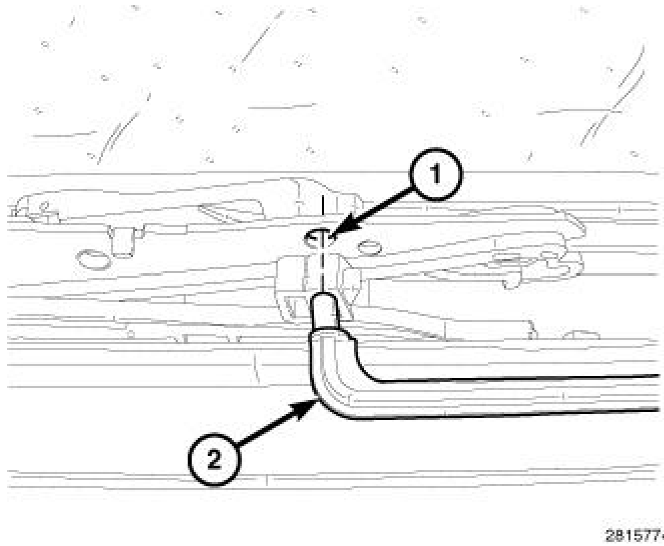


Fig. 397: Installing Drain Channel Arms Into Mechanism Holes
Courtesy of CHRYSLER GROUP, LLC

3. Install the drain channel arms (2) into the mechanism holes (1) one at a time.

CAUTION: Do not push the guide arms at the same time or you could break the guide mechanism. Do not use excessive force to install.

4. Connect the negative battery cable and turn the key to the accessory run position.
5. Cycle the mechanism through all the functions to verify proper operation.
6. Install the sunroof glass. Refer to **GLASS, SUNROOF, INSTALLATION**.

MOTOR, SUNROOF

DESCRIPTION

DESCRIPTION

For service information. Refer to **DESCRIPTION** .

SUNSHADE, SUNROOF

REMOVAL

REMOVAL

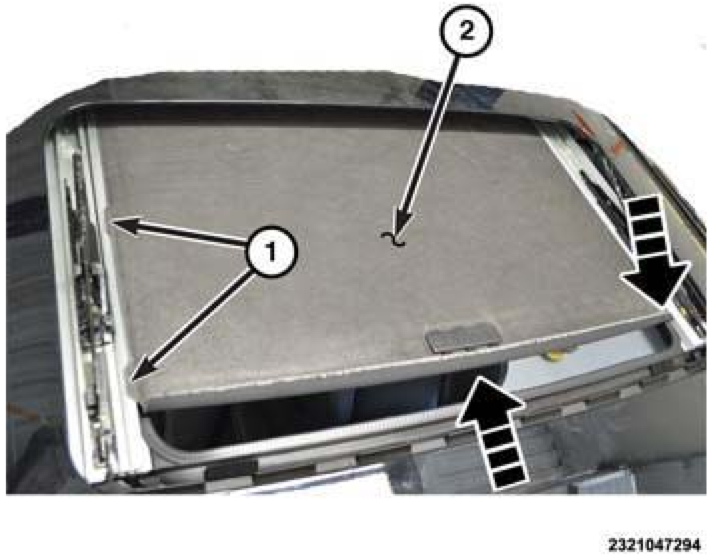


Fig. 398: Sunshade & Sunshade Feet
Courtesy of CHRYSLER GROUP, LLC

1. Remove the sunroof drain channel. Refer to **CHANNEL, SUNROOF DRAIN, REMOVAL**.
2. Cycle the sunroof motor to the vent position.
3. Move the sunshade (2) towards the closed position stopping three to four inches from the closed position.
4. Push up the front center of the sunshade (2) and push down on one side to pop out the two feet (1) on one side.

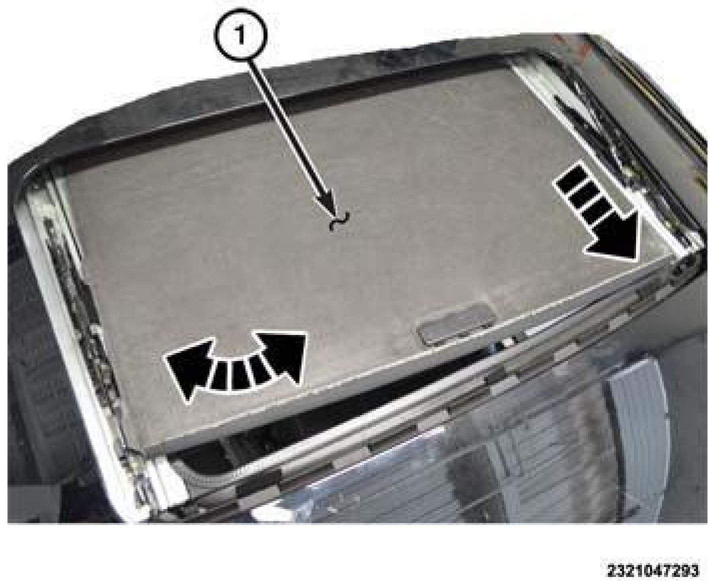


Fig. 399: Sunshade
Courtesy of CHRYSLER GROUP, LLC

5. Lift and rotate the sunshade (1) to remove it from the guide track.

INSTALLATION

INSTALLATION

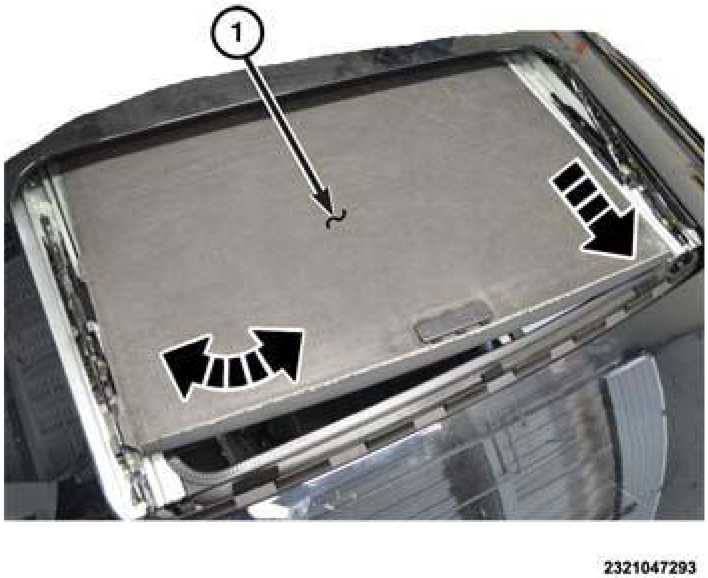


Fig. 400: Sunshade
Courtesy of CHRYSLER GROUP, LLC

1. Rotate the sunshade (1) into the guide track so that only the front two feet on one side are not installed fully.

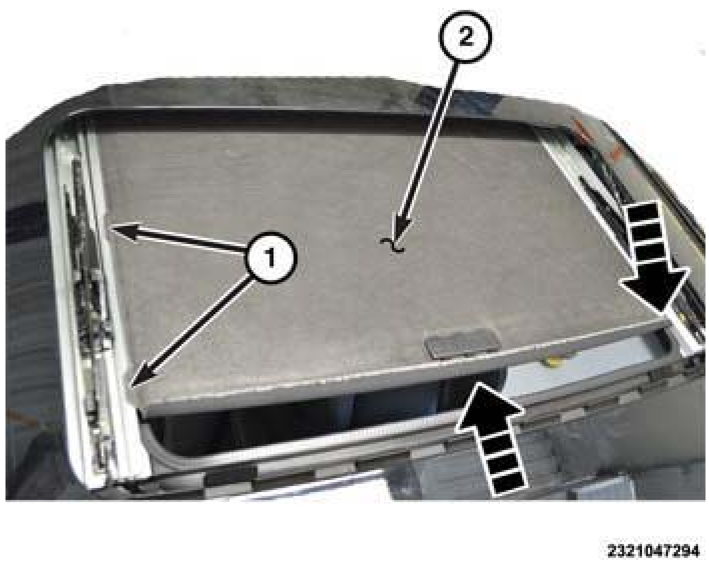


Fig. 401: Sunshade & Sunshade Feet
Courtesy of CHRYSLER GROUP, LLC

2. Arc the sunshade (2) in the middle to allow the feet on the opposite side (1) to go into the track.
3. Verify that the sunshade moves open and closed properly.
4. Install the sunroof drain channel. Refer to **CHANNEL, SUNROOF DRAIN, INSTALLATION**.

SWITCH, SUNROOF

DESCRIPTION

DESCRIPTION

For service information. Refer to **SWITCH, SUNROOF, DESCRIPTION** .

TUBE, SUNROOF DRAIN

REMOVAL

REMOVAL

FRONT DRAIN TUBE

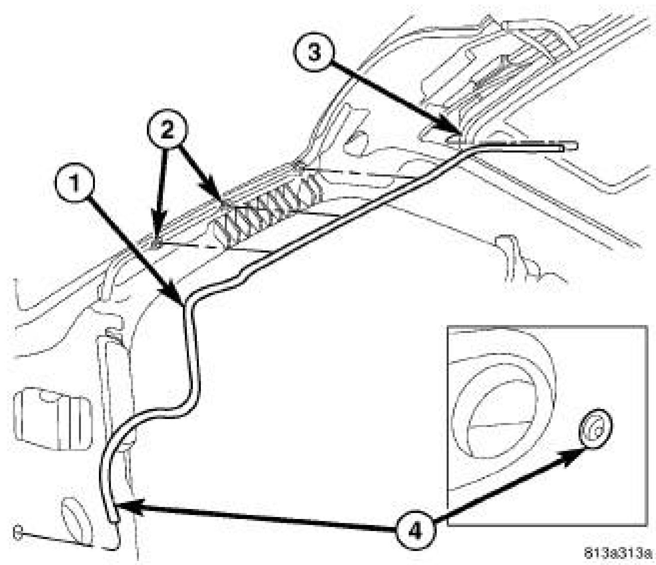


Fig. 402: Sunroof Drain Front Tube & Clips
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The front drain tube is a two-piece assembly consisting of an upper tube and lower tube.**

The upper tube can be serviced without removing the instrument panel.

1. Lower the headliner. Refer to **HEADLINER, REMOVAL**.
2. Disconnect the front drain tube (1) from the sunroof (3).
3. Remove the front drain tube from the retaining clips (2).
4. Separate the upper tube from the lower tube and remove.
5. If it is necessary to remove the lower tube, remove the instrument panel. Refer to **PANEL, INSTRUMENT, REMOVAL**.
6. Separate the grommet (4) from the body and remove the lower tube.

REAR DRAIN TUBE

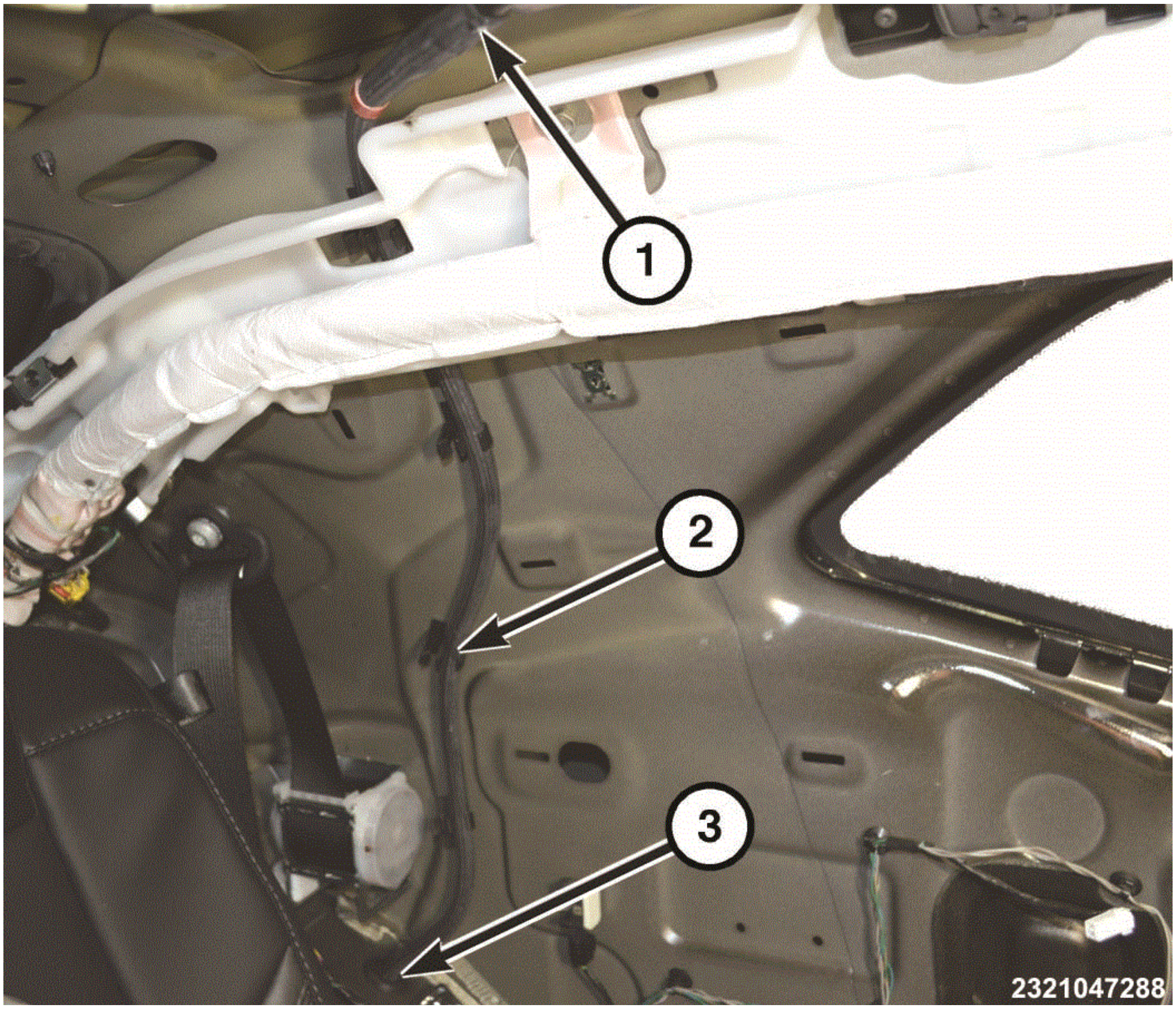


Fig. 403: Sunroof, Retaining Clips & Drain Tube Grommet
Courtesy of CHRYSLER GROUP, LLC

1. Lower the headliner in vehicle. Refer to **HEADLINER, REMOVAL**.
2. Remove the drain tube grommet (3) out of the rear quarter panel.
3. Disconnect the rear drain tube from the sunroof (1).
4. Remove the rear drain tube from the retaining clips (2) and remove.

INSTALLATION

INSTALLATION

FRONT DRAIN TUBE

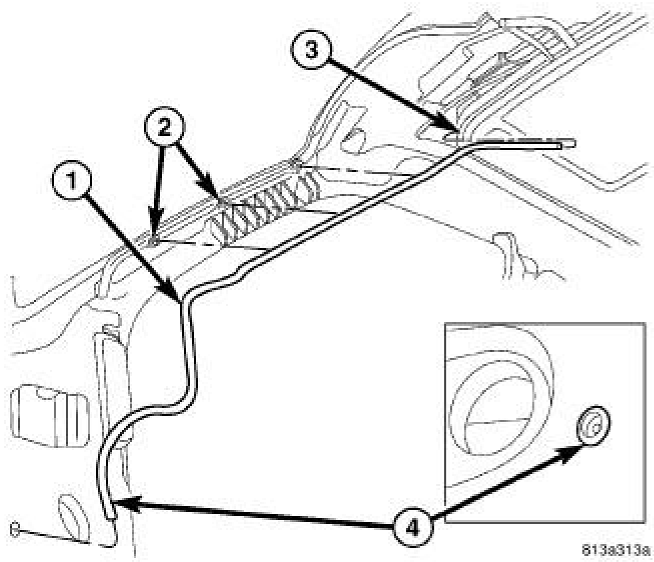


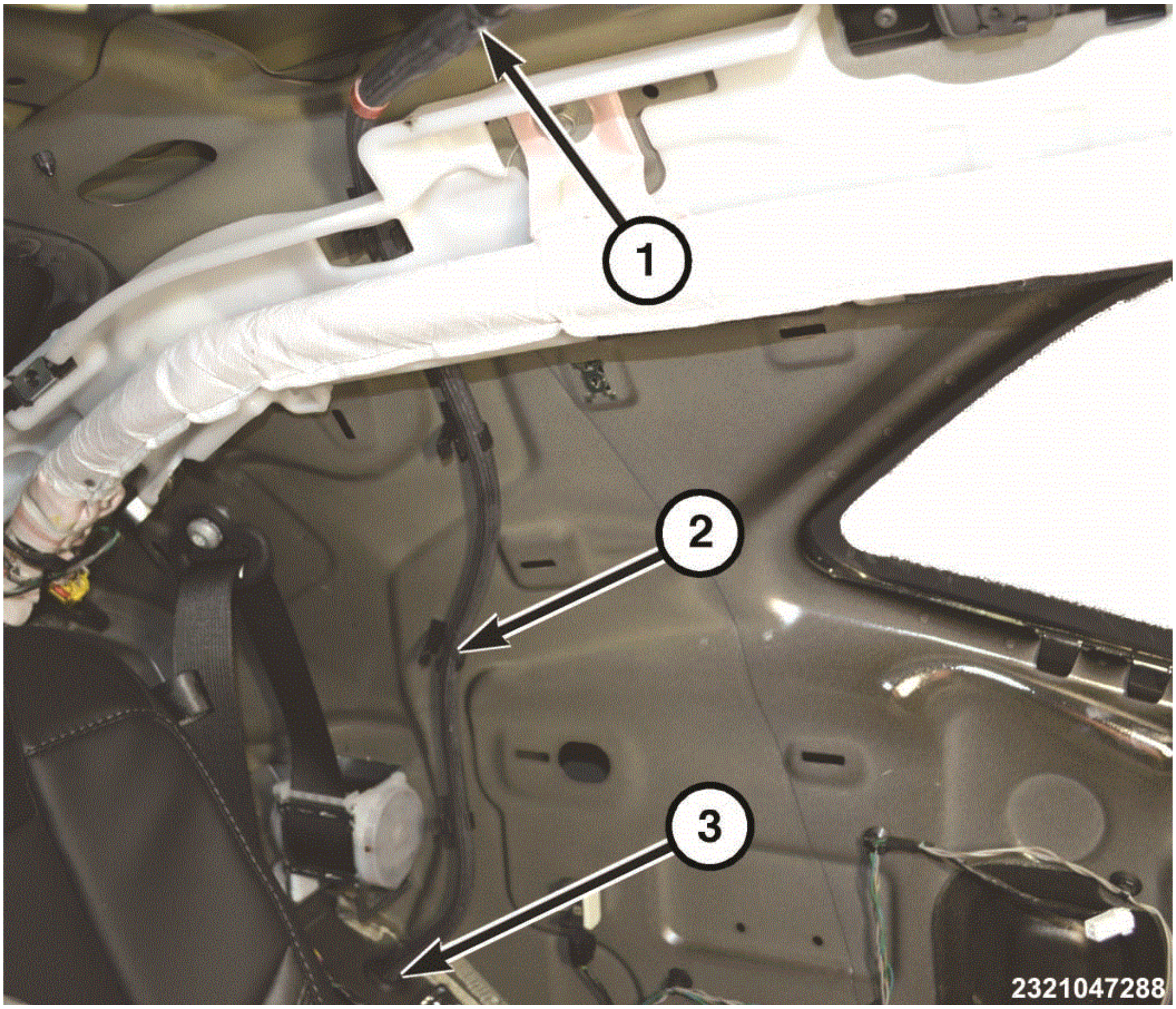
Fig. 404: Sunroof Drain Front Tube & Clips
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The front drain tube is a two-piece assembly consisting of an upper tube and lower tube.**

The upper tube can be serviced without removing the instrument panel.

1. Route the front drain tube (1) and install the grommet (4) into the body. Make sure the grommet is fully seated.
2. Connect the front drain tube to the sunroof.
3. Install the front drain tube into the retaining clips (2).
4. Install the instrument panel, if necessary. Refer to **PANEL, INSTRUMENT, INSTALLATION**.
5. Install the headliner. Refer to **HEADLINER, INSTALLATION**.

REAR DRAIN TUBE



[Fig. 405: Sunroof, Retaining Clips & Drain Tube Grommet]
Courtesy of CHRYSLER GROUP, LLC

1. Route the rear drain tube and install the grommet (3) into the body. Make sure the grommet is fully seated.
2. Connect the rear drain tube to the sunroof (1).
3. Install the rear drain tube into the retaining clips (2).
4. Install the headliner. Refer to **HEADLINER, INSTALLATION**.

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Article GUID: A00735855

WARNING

WARNING

WARNING: To avoid serious or fatal injury, eye protection should be used when servicing any glass components.

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

CAUTION: Do not contaminate the glass of halogen bulbs with fingerprints or allow contact with other possibly oily surfaces. Reduced bulb life will result.

CAUTION: Do not use bulbs with higher candle power than indicated in the Bulb Application table. In addition, do not use fuses, circuit breakers or relays having greater amperage value than indicated on the fuse panel or in the Owner's Manual. Damage to lamps, lenses, wiring and other related electrical components can result.

DESCRIPTION

DESCRIPTION

The exterior lighting system for this model includes the following exterior lamp units:

- **Center High Mounted Stop Lamp** - A Light-Emitting Diode (LED) Center High Mounted Stop Lamp (CHMSL) is centered near the top of the vertical surface of the deck lid at the rear of the vehicle.
- **Front Fog Lamps** - Vehicles equipped with this option have a front fog lamp unit mounted near each outboard end of the front fascia, below the front lamp units.

- **Front Lamp Units** - Standard equipment includes a bi-functional, single filament halogen front lamp unit. A bi-functional High Intensity Discharge (HID) front lamp unit is optional. The front lamp units are mounted at the front of each front fender panel at the outboard side of the grille opening.
- **License Plate Lamp** - A LED rear license plate lamp is mounted to the rear fascia, just above the license plate tub formation.
- **Rear Lamp Units** - An outboard rear lamp unit incorporating multiple LED units to serve tail, stop and turn signal functions is mounted to the rear of each quarter panel on either side of the deck lid opening. A center rear lamp unit incorporates multiple LED units to serve as an auxiliary tail lamp and backup (reverse) lamps.
- **Side Marker Lamp Units** - Side marker lamp units are mounted to the outboard end of both the front and rear fascia. All four marker lamps are LED units.

These exterior lighting lamps and their controls are combined to provide the following exterior lighting features:

- **Automatic Headlamps** - Automatic headlamps are standard equipment on this vehicle. The headlamp switch includes an **A** (Automatic) position and an automatic headlamp sensor senses ambient light levels. The automatic headlamp sensor is integral to the sun load sensor located on the top of the instrument panel. When the **A** position of the headlamp switch is selected, the headlamps are turned ON and OFF automatically as ambient light levels dictate. On EXPORT vehicles, the Sun Sensor is not used in this function. The Light Rain Sense Module is responsible for light level acquisition.
- **Backup Lamps** - The backup (or reverse) lamps include multiple LED unit, reflector and clear lens that are integral to rear center lamp unit.
- **Brake Lamps** - The brake (or stop) lamps include multiple LED units, a reflector and a red lens that are integral to each rear lamp unit, and the red lens and multiple LED units of the CHMSL.
- **Daytime Running Lamps / Turn Signal** - A 15 amber LED unit light pipe integral to each front lamp unit is illuminated when appropriate to serve as both the Daytime Running Lamps (DRL) and the turn signals. Hazard Warning flashes these LEDs. The DRL is preset to Off (except Canada) and can be enabled through the Electronic Vehicle Information Center (EVIC).
- **Park / Signature Lamps** - Two light pipes with a total of four white LEDS comprise the Signature / Park lamp integral to each front lamp unit and the rear tail lamps include the multiple LED units, a reflector and a red lens integral to combination rear lamp units. The LED array is at high intensity mode in Signature mode and low intensity in Park mode.
- **Exterior Lamp Fail-Safe Operation** - The Instrument Cluster (IC) and the Body Control Module (BCM) (also known as the Common Body Controller/CBC) provide a fail-safe feature which will automatically turn ON the low beam headlamps and all park lamps when the ignition switch is in the ON position and there is no detected input from either the headlamp switch or the multi-function switch, no communication from the Steering Column Control Module (SCCM) or Steering Angle Sensor (SAS) or when the Controller Area Network (CAN) data bus is inoperative.
- **Exterior Lamp Load Shedding** - The BCM provides a battery saver feature which will automatically turn OFF all exterior lamps that remain ON with the ignition switch in the LOCK position after a timed interval of about eight minutes.
- **Front Fog Lamps** - The optional front fog lamps include the bulb, reflector and projector lens of each adjustable front fog lamp unit.
- **Hazard Warning Lamps** - The hazard warning lamps include the Light Emitting Diode (LED) units and

lenses of each lamp in the right and left, front and rear turn signal circuits.

- **Headlamp Delay** - When this feature is enabled the low or high beam headlamps remain illuminated for a programmable delay interval of 0 (disabled), 30, 60 or 90 seconds after the ignition switch has been turned to the OFF position. This feature is customer programmable using the U-Connect Touch™ screen module in the Integrated Center Stack (ICS).
- **Headlamps** - Two headlamp systems are available on this vehicle for domestic markets. The standard halogen headlamp system includes a bi-functional single filament halogen bulb in each front lamp unit for low or high beam headlamps. The optional HID headlamp system includes a bi-functional single HID lighting element/igniter unit for low or high beam headlamps. In either halogen or HID form, an electric solenoid motor and mechanism internal to the front lamp unit closes a shutter for low beams and opens the shutter for high beams. HID headlamps are standard equipment for all vehicles manufactured for export markets. The HID front lamp units each include an electronic ballast module. Both headlamp systems also include an adjustable projector and clear lens integral to each front lamp unit.
- **Headlamps With Wipers** - When this feature is enabled and the **AUTO** position of the headlamp switch is selected, the headlamps are turned ON automatically whenever the windshield wipers are turned ON; and, if the headlamps were turned ON automatically when the wipers were turned ON and the appropriate ambient light conditions exist, they will also turn OFF automatically when the wipers are turned OFF. This feature is customer programmable using the U-Connect Touch™ screen module in the Integrated Center Stack (ICS).
- **Optical Horn** - Also known as flash-to-pass, the beam selection function of the multi-function switch control stalk has a momentary intermediate position that allows the headlamp high beams to be flashed momentarily, without changing the headlamp beam selection.
- **Turn Signal Lamps** - The LED front turn signal is included in the front lamp unit common with the daytime running lamps. The LED rear turn signals are common with the brake lamps located in the combination LED tail lamp.

Other components of the exterior lighting system for this vehicle include:

- **Backup Lamp Switch** - A Transmission Range Sensor (TRS) integral to the solenoid pack on the valve body of the electronic automatic transmission performs the backup lamp switch function for this vehicle.
- **Body Control Module** - The BCM is located beneath the instrument panel on the passenger side of the vehicle. Refer to MODULE, BODY CONTROL, DESCRIPTION .
- **Brake Lamp Switch** - A lever-actuated brake pedal position sensor serves as the brake lamp switch in this vehicle. The brake pedal position sensor is located on the brake pedal support bracket under the instrument panel and is actuated by a pin on the brake pedal arm when the brake pedal is depressed.
- **Antilock Brake System Module** - A Anti-lock Brake System (ABS) module is located in the engine compartment below the brake master cylinder. Refer to MODULE, ANTI-LOCK BRAKE SYSTEM, DESCRIPTION .
- **Electronic Ballast Module** - Vehicles equipped with the HID headlamps have an electronic ballast module secured to the side of each front lamp unit. Each module controls the HID lighting element/igniter within the front lamp unit to which it is mounted.
- **Hazard Switch** - A latching push button-actuated hazard switch is integral to the instrument panel switch bank in the lower vehicle feature controls module (also known as the Integrated Center Stack/ICS) located in the center stack area of the instrument panel.
- **Headlamp Switch** - A rotary knob-actuated headlamp switch is located in the headlamp switch bezel of

the instrument panel. The headlamp switch is used to select the park lamps, headlamps or fog lamps.

- **Instrument Cluster** - The IC is located in the instrument panel above the steering column opening, directly in front of the driver. Refer to **DESCRIPTION** .
- **Instrument Panel Switch Bank** - The instrument panel switch bank contains the hazard switch. The switch bank is located in the lower vehicle feature controls module (also known as the Integrated Center Stack/ICS) located in the center stack area of the instrument panel.
- **Multi-Function Switch** - The multi-function switch is located on the steering column, just below the steering wheel. A control stalk that extends from the left side of the switch is used to select the turn signal lamps (right or left) and to select the headlamp beam (low, high or optical horn).
- **Steering Column Control Module** - The Steering Column Control Module (SCCM) microcontroller is located within the SCCM on the top of the steering column, just below the steering wheel.
- **Turn Signal Cancel Cam** - The turn signal cancel cam is integral to the clockspring. The turn signal cancel cam provides automatic turn signal cancellation as the steering wheel is rotated back to its centered position following a vehicle turning maneuver.

Hard wired circuitry connects the exterior lighting system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the exterior lighting components through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

Following are paragraphs that briefly describe the operation of each of the major exterior lighting systems. The lamps and the hard wired circuits between components related to the exterior lighting system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, details of wire harness routing, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the exterior lighting system or the electronic controls or communication between modules and other devices that provide some features of the exterior lighting system. The most reliable, efficient and accurate means to diagnose the exterior lighting system or the electronic controls and communication related to exterior lighting system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

AUTOMATIC HEADLAMP

The two optional automatic headlamp systems can include the headlamp switch, the Body Control Module (BCM), the HVAC module. The auto headlamp system has two available sensors that give the BCM feedback for lamp control. The light rain sensor and the twilight sensor on the top of the instrument panel are the two available sensors.

If the vehicle is not equipped with a light rain sensor, the twilight sensor provides the ambient light level input

to the HVAC module whenever the ignition switch status is ON. The HVAC module responds to this input by sending the appropriate electronic **light level** messages to the BCM over the Controller Area Network (CAN) data bus. When the **AUTO** (Automatic) position is selected with the headlamp switch, the BCM receives a hard wired multiplex input from the headlamp switch. The BCM also receives electronic messages over the CAN data bus from the Powertrain Control Module (PCM) (also known as the Engine Control Module/ECM) indicating the engine is running. **The twilight sensor is only used for auto headlamp operation when the vehicle is not equipped with an optional light rain sensor.** If the vehicle is equipped with a light rain sensor, the light rain sensor communicates to the BCM via LIN bus. The BCM responds to either input condition by automatically controlling a Pulse-Width Modulated (PWM) voltage output to the selected headlamp bulb filaments through the right and left low or high beam driver circuits to illuminate the headlamps. The BCM also remembers which beams (low or high) were selected when the headlamps were last turned OFF, and energizes those beams and lamps again the next time it turns the headlamps ON.

BRAKE LAMPS

Each combined brake lamp / rear turn signal LED unit and the Center High Mounted Stop Lamp (CHMSL) have a path to ground at all times through a takeout and eyelet terminal of the body wire harness that is secured by a ground screw to the body sheet metal within the passenger compartment. The Antilock Brake System (ABS) module monitors a hard wired input from the brake pedal position sensor, which is actuated by movement of the brake pedal arm. When the ABS module receives an input from the brake pedal position sensor indicating movement of the brake pedal arm, it responds by sending the appropriate electronic **brake lamp switch** status message to the BCM over the CAN data bus. The BCM then controls brake lamp and CHMSL illumination through High Side Drivers (HSD) on the left and right brake lamp control circuits. When the turn signals are active, the signal takes precedence over the brake lamp.

DAYTIME RUNNING LAMPS

Vehicles equipped with this option or manufactured for sale in Canada illuminate multiple Light-Emitting Diode (LED) units in both front lamp units when the engine is running, the parking brake is released and the exterior lamps are turned OFF. The BCM must be programmed appropriately for this feature to be enabled. Once enabled, anytime the Body Control Module (BCM) receives electronic messages over the CAN data bus from the Powertrain Control Module (PCM) indicating the engine is running, a hard wired multiplex input from the headlamp switch indicating the status of the headlamp switch is OFF and a hard wired input from the park brake switch indicating that the parking brake is released, the BCM provides an output to the appropriate LED units to produce illumination. If a turn signal is activated while the DRL units are active, the DRL for the same side of the vehicle as the indicated turn is extinguished until the turn signal is cancelled to permit clear signal visibility. Hazard Warning flashes these LED units.

FRONT FOG LAMPS

Vehicles equipped with optional front fog lamps include a front fog lamp switch integral to the headlamp switch on the instrument panel. The front fog lamps have a path to ground at all times through their connection to the Front End Module (FEM) wire harness and a takeout with an eyelet terminal that is secured to the body sheet metal.

Fog Lamp Activation

- The headlamp switch needs to be in either park lamps or low beams before activating the front fog lamps.
- The headlamp switch is a momentary switch that sends an analog command to the BCM indicating that

the fog lamps are selected, The BCM controls front fog lamp operation by providing a battery voltage output to the fog lamps through the right and left front fog lamp control circuits.

- The BCM also sends the appropriate electronic front fog lamp status messages to the Instrument Cluster (IC) to illuminate or extinguish the front fog lamp indicator.

Fog Lamp Dropout with High Beam Activation - If the front fog lamps are active and the vehicle's high beams turn ON, then the front fog lamp outputs will turn OFF and the IC indicator will also turn off and remain off until the high beams are turned OFF. If vehicle high beams are active and the front fog lamp command is operated, the IC indicator will remain OFF. The BCM will keep track of a fog lamp request and honor the request when the high beams are turned OFF.

Battery Saver - The BCM also provides a battery saver (load shedding) feature for the front fog lamps, which will turn these lamps OFF if they are left ON for more than about eight minutes when the status of the ignition switch is LOCK, if there is a charging system failure or if the electrical system voltage falls below about 11.75 volts for more than about 30 seconds.

HAZARD WARNING LAMPS

The hazard warning system includes the IC, the BCM and the hazard switch in the instrument panel switch bank of the Integrated Center Stack (ICS) module located in the center stack area of the instrument panel. The hazard switch provides a hard wired input to the BCM. When the BCM receives an input from the hazard switch, it controls hazard warning system operation and flash rate by controlling battery voltage outputs through high side drivers on the front and rear, right and left turn signal control circuits.

The BCM also sends the appropriate electronic messages to the IC over the CAN data bus to control the illumination and flash rate of the right and left turn signal indicators, as well as to control the click rate of an electromechanical relay soldered onto the IC electronic circuit board that emulates the sound emitted by a conventional electromechanical hazard warning flasher.

HEADLAMPS

The headlamp system includes the Instrument Panel Cluster (IPC), the Steering Column Control Module (SCCM), the Body Control Module (BCM), the headlamp switch and the multi-function switch on the steering column. The headlamp bulbs have a path to ground at all times through their connection to the FEM wire harness. The FEM harness has takeouts with eyelet terminals that are secured to the front end sheet metal within the engine compartment. The BCM will store a Diagnostic Trouble Code (DTC) for any shorts or opens in the headlamp circuits.

The BCM monitors a hard wired multiplex input to determine the status of the headlamp switch. The BCM also monitors electronic headlamp beam select switch status messages received from the SCCM over the CAN data bus. The BCM responds to these inputs by providing a pulse width modulated voltage output to the headlamp through high side drivers on the right and left headlamp feed circuits to illuminate the headlamps, and controls the high and low beam shutter operation through high side drivers on the right and left high beam feed circuits. The BCM also sends the appropriate electronic headlamp beam status messages to the IPC to control the illumination of the high beam indicator.

The BCM also remembers which beams (LOW or HIGH) were selected when the headlamps were last turned OFF, and energizes those beams again the next time the headlamps are turned ON. The BCM provides a battery saver (load shedding) feature for the headlamps, which will turn these lamps OFF if they are left ON for more

than about eight minutes when the ignition switch status is LOCK. The SCCM and the BCM each provide a fail-safe feature for the headlamps, which will cause the BCM to turn the low beam headlamps ON automatically if there is no input available from the headlamp switch or the multi-function switch. The BCM also provides a fail-safe feature for the headlamps that will turn the headlamps ON automatically whenever a loss of CAN bus communication is detected when the ignition switch status is ON.

Each headlamp includes an integral reflector adjustment screw to be used for static aiming of the headlamps.

HEADLAMP TIME DELAY

The headlamp time delay feature includes the headlamp switch and the BCM. This feature is customer programmable using the Electronic Vehicle Information Center (EVIC) switches and the U-Connect Touch™ screen module in the Integrated Center Stack (ICS). If the headlamp switch is in the **AUTO** (Automatic) position when the ignition switch is moved from the ON position to any position except ON, then the headlamps will remain illuminated until after the selected delay interval has elapsed. The park lamps will not stay ON during the headlamp time delay interval. The default delay interval is 90 seconds, but can be reprogrammed by the customer using through the Uconnect™ options menu.

PARK LAMPS

The park lamps system includes the headlamp switch on the instrument panel and the BCM. The LED front park lamp and LED unit marker lamps each have a path to ground at all times through their connection to the headlamp and dash wire harness. The headlamp and dash wire harness has takeouts with eyelet terminals that are secured to the body sheet metal. The LED rear park/tail lamp and side marker LED units and the license plate lamp bulbs each have a path to ground at all times through a takeout and eyelet terminal of the body wire harness that is secured by a ground screw to the body sheet metal.

The BCM monitors a hard wired multiplex input from the headlamp switch. The BCM responds to this input by controlling a battery voltage output to the appropriate lamps through high side drivers on the front and rear, right and left lamp driver and control circuits.

The BCM provides a battery saver (load shedding) feature for the park lamps, which will turn these lamps OFF if they are left ON for more than about eight minutes with the ignition switch in the LOCK position. The BCM also provides a fail-safe feature for the park lamps, which will turn the park lamps and low beam headlamps ON automatically if there is no input available from the headlamp switch. The BCM also provides a fail-safe feature for the park lamps that will turn the park lamps and low beam headlamps ON automatically whenever a loss of CAN bus communication is detected with the ignition switch in the ON position.

REVERSE LAMPS

Automatic Transmission - The Body Control Module monitors the CAN C bus PRNDL status signal. Once this signal indicates that the reverse gear is active, the BCM activates the reverse LED lamps by providing a battery voltage output to the reverse lamps on the reverse lamp control output circuit.

Manual Transmission - The BCM monitors the manual transmission reverse switch. When the reverse switch outputs an active signal, the BCM activates the reverse lamps by providing a battery voltage output to the reverse LED lamps on the reverse lamp control output circuit.

SMARTBEAMĀ® SYSTEM

The optional SmartBeamĀ® (auto high beam) system includes the SmartBeamĀ® module with digital imager

camera and electronic circuitry integral to the electrochromic inside rear view mirror, the Steering Column Control Module (SCCM), the Body Control Module (BCM), the Instrument Cluster (IC), the headlamp switch and the multi-function switch. First, the **Auto High Beams** option must be enabled through the radio. Then the **AUTO** (Automatic) position must be selected using the rotary knob of the headlamp switch, the headlamp beam selector switch must be in the high beam position and the appropriate ambient light conditions must be present. Finally, the vehicle speed must be greater than 32 kph (20 mph).

Once all of these prerequisites have been met, the SmartBeamÂ® camera and its circuitry within the electrochromic mirror automatically sends the appropriate electronic **headlamp beam select switch status** messages to the BCM over the Local Interface Network (LIN) data bus. The BCM then responds to these messages by providing an output to the headlamp bulbs or the lighting elements through the right and left low and high beam feed circuits to illuminate the headlamps. The BCM also sends the appropriate electronic messages back to the IC to control the illumination of the high beam indicator.

The SCCM continues to monitor the multi-function switch, and will send the appropriate electronic messages to the BCM, which relays these messages to the SmartBeamÂ® circuitry in the inside rear view mirror to manually invoke the beam select switch momentary optical horn (flash-to-pass) feature or, when a detent switch position is selected to override SmartBeamÂ® operation.

TURN SIGNAL LAMPS

CONTROL MODULE RESPONSIBILITY

- BCM - Turn signal lights request from the Steering Control Module (SCCM), received from the turn signal multi-function switch.
- BCM - Turn signal lights powering (left and right sides).
- BCM - Turn signal light status transmittal over CAN-B.
- BCM - Combined lighting turn/stop and park/turn lamp management.
- IPC - Obtain turn signal lamp status from CAN-B.
- IPC - Turn signal lights signaling management.
- IPC - Turn signal lights fail signaling management.
- SCCM - Turn signal output acquisition from the multi-function switch.
- SCCM - Turn signal activation request to Body Control Module (BCM) over CAN-C.

The left or right direction signals are activated using the left stalk switch input to the SCCM. These commands are codified using a resistive divider, into the analogical command that is read by the SCCM and then sent to the BCM over CAN-C.

The turn signal lamps system includes the multi-function switch on the steering column, the SCCM, the Instrument Panel Cluster (IPC) and the BCM. The front turn signal lamp LED array has a path to ground at all times through their connection to the combination park/turn lamp and dash wire harness. The combination park/turn lamp and dash wire harness has takeouts with eyelet terminals that are secured to the body sheet metal. The rear turn signal lamps are LED elements within the rear outer tail lamp housing.

The SCCM monitors a hard wired multiplex input from the multi-function switch to determine the status of the turn signal switch, then sends the appropriate electronic turn signal switch status messages to the BCM over the CAN data bus. The BCM responds to these messages by controlling a battery voltage output and the flash rate

for either the right or left turn signal lamps through high side drivers on the appropriate front and rear, right or left turn signal control circuits. The BCM also sends the appropriate electronic messages to the IPC to control the illumination and flash rate of the right or left turn signal indicators, as well as to control the click rate of an electromechanical relay soldered onto the IPC electronic circuit board that emulates the sound emitted by a conventional electromechanical turn signal flasher.

The BCM also provides a Turn Signal ON warning that will send a request message to the IPC over the CAN bus that causes the IPC to generate repetitive chimes to indicate that a turn signal has been active continuously for 1.6 kilometers (1 mile) with the vehicle speed greater than 22 kilometers-per-hour (15 miles-per-hour). The chime will continue until the turn signal input becomes inactive or until the vehicle speed message indicates that the speed is less than 22 kilometers-per-hour (15 miles-per-hour), whichever occurs first.

SNA Definition - Signal Not Acquired (SNA). If the SCCM detects an issue (stuck switch, etc) and sets an active fault, the SCCM shall broadcast the SNA state to the BCM. BCM will default to an idle state and keep all turn signal outputs OFF until a valid request is received.

Combined Rear Lighting - Some models will be equipped with combined rear lighting. The stop lamp and the turn signal lamp share the same single bulb filament. When the turn signal is activated, the SCCM recognizes the signal switch request. The SCCM sends this message over the CAN C bus to the BCM for processing. The BCM then actuates the LED array for signal operation only until the stalk is reset back to the neutral position.

Lane Change Function - If either of the turn signals are actuated for a time equal to or less than 500 ms, the BCM will activate the requested turn signal light and will blink for three blinks. At the same time the signals are switched ON, the BCM will also activate the internal signal corresponding with the selected side. The internal signal will show ON for the entire period of the turn signal event and will not show to be blinking. The internal signal is synchronous with the signal activation and will turn OFF at the end of the event. After 3 blink cycles, the BCM switches OFF the turn signals, the CAN-B signals, and the internal signals corresponding to the selected side.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - EXTERIOR LIGHTING

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

WARNING: **To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of**

burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

NOTE: **When diagnosing the exterior lighting circuits, remember that high generator output can burn out bulbs rapidly and repeatedly; and, that dim or flickering bulbs can be caused by low generator output or poor battery condition. If one of these symptoms is a problem on the vehicle, be certain to diagnose the battery and charging system, then repair as necessary.**

NOTE: **A good ground is necessary for proper lighting operation. If a lighting problem is being diagnosed that involves multiple symptoms, systems, or components, the problem can often be traced to a loose, corroded, or open ground.**

The lamps and the hard wired circuits between components related to the exterior lighting system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between modules and other devices that provide some features of the exterior lighting system. The most reliable, efficient, and accurate means to diagnose the exterior lighting system or the electronic controls and communication related to exterior lighting system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

ACRONYMS USED IN THE FOLLOWING SERVICE INFORMATION	
Body Control Module	BCM
Center High-Mounted Stop Lamp	CHMSL
Controller Antilock Brake	CAB
Controller Area Network	CAN
Daytime Running Lamps	DRL
Diagnostic Trouble Code	DTC
Instrument Cluster	IC
Integrated Center Stack	ICS
Light-Emitting Diode	LED
Local Interface Network	LIN
Steering Angle Sensor	SAS
Steering Column Control Module	SCCM
Transmission Range Sensor	TRS

AUTOMATIC HEADLAMPS

NOTE: **Be certain that the headlamps can be turned ON and OFF manually before attempting to diagnose and repair the Automatic Headlamps. If not, diagnose and repair those problems before attempting to repair the Automatic Headlamps.**

NOTE: **The Automatic Headlamp switch is integral to the headlamp switch itself, which communicates with the Body Control Module (BCM) over via data bus. Before performing any of the following tests, determine whether the other functions of the headlamp are operational. If the other functions are ineffective, diagnose and repair that problem before attempting to repair the Automatic Headlamps.**

CONDITION	POSSIBLE CAUSES	CORRECTION
AUTO HEADLAMPS INEFFECTIVE	1. Feature not enabled.	1. Enable **Auto Low** or **Auto Low/High** using the customer programmable features function of the Electronic Vehicle Information Center (EVIC).
	2. Ineffective headlamp switch.	2. Test and replace switch if required.
	3. Ineffective circuits between sun load sensor and air conditioner - heater control.	3. Test and repair sun sensor and sun sensor return circuits if required.
	4. Ineffective sun load sensor (except with automatic wipers). If vehicle is export, then LRSM is 100% in control of light identification and not the Sun Sensor.	4. Test and replace sun load sensor if required. Connect the scan tool and monitor the sensor voltage while covering and uncovering the sensor. A covered sensor voltage should read approximately 4.6V and an uncovered sensor should read approximately 2.3V.
	5. Ineffective Light Rain Sensor Module (LRSM) (with automatic wipers).	5. Use a diagnostic scan tool to test and replace the LRSM if required. Refer to the appropriate diagnostic information.
	6. Ineffective BCM inputs or outputs.	6. Use a diagnostic scan tool to check and configure BCM if required.

BRAKE LAMPS

NOTE: **The rear lamp units and the CHMSL are illuminated by several LED units that are soldered to the electronic circuit boards within the lamp housings. The brake lamps are powered by high side drivers within the BCM based upon an input to the ABS module from the brake pedal position sensor. If all of the LED units within the CHMSL fail to operate, diagnose and repair the brake lamps before attempting to repair the CHMSL. If the brake lamp LED units in the rear lamps operate but none of the CHMSL LED units illuminate, test and repair the CHMSL ground or feed circuit if required. If some of the rear lamp or CHMSL LED units operate and others do not, the outer rear lamp or CHMSL assembly must be replaced with a new unit.**

CONDITION	POSSIBLE CAUSES	CORRECTION
BRAKE LAMP DOES NOT ILLUMINATE	1. Ineffective ground circuit.	1. Use the scan tool to check for fault codes. If fault codes are found, repair as needed and retest. If no fault codes are present, perform the diagnostics steps listed for code **C0042-28-BRAKE PEDAL POSITION SENSOR - SIGNAL BIAS LEVEL OUT OF RANGE / ZERO ADJUSTMENT FAILURE** . Refer to **DIAGNOSIS AND TESTING** .
	2. Ineffective fuse.	
	3. Ineffective feed circuit.	
	4. Ineffective brake pedal position sensor.	
	5. Ineffective ABS module inputs or outputs.	
	6. Ineffective BCM inputs or outputs.	
BRAKE LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Use the scan tool to check for fault codes. If fault codes are found, repair as needed and retest. If no fault codes are present, perform the diagnostics steps listed for code **C0042-2A-BRAKE PEDAL POSITION SENSOR - STUCK. Refer to DIAGNOSIS AND TESTING .**
	2. Ineffective brake pedal position sensor.	
	3. Ineffective ABS module inputs or outputs.	
	4. Ineffective BCM inputs or outputs.	

DAYTIME RUNNING LAMPS

CONDITION	POSSIBLE CAUSES	CORRECTION
DAYTIME RUNNING LAMPS WILL NOT ILLUMINATE	1. DRLs not enabled.	1. Using the EVIC, verify that the DRLs are enabled.
	2. Incorrect BCM configuration.	2. Use a diagnostic scan tool to check and configure BCM if required.
	3. Automatic transmission in PARK position.	3. Place the transmission gear selector lever in any position except PARK.
	4. Parking brake applied.	4. Release the parking brake.
	5. Engine not running.	5. Start the engine.
	6. Ineffective BCM inputs or outputs.	6. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
	7. Ineffective LED units.	7. Replace the front lamp unit if required.

FRONT FOG LAMPS

CONDITION	POSSIBLE CAUSES	CORRECTION
FRONT FOG LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb or ineffective LED lamp unit.	1. Test and replace front fog lamp bulb if required or test and replace the front fog lamp LED lamp unit.
	2. Ineffective ground circuit.	2. Test and repair open front fog lamp ground circuit if required.

CONDITION	POSSIBLE CAUSES	CORRECTION
	3. Ineffective feed circuit.	3. Test and repair open front fog lamp feed circuit if required.
	4. Ineffective switch.	4. Test and replace headlamp switch if required.
	5. Ineffective BCM inputs or outputs.	5. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
FRONT FOG LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted front fog lamp feed circuit if required.
	2. Ineffective switch.	2. Test and replace the headlamp switch if required.
	3. Ineffective BCM inputs or outputs.	3. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

HAZARD WARNING LAMPS

NOTE: **The hazard switch is integral to the instrument panel switch bank, which provides a hard wired output to the BCM. Before performing any of the following tests, confirm whether the left and right turn signals operate satisfactorily. Then determine whether the other functions of the instrument panel switch bank are operational. If the turn signals are ineffective or operate improperly, or if the other instrument panel switch bank functions are ineffective, diagnose and repair those problems before attempting to repair the hazard warning lamps system.**

CONDITION	POSSIBLE CAUSES	CORRECTION
HAZARD WARNING LAMPS DO NOT FLASH	1. Ineffective instrument panel switch bank.	1. Test and replace instrument panel switch bank if required.
	2. Ineffective BCM inputs or outputs.	2. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
HAZARD WARNING LAMPS DO NOT STOP FLASHING	1. Ineffective instrument panel switch bank.	1. Test and replace instrument panel switch bank if required.
	2. Ineffective BCM inputs or outputs.	2. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

HEADLAMPS

NOTE: **As part of the exterior lighting fail safe feature, upon ignition ON all exterior park lamps and the headlamp low beams will illuminate regardless of the headlamp switch control knob position if the IC cannot detect an input from the headlamp switch, or if there is a loss of communication between the multi-function switch/SCCM and the BCM. Diagnose and repair those problems before attempting to repair the headlamps. In addition, the BCM will store a DTC**

for an open or shorted headlamp circuit.

CONDITION	POSSIBLE CAUSES	CORRECTION
HEADLAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace headlamp bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open headlamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open headlamp low beam or high beam feed circuit if required.
	4. Ineffective switch.	4. Test and replace the headlamp switch if required.
	5. Ineffective BCM inputs or outputs.	5. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
HEADLAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted headlamp low beam or high beam feed circuit if required.
	2. Ineffective switch.	2. Test and replace headlamp switch if required.
	3. Ineffective BCM inputs or outputs.	3. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
HEADLAMPS ILLUMINATE WITH IGNITION ON AND HEADLAMP SWITCH OFF (FAIL-SAFE OPERATION)	1. Loss of LIN or CAN data bus communication.	1. Test and repair the LIN or CAN data bus if required. Refer to the appropriate diagnostic information.
HEADLAMPS WILL NOT SWITCH FROM HIGH TO LOW BEAMS, OR FROM LOW TO HIGH BEAMS	1. Ineffective SCCM microcontroller inputs or outputs.	1. Use a diagnostic scan tool and the appropriate diagnostic information for further SCCM microcontroller diagnosis.
	2. Ineffective BCM inputs or outputs.	2. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

PARK LAMPS

NOTE: **As part of the exterior lighting fail-safe feature, upon ignition ON all exterior park lamps and the headlamp low beams will illuminate regardless of the headlamp switch control knob position if the IC cannot detect an input from the headlamp switch, or if there is a loss of communication between the multi-function switch/SCCM and the BCM. Diagnose and repair those problems before attempting to repair the Park Lamps. In addition, the BCM will store a DTC for an open or shorted park lamps circuit.**

CONDITION	POSSIBLE CAUSES	CORRECTION

CONDITION	POSSIBLE CAUSES	CORRECTION
PARK LAMP DOES NOT ILLUMINATE	1. Ineffective LED unit.	1. Test and replace the front lamp unit if required.
	2. Ineffective ground circuit.	2. Test and repair open park lamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open park lamp feed circuit if required.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
PARK LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted park lamp feed circuit if required.
	2. Ineffective BCM inputs or outputs.	2. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

REVERSE LAMPS

CONDITION	POSSIBLE CAUSES	CORRECTION
REVERSE LAMP DOES NOT ILLUMINATE	1. Ineffective LED lamp.	1. Test and replace reverse lamp LED assembly if required.
	2. Ineffective ground circuit.	2. Test and repair open reverse lamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open reverse lamp feed circuit if required.
	4. Stuck switch.	4. Remove the switch and check for debris. Clean and retest. Replace the switch if no improvement.
	5. Ineffective switch.	5. Test and replace reverse lamp switch (manual transmission) or TRS (automatic transmission) if required.
	6. Ineffective BCM inputs or outputs.	6. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
REVERSE LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted reverse lamp feed circuit if required.
	2. Stuck switch.	2. Remove the switch and check for debris. Clean and retest. Replace the switch if no improvement.
	3. Ineffective switch.	3. Test and replace reverse lamp switch (manual transmission) or TRS (automatic transmission) if required.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

SIGNATURE LAMPS

CONDITION	POSSIBLE CAUSES	CORRECTION
SIGNATURE LAMP DOES NOT ILLUMINATE	1. Ineffective LED unit.	1. Test and replace the front lamp unit if required.
	2. Ineffective ground circuit.	2. Test and repair open lamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open signature lamp feed circuit if required.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
SIGNATURE LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted signature lamp feed circuit if required.
	2. Ineffective BCM inputs or outputs.	2. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.

SMARTBEAMĀ®

NOTE: **For SmartBeamĀ® to operate, the Auto High Beam option must be enabled using the customer programmable features function of the radio. Also, the Body Control Module (BCM) must be properly configured for the automatic headlamps option using a diagnostic scan tool. Refer to the appropriate diagnostic information.**

CONDITION	POSSIBLE CAUSES	CORRECTION
SMARTBEAMĀ® INEFFECTIVE AND RED LED ON INSIDE REAR VIEW MIRROR NOT ON	1. Feature not enabled.	1. Enable **Auto Dim High Beams** using the customer programmable features function of the radio.
	2. Automatic headlamps are not turned ON.	2. Turn automatic headlamps ON using the control knob of the headlamp switch.
	3. Headlamp high beams are not selected.	3. Turn high beam headlamps ON using the beam selector function of the multi-function switch control stalk.
	4. Vehicle speed is below 32 kilometers-per-hour (20 miles-per-hour).	4. Increase vehicle speed. SmartBeamĀ® is not designed to operate at speeds below 32 kilometers-per-hour (20 miles-per-hour).
	5. Ineffective ElectroChromic (EC) mirror inputs or outputs.	5. Use a diagnostic scan tool and the appropriate diagnostic information for further EC mirror diagnosis.
	6. Incorrect BCM configuration.	6. Use a diagnostic scan tool to check and correct the BCM configuration settings if required. Refer to the

CONDITION	POSSIBLE CAUSES	CORRECTION
		appropriate diagnostic information.
	7. SmartBeamÃ® imager lens dirty or obstructed.	7. Clean imager lens and windshield or remove obstructions from the windshield glass if required.
	8. Ineffective ground circuit.	8. Test and repair open ground circuit to inside rear view mirror as required.
	9. Ineffective feed circuit.	9. Test and repair open fused run relay output circuit to inside rear view mirror if required.
	10. Loss of CAN data bus or LIN data bus communication.	10. Use a diagnostic scan tool and the appropriate diagnostic information for further CAN data bus or LIN data bus diagnosis.
	11. Internal faults in imager camera or EC mirror circuitry.	11. Use a diagnostic scan tool and the appropriate diagnostic information for further imager camera and EC mirror (AHBM) diagnosis.
SMARTBEAMÃ® INEFFECTIVE AND RED LED ON INSIDE REAR VIEW MIRROR FLASHING CONTINUALLY	1. SmartBeamÃ® calibration lost.	1. Replace the EC mirror.

TURN SIGNAL LAMPS

NOTE: **The turn signal switch is integral to the multi-function switch/Steering Column Control Module (SCCM), which communicates with the Body Control Module (BCM) over the CAN data bus. Before performing any of the following tests, determine whether the other functions of the multi-function switch/SCCM are operational. If the other multi-function switch/SCCM functions are ineffective, diagnose and repair that problem before attempting to repair the Turn Signal Lamps.**

CONDITION	POSSIBLE CAUSES	CORRECTION
ONE TURN SIGNAL LAMP DOES NOT ILLUMINATE	1. Ineffective LED unit.	1. Test and replace front lamp unit or rear tail lamp unit as required.
	2. Ineffective ground circuit.	2. Test and repair open LED circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open right or left turn signal feed circuit if required.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
ALL RIGHT SIDE OR ALL LEFT SIDE TURN SIGNAL LAMPS	1. Ineffective feed circuit.	1. Test and repair open right or left turn signal feed circuit if required.

CONDITION	POSSIBLE CAUSES	CORRECTION
(OR BOTH SIDES) DO NOT FLASH	2. Ineffective SCCM inputs or outputs.	2. Use a diagnostic scan tool and the appropriate diagnostic information for further SCCM diagnosis.
	3. Ineffective BCM inputs or outputs.	3. Use a diagnostic scan tool to test the BCM inputs and outputs. Refer to the appropriate diagnostic information.
ALL RIGHT SIDE OR ALL LEFT SIDE TURN SIGNALS FLASH TOO RAPIDLY (MORE THAN 100 FLASHES PER MINUTE)	1. Ineffective LED unit.	1. Test and replace front lamp unit or rear tail lamp unit as required.
	2. Ineffective ground circuit.	2. Test and repair open LED ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open right or left turn signal feed circuit if required.
TURN SIGNALS DO NOT AUTOMATICALLY CANCEL	1. Ineffective cancel cam.	1. Inspect and replace the turn signal cancel cam (SCCM) if required.
	2. Ineffective cancel actuator.	2. Inspect and replace the turn signal cancel actuator (SCCM) if required.

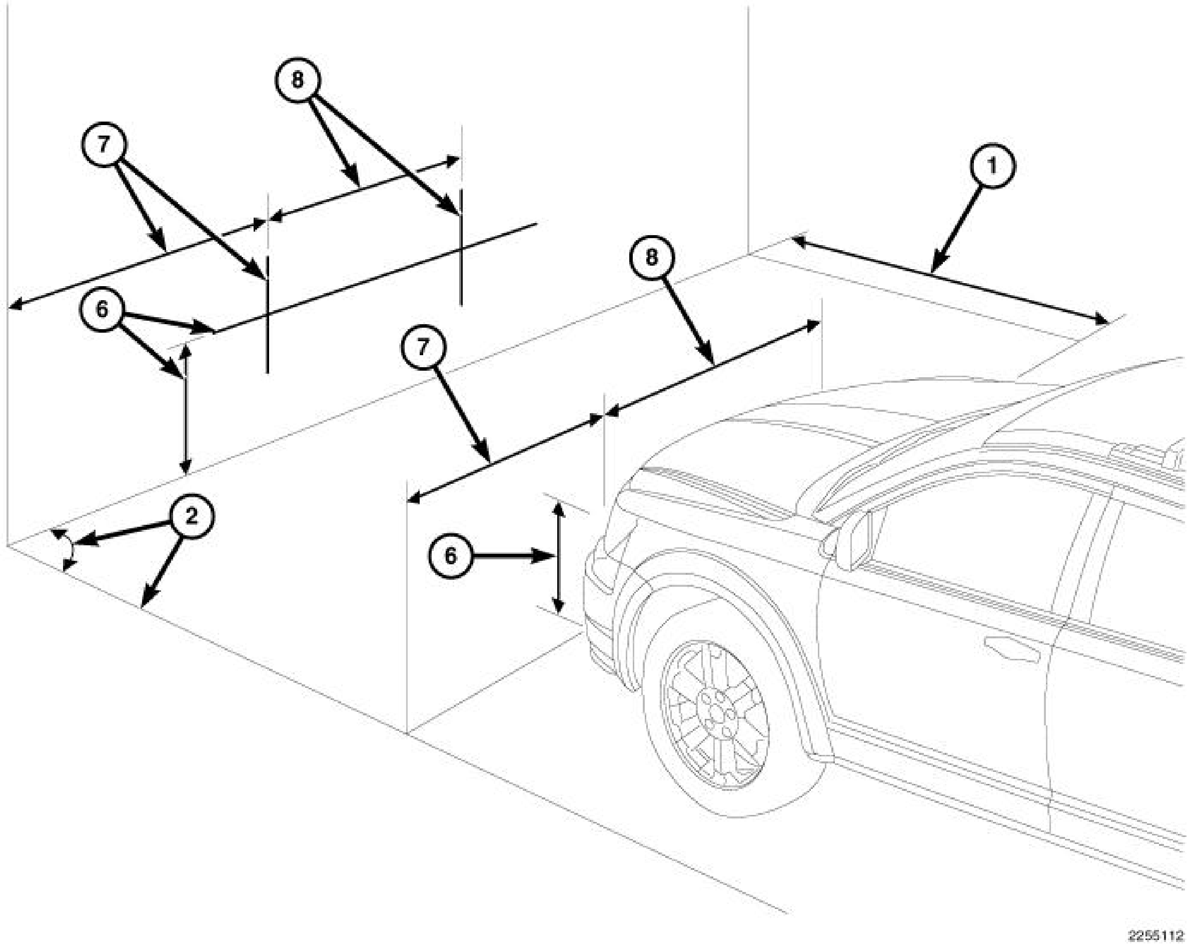
STANDARD PROCEDURE

STANDARD PROCEDURE - FRONT LAMP AIMING

VEHICLE PREPARATION FOR LAMP ALIGNMENT

1. Check for and correct any burnt out bulbs.
2. Repair or replace any faulty, worn or damaged body or suspension components that could hinder proper lamp alignment.
3. Verify proper tire inflation pressures.
4. Remove any accumulations of mud, snow or ice from the vehicle underbody and clean the front lamp lenses.
5. Verify that there is no load in the vehicle (cargo or passengers), except for the driver.
6. The fuel tank should be Full. Add 2.94 kilograms (6.5 pounds) of weight over the fuel tank for each estimated gallon of missing fuel.
7. Verify correct vehicle suspension height.

LAMP ALIGNMENT SCREEN PREPARATION



[**Fig. 1: Lamp Alignment Screen Preparation**]
Courtesy of CHRYSLER GROUP, LLC

The procedure that follows will prepare a suitable front lamp alignment screen.

1. Tape a line on a level floor 7.62 meters (25 feet) away from and parallel to the flat wall that will be used as the lamp alignment screen. The level floor will be used as the horizontal zero reference.
2. An adjacent wall or floor member that is perpendicular to the alignment screen can be used as the vertical zero reference. If there is no adjacent wall or floor member that is perpendicular to the screen, tape a second line on the floor perpendicular to both the alignment screen and the first line, and outboard of either side of where the vehicle will be positioned. This will be used as the vertical zero reference.
3. Position the vehicle so that the side of the vehicle is parallel to the vertical zero reference, and so that the front of the lamp lenses are in the vertical plane of the parallel line taped on the floor 7.62 meters (25 feet) away from the screen.
4. Rock the vehicle side-to-side three times to allow the suspension to stabilize.
5. Jounce the front suspension three times by pushing downward on the front bumper and releasing.
6. There is a small circle mark on the lamp lens indicating the optical center. Measure the distance between the optical center of one of the lamps being aimed (head or fog) and the floor (horizontal zero reference). Transfer this measurement to the alignment screen with a piece of tape placed horizontally to the floor. This line will be used as the lamp horizontal reference.
7. Measure the distance between the vertical zero reference and the optical center of the nearest lamp being

aimed (head or fog). Transfer this measurement to the alignment screen with a piece of tape placed vertically across the appropriate (head or fog) lamp horizontal reference. This is the centerline reference for the first lamp.

8. Measure the distance on center between the first and the second lamp being aimed. Transfer this measurement to the alignment screen with a second piece of tape placed vertically across the appropriate (head or fog) lamp horizontal reference. This is the centerline reference for the second lamp.

HEADLAMP ALIGNMENT

1. Turn the headlamps ON and select the LOW beams for vehicles in all markets.
2. Use a screwdriver to rotate the headlamp vertical adjustment screw.

FOG LAMP ALIGNMENT

Fig. 2: Fog Lamp Adjustment Screw
Courtesy of CHRYSLER GROUP, LLC

The fog lamp adjustment screw (1).

1. Turn the fog lamps ON.
2. Rotate the fog lamp vertical adjustment screw on each lamp to adjust the beam height as required.

SPECIFICATIONS

SPECIFICATIONS

BULB APPLICATION TABLE

LAMP	BULB
REVERSE - (REAR LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
BRAKE (REAR LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY

LAMP	BULB
CENTER HIGH MOUNTED STOP	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
DAYTIME RUNNING LAMPS (DRL) (FRONT LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
FRONT FOG	H11LL/55W
FRONT PARK (FRONT LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
FRONT SIDE MARKER (FRONT LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
FRONT TURN SIGNAL (FRONT LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
HALOGEN HEADLAMP	HIR2LL
HIGH INTENSITY DISCHARGE HEADLAMP	D3S
LICENSE PLATE	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
OUTSIDE MIRROR APPROACH	LIGHT-EMITTING DIODES SERVICED IN MIRROR GLASS AND CASE ASSEMBLY
OUTSIDE MIRROR REPEATER	LIGHT-EMITTING DIODES SERVICED IN MIRROR HEAD ASSEMBLY
OUTSIDE MIRROR TURN SIGNAL	LIGHT-EMITTING DIODES SERVICED IN MIRROR HEAD ASSEMBLY
REAR SIDE MARKER (REAR LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
REAR STOP (REAR LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
REAR TAIL (REAR LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
REAR TURN SIGNAL - (REAR LAMP UNIT)	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY

BALLAST, HIGH INTENSITY DISCHARGE (HID)

DESCRIPTION

DESCRIPTION

[Fig. 3: Electronic Ballast Module & Screws]
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the optional High Intensity Discharge (HID) headlamps have an electronic ballast module (1) mounted to the side of each front lamp unit. The electronic circuitry of the module is contained within a die cast aluminum module housing, which is secured by three screws (2) through integral mounting tabs to the molded plastic front lamp unit housing.

The sealed connector receptacle of the module is integral to the side of the housing that mates to the front lamp unit. The connector receptacle contains terminal pins that connect the module to the vehicle electrical system, to the high tension HID cable and to the front lamp unit through dedicated take outs and connectors of the front lamp unit wire harness.

The electronic ballast module cannot be adjusted or repaired and, if damaged or ineffective, it must be replaced.

OPERATION

OPERATION

The electronic ballast module operates on battery current and ground received directly from the Body Control Module (BCM). Each module controls operation of the High Intensity Discharge (HID) igniter and lighting element for the front lamp unit on which it is installed. The BCM monitors a hard wired input from the headlamp switch to determine the proper control outputs to the electronic ballast module, which then provides a controlled voltage to operate the HID lamp igniter as appropriate.

The BCM also monitors electronic message inputs received from the Steering Column Control Module (SCCM) over the Controller Area Network (CAN) Interior High Speed (IHS) data bus based upon multi-function switch inputs and, if the vehicle is so equipped, from the Automatic High Beam Module (AHBM) and the Light/Rain Sensor Module (LRSM) to determine the proper lighting outputs to provide to the ballast module.

When a proper 12 volt Direct Current (DC) control output is received from the BCM, the HID electronic ballast module activates the HID igniter integral to the lighting element through a high-tension cable to provide a high voltage (up to about 800 volts Alternating Current/AC) surge. The igniter further steps up this AC voltage to up to about 25, 000 volts, which creates a light arc between the lighting element electrodes. Once the igniter and

electronic ballast module detect a suitably stable light arc, they switch over to a power-limiting mode to sustain the light arc, which requires only about 85 volts to sustain proper lighting element output.

The hard wired electronic ballast module circuits may be diagnosed using conventional diagnostic tools and procedures. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic ballast module or the electronic controls and communication that provide some features of the HID lamp system. Proper diagnosis of the electronic ballast module, the BCM, the SCCM, the SmartBeamÃ®, the LRSM, the CAN data bus and the electronic communication related to electronic ballast module operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: **To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.**

NOTE: **Before replacing a High Intensity Discharge (HID) ballast due to an inoperative HID lamp, be certain that the HID lamp is receiving power from the Body Control Module (BCM). See the appropriate wiring information.**

Fig. 4: Electronic Ballast Module & Screws
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the front lamp unit from the vehicle. Refer to **UNIT, FRONT LAMP, REMOVAL**.
3. Remove the three screws (2) that secure the electronic ballast module (1) to the side of the front lamp unit housing.

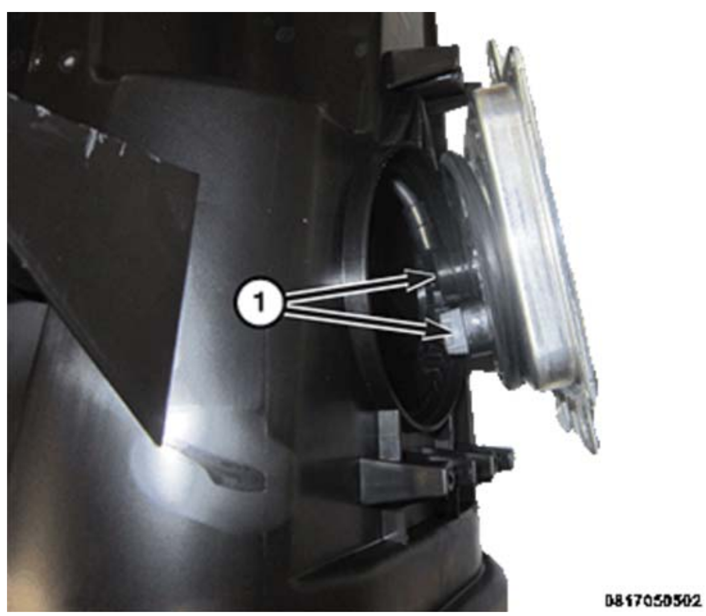


Fig. 5: Ballast Module Wire Harness Connections
Courtesy of CHRYSLER GROUP, LLC

4. Pull the ballast module away from the front lamp unit far enough to access and disconnect the wire harness connections (1) within the front lamp unit.

Fig. 6: Front Lamp Unit Wire Harness Connections
Courtesy of CHRYSLER GROUP, LLC

5. Remove the electronic ballast module from the lamp.

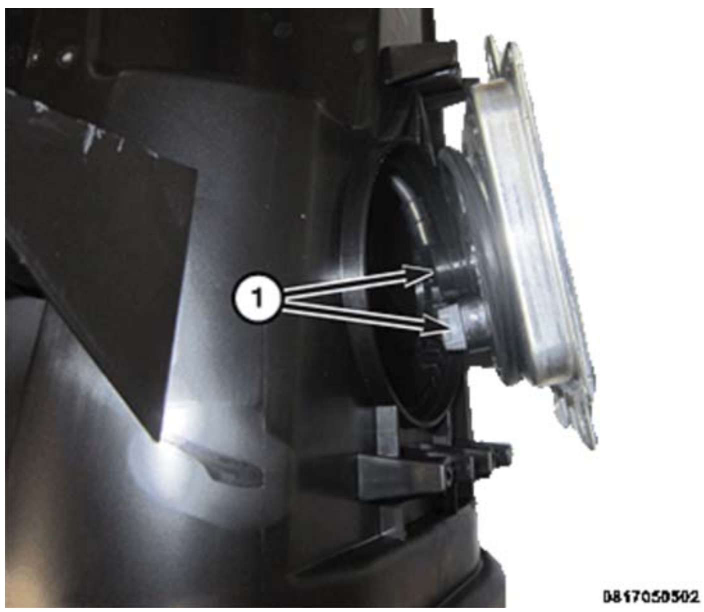
INSTALLATION

INSTALLATION

WARNING: **To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.**

[Fig. 7: Front Lamp Unit Wire Harness Connections](#)
Courtesy of CHRYSLER GROUP, LLC

1. Gently pull the harness connectors out from the ballast mounting location on the front lamp unit. Be careful to not pull too hard.



[Fig. 8: Ballast Module Wire Harness Connections](#)
Courtesy of CHRYSLER GROUP, LLC

2. Position the electronic ballast module to the side of the front lamp unit housing.
3. Connect the wire harness connections within the front lamp unit (1) to the module connector receptacles.

Fig. 9: Electronic Ballast Module & Screws
Courtesy of CHRYSLER GROUP, LLC

4. Install and tighten the three screws (2) that secure the module (1) to the housing. Tighten the screws securely.
5. Install the front lamp unit into the vehicle. Refer to **UNIT, FRONT LAMP, INSTALLATION**.
6. Connect the battery negative cable.

CAM, TURN SIGNAL CANCEL

DESCRIPTION

DESCRIPTION

The turn signal cancel cam is concealed within the clockspring integral to the Steering Column Control Module (SCCM) on the steering column. The turn signal cancel cam consists of integral eccentrics on the outer circumference of the molded plastic clockspring rotor. The clockspring mechanism provides turn signal cancellation as well as a constant electrical connection between the rotating electrical components on the steering wheel and the instrument panel wire harness on the steering column. The SCCM and the housing of the clockspring are secured to the steering column and remain stationary. The rotor of the clockspring, including the turn signal cancel cam lobes, rotates with the steering wheel.

The turn signal cancel cam is serviced as a unit with the SCCM and cannot be repaired. If ineffective or damaged, the entire SCCM must be replaced.

OPERATION

OPERATION

When the multi-function switch control stalk is moved to a latched turn signal ON position, a turn signal cancel actuator is extended from the inside surface of the switch housing through a small opening on the left side of the clockspring case toward the turn signal cancel cam. As the steering wheel is rotated to complete the turn, one of the cam eccentrics will contact the actuator, automatically cancelling the turn signal event and releasing the

latched multi-function switch control stalk to the neutral or OFF position.

LAMP, CENTER HIGH MOUNTED STOP

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Lower the back of the headliner. Refer to HEADLINER, REMOVAL .

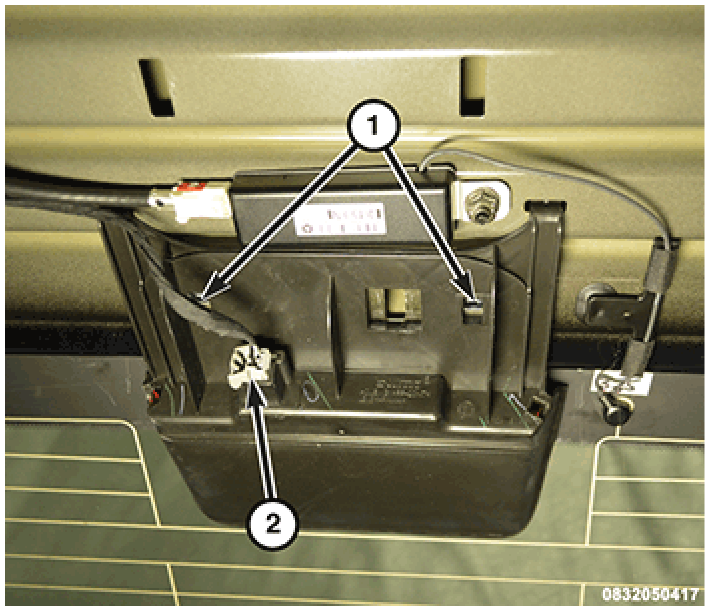


Fig. 10: Wire Harness Connector & Retaining Clips
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the body wire harness connector (2) from the connector receptacle integral to the back of the Center High Mounted Stop Lamp (CHMSL) housing.
4. If the vehicle is so equipped, disconnect the body wire harness connector from the Passive Entry (PE) deck lid release switch pigtail wire connector on the back of the CHMSL housing.
5. If the vehicle is so equipped, disconnect the body wire harness connector from the rear view camera connector receptacle on the back of the CHMSL housing.
6. Pull the CHMSL in a downward motion until the assembly is released from the retaining clips (1).
7. Remove the CHMSL from the vehicle.

INSTALLATION

INSTALLATION

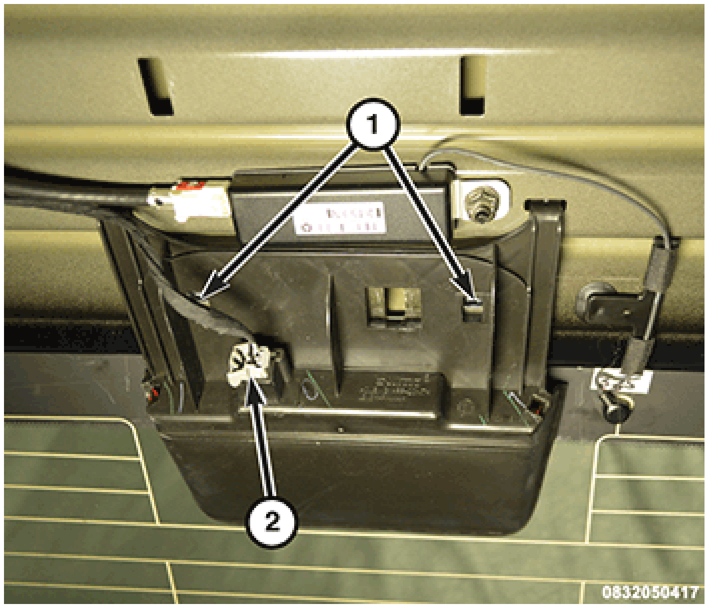


Fig. 11: Wire Harness Connector & Retaining Clips
Courtesy of CHRYSLER GROUP, LLC

1. Insert the two legs of the CHMSL to their roof opening mounting holes.
2. Once the legs are inserted, push the CHMSL into position until the two integral latch tabs (2) snap into place
3. Connect the body wire harness connector (2) to the connector receptacle integral to the back of the CHMSL housing.
4. If the vehicle is so equipped, connect the body wire harness connector to the Passive Entry (PE) deck lid release switch pigtail wire connector on the back of the CHMSL housing.
5. If the vehicle is so equipped, connect the body wire harness connector to the rear view camera connector receptacle on the back of the CHMSL housing.
6. Install the lowered back portion of the headliner. Refer to HEADLINER, INSTALLATION .
7. Connect the battery negative cable.

LAMP, FOG

REMOVAL

BULB

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

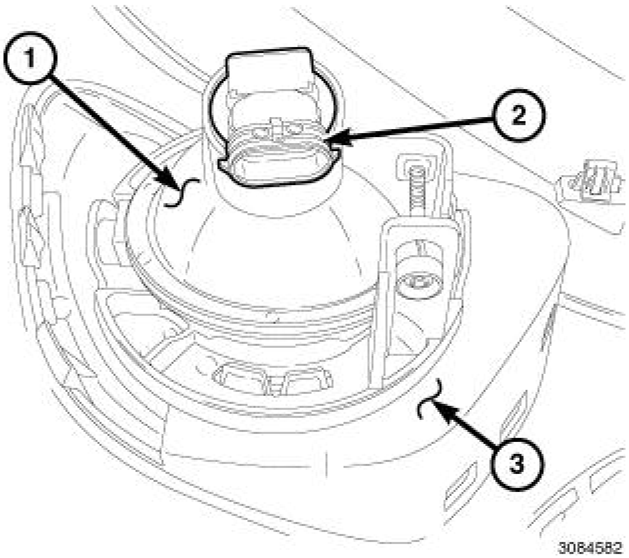


Fig. 12: Front Fascia, Connector Receptacle & Front Fog Lamp Housing
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Raise and support the vehicle.
3. Loosen the front belly pan from the underbody far enough to access the back of the fog lamp on the back of the fascia fog lamp seat (3). Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL** .
4. Reach behind the front fascia to access and disconnect the headlamp and dash wire harness connector from the front fog lamp bulb connector receptacle (2).
5. Firmly grasp the bulb on the back of the front fog lamp housing (1) and rotate it counterclockwise about 30 degrees to unlock it.
6. Pull the bulb straight out from the keyed opening in the housing.

LAMP

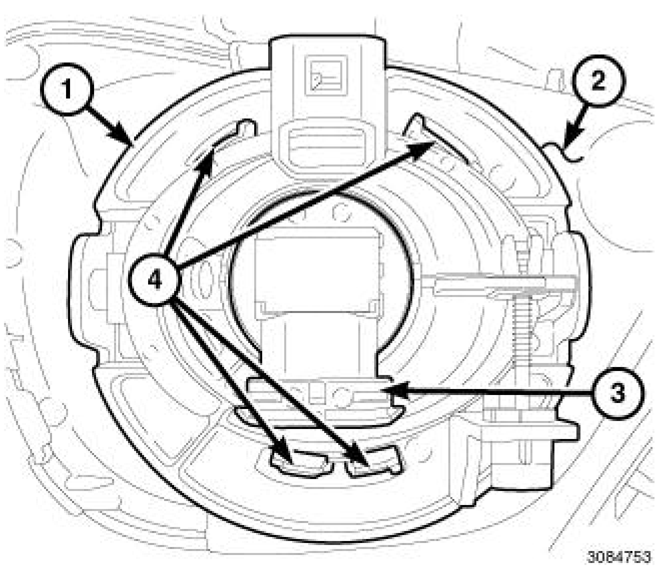


Fig. 13: Front Fascia, Connector Receptacle, Latch Features & Front Fog Lamp Mounting Ring
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Raise and support the vehicle.
3. Remove the front belly pan from the underbody. Refer to **BELLY PAN, REMOVAL** or **BELLY PAN, ENGINE, REMOVAL** .
4. Reach behind the front fascia (2) to access and disconnect the headlamp and dash wire harness connector from the front fog lamp bulb connector receptacle (3).
5. Using a trim stick or another suitable wide flat-bladed tool, carefully pry between the front fog lamp mounting ring (1) and the back of the front fascia as necessary to disengage the four latch features (4) integral to the back of the fog lamp seat in the fascia from the slots in the mounting ring.
6. Remove the front fog lamp unit from the back of the fascia.

INSTALLATION

BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

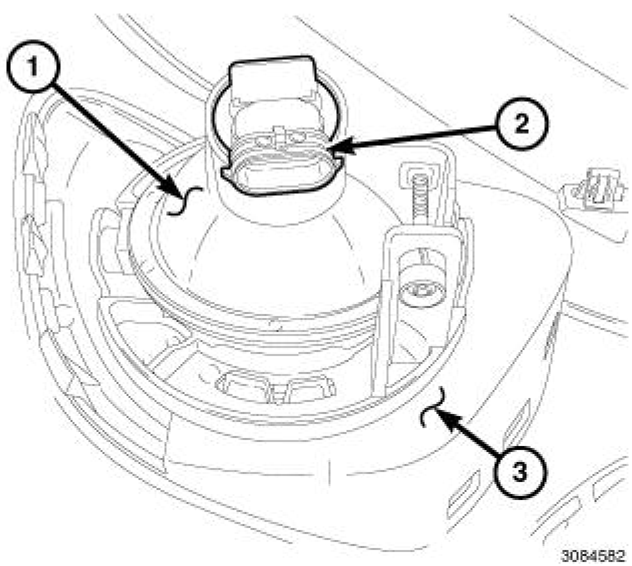


Fig. 14: Front Fascia, Connector Receptacle & Front Fog Lamp Housing
Courtesy of CHRYSLER GROUP, LLC

1. From behind the front fascia fog lamp seat (3), align the front fog lamp bulb with the keyed opening on the back of the front fog lamp housing (1).
2. Insert the bulb into the housing until the base is firmly seated.
3. Rotate the bulb clockwise about 30 degrees to lock it into place. The bulb connector receptacle (2) should be pointed straight downward.
4. Reconnect the headlamp and dash wire harness connector to the bulb connector receptacle.
5. Reinstall the front belly pan to the underbody. Refer to **BELLY PAN, INSTALLATION** or **BELLY**

PAN, ENGINE, INSTALLATION .

6. Lower the vehicle.
7. Reconnect the battery negative cable.

LAMP

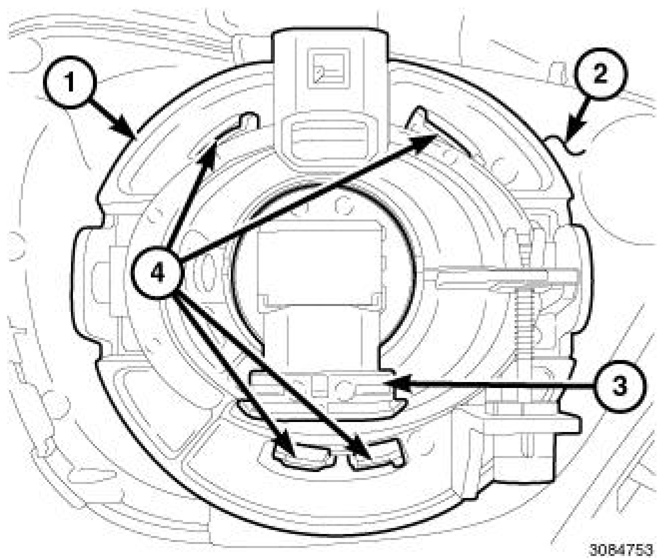


Fig. 15: Front Fascia, Connector Receptacle, Latch Features & Front Fog Lamp Mounting Ring
Courtesy of CHRYSLER GROUP, LLC

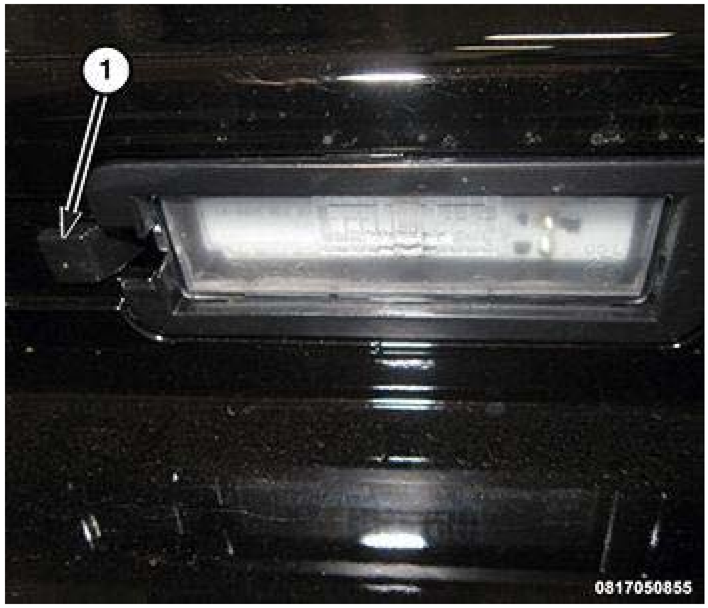
1. Reach behind the front fascia to position the front fog lamp and mounting ring unit (1) to the back of the fog lamp seat in the front fascia (2).
2. Align the four slots in the front fog lamp mounting ring with the four latch features (4) integral to the back of the fog lamp seat.
3. Press firmly and evenly on the fog lamp mounting ring until the four latch features snap into place through the mounting ring slots.
4. Reconnect the headlamp and dash wire harness connector to the front fog lamp bulb connector receptacle (3).
5. Reinstall the front belly pan to the underbody. Refer to **BELLY PAN, INSTALLATION** or **BELLY PAN, ENGINE, INSTALLATION** .
6. Lower the vehicle.
7. Reconnect the battery negative cable.
8. Confirm proper front fog lamp alignment. Refer to **STANDARD PROCEDURE**.

LAMP, LICENSE PLATE

REMOVAL

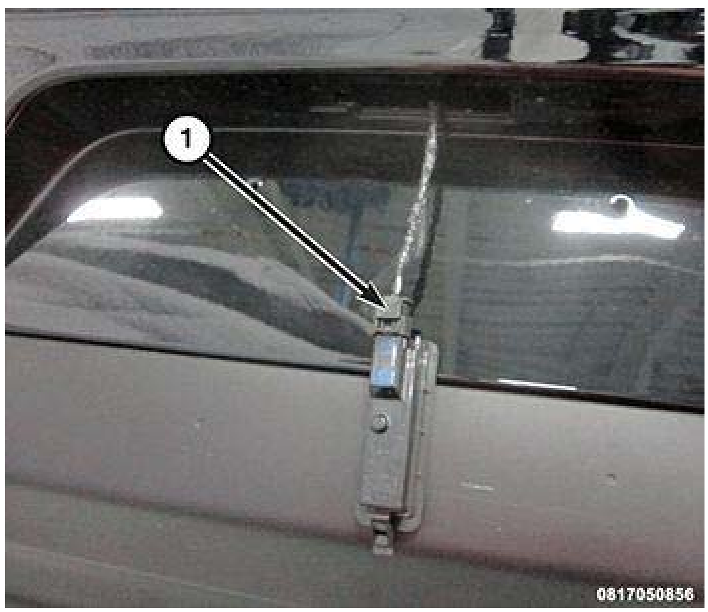
LAMP

1. Disconnect and isolate the battery negative cable.



[**Fig. 16: License Plate Lamp Release**]
Courtesy of CHRYSLER GROUP, LLC

2. Using a trim stick, release (1) the license plate lamp from the rear fascia.

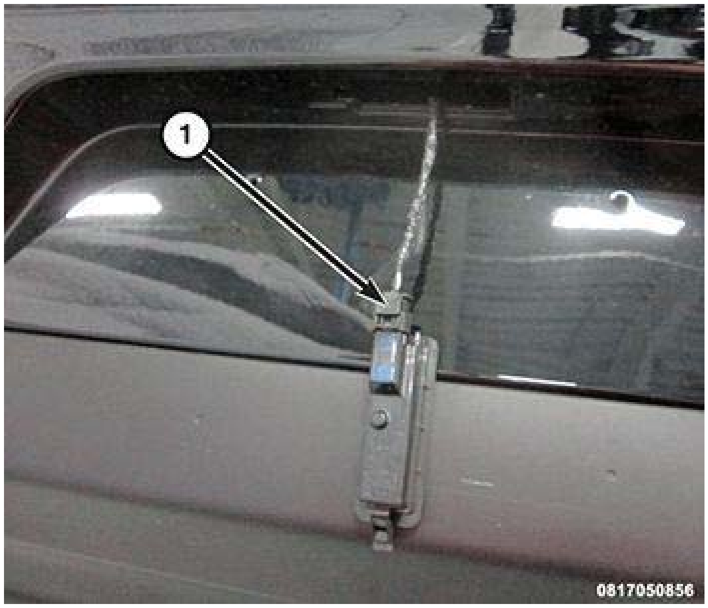


[**Fig. 17: License Plate Lamp Connector**]
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the license lamp from the wiring harness connector.

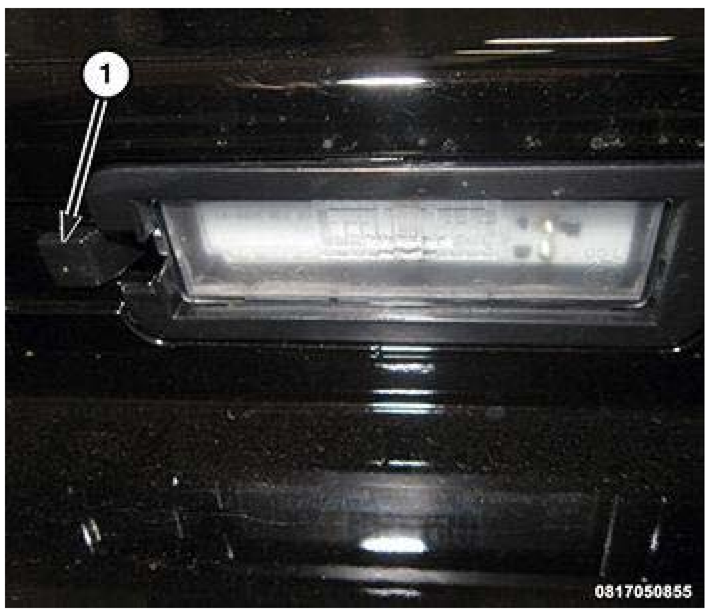
INSTALLATION

LAMP



[Fig. 18: License Plate Lamp Connector](#)
Courtesy of CHRYSLER GROUP, LLC

1. Connect the wiring harness connector (1) to the license plate lamp.



[Fig. 19: License Plate Lamp Release](#)
Courtesy of CHRYSLER GROUP, LLC

2. Insert the license plate lamp to the rear fascia until firmly seated.
3. Connect the battery negative cable.

LAMP, REAR COMBINATION

REMOVAL

INNER COMBINATION LAMP

1. Disconnect and isolate the battery negative cable.

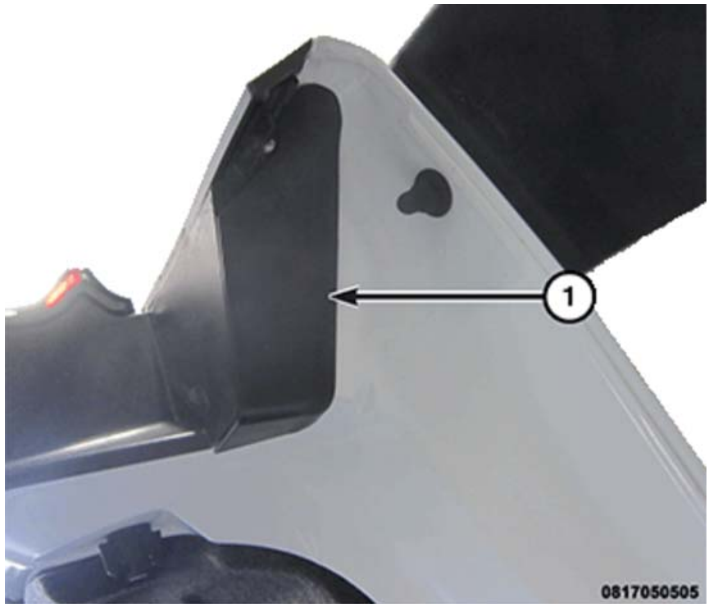
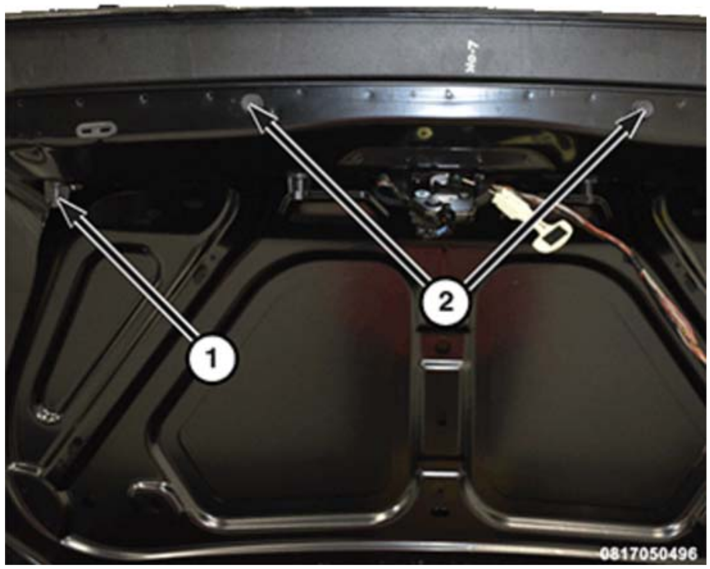


Fig. 20: Close Out Panel Cover
Courtesy of CHRYSLER GROUP, LLC

2. Open the decklid to access and remove the close out panel cover (1) on both sides on each side of the decklid.

Fig. 21: Inboard Screw
Courtesy of CHRYSLER GROUP, LLC

3. Remove the inboard screw (1) on each side of the decklid.

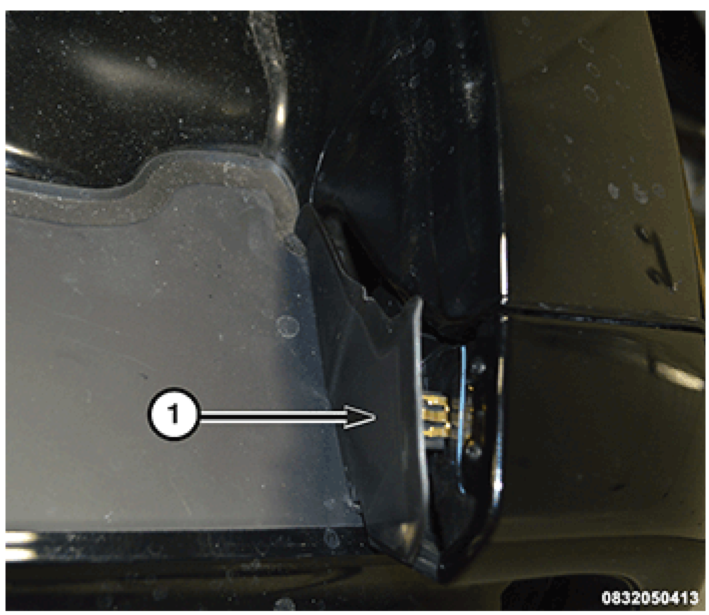


[Fig. 22: Push Pins & Plastic Wing-Nuts](#)
Courtesy of CHRYSLER GROUP, LLC

4. Remove two push pins (2) and four plastic wing-nuts (1).
5. Pull the lamp applique out far enough to disconnect the wiring harness connection.
6. Remove the lamp applique from the vehicle.

OUTER COMBINATION LAMP

1. Disconnect and isolate the negative battery cable.



[Fig. 23: Rear Quarter Close Out Trim](#)
Courtesy of CHRYSLER GROUP, LLC

2. Remove the rear quarter close out trim (1).
3. Open the deck lid and remove the inboard plastic wing-nut, then pull carpet back and remove other plastic

wing nut.

4. Disconnect the wiring harness connector (1) from the back of the combination lamp.
5. Remove the combination lamp from the vehicle.

INSTALLATION

INNER COMBINATION LAMP

1. Position the inner combination lamp to the vehicle close enough in order to the connect the wiring harness connector to the back of the assembly.

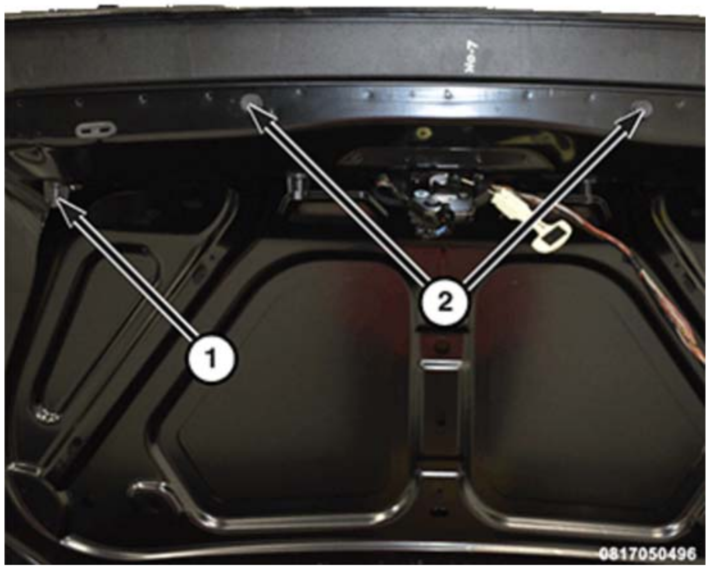


Fig. 24: Push Pins & Plastic Wing-Nuts
Courtesy of CHRYSLER GROUP, LLC

2. Install four wing-nut retainers (1) and two push pins (2) to secure the lamp to the deck lid.

Fig. 25: Inboard Screw

Courtesy of CHRYSLER GROUP, LLC

3. Install one inboard screw (1) as shown on each side.

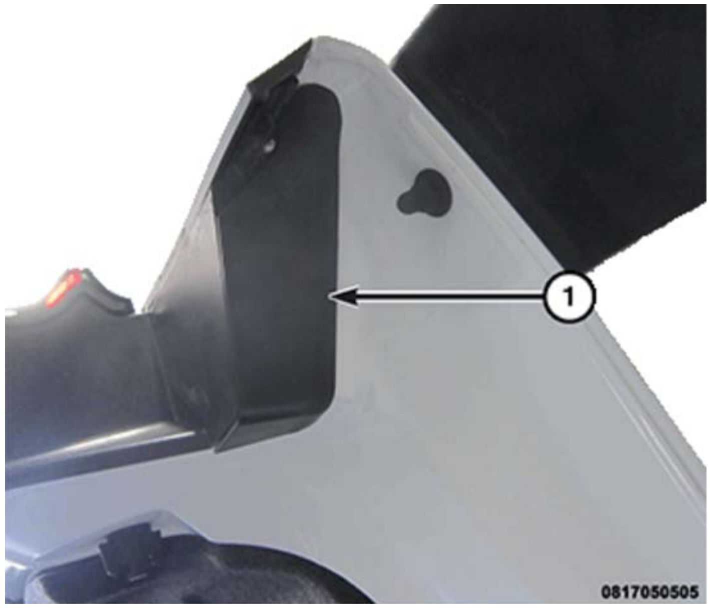


Fig. 26: Close Out Panel Cover
Courtesy of CHRYSLER GROUP, LLC

4. Install the close out panel cover on both sides of the deck lid.
5. Connect the negative battery cable.

OUTER COMBINATION LAMP

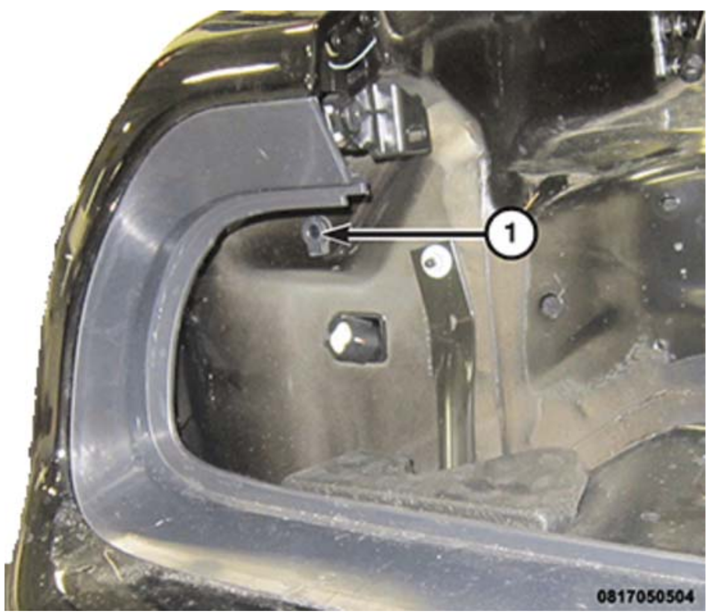


Fig. 27: Inside Trunk Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Align the ball stud on the back of the combination lamp to the lamp seat. Using hand pressure, push firmly and evenly on the outboard top and bottom of the lamp until the ball stud snaps into the grommet.

2. From the inside of the trunk, connect the wiring harness connector (1) to the back of the combination lamp.
3. From the inside of the trunk, install the one plastic wing nut that secure the studs of the tail lamp to the lamp seat.
4. Restore the trunk carpeting to cover the back side of the lamp seat and then install the one plastic wing nut that secure the studs of the tail lamp to the lamp seat.
5. Connect the negative battery cable.

SENSOR, STOP LAMP

DESCRIPTION

DESCRIPTION

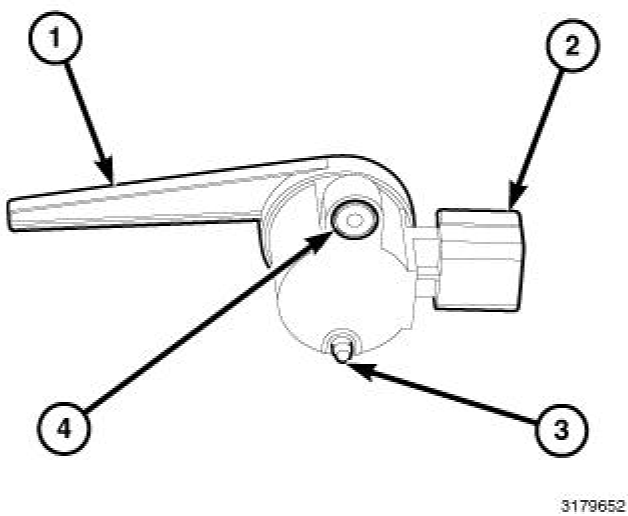


Fig. 28: Spring-Loaded Mechanical Lever Arm, Pin, Mounting Tab & Receptacle
Courtesy of CHRYSLER GROUP, LLC

The brake pedal position sensor is used in place of the brake (or stop) lamp switch in this vehicle. This sensor has a spring-loaded mechanical lever arm (1) that is actuated by a pin integral to the brake pedal arm. The sensor is secured by an integral locating pin (3) and a single screw through a metal insert in an integral mounting tab (4) to the brake pedal support bracket under the instrument panel on the driver side of the vehicle.

The molded plastic sensor housing has an integral connector receptacle (2) containing three terminal pins. The switch is connected to the vehicle electrical system through a dedicated take out of the body wire harness. A cavity in the center of the molded plastic sensor housing contains the electronic circuitry of the sensor. The sensor housing is sealed to enclose and protect the internal electronic circuitry and components.

The brake pedal position sensor cannot be repaired. If the sensor is damaged or ineffective it must be replaced with a new unit.

OPERATION

OPERATION

The brake pedal position sensor monitors changes in the brake pedal position relative to the brake pedal

mounting bracket. The sensor circuitry is energized by the Antilock Brake System (ABS) module and provides hard wired analog (potentiometer) inputs back to the ABS module. The ABS module uses the sensor inputs directly as additional logic for many of the ABS, Electronic Stability Control (ESC) and Brake Assist System (BAS) features.

The ABS module also sends electronic **brake lamp switch status** messages to other electronic modules in the vehicle over the Controller Area Network (CAN) data bus. Other electronic modules use this information as an additional logic input for controlling many other vehicle functions and features, including the Body Control Module (BCM) for control of the brake (or stop) lamps.

The hard wired circuits between the brake pedal position sensor and the ABS module may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the brake pedal position sensor or the electronic controls and communication that provide some features related to brake pedal position sensor operation. The most reliable, efficient and accurate means to diagnose the brake pedal position sensor or the electronic controls and communication related to sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

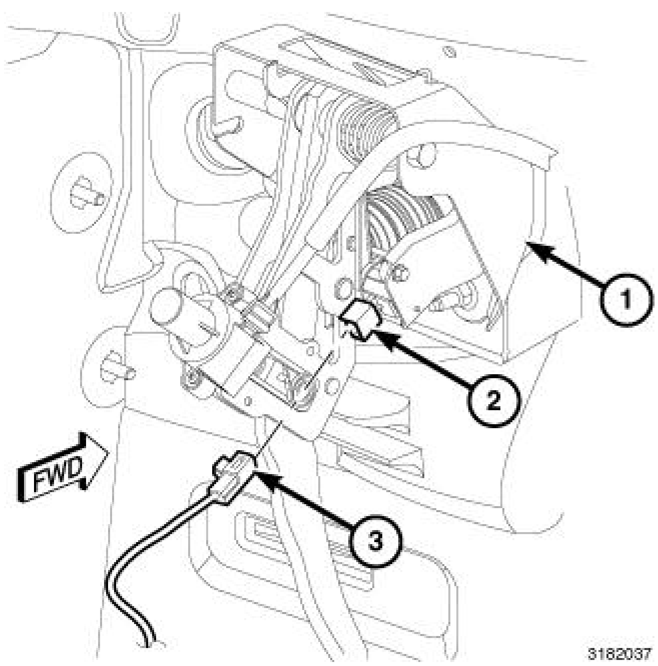


Fig. 29: Brake Pedal Position Sensor, Brake Pedal Support Bracket & Connector

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. If equipped, remove the silencer pad from below the steering column.
3. Locate the brake pedal position sensor (2) on the brake pedal support bracket (1) under the instrument panel.
4. Disconnect the body wire harness connector (3) from the sensor.

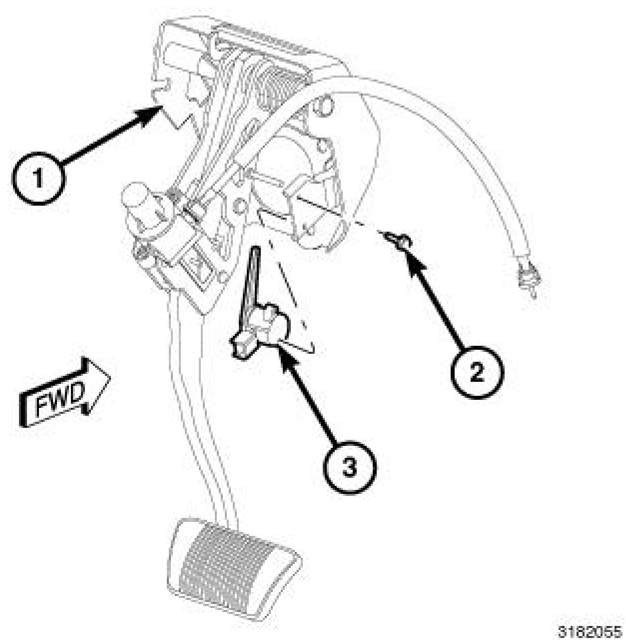


Fig. 30: Screw, Brake Pedal Position Sensor & Brake Pedal Support Bracket
Courtesy of CHRYSLER GROUP, LLC

5. Depress and hold the brake pedal in the depressed position.
6. Remove the screw (2) that secures the brake pedal position sensor (3) to the sensor bracket on the brake pedal support bracket (1).
7. Disengage the sensor locating pin from the locating hole in the sensor bracket.
8. Pull the sensor straight rearward from the pedal support bracket to remove it from the sensor bracket.
9. Release the brake pedal.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

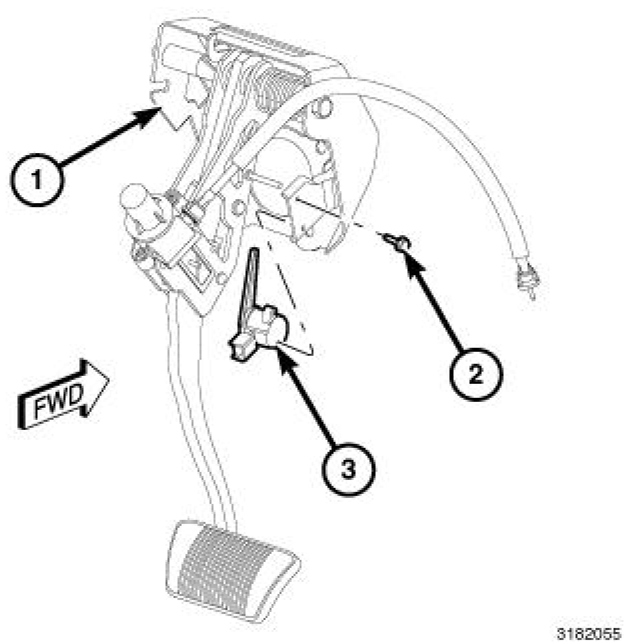


Fig. 31: Screw, Brake Pedal Position Sensor & Brake Pedal Support Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Depress and hold the brake pedal in the depressed position.
2. Position the brake pedal position sensor (3) to the sensor bracket on the brake pedal support bracket (1).
3. Engage the sensor locating pin into the locating hole in the sensor bracket.
4. Install and tighten the screw (2) that secures the sensor to the sensor bracket. Tighten the screw securely.

CAUTION: Brake booster damage may occur if the brake pedal pull exceeds about 9 kilograms (20 pounds).

5. Release the brake pedal. Then pull the pedal lightly upward to be certain the pedal is in its normal at-rest position.

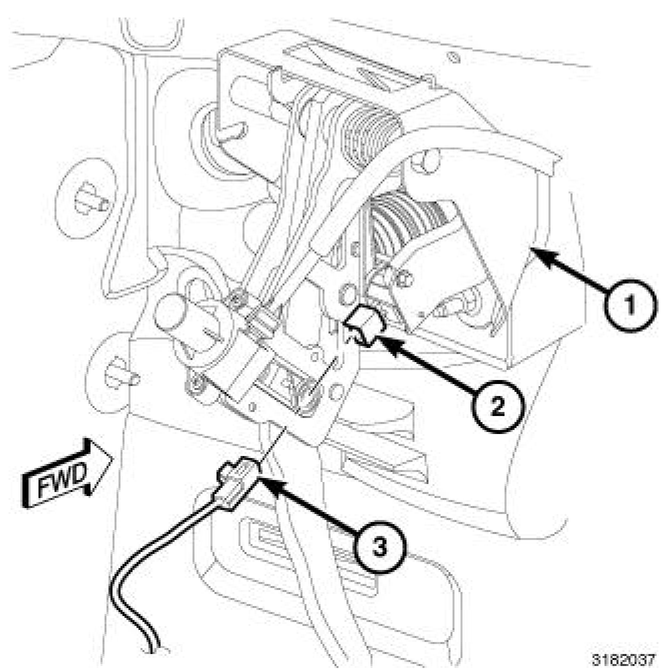


Fig. 32: Brake Pedal Position Sensor, Brake Pedal Support Bracket & Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Be certain the brake pedal position sensor is fully seated in the sensor bracket before completing the electrical connection.**

6. Reconnect the body wire harness connector (3) to the connector receptacle on the sensor (2).
7. If equipped, reinstall the silencer pad below the steering column.
8. Reconnect the battery negative cable.

NOTE: **Whenever the brake pedal position sensor is removed and reinstalled or replaced with a new unit, it is necessary for the Antilock Brake System (ABS) module to calibrate the reinstalled or the new sensor. Follow the programming steps outlined in the diagnostic scan tool for the "ABS Initialize" routine under "Miscellaneous Functions" for the "ABS Module" menu item as appropriate.**

SMART BEAM

DESCRIPTION

DESCRIPTION

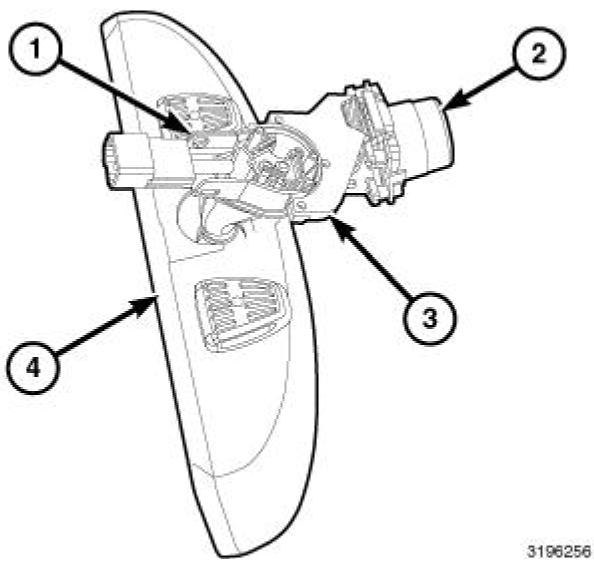


Fig. 33: Rear View Mirror, Camera Pod, Bracket
Courtesy of CHRYSLER GROUP, LLC

SmartBeamÂ® automatic high beam headlamp control is an available option on this vehicle when it is also equipped with the automatic headlamps, automatic wipers and the electrochromic inside rear view mirror (4) options. SmartBeamÂ® enhances the headlamp system of the vehicle by assisting the driver with the task of turning the headlamp high beams ON and OFF according to surrounding traffic conditions. The only visible component of SmartBeamÂ® is the camera pod (2) and the rectangular forward-facing clear lens. Because the SmartBeamÂ® camera looks through the windshield, the system may not function properly if this area of the glass is covered with ice, dirt, haze or any other obstruction.

The camera pod is secured to a bracket (3) that extends from the integral mounting bracket (1) of the

electrochromic inside rear view mirror. Within the camera pod is the circuit board and circuitry of the camera. The camera pod and bracket as well as the Light Rain Sensor Module (LRSM) (also known as the Rain Sensor Module/RSM or Light Sensor Module/LSM) are located just below the rear view mirror mounting button on the inside of the windshield glass, where they are both concealed from view within the vehicle interior behind a two piece clamshell-like mirror bracket trim cover.

The digital imager camera is aimed so as to view a predetermined area in the path directly ahead of the vehicle. If the camera is not properly aimed the system performance may be diminished or altered. For optimal system performance, the SmartBeamĀ® camera must be calibrated (aimed) by the dealer to insure that the camera aim is properly centered on the road ahead of the vehicle whenever the inside rear view mirror, the SmartBeamĀ® camera, the windshield glass or the mirror mounting button are replaced or reinstalled.

The microcontroller-based electronics of SmartBeamĀ® (also known as the Auto High Beam Module/AHBM) are integral to the circuit board contained within the electrochromic mirror. A short pigtail wire connects the camera circuit board directly to the electrochromic mirror circuit board, and a connector receptacle secured to the mount of the electrochromic mirror connects the mirror to the vehicle electrical system through a dedicated take out and connector of the overhead wire harness.

The SmartBeamĀ® is serviced as a unit with the electrochromic inside rear view mirror. If the SmartBeamĀ® camera, lens, circuitry or bracket is damaged or ineffective, the entire electrochromic inside rear view mirror must be replaced.

OPERATION

OPERATION

The SmartBeamĀ® automatic high beam control system uses digital light-sensing technology to monitor the lighting and traffic conditions in front of the vehicle. It helps improve forward visibility during nighttime driving by initiating high beam usage as ambient lighting and traffic conditions warrant. SmartBeamĀ® is also a Local Interface Network (LIN) slave node and communicates over a LIN data bus with the Body Control Module (BCM) (also known as the Common Body Controller/CBC), which is a LIN master node. The BCM is also a gateway to the Controller Area Network (CAN) data bus, which allows bus communication with other electronic modules in the vehicle and the diagnostic scan tool.

SmartBeamĀ® may be enabled or disabled by using the customer programmable features function of the EVIC and selecting or deselecting the **AUTO DIM HIGH BEAMS** feature. Then the headlamp switch control knob, located on the instrument panel, must be in the **AUTO** (Automatic) position and the high beams must be selected using the beam selector function of the multi-function switch control stalk for SmartBeamĀ® to be operational. An **AUTO HIGHBEAM ON** or **AUTO HIGHBEAM OFF** textual message will temporarily appear in the Integrated Center Stack (ICS) display to confirm the current system status.

When the SmartBeamĀ® system is enabled, ambient light levels are low enough to require the use of high beams, the vehicle is moving over 34 kilometers-per-hour (21 miles-per-hour) and no other traffic is present; SmartBeamĀ® will automatically turn the high beams ON. When the system detects the headlamps of an approaching vehicle or the tail lamps of a preceding vehicle, the high beams will automatically turn OFF. If the high beams are ON while decelerating and approaching a full stop, the system will turn them OFF automatically at below approximately 30 kilometers-per-hour (18 miles-per-hour).

SmartBeamĀ® will switch the high beams ON or OFF instantaneously. The high beam indicator in the instrument cluster will illuminate as soon as the high beams come ON, and will remain illuminated until the

high beams are OFF. SmartBeamÂ® will instantaneously turn the high beams OFF if the system detects the sudden presence of vehicle lights ahead. The vehicle operator can also override the SmartBeamÂ® selection at any time manually using the beam selection function of the multi-function switch control stalk to select the low beams, and the flash-to-pass (optical horn) feature is still functional with SmartBeamÂ®.

SmartBeamÂ® senses lighting conditions directly ahead of the vehicle. In certain situations, such as hills or winding roads, it may be more comfortable manually overriding the system because the vehicles in front may not be in the SmartBeamÂ® imaging camera field of view. However, it is not likely that your high beams will cause discomforting glare to other drivers in this situation.

SmartBeamÂ® may not function properly if its field of view is obscured. Because it looks through the windshield, the system may not function properly if this area is covered with ice, dirt, haze or any other obstruction. For optimal system performance, the lens of the imager camera must be cleaned periodically, as it may haze over due to the air quality in the vehicle passenger compartment. Spray a small amount of glass cleaner onto a soft cloth and gently clean the lens. Do not spray the glass cleaner directly onto the lens.

SmartBeamÂ® uses a red Light Emitting Diode (LED) unit to indicate certain faults it detects in the imager camera and circuitry. A slow (once-per-second) continual flashing of this LED indicates the SmartBeamÂ® camera requires aiming. A constantly (solid) illuminated LED indicates the camera has failed factory aim. The LED is located to the right of the rearward facing ElectroChromic (EC) inside rear view mirror photo sensor, behind the top center of the mirror glass. This LED is only clearly visible when it is illuminated.

The BCM will store a DTC for any SmartBeamÂ® fault that is detected. The hard wired inputs and outputs of the EC mirror may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SmartBeamÂ® unit, the EC mirror or the electronic controls or communication between modules and other devices that provide some features of the automatic high beam system. The most reliable, efficient, and accurate means to diagnose the SmartBeamÂ®, the EC mirror or the electronic controls and communication related to automatic high beam system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

STANDARD PROCEDURE

STANDARD PROCEDURE - SMART BEAM CALIBRATION

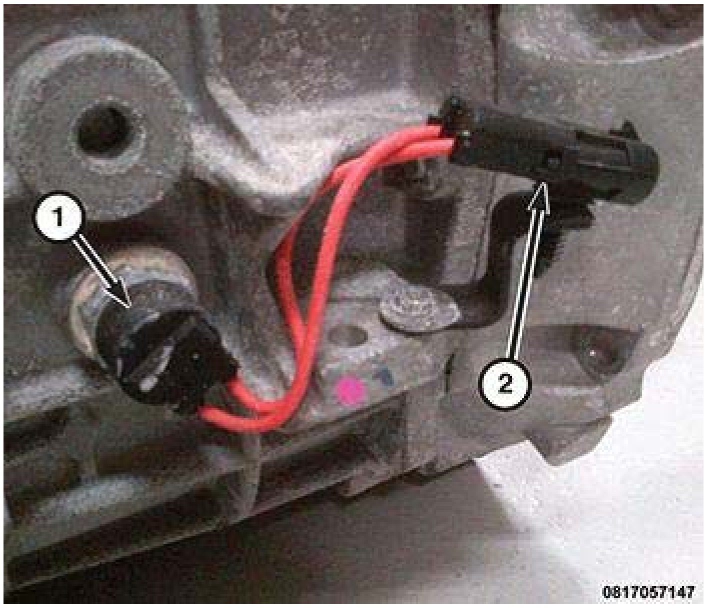
New and unused replacement SmartBeamÂ® units are shipped in calibration mode. Replace the mirror assembly if a loss of calibration is experienced.

SWITCH, BACKUP LAMP

DESCRIPTION

DESCRIPTION

Vehicles with an electronic automatic transmission have a Transmission Range Sensor (TRS) (2) that is used to perform several functions, including that of the backup lamp switch. The TRS is an integral component to the valve body assembly and is only serviced with a valve body replacement.



[Fig. 34: Back-Up Lamp Switch & Connector](#)
Courtesy of CHRYSLER GROUP, LLC

The manual transmission back-up lamp plunger style switch (1) is connected to a 3 inch wire pigtail connector (2) that clips to the side of the transmission case. The switch itself screws into the right hand side of the transmission case. It activates off of the offset lever which interacts within an area of the shift rails. When going into the reverse gate, the plunger depresses which turns on the reverse lamps.

SWITCH, HAZARD WARNING

DESCRIPTION

DESCRIPTION

[Fig. 35: Hazard Switch](#)
Courtesy of CHRYSLER GROUP, LLC

The hazard switch (2) is integral to the instrument panel switch bank (3) in the vehicle feature controls module (1) (also known as the Integrated Center Stack/ICS), which is secured to the lower instrument panel center stack just below the U-Connect Touch™ screen module. A red, stencil-like International Control and Display Symbol icon for **Hazard Warning** identifies the hazard switch button. The remainder of the hazard switch circuitry is concealed within the instrument panel switch bank.

The hazard switch button has panel lamps dimmer controlled illumination for night visibility. The switch button latches to a slightly lowered position when the hazard warning system is activated and unlatches to a position flush with the other push buttons in the switch bank when the hazard warning is deactivated.

All of the circuitry and components of the hazard switch are contained within the molded plastic vehicle feature controls module. A single connector receptacle is integral to the back of the module. The switch is connected to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness.

The hazard switch cannot be adjusted or repaired and, if ineffective or damaged, the entire instrument panel switch bank and vehicle features control module unit must be replaced.

OPERATION

OPERATION

The status of the hazard switch is continually monitored by the circuitry within the instrument panel switch bank in the Integrated Center Stack (ICS). The switch receives battery voltage at all times through a fused battery feed circuit, and a path to ground at all times through the instrument panel wire harness.

Whenever the hazard switch is in its latched and lowered position, the hazard warning system is selected and the switch bank circuitry provides a hard wired output to the Body Control Module (BCM). When the BCM receives a hazard switch input, it then controls hazard warning system operation and flash rate by controlling battery voltage outputs through high side drivers on the right and left, front and rear turn signal feed circuits.

The BCM also sends the appropriate electronic messages to the Instrument Cluster (IC) over the Controller Area Network (CAN) data bus to control the illumination and flash rate of the right and left turn signal indicators, as well as to control the click rate of an electromechanical relay soldered onto the IC electronic circuit board that emulates the sound emitted by a conventional hazard warning flasher.

The hard wired circuits for the instrument panel switch bank may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the hazard warning switch or the electronic controls and communication between other modules and devices that provide some features of the hazard warning system. The most reliable, efficient, and accurate means to diagnose the hazard switch or the electronic controls and communication related to hazard warning system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

SWITCH, HEADLAMP

DESCRIPTION

DESCRIPTION

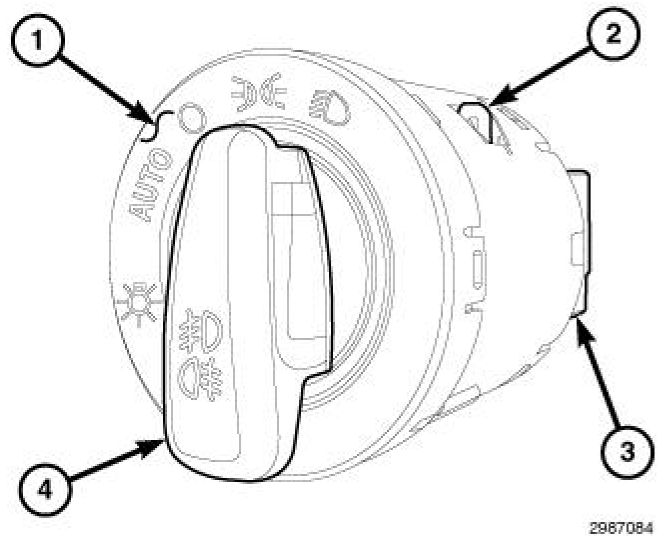


Fig. 36: Headlamp Switch, Retainers & Receptacle
Courtesy of CHRYSLER GROUP, LLC

The headlamp switch (1) is located on the instrument panel, in a cylinder-like mounting hole molded into the steering column opening cover to the left of the steering column. Several different switches are used, depending upon equipment and market requirements. The standard switch features a three-position rotary knob (4) for exterior lighting control. An optional switch has a fourth position added to the rotary knob for automatic headlamps and a momentary PUSH function added to the rotary knob for front fog lamp control.

Each of these switches is constructed of molded plastic. On vehicles with optional fog lamps the rotary knob also has the International Control and Display Symbol icon for **Front Fog Light** applied to it. The switch face plate is also labeled with graphics and icons to clearly identify the many functions of the rotary knob.

The switch housing is secured within the mounting hole of the instrument panel bezel by two spring loaded, pivoting pawl-like retainers (2), one near the bottom and another near the top. These pawls can be retracted for removal of the switch from the face of the instrument panel using a specific rotary knob actuation sequence. Refer to **SWITCH, HEADLAMP, REMOVAL**.

The back of the switch housing has an integral connector receptacle (3) containing terminal pins that connect the switch to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness. A panel dimmer controlled Light Emitting Diode (LED) unit soldered to the circuit board within the switch provides back lighting for visibility at night, but is not serviceable.

The headlamp switch cannot be repaired and, if ineffective or damaged, it must be replaced.

OPERATION

OPERATION

The headlamp switch uses a single resistor multiplexed output to control the many functions and features it provides. The switch receives a clean ground from the Body Control Module (BCM) on a headlamp switch MUltipleX (MUX) return circuit. The BCM then reads the switch outputs using an internal pull up on the headlamp/fog lamp switch signal circuit to control the exterior lighting functions.

The switch illumination circuit receives a path to ground at all times through an instrument panel ground circuit.

The illumination level is controlled by a Pulse-Width Modulated (PWM) output received from the BCM on a panel lamps driver circuit. The BCM controls this output based upon the panel lamps dimmer signal circuit input from the interior lighting thumbwheel switch in the dimmer module. Refer to **SWITCH, DIMMER, OPERATION** .

The headlamp switch operates as follows:

- **Exterior Lighting Control** - The rotary knob on the headlamp switch is rotated to a detent position to activate or deactivate the exterior lighting. The headlamp switch provides the appropriate resistor multiplexed output to the BCM over the headlamp/fog lamp switch signal circuit, and the BCM responds by energizing or de-energizing the right and left park lamp feed circuits and the right and left high or low beam driver circuits through internal HSDs and by sending an electronic confirmation message to the IC over the CAN data bus, which controls the high beam indicator as appropriate. The BCM also remembers which headlamp beams were last selected with the lamp switch, and energizes those beams by default the next time the headlamps are turned ON. If the vehicle is equipped with optional automatic headlamps and the AUTO (Automatic) position is selected, the BCM monitors an electronic ambient light level message received over the Local Interface Network (LIN) data bus from the Light Rain Sensor Module (LRSM) to turn the exterior lighting ON and OFF automatically while the ignition switch status is ON. If vehicle is not equipped with a RLSM,/LSM/RSM but is equipped with auto head lamps, the BCM also monitors for an electronic ambient light level message received over the CAN data bus from the air conditioner - heater control module based upon a hard wired input from the sun sensor.
- **Fog Lamps Control** - For vehicles so equipped, the rotary knob on the headlamp switch is depressed to activate or deactivate the optional fog lamps. If the vehicle is equipped with both front and rear fog lamps, the rotary knob is depressed once to activate only the front fog lamps, a second time to activate the rear fog lamps, a third time to deactivate the rear fog lamps and a fourth time to deactivate the front fog lamps. The rear fog lamps can only be illuminated in combination with the front fog lamps. The headlamp switch provides the appropriate resistor multiplexed output to the BCM over the headlamp/fog lamp switch signal circuit, and the BCM reads and responds to this input by energizing or de-energizing the right and left front and rear fog lamp control circuits through internal HSDs and by sending an electronic confirmation message to the Instrument Cluster (IC) over the Controller Area Network (CAN) data bus, which controls the front and rear fog lamp indicators as appropriate.

The headlamp switch as well as the hard wired inputs and outputs of the switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HEADLAMP SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

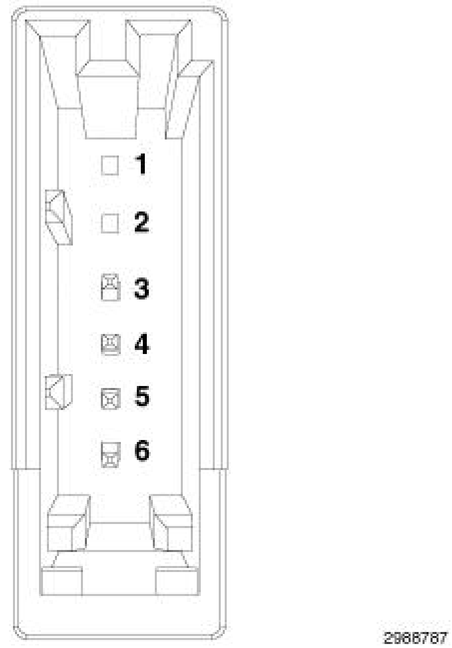


Fig. 37: Terminals Of The Switch
Courtesy of CHRYSLER GROUP, LLC

1. Remove the headlamp switch from the instrument panel. Refer to **SWITCH, HEADLAMP, REMOVAL**.
2. Disconnect the instrument panel wire harness connector from the back of the headlamp switch.
3. Using an ohmmeter, test the resistance between the terminals of the switch as shown in the HEADLAMP SWITCH TESTS TABLE.

HEADLAMP SWITCH TESTS	
SWITCH POSITION (PINS)	***RESISTANCE RANGE (OHMS)**
AUTO (3 and 6)	4028.0 - 4452.0
OFF (3 and 6)	1938.0 - 2142.0
PARK (3 and 6)	1073.5 - 1186.5
HEADLAMP (3 and 6)	627.0 - 693.0
FOG LAMP - AUTO (3 and 6)	347.2 - 383.8
FOG LAMP - OFF (3 and 6)	317.7 - 351.1
FOG LAMP - PARK (3 and 6)	280.6 - 310.1
FOG LAMP - HEADLAMP (3 and 6)	236.6 - 261.5
SWITCH ILLUMINATION (4 and 5)	LEDs - SET MULTIMETER TO DIODE MODE - CONNECT PIN 4 TO PLUS (+), CONNECT PIN 5 TO MINUS (-) - LEDs SHOULD BARELY GLOW
*All resistance values are plus or minus 5%.	

4. If the switch fails any of the tests, replace the ineffective headlamp switch as required.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

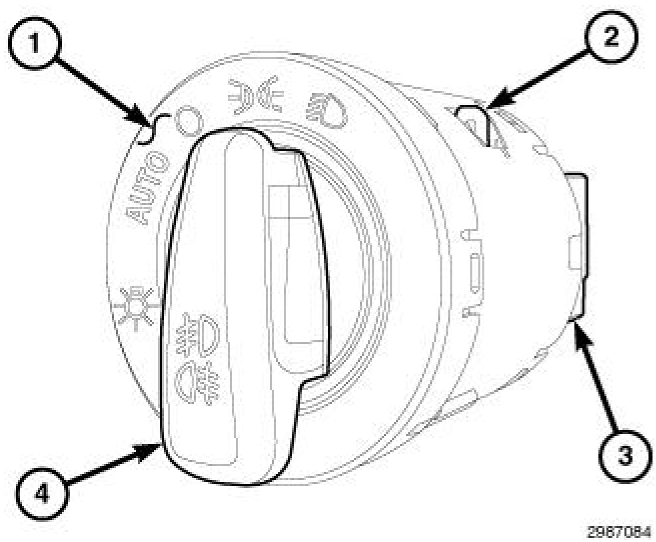


Fig. 38: Headlamp Switch, Retainers & Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Place the headlamp switch (1) rotary knob (4) in the OFF (**O**) position.
3. Push in on the rotary knob to engage the switch retainer (2) retractor mechanism.
4. Still holding the switch rotary knob depressed, rotate the knob clockwise toward the park lamps ON position to retract the two switch retainers. The retainers will be fully retracted before the rotary knob actually reaches the park lamps ON position.
5. With the switch rotary knob still in the retainer retractor position, pull the switch out of the cylinder-like mounting hole far enough to access and disconnect the instrument panel wire harness connector from the connector receptacle (3) on the back of the switch housing.
6. Remove the headlamp switch from the instrument panel steering column opening cover.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further

diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

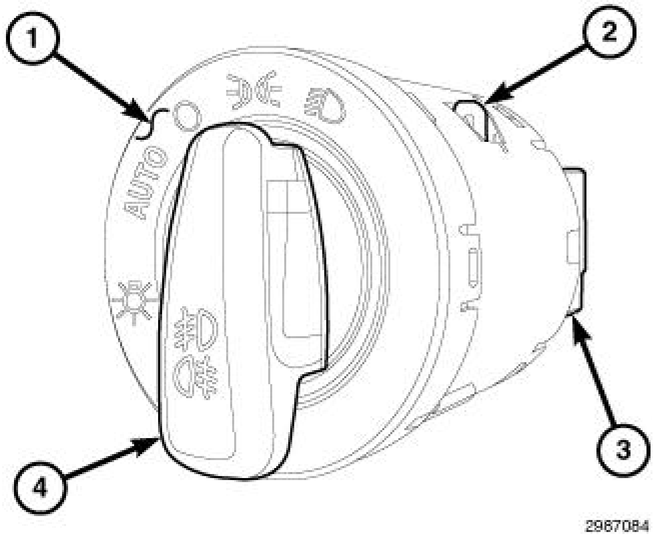


Fig. 39: Headlamp Switch, Retainers & Receptacle
Courtesy of CHRYSLER GROUP, LLC

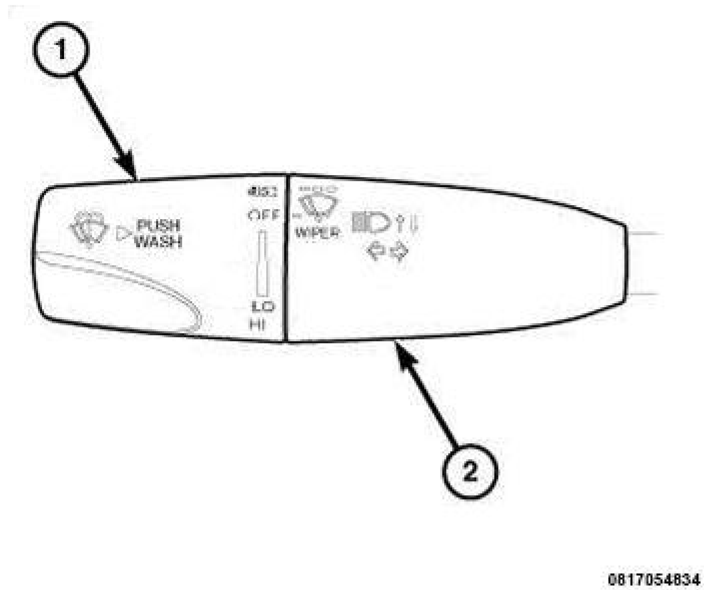
NOTE: **Before attempting to install the headlamp switch (1), be certain that both pawl-like retainers (2) are extended outward from the body of the switch. If the retainers are in the retracted position, rotating the headlamp switch rotary knob (4) to the OFF (O) position should disengage the retainer retractor mechanism causing the retainers to spring outward from the switch body.**

1. Position the headlamp switch (1) close enough to the cylinder-like switch mounting hole in the instrument panel steering column opening cover to reconnect the instrument panel wire harness connector to the connector receptacle (3) on the back of the switch housing.
2. Position and align the switch in the center of the switch mounting hole of the steering column opening cover on the instrument panel.
3. Using hand pressure, press the switch firmly and evenly into the mounting hole until it is fully seated. An indication that the switch is fully seated will be a light audible click as each of the two pawl-like retainers (2) snap into place within the mounting hole.
4. Reconnect the battery negative cable.

SWITCH, MULTIFUNCTION

DESCRIPTION

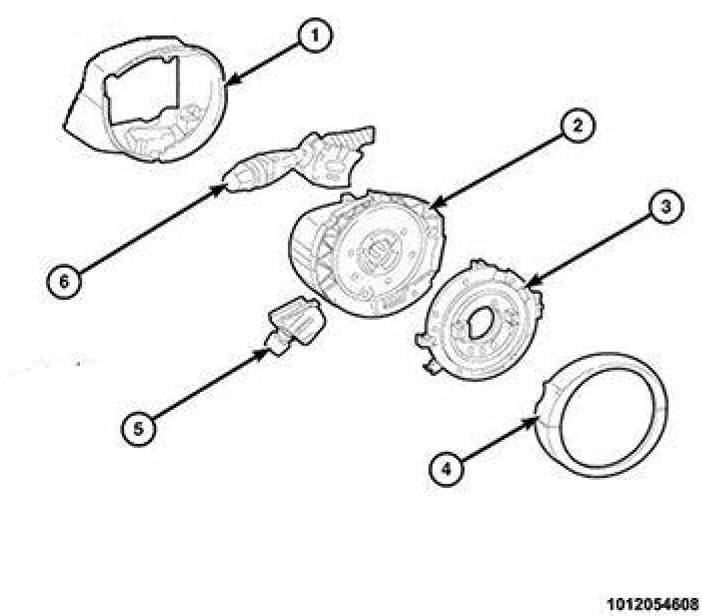
DESCRIPTION



[Fig. 40: Control Stalk & Knob](#)
Courtesy of CHRYSLER GROUP, LLC

The multi-function switch is located on the left side of the steering column, just below the steering wheel. This switch is the primary control for the front wiper and washer systems, the turn signals and headlamp beam selection. The only visible components of the switch are the control stalk (2) and control knob (1) that extend through the steering column shrouds on the left side of the column. The remainder of the switch including its mounting provisions, its electrical connections and the turn signal cancel actuator are concealed beneath the shrouds.

The switch housing and controls are constructed of molded black plastic. Each of the switch controls has white International Control and Display Symbol graphics applied to it, which clearly identify its many functions. The multi-function switch for this vehicle is integral to the Steering Column Control Module (SCCM).



[Fig. 41: Exploded View Of Steering Column Control Module](#)
Courtesy of CHRYSLER GROUP, LLC

The SCCM is located near the top of the steering column below the steering wheel. The SCCM includes the steering column shroud (1), the Steering Angle Sensor (SAS) (2), the clockspring (3), the multi-function switch (6), a steering column power tilt and telescope switch (5) for vehicles so equipped, a trim cover (4) and the SCCM microcontroller. The SCCM includes an integral connector receptacle that faces toward the instrument panel and is connected to the vehicle electrical system through a single take out and connector of the instrument panel wire harness.

The multi-function switch provides the vehicle operator with a control interface for the following functions:

- **Front Washer Control** - The multi-function switch control knob provides a momentary WASH position for washer system operation.
- **Front Wiper Control** - The multi-function switch control knob provides detent switching for two continuous wipe switch positions, LO speed or HI speed, and an intermittent wipe mode with four delay interval positions. The four delay positions become four sensitivity positions for vehicles equipped with the optional automatic wiper system. The control knob also has a momentary MIST or pulse wipe feature switch position.
- **Headlamp Beam Selection** - The multi-function switch control stalk provides detent switching for selection of the headlamp HIGH or LOW beams.
- **Headlamp Optical Horn** - The multi-function switch control stalk includes momentary switching of the headlamp high beam circuits to provide an optical horn feature (sometimes referred to as flash-to-pass), which allows the vehicle operator to momentarily flash the headlamp high beams as an optical signalling device.
- **Turn Signal Control** - The multi-function switch control stalk provides both momentary non-detent (lane change) switching or detent switching with automatic cancellation for both the left and right turn signals.

The multi-function switch cannot be adjusted or repaired. If any function of the switch is ineffective, or if the switch is damaged, the entire SCCM unit must be replaced.

OPERATION

OPERATION

The multi-function switch uses resistor multiplexing to control the many functions and features it provides using a minimal number of hard wired circuits. The switch receives clean grounds from the Steering Column Control Module (SCCM) microcontroller internal to the SCCM, then provides resistor multiplexed return outputs to the SCCM to indicate the selected switch positions. The SCCM then sends electronic **switch status** messages over the Controller Area Network (CAN) data bus to the Body Control Module (BCM) and to other electronic modules in the vehicle.

If the SCCM microcontroller detects no inputs from the multi-function switch, it transmits an electronic **Signal Not Available (SNA)** status message over the CAN data bus. The SNA status signals other electronic modules to implement a fail-safe or default mode of operation. For the exterior lighting system, the multi-function switch fail-safe mode automatically selects LOW beams when the headlamps are turned ON. For the wiper system, the multi-function switch fail-safe mode will maintain the last selected wiper system operation for the remainder of the current ignition cycle, after which the wiper system will default to OFF.

Some of the hard wired inputs and outputs of the SCCM and multi-function switch unit may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, the most

reliable, efficient and accurate means to diagnose the SCCM, the SCCM microcontroller and the multi-function switch requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

Following are descriptions of how the multi-function switch is operated to control the functions and features it provides:

- **Front Washer Control** - The control knob on the end of the multi-function switch control stalk is depressed toward the steering column to the momentary WASH detent position to activate the washer pump/motor in the FRONT WASH mode. The washer pump/motor will continue to operate for as long as the control knob is held in this position. The SCCM microcontroller reads the resistor multiplexed input from the multi-function switch and sends an electronic **front washer switch status** message over the CAN data bus to the BCM and to other electronic modules in the vehicle.
- **Front Wiper Control** - The control knob on the end of the multi-function switch control stalk is rotated to one of the two continuous wiper detents (LO or HI), to one of four intermittent delay or sensitivity wiper detents, or to the OFF position to select the FRONT WIPER mode. The SCCM microcontroller reads the resistor multiplexed input from the multi-function switch and sends electronic **front wiper switch status** messages over the CAN data bus to the BCM and to other electronic modules in the vehicle.
- **Front Wiper Mist Mode** - The control knob on the end of the multi-function switch control stalk is rotated to the momentary MIST position to activate the wiper MIST mode. The wiper motor will continue to operate, one complete cycle at a time, for as long as the control knob is held in this position. The SCCM microcontroller reads the resistor multiplexed input from the multi-function switch and sends an electronic **front wiper switch status** message over the CAN data bus to the BCM and to other electronic modules in the vehicle.
- **Headlamp Beam Selection** - The headlamp high beams are selected when the multi-function switch control stalk is pushed forward to the high beam selection detent position. The low beams are selected when the control stalk is pulled rearward to the low beam selection detent position. The SCCM microcontroller reads the resistor multiplexed input from the multi-function switch and sends an electronic **beam select switch status** message over the CAN data bus to the BCM and to other electronic modules in the vehicle.
- **Headlamp Optical Horn** - The headlamp optical horn is selected each time the multi-function switch control stalk is pulled fully rearward to a momentary position. The headlamp HIGH beams will remain illuminated for as long as the control stalk is held in this momentary position and the LOW beams will be restored when the control stalk is released. The SCCM microcontroller reads the resistor multiplexed input from the multi-function switch and sends an electronic **beam select switch status** message over the CAN data bus to the BCM and to other electronic modules in the vehicle.
- **Turn Signal Control** - The turn signals are requested when the multi-function switch control stalk is moved downward (LEFT signal) or upward (RIGHT signal). The control stalk has a detent position in each direction that provides turn signals with automatic cancellation, and an intermediate, momentary position in each direction that automatically provides three turn signal blinks as a LANE CHANGE feature when the control stalk is tapped or will energize the turn signals for as long as the control stalk is held in the momentary position. When the control stalk is moved to a detent turn signal switch position, a cancel actuator extends from the multi-function switch housing through an opening in the side of the clockspring case toward the center of the steering column. A turn signal cancel cam that is integral to the clockspring rotor rotates with the steering wheel and the cam lobes contact the cancel actuator when it is extended from the multi-function switch. When the steering wheel is rotated during a turning maneuver, one of the turn signal cancel cam lobes will contact the turn signal cancel actuator. The cancel actuator

latches against the cancel cam rotation in the direction opposite that which is signaled. If the LEFT turn signal detent is selected, the lobes of the cancel cam will ratchet past the cancel actuator when the steering wheel is rotated to the left, but will unlatch the cancel actuator as the steering wheel rotates to the right and returns to center, which will cancel the turn signal event and release the control stalk from the detent so it returns to the neutral OFF position. The SCCM microcontroller reads the resistor multiplexed input from the multi-function switch and sends an electronic **turn signal switch status** message over the CAN data bus to the BCM and to other electronic modules in the vehicle.

REMOVAL

REMOVAL

NOTE: **The multi-function switch for this vehicle is integral to the Steering Column Control Module (SCCM). If any function of the switch is ineffective, or if the switch is damaged, the entire SCCM unit must be replaced. Refer to MODULE, STEERING COLUMN CONTROL, REMOVAL .**

INSTALLATION

INSTALLATION

NOTE: **The multi-function switch for this vehicle is integral to the Steering Column Control Module (SCCM). If any function of the switch is ineffective, or if the switch is damaged, the entire SCCM unit must be replaced. Refer to MODULE, STEERING COLUMN CONTROL, INSTALLATION .**

SWITCH, PARKING BRAKE

DESCRIPTION

DESCRIPTION

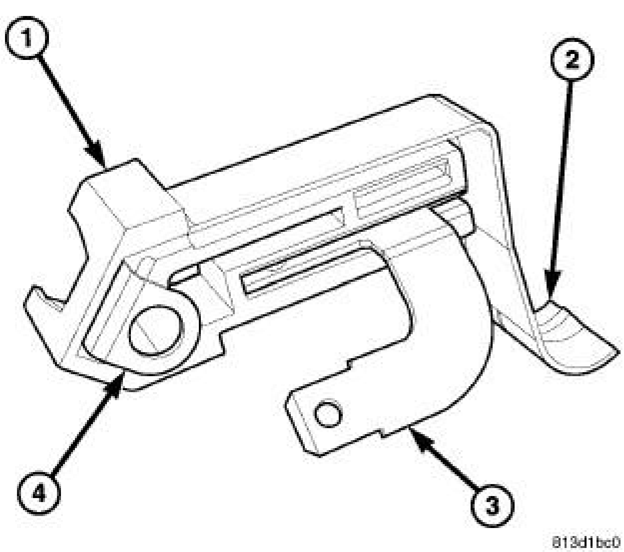


Fig. 42: Identifying Park Brake Switch
Courtesy of CHRYSLER GROUP, LLC

The park brake switch (1) is located on the park brake lever mechanism on the left cowl side inner panel below the instrument panel, outboard of the steering column. This switch includes a spade-type output terminal (3) that connects the switch to the vehicle electrical system through a dedicated take out and connector of the body wire harness. The output terminal is integral to the stationary contact within a molded plastic insulator.

A locating tab on the insulator engages a slot in the park brake lever mechanism for positive switch location. External to the insulator is a movable leaf contact with an integral grounding lug (4) on one end and an integral actuating lever and follower (2) on the opposite end. The switch is secured to and grounded by a single screw to the park brake lever mechanism.

The park brake switch cannot be adjusted or repaired and, if ineffective or damaged, it must be replaced.

OPERATION

OPERATION

The park brake switch is a normally closed, mechanically actuated leaf contact switch that is operated by the park brake lever mechanism. The switch is grounded through its mounting to the park brake lever mechanism and provides a ground input to the Instrument Cluster (IC) on a park brake switch sense circuit whenever the park brake is applied, and opens this circuit whenever the park brake is released. The park brake switch sense input to the IC is used as an additional logic input by the IC for control of the brake indicator and may also be used as a logic input for other electronic features in the vehicle.

The park brake switch as well as the hard wired inputs and outputs of the switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between other modules and devices that rely upon inputs from the park brake switch. The most reliable, efficient, and accurate means to diagnose the electronic controls and communication related to park brake switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - PARKING BRAKE SWITCH

WARNING:	**To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**
NOTE:	**If the brake indicator stays ON with the ignition switch in the ON position and the park brake released, or comes ON while driving, the brake system must be diagnosed and repaired prior to performing the following tests. If no brake system problem is found, the following procedures will help to locate a shorted or open park brake switch sense circuit, or an ineffective park brake switch.**

INDICATOR ILLUMINATES DURING BULB TEST, BUT DOES NOT WHEN PARK BRAKE APPLIED

1. Disconnect and isolate the battery negative cable. Disconnect the body wire harness connector for the park brake switch from the switch terminal. Apply the parking brake. Check for continuity between the park brake switch terminal and a good ground. There should be continuity. If OK, go to 2. If not OK, replace the ineffective park brake switch.
2. Disconnect the instrument panel wire harness connector for the Instrument Cluster (IC) from the cluster connector receptacle. Check for continuity between the park brake switch sense circuit cavities of the body wire harness connector for the park brake switch and the instrument panel wire harness connector for the IC. There should be continuity. If not OK, repair the open park brake switch sense circuit between the park brake switch and the IC as required.

INDICATOR REMAINS ILLUMINATED - BRAKE SYSTEM CHECKS OKAY

1. Disconnect and isolate the battery negative cable. Disconnect the body wire harness connector for the park brake switch from the switch terminal. Check for continuity between the terminal of the park brake switch and a good ground. There should be no continuity with the park brake released, and continuity with the park brake applied. If OK, go to 2. If not OK, replace the ineffective park brake switch.
2. Disconnect the instrument panel wire harness connector for the IC from the cluster connector receptacle. Check for continuity between the park brake switch sense circuit cavity of the body wire harness connector for the park brake switch and a good ground. There should be no continuity. If not OK, repair the shorted park brake switch sense circuit between the park brake switch and the IC as required.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

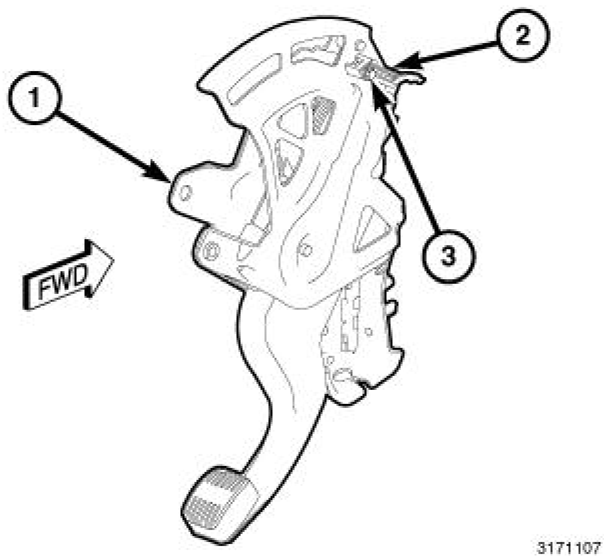


Fig. 43: Park Brake Switch, Park Brake Lever Mechanism & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Apply the parking brake.
3. Reach under the left end of the instrument panel to access and disconnect the body wire harness connector from the terminal of the park brake switch (2) located on the park brake lever mechanism (1) on the left cowl side inner panel.
4. Remove the screw (3) that secures the park brake switch to the park brake lever mechanism.
5. Remove the switch from the park brake lever mechanism.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

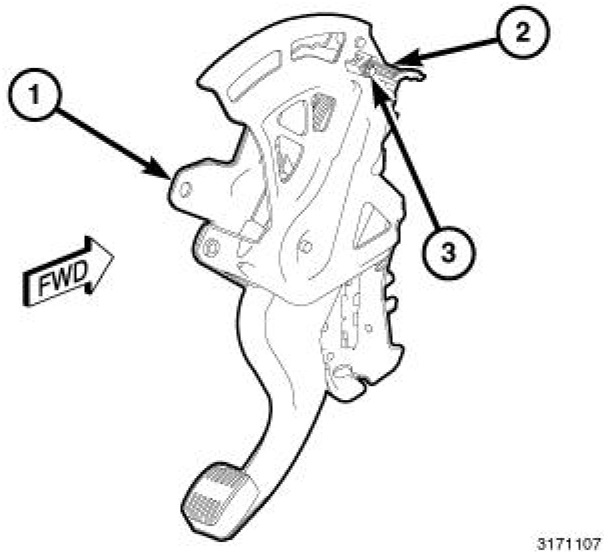


Fig. 44: Park Brake Switch, Park Brake Lever Mechanism & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Reach under the left end of the instrument panel to position the park brake switch (2) onto the park brake lever mechanism (1) on the left cowl side inner panel. Be certain to engage the locating pin on the back of the switch insulator into the locating slot in the lever mechanism bracket.
2. Install and tighten the screw (3) that secures the park brake switch to the park brake lever mechanism. Tighten the screw securely.
3. Reconnect the body wire harness connector to the terminal of the park brake switch.
4. Reconnect the battery negative cable.
5. Turn the ignition switch to the ON position and check for proper brake indicator operation with the parking brake applied, then release the parking brake and check that the brake indicator extinguishes.

UNIT, FRONT LAMP

STANDARD PROCEDURE

LAMP LENS DEFOGGING

Some customers may report that on occasion, vehicle exterior lamp assemblies are fogged with a light layer of condensation on the inside of the lenses. This may be reported after the lamps have been turned on and brought up to operating temperature, turned off, and then rapidly cooled by cold water (such as rain, or the water from a car wash). Lens fogging can also occur under certain atmospheric conditions after a vehicle has been parked outside overnight (i.e., a warm humid day followed by clear cool night). This will usually clear as atmospheric conditions change to allow the condensation to change back into a vapor. Turning the lamps on will usually accelerate this process.

A lamp that exhibits condensation/fogging should be evaluated in a service bay environment by first drying all water from the outside surface of the lens and operating the lamp for 20 minutes. If the condensation/fogging has begun to clear from the lamp lens after 20 minutes with the lamps operating, this indicates the lamp sealing has not been breached, and the lamp does not need to be replaced.

If the condensation/fogging has not begun to clear after 20 minutes with the lamps operating, or the lamp has

large amounts of water droplets visible on most internal surfaces, this indicates a problem with the lamp sealing that has allowed water to enter the lamp. In this instance, the customer is also likely to report that moisture in the lamp is always present and never disappears. A lamp that exhibits internal moisture permanently should be replaced.

REMOVAL

HEADLAMP

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

1. Disconnect and isolate the battery negative cable.
2. Remove the front fascia from the vehicle. Refer to **FASCIA, FRONT, REMOVAL** .

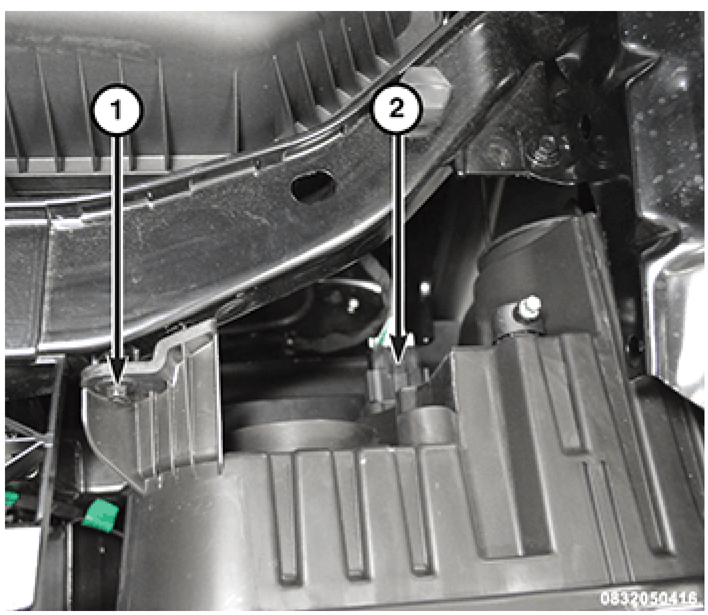


Fig. 45: Upper Screw & Wire Harness Connection
Courtesy of CHRYSLER GROUP, LLC

3. Remove the upper screw (1) securing the front lamp unit to the mounting bracket of the FEM support

structure.

4. Disconnect the wire harness connection (2) on the back of the lamp housing.

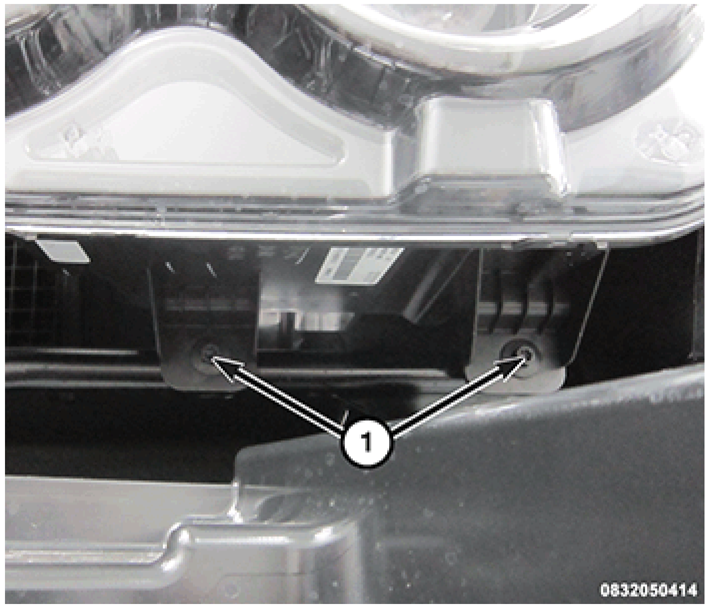


Fig. 46: Front Lamp Unit Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the two lower bolts securing the front lamp unit.
6. Remove the front lamp unit from the vehicle.

HEADLAMP BULB

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

1. Disconnect and isolate the battery negative cable.
2. Loosen the front wheel house splash shield on the side needed to access the lamp assembly. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .

Fig. 47: Headlamp Bulb Access Cover
Courtesy of CHRYSLER GROUP, LLC

3. Firmly grasp the headlamp bulb access cover (1) on the outboard back of the front lamp unit housing and rotate it counterclockwise about 30 degrees to unlock it.
4. Remove the access cover from the lamp housing.
5. Firmly grasp the bulb base on the back of the projector within the front lamp unit housing and rotate it counterclockwise about 30 degrees to unlock it.
6. Pull the bulb and base straight out from the keyed opening in the projector.

NOTE: **Take care to prevent the wire harness and connector from falling back into the headlamp housing after disconnecting it from the headlamp bulb.**

7. Disconnect the front lamp unit wire harness connector from the bulb connector receptacle.
8. Remove the bulb from the back of the front lamp unit.

HIGH INTENSITY DISCHARGE (HID) LIGHTING ELEMENT

WARNING: **To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and**

protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

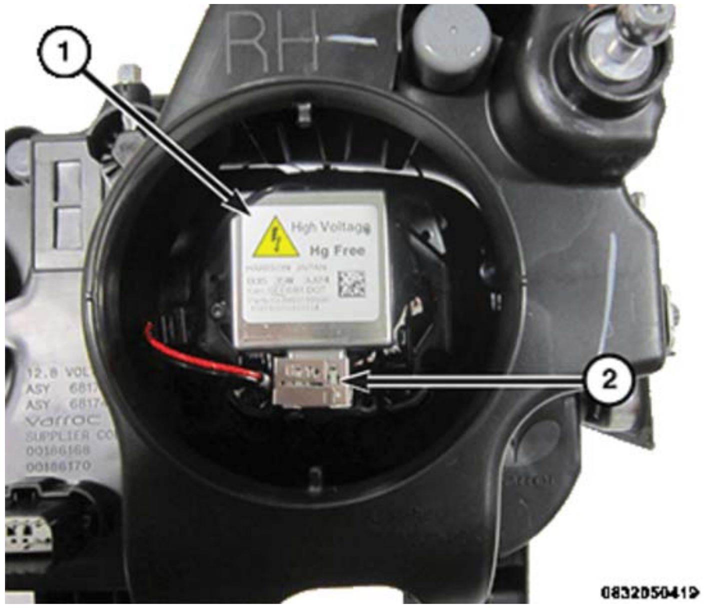
CAUTION: **Do not contaminate the lighting element glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened lighting element life will result.**

1. Disconnect and isolate the battery negative battery cable.
2. Loosen the front wheel house splash shield on the side needed to access the lamp assembly. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .

Fig. 48: Headlamp Bulb Access Cover
Courtesy of CHRYSLER GROUP, LLC

3. Firmly grasp the High Intensity Discharge (HID) igniter and lighting element access cover (1) on the outboard back of the front lamp unit housing and rotate it counterclockwise about 30 degrees to unlock it.
4. Remove the access cover from the lamp housing.

NOTE: **Take care to prevent the high tension cable from falling back into the lamp housing after disconnecting it from the HID igniter.**



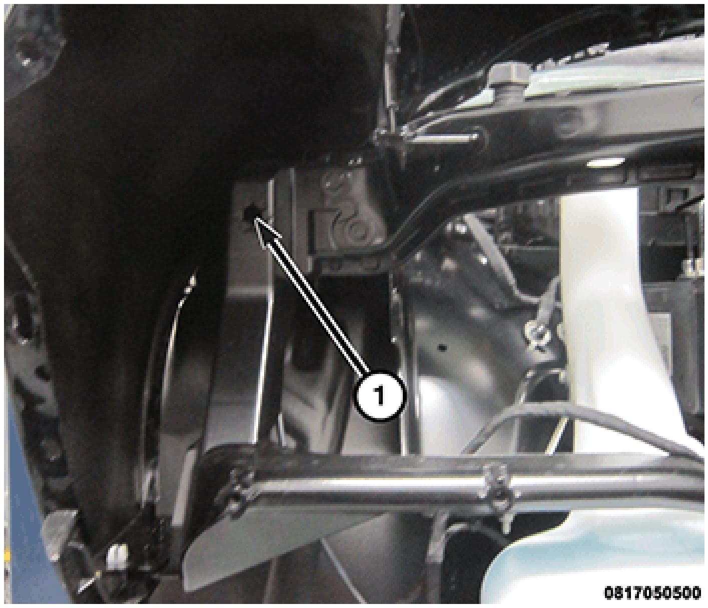
[Fig. 49: High Tension Cable Connector & HID Igniter](#)
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the high tension cable wire harness connector (2) from the HID igniter (1) connector receptacle.
6. Pull the HID igniter and lighting element straight out from the keyed opening in the projector.
7. Remove the igniter and lighting element from the back of the front lamp unit.

INSTALLATION

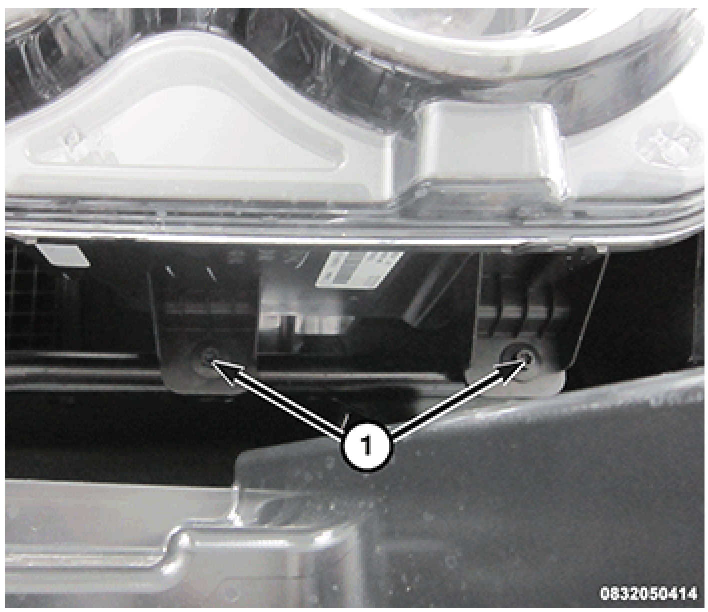
HEADLAMP

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.



[Fig. 50: FEM Guide Pin Hole & Lamp]
Courtesy of CHRYSLER GROUP, LLC

1. Position the lamp (2) to the lamp housing of the FEM. Line up the headlamp guide pin with the FEM guide pin hole (1) and seat the headlamp for lower bolt installation.



[Fig. 51: Front Lamp Unit Screws]
Courtesy of CHRYSLER GROUP, LLC

2. Install and tighten the two screws (1) that secure the lower a mounting brackets to the lamp housing of the FEM.

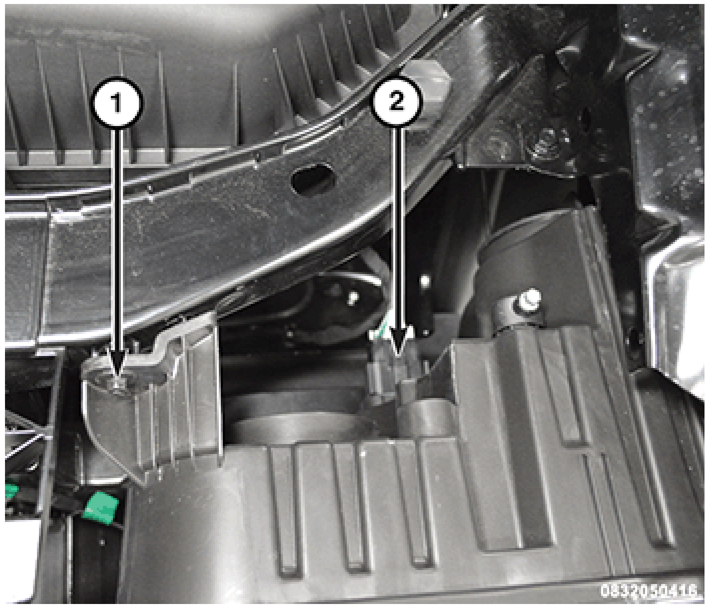


Fig. 52: Upper Screw & Wire Harness Connection
Courtesy of CHRYSLER GROUP, LLC

3. Install the upper screw (1) to secure the lamp to the upper FEM bracket.
4. Connect the wiring harness connector (2) to the back of the lamp assembly.
5. Install the fascia onto the FEM. Refer to **FASCIA, FRONT, INSTALLATION** .
6. Connect the battery negative cable.
7. Confirm proper headlamp alignment. Refer to **STANDARD PROCEDURE**.

HEADLAMP BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

1. Position the headlamp bulb close enough to the back of the front lamp unit housing to access and connect the lamp wire harness connector to the bulb connector receptacle.
2. Align the bulb with the keyed opening on the back of the front lamp unit projector.
3. Insert the bulb into the projector opening until the base is firmly seated.
4. Rotate the base clockwise about 30 degrees to lock it into place.

Fig. 53: Headlamp Bulb Access Cover
Courtesy of CHRYSLER GROUP, LLC

5. Position the headlamp bulb access cover (1) onto the outboard back of the front lamp unit housing and rotate it clockwise about 30 degrees to lock it into place.
6. Connect the battery negative cable.

HIGH INTENSITY DISCHARGE (HID) LIGHTING ELEMENT

WARNING: To avoid serious or fatal injury when working on the High Intensity Discharge (HID) headlamp system, be certain to take the proper precautions. The headlamp switch must be in the OFF position. Disconnect and isolate the battery negative cable. There is a risk of fatal injury caused by contact with high voltage used in the HID headlamps. There is a risk of explosion or fire caused by highly flammable materials in the vicinity of damaged HID lighting elements. There is a risk of injury caused by exposure to Ultra Violet (UV) light, a risk of burns caused by high component operating temperatures, a risk of mercury poisoning through glass splinters produced by bursting HID lighting elements. There is also a risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with the skin. Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on HID headlamps. Wear insulated safety shoes, safety glasses and protective gloves. Remove flammable materials and ensure sufficient ventilation in the working area.

CAUTION: Always use the correct lighting element size and type for replacement. An incorrect size or type may overheat and cause damage to the lamp or the lamp wiring.

CAUTION: Do not contaminate the lighting element glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened lighting element life

will result.

1. Align and insert the High Intensity Discharge (HID) igniter and lighting element unit straight into the opening in the front lamp unit projector as a unit.
2. Press the igniter firmly and evenly toward the projector until the base is firmly seated.
3. Insert the HID igniter into the headlamp projector. Be sure the igniter is fully seated in the projector.

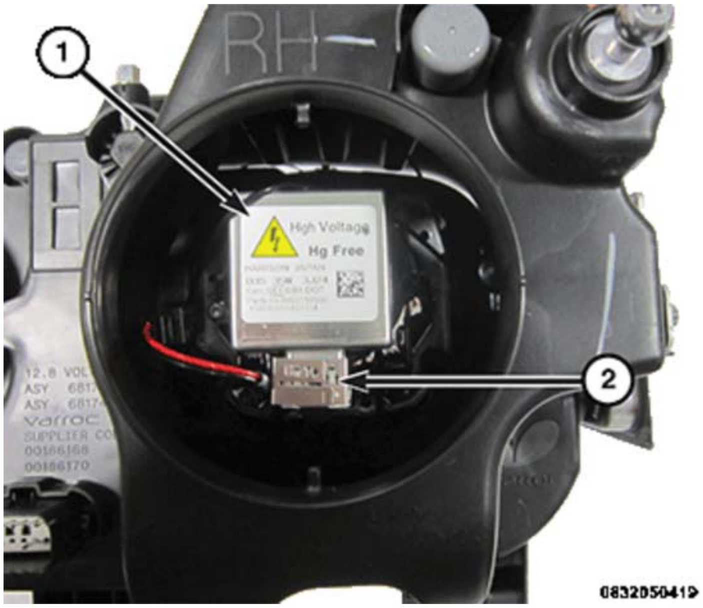


Fig. 54: High Tension Cable Connector & HID Igniter
Courtesy of CHRYSLER GROUP, LLC

4. Connect the high tension cable connector (2) to the connector receptacle integral to the lower edge of the igniter (1) housing.

Fig. 55: Headlamp Bulb Access Cover
Courtesy of CHRYSLER GROUP, LLC

5. Position the access cover (1) onto the outboard back of the front lamp unit housing and rotate it clockwise about 30 degrees to lock it into place.
6. Connect the battery negative cable.

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Article GUID: A00735854

WARNING

WARNING

WARNING:	**To avoid serious or fatal injury, eye protection should be used when servicing any glass components.**
CAUTION:	**Do not use bulbs with higher candle power than indicated in the Bulb Application table. In addition, do not use fuses, circuit breakers or relays having greater amperage value than indicated on the fuse panel or in the Owner's Manual. Damage to lamps, lenses, wiring and other related electrical components can result.**

DESCRIPTION

DESCRIPTION

The interior lighting system for this vehicle includes both incandescent and Light Emitting Diode (LED) unit lighting on several separate circuits. The lamps in the interior lighting system include:

- **Center Floor Console Cup Holder Lamps** - The cup holders in the center floor console include a standard equipment light pipe around their inside perimeter illuminated by LED lamp units to assist visibility at night. These lamps are controlled by the panel lamps dimmer circuit and illuminate whenever the exterior lighting is turned ON.
- **Center Floor Console Forward Storage Bin Lamp** - The forward storage bin in the center floor console on some models is illuminated by an LED lamp unit located in the overhead console to assist visibility at night. This lamp is controlled by the exterior lighting circuit and illuminates whenever the exterior lighting is turned ON.
- **Center Floor Console Universal Serial Bus Connector Lamp** - The Universal Serial Bus (USB) connector in the center floor console on some models includes an LED lamp unit to assist visibility at night. This lamp is controlled by the courtesy lamp circuit and illuminates whenever the interior courtesy lamps are turned ON.
- **Door Entry And Exit Lamps** - Door entry and exit lamps (also known as puddle lamps) on some models include an incandescent lamp unit on the underside of each door trim panel that illuminate the ground outside the opened doors to assist visibility at night. These lamps are controlled by the courtesy lamps circuit and illuminate whenever the interior courtesy lamps are turned ON.
- **Door Inside Handle Lamps** - Door inside latch release handle pockets on models with the ambient lighting package include an LED lamp unit to assist visibility at night. These lamps are controlled by both the ambient lamps dimmer circuit and the courtesy lamps circuit. These lamps are illuminated whenever the ambient lighting or the courtesy lighting is turned ON, and are dimmable only when the ambient lighting is turned ON while the exterior lighting is also turned ON.
- **Door Map Pocket Lamps** - Door trim panel map pockets on models with the ambient lighting package

include an LED lamp unit to assist visibility at night. These lamps are controlled by both the ambient lamps dimmer circuit and the courtesy lamps circuit. These lamps are illuminated whenever the ambient lighting or the courtesy lighting is turned ON, and are dimmable only when the ambient lighting is turned ON while the exterior lighting is also turned ON.

- **Front Dome Lamps** - Front seat driver side and passenger side incandescent dome lamps are located behind a lens shared with the LED map/reading lamps in the overhead console. The dome lamps are controlled by the courtesy lamp circuit and by independent lens-actuated switches.
- **Front Map/Reading Lamps** - Front seat driver side and passenger side LED map/reading lamps are located behind a lens shared with the incandescent dome lamps in the overhead console. The map/reading lamps are controlled by the courtesy lamp circuit and by independent push button switches in the overhead console.
- **Glove Box Lamp** - A standard glove box lamp with an integral plunger-actuated switch is located at the upper outboard corner of the instrument panel lower glove box opening and illuminates whenever the glove box door is opened.
- **Instrument Panel Courtesy Lamps** - Vehicles equipped with the optional instrument panel courtesy lamps have two LED lamp units mounted to the closeout panel located under each side of the instrument panel. These lamps are controlled by the courtesy lamps circuit and illuminate whenever the interior courtesy lamps are turned ON.
- **Rear Map/Reading Lamps** - Optional rear seat incandescent map/reading lamps are located behind a lens integral to the grab handle unit located on each roof side rail above the door openings. The map/reading lamps are controlled by the courtesy lamp circuit and by independent lens-actuated switches.
- **Trunk Lamps** - Standard trunk lamps are located in the right and left trunk trim panels and are activated automatically whenever the deck lid is opened to illuminate the trunk of the vehicle.
- **Vanity Lamps** - Optional single-intensity vanity lamps are located on both sides of a covered mirror on both the right and left sun visors. These lamps are controlled by an integral vanity mirror cover-actuated switch.

Most controls on the instrument panel and elsewhere in the interior of the vehicle are illuminated by the panel lamps dimmer circuit for night visibility. All have miniature incandescent bulbs, LED units or a combination of the two lighting types that are soldered to internal circuit boards and are not serviceable.

Other components of the interior lighting system for this vehicle include:

- **Body Control Module** - The Body Control Module (BCM) is located beneath the instrument panel on the passenger side of the vehicle. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Dimmer Module** - A dimmer module is located on the left side of the instrument panel, below and outboard of the steering column just inboard from the headlamp switch. The dimmer module features a vertical thumbwheel for selecting the panel lamps dimming level, a PARADE mode to illuminate all Vacuum Fluorescent Display (VFD) units at full brightness for visibility when driving in daylight with the exterior lighting turned ON. There are also detent positions to turn ON all interior courtesy lighting, and a DEFEAT position that overrides door ajar switch control of interior lighting. On vehicles equipped with the ambient lighting option the dimmer module includes a second thumbwheel dedicated to the ambient lighting, which allows the selection of the ambient lighting dimming level while the exterior lighting is turned ON and includes a detent position that turns the ambient lighting OFF.
- **Door Ajar Switches** - A door ajar switch is integral to the door latch mechanism of each door.
- **Door Module** - An electronic door control module is concealed behind the front door trim panel where it

is secured through two integral mounting tabs to the inner door panel. Refer to **MODULE, DOOR, DESCRIPTION** .

- **Trunk Ajar Switch** - A trunk ajar switch is integral to the deck lid latch mechanism.

Hard wired circuitry connects the interior lighting system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the interior lighting components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

All internal lights (except for the trunk lamp) are powered by the Inadvertent Lighting Feed. That inadvertent Lighting Feed is controlled via the SBMT Relay located in the Body Control Module (BCM). Power for the trunk lighting function is sourced by a dedicated high side relay in the BCM.

The lamps and the hard wired circuits between components related to the interior lighting system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the interior lighting system or the electronic controls or communication between modules and other devices that provide some features of the interior lighting system. The most reliable, efficient, and accurate means to diagnose the interior lighting system or the electronic controls and communication related to interior lighting system operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

AMBIENT LIGHTING

Ambient Lighting Components

- Front Overhead Flood Lamp
- Front Remote Handles
- Rear Remote Handles
- Front Map Pockets
- Rear Map Pockets

Power and Ground

- The primary power feed for ambient lighting is supplied by a 0.9A PWM high side driver located in the BCM.
- Ambient lighting located in each front door is supplied power by a 0.2A PWM high side driver in each

respective door module.

Ambient Lighting Operation

- The ambient lighting thumbwheel provides a resistor multiplexed input to the BCM.
- The BCM controls the front door ambient lighting using electronic messages sent to the door modules over the CAN data bus.
- The door modules then regulate the voltage output to the front door ambient lighting LED units accordingly.
- The BCM provides direct hard wired outputs to control the door ambient lighting LED units.

Thumbwheel Control Operation

- Vehicles equipped with the ambient lighting option have a second, dedicated ambient lighting thumbwheel located in the dimmer module.
- This thumbwheel controls the Light Emitting Diode (LED) units in the inside door latch release handle pockets and the door map pockets.
- The ambient lighting can be turned ON at full brightness or OFF using the ambient lighting thumbwheel.
- When the exterior lighting is turned ON, the ambient lighting can be dimmed using the ambient lighting thumbwheel.
- The ambient lighting is also controlled by the courtesy lamp circuit and will be turned ON at full brightness whenever the other courtesy lamps are turned ON, regardless of the ambient lighting thumbwheel setting.

COURTESY LIGHTING

The courtesy lamp circuit includes the dome/reading lamps located on the headliner near the center of the windshield opening upper header and front courtesy footwell lamps. The lamps in the courtesy lamp circuit are provided with battery voltage and ground by the Body Control Module (BCM) using internal low side drivers through two ground circuits based upon hard wired inputs from the ignition switch and the door ajar switches. The BCM also uses electronic message inputs received from other electronic modules in the vehicle over the Controller Area Network (CAN) data bus to control these outputs.

The BCM also provides courtesy lamp operation based upon certain inputs received from the ignition switch (also known as the Keyless Ignition Node/KIN), Remote Keyless Entry (RKE) transmitter and the Radio Frequency (RF) Hub to provide an Illuminated Entry feature and in response to certain electronic message inputs received from the Occupant Restraint Controller (ORC) or the Powertrain Control Module (PCM) over the CAN data bus.

For those lamps in the courtesy lamp circuit with independent switching such as the dome/reading lamps, the BCM provides a second feed to the switches using another internal low side driver through a separate load shed circuit. The BCM provides a battery saver (load shedding) feature for these lamps, which will automatically turn the lamps OFF if they are left ON for more than about fifteen minutes with the ignition switch in the OFF position.

PANEL LAMPS DIMMER CIRCUIT

Panel Lamp Dimmer Components

- Headlamp Switch Backlighting
- Dimmer Module Backlighting
- Automatic Transmission Gear Selector Bezel Lamp
- Cup Holder Lamps

Power and Ground

- All lamps in the panel lamps dimmer circuits are provided a path to ground at all times through a hard wired ground circuit.
- These lamps are illuminated by a 12-volt PWM output of the BCM or the door control modules through several panel lamps dimmer circuits.

Panel Lamp Dimmer Circuit Operation

- The shared PWM output synchronizes the selected illumination intensity level of all the lamps in the panel lamps dimmer circuits.
- The BCM uses hard wired resistor multiplexed inputs from the rotary exterior lighting control knob of the headlamp switch to determine when the exterior lighting is turned ON and from the thumbwheel of the dimmer module to determine the dimming level selection.
- Then the BCM provides the appropriate PWM outputs through the panel lamps dimmer circuits as well as electronic **dimming level** messages over the CAN data bus to other electronic modules in the vehicle
- The Instrument Cluster (IC) and the Integrated Center Stack (ICS) use the electronic **dimming level** messages to control the illumination intensity of their own back lighting, controls and display units.
- In addition, when the interior lighting thumbwheel of the dimmer module is moved to the PARADE (or funeral) mode detent position, all of the electronic display units are illuminated at their full intensity levels for increased visibility when the vehicle is driven during daylight hours with the exterior lighting turned ON. The PARADE mode has no effect on the illumination intensity of incandescent panel lamps.

SWITCHED/CONVENIENCE LIGHTING FUNCTION

Switched/Convenience Lighting Components

- Lower Glovebox
- Drivers Vanity Mirror
- Passenger Vanity Mirror
- Front Overhead Ready Lamp
- Rear Overhead Reading Lamp (Side Rails)
- Front Puddle Lamps
- Rear Puddle Lamps

Power and Ground

- The primary power feed for switched/convenience lighting is supplied by a 7.5A PWM high side driver located in the BCM.
- The primary feed for the front door puddle lamps is supplied by its dedicated door module. Whereas, the rear puddle lamps are fed directly by BCM.

Switched Convenience Lighting Operation

- The BCM provides a battery saver (load shedding) feature for the reading lamp circuit as well as the courtesy lamp circuit, which will automatically turn these lamps OFF if they are left ON for more than about 10 minutes after the electronic **ignition status** message transitions to OFF. If any reading lamp input is received subsequent to a 10 minute load shed and prior to a new ignition cycle, the courtesy lamps will turn OFF after 90 seconds.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - INTERIOR LIGHTING

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: When diagnosing the interior lighting circuits, remember that high generator output can burn out bulbs rapidly and repeatedly; and, that dim or flickering bulbs can be caused by low generator output or poor battery condition. If one of these symptoms is a problem on the vehicle, be certain to diagnose the battery and charging system, then repair as necessary.

NOTE: A good ground is necessary for proper lighting operation. If a lighting problem is being diagnosed that involves multiple symptoms, systems, or components, the problem can often be traced to a loose, corroded, or open ground.

The hard wired circuits between components related to the operation of the interior lighting system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the interior lighting system or the electronic controls or communication between modules and other devices that provide some features of the interior lighting system. The most reliable, efficient, and accurate means to diagnose the interior lighting system or the electronic controls and communication related to interior lighting system operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

ACRONYMS USED IN THE FOLLOWING SERVICE INFORMATION	
Body Control Module	BCM
Light-Emitting Diode	LED

COURTESY AND READING LAMP CIRCUITS

CONDITION	POSSIBLE CAUSES	CORRECTION
A SINGLE LAMP IN THE COURTESY LAMP CIRCUIT DOES NOT ILLUMINATE	1. Ineffective or missing bulb (except LED lamps).	1. Test and replace the courtesy lamp bulb if required.
	2. Ineffective lamp switch.	2. Test and replace a dome lamp switch, dome/reading lamp switch, glove box lamp switch or vanity lamp switch if required.
	3. Ineffective ground circuit.	3. Test and repair the open ground circuit if required.
	4. Ineffective feed circuit.	4. Test and repair the open feed circuit if required.
ALL LAMPS IN THE COURTESY LAMP CIRCUIT DO NOT ILLUMINATE	1. Courtesy DEFEAT feature turned ON.	1. Turn courtesy DEFEAT feature OFF.
	2. Ineffective ground circuit.	2. Test and repair the open ground circuit if required.
	3. Ineffective or missing fuse.	3. Test and replace the fuse if required.
	4. Ineffective courtesy lamp control circuit.	4. Test and repair the courtesy lamp control circuit if required.
	5. Ineffective dimmer module.	5. Test and replace the dimmer module if required.
	6. Ineffective BCM inputs or outputs.	6. Use a diagnostic scan tool and the appropriate diagnostic information for further BCM diagnosis.
A SINGLE LAMP IN THE COURTESY LAMP CIRCUIT DOES NOT EXTINGUISH	1. Ineffective lamp switch.	1. Test and replace a dome/reading lamp switch, glove box lamp switch or vanity lamp switch if required.
ALL LAMPS IN THE COURTESY LAMP CIRCUIT DO NOT EXTINGUISH	1. Ineffective ajar switch.	1. Test and replace a door ajar or liftgate ajar switch if required.
	2. Ineffective ajar switch sense circuit.	2. Test and repair the shorted ajar switch sense circuit if required.
	3. Ineffective dimmer module.	3. Test and replace the dimmer module if required.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool and the appropriate diagnostic information for further BCM diagnosis.

PANEL LAMPS DIMMER CIRCUIT

NOTE: **As part of the exterior lighting fail-safe feature, upon ignition ON all of the panel lamps dimmer circuit lamps will illuminate at full intensity and the exterior park lamps and headlamp low beams will illuminate regardless of the multi-function switch control knob and stalk positions if the Steering Column Control Module (SCCM) microcontroller cannot detect an input from the multi-function switch, or if there is a loss of data bus communication.**

CONDITION	POSSIBLE CAUSES	CORRECTION

CONDITION	POSSIBLE CAUSES	CORRECTION
A SINGLE LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb or Light Emitting Diode (LED) unit.	1. Test and replace the lamp bulb or LED unit if required.
	2. Ineffective ground circuit.	2. Test and repair the open lamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair the open lamp feed circuit if required.
A SINGLE LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair the shorted lamp feed circuit if required.
ALL LAMPS DO NOT ILLUMINATE	1. Ineffective ground circuit.	1. Test and repair the open lamp ground circuit if required.
	2. Ineffective feed circuit.	2. Test and repair the open lamp feed circuit if required.
	3. Ineffective BCM inputs or outputs.	3. Use a diagnostic scan tool and the appropriate diagnostic information for further BCM diagnosis.
ALL LAMPS ILLUMINATE AT FULL INTENSITY AT IGNITION ON	1. Ineffective dimmer module.	1. Test and replace the dimmer module if required.
	2. Ineffective IC inputs or outputs.	2. Use a diagnostic scan tool and the appropriate diagnostic information for further IC diagnosis.
	3. Loss of data bus communication.	3. Use a diagnostic scan tool to test the data bus. Refer to the appropriate Diagnostic & Testing article.

SPECIFICATIONS

SPECIFICATIONS

BULB APPLICATION TABLE

BULB APPLICATION TABLE

LAMP	BULB
AMBIENT LIGHTING (DOOR INSIDE LATCH RELEASE HANDLE POCKETS AND MAP POCKETS)	LIGHT EMITTING DIODES (LED) SERVICED IN DOOR TRIM PANEL ASSEMBLY
DOOR ENTRY AND EXIT	567
FRONT DOME	MOPARĀ® 68090625AA
FRONT MAP/READING	LIGHT EMITTING DIODES (LED) SERVICED IN OVERHEAD CONSOLE ASSEMBLY
GLOVE BOX LAMP	194
REAR DOME/READING	MOPARĀ® 68090625AA
TRUNK	567

LAMP	BULB
UNDER INSTRUMENT PANEL COURTESY LAMPS	LIGHT EMITTING DIODES (LED) SERVICED IN INSTRUMENT PANEL CLOSE OUT PANEL ASSEMBLIES
VANITY LAMP	MOPARĀ® 06501966

PANEL LAMPS

NOTE: **All illuminated controls on the instrument panel and elsewhere in the interior of the vehicle have either miniature incandescent bulbs or Light-Emitting Diode (LED) units that are soldered to internal circuit boards and are not serviceable.**

LAMP, COURTESY, CUPHOLDER

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.

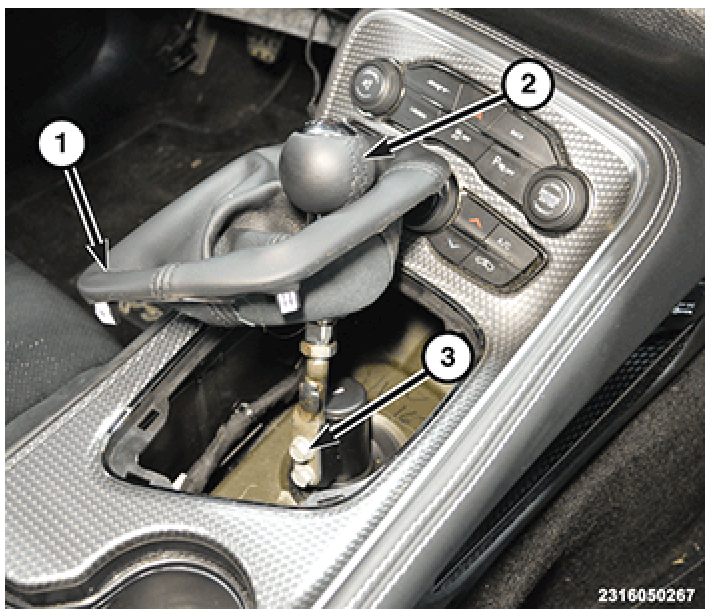
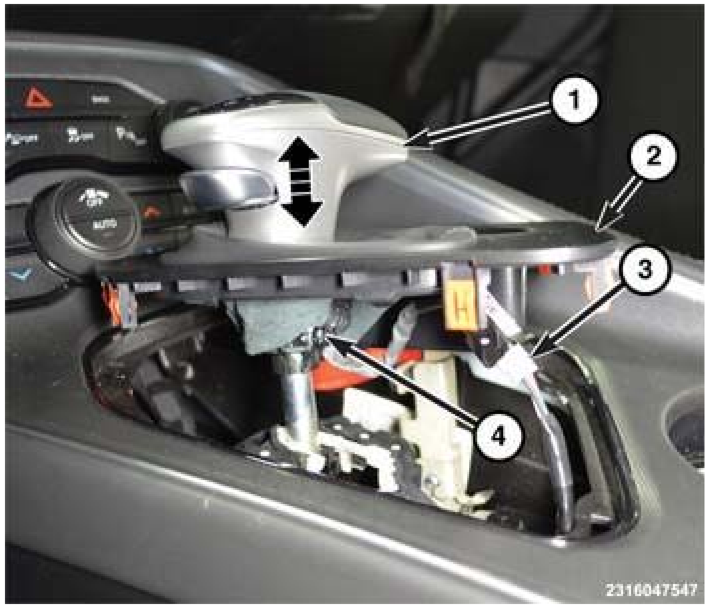


Fig. 1: Manual Shifter
Courtesy of CHRYSLER GROUP, LLC

2. For manual shifter using a trim stick or equivalent, carefully release the retaining clips and lift the shifter boot (1).
3. Remove the bolts (3) then the shift lever (2).

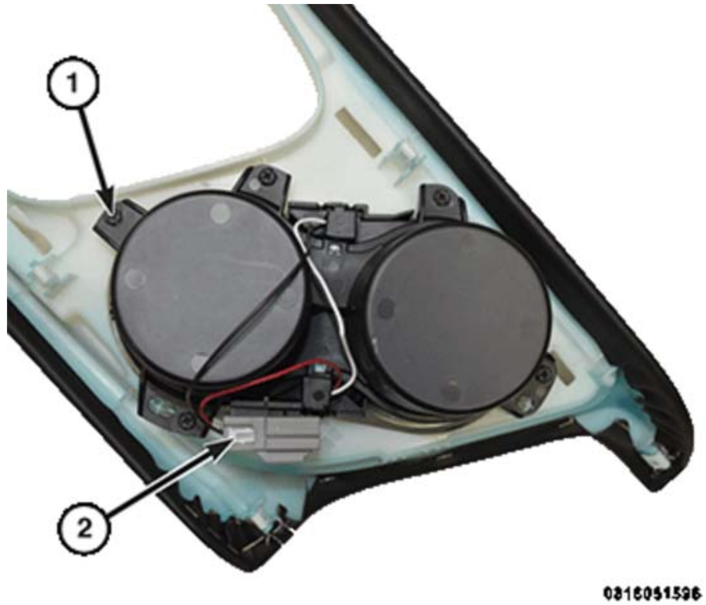


[Fig. 2: Automatic Shifter](#)
Courtesy of CHRYSLER GROUP, LLC

4. For automatic shifter, place the shifter in the Neutral position.
5. Using a trim stick or equivalent, carefully release the retaining clips and lift the shifter bezel (2).
6. Remove the screw (4) then lift the shifter knob (1) and remove.

[Fig. 3: Removing/Install Console Bezel Panel](#)
Courtesy of CHRYSLER GROUP, LLC

7. Using a trim stick or equivalent, starting at the rear carefully release the retaining clip and lift the shifter bezel panel (1). Disconnect the wire harness connectors and remove.



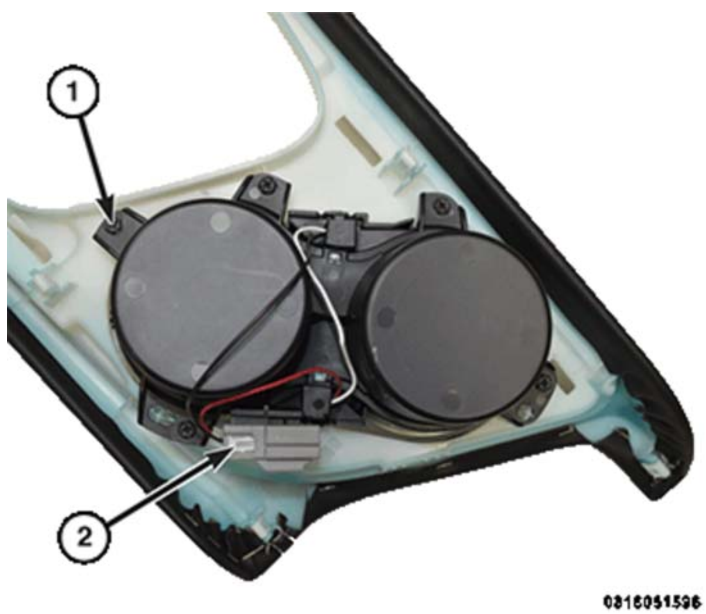
[Fig. 4: Wiring Harness Connector & Screws]
Courtesy of CHRYSLER GROUP, LLC

8. Working from the backside of the shifter bezel panel, remove the screws (1) that secure the cup holder to the bezel.
9. Disconnect the wiring harness connector (2) from the cup holder.

INSTALLATION

INSTALLATION

1. Position the cup holder to the shifter bezel panel.



[Fig. 5: Wiring Harness Connector & Screws]
Courtesy of CHRYSLER GROUP, LLC

2. Install the screws (1) securing the cup holder to the bezel.

3. Connect the wiring harness connector to the cup holder (2).

Fig. 6: Removing/Install Console Bezel Panel
Courtesy of CHRYSLER GROUP, LLC

4. Install the shifter bezel panel.

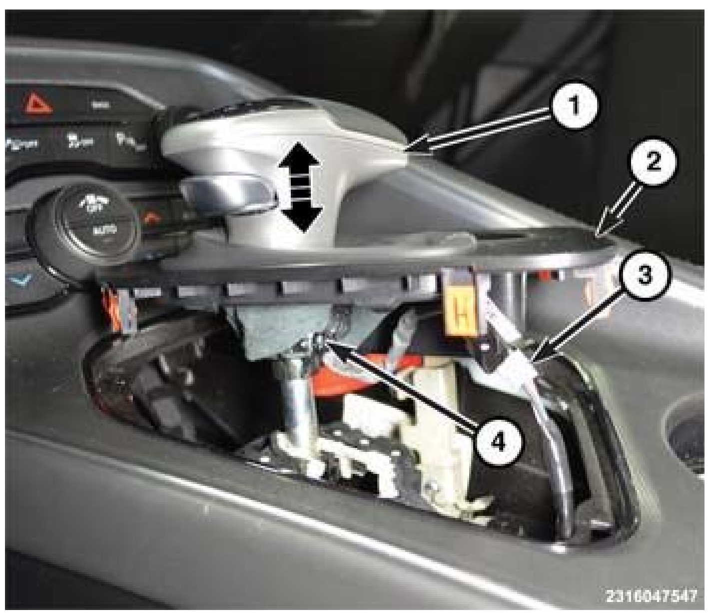


Fig. 7: Automatic Shifter
Courtesy of CHRYSLER GROUP, LLC

5. For automatic shifter, install the shifter knob and install the screw (4). Tighten the screw securely.
6. Connect the wire harness connector (3).
7. Position the shifter bezel (2) and engage the retaining clips.

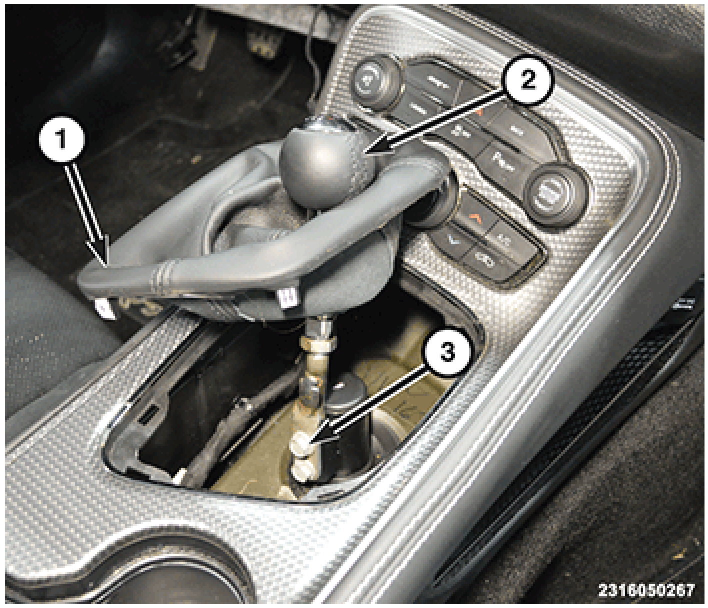


Fig. 8: Manual Shifter
Courtesy of CHRYSLER GROUP, LLC

8. For manual shifter, install the shift lever (2) and the bolts (3). Tighten the shift lever bolts to the proper **SPECIFICATIONS** .
9. Position the shifter boot (1) and engage the retaining clips.
10. Connect the battery negative cable.

LAMP, DOME

REMOVAL

BULB

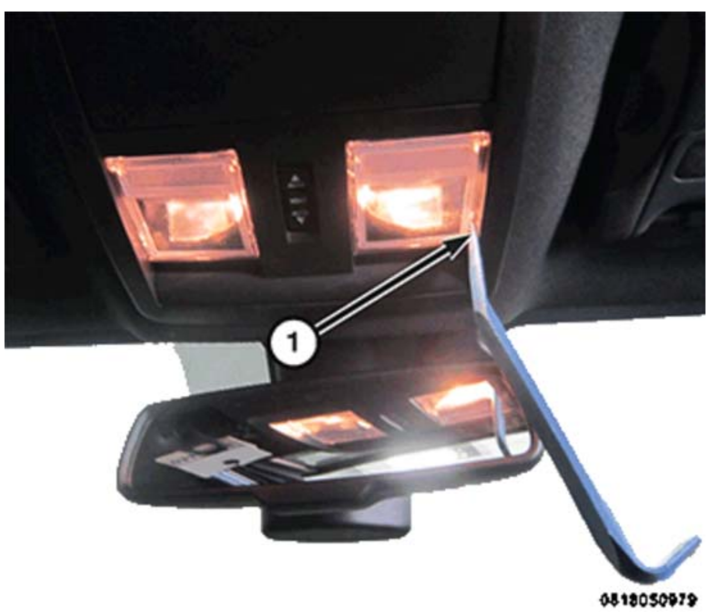


Fig. 9: Lens Cover
Courtesy of CHRYSLER GROUP, LLC

1. Using a trim stick or equivalent, insert the tip of the tool as shown to remove the lens cover (1).
2. Pull the bulb holder and bulb straight out of the housing.

INSTALLATION

BULB

1. Place lamp bulb into lamp unit.
2. Position dome lamp lens cover and firmly snap into place.

LAMP, ENTRY AND EXIT

REMOVAL

BULB

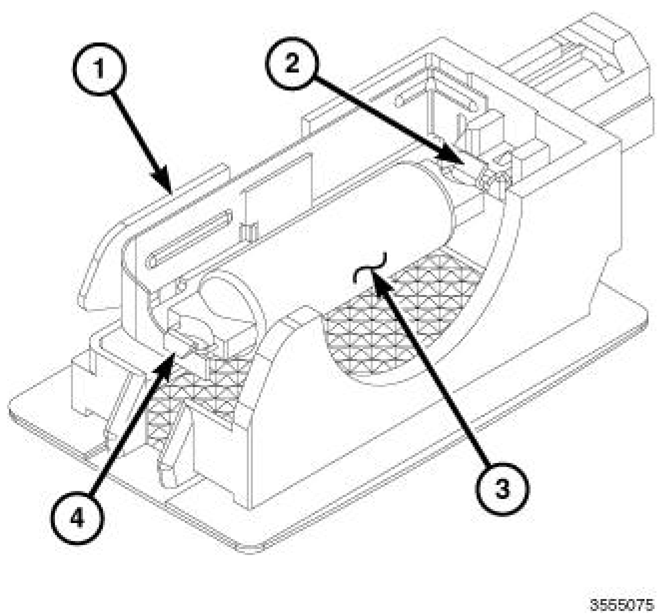


Fig. 10: Exit Lamp Unit, Bulb Holder & Bulb
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the entry and exit lamp unit (1) (also known as the puddle lamp) from the bottom of the door trim panel. Refer to **LAMP, ENTRY AND EXIT, REMOVAL**.
3. Gently press the movable bulb holder (4) and the bulb (3) towards the fixed bulb holder (2) far enough to disengage the wire loop terminal of the bulb from the hook of the fixed bulb holder.
4. Disengage the wire loop terminal of the bulb from the hook on the movable bulb holder.
5. Remove the bulb from the lamp.

LAMP

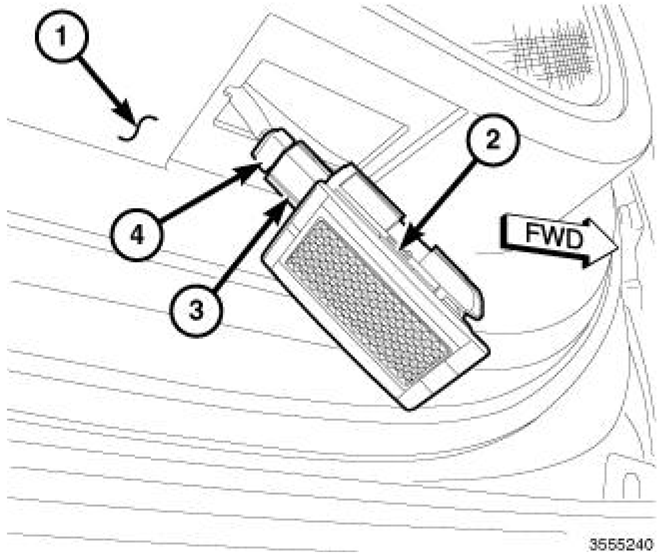


Fig. 11: Rear Door Trim Panel, Lens, Door Wire Harness Connector & Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Using a trim stick or another suitable flat wide-bladed tool, gently pry the forward (notched) edge of the entry and exit lamp (also known as the puddle lamp) lens (2) down from the mounting hole in the lower horizontal surface of the trim panel (1).
3. Disconnect the door wire harness connector (4) from the connector receptacle (3) integral to the lamp housing.
4. Remove the lamp from the vehicle.

INSTALLATION

BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

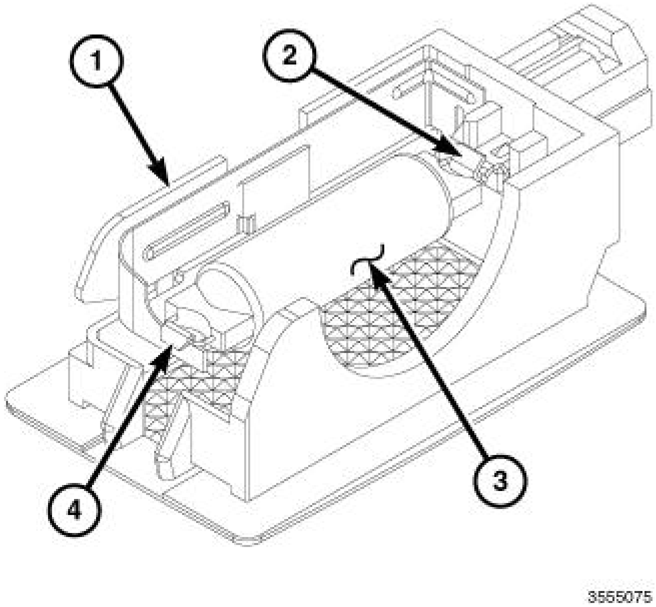


Fig. 12: Exit Lamp Unit, Bulb Holder & Bulb
Courtesy of CHRYSLER GROUP, LLC

1. Engage the wire loop terminal on one end of the bulb (3) over the hook on the movable bulb holder (4).
2. Gently press the movable bulb holder and bulb towards the fixed bulb holder (2) far enough to engage the wire loop terminal over the hook on the fixed bulb holder, then release the movable bulb holder.
3. Reinstall the entry and exit lamp unit (1) (also known as the puddle lamp) into the bottom of the door trim panel. Refer to **LAMP, ENTRY AND EXIT, INSTALLATION**.
4. Reconnect the battery negative cable.

LAMP

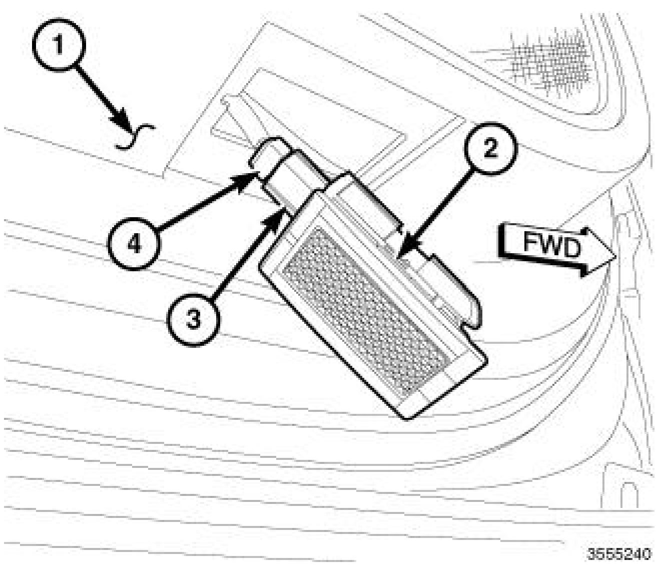


Fig. 13: Rear Door Trim Panel, Lens, Door Wire Harness Connector & Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Position the entry and exit lamp (also known as the puddle lamp) to the mounting hole in the lower

horizontal surface of the door trim panel (1).

2. Reconnect the door wire harness connector (4) to the connector receptacle (3) integral to the lamp housing.
3. Insert the connector end of the lamp into the rearward end of the mounting hole in the door trim panel far enough to engage the fixed retention tabs with the edge of the mounting hole.
4. Using hand pressure, press the front (notched) edge of the lamp lens (2) upward until the movable retention tabs snap into place and the lens is just proud of the trim panel.
5. Reconnect the battery negative cable.

LAMP, TRANSMISSION RANGE INDICATOR

REMOVAL

REMOVAL

1. Disconnect the battery negative cable.
2. Remove shift console trim ring and shift console trim panel. Refer to **CONSOLE, FLOOR, REMOVAL** .

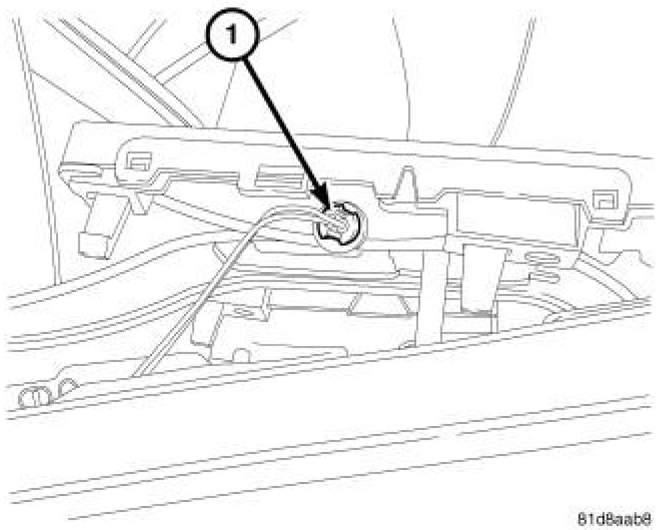


Fig. 14: Bulb Socket
Courtesy of CHRYSLER GROUP, LLC

3. Using a trim stick or equivalent, gently pry up the shifter bezel lock tabs.
4. Grasp the bulb socket (1) and turn counter clockwise to remove from the shifter assembly.
5. Pull the bulb from the bulb socket.

INSTALLATION

INSTALLATION

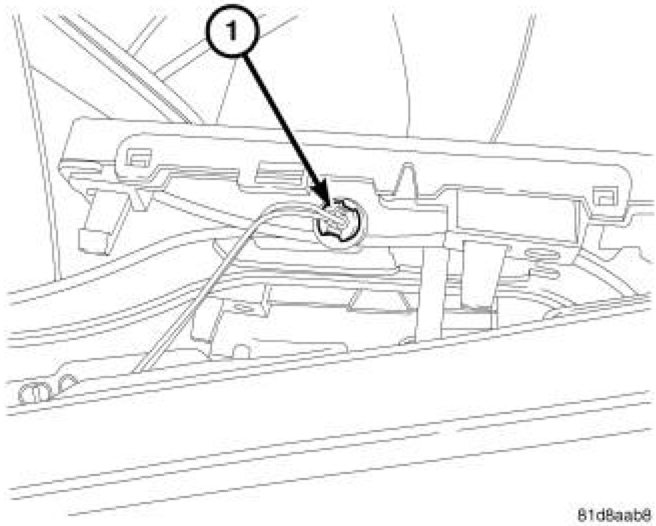


Fig. 15: Bulb Socket
Courtesy of CHRYSLER GROUP, LLC

1. Insert new bulb into bulb socket.
2. Install socket into shifter assembly.
3. Snap shifter assembly back into the center console.
4. Install shifter console trim panel and shift console trim ring. Refer to **CONSOLE, FLOOR, INSTALLATION** .
5. Connect battery negative cable.

LAMP, TRUNK

REMOVAL

BULB

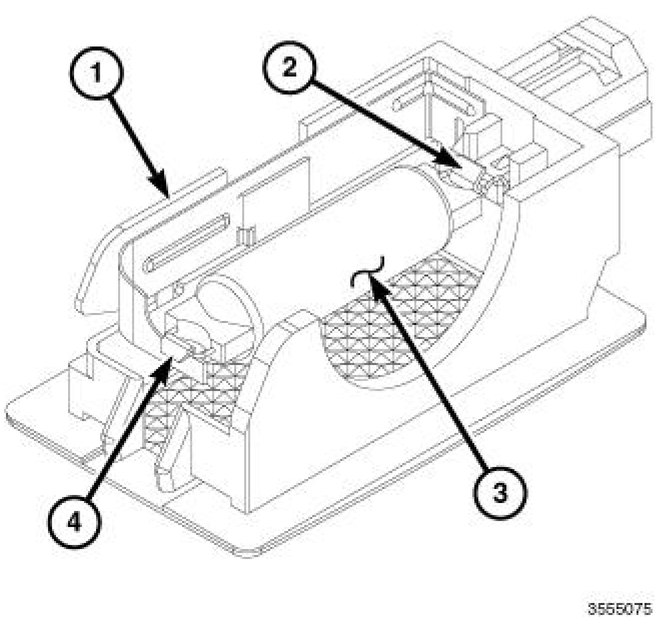


Fig. 16: Exit Lamp Unit, Bulb Holder & Bulb
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the trunk lamp unit (1) from the right or left trunk trim panel. Refer to **LAMP, TRUNK, REMOVAL**.
3. Gently press the movable bulb holder (4) and the bulb (3) towards the fixed bulb holder (2) far enough to disengage the wire loop terminal of the bulb from the hook of the fixed bulb holder.
4. Disengage the wire loop terminal of the bulb from the hook on the movable bulb holder.
5. Remove the bulb from the lamp.

LAMP

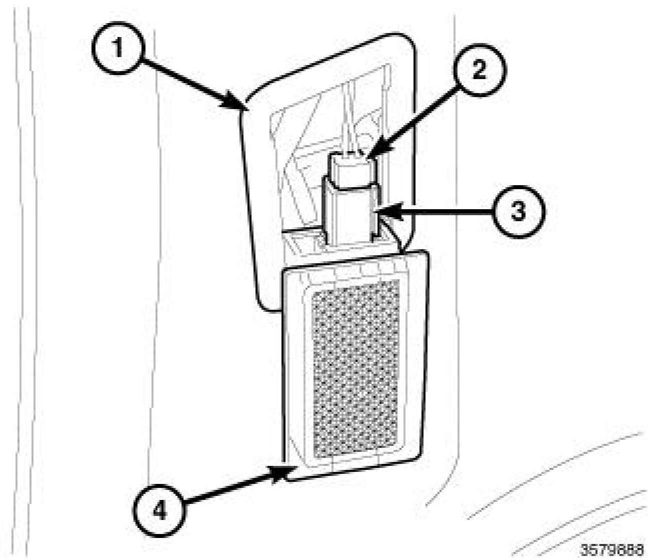


Fig. 17: Trunk Lamp Lens, Connector Receptacle & Mounting Hole
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Using a trim stick or another suitable flat wide-bladed tool, gently pry the upper (notched) edge of the trunk lamp lens (4) out from the mounting hole (1) in the right or left trunk side trim panel.
3. Disconnect the body wire harness connector (2) from the connector receptacle (3) integral to the lamp housing.
4. Remove the lamp from the vehicle.

INSTALLATION

BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

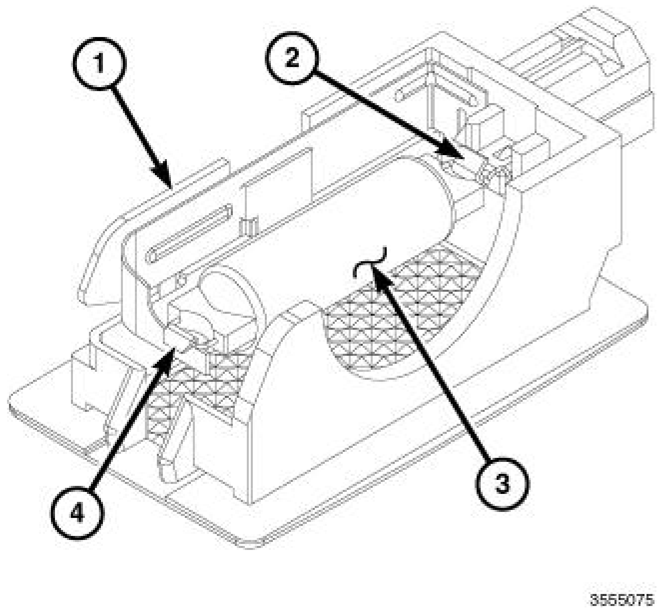


Fig. 18: Exit Lamp Unit, Bulb Holder & Bulb
Courtesy of CHRYSLER GROUP, LLC

1. Engage the wire loop terminal on one end of the bulb (3) over the hook on the movable bulb holder (4).
2. Gently press the movable bulb holder and bulb towards the fixed bulb holder (2) far enough to engage the wire loop terminal over the hook on the fixed bulb holder, then release the movable bulb holder.
3. Reinstall the trunk lamp unit (1) into the right or left trunk trim panel. Refer to **LAMP, TRUNK, INSTALLATION**.
4. Reconnect the battery negative cable.

LAMP

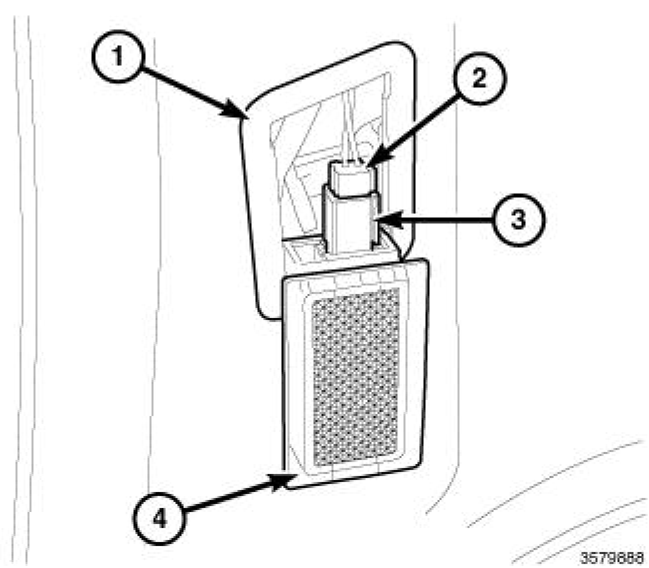


Fig. 19: Trunk Lamp Lens, Connector Receptacle & Mounting Hole
Courtesy of CHRYSLER GROUP, LLC

1. Position the trunk lamp to the mounting hole (1) in the right or left trunk side trim panel.

2. Reconnect the body wire harness connector (2) to the connector receptacle (3) integral to the lamp housing.
3. Insert the connector end of the lamp into the lower end of the mounting hole in the trunk side trim panel far enough to engage the fixed retention tabs with the edge of the mounting hole.
4. Using hand pressure, press the upper (notched) edge of the lamp lens (4) into the mounting hole until the movable retention tabs snap into place and the lens is just proud of the trim panel.
5. Reconnect the battery negative cable.

LAMP, VANITY

REMOVAL

REMOVAL

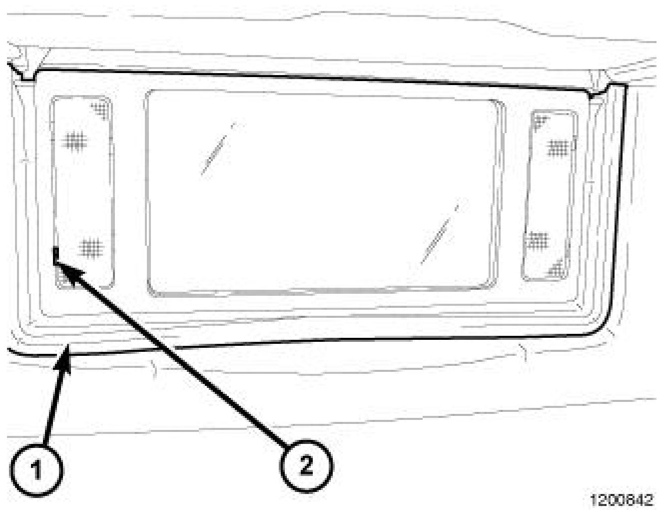


Fig. 20: Vanity Lamp
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Vehicles equipped with optional vanity lamps have a single lamp at each side of the covered mirror that is integral to each sun visor. Each lamp is independently controlled by an integral switch that is automatically actuated by the mirror cover. The lamp housings, the switch, the mirror and the mirror cover are serviced only as a unit with the sun visor. The bulb types and service procedures are identical for each of these lamp bulbs.**

1. Disconnect and isolate the battery negative cable.
2. Insert a small flat-bladed screwdriver on either side near the top or the bottom between the vanity lamp lens (2) and the lamp housing of the sun visor (1).
3. Carefully pry the lens outward until it unsnaps from the lamp housing.

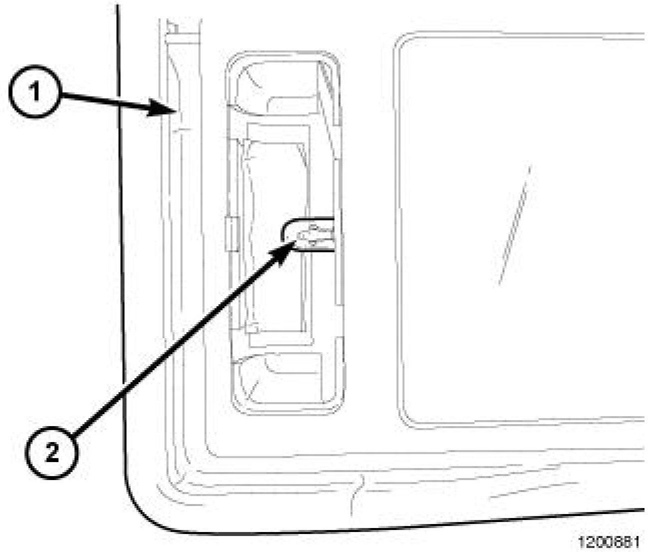


Fig. 21: Vanity Lamp Bulb
Courtesy of CHRYSLER GROUP, LLC

4. Using small needle-nose pliers, carefully grasp the bulb (2) and pull the base out of the lamp socket.

INSTALLATION

INSTALLATION

CAUTION: **Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.**

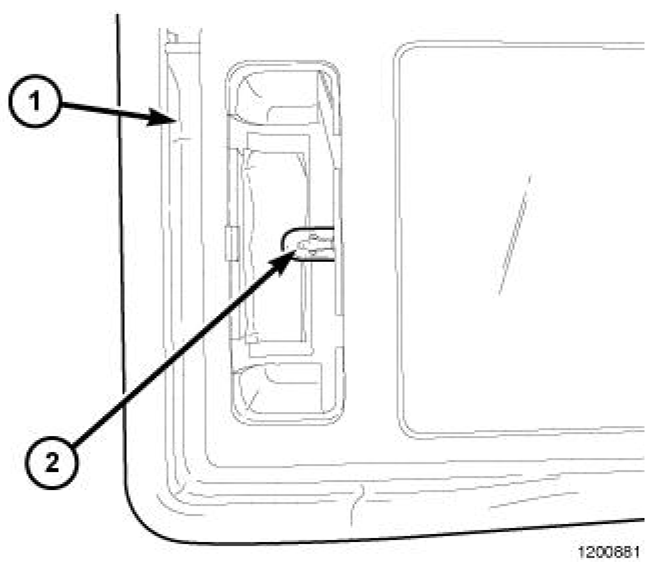


Fig. 22: Vanity Lamp Bulb
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Vehicles equipped with optional vanity lamps have a single lamp at each side of the covered mirror that is integral to each sun visor. Each lamp is independently controlled by an integral switch that is automatically actuated by**

the mirror cover. The lamp housings, the switch, the mirror and the mirror cover are serviced only as a unit with the sun visor. The bulb types and service procedures are identical for each of these lamp bulbs.

1. Using small needle-nose pliers, carefully grasp the vanity lamp bulb (2) and align the base of the bulb with the socket in the lamp housing of the sun visor (1).
2. Push the bulb straight into the socket until the base is fully seated.

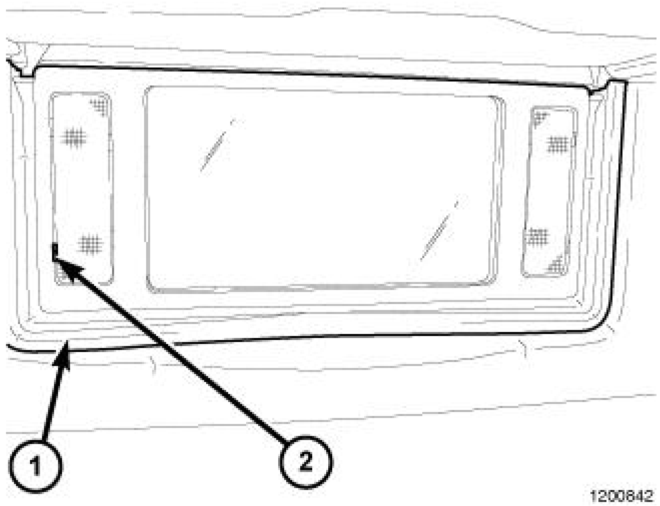


Fig. 23: Vanity Lamp
Courtesy of CHRYSLER GROUP, LLC

3. Insert one tab on the top or the bottom of the lens (2) into the appropriate slot at the top or bottom of the lamp housing.
4. Flex the lens far enough to engage the loose tab into its slot in the lamp housing.
5. Reconnect the battery negative cable.

SWITCH AND LAMP, GLOVE BOX

REMOVAL

BULB

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

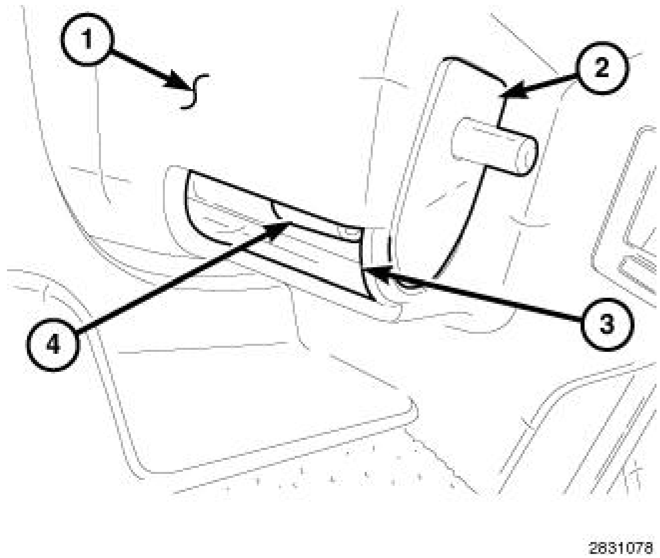
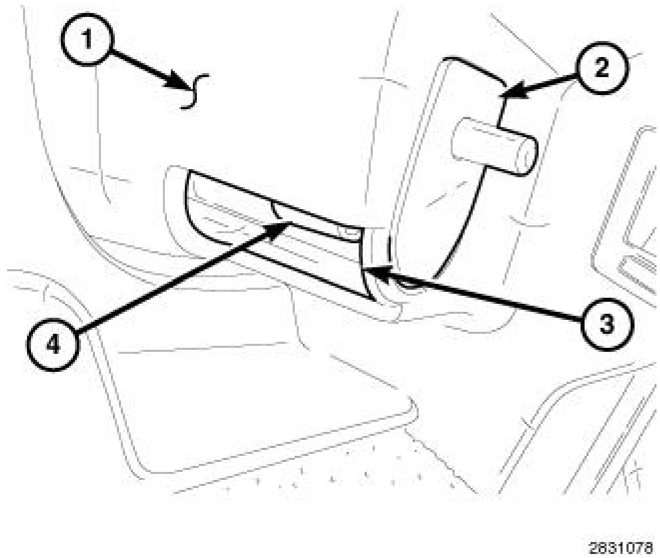


Fig. 24: Window, Glove Box Housing, Bulb & Switch Unit
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Open the glove box.
3. Reach through the window (3) in the instrument panel glove box housing (1) to access the bulb (4) on the lower side of the glove box lamp and switch unit (2).
4. Pull the base of the bulb straight out of the bulb holder and out through the window.

LAMP/SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.



[Fig. 25: Window, Glove Box Housing, Bulb & Switch Unit]
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Open the glove box.
3. Reach through the window (3) in the instrument panel glove box housing (1) to access and depress the latch feature on either side of the glove box lamp and switch unit (2).
4. While holding the retaining latch depressed, push the glove box lamp and switch unit out through the mounting hole in the face of the instrument panel glove box housing.
5. Disconnect the wire harness connector from the glove box lamp and switch.
6. Remove the lamp and switch unit from the instrument panel.

INSTALLATION

BULB

WARNING:	**To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

CAUTION:	**Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.**

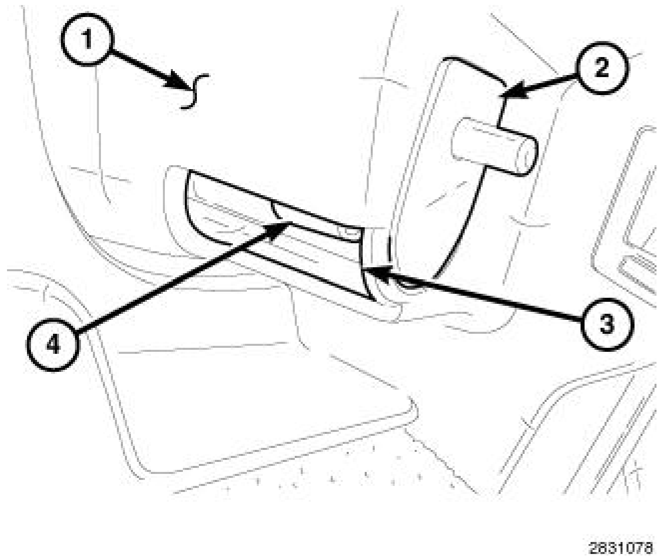
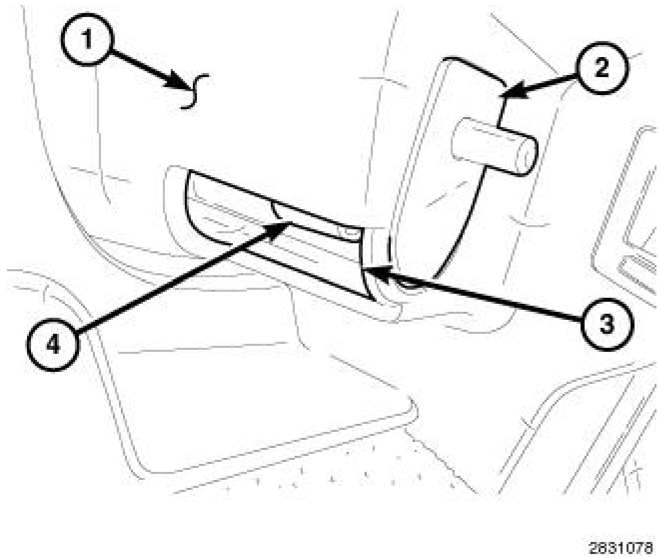


Fig. 26: Window, Glove Box Housing, Bulb & Switch Unit
Courtesy of CHRYSLER GROUP, LLC

1. Reach through the window (3) in the instrument panel glove box housing (1) to align the base of the bulb (4) with the bulb holder on the lower side of the glove box lamp and switch unit (2).
2. Push the bulb straight into the bulb holder until the base is firmly seated.
3. Close the glove box.
4. Reconnect the battery negative cable.

LAMP/SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.



[Fig. 27: Window, Glove Box Housing, Bulb & Switch Unit]

Courtesy of CHRYSLER GROUP, LLC

1. Position the glove box lamp and switch unit (2) to the instrument panel glove box housing (1).
2. Reconnect the wire harness connector to the lamp and switch unit.
3. Feed the wire harness back through the switch mounting hole.
4. Align the lamp and switch unit with the mounting hole in the instrument panel glove box housing.
5. Using hand pressure, push the lamp and switch unit firmly and evenly into the mounting hole until it is fully seated.
6. Close the glove box.
7. Reconnect the battery negative cable.

SWITCH, DIMMER

DESCRIPTION

DESCRIPTION

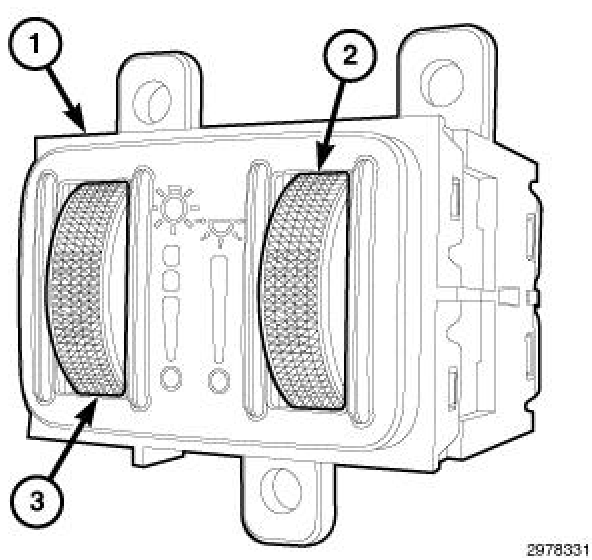


Fig. 28: Dimmer Module, Thumbwheel & Second Thumbwheel
Courtesy of CHRYSLER GROUP, LLC

This vehicle has a separate dimmer module (1) that is located on the instrument panel, in a mounting hole inboard of the headlamp switch mounting hole, outboard of the steering column. The standard dimmer module features a single thumbwheel (3) for panel lamps dimming and interior lighting control. There are also two optional switches with a second thumbwheel (2). The second thumbwheel is used for ambient (also known as halo) lighting control in vehicles with the ambient lighting option, or for headlamp leveling control in vehicles manufactured for certain markets where headlamp leveling is required.

The dimmer module is constructed of molded plastic. The thumbwheel is molded plastic and knurled around its circumference to ease operator control. The dimmer module face plate is labeled with graphics and International Control and Display Symbol icons to clearly identify the functions of the thumbwheel or optional thumbwheels.

The dimmer module housing is secured within the mounting hole of the instrument panel by three screws, two on the top and one on the bottom. The back of the dimmer module housing has an integral connector receptacle containing terminal pins that connect the module to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness. Panel dimmer controlled Light Emitting Diode (LED) units soldered to the circuit board within the module provide back lighting for visibility at night, but are not serviceable.

The dimmer module cannot be repaired and, if ineffective or damaged, it must be replaced.

OPERATION

OPERATION

The dimmer module uses a single resistor multiplexed output for each switch thumbwheel to control the many functions and features it provides. The switch receives a clean ground from the Body Control Module (BCM) on a multifunction switch MUX return circuit. It then provides outputs to the BCM on a panel lamps dimmer signal circuit to control panel dimmer and interior lighting functions, or on a dimmer environmental lighting circuit to control ambient (halo) lighting functions.

On vehicles equipped with a remote manual headlamp leveling system, the dimming module also receives a battery voltage input on a park/tail/running lamps feed circuit whenever the exterior lighting is turned ON. It then provides outputs to the BCM on a headlamp leveling switch to module signal circuit to control the headlamp leveling function.

The dimmer module illumination circuit receives a path to ground at all times through an instrument panel ground circuit. The illumination level is controlled by a Pulse-Width Modulated (PWM) output received from the BCM on a panel lamps driver circuit. The BCM controls this output based upon the panel lamps dimmer signal circuit input from the dimmer module.

The dimmer module operates as follows:

- **Ambient (Halo) Lighting Control -** On vehicles so equipped, the right thumbwheel on the dimmer module is rotated to the ambient DEFEAT or one of the six ambient dimmer detent positions to control the ambient (halo) lighting level. The dimmer module provides the appropriate resistor multiplexed output to the BCM over the dimmer environmental lighting circuit. The BCM reads and responds to this input by providing the appropriate control outputs through internal HSDs over the liftgate courtesy feeds

driver circuit.

- **Headlamp Leveling Control** - On vehicles so equipped, the right thumbwheel on the dimmer module is rotated to the 0, 1 or 2 detent positions to provide the appropriate resistor multiplexed output to the BCM over the headlamp leveling switch to module signal circuit. The BCM reads and responds to this input by providing the appropriate control outputs to the headlamp leveling motors.
- **Interior Lighting Control** - The left thumbwheel on the dimmer module is rotated to the dome DEFEAT, dome ON, PARADE mode, or one of the six panel dimmer detent positions to control the interior courtesy/dome and panel lamps. The dimmer module provides the appropriate resistor multiplexed output to the BCM over the panel lamps dimmer signal circuit. The BCM reads and responds to this input by providing the appropriate control outputs through internal HSDs over the courtesy lamps, panel lamps and reading lamps driver circuits, and by sending appropriate electronic **dimming level** messages to other electronic modules over the CAN data bus.

The dimmer module as well as the hard wired inputs and outputs of the module may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - DIMMER SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

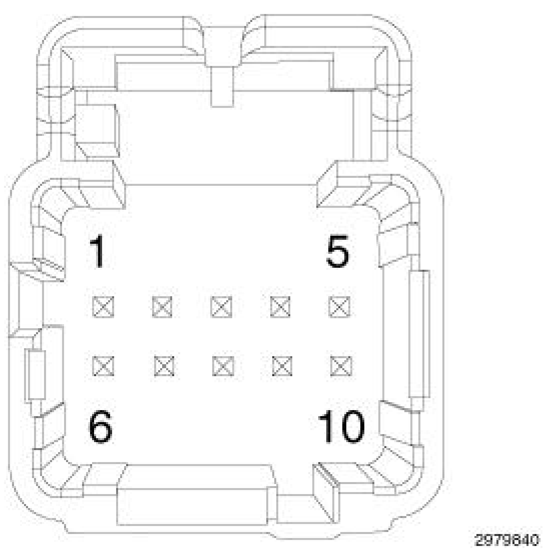


Fig. 29: Dimmer Switch Connector Terminal Identification
Courtesy of CHRYSLER GROUP, LLC

1. Remove the dimmer module from the instrument panel. Refer to SWITCH, DIMMER, REMOVAL.
2. Disconnect the instrument panel wire harness connector from the back of the dimmer module.

3. Using an ohmmeter, test the resistance between the terminals of the module as shown in the Dimmer Module Tests chart .

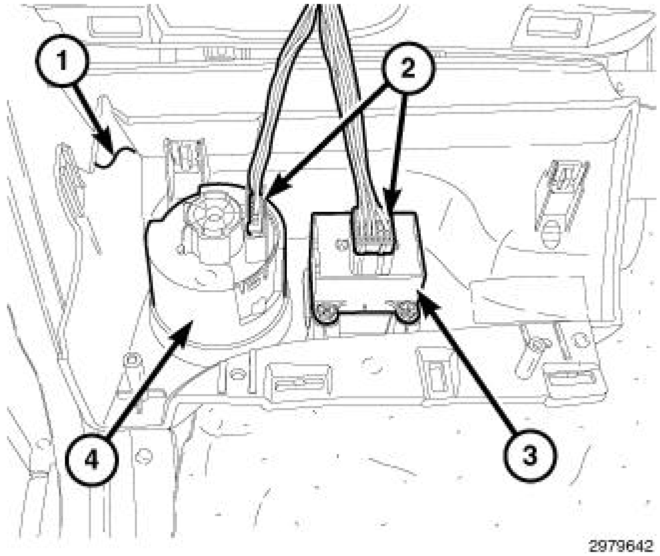
DIMMER MODULE TESTS	
SWITCH POSITION (PINS)	**RESISTANCE RANGE (OHMS)**
DOME DEFEAT (1 and 4)	8645 - 9555
PANEL DIMMER 1 (1 and 4)	2565 - 2835
PANEL DIMMER 2 (1 and 4)	1140 - 1260
PANEL DIMMER 3 (1 and 4)	646 - 714
PANEL DIMMER 4 (1 and 4)	417.78 - 426.22
PANEL DIMMER 5 (1 and 4)	256.5 - 283.5
PANEL DIMMER 6 (1 and 4)	180.18 - 183.82
PARADE MODE (1 and 4)	135.63 - 138.37
DOME ON (1 and 4)	172.26 - 175.74
AMBIENT DOME DEFEAT (1 and 5)	8645 - 9555
AMBIENT DIMMER 1 (1 and 5)	2565 - 2835
AMBIENT DIMMER 2 (1 and 5)	1140 - 1260
AMBIENT DIMMER 3 (1 and 5)	646 - 714
AMBIENT DIMMER 4 (1 and 5)	417.78 - 426.22
AMBIENT DIMMER 5 (1 and 5)	256.5 - 283.5
AMBIENT DIMMER 6 (1 and 5)	494.01 - 503.99
HEADLAMP LEVELING 0 (7 and 8)	172.26 - 175.74
HEADLAMP LEVELING 1 (7 and 8)	198 - 202
HEADLAMP LEVELING 2 (7 and 8)	575.19 - 586.81
SWITCH ILLUMINATION (2 and 3)	LEDs - SET MULTIMETER TO DIODE MODE - CONNECT PIN 3 TO PLUS (+), CONNECT PIN 2 TO MINUS (-) - LEDs SHOULD BARELY GLOW

4. If the module fails any of the tests, replace the ineffective dimmer module as required.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.



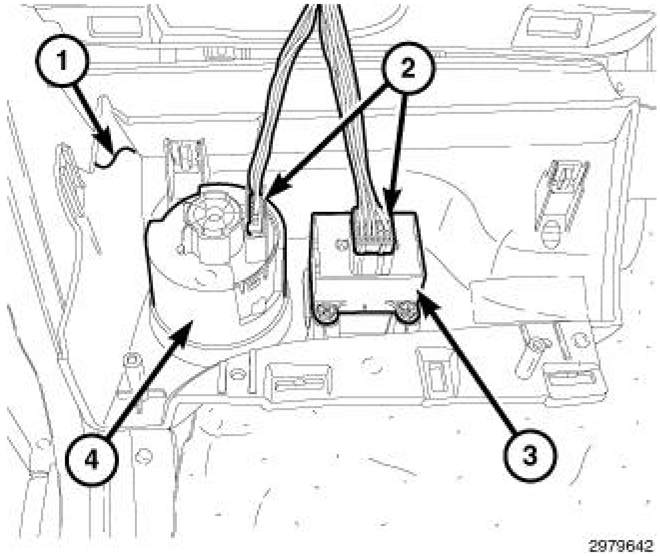
[Fig. 30: Trim Molding, Wire Harness Connector & Dimmer Module](#)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Using a trim stick or another suitable wide flat-bladed tool, gently and evenly pry around the perimeter of the instrument panel trim molding outboard of the steering column to unsnap the molding from the instrument panel.
3. Pull the trim molding (1) away from the instrument panel far enough to access and disconnect the instrument panel wire harness connector (2) from the dimmer module (3) connector receptacle.
4. Remove the three screws that secure the dimmer module to the back of the instrument panel trim molding.
5. Remove the dimmer module from the trim molding.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.



[Fig. 31: Trim Molding, Wire Harness Connector & Dimmer Module]

Courtesy of CHRYSLER GROUP, LLC

1. Position the dimmer module (3) onto the back of the driver side outboard instrument panel trim molding (1).
2. Install and tighten the three screws that secure the dimmer module to the trim molding. Tighten the screws securely.
3. Reconnect the instrument panel wire harness connector (2) to the dimmer module connector receptacle.
4. Align the snap clips on the back of the trim molding with the receptacles in the instrument panel outboard of the steering column. Using hand pressure, press firmly and evenly on the bezel until the clips snap into place.
5. Reconnect the battery negative cable.

SWITCH, DOOR AJAR

DESCRIPTION

DOOR

This vehicle has door ajar switches for each door. Each switch is concealed within and integral to its respective door latch unit. The switches are momentary leaf contact-type micro switch units that are actuated by the mechanisms internal to the door latch. An integral connector receptacle on each door latch connects the door ajar switch and the power lock motor to the vehicle electrical system through its respective door wire harness.

The door ajar switches cannot be adjusted or repaired and, if ineffective or damaged, the door latch unit must be replaced.

DECK LID

A deck lid ajar switch is standard equipment on this vehicle. The switch is concealed within and integral to the deck lid latch unit. The switch is a momentary leaf contact-type micro switch unit that is actuated by the deck lid latch mechanism. An integral connector receptacle on the deck lid latch connects the deck lid ajar switch to the vehicle electrical system through the body wire harness.

The deck lid ajar switch cannot be adjusted or repaired and, if ineffective or damaged, the deck lid latch unit must be replaced. Refer to **LATCH, REMOVAL** .

OPERATION

DOOR

The door ajar switches are actuated by the mechanisms internal to the door latch. When a door is closed and properly latched, its door ajar switch is an open circuit. When a door is open or only partially latched, the door ajar switch is a closed circuit. The door ajar switches are hard wired in series between a body ground and the Body Control Module (BCM). The BCM reads the hard wired door ajar switch inputs through internal pull-ups, then uses these inputs to control many electronic functions and features of the vehicle. The BCM also sends electronic **door ajar switch status** messages to other electronic modules in the vehicle over the Controller Area Network (CAN) data bus.

The door ajar switches as well as the hard wired inputs and outputs of the switches may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article.

DECK LID

The deck lid ajar switch is actuated by the deck lid latch mechanism. When the deck lid is closed and properly latched, the deck lid ajar switch is an open circuit. When the deck lid is open or only partially latched, the deck lid ajar switch is a closed circuit. The deck lid ajar switch is hard wired in series between a body ground and the Body Control Module (BCM). The BCM reads the hard wired liftgate ajar switch input through an internal pull-up, then uses this input to control many electronic functions and features of the vehicle. The BCM also sends electronic **deck lid ajar switch status** messages to other electronic modules in the vehicle over the Controller Area Network (CAN) data bus.

The deck lid ajar switch as well as the hard wired inputs and outputs of the switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article.

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Article GUID: A00735853

REMINDER INDICATOR (RESET PROCEDURES)

Chrysler / Dodge / Plymouth / RAM - 1978-17

EMISSIONS MAINTENANCE REMINDER (EGR)

NOTE: **To determine the appropriate reset procedure, refer to EMISSIONS MAINTENANCE REMINDER RESET INDEX. Only vehicles listed in this index have an EGR/Maintenance Required Warning Light reset.**

EMISSIONS MAINTENANCE REMINDER RESET INDEX

Model & Year	Reset Procedure
Colt & Colt Vista	
1978-94	Emissions Maintenance Reminder Reset - Procedure 1
Ram-50	
1985-93	Emissions Maintenance Reminder Reset - Procedure 1

EMISSIONS MAINTENANCE REMINDER RESET - PROCEDURE 1

1. On some models, an EGR or MAINTENANCE REQUIRED warning light in dash will come on as a reminder to have EGR system serviced (each 50,000 miles), oxygen sensor replaced (each 80,000 miles), or evaporative carbon canister replaced (100,000 miles).
2. After servicing or replacing components, reset mileage counter. Reset switch is located on back of instrument cluster. See **Fig. 1**, **Fig. 2** and **Fig. 3** . Slide switch to opposite side to reset indicator light.
3. Remove light bulb after 120,000 mile service on Ram-50.

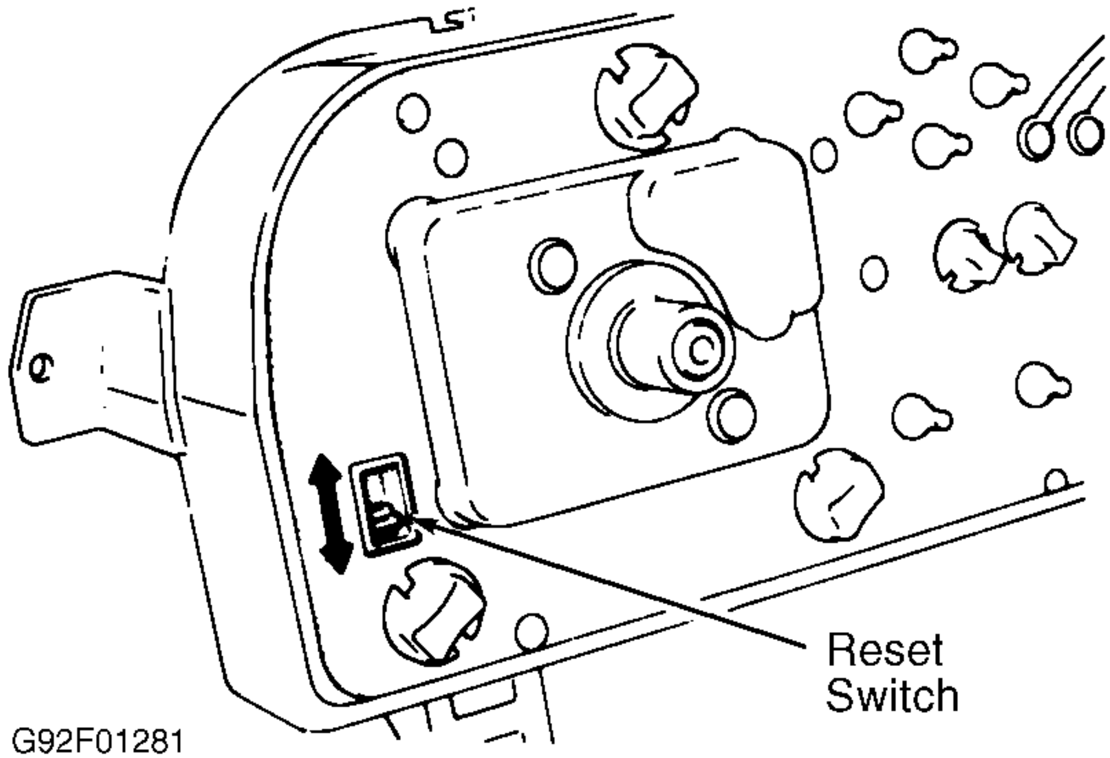

Fig. 1: Locating Warning Light Reset Switch (Colt Vista Shown; Colt Wagon Is Similar)
Courtesy of CHRYSLER CORP.

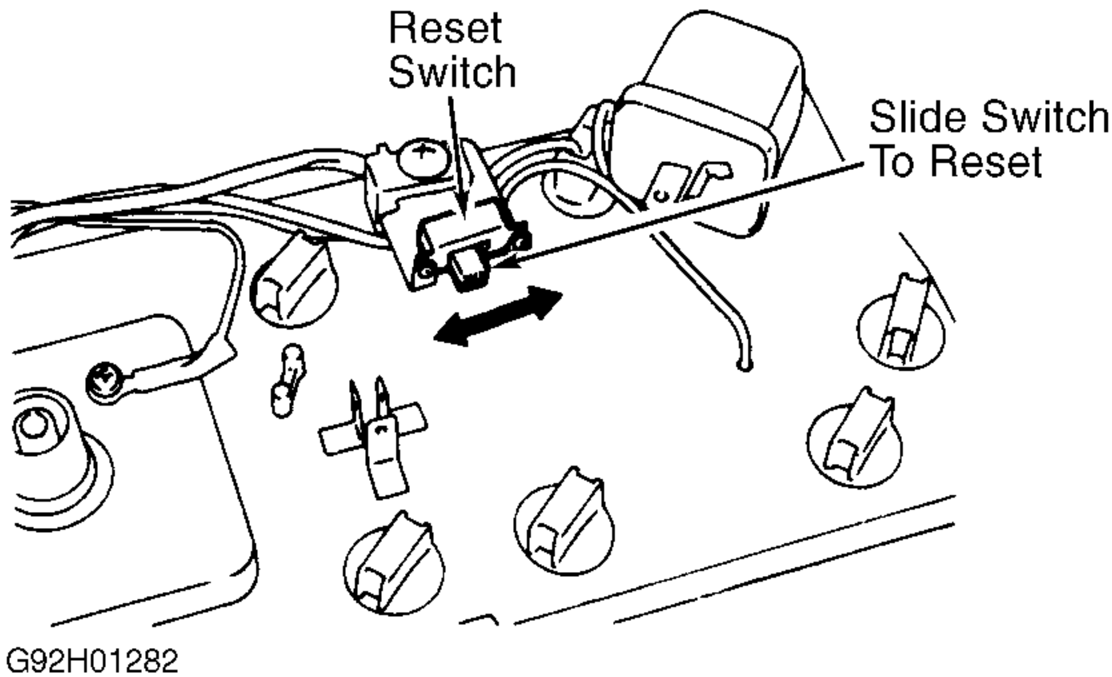

Fig. 2: Locating Warning Light Reset Switch (1985-86 Ram-50)
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

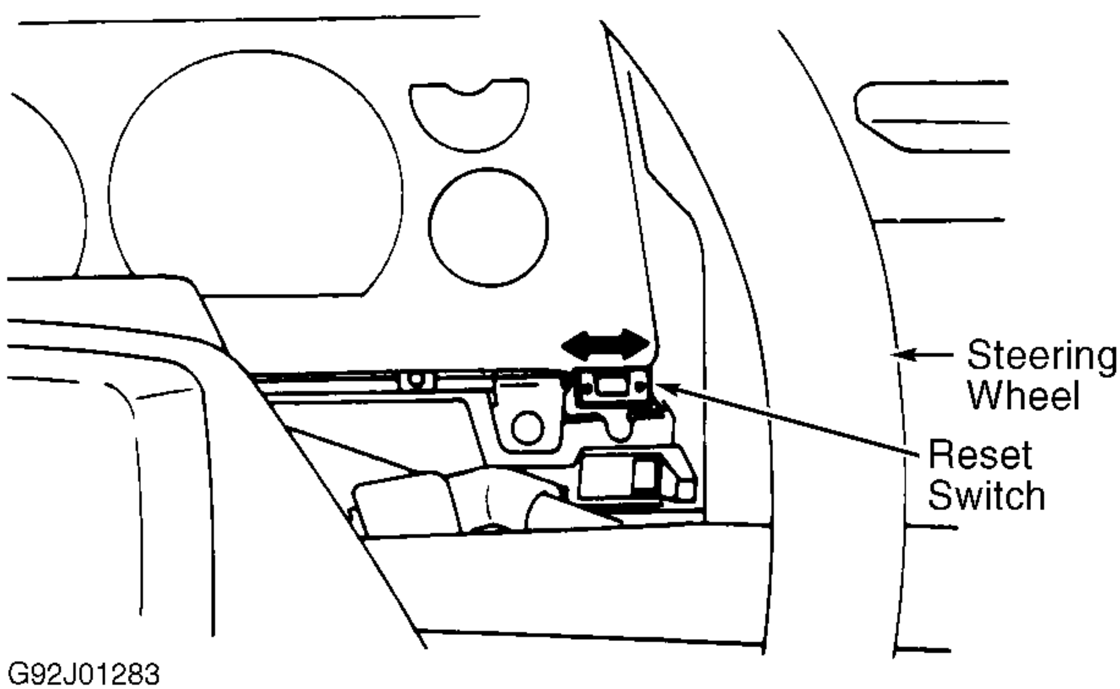

Fig. 3: Locating Warning Light Reset Switch (1987-93 Ram-50)
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

EMISSIONS MAINTENANCE REMINDER (EMR MILEAGE)

NOTE: **To determine the appropriate reset procedure, refer to EMISSIONS MAINTENANCE REMINDER RESET INDEX. Only vehicles listed in this index have a Emission Maintenance Reminder (EMR) mileage reset.**

EMISSIONS MAINTENANCE REMINDER RESET INDEX

Model & Year	Reset Procedure
Light Duty Trucks & Vans	
1989-92	Emissions Maintenance Reminder Reset - Procedure 1

EMISSIONS MAINTENANCE REMINDER RESET - PROCEDURE 1

NOTE: **If any other scan tool is used, use scan tool manufacturer's instructions.**

1. Attach DRB-II tester to diagnostic connector.
2. Turn ignition on but do not start engine.
3. Access SELECT SYSTEMS function of DRB-II tester.
4. Select appropriate engine.
5. Select with or without A/C.
6. Select FUEL & IGNITION.
7. Select ADJUSTMENTS.
8. Select RESET EMR LIGHT.
9. Reset EMR light.
10. When DRB-II is finished resetting light, DRB-II display will read EMR LIGHT IS RESET.

NOTE: **If Single Module Engine Controller (SMEC) or Single Board Engine Controller (SBEC) is replaced, vehicle mileage must be programmed back into the SMEC/SBEC. DRB-II tester MUST be used for this procedure. If the following procedure is not performed, EMR light will not turn on at the proper mileage intervals.**

EMISSIONS MAINTENANCE REMINDER (MAINT REQD OR CHECK EGR)

NOTE: **To determine the appropriate reset procedure, refer to EMISSIONS MAINTENANCE REMINDER RESET INDEX. Only vehicles listed in this index have a MAINT REQD OR CHECK EGR INDICATOR LIGHT reset.**

EMISSIONS MAINTENANCE REMINDER RESET INDEX

Model & Year	Reset Procedure
FWD Vans	
1987-88	Emissions Maintenance Reminder Reset - Procedure 1

Model & Year	Reset Procedure
Light Duty Trucks	
1988	Emissions Maintenance Reminder Reset - Procedure 1
RWD Vans	
1988	Emissions Maintenance Reminder Reset - Procedure 1

EMISSIONS MAINTENANCE REMINDER RESET - PROCEDURE 1

CAUTION: There is no test procedure for this system. Any attempt to test this system will damage system components.

The Service Reminder Indicator (SRI) module is not an emissions warning system. It is only a reminder to perform emissions servicing. Components to be serviced include the EGR system, PCV valve, oxygen sensor, delay valves, and bi-level purge valve.

The SRI module will illuminate the MAINT REQD or CHECK EGR light after a predetermined time. The light will remain on until the SRI module is reset by inserting a small screwdriver into the hole in the module (RWD only) and/or depressing the reset switch (FWD and RWD). Replace 9-volt battery (if equipped).

The SRI module is located on steering column, behind instrument panel on RWD vans and in instrument cluster, under fuel gauge, on FWD vans. See **Fig. 4** or **Fig. 5** . On light trucks except Dakota, SRI module is located behind the far right side of dash panel next to glove box. See **Fig. 6**. On Dakota models, module is located on bracket below headlight switch, on rear of instrument panel. See **Fig. 7**.

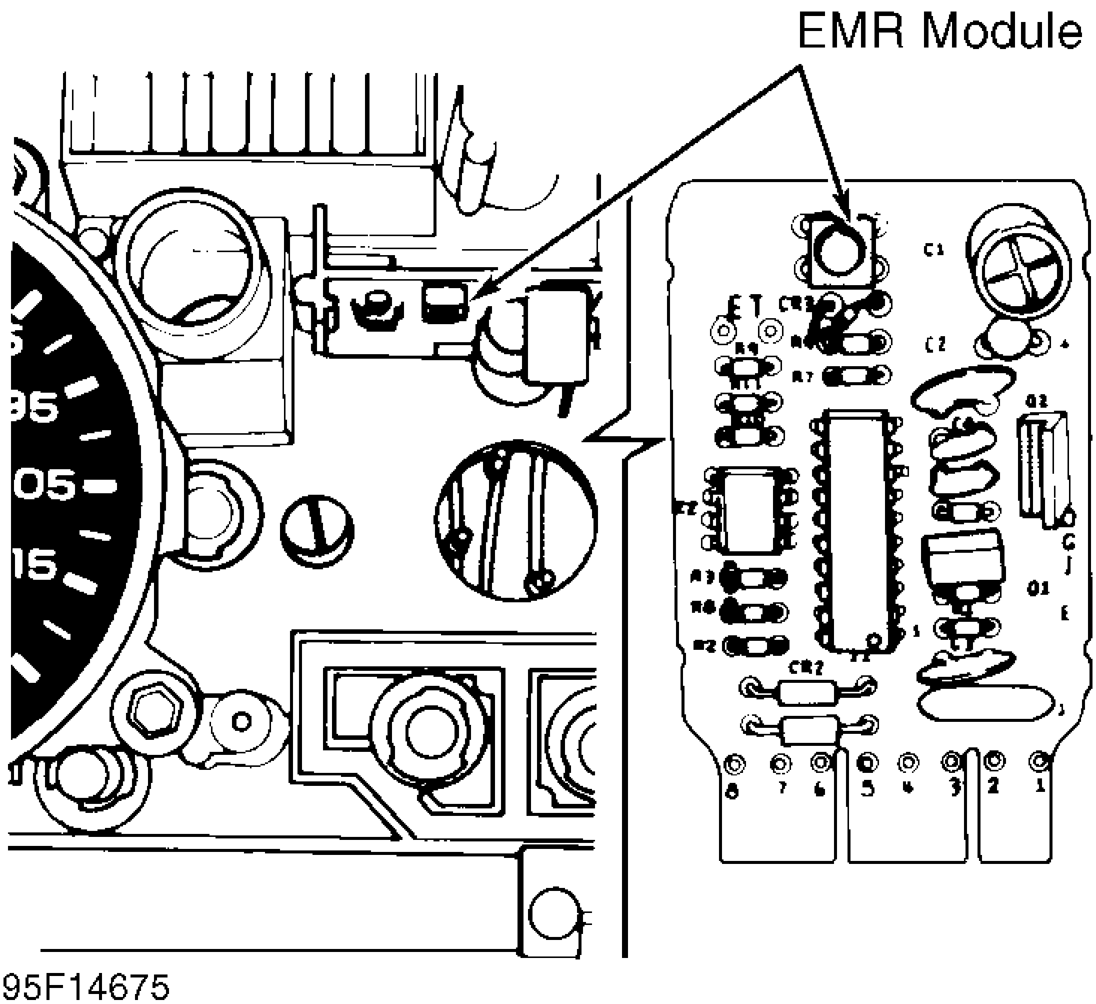

Fig. 4: Locating SRI Module (1987-88 FWD Vans)
Courtesy of CHRYSLER CORP.

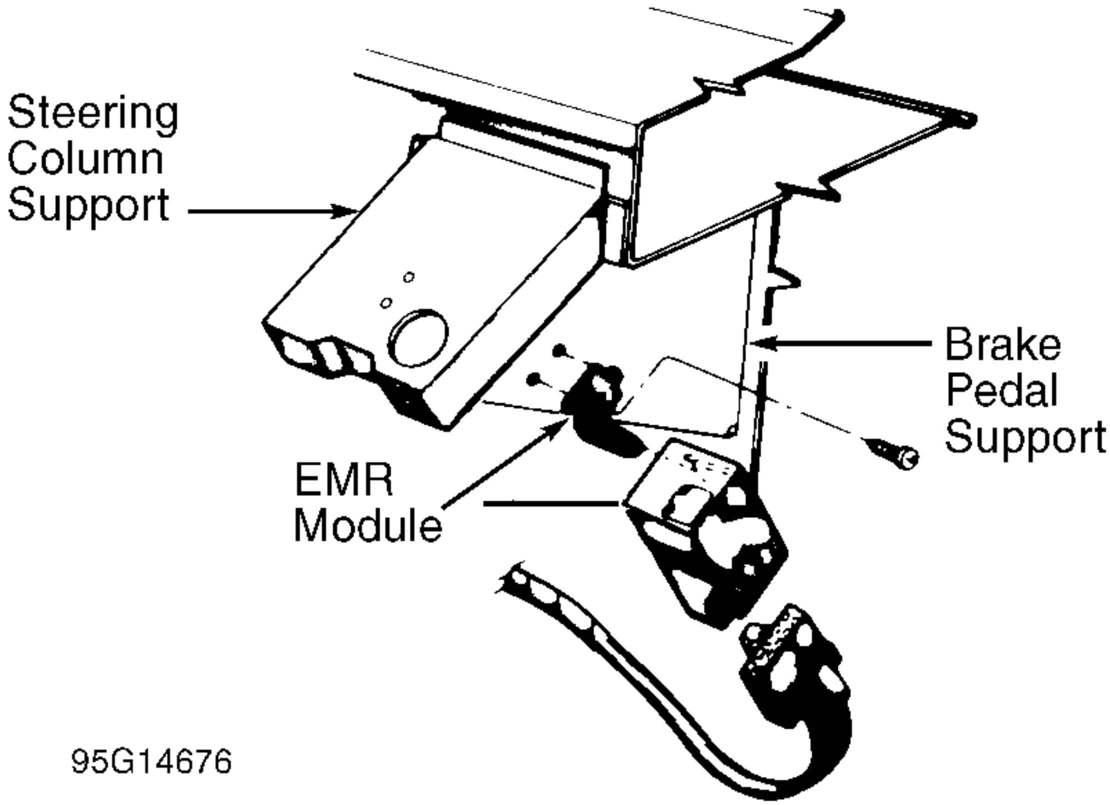

Fig. 5: Locating SRI Module (1988 RWD Vans)
Courtesy of CHRYSLER CORP.

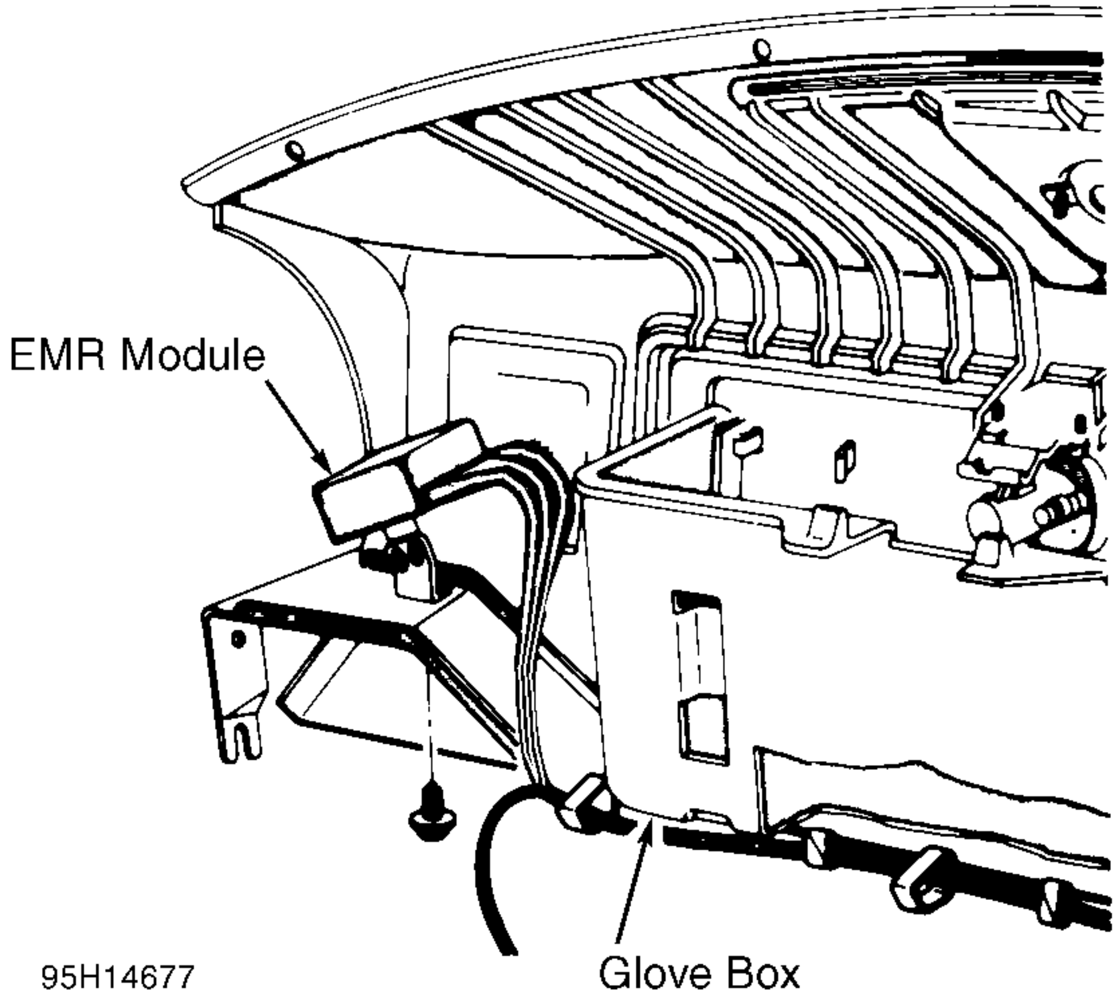

Fig. 6: Locating SRI Module (1988 Light Trucks Except Dakota)
Courtesy of CHRYSLER CORP.

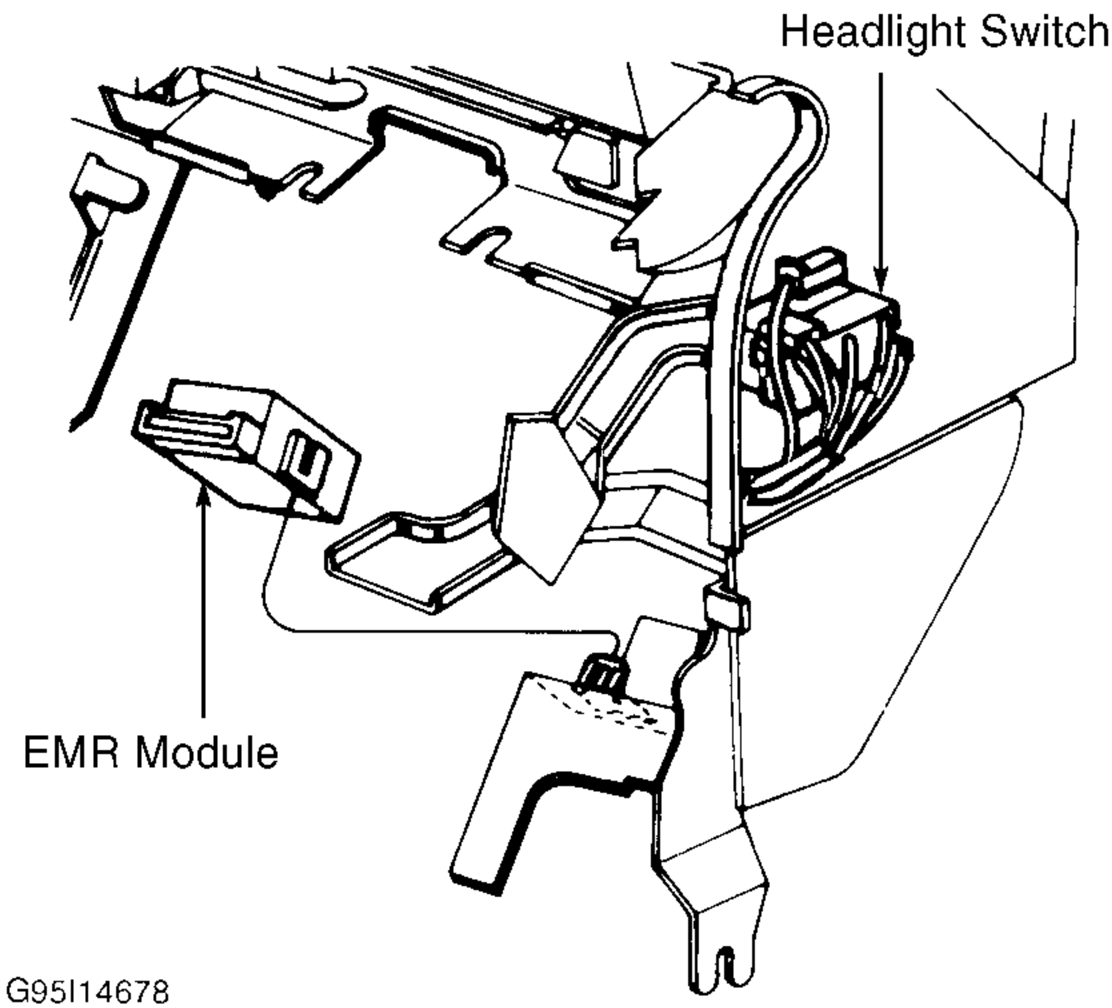

Fig. 7: Locating SRI Module (1988 Dakota)
Courtesy of CHRYSLER CORP.

EMISSIONS MAINTENANCE REMINDER (SRI)

NOTE: **To determine the appropriate reset procedure, refer to EMISSIONS MAINTENANCE REMINDER RESET INDEX. Only vehicles listed in this index have a MAINT REQD OR SRI LIGHT reset.**

EMISSIONS MAINTENANCE REMINDER RESET INDEX

Model & Year	Reset Procedure
Light Duty Trucks & Vans	
1993	Emissions Maintenance Reminder Reset - Procedure 1
Ram Pickup 2500/3500	
1994-02	Emissions Maintenance Reminder Reset - Procedure 2

EMISSIONS MAINTENANCE REMINDER RESET - PROCEDURE 1

The components to be serviced include the EGR system, PCV valve, oxygen sensor and some vacuum-operated components. SRI will illuminate after a predetermined mileage. To reset SRI, a Chrysler Diagnostic Readout Box (DRB) Tester or suitable scan tool is required.

1. Attach DRB tester to diagnostic connector. Turn ignition on, but do not start engine. Using DRB, perform Service Reminder Indicator (SRI) memory test. If DRB displays WRITE FAILURE, replace Powertrain Control Module (PCM).
2. If DRB displays WRITE REFUSED, go to step 4. If DRB displays SRI MILEAGE INVALID, update mileage and retest SRI memory. If DRB does not display SRI MILEAGE INVALID, compare SRI mileage stored with instrument panel odometer.
3. If mileage is same, retest SRI memory. If mileage is not same, update mileage and retest SRI memory.
4. PCM was busy. Using DRB, perform SRI memory test. Retest SRI memory 2 or more times, if necessary. If WRITE REFUSED trouble code returns, replace PCM. If WRITE REFUSED does not return, procedure is complete.

EMISSIONS MAINTENANCE REMINDER RESET - PROCEDURE 2

The components to be serviced include the EGR system, PCV valve, and oxygen sensor. The SRI or Maintenance Required will illuminate after a predetermined mileage. To reset the light, a Chrysler Diagnostic Readout Box (DRB) Tester or suitable scan tool is required. Follow scan tool manufacturer's information to reset SRI.

ENGINE OIL REPLACEMENT REMINDER

NOTE: **To determine the appropriate reset procedure, refer to ENGINE OIL REPLACEMENT REMINDER RESET INDEX. Only vehicles listed in this index have an Oil Change Required Message reset.**

ENGINE OIL REPLACEMENT REMINDER RESET INDEX

Model & Year	Reset Procedure
200	
2011-17	(1) Engine Oil Replacement Reminder Reset - Procedure 1
300	
2008-17	(1) Engine Oil Replacement Reminder Reset - Procedure 1
Aspen	
2008-09	Engine Oil Replacement Reminder Reset - Procedure 1
Avenger	
2008-14	Engine Oil Replacement Reminder Reset - Procedure 1
Caliber	
2008-12	Engine Oil Replacement Reminder Reset - Procedure 1
Challenger	
2008-17	(1) Engine Oil Replacement Reminder Reset - Procedure 1
Charger	
2008-17	(1) Engine Oil Replacement Reminder Reset - Procedure 1
Crossfire	

Model & Year	Reset Procedure
2004-08	Engine Oil Replacement Reminder Reset - Procedure 4
Dakota	
2008-11	Engine Oil Replacement Reminder Reset - Procedure 1
Dart	
2013-16	(1) Engine Oil Replacement Reminder Reset - Procedure 1
Dodge Pickup	
2008-10	Engine Oil Replacement Reminder Reset - Procedure 1
Durango	
2008-17	(1) Engine Oil Replacement Reminder Reset - Procedure 1
Grand Caravan	
2007-17	(1) Engine Oil Replacement Reminder Reset - Procedure 1
Journey	
2010-17	(1) Engine Oil Replacement Reminder Reset - Procedure 1
Magnum	
2008	Engine Oil Replacement Reminder Reset - Procedure 1
Nitro	
2008-11	Engine Oil Replacement Reminder Reset - Procedure 1
Pacifica	
2008 & 2017	Engine Oil Replacement Reminder Reset - Procedure 1
RAM C/V Tradesman	
2012-15	Engine Oil Replacement Reminder Reset - Procedure 1
RAM Pickup (1500/ 2500/ 3500)	
2011-14	Engine Oil Replacement Reminder Reset - Procedure 1
2015-17	Vehicles NOT Equipped with Passive Entry Engine Oil Replacement Reminder Reset - Procedure 2 Vehicles Equipped with Passive Entry Engine Oil Replacement Reminder Reset - Procedure 3
RAM ProMaster (1500/ 2500/ 3500)	
2014-17	Engine Oil Replacement Reminder Reset - Procedure 1
RAM ProMaster City	
2015-17	Engine Oil Replacement Reminder Reset - Procedure 1
Sebring	
2008-10	Engine Oil Replacement Reminder Reset - Procedure 1
Town & Country	
2008-16	Engine Oil Replacement Reminder Reset - Procedure 1
(1) On some vehicles Procedure 2 may also reset the Engine Oil Replacement Reminder.	

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 1

NOTE: **On some vehicles Procedure 2 may also reset the Engine Oil Replacement Reminder.**

NOTE: The Oil Change Required message can be temporarily turned off by pressing and releasing the Trip Odometer button in instrument cluster.

To reset oil change indicator after performing scheduled maintenance:

1. Turn ignition to ON/RUN, with engine OFF.

   NOTE: On vehicles with keyless START, without pressing the brake pedal, push the ENGINE START/STOP button and cycle the ignition to the ON/RUN position (DO NOT START the engine).

2. Fully depress accelerator pedal slowly 3 times within 10 seconds.
3. Turn ignition to OFF/LOCK.

   NOTE: On vehicles with keyless START, without pressing the brake pedal, push the ENGINE START/STOP button once to return the ignition to the OFF/LOCK position.

4. Start engine. If indicator message illuminates when engine is started, repeat reset procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 2

NOTE: For vehicles NOT equipped with Passive Entry.

NOTE: The manufacturer describes this procedure as a "Secondary Method Of Navigating To The Oil Life Screen In The DID And Holding OK". This method may not be appropriate for all vehicles.

1. Without pushing the brake pedal, push the engine START/STOP button and cycle the ignition to the ON/RUN position (DO NOT START the engine).
2. Push and release the DOWN arrow button (steering wheel) to scroll downward through the main menu to "Vehicle Info".
3. Push and release the RIGHT arrow button to access the "Oil Life" screen.
4. Push and hold the OK button to reset of the Oil Life.

   NOTE: If conditions are met, the gauge and numeric display will update to show 100%. If conditions are not met a popup message of "To reset oil life engine must be off with ignition in run" will be displayed (for 5 seconds), and the user will remain at the Oil Life screen.

5. Push and release the UP arrow button to exit the screen.

NOTE: If the indicator message illuminates when you start the vehicle, the oil change indicator system did not reset. If necessary, repeat this procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 3

NOTE: For vehicles equipped with Passive Entry.

1. Without pushing the brake pedal, push the engine START/STOP button and cycle the ignition to the ON/RUN position (DO NOT START the engine).
2. Push and release the DOWN arrow button (steering wheel) to scroll downward through the main menu to "Vehicle Info".
3. Push and release the right arrow button to access the "Vehicle Info" screen, then scroll up or down to select "Oil Life".
4. Push and hold the right arrow button to select "Reset".
5. Push and release the down arrow button to select "Yes," then push and release the right arrow button to select reset of the Oil Life to 100%.
6. Push and release the up arrow button to exit the instrument cluster display screen.

NOTE: **If the indicator message illuminates when you start the vehicle, the oil change indicator system did not reset. If necessary, repeat this procedure.**

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 4

The Flexible Service System (FSS) is a demand-activated engine oil service system. The FSS will illuminate a symbol (2) in the instrument cluster to indicate to the driver when a particular service is due. See **Fig. 8**. After a level has dropped below a warning threshold, the remaining distance or the remaining time and the tool symbol (2) are displayed in the panel of the odometer. The counter can be reset after the indicated service has been performed.

NOTE: **The FSS display can be called up for approximately ten seconds with the display illuminated by pressing the knob/button to the left of the display twice within one second.**

1. Turn the ignition key to the ON/RUN position.
2. Within one second press the knob/button to the left of the display twice. See **Fig. 8**.
3. The present status for days remaining or distance traveled is displayed. Within ten seconds turn the key to OFF.
4. Press and hold the knob/button to the left of the display, while turning the key to ON/RUN again. The present status for days remaining or distance traveled is displayed once more. Continue to hold the knob/button to the left of the display.
5. Release the knob/button to the left of the display. After approximately ten seconds, a tone sounds and the display shows 7,000 miles (11,000 km) for approximately ten seconds.

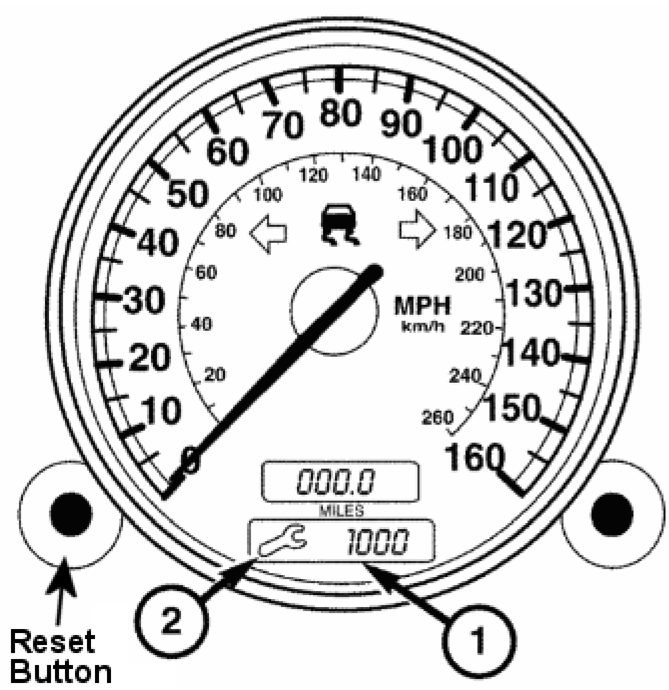

Fig. 8: Identifying FSS Display And Reset Button
Courtesy of CHRYSLER CORP

MAINTENANCE SERVICE REMINDER (ASSYST MAINTENANCE COMPUTER)

NOTE: **To determine the appropriate reset procedure, refer to MAINTENANCE SERVICE REMINDER RESET INDEX. Only vehicles listed in this index have an ASSYST Maintenance Computer reset.**

MAINTENANCE SERVICE REMINDER RESET INDEX

Model & Year	Reset Procedure
Sprinter	
2003-09	Maintenance Service Reminder Reset - Procedure 1

MAINTENANCE SERVICE REMINDER RESET - PROCEDURE 1

When a service as been performed, the ASSYST maintenance computer can be reset as follow:

1. Turn the key to position 2 in the ignition lock and immediately press the "mi" ("km") button twice and hold. Keep the "mi" ("km") button pressed.
2. Within 10 seconds, return the key to position 0 in the ignition lock.
3. Continue to press and hold the "mi" ("km") button. Turn the key to position 2 in the ignition lock. Keep the "mi" ("km") button pressed.
4. The maintenance indicator with the current remaining time/distance is shown.
5. After about 10 seconds, an acoustic signal will sound and the maintenance indicator is displayed with the new remaining time/distance.
6. Release the "mi" ("km") button.

MAINTENANCE SERVICE REMINDER (PERFORM SERVICE)

NOTE: **To determine the appropriate reset procedure, refer to MAINTENANCE SERVICE REMINDER RESET INDEX. Only vehicles listed in this index have a Perform Service Message reset.**

PERFORM SERVICE MESSAGE RESET INDEX

Model & Year	Reset Procedure
300M	
2001-04	Maintenance Service Reminder Reset - Procedure 1
Caravan & Grand Caravan	
2003-07	Maintenance Service Reminder Reset - Procedure 2
Concorde	
2001-04	Maintenance Service Reminder Reset - Procedure 1
Intrepid	
2001-04	Maintenance Service Reminder Reset - Procedure 1
LHS	
2001	Maintenance Service Reminder Reset - Procedure 1
Dodge Pickup 1500	
2002	Maintenance Service Reminder Reset - Procedure 3
Town & Country	
2003-07	Maintenance Service Reminder Reset - Procedure 4

MAINTENANCE SERVICE REMINDER RESET - PROCEDURE 1

The PERFORM SERVICE message is a warning message delivered from the Electronic Vehicle Information Center (EVIC). This indicates that regular maintenance is due. After regular required maintenance is performed, the counter is reset by pressing and holding the reset button for 3 seconds.

MAINTENANCE SERVICE REMINDER RESET - PROCEDURE 2

1. The Electronic Vehicle Information Center (EVIC) displays a PERFORM SERVICE message when distance to service interval has been reached, indicating that regular service and maintenance is due. After performing necessary services, reset service distance by selecting a distance to service interval.
2. To program EVIC, turn ignition switch to ON position. Depress and release MENU push button until SERVICE INTV. = is displayed. Press and release STEP button to step through available options. The last selected distance option displayed becomes the service interval at which the PERFORM SERVICE message will be displayed.
3. If a new distance interval is selected, RESET SERVICE DISTANCE? with a yes or no option. When YES is selected, the accumulated distance since the last previous PERFORM SERVICE message will be reset to zero because the service interval has been changed. When NO is selected, the distance until the next PERFORM SERVICE message is reduced by the accumulated distance since the last pervious message.
4. EVIC exits programming mode and returns to its normal operation mode when the C/T button is depressed or when the end of the programmable feature menu list is reached, whichever occurs first.

MAINTENANCE SERVICE REMINDER RESET - PROCEDURE 3

The Vehicle Information Center (VIC) displays a PERFORM SERVICE message. PERFORM SERVICE message is displayed when "miles/kms" to service is zero, indicating that regular service and maintenance is due. After performing necessary services, reset service distance by pressing the STEP button when in this display will select "Yes" or "No".

MAINTENANCE SERVICE REMINDER RESET - PROCEDURE 4

1. The Electronic Vehicle Information Center (EVIC) displays a PERFORM SERVICE message when distance to service interval has been reached, indicating that regular service and maintenance is due. After performing necessary services, reset service distance by selecting a distance to service interval.
2. To program EVIC, turn ignition switch to ON position. Depress and release MENU push button until SERVICE INTV. = is displayed. Press and release STEP button to step through available options. The last selected distance option displayed becomes the service interval at which the PERFORM SERVICE message will be displayed.
3. If a new distance interval is selected, RESET SERVICE DISTANCE? with a yes or no option. When YES is selected, the accumulated distance since the last previous PERFORM SERVICE message will be reset to zero because the service interval has been changed. When NO is selected, the distance until the next PERFORM SERVICE message is reduced by the accumulated distance since the last pervious message.
4. EVIC exits programming mode and returns to its normal operation mode when the C/T button is depressed or when the end of the programmable feature menu list is reached, whichever occurs first.

MAINTENANCE SERVICE REMINDER (SERVICE REMINDER INDICATOR)

NOTE: **To determine the appropriate reset procedure, refer to MAINTENANCE SERVICE REMINDER RESET INDEX. Only vehicles listed in this index have a Service Reminder Indicator Light reset.**

SERVICE REMINDER INDICATOR LIGHT RESET INDEX

Model & Year	Reset Procedure
Models With Electronic Type Counter	
1980	Maintenance Service Reminder Reset - Procedure 1
Monaco	
1990-92	Maintenance Service Reminder Reset - Procedure 2

MAINTENANCE SERVICE REMINDER RESET - PROCEDURE 1

NOTE: **This procedure is for models with Electronic Type Mileage Counter.**

A mileage counter activates the service reminder indicator between 12,000 and 30,000 mile intervals, depending on whether mechanical or electronic type is used. On 1987 Dakota models, mileage counter in the odometer will illuminate reminder light at 52,500, 82,500 and 105,000 miles.

The electronic type uses a 9-volt battery which supplies power to the electronic counter, preventing memory loss when vehicle battery is disconnected.

NOTE: **Vehicle battery must be connected during resetting procedure to prevent power loss to memory.**

To reset electronic type, locate Green, Red, White or Tan plastic case behind instrument panel in lower left cluster area. Slide case from bracket and open cover. Remove 9-volt battery, and insert a small rod or screwdriver into hole in switch, closing contacts. Replace battery with a new 9-volt alkaline type. Close case. Slide case back into bracket. See Fig. 9.

NOTE: **Some models use a non-resettable mileage counter. Replace it with a resettable type.**

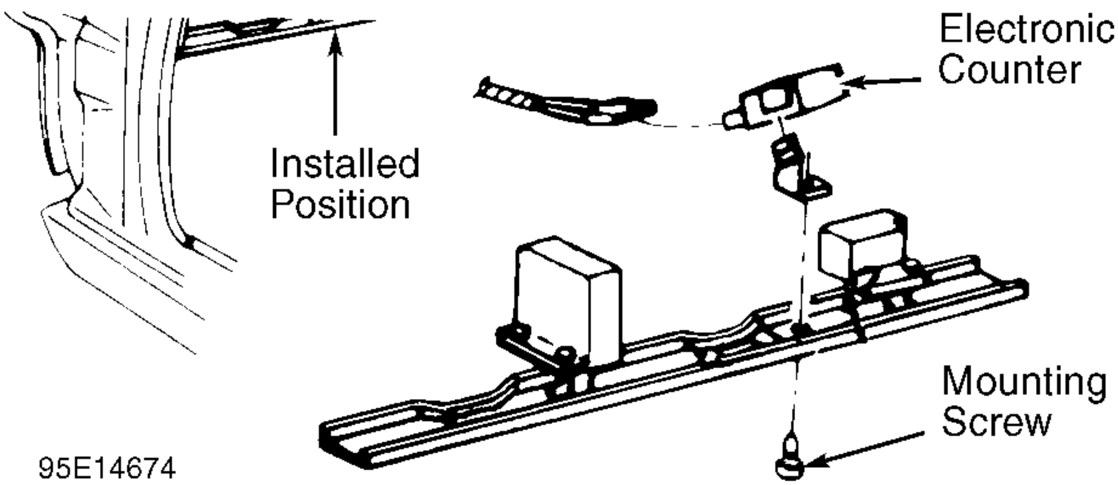

Fig. 9: Chrysler Electronic Type Reset Switch
Courtesy of CHRYSLER CORP.

MAINTENANCE SERVICE REMINDER RESET - PROCEDURE 2

Every 7500 miles, a Vehicle Maintenance Monitor (VMM) will illuminate a SERVICE interval reminder indicator light. This indicates regular maintenance is due. After required service is performed, press RESET button on dash below VMM display. Hold button until a beep is heard. VMM display will now be clear.

MAINTENANCE SERVICE REMINDER (SERVICE REMINDER MESSAGE)

NOTE: **To determine the appropriate reset procedure, refer to MAINTENANCE SERVICE REMINDER RESET INDEX. Only vehicles listed in this index have a Service Reminder Message reset.**

SERVICE REMINDER MESSAGE RESET INDEX

Model & Year	Reset Procedure
Imperial	
1990	Maintenance Service Reminder Reset - Procedure 2
Lebaron	
1990	Maintenance Service Reminder Reset - Procedure 2
New Yorker	

Model & Year	Reset Procedure
1988-89	Maintenance Service Reminder Reset - Procedure 1
1990	Maintenance Service Reminder Reset - Procedure 2

MAINTENANCE SERVICE REMINDER RESET - PROCEDURE 1

Every 7500 miles or 12 months which ever comes first, a service reminder message on Electronic Vehicle Information Center (EVIC) display will illuminate, indicating an oil change is due. The EVIC is an optional accessory located in the overhead console.

Pressing INFO button with the ignition on will activate a MONITORED SYSTEMS OK message on the display if all systems are operating properly. If service is required, SERVICE REMINDER message will be displayed. Pressing the RESET button after message has been displayed will clear the message.

MAINTENANCE SERVICE REMINDER RESET - PROCEDURE 2

Every 7500 miles or 12 months which ever comes first, a service reminder message on Electronic Vehicle Information Center (EVIC) display will illuminate, indicating an oil change is due. The EVIC is an optional accessory located in the overhead console.

Pressing INFO button with the ignition on will activate a MONITORED SYSTEMS OK message on the display if all systems are operating properly. If service is required, SERVICE REMINDER message will be displayed. To clear message, press INFO button and within 5 seconds, press SET button.

TIRE PRESSURE MONITOR SYSTEM REMINDER

NOTE: **To determine the appropriate reset procedure, refer to TPMS RESET INDEX. Only vehicles listed in this index have a TPMS reset.**

TPMS RESET INDEX

Model & Year	Reset Procedure
200	
2011-17	TPMS Reminder Reset - Procedure 1
300	
2005-18	TPMS Reminder Reset - Procedure 1
300M	
2002-04	TPMS Reminder Reset - Procedure 1
Aspen	
2007-09	TPMS Reminder Reset - Procedure 1
Avenger	
2008-14	TPMS Reminder Reset - Procedure 1
Caliber	
2007-12	TPMS Reminder Reset - Procedure 1
Caravan & Grand Caravan	
2005-17	TPMS Reminder Reset - Procedure 1
Challenger	

Model & Year	Reset Procedure
2008-18	TPMS Reminder Reset - Procedure 1
Charger	
2006-18	TPMS Reminder Reset - Procedure 1
Crossfire	
2005-08	TPMS Reminder Reset - Procedure 2
Concorde	
2002-04	TPMS Reminder Reset - Procedure 1
Dakota	
2008-11	TPMS Reminder Reset - Procedure 4
Dart	
2013-16	TPMS Reminder Reset - Procedure 1
Dodge Pickup (1500/ 2500/ 3500) (1)	
2008-10	TPMS Reminder Reset - Procedure 1
Durango	
2007-18	TPMS Reminder Reset - Procedure 1
Journey	
2009-10	TPMS Reminder Reset - Procedure 4
2011-18	TPMS Reminder Reset - Procedure 1
Nitro	
2007-11	TPMS Reminder Reset - Procedure 1
Magnum	
2006-08	TPMS Reminder Reset - Procedure 1
Pacifica	
2004-08 & 2017-18	TPMS Reminder Reset - Procedure 1
Prowler	
2002	TPMS Reminder Reset - Procedure 3
PT Cruiser	
2008-10	TPMS Reminder Reset - Procedure 1
RAM C/V Tradesman	
2012-15	TPMS Reminder Reset - Procedure 5
RAM Pickup (1500/ 2500/ 3500) (1)	
2011-18	TPMS Reminder Reset - Procedure 5
RAM ProMaster (1500/ 2500/ 3500)	
2014-18	TPMS Reminder Reset - Procedure 1
RAM ProMaster City	
2015-18	TPMS Reminder Reset - Procedure 1
Sebring	
2007-10	TPMS Reminder Reset - Procedure 1
Sprinter	
2007-09	TPMS Reminder Reset - Procedure 1

Model & Year	Reset Procedure
Town & Country	
2002-16	TPMS Reminder Reset - Procedure 1
Viper	
2005-10	TPMS Reminder Reset - Procedure 6
2013-17	TPMS Reminder Reset - Procedure 1
(1) Some early Dodge/RAM Pickup 3500 and Cab & Chassis models may not be equipped with TPMS.	

TPMS REMINDER RESET - PROCEDURE 1

NOTE: **Some early Dodge/RAM Pickup 3500 and Cab & Chassis models may not be equipped with TPMS.**

NOTE: **In a low tire pressure siuation, the TPMS indicator light (and message) will turn OFF only after the tires are inflated to the vehicles recommended cold placard pressure value. The vehicle may need to be driven for up to 20 minutes above 20 mph (32 km/h) in order for the TPMS to determine that the inflation pressures are correct.**

Once a sensor has been replaced and vehicle has remained stationary for more than 20 minutes, drive vehicle for a minimum of 20 minutes while maintaining a continuous speed above 20 mph (32 km/h). During this time, the system will learn the new sensor ID code and will clear any DTCs automatically. If a sensor cannot be trained, see appropriate manufacturer service information.

NOTE: **The sensor IDs can also be programmed using the TPM-RKE Analyzer Tool. Scan each TPM sensor at each road wheel, and store each Sensor ID in the correct location (Left Front, Left Rear, Right Front, and Right Rear). Connect the TPM-RKE Analyzer Tool to the Scan Tool. Then follow the programming steps outlined in the diagnostic Scan Tool for "Program Tire Pressure Sensor ID w/ TPM Tool".**

TPMS REMINDER RESET - PROCEDURE 2

TPMS Indicator Reset

Once a sensor has been replaced and vehicle has remained stationary for more than 20 minutes, drive vehicle for a minimum of 10 minutes while maintaining a continuous speed above 20 mph (32 km/h). During this time, the system will learn the new sensor ID code and will clear any DTCs automatically. If a sensor cannot be trained, see appropriate manufacturer service information.

Tire Sensors Programming

WARNING: **In the following procedure, Relearn Magnet (8821) is used. Death or serious injury can occur if magnetically sensitive devices are exposed to the retraining magnet used in the TPM system. Magnets can affect pacemakers.**

NOTE: **If a tire is changed (tire rotation), one or more tire pressure sensors fail, or if TPM module is replaced, the TPM system needs to relearn tire pressure sensor**

IDs. To perform this procedure, a Chrysler DRB-IIIÃ® scan tool and a Relearn Magnet (8821) must be used.

NOTE: **The vehicle's tires must not have been rotated above 5 mph (8 km/h) in the last 2 minutes prior to programming.**

1. Connect Chrysler DRB-IIIÃ® scan tool to vehicle's Data Link Connector (DLC), which is located beneath instrument panel, near steering column.
2. Using scan tool, access "CHASSIS SYSTEM".
3. Once in "CHASSIS SYSTEM", select "MISCELLANEOUS FUNCTIONS".
4. Select "TRAIN ALL MODE" from the menu selections. Select "YES" to continue.
5. Place Relearn Magnet (8821) over the valve stem for the left front wheel.
6. Each sensor/transmitter will automatically sense the presence of the magnet and begin transmitting. When the tire pressure sensor on each wheel has been programmed, the DRB-IIIÃ® will automatically beep and direct you to the next wheel to be programmed. Move the magnet to each of the remaining wheels as directed by scan tool.
7. Remove magnet from last tire to be programmed (left rear wheel).
8. Once "TRAINING COMPLETED" is displayed, exit the program function screen and use the following to verify TPM functionality:
   - Verify TPM module programming is complete by viewing the "INPUT/OUTPUT DISPLAY" selection of the DRB-IIIÃ® and confirming the tire pressure sensors are trained.
   - Verify TPM module programming is complete by viewing the "SENSOR DISPLAY" selection of the DRB-IIIÃ® and confirming the tire pressure sensor pressure readings are accurate.

TPMS REMINDER RESET - PROCEDURE 3

NOTE: **If a tire is changed (tire rotation), one or more tire pressure sensors fail, or if TPM module is replaced, the TPM system needs to relearn tire pressure sensor IDs. The procedure is similar to Tire Sensors Programming in TPMS RESET - PROCEDURE 2.**

When tire pressure is low, the "Low Tire" Pressure Indicator Lamp signal circuit will be pulsed to ground by the TPM module for two seconds on and then two seconds off, over and over. The BCM will then illuminate the "Low Tire" Pressure Indicator Lamp at the same rate and sound the audible chime as one single long tone.

When tire pressure is critical, the low tire pressure warning lamp signal circuit will be pulsed to ground by the low tire pressure warning module for one second on and then one second off, over and over. The BCM will then illuminate the "Low Tire" Pressure Indicator Lamp and sound the audible chime at the rate of one second on and one second off.

In either case, the TPM module will continue to pulse to ground the "Low Tire" Pressure Indicator Lamp signal circuit until the sensor/transmitter(s) transmits a pressure above the calibrated thresholds (and car is then driven above 20 mph (32 km/h)) or the ignition is turned off. If the conditions has not been corrected when the ignition is turned off, the indicator lamp will remain off when the ignition is turned on again until the vehicle reaches a speed of approximately 20 mph (32 km/h).

NOTE: **In the event a diagnostic trouble code (DTC) is set, the "Low Tire" Pressure Indicator Lamp will illuminate continuously until the ignition is turned off. A low tire pressure condition cannot set a diagnostic trouble code (DTC).**

TPMS REMINDER RESET - PROCEDURE 4

The TPMS will not turn off the indicator lamp until the tire pressure is at or above the Low Pressure (lamp) OFF threshold. The system will automatically update and the TPM indicator lamp will extinguish once the updated tire pressures have been received.

NOTE: **If a tire pressure sensor has been replaced, the TPM system needs to relearn tire pressure sensor IDs.**

Wireless Control Module (WCM): The WCM automatically learns and stores new sensor IDs while driving "within 10-20 minutes continuously above 15 mph (24 km/h)" after a sensor has been replaced. The learning sequence will initiate when the vehicle has been stopped for more then 20 minutes.

A new sensor ID can also be programmed directly into the WCM by using an RKE-TPM Analyzer in conjunction with a Scan Tool. Scan each TPM sensor at each road wheel, and store each Sensor ID in the correct location. (Left Front, Left Rear, Right Front, and Right Rear) Connect the TPM-RKE Analyzer Tool to the Scan Tool. Then follow the programming steps outlined in the diagnostic Scan Tool for "Program Tire Pressure Sensor ID w/ TPM Tool"

For further information, refer to the Owners Manual or the Appropriate Diagnostic Information.

TPMS REMINDER RESET - PROCEDURE 5

NOTE: **Some early Dodge/RAM Pickup 3500 and Cab & Chassis models may not be equipped with TPMS.**

There are two tire pressure monitoring systems available, a base system and a premium system. The base system does not specify how many tires are low or where they are located. The premium system does indicate which tire is low. Sensor types are the Tire Pressure Monitoring (TPM) module for the 2500/3500 series, or the Wireless Ignition Node (WIN) for the 1500 series.

Base Tire Pressure Monitoring System:

The TPMS will not turn off the indicator lamp until the tire pressure is at or above specified tire pressure. The system will automatically update and the TPM indicator lamp will extinguish once the updated tire pressures have been received.

Premium Tire Pressure Monitoring System:

If the TPMS detects that the tire pressure in any road tire is going low, a chime will sound and the indicator lamp will turn on. In addition to the chime and lamp, a graphic display of the pressure value(s) and position of the low tire(s) will flash in the Electronic Vehicle Information Center (EVIC). Once pressure in the suspect tire(s) raises above the specified tire pressure, and the TPM module receives a valid transmission from the sensor the lamp will go out. If a system fault is detected due to a missing sensor signal, in addition to a chime and a indicator lamp flashing, a "Check TPM System" text message will be displayed in the instrument cluster,

and the tire pressure graphic display will display "- -" in place of the pressure value. After the flash sequence the TPM indicator lamp will remain illuminated. The system will return to normal once the TPM module receives a valid transmission from that sensor location. If a system fault is detected, the indicator lamp will flash on/off for 75 seconds and then remain on solid.

Base and Premium Systems:

NOTE:	**If a tire pressure sensor has been replaced, the TPM system needs to relearn tire pressure sensor IDs.**

The WIN or TPM automatically learns and stores the sensor IDs while driving "within 10-20 minutes continuously above 15 mph (24 km/h)" after a sensor has been replaced. The learning sequence will initiate after the vehicle has been stopped for more than 20 minutes.

A new sensor ID can also be programmed directly into the WIN or TPM module by using a RKE-TPM Analyzer in conjunction with a Scan Tool. Once the new sensor ID has been programmed, the vehicle will need to be driven above 15 mph until the fault is no longer active (lamp extinguishes) and display is updated (for up to 20 minutes).

NOTE:	**The matching full size spare wheel and tire assembly (if equipped) has a TPM sensor. The spare can be used in place of any of the four road tires. The TPMS will only monitor the pressure in the full size spare when it is used in place of a road tire. Otherwise, a spare with pressure below the low-pressure limit will not cause the TPMS indicator light to illuminate or the chime to sound.**

TPMS REMINDER RESET - PROCEDURE 6

NOTE:	**If tires have been rotated or a tire pressure sensor has been replaced, the tire pressure sensors must be retrained. Refer to the following procedure to program the module for identification of one new or all tire pressure sensor/transmitters.**

NOTE:	**The vehicle's tires must not have been rotated above 5 mph (8 km/h) in the last two minutes prior to programming.**

1. Connect a DRBIIIÃ® scan tool to the vehicle's diagnostic connector beneath the instrument panel, to the right of the steering column.
2. Access the Chassis System using the DRBIII.
3. Once in the Chassis System, select Tire Pressure Monitor, followed by Miscellaneous.
4. Select the appropriate function from the next screen displaying the following options:
    - Program LF Pressure Sensor
    - Program RF Pressure Sensor
    - Program RR Pressure Sensor
    - Program LR Pressure Sensor
    - Program Module (4 Sensors)
    - Monitor

5. Place a magnet (or special tool 8821), at the valve stem for that wheel as directed by the DRBIII. If the Program Module function has been chosen, the DRBIII will direct you to the left front wheel pressure sensor/transmitter first.

NOTE: **When programming the module (all four sensor/transmitters), the magnet should be moved from wheel to wheel in a clockwise direction starting at the left front wheel.**

6. When that wheels pressure sensor/transmitter has been programmed, the DRBIII will display Program Transmitter Complete or will automatically direct you to the next wheel sensor/transmitter to be programmed.
7. Remove the magnet and if programming the entire module, move the magnet to each of the remaining wheels as directed by the DRBIII. Each sensor/transmitter will automatically sense the presence of the magnet and begin programming.
8. Once Program Transmitter Complete is displayed, exit the program function screen.
9. Verify that the module programming is complete by looking at the tire pressure sensor/transmitter ID's in the Sensor Display using the DRBIII.

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Article GUID: A00287594

2015-16 MANUAL TRANSMISSION

TR6060 - Service Information - 5.7L & 6.4L - Challenger

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - MANUAL TRANSMISSION - TR6060

LOW LUBRICANT LEVEL

A low transmission lubricant level is generally the result of a leak, inadequate lubricant fill, or an incorrect lubricant level check.

Leaks can occur at the mating surfaces of the gear case or from the front/rear seals. A suspected leak could also be the result of an overfill condition.

Leaks at the rear of the housing will be from the oil seals. Leaks at component mating surfaces will probably be the result of inadequate sealer, gaps in the sealer, incorrect bolt tightening, use of a non-recommended sealer or incorrect/damaged gasket(s), if equipped.

A leak at the front of the transmission will be from either the front bearing retainer or retainer seal. Lubricant may be seen dripping from the clutch housing after extended operation. If the leak is severe, it may also contaminate the clutch disc causing the disc to slip, grab, and/or chatter.

A correct lubricant level check can only be made when the vehicle is level. Also allow the lubricant to settle for a minute or so before checking. These recommendations will ensure an accurate check and avoid an underfill or overfill condition. Always check the lubricant level after any addition of fluid to avoid an incorrect lubricant level condition.

HARD SHIFTING

Hard shifting can be caused by a low lubricant level, improper or contaminated lubricants. The consequence of using non-recommended lubricants is noise, excessive wear, internal bind, and hard shifting. Substantial lubricant leaks can result in gear, shift rail, synchronizer, and bearing damage. If a leak goes undetected for an extended period, the first indications of component damage are usually hard shifting and noise.

Shift component damage, incorrect clutch adjustment or a worn or damaged clutch pressure plate or disc are additional probable causes of increased shift effort. If clutch problem is advanced, gear clash during shifts can result. Worn or damaged synchronizer rings can cause gear clash when shifting into any forward gear. In some new or rebuilt transmissions, new synchronizer rings may tend to stick slightly causing hard or noisy shifts. In most cases, this condition will decline as the rings wear-in.

TRANSMISSION NOISE

Most manual transmissions make some noise during normal operation. Gears can generate a rotational noise or rattle that is audible during idle in neutral, or generate a mild whine that is audible during regular driving. These conditions are normal and do not require repair.

Severe, highly audible transmission noise is generally the initial indicator of a lubricant problem. Insufficient, improper or contaminated lubricant will promote rapid wear of gears, synchros, shift rails, forks and bearings.

The overheating caused by a lubricant problem, can also lead to gear and bearing damage.

STANDARD PROCEDURE

STANDARD PROCEDURE - DRAIN AND FILL

CAUTION: Hypoid gear lube must not be used in this transmission. Use of hypoid gear lube will cause hard shifting effort/transmission failure.

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

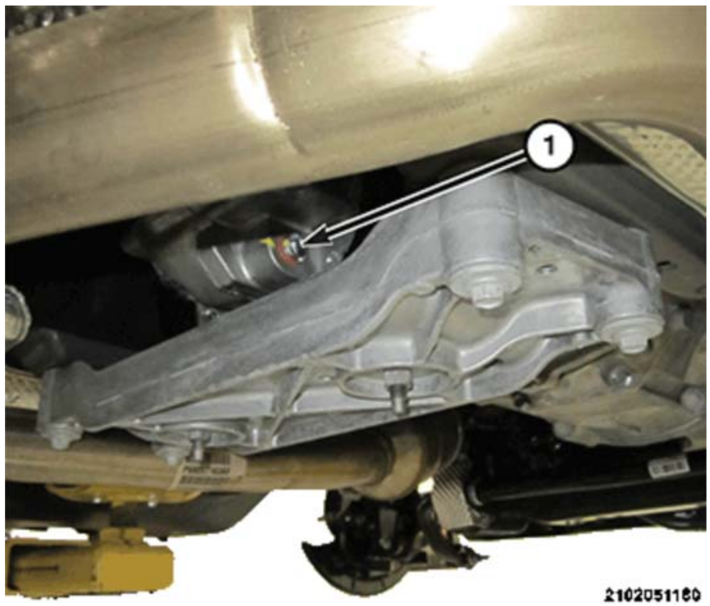


Fig. 1: Transmission Drain Plug
Courtesy of CHRYSLER GROUP, LLC

2. Remove transmission drain plug (1) and drain the transmission fluid.
3. Install transmission drain plug (1) and tighten to the proper **SPECIFICATIONS** .

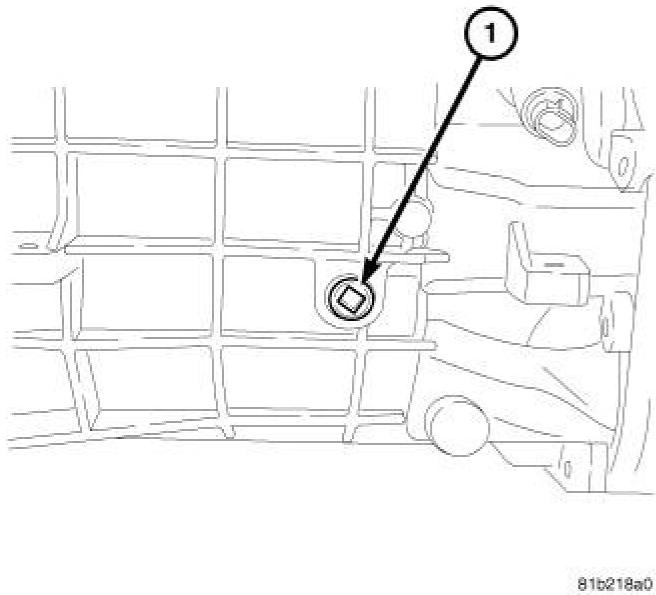


Fig. 2: Fill Plug
Courtesy of CHRYSLER GROUP, LLC

4. Remove the transmission fill plug (1).
5. Fill the transmission with the specified fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** . The transmission is full when the fluid level is 1/4 inch below the bottom of the fill hole on the left side of the transmission case.
6. Install the transmission fill plug (1) and tighten to the proper **SPECIFICATIONS** .

ADJUSTMENTS

ADJUSTMENTS

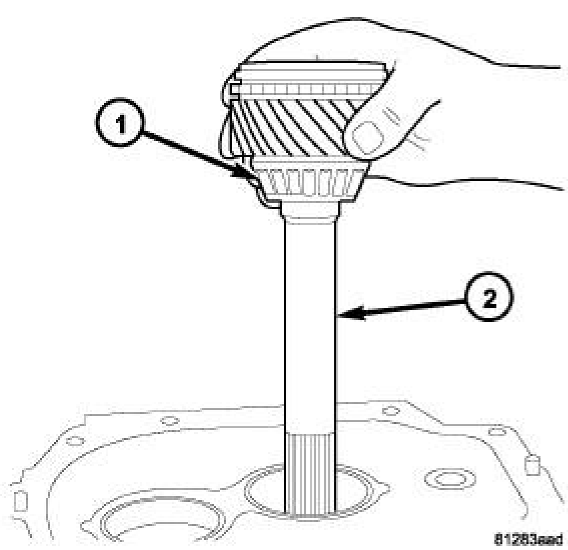


Fig. 3: Input Shaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure must be performed, when an input shaft (2) or tapered bearing (1) has been replaced. The measurement is performed with all shims removed from the front adapter.**

1. Install the input shaft (2) into the adapter.

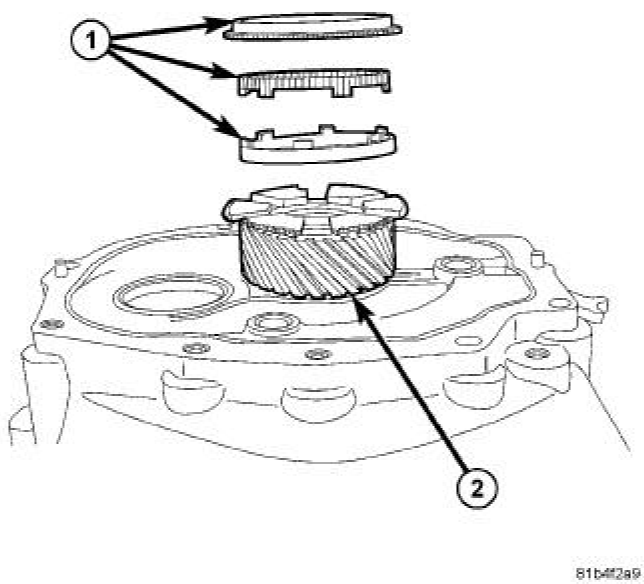
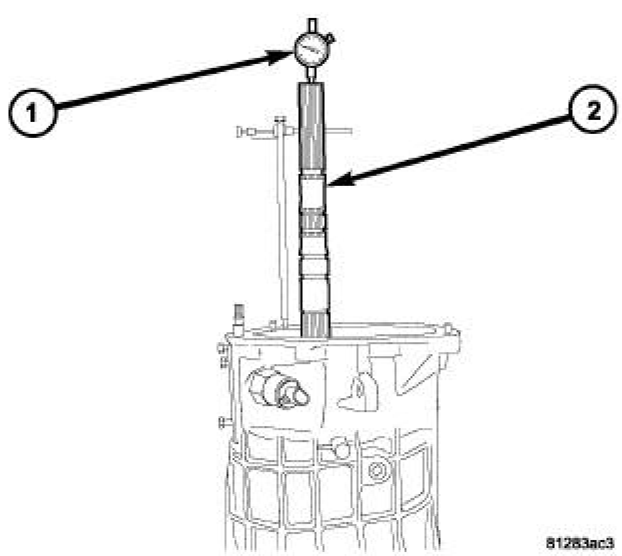


Fig. 4: Input Shaft & Fourth Gear Synchro Rings
Courtesy of CHRYSLER GROUP, LLC

2. Install the fourth gear synchronizer rings (1) on the input shaft (2).
3. Install mainshaft and countershaft.
4. Install the case on the adapter and tighten the bolts to the proper **SPECIFICATIONS** .

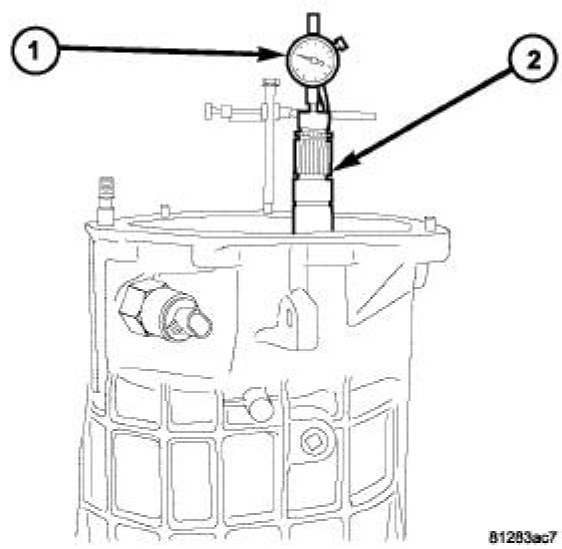
MAINSHAFT BEARINGS END-PLAY



[Fig. 5: Mainshaft & Dial Indicator]
Courtesy of CHRYSLER GROUP, LLC

1. Rotate input shaft/mainshaft several time to seat the bearings.
2. Screw dial indicator Stud (special tool #8161, Adapter Rod) into the case.
3. Attach a dial indicator (1) to the stud and set dial indicator (1) plunger on the end of the mainshaft (2).
4. Zero the dial indicator (1), then push up on the input shaft and record the dial indicator end-play measurement.
5. Subtract 0.0127 - 0.0889 mm (0.0005 - 0.0035 in.) from the recorded dial indicator end-play measurement. The remainder is the shim thickness needed behind the input shaft bearing cup in the front adapter.

COUNTERSHAFT BEARINGS END-PLAY



[Fig. 6: Identifying Countershaft & Dial Indicator]
Courtesy of CHRYSLER GROUP, LLC

1. Rotate countershaft several time to seat the bearings.
2. Screw Stud (special tool #8161, Adapter Rod) into the case.
3. Attach a dial indicator (1) to the stud and set dial indicator (1) plunger on the end of the countershaft (2).
4. Zero dial indicator, then pull up on the countershaft and record the dial indicator end-play measurement.
5. Subtract 0.0127 - 0.0889 mm (0.0005 - 0.0035 in.) from the recorded dial indicator end-play measurement. The remainder is the shim thickness needed behind the countershaft bearing cup in the front adapter.

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Shifter Assembly Bolts	19	-	168	Ā
Shift Lever Bolts	19	-	168	Ā
Top Cover Bolts	20	15	-	Ā
Extension Housing Nuts	48	35	-	Ā
Extension Housing Bolts	48	33	-	Ā
Adapter Bolts	34	25	-	Ā
* Side Shift Detent	40	30	-	Ā
* Roller Detent Bolt	40	30	-	Ā
Back Up Lamp Switch	34	25	-	Ā
Skip Shift Solenoid	34	25	-	Ā
Drain Plug	27	20	-	Ā
Fill Plug	27	20	-	Ā
Clutch Housing Bolts	34	25	-	Ā
Clutch Release Bearing/Slave Cylinder Bolts	28	21	-	Ā
Reverse Lockout Solenoid Bolt	18	13	-	Ā
Guide Plate Bolts	22	16	-	Ā
*Shift Lever Guide Bolts	27	20	-	Ā
* Reverse Idler Bracket Bolts	30	22	-	Ā
*Flywheel Bolts	75	55	-	X
Crossmember Bolts	61	45	-	Ā
Transmission Isolator To Crossmember Nuts	54	40	-	Ā
Transmission Isolator To Transmission Bolts	33	24	-	Ā
Top Transmission To Engine Studs	45	33	-	Ā
Front Transmission To Engine Bolts	45	33	-	Ā
Bottom Transmission To Oil Pan Bolts	45	33	-	Ā
Inspection Cover Bolt	11	-	95	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				
* Needs application of Mopar Lock AND Seal Adhesive or equivalent				

GENERAL SPECIFICATIONS

SHAFT END-PLAY

SHAFT	END-PLAY
MAINSHAFT	0.0127 - 0.0889 mm (0.0005 - 0.0035 in.)
COUNTERSHAFT	0.0127 - 0.0889 mm (0.0005 - 0.0035 in.)

GEAR RATIO

Ā	5.7L/6.4L	6.2L
Ā	**GEAR**	**RATIO**
FIRST	2.97	2.26
SECOND	2.10	1.58
THIRD	1.46	1.19
FOURTH	1.00	1.00
FIFTH	0.74	0.76
SIXTH	0.50	0.63
REVERSE	2.90	2.90

REMOVAL

REMOVAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the exhaust. Refer to **CONVERTER, CATALYTIC, REMOVAL** .
3. Remove the drive shaft. Refer to **REMOVAL** .

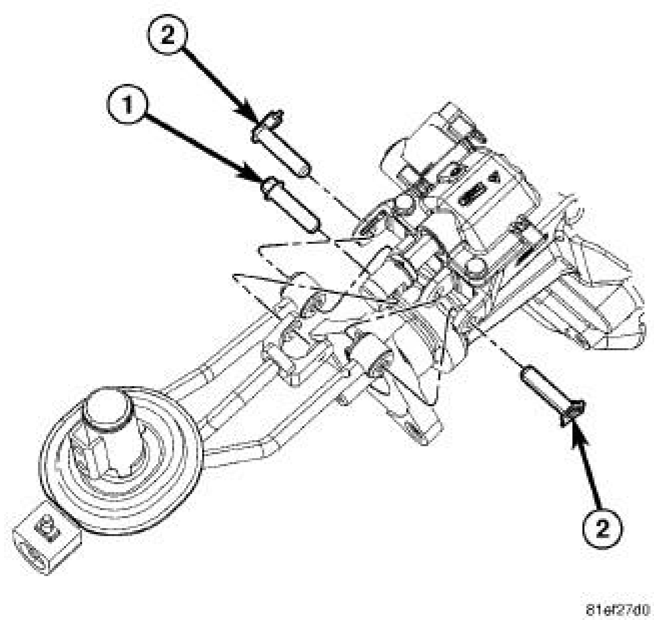


Fig. 7: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

4. Remove the shift linkage bolt (1) and the retaining pins (2), then separate the shift linkage from the transmission.

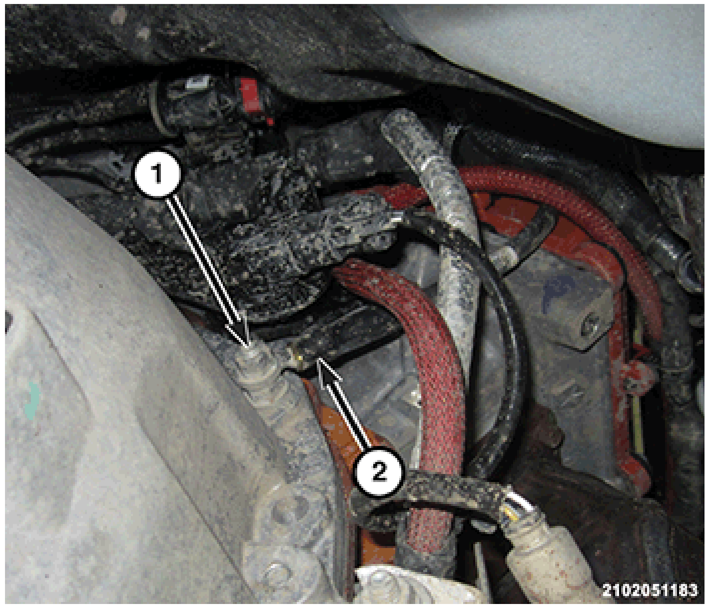


Fig. 8: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

5. Remove the ground wire nut (1) and position aside the ground wire (2).

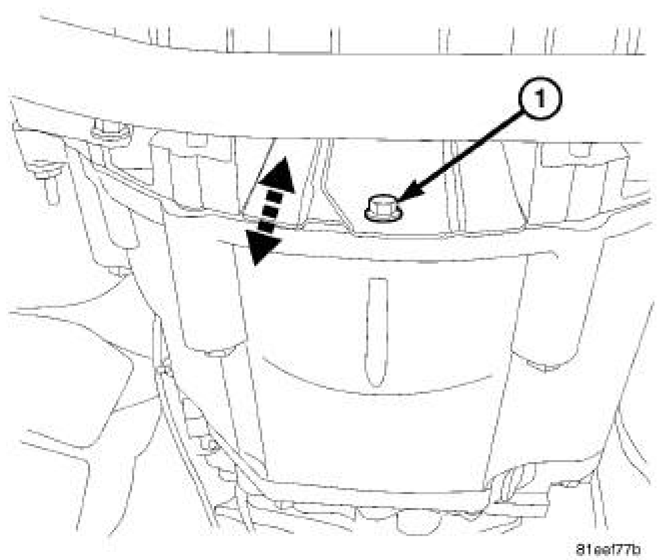


Fig. 9: Inspection Cover
Courtesy of CHRYSLER GROUP, LLC

6. Remove the inspection cover bolt (1) and the inspection cover.

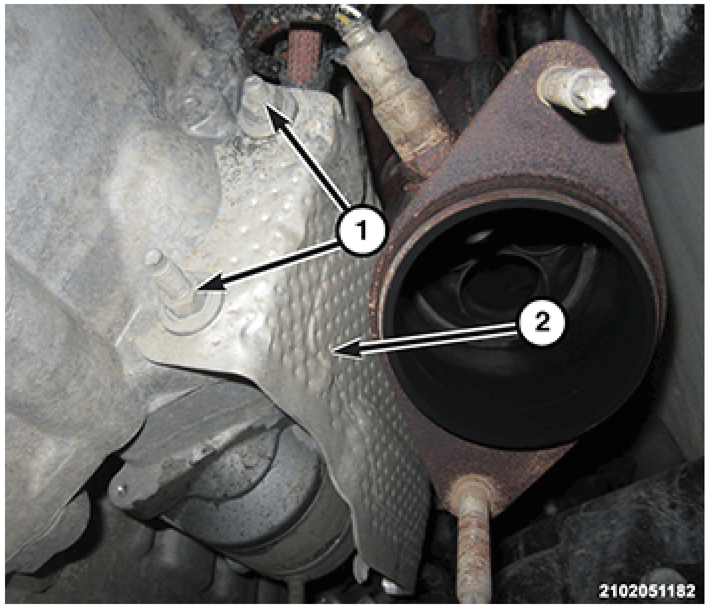


Fig. 10: Starter Heat Shield & Nuts
Courtesy of CHRYSLER GROUP, LLC

7. Remove the starter heat shield nuts (1) and the starter heat shield (2).

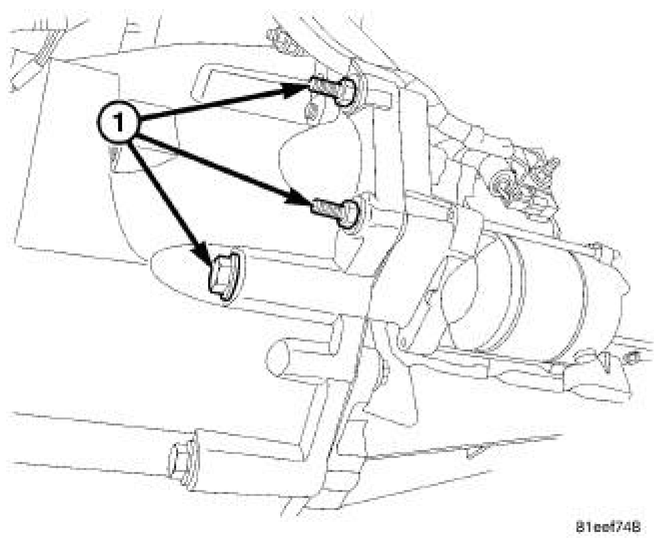


Fig. 11: Starter Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Remove the starter bolts (1) and securely position the starter aside.

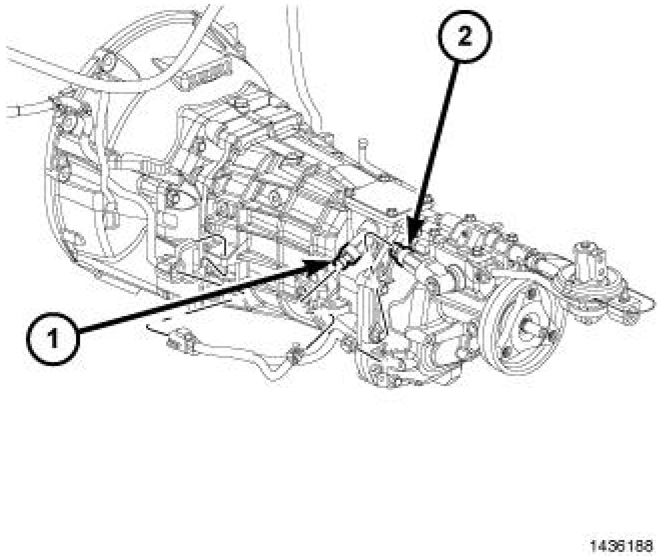


Fig. 12: Skip Shift & Reverse Lockout Solenoids
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the transmission skip shift solenoid wire harness connector (1) and the transmission reverse lockout solenoid wire harness connector (2).

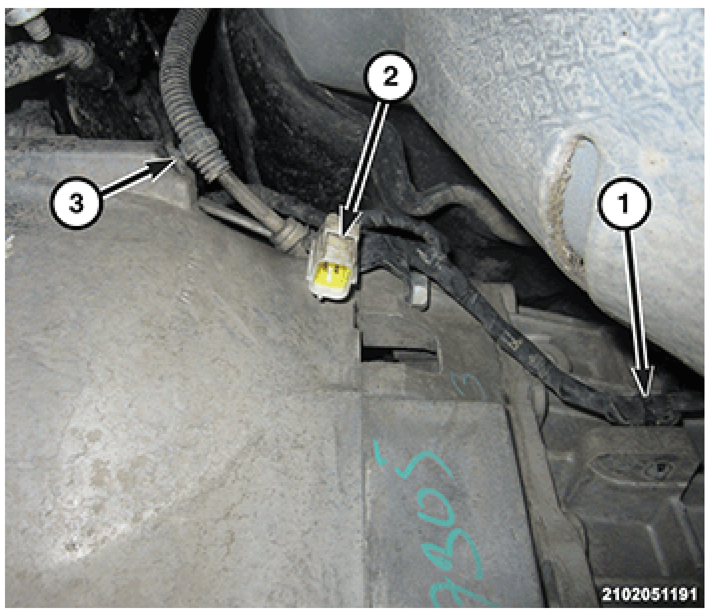


Fig. 13: Wire Harness Connector & Harness Clips
Courtesy of CHRYSLER GROUP, LLC

10. Remove push pin wiring connectors (1 and 2) and the clutch hydraulic tube push pin (3) from the transmission.

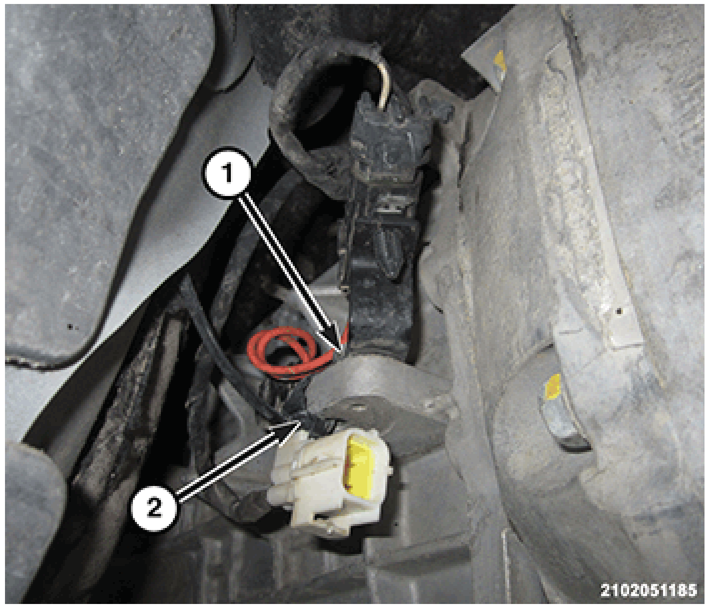


Fig. 14: Push Pin Wiring Connectors & Harness Clips
Courtesy of CHRYSLER GROUP, LLC

11. Remove push pin wiring connectors (1 and 2) from the transmission.

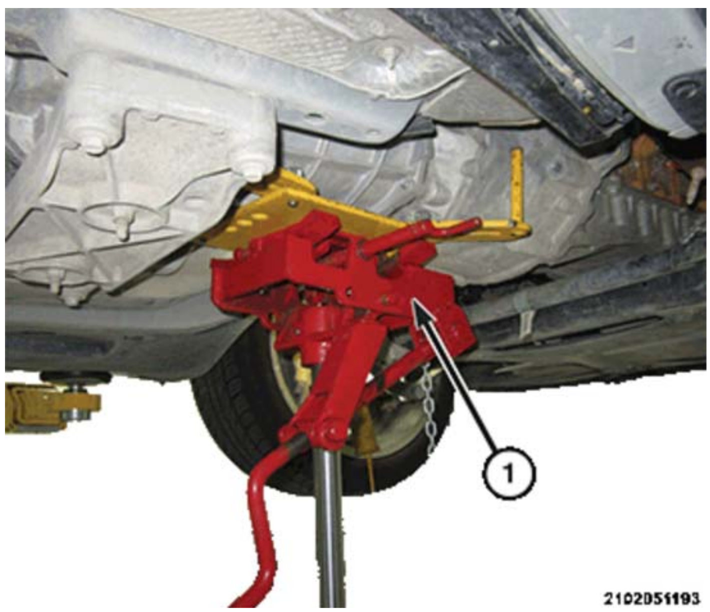


Fig. 15: Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

12. Raise the transmission slightly with the transmission jack (1) and relieve the load on the crossmember.

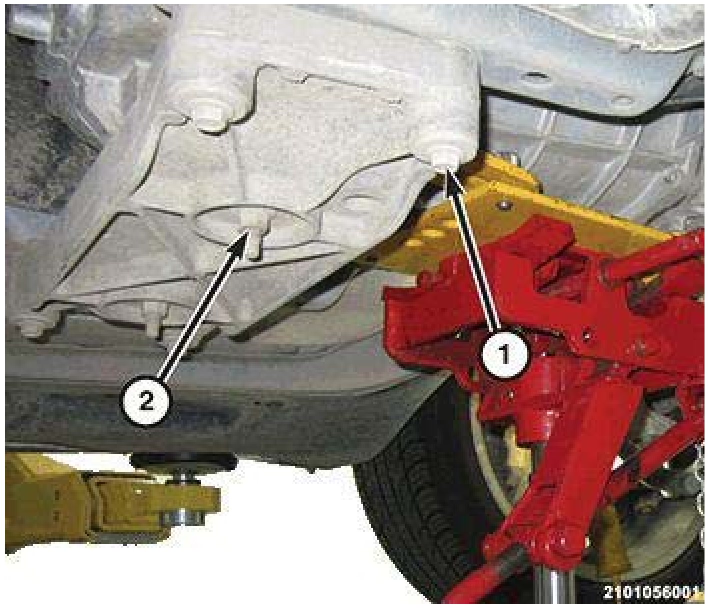


Fig. 16: Rear Cross Member & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Remove the crossmember bolts (1).

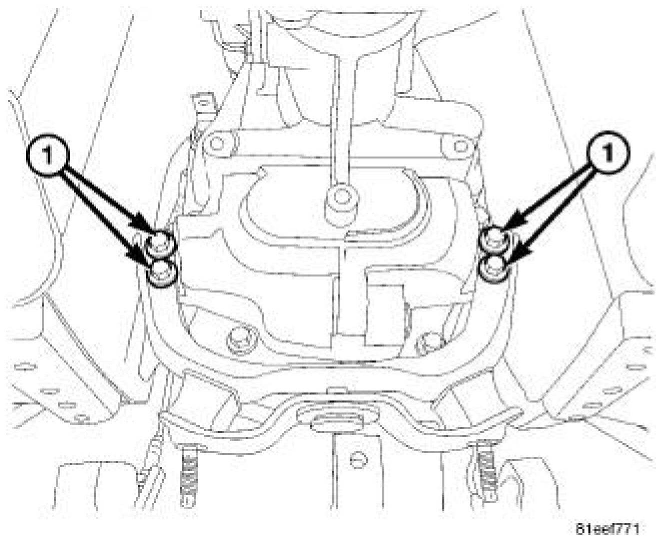


Fig. 17: Transmission Isolator Bracket Upper Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Remove the isolator bracket bolts (1).
15. Remove the crossmember, isolator bracket and isolator from the transmission.

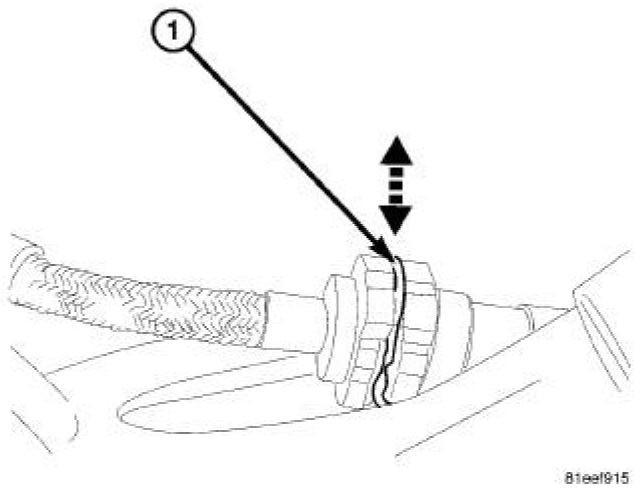


Fig. 18: Clutch Hose Removal
Courtesy of CHRYSLER GROUP, LLC

16. Raise the clip (1) securing the clutch hydraulic hose to the throw out bearing assembly. Remove and cap the clutch hydraulic hose.

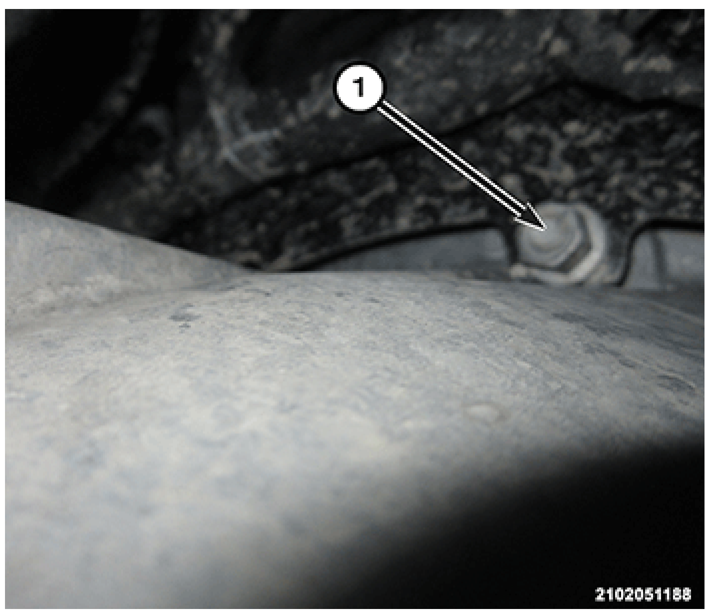


Fig. 19: Rainbow Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

17. Remove the rainbow bracket nut (1).

Fig. 20: Rainbow Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

18. Remove the rainbow bracket nut (1).

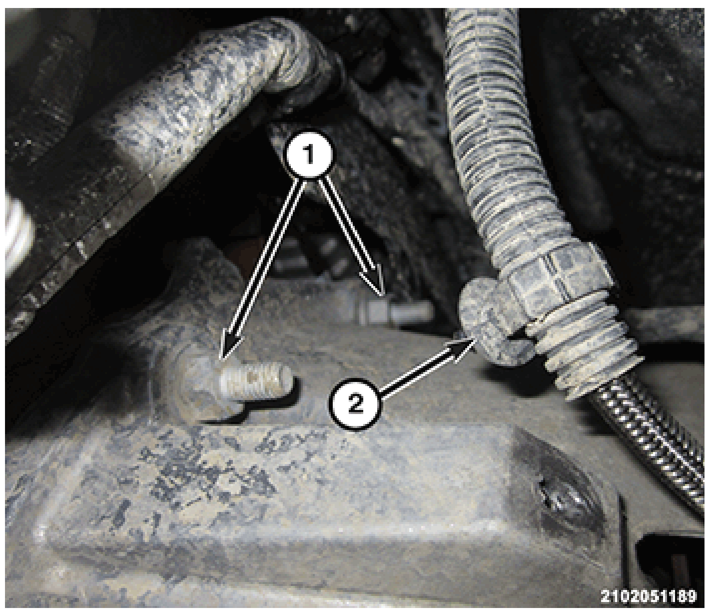


Fig. 21: Engine Stud Bolts & Harness Clip
Courtesy of CHRYSLER GROUP, LLC

19. Remove the top three (two shown) transmission to engine stud bolts (1).

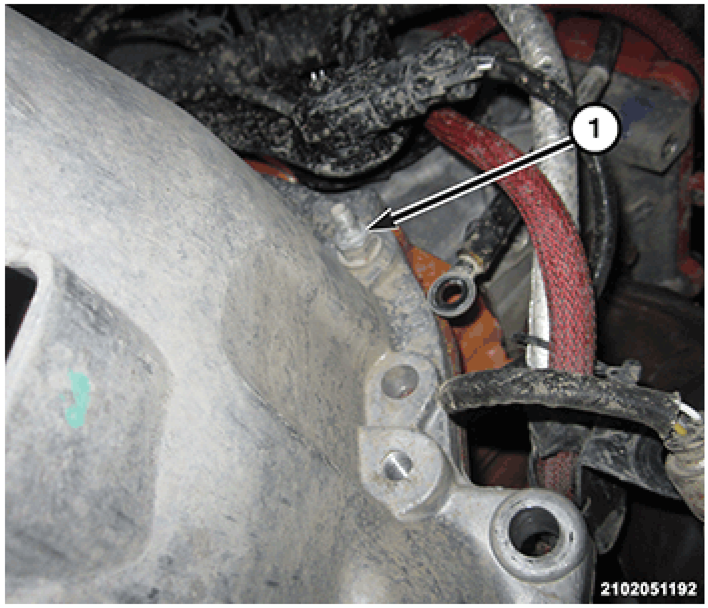


Fig. 22: Engine Stud Bolt
Courtesy of CHRYSLER GROUP, LLC

20. Remove the top transmission to engine stud bolt (1).

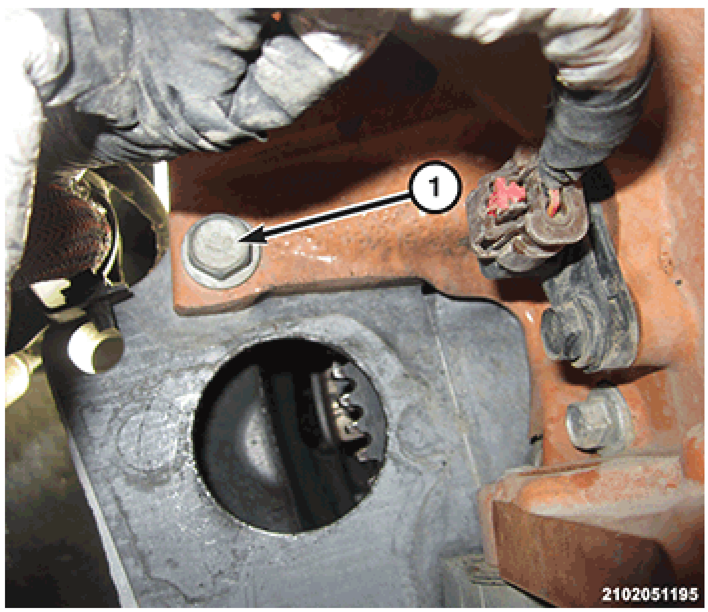


Fig. 23: Front Transmission To Engine Bolt
Courtesy of CHRYSLER GROUP, LLC

21. Remove the front transmission to engine bolt (1).

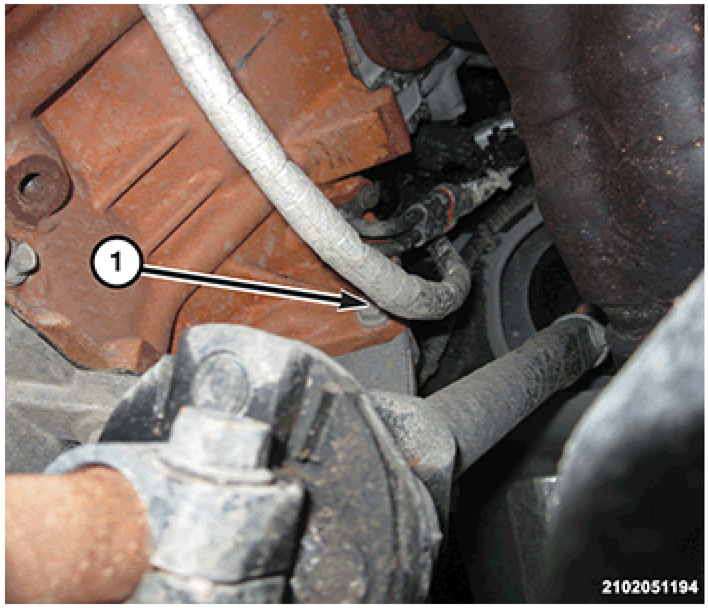


Fig. 24: Front Transmission To Engine Bolt
Courtesy of CHRYSLER GROUP, LLC

22. Remove the front transmission to engine bolt (1).

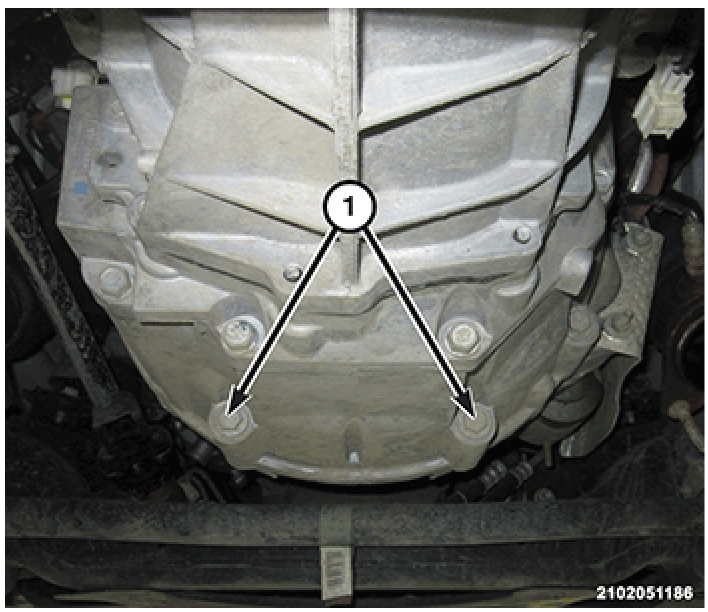


Fig. 25: Bottom Transmission To Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

23. Remove the bottom transmission to oil pan bolts (1).
24. Slide transmission back so that the input shaft clears pressure plate
25. Remove the transmission from the vehicle.

DISASSEMBLY

DISASSEMBLY

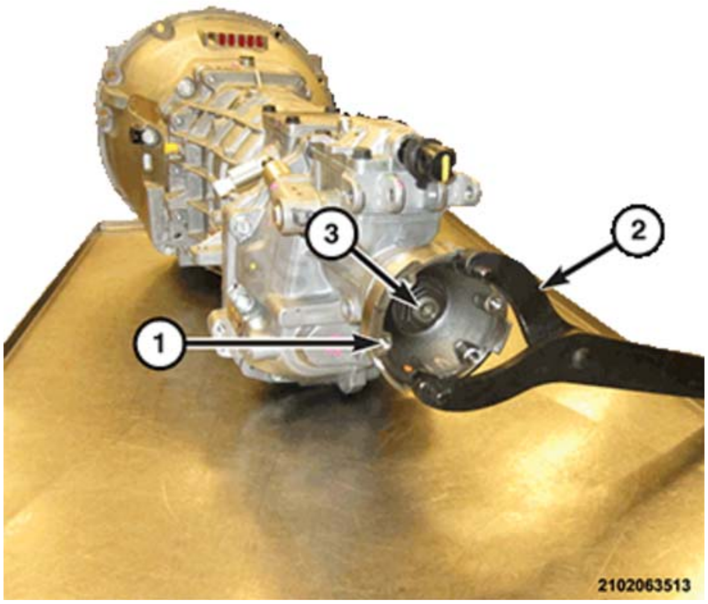


Fig. 26: Output Flange, Special Tool & Locknut
Courtesy of CHRYSLER GROUP, LLC

1. Hold the output flange (1) with Special Tool (special tool #C-3281, Holder, Flange) Flange Holder (2) while removing the output flange locknut (3).

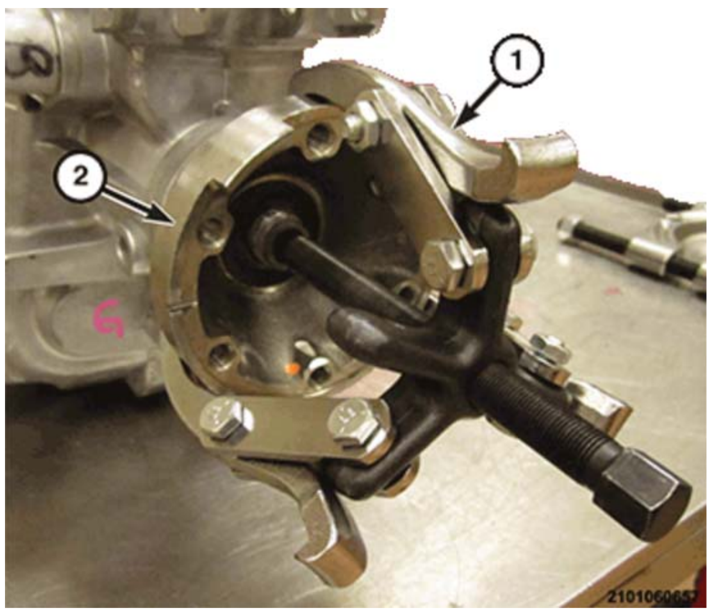


Fig. 27: Three Jaw Puller & Output Flange
Courtesy of CHRYSLER GROUP, LLC

2. Using a three jaw puller (1) or equivalent, remove the output flange (2) from the transmission output shaft.

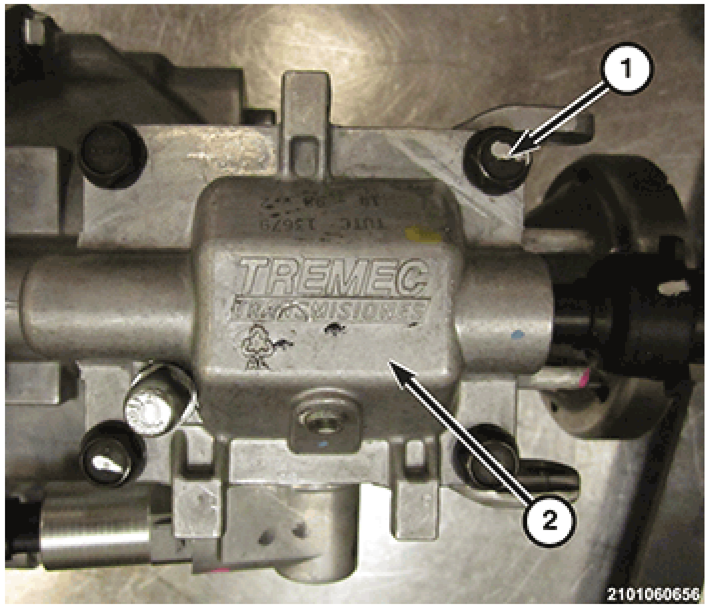


Fig. 28: Shift Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the shift cover (1) bolts (2) and remove the cover (2).

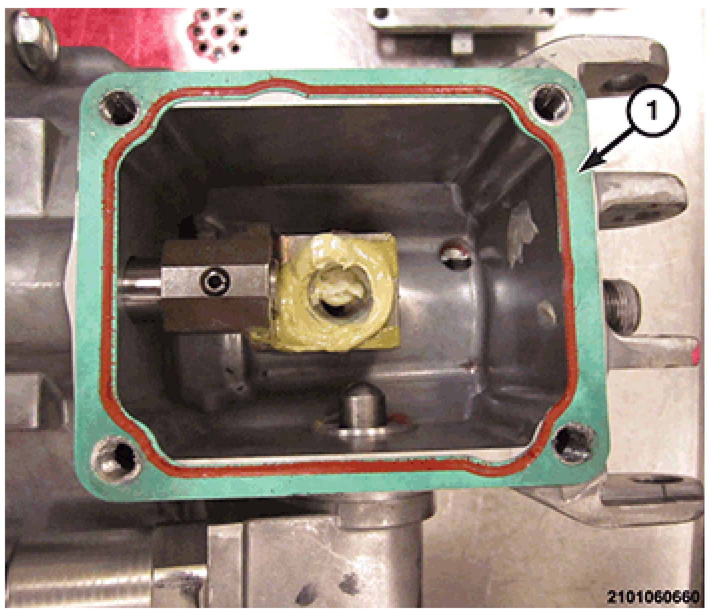


Fig. 29: Shift Cover Gasket
Courtesy of CHRYSLER GROUP, LLC

4. Remove the shift cover gasket (1).

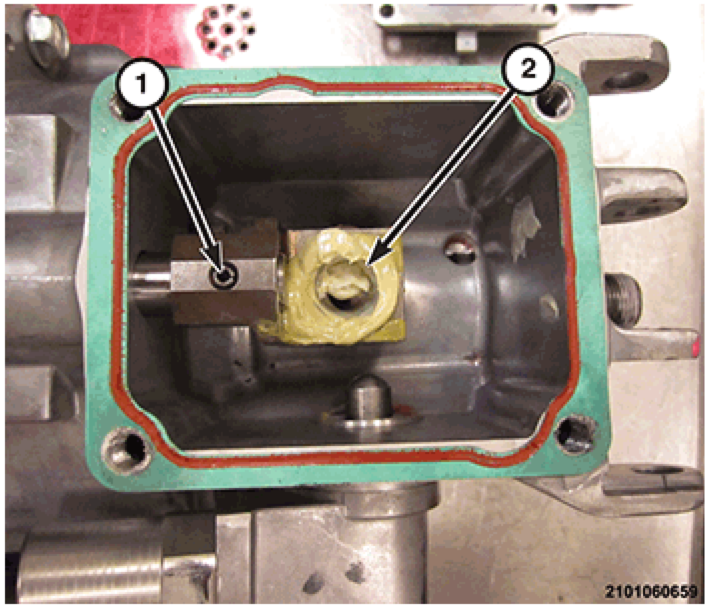


Fig. 30: Offset Lever & Roll Pin
Courtesy of CHRYSLER GROUP, LLC

5. Remove the offset lever (2) roll pin (1) with a hammer and punch and remove the offset lever.

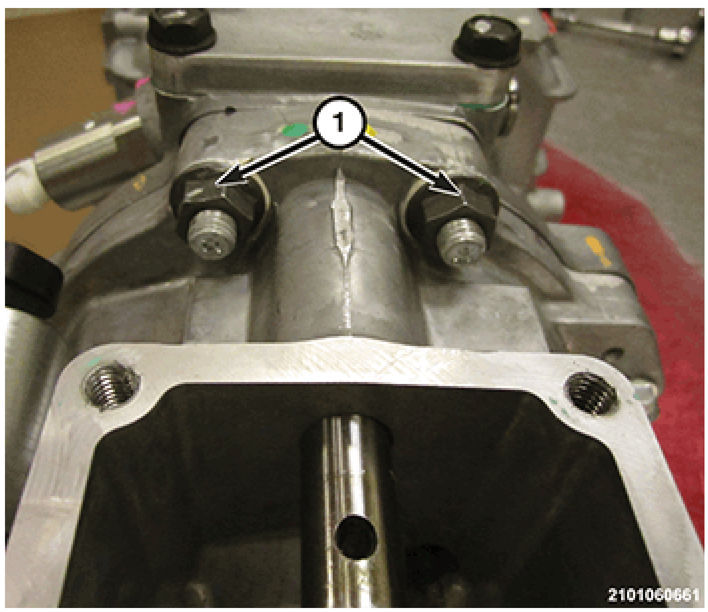
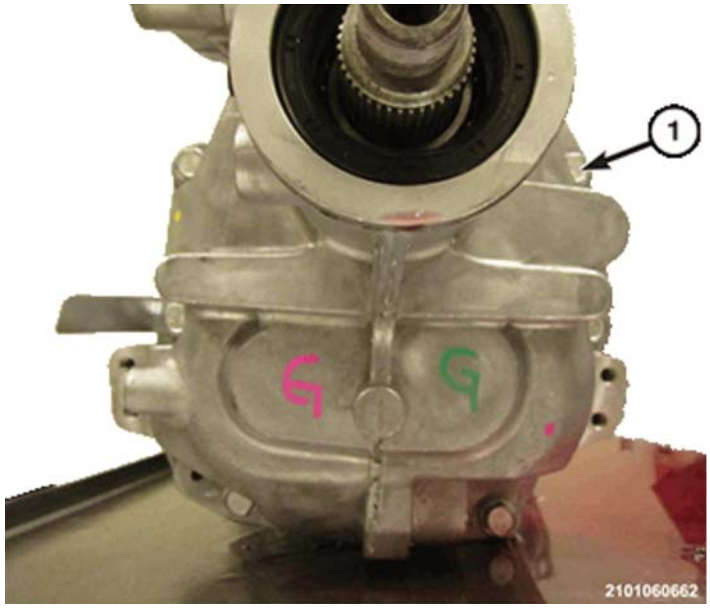


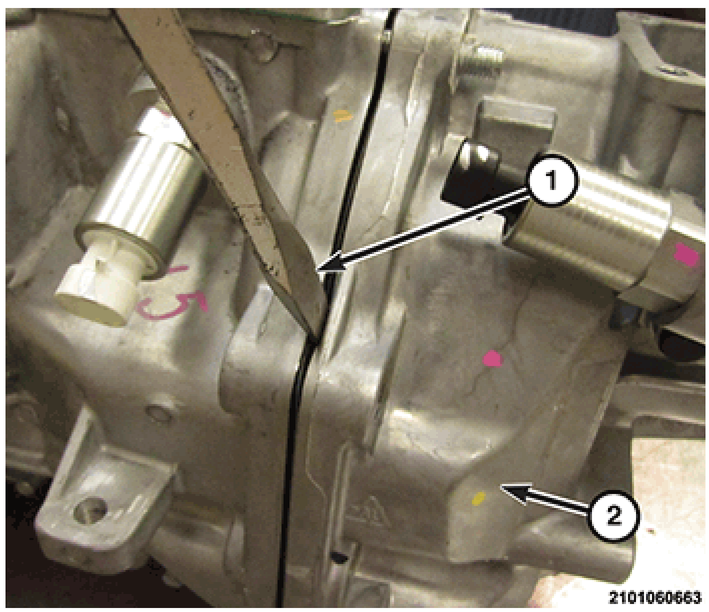
Fig. 31: Extension Housing Nuts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the extension housing nuts (1) from the transmission studs.



[Fig. 32: Extension Housing Bolts]
Courtesy of CHRYSLER GROUP, LLC

7. Remove the extension housing bolts (1).



[Fig. 33: Prying Extension Housing Off Transmission Case At Pry Points]
Courtesy of CHRYSLER GROUP, LLC

8. Pry the extension housing (2) off of the transmission case at the pry points (1).

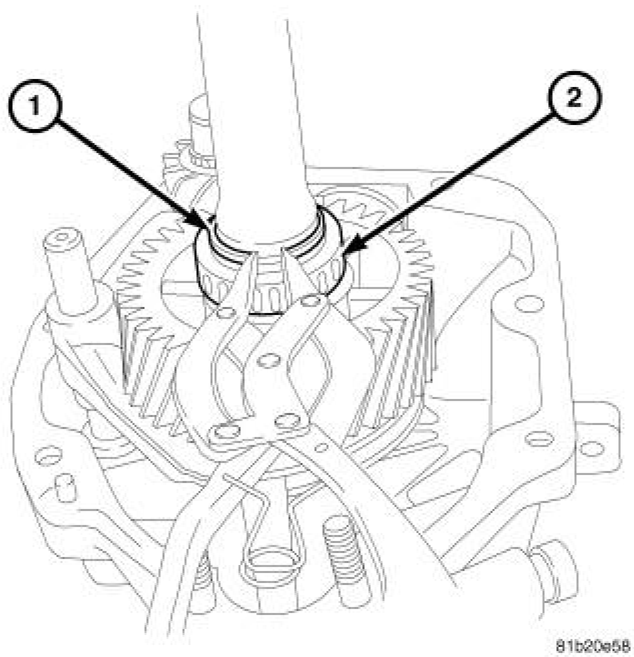


Fig. 34: Roller Bearing Snap-Ring
Courtesy of CHRYSLER GROUP, LLC

9. Stand the transmission on Fixture (special tool #9387, Fixture, Transmission Holding) and bolt the adapter to the fixture.
10. Install on bench Fixture (special tool #9385, Holding Fixture, Bench Mount).
11. Remove the mainshaft roller bearing (2) snap ring (1).

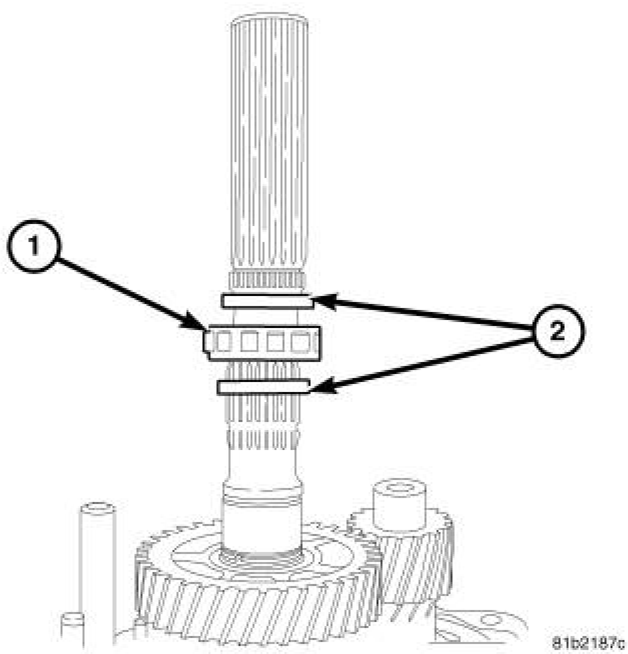


Fig. 35: Roller Bearing & Spacers
Courtesy of CHRYSLER GROUP, LLC

12. Remove the mainshaft roller bearing (1) and spacers (2) from the mainshaft.

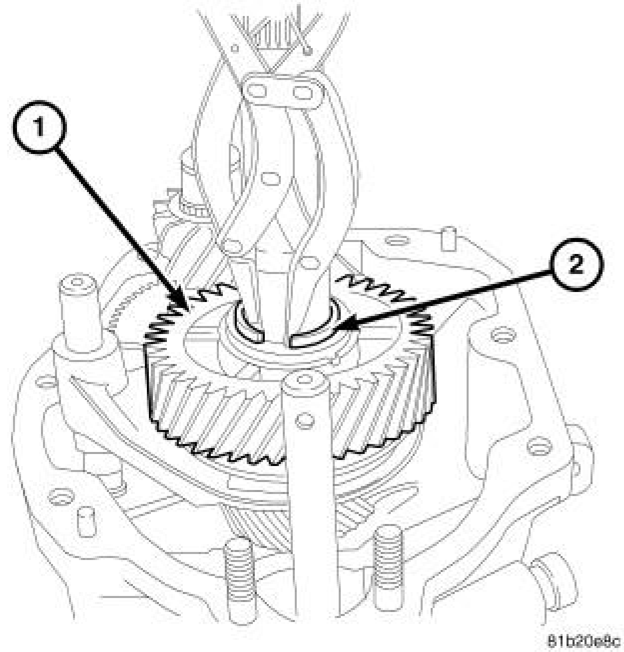


Fig. 36: Reverse Gear Snap Ring
Courtesy of CHRYSLER GROUP, LLC

13. Remove the reverse gear (1) snap ring (2) from the mainshaft.

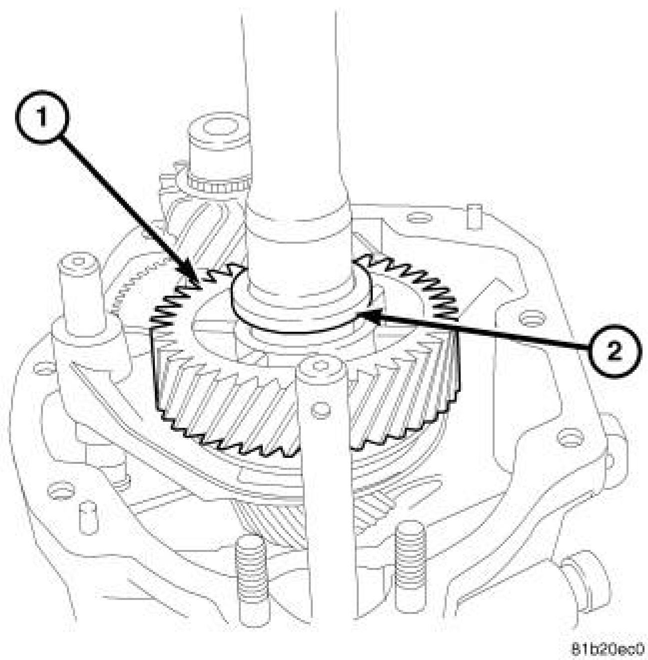


Fig. 37: Reverse Gear Thrust Washer
Courtesy of CHRYSLER GROUP, LLC

14. Remove the reverse gear (1) thrust washer (2) from the mainshaft.

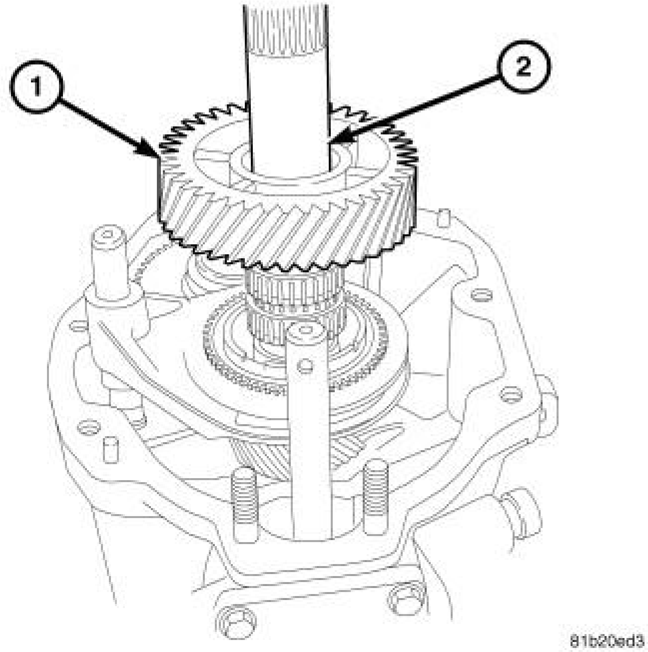


Fig. 38: Reverse Gear & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

15. Remove the reverse gear (1) from the mainshaft (2).

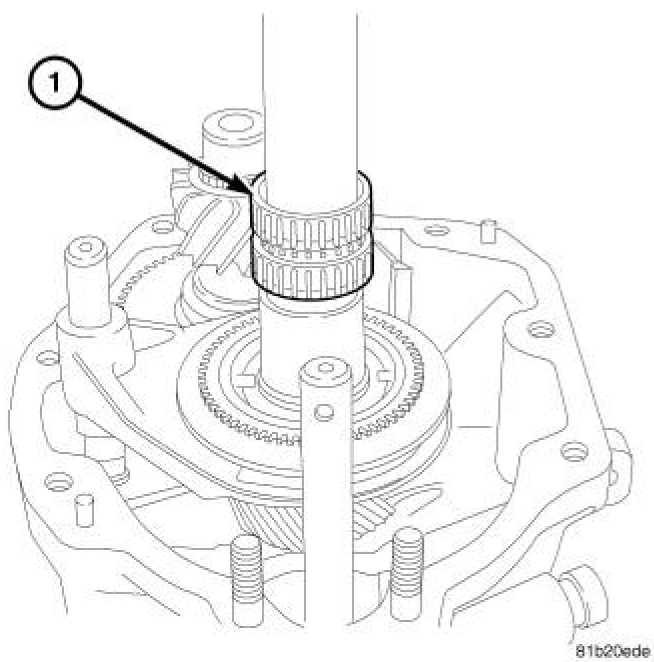


Fig. 39: Reverse Gear Bearing
Courtesy of CHRYSLER GROUP, LLC

16. Remove the reverse gear bearing (1) from the mainshaft (2).

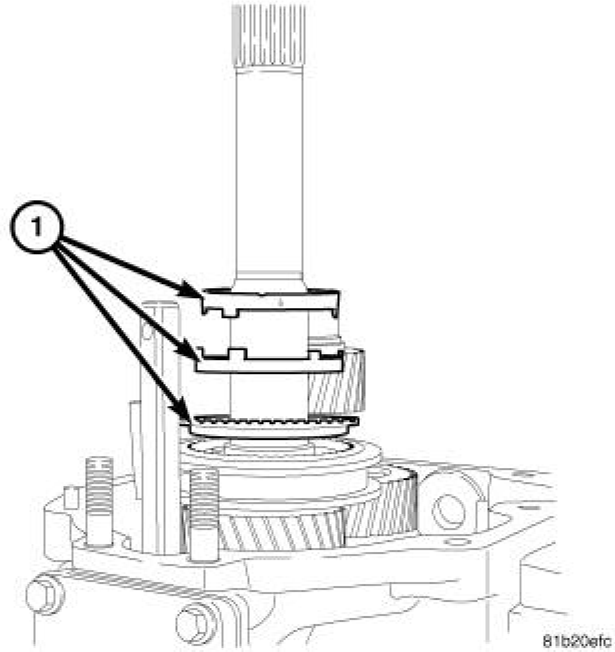


Fig. 40: Reverse Synchronizer Rings
Courtesy of CHRYSLER GROUP, LLC

17. Remove the reverse gear synchronizer rings (1) from the reverse gear synchronizer hub.

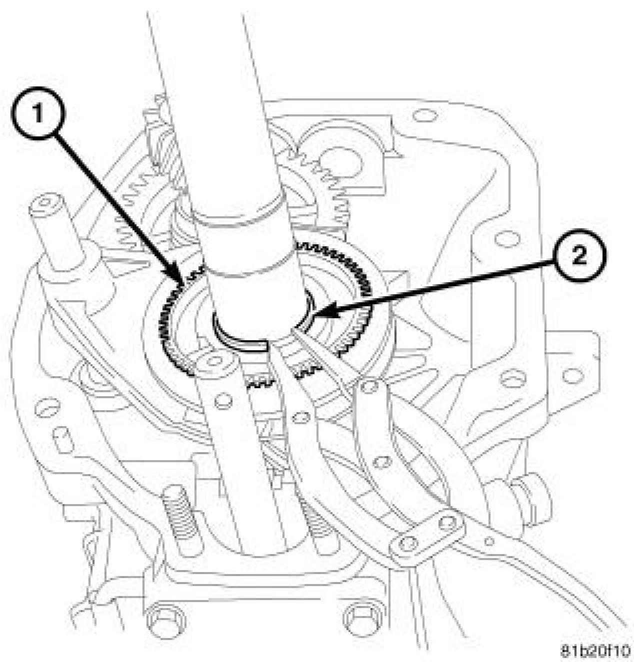


Fig. 41: Reverse Synchronizer Snap Ring
Courtesy of CHRYSLER GROUP, LLC

18. Remove the reverse gear synchronizer hub (1) snap ring (2) from the mainshaft.

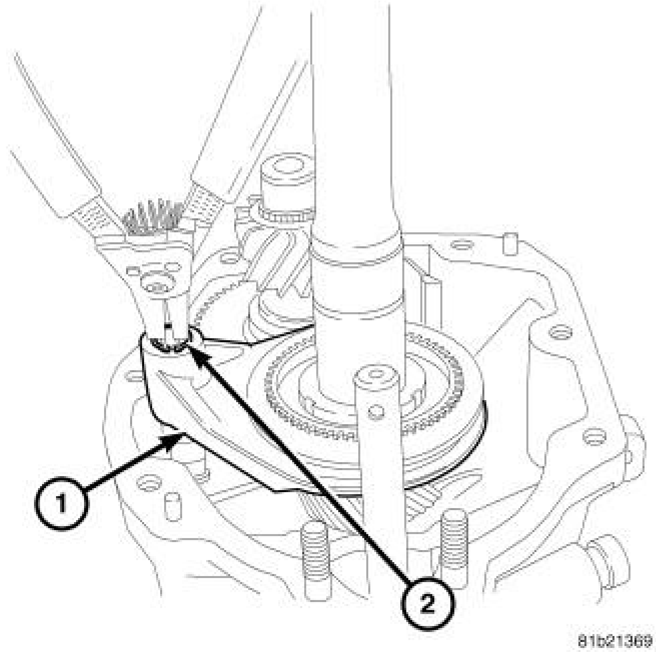


Fig. 42: Reverse Fork Snap Ring
Courtesy of CHRYSLER GROUP, LLC

19. Remove the reverse gear shift fork (1) snap ring (2) from the shift rail and discard the snap ring.

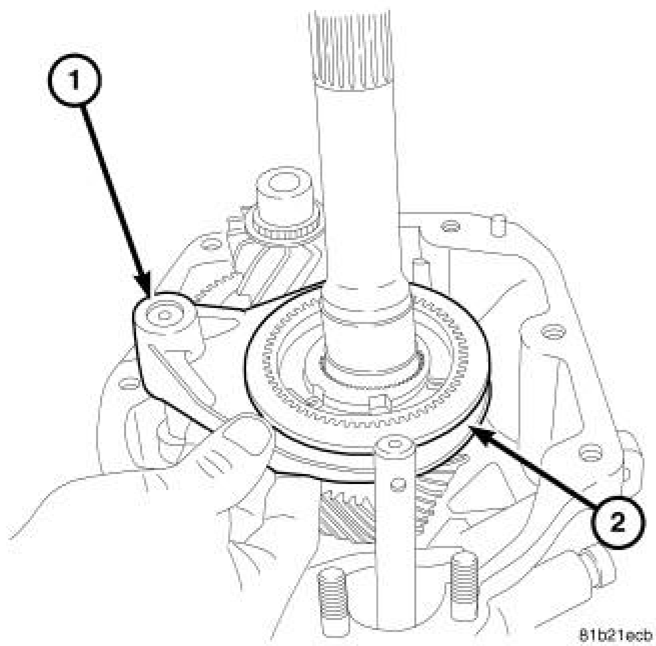


Fig. 43: Reverse Hub & Fork
Courtesy of CHRYSLER GROUP, LLC

20. Remove the reverse gear shift fork (1) synchronizer hub and sleeve as an assembly (2).

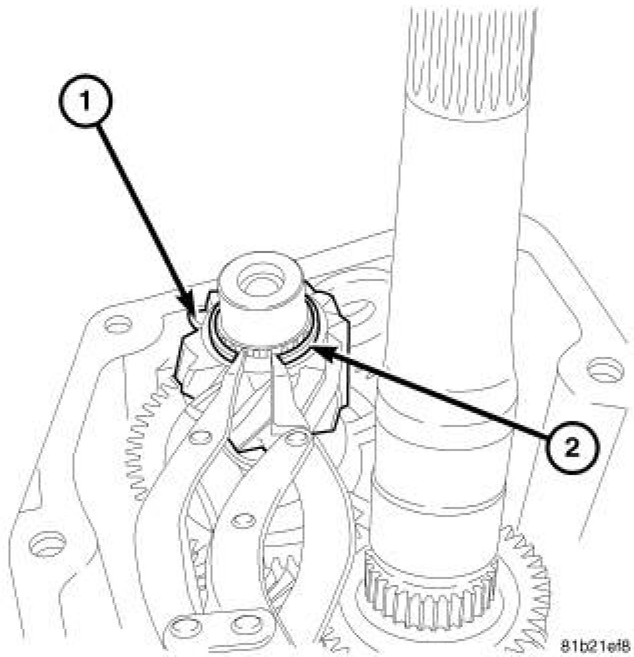


Fig. 44: Reverse Countershaft Snap Ring
Courtesy of CHRYSLER GROUP, LLC

21. Remove the reverse gear (1) snap ring (2) from the countershaft.

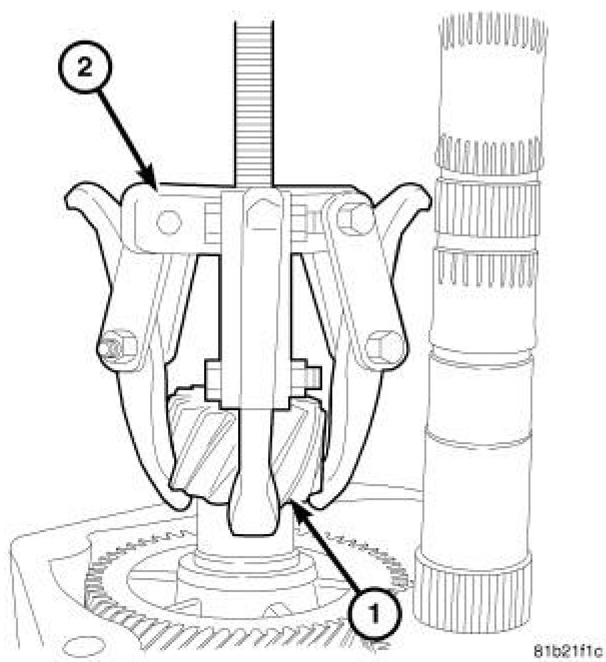
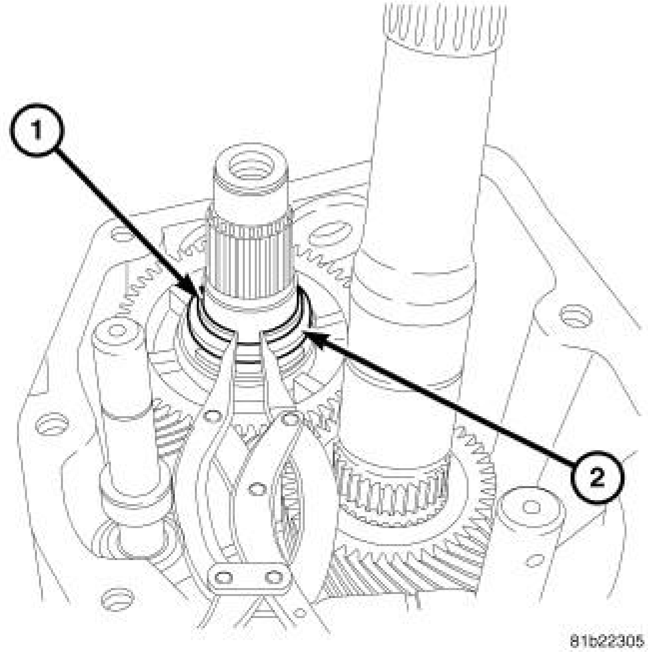


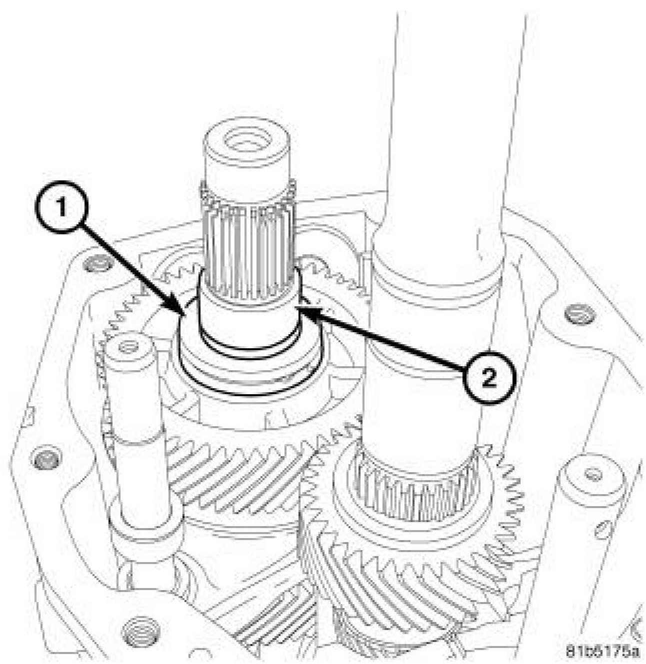
Fig. 45: Reverse Countershaft Gear
Courtesy of CHRYSLER GROUP, LLC

22. Remove the reverse gear from the countershaft (1) with a suitable three jaw puller (2) and Button (special tool #10027, Button, Press).



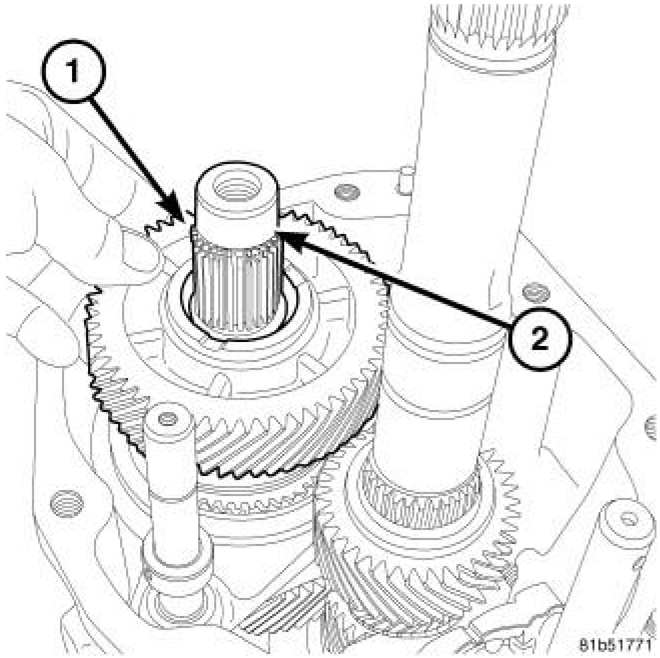
[Fig. 46: 5th Gear Snap Ring & Countershaft]
Courtesy of CHRYSLER GROUP, LLC

23. Remove the fifth gear snap ring (1) from the countershaft (2).



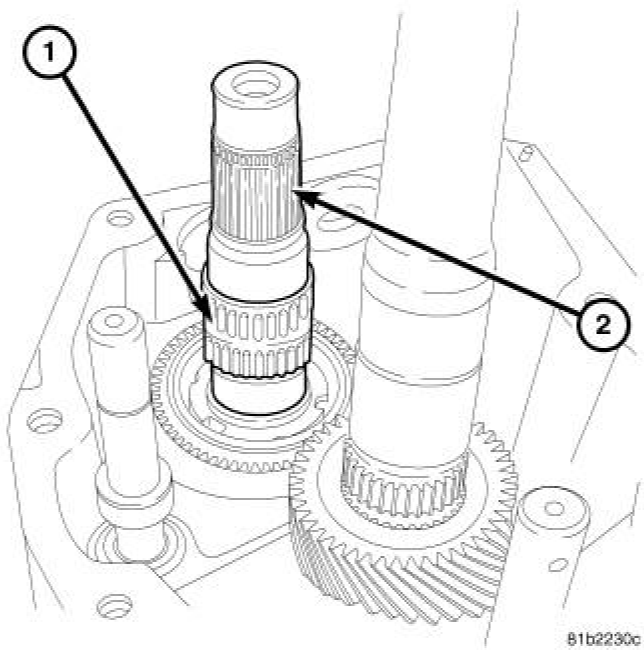
[Fig. 47: 5th Gear Thrust Washer & Countershaft]
Courtesy of CHRYSLER GROUP, LLC

24. Remove the fifth gear thrust washer (1) from the countershaft (2).



[Fig. 48: 5th Gear & Countershaft](#)
Courtesy of CHRYSLER GROUP, LLC

25. Remove the fifth gear (1) from the countershaft (2).



[Fig. 49: 5th Gear Bearing & Countershaft](#)
Courtesy of CHRYSLER GROUP, LLC

26. Remove the fifth gear bearing (1) from the countershaft (2).

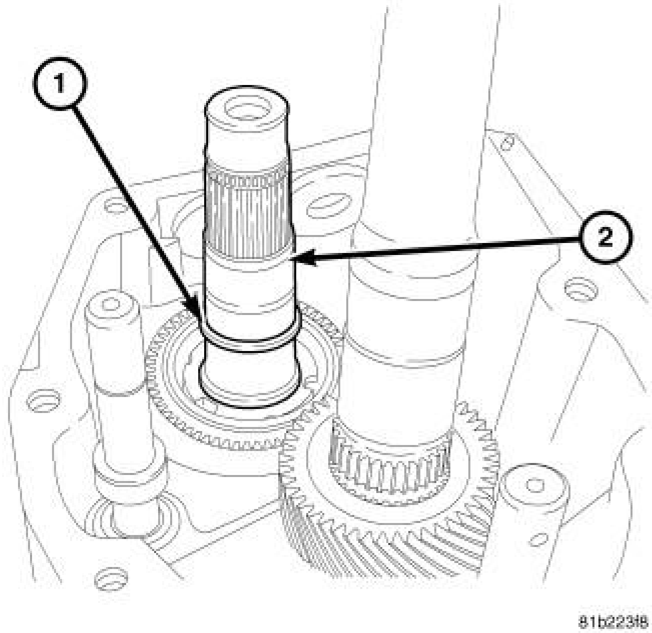


Fig. 50: 5th Gear Bearing Spacer & Countershaft
Courtesy of CHRYSLER GROUP, LLC

27. Remove the fifth gear bearing spacer (1) from the countershaft (2).

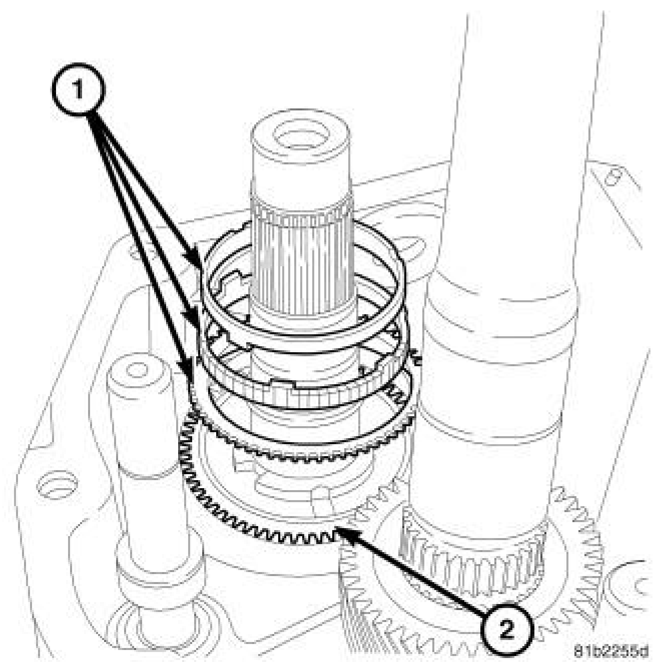


Fig. 51: Fifth Gear Synchro Rings & 5-6 Synchronizer Hub
Courtesy of CHRYSLER GROUP, LLC

28. Remove the fifth gear synchronizer rings (1) from the fifth and sixth gear synchronizer hub (2).

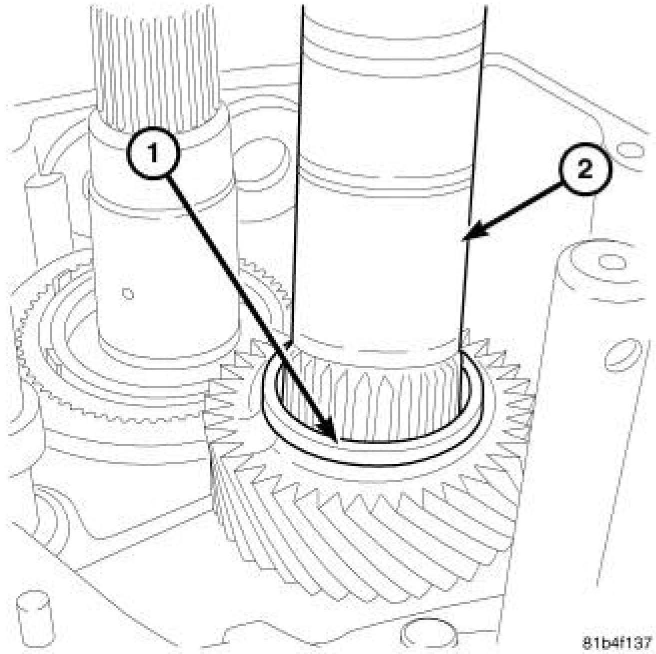


Fig. 52: 5th Gear Retainer Ring & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

29. Remove the fifth gear split ring retainer (1) from the mainshaft (2).

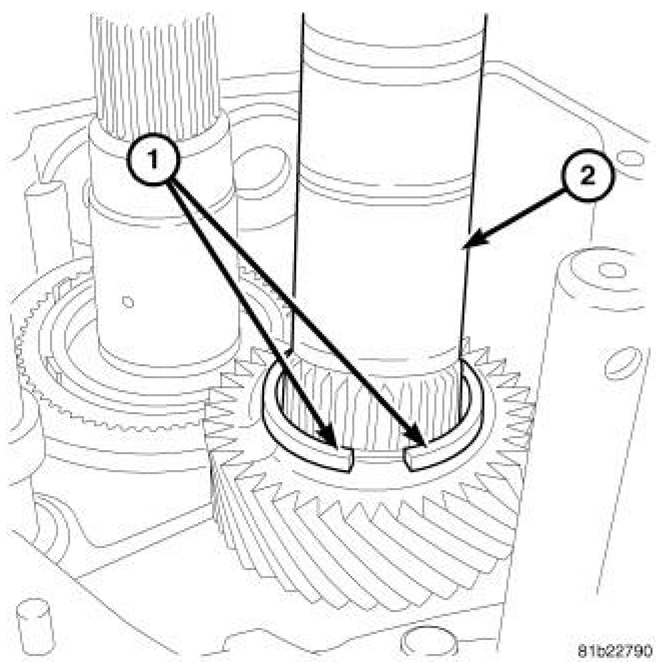


Fig. 53: 5th Gear Split Rings & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

30. Remove fifth gear split rings (1) from mainshaft (2).

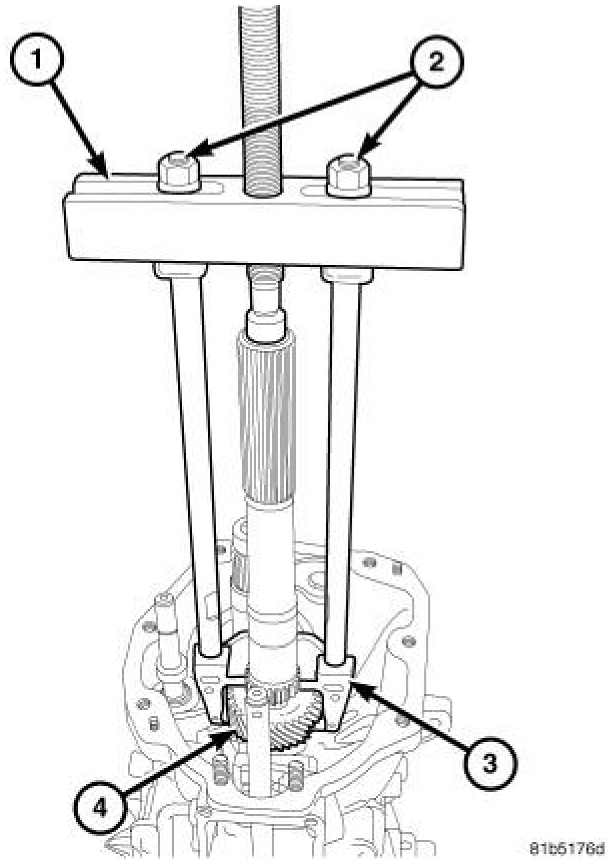


Fig. 54: 5th Gear Puller
Courtesy of CHRYSLER GROUP, LLC

31. Remove the fifth gear (4) from the mainshaft with Bridge (special tool #9382, Bridge) (1), Bolts (special tool #9378, Bolts, Puller) (2), Puller (special tool #9379a, Remover, Gear) (3), and Button (special tool #10027, Button, Press).

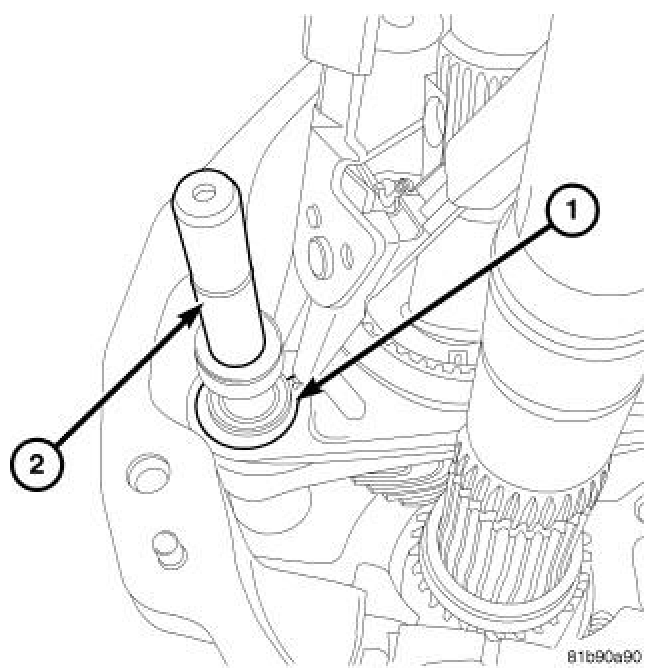


Fig. 55: 5-6 Shift Fork Snap Ring
Courtesy of CHRYSLER GROUP, LLC

32. Remove fifth and sixth gear shift fork snap ring (1) from the shift rail (2).

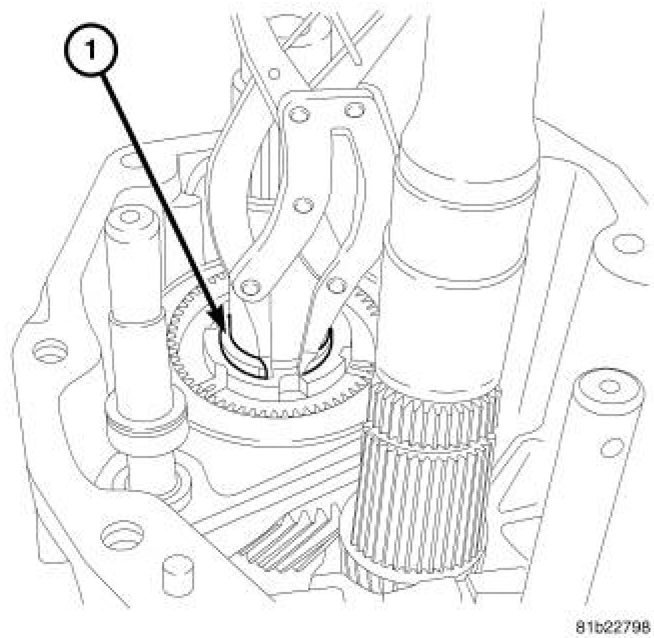


Fig. 56: 5-6 Hub Snap Ring
Courtesy of CHRYSLER GROUP, LLC

33. Remove the fifth and sixth gear synchronizer hub snap ring (1) from the countershaft.

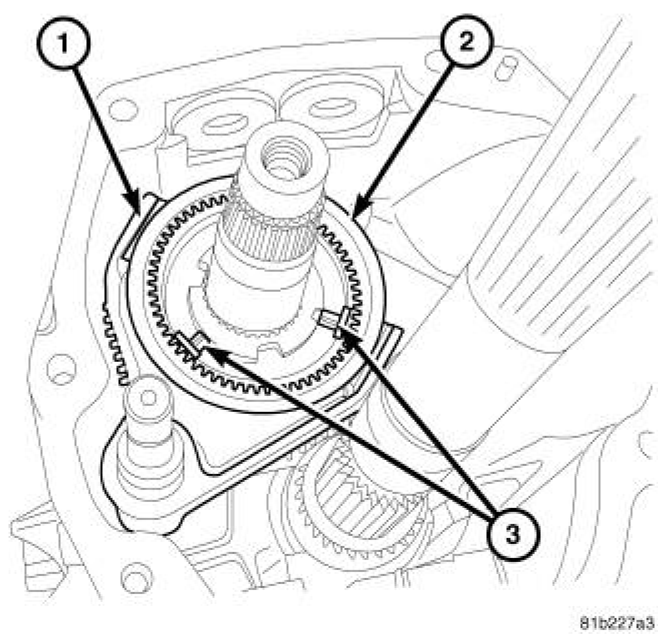
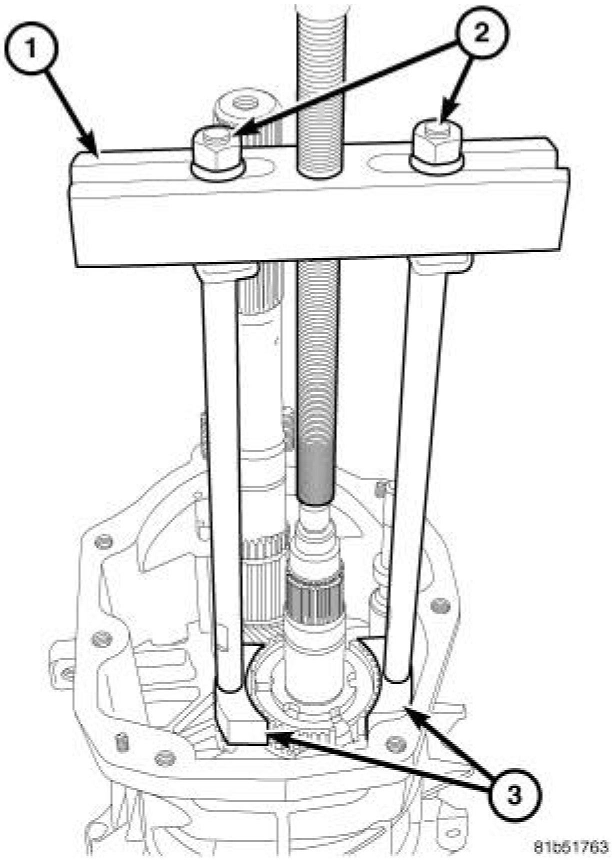


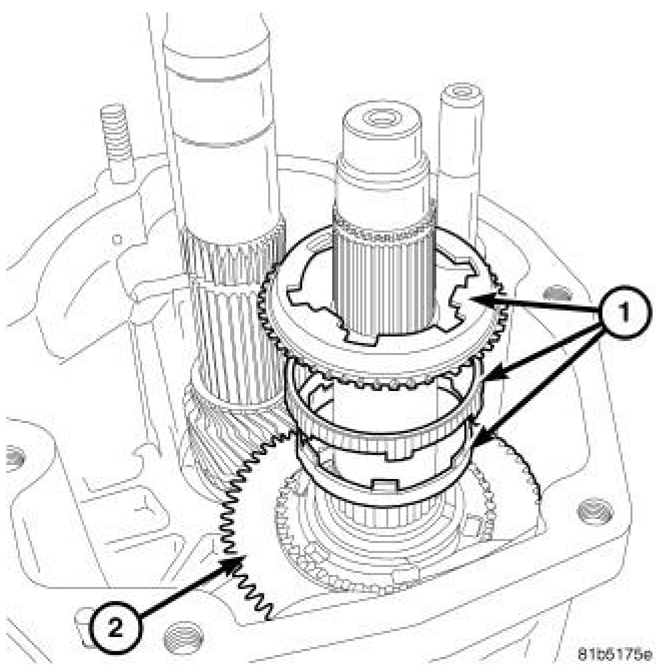
Fig. 57: 5-6 Fork & Sleeve
Courtesy of CHRYSLER GROUP, LLC

34. Remove the fifth and sixth gear shift fork (1), synchronizer sleeve (2), and detents (3) from the fifth and sixth gear synchronizer hub.



[Fig. 58: 5-6 Hub Puller]
Courtesy of CHRYSLER GROUP, LLC

35. Remove the fifth and sixth gear synchronizer hub from the countershaft with Bridge (special tool #9382, Bridge) (1), Bolts (special tool #9378, Bolts, Puller) (2), Puller (special tool #10026, Puller, Synchro Hub) (3) and Button (special tool #10027, Button, Press).



[Fig. 59: 6th Synchro Rings]
Courtesy of CHRYSLER GROUP, LLC

36. Remove the sixth gear synchronizer rings (1) from the sixth gear (2).

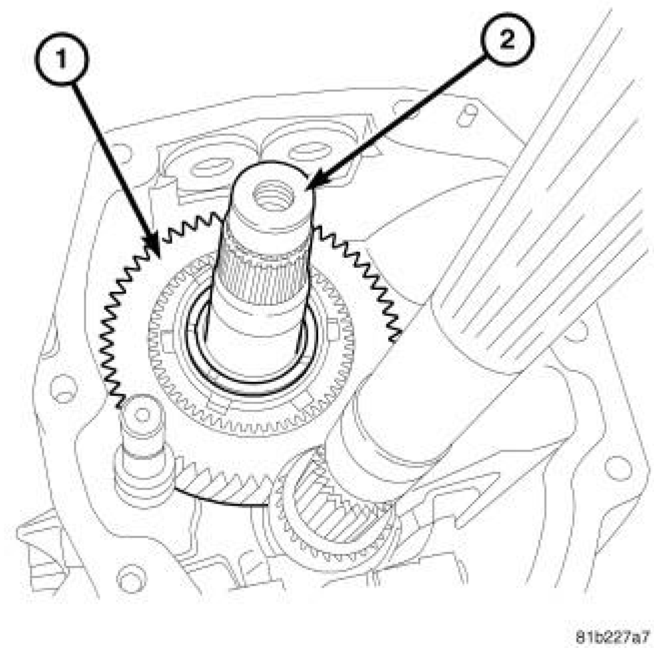


Fig. 60: 6th Gear & Countershaft
Courtesy of CHRYSLER GROUP, LLC

37. Remove the sixth gear (1) from the countershaft (2).

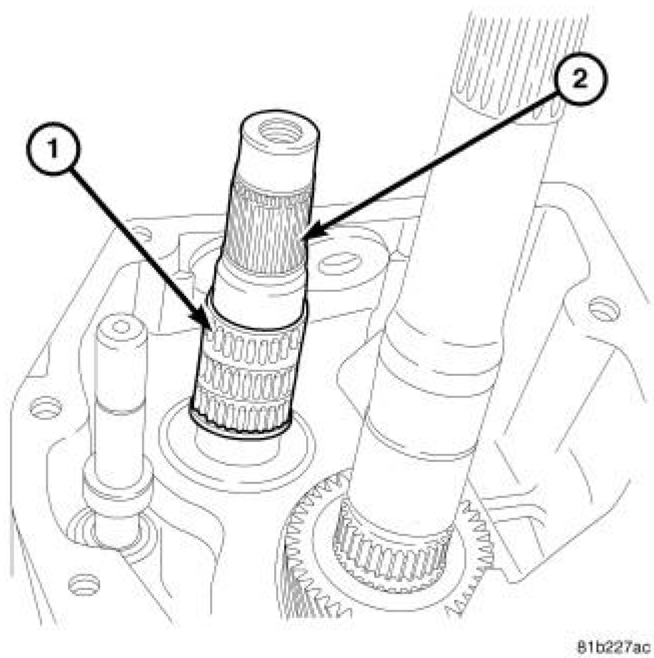


Fig. 61: 6th Gear Bearing & Countershaft
Courtesy of CHRYSLER GROUP, LLC

38. Remove the sixth gear bearing (1) from the countershaft (2).

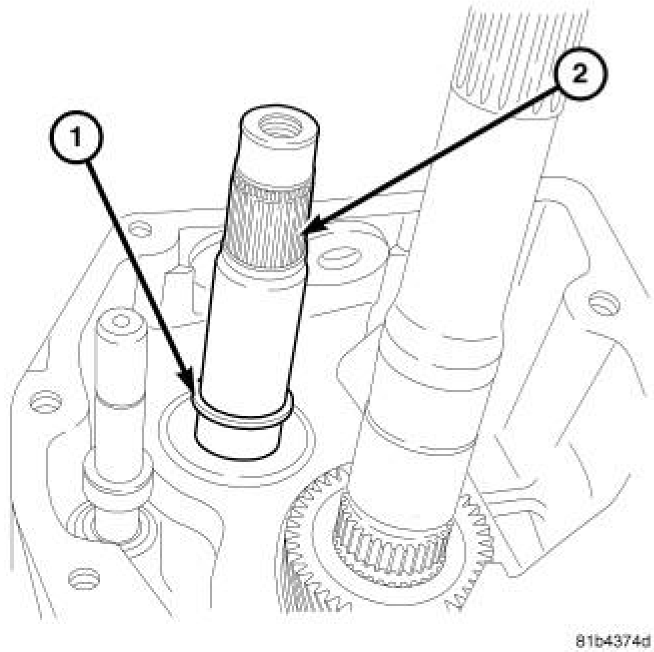


Fig. 62: 6th Gear Bearing Spacer & Countershaft
Courtesy of CHRYSLER GROUP, LLC

39. Remove the sixth gear bearing spacer (1) from the countershaft (2).

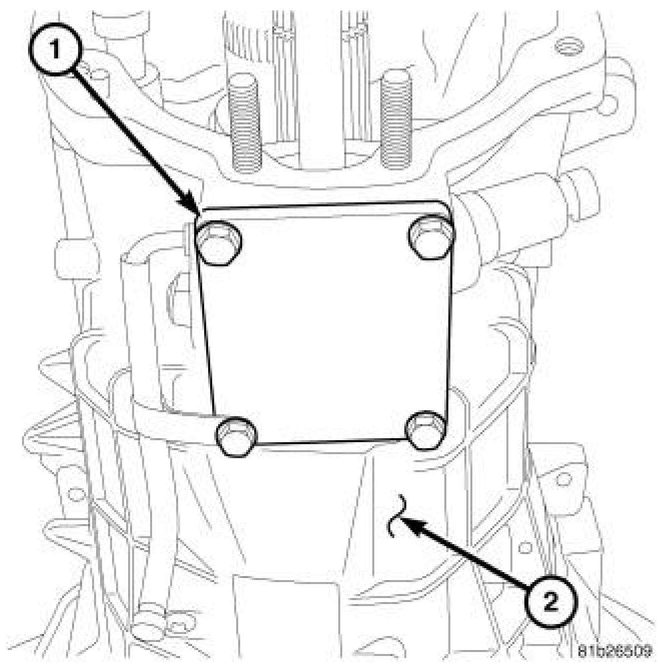


Fig. 63: Top Cover, Bolts & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

40. Remove the top cover (1) bolts and remove the cover from the transmission case (2).

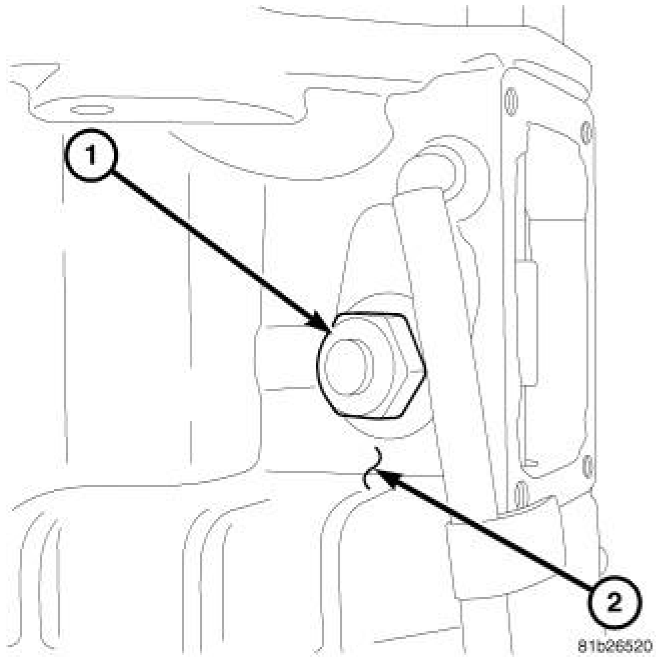


Fig. 64: Shift Detent & Right Side Of Case
Courtesy of CHRYSLER GROUP, LLC

41. Remove the shift detent (1) from the right side of the case (2).

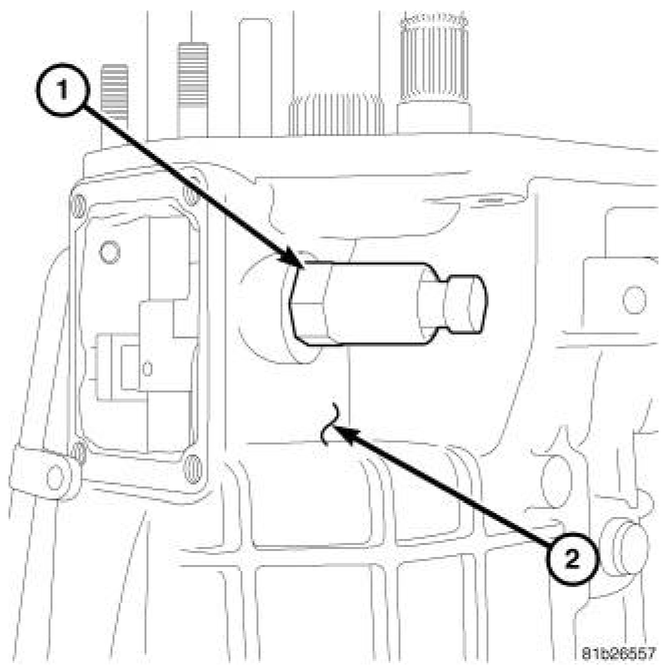
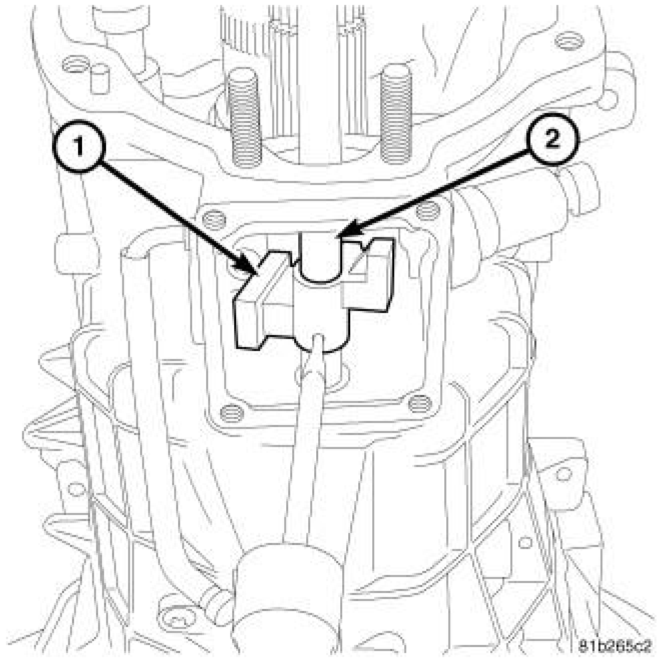


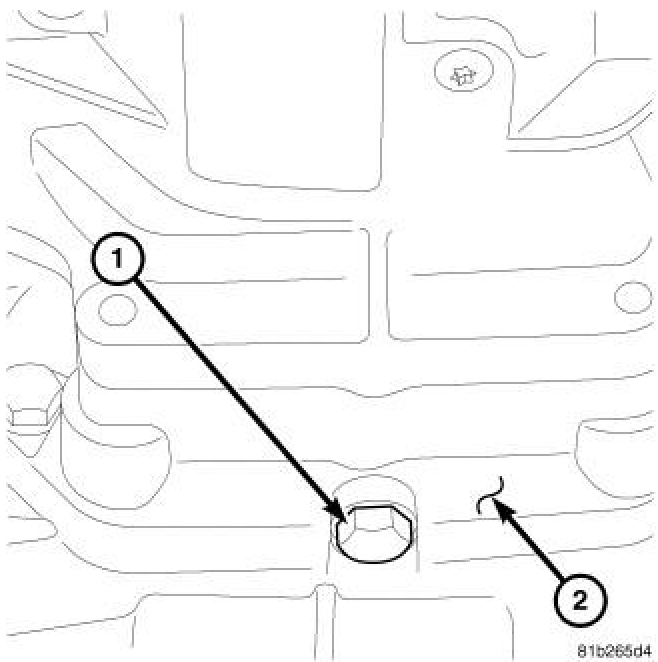
Fig. 65: Skip Shift Solenoid & Left Side Of Case
Courtesy of CHRYSLER GROUP, LLC

42. Remove the skip shift solenoid (1) from the left side of the case (2).



[Fig. 66: Skip Shift Lever & Roll Pin](#)
Courtesy of CHRYSLER GROUP, LLC

43. Drive the skip shift lever (1) roll pin down with a punch until the lever is loose from the shift rail (2).



[Fig. 67: Roller Detent Bolt & Transmission Adapter](#)
Courtesy of CHRYSLER GROUP, LLC

44. Remove the roller detent bolt (1) from the transmission adapter (2).

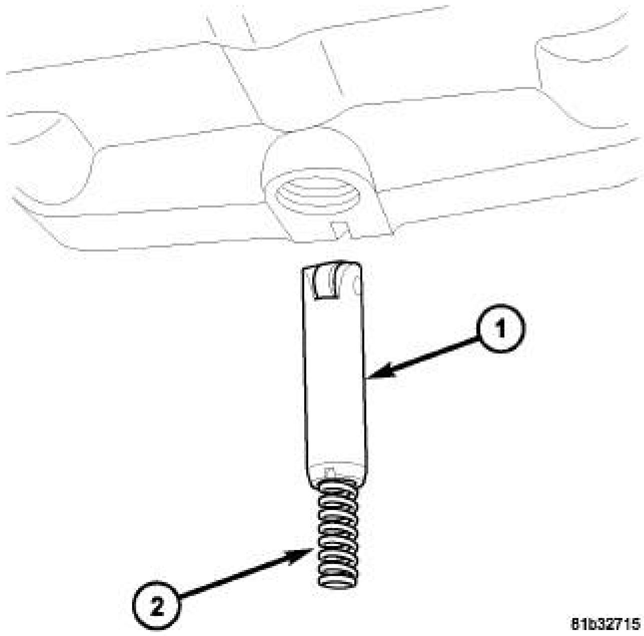


Fig. 68: Roller Detent & Spring
Courtesy of CHRYSLER GROUP, LLC

45. Remove the roller detent (1) and spring (2) from the transmission adapter.

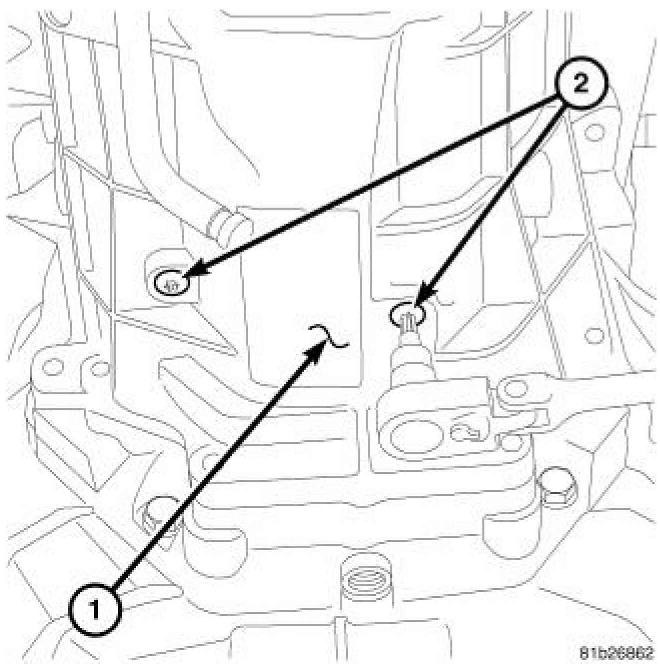


Fig. 69: Torx Screws
Courtesy of CHRYSLER GROUP, LLC

46. Remove the shift lever guide bolts (1) from the top of the transmission case (2).

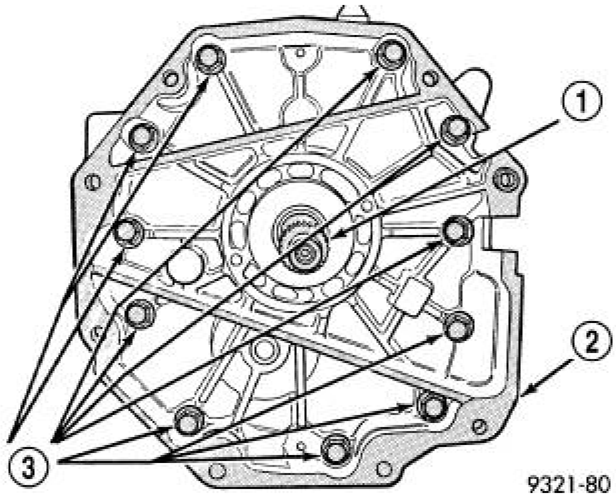


Fig. 70: Adapter Bolts Location
Courtesy of CHRYSLER GROUP, LLC

47. Remove the transmission adapter (2) bolts (3).

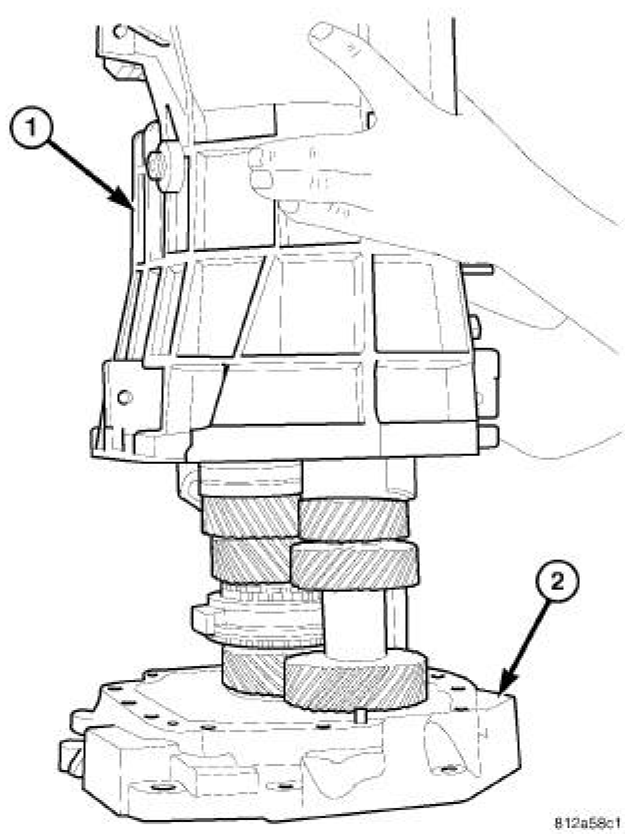


Fig. 71: Transmission Case
Courtesy of CHRYSLER GROUP, LLC

48. Remove the transmission case (1) upward off of the transmission adapter plate (2) and remove the skip shift lever from the shift rail.

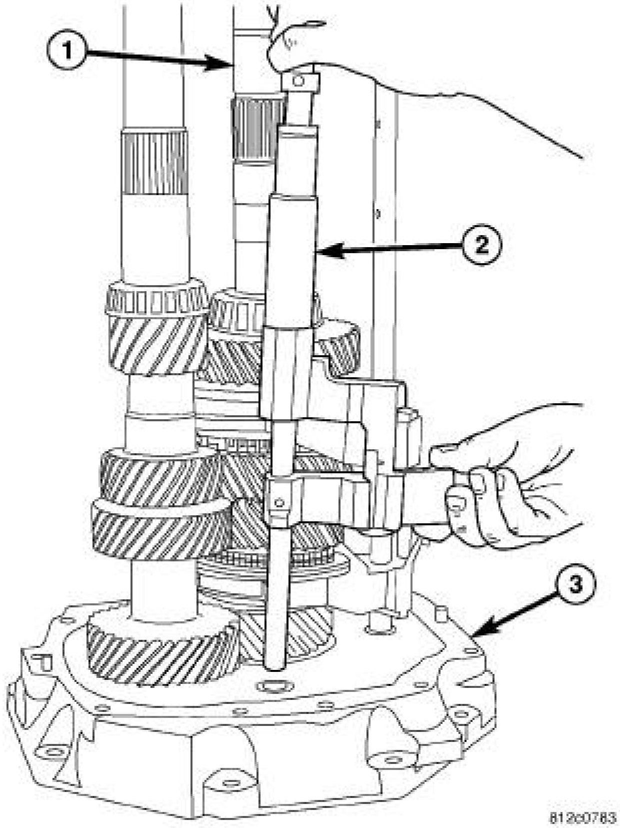


Fig. 72: Removing/Installing Reverse Shaft Rail Assembly
Courtesy of CHRYSLER GROUP, LLC

49. Remove the reverse shift rail assembly (2) from the transmission adapter (3).

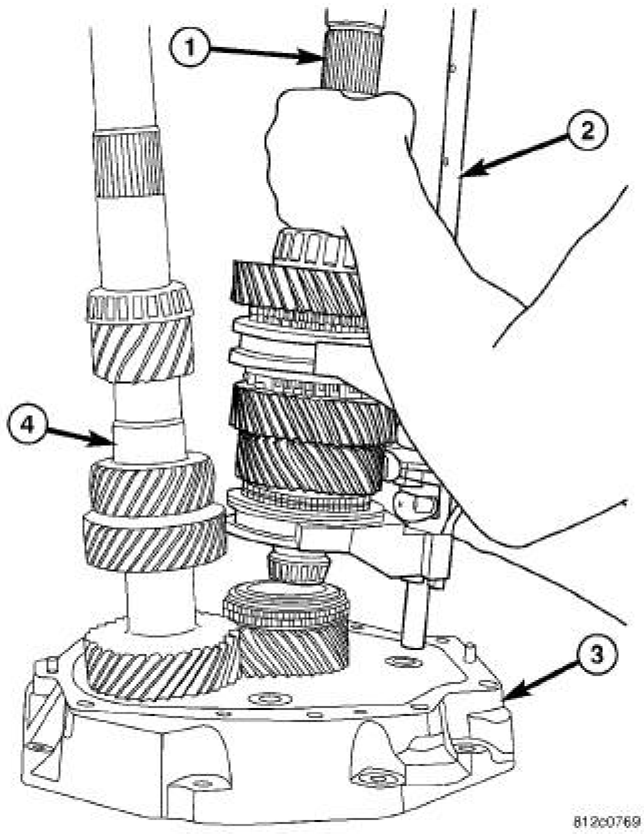


Fig. 73: Mainshaft, Shift Rail & Countershaft
Courtesy of CHRYSLER GROUP, LLC

50. Tilt the countershaft (4) sideways, then remove the mainshaft (1) and shift rail (2) from the adapter plate (3). Remove the countershaft assembly (4) from the adapter plate(3).

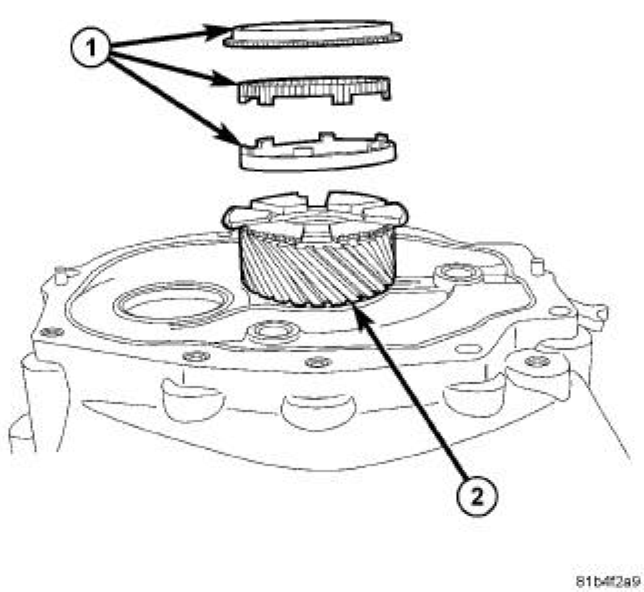


Fig. 74: Input Shaft & Fourth Gear Synchro Rings

Courtesy of CHRYSLER GROUP, LLC

51. Remove the input shaft synchronizer ring (1) and the input shaft (2) from the transmission adapter.

MAINSHAFT

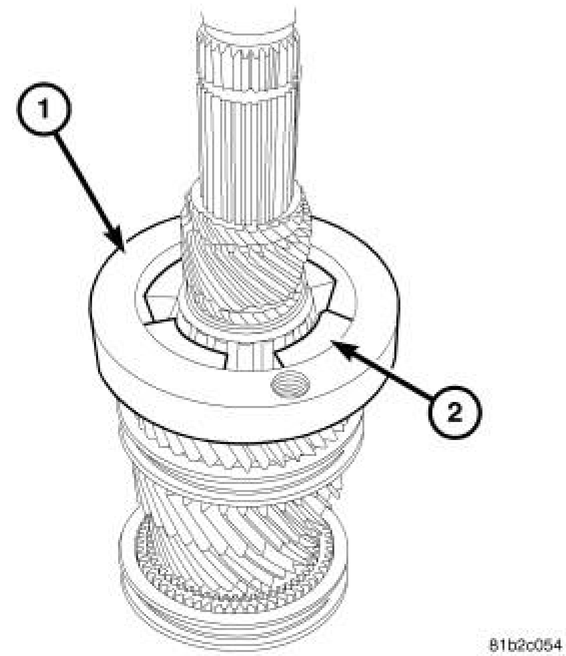


Fig. 75: Mainshaft Bearing Puller
Courtesy of CHRYSLER GROUP, LLC

1. Position Puller (special tool #C-293-PA, Puller, Press) (1) and Adapters (special tool #C-293-47, Block Set, Puller) (2) on the mainshaft bearing. Place Button (special tool #10027, Button, Press) in the end of the mainshaft.

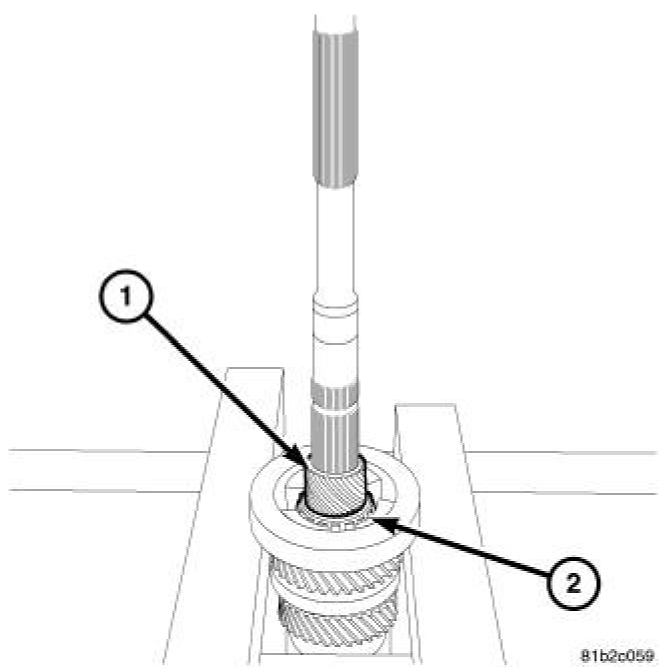


Fig. 76: Sixth Gear & Mainshaft Bearing

Courtesy of CHRYSLER GROUP, LLC

2. Remove the sixth gear (1) and mainshaft bearing (2) with Puller (special tool #C-293-PA, Puller, Press), Adapters (special tool #C-293-47, Block Set, Puller), Button (special tool #10027, Button, Press) and a press.

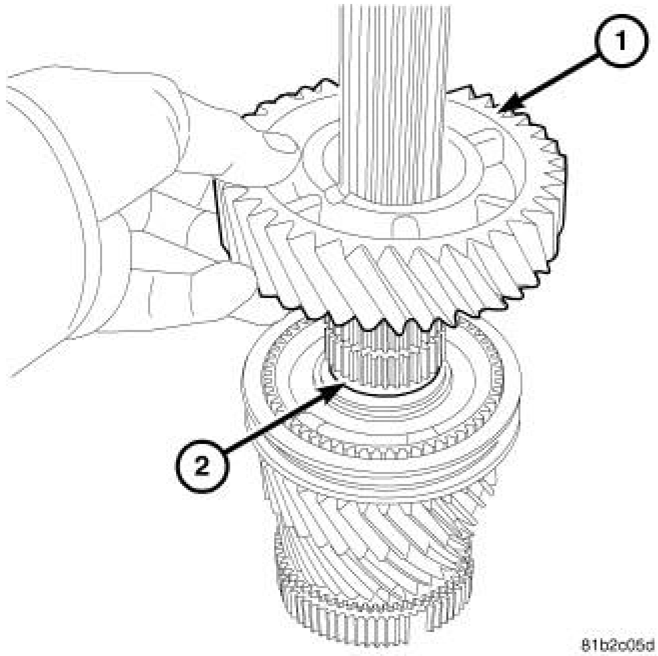


Fig. 77: 1st Gear & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

3. Remove first gear (1) from the mainshaft (2).

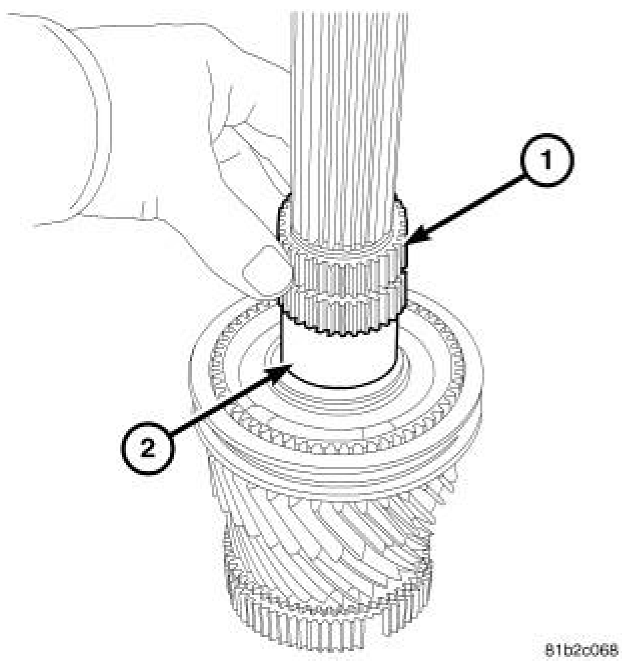


Fig. 78: 1st Gear Bearing & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

4. Remove the first gear bearing (1) from the mainshaft (2).

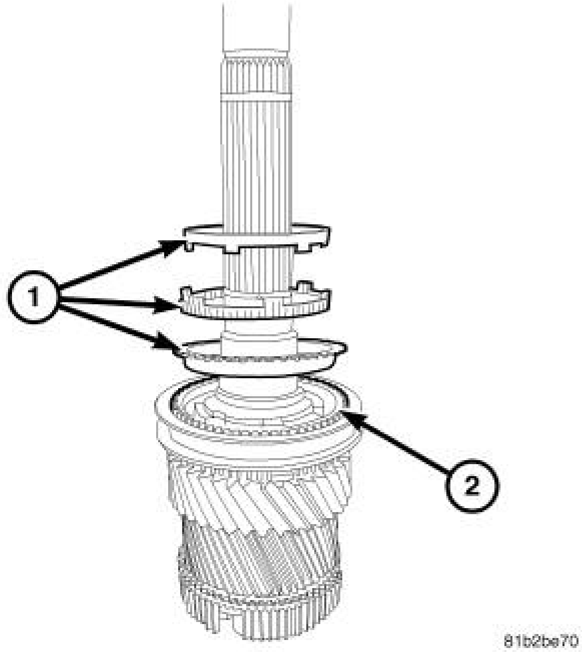


Fig. 79: 1st Gear Synchro
Courtesy of CHRYSLER GROUP, LLC

5. Remove the first gear synchronizer rings (1) from the first and second gear synchronizer hub (2).

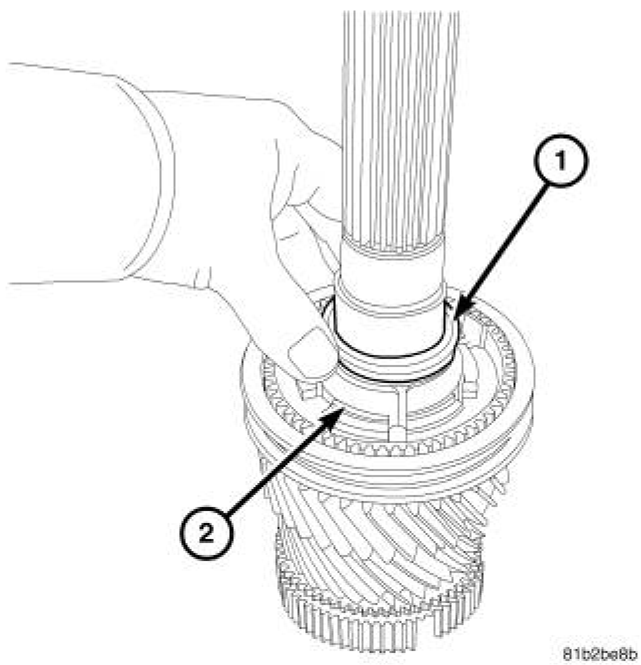


Fig. 80: 1-2 Synchronizer Hub Split Ring Retainer & Split Rings
Courtesy of CHRYSLER GROUP, LLC

6. Remove the first and second gear synchronizer hub split ring retainer (1) from the split rings (2).

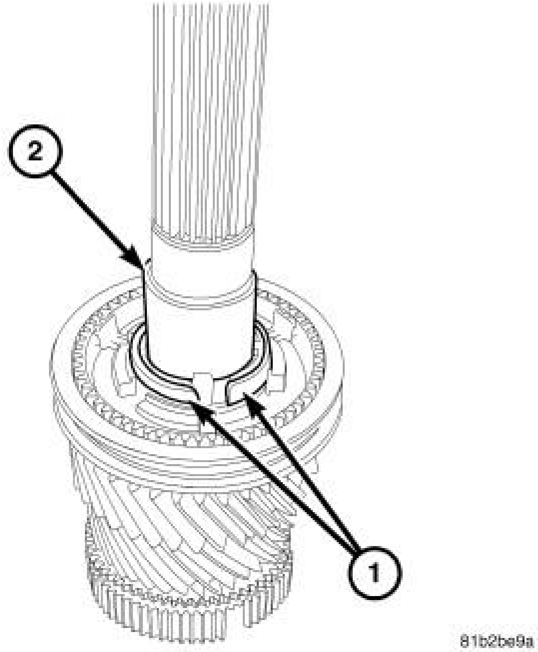


Fig. 81: 1-2 Synchronizer Hub Split Rings & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

7. Remove the first and second gear synchronizer hub split rings (1) from the mainshaft (2).

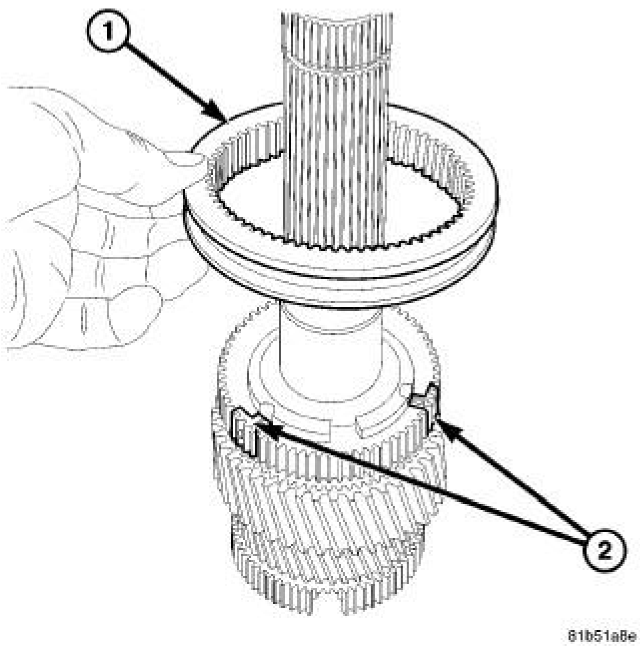


Fig. 82: 1-2 Synchro Sleeve
Courtesy of CHRYSLER GROUP, LLC

8. Remove the first and second gear synchronizer hub sleeve (1) and detents (2).

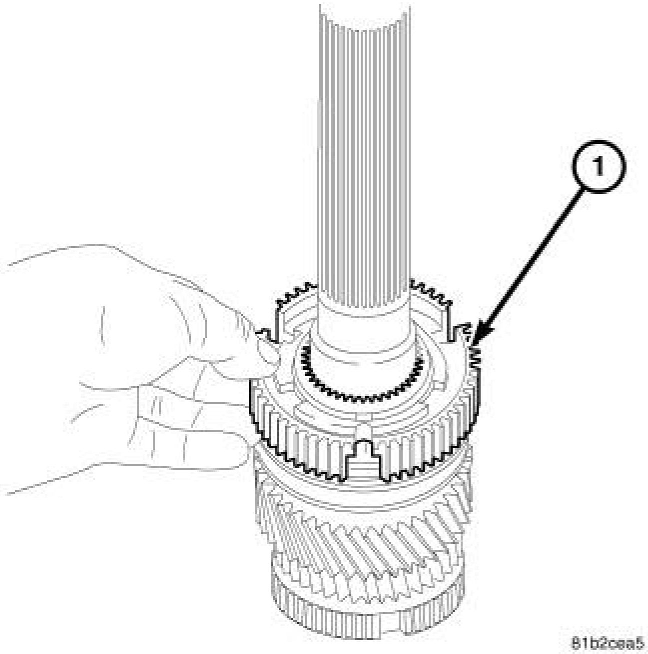


Fig. 83: 1-2 Synchro Hub
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Take note of the first and second gear synchronizer hub orientation prior to removal. It is a directional hub and will not work properly if installed incorrectly.**

9. Remove the first and second gear synchronizer hub (1) from the mainshaft.

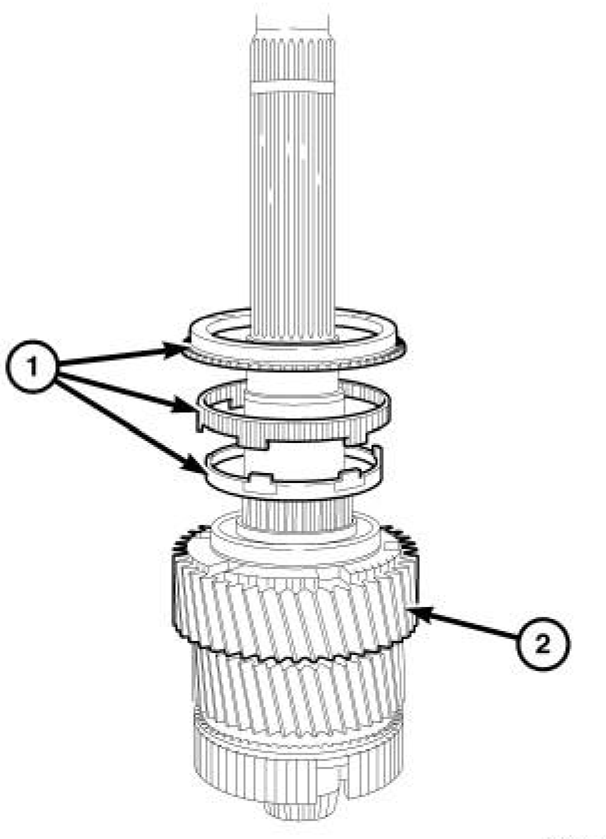


Fig. 84: 2nd Gear Synchro Rings
Courtesy of CHRYSLER GROUP, LLC

10. Remove the second gear synchronizer rings (1) from second gear (2).

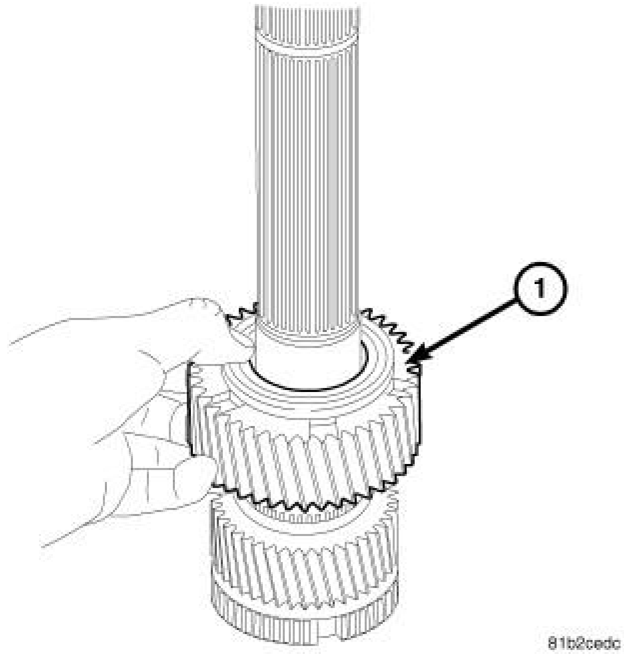


Fig. 85: 2nd Gear & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

11. Remove second gear (1) from the mainshaft.

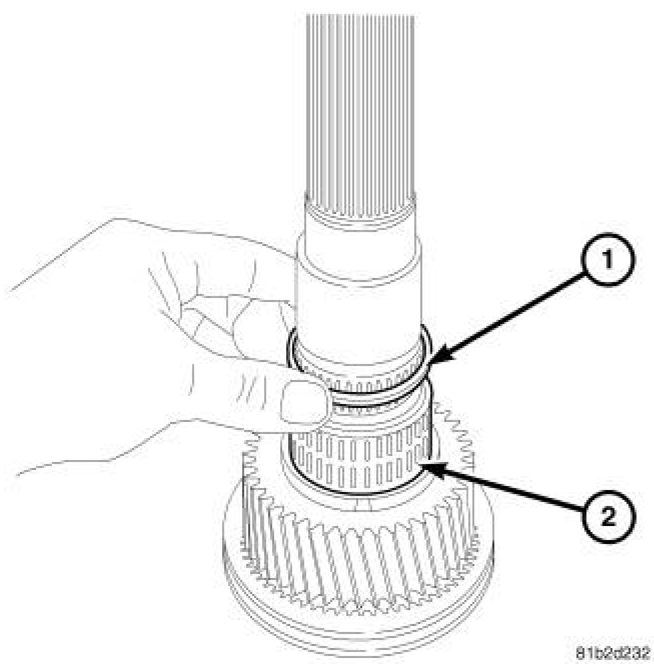


Fig. 86: 2nd Bearing Spacer
Courtesy of CHRYSLER GROUP, LLC

12. Remove the second gear bearing spacer (1) from the mainshaft (2).

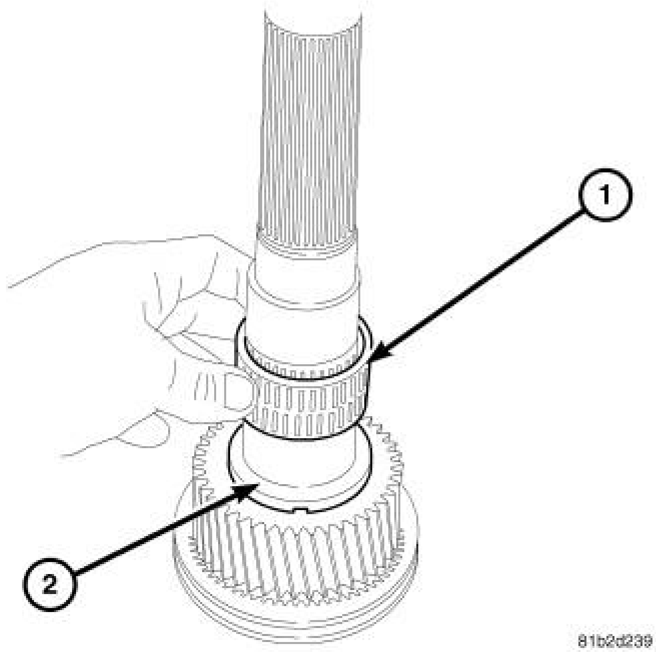


Fig. 87: 2nd Gear Bearing
Courtesy of CHRYSLER GROUP, LLC

13. Remove the second gear bearing (1) from the mainshaft (2).

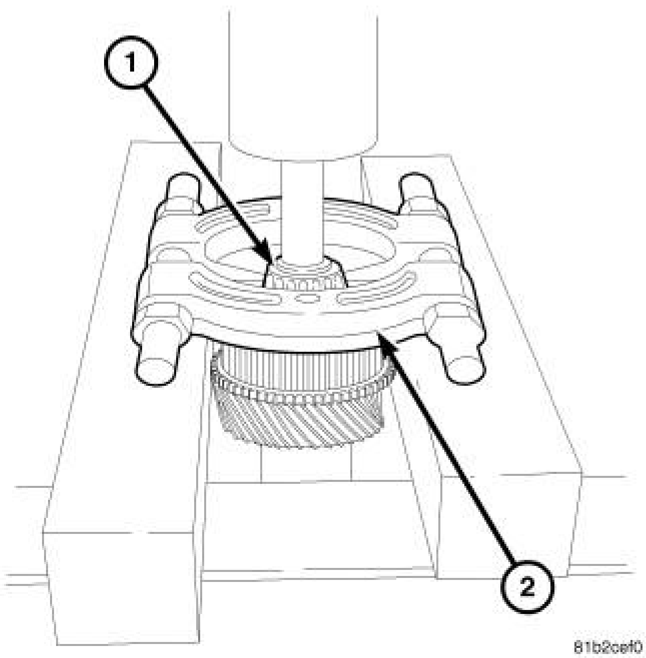


Fig. 88: Mainshaft Adapter Bearing
Courtesy of CHRYSLER GROUP, LLC

14. Remove the mainshaft transmission adapter bearing (1) with bearing Splitter (special tool #P-334, Splitter, Bearing) (2) and a press.

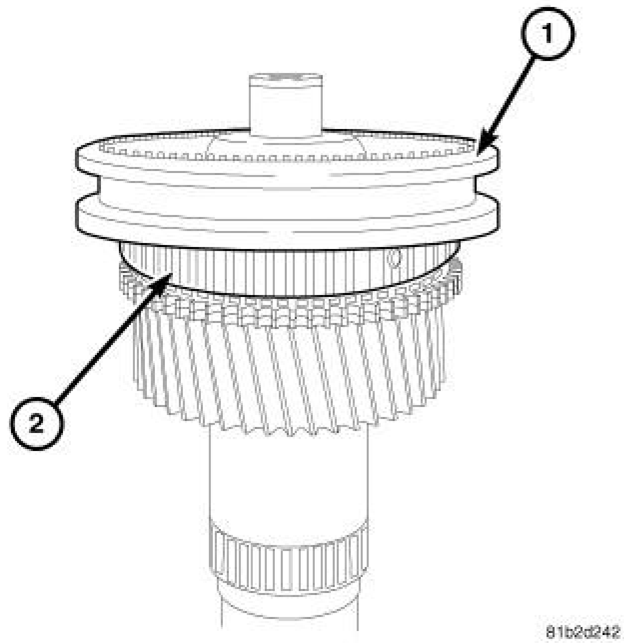


Fig. 89: 3-4 Synchro Sleeve
Courtesy of CHRYSLER GROUP, LLC

15. Remove the third and fourth gear synchronizer sleeve (1) from the third and fourth gear synchronizer hub (2).

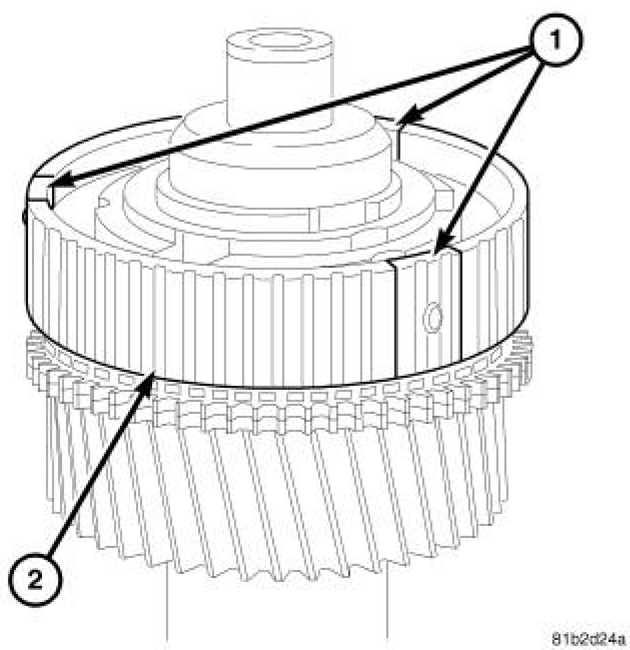
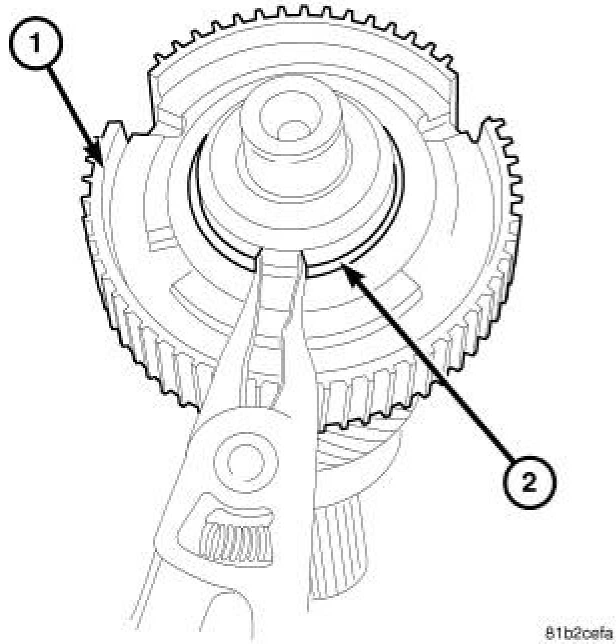


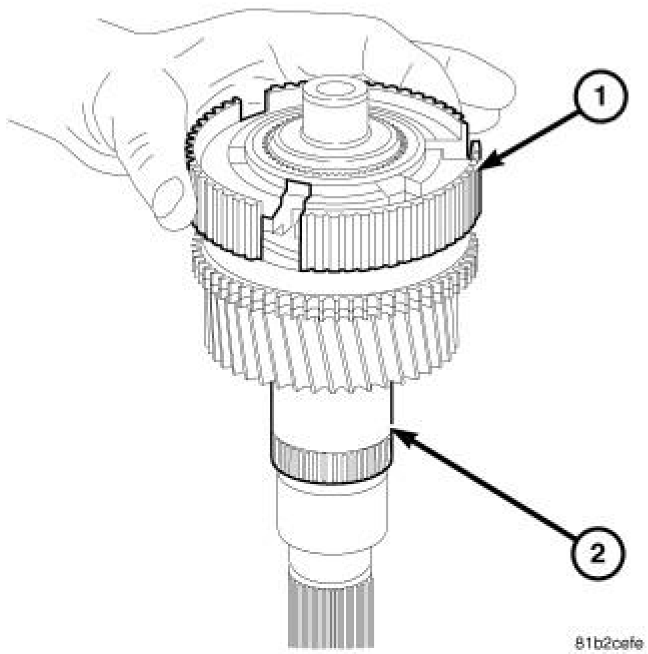
Fig. 90: 3-4 Synchronizer Detents & Hub
Courtesy of CHRYSLER GROUP, LLC

16. Remove the third and fourth gear synchronizer detents (1) from the third and fourth gear synchronizer hub (2).



[Fig. 91: 3-4 Hub Snap Ring]
Courtesy of CHRYSLER GROUP, LLC

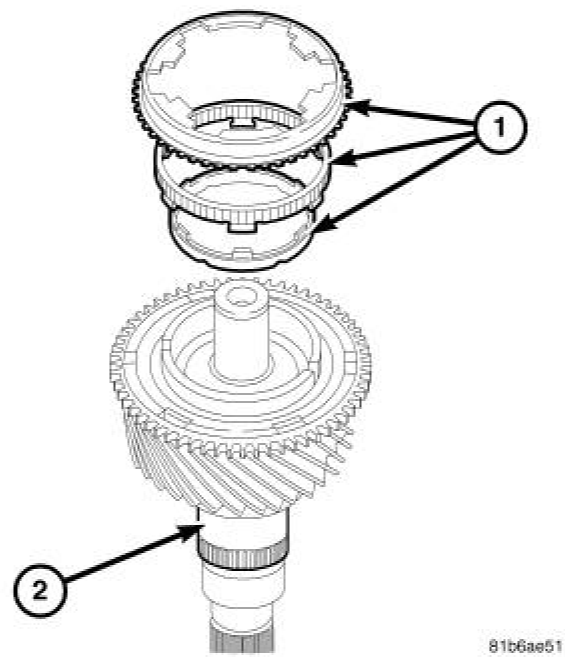
17. Remove the third and fourth gear synchronizer hub (1) snap ring (2) from the mainshaft.



[Fig. 92: 3-4 Synchro Hub]
Courtesy of CHRYSLER GROUP, LLC

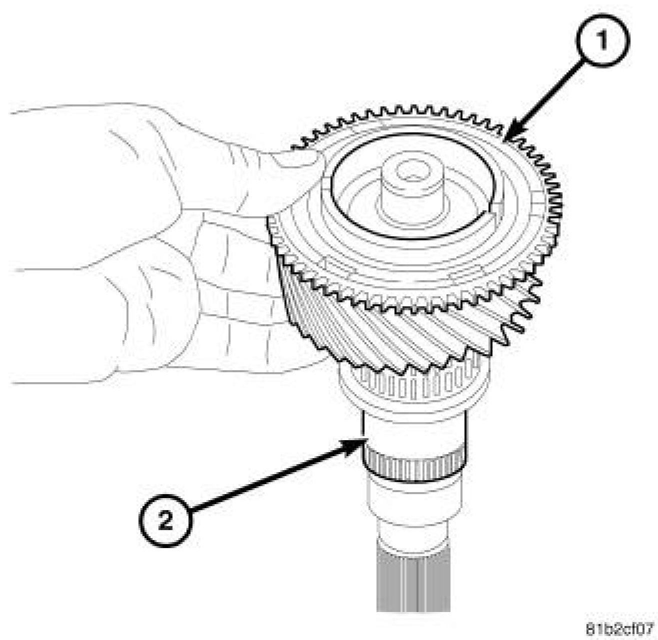
NOTE: **Take note of the third and fourth gear synchronizer hub orientation prior to removal. It is a directional hub and will not work properly if installed incorrectly.**

18. Remove the third and fourth gear synchronizer hub (1) from the mainshaft (2).



[Fig. 93: 3rd Gear Synchro Rings]
Courtesy of CHRYSLER GROUP, LLC

19. Remove the third gear synchronizer rings (1) from third gear (2).



[Fig. 94: 3rd Gear Synchronizer Rings]
Courtesy of CHRYSLER GROUP, LLC

20. Remove third gear (1) from the mainshaft (2).

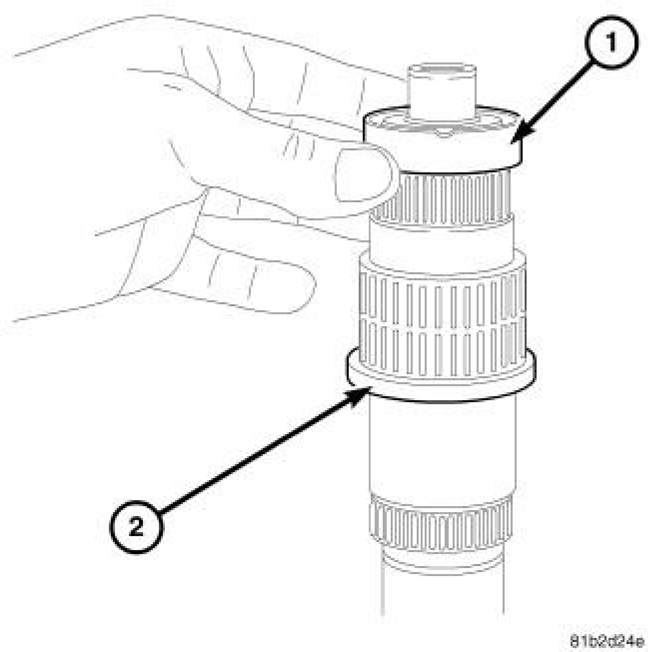


Fig. 95: 3rd Gear Bearing Spacer
Courtesy of CHRYSLER GROUP, LLC

21. Remove the third gear bearing spacer (1) from the mainshaft (2).

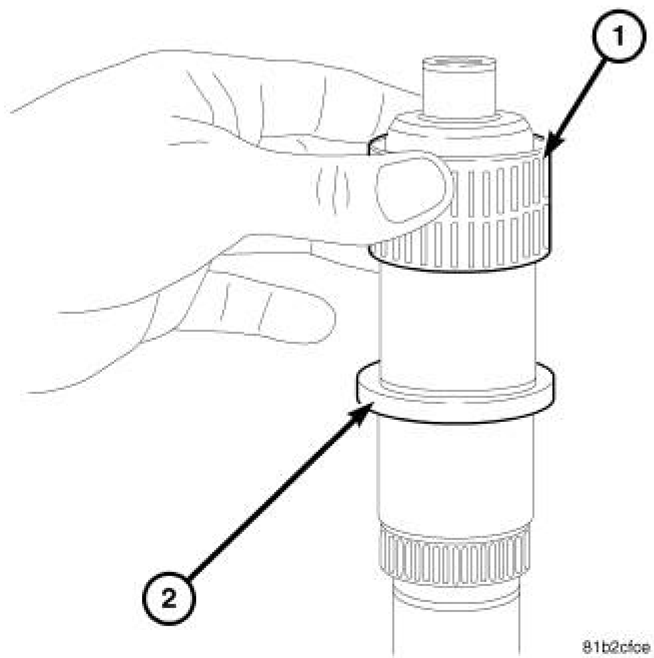
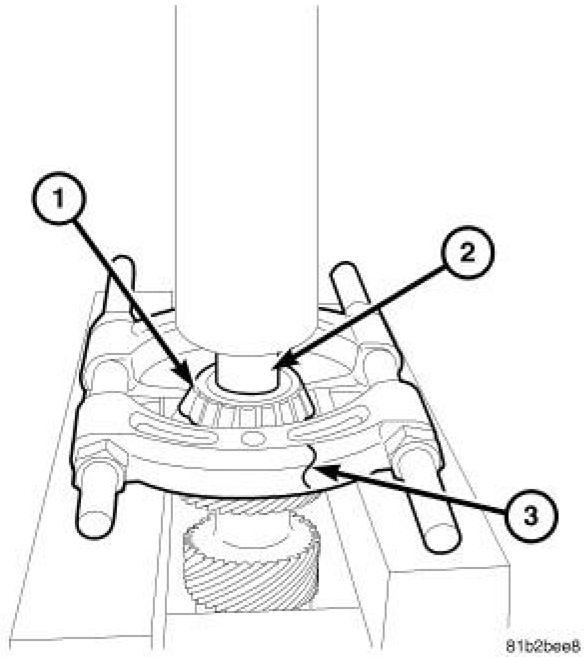


Fig. 96: 3rd Gear Bearing
Courtesy of CHRYSLER GROUP, LLC

22. Remove the third gear bearing (1) from the mainshaft (2).

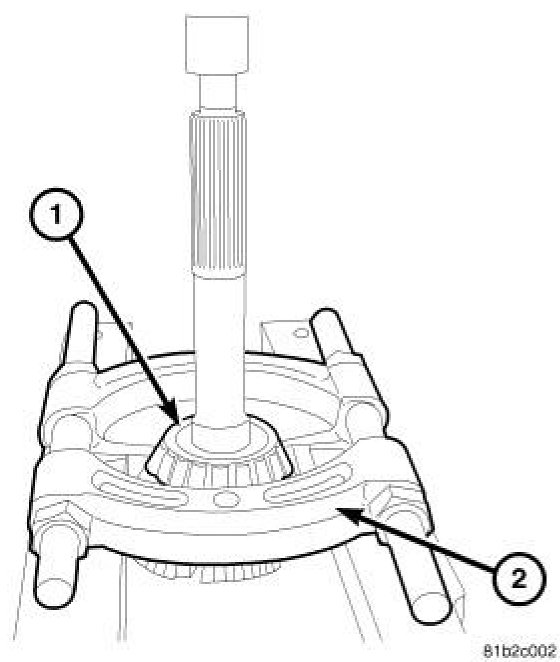
COUNTERSHAFT



[Fig. 97: Countershaft Adapter Bearing](#)
Courtesy of CHRYSLER GROUP, LLC

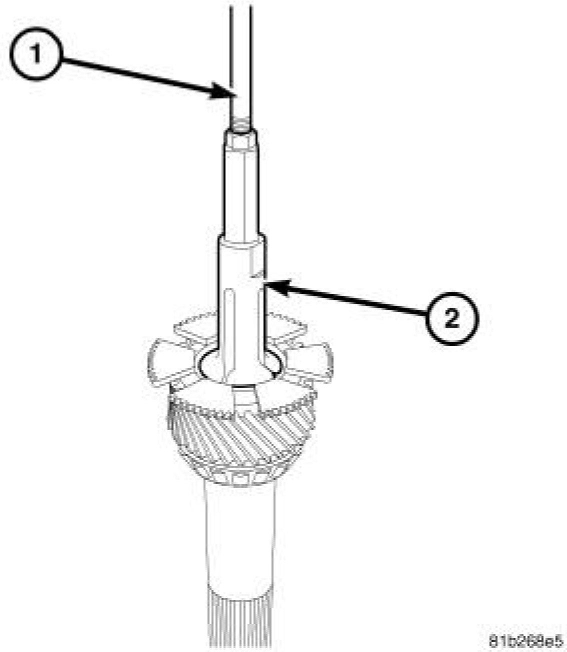
1. Remove the countershaft adapter bearings (1) with Adapter (special tool #9377, Press Adapter) (2) Splitter (special tool #1130, Splitter, Bearing/Gear) (3) and a press.

INPUT SHAFT



[Fig. 98: Input Shaft Bearing](#)
Courtesy of CHRYSLER GROUP, LLC

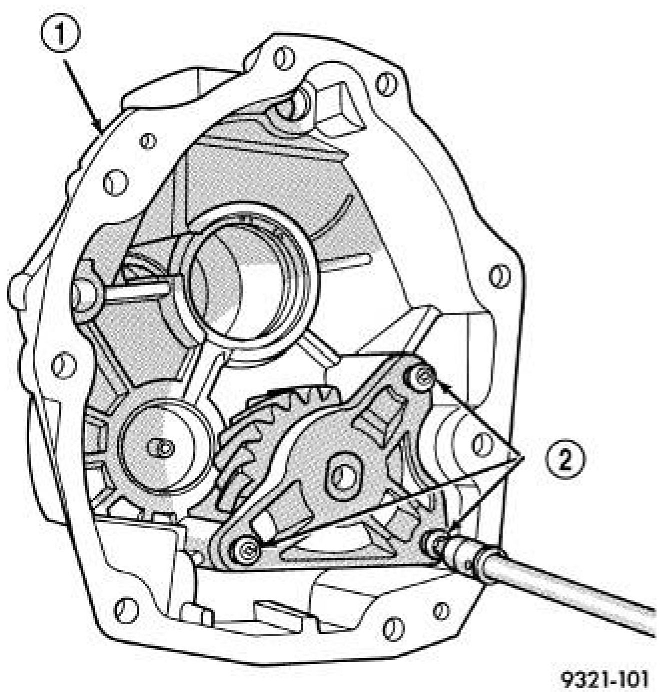
1. Remove the input shaft bearing (1) with Splitter (special tool #1130, Splitter, Bearing/Gear) (2) and a press.



[Fig. 99: Input Shaft Bearing Cup](#)
Courtesy of CHRYSLER GROUP, LLC

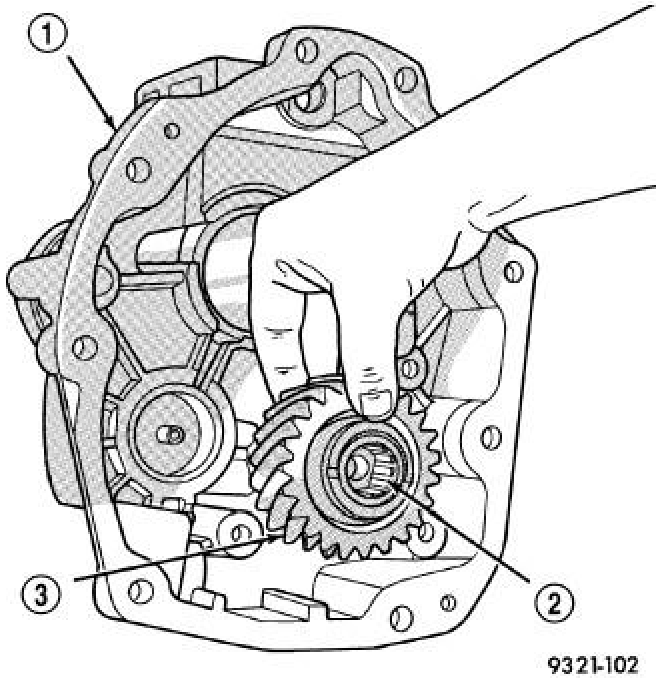
2. Remove the input shaft bearing cup with Slide Hammer (special tool #C-3752, Slide Hammers) (1) and Remover (special tool #9381, Remover, Bearing Cup) (1).

EXTENSION HOUSING



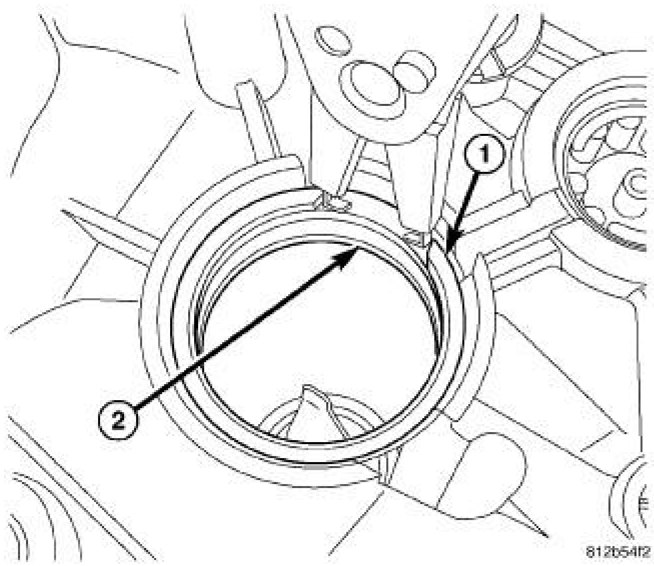
[Fig. 100: Idler Gear Bracket Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

1. Remove the extension housing (1) idler gear bracket bolts (2) and the bracket.



[Fig. 101: Thrust Washer, Gear And Bearing]
Courtesy of CHRYSLER GROUP, LLC

2. Remove the extension housing (1) idler gear bearing (2) and the idler gear (3).
3. Remove the idler gear shaft from the extension housing.



[Fig. 102: Removing Mainshaft Race Snap Ring]
Courtesy of CHRYSLER GROUP, LLC

4. Remove the mainshaft bearing cup (1) snap ring (2).

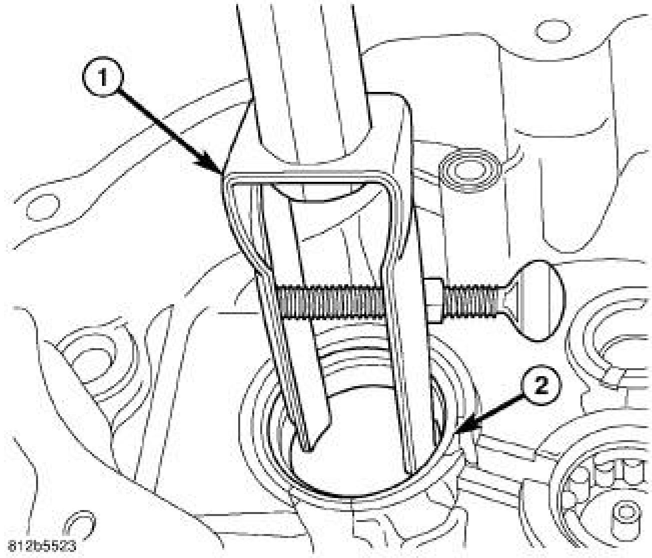


Fig. 103: Removing Mainshaft Race
Courtesy of CHRYSLER GROUP, LLC

5. Remove the mainshaft bearing cup (2) with Remover (special tool #7794-A, Remover, Seal) (1) and Slide Hammer (special tool #C-637, Slide Hammer, Universal).

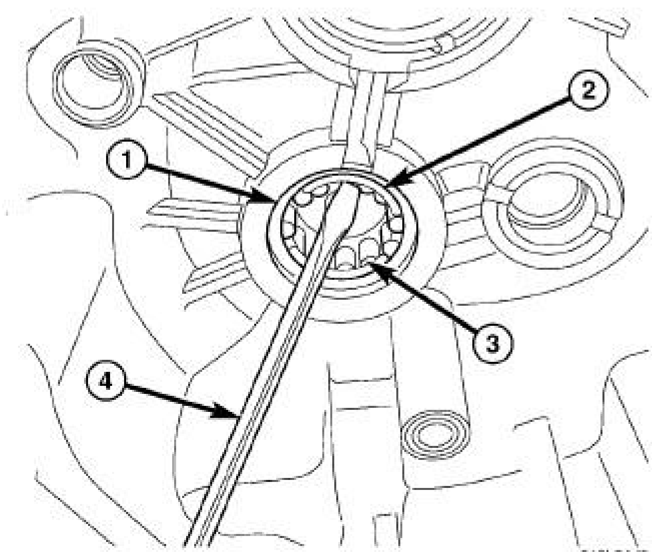


Fig. 104: Removing Countershaft Bearing Cage
Courtesy of CHRYSLER GROUP, LLC

6. Remove the countershaft bearing snap ring (1).
7. Remove the countershaft bearing plastic bearing cage (2) and remove roller bearings (3).

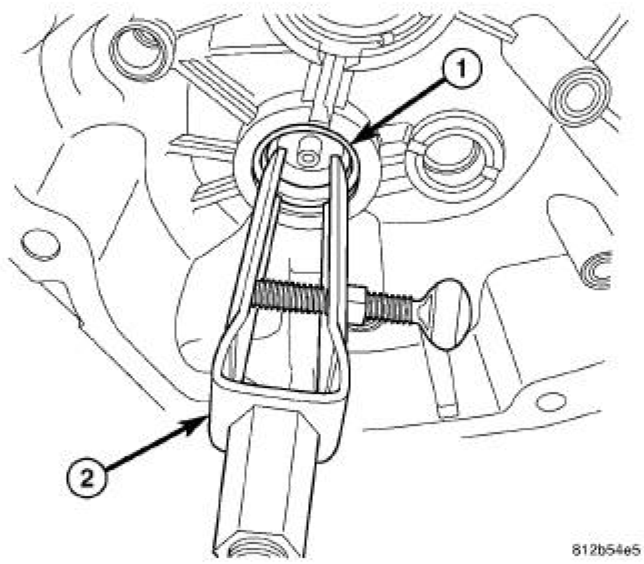


Fig. 105: Removing Countershaft Bearing Race
Courtesy of CHRYSLER GROUP, LLC

8. Remove the countershaft bearing cup (1) with Remover (special tool #7794-A, Remover, Seal) (2) and Slide Hammer (special tool #C-637, Slide Hammer, Universal).

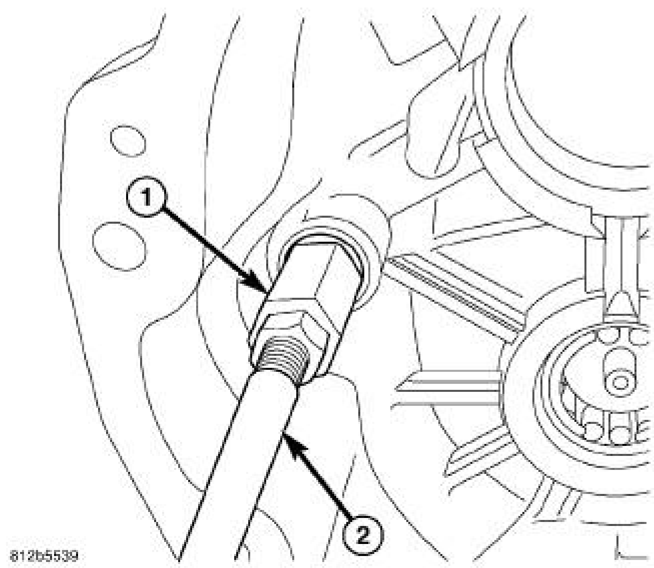
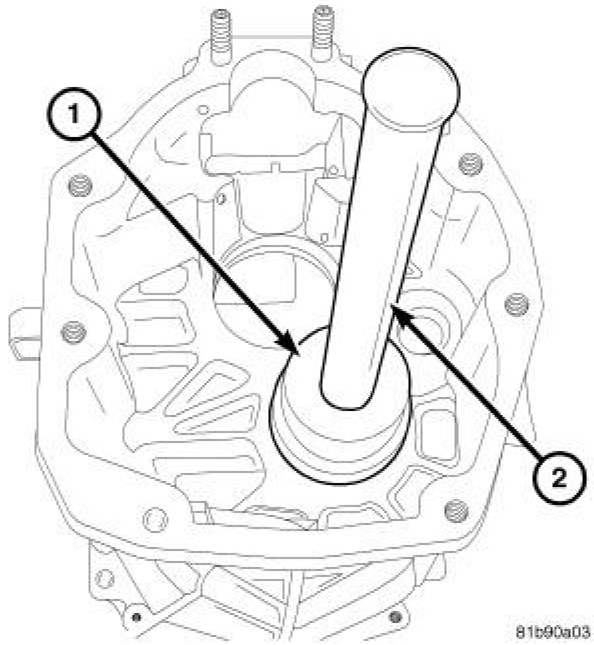


Fig. 106: Removing Shift Rail Bushing
Courtesy of CHRYSLER GROUP, LLC

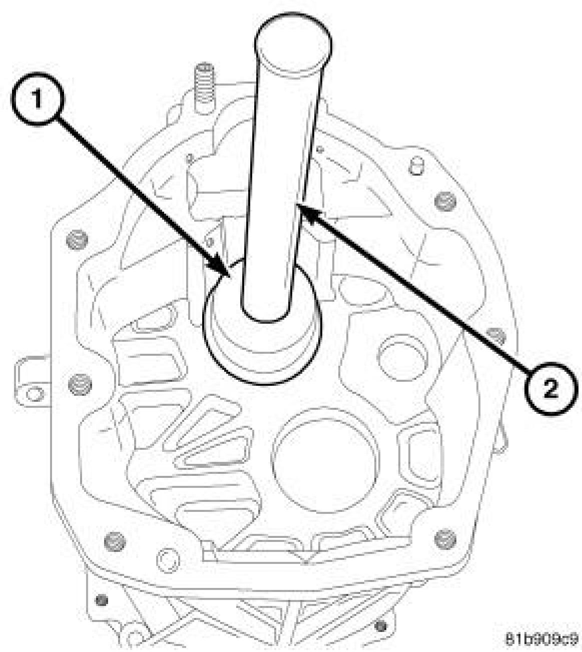
9. Remove the shift rail bushings with Remover (special tool #6786, Remover, Bushing) (1) and Slide Hammer (special tool #C-3752, Slide Hammers) (2).

TRANSMISSION CASE



[Fig. 107: Countershaft Bearing Cup](#)
Courtesy of CHRYSLER GROUP, LLC

1. Remove the countershaft bearing cups with Remover (special tool #9369, Remover, Bearing Cup) (1) and Handle (special tool #C-4171, Driver Handle, Universal) (2).



[Fig. 108: Mainshaft Bearing Cup](#)
Courtesy of CHRYSLER GROUP, LLC

2. Remove the mainshaft bearing cups with Remover (special tool #9369, Remover, Bearing Cup) (2) and Handle (special tool #C-4171, Driver Handle, Universal) (1).

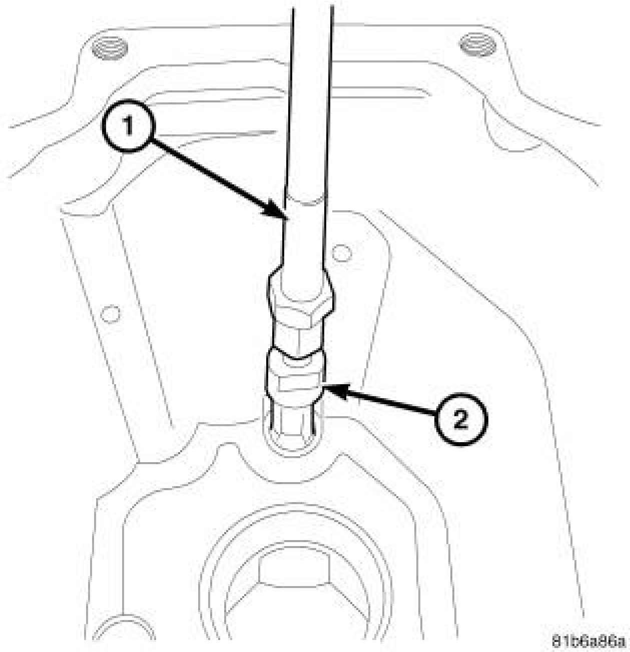


Fig. 109: Case Rail Bearing Remover
Courtesy of CHRYSLER GROUP, LLC

3. Remove the shift rail bearing with Slide Hammer (special tool #C-637, Slide Hammer, Universal) (1) and Remover (special tool #9609, Remover, Bearing) (2).

TRANSMISSION ADAPTER

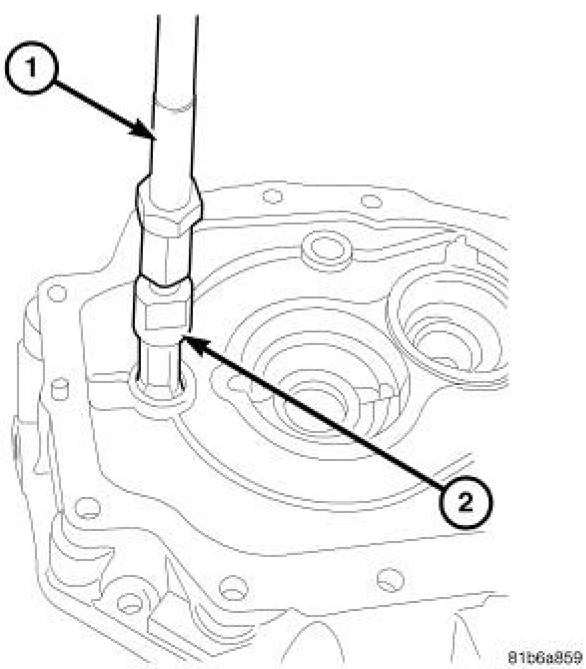
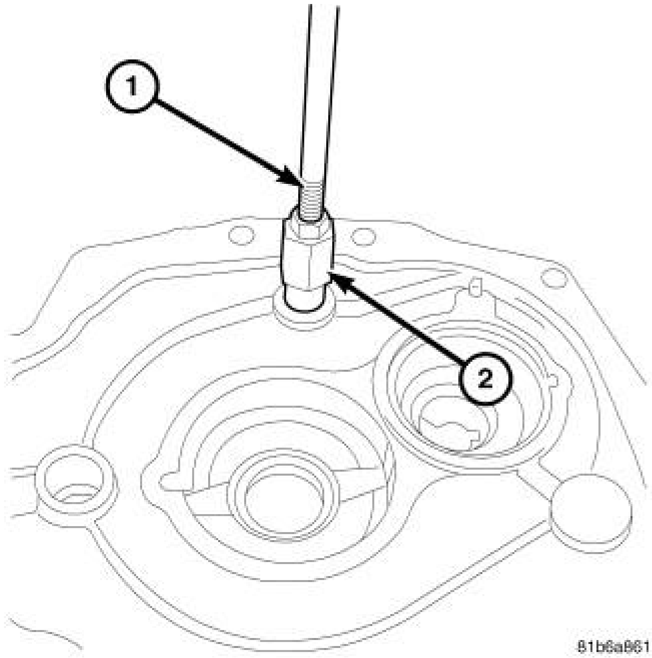


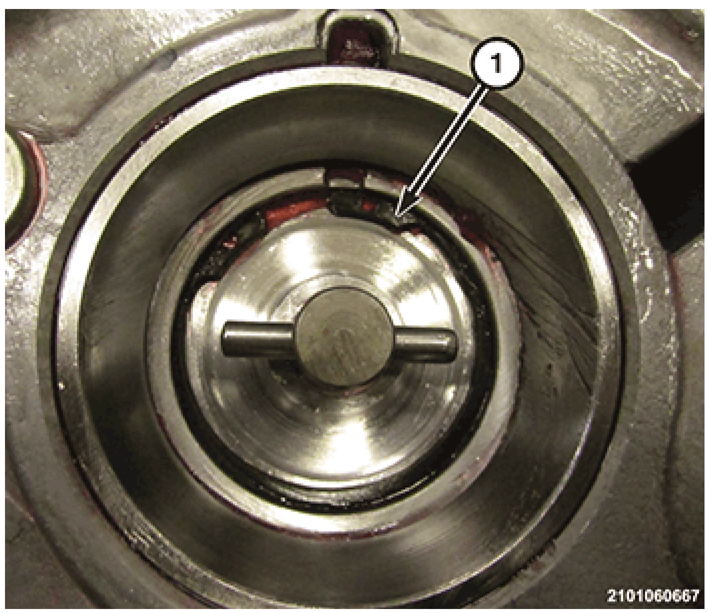
Fig. 110: Adapter Bearing Remover
Courtesy of CHRYSLER GROUP, LLC

1. Remove the shift rail bearing with Slide Hammer (special tool #C-637, Slide Hammer, Universal) (1) and Remover (special tool #9609, Remover, Bearing) (2).



[Fig. 111: Adapter Bushing Remover](#)
Courtesy of CHRYSLER GROUP, LLC

2. Remove the shift rail bushing with Slide Hammer (special tool #C-3752, Slide Hammers) (1) and Remover (special tool #6786, Remover, Bushing) (2).



[Fig. 112: Transmission Oil Pump Snap Ring](#)
Courtesy of CHRYSLER GROUP, LLC

3. If equipped, remove the transmission oil pump snap ring.

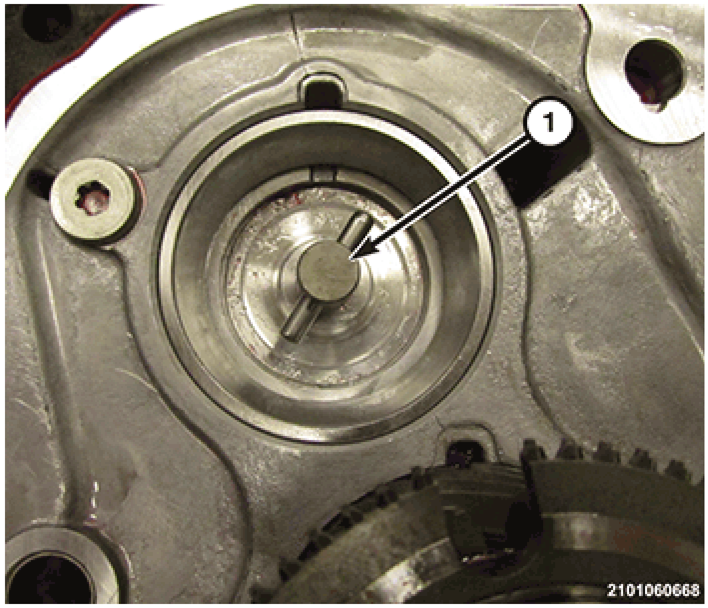


Fig. 113: Transmission Oil Pump
Courtesy of CHRYSLER GROUP, LLC

4. If equipped, remove the transmission oil pump.

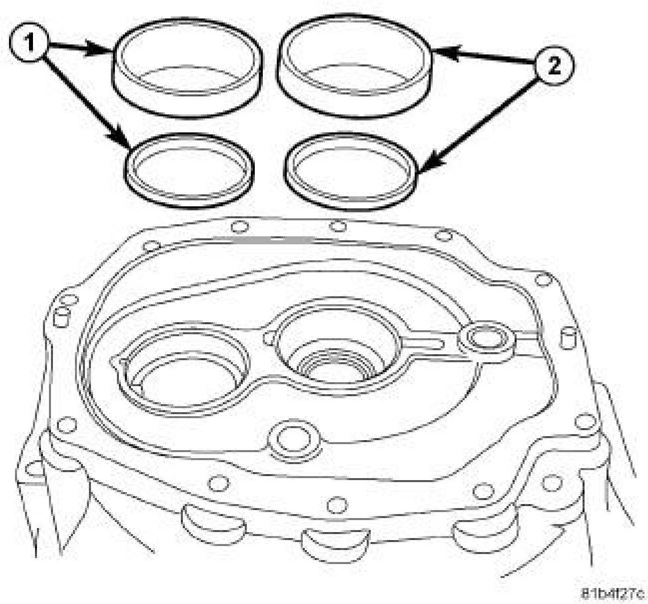


Fig. 114: Bearing Cups & Select Shims
Courtesy of CHRYSLER GROUP, LLC

5. Remove the countershaft bearing cup and select shim (1). Remove the mainshaft bearing cup and select shim (2).

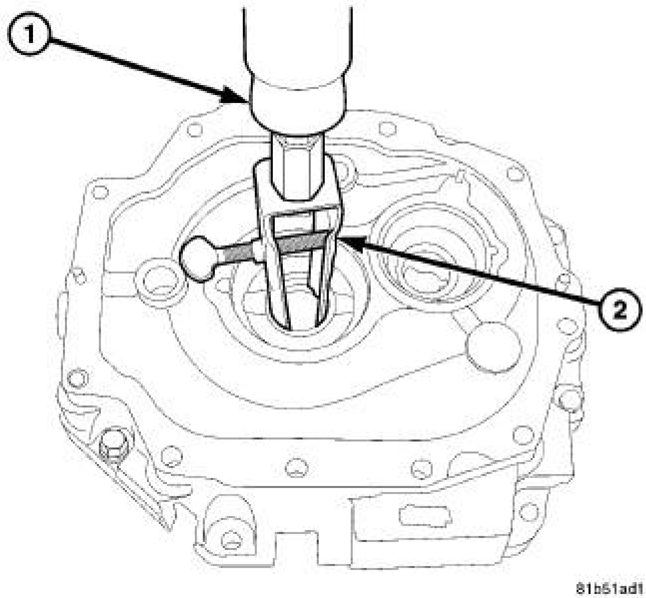


Fig. 115: Input Seal Puller
Courtesy of CHRYSLER GROUP, LLC

6. Remove the input shaft seal with Slide Hammer (special tool #C-637, Slide Hammer, Universal) (1) and Puller (special tool #7794-A, Remover, Seal) (2).

CLEANING

CLEANING

Clean the gears, bearings shafts, extension/adapter housing and gear case with solvent. Dry all parts except the bearings with compressed air. Allow the bearings to either air dry or wipe them dry with clean shop towels.

INSPECTION

INSPECTION

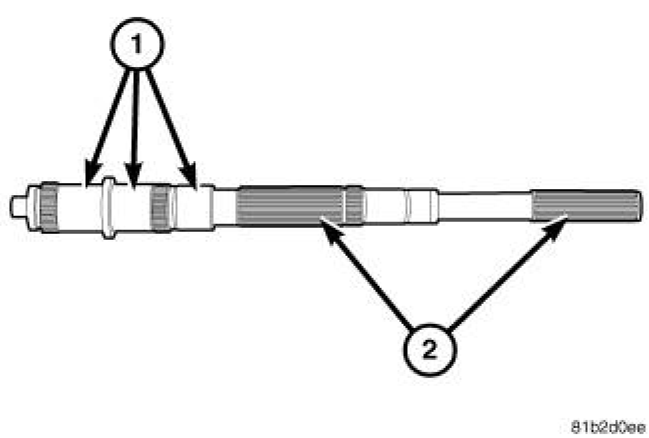


Fig. 116: Bearing Surfaces & Splines

Courtesy of CHRYSLER GROUP, LLC

NOTE: **Minor corrosion, nicks, or pitting can be smoothed with 400 grit emery and polished out with crocus cloth.**

Mainshaft: Inspect the bearing surfaces (1) for wear or flat-spots. Inspect the splines (2) and snap ring grooves for wear. Inspect the output seal surface for wear.

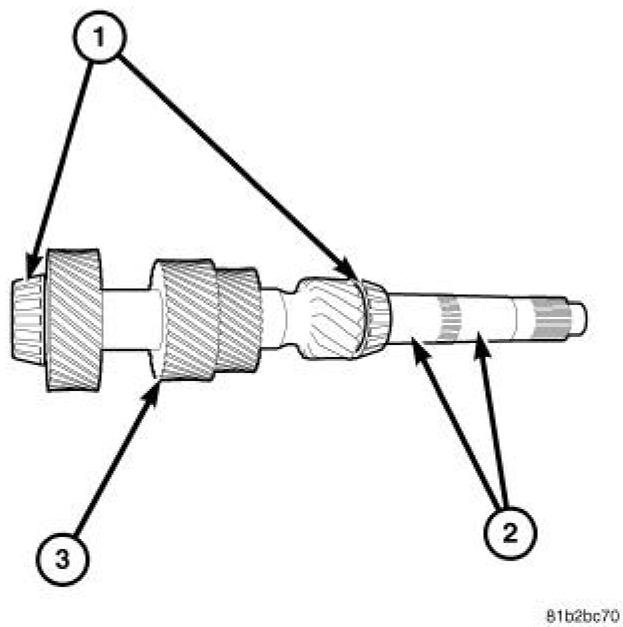
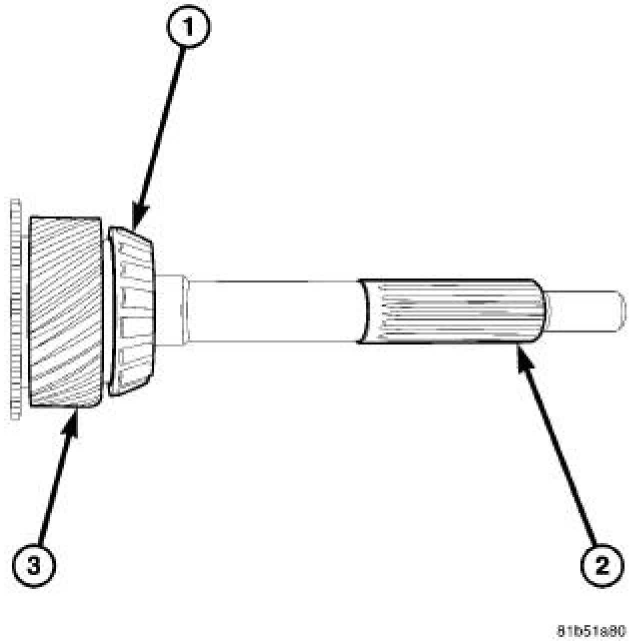


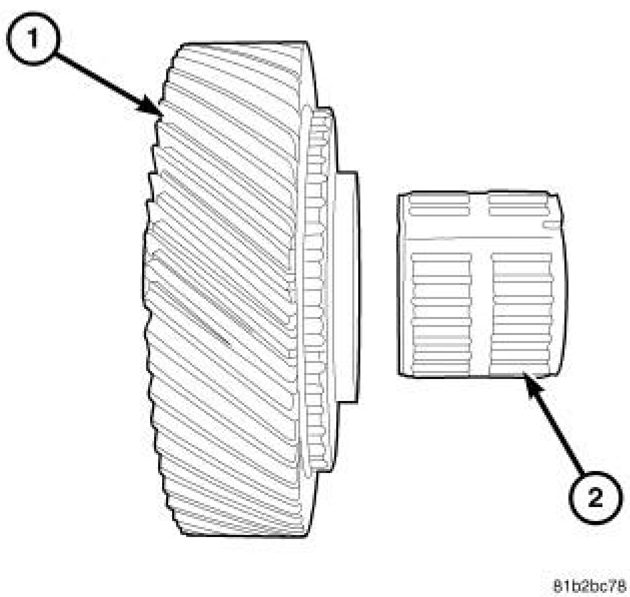
Fig. 117: Roller Bearings, Surfaces & Gear Teeth
Courtesy of CHRYSLER GROUP, LLC

Countershaft: Inspect the roller bearings (1) for wear, peeling, pitting or flat-spots. Inspect the bearing surfaces (2) for wear or flat-spots. Inspect the gear teeth (3) for wear, chips or cracks. Inspect the splines and snap ring grooves for wear.



[Fig. 118: Input Shaft Bearing, Splines & Forth Gear](#)
Courtesy of CHRYSLER GROUP, LLC

Input Shaft: Inspect the input shaft bearing (1) for wear, peeling, pitting or flat-spots. Inspect the input shaft splines (2) for wear. Inspect the fourth gear (3) for worn, chipped, or cracked teeth. Inspect the input seal surface for wear.



[Fig. 119: Gear & Bearing](#)
Courtesy of CHRYSLER GROUP, LLC

Gears: Inspect the gears (1) for worn, chipped or cracked teeth and the bearing surfaces for wear, peeling, pitting or flat-spots. Inspect the gear bearings (2) for wear, peeling, pitting, flat-spots or damaged bearing cage.

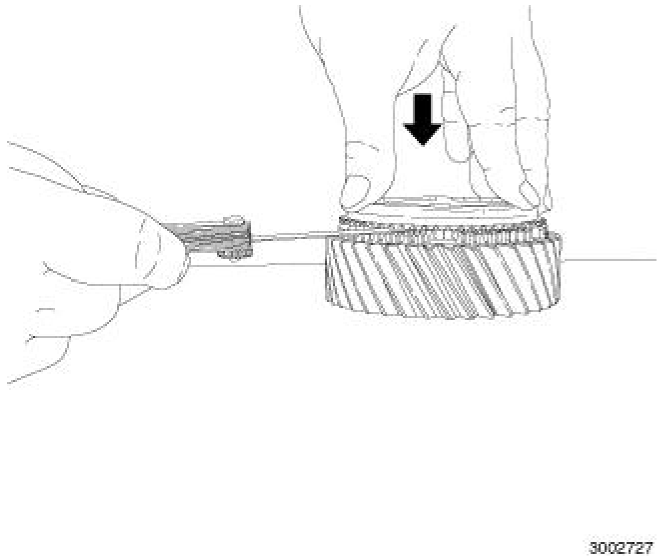


Fig. 120: measuring Clearance Between Blocker Ring & Gear
Courtesy of CHRYSLER GROUP, LLC

Synchronizer components: Inspect the synchronizer rings (1) for worn, chipped, or cracked teeth and burned or flaking friction material. Place the blocker rings on the gears. While applying pressure and rotating the blocker ring measure the clearance between the blocker ring and gear. If the clearance is less than 0.75 mm (0.030 in.) replace the blocker ring.**Synchronizer rings are serviced as an assembly.**

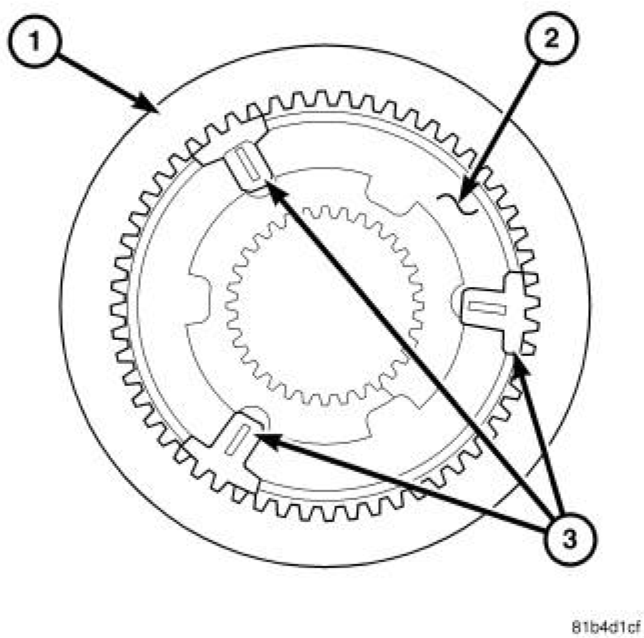
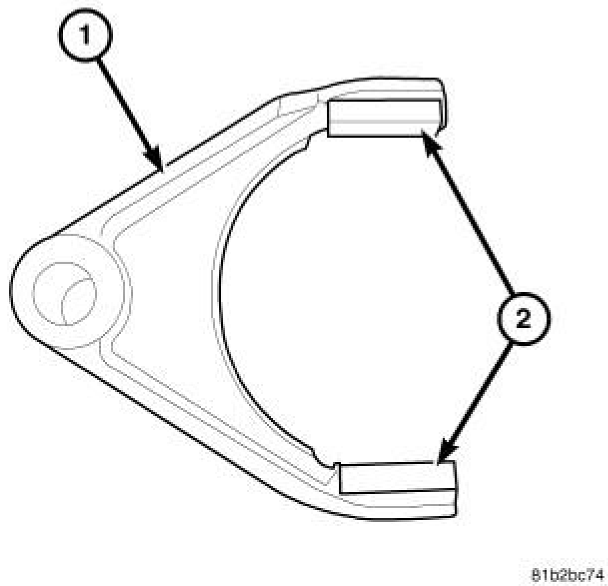


Fig. 121: Synchronizer Sleeve, Hub & Detents
Courtesy of CHRYSLER GROUP, LLC

Inspect the synchronizer sleeve (1) and hub (2) for worn teeth. Inspect the synchronizer detents (3) for broken springs, missing balls or cracked/damaged housings.



[Fig. 122: Shift Forks & Shoes](#)

Courtesy of CHRYSLER GROUP, LLC

Shift Forks/Shift Rails: Inspect the shift forks (1) for distortion. Inspect the shift fork shoes (2) for wear or cracks. Fit the shoes in the synchronizer sleeve to ensure the parts fit and work smoothly. Inspect the shift rails for wear. Inspect the shift rail bushings and bearings for wear.

ASSEMBLY

ASSEMBLY

TRANSMISSION ADAPTER

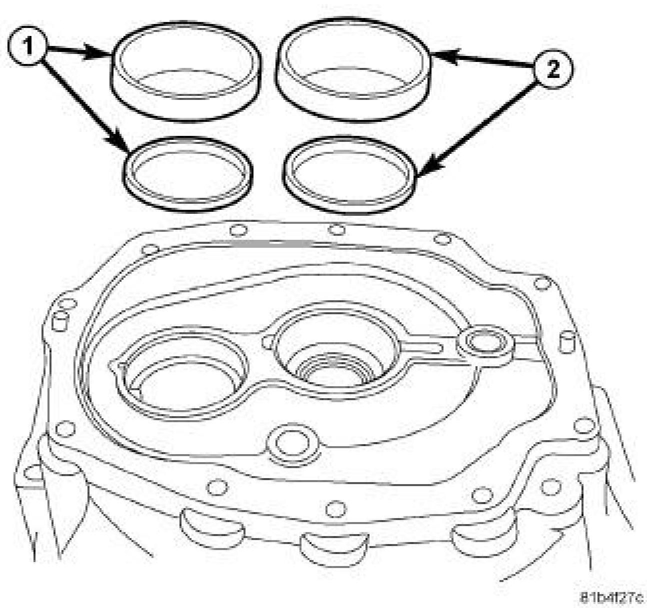


Fig. 123: Bearing Cups & Select Shims
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Refer to Adjustments for Mainshaft and Countershaft end play shim selection. Refer to ADJUSTMENTS .**

1. Install the countershaft select shim and bearing cup (1) into the adapter plate. Install the mainshaft select shim and bearing cup (2) into the adapter plate.

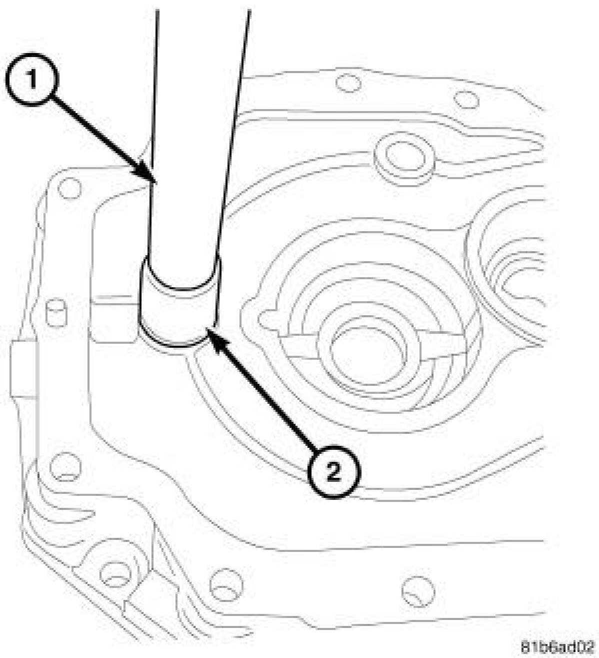


Fig. 124: Adapter Bearing Installer
Courtesy of CHRYSLER GROUP, LLC

2. Install the shift rail bearing with Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #10028, Installer, Bearing) (2).

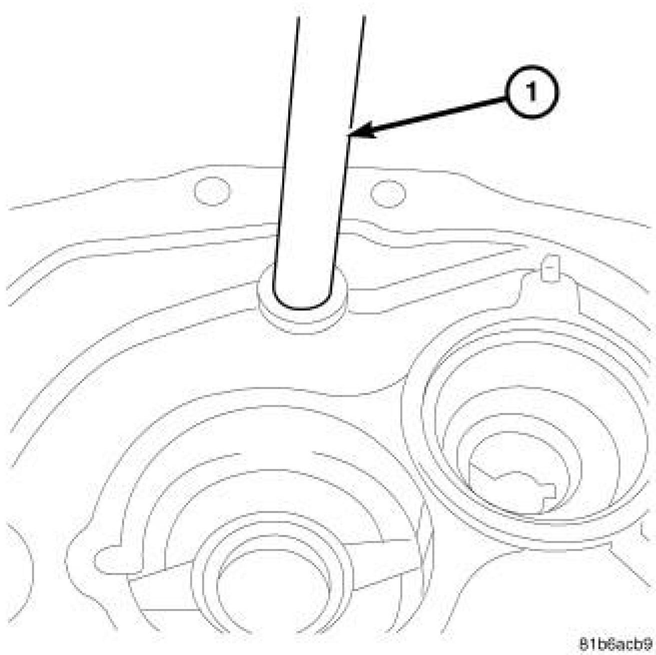


Fig. 125: Adapter Bushing Installer
Courtesy of CHRYSLER GROUP, LLC

3. Install the shift rail bushing with Installer (special tool #8475, Installer, Bushing) (1).

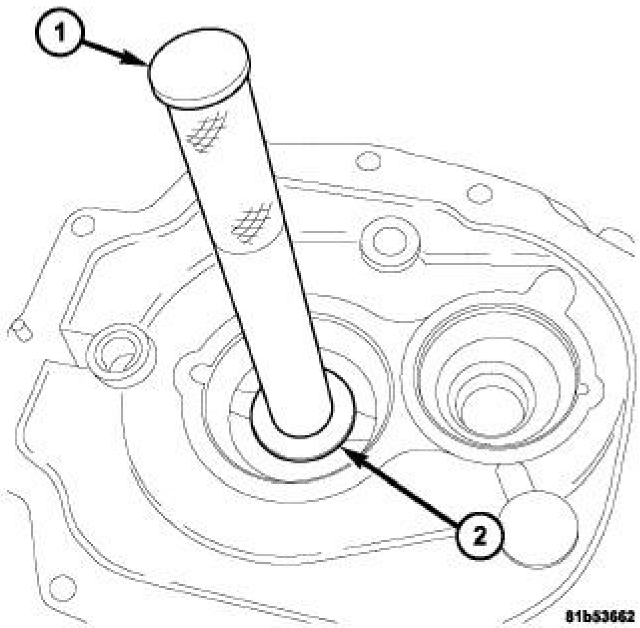


Fig. 126: Input Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

4. Install the input shaft seal with Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #9366, Installer, Seal) (2).

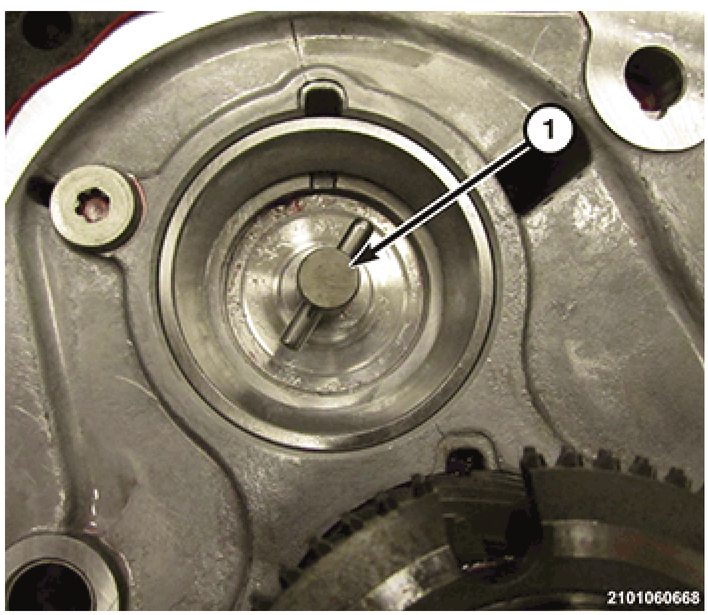
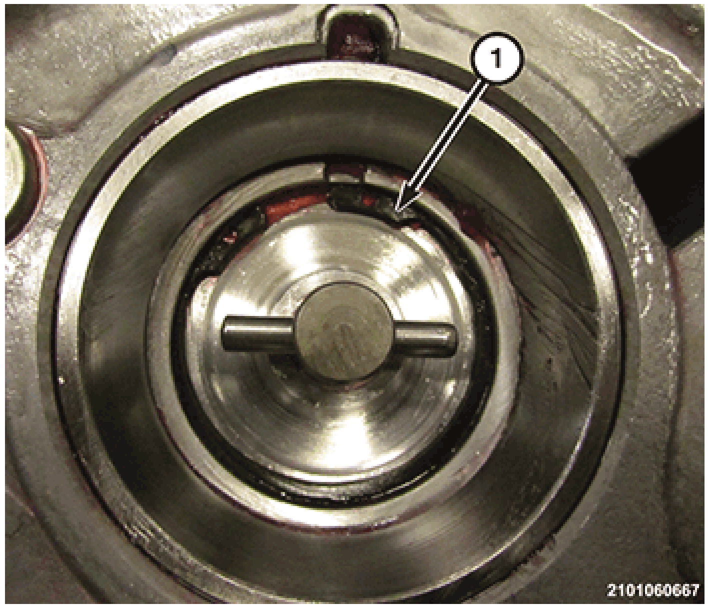


Fig. 127: Transmission Oil Pump
Courtesy of CHRYSLER GROUP, LLC

5. If equipped, install the transmission oil cooler pump.



[Fig. 128: Transmission Oil Pump Snap Ring](#)
Courtesy of CHRYSLER GROUP, LLC

6. If equipped, install the transmission oil cooler pump snap ring.
7. If equipped, install the transmission oil filter.

TRANSMISSION CASE

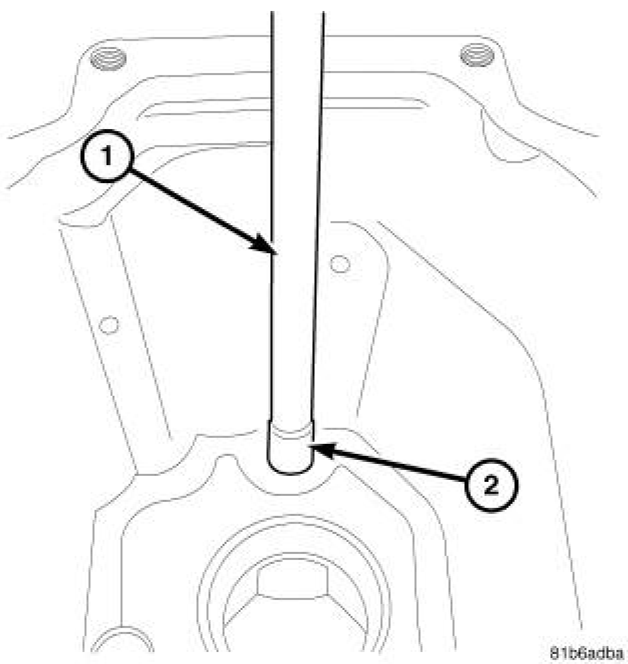


Fig. 129: Case Rail Bearing Installer
Courtesy of CHRYSLER GROUP, LLC

1. Install the shift rail bearing with Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #10028, Installer, Bearing) (2).

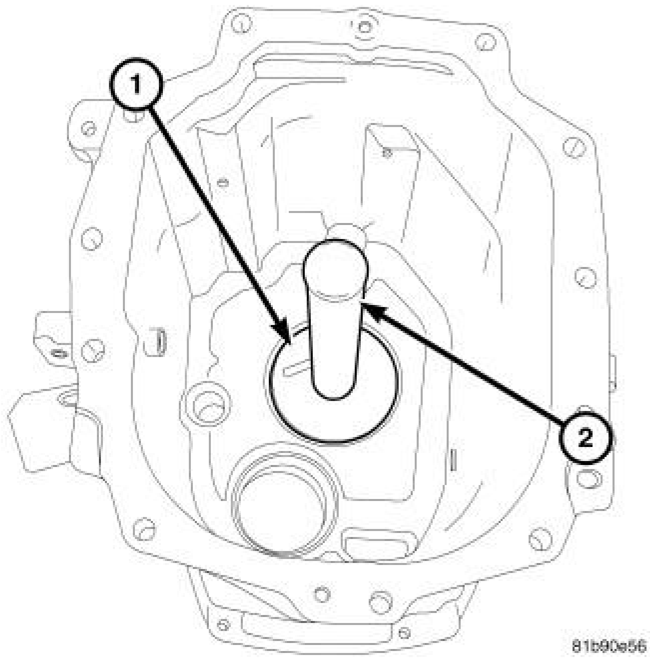


Fig. 130: Mainshaft Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

2. Install the mainshaft bearing cup with Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #9373, Installer, Bearing Cup) (2).

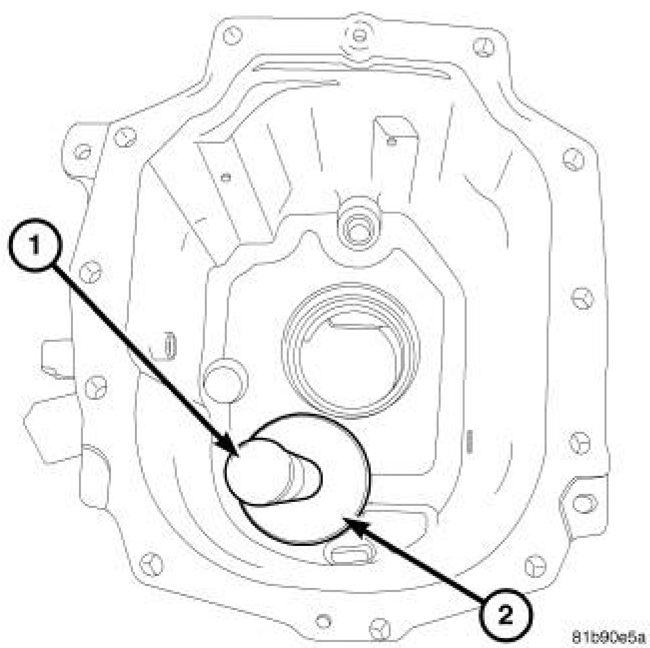


Fig. 131: Countershaft Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

3. Install the countershaft bearing cup with Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #9373, Installer, Bearing Cup) (2).

EXTENSION HOUSING

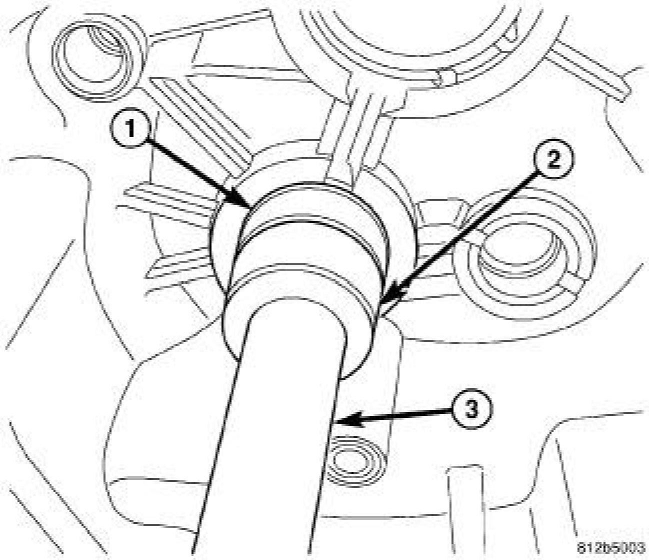


Fig. 132: Installing Countershaft Bearing
Courtesy of CHRYSLER GROUP, LLC

1. Install the countershaft bearing (1) with Installer (special tool #9394, Installer, Bearing) (2) and Handle (special tool #C-4171, Driver Handle, Universal) (3).
2. Install the countershaft bearing snap ring.

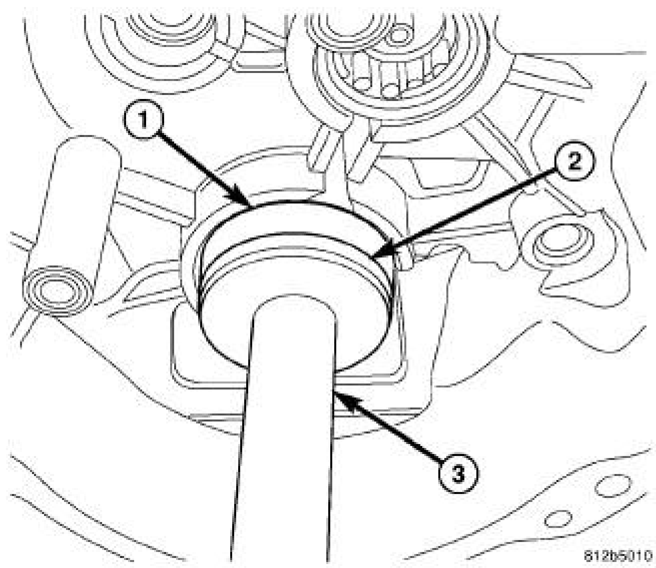


Fig. 133: Installing Mainshaft Bearing Race
Courtesy of CHRYSLER GROUP, LLC

3. Install the mainshaft bearing cup (1) with Installer (special tool #9392, Installer, Bearing Cup) (2) and Handle (special tool #C-4171, Driver Handle, Universal) (3).

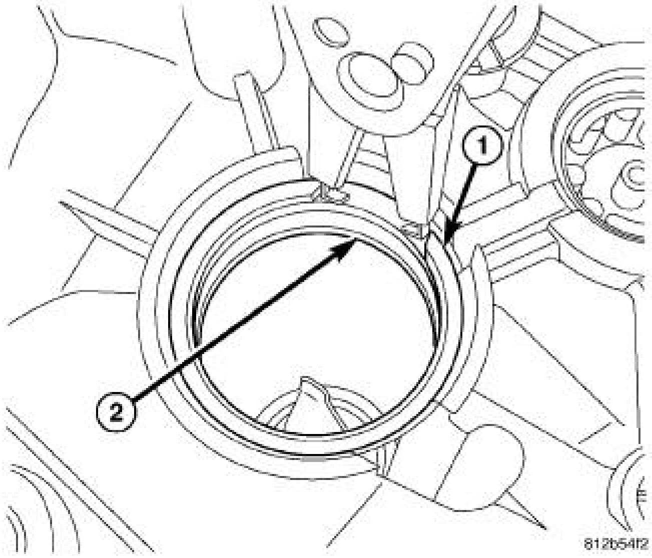


Fig. 134: Removing Mainshaft Race Snap Ring
Courtesy of CHRYSLER GROUP, LLC

4. Install the mainshaft bearing cup (2) snap ring (1).

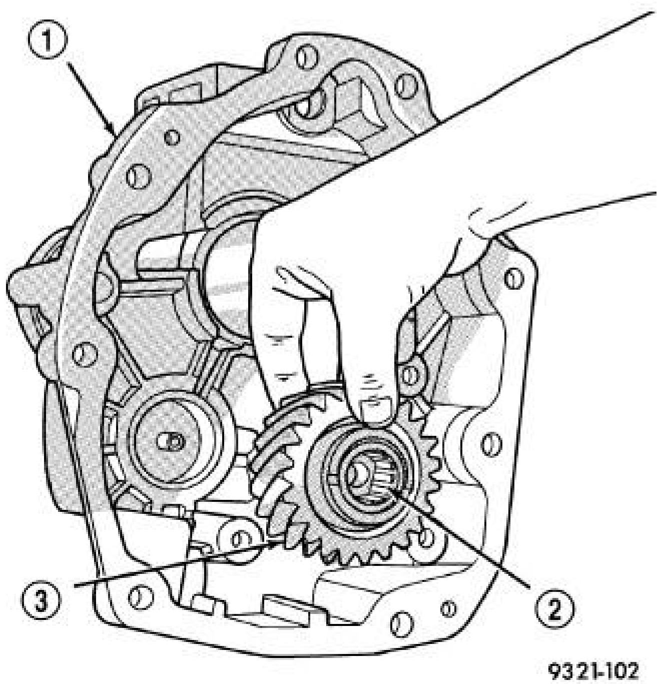


Fig. 135: Thrust Washer, Gear And Bearing
Courtesy of CHRYSLER GROUP, LLC

5. Install the reverse idler gear shaft in the extension housing (1).
6. Install the reverse idler gear bearing (2) and the idler gear (3).

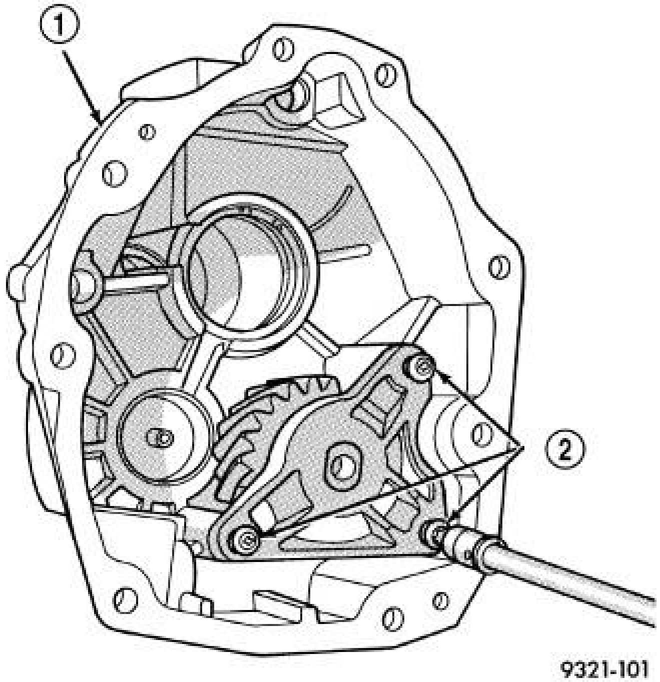


Fig. 136: Idler Gear Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Install the reverse idler gear bracket into the tail housing (1).
8. Apply Mopar Ā® Lock AND Seal Adhesive or equivalent on the idler gear bracket bolts (2). Install bolts (2) and tighten to the proper **SPECIFICATIONS** .

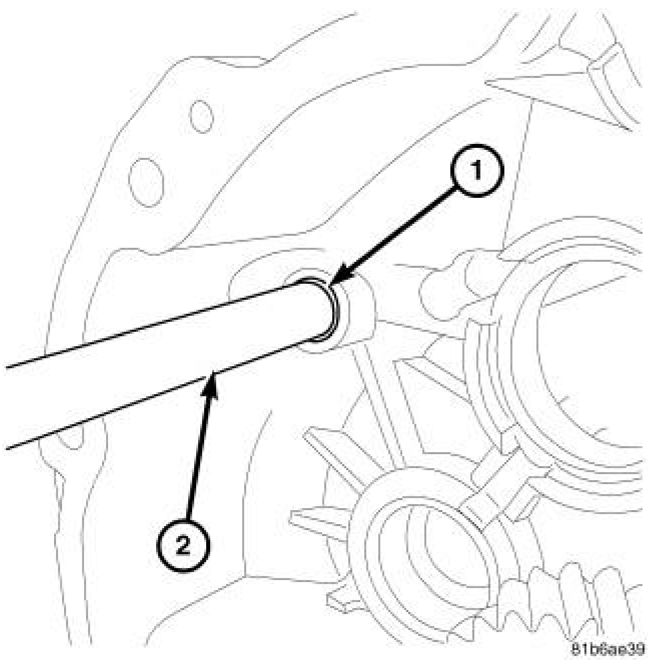


Fig. 137: Shift Rail Bushing Installer
Courtesy of CHRYSLER GROUP, LLC

9. Install the shift rail bushings (1) with Installer (special tool #8475, Installer, Bushing) (2).

INPUT SHAFT

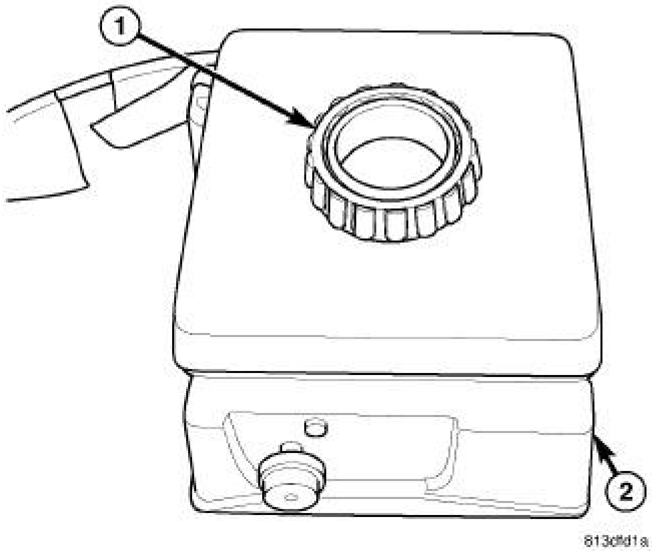


Fig. 138: Identifying Bearing Heater And Bearing
Courtesy of CHRYSLER GROUP, LLC

WARNING:	**Use tongs or welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.**
CAUTION:	**Bearings (1) are installed using a Bearing Heater (2). Use only a bearing heater/hot plate and follow manufacture's instructions. Heat components to 100 - 149 Celsius (212Â° Min. - 300Â° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.**

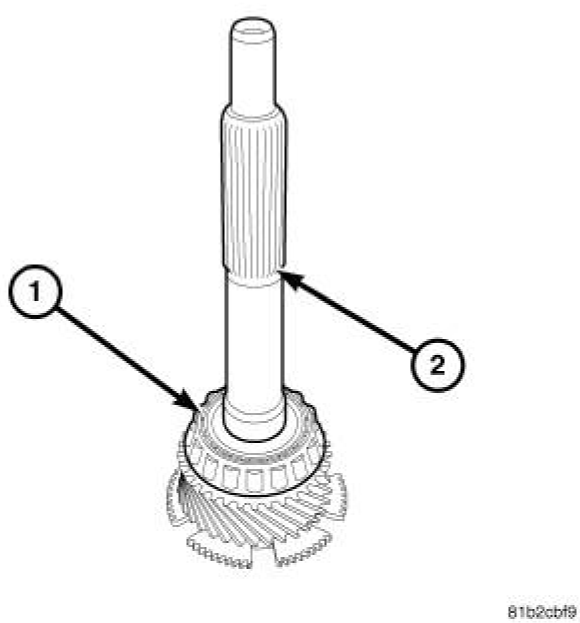
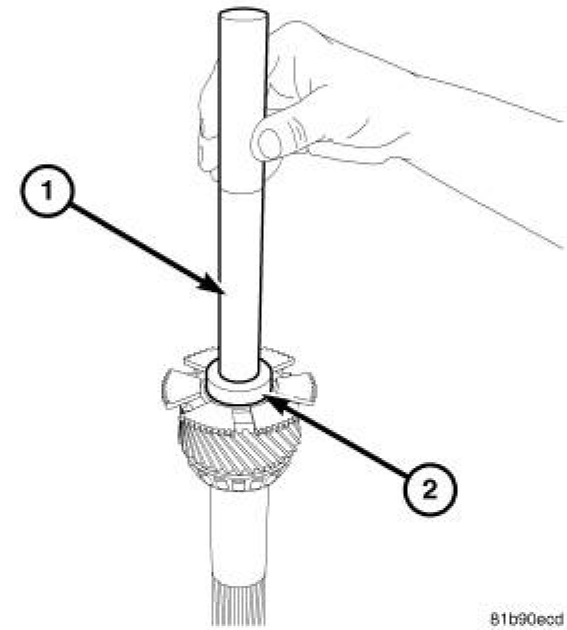


Fig. 139: Input Shaft Bearing

Courtesy of CHRYSLER GROUP, LLC

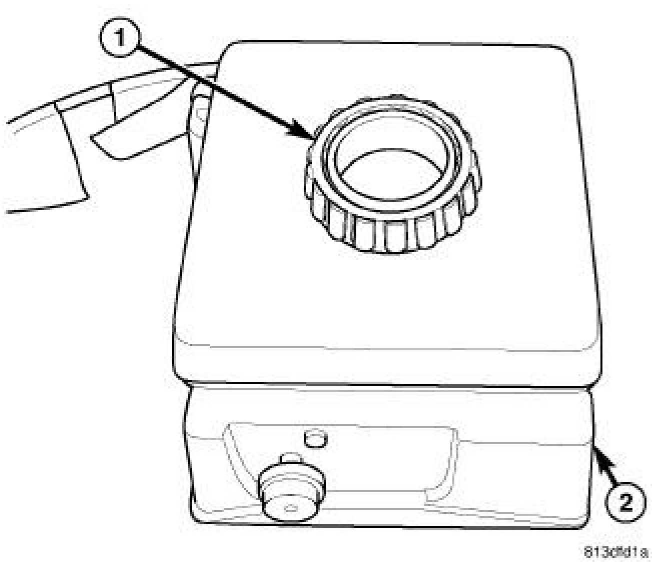
1. Heat the input shaft bearing to 100Ā° - 149Ā°C (212Ā° - 300Ā° F) and install the bearing (1) onto the input shaft (2) with tongs or welding gloves.



[**Fig. 140: Input Shaft Bearing Cup**]
Courtesy of CHRYSLER GROUP, LLC

2. Install the input shaft bearing cup with Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #9380, Installer, Bearing Cup) (2).

COUNTERSHAFT



[**Fig. 141: Identifying Bearing Heater And Bearing**]
Courtesy of CHRYSLER GROUP, LLC

WARNING: **Use tongs or welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.**

CAUTION: **Bearings (1) are installed using a Bearing Heater (2). Use only a bearing heater/hot plate and follow manufacture's instructions. Heat components to 100 - 149 Celsius (212Ā° Min. - 300Ā° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.**

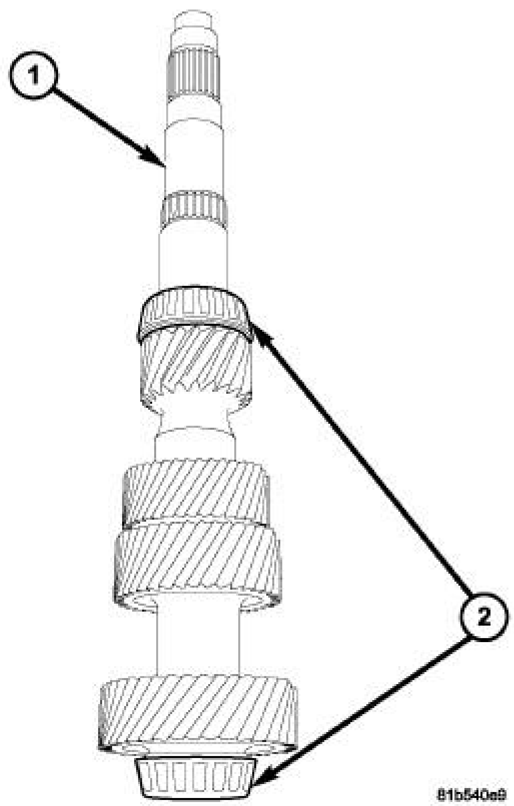
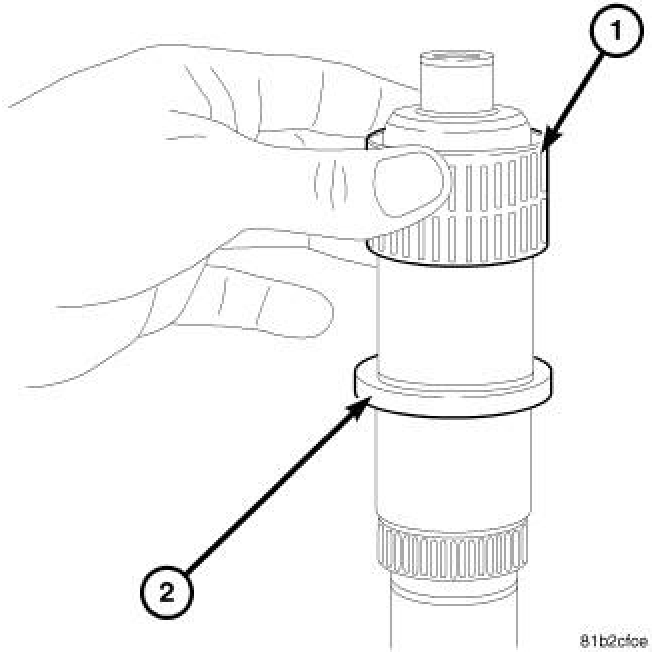


Fig. 142: Countershaft Bearings
Courtesy of CHRYSLER GROUP, LLC

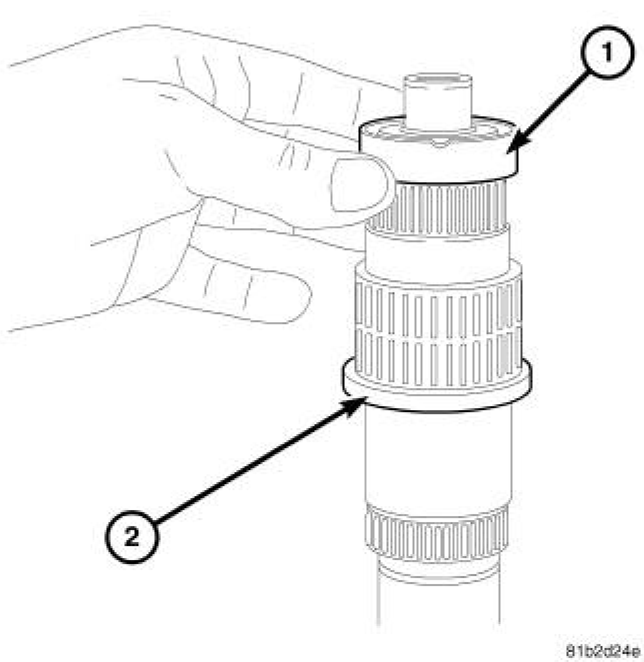
1. Heat the countershaft (1) bearings (2) to 100Ā° - 149Ā° C(212Ā° - 300Ā°F). Install the countershaft (1) bearings (2) onto the countershaft with tongs or welding gloves.

MAINSHAFT



[Fig. 143: 3rd Gear Bearing](#)
Courtesy of CHRYSLER GROUP, LLC

1. Install the third gear bearing (1) on the mainshaft (2).



[Fig. 144: 3rd Gear Bearing Spacer](#)
Courtesy of CHRYSLER GROUP, LLC

2. Install the third gear bearing spacer (1) on the mainshaft (2).

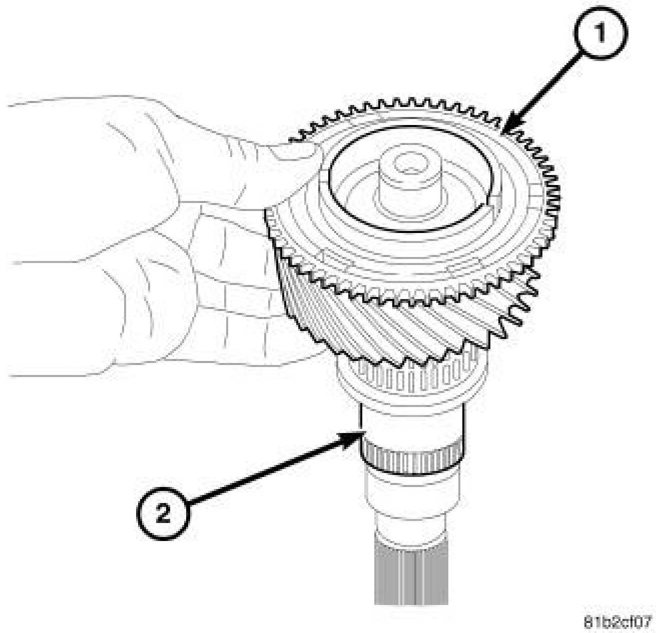


Fig. 145: 3rd Gear Synchronizer Rings
Courtesy of CHRYSLER GROUP, LLC

3. Install third gear (1) on the mainshaft (2).

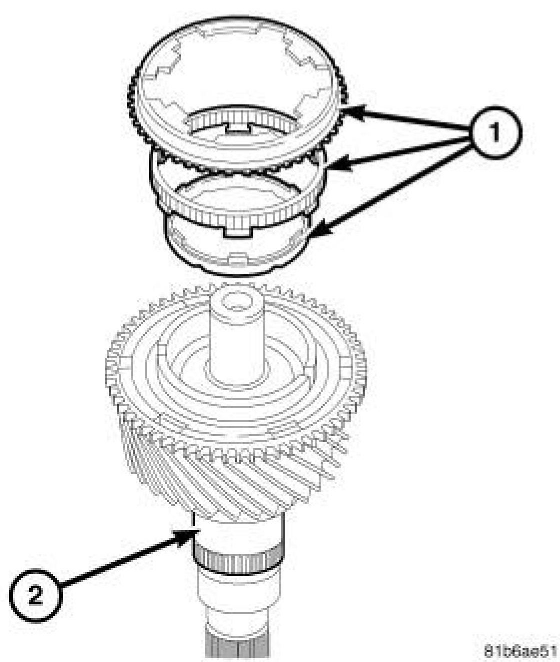


Fig. 146: 3rd Gear Synchro Rings
Courtesy of CHRYSLER GROUP, LLC

4. Install the third gear synchronizer rings (1) on the third gear (2).

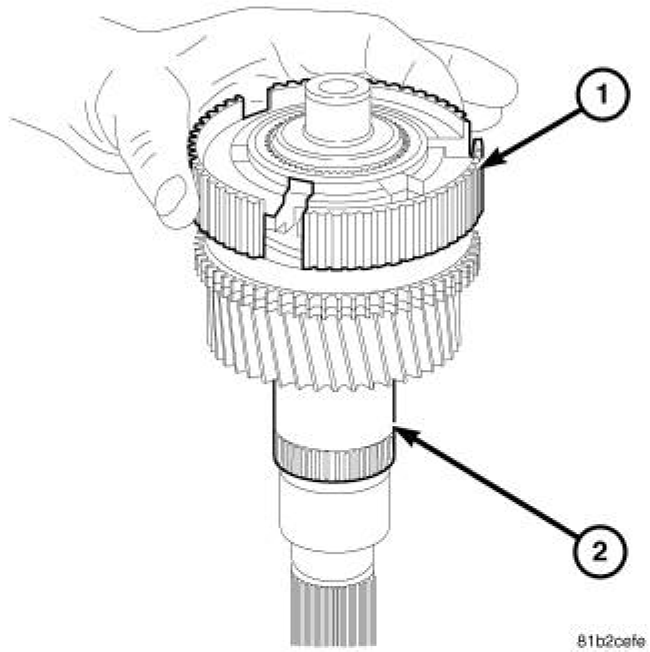


Fig. 147: 3-4 Synchro Hub
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Refer to the removal orientation noted of the third and fourth gear synchronizer hub orientation prior to installation. It is a directional hub and will not work properly if installed incorrectly.**

5. Install the third and fourth gear synchronizer hub (1) on the mainshaft (2).

CAUTION: **Synchronizer rings must be aligned with synchronizer hub and third gear during installation. Failure to follow these instructions will result in damage to the synchronizer rings.**

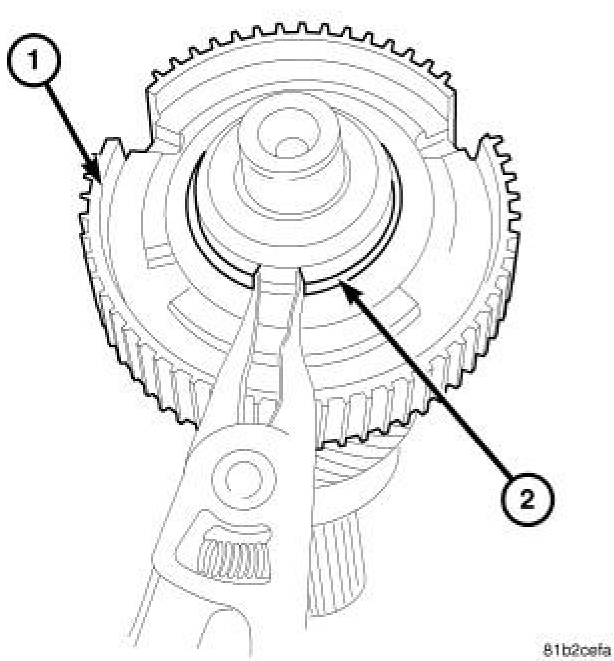


Fig. 148: 3-4 Hub Snap Ring

Courtesy of CHRYSLER GROUP, LLC

6. Install third and fourth gear synchronizer hub (1) snap ring (2) on the mainshaft.

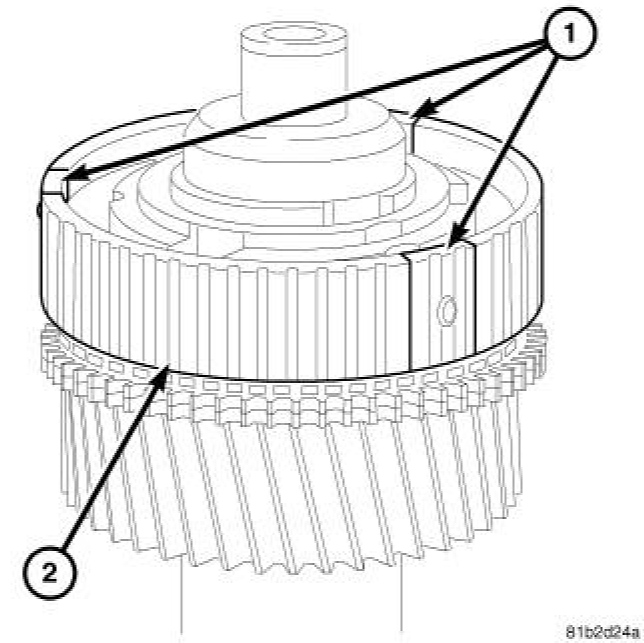


Fig. 149: 3-4 Synchronizer Detents & Hub
Courtesy of CHRYSLER GROUP, LLC

7. Install the synchronizer detents (1) in the third and fourth gear synchronizer hub (2).

NOTE: **First and second gear and the third and fourth gear synchronizer detents are the same.**

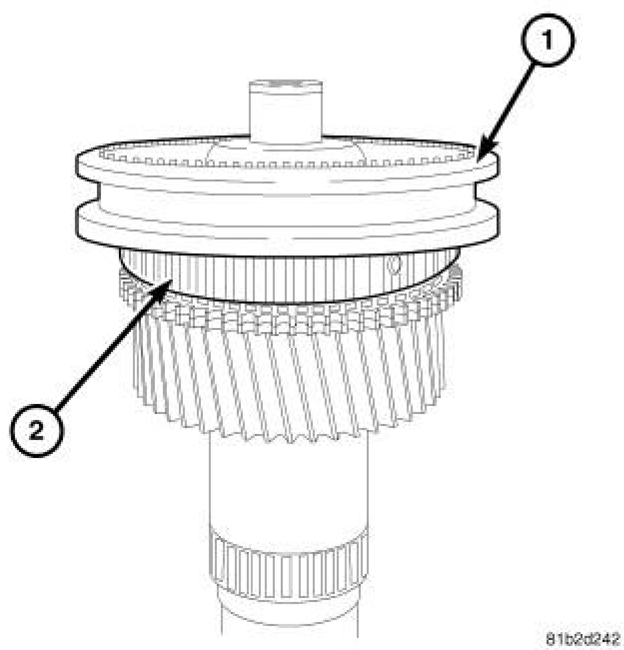


Fig. 150: 3-4 Synchro Sleeve
Courtesy of CHRYSLER GROUP, LLC

8. Install the third and fourth gear synchronizer sleeve (1) on the third and fourth gear synchronizer hub (2).

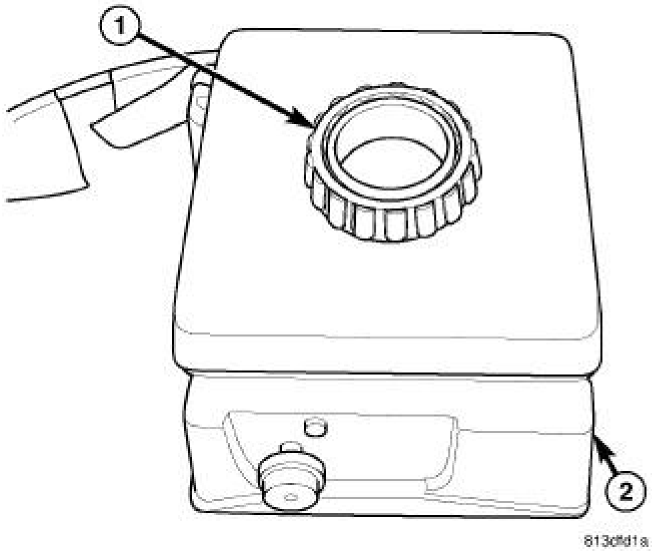
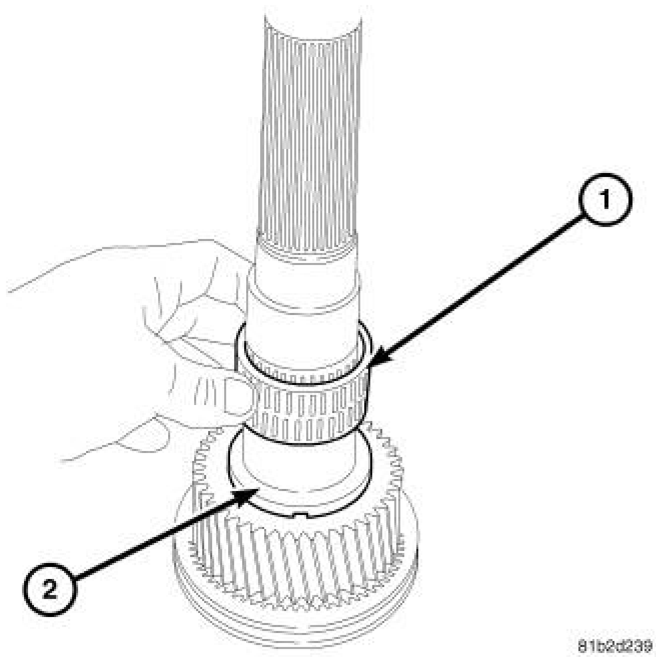


Fig. 151: Identifying Bearing Heater And Bearing
Courtesy of CHRYSLER GROUP, LLC

WARNING: **Use tongs or welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.**

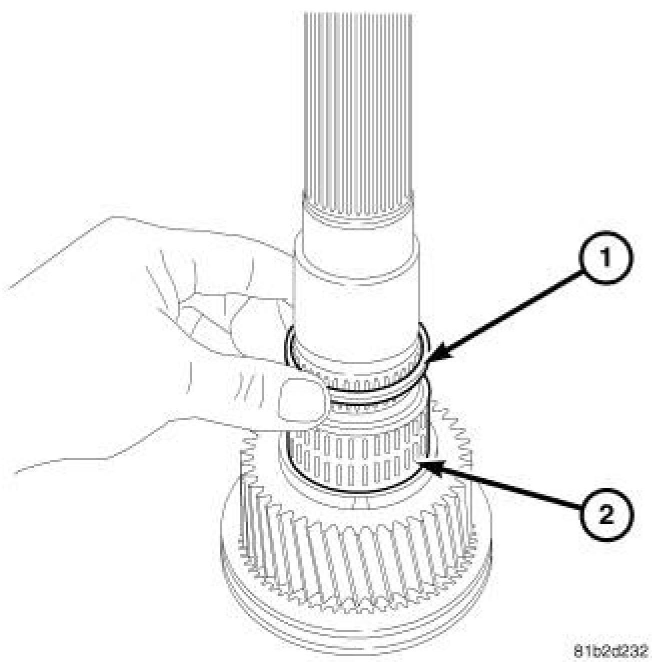
CAUTION: **Bearings (1) are installed using a Bearing Heater (2). Use only a bearing heater/hot plate and follow manufacture's instructions. Heat components to 100 - 149 Celsius (212Ā° Min. - 300Ā° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.**

9. Heat the mainshaft transmission adapter bearing to 100Ā° - 149Ā°C (212Ā° - 300Ā°F) and install onto the mainshaft with tongs or welding gloves.



[Fig. 152: 2nd Gear Bearing]
Courtesy of CHRYSLER GROUP, LLC

10. Install the second gear bearing (1) on the mainshaft (2).



[Fig. 153: 2nd Bearing Spacer]
Courtesy of CHRYSLER GROUP, LLC

11. Install the second gear bearing spacer (1) on the mainshaft (2).

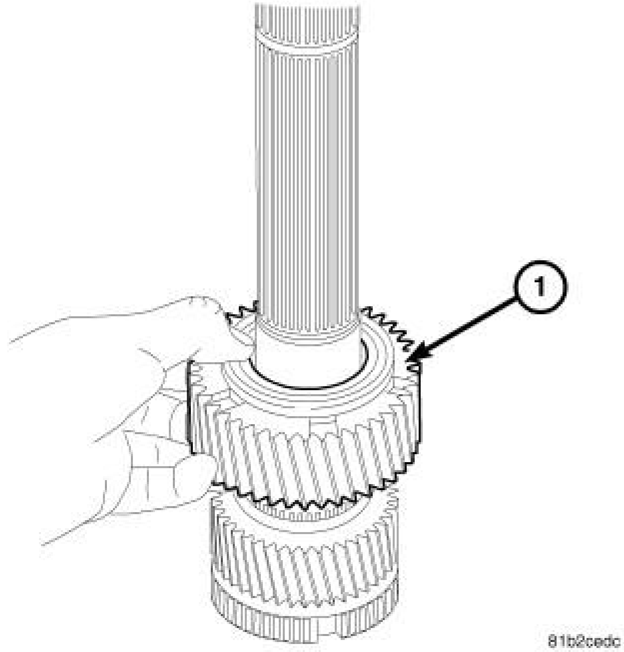


Fig. 154: 2nd Gear & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

12. Install second gear (1) on the mainshaft (2).

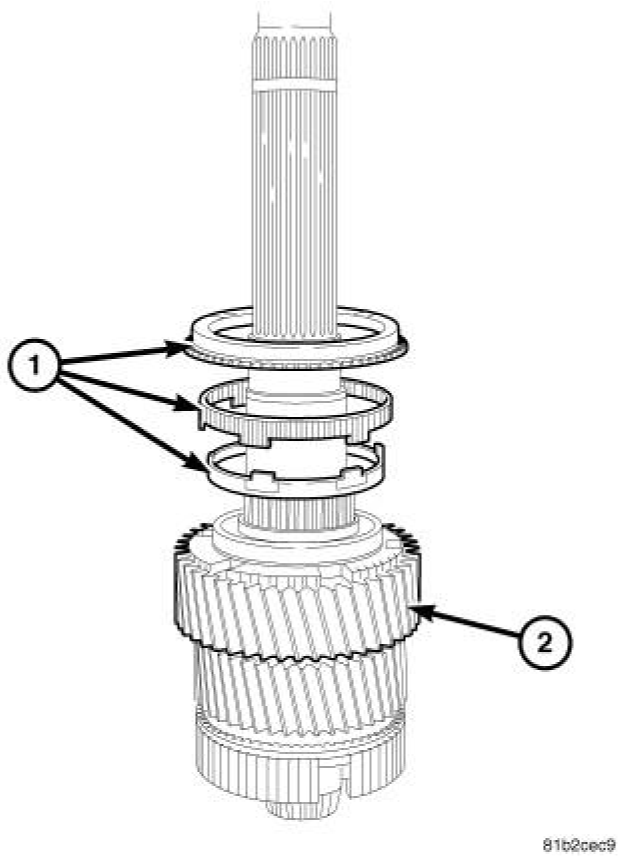


Fig. 155: 2nd Gear Synchro Rings
Courtesy of CHRYSLER GROUP, LLC

13. Install the second gear synchronizer rings (1) on the second gear (2).

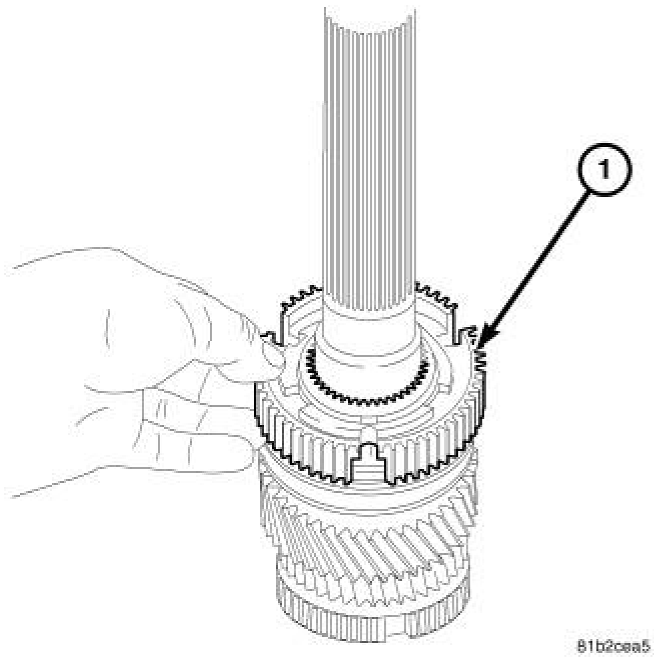


Fig. 156: 1-2 Synchro Hub
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Refer to the removal orientation noted of the first and second gear synchronizer hub orientation prior to installation. It is a directional hub and will not work properly if installed incorrectly.**

14. Install the first and second gear synchronizer hub (1) on the mainshaft (2).

CAUTION: **Synchronizer rings must be aligned with synchronizer hub and second gear during installation. Failure to follow these instructions will result in damage to the synchronizer rings.**

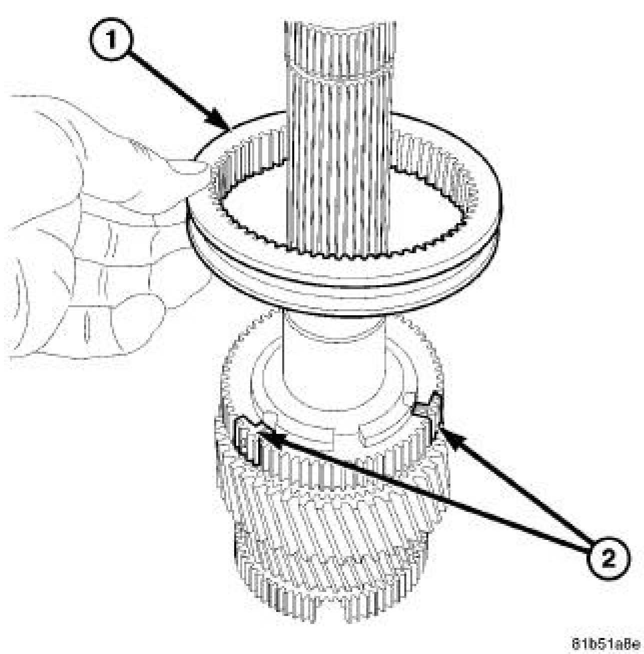


Fig. 157: 1-2 Synchro Sleeve
Courtesy of CHRYSLER GROUP, LLC

15. Install the first and second gear synchronizer hub sleeve (1) and detents (2).

NOTE: **The first and second gear and the third and fourth gear synchronizer detents are the same.**

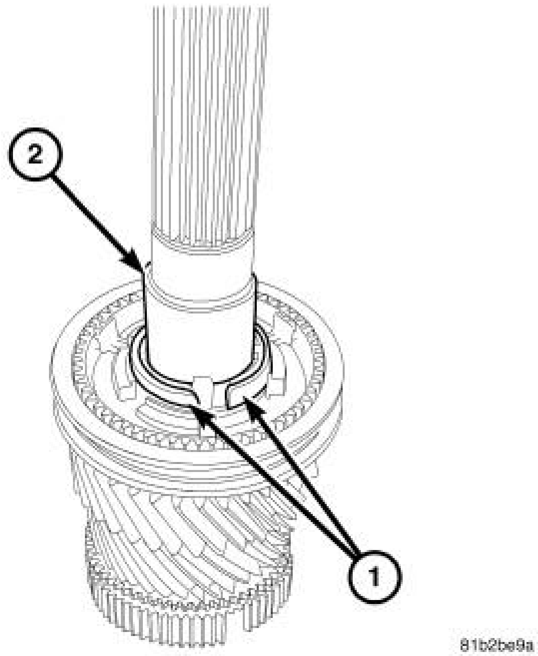


Fig. 158: 1-2 Synchronizer Hub Split Rings & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

16. Install the first and second gear synchronizer hub split rings (1) on the mainshaft (2).

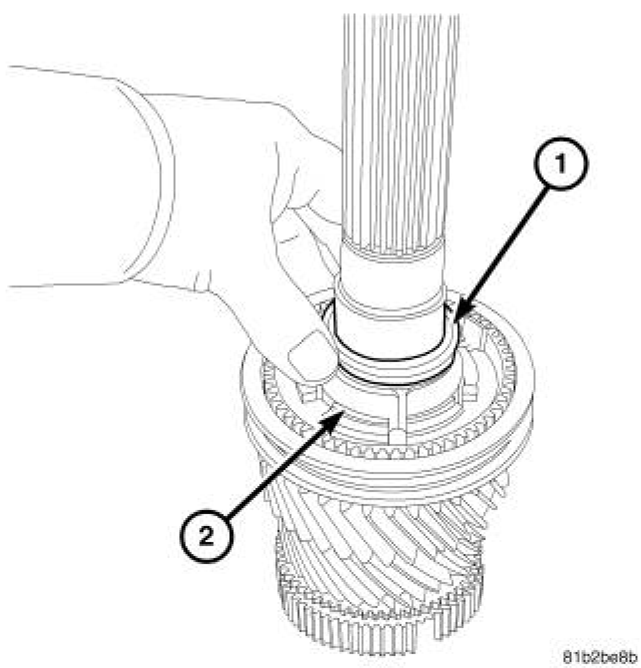


Fig. 159: 1-2 Synchronizer Hub Split Ring Retainer & Split Rings

Courtesy of CHRYSLER GROUP, LLC

17. Install the first and second gear synchronizer hub split ring retainer (1) over the split rings (2).

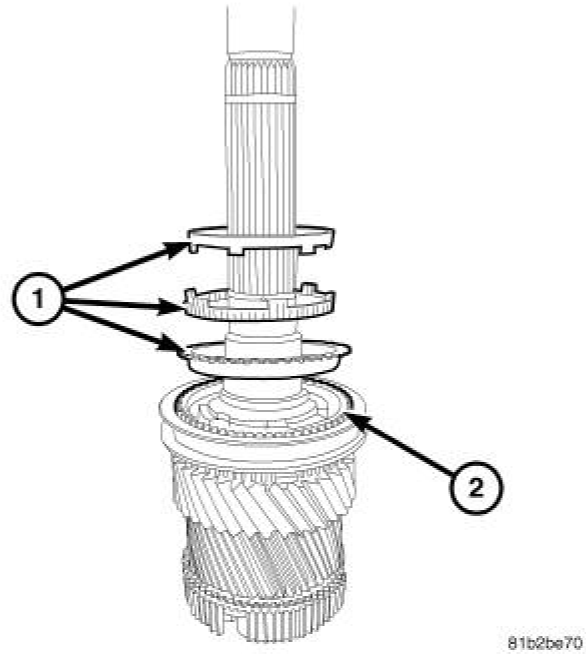


Fig. 160: 1st Gear Synchro
Courtesy of CHRYSLER GROUP, LLC

18. Install the first gear synchronizer rings (1) on the first and second gear synchronizer hub (2).

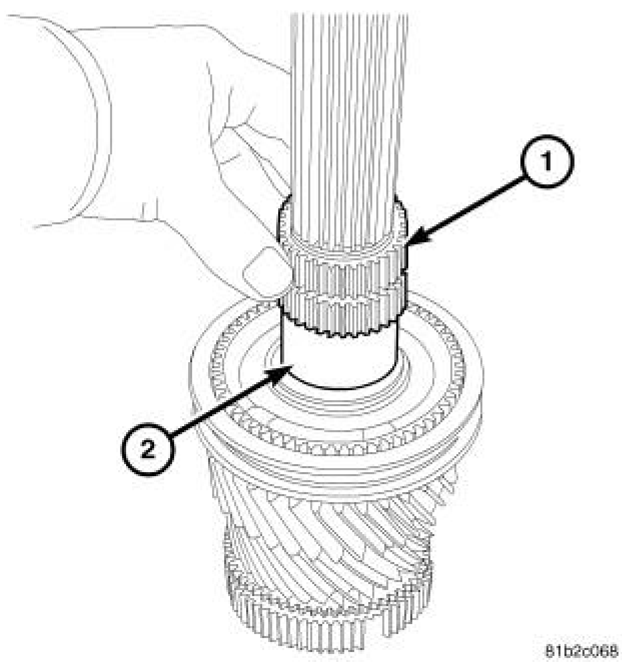


Fig. 161: 1st Gear Bearing & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

19. Install the first gear bearing (1) on the mainshaft (2).

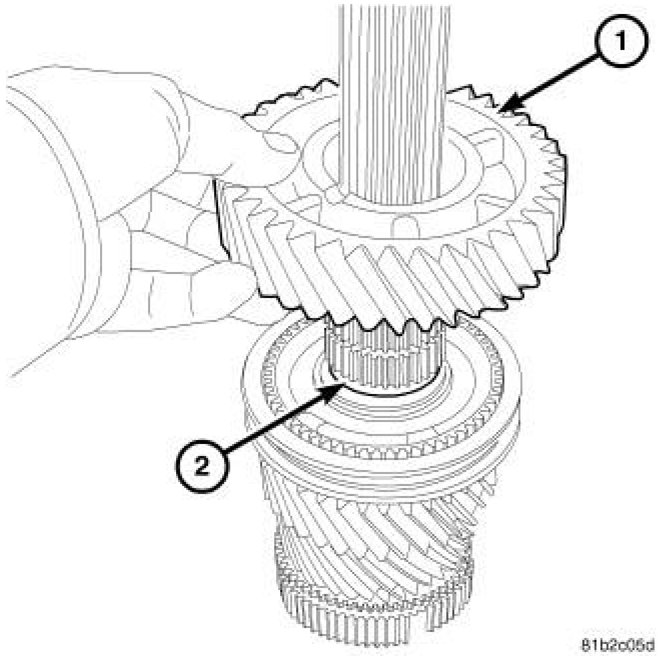


Fig. 162: 1st Gear & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

20. Install first gear (1) on the mainshaft (2).

CAUTION: **Synchronizer rings must be aligned with synchronizer hub and first gear during installation. Failure to follow these instructions will result in damage to the synchronizer rings.**

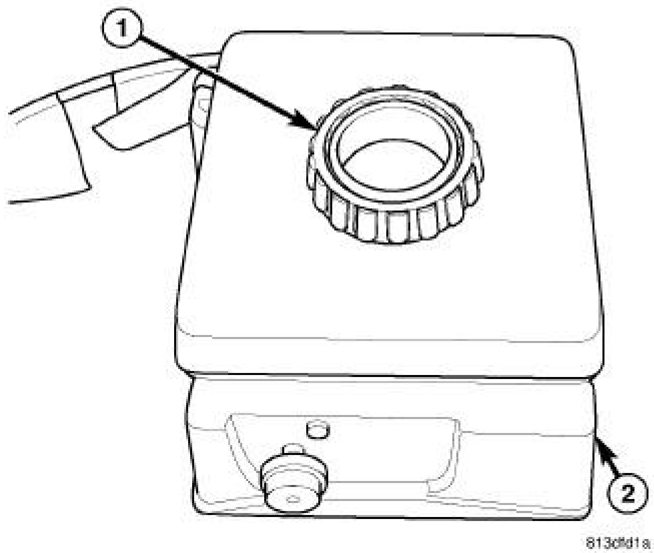


Fig. 163: Identifying Bearing Heater And Bearing
Courtesy of CHRYSLER GROUP, LLC

WARNING: **Use tongs or welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.**

CAUTION: Bearings (1) are installed using a Bearing Heater (2). Use only a bearing heater/hot plate and follow manufacture's instructions. Heat components to 100 - 149 Celsius (212Â° Min. - 300Â° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.

21. Heat the mainshaft case bearing to 100Â° - 149Â° C (212Â° - 300Â°F) and install on the mainshaft with tongs or welding gloves.

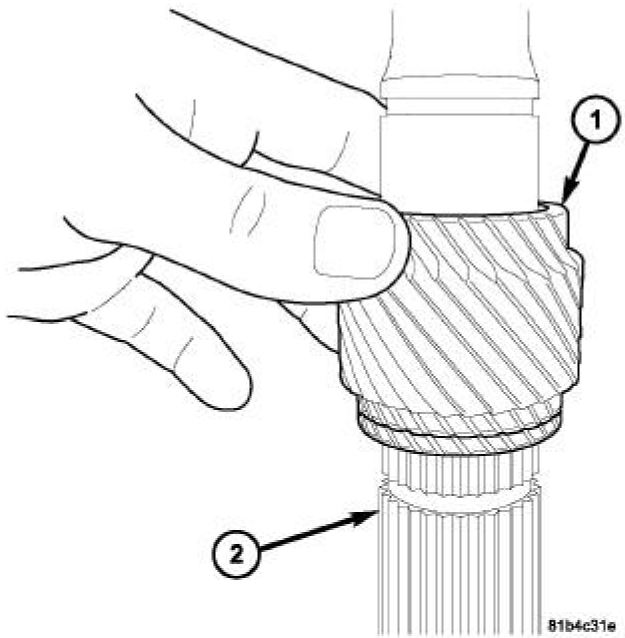
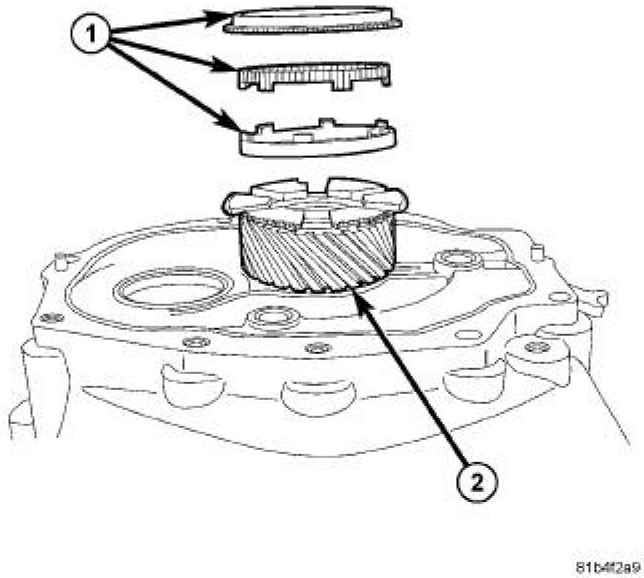


Fig. 164: Sixth Gear Mainshaft
Courtesy of CHRYSLER GROUP, LLC

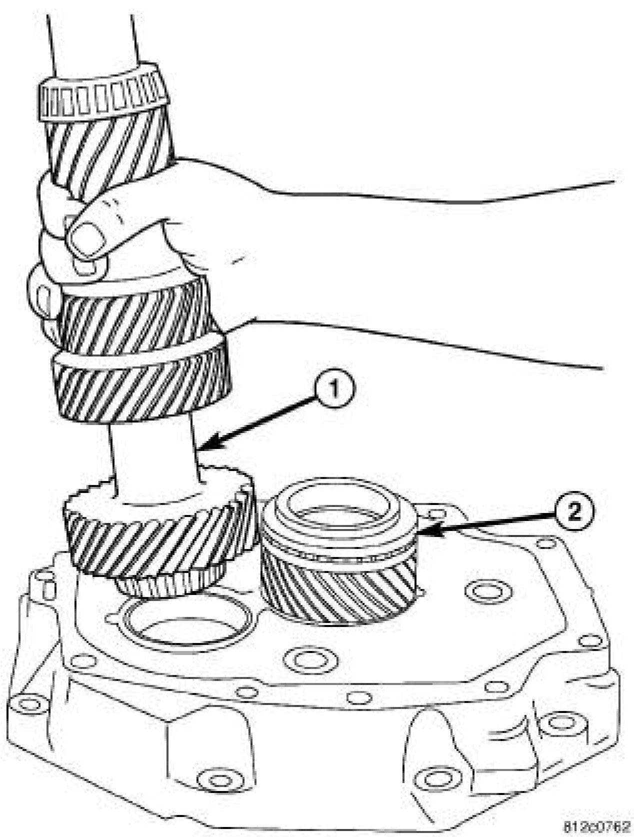
22. Position sixth gear (1) on the mainshaft (2).
23. Install sixth gear on the mainshaft with Installer (special tool #9391, Installer, Gear) and Coupler (special tool #9391-2, Adapter, Coupling).

TRANSMISSION HOUSING



[Fig. 165: Input Shaft & Fourth Gear Synchro Rings](#)
Courtesy of CHRYSLER GROUP, LLC

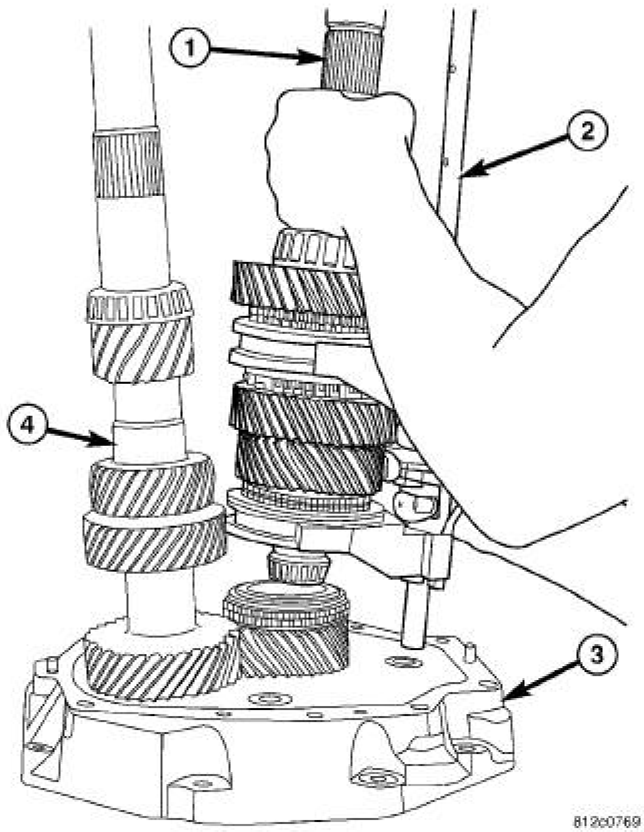
1. Install the input shaft (2) into the transmission adapter plate. Install the fourth gear synchronizer rings (1) on the fourth gear.



[Fig. 166: Removing/Installing Countershaft](#)

Courtesy of CHRYSLER GROUP, LLC

2. Install the countershaft (1) assembly into the transmission adapter.



[Fig. 167: Mainshaft, Shift Rail & Countershaft]
Courtesy of CHRYSLER GROUP, LLC

3. Tilt the countershaft (4) sideways then install the mainshaft (1) and shift rail (2) assemblies into the transmission adapter (3).

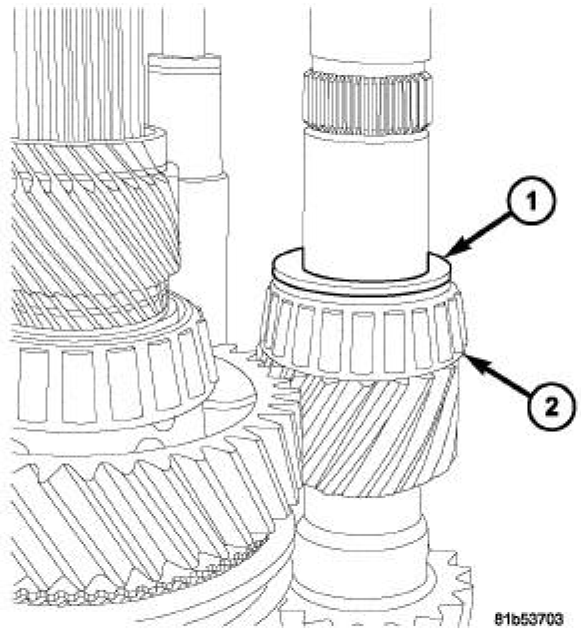


Fig. 168: Countershaft Washer
Courtesy of CHRYSLER GROUP, LLC

4. Install the countershaft thrust washer (1) on the countershaft (2).

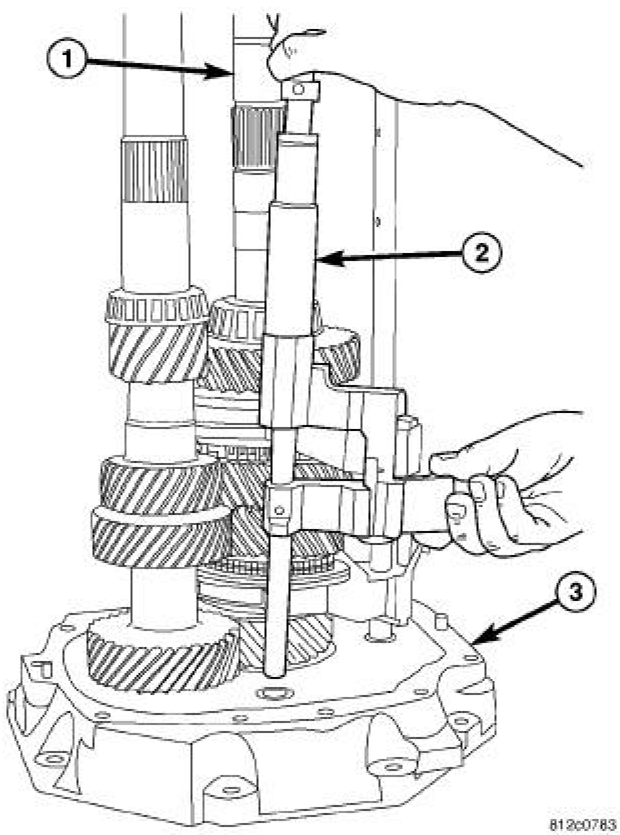


Fig. 169: Removing/Installing Reverse Shaft Rail Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Install the reverse rail assembly (2) into the transmission adapter (3).

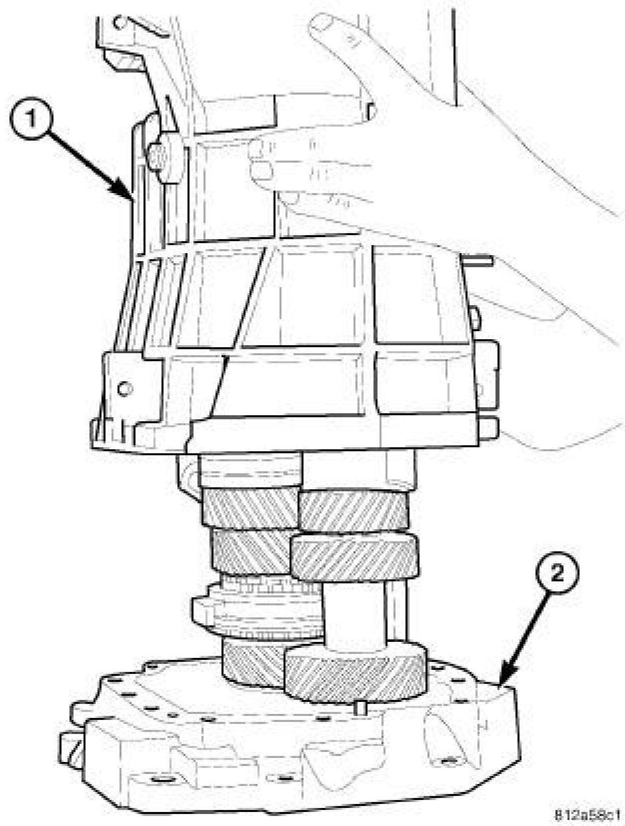


Fig. 170: Transmission Case
Courtesy of CHRYSLER GROUP, LLC

6. Apply Mopar Ā® ATF-RTV to the transmission adapter (2) sealing surface.
7. Install the transmission case (1) onto the gear set until the shift rail passes through the case bushing. Then install the skip shift lever on the shift rail and seat the transmission case on the adapter (2).

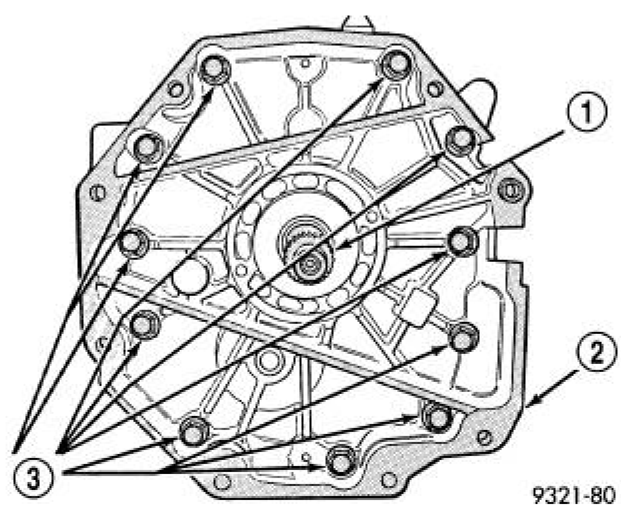


Fig. 171: Adapter Bolts Location
Courtesy of CHRYSLER GROUP, LLC

8. Install the transmission adapter (2) bolts (3) and tighten to the proper **SPECIFICATIONS** .

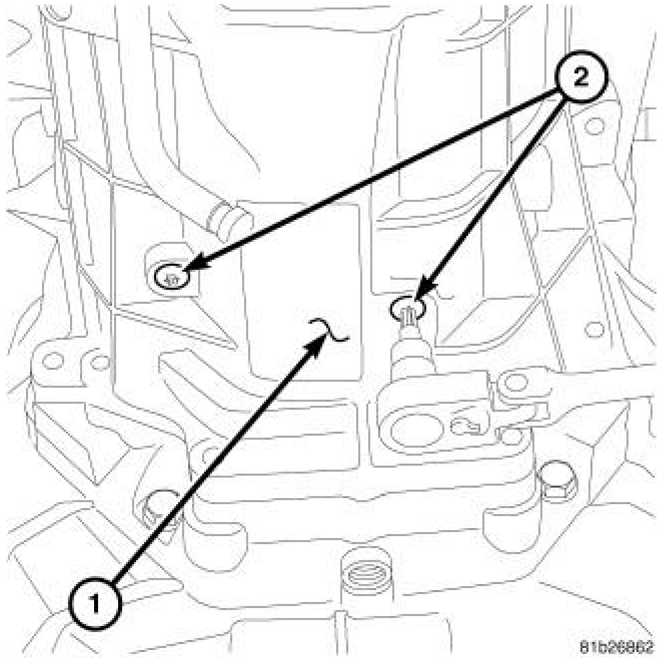


Fig. 172: Torx Screws
Courtesy of CHRYSLER GROUP, LLC

9. Apply Mopar Ā® Lock and Seal Adhesive to the shift lever guide bolts. Install the guide bolts (2) in the transmission case (1) and tighten to the proper **SPECIFICATIONS** .

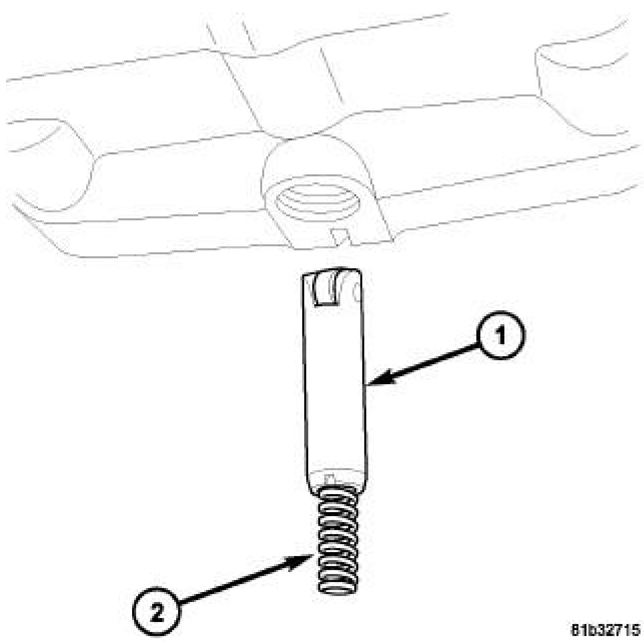


Fig. 173: Roller Detent & Spring
Courtesy of CHRYSLER GROUP, LLC

10. Install the roller detent (1) and spring (2) into the transmission adapter.

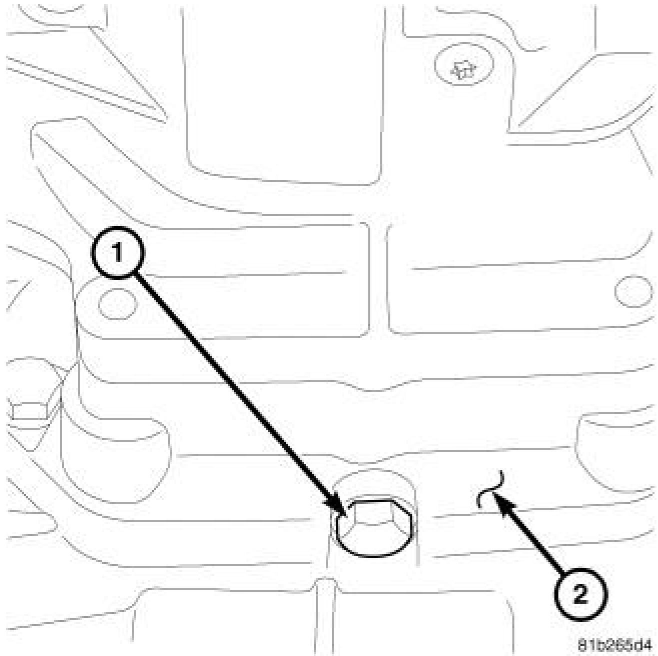


Fig. 174: Roller Detent Bolt & Transmission Adapter
Courtesy of CHRYSLER GROUP, LLC

11. Apply Mopar Ā® Lock and Seal to the roller detent bolt threads. Install the bolt (1) into the transmission adapter (2) and tighten to the proper **SPECIFICATIONS** .

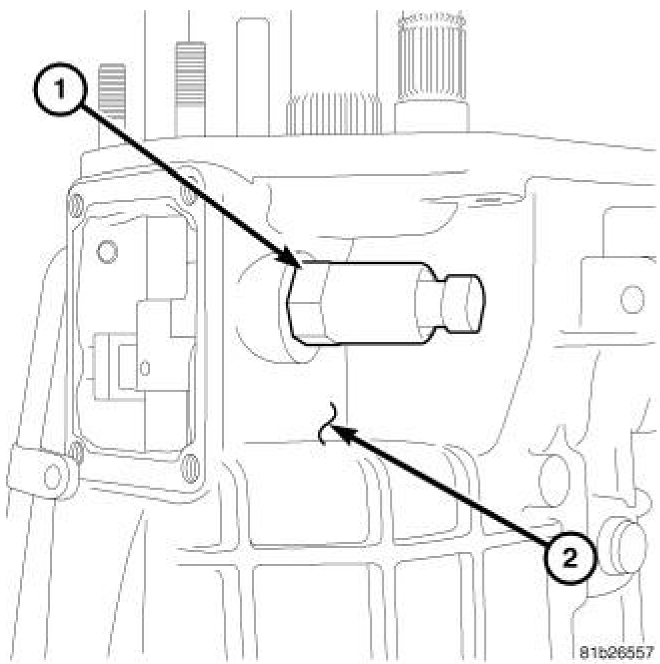


Fig. 175: Skip Shift Solenoid & Left Side Of Case
Courtesy of CHRYSLER GROUP, LLC

12. Install the skip shift solenoid (1) into the side of the case (2) and tighten to the proper **SPECIFICATIONS** .

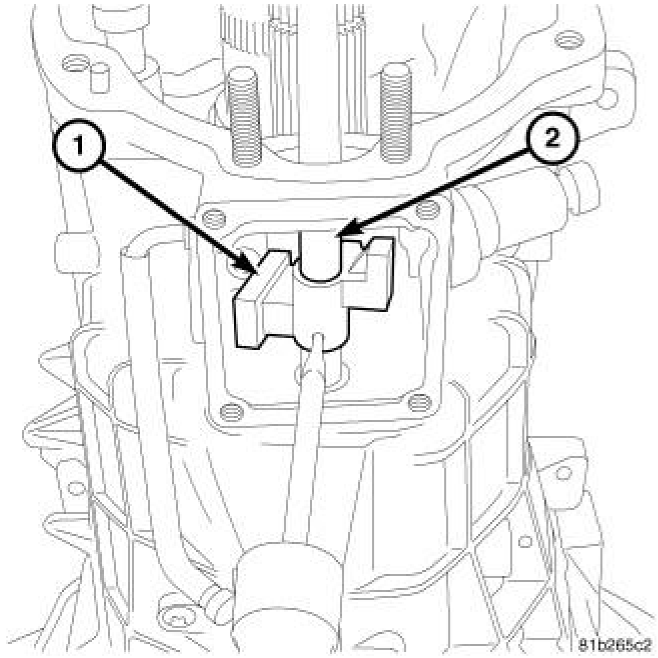


Fig. 176: Skip Shift Lever & Roll Pin
Courtesy of CHRYSLER GROUP, LLC

13. Install the skip shift lever (1) roll pin (2) with a hammer and punch.

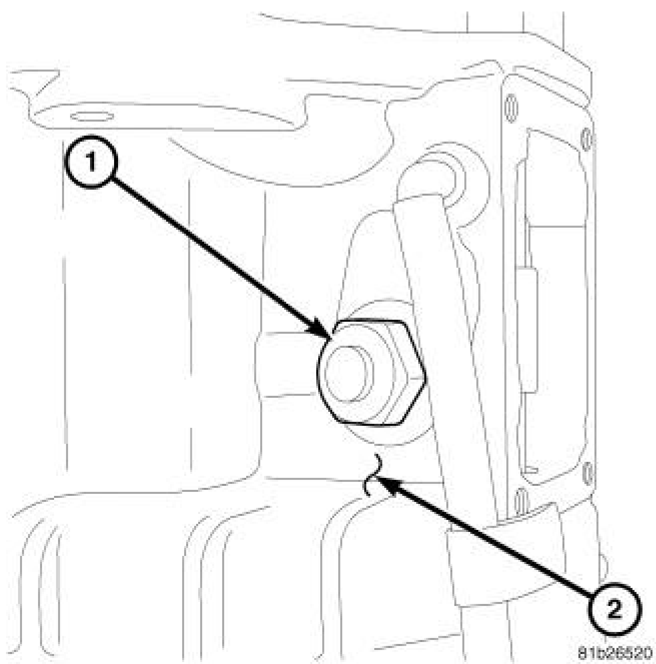
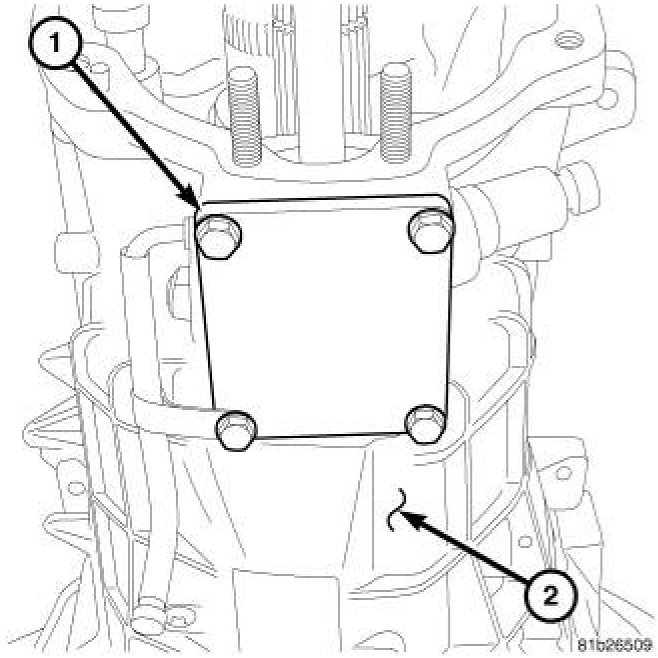


Fig. 177: Shift Detent & Right Side Of Case
Courtesy of CHRYSLER GROUP, LLC

14. Install the side shift detent (1) into the case (2) and tighten to the proper **SPECIFICATIONS** .



[**Fig. 178: Top Cover, Bolts & Transmission Case**]
Courtesy of CHRYSLER GROUP, LLC

15. Apply Mopar Ā® ATF-RTV to the top cover sealing surface.
16. Install the top cover (1) on the case (2) and tighten the bolts to the proper **SPECIFICATIONS** .

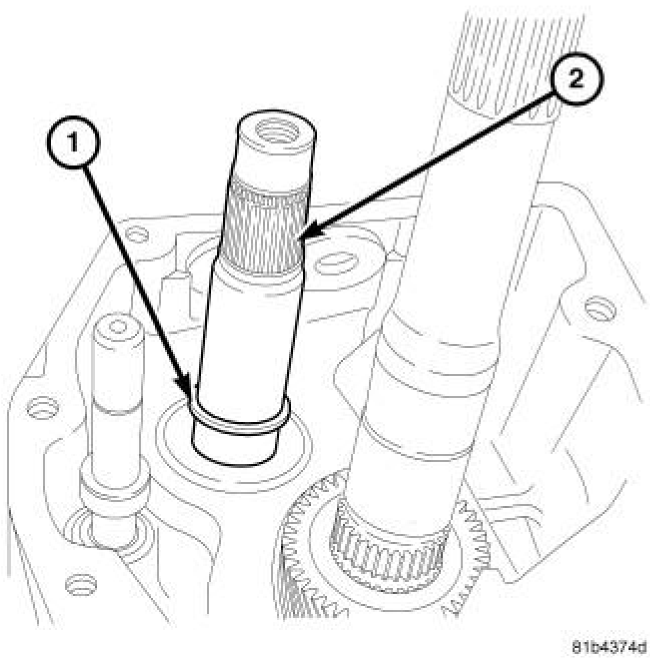


Fig. 179: 6th Gear Bearing Spacer & Countershaft
Courtesy of CHRYSLER GROUP, LLC

17. Install the sixth gear bearing spacer (1) on the countershaft (2).

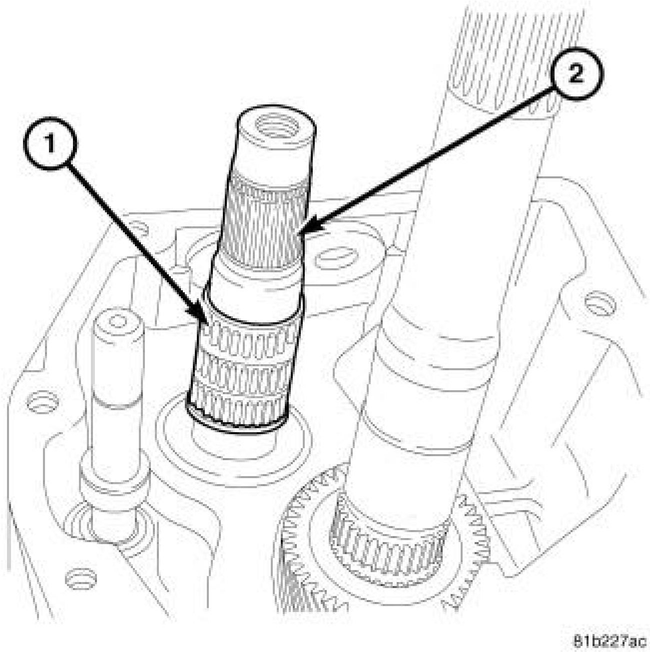


Fig. 180: 6th Gear Bearing & Countershaft
Courtesy of CHRYSLER GROUP, LLC

18. Install the sixth gear bearing (1) on the countershaft (2).

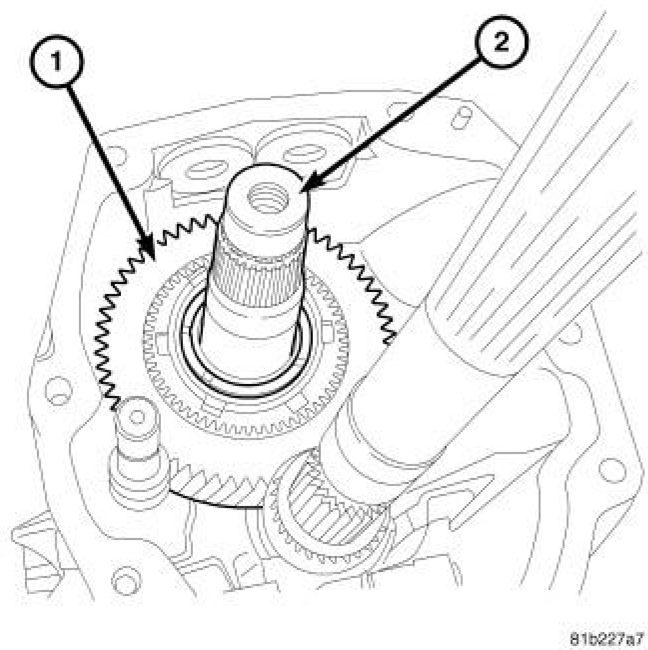
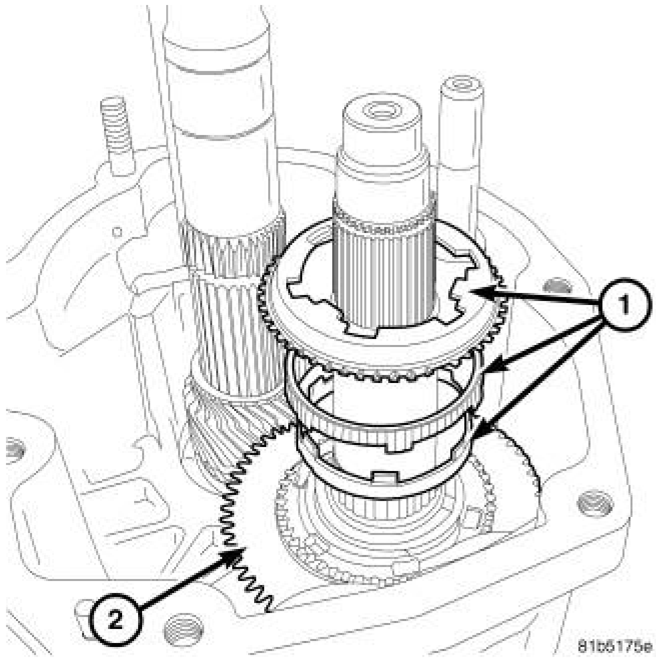


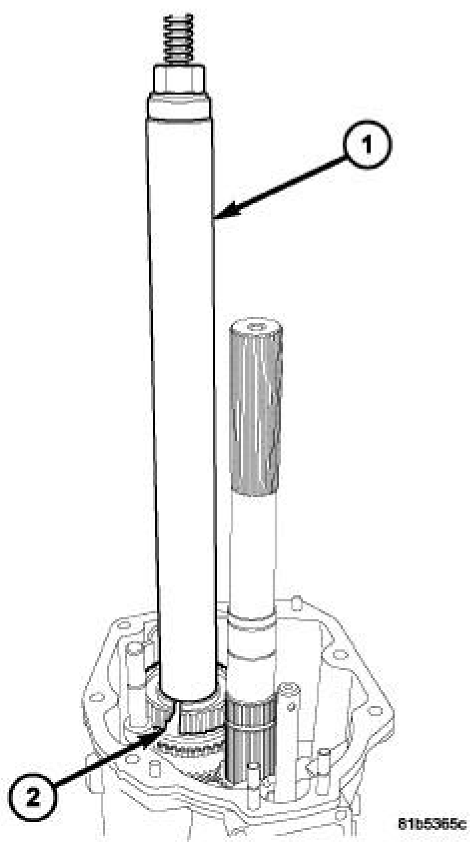
Fig. 181: 6th Gear & Countershaft
Courtesy of CHRYSLER GROUP, LLC

19. Install sixth gear (1) on the countershaft (2).



[Fig. 182: 6th Synchro Rings]
Courtesy of CHRYSLER GROUP, LLC

20. Install the sixth gear synchronizer rings (1) on the countershaft sixth gear (2).



[Fig. 183: 5-6 Hub Installer]
Courtesy of CHRYSLER GROUP, LLC

21. Install the fifth and sixth gear synchronizer hub (2) on the countershaft with Installer (special tool #9391, Installer, Gear) (1).

CAUTION: **Synchronizer rings must be aligned with synchronizer hub and sixth gear during installation. Failure to follow these instructions will result in damage to the synchronizer rings.**

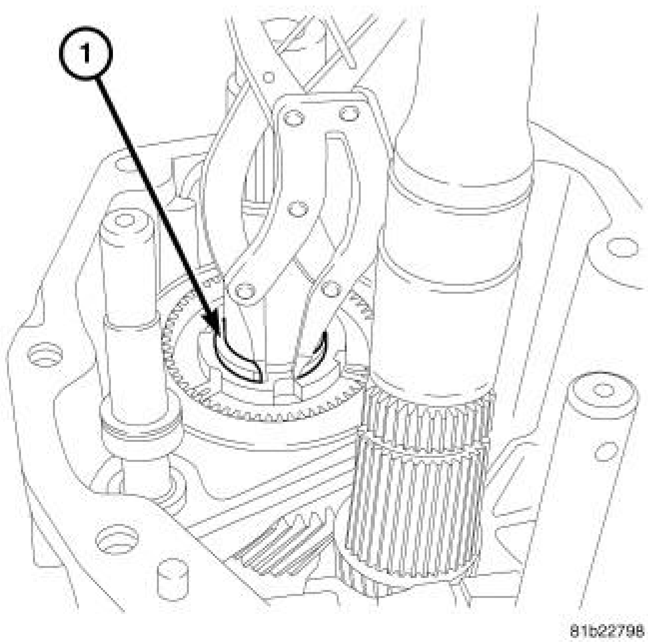


Fig. 184: 5-6 Hub Snap Ring
Courtesy of CHRYSLER GROUP, LLC

22. Install the fifth and sixth gear synchronizer hub (1) snap ring (2).

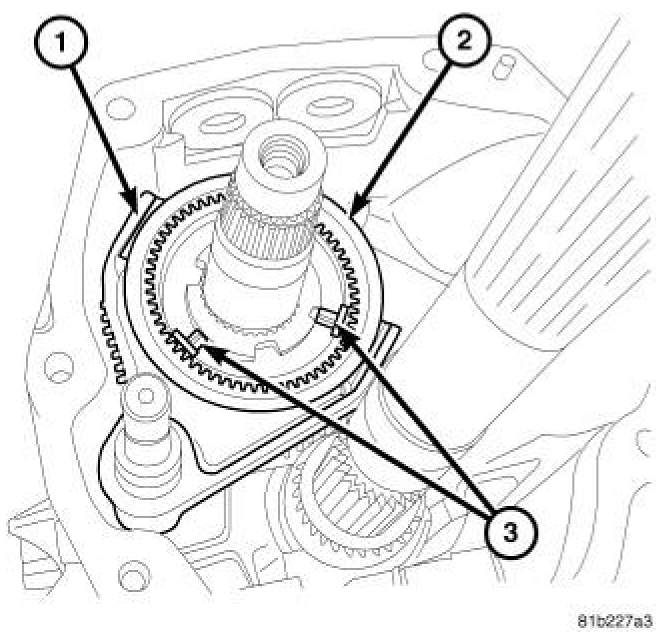


Fig. 185: 5-6 Fork & Sleeve
Courtesy of CHRYSLER GROUP, LLC

23. Install the fifth and sixth gear synchronizer shift fork (1) synchronizer sleeve (2) and the hub detents (3).

NOTE: **The fifth and sixth gear synchronizer detents and the reverse synchronizer detents are the same.**

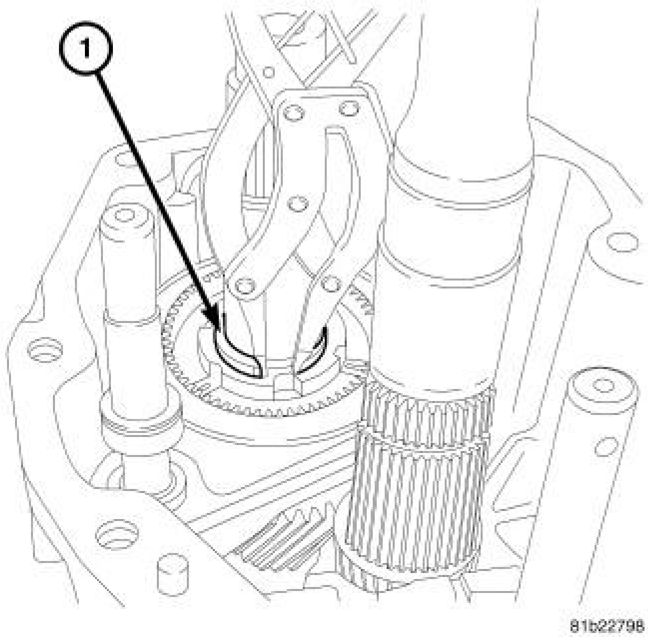
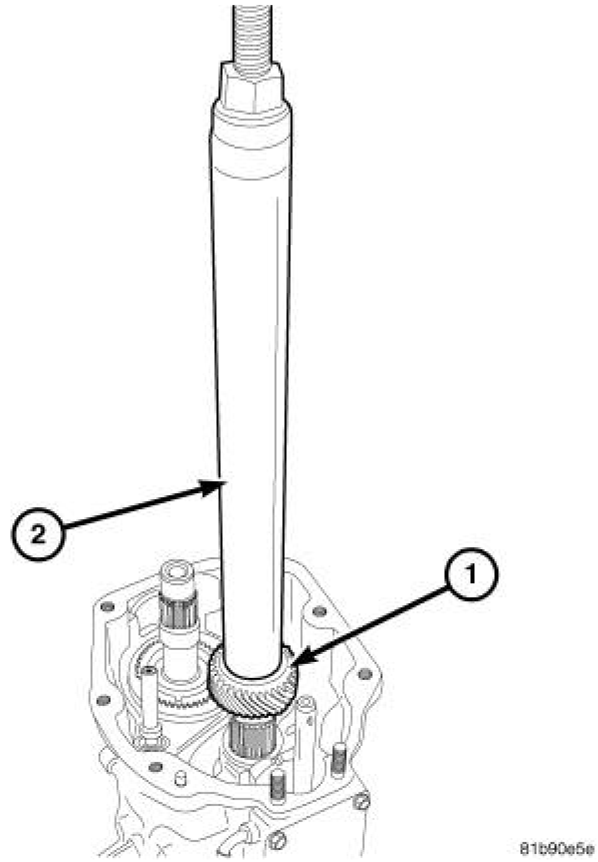


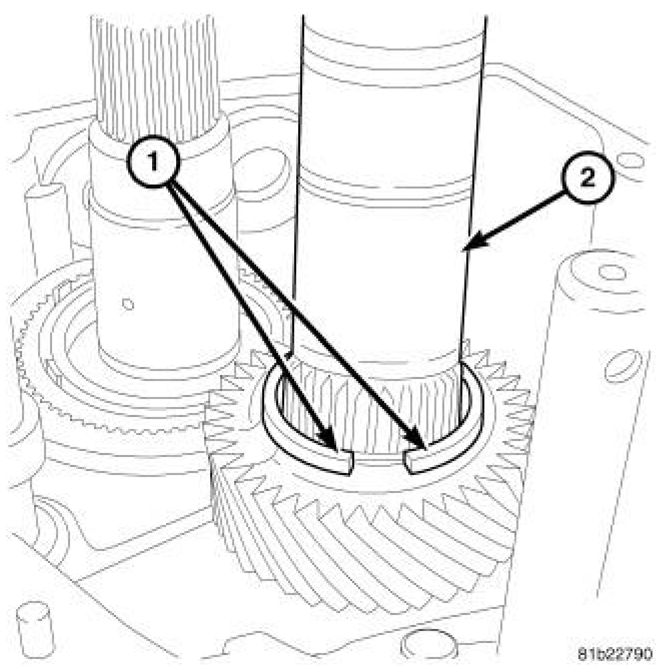
Fig. 186: 5-6 Hub Snap Ring
Courtesy of CHRYSLER GROUP, LLC

24. Install the fifth and sixth gear synchronizer hub snap ring (1).
25. Install a **NEW** fifth and sixth gear gear shift fork snap ring.



[**Fig. 187: 5th Gear Mainshaft**]
Courtesy of CHRYSLER GROUP, LLC

26. Install fifth gear (1) on the mainshaft with Installer (special tool #9391, Installer, Gear) (2) and Coupler (special tool #9391-2, Adapter, Coupling).



[**Fig. 188: 5th Gear Split Rings & Mainshaft**]
Courtesy of CHRYSLER GROUP, LLC

27. Install the fifth gear split rings (1) on the mainshaft (2).

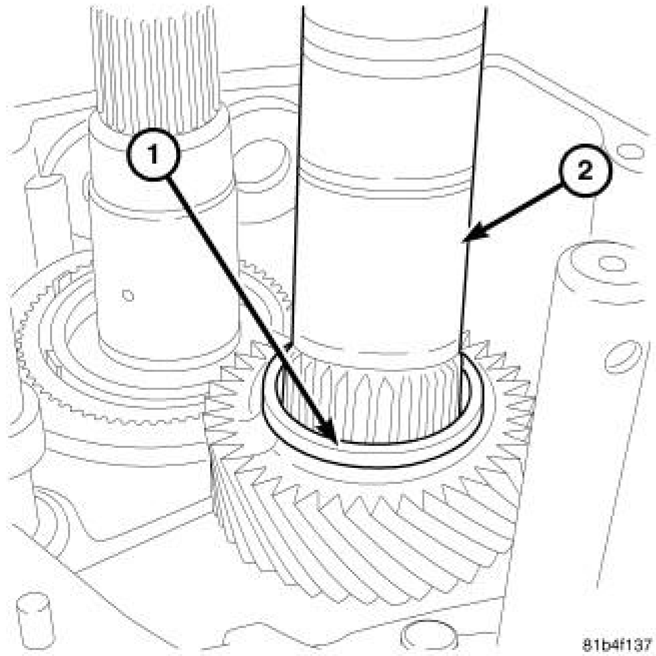


Fig. 189: 5th Gear Retainer Ring & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

28. Install the fifth gear split ring retainer (1) on the mainshaft (2).

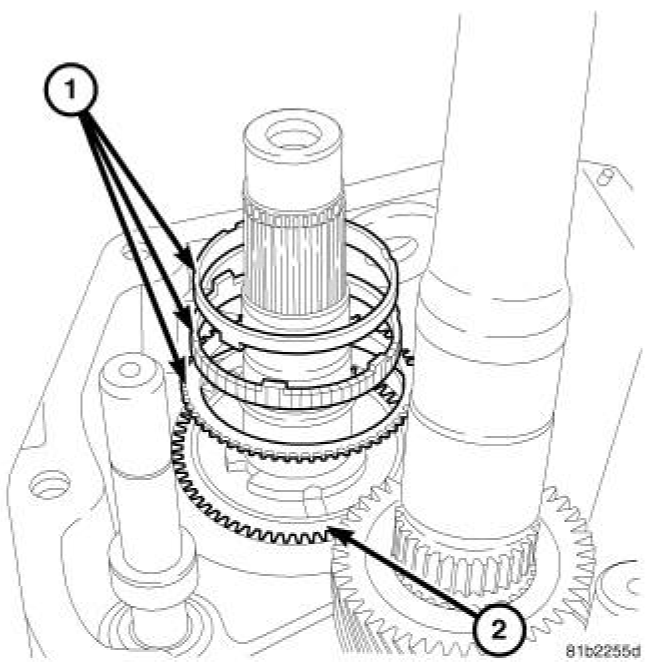


Fig. 190: Fifth Gear Synchro Rings & 5-6 Synchronizer Hub
Courtesy of CHRYSLER GROUP, LLC

29. Install the fifth gear synchronizer rings (1) on the fifth and sixth gear synchronizer hub (2).

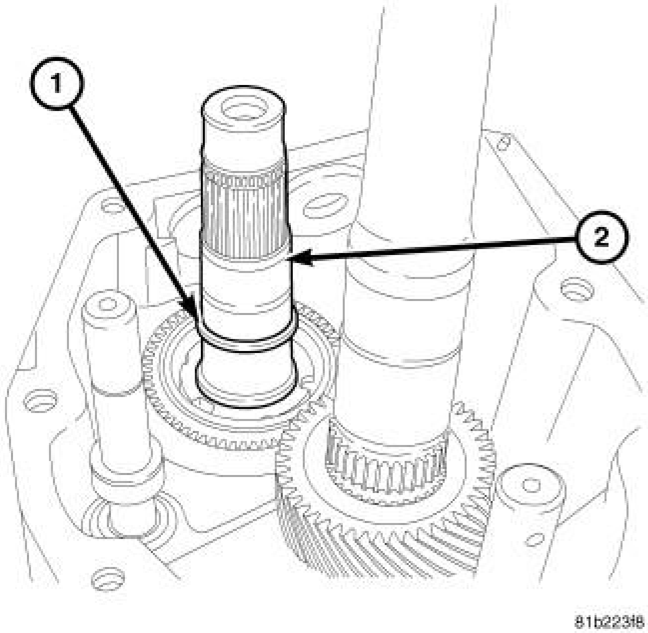


Fig. 191: 5th Gear Bearing Spacer & Countershaft
Courtesy of CHRYSLER GROUP, LLC

30. Install the fifth gear bearing spacer (1) on the countershaft (2).

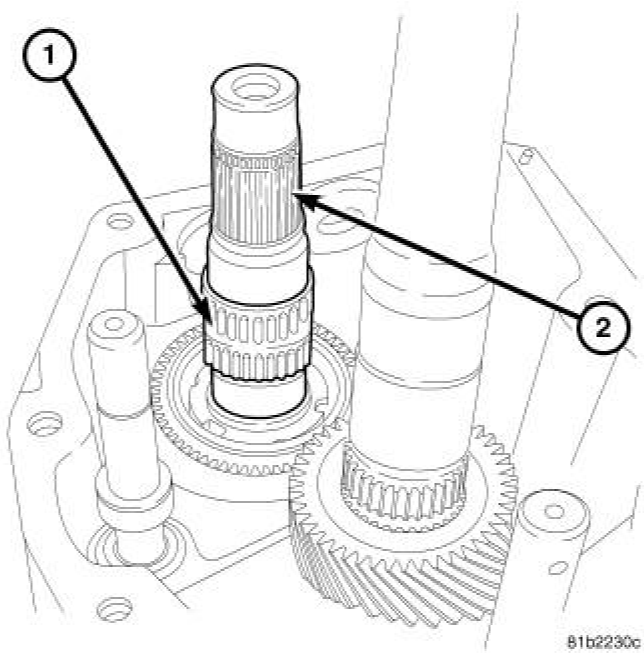
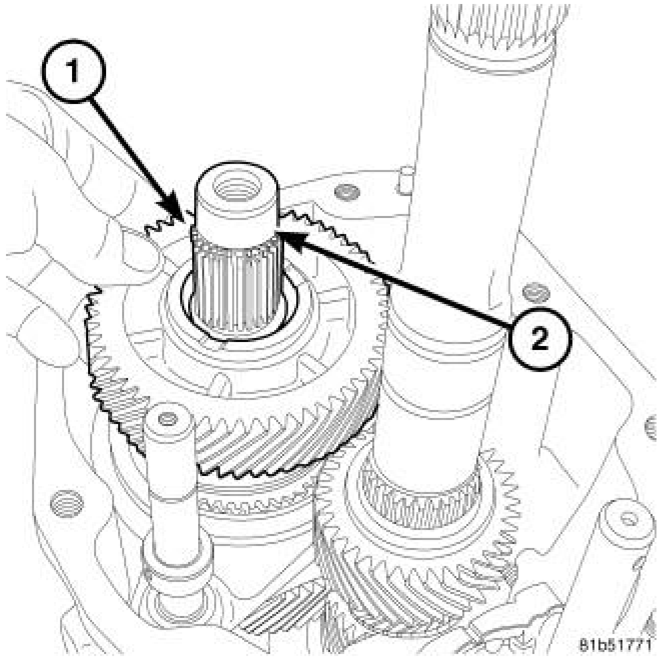


Fig. 192: 5th Gear Bearing & Countershaft
Courtesy of CHRYSLER GROUP, LLC

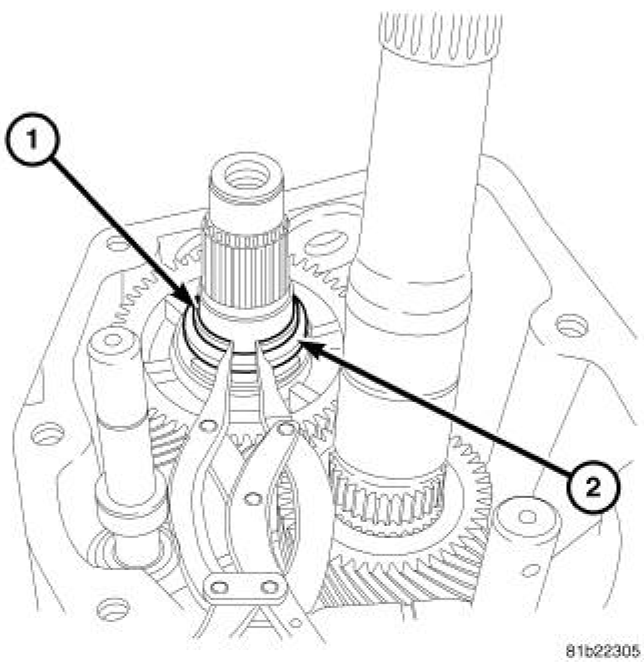
31. Install the fifth gear bearing (1) on the countershaft (2).



[Fig. 193: 5th Gear & Countershaft](#)
Courtesy of CHRYSLER GROUP, LLC

32. Install fifth gear (1) on the countershaft (2).

CAUTION: Synchronizer rings must be aligned with synchronizer hub and fifth gear during installation. Failure to follow these instructions will result in damage to the synchronizer rings.



[Fig. 194: 5th Gear Snap Ring & Countershaft](#)
Courtesy of CHRYSLER GROUP, LLC

33. Install the fifth gear thrust washer (2) and snap ring (1) on the countershaft.

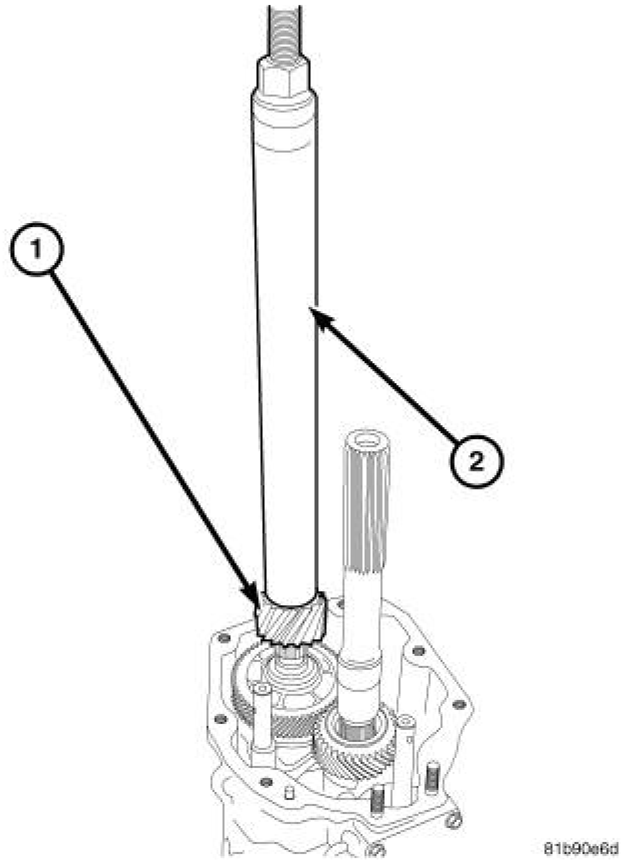


Fig. 195: Reverse Gear Countershaft
Courtesy of CHRYSLER GROUP, LLC

34. Install reverse gear (1) on the countershaft with Installer (special tool #9391, Installer, Gear) (2).

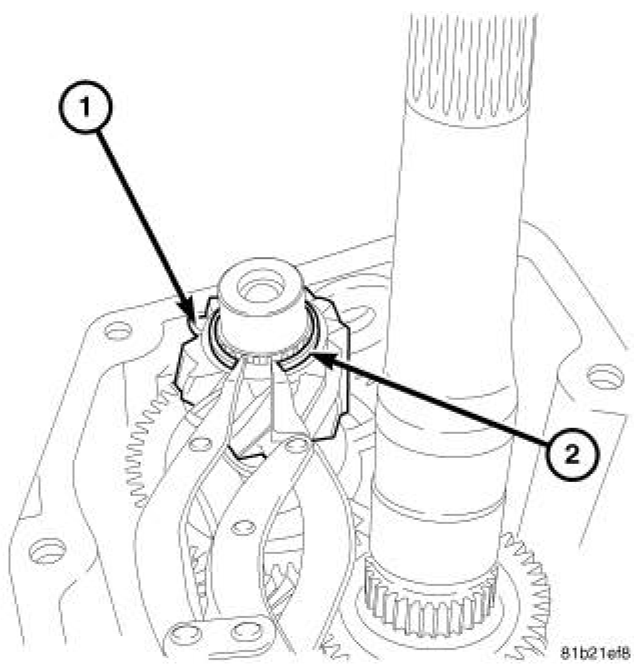


Fig. 196: Reverse Countershaft Snap Ring
Courtesy of CHRYSLER GROUP, LLC

35. Install the reverse gear (1) snap ring (2) on the countershaft.

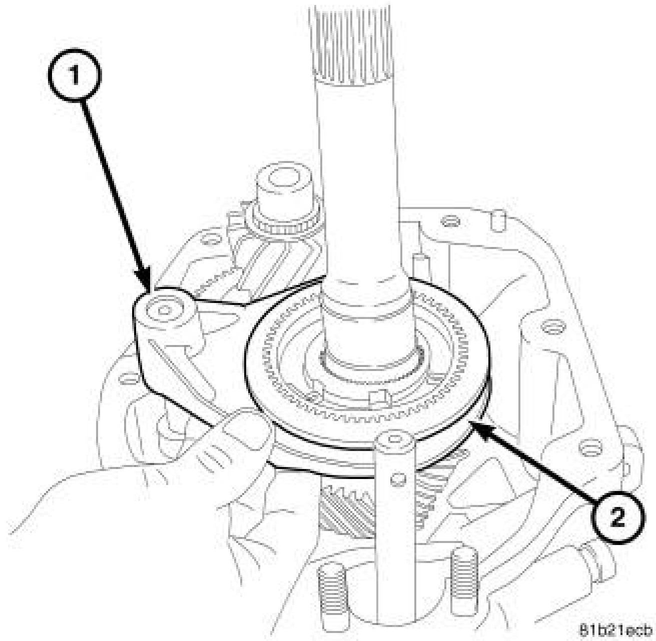


Fig. 197: Reverse Hub & Fork
Courtesy of CHRYSLER GROUP, LLC

36. Install the reverse gear shift fork (1), synchronizer hub with detents (2) and sleeve.

NOTE: **The fifth and sixth gear and the reverse gear synchronizer detents are the same.**

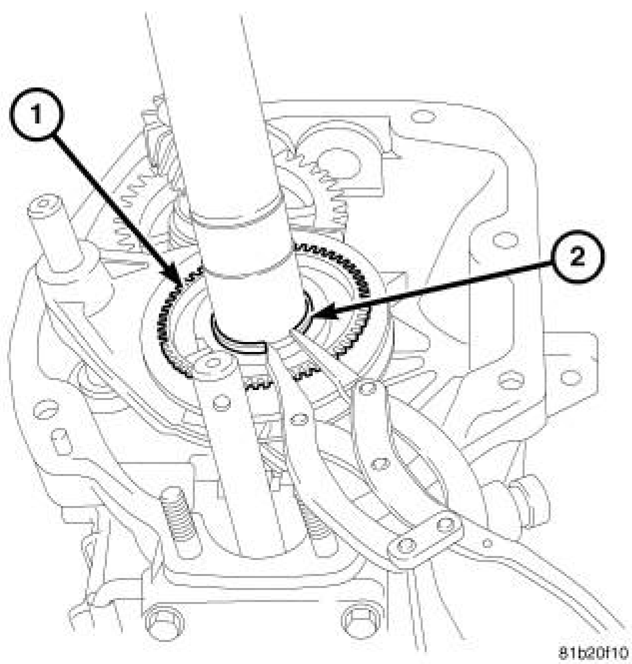


Fig. 198: Reverse Synchronizer Snap Ring
Courtesy of CHRYSLER GROUP, LLC

37. Install the reverse gear synchronizer hub (1) snap ring (2).

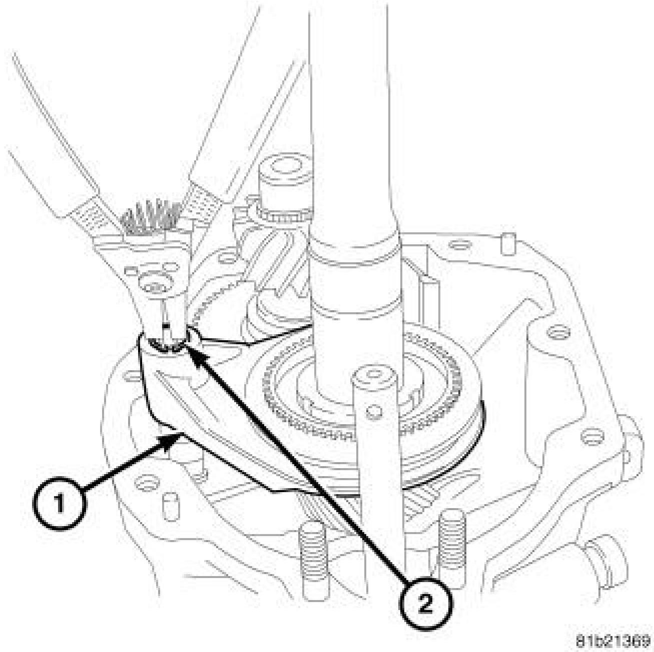


Fig. 199: Reverse Fork Snap Ring
Courtesy of CHRYSLER GROUP, LLC

38. Install a **NEW** reverse gear shift fork (1) snap ring (2).

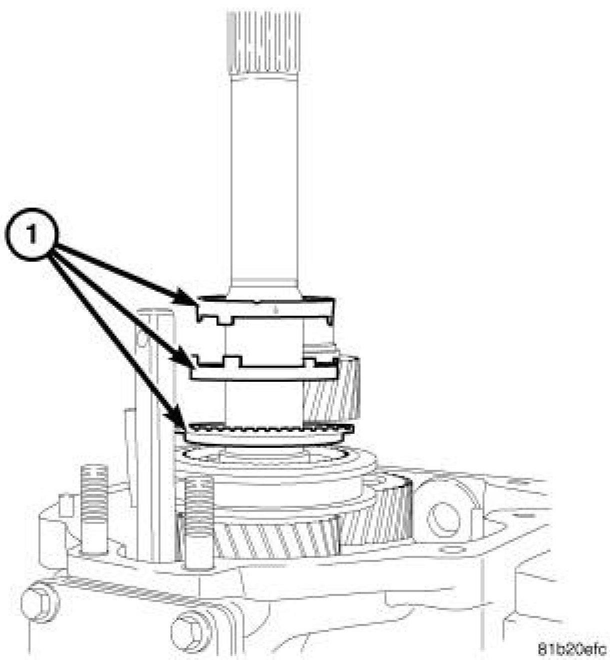


Fig. 200: Reverse Synchronizer Rings
Courtesy of CHRYSLER GROUP, LLC

39. Install the reverse gear synchronizer rings (1) on the reverse gear synchronizer hub.

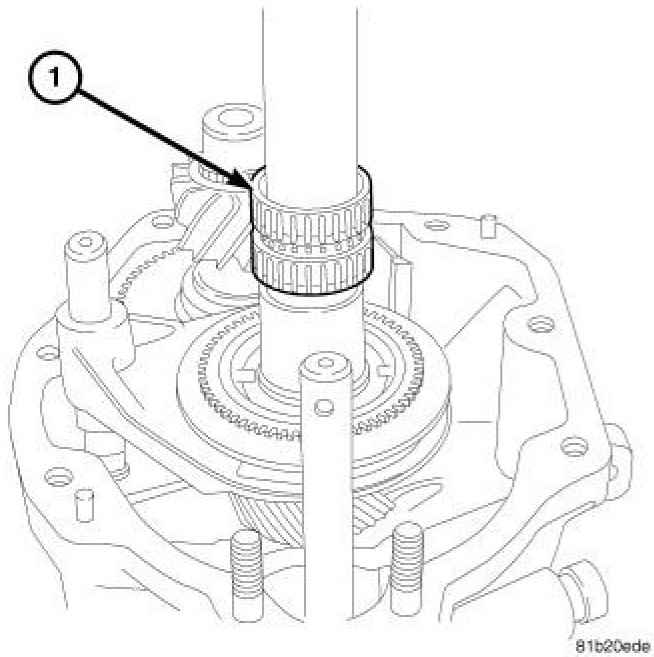


Fig. 201: Reverse Gear Bearing
Courtesy of CHRYSLER GROUP, LLC

40. Install the reverse gear bearing (1) on the mainshaft.

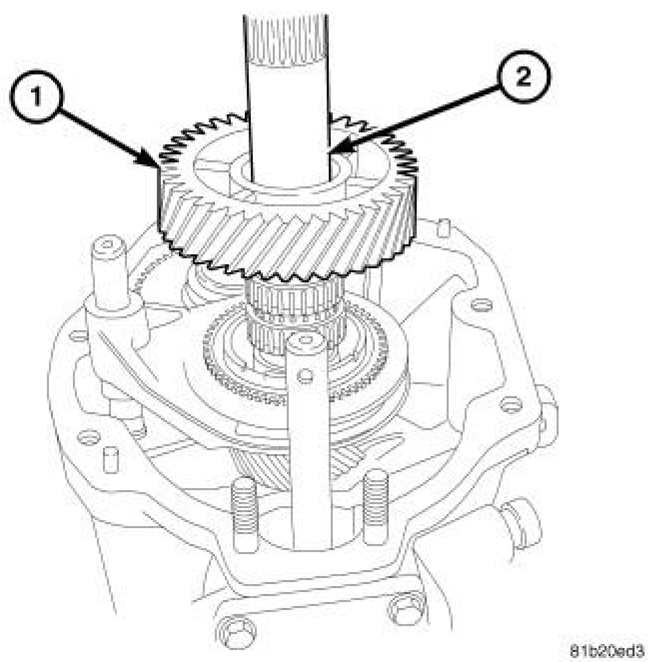


Fig. 202: Reverse Gear & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

41. Install reverse gear (1) on the mainshaft (2).

CAUTION: Synchronizer rings must be aligned with synchronizer hub and reverse gear during installation. Failure to follow these instructions will result in damage to the synchronizer rings.

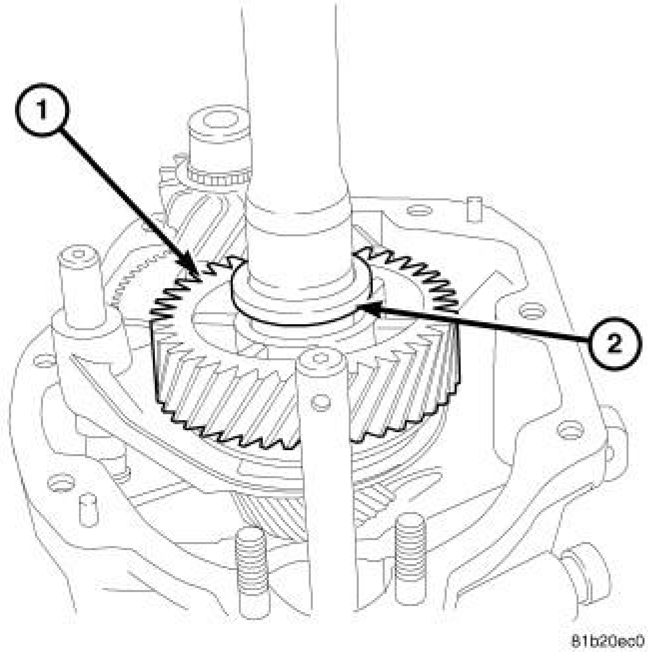


Fig. 203: Reverse Gear Thrust Washer
Courtesy of CHRYSLER GROUP, LLC

42. Install the reverse gear (1) thrust washer (2) on the mainshaft.

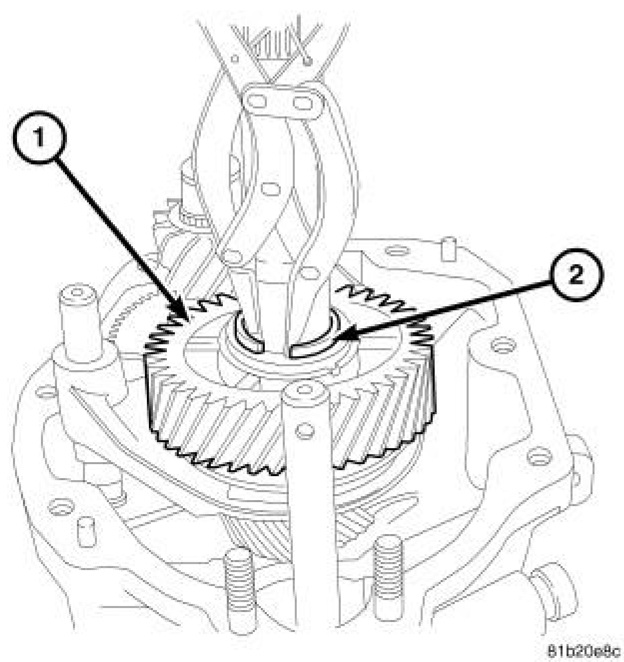


Fig. 204: Reverse Gear Snap Ring
Courtesy of CHRYSLER GROUP, LLC

43. Install the reverse gear (1) snap ring (2) on the mainshaft.

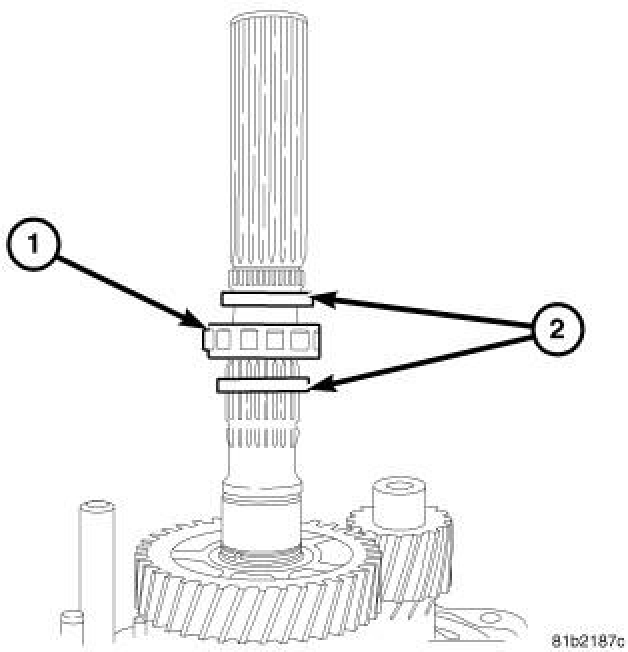


Fig. 205: Roller Bearing & Spacers
Courtesy of CHRYSLER GROUP, LLC

44. Install the mainshaft roller bearing (1) and spacers (2) on the mainshaft.

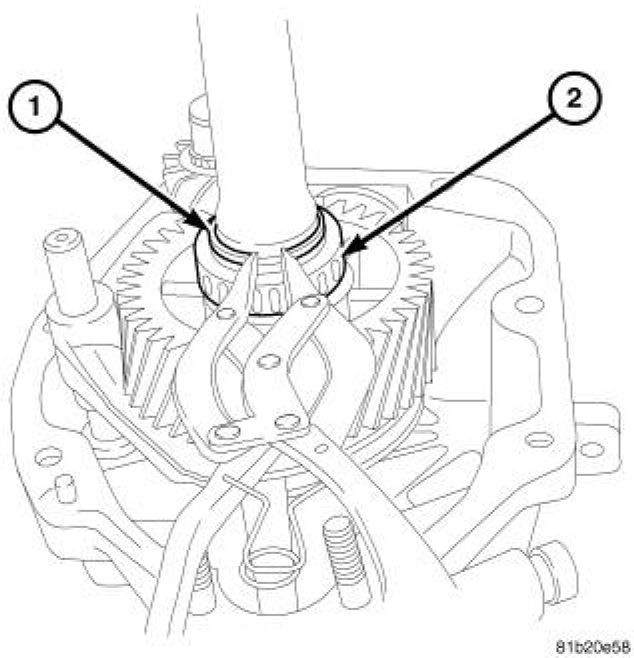
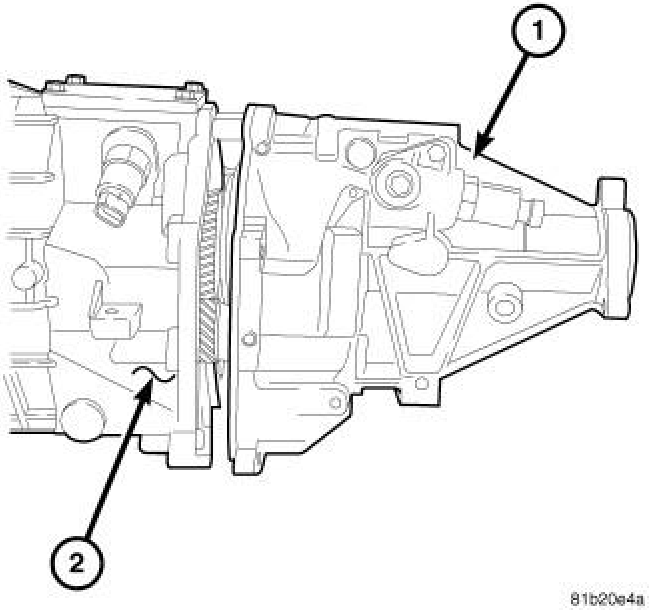


Fig. 206: Roller Bearing Snap-Ring
Courtesy of CHRYSLER GROUP, LLC

45. Install the mainshaft roller bearing (2) snap ring (1).

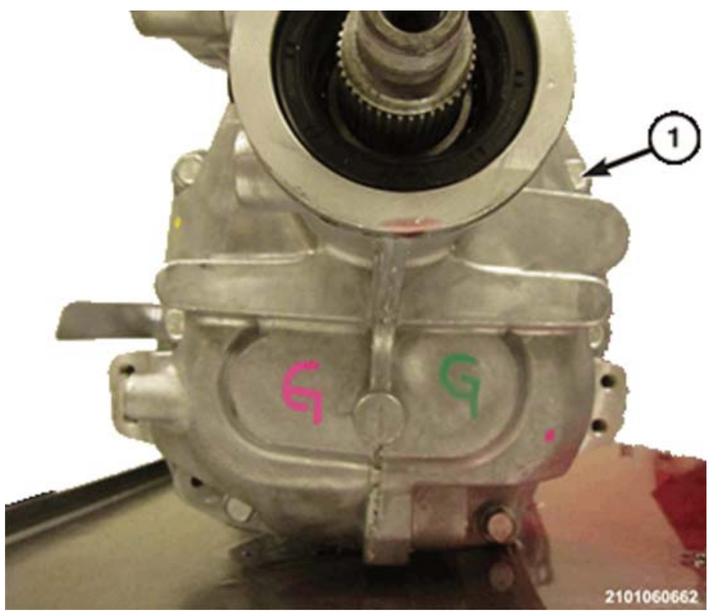


[Fig. 207: Removing/Installing Extension Housing](#)
Courtesy of CHRYSLER GROUP, LLC

46. If equipped, apply Mopar Ā® ATF-RTV to the extension housing sealing surface.

    If equipped with a gasket, install a **NEW** gasket.

47. Install the extension housing (1) on the transmission case (2).



[Fig. 208: Extension Housing Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

48. Install the extension housing bolts (1) and tighten to the proper **SPECIFICATIONS** .

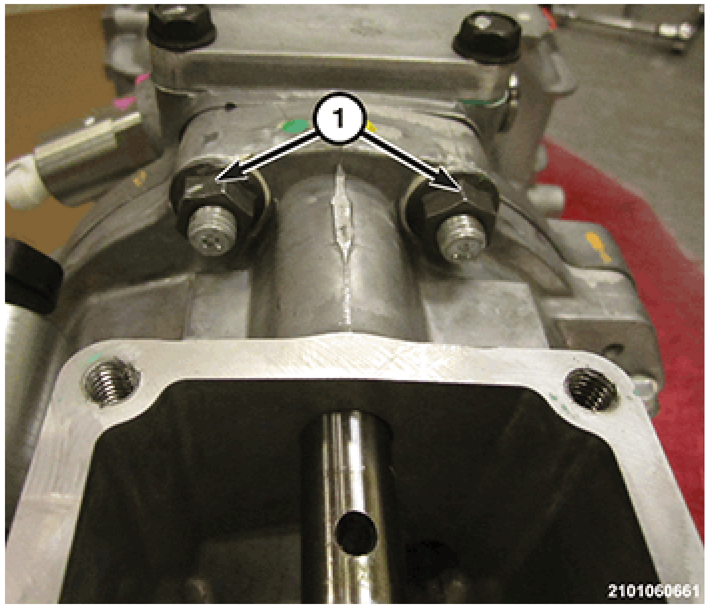


Fig. 209: Extension Housing Nuts
Courtesy of CHRYSLER GROUP, LLC

49. Install the extension housing nuts (1) and tighten to the proper **SPECIFICATIONS** .

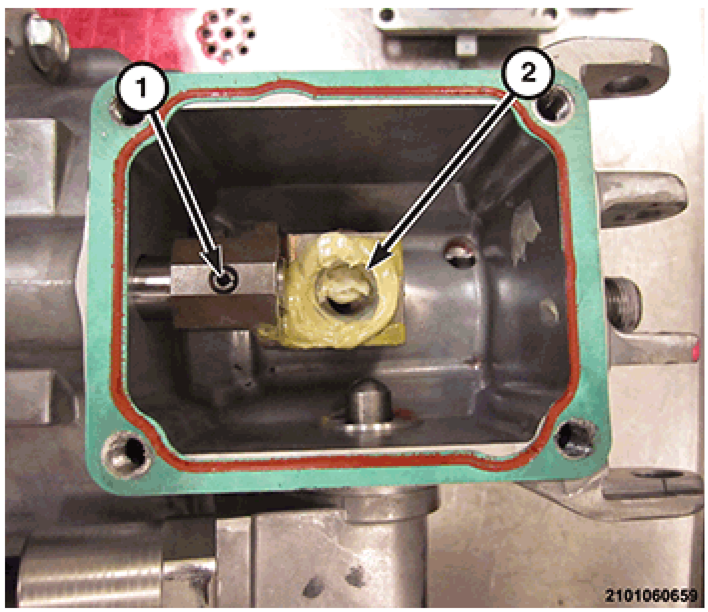


Fig. 210: Offset Lever & Roll Pin
Courtesy of CHRYSLER GROUP, LLC

50. Install the offset lever (2) and the offset lever roll pin (1) with a hammer and punch.

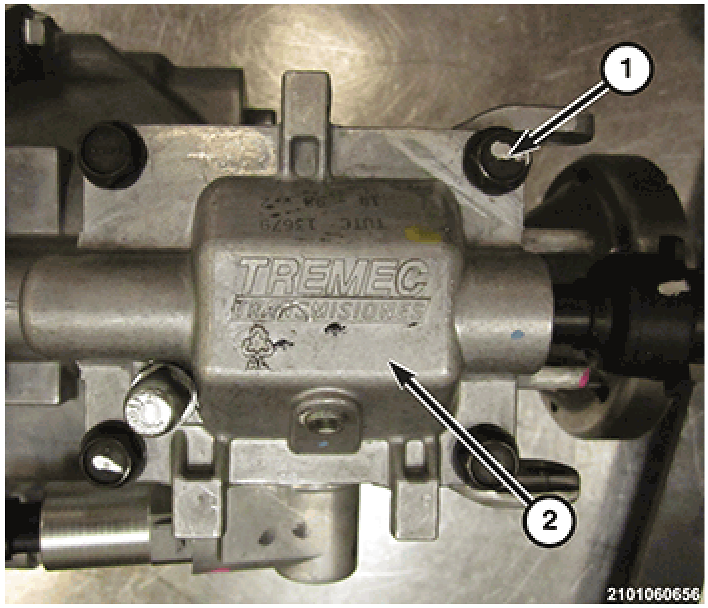


Fig. 211: Shift Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

51. For transmissions equipped with RTV use, Mopar Ā® ATF-RTV to the shift cover sealing surface.

    For transmissions equipped with a gasket, install a **NEW** gasket.

52. Install shift cover (2) bolts (1) and tighten to the proper **SPECIFICATIONS** .

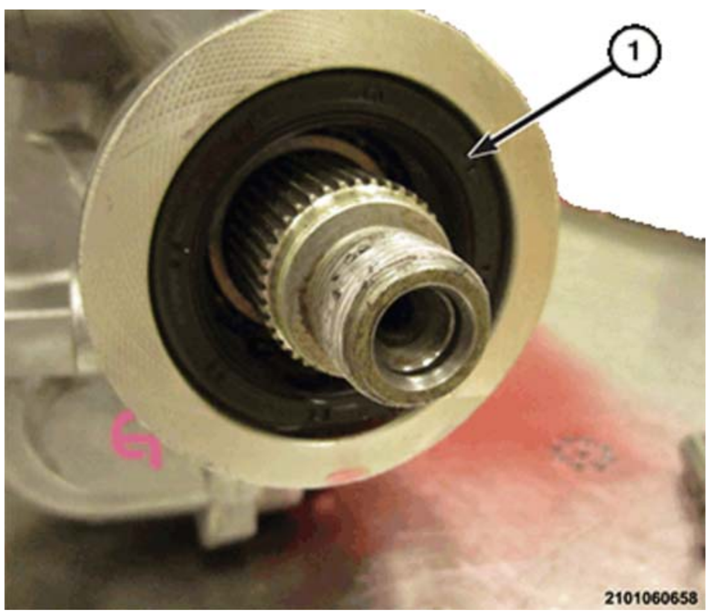


Fig. 212: Extension Housing Seal
Courtesy of CHRYSLER GROUP, LLC

53. Install the extension housing seal (1) in the extension housing with installer (special tool #7884, Installer, Seal) (2).

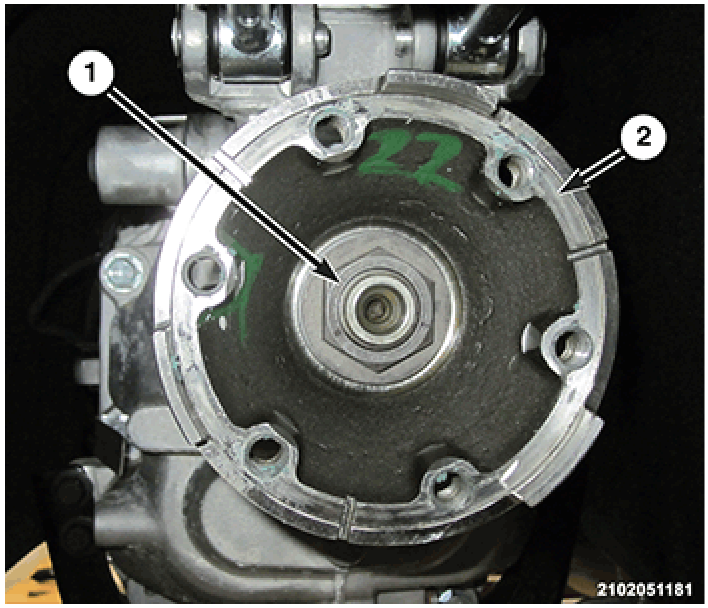


Fig. 213: Output Flange & Locknut
Courtesy of CHRYSLER GROUP, LLC

54. Install the output flange (2) to the transmission output shaft.
55. Hold the output flange (2) with Special Tool (special tool #C-3281, Holder, Flange) (2) Flange Wrench and tighten the output flange locknut (1) to the proper **SPECIFICATIONS** .

INSTALLATION

INSTALLATION

1. Position the transmission into the clutch and seat against the bell housing.

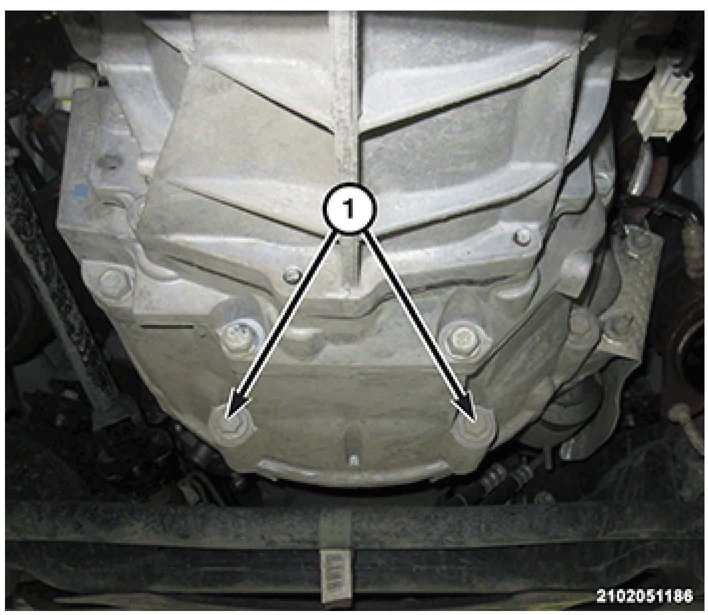


Fig. 214: Bottom Transmission To Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the bottom transmission to oil pan bolts (1) and tighten to the proper **SPECIFICATIONS** .

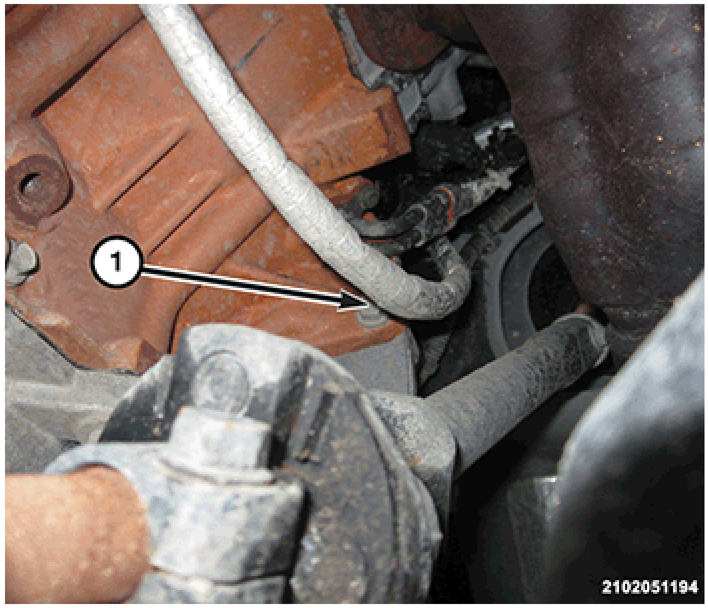


Fig. 215: Front Transmission To Engine Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Install the front transmission to engine bolt (1) and tighten to the proper **SPECIFICATIONS** .

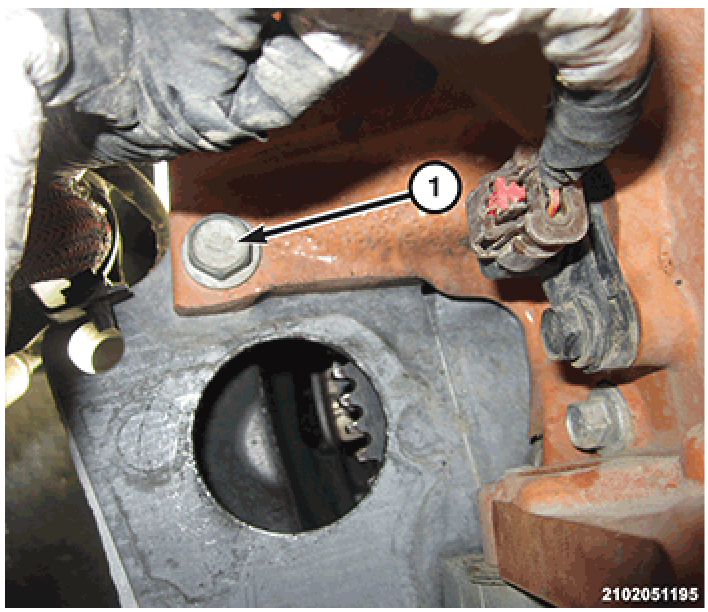


Fig. 216: Front Transmission To Engine Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Install the front transmission to engine bolt and tighten to the proper **SPECIFICATIONS** .

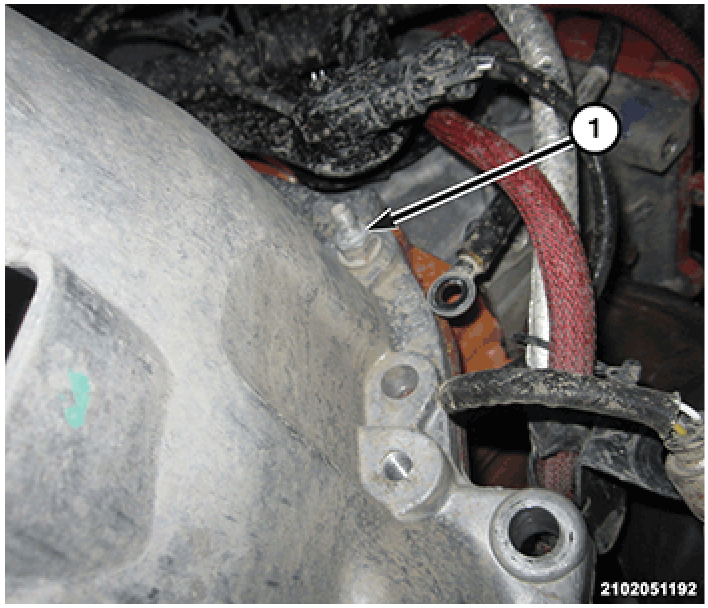


Fig. 217: Engine Stud Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Install the transmission to engine stud (1) and tighten to the proper **SPECIFICATIONS** .

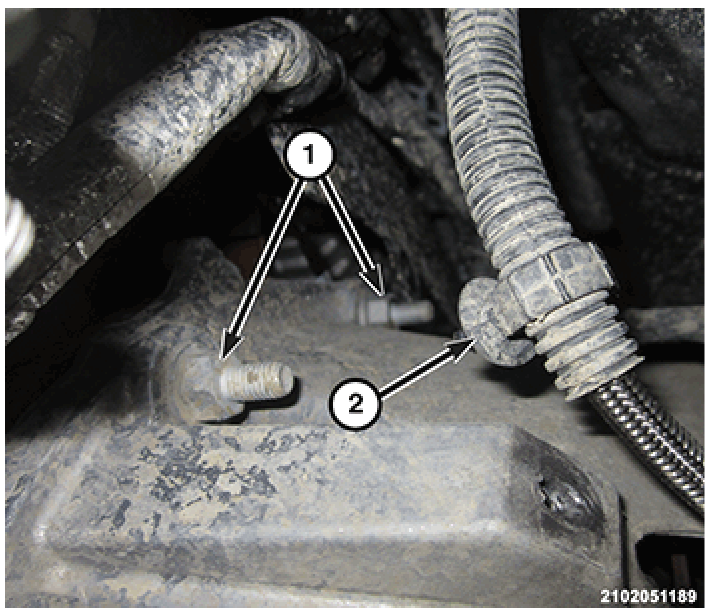


Fig. 218: Engine Stud Bolts & Harness Clip
Courtesy of CHRYSLER GROUP, LLC

6. Install the three (two shown) transmission to engine studs (1) and tighten to the proper **SPECIFICATIONS** .

Fig. 219: Rainbow Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

7. Install the rainbow bracket nut (1) and tighten to the proper **SPECIFICATIONS** .

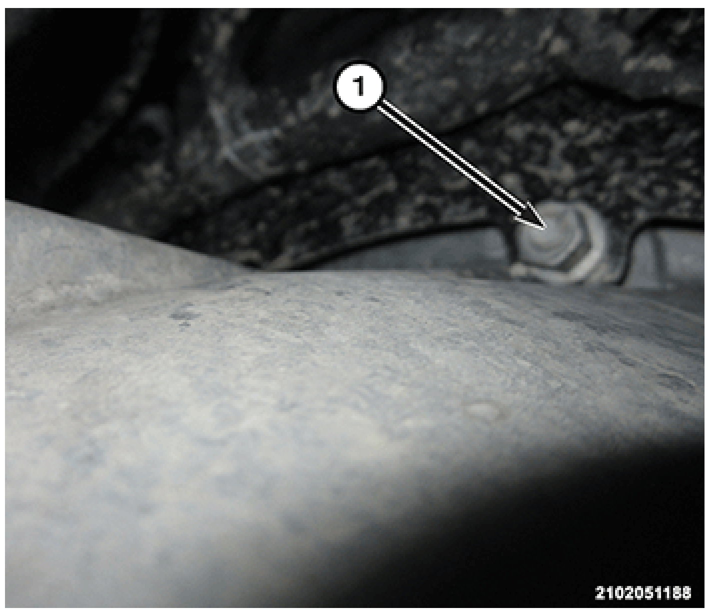


Fig. 220: Rainbow Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

8. Install the rainbow bracket nut (1) and tighten to the proper **SPECIFICATIONS** .

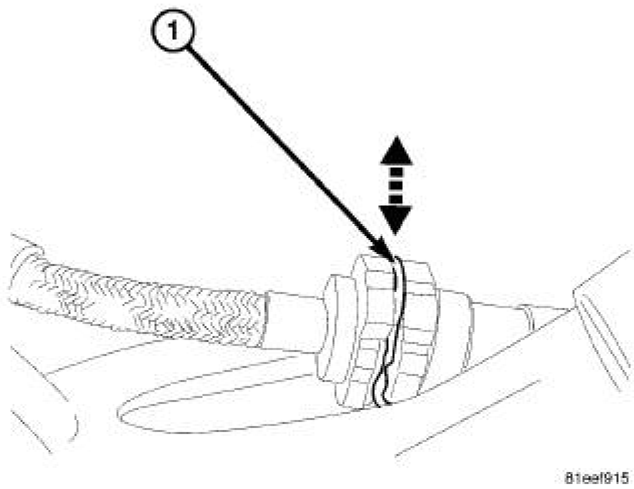


Fig. 221: Clutch Hose Removal
Courtesy of CHRYSLER GROUP, LLC

9. Push the clip (1) securing the clutch hydraulic hose to the throw out bearing assembly. Verify the clutch hydraulic hose is installed.

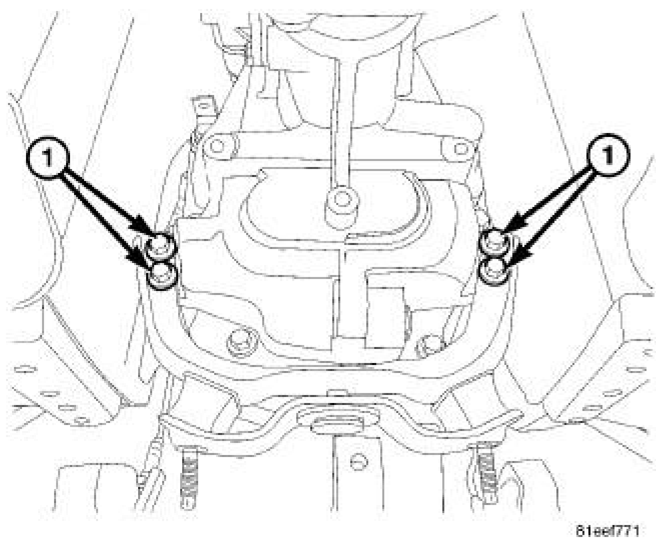


Fig. 222: Transmission Isolator Bracket Upper Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Install the crossmember, isolator bracket and isolator on the transmission.
11. Install the isolator bracket bolts (1) and tighten to the proper **SPECIFICATIONS** .

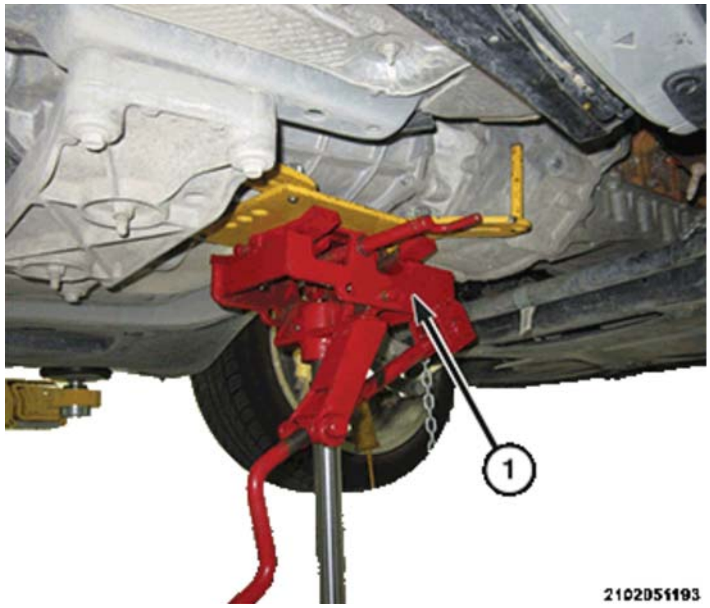


Fig. 223: Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

12. Raise the transmission slightly with the transmission jack (1) to allow the crossmember to sit flush with the body.

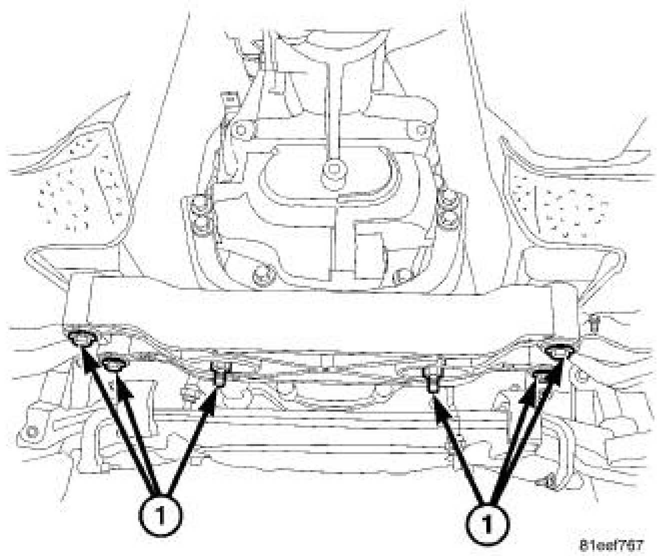


Fig. 224: Crossmember And Isolator Lower Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

13. Install the crossmember bolts (1) and tighten to the proper **SPECIFICATIONS** .

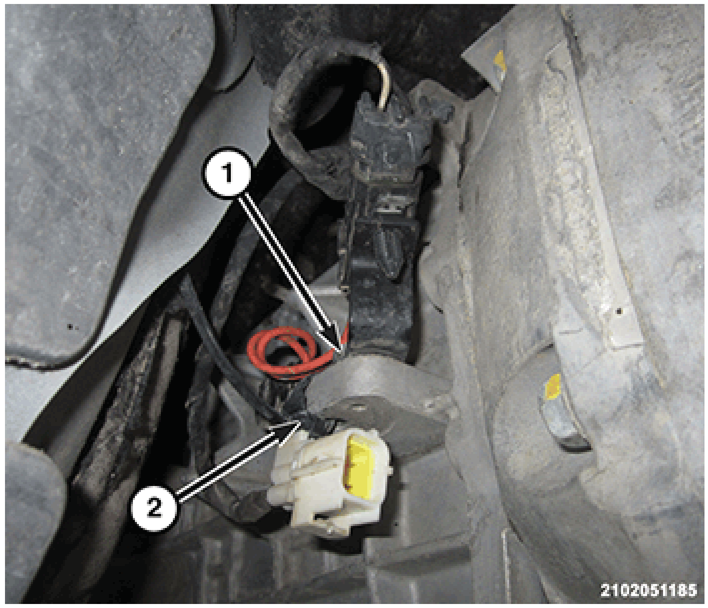


Fig. 225: Push Pin Wiring Connectors & Harness Clips
Courtesy of CHRYSLER GROUP, LLC

14. Install the push pin wiring connectors (1 and 2) on the transmission.

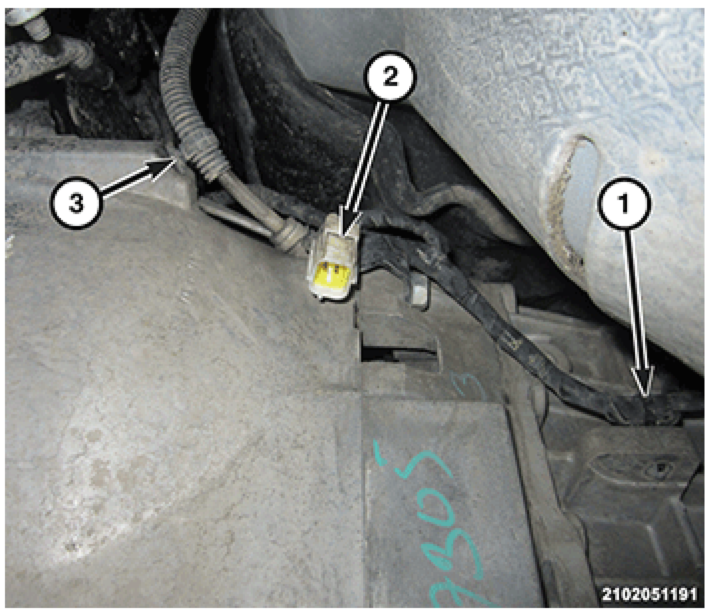
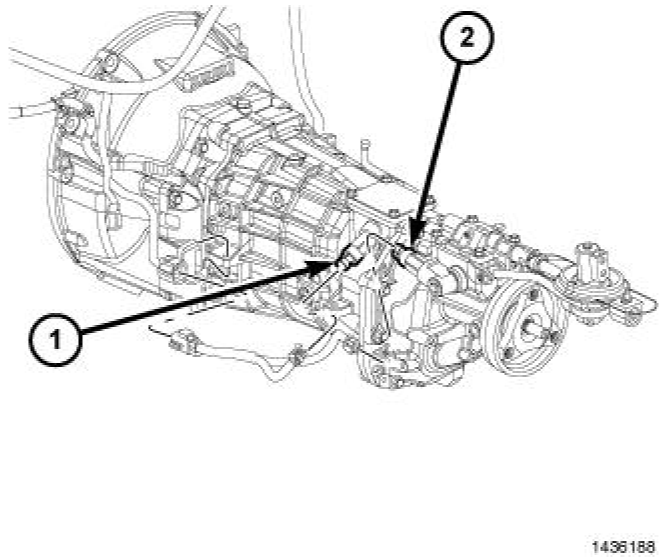


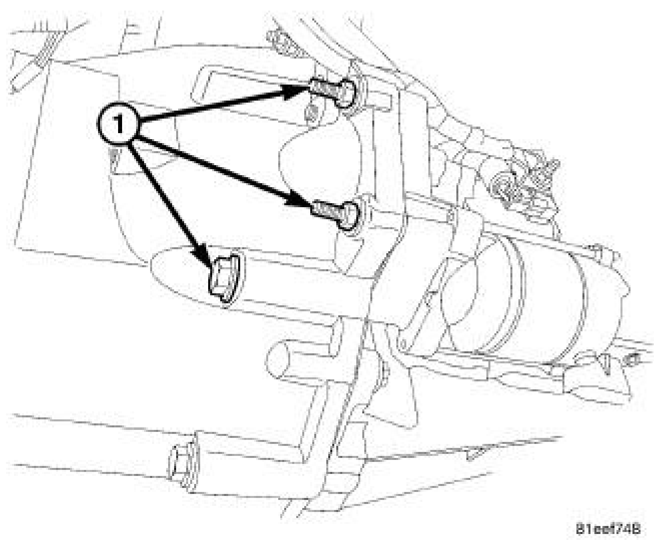
Fig. 226: Wire Harness Connector & Harness Clips
Courtesy of CHRYSLER GROUP, LLC

15. Install push pin wiring connectors (1 and 2) and the clutch hydraulic tube push pin (3) on the transmission.



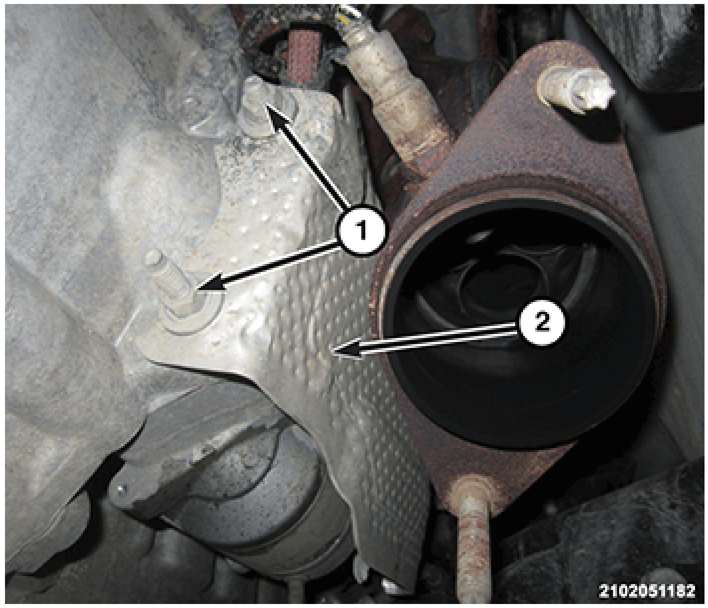
[Fig. 227: Skip Shift & Reverse Lockout Solenoids]
Courtesy of CHRYSLER GROUP, LLC

16. Connect the transmission skip shift solenoid wire harness connector (1) and the transmission reverse lockout solenoid wire harness connector (2).



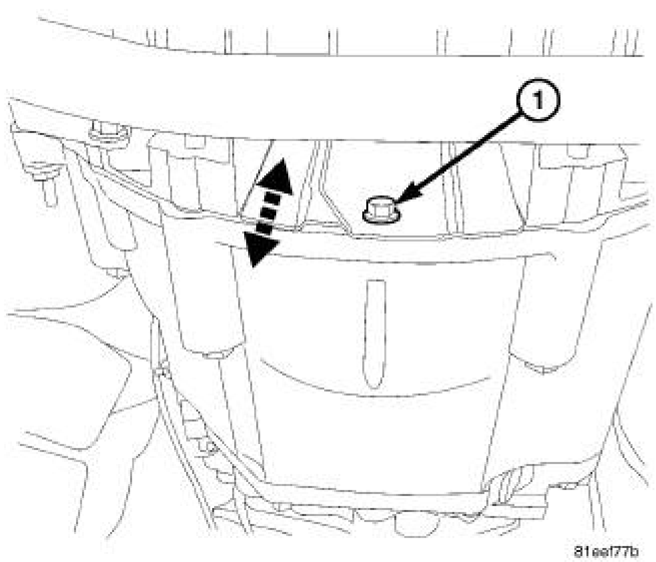
[Fig. 228: Starter Bolts]
Courtesy of CHRYSLER GROUP, LLC

17. Position the starter in place, install the starter bolts (1) and tighten to the proper **SPECIFICATIONS** .



[Fig. 229: Starter Heat Shield & Nuts]
Courtesy of CHRYSLER GROUP, LLC

18. Install the starter heat shield (2) and the starter heat shield nuts (1) and tighten to the proper **SPECIFICATIONS** .



[Fig. 230: Inspection Cover]
Courtesy of CHRYSLER GROUP, LLC

19. Install the inspection cover, the inspection cover bolt (1) and tighten to the proper **SPECIFICATIONS** .

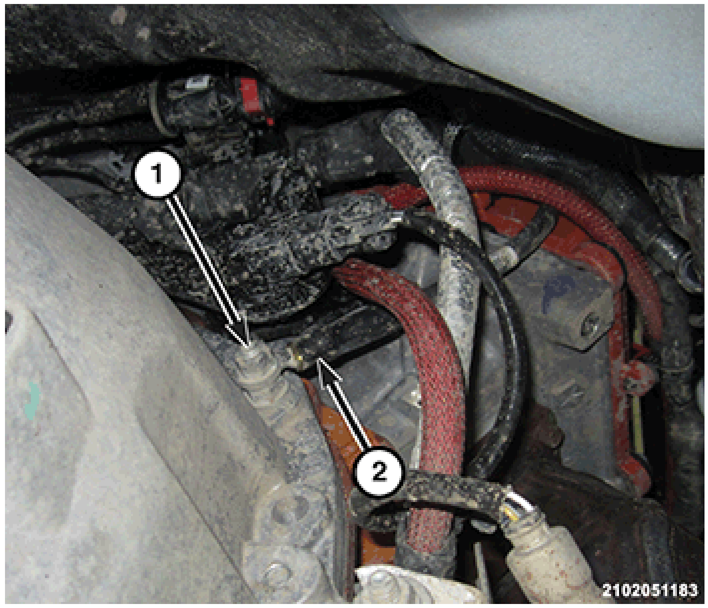


Fig. 231: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

20. Install the ground wire (2), the ground wire nut (1) and tighten to the proper SPECIFICATIONS .

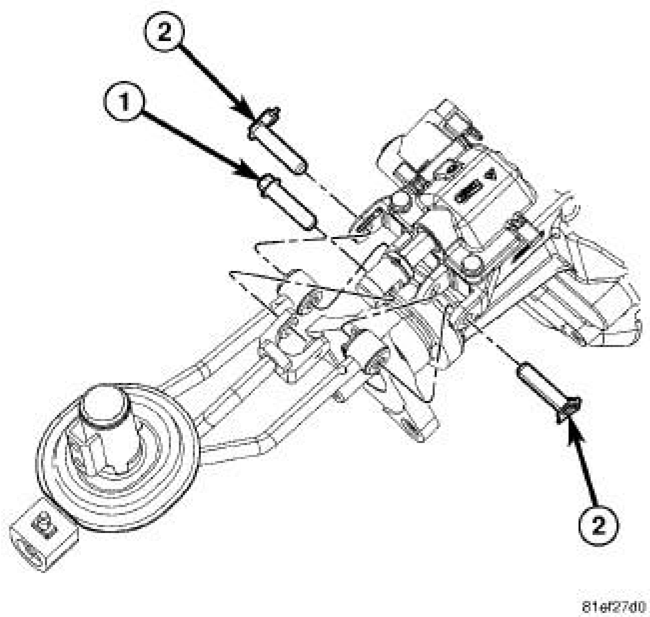


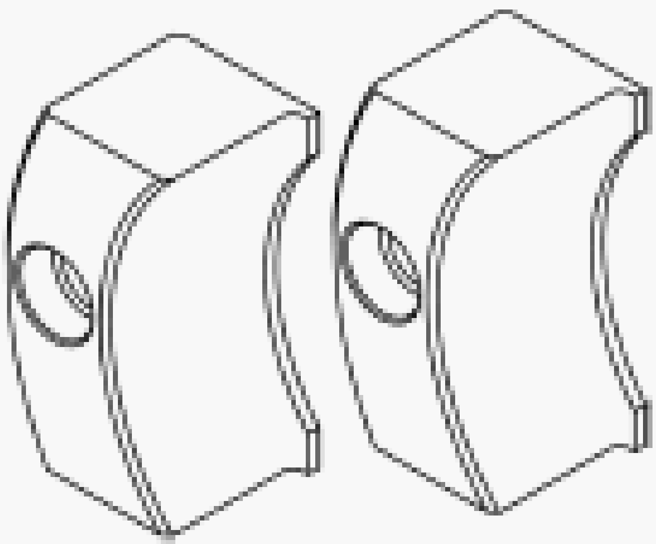
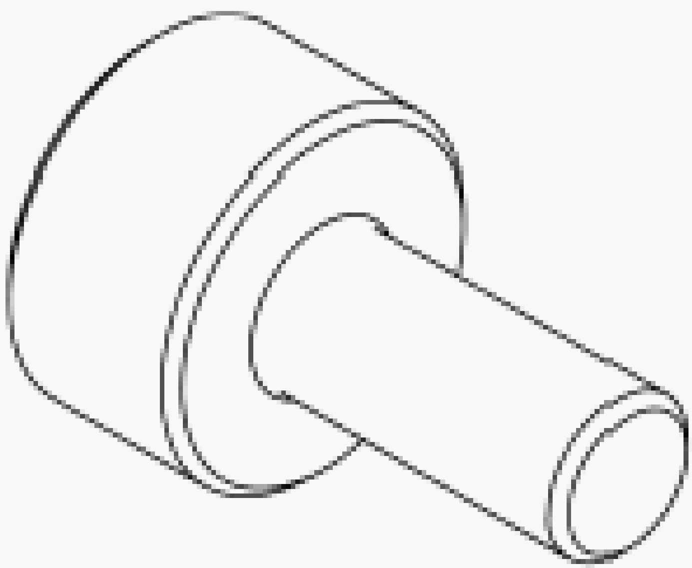
Fig. 232: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

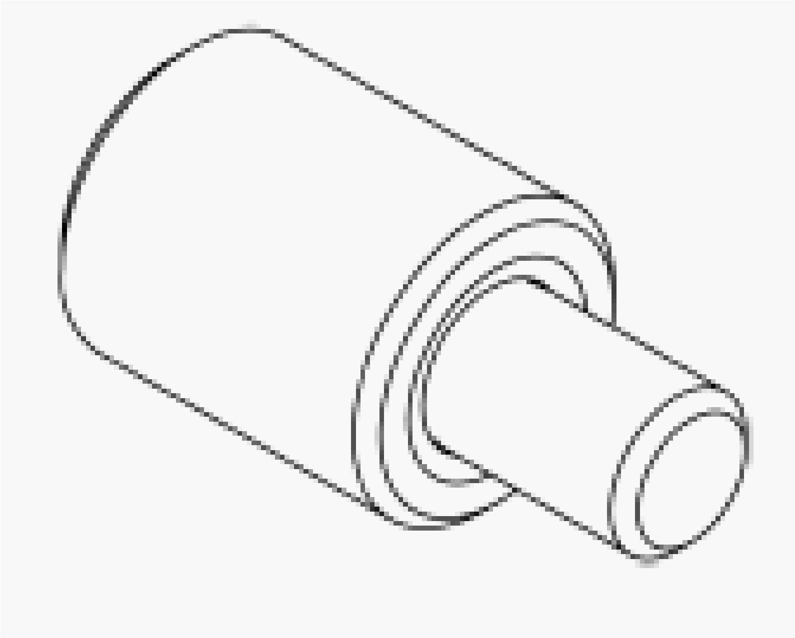
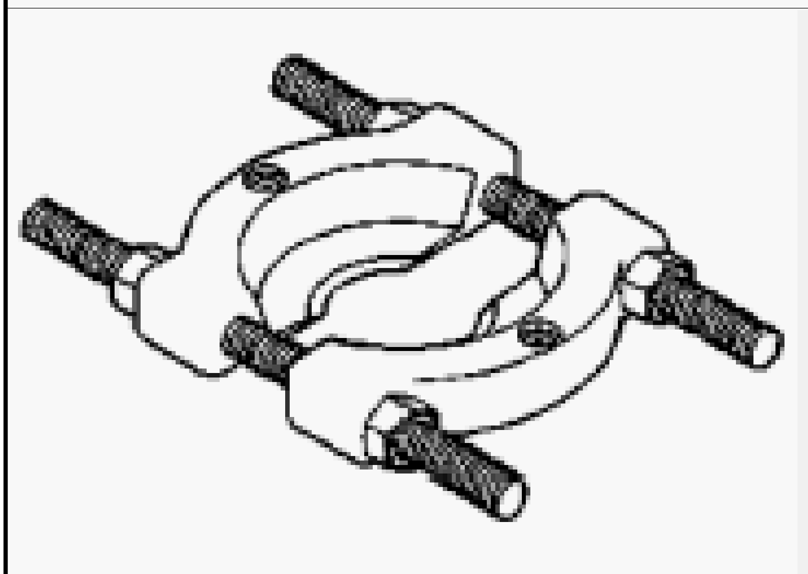
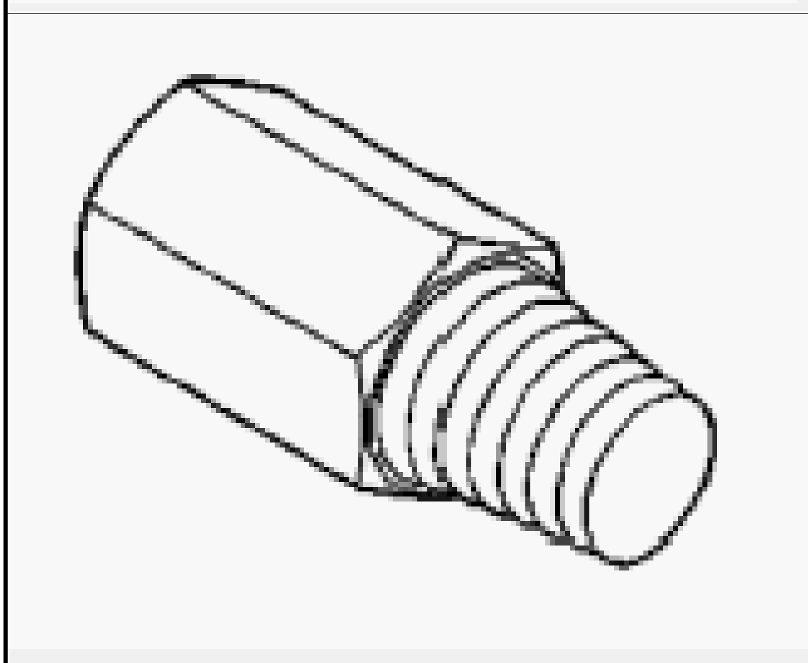
21. If necessary install the shift linkage bolt (1) and the roll pins (2) and the shift linkage onto the transmission. Tighten the shift linkage bolt to the proper SPECIFICATIONS .
22. Install the drive shaft. Refer to INSTALLATION .
23. Install the exhaust. Refer to CONVERTER, CATALYTIC, INSTALLATION .
24. Lower the vehicle.

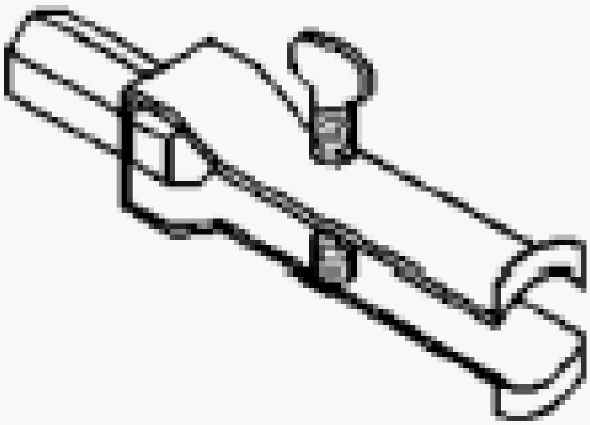
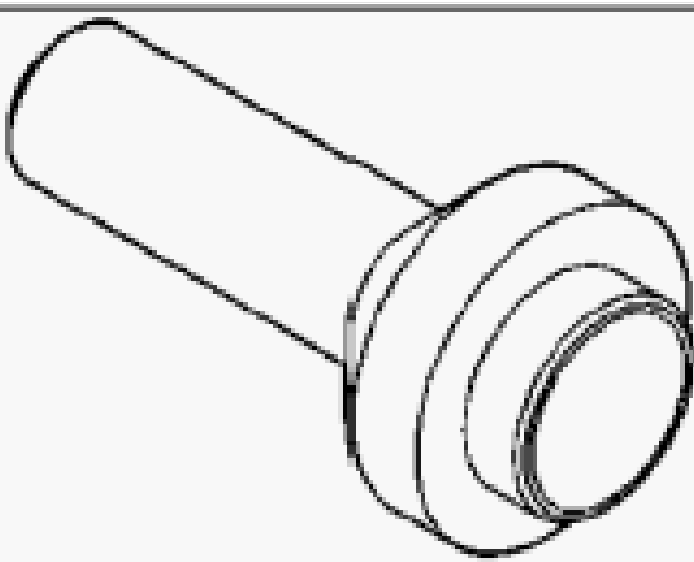
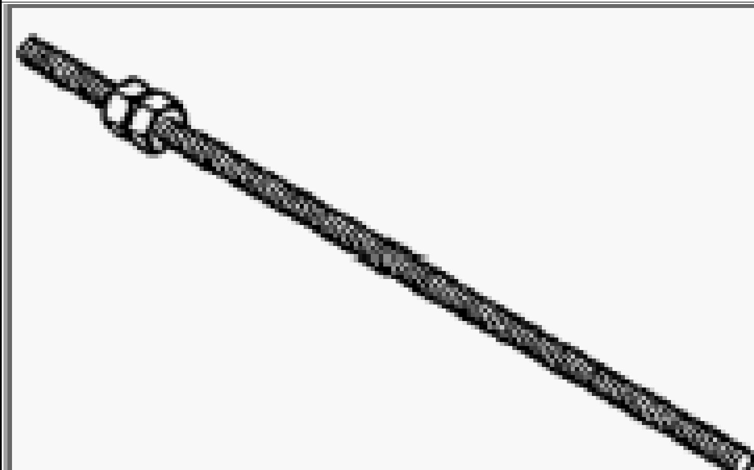
25. Connect the negative battery cable.
26. Road test the vehicle to verify proper operation.

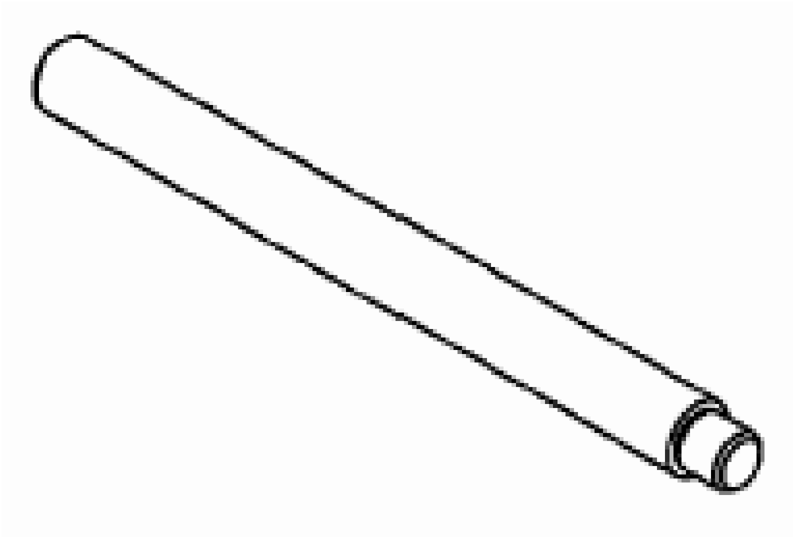
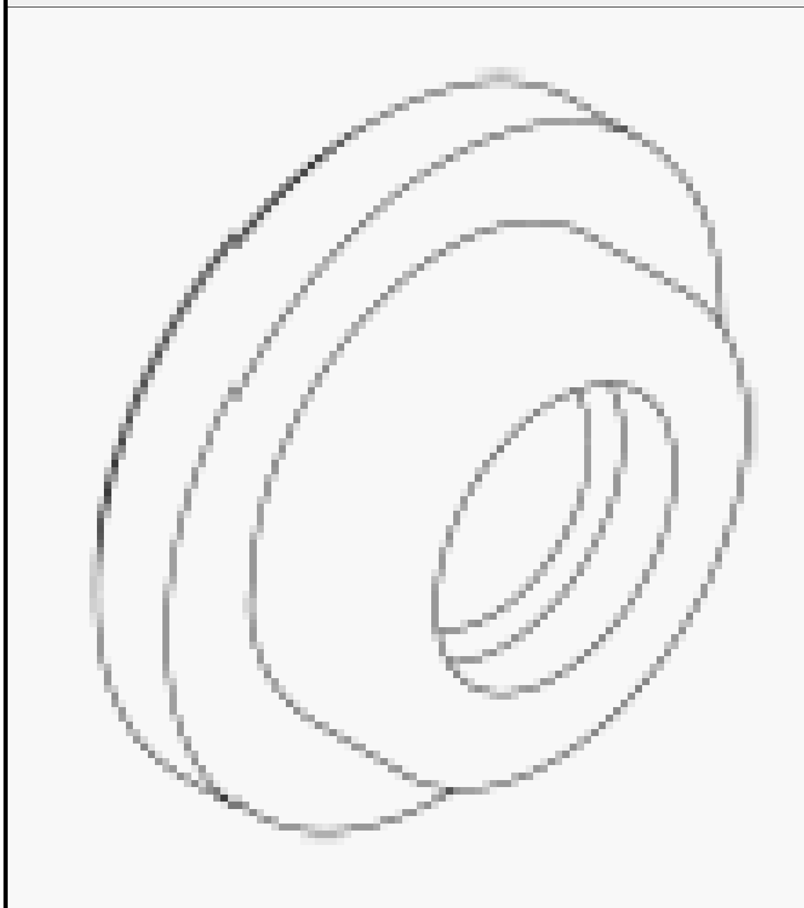
SPECIAL TOOLS

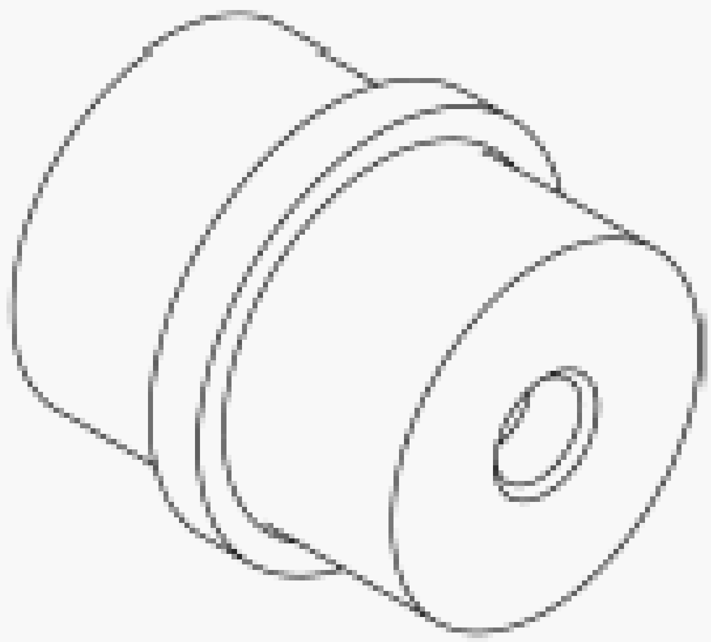
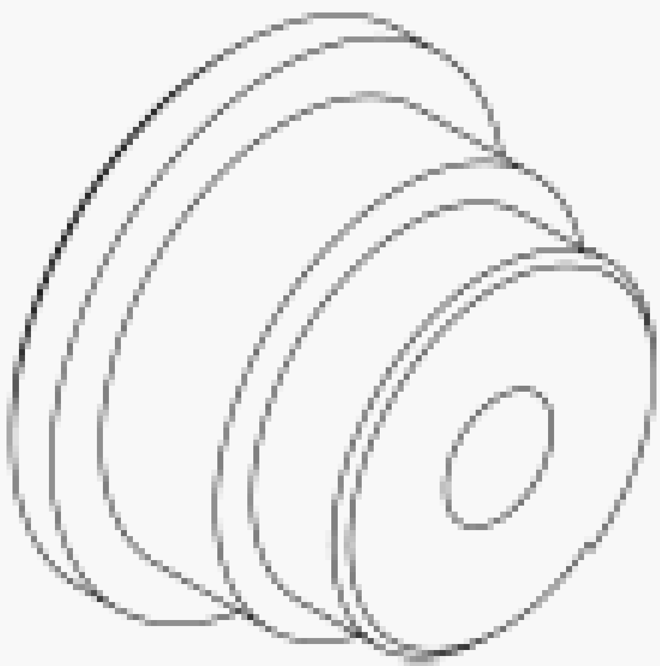
SPECIAL TOOLS

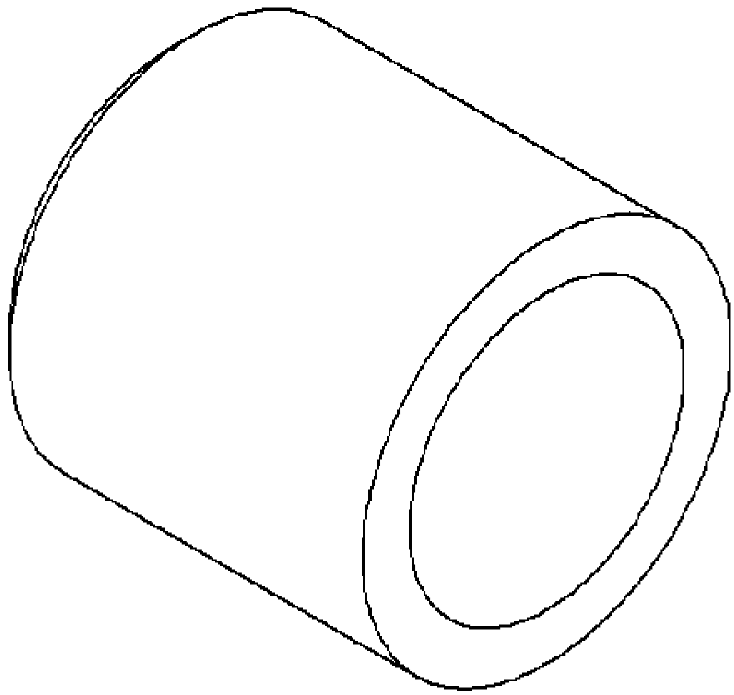
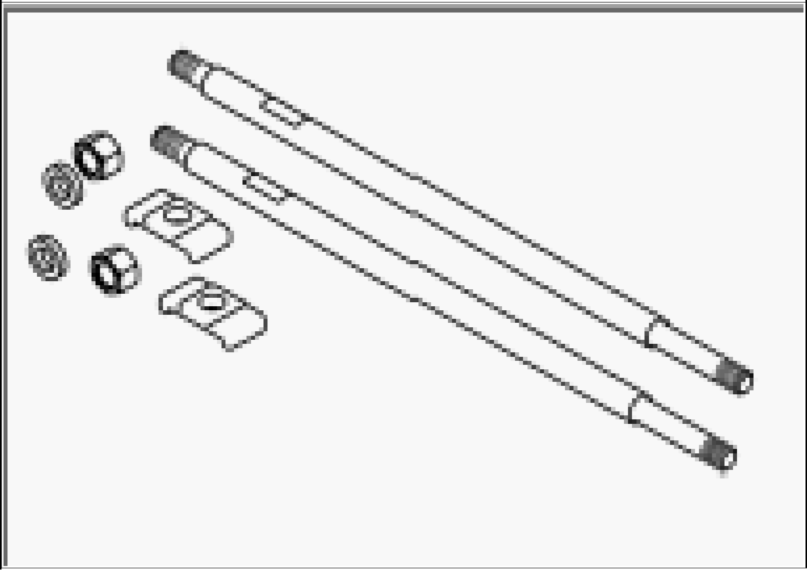
	10026 - Puller, Synchro Hub (Originally Shipped In Kit Number(s) 10017, 10017A.)
	10027 - Button, Press (Originally Shipped In Kit Number(s) 10017, 10017A.)

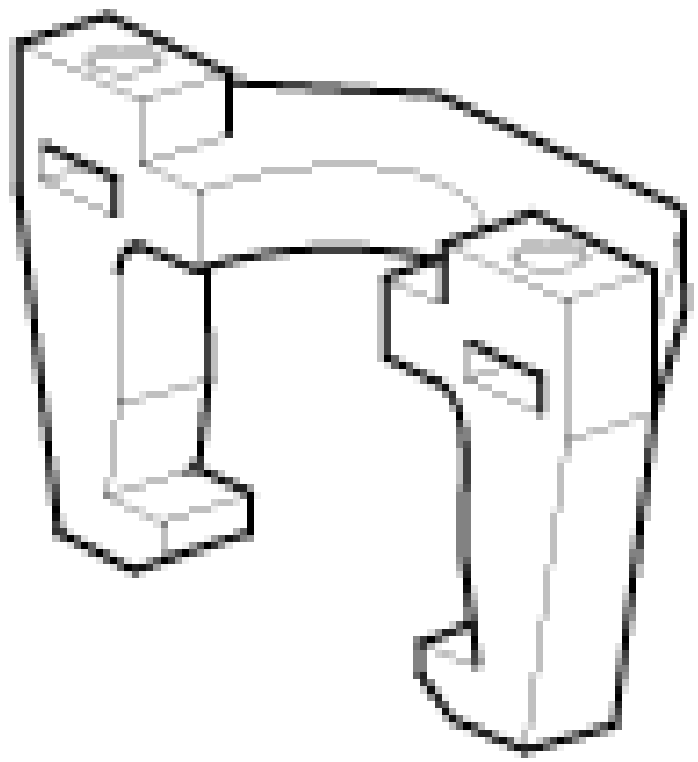
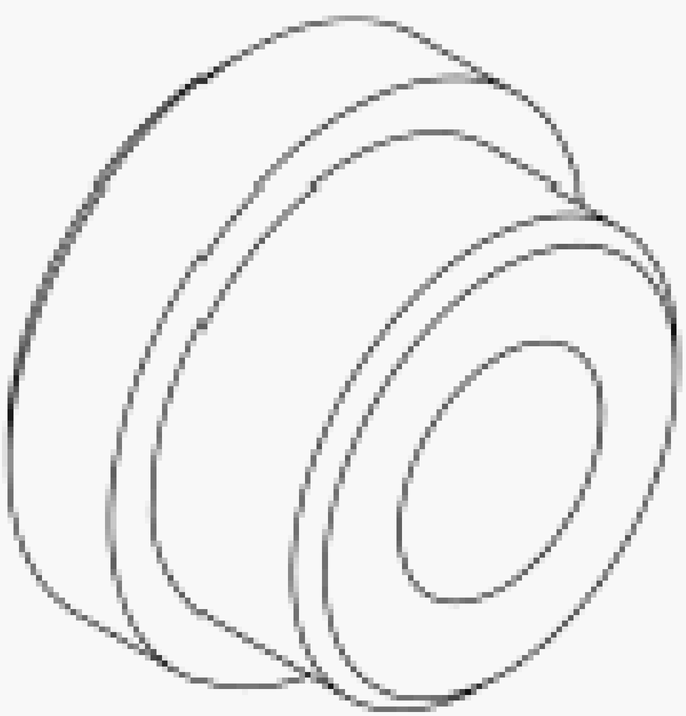
	10028 - Installer, Bearing (Originally Shipped In Kit Number(s) 10017, 10017A.)
	1130 - Splitter, Bearing/Gear (Originally Shipped In Kit Number(s) 6745, 6947, 6949, 9202, 9202A-CAN, 9202CC, 9299.)
	6786 - Remover, Bushing (Originally Shipped In Kit Number(s) 6784, 6809, 6822.)

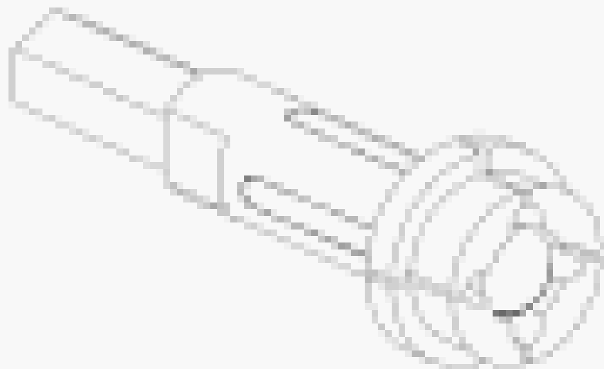
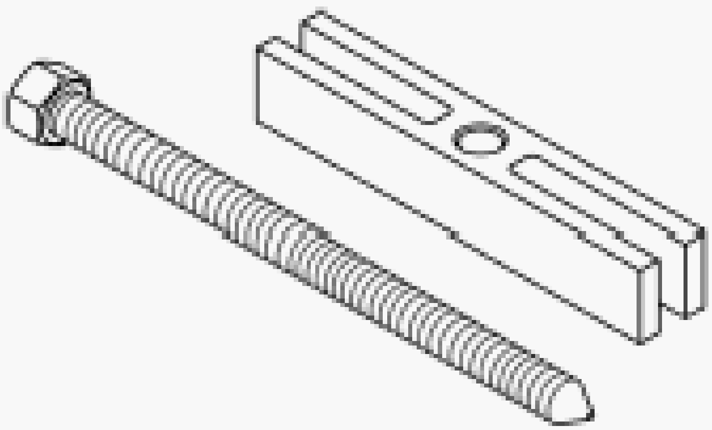
	7794-A - Remover, Seal (Originally Shipped In Kit Number(s) 6645.)
	7884 - Installer, Seal (Originally Shipped In Kit Number(s) 9975.)
	8161 - Adapter Rod (Originally Shipped In Kit Number(s) 8163, 8163CC, 8164, 8164CC.)

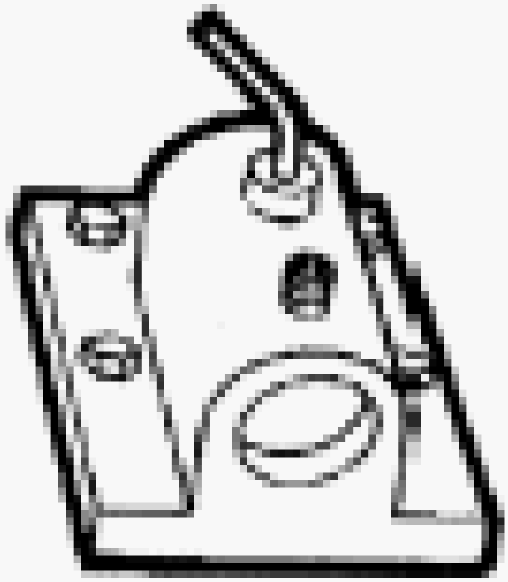
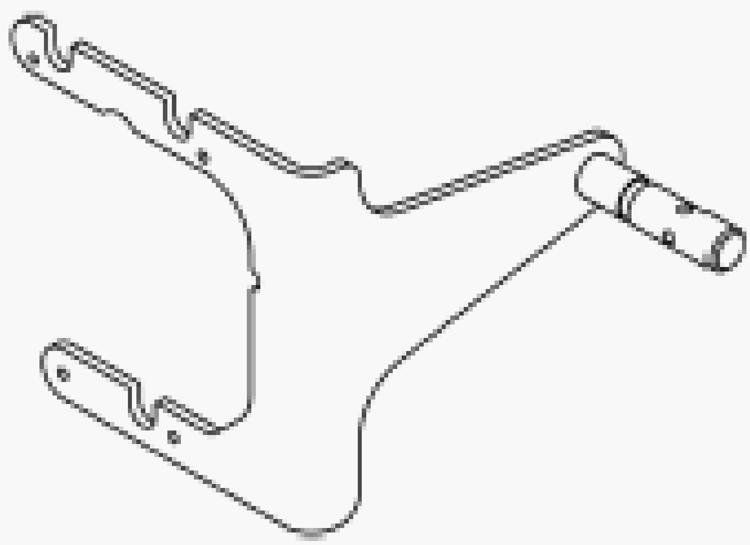
	8475 - Installer, Bushing (Originally Shipped In Kit Number(s) 8708, 8708CC.)
	9366 - Installer, Seal (Originally Shipped In Kit Number(s) 10017, 10017A.)

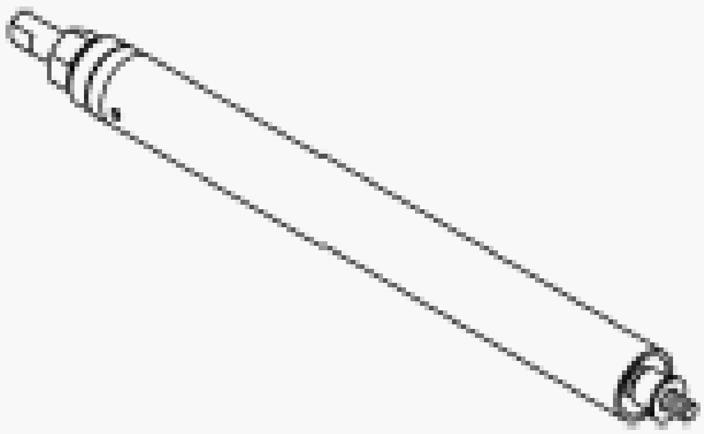
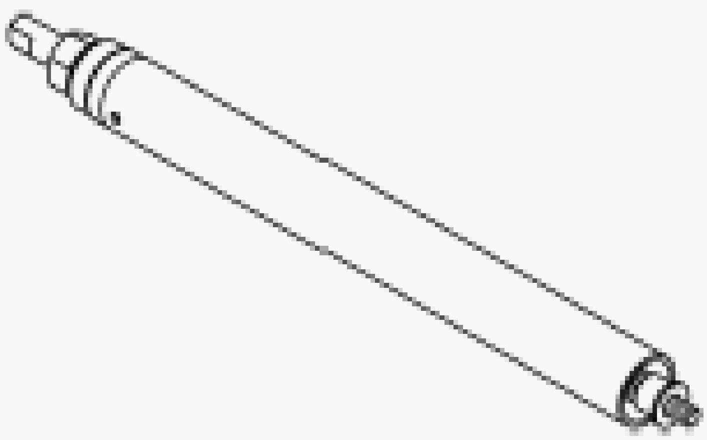
	9369 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9373 - Installer, Bearing Cup (Originally Shipped In Kit Number(s) 10017, 10017A.)

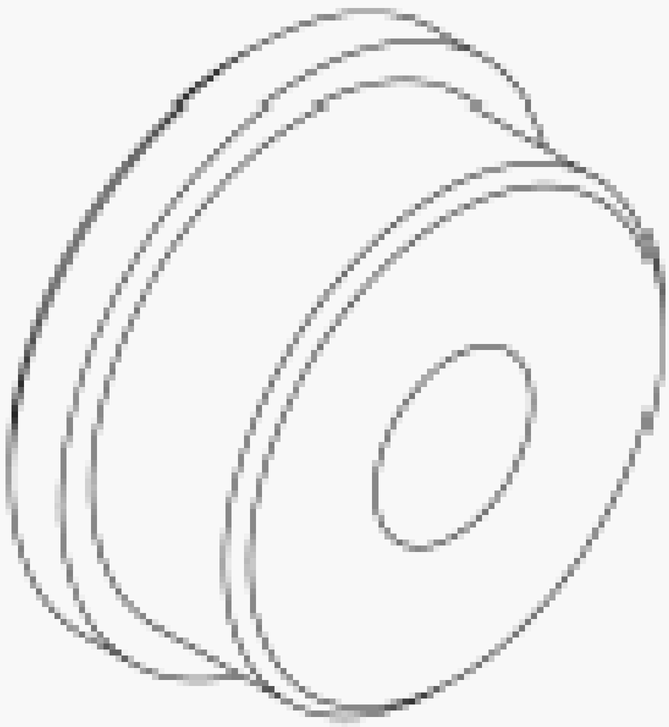
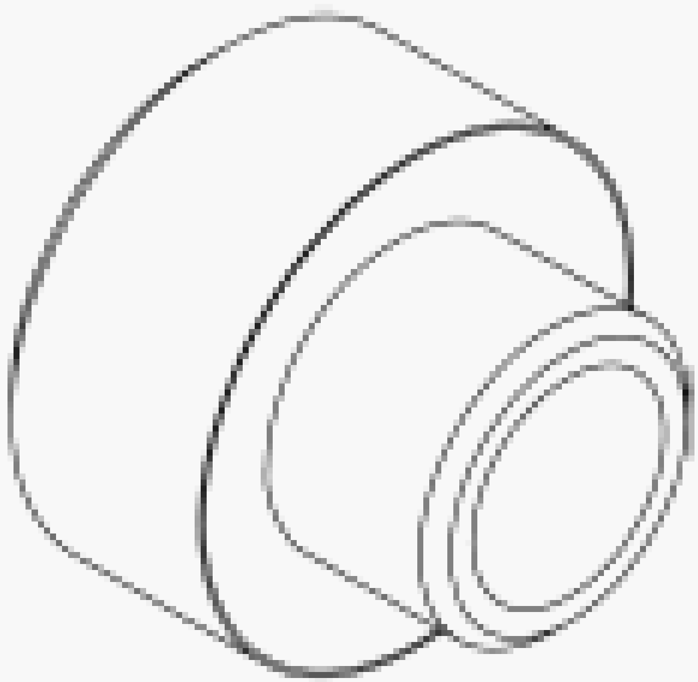
	9377 - Press Adapter (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9378 - Bolts, Puller (Originally Shipped In Kit Number(s) 10017, 10017A.)

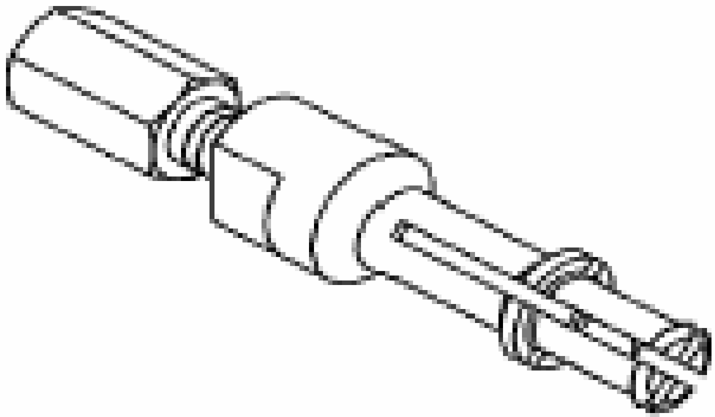
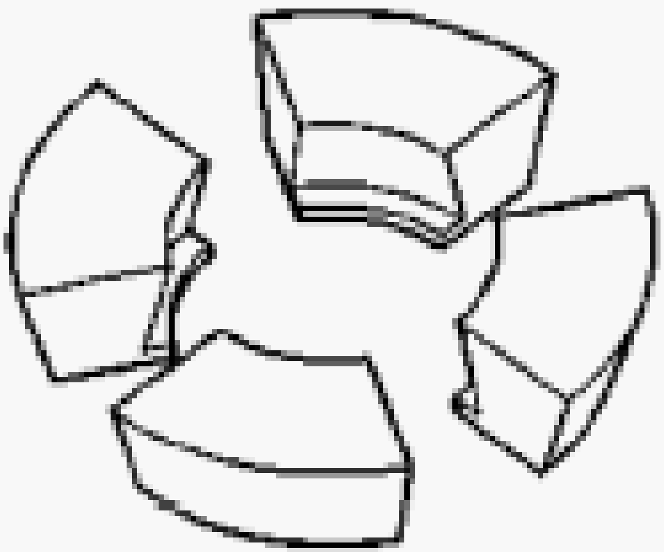
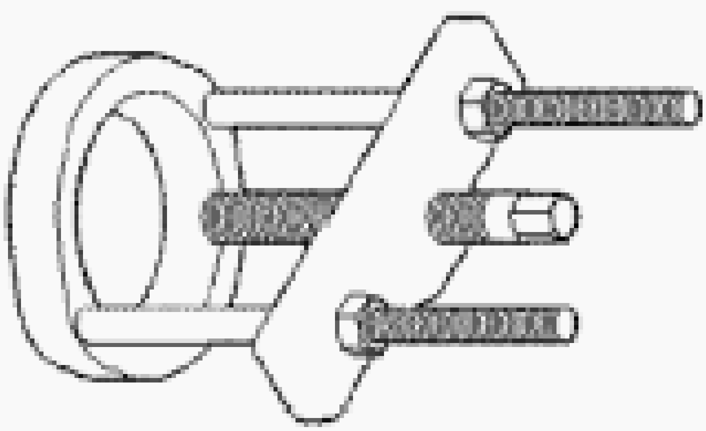
	9379a - Remover, Gear (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9380 - Installer, Bearing Cup (Originally Shipped In Kit Number(s) 10017, 10017A.)

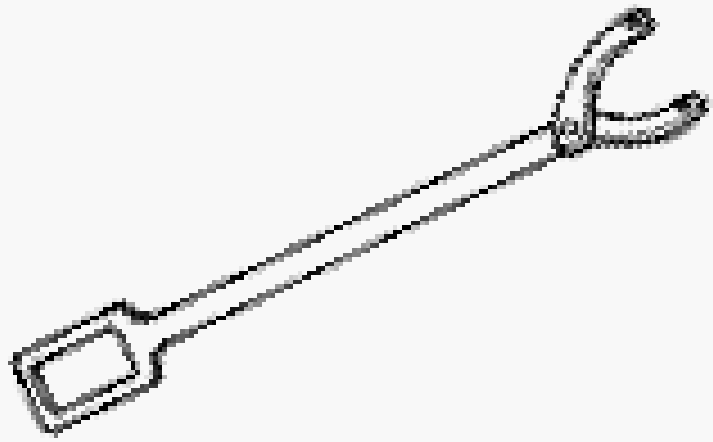
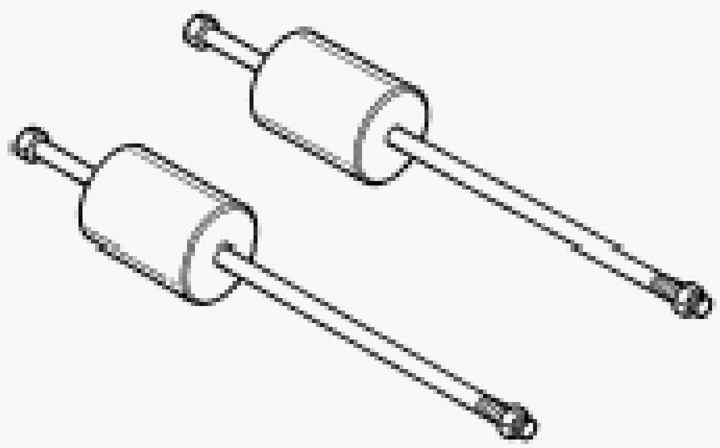
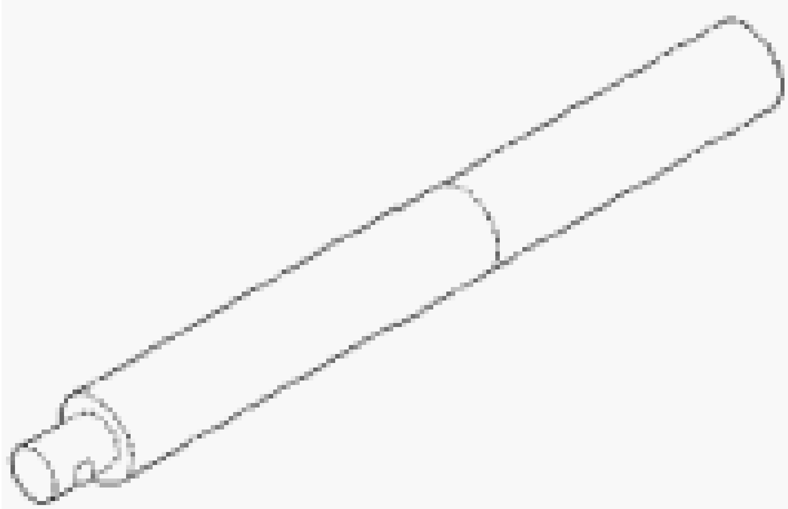
	9381 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9382 - Bridge (Originally Shipped In Kit Number(s) 10017, 10017A.)

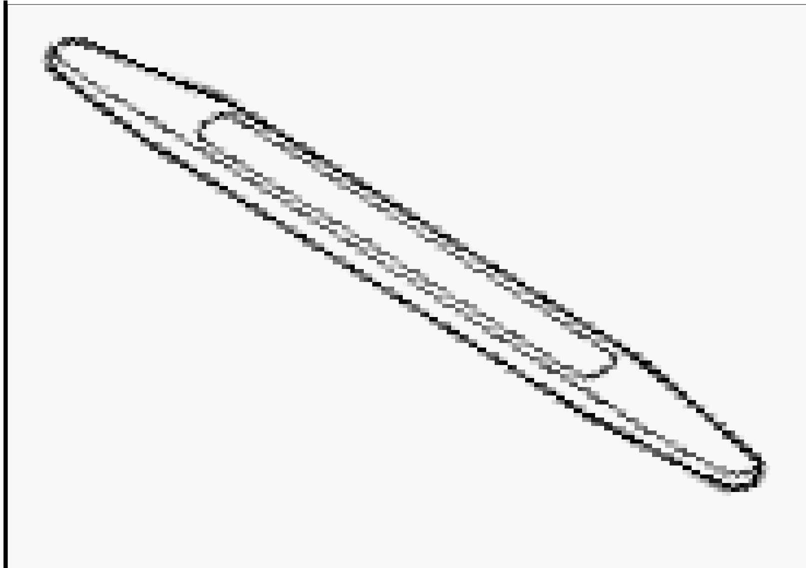
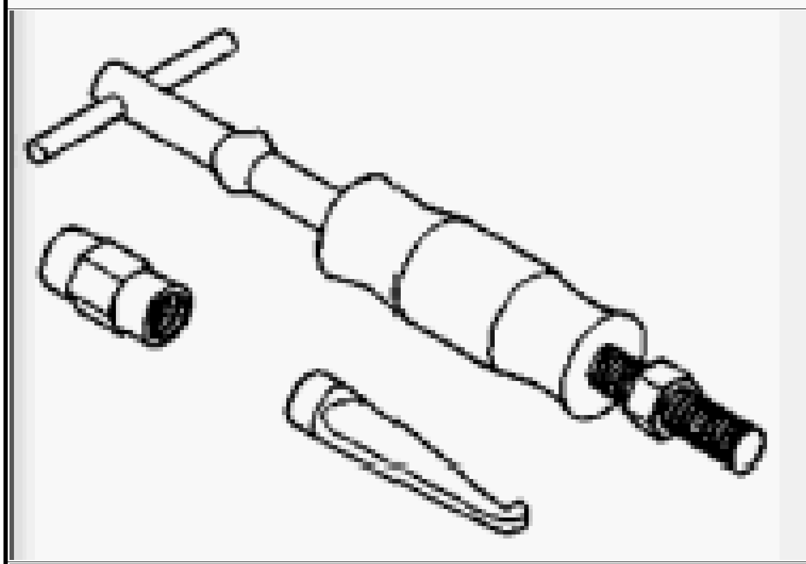
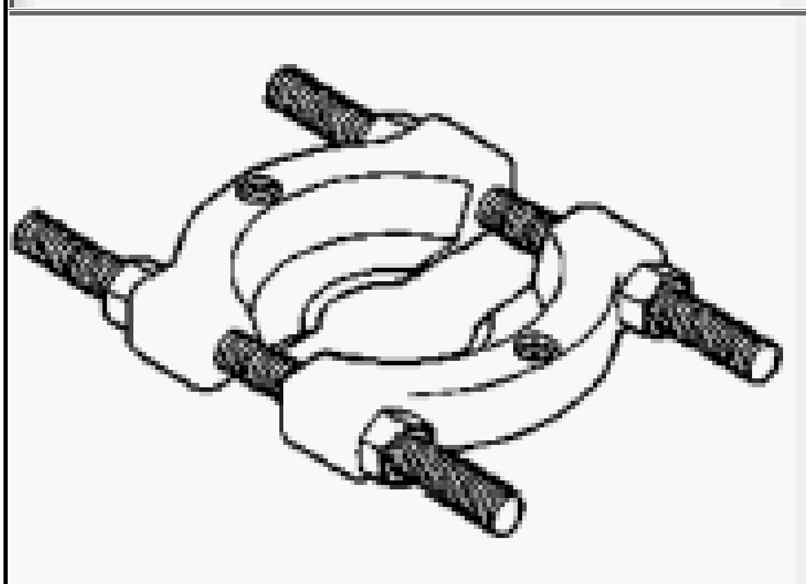
	9385 - Holding Fixture, Bench Mount (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9387 - Fixture, Transmission Holding (Originally Shipped In Kit Number(s) 10017, 10017A.)

	9391 - Installer, Gear (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9391-2 - Adapter, Coupling (Originally Shipped In Kit Number(s) 10017, 10017A.)

	9392 - Installer, Bearing Cup (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9394 - Installer, Bearing (Originally Shipped In Kit Number(s) 10017, 10017A.)

	9609 - Remover, Bearing (Originally Shipped In Kit Number(s) 9691.)
	C-293-47 - Block Set, Puller (Originally Shipped In Kit Number(s) 9975, C-293-M, DD-914-CLT-L.)
	C-293-PA - Puller, Press (Originally Shipped In Kit Number(s) 8418, 8837, C-293-M.)

	C-3281 - Holder, Flange (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)
	C-3752 - Slide Hammers (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202-CAN, 9202CC.)
	C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)

	C-4755 - Trim Stick (Originally Shipped In Kit Number(s) 9299, 9299CC, 9299CC, 9300A-CAN.)
	C-637 - Slide Hammer, Universal (Originally Shipped In Kit Number(s) 9202.)
	P-334 - Splitter, Bearing

INPUT SHAFT, TRANSMISSION

REMOVAL

REMOVAL

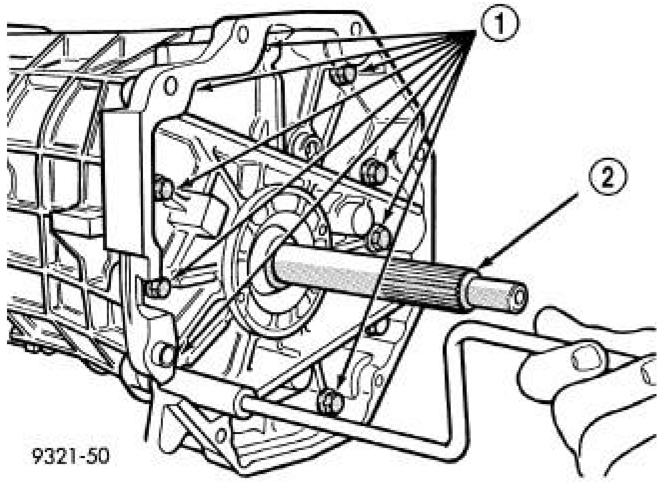


Fig. 233: Front Adapter Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If input shaft is damaged behind the seal, the transmission must be disassembled and inspected.**

1. Measure output shaft end play and record number.
2. Remove clutch slave cylinder from transmission adapter plate.
3. Remove front adapter plate bolts (1).

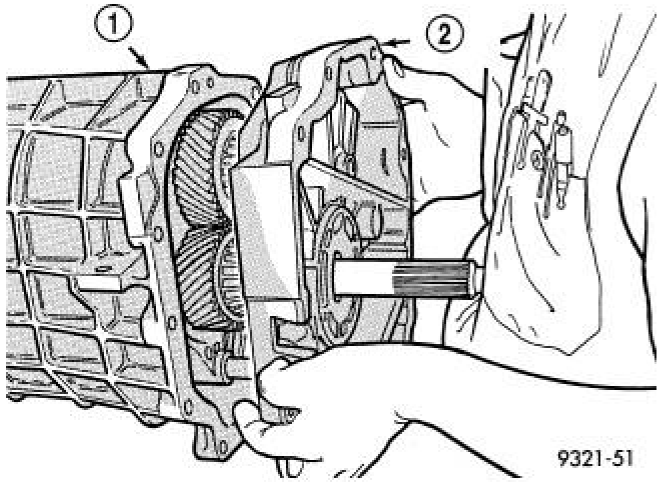


Fig. 234: Slide Off Adapter
Courtesy of CHRYSLER GROUP, LLC

4. Pry front cover adapter loose.
5. Hold input shaft while removing adapter (2).
6. Remove input shaft seal from adapter with a seal puller.
7. Clean and inspect all sealing surfaces for wear or damage.

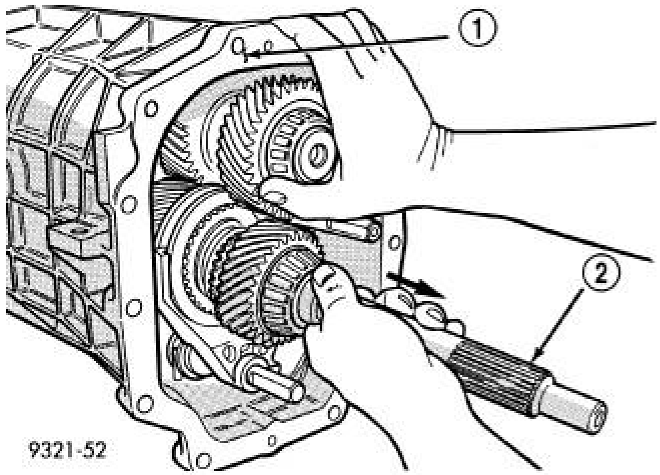


Fig. 235: Remove Input Shaft
Courtesy of CHRYSLER GROUP, LLC

8. Lift countershaft slightly and remove input shaft (2) from transmission (1).

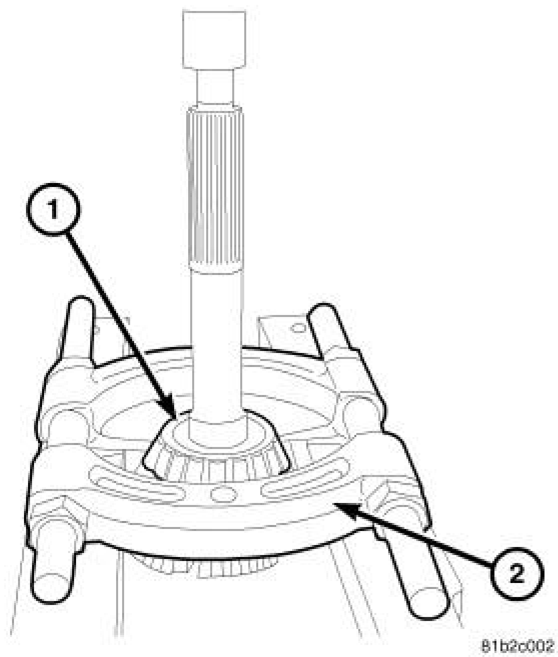


Fig. 236: Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

9. Remove input shaft bearing (1) with Splitter (special tool #1130, Splitter, Bearing/Gear) (2) and a press.

INSTALLATION

INSTALLATION

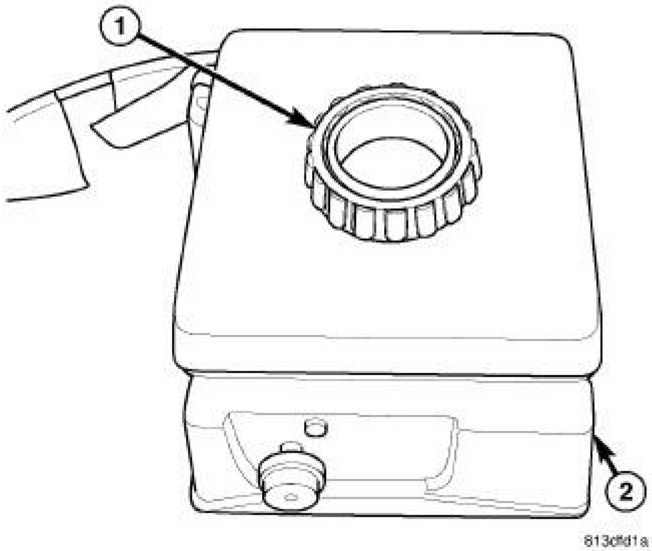


Fig. 237: Identifying Bearing Heater And Bearing
Courtesy of CHRYSLER GROUP, LLC

WARNING: Use tongs or welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.

CAUTION: Bearings (1) are installed using a Bearing Heater (2). Use only a bearing heater/hot plate and follow manufacture's instructions. Heat components to 100 - 149 Celsius (212Â° Min. - 300Â° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.

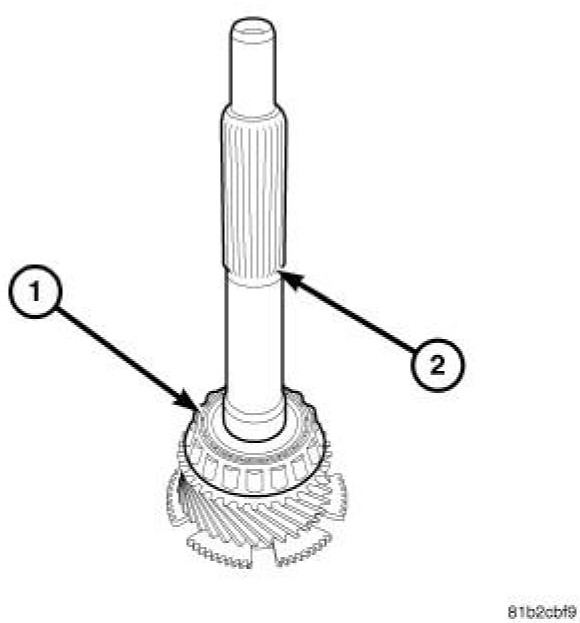


Fig. 238: Input Shaft Bearing

Courtesy of CHRYSLER GROUP, LLC

1. Heat input shaft bearing to 100 - 149 Celsius (212Â° Min. - 300Â° Max Fahrenheit). Install bearing (1) on input shaft (2) with tongs or welding gloves.
2. Install new bearing cup in front adapter with original shim behind cup.
3. Clean sealing surfaces of the transmission case and adapter plate.
4. Install input shaft and adapter plate.
5. Check output shaft end play and adjust shim to achieve the original reading.

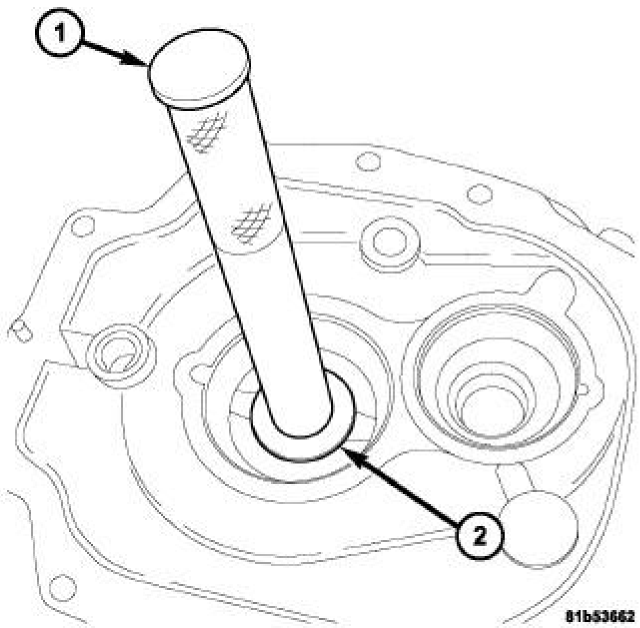


Fig. 239: Input Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

6. Remove adapter plate and install a new input shaft seal with Handle (special tool #C-4171, Driver Handle, Universal) and Installer (special tool #9366, Installer, Seal).
7. Apply Mopar Â® ATF-RTV to the cleaned sealing surfaces.
8. Install adapter and tighten bolts to 34 N.m (25 ft. lbs.).

LEVER, SHIFT

REMOVAL

SHIFT LEVER

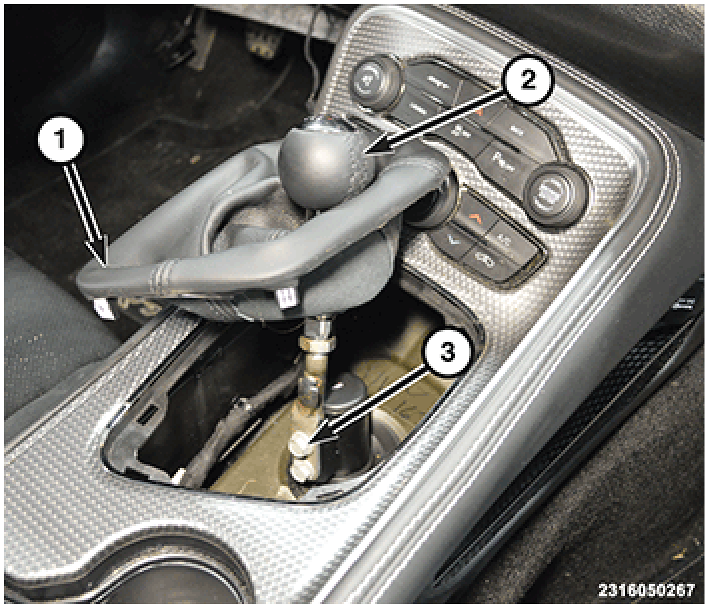


Fig. 240: Shifter Boot, Shift Lever & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent, separate the shift lever boot (1) from the floor console.
2. Remove the shift lever bolts (3) and the shift lever (2).

INSTALLATION

SHIFT LEVER

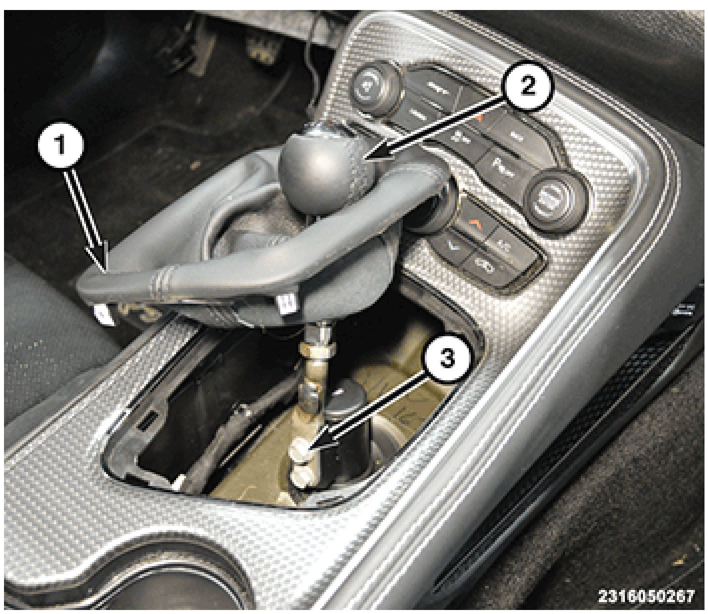


Fig. 241: Shifter Boot, Shift Lever & Bolts
Courtesy of CHRYSLER GROUP, LLC

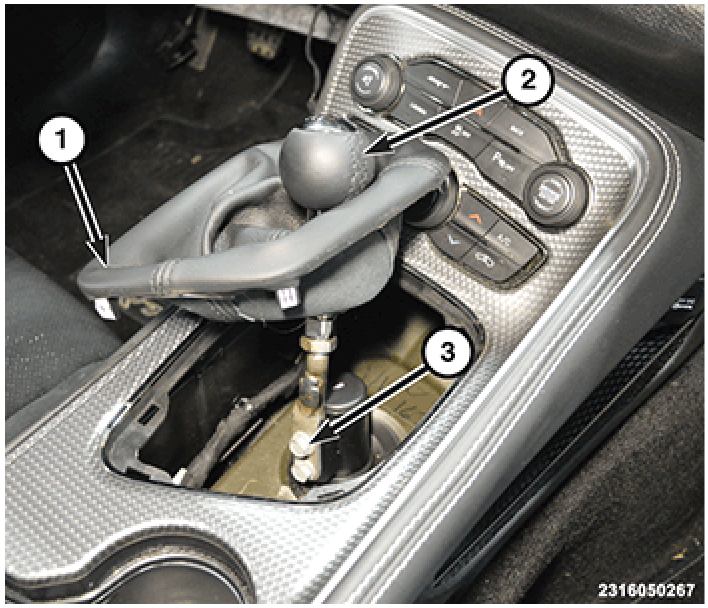
1. Install the shift lever (2) and the shift lever bolts (3) on the shifter assembly and tighten to the proper SPECIFICATIONS .
2. Install the shift lever boot (1).

MECHANISM, GEARSHIFT

REMOVAL

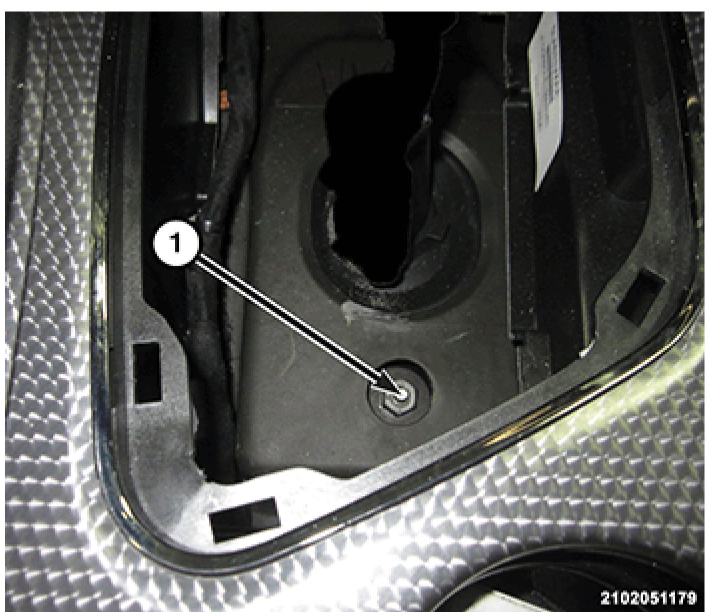
GEARSHIFT MECHANISM

1. Disconnect and isolate the negative battery cable.
2. Place transmission shifter in neutral.



[Fig. 242: Shifter Boot, Shift Lever & Bolts]
Courtesy of CHRYSLER GROUP, LLC

3. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent, separate the shift lever boot (1) from the floor console.
4. Remove the shift lever bolts (3) and the shift lever (2).



[Fig. 243: Shift Linkage To Closure Panel Nut]

Courtesy of CHRYSLER GROUP, LLC

5. Remove the nut (1) holding the shift linkage to the closure panel.
6. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
7. Remove the exhaust system. Refer to **MUFFLER, EXHAUST, REMOVAL** .
8. Remove the drive shaft. Refer to **REMOVAL** .

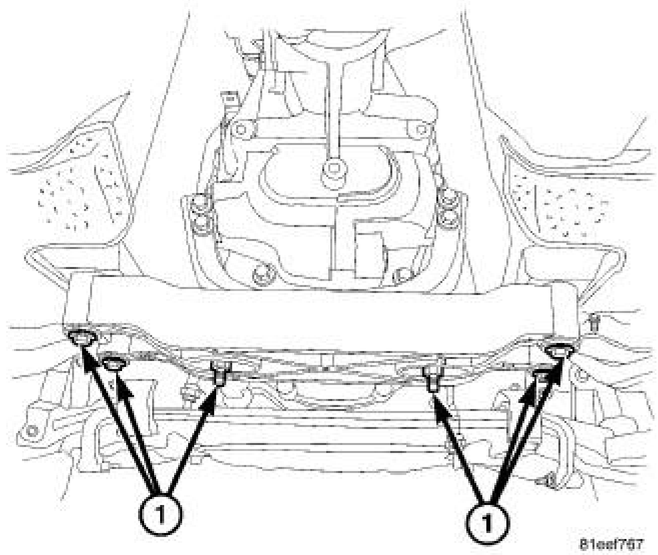


Fig. 244: Crossmember And Isolator Lower Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Raise transmission slightly with suitable jack or high stand to relieve load on crossmember mount.
10. Remove the crossmember bolts (1) and remove the crossmember.
11. Lower the transmission enough to gain access to the shift linkage.

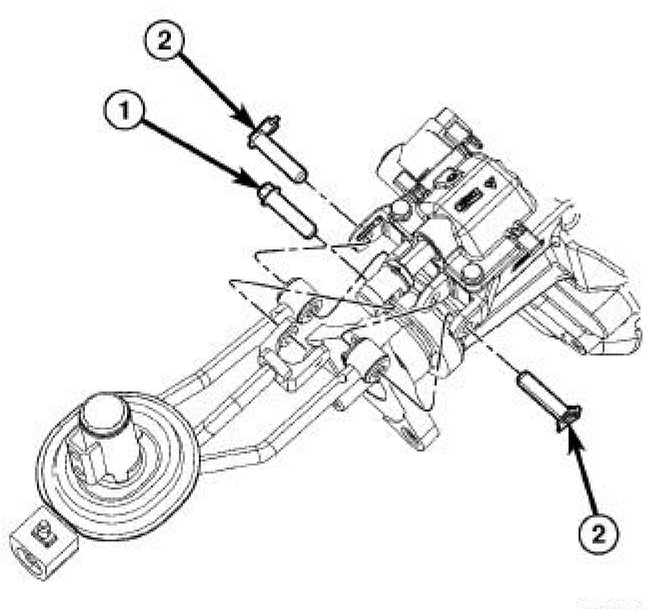


Fig. 245: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

12. Remove the bolt (1) holding the shift linkage to the transmission shift rail.

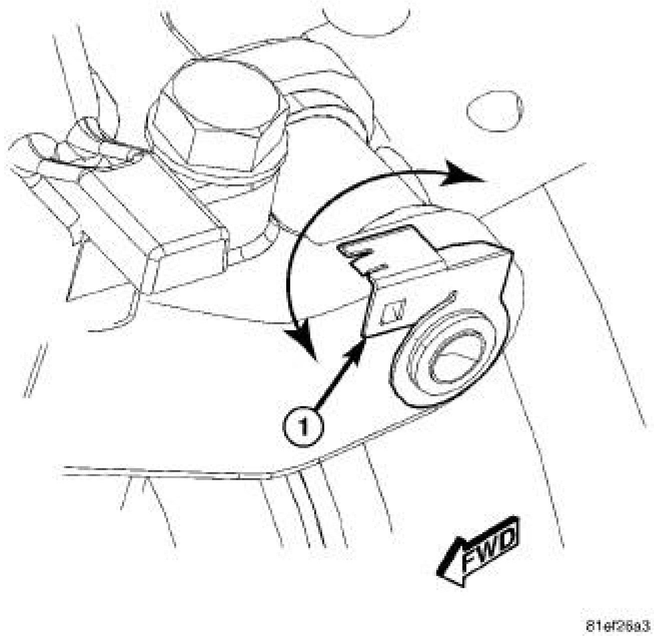


Fig. 246: Shifter Roll Pin Rotation
Courtesy of CHRYSLER GROUP, LLC

13. Rotate each of the locking tabs (1) to disengage them from the roll pins.

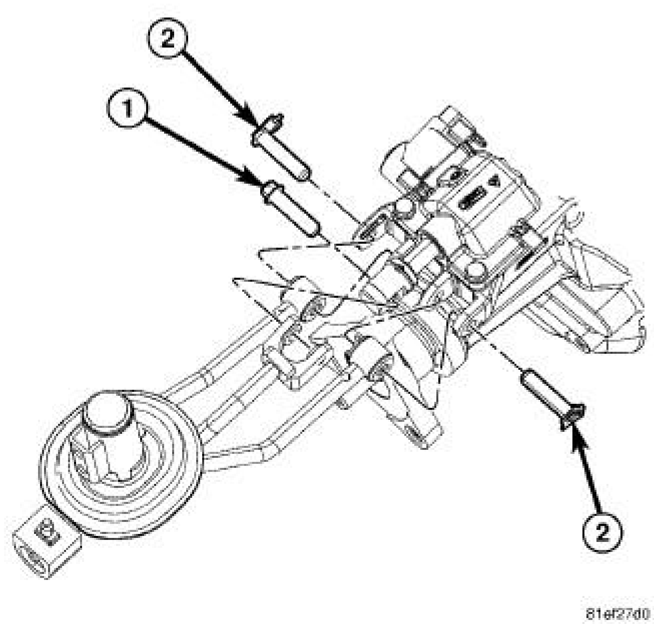


Fig. 247: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

14. Remove the roll pins (2) holding the shift linkage to the transmission.
15. Remove the shift linkage from the vehicle.

INSTALLATION

GEARSHIFT MECHANISM

1. Place the shift linkage in position on the vehicle.

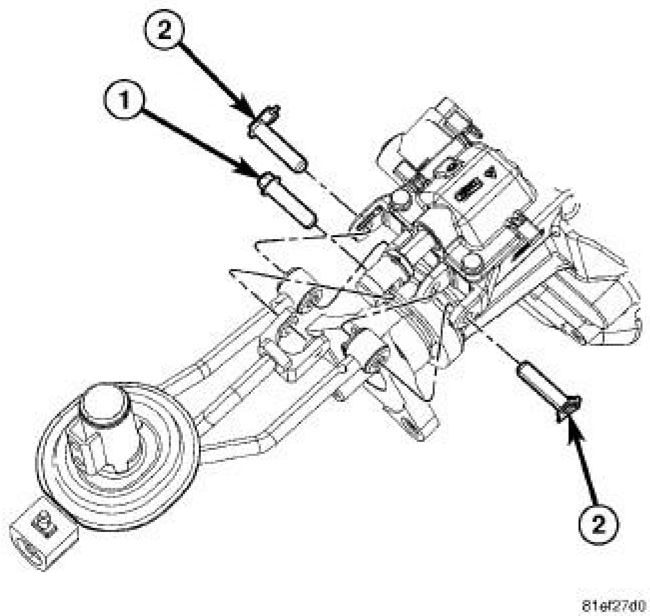


Fig. 248: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

2. Install the roll pins (2) to hold the shift linkage to the transmission.

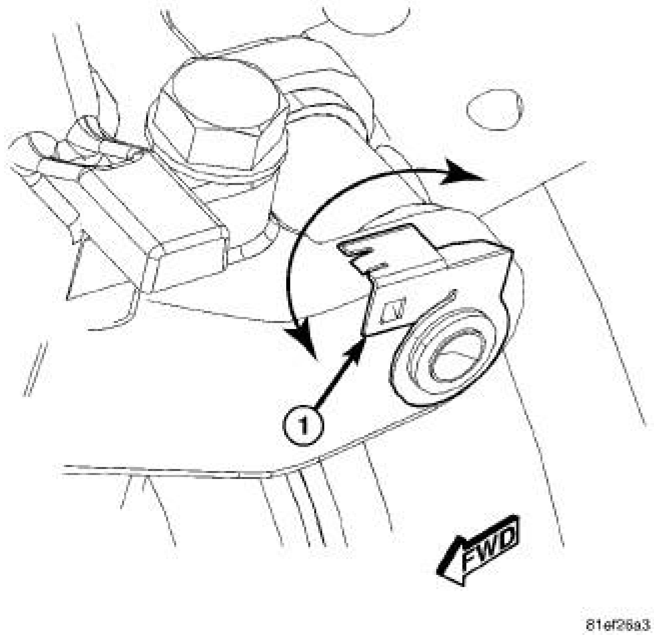


Fig. 249: Shifter Roll Pin Rotation
Courtesy of CHRYSLER GROUP, LLC

3. Install and rotate the locking tabs (1) to engage them onto the roll pins.

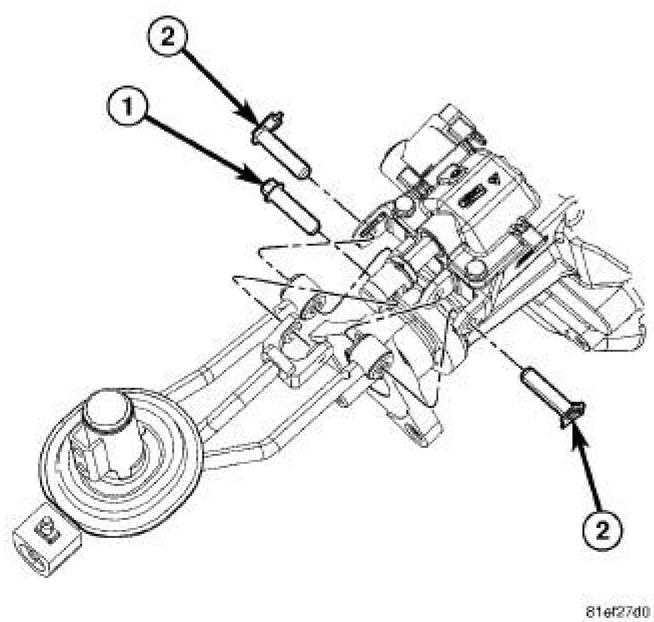


Fig. 250: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

4. Install the shift linkage bolt (1) and tighten to the proper **SPECIFICATIONS** .

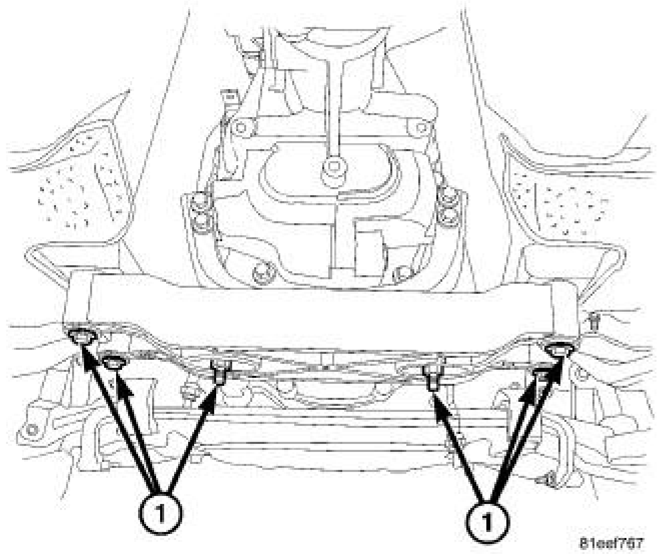


Fig. 251: Crossmember And Isolator Lower Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

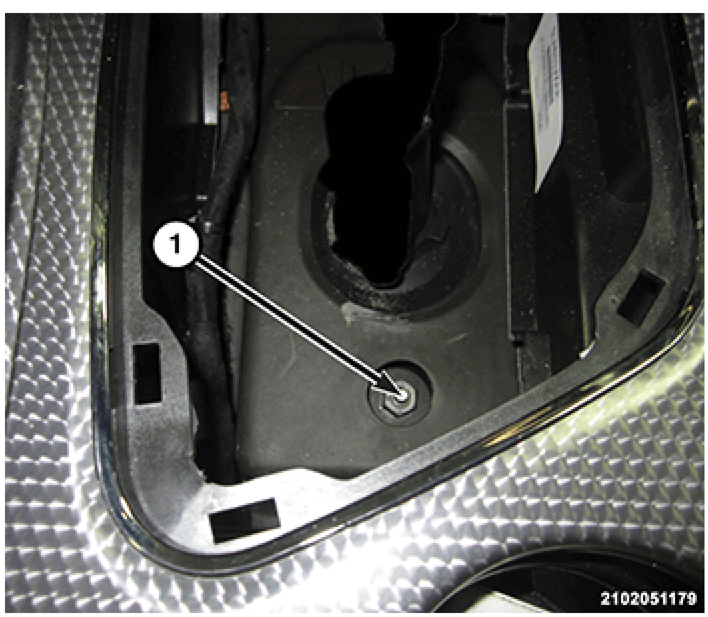
5. Lift the transmission enough to gain clearance for the crossmember.
6. Place the crossmember in position under the vehicle.
7. Install the crossmember, the crossmember bolts (1) and tighten to the proper **SPECIFICATIONS** .

   .

8. Install the drive shaft. Refer to **INSTALLATION** .

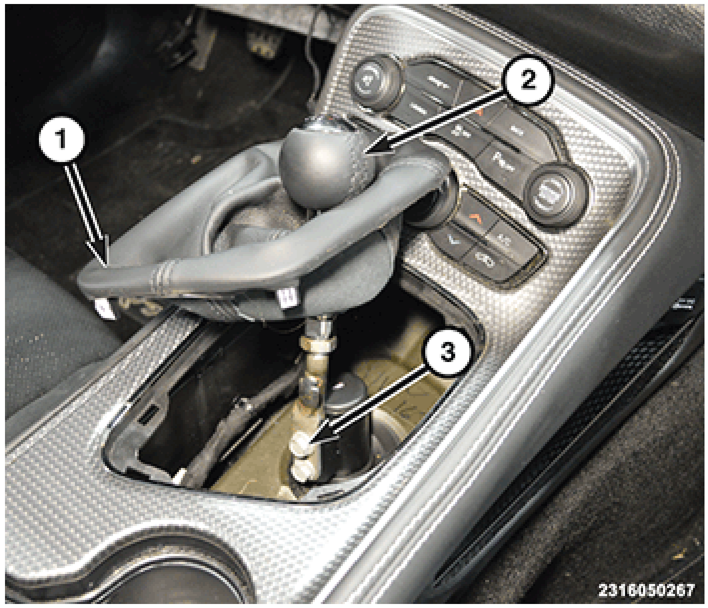
   .

9. Install the exhaust system. Refer to **MUFFLER, EXHAUST, INSTALLATION** .
10. Lower the vehicle.



[Fig. 252: Shift Linkage To Closure Panel Nut]
Courtesy of CHRYSLER GROUP, LLC

11. Install the nut (2) to holding the shift linkage to the closure panel.



[Fig. 253: Shifter Boot, Shift Lever & Bolts]
Courtesy of CHRYSLER GROUP, LLC

12. Install the shift lever (2) and the shift lever bolts (3) on the shifter assembly and tighten to the proper **SPECIFICATIONS** .
13. Install the shift lever boot (1).
14. Connect the negative battery cable.
15. Road test the vehicle to verify proper operation.

SEAL, EXTENSION HOUSING

REMOVAL

EXTENSION HOUSING SEAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the drive shaft. Refer to **REMOVAL** .

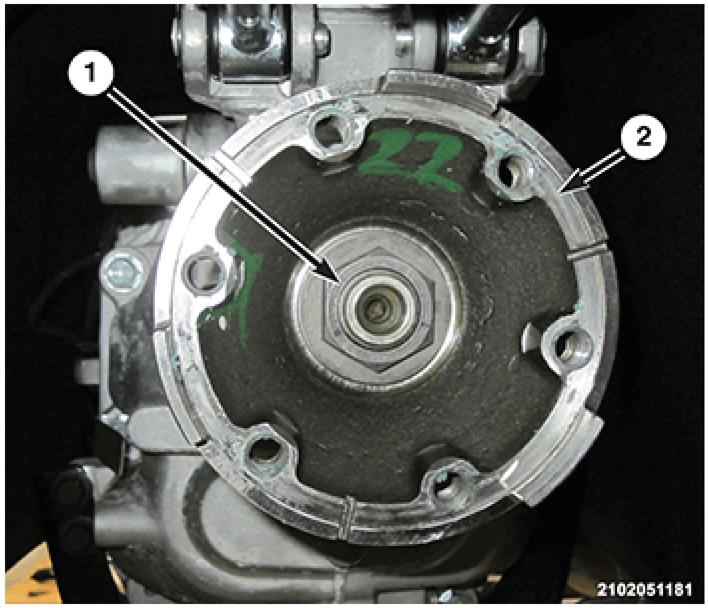


Fig. 254: Output Flange & Locknut
Courtesy of CHRYSLER GROUP, LLC

3. Hold the output flange (2) with Special Tool (special tool #C-3281, Holder, Flange) Flange Wrench while removing the output flange locknut (1).
4. Remove the output flange (2).
5. Remove the extension housing seal.
6. Clean and inspect extension housing seal location.

INSTALLATION

OUTPUT SHAFT SEAL

1. Install extension housing seal into extension housing (1) with Installer (special tool #7884, Installer, Seal) (2).
2. Install the extension housing seal in the extension housing (1) with Installer (special tool #7884, Installer, Seal) (2).

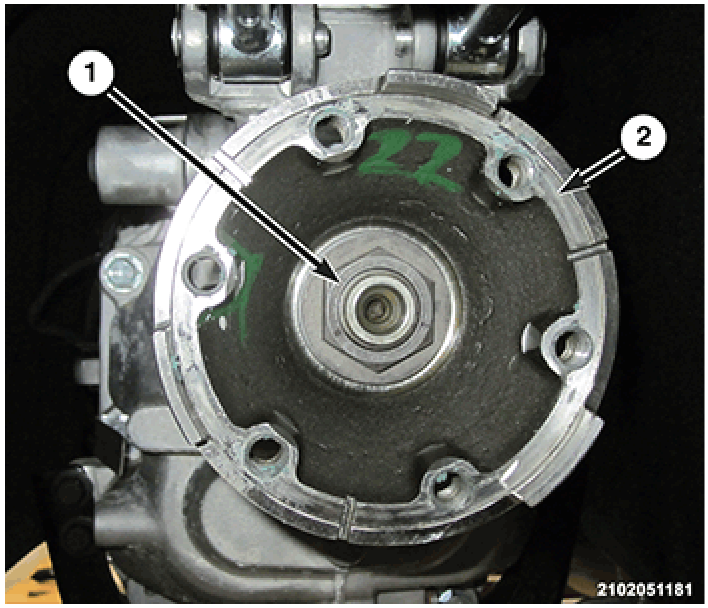


Fig. 255: Output Flange & Locknut
Courtesy of CHRYSLER GROUP, LLC

3. Install the output flange (2) to the transmission output shaft.
4. Hold the output flange (2) with Special Tool (special tool #C-3281, Holder, Flange) (2) Flange Wrench and tighten the output flange locknut (1) to the proper **SPECIFICATIONS** .
5. Install the drive shaft. Refer to **INSTALLATION** .
6. Check transmission fluid level and fill as necessary. Refer to **STANDARD PROCEDURE** .

SOLENOID, TRANSMISSION SKIP SHIFT

DESCRIPTION

DESCRIPTION

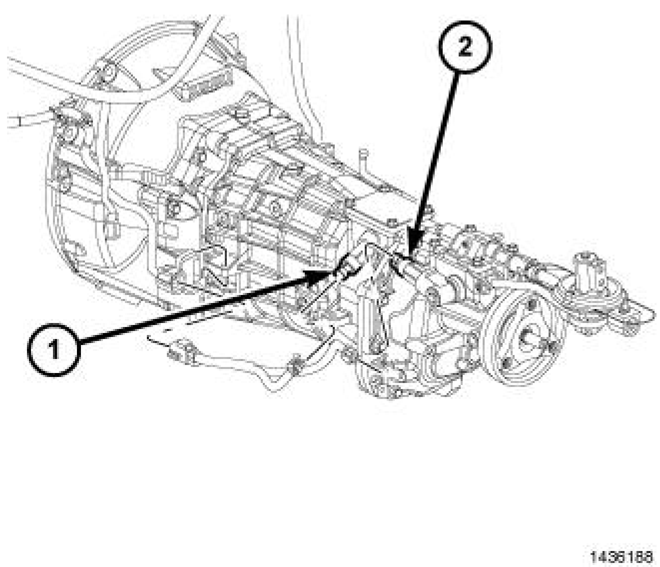


Fig. 256: Skip Shift & Reverse Lockout Solenoids
Courtesy of CHRYSLER GROUP, LLC

The skip shift solenoid (1) prevents the operator from shifting into second or third gear during part throttle operation. The solenoid is threaded into the left side of the transmission case.

OPERATION

OPERATION

The Powertrain Control Module (PCM) controls the skip shift solenoid, locking out second and third gear when all of the following conditions are met:

- Engine coolant exceeds 41Â°C (106Â°F)
- Vehicle speed is between 19 and 20 MPH
- The PCM verified first gear speed/RPM
- Throttle Position Sensor (TPS) signal is less than 0.68 volt above closed throttle (23 percent throttle opening)

The solenoid resets when vehicle speed drops below 3 MPH.

SOLENOID, TRANSMISSION, REVERSE LOCKOUT

DESCRIPTION

DESCRIPTION

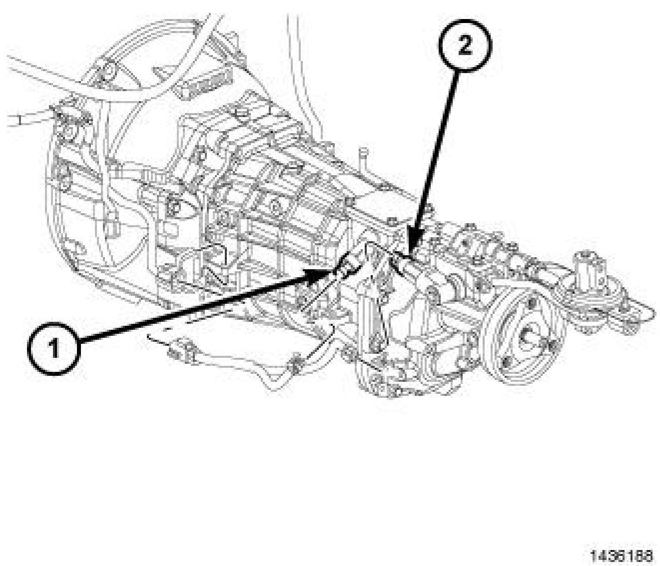


Fig. 257: Skip Shift & Reverse Lockout Solenoids
Courtesy of CHRYSLER GROUP, LLC

The reverse inhibitor solenoid (2) helps the operator to avoid shifting into reverse when the vehicle speed is greater than 3 mph. The solenoid is mounted to the left/rear side of the transmission with a bolt.

OPERATION

OPERATION

If the vehicle speed is less than 3 mph, the PCM sends a ground to energize the solenoid, which provides a low

spring load to the shift knob at the reverse gate and allows shifting the transmission into reverse. If the vehicle speed is greater than 3 mph, the solenoid is deactivated, which provides a high spring load to the shift knob at the reverse gate to help prevent shifting the transmission into reverse.

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Article GUID: A00735952

CENTER, ELECTRONIC VEHICLE INFORMATION

DESCRIPTION

DESCRIPTION

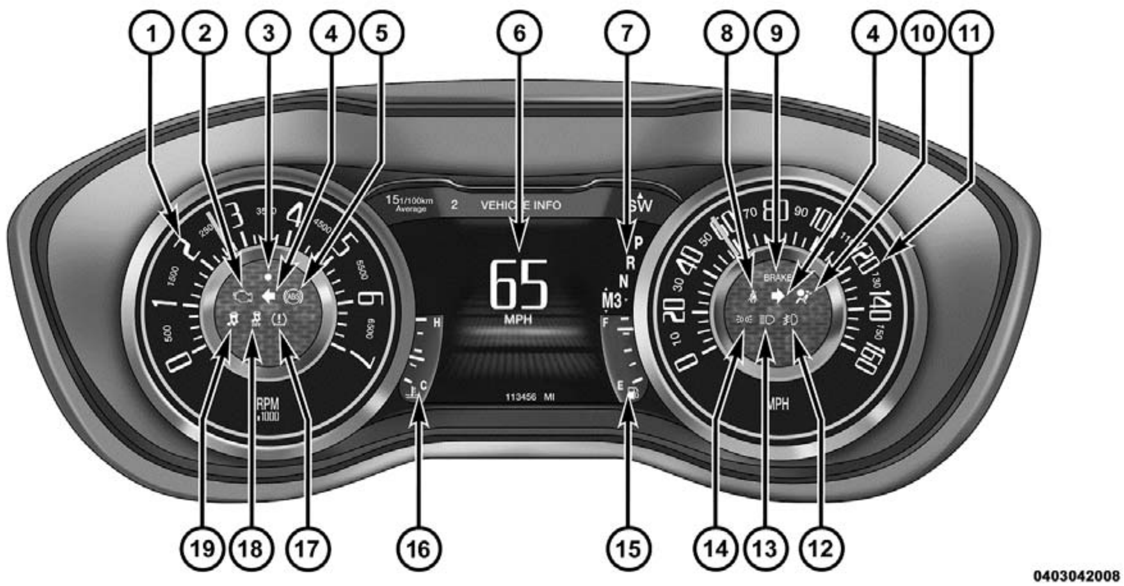


Fig. 1: Electronic Vehicle Information Center (EVIC)
Courtesy of CHRYSLER GROUP, LLC

The Electronic Vehicle Information Center (EVIC) system provides the vehicle operator with a convenient access to a wealth of useful information. This includes information that assists the operator in properly operating and maintaining the vehicle, cautions and warnings that improve the safety of the vehicle and its occupants, and information concerning environmental variables outside of the vehicle. The EVIC also provides an interface from which the vehicle operator can view and select from several programmable electronic feature options to customize those features to his or her particular preferences.

The EVIC system includes the following major components, which are described in further detail elsewhere in this service information:

- **EVIC Display** - A reconfigurable, multicolor, Thin Film Transistor (TFT) display unit is located between the speedometer and the tachometer and is integral to the Instrument Cluster (IC). Refer to DESCRIPTION .
- **EVIC Switches** - An EVIC switch pod containing momentary switch push buttons is located in the left horizontal spoke of the steering wheel.
- Controller Area Network (CAN) Data Bus

These EVIC components communicate with each other and with other systems and components throughout the vehicle using a combination of hard wired and the Controller Area Network (CAN) data bus. Refer to

COMMUNICATION, DESCRIPTION .

Hard wired circuitry connects the EVIC system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the EVIC system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

The Electronic Vehicle Information Center (EVIC) uses both non-switched and ignition switched sources of battery current so that some of its features remain operational at any time, while others may only operate with the ignition switch placed in the ON position.

Most EVIC messages automatically pop up and display when conditions warrant. The EVIC will display some message types until the condition that caused the message is corrected. Certain other message types will be automatically stored by the EVIC for later retrieval. When conditions warrant that multiple messages be displayed in the EVIC Thin Film Transistor (TFT) display at the same time, the EVIC uses arbiter programming to sort and prioritize the cycle sequence and duration of each message to be displayed.

Optional function and feature menus can be navigated, selected and displayed using the EVIC switch pod in the left horizontal spoke of the steering wheel. When the ignition switch is placed in the ON position, the EVIC display will return to the last main menu, sub menu or function being displayed before the ignition was placed in the OFF position.

Displays warnings and user interaction messages. Initial warnings will be displayed accompanied by a series of audible beeps. Critical text warnings will be displayed until the failure is corrected. Non-critical text warnings will be displayed for 60 seconds. The driver can scroll to view multiple messages by using the menu buttons.

When the appropriate conditions exist, the EVIC displays the following messages.

SYSTEM STATUS

- Autostick Unavailable Service Required
- Automatic Unavailable Use Autostick Service Req.
- Brake Fluid Low
- Battery Voltage Low
- Cruise Off
- Cruise Ready
- Cruise Set To XXX KM/H
- Cruise Set To XXX MPH
- Doors Open
- Driver Seatbelt Unbuckled

- Engage Park Brake to Prevent Rolling
- Engine Temperature Hot
- Front Seatbelts Unbuckled
- Fuel Low
- Gear Not Available
- Key in Ignition
- Key in Ignition Lights On
- Left Turn Signal Light Out
- Lights On
- Oil Change Due
- Oil Pressure Low
- Parking Brake Engaged
- Passenger Seatbelt Unbuckled
- Remote Start Aborted Door Open
- Remote Start Aborted Fuel Low
- Remote Start Aborted Hood Open
- Remote Start Active Key to Run
- Remote Start Aborted Trunk Open
- Remote Start Aborted Time Expired
- Remote Start Aborted Too Cold
- Remote Start Active Push Start Button
- Remote Start Disabled Start to Reset
- Right Turn Signal Light Out
- Service Antilock Brake System
- Service Airbag System
- Service Airbag Warning Light
- Service Electronic Braking System
- Service Electronic Throttle Control
- Shift Not Allowed
- Service Power Steering
- Service Shifter
- Service Tire Pressure System
- Service Transmission
- Shift to Neutral then Drive or Reverse
- Tire Pressure Screen With Low Tire(s) "Inflate Tire to XX"
- Traction Control Off
- Transmission Cool Ready to Drive
- Transmission Getting Hot Press Brake

- Transmission Too cold Idle with Engine On
- Trans. Hot Stop Safely Shift to Park Wait to Cool
- Turn Signal On
- Vehicle Not in Park
- Washer Fluid Low

DISPLAY INFORMATION

Menu Items consists of the following:

- Speedometer
- Vehicle Info
- Performance - If Equipped
- Driver Assist - If Equipped
- Fuel Economy
- Trip
- Audio
- Messages
- Screen Setup
- Diagnostics - If Equipped

The system allows the driver to select information by pressing the steering wheel mounted buttons.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - ELECTRONIC VEHICLE INFORMATION CENTER

The Electronic Vehicle Information Center (EVIC) data is obtained from several components on the Controller Area Network (CAN) Data Bus circuit. The EVIC will not function properly if the bus messages from any of these components is not received. If no EVIC data is displayed, check the CAN Data Bus circuit communications, the Instrument Cluster (IC) functions and the Body Control Module (BCM).

The use of a scan tool and the proper diagnostic procedures information are recommended for further testing of the EVIC and the CAN Data Bus circuit. Refer to the appropriate wiring information for complete circuit schematic or connector pin-out information.

STANDARD PROCEDURE

ENGINE OIL LIFE RESET

Vehicles Equipped With Keyless Enter-N-Go™

1. Without pressing the brake pedal, press the ENGINE START/STOP button and place the ignition to the ON/RUN position (do not start the engine.)
2. Fully depress the accelerator pedal, slowly, three times within 10 seconds.
3. Without pressing the brake pedal, press the ENGINE START/STOP button once to return the ignition to the OFF/LOCK position.

Secondary Method Of Navigating To The Oil Life Screen

Use the steering wheel controls for the following procedure(s):

1. Without pushing the brake pedal, cycle the ignition to the **ON/RUN** position (do not start the engine.)
2. Push and release the **DOWN** arrow button to scroll downward through the main menu to**" Vehicle Info** ".
3. Push and release the **RIGHT** arrow button to access the **"Oil Life"** screen.
4. Push and hold the **OK** button for one second to access the **" Oil Life Reset"** screen.
5. Push and release the **DOWN** arrow button to select**" Yes"** , then push and release the **OK** button to select reset of the Oil Life.
6. Push and release the **Up** arrow button to exit the screen.

MODULE, COMPASS

DESCRIPTION

DESCRIPTION

The compass module is an integrated part of the Combined Rear View Mirror module. Refer to MODULE, COMBINED REAR VIEW MIRROR, DESCRIPTION .

Refer to the Owners Manual for Compass Variance Adjustment and Manual Compass Calibration.

SENSOR, AMBIENT TEMPERATURE

DESCRIPTION

DESCRIPTION

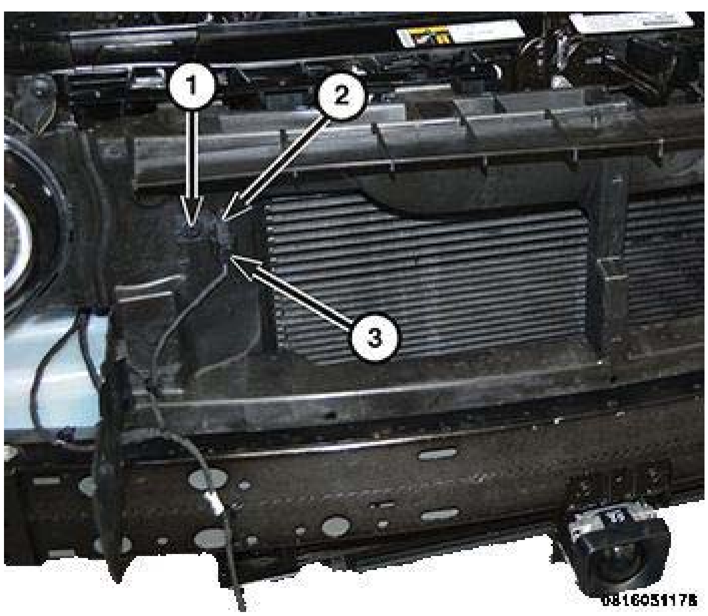


Fig. 2: Ambient Air Temperature Sensor, Wire Harness Connector & Retainer
Courtesy of CHRYSLER GROUP, LLC

The ambient air temperature sensor (2) is a variable resistor that monitors the air temperature outside of the

vehicle. The Automatic Temperature Control (ATC) heating and A/C system uses the ambient air temperature sensor data to help maintain optimum passenger compartment temperature levels. The ambient air temperature sensor is mounted behind the front fascia.

OPERATION

OPERATION

The ambient air temperature sensor is a variable resistor that operates on a 5 volt Direct Current (DC) reference signal sent by the Body Control Module (BCM). The ambient air temperature sensor is connected to the BCM through a two-wire lead and connector of the vehicle wire harness. The ambient air temperature sensor changes its internal resistance in response to changes in the outside air temperature, which either increases or decreases the reference signal voltage read by the BCM. The BCM converts and broadcasts the sensor data over the Controller Area Network (CAN) data bus, where it is read by the A/C-heater control, Powertrain Control Module (PCM) and other vehicle control modules.

NOTE: **To get the most accurate ambient temperature readings, the vehicle should be driven.**

The ambient air temperature sensor is diagnosed using a scan tool. Refer to **DIAGNOSIS AND TESTING** .

The ambient air temperature sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged. Refer to **SENSOR, AMBIENT TEMPERATURE, REMOVAL**.

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .

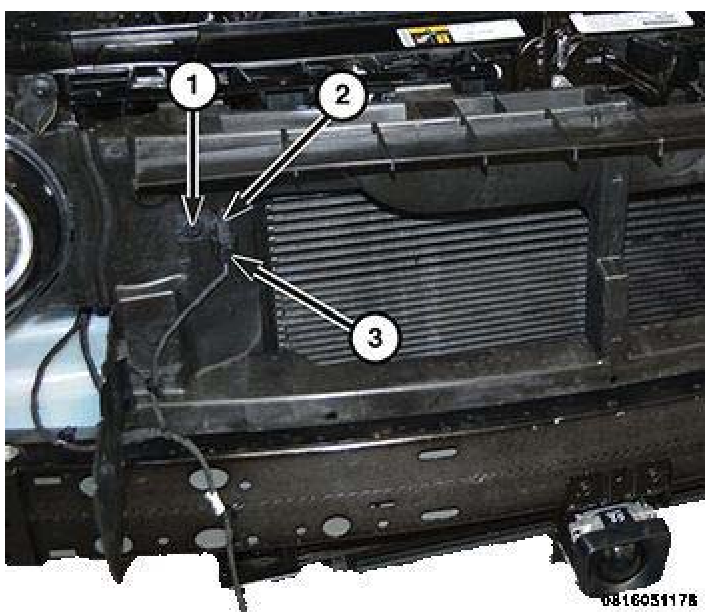


Fig. 3: Ambient Air Temperature Sensor, Wire Harness Connector & Retainer
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the wire harness connector (3) from the ambient temperature sensor (2).
4. Remove the push pin retainer (1) that secures the ambient temperature sensor.

INSTALLATION

INSTALLATION

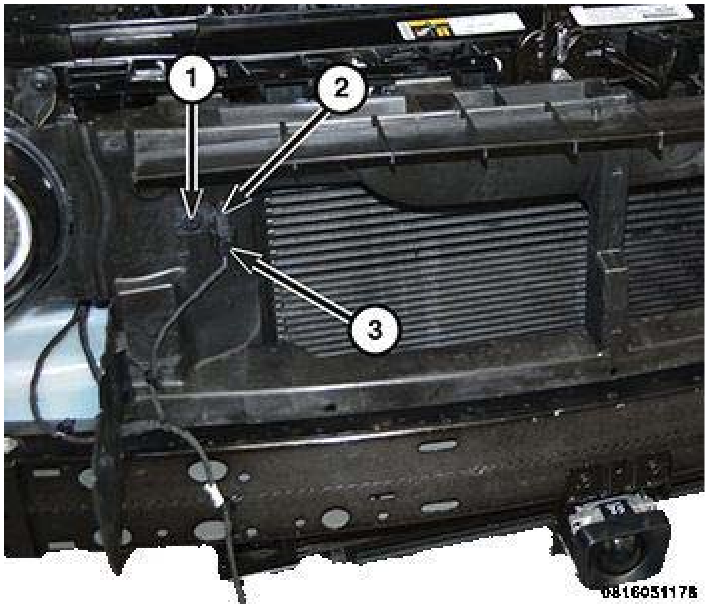


Fig. 4: Ambient Air Temperature Sensor, Wire Harness Connector & Retainer
Courtesy of CHRYSLER GROUP, LLC

1. Position the ambient temperature sensor (2) in the vehicle and install the push pin retainer (1).
2. Connect the wire harness connector (3) to the ambient temperature sensor (2).
3. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
4. Connect the battery negative cable.

SWITCH, EVIC CONTROL

DESCRIPTION

DESCRIPTION

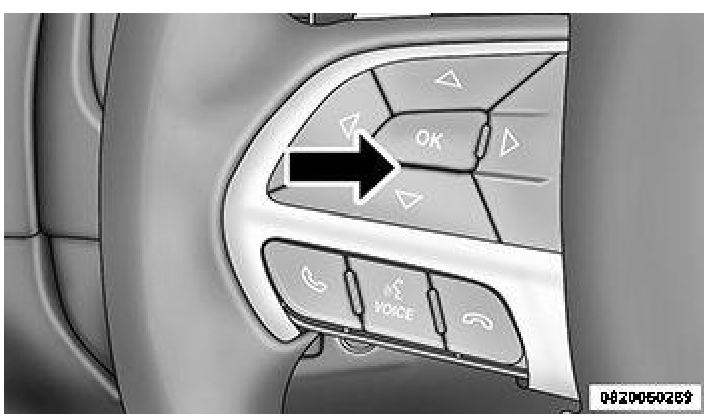


Fig. 5: EVIC Control Switch Pod

Courtesy of CHRYSLER GROUP, LLC

The Electronic Vehicle Information Center (EVIC) control switch pod is located in the left spoke of the steering wheel spoke bezel. This switch has up to eight push buttons. Five of the push buttons are used on all vehicles equipped with the EVIC. Three additional push buttons are found on vehicles equipped with the optional Uconnect™ Hands-Free Communication System. The only visible components of the switch pod are the switch push buttons and a decorative bezel around the push buttons, which stands slightly proud of the steering wheel spoke bezel. The remainder of the switch pod including its mounting provisions and its electrical connection are concealed beneath the spoke bezel.

The switch pod housing and push buttons are constructed of molded plastic. Each of the push buttons has white International Control and Display Symbol graphics or text applied to it, which clearly identify the function of each push button. The switch pod is secured through three integral mounting tabs to mounting bosses on the back of the spoke bezel by three screws. A connector receptacle integral to the inboard end of the switch pod housing connects the EVIC control switch pod to the vehicle electrical system through a dedicated take out and connector of the steering wheel wire harness.

The EVIC control switch pod cannot be adjusted or repaired. If any function of the switch is ineffective or damaged, the entire switch pod unit must be replaced.

OPERATION

OPERATION

The Electronic Vehicle Information Center (EVIC) control switch pod is Local Interface Network (LIN) unit that receives source current from and provides hard wired inputs to the LIN slave node circuitry of the LIN module. The LIN slave node circuitry communicates the switch states of the EVIC control switch pod, the remote radio switches, the horn switch and the heated steering wheel sensor (if equipped) over the LIN data bus to the LIN master node integral to the Steering Column Control Module (SCCM) microcontroller internal to the SCCM mounting housing located on the top of the steering column below the clockspring. The SCCM microcontroller is also a gateway to the Controller Area Network (CAN) data bus.

The EVIC control switch pod contains five push buttons whose functions are:

- **Down Arrow** - Pressing and releasing the Down Arrow push button allows the operator to scroll downward through the various EVIC main menus and sub menus.
- **Left Arrow** - Pressing and releasing the Left Arrow push button returns you to the previous sub menu or main menu.
- **OK** - Push the OK button to access/select the information screens or submenu screens of the Main Menu item. Push and hold the OK arrow button for one second to reset the displayed/selected features that can be reset.
- **Right Arrow** - Pressing and releasing the Right Arrow (Select) push button allows the operator to navigate, select and reset items or settings in the currently displayed EVIC main menu or sub menu. Pressing and holding the Right Arrow (Select) push button for two seconds provides a global reset of all of those EVIC features that can be reset, whether currently displayed or not.
- **Up Arrow** - Pressing and releasing the Up Arrow push button allows the operator to scroll upward through the various EVIC main menus and sub menus.

For vehicles equipped with the UconnectÂ® Hands-Free Communication System, the EVIC control switch pod

contains three additional switch push buttons whose functions are:

- **VR (Voice Recognition)** - This switch button activates the UconnectÂ® Voice Command system.
- **Phone Pick-Up** - This switch push button activates the UconnectÂ® Hands-Free Phone system.
- **Phone Hang-Up** - This switch push button disconnects the UconnectÂ® Hands-Free Phone system.

The LIN slave node circuitry of the LIN module or the cruise control switch pod provides current for all of the switches and sensors on the rotating steering wheel as well as for the Light Emitting Diode (LED) back lighting of both the cruise control and the EVIC control switch pods. The SCCM microcontroller continually monitors all of the hard wired speed control switch circuits as well as the LIN bus data. The SCCM will store a Signal Not Available (SNA) code for any LIN bus input errors. The SCCM also communicates with other electronic modules over the CAN data bus. Therefore, any SCCM DTC information can be retrieved using a diagnostic scan tool connected to the Data Link Connector (DLC).

The analog resistor multiplexed circuits of the EVIC control switch pod as well as the hard wired circuits between the switch pod and the speed control switch pod may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate Diagnostic & Testing article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the LIN slave or master nodes, the SCCM microcontroller or the electronic controls and communication between modules and other devices that provide some features of the EVIC system. The most reliable, efficient, and accurate means to diagnose the EVIC control switch pod, the LIN slave or master nodes, the SCCM microcontroller or the electronic controls and communication related to EVIC system operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

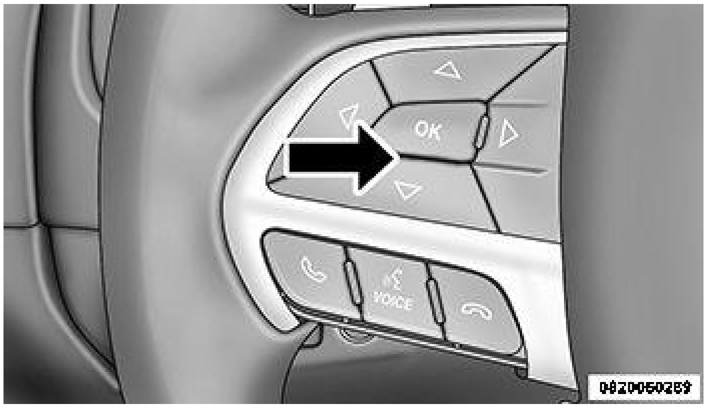


Fig. 6: EVIC Control Switch Pod
Courtesy of CHRYSLER GROUP, LLC

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative**

(ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.

Fig. 7: EVIC Switch Screw - Back Of Steering Wheel
Courtesy of CHRYSLER GROUP, LLC

2. Remove the remote radio switch, but leave the wire harness connected. Refer to **SWITCH, REMOTE RADIO, REMOVAL** .
3. From the back of the steering wheel, remove the screw (2) which secures the Electronic Vehicle Information Center (EVIC) switch to the steering wheel (1).

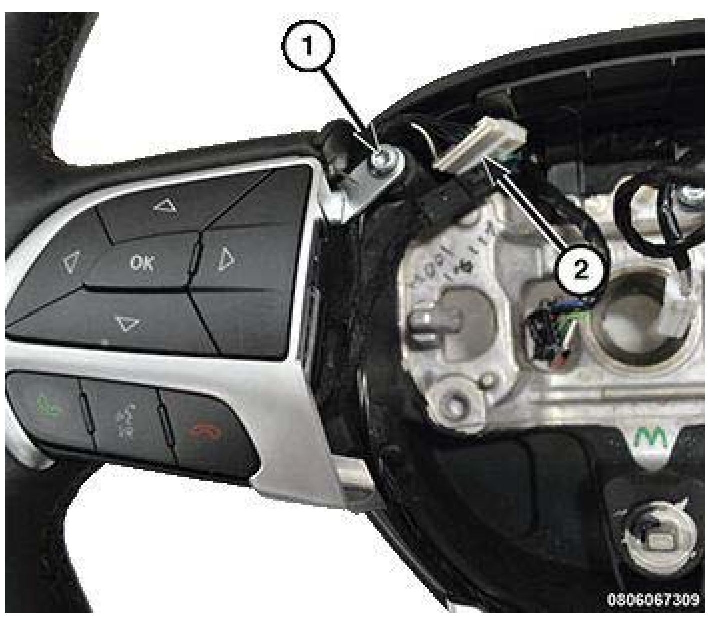


Fig. 8: EVIC Switch Screw & Connector
Courtesy of CHRYSLER GROUP, LLC

4. Remove the screw (1) from the front of the EVIC that secures it to the steering wheel.

NOTE: **Noting the position of the wire harnesses prior to removing the EVIC switch will help with assembly.**

5. Carefully pull the EVIC switch away from the steering wheel spoke. Disconnect the connector on the back of the switch from the steering wheel wire harness connector (2) and remove the switch.

INSTALLATION

INSTALLATION

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

Fig. 9: EVIC Switch Screw & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Connect the EVIC wire harness to the steering wheel wire harness connector (2).
2. Position the Electronic Vehicle Information Center (EVIC) switch and wire harnesses to the front of the steering wheel.
3. Install and securely tighten the screw (1) that secures the switch to the steering wheel.

Fig. 10: EVIC Switch Screw - Back Of Steering Wheel
Courtesy of CHRYSLER GROUP, LLC

4. From the back of the steering wheel, install the screw (2) for the EVIC switch.
5. Install the remote radio switch. Refer to **SWITCH, REMOTE RADIO, INSTALLATION** .
6. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

.

Article GUID: A00735932

2015-16 ACCESSORIES AND EQUIPMENT

Park Assist Module (PAM) (PTS/PAM) - Electrical Diagnostics - Dodge Challenger

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
B1295-12	PTS SENSOR 8-CIRCUIT SHORT TO BATTERY
B1295-14	PTS-SENSOR-8-CIRCUIT-SHORT-TO-GROUND OR OPEN
B1295-25	PTS SENSOR 8-SIGNAL SHAPE / WAVEFORM FAILURE
B1295-92	PTS SENSOR 8-PERFORMANCE OR INCORRECT OPERATION
B1296-12	PTS SENSOR 9-CIRCUIT SHORT TO BATTERY
B1296-14	PTS SENSOR 9-CIRCUIT SHORT TO GROUND OR OPEN
B1296-25	PTS SENSOR 9-SIGNAL SHAPE / WAVEFORM FAILURE
B1296-92	PTS SENSOR 9-PERFORMANCE OR INCORRECT OPERATION
B1297-12	PTS SENSOR 10-CIRCUIT SHORT TO BATTERY
B1297-14	PTS SENSOR 10-CIRCUIT SHORT TO GROUND OR OPEN
B1297-25	PTS SENSOR 10-SIGNAL SHAPE / WAVEFORM FAILURE
B1297-92	PTS SENSOR 10-PERFORMANCE OR INCORRECT OPERATION
B1298-12	PTS SENSOR 11-CIRCUIT SHORT TO BATTERY
B1298-14	PTS SENSOR 11-CIRCUIT SHORT TO GROUND OR OPEN
B1298-25	PTS SENSOR 11-SIGNAL SHAPE / WAVEFORM FAILURE
B1298-92	PTS SENSOR 11-PERFORMANCE OR INCORRECT OPERATION
B212B-11	REAR SENSORS POWER SUPPLY-CIRCUIT SHORT TO GROUND
B2199-16	BATTERY VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD
B2199-17	BATTERY VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD
B21DD-84	SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE
B21DD-85	SYSTEM VOLTAGE-SIGNAL ABOVE ALLOWABLE RANGE
B222A-00	VEHICLE LINE MISMATCH
B2232-00	(PTS) PARKTRONICS INTERNAL
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0101-00	LOST COMMUNICATION WITH TCM
U0121-00	LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0401-00	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402-00	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0415-00	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0422-00	IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE

..

DTC	Description
U0423-00	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN

DTC TROUBLESHOOTING

B1295-12-PTS SENSOR 8-CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

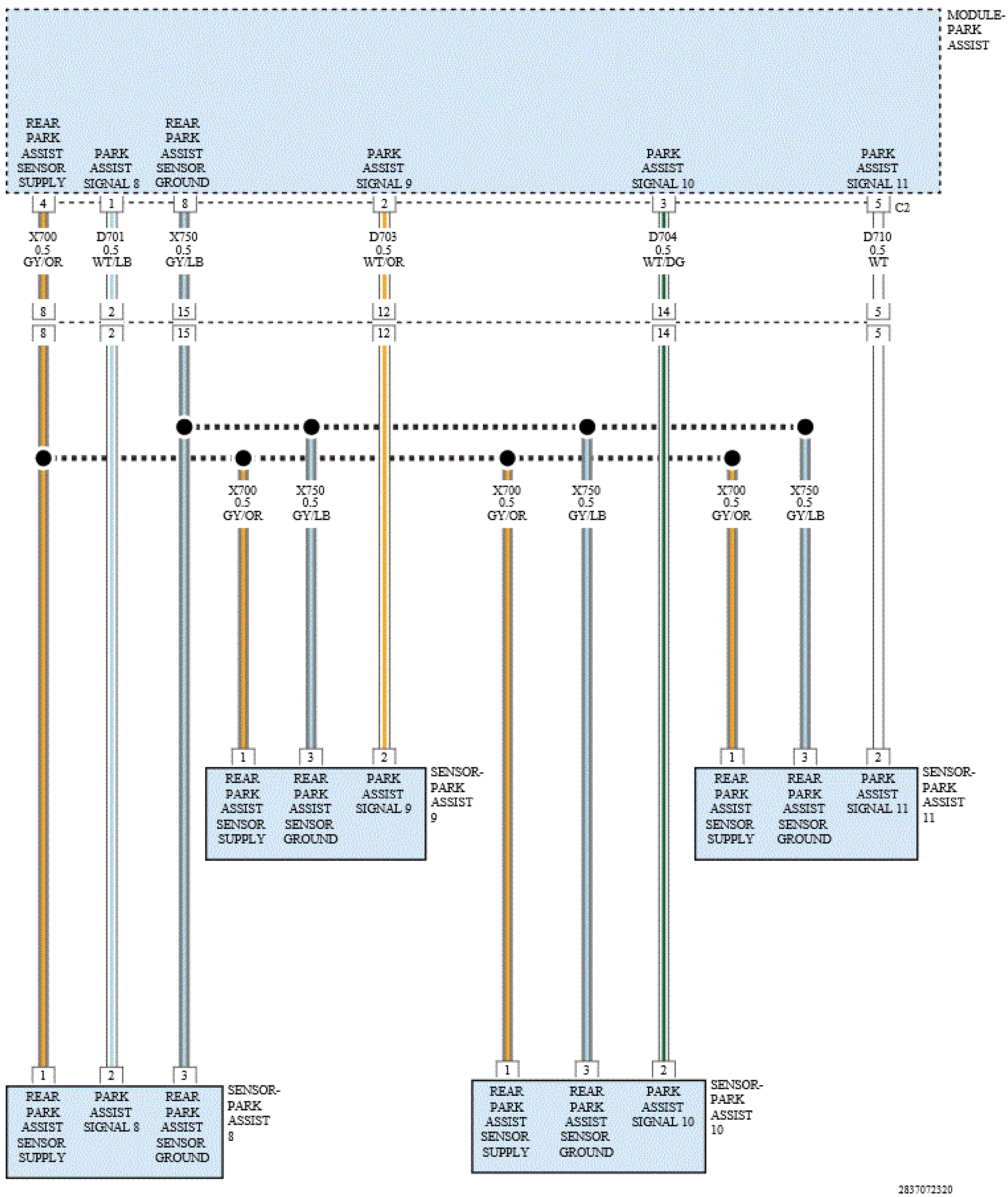


Fig. 1: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- Park Assist Module detects an open on the Park Assist Sensor Signal circuit.
- Park Assist Module detects a short to voltage on the Park Assist Sensor Signal circuit.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SVS REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR 8 SIGNAL CIRCUIT SHORTED TO VOLTAGE
PARK ASSIST SENSOR 8 SIGNAL CIRCUIT SHORTED TO THE PARK ASSIST SENSOR SUPPLY CIRCUIT
PARK ASSIST SENSOR GROUND CIRCUIT OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

        NOTE: **A disconnected sensor will set this DTC.**

    2. With the scan tool, read PAM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.

4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
5. With the scan tool, read PAM DTCs.

   Did the DTC return?

   Yes

   - Go To 2

   No

   - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **(D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT SHORTED TO BATTERY**
   1. Turn the ignition off.
   2. Disconnect the Park Assist Module C2 harness connector.
   3. Disconnect the Park Assist Sensor harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (D701) Park Assist Sensor 8 Signal circuit at the Park assist C2 harness connector.

      Is there any voltage present?

      Yes

      - Repair the (D701) Park Assist Sensor 8 Signal circuit for a short to voltage.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Go To 3

3. **(D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT SHORTED TO THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**
   1. Turn the ignition off.
   2. Check for continuity between the (D701) Park Assist Sensor 8 Signal circuit and the (X700) Park Assist Sensor Supply circuit at the Park Assist Module C2 harness connector.

      Is there continuity between the (D701) Park Assist Sensor 8 Signal circuit and the (X700) Park Assist Sensor Supply circuit?

      Yes

      - Repair the (D701) Park Assist Sensor 8 Signal circuit for a short to the (X700) Park Assist

Sensor Supply circuit.

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Go To4

4. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT OPEN**
    1. Reconnect the Park Assist Module C2 harness connector.
    2. Measure the resistance between ground and the (X750) Park Assist Sensor Ground circuit.

    Is the resistance below 3.0 Ohms?

    Yes

    - Go To 5

    No

    - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
5. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**
    1. Disconnect the Park Assist Module C2 harness connector.
    2. Measure the resistance of the (X750) Park Assist Sensor Ground circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

    Is the resistance below 3.0 Ohms?

    Yes

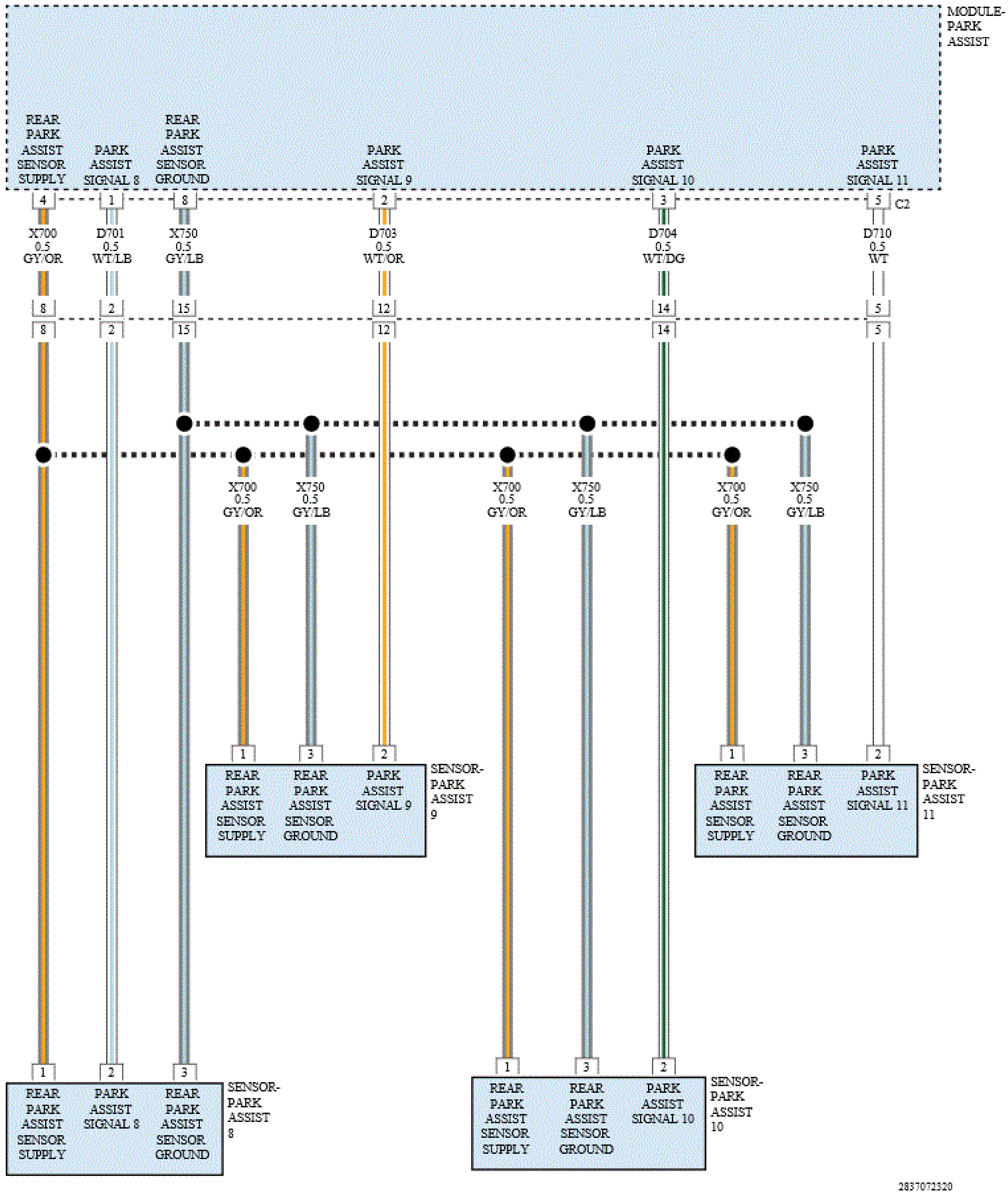
    - Repair the (X750) Park Assist Sensor Ground circuit for an open.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Replace the Park Assist Module in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1295-14-PTS-SENSOR-8-CIRCUIT-SHORT-TO-GROUND OR OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 2: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram]

Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if**

equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while the vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- Park Assist Module detects a short to ground on the Park Assist Signal circuit.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SVS REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
PARK ASSIST SENSOR 8 SIGNAL SHORTED TO GROUND
PARK ASSIST SENSOR 8 SIGNAL CIRCUIT SHORTED TO THE PARK ASSIST SENSOR GROUND CIRCUIT
PARK ASSIST SENSOR 8 SIGNAL CIRCUIT OPEN
PARK ASSIST SENSOR SUPPLY CIRCUIT OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

       NOTE: A disconnected sensor will set this DTC.

    2. With the scan tool, read PAM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read PAM DTCs.

       Did the DTC return?

       Yes

- Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK THE VOLTAGE OF THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**
   1. Turn the ignition off.
   2. Disconnect the Park Assist Sensor harness connector.
   3. Turn the ignition on.
   4. Measure the voltage between ground and the (X700) Park Assist Sensor Supply circuit at the Park Assist Sensor harness connector.

   Is the voltage above 10.0 volts?

   Yes

   - Go To 4

   No

   - Go To 3
3. **CHECK THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Disconnect the Park Assist Module C2 harness connector.
   3. Measure the resistance of the (X700) Park Assist Sensor Supply circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

   Is the resistance below 3.0 Ohms?

   Yes

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

   No

   - Repair the (X700) Park Assist Sensor Supply circuit for an open or high resistance.
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
4. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

NOTE: **Perform this step with the Park Assist Module connected.**

1. Check for continuity between ground and the (D701) Park Assist Sensor 8 Signal circuit at the Park Assist Module C2 harness connector.

   Is there continuity between ground and the (D701) Park Assist Sensor 8 Signal circuit?

   Yes

   - Go To 5

   No

   - Go To 7

5. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**
   1. Disconnect the Park Assist Module C2 harness connector.
   2. Check for continuity between ground and the (D701) Park Assist Sensor 8 Signal circuit at the Park Assist Module C2 harness connector.

      Is there continuity between ground and the (D701) Park Assist Sensor 8 Signal circuit?

      Yes

      - Repair the (D701) Park Assist Sensor 8 Signal circuit for a short to ground.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Go To 6
6. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO THE (X750) PARK ASSIST SENSOR GROUND CIRCUIT**
   1. Check for continuity between the (D701) Park Assist Sensor 8 Signal circuit and the (X750) Park Assist Sensor Ground circuit at the Park Assist Module C2 harness connector.

      Is there continuity between the (D701) Park Assist Sensor 8 Signal circuit and the (X750) Park Assist Sensor Ground circuit?

      Yes

      - Repair the (D701) Park Assist Sensor 8 Signal circuit and the (X750) Park Assist Sensor Ground circuit for a short together.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

7. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR AN OPEN**
    1. Disconnect the Park Assist Module C2 harness connector.
    2. Measure the resistance of the (D701) Park Assist Sensor 8 Signal circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

    Is the resistance below 3.0 Ohms?

    Yes

    - Repair the (D701) Park Assist Sensor 8 Signal circuit for an open.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Go To 8
8. **PARK ASSIST SENSOR**
    1. Turn the ignition on.
    2. Reconnect the Park Assist Module C2 harness connector.
    3. Connect a jumper wire between the (X700) Park Assist Sensor Supply and (D701) Park Assist Sensor 8 Signal circuit at the Park Assist Sensor harness connector.
    4. Turn the ignition on.
    5. With the scan tool, read PAM DTCs.

    Does the scan tool display DTC: B1295-12-PTS SENSOR 8 - CIRCUIT SHORT TO BATTERY?

    Yes

    - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1295-25-PTS SENSOR 8-SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 7 mph (11 km/h) and 25 mph (40 km/h).

SET CONDITION

- The Park Assist Module detects an internal Sensor error.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE WIPE REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.**

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

      Is the DTC active?

      Yes

      - Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **PARK ASSIST SENSOR**
    1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

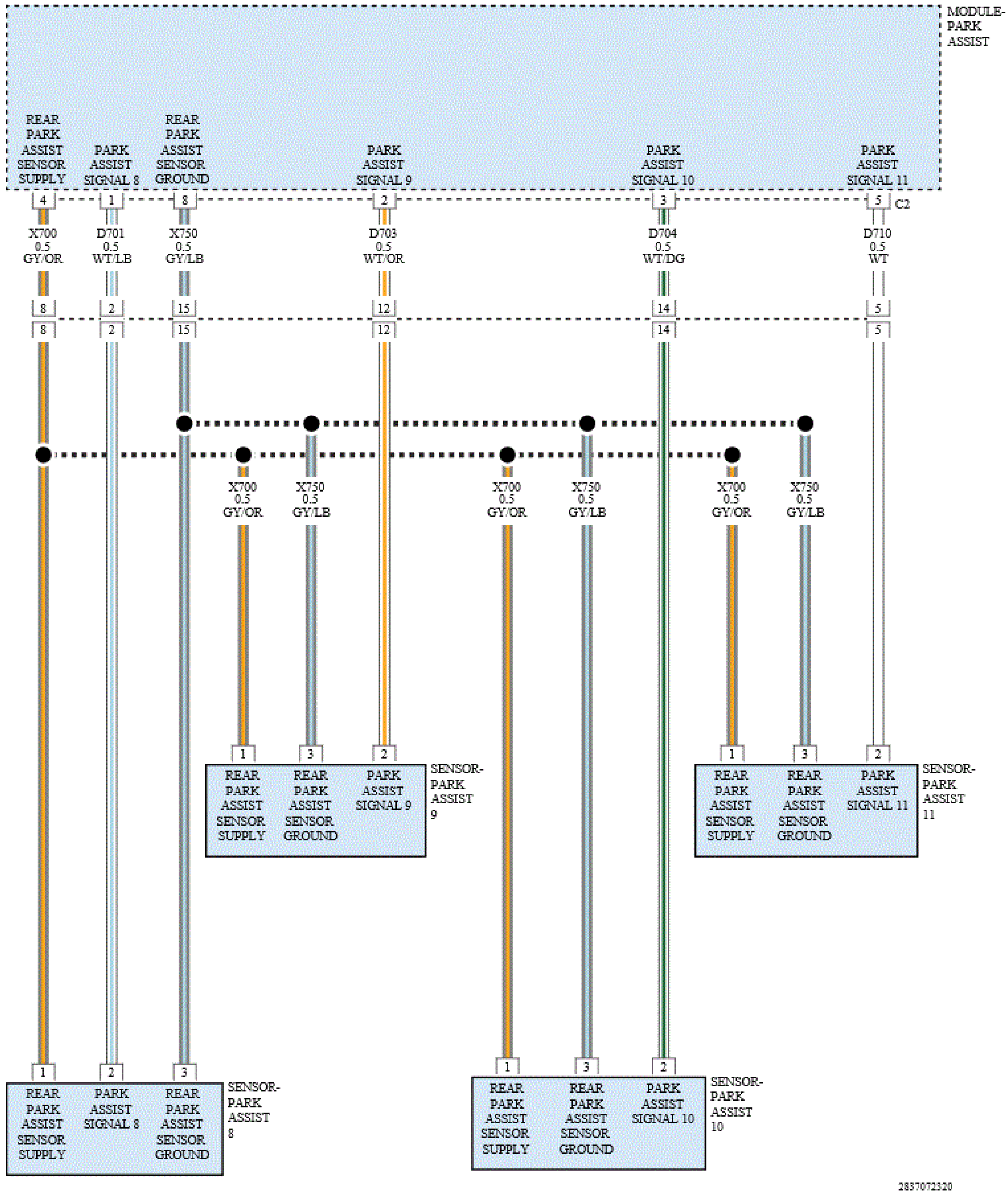
    If none of the possible causes mentioned above are present, view repair.

    Repair

    - Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1295-92-PTS SENSOR 8-PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 3: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram]
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if**

equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- When the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SVS REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR 8 SIGNAL CIRCUIT SHORTED TO GROUND
PARK ASSIST SENSOR 8 SIGNAL CIRCUIT SHORTED TO BATTER
PARK ASSIST SENSOR 8 SIGNAL CIRCUIT OPEN
PARK ASSIST SENSOR 8
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read PAM DTCs and record on the repair order.
    2. With the scan tool, erase DTCs.
    3. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    4. With the scan tool, read PAM DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water

intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK PARK ASSIST SENSOR 8 FOR INTERNAL SHORT**
    1. Disconnect Park Assist Sensor 8.
    2. With the scan tool, read Park Assist Module DTCs.

    Is the DTC active?

    Yes

    - Go To 3

    No

    - Replace Park Assist Sensor 8 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

3. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the Park Assist Module C2 harness connector.
    3. Check for continuity between ground and the (D701) Park Assist Sensor 8 Signal circuit at the Park Assist Module C2 harness connector.

    Is there continuity between ground and the (D701) Park Assist Sensor 8 Signal circuit?

    Yes

    - Repair the (D701) Park Assist Sensor 8 Signal circuit for a short to ground.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Go To 4

4. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition on.
    2. Measure the voltage between ground and the (D701) Park Assist Sensor 8 Signal circuit at the Park Assist Module C2 harness connector.

    Is there any voltage present?

    Yes

    - Repair the (D701) Park Assist Sensor 8 Signal circuit for a short to voltage.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Go To 5

5. **CHECK THE (D701) PARK ASSIST SENSOR 8 SIGNAL CIRCUIT FOR AN OPEN**
    1. Measure the resistance of the (D701) Park Assist Sensor 8 Signal circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor 8 harness connector.

       Is the resistance below 3.0 Ohms?

       Yes

       - Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

       No

       - Repair the (D701) Park Assist Sensor 8 Signal circuit for an open.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1296-12-PTS SENSOR 9-CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

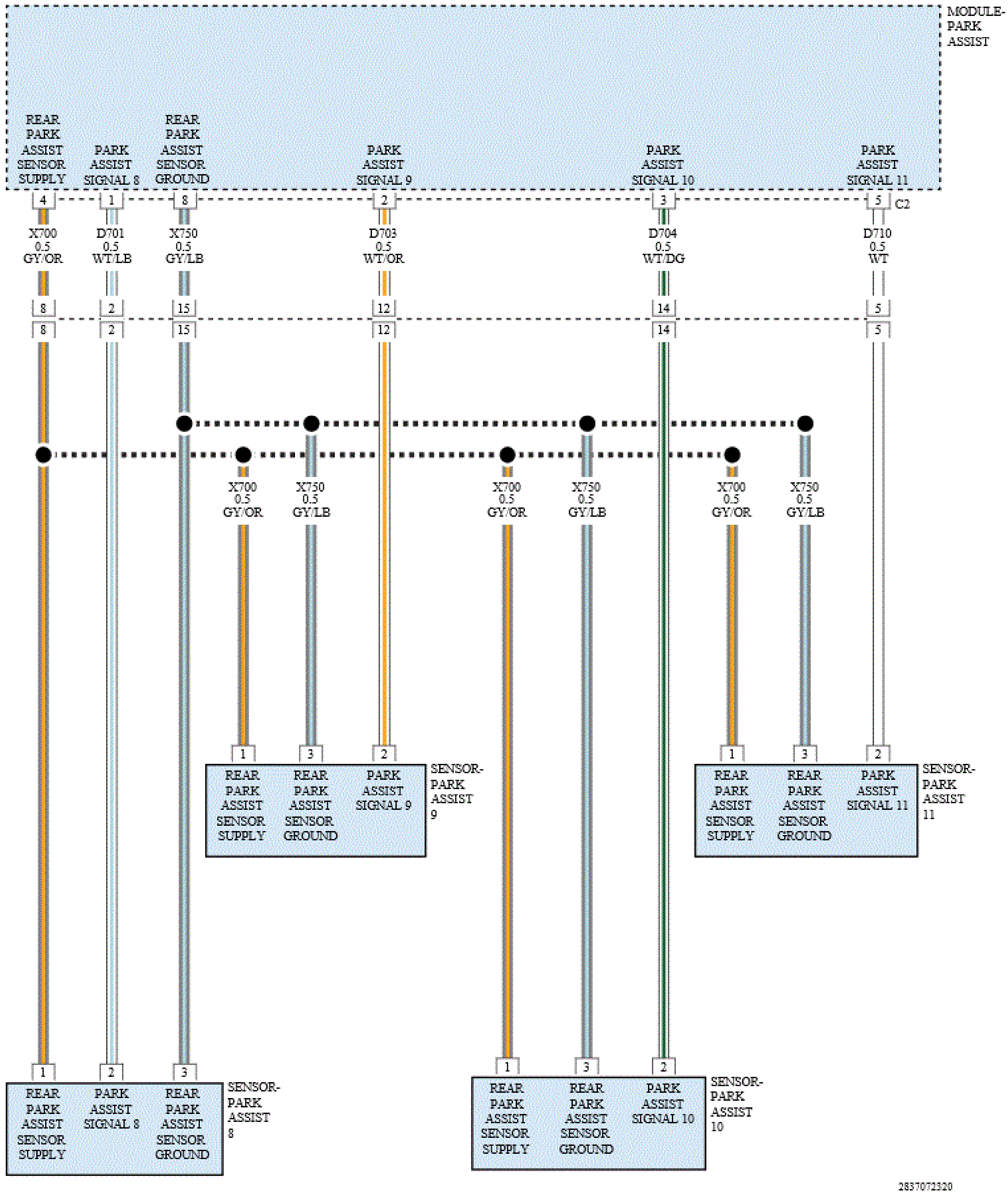


Fig. 4: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if**

equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SVS REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR 9 SIGNAL CIRCUIT SHORTED TO VOLTAGE
PARK ASSIST SENSOR 9 SIGNAL CIRCUIT SHORTED TO THE PARK ASSIST SENSOR SUPPLY CIRCUIT
PARK ASSIST SENSOR GROUND CIRCUIT OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

      NOTE: A disconnected sensor will set this DTC.

   2. With the scan tool, read PAM DTCs and record on the repair order.
   3. With the scan tool, erase DTCs.
   4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
   5. With the scan tool, read PAM DTCs.

      Did the DTC return?

      Yes

      - Go To 2

No

- Test complete, the condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **(D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT SHORTED TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the Park Assist Module C2 harness connector.
    3. Disconnect the Park Assist Sensor harness connector.
    4. Turn the ignition on.
    5. Measure the voltage between ground and the (D703) Park Assist Sensor 9 Signal circuit at the Park Assist Module C2 harness connector.

    Is there any voltage present?

    Yes

    - Repair the (D703) Park Assist Sensor 9 Signal circuit for a short to voltage.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Go To 3
3. **(D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT SHORTED TO THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**
    1. Turn the ignition off.
    2. Measure the resistance between the (D703) Park Assist Sensor 9 Signal circuit and the (X700) Park Assist Sensor Supply circuit at the Park Assist Module C2 harness connector.

    Is the resistance below 3.0 Ohms?

    Yes

    - Repair the (D703) Park Assist Sensor 9 Signal circuit for a short to the (X700) Park Assist Sensor Supply circuit.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Go To 4
4. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT OPEN**
    1. Reconnect the Park Assist Module C2 harness connector.
    2. Measure the resistance between ground and the (X750) Park Assist Sensor Ground circuit.

    Is the resistance below 3.0 Ohms?

Yes

- Go To 5

No

- Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

5. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**
   1. Disconnect the Park Assist Module C2 harness connector.
   2. Measure the resistance of the (X750) Park Assist Sensor Ground circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

   Is the resistance below 3.0 Ohms?

   Yes

   - Repair the (X750) Park Assist Sensor Ground circuit for an open.
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

   No

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1296-14-PTS SENSOR 9-CIRCUIT SHORT TO GROUND OR OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

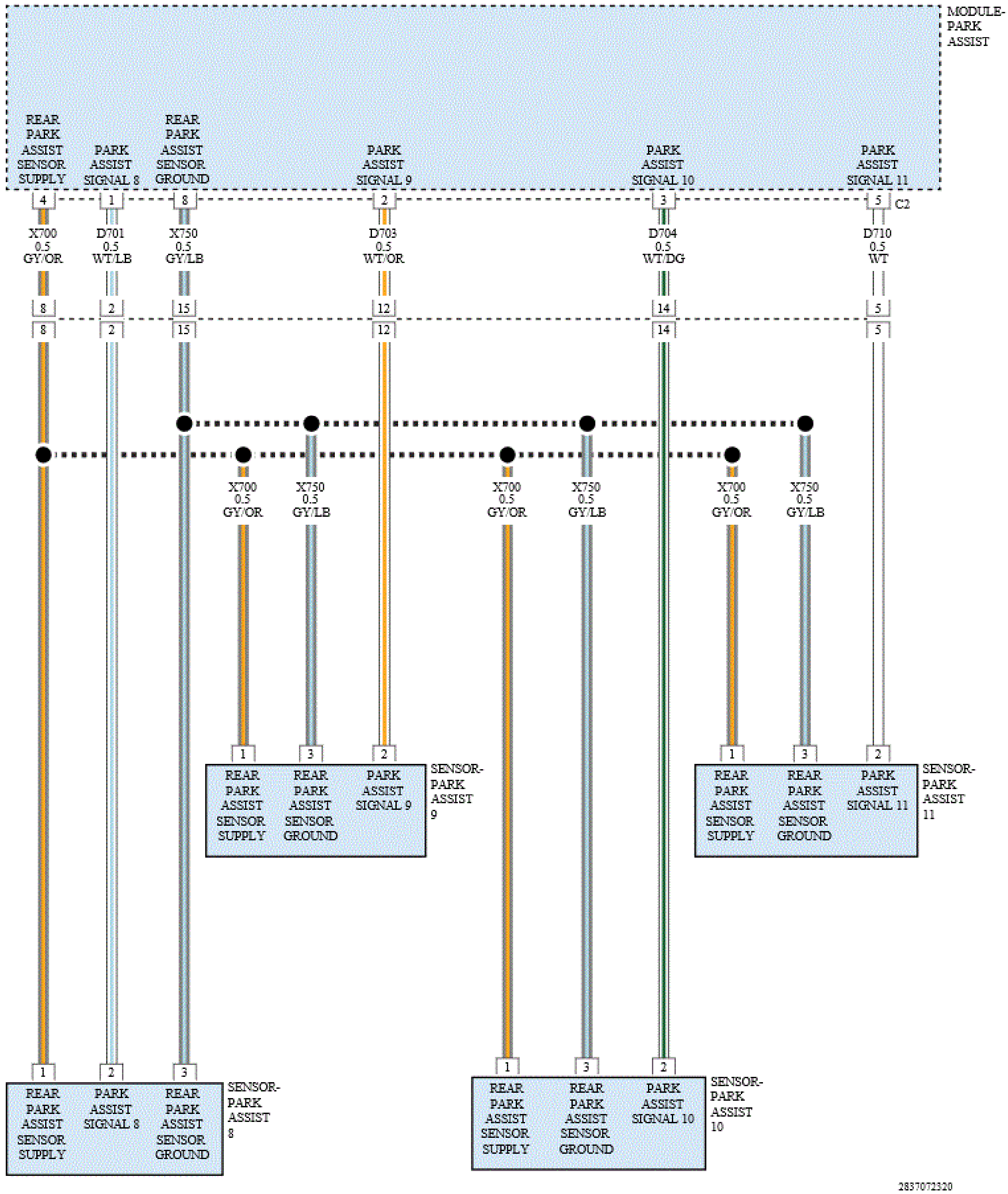


Fig. 5: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if**

equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SVS REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
PARK ASSIST SENSOR 9 SIGNAL CIRCUIT SHORTED TO GROUND
PARK ASSIST SENSOR 9 SIGNAL CIRCUIT SHORTED TO THE PARK ASSIST SENSOR GROUND CIRCUIT
PARK ASSIST SENSOR 9 SIGNAL CIRCUIT OPEN
PARK ASSIST SENSOR SUPPLY CIRCUIT OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

       NOTE: A disconnected sensor will set this DTC.

    2. With the scan tool, read PAM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read PAM DTCs.

       Did the DTC return?

       Yes

- Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK THE VOLTAGE OF THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**
    1. Turn the ignition off.
    2. Disconnect the Park Assist Sensor.
    3. Turn the ignition on.
    4. Measure the voltage between ground and the (X700) Park Assist Sensor Supply circuit at the Park Assist Sensor harness connector.

    Is the voltage above 10.0 volts?

    Yes

    - Go To 4

    No

    - Go To 3
3. **CHECK THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. Turn the ignition off.
    2. Disconnect the Park Assist Module C2 harness connector.
    3. Measure the resistance of the (X700) Park Assist Sensor Supply circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

    Is the resistance below 3.0 Ohms?

    Yes

    - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Repair the (X700) Park Assist Sensor Supply circuit for an open or high resistance.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
4. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

NOTE: **Perform this step with the Park Assist Module connected.**

1. Check for continuity between ground and the (D703) Park Assist Sensor 9 Signal circuit at the Park Assist Module C2 harness connector.

   Is the resistance below 3.0 Ohms?

   Yes

   - Go To 5

   No

   - Go To 7

5. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**
   1. Disconnect the Park Assist Module C2 harness connector.
   2. Check for continuity between ground and the (D703) Park Assist Sensor 9 Signal circuit at the Park Assist Module C2 harness connector.

      Is the resistance below 3.0 Ohms?

      Yes

      - Repair the (D703) Park Assist Sensor 9 Signal circuit for a short to ground.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Go To 6

6. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO THE (X750) PARK ASSIST SENSOR GROUND CIRCUIT**
   1. Check for continuity between the (D703) Park Assist Sensor 9 Signal circuit and the (X750) Park Assist Sensor Ground circuit at the Park Assist Module C2 harness connector.

      Is the resistance below 3.0 Ohms?

      Yes

      - Repair the (D703) Park Assist Sensor 9 Signal circuit and the (X750) Park Assist Sensor Ground circuit for a short together.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

7. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR AN OPEN**
    1. Disconnect the Park Assist Module C2 harness connector.
    2. Measure the resistance of the (D703) Park Assist Sensor 9 Signal circuit.

    Is the resistance above 3.0 Ohms?

    Yes

    - Repair the open in the (D703) Park Assist Sensor 9 Signal circuit.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Go To 8
8. **PARK ASSIST SENSOR**
    1. Turn the ignition on.
    2. Reconnect the Park Assist Module C2 harness connector.
    3. Connect a jumper wire across the (X700) Park Assist Sensor Supply and (D703) Park Assist Sensor 9 Signal circuits.
    4. Turn the ignition on.
    5. With the scan tool, read DTCs.

    Does the scan tool display DTC: B1296-12-PTS SENSOR 9-CIRCUIT SHORT TO BATTERY as active?

    Yes

    - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1296-25-PTS SENSOR 9-SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve**

sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 7 mph (11 km/h) and 25 mph (40 km/h).

SET CONDITION

- The Park Assist Module detects an internal Sensor error.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE WIPE REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.**

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

      Is the DTC active?

      Yes

      - Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **PARK ASSIST SENSOR**
   1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

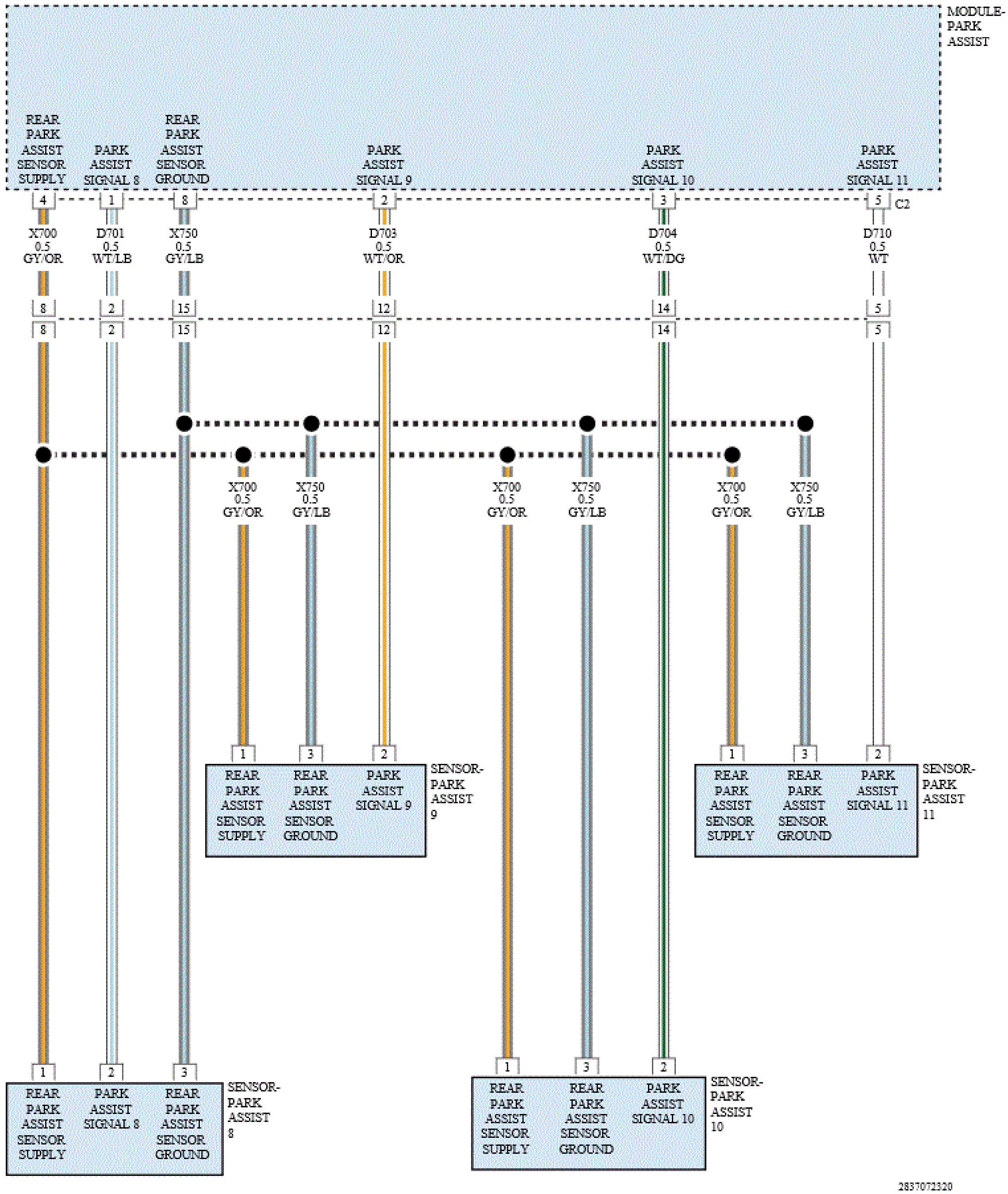
      If none of the possible causes mentioned above are present, view repair.

      Repair

      - Replace the Park Assist Sensor that caused this DTC to change from active to stored after disconnecting it in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1296-92-PTS SENSOR 9-PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 6: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram]
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if**

equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- If the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SVS REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR 9 SIGNAL CIRCUIT SHORTED TO GROUND
PARK ASSIST SENSOR 9 SIGNAL CIRCUIT SHORTED TO BATTERY
PARK ASSIST SENSOR 9 SIGNAL CIRCUIT OPEN
PARK ASSIST SENSOR 9
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

       NOTE: A disconnected sensor will set this DTC.

    2. With the scan tool, read PAM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read PAM DTCs.

       Did the DTC return?

       Yes

       - Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK PARK ASSIST SENSOR 9 FOR INTERNAL SHORT**
   1. Disconnect Park Assist Sensor 9.
   2. With the scan tool, read Park Assist Module DTCs.

   Is the DTC active?

   Yes

   - Go To 3

   No

   - Replace Park Assist Sensor 9 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
3. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO GROUND**
   1. Turn the ignition off.
   2. Disconnect the Park Assist Module C2 harness connector.
   3. Check for continuity between ground and the (D703) Park Assist Sensor 9 Signal circuit at the Park Assist Module C2 harness connector.

   Is there continuity between ground and the (D703) Park Assist Sensor 9 Signal circuit?

   Yes

   - Repair the (D703) Park Assist Sensor 9 Signal circuit for a short to ground.
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

   No

   - Go To 4
4. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**
   1. Turn the ignition on.
   2. Measure the voltage between ground and the (D703) Park Assist Sensor 9 Signal circuit at the Park Assist Module C2 harness connector.

   Is there any voltage present?

Yes

- Repair the (D703) Park Assist Sensor 9 Signal circuit for a short to voltage

  Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Go To 5

5. **CHECK THE (D703) PARK ASSIST SENSOR 9 SIGNAL CIRCUIT FOR AN OPEN**
   1. Measure the resistance of the (D703) Park Assist Sensor 9 Signal circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor 9 harness connector.

      Is the resistance below 3.0 Ohms?

      Yes

      - Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Repair the (D703) Park Assist Sensor 9 Signal circuit for an open.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1297-12-PTS SENSOR 10-CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

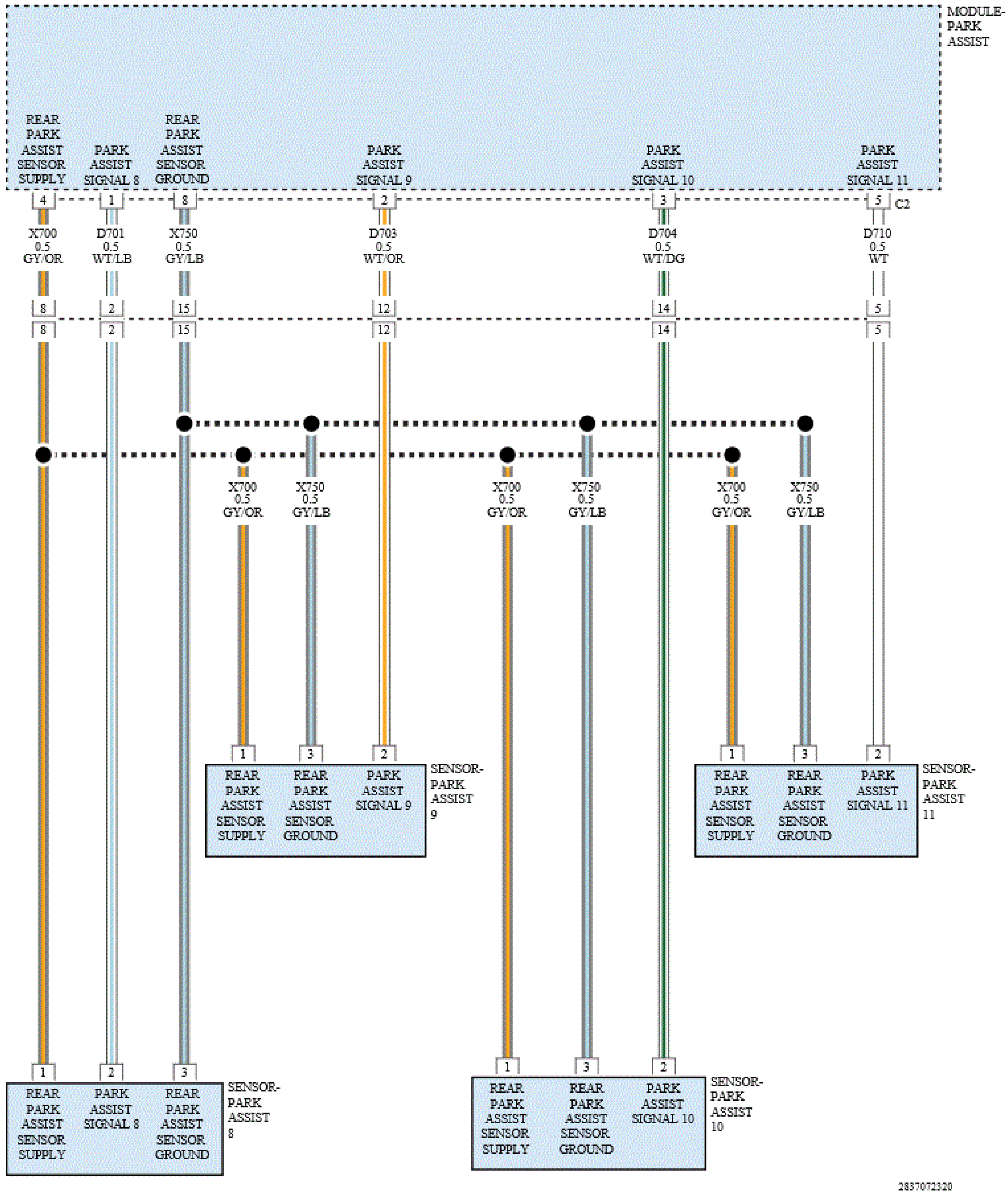


Fig. 7: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if**

equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SVS REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR 10 SIGNAL CIRCUIT SHORTED TO VOLTAGE
PARK ASSIST SENSOR 10 SIGNAL CIRCUIT SHORTED TO THE PARK ASSIST SENSOR SUPPLY CIRCUIT
PARK ASSIST SENSOR GROUND CIRCUIT OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

      NOTE: A disconnected sensor will set this DTC.

   2. With the scan tool, read PAM DTCs and record on the repair order.
   3. With the scan tool, erase DTCs.
   4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
   5. With the scan tool, read PAM DTCs.

      Did the DTC return?

      Yes

      - Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **(D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT SHORTED TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the Park Assist Module C2 harness connector.
    3. Disconnect the Park Assist Sensor harness connector.
    4. Turn the ignition on.
    5. Measure the voltage between ground and the (D704) Park Assist Sensor 10 Signal circuit at the Park Assist Module C2 harness connector.

    Is there any voltage present?

    Yes

    - Repair the (D704) Park Assist Sensor 10 Signal circuit for a short to voltage.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Go To 3
3. **(D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT SHORTED TO THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**
    1. Turn the ignition off.
    2. Check for continuity between the (D704) Park Assist Sensor 10 Signal circuit and the (X700) Park Assist Sensor Supply circuit at the Park Assist Module C2 harness connector.

    Is there continuity between the (D704) Park Assist Sensor 10 Signal circuit and the (X700) Park Assist Sensor Supply circuit?

    Yes

    - Repair the (D704) Park Assist Sensor 10 Signal circuit for a short to the (X700) Park Assist Sensor Supply circuit.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Go To 4
4. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT OPEN**
    1. Reconnect the Park Assist Module C2 harness connector.
    2. Measure the resistance between ground and the (X750) Park Assist Sensor Ground circuit at the

Park Assist Module C2 harness connector.

Is the resistance above 3.0 Ohms?

Yes

- Go To 5

No

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

5. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**
    1. Disconnect the Park Assist Module C2 harness connector.
    2. Measure the resistance of the (X750) Park Assist Sensor Ground circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

    Is the resistance below 3.0 Ohms?

    Yes

    - Repair the (X750) Park Assist Sensor Ground circuit for an open.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Replace the Park Assist Module in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1297-14-PTS SENSOR 10-CIRCUIT SHORT TO GROUND OR OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

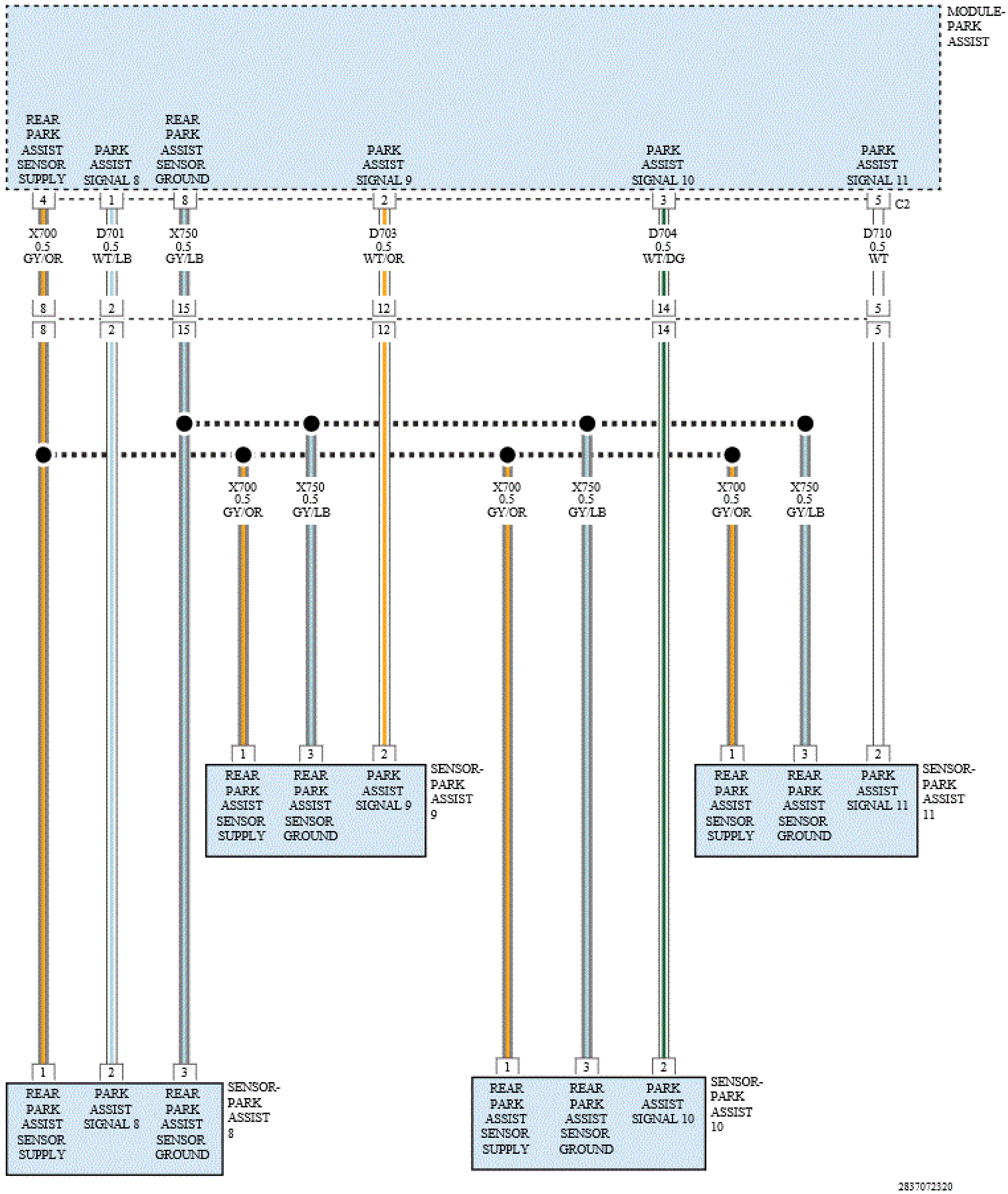


Fig. 8: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE:	**The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if**

equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SVS REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
PARK ASSIST SENSOR 10 SIGNAL CIRCUIT SHORTED TO GROUND
PARK ASSIST SENSOR 10 SIGNAL CIRCUIT SHORTED TO THE PARK ASSIST SENSOR GROUND CIRCUIT
PARK ASSIST SENSOR 10 SIGNAL CIRCUIT OPEN
PARK ASSIST SENSOR SUPPLY CIRCUIT OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

       NOTE: **A disconnected sensor will set this DTC.**

    2. With the scan tool, read PAM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read PAM DTCs.

       Did the DTC return?

       Yes

- Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK THE VOLTAGE OF THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**
   1. Turn the ignition off.
   2. Disconnect the Park Assist Sensor harness connector.
   3. Turn the ignition on.
   4. Measure the voltage between ground and the (X700) Park Assist Sensor Supply circuit at the Park Assist Sensor harness connector.

      Is the voltage above 10.0 volts?

      Yes

      - Go To 4

      No

      - Go To 3

3. **CHECK THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Disconnect the Park Assist Module C2 harness connector.
   3. Measure the resistance of the (X700) Park Assist Sensor Supply circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

      Is the resistance below 3.0 Ohms?

      Yes

      - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Repair the (X700) Park Assist Sensor Supply circuit for an open or high resistance.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

4. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE CONNECTED**

NOTE: **Perform this step with the Park Assist Module connected.**

1. Measure the resistance between ground and the (D704) Park Assist Sensor 10 Signal circuit at the Park Assist Module C2 harness connector.

   Is the resistance below 3.0 Ohms?

   Yes

   - Go To 5

   No

   - Go To 7

5. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**
   1. Disconnect the Park Assist Module C2 harness connector.
   2. Measure the resistance between ground and the (D704) Park Assist Sensor 10 Signal circuit at the Park Assist Module C2 harness connector.

      Is the resistance below 3.0 Ohms?

      Yes

      - Repair the (D704) Park Assist Sensor 10 Signal circuit for a short to ground.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Go To 6

6. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO THE (X750) PARK ASSIST SENSOR GROUND CIRCUIT**
   1. Measure the resistance between the (D704) Park Assist Sensor 10 Signal circuit and the (X750) Park Assist Sensor Ground circuit at the Park Assist Module C2 harness connector.

      Is the resistance below 3.0 Ohms?

      Yes

      - Repair the (D704) Park Assist Sensor 10 Signal circuit and the (X750) Park Assist Sensor Ground circuit for a short together.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

7. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR AN OPEN**
    1. Disconnect the Park Assist Module C2 harness connector.
    2. Measure the resistance of the (D704) Park Assist Sensor 10 Signal circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

       Is the resistance below 3.0 Ohms?

       Yes

        - Repair the (D704) Park Assist Sensor 10 Signal circuit for an open.
        - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

       No

        - Go To 8
8. **PARK ASSIST SENSOR**
    1. Turn the ignition on.
    2. Reconnect the Park Assist Module C2 harness connector.
    3. Connect a jumper wire between the (X700) Park Assist Sensor Supply and (D704) Park Assist Sensor 10 Signal circuits at the Park Assist Sensor harness connector.
    4. Turn the ignition on.
    5. With the scan tool, read DTCs.

       Does the scan tool display DTC: B1297-12-PTS SENSOR 10 - CIRCUIT SHORT TO BATTERY?

       Yes

        - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
        - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

       No

        - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
        - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1297-25-PTS SENSOR 10-SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve**

sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 7 mph (11 km/h) and 25 mph (40 km/h).

SET CONDITION

- The Park Assist Module detects an internal Sensor error.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE WIPE REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: **Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.**

1. Turn the ignition on.
2. With the scan tool, read Park Assist Module DTCs.

Is the DTC active?

Yes

- Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **PARK ASSIST SENSOR**
    1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

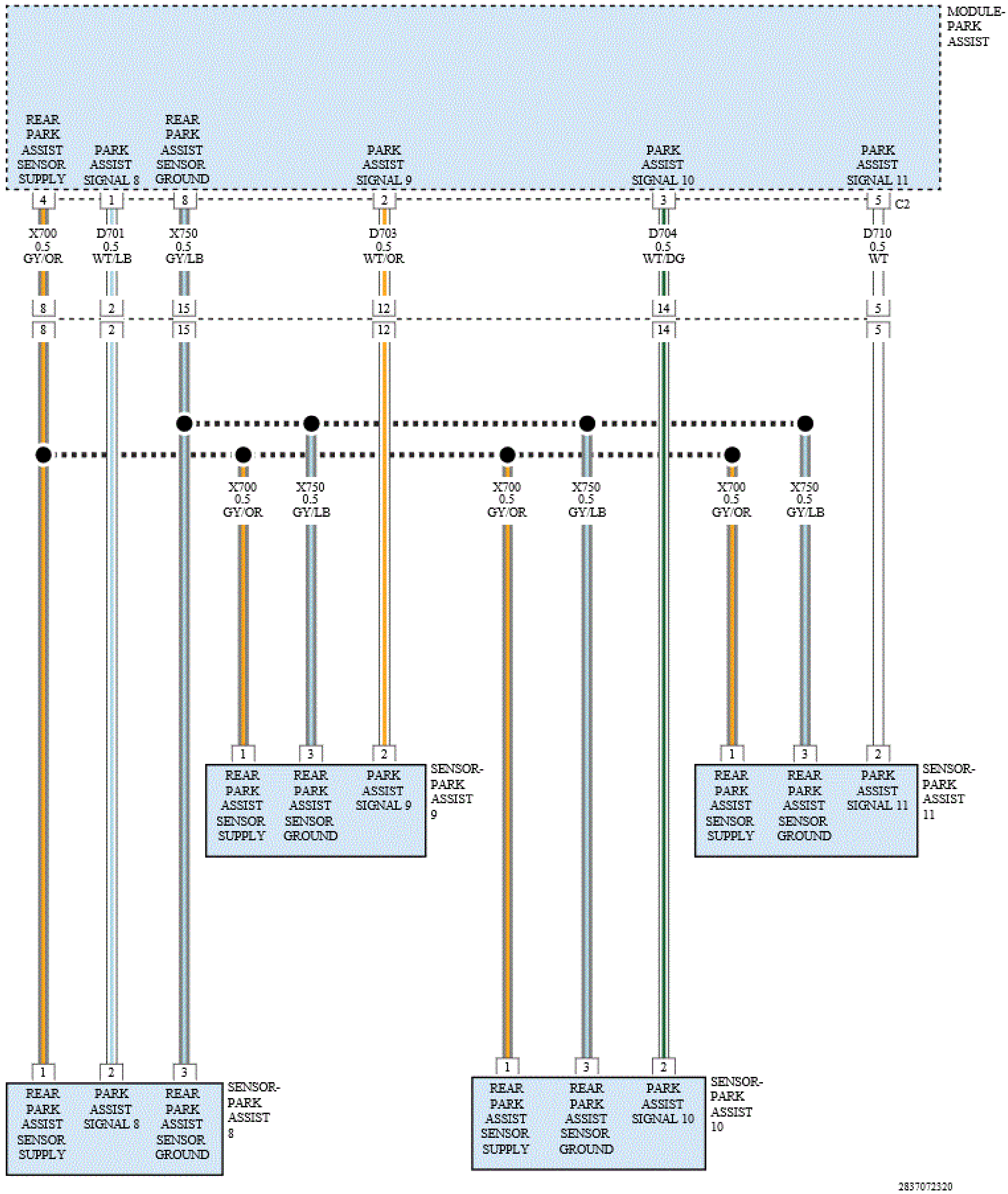
    If none of the possible causes mentioned above are present, view repair.

    Repair

    - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1297-92-PTS SENSOR 10-PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 9: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram]

Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if**

equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- When the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SVS REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR 10 SIGNAL CIRCUIT SHORTED TO GROUND
PARK ASSIST SENSOR 10 SIGNAL CIRCUIT SHORTED TO BATTERY
PARK ASSIST SENSOR 10 SIGNAL CIRCUIT OPEN
PARK ASSIST SENSOR 10
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

       NOTE: A disconnected sensor will set this DTC.

    2. With the scan tool, read PAM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read PAM DTCs.

       Did the DTC return?

       Yes

       - Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK PARK ASSIST SENSOR 10 FOR INTERNAL SHORT**
    1. Disconnect Park Assist Sensor 10.
    2. With the scan tool, read Park Assist Module DTCs.

    Is the DTC active?

    Yes

    - Go To 3

    No

    - Replace Park Assist Sensor 10 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

3. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the Park Assist Module C2 harness connector.
    3. Check for continuity between ground and the (D704) Park Assist Sensor 10 Signal circuit at the Park Assist Module C2 harness connector.

    Is there continuity between ground and the (D704) Park Assist Sensor 10 Signal circuit?

    Yes

    - Repair the (D704) Park Assist Sensor 10 Signal circuit for a short to ground.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Go To 4

4. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition on.
    2. Measure the voltage between ground and the (D704) Park Assist Sensor 10 Signal circuit at the Park Assist Module C2 harness connector.

    Is there any voltage present?

Yes

- Repair the (D704) Park Assist Sensor 10 Signal circuit for a short to voltage.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Go To 5

5. **CHECK THE (D704) PARK ASSIST SENSOR 10 SIGNAL CIRCUIT FOR AN OPEN**
   1. Turn the ignition off.
   2. Measure the resistance of the (D704) Park Assist Sensor 10 Signal circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor 10 harness connector.

      Is the resistance below 3.0 Ohms?

      Yes

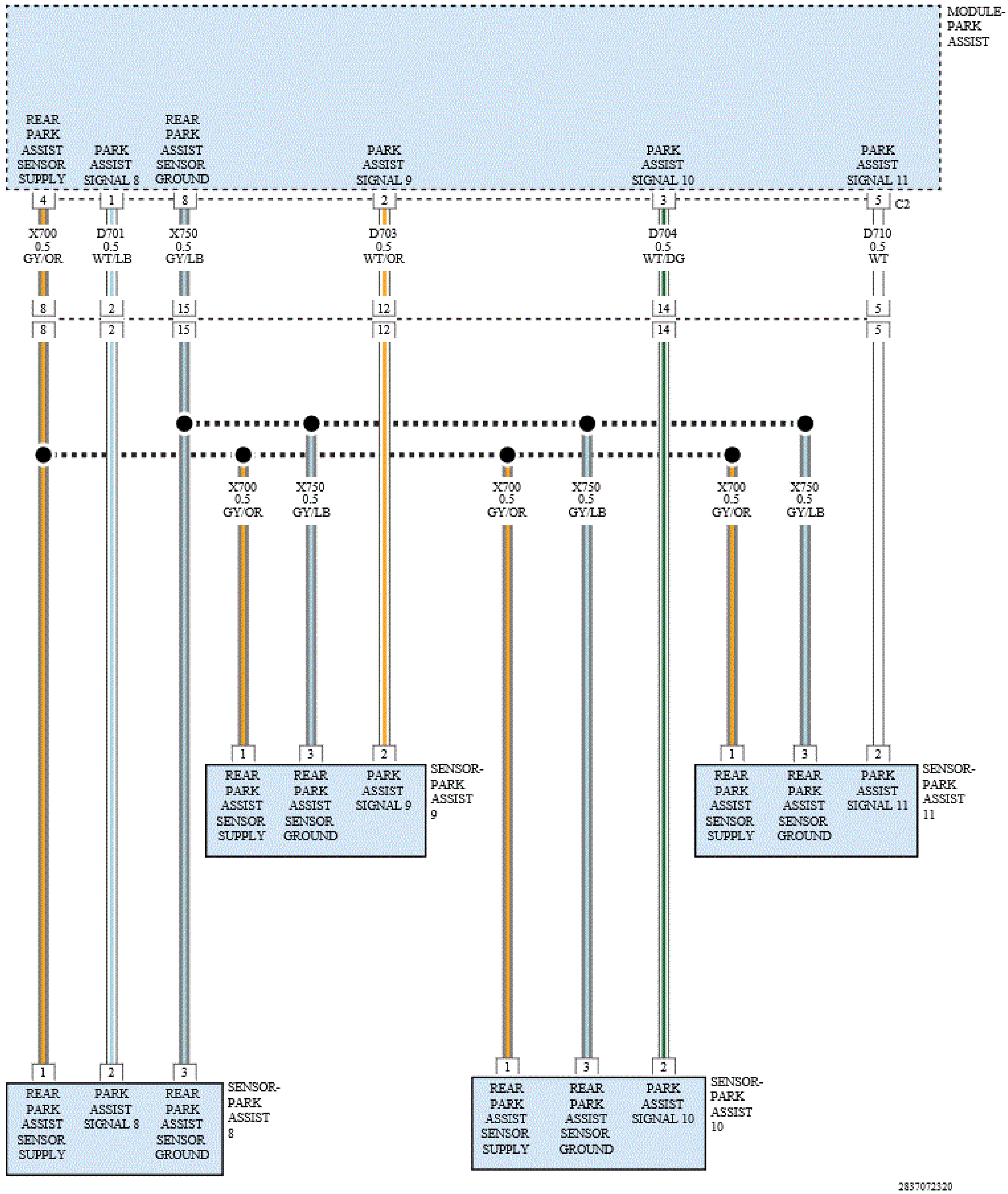
      - Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Repair the (D704) Park Assist Sensor 10 Signal circuit for an open.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1298-12-PTS SENSOR 11-CIRCUIT SHORT TO BATTERY

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 10: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram]
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE:	**The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if**

equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- The Park Assist Module detects an open or short to voltage on the Park Assist Sensor Signal circuit.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SVS REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR 11 SIGNAL CIRCUIT SHORTED TO VOLTAGE
PARK ASSIST SENSOR 11 SIGNAL CIRCUIT SHORTED TO THE PARK ASSIST SENSOR SUPPLY CIRCUIT
PARK ASSIST SENSOR GROUND CIRCUIT OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

       NOTE: **A disconnected sensor will set this DTC.**

    2. With the scan tool, read PAM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read PAM DTCs.

       Did the DTC return?

       Yes

       - Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **(D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT SHORTED TO VOLTAGE**
   1. Turn the ignition off.
   2. Disconnect the Park Assist Module C2 harness connector.
   3. Disconnect the Park Assist Sensor 11 harness connector.
   4. Turn the ignition on.
   5. Measure the voltage between ground and the (D710) Park Assist Sensor 11 Signal circuit at the Park Assist Module C2 harness connector.

      Is there any voltage present?

      Yes

      - Repair the (D710) Park Assist Sensor 11 Signal circuit for a short to voltage.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Go To 3
3. **(D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT SHORTED TO THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**
   1. Turn the ignition off.
   2. Check for continuity between the (D710) Park Assist Sensor 11 Signal circuit and the (X700) Park Assist Sensor Supply circuit at the Park Assist Module C2 harness connector.

      Is there continuity between the (D710) Park Assist Sensor 11 Signal circuit and the (X700) Park Assist Sensor Supply circuit ?

      Yes

      - Repair the (D710) Park Assist Sensor 11 Signal circuit for a short to the (X700) Park Assist Sensor Supply circuit.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Go To 4
4. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT OPEN**
   1. Reconnect the Park Assist Module C2 harness connector.
   2. Measure the resistance between ground and the (X750) Park Assist Sensor Ground circuit at the

Park Assist Module C2 harness connector.

Is the resistance below 3.0 Ohms?

Yes

- Go To 5

No

- Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

5. **(X750) PARK ASSIST SENSOR GROUND CIRCUIT OPEN BETWEEN PARK ASSIST MODULE AND SENSOR**
   1. Disconnect the Park Assist Module C2 harness connector.
   2. Measure the resistance of the (X750) Park Assist Sensor Ground circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

      Is the resistance above 3.0 Ohms?

      Yes

      - Repair the (X750) Park Assist Sensor Ground circuit for an open.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Replace the Park Assist Module in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1298-14-PTS SENSOR 11-CIRCUIT SHORT TO GROUND OR OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

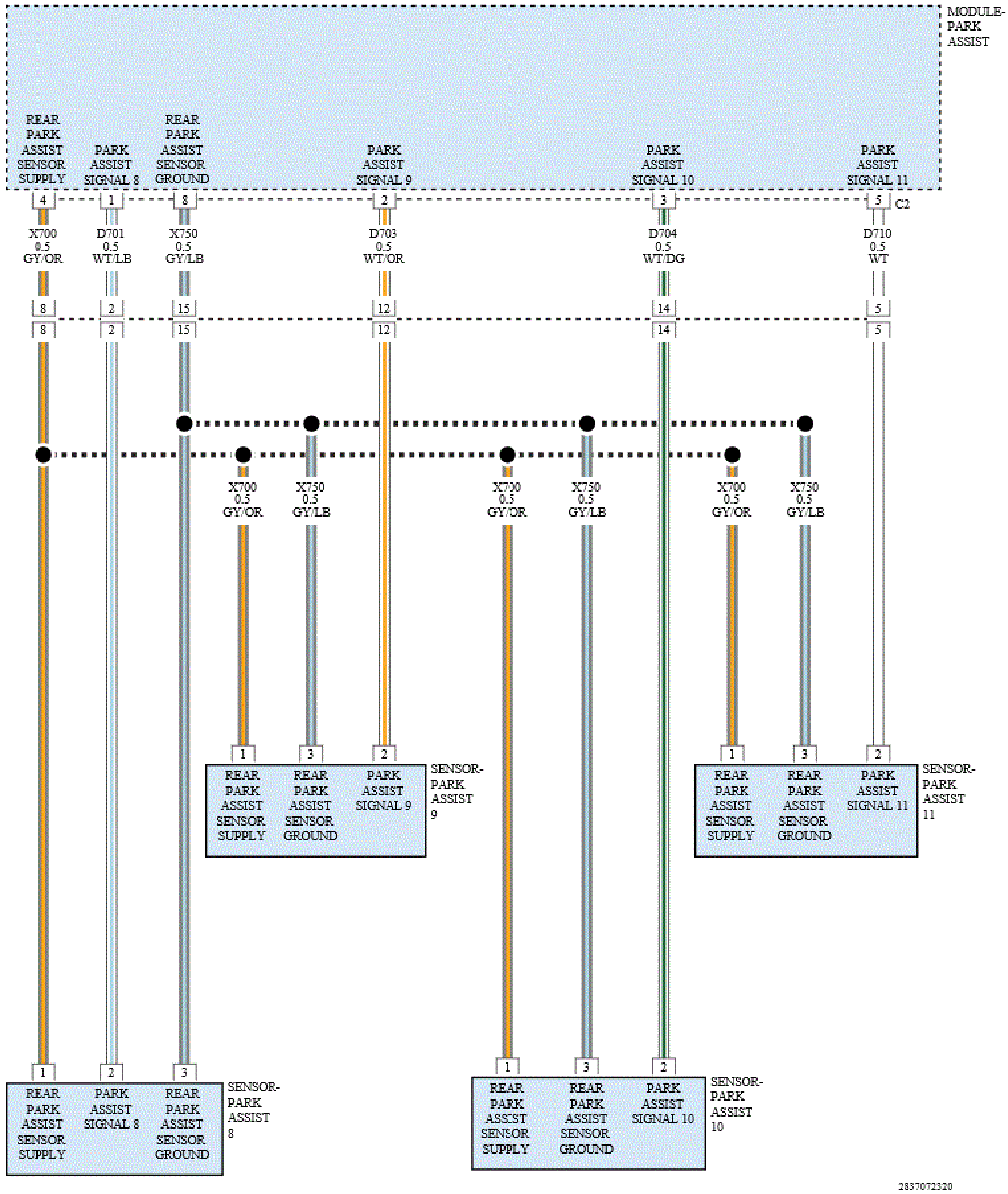


Fig. 11: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if**

equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- The Park Assist Module detects a short to ground on the Park Assist Sensor Signal circuit.
-

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SVS REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR DISCONNECTED
PARK ASSIST SENSOR 11 SIGNAL CIRCUIT SHORTED TO GROUND
PARK ASSIST SENSOR 11 SIGNAL CIRCUIT SHORTED TO THE PARK ASSIST SENSOR GROUND CIRCUIT
PARK ASSIST SENSOR 11 SIGNAL CIRCUIT OPEN
PARK ASSIST SENSOR SUPPLY CIRCUIT OPEN
PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

      NOTE: A disconnected sensor will set this DTC.

   2. With the scan tool, read PAM DTCs and record on the repair order.
   3. With the scan tool, erase DTCs.
   4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
   5. With the scan tool, read PAM DTCs.

      Did the DTC return?

Yes

- Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK THE VOLTAGE OF THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT**
   1. Turn the ignition off.
   2. Disconnect the Park Assist Sensor 11 harness connector.
   3. Turn the ignition on.
   4. Measure the voltage between ground and the (X700) Park Assist Sensor Supply circuit at the Park Assist Sensor harness connector.

   Is the voltage above 10.0 volts?

   Yes

   - Go To 4

   No

   - Go To 3
3. **CHECK THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Disconnect the Park Assist Module C2 harness connector.
   3. Measure the resistance of the (X700) Park Assist Sensor Supply circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

   Is the resistance below 3.0 Ohms?

   Yes

   - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

   No

   - Repair the (X700) Park Assist Sensor Supply circuit for an open or high resistance.
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
4. **CHECK THE (D711) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO**

GROUND WITH THE PARK ASSIST MODULE CONNECTED

NOTE: Perform this step with the Park Assist Module connected.

1. Check for continuity between ground and the (D711) Park Assist Sensor 11 Signal circuit at the Park Assist Module C2 harness connector.

   Is there continuity between ground and the (D711) Park Assist Sensor 11 Signal circuit?

   Yes

   - Go To 5

   No

   - Go To 7

5. **CHECK THE (D711) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO GROUND WITH THE PARK ASSIST MODULE DISCONNECTED**
   1. Disconnect the Park Assist Module C2 harness connector.
   2. Check for continuity between ground and the (D711) Park Assist Sensor 11 Signal circuit at the Park Assist Module C2 harness connector.

      Is there continuity between ground and the (D711) Park Assist Sensor 11 Signal circuit?

      Yes

      - Repair the (D711) Park Assist Sensor 11 Signal circuit for a short to ground.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Go To 6

6. **CHECK THE (D711) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO THE (X750) PARK ASSIST SENSOR GROUND CIRCUIT**
   1. Measure the resistance between the (D711) Park Assist Sensor 11 Signal circuit and the (X750) Park Assist Sensor Ground circuit at the Park Assist Module C2 harness connector.

      Is the resistance below 3.0 Ohms?

      Yes

      - Repair the (D711) Park Assist Sensor 11 Signal circuit and the (X750) Park Assist Sensor Ground circuit for a short together.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

7. **CHECK THE (D711) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR AN OPEN**
    1. Disconnect the Park Assist Module C2 harness connector.
    2. Measure the resistance of the (D711) Park Assist Sensor 11 Signal circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor harness connector.

       Is the resistance below 3.0 Ohms?

       Yes

       - Repair the (D711) Park Assist Sensor 11 Signal circuit for an open.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

       No

       - Go To 8
8. **PARK ASSIST SENSOR**
    1. Turn the ignition on.
    2. Reconnect the Park Assist Module C2 harness connector.
    3. Connect a jumper wire between the (X700) Park Assist Sensor Supply and (D711) Park Assist Sensor 11 Signal circuits at the Park Assist Sensor harness connector.
    4. Turn the ignition on.
    5. With the scan tool, read DTCs.

       Does the scan tool display DTC: B1298-12 PTS SENSOR 11-CIRCUIT SHORT TO BATTERY?

       Yes

       - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

       No

       - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1298-25PTS SENSOR 11-SIGNAL SHAPE / WAVEFORM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.**

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 7 mph (11 km/h) and 25 mph (40 km/h).

SET CONDITION

- The Park Assist Module detects an internal Sensor error.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE WIPE REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR MEMBRANE OBSTRUCTION (ICE, SNOW, MUD, DIRT COVERING FASCIA)
PARK ASSIST SENSOR CONNECTOR OBSTRUCTION (ICE, SNOW, MUD, DIRT)
DECOUPLING RING MISSING/MOUNTED WRONG
OBJECTS - SUCH AS LICENSE PLATES - IN CLOSE RANGE TO THE SENSOR
PARK ASSIST SENSOR

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

   NOTE: **Before proceeding with this diagnostic procedure, remove any ice, snow, mud, dirt, or other obstructions from the front/rear fascia/bumper. Also remove any ice, snow, dirt, mud, or other obstructions from the underside of the Fascia/Bumper surrounding the sensors.**

   1. Turn the ignition on.
   2. With the scan tool, read Park Assist Module DTCs.

   Is the DTC active?

   Yes

   - Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **PARK ASSIST SENSOR**
    1. Verify that none of the possible causes mentioned above are present. Repair as necessary.

    If none of the possible causes mentioned above are present, view repair.

    Repair

    - Replace the Park Assist Sensor in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B1298-92PTS SENSOR 11-PERFORMANCE OR INCORRECT OPERATION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

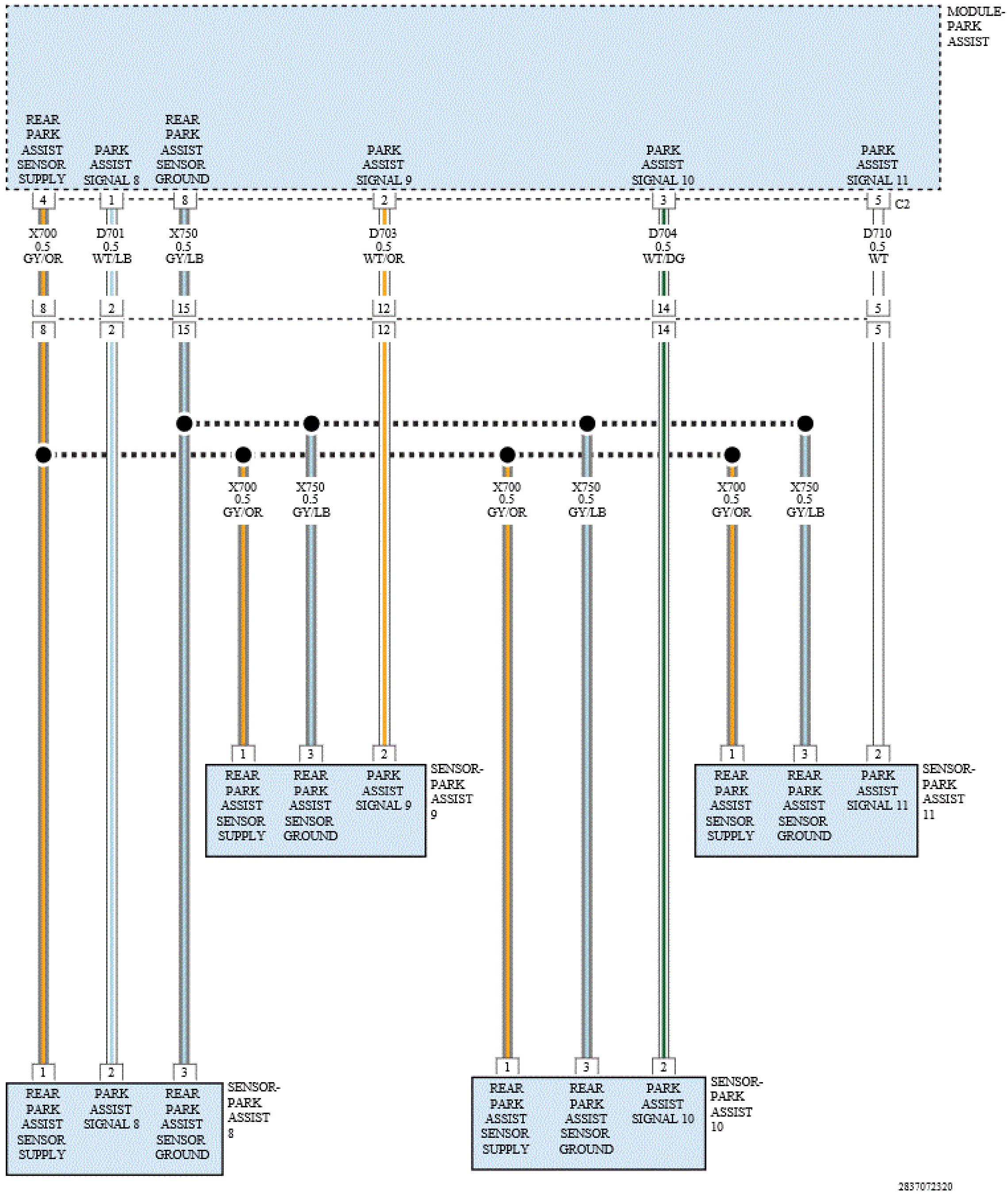


Fig. 12: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if**

equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- When the system detects data corruption in the transmission in the internal communication line between the module and sensors, this code will set.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SVS REAR SENSORS

POSSIBLE CAUSES

Possible Causes
PARK ASSIST SENSOR 11 SIGNAL CIRCUIT SHORTED TO GROUND
PARK ASSIST SENSOR 11 SIGNAL CIRCUIT SHORTED TO BATTERY
PARK ASSIST SENSOR 11 SIGNAL CIRCUIT OPEN
PARK ASSIST SENSOR 11
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

       NOTE: A disconnected sensor will set this DTC.

    2. With the scan tool, read PAM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read PAM DTCs.

       Did the DTC return?

       Yes

       - Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK PARK ASSIST SENSOR 11 FOR INTERNAL SHORT**
    1. Disconnect Park Assist Sensor 11 harness connector.
    2. With the scan tool, read Park Assist Module DTCs.

    Is the DTC active?

    Yes

    - Go To 3

    No

    - Replace Park Assist Sensor 11 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
3. **CHECK THE (D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the Park Assist Module C2 harness connector.
    3. Check for continuity between ground and the (D710) Park Assist Sensor 11 Signal circuit at the Park Assist Module C2 harness connector.

    Is there continuity between ground and the (D710) Park Assist Sensor 11 Signal circuit?

    Yes

    - Repair the (D710) Park Assist Sensor 11 Signal circuit for a short to ground.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Go To 4
4. **CHECK THE (D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Turn the ignition on.
    2. Measure the voltage between ground and the (D710) Park Assist Sensor 11 Signal circuit at the Park Assist Module C2 harness connector.

    Is there any voltage present?

Yes

- Repair the (D710) Park Assist Sensor 11 Signal circuit for a short to voltage.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Go To 5

5. **CHECK THE (D710) PARK ASSIST SENSOR 11 SIGNAL CIRCUIT FOR AN OPEN**
    1. Measure the resistance of the (D710) Park Assist Sensor 11 Signal circuit between the Park Assist Module C2 harness connector and the Park Assist Sensor 11 harness connector.

    Is the resistance below 3.0 Ohms?

    Yes

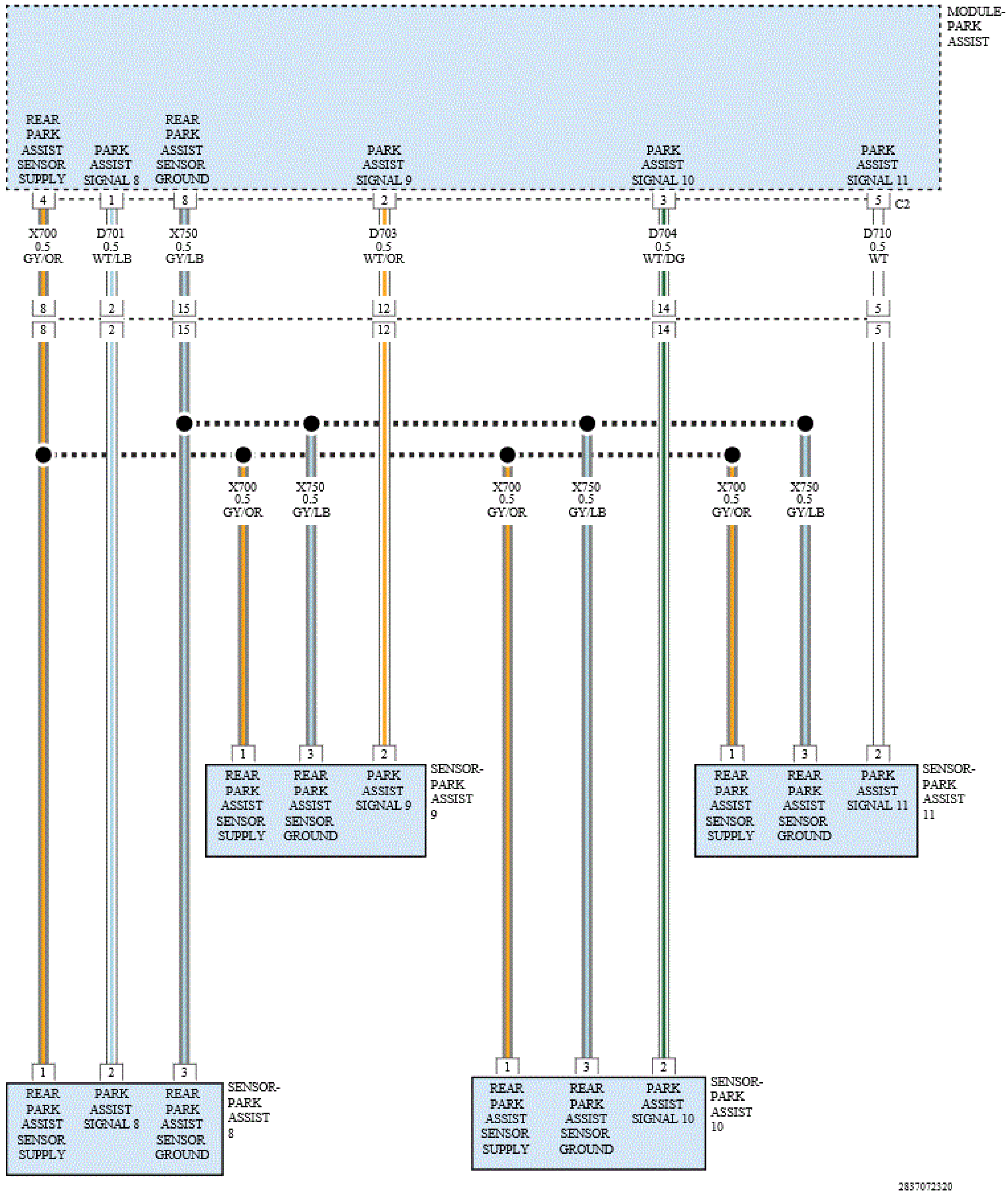
    - Replace the Park Assist Module in accordance with Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Repair the (D710) Park Assist Sensor 11 Signal circuit for an open.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B212B-11-REAR SENSORS POWER SUPPLY-CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 13: PTS Sensor 8, 9, 10, 11 & Rear Sensors - Circuit Diagram]

Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Park Assist Sensors are ultrasonic transceivers that are controlled by the Park Assist Module. The sensors transmit and receive ultrasonic signals. Each sensor has a voltage, signal, and return circuit to the module. The sensors communicate with the Park Assist Module using a dedicated serial bus communication circuit.

NOTE: **The numbering system for the park assist sensors allows for up to twelve sensors on the vehicle, six front and six rear. The sensors are numbered in a clockwise manner starting at the left front bumper. The left front sensor (if**

equipped with front park assist) is the number 1 sensor. The numbering continues in a clockwise direction around the vehicle.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

Default Actions:

DEFAULT ACTION

- Park Assist Module is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE SRVS REAR SENSORS message on the cluster.

POSSIBLE CAUSES

Possible Causes
REAR PARK ASSIST SENSOR SUPPLY CIRCUIT SHORTED TO GROUND
REAR PARK ASSIST SENSOR HARNESS SHORTED TO GROUND
REAR PARK ASSIST SENSOR
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read PAM DTCs and record on the repair order.
    2. With the scan tool, erase DTCs.
    3. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    4. With the scan tool, read PAM DTCs.

       Did the DTC return?

       Yes

       - Go To 2

       No

       - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK THE REAR PARK ASSIST SENSOR WIRING HARNESS**
    1. Turn the ignition off.
    2. Disconnect the Park Assist Sensor wiring harness from the vehicle.
    3. With the scan tool, erase DTCs.
    4. Turn the ignition on.
    5. With the scan tool, read PAM DTCs.

    Did the DTC return?

    Yes

    - Go To 3

    No

    - Go To 4
3. **CHECK THE (X700) PARK ASSIST SENSOR SUPPLY CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the Park Assist Module C2 harness connector.
    3. Check for continuity between ground and the (X700) Park Assist Sensor Supply circuit at the Park Assist Module C2 harness connector.

    Is there continuity between ground and the (X700) Park Assist Sensor Supply circuit?

    Yes

    - Repair the (X700) Park Assist Sensor Supply circuit for a short to ground.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
4. **CHECK THE PARK ASSIST WIRING HARNESS FOR WIRE TO WIRE SHORTS**
    1. Disconnect all 4 Park Assist Sensors from the Park Assist harness connector.
    2. Check for continuity between the (X700) Park Assist Sensor Supply circuit and all other circuits at the Rear Park Assist harness connector.

    Is there continuity between the (X700) Park Assist Sensor Supply circuit and any other circuit?

    Yes

    - Repair the (X700) Park Assist Sensor Supply circuit for a short to another circuit.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

- Go To 5

5. **CHECK FOR AN INTERNALLY SHORTED OUT PARK ASSIST SENSOR**
    1. Reconnect the Park Assist Module C2 harness connector.
    2. Reconnect all Park Assist sensors except for Park Assist Sensor 8.
    3. Reconnect the Park Assist Sensor wiring harness.
    4. With the scan tool, erase DTCs.
    5. With the scan tool, read PAM DTCs.

    Did the DTC return?

    Yes

    - Go To 6

    No

    - Replace the Park Assist Sensor 8 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
6. **CHECK THE REMAINING PARK ASSIST SENSORS FOR AN INTERNALLY SHORTED OUT SENSOR**
    1. Disconnect Park Assist Sensor 9.
    2. With the Scan tool, erase DTCs.
    3. Turn the ignition on.
    4. With the scan tool, read PAM DTCs.

    Did the DTC return?

    Yes

    - Go To 7

    No

    - Replace the Park Assist Sensor 9 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
7. **CHECK THE REMAINING PARK ASSIST SENSORS FOR AN INTERNALLY SHORTED OUT SENSOR**
    1. Disconnect Park Assist Sensor 10.
    2. With the Scan tool, erase DTCs.
    3. Turn the ignition on.
    4. With the scan tool, read PAM DTCs.

    Did the DTC return?

Yes

- Go To 8

No

- Replace the Park Assist Sensor 10 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

8. **CHECK THE REMAINING PARK ASSIST SENSORS FOR AN INTERNALLY SHORTED OUT SENSOR**
    1. Disconnect Park Assist Sensor 11.
    2. With the Scan tool, erase DTCs.
    3. Turn the ignition on.
    4. With the scan tool, read PAM DTCs.

    Did the DTC return?

    Yes

    - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Replace the Park Assist Sensor 11 in accordance with the Service Information. Refer to **SENSOR, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B2199-16-BATTERY VOLTAGE-CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

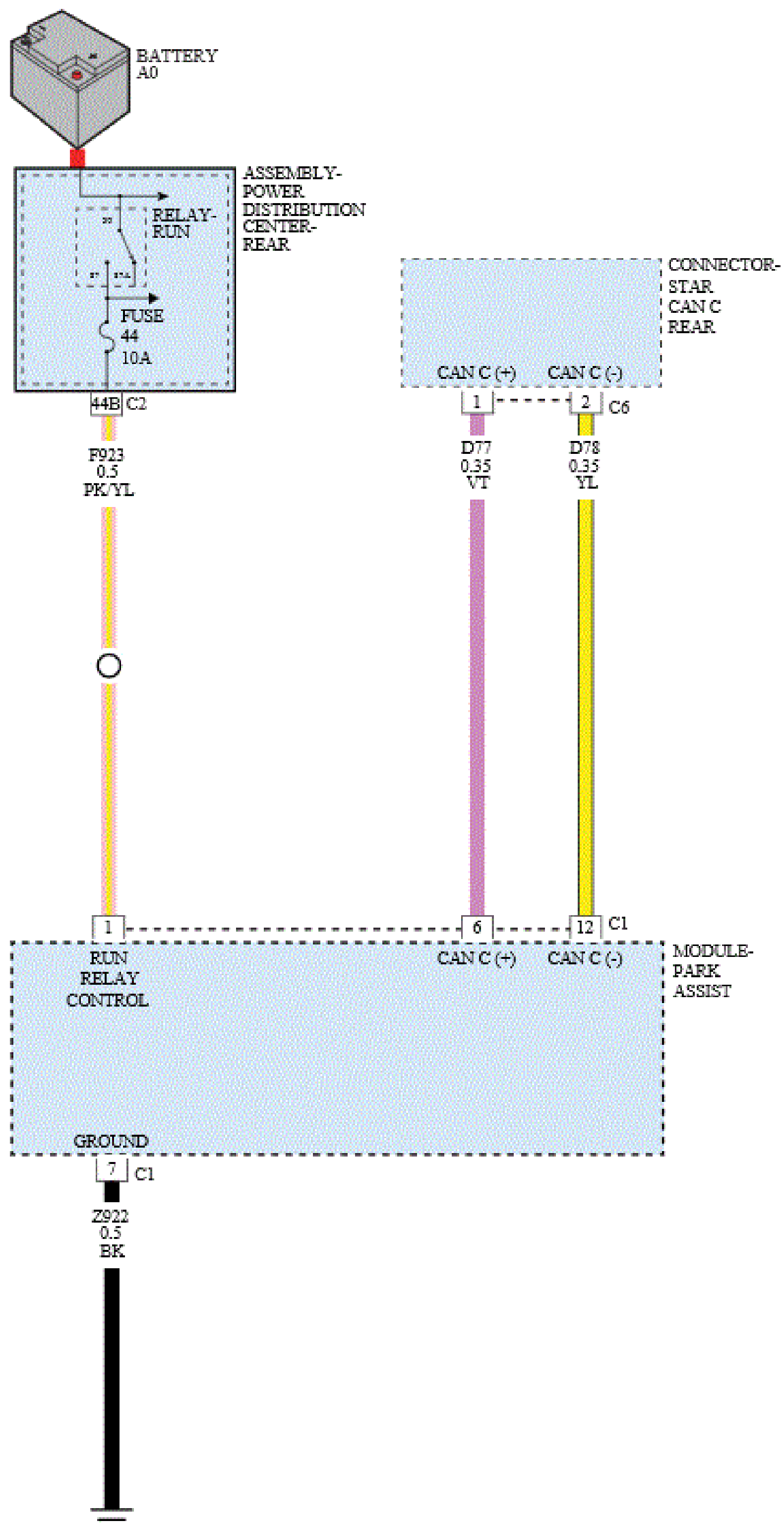


Fig. 14: Park Module Assist Module Battery Voltage - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- Park Assist Module supply voltage less than 6.5 volts.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE DISABLED

POSSIBLE CAUSES

Possible Causes
VEHICLE CHARGING SYSTEM
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read PAM DTCs and record on the repair order.
    2. With the scan tool, erase DTCs.
    3. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    4. With the scan tool, read PAM DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension and repair as necessary. If no problems are found, test complete.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **VERIFY OPERATION OF THE VEHICLE CHARGING SYSTEM**

    NOTE: **Troubleshoot any PCM charging/cranking DTCs before proceeding.**

    NOTE: **Make sure the battery is fully charged.**

    Are any charging system DTCs present?

    Yes

- Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B2199-17-BATTERY VOLTAGE-CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

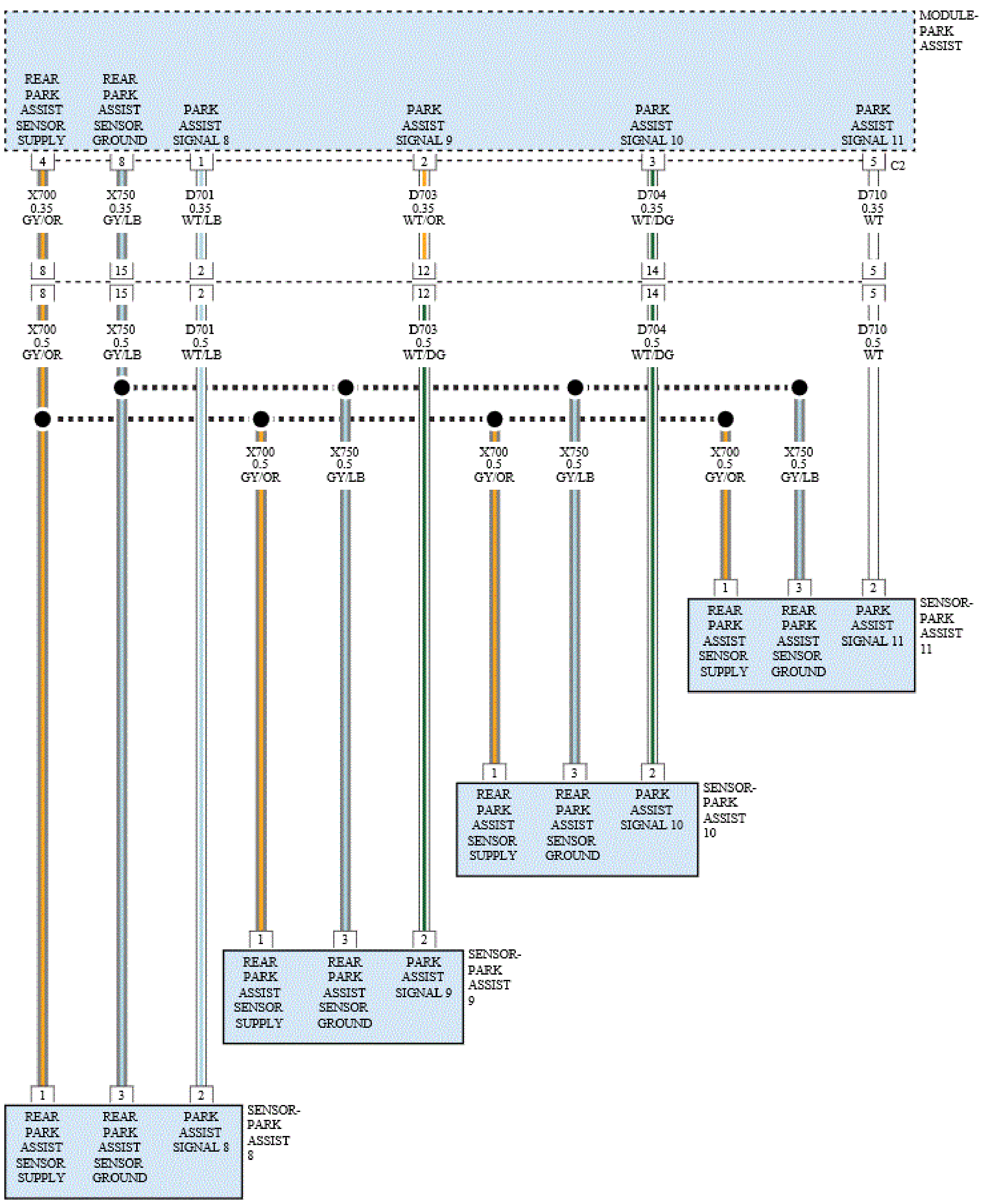


Fig. 15: Park Assist Battery Voltage - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- Park Assist Module supply voltage greater than 16.0 volts.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE DISABLED

POSSIBLE CAUSES

Possible Causes
VEHICLE CHARGING SYSTEM
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. Verify the Park Assist Sensor is connected before proceeding with this diagnostic procedure.

       NOTE: A disconnected sensor will set this DTC.

    2. With the scan tool, read PAM DTCs and record on the repair order.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read PAM DTCs.

       Did the DTC return?

       Yes

       - Go To 2

       No

       - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **VERIFY OPERATION OF THE VEHICLE CHARGING SYSTEM**

NOTE: **Troubleshoot any PCM charging/cranking DTCs before proceeding.**

NOTE: **Make sure the battery is fully charged.**

Are any charging system DTCs present?

Yes

- Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B21DD-84-SYSTEM VOLTAGE-SIGNAL BELOW ALLOWABLE RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

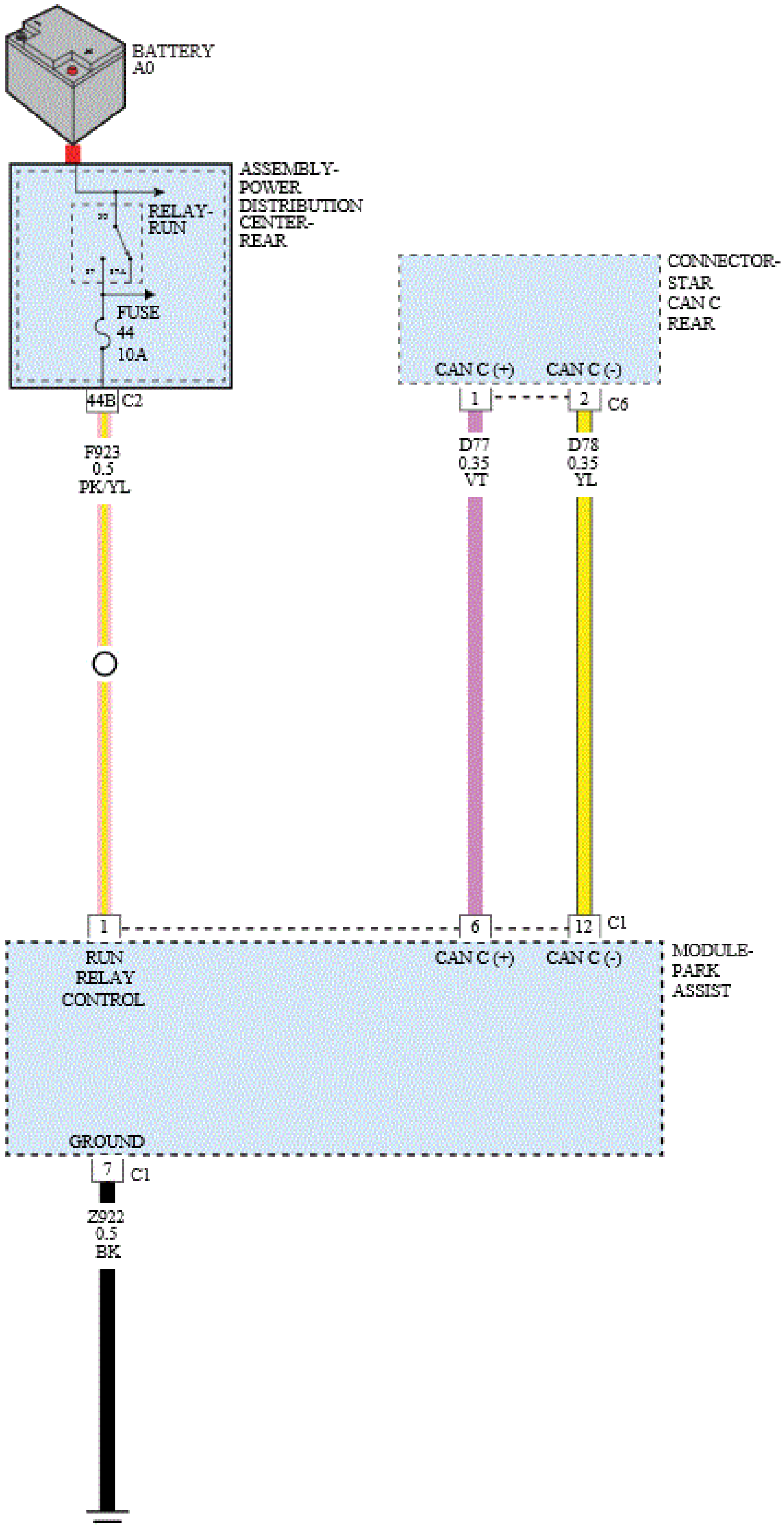


Fig. 16: Park Module Assist Module Battery Voltage - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- Vehicle System voltage less than 6.5 volts.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE DISABLED

POSSIBLE CAUSES

Possible Causes
VEHICLE CHARGING SYSTEM
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read PAM DTCs and record on the repair order.
    2. With the scan tool, erase DTCs.
    3. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    4. With the scan tool, read PAM DTCs.

       Did the DTC return?

       Yes

       - Go To 2

       No

       - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **VERIFY OPERATION OF THE VEHICLE CHARGING SYSTEM**

   NOTE: **Troubleshoot any PCM charging/cranking DTCs before proceeding.**

   NOTE: **Make sure the battery is fully charged.**

   Are any charging system DTCs present?

   Yes

..

- Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B21DD-85-SYSTEM VOLTAGE-SIGNAL ABOVE ALLOWABLE RANGE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

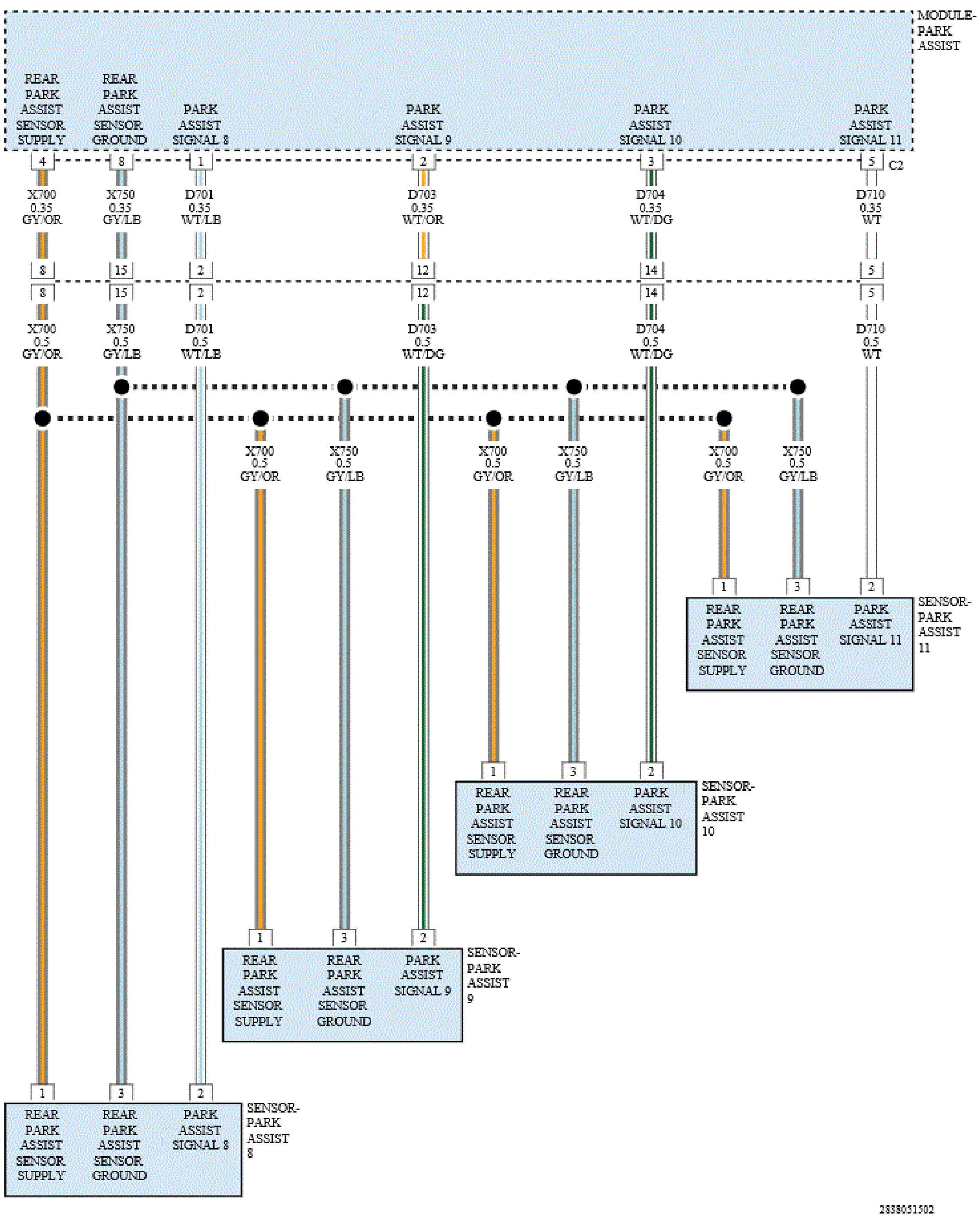


Fig. 17: Park Assist Battery Voltage - Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Vehicle in reverse.
- During the self-test while vehicle is in drive between 11 km/h (7 mph) and 40 km/h (25 mph).

SET CONDITION

- Vehicle System voltage greater than 16.0 volts.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE DISABLED

POSSIBLE CAUSES

Possible Causes
VEHICLE CHARGING SYSTEM
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read PAM DTCs and record on the repair order.
    2. With the scan tool, erase DTCs.
    3. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    4. With the scan tool, read PAM DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **VERIFY OPERATION OF THE VEHICLE CHARGING SYSTEM**

NOTE: **Troubleshoot any PCM charging/cranking DTCs before proceeding.**

NOTE: **Make sure the battery is fully charged.**

Are any charging system DTCs present?

Yes

- Refer to **DTC INDEX** and perform the appropriate diagnostic procedure.

No

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B222A-00-VEHICLE LINE MISMATCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following condition is met:

- Ignition on.

SET CONDITION

- If the Vehicle Line data transmitted on the CAN C Interior bus doesn't correspond with the data stored in the Park Assist Module.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE DISABLED

POSSIBLE CAUSES

Possible Causes
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read PAM DTCs and record on the repair order.
    2. With the scan tool, erase DTCs.
    3. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    4. With the scan tool, read PAM DTCs.

Did the DTC return?

Yes

- Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK VEHICLE LINE IN THE BCM**
    1. With the scan tool, compare the vehicle line that is programmed in to the BCM to the vehicle line of the vehicle.

       Does the vehicle line programmed into the BCM match the vehicle?

       Yes

       - Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

       No

       - Use the scan tool to read DTCs in all other modules. If any communication DTCs are present, perform the appropriate diagnostic procedure. Perform any Technical Service Bulletins that apply. If no problems are found, test is complete.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

B2232-00-(PTS) PARKTRONICS INTERNAL

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following condition is met:

- Ignition on.

SET CONDITION

- The Park Assist Module detects an internal failure.

DEFAULT ACTION

- Park Assist Module is disabled.

POSSIBLE CAUSES

Possible Causes
PARK ASSIST MODULE

DIAGNOSTIC TEST

REPLACE THE PARK ASSIST MODULE

View Repair

Repair

- Replace the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

U0002-00-CAN C BUS OFF PERFORMANCE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

THEORY OF OPERATION

For an in-depth explanation of the CAN system operation, refer to **DESCRIPTION** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- Battery voltage above a calibrated value.

SET CONDITION

- CAN C bus has experienced a failure due to a circuit or processor fault.

POSSIBLE CAUSES

Possible Causes
OPEN OR SHORTED CAN C BUS CIRCUIT
CAN C RELATED MODULE
CAN C RELATED STAR CONNECTOR (IF EQUIPPED)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: **If the scan tool will not communicate with CAN C, proceed to SCAN TOOL DOES NOT COMMUNICATE WITH CAN C. Refer to SCAN TOOL DOES NOT COMMUNICATE WITH CAN C .**

1. With the scan tool, run a Vehicle Scan Report and attached it to the repair order.
2. With the scan tool, erase DTCs.

3. Using the Vehicle Scan Report, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
4. With the scan tool, read DTCs.

   Did the DTC return?

   Yes

   - Proceed to SCAN TOOL DOES NOT COMMUNICATE WITH CAN C. Refer to **SCAN TOOL DOES NOT COMMUNICATE WITH CAN C** .

   No

   - Go To 2

2. **ATTEMPT TO LOCATE AN INTERMITTENT CIRCUIT FAULT**

   NOTE: The scan tool LOSS OF COMM TEST will force the modules on the CAN C bus to continuously ping each other.

   1. With the scan tool, initiate the LOSS OF COMM TEST.

      NOTE: A value above 0 under the NUMBER OF NO RESPONSES can help indicate the location of a circuit fault while wiggling the related CAN C bus circuits.

      NOTE: The scan tool lag time between pings is almost 1 full second. Keep this in mind while wiggling the wires and connectors.

   2. In a systematic manner, wiggle the applicable CAN C circuits at each related module, in-line connector, and Star Connector (if equipped) while monitoring the NUMBER OF NO RESPONSES on the scan tool.

      Did the above test help locate the fault?

      Yes

      - Repair as necessary.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Go To 3

3. **PERFORM VISUAL INSPECTION OF CONNECTORS, TERMINALS AND WIRES**
   1. Disconnect all CAN C related module harness connectors.
   2. Disconnect all related in-line harness connections.
   3. Inspect the harness connectors, component connectors, and all male and female terminals for the following conditions:
      - Proper connector installation.

- Damaged connector locks.
- Corrosion.
- Signs of water intrusion.
- Weather seal damage (if equipped).
- Bent terminals.
- Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
- Terminals that have been pushed back into the connector cavity.
- Perform a terminal drag test on each connector terminal to verify proper terminal tension.

Repair any conditions that are found.

4. Reconnect all CAN C related module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
5. Reconnect all in-line harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
6. With the scan tool, erase DTCs.
7. Using the Vehicle Scan Report, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
8. With the scan tool, read DTCs.

Did the DTC return?

Yes

- Proceed to SCAN TOOL DOES NOT COMMUNICATE WITH CAN C. Refer to **SCAN TOOL DOES NOT COMMUNICATE WITH CAN C** .

No

- The conditions that caused this DTC to set are no longer present. Test complete.

U0100-00-LOST COMMUNICATION WITH ECM/PCM

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0101-00-LOST COMMUNICATION WITH TCM

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0121-00-LOST COMMUNICATION WITH ANTI-LOCK BRAKE SYSTEM (ABS) CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0140-00-LOST COMMUNICATION WITH BODY CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0155-00-LOST COMMUNICATION WITH CLUSTER-CCN

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to STANDARD PROCEDURE .

U0401-00-IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on.
- Vehicle in reverse.

SET CONDITION

- VIN data not received from Powertrain Control Module (PCM).

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE DISABLED

POSSIBLE CAUSES

Possible Causes
NO COMMUNICATION WITH POWERTRAIN CONTROL MODULE (PCM)
DTCS STORED OR ACTIVE IN THE PCM
ACTIVE COMMUNICATION DTCS IN THE BCM
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read PAM DTCs and record on the repair order.
    2. With the scan tool, erase DTCs.
    3. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    4. With the scan tool, read PAM DTCs.

       Did the DTC return?

       Yes

       - Go To 2

       No

       - The condition or conditions that originally set this DTC are not present at this time. Using the

wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension and repair as necessary. If no problems are found, test complete.

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **VERIFY PCM IS ACTIVE ON THE CAN BUS**
    1. With the scan tool, select ECU View.
    2. Verify that the PCM is active on the bus.

    Is the PCM active on the bus?

    Yes

    - Go To 3

    No

    - Perform the No Response from PCM diagnostic procedure. Refer to **NO RESPONSE FROM PCM (POWERTRAIN CONTROL MODULE) -- GAS** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
3. **DTCS STORED OR ACTIVE IN THE PCM**
    1. With the scan tool, read PCM DTCs and record on the repair order.

    Are any DTCs active or stored in the PCM?

    Yes

    - Perform the appropriate diagnostic procedure. Refer to **DTC INDEX** .

    No

    - Go To 4
4. **ACTIVE COMMUNICATION DTCS IN THE BCM**
    1. With the scan tool, select ECU View and select BCM.
    2. With the scan tool, read active DTCs.

    Are any Communication DTCs active in the BCM?

    Yes

    - Perform the appropriate diagnostic procedure. Refer to **DIAGNOSIS AND TESTING** .

    No

    - Replace and program the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

U0402-00-IMPLAUSIBLE DATA RECEIVED FROM TCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- With the ignition on for at least five seconds.
- Battery voltage between 10 and 16 volts.
- Body Control Module (BCM) is configured correctly.

SET CONDITION

- Whenever the communication data sent over the CAN BUS from the Transmission Control Module (TCM) is missing part of the message, the message is corrupted, or the message is an irrational value.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE DISABLED

POSSIBLE CAUSES

Possible Causes
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
BCM NOT CONFIGURED CORRECTLY
TRANSMISSION CONTROL MODULE POWERS OR GROUNDS
TRANSMISSION CONTROL MODULE
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read PAM DTCs and record on the repair order.
    2. With the scan tool, erase DTCs.
    3. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    4. With the scan tool, read PAM DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension and repair as

necessary. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **VERIFY TCM IS ACTIVE ON THE CAN BUS**
    1. With the scan tool, select ECU View.
    2. Verify that the TCM is active on the bus.

    Is the TCM active on the bus?

    Yes

    - Go To 3

    No

    - Refer to **NO RESPONSE FROM TCM (TRANSMISSION CONTROL MODULE) 8--SPEED** and perform the No Response from TCM diagnostic procedure.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
3. **DTCS STORED OR ACTIVE IN THE TCM**
    1. With the scan tool, read TCM DTCs.

    Are any DTCs active or stored in the TCM?

    Yes

    - Perform the appropriate diagnostic procedure.

    No

    - Go To 4
4. **ACTIVE COMMUNICATION DTCS IN THE BCM**
    1. With the scan tool, select ECU View and select BCM.
    2. With the scan tool, read active DTCs.

    Are any Communication DTCs active in the BCM?

    Yes

    - Refer to **DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

    No

    - Replace and program the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

U0415-00-IMPLAUSIBLE DATA RECEIVED FROM ABS

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Ignition on and the vehicle in reverse.

SET CONDITION

- Inaccurate or missing data from the Antilock Brake Module (ABS).

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE DISABLED

POSSIBLE CAUSES

Possible Causes
NO COMMUNICATION WITH ANTILOCK BRAKE MODULE (ABS)
DTCS STORED OR ACTIVE IN THE ANTILOCK BRAKE MODULE (ABS)
ACTIVE COMMUNICATION DTCS IN THE BCM
INACCURATE OR SIGNAL NOT AVAILABLE (SNA) WHEEL SPEED SENSOR (WSS) MESSAGES RECEIVED FROM THE ABS MODULE
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read PAM DTCs and record on the repair order.
    2. With the scan tool, erase DTCs.
    3. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    4. With the scan tool, read PAM DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension and repair as necessary. If no problems are found, test complete.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **VERIFY ABS IS ACTIVE ON THE CAN BUS**
    1. With the scan tool, select ECU View.

2. Verify that the ABS is active on the bus.

   Is the ABS active on the bus?

   Yes

   - Go To 3

   No

   - Refer to **NO RESPONSE FROM ABS (ANTI-LOCK BRAKE SYSTEM) MODULE** and perform the No Response from ABS diagnostic procedure.
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

3. **DTCS STORED OR ACTIVE IN THE ANTILOCK BRAKE MODULE (ABS)**
   1. With the scan tool, read ABS DTCs.

      Are any DTCs active or stored in the ABS?

      Yes

      - Refer to **DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

      No

      - Go To 4
4. **ACTIVE COMMUNICATION DTCS IN THE BCM**
   1. With the scan tool, select ECU View and select BCM.
   2. With the scan tool, read active DTCs.

      Are any Communication DTCs active in the BCM?

      Yes

      - Refer to **DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

      No

      - With the scan tool, communicate with the ABS Module and check for any inaccurate or Signal Not Available (SNA) wheel Speed Sensor (WSS) data sensor values. Repair as necessary.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

U0422-00-IMPLAUSIBLE DATA RECEIVED FROM BODY CONTROL MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- With the ignition on and the vehicle in reverse.

SET CONDITION

- Inaccurate or missing data received from the Body Control Module (BCM).

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE DISABLED

POSSIBLE CAUSES

Possible Causes
NO COMMUNICATION WITH THE BODY CONTROL MODULE (BCM)
DTCS STORED OR ACTIVE IN THE BCM
INACCURATE OR SIGNAL NOT AVAILABLE (SNA) MESSAGES RECEIVED FROM THE BCM
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read PAM DTCs and record on the repair order.
    2. With the scan tool, erase DTCs.
    3. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    4. With the scan tool, read PAM DTCs.

       Did the DTC return?

       Yes

       - Go To 2

       No

       - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension and repair as necessary. If no problems are found, test complete.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **VERIFY BCM IS ACTIVE ON THE CAN BUS**
    1. With the scan tool, select ECU View.
    2. Verify that the BCM is active on the bus.

       Is the BCM active on the bus?

       Yes

- Go To 3

No

- Refer to **NO RESPONSE FROM BCM (BODY CONTROL MODULE)** and perform the No Response from BCM diagnostic procedure.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

3. **DTCS STORED OR ACTIVE IN THE BCM**
    1. With the scan tool, read BCM DTCs and record on the repair order.

    Are any DTCs active or stored in the BCM?

    Yes

    - Refer to **DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

    No

    - Replace and program the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

U0423-00-IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- Park Assist Module supply voltage between 9-16 volts.
- Ignition in Run/Start.

SET CONDITION

- Incorrect ignition status received from the Cluster.

DEFAULT ACTION

- Park Assist is disabled.
- The Electronic Vehicle Information Center (EVIC) will display PARKING ASSISTANCE DISABLED

POSSIBLE CAUSES

Possible Causes
NO COMMUNICATION WITH CLUSTER
DTCS STORED OR ACTIVE IN THE CLUSTER
ACTIVE COMMUNICATION DTCS IN THE BODY CONTROL MODULE (BCM)
PARK ASSIST MODULE

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read PAM DTCs and record on the repair order.
    2. With the scan tool, erase DTCs.
    3. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    4. With the scan tool, read PAM DTCs.

    Did the DTC return?

    Yes

    - Go To 2

    No

    - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension and repair as necessary. If no problems are found, test complete.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **VERIFY CLUSTER IS ACTIVE ON THE CAN BUS**
    1. With the scan tool, select ECU View.
    2. Verify that the Cluster is active on the bus.

    Is the Cluster active on the bus?

    Yes

    - Go To 3

    No

    - Refer to **NO RESPONSE FROM IPC (INSTRUMENT PANEL CLUSTER)** and perform the No Response from Cluster/CCN diagnostic procedure.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
3. **DTCS STORED OR ACTIVE IN THE CLUSTER**
    1. Check for DTCs in the Cluster.

    Are any DTCs active or stored in the Cluster?

    Yes

    - Refer to **DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

    No

- Go To 4

4. **ACTIVE COMMUNICATION DTCS IN THE BCM**
    1. With the scan tool, select ECU View and select BCM.
    2. With the scan tool, read active DTCs.

    Are any Communication DTCs active in the BCM?

    Yes

    - Refer to **DIAGNOSIS AND TESTING** and perform the appropriate diagnostic procedure.

    No

    - Replace and program the Park Assist Module in accordance with the Service Information. Refer to **MODULE, PARK ASSIST, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

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Article GUID: A00735892

2015-16 ELECTRICAL

Power Distribution - Challenger

DESCRIPTION

DESCRIPTION

The power distribution system for this vehicle consists of the following components:

- Front Power Distribution Center (PDC) - located in the engine compartment
- Rear PDC - located in trunk
- Power Outlets - One outlet is located on the right side wall of the center console and the second outlet is located internal to the center bin storage compartment.
- Two Universal Serial Bus (USB) charging ports are located on the back of the center console.

For complete circuit schematics, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

The power distribution system also incorporates various types of circuit control and protection features, including:

- Automatic resetting circuit breakers
- Blade-type fuses
- Cartridge fuses
- Relays
- Mini fuses

CENTER, POWER DISTRIBUTION (PDC)

DESCRIPTION

DESCRIPTION

The majority of electrical system fuses and relays are housed in the two Power Distribution Centers (PDC). Both of the PDC assemblies are replaced only as part of the body wiring harness.

For fuse description and layout, refer to **FUSE - RELAY LOCATIONS AND TYPES, SPECIFICATIONS** .

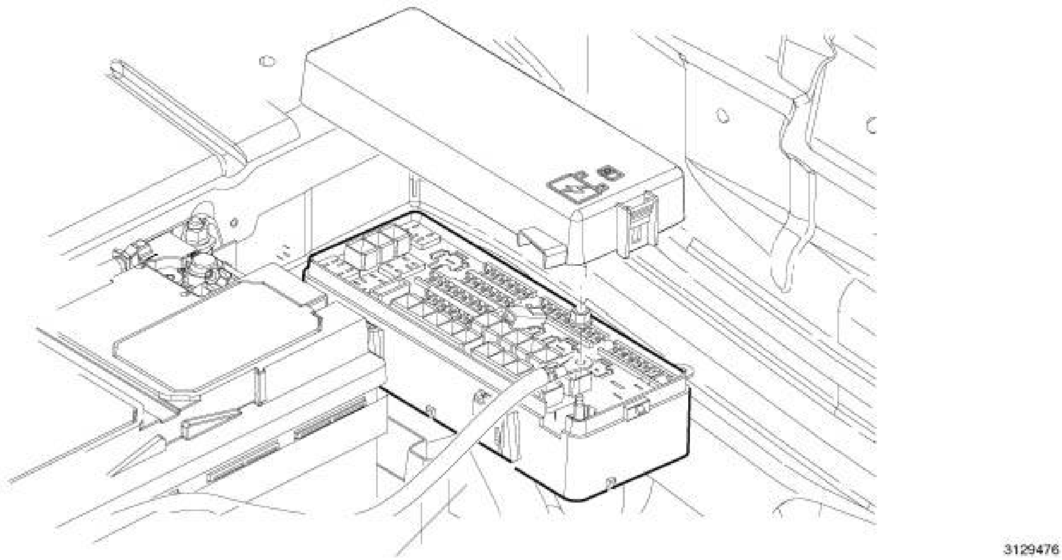


Fig. 1: Identifying Rear PDC
Courtesy of CHRYSLER GROUP, LLC

Rear PDC located in the truck next to the battery.

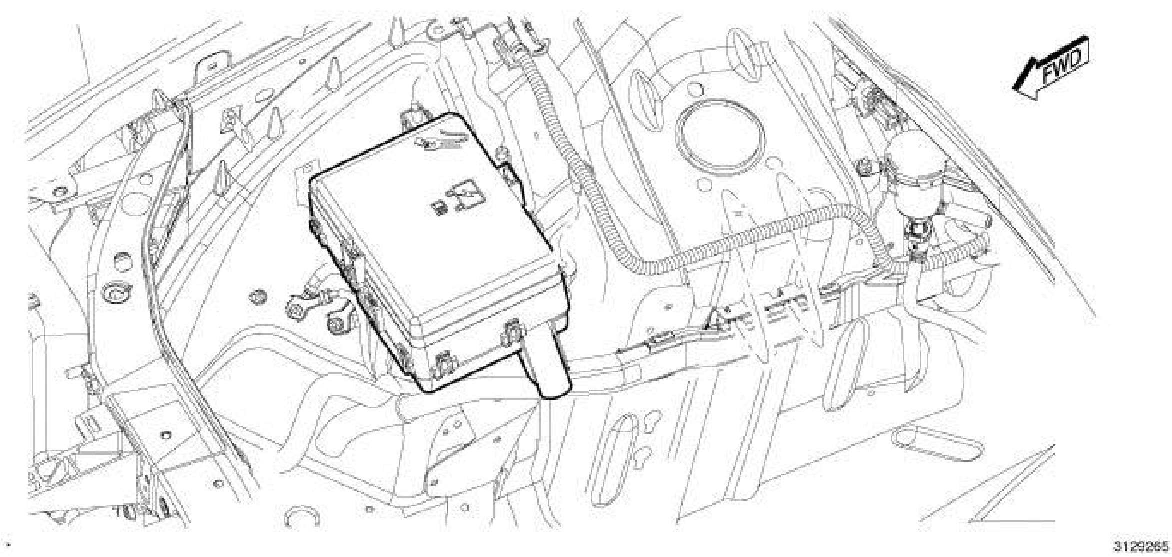


Fig. 2: Identifying Front PDC
Courtesy of CHRYSLER GROUP, LLC

Front PDC located in the engine compartment on the passenger side fender.

OUTLET, POWER, 12 V

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.

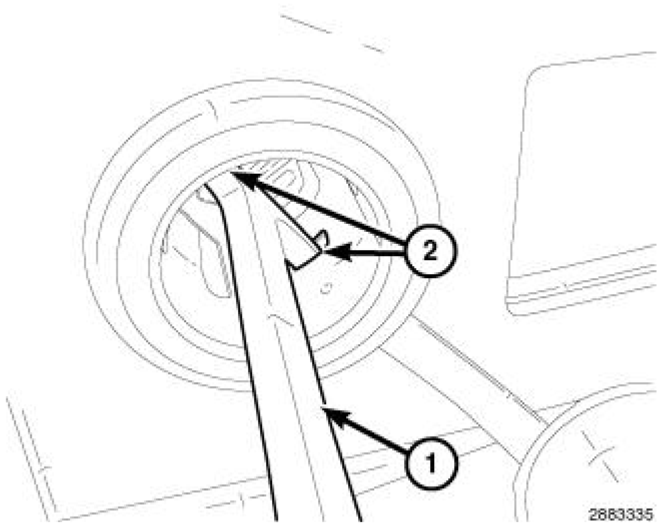


Fig. 3: Inserting Power Outlet Remover Special Tool
Courtesy of CHRYSLER GROUP, LLC

2. Look inside and note position of the retaining bosses (2).
3. Insert Remover, Power Outlet (special tool #10246, Remover, Power Outlet) (1) into the retaining bosses (2) of the power outlet.
4. Pull out the base through the mounting ring by gently rocking the tool.

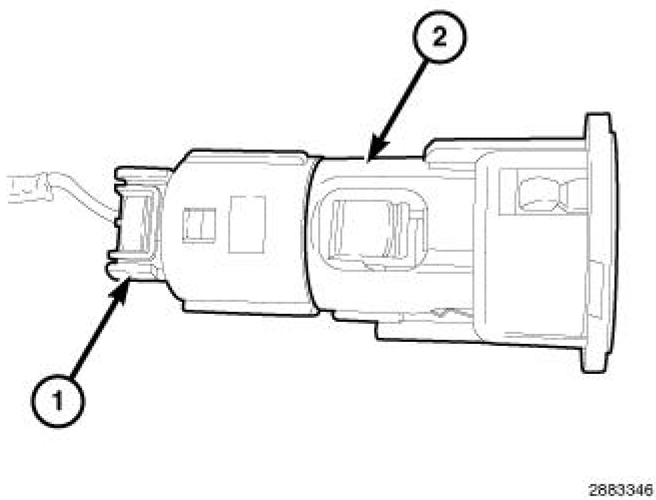


Fig. 4: Power Outlet & Connector
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the harness connector (1) from the power outlet (2).
6. Set the base aside and remove the base mount ring.

INSTALLATION

INSTALLATION

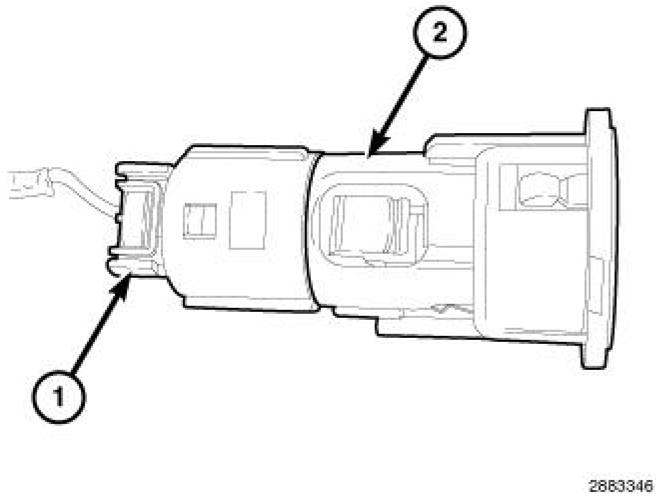


Fig. 5: Power Outlet & Connector
Courtesy of CHRYSLER GROUP, LLC

1. Connect the harness connector (1) to the power outlet receptacle (2).
2. Install the power outlet mount ring into the panel.
3. Align the splines on the outside of the power outlet receptacle base connector receptacle with the grooves on the inside of the mount ring.
4. Press firmly on the power outlet receptacle base until the retaining bosses of the mount ring are fully engaged in their receptacles.
5. Connect the battery negative cable.

Article GUID: A00735977

2015-16 ACCESSORIES AND EQUIPMENT

Power Locks - Service Information - Challenger

DESCRIPTION

DESCRIPTION

A power operated door and decklid lock system is standard factory-installed equipment on this vehicle. The power lock system allows all of the doors and the trunk to be locked or unlocked electrically. Locking or unlocking the vehicle using the power lock system can be accomplished by up to three different methods:

- **Power Lock System** - Operating a power lock system switch on either front door inside trim panel will lock or unlock the latches of all doors. Operating a trunk release switch on the instrument panel will unlatch the deck lid.
- **Remote Keyless Entry System** - Depressing the **Lock** or **Unlock** button of the standard equipment Remote Keyless Entry (RKE) system transmitter (also known as the FOB with Integrated Key/FOBIK) can also be used to lock or unlock the latches of the doors. Depressing the **Trunk Release** button of the RKE transmitter will unlatch the deck lid. The specific locks operated and the number of FOBIK button presses required varies depending upon the Customer Programmable settings chosen by the vehicle operator.
- **Passive Entry System** - Contacting the capacitive **Unlock** switch on the inside of either exterior front door Smart handle pull or depressing the tactile **Lock** button of either front door Smart handle while a valid FOBIK is identified in that same zone can be used to lock or unlock the doors. Also depressing the tactile **Unlock** button on the lens of the deck lid Center High Mounted Stop Lamp (CHMSL) while a valid FOBIK is identified in that same zone can be used to unlatch the deck lid. The specific locks operated varies depending upon the Customer Programmable settings chosen by the vehicle operator.

Additional details of each of these subsystems and their components can be found in the subheadings and paragraphs that follow.

PASSIVE ENTRY SYSTEM

An optional Passive Entry (PE) system is available factory-installed equipment for this vehicle. The PE system allows the vehicle to be unlocked without the use of a key, as long as an authorized FOB with Integrated Key (FOBIK) is in the possession of, or in close proximity to the individual and the aperture of the vehicle that is to be unlocked. All other features and Customer Programmable feature settings of the power lock system and the Remote Keyless Entry (RKE) system function the same as they would on vehicles without the PE system option.

The PE system includes the following major components, which are described in further detail elsewhere in this service information:

- **Deck Lid Latch Release Switch** - A tactile deck lid latch release switch is located on the right side of the lens of the Center High Mounted Stop Lamp (CHMSL) in the center of the vertical rear deck lid surface. Only the resilient black switch push button membrane is visible on the outside of the CHMSL lens.
- **Door Handle Switches** - Each PE door outside handle (also known as a Smart handle) is equipped with three switches and an Integrated Circuit (IC). A tactile Lock switch is located on the outer horizontal

surface of each door handle pull, a capacitive Unlock switch membrane is located on the inner vertical surface of the handle pull, while a Hall effect switch and an IC are concealed within the handle pull unit.

- **Low Frequency Antennas** - The PE system includes five Low Frequency (LF) antennas, one mounted on the underside of the center floor console, one on inside each lower quarter trim panel, one at the forward edge of the spare tire well within the trunk compartment and one on the rear fascia bracket above the license plate tub and to the right of the license plate lamp concealed behind the rear fascia at the rear of the vehicle.
- **Radio Frequency Hub** - The Radio Frequency Hub (also known as the RF Hub) is the Passive Entry Keyless Go (PEKG) system control module and RF receiver located on the shelf support behind the rear seat and is concealed beneath the package tray interior trim. Refer to **MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION** .

Hard wired circuitry connects many of the PE system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the PE system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

POWER LOCK SYSTEM

The power lock system includes the following major components, which are described in further detail elsewhere in this service information:

- **Body Control Module** - The Body Control Module (BCM) is located beneath the instrument panel on the passenger side of the vehicle. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Deck Lid Release Switch** - A switch on the instrument panel to the left of the steering column will unlatch the deck lid only when the automatic transmission gear selector is in the PARK position, or when the manual transmission vehicle speed is below 8 kilometers-per-hour (5 miles-per-hour).
- **Door Modules** - The Driver Door Module (DDM) and Passenger Door Module (PDM) are located on their respective driver and passenger door hardware module carriers and are concealed behind the door inside trim panels. Refer to **MODULE, DOOR, DESCRIPTION** .
- **Electronic Vehicle Information Center** - The Electronic Vehicle Information Center (EVIC) includes the EVIC switches and the U-Connect Touch™ screen module in the Integrated Center Stack (ICS) located in the center stack area of the instrument panel.
- **Power Lock Motors** - A reversible electric power lock motor is integral to the latch of door and the deck lid.
- **Power Lock Switches** - A power lock switch is integral to the switch module located on the forward end of the arm rest of each door inside trim panel.

These components and their controls are combined to provide the following power lock system central locking and unlocking features:

- **Automatic Door Locking** - Automatic door locking (also known as rolling door locks) automatically locks any unlocked door when the vehicle speed exceeds about 25.7 kilometers per hour (15 miles per

hour). This is a Customer Programmable feature.

- **Automatic Door Unlocking** - Automatic door unlocking (also known as automatic unlock doors on exit) automatically unlocks the doors after they were automatically locked when the vehicle speed exceeded about 25.7 kilometers per hour (15 miles per hour), the vehicle speed has returned to zero, the transmission shift lever is in the **Neutral** or **Park** positions and the driver side front door is opened. This is a Customer Programmable feature.
- **Customer Programmable Features** - The vehicle operator interfaces with the BCM, which is the power lock system controller, using the EVIC. EVIC switches allow the vehicle operator to set or change the power lock system Customer Programmable Features through the U-Connect Touch™ screen module EVIC display.
- **Door Lock Inhibit** - Prevents locking the doors using a power door lock switch or the **Lock** button of the Remote Keyless Entry (RKE) system transmitter (also known as the FOB with Integrated Key/FOBIK) if the key is in the ignition and the driver side front door is open.
- **Enhanced Accident Response System** - In the event of a vehicle impact that causes airbag deployment but leaves vehicle electrical power intact, the Enhanced Accident Response System (EARS) automatically turns OFF the supply of fuel to the engine, turns ON the interior courtesy lamps, turns ON the hazard warning flashers and unlocks the doors after the vehicle speed has returned to zero. This helps emergency responders in their efforts to render the appropriate assistance. The courtesy lamps and hazard flashers remain ON as long as the battery has power or until the ignition is cycled to OFF.
- **Illuminated Entry** - Automatic illumination of the interior courtesy lamps when the vehicle is unlocked using the power lock system.

Hard wired circuitry connects the power lock system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the power lock system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

REMOTE KEYLESS ENTRY SYSTEM

The Remote Keyless Entry (RKE) system is standard factory-installed equipment on this vehicle. The RKE system includes the following major components, which are described in further detail elsewhere in this service information:

- **Electronic Vehicle Information Center** - The Electronic Vehicle Information Center (EVIC) is a digital display integral to the Integrated Center Stack (ICS). The EVIC includes the EVIC switches and the U-Connect Touch™ screen module located in the center stack area of the instrument panel. Refer to CENTER, ELECTRONIC VEHICLE INFORMATION, DESCRIPTION .
- **Radio Frequency Hub Module (RFHM)** - The RFHM is the RKE system control module and RF receiver located on the shelf support behind the rear seat and is concealed beneath the package tray interior trim. Refer to MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION .
- **Remote Keyless Entry System Transmitter** - The FOBIK is the battery powered, wireless and portable Radio Frequency (RF) user controller for all of the features of the RKE system.

These components and their controls are combined to provide the following RKE system features:

- **Customer Programmable Features** - The vehicle operator interfaces with the RFHM, which is the RKE system controller, using the EVIC. EVIC switches allow the vehicle operator to set or change the RKE system Customer Programmable Features through the U-Connect Touch™ screen module EVIC display.
- **Flash Lights With Lock And Unlock** - This is a Customer Programmable feature of the RKE system. The first option has the park lamps flash as an optical verification that the RKE system has received a valid **Lock** or **Unlock** request from the FOBIK. The second option disables the optical verification feature.
- **Panic Feature** - In certain markets the FOBIK may also be equipped with a red **Panic** button. Depressing the **Panic** button of the FOBIK while within transmitter range will sound the vehicle signal horn and flash the exterior lighting of the vehicle for about three minutes or until the **Panic** button is depressed a second time, whichever occurs first. Attaining a vehicle speed of about 25.7 kilometers per hour (15 miles per hour) will also cancel the panic event.
- **Programming Additional Transmitters** - Two RKE transmitters are shipped with the vehicle from the factory, but the RKE system can retain the vehicle access codes of up to a total of eight transmitters. The transmitter codes are retained in the RKE system controller memory, even if the battery is disconnected. If a FOBIK is ineffective, lost or an additional FOBIK is desired, new transmitter vehicle access codes can be programmed into the system using a diagnostic scan tool.
- **Remote Deck Lid Unlatching** - Depressing the **Trunk Release** button of the FOBIK twice within 5 seconds while within transmitter range will unlatch the deck lid of the vehicle.
- **Remote Engine Start** - On vehicles equipped with the optional Remote Starting System, depressing the **Remote Start** button of the FOBIK twice while within transmitter range will start the engine of the vehicle.
- **Remote Locking** - Depressing the **Lock** button of the FOBIK while within transmitter range will lock all of the vehicle doors.
- **Remote Unlocking** - Depressing the **Unlock** button of the FOBIK while within transmitter range will unlock the vehicle and activate the Illuminated Entry System. The specific locks operated and the number of FOBIK button presses required varies depending upon the Customer Programmable settings chosen by the vehicle operator.
- **Remote Unlock Sequence** - This is a Customer Programmable feature of the RKE system. There are two options available. The first option allows only the driver side front door to unlock when the FOBIK **Unlock** button is depressed one time, and the remaining doors unlock when the button is depressed a second time within 5 seconds of the first press. The second option allows all doors to unlock upon a single press of the FOBIK **Unlock** button.
- **Sound Horn On Lock** - This is a Customer Programmable feature of the RKE system. There are two options available. The first option has the signal horn of the vehicle sound a short chirp as an audible verification that the RKE system received a valid **Lock** request from the FOBIK. The second option disables the audible verification feature.
- **Vehicle Theft Security System Arming** - If the vehicle is equipped with the optional Vehicle Theft Security System (VTSS), depressing the **Lock** button of the FOBIK while within transmitter range will arm the VTSS in addition to activating the remote locking feature.
- **Vehicle Theft Security System Disarming** - If the vehicle is equipped with the optional Vehicle Theft Security System (VTSS), depressing the **Unlock** button of the FOBIK while within transmitter range will disarm the VTSS in addition to activating the remote unlocking feature.

Hard wired circuitry connects many of the RKE system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the RKE system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

POWER LOCK SYSTEM

The power lock system uses non-switched battery current received through a fused B(+) fuse in the Body Control Module (BCM) so that the system remains operational regardless of the ignition switch position. The BCM is the primary power lock system controller. The power lock switches are hard wired to their respective Driver Door Module (DDM) or Passenger Door Module (PDM). The BCM, the DDM and the PDM all communicate with each other and with other electronic modules in the vehicle over the Controller Area Network (CAN) data bus.

When a door module receives an input from a power lock switch, it sends the appropriate electronic **Lock Request** or **Unlock Request** message to the BCM over the CAN data bus. The BCM responds to these request messages by providing the appropriate outputs to each of the power lock motors to lock or unlock each of the door latches. The BCM also monitors a hard wired input from the deck lid release switch and electronic message inputs indicating automatic transmission gear selector position and vehicle speed. The BCM uses all of these inputs and internal programming to determine whether or not to provide the output necessary to operate the deck lid latch release motor.

The BCM also stores the power lock system Customer Programmable feature settings received over the CAN data bus from the Electronic Vehicle Information Center (EVIC). The BCM uses these settings and internal programming along with hard wired and electronic message inputs to determine the proper outputs needed to produce each of the appropriate power lock system features.

The power lock system circuits are continually monitored and controlled by the microcontroller and software contained within the BCM, the DDM and the PDM. When one of these modules monitors a problem in any of the power lock system circuits or components, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit. The hard wired circuits between components related to the power lock system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the power lock system or the electronic controls or communication between other modules and devices that provide features of the power lock system. The most reliable, efficient, and accurate means to diagnose the power lock system or the electronic controls and communication related to power lock system operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOTE KEYLESS ENTRY SYSTEM

The Remote Keyless Entry (RKE) system uses non-switched battery current received through a fused B(+) fuse in the Body Control Module (BCM) so that the system remains operational regardless of the ignition switch position. The Radio Frequency Hub Module (RFHM) is the primary RKE system controller as well as the Radio Frequency (RF) RKE receiver. The RFHM validates the vehicle access code of each RKE transmitter (also known as FOB with Integrated Key/FOBIK) from which it receives RF signal inputs. It ignores requests from any transmitter for which it has no stored vehicle access code.

The RFHM communicates and shares resources with the BCM and many other electronic modules in the vehicle over the CAN data bus. The RFHM also stores the RKE system Customer Programmable feature settings received over the CAN data bus from the Electronic Vehicle Information Center (EVIC). When the RFHM receives an input from a valid transmitter source, it uses these settings and internal programming to send the appropriate electronic request messages to the BCM and other electronic modules over the CAN data bus to invoke the proper RKE system features and responses.

The RKE system circuits and transmitter inputs are continually monitored by the microcontroller and software contained within the RFHM. When the RFHM monitors a problem in any of the RKE system circuits or transmitters, it stores a Diagnostic Trouble Code (DTC) in its memory circuit. The hard wired circuits between components related to the RKE system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RKE system or the electronic controls or communication between other modules and devices that provide features of the RKE system. The most reliable, efficient, and accurate means to diagnose the RKE system or the electronic controls and communication related to RKE system operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

PASSIVE ENTRY SYSTEM

In the Passive Entry (PE) system the doors are unlocked passively; however, they must still be locked actively after exiting the vehicle using the tactile **Lock** button on either front door handle. When the system senses a hand approaching the capacitive switch in the door handle pull or detects a button press of the deck lid release switch, it sends out challenge messages through the Low Frequency (LF) antennas to authenticate the presence and location of a valid FOB with Integrated Key (FOBIK).

The FOBIK responds by sending a Ultra High Frequency (UHF) message back to the receiver within the Radio Frequency Hub Module (RFHM). If the RFHM determines the FOBIK is valid and that it is located outside the vehicle in the same zone or vicinity as the door handle or deck lid switch being activated, it sends an electronic **Unlock Request** message over the Controller Area Network (CAN) data bus to the Body Control Module (BCM) to automatically unlock and allow entry to that aperture.

The PE system circuits and FOBIK inputs are continually monitored by the microcontroller and software contained within the RFHM. When the RFHM monitors a problem in any of the PE system circuits or FOBIK inputs, it stores a Diagnostic Trouble Code (DTC) in its memory circuit. The hard wired circuits between components related to the PE system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and

connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the PE system or the electronic controls or communication between other modules and devices that provide features of the PE system. The most reliable, efficient, and accurate means to diagnose the PE system or the electronic controls and communication related to PE system operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER LOCKS AND REMOTE KEYLESS ENTRY SYSTEM

POWER LOCK SYSTEM

The following are tests that may help to diagnose the hard wired components and circuits of the power lock system. However, these tests may not prove conclusive in the diagnosis of this system. In order to obtain conclusive testing of the power lock system, the Controller Area Network (CAN) data bus and all of the electronic modules that provide inputs to, or receive outputs from the power lock system components must also be tested.

The most reliable, efficient, and accurate means to diagnose the power lock system requires the use of a diagnostic scan tool and the appropriate diagnostic information. The diagnostic scan tool can provide confirmation that the CAN data bus is functional, that all of the proper electronic modules are sending and receiving the proper electronic messages over the CAN data bus, and that the power lock motors are receiving the proper hard wired outputs from the Body Control Module (BCM) for them to perform their power lock system functions.

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

PRELIMINARY DIAGNOSIS

As a preliminary diagnosis for the power lock system, note the system operation while actuating both the Lock and Unlock functions with the power lock switches and with the Remote Keyless Entry (RKE) transmitter (also known as the FOB with Integrated Key/FOBIK). Then, proceed as follows:

1. If the entire power lock system fails to function with either the power lock switches or the FOBIK, check the fused B(+) fuse for the power lock system.
2. If the power lock system functions with both power lock switches, but not with the FOBIK, proceed to diagnosis of the RKE system.
3. If the power lock system functions with the FOBIK, but not with one or both power lock switches, proceed to diagnosis of the door lock switches.
4. If only one power lock motor fails to operate with both power lock switches and the RKE transmitter, proceed to diagnosis of the power lock motor.

REMOTE KEYLESS ENTRY SYSTEM

Following are tests that may help to diagnose the Remote Keyless Entry (RKE) system. However, these tests

may not prove conclusive in the diagnosis of this system. In order to obtain conclusive testing of the RKE system, the Controller Area Network (CAN) data bus network and all of the electronic modules that provide inputs to, or receive outputs from the RKE system components must also be tested.

The most reliable, efficient, and accurate means to diagnose the RKE system requires the use of a diagnostic scan tool and the appropriate diagnostic information. The diagnostic scan tool can provide confirmation that the CAN data bus is functional, that all of the proper electronic modules are sending and receiving the proper electronic messages over the CAN data bus, and that the Radio Frequency Hub (also known as the RF Hub) is being sent the proper Radio Frequency (RF) signals by the RKE transmitters (also known as FOB with Integrated Key/FOBIK) to perform its RKE system functions.

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

PRELIMINARY DIAGNOSIS

As a preliminary diagnosis for the RKE system, first confirm that the power lock system operates satisfactorily. If the power lock system fails to operate correctly, repair that problem before attempting to diagnose the RKE system. If the problem being diagnosed involves only one or more Customer Programmable features, check using the Electronic Vehicle Information Center (EVIC) or with a diagnostic scan tool to be certain that these programmable features are enabled. If the features are enabled and still fail to operate, the RF Hub and the CAN data bus must be tested. Next, note the RKE system operation while you perform both the Lock and Unlock functions with the FOBIK. Then, proceed as follows:

1. If the power lock system functions with both power lock switches, but not with the FOBIK, proceed to diagnosis of the FOBIK.
2. If the FOBIK checks okay, proceed to diagnosis of the RF Hub or the CAN data bus. The use of a diagnostic scan tool and the appropriate diagnostic information are required.

PASSIVE ENTRY SYSTEM

As a preliminary diagnosis for the Passive Entry (PE) system, first check using the Electronic Vehicle Information Center (EVIC). U-Connect™ menu options or with a diagnostic scan tool to be certain that this Customer Programmable feature is enabled. Next, confirm that the power lock system and the RKE system operate satisfactorily. If the power lock system or the RKE system fails to operate correctly, repair that problem before attempting to diagnose the PE system.

The most reliable, efficient, and accurate means to diagnose the PE system requires the use of a diagnostic scan tool and the appropriate diagnostic information. The diagnostic scan tool can provide confirmation that the CAN data bus is functional, that all of the proper electronic modules are sending and receiving the proper electronic messages over the CAN data bus, and that the Radio Frequency Hub Module (RFHM) is sending the proper Radio Frequency (RF) signals to and receiving the proper RF signals from the RKE transmitters (also known as FOB with Integrated Key/FOBIK) to perform its PE system functions.

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

ANTENNA, PASSIVE ENTRY

DESCRIPTION

DESCRIPTION

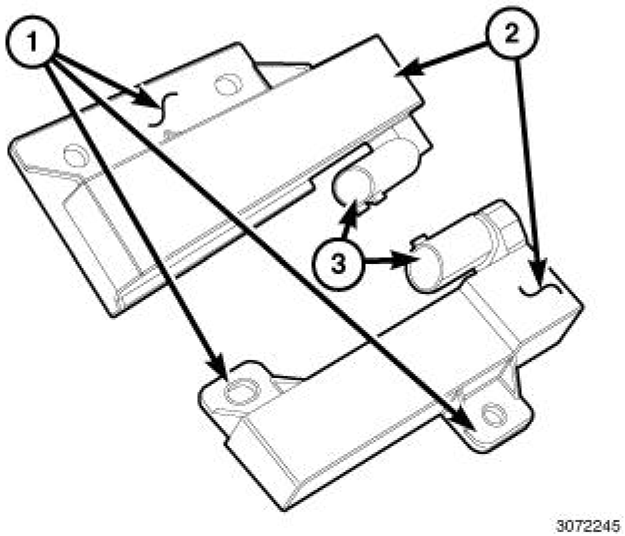


Fig. 1: Integral Connector Receptacle, Ferrite Antenna Units & Flanges
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the Passive Entry (PE) and Keyless Go (KG) systems have several Low Frequency (LF), ferrite antenna units (2) located within the vehicle. Each ferrite PE antenna unit is contained within a molded black plastic housing with an integral connector receptacle (3) molded into one end. The connector receptacle contains terminal pins that connect the antenna to the vehicle electrical system through a twisted pair of conductors and a connector that are part of the adjacent wire harness.

Each antenna housing also includes two integral mounting flange or flanges (1) which can be used to mount the unit with screws. However, in some applications the antenna mounting flanges are snapped into a spring steel adapter or retainer, which allows the antenna unit to be securely clipped in place over a body flange rather than being secured with screws. This vehicle platform uses five PE antenna units. One is secured to the underside of the center floor console, one is secured to each rear quarter concealed behind the inside quarter trim panels, one is secured to the forward flange of the spare tire well within the trunk area and one is concealed behind the rear fascia to the right of the license plate lamp.

The antennas are each connected to the Radio Frequency Hub (also known as the RF Hub) on dedicated and sequentially numbered circuits. The left rear quarter antenna is connected through the antenna 1 circuits, the right rear quarter antenna is connected through the antenna 2 circuits, the trunk antenna is connected through the antenna 3 circuits, the center floor console is connected through the antenna 4 circuits and the rear fascia bracket antenna is connected through the antenna 5 circuits.

LOW FREQUENCY ANTENNA AND CIRCUIT NUMBERING	
Location	**Antenna And Circuit Number**
Left Rear Quarter Panel	1
Right Rear Quarter Panel	2
Trunk	3

LOW FREQUENCY ANTENNA AND CIRCUIT NUMBERING	
Location	**Antenna And Circuit Number**
Center Floor Console	4
Rear Fascia Bracket	5

An LF antenna unit cannot be adjusted or repaired. If ineffective or damaged, it must be replaced with a new unit. For applications where it is used, the antenna unit adapter or retainer may be serviced only as a unit with the LF antenna.

OPERATION

OPERATION

The Passive Entry (PE) antenna units allow the transmitter within the Radio Frequency Hub (also known as the RF Hub) to communicate via Low Frequency (LF) radio transmission with a FOB with Integrated Key (FOBIK) that is located inside the vehicle or, at most, about 2 meters (6.5 feet) horizontally in all directions around the outside of the vehicle. The RF Hub uses communication through the antenna units to wake up and challenge a FOBIK that is within range in order to authenticate whether that FOBIK is valid (programmed) to the vehicle. The RF Hub communication with the FOBIK is on 20 kilohertz using Frequency-Shift Keying (FSK) modulation.

Each antenna unit has two dedicated connections to the RF Hub. One connection is the LF antenna output circuit, while the other connection Is the LF antenna return circuit. These circuits to each antenna unit are a twisted pair to help reduce the potential for induced electrical interference. The RF Hub microcontroller continuously monitors all of the antenna units and will store a Diagnostic Trouble Code (DTC) for any fault that it detects.

The hard wired inputs and outputs of the antenna units may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, the most reliable, efficient, and accurate means to diagnose the antenna units requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

CENTER FLOOR CONSOLE

1. Disconnect and isolate the battery negative cable.
2. Remove the center floor console from the vehicle. Refer to **CONSOLE, FLOOR, REMOVAL** .

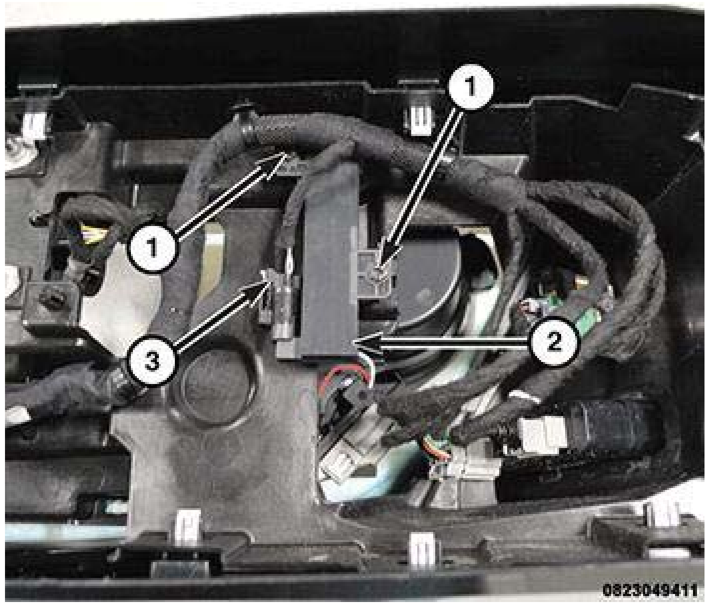


Fig. 2: Antenna, Connector Receptacle & Screws
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the wire harness connector from the connector receptacle (3) for the Low Frequency (LF) antenna (2) on the underside of the console.
4. Remove the two screws (1) that secure the antenna to the underside of the console.
5. Remove the antenna from the console.

INTERIOR REAR QUARTER

1. Disconnect and isolate the negative battery cable.
2. Remove the C-pillar trim panel. Refer to **PANEL, C-PILLAR TRIM, REMOVAL** .

Fig. 3: Quarter Trim Panel Screws
Courtesy of CHRYSLER GROUP, LLC

3. Remove the screw covers and remove the screws (1) and (2).
4. Remove the quarter trim lower panel. Refer to PANEL, QUARTER TRIM, REMOVAL .

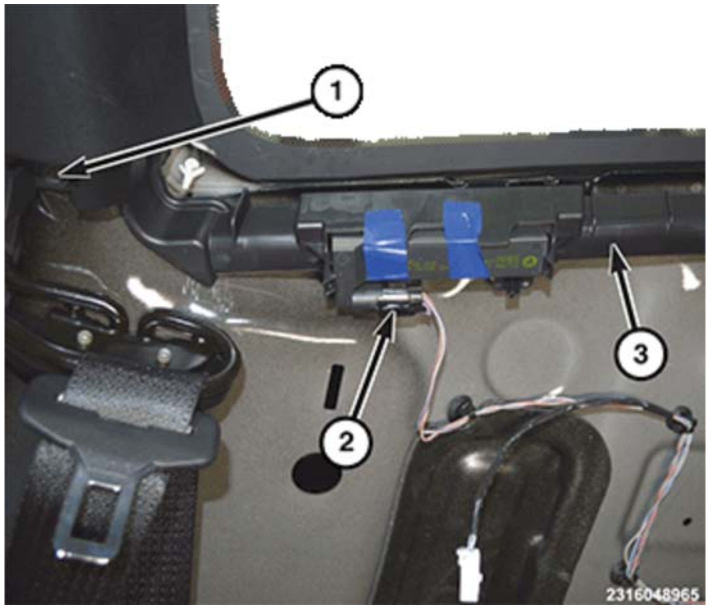


Fig. 4: Screw, Wire Harness Connector & Quarter Trim Upper Panel
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the wire harness connector (2).
6. Remove the LF antenna by sliding it off of the bracket attached to the body panel.

REAR FASCIA BRACKET

1. Disconnect and isolate the battery negative cable.
2. Remove the rear fascia from the vehicle. Refer to FASCIA, REAR, REMOVAL or FASCIA, REAR, LOWER, REMOVAL .

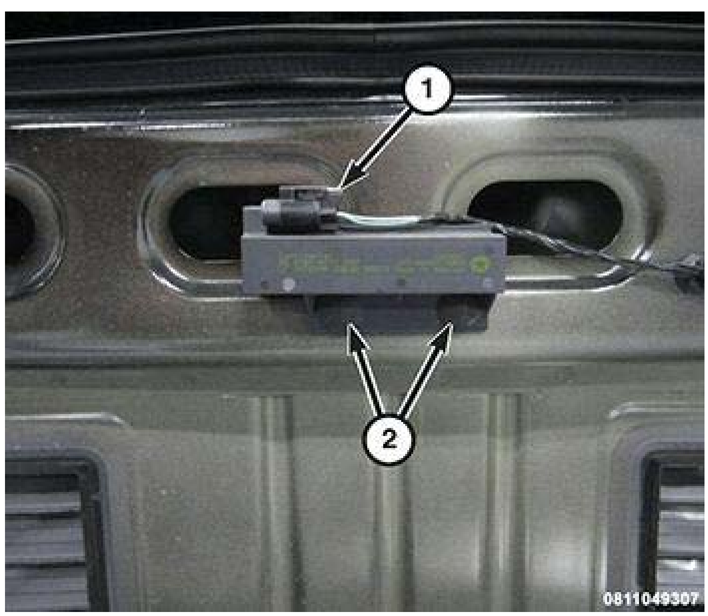


Fig. 5: Connector & Retainers

Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the wire harness connector (1) from the connector receptacle for the Low Frequency (LF) antenna.
4. Unsnap and lift the LF antenna from the retainer and remove from the vehicle.

TRUNK

1. Disconnect and isolate the battery negative cable.
2. Fold up and move the spare tire cover and trunk carpet aside far enough to access the trunk floor where it meets the forward edge of the spare tire well. Refer to CARPET, REMOVAL .

Fig. 6: Antenna & Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the body wire harness connector (2) from the Low Frequency (LF) antenna (1) connector receptacle.
4. Pull the antenna and retainer unit rearward off of the flange at the front of the spare tire well.
5. Remove the antenna and retainer from the trunk as a unit.

INSTALLATION

CENTER FLOOR CONSOLE

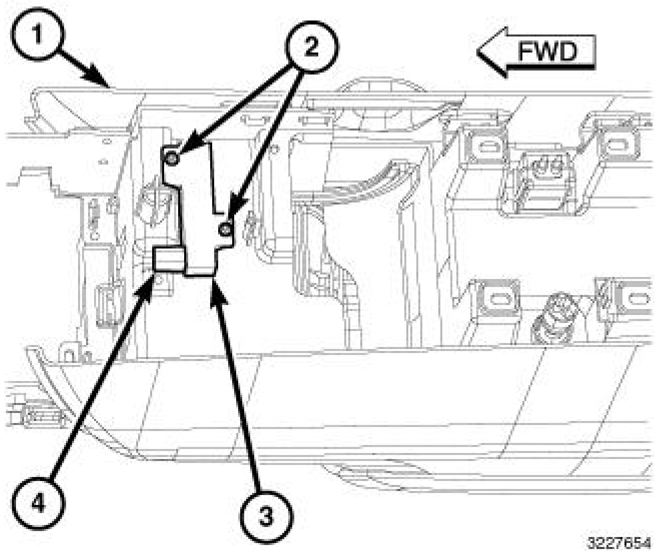


Fig. 7: Center Floor Console, Connector Receptacle & Low Frequency Antenna
Courtesy of CHRYSLER GROUP, LLC

1. Position the Low Frequency (LF) antenna (3) to the underside of the center floor console (1).
2. Install and tighten the two screws (2) that secure the antenna to the console. Tighten the screws securely.
3. Reconnect the wire harness connector to the antenna connector receptacle (4).
4. Reinstall the console into the vehicle. Refer to **CONSOLE, FLOOR, INSTALLATION** .
5. Reconnect the battery negative cable.

INTERIOR REAR QUARTER

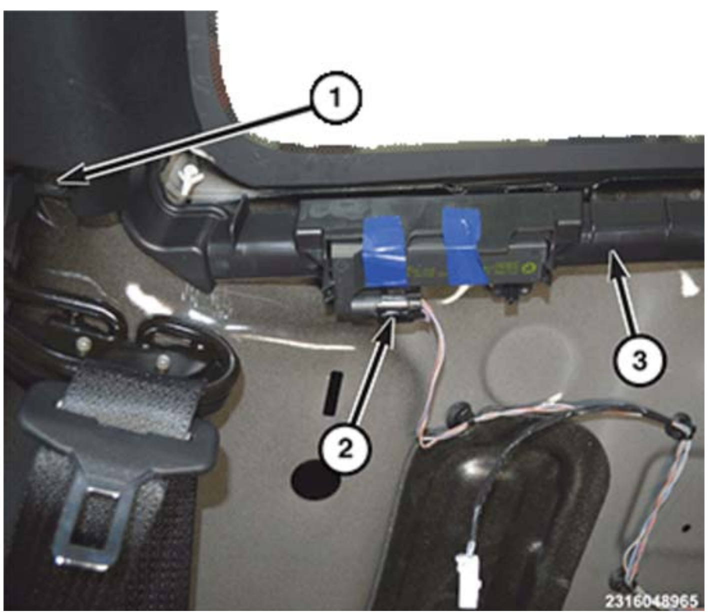


Fig. 8: Screw, Wire Harness Connector & Quarter Trim Upper Panel
Courtesy of CHRYSLER GROUP, LLC

1. Install the LF antenna to the interior rear quarter clip / bracket.
2. Connect the wire harness connector (2).

Fig. 9: Quarter Trim Panel Screws
Courtesy of CHRYSLER GROUP, LLC

3. Install the screws (1) and (2) and tighten securely, then install the screw covers.
4. Install the quarter trim lower panel. Refer to **PANEL, QUARTER TRIM, INSTALLATION** .
5. Install the C-pillar trim panel. Refer to **PANEL, C-PILLAR TRIM, INSTALLATION** .
6. Connect the negative battery cable.

REAR FASCIA BRACKET

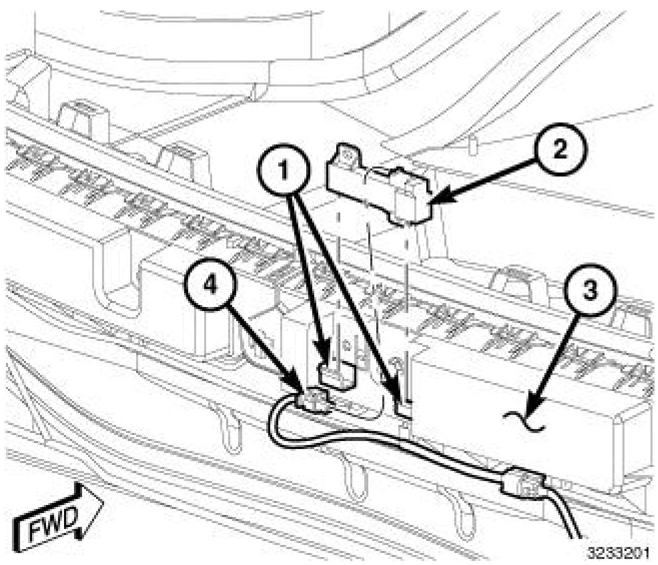


Fig. 10: Wire Harness Connector, Antenna & Rear Fascia Bracket
Courtesy of CHRYSLER GROUP, LLC

1. Position the Low Frequency (LF) antenna (2) to the pocket near the center of the rear fascia bracket (3).
2. Reconnect the wire harness connector (4) to the connector receptacle for the antenna.
3. Align the antenna with the retainers (1) integral to the rear fascia bracket, then slide it downward until it snaps into place.

4. Reinstall the rear fascia onto the vehicle. Refer to **FASCIA, REAR, INSTALLATION** or **FASCIA, REAR, LOWER, INSTALLATION** .
5. Reconnect the battery negative cable.

TRUNK

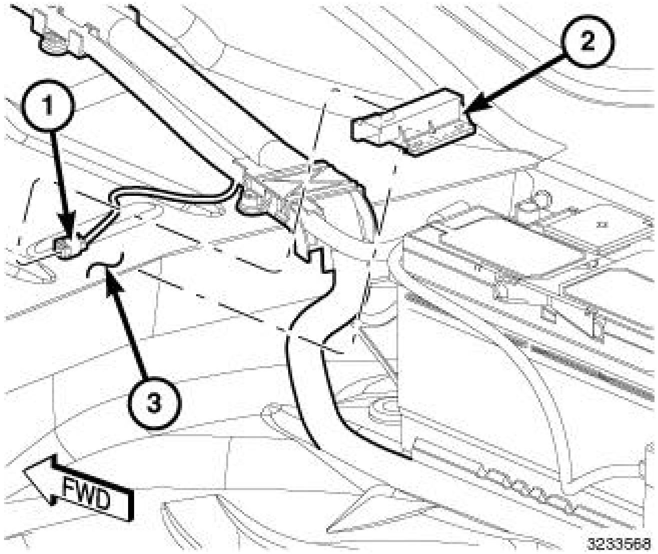


Fig. 11: Wire Harness Connector, Antenna & Trunk Floor
Courtesy of CHRYSLER GROUP, LLC

1. Position the Low Frequency (LF) antenna and receiver (2) into the trunk as a unit.
2. Align the clip on the underside of the antenna retainer with the flange where the trunk floor (3) meets the forward edge of the spare tire well.
3. Push the antenna and retainer unit forward until the clip is fully seated on the flange.
4. Reconnect the body wire harness connector (1) to the antenna connector receptacle.
5. Reinstall the spare tire cover and trunk carpet over the trunk floor and the spare tire well. Refer to **CARPET, INSTALLATION** .
6. Reconnect the battery negative cable.

MOTOR, DOOR LOCK

DESCRIPTION

DESCRIPTION

Power operated door locking and deck lid latching mechanisms are standard equipment in this vehicle. The lock mechanisms of each door and the deck lid latch are actuated by a reversible electric motor integral to each latch unit. A connector receptacle integral to each latch connects the power lock motor and the integral door or deck lid ajar micro switch to the vehicle electrical system through a dedicated take out and connector of the door or body wire harness.

The power lock motors cannot be adjusted or repaired and, if ineffective or damaged, the entire door or deck lid latch unit must be replaced.

OPERATION

OPERATION

The power lock motors are controlled by outputs received from the Body Control Module (BCM). The BCM acts upon programming, hard wired inputs from the driver or passenger door lock switches as well as electronic **lock** or **unlock** command message inputs received over the Controller Area Network (CAN) data bus from the Radio Frequency Hub Module (RFHM) based upon inputs from the FOB with Integrated Key (FOBIK) transmitters.

A positive and negative battery connection to the two lock motor terminals will cause the motor to move in one direction, locking or unlocking the latch. Reversing the current will cause the motor to move in the opposite direction.

The power lock motors and the hard wired circuits between the motors and the BCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the power lock system or the electronic controls or communication between other modules and devices that provide some features of the power lock system. The most reliable, efficient, and accurate means to diagnose the power lock motors or the electronic controls and communication related to power lock motor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER LOCK MOTOR

Remember, the Body Control Module (BCM) (also known as the Common Body Controller/CBC) circuitry controls the outputs to the power lock motors. If both the power lock motors and the circuits between the motors and the BCM test okay, the use of a diagnostic scan tool is required for further power lock system diagnosis. Refer to the appropriate diagnostic information.

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

1. Check the power lock motor for correct operation while moving a power lock switch to both the **Lock** and **Unlock** positions.
2. Disconnect the door or body wire harness connector from the inoperative power lock motor.
3. Apply 12 volts to the lock and unlock driver circuit cavities of the power lock motor connector to check its operation in one direction.
4. Reverse the connection polarity to check the motor operation in the opposite direction.
5. If motor operation is okay in both directions, check both the lock and unlock circuits between the lock motor and the BCM and repair if required. If motor operation is not okay in both directions, replace the latch unit containing the ineffective power lock motor.

SWITCH, DECK LID RELEASE

DESCRIPTION

DECK LID

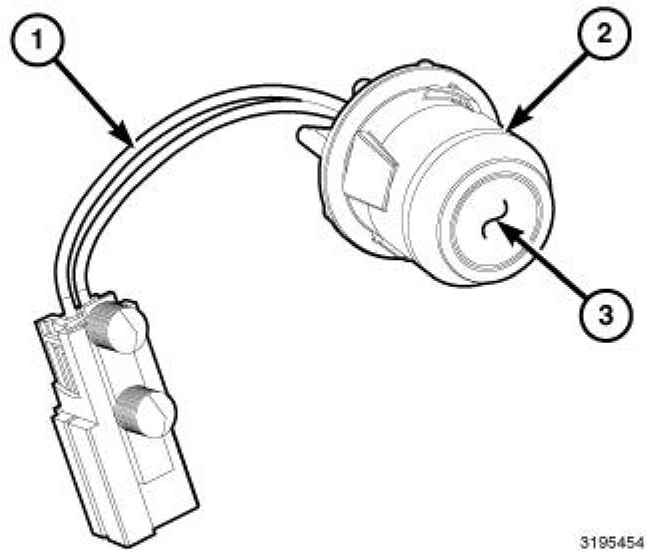


Fig. 12: Wire And Connector, Release Switch & Switch Button
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the Passive Entry (PE) system have a PE deck lid release switch (2) integral to the Center High Mounted Stop Lamp (CHMSL). This tactile switch is secured to the back of the right side of the CHMSL housing with a wedge type base connection. The switch button (3) extends through clearance holes in the lamp housing and lens so that it can be accessed on the right end of the CHMSL lens, which is visible on the upper rear vertical face of the deck lid.

The switch has a pigtail wire and connector (1) secured to the back of the CHMSL housing that connects the switch to the vehicle electrical system through a dedicated take out and connector of the body wire harness. An integral 3.0 kilohm diagnostic resistor is connected in series with the output side of the switch.

The PE deck lid release switch cannot be adjusted or repaired. If the switch is damaged or ineffective, the entire switch unit must be replaced.

INSTRUMENT PANEL

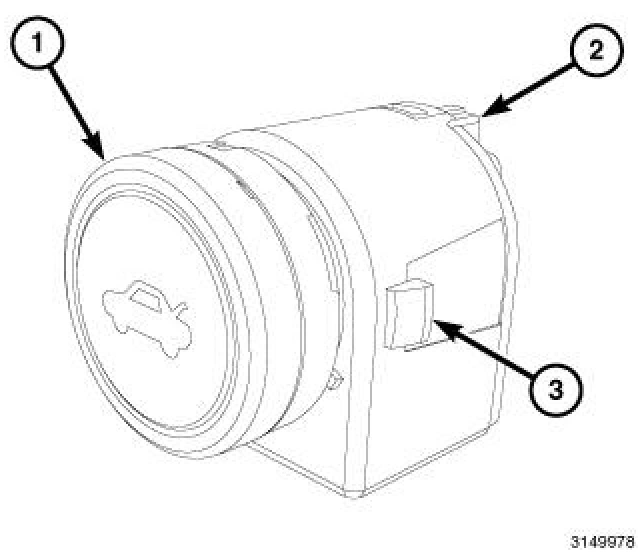


Fig. 13: Release Switch, Receptacle & Single Integral Latch
Courtesy of CHRYSLER GROUP, LLC

The instrument panel deck lid release switch (1) is mounted in the steering column opening cover to the left of the steering column on the instrument panel. Only the switch button is visible on the outer surface of the instrument panel. The black plastic switch button has a white International Control and Display Symbol icon applied to it, which clearly identifies its function.

The black, molded plastic switch housing encloses the switch button mechanism and the switch circuitry including the switch contacts. A connector receptacle (2) is integral to the back of the switch housing, while a single integral latch feature (3) on each side of the housing are used secure the switch by a yoke type retainer and two screws on the back side of the steering column opening cover. The deck lid release switch is connected to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness.

The instrument panel deck lid release switch cannot be adjusted or repaired and, if ineffective or damaged, the unit must be replaced.

OPERATION

DECK LID

The Passive Entry (PE) deck lid release switch is a normally open switch that is connected to ground at all times. When the switch button is depressed, it provides a ground signal to the Body Control Module (BCM) through a deck lid release switch sense circuit. In response to that input, the BCM sends an electronic **unlock request** message to the Radio Frequency Hub Module (RFHM) over the Controller Area Network (CAN) data bus. The RFHM determines the PE system response based upon the inputs it receives through the authentication process with each detected FOB with Integrated Key (FOBIK).

The diagnostic resistor integral to the output side of the switch enables the BCM to monitor the condition of the deck lid release switch and switch sense circuit. The BCM will store a Diagnostic Trouble Code (DTC) for any fault that is detected in this circuit.

The hard wired circuits between the PE deck lid release switch and the BCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the switch or the electronic controls and communication between other modules and devices that provide some features of the PE system. The most reliable, efficient, and accurate means to diagnose the PE system or the electronic controls and communication related to deck lid release switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

INSTRUMENT PANEL

The instrument panel deck lid release switch is a normally open switch that is connected to ground at all times. When the switch button is depressed, it provides a ground signal to the Body Control Module (BCM) (also known as the Common Body Controller/CBC) through a deck lid release switch sense circuit.

The BCM uses internal programming and inputs from other sources to determine the appropriate response to an instrument panel deck lid release switch input. If the vehicle has an automatic transmission, the BCM must confirm that the transmission gear selector lever is in the PARK position before activating the deck lid latch motor. If the vehicle is equipped with a manual transmission, the BCM must confirm that the vehicle speed input is less than 8 kilometers-per-hour (5 miles-per-hour) before activating the deck lid latch motor.

The hard wired circuits between the instrument panel deck lid release switch and the BCM may be diagnosed

using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the switch or the electronic controls and communication between other modules and devices that provide the deck lid release feature. The most reliable, efficient, and accurate means to diagnose the deck lid release feature or the electronic controls and communication related to instrument panel deck lid release switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

DECK LID

1. Disconnect and isolate the battery negative cable.

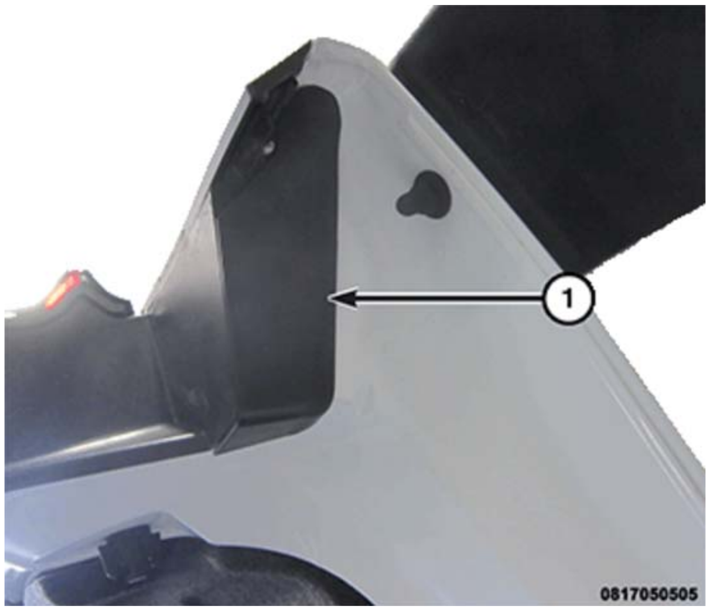
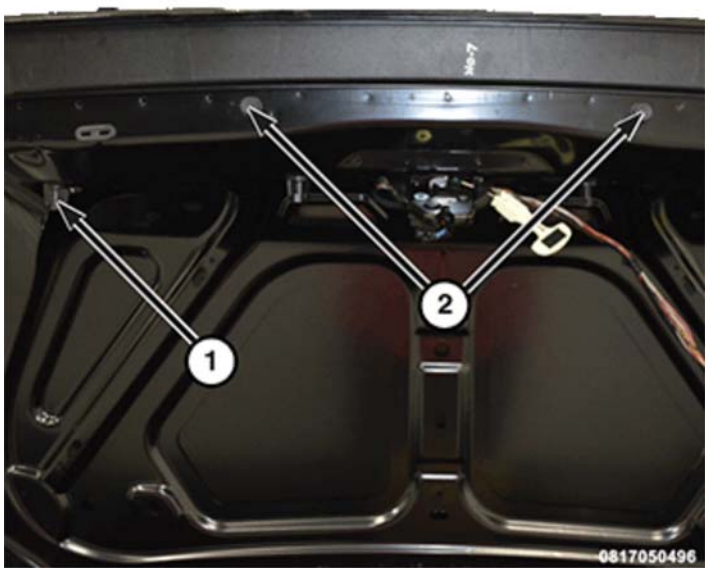


Fig. 14: Close Out Panel Cover
Courtesy of CHRYSLER GROUP, LLC

2. Open the deck lid to access and remove the close out panel cover (1) on both sides on each side of the deck lid.

[Fig. 15: Inboard Screw](#)
Courtesy of CHRYSLER GROUP, LLC

3. Remove the inboard screw (1) on each side of the deck lid.



[Fig. 16: Push Pins & Plastic Wing-Nuts](#)
Courtesy of CHRYSLER GROUP, LLC

4. Remove two push pins (2) and four plastic wing-nuts (1).
5. Pull the lamp applique out far enough to disconnect the wiring harness connection.
6. Remove the lamp applique from the vehicle.
7. Disconnect the passive entry switch from the wiring harness.
8. Remove the passive entry switch from the applique.

INSTRUMENT PANEL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

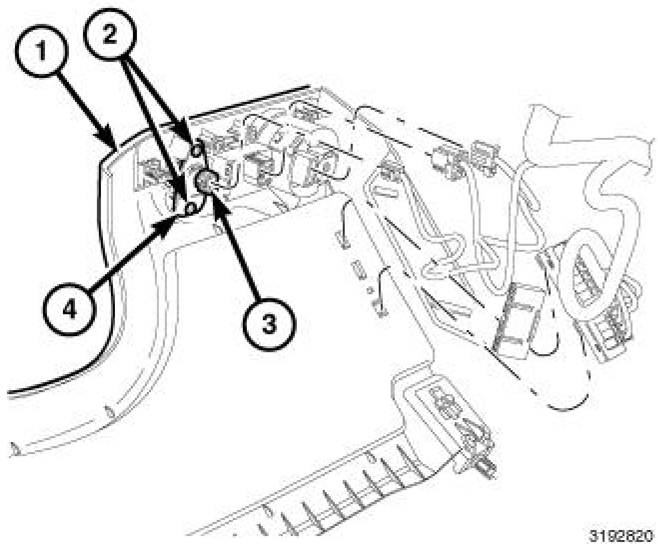


Fig. 17: Steering Column Opening Cover, Release Switch & Retainer Yoke
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the steering column opening cover (1) from the instrument panel. Refer to **COVER, STEERING COLUMN OPENING, REMOVAL** .
3. Working from the back of the steering column opening cover, remove the two screws that secure the deck lid release switch (3) retainer yoke (4) to the back of the cover.
4. Remove the switch and retainer from the back of the cover.
5. Remove the switch from the retainer.

INSTALLATION

DECK LID

1. Install the passive entry deck lid switch to the applique.
2. Position the applique to the vehicle close enough in order to the connect the wiring harness connector to the back of the assembly.

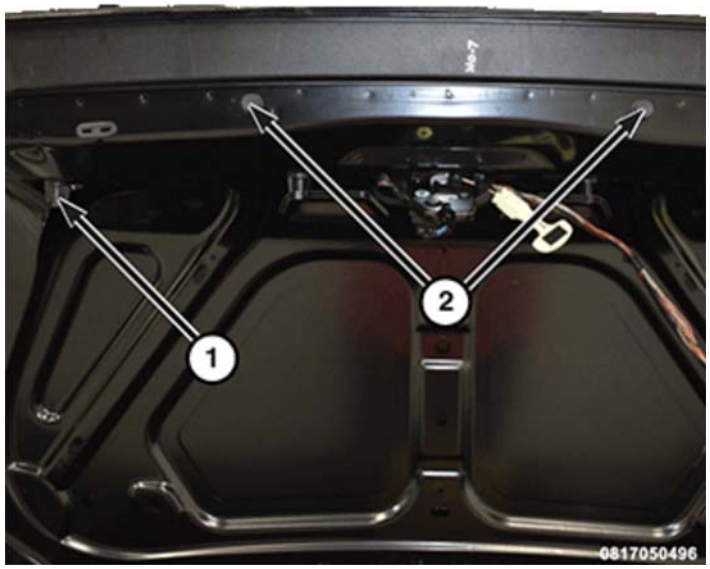


Fig. 18: Push Pins & Plastic Wing-Nuts
Courtesy of CHRYSLER GROUP, LLC

3. Install four wing-nut retainers (1) and two push pins (2) to secure the applique to the deck lid.

Fig. 19: Inboard Screw
Courtesy of CHRYSLER GROUP, LLC

4. Install the inboard screw (1) on each side of the deck lid.

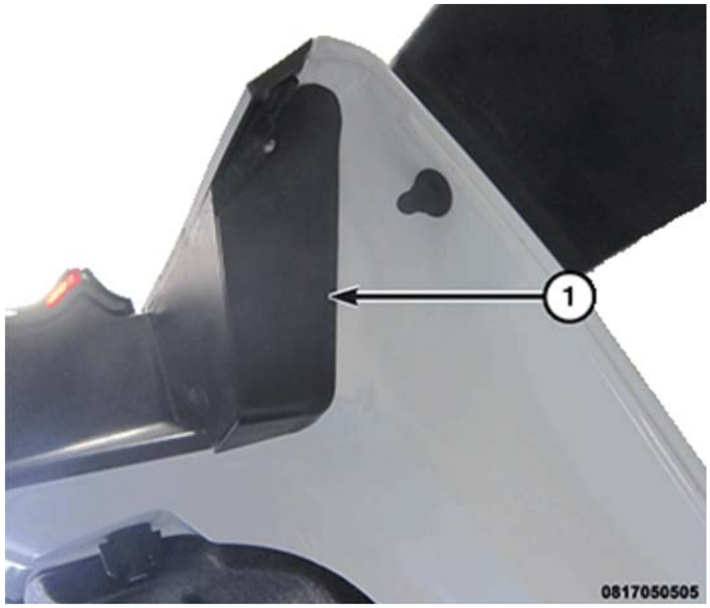


Fig. 20: Close Out Panel Cover
Courtesy of CHRYSLER GROUP, LLC

5. Install the close out panel cover on both sides of the deck lid.
6. Connect the negative battery cable.

INSTRUMENT PANEL

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

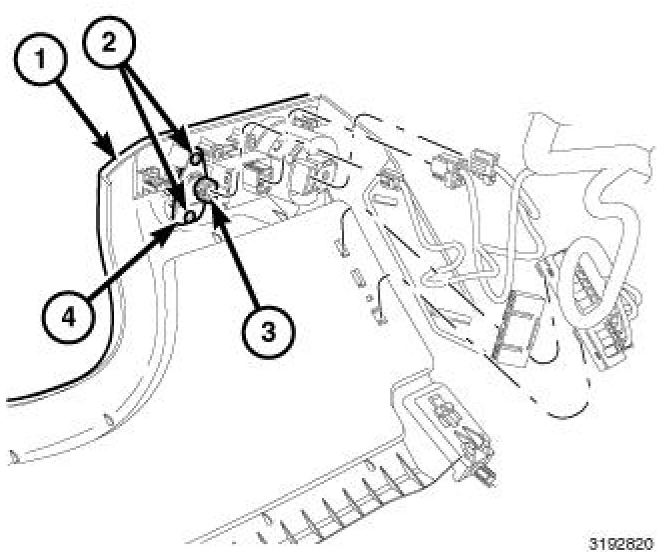


Fig. 21: Steering Column Opening Cover, Release Switch & Retainer Yoke

Courtesy of CHRYSLER GROUP, LLC

1. Position the back of the deck lid release switch (3) through the hole in the retainer yoke (4).
2. Position the switch and retainer to the back of the steering column opening cover (1).
3. Install and tighten the two screws (2) that secure the switch and retainer to the back of the cover. Tighten the screws securely.
4. Reinstall the steering column opening cover onto the instrument panel. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
5. Reconnect the battery negative cable.

SWITCH, DOOR HANDLE

DESCRIPTION

DESCRIPTION

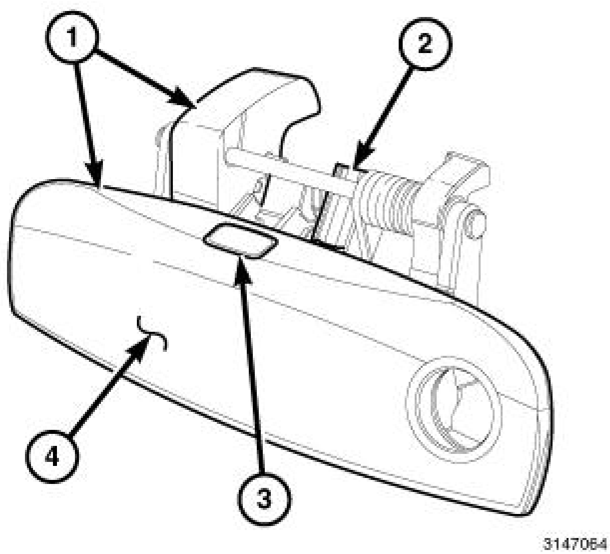


Fig. 22: Pull, Surface & Resistive Membrane Lock Switch
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the optional Passive Entry (PE) system have unique outside door handles that incorporate three switches and a logic circuit. These unique PE door handles are sometimes referred to as smart handles. The handle itself is very similar in appearance to those used in conventional non-PE applications, consisting primarily of a pull (4) and a base.

The PE door handles can be readily identified by a tactile, resistive membrane lock switch (3) located on the outward facing horizontal surface at the top of the pull, and by a capacitive sensor or switch membrane patch on the inside surface (2) of the pull. A third, Hall-effect type switch as well as an Integrated Circuit (IC) chip are concealed within the pull.

The mechanical functions and mounting provisions of the PE handle are identical to those of a conventional outside door handle. However, an integral connector receptacle (2) is located at the back of the handle base where it is concealed within the door interior. The PE handle is connected to the vehicle electrical system through a dedicated take out and connector of the PE door jumper wire harness.

The individual switches of the PE outside front door handles cannot be adjusted or repaired. If any one of the switches, the IC or any of the mechanical handle components is damaged or ineffective, the entire handle unit must be replaced. Refer to **HANDLE, EXTERIOR, REMOVAL** .

OPERATION

OPERATION

The three switches of each Passive Entry (PE) outside door handle are powered by and provide a direct input to the Integrated Circuit (IC) of that door handle. The IC of each PE outside front door handle receives power from the Radio Frequency Hub Module (RFHM) on a signal circuit, and a clean ground from the RFHM on a return circuit. The PE handle IC and the RFHM communicate with each other by modulating the current in the signal circuit.

Each PE outside front door handle has three switches. The inputs from those three switches and the handle logic circuit allow each handle to send the RFHM up to four different signals: Unlock Request, Hall, Lock Request and Error. The RFHM determines the system response based upon the inputs it receives from each handle as well as the inputs it receives through the authentication process with each detected FOB with Integrated Key (FOBIK).

The tactile, mechanical, resistive membrane lock switch allows the user to actively lock the vehicle. The capacitive switch senses a hand approaching the handle grip to passively unlock the vehicle. The Hall-effect switch senses handle grip movement. An adaptation algorithm in the logic circuit of each handle can modify the sensitivity of the capacitive switches as well as system responses to the Hall-effect switch inputs to compensate for sensed repeated or continuous actuations such as might be caused by the switch membrane being wetted, but restores normal sensitivity about one minute after the repeated or continuous actuation input ceases.

The hard wired inputs and outputs of the PE outside front door handle may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, the most reliable, efficient and accurate means to diagnose this component requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

SWITCH, LOCK

DESCRIPTION

DESCRIPTION

A window/lock switch located in each door trim panel. The driver's side window/lock switch includes the following:

- **Power Lock Switch** - A two-way, momentary, resistor multiplexed switch to control the power lock system.
- **Power Window Lockout Switch** - A two-way, latching, push-button switch allows the vehicle operator to lock out the power window switch on the passenger door so that the passenger door power window may be operated only from the master switches.
- **Power Window Switches** - A two-way, momentary power window switch for the driver side door also has a second detent in the Down direction and internal circuitry to provide an Auto-Down feature for the driver side door power window. In addition to the power window switch for its own door, the window/lock switch houses a master switch for the passenger door power window.

The passenger side window/lock switch includes the following:

- **Power Lock Switch** - A two-way, momentary, resistor multiplexed switch to control the power lock system.
- **Power Window Switch** - A two-way, momentary power window switch for the passenger side door.

OPERATION

OPERATION

The two-way, momentary, resistor multiplexed (MUX) power lock switches on the driver and passenger side doors are connected in series between the door lock switch return and the right or left door lock switch mux inputs to the Body Control Module (BCM) located in the passenger compartment. Each power lock switch rocker position (LOCK and UNLOCK) provides a unique input to the BCM through the resistor trees within the switches which allows the BCM to sense the switch position.

Based upon the power lock switch inputs, the BCM controls the battery and ground outputs to the power lock motors to lock or unlock all of the doors The Light-Emitting Diode (LED) in the rocker of the power lock switches is connected to battery current through a panel lamps dimmer circuit Pulse Width Modulated (PWM) output from the Electro Mechanical Instrument Cluster (EMIC); therefore, the switch will only be illuminated when the exterior lighting is turned ON and the illumination level will be synchronized with that of the other panel lamps dimmer controlled lamps in the vehicle.

The power lock switch as well as the hard wired inputs and outputs of the switch may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER WINDOW SWITCH

Any diagnosis of the Power Windows system should begin with the use of scan tool and the appropriate Diagnostic Service Information .

The hard wired inputs and outputs of the speed control system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the Local Interface Network (LIN) slave node integral and internal to the door control switch. The most reliable, efficient and accurate means to diagnose the LIN slave node operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.

Fig. 23: Prying Bezel Of Front Door Switch Module
Courtesy of CHRYSLER GROUP, LLC

2. Using a trim stick or another suitable wide flat-bladed tool, pry the bezel of the front door switch module up and away from the front door trim panel arm rest far enough to disengage the four spring steel retainers of the switch from the arm rest opening.

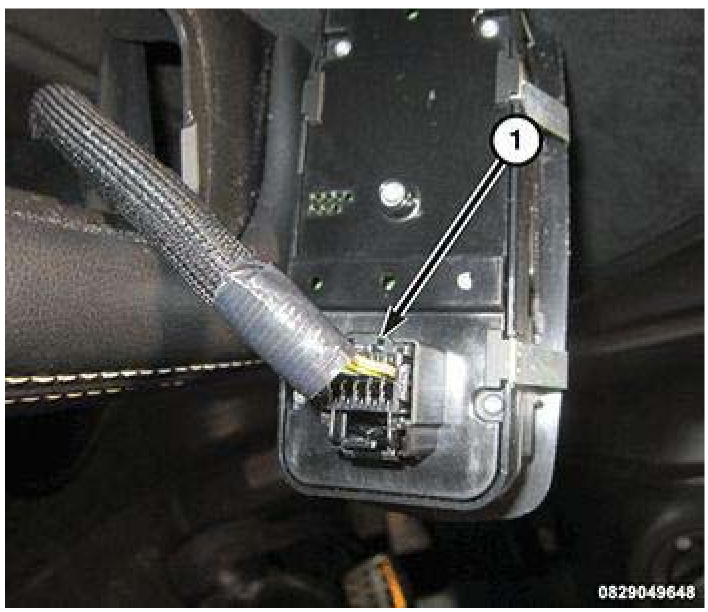
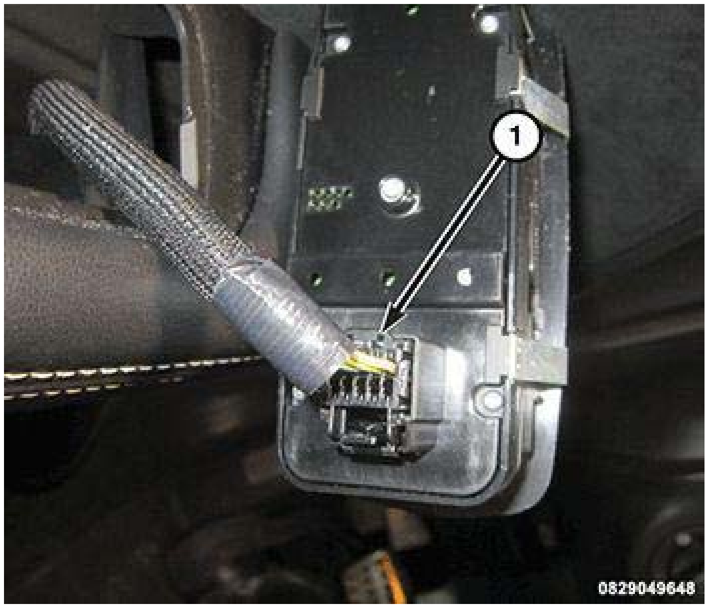


Fig. 24: Front Door Switch Module Connector
Courtesy of CHRYSLER GROUP, LLC

3. Pull the switch module away from the mounting hole of the arm rest far enough to access and disconnect the door wire harness connector (1) from the switch connector receptacle.
4. Remove the switch module from the vehicle.

INSTALLATION

INSTALLATION



[Fig. 25: Front Door Switch Module Connector](#)
Courtesy of CHRYSLER GROUP, LLC

1. Position the front door switch module close enough to the mounting hole in the arm rest of the front door trim panel to access and reconnect the front door wire harness connector (1) to the switch connector receptacle.
2. Align the switch module to the arm rest mounting hole.
3. Using hand pressure, press the switch module firmly and evenly into the mounting hole until the four spring steel retainers of the switch are fully engaged and the switch bezel is fully seated against the arm rest.
4. Connect the battery negative cable.

TRANSMITTER, INTEGRATED KEY FOB

DESCRIPTION

DESCRIPTION

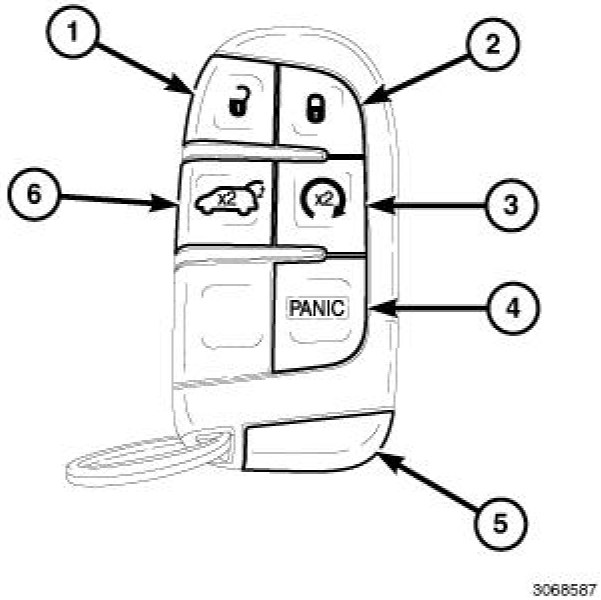


Fig. 26: Transponder Key
Courtesy of CHRYSLER GROUP, LLC

Vehicles are shipped from the factory with two FOB with Integrated Key (FOBIK) Remote Keyless Entry (RKE) transmitters programmed to the vehicle as standard equipment. The FOBIK circuitry is contained and protected within a molded black plastic case with a black soft rubber touch pad on the face divided into six sections. The rearward end of the FOBIK case houses a mechanical, metal, coded emergency key (5) that is released by sliding a latch button on the back of the FOBIK case.

Depending upon vehicle equipment, each FOBIK has at least three and no more than five functional resistive membrane switches located beneath the six touch pad sections. Each functional touch pad section is clearly identified by white icons or white text and icons identifying the specific function obtained by pushing that button. Domestic market vehicles also include a touch pad section on the FOBIK with the red text **PANIC** applied to it. Please note that when selecting stealth mode on the interceptor model vehicle, the panic alarm feature is disabled by design. Not counting the **PANIC** touch pad (4), the available switches include:

- **Unlock (1)**

  - Standard equipment.

- **Lock (2)** - Standard equipment.
- **Remote Start (3)** - Only for vehicles equipped with the factory-installed remote start system.
- **Trunk (6)** - Standard equipment.

The FOBIK RKE transmitter is the primary customer active interface for remotely operating the power lock system, the RKE system and the remote start system components and features. However, the FOBIK also has an important passive role in each of the following vehicle systems:

- **Keyless Go System** - Refer to STARTING - SERVICE INFORMATION . .
- **Passive Entry System** - Refer to DESCRIPTION.
- **Sentry KeyÂ® Theft Deterrent System** - Refer to VEHICLE THEFT SECURITY SYSTEM .

- **Vehicle Theft Security System (VTSS)** - Refer to **VEHICLE THEFT SECURITY SYSTEM** .

Other than battery replacement, the FOBIK cannot be adjusted or repaired. Once a FOBIK has been programmed to a vehicle, it cannot be reprogrammed for use on any other vehicle. If damaged or ineffective, the FOBIK must be replaced with a new unit. A new and unused FOBIK unit must be properly programmed in order to function properly with the systems of the vehicle. The mechanical emergency key of the new FOBIK must also be cut to match the coding of the lock cylinders in the vehicle.

SRT KEY FOBS

If the vehicle is equipped with the 6.2L supercharged engine, it will support an additional engine power level configuration as part of SRT Drive Modes. The vehicle comes with three key fobs (two red and one black) that allow for different engine power levels.

- Use of the RED key FOB unlocks the full potential of the engine's output, and allows the driver to select from two power levels within Drive Modes Set-Up.
- Use of the BLACK key FOB limits the driver to a reduced engine output. This information is also available within the SRT Drive Modes UconnectÂ® interface, and can be accessed by pressing the "KEY FOB" button on the touchscreen in the SRT Drive Modes menu.

NOTE: **Not all options listed in this service information are available on every vehicle. Refer to the chart below for all available Drive Mode vehicle configurations.**

Engine/Transmission	Red Key / 700+ HP	Black Key / 500 HP	Transmission	Paddle Shifters	Suspension	Steering	Traction
6.2L AUTO	X	X	X	X	X	N/A	X
6.2L MANUAL	X	X	N/A	N/A	X	N/A	X
6.4L AUTO	N/A	N/A	N/A	X	X	X	X
6.4L MANUAL	N/A	N/A	N/A	N/A	X	X	X

The SRT Drive Modes main screen displays the current drive mode and real-time status of the vehicle's performance configuration. The selectable Drive Modes buttons are Track, Sport, Custom, or Default and will be highlighted when displaying the current configuration. Information shown below each drive mode button will indicate the actual status of each system, along with a graphic that displays the status of the vehicle's components. The color red indicates "Track," orange "Sport," and yellow "Street." If the system status shown does not match the current drive mode set up, a message will be displayed indicating which values are not matching the current mode and why.

NOTE: **ESC Full-Off can be activated across all of the Drive Mode features by pushing and holding the ESC Off button on the instrument panel switch bank for five seconds.**

Listed below are the available Drive Modes:

- Track
- Sport

- Default
- Custom

OPERATION

OPERATION

The FOB with Integrated Key (FOBIK) incorporates many useful functions into a single, compact unit. The transducer on the internal circuit board of the FOBIK uses low frequency Radio Frequency (RF) communication to ensure vehicle security through an electronic validation or handshake process that is performed with the RF Hub each time the engine is started.

When any one of the Remote Keyless Entry (RKE), liftgate or remote start buttons of the FOBIK is depressed, the on-board transmitter of the FOBIK generates a high frequency RF request signal that is received and validated by the RF Hub. If the RF Hub determines the RF signal was generated by a FOBIK that is valid for the vehicle, the RF Hub relays electronic request messages to the appropriate electronic modules in the vehicle over the Controller Area Network (CAN) data bus to invoke the functions or features associated with the request.

The integrated mechanical emergency key of the FOBIK provides emergency access to the vehicle in case the battery in the vehicle or the transmitter becomes discharged. The emergency key can also be retained to keep any locked on-board vehicle storage compartments such as the glove box secured, for example: While the vehicle is being attended to by a parking valet.

Each vehicle owner is provided with a four-digit Personal Identification Number (PIN) by the dealer at the time of vehicle purchase. This number is required along with a diagnostic scan tool for the dealer to program an additional or replacement FOBIK into the electronics of the vehicle. The emergency key included with a new additional or replacement blank FOBIK must also be cut to match the coding of the lock cylinders in the vehicle.

Diagnosis of a FOBIK transmitter requires the use of a Radio Frequency Detector such as (special tool #9001, Rf Detector). Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - RKE TRANSMITTER

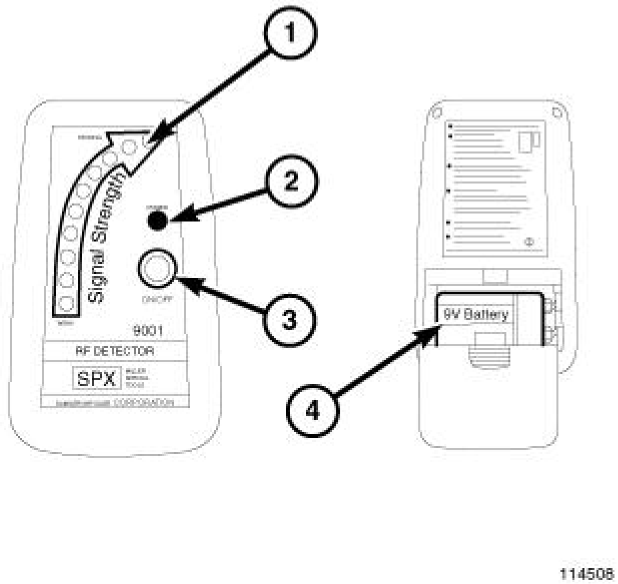


Fig. 27: Radio Frequency Detector #9001
Courtesy of CHRYSLER GROUP, LLC

Use a Radio Frequency Detector such as (special tool #9001, Rf Detector) to confirm that the Remote Keyless Entry (RKE) transmitter is functioning. Typical testing distance is 2.5 centimeters (1 inch) for the transmitters of vehicles manufactured for Asian markets, and 30.5 centimeters (12 inches) for all others.

NOTE: **The panic alarm is not designed to function when stealth mode is enabled on Interceptor package vehicles.**

1. Position the transmitter the appropriate distance from the special tool.
2. Depress any transmitter button, then test each button individually. The special tool will issue an audible beep tone if a satisfactory radio signal strength that lights five or more LED units is detected.
3. Repeat Step 2 three times. If the transmitter fails any of the signal strength tests, use a diagnostic scan tool and the appropriate diagnostic information to complete further diagnosis.

STANDARD PROCEDURE

BATTERY REPLACEMENT

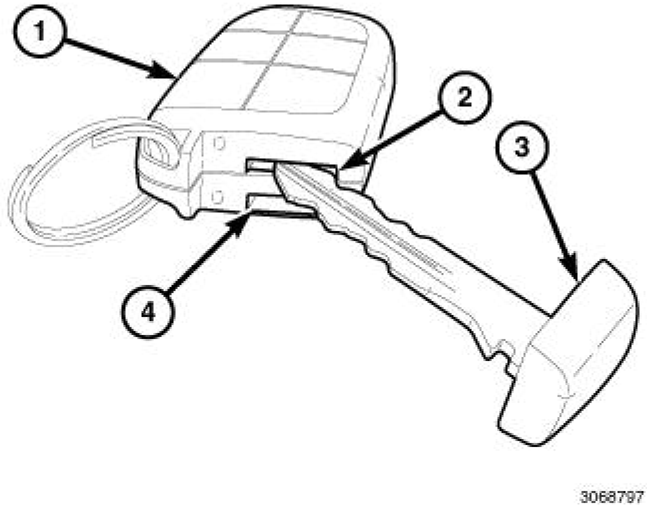


Fig. 28: Emergency Key, Storage Slot & Integrated Key (FOBIK) Case
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Do not touch or disturb the metal contacts for the battery. Avoid touching the new battery. Battery contamination from oils on your skin may result in shortened battery life. If the battery or contacts are contaminated, clean them thoroughly with rubbing alcohol.**

1. Unlatch and remove the emergency key (3) from the storage slot (4) of the FOB with Integrated Key (FOBIK) case (1).
2. With the front of the FOBIK case facing upward, insert the tip of the emergency key into the notch (2) between the case halves and twist the key to unsnap and separate the front case half from the back case half.

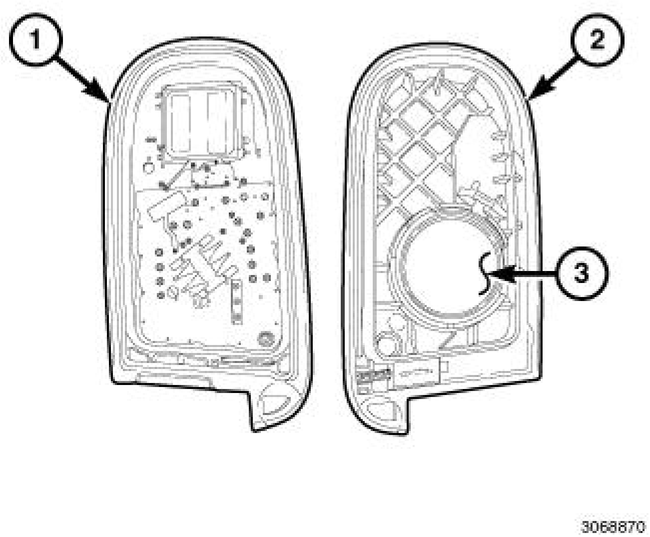


Fig. 29: FOBIK Case & Battery
Courtesy of CHRYSLER GROUP, LLC

3. Lift the battery (3) out of the receptacle in the back half of the FOBIK case (2).
4. Replace the battery with a recommended replacement battery. Refer to **TRANSMITTER,**

   INTEGRATED KEY FOB, SPECIFICATIONS.

5. Install the new battery into the receptacle in the back half of the FOBIK case with the negative terminal facing upward.
6. Align the front half of the FOBIK case (1) with the back half.
7. Using hand pressure, squeeze the two FOBIK case halves around their perimeters until they snap back together.
8. Reinsert the emergency key into the storage slot of the FOBIK case.
9. Test the FOBIK operation.

FOBIK PROGRAMMING

FOB with Integrated Key (FOBIK) programming may require the use of the Personal Identification Number PIN) for the vehicle, a diagnostic scan tool and the appropriate diagnostic information. Also be certain that the FOBIK and any replaced electronic modules are programmed in the proper sequence. Refer to **STANDARD PROCEDURE** .

SPECIFICATIONS

SPECIFICATIONS

BATTERY

The FOB with Integrated Key (FOBIK) transmitter is powered by a single 3-volt lithium and manganese dioxide button cell battery, which can be removed and replaced without special tools. Refer to **TRANSMITTER, INTEGRATED KEY FOB, STANDARD PROCEDURE**. The international standard battery type designation is: **CR2032** . This battery type is available at many local retail stores. Typical battery life is approximately three years.

CAUTION: Do not handle the batteries any more than necessary. Hands must be clean and dry.

RANGE

Normal Remote Keyless Entry (RKE) transmitter operation range for vehicles manufactured for domestic markets is up to 20 meters (66 feet) away from the vehicle. On vehicles manufactured for export markets, normal RKE transmitter range is up to 10 meters (33 feet) away from the vehicle. If a domestic market vehicle is equipped with the optional factory-installed Remote Start System, the normal transmitter range is increased to up to 91 meters (300 feet). Please note that the actual RKE transmitter range values may be better or worse than specified above, depending upon many possible variables in the environment at the specific time and location that any RKE transmission is attempted.

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Article GUID: A00735856

2015-16 ACCESSORIES AND EQUIPMENT

Power Mirrors - Service Information - Challenger

DESCRIPTION

DESCRIPTION

Driver and passenger power operated outside rear view mirrors are standard factory-installed equipment. In addition, automatic dimming rear view mirrors, both inside and a driver side outside are available as optional equipment. The power mirror system for this vehicle includes the following major components, which are described in further detail elsewhere in this service information:

- **Automatic Dimming Rear View Mirrors** - The optional automatic dimming inside rear view mirror is secured to a mounting button on the inside of the windshield glass near the upper windshield opening header. This is the same mounting button that is used for mounting the standard prismatic inside rear view mirror. The optional automatic dimming outside rear view mirror is only available for the driver side door. The automatic dimming outside rear view mirror is secured to the same mounting flag on the front door panel and in the same manner that is used to mount the standard equipment outside rear view mirrors.
- **Front Door Control Modules** - Vehicles that use the low current front door power switch configuration also have a front door control module for each front door. The front door control modules are concealed behind the door trim panels on the front door hardware module carrier. Refer to **MODULE, DOOR, DESCRIPTION** .
- **Front Door Power Switch Modules** - Front door power switch modules are used in both primary system configurations: high current and low current. The outputs of the switches will identify the configuration type being used. In the high current configuration the switch outputs are hard wired directly to the power mirror, power window and power lock motors. In the low current configuration the switch outputs are hard wired to the driver or passenger front door control modules, which then control the high current outputs to the power mirror, power window and power lock motors. Refer to **SWITCH, POWER WINDOW, DESCRIPTION** .
- **Power Mirror Switches** - The power mirror system includes two selector switches and an adjuster switch that are located on the driver front door trim panel and are only serviced as an integral part of their respective driver front door power switch module. Refer to **SWITCH, POWER WINDOW, DESCRIPTION** .
- **Power Outside Rear View Mirrors** - Power outside rear view mirror units are mounted to the mirror flag at the front belt line of each front door window opening. Many variations of both the driver and passenger mirror are available, depending upon both trim and other optional equipment in the vehicle.

In the low current switch configuration, the front door power switch modules and the front door control modules each contain a microcontroller and programming that allow them to communicate with each other using a Local Interface Network (LIN) data bus. The front door control modules and the automatic dimming inside rear view mirror each contain a microcontroller and programming that allow them to communicate with each other, with other electronic modules in the vehicle and with a diagnostic scan tool connected to the 16-way Data Link Connector (DLC) using the Controller Area Network (CAN) Interior High Speed (IHS) data bus. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the power mirror system components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the power mirror system components through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

POWER OPERATED OUTSIDE REAR VIEW MIRROR SYSTEM

The power operated outside rear view mirror system is available factory-installed equipment on this vehicle. This system allows the driver to adjust both the driver and passenger side outside rear view mirrors electrically from the driver seat by operating switches on the arm rest of the driver side front door inside trim panel. These switches allow the vehicle operator a convenient means of adjusting the mirrors to optimize peripheral vision to include the areas at the sides and rear corners of the vehicle, those blind spot areas that are generally blocked from the view of the vehicle operator by the vehicle structure.

The power operated outside rear view mirror system includes the following major components, which are described in further detail elsewhere in this service information:

- **Power Mirror** - Vehicles equipped with the power operated outside rear mirror system have a power operated mirror secured to the mirror flag area at the front of each front door glass opening. Refer to **MIRROR, OUTSIDE REARVIEW, DESCRIPTION**.
- **Power Mirror Switch** - Vehicles equipped with the power operated outside rear view mirror system have a power mirror selector switch, a power mirror control switch, and a power folding mirror switch integral to the power switch module located near the front of the arm rest on the driver side front door interior trim panel. Refer to **SWITCH, LOCK, DESCRIPTION** .

Certain functions and features of the power operated outside rear view mirror system may rely upon resources shared by other electronic modules in the vehicle over a Local Interface Network (LIN) data bus as well as over the Controller Area Network (CAN) data bus. Other electronic modules in the vehicle that may affect power operated outside rear view mirror operation are:

- **Blind Spot Sensors** - Vehicles equipped with the BSM system have both a Left Blind Spot Sensor (LBSS) and a Right Blind Spot Sensor (RBSS). The LBSS and the RBSS each include a RAdio Detection And Ranging (RADAR) sensor and an integral electronic control unit. Each of the two control units is independent, communicates on the Controller Area Network (CAN) data bus and is hard wired to its respective right or left blind spot display. The LBSS and the RBSS are concealed behind their respective right and left outboard ends of the rear bumper fascia, just behind the rear wheel openings.
- **Body Control Module** - The BCM controls many of the body electrical system components. The BCM is both a LIN master node and a gateway to the CAN data bus. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Radio Frequency Hub Module** - The Radio Frequency Hub Module (RFHM) (also known as the RF

Hub) is the RKE system control module and RF receiver. Refer to **MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION** .

These components and their controls are combined to provide the following power operated outside rear view mirror system features:

- **Blind Spot Monitor Display** - In vehicles also equipped with the optional Blind Spot Monitor (BSM) system, an amber Light Emitting Diode (LED) unit behind a small, triangular translucent icon in each outside rear view mirror glass is illuminated each time the right or left blind spot sensor detects an object of interest in one of the monitored vehicle blind spots. Refer to **DISPLAY, BLIND SPOT, DESCRIPTION** .
- **Heated Mirrors** - The heated mirror option includes an electric heating grid behind the mirror glass in each outside rear view mirror, which can clear the mirror glass of ice, snow, or fog. Refer to **DESCRIPTION** .

AUTOMATIC DIMMING INSIDE REAR VIEW MIRROR SYSTEM

The automatic dimming inside rear view mirror is available factory-installed equipment on this vehicle. This mirror is also known as the ElectroChromic Mirror Module (ECMM). This mirror system uses an ElectroChromic (EC) material and will automatically adjust the reflectance of the mirror glass to reduce glare from the headlamps of following vehicles during dark or night time driving conditions. Reducing glare will improve driver comfort and vision under these driving conditions. The components of the automatic dimming inside rear view mirror system are completely self-contained within the inside rear view mirror. Refer to **MIRROR, AUTOMATIC DAY AND NIGHT, DESCRIPTION**.

Certain functions and features of the EC mirror system may rely upon resources shared by other electronic modules in the vehicle over a Local Interface Network (LIN) data bus as well as over the Controller Area Network (CAN) data bus. Other electronic modules in the vehicle that may affect EC mirror operation are:

- **Body Control Module** - The Body Control Module (BCM) is located beneath the instrument panel on the driver side of the vehicle. The BCM controls many of the body electrical system components. The BCM is both a LIN master node and a gateway to the CAN data bus. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Powertrain Control Module** - The Powertrain Control Module (PCM) is located beneath the hood in the engine compartment of the vehicle. The PCM controls many of the powertrain electrical system components. The PCM communicates on the CAN data bus. Refer to **MODULE, POWERTRAIN CONTROL, DESCRIPTION** .
- **Transmission Control Module** - On vehicles with an automatic transmission, the Transmission Control Module (TCM) controls many of the automatic transmission electrical system components. The TCM communicates on the CAN data bus. Refer to **MODULE, TRANSMISSION CONTROL, OPERATION** .

These components and their controls are combined to provide the following EC mirror system feature:

- **Dimming Disabled In Reverse** - The automatic dimming feature of the EC mirrors is disabled anytime the Reverse position of the transmission is selected.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER MIRRORS

The hard wired inputs and outputs of the speed control system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the Local Interface Network (LIN) slave node integral and internal to the drivers door master control switch. The most reliable, efficient and accurate means to diagnose the LIN slave node operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

MIRROR, AUTOMATIC DAY AND NIGHT

DESCRIPTION

DESCRIPTION

An automatic dimming (day and night) inside rear view mirror is an available factory-installed option for this vehicle. Vehicles equipped with the automatic dimming inside rear view mirror are also available with an optional factory-installed automatic dimming outside rear view mirror for the driver side of the vehicle. In vehicles so equipped, this system will automatically change the reflectance of the inside and driver side outside rear view mirrors to protect the driver from the unwanted headlight glare of trailing vehicles while driving at night. Following are general descriptions of this optional equipment.

INSIDE MIRROR

Fig. 1: Automatic Dimming Mirror
Courtesy of CHRYSLER GROUP, LLC

An automatic dimming inside rear view mirror is an available factory-installed option on this vehicle. This mirror features a thin layer of ElectroChromic (EC) material sandwiched between two pieces of conductive glass to make up the face of the mirror. The EC material explains how this mirror also became known as the ElectroChromic Mirror Module (ECMM). The ECMM will automatically change the reflectance of the inside rear view mirror glass to reduce the glare of headlamps approaching the vehicle from the rear while driving during dark or night time conditions. The Automatic Dimming Mirror feature can be turned on or off using the UconnectÂ® System. The Automatic Dimming Mirror feature is disabled when the vehicle is in reverse gear to improve rear view viewing.

The ECMM is a completely self-contained unit that replaces the standard equipment prismatic inside rear view mirror. Besides the mirror glass, the ECMM includes a power switch, a Light Emitting Diode (LED) power indicator, two photocell sensors, the electronic mirror control circuitry and the hardware necessary to communicate as a Local Interface Network (LIN) slave node on the LIN data bus.

The ECMM may also integrate these other optional features:

- **Imager Camera** - For vehicles equipped with the SmartBeamÂ® Automatic Headlamp High Beam System, a digital imaging camera is integral to the ECMM mounting bracket and shares the LIN data bus communication features of the ECMM.
- **Microphones** - Stereo microphones are integral to the inside rear view mirror in vehicles equipped with the hands-free phone system. These microphones are located on the top surface of the mirror housing, one to each side of center.
- **Assist** - Pressing the **ASSIST** button will present the customer with three choices. Uconnect™ Care, Vehicle Care or Roadside Assistance. These selection options are presented as soft keys in the RRM display. Selecting any one of these choices will place a call to the selected group. If there are questions about Uconnect™ Services, Uconnect™ Care can be contacted; if there are questions related to vehicle functionality, Vehicle Care can be contacted; or, if Roadside Assistance is needed, a direct call can be made.
- **9-1-1** - Pressing the **9-1-1** button will initiate an emergency call to a Public Safety Answering Point (PSAP). The Global Positioning System (GPS) coordinates of the vehicle are made available to the emergency operator in the event help needs to be sent. In addition it opens a two way voice channel with the emergency operator allowing communication between the vehicle occupant and the emergency operator.

Hard wired circuitry connects the ECMM to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the ECMM through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The ECMM cannot be repaired or adjusted. If any component of this unit is ineffective or damaged, the entire ECMM unit must be replaced.

OUTSIDE

The automatic dimming driver side outside rear view mirror is able to automatically change its reflectance. The automatic dimming outside rear view mirror replaces the standard equipment outside rear view mirror. The two layers of conductive mirror glass with a thin layer of electrochromic material between them is contained within the outside rear view mirror glass case. However, this mirror relies upon the photocells and mirror control circuitry of the automatic dimming inside rear view mirror to control its reflectance.

The automatic dimming outside rear view mirror is secured to the same mounting flag on the front door panel and in the same manner that is used to mount the standard equipment outside rear view mirrors. The mirror is connected to the vehicle electrical system through a dedicated take out and connector of the front door wire harness. The automatic dimming circuitry of the outside rear view mirror receives current through auto

day/night mirror feed (+) and return (-) circuits from the inside rear view mirror, and will only operate when the ignition switch is in the ON or START positions.

The automatic dimming outside rear view mirror sensitivity cannot be repaired or adjusted. If any component of this unit is ineffective or damaged, the entire outside rear view mirror unit must be replaced. For service procedures, refer to **MIRROR, OUTSIDE REARVIEW, REMOVAL** and **MIRROR, OUTSIDE REARVIEW, INSTALLATION** .

OPERATION

OPERATION

Both the inside and outside automatic dimming mirrors receive battery current through a fused ignition switch output (run/start) circuit and fuse in the Power Distribution Center (PDC), and will only operate when the ignition switch is in the ON or START positions.

INSIDE

The soft switch located in the U-Connect™ touch screen provides the vehicle operator with a manual control of whether the automatic dimming feature is operational. If the dimming is turned to the off position, the mirror will always turn back ON by default at the onset of a new ignition ON cycle. The automatic dimming mirror circuitry also senses the backup lamp circuit, and will automatically disable its self-dimming feature whenever the transmission gear selector is in the REVERSE position.

The ambient photocell sensor of the mirror faces forward, to detect the outside light levels through the windshield glass. A second headlamp photocell sensor is located in the upper right quadrant of the mirror face, to detect the light level received at the rear window side of the mirror. When the mirror control circuitry detects that the difference between the two sensed light levels has become too great (the light level received at the rear of the mirror is much higher than that at the front of the mirror) the mirror begins to darken. A thin layer of electrochromic material between two pieces of conductive glass make up the face of the mirror.

On vehicles equipped with an optional driver side automatic dimming outside rear view mirror, the signal to control the dimming of that mirror is generated by the automatic dimming inside rear view mirror circuitry. That signal is then delivered to the driver side outside rear view mirror on two hard wired circuits.

For vehicles equipped with the **ASSIST Call** and **911 Call** options. Refer to **OPERATION** .

The BCM determines the ignition status and the gear status. Once determined, the BCM sends an enable/disable signal over the LIN bus to the electrochromic mirror. The electrochromic mirror reads the internal message for the sensor value and determines the ratio between forward/backward light intensity, along with the enable signal coming from the BCM, to determine the reflecting mode to be used.

OUTSIDE

The driver side automatic dimming outside mirror is operated by the same controls and circuitry as the automatic inside rear view mirror. When the automatic inside rear view mirror is switched ON or OFF, the automatic dimming outside mirror is likewise switched ON or OFF. Just as in the automatic inside rear view mirror, a thin layer of electrochromic material between two pieces of conductive glass make up the face of the automatic dimming outside mirror. However, the signal to control the dimming of the outside mirror is generated by the automatic dimming inside rear view mirror control circuitry based upon the inputs from the two photocell sensors integral to the inside mirror. That signal is then delivered to the driver side outside rear

view mirror on two hard wired circuits.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - AUTOMATIC DIMMING MIRRORS

For complete circuit diagrams, **refer to appropriate SYSTEM WIRING DIAGRAMS article** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

1. Check the fused ignition switch output (run/start) fuse in the Power Distribution Center (PDC). If OK, go to step 2. If not OK, repair the shorted circuit or component as required and replace the ineffective fuse.
2. Turn the ignition switch to the ON position. Check for battery voltage at the fused ignition switch output (run/start) fuse in the PDC. If OK, go to step 3. If not OK, repair the open fused ignition switch output (run/start) circuit to the run-start relay in the PDC as required.
3. Disconnect the overhead wire harness connector from the automatic dimming inside rear view mirror. Check for battery voltage at the fused ignition switch output (run-start) circuit cavity of the overhead wire harness connector for the mirror. If OK, go to step 4. If not OK, repair the open fused ignition switch output (run/start) circuit to the fuse in the PDC as required.
4. Turn the ignition switch to the OFF position. Check for continuity between the ground circuit cavity of the overhead wire harness connector for the automatic dimming inside rear view mirror and a good ground. There should be continuity. If OK, go to step 5. If not OK, repair the open circuit to ground as required.
5. Turn the ignition switch to the ON position. Set the parking brake. Place the transmission gear selector lever in the REVERSE position. Check for battery voltage at the backup lamp switch output circuit cavity of the overhead wire harness connector for the automatic dimming inside rear view mirror. If OK, reconnect the overhead wire harness connector to the mirror and go to step 6. If not OK, repair the open backup lamp switch output circuit as required.
6. Place the transmission gear selector lever in the NEUTRAL position. Place the automatic dimming inside rear view mirror switch in the ON (green LED indicator illuminated) position. Cover the forward facing ambient photocell light sensor to keep out any ambient light.

NOTE: **The ambient photocell sensor must be covered completely, so that no light reaches the sensor. Use a finger pressed tightly against the sensor, or cover the sensor completely with electrical tape.**

7. Shine a light into the rearward facing headlamp photocell light sensor. The automatic dimming mirror glass should darken within 2 minutes if testing for the first time. For an immediate response, turn the mirror switch to the OFF position and back to the ON position with the forward-facing ambient light sensor still covered. This defeats the daylight detection logic of the mirror. If OK, go to step 8. If not OK, replace the ineffective mirror unit.
8. With the mirror darkened, place the transmission gear selector lever in the REVERSE position. The automatic dimming mirror glass should return to its normal reflectance. If not OK, replace the ineffective mirror unit.

MIRROR, OUTSIDE REARVIEW

DESCRIPTION

DESCRIPTION

The power operated outside rear view mirrors allow the driver to adjust both mirrors electrically from the driver seat position by operating switches integral to the power switch module on the driver side front door trim panel. The power outside mirrors operate on non-switched battery current received through a fuse in the Power Distribution Center (PDC) so that the mirrors remain operational, regardless of the ignition switch position.

Each power mirror housing contains two electric motors, two drive mechanisms, the mirror glass case and the mirror glass (2). One motor and drive controls mirror up-and-down (vertical) movement, and the other controls right-and-left (horizontal) movement. Vehicles manufactured for certain export markets also have a power folding mirror option. These mirrors include a third motor and drive mechanism that allow the mirror to be folded inward and outward from the driver seat position for additional clearance through narrow passages or in tight parking spaces.

A memory system that automatically positions the driver power mirror for two different drivers is an available option. With the memory system, the driver side mirror head also contains two position potentiometers. One position potentiometer monitors the vertical mirror motor, and the other monitors the horizontal mirror motor. Refer to **DESCRIPTION** .

The standard equipment mechanically folding or the optional power folding, power operated outside rear view mirrors are also electrically heated. The mirror heater only operates when the ignition switch is in the ON position and the rear window defogger switch is turned ON. When the rear window defogger switch is in the ON position, electric heater grids on the rear window glass and behind both outside rear view mirror glasses are energized. These electric heater grids produce heat to help clear the rear window glass and outside rear view mirrors of ice, snow, or fog. Refer to **DESCRIPTION** .

On vehicles equipped with the optional automatic dimming inside rear view mirror, an optional driver side automatic dimming outside rear view mirror that darkens the mirror to reduce the glare of bright lights approaching the vehicle from behind is available. This mirror is controlled an output of the automatic dimming inside rear view mirror. Like the automatic dimming inside rear view mirror, a thin layer of electrochromic material between two pieces of conductive glass make up the face of the mirror glass. Refer to **MIRROR, AUTOMATIC DAY AND NIGHT, DESCRIPTION**.

On vehicles equipped with the optional Blind Spot Monitor (BSM) system, a Light Emitting Diode (LED) display unit is concealed behind the outside rear view mirror glass. This unit illuminates an amber triangle icon through the lower edge of the mirror glass to give the vehicle operator an indication that an object has been detected by the BSM system. Refer to **DESCRIPTION** .

The power outside rear view mirror unit cannot be repaired. If any other component of the power mirror unit is ineffective or damaged, the entire power mirror unit must be replaced.

OPERATION

OPERATION

The power operated outside rear view mirrors are connected to battery current at all times. Each mirror head contains two electric motors, two drive mechanisms, an electric heating element and the mirror glass. If the vehicle is equipped with the high current door power switch module configuration, hard-wired ground and

battery current outputs to each power mirror motor determine whether the horizontal or the vertical motor will be operated and the polarity of those outputs control the direction in which the motor will move the drive unit and mirror glass.

Power mirror and mirror switch functionality is the same with the low current configuration; however, the driver door power switch module sends power mirror switch status messages over the Local Interface Network (LIN) data bus to the driver front door control module. The driver front door control module then controls the high current outputs to the driver door mirror motors or sends electronic request messages over the Controller Area Network (CAN) Interior High Speed (IHS) data bus to the passenger front door control module to control high current outputs to the passenger door mirror motors.

The standard equipment power outside rear view mirrors are electrically heated. In the high current door power switch module configuration, the heater grid behind each mirror glass is energized whenever the rear window defogger relay is energized by the Power Distribution Center (PDC) in response to electronic defogger switch status messages received over the CAN data bus from the A/C-heater control. In the low current door power switch configuration each front door control module responds to the electronic defogger switch status messages received over the CAN data bus from the A/C-heater control to control the high current output to the heater grid of the mirror on the same door as appropriate.

On vehicles equipped with the optional driver side automatic dimming outside rear view mirror, the mirror reflectance is controlled by the driver front door control module based upon hard-wired inputs received from the automatic dimming inside rear view mirror.

If the vehicle is equipped with the optional Blind Spot Monitor (BSM) system, an LED display unit behind the lower edge of each mirror glass illuminates an amber triangle to indicate to the vehicle operator that an object has been detected by the BSM system. The BSM LED display is controlled by the front door control modules based upon electronic messages received from the BSM control module over the CAN data bus.

SWITCH, MIRROR

DESCRIPTION

DESCRIPTION

The power mirror system includes two selector switches and an adjuster switch that are located on the driver front door trim panel and are only serviced as an integral part of the driver front door power switch module. For the appropriate service information, refer to **SWITCH, POWER WINDOW, REMOVAL** and **SWITCH, POWER WINDOW, INSTALLATION** .

OPERATION

OPERATION

The power mirror switch circuitry within the driver side front door power switch module is connected to battery current through a non-switched fused B(+) circuit in the underhood Power Distribution Center (PDC). The power mirror switch circuitry also has a path to ground at all times through a take out and eyelet terminal of the body wire harness that is secured to the body sheet metal. These connections allow the power mirror switch to remain operational regardless of the status of the ignition switch.

A latching push button power mirror selector switch has three positions, **L** (left), **R** (right) and **N** (neutral).

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After the right or left mirror is selected, one of the four directional arrows on the momentary power mirror control switch disc is depressed to move the selected mirror up, down, right or left. The power mirror control switch directs the appropriate battery current and ground feeds to the proper horizontal or vertical motor within the mirror articulating mechanism of the selected power mirror.

The power mirror switches as well as the hard wired input and output circuits of the switches may be diagnosed using conventional diagnostic tools and procedures.

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Article GUID: A00735967

2015-16 ACCESSORIES AND EQUIPMENT

Power Seats - Service Information - Challenger

DESCRIPTION

DESCRIPTION

The power seat system allows the driver to electrically adjust the seating position using the power seat switch located on the outboard seat cushion side shield.

The available driver side six-way power seat includes a six-way adjustable seat cushion track and a manual recline and fold flat feature. The seat can be electrically adjusted forward, rearward, up, down and seat front only, up and down.

The driver power seat includes a four-way power lumbar support. The lumbar support can be electrically adjusted in, out, up and down.

The power seat contains reversible motors that are connected to worm-drive gearboxes that move the seat through a combination of screw-type drive units. Each motor contains a self-resetting circuit breaker to protect it from overload. Consecutive or frequent resetting of the circuit breakers may damaged the motors.

The power seating system is also available with heated seat and vented seat options. Refer to **DESCRIPTION** and **DESCRIPTION** .

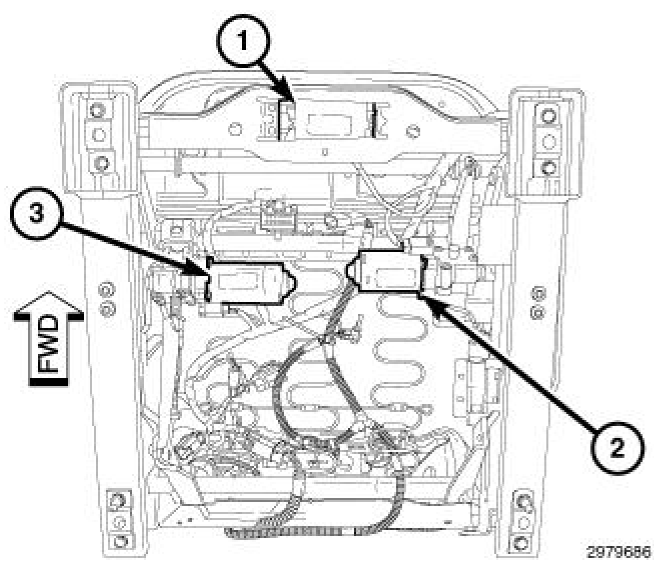
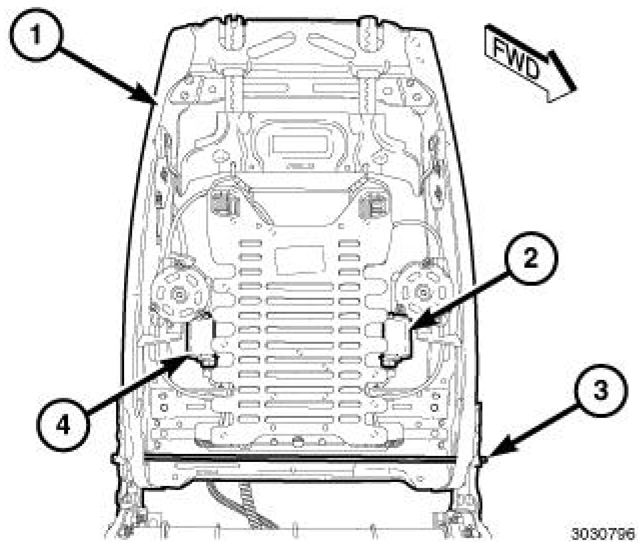


Fig. 1: Fore/Aft Motor, Front Tilt Motor & Rear Tilt Motor
Courtesy of CHRYSLER GROUP, LLC

The power seat track for this vehicle includes the following:

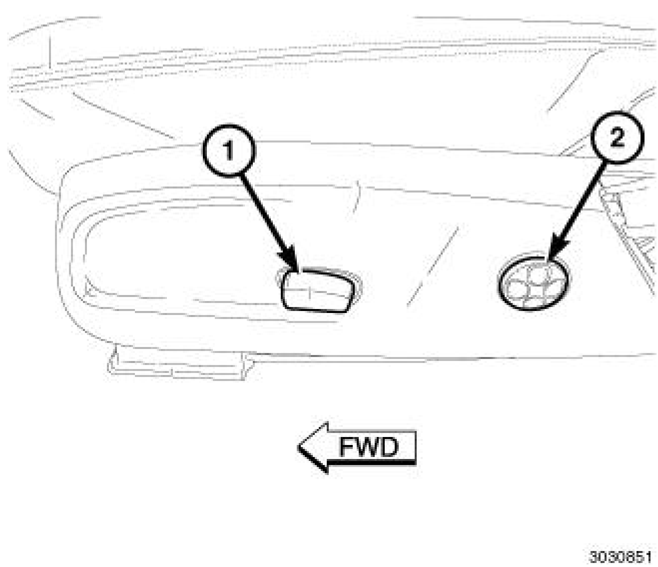
- **Fore/Aft Motor** (1) - located at the front of the seat track.
- **Front Tilt Motor** (2) - located on the left side of the seat track.
- **Rear Tilt Motor** (3) - located on the right side of the seat track.



[Fig. 2: Seat Back, Power Lumbar Motors & Manual Seat Back Recliner]
Courtesy of CHRYSLER GROUP, LLC

The seat back (1) for this vehicle includes the two following major components:

- **Power Lumbar Motors** (2 and 4) - two motors located on the power lumbar mechanism, in seat back frame.
- **Manual Seat Back Recliner** (3) - located on the outboard side of the seat back frame. Controls the up and down movement of the seat back.



[Fig. 3: Seat Position Switch & Lumbar Switch]
Courtesy of CHRYSLER GROUP, LLC

The power seat for this vehicle can include the following switches:

- **Seat Position Switch** (1) - located at the center of the outboard seat cushion trim panel. The power seat switch is a six-way paddle-type lever. Movement of the seat bottom mimics the action of the switch.
- **Lumbar Switch** (2) - located at the rear of the outboard seat cushion trim panel. The power lumbar switch is a four-way rocker type switch. Lumbar support can be increased and decreased, and the support

area can be lowered or raised for added driver comfort.

OPERATION

POWER SEAT SYSTEM

- Only the driver's seat can be equipped with an electrically adjustable lumbar support device.
- Lumbar adjustment allows the backrest support to be altered to improve comfort. It is operated by a special electric motor and controlled by a switch on the seat.
- The circuit is protected by a special fuse and controlled by a relay switch in the luggage compartment.
- Lumbar adjustment is only allowed with ignition-operated exclusion (INT/A).

NOTE: **The front seats are also equipped with backrest angle adjustment, lengthwise adjustment and cushion height adjustment. In this configuration these adjustments are always mechanical, not controlled by electric motors.**

When a power seat switch is actuated, a battery feed and a ground path are applied through the power seat switch contacts to the Memory Seat Motor (MSM). The MSM then applies power and ground to the appropriate motor or motors. The motor and drive unit operate to move the seat adjuster, seat back or lumbar support (when equipped) in the selected direction until the switch is released, or until the travel limit of the drive unit is reached. When the switch is moved in the opposite direction, the battery feed and ground path to the motor is reversed through the switch contacts. This causes the motor to run in the opposite direction. Power seats remain operational, regardless of the ignition switch position.

The motors, gearboxes and linkage for the power seat adjuster, power reclining seat back and power lumbar support cannot be adjusted or serviced separately. If a motor, gearbox or linkage for the power seat adjuster, power recliner or power lumbar becomes inoperative or damaged, the entire power seat adjuster and pan assembly, or the seat back frame assembly must be replaced.

Lumbar adjustment is only allowed with ignition-operated exclusion (INT/A).

DIAGNOSIS AND TESTING

POWER SEAT SYSTEM

NOTE: **For complete circuit diagrams, refer to appropriate SYSTEM WIRING DIAGRAMS article . Wiring Information includes wiring diagrams, connector pin-out and location views, details of wire harness routing and retention, splice and ground locations and proper wire and connector repair procedures.**

Operate the power seat switches and power lumbar support switch. Move the seat, seat back and power lumbar support in all directions. The seat and lumbar support should move in each of the selected directions. If any of the power seat and/or lumbar support motors fail to operate in more than one direction, proceed as follows:

1. Inspect the power seat motors, power lumbar motors and Memory Seat Module (MSM) to ensure the electrical connectors are fully connected to the motors. If OK, go to Step 2. If not OK, reconnect the electrical connector(s).
2. Check the power seat fuse in the Power Distribution Center (PDC). If OK, go to Step 3. If not OK,

replace the fuse.

3. Remove the power seat switch and/or power lumbar switch from the seat cushion side panel. Check for battery voltage at the fused B(+) circuit cavity of the switch wire harness connector. If OK, go to Step 4. If not OK, repair the open circuit as required.
4. Check for continuity between the ground circuit cavity of the power seat switch and/or power lumbar switch wire harness connector and a good ground. There should be continuity. If OK, go to Step 5. If not OK, repair the open circuit to ground as required.
5. Test the power seat switch and/or power lumbar switch. Refer to **SWITCH, SEAT, DIAGNOSIS AND TESTING** and **SWITCH, LUMBAR CONTROL, DIAGNOSIS AND TESTING**. If the switch tests OK, check the wire harness between the switch and the MSM and then the MSM and the motor(s) (See appropriate Wiring information). If the circuits check OK, replace the inoperative power seat track and pan assembly or the seat back assembly. If the circuits are not OK, repair the wire harness as required.

SWITCH, LUMBAR CONTROL

DESCRIPTION

DESCRIPTION

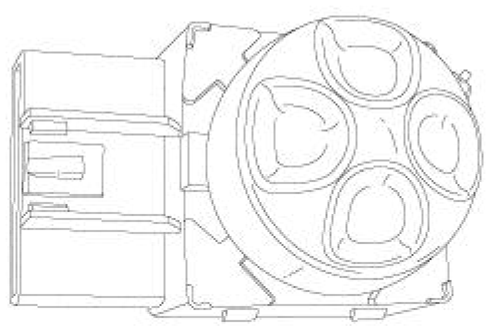


Fig. 4: Power Lumbar Switch
Courtesy of CHRYSLER GROUP, LLC

The driver power lumbar can be adjusted in four different ways using the power lumbar switch, located on the outboard seat cushion side shield, on models so equipped. The power lumbar support can be adjusted inward, outward, upward and downward for added driver comfort.

OPERATION

OPERATION

When the lumbar support switch is actuated, a battery feed and a ground path are applied through the switch contacts to the lumbar support adjuster. The selected lumbar support adjuster motor operates the lumbar support adjuster mechanism through its drive unit in the selected direction until the switch is released, or until the travel limit of the adjuster is reached. When the switch is moved in the opposite direction, the battery feed and ground

path to the motor are reversed through the switch contacts. This causes the selected lumbar support adjuster motor to run in the opposite direction.

The lumbar support switch should be held applied in any direction after the adjuster has reached its travel limit. The lumbar support adjuster motors each contain a self-resetting circuit breaker to protect them from overload. However, consecutive or frequent resetting of the circuit breaker may result in motor damage.

The lumbar switch cannot be adjusted or repaired and must be replaced if damaged or inoperative.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER LUMBAR SWITCH

NOTE: **For complete circuit diagrams, refer to appropriate SYSTEM WIRING DIAGRAMS article . Wiring Information includes wiring diagrams, connector pin-out and location views, details of wire harness routing and retention, splice and ground locations and proper wire and connector repair procedures.**

DRIVER SEAT

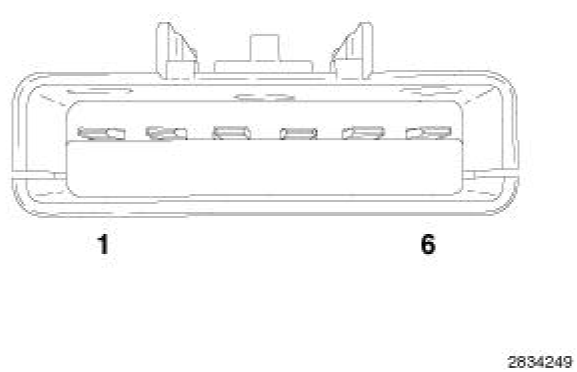


Fig. 5: Power Lumbar Switch Connector End View
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the power lumbar support switch from the seat. Refer to **SWITCH, LUMBAR CONTROL, REMOVAL**.
3. Use an ohmmeter to test the continuity of the power lumbar support switch using the following table. If not OK, replace the inoperative power lumbar support switch. If switch tests OK, check for an open or short in the power lumbar support circuit wiring. If no open or short is found, replace the power lumbar support adjuster motor(s) as required.

DRIVER SEAT LUMBAR SWITCH CONTINUITY

SWITCH POSITION	CONTINUITY BETWEEN
OFF	1-2, 1-3, 1-4, 1-5, 2-3, 2-4, 2-5, 3-4, 3-5, 4-5

SWITCH POSITION	CONTINUITY BETWEEN
UP	1-2, 1-3, 1-4, 2-3, 2-4, 3-4, 5-6
DOWN	1-3, 1-4, 1-5, 2-3, 2-4, 2-5, 3-4, 3-5, 4-5
IN	1-2, 1-4, 1-5, 2-6, 3-4, 3-5, 4-5
OUT	2-4, 2-5, 3-6, 4-5

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury. Refer to WARNING .

NOTE: Driver seat shown in illustrations. Passenger seat similar.

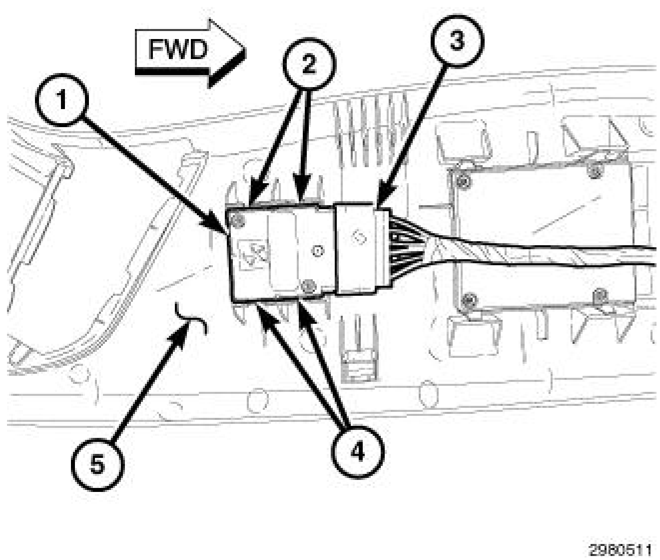


Fig. 6: Electrical Connector, Power Lumbar Control Switch, Seat Cushion Side Trim Panel & Four Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Position the seat being serviced all the way forward.
2. Disconnect and isolate the negative battery cable.

NOTE: It is not necessary to remove the seat belt anchor from the seat when servicing the power lumbar control switch.

3. Remove the outboard seat cushion side trim panel (5) from the seat. Refer to **REMOVAL** .
4. Using Trim Stick (special tool #C-4755, Trim Stick) or equivalent, carefully disengage the four tabs (2 and 4) that secure the lumbar control switch (1) to the seat cushion side trim panel.
5. Disconnect the electric connector (3) from the lumbar control switch and remove the switch.

INSTALLATION

INSTALLATION

NOTE: Driver seat shown in illustrations. Passenger seat similar.

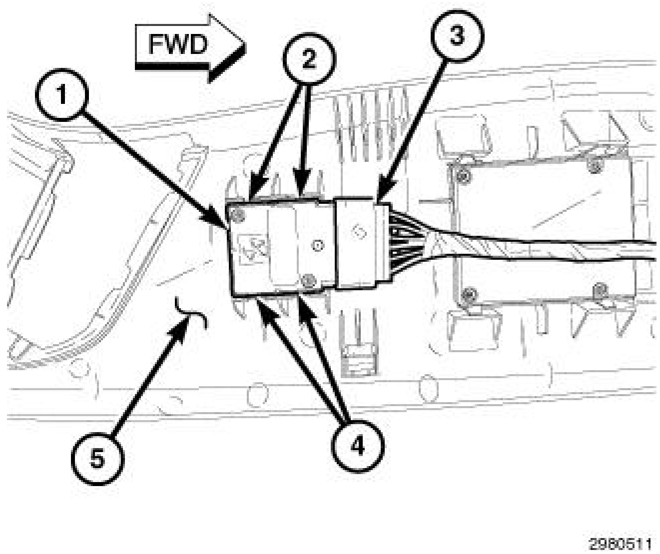


Fig. 7: Electrical Connector, Power Lumbar Control Switch, Seat Cushion Side Trim Panel & Four Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Connect the electrical connector (3) to the power lumbar control switch (1). Make sure the connector is fully engaged to the switch.
2. Position the lumbar control switch to the seat cushion side trim panel (5) and engage the four retaining tabs (2 and 4) that secure the switch to the trim panel. Make sure the retaining tabs are fully engaged.
3. Install the outboard seat cushion side trim panel. Refer to **INSTALLATION** .
4. Connect the negative battery cable.
5. Verify proper power lumbar support operation.

SWITCH, SEAT

DESCRIPTION

DESCRIPTION

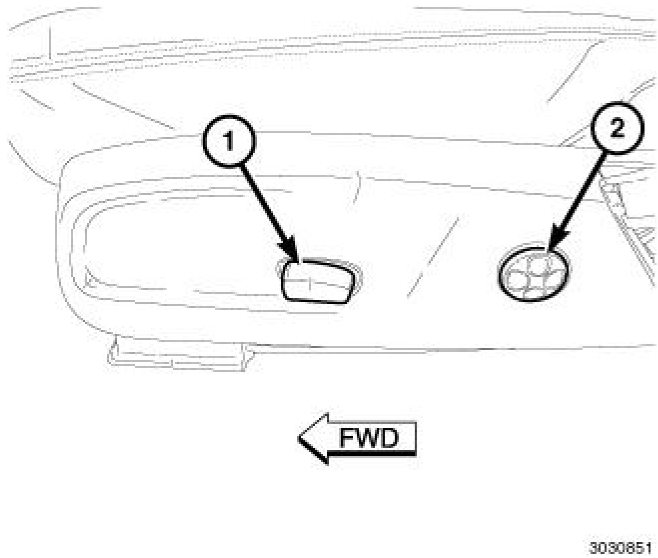


Fig. 8: Seat Position Switch & Lumbar Switch
Courtesy of CHRYSLER GROUP, LLC

The available driver side six-way power seat switch (1) includes a six-way adjustable seat cushion track and a manual recline and fold flat feature. The seat can be electrically adjusted forward, rearward, up, down and seat front only, up and down. The available driver power seat includes a four-way power lumbar support. The lumbar support can be electrically adjusted in, out, up and down by the lumbar seat switch (2).

OPERATION

OPERATION

When a power seat switch is actuated, a hardwired resistive multiplex signal is sent to the Memory Seat Module (MSM). The resistor value indicates which seat motor(s) to drive. The MSM then applies battery feed and ground to the appropriate power seat adjuster or recliner adjuster motor (s). The selected seat adjuster motor operates to move the seat or recliner through its drive unit in the selected direction until the switch is released, or until the travel limit of the adjuster is reached. When the switch is moved in the opposite direction, the battery feed and ground path from the MSM to the motor are reversed through the switch contacts. This causes the seat adjuster motor to run in the opposite direction.

No power seat switch should be held applied in any direction after the adjuster has reached its travel limit. The power seat adjuster motors each contain a self-resetting circuit breaker to protect them from overload. However, consecutive or frequent resetting of the circuit breaker may result in motor damage.

The individual switches in the power seat switch cannot be adjusted or repaired. If one switch is damaged or inoperative, the entire power seat switch must be replaced.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER SEAT SWITCH

6-WAY DRIVER SEAT

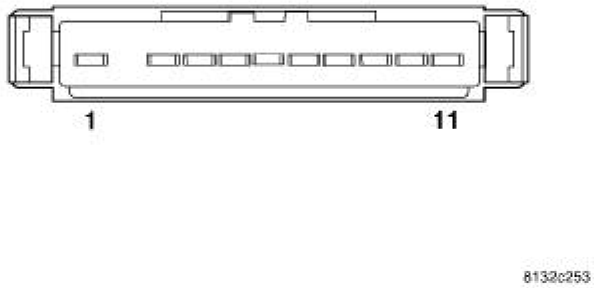


Fig. 9: Power Seat Switch Connector End View
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the power seat switch from the seat. Refer to SWITCH, SEAT, REMOVAL.
3. Use an ohmmeter to test the continuity of the power seat switch using the following table. If not OK, replace the inoperative power seat switch. If switch tests OK, check for an open or short in the power seat circuit wiring. If no open or short is found, replace the power seat track and pan assembly.

6-WAY DRIVER SEAT SWITCH CONTINUITY

SWITCH POSITION	CONTINUITY BETWEEN
OFF	7-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-10, 7-11
HORIZONTAL FORWARD	6-8, 7-1, 7-3, 7-4, 7-5, 7-9, 7-10, 7-11
HORIZONTAL REARWARD	6-4, 7-1, 7-3, 7-5, 7-8, 7-9, 7-10, 7-11
FRONT TILT DOWN	6-5, 7-1, 7-3, 7-4, 7-8, 7-9, 7-10, 7-11
FRONT TILT UP	6-9, 7-1, 7-3, 7-4, 7-5, 7-8, 7-10, 7-11
REAR TILT DOWN	6-10, 7-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-11
REAR TILT UP	6-11, 7-1, 7-3, 7-4, 7-5, 7-8, 7-9, 7-10

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any front seat diagnosis or service. Disconnect and isolate the negative battery (ground) cable and wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury. Refer to WARNING .

NOTE: Driver seat shown in illustrations. Passenger seat similar.

1. Position the seat being serviced all the way forward.
2. Disconnect and isolate the negative battery cable.

NOTE: **It is not necessary to remove the seat belt anchor from the seat when servicing the power seat switch.**

3. Remove the seat back panel. Refer to **PANEL, SEAT BACK, FRONT, REMOVAL** .

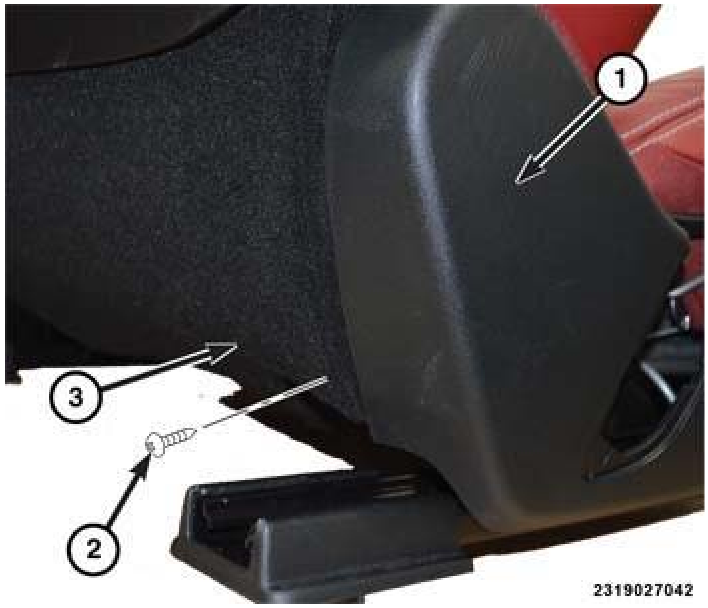


Fig. 10: Back Of Side Shield & Screw
Courtesy of CHRYSLER GROUP, LLC

4. Remove the screw (2) at the back of the side shield (1).
5. Unclip the side shield (1) and position aside to disconnect the wiring harness from the seat switches.

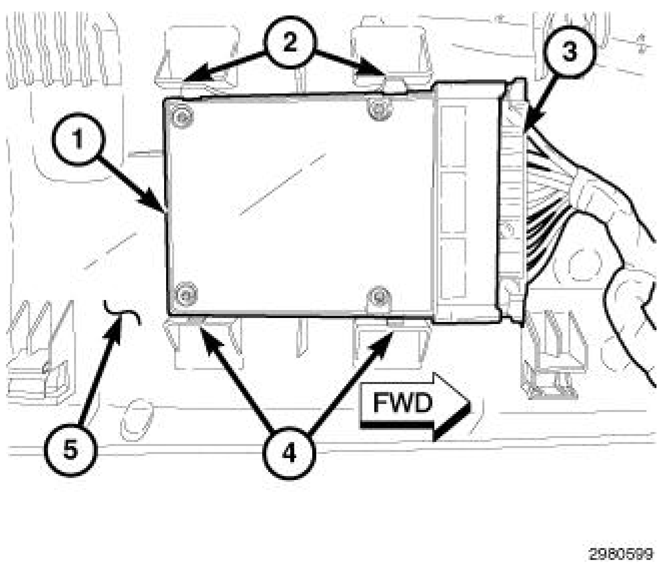


Fig. 11: Electrical Connector, Power Seat Switch, Seat Cushion Side Trim Panel & Four Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

6. Using Trim Stick (special tool #C-4755, Trim Stick) or equivalent, carefully disengage the four tabs (2 and 4) that secure the power seat switch (1) to the seat cushion side trim panel.

7. Disconnect the electric connector (3) from the power seat switch and remove the switch.

INSTALLATION

INSTALLATION

NOTE: **Driver seat shown in illustrations. Passenger seat similar.**

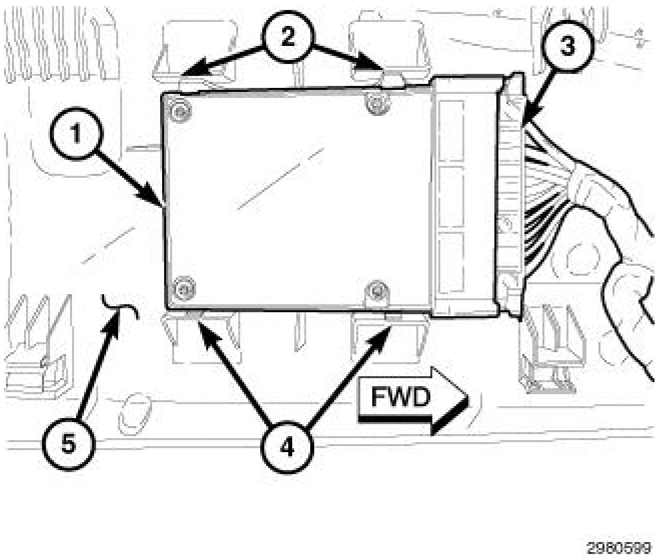


Fig. 12: Electrical Connector, Power Seat Switch, Seat Cushion Side Trim Panel & Four Retaining Tabs
Courtesy of CHRYSLER GROUP, LLC

1. Connect the electrical connector (3) to the power seat switch (1). Make sure the connector is fully engaged to the switch.
2. Position the power seat switch to the seat cushion side trim panel (5) and engage the four retaining tabs (2 and 4) that secure the switch to the trim panel. Make sure the retaining tabs are fully engaged.

Fig. 13: Back Of Side Shield & Screw
Courtesy of CHRYSLER GROUP, LLC

3. Position the side shield (1) close to the seat and connect the wiring connectors to the seat switches.
4. Clip the side shield onto the seat and install screw (2).
5. Install the seat back panel. Refer to **PANEL, SEAT BACK, FRONT, INSTALLATION** .
6. Connect the negative battery cable.
7. Verify proper power seat operation.

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Article GUID: A00735976

2015-16 ACCESSORIES AND EQUIPMENT

Power Windows - Service Information - Challenger

DESCRIPTION

DESCRIPTION

The power window system allows each of the door windows to be raised and lowered electrically by actuating a switch on the trim panel of each respective door. A master switch on the driver side front door trim panel allows the driver to raise or lower each of the passenger door windows and to lock out the individual switches on the passenger door from operation. The power window system receives battery feed through a circuit breaker, only when the ignition switch is in the RUN or ACCESSORY position.

The power window system includes the power window switches on each door trim panel, the circuit breaker, and the power window motors inside each door. The power switches are all similar in design and function with exception of the drivers side power switch module however, they are all serviced in the same manner. The power motors are similar as well and can be serviced separately from the window regulators.

OPERATION

OPERATION

POWER WINDOW MOTOR

A permanent magnet reversible motor moves the window regulator through an integral gearbox mechanism. A positive and negative battery connection to the two motor terminals will cause the motor to rotate in one direction. Reversing the current through these same two connections will cause the motor to rotate in the opposite direction. Each individual motor is grounded through the master switch. In addition, each power window motor is equipped with an integral self-resetting circuit breaker to protect the motor from overloads. The power window motor and gearbox assembly cannot be adjusted or repaired. If damaged or ineffective, the entire unit must be replaced.

POWER WINDOW SWITCH

The power windows are controlled by a window/lock switch on the trim panel of each front door. Switches in the driver door window/lock switch allows the driver to control the passenger windows.

The power window switch for the driver side front door window has a second detent position beyond the normal Down position, that provides an automatic one-touch window down feature.

Some vehicles may be equipped with an express closing feature. During an express closing, anytime an obstacle is detected in the way of the glass, the motor will stop and reverses travel to avoid pinching an occupant fingers. Modules in the doors are programmed to compare the position of the glass to the amount of current being used to drive up the glass.

The system also includes various features to manage the perceived forces on the glass as it travels up. If the express closing calibration is lost, the system will self-calibrate itself after the windows are moved up and down two cycles.

The power window switches control the battery and ground feeds to the power window motors. All passenger door power window switches receive their battery and ground feeds through the circuitry of the window/lock switch. When the power window lockout switch is in the Lock position, the battery feed for the individual passenger door power window switches is interrupted.

EXPRESS DOWN WINDOW FEATURE

This feature allows the customer to remotely lower both front door windows at the same time. To use this feature, press and release the UNLOCK button on the RKE transmitter and then immediately press and hold the UNLOCK button until the windows lower to the desired level or until they lower completely.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER WINDOWS

For complete circuit diagrams, **refer to appropriate SYSTEM WIRING DIAGRAMS article.**

ALL WINDOWS INOPERATIVE

1. Check the circuit breaker. If OK, go to Step 2. If not OK, replace the inoperative circuit breaker.
2. Disconnect and isolate the battery negative cable. Remove the window/lock switch from the driver side front door trim panel. Unplug the wire harness connector.
3. Check for continuity between the ground circuit cavity of the door module wire harness connector and a good ground. If OK, go to Step 4. If not OK, repair the circuit to ground as required.
4. Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run) circuit cavity of the window/lock switch wire harness connector. If OK, refer to **SWITCH, LOCK, DIAGNOSIS AND TESTING** . If not OK, repair the circuit as required.

ONE WINDOW INOPERATIVE

The window glass must be free to slide up and down for the power window motor to function properly. If the glass is not free to move up and down, the motor will overload and trip the integral circuit breaker. To determine if the glass is free, disconnect the regulator from the glass. Then slide the window up and down by hand.

There is an alternate method to check if the glass is free. Position the glass between the up and down stops. Then, shake the glass in the door. Check that the glass can be moved slightly from side to side, front to rear, and up and down. Then check that the glass is not bound tight in the tracks. If the glass is free, proceed with the diagnosis that follows. If the glass is not free, determine the cause of the condition.

If the only inoperative window is in the driver or passenger side front door and the preceding checks have not identified a problem, refer to **MOTOR, WINDOW REGULATOR, DIAGNOSIS AND TESTING**. If the problem being diagnosed involves only the Auto-down feature for the driver side front door window, but all of the power windows are operational, replace the driver's side window/lock switch. For diagnosis of the window/lock switch, refer to **SWITCH, LOCK, DIAGNOSIS AND TESTING** . For a rear power window problem proceed with the following:

1. Disconnect and isolate the battery negative cable. Unplug the wire harness connector from the power window switch unit on the door with the inoperative power window. Check for continuity between the

ground circuit cavity of the power window switch wire harness connector and a good ground. There should be continuity. If OK, go to Step 2. If not OK, repair the open circuit to the power window and door lock master switch as required.

2. Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run) circuit cavity in the body half of the power window switch unit wire harness connector. If OK, go to Step 3. If not OK, repair the open circuit to the power window and door lock master switch as required.
3. Test the power window switch continuity. Refer to **SWITCH, POWER WINDOW, DIAGNOSIS AND TESTING**. If OK, go to Step 4. If not OK, replace the power window switch.
4. Check the continuity in each circuit between the inoperative power window switch wire harness connector cavities and the corresponding power window motor wire harness connector cavities. If OK, refer to **MOTOR, WINDOW REGULATOR, DIAGNOSIS AND TESTING**. If not OK, repair the open circuit(s) as required.

NOTE: **All passenger door power window switches receive their battery and ground feed for operating the passenger door power window motors through the driver side power window and lock master switch and wire harness connector.**

STANDARD PROCEDURE

DOOR MODULE LEARN PROCEDURES

NOTE:

- **This procedure must be performed anytime the power window system has been serviced in either front door or when there is a possible concern with a door module calibration.**
- **The battery must be fully charged or the vehicle running before proceeding with the learn procedure.**
- **All doors must be completely closed before proceeding.**
- **It is suggested to sit inside the vehicle in the drivers seat and close the door.**

Express-up / Express-down possible concerns.

- Glass will not lower all the way down flush to the belt-line.
- Glass will not raise fully; wind noise / water leak.
- Glass will not raise automatically (Expess-up) after lifting the switch to the second detent and releasing.

To relearn the door module memory after module replacement, perform the following procedure:

1. Check and repair any door module Diagnostic Trouble Code (DTC) (s) unrelated to missing calibration before proceeding.
2. Using the window switch, lower the door glass to the full-down position by pushing down (depress) the window switch to its second detent and hold the switch until the door glass is fully open. Continue to hold the window switch down for two seconds after the door glass is fully open.
3. Raise the door glass to the full-up position by pulling up on the window switch and hold the switch until

the door glass is fully closed. Continue to hold the window switch up for two seconds after the door glass is full closed.

4. Code should now be stored. Clear code and test window operations.

To relearn the door module memory after window/regulator replacement, perform the following procedure:

1. Using the scan tool, go to the network topology screen.
2. Click on the Diagnostic Procedures tab at the lower portion of the screen.
3. Run ECU Reset for DDM/PDM.
4. DDM/PDM calibration missing DTC will now set.
5. Using the window switch, lower the door glass to the full-down position by pushing down (depress) the window switch to its second detent and hold the switch until the door glass is fully open. Continue to hold the window switch down for two seconds after the door glass is fully open.
6. Raise the door glass to the full-up position by pulling up on the window switch and hold the switch until the door glass is fully closed. Continue to hold the window switch up for two seconds after the door glass is full closed.
7. DTC will now be stored. Clear code and test window operations.

MOTOR, WINDOW REGULATOR

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - WINDOW MOTOR

NOTE: **Even though the motor has a circuit breaker a fused jumper should be used to avoid any damage to the circuits.**

1. Remove door trim panel. Refer to PANEL, DOOR TRIM, REMOVAL .
2. Connect positive (+) lead from a test battery to either of the two motor terminals.
3. Connect negative (-) lead from test battery to remaining motor terminal.
4. The motor should now rotate in one direction to either move window up or down.
   a. If window happens to already be in full UP position and motor is connected so as to move it in UP direction no movement will be observed.
   b. Likewise, motor connected to move window in DOWN direction no movement will be observed if window is already in full DOWN position.
   c. Reverse battery leads in Step 2 and Step 3 and window should now move. If window does not move, replace motor.
5. If window moved completely up or down, the test leads should be reversed one more time to complete a full window travel inspection.
6. If window does not move, check to make sure that it is free.
7. It is necessary that the window be free to slide up and down in the glass channels. If the window is not free to move up and down, the window lift motor will not be able to move the glass.
8. To determine if the glass is free, disconnect the regulator from the glass lift plate. Remove the two

attaching screws, and slide the window up and down by hand.

REMOVAL

REMOVAL

Refer to **REGULATOR, WINDOW, REMOVAL** .

INSTALLATION

INSTALLATION

Refer to **REGULATOR, WINDOW, INSTALLATION** .

SWITCH, POWER WINDOW

DESCRIPTION

DESCRIPTION

0829051259

Fig. 1: Power Window Switch
Courtesy of CHRYSLER GROUP, LLC

A front door power switch module and bezel unit is located near the forward end of the arm rest of each front door trim panel. Two different modules are used: a driver side module, and a passenger side module. Each switch button in both modules is identified with either an International Control and Display Symbol icon or text that clearly identifies the switch function, and each switch button has a Light Emitting Diode (LED) unit soldered to the switch circuit board that provides back lighting of the icon or text for night visibility.

Each switch module housing is secured within the trim panel armrest by four spring clip retainers, two on each side of the switch module housing. The passenger side switch module includes a small cubby bin. A connector receptacle integral to the switch module housing connect the switches to the vehicle electrical system through dedicated take outs and connectors of the door wire harness.

The front door power switch modules include the following switches:

- **Power Lock Switch** - A momentary switch button to control the **Lock** function of the power lock system.
- **Power Unlock Switch** - A momentary switch button to control the **Unlock** function of the power lock system.
- **Power Mirror Selector Switch (Driver Side Switch Only)** - Three mirror selector switch buttons choose the power mirror to be adjusted, **R** (right) or **L** (left).
- **Power Mirror Direction Control Switch (Driver Side Switch Only)** - After a power mirror is selected, pressing down on one of the arrows on the momentary mirror direction switch will move the selected mirror in that direction for as long as it is held down until the limit of the mirror travel is reached.
- **Power Window Switches** - A single two-way, momentary power window switch with a push-to-open and a lift-to-close tab is provide for the passenger door window while the driver side switch module contains two of these power window switches, one switch dedicated to each door window. The switch tab for the driver side front door power window has a second detent in the down direction which is used to activate the **Auto-Down** (also known as express down or one-touch down) feature. A second detent in the up direction on both front door power window switches activates the **Express-Up** feature.

The front door power switch modules cannot be adjusted or repaired. If damaged or ineffective, the entire driver side or passenger side front door switch module must be replaced as a unit.

OPERATION

OPERATION

The driver side front door power switch assembly combines the following switches into a single unit:

- power lock
- power window (for each window including auto-down and express up for both front door windows)
- power mirror selector
- power mirror adjustment in a single unit

The passenger side power door switch module contains a passenger side front door power window switch with the auto-down and express up features.

The driver side front door power switch module provides resistor multiplexed outputs to the driver door module indicating the power lock switch selection. The power window switch selections are hard wired analog outputs indicating the power mirror selector switch, adjustment switch selections, and electronic message outputs over a Local Interface Network (LIN) data bus connection.

The passenger side front door power switch module provides resistor multiplexed outputs to the passenger door module indicating the power window switch selections.

The hard-wired circuits between the driver side front door power switch module and the driver side door module may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between the switch module and the door module or in the diagnosis of the electronic controls and communication between other modules and the door module that provide some features of the power lock, power mirror or power window systems. The most reliable, efficient, and accurate means to diagnose the driver side power switch module or the electronic controls and communication related to power lock, power mirror or power window system operation requires the use of a diagnostic scan tool. Refer to

the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER WINDOW SWITCH

Any diagnosis of the Power Windows system should begin with the use of scan tool and the appropriate Diagnostic Service Information.

The hard wired inputs and outputs of the speed control system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the Local Interface Network (LIN) slave node integral and internal to the door control switch. The most reliable, efficient and accurate means to diagnose the LIN slave node operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.

Fig. 2: Prying Bezel Of Front Door Switch Module
Courtesy of CHRYSLER GROUP, LLC

2. Insert the (special tool #C-4755, Trim Stick) as shown in illustration and lift to partially release switch from the door panel.

Fig. 3: Lifting Switch From Door Panel
Courtesy of CHRYSLER GROUP, LLC

3. Insert the trim stick as shown in illustration and lift the switch from the door panel.

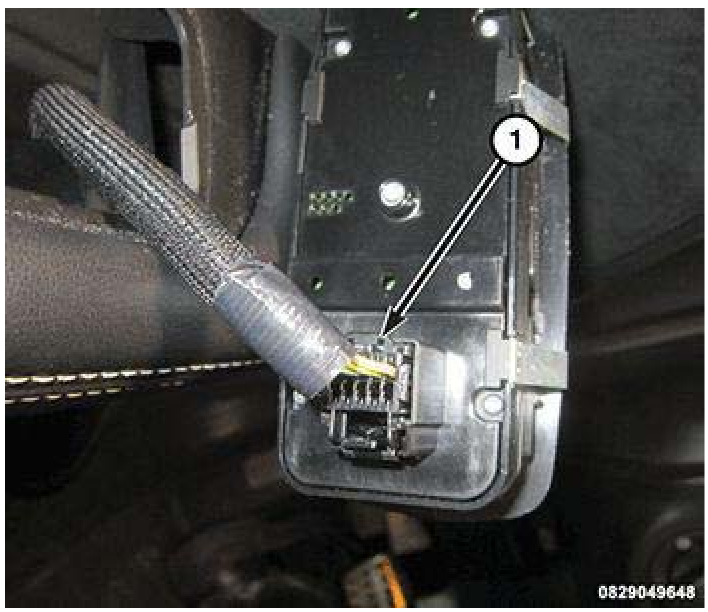

Fig. 4: Front Door Switch Module Connector
Courtesy of CHRYSLER GROUP, LLC

4. Pull the switch module away from the mounting hole far enough to access and disconnect the door wire harness connector (1) from the switch connector receptacle.
5. Remove the switch module from the vehicle.

INSTALLATION

INSTALLATION

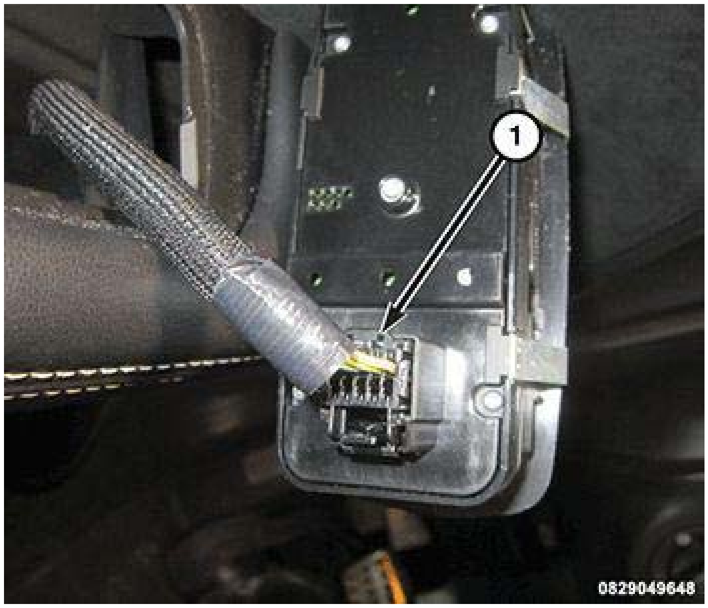

Fig. 5: Front Door Switch Module Connector
Courtesy of CHRYSLER GROUP, LLC

1. Position the front door switch module (1) close enough to the mounting hole in the arm rest of the front door trim panel to access and connect the front door wire harness connector (1) to the switch connector receptacle.
2. Align the switch module to the arm rest mounting hole.
3. Using hand pressure, press the switch module firmly and evenly into the mounting hole until the four spring steel retainers of the switch are fully engaged and the switch bezel is fully seated against the arm rest.
4. Connect the negative battery cable.

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Article GUID: A00735968

2015-16 DRIVELINE/AXLES

Propeller Shaft - Challenger

DESCRIPTION

DESCRIPTION

NOTE: **The drive shaft components are not serviceable, the drive shaft must be replaced as an assembly.**

Rear wheel drive utilizes a "two-piece" rear drive shaft design to transmit torque to the rear axle assembly. This two-piece design consists of:

- Front and rear shaft segments
- Center support bearing/bracket assembly
- Plunging Cross Grove (CG) Constant Velocity (CV) joint aft of the center bearing
- Plunging CG CV joint at the transmission flange
- Fixed Rzeppa CV joint at the rear axle flange

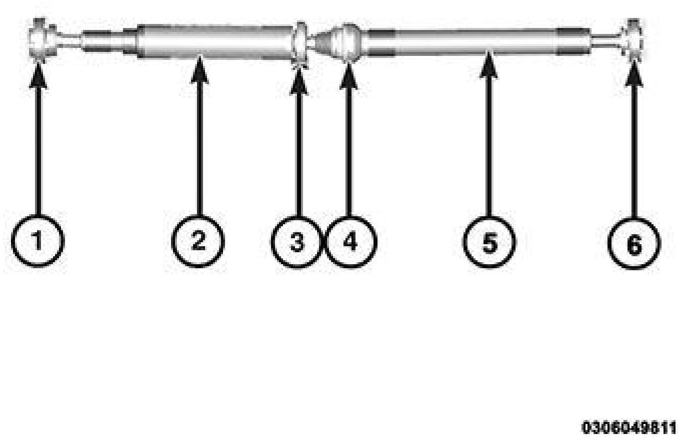


Fig. 1: Driveshaft Assembly
Courtesy of CHRYSLER GROUP, LLC

1 - FRONT PLUNGING CG CV JOINT (TRANSMISSION FLANGE)
2 - FRONT SHAFT SEGMENT
3 - CENTER SUPPORT BEARING/BRACKET ASSEMBLY
4 - PLUNGING CG CV JOINT
5 - REAR SHAFT SEGMENT
6 - FIXED RZEPPA CV JOINT (AXLE FLANGE)

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Drive Shaft to Transmission Flange Bolts/Nuts **(Non- SRT8)**	66	49	-	X
Drive Shaft to Transmission Flange Bolts/Nuts **(SRT8 & Manual)**	66	49	-	X
Drive Shaft to Rear Axle Flange Bolts/Nuts **(Non- SRT8)**	66	49	-	X
Drive Shaft to Rear Axle Flange Bolts/Nuts **(SRT8 & Manual)**	66	49	-	X
Center Bearing to Body Bolts	28	21	-	-
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications. If **NEW** bolts/nuts are not available clean the old bolts/nuts and apply MoparÂ® Lock and Seal Adhesive or equivalent.				

REMOVAL

DRIVE SHAFT

CAUTION: **Drive shaft removal is a two-person operation. Never allow the drive shaft to hang from the center bearing, or while only connected to the transmission or rear axle flanges. An assistant is required. If a drive shaft section is hung unsupported, damage may occur to the shaft, joint and/or center bearing from over-angulation. This may result in driveline vibrations and/or component failure."**

NOTE: **During drive shaft removal or installation avoid any contact with the front and rear joint grease caps. Any damage to the grease cap caused by improper handling during installation or removal could cause a grease leak and subsequent damage to the CV joint. Do not pull on the shaft in order to remove the front joint from the transmission/transfer case flange, this could dent or dislodge the boot and cause a grease leak and subsequent joint failure.**

NOTE: **The use of soft blunt tools is recommended for removal of the joints from companion flanges. Use of sharp pry tools, such as a screwdriver, will damage the joint housing and could result in driveline imbalance.**

1. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .

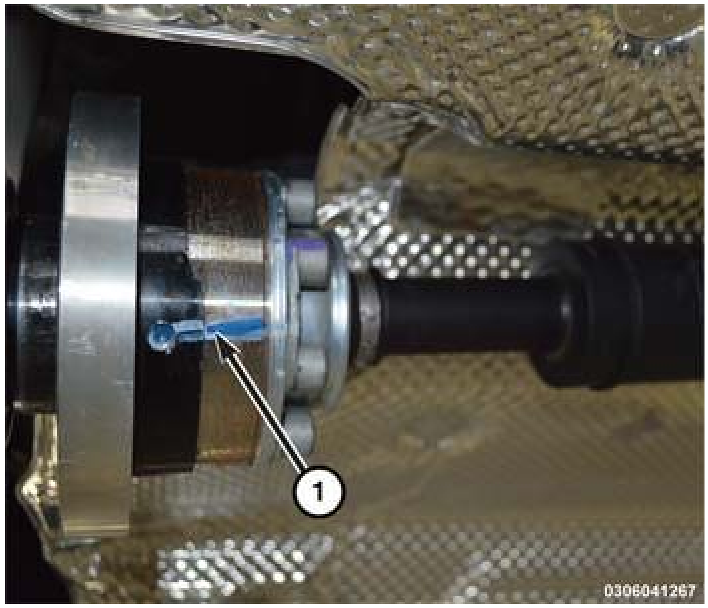


Fig. 2: Alignment Index Marks
Courtesy of CHRYSLER GROUP, LLC

2. Apply alignment index marks (1) on the transmission and axle flanges.
3. Remove the rear exhaust system. Refer to **MUFFLER, EXHAUST, REMOVAL** .

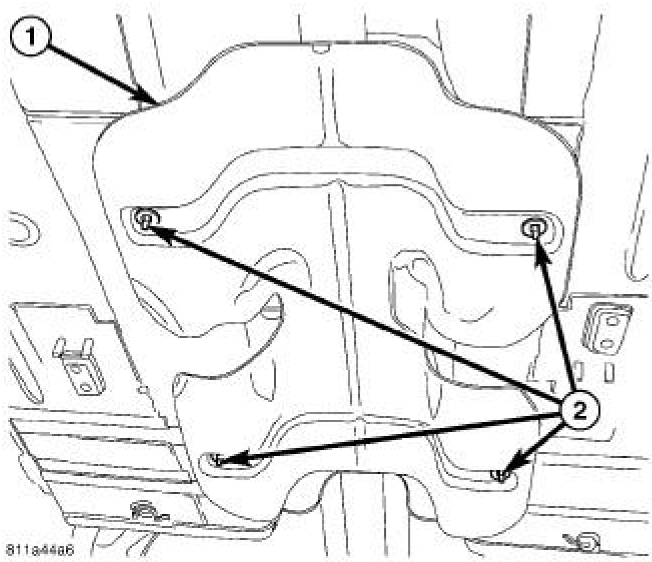


Fig. 3: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

4. Remove the heat shield nuts (2) and the heat shield (1).

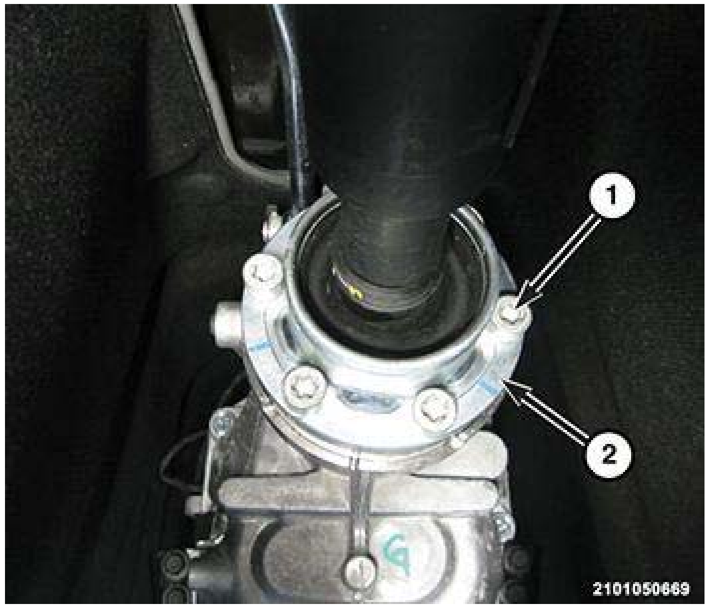


Fig. 4: Bolts And Washers & Transmission Flange
Courtesy of CHRYSLER GROUP, LLC

5. Remove and discard the drive shaft to transmission flange (1) bolts and washers (2).

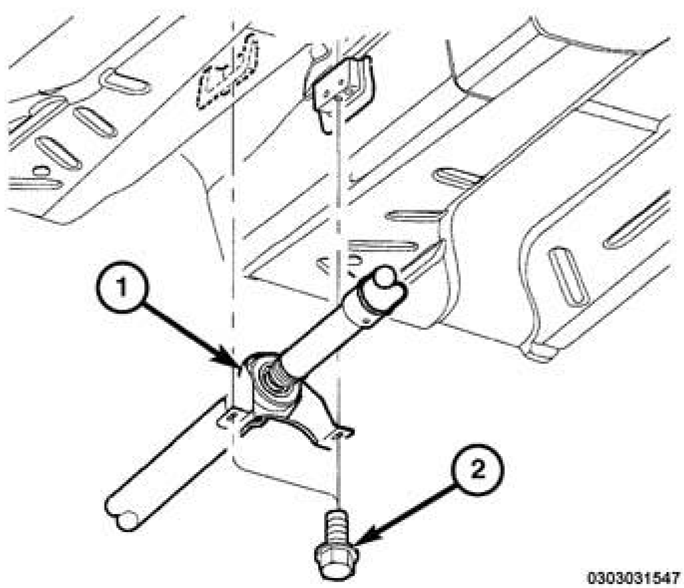


Fig. 5: Center Bearing & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the center bearing bracket (1) bolts (2).

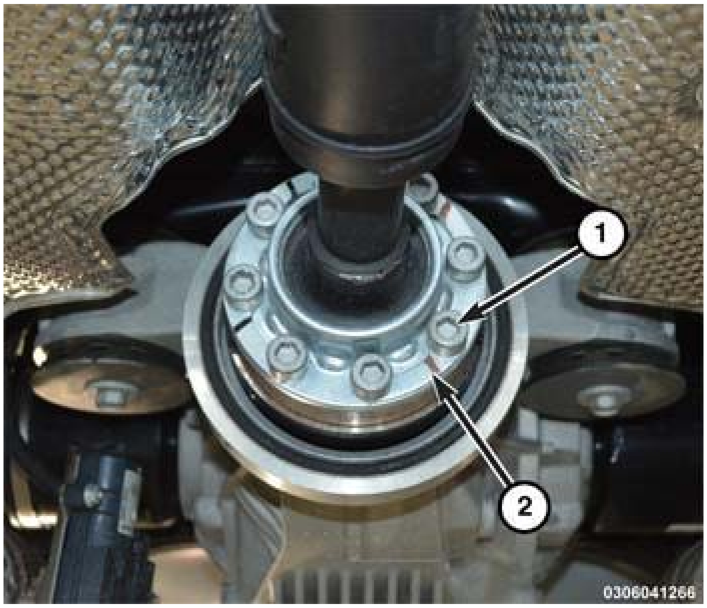


Fig. 6: Drive Shaft To Axle Flange Bolts & Washers
Courtesy of CHRYSLER GROUP, LLC

7. Remove and discard the drive shaft to axle flange bolts (1) and washers (2).
8. With the aid of an assistant, remove the drive shaft assembly.

INSTALLATION

DRIVE SHAFT

CAUTION: **Drive shaft removal is a two-person operation. Never allow the drive shaft to hang from the center bearing, or while only connected to the transmission or rear axle flanges. An assistant is required. If a drive shaft section is hung unsupported, damage may occur to the shaft, joint and/or center bearing from over-angulation. This may result in driveline vibrations and/or component failure."**

NOTE: **During drive shaft removal or installation avoid any contact with the front and rear joint grease caps. Any damage to the grease cap caused by improper handling during installation or removal could cause a grease leak and subsequent damage to the CV joint. Do not pull on the shaft in order to remove the front joint from the transmission/transfer case flange, this could dent or dislodge the boot and cause a grease leak and subsequent joint failure.**

NOTE: **Drive shaft bolts must be replaced with NEW . If NEW bolts are not available clean the old bolts and apply MoparÃ® Lock and Seal Adhesive or equivalent.**

NOTE: **To avoid driveline vibration or damage, it is critical that all components are reinstalled in their original orientations.**

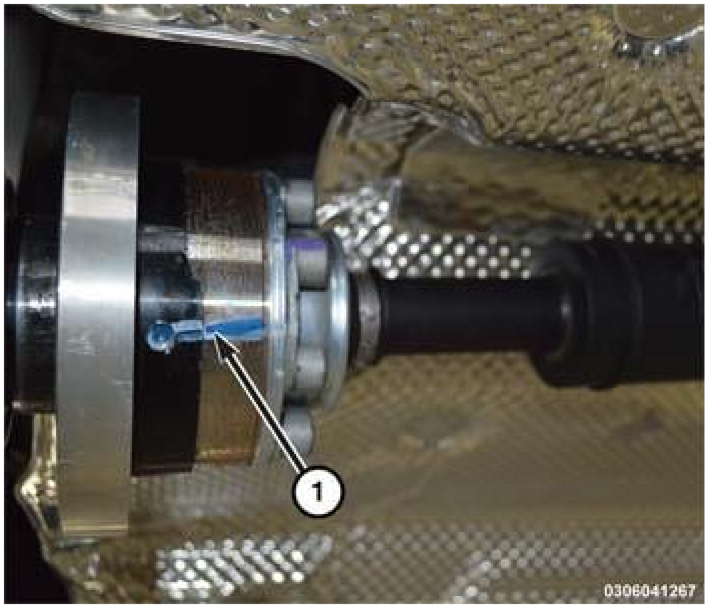


Fig. 7: Alignment Index Marks
Courtesy of CHRYSLER GROUP, LLC

1. With the aid of an assistant, install the drive shaft into position at the axle flange and align the index marks (1) made upon removal.

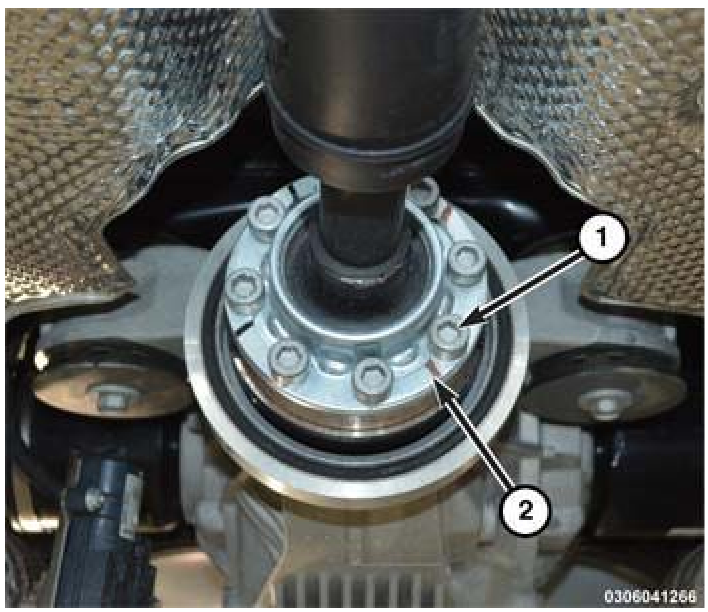


Fig. 8: Drive Shaft To Axle Flange Bolts & Washers
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Drive shaft bolts must be replaced with NEW . If NEW bolts are not available clean the old bolts and apply MoparÃ® Lock and Seal Adhesive or equivalent.**

2. Install the **NEW** drive shaft to axle flange washers (2) and bolts (1) by hand. Do not tighten at this time.

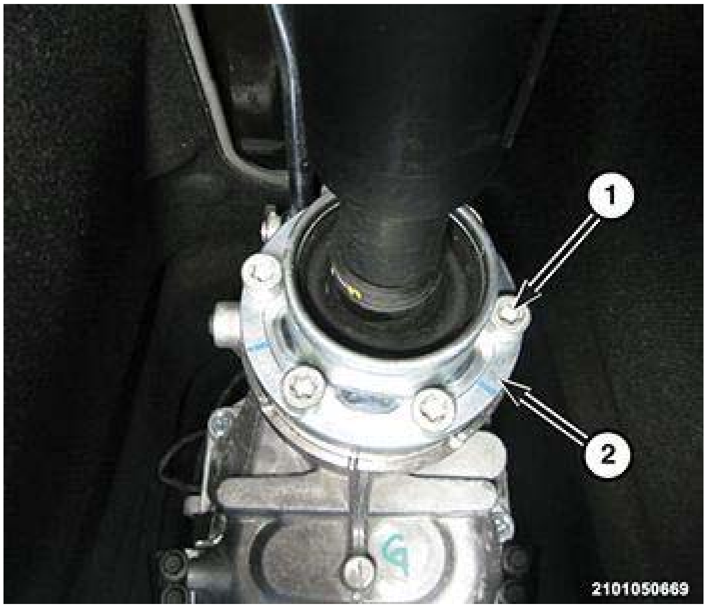


Fig. 9: Bolts And Washers & Transmission Flange
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Drive shaft bolts must be replaced with NEW . If NEW bolts are not available clean the old bolts and apply MoparÂ® Lock and Seal Adhesive or equivalent.**

3. Install drive shaft into position at the transmission flange. Align index marks made upon removal. Install the **NEW** drive shaft to transmission flange washers (2) and drive shaft bolts (1) by hand. Do not tighten at this time.

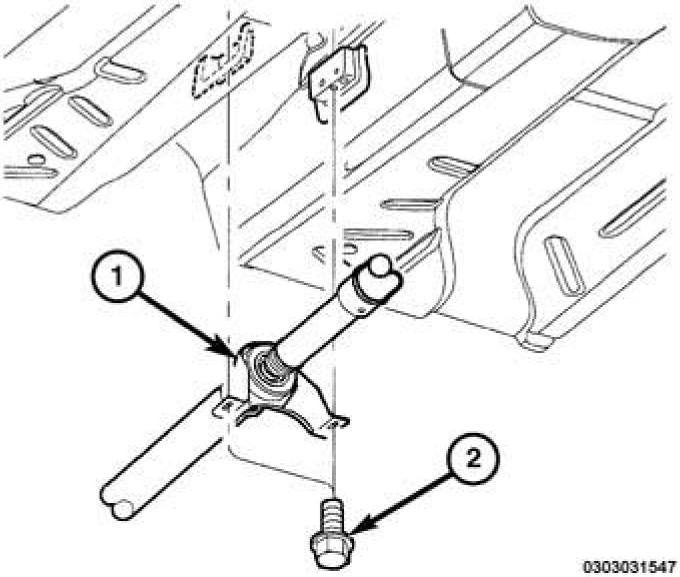
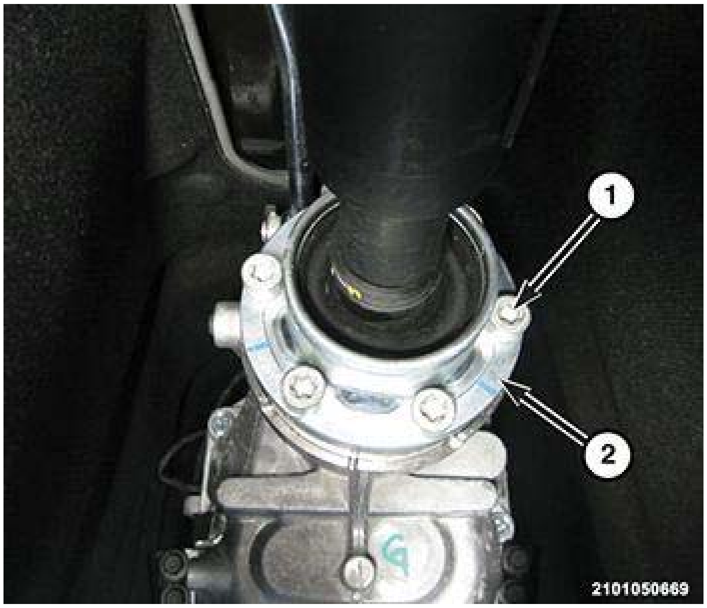


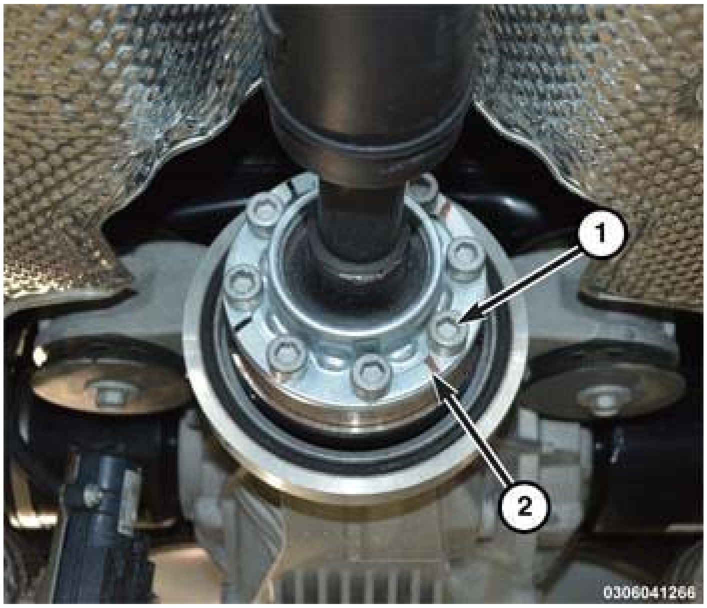
Fig. 10: Center Bearing & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Position the center bearing (1) in place and loosely install the center bearing to body bolts (2) by hand. Do not tighten at this time.



[Fig. 11: Bolts And Washers & Transmission Flange](#)
Courtesy of CHRYSLER GROUP, LLC

5. Tighten the drive shaft to transmission flange bolts (1) in a star pattern to 66 Nm (49 ft.-lbs.).



[Fig. 12: Drive Shaft To Axle Flange Bolts & Washers](#)
Courtesy of CHRYSLER GROUP, LLC

6. Tighten the drive shaft to rear axle flange bolts (1) in a star pattern to 66 Nm (49 ft.-lbs.).

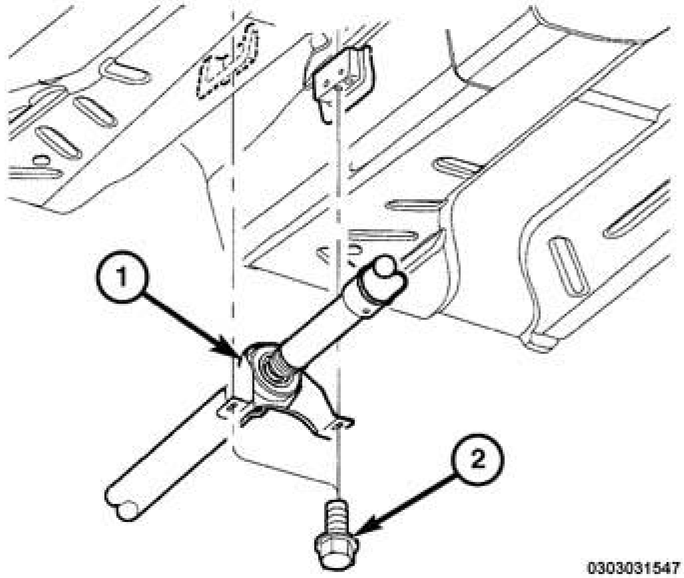


Fig. 13: Center Bearing & Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Tighten the center bearing to body bolts (2) to the proper specification. Refer to **SPECIFICATIONS**.

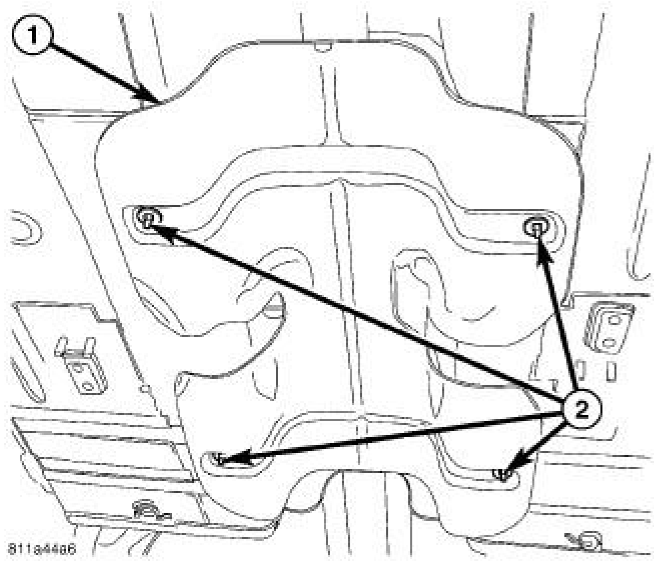


Fig. 14: Heat Shield
Courtesy of CHRYSLER GROUP, LLC

8. Install the heat shield (1) and the heat shield nuts (2).
9. Install the rear exhaust system. Refer to **MUFFLER, EXHAUST, INSTALLATION** .

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Article GUID: A00735926

DESCRIPTION

DESCRIPTION

The 195 MM RIA (Rear-Independent-Aluminum) axle is an independent assembly with an aluminum housing and differential.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - AXLE

DIAGNOSTIC CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
WHEEL NOISE	1. Wheel loose.	1. Tighten loose lug nuts.
	2. Faulty, brinelled wheel bearing.	2. Replace wheel bearing.
LOSS OF LUBRICANT	1. Lubricant level too high.	1. Drain lubricant to the correct level.
	2. Worn axle seals.	2. Replace axle seals.
	3. Worn pinion seal.	3. Replace pinion seal.
	4. Worn/scored pinion flange journal.	4. Replace axle assembly.
	5. Axle cover not properly sealed.	5. Replace axle assembly.
	6. Vent hose/gore vent position is not vertical	6. Replace gore vent/hose assembly, install in 12 O'Clock orientation.
AXLE OVERHEATING	1. Lubricant level low.	1. Fill differential to correct level.
	2. Improper grade of lubricant.	2. Fill differential with the correct fluid type and quantity.
	3. Bearing preload too high.	3. Replace axle assembly.
	4. Insufficient ring gear backlash.	4. Replace axle assembly.
GEAR TEETH BROKE	1. Overloading.	1. Replace axle assembly.
	2. Improper adjustments.	2. Replace axle assembly.
AXLE NOISE	1. Insufficient lubricant.	1. Fill axle with the correct fluid type and quantity.
	2. Improper ring gear and pinion adjustment.	2. Replace axle assembly.
	3. Unmatched ring gear and pinion.	3. Replace axle assembly.

CONDITION	POSSIBLE CAUSE	CORRECTION
	4. Worn teeth on ring gear and/or pinion.	4. Replace axle assembly.
	5. Loose pinion bearings.	5. Replace axle assembly.
	6. Loose differential bearings.	6. Replace axle assembly.
	7. Misaligned or sprung ring gear.	7. Replace axle assembly.
	8. Housing not machined properly.	8. Replace axle assembly.

GEAR NOISE

Axle gear noise can be caused by insufficient lubricant, incorrect backlash, incorrect pinion depth, tooth contact, worn/damaged gears, or the carrier housing not having the proper offset and squareness.

Gear noise usually happens at a specific speed range. The noise can also occur during a specific type of driving condition. These conditions are acceleration, deceleration, coast, or constant load.

When road testing, first warm-up the axle fluid by driving the vehicle at least 5 miles and then accelerate the vehicle to the speed range where the noise is the greatest. Shift out-of-gear and coast through the peak-noise range. If the noise stops or changes greatly:

- Check for insufficient lubricant.

Differential side gears and pinions can be checked by turning the vehicle. They usually do not cause noise during straight-ahead driving when the gears are unloaded. The side gears are loaded during vehicle turns. A worn pinion shaft can also cause a snapping or a knocking noise.

BEARING NOISE

The differential and pinion bearings can produce noise when worn or damaged. Bearing noise can be either a whining, or a growling sound.

Pinion bearings have a constant-pitch noise. This noise changes only with vehicle speed. Pinion bearing noise will be higher pitched because it rotates at a faster rate.

Worn or damaged differential bearings usually produce a low pitch noise. Differential bearing noise is similar to pinion bearing noise. The pitch of differential bearing noise is also constant and varies only with vehicle speed.

Wheel hub bearings produce noise and vibration when worn or damaged. The noise generally changes when the bearings are loaded. Road test the vehicle. Turn the vehicle sharply to the left and to the right. This will load the bearings and change the noise level. Where axle bearing damage is slight, the noise is usually not noticeable at speeds above 30 mph.

LOW SPEED KNOCK

Low speed knock is generally caused by a worn joint or by worn side-gear thrust washers. A worn pinion shaft bore will also cause low speed knock.

VIBRATION

Vibration at the rear of the vehicle is usually caused by a:

- Damaged propeller shaft.
- Missing propeller shaft balance weight(s).
- Worn or out-of-balance wheels.
- Loose wheel lug nuts.
- Worn Constant Velocity (CV) joints.
- Loose/broken springs.
- Loose pinion gear nut.
- Excessive pinion CV flange run out.
- Bent halfshaft(s).

Check for loose or damaged front-end components or engine/transmission mounts. These components can contribute to what appears to be a rear end vibration. Do not overlook engine accessories, brackets and drive belts.

All driveline components should be examined before starting any repair.

DRIVELINE SNAP

A snap or clunk noise when the vehicle is shifted into gear, can be caused by:

- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn Constant Velocity (CV) joints.
- Worn or broken axle mount isolators.
- Loose pinion gear nut and CV flange.
- Excessive ring gear backlash.
- Excessive side gear to case clearance.

The source of a snap or a clunk noise can be determined with the assistance of a helper. Raise the vehicle on a hoist with the wheels free to rotate. Instruct the helper to shift the transmission into gear. Listen for the noise, a mechanics stethoscope is helpful in isolating the source of a noise.

STANDARD PROCEDURE

STANDARD PROCEDURE - FLUID DRAIN AND FILL

1. Drive the vehicle until the differential lubricant is at the normal operating temperature.

   NOTE: The vehicle must be LEVEL .

2. Raise and support the vehicle and hold vehicle at curb position. Refer to **HOISTING, STANDARD PROCEDURE** .

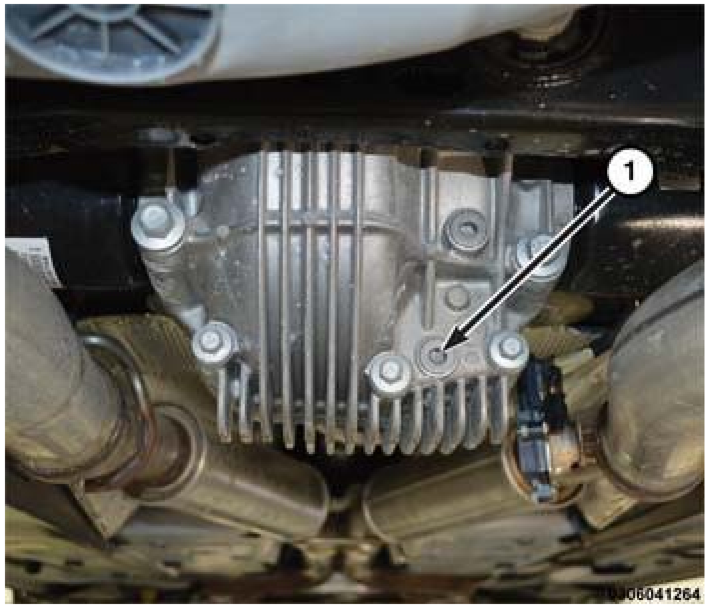


Fig. 1: Rear Axle Drain Plug
Courtesy of CHRYSLER GROUP, LLC

3. Remove the rear axle drain plug (1) and drain the lubricant completely from the axle.
4. Install the rear axle drain plug (1) and tighten to the proper specification. Refer to **SPECIFICATIONS** .

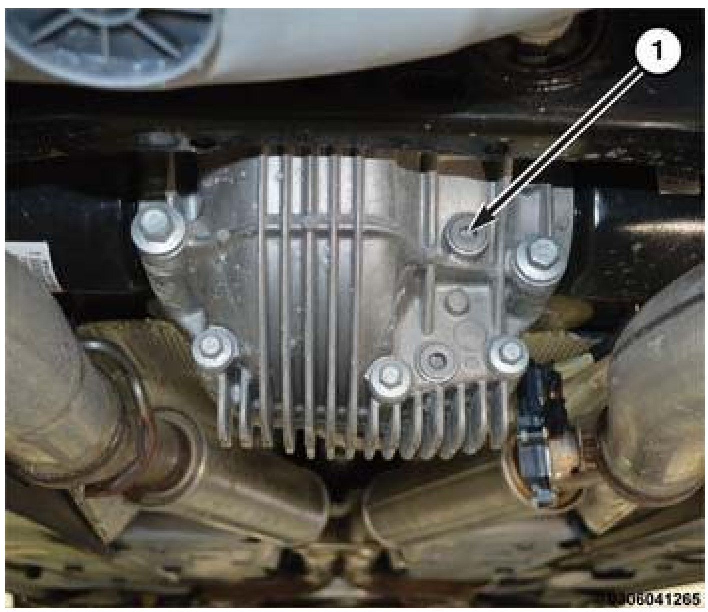


Fig. 2: Rear Axle Fill Plug
Courtesy of CHRYSLER GROUP, LLC

5. Fill the rear axle to the correct level. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
6. Install the rear axle fill plug (1) and tighten to the proper specification. Refer to **SPECIFICATIONS** .

SPECIFICATIONS

TORQUE SPECIFICATIONS

REAR AXLE TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Axle Drain Plug	35	26	-	Ā
Axle Fill Plug	35	26	-	Ā
Pinion Flange Nut	Refer to **SEAL, DRIVE PINION, INSTALLATION**.			Ā
Rear Axle Forward Mount Isolator Bolts	70	52	-	X
Rear Axle To Crossmember Bolts	150	111	-	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

REMOVAL

REAR AXLE

NOTE: **This procedure requires the compression of the rear suspension to ride height. A drive-on hoist should be used. If a drive-on hoist is not used, screw-style under-hoist jack stands are required to compress the rear suspension, facilitating rear halfshaft removal.**

CAUTION: **Never grasp halfshaft assembly by the inner or outer boots. Doing so may cause the boot to pucker or crease, reducing the service life of the boot and joint. Avoid over angulating or stroking the C/V joints when handling the halfshaft.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the rear exhaust system. Refer to **MUFFLER, EXHAUST, REMOVAL** .

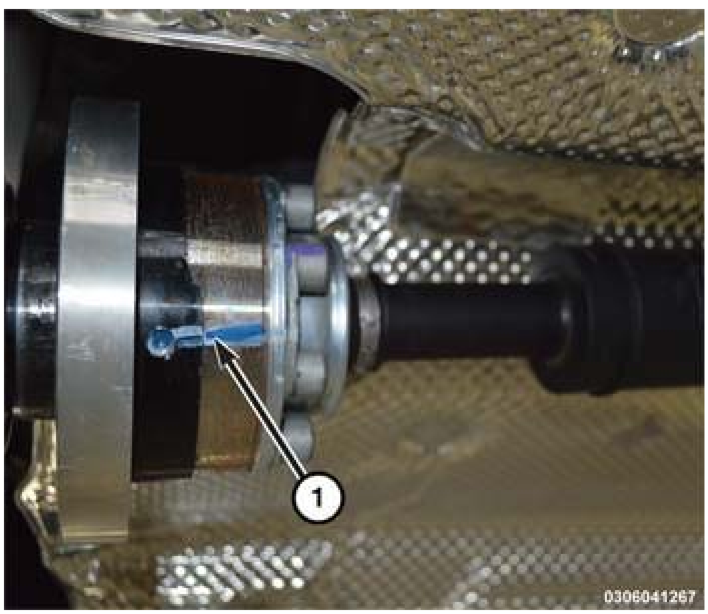
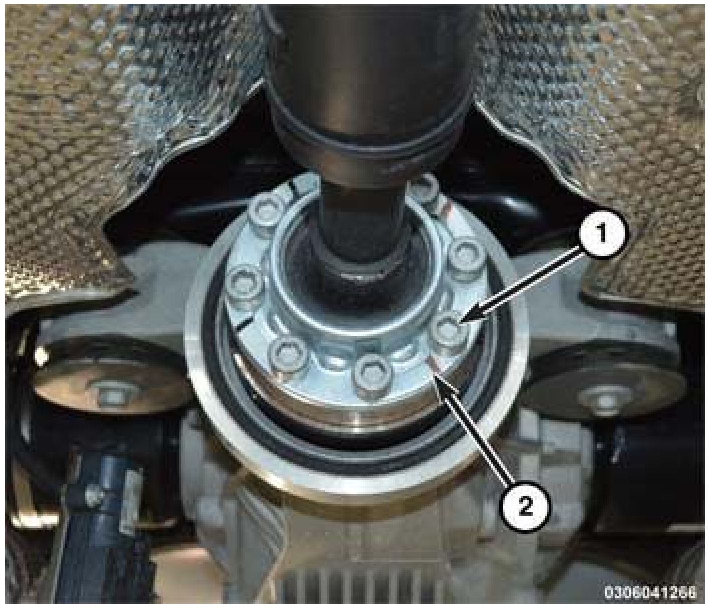


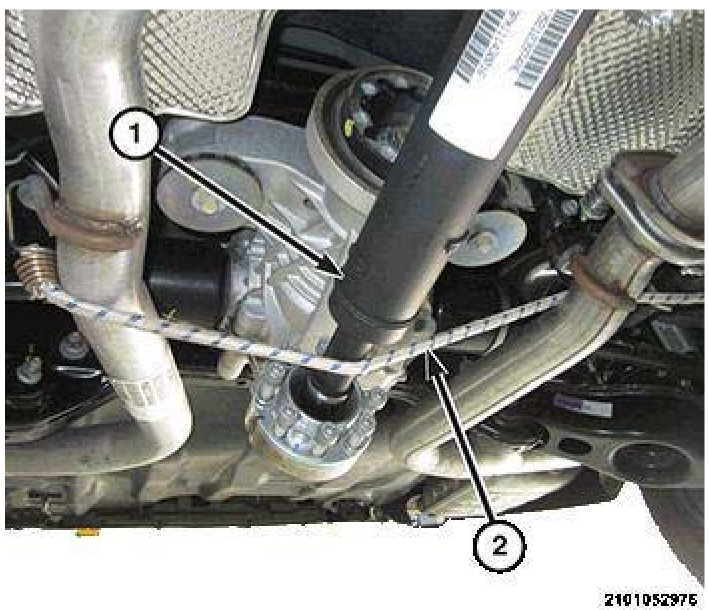
Fig. 3: Alignment Index Marks
Courtesy of CHRYSLER GROUP, LLC

3. Apply alignment index marks (1) to the drive shaft and the axle flange.



[Fig. 4: Drive Shaft To Axle Flange Bolts & Washers](#)
Courtesy of CHRYSLER GROUP, LLC

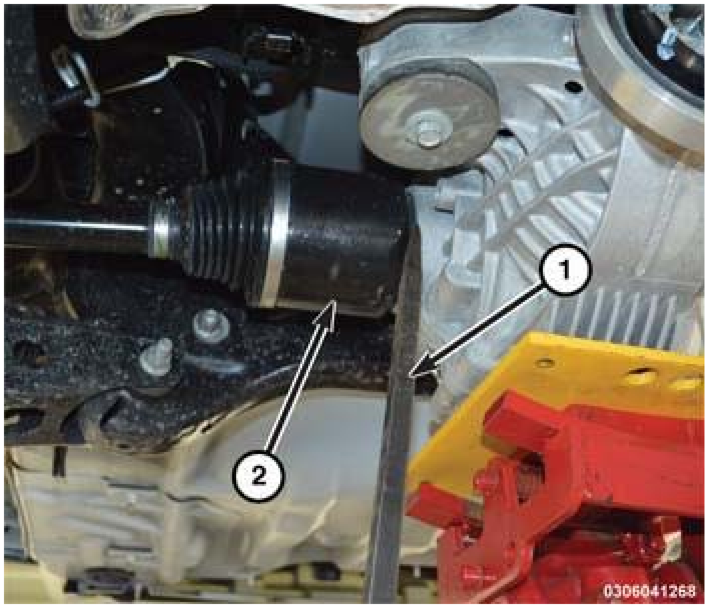
4. Remove and discard the drive shaft to axle flange bolts (1) and washers (2).



[Fig. 5: Supporting Drive Shaft With Strap](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not let the drive shaft hang on the center support bearing.**

5. Support the drive shaft (1) with a strap (2) or equivalent.



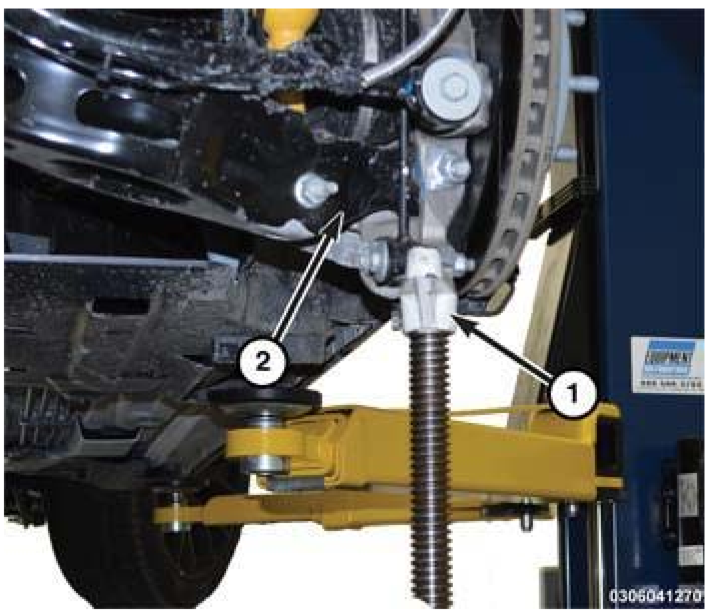
[Fig. 6: Removing Halfshaft]

Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not damage the axle seal, axle seal dust cover, and halfshaft boot.**

NOTE: **Left Hand (LH) side shown in illustration, Right Hand (RH) side similar.**

6. Using a suitable screwdriver (1), partially disengage the halfshafts (2) from the axle assembly.



[Fig. 7: Screw-Style Under-Hoist Jack Stand & Rear Suspension]

Courtesy of CHRYSLER GROUP, LLC

7. If a drive-on hoist is not used, compress the rear suspension (2) using a screw-style under-hoist jack stand (1), and position a transmission jack under the rear axle assembly.

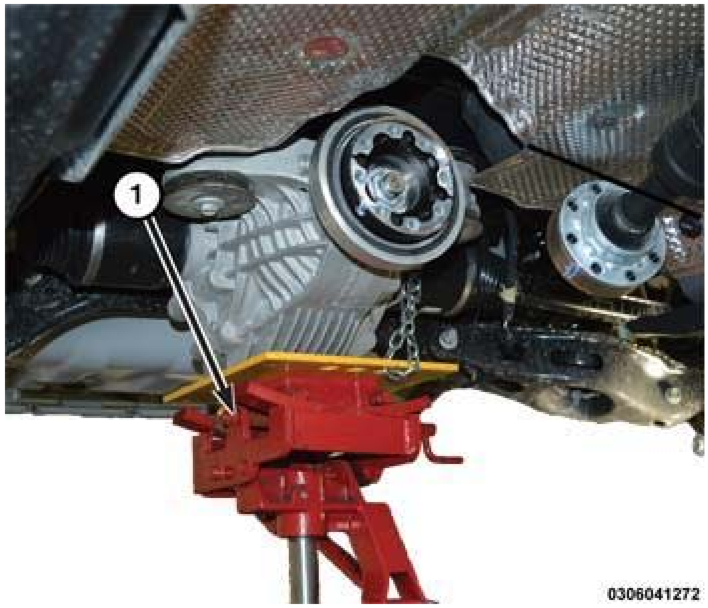


Fig. 8: Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

8. Position the transmission jack (1) under the rear axle assembly.

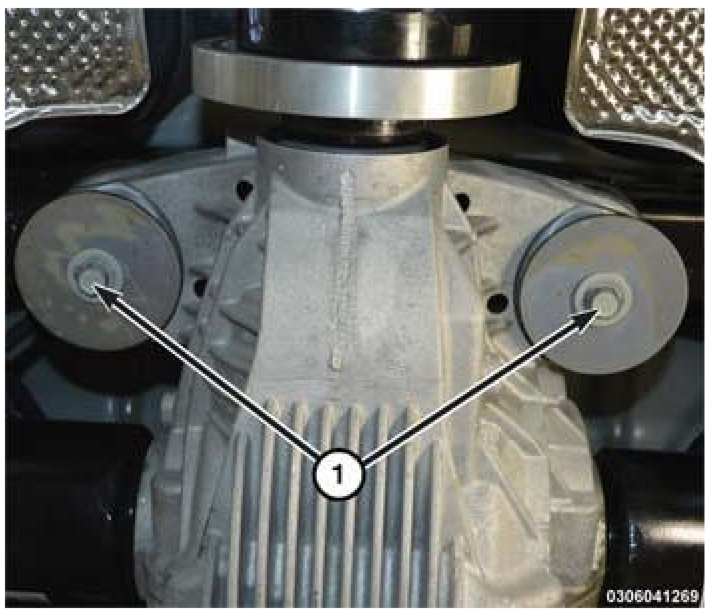


Fig. 9: Rear Axle Forward Mount Isolator Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Remove and discard the rear axle forward mount isolator bolts (1).

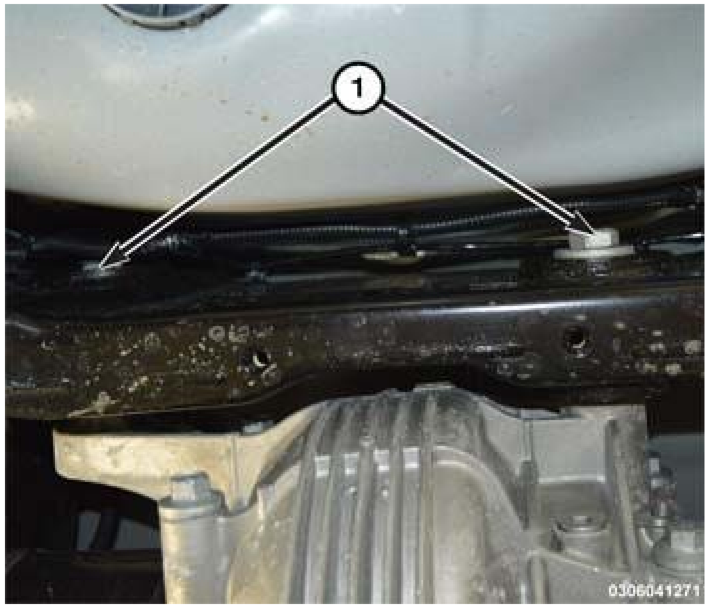


Fig. 10: Rear Axle To Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Remove the two rear axle to crossmember bolts (1) from the rear axle.

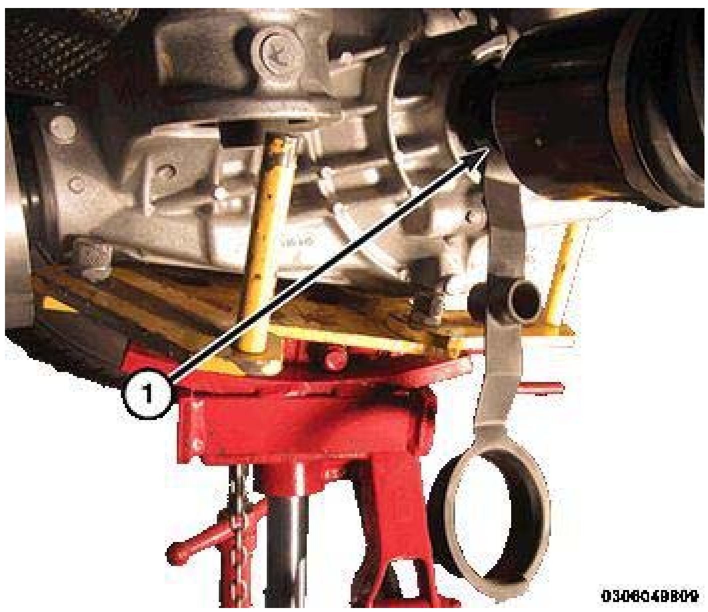
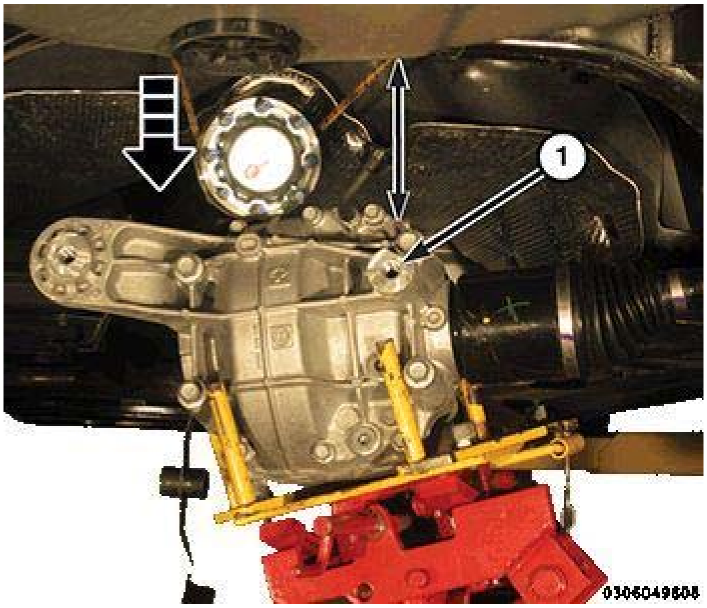


Fig. 11: Half Shaft Protector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left Hand (LH) side shown in illustration, Right Hand (RH) side similar.**

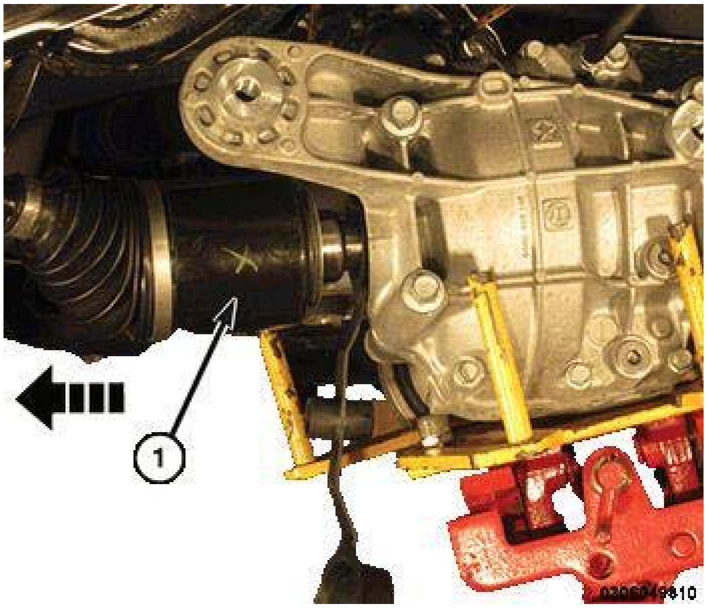
11. Install the Protector, Half Shaft, Drive (special tool #10270, Protector, Half Shaft, Drive) (1).



[Fig. 12: Lowering Rear Axle]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left Hand (LH) side shown in illustration, Right Hand (RH) side similar.**

12. Lower the rear axle (1) approximately six inches and push the rear axle assembly towards the front of the vehicle.



[Fig. 13: Removing Halfshaft]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not allow the halfshaft splines to come in contact with the halfshaft seal.**

13. With the aid of an assistant, shift the rear axle assembly in one direction and compress one halfshaft inner joint as far as possible while removing the other halfshaft (1).

14. Remove the rear axle assembly from vehicle.

INSTALLATION

REAR AXLE

1. Install new circlip (s), on the halfshaft (s).

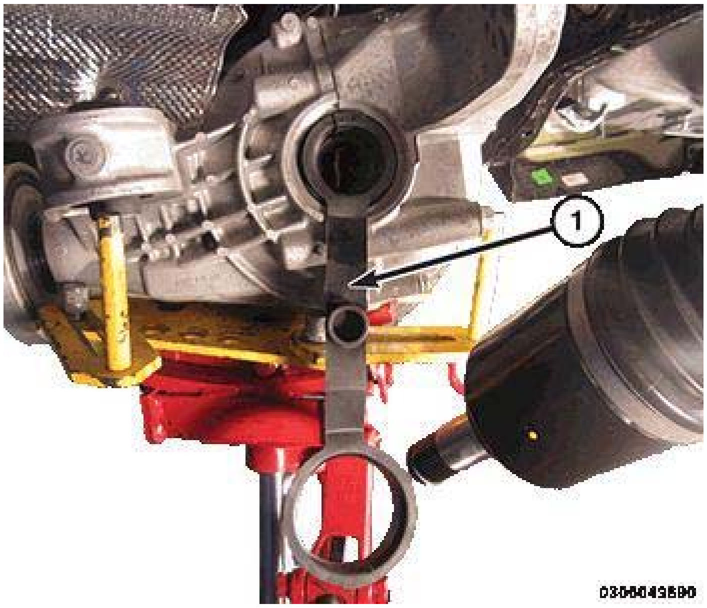


Fig. 14: Protector Installed In Rear Axle
Courtesy of CHRYSLER GROUP, LLC

2. Install the Protector, Half Shaft, Drive (special tool #10270, Protector, Half Shaft, Drive) (1) in the rear axle.

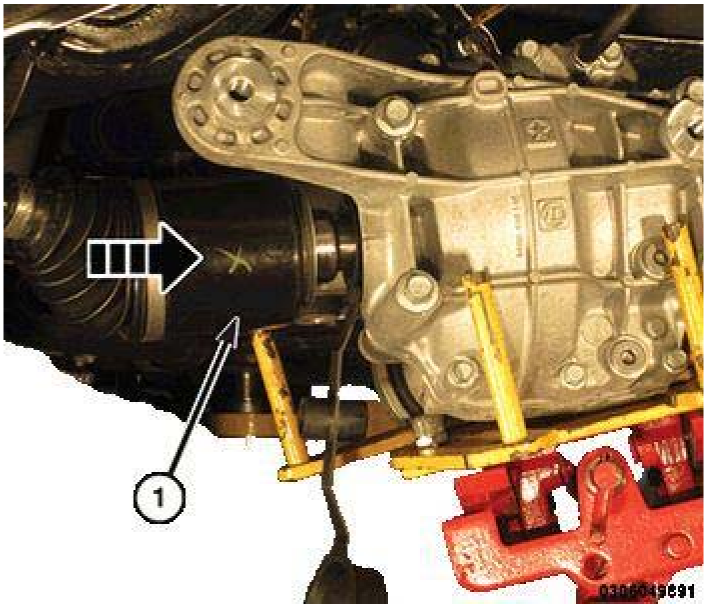


Fig. 15: Installing Halfshaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Use care when installing halfshaft to axle assembly. The halfshaft installation angle should be minimized to avoid damage to seal upon installation.**

NOTE: **Use care not to damage the axle seal or the seal dust cover.**

3. With the Protector, Half Shaft, Drive (special tool #10270, Protector, Half Shaft, Drive) (1) installed and the aid of an assistant, shift the rear axle assembly in one direction and compress one halfshaft inner joint as far as possible while installing the other halfshaft (1).

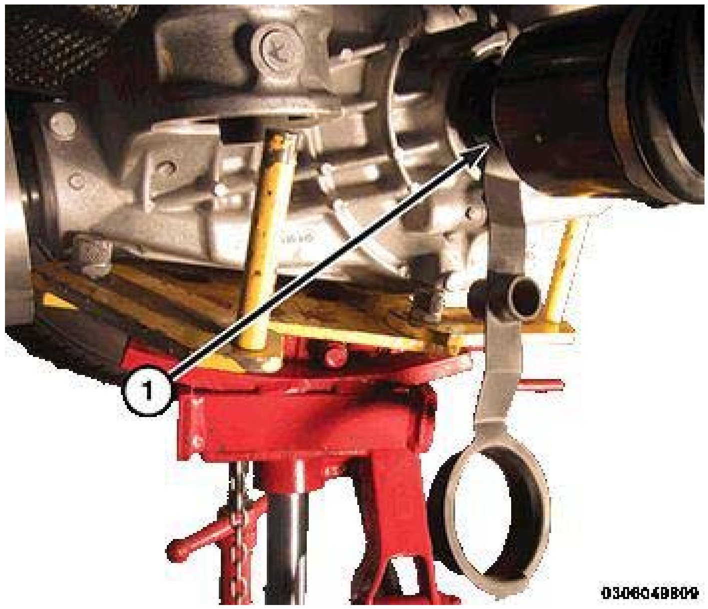


Fig. 16: Half Shaft Protector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not grasp the rubber boot or the axle bar when checking for proper installation.**

4. Remove the Protector, Half Shaft, Drive (special tool #10270, Protector, Half Shaft, Drive) (1) and fully install the halfshaft in the rear axle. Verify proper installation by pulling outward on the joint by hand.
5. Raise the rear axle into position.

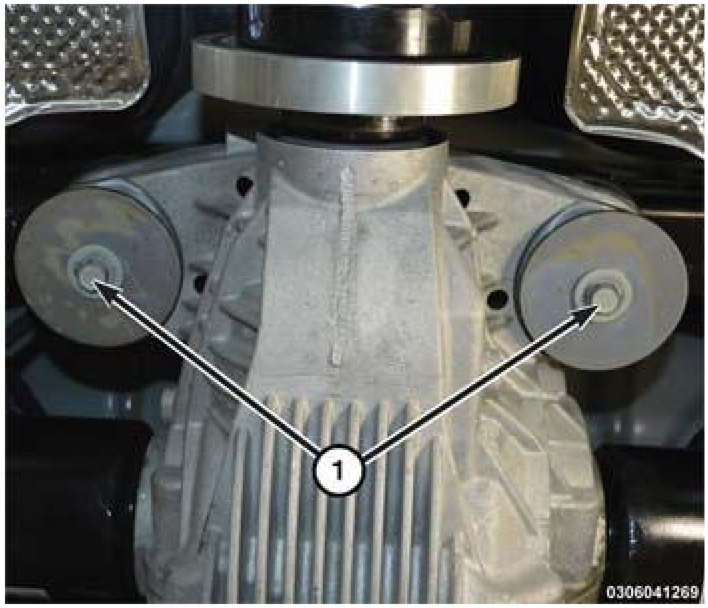


Fig. 17: Rear Axle Forward Mount Isolator Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install the **NEW** rear axle forward mount isolator bolts (1) hand tight.

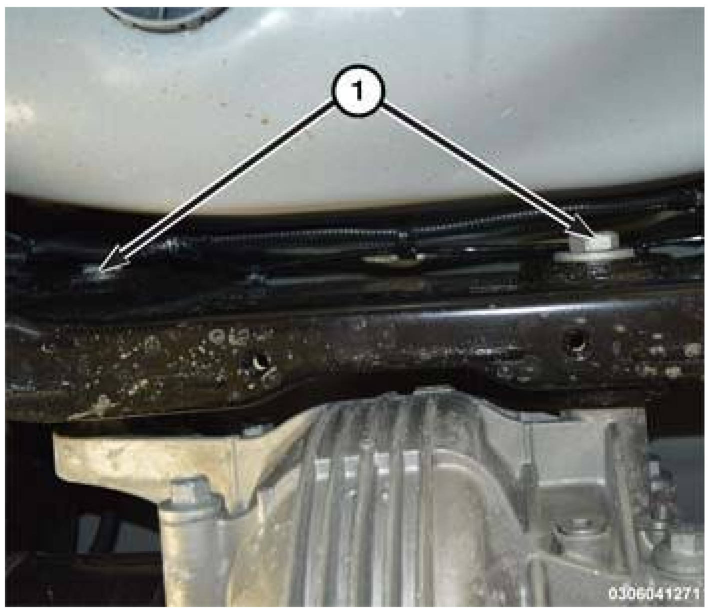


Fig. 18: Rear Axle To Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Install the rear axle to crossmember bolts (1) hand tight.
8. Tighten the **NEW** rear axle forward mount isolator bolts to the proper specification. Refer to **SPECIFICATIONS** .
9. Tighten the rear axle to crossmember bolts to the proper specification. Refer to **SPECIFICATIONS** .
10. Again verify halfshaft inner joints are fully engaged in the axle assembly.

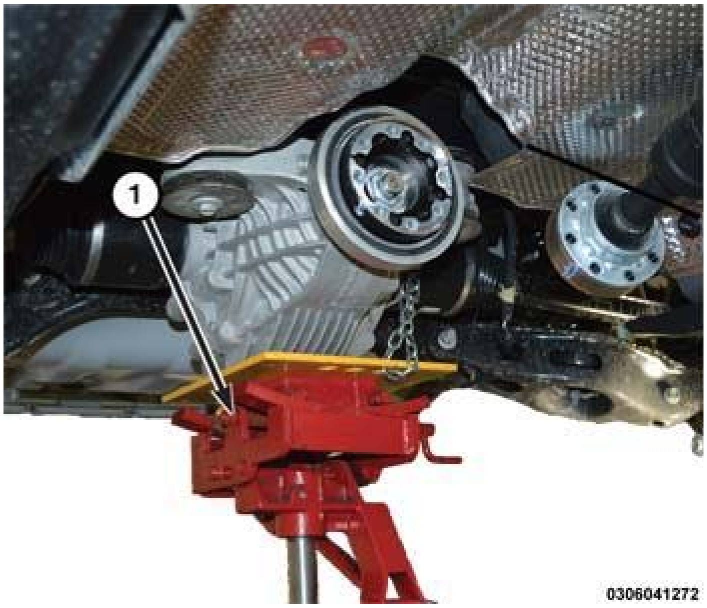


Fig. 19: Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

11. Remove transmission jack (1).

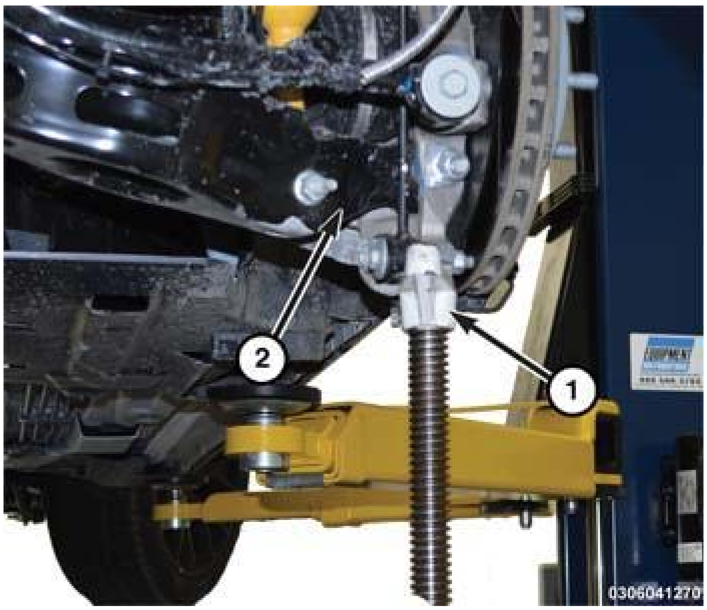


Fig. 20: Screw-Style Under-Hoist Jack Stand & Rear Suspension
Courtesy of CHRYSLER GROUP, LLC

12. If used, remove screw-type under-hoist jack stands (1).

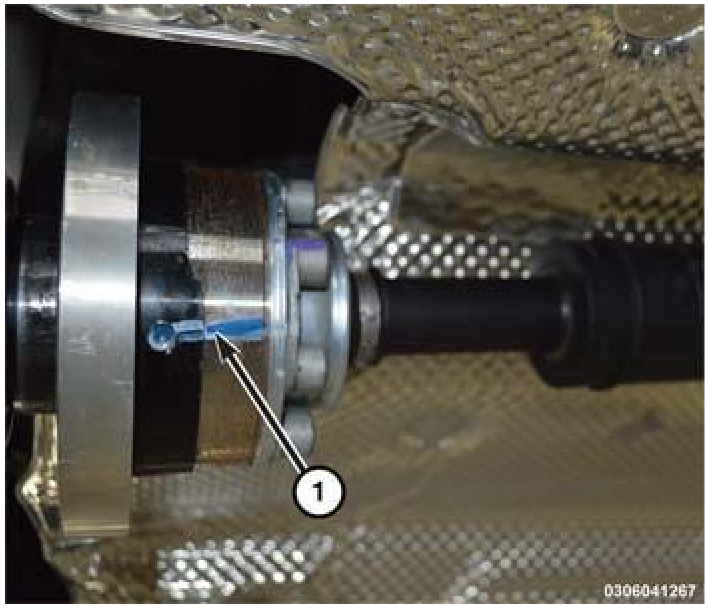


Fig. 21: Alignment Index Marks
Courtesy of CHRYSLER GROUP, LLC

13. Align drive shaft index marks (1).

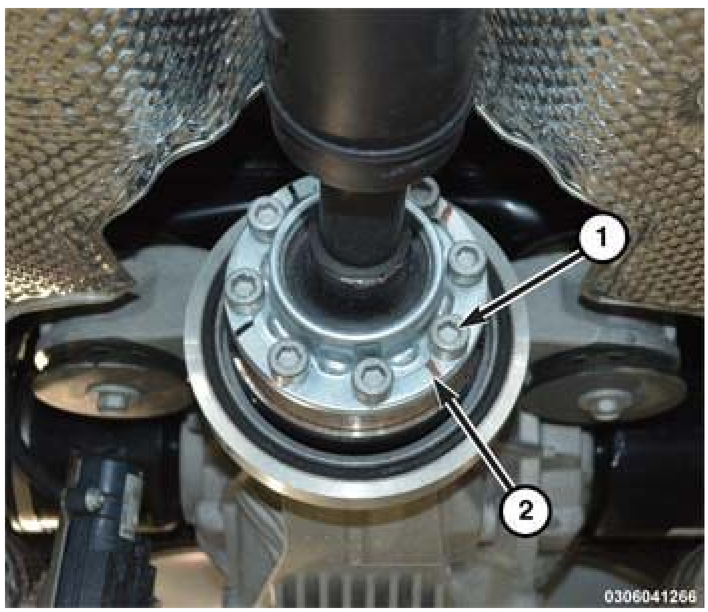


Fig. 22: Drive Shaft To Axle Flange Bolts & Washers
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Drive shaft bolts must be replaced with NEW . If NEW bolts are not available clean the old bolts and apply MoparÃ® Lock and Seal Adhesive or equivalent.**

14. Install the **NEW** drive shaft washers (2) and bolts (1) and tighten in a star pattern to 66 Nm (49 ft.-lbs.).
15. Install the rear exhaust system. Refer to **MUFFLER, EXHAUST, INSTALLATION** .

NOTE: **If significant fluid loss occurred while installing the rear axle proceed to**

step 16.

If there was no fluid loss proceed to step 19.

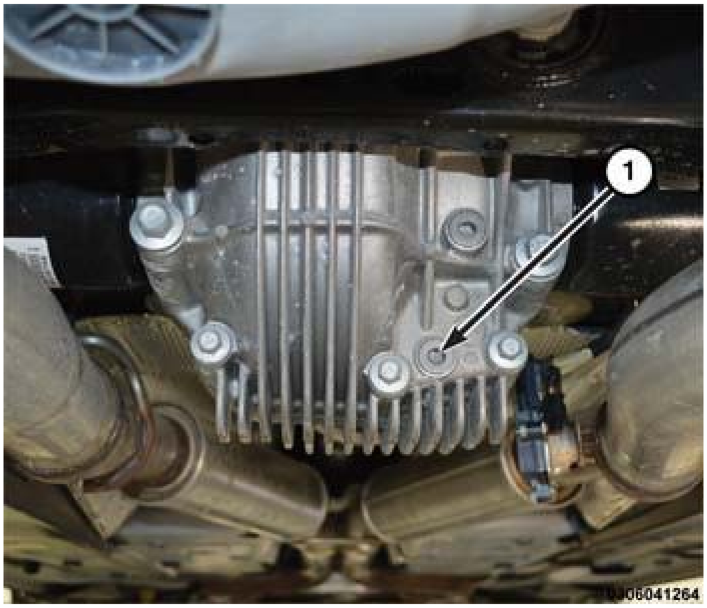


Fig. 23: Rear Axle Drain Plug
Courtesy of CHRYSLER GROUP, LLC

16. Remove rear axle drain plug (1) and drain the rear axle fluid.
17. Install the rear axle drain plug (1) and tighten to the proper specification. Refer to **SPECIFICATIONS** .

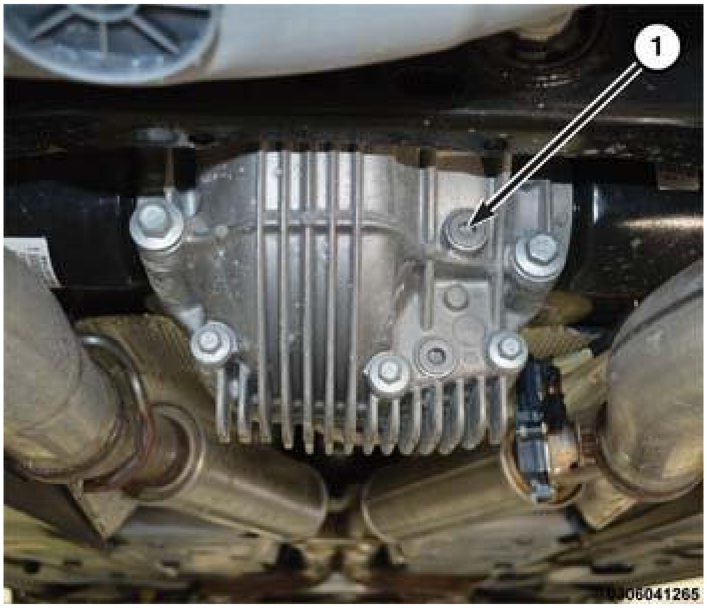


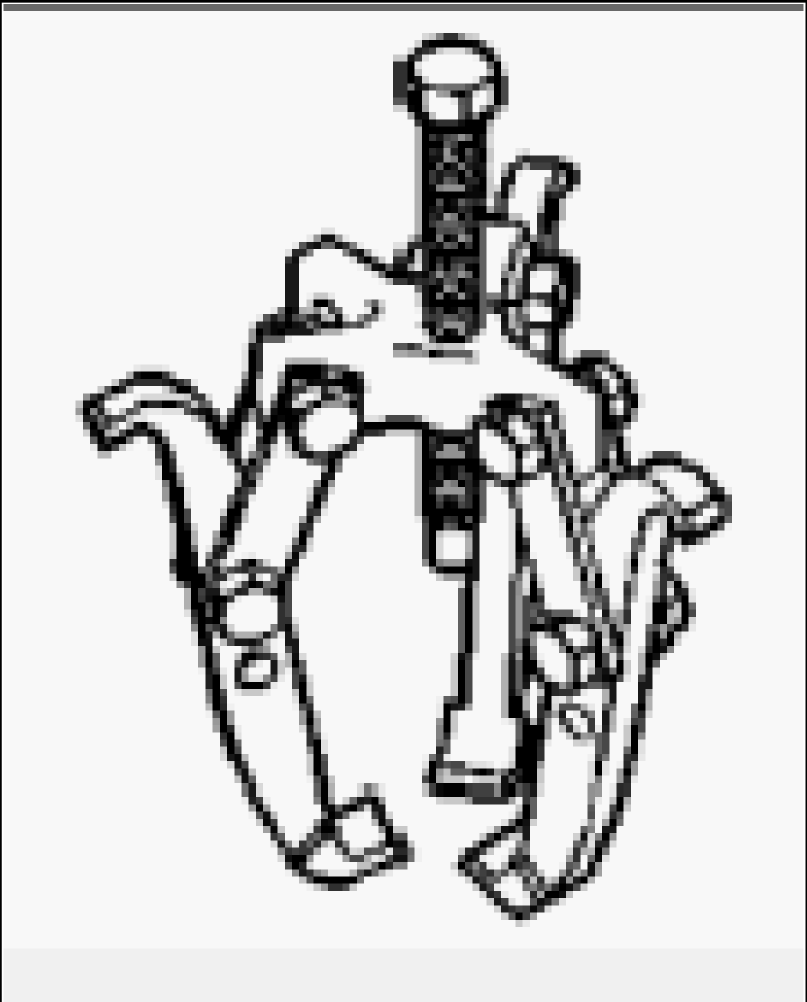
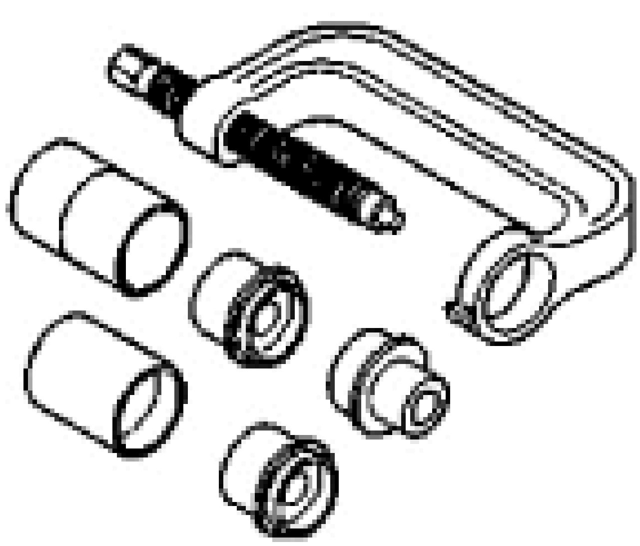
Fig. 24: Rear Axle Fill Plug
Courtesy of CHRYSLER GROUP, LLC

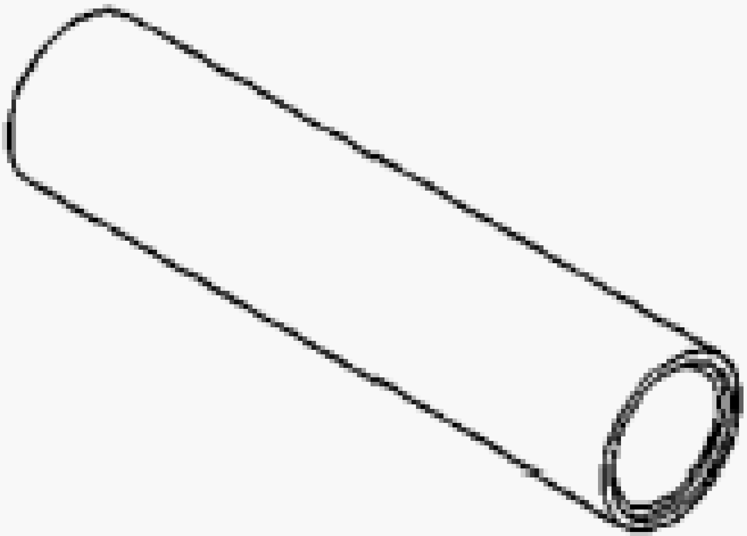
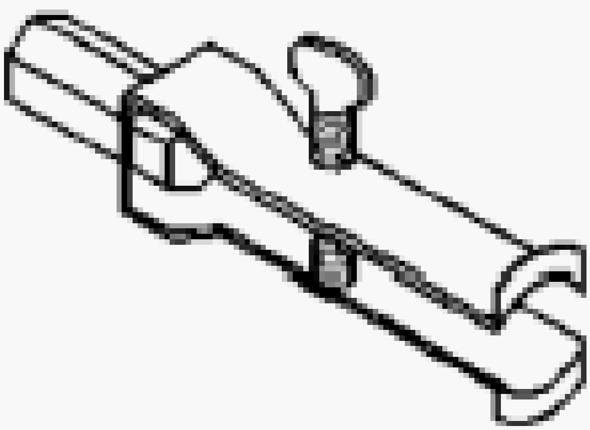
18. Remove the rear axle fill plug (1) and fill the rear axle with the specified fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
19. Install the rear axle fill plug (1) and tighten to the proper specification. Refer to **SPECIFICATIONS** .

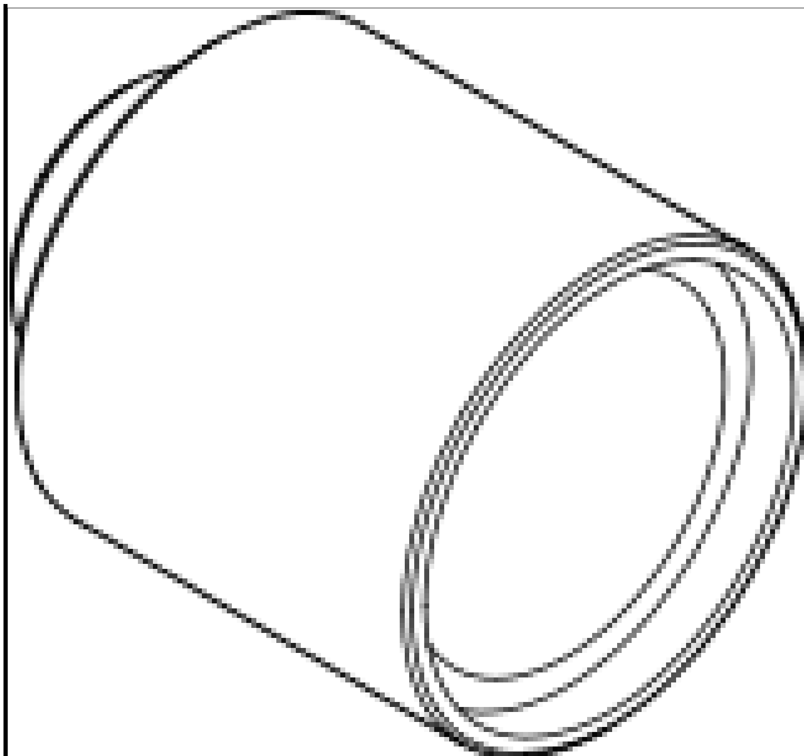
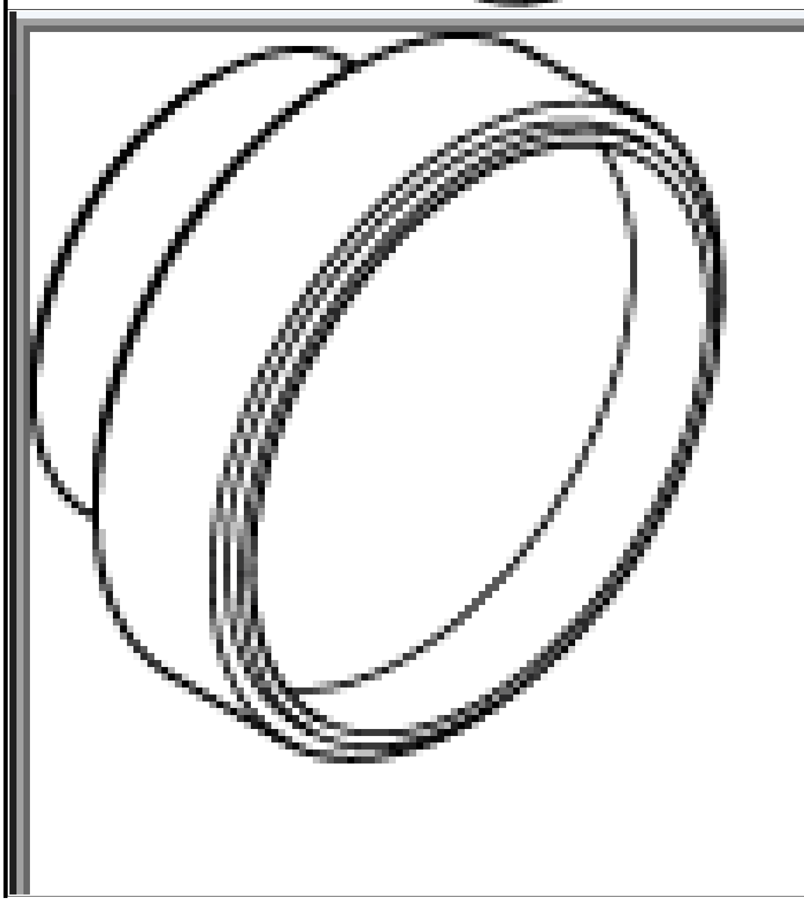
20. Remove the support and lower the vehicle.

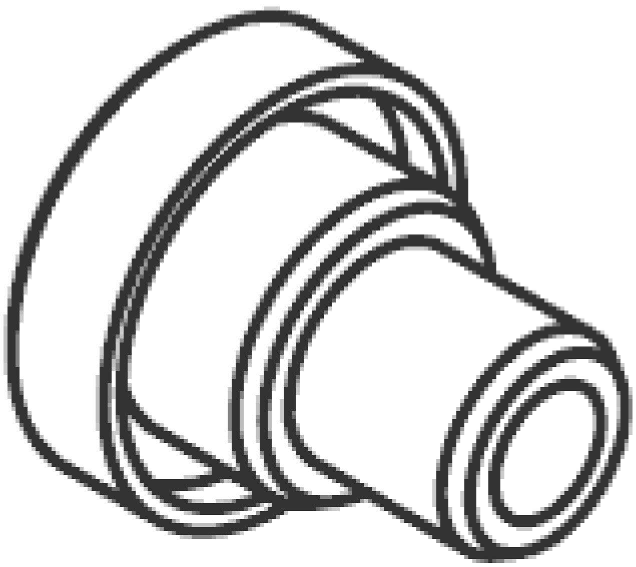
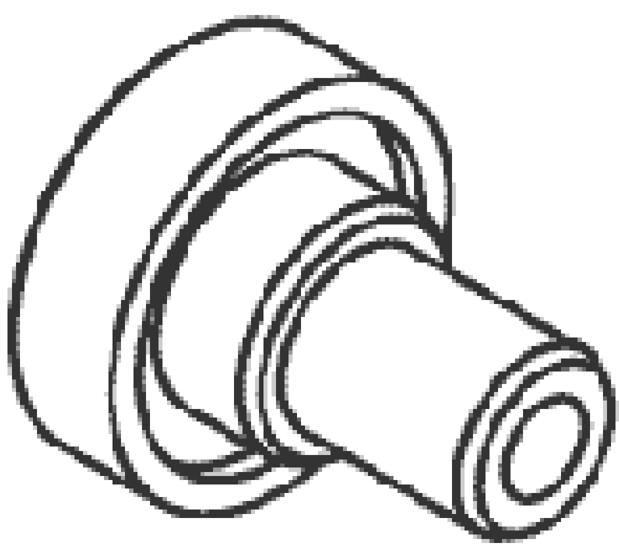
SPECIAL TOOLS

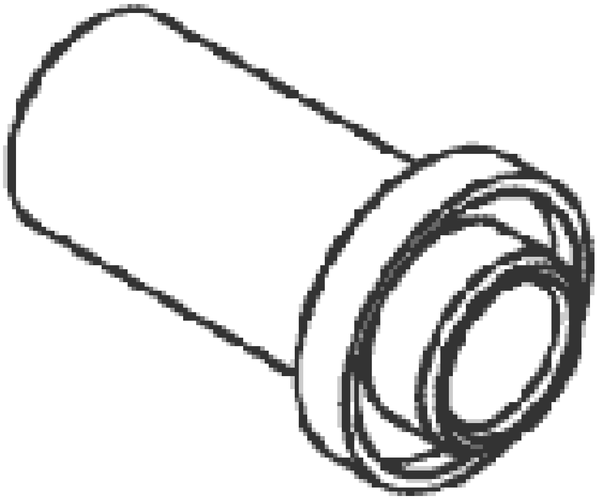
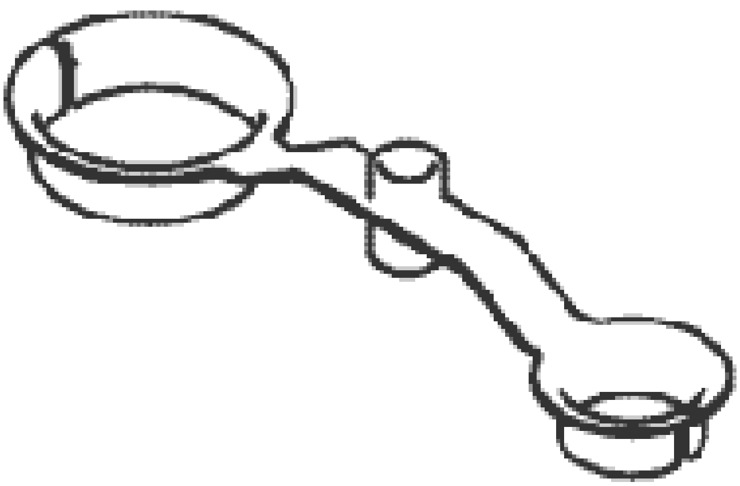
SPECIAL TOOLS

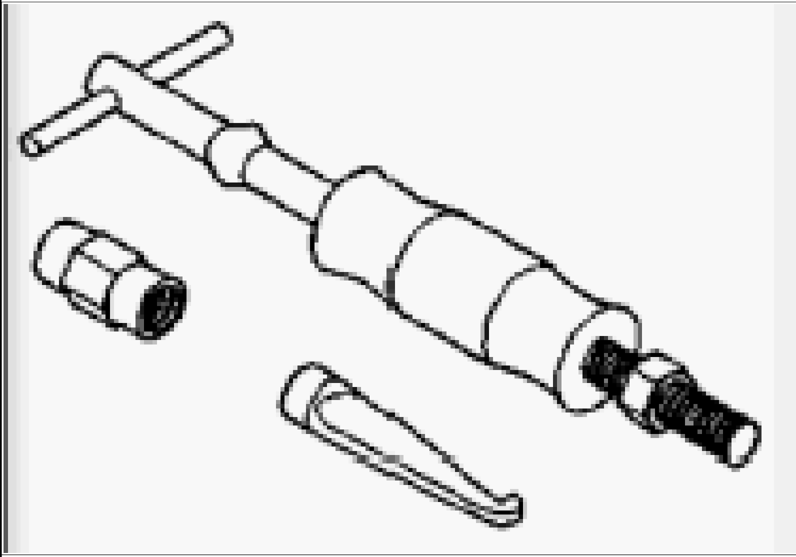
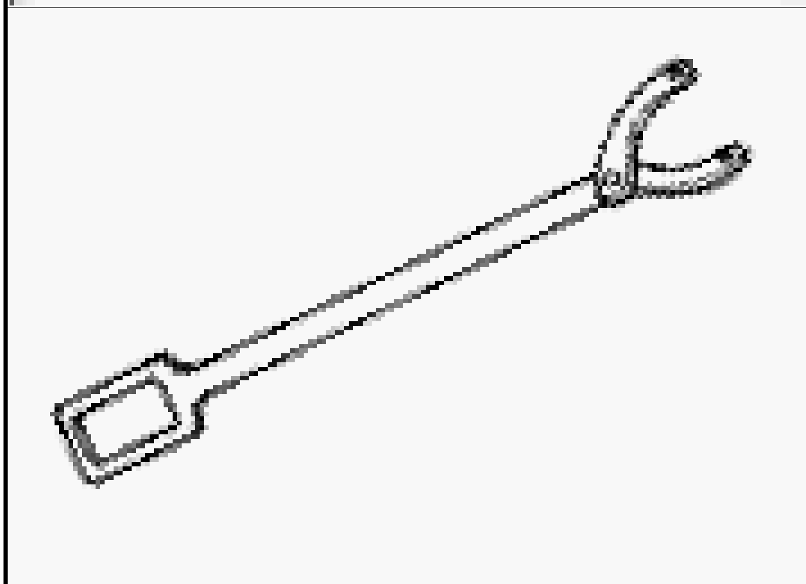
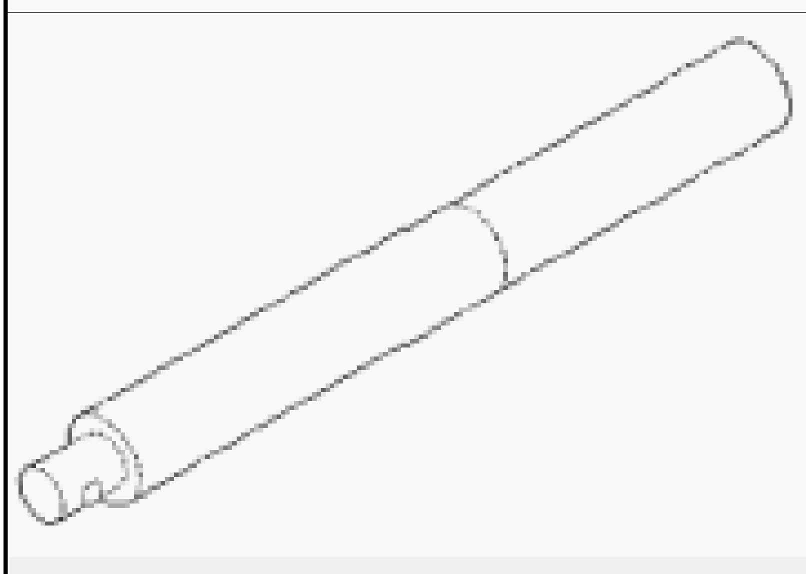
	1026 - Puller (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC.)
	6289A - Installer, Ball Joint (Originally Shipped In Kit Number(s).)

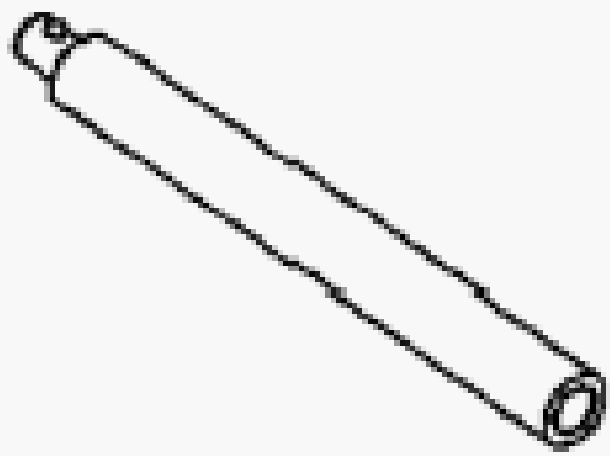
	6448A - Installer, Bearing/Gear (Originally Shipped In Kit Number(s) 6947, 8667, 8837, 8867.)
	7794-A - Remover, Seal (Originally Shipped In Kit Number(s) 6645.)

	8405-1 - Cup, Receiver (Originally Shipped In Kit Number(s).)
	10106-3 - Remover, Ball Joint (Originally Shipped In Kit Number(s) 10105, 10108.)

	10266 - Installer, Seal
	10267 - Installer, Seal

	10269 - Installer, Seal
	10270 - Protector, Half Shaft, Drive

	C-637 - Slide Hammer, Universal (Originally Shipped In Kit Number(s) 9202.)
	C-3281 - Holder, Flange (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9300A-CAN.)
	C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9300A-CAN.)

	C-4171-2 - Extension, Drive Handle (Originally Shipped In Kit Number(s) 6672, 8659.)

SEAL, AXLE DRIVE SHAFT

REMOVAL

AXLE SEAL

RIGHT SIDE

1. Remove halfshaft(s). Refer to **REMOVAL** .
2. Drain the rear axle fluid. Refer to **STANDARD PROCEDURE**.

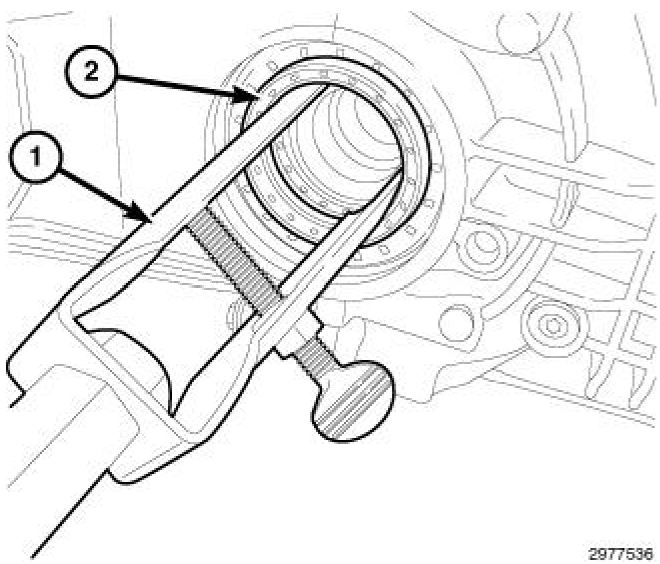


Fig. 25: Seal Remover & Axle Shaft Seal (Right)
Courtesy of CHRYSLER GROUP, LLC

3. Using seal remover (special tool #7794-A, Remover, Seal) (1) and slide hammer (special tool #C-637, Slide Hammer, Universal), remove axle shaft seal (2).
4. Visually inspect the halfshaft seal journal for damage (excessive seal groove, nicks, scratches, etc.). Replace the halfshaft if necessary.

LEFT SIDE

1. Remove the halfshaft. Refer to **REMOVAL** .
2. Drain the rear axle fluid. Refer to **STANDARD PROCEDURE**.

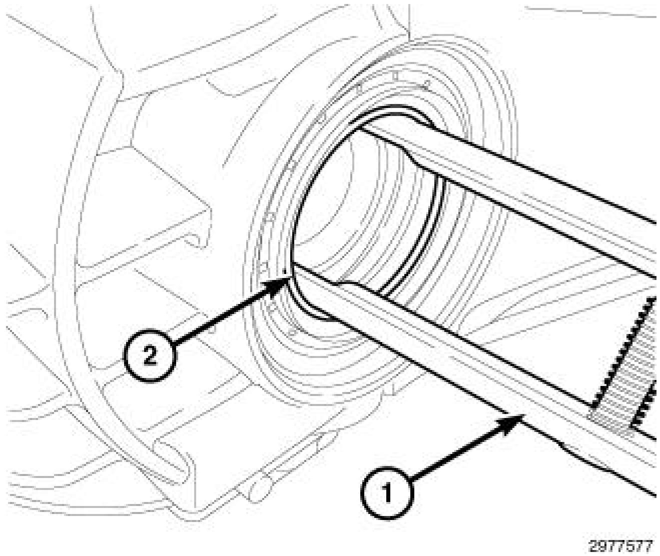


Fig. 26: Seal Remover & Axle Shaft Seal (Left)
Courtesy of CHRYSLER GROUP, LLC

3. Using seal remover (special tool #7794-A, Remover, Seal) (1) and slide hammer (special tool #C-637, Slide Hammer, Universal), remove the axle seal (2).
4. Visually inspect the halfshaft seal journal for damage (excessive seal groove, nicks, scratches, etc.). Replace the halfshaft if necessary.

INSTALLATION

AXLE SEAL

RIGHT SIDE

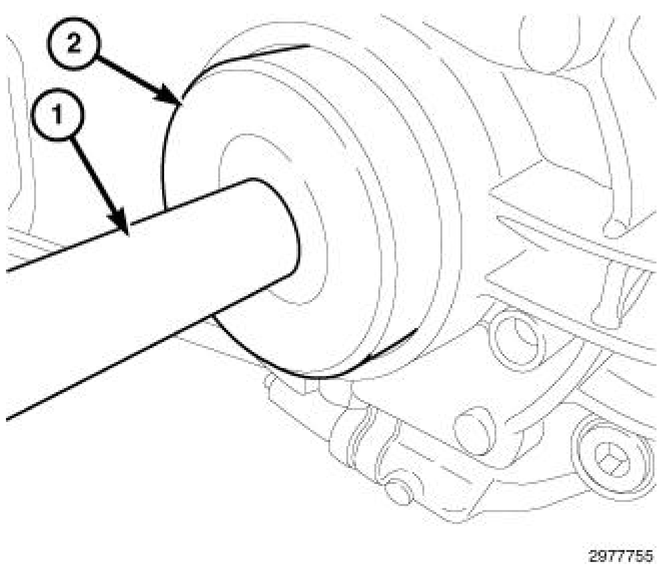


Fig. 27: Installing Axle Shaft Seal (Right)

Courtesy of CHRYSLER GROUP, LLC

1. Using Driver Handle (special tool #C-4171, Driver Handle, Universal) (1), Drive Handle Extension (special tool #C-4171-2, Extension, Drive Handle) and Installer (special tool #10267, Installer, Seal) (2), and install a **NEW** axle seal. Lubricate the inside diameter of the axle seal with the specified axle fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
2. Install the halfshaft. Refer to **INSTALLATION** .
3. Fill the rear axle with the specified fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

LEFT SIDE

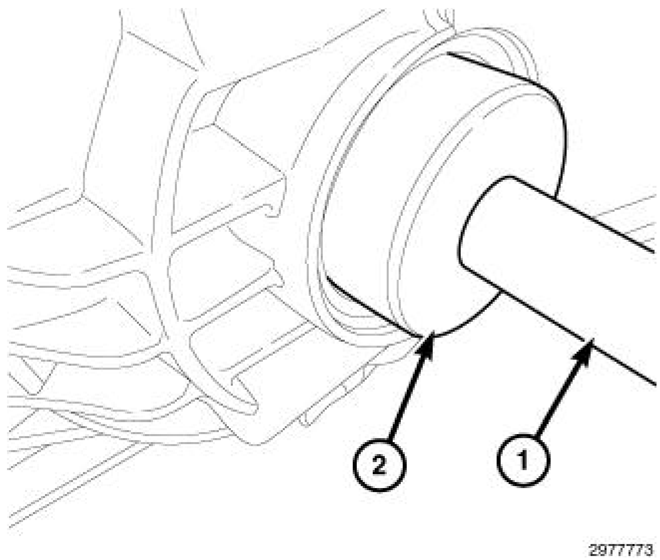


Fig. 28: Installing Axle Shaft Seal (Left)
Courtesy of CHRYSLER GROUP, LLC

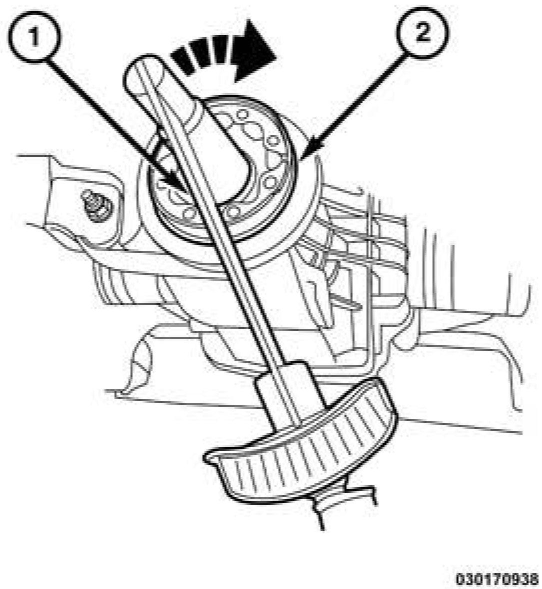
1. Using the Driver Handle (special tool #C-4171, Driver Handle, Universal) (1), Drive Handle Extension (special tool #C-4171-2, Extension, Drive Handle) and the Installer (special tool #10266, Installer, Seal) (2), install a **NEW** axle seal. Lubricate the inside diameter of the axle seal with the specified axle fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
2. Install the halfshaft. Refer to **INSTALLATION** .
3. Fill the rear axle with the specified fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

SEAL, DRIVE PINION

REMOVAL

PINION SEAL

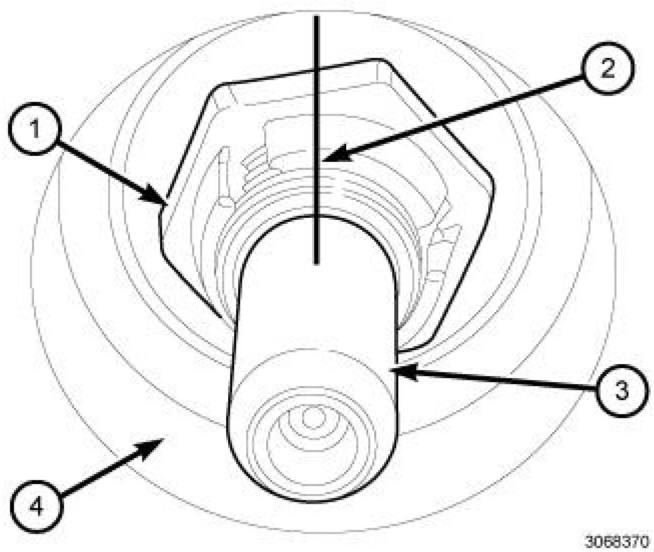
1. Remove rear axle assembly from vehicle. Refer to **REMOVAL**.



[Fig. 29: Pinion Rotational Torque](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Torque reading must be taken with a constant rotational speed. Do not measure break away torque.**

2. Using a torque wrench (1), measure and record the pinion rotational torque.



[Fig. 30: Identifying Alignment Mark On Pinion Flange, Nut & Pinion Shaft](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Due to axle imbalance concerns and bearing preload sensitivity, it is necessary to make sure pinion nut-to-shaft orientation is maintained. If alignment marks are not visible, apply appropriate marks before removing pinion nut.**

3. Apply an alignment index mark (2) on the pinion flange nut (1) to the pinion shaft (3) to the pinon flange (4).

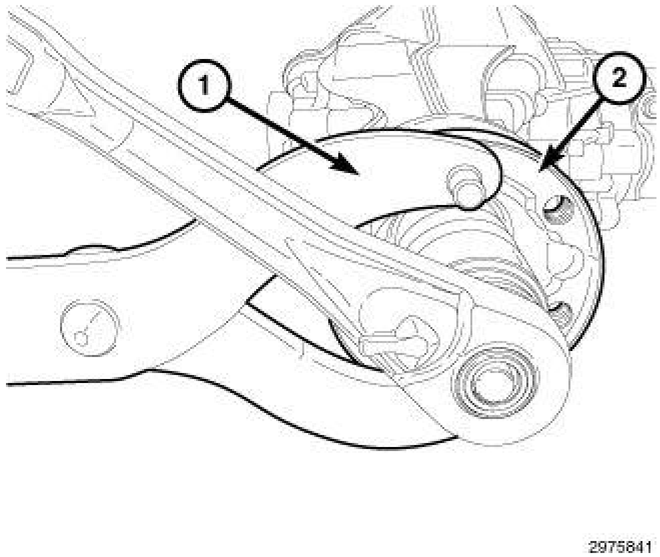


Fig. 31: Flange Wrench, Pinion Flange & Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Due to axle imbalance concerns, it is necessary to make sure pinion nut-to-shaft orientation is maintained. If alignment index marks are not visible, apply appropriate alignment index marks before removing pinion nut.**

4. Using Flange Wrench (special tool #C-3281, Holder, Flange) (1) and a 32mm socket, remove the pinion flange nut.

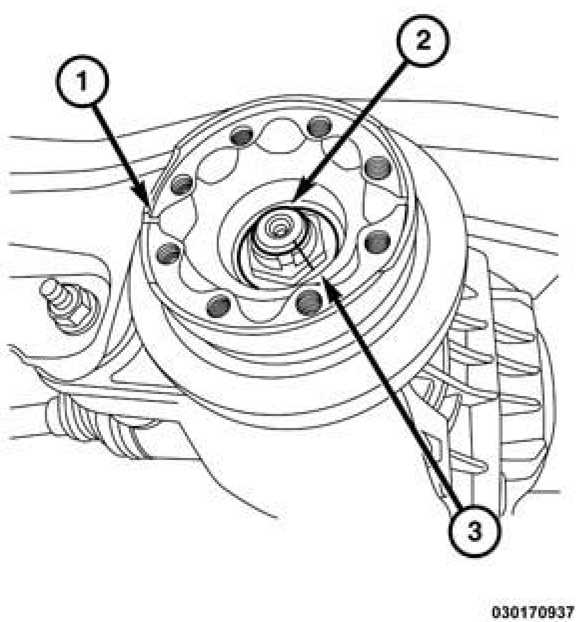


Fig. 32: Pinion Flange, Pinion Shaft & Alignment Marks
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Due to axle imbalance concerns, it is necessary to make sure pinion flange-to-shaft orientation is maintained. If alignment index marks are not visible, apply appropriate alignment index marks before removing pinion flange.**

5. Apply an alignment index mark (3) on the pinion flange (1) to the pinion shaft (2) and should be aligned after nut has been removed.
6. Using Puller (special tool #1026, Puller), remove the pinion flange from the pinion shaft.

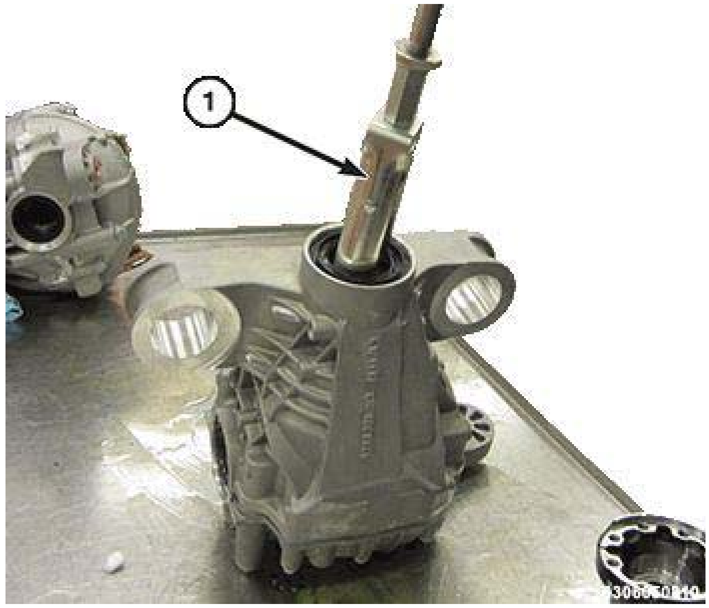


Fig. 33: Seal Remover
Courtesy of CHRYSLER GROUP, LLC

7. Using seal remover (special tool #7794-A, Remover, Seal) (1) and slide hammer (special tool #C-637, Slide Hammer, Universal), remove the pinion seal and discard.

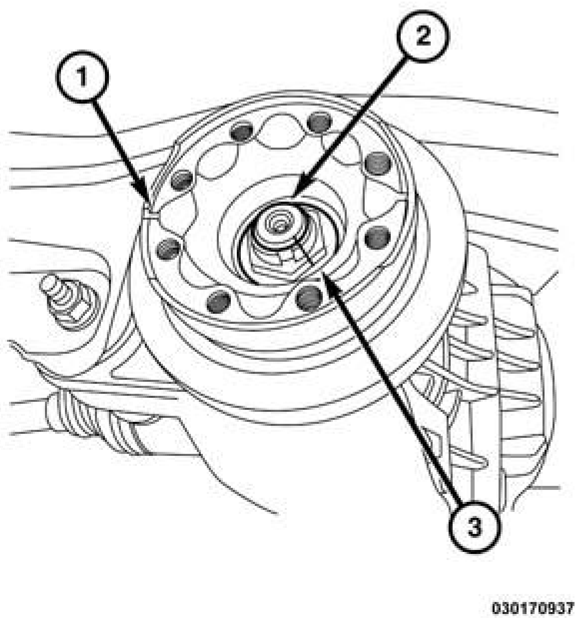
INSTALLATION

PINION SEAL

1. Clean any thread locker from pinion flange nut and the pinion shaft.
2. Lubricate the outer diameter of the flange on the sealing surface with the specified axle fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

[Fig. 34: Driver Handle & Seal Installer]
Courtesy of CHRYSLER GROUP, LLC

3. Using Driver Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #10269, Installer, Seal) (2), install the pinion seal until tool bottoms on the carrier.



[Fig. 35: Pinion Flange, Pinion Shaft & Alignment Marks]
Courtesy of CHRYSLER GROUP, LLC

4. Install the pinion flange into position. Align the alignment index marks (3) made during removal.
5. Using (special tool #6448A, Installer, Bearing/Gear), lightly tap on the pinion flange (1) until adequate pinion shaft threads are exposed.
6. Apply MoparÂ® Lock and Seal Adhesive Loctite 2701 to the pinion nut (2) and install the pinion flange nut.

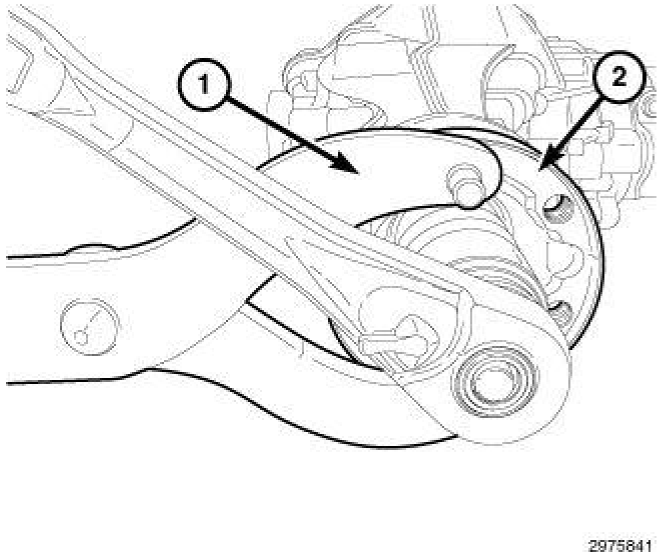


Fig. 36: Flange Wrench, Pinion Flange & Nut
Courtesy of CHRYSLER GROUP, LLC

7. Using Flange Holder (special tool #C-3281, Holder, Flange) (1) and 32mm socket tighten the pinion flange nut in small increments until the pinion nut index mark aligns with the index mark on the pinion shaft.

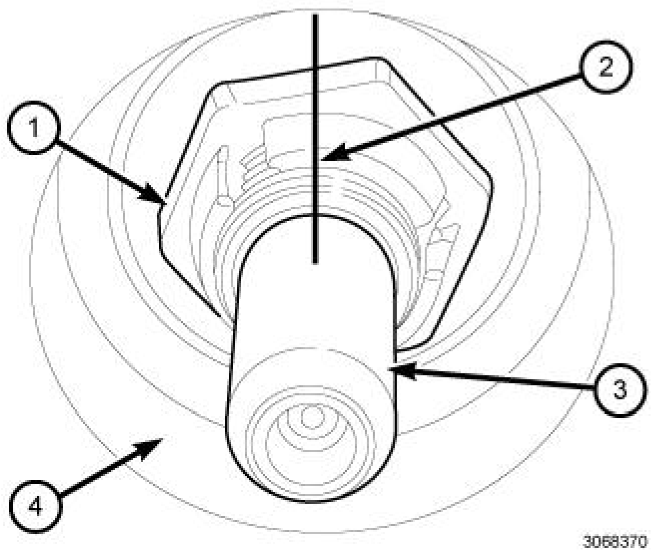


Fig. 37: Identifying Alignment Mark On Pinion Flange, Nut & Pinion Shaft
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**If the pinion nut alignment index mark exceeds the pinion shaft alignment index mark the unit must be discarded. If the pinion nut alignment index mark falls short of the pinion shaft alignment index mark the unit will possibly generate an Noise, Vibration, or Harshness (NVH) concern.**

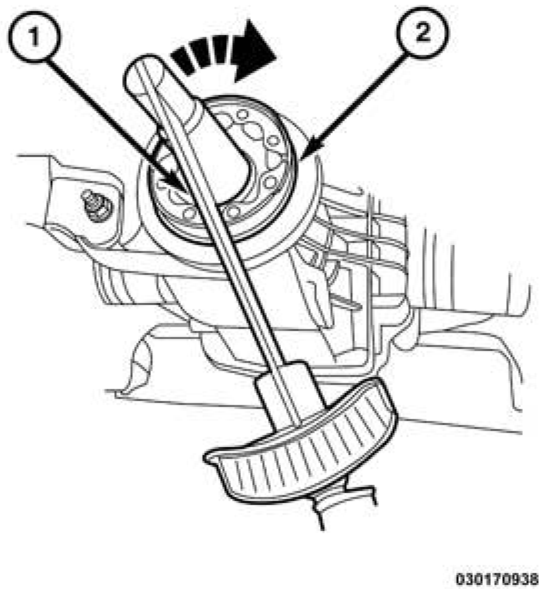


Fig. 38: Pinion Rotational Torque
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Torque reading must be taken with a constant rotational speed. Do not measure break away torque.**

8. Using a torque wrench (1), measure and record the pinion rotational torque.
9. After the torque reading has been obtained, compare the reading to the recorded reading when removing the pinion flange. The difference in the reading should be within 0 Ā± 0.2 N.m (0 Ā± 1.7 in. lbs.). Value after repair should be higher due to tighter fit of the new pinion seal.
10. Install the rear axle assembly. Refer to **INSTALLATION**.

BUSHING, FRONT

REMOVAL

FRONT BUSHING

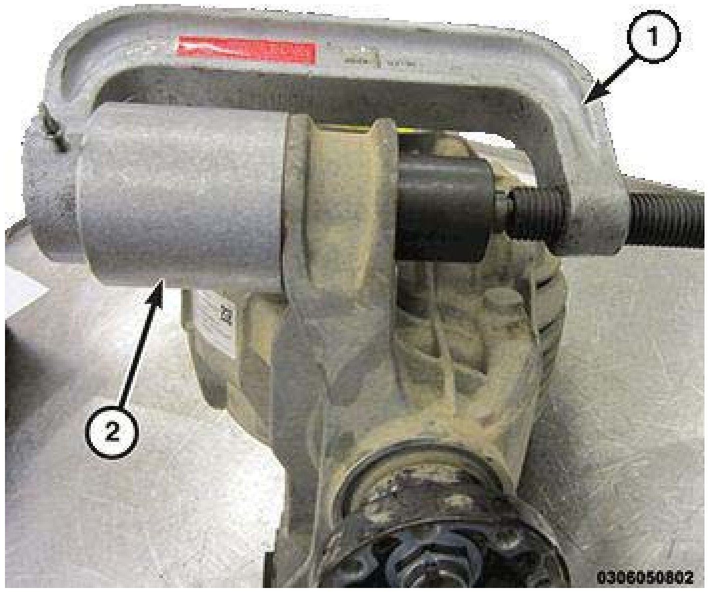
1. Remove rear axle from vehicle. Refer to **REMOVAL**.

NOTE: **195RIA axle bushing shown in illustration. 230RIA axle bushing uses the same procedure.**

NOTE: **Right Hand (RH) side shown in illustration, Left Hand (LH) similar.**

NOTE: **Take note of the bushing inner metal orientation prior to bushing removal, the replacement bushing metal must be installed in the same exact orientation.**

2. Secure the rear axle in a vice.

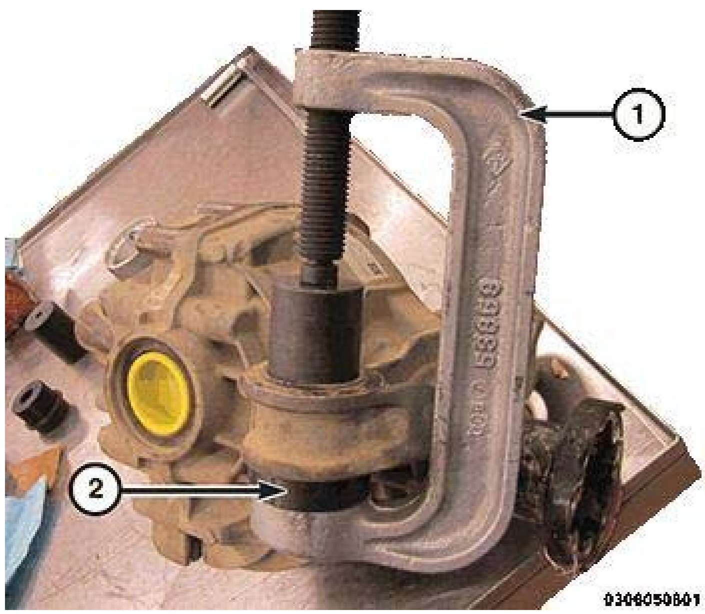


[Fig. 39: Ball Joint Installer & Receiver Cup]
Courtesy of CHRYSLER GROUP, LLC

3. Using (special tool #6289A, Installer, Ball Joint) (1) and (special tool #8405-1, Cup, Receiver) (2) remove the front bushing from the rear axle.

INSTALLATION

FRONT BUSHING



[Fig. 40: Ball Joint Installer & Ball Joint Remover]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **195RIA axle bushing shown in illustration. 230RIA axle bushing uses the same procedure.**

NOTE: **Make sure the bushing inner metal orientation notches are in the same exact**

orientation as the original removed bushing inner metal.

1. Install a **NEW** bushing in the rear axle using (special tool #10106-3, Remover, Ball Joint) (2) and (special tool #6289A, Installer, Ball Joint) (1).
2. Install the rear axle assembly. Refer to **INSTALLATION**.

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Article GUID: A00735942

2015-16 DRIVELINE/AXLES

Rear Axle - 230RIA - Challenger

DESCRIPTION

DESCRIPTION

The 230 MM RIA (Rear-Independent-Aluminum) axle is an independent assembly with an aluminum housing and machined cast iron differential. The 230 MM axle can be equipped with or without LSD (Limited Slip Differential). All SRT vehicles and manual transmission applications are equipped with LSD axle and all other applications are open differentials.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - AXLE

DIAGNOSTIC CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
WHEEL NOISE	1. Wheel loose.	1. Tighten loose lug nuts.
	2. Faulty, brinelled wheel bearing.	2. Replace wheel bearing.
LOSS OF LUBRICANT	1. Lubricant level too high.	1. Drain lubricant to the correct level.
	2. Worn axle seals.	2. Replace axle seals.
	3. Worn pinion seal.	3. Replace pinion seal.
	4. Worn/scored pinion flange journal.	4. Replace axle assembly.
	5. Axle cover not properly sealed.	5. Replace axle assembly.
	6. Vent hose/gore vent position is not vertical	6. Replace gore vent/hose assembly, install in 12 O'Clock orientation.
AXLE OVERHEATING	1. Lubricant level low.	1. Fill differential to correct level.
	2. Improper grade of lubricant.	2. Fill differential with the correct fluid type and quantity.
	3. Bearing preload too high.	3. Replace axle assembly.
	4. Insufficient ring gear backlash.	4. Replace axle assembly.
GEAR TEETH BROKE	1. Overloading.	1. Replace axle assembly.
	2. Improper adjustments.	2. Replace axle assembly.
AXLE NOISE	1. Insufficient lubricant.	1. Fill axle with the correct fluid type and quantity.
	2. Improper ring gear and pinion adjustment.	2. Replace axle assembly.

CONDITION	POSSIBLE CAUSE	CORRECTION
	3. Unmatched ring gear and pinion.	3. Replace axle assembly.
	4. Worn teeth on ring gear and/or pinion.	4. Replace axle assembly.
	5. Loose pinion bearings.	5. Replace axle assembly.
	6. Loose differential bearings.	6. Replace axle assembly.
	7. Misaligned or sprung ring gear.	7. Replace axle assembly.
	8. Housing not machined properly.	8. Replace axle assembly.

GEAR NOISE

Axle gear noise can be caused by insufficient lubricant, incorrect backlash, incorrect pinion depth, tooth contact, worn/damaged gears, or the carrier housing not having the proper offset and squareness.

Gear noise usually happens at a specific speed range. The noise can also occur during a specific type of driving condition. These conditions are acceleration, deceleration, coast, or constant load.

When road testing, first warm-up the axle fluid by driving the vehicle at least 5 miles and then accelerate the vehicle to the speed range where the noise is the greatest. Shift out-of-gear and coast through the peak-noise range. If the noise stops or changes greatly:

- Check for insufficient lubricant.

Differential side gears and pinions can be checked by turning the vehicle. They usually do not cause noise during straight-ahead driving when the gears are unloaded. The side gears are loaded during vehicle turns. A worn pinion shaft can also cause a snapping or a knocking noise.

BEARING NOISE

The differential and pinion bearings can produce noise when worn or damaged. Bearing noise can be either a whining, or a growling sound.

Pinion bearings have a constant-pitch noise. This noise changes only with vehicle speed. Pinion bearing noise will be higher pitched because it rotates at a faster rate.

Worn or damaged differential bearings usually produce a low pitch noise. Differential bearing noise is similar to pinion bearing noise. The pitch of differential bearing noise is also constant and varies only with vehicle speed.

Wheel hub bearings produce noise and vibration when worn or damaged. The noise generally changes when the bearings are loaded. Road test the vehicle. Turn the vehicle sharply to the left and to the right. This will load the bearings and change the noise level. Where axle bearing damage is slight, the noise is usually not noticeable at speeds above 30 mph.

LOW SPEED KNOCK

Low speed knock is generally caused by a worn joint or by worn side-gear thrust washers. A worn pinion shaft bore will also cause low speed knock.

VIBRATION

Vibration at the rear of the vehicle is usually caused by a:

- Damaged propeller shaft.
- Missing propeller shaft balance weight(s).
- Worn or out-of-balance wheels.
- Loose wheel lug nuts.
- Worn Constant Velocity (CV) joints.
- Loose/broken springs.
- Loose pinion gear nut.
- Excessive pinion CV flange run out.
- Bent halfshaft(s).

Check for loose or damaged front-end components or engine/transmission mounts. These components can contribute to what appears to be a rear end vibration. Do not overlook engine accessories, brackets and drive belts.

All driveline components should be examined before starting any repair.

DRIVELINE SNAP

A snap or clunk noise when the vehicle is shifted into gear, can be caused by:

- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn Constant Velocity (CV) joints.
- Worn or broken axle mount isolators.
- Loose pinion gear nut and CV flange.
- Excessive ring gear backlash.
- Excessive side gear to case clearance.

The source of a snap or a clunk noise can be determined with the assistance of a helper. Raise the vehicle on a hoist with the wheels free to rotate. Instruct the helper to shift the transmission into gear. Listen for the noise, a mechanics stethoscope is helpful in isolating the source of a noise.

STANDARD PROCEDURE

STANDARD PROCEDURE - FLUID DRAIN AND FILL

1. Drive the vehicle until the differential lubricant is at the normal operating temperature.

   NOTE: The vehicle must be LEVEL .

2. Raise and support the vehicle and hold vehicle at curb position. Refer to **HOISTING, STANDARD**

PROCEDURE .

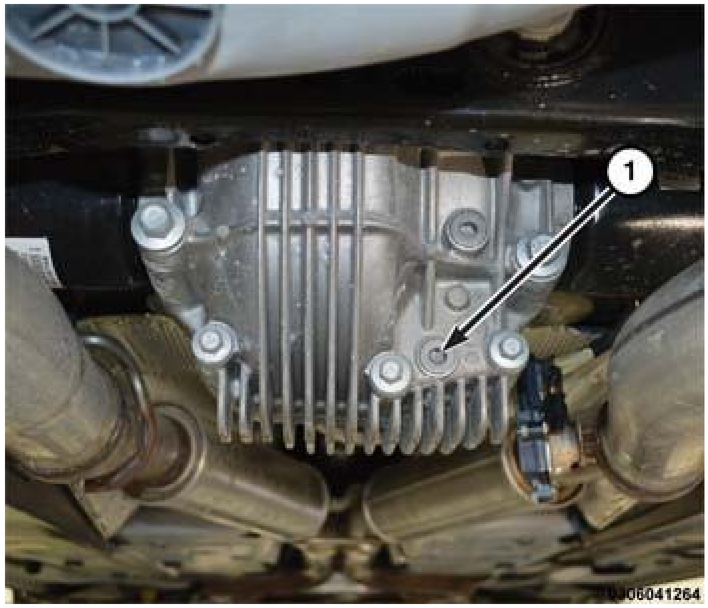


Fig. 1: Rear Axle Drain Plug
Courtesy of CHRYSLER GROUP, LLC

3. Remove the rear axle drain plug (1) and drain the lubricant completely from the axle.
4. Install the rear axle drain plug (1) and tighten to the proper specifications. Refer to **SPECIFICATIONS**.

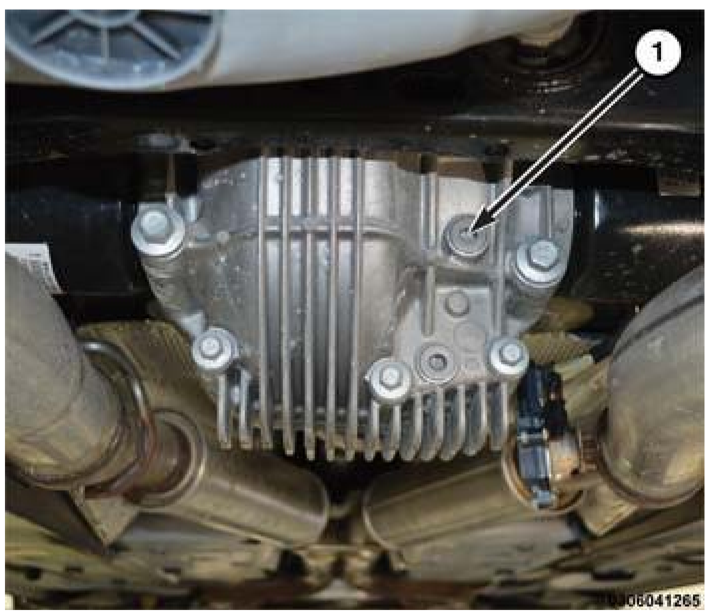


Fig. 2: Rear Axle Fill Plug
Courtesy of CHRYSLER GROUP, LLC

5. Remove the rear axle fill plug (1) and fill the rear axle with the specified amount of fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
6. Install the rear axle fill plug (1) and tighten to the proper specifications. Refer to **SPECIFICATIONS**.

SPECIFICATIONS

TORQUE SPECIFICATIONS

REAR AXLE TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Axle Drain Plug	35	26	-	Ā
Axle Fill Plug	35	26	-	Ā
Pinion Flange Nut	Refer to **SEAL, DRIVE PINION, INSTALLATION**.			Ā
Rear Axle Forward Mount Isolator Bolts	70	48	-	X
Rear Axle To Crossmember Bolts	150	111	-	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

REMOVAL

REAR AXLE

NOTE: **This procedure requires the compression of the rear suspension to ride height. A drive-on hoist should be used. If a drive-on hoist is not used, screw-style under-hoist jack stands are required to compress the rear suspension, facilitating rear halfshaft removal.**

CAUTION: **Never grasp halfshaft assembly by the inner or outer boots. Doing so may cause the boot to pucker or crease, reducing the service life of the boot and joint. Avoid over angulating or stroking the C/V joints when handling the halfshaft.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the rear exhaust system. Refer to **MUFFLER, EXHAUST, REMOVAL** .

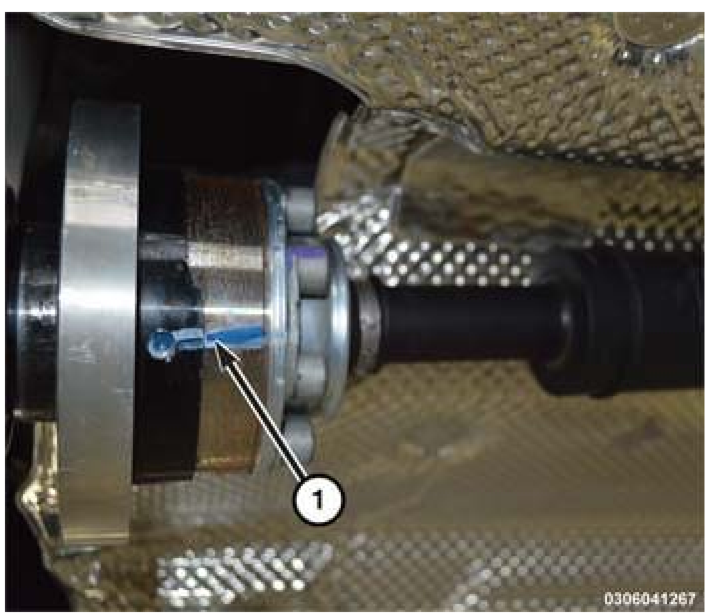


Fig. 3: Alignment Index Marks
Courtesy of CHRYSLER GROUP, LLC

3. Apply alignment index marks (1) to the drive shaft and the axle flange.

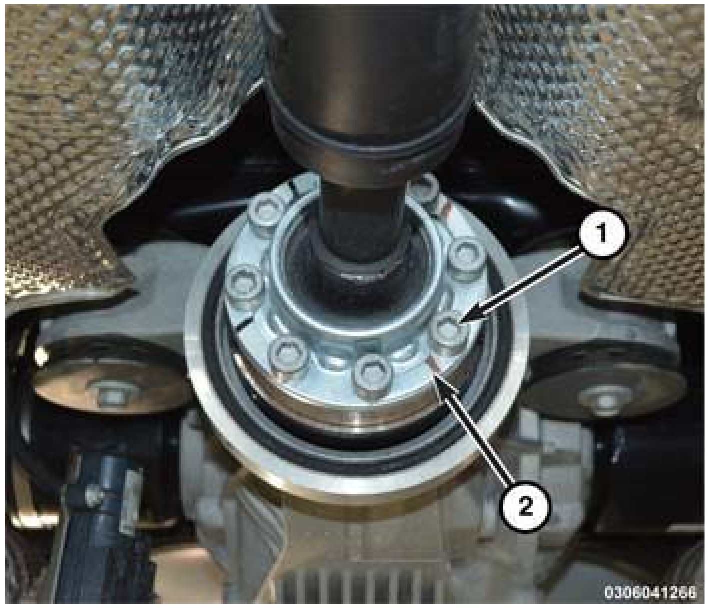


Fig. 4: Drive Shaft To Axle Flange Bolts & Washers
Courtesy of CHRYSLER GROUP, LLC

4. Remove and discard the drive shaft to axle flange bolts (1) and washers (2) and separate the drive shaft from the rear axle.

NOTE: **Do not let the drive shaft hang on the center support bearing.**

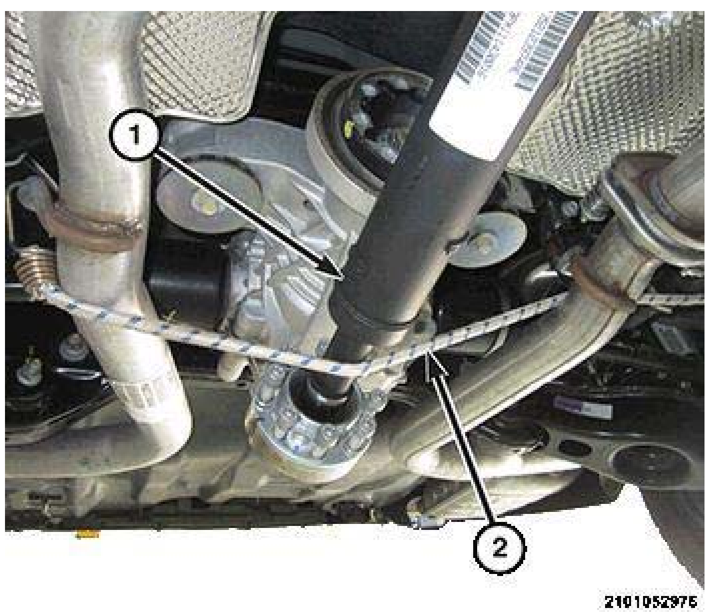
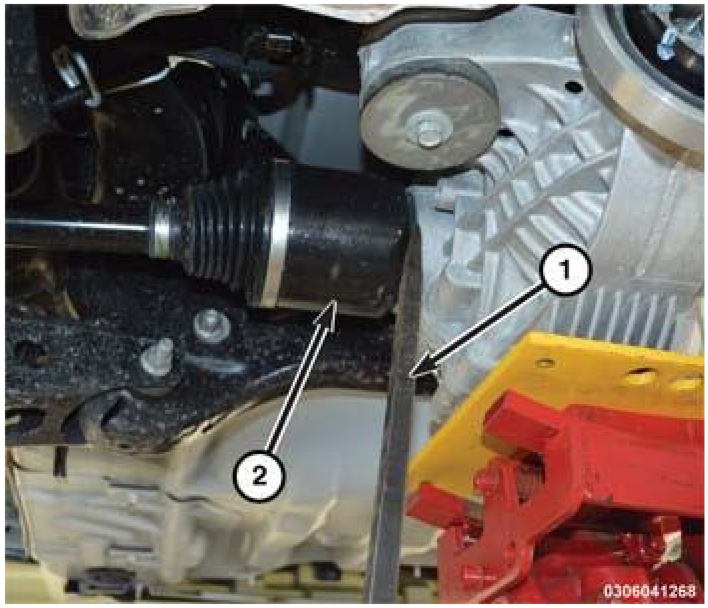


Fig. 5: Supporting Drive Shaft With Strap
Courtesy of CHRYSLER GROUP, LLC

5. Support the drive shaft (1) with a strap (2) or equivalent.

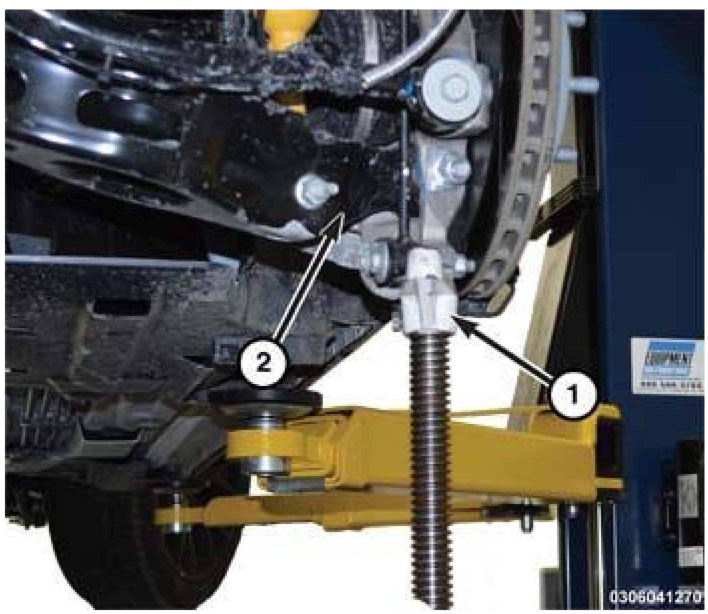


[Fig. 6: Removing Halfshaft](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not damage the axle seal, axle seal dust cover, and halfshaft boot.**

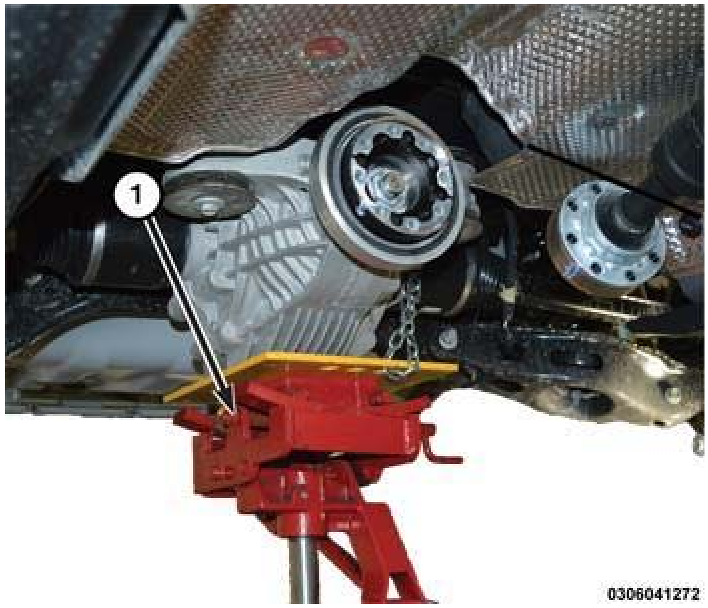
NOTE: **Left Hand (LH) side shown in illustration, Right Hand (RH) side similar.**

6. Using a suitable screwdriver (1), partially disengage the halfshafts (2) from the axle assembly.



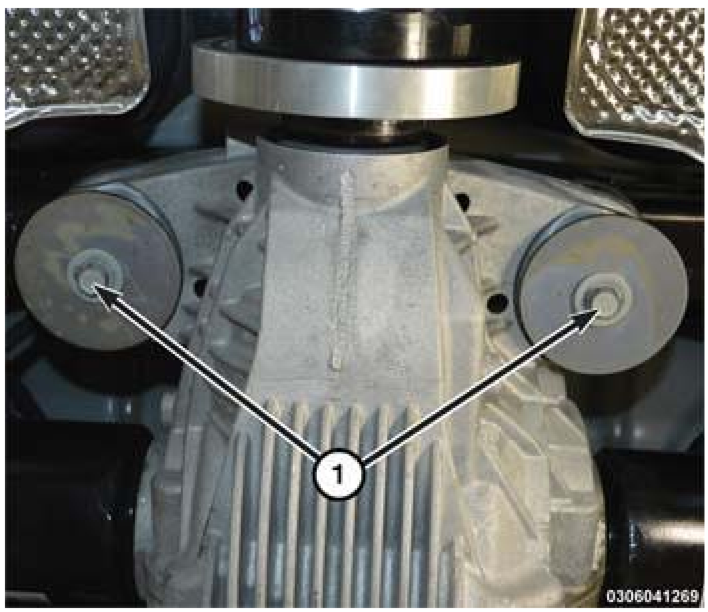
[Fig. 7: Screw-Style Under-Hoist Jack Stand & Rear Suspension](#)
Courtesy of CHRYSLER GROUP, LLC

7. If a drive-on hoist is not used, compress the rear suspension (2) using a screw-style under-hoist jack stand (1), and position a transmission jack under the rear axle assembly.



[Fig. 8: Transmission Jack](#)
Courtesy of CHRYSLER GROUP, LLC

8. Position the transmission jack (1) under the rear axle assembly.



[Fig. 9: Rear Axle Forward Mount Isolator Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

9. Remove and discard the rear axle forward mount isolator bolts (1).

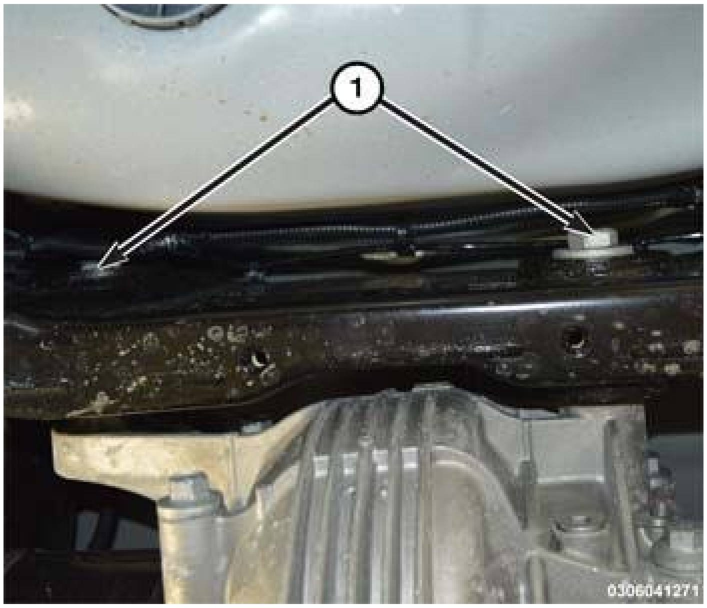


Fig. 10: Rear Axle To Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Remove the two rear axle to crossmember bolts (1) from the rear axle.

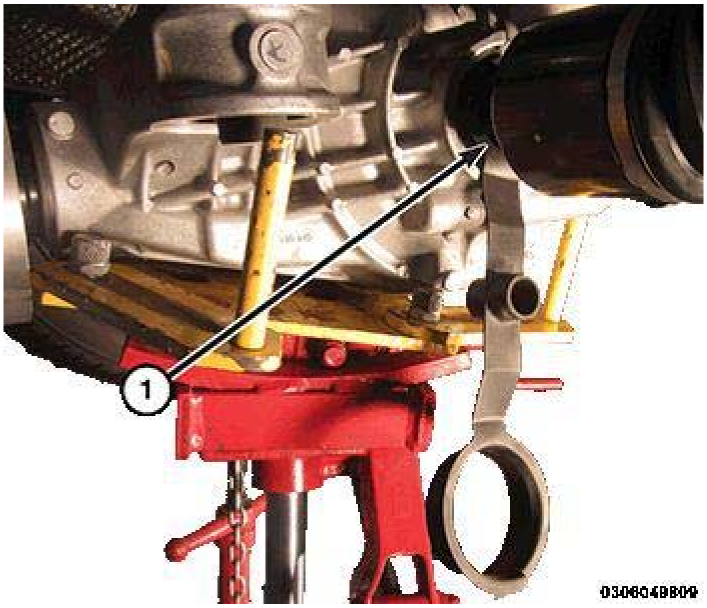


Fig. 11: Half Shaft Protector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left Hand (LH) side shown in illustration, Right Hand (RH) side similar.

11. Install the Protector, Half Shaft, Drive (special tool #10270, Protector, Half Shaft, Drive) (1).

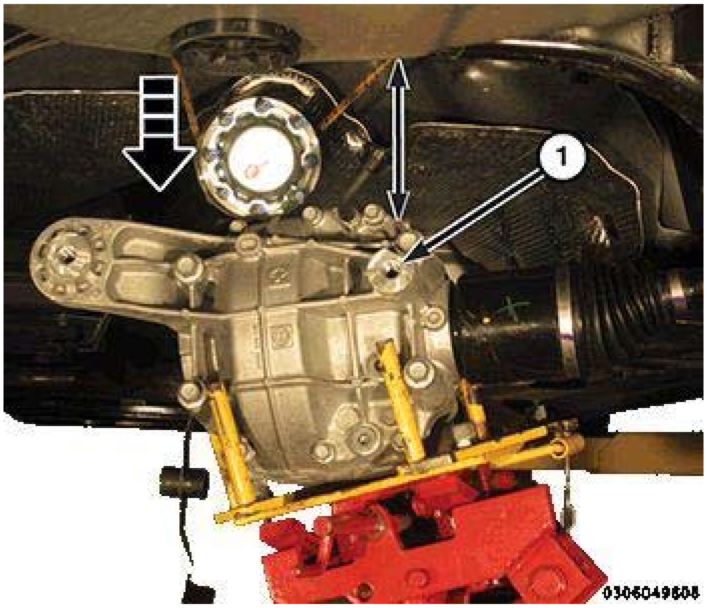


Fig. 12: Rear Axle
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left Hand (LH) side shown in illustration, Right Hand (RH) side similar.

12. Lower the rear axle (1) approximately six inches and push the rear axle assembly towards the front of the vehicle.

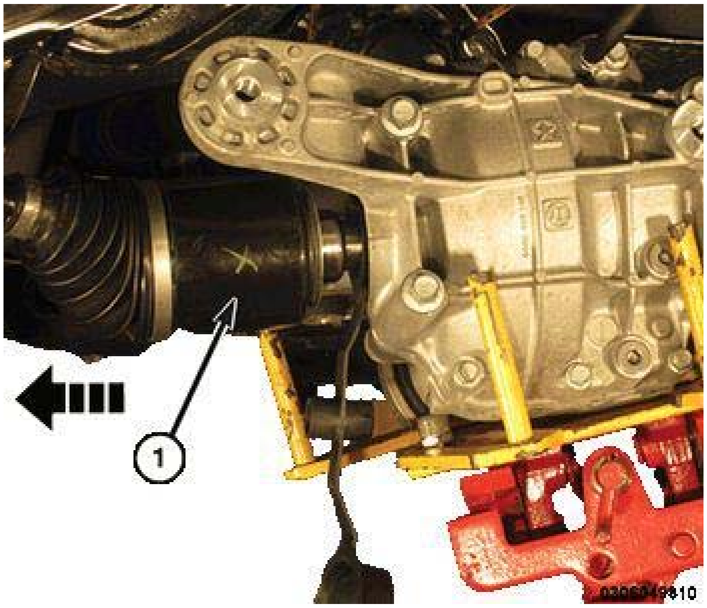


Fig. 13: Removing Halfshaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not allow the halfshaft splines to come in contact with the halfshaft seal.

13. With the aid of an assistant, shift the rear axle assembly in one direction and compress one halfshaft inner joint as far as possible while removing the other halfshaft (1).

14. Remove the rear axle assembly from vehicle.

INSTALLATION

REAR AXLE

1. Install new circlip(s), on the halfshaft(s).

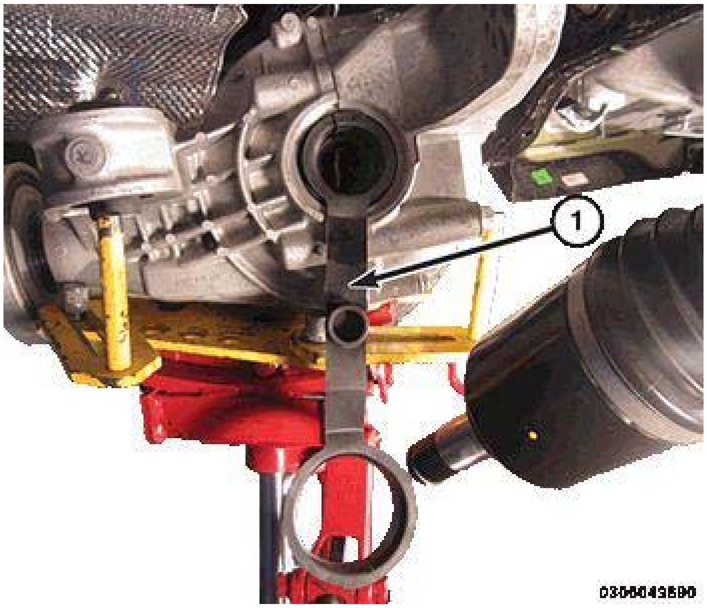


Fig. 14: Protector Installed In Rear Axle
Courtesy of CHRYSLER GROUP, LLC

2. Install the Protector, Half Shaft, Drive (special tool #10270, Protector, Half Shaft, Drive) (1) in the rear axle.

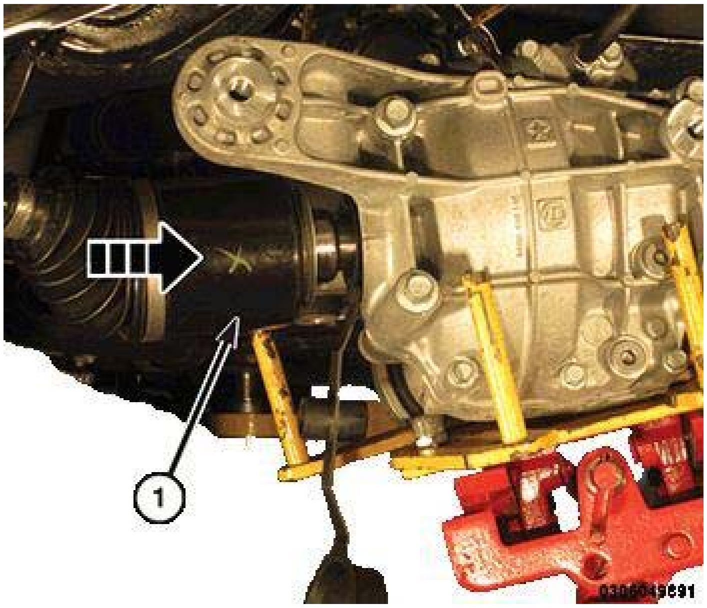


Fig. 15: Installing Halfshaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Use care when installing halfshaft to axle assembly. The halfshaft installation angle should be minimized to avoid damage to seal upon installation.**

NOTE: **Use care not to damage the axle seal or the seal dust cover.**

3. With the Protector, Half Shaft, Drive (special tool #10270, Protector, Half Shaft, Drive) (1) installed and the aid of an assistant, shift the rear axle assembly in one direction and compress one halfshaft inner joint as far as possible while installing the other halfshaft (1).

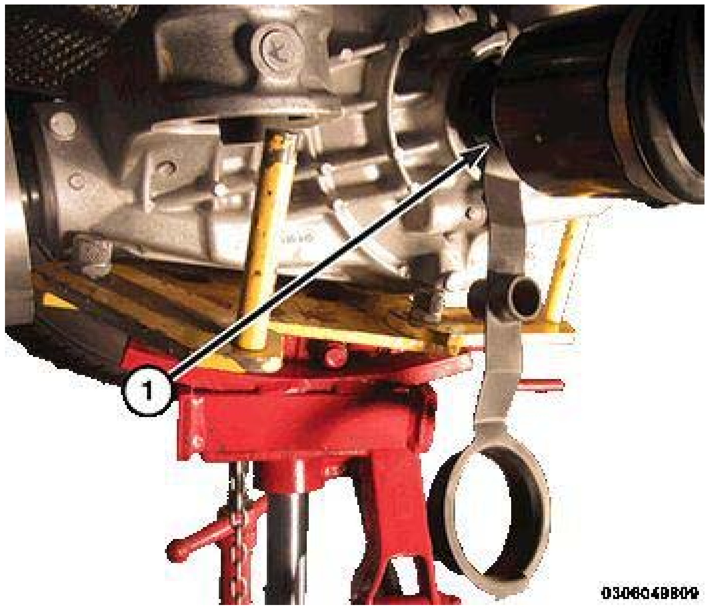


Fig. 16: Half Shaft Protector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Do not grasp the rubber boot or the axle bar when checking for proper installation.**

4. Remove the Protector, Half Shaft, Drive (special tool #10270, Protector, Half Shaft, Drive) (1) and fully install the halfshaft in the rear axle. Verify proper installation by pulling outward on the joint by hand.
5. Raise the rear axle assembly into position.

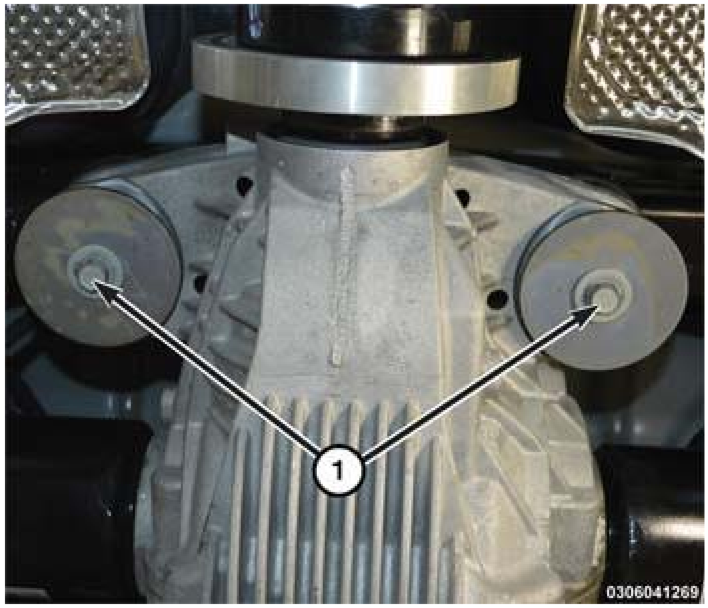


Fig. 17: Rear Axle Forward Mount Isolator Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install the **NEW** rear axle forward mount isolator bolts (1) hand tight.

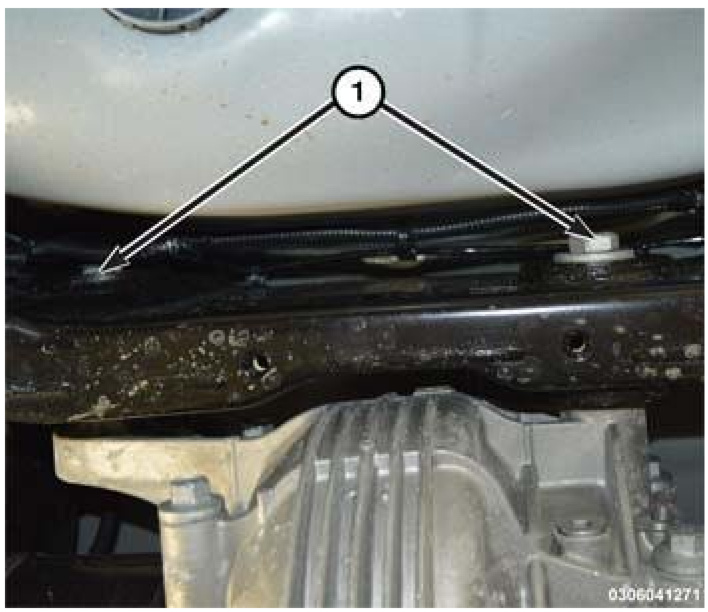
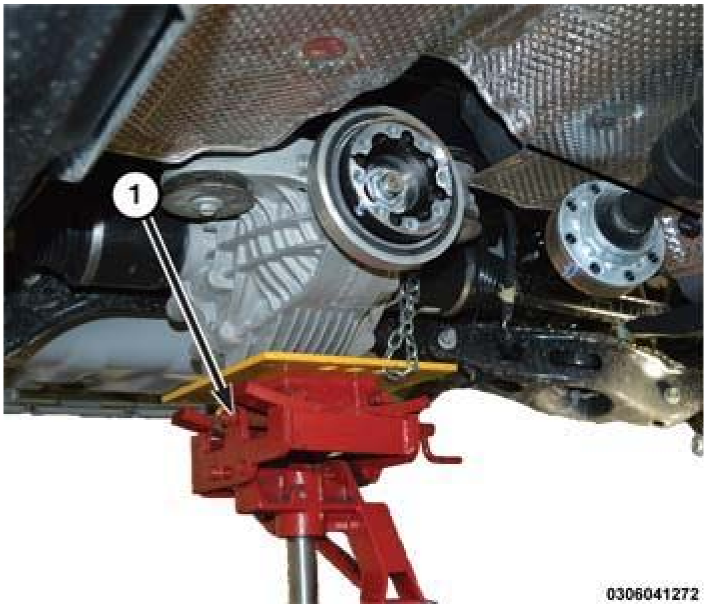


Fig. 18: Rear Axle To Crossmember Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Install the rear axle to crossmember bolts (1) hand tight.
8. Tighten the **NEW** rear axle forward mount isolator bolts to the proper specifications. Refer to **SPECIFICATIONS**.
9. Tighten the rear axle to crossmember bolts to the proper specifications. Refer to **SPECIFICATIONS**.
10. Again verify halfshaft inner joints are fully engaged in the axle assembly.

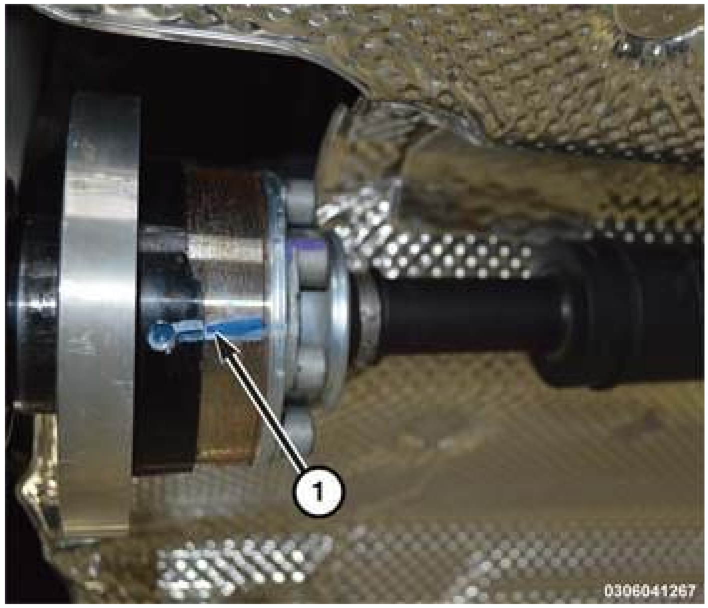


[Fig. 19: Transmission Jack](#)
Courtesy of CHRYSLER GROUP, LLC

11. Remove transmission jack (1).

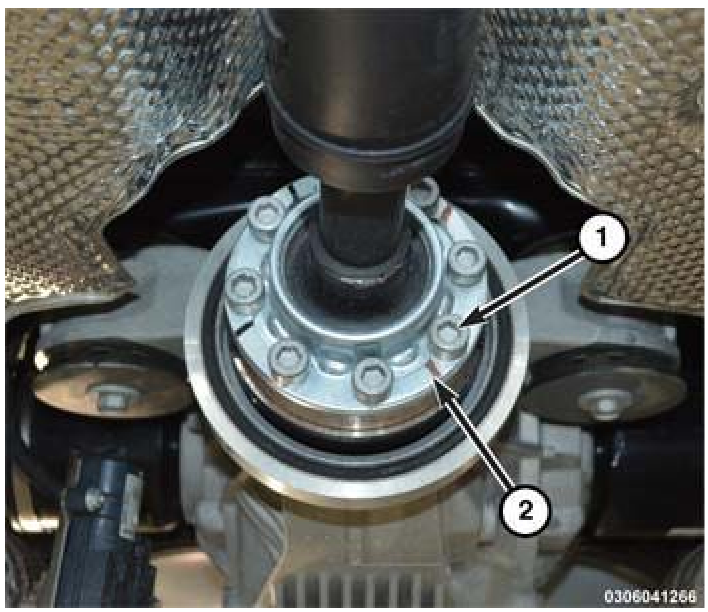
[Fig. 20: Screw-Style Under-Hoist Jack Stand & Rear Suspension](#)
Courtesy of CHRYSLER GROUP, LLC

12. If used, remove screw-type under-hoist jack stands (1).



[Fig. 21: Alignment Index Marks](#)
Courtesy of CHRYSLER GROUP, LLC

13. Align propeller shaft index marks (1).



[Fig. 22: Drive Shaft To Axle Flange Bolts & Washers](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Drive shaft bolts must be replaced with NEW . If NEW bolts are not available clean the old bolts and apply MoparÃ® Lock and Seal Adhesive or equivalent.**

14. Install the **NEW** drive shaft washers (2) and bolts (1) and tighten in a star pattern to 66 Nm (49 ft.-lbs.).
15. Install the rear exhaust system. Refer to **MUFFLER, EXHAUST, INSTALLATION** .

NOTE: **If significant fluid loss occurred while installing the rear axle proceed to**

step 16.

If there was no fluid loss proceed to step 19.

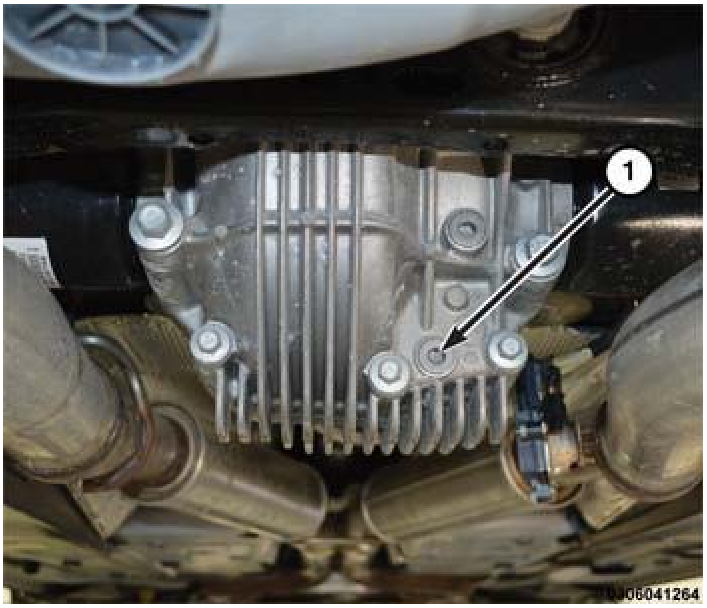


Fig. 23: Rear Axle Drain Plug
Courtesy of CHRYSLER GROUP, LLC

16. Remove rear axle drain plug (1) and drain the rear axle fluid.
17. Install the rear axle drain plug (1) and tighten to the proper specifications. Refer to **SPECIFICATIONS** .

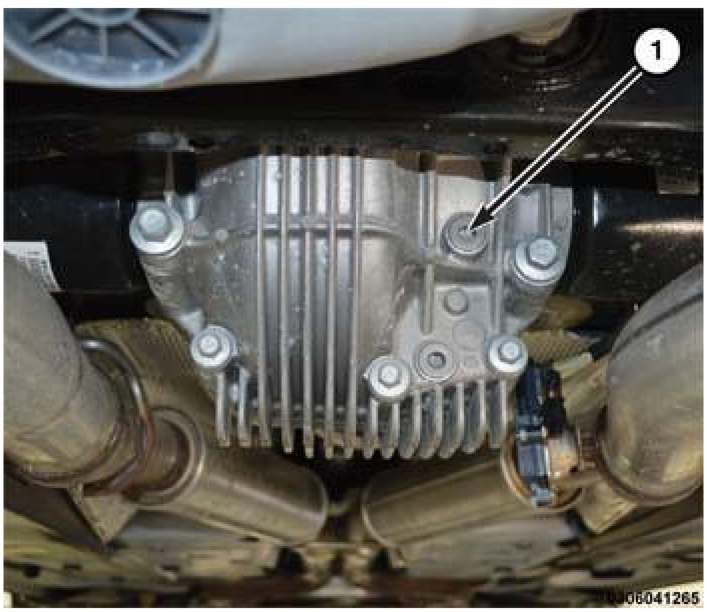


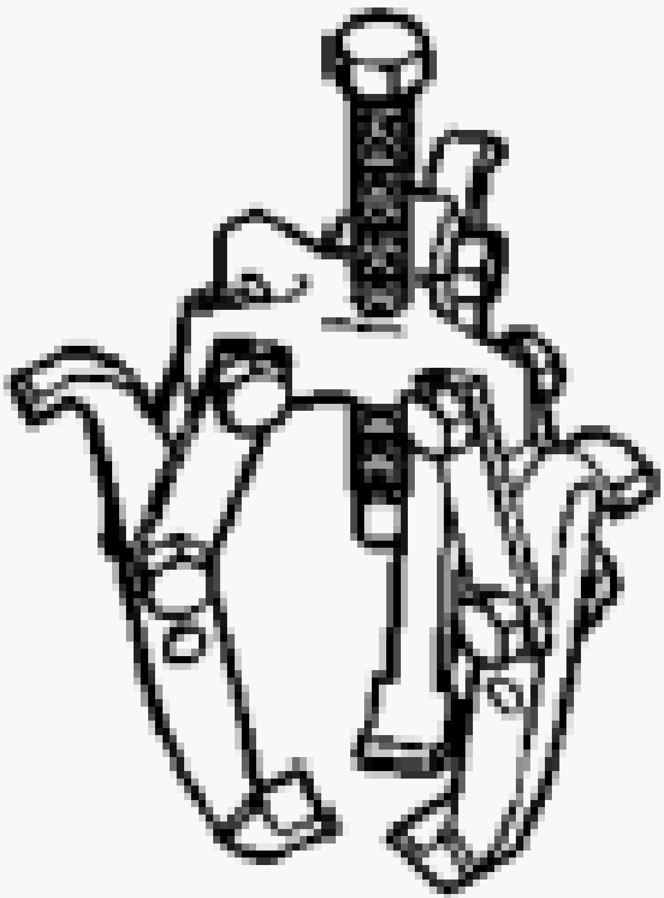
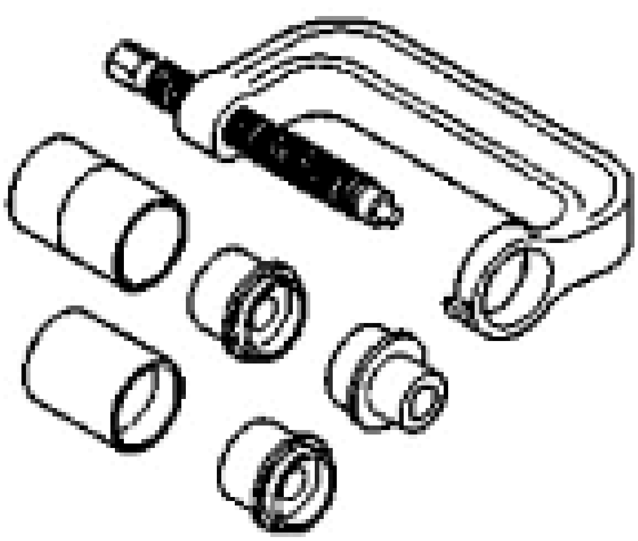
Fig. 24: Rear Axle Fill Plug
Courtesy of CHRYSLER GROUP, LLC

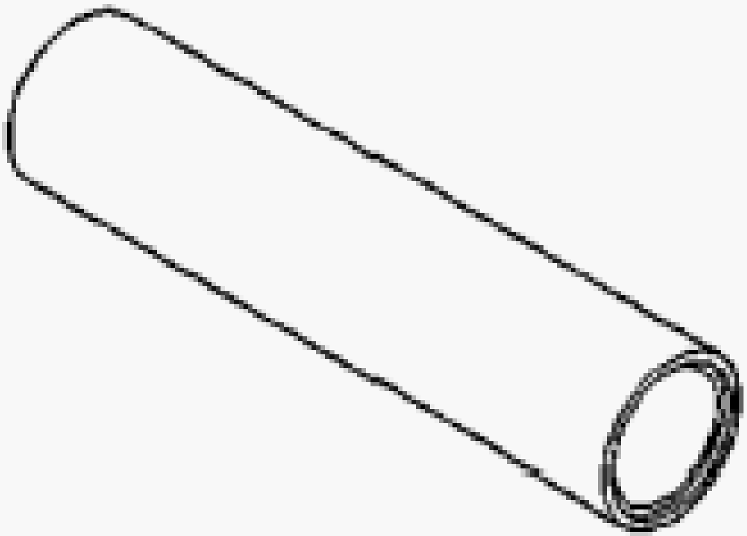
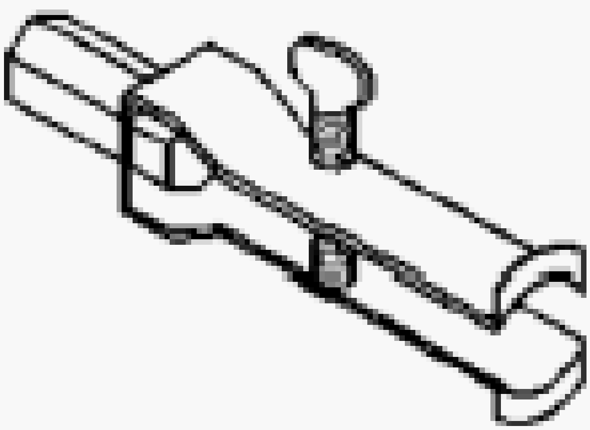
18. Remove the rear axle fill plug (1) and fill the rear axle with the specified fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
19. Install the rear axle fill plug (1) and tighten to the proper specifications. Refer to **SPECIFICATIONS**.

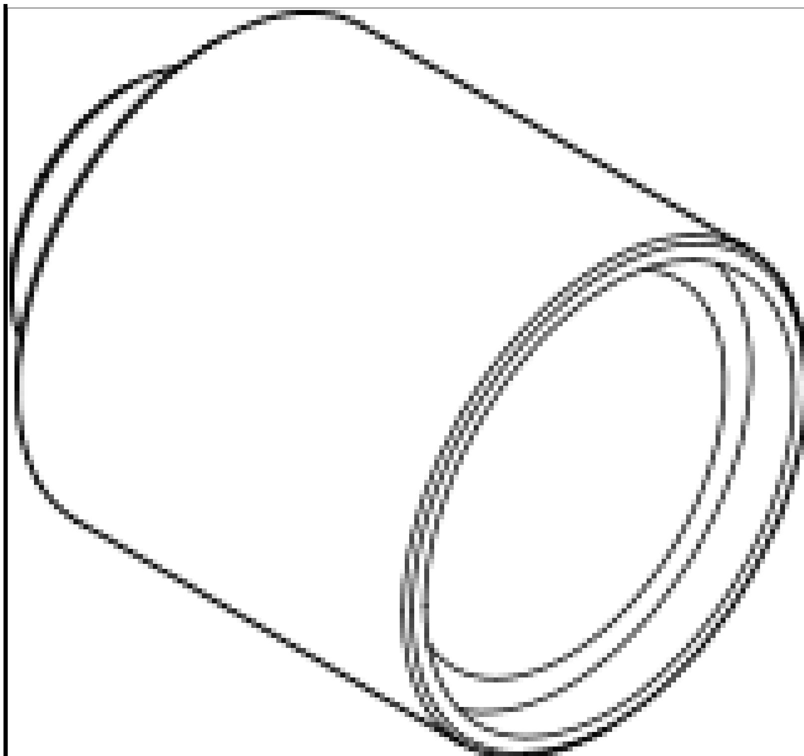
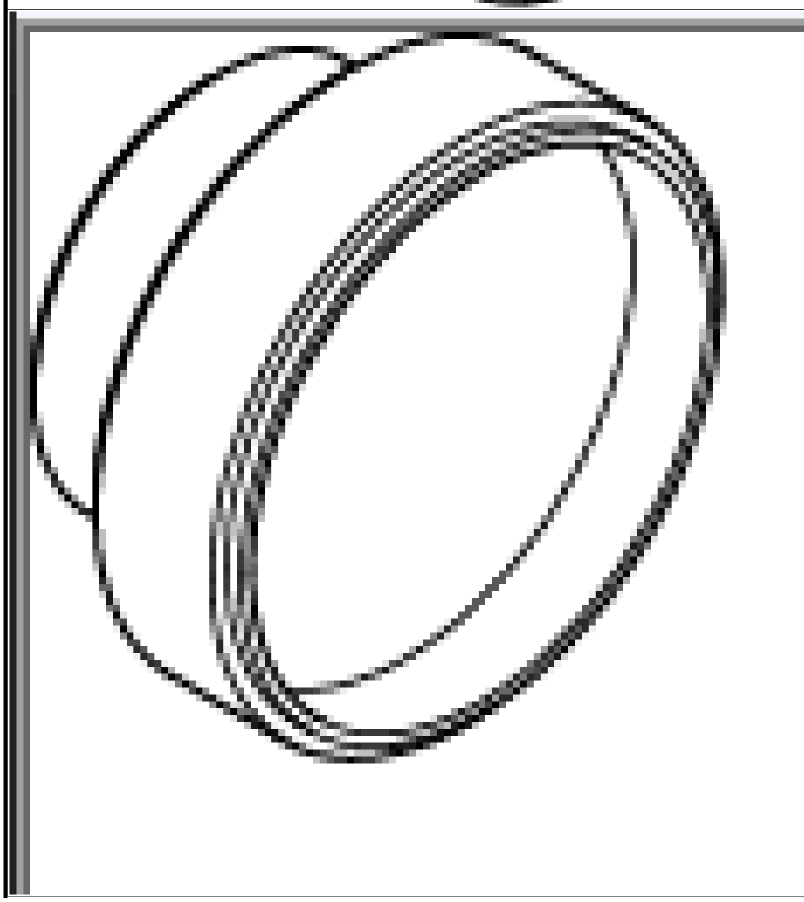
20. Remove the support and lower the vehicle.

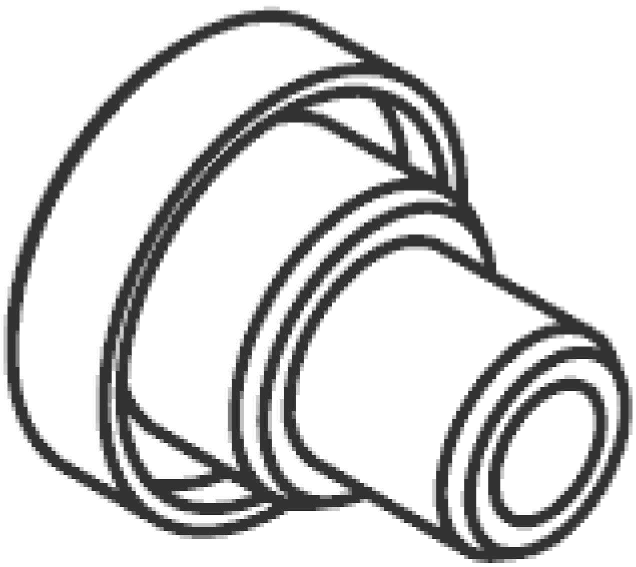
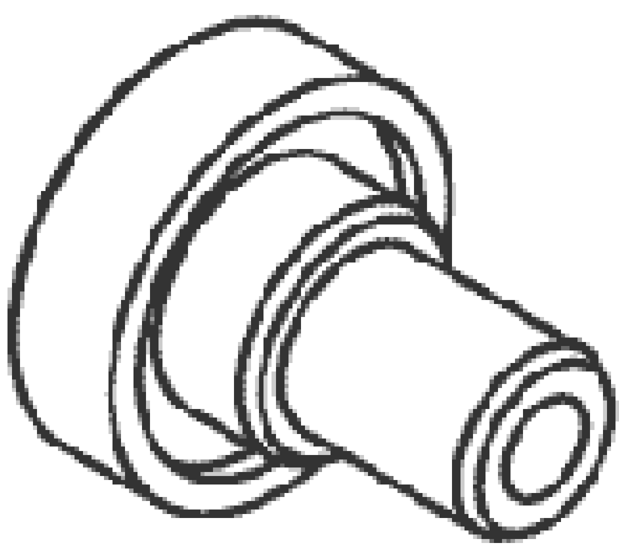
SPECIAL TOOLS

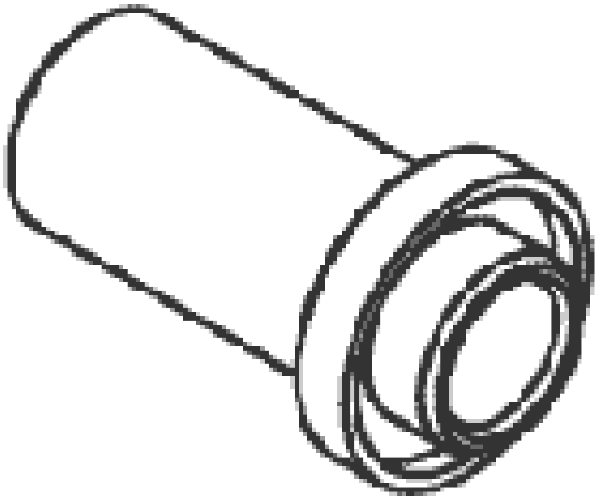
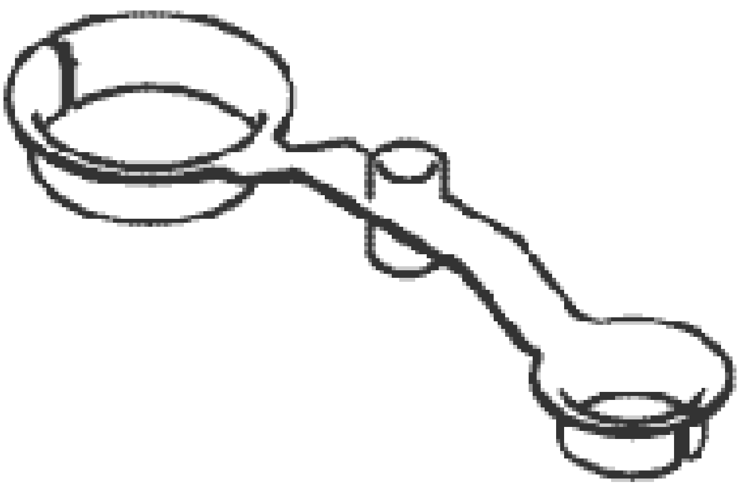
SPECIAL TOOLS

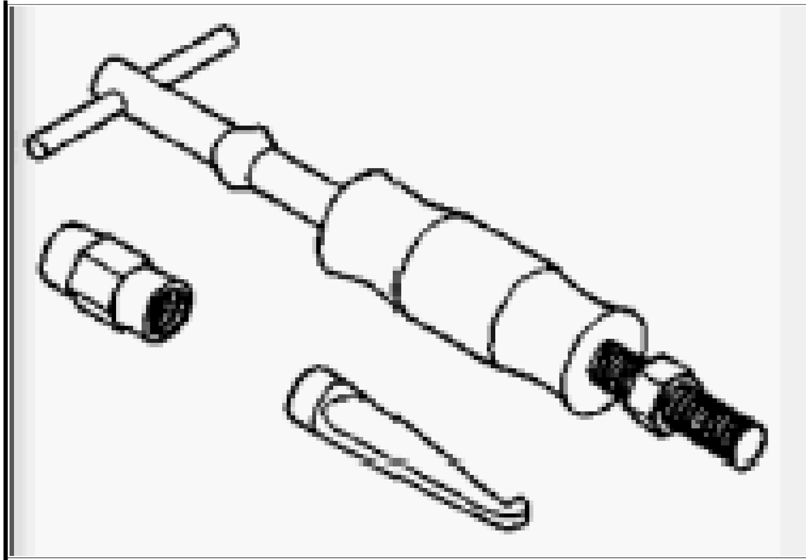
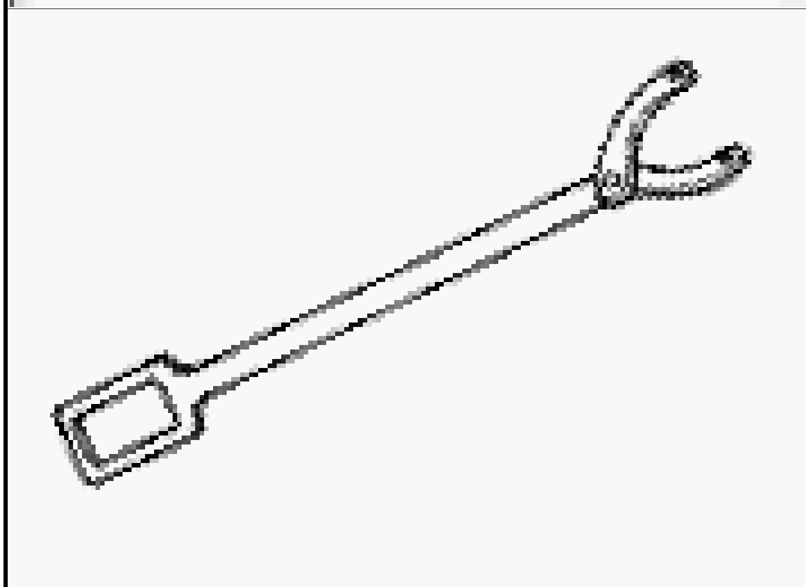
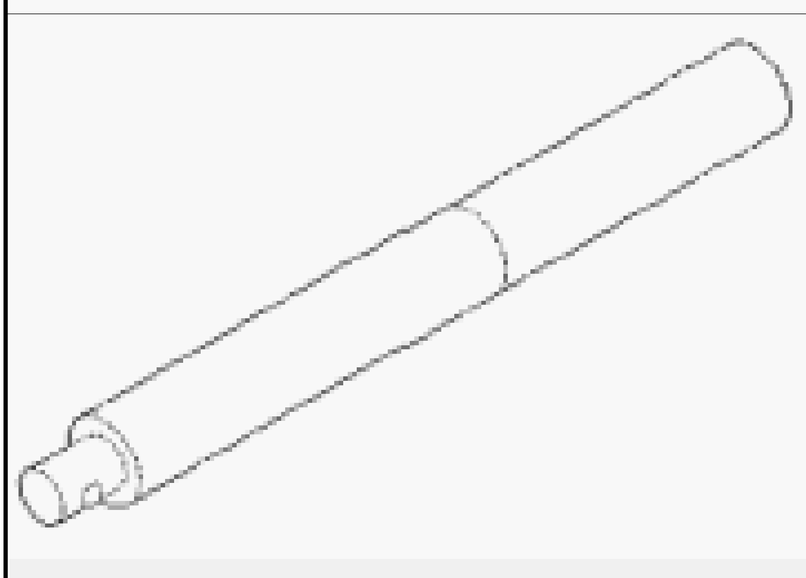
	1026 - Puller (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC.)
	6289A - Installer, Ball Joint (Originally Shipped In Kit Number(s).)

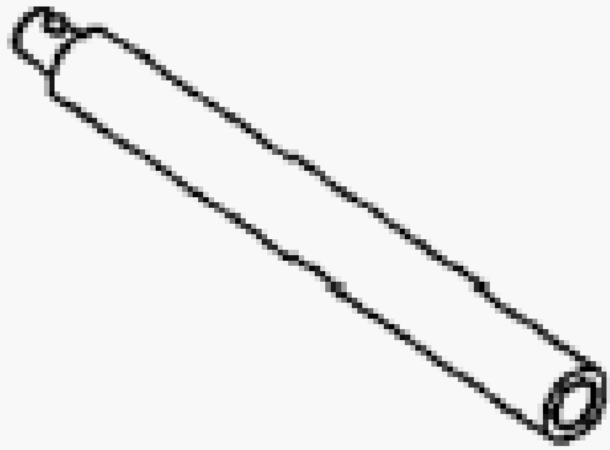
	6448A - Installer, Bearing/Gear (Originally Shipped In Kit Number(s) 6947, 8667, 8837, 8867.)
	7794-A - Remover, Seal (Originally Shipped In Kit Number(s) 6645.)

	8405-1 - Cup, Receiver (Originally Shipped In Kit Number(s).)
	10106-3 - Remover, Ball Joint (Originally Shipped In Kit Number(s) 10105, 10108.)

	10266 - Installer, Seal
	10267 - Installer, Seal

	10269 - Installer, Seal
	10270 - Protector, Half Shaft, Drive

	C-637 - Slide Hammer, Universal (Originally Shipped In Kit Number(s) 9202.)
	C-3281 - Holder, Flange (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9300A-CAN.)
	C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9300A-CAN.)

	C-4171-2 - Extension, Drive Handle (Originally Shipped In Kit Number(s) 6672, 8659.)

SEAL, AXLE DRIVE SHAFT

REMOVAL

REMOVAL

RIGHT SIDE

1. Remove halfshaft(s). Refer to **REMOVAL** .
2. Drain the rear axle fluid. Refer to **STANDARD PROCEDURE** .

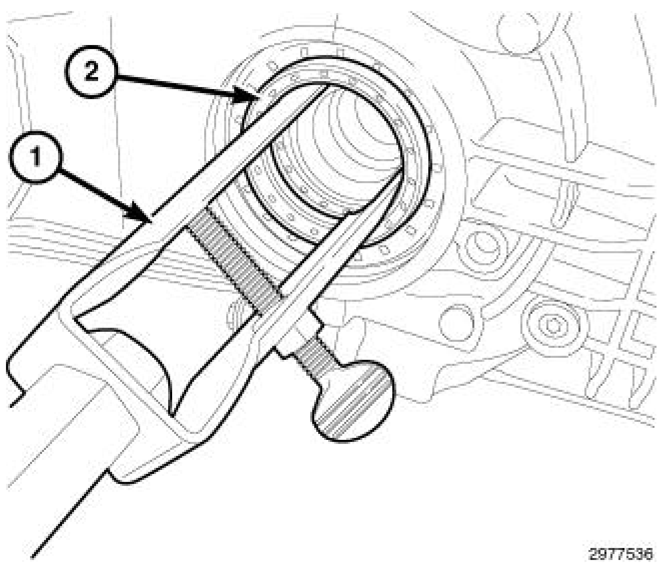


Fig. 25: Seal Remover & Axle Shaft Seal (Right)
Courtesy of CHRYSLER GROUP, LLC

3. Using seal remover (special tool #7794-A, Remover, Seal) (1) and slide hammer (special tool #C-637, Slide Hammer, Universal), remove axle shaft seal (2).
4. Visually inspect the halfshaft seal journal for damage (excessive seal groove, nicks, scratches, etc.). Replace the halfshaft if necessary.

LEFT SIDE

1. Remove the halfshaft. Refer to **REMOVAL** .
2. Drain the rear axle fluid. Refer to **STANDARD PROCEDURE** .

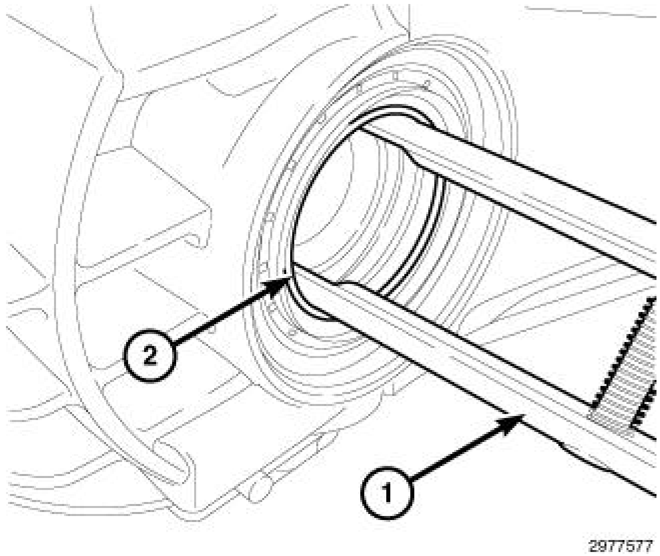


Fig. 26: Seal Remover & Axle Shaft Seal (Left)
Courtesy of CHRYSLER GROUP, LLC

3. Using seal remover (special tool #7794-A, Remover, Seal) (1) and slide hammer (special tool #C-637, Slide Hammer, Universal), remove the axle seal (2).
4. Visually inspect the halfshaft seal journal for damage (excessive seal groove, nicks, scratches, etc.). Replace the halfshaft if necessary.

INSTALLATION

INSTALLATION

RIGHT SIDE

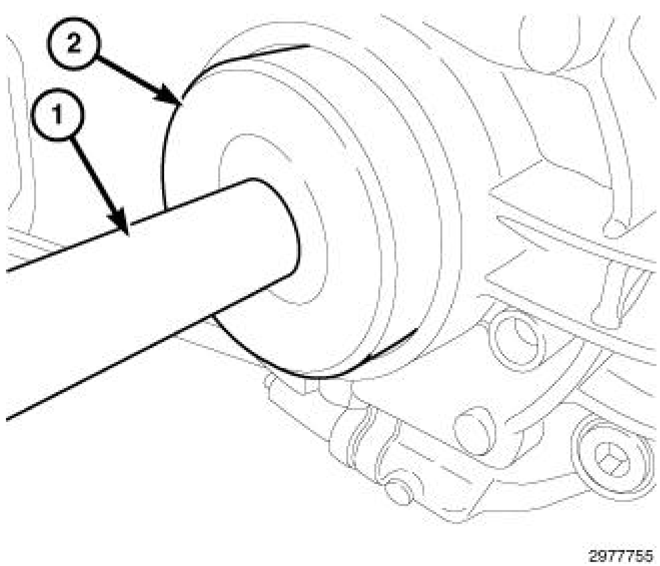


Fig. 27: Installing Axle Shaft Seal (Right)

Courtesy of CHRYSLER GROUP, LLC

1. Using Driver Handle (special tool #C-4171, Driver Handle, Universal) (1), Drive Handle Extension (special tool #C-4171-2, Extension, Drive Handle) and Installer (special tool #10267, Installer, Seal) (2), and install a **NEW** axle seal. Lubricate the inside diameter of the axle seal with the specified axle fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
2. Install the halfshaft. Refer to **INSTALLATION** .
3. Fill the rear axle with the specified fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

LEFT SIDE

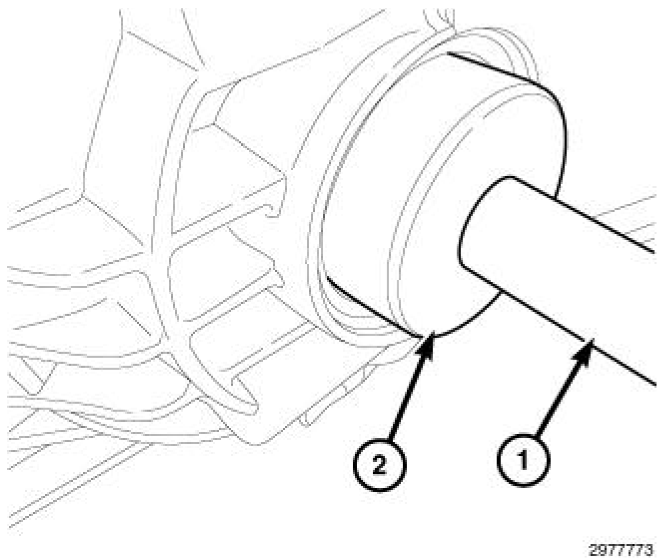


Fig. 28: Installing Axle Shaft Seal (Left)
Courtesy of CHRYSLER GROUP, LLC

1. Using the Driver Handle (special tool #C-4171, Driver Handle, Universal) (1), Drive Handle Extension (special tool #C-4171-2, Extension, Drive Handle) and the Installer (special tool #10266, Installer, Seal) (2), install a **NEW** axle seal. Lubricate the inside diameter of the axle seal with the specified axle fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
2. Install the halfshaft. Refer to **INSTALLATION** .
3. Fill the rear axle with the specified fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .

SEAL, DRIVE PINION

REMOVAL

REMOVAL

1. Remove the rear axle assembly from vehicle. Refer to **REMOVAL**.

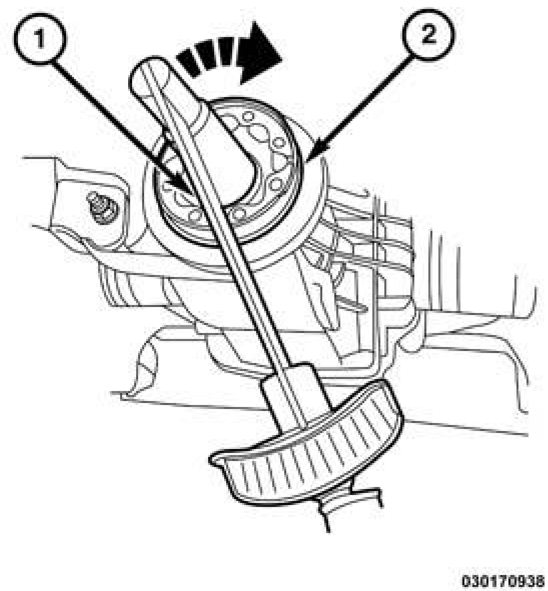


Fig. 29: Pinion Rotational Torque
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Torque reading must be taken with a constant rotational speed. Do not measure break away torque.**

2. Using a torque wrench (1), measure and record the pinion rotational torque.

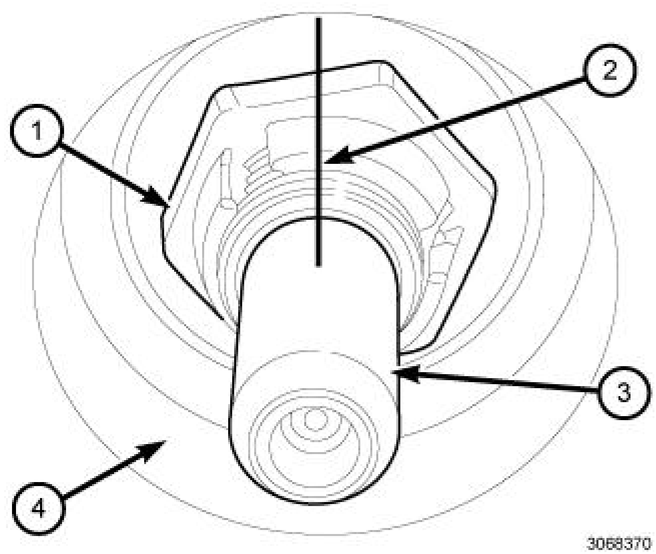


Fig. 30: Identifying Alignment Mark On Pinion Flange, Nut & Pinion Shaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Due to axle imbalance concerns and bearing preload sensitivity, it is necessary to make sure pinion nut-to-shaft orientation is maintained. If alignment marks are not visible, apply appropriate marks before removing pinion nut.**

3. Apply an alignment mark (2) on the pinion flange nut (1) to the pinion shaft (3) and the pinion flange (4).

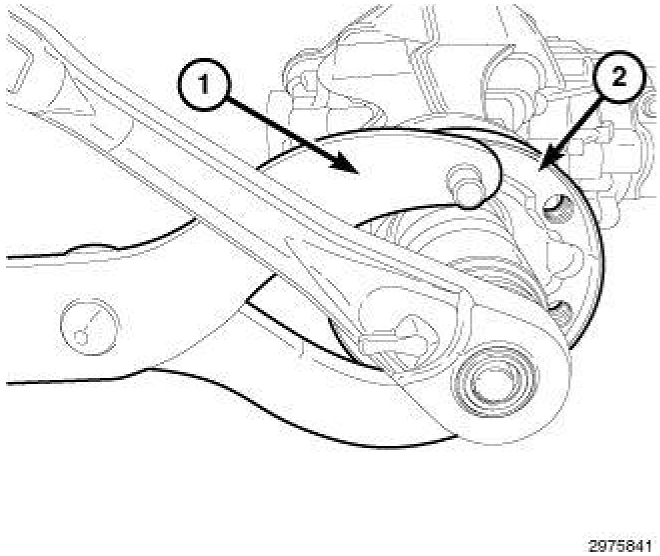


Fig. 31: Flange Wrench, Pinion Flange & Nut
Courtesy of CHRYSLER GROUP, LLC

4. Using Flange Wrench (special tool #C-3281, Holder, Flange) (1) and 32mm socket, remove the pinion flange nut.

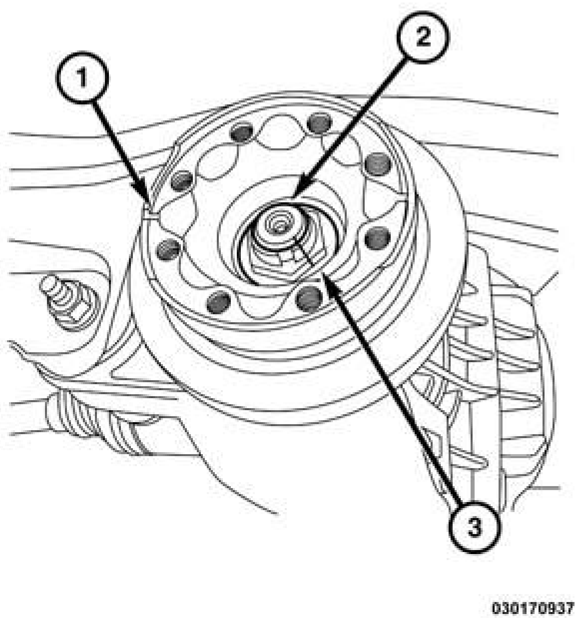


Fig. 32: Pinion Flange, Pinion Shaft & Alignment Marks
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Due to axle imbalance concerns and bearing preload sensitivity, it is necessary to make sure pinion flange-to-shaft orientation is maintained. If alignment marks are not visible, apply appropriate marks before removing pinion flange.**

5. Apply an alignment mark (3) on the pinion flange (1) to the pinion shaft (2) and should be aligned after nut has been removed.
6. Using Puller (special tool #1026, Puller), remove pinion flange from pinion shaft.

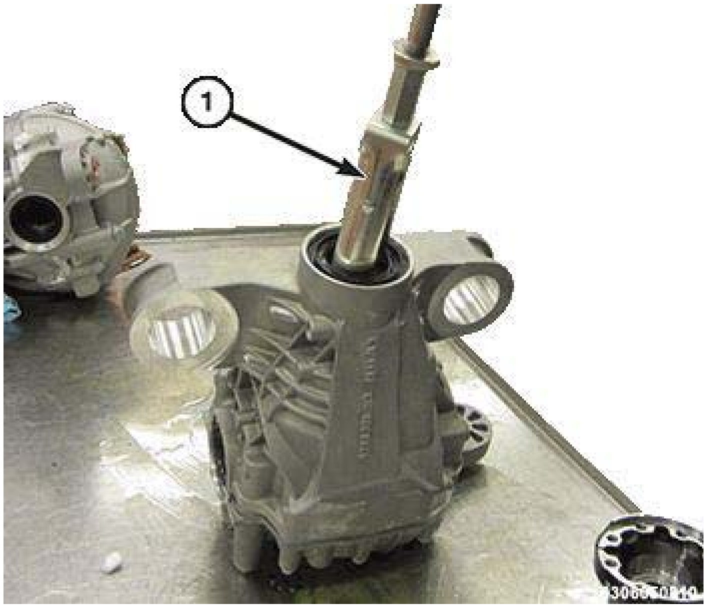


Fig. 33: Seal Remover
Courtesy of CHRYSLER GROUP, LLC

7. Using seal remover (special tool #7794-A, Remover, Seal) (1) and slide hammer (special tool #C-637, Slide Hammer, Universal), remove the pinion seal and discard.

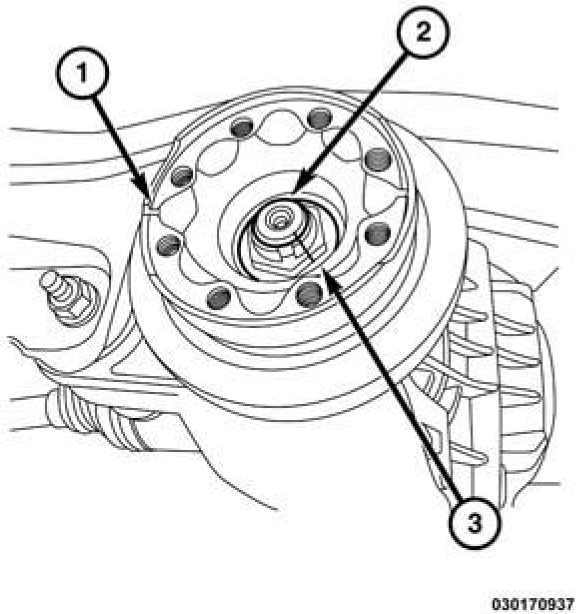
INSTALLATION

PINION SEAL

1. Clean any thread locker from pinion flange nut and the pinion shaft.
2. Apply light coating of gear lubricant to the outer diameter of the flange on the sealing surface.

[Fig. 34: Driver Handle & Seal Installer](#)
Courtesy of CHRYSLER GROUP, LLC

3. Using Driver Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #10269, Installer, Seal) (2), install the pinion seal until tool bottoms on the carrier.



[Fig. 35: Pinion Flange, Pinion Shaft & Alignment Marks](#)
Courtesy of CHRYSLER GROUP, LLC

4. Install the pinion flange into position. Align the alignment index marks (3) made during removal.
5. Using (special tool #6448A, Installer, Bearing/Gear), lightly tap on the pinion flange (1) until adequate pinion shaft threads are exposed.
6. Apply MoparÃ® Lock and Seal Adhesive Loctite 2701 to the pinion nut (2) and install the pinion flange nut. Apply axle grease to pinion nut washer face prior to assembly.

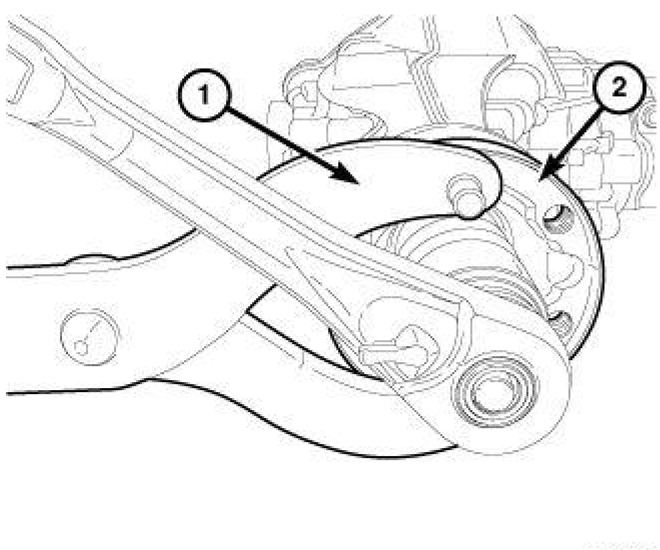


Fig. 36: Flange Wrench, Pinion Flange & Nut
Courtesy of CHRYSLER GROUP, LLC

7. Using Flange Holder (special tool #C-3281, Holder, Flange) (1) and 32mm socket tighten the pinion flange nut in small increments until the pinion nut index mark aligns with the index mark on the pinion shaft.

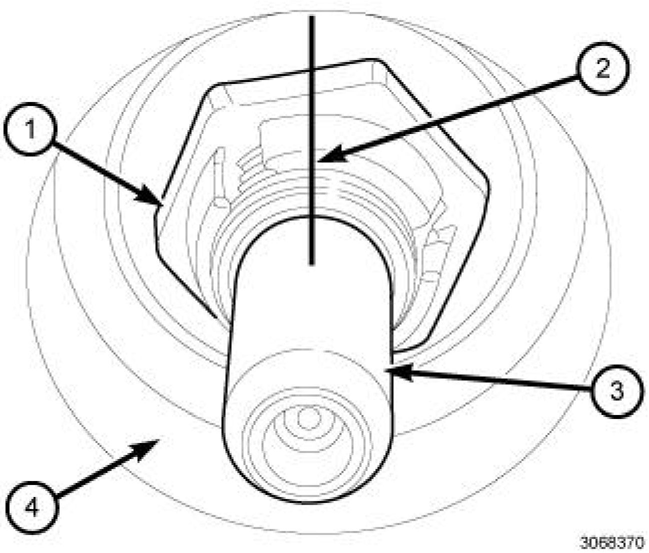


Fig. 37: Identifying Alignment Mark On Pinion Flange, Nut & Pinion Shaft
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**If the pinion nut alignment index mark exceeds the pinion shaft alignment index mark the unit must be discarded. If the pinion nut alignment index mark falls short of the pinion shaft alignment index mark the unit will possibly generate an Noise, Vibration, or Harshness (NVH) concern.**

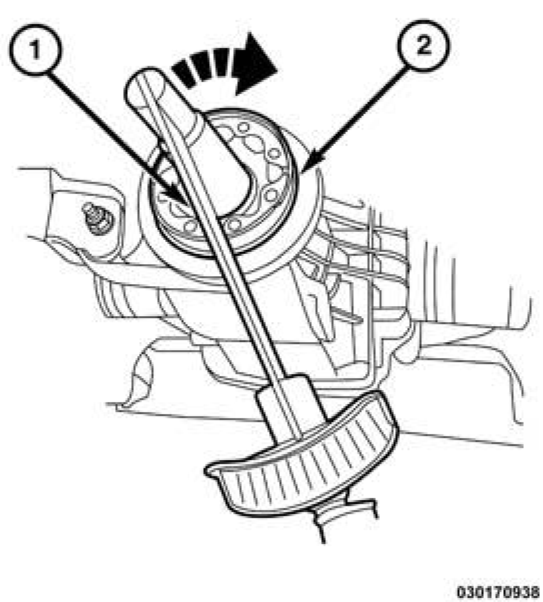


Fig. 38: Pinion Rotational Torque
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Torque reading must be taken with a constant rotational speed. Do not measure break away torque.**

8. Using a torque wrench (1), measure and record the pinion rotational torque.
9. After the torque reading has been obtained, compare the reading to the recorded reading when removing the pinion flange. The difference in the reading should be within 0 Ā± 0.2 N.m (0 Ā± 1.7 in. lbs.). Value after repair should be higher due to tighter fit of the new pinion seal.
10. Install the rear axle assembly. Refer to **INSTALLATION** .

BUSHING, FRONT

REMOVAL

FRONT BUSHING

1. Remove rear axle from vehicle. Refer to **REMOVAL**.

NOTE: **195RIA axle bushing shown in illustration. 230RIA axle bushing uses the same procedure.**

NOTE: **Right Hand (RH) side shown in illustration, Left Hand (LH) similar.**

NOTE: **Take note of the bushing inner metal orientation prior to bushing removal, the replacement bushing metal must be installed in the same exact orientation.**

2. Secure the rear axle in a vice.

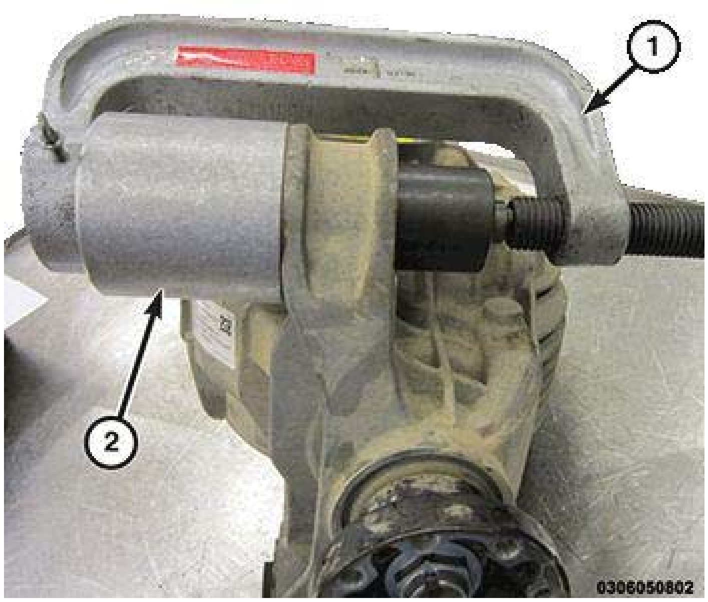


Fig. 39: Ball Joint Installer & Receiver Cup
Courtesy of CHRYSLER GROUP, LLC

3. Using (special tool #6289A, Installer, Ball Joint) (1) and (special tool #8405-1, Cup, Receiver) (2) remove the front bushing from the rear axle.

INSTALLATION

FRONT BUSHING

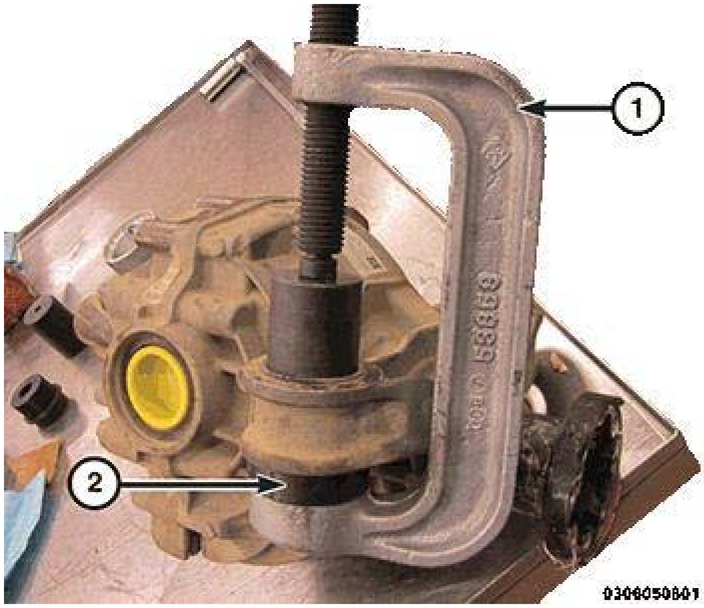


Fig. 40: Ball Joint Installer & Ball Joint Remover
Courtesy of CHRYSLER GROUP, LLC

NOTE: **195RIA axle bushing shown in illustration. 230RIA axle bushing uses the same procedure.**

NOTE: **Make sure the bushing inner metal orientation notches are in the same exact orientation as the original removed bushing inner metal.**

1. Install a **NEW** bushing in the rear axle using (special tool #10106-3, Remover, Ball Joint) (2) and (special tool #6289A, Installer, Ball Joint) (1).
2. Install the rear axle assembly. Refer to **INSTALLATION**.

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Article GUID: A00735943

2015-16 SUSPENSION

Rear Suspension - Challenger

DESCRIPTION

NON SRT

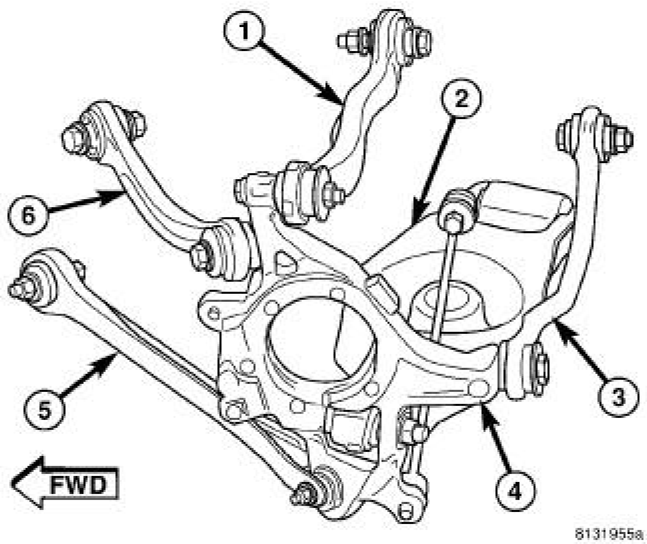


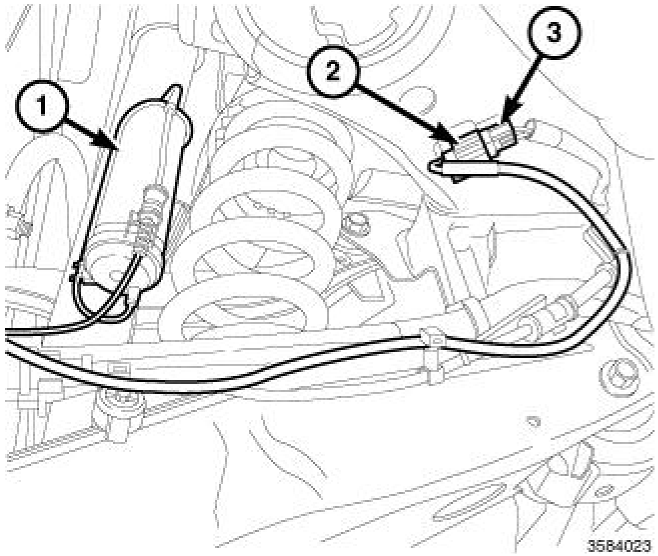
Fig. 1: Rear Suspension Components
Courtesy of CHRYSLER GROUP, LLC

This vehicle utilizes a five-link rear suspension including the following major components:

- Camber Link (1)
- Compression Link (5)
- Spring Link (2)
- Tension Link (6)
- Toe Link (3)
- Coil Spring
- Crossmember
- Hub And Bearing
- Knuckle (4)
- Shock Absorber
- Stabilizer Bar

Service Procedures for the crossmember can be found in Frame And Bumpers. Refer to **CROSSMEMBER, REAR, REMOVAL** and **CROSSMEMBER, TRANSMISSION, REMOVAL** .

SRT



[Fig. 2: Shock Solenoid Assembly & ADS Harness Connector]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Left side shown in the illustration, right side similar.**

The SRT rear suspension is part of an Active Damping System (ADS). The ADS includes unique shock absorbers, an Active Damping Control Module (ADCM), and three accelerometers that work together to modify the ride of the suspension over varying road conditions.

The Active Damping System (ADS) rear shock is similar to a conventional shock with the addition of a shock solenoid assembly (1) mounted on the side of its body with a three wire harness connector attached to it. The ADS shock assembly is serviced the same as a conventional shock absorber, with the addition of disconnecting the ADS harness connector (2) on the crossmember.

Service of all other rear suspension components remain the same as the standard components. When components differ, be sure to use only SRT components on SRT vehicles.

The rear knuckle for the SRT is different from the standard knuckle. Although similar in appearance and in service, the mounting bosses for the disc brake caliper have been moved downward to allow mounting of the Brembo four-piston brake caliper. Due to this change, an updated special tool is needed to remove the sleeve that retains the lower control arm ball joint to the knuckle.

The rear stabilizer bar diameter has been increased for the SRT but it is serviced in the same manner as the standard bar.

SPECIFICATIONS

TORQUE SPECIFICATIONS

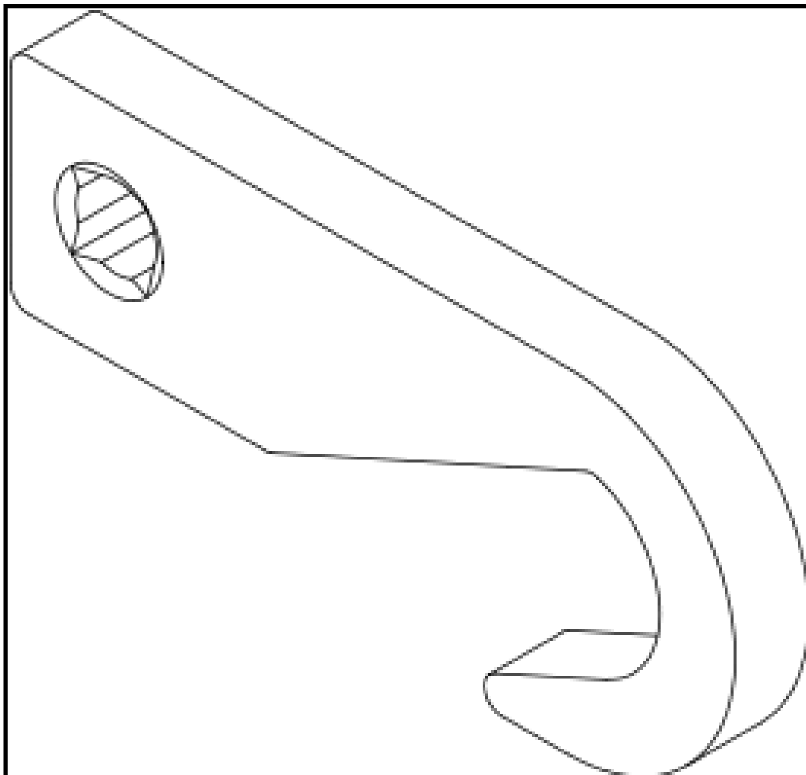
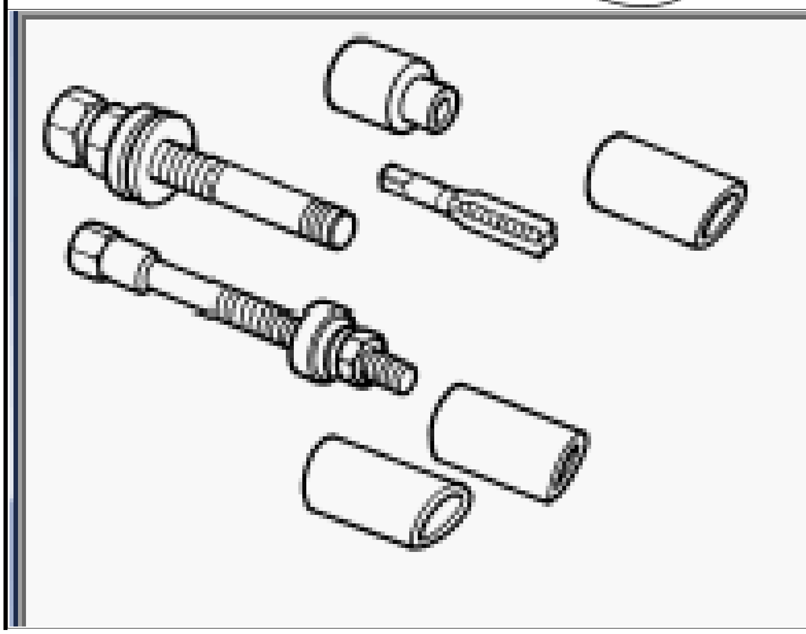
TORQUE SPECIFICATIONS

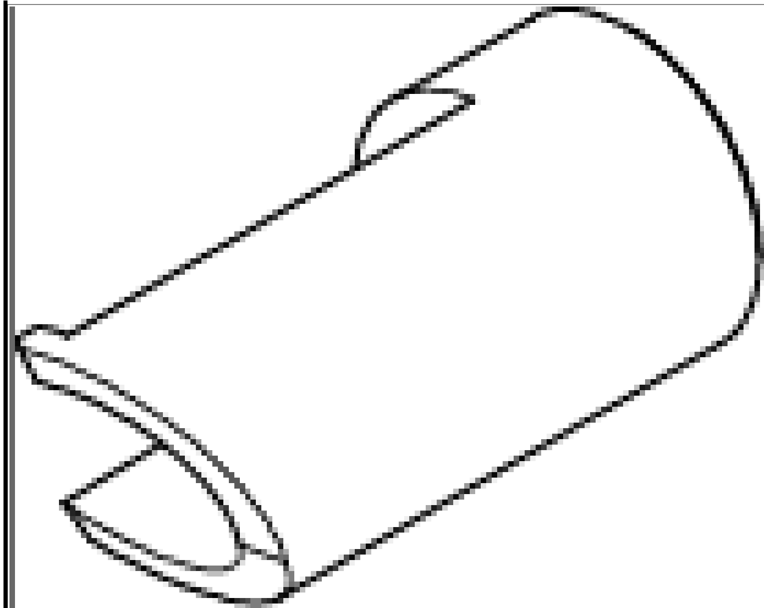
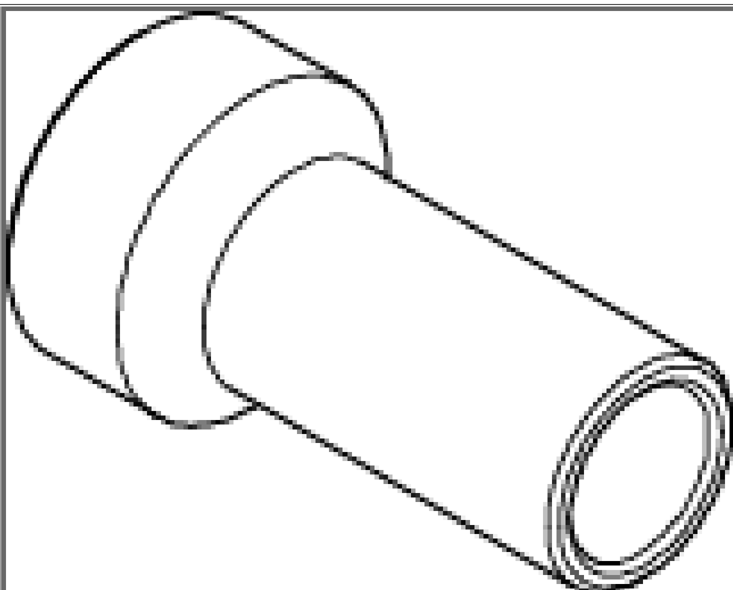
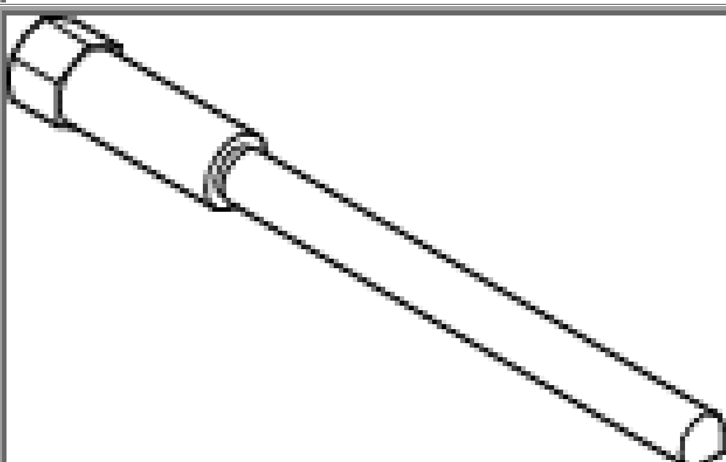
DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	* NEW FASTENER
Camber Link to Crossmember Bolt	98	72	-	Ā

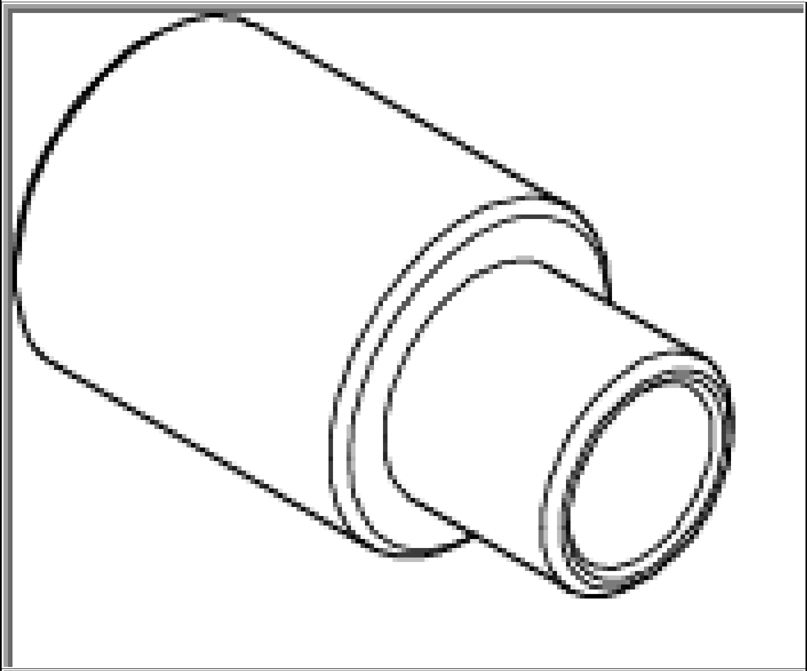
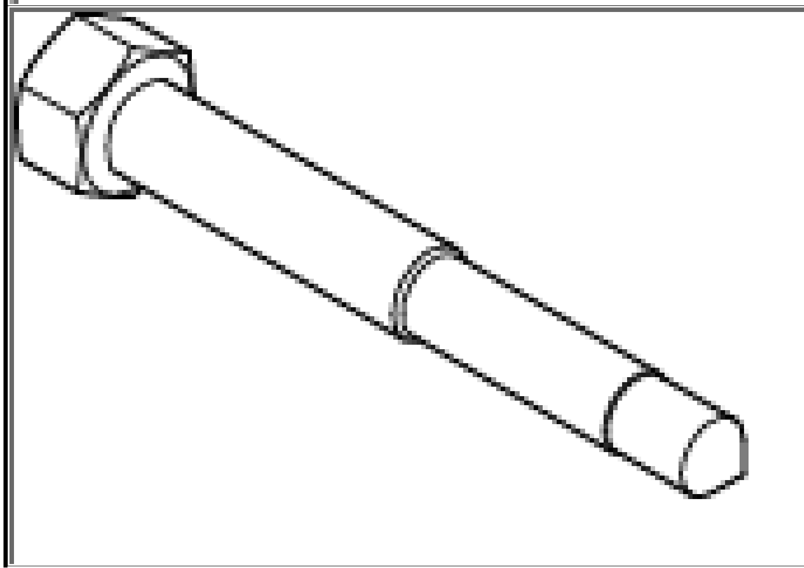
DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	* NEW FASTENER
Camber Link to Knuckle Bolt	98	72	-	Ā
Compression Link to Crossmember Bolt	98	72	-	Ā
Compression Link to Knuckle Bolt	98	72	-	Ā
Hub And Bearing Bolts	60	44	-	Ā
Hub Nut	230	170	-	Ā
Shock Absorber Upper Bolts	63	46	-	Ā
Shock Absorber Lower Bolt	130	96	-	Ā
Shock Rod to Shock Mount Nut	24	18	-	Ā
Spring Link to Crossmember Bolt	110	81	-	Ā
Spring Link to Knuckle Bolt	142	105	-	Ā
Stabilizer Bar Bushing Bolts	61	45	-	Ā
Stabilizer Link to Knuckle Bolt	61	45	-	Ā
Stabilizer Link to Stabilizer Bar Bolt	61	45	-	Ā
Tension Link to Crossmember Bolt	98	72	-	Ā
Tension Link to Knuckle Bolt	98	72	-	Ā
Toe Link to Crossmember Nut	90	66	-	Ā
Toe Link to Knuckle Bolt	95	70	-	Ā
Wheel Speed Sensor Bolt	11	-	97	Ā
* New Fastener: Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

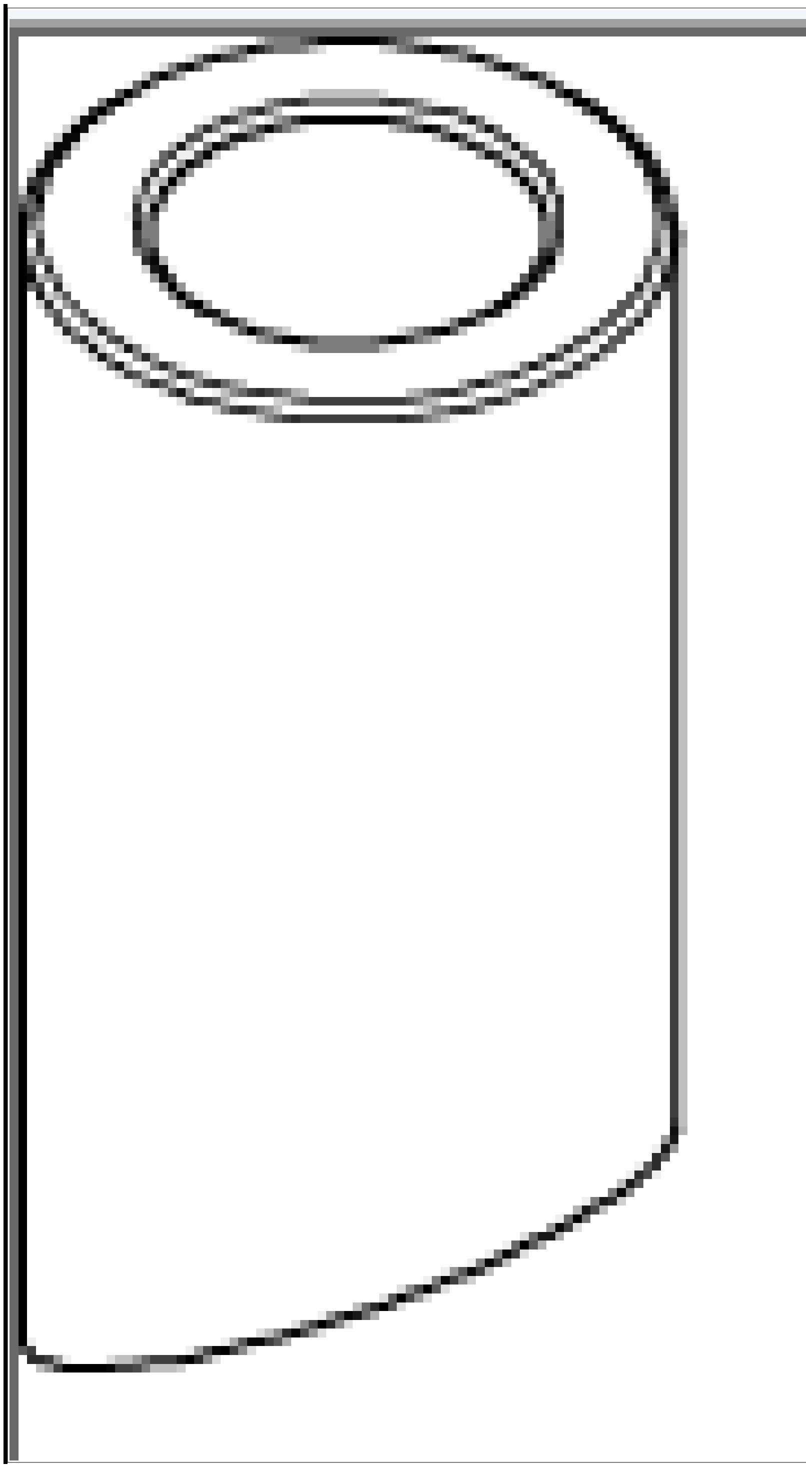
SPECIAL TOOLS

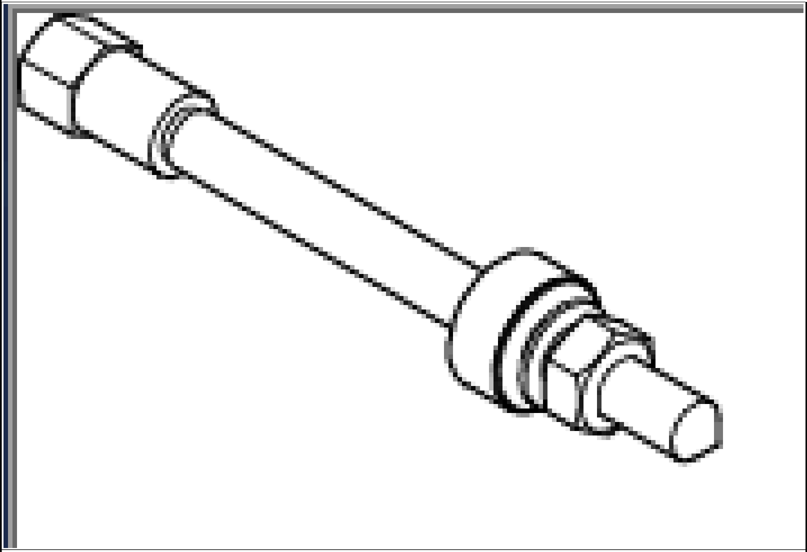
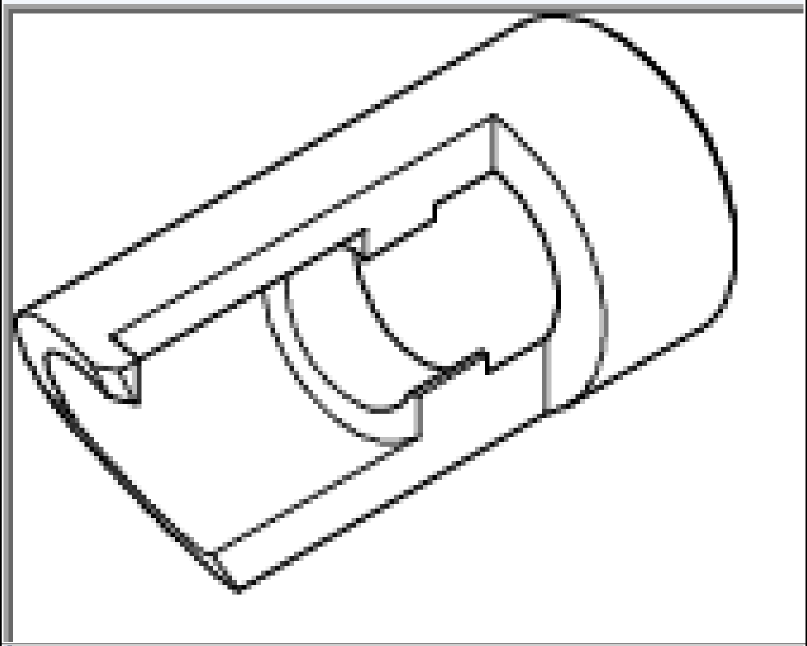
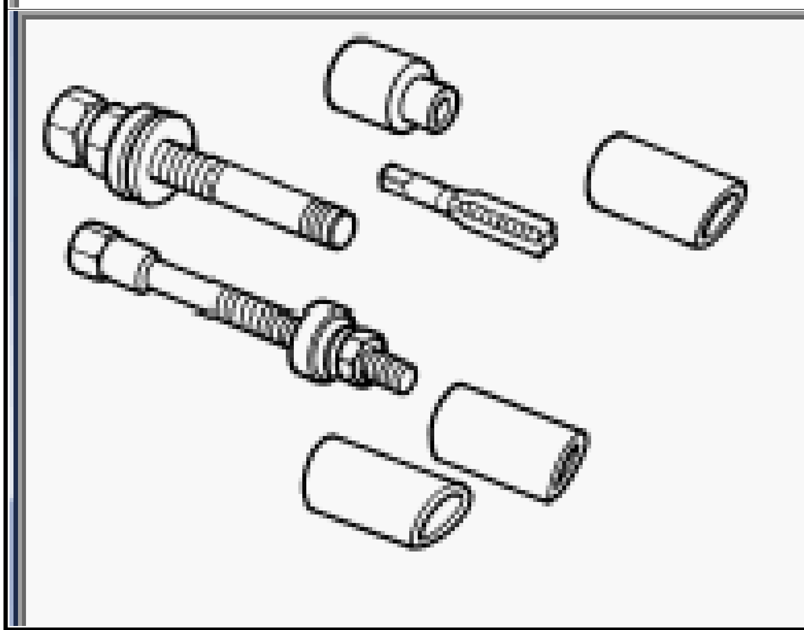
SPECIAL TOOLS

	10417-1 - Holder, EPS Steering Rack (Originally Shipped In Kit Number(s).)
	9361-1 - Tap, Plug M16 X 2.0

	9361-10 - Cup, Remover, Right Side
	9361-11 - Guide, Tap
	9361-12 - Installer, Bushing

	9361-2 - Tap Guide
	9361-3 - Screw, Forcing

	9361-4 - Cup, Bushing

	9361-7 - Screw, Installation
	9361-9 - Cup, Remover, Left Side
	9361A - Rear Knuckle Sleeve Remover/Installer Kit (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)

HUB AND BEARING

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HUB BEARING - NOISE

NOTE: **The wheel bearing is designed to last for the life of the vehicle and requires no type of periodic maintenance. If it becomes necessary to replace a faulty bearing, do not replace in pairs unless parts service information specifically states to do so.**

Bearings will produce noise if worn or damaged. The noise will generally change when the bearings are loaded. A road test of the vehicle is normally required to determine if there is a bearing noise, or if it is some other component. To assist in finding the location, the following procedure, together with the **DIAGNOSTIC TABLE** , should help determine if a bearing is causing the noise, and if so which one. Keep in mind that bearing noises are not typically intermittent. If a particular vehicle road test maneuver results in noise only part of the time, it is not likely a faulty bearing.

NOTE: **Damaged bearing seals and the resulting excessive grease loss may also require bearing replacement. Moderate grease seepage from the bearing is considered normal and should not require replacement of the wheel bearing. To diagnose the hub, measure hub runout. Refer to ROTOR, BRAKE, DIAGNOSIS AND TESTING .**

DIAGNOSTIC PROCEDURE:

1. Perform a drive evaluation. Find a smooth level road surface void of traffic or obstructions. Turn off any accessories which may cause background noise. Evaluate for noise at 50 km/h (30 mph) and 100 km/h (60 mph) and with vehicle in neutral to eliminate potential drivetrain noises. With vehicle at a constant speed, steer back and forth to left and right. This will load and unload the bearings and may change the noise level. When bearing damage is slight, the noise is sometimes noticeable at lower speeds and at other times is more noticeable at higher speeds.
2. Drive evaluation results: Did the noise increase when turning right which may indicate a problem with the left bearing? Did the noise increase when turning left which may indicate a problem with the right bearing?
3. Put vehicle up on hoist. Grab the tire by pushing in on the top center and pulling out on the bottom center to check for excessive movement in the bearing.
4. Check for potential rubbing on rotating components, such as rotor splash shields, heat shields touching propshaft or halfshaft, wheel well liners contacting tire, wheel cover on wheel, etc. Any cyclic noise (once per wheel revolution for example) is not a wheel bearing fault.
5. Remove the wheel and tire assembly, disc brake caliper and brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .
6. Rotate the wheel hub, checking for resistance or roughness.
7. Any roughness or resistance to rotation may indicate dirt intrusion or a failed hub bearing. If the bearing exhibits any of these conditions, the hub & bearing will require replacement. Do not attempt to disassemble the bearing for repair.
8. Rotate the wheel hub, utilize Chassis Ears (or stethoscope) to check for noise.
9. If none of the above checks indicate a bearing failure, refer to the **DIAGNOSTIC TABLE** for other possible causes.

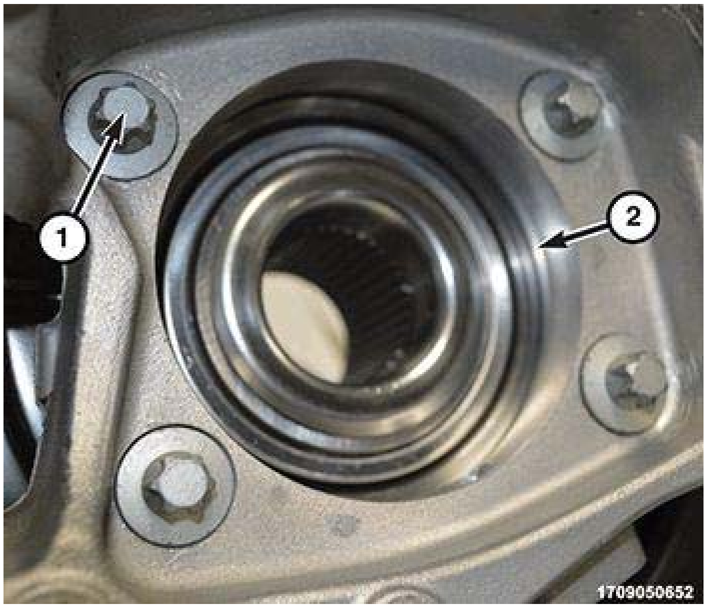
DIAGNOSTIC TABLE - HUB BEARING

CONDITION	POSSIBLE CAUSES	POTENTIAL CORRECTIONS
FRONT END WHINE ON TURNS	1. Low Power Steering Fluid Level (if applicable)	1. Fill power steering fluid reservoir to proper level, check for leaks (make sure all air is bled from system fluid)
	2. Worn Tires and/or Incorrect Wheel Alignment	2. Replace Tires, Check And Reset Wheel Alignment
	3. Defective Wheel Bearing	3. Replace Wheel Bearing
	4. Wrong Power Steering Fluid (if applicable)	4. Replace With Correct Power Steering Fluid
FRONT END GROWL OR GRINDING ON TURNS	1. Loose Wheel Lug Nuts	1. Verify Wheel Lug Nut Torque
	2. Engine Mount Grounding Against Frame Or Body Of Vehicle	2. Check For Engine Mount Hitting Frame Rail And Reposition Engine As Required
	3. Worn Tires and/or Incorrect Wheel Alignment	3. Replace Tires, Check and Reset Wheel Alignment
	4. Defective Wheel Bearing	4. Replace Wheel Bearing
	5. Worn or Broken C/V Joint	5. Replace C/V Joint
	6. Engine Not Centered, Causing Axle Half Shaft to Bottom Out	6. Center the Engine
POPPING/CLICKING/SNAPPING DURING ACCELERATION AFTER DRIVE-TO-REVERSE SHIFT, REVERSE-TO-DRIVE SHIFT OR WHILE TURNING	1. Insufficient Hub Nut Torque	1. Torque Hub Nut to Spec
	2. Insufficient Grease on Mating Surface of Axle Half Shaft Outer C/V Joint to Wheel Hub/Bearing, or Worn/Damaged Gasket	2. Separate Half Shaft From Hub and Bearing and Wipe Mating Surfaces Clean. Apply Light Coating of Wheel Bearing Grease to C/V Joint Surface and Reassemble, or Replace Gasket. Torque Hub Nut to Spec
WHINE/HUM/ROAR WITH VEHICLE GOING STRAIGHT AT A CONSTANT SPEED	1. Worn Tires and/or Incorrect Wheel Alignment	1. Replace Tires and Reset Wheel Alignment
	2. Defective Wheel Bearing	2. Replace Wheel Bearing
GROWL OR GRINDING WITH VEHICLE GOING STRAIGHT AT A CONSTANT SPEED	1. Engine Mount Grinding Against Frame or Body	1. Check and Reposition Engine as Required
	2. Defective Wheel Bearing	2. Replace Wheel Bearing
	3. Worn or Broken C/V Joint	3. Replace C/V Joint

REMOVAL

REMOVAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .
3. Remove the rear knuckle. Refer to **KNUCKLE, REAR, REMOVAL**.

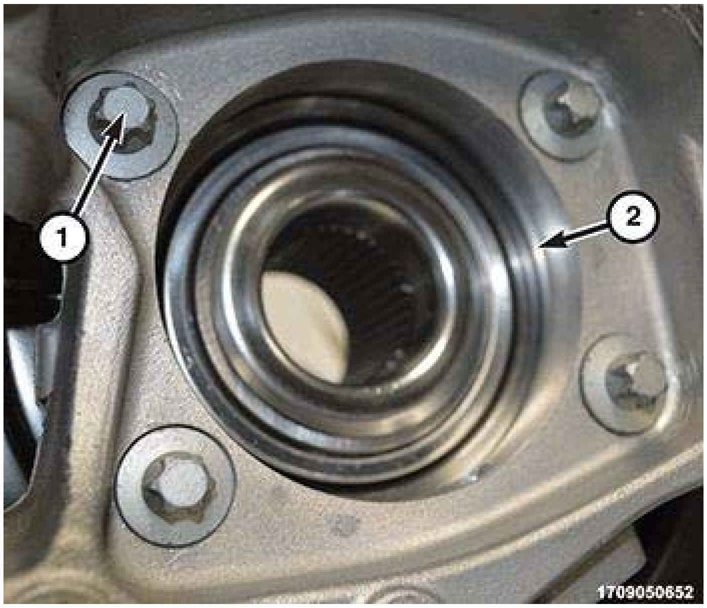


[Fig. 3: Hub, Bearing & Bolts]
Courtesy of CHRYSLER GROUP, LLC

4. Remove the four hub and bearing bolts (1).
5. Separate the hub and bearing (2) from the knuckle.

INSTALLATION

INSTALLATION



[Fig. 4: Hub, Bearing & Bolts]
Courtesy of CHRYSLER GROUP, LLC

1. Slide the hub and bearing (2) into the knuckle and position the hub and bearing to the mounting holes.
2. Install the four hub and bearing bolts (1). Tighten to the proper torque specification. Refer to SPECIFICATIONS.

3. Install the knuckle. Refer to **KNUCKLE, REAR, INSTALLATION**.
4. Verify proper adjustment of the parking brake shoes and adjust as necessary. Refer to **SHOES, PARKING BRAKE, ADJUSTMENTS** .
5. Install tire and wheel assembly. Refer to **INSTALLATION** .
6. Remove the support and lower the vehicle.

KNUCKLE, REAR

REMOVAL

REMOVAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

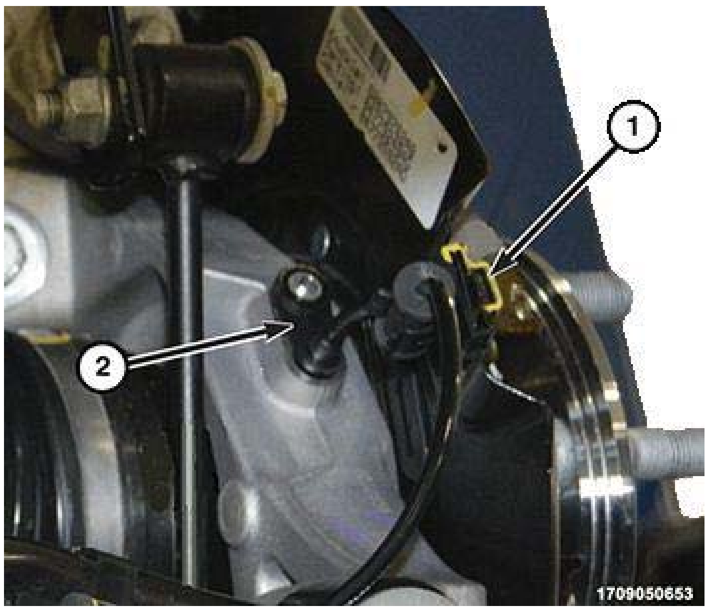


Fig. 5: Wheel Speed Sensor Connector & Knuckle
Courtesy of CHRYSLER GROUP, LLC

3. Detach the wheel speed sensor connector from the brake splash shield (1) and remove the wheel speed sensor bolt, then separate the wheel speed sensor from the knuckle (2).
4. Remove the brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .
5. Remove the parking brake shoes. Refer to **SHOES, PARKING BRAKE, REMOVAL** .

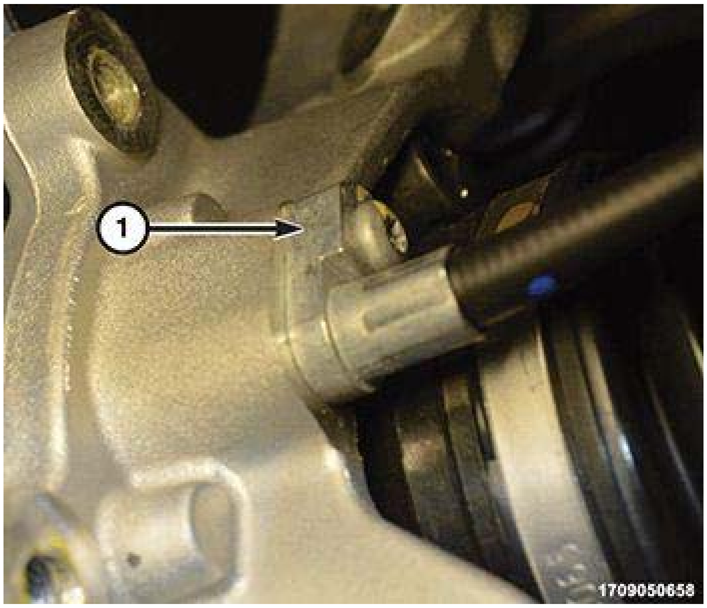


Fig. 6: Parking Brake Cable
Courtesy of CHRYSLER GROUP, LLC

6. Remove the parking brake cable (1) from the knuckle.
7. Position a suitable jack under the spring link. Raise the jack head to contact the spring link at the shock mount and secure in place.

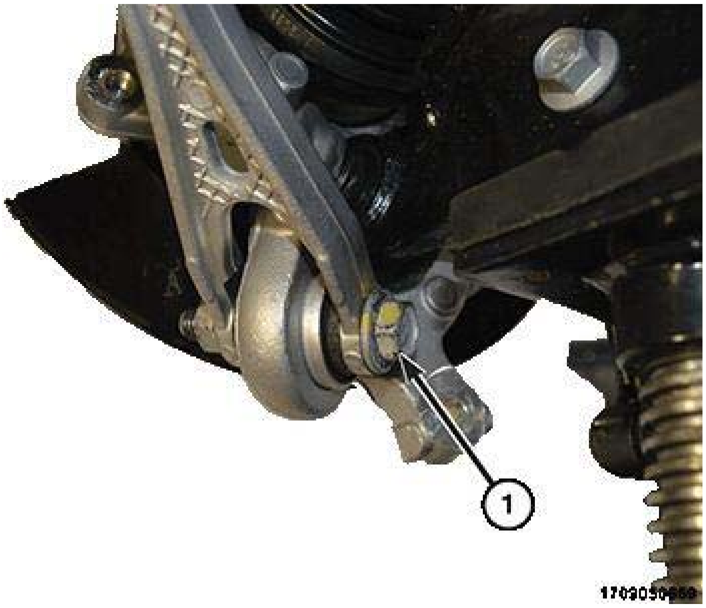
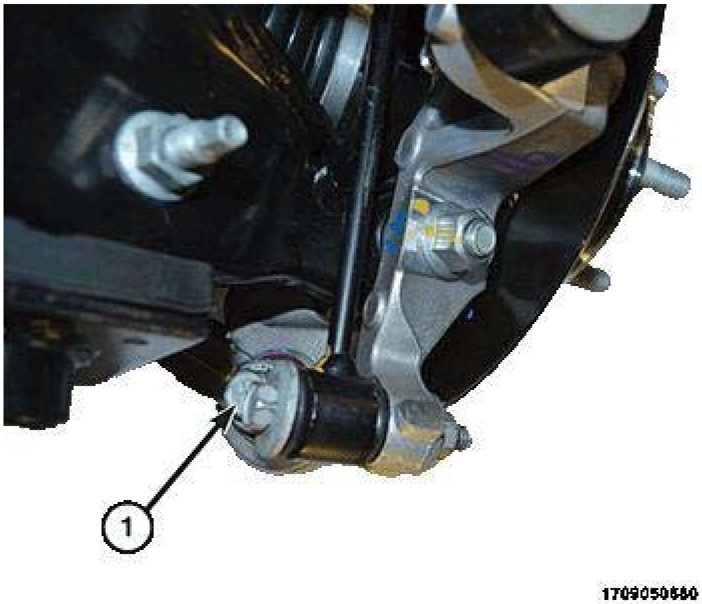


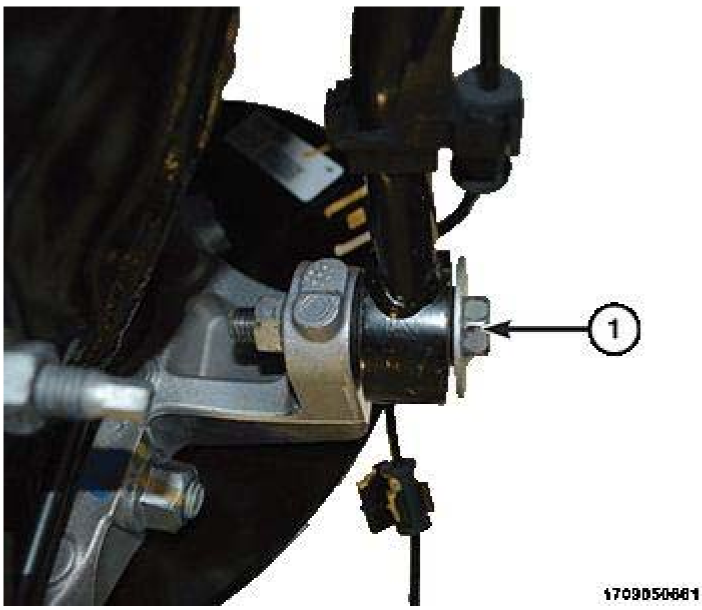
Fig. 7: Compression Link To Knuckle Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Remove the compression link to knuckle bolt (1).



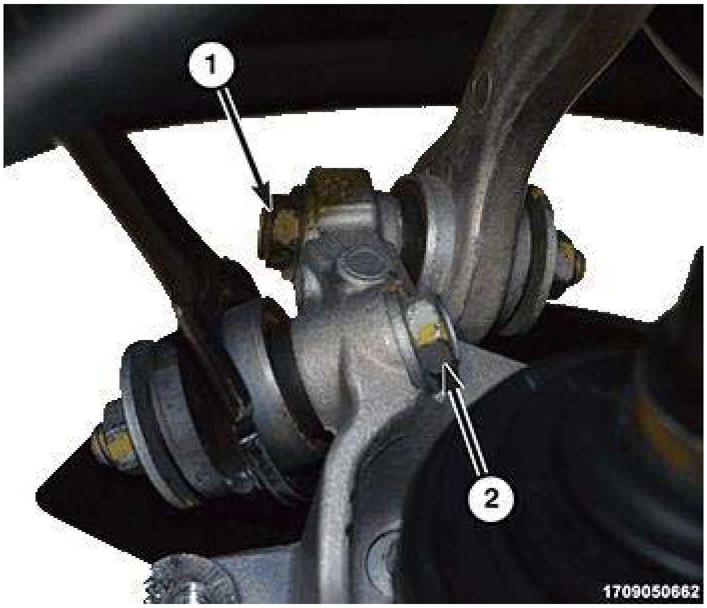
[Fig. 8: Stabilizer Link To Knuckle Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

9. Remove the stabilizer link to knuckle bolt (1).



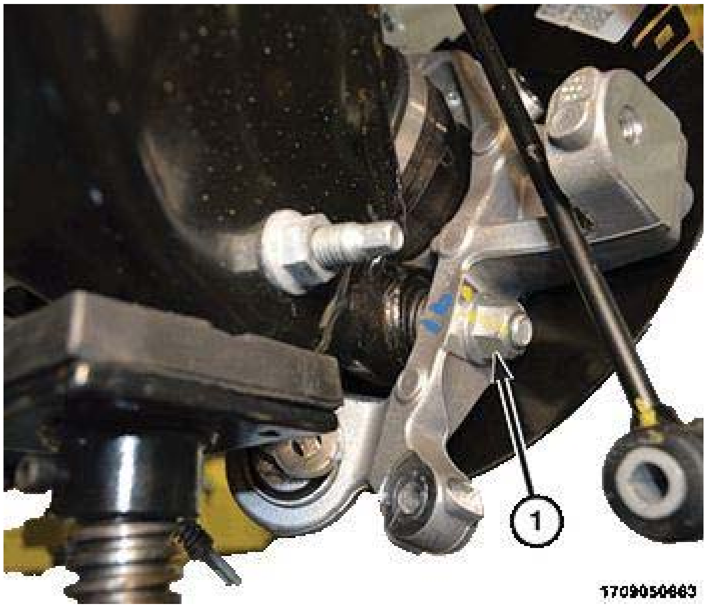
[Fig. 9: Toe Link To Knuckle Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

10. Remove the toe link to knuckle bolt (1).



[**Fig. 10: Camber Link Bolt & Tension Link Bolt**]
Courtesy of CHRYSLER GROUP, LLC

11. Remove the camber link (1) and the tension link (2) to knuckle bolts.



[**Fig. 11: Spring Link Bolt**]
Courtesy of CHRYSLER GROUP, LLC

12. Remove the spring link (1) bolt.
13. Remove the knuckle.

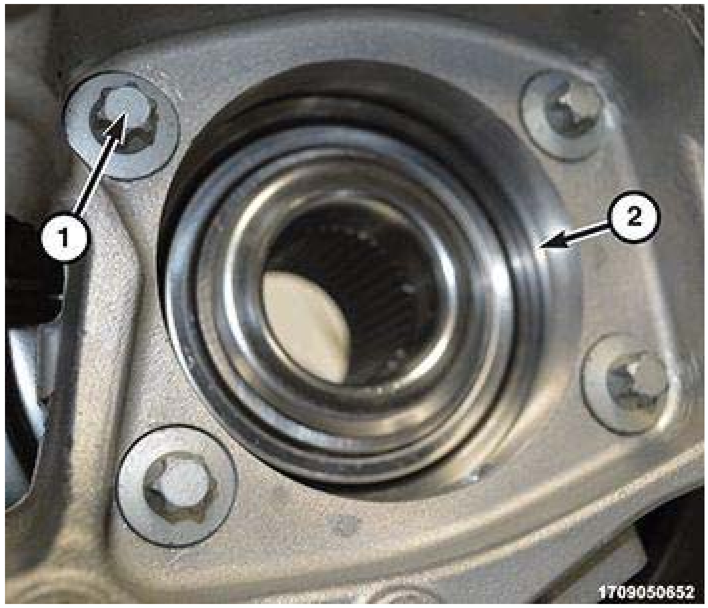


Fig. 12: Hub, Bearing & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Remove bolts (1) and separate the hub and bearing from the knuckle (2).
15. Remove the brake splash shield.
16. If necessary, remove the knuckle lower bushing as follows:

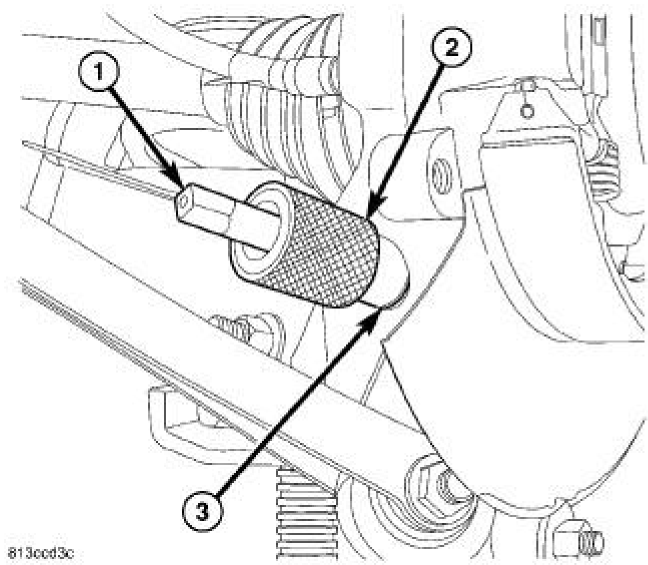


Fig. 13: Using Tap & Guide
Courtesy of CHRYSLER GROUP, LLC

NOTE: **It important to use (2), when tapping sleeve in knuckle to help keep (1), straight during use or damage to Tap may occur.**

17. Place (special tool #9361-2, Tap Guide) (2) against sleeve (3) in knuckle to keep (special tool #9361-1, Tap, Plug M16 X 2.0) (1) straight. Using Tap with an appropriate handle, cut threads approximately halfway through bushing (or about six complete threads). **It is important to back tap out, clean out**

burrs and lubricate Tap often during process.

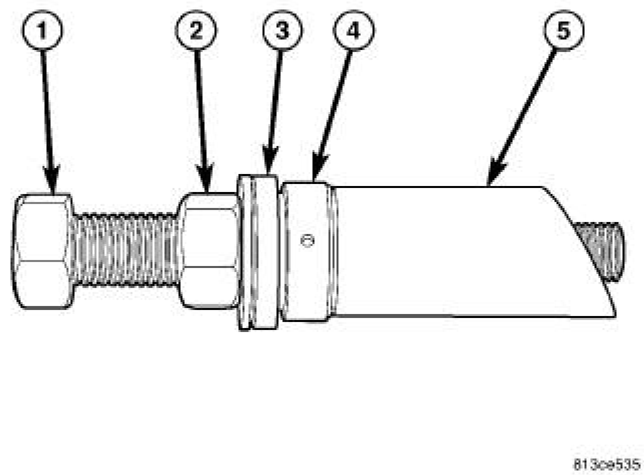


Fig. 14: Rear Knuckle Sleeve Remover/Installer
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**Prior to using (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit), lubricate bolt (1) threads to provide ease of use and promote tool longevity.**

NOTE:	**When installing thrust bearing on remover, be sure to place hardened side against nut. Place bearing outer cage against stationary component.**

18. Assemble (special tool #9361A, Rear Knuckle Sleeve Remover/Installer Kit) as shown in the illustration.
    - (1) (special tool #9361-3, Screw, Forcing)
    - (2) Nut
    - (3) Spherical Washer
    - (4) Thrust Bearing
    - (5) (special tool #9361-4, Cup, Bushing)

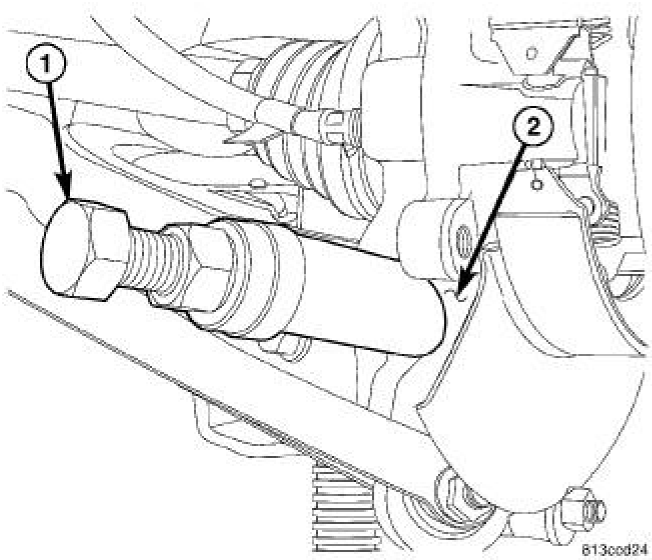


Fig. 15: Bolt & Tapped Knuckle Sleeve
Courtesy of CHRYSLER GROUP, LLC

19. Thread (special tool #9361-3, Screw, Forcing) (1) into tapped knuckle sleeve.
20. Tighten the nut down, matching Sleeve angled end with angled face of the knuckle.
21. Continue to tighten nut until knuckle sleeve is removed from the knuckle. **Discard knuckle sleeve.**

INSTALLATION

INSTALLATION

1. If necessary, install a new knuckle lower bushing as follows:

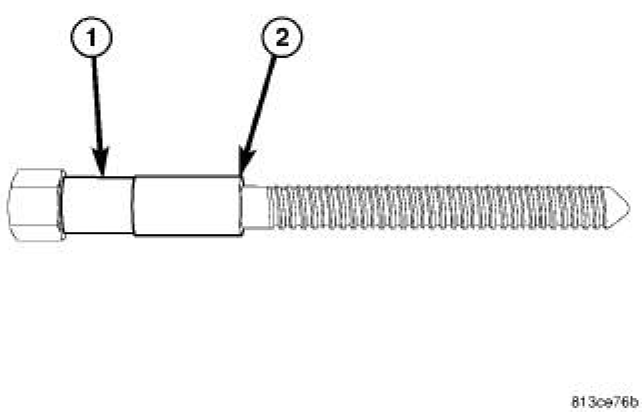


Fig. 16: Rear Knuckle Sleeve Installer
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Prior to using the Tool (special tool #9361A, Rear Knuckle Sleeve**

Remover/Installer Kit), lubricate the bolt (1) threads to provide ease of use and promote tool longevity.

2. Place the new knuckle sleeve (2) onto (special tool #9361-7, Screw, Installation) (1), and slide it up to bolt's head.
3. Starting from knuckle forward end, slide (special tool #9361-7, Screw, Installation) (1) with sleeve through knuckle.
4. Install the thrust bearing and nut. **When installing thrust bearing on Installer, make sure to install the hardened side against nut. Place bearing outer cage against stationary component.**
5. Using hand tools, hold the bolt head (1) stationary, then rotate nut to install sleeve in the knuckle. Install sleeve until nut stops turning. **Do not overtighten Nut.**
6. Remove the special tool.

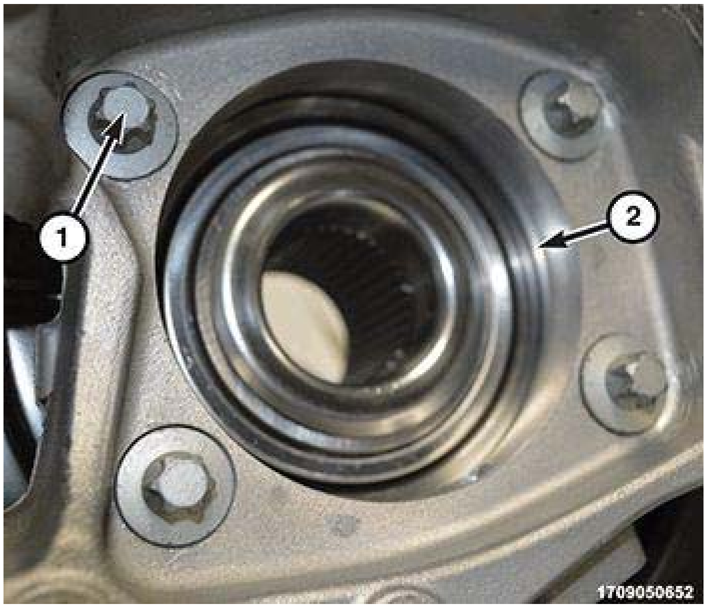
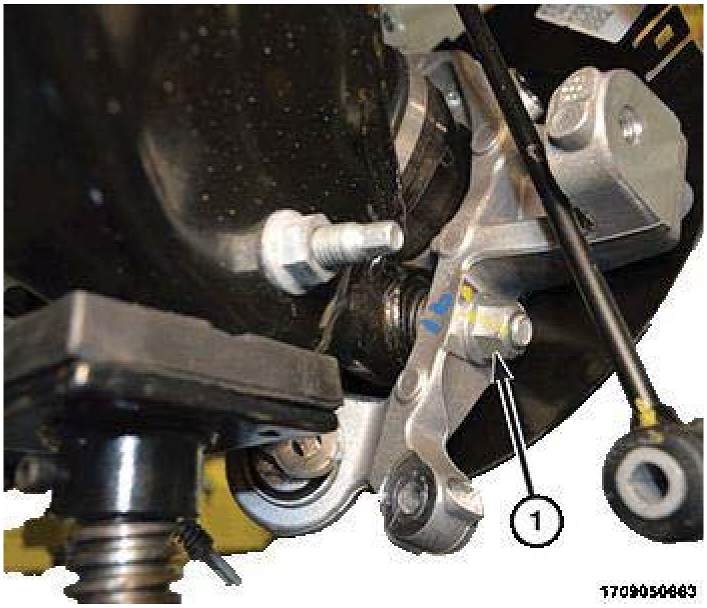


Fig. 17: Hub, Bearing & Bolts
Courtesy of CHRYSLER GROUP, LLC

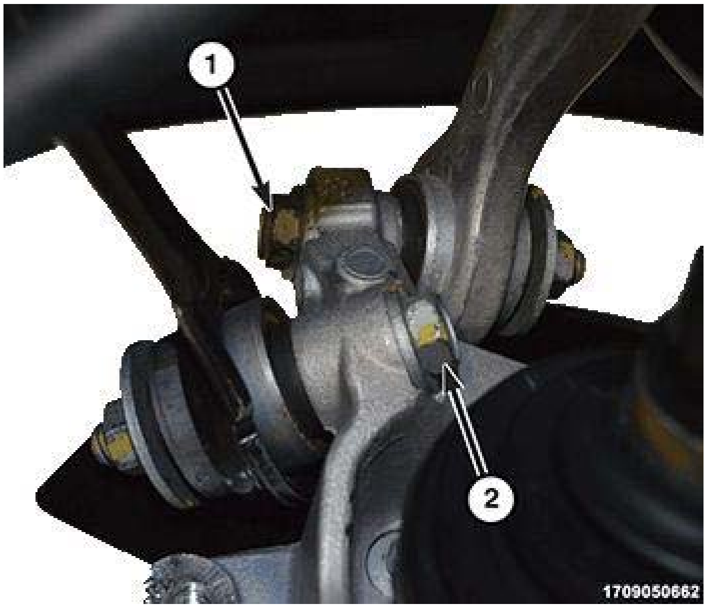
7. Install the brake splash shield and hub bearing (2) in the knuckle and install the hub and bearing bolts (1). Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.



[Fig. 18: Spring Link Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

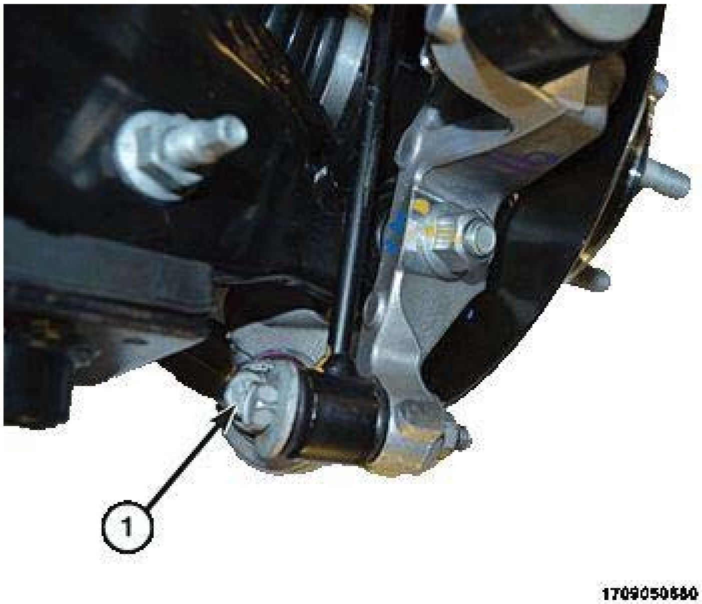
8. Position the knuckle on the vehicle and install the spring link bolt (1). **Do not tighten bolt at this time.**

NOTE: **Using a suitable tool, move the knuckle lower bushing inward to ease installation of the spring link onto the knuckle.**



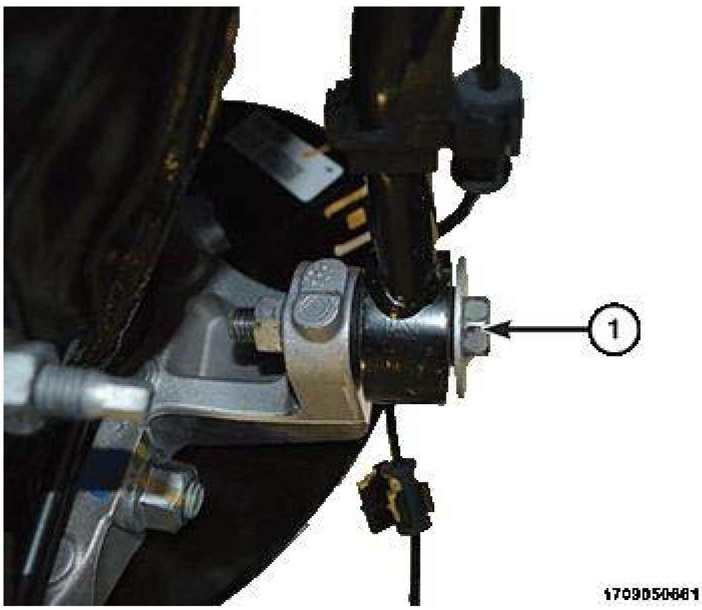
[Fig. 19: Camber Link Bolt & Tension Link Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

9. Install the tension link (2) and the camber link (1) to knuckle bolts **Do not tighten bolt at this time.**



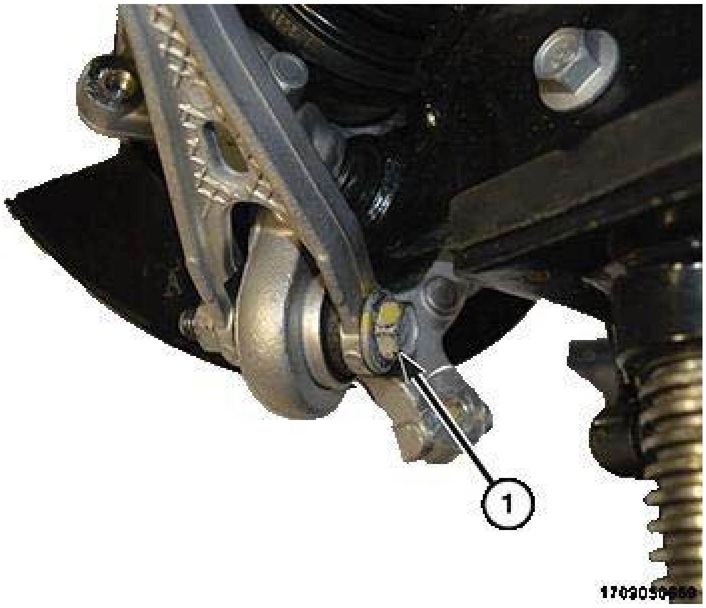
[Fig. 20: Stabilizer Link To Knuckle Bolt]
Courtesy of CHRYSLER GROUP, LLC

10. Install the stabilizer link to the knuckle bolt (1). **Do not tighten bolt at this time.**



[Fig. 21: Toe Link To Knuckle Bolt]
Courtesy of CHRYSLER GROUP, LLC

11. Install the toe link (1) to knuckle bolt. **Do not tighten bolt at this time.**



[**Fig. 22: Compression Link To Knuckle Bolt**]
Courtesy of CHRYSLER GROUP, LLC

12. Install the compression link to the knuckle bolt (1). **Do not tighten bolt at this time.**

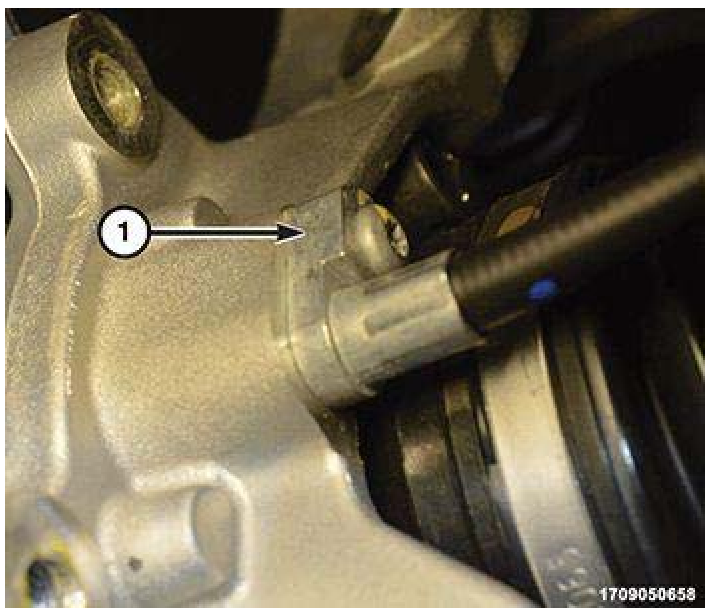


Fig. 23: Parking Brake Cable
Courtesy of CHRYSLER GROUP, LLC

13. Insert end of parking brake cable (1) into the knuckle and install the parking brake cable bolt. Tighten the parking brake cable bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
14. Install the parking brake shoes. Refer to **SHOES, PARKING BRAKE, INSTALLATION** .

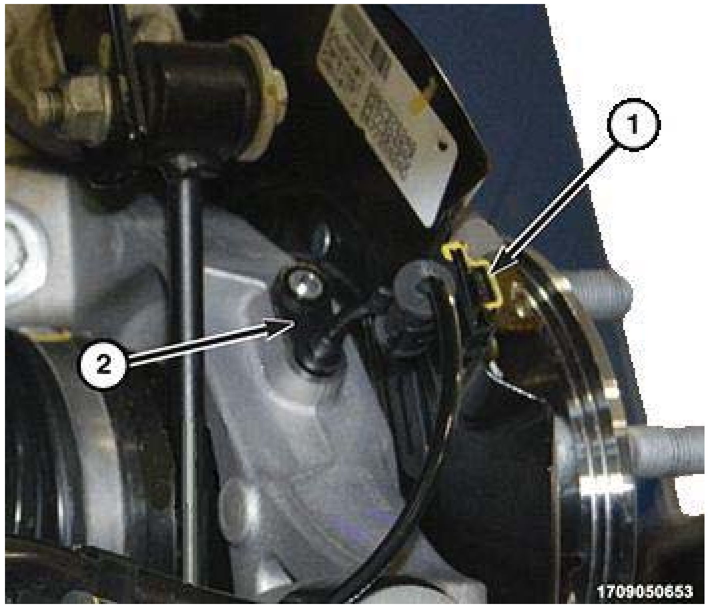


Fig. 24: Wheel Speed Sensor Connector & Knuckle
Courtesy of CHRYSLER GROUP, LLC

15. Attach the wheel speed sensor connector (1) onto the brake splash shield. Install the wheel speed sensor into the knuckle (2), then install the wheel speed sensor bolt. Tighten the wheel speed sensor bolt to proper torque specification. Refer to **SPECIFICATIONS**.

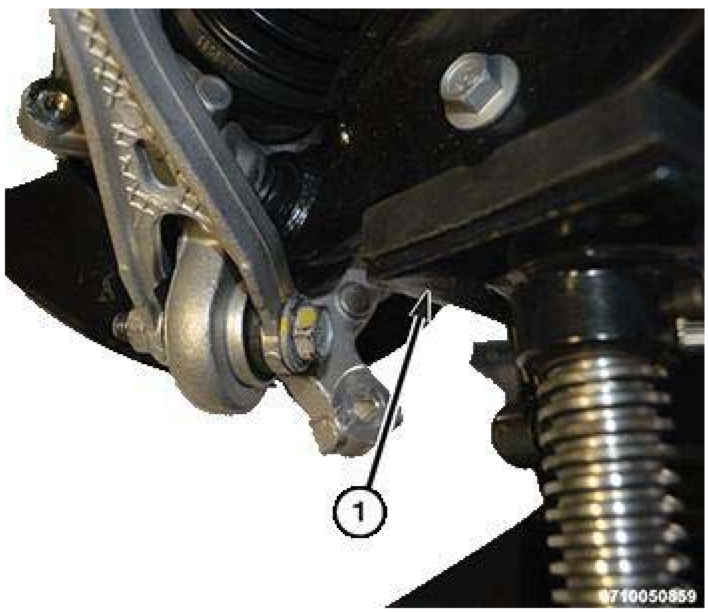


Fig. 25: Suitable Jack Under The Spring Link
Courtesy of CHRYSLER GROUP, LLC

16. Remove the support (1) from under the spring link.
17. Install the brake caliper and the brake rotor. Refer to **ROTOR, BRAKE, INSTALLATION** .
18. Lower vehicle.
19. Adjust parking brake shoes as necessary. Refer to **SHOES, PARKING BRAKE, ADJUSTMENTS** .
20. Position vehicle on alignment rack/drive-on hoist. Raise vehicle as necessary to access mounting bolts.

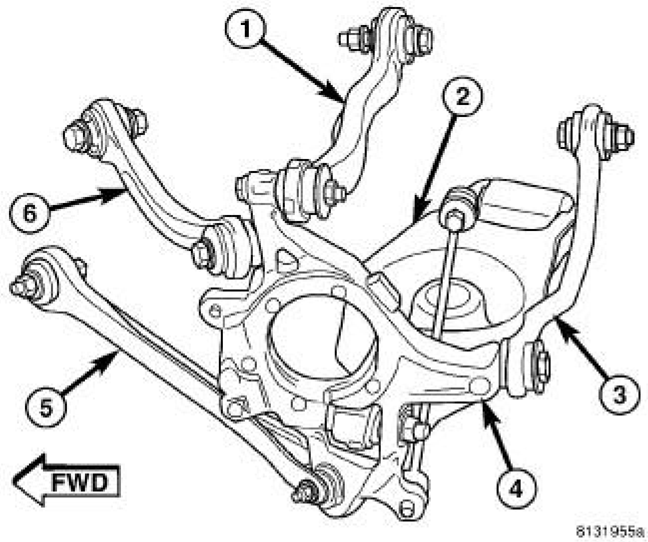


Fig. 26: Rear Suspension Components
Courtesy of CHRYSLER GROUP, LLC

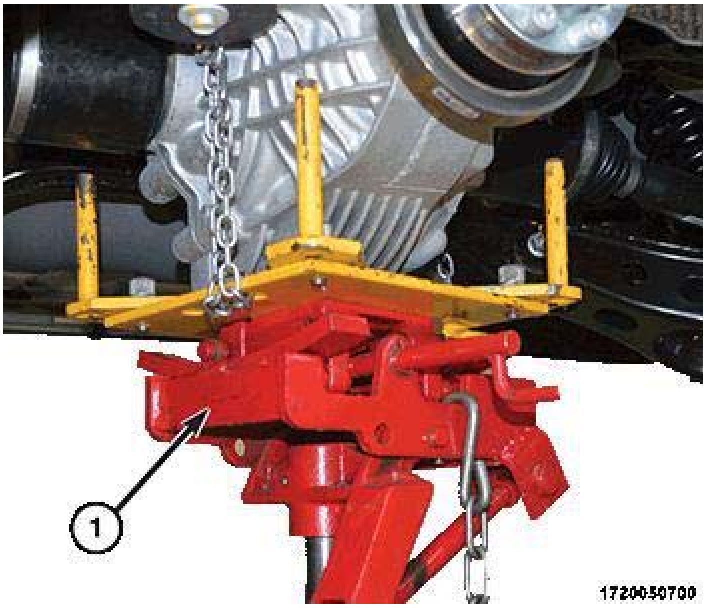
21. Tighten the following fasteners to the proper torque specification with vehicle at curb height: Refer to **SPECIFICATIONS**.
    - Camber Link (1) to Knuckle Bolt.
    - Compression Link (5) to Knuckle Bolt.
    - Stabilizer Link to Knuckle Bolt.
    - Tension Link (6) to Knuckle Bolt.
    - Toe Link (3) to Knuckle Bolt.
    - Spring Link to Knuckle Bolt.
22. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

LINK, CAMBER

REMOVAL

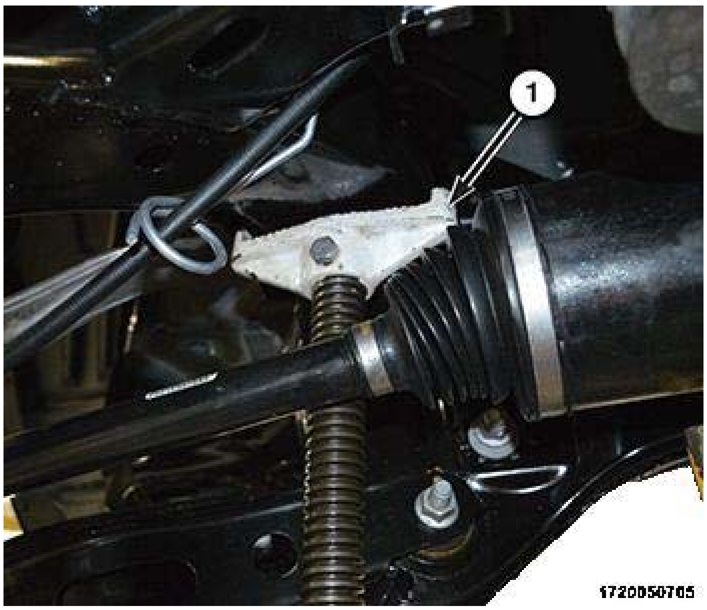
REMOVAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .
3. For left hand side camber link service, remove the fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** .
4. Remove the rear exhaust. Refer to **MUFFLER, EXHAUST, REMOVAL** .



[Fig. 27: Jack](#)
Courtesy of CHRYSLER GROUP, LLC

5. Position a suitable jack (1) under the rear axle differential. **Do not secure the jack to the stabilizer bar.**



[Fig. 28: Jack](#)
Courtesy of CHRYSLER GROUP, LLC

6. Position a suitable jack (1) to the crossmember on the repair-side of the vehicle.

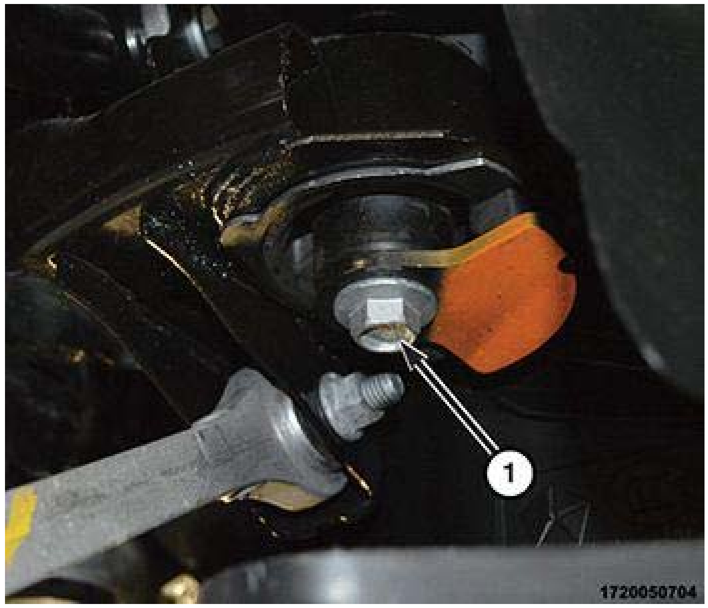


Fig. 29: Front Crossmember Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Remove the front crossmember mounting bolt (1) on the repair-side of the vehicle.
   - Remove the crossmember mounting bolts on the repair-side of the vehicle. Do NOT loosen or remove crossmember mounting bolts on the opposite side of vehicle. This will require a rear wheel alignment following reinstallation to ensure proper thrust angle.

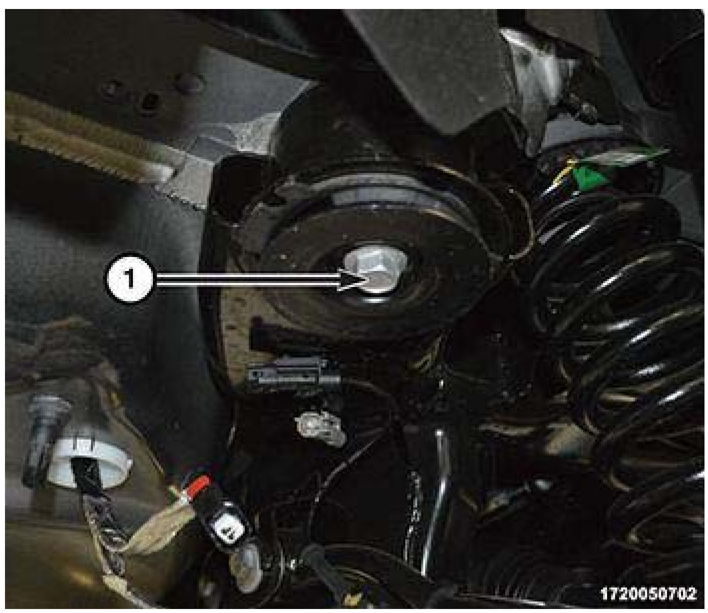


Fig. 30: Rear Crossmember Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Remove the rear crossmember mounting bolt (1) on the repair-side of the vehicle.
9. Carefully lower the crossmember.

NOTE: **Do not lower the repair-side of the crossmember any further than necessary to gain access to the link mounting bolts.**

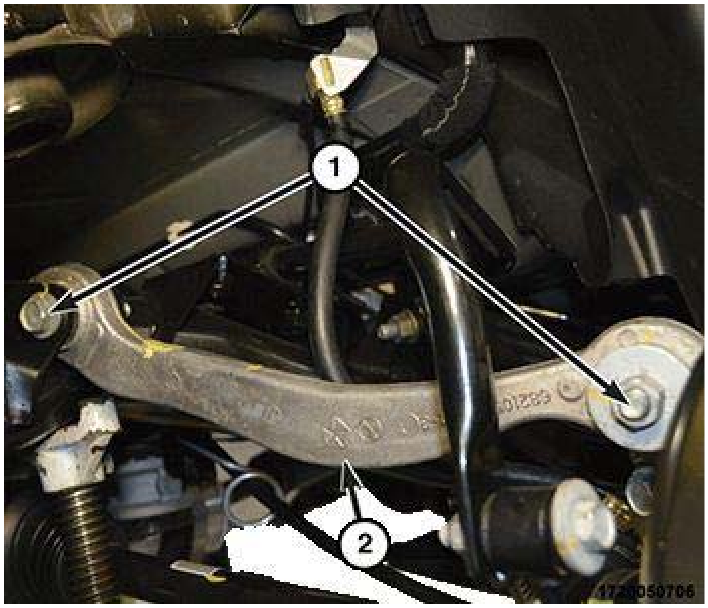


Fig. 31: Camber Link & Bolts
Courtesy of CHRYSLER GROUP, LLC

10. Remove the camber link bolts (1) and camber link (2).

INSTALLATION

INSTALLATION

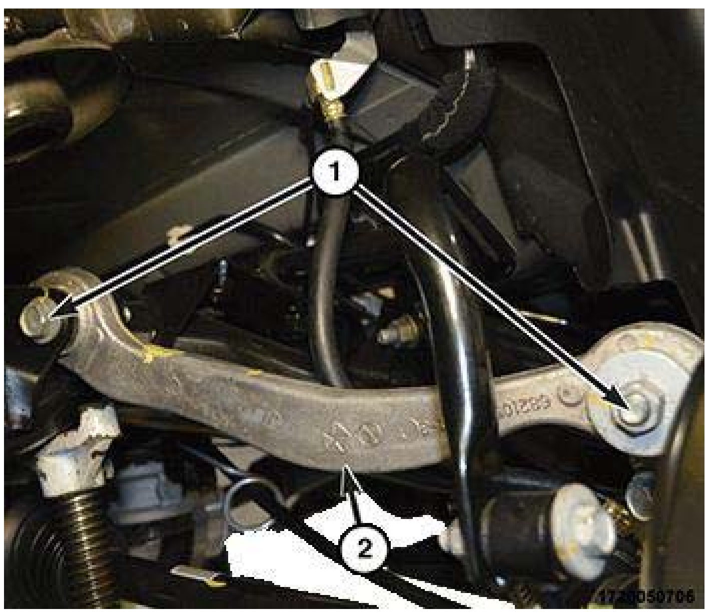


Fig. 32: Camber Link & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the camber link (2) into the bracket on the crossmember. Install the camber link to crossmember bolt (1). **Do not tighten the bolt at this time.**
2. Position the camber link (2) into the knuckle. Install the camber link to knuckle bolt (1). **Do not tighten the bolt at this time.**
3. The rear crossmember bolts are longer than the front crossmember bolts. Install them in the original

positions.

Install the crossmember bolts. **Do not fully tighten bolts at this time.**

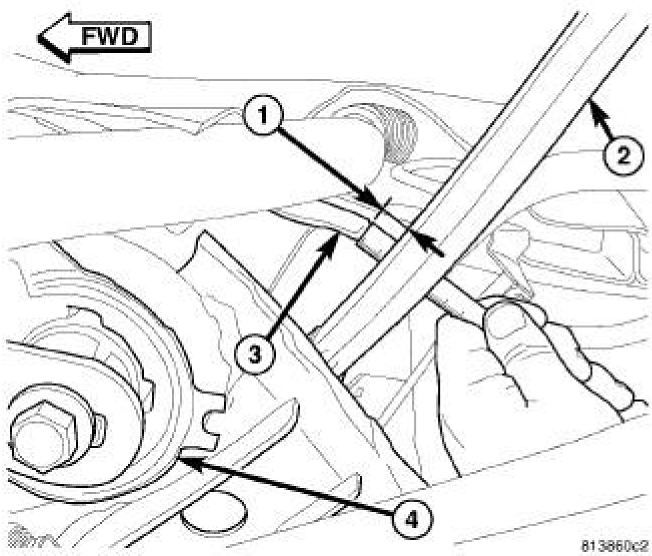


Fig. 33: Measuring Tension Link Clearance
Courtesy of CHRYSLER GROUP, LLC

4. Measure the tension link clearance as follows:
   - Measure the distance (1) from tension link (2) to body weld flange (3) directly in front of it, just outboard of front mount bushing (4). **This distance must be at least 12 mm to allow proper clearance for suspension movement.** If distance is less than 12 mm, shift that side of rear crossmember directly rearward until distance is 12 mm or greater. To adjust, loosen three crossmember mounting bolts slightly, leaving one on opposite side of shift snugged to pivot from. Shift the crossmember rearward and snug the loosened bolts. Measure opposite side to be sure it has maintained a minimum 12 mm distance.
5. Tighten the crossmember bolts to the proper torque specification. Refer to **SPECIFICATIONS**.

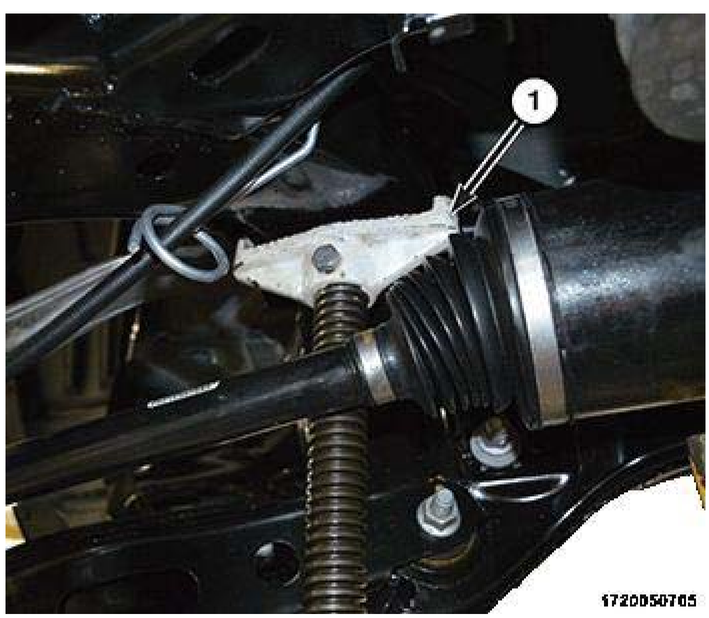


Fig. 34: Jack
Courtesy of CHRYSLER GROUP, LLC

6. Remove the support (1) from the crossmember.

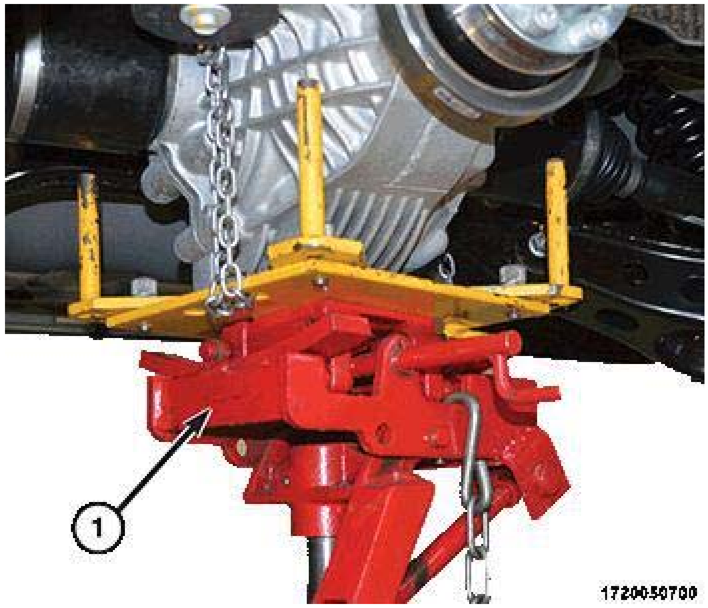


Fig. 35: Jack
Courtesy of CHRYSLER GROUP, LLC

7. Remove the support from the rear axle differential.
8. Install the rear exhaust. Refer to **MUFFLER, EXHAUST, INSTALLATION** .
9. For left hand side camber link service, install the fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** .

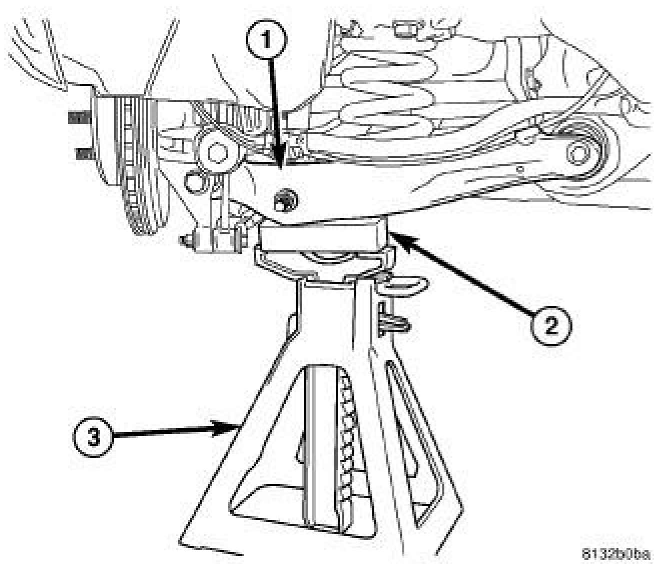


Fig. 36: Jack Stand Under Control Arm
Courtesy of CHRYSLER GROUP, LLC

10. Lower the vehicle until the front tires contact floor but the rear tires are still suspended. Place jack stands with wooden blocks under each rear suspension spring link. Lower the vehicle until the full weight is supported by the suspension.
11. Tighten the camber link to the crossmember bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
12. Tighten the camber link to the knuckle bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
13. Raise the vehicle and remove the jack stands.
14. Install the tire and wheel assembly. Refer to **INSTALLATION** .
15. Carry out a wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

LINK, COMPRESSION

REMOVAL

REMOVAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the rear tire and wheel assembly. Refer to **REMOVAL** .

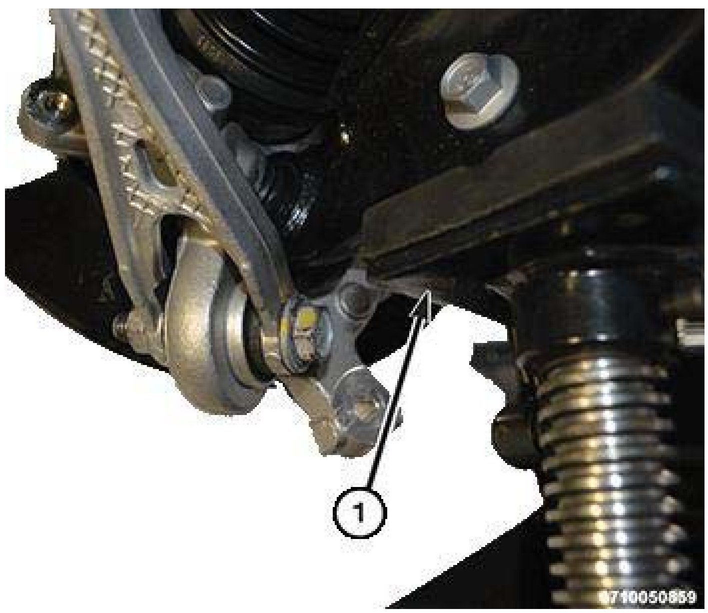


Fig. 37: Suitable Jack Under The Spring Link
Courtesy of CHRYSLER GROUP, LLC

3. Position a suitable jack (1) under the spring link.

Fig. 38: Lower Shock Absorber Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Remove the lower shock absorber bolt (1) and lower the spring link.

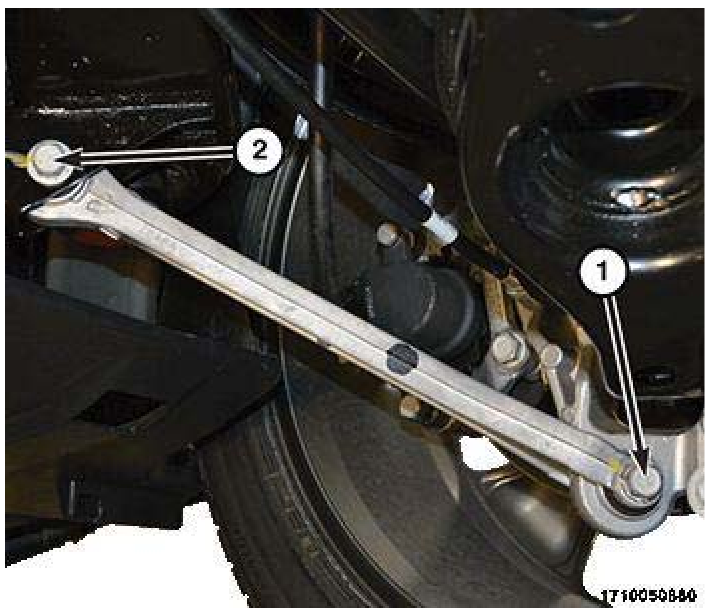


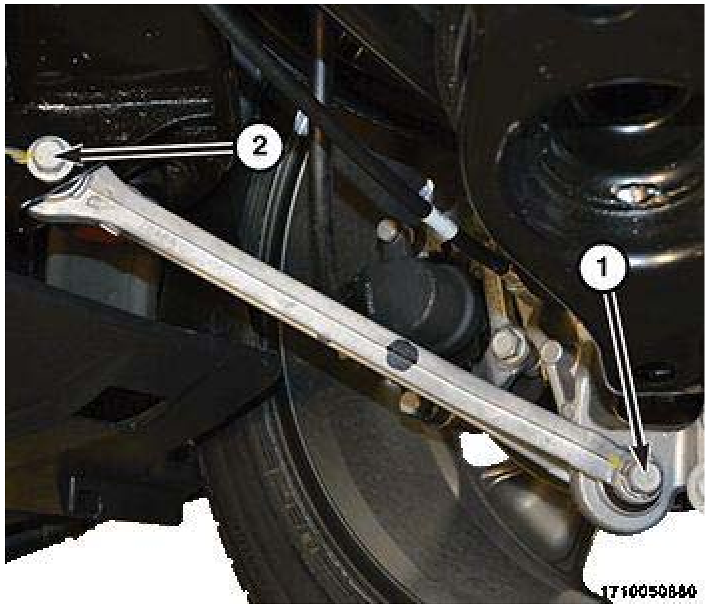
Fig. 39: Compression Link To Knuckle Bolt & Compression Link To Crossmember Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Remove the compression link to knuckle bolt (1).
6. Remove the compression link to crossmember bolt (2).
7. Remove compression link.

INSTALLATION

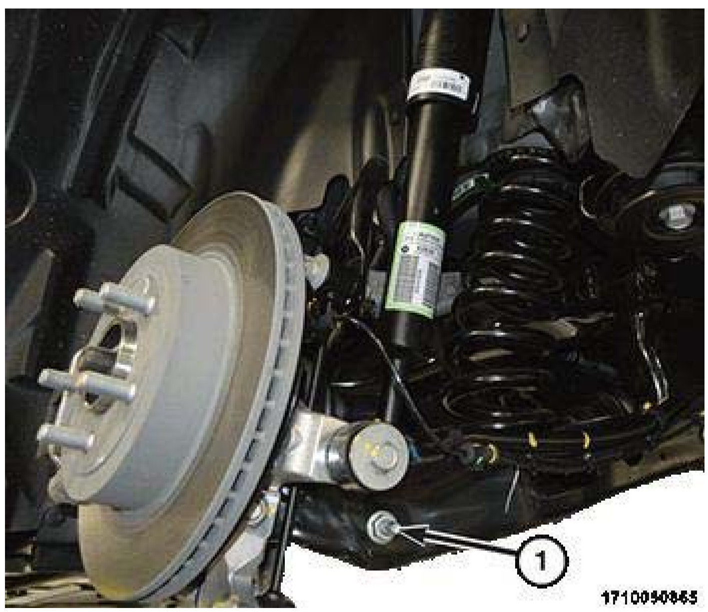
INSTALLATION

1. Position the compression link in the vehicle.



[Fig. 40: Compression Link To Knuckle Bolt & Compression Link To Crossmember Bolt]
Courtesy of CHRYSLER GROUP, LLC

2. Install the compression link to crossmember bolt (1). **Do not tighten bolt at this time.**
3. Install the compression link to knuckle bolt (2). **Do not tighten bolt at this time.**



[Fig. 41: Lower Shock Absorber Bolt]
Courtesy of CHRYSLER GROUP, LLC

4. Install the lower shock absorber bolt (1). **Do not tighten bolt at this time.**
5. Install the tire and wheel assembly. Refer to **INSTALLATION** .
6. Remove the support and lower the vehicle.
7. Position the vehicle on an alignment rack/drive-on lift. Position the vehicle to access the compression link fasteners.
8. Tighten the compression link bolts to the proper torque specification. Refer to **SPECIFICATIONS**.

9. Tighten the lower shock absorber bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
10. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

LINK, SPRING

REMOVAL

REMOVAL

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

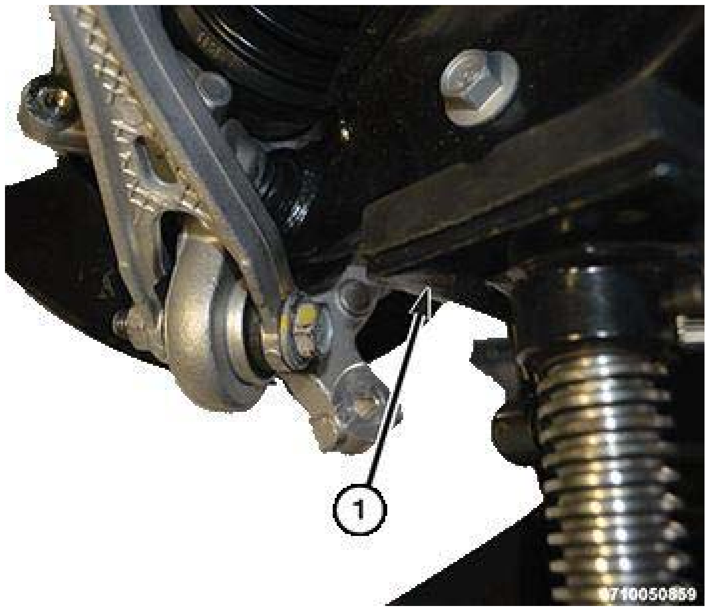


Fig. 42: Suitable Jack Under The Spring Link
Courtesy of CHRYSLER GROUP, LLC

3. Position a suitable jack (1) under the spring link.
4. Remove the shock absorber. Refer to **SHOCK ABSORBER, SUSPENSION, REMOVAL**.
5. Carefully lower the jack and remove the rear spring.

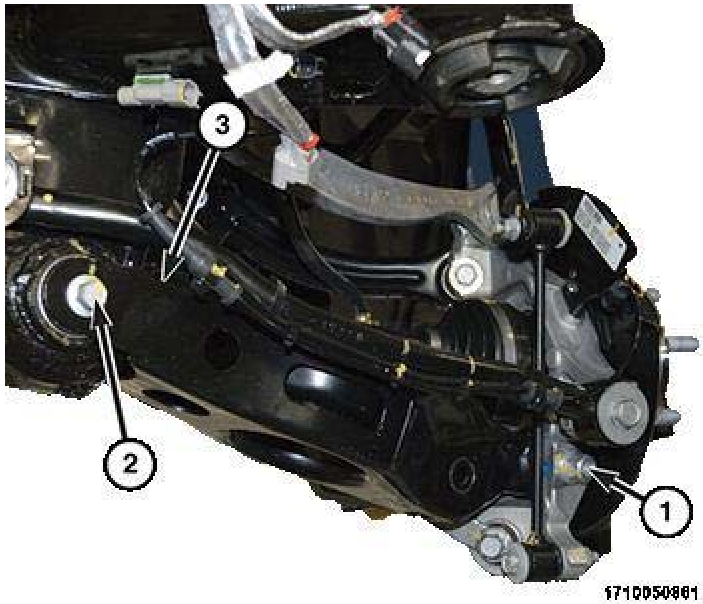


Fig. 43: Spring Link To Knuckle Bolt & Spring Link To Crossmember Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Remove the spring link to knuckle bolt (1).
7. Remove the spring link to crossmember bolt (2).
8. Remove the spring link (3).

INSTALLATION

INSTALLATION

NOTE: **Using a suitable tool, move the knuckle lower bushing inward to ease installation of the spring link onto the knuckle.**

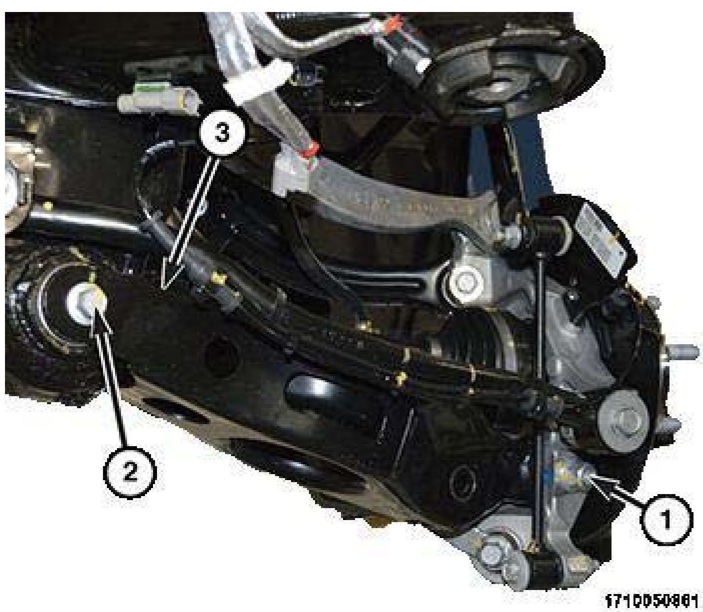


Fig. 44: Spring Link To Knuckle Bolt & Spring Link To Crossmember Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Position the spring link (3) in the vehicle and install the spring link to crossmember bolt (2). **Do not tighten bolt at this time.**
2. Install the spring link to knuckle bolt (1). **Do not tighten bolt at this time.**
3. Install the rear spring.

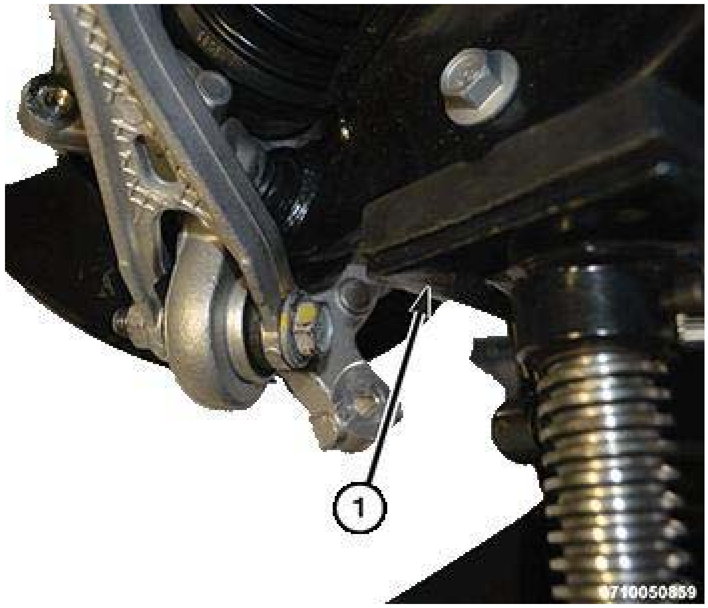


Fig. 45: Suitable Jack Under The Spring Link
Courtesy of CHRYSLER GROUP, LLC

4. Position a suitable jack (1) under the spring link.
5. Install the shock absorber **Do not tighten bolt at this time.** . Refer to **SHOCK ABSORBER, SUSPENSION, INSTALLATION**.
6. Remove the jack and lower the vehicle.
7. Position the vehicle on an alignment rack. Raise vehicle as necessary to access mounting bolts.
8. Tighten spring link to crossmember bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
9. Tighten the spring link to knuckle bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
10. Tighten the shock absorber bolts to the proper torque specification. Refer to **SPECIFICATIONS**.
11. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

LINK, TENSION

REMOVAL

REMOVAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .
3. For left hand side tension link service, remove the fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** .
4. Remove the rear exhaust. Refer to **MUFFLER, EXHAUST, REMOVAL** .

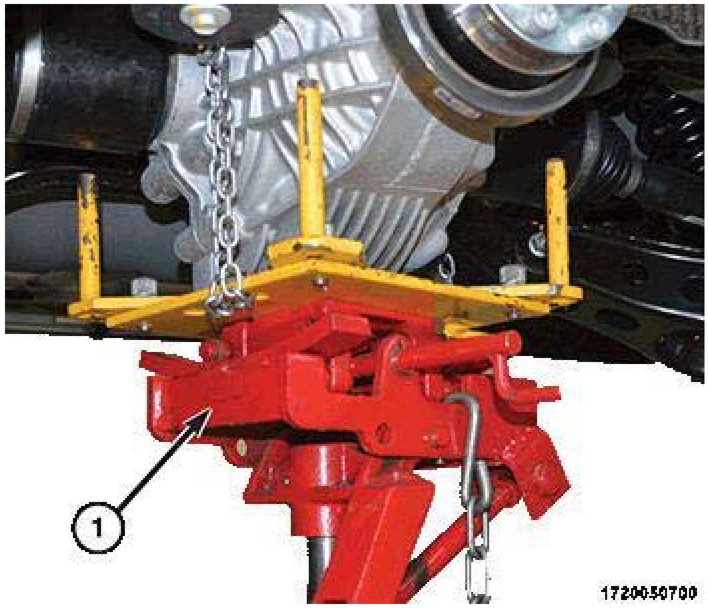


Fig. 46: Jack
Courtesy of CHRYSLER GROUP, LLC

5. Position a suitable jack under the rear axle differential. **Do not secure the jack to the stabilizer bar.**

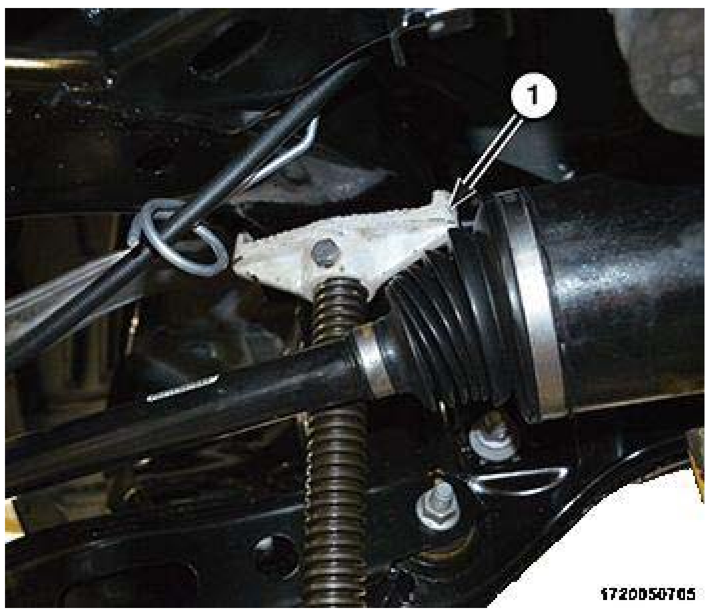


Fig. 47: Jack
Courtesy of CHRYSLER GROUP, LLC

6. Position a suitable jack (1) to the crossmember on the repair-side of the vehicle.

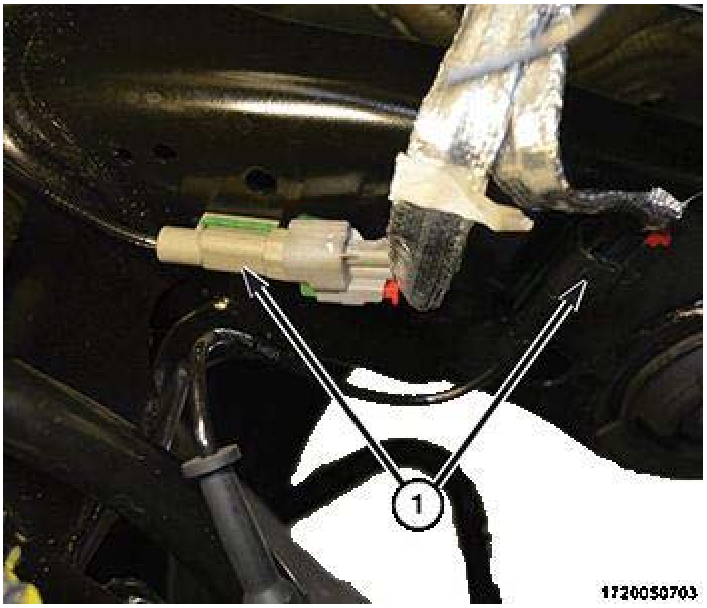


Fig. 48: Wheel Speed Sensor Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the wheel speed sensor electrical connectors (1).

Fig. 49: Shock Absorber Lower Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Remove the lower shock absorber bolt.

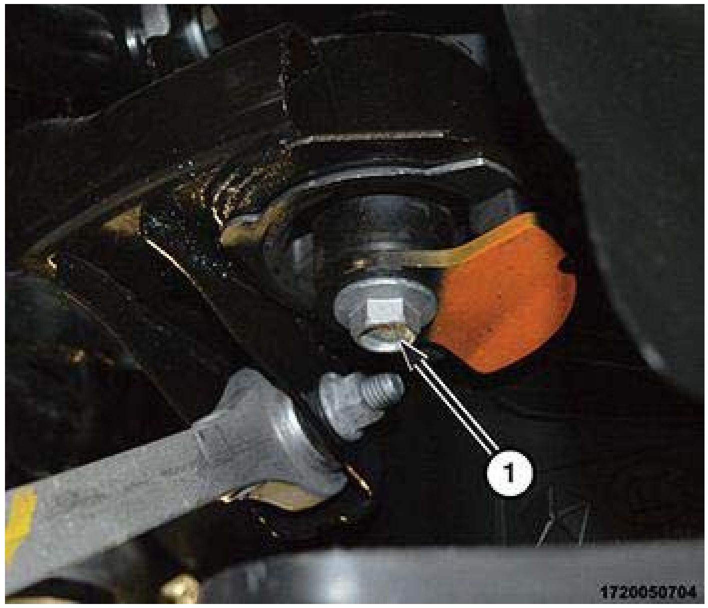


Fig. 50: Front Crossmember Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Remove the front crossmember mounting bolt (1) on the repair-side of the vehicle.

NOTE: **When removing crossmember mounting bolts it is important NOT to loosen or remove crossmember mounting bolts on opposite side of vehicle. Doing so will require rear wheel alignment following reinstallation to ensure proper thrust angle.**

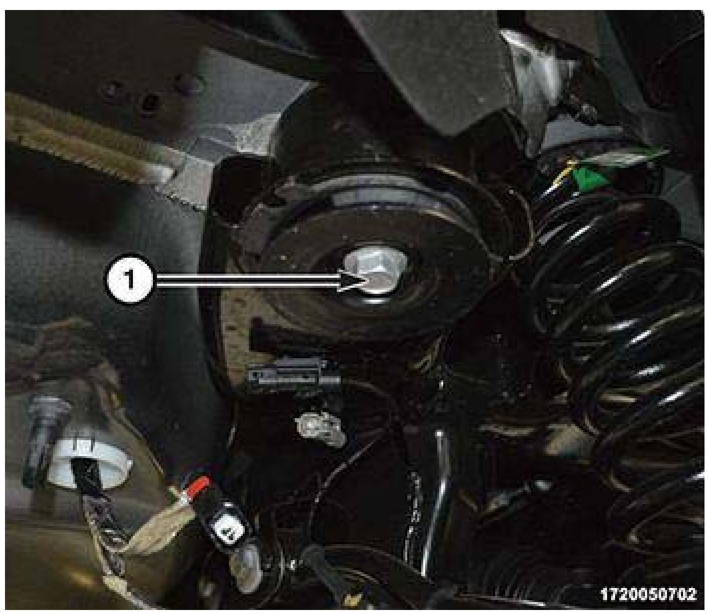


Fig. 51: Rear Crossmember Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Remove the rear crossmember mounting bolt (1) on the repair-side of the vehicle.
11. **Carefully** lower the crossmember.

NOTE: Do not lower repair-side of the crossmember any further than necessary to gain access to the link mounting bolts at the crossmember.

CAUTION: To avoid damaging other components of vehicle, do not lower crossmember (1) any further than necessary to remove shock absorber.

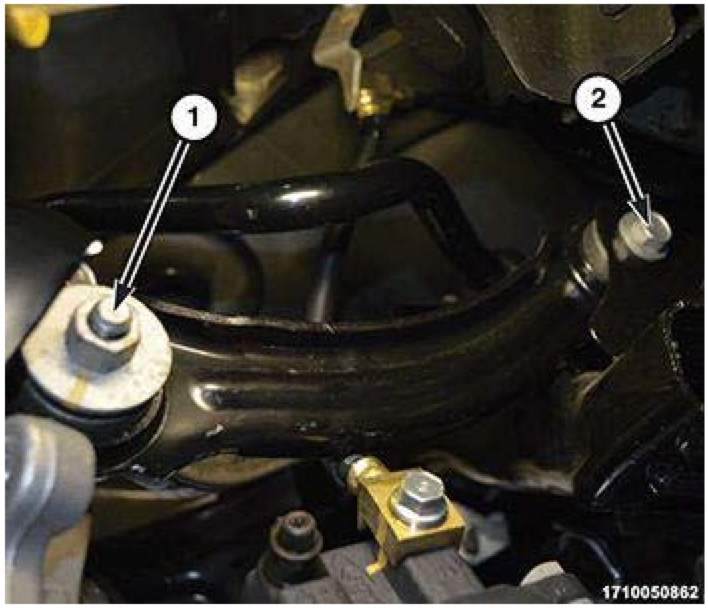


Fig. 52: Tension Link To Knuckle Bolt & Tension Link To Crossmember Bolt
Courtesy of CHRYSLER GROUP, LLC

12. Remove the tension link to knuckle bolt (1).
13. Remove the tension link to crossmember bolt (2).
14. Remove the tension link.

INSTALLATION

INSTALLATION

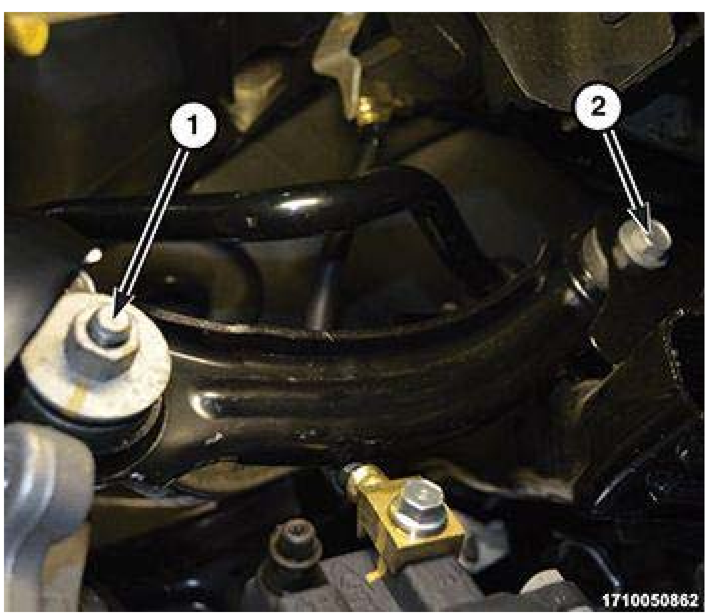


Fig. 53: Tension Link To Knuckle Bolt & Tension Link To Crossmember Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Position the tension link into the bracket on the knuckle. Install the tension link to knuckle bolt (1). **Do not tighten bolt at this time.**

NOTE: **This upper flange must be pointing forward in vehicle when the tension link is reinstalled.**

2. Position the tension link on the crossmember. Install the tension link to crossmember bolt (2). **Do not tighten bolt at this time.**
3. Carefully raise the coil spring and shock absorber, position the shock absorber into the spring link pocket and the coil spring to the spring link and chassis.

Fig. 54: Shock Absorber Lower Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Install the shock absorber lower bolt (1). **Do not tighten at this time** .
5. The rear crossmember bolts are longer than the front crossmember bolts. Install them in the original positions. **Do not fully tighten bolts at this time.**

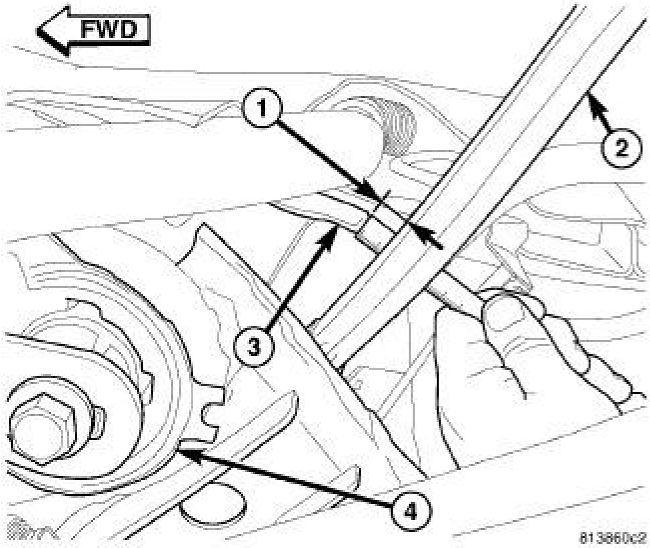


Fig. 55: Measuring Tension Link Clearance
Courtesy of CHRYSLER GROUP, LLC

6. Measure distance (1) between from tension link (2) to body weld flange (3) directly in front of it, just outboard of front mount bushing (4). **This distance must be at least 12 mm to allow proper clearance for suspension movement.** If distance is less than 12 mm, shift that side of rear crossmember directly rearward until distance is 12 mm or greater. To do so, loosen 3 mounting bolts slightly, leaving one on opposite side of shift snugged to pivot off of. Shift crossmember rearward and snug loosened bolts. Measure opposite side to be sure it also maintains minimum 12 mm distance.

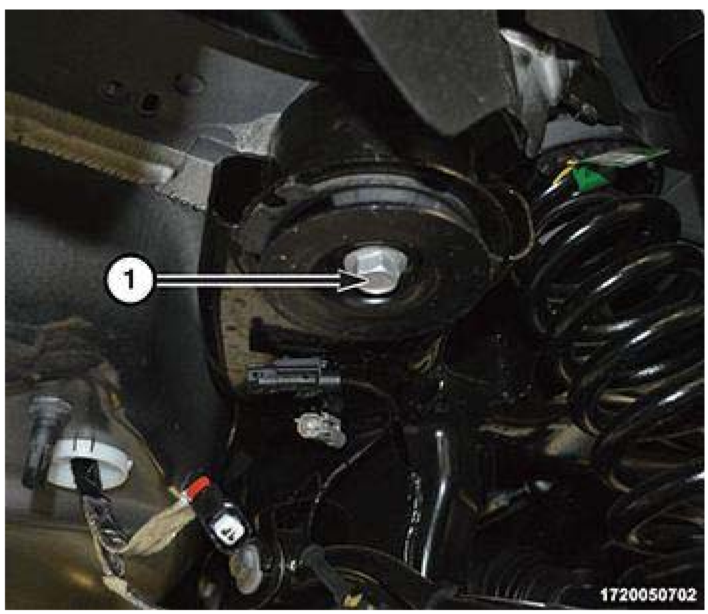


Fig. 56: Rear Crossmember Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Tighten the rear crossmember bolts to the proper torque specification. Refer to **SPECIFICATIONS**.

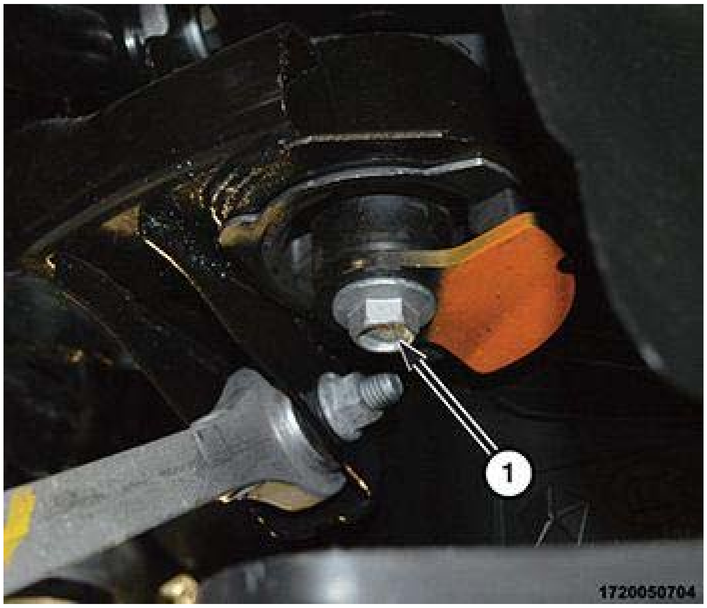


Fig. 57: Front Crossmember Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Tighten the front crossmember bolts to the proper torque specification. Refer to **SPECIFICATIONS**.

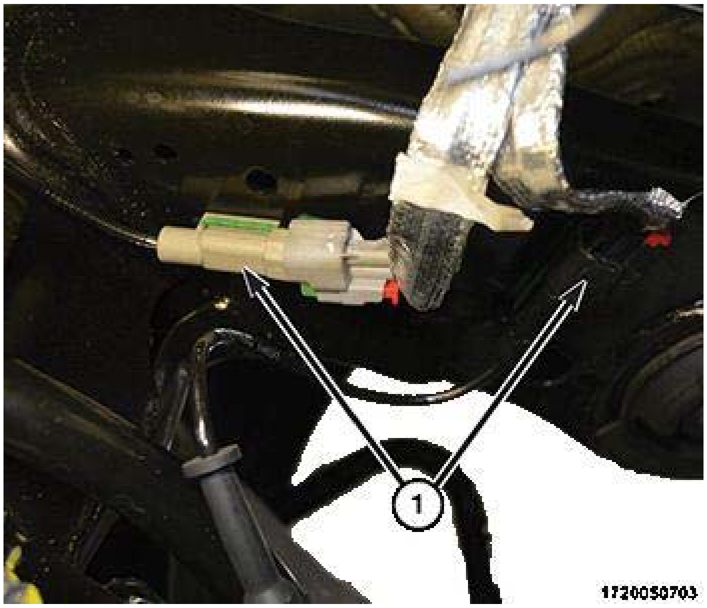


Fig. 58: Wheel Speed Sensor Electrical Connectors
Courtesy of CHRYSLER GROUP, LLC

9. Connect the wheel speed sensor electrical connectors

Fig. 59: Jack
Courtesy of CHRYSLER GROUP, LLC

10. Remove the support (1) from the crossmember.

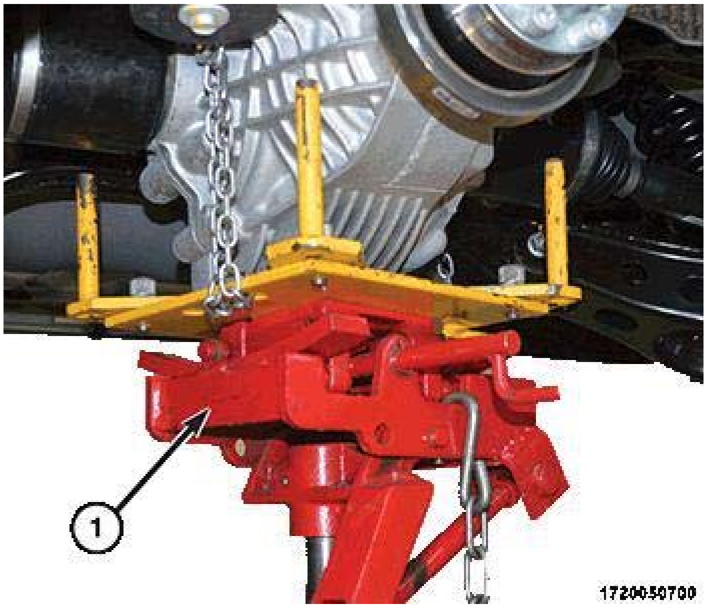


Fig. 60: Jack
Courtesy of CHRYSLER GROUP, LLC

11. Remove the support (1) from the rear axle differential.
12. Install the rear exhaust. Refer to **MUFFLER, EXHAUST, INSTALLATION** .
13. If removed, install fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** .

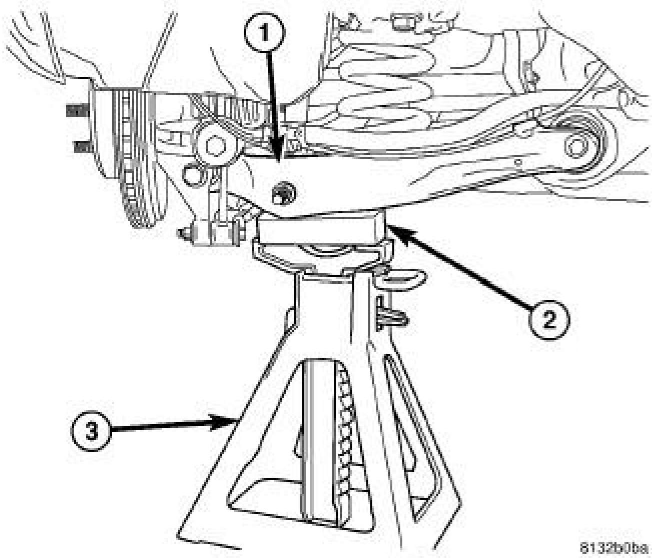


Fig. 61: Jack Stand Under Control Arm
Courtesy of CHRYSLER GROUP, LLC

14. Lower the vehicle until the front tires contact floor but rear tires are still suspended. Place jack stands (3) with wooden blocks (2) under each rear suspension spring link (1). Lower vehicle until the full the weight is supported by the suspension.
15. Tighten the tension link to crossmember bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
16. Tighten the tension link to knuckle bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
17. Tighten the shock absorber lower bolt to the proper torque specification. Refer to **SPECIFICATIONS**.
18. Raise the vehicle and remove the jack stands.
19. Install the tire and wheel assembly. Refer to **INSTALLATION** .
20. Lower the vehicle.
21. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

LINK, TOE

REMOVAL

LEFT LINK

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .
3. Remove the fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, REMOVAL** .
4. Remove the rear exhaust. Refer to **MUFFLER, EXHAUST, REMOVAL** .

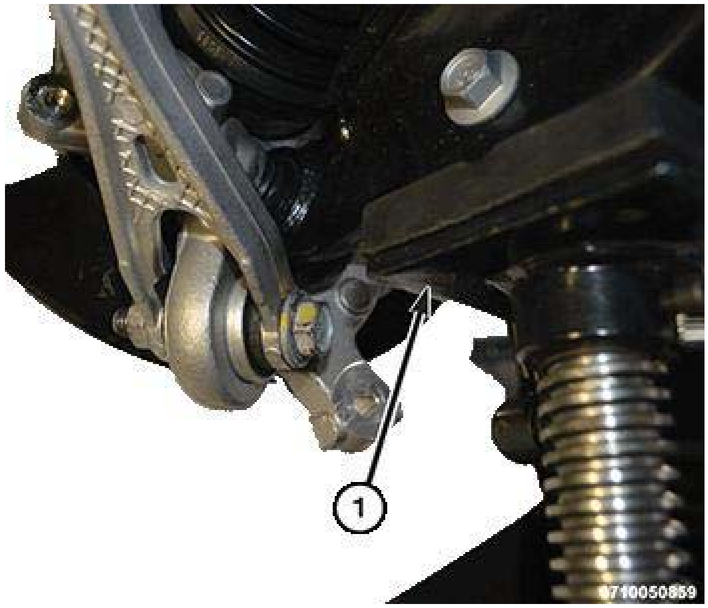


Fig. 62: Suitable Jack Under The Spring Link
Courtesy of CHRYSLER GROUP, LLC

5. Position a suitable jack under the spring link.

Fig. 63: Shock Absorber Lower Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Remove the lower shock absorber bolt and lower the spring link.

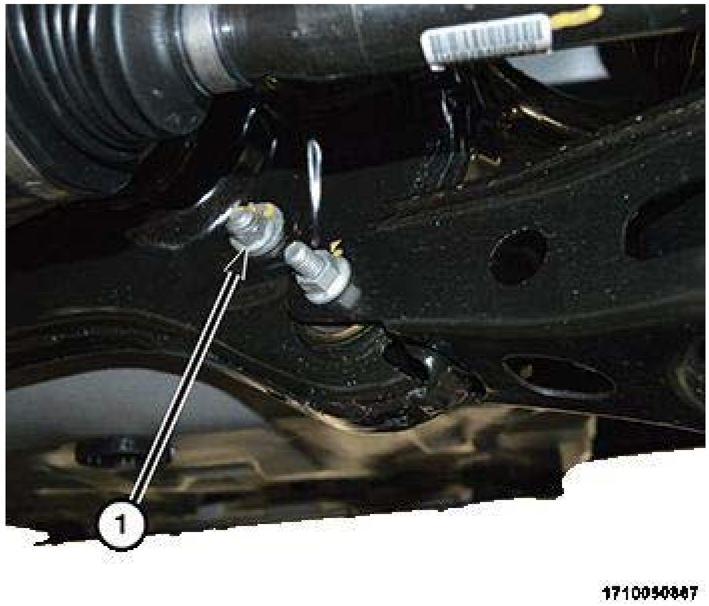


Fig. 64: Toe Link Nut
Courtesy of CHRYSLER GROUP, LLC

7. Hold the toe adjustment cam bolt stationary, remove toe link nut (1) at the crossmember.

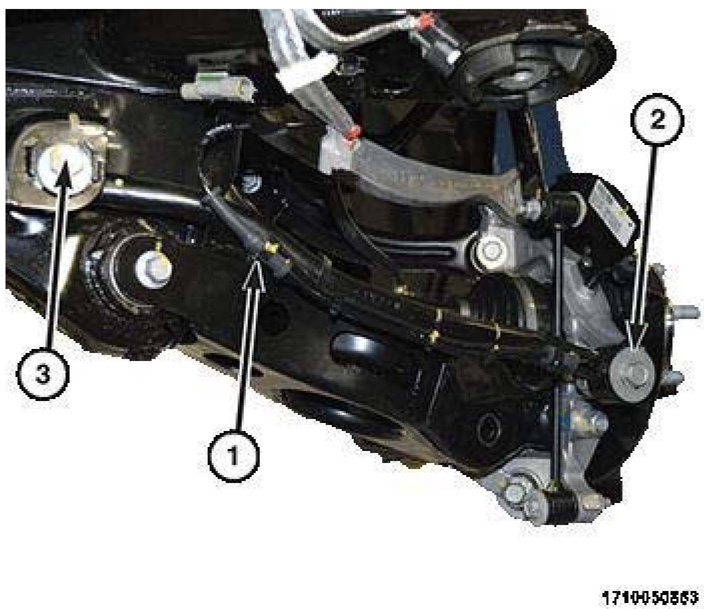


Fig. 65: Wheel Speed Sensor Cable, Toe Link To Knuckle Bolt & Adjustment Cam To Crossmember Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Separate the wheel speed sensor cable (1) from the toe link.
9. Remove toe link to knuckle bolt (2).
10. Remove the toe adjustment cam (3) to crossmember bolt.
11. Remove the toe link.

RIGHT LINK

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .
3. Remove the rear exhaust. Refer to **MUFFLER, EXHAUST, REMOVAL** .

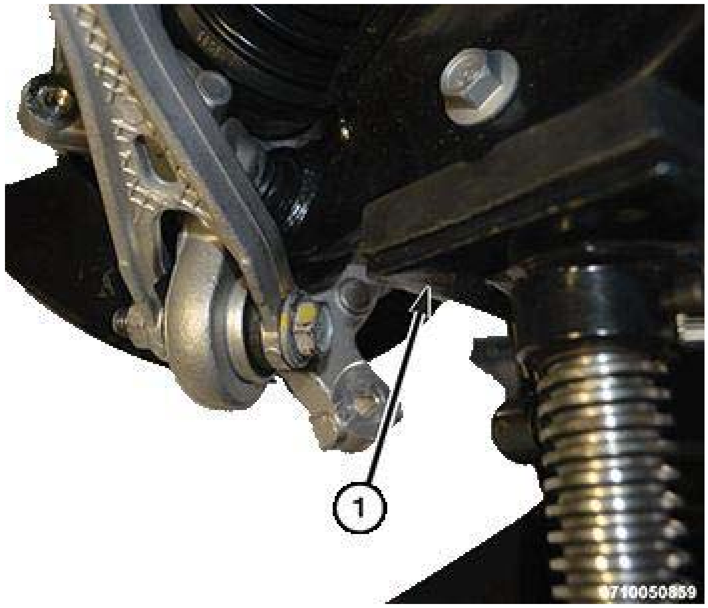


Fig. 66: Suitable Jack Under The Spring Link
Courtesy of CHRYSLER GROUP, LLC

4. Position a suitable jack (1) under the spring link.

Fig. 67: Shock Absorber Lower Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Remove the lower shock absorber bolt (1) and lower the spring link.

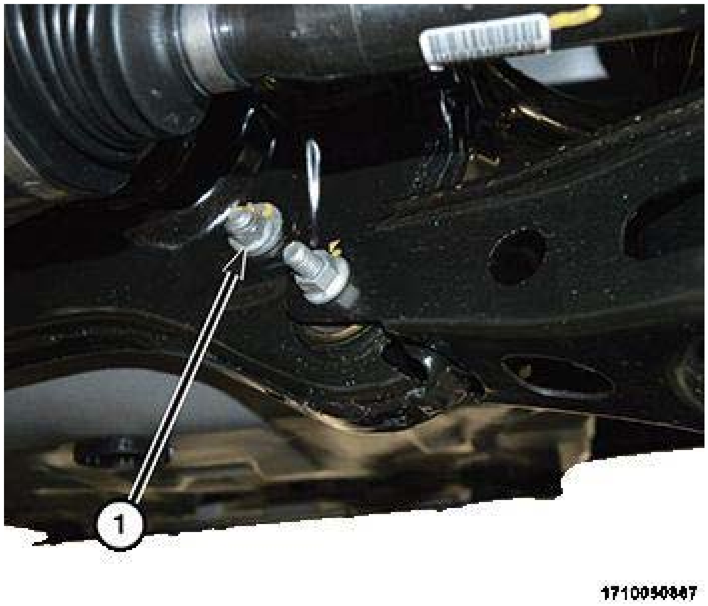


Fig. 68: Toe Link Nut
Courtesy of CHRYSLER GROUP, LLC

6. Hold the toe adjustment cam bolt stationary, remove toe link nut (1) at the crossmember.

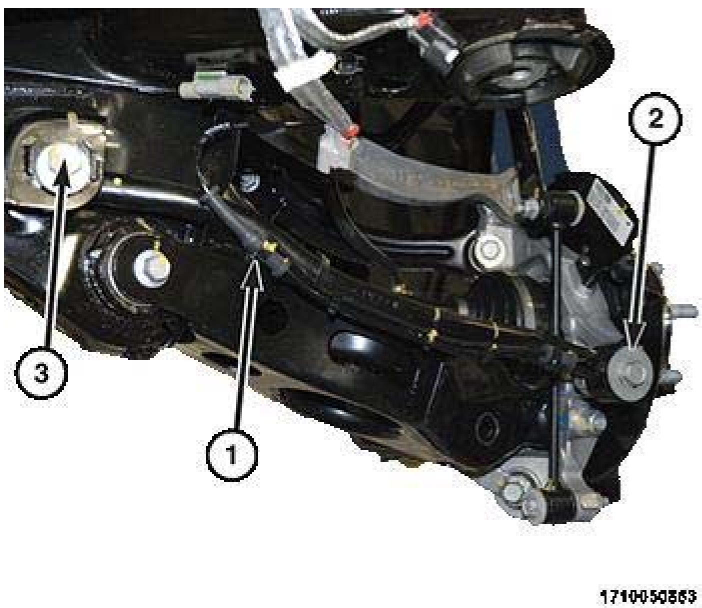


Fig. 69: Wheel Speed Sensor Cable, Toe Link To Knuckle Bolt & Adjustment Cam To Crossmember Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Separate the wheel speed sensor cable (1) from the toe link.
8. Remove toe link to knuckle bolt (2).
9. Remove the toe adjustment cam (3) to crossmember bolt.
10. Remove the toe link.

INSTALLATION

LEFT LINK

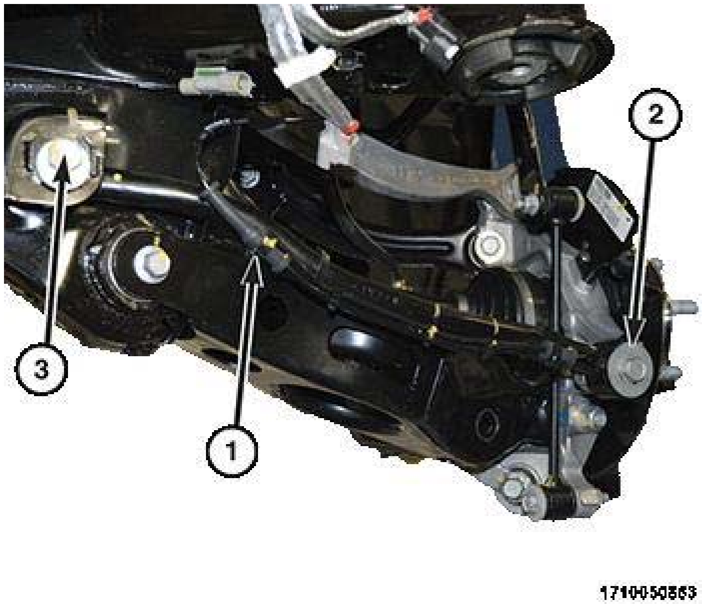


Fig. 70: Wheel Speed Sensor Cable, Toe Link To Knuckle Bolt & Adjustment Cam To Crossmember Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Position the toe link to the knuckle and at the crossmember.
2. Install the cam bolt at the crossmember (3).
3. Install the toe link to knuckle bolt (2). **Do not tighten bolt at this time.**
4. Attach the wheel speed sensor cable (1) to the toe link.

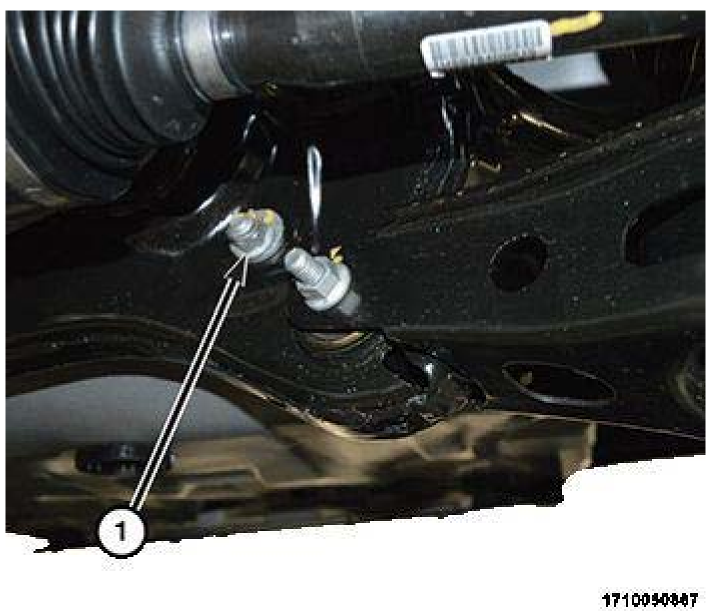


Fig. 71: Toe Link Nut
Courtesy of CHRYSLER GROUP, LLC

5. Hold the toe adjustment cam stationary (cam facing upward). Install the cam washer and toe link nut (1). **Do not tighten nut at this time.**
6. Raise the jack and position the shock absorber into the pocket in the spring link. Install the shock

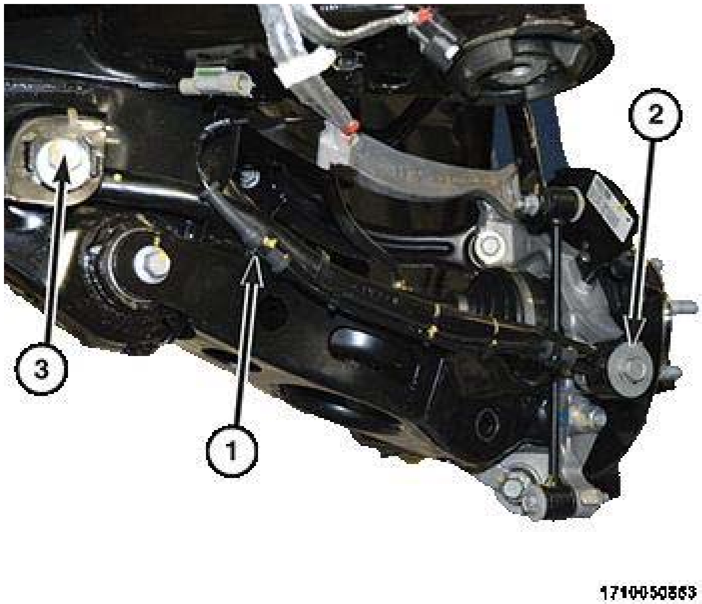
absorber lower bolt. **Do not tighten at this time.**

7. Install the fuel filler tube. Refer to **TUBE, FUEL TANK FILLER, INSTALLATION** .
8. Install the rear exhaust. Refer to **MUFFLER, EXHAUST, INSTALLATION** .
9. Install tire and wheel assembly. Refer to **INSTALLATION** .
10. Remove the support and lower the vehicle.
11. Position the vehicle on an alignment rack. Raise the vehicle as necessary to access the mounting bolts.

Fig. 72: Shock Absorber Lower Bolt
Courtesy of CHRYSLER GROUP, LLC

12. Tighten the shock absorber lower bolt (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
13. Tighten the toe link bolt at the knuckle to the proper torque specification. Refer to **SPECIFICATIONS**.
14. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .
15. Tighten the toe link bolt at the crossmember after the rear wheel alignment toe is set. Tighten the toe link nut (do not tighten at the bolt head) to the proper torque specification. Refer to **SPECIFICATIONS**.

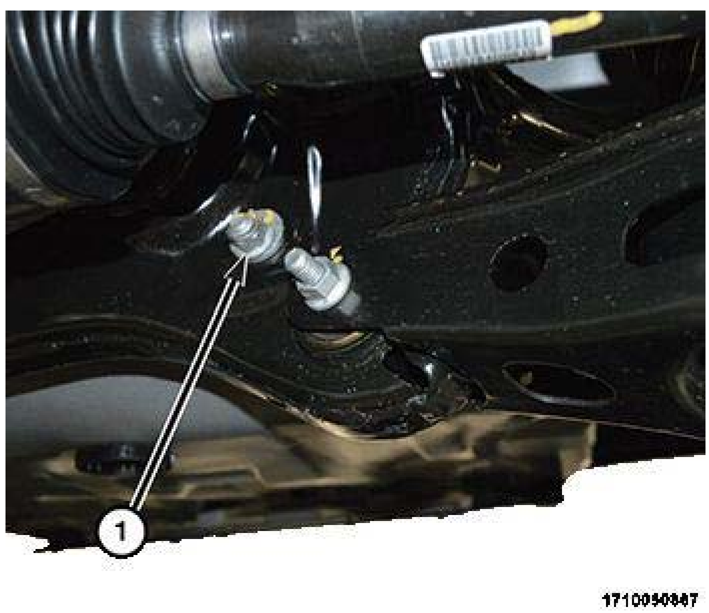
RIGHT LINK



[Fig. 73: Wheel Speed Sensor Cable, Toe Link To Knuckle Bolt & Adjustment Cam To Crossmember Bolt]

Courtesy of CHRYSLER GROUP, LLC

1. Position the toe link to the knuckle and at the crossmember.
2. Install the cam bolt at the crossmember (3).
3. Install the toe link to knuckle bolt (2). **Do not tighten bolt at this time.**
4. Attach the wheel speed sensor cable (1) to the toe link.



[Fig. 74: Toe Link Nut]

Courtesy of CHRYSLER GROUP, LLC

5. Hold the toe adjustment cam stationary (cam facing upward). Install the cam washer and toe link nut (1). **Do not tighten nut at this time.**
6. Raise the jack and position the shock absorber into the pocket in the spring link. Install the shock absorber lower bolt.**Do not tighten at this time.**

7. Install the rear exhaust. Refer to **MUFFLER, EXHAUST, INSTALLATION** .
8. Install the tire and wheel assembly. Refer to **INSTALLATION** .
9. Remove the support and lower the vehicle.
10. Position vehicle on alignment rack. Raise vehicle as necessary to access mounting bolts.

Fig. 75: Shock Absorber Lower Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Tighten the shock absorber lower bolt (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
12. Tighten the toe link bolt at the knuckle to the proper torque specification. Refer to **SPECIFICATIONS**.
13. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .
14. Tighten the toe link bolt at the crossmember after the rear wheel alignment toe is set. Tighten the toe link nut (do not tighten at the bolt head) to the proper torque specification. Refer to **SPECIFICATIONS**.

SHOCK ABSORBER, SUSPENSION

DESCRIPTION

NON SRT

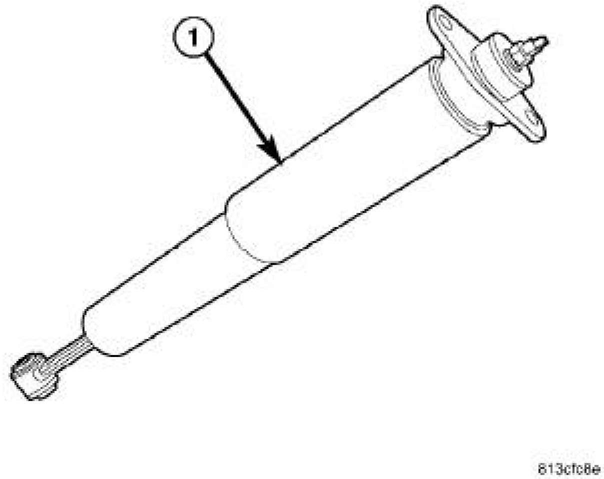


Fig. 76: Nivomat Load-Leveling Shock Absorber
Courtesy of CHRYSLER GROUP, LLC

Non-SRT vehicles have standard gas-charged shock absorbers for the rear suspension. The shock absorbers absorb and dissipate road vibration and to dampen spring oscillations. Shock absorbers also limit the suspension movement.

SRT

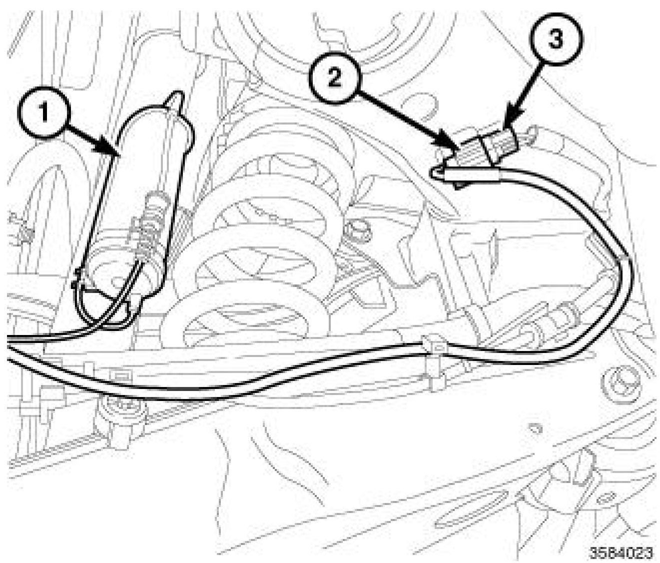


Fig. 77: Shock Solenoid Assembly & ADS Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: Left side shown in the illustration, right side similar.

This vehicle has Active Damping System (ADS) shock absorbers for the rear suspension. The ADS shock absorbers are serviced the same as conventional shocks, except the ADS connector (2) must be removed from the wire harness connector (3). It is important to pay close attention to which direction the shock solenoid assembly (1) is pointing when removing and installing ADS shocks.

REMOVAL

NON SRT

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

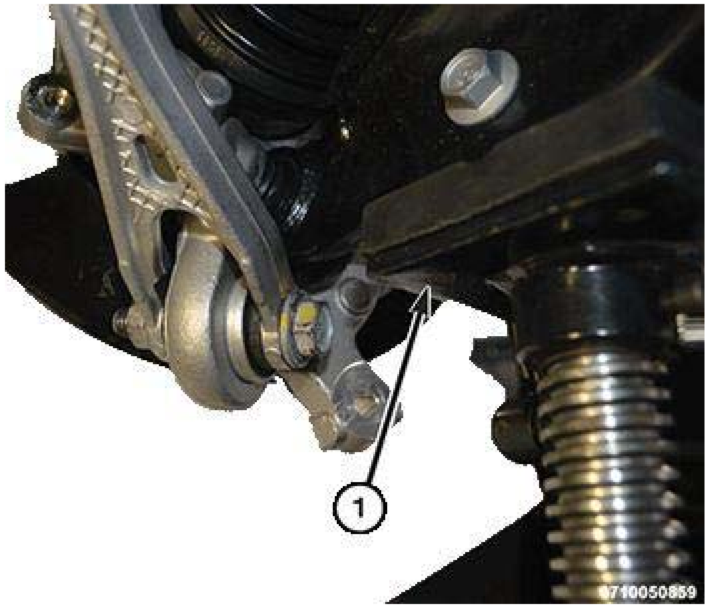


Fig. 78: Suitable Jack Under The Spring Link
Courtesy of CHRYSLER GROUP, LLC

3. Position a suitable jack under spring link.

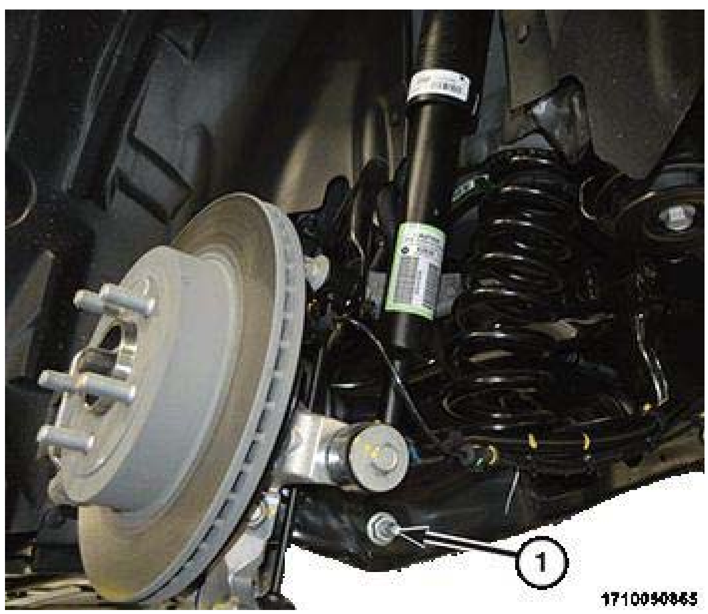


Fig. 79: Lower Shock Absorber Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Remove the shock absorber (1) lower bolt (1).

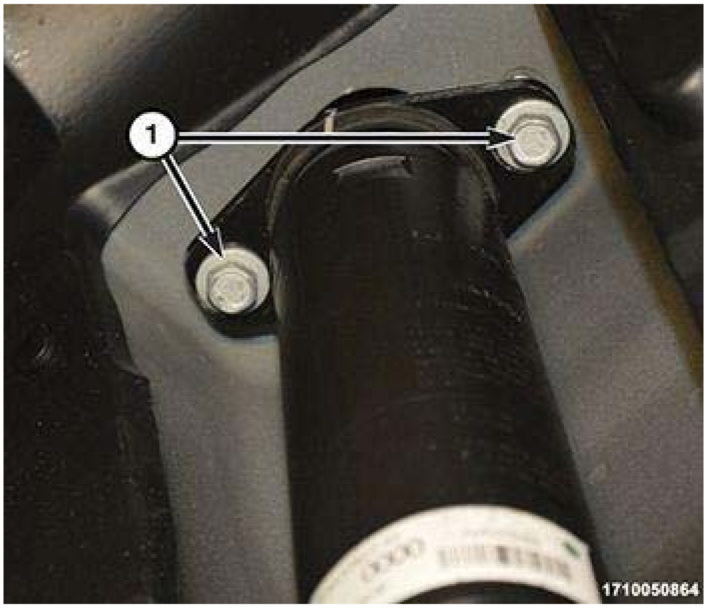


Fig. 80: Shock Absorber Upper Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove shock absorber upper bolts (1).
6. Lower the spring link and remove shock absorber.

SRT

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

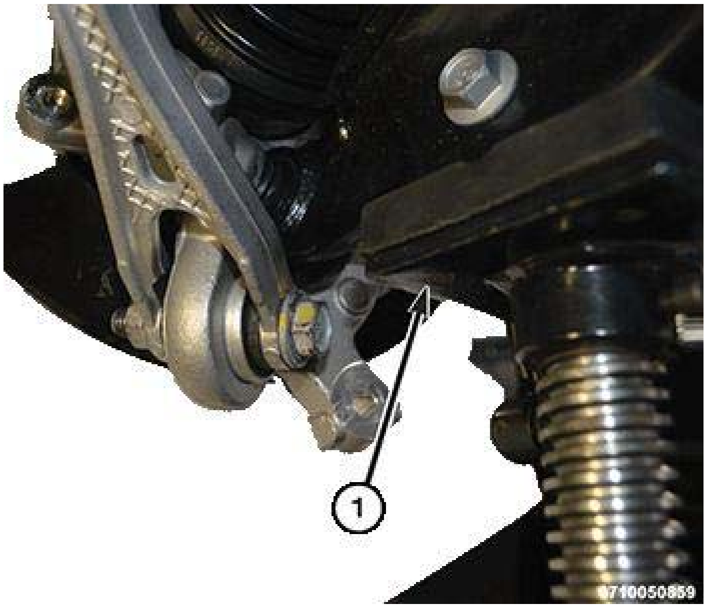


Fig. 81: Suitable Jack Under The Spring Link
Courtesy of CHRYSLER GROUP, LLC

3. Position a suitable jack under spring link.

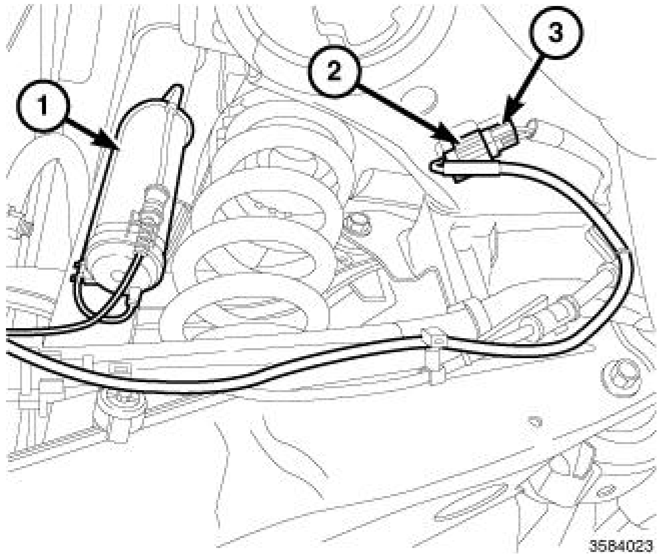


Fig. 82: Shock Solenoid Assembly & ADS Harness Connector
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the Active Damping System (ADS) shock connector (2) from the wire harness connector (3).

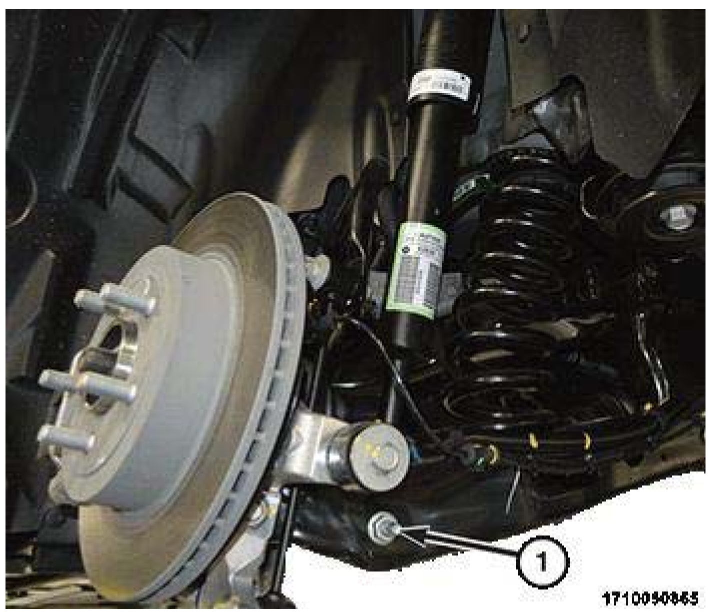
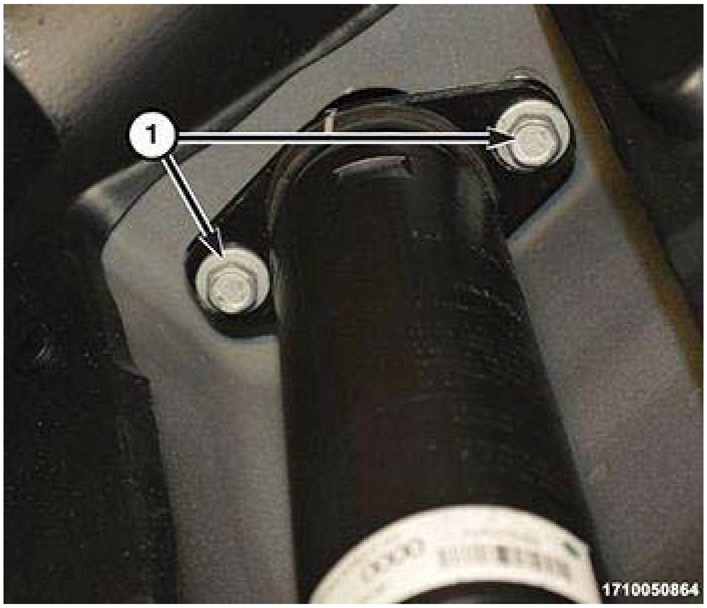


Fig. 83: Lower Shock Absorber Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Remove the shock absorber (1) lower bolt (1).



[Fig. 84: Shock Absorber Upper Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

6. Remove shock absorber upper bolts (1).
7. Lower the spring link and remove shock absorber.

INSTALLATION

NON SRT

1. Position the shock absorber in the vehicle.
2. Raise the jack and position the shock absorber into the pocket in the spring link and into the mount on the body.

[Fig. 85: Lower Shock Absorber Bolt](#)
Courtesy of CHRYSLER GROUP, LLC

3. Install the shock absorber lower bolt (1). **Do not tighten at this time.**

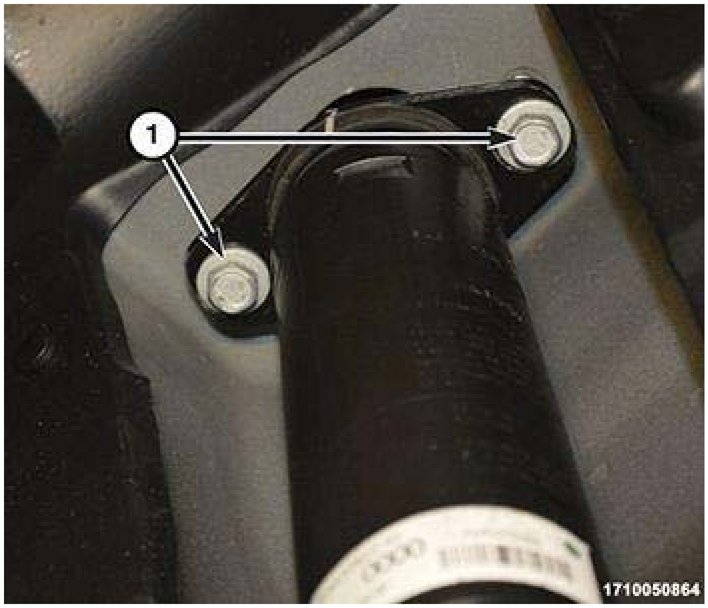


Fig. 86: Shock Absorber Upper Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the shock absorber upper bolts (1). Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
5. Remove the jack from under the spring link.
6. Install the tire and wheel assembly. Refer to **INSTALLATION** .
7. Remove support and lower the vehicle.
8. Position vehicle on alignment rack/drive-on hoist. Raise vehicle as necessary to access lower mounting bolt.
9. Tighten shock absorber lower bolt to the proper torque specification. Refer to **SPECIFICATIONS**.

SRT

1. Position the shock absorber in the vehicle.
2. Raise the jack and position the shock absorber into the pocket in the spring link and into the mount on the body.

Fig. 87: Lower Shock Absorber Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Install the shock absorber lower bolt (1). **Do not tighten at this time.**

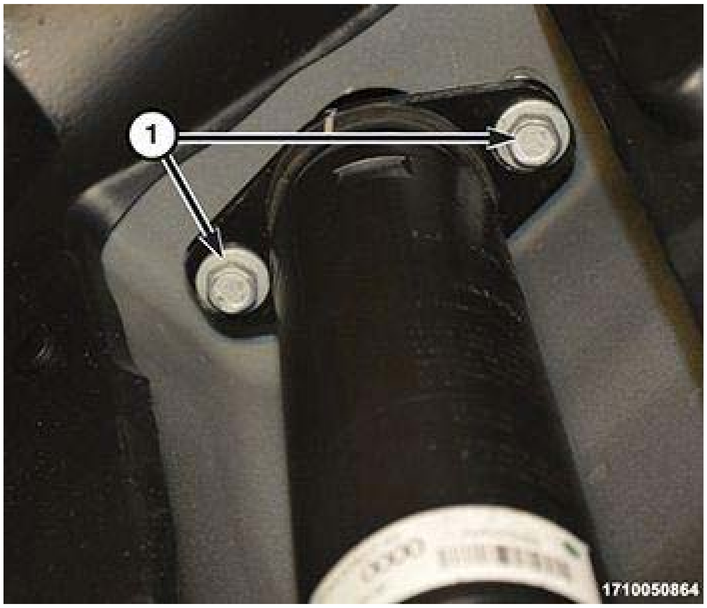


Fig. 88: Shock Absorber Upper Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the shock absorber upper bolts (1). Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
5. Remove jack or from under spring link.

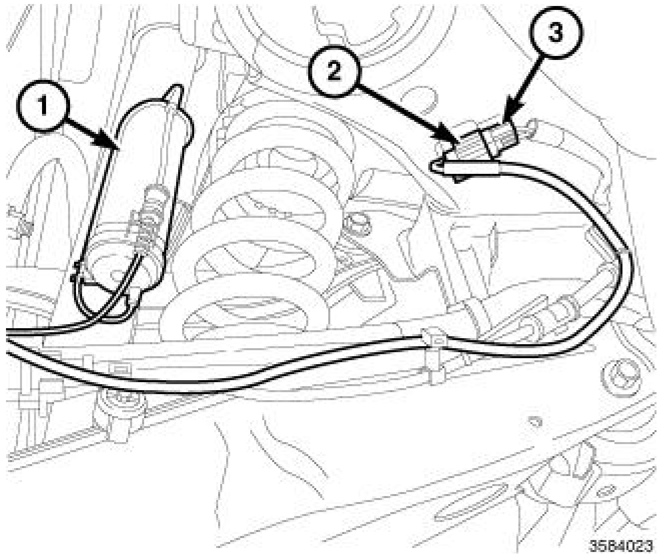


Fig. 89: Shock Solenoid Assembly & ADS Harness Connector
Courtesy of CHRYSLER GROUP, LLC

6. Connect the ADS wire harness connector (2).
7. Install the tire and wheel assembly. Refer to **INSTALLATION** .
8. Remove support and lower the vehicle.
9. Position vehicle on alignment rack/drive-on hoist. Raise vehicle as necessary to access lower mounting bolt.
10. Tighten shock absorber lower mounting nut to the proper torque specification. Refer to **SPECIFICATIONS**.

SPRING(S)

REMOVAL

REMOVAL

NOTE: **Removal process is the same for both sides of the vehicle.**

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the tire and wheel assembly. Refer to **REMOVAL** .
4. Remove rear crossmember assembly. Refer to **CROSSMEMBER, REAR, REMOVAL** or **CROSSMEMBER, TRANSMISSION, REMOVAL** .
5. Slowly lower jack until crossmember is low enough to remove coil spring. **Do not lower jack any further than necessary to remove spring.**

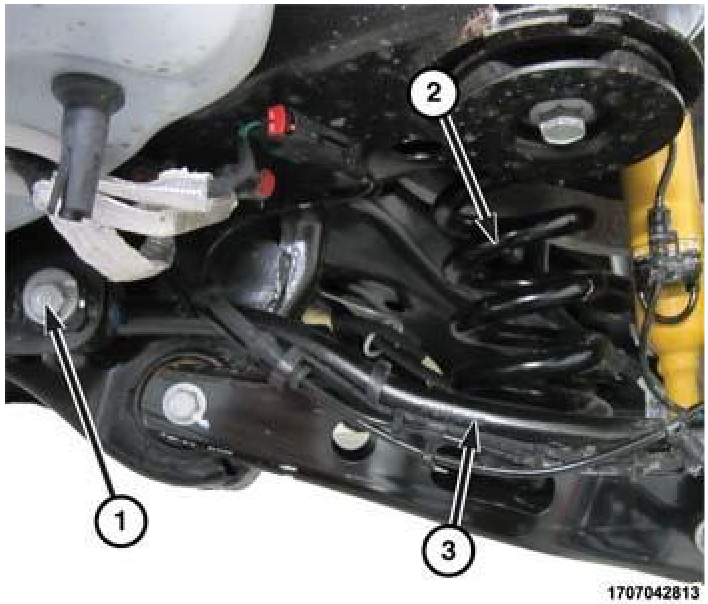


Fig. 90: Removing/Installing Coil Spring
Courtesy of CHRYSLER GROUP, LLC

6. Remove coil spring (2) and isolators.

INSTALLATION

INSTALLATION

NOTE: **Installation process is the same for both sides of the vehicle.**

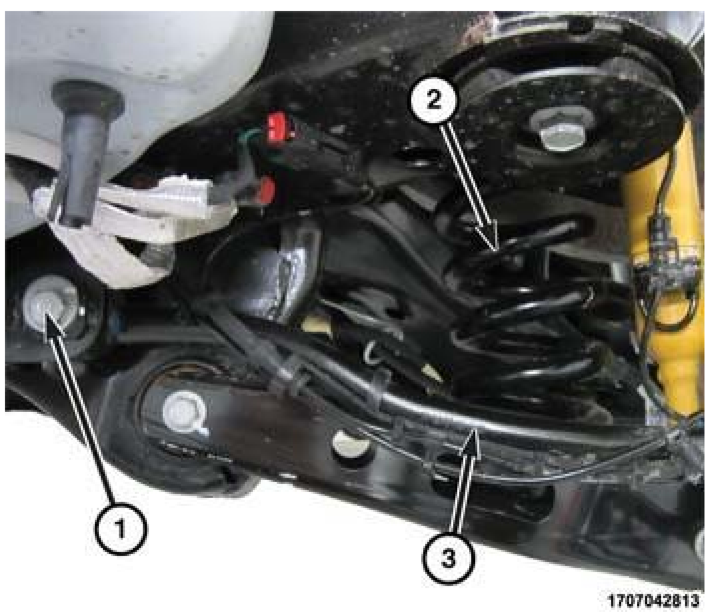


Fig. 91: Removing/Installing Coil Spring
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Rear coil springs are interchangeable.**

1. Install coil spring (2) with isolators into spring pocket of spring link fitting lower isolator to shape of

pocket, then align top of spring with body mount.

2. Install rear crossmember assembly. Refer to **CROSSMEMBER, REAR, INSTALLATION** or **CROSSMEMBER, TRANSMISSION, INSTALLATION** .
3. Install the tire and wheel assembly. Refer to **INSTALLATION** .
4. Remove the support and lower the vehicle.
5. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

STABILIZER BAR, REAR SUSPENSION

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the tire and wheel assembly. Refer to **REMOVAL** .
4. Remove the rear crossmember assembly. Refer to **CROSSMEMBER, REAR, REMOVAL** or **CROSSMEMBER, TRANSMISSION, REMOVAL** .

Fig. 92: Stabilizer Bar Bushing Retainer Bolt & Stabilizer Link To Stabilizer Bar Bolt And Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Mark the location of the stabilizer bushings prior to removing the stabilizer bar bushing clamps, this will be essential for the installation process.**

5. On each end, remove the stabilizer link to stabilizer bar bolt and nut (2).
6. Remove the four stabilizer bar bushing retainer bolts (1) and retainer brackets.
7. Remove stabilizer bar with bushings and retainers.

8. Remove retainers from bushings.
9. Remove bushings from stabilizer bar utilizing slits in bushings.

INSTALLATION

INSTALLATION

Fig. 93: Stabilizer Bar Bushing Retainer Bolt, Stabilizer Link To Stabilizer Bar Bolt And Nut
Courtesy of CHRYSLER GROUP, LLC

1. Install isolators on stabilizer bar utilizing slits in bushings. Install each isolator so its slit faces forward and flat side is positioned toward crossmember once installed.
2. Install retainers onto the bushings.

NOTE: **Be sure to center the stabilizer bar before tightening down, utilizing the marks made during the removal. Failure to do so could cause damage to other suspension components.**

3. Install stabilizer bar with bushings and retainers on crossmember.
4. Install the four stabilizer bar bushing retainer bolts (1). **Do not tighten at this time.**
5. On each side, install the stabilizer link to stabilizer bar bolt and nut (2) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
6. Tighten the four stabilizer bar bushing retainer bolts (1) to the proper torque specification. Refer to **SPECIFICATIONS**.
7. Install the rear crossmember assembly. Refer to **CROSSMEMBER, REAR, INSTALLATION** or **CROSSMEMBER, TRANSMISSION, INSTALLATION** .
8. Install the tire and wheel assembly. Refer to **INSTALLATION** .
9. Remove the support and lower the vehicle.
10. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

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Article GUID: A00735960

2015-16 RESTRAINTS

Service Information - Challenger

WARNING

WARNING

WARNING: To avoid serious or fatal injury on vehicles equipped with the Supplemental Restraint System (SRS), never attempt to repair the electrically conductive circuits or wiring components related to the SRS for which there is no MOPAR wiring repair kit. It is important to use ONLY the recommended splicing kit and procedure. For applicable and available MOPAR wiring repair kits, please visit the MOPAR Connection Repair Kit Web Site. Inappropriate repairs can compromise the conductivity and current carrying capacity of those critical electrical circuits, which may cause SRS components not to deploy when required, or to deploy when not required. Only minor cuts or abrasions of wire and terminal insulation where the conductive material has not been damaged, or connector insulators where the integrity of the latching and locking mechanisms have not been compromised may be repaired using appropriate methods.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÂ® Parts Catalog. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain or seat (pelvic and thorax) airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC contains a rollover sensor, which enables the system to deploy the side curtains or seat airbags in the event of a vehicle rollover event. If an ORC is accidentally rolled during service while still connected to battery power, the side curtain and seat airbags will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid potential physical injury or damage to sensitive electronic circuits and systems, always disconnect and isolate the battery negative (ground) cable and the positive cable, then ground the positive cable to discharge the Occupant Restraint Controller (ORC) capacitor before performing any welding operations on the vehicle. Failure to take the proper precautions could result in accidental airbag deployment, possible damage to the Supplemental Restraint System (SRS) circuits and components, and possible damage to other electronic circuits and components. Whenever a welding process is being performed within 12 inches (30 centimeters) of an electronic module or wiring harness, then that module or harness should be relocated out of the way, or disconnected. Always protect against component or vehicle damage from weld spatter by using weld blankets and screens.

WARNING: To avoid serious or fatal injury, do not attempt to dismantle an airbag unit or tamper with its inflator. Do not puncture, incinerate or bring into contact with electricity. Do not store at temperatures exceeding 93Ā° C (200Ā° F). An airbag inflator unit may contain sodium azide and potassium nitrate. These materials are poisonous and extremely flammable. Contact with acid, water, or heavy metals may produce harmful and irritating gases (sodium hydroxide is formed in the presence of moisture) or combustible compounds. An airbag inflator unit may also contain a gas canister pressurized to over 17.24 kPa (2500 psi). Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: To avoid serious or fatal injury when handling a seat belt tensioner retractor or buckle, proper care should be exercised to keep fingers out from under the retractor or buckle cover and away from the seat belt webbing or cable where it exits from the retractor or buckle cover.

WARNING: To avoid serious or fatal injury, replace all Supplemental Restraint System (SRS) components only with parts specified in the Chrysler MoparĀ® Parts Catalog. Substitute parts may appear interchangeable, but internal differences may result in inferior occupant protection.

WARNING: To avoid serious or fatal injury, the fasteners, screws, and bolts originally used for the Supplemental Restraint System (SRS) components must never be replaced with any substitutes. These fasteners have special coatings and are specifically designed for the SRS. Anytime a new fastener is needed, replace it with the correct fasteners provided in the service package or specified in the Chrysler MoparĀ® Parts Catalog.

WARNING: To avoid serious or fatal injury when a steering column has an airbag unit attached, never place the column on the floor or any other surface with the steering wheel or airbag unit face down. Failure to follow these instructions may result in possible serious or fatal injury.

DESCRIPTION

SUPPLEMENTAL RESTRAINT SYSTEM

A Supplemental Restraint System (SRS) is standard factory-installed safety equipment on this vehicle. Available supplemental occupant restraints for this vehicle include both active and passive types. Active restraints are those which require the vehicle occupants to take some action to employ, such as fastening and adjusting a seat belt; while passive restraints require no action by the vehicle occupants to be employed. Additional information on each of these subsystems of the SRS can be found elsewhere within this service information.

ACTIVE RESTRAINTS

The active restraints for this vehicle include:

- **Child Restraint Anchors** - All vehicles are equipped with three, fixed-position, child seat upper tether anchors for the rear seating. These upper anchors are integral to the rear shelf panel support. Two lower anchors are also provided for each rear seating position. The lower anchors are integral to an isofix cross member welded to the center floor panel beneath the rear seat. These lower anchors are accessed from the front of the rear seat where the seat back meets the seat cushion.
- **Front Seat Belts** - Both front seating positions are equipped with three-point seat belt systems employing lower B-pillar mounted inertia latch-type emergency locking retractors, fixed B-pillar mounted webbing guides, a traveling webbing guide on the outboard side of each front seat head restraint, a fixed lower seat belt anchor secured to the inboard side of the floor sill, and a traveling end-release seat belt buckle secured to the inboard side of the seat frame. The passenger side front seat belt retractor is switchable to an automatic locking retractor for compatibility with child seats. The driver and passenger side front seat belt buckles each include an integral seat belt switch that detects whether the front seat belts have been fastened.
- **Rear Seat Belts** - All three rear seating positions are equipped with three-point seat belt systems. The outboard seating position belts employ C-pillar mounted inertia latch-type emergency locking retractors, fixed position upper C-pillar mounted turning loops and fixed lower seat belt anchors secured to the lower C-pillar. The center position retractor is secured to the rear shelf panel and the fixed lower center seat belt anchor is secured to the floor panel. All three rear seat belts have fixed end-release seat belt buckles secured to the floor panel, a double buckle unit on the right side and a single buckle unit on the left side. Both outboard rear seat belt retractors are switchable to an automatic locking retractor for compatibility with child seats.

PASSIVE RESTRAINTS

Fig. 1: SRS Logo
Courtesy of CHRYSLER GROUP, LLC

The passive restraints available for this vehicle include the following:

- **Active Head Restraints** - Inertia-based Active Head Restraints (AHR) are standard equipment for both front seating positions in this vehicle.
- **Dual Front Airbags** - A multistage Driver AirBag (DAB) and front Passenger AirBag (PAB) are standard in this vehicle. This airbag system consists of passive, inflatable, Supplemental Restraint System (SRS) components and vehicles with this equipment can be readily identified by the **SRS - AIRBAG** logo molded into the DAB trim cover in the center of the steering wheel and also into the PAB door on the top of the instrument panel above the glove box. Vehicles with the airbag system can also be identified by the airbag indicator, which will illuminate in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) from four to six seconds as a bulb test each time the status of the ignition switch transitions to On. Pyrotechnic-type seat belt tensioners are also integral for the driver and passenger front seat belts of all airbag equipped vehicles to work in conjunction with the dual front and side curtain airbags.
- **Seat Airbags** - Front seat integrated Seat AirBags (SAB) (also known as pelvic and thoracic airbags) are standard equipment in all markets. This airbag system consists of passive, inflatable, SRS components and vehicles with this equipment can be readily identified by a sewn tag with the **SRS - AIRBAG** logo located on the outboard side of the front seat back trim cover.
- **Side Curtain Airbags** - Side curtain airbags (also known as Side AirBag Inflatable Curtains/SABIC) are standard equipment for this vehicle when it is also equipped with dual front airbags. This airbag system consists of passive, inflatable, SRS components and vehicles with this equipment can be readily identified by a molded identification trim button with the **SRS - AIRBAG** logo located on the top of each B-pillar upper trim panel near the headliner.

The SRS includes the following major components, which are described in further detail elsewhere in this service information:

- **Active Head Restraints** - One Active Head Restraint (AHR) is located atop each front seat back unit.
- **Airbag Indicator** - The airbag indicator is integral to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC), which is located on the instrument panel in front of the driver.
- **Clockspring** - The clockspring is located near the top of the steering column, directly beneath the

steering wheel.

- **Driver Airbag** - The Driver AirBag (DAB) is located in the center of the steering wheel, beneath the DAB trim cover.
- **Driver Knee Blocker** - The driver knee blocker is a static structural unit secured to the back side of and integral to the instrument panel steering column opening cover.
- `
- **Front Impact Sensor** - Two front impact sensors are used on vehicles equipped with dual front airbags, one left side and one right side. One sensor is located on the back side of each vertical member of the Front End Module (FEM) structural support.
- **Occupant Detection Sensor** - An Occupant Detection Sensor (ODS) is located on the top of the seat cushion of the passenger side front seat.
- **Occupant Restraint Controller** - The Occupant Restraint Controller (ORC) is located on a mount on the floor panel transmission tunnel forward of the transmission gear selector, and is concealed below the instrument panel.
- **Passenger Airbag** - The Passenger AirBag (PAB) is located in the instrument panel, beneath the PAB door on the top of the instrument panel above the glove box on the passenger side of the vehicle.
- **Passenger Knee Blocker** - The passenger knee blocker is a static structural reinforcement that is integral to and concealed within the glove box door.
- **Seat Airbag** - A Seat AirBag (SAB) (also known as a pelvic and thoracic airbag) is secured to each outboard front seat back frame, where it is concealed beneath the seat back trim cover and foam.
- **Seat Belt Tensioner** - A seat belt tensioner is integral to both front seat belt retractor units and both front seat buckle units. The seat belt retractor tensioner units are secured to each lower inner quarter panel and are concealed behind the lower quarter panel trim. The seat belt buckle tensioner units are located on the inboard rear corner of each front seat cushion frame.
- **Seat Track Position Sensor** - Certain vehicles may include a Seat Track Position Sensor (STPS) that may be located on the inboard side of one of the seat adjuster tracks on both the driver and the passenger front seats.
- **Side Curtain Airbag** - A standard equipment side curtain airbag (also known as a Side AirBag Inflatable Curtain/SABIC) is secured to each inside roof side rail above the headliner, and extends from the A-pillar to just beyond the C-pillar.
- **Side Impact Sensor** - Six side impact sensors are standard equipment on vehicles equipped with side curtain airbags, three on each side of the vehicle. One pressure-type sensor is located on each right and left side door hardware module carrier, while one acceleration-type sensor is located on each B-pillar and C-pillar. These sensors are each concealed behind the adjacent interior trim components.

The ORC and the IC each contain a microcontroller and programming that allow them to communicate with each other using the Controller Area Network (CAN) data bus. This method of communication is used by the ORC for control of the airbag indicator in the IC. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the SRS components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system, and to the SRS components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper

wire and connector repair procedures, further details on wire harness routing and retention, as well as pin out and location views for the various wire harness connectors, splices and grounds.

OPERATION

SUPPLEMENTAL RESTRAINT SYSTEM

The Supplemental Restraint System (SRS) is comprised of two primary subsystems: Active Restraints and Passive Restraints. Additional operational details on each of these subsystems of the SRS can be found elsewhere within this service information.

ACTIVE RESTRAINTS

The primary passenger restraints in this or any other vehicle are the standard equipment factory-installed seat belts and child restraint anchors. Seat belts and child restraint anchors are referred to as an active restraint because the vehicle occupants are required to physically fasten and properly adjust these restraints in order to benefit from them.

PASSIVE RESTRAINTS

The passive restraints are referred to as Supplemental Restraint System (SRS) components because they were designed and are intended to enhance the protection for the occupants of the vehicle **only** when used in conjunction with the seat belts. They are referred to as passive restraints because the vehicle occupants are not required to do anything to make them operate; however, the vehicle occupants must be wearing their seat belts in order to obtain the maximum safety benefit from the factory-installed SRS components. In addition, each front seat occupant must have their Active Head Restraint (AHR) unit properly adjusted in order to obtain its maximum safety benefit.

The SRS electrical circuits are continuously monitored and controlled by a microcontroller and software contained within the Occupant Restraint Controller (ORC). An airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) illuminates from four to six seconds as a bulb test each time the status of the ignition switch transitions to On or Start. Following the bulb test, the airbag indicator is turned On or Off by the ORC to indicate the status of the SRS. If the airbag indicator comes On at any time other than during the bulb test, it indicates that there is a problem in the SRS electrical circuits. Such a problem may cause airbags not to deploy when required, or to deploy when not required.

Deployment of the SRS components depends upon the angle and severity of an impact. Deployment is not based upon vehicle speed; rather, deployment is based upon the rate of deceleration as measured by the forces of gravity (G force) upon the acceleration-type impact sensors, or by a pressure wave within a front door as measured by the pressure-type impact sensor. When an impact is severe enough, the microcontroller within the ORC signals the inflator of the appropriate airbag units to deploy their airbag cushions.

The front seat belt retractor and buckle tensioners are provided with a deployment signal by the ORC in conjunction with the front airbags. The side curtain airbags (also known as the Side AirBag Inflatable Curtains/SABIC) and the Seat AirBags (SAB) (also known as pelvic and thoracic airbags) are provided with a deployment signal individually by the ORC based upon a side impact sensor input for the same side of the vehicle. The ORC also contains a rollover sensor. Should the vehicle roll over and not cause any impact sensor to signal the need for a deployment, the rollover sensor in the ORC will deploy the SABIC units, the SAB units and under certain conditions, will also actuate the front seat belt retractor and anchor buckle tensioners.

During a frontal vehicle impact, the static knee blockers work in concert with properly fastened and adjusted seat belts to restrain both the driver and the front seat passenger in the proper position for an airbag deployment. The knee blockers also absorb and distribute the crash energy from the driver and the front seat passenger to the structure of the instrument panel. The seat belt tensioners remove the slack from the front seat belts to provide further assurance that the driver and front seat passenger are properly positioned and restrained for an airbag deployment.

Typically, the vehicle occupants recall more about the events preceding and following a collision than they do of an airbag deployment itself. This is because the airbag deployment and deflation occur very rapidly. In a typical 48 kilometer-per-hour (30 mile-per-hour) barrier impact, from the moment of impact until the airbags are fully inflated takes about 40 milliseconds. Within one to two seconds from the moment of impact, the airbags are almost entirely deflated. The times cited for these events are approximations, which apply only to a barrier impact at the given speed. Actual times will vary somewhat, depending upon the vehicle speed, impact angle, severity of the impact, and the type of collision.

When the ORC monitors a problem in any of the SRS circuits or components, including the seat belt tensioners, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit and sends an electronic message to the IC to turn On the airbag indicator. The hard wired circuits between components related to the SRS may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SRS or the electronic controls and communication between other modules and devices that provide features of the SRS. The most reliable, efficient and accurate means to diagnose the SRS or the electronic controls and communication related to SRS operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate Diagnostic & Testing article.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SUPPLEMENTAL RESTRAINT SYSTEM

The hard wired circuits between modules and components related to the Supplemental Restraint System (SRS) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SRS or the electronic controls and communication between other modules and devices that provide features of the SRS. The most reliable, efficient and accurate means to diagnose the SRS or the electronic controls and communication related to SRS operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

In addition to a diagnostic scan tool that contains the latest version of the proper diagnostic software, certain diagnostic procedures for the SRS may require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate Diagnostic & Testing article.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

STANDARD PROCEDURE

HANDLING NON-DEPLOYED SUPPLEMENTAL RESTRAINTS

At no time should any source of electricity be permitted near the inflator on the back of a non-deployed airbag or seat belt tensioner. When carrying a non-deployed airbag, the trim cover or airbag cushion side of the unit should be pointed away from the body to minimize injury in the event of an accidental deployment. If the airbag unit is placed on a bench or any other surface, the trim cover or airbag cushion side of the unit should be face up to minimize movement in the event of an accidental deployment.

When handling a non-deployed seat belt tensioner, take proper care to keep fingers out from under the retractor or buckle cover and away from the seat belt webbing or cable where it exits from the retractor or buckle cover. In addition, the Supplemental Restraint System (SRS) should be disarmed whenever any steering wheel, steering column, seat belt tensioner, airbag, impact sensor or instrument panel components require diagnosis or service. Failure to observe this warning could result in accidental airbag deployment and possible personal injury.

All damaged, ineffective or non-deployed airbags and seat belt tensioners which are replaced on vehicles are to be handled and disposed of properly. If an airbag or seat belt tensioner unit is ineffective or damaged and non-deployed, refer to the Hazardous Substance Control System for information regarding the potentially hazardous properties of the subject component and the proper safe handling procedures. Then dispose of all non-deployed and deployed airbags and seat belt tensioners in a manner consistent with state, provincial, local and federal regulations.

SERVICE AFTER A SUPPLEMENTAL RESTRAINT SYSTEM DEPLOYMENT

Any vehicle which is to be returned to use following a Supplemental Restraint System (SRS) component deployment must have the deployed restraints replaced. In addition, the following guidelines MUST be observed.

- **Following ANY major vehicle impact damage in the vicinity of an impact sensor or the ORC -** It is critical that the mounting surfaces and mounting brackets for the Occupant Restraint Controller (ORC), front impact sensors and side impact sensors located within the proximity of the impact damage be closely inspected and restored to their original conditions. Because the ORC and each impact sensor are used by the SRS to monitor or confirm the direction and severity of a vehicle impact, improper orientation or insecure fastening of these components may cause airbags not to deploy when required, or to deploy when not required.
- **Following ANY airbag deployment event -** The Lower Anchors and Tethers for CHildren (LATCH) provisions, the upper tether anchors (if equipped) and all interior trim panels must also be inspected.

- **If an active head restraint is deployed** - An inertia-based Active Head Restraint (AHR) unit that is undamaged following a deployment automatically resets itself. These units are designed with the intention of reuse.
- **If the driver airbag is deployed** - If the Driver AirBag (DAB) has been deployed, the DAB, the clockspring, the steering wheel, the steering column assembly including the intermediate shaft and coupler, both front seat belt retractor and tensioner assemblies, and all other seat belt retractors and buckles in use must be replaced. The front impact sensors must be inspected.
- **If the passenger airbag is deployed** - If the Passenger AirBag (PAB) has been deployed, the PAB, the instrument panel and the PAB wire harness or connector must be replaced.
- **If a seat airbag is deployed** - If a Seat AirBag (SAB) (also known as the pelvic and thoracic airbag) has been deployed, the SAB, the SAB jumper wire harness, the thermoplastic SAB chute, the seat back frame, the seat back foam, the seat back trim cover and the side impact sensors on the same side of the vehicle as the deployed airbag must be replaced. Both front seat belt retractor and tensioner assemblies, and all other seat belt retractors and buckles in use must be replaced.
- **If a seat belt tensioner is deployed** - The seat belt tensioners are deployed in conjunction with the front airbags, but can also be deployed with a Seat AirBag (SAB) (also known as the pelvic and thoracic airbag) or side curtain airbags (also known as Side AirBag Inflatable Curtains/SABIC). All seat belt tensioners must be replaced if any airbag in the vehicle has been deployed.
- **If a side curtain airbag is deployed** - If a side curtain airbag (also known as Side AirBag Inflatable Curtain/SABIC) has been deployed, the SABIC, the upper A and C-pillar trim, the upper quarter trim and the side impact sensors on the same side of the vehicle as the deployed airbag must be replaced. The headliner, both front seat belt retractor and tensioner assemblies, and all other seat belt retractors and buckles in use must be replaced. For vehicles with an optional sunroof, the sunroof and the sunroof drain tubes and hoses must be inspected.

The components identified with the deployed SRS components in the preceding list are not intended for reuse and will be damaged or weakened as a result of an airbag deployment, which may or may not be obvious during a visual inspection. All other vehicle components should be closely inspected following any SRS component deployment, but are to be replaced only as required by the extent of the visible damage incurred.

SQUIB CIRCUIT DAMAGE

In addition to the preceding guidelines, be aware that the heat created by the initiator during an airbag or tensioner deployment will cause collateral damage to the connected wiring (squib circuits) and connector insulators. There are two methods by which an airbag or seat belt tensioner may be connected to the vehicle electrical system. The first method involves a short pigtail harness and connector insulator that are integral to the airbag or tensioner unit and are replaced as a unit with the service replacement airbag or seat belt tensioner. This connection method typically requires no additional wiring repair following a deployment.

However, the second connection method involves a wire harness takeout and connector insulator that are connected directly to the airbag or tensioner initiator or squib. These direct-connect type take outs and connector insulators **MUST** be repaired following an airbag or seat belt tensioner deployment using the approved Supplemental Restraint System Wiring Repairs procedure. Refer to STANDARD PROCEDURE.

AIRBAG SQUIB STATUS

Multistage airbags with multiple initiators (squibs) must be checked to determine that all squibs were used during the deployment event. The Driver AirBag (DAB) and Passenger AirBag (PAB) in this vehicle are

deployed by electrical signals generated by the Occupant Restraint Controller (ORC) through the driver or passenger squib 1 and squib 2 circuits to the two initiators in the airbag inflators. Typically, both initiators are used and all potentially hazardous chemicals are burned during an airbag deployment event. However, it is possible for only one initiator to be used; therefore, it is always necessary to confirm that both initiators have been used in order to avoid the improper handling or disposal of potentially live pyrotechnic or hazardous materials. The following procedure should be performed using a diagnostic scan tool to verify the status of both airbag squibs before either deployed airbag is removed from the vehicle for disposal.

CAUTION: Deployed front airbags having two initiators (squibs) in the airbag inflator may or may not have live pyrotechnic material within the inflator. Do not dispose of these airbags unless you are certain of complete deployment. Refer to the Hazardous Substance Control System for information regarding the potentially hazardous properties of the subject component and the proper safe handling procedures. Then dispose of all non-deployed and deployed airbags and seat belt tensioners in a manner consistent with state, provincial, local and federal regulations.

1. Be certain that the diagnostic scan tool contains the latest version of the proper diagnostic software. Connect the scan tool to the 16-way Data Link Connector (DLC). The DLC is located on the driver side lower edge of the instrument panel, outboard of the steering column.
2. Transition the status of the ignition switch to On.
3. Using the scan tool, read and record the active (current) Diagnostic Trouble Code (DTC) data.

Using the active DTC information, refer to the **Airbag Squib Status** table to determine the status of both DAB squibs and both PAB squibs.

<table>
<tr><th colspan="3">AIRBAG SQUIB STATUS</th></tr>
<tr><th>IF THE ACTIVE DTC IS:</th><th>CONDITIONS</th><th>SQUIB STATUS</th></tr>
<tr><td>Driver or Passenger Squib 1 open</td><td rowspan="2">AND the stored DTC minutes for both Driver or Passenger squibs are within 15 minutes of each other</td><td rowspan="2">Both Squib 1 and 2 were used.</td></tr>
<tr><td>Driver or Passenger Squib 2 open</td></tr>
<tr><td>Driver or Passenger Squib 1 open</td><td rowspan="2">AND the stored DTC minutes for Driver or Passenger Squib 2 open is GREATER than the stored DTC minutes for Driver or Passenger Squib 1 by 15 minutes or more</td><td rowspan="2">Squib 1 was used; Squib 2 is live.</td></tr>
<tr><td>Driver or Passenger Squib 2 open</td></tr>
<tr><td>Driver or Passenger Squib 1 open</td><td rowspan="2">AND the stored DTC minutes for Driver or Passenger Squib 1 open is GREATER than the stored DTC minutes for Driver or Passenger Squib 2 by 15 minutes or more</td><td rowspan="2">Squib 1 is live; Squib 2 was used.</td></tr>
<tr><td>Driver or Passenger Squib 2 open</td></tr>
<tr><td>Driver or Passenger Squib 1 open</td><td>AND Driver or Passenger Squib 2 open is NOT an active code</td><td>Squib 1 was used; Squib 2 is live.</td></tr>
<tr><td>Driver or Passenger Squib 2 open</td><td>AND Driver or Passenger Squib 1 open is NOT an active code</td><td>Squib 1 is live; Squib 2 was used.</td></tr>
</table>

NOTE: If none of the Driver or Passenger Squib 1 or 2 open are active codes, the status

of the airbag squibs is unknown. In this case the airbag should be handled and disposed of as if the squibs were both live.

CLEANUP PROCEDURE

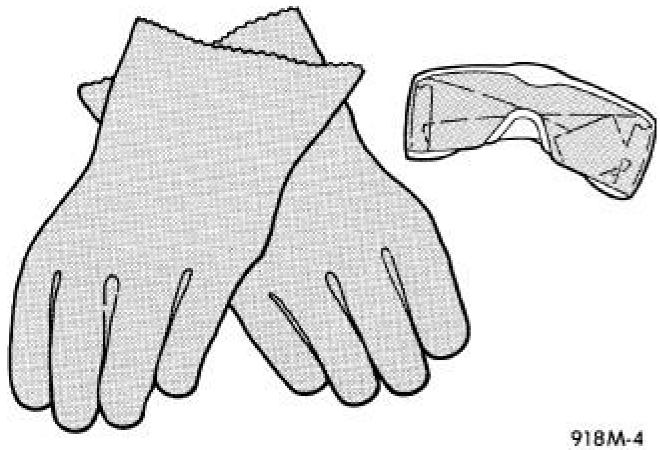


Fig. 2: Safety Glasses & Rubber Gloves
Courtesy of CHRYSLER GROUP, LLC

Following a Supplemental Restraint System (SRS) component deployment, the vehicle interior will contain a powdery residue. This residue consists primarily of harmless particulate by-products of the small pyrotechnic charge that initiates the propellant used to deploy a SRS component. However, this residue may also contain traces of sodium hydroxide powder, a chemical by-product of the propellant material that is used to generate the inert gas that inflates the airbag. Since sodium hydroxide powder can irritate the skin, eyes, nose, or throat, be certain to wear safety glasses, rubber gloves, and a long-sleeved shirt during cleanup.

WARNING: **To avoid serious or fatal injury, if you experience skin irritation during cleanup, run cool water over the affected area. Also, if you experience irritation of the nose or throat, exit the vehicle for fresh air until the irritation ceases. If irritation continues, see a physician.**

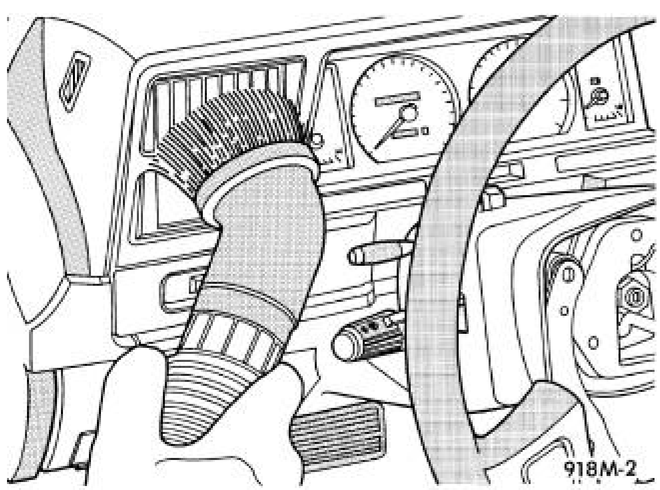


Fig. 3: Vacuum Cleaner
Courtesy of CHRYSLER GROUP, LLC

1. Begin the cleanup by using a vacuum cleaner to remove any residual powder from the vehicle interior. Clean from outside the vehicle and work your way inside, so that you avoid kneeling or sitting on a non-cleaned area.
2. Be certain to vacuum the heater and air conditioning outlets as well. Run the heater and air conditioner blower on the lowest speed setting and vacuum any powder expelled from the outlets.

CAUTION: Deployed front airbags having two initiators (squibs) in the airbag inflator may or may not have live pyrotechnic material within the inflator. Do not dispose of these airbags unless you are certain of complete deployment. Refer to the AIRBAG SQUIB STATUS heading within this information. All damaged, ineffective, or non-deployed Supplemental Restraint System (SRS) components which are replaced on vehicles are to be handled and disposed of properly. If an airbag or seat belt tensioner unit is ineffective or damaged and non-deployed, refer to the Hazardous Substance Control System for information regarding the potentially hazardous properties of the subject component and the proper safe handling procedures. Then dispose of all non-deployed and deployed airbags and seat belt tensioners in a manner consistent with state, provincial, local and federal regulations.

3. Next, remove the deployed SRS components from the vehicle. Refer to the appropriate service removal procedures.
4. You may need to vacuum the interior of the vehicle a second time to recover all of the powder.

SUPPLEMENTAL RESTRAINT STORAGE

Airbags and seat belt tensioners must be stored in their original, special container until they are used for service. Also, they must be stored in a clean, dry environment away from sources of extreme heat, sparks and high electrical energy. Always place or store any airbag on a surface with its trim cover or airbag cushion side facing up, to minimize movement in case of an accidental deployment.

SUPPLEMENTAL RESTRAINT SYSTEM VERIFICATION TEST

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbags, airbag curtains, knee blocker, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect the IBS/negative battery cable assembly from the negative battery post, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: The following procedure should be performed using a diagnostic scan tool to verify proper Supplemental Restraint System (SRS) operation following the service or replacement of any SRS component. Refer to the appropriate Diagnostic & Testing procedures.

1. During the following test, the negative cable remains disconnected and isolated from the battery, as it was during the Supplemental Restraint System (SRS) component removal and installation procedures.

2. Be certain that the diagnostic scan tool contains the latest version of the proper diagnostic software. Connect the scan tool to the 16-way Data Link Connector (DLC). The DLC is located on the driver side lower edge of the instrument panel, near the steering column opening cover and outboard of the steering column.
3. Transition the status of the ignition switch to On and exit the vehicle with the scan tool.
4. Check to be certain that nobody is in the vehicle, then reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.
5. Using the scan tool, read and record the active (current) Diagnostic Trouble Code (DTC) data.
6. Next, use the scan tool to read and record any stored (historical) DTC data.
7. If any DTC is found in Step 5 or Step 6, Refer to the appropriate Diagnostic & Testing article.
8. Use the scan tool to erase the stored DTC data. If any problems remain, the stored DTC data will not erase. Refer to the appropriate Diagnostic & Testing article to diagnose any stored DTC that will not erase. If the stored DTC information is successfully erased, go to Step 9.
9. Transition the status of the ignition switch to Off for about 15 seconds, and then back to On. Observe the airbag indicator in the instrument cluster. It should light from four to six seconds, and then go out. This indicates that the SRS is functioning normally and that the repairs are complete. If the airbag indicator fails to light, or lights and stays On, there is still an active SRS fault or malfunction. Refer to the appropriate Diagnostic & Testing article to diagnose the problem.

SUPPLEMENTAL RESTRAINT SYSTEM WIRING REPAIRS

It is important when repairing any Supplemental Restraint System (SRS) electrical circuits to use the recommended splicing kit and procedure. For applicable and available MOPAR wiring repair kits, please visit the MOPAR Connection Repair Kit Web Site.

This recommended procedure involves crimping the wires together with a splice band, soldering the crimped connection and, finally, sealing and protecting the repair. The crimp and solder ensure a strong mechanical bond that will always pass a pull test while also maintaining the conductivity and current carrying capacity of the circuit. The adhesive sealant and heat shrink tubing ensures the splice repair will perform as well or better than the original wire and be safe from potential corrosion or short circuits.

There is no limit to the number of splice repairs that can be made in one harness using this procedure. However, as has been past practice, multiple adjacent splices should be offset from each other. This wiring splice repair procedure is approved for harness side repairs only. Repairs and splices to pigtail wires on SRS components such as airbag units, seat belt tensioner units or clocksprings are not approved or recommended.

REPAIR PROCEDURE

CAUTION: If additional wire is needed when making a splice repair to any wire, it is important that the same or next larger size wire gauge be used. Refer to the appropriate SYSTEM WIRING DIAGRAMS article for the original wire gauge size.

1. Remove 13 millimeters (0.50 inch) of insulation from each wire that needs to be spliced.

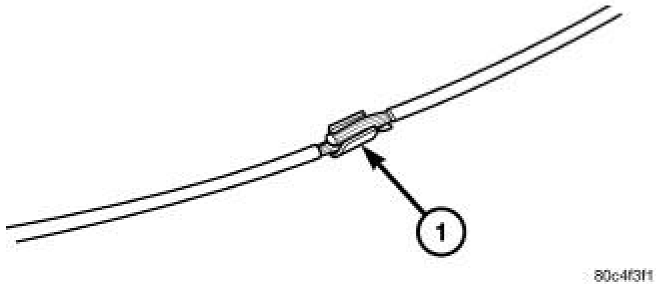


Fig. 4: Splice Band
Courtesy of CHRYSLER GROUP, LLC

2. Place a piece of adhesive sealant-lined heat shrink tubing (Part Number 04778570 or equivalent) over the wire on one side of the splice. Be certain the length of tubing will be sufficient to cover and seal the entire repair area.
3. Place the strands of the wires being spliced so that they are overlapping each other within the splice band (1).

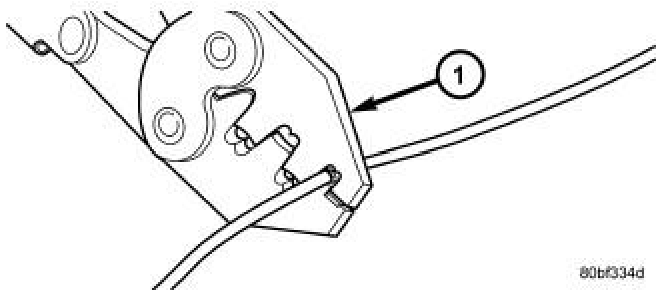


Fig. 5: Crimping Tool
Courtesy of CHRYSLER GROUP, LLC

4. Using a crimping tool (1) (MOPAR Part Number 05019912AA, Miller Special Tool Number (special tool #10042, Crimper, Wire/Terminal) or equivalent) crimp the splice band and wires together securely.

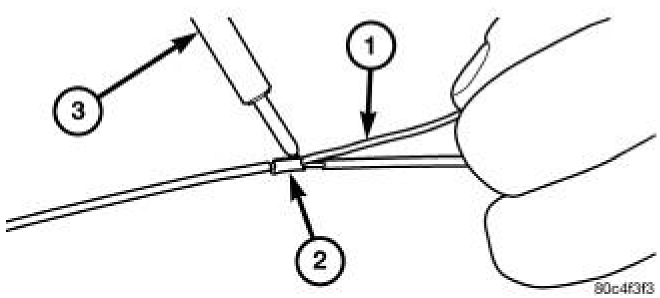
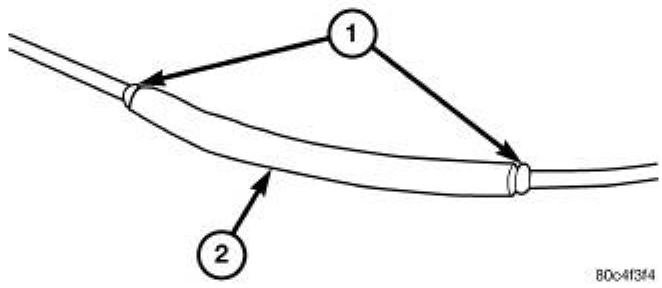


Fig. 6: Solder Splice
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Never use acid core solder for electrical wiring repairs.

5. Using rosin core type solder (1) only and a suitable soldering iron (3), solder the wire and splice band connection (2) together.



[Fig. 7: Heat Shrink Tube]
Courtesy of CHRYSLER GROUP, LLC

6. Center the heat shrink tubing (2) over the splice joint repair and heat using a suitable heat gun. Heat the joint until the tubing is tightly sealed and sealant (1) begins to ooze out of both ends of the tubing.

SPECIFICATIONS

TORQUE SPECIFICATIONS

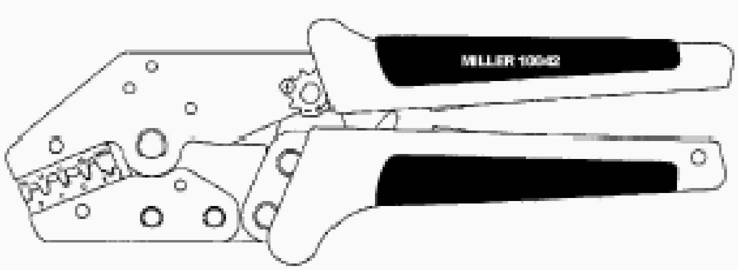
TORQUE SPECIFICATIONS TABLE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Passenger Airbag Mounting Screws	11	8	-	Ā
Seat Airbag To Seat Back Frame Nuts	10	-	88	Ā
Curtain Airbag Roof Side Rail Mounting Screws	7	-	62	Ā
Curtain Airbag Inflator Bracket Mounting Screws	7	-	62	Ā
Front Seat Belt Buckle Mounting Screws	43	32	-	Ā
Front Seat Belt And Tensioner Lower Bracket Mounting Screws	45	33	-	Ā
Front Seat Belt And Tensioner Upper Bracket Mounting Screws	3	-	27	Ā
Rear Seat Belt Buckle Anchor To Floor Panel Weld Stud Mounting Nuts	55	41	-	Ā
Occupant Restraint Controller Mounting Screws	8	-	71	Ā
Front Seat Belt Retractor Mounting Screws	45	33	-	Ā
Front Seat Belt Web Guide Mounting Screws	3	-	27	Ā
Front Seat Belt Lower Anchor To Floor Sill Mounting Screws	45	33	-	Ā
Rear Center Seat Belt Retractor Mounting Nut	50	37	-	Ā

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Rear Center Seat Belt Anchor To Floor Panel Weld Stud Mounting Nut	55	41	-	Ā
Rear Outboard Seat Belt Retractor Mounting Screws	45	33	-	Ā
Rear Outboard Seat Belt Turning Loop Mounting Screws	45	33	-	Ā
Rear Outboard Seat Belt Lower Anchor Mounting Screws	45	33	-	Ā
Front Impact Sensor Mounting Screws	7	-	62	Ā
B-Pillar Side Impact Sensor Mounting Screws	7	-	62	Ā
C-Pillar Side Impact Sensor Mounting Screws	7	-	62	Ā
Front Door Side Impact Sensor Mounting Screws	2.4	-	21	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

SPECIAL TOOLS

SPECIAL TOOLS

	10042 - Crimper, Wire/Terminal (Originally Shipped In Kit Number(s) 10042.)

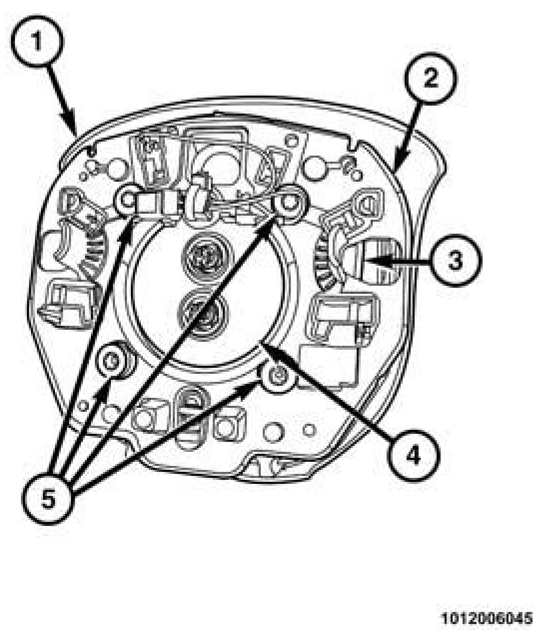
AIR BAG, DRIVER

DESCRIPTION

DESCRIPTION

[Fig. 8: Steering Wheel & Protective Trim Cover]
Courtesy of CHRYSLER GROUP, LLC

The injection molded, thermoplastic Driver AirBag (DAB) protective trim cover (2) is the most visible part of the DAB. The DAB is located in the center of the steering wheel (1), where it is secured by a spring wire retainer integral to the fixing plate to two hooks of the steering wheel armature within the hub cavity of the steering wheel. An injection molded, bright emblem with the Dodge logo or the SRT logo is applied to the center of the trim cover.



[Fig. 9: Trim Cover, Floating Horn Switch/Fixing Plate Unit, Spring Wire Retainer, Airbag Inflator & Screws]
Courtesy of CHRYSLER GROUP, LLC

Concealed beneath the DAB trim cover (1) are the folded airbag cushion, the airbag housing, the airbag inflator

(4) and the retainers that secure the inflator to the housing. The airbag cushion, housing and inflator are secured within an integral receptacle molded into the back of the trim cover. The vertical walls of this receptacle have numerous integral window features that are engaged by numerous hook features around the perimeter of the DAB housing. Once the trim cover is fully seated onto the housing, it can only be removed by cutting it off. The DAB housing also has four well nuts, to which four screws (5) are fastened to secure the spring wire retainer (3) and the floating horn switch/fixing plate unit (2) to the back of the housing.

The DAB used in this vehicle is a multistage-type that complies with revised federal airbag standards to deploy with less force than those used in some prior vehicles. A radial deploying fabric airbag cushion with internal tethers is used. The airbag inflator is a dual-initiator, non-azide, pyrotechnic-type unit and is secured to the airbag housing. Two keyed and color-coded connector receptacles on the two inflator initiators are connected to the vehicle electrical system through two jacketed, two-wire pigtail harnesses from the clockspring.

The DAB cannot be repaired, and must be replaced if deployed, ineffective or in any way damaged. The DAB trim cover and the floating horn switch are serviced only as a unit with the DAB.

OPERATION

OPERATION

The multistage Driver AirBag (DAB) is deployed by electrical signals generated by the Occupant Restraint Controller (ORC) through the DAB squib 1 and squib 2 circuits to the two initiators in the airbag inflator. By using two initiators, the airbag can be deployed at multiple levels of force. The force level is controlled by the ORC to suit the monitored impact conditions by providing one of several delay intervals between the electrical signals provided to the two initiators. The longer the delay between these signals, the less forcefully the airbag will deploy.

When the ORC sends the proper electrical signals to each initiator, the electrical energy generates enough heat to initiate a small pyrotechnic charge which, in turn ignites chemical pellets within the inflator. Once ignited, these chemical pellets burn rapidly and produce a large quantity of inert gas. The inflator is sealed to the back of the DAB housing and a diffuser in the inflator directs all of the inert gas into the airbag cushion, causing the cushion to inflate. As the cushion inflates, the DAB trim cover will split at predetermined breakout lines, then fold back out of the way. Following a deployment, the airbag cushion quickly deflates by venting the inert gas towards the instrument panel through vent holes within the fabric used to construct the back (steering wheel side) panel of the cushion.

Some of the chemicals used to create the inert gas may be considered hazardous while in their solid state before they are burned, but they are securely sealed within the airbag inflator. Typically, both initiators are used and all potentially hazardous chemicals are burned during an airbag deployment event. However, it is possible for only one initiator to be used during a deployment due to a Supplemental Restraint System (SRS) fault; therefore, it is necessary to always confirm that both initiators have been used in order to avoid the improper disposal of potentially live pyrotechnic or hazardous materials. Refer to **STANDARD PROCEDURE**.

The inert gas that is produced when the chemicals are burned during a deployment is harmless. However, a small amount of residue from the burned chemicals may cause some temporary discomfort if it contacts the skin, eyes, or breathing passages. If skin or eye irritation is noted, rinse the affected area with plenty of cool, clean water. If breathing passages are irritated, move to another area where there is plenty of clean, fresh air to breath. If the irritation is not alleviated by these actions, contact a physician.

The ORC monitors the condition of the driver airbag through circuit resistance. If any fault is detected the ORC

will illuminate the airbag indicator in the instrument cluster and store a Diagnostic Trouble Code (DTC). Proper diagnosis of the DAB inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

WARNING: **To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag cushion and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.**

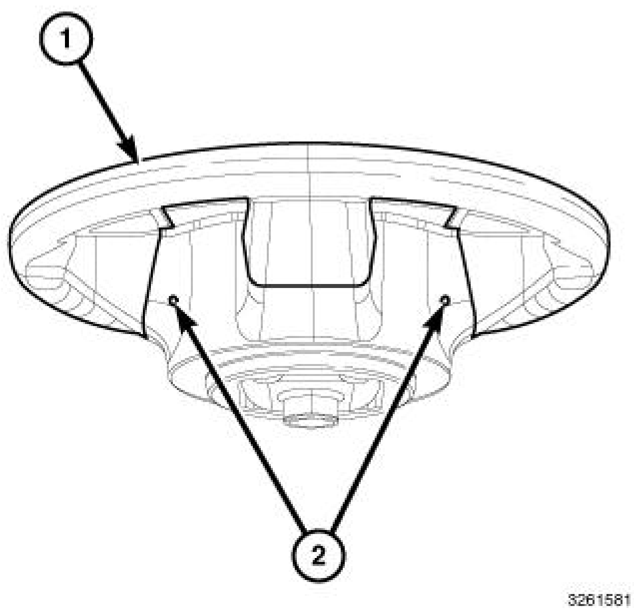


Fig. 10: Access Holes & Steering Wheel
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure is for replacement of an ineffective or damaged Driver AirBag (DAB). If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the DAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. Refer to**

STANDARD PROCEDURE.

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
2. Locate the access holes (2) in the lower surface of the steering wheel (1) hub rear trim cover near each of the two horizontal spokes.

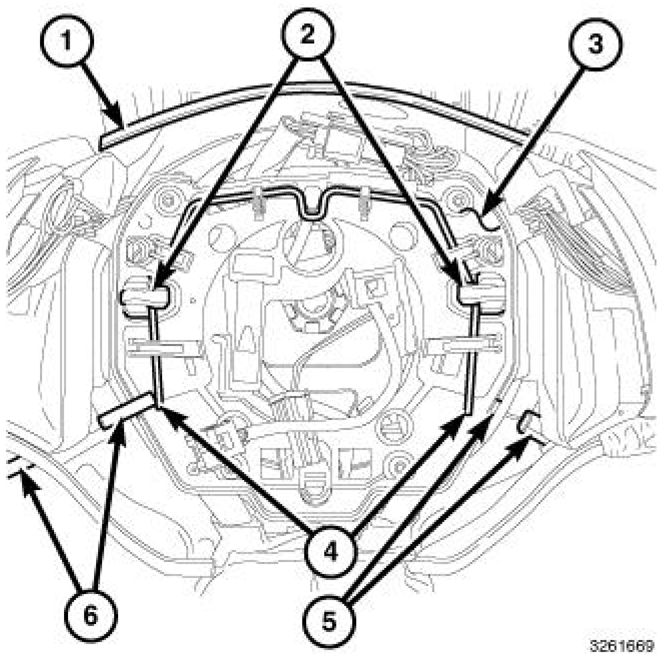
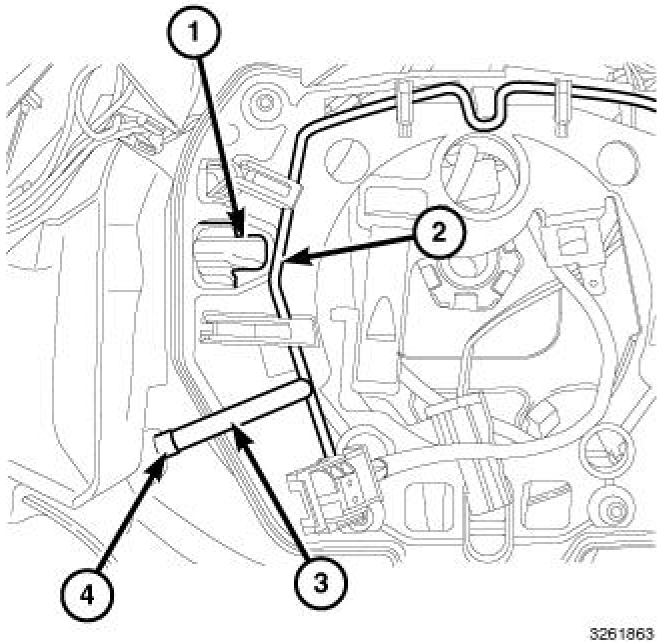


Fig. 11: Driver AirBag (DAB) Mounting/Horn Switch Plate, Retainer Spring, Hooks & Steering Wheel Hub Cavity
Courtesy of CHRYSLER GROUP, LLC

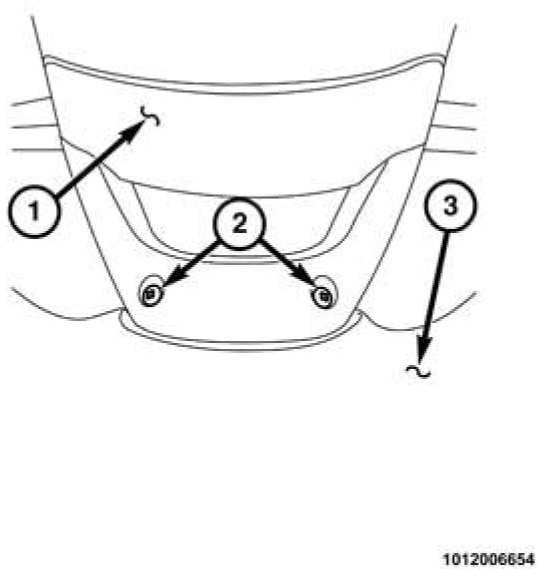
NOTE: **The graphic for this procedure shows the Driver AirBag (DAB) mounting/horn switch plate (3) and the retainer spring (4) engaged under the hooks (2) of the armature within the steering wheel hub cavity (1) without the DAB trim cover, cushion, housing and inflator present. This was done to provide graphical clarity of the components involved in DAB retention. The DAB trim cover, cushion, housing and inflator can only be removed as a unit with the mounting/horn switch plate and retainer spring as outlined in the following procedure.**

3. Insert an appropriately sized pin punch or Allen wrench through one of the steering wheel access holes. A guide and notch (5) integral to each side of the steering wheel hub rear trim cover (1) and the mounting/horn switch plate (3) will assist in directing the tool to the ends of the retainer spring (4).



[Fig. 12: Special Tool, Groove, Retainer Spring & Hook](#)
Courtesy of CHRYSLER GROUP, LLC

4. When the tool (3) makes contact with the retainer spring (2), push inward (toward the steering column) on the tool far enough to disengage the retainer spring from under the hook (1) of the steering wheel armature.



[Fig. 13: Lower Rear Spoke Cover, Screws & Steering Wheel](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**It is not necessary, but may prove helpful to remove the two screws (2) that secure the lower rear spoke cover (1) to the back of the steering wheel (3) and remove the cover. It will then be possible to observe the Allen**

wrench or pin punch contacting and releasing the retainer spring.

5. Pull the released side of the DAB away from the steering wheel far enough to insert a trim stick or another long and thin obstacle between the released side of the DAB trim cover and the steering wheel hub cavity. This will help to prevent the released end of the retainer spring from becoming accidentally engaged again, while the opposite end of the retainer spring is being released.
6. Repeat Steps 3 and 4 for the opposite end of the retainer spring.

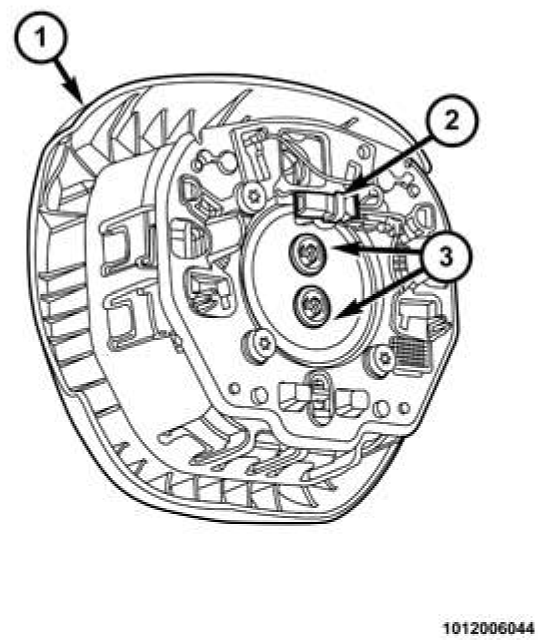


Fig. 14: DAB, Horn Switch & DAB Inflator Initiators
Courtesy of CHRYSLER GROUP, LLC

7. Pull the DAB (1) away from the steering wheel far enough to access the clockspring pigtail wire connections to the horn switch (2) and the DAB inflator initiators (3).
8. Disconnect the clockspring pigtail wire connector from the floating horn switch plate connector on the back of the switch plate.

CAUTION: **Do not pull on the clockspring pigtail wires or pry on the connector insulators to disengage them from the Driver AirBag (DAB) inflator initiator connector receptacles. Improper removal of these pigtail wires and their connector insulators can result in damage to the airbag circuits or the connector insulators.**

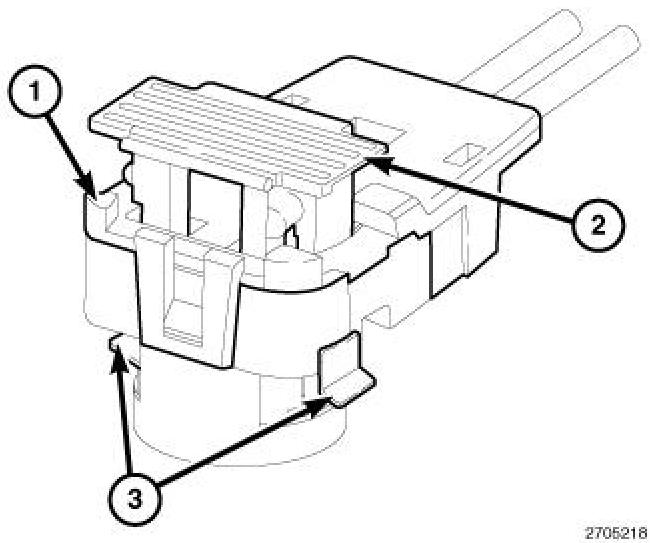


Fig. 15: Clockspring DAB Pigtail Wire Connector Insulators, Latches & Connector Position Assurance (CPA) Lock
Courtesy of CHRYSLER GROUP, LLC

9. The clockspring DAB pigtail wire connector insulators (1) are secured by integral latches (3) and a Connector Position Assurance (CPA) lock (2) to the airbag tether cutter and inflator connector receptacles, which are located on the back of the floating horn switch plate and the DAB housing. Pull the lock straight out from the connector insulator, then pull the insulators straight out from the connector receptacles to disengage and disconnect them.
10. Remove the DAB and floating horn switch plate from the steering wheel as a unit.
11. If the DAB has been deployed, the clockspring and the steering column must also be replaced. Refer to **CLOCKSPRING, REMOVAL** and **COLUMN, REMOVAL** .

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the Driver AirBag (DAB), or becoming entrapped between the DAB cushion and the DAB trim cover. Failure to observe this warning could result in occupant injuries upon airbag deployment.

WARNING: To avoid serious or fatal injury, the driver airbag trim cover must never be painted. Replacement airbags are serviced with trim covers in the original colors. Paint may change the way in which the material of the trim cover

responds to an airbag deployment. Failure to observe this warning could result in occupant injuries upon airbag deployment.

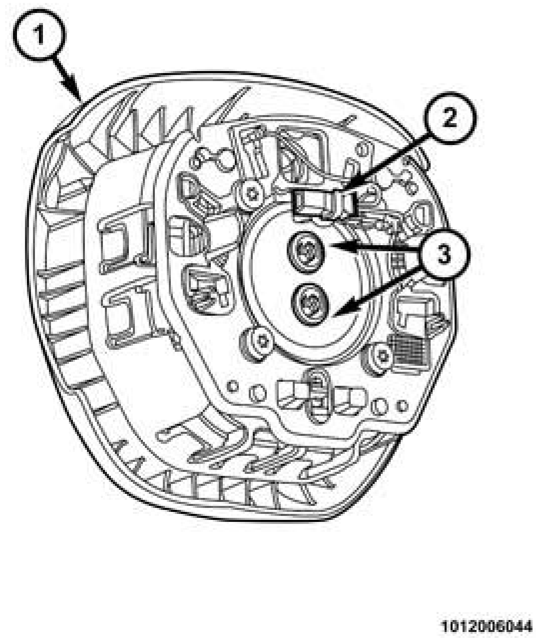


Fig. 16: DAB, Horn Switch & DAB Inflator Initiators
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure is for replacement of an ineffective or damaged Driver AirBag (DAB). If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the DAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. Refer to STANDARD PROCEDURE.**

1. Position the Driver AirBag (DAB) and floating horn switch unit (1) close enough to the steering wheel to access the clockspring pigtail wire connections to the horn switch (2) and the DAB inflator initiators (3).
2. Reconnect the clockspring pigtail wire connectors to the airbag inflator initiator connector receptacles by pressing straight in on the connector insulator. Be certain to engage each keyed and color-coded connector to the matching connector receptacle. Be certain that each connector is fully engaged in its receptacle, then push the connector lock straight into the connector to lock it into place.
3. Reconnect the clockspring pigtail wire connector to the floating horn switch connector on the back of the mounting/horn switch plate.
4. Carefully position the DAB and floating horn switch unit into the steering wheel hub cavity while tugging lightly upward on the clockspring pigtail wires for the airbag and tucking the wires into the upper hub cavity of the steering wheel. Be certain that none of the steering wheel wiring is pinched between the airbag housing or the horn switch and the steering wheel armature.
5. Using both hands, push firmly and evenly on both sides of the DAB trim cover until both ends of the spring retainer have snapped into place under the hooks within the hub cavity of the steering wheel.

6. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

AIR BAG, PASSENGER

DESCRIPTION

DESCRIPTION

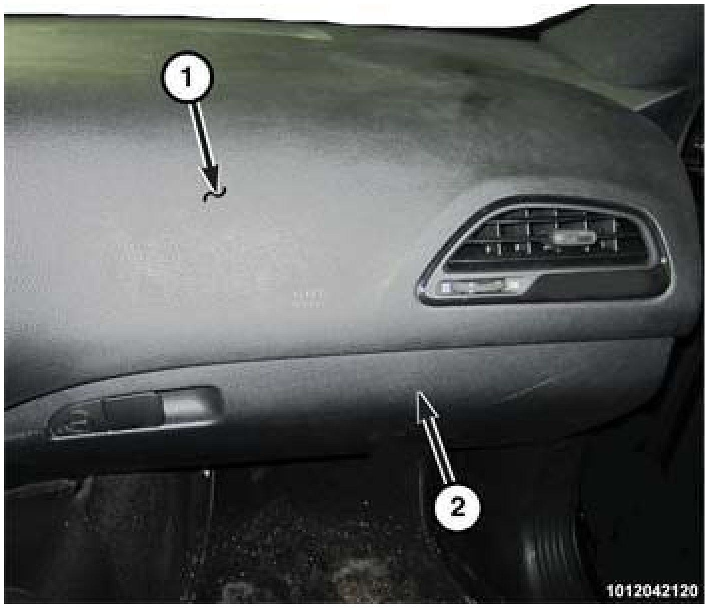


Fig. 17: Instrument Panel Top Pad & Glove Box
Courtesy of CHRYSLER GROUP, LLC

The horizontal surface of the instrument panel top pad (1) above the glove box (2) is the most visible part of the Passenger Airbag (PAB). The PAB door is integral to the top of the instrument panel top pad forward of and above the glove box on the instrument panel in front of the front seat passenger seating position.

Located below the PAB door area of the instrument panel top pad, the molded thermoplastic PAB retainer or chute is secured to the underside of the top pad. The retainer defines the PAB door breakout area of the top pad and serves as the receptacle for the PAB cushion and housing.

Three small window openings on the forward and rearward flanges of the receptacle receive mating hook formations of the airbag housing, which locate and secure the housing to the top pad. The center window in the rearward flange of the receptacle and the center hook on the rearward side of the housing have a reduced width to ensure the that the PAB cannot be incorrectly oriented during installation.

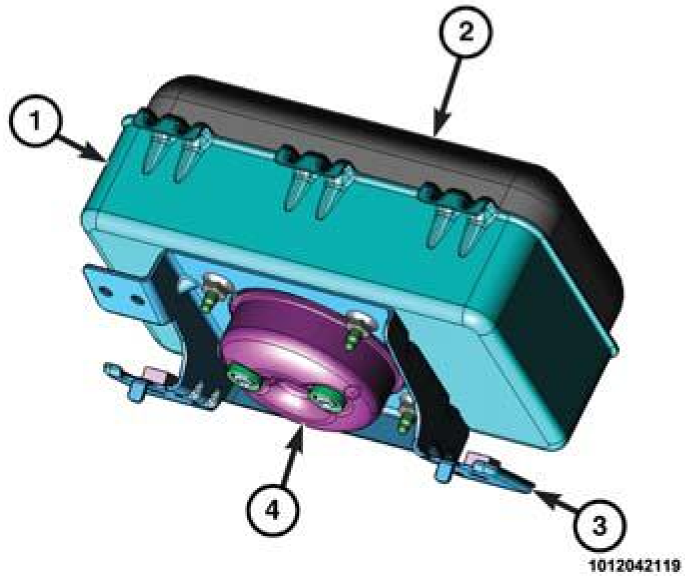


Fig. 18: PAB Housing, Airbag Cushion, Mounting Bracket & Inflator
Courtesy of CHRYSLER GROUP, LLC

The PAB unit is also secured by a stamped metal mounting bracket (3) and two screws to the instrument panel structural support. The PAB unit used in this vehicle is a multistage type that complies with revised federal airbag standards to deploy with less force than those used in some prior vehicles. The PAB unit consists of a housing (1), the airbag cushion (2) and the two-stage airbag inflator (4). The PAB inflator, the mounting bracket and the airbag cushion retainer are secured to the housing by four studs and four nuts. The airbag housing contains the folded airbag cushion, the inflator diffuser and the cushion retainer. A rectangular fabric cushion is used.

The PAB inflator is a non-azide, pyrotechnic-type unit that is secured to and sealed within the airbag housing. A dedicated take out and connectors of the instrument panel wire harness with keyed, color-coded insulators connects the two inflator initiators to the vehicle electrical system and are secured to a tab on the outboard side of the PAB mounting bracket.

The PAB cannot be repaired, and must be replaced if deployed, ineffective or in any way damaged. The PAB door and chute or retainer are serviced only as a unit with the instrument panel top pad. If the PAB is deployed, the top pad must also be replaced.

OPERATION

OPERATION

The multistage Passenger AirBag (PAB) is deployed by electrical signals generated by the Occupant Restraint Controller (ORC) through the PAB squib 1 and squib 2 circuits to the two initiators in the airbag inflator. By using two initiators, the PAB can be deployed at multiple levels of force. The force level is controlled by the ORC to suit the monitored impact conditions by providing one of several delay intervals between the electrical signals provided to the two initiators. The longer the delay between these signals, the less forcefully the airbag cushion will deploy.

When the ORC sends the proper electrical signals to each initiator, the electrical energy generates enough heat to initiate a small pyrotechnic charge which, in turn, ignites chemical pellets within the inflator. Once ignited,

these chemical pellets burn rapidly and produce a large quantity of inert gas. The inflator is sealed to the airbag cushion and a diffuser in the inflator directs all of the inert gas into the cushion, causing the cushion to inflate. As the cushion inflates, the PAB door area of the instrument panel cover will split at predetermined tear seam lines concealed on the underside of the cover, then the door will pivot up over the top of the instrument panel and out of the way. Following a deployment, the airbag cushion quickly deflates by venting the inert gas through vent holes within the fabric used to construct the back (windshield side) of the cushion.

Typically, both initiators are used during a PAB deployment event. However, it is possible for only one initiator to be used during a deployment due to an airbag system fault; therefore, it is necessary to always confirm that both initiators have been used in order to avoid the improper disposal of potentially live pyrotechnic materials. Refer to **STANDARD PROCEDURE**.

The ORC monitors the condition of the passenger airbag through circuit resistance. If any fault is detected the ORC will illuminate the airbag indicator in the instrument cluster and store a Diagnostic Trouble Code (DTC). Proper diagnosis of the PAB inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

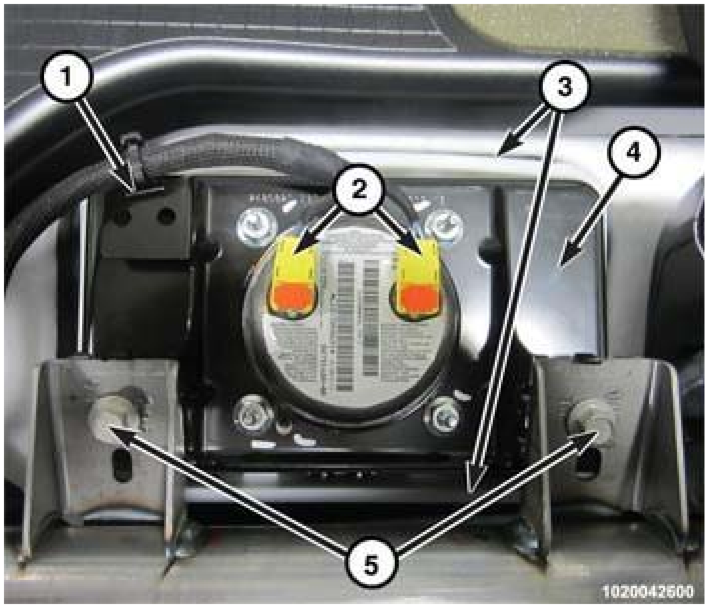


Fig. 19: PAB Housing, Bracket, Inflator Connector Receptacles, Wire Harness & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure is for replacement of an ineffective or damaged Passenger AirBag (PAB). If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the PAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. Refer to STANDARD PROCEDURE.**

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the Passenger AirBag (PAB) and the instrument panel from the vehicle as a unit. Refer to **PANEL, INSTRUMENT, REMOVAL** .
3. Place the instrument panel and PAB unit on a suitable work surface with the top cover facing down.

   NOTE: **If the instrument panel top cover will be reused, be certain to take the proper precautions to prevent the top cover from receiving cosmetic damage during the following procedures.**

4. Disconnect the two instrument panel wire harness connectors (2) from the PAB inflator connector receptacles. These wire connector insulators are secured by an integral Connector Position Assurance (CPA) lock to the inflator connector receptacles. Pull the lock straight back from the connector insulator, then pull the insulator straight out from the connector receptacle to disengage and disconnect it.
5. Disengage the routing clip (1) of the instrument panel wire harness take out for the PAB from the tab on the outboard side of the PAB mounting bracket.
6. Remove the two screws (5) that secure the PAB bracket to the instrument panel structural support.
7. Remove the top cover and PAB unit from the instrument panel. Refer to **COVER, INSTRUMENT PANEL, REMOVAL** .

8. Disengage each of the hooks on one side of the PAB housing (4) from the windows in the forward or rearward vertical walls of the PAB retainer or chute (3) on the underside of the top cover. To disengage the hooks, use hand pressure to pull the adjacent edge of the PAB housing firmly and evenly upward out of the retainer receptacle, while at the same time pulling the upper edge of the receptacle wall outward far enough to disengage the hooks.
9. With all of the hooks on one side of the PAB housing disengaged from the retainer, rotate that side of the housing upward far enough to disengage the hooks on the opposite side of the housing from the retainer.
10. With all of the hooks disengaged, lift the PAB housing, inflator and cushion as a unit from the receptacle of the PAB retainer or chute on the underside of the instrument panel top cover.

INSTALLATION

INSTALLATION

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

WARNING: **To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.**

WARNING: **To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the passenger airbag, or becoming entrapped between the passenger airbag cushion and the instrument panel top pad. Failure to observe this warning could result in occupant injuries upon airbag deployment.**

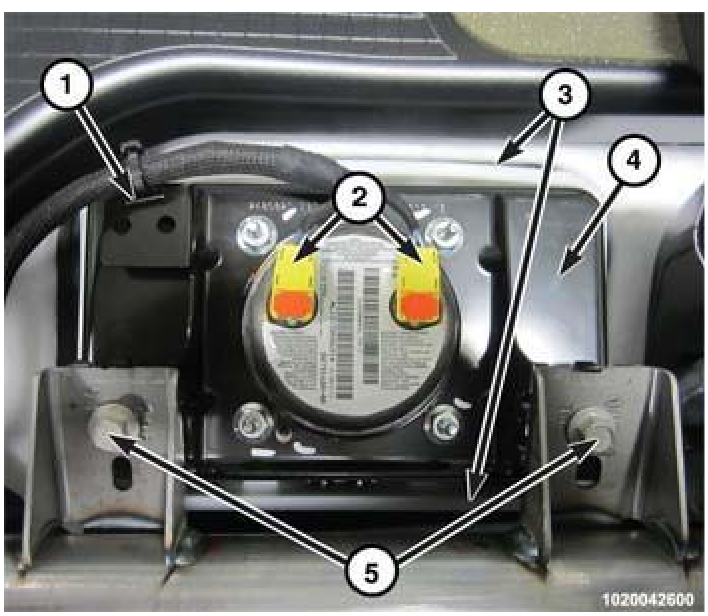


Fig. 20: PAB Housing, Bracket, Inflator Connector Receptacles, Wire Harness & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure is for replacement of an ineffective or damaged Passenger AirBag (PAB). If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the PAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. Refer to STANDARD PROCEDURE.**

1. Place the instrument panel top cover on a suitable work surface with the receptacle of the PAB retainer or chute (3) facing up.

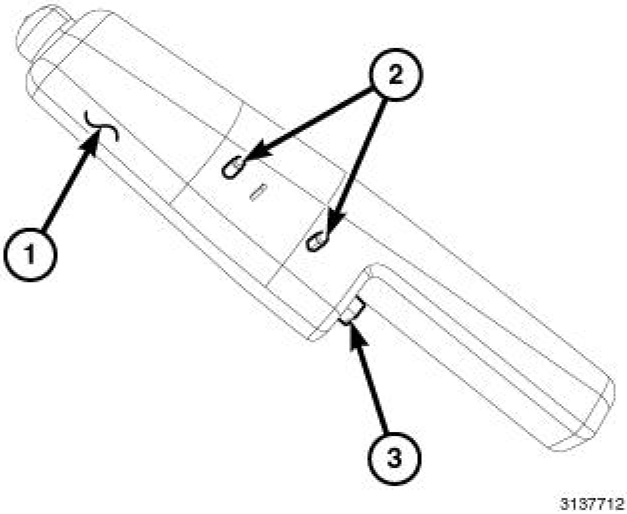
   NOTE: **Be certain to take the proper precautions to prevent the top cover from receiving cosmetic damage during the following procedures.**

2. Carefully position the PAB housing (4) to the PAB retainer or chute receptacle. The side of the PAB housing with the narrowed center hook faces rearward in the vehicle.
3. Engage all of the hooks on one side of the PAB housing through the windows on the same side of the PAB retainer or chute, then rotate the opposite side of the PAB housing downward into the receptacle.
4. Inspect around the perimeter of the PAB making certain each of the hooks on the PAB housing is fully engaged through the windows in the forward and rearward vertical walls of the PAB retainer or chute receptacle.
5. Reinstall the top cover and PAB unit onto the instrument panel. Refer to **COVER, INSTRUMENT PANEL, INSTALLATION** .
6. Engage the routing clip (1) of the instrument panel wire harness take out for the PAB with the tab on the outboard side of the PAB mounting bracket.
7. Reconnect the two instrument panel wire harness connectors (2) to the PAB inflator connector receptacles. Be certain to engage each keyed and color-coded connector to the matching connector receptacle. Be certain that each connector is fully engaged in its receptacle, then push the Connector Position Assurance (CPA) lock straight into the connector to lock it into place.
8. Install and tighten the two screws (5) that secure the PAB mounting bracket to the instrument panel structural support. Tighten the screws to **SPECIFICATIONS**.
9. Reinstall the instrument panel, instrument panel top cover and PAB into the vehicle as a unit. Refer to **PANEL, INSTRUMENT, INSTALLATION** .
10. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

AIR BAG, SEAT

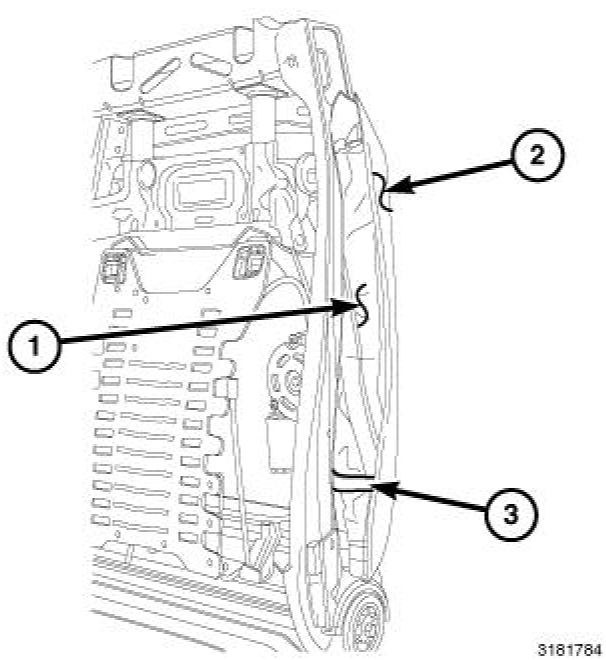
DESCRIPTION

DESCRIPTION



[Fig. 21: Seat AirBags (SAB), Two Studs & Inflator Initiator]
Courtesy of CHRYSLER GROUP, LLC

Seat AirBags (SAB) (1) (also known as pelvic and thoracic airbags) are standard equipment on this model. Vehicles with this equipment can be readily identified by a sewn tag with the **SRS - AIRBAG** logo located on the outboard side of the front seat back trim cover. These airbags are completely concealed beneath the seat back trim cover on the upper outboard sides of both front seat backs. Each SAB is inserted into a molded thermoplastic chute called an intensifier on the outside of the seat back frame, then secured to the frame by nuts on two studs (2) on the SAB bracket on the inboard side of the inflator. The SAB is connected to the vehicle electrical system through a dedicated jumper wire harness with a connector insulator that connects directly to the inflator initiator (3). The connector insulators are uniquely keyed and color-coded to ensure they can only be connected to the initiator.



[Fig. 22: Folded SAB Cushion, Chute & Fabric Strap]
Courtesy of CHRYSLER GROUP, LLC

The folded SAB cushion (1) is contained within and protected by the chute (2). The cushion is constructed of a

coated nylon fabric. The folded SAB cushion is tied to the airbag inflator with a fabric strap (3). The inflator consists of the airbag initiator and a high pressure cylinder filled with inert gas. The airbag inflator is a single-initiator, hybrid-type unit that is secured to the SAB bracket.

The SAB cannot be repaired, and must be replaced if deployed, ineffective, or in any way damaged. If the SAB is deployed the thermoplastic chute, the seat back frame, the seat back foam, the seat back trim cover and the SAB jumper wire harness must also be replaced.

OPERATION

OPERATION

Each Seat AirBag (SAB) (also known as a pelvic and thoracic airbag) is deployed individually by an electrical signal generated by the Occupant Restraint Controller (ORC) to which it is connected through left or right SAB line 1 and line 2 (or squib) circuits. The hybrid-type inflator assembly for each SAB contains a small canister of highly compressed inert gas. When the ORC sends the proper electrical signal to the inflator, the electrical energy creates enough heat to ignite chemical pellets within the inflator.

Once ignited, these chemicals burn rapidly and produce the pressure necessary to rupture a containment disk in the inert gas canister. The inflator and inert gas canister are sealed and connected so that all of the released gas is directed into the folded SAB cushion, causing the cushion to inflate. As the cushion inflates it will split the fabric retainer strap and the thermoplastic chute (intensifier) will direct the expanding cushion through the outboard side of the seat back trim cover and into the area between the outboard side of the front seat and the front door to protect the front seat occupant during a side impact collision.

Following the deployment, the SAB cushion slowly deflates by venting the inert gas through the loose weave of the cushion fabric, and the deflated cushion hangs down loosely from the outboard side of the front seat back.

The ORC monitors the condition of the seat airbags through circuit resistance. If any fault is detected the ORC will illuminate the airbag indicator in the instrument cluster and store a Diagnostic Trouble Code (DTC). Proper diagnosis of the SAB inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these

deposits may cause irritation to the skin and eyes.

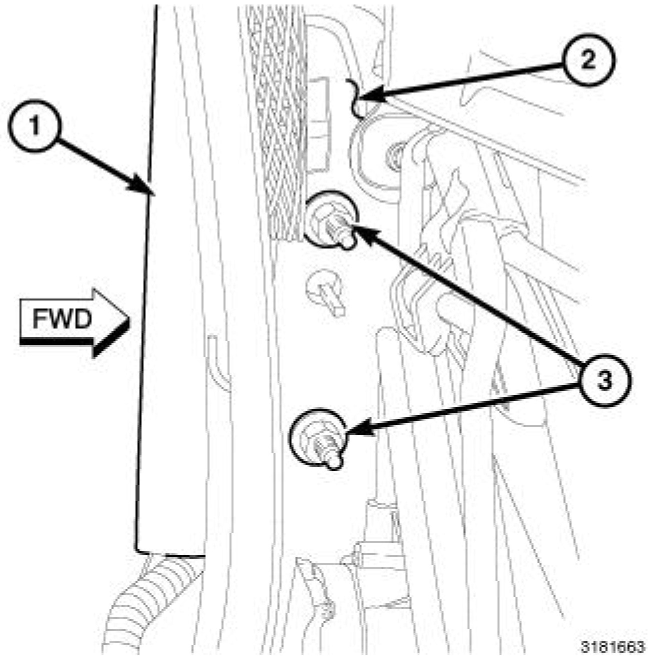


Fig. 23: Front Seat Back Frame, Two Nuts & Seat AirBag (SAB) And Thermoplastic Chute
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure is for replacement of an ineffective or damaged Seat AirBag (SAB). If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the SAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. Refer to STANDARD PROCEDURE.**

1. Position the front seat to its most forward position for easiest access to the front seat mounting hardware.
2. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
3. Remove the front seat from the vehicle. Refer to **SEAT, FRONT, REMOVAL** .
4. Remove the trim from the front and back of the front seat back frame (2). Refer to **COVER, SEAT BACK, FRONT, REMOVAL** .
5. Remove the two nuts (3) that secure the Seat AirBag (SAB) and thermoplastic chute (intensifier) (1) to the outboard side of the seat back frame.

CAUTION: **Do not pull on the Seat AirBag (SAB) jumper wire harness take out or pry on the connector insulator to disengage the connector from the SAB inflator connector receptacle. Improper removal of this take out and its connector insulator can result in damage to the airbag circuits or the connector insulator.**

6. Disengage the two SAB studs from the seat back frame and remove the SAB and chute from the seat back

as a unit.

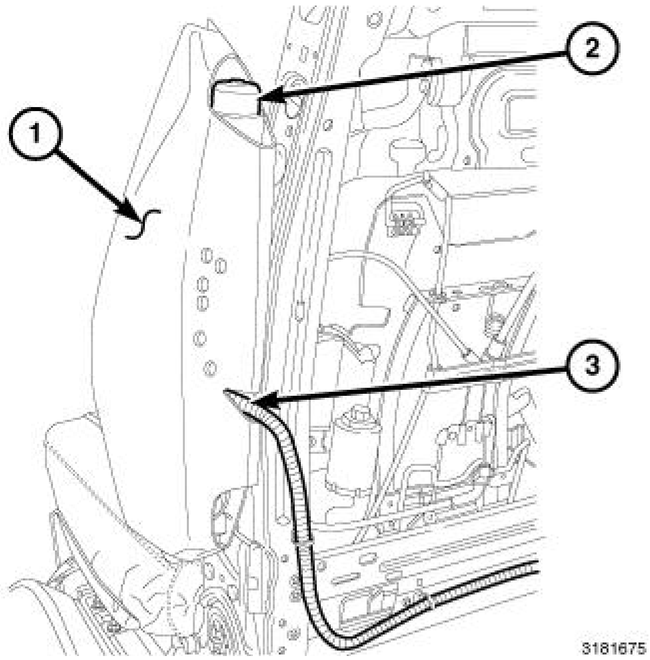


Fig. 24: Chute, SAB Jumper Wire Harness & SAB Inflator
Courtesy of CHRYSLER GROUP, LLC

7. Disengage the SAB from the chute (1) to access and disconnect the SAB jumper wire harness (3) connector from the base of the SAB inflator (2). Pull the connector insulator straight out from the inflator to disconnect it from the connector receptacle.
8. Disengage the SAB jumper wire harness from the opening in the back of the chute.

INSTALLATION

INSTALLATION

WARNING:	**To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

CAUTION:	**The Seat AirBag (SAB) must be installed into the nylon pouch integral to the front seat back trim cover before the SAB or the trim cover are installed on the front seat back frame. Failure to do so will adversely affect the function of the SAB system.**

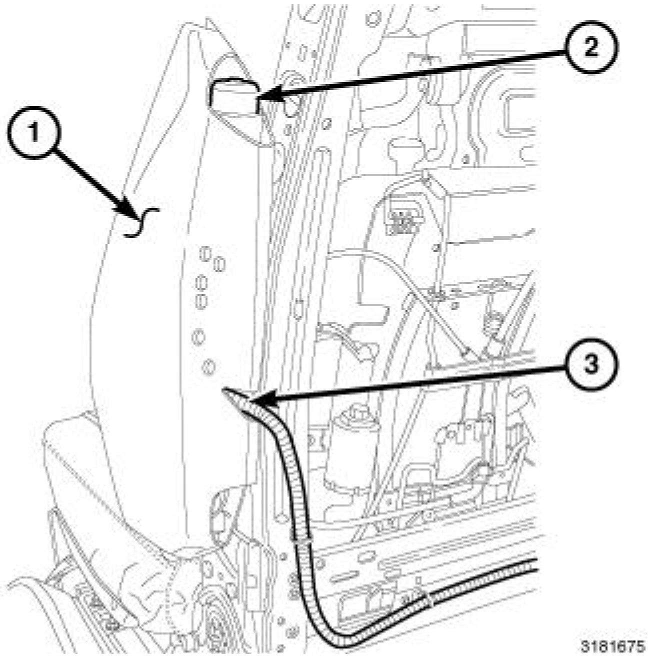


Fig. 25: Chute, SAB Jumper Wire Harness & SAB Inflator
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure is for replacement of an ineffective or damaged Seat AirBag (SAB). If the SAB is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the SAB has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. Refer to STANDARD PROCEDURE.**

1. Engage the SAB jumper wire harness (3) through the opening in the back of the thermoplastic chute (1).
2. Reconnect the seat jumper wire harness connector to the connector receptacle at the base of the SAB inflator. Be certain that the connector latches and lock are fully engaged.
3. Carefully slide the Seat AirBag (SAB) and inflator (2) into the chute and engage the two SAB studs through the holes provided in the chute. Be certain not to tear or damage the chute.

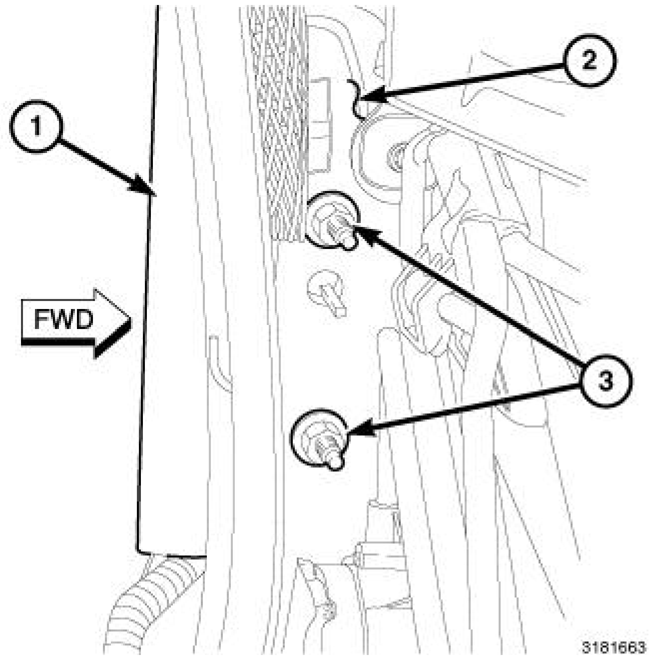


Fig. 26: Front Seat Back Frame, Two Nuts & Seat AirBag (SAB) And Thermoplastic Chute
Courtesy of CHRYSLER GROUP, LLC

4. Position the SAB and chute (1) as a unit to the outboard side of the seat back frame (2) and insert the SAB mounting studs through the mounting holes in the frame.
5. Install and tighten the two nuts (3) that secure the SAB to the outboard side of the seat back frame. Tighten the nuts to **SPECIFICATIONS**.

CAUTION: Be certain that all of the trim is properly reinstalled on the front seat back frame. Failure to do so will adversely affect the function of the Seat AirBag (SAB) system.

6. Reinstall the trim onto the front and back of the front seat back frame. Refer to **COVER, SEAT BACK, FRONT, INSTALLATION** .
7. Reinstall the front seat into the vehicle. Refer to **SEAT, FRONT, INSTALLATION** .
8. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

AIR BAG, SIDE CURTAIN

DESCRIPTION

DESCRIPTION

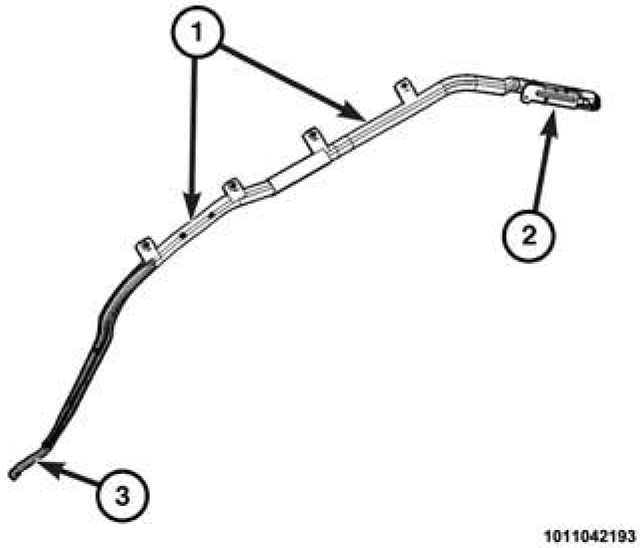


Fig. 27: Side Curtain Airbags, Bracket & Tether
Courtesy of CHRYSLER GROUP, LLC

Side curtain airbags (1) (also known as Side AirBag Inflatable Curtains/SABIC) are standard factory-installed equipment for this vehicle. These airbags are passive, inflatable, Supplemental Restraint System (SRS) components. The side curtain airbag system is designed to reduce injuries to the vehicle occupants in the event of a side impact collision or a vehicle rollover incident. Each side curtain airbag cushion provides full coverage of the side glass on the same side of the vehicle as the monitored impact.

Each vehicle is equipped with two individually controlled side curtain airbag units. These side curtain airbag units are concealed and mounted above the headliner where they are each secured to one of the inner roof side rails. Each folded airbag cushion is contained within a fabric wrap and suspended from plastic clamp hangers that are spaced along the inner roof rail from the A-pillar at the front of the vehicle to the C-pillar at the rear of the vehicle. A screw secures each of the clamp hangers to a weld nut in the inner roof rail.

A tether (3) extends down the A-pillar from the front of the side curtain airbag cushion. A stamped T-tab retainer at the end of the tether is secured to a slot in the sheet metal. A screw secures the tether retainer to a weld nut in the A-pillar.

The stamped metal airbag inflator bracket (2) at the rear of each SABIC unit is hung by two hooks from slots in the inner C-pillar, then secured by a screw to a weld nut in the inner C-pillar. The inflator initiator is connected to the vehicle electrical system through a dedicated take out and connector of the body wire harness at the rear of the inflator. The body wire harness connects the side curtain airbag unit to the Occupant Restraint Controller (ORC).

The side curtain airbag units cannot be adjusted or repaired and must be replaced if deployed, ineffective or in any way damaged. Once a side curtain airbag has been deployed, the complete side curtain airbag unit, the support bracket, the headliner, the A-pillar trim, the upper quarter panel trim, the C-pillar trim as well as all other visibly damaged components must be replaced.

OPERATION

OPERATION

Each side curtain airbag (also known as Side AirBag Inflatable Curtain/SABIC) is deployed individually by an electrical signal generated by the Occupant Restraint Controller (ORC) to which it is connected through the left or right SABIC line 1 and line 2 (or squib) circuits. The hybrid-type inflator assembly for each airbag contains a small canister of highly compressed inert gas. When the ORC sends the proper electrical signal to the airbag inflator, the electrical energy creates enough heat to ignite chemical pellets within the inflator.

Once ignited, these chemicals burn rapidly and produce the pressure necessary to rupture a containment disk in the inert gas canister. The inflator and inert gas canister are sealed and connected to a tubular manifold so that all of the released gas is directed into the folded airbag cushion, causing the cushion to inflate. As the cushion inflates it will drop down from the roof rail between the edge of the headliner and the side glass/body pillars to form a curtain-like cushion to protect the vehicle occupants during a side impact collision or a vehicle rollover incident. The cushion features large chambers that inflate adjacent to the head of each front and rear seat occupant.

The front tether keeps the side curtain airbag cushion taut to the side of the vehicle. In addition, ramps integral to the side trim of the interior guide the cushion into the proper deployment position. Following the deployment, the cushion slowly deflates by venting the inert gas through the loose weave of the cushion fabric and the deflated cushion hangs down loosely from the roof rail.

The ORC monitors the condition of the side curtain airbags through circuit resistance. If any fault is detected the ORC will illuminate the airbag indicator in the instrument cluster and store a Diagnostic Trouble Code (DTC). Proper diagnosis of the side curtain airbag inflator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

AIRBAG

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.

WARNING: To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the side curtain airbag, or becoming entrapped between the side curtain airbag cushion and the headliner. Failure to observe this warning could result in occupant injuries upon airbag deployment.

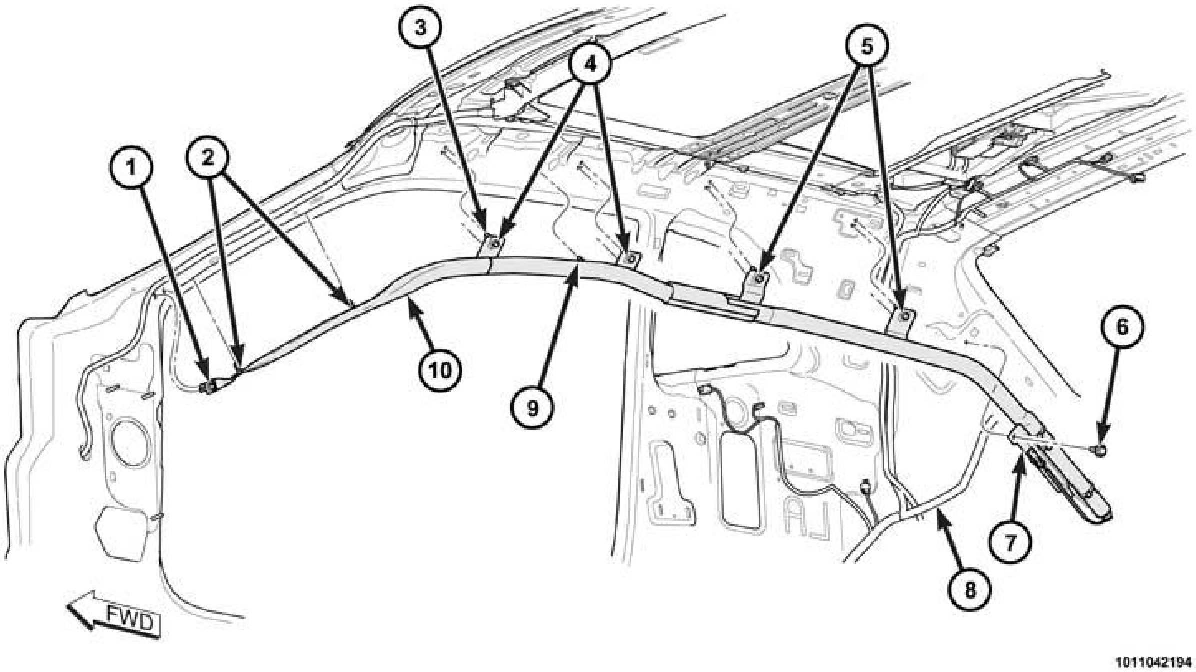


Fig. 28: Side AirBag Inflatable Curtain (SABIC), Bracket, Harness Connectors & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure is for replacement of an ineffective or damaged side curtain airbag (also known as Side AirBag Inflatable Curtain/SABIC). If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the side curtain airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. Refer to STANDARD PROCEDURE.**

1. Remove the rear seat back from the vehicle. Refer to **SEAT BACK, REAR, REMOVAL** .
2. Fully recline both front seat backs.
3. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.

   NOTE: **Use the headliner removal procedure to lower the headliner from the inner roof panel. The headliner will NOT be removed from the vehicle interior; therefore, it is NOT necessary to remove the windshield.**

4. Lower the headliner from the inner roof panel and allow it to rest within the vehicle interior. Refer to **HEADLINER, REMOVAL** .
5. Remove the screw (6) that secures the Side AirBag Inflatable Curtain (SABIC) inflator bracket (7) to the upper inner C-pillar.
6. Working from the back of the SABIC (10) to the front, remove the five screws (1, 4 and 5) that secure the SABIC mounting tabs to the weld nuts in the inner roof rail and the inner A-pillar.

7. Disconnect the body wire harness (8) connector for the SABIC (10) from the SABIC pigtail harness connector located on the inflator bracket on the upper C-pillar and disengage the retainer on the body wire harness from the inflator bracket hole.
8. Disengage the two plastic push-in retainers that secure the two rearward SABIC mounting tabs to the slots in the inner roof rail.
9. Disengage the two hooks of the SABIC inflator bracket from the upper inner C-pillar.
10. Disengage the plastic push-in retainer that secures the most rearward of the two forward SABIC mounting tabs (4) to the slot in the inner roof rail.
11. Disengage the plastic push-in retainer (9) that secures the SABIC to the inner roof rail above the door opening.
12. Disengage the plastic push-in retainer that secures the most forward SABIC mounting tab (3) to the slot in the inner roof rail.
13. Disengage the two plastic push-in retainers (2) that secure the SABIC front tether to the inner A-pillar.
14. Disengage the T-tab retainer that secures the end of the SABIC front tether to the slot in the inner A-pillar.
15. Remove the SABIC and inflator from the vehicle as a unit.

NOTE: **If the SABIC has been deployed, the support bracket on the C-pillar must also be replaced.**

SUPPORT BRACKET

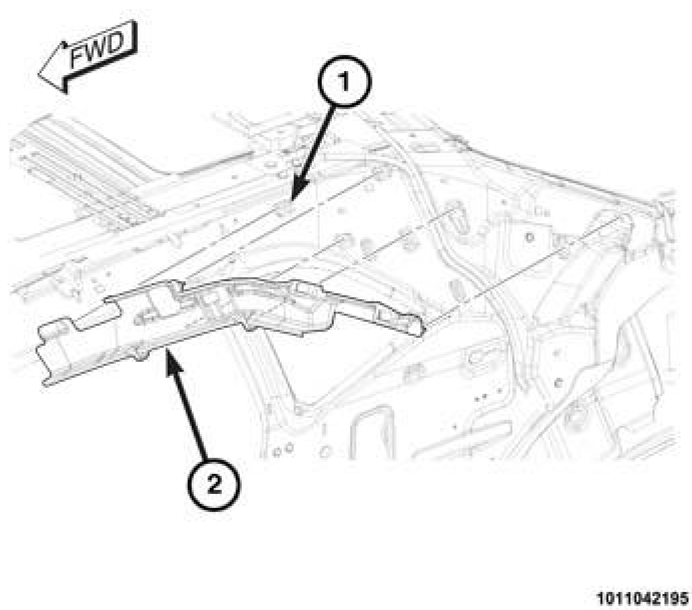


Fig. 29: Support Bracket & Slotted Holes
Courtesy of CHRYSLER GROUP, LLC

1. Remove the side curtain airbag (also known as Side AirBag Inflatable Curtain/SABIC) from the vehicle. Refer to **AIR BAG, SIDE CURTAIN, REMOVAL**.
2. Using a trim stick or another suitable wide flat-bladed tool, pry the support bracket (2) away from the upper inner C-pillar far enough to disengage each of the five clips that secure the support to the slotted holes (1).

3. Remove the support bracket from the vehicle and discard.

INSTALLATION

AIRBAG

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

WARNING: **To avoid serious or fatal injury when removing a deployed airbag, rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the airbag unit and other interior surfaces. In large doses, these deposits may cause irritation to the skin and eyes.**

WARNING: **To avoid serious or fatal injury, use extreme care to prevent any foreign material from entering the side curtain airbag, or becoming entrapped between the side curtain airbag cushion and the headliner. Failure to observe this warning could result in occupant injuries upon airbag deployment.**

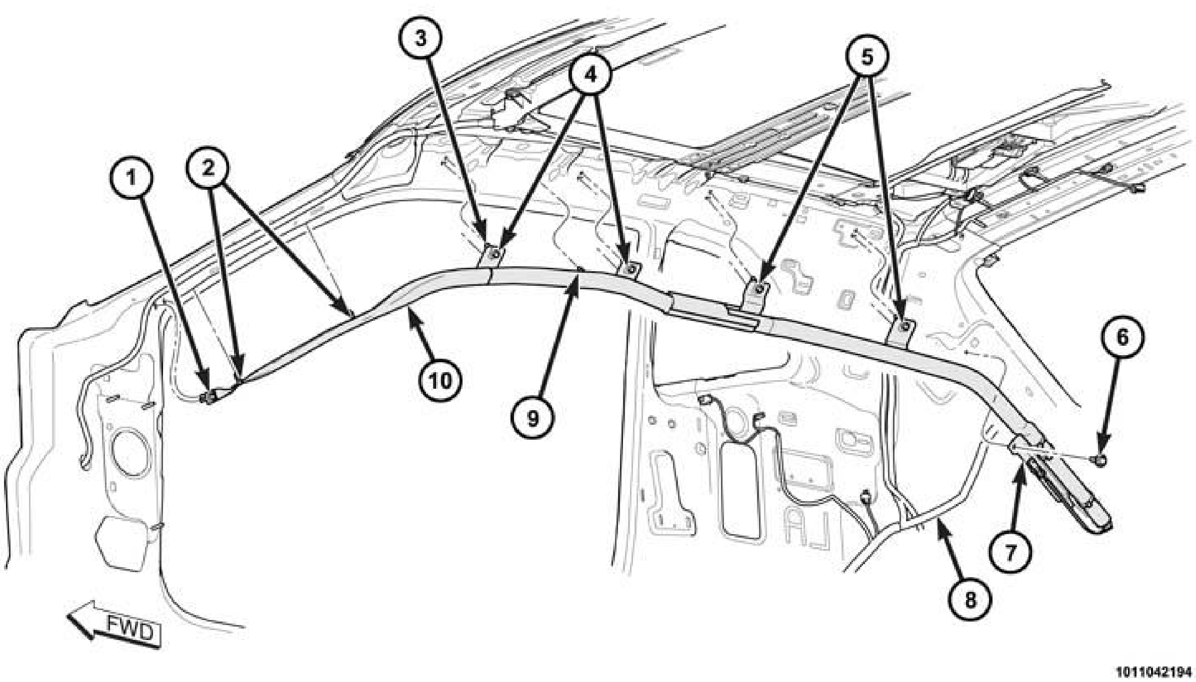


Fig. 30: Side AirBag Inflatable Curtain (SABIC), Bracket, Harness Connectors & Fasteners
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure is for replacement of an ineffective or damaged side**

curtain airbag (also known as Side AirBag Inflatable Curtain/SABIC). If the airbag is ineffective or damaged, but not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the side curtain airbag has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the airbag from the vehicle. Refer to STANDARD PROCEDURE.

NOTE: **If the SABIC has been deployed, the support bracket on the C-pillar must also be replaced.**

1. Position the Side AirBag Inflatable Curtain (SABIC) (10) and inflator into the vehicle as a unit.
2. Engage the T-tab retainer that secures the end of the SABIC front tether (1) into the slot in the inner A-pillar.
3. Engage the two plastic push-in retainers (2) that secure the SABIC front tether to the inner A-pillar.
4. Engage the plastic push-in retainer that secures the most forward SABIC mounting tab (3) to the slot in the inner roof rail.
5. Engage the plastic push-in retainer (9) that secures the SABIC to the inner roof rail above the door opening.
6. Engage the plastic push-in retainer that secures the most rearward of the two forward SABIC mounting tabs (4) to the slot in the inner roof rail.
7. Engage the two hooks of the SABIC inflator bracket (7) with the upper inner C-pillar.
8. Engage the two plastic push-in retainers that secure the two rearward SABIC mounting tabs to the slots in the inner roof rail.
9. Reconnect the body wire harness (8) connector for the SABIC to the SABIC pigtail harness connector located on the inflator bracket on the upper C-pillar and engage the retainer on the body wire harness with the SABIC inflator bracket hole.
10. Working from the back of the SABIC (10) to the front, install and tighten the five screws (1, 4 and 5) that secure the SABIC mounting tabs to the weld nuts in the inner roof rail and the inner A-pillar. Tighten the screws to **SPECIFICATIONS**.
11. Install and tighten the screw (6) that secures the SABIC inflator bracket to the upper inner C-pillar. Tighten the screw to **SPECIFICATIONS**.
12. Reinstall the headliner onto the inner roof panel. Refer to **HEADLINER, INSTALLATION** .
13. Reinstall the rear seat back into the vehicle. Refer to **SEAT BACK, REAR, INSTALLATION** .
14. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SUPPORT BRACKET

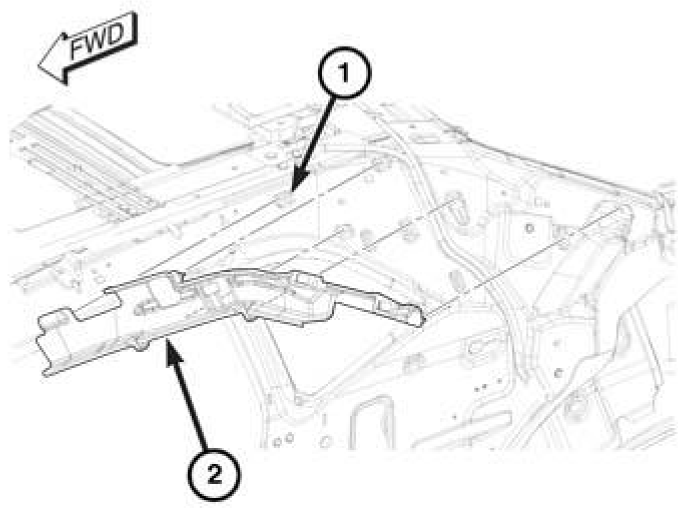


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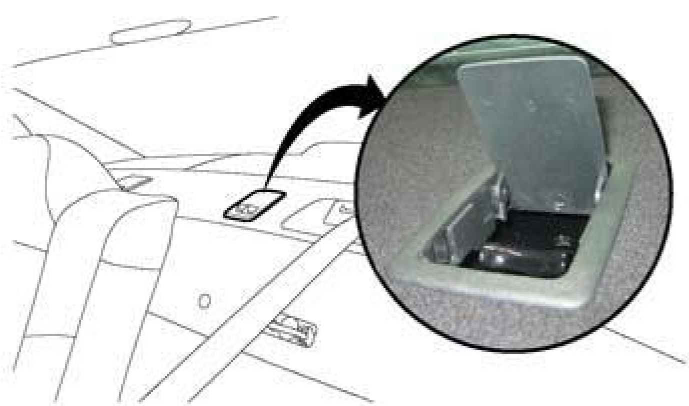
Fig. 31: Support Bracket & Slotted Holes
Courtesy of CHRYSLER GROUP, LLC

1. Position the support bracket (2) to the upper inner C-pillar.
2. Align the five clips on the support bracket with the slotted holes (1) in the inner C-pillar.
3. Using hand pressure press the support bracket against the upper inner C-pillar until each of the five clips is fully engaged.
4. Reinstall the side curtain airbag (also known as Side AirBag Inflatable Curtain/SABIC) into the vehicle. Refer to **AIR BAG, SIDE CURTAIN, INSTALLATION**.

ANCHOR, CHILD SEAT

DESCRIPTION

DESCRIPTION



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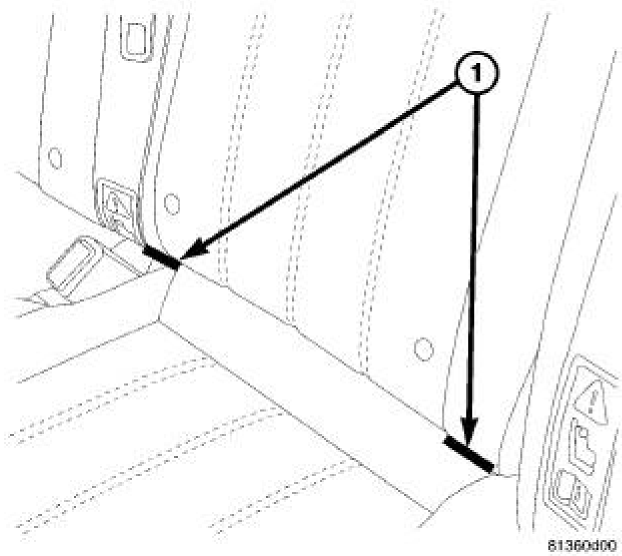
[**Fig. 32: Child Seat Anchor**]
Courtesy of CHRYSLER GROUP, LLC

This vehicle is equipped with a Lower Anchors and Tether for CHildren (LATCH) child restraint anchorage system. The LATCH system provides for the installation of suitable child restraints in certain seating positions without using the standard equipment seat belt provided for that seating position. The rear seats in these vehicles are equipped with a fixed-position child restraint upper tether anchor and child restraint lower anchors (also known as ISOFIX anchors) for both the center and the two outboard seating positions.

The three upper tether anchors are integral to the rear shelf panel support. These anchors are each constructed of heavy-gauge steel reinforcement brackets integral to the rear shelf panel support and are concealed beneath individual trim cover and bezel units that are integral to the rear shelf trim panel. These upper tether anchors cannot be adjusted or repaired and, if ineffective or damaged, they must be replaced as a unit with the rear shelf panel support. The upper tether anchor trim covers and bezels are serviced as a unit with the rear shelf trim panel.



[**Fig. 33: Lower Anchors**]
Courtesy of CHRYSLER GROUP, LLC

The three pairs of lower anchors (1) are integral to an ISOFIX cross member that is permanently mounted to the center floor panel beneath the rear seat. These anchors are constructed from heavy-gauge round steel bar stock that is formed into a U-shape, then securely welded at each end to the cross member.

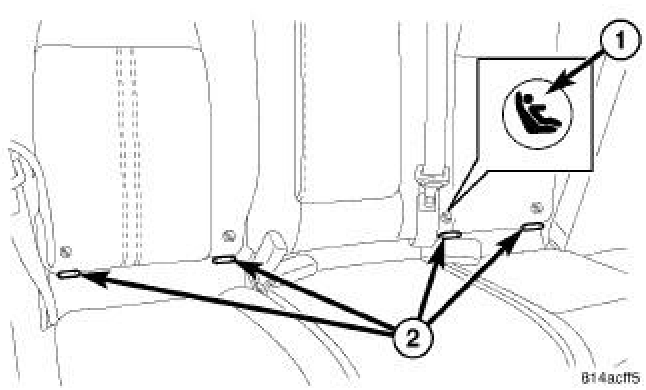


Fig. 34: Identifying Rear Seat Lower Anchors & Markers With An Imprinted Child Seat Icon
Courtesy of CHRYSLER GROUP, LLC

The rear seat lower anchors (2) are each accessed from the front of their respective seating position where the seat back meets the seat cushion. Round molded plastic markers (1) with an imprinted child seat icon help identify the anchor locations as they may be otherwise difficult to see with the seat back in the upright position. These lower anchors cannot be adjusted or repaired and, if ineffective or damaged, they must be replaced as a unit with the isofix cross member of the center floor panel.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÃ® Parts Catalog.

OPERATION

OPERATION

All vehicles manufactured for sale in the United States and Canada are required to be equipped with a Lower Anchors and Tether for CHildren (LATCH) child restraint anchorage system. The rear seats in this vehicle have three pairs of anchor provisions for installing up to three LATCH-compatible child seats.

With LATCH, child seats are secured by direct attachment to the vehicle structure, rather than by the seat belts. With LATCH-compatible child seats, lower (also known as ISOFIX) anchors attach to the vehicle structure through heavy-gauge wire loops located at the intersection between the seat cushion and the seat back surfaces.

Three upper tether anchors are integral to the rear shelf panel support to secure the top tether strap of child seats equipped with this feature. These upper tether anchors work with both LATCH-compatible and other child seats equipped with a top tether strap.

The owner's information packet in the vehicle glove box contains details and suggestions on the proper use of all of the factory-installed child restraint anchors.

BUCKLE, SEAT BELT

REMOVAL

FRONT SEAT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, Occupant Classification System (OCS), seat belt

tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to follow these instructions may result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÃ® Parts Catalog.

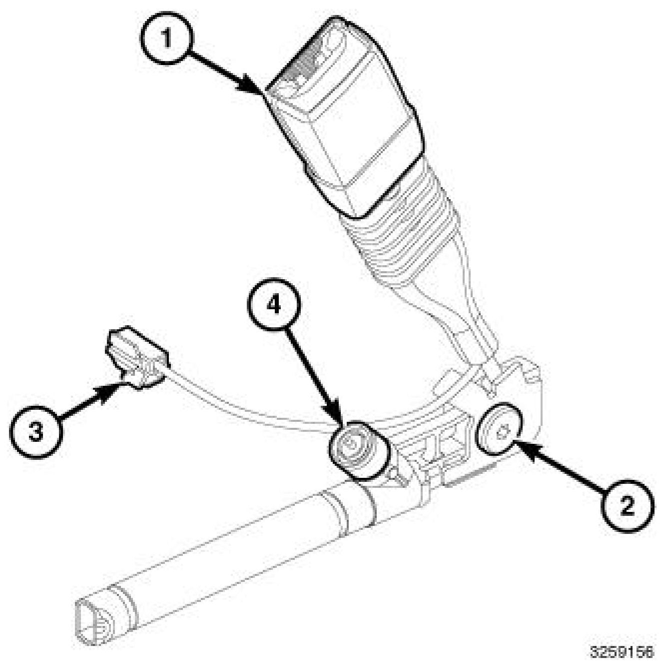


Fig. 35: Seat Belt Tensioner Initiator, Buckle And Tensioner, Switch Pigtail Wire Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

NOTE: The following procedure is for replacement of an ineffective or damaged seat belt buckle unit. The front seat belt buckle also includes a seat belt tensioner. If the front seat belt buckle is ineffective or damaged, but the seat belt tensioner is not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the seat belt tensioner has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the unit from the vehicle. Refer to STANDARD PROCEDURE.

1. Position the front seat for easiest access to the seat mounting hardware.
2. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
3. Remove the front seat from the vehicle. Refer to **SEAT, FRONT, REMOVAL** .
4. Disconnect the seat wire harness connector from the seat belt tensioner initiator (4).
5. Disconnect the seat belt switch pigtail wire connector (3) from the seat wire harness connector.
6. Remove the screw (2) that secures the front seat belt buckle lower anchor to the bracket at the back of the seat cushion frame.
7. Remove the buckle and tensioner (1) from the front seat as a unit.

REAR SEAT

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÃ® Parts Catalog.

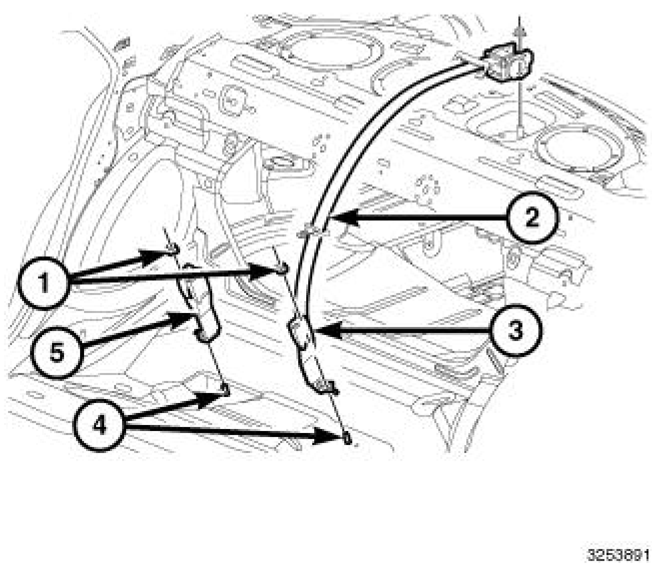


Fig. 36: Center Rear Seating Position Buckles, Left Outboard Rear Seating Position Buckle & Center Rear Seating Position Seat Belt And Retractor
Courtesy of CHRYSLER GROUP, LLC

NOTE: The right outboard and center rear seating position buckles (5) are serviced only as a unit. The left outboard rear seating position buckle (3) is integral to

the center rear seating position seat belt and retractor (2) lower anchor. Refer to RETRACTOR, SEAT BELT, REMOVAL.

1. Remove the rear seat cushion from the vehicle. Refer to **COVER, SEAT CUSHION, REAR, REMOVAL** .
2. Remove the nut (1) that secures the anchor plate of the right outboard and center rear seating position buckles (5) to the stud (4) on the center floor panel.
3. Remove the buckle unit from the vehicle.

INSTALLATION

FRONT SEAT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÃ® Parts Catalog.

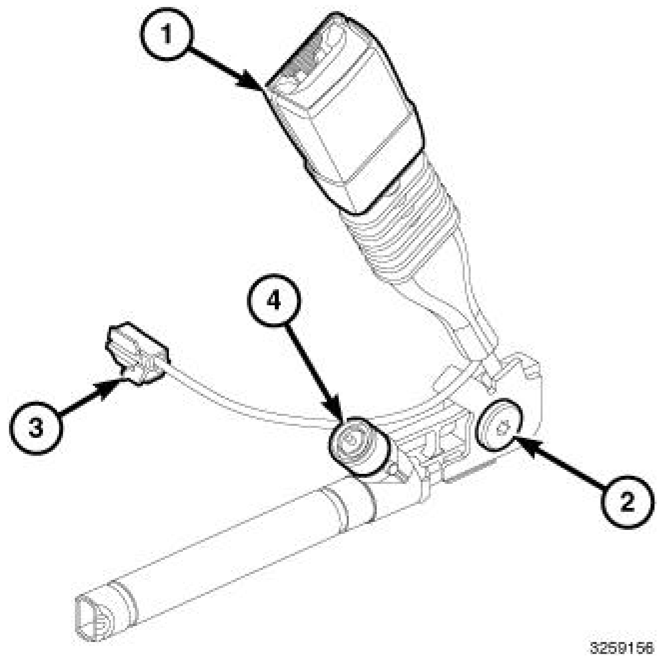


Fig. 37: Seat Belt Tensioner Initiator, Buckle And Tensioner, Switch Pigtail Wire Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure is for replacement of an ineffective or damaged seat belt buckle unit. The front seat belt buckle also includes a seat belt tensioner. If the front seat belt buckle is ineffective or damaged, but the seat belt tensioner is not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the seat belt tensioner has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the unit from the vehicle. Refer to STANDARD PROCEDURE.**

1. Position the front seat belt buckle and tensioner (1) lower anchor to the bracket at the back of the seat cushion frame.
2. Install and tighten the screw (2) that secures the lower anchor to the seat cushion frame. Tighten the screw to **SPECIFICATIONS**.
3. Reconnect the seat belt switch pigtail wire connector (3) to the seat wire harness connector.
4. Reconnect the seat wire harness connector to the seat belt tensioner initiator (4).
5. Reinstall the front seat into the vehicle. Refer to **SEAT, FRONT, INSTALLATION** .
6. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

REAR SEAT

WARNING: **To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a**

damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÃ® Parts Catalog.

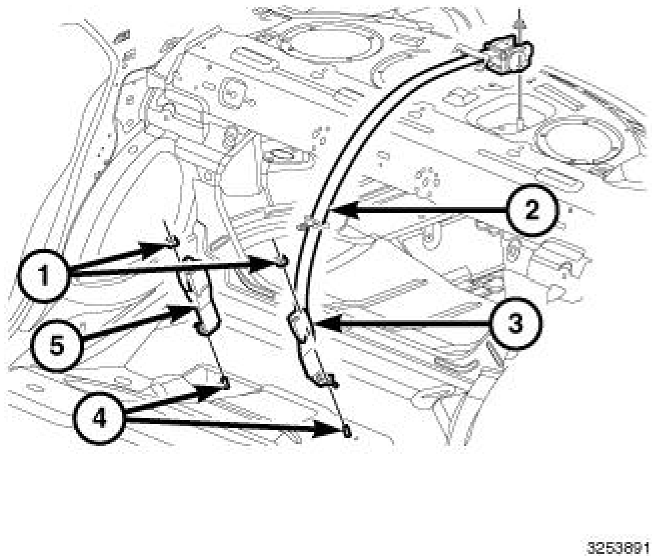


Fig. 38: Center Rear Seating Position Buckles, Left Outboard Rear Seating Position Buckle & Center Rear Seating Position Seat Belt And Retractor
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The right outboard and center rear seating position buckles (5) are serviced only as a unit. The left outboard rear seating position buckle (3) is integral to the center rear seating position seat belt and retractor (2) lower anchor. Refer to RETRACTOR, SEAT BELT, INSTALLATION.**

1. Position the anchor plate of the right outboard and center rear seating position buckles (5) onto the stud (4) on the center floor panel. Be certain to engage the anti-rotation tab of the anchor plate into the clearance hole in the floor panel.
2. Install and tighten the nut (1) that secures buckle anchor plate to the floor. Tighten the nut to **SPECIFICATIONS**.
3. Reinstall the rear seat cushion into the vehicle. Refer to **COVER, SEAT CUSHION, REAR, INSTALLATION** .

CLOCKSPRING

DESCRIPTION

DESCRIPTION

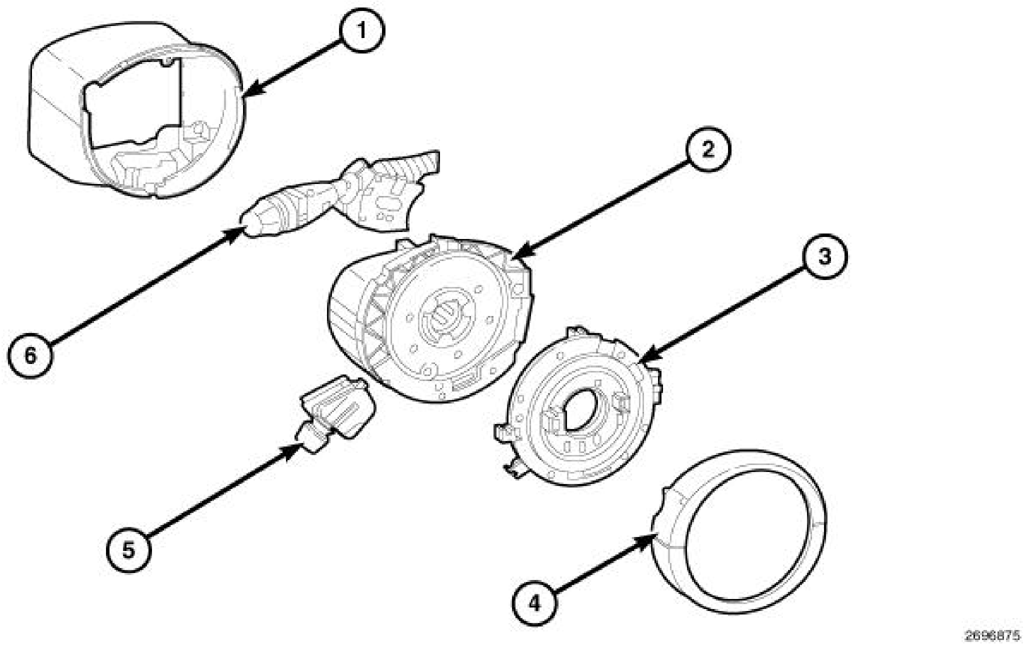


Fig. 39: Steering Column Shroud, Steering Angle Sensor (SAS), Clockspring, Telescope Switch & Trim Cover
Courtesy of CHRYSLER GROUP, LLC

The clockspring (3) for this vehicle is integral to the Steering Column Control Module (SCCM). The clockspring includes an integral, internal turn signal cancel cam. The SCCM is secured near the top of the steering column below the steering wheel. In addition to the clockspring the SCCM includes the steering column shroud (1), the Steering Angle Sensor (SAS) (2), the multifunction switch (6), a power adjustable steering column tilt and telescope switch (5) for vehicles so equipped and a trim cover (4).

Within the plastic clockspring case is a spool-like molded clear plastic rotor with an exposed hub. The upper surface of the rotor hub has a large center hole, two short pigtail wires with connectors, and two connector receptacles that face toward the steering wheel. The inner surface of the clockspring rotor hub has keyway features that are engaged by lug features on the outer circumference of the steering wheel hub. These interlocking features allow the steering wheel to drive the clockspring and SAS and also unlock the clockspring rotor when the steering wheel has been properly installed.

The SCCM includes an integral connector receptacle that faces toward the instrument panel and is connected to the vehicle electrical system through a single takeout and connector of the instrument panel wire harness. The instrument panel wire harness take out has been intentionally provided with additional length to facilitate service removal and installation of the SCCM. However, following SCCM installation, this additional length must be pulled back and secured to the instrument panel structure to prevent undesirable noises while driving.

Wound around the rotor spool within the clockspring case are long ribbon-like tapes that consist of several thin copper wire leads sandwiched between two thin plastic membranes. The outer end of the tapes terminate at the connector receptacle that faces the instrument panel, while the inner end of the tapes terminate at the pigtail wires and connector receptacles on the hub of the clockspring rotor that face the steering wheel. The outer surface of the rotor spool hub within the clockspring case also has the integral lobes of the turn signal cancel cam.

The clear plastic clockspring rotor has an outer band that has a translucent or frosted appearance except for a small, clear inspection window area in the lower right quadrant. The clockspring tape has several black squares

that are only visible through the clear inspection window when the clockspring is properly centered. If these squares are not visible through the inspection window, clockspring centering has been compromised and the entire SCCM must be replaced with a new unit.

The service replacement SCCM is shipped with the clockspring pre-centered and with a red molded plastic locking tab installed. The locking tab secures the centered clockspring rotor to the clockspring case during shipment and handling, but must be removed after the SCCM is installed on the steering column and before the steering wheel can be installed. The clockspring cannot be repaired. If the clockspring is ineffective, damaged, if clockspring centering is compromised or if the Driver AirBag (DAB) has been deployed the entire SCCM unit must be replaced. Refer to **MODULE, STEERING COLUMN CONTROL, DESCRIPTION** .

OPERATION

OPERATION

The clockspring is a mechanical electrical circuit component that is used to provide continuous electrical continuity between the fixed instrument panel wire harness and certain electrical components mounted on or in the rotating steering wheel. On this vehicle the rotating electrical components include the Driver AirBag (DAB), the horn switch, the speed control switch, the remote radio switches, the hands-free communication switches and the Electronic Vehicle Information Center (EVIC) control switches, if the vehicle is so equipped.

The clockspring is integral to the Steering Column Control Module (SCCM) positioned and secured near the top of the steering column. Refer to **MODULE, STEERING COLUMN CONTROL, OPERATION** . The turn signal cancel cam is integral to the rim of the clockspring rotor hub spool within the clockspring case so it also moves with the rotation of the steering wheel. Two short, sleeved pigtail wires on the upper surface of the clockspring rotor connect the clockspring to the DAB, while a steering wheel wire harness connected to the connector receptacles on the upper surface of the clockspring rotor completes circuits for the various steering wheel-mounted switches and the heated steering wheel, if the vehicle is so equipped.

Like the clockspring in a timepiece, the clockspring tape and conductors have travel limits and can be damaged by being wound too tightly during full stop-to-stop steering wheel rotation. To prevent this from occurring, the clockspring is centered when it is installed on the steering column. Centering the clockspring indexes the clockspring tape to the movable steering components so that the tape can operate within its designed travel limits.

However, if the steering shaft is disconnected from the steering gear the clockspring rotor spool can change position relative to other movable steering components. Clockspring centering must be confirmed by viewing the inspection window on the clockspring rotor. If the black squares of the clockspring tape are not visible in the inspection window, clockspring centering has been compromised and the entire SCCM must be replaced with a new unit. Refer to **MODULE, STEERING COLUMN CONTROL, INSTALLATION** .

Service replacement clocksprings are shipped pre-centered within the SCCM and with a plastic locking tab installed. This locking tab should not be removed until the SCCM has been properly installed on the steering column. If the locking tab is removed before the SCCM is installed on a steering column, clockspring centering must be confirmed by viewing the inspection window on the clockspring rotor. If the black squares of the clockspring tape are not visible in the inspection window, the SCCM must be replaced with a new unit. Proper clockspring installation may also be confirmed by viewing the Steering Angle Sensor (SAS) data using a diagnostic scan tool.

The hard wired clockspring circuits to the SCCM microcontroller may be diagnosed using conventional

diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SCCM microcontroller or the electronic controls and communication between other modules and devices that provide some features of the Supplemental Restraint System (SRS). The most reliable, efficient and accurate means to diagnose the electronic controls and communication related to SRS operation requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate Diagnostic & Testing article.

STANDARD PROCEDURE

STANDARD PROCEDURE - CLOCKSPRING CENTERING

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

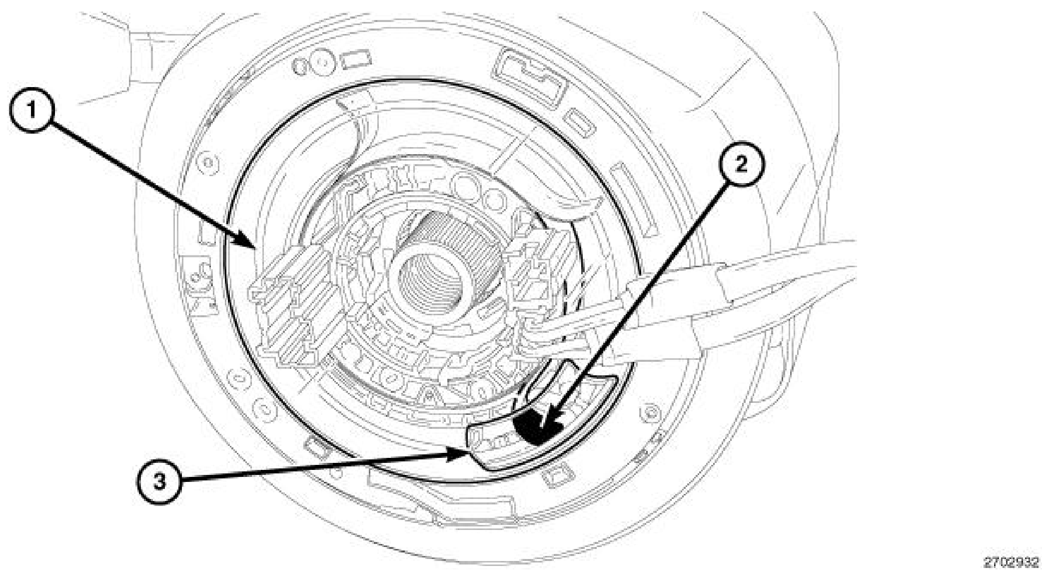


Fig. 40: Inspection Window, Clockspring Rotor & Black Squares
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Always turn the steering wheel until the front wheels are in the straight-ahead position. Then, prior to disconnecting the steering column from the steering gear, lock the steering wheel to the steering column. If clockspring centering has been compromised for ANY reason, the entire Steering Column Control Module (SCCM) and clockspring unit MUST be replaced with a new unit.

Like the clockspring in a timepiece, the clockspring tape has travel limits and can be damaged by being wound too tightly during full stop-to-stop steering wheel rotation. To prevent this from occurring, the clockspring is centered when it is installed on the steering column. Centering the clockspring indexes the clockspring tape to the movable steering components so that the tape can operate within its designed travel limits. However, if the

steering shaft is disconnected from the steering gear, the clockspring rotor spool can change position relative to the fixed steering components.

Clockspring centering must always be confirmed by viewing the inspection window (3) on the clockspring rotor (1). If the black squares (2) on the clockspring tape are not visible through the inspection window, clockspring centering has been compromised and the Steering Column Control Module (SCCM) must be replaced with a new unit. Refer to **MODULE, STEERING COLUMN CONTROL, INSTALLATION** .

The service replacement SCCM is shipped with the clockspring pre-centered and with a red plastic locking tab installed. This locking tab should not be removed until the SCCM has been properly installed on the steering column. If the locking tab is removed before the SCCM is installed on a steering column, clockspring centering must be confirmed by viewing the black squares on the clockspring tape through the inspection window on the clockspring rotor. If the black squares of the clockspring tape are not visible through the inspection window, clockspring centering has been compromised and the SCCM must be replaced with a new unit. Refer to **MODULE, STEERING COLUMN CONTROL, INSTALLATION** . Proper clockspring installation may also be confirmed by viewing the Steering Angle Sensor (SAS) data using a diagnostic scan tool.

REMOVAL

REMOVAL

NOTE: **The clockspring for this vehicle is integral to the Steering Column Control Module (SCCM). If any function of the clockspring is ineffective, or if the clockspring is damaged, the entire SCCM unit must be replaced. Refer to MODULE, STEERING COLUMN CONTROL, REMOVAL .**

INSTALLATION

INSTALLATION

NOTE: **The clockspring for this vehicle is integral to the Steering Column Control Module (SCCM). If any function of the clockspring is ineffective, or if the clockspring is damaged, the entire SCCM unit must be replaced. Refer to MODULE, STEERING COLUMN CONTROL, INSTALLATION .**

MODULE, OCCUPANT RESTRAINT CONTROLLER

DESCRIPTION

DESCRIPTION

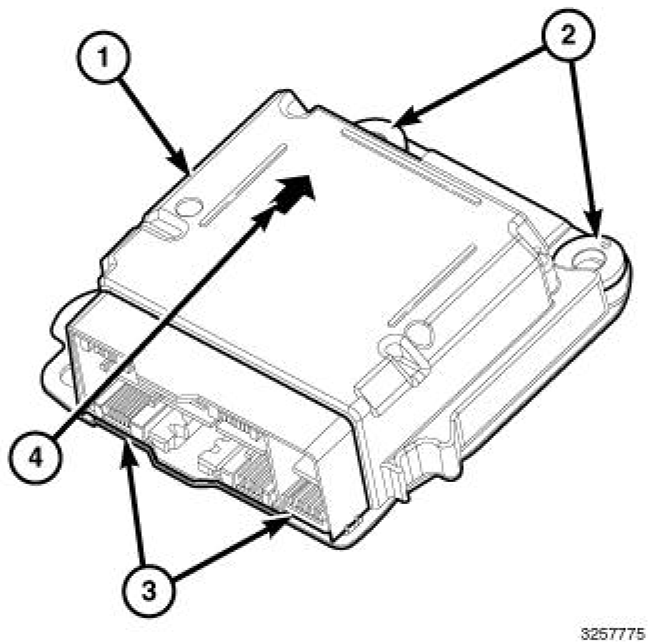


Fig. 41: Occupant Restraint Controller (ORC), Arrow, Integral Mounting Flanges & Electrical Connector Receptacles
Courtesy of CHRYSLER GROUP, LLC

The Occupant Restraint Controller (ORC) (1) is secured by three screws to a stamped steel mounting bracket on the top of the floor panel transmission tunnel near the dash panel and beneath the instrument panel center support in the passenger compartment of the vehicle. Concealed within a hollow in the center of the ORC housing is the electronic circuitry of the ORC which includes a microcontroller, an electronic impact sensor, a rollover sensor, an electronic safing sensor and an energy storage capacitor. A stamped metal cover plate is secured to the bottom of the ORC housing to enclose and protect the internal electronic circuitry and components.

An arrow (4) printed on the label on the top of the ORC housing provides a visual verification of the proper orientation of the unit, and should always be pointed toward the front of the vehicle. The ORC housing has integral mounting flanges (2) on the right and left front and the left rear corner. The stamped metal cover plate has two integral locating pins on its lower surface. Two molded plastic electrical connector receptacles (3) exit the rearward facing side of the ORC housing. These receptacles connect the ORC to the vehicle electrical system through two dedicated take outs and connectors, one from the instrument panel wire harness and the second from the body wire harness.

The impact sensor and safing sensor internal to the ORC are calibrated for the specific vehicle, and are only serviced as a unit with the ORC. In addition, there are unique versions of the ORC for vehicles with or without certain optional Supplemental Restraint System (SRS) components. The ORC cannot be repaired or adjusted and, if damaged or ineffective, it must be replaced.

OPERATION

OPERATION

The microcontroller within the Occupant Restraint Controller (ORC) contains the Supplemental Restraint System (SRS) logic circuits and controls all of the SRS components. The ORC uses On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan

tool using the Controller Area Network (CAN) data bus. This method of communication is used for control of the airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) and for SRS diagnosis and testing through the 16-way data link connector located on the driver side lower edge of the instrument panel.

The ORC microcontroller continuously monitors all of the SRS electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it sets an active and stored Diagnostic Trouble Code (DTC) and sends electronic messages to the IC over the CAN data bus to turn On the airbag indicator. An active fault only remains for the duration of the fault, or in some cases for the duration of the current ignition cycle, while a stored fault causes a DTC to be stored in memory by the ORC. For some DTCs, if a fault does not recur for a number of ignition cycles, the ORC will automatically erase the stored DTC. For other internal faults, the stored DTC is latched forever.

The ORC receives battery current through two circuits; a fused ignition switch output (run) circuit through a fuse in the rear Power Distribution Center (PDC) and a fused ignition switch output (run-start) circuit through a second fuse in the rear PDC. The ORC receives ground through a ground circuit and take out of the instrument panel wire harness that is secured by a ground screw to the body sheet metal. These connections allow the ORC to be operational whenever the status of the ignition switch is Start or On.

The ORC also contains an energy-storage capacitor. When the ignition switch status is Start or On, this capacitor is continually being charged with enough electrical energy to deploy the SRS components for up to one second following a battery disconnect or failure. The purpose of the capacitor is to provide backup SRS protection in case there is a loss of battery current supply to the ORC during an impact.

Various sensors within the ORC are continuously monitored by the ORC logic. These internal sensors, along with several external impact sensor inputs allow the ORC to determine both the severity of an impact and to verify the necessity for deployment of any SRS components. Two remote front impact sensors are located on the back of the right and left vertical members of the radiator support near the front of the vehicle. The electronic impact sensors are accelerometers that sense the rate of vehicle deceleration, which provides verification of the direction and severity of an impact.

The ORC also monitors inputs from the seat track position sensors, seat belt switches, an internal rollover sensor and six additional remote side impact sensors located on the left and right front door module carriers, on the right and left lower B-pillars and on the right and left C-pillars near the belt line to control deployment of the side curtain airbag units and seat (also known as pelvic and thorax) airbags. On vehicles so equipped, the ORC also uses the passenger side seat belt switch input along with an input from the Occupant Detection Sensor (ODS) in the passenger front seat cushion to support the passenger belt alert feature, and will send electronic messages to the IC to illuminate the seat belt indicator when appropriate.

The impact sensors within the ORC are electronic accelerometer sensors that provide an additional logic input to the ORC microcontroller. These sensors are used to verify the need for a SRS component deployment by detecting impact energy of a lesser magnitude than that of the primary electronic impact sensors, and must exceed a safing threshold in order for the SRS components to deploy. On vehicles equipped with side curtain airbags or seat airbags, a separate impact sensor within the ORC provides confirmation to the ORC microcontroller of side impact forces. This separate sensor is a bi-directional unit that detects impact forces from either side of the vehicle.

Pre-programmed decision algorithms in the ORC microcontroller determine when the deceleration rate as signaled by the impact sensors indicate an impact that is severe enough to require SRS protection and, based

upon the severity of the monitored impact, determines the level of front airbag deployment force required for each front seating position. When the programmed conditions are met, the ORC sends the proper electrical signals to deploy the dual multistage front airbags at the programmed force levels, the front seat belt tensioners and, if the vehicle is so equipped, the seat airbags and either side curtain airbag unit.

The hard wired inputs and outputs for the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the ORC or the electronic controls and communication between other modules and devices that provide some features of the SRS. The most reliable, efficient and accurate means to diagnose the ORC or the electronic controls and communication related to SRS operation requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC may contain a rollover sensor, which enables the system to deploy the side SRS components in the event of a vehicle rollover event. If an ORC containing a rollover sensor is accidentally rolled during service while still connected to battery power, the side SRS components will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the Occupant Restraint Controller (ORC), as it can damage the impact sensor or affect its calibration. The ORC contains the impact sensor, which enables the system to deploy the Supplemental Restraint System (SRS) components. If an ORC is accidentally dropped during service, the module must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper SRS component deployment.

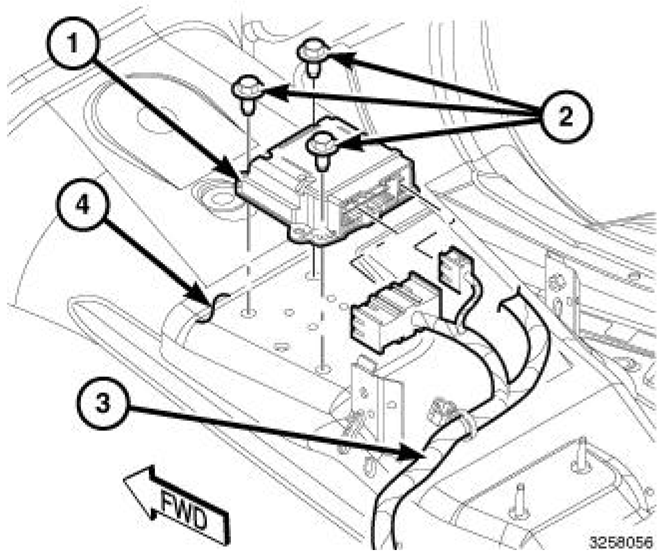


Fig. 42: Floor Panel Transmission Tunnel, Instrument Panel And Body Wire Harness, Three Screws & Occupant Restraint Controller (ORC)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the center console from the top of the floor panel transmission tunnel (4). Refer to **CONSOLE, FLOOR, REMOVAL** .
3. Remove the console floor duct from the floor panel transmission tunnel. Refer to **DUCT, FLOOR CONSOLE, REMOVAL** .

NOTE: **If equipped with a cable-type floor shifter, it is not necessary to disconnect the shift cable from the shifter.**

4. If equipped with a floor shifter:
   a. Disconnect the wire harness connectors from the shifter.
   b. Remove the four nuts that secure the shifter to the weld studs on the floor panel transmission tunnel.
   c. Remove the shifter from the transmission tunnel. If it is a cable-type shifter, carefully position the shifter and cable out of the way over the right side of the transmission tunnel.
5. Remove the switch bank and bezel from the instrument panel center stack. Refer to **POD, SWITCH BANK, REMOVAL** .
6. Disconnect the instrument panel and body wire harness (3) connectors from the Occupant Restraint Controller (ORC) (1) connector receptacles located on the rearward facing side of the module.
7. Reach through the instrument panel center stack openings to access and cut the sound deadening material along the right side of the ORC.
8. Reach around and behind the left side of the instrument panel center stack support structure to access and cut the sound deadening material along the forward-facing side of the ORC.
9. Pull the sound deadening material over the left side of the ORC far enough to access the mounting provisions.

10. Remove the three screws (2) that secure the ORC to the top of the floor panel transmission tunnel.
11. Remove the ORC from the vehicle.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with side curtain airbags, disable the Supplemental Restraint System (SRS) before attempting any Occupant Restraint Controller (ORC) diagnosis or service. The ORC may contain a rollover sensor, which enables the system to deploy the side SRS components in the event of a vehicle rollover event. If an ORC containing a rollover sensor is accidentally rolled during service while still connected to battery power, the side SRS components will deploy. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the Occupant Restraint Controller (ORC), as it can damage the impact sensor or affect its calibration. The ORC contains the impact sensor, which enables the system to deploy the Supplemental Restraint System (SRS) components. If an ORC is accidentally dropped during service, the module must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper SRS component deployment.

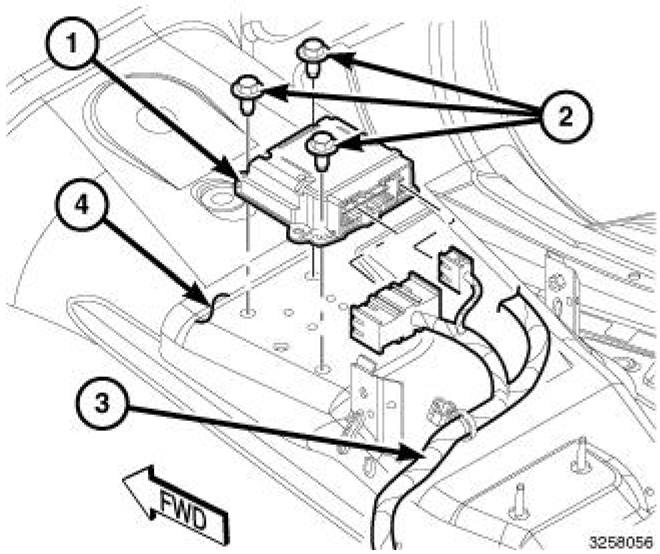


Fig. 43: Floor Panel Transmission Tunnel, Instrument Panel And Body Wire Harness, Three Screws & Occupant Restraint Controller (ORC)
Courtesy of CHRYSLER GROUP, LLC

1. Carefully position the Occupant Restraint Controller (ORC) (1) onto the floor panel transmission tunnel (4). When the ORC is correctly positioned, the orientation arrow on the ORC label will be pointed forward in the vehicle.
2. Install and tighten the three screws (2) that secure the ORC to the floor panel transmission tunnel. Tighten the screws to **SPECIFICATIONS**.
3. Restore the flap of sound deadening material that was cut during the removal procedure over and around the ORC.
4. Reconnect the instrument panel and body wire harness (3) connectors to the ORC connector receptacles located on the rearward facing side of the module. Be certain that the latches and the locks on both connectors are each fully engaged.
5. Reinstall the switch bank and bezel into the instrument panel center stack. Refer to **POD, SWITCH BANK, INSTALLATION** .
6. If equipped with a floor shifter:
   a. Position the shifter over the four weld studs on the top of the floor panel transmission tunnel.
   b. Install and tighten the four nuts that secure the shifter to the weld studs on the floor panel transmission tunnel. Tighten the nuts securely.
   c. Reconnect the wire harness connectors to the shifter.
7. Reinstall the console floor duct onto the floor panel transmission tunnel. Refer to **DUCT, FLOOR CONSOLE, INSTALLATION** .
8. Reinstall the center console onto the top of the floor panel transmission tunnel. Refer to **CONSOLE, FLOOR, INSTALLATION** .
9. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

RESTRAINT, ACTIVE HEAD

DESCRIPTION

DESCRIPTION

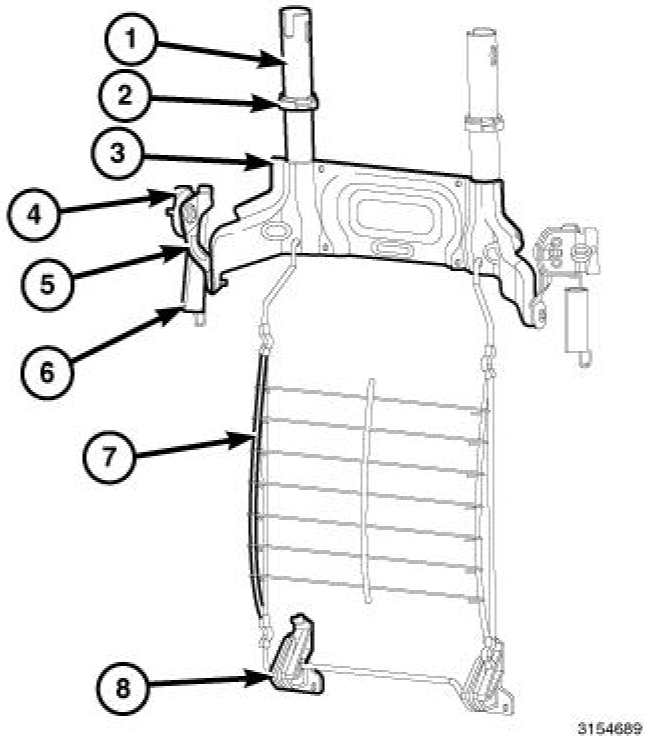


Fig. 44: Steel Headrest Guide Tubes, Fulcrum Bushing, Brackets, Steel Pivot Link, Spring & Static Lumbar Assembly
Courtesy of CHRYSLER GROUP, LLC

Active Head Restraint (AHR) units are standard equipment for both front seating positions in this vehicle. One inertia-activated AHR unit is located atop each front seat back. Outwardly, an inertia-activated AHR appears the same as a non-active head restraint. The mechanical components that articulate the inertia-activated AHR headrest pad are all concealed within the front seat back frame assembly.

At the top of the seat back frame are two stamped steel headrest guide tubes (1). The guide tubes are each inserted through a molded plastic fulcrum bushing (2) installed in the upper seat back frame member and are permanently fixed to a movable stamped steel armature bracket (3) located just below the upper frame member near the top of the seat back. The armature bracket is secured to a stamped steel pivot link (5) at each side that pivots on a screw threaded into a mounting bracket (4) welded to each side member of the seat back frame. The pivot links each have a spring (6) attached to a lever opposite the armature bracket attachment that is anchored to the seat back frame side member below, which provides the spring-loaded return action of the inertia mechanism.

The upper end of the static lumbar assembly (7) is secured at each side to the base of the armature bracket. Each side of the lower end of the lumbar assembly is engaged in a ramp bracket (8) riveted to the lower seat back frame member. The optional power lumbar assembly (not shown) is secured to the armature bracket at the top and the ramp brackets at the bottom in an identical manner as the standard equipment static lumbar assembly.

The inertia-activated AHR linkage cannot be repaired. If damaged or ineffective, it must be replaced as a unit with a new seat back frame unit. However, following an AHR deployment if no physical damage to the unit has occurred, unlike many other Supplemental Restraint System (SRS) components, the spring-loaded inertia-

activated AHR linkage will reset itself for reuse.

OPERATION

OPERATION

The inertia-activated Active Head Restraint (AHR) units are deployed and reset automatically by the mechanism contained within each front seat back assembly. During a rear impact, inertia drives the seat occupant rearward into the seat back, loading the seat lumbar assembly. The ramp brackets at the base of the lumbar assembly translate this rearward travel into a vertical motion. The vertical motion of the lumbar assembly is then transmitted to the armature bracket.

Through the rotation of the pivot links at each side of the armature bracket, the vertical motion of the lumbar assembly is converted to a slightly forward and upward arc of the armature bracket, headrest guide tubes and headrest that is designed to reduce the space between the back of the head of the seat occupant and the head restraint pad. Closing this space catches the head of the seat occupant during a low speed rear impact collision event and is important in reducing or eliminating potentially debilitating cervical (also known as whiplash) injuries.

Unless damaged, following the rear impact, the return spring on the pivot link at each side of the armature bracket returns the mechanical components within the seat back and the headrest to their non-loaded positions.

RETRACTOR, SEAT BELT

DESCRIPTION

DESCRIPTION

Both front seating position seat belts are equipped with a Constant Force Retractor (CFR), while the seat belt retractors used in all seating positions include an inertia-type, Emergency Locking Retractor (ELR) mechanism as standard equipment. However, the ELR for all seating positions except the driver side front are mechanically switchable from an ELR to an Automatic Locking Retractor (ALR).

The CFR, ELR and ALR features are all integral to the seat belt retractor unit mechanism that is concealed beneath a molded plastic cover located on one side of the retractor spool. The CFR, ELR and ALR features cannot be adjusted or repaired and, if ineffective or damaged, the entire seat belt and retractor must be replaced as a unit.

OPERATION

OPERATION

The Constant Force Retractors (CFR) used for both front seating positions provide a constant force load-limiting feature. This load-limiting feature helps to limit the maximum force on the belt webbing to help absorb the energy of the upper torso during an impact event. The CFR feature also helps to offset any extreme torso loading that might occur as the seat belt webbing is automatically retracted by deployment of the belt tensioners in conjunction with a front airbag deployment.

The primary function of the switchable Emergency Locking Retractor (ELR) to Automatic Locking Retractor (ALR) feature is to securely accommodate an infant or child booster seat in any seating position of the vehicle except the driver side front seat without the need for a self-cinching seat belt tip half latch plate unit or another

supplemental device that would be required to prevent the seat belt webbing from unwinding freely from the retractor spool of an inertia-type ELR in situations where the minimum inertia locking threshold has not been achieved.

The locked mode of the ALR is engaged and the retractor is switched from operating as a standard inertia-type ELR by first buckling the combination lap and shoulder belt buckle. Then all of the shoulder belt webbing is pulled out from the retractor. Once all of the belt webbing is extracted from the retractor spool, the retractor will automatically become engaged in the pre-locked ALR mode and will make a light, audible clicking or ratchet-like sound as the shoulder belt is allowed to retract onto the spool to provide an audible confirmation that the ALR mode is engaged. Once the ALR mode is engaged, the retractor will remain locked and the belt will remain tight around whatever it is restraining.

The retractor is returned to standard ELR (inertia) mode by unbuckling the combination lap and shoulder belt buckle and allowing the belt webbing to be almost fully retracted back onto the retractor spool. The ELR mode is confirmed by the absence of the light, audible clicking or ratchet-like sound as the belt webbing retracts. This mode will allow the belt to unwind from and wind onto the retractor spool freely unless and until a predetermined inertia load threshold is sensed, or until the retractor is again switched to the ALR mode.

REMOVAL

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÃ® Parts Catalog.

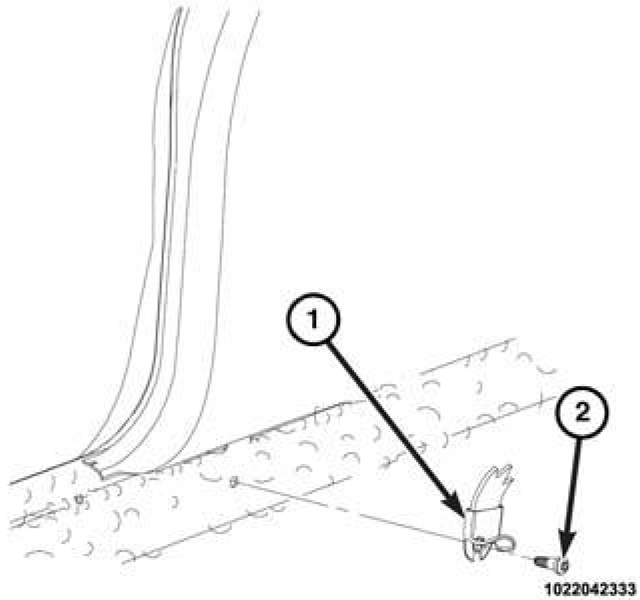
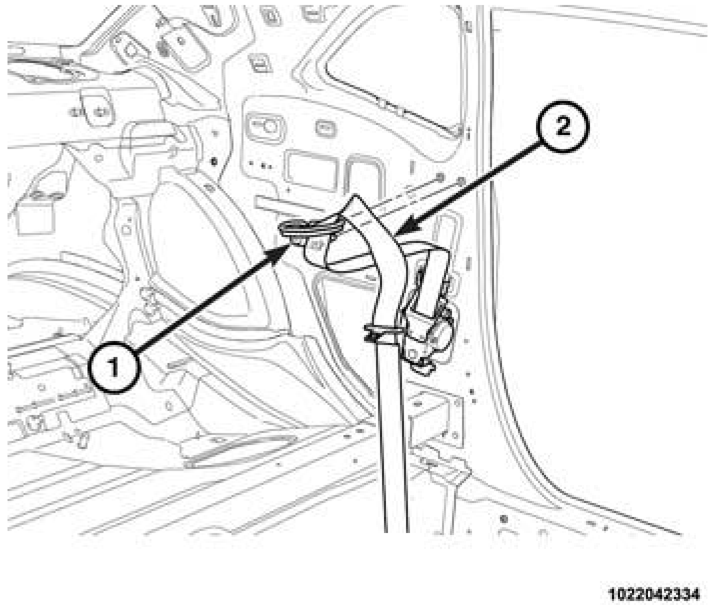


Fig. 45: Front Seat Belt Lower Anchor Plate & Screw
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure is for replacement of an ineffective or damaged seat belt and retractor unit. The front outboard retractors also include a seat belt tensioner. If the front seat belt or retractor is ineffective or damaged, but the seat belt tensioner is not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the seat belt tensioner has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the unit from the vehicle. Refer to STANDARD PROCEDURE.**

NOTE: **All seat belt retractors except the driver side front retractor include a switchable automatic locking mechanism. Refer to RETRACTOR, SEAT BELT, DESCRIPTION.**

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the screw (2) that secures the front seat belt lower anchor plate (1) to the inner floor sill near the base of the B-pillar.
3. Remove the trim panel from the lower quarter inner panel. Refer to **PANEL, QUARTER TRIM, REMOVAL** .



[**Fig. 46: Seat Belt & Screws**]
Courtesy of CHRYSLER GROUP, LLC

4. Remove the two screws (1) that secure the web guide for the seat belt (2) to the quarter inner panel just below the belt line.

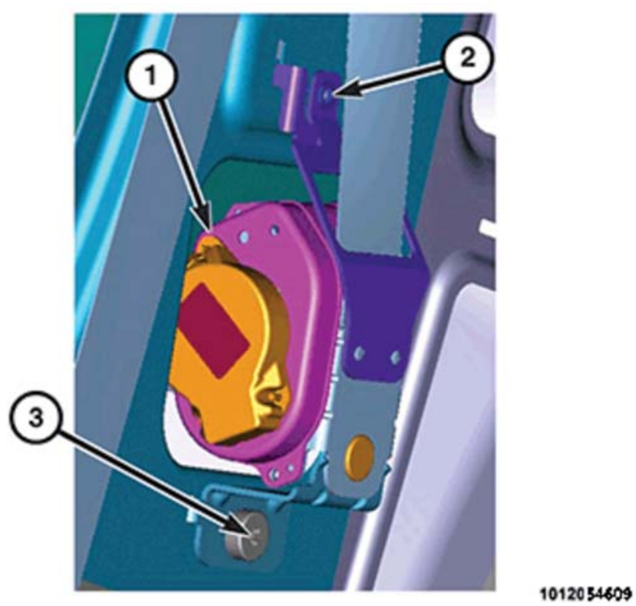


Fig. 47: Retractor & Screws
Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the yellow body wire harness connector from the retractor (1) tensioner initiator.
6. Remove the screw (2) that secures the retractor upper bracket to the quarter inner panel.
7. Remove the screw (3) that secures the retractor lower bracket to the quarter inner panel.
8. Disengage the retractor by pulling the lower bracket inboard, then lifting it slightly upward to release the hooks on the upper bracket from the slots in the quarter inner panel.
9. Remove the front seat belt, retractor and web guide from the vehicle as a unit.

REAR CENTER

WARNING: **To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÂ® Parts Catalog.**

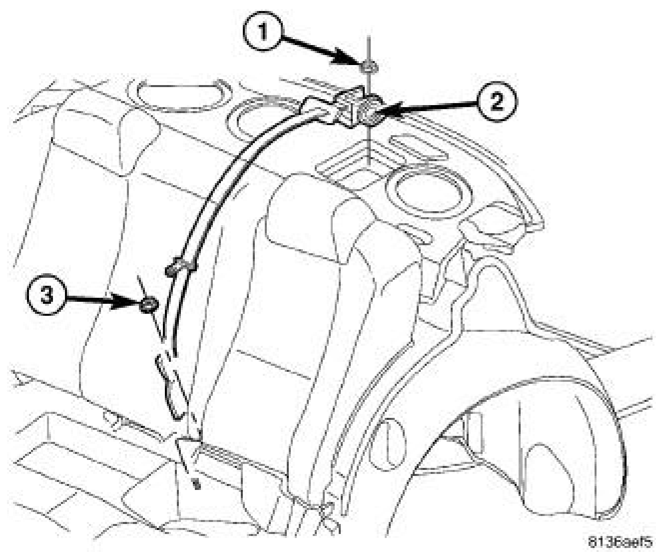


Fig. 48: Rear Center Seat Belt
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear seat cushion from the vehicle. Refer to **COVER, SEAT CUSHION, REAR, REMOVAL** .
2. Remove the nut (3) that secures the rear center seat belt lower anchor plate to the rear floor panel. The rear center seat belt lower anchor is shared with the left rear seat belt buckle unit.
3. Remove the rear center seat belt lower anchor and the left rear seat belt buckle from the mounting stud as a unit.
4. Remove the trim from the rear shelf panel support. Refer to **PANEL, REAR SHELF, REMOVAL** .
5. Remove the nut (1) that secures the rear center seat belt retractor (2) to the stud on the rear shelf panel support.
6. Remove the rear center seat belt retractor and left rear buckle unit from the vehicle as a unit.

REAR OUTBOARD

WARNING: **To avoid serious or fatal injury during and following any seat belt or child**

restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÃ® Parts Catalog.

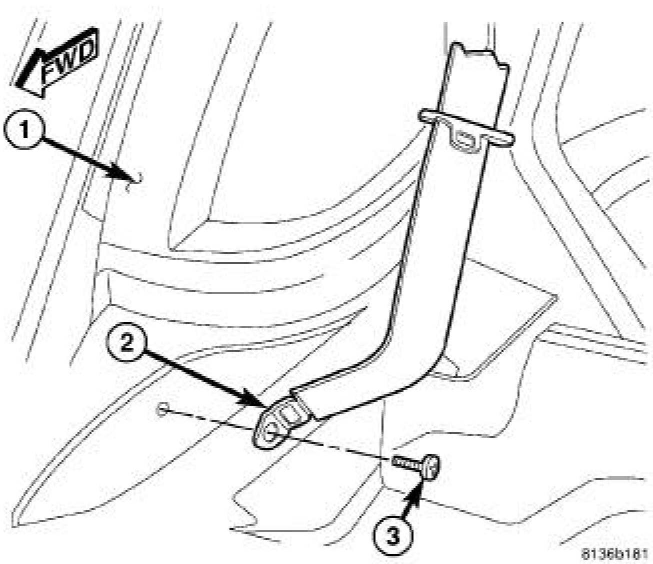


Fig. 49: Rear Seat Belt Anchor
Courtesy of CHRYSLER GROUP, LLC

1. Remove the trim panel from the upper quarter inner panel. Refer to **PANEL, QUARTER TRIM, REMOVAL** .
2. Remove the screw (3) that secures the rear outboard seat belt lower anchor (2) to the quarter inner panel just forward of the rear wheel housing (1).

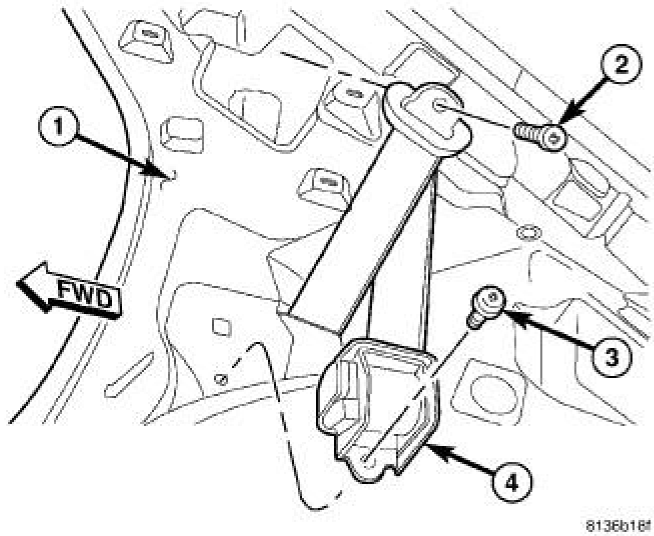


Fig. 50: Rear Seat Belt Anchor
Courtesy of CHRYSLER GROUP, LLC

3. Remove the screw (2) that secures the seat belt turning loop to the inside of the upper C-pillar.
4. Remove the seat belt turning loop from the upper inner C-pillar.
5. Remove the screw (3) that secures the retractor (4) lower bracket to the inner C-pillar.
6. Lift the retractor upward far enough to disengage the retractor upper bracket T-tab from the keyed slot in the inner C-pillar.
7. Remove the rear outboard seat belt and retractor from the vehicle as a unit.

INSTALLATION

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace

damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparĀ® Parts Catalog.

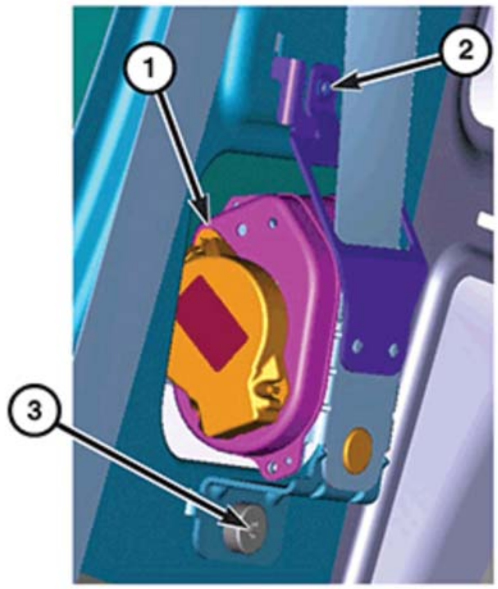


Fig. 51: Retractor & Screws
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure is for replacement of an ineffective or damaged seat belt and retractor unit. The front outboard retractors also include a seat belt tensioner. If the front seat belt or retractor is ineffective or damaged, but the seat belt tensioner is not deployed, review the recommended procedures for Handling Non-Deployed Supplemental Restraints. Refer to STANDARD PROCEDURE. If the seat belt tensioner has been deployed, review the recommended procedures for Service After A Supplemental Restraint Deployment before removing the unit from the vehicle. Refer to STANDARD PROCEDURE.**

NOTE: **All seat belt retractors except the driver side front retractor include a switchable automatic locking mechanism. Refer to RETRACTOR, SEAT BELT, DESCRIPTION.**

1. Position the front seat belt and retractor (1) into the vehicle as a unit.
2. Engage the hooks on the retractor upper bracket into the slots in the quarter inner panel.
3. Engage the locator tab on the retractor lower bracket into the locator hole in the quarter inner panel.
4. Install and tighten the screw (3) that secures the retractor lower bracket to the quarter inner panel. Tighten the screw to **SPECIFICATIONS**.
5. Install and tighten the screw (2) that secures the retractor upper bracket to the quarter inner panel. Tighten the screw to **SPECIFICATIONS**.
6. Reconnect the yellow body wire harness connector to the retractor tensioner initiator.

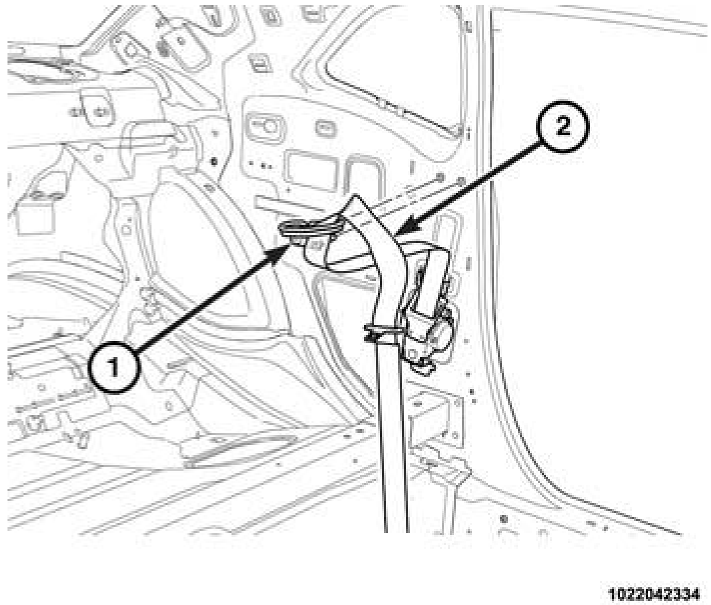


Fig. 52: Seat Belt & Screws
Courtesy of CHRYSLER GROUP, LLC

7. Position the web guide for the seat belt (2) to the quarter inner panel just below the belt line. Be certain that the belt webbing is not twisted between the retractor and the web guide.
8. Install and tighten the two screws (1) that secure the web guide to the quarter inner panel. Tighten the screws to SPECIFICATIONS.
9. Reinstall the trim panel onto the lower quarter inner panel. Refer to PANEL, QUARTER TRIM, INSTALLATION .

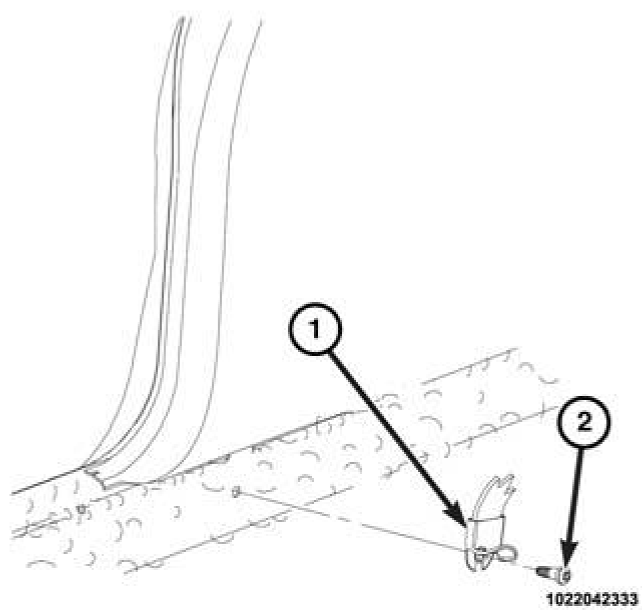


Fig. 53: Front Seat Belt Lower Anchor Plate & Screw
Courtesy of CHRYSLER GROUP, LLC

10. Position the front seat belt lower anchor plate (1) to the inner floor sill near the base of the B-pillar. Be certain that the belt webbing is not twisted between the web guide and the lower anchor plate.
11. Install and tighten the screw (2) that secures the lower anchor plate to the inner floor sill. Tighten the

screw to **SPECIFICATIONS**.

12. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

REAR CENTER

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparÂ® Parts Catalog.

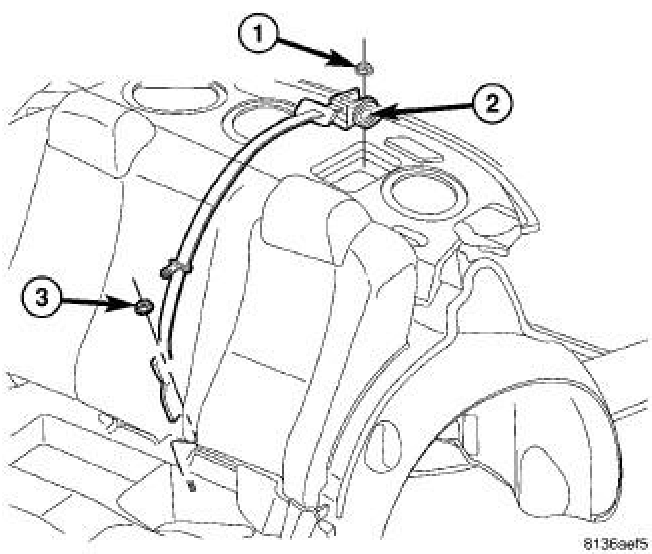


Fig. 54: Rear Center Seat Belt
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear center seat belt and retractor unit (2) over the stud on the rear shelf panel support. Be certain to engage the anti-rotation tab on the retractor bracket into the clearance hole in the shelf panel support.
2. Install and tighten the nut (1) that secures the retractor to the stud on the shelf panel support. Tighten the nut to **SPECIFICATIONS**.
3. Reinstall the trim onto the rear shelf panel support. Refer to **PANEL, REAR SHELF, INSTALLATION** .
4. Position the rear center seat belt and left rear seat belt buckle unit lower anchor plate over the mounting stud on the rear floor panel. The rear center seat belt shares the lower anchor plate with the left rear seat

belt buckle. Be certain the seat belt webbing is not twisted between the retractor and the lower anchor plate.

5. Install and tighten the nut (3) that secures the rear center seat belt and buckle unit lower anchor plate to the rear floor panel. Tighten the nut to **SPECIFICATIONS**.
6. Reinstall the rear seat cushion into the vehicle. Refer to **COVER, SEAT CUSHION, REAR, INSTALLATION** .

REAR OUTBOARD

WARNING: To avoid serious or fatal injury during and following any seat belt or child restraint anchor service, carefully inspect all seat belts, buckles, mounting hardware, retractors, tether straps, and anchors for proper installation, operation, or damage. Replace any belt that is cut, frayed, or torn. Straighten any belt that is twisted. Tighten any loose fasteners. Replace any belt that has a damaged or ineffective buckle or retractor. Replace any belt that has a bent or damaged latch plate or anchor plate. Replace any child restraint anchor or the unit to which the anchor is integral that has been bent or damaged. Never attempt to repair a seat belt or child restraint component. Always replace damaged or ineffective seat belt and child restraint components with the correct, new and unused replacement parts listed in the Chrysler MoparĀ® Parts Catalog.

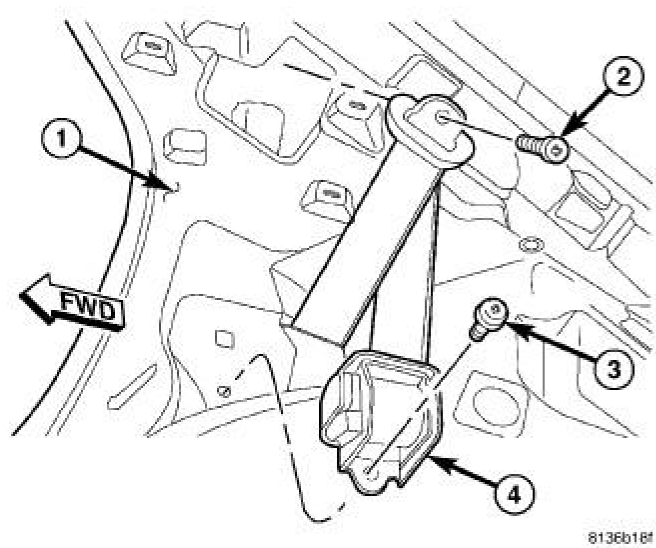


Fig. 55: Rear Seat Belt Anchor
Courtesy of CHRYSLER GROUP, LLC

1. Position the rear outboard seat belt and retractor unit (4) onto the inner C-pillar. Be certain to engage the retractor upper bracket T-tab into the keyed slot in the inner C-pillar.
2. Install and tighten the screw (3) that secures the retractor lower bracket to the inner C-pillar. Tighten the screw to **SPECIFICATIONS**.
3. Position the seat belt turning loop onto the upper inner C-pillar. Be certain the seat belt webbing is not twisted between the retractor and the turning loop.
4. Install and tighten the screw (2) that secures the seat belt turning loop to the inside of the upper C-pillar.

Tighten the screw to **SPECIFICATIONS**.

5. Reinstall the trim panel onto the upper quarter inner panel. Refer to **PANEL, QUARTER TRIM, INSTALLATION** .

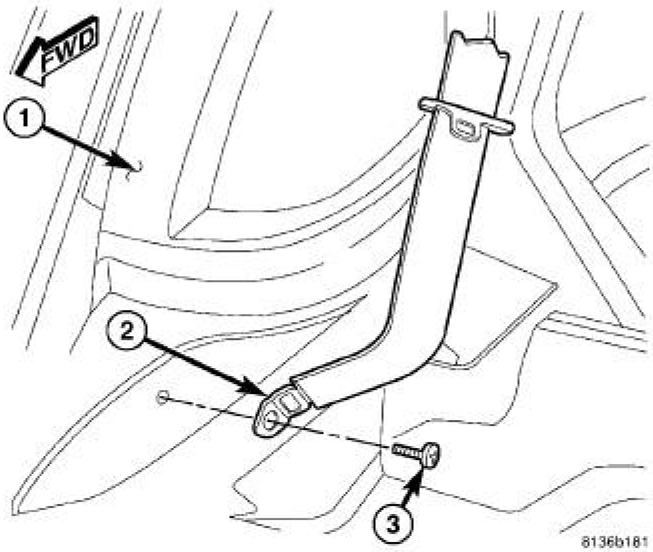


Fig. 56: Rear Seat Belt Anchor
Courtesy of CHRYSLER GROUP, LLC

6. Position the rear outboard seat belt lower anchor (2) to the quarter inner panel just forward of the rear wheel housing (1). Be certain the seat belt webbing is not twisted between the upper C-pillar and the lower anchor.
7. Install and tighten the screw (3) that secures the rear outboard seat belt lower anchor to the quarter inner panel. Tighten the screw to **SPECIFICATIONS**.

SENSOR, IMPACT

DESCRIPTION

IMPACT SENSORS

Remote or satellite impact sensors are mounted in various strategic locations of the vehicle. These sensors are mounted remotely from the impact sensor that is internal to the Occupant Restraint Controller (ORC). Sensors at the front of the vehicle provide an additional logic input for use by the Occupant Restraint Controller (ORC) to control the front airbags and the seat belt pretensioners. Sensors on each side of the vehicle provide an additional logic input for use by the ORC to control the side curtain airbags, seat airbags and the seat belt pretensioners. Two types of sensors are used in this vehicle. They are the acceleration-type and the pressure-type, which are described in further detail elsewhere within this service information.

ACCELERATION TYPE

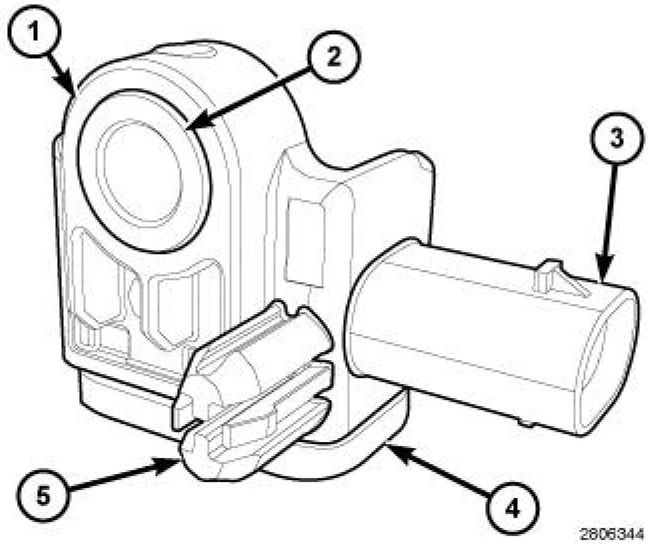


Fig. 57: Satellite Acceleration-Type Impact Sensors, Integral Connector Receptacle, Metal Sleeve & Molded Cover
Courtesy of CHRYSLER GROUP, LLC

Remote or satellite acceleration-type impact sensors (1) are mounted in various locations in the vehicle. These sensors are mounted remotely from the impact sensor that is internal to the Occupant Restraint Controller (ORC). Sensors at the front of the vehicle provide an additional logic input for use by the ORC to control the front airbags and the seat belt pretensioners. Sensors on each side of the vehicle provide an additional logic input for use by the ORC to control the side curtain airbags, the seat belt pretensioners and the seat (also known as pelvic and thorax) airbags.

Although the front and side acceleration-type impact sensors are similar in appearance and construction, they may not be interchangeable. The front impact sensors may monitor acceleration forces on a different axis than those monitored by the side impact sensors. Each sensor is secured with a single screw to its mounting location. The front sensors are located on the back of each vertical support member of the headlamp mounting cross member between the cooling module and the front lamp unit. A side sensor is located near the base of each inner B-pillar and near the belt line of each C-pillar and concealed behind the interior trim.

Each sensor housing has an integral connector receptacle (3), an integral locator pin with two latch features (5), and an integral mounting hole with a metal sleeve (2) to provide crush protection. A cavity in the center of the molded plastic impact sensor housing contains the electronic circuitry of the sensor which includes an electronic communication chip and an electronic acceleration sensor. Potting material fills the cavity and a molded cover (4) is laser welded over the cavity to seal and protect the internal electronic circuitry and components.

The front impact sensors are each connected to the vehicle electrical system through dedicated take outs and connectors of the headlamp and dash wire harness, while the side impact sensors are connected through dedicated take outs and connectors of the body wire harness.

The acceleration-type impact sensors cannot be repaired or adjusted and, if damaged or ineffective, they must be replaced.

PRESSURE TYPE

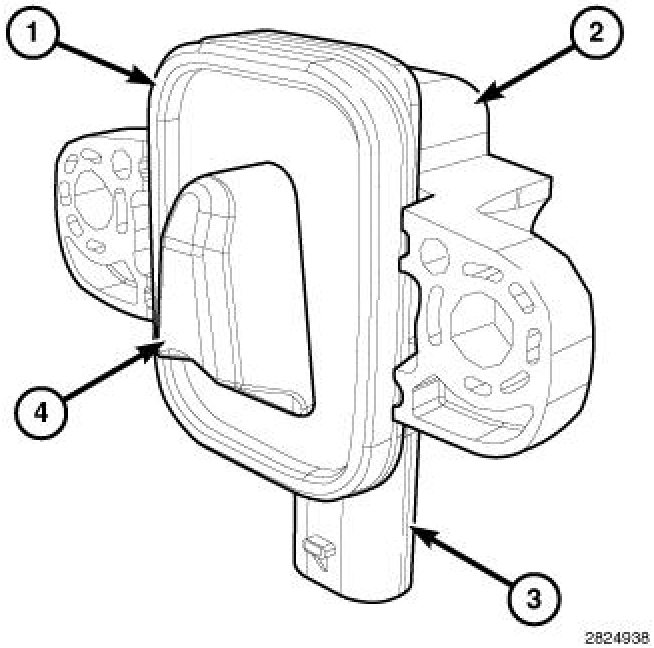


Fig. 58: Sensors, Resilient Gasket, Connector Receptacle & Water Shield
Courtesy of CHRYSLER GROUP, LLC

Two pressure-type door side impact sensors (2) are used on this vehicle, one each for the left and right sides of the vehicle. These sensors are mounted remotely from the impact sensor that is internal to the Occupant Restraint Controller (ORC). Each side sensor is secured with two screws and is sealed by a resilient gasket (1) to the door hardware module carrier on the door inner panel. The sensors are concealed behind the door trim panel within the passenger compartment.

The right and left door side impact sensors are identical in construction and calibration. The impact sensor housing has an integral connector receptacle (3), two integral mounting tabs and an integral hood-like water shield (4). The water shield extends through a hole in the door module carrier into the interior of the door cavity and protects the sensor orifice from contamination. A cavity in the center of the molded plastic impact sensor housing contains the electronic circuitry of the sensor, which includes an electronic communication chip and the pressure sensor.

The housing cavity is filled with a potting material to seal and protect the internal electronic circuitry and components. A label on the sensor has a directional arrow and the word **down** imprinted upon it to provide verification of the correct sensor orientation in the vehicle. The pressure-type side impact sensors are each connected to the vehicle electrical system through a dedicated take out and connector of the door wire harness.

These pressure-type door side impact sensors cannot be repaired or adjusted and, if damaged or ineffective, they must be replaced.

OPERATION

IMPACT SENSORS

Two types of impact sensors are used in this vehicle. They are the acceleration-type and the pressure-type. Additional operational details of each of these sensor types is described in further detail elsewhere within this service information.

ACCELERATION TYPE

The acceleration-type impact sensors are electronic accelerometers that sense the rate of vehicle deceleration, which provides verification of the direction and severity of an impact. Each sensor also contains an electronic communication chip that allows the unit to communicate the sensor status as well as sensor fault information to the microcontroller within the Occupant Restraint Controller (ORC).

The ORC microcontroller continuously monitors all of the passive restraint system electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it sets a Diagnostic Trouble Code (DTC) and controls the airbag indicator operation accordingly. The impact sensors each receive battery current and ground through dedicated left and right sensor plus and minus circuits from the ORC. The impact sensors and the ORC communicate by modulating the voltage in the sensor plus circuit.

The hard wired circuits between the impact sensors and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the impact sensors or the electronic controls and communication between other modules and devices that provide some features of the Supplemental Restraint System (SRS). The most reliable, efficient and accurate means to diagnose the acceleration-type impact sensors or the electronic controls and communication related to impact sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

PRESSURE TYPE

The pressure-type door side impact sensors recognize a side impact in the door area by monitoring changes in pressure within the door cavity. A sudden pressure wave is created as the door collapses during an impact event. Each sensor also contains an electronic communication chip that allows the unit to communicate the sensor status as well as sensor fault information to the microcontroller within the Occupant Restraint Controller (ORC).

The ORC microcontroller continuously monitors all of the passive restraint system electrical circuits to determine the system readiness. If the ORC detects a monitored system fault, it sets a Diagnostic Trouble Code (DTC) and controls the airbag indicator operation accordingly. The impact sensors each receive battery current and ground through dedicated left and right sensor plus and minus circuits from the ORC. The impact sensors and the ORC communicate by modulating the current in the sensor plus circuit.

The hard wired circuits between the pressure-type door side impact sensors and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the impact sensors or the electronic controls and communication between other modules and devices that provide features of the Supplemental Restraint System (SRS). The most reliable, efficient and accurate means to diagnose the pressure-type impact sensors or the electronic controls and communication related to impact sensor operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge

before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the front impact sensor, as it can damage the impact sensor or affect its calibration. The front impact sensor enables the system to deploy the front Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper front SRS component deployment.

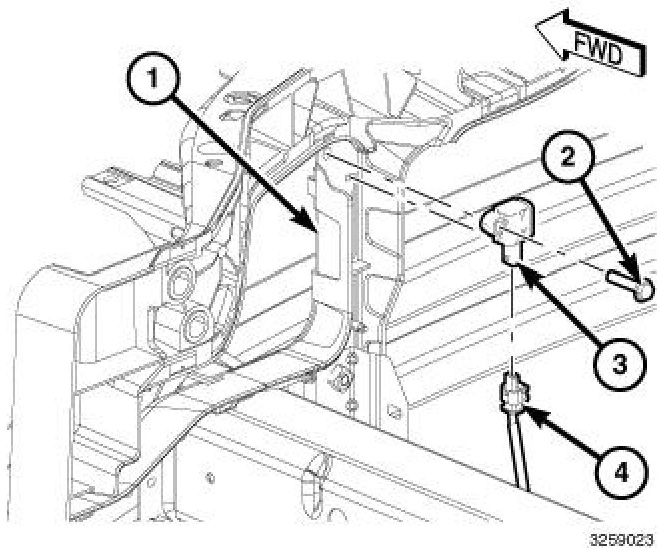


Fig. 59: Front End Module (FEM) Structural Support, Wire Harness Connector, Screw & Left Front Impact Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
2. For the left hand side only, remove the fastener that secures the engine air cleaner assembly to the Front End Module (FEM) structural support (1) and move the air cleaner assembly far enough to access the impact sensor connector and fastener on the back of the vertical support member between the cooling module and the front lamp unit opening.
3. Disconnect the headlamp and dash wire harness connector (4) from the right or left front impact sensor (3) connector receptacle.
4. Remove the screw (2) that secures the sensor to the back of the FEM vertical support member.
5. Disengage the locating pin integral to the sensor from the locating hole in the FEM vertical support member.
6. Remove the right or left front impact sensor from the vehicle.

SIDE - B-PILLAR

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

WARNING: **To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.**

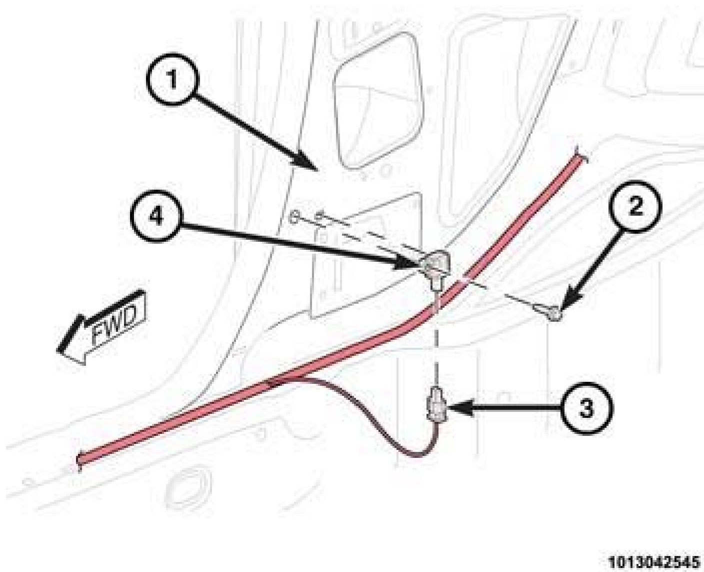


Fig. 60: Lower B-Pillar, Side Impact Connector, Wire Harness Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the trim from the inside of the lower B-pillar (1). Refer to **PANEL, QUARTER TRIM, REMOVAL** .
3. Disconnect the body wire harness connector (3) from the side impact sensor (4) connector receptacle.
4. Remove the screw (2) that secures the sensor to the lower B-pillar.
5. Gently pry the sensor away from the inner B-pillar far enough to disengage the latch features of the locator pin from the locator hole.
6. Remove the sensor from the inner B-pillar.

SIDE - C-PILLAR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

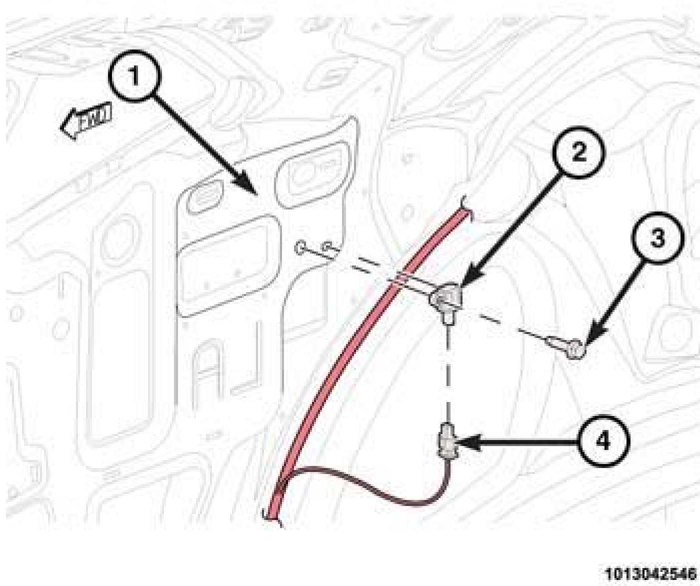


Fig. 61: C-Pillar, Wire Harness Connector, Side Impact Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the trim from the inside of the C-pillar (1). Refer to **PANEL, C-PILLAR TRIM, REMOVAL** .
3. Disconnect the body wire harness connector (4) from the side impact sensor (2) connector receptacle.
4. Remove the screw (3) that secures the sensor to the inner C-pillar.
5. Gently pry the sensor away from the inner C-pillar far enough to disengage the latch features of the locator pin from the locator hole.
6. Remove the sensor from the inner C-pillar.

SIDE - DOOR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

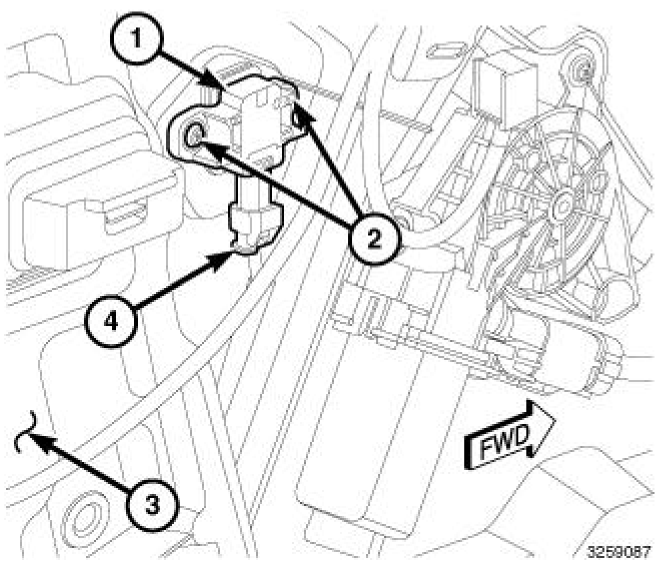


Fig. 62: Front Door Wire Harness Connector, Side Impact Sensor, Two Screws & Front Door Hardware Module Carrier Panel
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
2. Remove the trim panel from the inside of the right or left door. Refer to **PANEL, DOOR TRIM, REMOVAL** .
3. Disconnect the door wire harness connector (4) from the side impact sensor (1) connector receptacle.
4. Remove the two screws (2) that secure the side impact sensor to the door hardware module carrier panel (3).
5. Remove the side impact sensor from the vehicle.

INSTALLATION

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the front impact sensor, as it can damage the impact sensor or affect its calibration. The front impact sensor enables the system to deploy the front Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper front SRS component deployment.

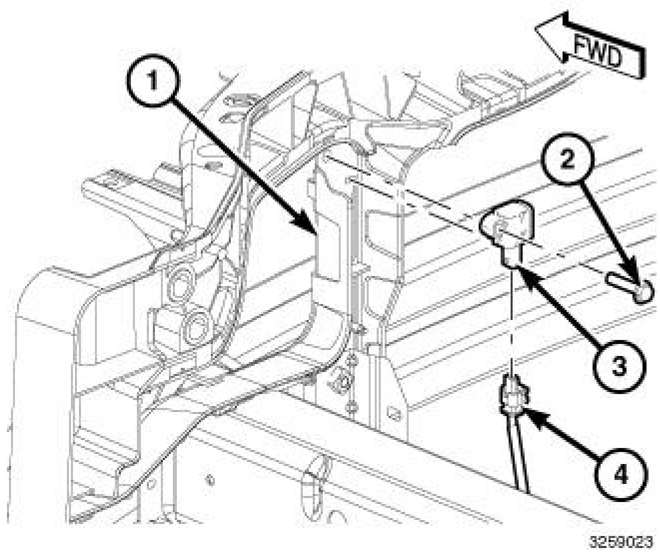


Fig. 63: Front End Module (FEM) Structural Support, Wire Harness Connector, Screw & Left Front Impact Sensor
Courtesy of CHRYSLER GROUP, LLC

1. Position the right or left front impact sensor (3) to the back of the Front End Module (FEM) vertical support member (1) between the cooling module and the front lamp unit opening.
2. Be certain to engage the locating pin integral to the sensor into the locating hole in the FEM vertical support member.
3. Install and tighten the screw (2) that secures the sensor to the FEM vertical support member. Tighten the screw to **SPECIFICATIONS**.
4. Reconnect the headlamp and dash wire harness connector (4) to the sensor connector receptacle.
5. For the left hand side only, position the engine air cleaner assembly to the FEM structural support and

reinstall the fastener that secures the air cleaner assembly.

6. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SIDE - B-PILLAR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

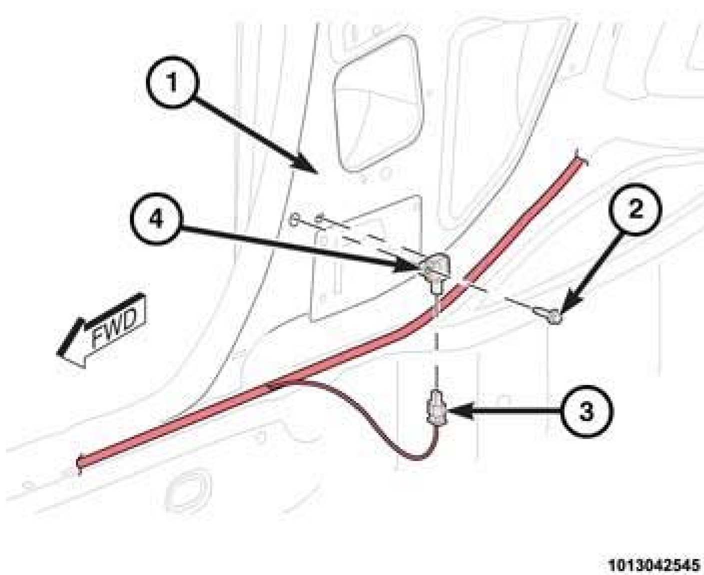


Fig. 64: Lower B-Pillar, Side Impact Connector, Wire Harness Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Position the side impact sensor (4) onto the inner B-pillar (1). Be certain that the locator pin on the sensor is fully engaged in the locator hole of the inner B-pillar.
2. Install and tighten the screw (2) that secures the sensor to the inner B-pillar. Tighten the screw to **SPECIFICATIONS**.
3. Reconnect the body wire harness connector (3) to the sensor connector receptacle.

4. Reinstall the trim onto the inside of the lower B-pillar. Refer to **PANEL, QUARTER TRIM, INSTALLATION** .
5. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SIDE - C-PILLAR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.

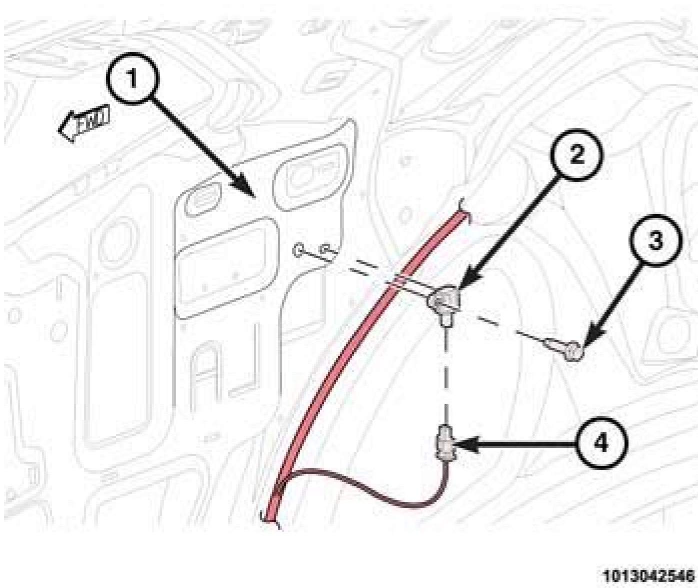


Fig. 65: C-Pillar, Wire Harness Connector, Side Impact Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

1. Position the side impact sensor (2) onto the inner C-pillar (1). Be certain that the locator pin on the sensor is fully engaged in the locator hole of the inner C-pillar.
2. Install and tighten the screw (3) that secures the sensor to the inner C-pillar. Tighten the screw to **SPECIFICATIONS**.

3. Reconnect the body wire harness connector (4) to the sensor connector receptacle.
4. Reinstall the trim onto the inside of the C-pillar. Refer to **PANEL, QUARTER TRIM, INSTALLATION** .
5. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SIDE - DOOR

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

WARNING: **To avoid serious or fatal injury, never strike or drop the side impact sensor, as it can damage the impact sensor or affect its calibration. The side impact sensor enables the system to deploy the side Supplemental Restraint System (SRS) components. If an impact sensor is accidentally dropped during service, the sensor must be scrapped and replaced with a new unit. Failure to observe this warning could result in accidental, incomplete, or improper side SRS component deployment.**

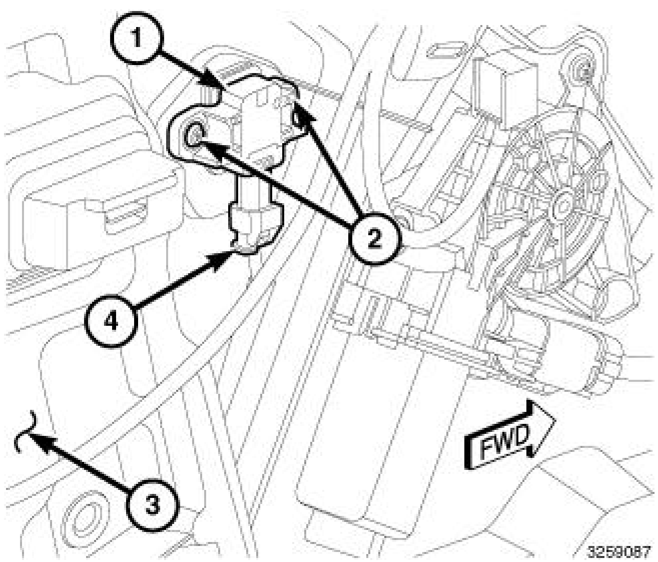


Fig. 66: Front Door Wire Harness Connector, Side Impact Sensor, Two Screws & Front Door Hardware Module Carrier Panel
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Be certain that the gasket between the pressure-type side impact sensor and the door hardware module carrier panel is in good condition and positioned on the back of the sensor. There MUST be a good seal between the sensor and the**

hardware module carrier panel for the sensor to operate properly. If the gasket is in poor condition, replace the sensor.

1. Position the side impact sensor (1) to the right or left door hardware module carrier panel (3). When the sensor is correctly positioned, the sensor connector receptacle will be pointed toward the bottom of the door.
2. Install and tighten the two screws (2) that secure the side impact sensor to the door hardware module carrier panel. Tighten the screws to **SPECIFICATIONS**.
3. Reconnect the door wire harness connector (4) to the sensor connector receptacle.
4. Reinstall the trim panel onto the inside of the right or left door. Refer to **PANEL, DOOR TRIM, INSTALLATION** .
5. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SENSOR, OCCUPANT DETECTION

DESCRIPTION

DESCRIPTION

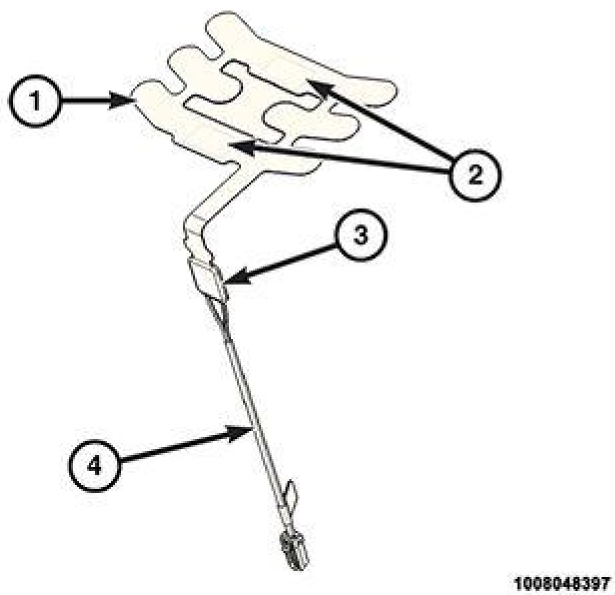


Fig. 67: Occupant Detection Sensor Components
Courtesy of CHRYSLER GROUP, LLC

An Occupant Detection Sensor (ODS) is located directly below the passenger side front seat cushion trim cover. This sensor provides information to the Occupant Restraint Controller (ORC) used for control of the passenger belt alert feature.

The ODS consists of a flexible clear plastic sensor mat (1) containing several resistive membrane, force sensing resistor cells. The sensor is secured by two adhesive patches (2) to the top surface of the seat cushion foam. If the vehicle is equipped with either heated seats or heated and ventilated seats the respective heater or heat and ventilation mat is placed over the top of the ODS mat on the seat cushion foam. The adhesive patches on the

ODS are a one time only material and cannot be reactivated or reused if removed.

A short, two-conductor pigtail wire and connector (4) connect the sensor to the vehicle electrical system through a dedicated take out and connector of the seat wire harness. A hot melt adhesive block (3) encapsulates and protects the connections between the electrical conductors in the tail of the sensor mat and the pigtail wires as well as a diagnostic resistor.

The ODS cannot be adjusted or repaired, and must be replaced if damaged or ineffective.

OPERATION

OPERATION

The Occupant Detection Sensor (ODS) acts as a simple switch to detect loads placed upon the passenger side front seat cushion. The sensor circuits are connected to and monitored by the Occupant Restraint Controller (ORC) whenever the ignition switch is in the ON position. The ORC uses an algorithm logic in monitoring the changing states of the sensor input to determine whether the seat cushion load is static or dynamic.

The ORC microcontroller continuously monitors all of the Supplemental Restraint System (SRS) electrical circuits to determine the system status and readiness. If the ORC detects a monitored system fault, it sets a Diagnostic Trouble Code (DTC). However, because the ODS input is only used for control of the passenger belt alert feature, which has no effect on SRS component features or functions, the airbag indicator is **NOT** illuminated in response to a detected ODS circuit fault.

The ODS receives source current and a clean ground through dedicated sensor plus and minus circuits from the ORC. The ORC then sends the appropriate sensor status information to the Body Control Module (BCM) (also known as the Common Body Controller/CBC), which uses this information as an additional logic input used for control of the seat belt indicator and the passenger belt alert feature in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC).

The hard wired circuits between the ODS and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the ODS or the electronic controls and communication between other modules and devices that provide some features of the passenger belt alert feature. The most reliable, efficient and accurate means to diagnose the ODS or the electronic controls and communication related to the passenger belt alert feature operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

WITH CLOTH SEAT TRIM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

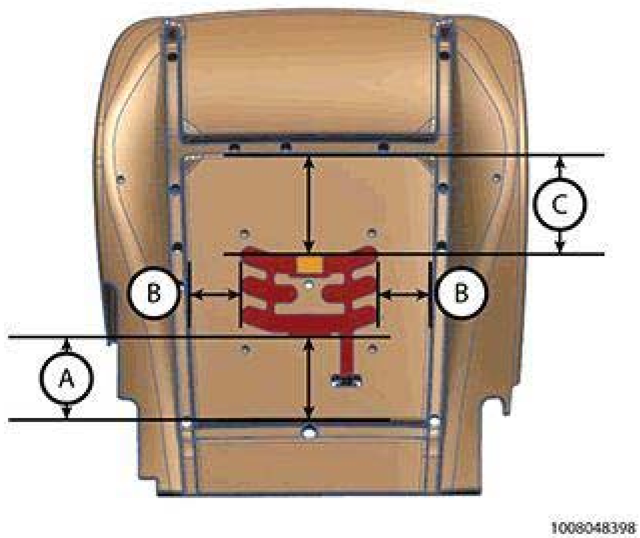


Fig. 68: Cloth - Except SRT
Courtesy of CHRYSLER GROUP, LLC

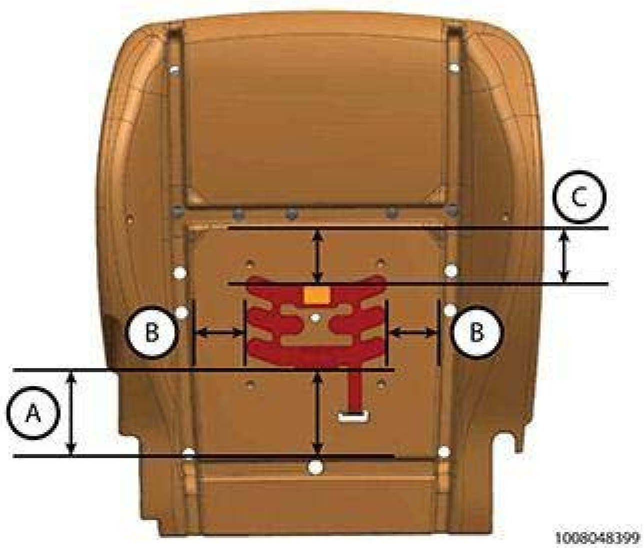


Fig. 69: Cloth - SRT
Courtesy of CHRYSLER GROUP, LLC

1. Position the passenger side front seat to its most forward position for easiest access to the front seat mounting hardware.
2. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
3. Remove the passenger side front seat from the vehicle. Refer to **SEAT, FRONT, REMOVAL** .
4. Remove the trim from the front seat cushion foam and frame. Refer to **COVER, SEAT CUSHION, FRONT, REMOVAL** .
5. If the vehicle is so equipped, remove the heater mat or heater and ventilation mat from the seat cushion foam. Refer to **PAD, HEATER, REMOVAL** .
6. Reach under the back of the front seat cushion frame to access and disconnect the Occupant Detection

Sensor (ODS) pigtail wire connector from the seat wire harness.

7. Disengage the ODS hot melt block and pigtail wire from the clearance hole near the back of the seat cushion foam.
8. Disengage the adhesive patches of the ODS from the top surface of the seat cushion foam.
9. Remove the ODS from the seat cushion.

WITH LEATHER SEAT TRIM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

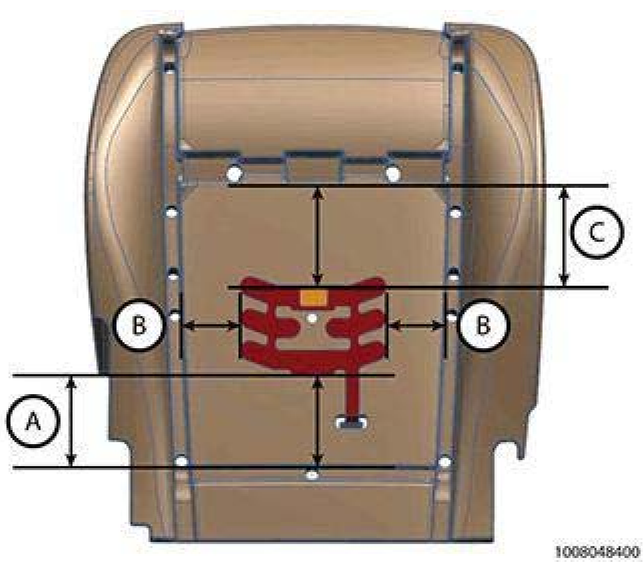


Fig. 70: Leather - Except SRT
Courtesy of CHRYSLER GROUP, LLC

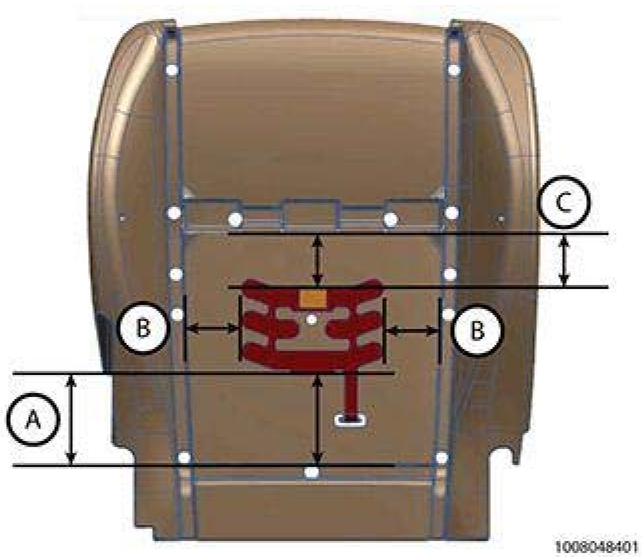


Fig. 71: Leather - SRT
Courtesy of CHRYSLER GROUP, LLC

1. Position the passenger side front seat to its most forward position for easiest access to the front seat mounting hardware.
2. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
3. Remove the passenger side front seat from the vehicle. Refer to **SEAT, FRONT, REMOVAL** .
4. Remove the trim from the front seat cushion foam and frame. Refer to **COVER, SEAT CUSHION, FRONT, REMOVAL** .
5. If the vehicle is so equipped, remove the heater mat or heater and ventilation mat from the seat cushion foam. Refer to **PAD, HEATER, REMOVAL** .
6. Reach under the back of the front seat cushion frame to access and disconnect the Occupant Detection Sensor (ODS) pigtail wire connector from the seat wire harness.
7. Disengage the ODS hot melt block and pigtail wire from the clearance hole near the back of the seat cushion foam.
8. Disengage the adhesive patches of the ODS from the top surface of the seat cushion foam.
9. Remove the ODS from the seat cushion.

INSTALLATION

WITH CLOTH SEAT TRIM

WARNING: **To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.**

CAUTION: When handling a new Occupant Detection Sensor (ODS), it should never be bent, creased, torn, cut or abraded. The ODS should not be handled with or come into contact with hard or sharp-edged tools or objects. Do not allow the ODS to drop more than 2 meters (6.5 feet). Prior to installation, do not sit on, stand on or place boxes, tools or any other foreign object on the ODS. If the ODS adhesive patches become inadvertently adhered to any seat materials or foreign objects prior to proper positioning on the seat cushion, the ODS must be scrapped and replaced with a new unit. Do not modify the seat foam or trim materials of a seat that contains an ODS. Failure to observe these cautions may result in an inoperative ODS, or an ODS that provides inaccurate inputs to the Occupant Restraint Controller (ORC).

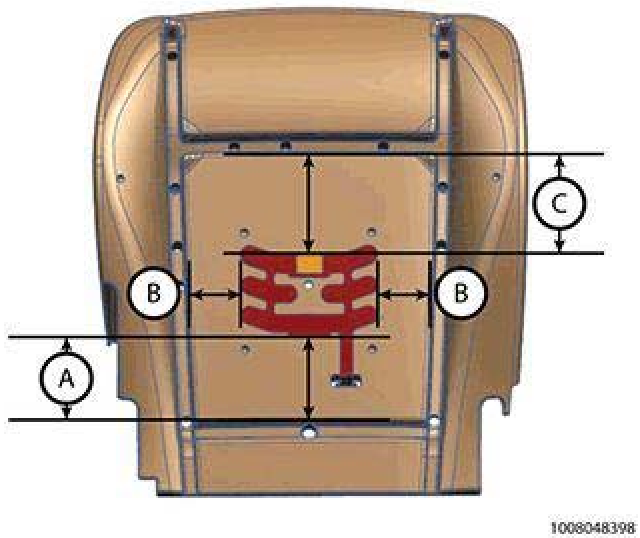


Fig. 72: Cloth - Except SRT
Courtesy of CHRYSLER GROUP, LLC

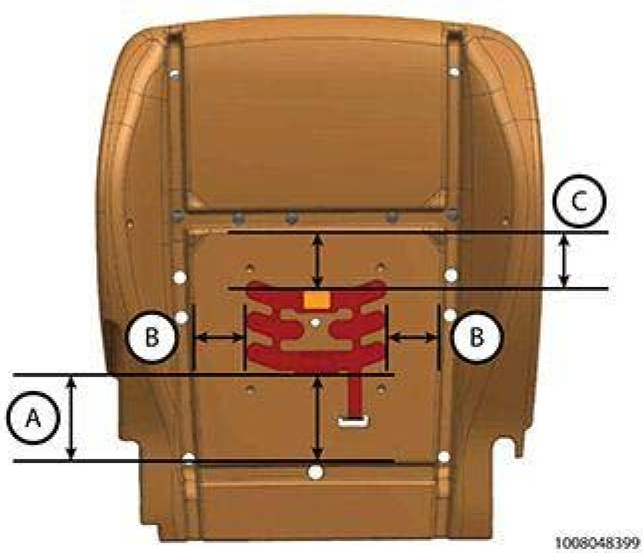


Fig. 73: Cloth - SRT
Courtesy of CHRYSLER GROUP, LLC

1. Route the Occupant Detection Sensor (ODS) pigtail wires and the hot melt block through the clearance

hole near the back of the seat cushion foam.

2. Remove the release paper from the front adhesive patch on the underside of the ODS mat.
3. Carefully position the sensor mat on the seat cushion foam with Distances A, B and C as shown in the following table before sticking the adhesive patch down onto the foam.

REFERENCE POINTS	EXCEPT SRT	SRT
Distance A - Front edge of rear crimp channel to center of rear edge of sensor mat.	100 millimeters (3.93 inches)	90 millimeters (3.54 inches)
Distance B - Inside edge of each side crimp channel to nearest edge of sensor mat.	62 millimeters (2.44 inches)	62 millimeters (2.44 inches)
Distance C - Rear edge of front crimp channel to center of front edge of sensor mat.	120 millimeters (4.72 inches)	75 millimeters (2.95 inches)

CAUTION: The adhesive used to secure the ODS to the seat is heat activated and requires that both the adhesive and the material it is applied to be ideally between 21Ā° and 38Ā° C (between 70Ā° and 100Ā° F). Application of the ODS to surfaces below 10Ā° C (50Ā° F) is not recommended as the adhesive becomes too firm to readily adhere. Do not touch or allow the adhesive patches to contact any foreign materials with the release paper removed. Do not attempt to add adhesive materials to the ODS.

4. Peel the release paper off of the rear adhesive patch on the underside of the ODS mat.
5. One at a time, apply hand pressure (0.8 bar or 12 psi) over each of the adhesive patches of the ODS mat for at least four seconds to activate and adhere the adhesive to the seat cushion foam.
6. Confirm the ODS mat is properly positioned on the seat cushion foam.
7. Reach under the back of the front seat cushion frame to access, route and reconnect the ODS pigtail wire and connector to the seat wire harness.
8. If the vehicle is so equipped, reinstall the heater mat or the heater and ventilation mat onto the seat cushion foam. Refer to PAD, HEATER, INSTALLATION .
9. Reinstall the trim onto the front seat cushion. Refer to COVER, SEAT CUSHION, FRONT, INSTALLATION .
10. Reinstall the passenger side front seat into the vehicle. Refer to SEAT, FRONT, INSTALLATION .
11. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

WITH LEATHER SEAT TRIM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to

disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

CAUTION: When handling a new Occupant Detection Sensor (ODS), it should never be bent, creased, torn, cut or abraded. The ODS should not be handled with or come into contact with hard or sharp-edged tools or objects. Do not allow the ODS to drop more than 2 meters (6.5 feet). Prior to installation, do not sit on, stand on or place boxes, tools or any other foreign object on the ODS. If the ODS adhesive patches become inadvertently adhered to any seat materials or foreign objects prior to proper positioning on the seat cushion, the ODS must be scrapped and replaced with a new unit. Do not modify the seat foam or trim materials of a seat that contains an ODS. Failure to observe these cautions may result in an inoperative ODS, or an ODS that provides inaccurate inputs to the Occupant Restraint Controller (ORC).

1. Route the Occupant Detection Sensor (ODS) pigtail wires and the hot melt block through the clearance hole near the back of the seat cushion foam.
2. Remove the release paper from the front adhesive patch on the underside of the ODS mat.
3. Carefully position the sensor mat on the seat cushion foam with Distances A, B and C as shown in the following table before sticking the adhesive patch down onto the foam.

REFERENCE POINTS	EXCEPT SRT	SRT
Distance A - Front edge of rear crimp channel to center of rear edge of sensor mat.	95 millimeters (3.74 inches)	94 millimeters (3.70 inches)
Distance B - Inside edge of each side crimp channel to nearest edge of sensor mat.	63 millimeters (2.48 inches)	63 millimeters (2.48 inches)
Distance C - Rear edge of front crimp channel to center of front edge of sensor mat.	115 millimeters (4.52 inches)	70 millimeters (2.75 inches)

CAUTION: The adhesive used to secure the ODS to the seat is heat activated and requires that both the adhesive and the material it is applied to be ideally between 21Ā° and 38Ā° C (between 70Ā° and 100Ā° F). Application of the ODS to surfaces below 10Ā° C (50Ā° F) is not recommended as the adhesive becomes too firm to readily adhere. Do not touch or allow the adhesive patches to contact any foreign materials with the release paper removed. Do not attempt to add adhesive materials to the ODS.

4. Peel the release paper off of the rear adhesive patch on the underside of the ODS mat.
5. One at a time, apply hand pressure (0.8 bar or 12 psi) over each of the adhesive patches of the ODS mat for at least four seconds to activate and adhere the adhesive to the seat cushion foam.
6. Reach under the back of the front seat cushion frame to access, route and reconnect the ODS pigtail wire and connector to the seat wire harness.
7. If the vehicle is so equipped, reinstall the heater mat or the heater and ventilation mat onto the seat

cushion foam. Refer to **PAD, HEATER, INSTALLATION** .

8. Reinstall the trim onto the front seat cushion. Refer to **COVER, SEAT CUSHION, FRONT, INSTALLATION** .
9. Reinstall the passenger side front seat into the vehicle. Refer to **SEAT, FRONT, INSTALLATION** .
10. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

SENSOR, SEAT TRACK POSITION

DESCRIPTION

DESCRIPTION

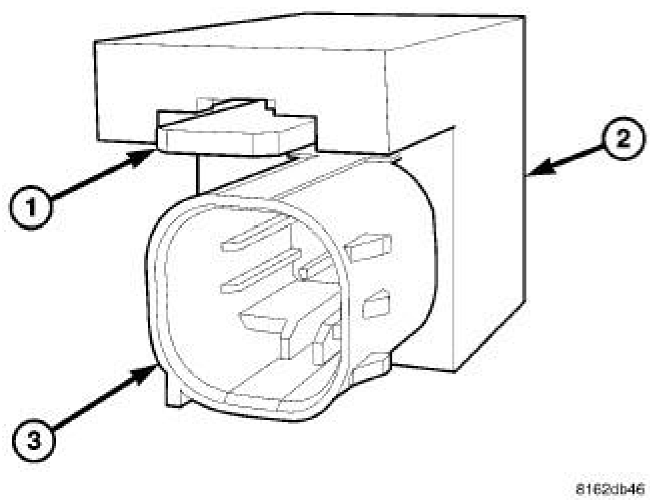


Fig. 74: Identifying Seat Track Position Sensor
Courtesy of CHRYSLER GROUP, LLC

The Seat Track Position Sensor (STPS) (2) is a Hall Effect-type sensor used on some vehicles. This sensor consists of a Hall Effect Integrated Circuit (IC) chip encased in potting material within a cavity of the molded plastic sensor housing.

The STPS housing has a mounting slot containing an integral latch feature (1) and slides and latches onto a stamped metal blade-type bracket located on the inboard side of one of the upper seat adjuster tracks near the rear of the driver side or passenger side front seat. A molded connector receptacle (3) integral to the STPS housing is connected to the vehicle electrical system through a connector and take out of the front seat wire harness beneath the front seat cushion frame.

The STPS cannot be adjusted or repaired and, if ineffective or damaged, the entire STPS unit must be replaced.

OPERATION

OPERATION

The Seat Track Position Sensor (STPS) is designed to provide a seat position data input to the Occupant

Restraint Controller (ORC) indicating whether the driver or passenger side front seat is in a full forward or a not full forward position. The ORC uses this data as an additional logic input for use in determining the appropriate deployment force to be used when deploying the multistage Driver AirBag (DAB) or Passenger AirBag (PAB).

The STPS receives a nominal five volt supply from the ORC. The STPS communicates the seat position by modulating the voltage returned to the ORC on a sensor data circuit. The ORC also monitors the condition of the STPS circuits and will store a Diagnostic Trouble Code (DTC) for any fault that is detected. The ORC sends messages over the CAN data bus to control the illumination of the airbag indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC).

The hard wired circuits between the STPS and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the STPS or the electronic controls and communication between other modules and devices that provide features of the Supplemental Restraint System (SRS). The most reliable, efficient and accurate means to diagnose the STPS or the electronic controls and communication related to STPS operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

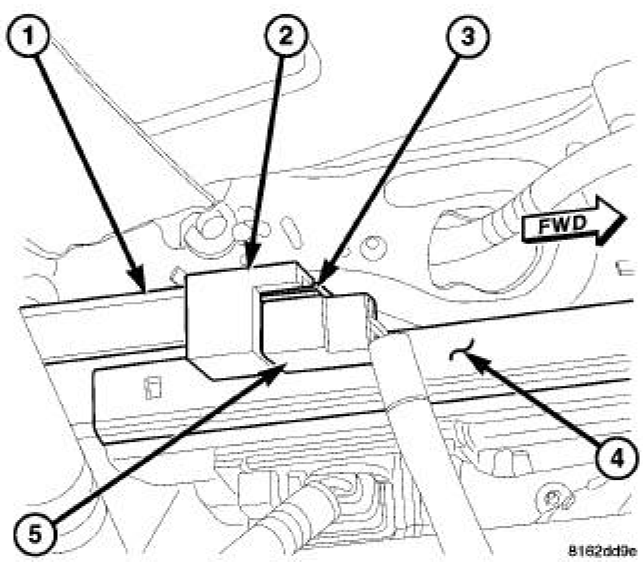


Fig. 75: Seat Track Position Sensor, Bracket, Upper Inboard Seat Track & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery. Wait two minutes for the system capacitor to discharge before further service.
2. Reach under the rear edge of the front seat cushion to access the Seat Track Position Sensor (STPS) (2) on a bracket (1) located on the inboard side near the rear of one of the upper seat tracks (4).
3. Using a small screwdriver, hold the latch feature (3) depressed while sliding the connector end of the STPS off of the bracket.
4. Disconnect the seat wire harness connector (5) from the STPS connector receptacle.
5. Remove the STPS from under the front seat.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

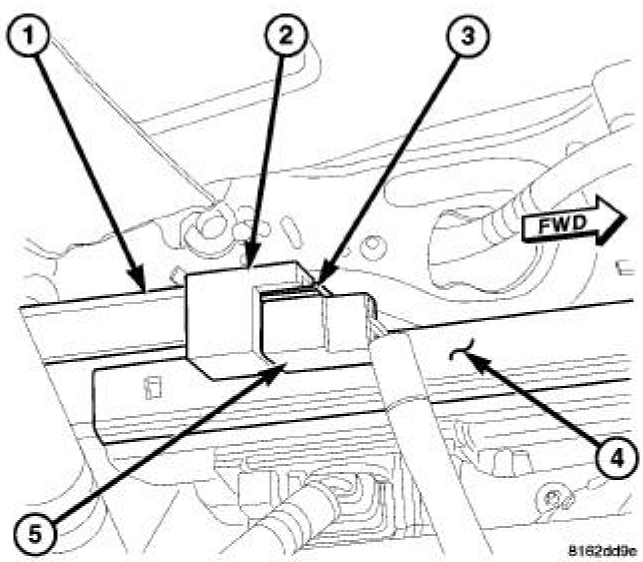


Fig. 76: Seat Track Position Sensor, Bracket, Upper Inboard Seat Track & Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Reach under the rear edge of the front seat cushion to reconnect the seat wire harness connector (5) to the Seat Track Position Sensor (STPS) (2) connector receptacle. Be certain that the latch on the connector is fully engaged.
2. Align the open end of the STPS mounting slot to the blade of the STPS bracket (1) located on the inboard side near the rear of one of the upper seat tracks (4).
3. Push the STPS firmly onto the bracket until the latch feature (3) snaps into place with an audible click.

4. Do not reconnect the negative cable to the battery at this time. The Supplemental Restraint System (SRS) Verification Test procedure should be performed following service of any SRS component. Refer to **STANDARD PROCEDURE**.

SWITCH, SEAT BELT

DESCRIPTION

DESCRIPTION

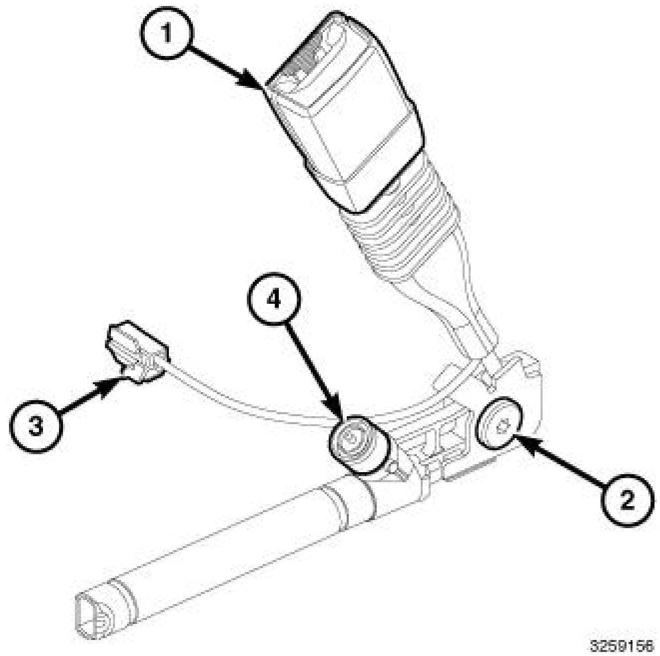


Fig. 77: Seat Belt Tensioner Initiator, Buckle And Tensioner, Switch Pigtail Wire Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

The driver and passenger side front seat belt switches for this vehicle are actually Hall Effect-type sensors. These sensors consist of a fixed-position, Hall Effect Integrated Circuit (IC) chip and a small permanent magnet that is integral to each front seat belt buckle (1). The front seat belt buckles are located on a molded plastic scabbard and secured by a screw (2) to the inboard side of each front seat cushion frame so that the buckles travel with the seat.

The front seat belt switches are connected to the vehicle electrical system through a two-lead pigtail wire and connector (3) on the front seat belt buckle-half, which is connected to a wire harness connector and take out of the seat wire harness. A one kilohm diagnostic resistor is connected in parallel with the IC where the two pigtail wire leads connect to the IC pins.

The seat belt switches cannot be adjusted or repaired and, if ineffective or damaged, the entire front seat belt buckle-half unit must be replaced.

OPERATION

OPERATION

The front seat belt switches are designed to control a hard wired sense input to the Occupant Restraint Controller (ORC). A spring-loaded slide with a small window-like opening is integral to the buckle latch

mechanism. When a seat belt tip-half is inserted and latched into the seat belt buckle, the slide is pushed downward and the window of the slide exposes the Hall Effect Integrated Circuit (IC) chip within the buckle. The field of the permanent magnet induces a current within the chip. The chip provides this induced current as an output to the ORC. When the seat belt is unbuckled, the spring-loaded slide moves upward and shields the IC from the field of the permanent magnet, causing the output current from the seat belt switch to be reduced.

The seat belt switches receive a supply of current from the ORC, and the ORC senses the status of the front seat belt switches through its connection to the seat wire harness. The ORC provides electronic **seat belt switch status** messages to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) over the Controller Area Network (CAN) data bus. The IC uses these messages as an additional logic input for control of the seat belt indicator. The ORC monitors the condition of the seat belt switch circuits and will store a Diagnostic Trouble Code (DTC) for any fault that is detected.

The hard wired circuits between the seat belt switches and the ORC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the switches or the electronic controls and communication between other modules and devices that provide some features of the seat belt reminder system. The most reliable, efficient and accurate means to diagnose the seat belt switches or the electronic controls and communication related to seat belt switch operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

TENSIONER, SEAT BELT

DESCRIPTION

SEAT BELT TENSIONERS

In vehicles manufactured for domestic markets, the front seat belt incorporates dual tensioners: one integral to the retractor, and one integral to the buckle. In vehicles manufactured for export markets, only the retractor tensioner is used. Each of these tensioner types is described in further detail elsewhere within this service information.

BUCKLE TENSIONER

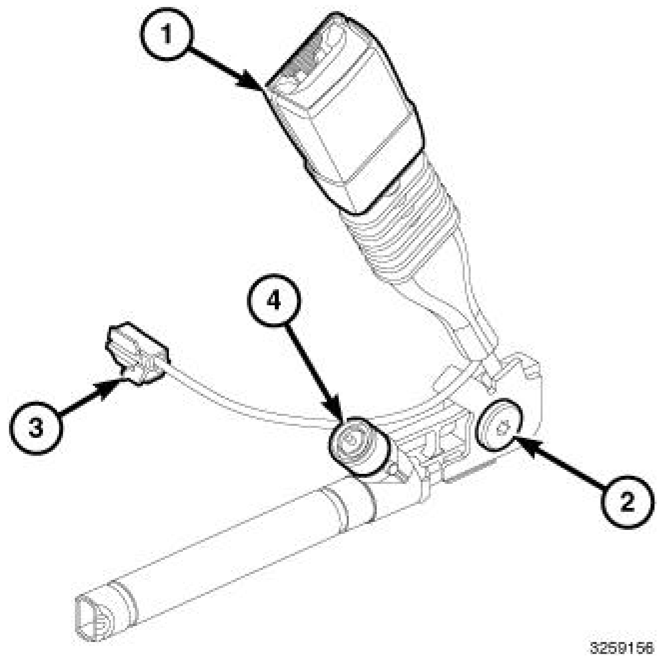


Fig. 78: Seat Belt Tensioner Initiator, Buckle And Tensioner, Switch Pigtail Wire Connector & Screw
Courtesy of CHRYSLER GROUP, LLC

A seat belt buckle tensioner supplements the dual front airbags for domestic market versions of this vehicle. This tensioner is integral to the front seat belt buckle unit, which is secured by a large screw to the outside of the inboard seat cushion frame of the front seat. The buckle tensioner consists primarily of a buckle (1), a molded plastic scabbard, a cable and piston, a cable guide and bracket, a metal cylinder tube and a small pyrotechnically activated gas generator (4).

The buckle tensioner is controlled by the Occupant Restraint Controller (ORC) and is connected to the vehicle electrical system through a dedicated take out of the seat wire harness by a keyed and latching yellow molded plastic connector insulator to ensure a secure connection. The buckle tensioner has a single pigtail harness (3) for the integral seat belt switch.

The buckle tensioner cannot be repaired and, if ineffective or damaged, the entire front seat belt buckle unit must be replaced. If the front airbags have been deployed, the buckle tensioners have also been deployed. The buckle tensioners are not intended for reuse and must be replaced following any front airbag deployment. Refer to **BUCKLE, SEAT BELT, REMOVAL**.

RETRACTOR TENSIONER

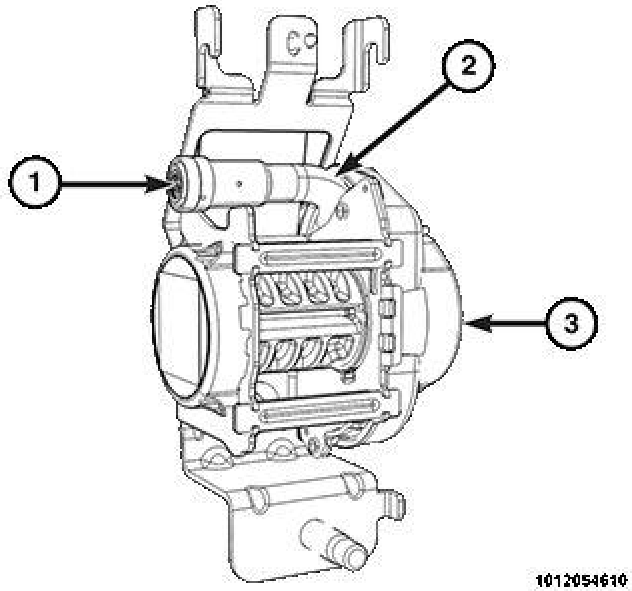


Fig. 79: Seat Belt Retractor Tensioner
Courtesy of CHRYSLER GROUP, LLC

Seat belt retractor tensioners supplement the dual front airbag system for all versions of this vehicle. These tensioners are integral to the front seat belt and retractor units (3), which are secured to the inner quarter panel on the right and left sides of the vehicle. The retractor is concealed beneath the molded plastic inner quarter panel trim. The seat belt tensioner consists primarily of a sprocket/pinion, a steel tube (2), a cast metal housing, numerous steel balls, a torsion bar and a small pyrotechnically activated Micro Gas Generator (MGG) with a connector receptacle (1).

All of these components are located on one side of the retractor spool on the outside of the retractor housing except for the torsion bar, which serves as the spindle upon which the retractor spool rides. The seat belt tensioners are controlled by the Occupant Restraint Controller (ORC) and are connected to the vehicle electrical system through a dedicated take outs of the body wire harness by keyed and latching yellow molded plastic connector insulator to ensure a secure connection.

The retractor tensioners cannot be repaired and, if ineffective or damaged, the entire front seat belt and retractor unit must be replaced. If the front airbags have been deployed, the seat belt tensioners have also been deployed. The seat belt tensioners are not intended for reuse and must be replaced following any front airbag deployment. A growling or grinding sound while attempting to operate the seat belt retractor is a sure indication that the seat belt tensioner has been deployed and requires replacement. Refer to **RETRACTOR, SEAT BELT, REMOVAL**.

OPERATION

OPERATION

The seat belt tensioners are deployed in conjunction with the dual front airbags by a signal generated by the Occupant Restraint Controller (ORC) through the driver or passenger seat belt tensioner line 1 and line 2 (or squib) circuits. When the ORC sends the proper electrical signal to the tensioners, the electrical energy generates enough heat to initiate a small pyrotechnic gas generator.

On the retractor tensioner, the gas generator is installed in one end of a steel tube that contains numerous steel

balls. As the gas expands, it pushes the steel balls through the tube into a cast metal housing, where a ball guide directs the balls into engagement with the teeth of a sprocket that is geared to one end of the retractor spool. As the balls drive past the sprocket, the sprocket turns and drives the seat belt retractor spool causing the slack to be removed from the front seat belts. The ball trap captures the balls as they leave the sprocket and are expelled from the housing.

On the buckle tensioner, the gas generator is installed in one end of the tubular metal piston housing, which contains a piston secured to one end of a cable. The cable is routed around an integral guide to the buckle, which is secured to the opposite end of the cable. As the gas expands, it pushes the piston and the cable through the tube and pulls the buckle downward, causing the slack to be removed from the front seat belt.

Removing excess slack from the front seat belts not only keeps the occupants properly positioned for an airbag deployment following a frontal impact of the vehicle, but also helps to reduce injuries that the occupants of the front seats might experience in these situations as a result of harmful contact with the steering wheel, steering column, instrument panel or windshield. The seat belt retractor also has a torsion bar mechanism that is designed to deform in order to control the loading being applied to the occupants by the seat belts during a frontal impact, further reducing the potential for occupant injuries.

The ORC monitors the condition of the seat belt tensioners through circuit resistance. If any fault is detected the ORC will illuminate the airbag indicator in the instrument cluster and store a Diagnostic Trouble Code (DTC). Proper diagnosis of the seat belt tensioner gas generator and squib circuits requires the use of a diagnostic scan tool and may also require the use of the SRS Load Tool special tool along with the appropriate Load Tool Jumpers and Adapters. Refer to the appropriate Diagnostic & Testing article.

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Article GUID: A00735939

2015-16 COMMON SPECS & PROCEDURES

Challenger

COMMON SPECS & PROCEDURES

CHALLENGER COMMON SPECS & PROCEDURES

System	Specification/Procedure
Air Conditioning	
Service	A/C SYSTEM
Torque	TORQUE SPECIFICATIONS
Axle Nut/Hub Nut	
Front	41 ft. lbs. (55 N.m)
Rear	170 ft. lbs. (230 N.m)
Battery	SPECIFICATIONS
Brakes	
Bleeding Sequence	Except SRT8: BASE BRAKE BLEEDING , SRT8: BASE BRAKE BLEEDING - SRT8 or STANDARD PROCEDURE - ANTILOCK BRAKE SYSTEM BLEEDING
Disc Brakes	
Service Specifications	SPECIFICATIONS
Torque	SPECIFICATIONS
Drum Brakes	
Service Specifications	N/A
Torque	N/A
Charging	
Generator	GENERATOR
Torque	TORQUE SPECIFICATIONS
Drive Belts	
Adjustment	Serpentine belt used, not adjustable
Drive Belt Routing	Refer to appropriate "Accessory Drive Belt Routing" figure under REMOVAL .
Engine Cooling	
General Service Specifications	SPECIFICATIONS
Radiator Cap Pressure	Needs to hold pressure of at least 16 psi (110 kPa)
Thermostat R & I	THERMOSTAT
Water Pump R & I	PUMP, WATER
Engine Mechanical	
3.6L	
Compression	Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.

System		Specification/Procedure
	Oil Pressure	Refer to OIL PRESSURE table under **ENGINE SPECIFICATIONS**
	Overhaul	**ENGINE SPECIFICATIONS**
	Torque	**TORQUE SPECIFICATIONS**
5.7L		
	Compression	Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
	Oil pressure	At Curb Idle Speed (min.): 4 psi (25 kPa), @ 3000 RPM: 25 - 110 psi (170 - 758 kPa): CAUTION: If pressure is zero at curb idle, DO NOT run engine.
	Overhaul	**ENGINE SPECIFICATIONS**
	Torque	**TORQUE SPECIFICATIONS**
6.2L		
	Compression	**DIAGNOSIS AND TESTING**
	Oil pressure	At Curb Idle Speed (min.): 13 psi (90 kPa), @ 3000 RPM: 25 - 110 psi (170 - 758 kPa): CAUTION: If pressure is zero at curb idle, DO NOT run engine.
	Overhaul	**ENGINE SPECIFICATIONS**
	Torque	**TORQUE SPECIFICATIONS**
6.4L		
	Compression	Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
	Oil pressure	At Curb Idle Speed (min.): 4 psi (25 kPa), @ 3000 RPM: 25 - 110 psi (170 - 758 kPa): CAUTION: If pressure is zero at curb idle, DO NOT run engine.
	Overhaul	**ENGINE SPECIFICATIONS**
	Torque	**TORQUE SPECIFICATIONS**
Fluid Specifications		See FLUIDS under MAINTENANCE/FLUIDS tab. From within Manager or Service Writer, click the "30/60/90 Interval" or "Maint." button.
Flywheel/Flex Plate/Drive Plate Torque		
	Flexplate	70 ft. lbs. (95 N.m)
	Flywheel	55 ft. lbs. (75 N.m)
Fuel System		
Pressure Specification		58 psi Ā± 5 psi (400 kPa Ā±34 kPa)
	Fuel Pressure Test Procedure	**CHECKING THE FUEL DELIVERY SYSTEM (HARD START)**
	Fuel Filter Location	Fuel filter is part of fuel pump module.
	Fuel Filter R & I	**MODULE, FUEL PUMP**
Ignition		
Firing Order & Cylinder Identification		**FIRING ORDER & CYLINDER IDENTIFICATION**
Ignition Wires (Resistance)		Coil On Plug

System	Specification/Procedure
Ignition Wires (Routing)	Coil On Plug
Spark Plug	
3.6L	
Type	SP149125AD
Gap	.043 in. (1.10 mm)
Torque	13 ft. lbs. (18 N.m)
5.7L	
Type	SP143877AA
Gap	.043 in. (1.10 mm)
Torque	20 ft. lbs. (27 N.m)
6.2L	
Type	SP196724AA
Gap	.031 in. (0.08 mm)
Torque	20 ft. lbs. (27 N.m)
6.4L	
Type	SP149212AC
Gap	.043 in. (1.10 mm)
Torque	13 ft. lbs. (18 N.m): Torque critical tapered design. Do not exceed 15 ft. lbs. (21 N.m)
Starting	
Starter	**STARTER MOTOR**
Torque	**TORQUE SPECIFICATIONS**
Wheel Alignment	
Adjustment Specifications	**SPECIFICATIONS**
Torque	Front: **SPECIFICATIONS** ; Rear: **SPECIFICATIONS**
Wheel & Tire	
Wheel Lug Nut Torque	
Base	130 ft. lbs. (176 N.m)
SRT	111 ft. lbs. (150 N.m)

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Article GUID: A00743829

2015-16 ACCESSORIES AND EQUIPMENT

Speed Control - Service Information - Challenger

DESCRIPTION

DESCRIPTION

Two electronic speed control systems are available factory-installed equipment on this vehicle: a conventional system and an adaptive system. Additional details of these two systems and their components can be found under the subheadings and paragraphs that follow.

CONVENTIONAL SPEED CONTROL

The conventional electronic speed control system includes the following major components, which are described in further detail elsewhere in this service information:

- **Antilock Brake System Module** - An Antilock Brake System (ABS) module is located below the antilock brake Hydraulic Control Unit (HCU) in the engine compartment. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, DESCRIPTION** .
- **Brake Lamp Sensor** - The brake (also known as stop) lamp switch in this vehicle is actually a brake pedal position sensor. This sensor is located on the brake pedal support bracket under the driver side of the instrument panel. Refer to **DESCRIPTION** .
- **Instrument Panel Cluster** - An indicator located in the Instrument Panel Cluster (IPC) displays "CRUISE" to inform the vehicle operator when the speed control system is turned ON. Refer to **DESCRIPTION** .
- **Powertrain Control Module** - The Powertrain Control Module (PCM) is located in the engine compartment. The PCM contains the software and hardware that monitors all BUSSED and hardwired inputs related to the speed control system. Along with monitoring the inputs the PCM controls all of the speed control system outputs. Refer to **MODULE, POWERTRAIN CONTROL, DESCRIPTION** .
- **Speed Control Switches** - A speed control switch pod containing five momentary switch push buttons is located in the right horizontal spoke of the steering wheel. The switches communicate over the LIN bus system.
- **Steering Column Control Module** - A Steering Column Control Module microcontroller is internal to the SCCM located at the top of the steering column just below the steering wheel. Refer to **MODULE, STEERING COLUMN CONTROL, DESCRIPTION** .
- **Wheel Speed Sensors** - A wheel speed sensor is located on the knuckle of each front and rear wheel. Refer to **SENSOR, WHEEL SPEED, FRONT, DESCRIPTION** .

The ABS, the IPC, the PCM and the SCCM each contain a microcontroller and programming that allow them to communicate with each other using the Controller Area Network (CAN) data bus. This method of communication is used by the SCCM microcontroller to relay the status of the speed control switches over a dedicated LIN bus to the PCM, and by the PCM for control of the CRUISE indicator in the IC. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the conventional electronic speed control system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed

throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the speed control system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

ADAPTIVE SPEED CONTROL

The adaptive electronic speed control system includes the following major components, which are described in further detail elsewhere in this service information:

- **Adaptive Cruise Control (ACC) Module** - An ACC module and the radar sensor or module) is located on a bracket secured near the right outboard end of the front bumper support member of the Front End Module (FEM) behind the front fascia. Refer to **MODULE, ADAPTIVE CRUISE CONTROL, DESCRIPTION** .
- **Antilock Brake System Module** - An Antilock Brake System (ABS) module is located below the antilock brake Hydraulic Control Unit (HCU) in the engine compartment. Refer to **MODULE, ANTI-LOCK BRAKE SYSTEM, DESCRIPTION** .
- **Brake Lamp Switch** - The brake (also known as stop) lamp sensor in this vehicle is actually a brake pedal position sensor. This sensor is located on the brake pedal support bracket under the driver side of the instrument panel. Refer to **DESCRIPTION** .
- **Instrument Panel Cluster** - An indicator located in the Instrument Panel Cluster (IPC) displays "CRUISE" to inform the vehicle operator when the speed control system is turned ON. Refer to **DESCRIPTION** .
- **Electronic Vehicle Information Center** - The Electronic Vehicle Information Center (EVIC) is located in the Integrated Center Stack (ICS) and provides an interface to the vehicle operator for setting the adaptive speed control customer preferences as well as a display of the adaptive speed control and Forward Collision Warning (FCW) system status messages. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, DESCRIPTION** .
- **Powertrain Control Module** - The Powertrain Control Module (PCM) is located in the engine compartment. The PCM contains the software and hardware that monitors all of the speed control system inputs and controls all of the speed control system outputs. Refer to **MODULE, POWERTRAIN CONTROL, DESCRIPTION** .
- **Speed Control Switches** - A speed control switch pod containing eight momentary switch push buttons is located in the right horizontal spoke of the steering wheel.
- **Steering Column Control Module** - A microcontroller is integral to the Steering Column Control Module (SCCM) located at the top of the steering column just below the steering wheel. Refer to **MODULE, STEERING COLUMN CONTROL, DESCRIPTION** .
- **Wheel Speed Sensors** - A wheel speed sensor is located on the knuckle of each front and rear wheel. Refer to **SENSOR, WHEEL SPEED, FRONT, DESCRIPTION** .

The ACC sensor, the ABS, the IPC, the EVIC, the PCM and the SCCM each contain a microcontroller and programming that allow them to communicate with each other using the Controller Area Network (CAN) data bus. This method of communication is used by the ACC sensor to provide inputs to the ABM, the EVIC and the PCM, is used by the ABM to provide inputs to the PCM, is used by the SCCM to relay the status of the speed

control switches to the PCM and is used by the PCM for control of the indicators in the IC and the indications in the EVIC. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the adaptive electronic speed control system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the speed control system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

CONVENTIONAL SPEED CONTROL

The vehicle operator controls all conventional speed control system features through the speed control switch pod on the face of the right horizontal spoke of the steering wheel. The Steering Column Control Module (SCCM) reads the speed control switch input via LIN bus. The SCCM relays an electronic speed control switch status message to the Powertrain Control Module (PCM) over the Controller Area Network (CAN) data bus (CAN-C). The PCM software continually monitors these inputs as well as electronic vehicle distance message inputs from the Antilock Brake System Module (ABS) and numerous hard wired inputs including the brake (stop) lamp sensor, then provides the appropriate electronic message and hard wired outputs to invoke the requested electronic speed control features. The PCM manages the Cruise Control algorithm to maintain vehicle speed established by the driver. It is also the responsibility of the PCM to send out cruise control override information and perform stuck button diagnostics.

The PCM microcontroller continuously monitors all of the speed control system electrical circuits to determine the system readiness. If the PCM detects a monitored system fault, it sets and stores a Diagnostic Trouble Code (DTC). The PCM uses On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool using the CAN data bus. This method of communication is used for control of the Malfunction Indicator Lamp (MIL) (also known as the Check Engine lamp) in the Instrument Cluster (IC) and for system diagnosis and testing through the 16-way data link connector located on the driver side lower edge of the instrument panel.

The hard wired inputs and outputs for the PCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the PCM or the electronic controls or communication between other modules and devices that provide features of the conventional speed control system. The most reliable, efficient, and accurate means to diagnose the PCM or the electronic controls and communication related to speed control system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

ADAPTIVE SPEED CONTROL

The vehicle operator controls all Adaptive Speed Control (ACC) system features through the speed control switch pod on the face of the right horizontal spoke of the steering wheel. When a push button of the switch pod is depressed, it provides a LIN switch input to the Steering Column Control Module (SCCM).

The SCCM reads the speed control switch input, then relays an electronic speed control switch status message to the Powertrain Control Module (PCM) and to the ACC module over the Controller Area Network (CAN) data bus. The PCM and ACC module continually monitor these inputs as well as electronic wheel speed message inputs from the Antilock Brake System Module (ABS), electronic gear selector message inputs from the Transmission Control Module (TCM), and numerous hard wired inputs including the brake (stop) lamp sensor, then provides the appropriate electronic message and hard wired outputs to invoke the requested electronic speed control features.

Using the MODE push button of the speed control switch pod on the face of the right horizontal spoke of the steering wheel, the vehicle operator can choose between adaptive speed control and conventional speed control modes of operation. As the name implies, when in the conventional speed control mode the speed control system is used and functions exactly like a conventional speed control system. When in the adaptive speed control mode, the vehicle operator can use the DISTANCE increase or decrease push buttons of the speed control switch pod to select from one of three distance settings for the adaptive cruise system to maintain. These settings equate to the time in seconds separating the vehicle from a preceding vehicle. The ACC module sends electronic message outputs to the ABS, the TCM and the PCM to maintain the selected separation distance. The available distance settings are:

- **1** - 1.0 second
- **2** - 1.5 seconds
- **3** - 2.0 seconds

If the PCM detects a fault on one of the following systems, it will disable the cruise control system. The PCM will store an appropriate DTC.

- Engine Speed Sensor
- Sensor or actuators of the electric throttle (only for gasoline engines)
- Accelerator Pedal Potentiometer (APP Sensor)
- Brake Pedal Position
- Clutch Switch rationality
- Engine Load sensor (only for gasoline engines)
- Ignition Coils (only for gasoline engines)
- Fuel Injectors
- Turbo sensors or actuators

The PCM and ACC module continuously monitor all of the speed control system electrical circuits to determine the system readiness and accuracy. If the PCM or ACC module detects a monitored system fault, it sets and stores a Diagnostic Trouble Code (DTC). The PCM and ACC components use On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the diagnostic scan tool using the CAN data bus. This method of communication is used for control of the Malfunction Indicator Lamp (MIL) (also known as the Check Engine lamp) in the Instrument Cluster (IC) and for system diagnosis and testing through the 16-way data link connector located on the driver side lower edge of the instrument panel.

The hard wired inputs and outputs for the PCM and the ACC module may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the PCM, the ACC module or the electronic controls or

communication between other modules and devices that provide features of the adaptive speed control system. The most reliable, efficient, and accurate means to diagnose the PCM, the ACC module or the electronic controls and communication related to speed control system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SPEED CONTROL SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Refer to WARNING . Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired inputs and outputs of the speed control system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the multi-function switch integral to the Steering Column Control Module (SCCM), the SCCM microcontroller, the Antilock Brake System (ABS) module, the Powertrain Control Module (PCM) or the electronic controls and communication between modules and other devices that provide some features of the speed control system. The most reliable, efficient and accurate means to diagnose the multifunction switch, the SCCM microcontroller, the ABS module, the PCM or the electronic controls and communication related to speed control system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

SWITCH, SPEED CONTROL

DESCRIPTION

DESCRIPTION

Fig. 1: Speed Control Switch Pod
Courtesy of CHRYSLER GROUP, LLC

The speed control switch pod is located in the right spoke of the steering wheel spoke bezel. Two different switches are used. One switch has five buttons and is used on vehicles not equipped with the optional Adaptive Cruise Control (ACC) system. The other switch has eight buttons and is used on vehicles equipped with the ACC system option. These switches are the primary control used by the vehicle operator to manage the particular speed control system installed in the vehicle. The only visible components of the switch pod are the switch push buttons and a decorative bezel around the push buttons, which stands slightly proud of the steering wheel spoke bezel. The remainder of the switch pod including its mounting provisions and its electrical connection are concealed beneath the spoke bezel.

The switch pod housing and push buttons are constructed of molded plastic. Each of the push buttons has white International Control and Display Symbol graphics or text applied to it, which clearly identify the function of each push button. The switch pod is secured through three integral mounting tabs to mounting bosses on the back of the spoke bezel by three screws. A connector receptacle integral to the inboard end of the switch pod housing connects the speed control switch and the Local Interface Network (LIN) slave node circuitry integral to the switch pod to the vehicle electrical system through a dedicated take out and connector of the steering wheel wire harness.

The speed control switch pod cannot be adjusted or repaired. If any function of the switch or the LIN slave node is ineffective or damaged, the switch pod must be replaced.

OPERATION

OPERATION

- The speed control switch pod is a LIN unit that provides LIN bussed inputs to the Steering Column Control Module (SCCM) microcontroller.
- The driver acts on the speed control switch assembly installed into the steering column.
- SCCM acquires LIN inputs from the speed control push button assembly and then transmits the status via CAN-C network to the Powertrain Control Module (PCM).

- PCM manages the Speed Control algorithm to maintain vehicle speed established by the driver. It is also the responsibility of the PCM to send out cruise control override information and perform stuck button diagnostics.
- The radio switch resistive ladder inputs are read by the steering wheel switch bank and broadcasts the signals on LIN

The speed control switch pod for vehicles equipped with a conventional electronic speed control system and not equipped with the optional Adaptive Cruise Control (ACC) system contains five switch push buttons whose functions are:

- **On/Off** - This switch button enables or disables the speed control system and clears any previous speed control set speed from system memory.
- **Set (+)** - This switch button sets the current vehicle speed as the stored set speed or accelerates the vehicle to a speed that is faster than the already attained set speed.
- **Set / (-)** - This switch button sets the current vehicle speed as the stored set speed or decelerates (coasts) the vehicle to a speed that is slower than the already attained set speed.
- **Resume / (+)** - Resume is a momentary switch that allows the driver to re-engage Cruise Control to the last stored vehicle speed, provided that the cruise control system is still enabled and current vehicle speed is greater than the calibrated minimum resume speed.
- **Cancel** - This switch button cancels the current speed control event, but does not turn the system OFF or clear the currently stored set speed.

The optional adaptive speed control switch pod for vehicles equipped with the ACC system option contains the same five switch push buttons as the conventional speed control switch pod, then adds three buttons whose functions are:

- **Mode** - This switch button toggles the speed control system between ACC or conventional (non-ACC) modes of operation.
- **Distance Buttons** - These switch buttons select the separation or following distance (in seconds) that the ACC system maintains between this vehicle and any preceding vehicle.

The SCCM LIN master node provides a clean ground and fused B(+) current for all of the switches and sensors on the rotating steering wheel through the LIN slave node circuitry of the speed control switch pod as well as for the Light Emitting Diode (LED) back lighting of both the speed control and the EVIC switch pods. The SCCM continually monitors all of the hard wired speed control switch circuits as well as the LIN bus data. The SCCM will set a Diagnostic Trouble Code (DTC) for any problem it detects in the speed control switch circuits, and will store a Signal Not Available (SNA) code for any LIN bus input errors. The SCCM also communicates with other electronic modules over the Controller Area Network (CAN) data bus. Therefore, any SCCM DTC information can be retrieved using a diagnostic scan tool connected to the Data Link Connector (DLC).

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SPEED CONTROL SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, Occupant Classification System (OCS), seat belt tensioner, impact sensor or instrument panel component diagnosis or service.

Refer to WARNING . Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to follow these instructions may result in accidental airbag deployment.

The hard wired inputs and outputs of the speed control system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the Local Interface Network (LIN) slave node integral and internal to the speed control switch, the Steering Column Control Module (SCCM) integral and internal to the multi-function switch, the Antilock Brake System (ABS) module, the Powertrain Control Module (PCM) or the electronic controls and communication between modules and other devices that provide some features of the speed control system. The most reliable, efficient and accurate means to diagnose the LIN slave node, the SCCM, the ABS module, the PCM or the electronic controls and communication related to speed control system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Refer to WARNING . Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

1. Remove the air bag from the steering wheel. Refer to **AIR BAG, DRIVER, REMOVAL** .
2. Remove the remote radio switch on the speed control switch bezel side of the steering wheel. Refer to **SWITCH, REMOTE RADIO, REMOVAL** .

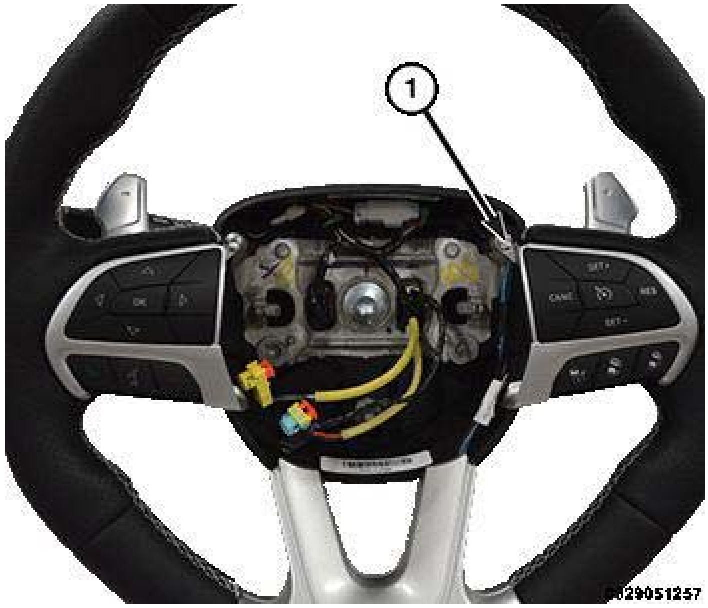

Fig. 2: Speed Control Switch Screw
Courtesy of CHRYSLER GROUP, LLC

3. Remove screw from front if speed control switch bezel to steering wheel.
4. From the backside of the steering wheel, remove two screws securing the speed control switch bezel to the steering wheel.
5. Disconnect the electrical connection from the switch bezel.
6. Remove the switch from the bezel.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Refer to WARNING . Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

1. Position the Speed Control switch pod to the back of the steering wheel armature.

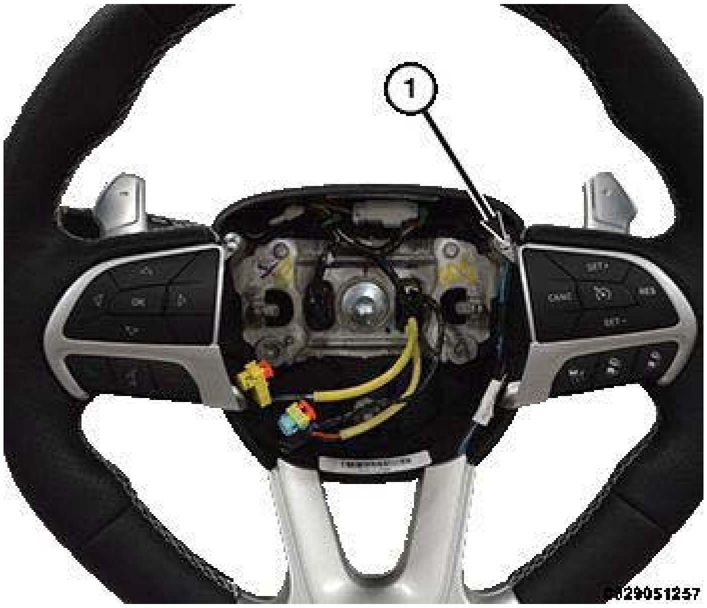

Fig. 3: Speed Control Switch Screw
Courtesy of CHRYSLER GROUP, LLC

2. Install and tighten the three screws (one front (1), two back) securing the speed control switch bezel to the steering wheel armature.
3. Connect the wiring harness to the speed control switch bezel.
4. Install the remote radio switch. Refer to **SWITCH, REMOTE RADIO, INSTALLATION** .
5. Install the air bag. Refer to **AIR BAG, DRIVER, INSTALLATION** .
6. Connect the negative battery cable.

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Article GUID: A00735962

2015-16 ENGINE

Starting - Non-DTC Based Diagnostics - Challenger

DIAGNOSIS AND TESTING

NO CRANK (BCM EQUIPPED)

For a complete wiring diagram, **refer to SYSTEM WIRING DIAGRAMS article** .

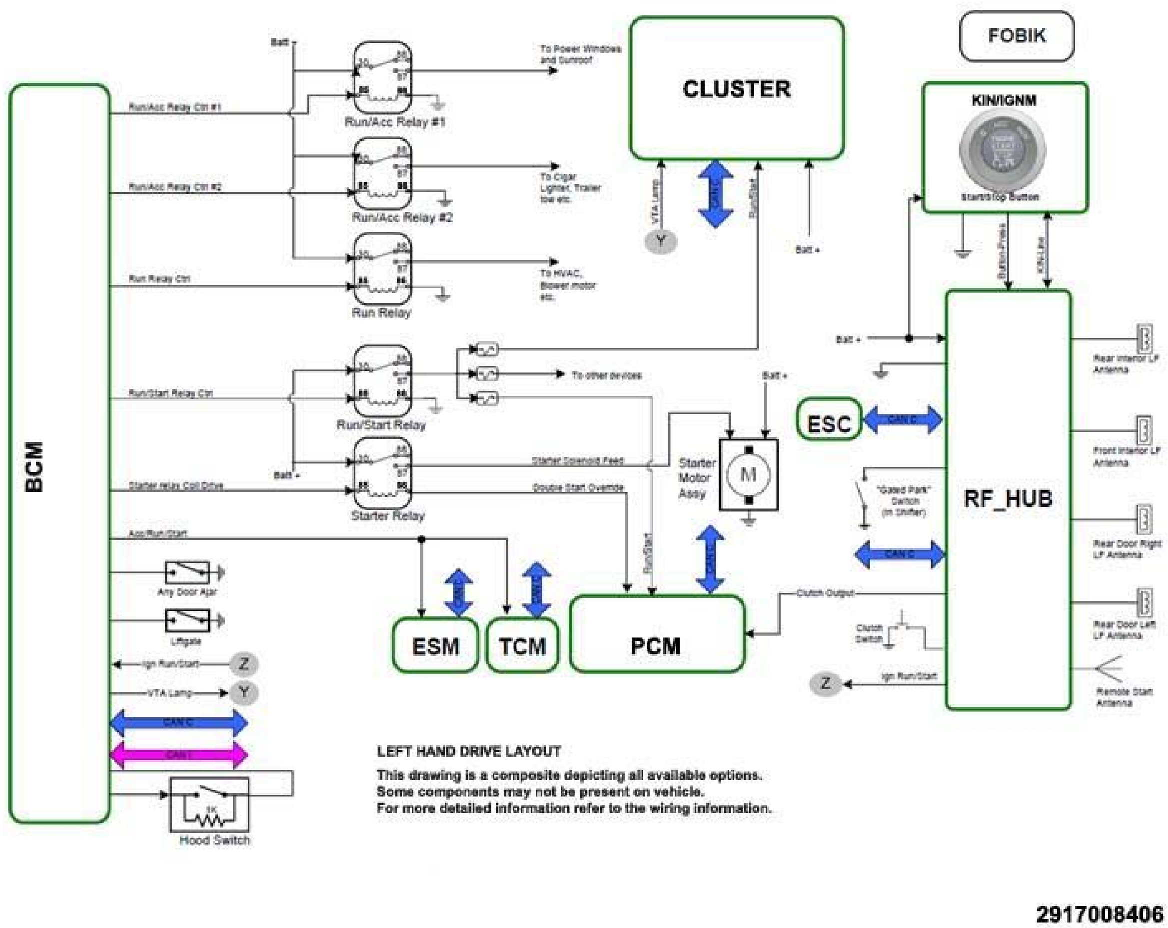

Fig. 1: Starting System Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

This vehicle may come equipped with one of two types of ignitions, the IGNM (IGnition Node Module) or a KIN (Keyless Ignition Node). The KIN uses a Keyless Go Start/Stop push button for cycling the ignition on/off. The IGNM does not use a Keyless Go Start/Stop push button, instead providing a visible slot for the FOBIK to fit into for cycling the ignition on/off.

When the operator presses the Start/Stop Button on a KIN or cycles the FOBIK in a IGNM type ignition, the FOBIK is validated wirelessly by the RF Hub (Radio Frequency Hub Module). If the FOBIK is recognized as belonging to the vehicle and is inside the vehicle, the system allows the ignition state of the vehicle to be

changed by the operator between the LOCK, ACCESSORY, RUN, and START ignition states.

LED Operation

The LEDs in the IGNM and Start/Stop Button provide visual indication of the ignition system and button use to aid the driver. The Logic for LED control is implemented in the IGNM and RF HUB. The IGNM and Start/Stop Button contain four LEDs:

- OFF Indication
- ACC Indication (Accessory)
- ON Indication (On or Run)
- Ignition Switch Indicator (button backlight)

The LEDs indicate the vehicle ignition position and are driven by the CAN bus signals related to the ignition position. The Center LED (Ignition Switch Indicator) will blink if there is a related concern.

The RF HUB will log a DTC indicating an incorrect Ignition status value is present; in this state the ignition status is unknown. This will continue until the correct signal is received by the RF Hub.

EVIC Operation

The Keyless Go feature requires the vehicle to be equipped with an EVIC display for prompts and status information. The display messages are:

- Service Keyless System
- FOB Not Detected
- FOB Left Vehicle
- Not in Park
- Push Brake Pedal and Push Button to Start
- Push Clutch Pedal and Push Button to Start
- Vehicle not in Park Warning

BCM/RF Hub Module Interaction

There are a few things that must take place before the starter relay can apply voltage to the starter. Below are some key points to check when diagnosing a no crank condition.

The BCM requires two signals from the RF HUB to verify the ignition is in the run or start position. The voltage on the F20 circuit is one of these signals. It can be monitored in both the RF HUB and BCM data display screens as the Ignition Run/Start under the "Sensor" value. The run or start position voltage on this circuit should be at or close to battery voltage.

Simultaneously the RF HUB busses the Ignition Run/Start status to the BCM. The BCM monitors the bussed input information as the secondary verification on the Ignition Run/Start status. The bussed messages can be monitored with the scan tool in both the RF HUB and BCM data display screens.

The F20 circuit voltage and the bussed ignition run/start status message received by the BCM must agree to enable starting. Once the vehicle is started, the loss of only one ignition signal will not cause the vehicle to

cycle off as long as the other feed still indicates a "run status".

The RF HUB also requires an input from the Gated park switch (hardwired) and the OK to start CAN Bus message from the TCM (Crank Enable).

Diagnostic Aids

NOTE: **The No Crank Diagnostic serves as an aid in diagnosing the concern and is intended to be used as a general guide, since each no crank condition can be unique.**

The No Crank Diagnostic Test assumes all of the following to be true:

- Communication to all configured modules in the vehicle is possible with the scan tool.
- The condition is currently present.
- The TCM, PCM, RF HUB, and BCM are at the latest calibration (part number) levels.
- There are no active DTCs.
- There are no applicable Recalls.
- There are no applicable TSBs.
- There are no PCM inhibits (i.e. RPM, Trans Range, Clutch).
- The FOBIKs complete function and operation is correct.
- All battery cables and connections are clean and tight.
- There are no open fuses.
- The battery is fully charged and can pass a load test from the GR8 tester.
- The engine rotates freely.
- Any aftermarket equipment/wiring that has been installed is operating correctly.

Starter Relay Operation

In a no crank condition the Starter Relay can be missing power at pin 85, feed at pin 30, controlled ground at pin 86 or output at pin 87. Further explanation of how a relay operates is listed below:

- Pin 85 receives power from the BCM once the parameters for the Ignition Switch position and status, and all inhibit monitors (i.e. clutch switch, RPM, etc.) are satisfied.
- Pin 30 is a constant B+ feed.
- Pin 86 is a controlled ground by a module (i.e. PCM or BCM). Once power is sent from the BCM to the pin 85 of the relay it passes through a coil and leaves the relay through pin 86 to the control module.
- Pin 87 is an output circuit to the Starter solenoid. Once the circuit on pin 86 is grounded by the control module, the coil winding in the relay magnetically pulls the internal switch closed. When the internal switch is closed the power at pin 30 is sent to pin 87 of the relay.

DIAGNOSTIC TEST

1. **STARTER RELAY CHECK**
    1. When attempting to start the vehicle, listen and if needed feel for a click at the starter relay in the

PDC.

NOTE: **Some starter relays are internal to a module and may not be accessible, making it more difficult to hear, or feel the clicking response. It is possible for a poor ground or the Trans Range Sensor position to be lost causing the starter to click once.**

Did you hear an audible click at the relay or starter?

Yes

- Go To Step 9

No

- Go To Step 2

2. **STARTER RELAY INPUT CHECK**
    1. Use a 12-volt test light/DVOM to check for power at pin 85 of the starter relay.

       Is there Power/12 volts at pin 85?

       Yes

       - Go To Step 8

       No

       - Go To Step 3
3. **RF HUB OPERATION**
    1. Using the scan tool, confirm the ignition switch status changes in the RF HUB under the data display screen for the "Sensor" values.

       Does the ignition switch status on the data screen match the physical position of the KIN/IGNM?

       Yes

       - Go To Step 5

       No

       - Go To Step 4
4. **REMOTE START ANTENNA**

    NOTE: **If the vehicle is not equipped with Remote Start, proceed to the next test step.**

    1. Cycle the ignition off.
    2. Disconnect the Remote Start Antenna from the RF HUB.
    3. Using one FOBIK and sitting in the driver's seat, attempt to start the vehicle.

Did the vehicle start?

Yes

- Replace the Remote Start Antenna in accordance with the Service Information.
- Perform the **BODY VERIFICATION TEST** .

No

- Go To Step 5

5. **BCM IGNITION STATUS**
   1. Using the scan tool, confirm the ignition switch status changes in the BCM under the data display screen for the "Bussed Input" and "Sensor" values.

   NOTE: **The change of status in the BCM for the "Sensor" value validates the voltage activity (with very low amperage) of the F20 circuit.**

   In the BCM, do both values for the ignition switch status match; and do they match those in the RF HUB?

   Yes

   - Go To Step 6

   No

   - If the status of the Ignition Switch position is not changing under the "Sensor" value, check the F20 circuit at the BCM for battery voltage with a DVOM (not a test light).
   - If there is Battery voltage **at the BCM on the F20 circuit** verify all power, ground and bus circuits are OK for the BCM. If no problem found replace the BCM in accordance with Service Information. Refer to **MODULE, BODY CONTROL, REMOVAL** .
   - If there is **NO** Battery voltage **at the BCM** on the F20 circuit, then check for voltage on the F20 circuit at the RF HUB.
   - If there is Battery voltage **coming out of the RF HUB on the F20 circuit** , check the F20 circuit between the RF HUB and BCM for a short, open condition or high resistance.
   - If there is **NO** Battery voltage **coming out of the RF HUB on the F20 circuit** verify all power, ground & communication circuits, & connections to the RF HUB prior to replacing. Refer to **MODULE, RADIO FREQUENCY (RF HUB), REMOVAL** .
   - In the data screen, if the status of the Ignition Switch was not changing under the "Bussed Input" value, further diagnosis is needed between the RF HUB, (bus circuits, connections) and the BCM.
6. **PCM IGNITION, TRANS RANGE/CLUTCH SWITCH STATUS VERIFICATION**
   1. Using the scan tool confirm there are no inhibits that have been triggered in the PCM (i.e. Ignition Switch, Trans Range or Clutch Switch) and any switch inputs (filtered states) relating to the starting system function and operate correctly under the data display screen.

   Does the PCM show any inhibits (**not DTCs**) for starting (**not remote starting**)?

Yes

- Correct the inhibit reason listed.
- If no problem can be found, then verify all power, ground and bus circuits to the PCM and replace the PCM in accordance with the Service Information. Refer to **MODULE, POWERTRAIN CONTROL, REMOVAL** .

No

- Go To Step 7

7. **BCM TO STARTER RELAY POWER INPUT CHECK**
   1. At this time if all the correct inputs for the ignition switch status are correct in the RF HUB, BCM and PCM, verify both power feeds are present (pin 30 and 85) to the Starter Relay while in the crank position.

      Are both power feeds present at the relay when the ignition is in the crank position?

      Yes

      - Go To Step 8

      No

      - If, there is no power to pin 30 or 85, no DTCs, TSBs, Recalls, or Inhibits replace the BCM in accordance with Service Information. Refer to **MODULE, BODY CONTROL, REMOVAL** .
8. **STARTER RELAY CONTROL CIRCUIT CHECK**
   1. Using a test light/DVOM determine if the Starter Control circuit at pin 86 of the relay is missing ground (at the relay if equipped with a removable relay or wiring to the internal relay) when the ignition is in the crank position.

      Was the Starter Control circuit for pin 86 being grounded when the ignition was in the crank position?

      Yes

      - Go To Step 10

      No

      - Verify the Starter Relay Control circuit from pin 86, has no shorts, opens or high resistance on the wiring going from the Starter Relay in the BCM (or PDC) to the PCM.
      - Verify the cables do not have excessive resistance by performing a voltage drop on the battery cables.
9. **STARTER RELAY OUTPUT CIRCUIT CHECK**

NOTE: **At this point in the test, when the key is in the crank position power has been verified at Pin 30 & 85, along with the control circuit being grounded**

for pin 86.

1. Remove the Starter Relay Output circuit connector from the Starter solenoid.
2. Using a test light/DVOM and ignition in the crank position check for power at pin 87 (If equipped with a removable relay or wiring to the internal relay) of the relay and at the connection to the starter.

   Was there power at pin 87 for the output circuit?

   Yes

   - Go To Step 10

   No

   - If power is missing to pin 30 of the starter relay the BCM is suspect. Verify all power, ground, communication circuits and connections to the BCM before replacing in accordance with service information.
   - If power is missing at pin 87 of the starter relay and the relay is replaceable, change out the relay and recheck the concern. If a known good relay causes no change, check the Starter Output circuit from pin 87 of the relay to the starter for an open, short, excessive resistance, or poor connections to the solenoid or starter.
   - Verify and Inspect the Starter to ensure it is free of corrosion, oil, and there is no damage, or binding conditions.
   - Verify that all wiring, cables and connections are clean and tight.

10. **STARTER RELAY OUTPUT CIRCUIT LOAD TEST**
    1. Load test the Starter Relay output circuit going from the BCM to the Starter.

       Does the starter relay output circuit pass the load test?

       Yes

       - Verify that all connections are clean, tight and there is no damage to starter when fully inspected. If no problem found then replace the Starter in accordance with Service Information. Refer to **STARTER, REMOVAL** .

       No

       - Adjust the shift cable in accordance with the Service Information. Perform the POWERTRAIN VERIFICATION TEST. Refer to appropriate ELECTRICAL DIAGNOSTICS article.

REMOTE START INOPERATIVE (BCM - RF HUB EQUIPPED)

For a complete wiring diagram, **refer to SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The customer may notice that the signal range of the Remote Keyless Entry (RKE) system is reduced. This

condition may be due to the RKE antenna where the RKE key fob may need to be closer than 3 meters (10 feet) before the functions available on the key fob will operate. The diagnostic test is provided as a diagnostic aid for the dealer technician.

It is necessary to confirm the correct sales code(s) are present in the Standard and Optional Equipment sections of DealerCONNECT to determine if a factory or a MoparÂ® Accessory Remote Start kit was installed. If the vehicle has a MoparÂ® Accessory Remote Start kit, verify that at least 20 minutes has elapsed since the sales codes were added to DealerCONNECT. Once it has been confirmed that the proper sales codes have been added and the allotted time has passed, verify the vehicle has been configured properly using the scan tool. Also, make sure that the system shows as enabled in the BCM and that the temporary remote start override is set to disabled.

For any further assistance on diagnosing the installed MoparÂ® Accessory kit contact the MoparÂ® Accessories group at 800-84-MOPAR (66787).

DIAGNOSTIC TEST

1. **REMOTE START FUNCTION**

   NOTE: In some cases the vehicle will start then stall, indicating a fuel level concern (less than a quarter of a tank). Before proceeding verify there is enough fuel in the tank for the vehicle to start and run.

   1. Attempt to start the vehicle with the FOBIK.

      Does the vehicle start when using the FOBIK?

      Yes

      - At this time the Remote Start is functioning properly.
      - Using the scan tool, check for any related Starting, Communication, or Ignition related DTCs that may inhibit the Remote Starting feature. Check the BCM for any previous Remote Start Inhibits and mileage that were stored. Inhibits may be found under the system tests or miscellaneous functions tab.

      No

      - Go To Step 2
2. **REMOTE START VISUAL CHECK**
   1. While pressing the remote start button on the FOBIK, observe the exterior lights and the horn operation.

      Does the horn sound and the exterior parking lights flash?

      Yes

      - Go To Step 3

      No

- Go To Step 4

3. **CHECKING BCM INHIBITS**

   NOTE: Since the horn sounds and the parking lights flash, this verifies the BCM is receiving the CAN BUS message from the RF HUB. It also verifies the RF signal for Remote Start from the FOBIK to the RF HUB is operating correctly.

   1. Using the scan tool, check the Remote Start inhibits of the BCM or any ACTIVE DTCs listed in all modules.

      NOTE: Inhibits may be found under the system tests or miscellaneous functions tab. The fuel level may not be a listed inhibit.

      Are there any Remote Start inhibits or any ACTIVE DTCs listed in the entire vehicle?

      Yes

      - For any inhibits for a complete list of Remote Start inhibits. Refer to **DIAGNOSIS AND TESTING** .
      - For any ACTIVE DTCs, perform the appropriate diagnostic procedure in **DTC INDEX** article.

      No

      - Check for any related TSBs prior to replacing the BCM. If no related TSBs are found, then replace the BCM in accordance with the Service Information. Refer to **MODULE, BODY CONTROL, REMOVAL** .

4. **RKE FUNCTION SHORT RANGE**
   1. While standing next to the Driver door and using the FOBIK, attempt to lock and unlock the doors.

      Does the RKE function properly?

      Yes

      - Go To Step 5

      No

      - Go To Step 7

5. **RKE FUNCTION MID RANGE**
   1. While standing 20 feet from the vehicle and using the FOBIK, attempt to lock and unlock the doors.

      Does the RKE function properly at 20 feet?

      Yes

      - Go To Step 6

No

- Go To Step 7

6. **RKE FUNCTION LONG RANGE**
    1. While standing 100 feet from the vehicle and using the FOBIK, attempt to lock and unlock the doors.

       Does the RKE function properly at 100 feet?

       Yes

       - Go To Step 9

       No

       - Go To Step 7
7. **FOBIK SIGNAL STRENGTH**
    1. Use the RF Tester 9001 to check the signal strength of the FOBIK.

       Does the FOBIK pass?

       Yes

       - Go To Step 10

       No

       - Go To Step 8
8. **CHECKING THE FOBIK**
    1. Replace the battery in the FOBIK with a known good battery and recheck the signal from the FOBIK with the RF Tester 9001.

       Does the FOBIK pass?

       Yes

       - Go To Step 9

       No

       - Check for any related TSBs prior to replacing the FOBIK. If no related TSBs are found, then replace the FOBIK in accordance with the Service Information.
9. **CHECKING FOR ACTIVE DTCs**

   NOTE: **The RKE portion of the FOBIK is operational, this verifies that the RF HUB is capable of receiving signals and communicating to operate the locks.**

    1. Use the scan tool to check for ACTIVE DTCs.

Did the scan tool show any ACTIVE DTCs in the entire vehicle?

Yes

- Diagnose the DTCs in accordance with the Service Information before proceeding with the Remote Start Inoperative concern.

No

- Go To Step 10

10. **CHECKING THE RF HUB**

NOTE: **Even though the RKE function of the system may work with no concern, the BCM is either not receiving a message or is receiving a corrupt message from the RF HUB for remote start operation.**

1. While sitting in the driver seat and using the scan tool, monitor the RF HUB on the data display screen for changes when the Remote Start button of the FOBIK is pressed.

Did the status change when the Remote Start button of the FOBIK was pressed?

Yes

- Go To Step 11

No

- Go To Step 12

11. **CHECKING BCM INHIBITS**

NOTE: **The parking lights flash and the horn are inoperative when using the FOBIK, this indicates a faulty BCM or "Inhibit" that may be preventing the start request from occurring.**

1. Use the scan tool to check for any Remote Start inhibits listed in the BCM. This may be found under the system tests or miscellaneous functions tab.

Were there any Remote Start inhibits listed in the BCM?

Yes

- Perform the REMOTE START SYSTEM Diagnosing and Testing. Refer to **DIAGNOSIS AND TESTING** .

No

- If this has had a MoparÃ® Accessory kit installed verify the correct Sales Code for Remote Start has been added to Dealer Connect and a Restore Vehicle Configuration has been performed.
- Confirm the system is enabled; and the temporary Remote Start override is set to disabled in

the BCM and contact the MoparÂ® Accessories group (800-84-Mopar) for further details before proceeding.

- If this has a factory installed Remote Start, check for any related TSBs prior to replacing the BCM. If no related TSBs are found, then replace the BCM in accordance with the Service Information.

12. **CHECKING THE REMOTE START ANTENNA**
    1. Cycle the ignition off
    2. Disconnect the Remote Start antenna from the RF Hub.
    3. Using one FOBIK and sitting in the driver's seat, attempt to start the vehicle.

    Did the vehicle start?

    Yes

    - Replace the Remote Start Antenna in accordance with the Service Information.
    - Perform the BODY VERIFICATION TEST. **BODY VERIFICATION TEST**

    No

    - Verify all power, ground, communication circuits, & connections to the RF HUB prior to replacing. Refer to **MODULE, RADIO FREQUENCY (RF HUB), REMOVAL** .

Article GUID: A00735950

2015-16 ENGINE

Starting - Service Information - Challenger

DESCRIPTION

REMOTE START SYSTEM

NOTE: Available on automatic transmission equipped vehicles only.

Remote start conveniently starts the engine from outside the vehicle by using the Remote Keyless Entry (RKE) key fob while maintaining security. The system has a targeted range of 200 ft. (61 m). The vehicle must be locked, the deck lid and hood closed and the transmission in Park in order to start the engine using the Remote Start button on the key fob.

STANDARD STARTING SYSTEM

The starting system consists of:

- Starter relay.
- Starter motor (including an integral starter solenoid).

Other components to be considered as part of starting system are:

- Battery.
- Battery cables.
- Ignition switch and key lock cylinder.
- Clutch pedal position switch (manual transmission).
- Park/neutral position switch (automatic transmission).
- Wire harnesses and connections.

The Battery, Starting, and Charging systems operate in conjunction with one another, and must be tested as a complete system. For correct operation of starting/charging systems, all components used in these 3 systems must perform within specifications. When attempting to diagnose any of these systems, it is important that you keep their interdependency in mind.

The diagnostic procedures used in each of these groups include the most basic conventional diagnostic methods, to the more sophisticated On-Board Diagnostics (OBD) built into the Powertrain Control Module (PCM). Use of an induction-type milliampere ammeter, volt / ohmmeter, battery charger, carbon pile rheostat (load tester), and 12-volt test lamp may be required.

OPERATION

REMOTE START SYSTEM

The optional Smart Remote Start system (which operates from as far as 200 feet) not only starts the vehicle via fob activation, but also activates the climate control and (if equipped) the optional heated/ventilated seats and

optional heated steering wheel depending on temperatures outside and inside the car.

REMOTE START OPERATING CONDITIONS

In order to operate remote start, the following conditions must be met:

- Key fob sequence must be operated within a 200 foot range of the vehicle.
- The vehicle must be in Park.
- Key is not in the ignition.
- The hazard switch off.
- Vehicle Theft Alarm or Panic is not alarming.
- Doors and hood must be closed.
- The battery voltage is within a normal operating range of 11 to 15 volts.

REMOTE START SHUT DOWN/DEACTIVATE CONDITIONS

Engine will NOT start or will shut down/deactivate during any of the following conditions:

- Key in Ignition.
- Doors or hood are opened before remote unlock.
- Hazard Switch depressed.
- Panic or theft alarm active.
- Brake applied.
- A prior remote start cranked the engine, but failed to start the engine.
- Battery voltage NOT in the normal range.
- High (run away) or Low Idle (stall) RPM.
- MIL Active.
- High Engine Coolant Temperature.
- Low Engine Oil Pressure.
- Low fuel levels

INITIATE REMOTE START

To Remote Start the vehicle:

1. Press remote button on the Key Fob twice within 5 seconds.

   NOTE: **Engine will run for 15 minutes after a remote start is initiated. After 15 minutes, the engine will shut off. The system allows for only two sequential remote starts without a key ignition cycle.**

2. Unlock vehicle with Key Fob to enter the vehicle.
3. Put key in ignition, turn key to run position to exit remote start and enter a normal start without engine shut off.

IDENTIFICATION THAT REMOTE START IS ACTIVATED

To identify that Remote Start has been activated the following will occur:

- Horn will sound and lights will flash to acknowledge a start command was received.
- Park Lamps will turn on to indicate that the engine is running in remote start mode.

TERMINATE REMOTE START

To terminate Remote Start, press Remote Start button on the Key Fob once.

NOTE: **In order to avoid inadvertent shut downs, the one-time press to shut down the vehicle will be disabled for two seconds after receipt of a valid remote start request.**

STANDARD STARTING SYSTEM

Starting System Flow

- Pressing the Keyless Ignition Node (KIN Button), a request is sent to the Remote Frequency Hub Module (RFHM) via the private LIN bus.
- The RFHM receives the request from the KIN and then looks for the valid key via the Low Frequency (LF) antennas.
- If the RFHM detects a valid key and if the brake is engaged, then the RFHM sets the ignition position to START/CRANK.
- The Body Control Module (BCM) turns the Ignition status to START/CRANK.
- Then the BCM sends the command to turn the vehicle to CRANK.
- If conditions are correct to start, the Powertrain Control Module (PCM) turns on the high side of the PCM starter relay and turns the Crank Hold Signal to True. If the BCM is still in crank and the Crank Hold is true then the BCM turns on the Low side of the BCM Starter relay and the engine will start cranking.
- Once the engine is started the PCM deactivates the double start over ride.
- The BCM will then deactivate the starter either when the engine starts or the maximum time of 10 seconds has been reach for the tip start.
- The RFHM changes the ignition position to RUN if the start type is TIP start or the 5 second time expires or the engine controller indicates the vehicle is not in park or neutral.
- The engine can be manually shut down by the driver with speeds over 5 MPH in any gear.

DIAGNOSIS AND TESTING

REMOTE START SYSTEM

For diagnostic and testing information, refer to DIAGNOSIS AND TESTING .

STANDARD STARTING SYSTEM

The battery, starting, and charging systems operate in conjunction with one another, and must be tested as a complete system. For correct starting/charging system operation, all of the components involved in these three systems must perform within specifications.

Starting System Diagnosis		
CONDITION	**POSSIBLE CAUSE**	**CORRECTION**
STARTER FAILS TO OPERATE.	1. Battery discharged or faulty.	1. Refer to **BATTERY, DIAGNOSIS AND TESTING** . Charge or replace battery, if required.
	2. Starting circuit wiring faulty.	2. See the appropriate Wiring Information. Test and repair starter feed and/or control circuits, if required.
	3. Starter relay faulty.	3. The starter relay is located within the front Power Distribution Center (PDC). See no crank condition, refer to **DIAGNOSIS AND TESTING** .
	4. Park/Neutral position switch faulty or misadjusted.	4. Refer to Park/Neutral Position Switch. Replace park/neutral position switch if required. See the appropriate TRANSMISSION SERVICE INFORMATION article.
	5. Starter solenoid faulty.	5. Refer to Starter Motor. Replace starter motor assembly if required. See **STARTER**.
	6. Starter motor faulty.	6. If all other starting system components and circuits test OK, replace starter motor. See **STARTER**.
STARTER ENGAGES, FAILS TO TURN ENGINE.	1. Battery discharged or faulty.	1. Refer to **BATTERY, DIAGNOSIS AND TESTING** . Charge or replace battery, if required.
	2. Starting circuit wiring faulty.	2. See the appropriate Wiring Information. Test and repair starter feed and/or control circuits if required.
	3. Starter motor faulty.	3. If all other starting system components and circuits test OK, replace starter motor assembly. See **STARTER**.
	4. Engine seized.	4. Refer to the appropriate Engine Service Information article for diagnostic and service procedures. .
STARTER ENGAGES, SPINS OUT BEFORE ENGINE STARTS.	1. Starter ring gear faulty.	1. Refer to Starter Motor Removal and Installation. Remove starter motor to inspect starter ring gear. Replace starter ring gear if required. See **STARTER**.
	2. Starter motor faulty.	2. If all other starting system components and circuits test OK, replace starter motor assembly. See **STARTER**.
STARTER DOES NOT DISENGAGE.	1. Starter motor improperly installed.	1. Refer to Starter Motor Removal and Installation. Tighten starter mounting hardware to correct torque specifications. See **STARTER**.
	2. Starter relay faulty.	3. The starter relay is located within the front PDC. See no crank condition, refer to **DIAGNOSIS AND TESTING** .
	3. Ignition switch faulty.	4. Replace KIN module if required.

Starting System Diagnosis		
CONDITION	POSSIBLE CAUSE	CORRECTION
	4. Starter motor faulty.	4. If all other starting system components and circuits test OK, replace starter motor. See **STARTER**.

INSPECTION

For complete starter wiring circuit diagrams, refer to **SYSTEM WIRING DIAGRAMS** . Before removing any unit from starting system for repair or diagnosis, perform the following inspections:

WARNING: On vehicles equipped with airbags, refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury.

- **Battery** - Visually inspect battery for indications of physical damage and loose or corroded cable connections. Determine state-of-charge and cranking capacity of battery. Charge or replace battery if required. Refer to **Battery** in the **BATTERY SYSTEM - SERVICE INFORMATION** article .
- **Clutch Pedal Position Switch** - If equipped with manual transmission, visually inspect clutch pedal position switch for indications of physical damage and loose or corroded wire harness connections. Refer to **Clutch Pedal Position Switch** in the **CLUTCH SYSTEM** article .
- **Park/Neutral Position Switch** - If equipped with automatic transmission, visually inspect park/neutral position switch for indications of physical damage and loose or corroded wire harness connections. Refer to **Park/Neutral Position Switch** in the appropriate TRANSMISSION SERVICE INFORMATION article .
- **Starter Relay** - The starter relay is located within the front Power Distribution Center (PDC). Refer to **DIAGNOSIS AND TESTING** .
- **Starter Motor** - Visually inspect starter motor for indications of physical damage and loose or corroded wire harness connections.
- **Starter Solenoid** - Visually inspect starter solenoid for indications of physical damage and loose or corroded wire harness connections.
- **Wiring** - Visually inspect wire harnesses for damage. Repair or replace any faulty wiring, as required. Refer to **SYSTEM WIRING DIAGRAMS** . .

TESTING

COLD CRANKING TEST

NOTE: For complete starter wiring circuit diagrams, refer to SYSTEM WIRING DIAGRAMS . The battery must be fully-charged and load-tested before proceeding. Refer to Battery in the BATTERY SYSTEM - SERVICE INFORMATION article .

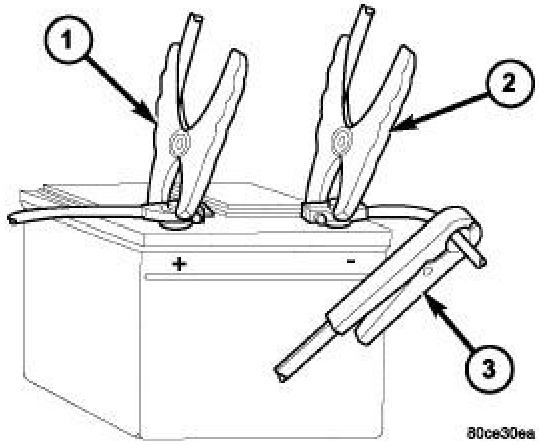

Fig. 1: Induction Ammeter, Positive & Negative Clamp
Courtesy of CHRYSLER GROUP, LLC

1 - POSITIVE CLAMP
2 - NEGATIVE CLAMP
3 - INDUCTION AMMETER CLAMP

1. Connect volt-ampere tester (1) and (2) to battery terminals. See instructions provided by manufacturer of volt-ampere tester being used.
2. Fully engage parking brake.
3. If equipped with manual transmission, place gearshift selector lever in Neutral position and block clutch pedal in fully depressed position. If equipped with automatic transmission, place gearshift selector lever in Park position.
4. Verify that all lamps and accessories are turned off.
5. To prevent a gasoline engine from starting, remove either the ignition run fuse, or the fuel pump control fuse.

WARNING: Attempt to start engine a few times before proceeding with following step.

NOTE: A cold engine will increase starter current (amperage) draw reading, and reduce battery voltage reading.

6. Press and hold the ignition in **Start** position. Note cranking voltage and current (amperage) draw readings shown on volt-ampere tester.
   a. If voltage reads below 9.6 volts, refer to **STANDARD STARTING SYSTEM** . If starter motor is OK, refer to the appropriate Engine Service Information article for further testing of engine. If starter motor is not OK, replace faulty starter motor.
   b. If voltage reads above 9.6 volts and current (amperage) draw reads below specifications, refer to **FEED CIRCUIT TEST** in this service information .
   c. If voltage reads 12.5 volts or greater and starter motor does not turn, refer to **CONTROL CIRCUIT TESTING** in this service information. .
   d. If voltage reads 12.5 volts or greater and starter motor turns very slowly, refer to **FEED CIRCUIT**

TEST in this service information. .

FEED CIRCUIT TEST

The starter feed circuit test (voltage drop method) will determine if there is excessive resistance in high-amperage feed circuit. For complete starter wiring circuit diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

When performing these tests, it is important to remember that voltage drop is giving an indication of resistance between two points at which voltmeter probes are attached.

Example: When testing resistance of positive battery cable, touch voltmeter leads to positive battery cable clamp and cable connector at starter solenoid. If you probe positive battery terminal post and cable connector at starter solenoid, you are reading combined voltage drop in positive battery cable clamp-to-terminal post connection and positive battery cable.

The following operation will require a voltmeter accurate to 1/10 (0.10) volt. Before performing tests, be certain that following procedures are accomplished:

- Battery is fully-charged and load-tested. Refer to **Battery** in **BATTERY SYSTEM - SERVICE INFORMATION** .
- Fully engage parking brake.
- If equipped with manual transmission, place gearshift selector lever in Neutral position and block clutch pedal in fully depressed position. If equipped with automatic transmission, place gearshift selector lever in Park position.
- Verify that all lamps and accessories are turned off.
- To prevent a gasoline engine from starting, remove Automatic Shut Down (ASD) relay. These relays are located in front PDC. Refer to label on PDC cover for relay location.

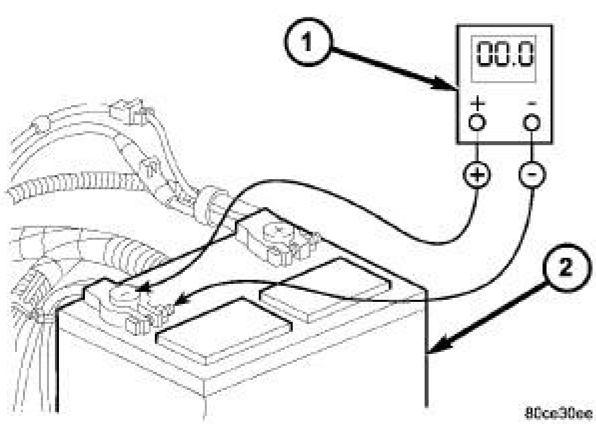

Fig. 2: Testing Battery Negative Connection Resistance - Typical
Courtesy of CHRYSLER GROUP, LLC

1 - VOLTMETER	
2 - BATTERY	

1. Connect positive lead of voltmeter (1) to negative battery cable terminal post. Connect negative lead of voltmeter to negative battery cable clamp. Press and hold the ignition in **Start** position. Observe voltmeter. If voltage is detected, correct poor contact between cable clamp and terminal post.

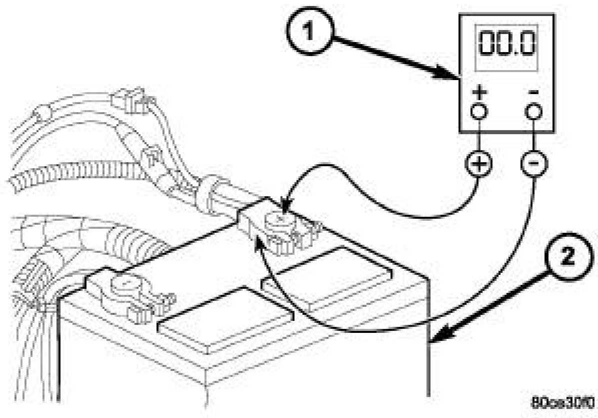

Fig. 3: Testing Battery Positive Connection Resistance - Typical
Courtesy of CHRYSLER GROUP, LLC

1 - VOLTMETER
2 - BATTERY

2. Connect positive lead of voltmeter to positive battery terminal post. Connect negative lead of voltmeter to battery positive cable clamp. Press and hold the ignition in **Start** position. Observe voltmeter. If voltage is detected, correct poor contact between cable clamp and terminal post.

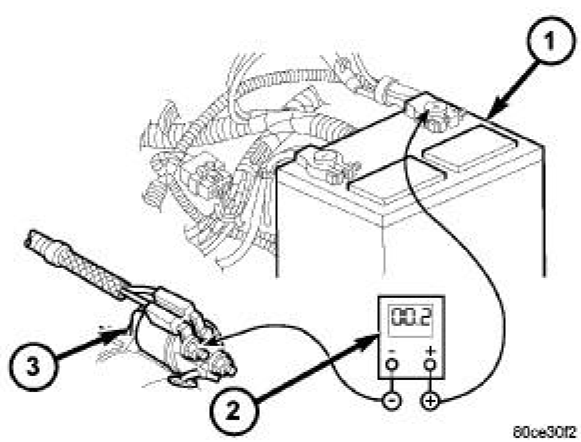

Fig. 4: Testing Battery Positive Cable Resistance - Typical
Courtesy of CHRYSLER GROUP, LLC

1 - BATTERY
2 - VOLTMETER
3 - STARTER MOTOR

3. Connect voltmeter to measure between battery positive terminal post and starter solenoid battery terminal stud. Press and hold the ignition in **Start** position. Observe voltmeter. If reading is above 0.2 volt, clean and tighten battery cable connection at solenoid. Repeat test. If reading is still above 0.2 volt, replace faulty positive battery cable.

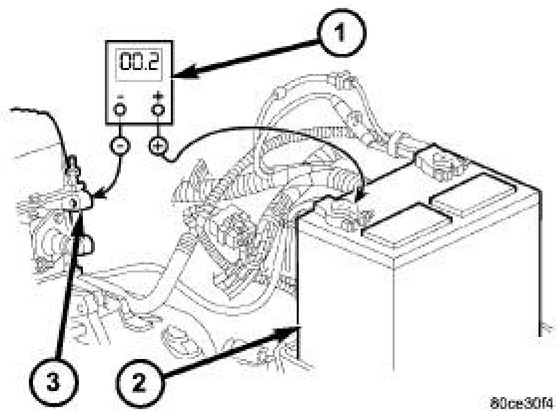

Fig. 5: Testing Ground Circuit Resistance - Typical
Courtesy of CHRYSLER GROUP, LLC

1 - VOLTMETER
2 - BATTERY
3 - ENGINE GROUND

4. Connect voltmeter to measure between negative battery terminal post and a good clean ground on engine block. Press and hold the ignition in **Start** position. Observe voltmeter. If reading is above 0.2 volt, clean and tighten negative battery cable attachment on engine block. Repeat test. If reading is still above 0.2 volt, replace faulty negative battery cable.

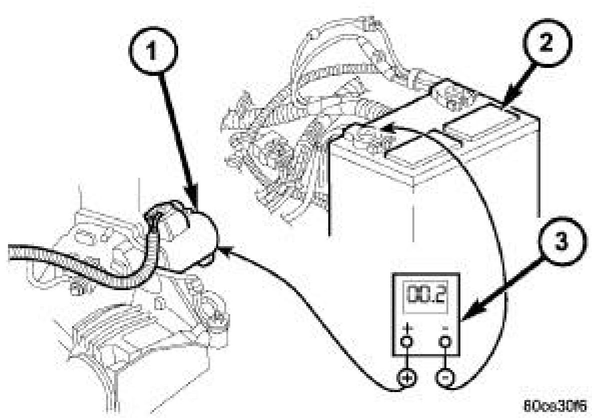

Fig. 6: Testing Starter Ground - Typical
Courtesy of CHRYSLER GROUP, LLC

1 - STARTER MOTOR

2 - BATTERY
3 - VOLTMETER

5. Connect positive lead of voltmeter to starter housing. Connect negative lead of voltmeter to negative battery terminal post. Press and hold the ignition in **Start** position. Observe voltmeter. If reading is above 0.2 volt, correct poor starter to engine block ground contact.
6. If equipped with dual battery system, connect positive lead of voltmeter to positive battery cable clamp on battery located on left side of vehicle. Connect negative lead of voltmeter to positive battery terminal post on battery located on right side of vehicle. Press and hold the ignition in **Start** position. Observe voltmeter. If reading is above 0.2 volt, clean and tighten battery cables at both batteries. Repeat test. If reading is still above 0.2 volt, replace faulty positive battery cable.

If resistance tests detect no feed circuit problems, refer to STANDARD STARTING SYSTEM .

CONTROL CIRCUIT TESTING

The starter control circuit components should be tested in the order in which they are listed, as follows:

- **Starter Relay** - The starter relay is located within the PDC. Refer to DIAGNOSIS AND TESTING .
- **Starter Solenoid** - Refer to **Starter Motor** DIAGNOSIS AND TESTING .
- **Ignition Switch** - Refer to **Ignition Switch and Key Lock Cylinder**
- **Clutch Pedal Position Switch** - If equipped with manual transmission, refer to **Clutch Pedal Position Switch** . See CLUTCH SYSTEM .
- **Park/Neutral Position Switch** - If equipped with automatic transmission, refer to **Park/Neutral Position Switch** in the appropriate TRANSMISSION SERVICE INFORMATION article .
- **Wire harnesses and connections** - Refer to SYSTEM WIRING DIAGRAMS .

SPECIFICATIONS

STARTER MOTOR

Engine Application	Power Rating	Cranking Amperage Draw Test	
3.6L	1.2 Kilowatt / 1.6 Horsepower	100 - 300 Amperes	
5.7L	1.4 Kilowatt / 1.87 Horsepower	100 - 300 Amperes	
6.2L	1.4 Kilowatt / 1.87 Horsepower	100 - 300 Amperes	
6.4L	2.0 Kilowatt / 1.87 Horsepower	100 - 300 Amperes	
* Test at operating temperature. A cold engine, tight (new) engine, or heavy oil increases starter amperage draw. Starters are equipped with permanent magnets. Never strike the starter case in an attempt to loosen a sticking/stuck armature as the permanent magnets may crack or break.			Ā

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Battery Cable Nut	11	8	97	Ā
Heat shield, Starter	18	13	-	Ā
Intermediate Shaft Pinch Bolt	43	32	-	Ā
Starter B+ Nut	11	8	97	Ā
Starter Mounting Bolts	54	40	-	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specification.				

ANTENNA, REMOTE START

DESCRIPTION

DESCRIPTION

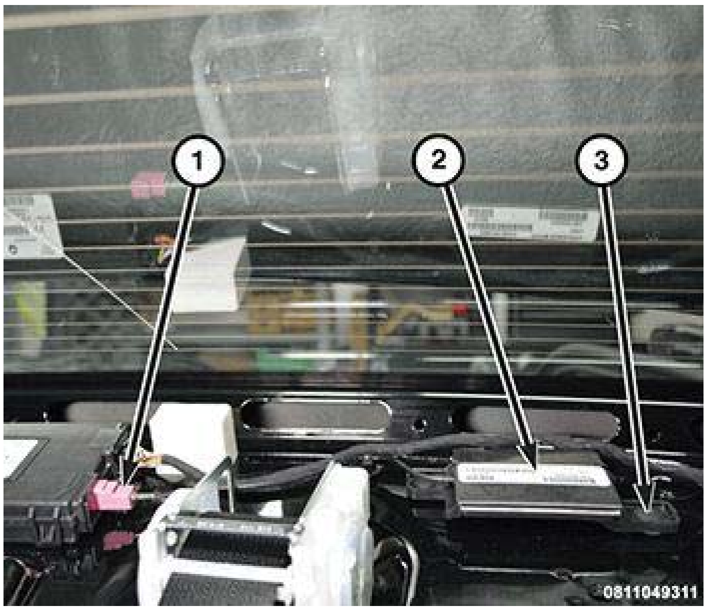

Fig. 7: Remote Frequency Hub Module (RFHM) Jump Wire, Remote Start Antenna Module & Push Tab
Courtesy of CHRYSLER GROUP, LLC

The Remote Start Antenna Module Assembly (2) consists of an electrical connection to the Radio Frequency Hub Module (RFHM) (1), a short length of coaxial cable with a connection to the RFHM, two mounting clips (3), and the control module/antenna. The antenna is located on the rear shelf package tray area next to the RFHM. The antenna which is printed on a circuit board in an enclosed plastic housing that is fed regulated 5v DC (+/-5%) via the attached coaxial cable pigtail. The Remote Start Antenna captures radiated RF signals that are transmitted from the Key FOB transmitter throughout the intended broadcast bands. The RF signal captured is then amplified and sent to the desired receiver/tuner.

OPERATION

OPERATION

The Remote Start Antenna is used to receive the signal from the remote key. The antenna captures radiated RF signals that are transmitted from the Key FOB transmitter throughout the intended broadcast bands. The RF signal captured is then amplified and sent to the Remote Frequency Hub Module (RFHM).

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the trim panel from the rear shelf. Refer to **PANEL, REAR SHELF, REMOVAL** .

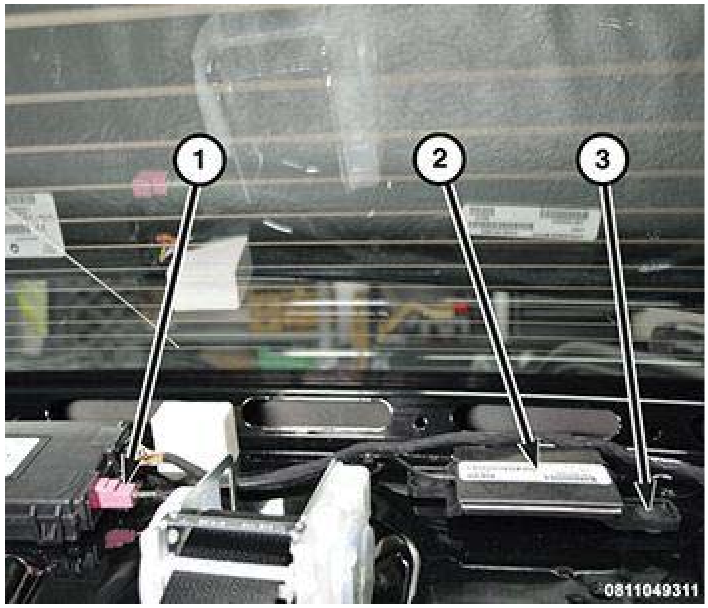

Fig. 8: Remote Frequency Hub Module (RFHM) Jump Wire, Remote Start Antenna Module & Push Tab
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the remote start antenna from the Remote Frequency Hub Module (RFHM) jump wire (1).
4. Remove the two push tabs (3) securing the remote start antenna to the shelf.
5. Remove the remote start antenna module (2) from the mounting bracket.

INSTALLATION

INSTALLATION

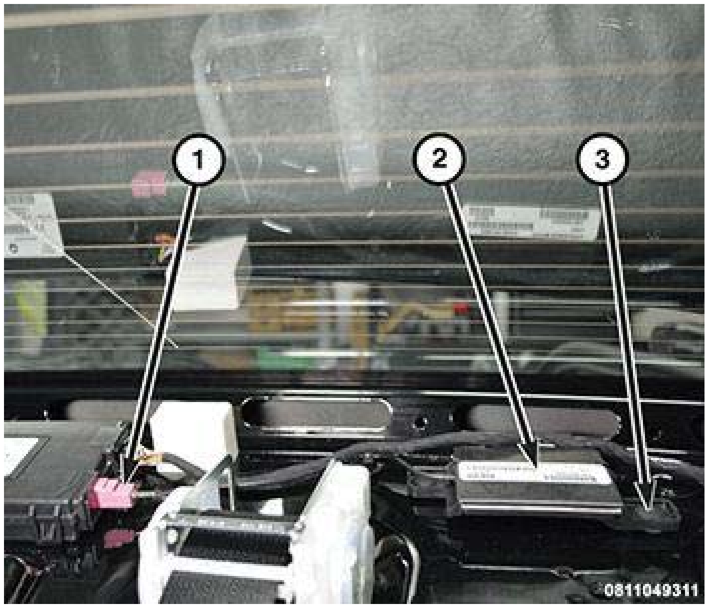

Fig. 9: Remote Frequency Hub Module (RFHM) Jump Wire, Remote Start Antenna Module & Push Tab
Courtesy of CHRYSLER GROUP, LLC

1. Position the Remote Start Antenna assembly (2) to the vehicle and install the push tab retainers (3).
2. Connect the electrical connectors at both the antenna module and the Remote Frequency Hub Module (RFHM) (1).
3. Connect the negative battery cable.
4. Connect the scan tool to the vehicle.
5. Perform the "Programming the RF-Hub" instructions. Refer to **STANDARD PROCEDURE** .
6. After programming the FOBIKs and the module, install the rear shelf cover. Refer to **PANEL, REAR SHELF, INSTALLATION** .
7. Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

NOTE: **Replace and Program the module(s) per the "RF-Hub, BCM, PCM, FOBIK and ELV Replacement and Programming Order Guide". Refer to STANDARD PROCEDURE .**

STARTER

REMOVAL

3.6L

1. Disconnect and isolate the negative battery cable at the battery.

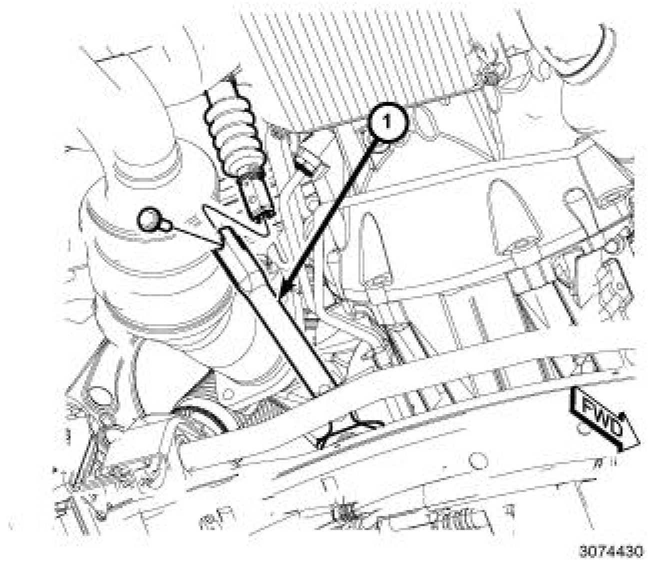

Fig. 10: Steering Gear Intermediate Shaft
Courtesy of CHRYSLER GROUP, LLC

2. Secure the steering wheel.
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Disconnect the steering gear intermidiate shaft (1). Refer to **SHAFT, INTERMEDIATE, LOWER, REMOVAL** .

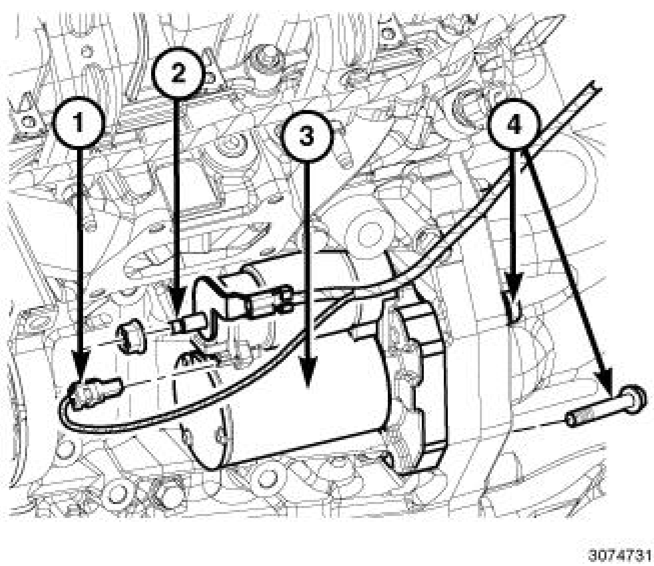

Fig. 11: Starter Solenoid Electrical Connector, Solenoid Stud, Starter Mounting Bolts & Starter Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Remove the starter solenoid heat shield.
6. Disconnect the starter solenoid electrical connector (1) from the starter solenoid terminal.
7. Remove the battery cable nut and battery cable from the solenoid stud (2).
8. Remove the starter mounting bolts (4), the electrical harness mounting bracket should remain in position.

9. Rotate and remove the starter assembly (3) from the transmission.

5.7L / 6.4L WITH AUTO TRANS

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.

Fig. 12: Electric Power Steering Harness Connector
Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the electric power steering harness connector (1) in order to gain access to the starter wiring connections.
4. If equipped, remove the starter assembly heat shield.

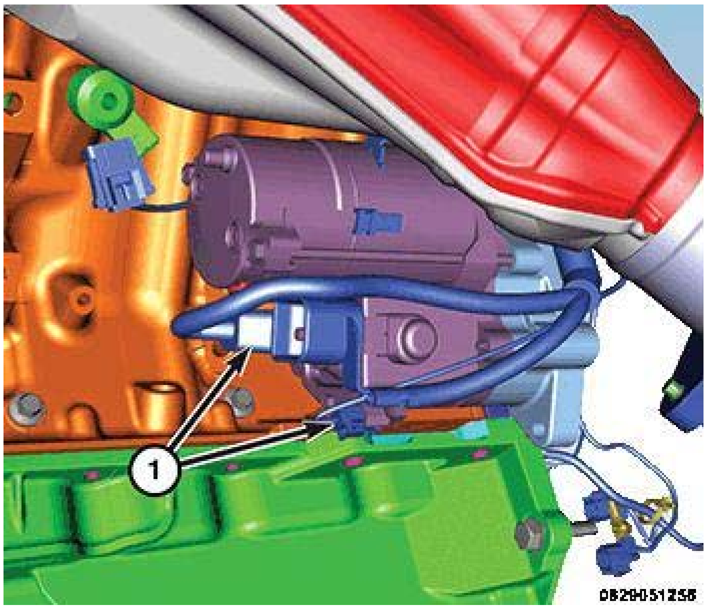

Fig. 13: Starter Connections
Courtesy of CHRYSLER GROUP, LLC

5. Remove the wiring harness connectors from the starter (1).

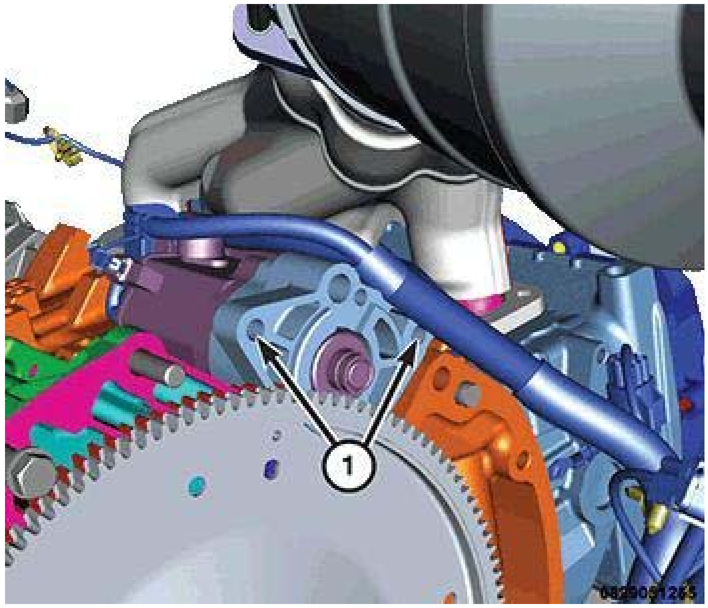

Fig. 14: Starter Mount To Transmission Bell Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the two starter mount to transmission bell housing bolts (1).
7. Remove the starter motor.

5.7L / 6.4L WITH MAN TRANS

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.

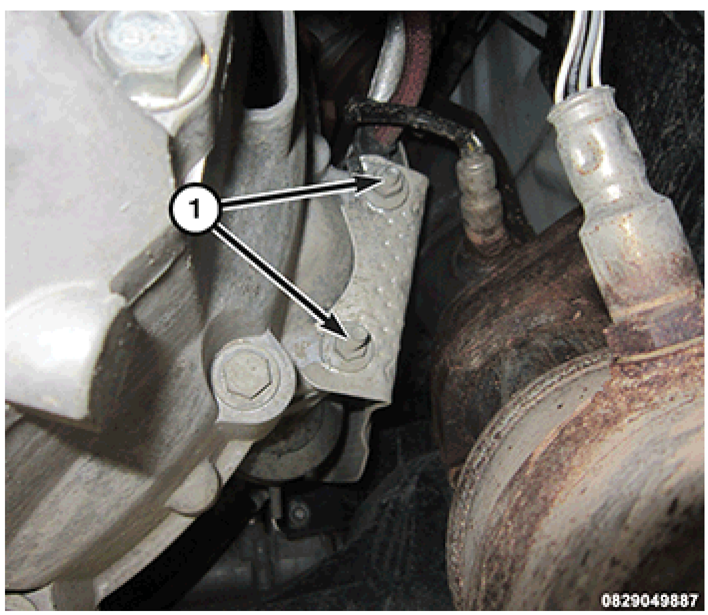

Fig. 15: Heat Shield Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the heat shield (if equipped).

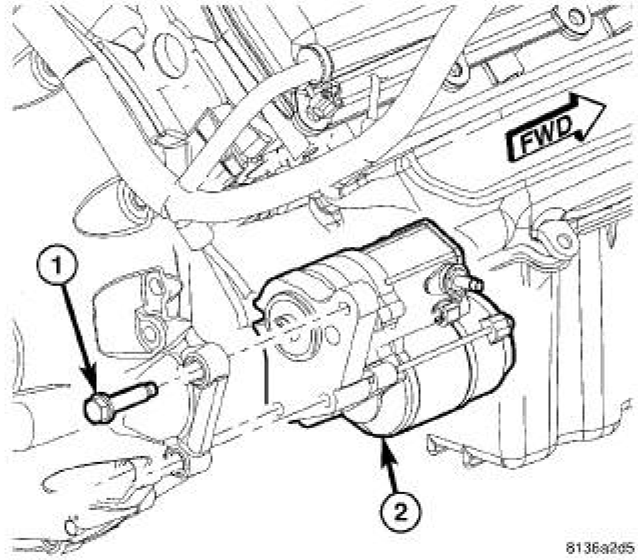

Fig. 16: Starter Mounting Bolt & Starter Motor
Courtesy of CHRYSLER GROUP, LLC

4. Remove the three starter mounting bolts (1).
5. Move the starter motor (2) towards front of vehicle far enough for nose of starter to clear. Always support starter motor (2) during this process. Do not let starter motor hang from wire harness.

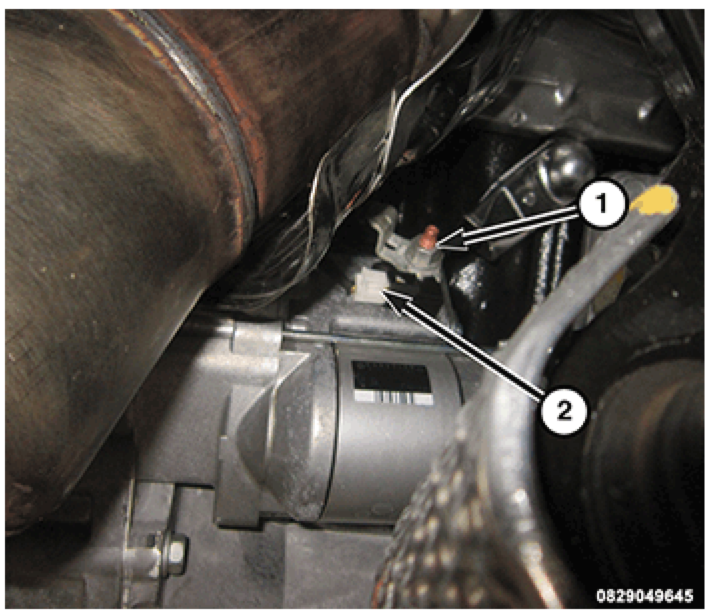

Fig. 17: Battery Cable-To-Solenoid Nut & Solenoid Stud
Courtesy of CHRYSLER GROUP, LLC

6. Remove the battery cable-to-solenoid nut (1).
7. Remove the solenoid wire from solenoid stud (2).
8. Remove the starter motor.

6.2L

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.

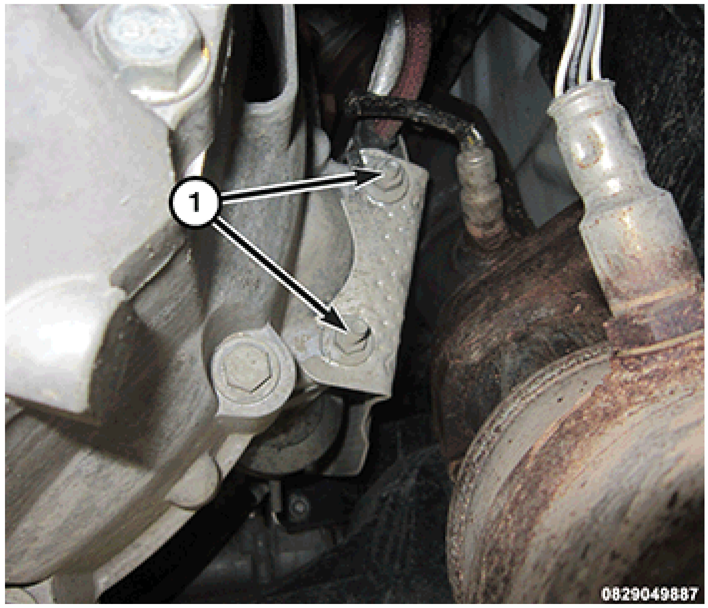

Fig. 18: Heat Shield Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the two heat shield nuts (1) and remove the heat shield.

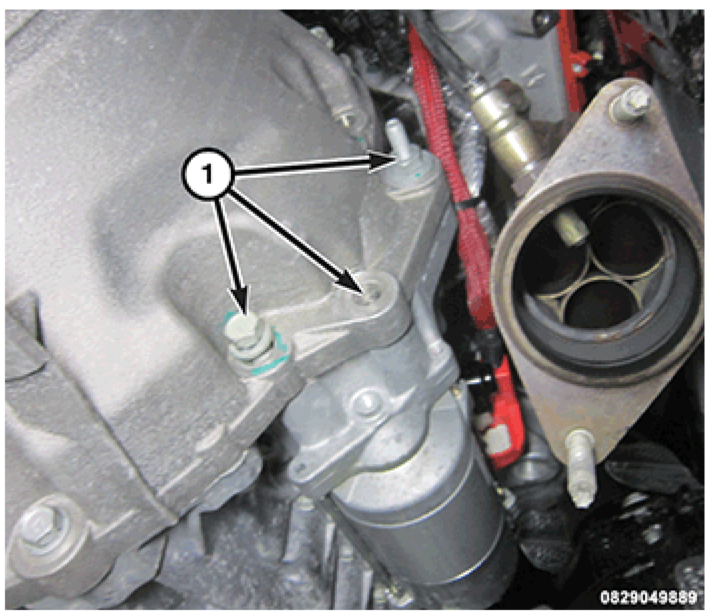

Fig. 19: Starter Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Remove the three starter mounting bolts (1).
5. Move the starter motor towards the front of vehicle far enough for the nose of starter to clear. Always support the starter motor during this process. Do not let the starter motor hang from the wire harness.

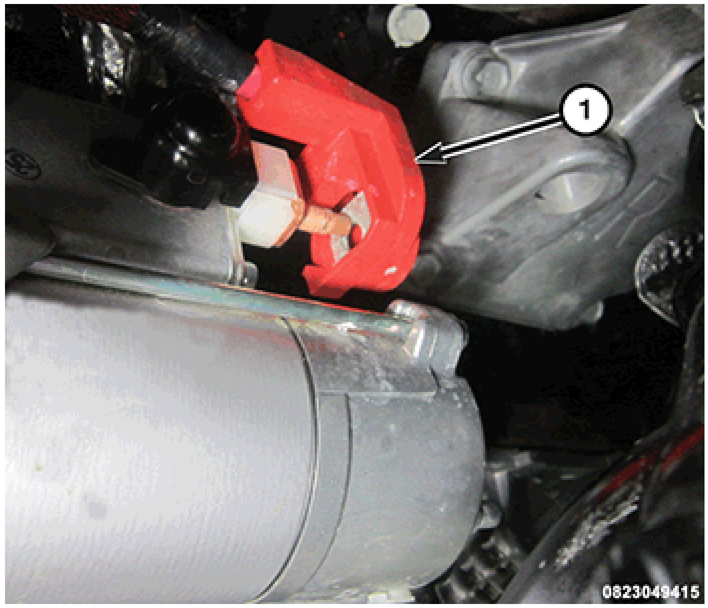

Fig. 20: Solenoid Wire
Courtesy of CHRYSLER GROUP, LLC

6. Remove the battery cable-to-solenoid nut (1).
7. Remove the solenoid wire (1) from the solenoid stud.
8. Remove the starter motor.

INSTALLATION

3.6L

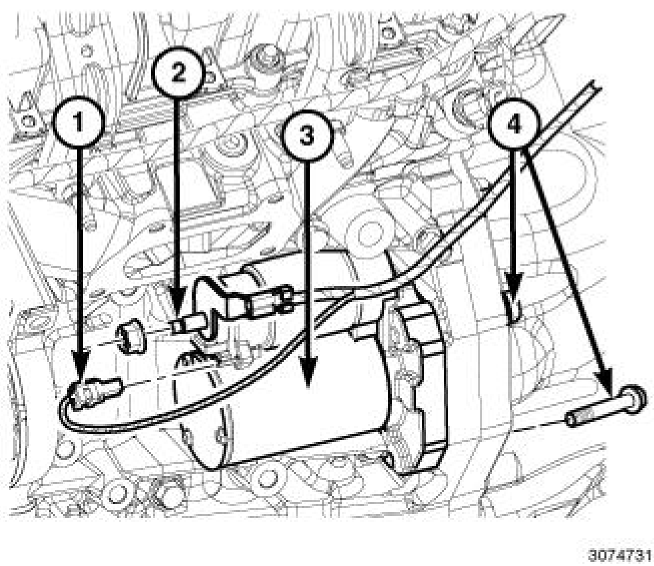

Fig. 21: Starter Solenoid Electrical Connector, Solenoid Stud, Starter Mounting Bolts & Starter Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Position the starter (3) inside the transmission.

2. Install the starter mounting bolts (4) and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Connect the starter solenoid electrical connector (1) to starter solenoid terminal.
4. Install the battery cable and nut to the solenoid stud (2). Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
5. Install the starter solenoid heat shield. Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

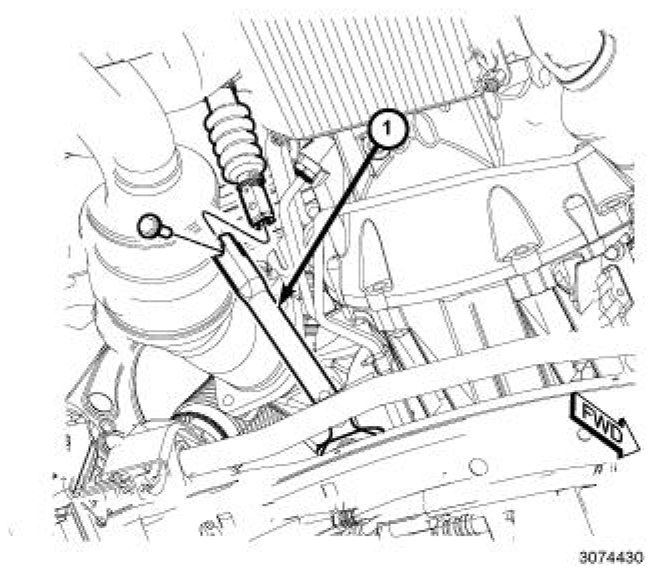

Fig. 22: Steering Gear Intermediate Shaft
Courtesy of CHRYSLER GROUP, LLC

6. Install the steering gear lower intermediate shaft (1). Refer to **SHAFT, INTERMEDIATE, LOWER, INSTALLATION** .
7. Remove the steering wheel holder.
8. Connect the negative battery cable and tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

5.7L / 6.4L WITH AUTO TRANS

1. Position the starter into transmission but do not install bolts.

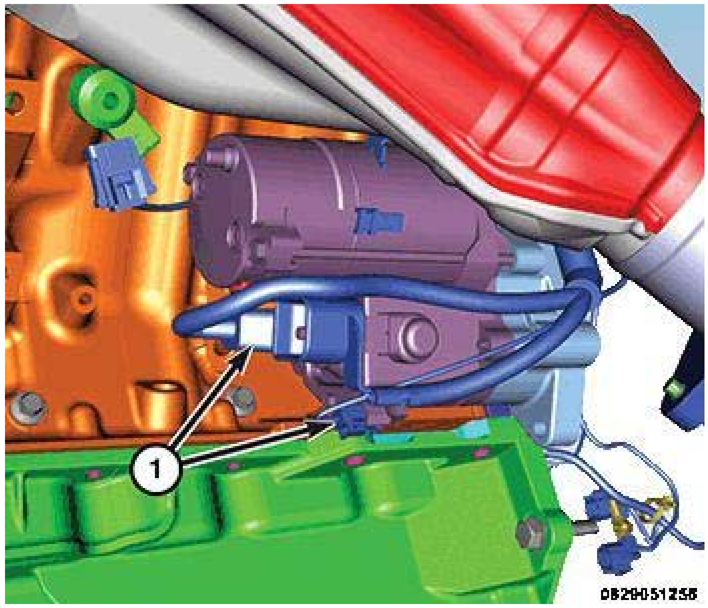

Fig. 23: Starter Connections
Courtesy of CHRYSLER GROUP, LLC

2. Connect the solenoid harness connector (1) to starter motor (snaps on). Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Position the battery cable (1) to solenoid stud. Install and tighten the battery cable eyelet nut to the proper torque specification. Refer to **SPECIFICATIONS**. Do not allow the starter motor to hang from wire harness.

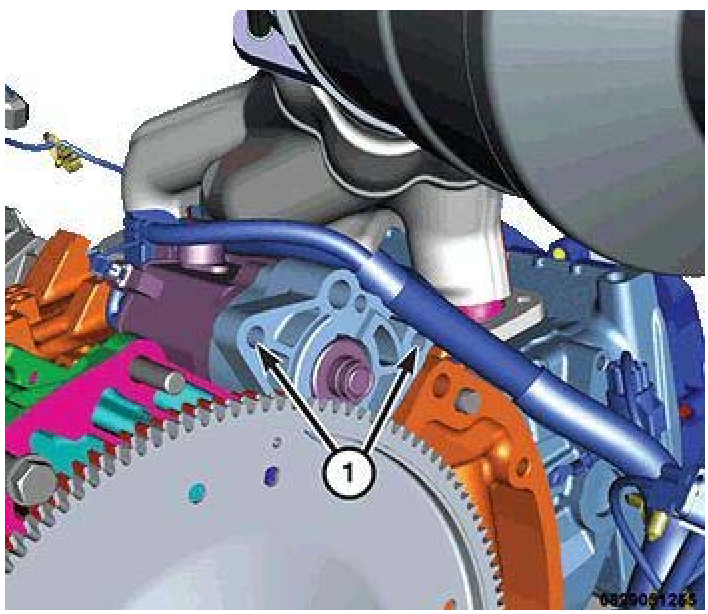

Fig. 24: Starter Mount To Transmission Bell Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install and tighten two mounting bolts (1). Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
5. Install the starter heat shield (if equipped). Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

Fig. 25: Electric Power Steering Harness Connector
Courtesy of CHRYSLER GROUP, LLC

6. Connect the electronic power steering connector (1).
7. Connect the negative battery cable. Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

5.7L / 6.4L WITH MAN TRANS

1. Position the starter into the transmission but do not install bolts.

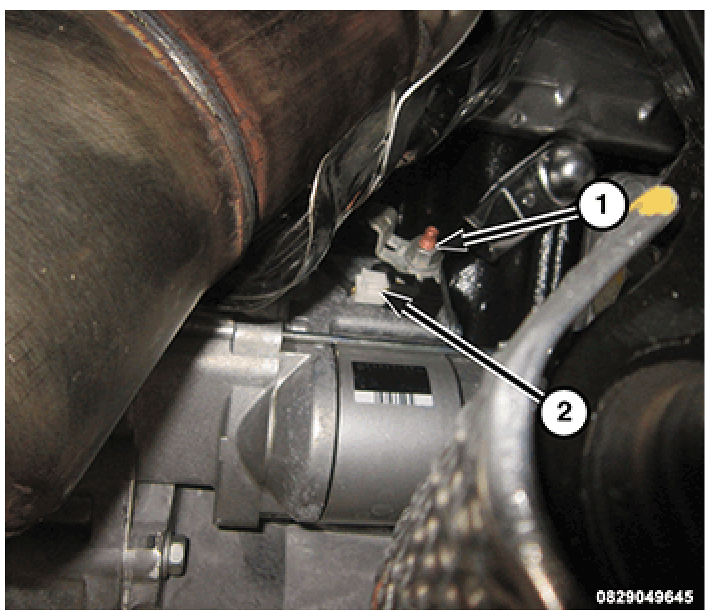

Fig. 26: Battery Cable-To-Solenoid Nut & Solenoid Stud
Courtesy of CHRYSLER GROUP, LLC

2. Connect the solenoid wire (2) to the starter motor (snaps on). Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
3. Position the battery cable to the solenoid stud (1). Install the battery cable eyelet nut.

Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

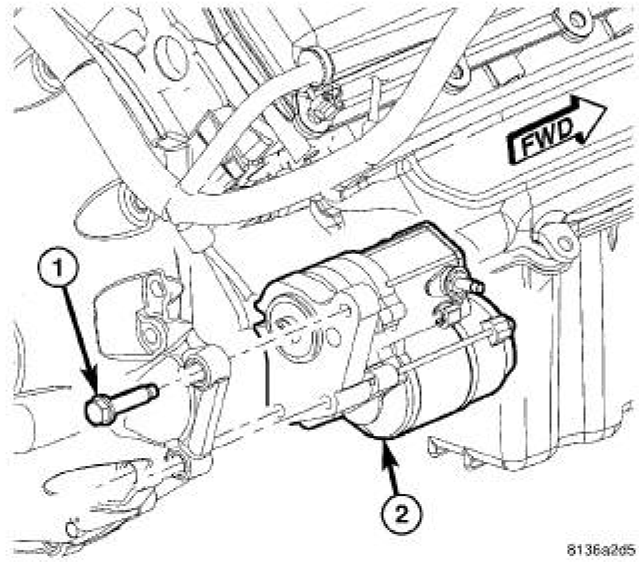

Fig. 27: Starter Mounting Bolt & Starter Motor
Courtesy of CHRYSLER GROUP, LLC

4. Install the three mounting bolts (1).

   Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

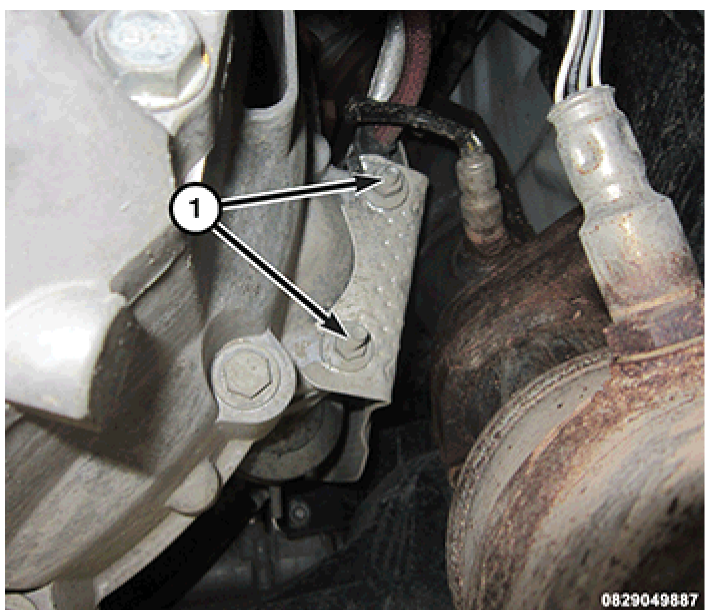

Fig. 28: Heat Shield Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Position the heat shield and install the two shield mounting nuts (1). Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
6. Connect the negative battery cable. Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

6.2L

1. Position the starter into the transmission but do not install bolts.
2. Connect the solenoid wire to the starter motor (snaps on).
3. Position the battery cable to the solenoid stud. Install the battery cable eyelet nut.

   Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

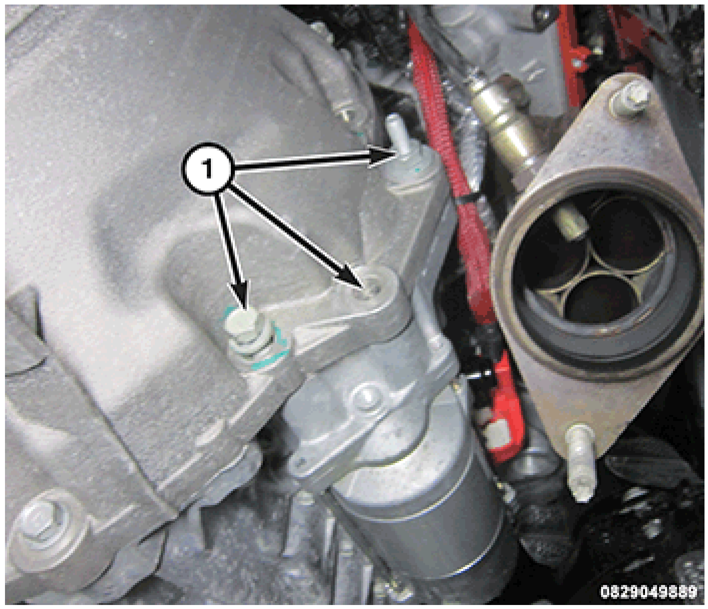

Fig. 29: Starter Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the three mounting bolts (1).

   Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

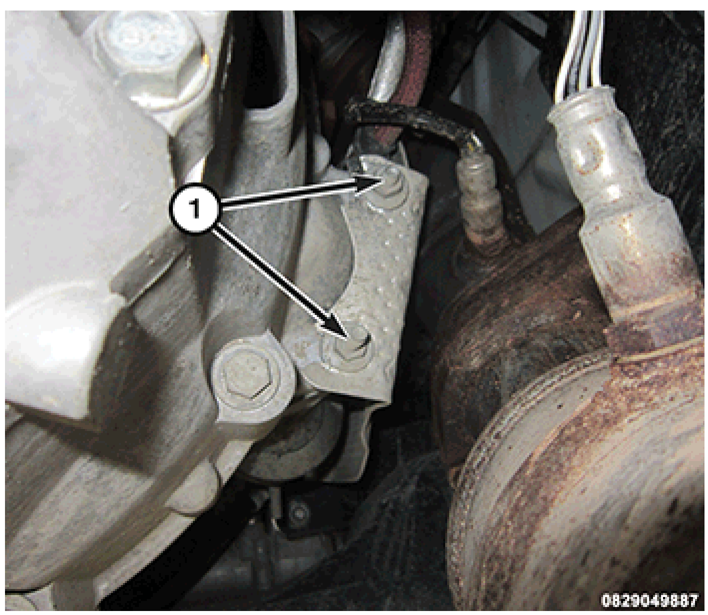

Fig. 30: Heat Shield Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Position the heat shield and install the two shield mounting nuts (1). Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.
6. Connect the negative battery cable. Tighten to the proper torque specification. Refer to **SPECIFICATIONS**.

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Article GUID: A00735927

2015-16 GENERAL INFORMATION

Steering Column Control Module (SCCM) - Dodge Challenger

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
B1D9C-00	STEERING COLUMN TILT SWITCH
B1D9C-2A	STEERING COLUMN TILT SWITCH - STUCK
B2225-00	(SCM) STEERING COLUMN MODULE INTERNAL
B2306-2A	FRONT WASHER SWITCH - STUCK
B23A1-2A	FLASH TO PASS/OPTICAL HORN SWITCH - STUCK
C1240-76	STEERING ANGLE SENSOR ANGLE OVERTRAVEL PERFORMANCE - WRONG MOUNTING POSITION
C2129-16	BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C2129-17	BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C212A-16	SYSTEM VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD
C212A-17	SYSTEM VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD
C2205-00	STEERING ANGLE SENSOR INTERNAL
C2205-29	STEERING ANGLE SENSOR INTERNAL - SIGNAL INVALID
C2205-2F	STEERING ANGLE SENSOR INTERNAL - SIGNAL ERRATIC
C2205-41	STEERING ANGLE SENSOR INTERNAL - GENERAL CHECKSUM FAILURE
C2205-96	STEERING ANGLE SENSOR INTERNAL - COMPONENT INTERNAL FAILURE
P0815-2A	UPSHIFT SWITCH - STUCK
P0816-2A	DOWNSHIFT SWITCH - STUCK
P0826-11	UP/DOWN SHIFT SWITCH - CIRCUIT SHORT TO GROUND
P0826-13	UP/DOWN SHIFT SWITCH - CIRCUIT OPEN
P0826-15	UP/DOWN SHIFT SWITCH - CIRCUIT SHORT TO BATTERY OR OPEN
U0002-00	CAN C BUS OFF PERFORMANCE
U0100-00	LOST COMMUNICATION WITH ECM/PCM
U0140-00	LOST COMMUNICATION WITH BODY CONTROL MODULE
U0155-00	LOST COMMUNICATION WITH CLUSTER-CCN
U0401-00	IMPLAUSIBLE DATA RECIEVED FROM ECM/PCM
U0422-00	IMPLAUSIBLE DATA RECIEVED FROM THE BODY CONTROL MODULE
U0423-00	IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN
U1008-00	LIN 1 BUS
U121E-00	LOST COMMUNICATION WITH STEERING WHEEL CRUISE CONTROL SWITCH

DTC TROUBLESHOOTING

B1D9C-00-STEERING COLUMN TILT SWITCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- The ignition is on.
- The Battery voltage is between 7 and 17 volts.

SET CONDITION

- The Steering Column Control Module (SCCM) detects a Steering Column Power Tilt and Telescope Switch failure for greater than 50 milliseconds.

DEFAULT ACTION

- The Tilt and Telescope Switches will be inactive.

POSSIBLE CAUSES

Possible Causes
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read SCCM DTCs.

    Did the DTC return?

    Yes

    - Go to 2

    No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK RELATED HARNESS CONNECTIONS**
   1. Disconnect all SCCM Module harness connectors.
   2. Disconnect all related in-line harness connections (if equipped).
   3. Disconnect the related component harness connectors.
   4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
      - Proper connector installation.
      - Damaged connector locks.
      - Corrosion.
      - Other signs of water intrusion.
      - Weather seal damage (if equipped).
      - Bent terminals.
      - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
      - Terminals that have been pushed back into the connector cavity.
      - Perform a terminal drag test on each connector terminal to verify proper terminal tension.

      Repair any conditions that are found.
   5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
   6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
   7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
   8. With the scan tool, erase DTCs.
   9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
   10. With the scan tool, read SCCM Module DTCs.

       Did the DTC return?

       Yes

       - Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
- Test complete.

B1D9C-2A-STEERING COLUMN TILT SWITCH - STUCK

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- The ignition is on.
- The Battery voltage is between 7 and 17 volts.

SET CONDITION

- The Steering Column Control Module (SCCM) detects the Steering Column Power Tilt and Telescope Switch has been active for greater than 50 seconds.

DEFAULT ACTION

- The Tilt and Telescope Switches will be inactive.

POSSIBLE CAUSES

Possible Causes
STEERING COLUMN TILT SWITCH STUCK
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read SCCM DTCs.

    Did the DTC return?

Yes

- Check the Steering Column Tilt Switch for any debris that could cause a sticking or stuck switch. If no problem is found, refer to 2.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK RELATED HARNESS CONNECTIONS**
    1. Disconnect all SCCM Module harness connectors.
    2. Disconnect all related in-line harness connections (if equipped).
    3. Disconnect the related component harness connectors.
    4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
        - Proper connector installation.
        - Damaged connector locks.
        - Corrosion.
        - Other signs of water intrusion.
        - Weather seal damage (if equipped).
        - Bent terminals.
        - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
        - Terminals that have been pushed back into the connector cavity.
        - Perform a terminal drag test on each connector terminal to verify proper terminal tension.

       Repair any conditions that are found.
    5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
    6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
    7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
    8. With the scan tool, erase DTCs.
    9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    10. With the scan tool, read SCCM Module DTCs.

Did the DTC return?

Yes

- Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
- Test complete.

B2225-00-(SCM) STEERING COLUMN MODULE INTERNAL

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- The ignition is on.
- The Battery voltage is between 7 and 17 volts.

SET CONDITION

- The Steering Column Control Module (SCCM) detects a Steering Angle Sensor (SAS) failure.

POSSIBLE CAUSES

Possible Causes
LOW BATTERY VOLTAGE
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR CHARGING OR VOLTAGE RELATED DTC(S)**
    1. With the scan tool, read PCM DTCs and record on the repair order.

       Are there any charging system or battery voltage related DTCs present?

       Yes

       - Repair the Powertrain Control Module (PCM) DTCs before continuing with this test. Refer

to **DTC INDEX** .

-

No

- Go To 2

2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read SCCM DTCs.

    Did the DTC return?

    Yes

    - Go to 3

    No

    - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
3. **CHECK RELATED HARNESS CONNECTIONS**
    1. Disconnect all SCCM Module harness connectors.
    2. Disconnect all related in-line harness connections (if equipped).
    3. Disconnect the related component harness connectors.
    4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
        - Proper connector installation.
        - Damaged connector locks.
        - Corrosion.
        - Other signs of water intrusion.
        - Weather seal damage (if equipped).
        - Bent terminals.
        - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
        - Terminals that have been pushed back into the connector cavity.

- Perform a terminal drag test on each connector terminal to verify proper terminal tension.

Repair any conditions that are found.

5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
8. With the scan tool, erase DTCs.
9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
10. With the scan tool, read SCCM Module DTCs.

Did the DTC return?

Yes

- Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
- Test complete.

B2306-2A-FRONT WASHER SWITCH - STUCK

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

The Right Hand (RH) Multifunction Switch provides a Front Wiper Washer Switch signal to the Steering Column Control Module (SCCM). The SCCM sends the Front Wiper Washer Switch signal to the Body Control Module (BCM) through the LIN 3 Bus circuit. When the BCM receives the Front Wiper Washer Switch signal from the SCCM, the BCM activates the Front Wiper Washer Pump.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- The ignition is on.

SET CONDITION

- The Steering Column Control Module (SCCM) detects the Washer Switch has been active for greater than 20 seconds.
- Battery voltage is between 7 and 17 volts.

DEFAULT ACTION

- The Washer Switch will be inactive.

POSSIBLE CAUSES

Possible Causes
FRONT WASHER SWITCH STUCK
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read SCCM DTCs.

       Did the DTC return?

       Yes

       - Go to 2

       No

       - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **CHECK RELATED HARNESS CONNECTIONS**
    1. Disconnect all SCCM Module harness connectors.
    2. Disconnect all related in-line harness connections (if equipped).
    3. Disconnect the related component harness connectors.
    4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
        - Proper connector installation.

- Damaged connector locks.
- Corrosion.
- Other signs of water intrusion.
- Weather seal damage (if equipped).
- Bent terminals.
- Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
- Terminals that have been pushed back into the connector cavity.
- Perform a terminal drag test on each connector terminal to verify proper terminal tension.

Repair any conditions that are found.

5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
8. With the scan tool, erase DTCs.
9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
10. With the scan tool, read SCCM Module DTCs.

Did the DTC return?

Yes

- Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
- Test complete.

B23A1-2A-FLASH TO PASS/OPTICAL HORN SWITCH - STUCK

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

The LH Multifunction Switch provides Flash to Pass/Optical Horn Switch signals to the Steering Column Control Module (SCCM). The SCCM sends the requested signal to the Body Control Module (BCM) through the LIN 3 Bus circuit.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- The ignition is on.
- The Battery voltage is between 7 and 17 volts.

SET CONDITION

- The Steering Column Control Module (SCCM) detects the Flash To Pass/Optical Horn Switch has been active for greater than 20 seconds.

DEFAULT ACTION

- The Flash To Pass/Optical Horn Switch will be inactive.

POSSIBLE CAUSES

Possible Causes
STEERING COLUMN CONTROL MODULE (SCCM)
FLASH TO PASS/OPTICAL HORN SWITCH STUCK

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read SCCM DTCs.

    Did the DTC return?

    Yes

    - Go to 2

    No

    - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK RELATED HARNESS CONNECTIONS**
   1. Disconnect all SCCM Module harness connectors.
   2. Disconnect all related in-line harness connections (if equipped).
   3. Disconnect the related component harness connectors.
   4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
      - Proper connector installation.
      - Damaged connector locks.
      - Corrosion.
      - Other signs of water intrusion.
      - Weather seal damage (if equipped).
      - Bent terminals.
      - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
      - Terminals that have been pushed back into the connector cavity.
      - Perform a terminal drag test on each connector terminal to verify proper terminal tension.

      Repair any conditions that are found.
   5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
   6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
   7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
   8. With the scan tool, erase DTCs.
   9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
   10. With the scan tool, read SCCM Module DTCs.

      Did the DTC return?

      Yes

      - Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
      - Test complete.

C1240-76-STEERING ANGLE SENSOR ANGLE OVERTRAVEL PERFORMANCE - WRONG MOUNTING POSITION

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

The Steering Angle Sensor (SAS) for this vehicle is integral to the Steering Column Control Module (SCCM).

WHEN MONITORED

- This diagnostic runs continuously when the ignition is on.

SET CONDITION

- The Steering Column Control Module (SCCM) detects an incorrect installation of the Steering Angle Sensor (SAS).

DEFAULT ACTION

- The SAS will be inactive.

POSSIBLE CAUSES

Possible Causes
INCORRECT STEERING ANGLE SENSOR (SAS) INSTALLATION
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**

NOTE: **If steering system service has been performed and the Steering Angle Sensor (SAS) has been installed incorrectly, this DTC may set. Refer to the Service Information to verify repairs have been performed correctly.**

1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
2. Record the Environmental Data and any DTCs.
3. With the scan tool, erase DTCs.
4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
5. With the scan tool, read SCCM DTCs.

   Did the DTC return?

Yes

- Go to 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK RELATED HARNESS CONNECTIONS**
    1. Disconnect all SCCM Module harness connectors.
    2. Disconnect all related in-line harness connections (if equipped).
    3. Disconnect the related component harness connectors.
    4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
        - Proper connector installation.
        - Damaged connector locks.
        - Corrosion.
        - Other signs of water intrusion.
        - Weather seal damage (if equipped).
        - Bent terminals.
        - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
        - Terminals that have been pushed back into the connector cavity.
        - Perform a terminal drag test on each connector terminal to verify proper terminal tension.

        Repair any conditions that are found.
    5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
    6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
    7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
    8. With the scan tool, erase DTCs.
    9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    10. With the scan tool, read SCCM Module DTCs.

        Did the DTC return?

        Yes

- Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
- Test complete.

C2129-16-BATTERY VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

WHEN MONITORED

- This diagnostic runs continuously when the ignition is on.

SET CONDITION

- The Steering Column Control Module (SCCM) detects the voltage is below 10 volts for greater than 15 seconds.

DEFAULT ACTION

- All switch outputs will be inactive.

POSSIBLE CAUSES

Possible Causes
CHARGING OR VOLTAGE DTCS PRESENT
LOW BATTERY VOLTAGE
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR CHARGING OR VOLTAGE RELATED DTC(S) PRESENT IN OTHER MODULES**
    1. With the scan tool, read the PCM DTCs and record on the repair order.

       Are there any charging system or battery voltage related DTCs present?

       Yes

       - Repair the Powertrain Control Module (PCM) DTCs before continuing with this test. Refer

to **DTC INDEX** .

-

No

- Go To 2

2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read SCCM DTCs.

    Did the DTC return?

    Yes

    - Go to 3

    No

    - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
3. **CHECK RELATED HARNESS CONNECTIONS**
    1. Disconnect all SCCM Module harness connectors.
    2. Disconnect all related in-line harness connections (if equipped).
    3. Disconnect the related component harness connectors.
    4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
        - Proper connector installation.
        - Damaged connector locks.
        - Corrosion.
        - Other signs of water intrusion.
        - Weather seal damage (if equipped).
        - Bent terminals.
        - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
        - Terminals that have been pushed back into the connector cavity.

- Perform a terminal drag test on each connector terminal to verify proper terminal tension.

Repair any conditions that are found.

5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
8. With the scan tool, erase DTCs.
9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
10. With the scan tool, read SCCM Module DTCs.

Did the DTC return?

Yes

- Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
- Test complete.

C2129-17-BATTERY VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

WHEN MONITORED

- This diagnostic runs continuously when the Engine is on.

SET CONDITION

- The Steering Column Control Module (SCCM) detects the voltage is above 16 volts for greater than 15 seconds.

DEFAULT ACTION

- All switch outputs will be inactive.

POSSIBLE CAUSES

Possible Causes
CHARGING OR VOLTAGE DTCS PRESENT
HIGH BATTERY VOLTAGE
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR CHARGING OR VOLTAGE RELATED DTC(S) PRESENT IN OTHER MODULES**
    1. Start the Engine.
    2. With the scan tool, read the PCM DTCs and record on the repair order.

       Are there any charging system or battery voltage related DTCs present?

       Yes

       - Repair the Powertrain Control Module (PCM) DTCs before continuing with this test. Refer to **DTC INDEX** .
       -

       No

       - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read SCCM DTCs.

       Did the DTC return?

       Yes

       - Go to 3

       No

       - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

3. **CHECK RELATED HARNESS CONNECTIONS**
    1. Disconnect all SCCM Module harness connectors.
    2. Disconnect all related in-line harness connections (if equipped).
    3. Disconnect the related component harness connectors.
    4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
        - Proper connector installation.
        - Damaged connector locks.
        - Corrosion.
        - Other signs of water intrusion.
        - Weather seal damage (if equipped).
        - Bent terminals.
        - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
        - Terminals that have been pushed back into the connector cavity.
        - Perform a terminal drag test on each connector terminal to verify proper terminal tension.

        Repair any conditions that are found.
    5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
    6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
    7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
    8. With the scan tool, erase DTCs.
    9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    10. With the scan tool, read SCCM Module DTCs.

        Did the DTC return?

        Yes

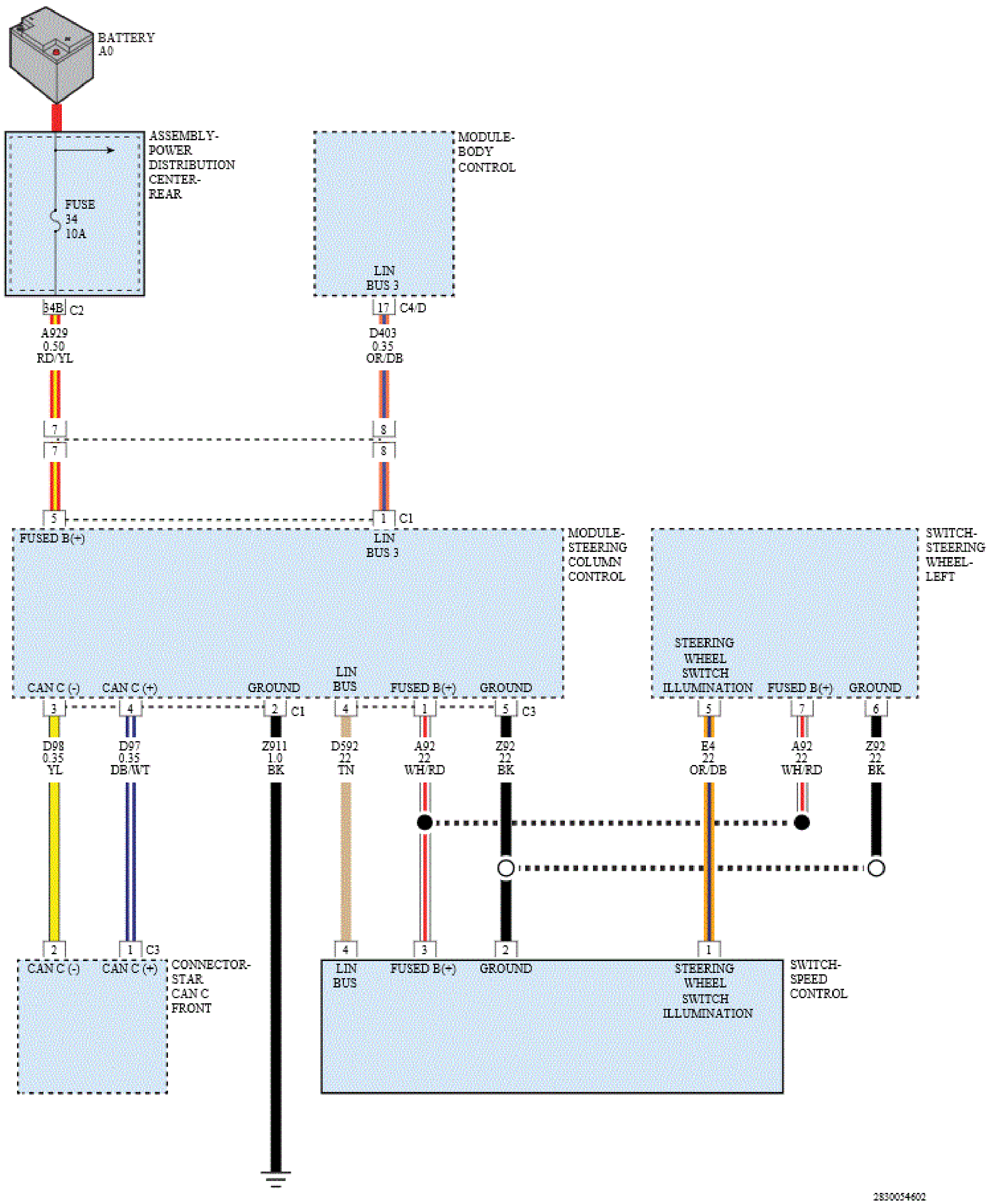
        - Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
        - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

        No

        - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
        - Test complete.

C212A-16-SYSTEM VOLTAGE - CIRCUIT VOLTAGE BELOW THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .



[Fig. 1: Steering Column Control Module Circuit Diagram]
Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate

modules.

WHEN MONITORED

- This diagnostic runs continuously when the ignition is on.

SET CONDITION

- The Steering Column Control Module (SCCM) internal power supply is below 10 volts for more than 15 seconds.

DEFAULT ACTION

- All switch outputs will be inactive.

POSSIBLE CAUSES

Possible Causes
CHARGING OR VOLTAGE DTCS PRESENT
LOW BATTERY VOLTAGE
FUSED B(+) CIRCUIT OPEN OR EXCESSIVE RESISTANCE
GROUND CIRCUIT OPEN OR EXCESSIVE RESISTANCE
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR RELATED DTC(S) PRESENT IN PCM**
    1. With the scan tool, read the Powertrain Control Module (PCM) DTCs and record on the repair order.

       Are there any charging system or related battery voltage DTCs present?

       Yes

       - Perform the appropriate Charging System DTC diagnostic procedures before continuing with this test. Refer to **DTC INDEX** .

       No

       - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read SCCM DTCs.

Did the DTC return?

Yes

- Go To 3

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

3. **CHECK THE (A929) FUSED B(+) CIRCUIT FOR VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the Steering Control Module C1 harness connector.
    3. Turn the ignition on.
    4. Measure the voltage of the (A929) Fused B(+) circuit.

    Is voltage above 10 volts?

    Yes

    - Go To 4

    No

    - Repair the (A929) Fused B(+) circuit for an open.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
4. **CHECK THE CONTINUITY OF THE (Z912) GROUND CIRCUIT**
    1. Turn the ignition off.
    2. Check for continuity between ground and the (Z912) Ground circuit at the Steering Control Module C1 harness connector.

    Is there continuity between ground and the (Z912) Ground circuit?

    Yes

    - Go to 5

    No

    - Repair the (Z912) Ground circuit for an open.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
5. **CHECK RELATED HARNESS CONNECTIONS**
    1. Disconnect all SCCM Module harness connectors.
    2. Disconnect all related in-line harness connections (if equipped).

3. Disconnect the related component harness connectors.
4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
    - Proper connector installation.
    - Damaged connector locks.
    - Corrosion.
    - Other signs of water intrusion.
    - Weather seal damage (if equipped).
    - Bent terminals.
    - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
    - Terminals that have been pushed back into the connector cavity.
    - Perform a terminal drag test on each connector terminal to verify proper terminal tension.

    Repair any conditions that are found.

5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
8. With the scan tool, erase DTCs.
9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
10. With the scan tool, read SCCM Module DTCs.

    Did the DTC return?

    Yes

    - Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
    - Test complete.

C212A-17-SYSTEM VOLTAGE - CIRCUIT VOLTAGE ABOVE THRESHOLD

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

WHEN MONITORED

- This diagnostic runs continuously when the Engine is on.

SET CONDITION

- The Steering Column Control Module (SCCM) internal power supply is above 16 volts for more than 15 seconds.

DEFAULT ACTION

- All switch outputs will be inactive.

POSSIBLE CAUSES

Possible Causes
CHARGING OR VOLTAGE DTCS PRESENT
HIGH BATTERY VOLTAGE
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR CHARGING OR VOLTAGE RELATED DTC(S) PRESENT IN OTHER MODULES**
    1. Start the Engine.
    2. With the scan tool, read the PCM DTCs and record on the repair order.

       Are there any charging system or battery voltage related DTCs present?

       Yes

       - Repair the Powertrain Control Module (PCM) DTCs before continuing with this test. Refer to **DTC INDEX** .

       No

       - Go To 2
2. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.

5. With the scan tool, read SCCM DTCs.

   Did the DTC return?

   Yes

   - Go to 3

   No

   - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

3. **CHECK RELATED HARNESS CONNECTIONS**
   1. Disconnect all SCCM Module harness connectors.
   2. Disconnect all related in-line harness connections (if equipped).
   3. Disconnect the related component harness connectors.
   4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
      - Proper connector installation.
      - Damaged connector locks.
      - Corrosion.
      - Other signs of water intrusion.
      - Weather seal damage (if equipped).
      - Bent terminals.
      - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
      - Terminals that have been pushed back into the connector cavity.
      - Perform a terminal drag test on each connector terminal to verify proper terminal tension.

      Repair any conditions that are found.

   5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
   6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
   7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
   8. With the scan tool, erase DTCs.
   9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
   10. With the scan tool, read SCCM Module DTCs.

Did the DTC return?

Yes

- Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
- Test complete.

C2205-00-STEERING ANGLE SENSOR INTERNAL

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

The Steering Angle Sensor (SAS) for this vehicle is integral to the Steering Column Control Module (SCCM).

WHEN MONITORED

- This diagnostic runs continuously when the ignition is on.

SET CONDITION

- The Steering Column Control Module (SCCM) detects the Steering Angle Sensor (SAS) has set an internal failure.

DEFAULT ACTION

- The SAS will be inactive.

POSSIBLE CAUSES

Possible Causes
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.

4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
5. With the scan tool, read SCCM DTCs.

   Did the DTC return?

   Yes

   - Go to 2

   No

   - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK RELATED HARNESS CONNECTIONS**
   1. Disconnect all SCCM Module harness connectors.
   2. Disconnect all related in-line harness connections (if equipped).
   3. Disconnect the related component harness connectors.
   4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
      - Proper connector installation.
      - Damaged connector locks.
      - Corrosion.
      - Other signs of water intrusion.
      - Weather seal damage (if equipped).
      - Bent terminals.
      - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
      - Terminals that have been pushed back into the connector cavity.
      - Perform a terminal drag test on each connector terminal to verify proper terminal tension.

      Repair any conditions that are found.

   5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
   6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
   7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
   8. With the scan tool, erase DTCs.
   9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions

above, operate the vehicle in the conditions that set the DTC.

10. With the scan tool, read SCCM Module DTCs.

    Did the DTC return?

    Yes

    - Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
    - Test complete.

C2205-29-STEERING ANGLE SENSOR INTERNAL - SIGNAL INVALID

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

The Steering Angle Sensor (SAS) for this vehicle is integral to the Steering Column Control Module (SCCM).

WHEN MONITORED

- This diagnostic runs continuously when the ignition is on.

SET CONDITION

- The Steering Column Control Module (SCCM) detects the Steering Angle Sensor (SAS) has set an internal failure.

DEFAULT ACTION

- The SAS will be inactive.

POSSIBLE CAUSES

Possible Causes
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair

order.

2. Record the Environmental Data and any DTCs.
3. With the scan tool, erase DTCs.
4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
5. With the scan tool, read SCCM DTCs.

   Did the DTC return?

   Yes

   - Go to 2

   No

   - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK RELATED HARNESS CONNECTIONS**
   1. Disconnect all SCCM Module harness connectors.
   2. Disconnect all related in-line harness connections (if equipped).
   3. Disconnect the related component harness connectors.
   4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
      - Proper connector installation.
      - Damaged connector locks.
      - Corrosion.
      - Other signs of water intrusion.
      - Weather seal damage (if equipped).
      - Bent terminals.
      - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
      - Terminals that have been pushed back into the connector cavity.
      - Perform a terminal drag test on each connector terminal to verify proper terminal tension.

      Repair any conditions that are found.

   5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
   6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
   7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated

and the connector locks are fully engaged.

8. With the scan tool, erase DTCs.
9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
10. With the scan tool, read SCCM Module DTCs.

Did the DTC return?

Yes

- Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
- Test complete.

C2205-2F-STEERING ANGLE SENSOR INTERNAL - SIGNAL ERRATIC

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

The Steering Angle Sensor (SAS) for this vehicle is integral to the Steering Column Control Module (SCCM).

WHEN MONITORED

- This diagnostic runs continuously when the ignition is on.

SET CONDITION

- The Steering Column Control Module (SCCM) detects the Steering Angle Sensor (SAS) has set an internal failure.

DEFAULT ACTION

- The SAS will be inactive.

POSSIBLE CAUSES

Possible Causes
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read SCCM DTCs.

    Did the DTC return?

    Yes

    - Go to 2

    No

    - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **CHECK RELATED HARNESS CONNECTIONS**
    1. Disconnect all SCCM Module harness connectors.
    2. Disconnect all related in-line harness connections (if equipped).
    3. Disconnect the related component harness connectors.
    4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
        - Proper connector installation.
        - Damaged connector locks.
        - Corrosion.
        - Other signs of water intrusion.
        - Weather seal damage (if equipped).
        - Bent terminals.
        - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
        - Terminals that have been pushed back into the connector cavity.
        - Perform a terminal drag test on each connector terminal to verify proper terminal tension.

        Repair any conditions that are found.
    5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
    6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully

seated and the connector locks are fully engaged.

7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
8. With the scan tool, erase DTCs.
9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
10. With the scan tool, read SCCM Module DTCs.

Did the DTC return?

Yes

- Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
- Test complete.

C2205-41-STEERING ANGLE SENSOR INTERNAL - GENERAL CHECKSUM FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

The Steering Angle Sensor (SAS) for this vehicle is integral to the Steering Column Control Module (SCCM).

WHEN MONITORED

- This diagnostic runs continuously when the ignition is on.

SET CONDITION

- The Steering Column Control Module (SCCM) detects the Steering Angle Sensor (SAS) has set an internal failure.

DEFAULT ACTION

- The SAS will be inactive.

POSSIBLE CAUSES

Possible Causes

Possible Causes
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read SCCM DTCs.

    Did the DTC return?

    Yes

    - Go to 2

    No

    - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **CHECK RELATED HARNESS CONNECTIONS**
    1. Disconnect all SCCM Module harness connectors.
    2. Disconnect all related in-line harness connections (if equipped).
    3. Disconnect the related component harness connectors.
    4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
        - Proper connector installation.
        - Damaged connector locks.
        - Corrosion.
        - Other signs of water intrusion.
        - Weather seal damage (if equipped).
        - Bent terminals.
        - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
        - Terminals that have been pushed back into the connector cavity.
        - Perform a terminal drag test on each connector terminal to verify proper terminal tension.

Repair any conditions that are found.

5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
8. With the scan tool, erase DTCs.
9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
10. With the scan tool, read SCCM Module DTCs.

    Did the DTC return?

    Yes

    - Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
    - Test complete.

C2205-96-STEERING ANGLE SENSOR INTERNAL - COMPONENT INTERNAL FAILURE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

The Steering Angle Sensor (SAS) for this vehicle is integral to the Steering Column Control Module (SCCM).

WHEN MONITORED

- This diagnostic runs continuously when the ignition is on.

SET CONDITION

- The Steering Column Control Module (SCCM) detects the Steering Angle Sensor (SAS) has set an internal failure.

DEFAULT ACTION

- The SAS will be inactive.

POSSIBLE CAUSES

Possible Causes
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read Steering Column Control Module (SCCM) DTCs and record on the repair order.
    2. Record the Environmental Data and any DTCs.
    3. With the scan tool, erase DTCs.
    4. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
    5. With the scan tool, read SCCM DTCs.

        Did the DTC return?

        Yes

        - Go to 2

        No

        - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
        - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **CHECK RELATED HARNESS CONNECTIONS**
    1. Disconnect all SCCM Module harness connectors.
    2. Disconnect all related in-line harness connections (if equipped).
    3. Disconnect the related component harness connectors.
    4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
        - Proper connector installation.
        - Damaged connector locks.
        - Corrosion.
        - Other signs of water intrusion.
        - Weather seal damage (if equipped).
        - Bent terminals.
        - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).

- Terminals that have been pushed back into the connector cavity.
- Perform a terminal drag test on each connector terminal to verify proper terminal tension.

Repair any conditions that are found.

5. Reconnect all SCCM Module harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
8. With the scan tool, erase DTCs.
9. Using the recorded Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
10. With the scan tool, read SCCM Module DTCs.

Did the DTC return?

Yes

- Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
- Test complete.

P0815-2A-UPSHIFT SWITCH - STUCK

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Paddle Shifters are integral to the Remote Radio Switches. The Paddle Shifters in the two remote radio switch units are normally open MUX switches that are hard wired to the Right Steering Wheel Switch (Speed Control Switch). The right steering wheel switch (speed control switch) provides a five volt signal and return circuit to the switches. Both switches share the signal and return circuits. The Right Steering Wheel Switch senses the status of the switches by reading the voltage drop of the signal circuit.

When the Right Steering Wheel Switch senses an input (voltage drop) from any one of the Paddle Shifters, it communicates the switch status message to the Steering Column Control Module (SCCM) through the LIN Bus (through the Clockspring). The SCCM then broadcasts the switch status information over the CAN Bus to the Transmission Control Module (TCM) communicating the request for Transmission upshift or downshift.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- The ignition is on.
- The Battery voltage is between 7 and 17 volts.

SET CONDITION

- The Steering Column Control Module (SCCM) detects the Upshift Paddle Shift Switch has been active for greater than 20 seconds.

DEFAULT ACTION

- The Upshift Paddle Shift Switch will be inactive.

POSSIBLE CAUSES

Possible Causes
UPSHIFT PADDLE SHIFT SWITCH STUCK
UPSHIFT PADDLE SHIFT SWITCH

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read the Steering Column Control Module (SCCM) DTCs and record on the repair order.

       Is the DTC active?

       Yes

       - Go To 2

       No

       - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **CHECK THE UPSHIFT PADDLE SHIFT SWITCH**
    1. With the scan tool, view the Upshift Paddle Shift Switch status.
    2. While monitoring the Upshift Paddle Shift Switch status, actuate the switch multiple times.

       Does the scan tool display the correct status of the switch in the data display?

       Yes

       - Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Verify all connections between the Downshift Paddle Shift Switch and the SCCM are properly made, properly seated and verify proper pin terminal tension. If no problems are found, replace the Upshift Paddle Shift Switch in accordance with the Service Information. Refer to **SWITCH, REMOTE RADIO, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

P0816-2A-DOWNSHIFT SWITCH - STUCK

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Paddle Shifters are integral to the Remote Radio Switches. The Paddle Shifters in the two remote radio switch units are normally open MUX switches that are hard wired to the Right Steering Wheel Switch (Speed Control Switch). The right steering wheel switch (speed control switch) provides a five volt signal and return circuit to the switches. Both switches share the signal and return circuits. The Right Steering Wheel Switch senses the status of the switches by reading the voltage drop of the signal circuit.

When the Right Steering Wheel Switch senses an input (voltage drop) from any one of the Paddle Shifters, it communicates the switch status message to the Steering Column Control Module (SCCM) through the LIN Bus (through the Clockspring). The SCCM then broadcasts the switch status information over the CAN Bus to the Transmission Control Module (TCM) communicating the request for Transmission upshift or downshift.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- The ignition is on.
- The Battery voltage is between 7 and 17 volts.

SET CONDITION

- The Steering Column Control Module (SCCM) detects the Downshift Paddle Shift Switch has been active for greater than 20 seconds.

DEFAULT ACTION

- The Downshift Paddle Shift Switch will be inactive.

POSSIBLE CAUSES

Possible Causes
DOWNSHIFT PADDLE SHIFT SWITCH STUCK
DOWNSHIFT PADDLE SHIFT SWITCH

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read the Steering Column Control Module (SCCM) DTCs and record on the

repair order.

Is the DTC active?

Yes

- Go To 2

No

- The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

2. **CHECK THE DOWNSHIFT PADDLE SHIFT SWITCH**
    1. With the scan tool, view the Downshift Paddle Shift Switch status.
    2. While monitoring the Downshift Paddle Shift Switch status, actuate the switch multiple times.

    Does the scan tool display the correct status of the switch in the data display?

    Yes

    - Replace the Steering Column Control Module (SCCM) in accordance with the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Verify all connections between the Downshift Paddle Shift Switch and the SCCM are properly made, properly seated and verify proper pin terminal tension. If no problems are found, replace the Downshift Paddle Shift Switch in accordance with the Service Information. Refer to **SWITCH, REMOTE RADIO, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

P0826-11-UP/DOWN SHIFT SWITCH - CIRCUIT SHORT TO GROUND

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Paddle Shifters are integral to the Remote Radio Switches. The Paddle Shifters in the two remote radio switch units are normally open MUX switches that are hard wired to the Right Steering Wheel Switch (Speed Control Switch). The right steering wheel switch (speed control switch) provides a five volt signal and return circuit to the switches. Both switches share the signal and return circuits. The Right Steering Wheel Switch senses the status of the switches by reading the voltage drop of the signal circuit.

When the Right Steering Wheel Switch senses an input (voltage drop) from any one of the Paddle Shifters, it communicates the switch status message to the Steering Column Control Module (SCCM) through the LIN Bus

(through the Clockspring). The SCCM then broadcasts the switch status information over the CAN Bus to the Transmission Control Module (TCM) communicating the request for Transmission upshift or downshift.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- The ignition is on.
- The Battery voltage is between 7 and 17 volts.

SET CONDITION

- The Steering Column Control Module (SCCM) detects one of the Paddle Shift Switch circuits is shorted to ground for greater than 40 milliseconds.

DEFAULT ACTION

- The Paddle Shift Switches will be inactive.

POSSIBLE CAUSES

Possible Causes
PADDLE SHIFT SWITCH SIGNAL CIRCUIT SHORTED TO GROUND
LEFT OR RIGHT PADDLE SHIFT SWITCHES
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read the Steering Column Control Module (SCCM) DTCs and record on the repair order.

       Is the DTC active?

       Yes

       - Go To 2

       No

       - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **CHECK THE WIRING HARNESS**
    1. Turn the ignition off.
    2. Disconnect the Upshift and Downshift Paddle Shift Switches.
    3. Visually and physically inspect the wiring harness between the Upshift and Downshift Paddle Shift

Switch harness connectors and the Steering Column Control Module (SCCM) harness connector for any damaged wires, connectors, and open/spread terminals.

Were any problems found?

Yes

- Repair as necessary.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Go To 3

3. **CHECK THE UPSHIFT PADDLE SHIFT SWITCH**
    1. Reconnect the Downshift Paddle Shift Switch.
    2. Turn the ignition on.
    3. With the scan tool, erase the SCCM DTCs.
    4. Cycle the ignition switch from off to on.
    5. With the scan tool, read the SCCM DTCs.

NOTE: **Other DTCs may set in the SCCM and the Radio. Disregard any other DTCs that may set.**

Did the DTC return?

Yes

- Go To 4

No

- Replace the Upshift Paddle Shift Switch in accordance with the Service Information. Refer to **SWITCH, REMOTE RADIO, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

4. **CHECK THE DOWNSHIFT PADDLE SHIFT SWITCH**
    1. Turn the ignition off.
    2. Reconnect the Upshift Paddle Shift Switch.
    3. Disconnect the Downshift Paddle Shift Switch.
    4. Turn the ignition on.
    5. With the scan tool, erase the SCCM DTCs.
    6. Cycle the ignition switch from off to on.
    7. With the scan tool, read the SCCM DTCs.

Did the DTC return?

Yes

- Replace the Steering Column Control Module (SCCM). Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Replace the Downshift Paddle Shift Switch in accordance with the Service Information. Refer to **SWITCH, REMOTE RADIO, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

P0826-13-UP/DOWN SHIFT SWITCH - CIRCUIT OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Paddle Shifters are integral to the Remote Radio Switches. The Paddle Shifters in the two remote radio switch units are normally open MUX switches that are hard wired to the Right Steering Wheel Switch (Speed Control Switch). The right steering wheel switch (speed control switch) provides a five volt signal and return circuit to the switches. Both switches share the signal and return circuits. The Right Steering Wheel Switch senses the status of the switches by reading the voltage drop of the signal circuit.

When the Right Steering Wheel Switch senses an input (voltage drop) from any one of the Paddle Shifters, it communicates the switch status message to the Steering Column Control Module (SCCM) through the LIN Bus (through the Clockspring). The SCCM then broadcasts the switch status information over the CAN Bus to the Transmission Control Module (TCM) communicating the request for Transmission upshift or downshift.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- The ignition is on.
- The Battery voltage is between 7 and 17 volts.

SET CONDITION

- The Steering Column Control Module (SCCM) detects one of the Paddle Shift Switch circuits is open for greater than 40 milliseconds.

DEFAULT ACTION

- The Paddle Shift Switches will be inactive.

POSSIBLE CAUSES

Possible Causes
PADDLE SHIFT SWITCH SIGNAL CIRCUIT OPEN
LEFT OR RIGHT PADDLE SHIFT SWITCH
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read the Steering Column Control Module (SCCM) DTCs and record on the repair order.

       Is the DTC active?

       Yes

       - Go To 2

       No

       - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **CHECK THE WIRING HARNESS**
    1. Turn the ignition off.
    2. Disconnect the Upshift and Downshift Paddle Shift Switches.
    3. Visually and physically inspect the wiring harness between the Upshift and Downshift Paddle Shift Switch harness connectors and the Steering Column Control Module (SCCM) harness connector for any damaged wires, connectors, and open/spread terminals.

       Were any problems found?

       Yes

       - Repair as necessary.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

       No

       - Go To 3
3. **CHECK THE UPSHIFT PADDLE SHIFT SWITCH**
    1. Reconnect the Downshift Paddle Shift Switch.
    2. Turn the ignition on.
    3. With the scan tool, erase the SCCM DTCs.
    4. Cycle the ignition switch from off to on.
    5. With the scan tool, read the SCCM DTCs.

       NOTE: **Other DTCs may set in the SCCM and the Radio. Disregard any other DTCs that may set.**

       Did the DTC return?

       Yes

- Go To 4

No

- Replace the Upshift Paddle Shift Switch in accordance with the Service Information. Refer to **SWITCH, REMOTE RADIO, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

4. **CHECK THE DOWNSHIFT PADDLE SHIFT SWITCH**
    1. Turn the ignition off.
    2. Reconnect the Upshift Paddle Shift Switch.
    3. Disconnect the Downshift Paddle Shift Switch.
    4. Turn the ignition on.
    5. With the scan tool, erase the SCCM DTCs.
    6. Cycle the ignition switch from off to on.
    7. With the scan tool, read the SCCM DTCs.

    Did the DTC return?

    Yes

    - Replace the Steering Column Control Module (SCCM). Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Replace the Downshift Paddle Shift Switch in accordance with the Service Information. Refer to **SWITCH, REMOTE RADIO, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

P0826-15-UP/DOWN SHIFT SWITCH - CIRCUIT SHORT TO BATTERY OR OPEN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

THEORY OF OPERATION

The Paddle Shifters are integral to the Remote Radio Switches. The Paddle Shifters in the two remote radio switch units are normally open MUX switches that are hard wired to the Right Steering Wheel Switch (Speed Control Switch). The right steering wheel switch (speed control switch) provides a five volt signal and return circuit to the switches. Both switches share the signal and return circuits. The Right Steering Wheel Switch senses the status of the switches by reading the voltage drop of the signal circuit.

When the Right Steering Wheel Switch senses an input (voltage drop) from any one of the Paddle Shifters, it communicates the switch status message to the Steering Column Control Module (SCCM) through the LIN Bus (through the Clockspring). The SCCM then broadcasts the switch status information over the CAN Bus to the Transmission Control Module (TCM) communicating the request for Transmission upshift or downshift.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- The ignition is on.
- The Battery voltage is between 7 and 17 volts.

SET CONDITION

- The Steering Column Control Module (SCCM) detects one of the Paddle Shift Switch circuits is shorted to battery or both Left & Right Paddle Shift Switches are open for greater than 40 milliseconds.

DEFAULT ACTION

- The Paddle Shift Switches will be inactive.

POSSIBLE CAUSES

Possible Causes
PADDLE SHIFT SWITCH SIGNAL CIRCUIT SHORTED TO VOLTAGE
PADDLE SHIFT SWITCH SIGNAL CIRCUIT OPEN
PADDLE SHIFT SWITCH
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
   1. With the scan tool, read the Steering Column Control Module (SCCM) DTCs and record on the repair order.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
      - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **CHECK THE WIRING HARNESS**
   1. Turn the ignition off.
   2. Disconnect the Upshift and Downshift Paddle Shift Switches.
   3. Visually and physically inspect the wiring harness between the Upshift and Downshift Paddle Shift Switch harness connectors and the Steering Column Control Module (SCCM) harness connector for any damaged wires, connectors, and open/spread terminals.

      Were any problems found?

Yes

- Repair as necessary.
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Go To 3

3. **CHECK THE UPSHIFT PADDLE SHIFT SWITCH**
    1. Reconnect the Downshift Paddle Shift Switch.
    2. Turn the ignition on.
    3. With the scan tool, erase the SCCM DTCs.
    4. Cycle the ignition switch from off to on.
    5. With the scan tool, read the SCCM DTCs.

    NOTE: **Other DTCs may set in the SCCM and the Radio. Disregard any other DTCs that may set.**

    Did the DTC return?

    Yes

    - Go To 4

    No

    - Replace the Upshift Paddle Shift Switch in accordance with the Service Information. Refer to **SWITCH, REMOTE RADIO, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
4. **CHECK THE DOWNSHIFT PADDLE SHIFT SWITCH**
    1. Turn the ignition off.
    2. Reconnect the Upshift Paddle Shift Switch.
    3. Disconnect the Downshift Paddle Shift Switch.
    4. Turn the ignition on.
    5. With the scan tool, erase the SCCM DTCs.
    6. Cycle the ignition switch from off to on.
    7. With the scan tool, read the SCCM DTCs.

    Did the DTC return?

    Yes

    - Replace the Steering Column Control Module (SCCM). Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- Replace the Downshift Paddle Shift Switch in accordance with the Service Information. Refer to **SWITCH, REMOTE RADIO, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

U0002-00-CAN C BUS OFF PERFORMANCE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0100-00-LOST COMMUNICATION WITH ECM/PCM

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0140-00-LOST COMMUNICATION WITH BODY CONTROL MODULE

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0155-00-LOST COMMUNICATION WITH CLUSTER-CCN

Perform the COMMUNICATION PRE-DIAGNOSTIC PROCEDURE. Refer to **STANDARD PROCEDURE** .

U0401-00-IMPLAUSIBLE DATA RECIEVED FROM ECM/PCM

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- With the ignition on for at least five seconds.
- Battery voltage between 10 and 16 volts.
- Body Control Module (BCM) is configured correctly.

SET CONDITION

- When the communication data sent over the CAN BUS from the Powertrain Control Module (PCM) is missing part of the message or the message is an irrational value for at least three message attempts.

POSSIBLE CAUSES

Possible Causes
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
BODY CONTROL MODULE (BCM) NOT CONFIGURED CORRECTLY
POWERTRAIN CONTROL MODULE (PCM) POWERS OR GROUNDS
POWERTRAIN CONTROL MODULE (PCM)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**

NOTE: Make sure the battery voltage is between 10 and 16 volts before proceeding.

   1. With the scan tool, read the Steering Column Control Module (SCCM) DTCs and record on the repair order.

   Is the DTC active?

   Yes

   - Go To 2

   No

   - Perform the STORED LOST COMMUNICATION DTCS diagnostic procedure. Refer to **STORED LOST COMMUNICATION DTCS** .

2. **CHECK FOR ANY OF THE FOLLOWING ACTIVE DTCS**
   1. With the scan tool, read all active DTCs from all modules.

   NOTE: Check for BCM configuration, CAN C hardware electrical, VIN Missing/Mismatch, battery or ignition related DTCs.

   Does the scan tool display any active DTCs to the conditions listed above?

   Yes

   - Go to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

   No

   - Go To 3

3. **VERIFY THE PCM IS ACTIVE ON THE BUS**
   1. Turn the ignition on.
   2. With the scan tool, verify the PCM is active on the bus.

   Is the PCM active on the bus?

   Yes

   - Go To 4

   No

   - Perform the NO RESPONSE FROM PCM (POWERTRAIN CONTROL MODULE) diagnostic procedure. Refer to **NO RESPONSE FROM PCM (POWERTRAIN CONTROL MODULE) -- GAS** .

4. **CHECK FOR ADDITIONAL COMMUNICATION RELATED DTCS**

1. With the scan tool, read all the DTCs.

   Is there more than one module with active DTCs "Logged Against" the PCM?

   Yes

   - Replace/update the Powertrain Control Module (PCM) in accordance with the Service Information. Refer to **MODULE, POWERTRAIN CONTROL, REMOVAL** .
   - Perform the POWERTRAIN VERIFICATION TEST. Refer to the appropriate Testing & Diagnostics article in Engine Performance .

   No

   - Go To 5

5. **CLEAR DTC IN MODULE SETTING FAULT**
   1. With the scan tool, select the module setting the DTC against the PCM.
   2. With the scan tool, erase the DTCs.

      Did the DTC return?

      Yes

      - Replace/update the module that set this DTC in accordance with the Service Information.
      - Perform the appropriate verification test for the module being replaced. If there is no verification test for the associated module perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

      No

      - The condition is not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test Complete.
      - Perform the appropriate verification test for the module. If there is no verification test for the associated module perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

U0422-00-IMPLAUSIBLE DATA RECIEVED FROM THE BODY CONTROL MODULE

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- With the ignition on for at least five seconds.
- Battery voltage between 10 and 16 volts.
- Body Control Module (BCM) is configured correctly.

SET CONDITION

- When the communication data sent over the CAN BUS from the BCM is missing part of the message or the message is an irrational value for at least three message attempts.

POSSIBLE CAUSES

Possible Causes
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
BODY CONTROL MODULE (BCM) NOT CONFIGURED CORRECTLY
BODY CONTROL MODULE (BCM) POWERS OR GROUNDS
BODY CONTROL MODULE (BCM)
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**

   NOTE: **Make sure the battery voltage is between 10 and 16 volts before proceeding.**

   1. With the scan tool, read the Steering Column Control Module (SCCM) DTCs and record on the repair order.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Perform the STORED LOST COMMUNICATION DTCS diagnostic procedure. Refer to **STORED LOST COMMUNICATION DTCS** .

2. **CHECK FOR ANY OF THE FOLLOWING ACTIVE DTCS**
   1. With the scan tool, read all active DTCs from all modules.

      NOTE: **Check for BCM configuration, CAN C hardware electrical, VIN Missing/Mismatch, battery or ignition related DTCs.**

      Does the scan tool display any active DTCs to the conditions listed above?

      Yes

      - Go to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

      No

      - Go To 3

3. **VERIFY THE BCM IS ACTIVE ON THE BUS**
    1. Turn the ignition on.
    2. With the scan tool, verify the BCM is active on the bus.

    Is the BCM active on the bus?

    Yes

    - Go To 4

    No

    - Perform the NO RESPONSE FROM BCM (BODY CONTROL MODULE) diagnostic procedure. Refer to **NO RESPONSE FROM BCM (BODY CONTROL MODULE)** .
4. **CHECK FOR ADDITIONAL COMMUNICATION RELATED DTCS**
    1. With the scan tool, read all the DTCs.

    Is there more than one module with active DTCs "Logged Against" the BCM?

    Yes

    - Replace/update the Body Control Module (BCM) in accordance with the Service Information. Refer to **MODULE, BODY CONTROL, REMOVAL** .
    - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Go To 5
5. **CLEAR DTC IN MODULE SETTING FAULT**
    1. With the scan tool, select the module setting the DTC against the BCM.
    2. With the scan tool, erase the DTCs.

    Did the DTC return?

    Yes

    - Replace/update the module that set this DTC in accordance with the Service Information.
    - Perform the appropriate verification test for the module being replaced. If there is no verification test for the associated module perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

    No

    - Test complete. The condition is not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    - Perform the appropriate verification test for the module. If there is no verification test for the associated module perform the BODY VERIFICATION TEST. Refer to **STANDARD**

PROCEDURE .

U0423-00 IMPLAUSIBLE DATA RECEIVED FROM CLUSTER/CCN

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- With the ignition on for at least five seconds.
- Battery voltage between 10 and 16 volts.
- Body Control Module (BCM) is configured correctly.

SET CONDITION

- When the communication data sent over the CAN BUS from the Instrument Cluster (IC) is missing part of the message or the message is an irrational value for at least three message attempts.

POSSIBLE CAUSES

Possible Causes
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
BCM NOT CONFIGURED CORRECTLY
INSTRUMENT CLUSTER (IC) POWERS OR GROUNDS
INSTRUMENT CLUSTER
MODULE THAT SET THIS DTC

DIAGNOSTIC TEST

1. **VERIFY DTC IS ACTIVE**

   NOTE: Make sure the battery voltage is between 10 and 16 volts before proceeding.

   1. With the scan tool, read the Steering Column Control Module (SCCM) DTCs and record on the repair order.

      Is the DTC active?

      Yes

      - Go To 2

      No

      - Perform the STORED LOST COMMUNICATION DTCS diagnostic procedure. Refer to **STORED LOST COMMUNICATION DTCS** .

2. **CHECK FOR ANY OF THE FOLLOWING ACTIVE DTCS**

1. With the scan tool, read all active DTCs from all modules.

NOTE: **Check for BCM configuration, CAN C hardware electrical, VIN Missing/Mismatch, battery or ignition related DTCs.**

Does the scan tool display any active DTCs to the conditions listed above?

Yes

- Go to **DIAGNOSTIC CODE INDEX** and perform the appropriate diagnostic procedure.

No

- Go To 3

3. **VERIFY THE INSTRUMENT CLUSTER (IC) IS ACTIVE ON THE BUS**
   1. Turn the ignition on.
   2. With the scan tool, verify the IC is active on the bus.

   Is the IC active on the bus?

   Yes

   - Go To 4

   No

   - Perform the NO RESPONSE FROM IC (INSTRUMENT CLUSTER) diagnostic procedure. Refer to **NO RESPONSE FROM IPC (INSTRUMENT PANEL CLUSTER)** .

4. **CHECK FOR ADDITIONAL COMMUNICATION RELATED DTCS**
   1. With the scan tool, read all the DTCs.

   Is there more than one module with active DTCs "Logged Against" the IC?

   Yes

   - Replace/update the Instrument Cluster (IC) in accordance with the Service Information. Refer to **REMOVAL** .
   - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

   No

   - Go To 5

5. **CLEAR DTC IN MODULE SETTING FAULT**
   1. With the scan tool, select the module setting the DTC against the IC.
   2. With the scan tool, erase the DTCs.

   Did the DTC return?

   Yes

- Replace/update the module that set this DTC in accordance with the Service Information.
- Perform the appropriate verification test for the module being replaced. If there is no verification test for the associated module perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

No

- The condition is not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
- Perform the appropriate verification test for the module. If there is no verification test for the associated module perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

U1008-00-LIN 1 BUS

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

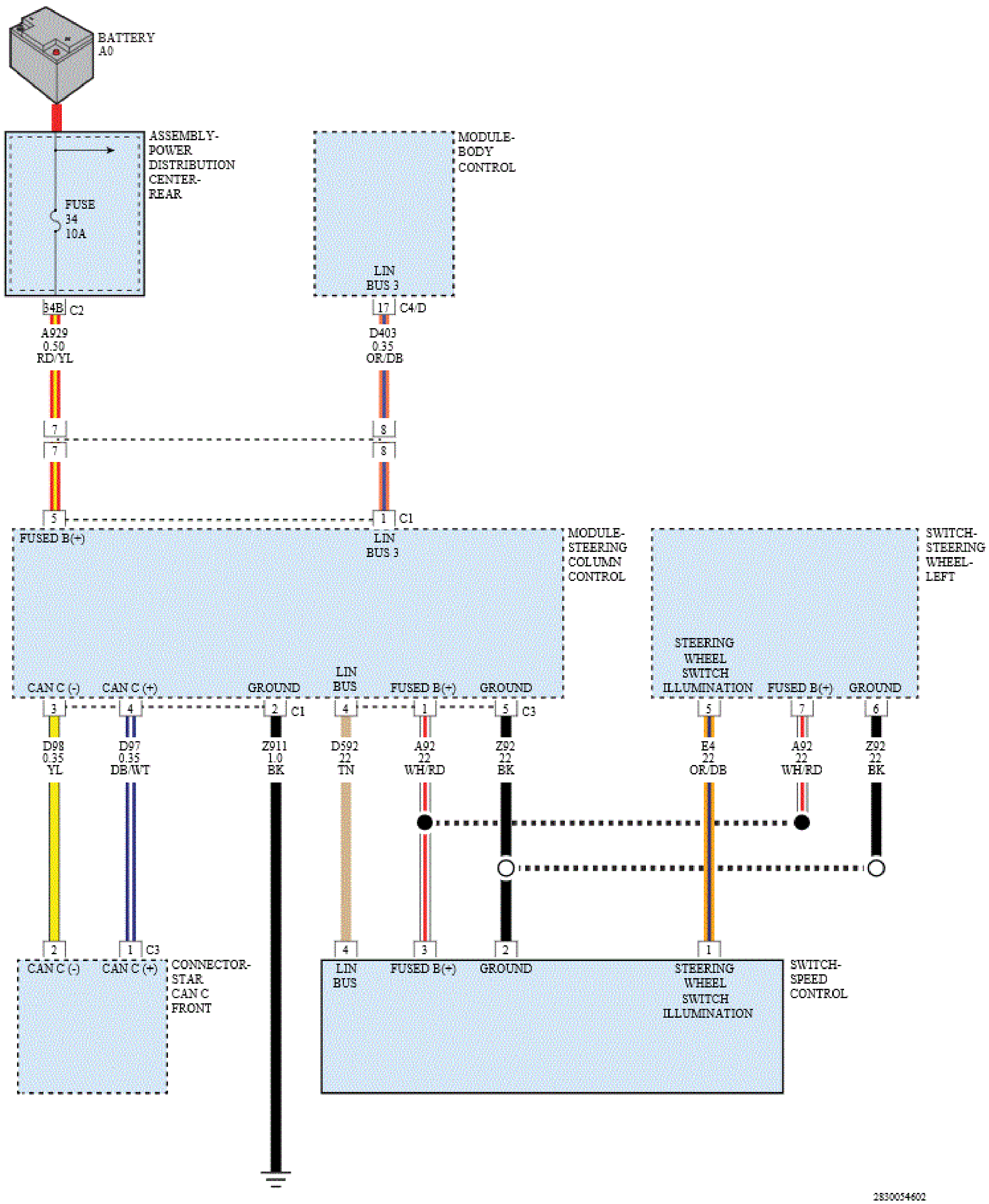


Fig. 2: Steering Column Control Module Circuit Diagram

Courtesy of CHRYSLER GROUP, LLC

THEORY OF OPERATION

The Steering Column Control Module (SCCM) is located near the top of the Steering Column underneath the Steering Wheel. The SCCM includes the Clockspring, the Multi-Function Switch and a LIN/CAN C Gateway. LIN Bus messages received by the LIN/CAN C Gateway are broadcast over the CAN C Bus to the appropriate modules.

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- The ignition is on.
- The Battery voltage is between 10 and 16 volts.

SET CONDITION

- The Steering Column Control Module (SCCM) detects a short on the LIN Bus circuit for greater than five seconds.

DEFAULT ACTION

- The Cruise Control Switches will be inactive.

POSSIBLE CAUSES

Possible Causes
LIN BUS CIRCUIT SHORTED TO VOLTAGE
LIN BUS CIRCUIT SHORTED TO GROUND
RIGHT STEERING WHEEL SWITCH (SPEED CONTROL)
STEERING COLUMN CONTROL SWITCH (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read the Steering Column Control Module (SCCM) DTCs and record on the repair order.

        Is the DTC active?

        Yes

        - Go To 2

        No

        - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals and correct pin tension. If no problems are found, test complete.
2. **CHECK THE RIGHT STEERING WHEEL SWITCH**
    1. Turn the ignition off.
    2. Disconnect the Right Steering Wheel Switch (Speed Control) harness connector.
    3. Turn the ignition on.
    4. With the scan tool, read the DTCs

        Is this DTC active?

        Yes

- Go To 3

No

- Replace the Right Steering Wheel Switch (Speed Control Switch) in accordance to the Service Information. Refer to **SWITCH, SPEED CONTROL, REMOVAL** .
- Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

3. **CHECK THE (D592) LIN BUS CIRCUIT FOR A SHORT TO VOLTAGE**
    1. Measure the voltage between ground and the (D592) LIN Bus circuit at the Right Steering Wheel Switch harness connector.

       Is there any voltage present?

       Yes

       - Repair the (D592) LIN Bus circuit for a short to voltage.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

       No

       - Go To

         Refer to 4.

4. **CHECK THE (D592) LIN BUS CIRCUIT FOR A SHORT TO GROUND**
    1. Turn the ignition off.
    2. Disconnect the Steering Column Control Module (SCCM) C3 harness connector.
    3. Check for continuity between ground and the (D592) LIN Bus circuit at the SCCM C3 harness connector.

       Is there continuity between ground and the (D592) LIN Bus circuit?

       Yes

       - Repair the (D592) LIN Bus circuit for a short to ground.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

       No

       - Replace the Steering Column Control Module (SCCM) in accordance to the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .

U121E-00-LOST COMMUNICATION WITH STEERING WHEEL CRUISE CONTROL SWITCH

For a complete wiring diagram, **refer to appropriate SYSTEM WIRING DIAGRAMS article** .

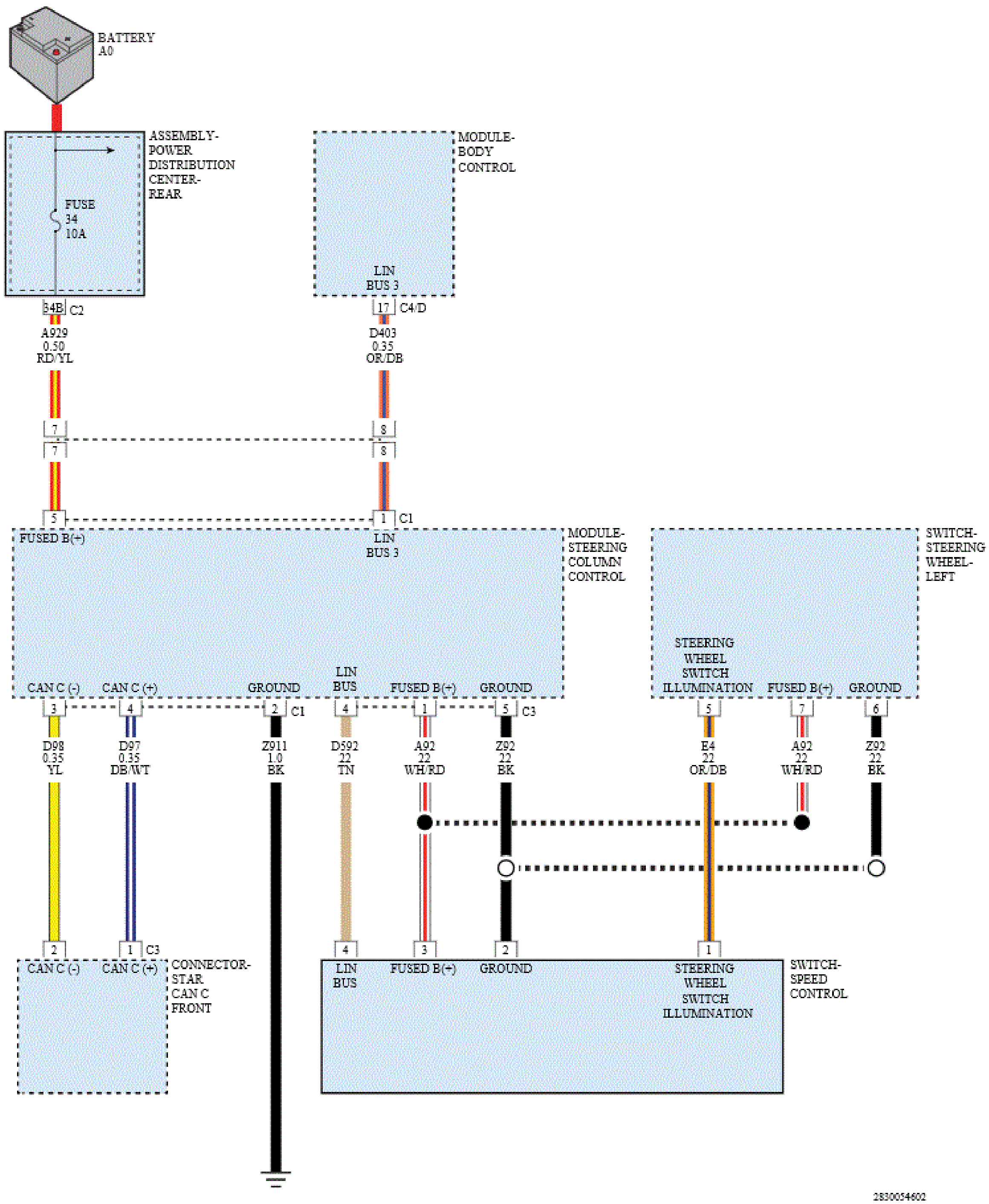


Fig. 3: Steering Column Control Module Circuit Diagram
Courtesy of CHRYSLER GROUP, LLC

WHEN MONITORED

This diagnostic runs continuously when the following conditions are met:

- The ignition is on.
- The Battery voltage is between 10 and 16 volts.

SET CONDITION

- The Steering Column Control Module (SCCM) detects no communication with the Speed Control Switch for greater than five seconds.

DEFAULT ACTION

- The Cruise Control Switches will be inactive.

POSSIBLE CAUSES

Possible Causes
RIGHT STEERING WHEEL SWITCH (SPEED CONTROL SWITCH) UNPLUGGED, POOR CONNECTION OR WIRING HARNESS
RIGHT STEERING WHEEL SWITCH (SPEED CONTROL SWITCH)
STEERING COLUMN CONTROL MODULE (SCCM)

DIAGNOSTIC TEST

1. **CHECK FOR AN ACTIVE DTC**
    1. With the scan tool, read the Steering Column Control Module (SCCM) DTCs and record on the repair order.

       Is the DTC active?

       Yes

       - Go To 2

       No

       - The condition or conditions that originally set this DTC are not present at this time. Using the wiring diagrams as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension. If no problems are found, test complete.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .
2. **CHECK THE RIGHT STEERING WHEEL SWITCH AND WIRING HARNESS**
    1. Visually and physically inspect the wiring harness between the Right Steering Wheel Switch (Speed Control Switch) harness connector and the SCCM C3 harness connector for damaged wires, connectors, and open/spread terminals.

       Were there any problems found?

       Yes

       - Repair or replace the wiring harness as necessary.
       - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

       No

       - Go To 3

3. **CHECK THE STEERING COLUMN CONTROL MODULE**
    1. Replace the Right Steering Wheel Switch (Speed Control Switch) in accordance to the Service Information. Refer to **SWITCH, SPEED CONTROL, REMOVAL** .

        Does this DTC reset?

        Yes

        - Replace the Steering Column Control Module (SCCM) in accordance to the Service Information. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .
        - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

        No

        - Test Complete.
        - Perform the BODY VERIFICATION TEST. Refer to **STANDARD PROCEDURE** .

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Article GUID: A00735912

2015-16 STEERING

Steering System - Challenger

WARNING

WARNING

WARNING: **Power steering fluid, engine parts and exhaust system may be extremely hot if engine has been running. Do not start engine with any loose or disconnected hoses. Do not allow hoses to touch hot exhaust manifold or catalyst.**

WARNING: **Fluid level should be checked with the engine off to prevent personal injury from moving parts.**

CAUTION

CAUTION

CAUTION: **When the power steering system is open, cap all open ends of the hoses, power steering pump fittings or power steering gear ports to prevent entry of foreign material into the components.**

CAUTION: **When servicing power steering components, do not pinch off power steering hoses in any way to stop fluid flow. Damage to hoses may result.**

NOTE: **The Electronic Stability Control (ESC) may also be referred to as Electronic Stability Program (ESP) depending on the vehicle model year and configuration. Certain components may also reference ESP, ESC, or use the traction control symbol.**

CAUTION: **If the steering wheel is excessively off-center while driving, outside of Chassis specifications, inadvertent ESC activations may occur on a vehicle so equipped.**

DESCRIPTION

DESCRIPTION

ELECTRIC POWER STEERING

Vehicles with Electric Power Steering (EPS) system consisting of:

- Steering column
- Rack and pinion steering gear
- EPS module
- Inner and Outer tie rod ends

- Intermediate shaft

HYDRAULIC POWER STEERING

Vehicles with Hydraulic Power Steering system consisting of:

- Steering column
- Rack and pinion steering gear
- Belt driven hydraulic steering pump with integrated reservoir
- Pump pressure, return and supply hoses
- Oil Cooler
- Inner and Outer tie rod ends

DIAGNOSIS AND TESTING

POWER STEERING FLOW AND PRESSURE TEST - HYDRAULIC

The following procedure is used to test the operation of the power steering system on this vehicle. This test will provide the gallons per minute (GPM) or flow rate of the power steering pump along with the maximum relief pressure. Perform this test anytime a power steering system problem is present. This test will determine if the power steering pump or power steering gear is not functioning properly. The following test is performed using the Power Steering Analyzer Kit (special tool #6815, Kit, Power Steering) (with appropriate hoses) and Adapters from Power Steering Analyzer Adapter Kit (special tool #6893A, Kit, Power Steering). Refer to SPECIAL TOOLS.

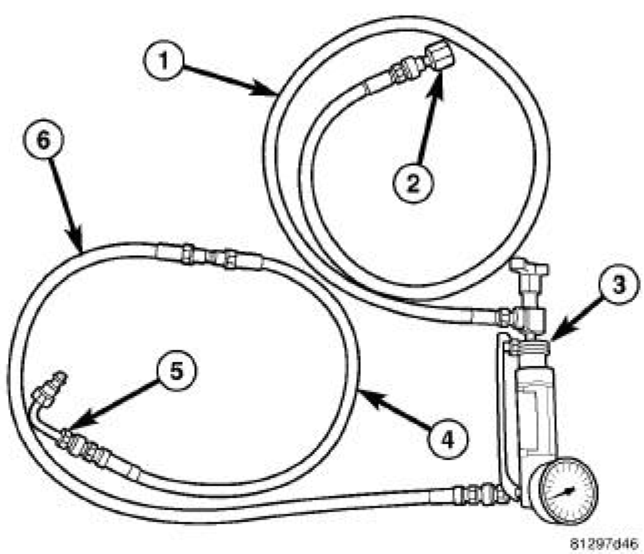

Fig. 1: Power Steering Analyzer Components
Courtesy of CHRYSLER GROUP, LLC

1. Check power steering belt to ensure it is in good condition and adjusted properly.
2. Assemble Power Steering Analyzer as follows:
   a. Gauge end (inlet) of Flow Meter And Gauge (special tool #6800, Analyzer, Power Steering) (3) - Hose (special tool #6905, Assembly, Hose) (6), Hose (special tool #6713, Hose, Power Steering)

(4), Adapter Tube (special tool #6844, Adapter, Power Steering (Truck)) (5)

b. Valve end (outlet) of Flow Meter And Gauge (special tool #6800, Analyzer, Power Steering) (3) - Hose (special tool #6959, Assembly, Hose) (1), Adapter Fitting (special tool #6826, Adapter, LH P/S Tester) (2)

3. Unthread pressure hose tube nut at power steering pump.
4. Connect Adapter Tube (special tool #6844, Adapter, Power Steering (Truck)) to pressure fitting on power steering pump. Tighten tube nut to specifications. Refer to **SPECIFICATIONS**.
5. Connect power steering pressure hose to Adapter Fitting (special tool #6826, Adapter, LH P/S Tester). Tighten tube nut to specifications. Refer to **SPECIFICATIONS**.
6. Open Analyzer test valve completely.
7. Start engine and allow to idle long enough to circulate power steering fluid through Analyzer flow meter and hoses.
8. Shut off engine and check fluid level; add fluid as necessary. Repeat Step 7 and Step 8 until the air is bled from the system.
9. Start engine and allow to idle.
10. Check Analyzer gauge (3) pressure. Initial pressure reading should be less than 1379 kPa (300 psi). If pressure is higher, inspect hoses for restrictions and repair as necessary.
11. Increase engine speed to 1, 200 RPM for SRT8 and read Analyzer Flow Meter. The reading should be 8.2 LPM (2.2 GPM) minimum. If flow reading is below specification, replace power steering pump.

CAUTION: The following test procedure involves testing maximum pump pressure output and flow control valve operation. Do not leave valve closed for more than five seconds as the pump could be damaged.

12. Close valve fully three times and record highest pressure indicated each time. **All three readings must be above specifications and within 345 kPa (50 psi) of each other.**
    - Power steering pump pressures above specifications but not within 345 kPa (50 psi) of each other, replace pump.
    - Pressures within 345 kPa (50 psi) of each other but below specifications, replace pump.

CAUTION: Do not force the pump to operate against the stops for more than 2 to 4 seconds at a time because, pump damage will result.

13. Completely open the valve on the Power Steering Analyzer. Turn the steering wheel to the extreme left until the stop in the steering gear is met, then turn the steering wheel to the right until the right stop is met. Record the highest indicated pressure at each position. Compare the recorded readings to the specifications. If the highest recorded output pressure reading against one stop is not within 345 kPa (50 psi) of the highest recorded reading at the other stop, the steering gear is leaking internally and must be replaced.

PUMP SPECIFICATIONS

VEHICLE	RELIEF PRESSURE
SRT Vehicles	11307 to 11997 kPa (1640-1740 psi)

STEERING DIAGNOSIS CHARTS

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NOTE: **There are three diagnosis charts following that cover NOISE, VIBRATION AND HARSHNESS (NVH) ISSUES, PERFORMANCE ISSUES, and FLUID ISSUES.**

NOISE, VIBRATION AND HARSHNESS (NVH) ISSUES

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
OBJECTIONABLE HISS OR WHISTLE WHILE TURNING STEERING WHEEL WHEN STATIONARY OR MOVING SLOWLY*	1. Damaged or mispositioned steering column shaft/coupling dash boot seal.	1. Check to ensure boot is properly installed and seals against sheet metal. Reposition or replace steering column shaft/coupling dash boot seal as necessary.
Ā	2. Mis-routed power steering hose.	2. Check routing of power steering hoses. Ensure hoses do not come in unwanted contact with other components and objects.
Ā	3. Restriction in pressure or return hose.	3. Using an electronic listening tool, determine if noise is coming from either pressure or return hose. Replace hose that noise is present within.
Ā	4. Noisy valve in power steering gear.	4. For evaluation and correction. Refer to **GEAR, DIAGNOSIS AND TESTING**.
RATTLE OR EXCESSIVE CLUNK**	1. Power steering gear loose on engine cradle/crossmember.	1. Check fastener torque and tighten to specifications. Replace as necessary. Check steering wheel center following repair.
Ā	2. Loose strut assembly mounting fasteners at tower or knuckle.	2. Check fastener torque and tighten to specifications.
Ā	3. Excessive play in outer tie rod.	3. For evaluation and correction. Refer to **TIE ROD, STEERING, DIAGNOSIS AND TESTING**.
Ā	4. Engine cradle/crossmember mounting fasteners loose at frame or bushings worn.	4. Check fastener torque and tighten to specifications. Inspect bushings and repair as necessary.
Ā	5. Wheel mounting (lug) nuts loose.	5. Inspect wheel mounting (lug) nuts and studs and repair as necessary. Tighten nuts to specifications.
Ā	6. Power steering hose touching the body or frame of vehicle.	6. For evaluation and correction. Refer to **PUMP, DIAGNOSIS AND TESTING**.
Ā	7. Stabilizer bar link joints worn (occurs with steering input only when moving, not stationary).	7. At park, jounce only one side of vehicle front to exercise stabilizer bar. Replace stabilizer bar link.
Ā	8. Loose lower control arm or tension strut mounting bolts at engine cradle, frame or crossmember (occurs with steering input only when	8. Check control arm or tension strut mounting bolts and tighten to specified torque.

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
	moving, not stationary).	
Ā	9. Loose intermediate shaft or column.	9. Rotate intermediate (steering) shaft in relationship to gear, checking for free-play. Check column fasteners and tighten to specifications as necessary.
Ā	10. Lower control arm pivot bushing worn (occurs with steering input only when moving, not stationary).	10. Inspect bushings for wear and replace lower control arm as necessary.
Ā	11. Internal power steering gear noise.	11. Drive vehicle on rough road, then steer rapidly back and forth when stopped. Replace power steering gear as necessary.
Ā	12. Loose inner tie rod.	12. For evaluation and correction. Refer to **TIE ROD, STEERING, DIAGNOSIS AND TESTING**.
Ā	13. Damaged engine cradle/crossmember.	13. Inspect the cradle/crossmember for cracks or other damage. Replace as necessary.
POPPING NOISE	1. Loose steering gear mounting fasteners.	1. Check fasteners for proper torque and retighten as necessary.
Ā	2. Loose outer tie rod mounting nut or jam nut.	2. Check fastener torque. Replace nuts as necessary and tighten to specifications.
Ā	3. Loose intermediate (steering) shaft coupling at gear input shaft.	3. Make sure coupling is fully seated on gear input shaft. Remove and replace as necessary.
Ā	4. Worn tie rod (outer or inner).	4. For evaluation and correction. Refer to **TIE ROD, STEERING, DIAGNOSIS AND TESTING**.
Ā	5. Worn axle half-shaft.	5. For evaluation and correction. Refer to **DIAGNOSIS AND TESTING** .
CHIRP OR SQUEAL (POWER STEERING PUMP)	1. Loose power steering pump drive belt.	1. Inspect belt. Replace belt if worn or glazed. Tighten/adjust power steering pump drive belt if equipped with a manual tensioner.
Ā	2. Pulley alignment incorrect.	2. Realign accessory drives.
Ā	3. Malfunctioning belt auto-tensioner.	3. Verify belt tension. Replace belt auto-tensioner.
Ā	4. Power steering pump noisy (worn bearing/bushing noise).	4. Using an electronic listening tool, determine if noise is coming from pump. Replace power steering pump as required.
Ā	5. Generator or water pump noisy.	5. Using an electronic listening tool, determine if noise is coming from Generator or water pump. Replace faulty component.

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
WHINE, GROWL, MOAN OR GROAN (POWER STEERING PUMP)***	1. Low power steering fluid level.	1. Fill power steering fluid reservoir to proper level and check for leaks (make sure all air is bled from the system fluid).
Ā	2. Air in power steering fluid.	2. Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace as necessary. Bleed air from fluid. Refer to **STANDARD PROCEDURE**.
Ā	3. Power steering hose touching body or frame of vehicle.	3. For evaluation and correction. Refer to **PUMP, DIAGNOSIS AND TESTING**.
Ā	4. Wear of power steering pump internal components.	4. For evaluation and correction. Refer to **PUMP, DIAGNOSIS AND TESTING**.
COLD START WHINE OR MOAN (POWER STEERING PUMP)***	1. Low power steering fluid level.	1. Fill power steering fluid reservoir to proper level and check for leaks (make sure all air is bled from the system fluid).
Ā	2. Extremely low ambient temperature (near -18 CĀ° (0 FĀ°) or below).	2. Some noise is expected as pump attempts to pull cold, thick fluid. Noise should go away as vehicle warms up. Acceptable levels of excessive noise are one second at -18 CĀ° (0 FĀ°) and 15 seconds at -29 CĀ° (-20 FĀ°). If noise is excessive, look for poor sealing on the return hose or a possible fluid leak.
SQUEAKING OR RUBBING SOUND	1. Steering column shroud or shaft rubbing.	1. While turning the steering wheel, listen down column to locate. Check interference between moving components. Move or realign shrouds or shaft as necessary. Replace components if this does not correct problem.
Ā	2. Clockspring inside steering column noisy.	2. Remove clockspring and reinstall steering wheel for testing. If noise is gone, replace clockspring.
Ā	3. Boot/dash seal lubrication inadequate.	3. Remove boot seal and recheck for noise. Lubricate seal as necessary.
Ā	4. Steering gear outer tie rod noisy.	4. While a helper turns the steering wheel, use an electronic listening tool to determine if noise is coming from either outer tie rod. Replace outer tie rods as necessary.
Ā	5. Steering gear internally noisy.	5. Remove dash seal boot, then exercise the steering wheel. If noise is still present at gear, replace steering gear.
SCRUBBING OR KNOCKING SOUND	1. Incorrect tire or wheel size.	1. Replace incorrect size tire or wheel with original equipment size.

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
Ā	2. Worn motor or transmission mount.	2. Drive vehicle, moving accelerator pedal rapidly up and down attempting to locate noise. Try in both forward and reverse. Replace mounts as necessary.
Ā	3. Tires contacting wheel well.	3. Make sure wheel house is properly positioned. If not, reposition as necessary. If steering wheel is properly centered, check steering gear travel left to right by rotating the steering wheel to each stop. Steering wheel should rotate the same amount in both directions from center. If not, replace steering gear.
Ā	4. Interference between moving steering components and other components.	4. Check for bent or misaligned components. Correct or replace as necessary.
Ā	5. Accessory drive pulley rubbing against another component.	5. Check pulleys for wear. Check for worn engine or transmission mount. Reposition components or replace mounts as necessary.

NOTE: *** There is some noise in all power steering systems. One of the most common is a hissing sound evident when turning the steering wheel when at a standstill or when parking and the steering wheel is at the end of its travel. Hiss is a very high frequency noise similar to that experienced while slowly closing a water tap. The noise is present in every valve and results when high velocity fluid passes valve orifice edges. There is no relationship between this noise and the performance of the steering system.**

NOTE: **** A light clunk may be felt or heard during steering wheel reversal while vehicle is stationary. This results from internal steering gear rack movement at the bushings and in no way affects the performance of the steering system. This movement may be felt in the steering components during steering wheel reversal.**

NOTE: ***** Power steering pump growl/moan/groan results from the development of high pressure fluid flow. Normally this noise level should not be high enough to be objectionable.**

PERFORMANCE ISSUES

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
STEERING WHEEL OR COLUMN HAS FREE-PLAY/LASH /LOOSENESS (CLUNKING OR RATTLING)	1. Loose coupling pinch bolt at gear input shaft.	1. Check pinch bolt torque. Replace pinch bolt if equipped with thread locker patch and tighten to specifications.

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
Ā	2. Power steering gear loose on cradle/crossmember.	2. Inspect gear mounting bolts. Replace if necessary and tighten to specifications.
Ā	3. Excessive free-play or noise from steering column bearings.	3. Replace steering column.
Ā	4. Excessive intermediate (steering) shaft coupling U-joint free-play.	4. Rotate steering wheel back-and-forth while watching coupling. Observe for free-play. Replace intermediate shaft as necessary.
Ā	5. Loose or worn outer tie rod.	5. For evaluation and correction. Refer to **TIE ROD, STEERING, DIAGNOSIS AND TESTING**.
Ā	6. Lack of lubrication in lower ball joint or ball joint is damaged.	6. For evaluation. Refer to **BALL JOINT, SUSPENSION, LOWER, DIAGNOSIS AND TESTING** . Lubricate ball joint if equipped with a zerk fitting and check for function. If not equipped with a zerk fitting, test and replace ball joint as necessary.
Ā	7. Excessive lash inside steering gear.	7. Disconnect intermediate shaft and turn steering gear input shaft. Observe for any movement without a corresponding tire movement. Replace steering gear as necessary.
STEERING WHEEL HAS FORE AND AFT LOOSENESS	1. Steering wheel retaining bolt loose.	1. Check steering wheel retaining bolt torque and tighten to specifications as necessary.
Ā	2. Loose steering column to instrument panel fasteners.	2. Check steering column to instrument panel fastener torque and tighten to specifications as necessary.
STEERING WHEEL, DASH OR VEHICLE VIBRATES DURING STEERING MANEUVERS (ESPECIALLY AT LOW SPEED OR STANDSTILL)	1. Air in power steering fluid.	1. Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace as necessary. Bleed air from fluid. Refer to **STANDARD PROCEDURE**.
Ā	2. Tire(s) not properly inflated.	2. Check and inflate tires to the specified pressure.
Ā	3. Excessive engine vibration.	3. Ensure that the engine is tuned properly.
Ā	4. Loose tie rod end jam nut.	4. Check torque and tighten the inner to outer tie rod jam nut to specifications.
Ā	5. Overcharged air conditioning (A/C) system.	5. Turn A/C off and verify issue goes away. Repair A/C as necessary.
Ā	6. Grounded, damaged or loose engine mount.	6. Visually inspect for damaged or misaligned mounts. Check fastener torque. Replace,

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
		realign or retighten as necessary.
Ā	7. Loose or worn outer tie rod.	7. For evaluation and correction. Refer to **TIE ROD, STEERING, DIAGNOSIS AND TESTING**.
Ā	8. Steering gear noisy.	8. During a parking event at 0 mph, verify there is vibration only with steering. Steer in both directions and verify that the noise follows the steering input. Check TSB's for any known issue. Replace steering gear as necessary.
STEERING CATCHES, SURGES OR STICKS IN CERTAIN POSITIONS OR IS DIFFICULT TO TURN	1. Low power steering fluid level.	1. Check fluid level and fill to proper level as necessary. Check for leaks. Make sure all air is bled from system.
Ā	2. Tire(s) not properly inflated.	2. Check and inflate tires to the specified pressure.
Ā	3. Loose or slipping power steering/accessory drive belt.	3. Verify belt tension. Replace belt auto-tensioner and belt as necessary.
Ā	4. Lack of lubrication in lower ball joint or ball joint is damaged.	4. For evaluation. Refer to **BALL JOINT, SUSPENSION, LOWER, DIAGNOSIS AND TESTING** . Lubricate ball joint if equipped with a zerk fitting and check for function. If not equipped with a zerk fitting, test and replace ball joint as necessary.
Ā	5. Lack of lubrication in steering gear outer tie rod end(s).	5. For evaluation and correction. Refer to **TIE ROD, STEERING, DIAGNOSIS AND TESTING**.
Ā	6. Faulty power steering pump.	6. Perform Power Steering Flow and Pressure Test. Refer to **DIAGNOSIS AND TESTING**. Look for low or erratic flow or pressure. Replace power steering pump as necessary.
Ā	7. Excessive friction in intermediate shaft/coupler joint.	7. Disconnect intermediate shaft/coupler at steering gear and check joint for smooth operation in all directions. Replace intermediate shaft/coupler joint.
Ā	8. Excessive friction in steering column.	8. Disconnect intermediate shaft/coupler at steering gear. Turn steering wheel two revolutions in either direction from on center and check for smooth operation. DO NOT turn past two revolutions. Damage to the clockspring may occur. Replace steering column as necessary.

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
Ā	9. Worn or binding seat and bearing in front strut assembly.	9. Disconnect outer tie rod ends from knuckles, then turn tire and wheel assembly checking for smooth operation. Replace front strut assembly seat and bearing.
Ā	10. Faulty steering gear.	10. With vehicle on hoist, tires unsupported and engine off, steer gear throughout travel and check for smooth operation. Replace steering gear (only after all previous components have been checked).
STEERING WHEEL DOES NOT RETURN TO CENTER POSITION	1. Tire(s) not properly inflated.	1. Check and inflate tires to the specified pressure.
Ā	2. Improper front wheel alignment.	2. Check and adjust wheel alignment as necessary.
Ā	3. Lack of lubrication in lower ball joint or ball joint is damaged.	3. For evaluation. Refer to **BALL JOINT, SUSPENSION, LOWER, DIAGNOSIS AND TESTING** . Lubricate ball joint if equipped with a zerk fitting and check for function. If not equipped with a zerk fitting, test and replace ball joint as necessary.
Ā	4. Excessive friction in intermediate shaft/coupler joint.	4. Disconnect intermediate shaft/coupler at steering gear and check joint for smooth operation in all directions. Replace intermediate shaft/coupler joint.
Ā	5. Excessive friction in steering column.	5. Disconnect intermediate shaft/coupler at steering gear. Turn steering wheel two revolutions in either direction from on center and check for smooth operation. DO NOT turn past two revolutions. Damage to the clockspring may occur. Replace steering column as necessary.
Ā	6. Worn or binding seat and bearing in front strut assembly.	6. Disconnect steering gear outer tie rod ends at knuckles, then turn tire and wheel assembly in and out checking for smooth operation. Replace seat and bearing as necessary.
Ā	7. Excessive friction in power steering gear.	7. With vehicle on hoist, tires unsupported and engine off, steer gear throughout travel and check for smooth operation. Replace steering gear (only after all previous components have been checked).
EXCESSIVE STEERING WHEEL KICKBACK FROM ROAD INPUTS	1. Air in power steering fluid.	1. Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace as necessary. Bleed air from fluid. Refer to

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
		STANDARD PROCEDURE.
Ā	2. Power steering gear loose on cradle/crossmember.	2. Inspect gear mounting bolts. Replace if necessary and tighten to specifications.
Ā	3. Steering column, coupling or intermediate shaft worn or loose.	3. Rotate steering wheel back-and-forth while inspecting intermediate shaft going into steering gear. Look for excessive free-play. Replace bolt if it is found loose. Replace steering column, coupling or intermediate shaft if necessary.
Ā	4. Power steering pump flow is too low.	4. Perform Power Steering Flow and Pressure Test. Refer to **DIAGNOSIS AND TESTING**. Look for low or erratic flow or pressure. Replace power steering pump as necessary.

FLUID ISSUES

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
LOW FLUID LEVEL WITH VISIBLE LEAK	1. Loose power steering hose fittings or connections.	1. Check torque on all tube nuts (at gear and pump). Inspect clamps at all rubber hose connections for correct position, damage and tension. Tighten tube nuts as required. Reposition or replace clamps at hose connections. Clean joints and reinspect for leaks.
Ā	2. Damaged or missing O-ring at power steering hose tube nuts.	2. Remove tube nut and inspect O-ring. If damaged or missing, replace O-ring. Clean joints and reinspect for leaks.
Ā	3. Power steering line or hose failure.	3. Clean fluid from around suspect areas. Run vehicle and inspect for leaks. Look inside reservoir to see if air is being ingested. Replace hoses as necessary.
Ā	4. Power steering component leaking (reservoir, pump, gear).	4. Clean fluid from around suspect areas. Run vehicle and inspect for leaks. Look inside reservoir to see if air is being ingested. Replace power steering component as necessary.
AERATED FLUID*	1. Low power steering fluid level.	1. Check fluid level and fill to proper level as necessary. Check for leaks. Make sure all air is bled from system.
Ā	2. Air leak at power steering supply hose, reservoir or pump.	2. Inspect components. Place a hand vacuum pump with Adapter 9688 on reservoir and verify that system can sustain vacuum. System should not lose more than 1 psi (7 kPa) in 2 minutes (make sure vacuum pump is sealed well to the reservoir). Replace steering component as necessary.

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
RESERVOIR FLUID OVERFLOW OR FLUID THAT IS MILKY IN COLOR	1. Water contamination of power steering fluid.	1. Inspect fluid for milky appearance. Completely drain power steering fluid. Refill and bleed system. Refer to **STANDARD PROCEDURE**.

NOTE: *** Extremely cold temperatures may cause power steering fluid aeration. The air should work its way out of the system as the fluid warms.**

STANDARD PROCEDURE

STANDARD PROCEDURE - POWER STEERING SYSTEM BLEEDING

19-0000-00000-36-TITLE

WARNING: **The fluid level should be checked with engine off to prevent injury from moving components.**

CAUTION: **If the air is not purged from the power steering system correctly, pump failure could result.**

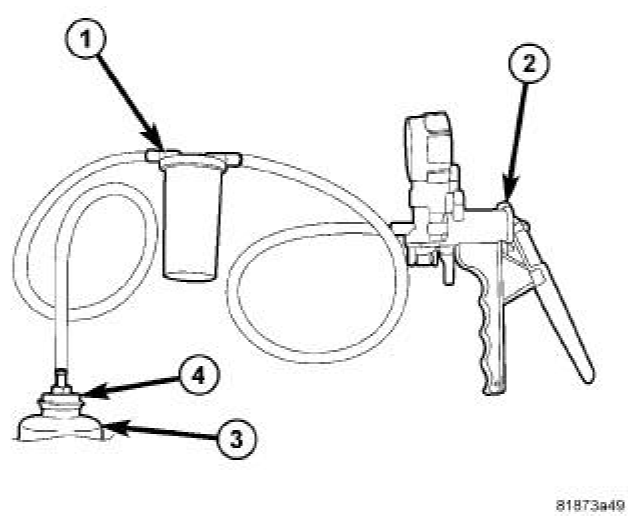


Fig. 2: Hand Vacuum Pump On Reservoir
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Be sure the vacuum tool used in the following procedure is clean and free of any fluids.**

1. Check the fluid level. As measured on the side of the reservoir, the level should indicate between ADD and FULL COLD when the fluid is at normal ambient temperature. Adjust the fluid level as necessary. Refer to **FLUID, STANDARD PROCEDURE**.
2. Tightly insert Power Steering Cap Adapter (4), Special Tool (special tool #9688A, Cap Adapter, Power Steering Pump), into the mouth of the reservoir.

CAUTION: Failure to use a the vacuum pump reservoir (1) may allow power steering fluid to be sucked into the hand vacuum pump.

3. Attach Hand Vacuum Pump (2), Special Tool (special tool #C-4207-A, Vacuum Pump, Hand) or equivalent, with reservoir (1) attached, to the Power Steering Cap Adapter (4).

CAUTION: Do not run the engine while vacuum is applied to the power steering system. Damage to the power steering pump can occur.

NOTE: When performing the following step make sure the vacuum level is maintained during the entire time period.

4. Using Hand Vacuum Pump (2), apply 68-85 kPa (20-25 in. Hg) of vacuum to the system for a minimum of three minutes.
5. Slowly release the vacuum and remove the special tools.
6. Adjust the fluid level as necessary.
7. Start the engine and cycle the steering wheel lock-to-lock three times.

NOTE: Do not hold the steering wheel at the stops.

8. Stop the engine and check for leaks at all connections.
9. Check for any signs of air in the reservoir and check the fluid level. If air is present, repeat the procedure as necessary.

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

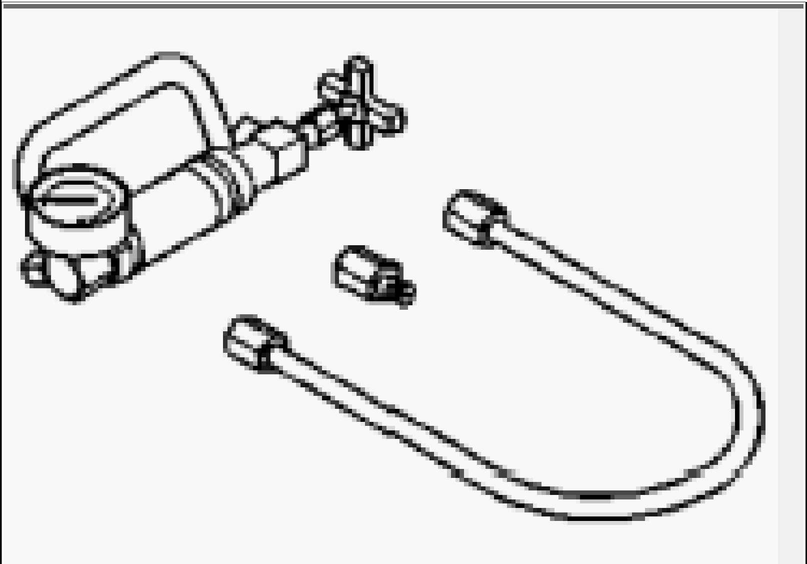
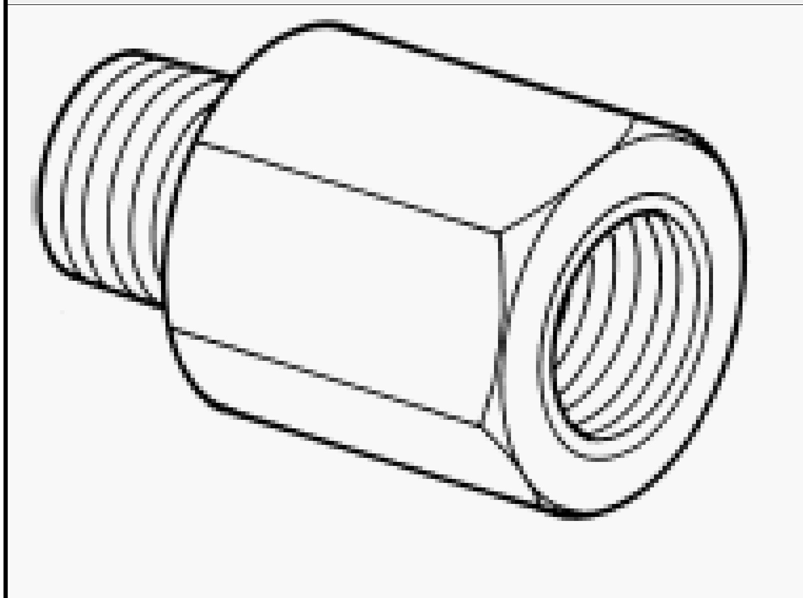
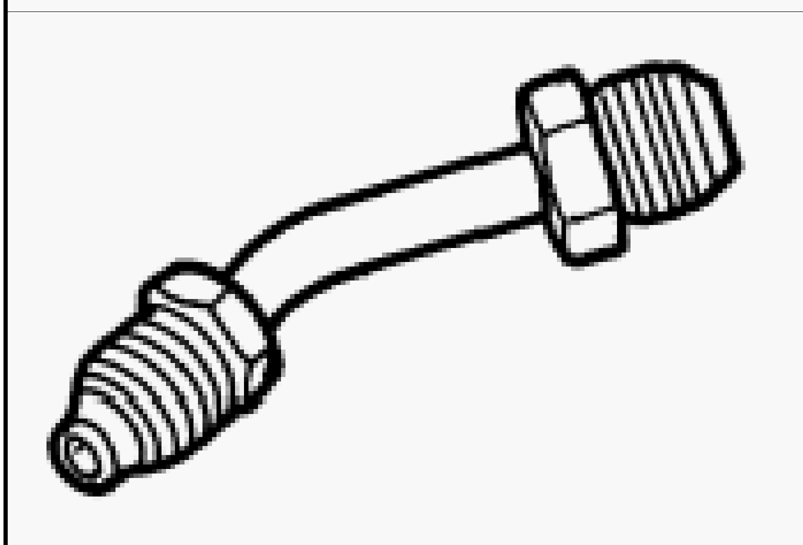
DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Dash Seal Mounting Nuts	7	-	62	Ā
Power Steering Gear Bolts	95	70	-	Ā
Inner Tie Rod End to Steering Gear Nut	85	63	-	Ā
Lower Intermediate Shaft Pinch Bolt	57	42	-	Ā
Outer Tie Rod End to Knuckle Nut	50 + 80Ā° TURN	37 + 80Ā° TURN	-	Ā
Power Steering Pump Bolts	28	21	-	Ā
Power Steering Return Line Nuts	38	28	-	Ā
Power Steering Pressure Line Nuts	38	28	-	Ā
Steering Column to IP Nuts	18	13	-	Ā

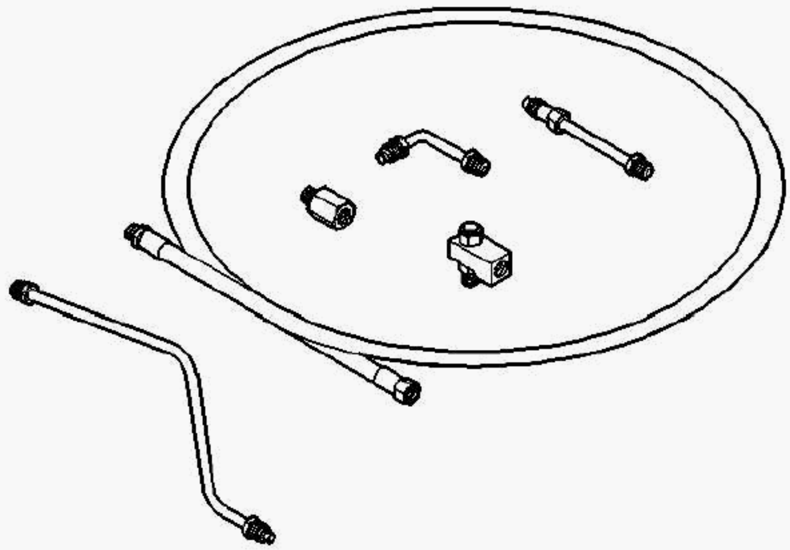
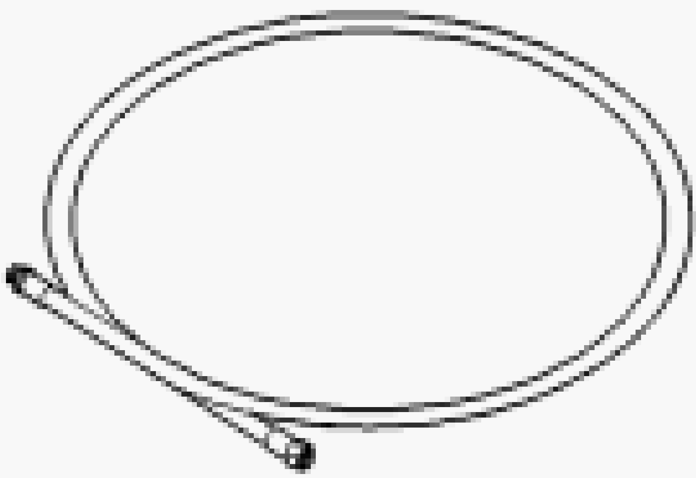
DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER *
Steering Wheel Bolt	85	63	-	Ā
Tie Rod Jam Nut	85	63	-	Ā
*** New Fastener:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

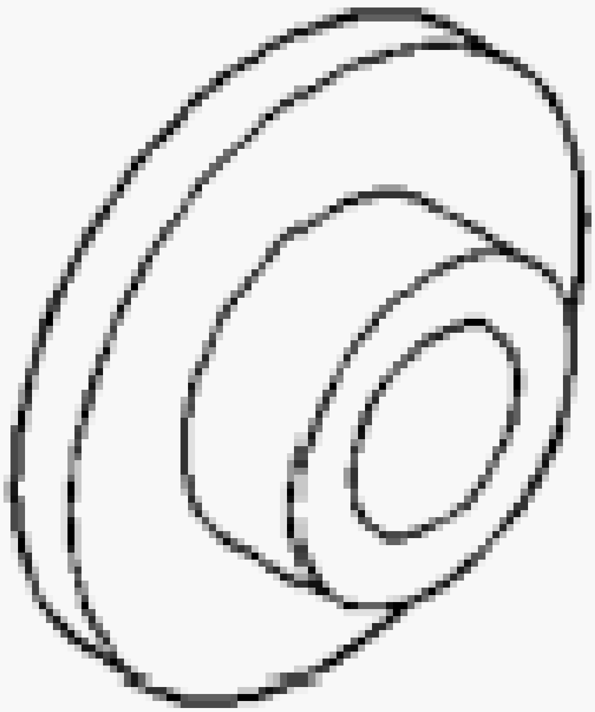
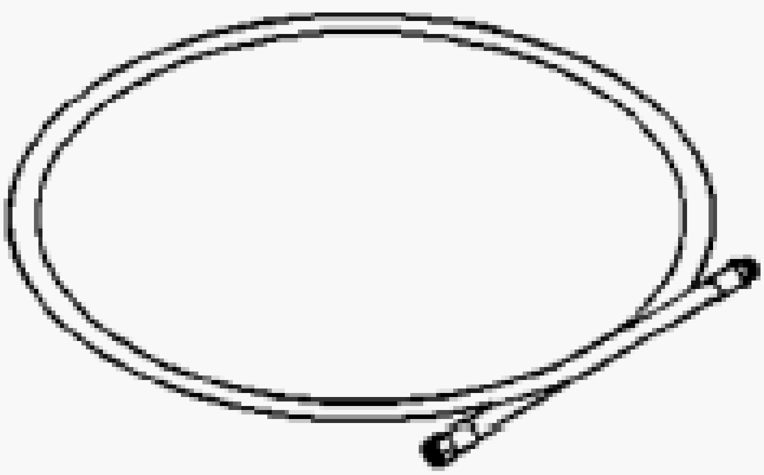
SPECIAL TOOLS

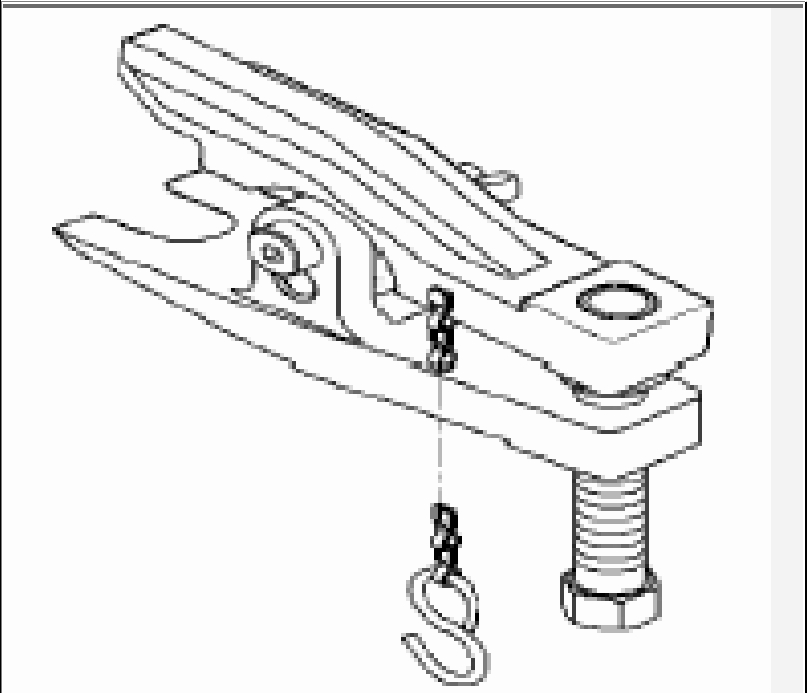
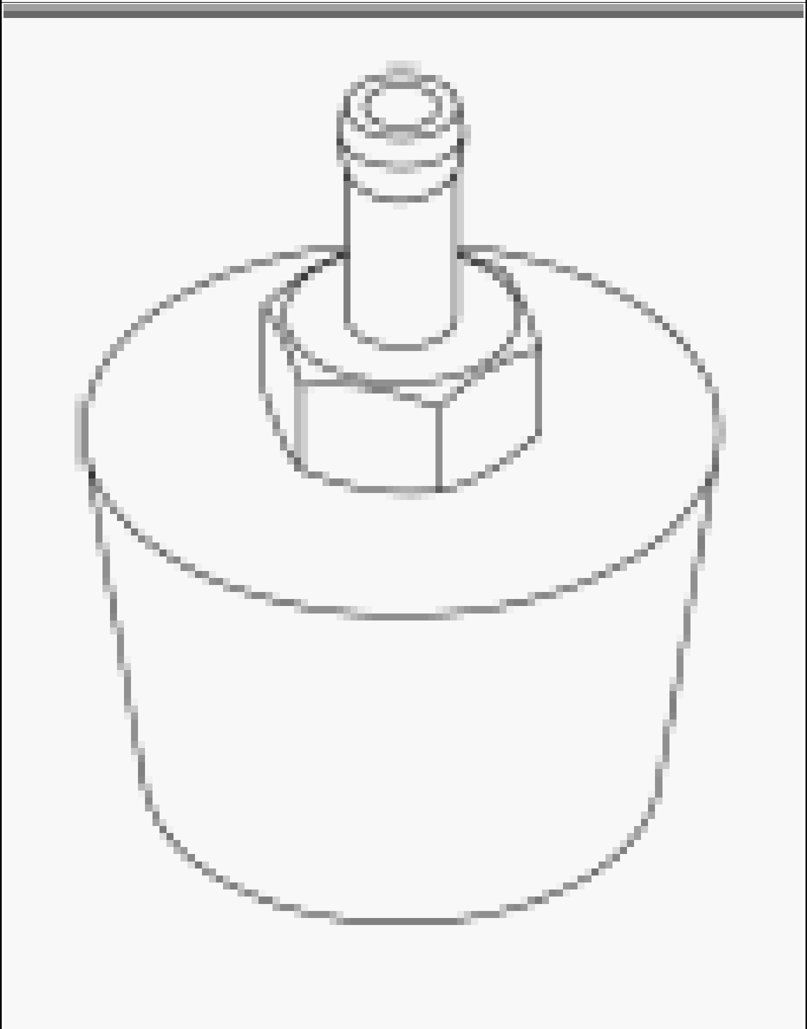
SPECIAL TOOLS

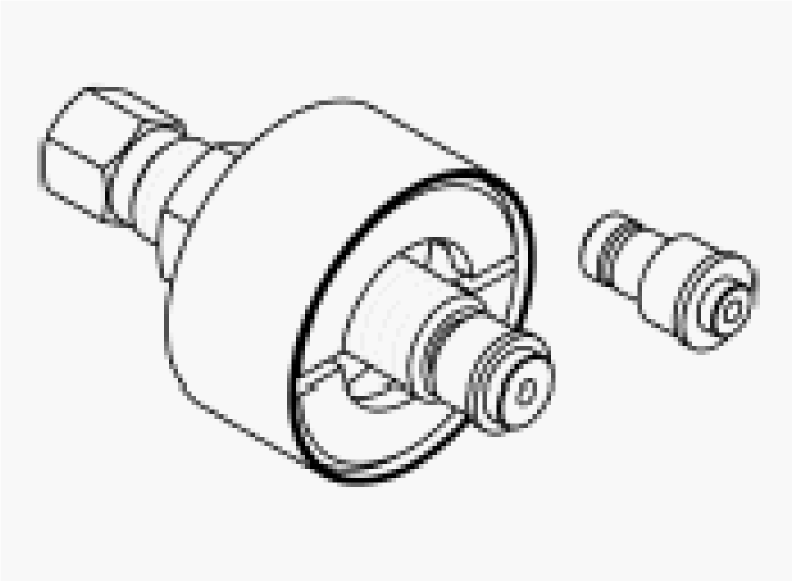
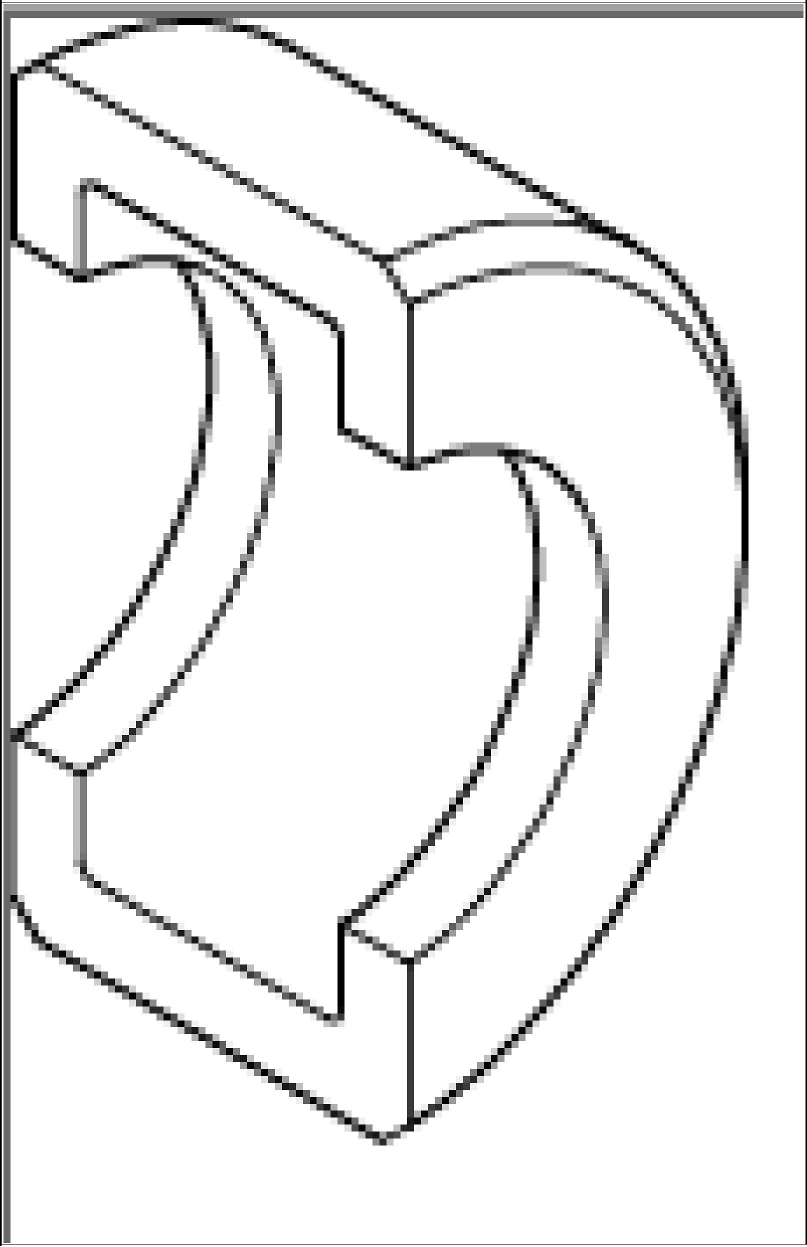
	6713 - Hose, Power Steering
	6800 - Analyzer, Power Steering

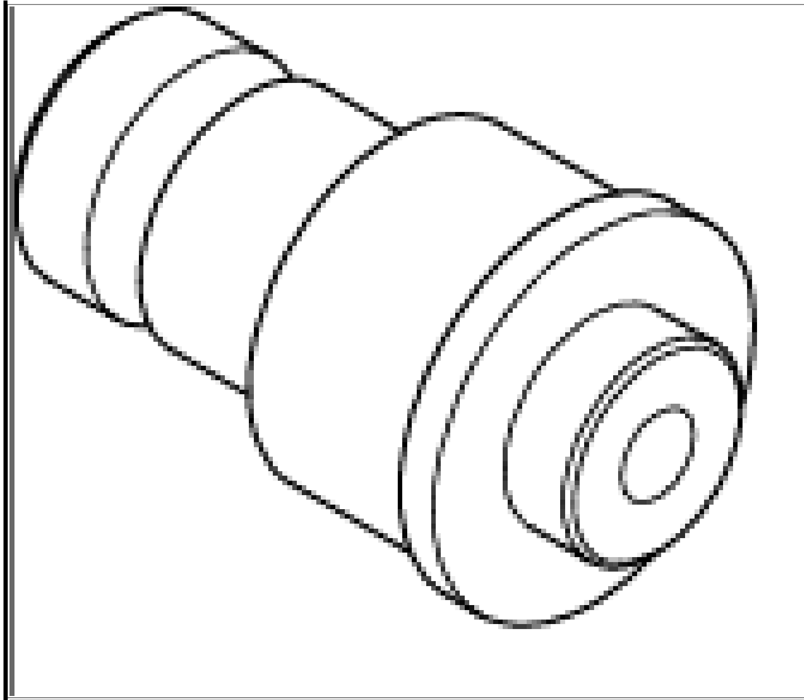
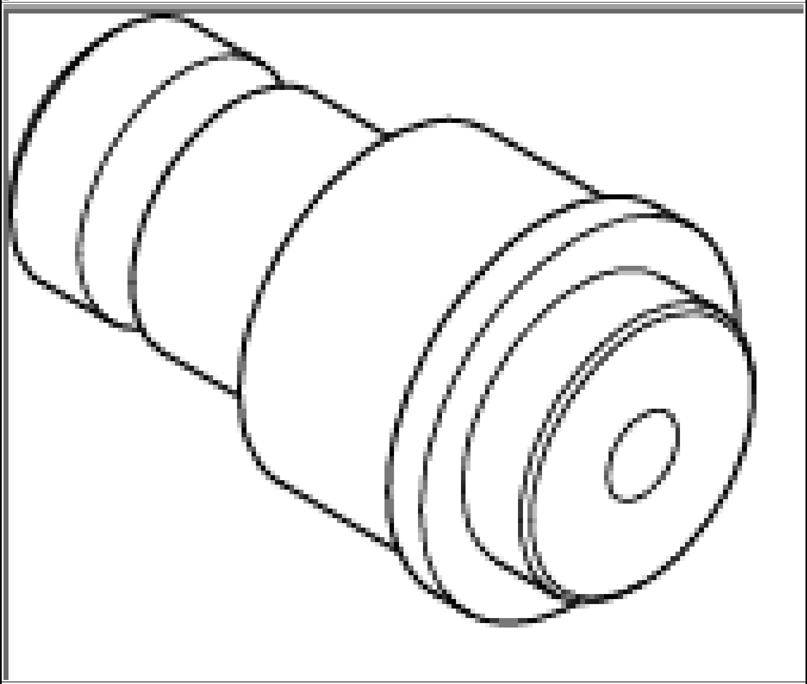
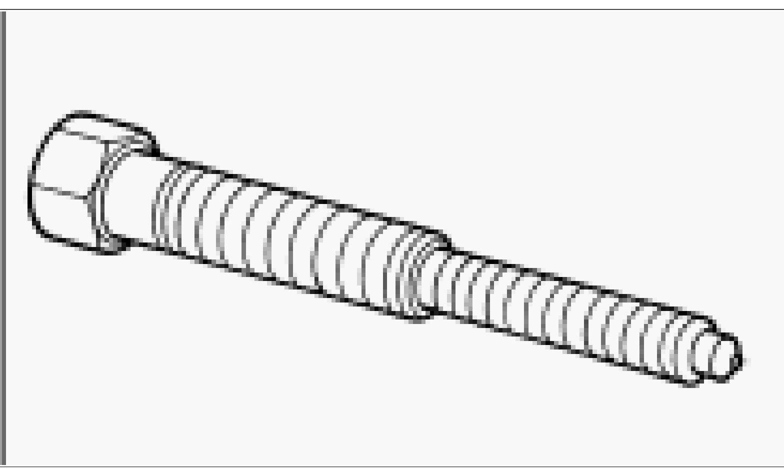
	6815 - Kit, Power Steering (Originally Shipped In Kit Number(s) 6784, 6809, 6898.)
	6826 - Adapter, LH P/S Tester (Originally Shipped In Kit Number(s) 6893A, 6894, 6895, 6897, 6898.)
	6844 - Adapter, Power Steering (Truck) (Originally Shipped In Kit Number(s) 6896.)

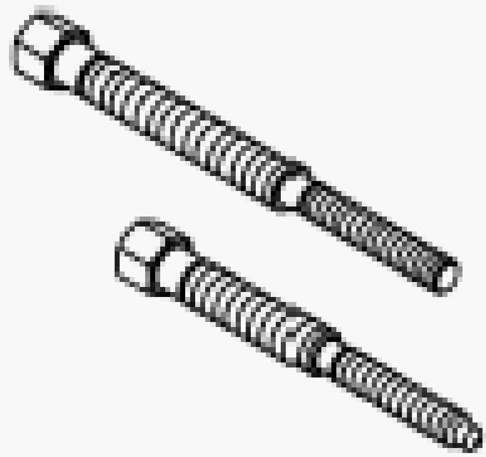
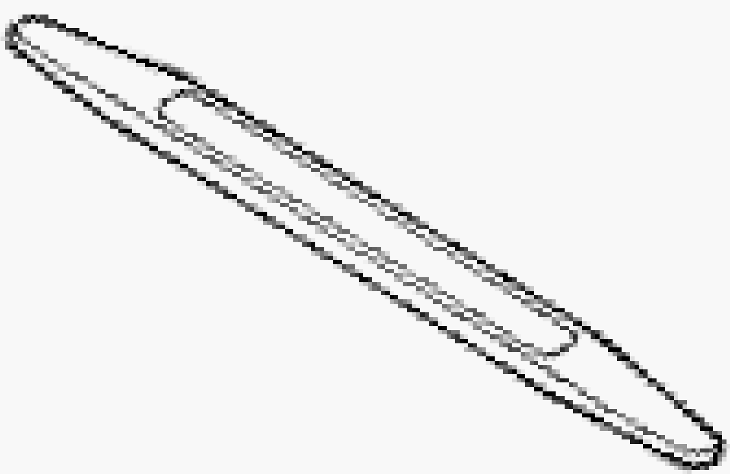
	6893A - Kit, Power Steering (Originally Shipped In Kit Number(s) 6896.)
	6905 - Assembly, Hose (Originally Shipped In Kit Number(s) 6896.)

	6936 - Spacer (Originally Shipped In Kit Number(s) 6945, 6946, 6947, 6948.)
	6959 - Assembly, Hose (Originally Shipped In Kit Number(s) 6945, 6946, 6947, 6948, 6949.)

	9360 - Remover, Ball Joint (Originally Shipped In Kit Number(s) 9329, 9515, 9516, 9516-CAN, 9517, 9517-CAN, 9518, 9519, 9540, 9541.)
	9688A - Cap Adapter, Power Steering Pump (Originally Shipped In Kit Number(s) 10075A-DOD, 10075-CHRYSLER, 10075-DODGE.)

	9962 - Puller, P/S Pulley (Originally Shipped In Kit Number(s) 9962.)
	9962-2 - Collet, Half, Pulley Remover (Originally Shipped In Kit Number(s) 9962.)

	9962-3 - Button, Thrust (Originally Shipped In Kit Number(s) 9962.)
	9962-4 - Button, Thrust (Originally Shipped In Kit Number(s) 9962.)
	C-4063-2 - Forcing Screw (Originally Shipped In Kit Number(s) 9398, C-4063-2.)

 	C-4063C - Installer, P/S Pulley
	C-4207-A - Vacuum Pump, Hand
	C-4755 - Trim Stick (Originally Shipped In Kit Number(s) 9299, 9299CC, 9299CC, 9300A-CAN.)

COLUMN

DESCRIPTION

DESCRIPTION

WARNING: The airbag system is a sensitive, complex electro-mechanical unit. Before attempting to diagnose, remove or install the airbag system components you must first disconnect and isolate the battery negative (ground) cable. Then wait two minutes for the system capacitor to discharge. Failure to do so could result in accidental deployment of the airbag and possible personal injury. The fasteners, screws, and bolts, originally used for the airbag components, have special coatings and are specifically designed for the airbag system. They must never be replaced with any substitutes. Anytime a new fastener is needed, replace with the correct fasteners provided in the service package or fasteners listed in the parts books.

CAUTION: Do not hammer on steering column shaft. This may cause damage to the column internally.

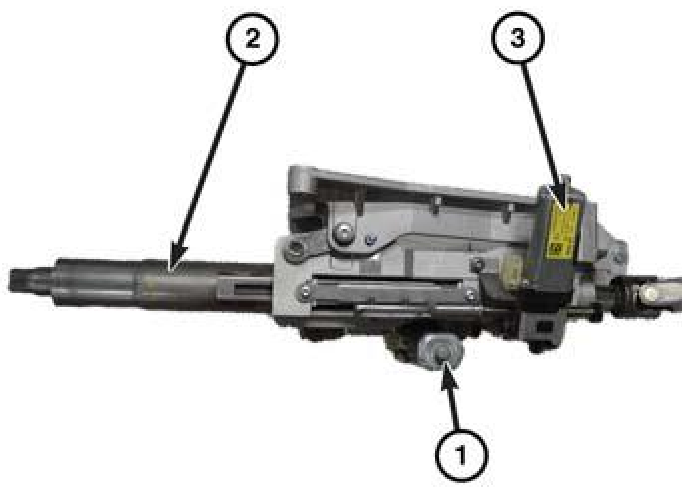


Fig. 3: Tilt Motor, Electronic Tilt/Telescope & Telescoping Motor
Courtesy of CHRYSLER GROUP, LLC

There are two types of columns available: electronic tilt/telescope (2) and manual tilt/telescope (not shown in illustration). Each type of column has been designed to be serviced as an assembly less wiring, switches, steering wheel, etc.

There are no serviceable components on the steering column.

The electronic tilt and telescope column is operated by a switch on the column located below the multi-function switch. If the tilt or telescope function is not working, check the connectors before replacing the column.

When servicing any component of the steering column, refer to WARNING and observe all WARNINGS and CAUTIONS.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - STEERING COLUMN

If the vehicle is involved in a front end collision or the air bag has deployed or both, the steering column must be replaced.

REMOVAL

REMOVAL

WARNING: Before servicing the steering column the airbag system must be disarmed. Failure to do so may result in accidental deployment of the airbag and possible personal injury.

CAUTION: Steering column module is centered to the vehicles steering system. Failure to keep the system and steering column module centered and locked/inhibited from rotating can result in steering column module damage.

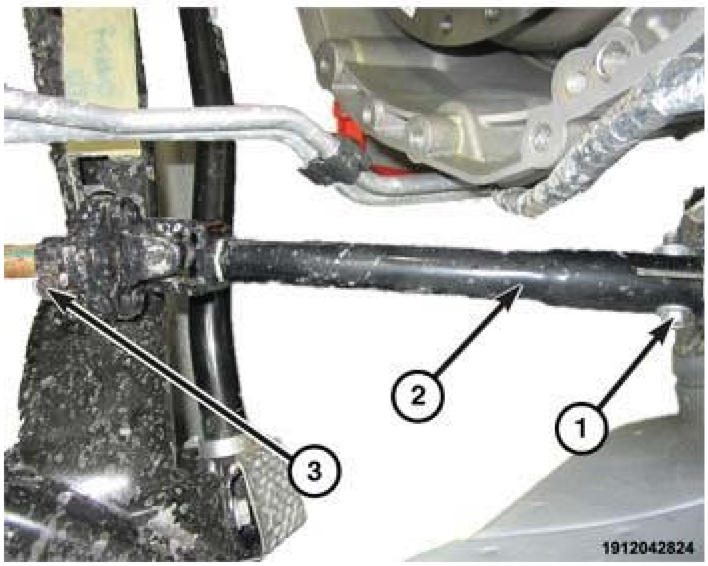


Fig. 4: Lower Intermediate Shaft To Upper Intermediate Shaft Bolt, Lower Intermediate Shaft & Lower Intermediate Shaft To Steering Gear Coupling Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Position front wheels straight ahead.
2. Fully extend the telescoping column.
3. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
4. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
5. Remove and discard the lower intermediate shaft to upper intermediate shaft bolt (1).
6. Separate the lower intermediate shaft (2) from the upper intermediate shaft.
7. Remove the support and lower the vehicle.
8. Remove the steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, REMOVAL** .

9. Remove the steering column control module. Refer to **MODULE, STEERING COLUMN CONTROL, REMOVAL** .

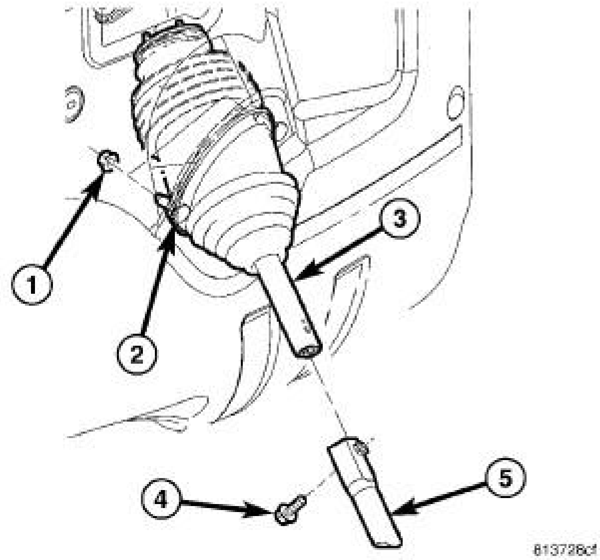


Fig. 5: Shaft Retaining Nuts
Courtesy of CHRYSLER GROUP, LLC

10. Remove two intermediate shaft boot retaining nuts (1) at the bulkhead (2).

Fig. 6: Power Tilt Electrical Connector & Telescope Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

11. If equipped, disconnect the power tilt electrical connector and the telescope electrical connector (1).

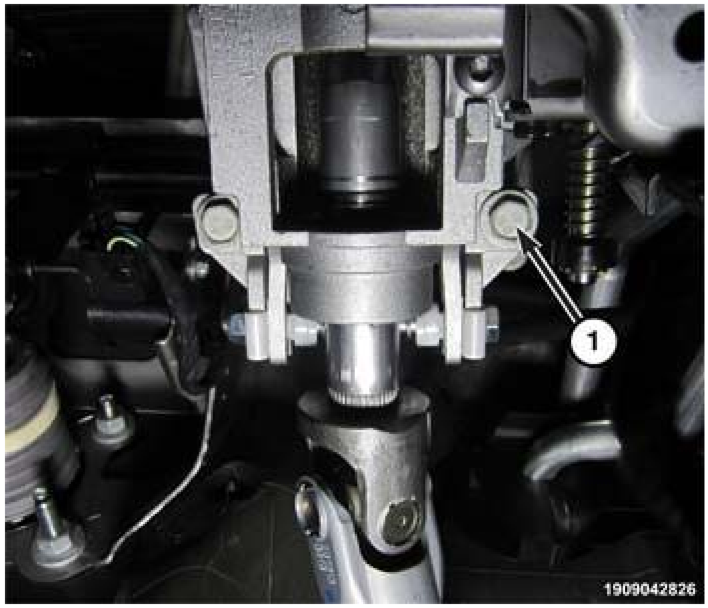


Fig. 7: Column Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

12. Remove front two column mounting bolts (1).

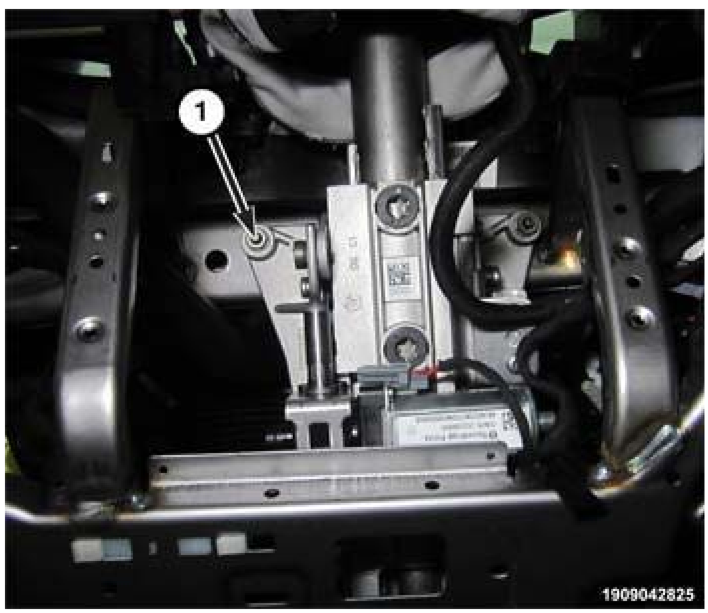


Fig. 8: Mounting Nut
Courtesy of CHRYSLER GROUP, LLC

13. Support the column and remove the two mounting nuts (1).
14. Remove column from the vehicle.

INSTALLATION

INSTALLATION

WARNING: Before servicing the steering column the airbag system must be disarmed. Failure to do so may result in accidental deployment of the airbag and possible

personal injury.

CAUTION: Steering column module is centered to the vehicles steering system. Failure to keep the system and steering column module centered and locked/inhibited from rotating can result in steering column module damage.

NOTE: Make sure the front wheels are still in the straight ahead position.

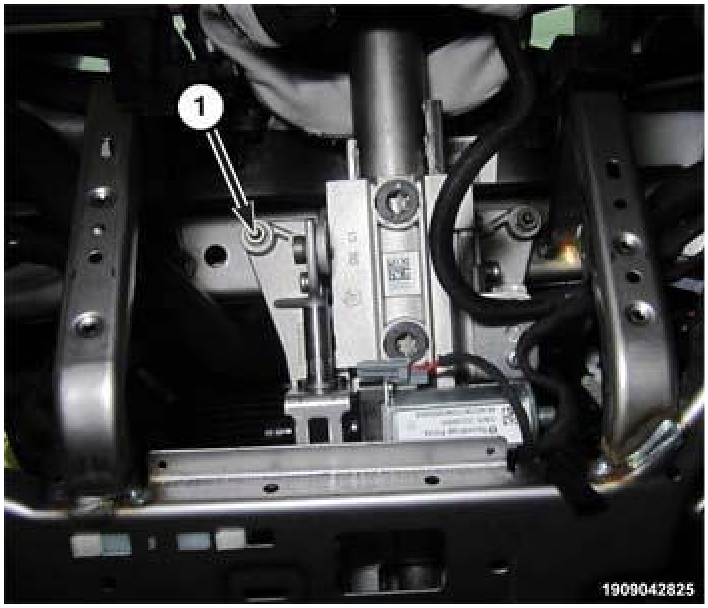


Fig. 9: Mounting Nut
Courtesy of CHRYSLER GROUP, LLC

1. Install the column into the vehicle and lift the column up into place. Loosely install the mounting nuts (1), do not tighten at this time.

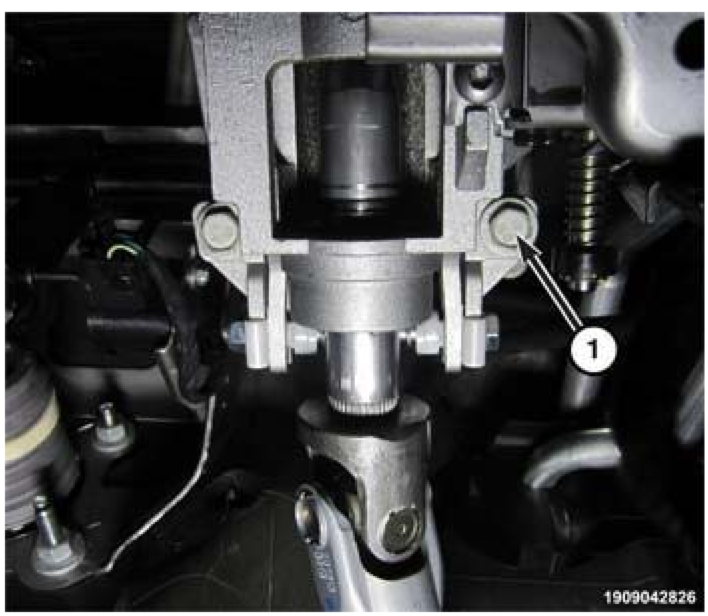


Fig. 10: Column Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Install the two mounting bolts (1) and tighten all four mounting fasteners to the proper specification. Refer to **SPECIFICATIONS**.

Fig. 11: Power Tilt Electrical Connector & Telescope Electrical Connector
Courtesy of CHRYSLER GROUP, LLC

3. If equipped, connect the tilt motor electrical connector and the telescope motor electrical connector (1).
4. Center the intermediate shaft boot at the bulkhead and install the intermediate shaft boot nuts. Tighten the two intermediate shaft boot nuts to the proper specification. Refer to **SPECIFICATIONS**.
5. Install the steering column control module. Refer to **MODULE, STEERING COLUMN CONTROL, INSTALLATION** .
6. Install the steering column opening cover. Refer to **COVER, STEERING COLUMN OPENING, INSTALLATION** .
7. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

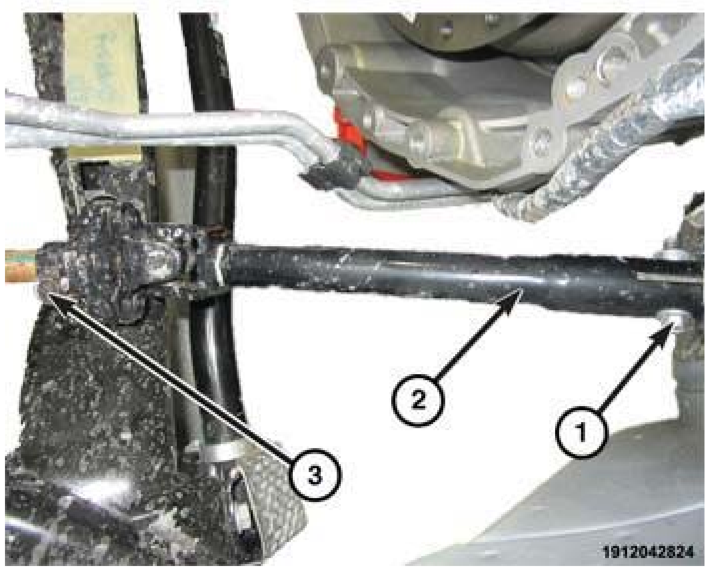


Fig. 12: Lower Intermediate Shaft To Upper Intermediate Shaft Bolt, Lower Intermediate Shaft &

Lower Intermediate Shaft To Steering Gear Coupling Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: **A new lower intermediate shaft to upper intermediate shaft bolt (1) must be installed every time the bolt is removed.**

8. Slide the lower intermediate shaft (2) onto the upper intermediate shaft. Install a **NEW** lower intermediate shaft to upper intermediate shaft bolt (1) and tighten to the proper specification. Refer to **SPECIFICATIONS**.
9. Remove the support and lower the vehicle.
10. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

SHAFT, INTERMEDIATE, LOWER

REMOVAL

REMOVAL

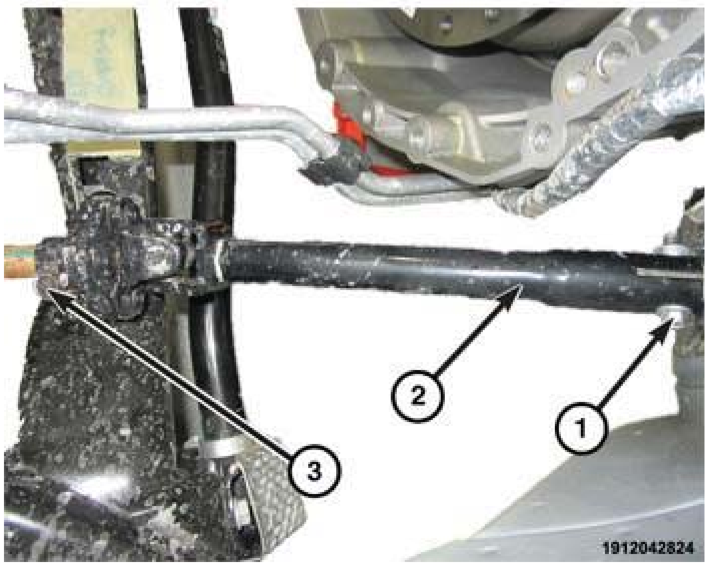


Fig. 13: Lower Intermediate Shaft To Upper Intermediate Shaft Bolt, Lower Intermediate Shaft & Lower Intermediate Shaft To Steering Gear Coupling Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Steering column module is centered to the vehicles steering system. Failure to keep the system and steering column module centered and locked/inhibited from rotating can result in steering column module damage.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove and discard the lower intermediate shaft to upper intermediate shaft bolt (1).
3. Separate the lower intermediate shaft (2) from the upper intermediate shaft.
4. Remove and discard the lower intermediate shaft to steering gear coupling bolt (3).
5. Carefully separate the intermediate shaft (2) from the steering gear.

INSTALLATION

INSTALLATION

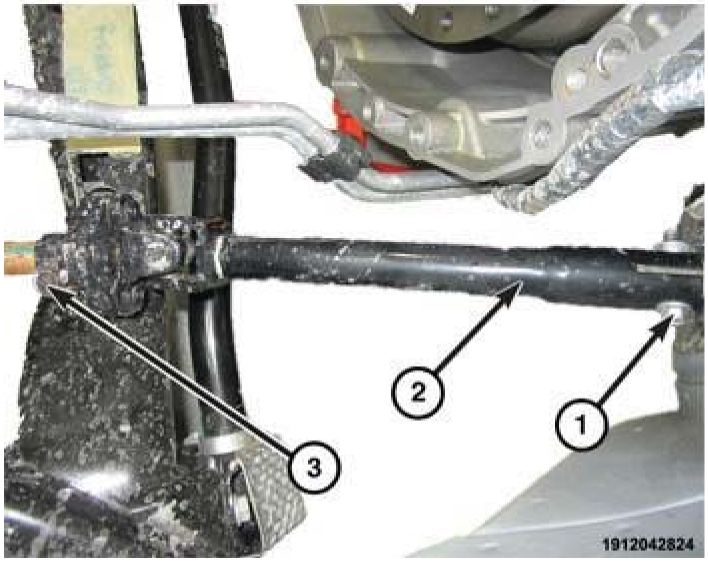


Fig. 14: Lower Intermediate Shaft To Upper Intermediate Shaft Bolt, Lower Intermediate Shaft & Lower Intermediate Shaft To Steering Gear Coupling Bolt
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Steering column module is centered to the vehicles steering system. Failure to keep the system and steering column module centered and locked/inhibited from rotating can result in steering column module damage.**

NOTE: **A new lower intermediate shaft to upper intermediate shaft bolt (1) must be installed every time the bolt is removed.**

1. Slide the lower intermediate shaft (2) onto the upper intermediate shaft. Install a **NEW** lower intermediate shaft to upper intermediate shaft bolt (1) and tighten to the proper specification. Refer to **SPECIFICATIONS**.

   NOTE: **A new lower intermediate shaft to steering gear coupling bolt (3) must be installed every time the bolt is removed.**

2. Slide the coupler from the lower intermediate shaft (2) onto the steering gear shaft and install a **NEW** lower intermediate shaft to steering gear coupling bolt (3) and tighten to the proper specification. Refer to **SPECIFICATIONS**.
3. Remove the support and lower the vehicle.

SHROUD, STEERING COLUMN

DESCRIPTION

DESCRIPTION

The steering column shroud is serviced with the steering column control module. Refer to **MODULE,**

STEERING COLUMN CONTROL, REMOVAL .

WHEEL, STEERING

REMOVAL

REMOVAL

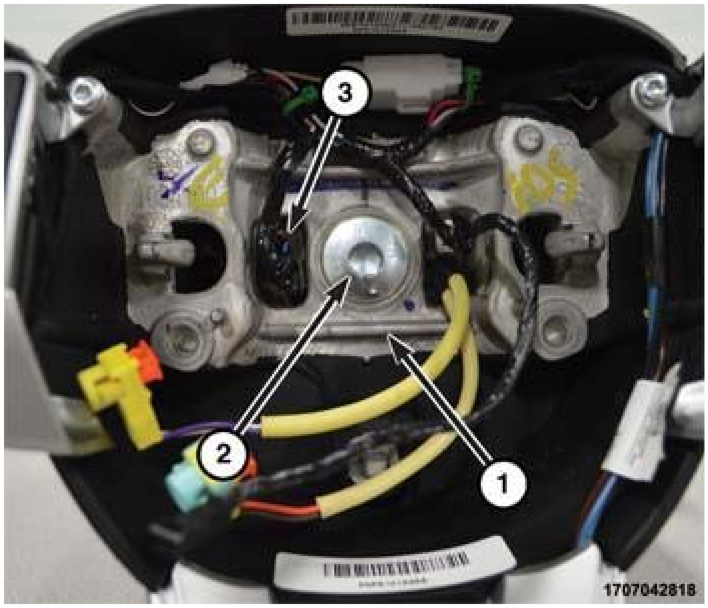


Fig. 15: Steering Wheel, Steering Wheel Bolt & Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

WARNING: Before servicing the steering column, the airbag system must be disarmed. Refer to electrical restraint system for service procedures. Failure to do so may result in accidental deployment of the airbag and possible personal injury.

1. Position the front wheels **straight-ahead** .
2. Fully extend the adjustable steering column.
3. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
4. Remove the driver airbag. Refer to AIR BAG, DRIVER, REMOVAL .
5. Disconnect all wire harness connectors (3).
6. Remove and discard the steering wheel bolt (2) and then slide the steering wheel (1) off the shaft.
7. If the wheel is being replaced, transfer attached components as necessary.

INSTALLATION

INSTALLATION

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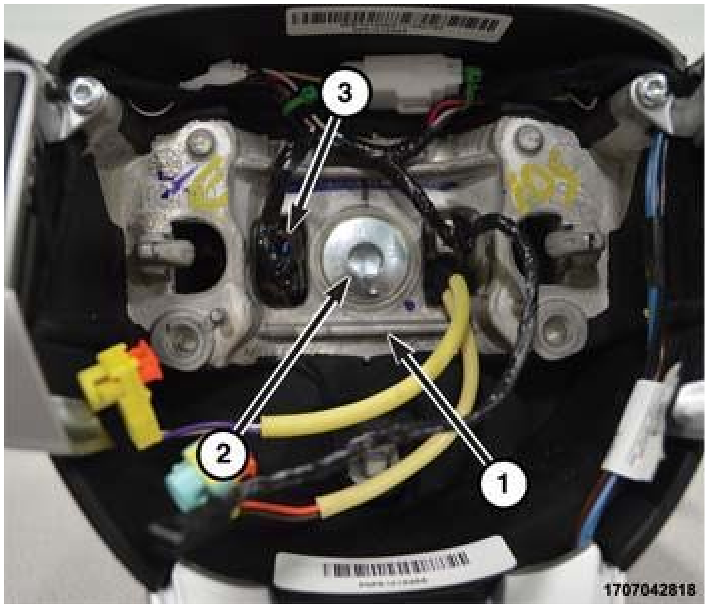

Fig. 16: Steering Wheel, Steering Wheel Bolt & Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **If the steering wheel is excessively off-center while driving, outside of Chassis specifications, inadvertent ESC activations may occur on a vehicle so equipped.**

1. Align the spline on the steering wheel hub to the column shaft, then install the steering wheel (1).

   NOTE: **A new steering wheel bolt (2) must be installed every time the bolt is removed.**

2. Install a **NEW** steering wheel bolt (2) and tighten to the proper specification. Refer to SPECIFICATIONS.
3. Connect all wire harness connectors (3).
4. Install the driver airbag. Refer to AIR BAG, DRIVER, INSTALLATION .
5. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
6. Test the operation of the horn, lights and any other functions that are steering column operated.

GEAR

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER STEERING GEAR

NOTE: **This information is designed to be used in conjunction with the diagnostic charts at the beginning of the Steering Service Information. Refer to DIAGNOSIS AND TESTING.**

OBJECTIONABLE HISS OR WHISTLE POSSIBLY CAUSED BY A NOISY STEERING GEAR

1. Check and adjust power steering fluid level in the reservoir as necessary. Refer to **FLUID, STANDARD PROCEDURE**.
2. Start the vehicle and heat system by steering lock-to-lock 5 times with the engine running at 3000 rpm. Do not hold the gear against the stops for more than 15 seconds at a time.
3. Return the engine to idle speed.
4. Listen for the noise when turning the wheel slowly off center during a dry park maneuver.
5. Replace power steering gear if the hiss or whistle is present. Refer to **GEAR, REMOVAL**.

REMOVAL

ELECTRIC POWER STEERING

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Using a steering wheel holder, lock the steering wheel in place. This will keep the clock spring in the proper orientation.
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

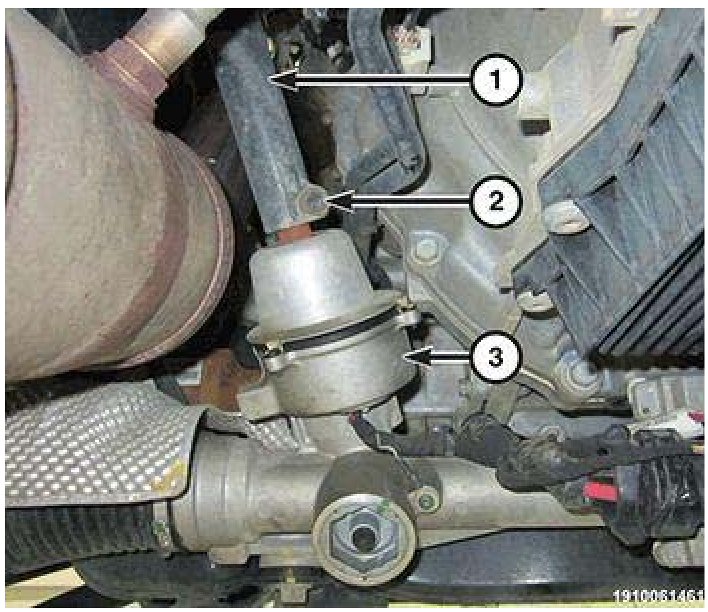

Fig. 17: Lower Intermediate Shaft, Lower Intermediate Shaft Pinch Bolt & Steering Gear
Courtesy of CHRYSLER GROUP, LLC

4. Remove the lower intermediate shaft pinch bolt (2) at the steering gear (3). Separate the lower intermediate shaft (1) from the steering gear (3).

[Fig. 18: Outer Tie Rod Nut]
Courtesy of CHRYSLER GROUP, LLC

5. Remove outer tie rod nut (1) at each knuckle.
6. Using Remover (special tool #9360, Remover, Ball Joint), separate the outer tie rod from each knuckle.

[Fig. 19: Steering Gear Wire Harness Connectors]
Courtesy of CHRYSLER GROUP, LLC

7. Remove the two black steering gear wire harness connectors (1) from the steering gear.

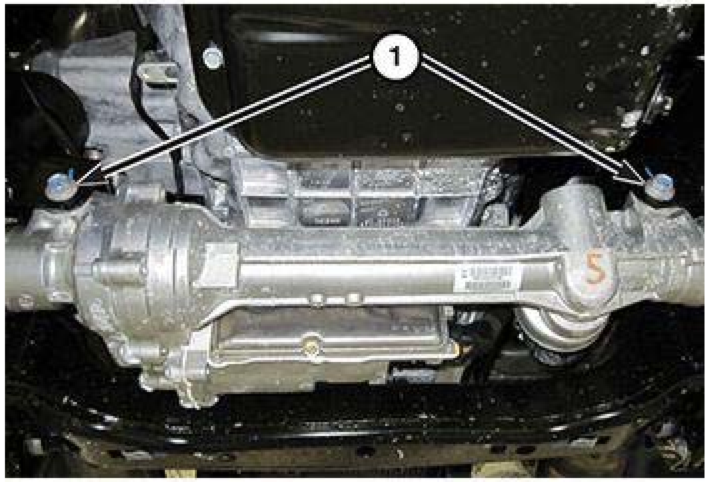

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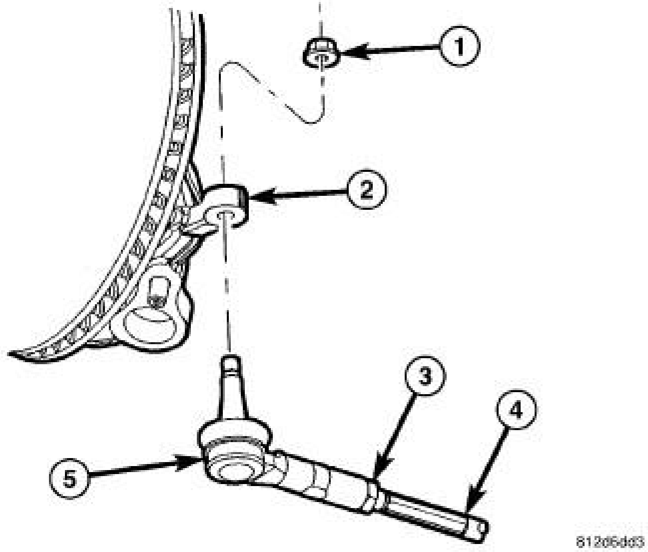
Fig. 20: Steering Gear Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Remove steering gear mounting bolts (1).
9. Remove the steering gear from the vehicle.
10. If necessary, remove the outer tie rods from the gear. Count the number of revolutions during removal for each tie rod, for reference upon installation of a new gear.

HYDRAULIC POWER STEERING

NOTE: **Full hydraulic power steering shown in illustration, electric hydraulic power steering similar.**

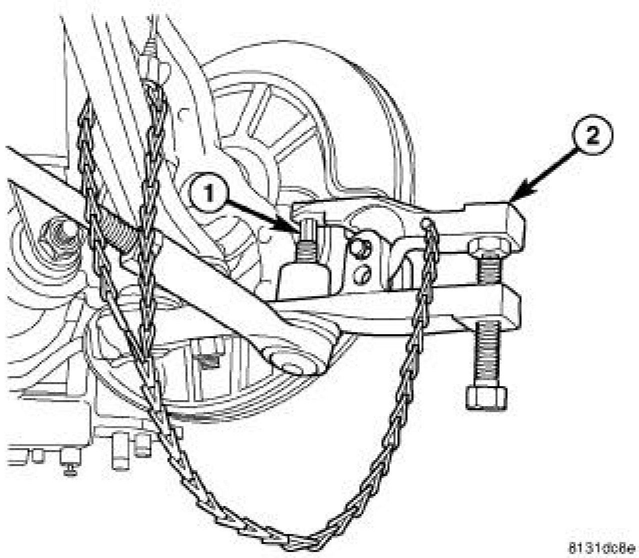
1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Siphon power steering fluid from pump reservoir.
3. Using a steering wheel holder, lock the steering wheel in place to keep it from rotating. This will keep the clock spring in the proper orientation.
4. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
5. Remove the tire and wheel assembly. Refer to **REMOVAL** .



[Fig. 21: Front Outer Tie Rod](#)
Courtesy of CHRYSLER GROUP, LLC

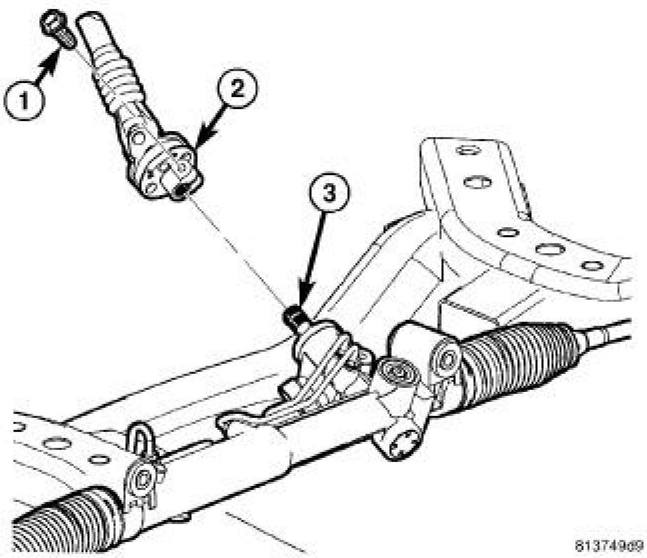
CAUTION: When loosening jam nut and rotating inner tie rod, use care not to twist bellows at inner tie rod. Remove clamp at inner tie rod and make sure bellows moves freely before rotating inner tie rod.

6. Loosen tie rod jam nut (3) on both outer tie rods (5).
7. Remove outer tie rod nut (1) at each knuckle (2).



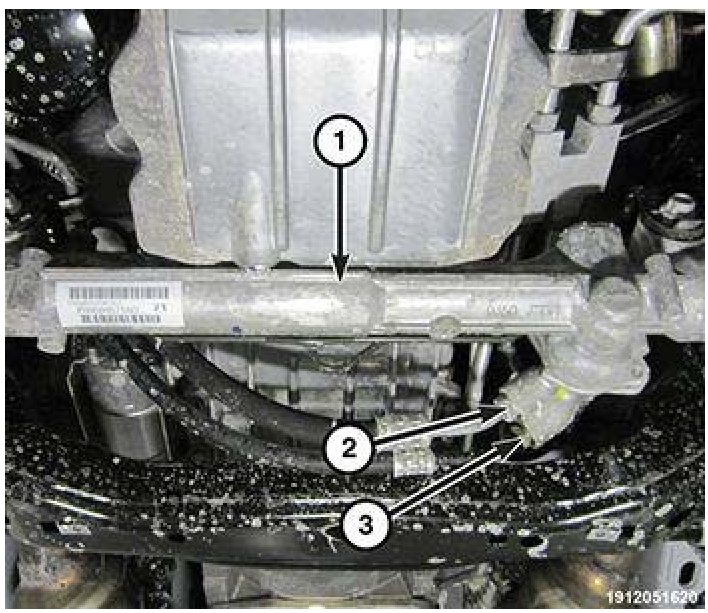
[Fig. 22: Using Puller On Outer Tie Rod](#)
Courtesy of CHRYSLER GROUP, LLC

8. Using Remover (special tool #9360, Remover, Ball Joint) (2), separate outer tie rod (1) from each knuckle.



[Fig. 23: Steering Coupling](#)
Courtesy of CHRYSLER GROUP, LLC

9. Remove lower intermediate shaft pinch bolt (1) at steering gear shaft (3). Separate lower intermediate shaft (2) from steering gear (3).



[Fig. 24: Steering Gear, Pressure Hose & Return Hose](#)
Courtesy of CHRYSLER GROUP, LLC

10. Remove the pressure hose (2) from the steering gear (1).
11. Remove the return hose (3) from the steering gear (1).

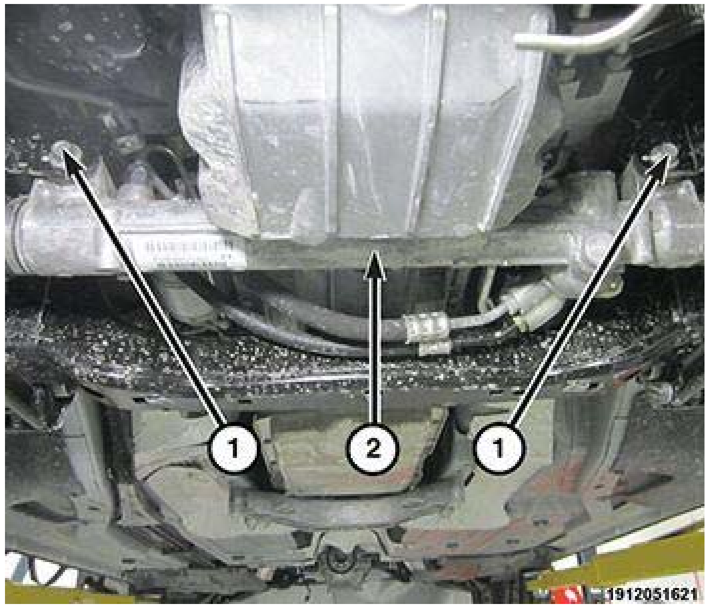


Fig. 25: Steering Gear Assembly & Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove steering gear mounting bolts (1) and the steering gear assembly (2).
13. If necessary, remove outer tie rods from gear. Count number of revolutions off for each tie rod for reference upon installation to replacement gear.

INSTALLATION

ELECTRIC POWER STEERING

1. If removed, install the outer tie rods on the gear.
2. Position the steering gear in the vehicle.

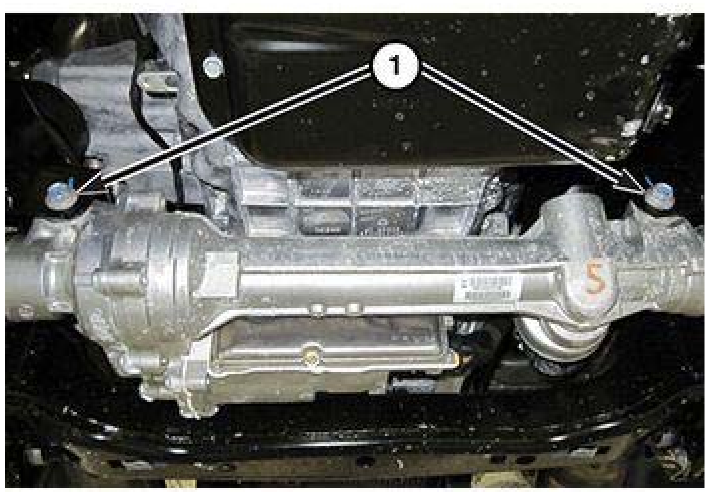


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Fig. 26: Steering Gear Mounting Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Install the steering gear mounting bolts (1). Tighten the steering gear mounting bolts to the proper specification. Refer to **SPECIFICATIONS**.

Fig. 27: Steering Gear Wire Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

4. Install the two black steering gear wire harness connector (1) onto the steering gear.

Fig. 28: Outer Tie Rod Nut
Courtesy of CHRYSLER GROUP, LLC

5. Install the outer tire rod nut (1) at each knuckle. Tighten to the proper specification. Refer to **SPECIFICATIONS**.
6. Install the lower intermediate steering column coupling to steering gear input shaft bolt. Tighten the bolt to the proper specification. Refer to **SPECIFICATIONS**.
7. Remove support and lower the vehicle.

8. Remove the steering wheel holding tool.
9. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
10. With the key on, engine off turn the steering wheel lock to lock one time to calibrate the EPS gear.

HYDRAULIC POWER STEERING

NOTE: **Full hydraulic power steering shown in illustration, electric hydraulic power steering similar.**

1. If installing outer tie rods from the original gear, install each outer tie rod the same amount of threads as it was installed on original gear.

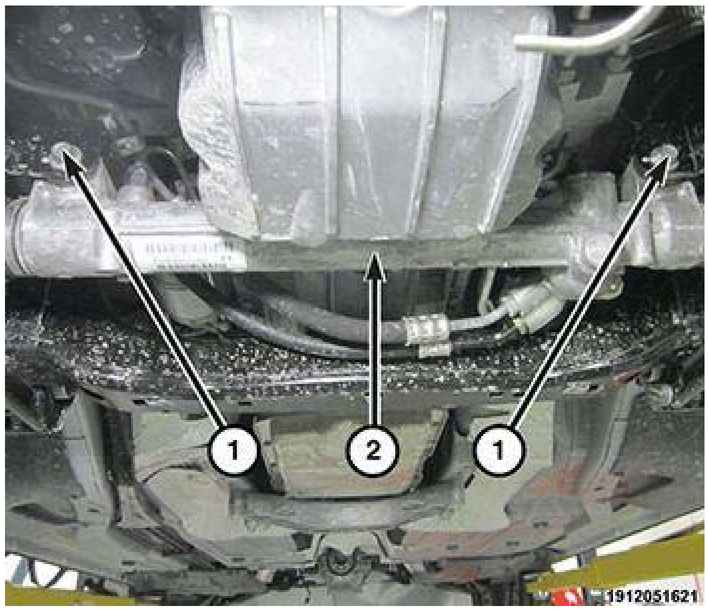


Fig. 29: Steering Gear Assembly & Gear Mounting Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Position the steering gear assembly (2) into the vehicle. Install and tighten the steering gear bolts (1) to the proper specification. Refer to **SPECIFICATIONS**.

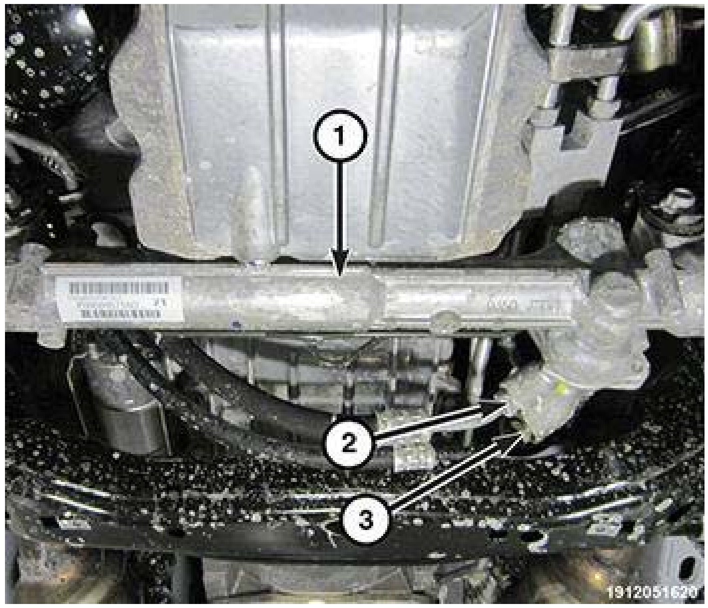


Fig. 30: Steering Gear, Pressure Hose & Return Hose
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Always use a NEW O-ring on the steering hoses.**

3. Using clean power steering fluid, lubricate the **NEW** O-ring on the return hose.
4. Install the return hose (3) to the steering gear (1). Refer to **SPECIFICATIONS**.
5. Using clean power steering fluid, lubricate the **NEW** O-ring on end of pressure hose.
6. Install pressure hose (2) to the steering gear (1). Tighten to the proper specification. Refer to **SPECIFICATIONS**.

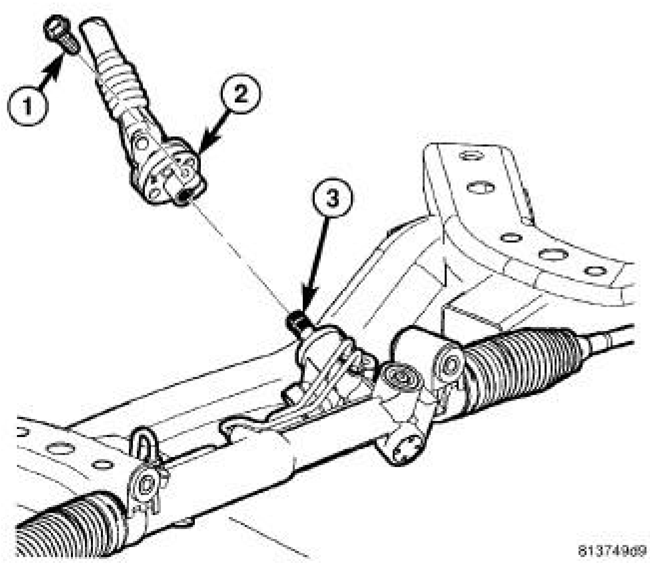


Fig. 31: Steering Coupling
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **Prior to coupling installation, make sure gear is centered in its travel to match clockspring centering in steering column.**

7. Align lower intermediate shaft coupling (2) with input shaft (3). Install the steering coupling using a **NEW** steering coupling pinch bolt. Tighten to the proper specification. Refer to **SPECIFICATIONS**.

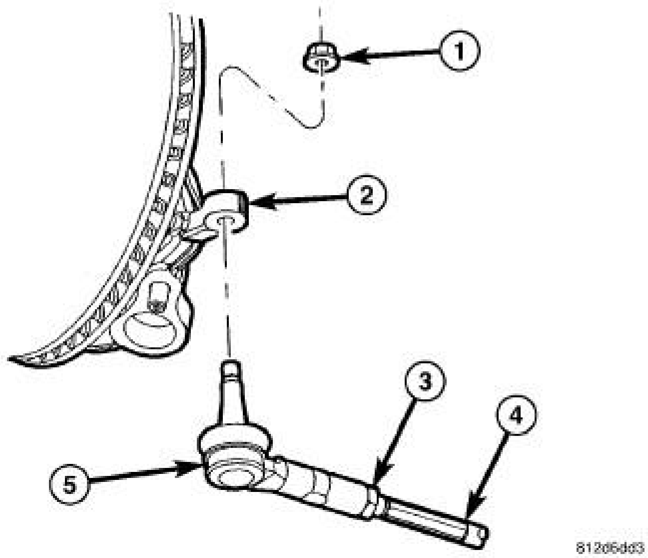


Fig. 32: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

8. Install the outer tie rod ends (5) to the knuckles (2). Tighten tie rod end jam nut (3) to the proper specification. Refer to **SPECIFICATIONS**.
9. Install the tire and wheel assembly. Refer to **INSTALLATION** .
10. Remove support and lower the vehicle.
11. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
12. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.
13. Perform wheel alignment. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

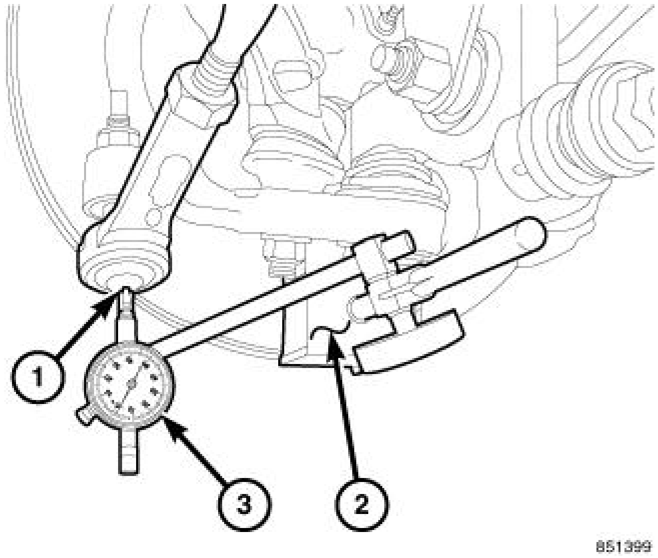
TIE ROD, STEERING

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - TIE ROD

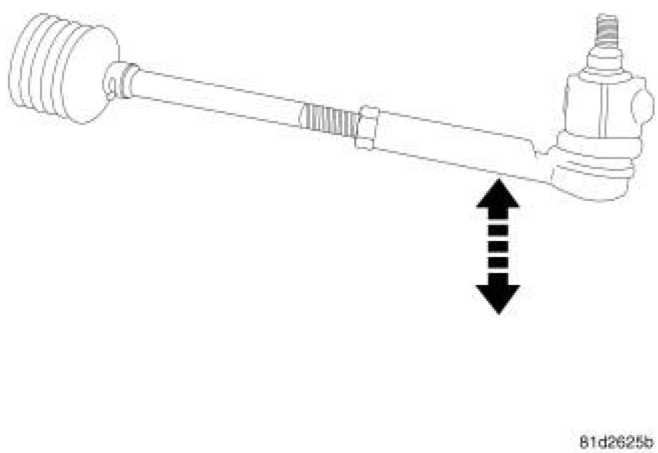
Tie rod free-play can be measured using the following methods:

OUTER TIE ROD



[Fig. 33: Magnetic Dial Indicator]
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the front wheels. Refer to **REMOVAL** .
3. Install two standard wheel mounting nuts, flat side to rotor, diagonally opposite to each on the rotor.
4. Attach a magnetic dial indicator (2) to the inside of the brake rotor, then align dial indicator's contact pointer (1) with direction of stud axis and touch outer tie rod.
5. Zero dial indicator (3).



[Fig. 34: Checking Outer Tie Rod Free-Play]
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**When checking free-play, DO NOT rotate the tie rod. Just because a tie rod rotates easily does not mean that it is necessarily faulty. Using more than light hand pressure will result in a false reading.**

6. Grasp the outer tie rod near the ball stud and attempt to move the tie rod straight up and down using light

hand pressure. (Less than 10 lbs. of force.)

7. Measure and record any tie rod free-play movement.
8. Remove the magnetic dial indicator.
9. Remove the standard wheel mounting nuts from the two studs.
10. If the free-play in the tie rod exceeds 0.05 mm (.002 in.), replace the outer tie rod. Refer to **TIE ROD, STEERING, REMOVAL**. If the free-play is less than 0.05 mm (.002 in.) at the outer tie rod, check the inner tie rod for free-play. See the following procedure:

INNER TIE ROD

NOTE: **Always check and repair (if necessary) outer tie rod free-play before checking inner tie rod free-play. False results can otherwise be obtained.**

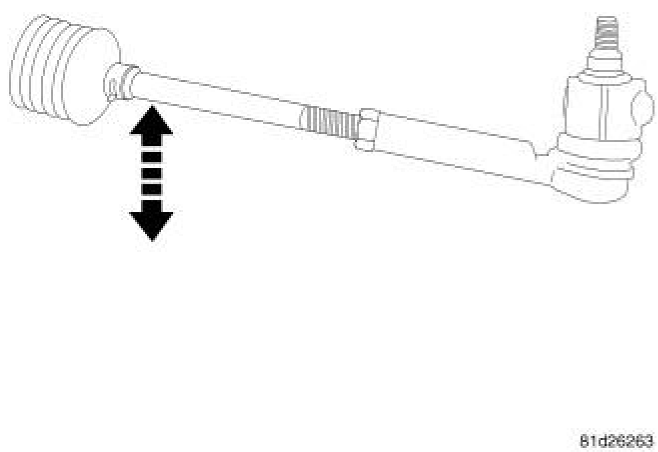


Fig. 35: Checking Inner Tie Rod Free-Play
Courtesy of CHRYSLER GROUP, LLC

1. Grasp the inner tie rod near the steering gear bellows and attempt to move the tie rod straight up and down. If any free-play is felt, replace the inner tie rod. Refer to **TIE ROD, STEERING, REMOVAL**.
2. If no free-play is felt, install the front wheels. Refer to **INSTALLATION** .
3. Remove support and lower the vehicle.

REMOVAL

OUTER TIE ROD

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the tire and wheel assembly. Refer to **REMOVAL** .

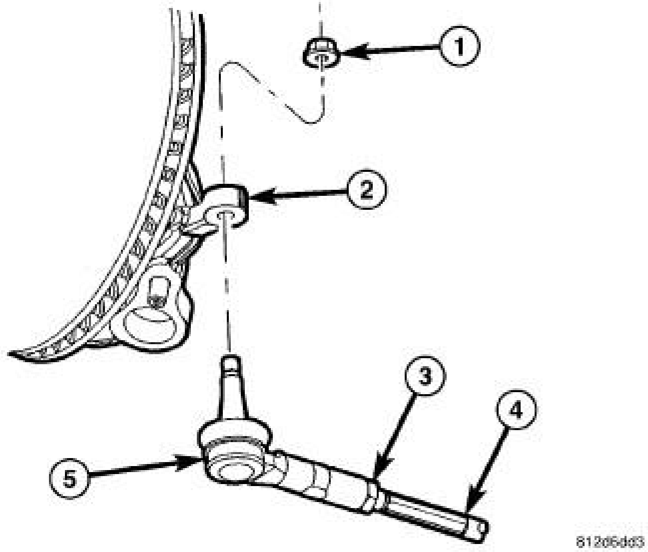


Fig. 36: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **When loosening jam nut and rotating inner tie rod, use care not to twist bellows at inner tie rod. Remove clamp at inner tie rod and make sure bellows moves freely before rotating inner tie rod.**

3. Loosen tie rod jam nut (3) at outer tie rod (5).
4. Remove outer tie rod end nut (1) at knuckle (2).

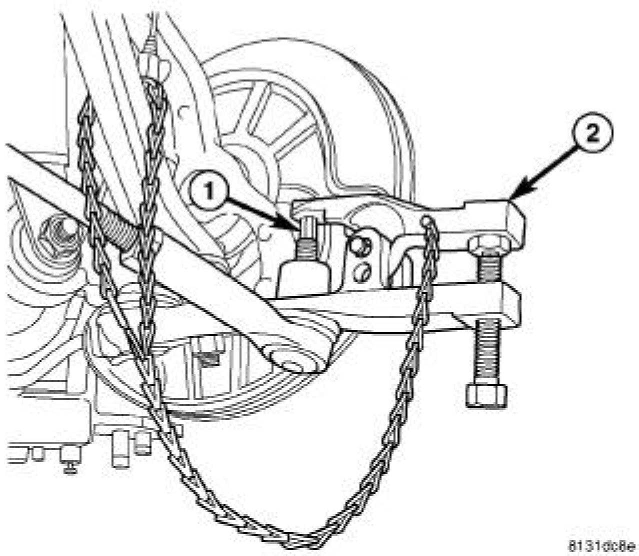


Fig. 37: Using Puller On Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

5. Using Remover (special tool #9360, Remover, Ball Joint) (2), separate outer tie rod end (1) from knuckle.
6. Unthread outer tie rod from inner tie rod. **Count number of turns when removing outer tie rod. This will give a good starting point when reassembling and when setting toe.**

INNER TIE ROD

1. Remove outer tie rod. Refer to **TIE ROD, STEERING, REMOVAL**.
2. Remove tie rod jam nut from inner tie rod.

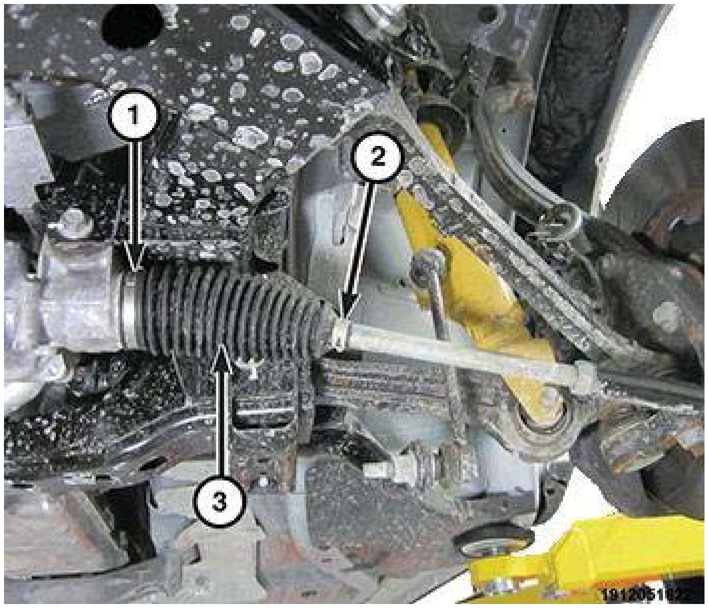


Fig. 38: Clamps & Bellows
Courtesy of CHRYSLER GROUP, LLC

3. Remove clamp (1) securing bellows (3) to inner tie rod.
4. Remove clamp (2) securing bellows (3) to steering gear body.
5. Remove bellows (3).

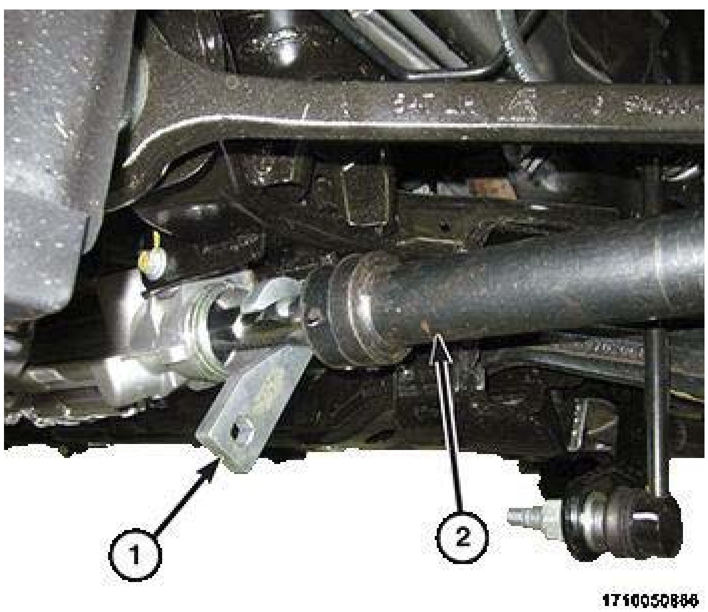


Fig. 39: Inner Tie Rod & Special Tool
Courtesy of CHRYSLER GROUP, LLC

6. Install the (special tool #10417, Holder, EPS Steering Rack) (1) on the LH inner tie rod. Using a suitable

tool (2), remove the inner tie rod.

CAUTION: If inner tie rod cannot be removed using specified tools, do not use a hammer or heat to loosen. Damage to steering gear will occur. Replace entire steering gear.

7. Unthread and remove inner tie rod (2).

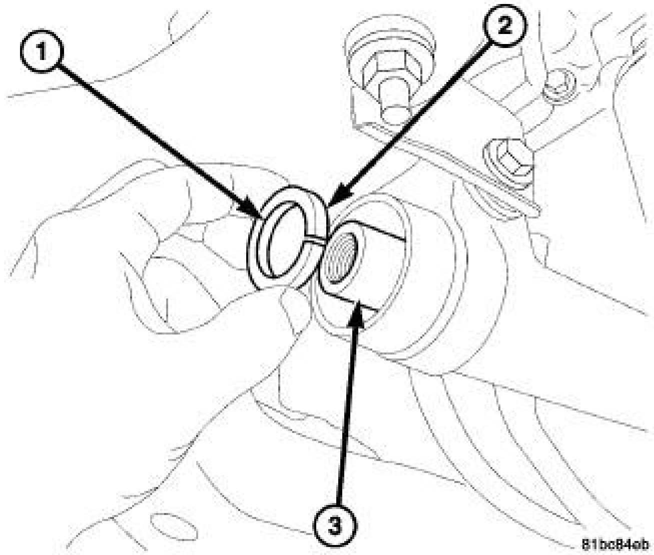


Fig. 40: Restrictor Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

8. Remove travel restrictor (2) from rack gear (3).

INSTALLATION

INNER TIE ROD

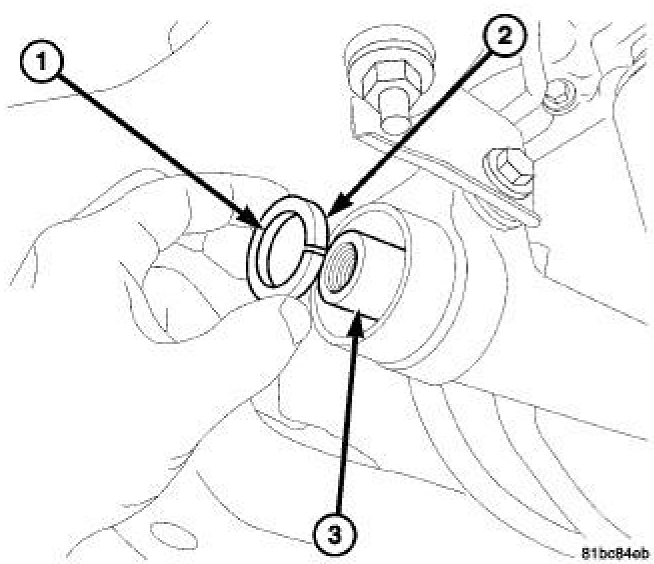


Fig. 41: Restrictor Removal/Installation

Courtesy of CHRYSLER GROUP, LLC

NOTE: **The travel restrictor (2) has a beveled lip (1) on one end of its inside diameter to keep the restrictor from being install too far onto the rack gear. Install the restrictor with the beveled lip side outward (away from gear) to avoid misinstallation and restrictor damage.**

1. Install travel restrictor (2), beveled lip (1) side outward, on end of rack gear (3). Once installed, restrictor will be flush with end of rack gear.
2. Apply MoparÂ® Lock and Seal Adhesive or equivalent medium thread locker adhesive to inboard end threads of inner tie rod.

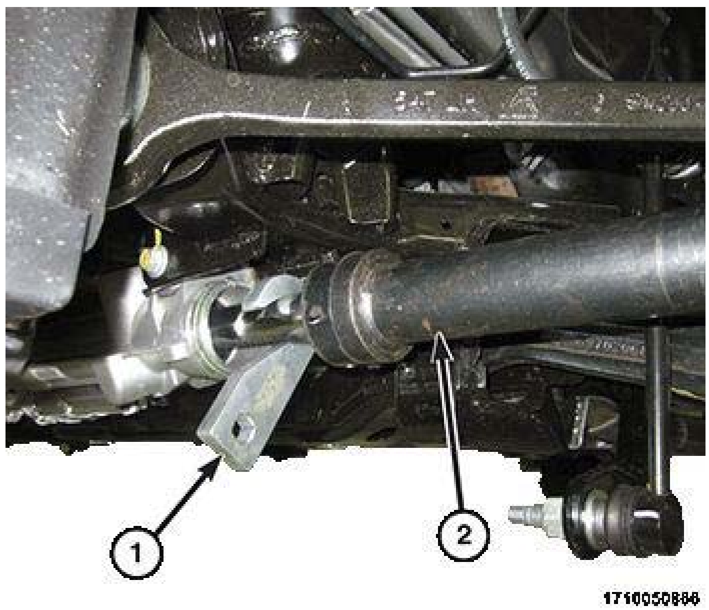


Fig. 42: Inner Tie Rod & Special Tool
Courtesy of CHRYSLER GROUP, LLC

3. Install the inner tie rod, then install the (special tool #10417, Holder, EPS Steering Rack) (1) on the LH inner tie rod. Using a suitable tool (2), install the inner tie rod.
4. Loosely place a new clamp over large end of bellows.

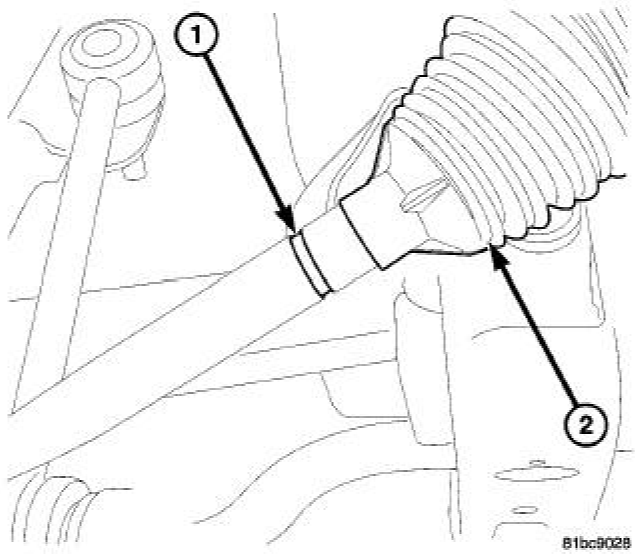


Fig. 43: Groove In Inner Tie Rod
Courtesy of CHRYSLER GROUP, LLC

5. Apply a small amount of MoparÃ® Lubriplate or equivalent uniformly to groove (1) in inner tie rod shaft. This allows for toe adjustment without twisting bellows.
6. Slide new bellows with clamp over end of inner tie rod and onto gear body.
7. Push small end of bellows (2) until ridge inside bellow engages groove (1) machined into inner tie rod.

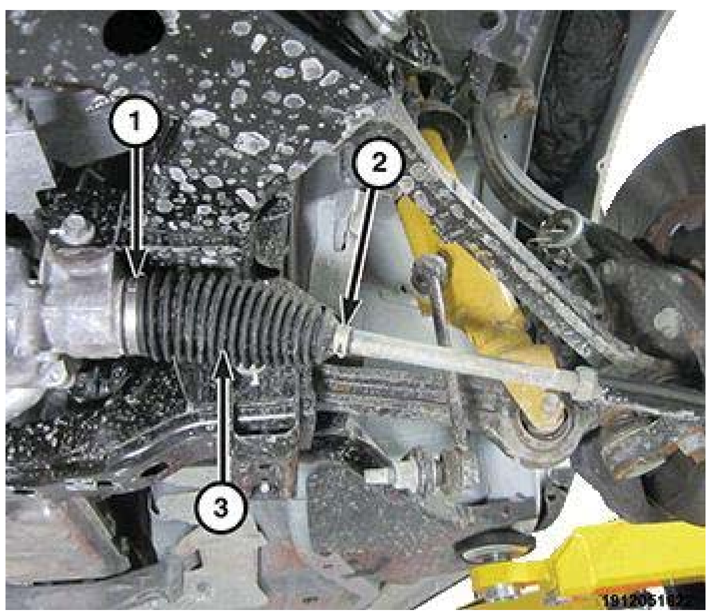


Fig. 44: Clamps & Bellows
Courtesy of CHRYSLER GROUP, LLC

8. Install new clamp (1) over small end of bellows (3).
9. Using crimping pliers, crimp bellows clamp (1) at gear body.
10. Thread tie rod jam nut onto inner tie rod far enough to install outer tie rod.
11. Install outer tie rod. Refer to **TIE ROD, STEERING, INSTALLATION**.

OUTER TIE ROD

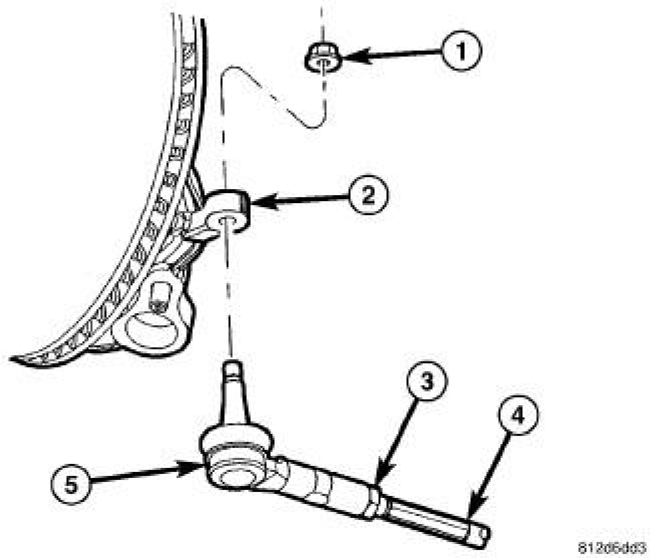


Fig. 45: Front Outer Tie Rod
Courtesy of CHRYSLER GROUP, LLC

CAUTION: When rotating inner tie rod, use care not to twist bellows at inner tie rod. Remove clamp at inner tie rod and make sure bellows moves freely before rotating inner tie rod.

1. Thread outer tie rod (5) onto inner tie rod (4). Install outer tie rod using same number of turns as when removed.
2. Install outer tie rod end (5) into steering knuckle (2). Install and tighten the outer tie rod ball joint nut (1) to the proper specification. Refer to **SPECIFICATIONS**.
3. Tighten the tie rod jam nut (3) to the proper specification. Refer to **SPECIFICATIONS**.
4. Install the tire and wheel assembly. Refer to **INSTALLATION** .
5. Remove the support and lower the vehicle.
6. Perform wheel alignment setting toe to specifications. Refer to **WHEEL ALIGNMENT, STANDARD PROCEDURE** .

PUMP

DESCRIPTION

HYDRAULIC POWER STEERING

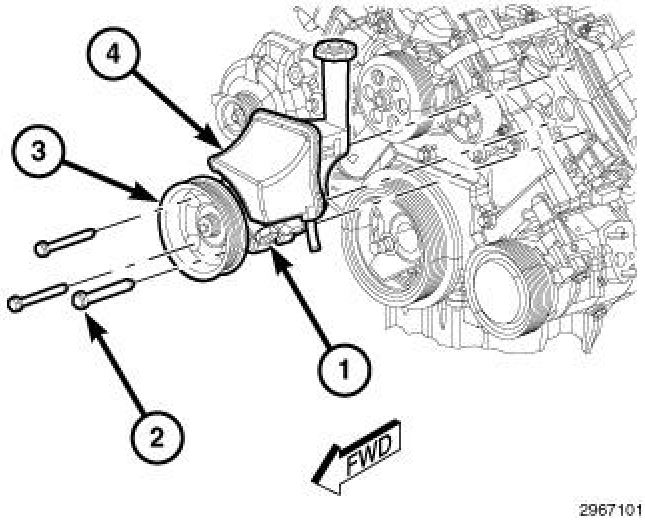


Fig. 46: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

Hydraulic pressure for operation of the power steering gear is provided by a belt-driven all-aluminum power steering pump. Vehicles use a constant displacement type pump that is mounted to the left front of engine. The power steering reservoir (4) is integrated with the power steering pump.

DIAGNOSIS AND TESTING

POWER STEERING PUMP AND HOSES

NOTE: This information is designed to be used in conjunction with the diagnostic charts at the beginning of the Steering Service Information. Refer to DIAGNOSIS AND TESTING.

CHECKING FOR WEAR OF POWER STEERING PUMP INTERNAL COMPONENTS

1. Place gear selector in PARK (or NEUTRAL) with wheels chalked.
2. With the engine idling, have a helper turn the steering wheel.
3. Using an electronic listening tool, determine if noise is coming from the pump.
4. Increase the engine speed and have a helper turn the steering wheel. Does the noise change with load?
5. Replace the power steering pump if excessive noise is present. Refer to PUMP, REMOVAL.

CHECKING FOR POWER STEERING HOSES TOUCHING BODY OR FRAME OF VEHICLE

Check hoses and hose tubes as following:

- Inspect hoses and hose tubes for witness marks. If witness marks are present, adjust hose(s) to the proper position by loosening, repositioning and tightening attachments to the specified torque. Refer to SPECIFICATIONS. **Do not bend tubing to adjust.** Replace the hose assembly if damaged.
- Check fastener torque of hose mounting brackets and tube nuts. Refer to SPECIFICATIONS.
- Have a helper bump the steering gear off of the stops to induce pressure fluctuations which may move the hose. If hose contact is made, adjust hose(s) to the proper position by loosening, repositioning and tightening attachments to the specified torque. Refer to SPECIFICATIONS. **Do not bend tubing to**

adjust. Replace the hose assembly if damaged.

PUMP LEAKAGE

The pump is serviced as an assembly and should not be disassembled.

Check for leaks in the following areas:

- Pump shaft seal behind the pulley
- Pressure and return lines
- Flow control valve fitting

REMOVAL

HYDRAULIC POWER STEERING

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Siphon power steering fluid from pump reservoir.
3. Remove air filter housing. Refer to **BODY, AIR CLEANER, REMOVAL, 3.6L** , **BODY, AIR CLEANER, REMOVAL, 5.7L** , **BODY, AIR CLEANER, REMOVAL, 6.2L** or **BODY, AIR CLEANER, REMOVAL, 6.4L** .
4. Remove serpentine drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .

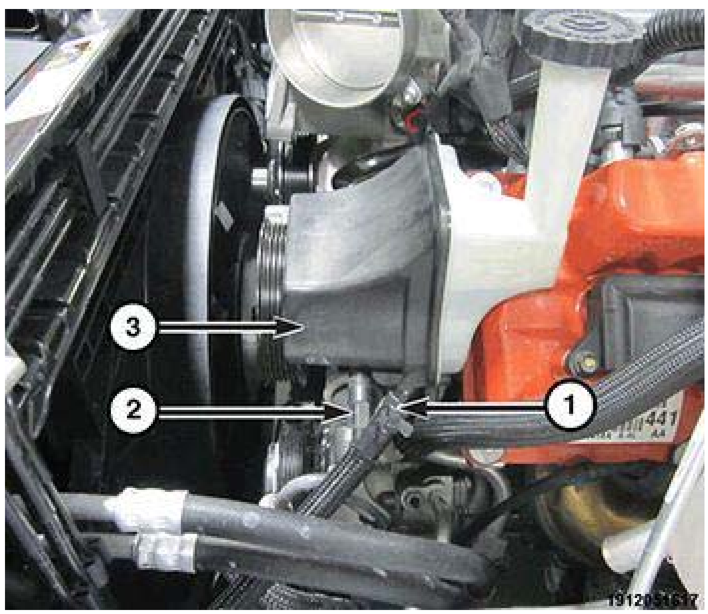


Fig. 47: Supply Hose, Pressure Hose & Power Steering Pump
Courtesy of CHRYSLER GROUP, LLC

5. Loosen the hose clamp, then remove the supply hose (1) from power steering pump (3).
6. Remove the pressure hose (2) from power steering pump (3).

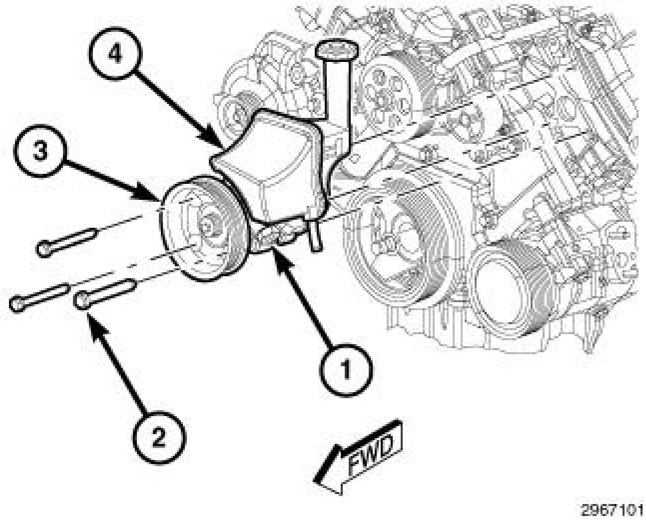


Fig. 48: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove the three power steering pump bolts (2) through the access holes in pulley (3).
8. Remove the power steering pump (1) from engine.
9. If necessary, remove the power steering pump pulley. Refer to **PULLEY, POWER STEERING PUMP, REMOVAL**.

INSTALLATION

HYDRAULIC POWER STEERING

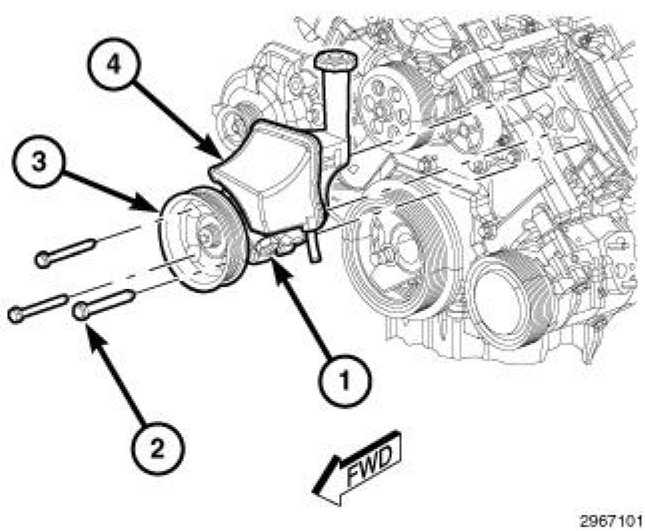


Fig. 49: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Align the power steering pump (1) with mounting holes on engine.
2. Install the three power steering pump bolts (2). Tighten bolts to the proper specification. Refer to **SPECIFICATIONS**.

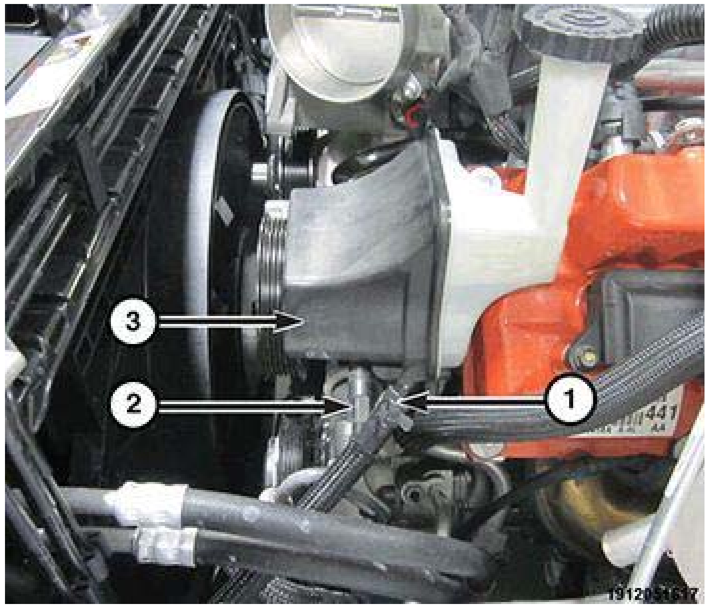


Fig. 50: Supply Hose, Pressure Hose & Power Steering Pump
Courtesy of CHRYSLER GROUP, LLC

NOTE: Always use a NEW O-ring on the end of the pressure hose.

3. Lubricate **NEW** O-ring on end of pressure hose with clean power steering fluid.
4. Install pressure hose (2) to power steering pump (3). Tighten pressure hose tube nut to the proper specification. Refer to **SPECIFICATIONS**.
5. Install the power steering pump return hose (1) and securely tighten the clamp.
6. Install serpentine drive belt. Refer to **BELT, SERPENTINE, INSTALLATION** .
7. Install the air cleaner housing. Refer to **BODY, AIR CLEANER, INSTALLATION, 3.6L** , **BODY, AIR CLEANER, INSTALLATION, 5.7L** , **BODY, AIR CLEANER, INSTALLATION, 6.2L** or **BODY, AIR CLEANER, INSTALLATION, 6.4L** .
8. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
9. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.

COOLER, POWER STEERING

DESCRIPTION

HYDRAULIC POWER STEERING

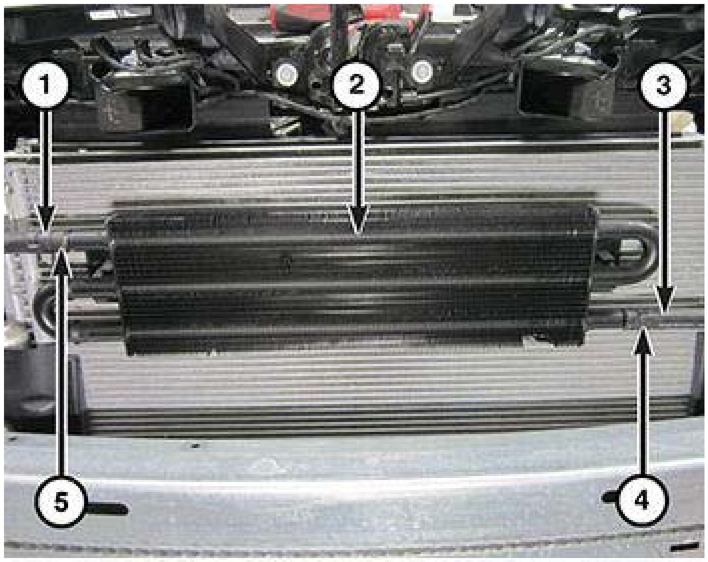


Fig. 51: Power Steering Fluid Cooler Components
Courtesy of CHRYSLER GROUP, LLC

This vehicle uses a fluid-to-air type power steering fluid cooler (2) with external cooling fins. The cooler mounts to clips attached to the front of the cooling module.

The 6.2L Hellcat is the only application with a power steering cooler.

REMOVAL

SRT

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Siphon power steering fluid from pump reservoir.
3. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
4. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .

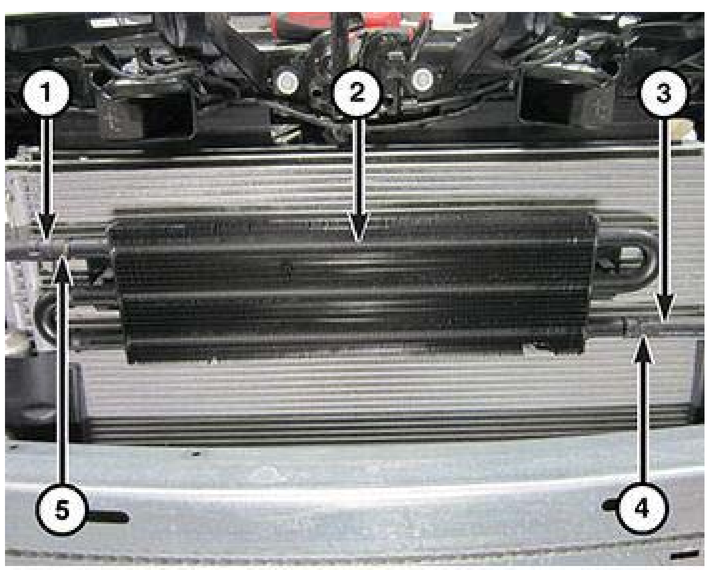


Fig. 52: Power Steering Fluid Cooler Components
Courtesy of CHRYSLER GROUP, LLC

5. Loosen the hose clamp (1) and remove the cooler hose (5) from the cooler (2).
6. Loosen the hose clamp (4) and remove the cooler hose (3) from the cooler (2).

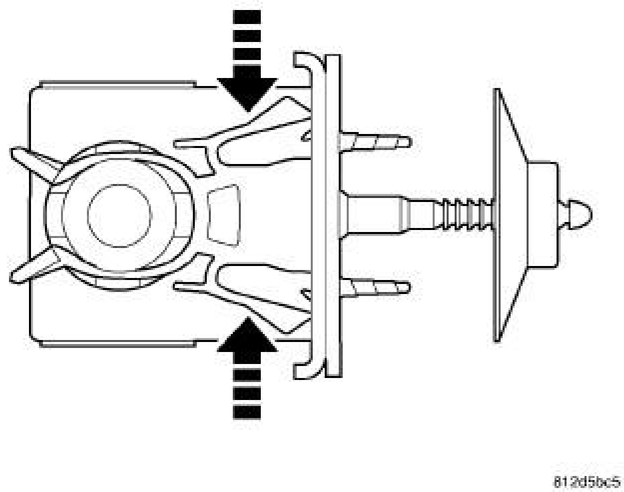


Fig. 53: Cooler Retainer Clips
Courtesy of CHRYSLER GROUP, LLC

7. Push in on cooler mounting clip tabs.
8. Remove cooler from clips mounted to cooling module.

INSTALLATION

SRT

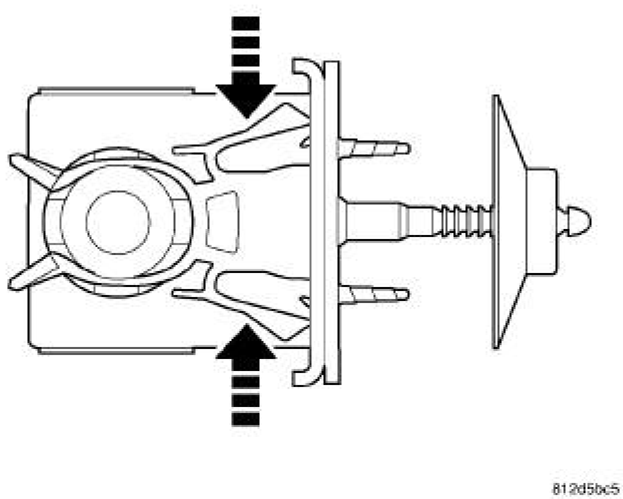


Fig. 54: Cooler Retainer Clips

Courtesy of CHRYSLER GROUP, LLC

1. Install center tube of cooler over mounting clips attached to cooling module. Push cooler past clip retaining tabs allowing it to lock into place.

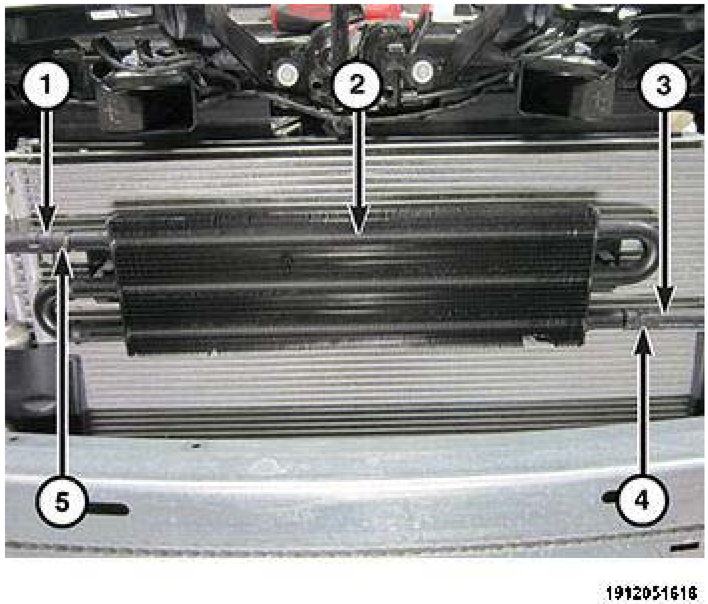


Fig. 55: Power Steering Fluid Cooler Components
Courtesy of CHRYSLER GROUP, LLC

2. Install the hose on (3) on the cooler (2) and securely tighten the clamp (4).
3. Install the hose clamp (5) on the cooler (2) and securely tighten the clamp.
4. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
5. Remove support and lower the vehicle.
6. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
7. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.

FLUID

DESCRIPTION

DESCRIPTION

The recommended fluid for the power steering system is MoparÃ® Hydraulic System Power Steering Fluid (MS-10838).

MoparÃ® Hydraulic System Power Steering Fluid, when new, is amber in color. MoparÃ® Hydraulic System Power Steering Fluid is dyed amber so it can be identified from other fluids used in the vehicle such as engine oil or antifreeze. The amber color is not permanent and is not an indicator of fluid condition. As the vehicle is driven, MoparÃ® Hydraulic System Power Steering Fluid will begin to look darker in color and may eventually become brown. **THIS IS NORMAL.** Consequently, odor and color cannot be used to indicate the fluid condition or the need for a fluid change.

STANDARD PROCEDURE

POWER STEERING FLUID LEVEL CHECKING

WARNING: **Fluid level should be checked with the engine OFF to prevent personal injury from moving parts and to assure an accurate fluid level reading.**

CAUTION: **MoparÂ® Hydraulic System Power Steering Fluid MS-10838 is to be used in the power steering system. No other power steering is to be used in the system. Damage may result to the power steering pump and system if another fluid is used. Do not overfill the system.**

NOTE: **Although not required at specific intervals, the fluid level may be checked periodically. Check the fluid level anytime there is a system noise or fluid leak suspected.**

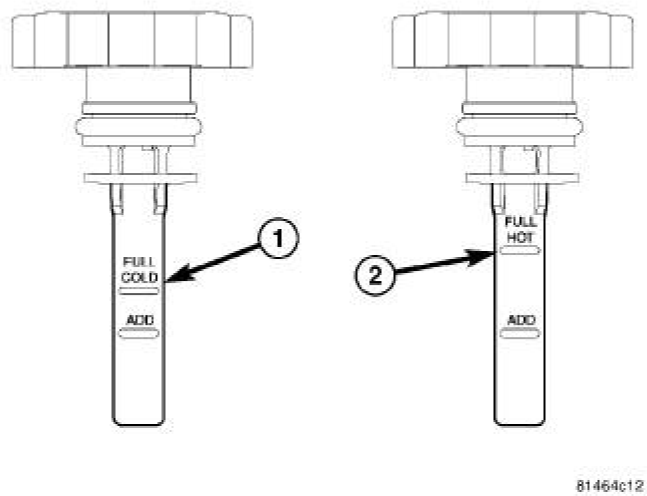


Fig. 56: Cold & Hot Sides Of Dipstick
Courtesy of CHRYSLER GROUP, LLC

The power steering fluid level can be viewed on the dipstick attached to the filler cap. There are two sides to the dipstick, one is for checking the fluid when it is cold, the other is for checking the fluid when it is hot. Before opening the power steering system, wipe the reservoir filler cap free of dirt and debris. Remove the cap and check the fluid level on its dipstick.

Use the COLD side of the dipstick (1) to measure when the fluid is at normal ambient temperature, approximately 21Â°C to 27Â°C (70Â°F to 80Â°F). The fluid level should read between the ADD and FULL COLD lines.

Use the HOT side of the dipstick (2) to measure when the vehicle has been running and the fluid is hot. When the fluid is hot, the fluid level is allowed to read up to the FULL HOT line. **Only add fluid to the system when the vehicle is cold.**

Use only MoparÂ® Hydraulic System Power Steering Fluid (MS-10838) in the power steering system. Do not overfill the power steering system.

HOSE, POWER STEERING, PRESSURE

REMOVAL

HYDRAULIC POWER STEERING

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Siphon power steering fluid from pump reservoir.
3. Remove air cleaner and inlet tube. Refer to **BODY, AIR CLEANER, REMOVAL, 3.6L** , **BODY, AIR CLEANER, REMOVAL, 5.7L** , **BODY, AIR CLEANER, REMOVAL, 6.2L** or **BODY, AIR CLEANER, REMOVAL, 6.4L** .

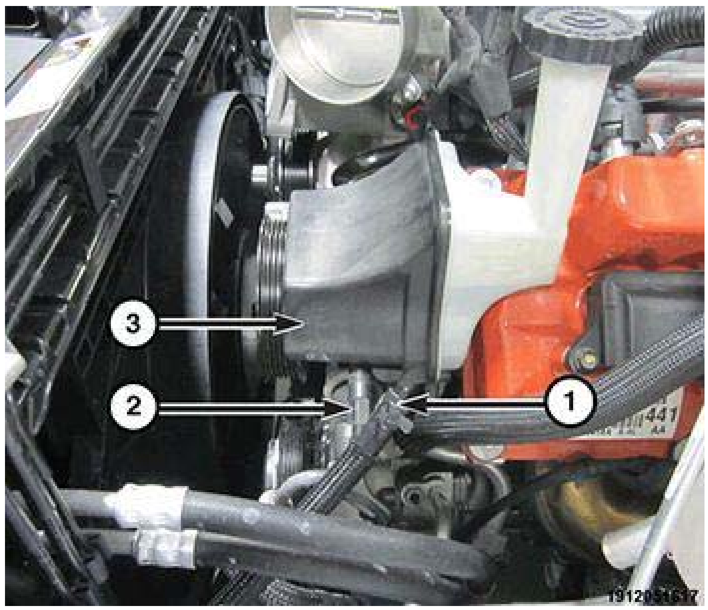


Fig. 57: Supply Hose, Pressure Hose & Power Steering Pump
Courtesy of CHRYSLER GROUP, LLC

4. Remove power steering pressure hose (2) from the power steering pump (3).
5. Raise and support vehicle. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .
6. Remove belly pan. Refer to **BELLY PAN, REMOVAL** and **BELLY PAN, ENGINE, REMOVAL** .

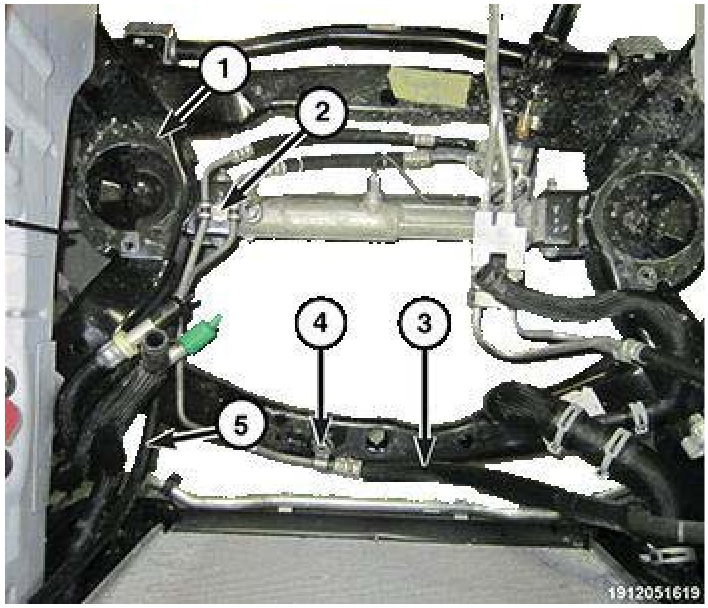


Fig. 58: Engine Cradle, Fasteners, Pressure Hose & Return Hose
Courtesy of CHRYSLER GROUP, LLC

7. Remove the fastener (4) securing power steering pressure hose (3) to the front of engine cradle (1).
8. Remove screw (2) fastening routing clamps securing pressure (3) and return (5) hoses to right side of engine cradle (1).

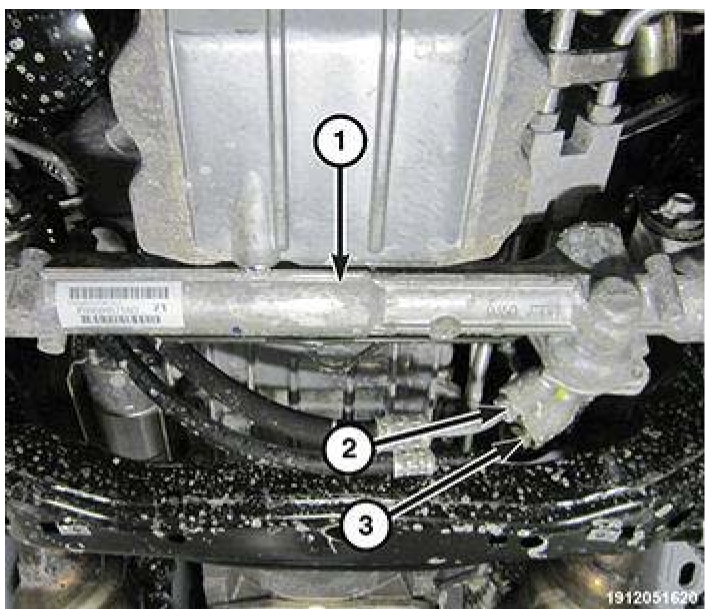
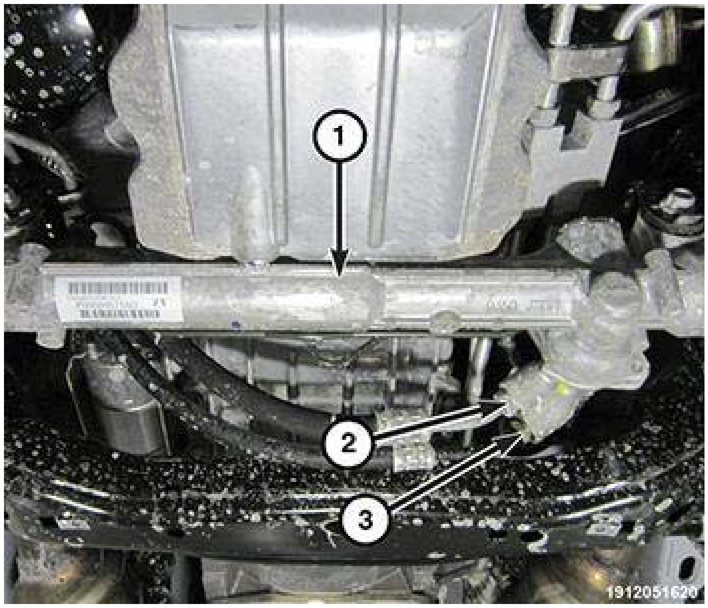


Fig. 59: Steering Gear, Pressure Hose & Return Hose
Courtesy of CHRYSLER GROUP, LLC

9. Remove the power steering pressure hose (2) from the steering gear (1).
10. Remove power steering pressure hose from vehicle.

INSTALLATION

HYDRAULIC POWER STEERING

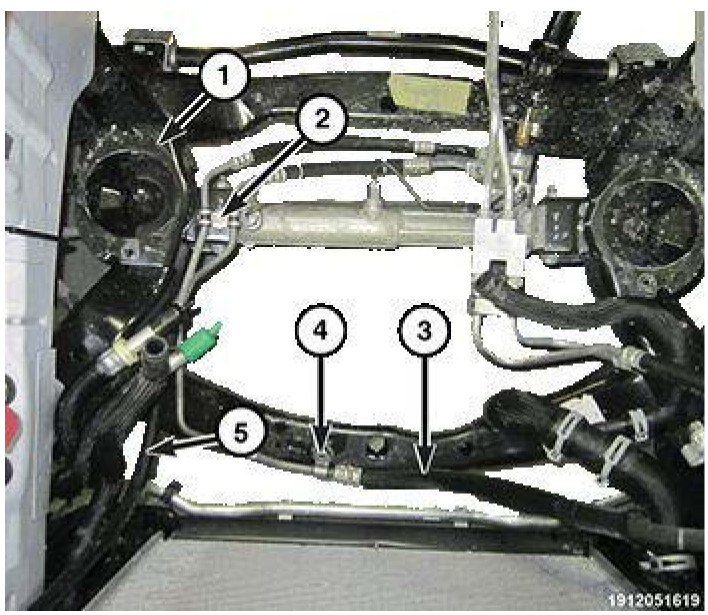


[Fig. 60: Steering Gear, Pressure Hose & Return Hose]
Courtesy of CHRYSLER GROUP, LLC

1. Install pressure hose in engine compartment from underneath.

NOTE: **Always use a NEW O-ring on the end of the pressure hose.**

2. Lubricate new O-ring on steering gear end of pressure hose with clean power steering fluid.
3. Install pressure hose (2) to steering gear (1). **Do not tighten tube nut at this time.**



[Fig. 61: Engine Cradle, Fasteners, Pressure Hose & Return Hose]
Courtesy of CHRYSLER GROUP, LLC

4. Route pressure hose along right side of engine cradle. Position pressure hose (3) routing clamp over return hose (5) routing clamp, then install screw (2) securing hoses to right side of engine cradle (1).
5. Route pressure hose along front of engine cradle. Install screw (4) through routing clamp securing hose to front of engine cradle (1).

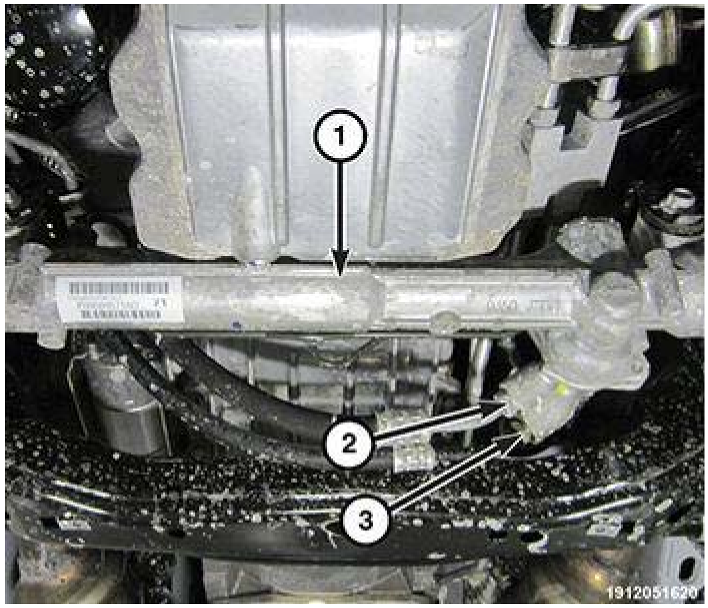


Fig. 62: Steering Gear, Pressure Hose & Return Hose
Courtesy of CHRYSLER GROUP, LLC

6. Tighten power steering pressure hose nut (2) at steering gear to the proper specification. Refer to **SPECIFICATIONS**.
7. Install belly pan. Refer to **BELLY PAN, INSTALLATION** and **BELLY PAN, ENGINE, INSTALLATION** .
8. Remove support and lower the vehicle.

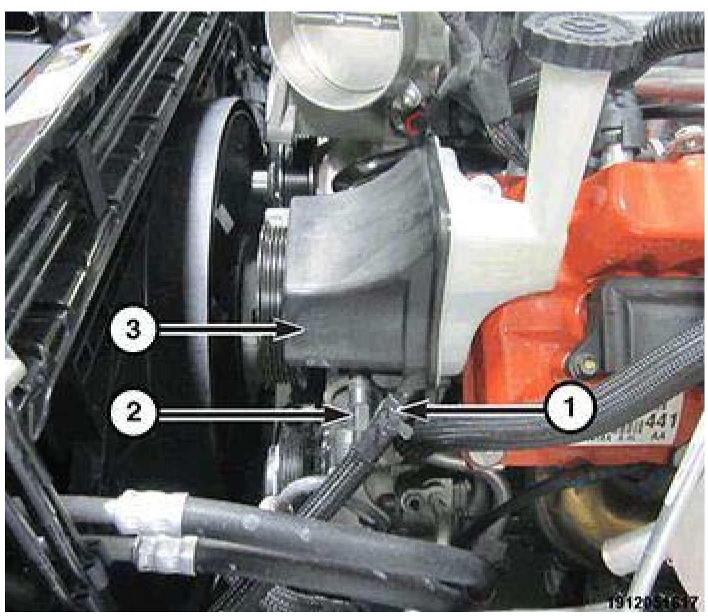


Fig. 63: Supply Hose, Pressure Hose & Power Steering Pump
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Always use a**

NEW

O-ring on the end of the pressure hose.

9. Lubricate new O-ring on power steering pump end of pressure hose with clean power steering fluid.
10. Install power steering pressure hose (2) to pump (3). Tighten power steering pressure hose nut to the proper specification. Refer to **SPECIFICATIONS**.
11. Install the air cleaner body and inlet tube. Refer to **BODY, AIR CLEANER, INSTALLATION, 3.6L** , **BODY, AIR CLEANER, INSTALLATION, 5.7L** , **BODY, AIR CLEANER, INSTALLATION, 6.2L** or **BODY, AIR CLEANER, INSTALLATION, 6.4L** .
12. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
13. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.

HOSE, POWER STEERING, RETURN

REMOVAL

COOLER TO RESERVOIR - 6.2L

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Siphon power steering fluid from pump reservoir.
3. Remove the air cleaner. Refer to **BODY, AIR CLEANER, REMOVAL, 6.2L** .

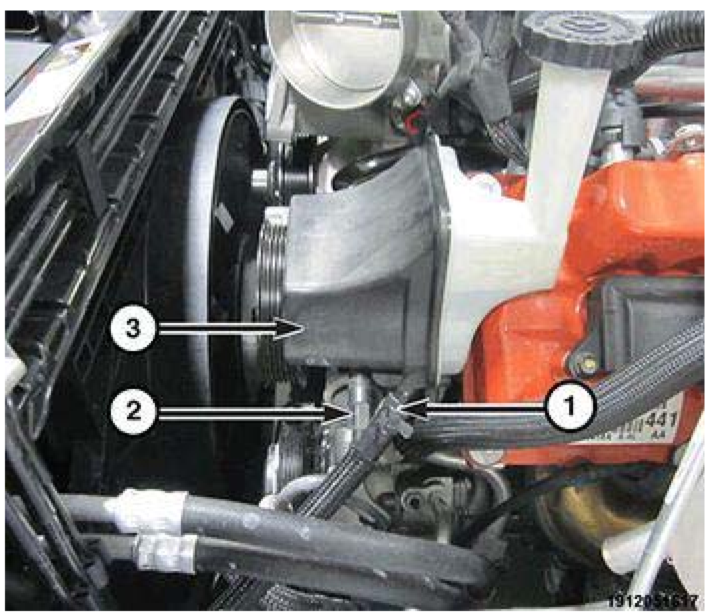
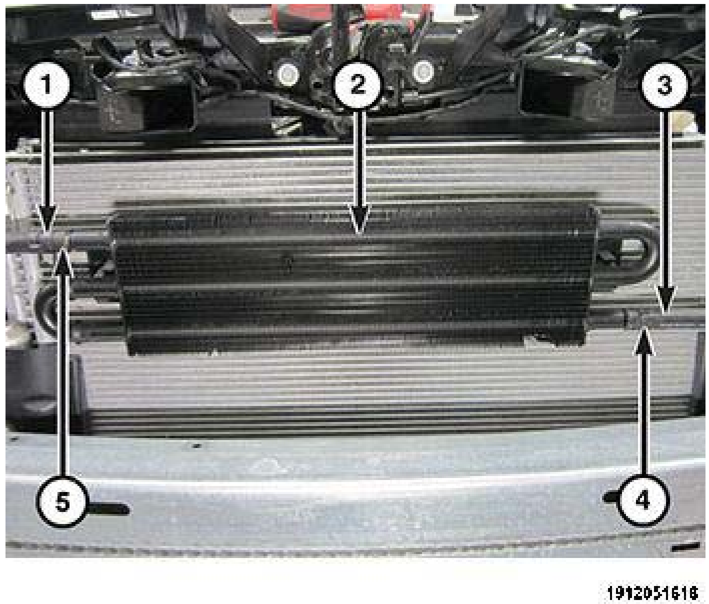


Fig. 64: Supply Hose, Pressure Hose & Power Steering Pump
Courtesy of CHRYSLER GROUP, LLC

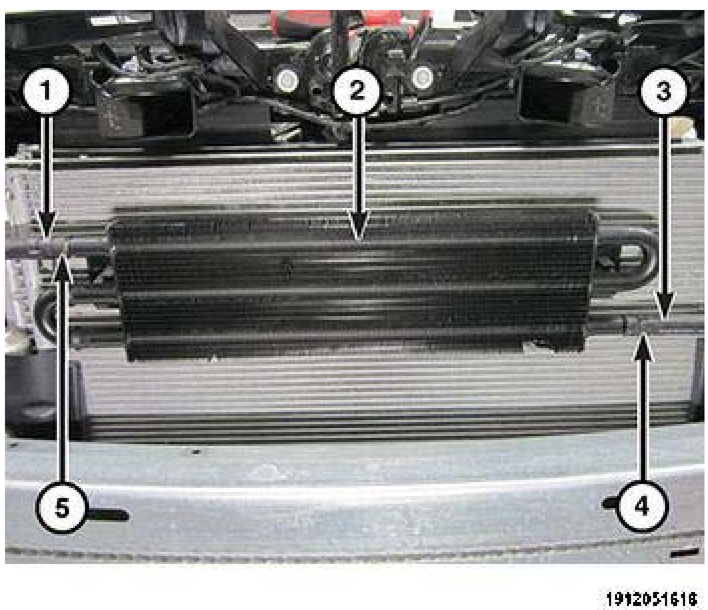
4. Loosen the hose clamp and remove the power steering return hose (1).
5. Remove upper radiator closeout panels.



[Fig. 65: Power Steering Fluid Cooler Components](#)
Courtesy of CHRYSLER GROUP, LLC

6. Loosen the hose clamp (4) and remove power steering return hose (3) at cooling module (2).
7. Remove return hose from routing clip on headlamp mounting crossmember.
8. Remove the power steering return hose from the vehicle.

GEAR TO COOLER - 6.2L



[Fig. 66: Power Steering Fluid Cooler Components](#)
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
2. Remove the radiator closeout panels.
3. Loosen the steering gear to cooler hose clamp (1) and remove the steering gear to cooler hose. (5).

4. Siphon the power steering fluid from the power steering pump reservoir.
5. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
6. Remove the belly pan. Refer to **BELLY PAN, REMOVAL** and **BELLY PAN, ENGINE, REMOVAL** .

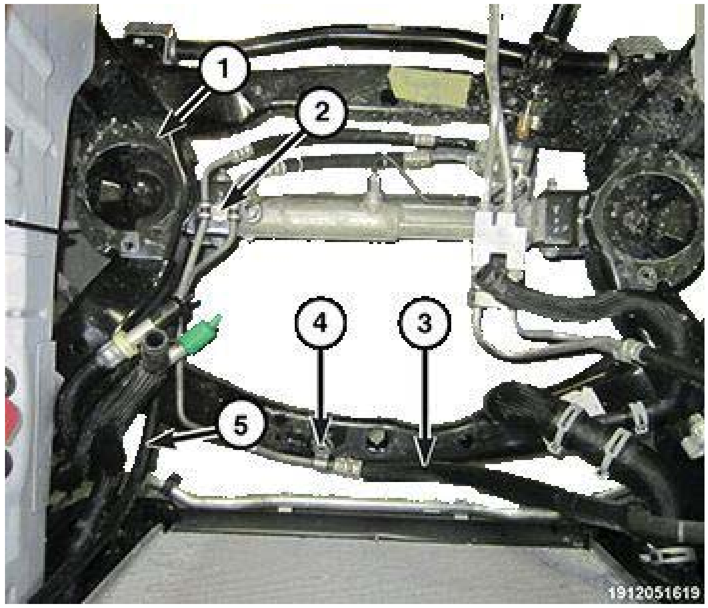


Fig. 67: Engine Cradle, Fasteners, Pressure Hose & Return Hose
Courtesy of CHRYSLER GROUP, LLC

7. Remove the fastener (2) securing power steering pressure hose (3) and power steering return hose (5) to the engine cradle (1).

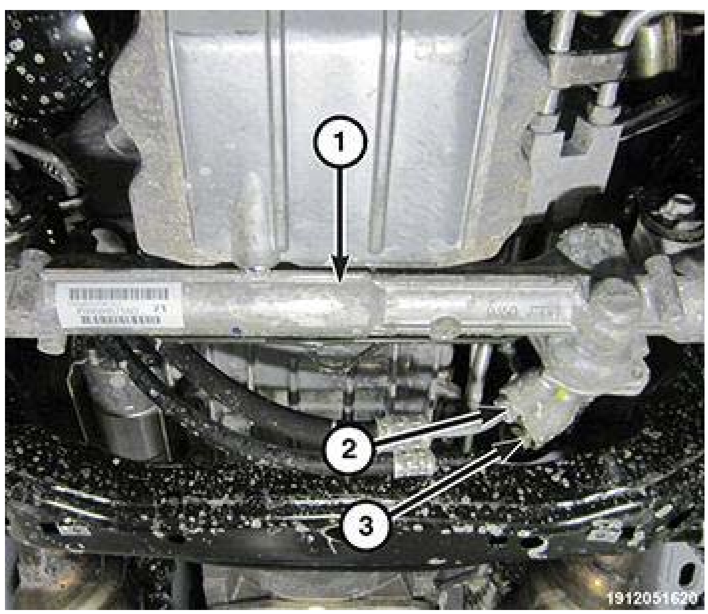


Fig. 68: Steering Gear, Pressure Hose & Return Hose
Courtesy of CHRYSLER GROUP, LLC

8. Remove the power steering return hose nut (3) from the steering gear (1) and remove the power steering return hose from the vehicle.

INSTALLATION

COOLER TO RESERVOIR - 6.2L

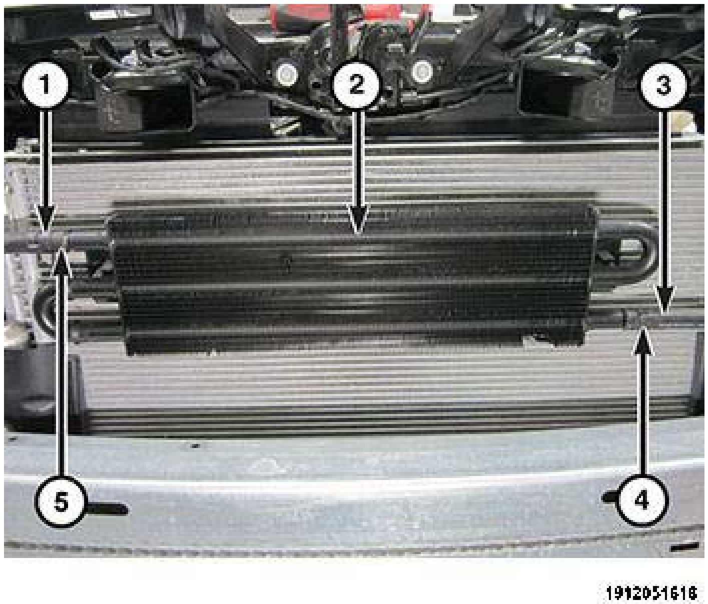


Fig. 69: Power Steering Fluid Cooler Components
Courtesy of CHRYSLER GROUP, LLC

1. Install the power steering return hose (3) to the cooling module (2) and tighten the clamp (4).

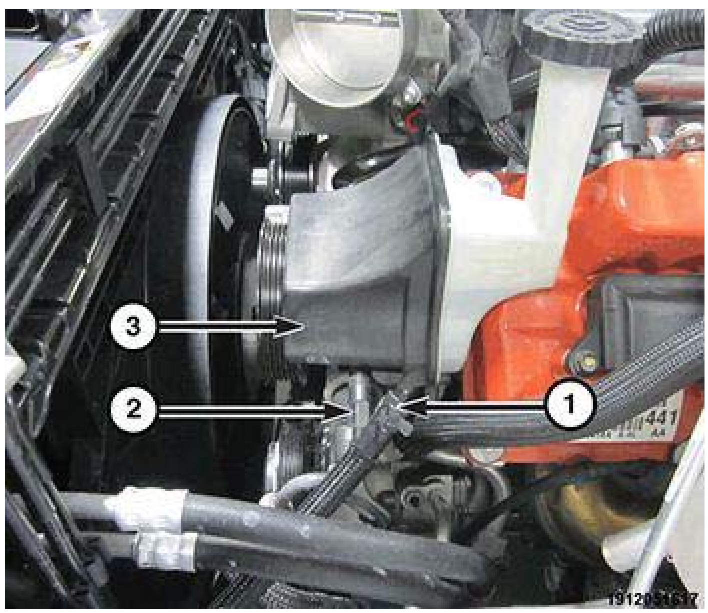


Fig. 70: Supply Hose, Pressure Hose & Power Steering Pump
Courtesy of CHRYSLER GROUP, LLC

2. Route hose through engine compartment.
3. Install the power steering return hose (1) onto reservoir (3) and tighten the clamp.
4. Install upper radiator closure panels.
5. Install the air cleaner. Refer to **BODY, AIR CLEANER, INSTALLATION, 6.2L** .
6. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.

7. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.

GEAR TO COOLER - 6.2L

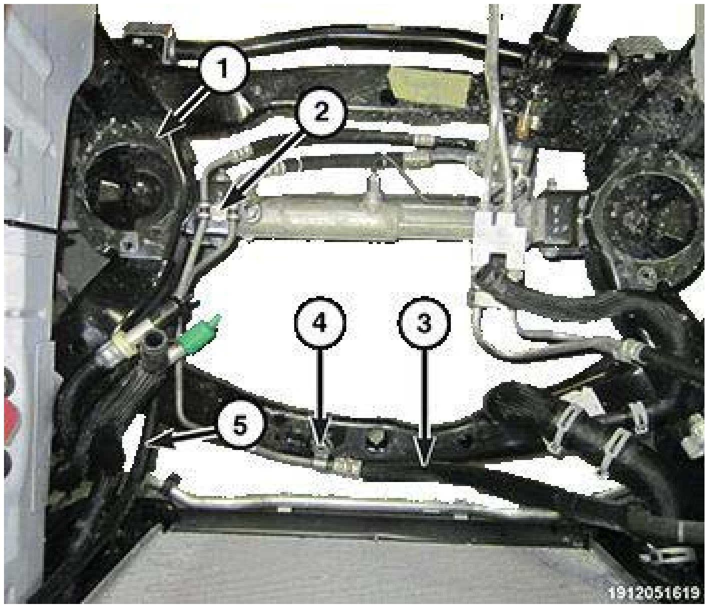


Fig. 71: Engine Cradle, Fasteners, Pressure Hose & Return Hose
Courtesy of CHRYSLER GROUP, LLC

1. Position the steering gear to cooler hose (5) in the vehicle.

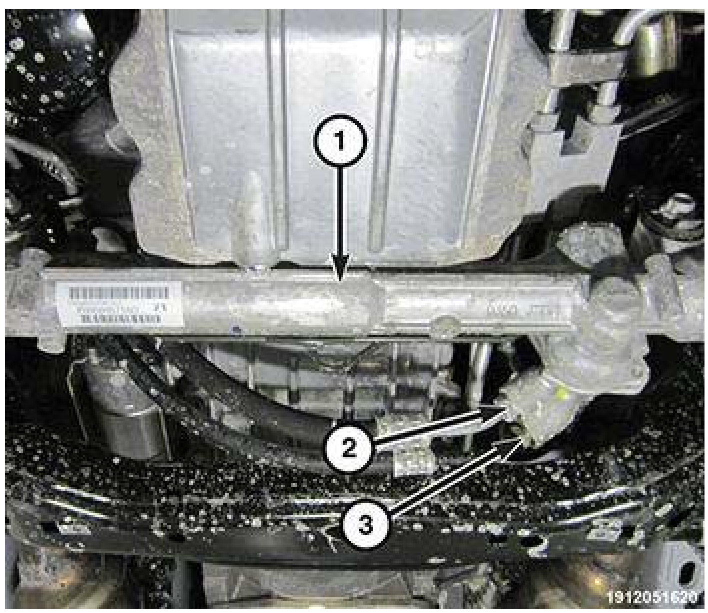


Fig. 72: Steering Gear, Pressure Hose & Return Hose
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Always use a**

NEW

O-ring on the end of the return hose at the steering gear.

2. Lubricate new O-ring on steering gear end of return hose with clean power steering fluid.
3. Lift gear end of return hose to return port on steering gear. Install return hose (2) to steering gear (1). **Do not tighten tube nut at this time.**

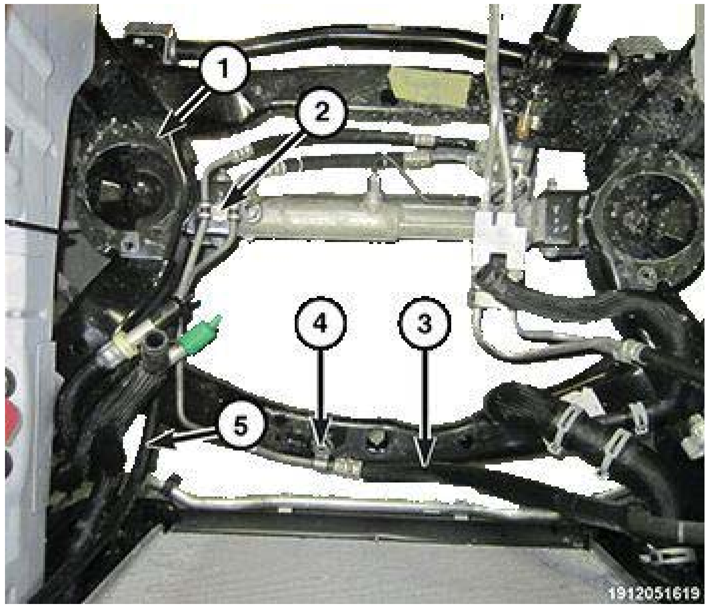


Fig. 73: Engine Cradle, Fasteners, Pressure Hose & Return Hose
Courtesy of CHRYSLER GROUP, LLC

4. Route return hose along right side of engine cradle as shown in illustration. Position pressure hose (3) routing clamp over return hose (5) routing clamp, then install screw (2) securing hoses to right side of engine cradle (1).

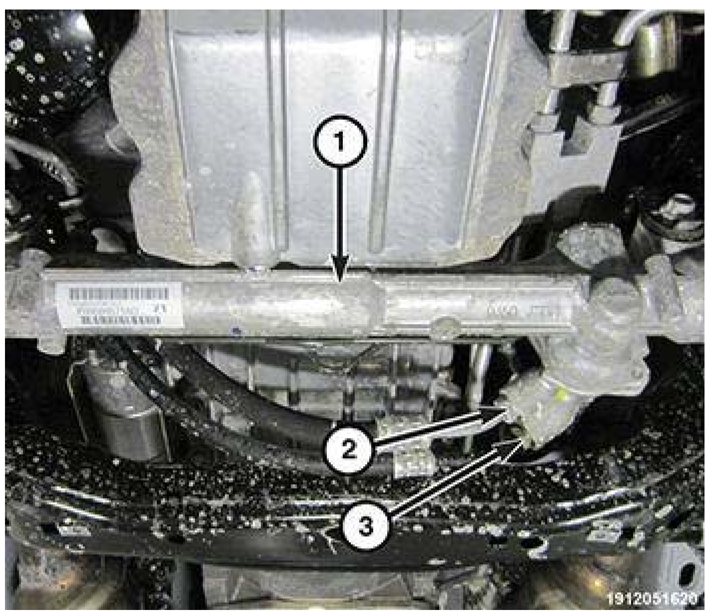


Fig. 74: Steering Gear, Pressure Hose & Return Hose
Courtesy of CHRYSLER GROUP, LLC

5. Tighten power steering return hose nut (2) at steering gear to the proper specification. Refer to **SPECIFICATIONS**.

6. Install belly pan. Refer to **BELLY PAN, INSTALLATION** and **BELLY PAN, ENGINE, INSTALLATION** .
7. Remove support and lower the vehicle.

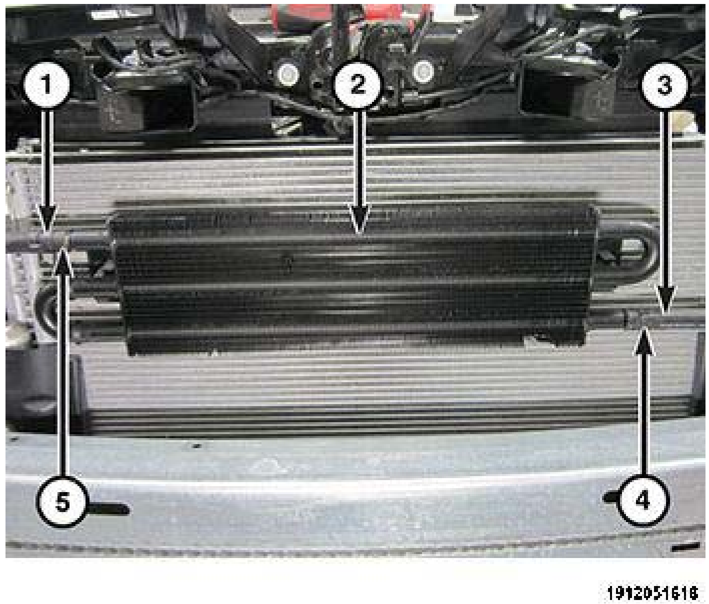


Fig. 75: Power Steering Fluid Cooler Components
Courtesy of CHRYSLER GROUP, LLC

8. Install the power steering hose (5) on the cooling module (2) and tighten the clamp (1).
9. Install radiator closeout panels.
10. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector.
11. Fill and bleed power steering system. Refer to **STANDARD PROCEDURE**.

PULLEY, POWER STEERING PUMP

REMOVAL

6.2L

CAUTION: **Do not hammer on power steering pump pulley or shaft to remove power steering pump pulley. Damage to pulley and power steering pump will occur.**

CAUTION: **It is very important to use Puller, to remove pulley from power steering pump shaft. Use of other pullers can damage or break pulley and pump shaft.**

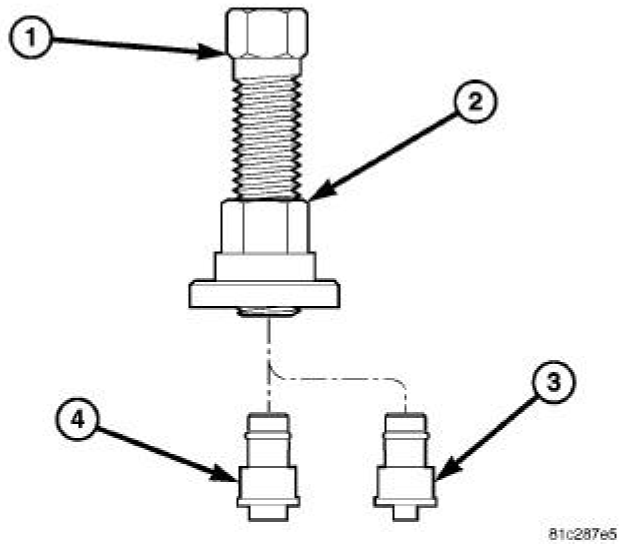


Fig. 76: Identifying Button Installation On Tool
Courtesy of CHRYSLER GROUP, LLC

1. Remove power steering pump from engine. Refer to **PUMP, REMOVAL**.
2. Coat Screw-Drive (1) with lubricant and thread into Puller Body (2).

NOTE: **Two Buttons come with Puller kit ((special tool #9962-3, Button, Thrust) and (special tool #9962-4, Button, Thrust)). Be sure to use Button that best fits end of pump shaft to avoid damage to Button or pump shaft.**

3. Insert Button (4) (special tool #9962-4, Button, Thrust), into end of Screw-Drive. Be sure not to misplace ball bearing that resides behind Button.

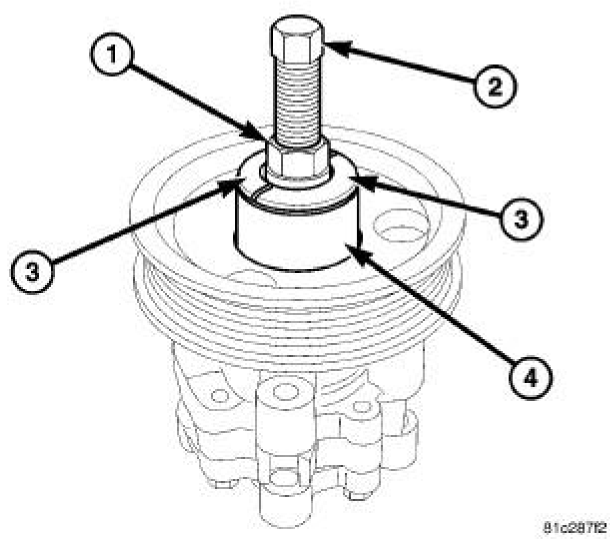


Fig. 77: View Of Tool 9962 Installed On Pulley
Courtesy of CHRYSLER GROUP, LLC

4. Assemble Puller (special tool #9962, Puller, P/S Pulley), over end of pump shaft and pulley hub.

a. Place Button on end of Screw-Drive against pump shaft.
b. Assemble Collets (3) (special tool #9962-2, Collet, Half, Pulley Remover), surrounding Puller Body (1) and pulley hub flange, then slide the Collet Sleeve over the Collets.
c. Hand tighten Screw-Drive (2) taking up any slack in Puller.

5. Hold Puller Body stationary while turning Screw-Drive until pulley is removed from power steering pump shaft.

NOTE: **Inspect pulley. Replace if pulley is bent, cracked, or loose.**

INSTALLATION

6.2L

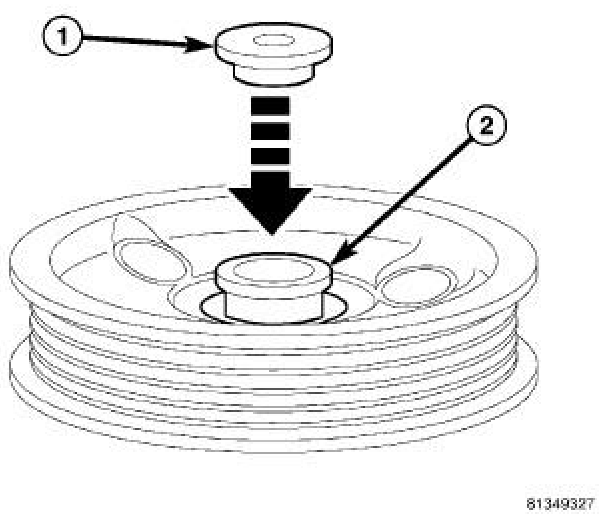
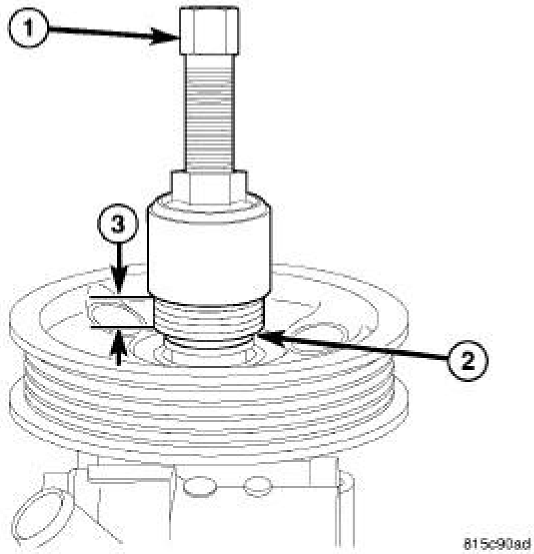


Fig. 78: Installing Spacer 6936 On Pulley
Courtesy of CHRYSLER GROUP, LLC

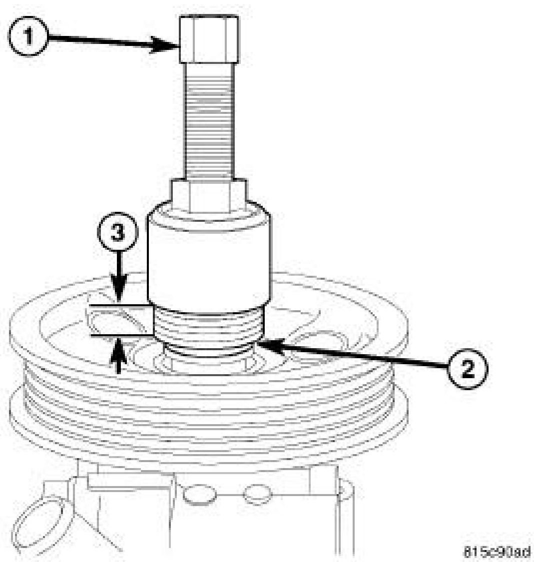
CAUTION: **Do not hammer on power steering pump pulley (2) or pump shaft to install pulley. This action will damage pulley and power steering pump.**

1. Place power steering pump pulley (2) squarely on end of power steering pump shaft.
2. Place Installation Spacer (1) (special tool #6936, Spacer), on top of pump pulley (2).



[Fig. 79: Install Pulley Using C-4063C, 6936 & Washers]
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Later build pumps feature a shaft with internal threads that are not as deep as earlier production, thus requiring a stack of washers, approximately 13 mm (0.512 in.) thickness (3), placed over Spacer (special tool #6936, Spacer) (2), before mounting Installer (special tool #C-4063C, Installer, P/S Pulley) (1) on the pump. To know if a replacement pump requires the stack of washers, measure the depth of the shaft hole. A later build pump will have a depth of 20 mm (0.787 in.) while an earlier build pump will have a depth of 32 mm (1.25 in.).**



[Fig. 80: Install Pulley Using C-4063C, 6936 & Washers]
Courtesy of CHRYSLER GROUP, LLC

3. As necessary (see above note), place a stack of washers approximately 13 mm (0.512 in.) thickness (3) over Spacer (special tool #6936, Spacer) (2).

NOTE: **Installer (special tool #C-4063C, Installer, P/S Pulley), is a combination of Installer (special tool #C-4063C, Installer, P/S Pulley), and Forcing Screw (special tool #C-4063-2, Forcing Screw). It is important to use Forcing Screw (special tool #C-4063-2, Forcing Screw) when performing this procedure.**

4. Thread Installer (1) (special tool #C-4063C, Installer, P/S Pulley), completely into internal threads of power steering pump shaft, then rotate Installer Nut down against washers (as necessary) and Spacer (2) on pump pulley.
5. Ensuring that special tools and pulley remain aligned with pump shaft, tighten Installer Nut, forcing pulley onto power steering pump shaft until Spacer (2) comes in contact with end of pump shaft. **When Spacer (2) is against shaft of power steering pump, Installer (1) Nut will no longer rotate.**
6. Install power steering pump. Refer to PUMP, INSTALLATION.

RESERVOIR, POWER STEERING PUMP

REMOVAL

SRT

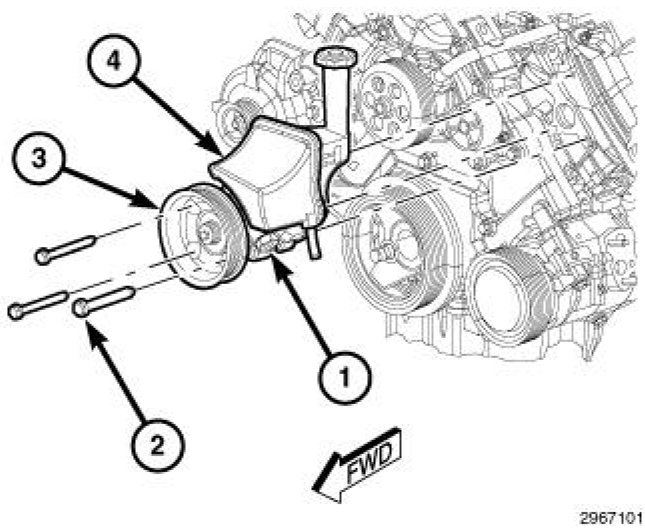


Fig. 81: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

For the hydraulic Power Steering System, the power steering reservoir (4) is integrated with the power steering pump (1) Refer to PUMP, REMOVAL.

INSTALLATION

SRT

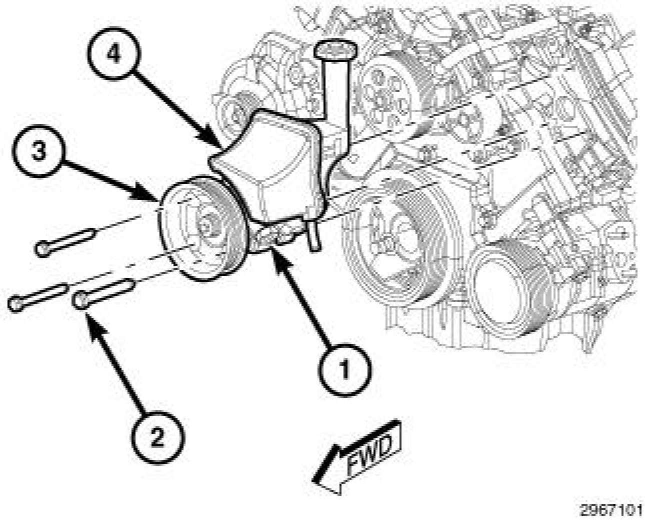


Fig. 82: Power Steering Reservoir, Pump, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

For the hydraulic Power Steering System, the power steering reservoir (4) is integrated with the power steering pump (1). Refer to **PUMP, INSTALLATION**.

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Article GUID: A00735951

2015-16 ACCESSORIES AND EQUIPMENT

Power Top/Sunroof - Service Information - Challenger

DESCRIPTION

DESCRIPTION

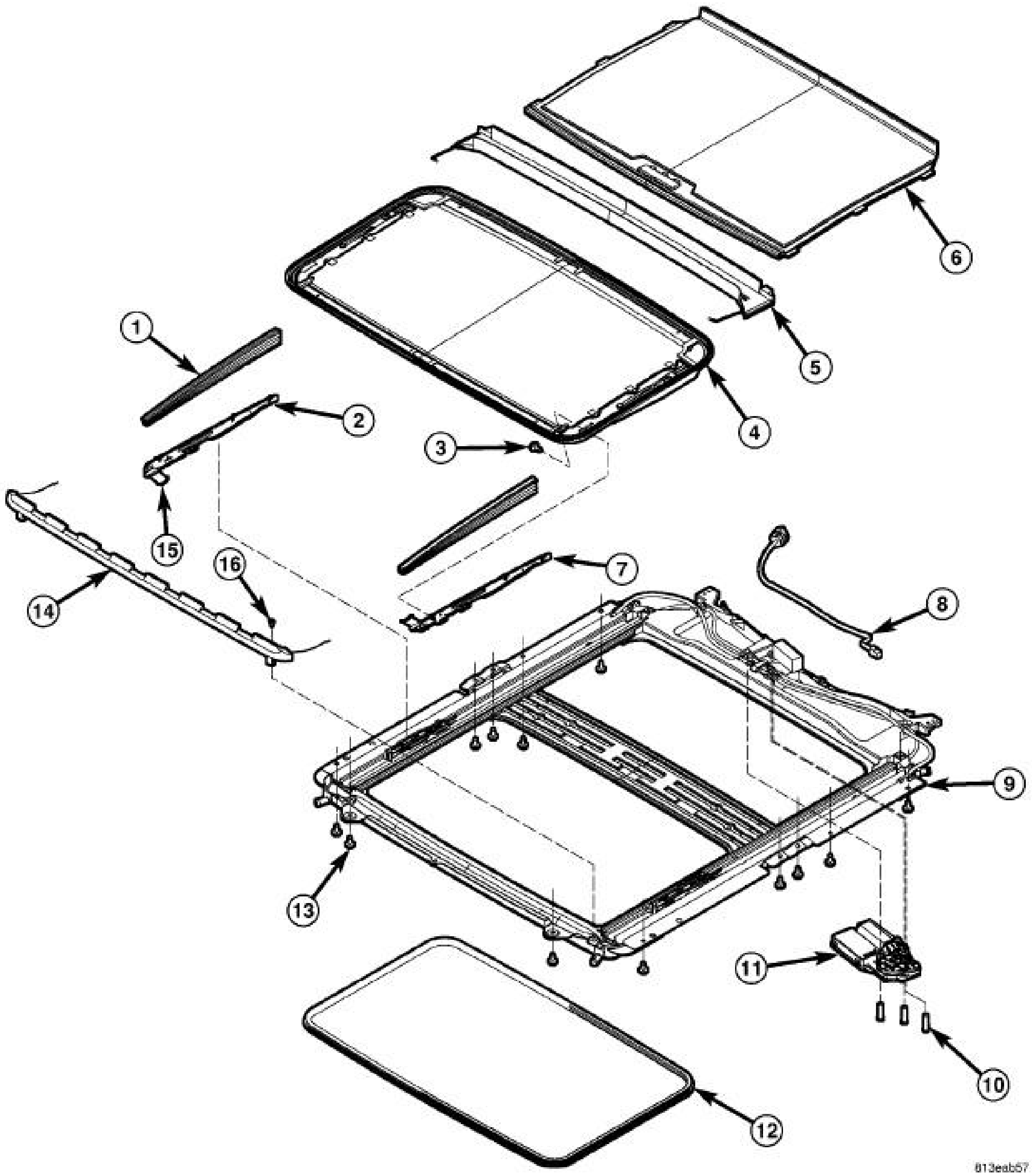

Fig. 1: Exploded View Of Sunroof
Courtesy of CHRYSLER GROUP, LLC

The power sunroof system allows the sunroof to be opened, closed or placed in the vent position electrically by actuating a switch in the overhead console. The sunroof system receives battery feed through a fuse in the

Power Distribution Center (PDC). The sunroof will operate normally with the ignition state in any position while the Accessory Delay system is active.

The sunroof glass panel tilts upward at the rear for ventilation and slides rearward under the roof when open. The panel seals flush with the roof in the closed position to eliminate wind noise. The sunroof includes a manual-sliding sunshade to cover the deep-tinted glass panel.

In addition to the standard power sunroof operation, this vehicle offers several additional features. There is an express (one-touch) opening and closing feature as well as Excessive Force Limitation (EFL). The EFL function detects obstacles trapped between the glass and the vehicle roof during a closing motion. Upon sensing an obstacle the EFL function will reverse direction of the glass to allow removal of the obstacle.

The main components of the power sunroof system are:

- The motor/module assembly
- The power sunroof glass and frame assembly
- The power sunroof switch
- The manual-sliding sunshade

OPERATION

OPERATION

This vehicle has a vent, tilt and slide power sunroof system with express (one-touch) open and closing feature. The sunroof system receives constant battery feed through a fuse in the Power Distribution Center (PDC). If the sunroof is moving when the key is turned to the START position (crank engine), all motion stops. New switch press is needed to start motion. The sunroof will stop a requested motion if the Accessory Delay system goes inactive while the motion is in progress.

A combination push-button and rocker switch module mounted in the overhead console controls sunroof operation. The sunroof switch is a rocker design with a push button in the center of the two halves of the rocker. Pressing the rocker towards the front of the car commands the sunroof closed. Pressing the rocker towards the rear of the car commands the sunroof open. Pressing the center push button commands the sunroof up into the vent position (Rear of sunroof glass raises above the vehicle roof with glass still covering the sunroof opening). All switch commands operate with the glass starting in any position. For additional information, refer to **SWITCH, SUNROOF, OPERATION**.

An electronic control system, integral to the motor/module assembly, provides the express and manual modes of operation for the open, close and vent functions. Manual operation is activated when by pressing and holding the open, close or vent rocker switch. In manual mode operation the glass will stop operation as soon as the switch is released or when the full closed or full open position is reached. Express operation is activated by pressing and releasing the "open" or "close" rocker switch within one half second. In express operation the glass will automatically open/close to the full open, vent open or closed position and automatically stop. During express closing, anytime an obstacle is detected in the way of the glass, the motor will stop and reverse travel to avoid pinching an occupant's finger, ice in the track, etc. This function is called Excessive Force Limitation (EFL). When three EFL events occur without the glass being allowed to fully close, the next close attempt will only move while the close switch is continuously actuated. This allows the sunroof to be forced closed if multiple close attempts fail. While in EFL override, the closing motion will cease if the sunroof switch is

released at any time.

The sunroof is calibrated to stop the glass in the correct open, close and vent positions. If the sunroof becomes uncalibrated, it will only respond to the vent switch. If the vent switch is pressed, the glass will move toward vent; if the switch is released, all motion stops. In the event that the sunroof system becomes uncalibrated perform the sunroof position calibration procedure. Refer to **MOTOR, SUNROOF, STANDARD PROCEDURE**.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SUNROOF SYSTEM

The hard wired circuits between components related to the operation of the single pane power sunroof system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic module integral to the power sunroof motor. If the power sunroof switches, motors and circuitry test okay, but the express or Excess Force Limitation (EFL) features are still ineffective following the calibration and initialization procedures, the motor and module unit must be replaced.

NOTE: **If there is no sliding sunroof panel movement when the power sunroof switch OPEN or CLOSE push button is depressed, but there is movement when the VENT push button is depressed, the sunroof module requires calibration. Complete the Single Pane Sunroof Motor And Module Initialization procedure prior to performing any further sunroof diagnosis. Refer to** **MOTOR, SUNROOF, STANDARD PROCEDURE****.**

CONDITION	POSSIBLE CAUSES	CORRECTION
POWER SUNROOF COMPLETELY INOPERATIVE	1. Ineffective ground circuit.	1. Test and repair the open sunroof motor ground circuit if required.
	2. Ineffective feed circuit.	2. Test and repair the open sunroof motor feed circuit if required.
	3. Ineffective sunroof switch.	3. Test and replace the sunroof switch (overhead console assembly) if required.
	4. Ineffective sunroof motor and module unit.	4. Replace the sunroof motor and module unit if required.
AUDIBLE WHINE WHEN POWER SUNROOF SWITCH IS ACTUATED	1. Binding drive cable.	1. Replace the binding drive cable if required.
	2. Ineffective sunroof motor and module unit.	2. Replace the sunroof motor and module unit if required.
AUDIBLE CLICKING OR RATCHETING WHEN POWER SUNROOF SWITCH IS	1. Improperly adjusted sliding glass panel.	1. Adjust the sunroof glass panel if required. Refer to **GLASS, SUNROOF, ADJUSTMENTS** .

CONDITION	POSSIBLE CAUSES	CORRECTION
ACTUATED	2. Damaged or worn drive cable.	2. Replace the broken or worn drive cable if required.
	3. Damaged or worn motor drive gear.	3. Replace the sunroof motor and module unit if required.
POWER SUNROOF VENTS AND OPENS BUT DOES NOT CLOSE	1. Damaged or disengaged trough guide.	1. Replace or reinstall trough guide if required.
	2. Binding drive cable.	2. Replace the binding drive cable if required.
	3. Ineffective CLOSE circuit.	3. Repair the sunroof CLOSE circuit between the switch and the motor if required.
	4. Ineffective sunroof switch.	4. Test and replace the sunroof switch (overhead console assembly) if required.
	5. Ineffective sunroof motor and module unit.	5. Replace the sunroof motor and module unit if required.
POWER SUNROOF VENTS AND CLOSES BUT DOES NOT OPEN	1. Binding drive cable.	1. Replace the binding drive cable if required.
	2. Ineffective OPEN circuit.	2. Repair the sunroof OPEN circuit between the switch and the motor if required.
	3. Ineffective sunroof switch.	3. Test and replace the sunroof switch (overhead console assembly) if required.
	4. Ineffective sunroof motor and module unit.	4. Replace the sunroof motor and module unit if required.
POWER SUNROOF DOES NOT VENT	1. Binding drive cable.	1. Replace the binding drive cable if required.
	2. Ineffective VENT circuit.	2. Repair the sunroof VENT circuit between the switch and the motor if required.
	3. Ineffective sunroof switch.	3. Test and replace the sunroof switch (overhead console assembly) if required.
	4. Ineffective sunroof motor and module unit.	4. Replace the sunroof motor and module unit if required.
POWER SUNROOF GLASS MOVEMENT INCONSISTENT - NOT SMOOTH AND UNIFORM	1. Improperly adjusted sliding glass panel.	1. Adjust the sunroof glass panel if required. Refer to **GLASS, SUNROOF, ADJUSTMENTS** .

MOTOR, SUNROOF

DESCRIPTION

DESCRIPTION

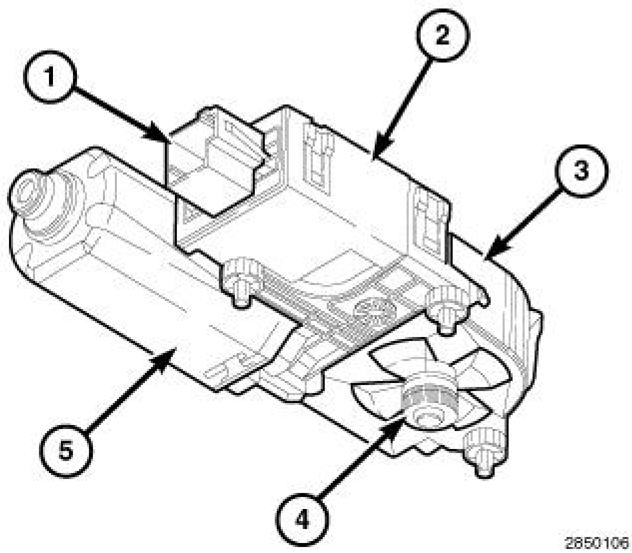

Fig. 2: Single Pane Sunroof Motor Assembly
Courtesy of CHRYSLER GROUP, LLC

The single pane sunroof has a single motor (5) and electronic module unit (2) secured by three screws near the center of the underside of the rear sunroof frame member where it is concealed above the headliner. The motor is a reversible, 12-volt Direct Current (DC) permanent magnet motor with internal thermal protection. The motor is connected mechanically to the sunroof drive gear (4) through a right angle drive and gear reduction transmission (3). The motor also is connected electrically to the on-board electronic control unit that includes an integral connector receptacle (1) that connects the unit to the vehicle electrical system through a dedicated take out and connector of the sunroof wire harness.

The sunroof motor and electronic module units cannot be repaired. If ineffective or damaged, the entire motor and module unit must be replaced.

OPERATION

OPERATION

The single pane power sunroof motor is completely controlled by the circuitry of the on-board electronic module. The module receives battery current on a fused B(+) circuit from the Body Control Module (BCM) and has a path to ground at all times through a take out and eyelet terminal connector secured by a ground screw to the body sheet metal. These connections allow the module to function regardless of the ignition switch position.

However, the module also monitors an input on a fused ignition switch output (run - accessory) circuit, and provides a source current to the sunroof switches in the overhead console only when the ignition switch is in the ON or ACCESSORY positions, or while the accessory delay feature is active. The module then monitors a separate input circuit for each switch position, which it uses to determine the proper outputs to the power sunroof motor. A positive and negative battery connection to the two motor brushes will cause the power sunroof motor to rotate in one direction. Reversing the current through these same two brushes will cause the motor to rotate in the opposite direction.

The hard wired circuits of the power sunroof motor as well as those between the electronic module and the switch in the overhead console may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic module integral to the power sunroof motor. If the power sunroof switch and the hard

wired circuitry test okay, but the motor or the express or Excess Force Limitation (EFL) features are still ineffective following the calibration and initialization procedures, the motor and module must be replaced as a unit.

STANDARD PROCEDURE

EXCESSIVE FORCE LIMITATION (EFL) CALIBRATION

NOTE: **Verify the battery is in good condition prior to performing this procedure. Do not leave the vehicle on a battery charger while performing this procedure. If the voltage at the sunroof motor/module drops below 11 volts or exceeds 15 volts at anytime while this procedure is being performed, the Excessive Force Limitation (EFL) function will not be properly calibrated.**

1. Depress the VENT push button of the sunroof switch so that the sliding glass panel travels to the fully vented position.
2. Depress the CLOSE push button of the sunroof switch so that the sliding glass panel travels to the fully closed position.
3. Depress the OPEN push button of the sunroof switch so that the sliding glass panel travels to the fully open position.
4. Depress the CLOSE push button of the sunroof switch so that the sliding glass panel travels to the fully closed position.
5. Repeat steps 2 through 5 for at least 5 complete sliding glass panel cycles (VENT, CLOSE, OPEN, CLOSE).

EXCESSIVE FORCE LIMITATION (EFL) OVERRIDE

There are two methods for overriding the obstacle detection feature if the single pane sunroof sliding glass is unable to close due to a known blockage conditions (ice, leaves, debris in the track).

- **OVERRIDE - METHOD 1** - Depress and hold the CLOSE push button of the sunroof switch during the close. The sunroof will be in override mode during the close.
- **OVERRIDE - METHOD 2** - Once the sunroof encounters and reverse on an obstacle during express (one touch) closing three consecutive times, the sunroof will be in override mode. All push button commands will be in manual mode (no one-touch or express mode) while the obstacle detection feature is in override mode.

EXITING OVERRIDE MODE - Any sunroof obstacle detection override mode is exited by reaching the close position. Once the override has been existed, all normal operation will resume including the obstacle detection feature.

SUNROOF POSITION CALIBRATION

Press the power sunroof switch (Open, Closed, and Vent). If no movement occurs when either the open switch or closed switch is pressed, but the system does move when the vent button is pressed and held, the system is not calibrated. Perform the following procedure to position calibrate the power sunroof system.

1. Turn the ignition to the RUN position.
2. Press the vent button on the power sunroof switch and hold until the sunroof glass panel has moved to the

full vent position and the motor movement has stopped for at least 1 second.

3. Press the close switch on the power sunroof switch and hold for a moment (at least 100ms) and release. The sunroof glass panel should continue travel to the full close position. If the sunroof glass panel does not return to the full close position, refer to the appropriate diagnostic information for full system diagnosis.
4. Verify proper system operation.

SUNROOF OVERRIDE POSITION CALIBRATION

The sliding glass panel motor stalls when the glass reaches the fully vented position and the electronic motor module learns that position (hard stop), then counts the number of motor rotation to know where the fully closed and fully open positions of the glass are located. The following procedure causes a previously calibrated and properly operating electronic motor module to relearn the fully vented motor stall position. This routine should be performed after the sunroof position calibration procedure has been performed.

1. Be certain the electrical system voltage is at or above 12.5 volts.
2. Be certain that ignition switch is in the ON position.
3. Be certain the power sunshade is open at least beyond the back of the sliding glass panel opening.
4. Depress and hold the VENT push button of the sunroof switch until the sliding glass panel is in the fully vented position or until the motor will not drive the glass any further towards the fully vented position.
5. Open the drivers side front door.
6. Turn the ignition to the OFF position.
7. Within 2 seconds, turn the ignition back to the ON position.
8. Within 2 seconds, depress and hold the vent push button on the sunroof switch for about ten seconds. At the end of ten seconds, the motor will try to drive the sliding glass panel to the fully vented position. Once the motor stall is detected the electronic module will write that stall position to memory as the new glass position.
9. Verify sliding glass panel motor operation by cycling the glass to fully opened, fully closed, fully vented, then fully closed again.

REMOVAL

REMOVAL

WARNING: Do not attempt to move or reposition the sunroof glass panel or drive cables with the sunroof motor and module unit removed. Damage to the vehicle, to the sunroof or personal injuries may result.

WARNING: The Sunroof Motor And Module Initialization procedure must be completed any time a sunroof motor and module unit is replaced with a new component. Failure to perform this procedure may result in damage to the vehicle, to the sunroof or in serious or fatal injuries.

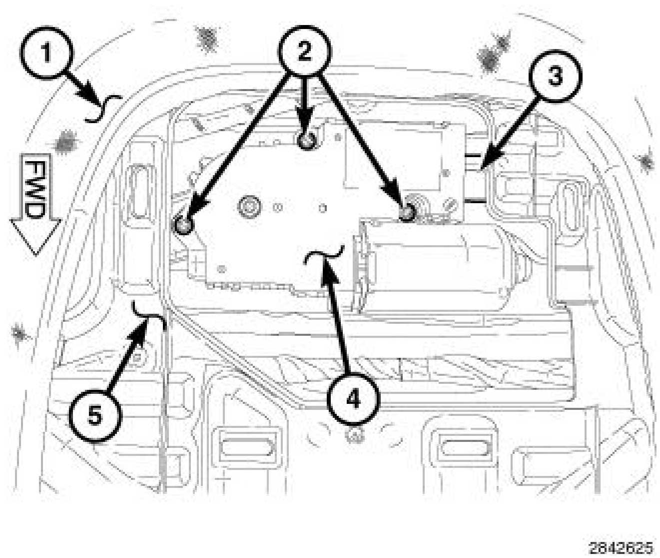

Fig. 3: Headliner, Bracket, Module Unit, Screws & Module Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Lower the back of the headliner (1) to gain access to the module unit (4). Refer to **HEADLINER, REMOVAL** .
3. Remove the three screws (2) that secure the motor and module to the sunroof frame.
4. Lower the motor and module unit far enough to access and disconnect the sunroof wire harness connector from the motor and module connector receptacle (3).
5. Remove the sunroof motor and module unit from the vehicle.

INSTALLATION

INSTALLATION

WARNING: Do not attempt to move or reposition the sunroof glass panel or drive cables with the sunroof motor and module unit removed. Damage to the vehicle, to the sunroof or personal injuries may result.

WARNING: The Sunroof Motor And Module Initialization procedure must be completed any time a sunroof motor and module unit is replaced with a new component. Failure to perform this procedure may result in damage to the vehicle, to the sunroof or in serious or fatal injuries.

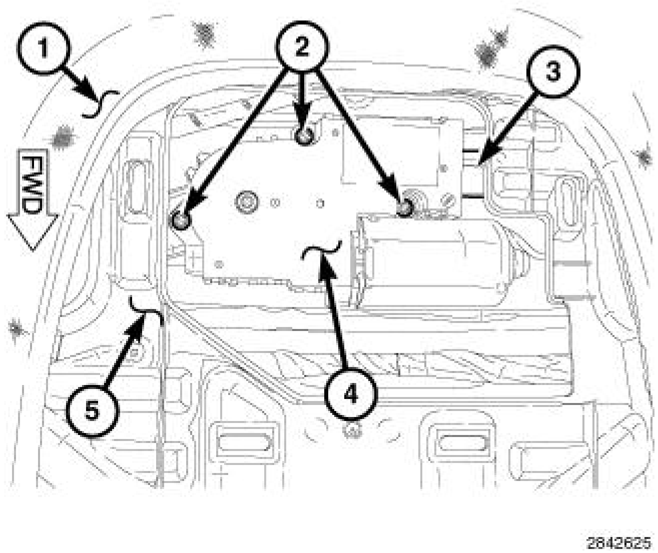

Fig. 4: Headliner, Bracket, Module Unit, Screws & Module Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

1. Position the sunroof motor and module unit (4) close enough to connect the wire harness connector to the motor and module connector receptacle (3).
2. Position the motor and module onto the sunroof frame.
3. Install and tighten the three screws (2) that secure the motor and module to the sunroof frame.
4. Install the rear of the headliner. Refer to **HEADLINER, INSTALLATION** .
5. Reconnect the battery negative cable.
6. Perform the Sunroof Position Calibration procedure followed by the Excessive Force Limitation (EFL) Calibration procedure. Refer to **MODULE, POWER SUNROOF, MODULE PROGRAMMING** .

SWITCH, SUNROOF

DESCRIPTION

DESCRIPTION

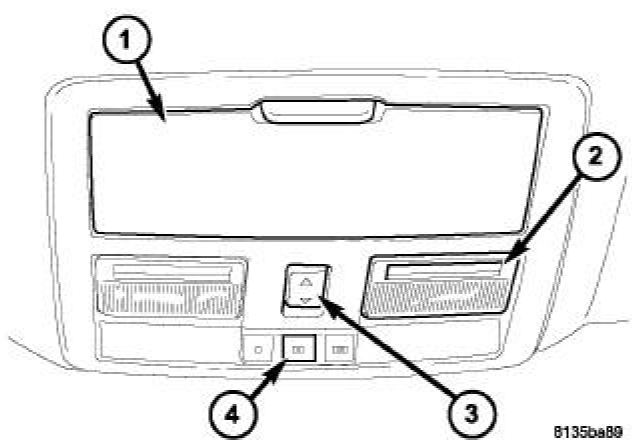

Fig. 5: Overhead Console Components

Courtesy of CHRYSLER GROUP, LLC

The power sunroof switch (3) is a combination push-button and rocker switch module mounted in the overhead console. The sunroof switch is a direct contact unit that is directly wired to the sunroof motor/module assembly. The sunroof switch performs the following functions:

- Power sunroof open (back of switch pushed)
- Power sunroof closed (front of switch pushed)
- Power sunroof vent (switch center button pushed)

The power sunroof switch is part of the overhead console assembly and cannot be replaced separately. If the switch is damaged or inoperative the overhead console unit must be replaced. Refer to **CONSOLE, OVERHEAD, FRONT, REMOVAL** .

OPERATION

OPERATION

The single pane power sunroof motor is completely controlled by the circuitry of the on-board electronic module. The module receives battery current on a fused B(+) circuit from the Body Control Module (BCM) and has a path to ground at all times through a take out and eyelet terminal connector secured by a ground screw to the body sheet metal. These connections allow the module to function regardless of the ignition switch position.

However, the module also monitors an input on a fused ignition switch output (run - accessory) circuit, and provides a source current to the sunroof switches in the overhead console only when the ignition switch is in the ON or ACCESSORY positions, or while the accessory delay feature is active. The module then monitors a separate input circuit for each switch position, which it uses to determine the proper outputs to the power sunroof motor. A positive and negative battery connection to the two motor brushes will cause the power sunroof motor to rotate in one direction. Reversing the current through these same two brushes will cause the motor to rotate in the opposite direction.

The hard wired circuits of the power sunroof motor as well as those between the electronic module and the switch in the overhead console may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic module integral to the power sunroof motor. If the power sunroof switch and the hard wired circuitry test okay, but the motor or the express or Excess Force Limitation (EFL) features are still ineffective following the calibration and initialization procedures, the motor and module must be replaced as a unit.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - SUNROOF SWITCH

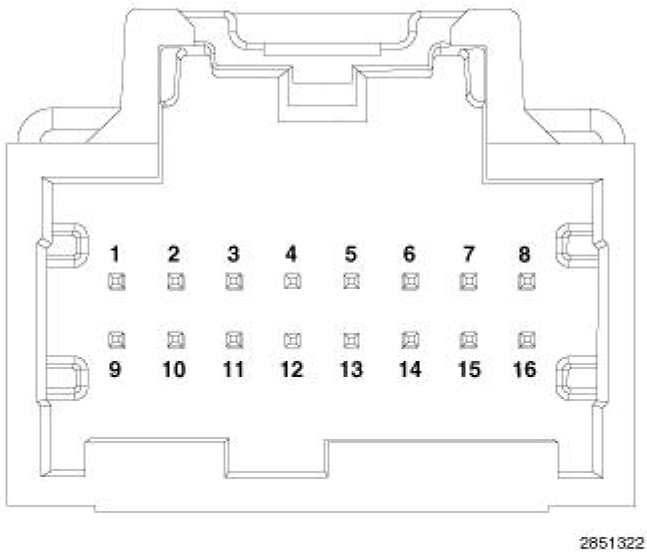

Fig. 6: Sunroof Switch Connector Terminal Identification
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the overhead console from the headliner. Refer to **CONSOLE, OVERHEAD, FRONT, REMOVAL** .
3. Disconnect the overhead wire harness connector from the overhead console connector receptacle.
4. Using a multimeter, test the continuity between the terminals of the overhead console connector receptacle while actuating the power sunroof switch or power sunshade switch as shown in the Sunroof Switch Tests or Sunshade Switch Tests table.

SUNROOF SWITCH TESTS	
SWITCH POSITION	CONTINUITY BETWEEN PINS
OFF	NO CONTINUITY
OPEN	9 and 12
CLOSE	11 and 12
VENT	10 and 12

SUNSHADE SWITCH TESTS	
SWITCH POSITION	CONTINUITY BETWEEN PINS
OFF	NO CONTINUITY
OPEN	12 and 14
CLOSE	12 and 13

5. If either switch fails any of the tests, replace the overhead console and both switches as a unit as required.

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Article GUID: A00735963

2016 SYSTEM WIRING DIAGRAMS

Dodge - Challenger

AIR CONDITIONING

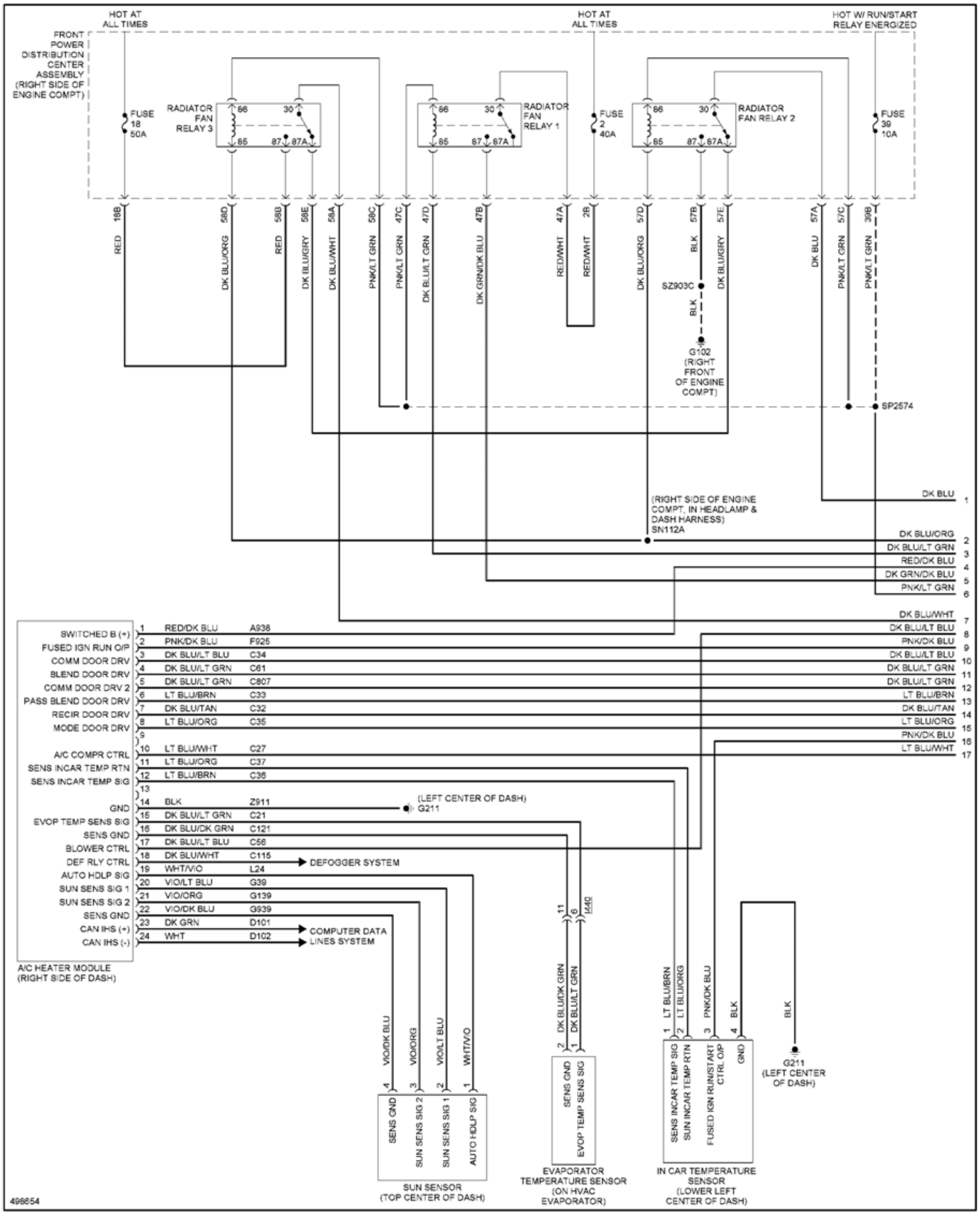


Fig. 1: Automatic A/C Circuit (1 of 4)

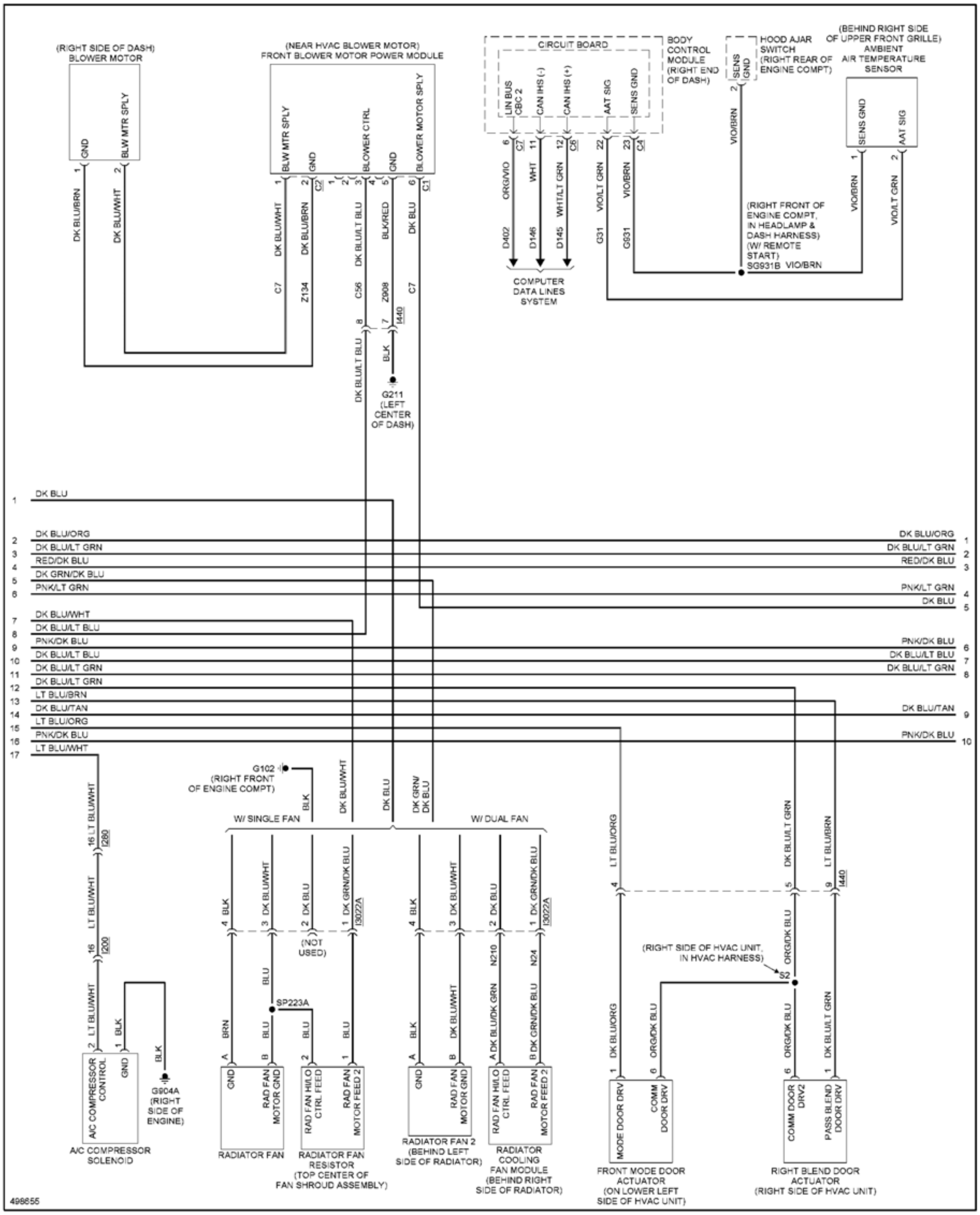
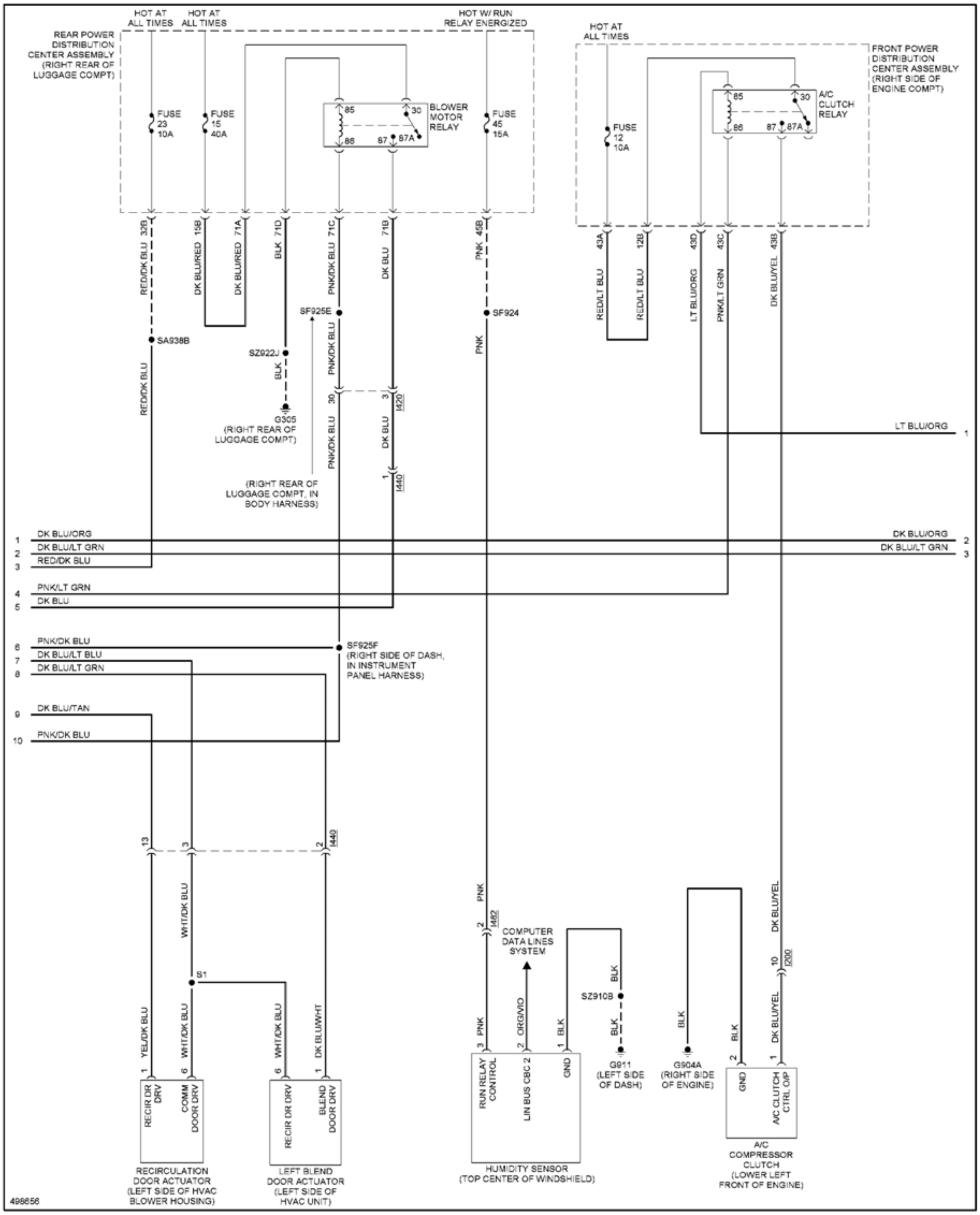


Fig. 2: Automatic A/C Circuit (2 of 4)



[Fig. 3: Automatic A/C Circuit (3 of 4)]()

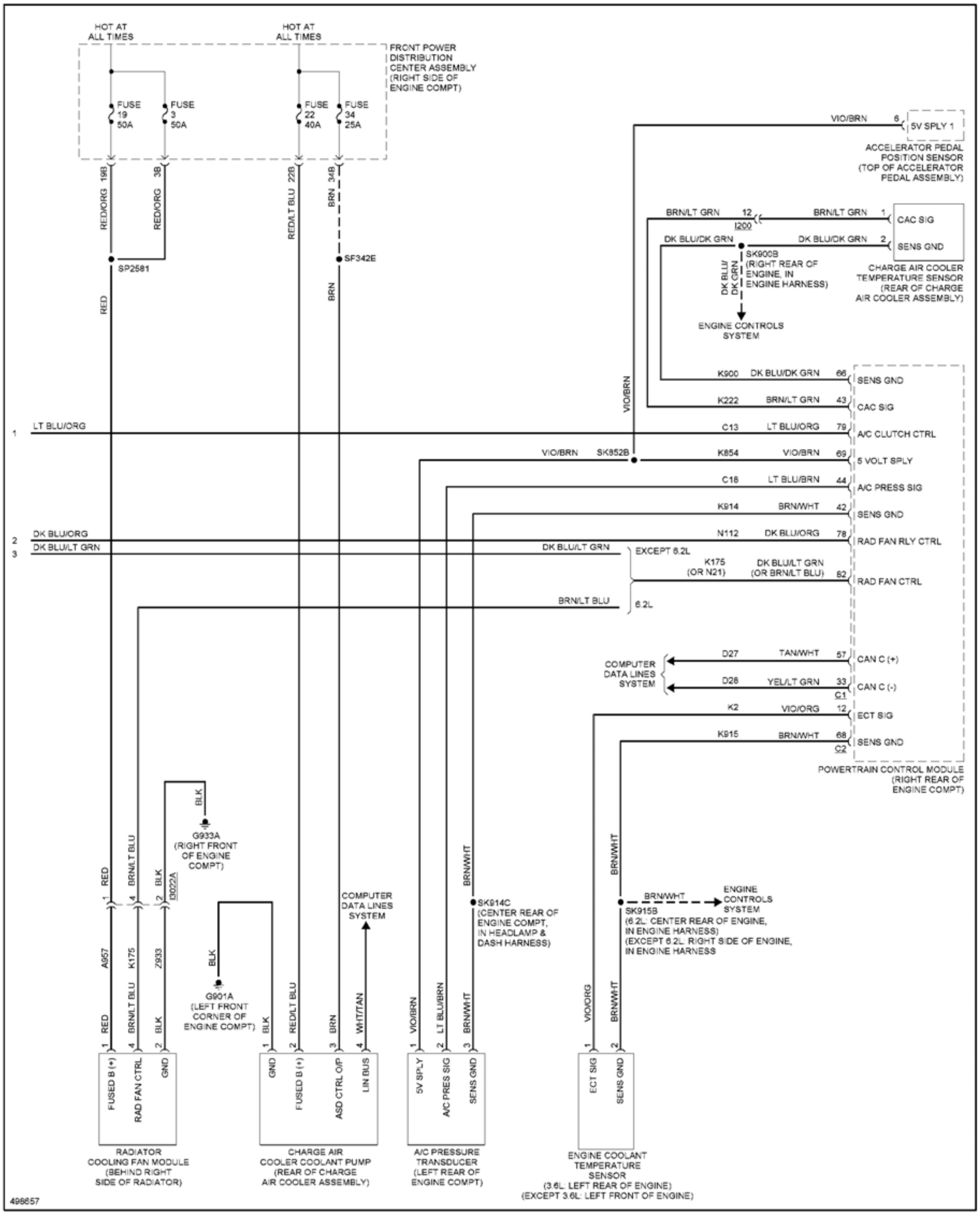


Fig. 4: Automatic A/C Circuit (4 of 4)

ANTI-LOCK BRAKES

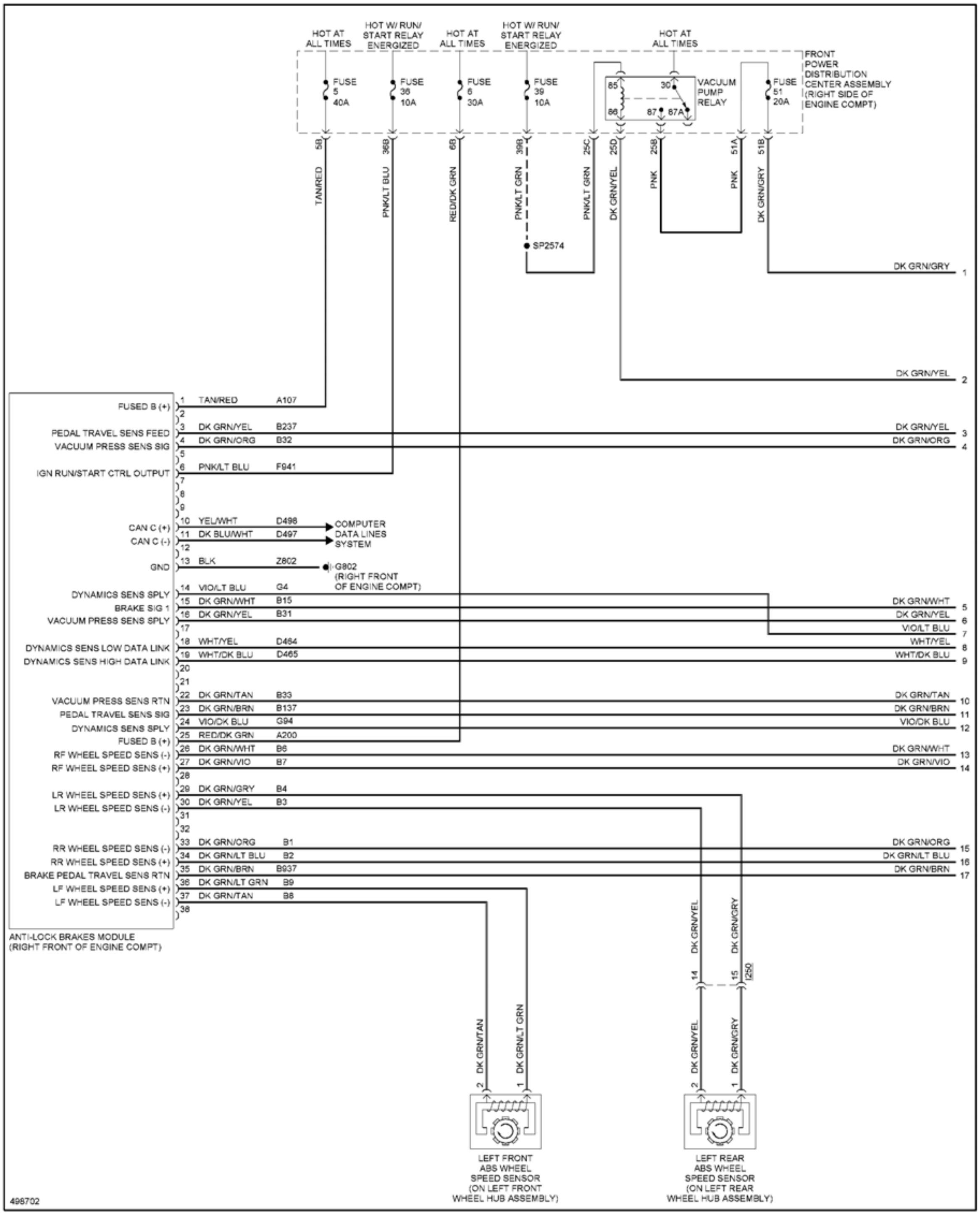


Fig. 5: Anti-lock Brakes Circuit (1 of 2)

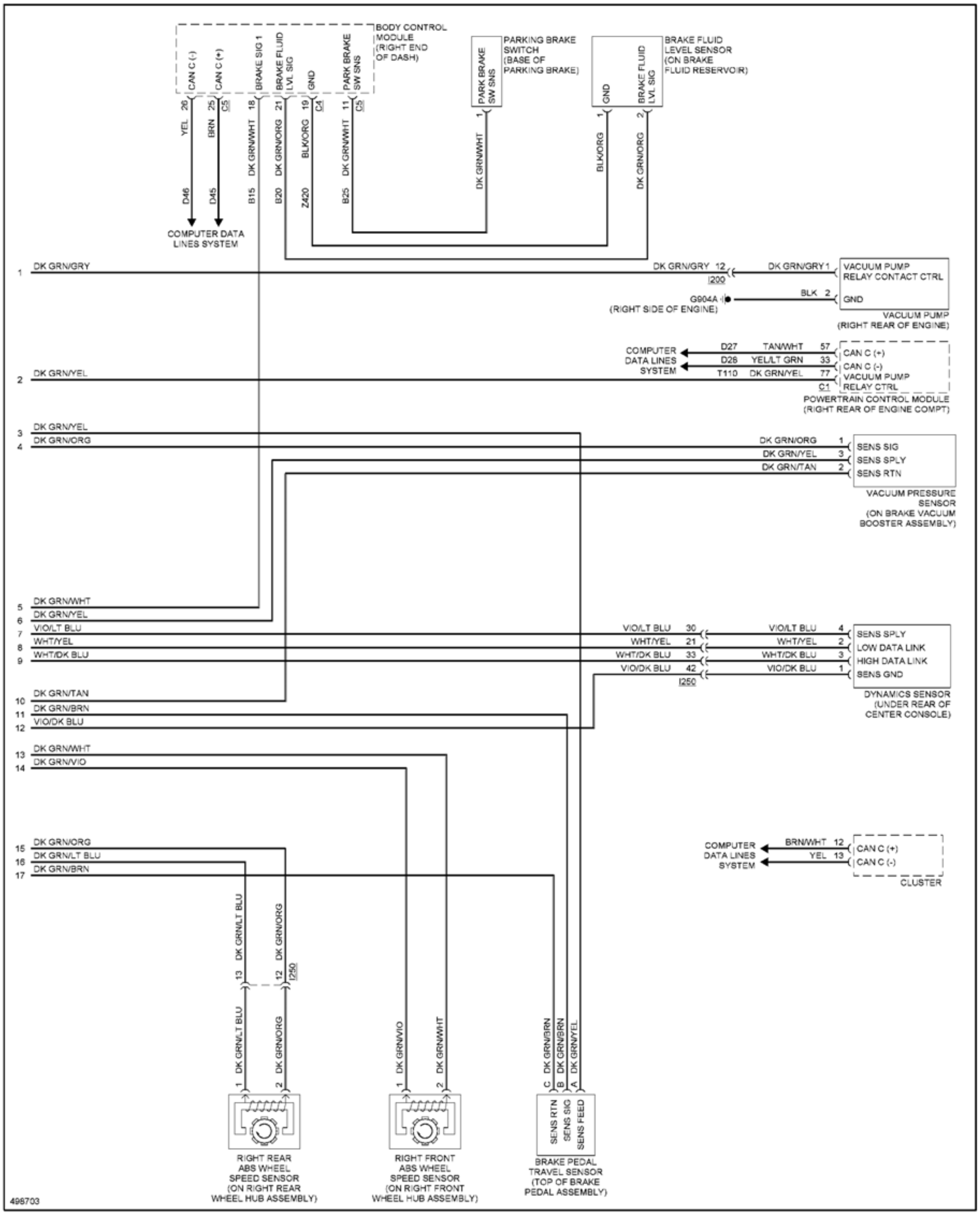


Fig. 6: Anti-lock Brakes Circuit (2 of 2)

ANTI-THEFT

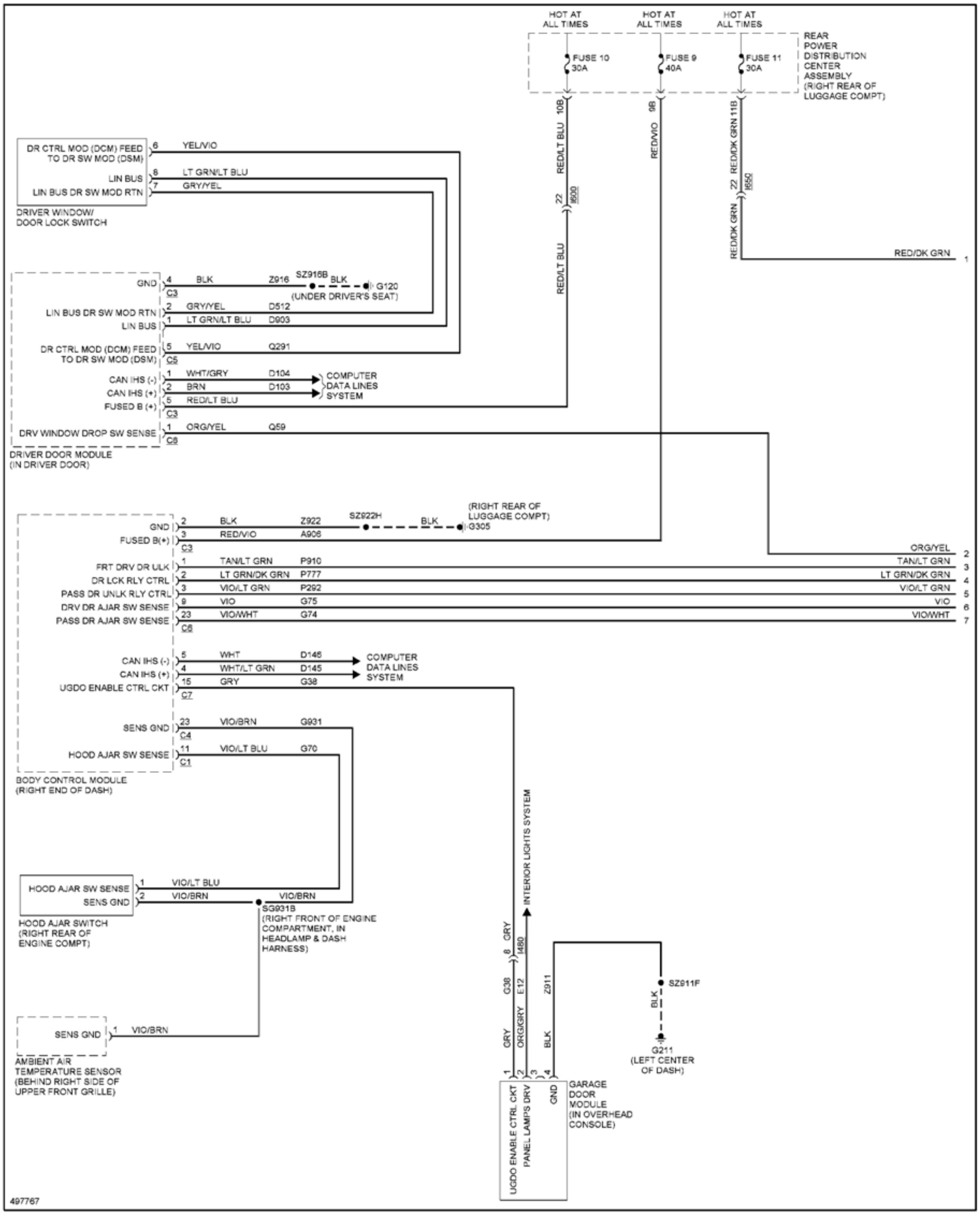


Fig. 7: Forced Entry Circuit (1 of 2)

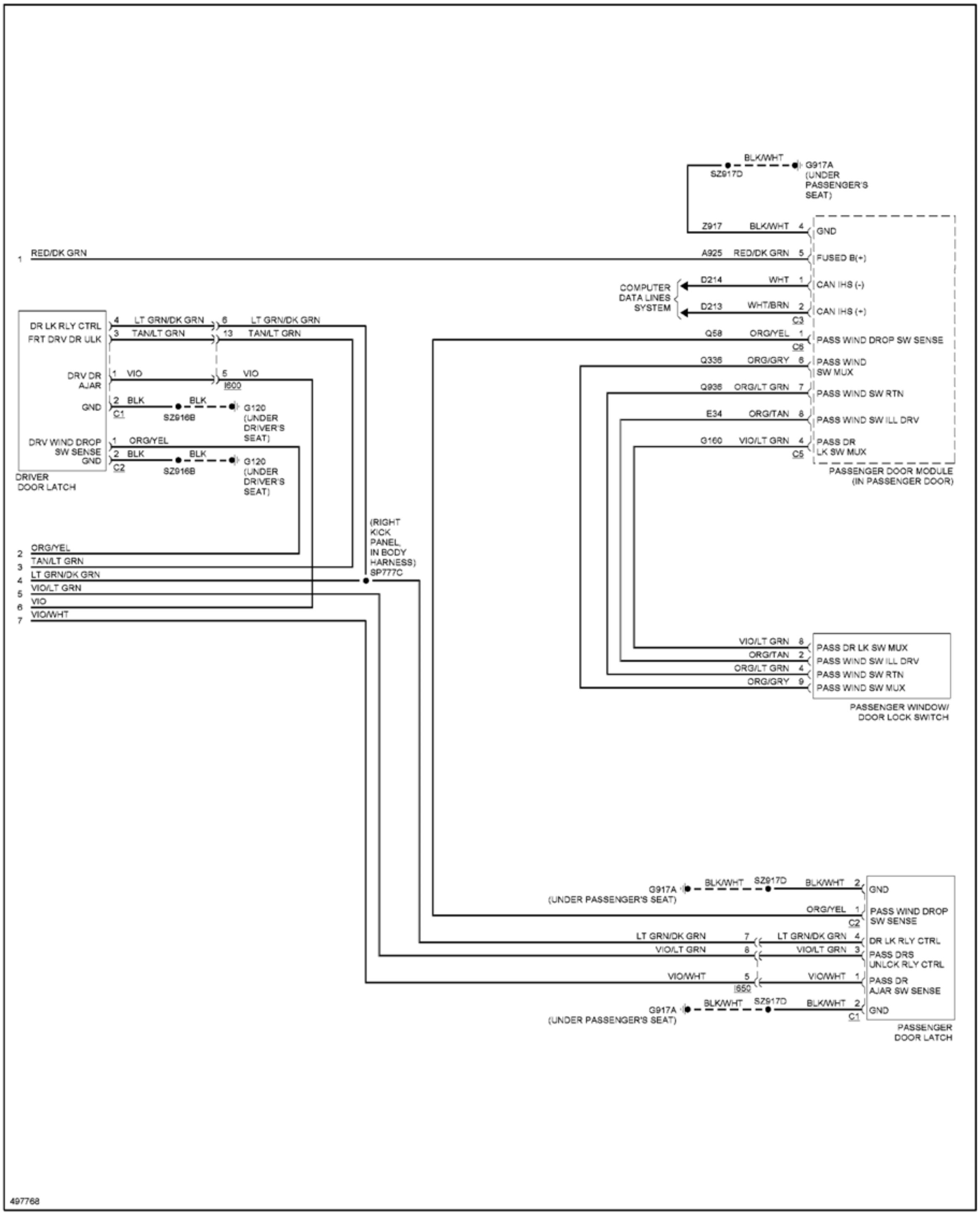


Fig. 8: Forced Entry Circuit (2 of 2)

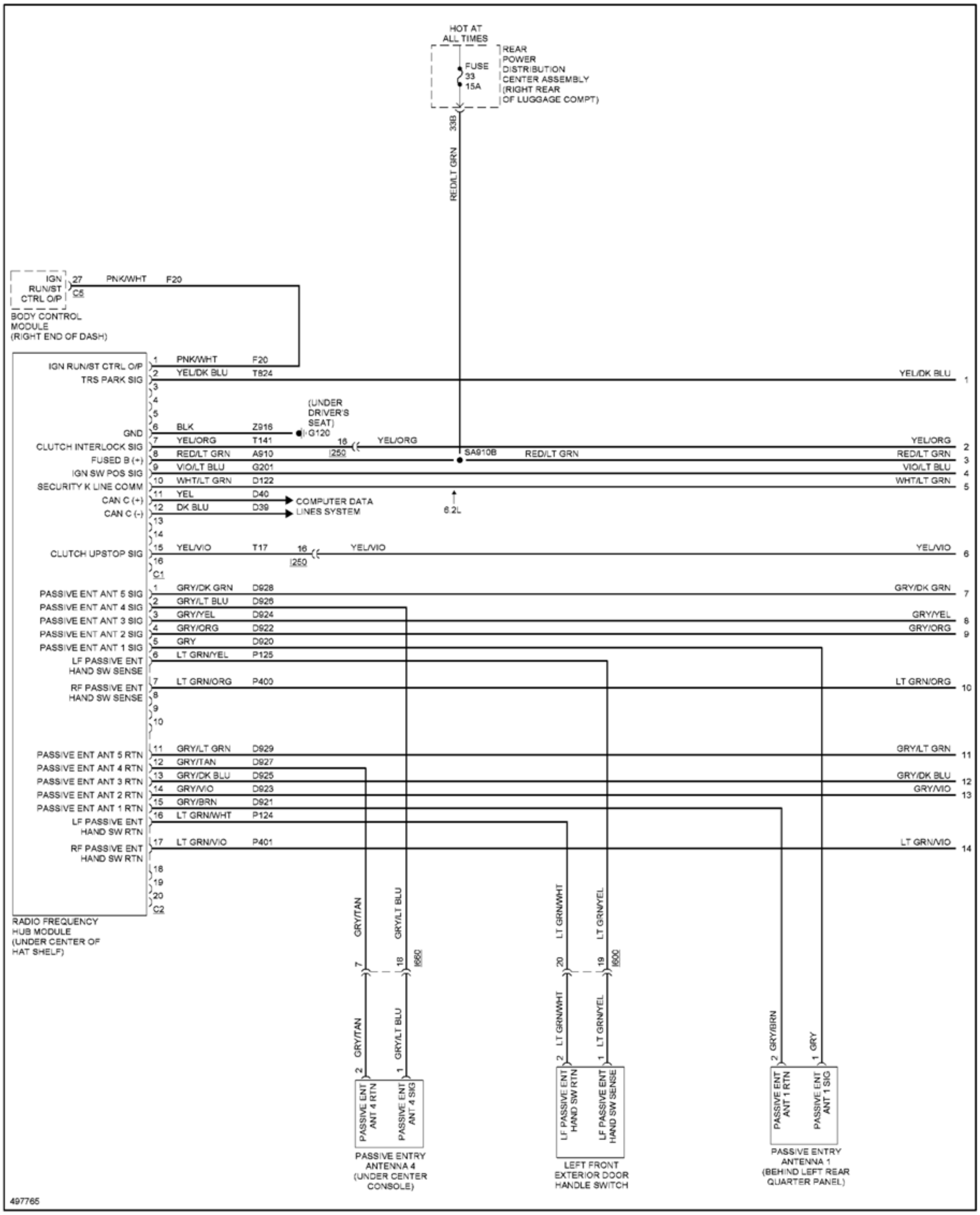


Fig. 9: Passive Anti-theft Circuit (1 of 2)

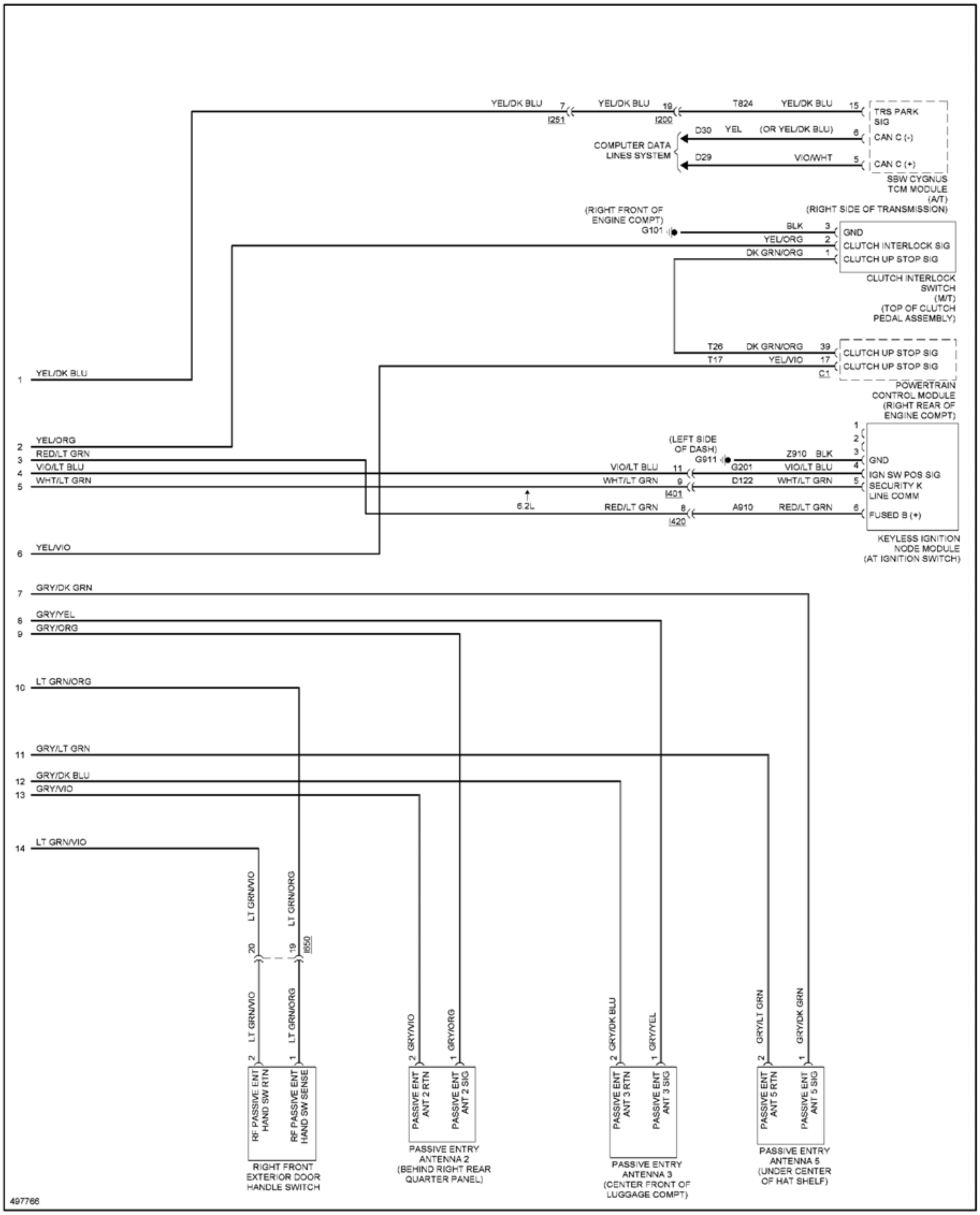


Fig. 10: Passive Anti-theft Circuit (2 of 2)

BODY CONTROL MODULES

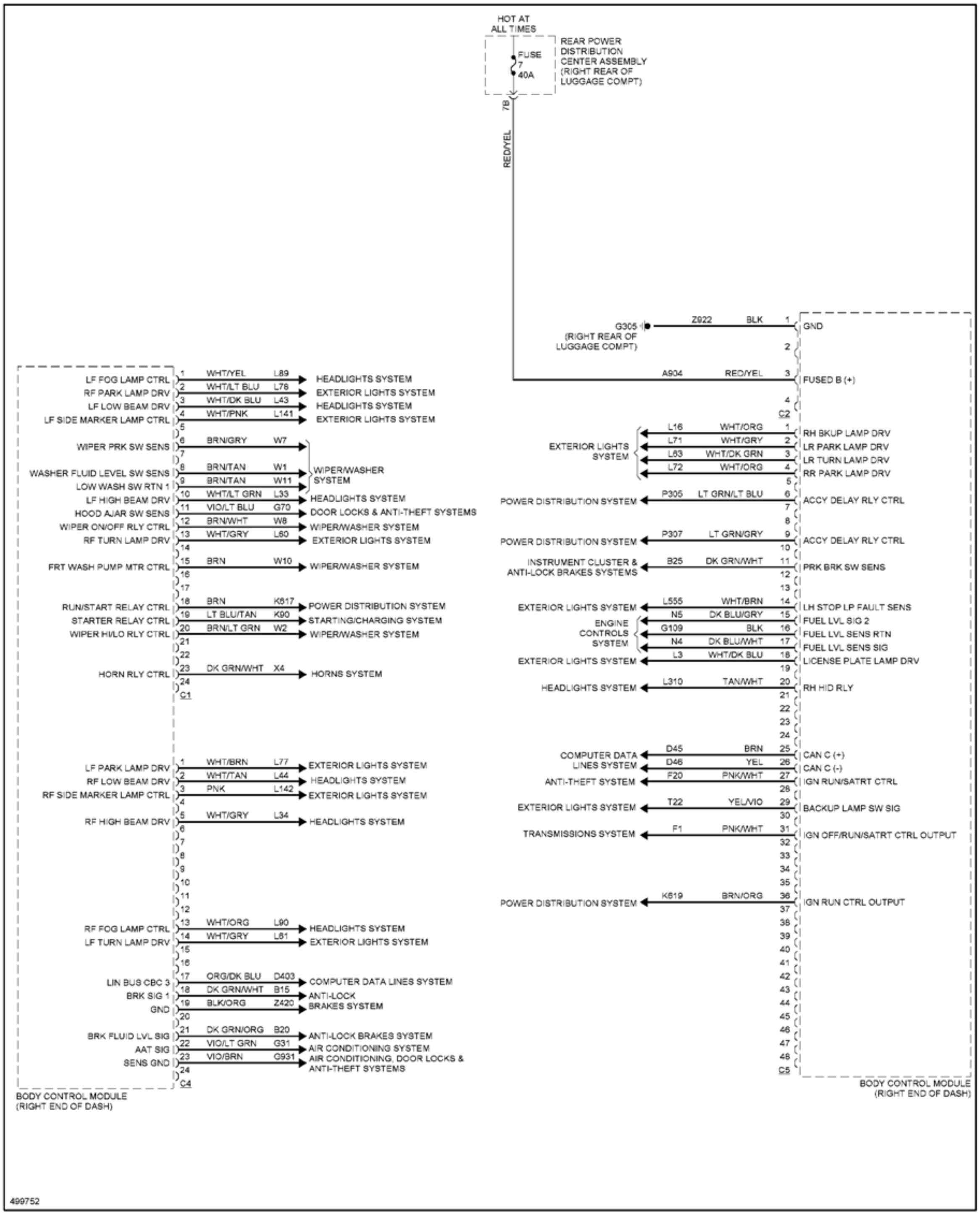


Fig. 11: Body Control Modules Circuit (1 of 2)

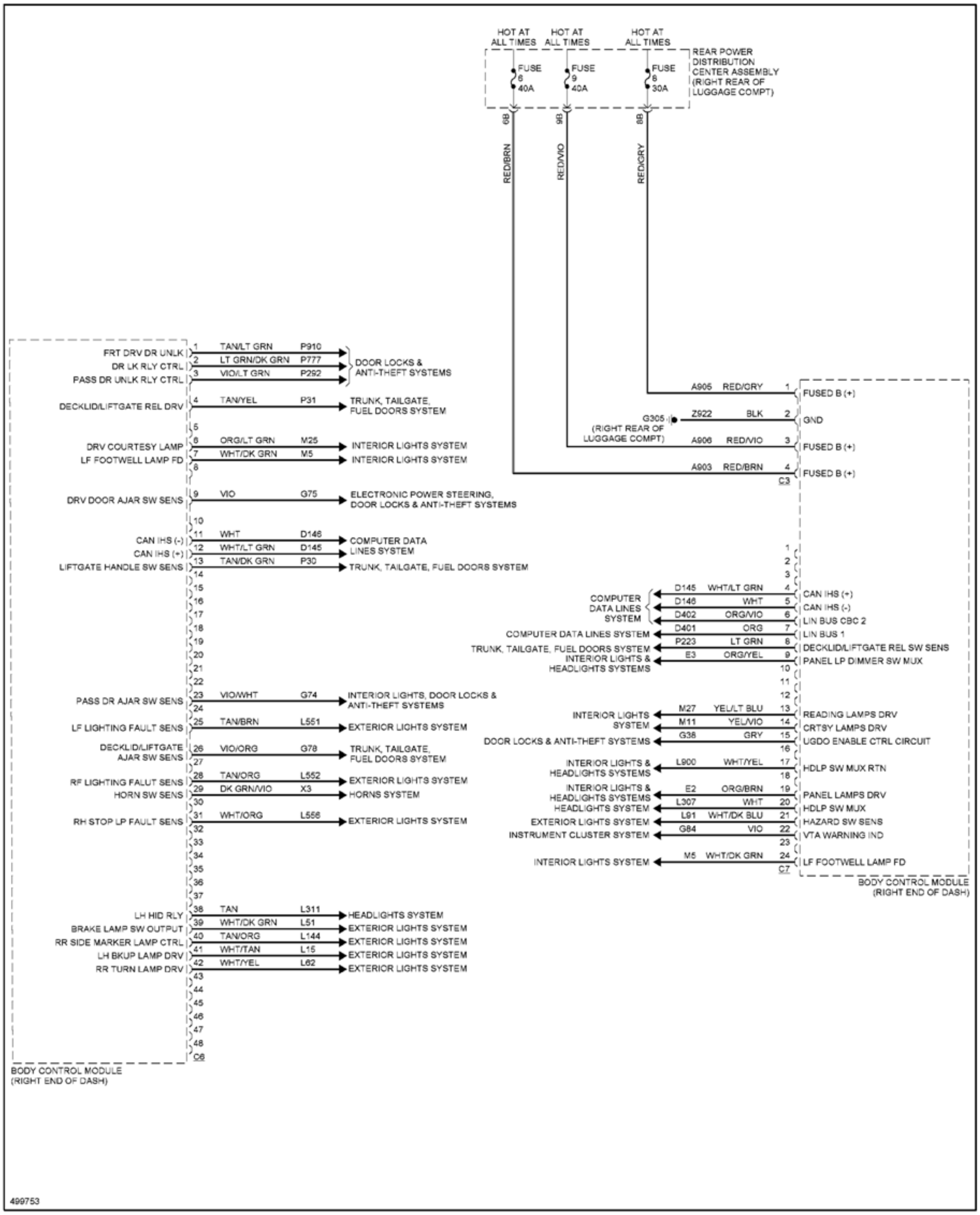
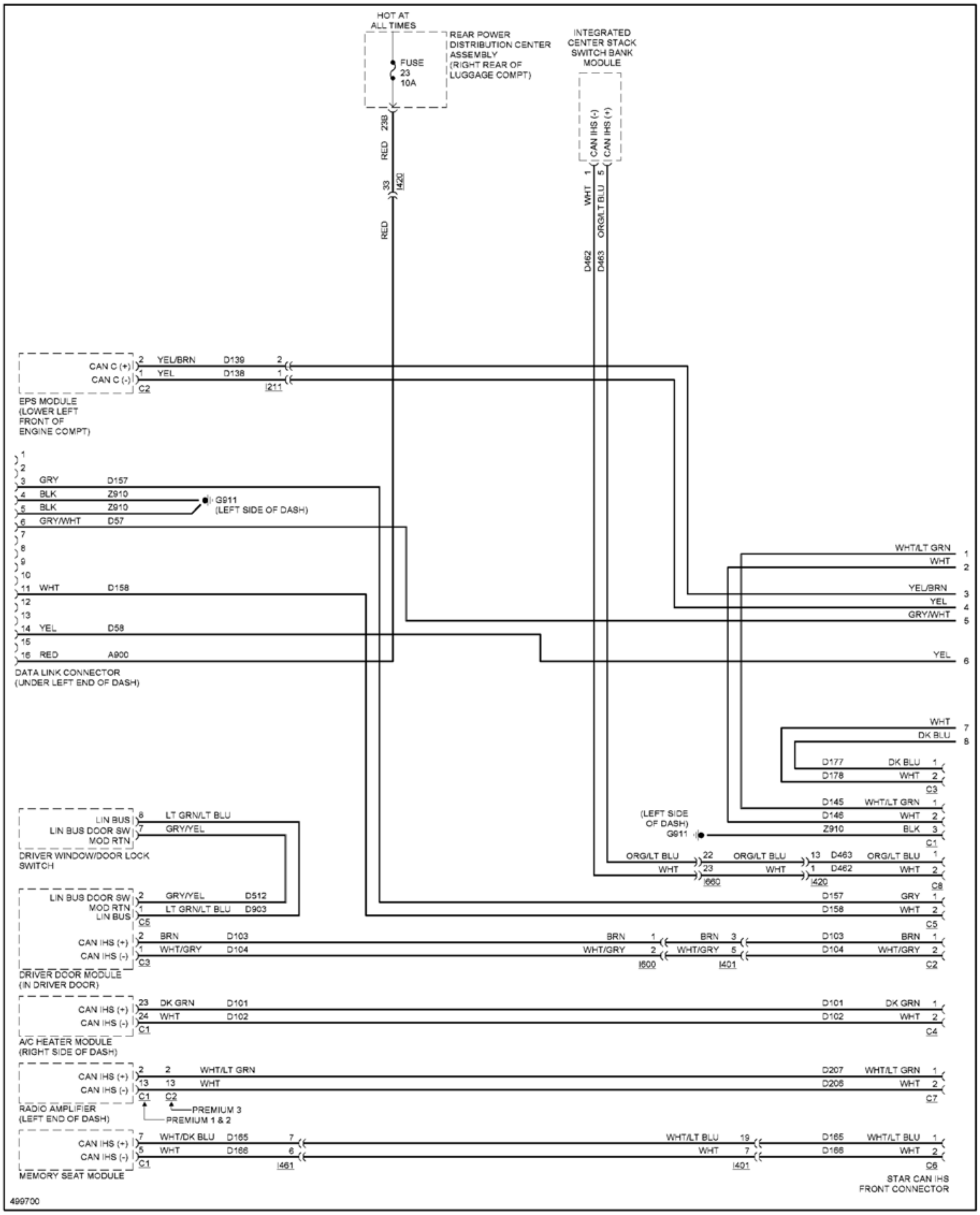


Fig. 12: Body Control Modules Circuit (2 of 2)

COMPUTER DATA LINES



[Fig. 13: Computer Data Lines Circuit (1 of 5)]()

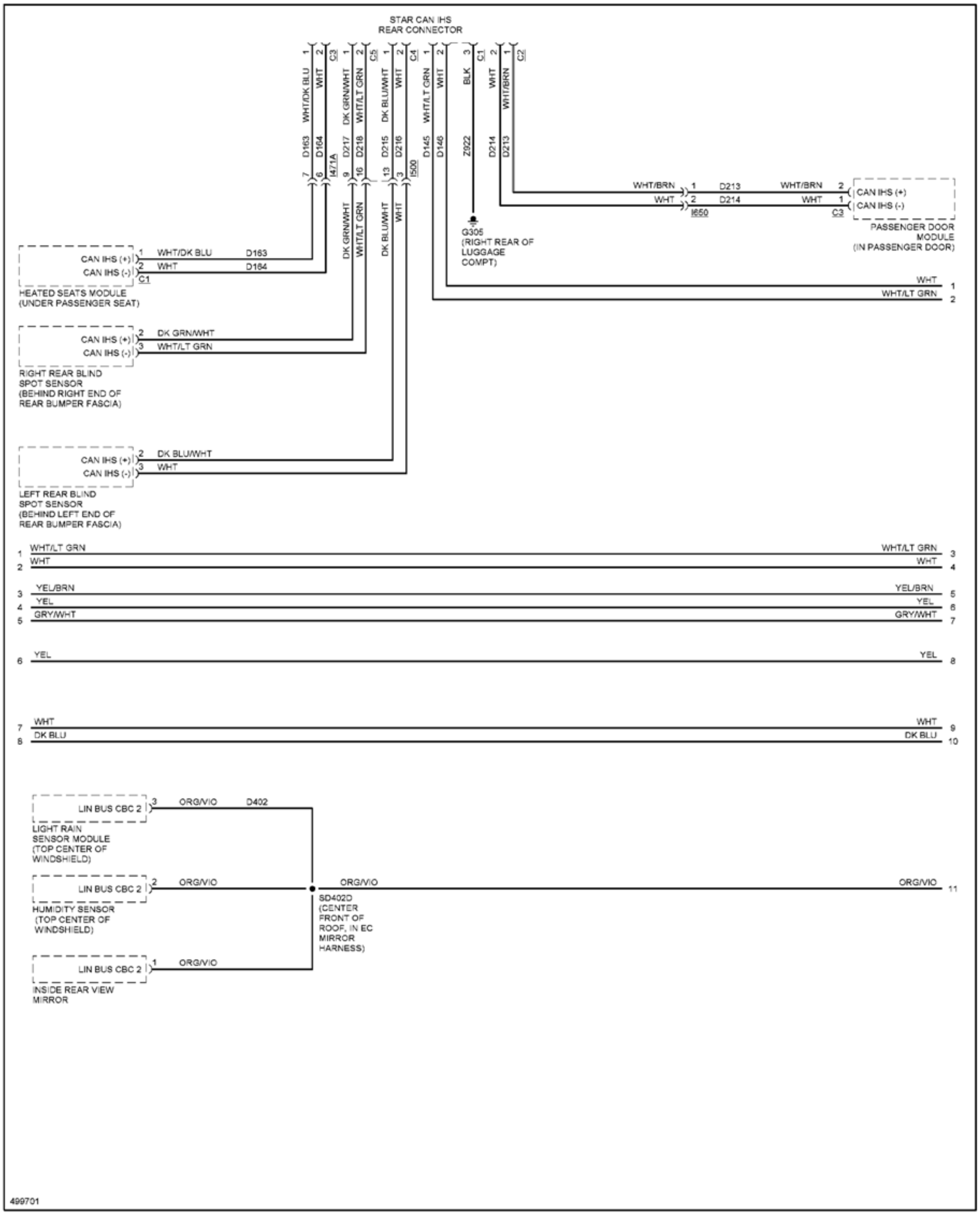


Fig. 14: Computer Data Lines Circuit (2 of 5)

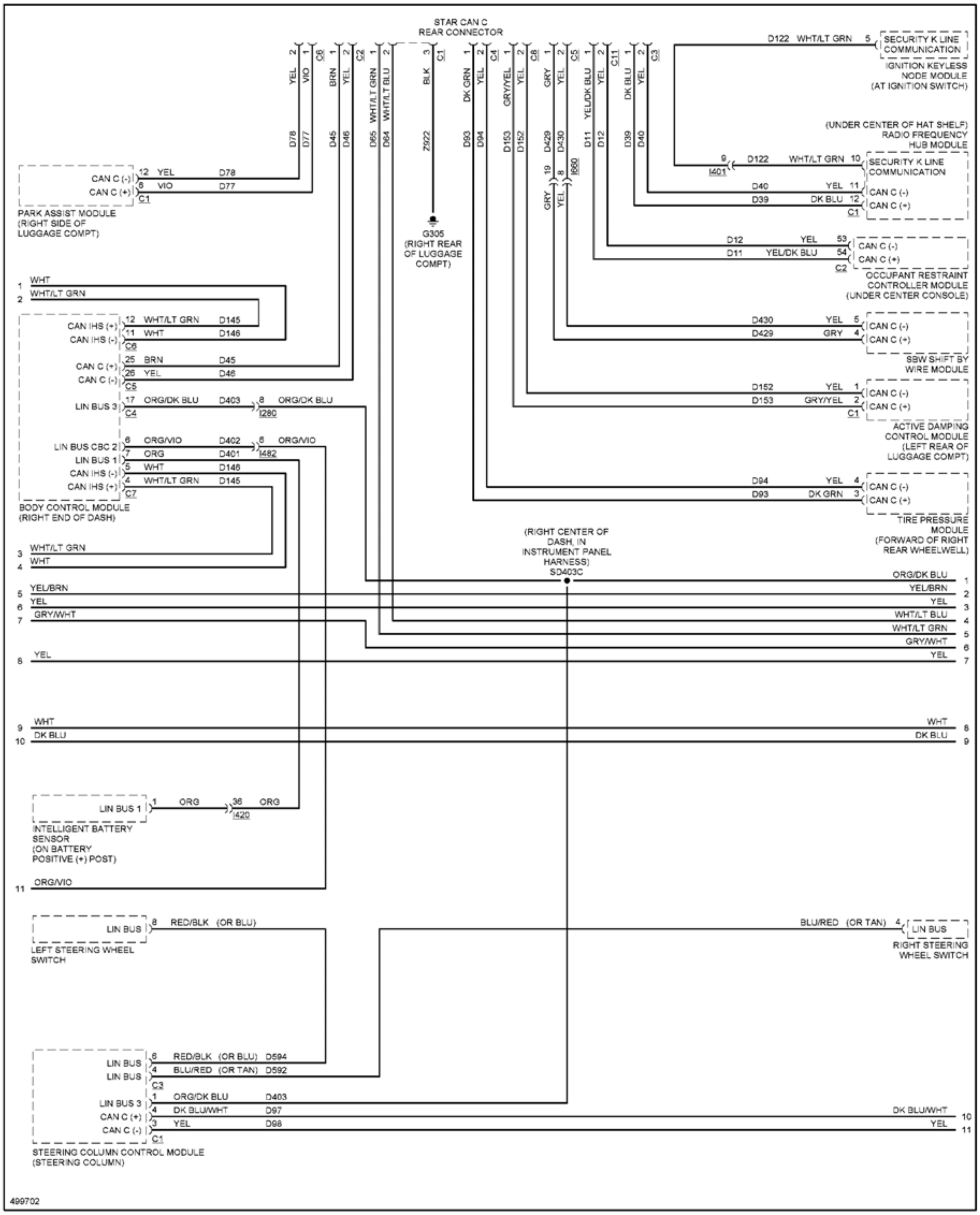


Fig. 15: Computer Data Lines Circuit (3 of 5)

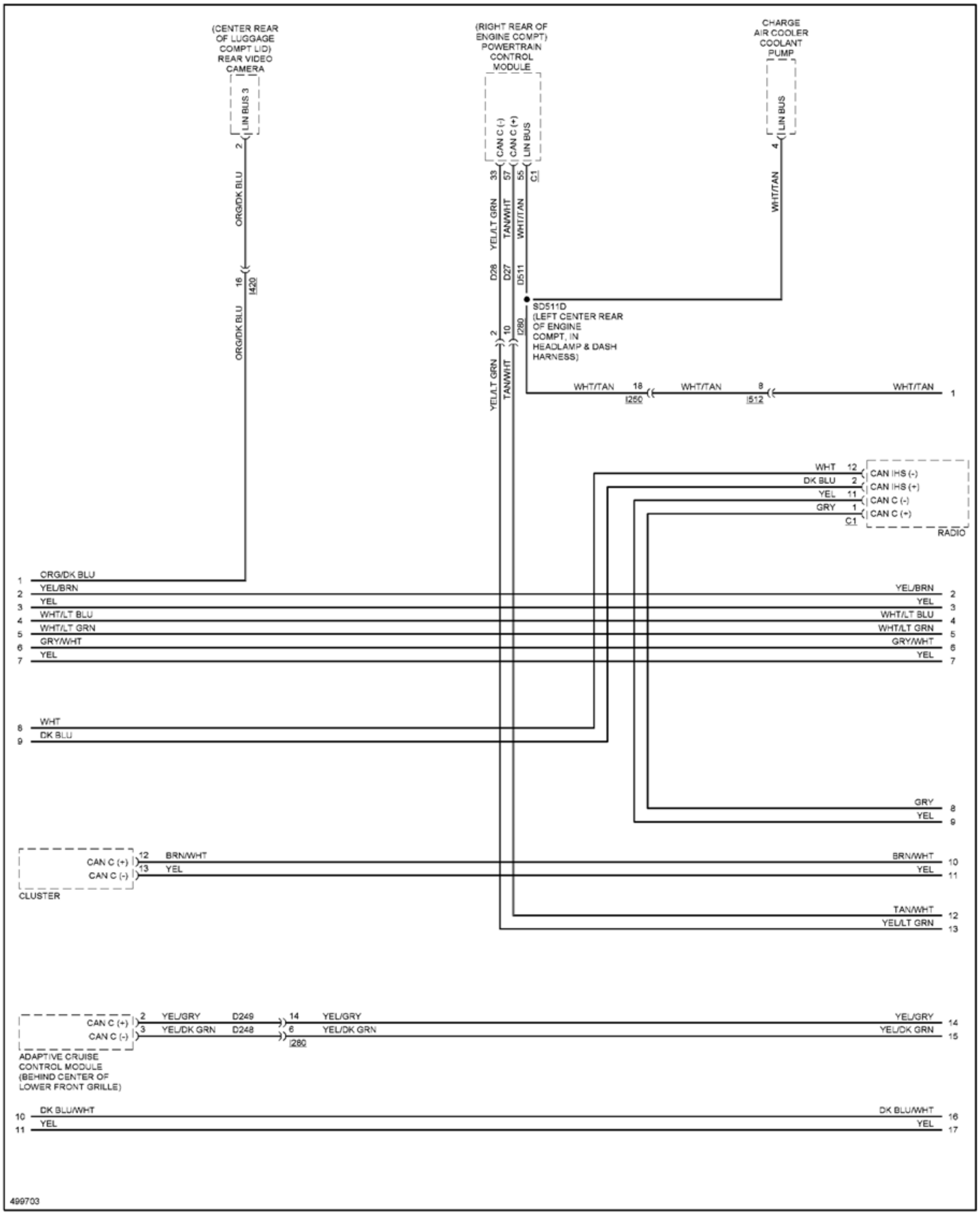


Fig. 16: Computer Data Lines Circuit (4 of 5)

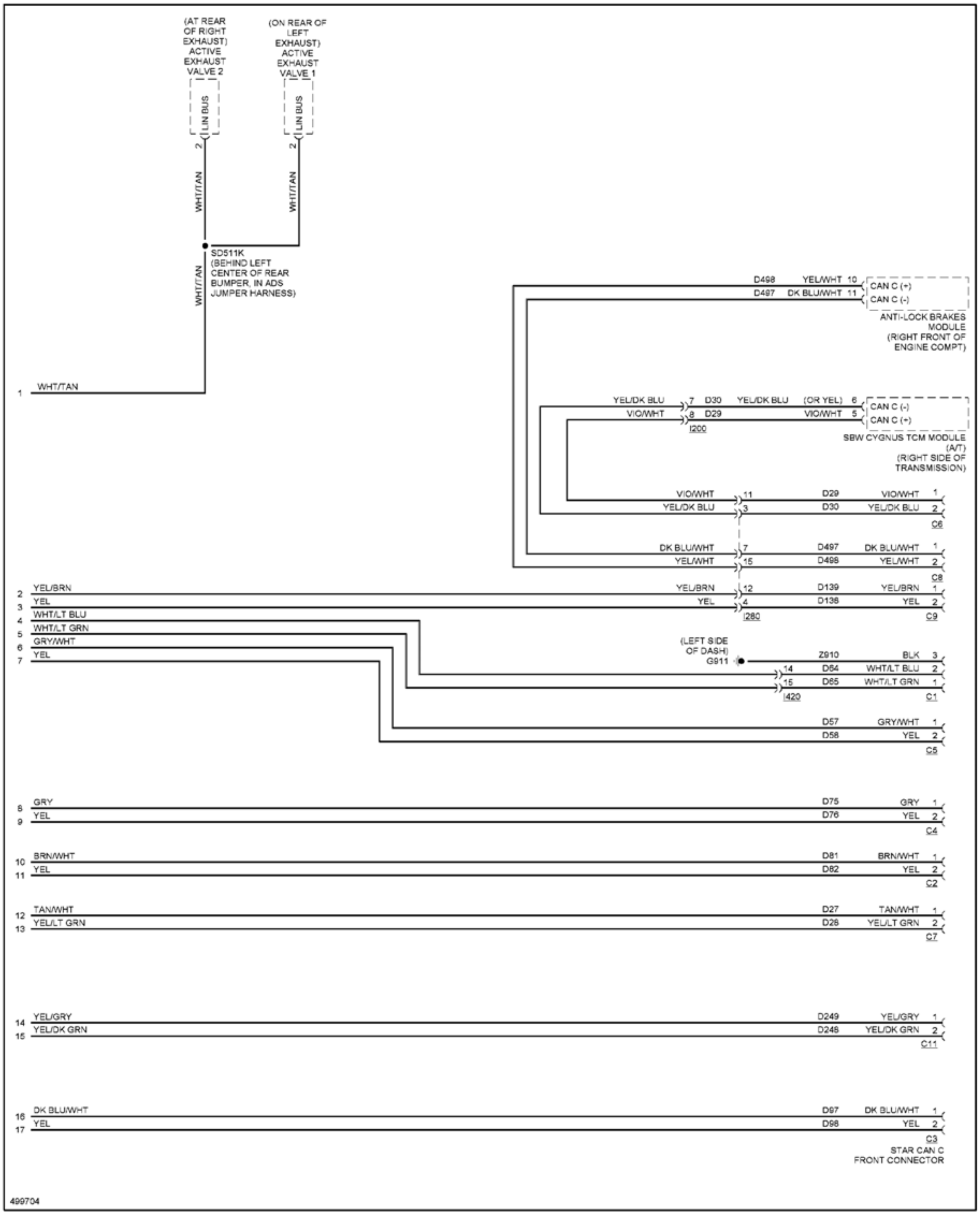


Fig. 17: Computer Data Lines Circuit (5 of 5)

COOLING FAN

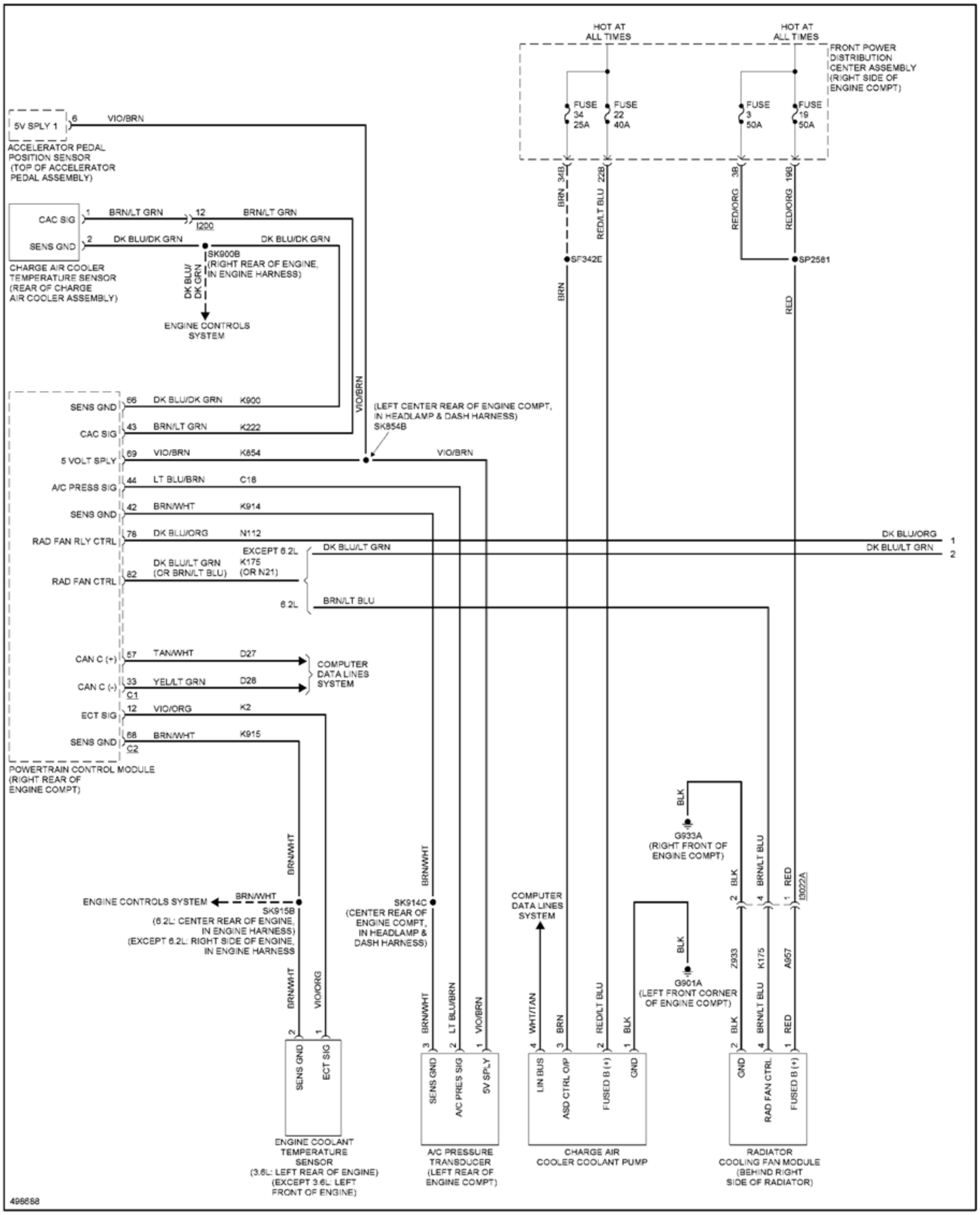
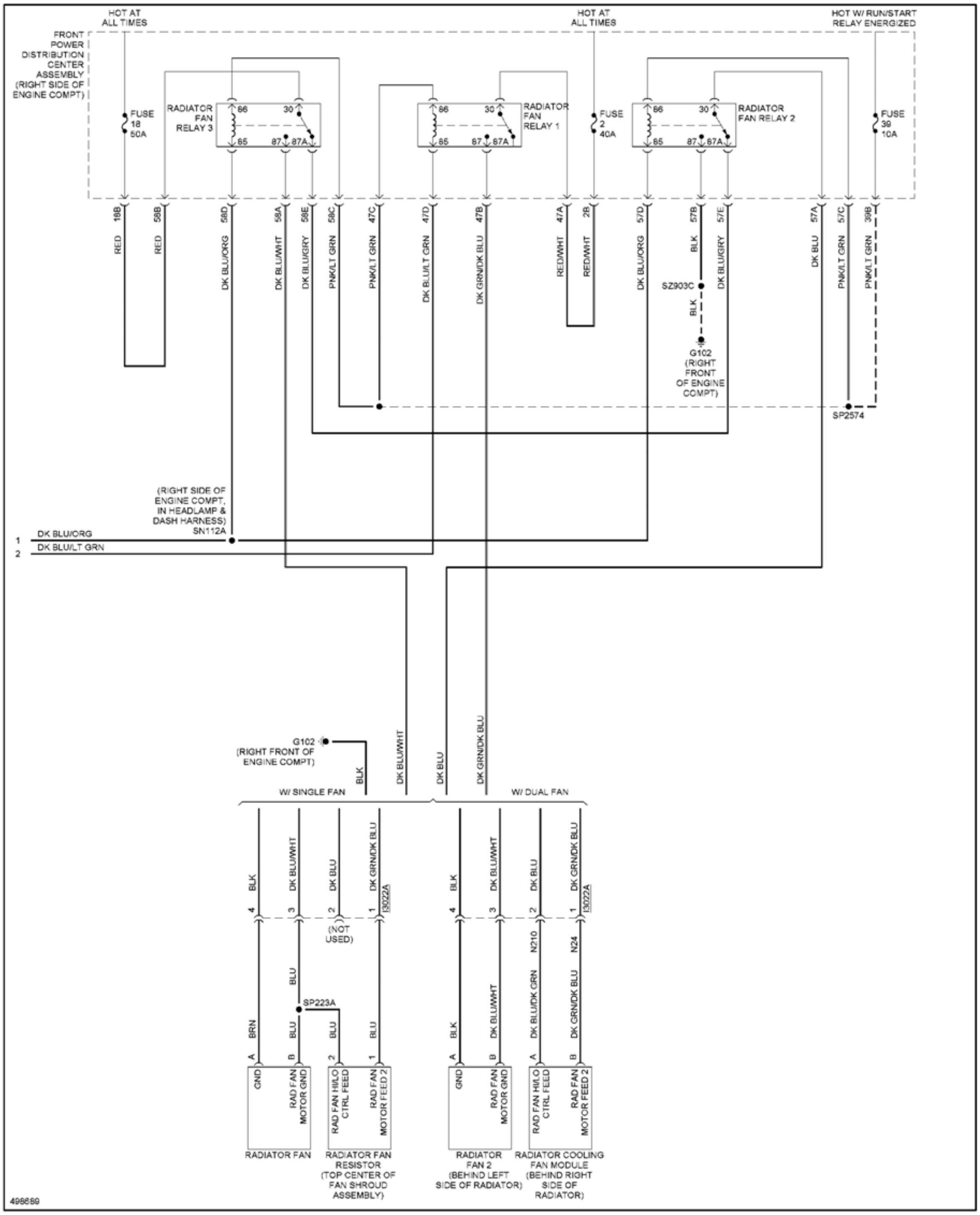


Fig. 18: Cooling Fan Circuit (1 of 2)



[Fig. 19: Cooling Fan Circuit (2 of 2)](#)

CRUISE CONTROL

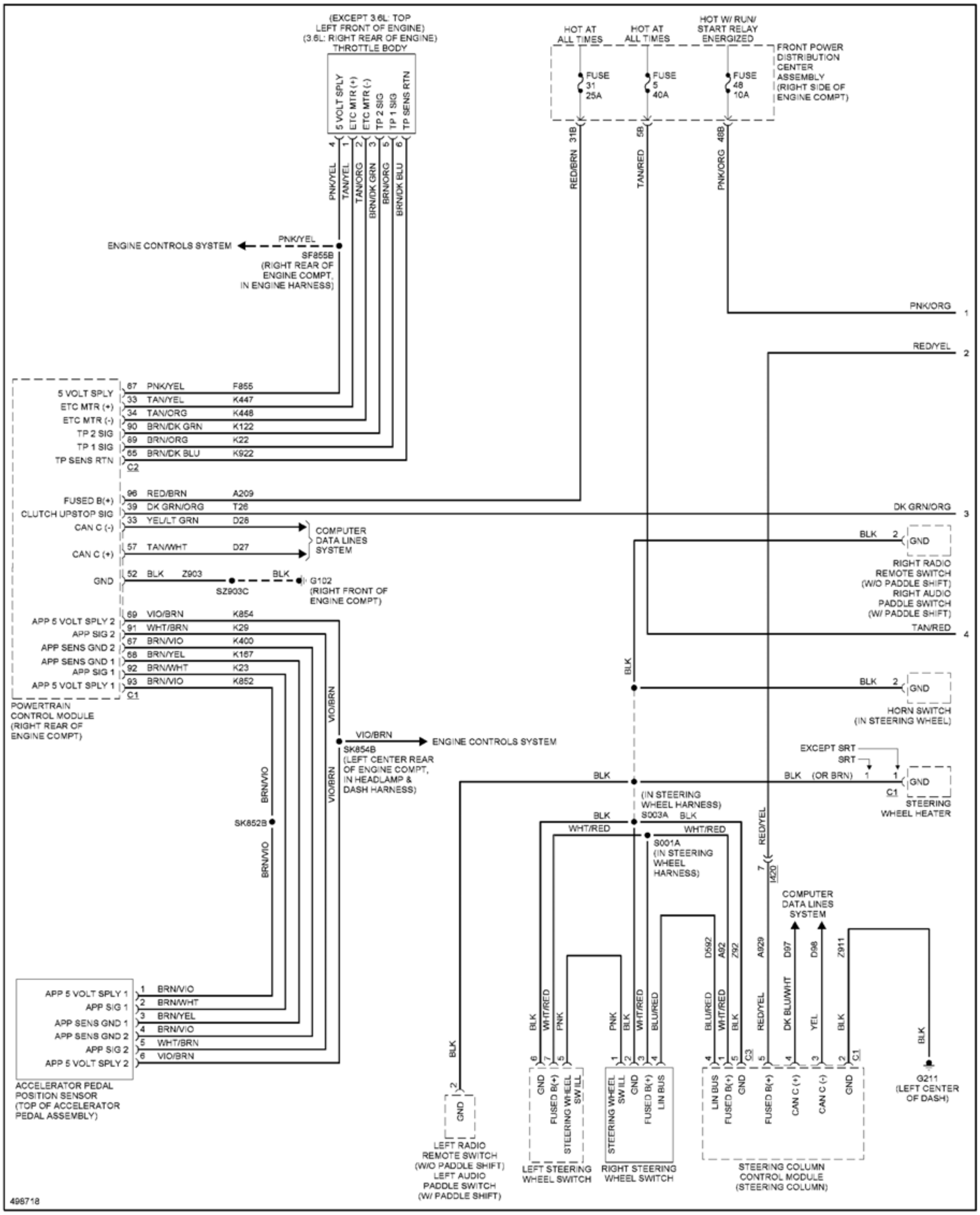


Fig. 20: Cruise Control Circuit (1 of 2)

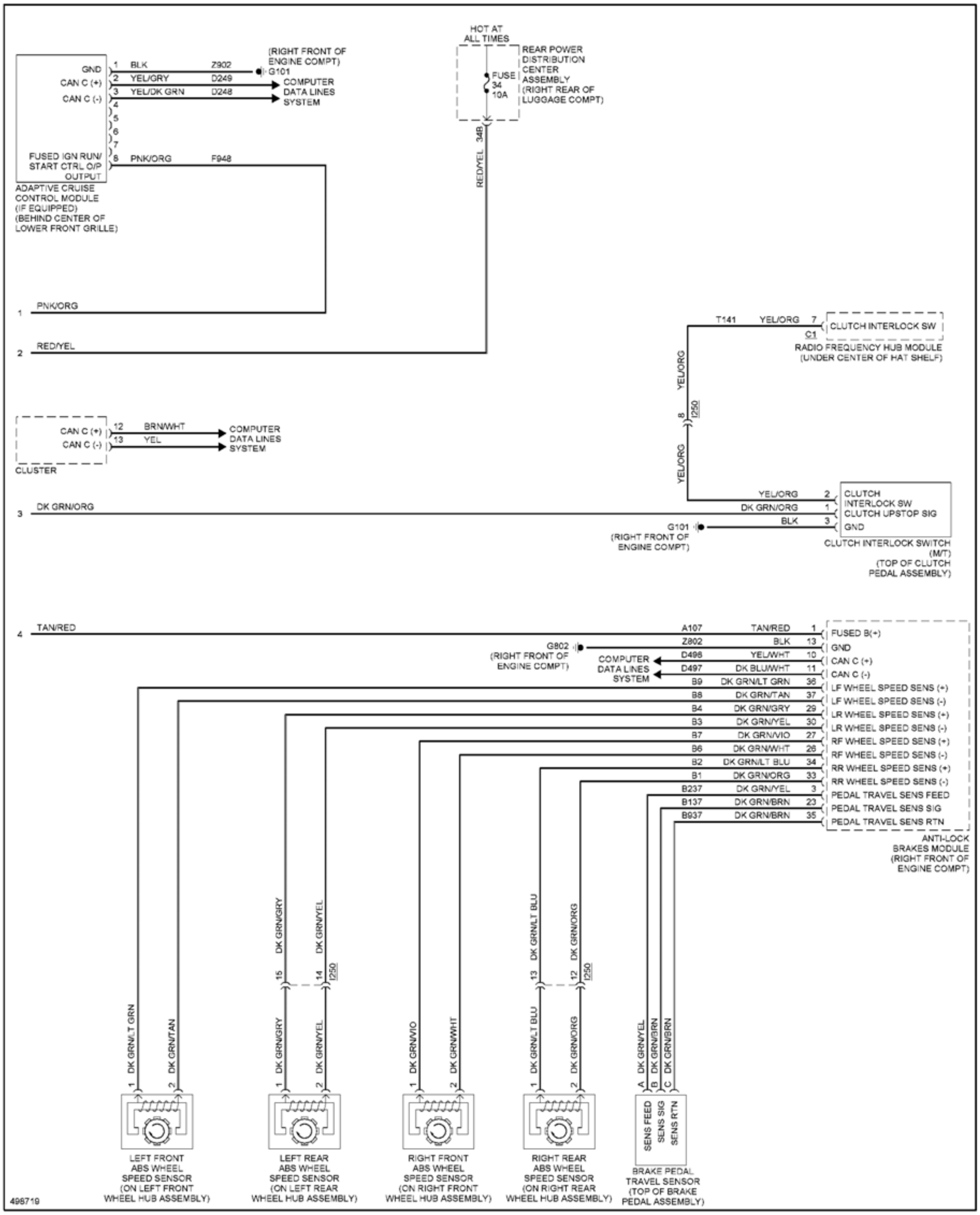


Fig. 21: Cruise Control Circuit (2 of 2)

DEFOGGERS

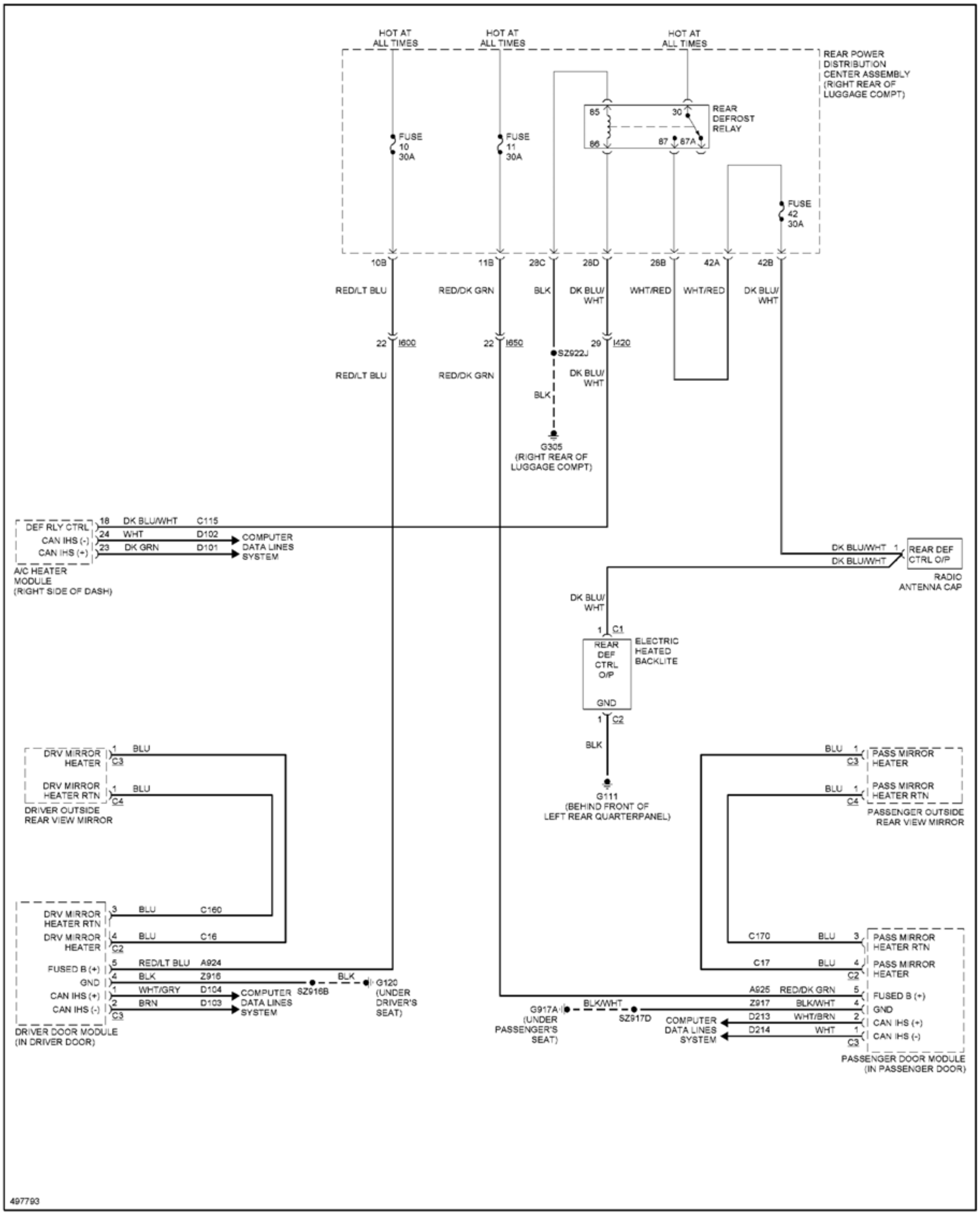


Fig. 22: Defoggers Circuit

ELECTRONIC POWER STEERING

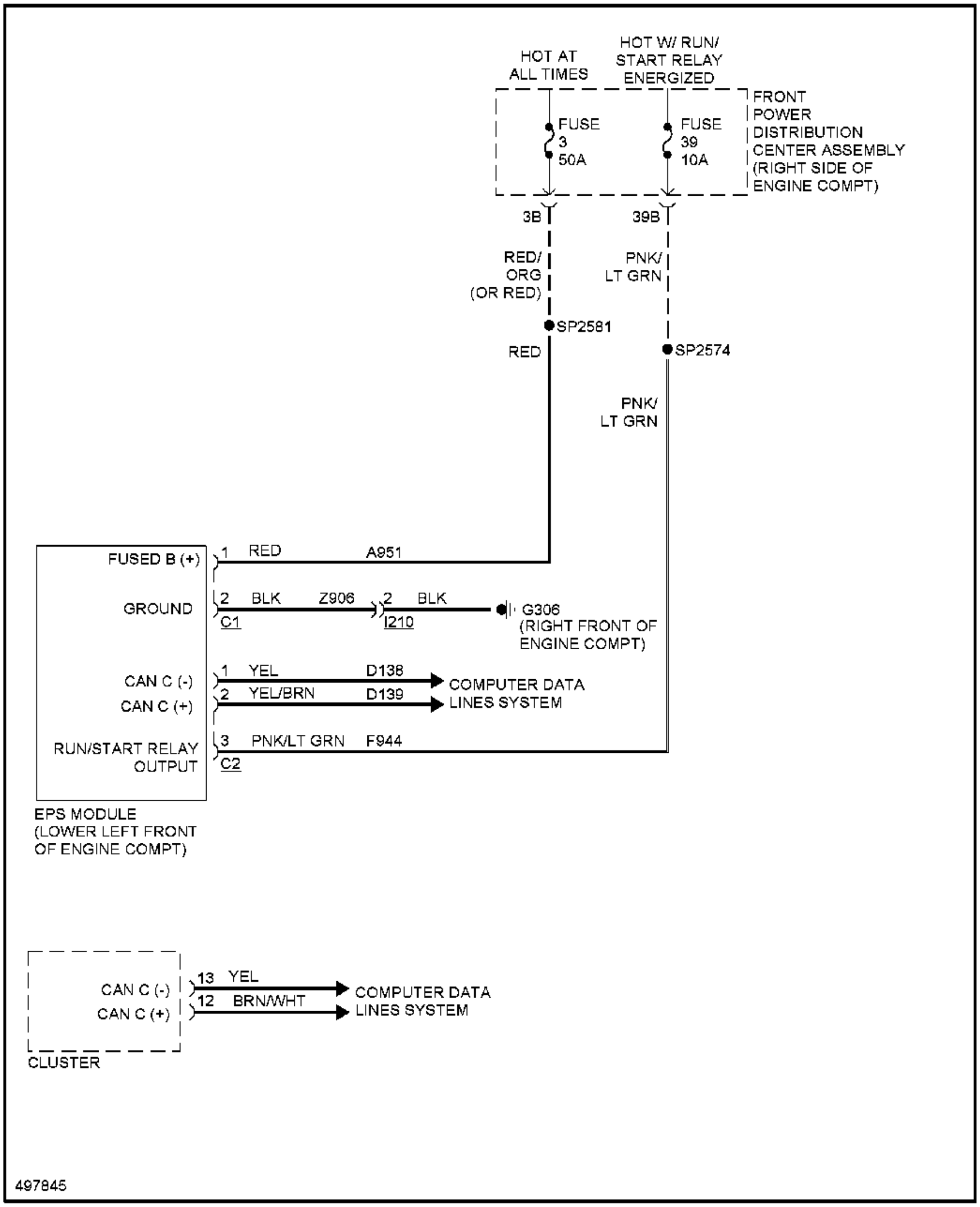


Fig. 23: Electronic Power Steering Circuit

ELECTRONIC SUSPENSION

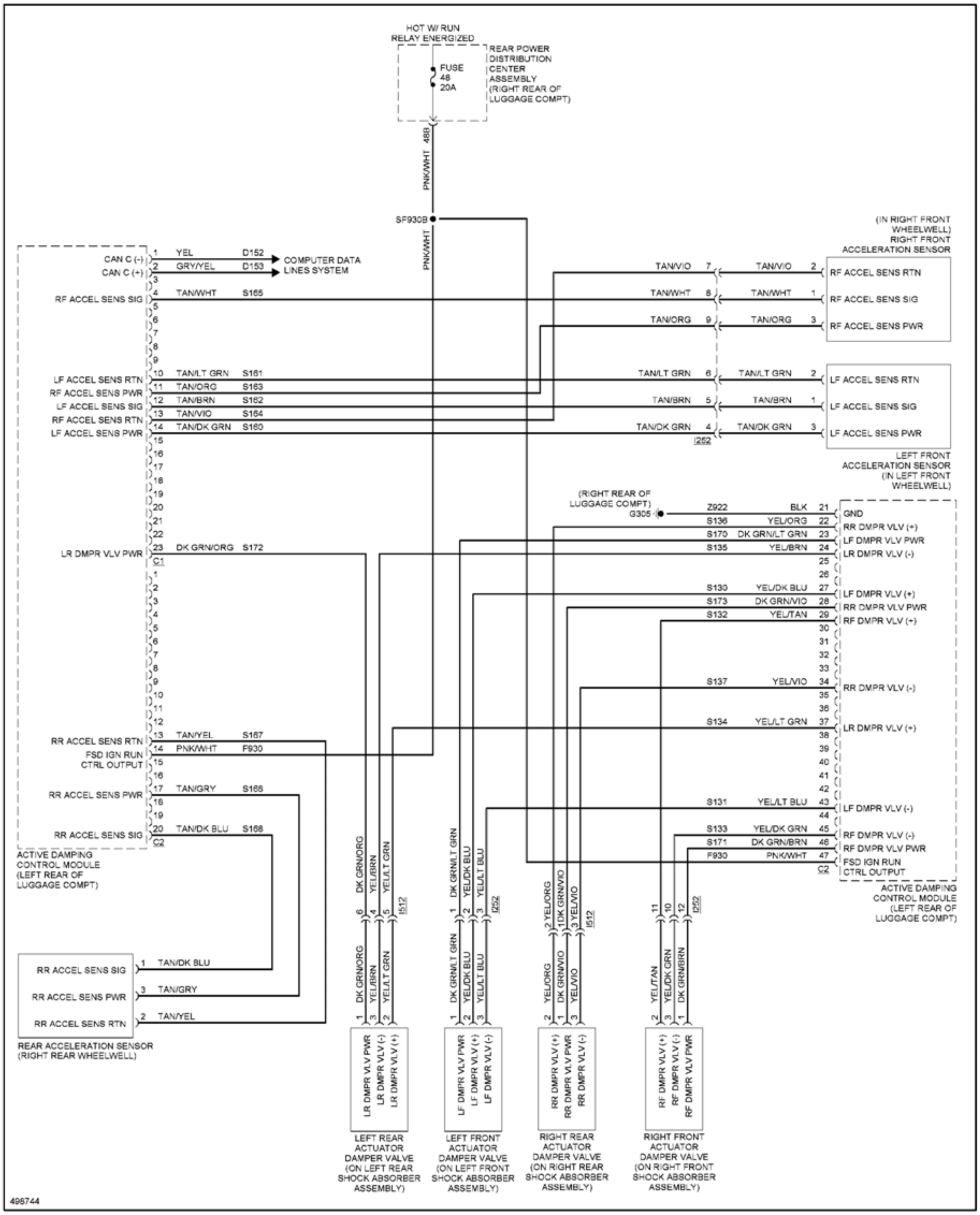


Fig. 24: Electronic Suspension Circuit

ENGINE PERFORMANCE

3.6L

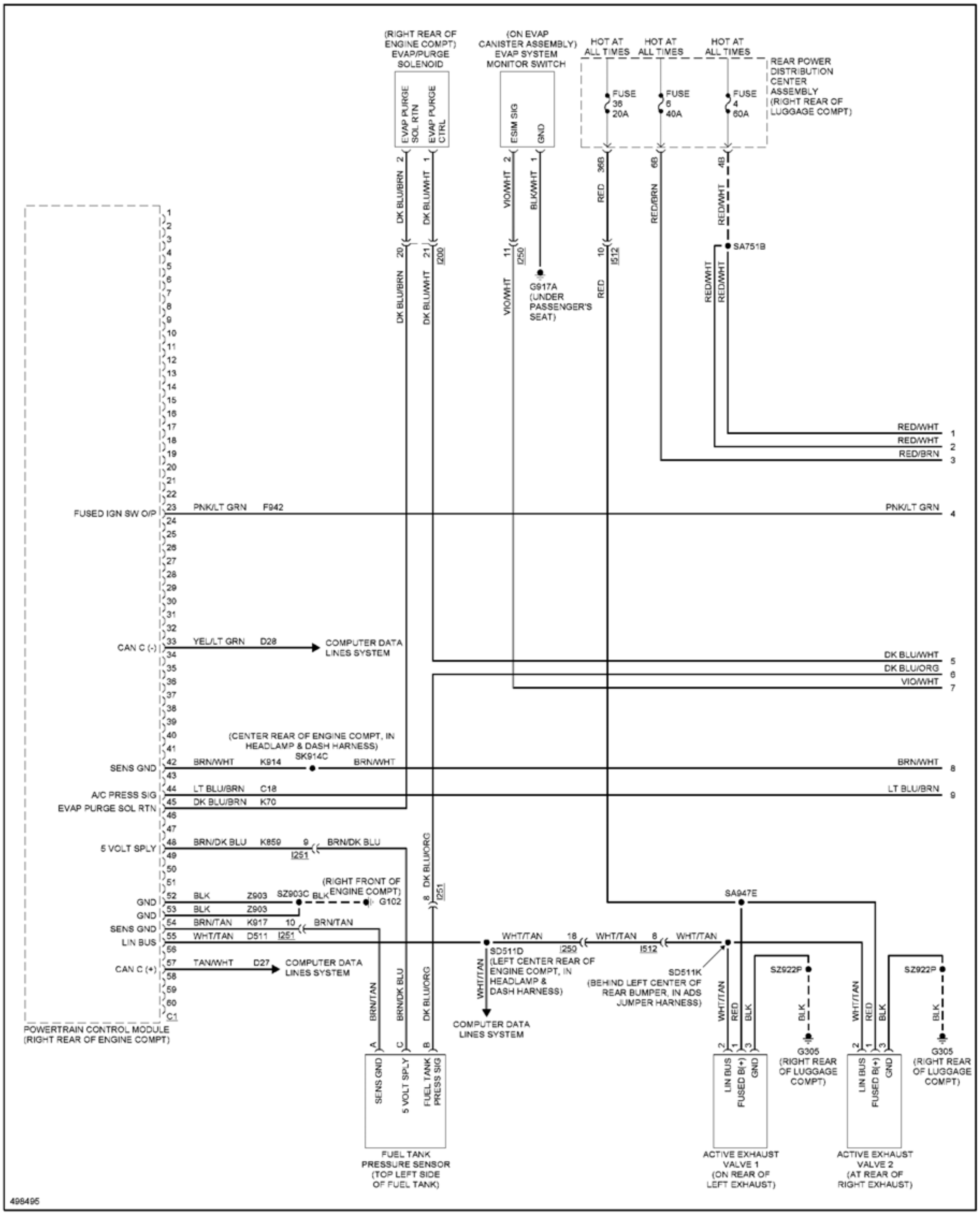


Fig. 25: 3.6L, Engine Performance Circuit (1 of 7)

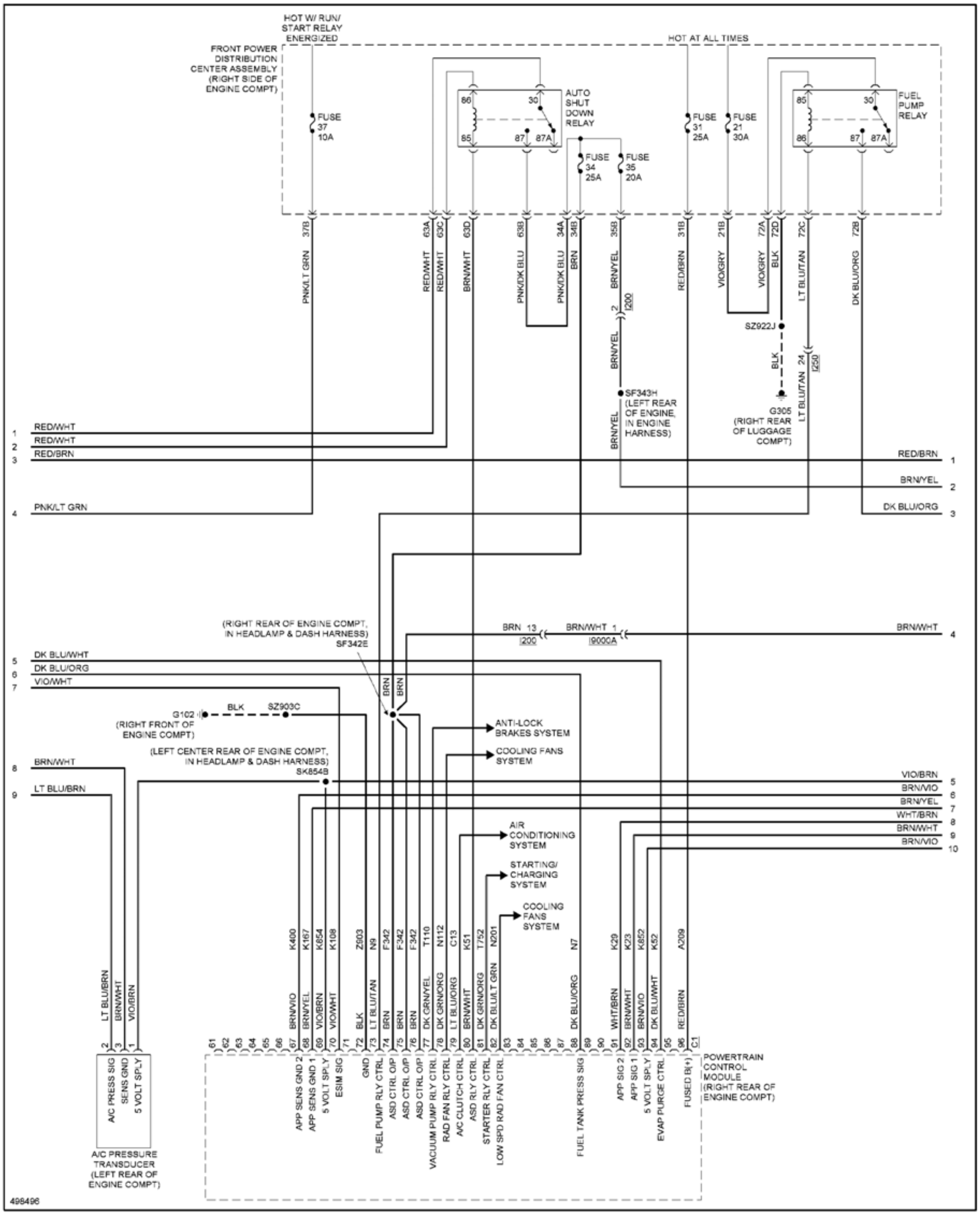


Fig. 26: 3.6L, Engine Performance Circuit (2 of 7)

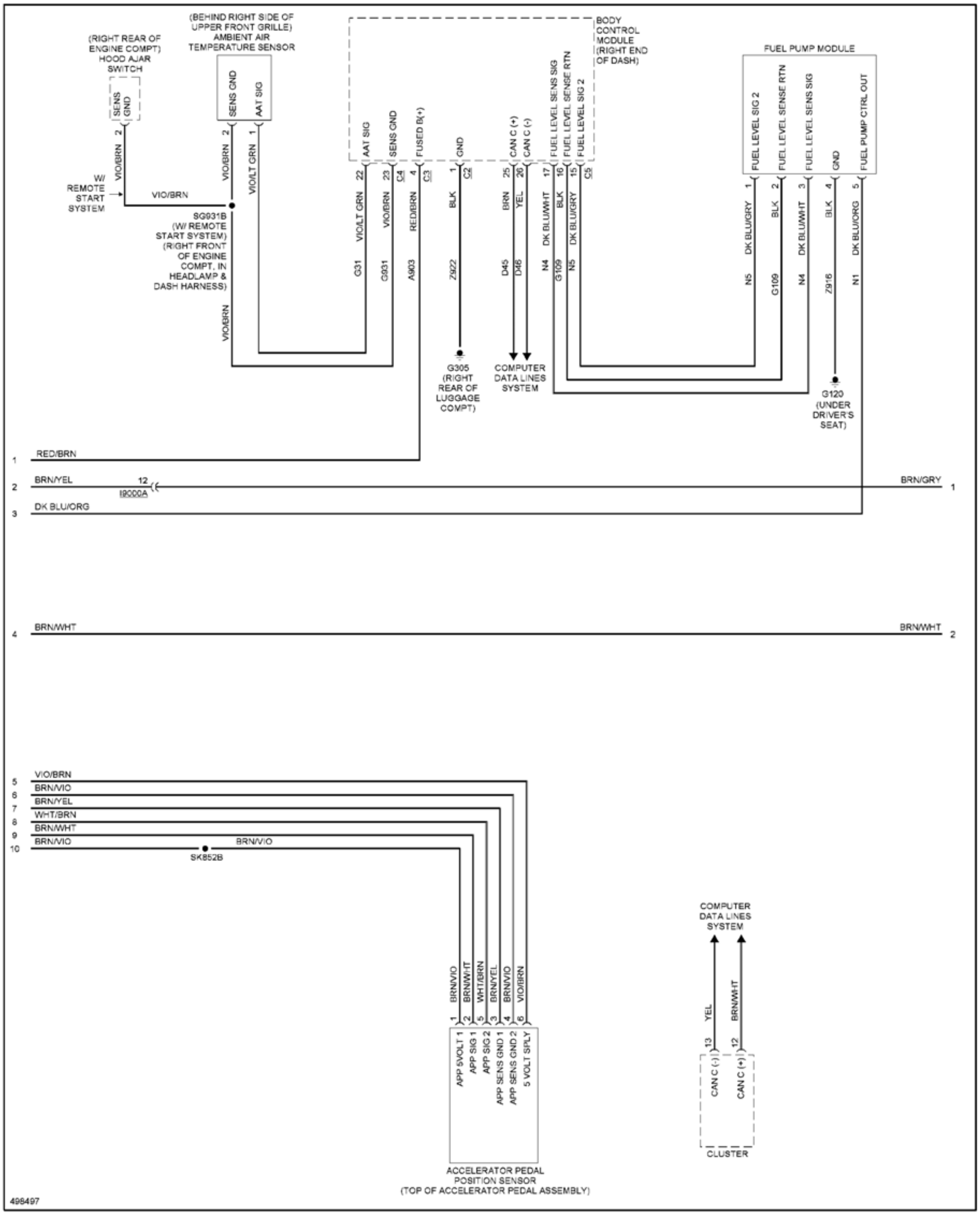


Fig. 27: 3.6L, Engine Performance Circuit (3 of 7)

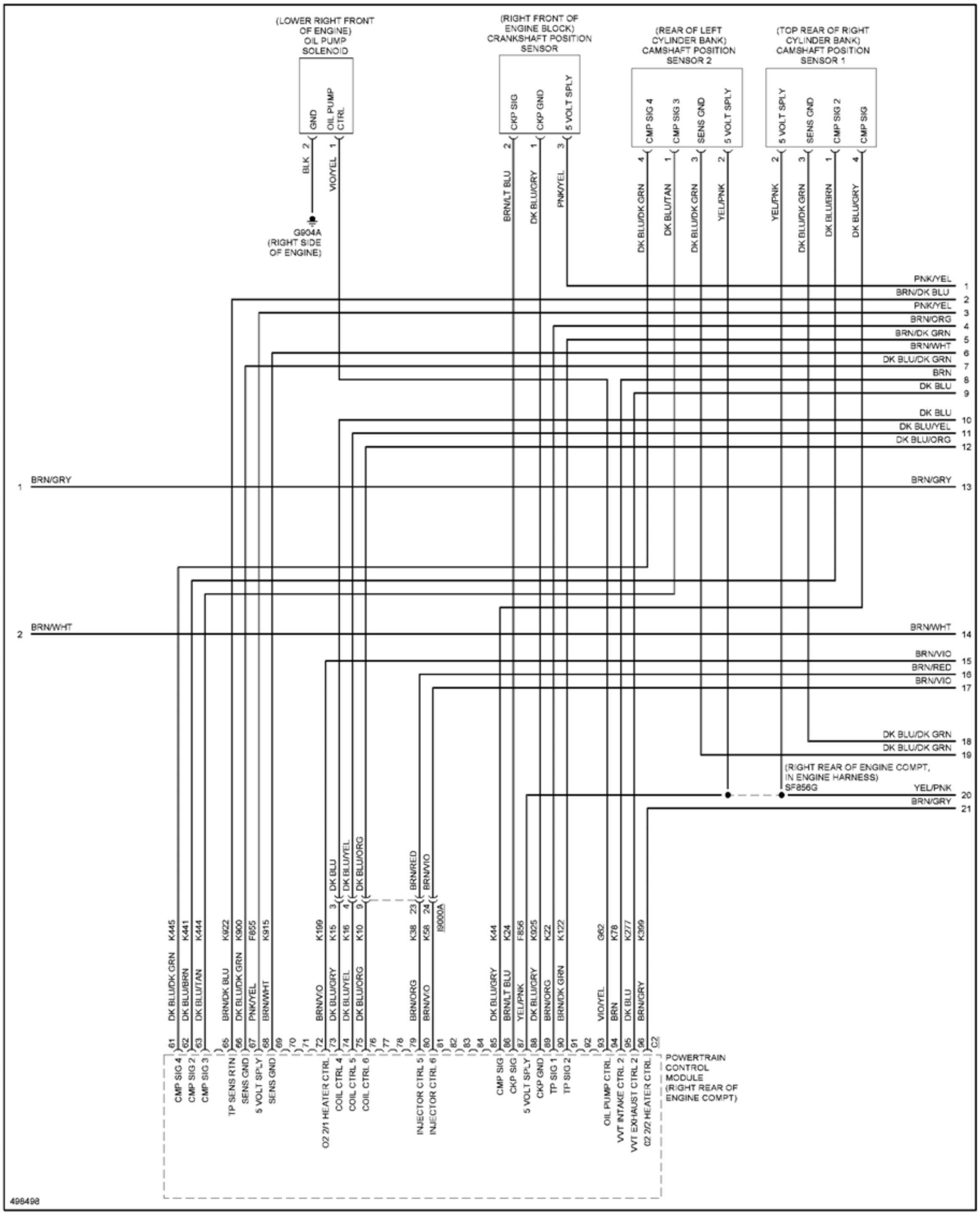
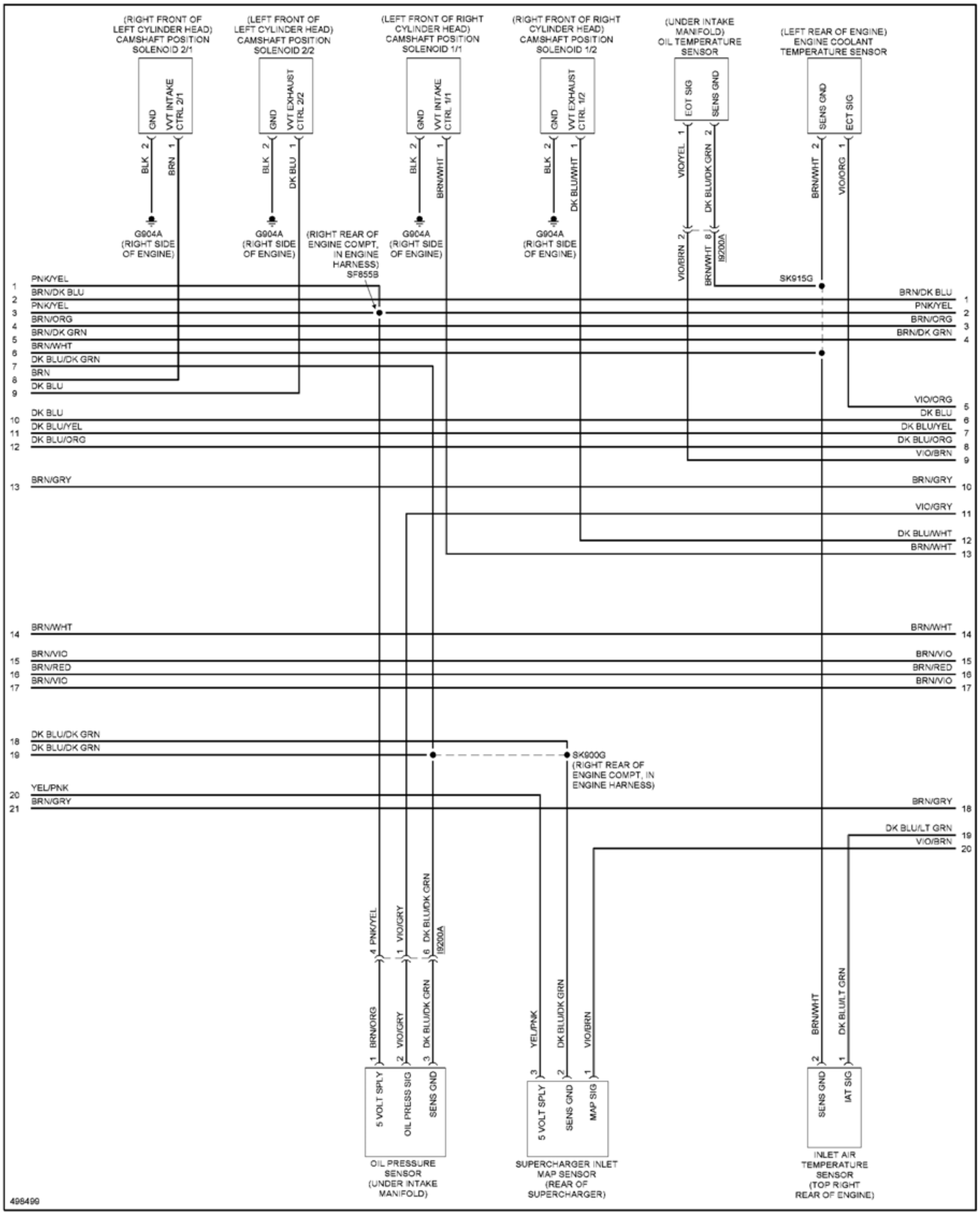


Fig. 28: 3.6L, Engine Performance Circuit (4 of 7)



[Fig. 29: 3.6L, Engine Performance Circuit (5 of 7)]()

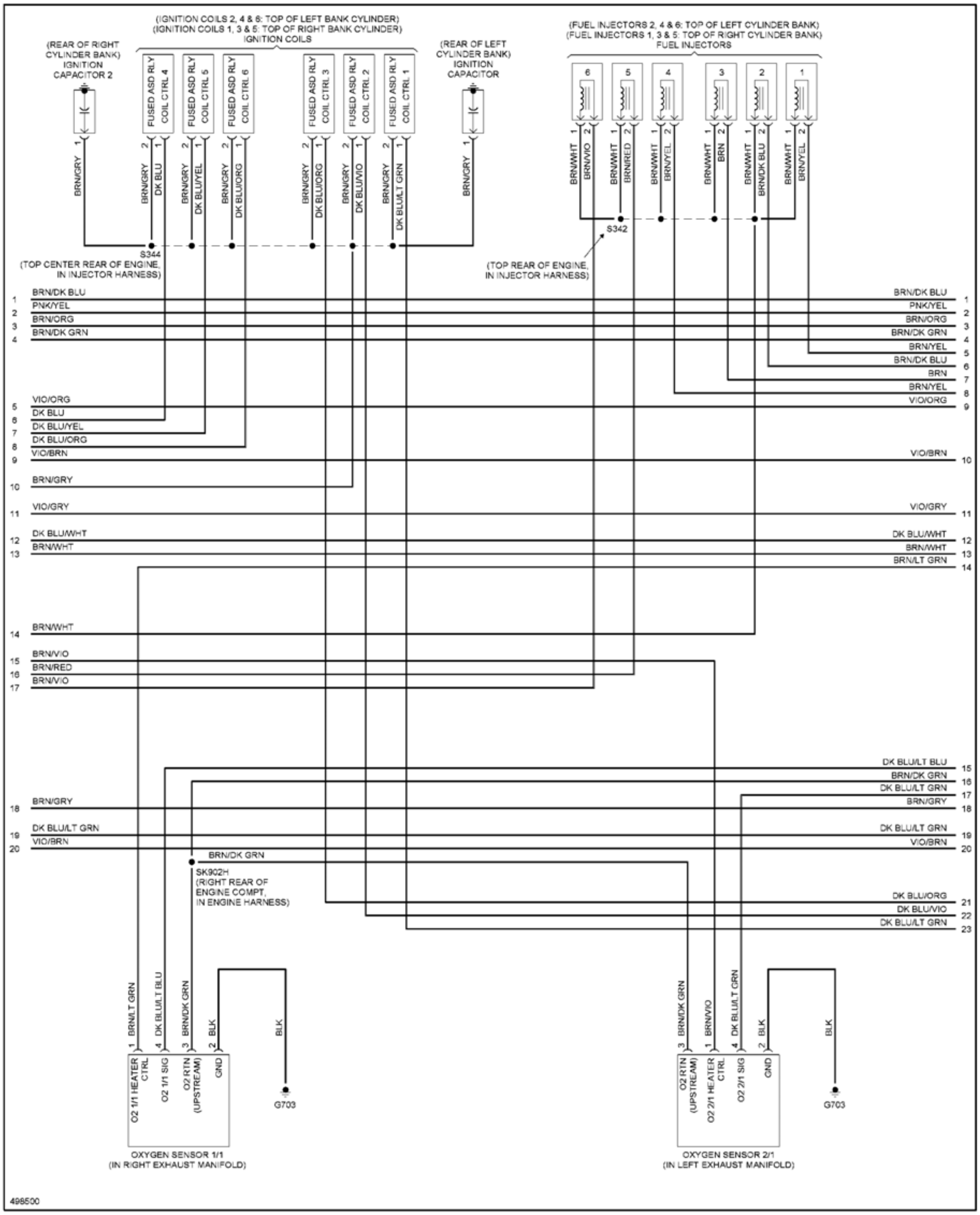


Fig. 30: 3.6L, Engine Performance Circuit (6 of 7)

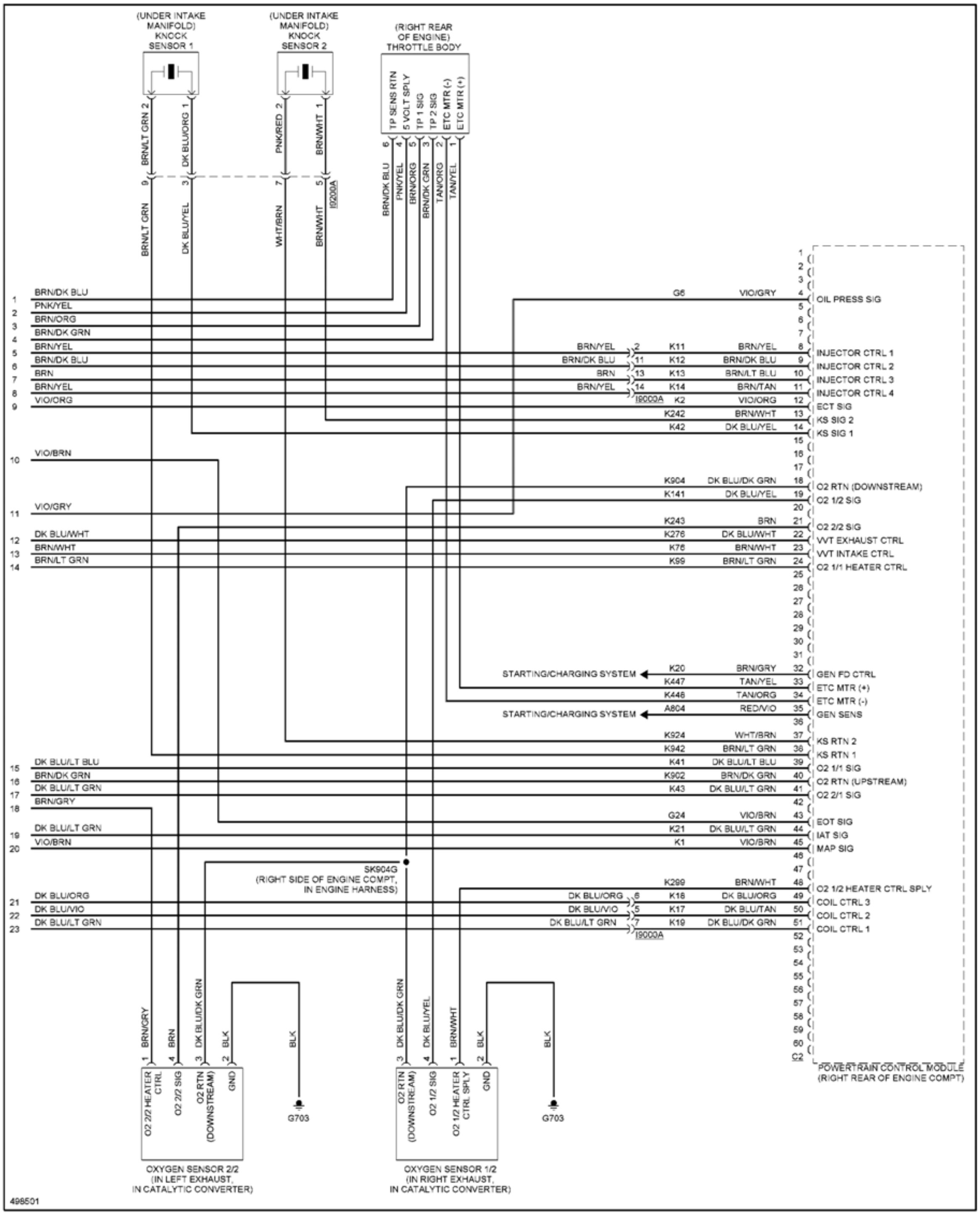


Fig. 31: 3.6L, Engine Performance Circuit (7 of 7)

5.7L

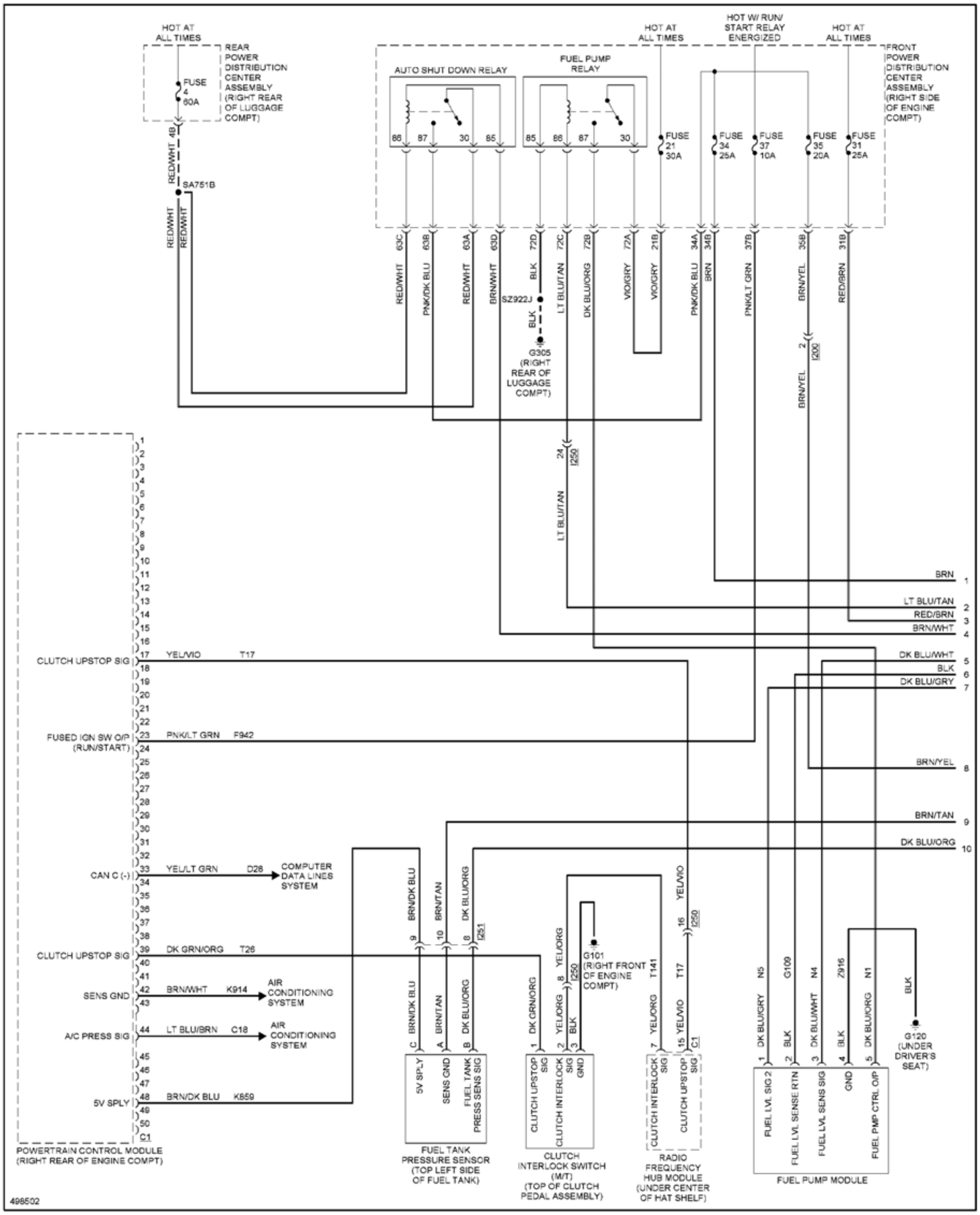


Fig. 32: 5.7L, Engine Performance Circuit (1 of 5)

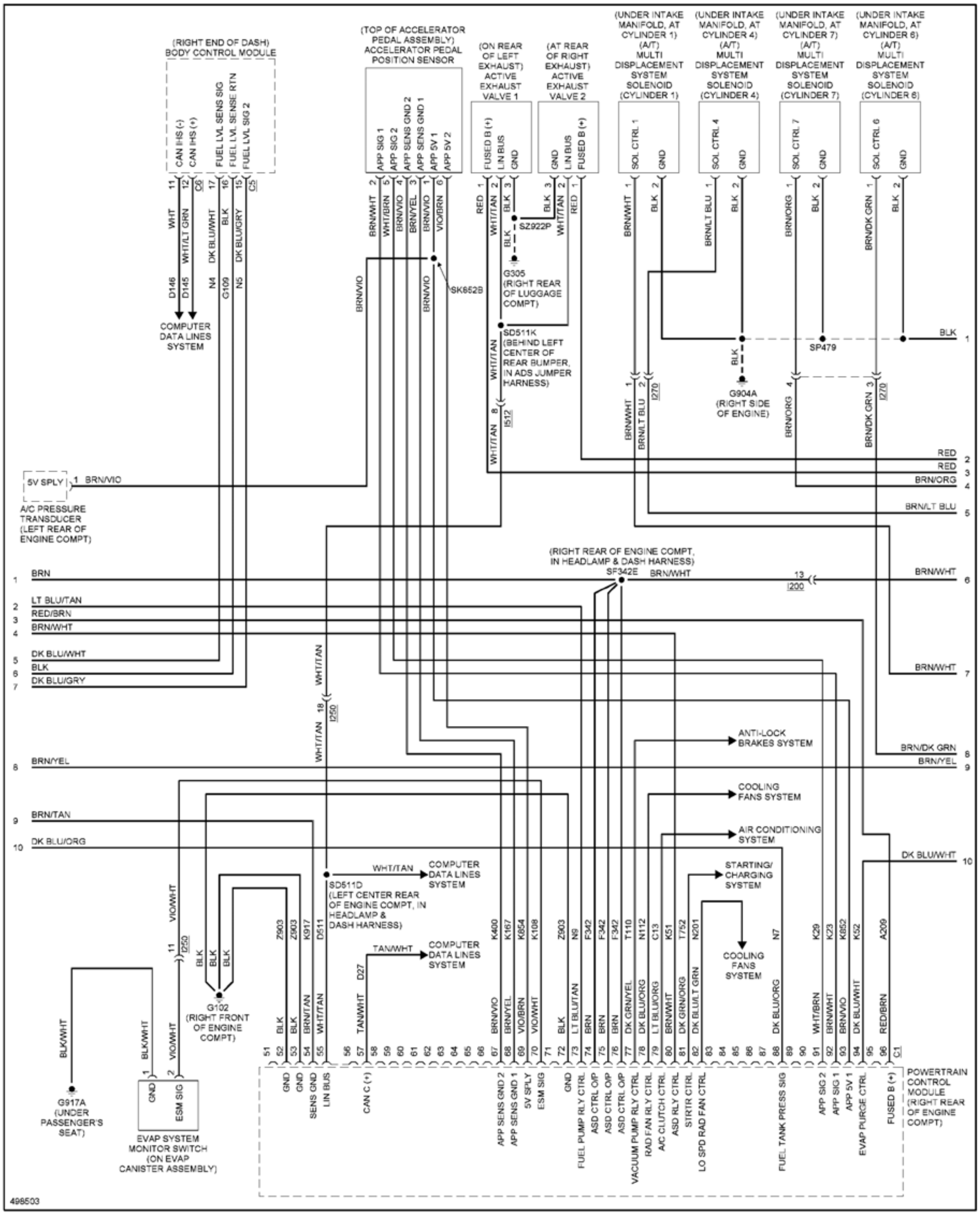
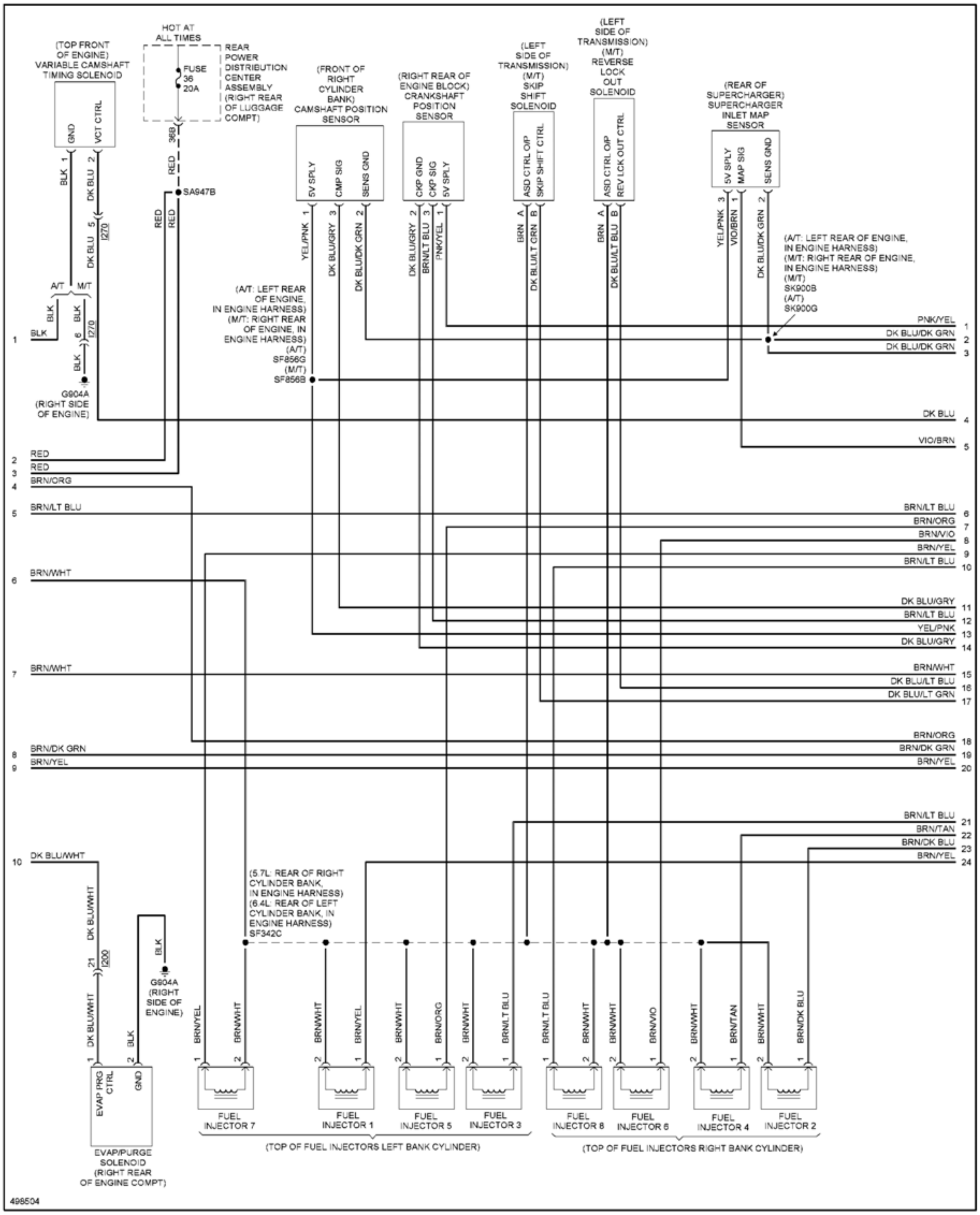
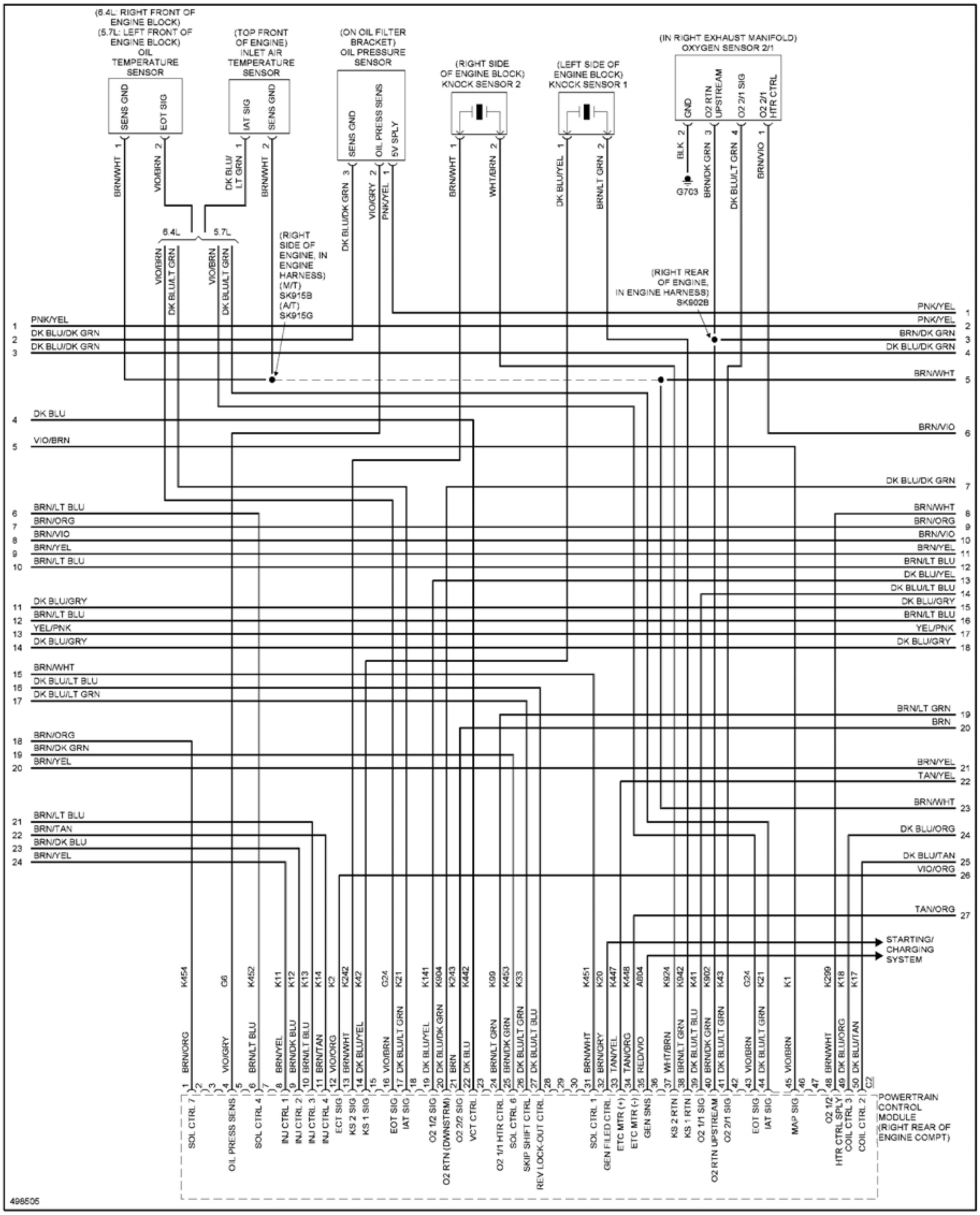


Fig. 33: 5.7L, Engine Performance Circuit (2 of 5)



[**Fig. 34: 5.7L, Engine Performance Circuit (3 of 5)**]()



[Fig. 35: 5.7L, Engine Performance Circuit (4 of 5)]

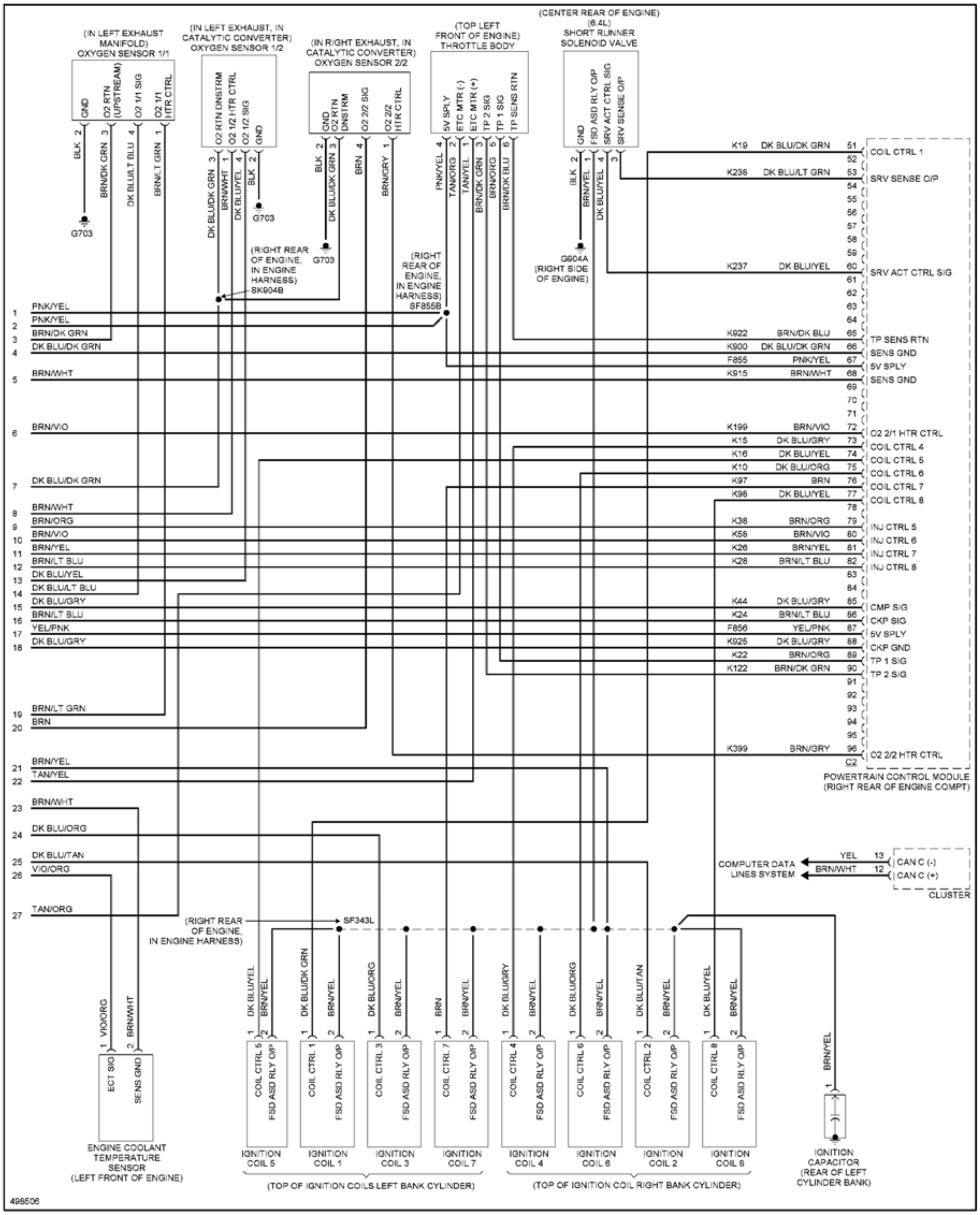


Fig. 36: 5.7L, Engine Performance Circuit (5 of 5)

6.2L

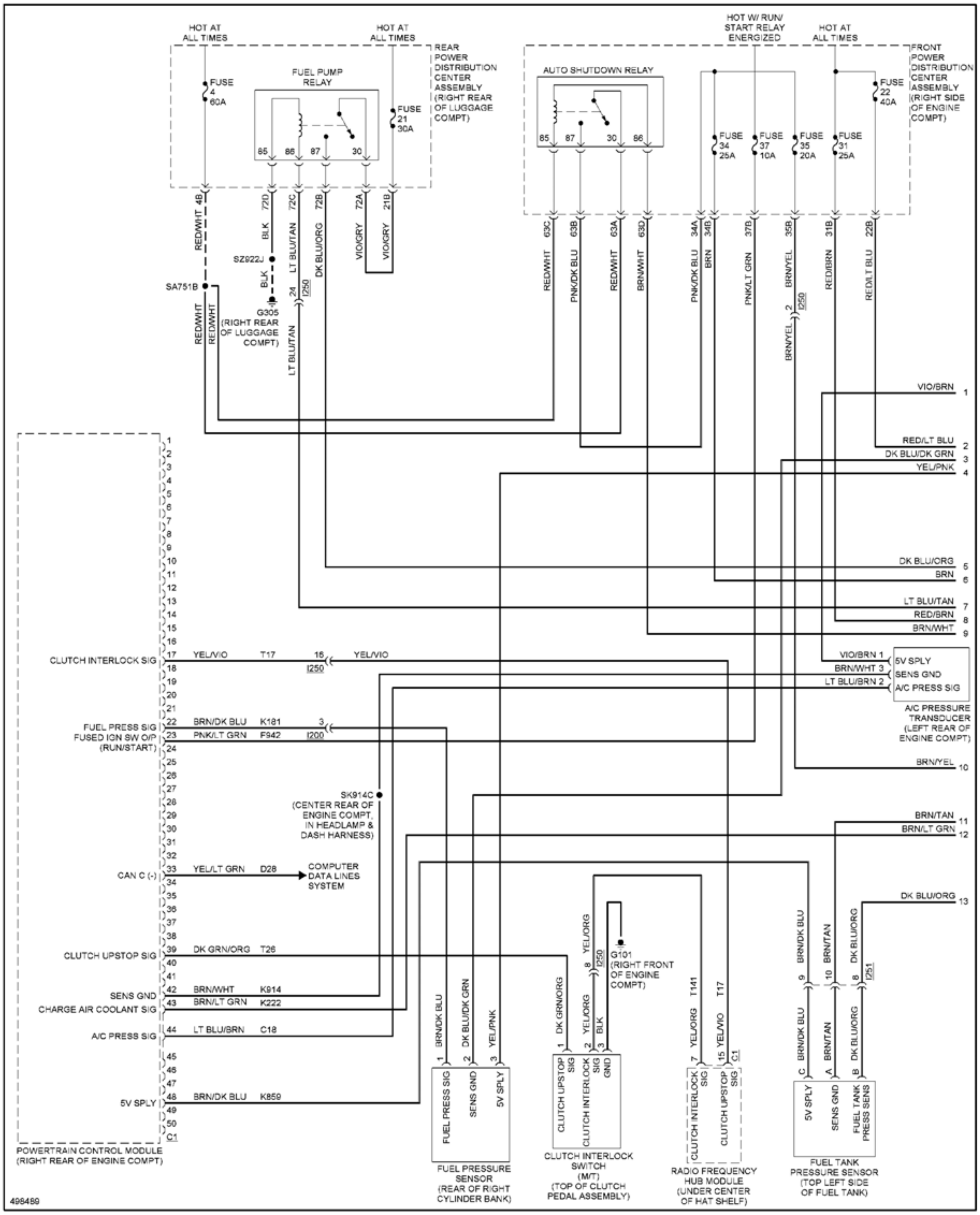


Fig. 37: 6.2L, Engine Performance Circuit (1 of 6)

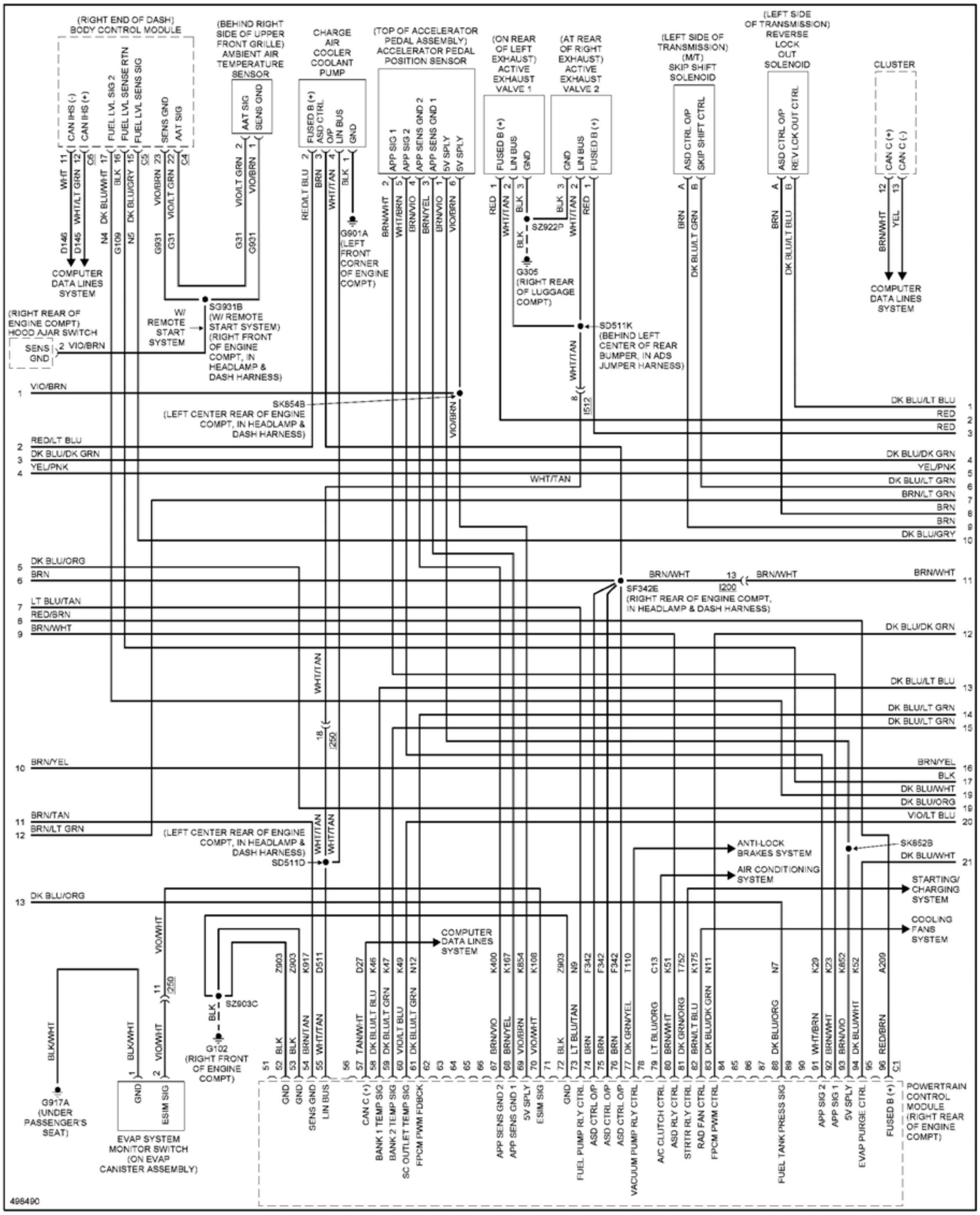


Fig. 38: 6.2L, Engine Performance Circuit (2 of 6)

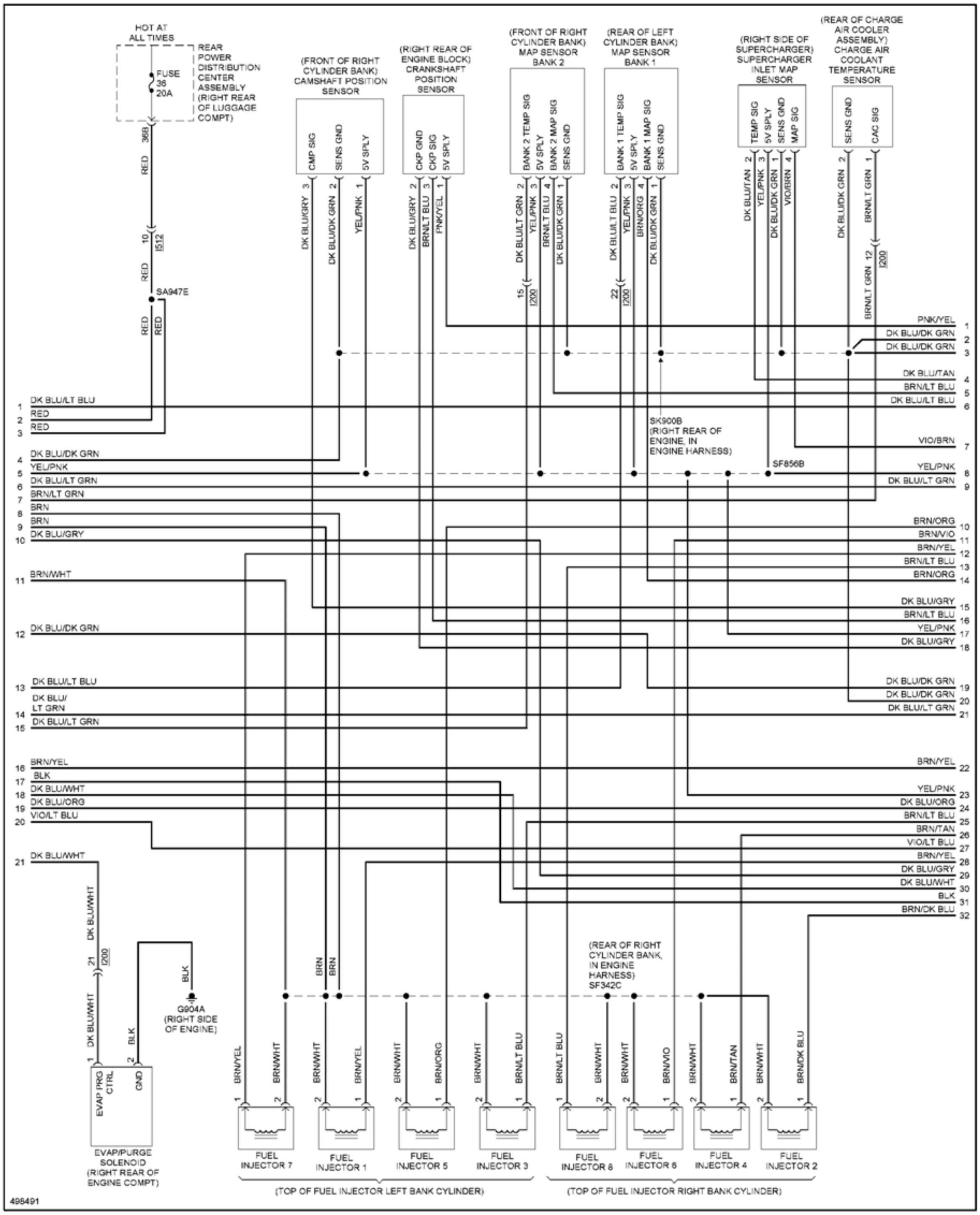


Fig. 39: 6.2L, Engine Performance Circuit (3 of 6)

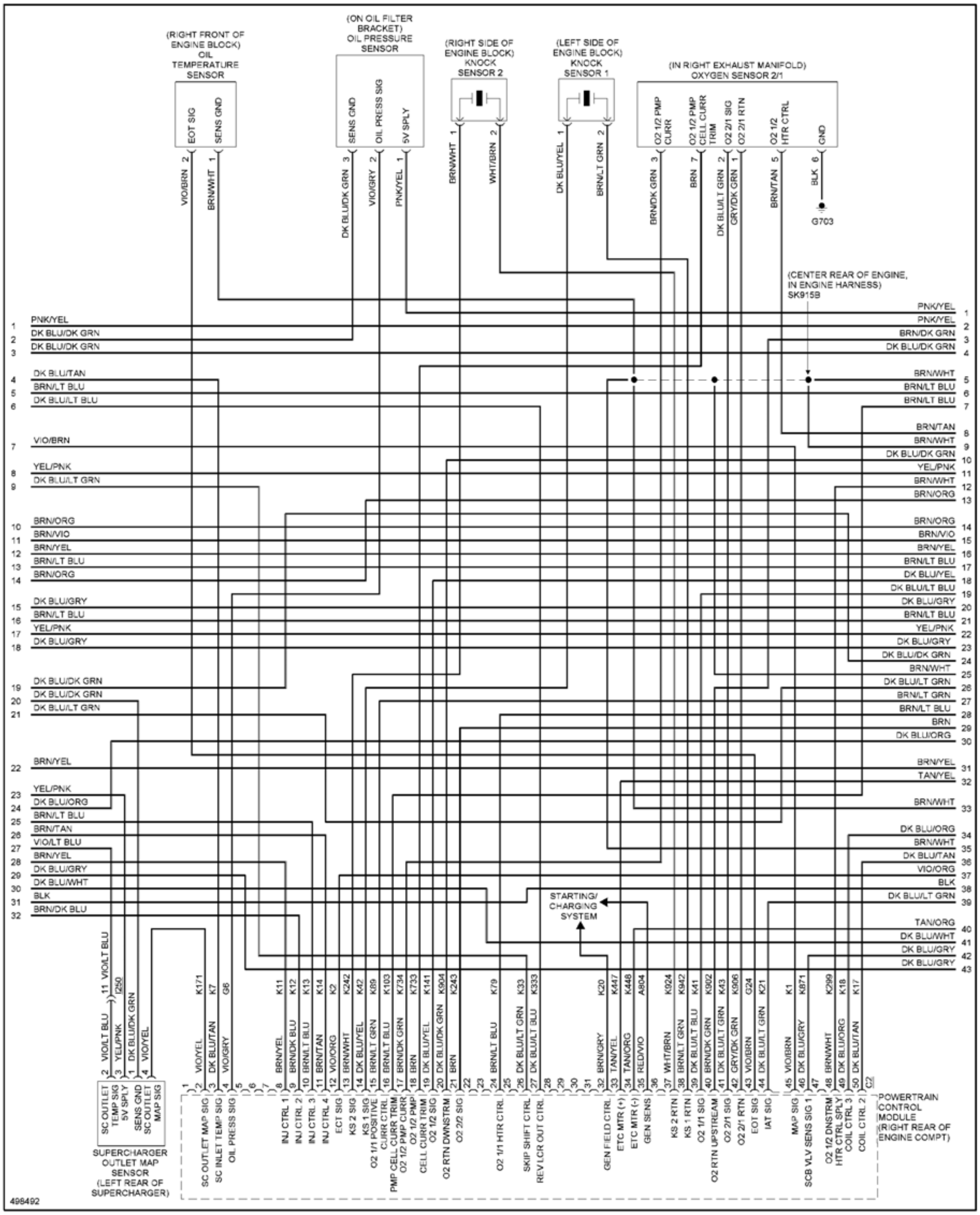
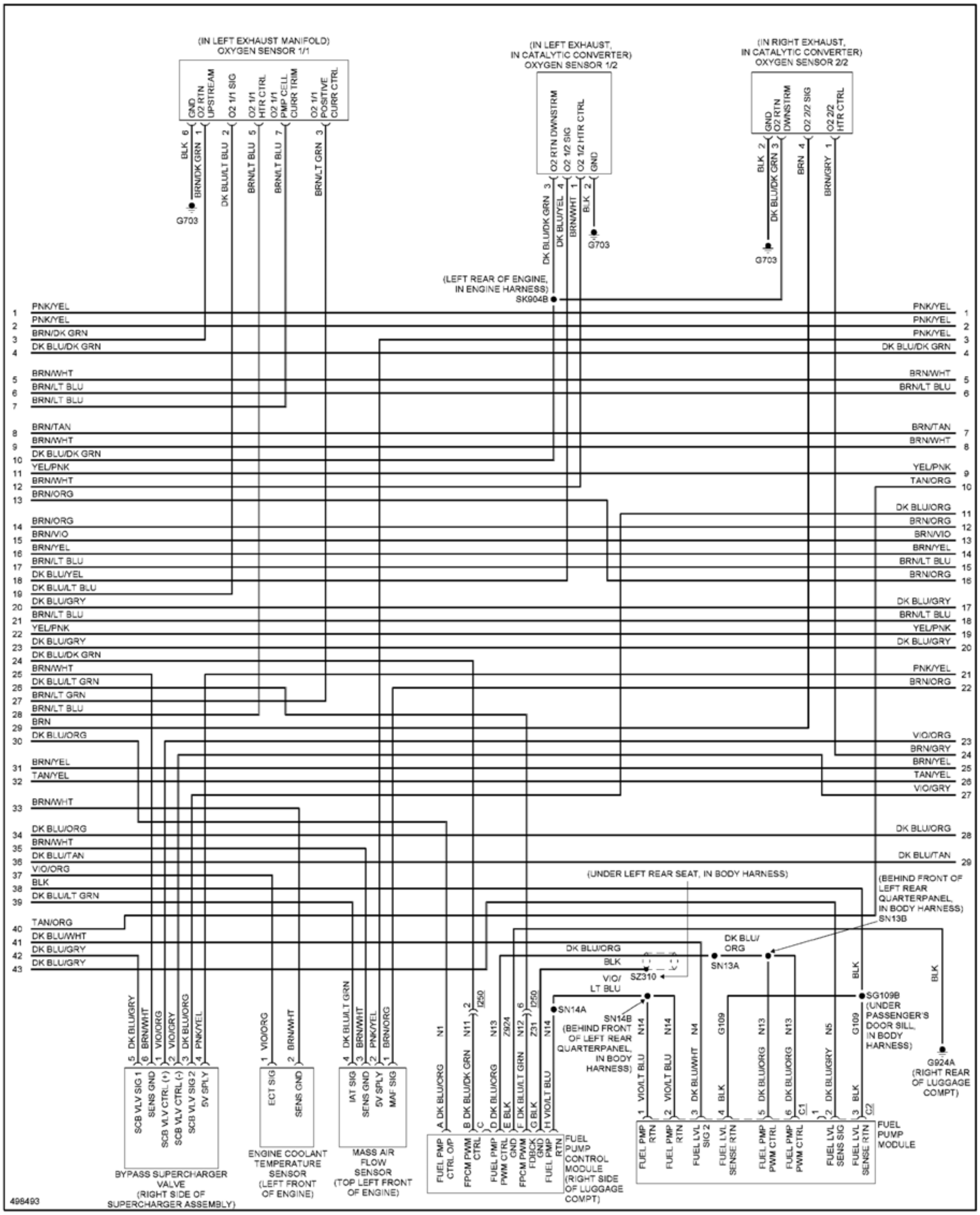
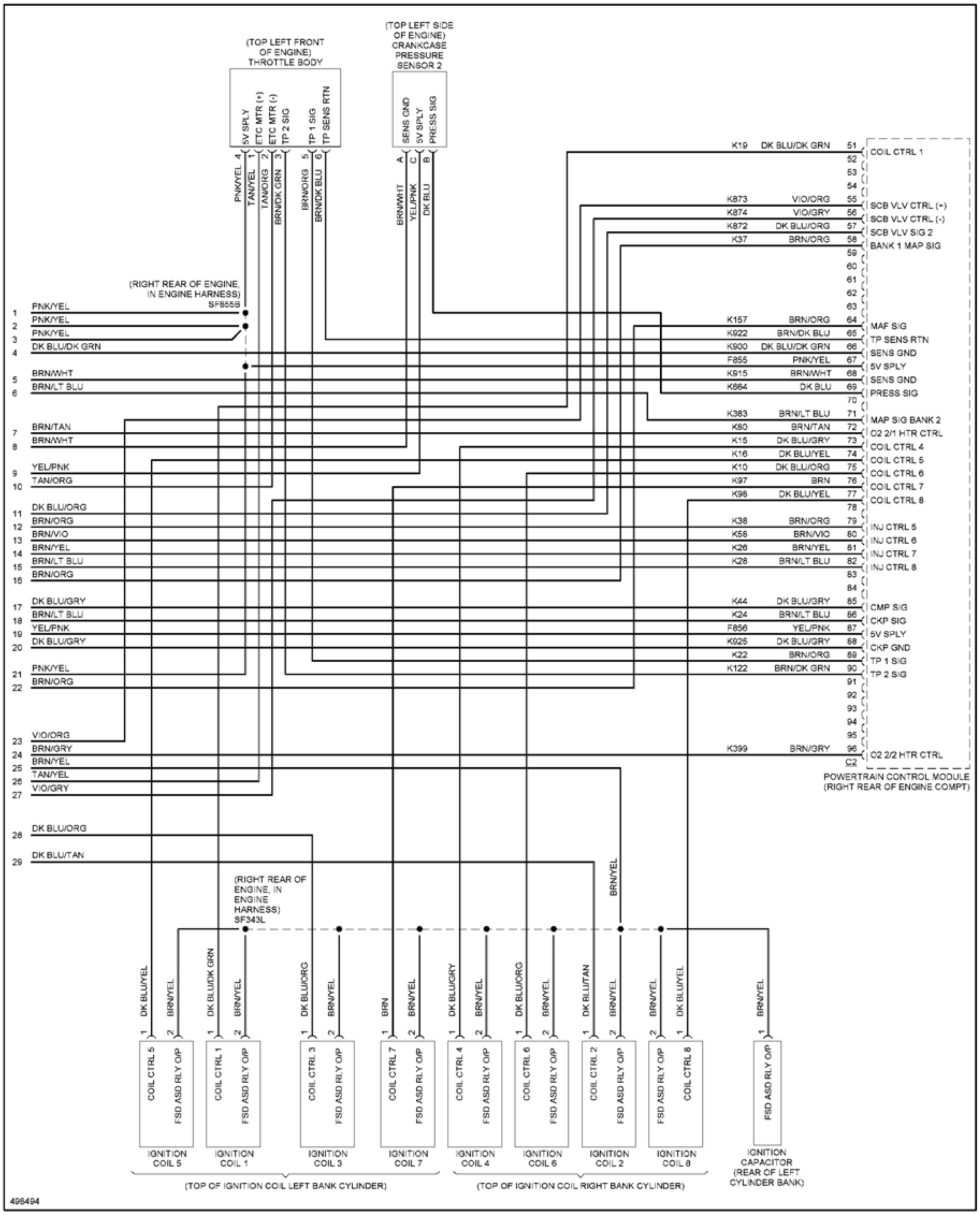


Fig. 40: 6.2L, Engine Performance Circuit (4 of 6)



[Fig. 41: 6.2L, Engine Performance Circuit (5 of 6)]()



[Fig. 42: 6.2L, Engine Performance Circuit (6 of 6)]

6.4L

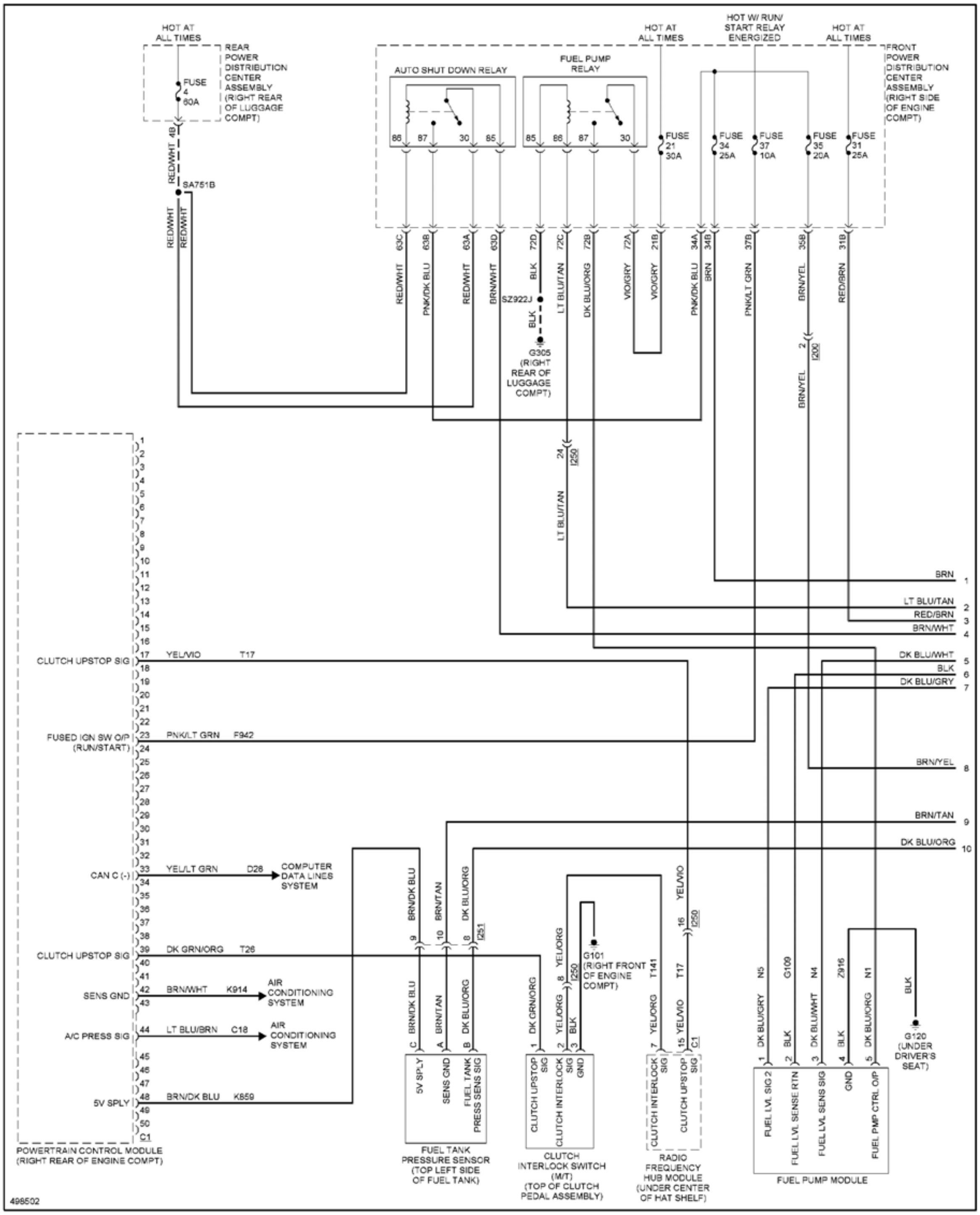
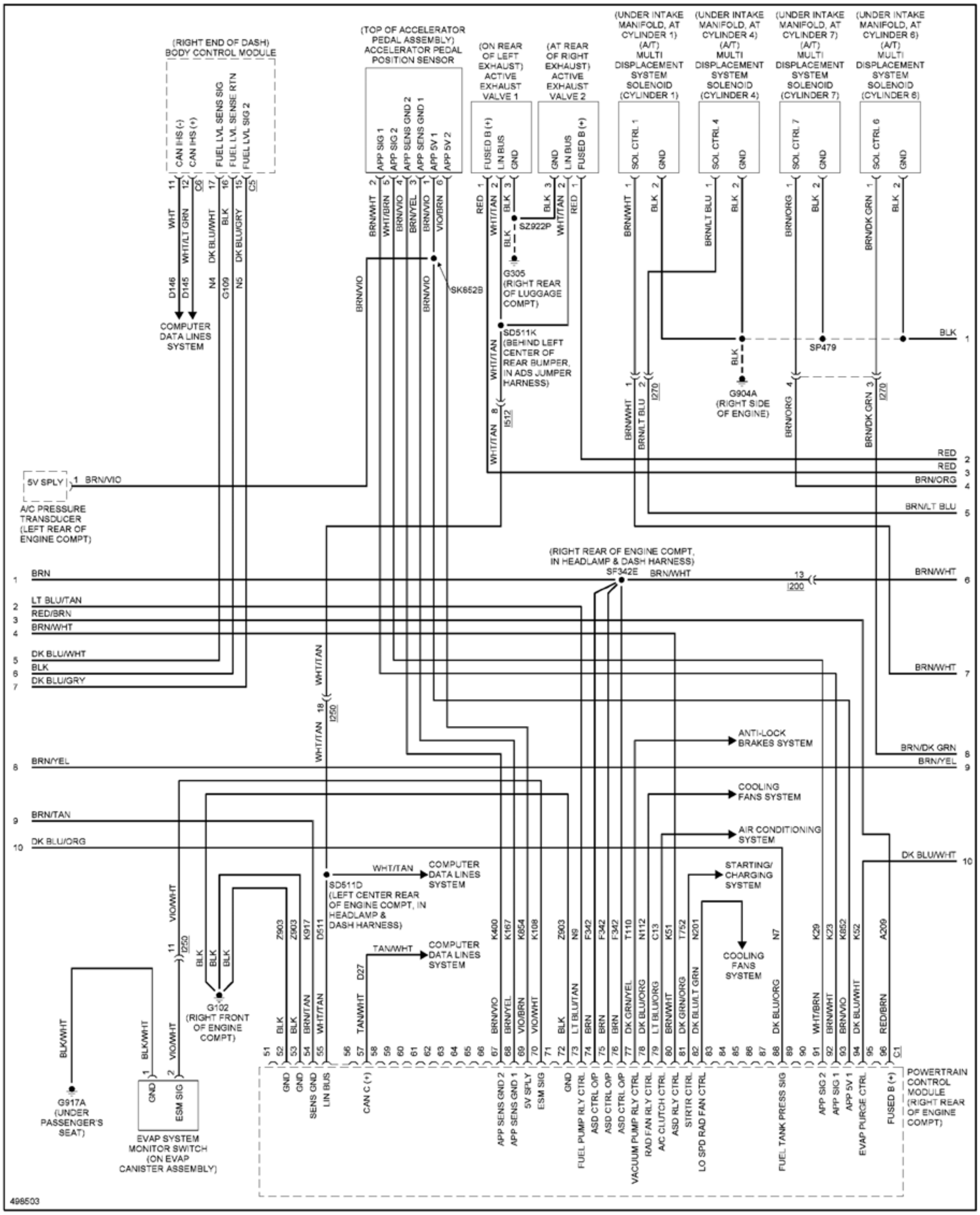


Fig. 43: 6.4L, Engine Performance Circuit (1 of 5)



[**Fig. 44: 6.4L, Engine Performance Circuit (2 of 5)**]()

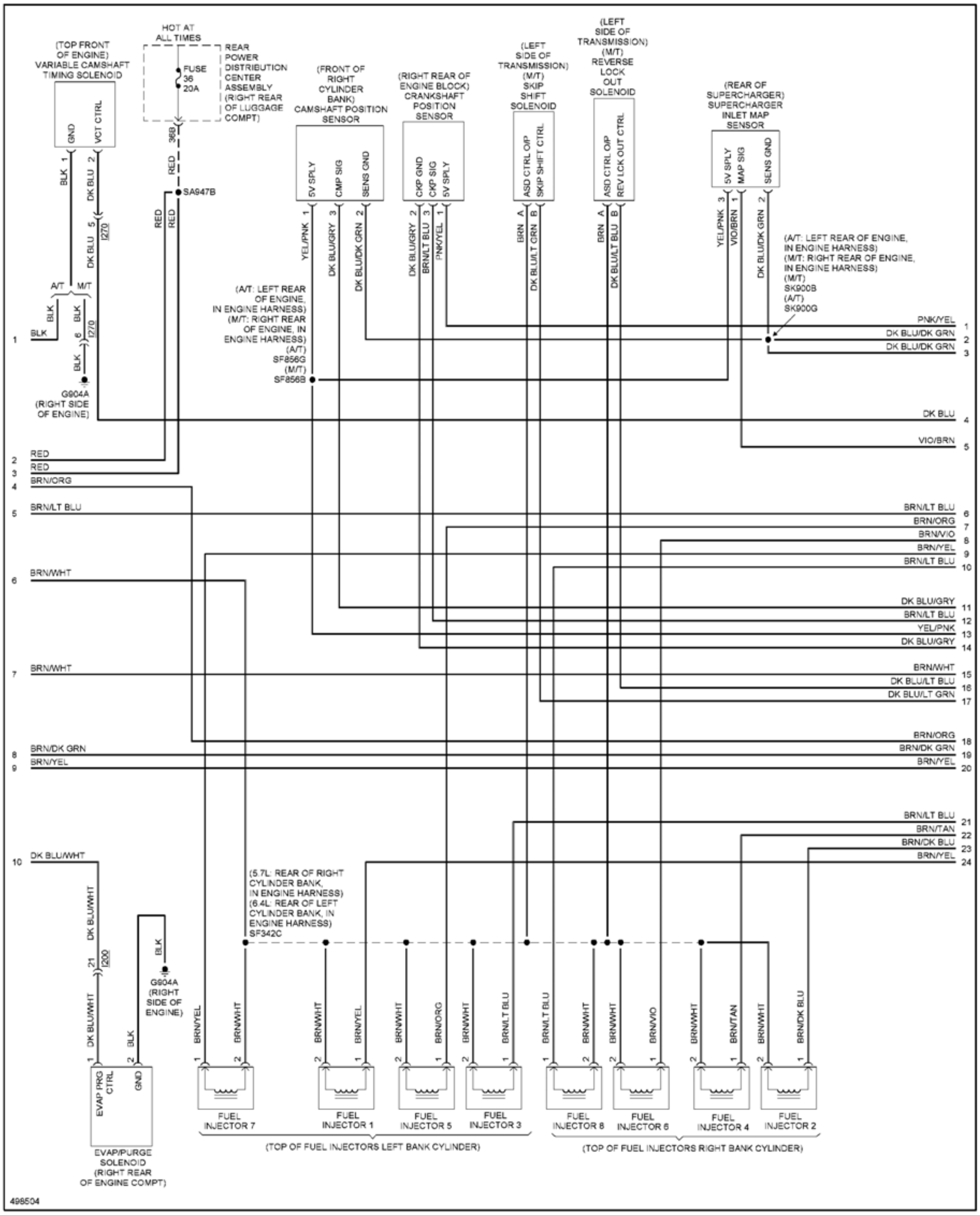


Fig. 45: 6.4L, Engine Performance Circuit (3 of 5)

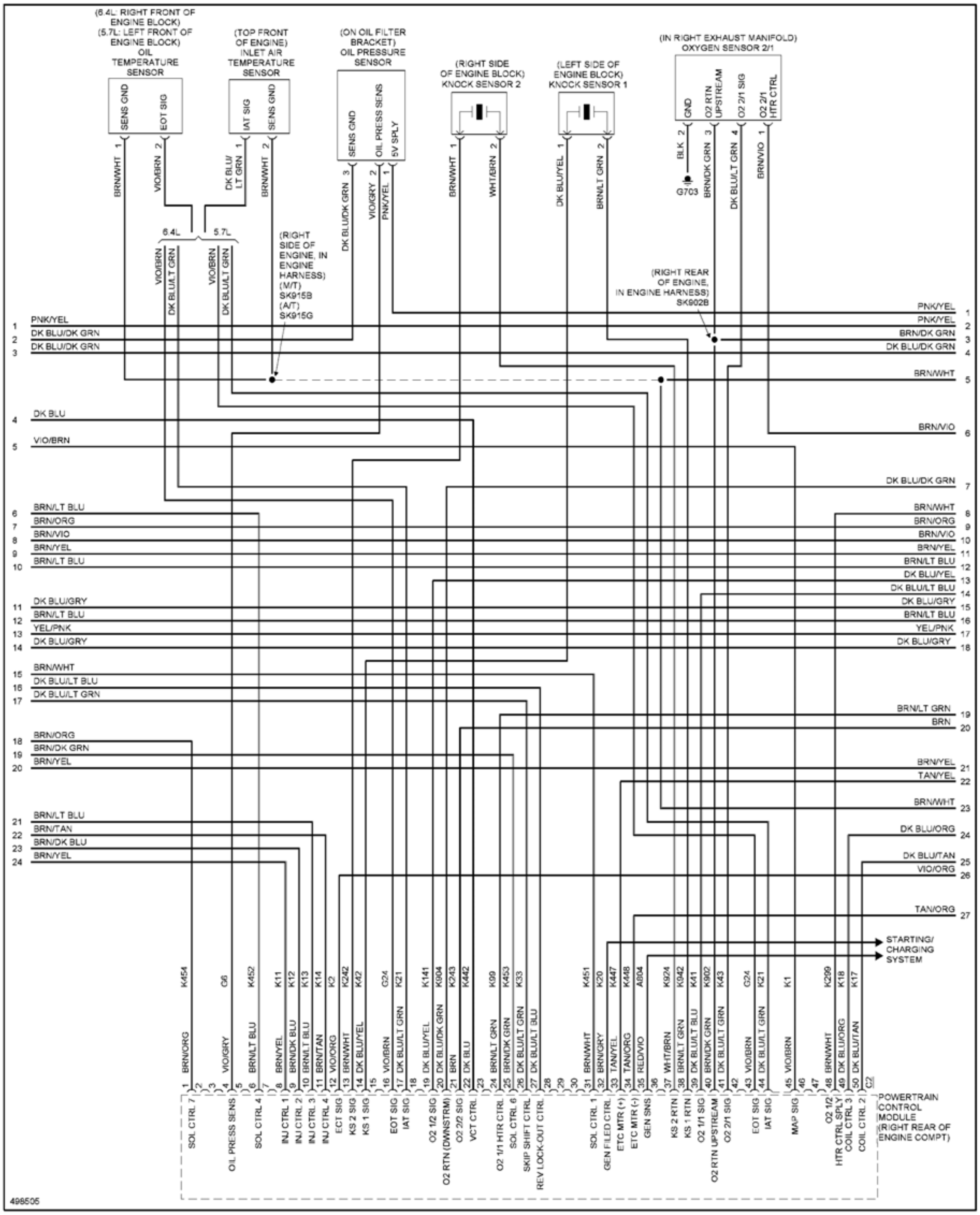
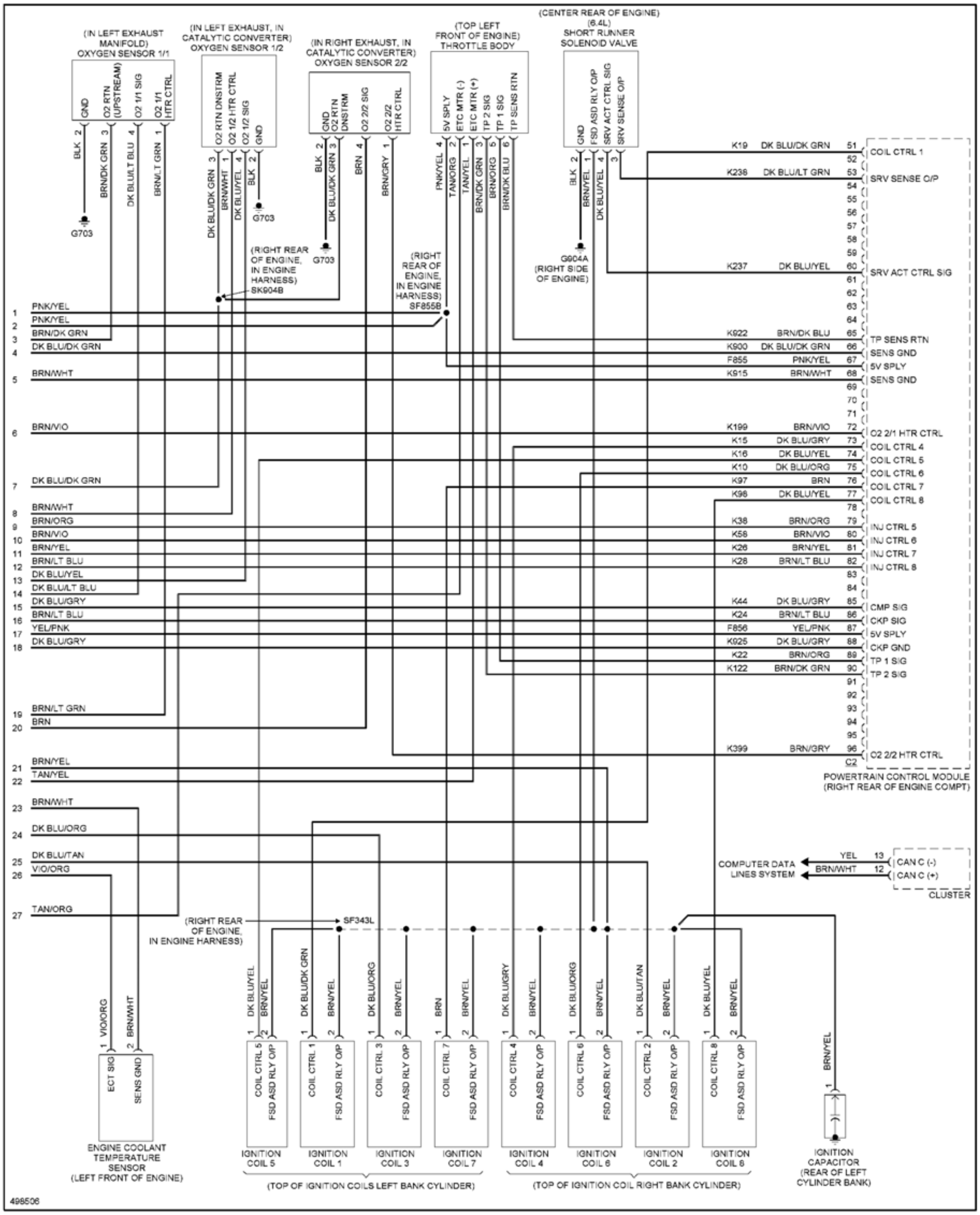


Fig. 46: 6.4L, Engine Performance Circuit (4 of 5)



[Fig. 47: 6.4L, Engine Performance Circuit (5 of 5)]

EXTERIOR LIGHTS

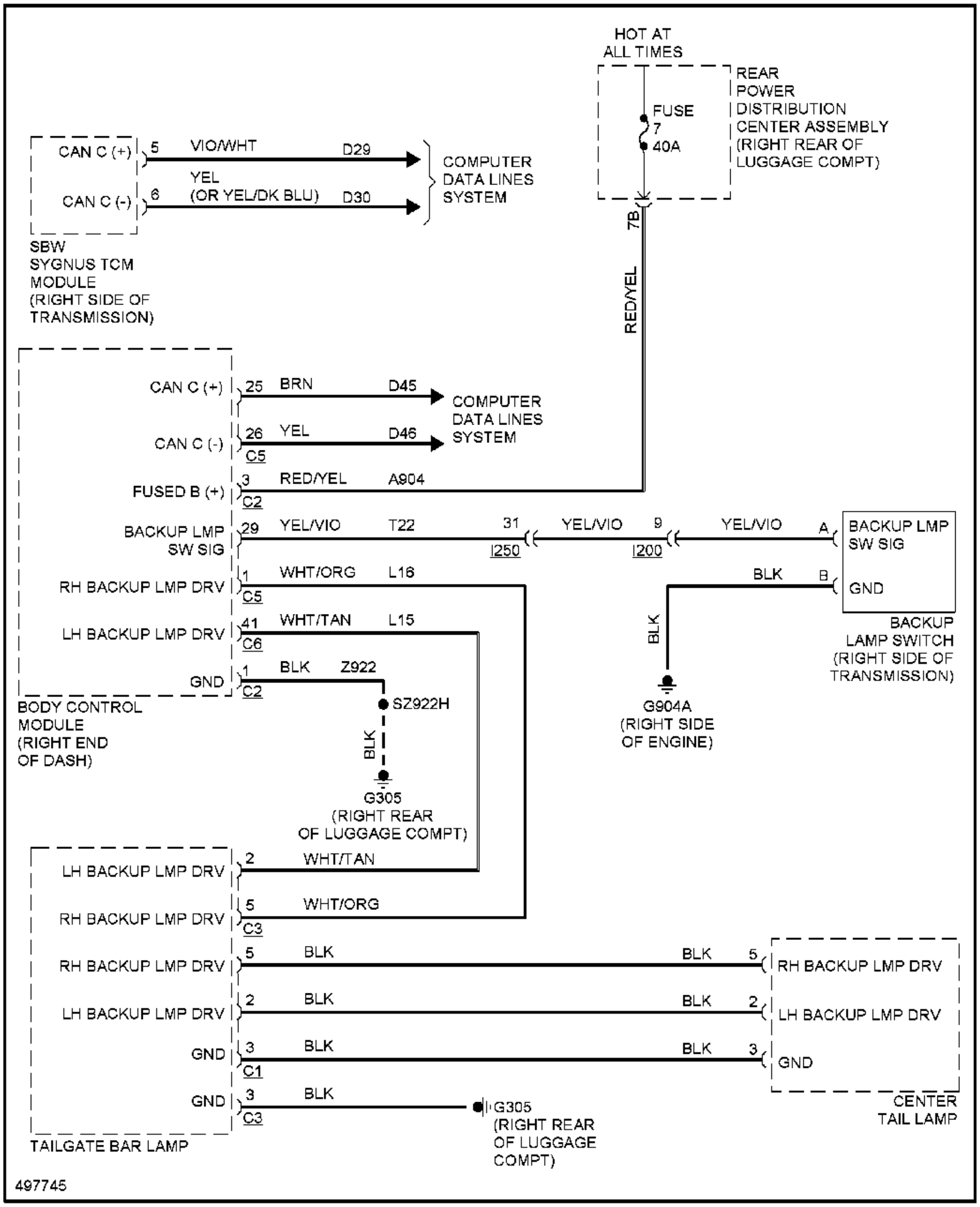


Fig. 48: Backup Lamps Circuit

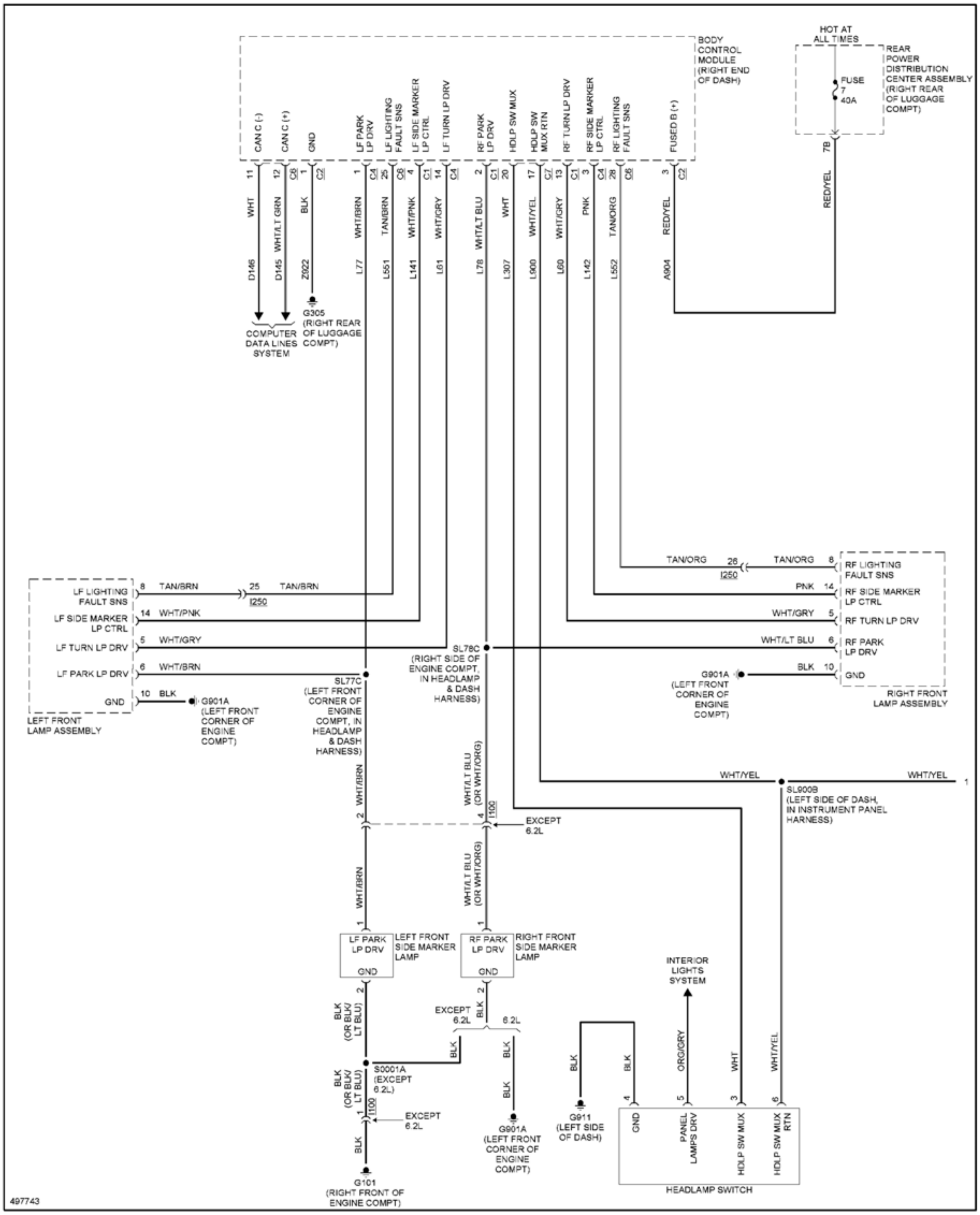


Fig. 49: Exterior Lamps Circuit (1 of 2)

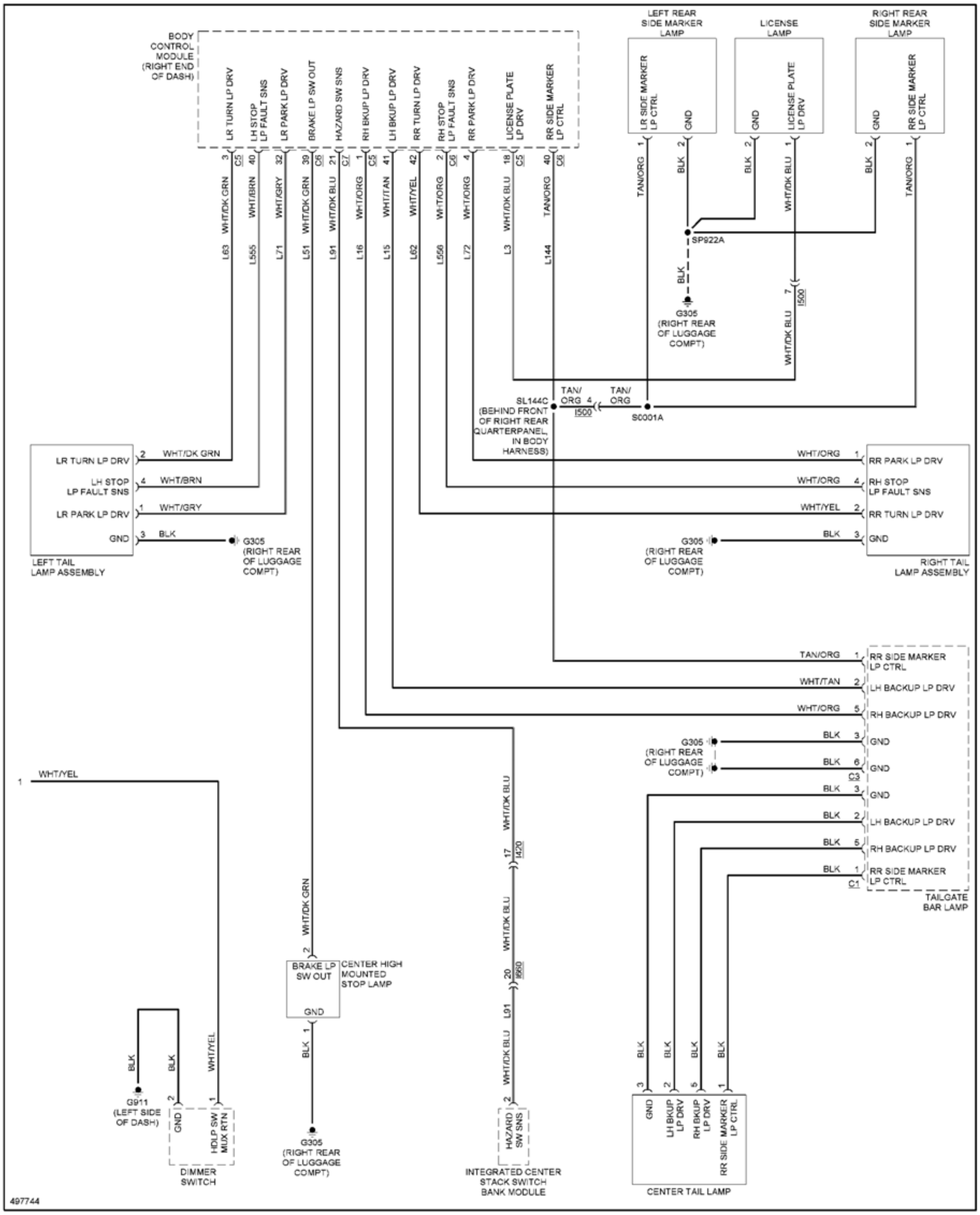


Fig. 50: Exterior Lamps Circuit (2 of 2)

GROUND DISTRIBUTION

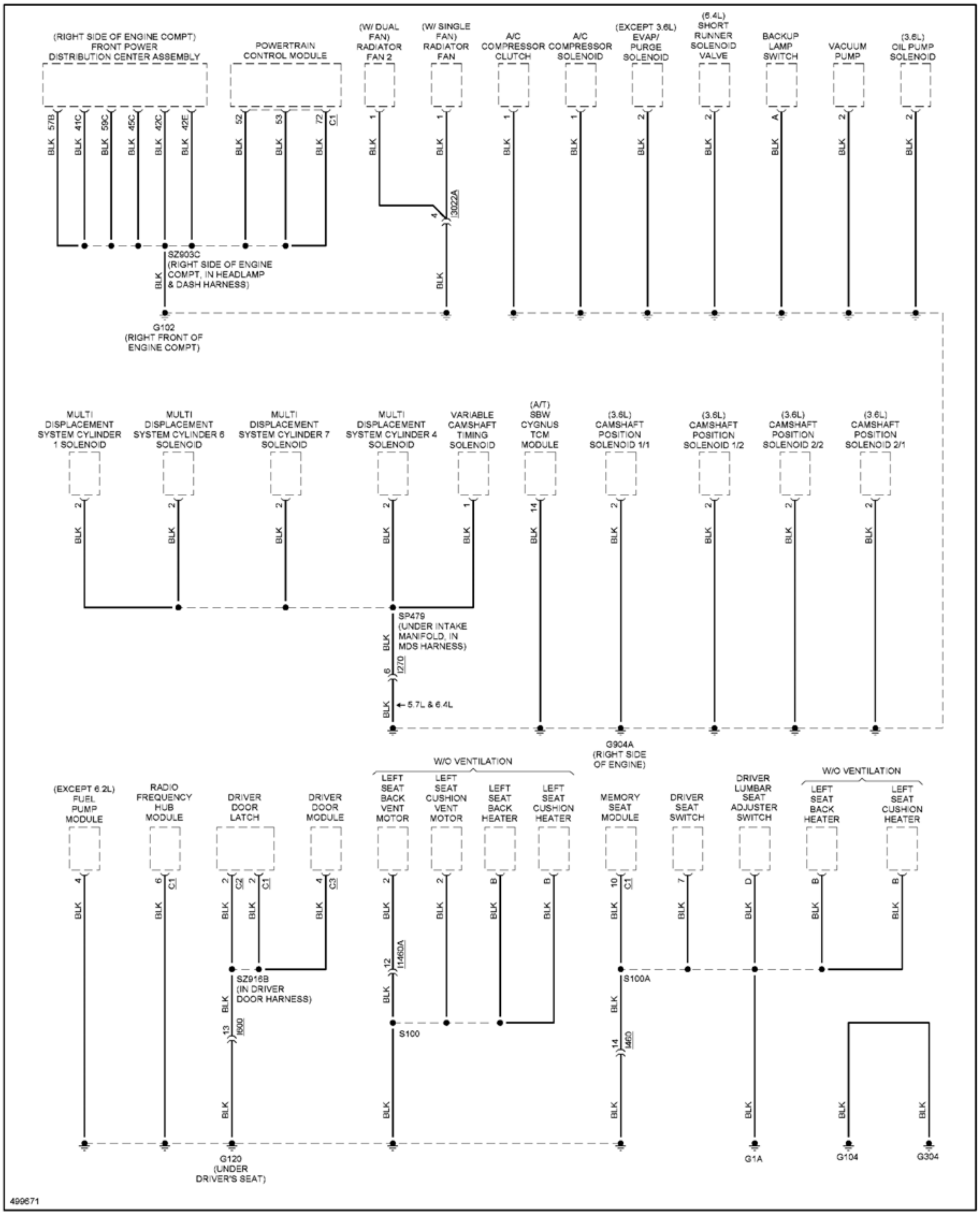


Fig. 51: Ground Distribution Circuit (1 of 4)

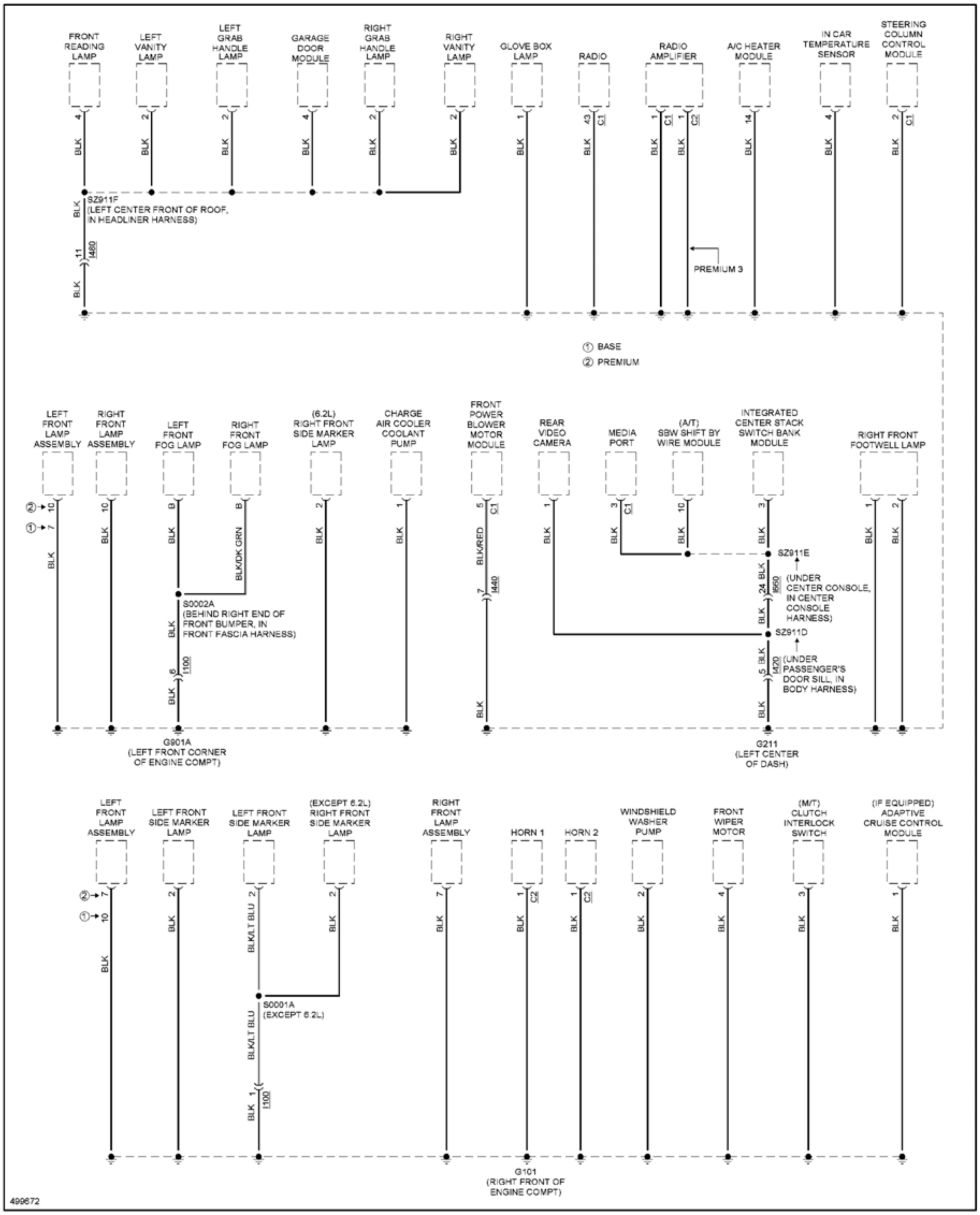


Fig. 52: Ground Distribution Circuit (2 of 4)

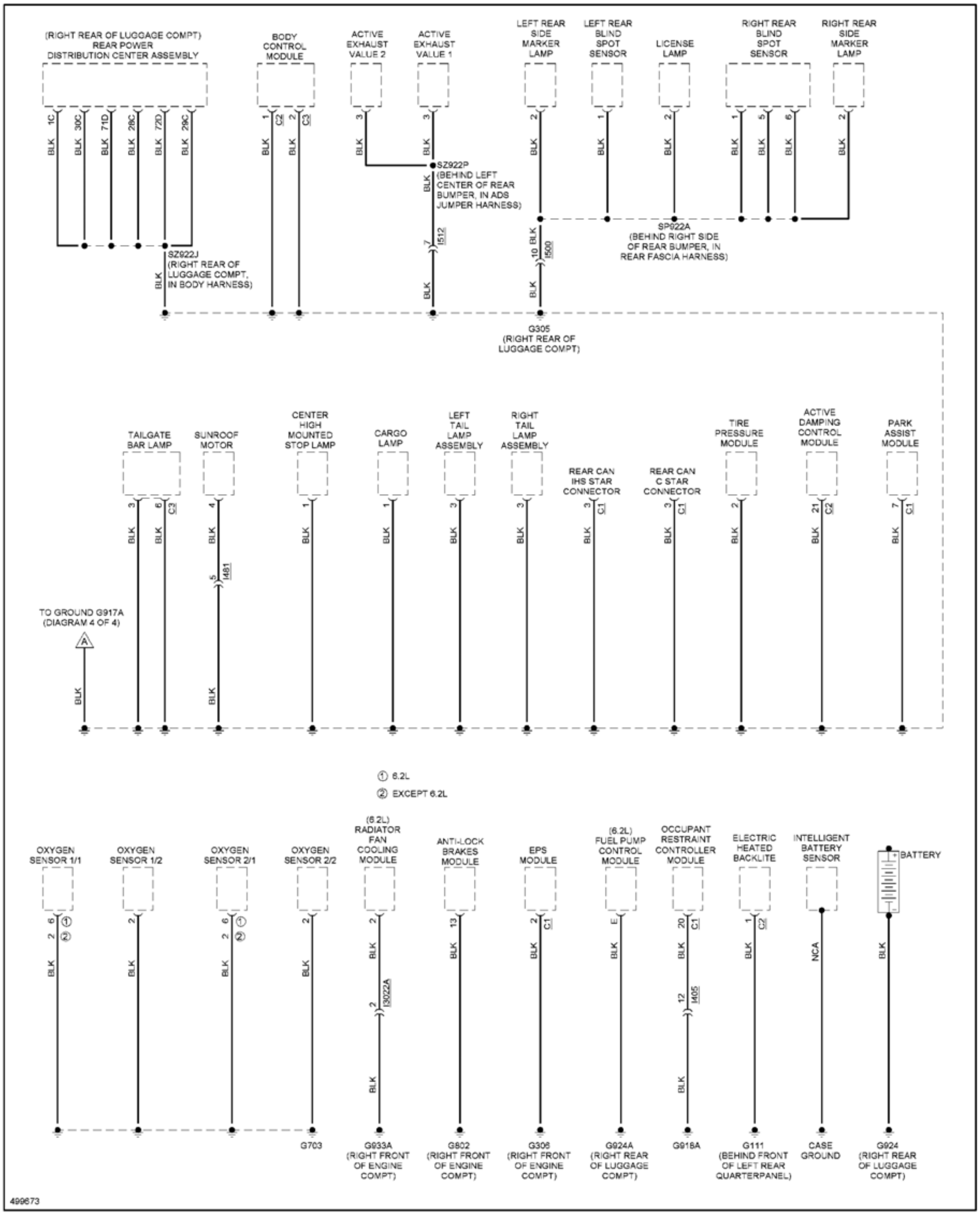


Fig. 53: Ground Distribution Circuit (3 of 4)

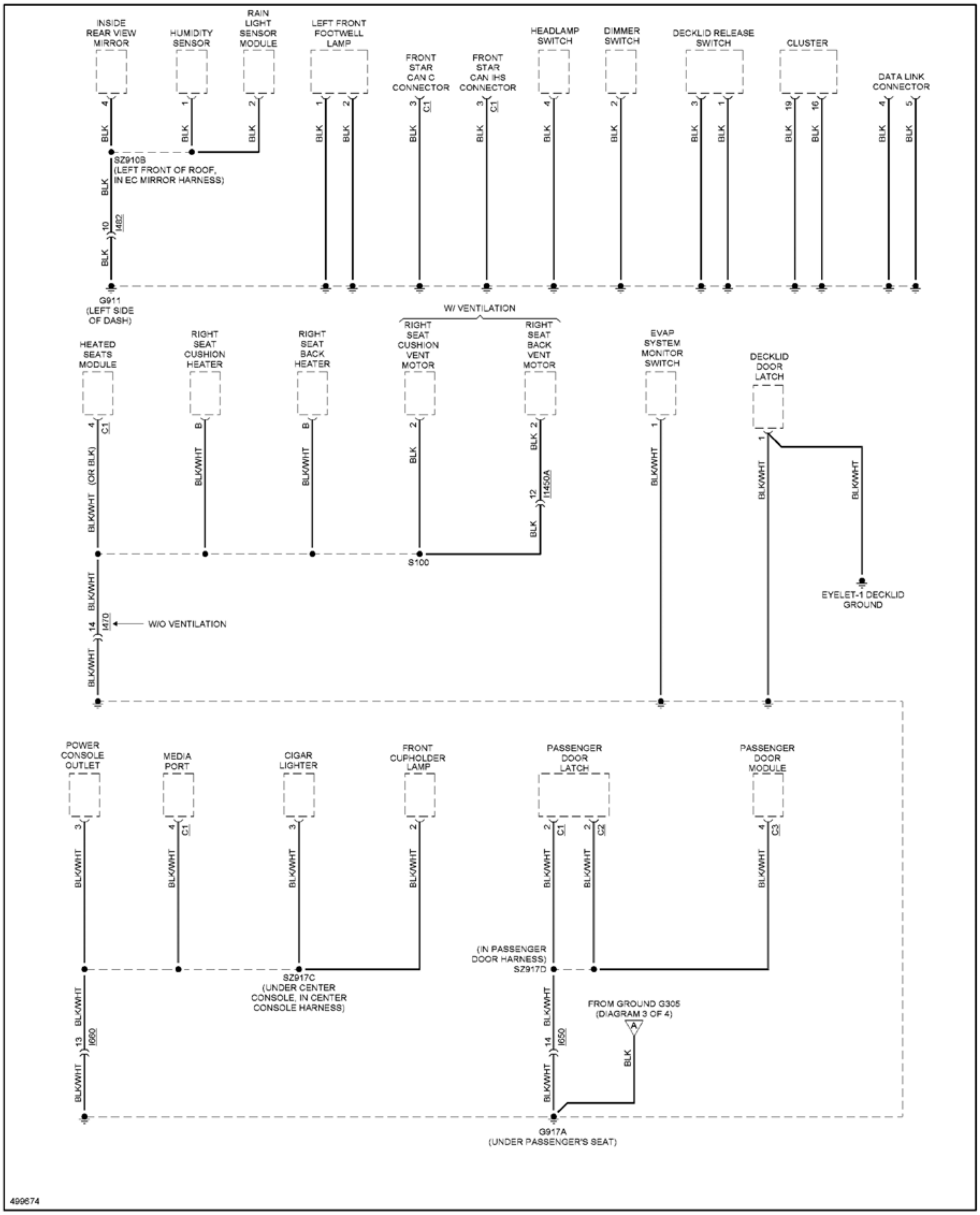


Fig. 54: Ground Distribution Circuit (4 of 4)

HEADLIGHTS

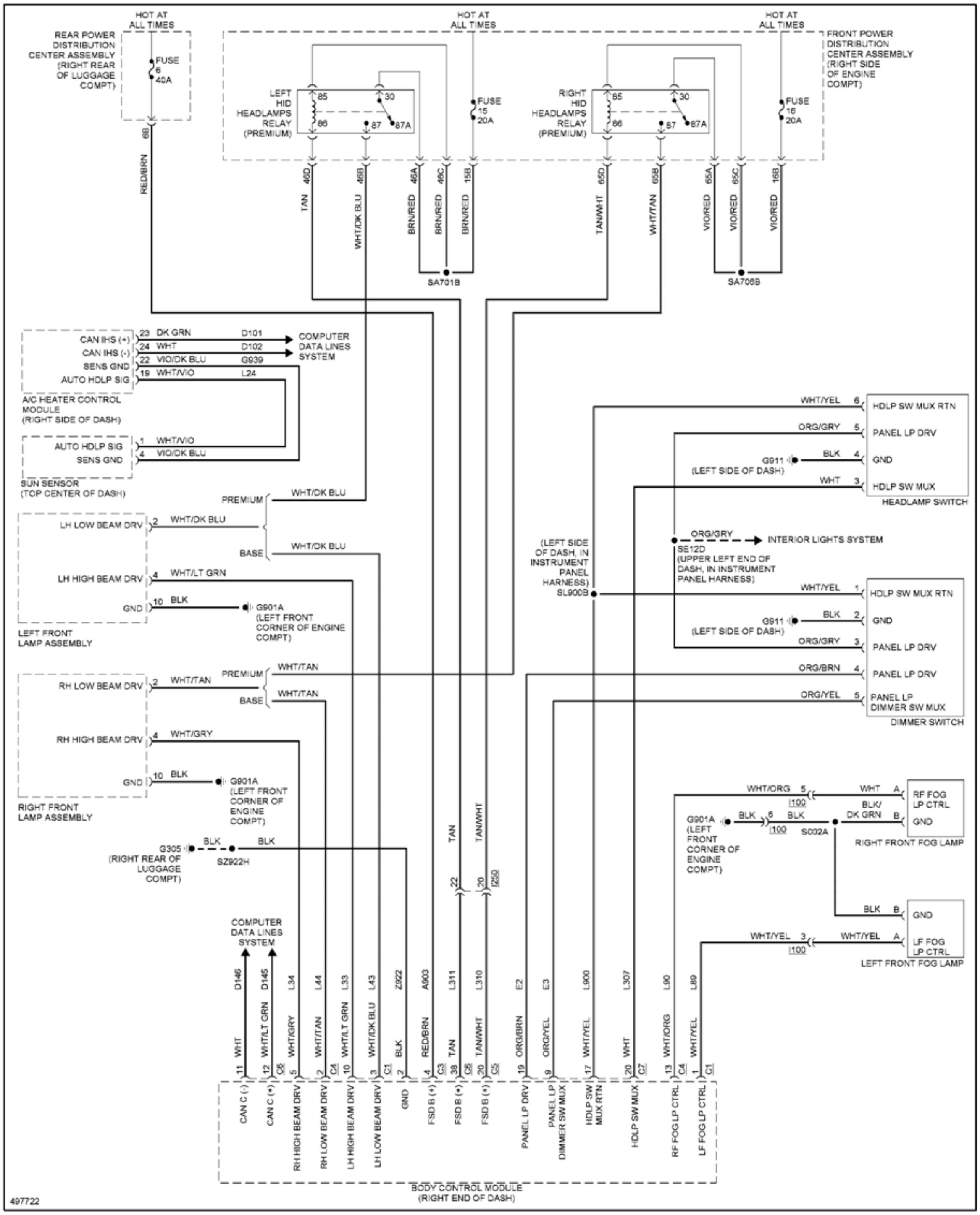


Fig. 55: Headlights Circuit

HORN

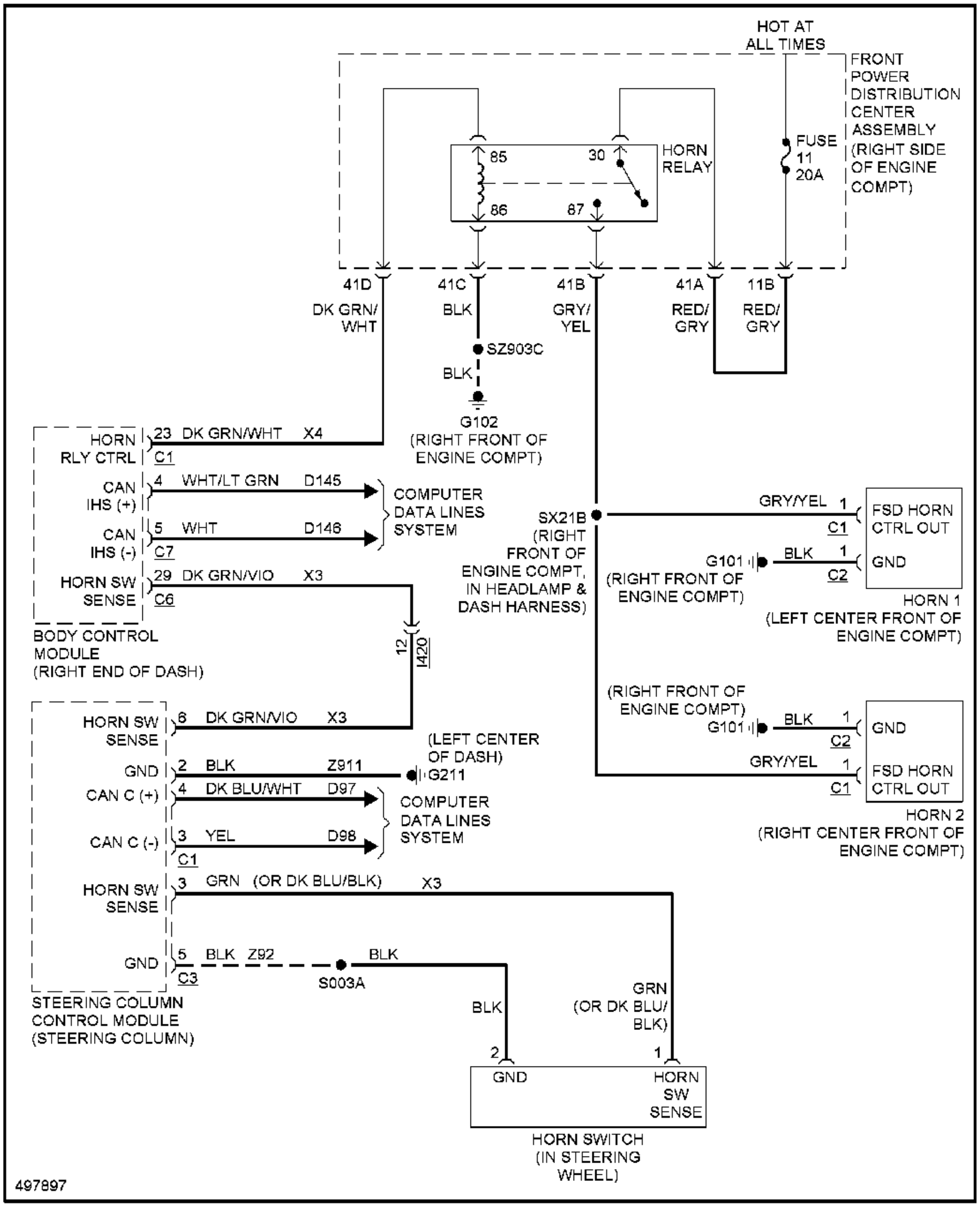


Fig. 56: Horn Circuit

INSTRUMENT CLUSTER

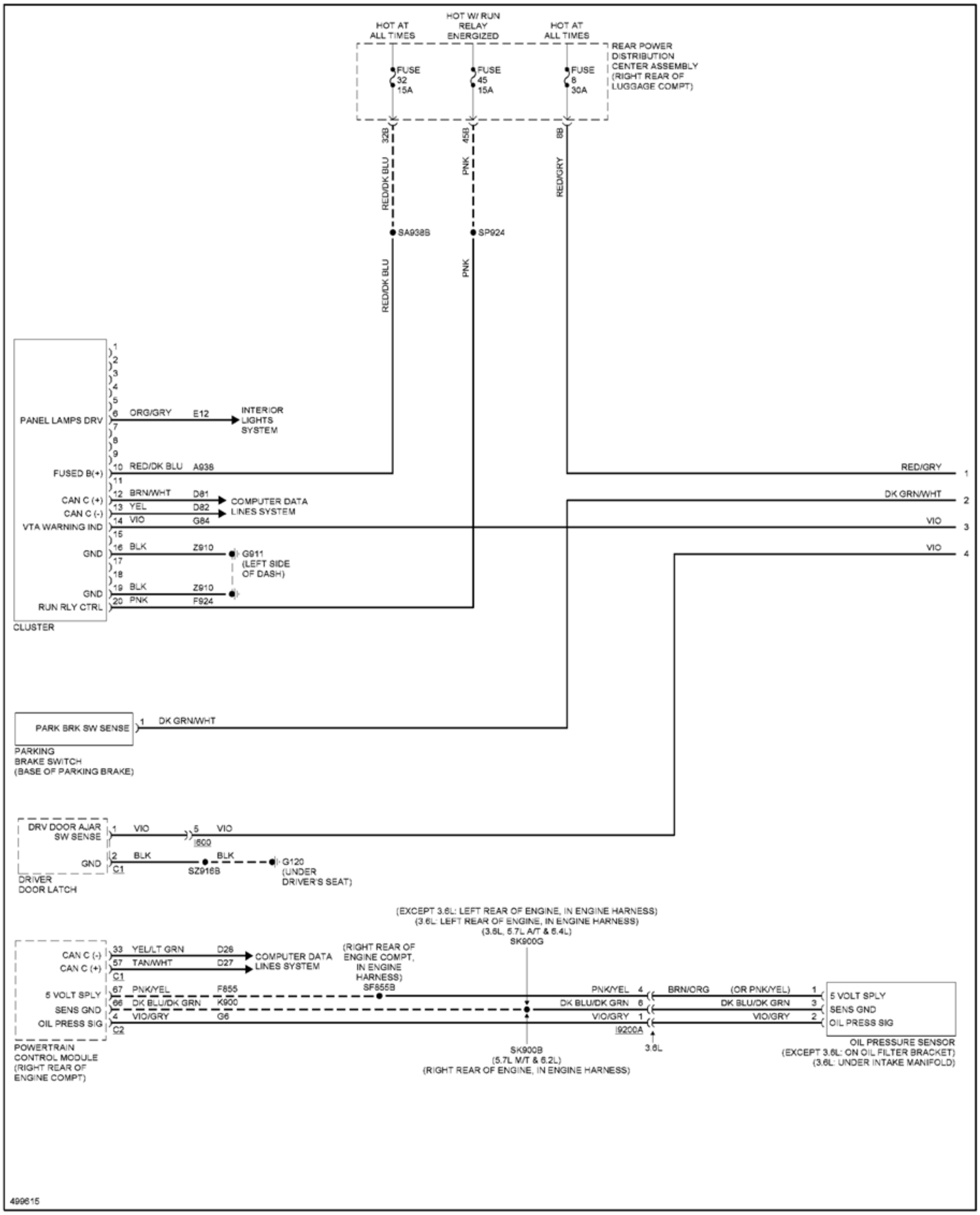


Fig. 57: Instrument Cluster Circuit (1 of 2)

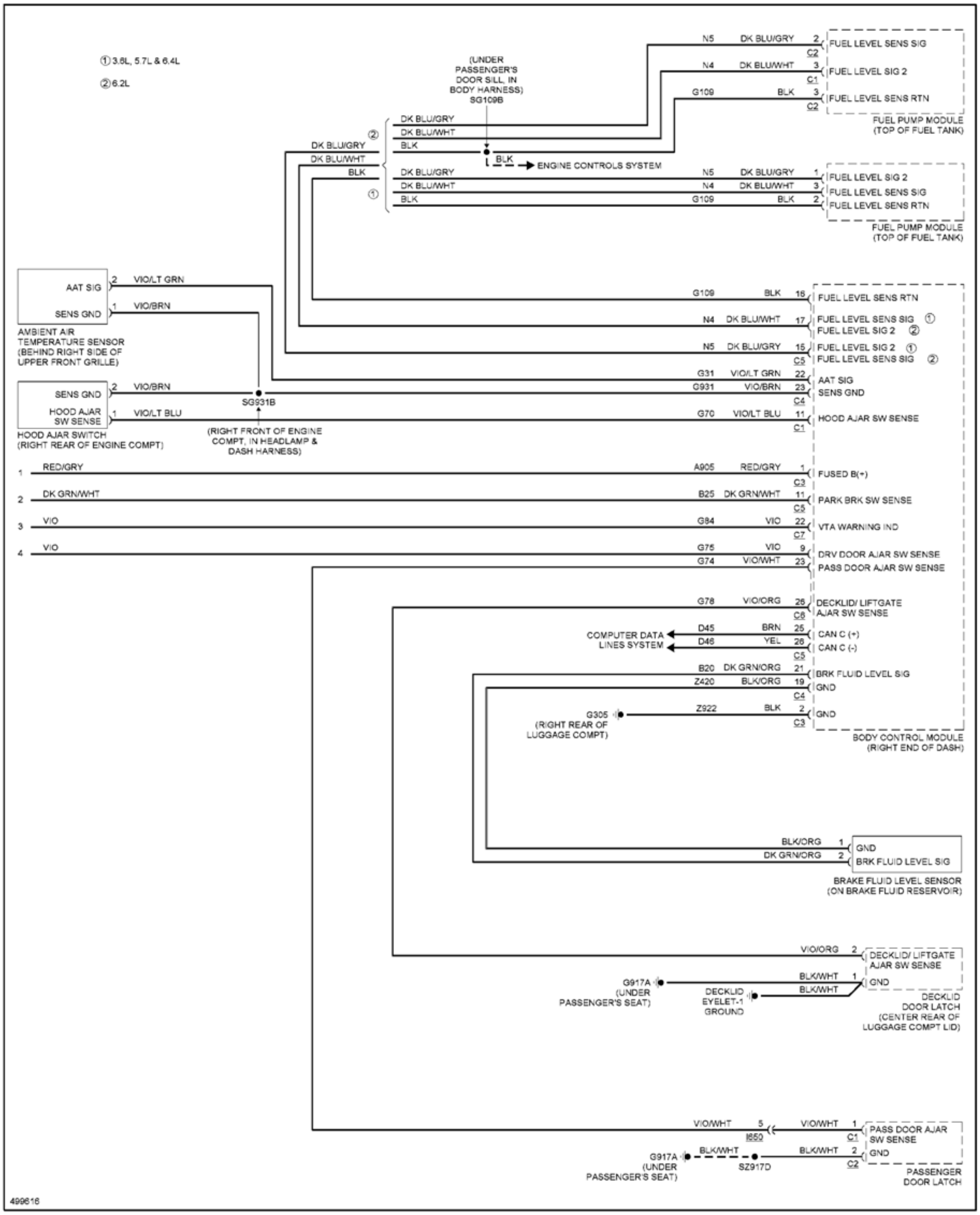
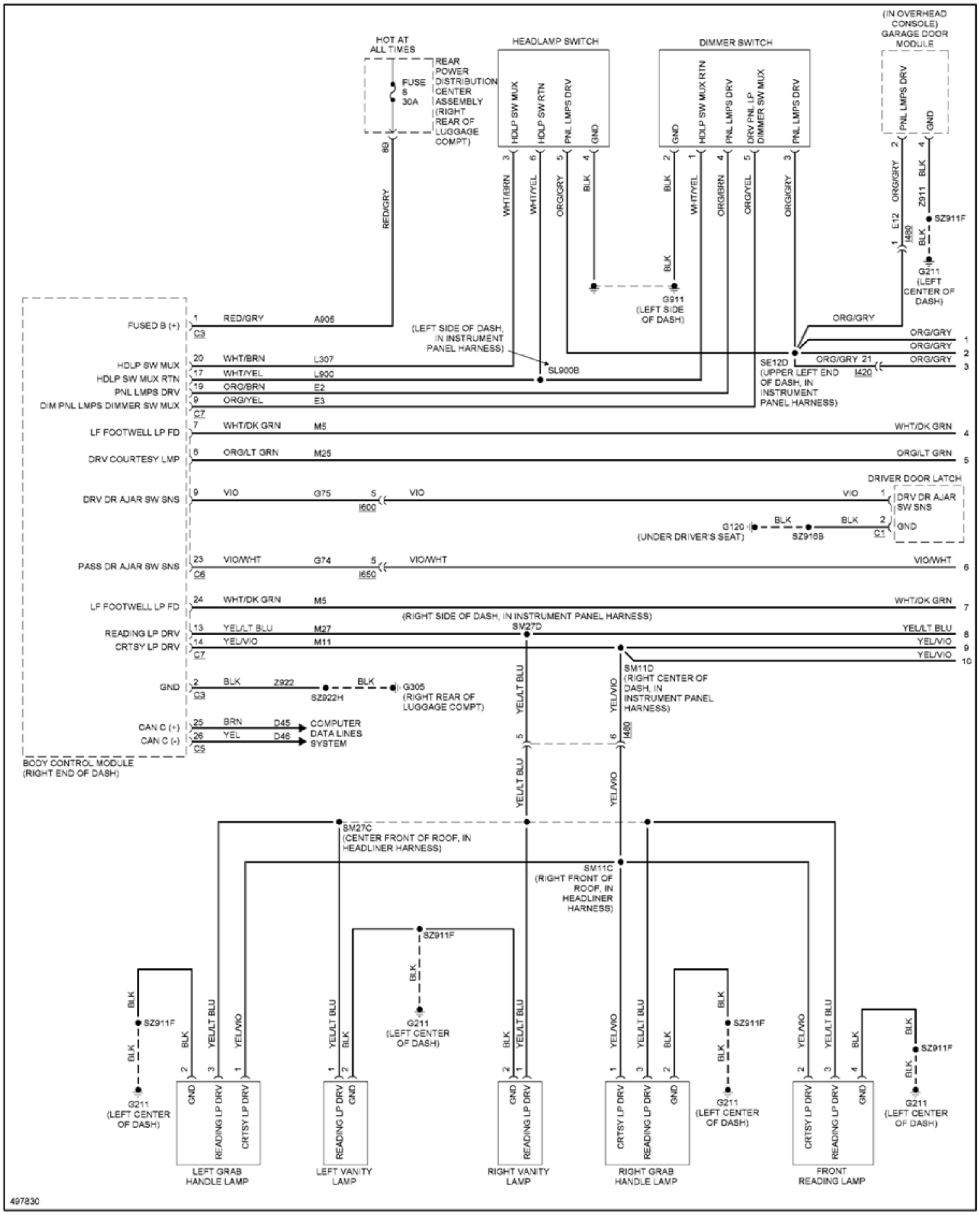


Fig. 58: Instrument Cluster Circuit (2 of 2)

INTERIOR LIGHTS



[Fig. 59: Interior Lights Circuit (1 of 3)]()

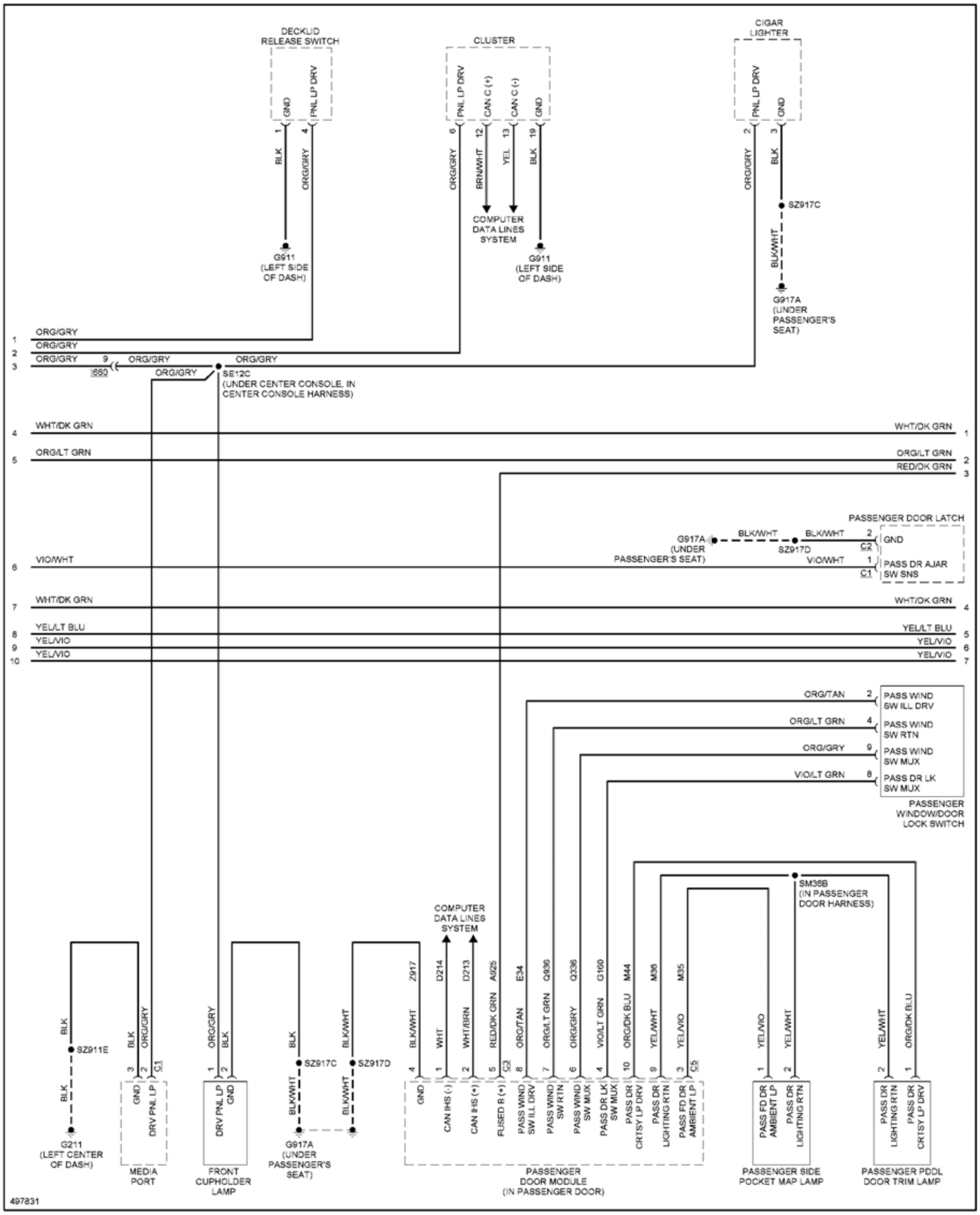
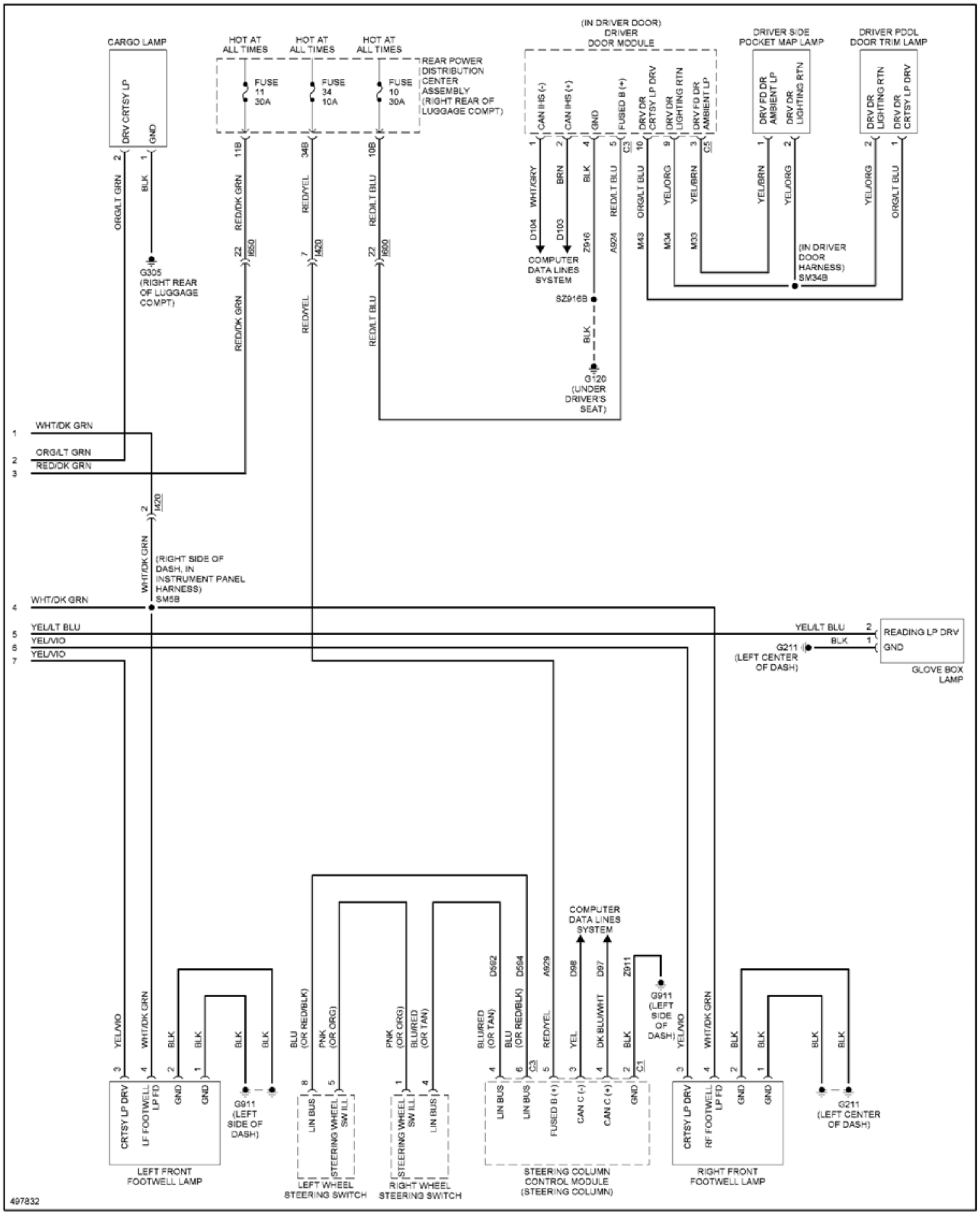
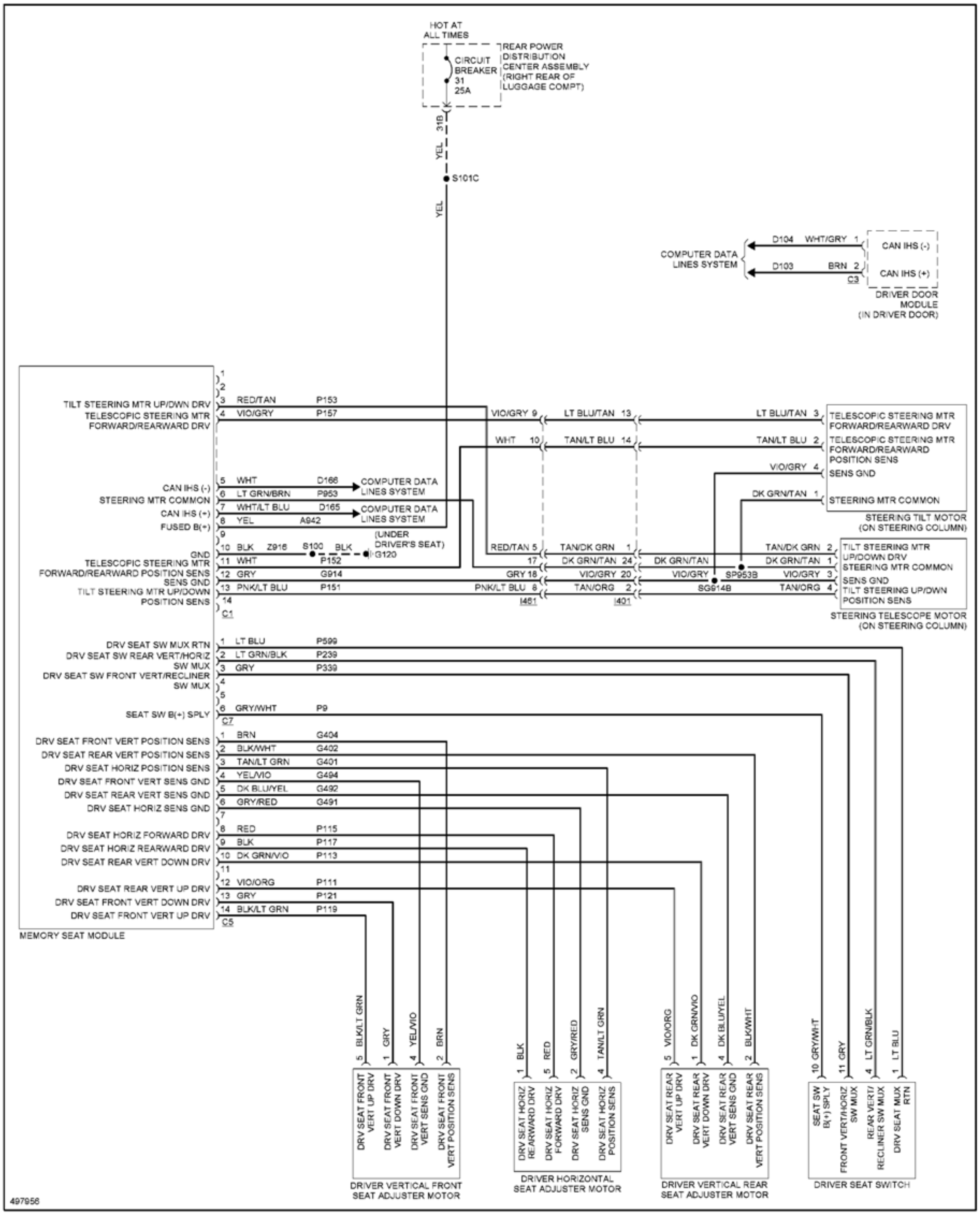


Fig. 60: Interior Lights Circuit (2 of 3)



[Fig. 61: Interior Lights Circuit (3 of 3)]()

MEMORY SYSTEMS



[Fig. 62: Memory Systems Circuit](#)

NAVIGATION

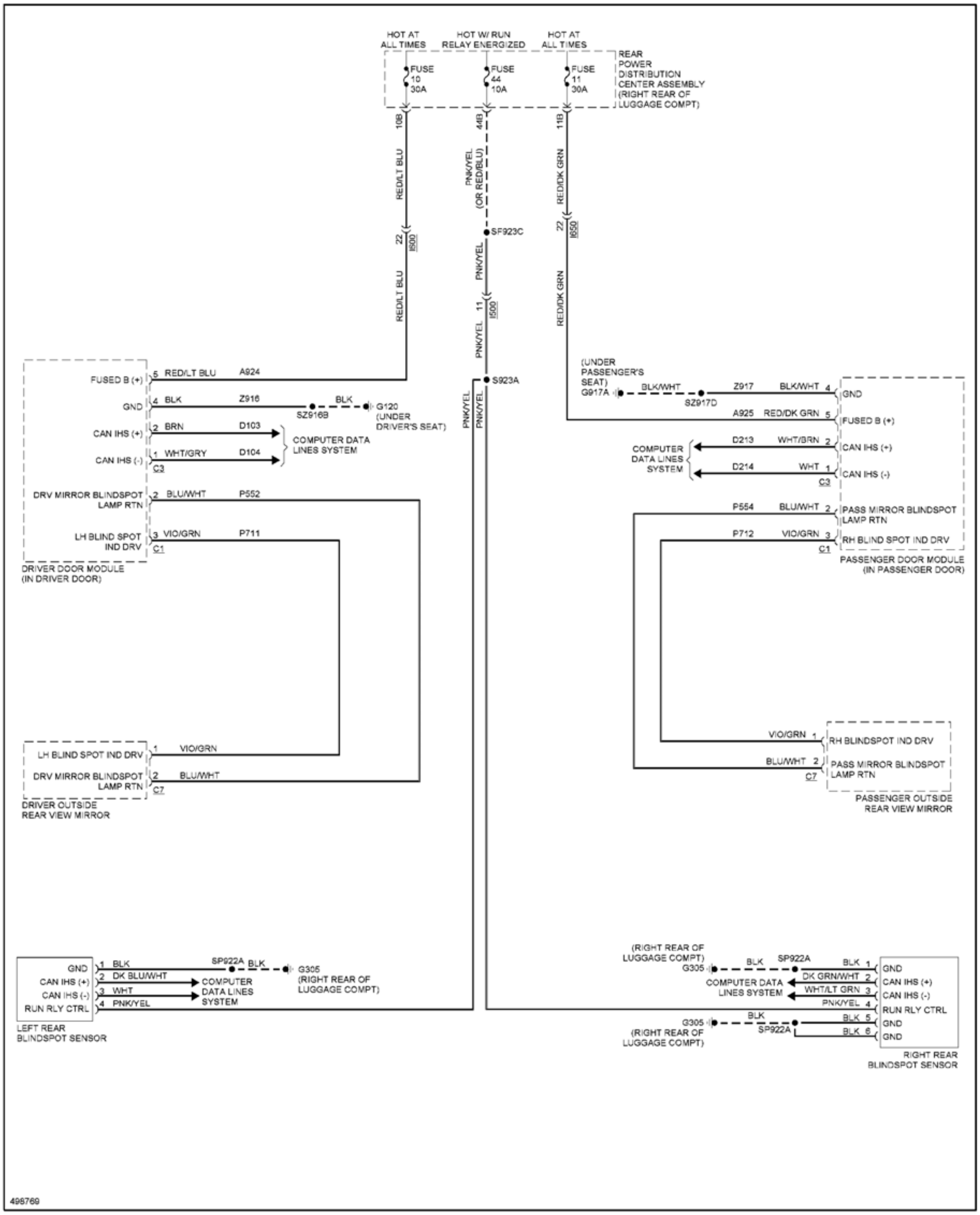


Fig. 63: Blind Spot Monitoring Circuit

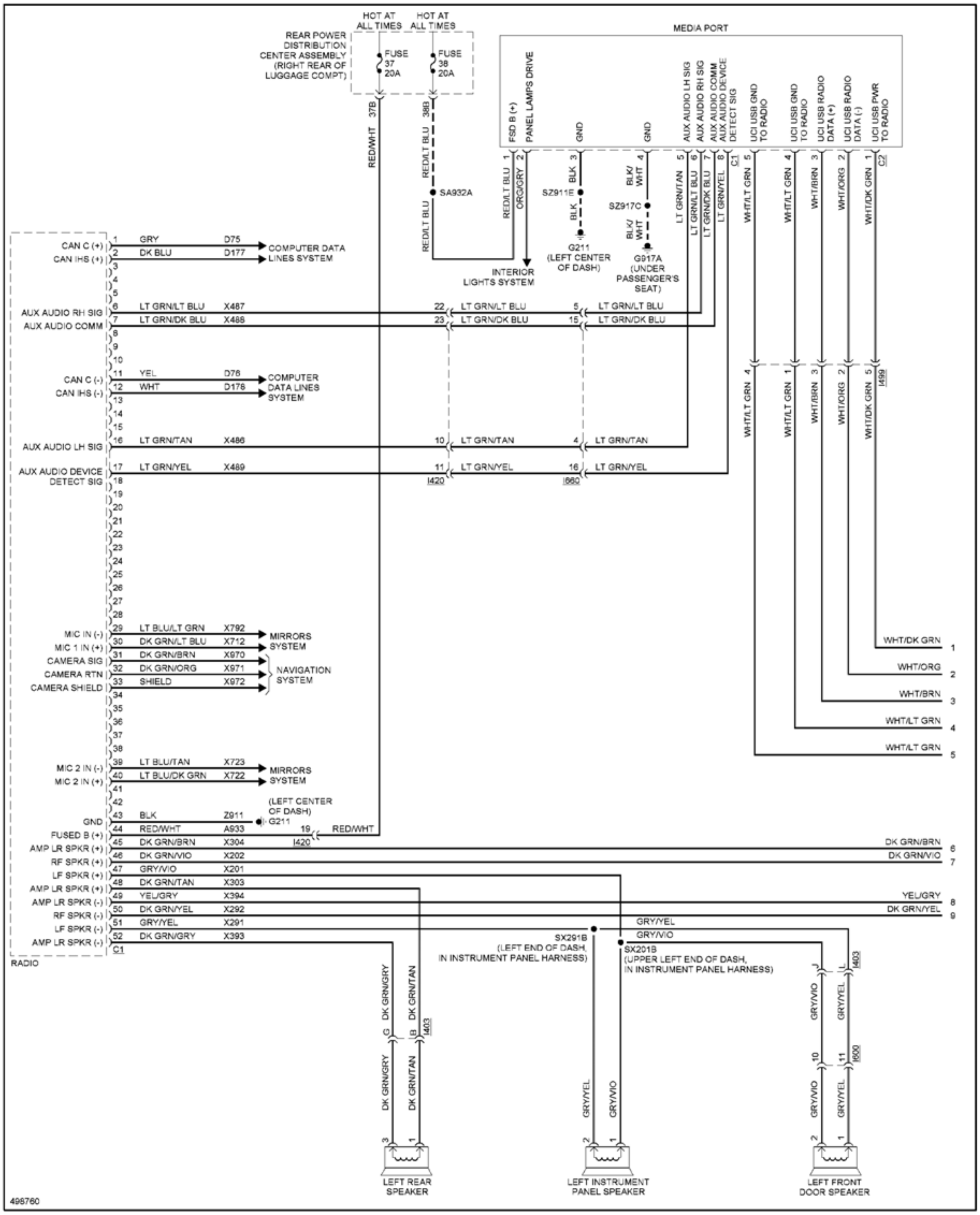


Fig. 64: Navigation Circuit, Base (1 of 2)

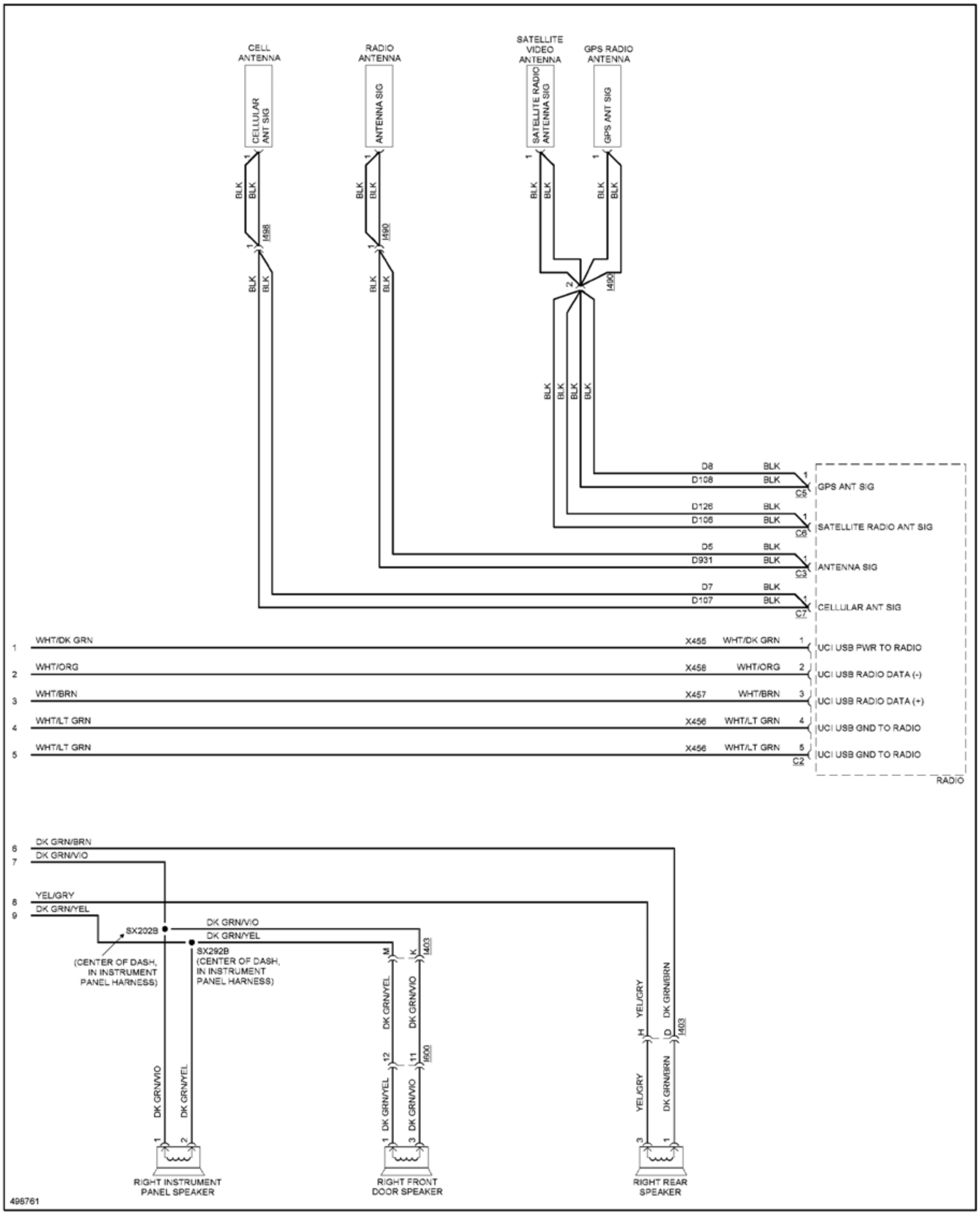


Fig. 65: Navigation Circuit, Base (2 of 2)

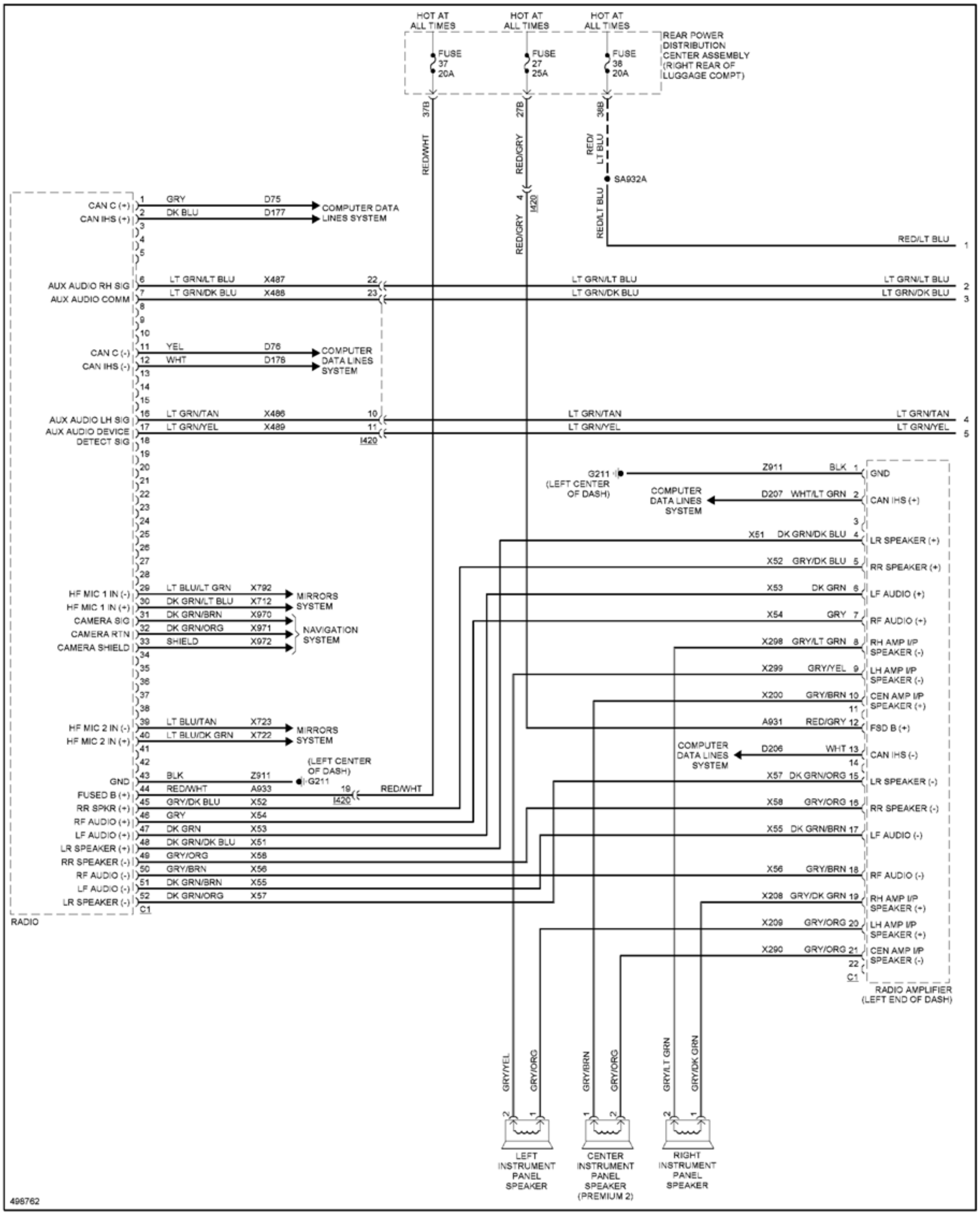


Fig. 66: Navigation Circuit, Premium 1 (1 of 3)

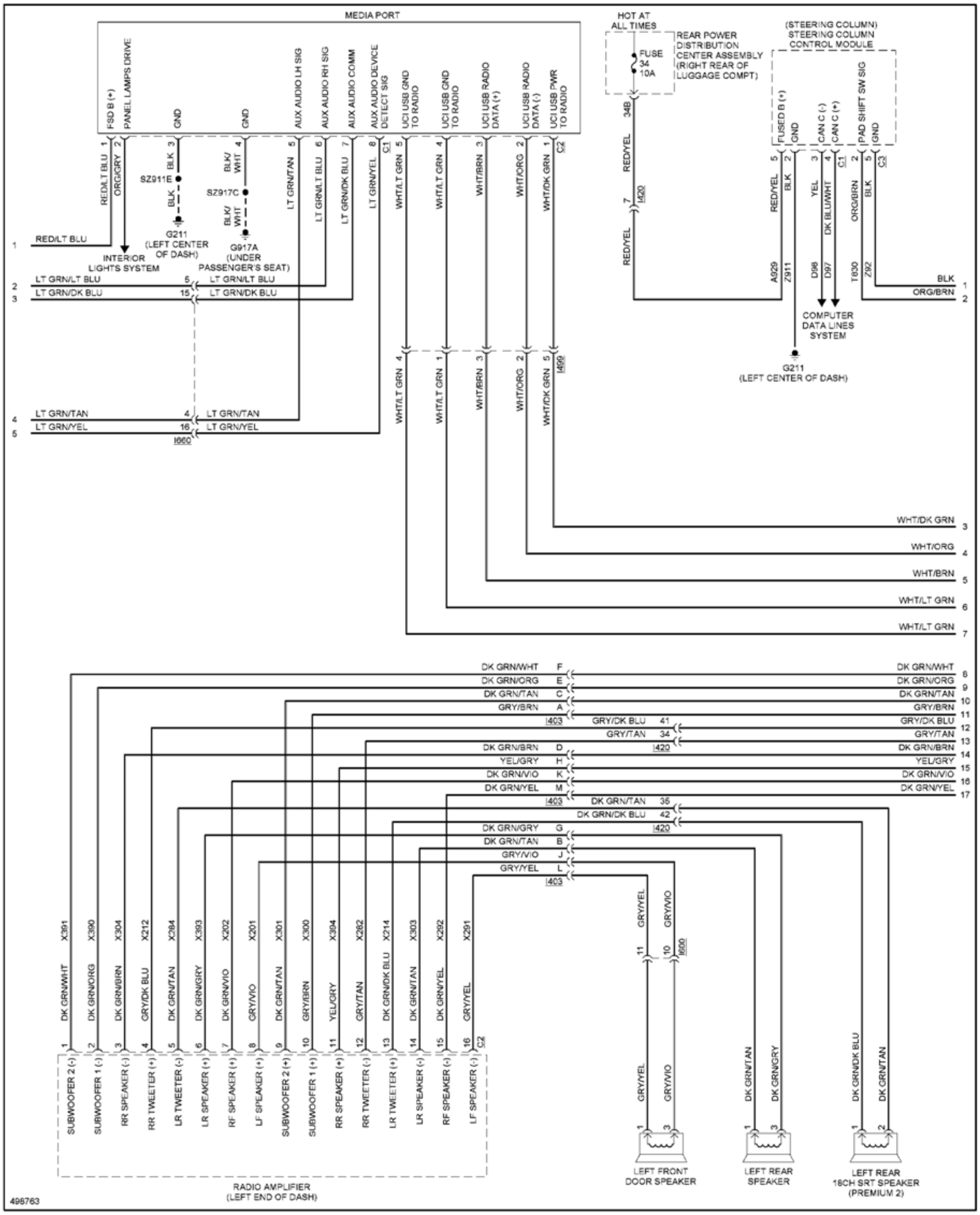


Fig. 67: Navigation Circuit, Premium 1 (2 of 3)

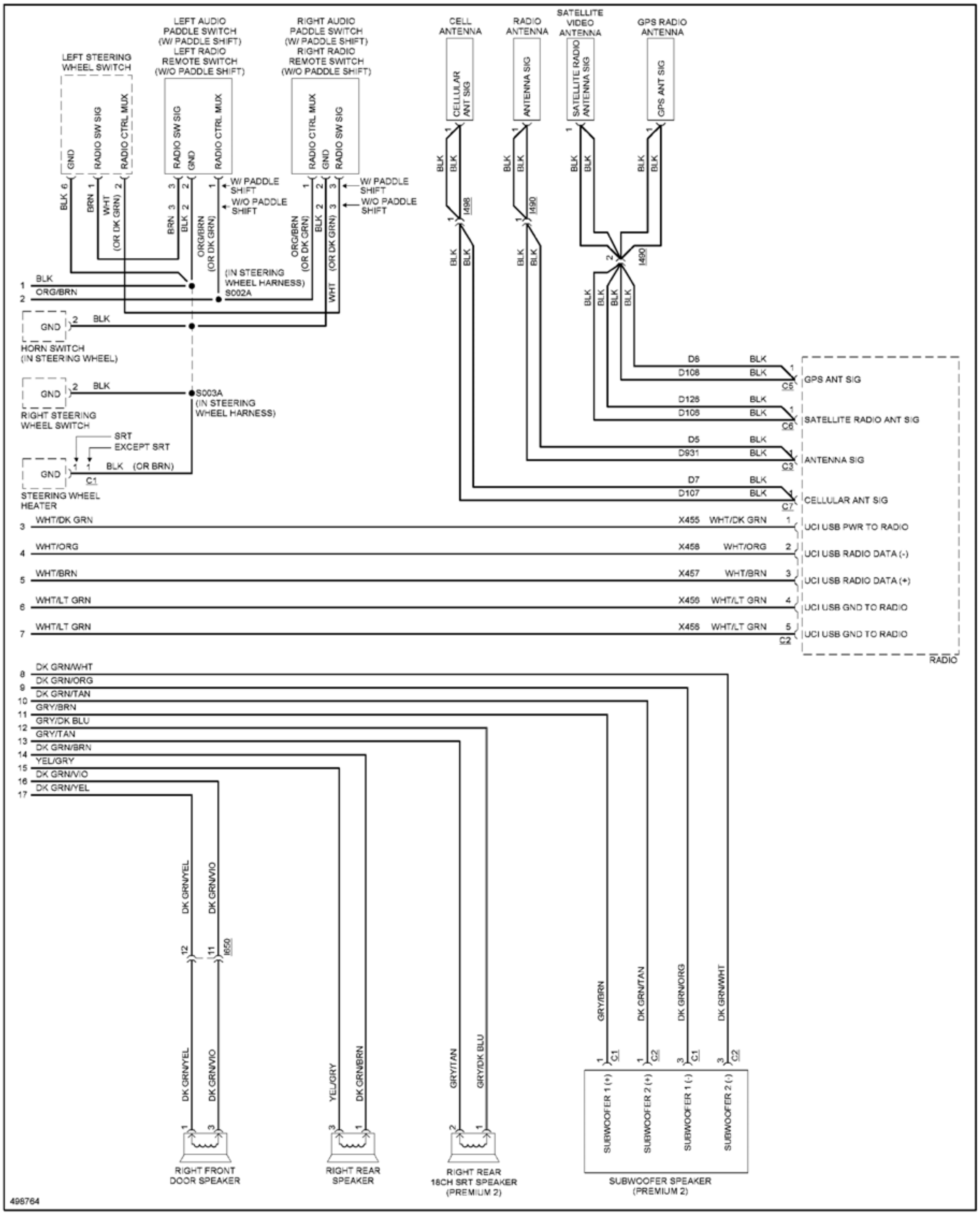


Fig. 68: Navigation Circuit, Premium 1 (3 of 3)

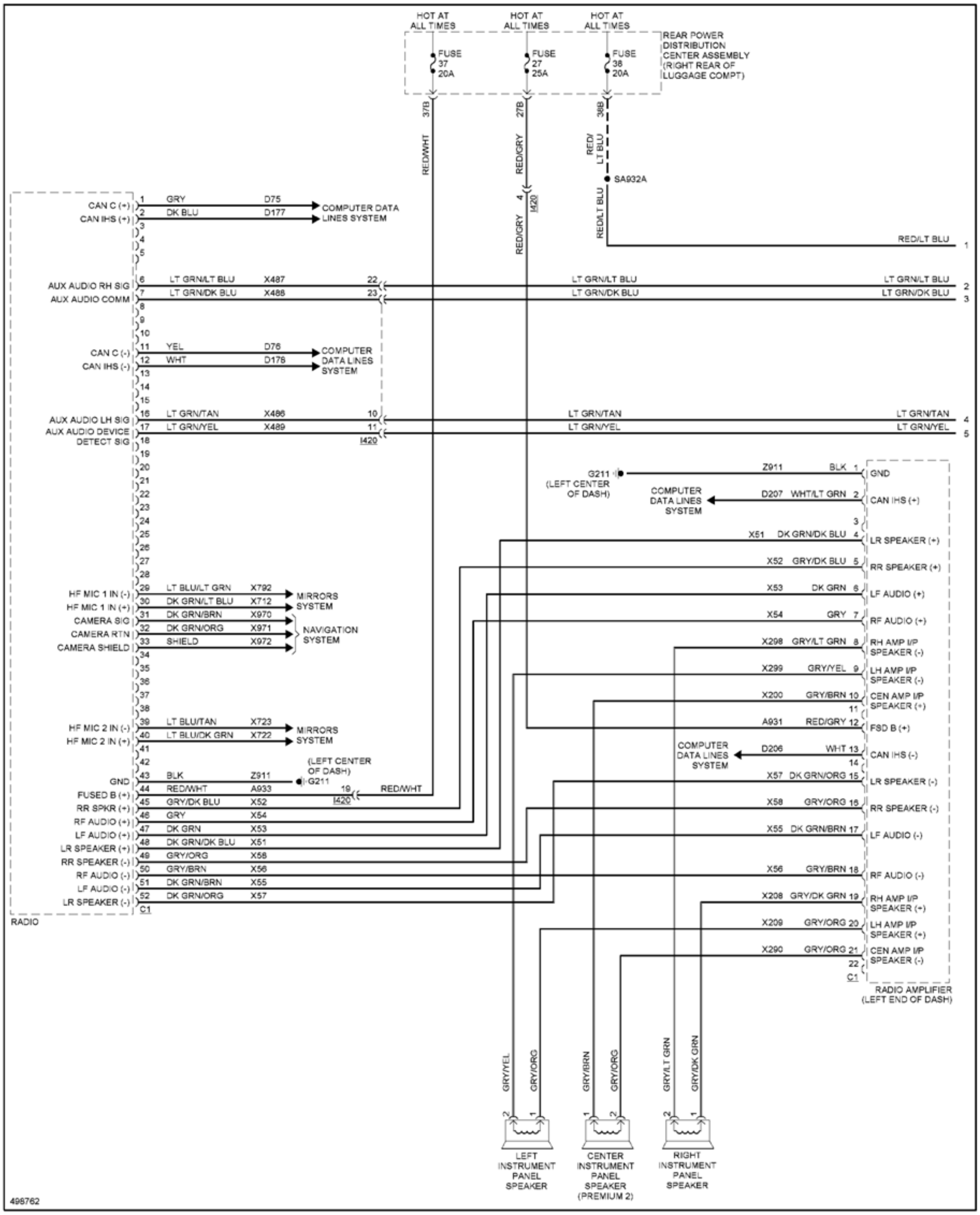


Fig. 69: Navigation Circuit, Premium 2 (1 of 3)

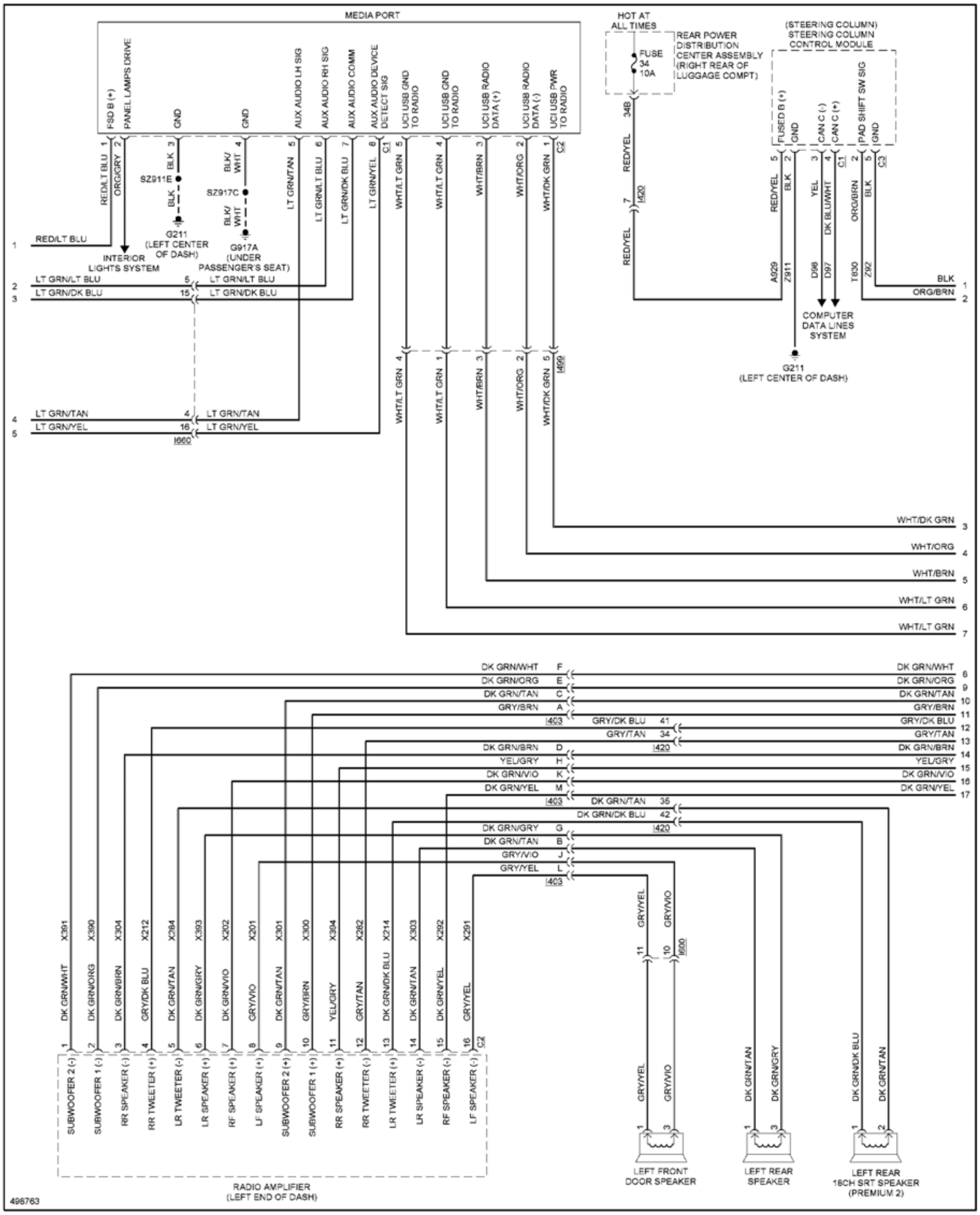


Fig. 70: Navigation Circuit, Premium 2 (2 of 3)

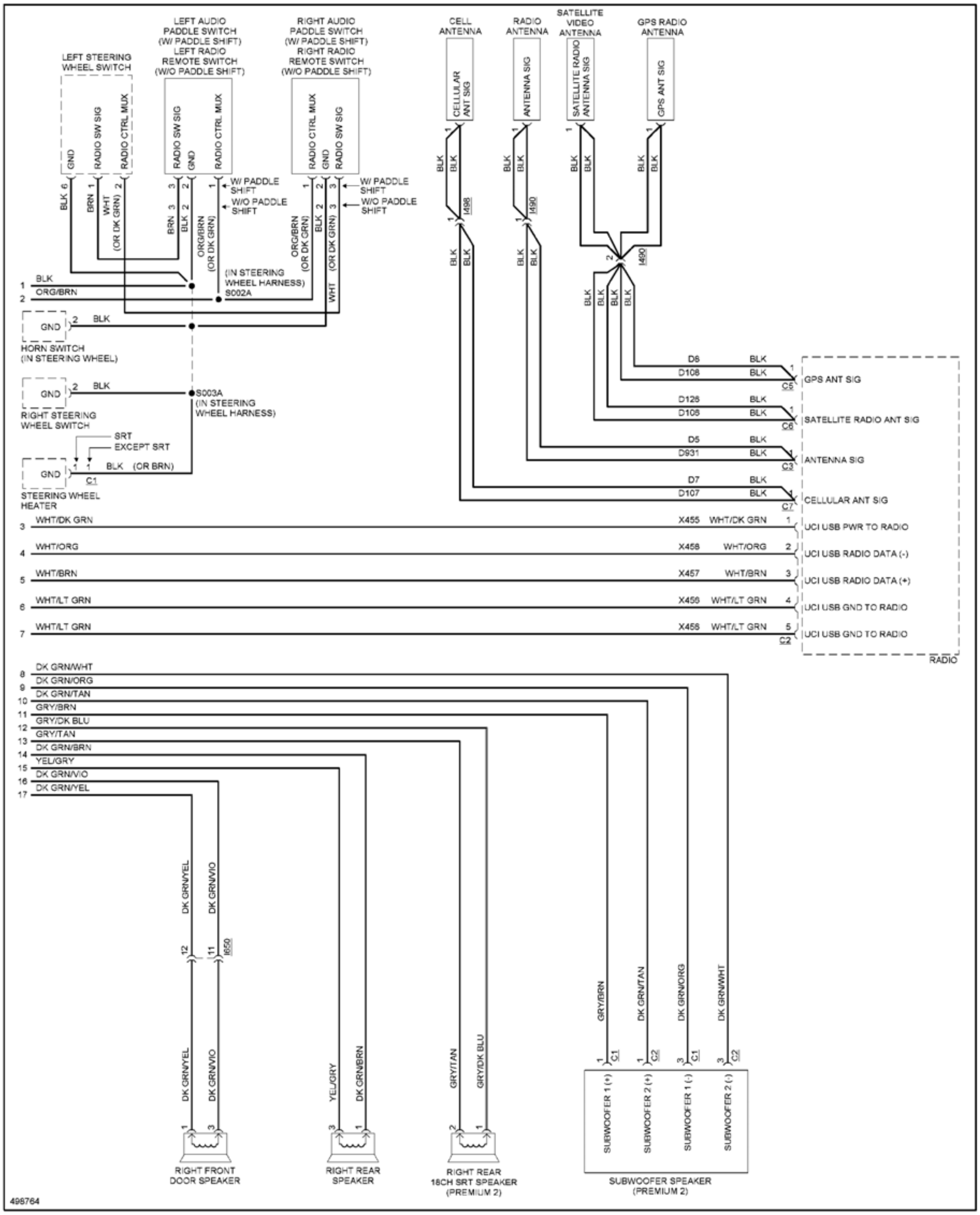


Fig. 71: Navigation Circuit, Premium 2 (3 of 3)

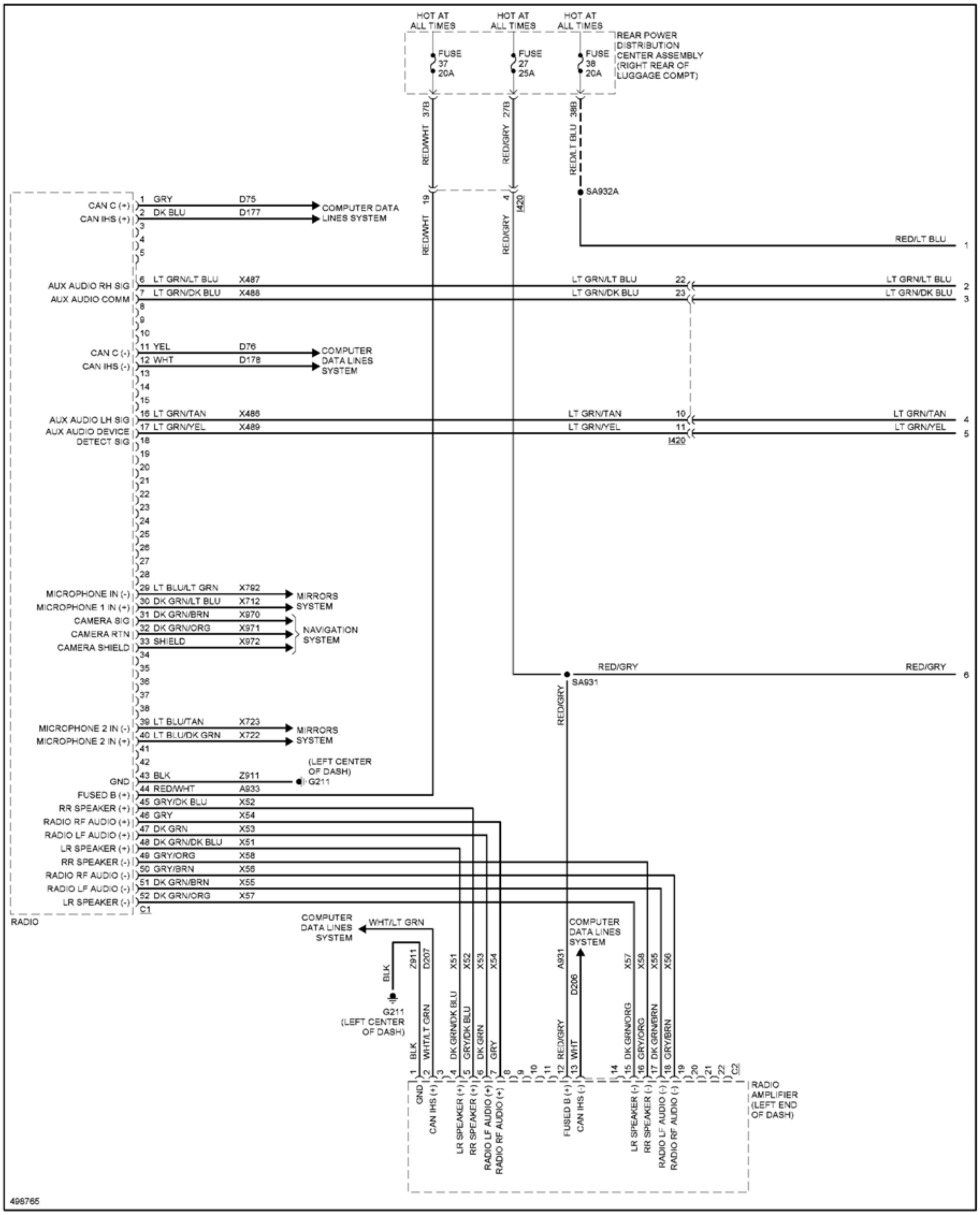
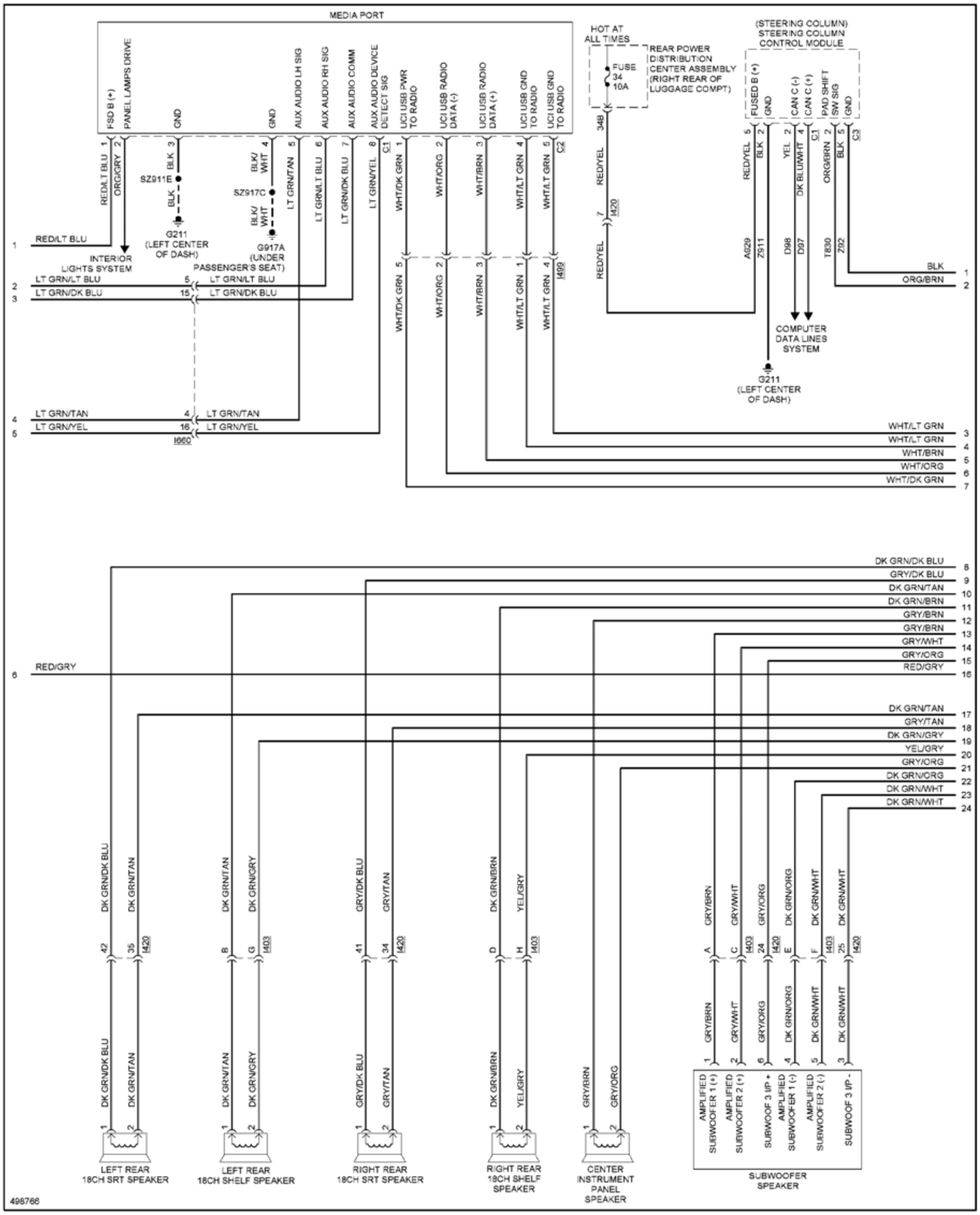
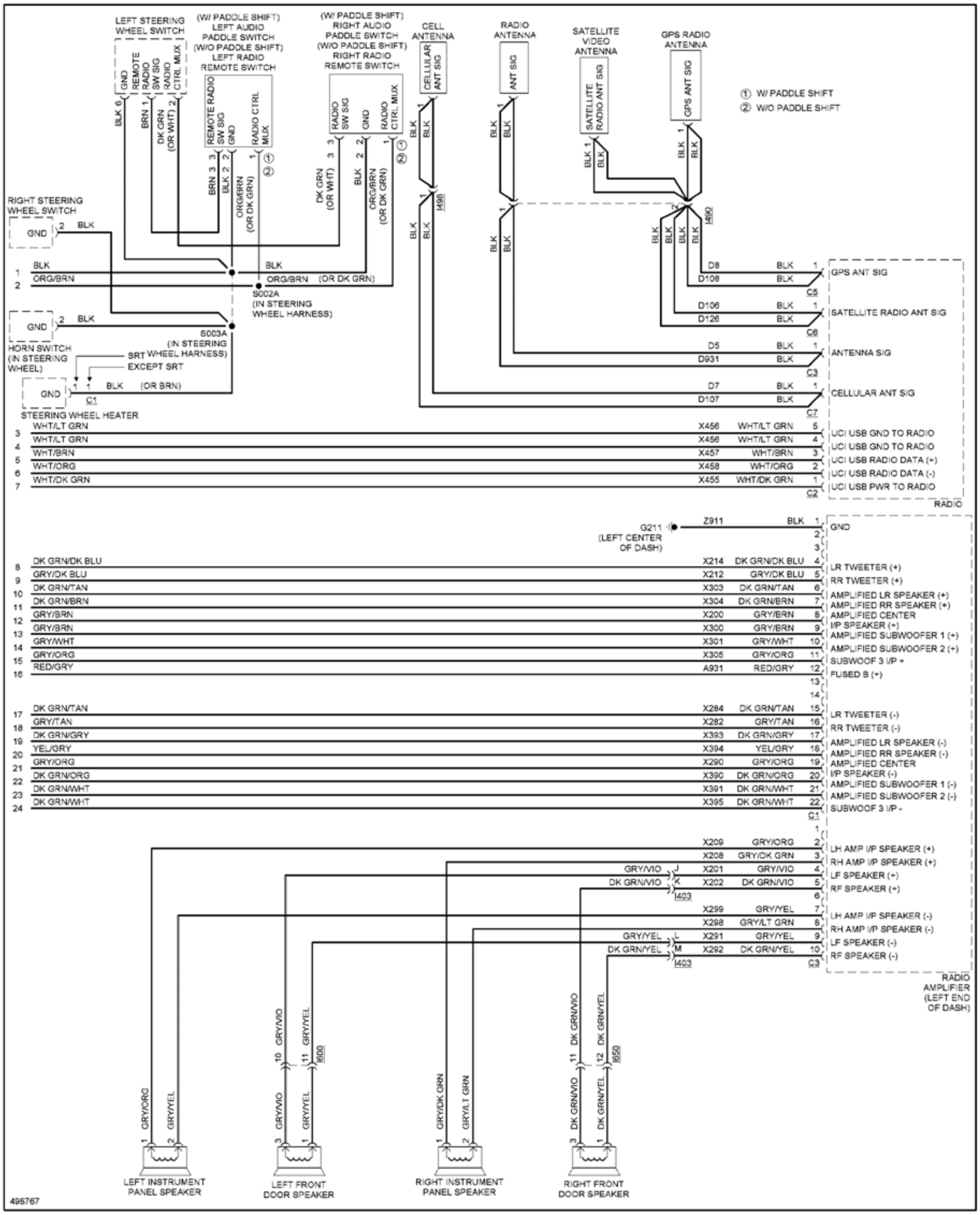


Fig. 72: Navigation Circuit, Premium 3 (1 of 3)



[Fig. 73: Navigation Circuit, Premium 3 (2 of 3)]



[Fig. 74: Navigation Circuit, Premium 3 (3 of 3)]()

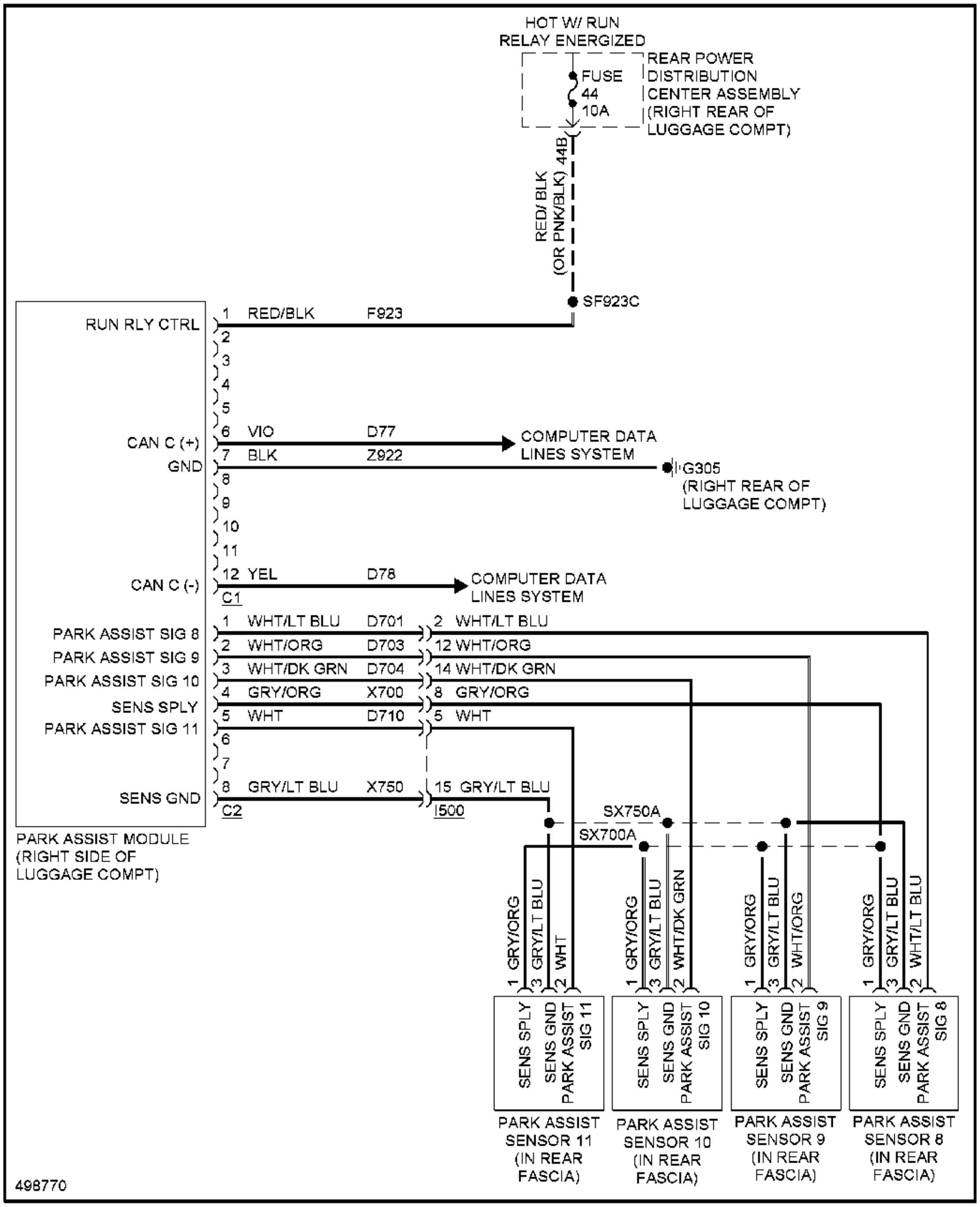


Fig. 75: Parking Assistant Circuit

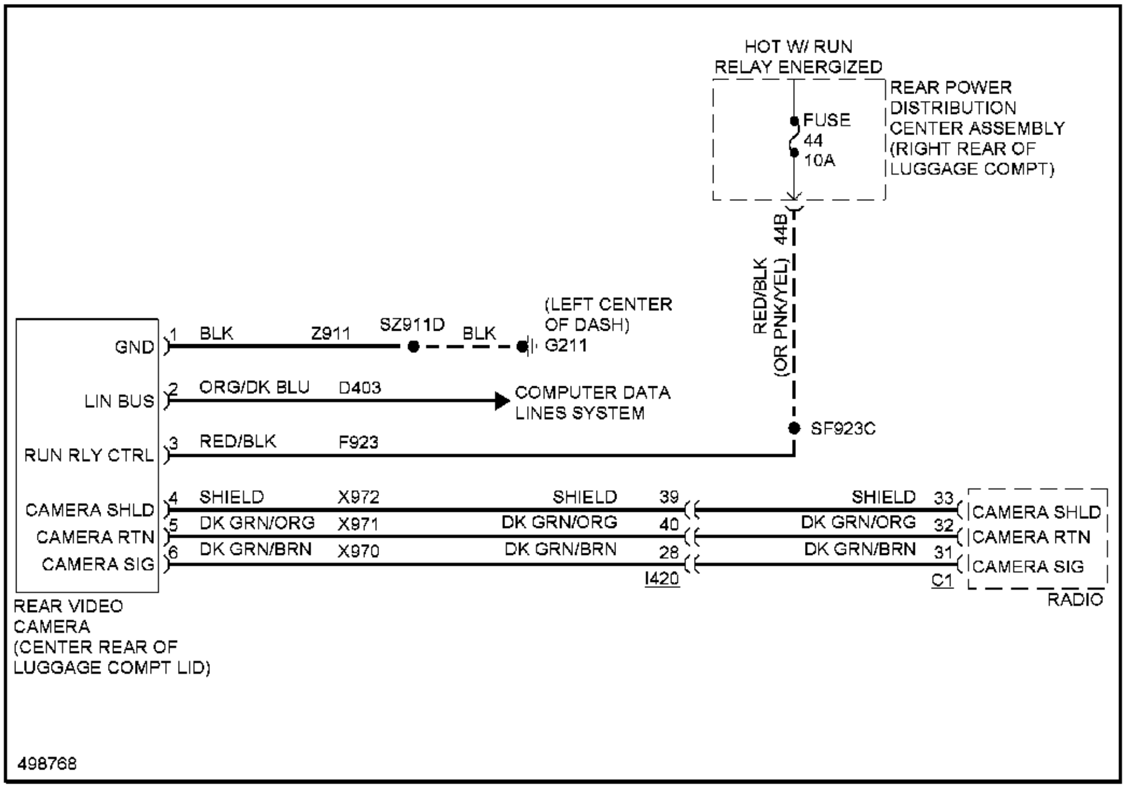


Fig. 76: Rear Camera Circuit

POWER DISTRIBUTION

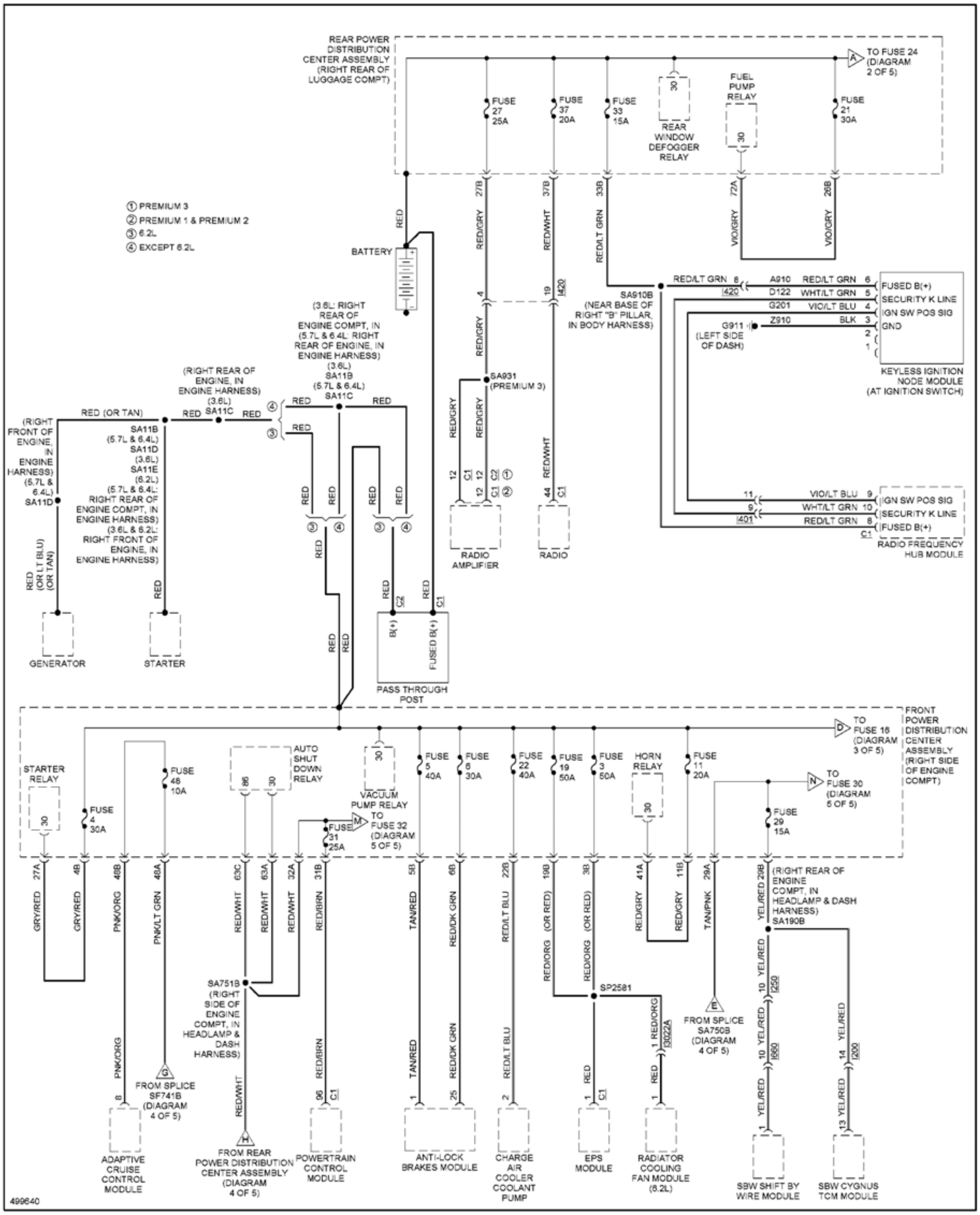


Fig. 77: Power Distribution Circuit (1 of 5)

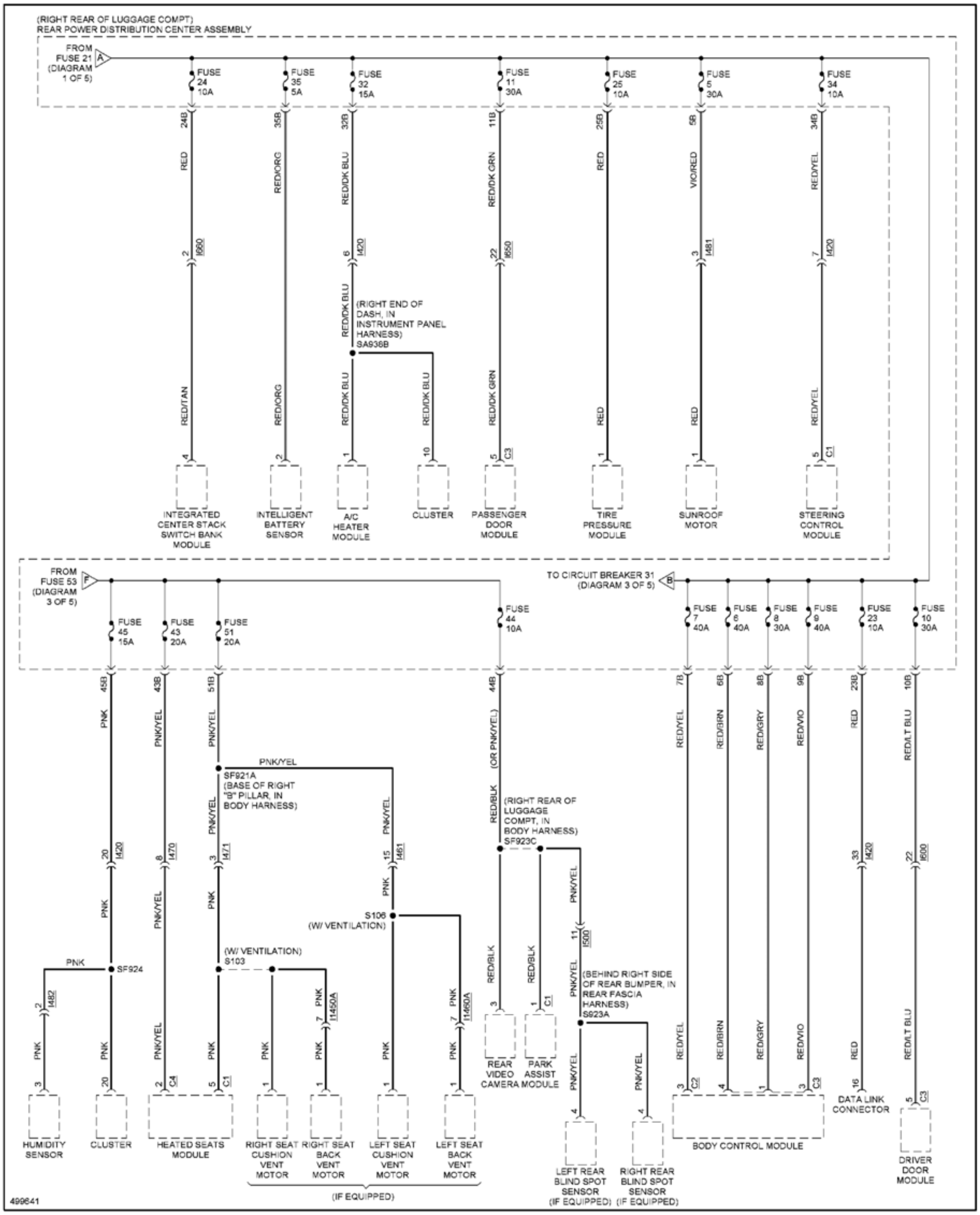
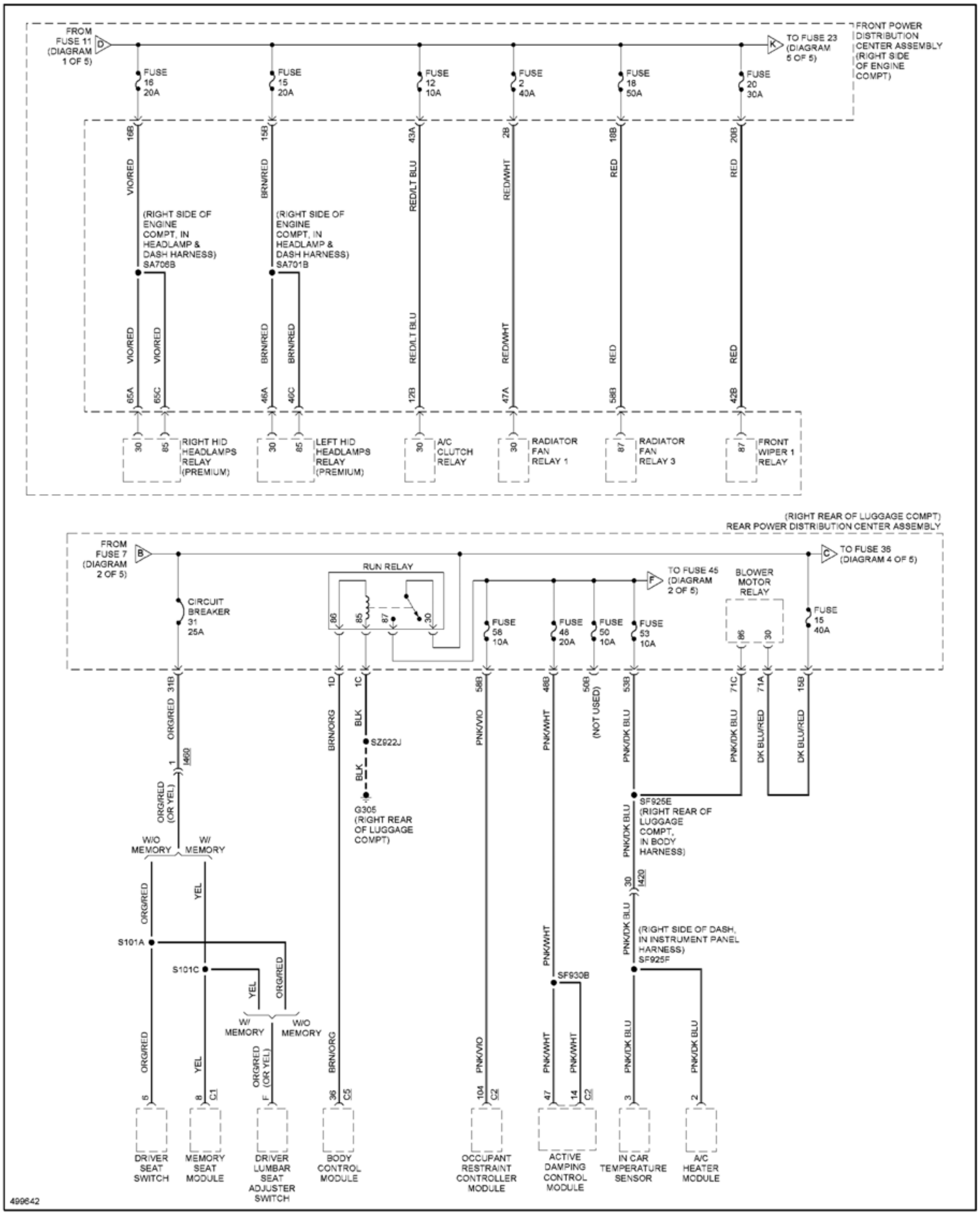


Fig. 78: Power Distribution Circuit (2 of 5)



[Fig. 79: Power Distribution Circuit (3 of 5)](#)

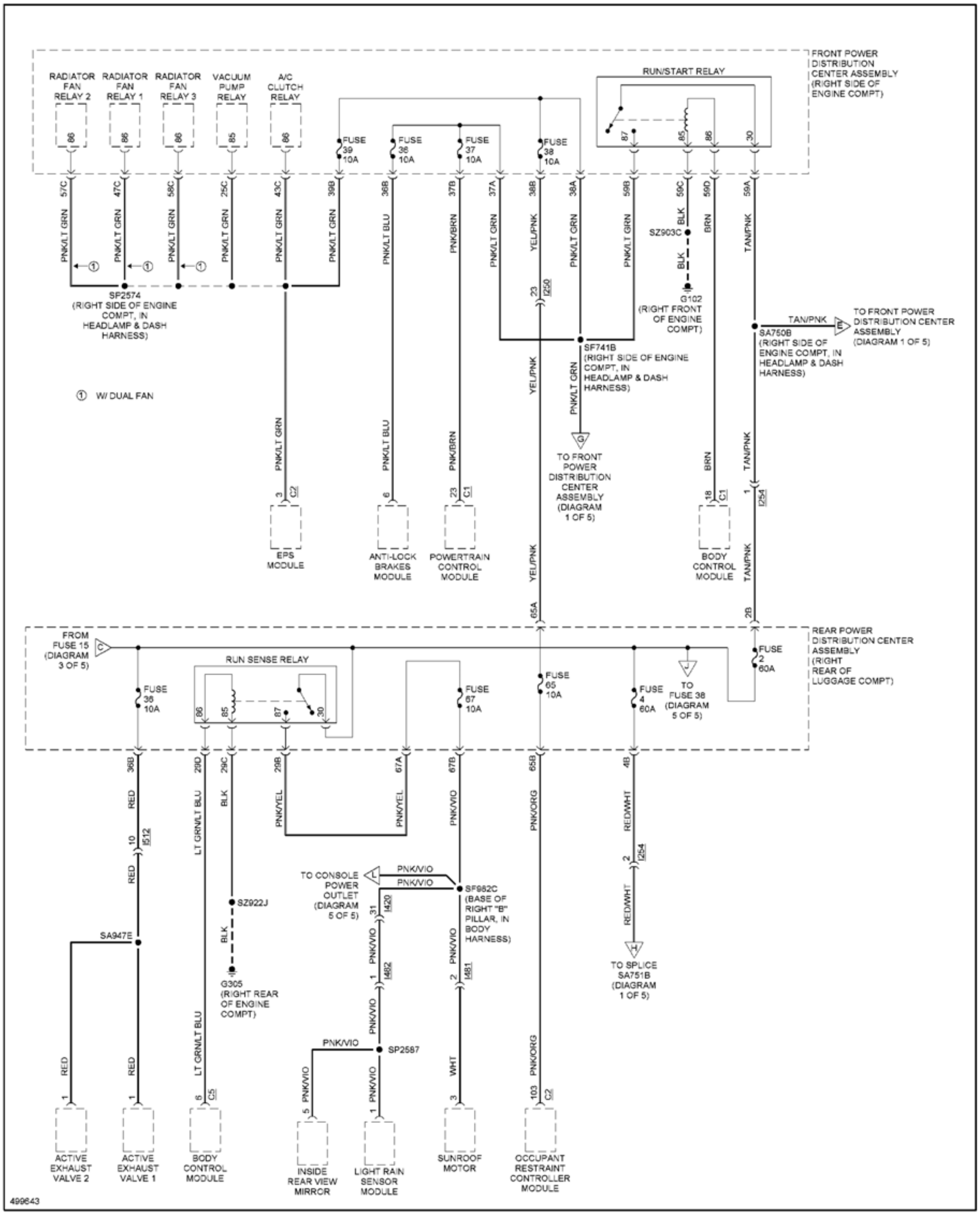
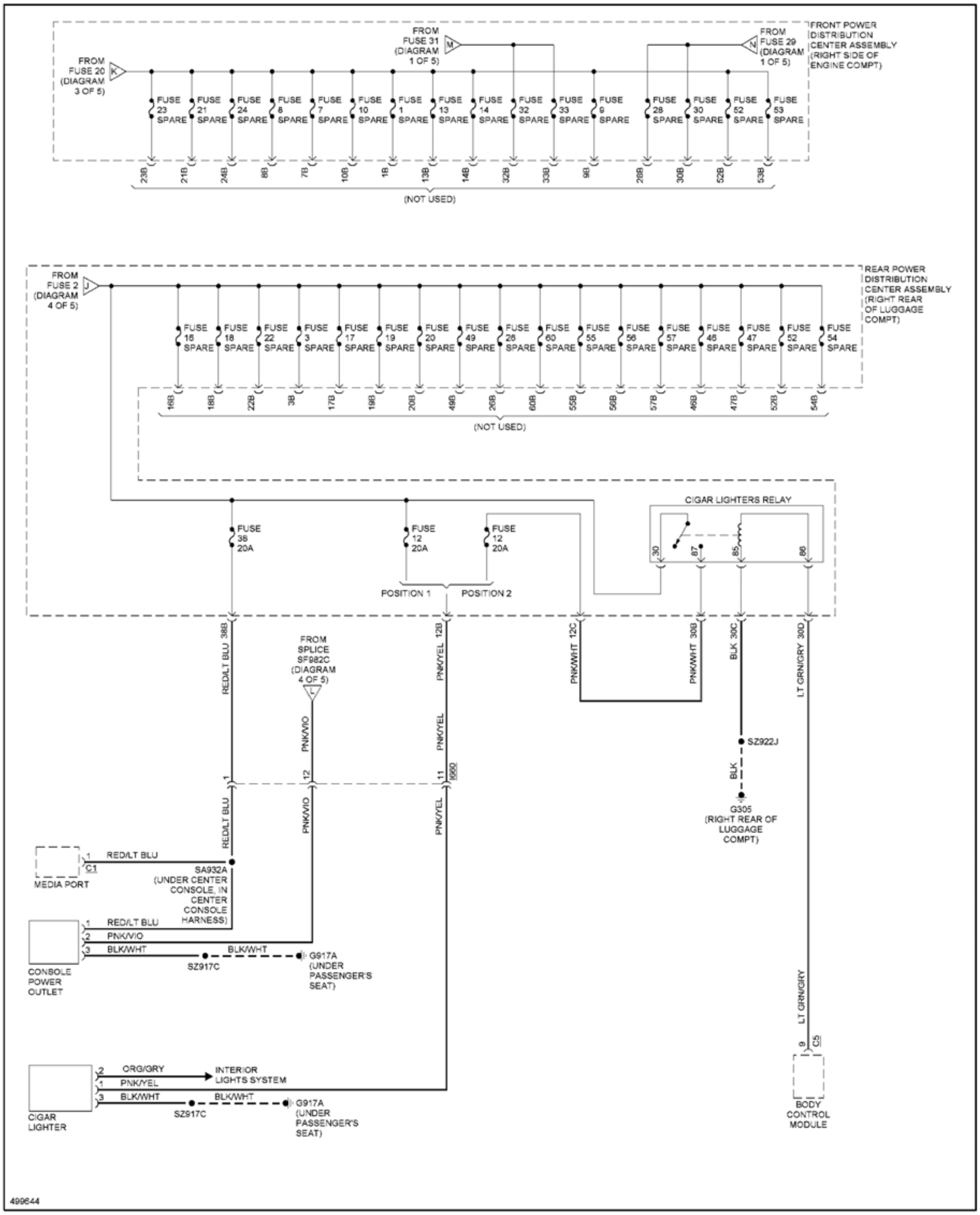


Fig. 80: Power Distribution Circuit (4 of 5)



[Fig. 81: Power Distribution Circuit (5 of 5)]

POWER DOOR LOCKS

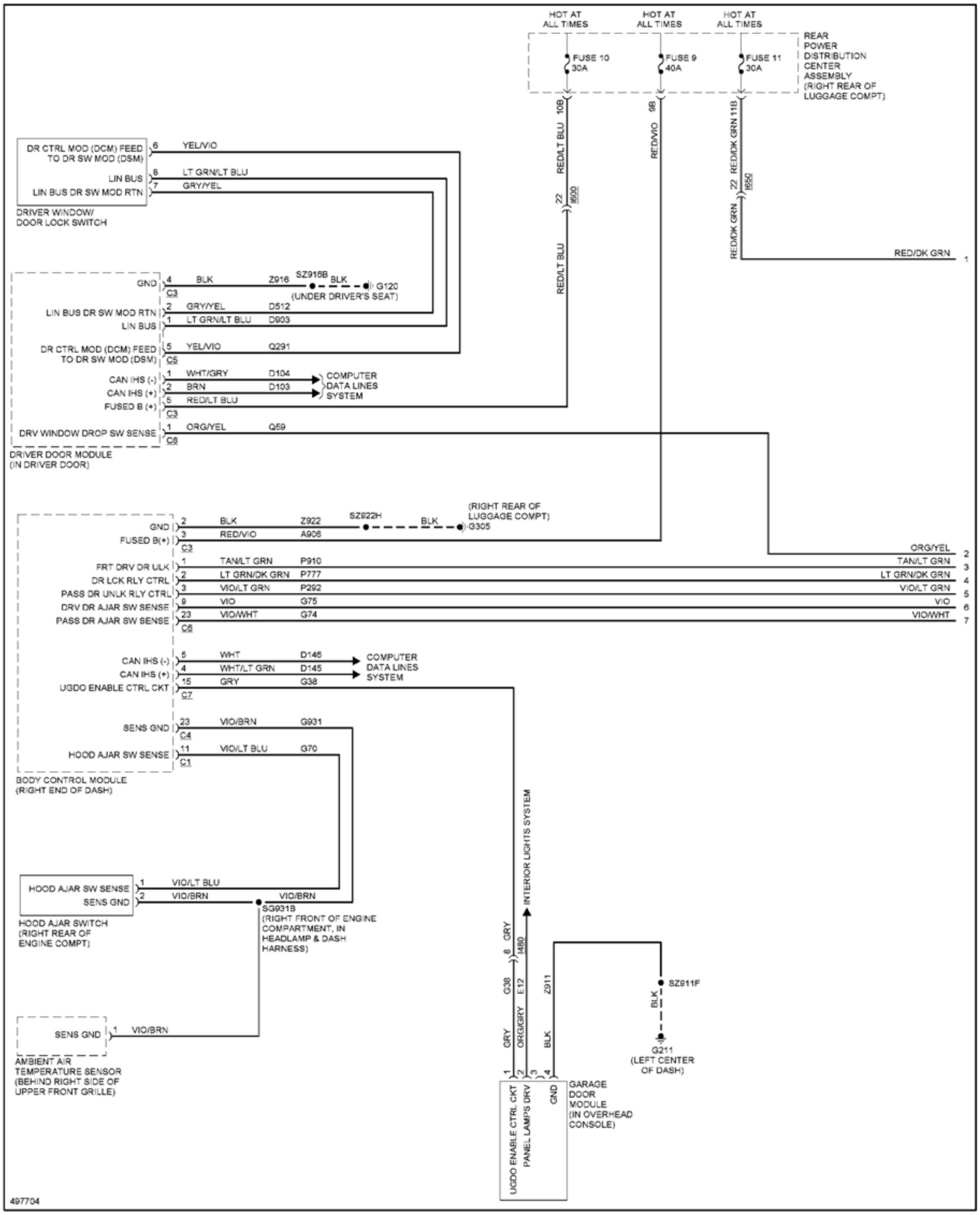
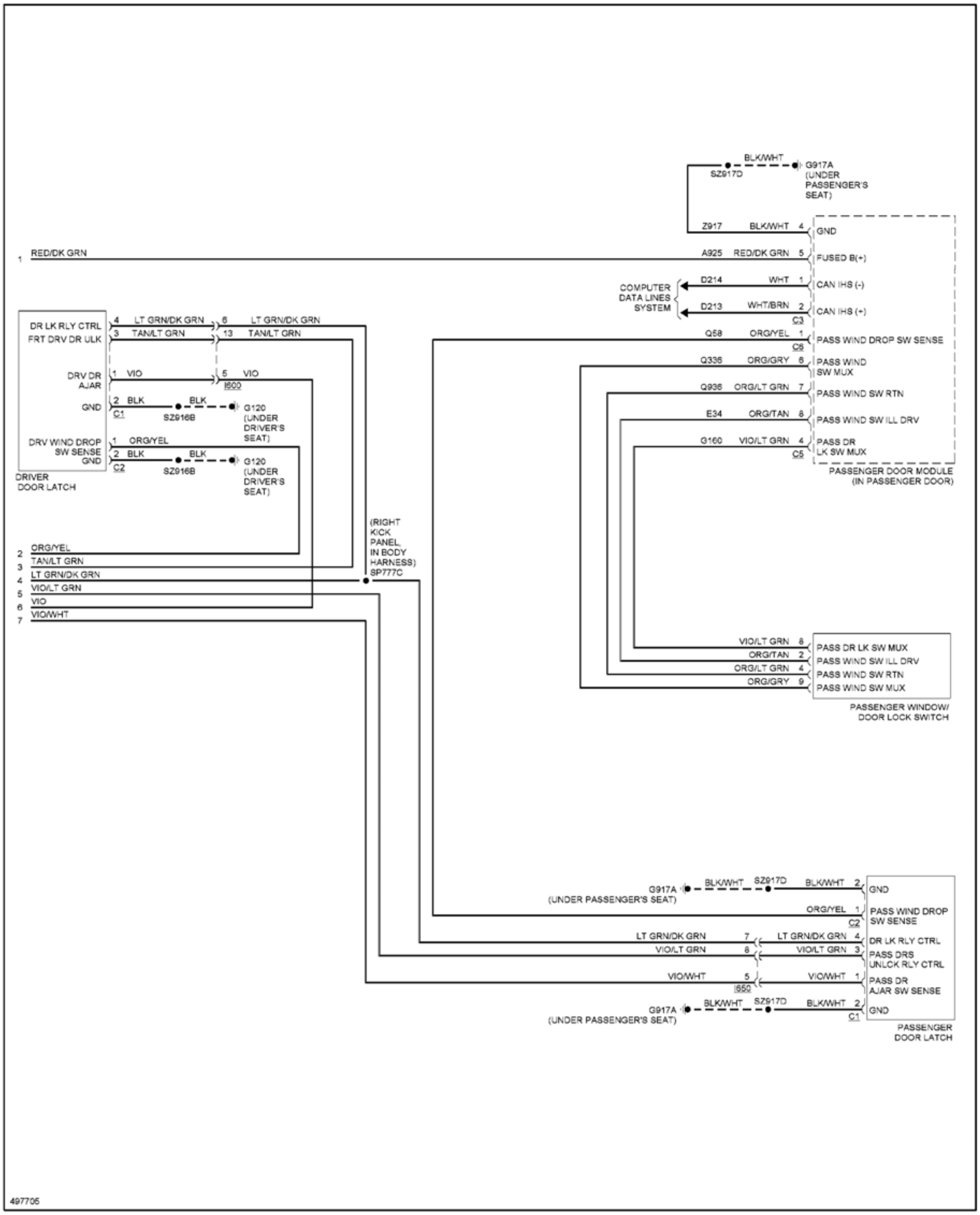


Fig. 82: Power Door Locks Circuit (1 of 2)



[Fig. 83: Power Door Locks Circuit (2 of 2)]

POWER MIRRORS

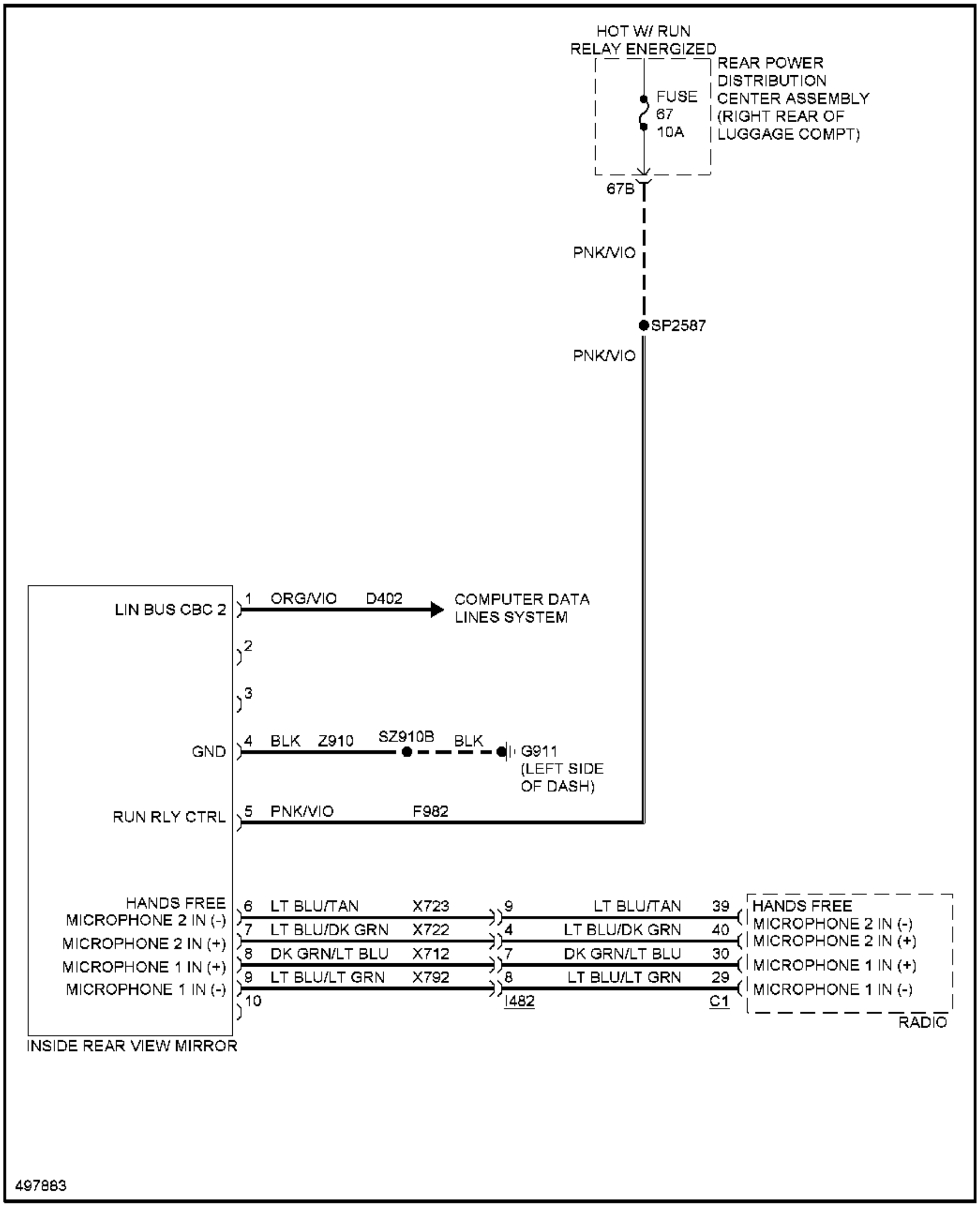


Fig. 84: Automatic Day/Night Mirror Circuit

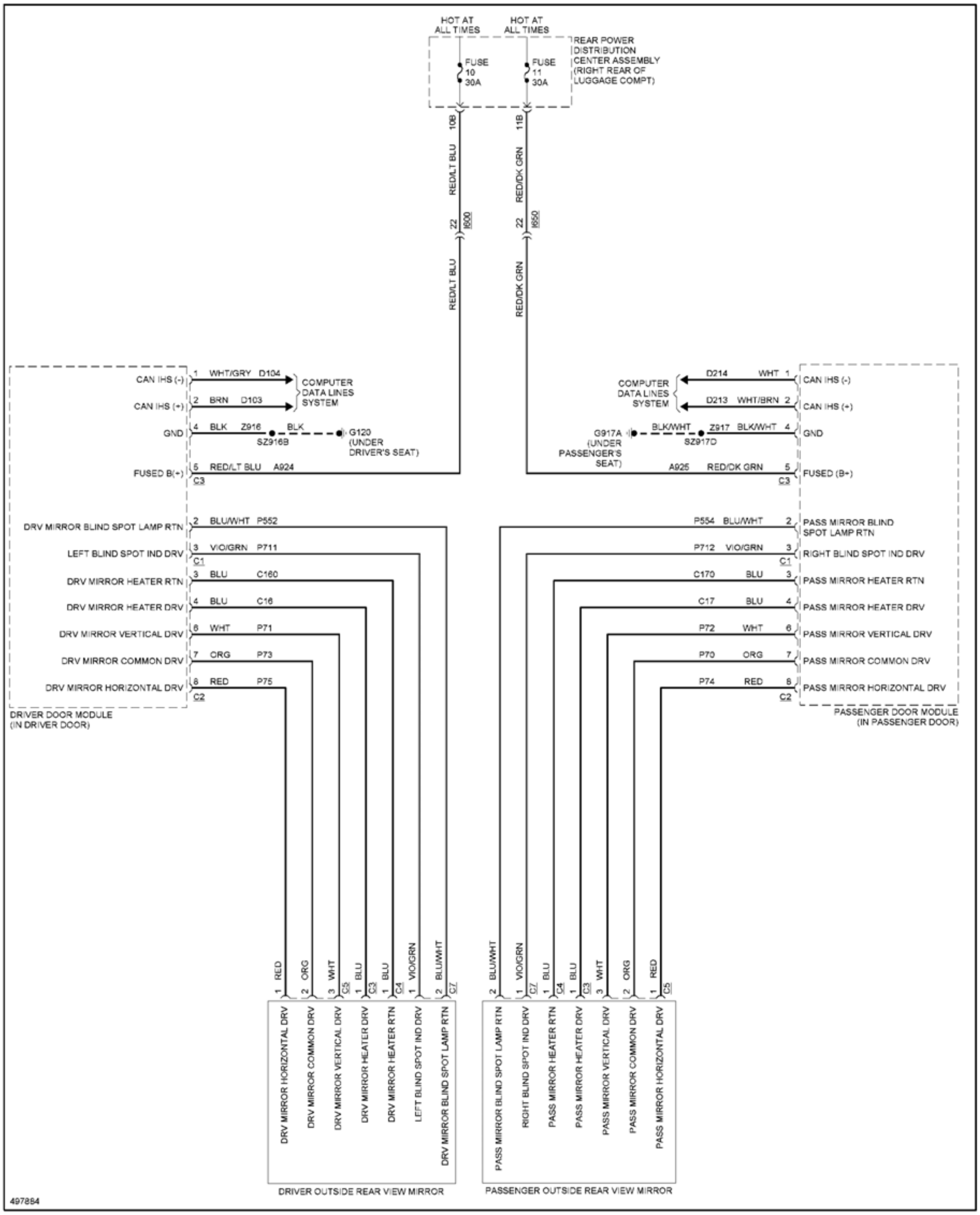
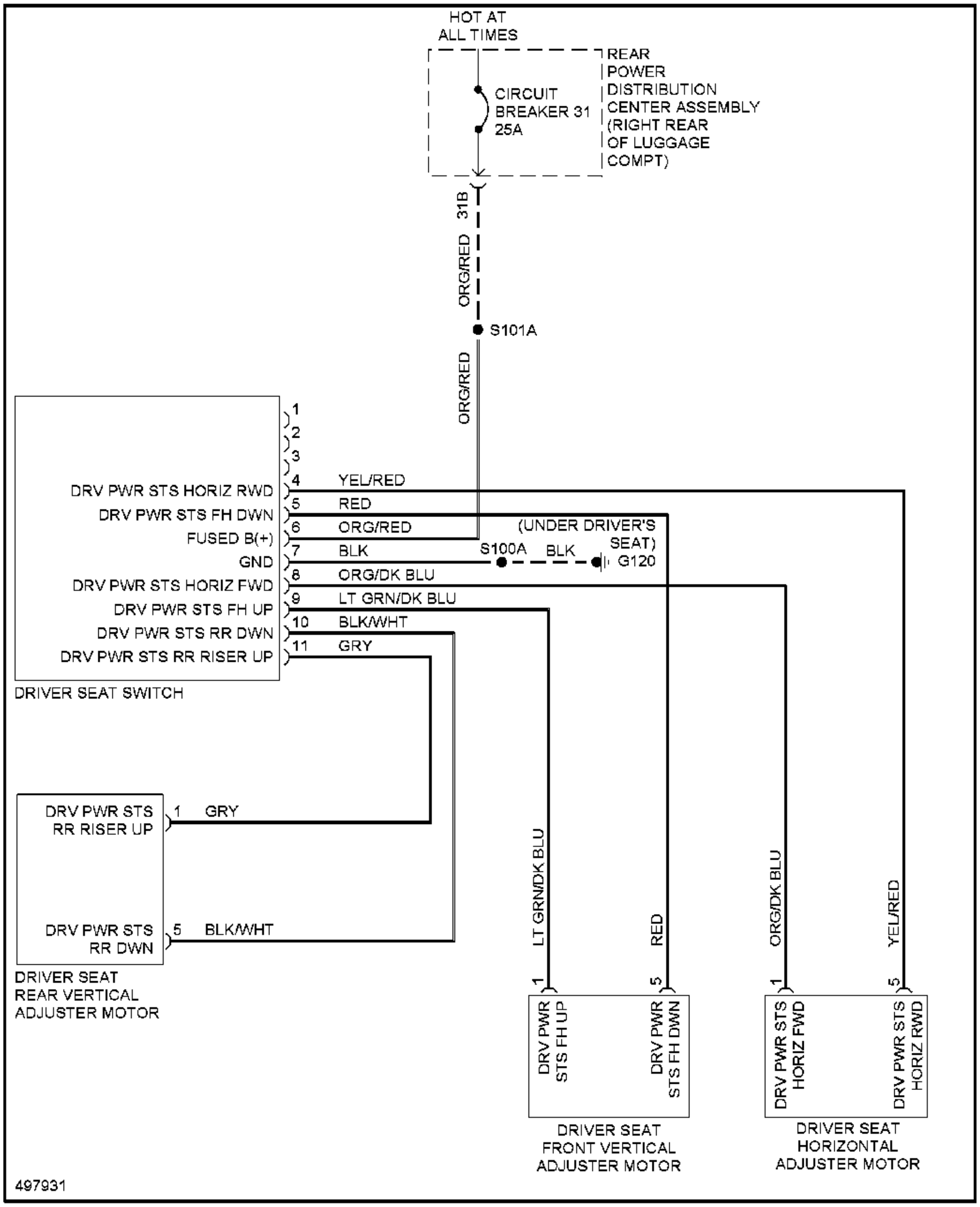


Fig. 85: Power Mirrors Circuit

POWER SEATS



[**Fig. 86: Driver Power Seat Circuit**]

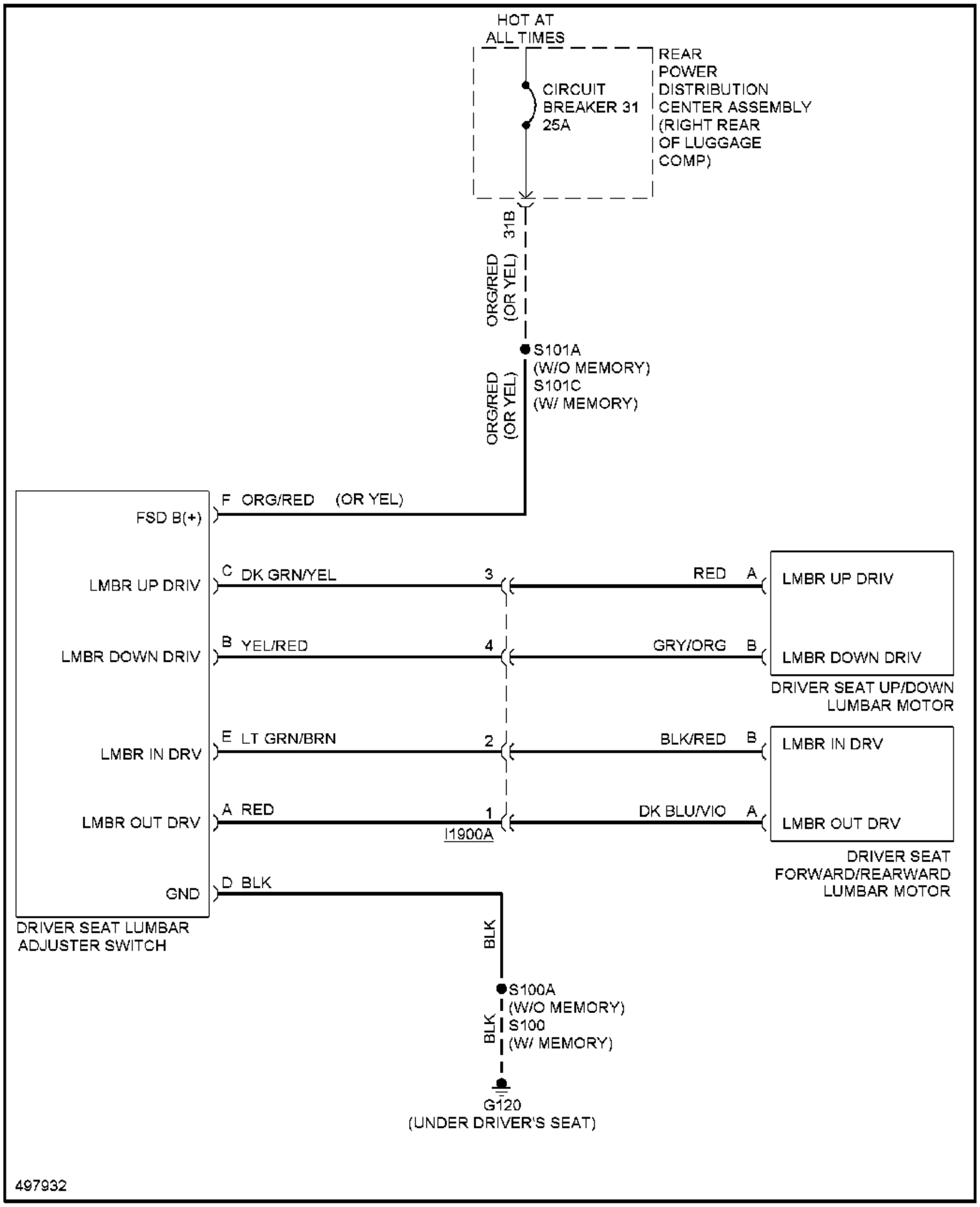
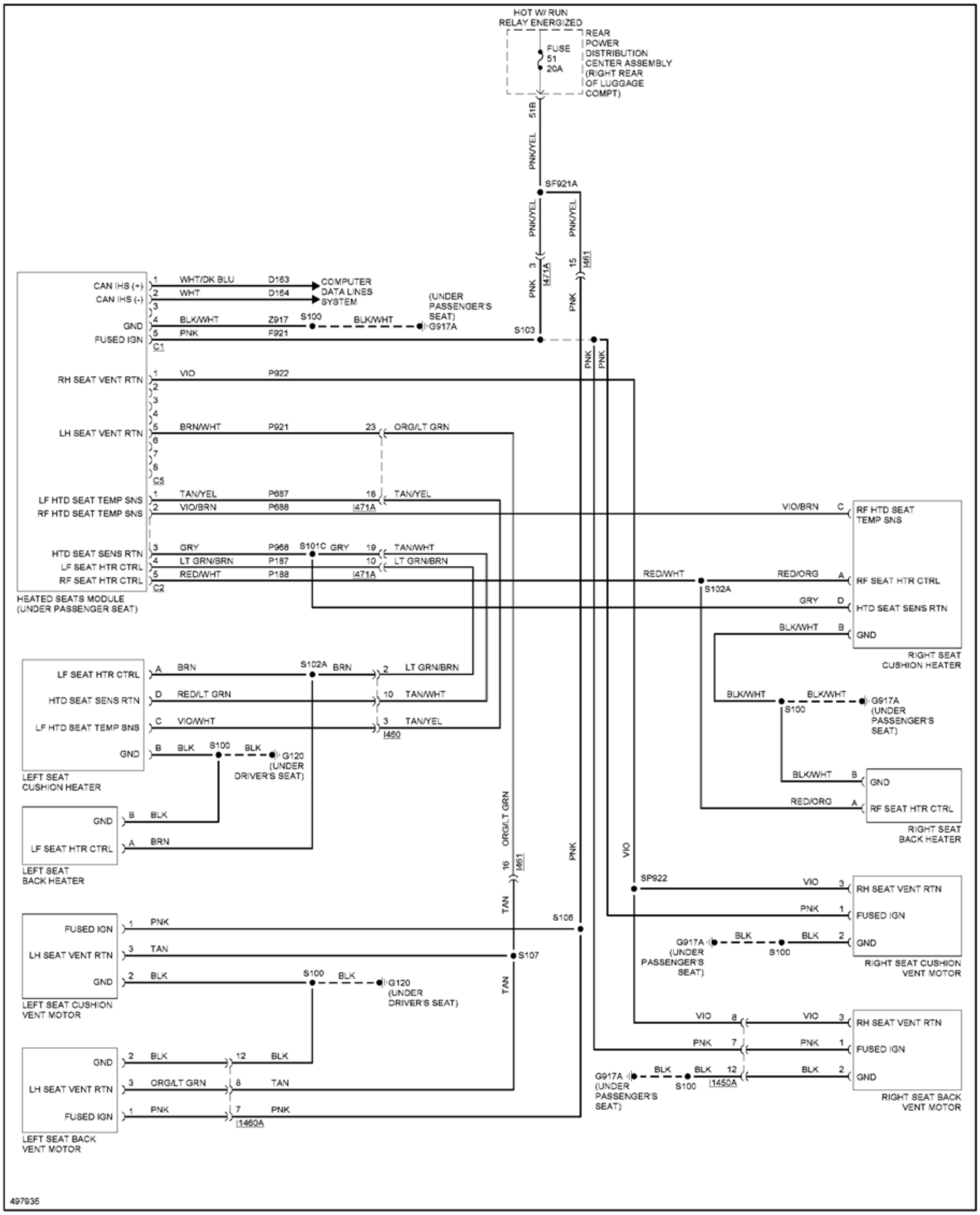


Fig. 87: Driver"s Lumbar Circuit



[Fig. 88: Heated Seats Circuit, W/ Ventilation]()

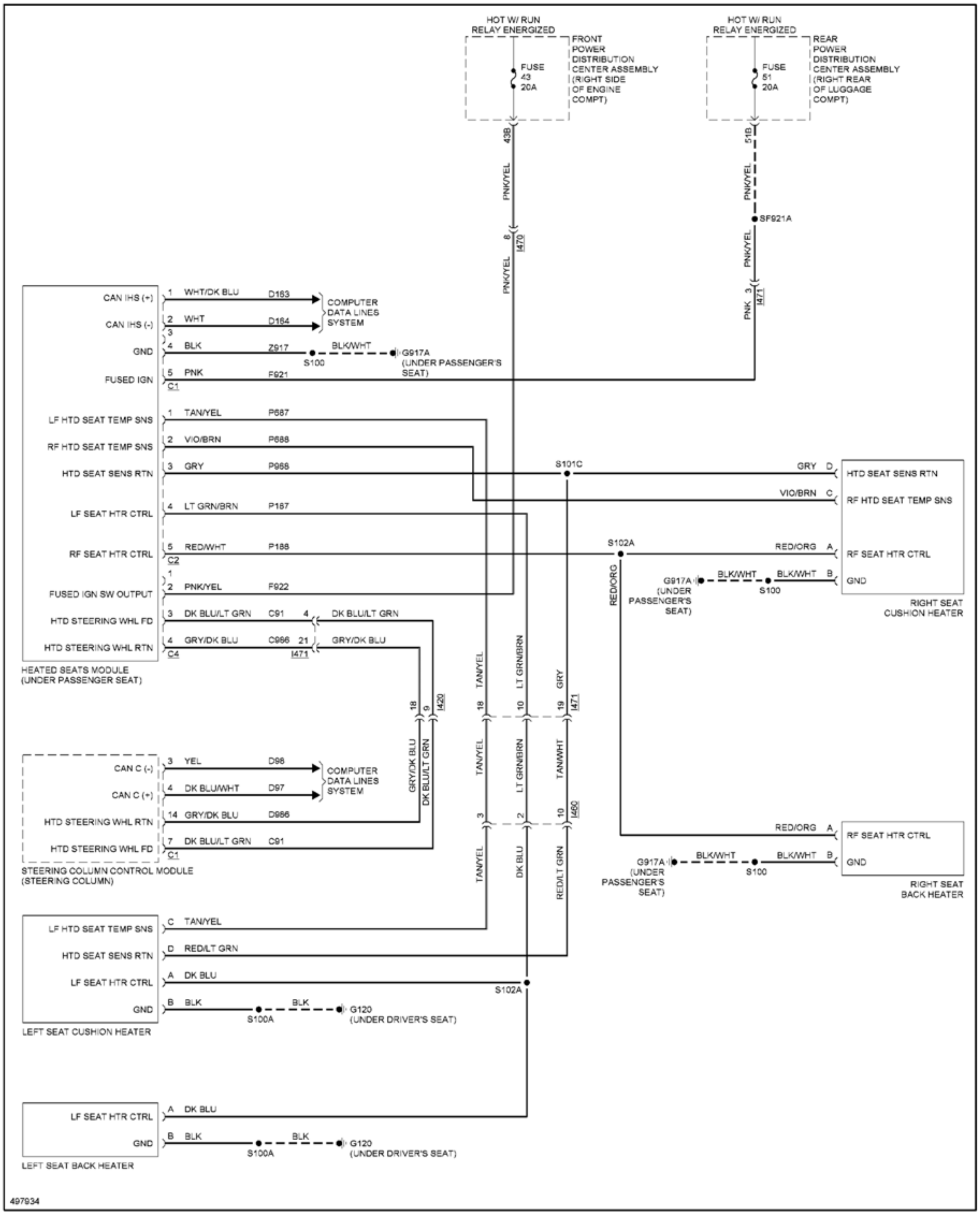
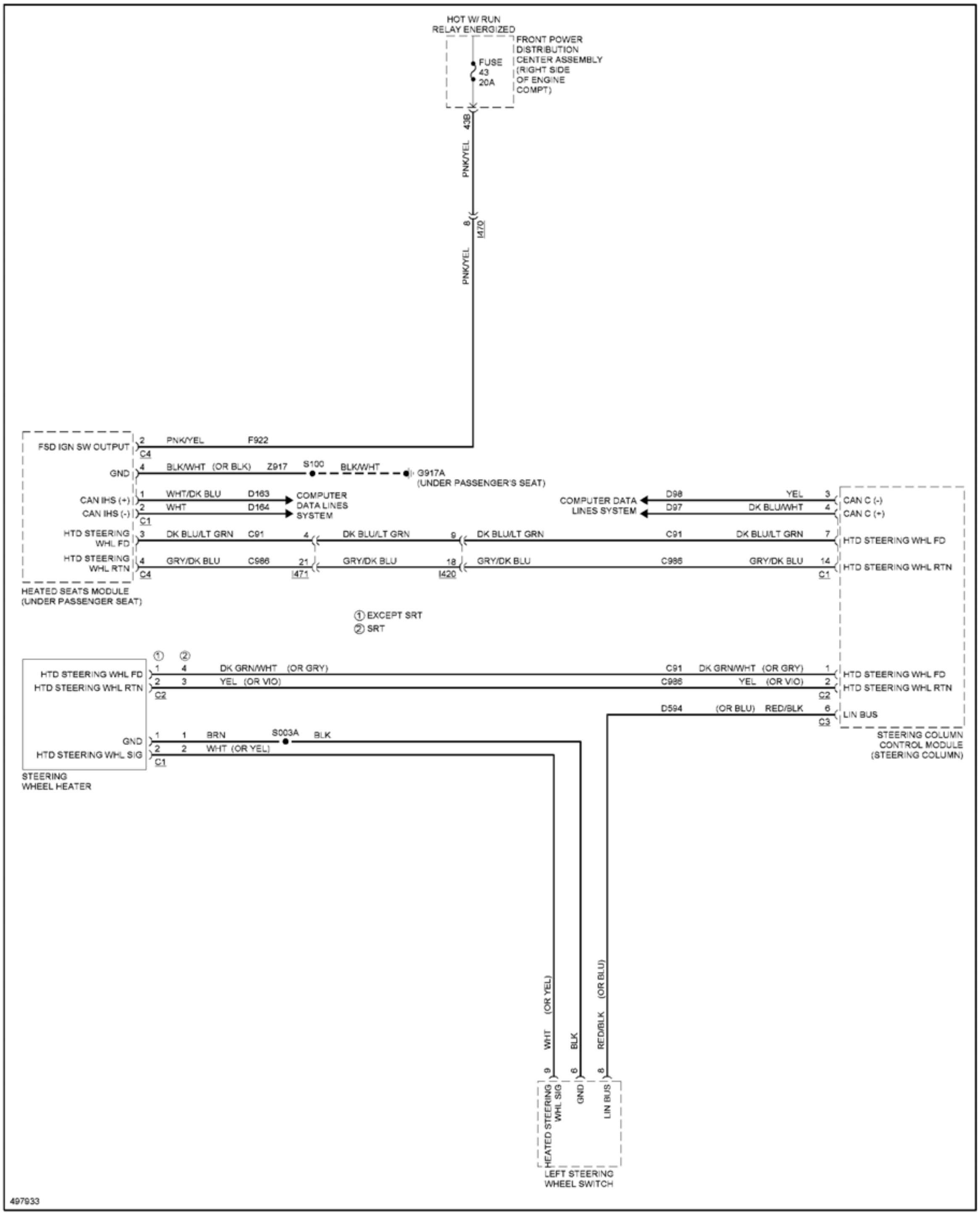


Fig. 89: Heated Seats Circuit, W/O Ventilation



[Fig. 90: Heated Steering Wheel Circuit]()

POWER TOP/SUNROOF

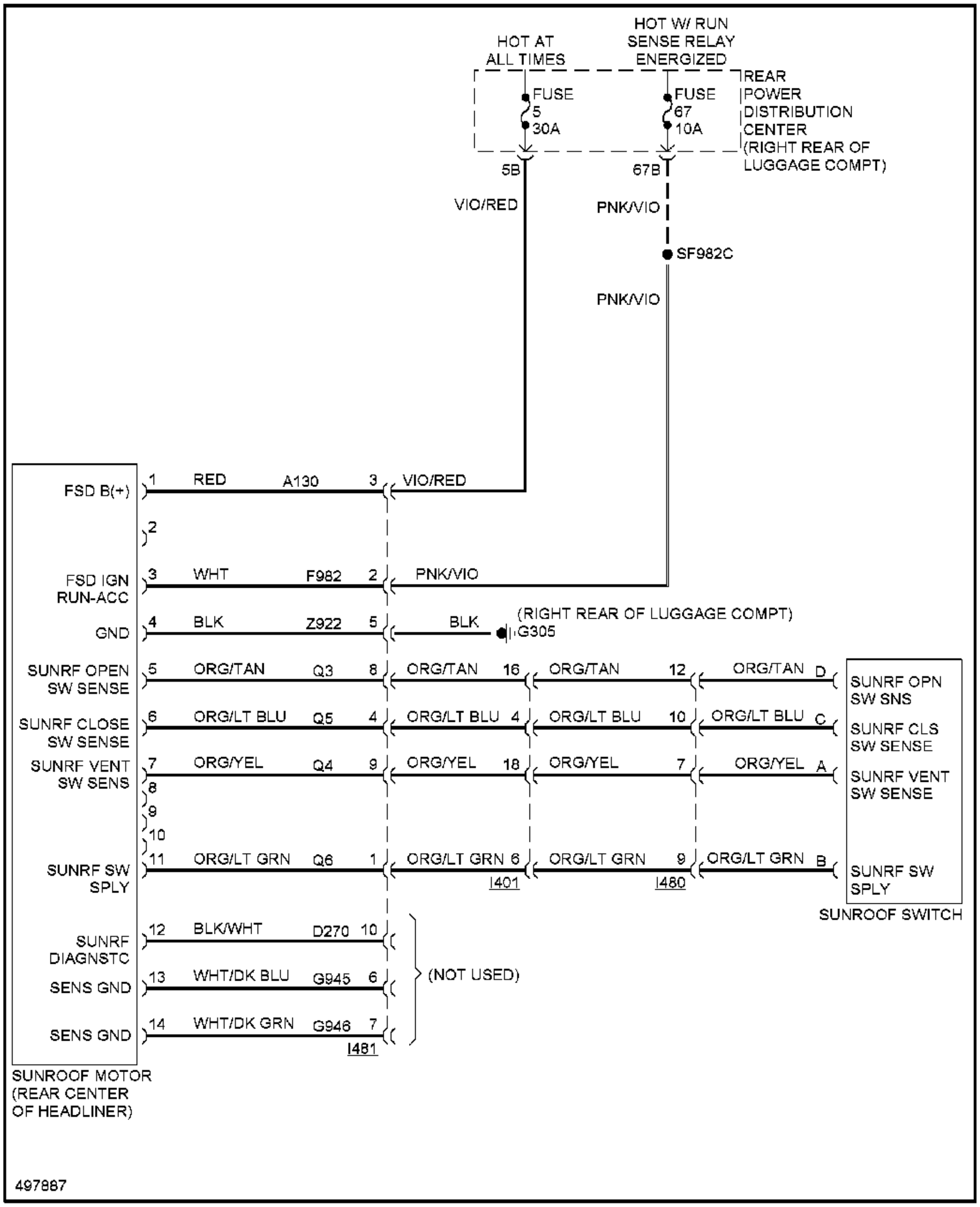
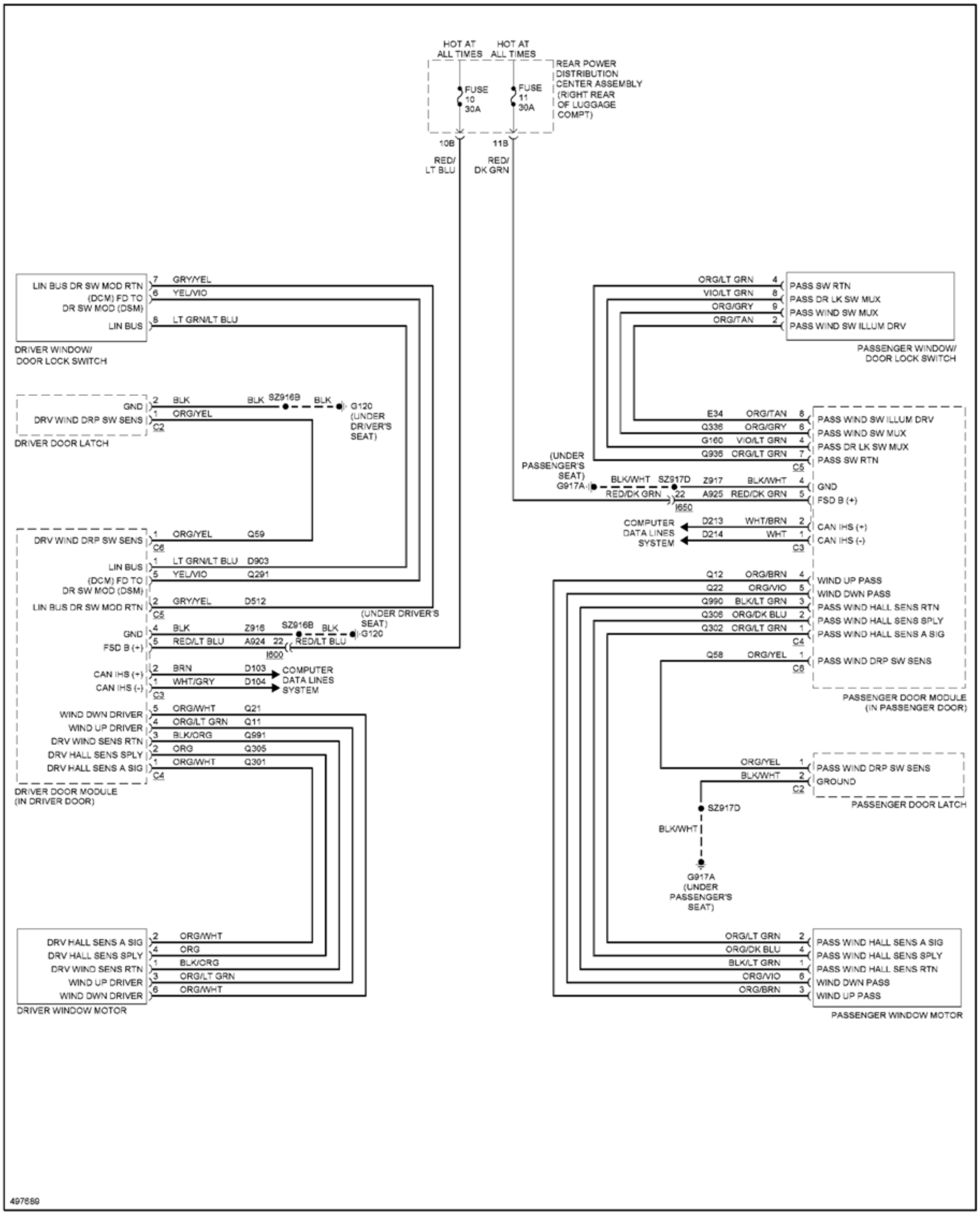


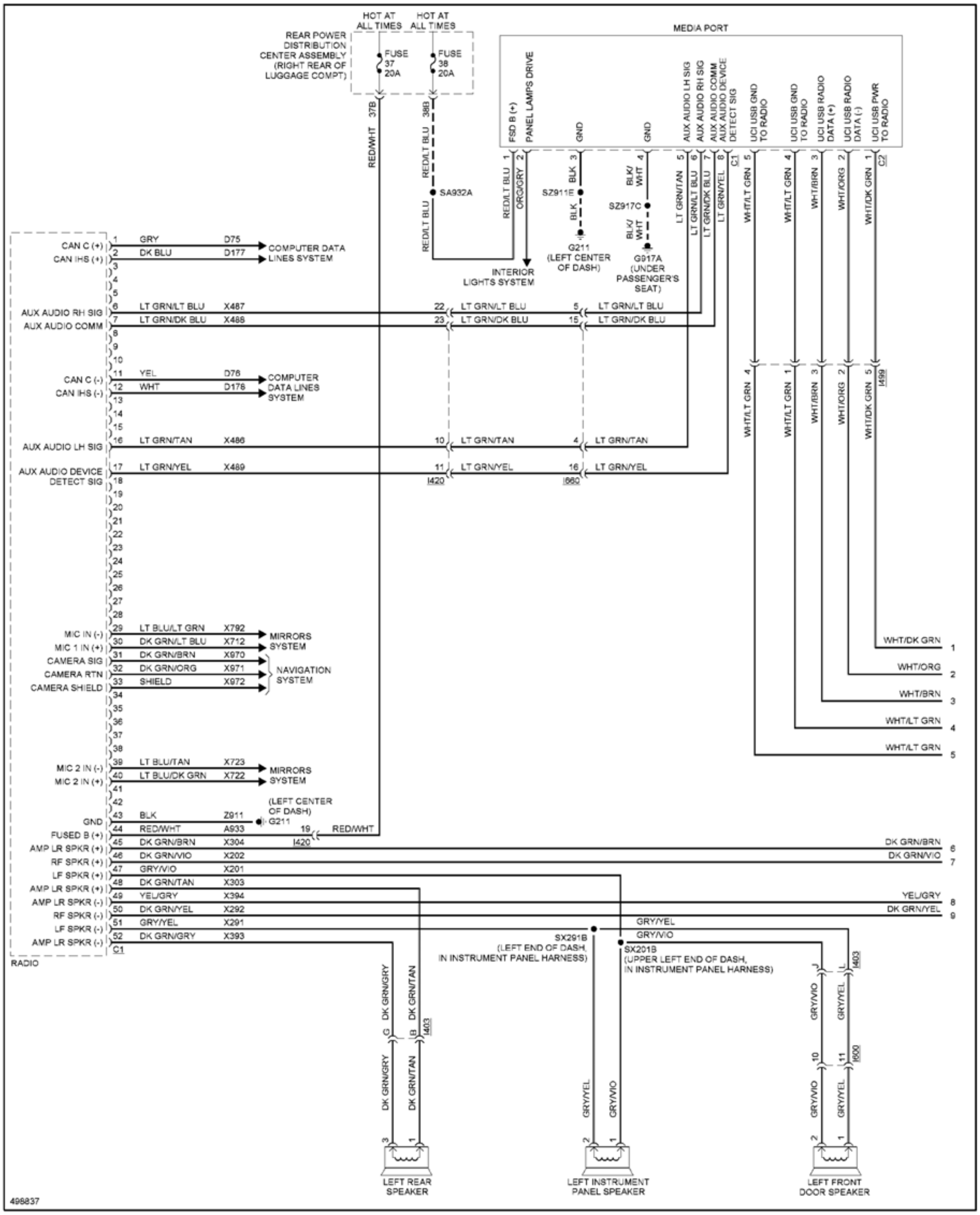
Fig. 91: Power Top/Sunroof Circuit

POWER WINDOWS

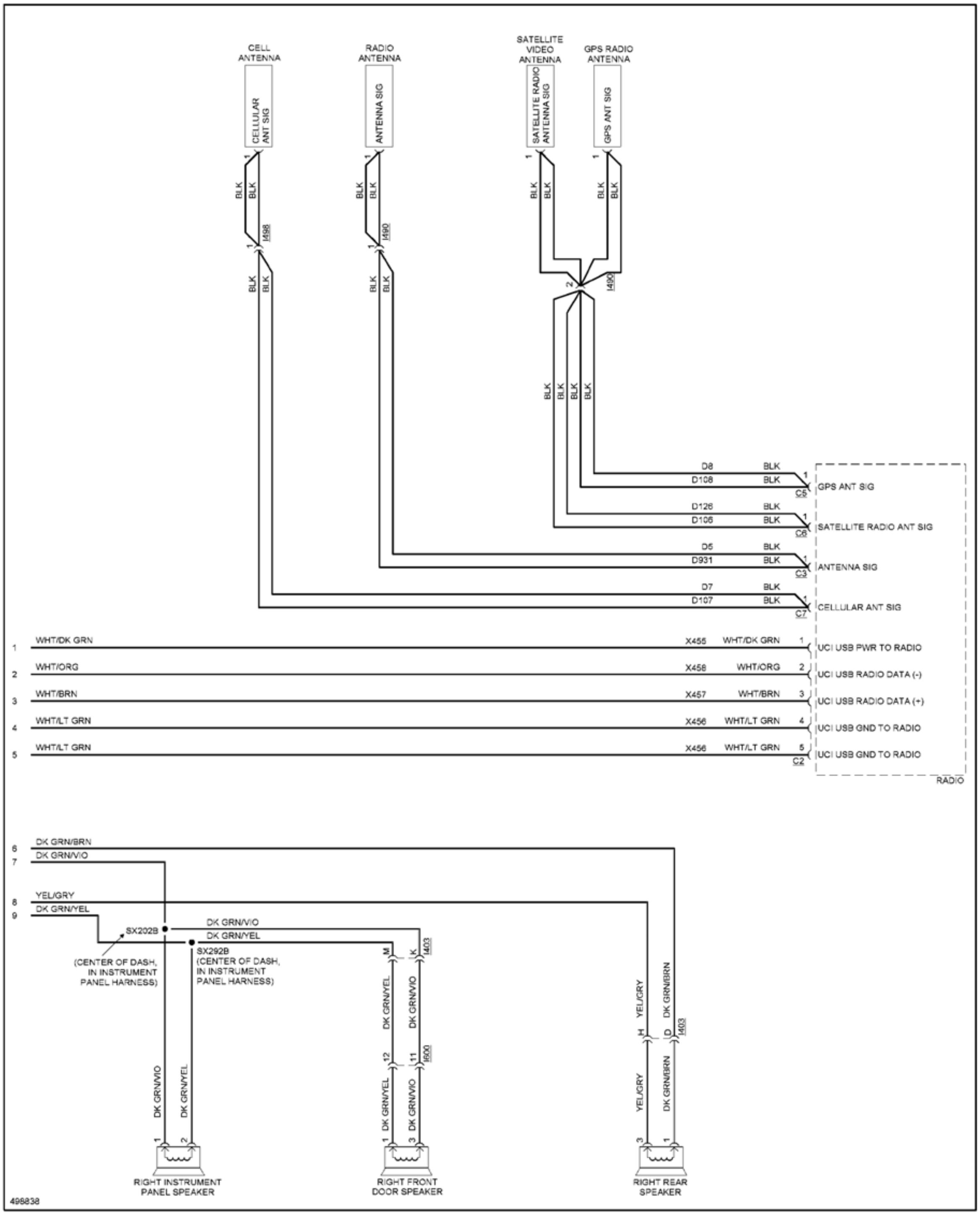


[Fig. 92: Power Windows Circuit](#)

RADIO



[**Fig. 93: Radio Circuit, Base (1 of 2)**]



[**Fig. 94: Radio Circuit, Base (2 of 2)**]

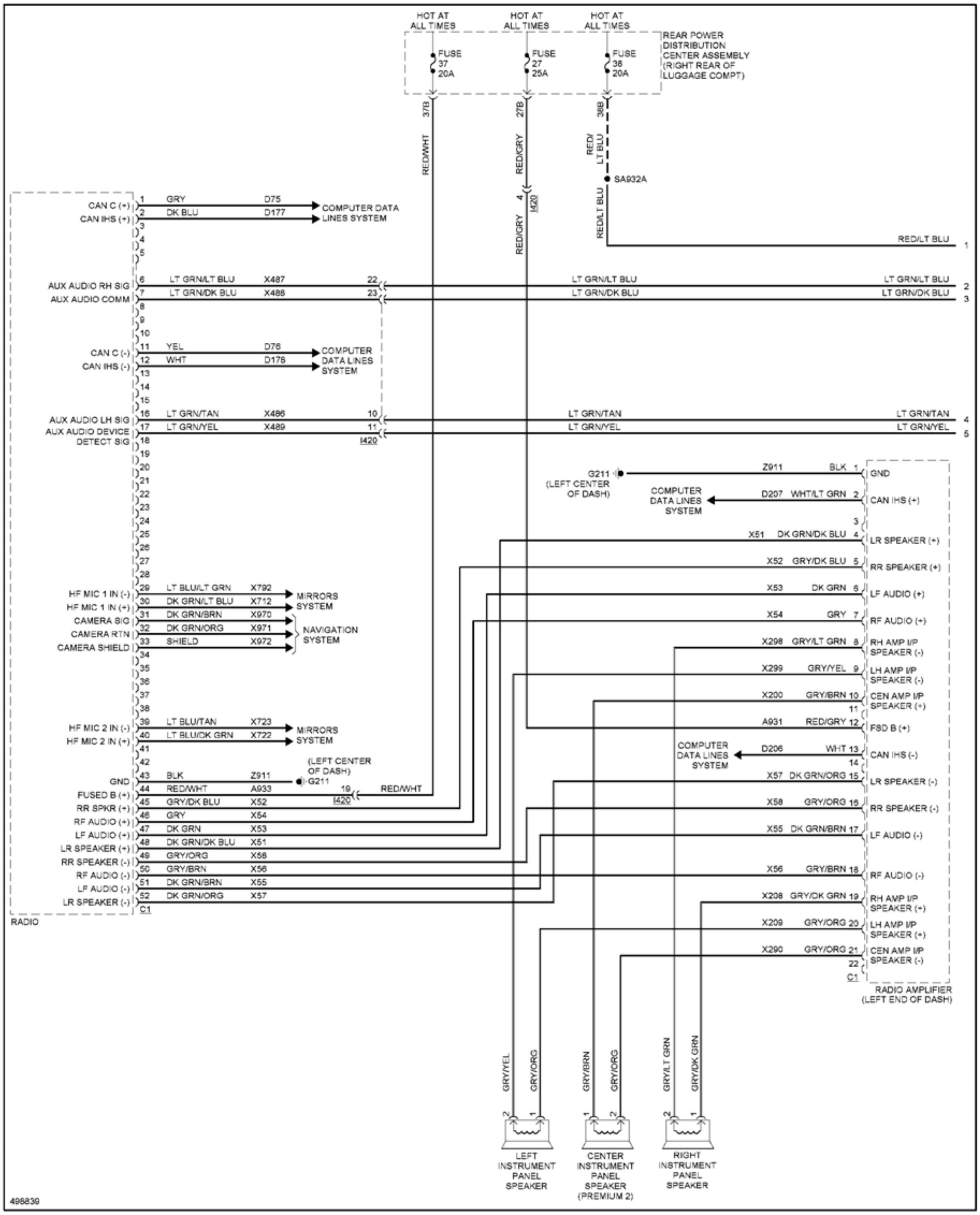


Fig. 95: Radio Circuit, Premium 1 (1 of 3)

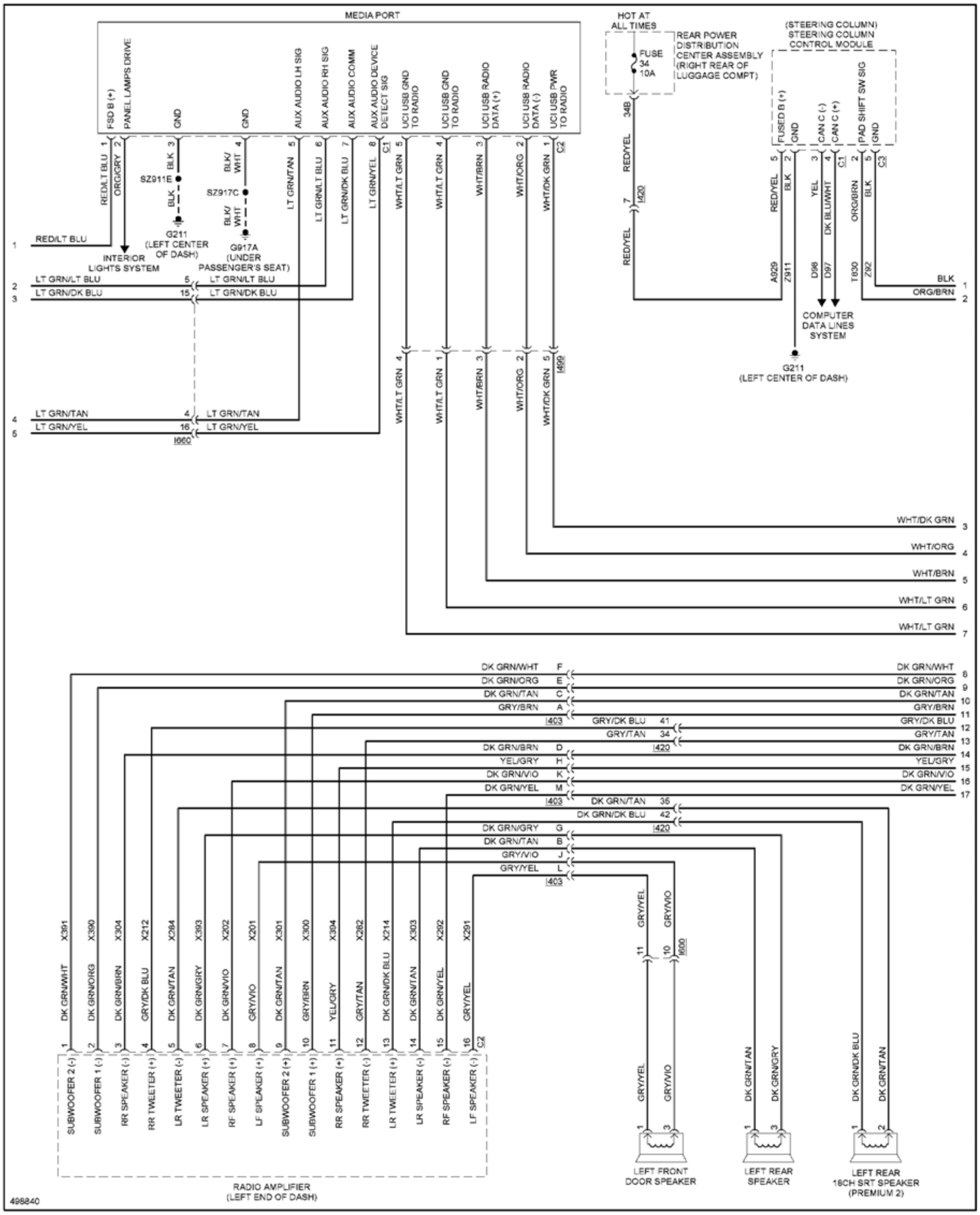


Fig. 96: Radio Circuit, Premium 1 (2 of 3)

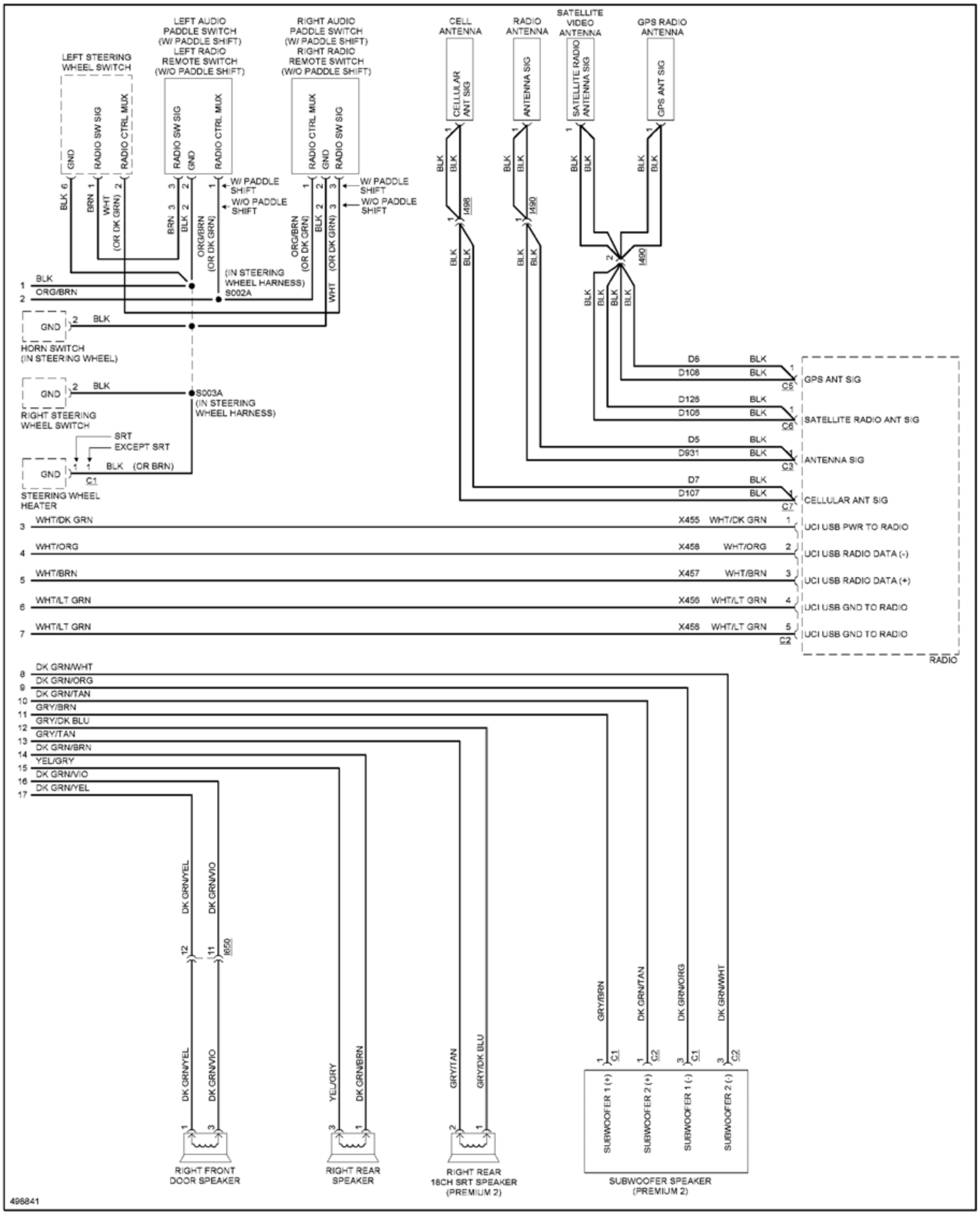


Fig. 97: Radio Circuit, Premium 1 (3 of 3)

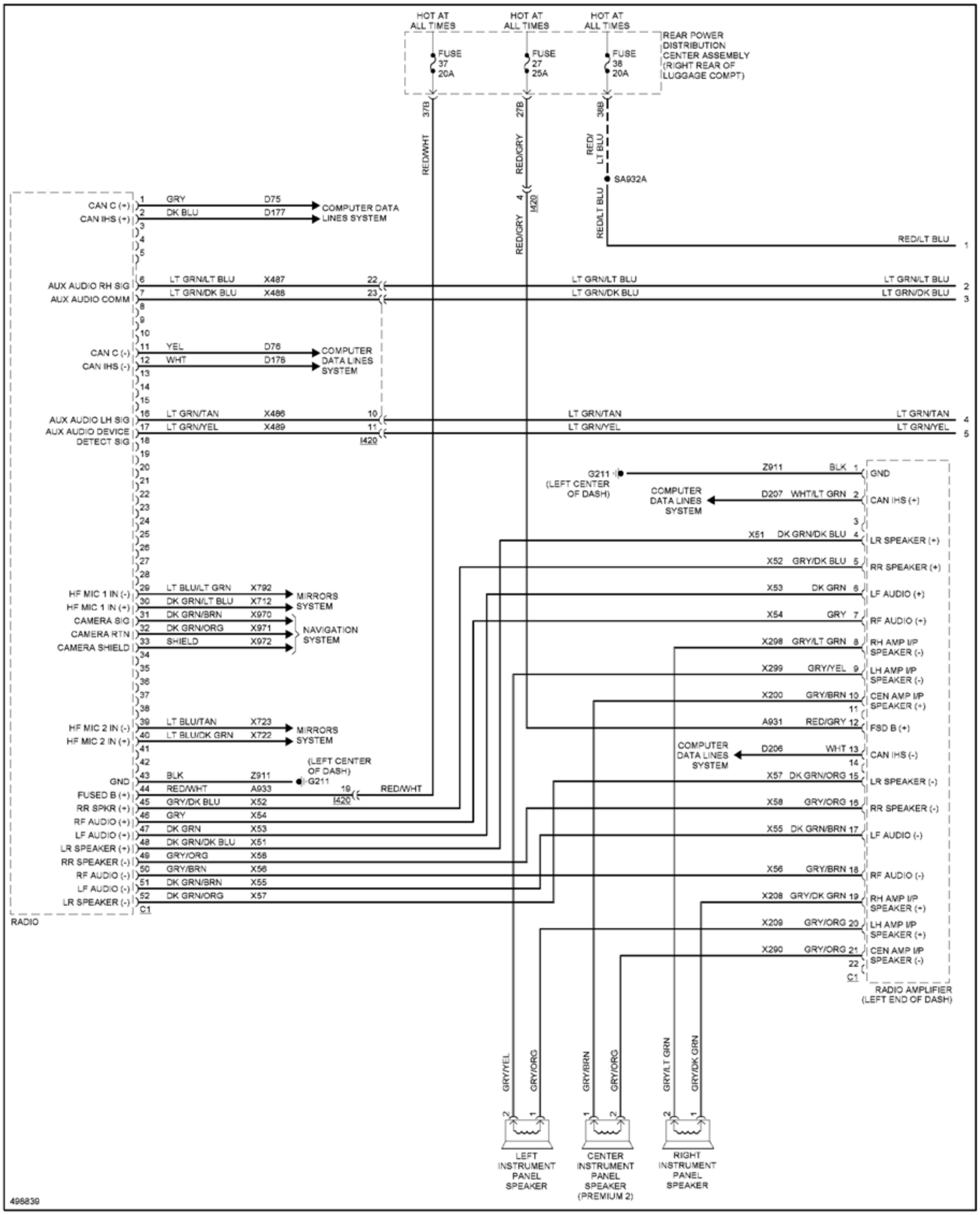
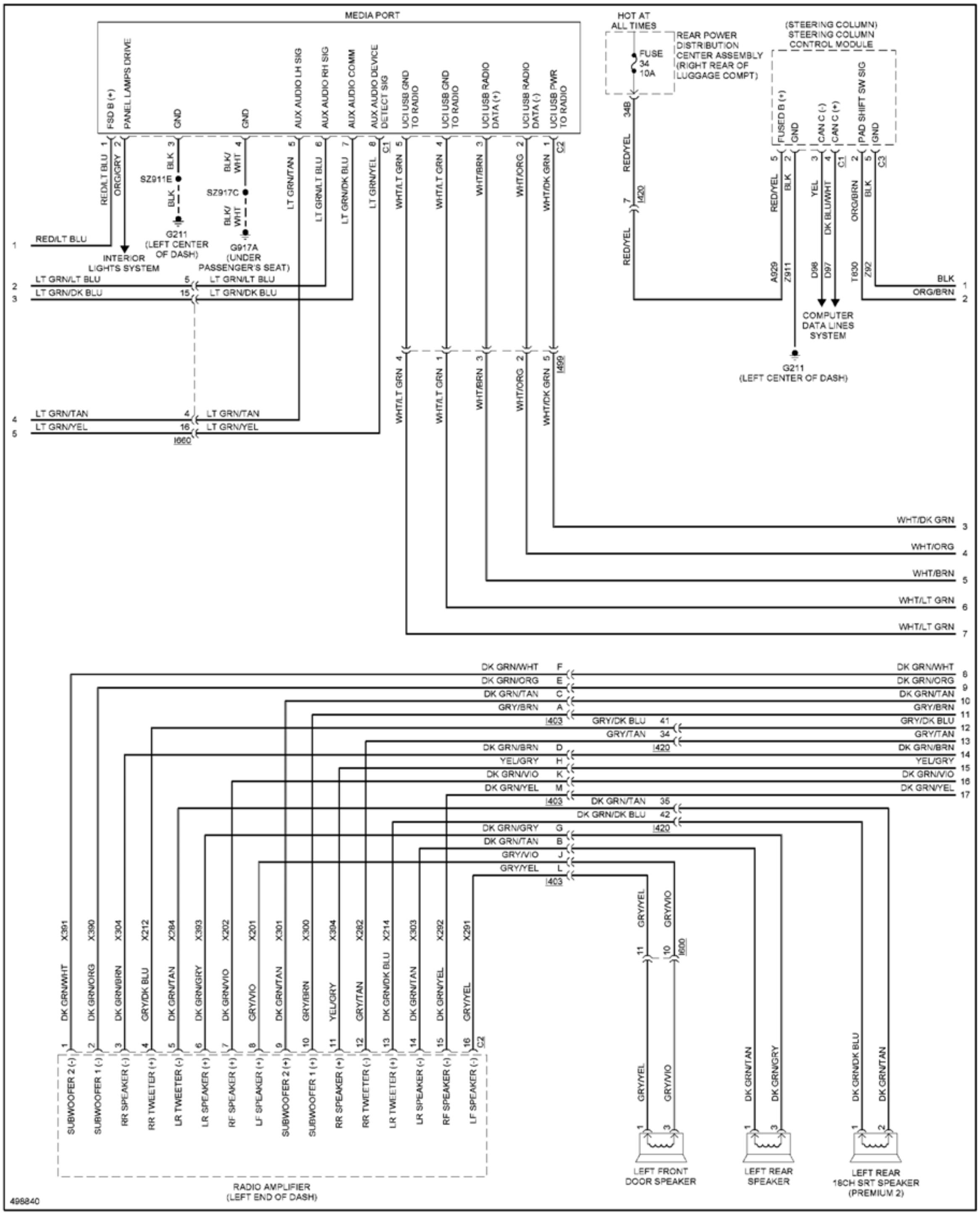
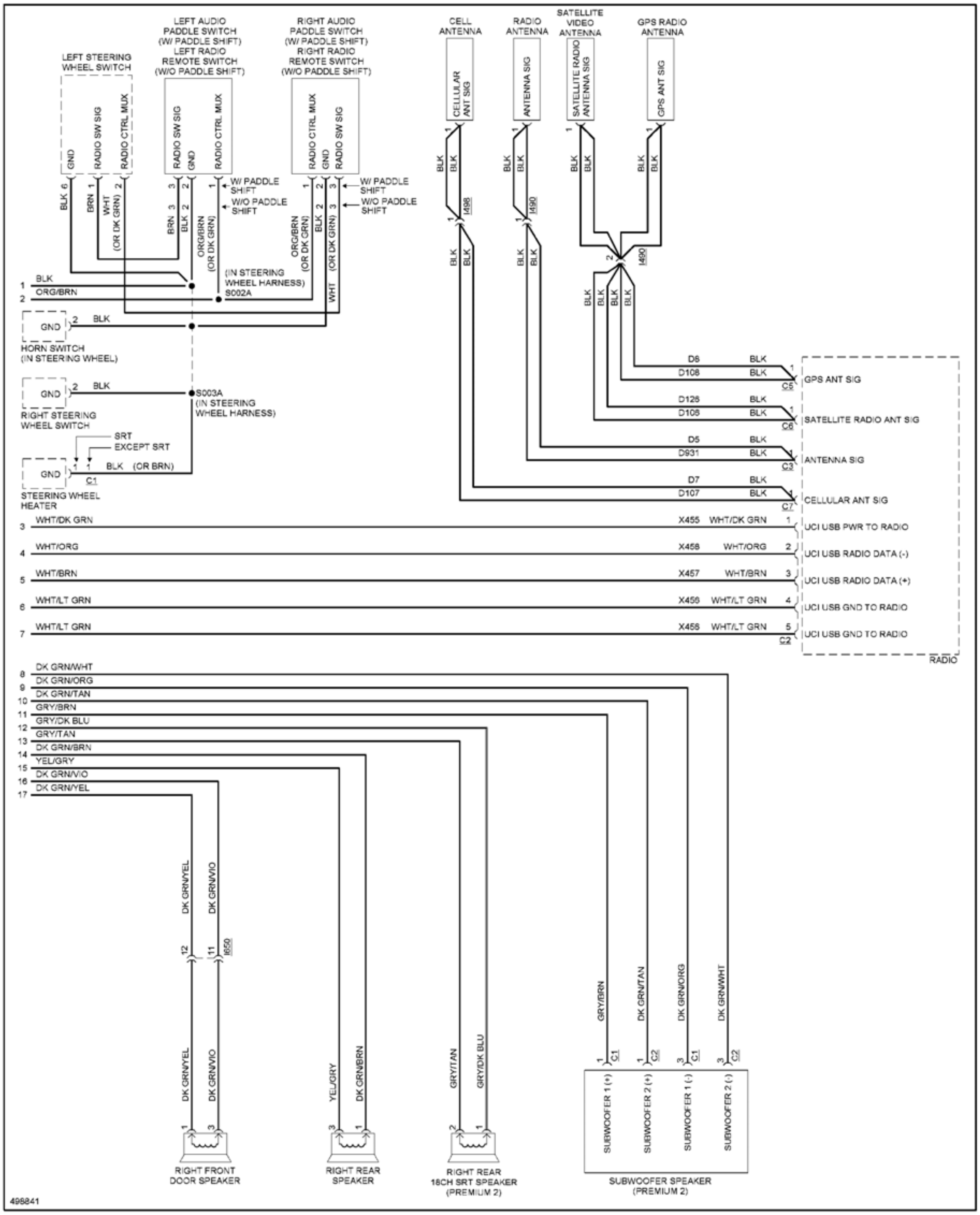


Fig. 98: Radio Circuit, Premium 2 (1 of 3)



[Fig. 99: Radio Circuit, Premium 2 (2 of 3)]()



[Fig. 100: Radio Circuit, Premium 2 (3 of 3)]()

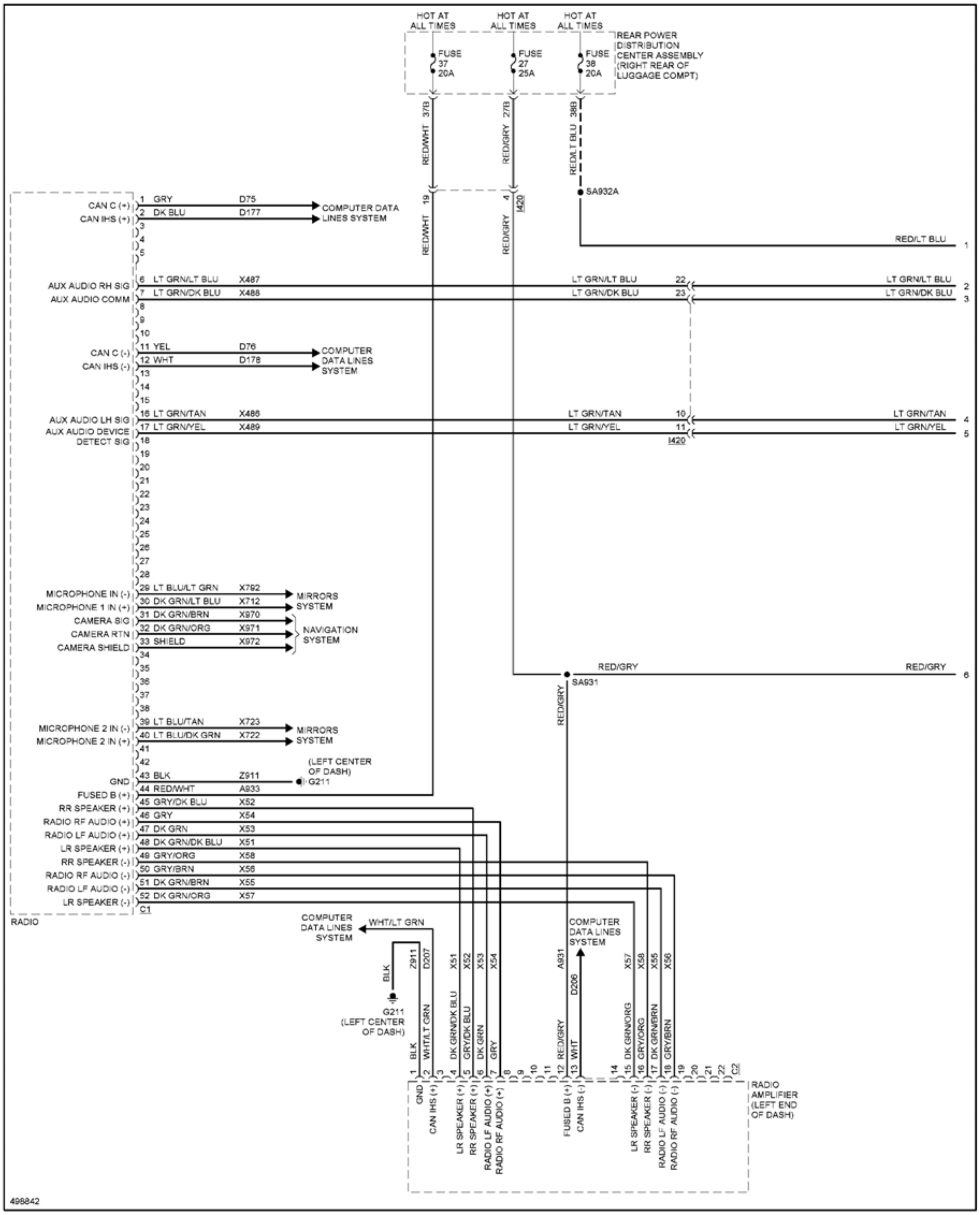


Fig. 101: Radio Circuit, Premium 3 (1 of 3)

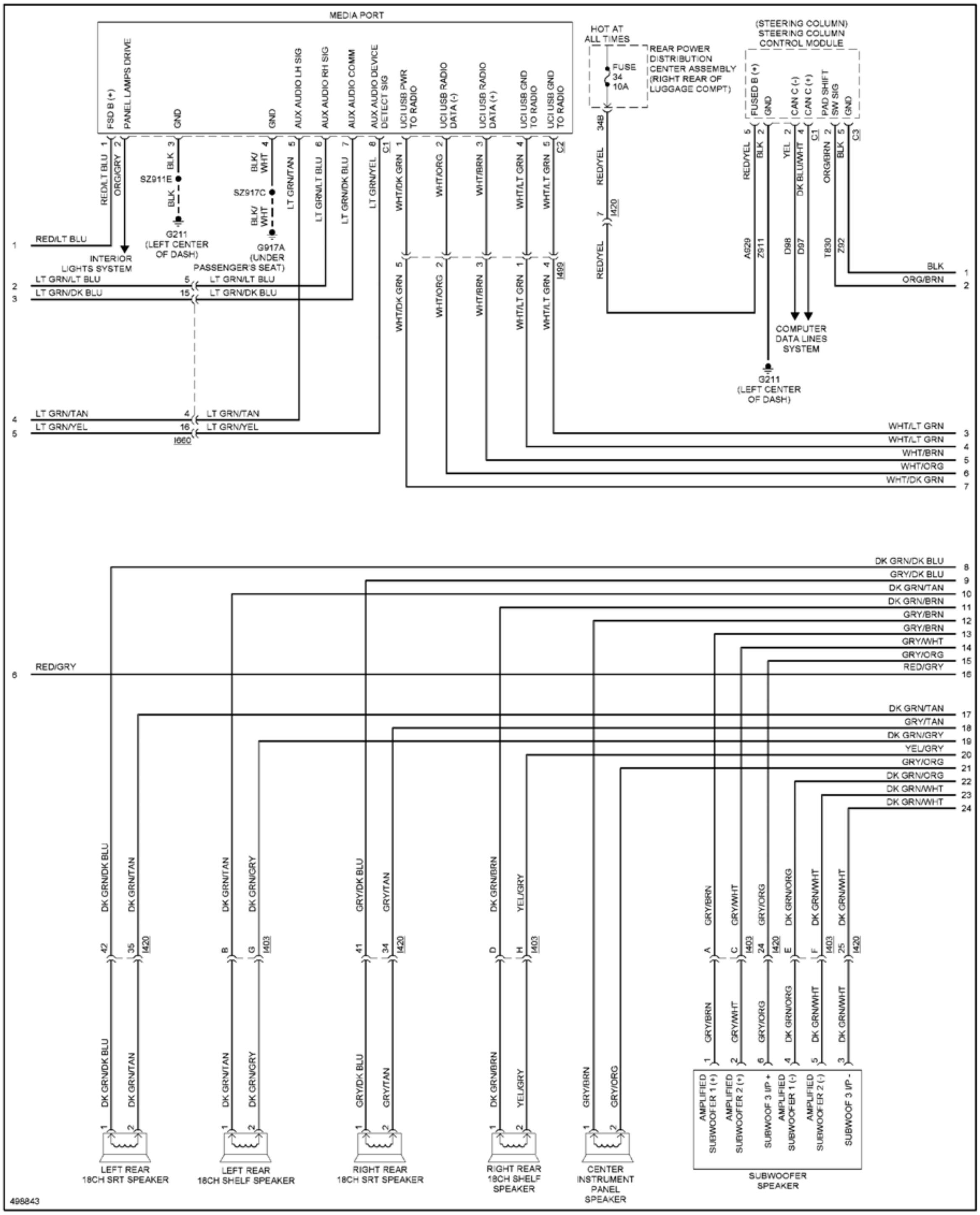


Fig. 102: Radio Circuit, Premium 3 (2 of 3)

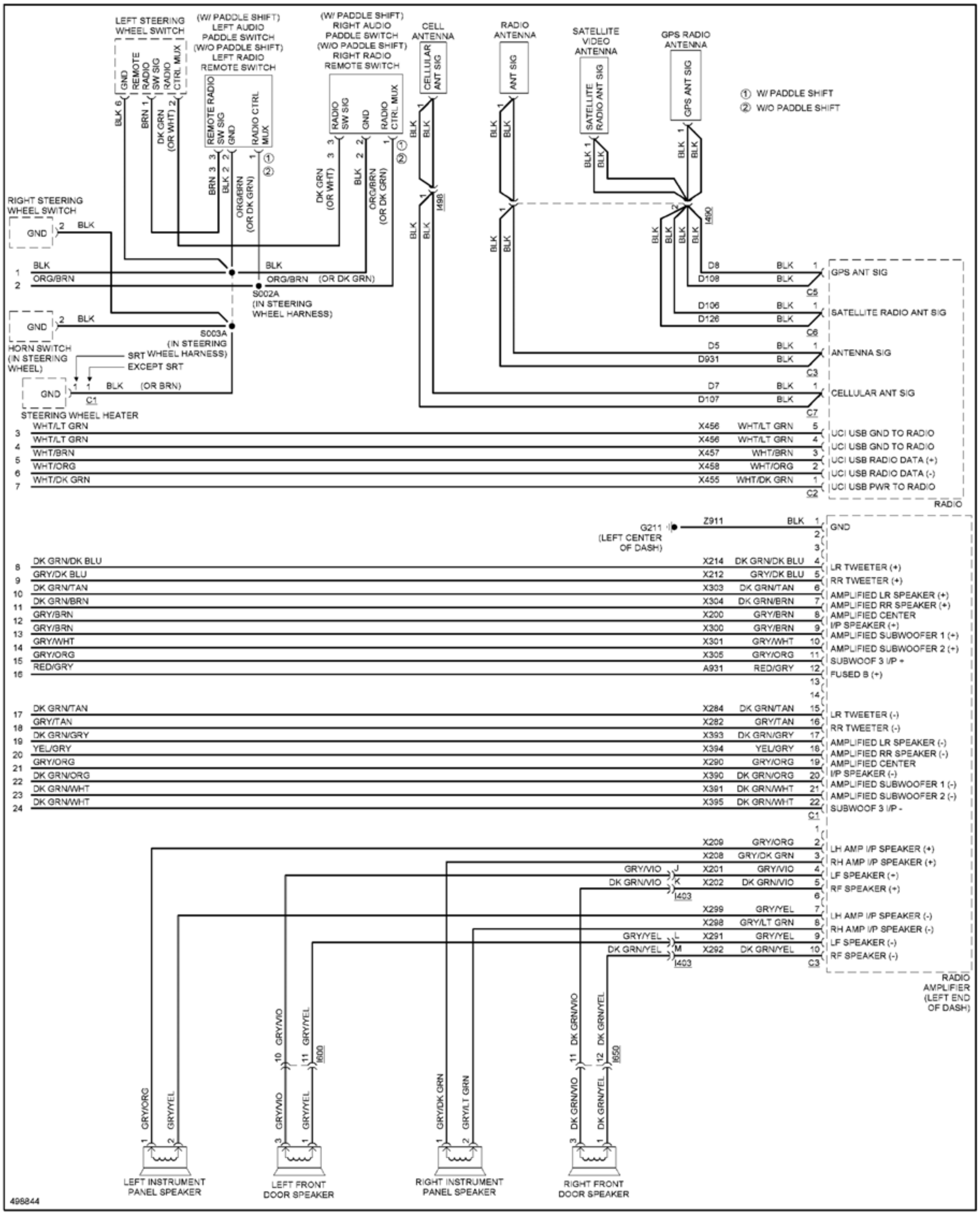


Fig. 103: Radio Circuit, Premium 3 (3 of 3)

SHIFT INTERLOCK

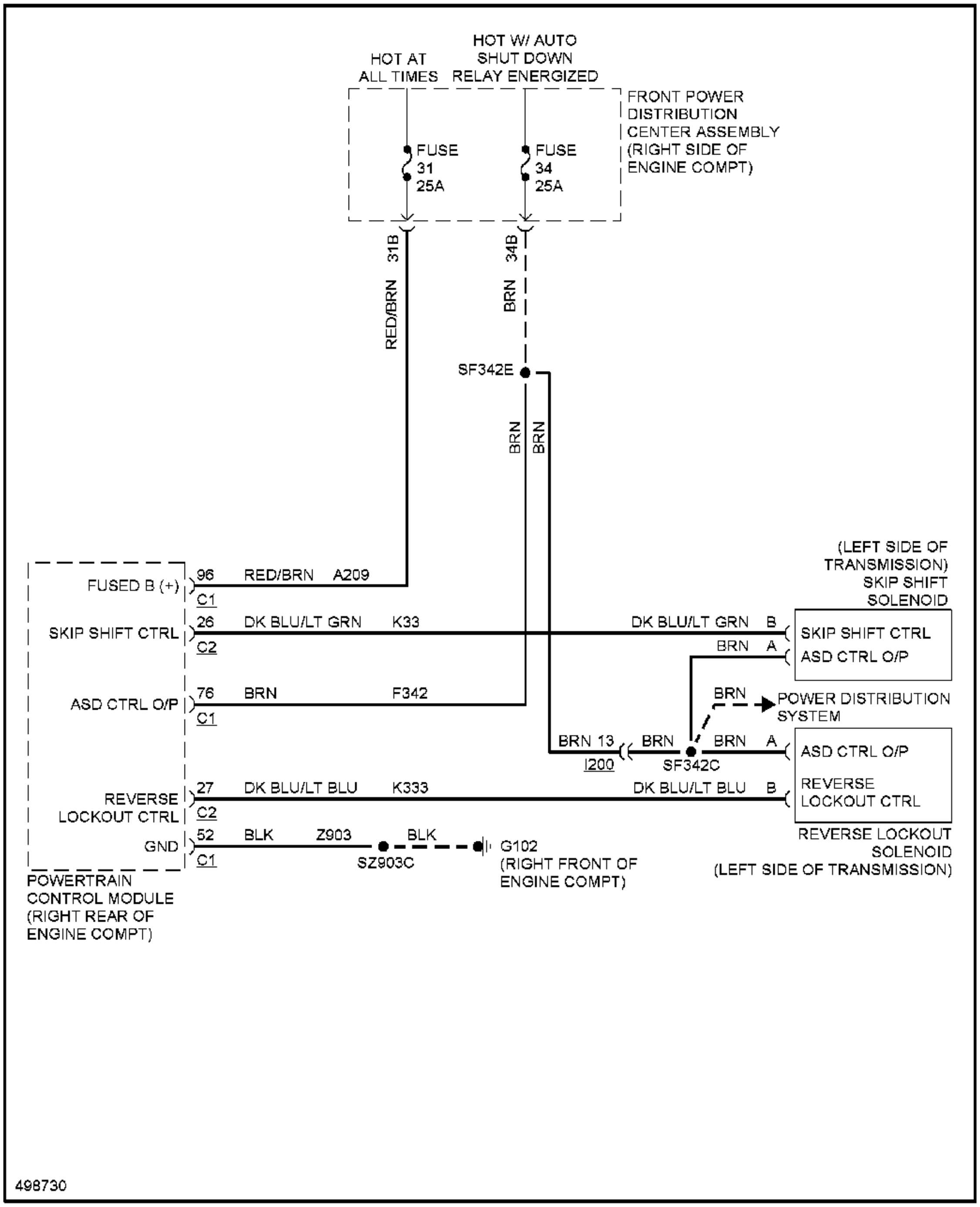


Fig. 104: Reverse Lockout Circuit

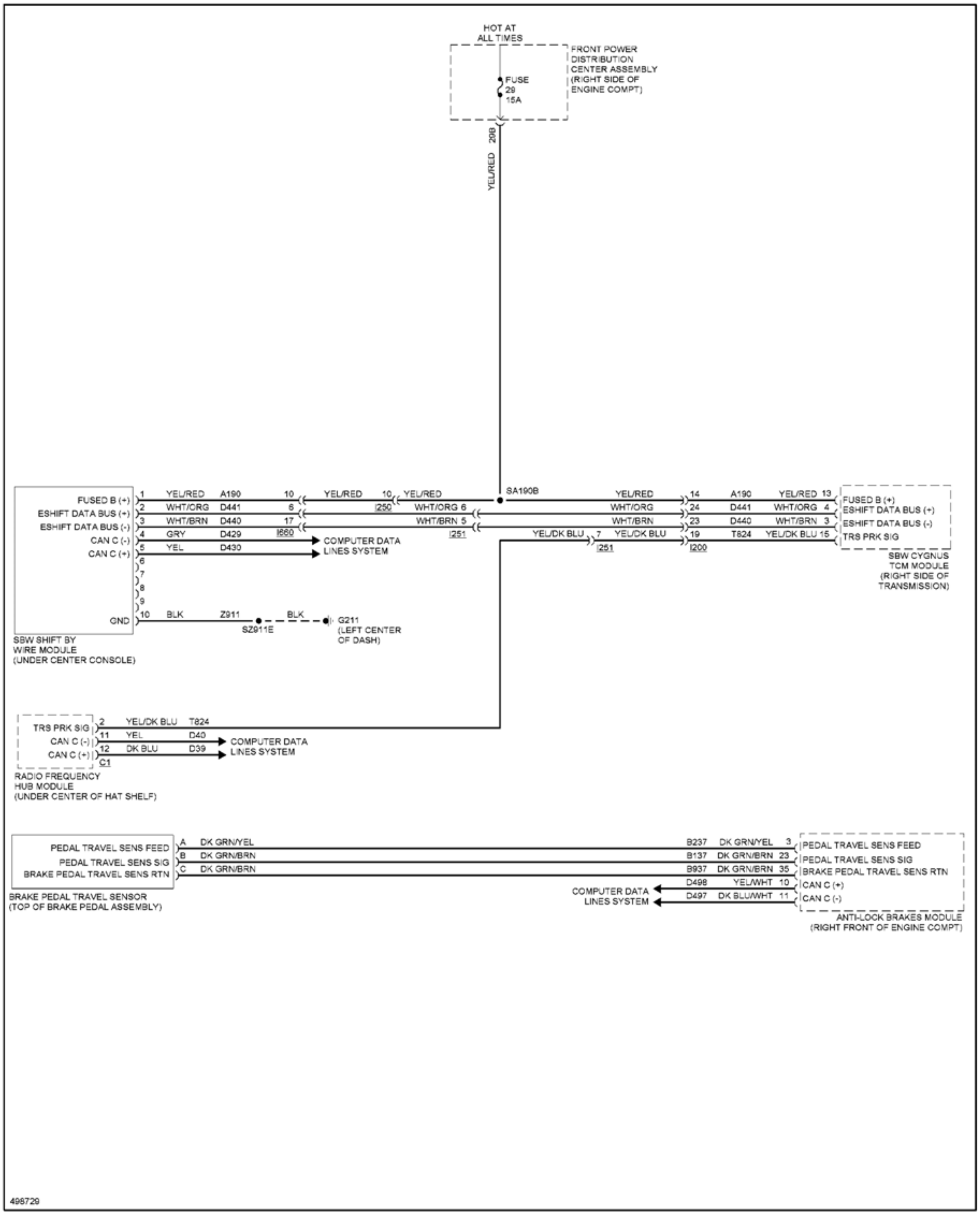


Fig. 105: Shift Interlock Circuit

STARTING/CHARGING

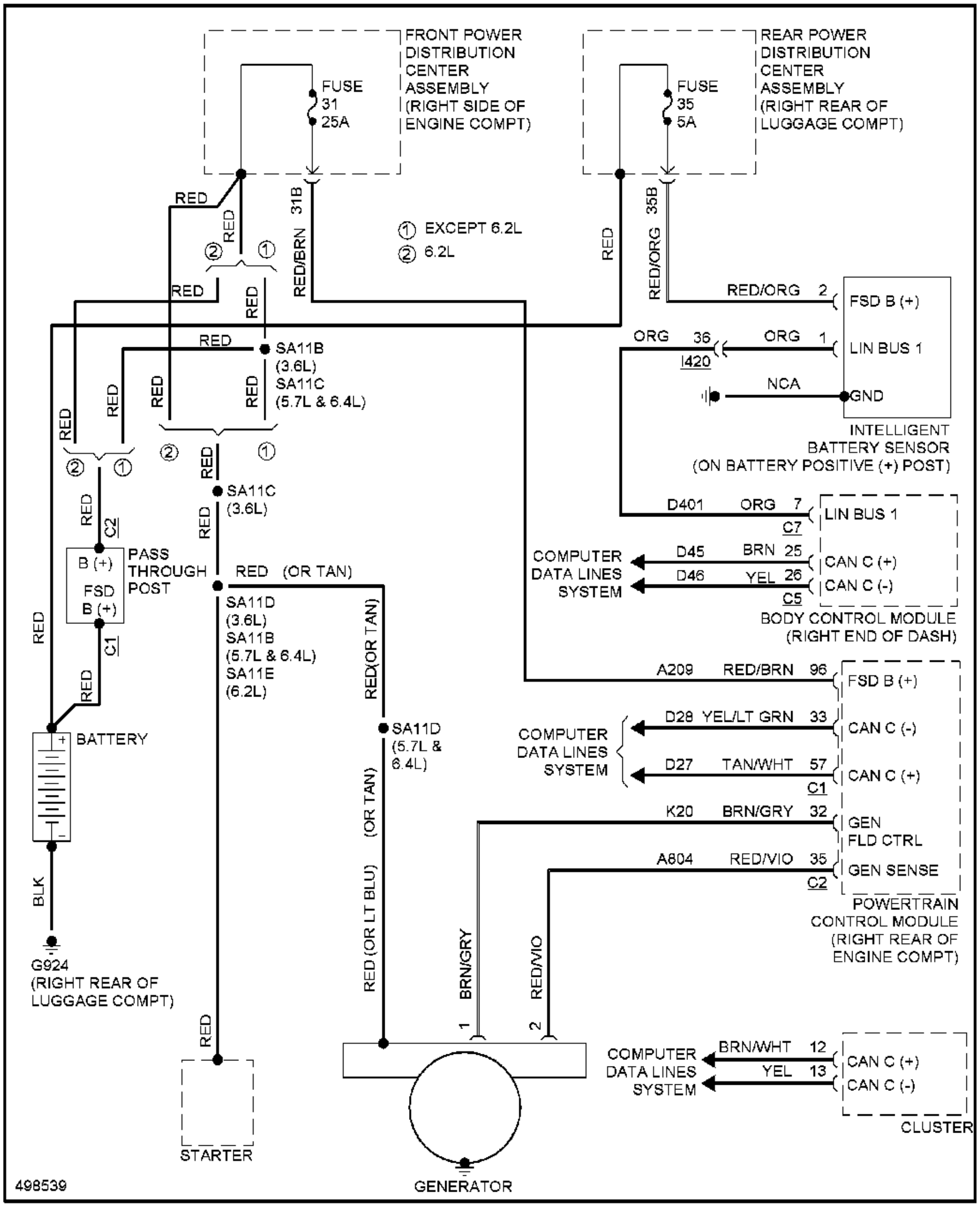


Fig. 106: Charging Circuit

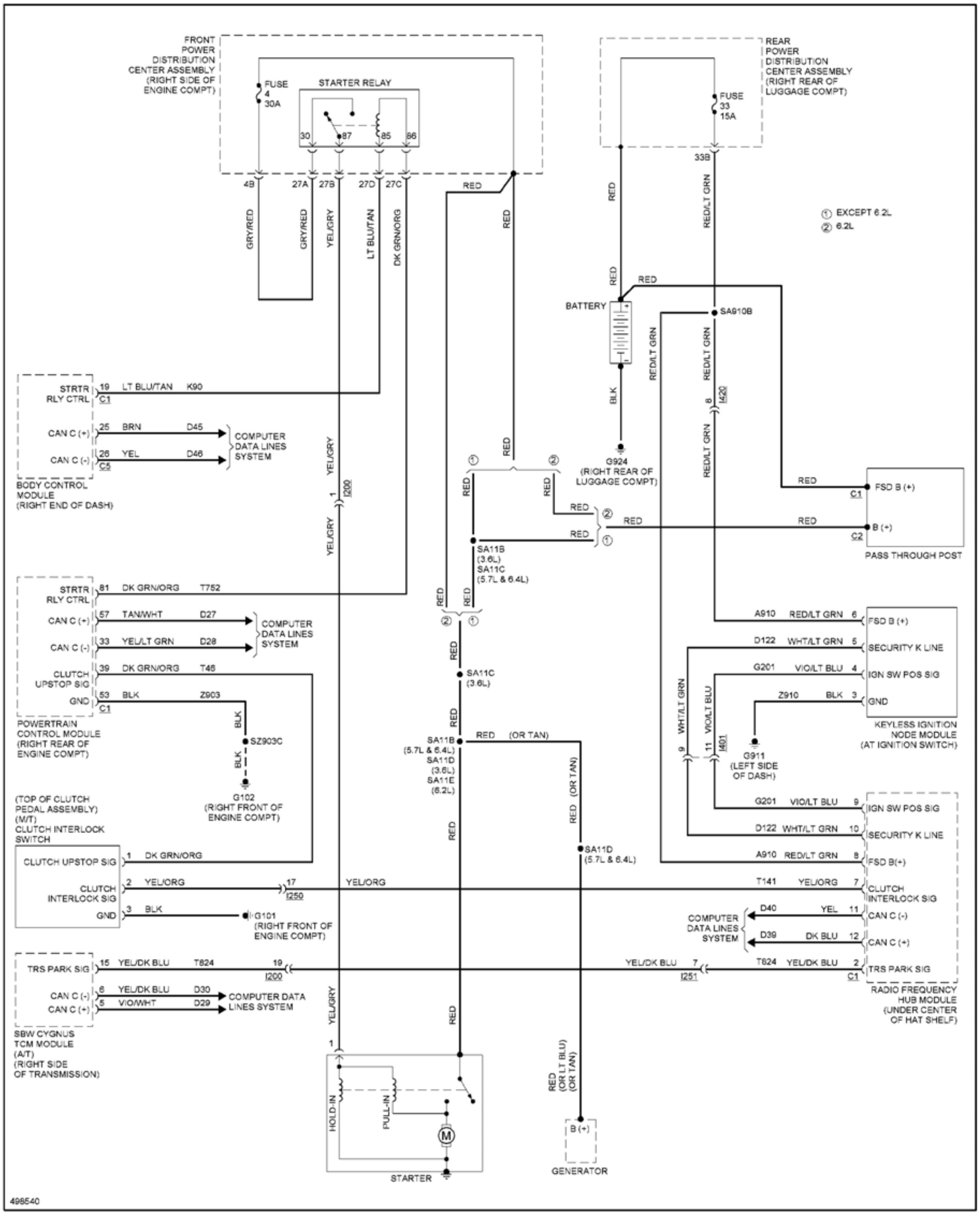


Fig. 107: Starting Circuit

SUPPLEMENTAL RESTRAINTS

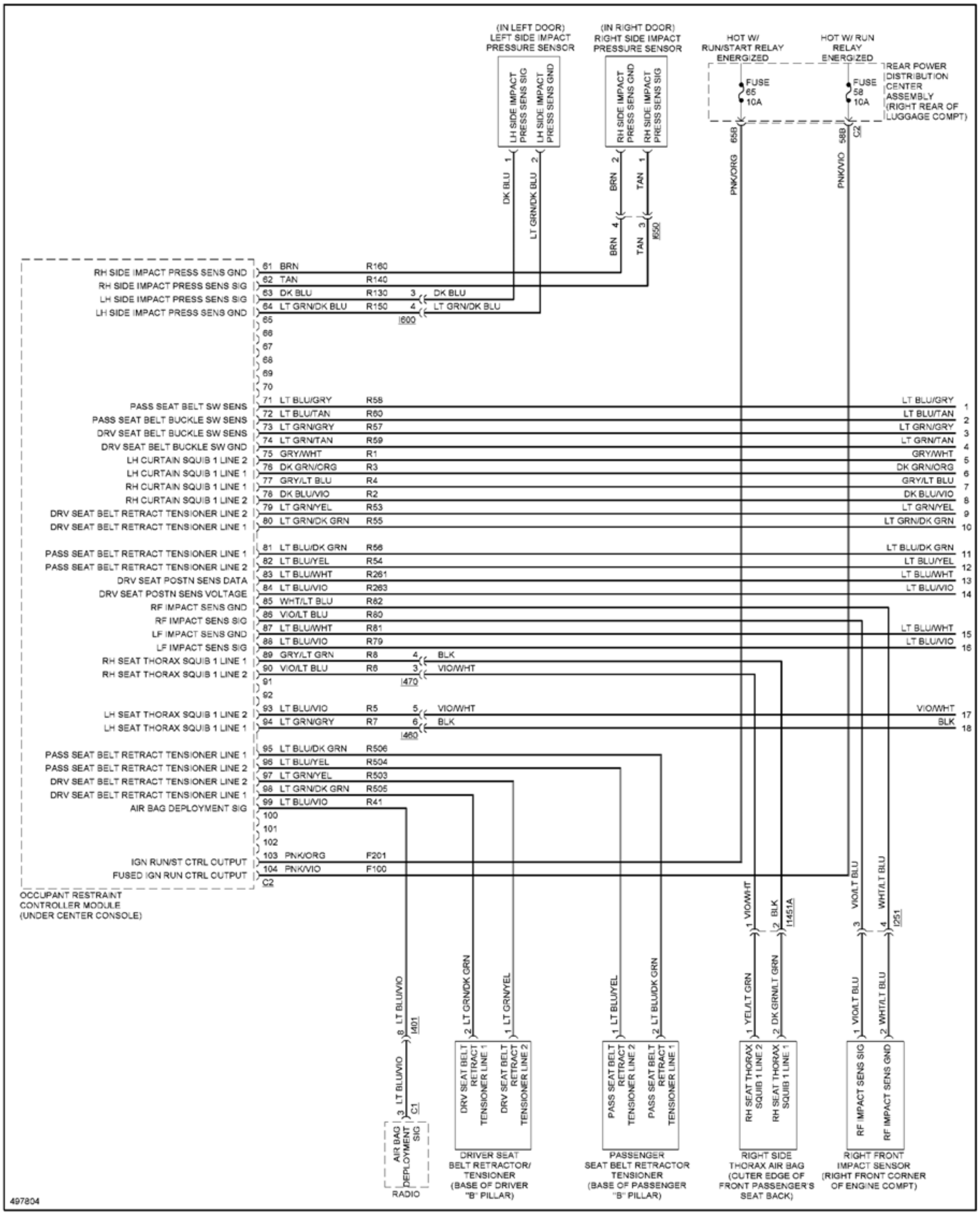


Fig. 108: Supplemental Restraints Circuit (1 of 3)

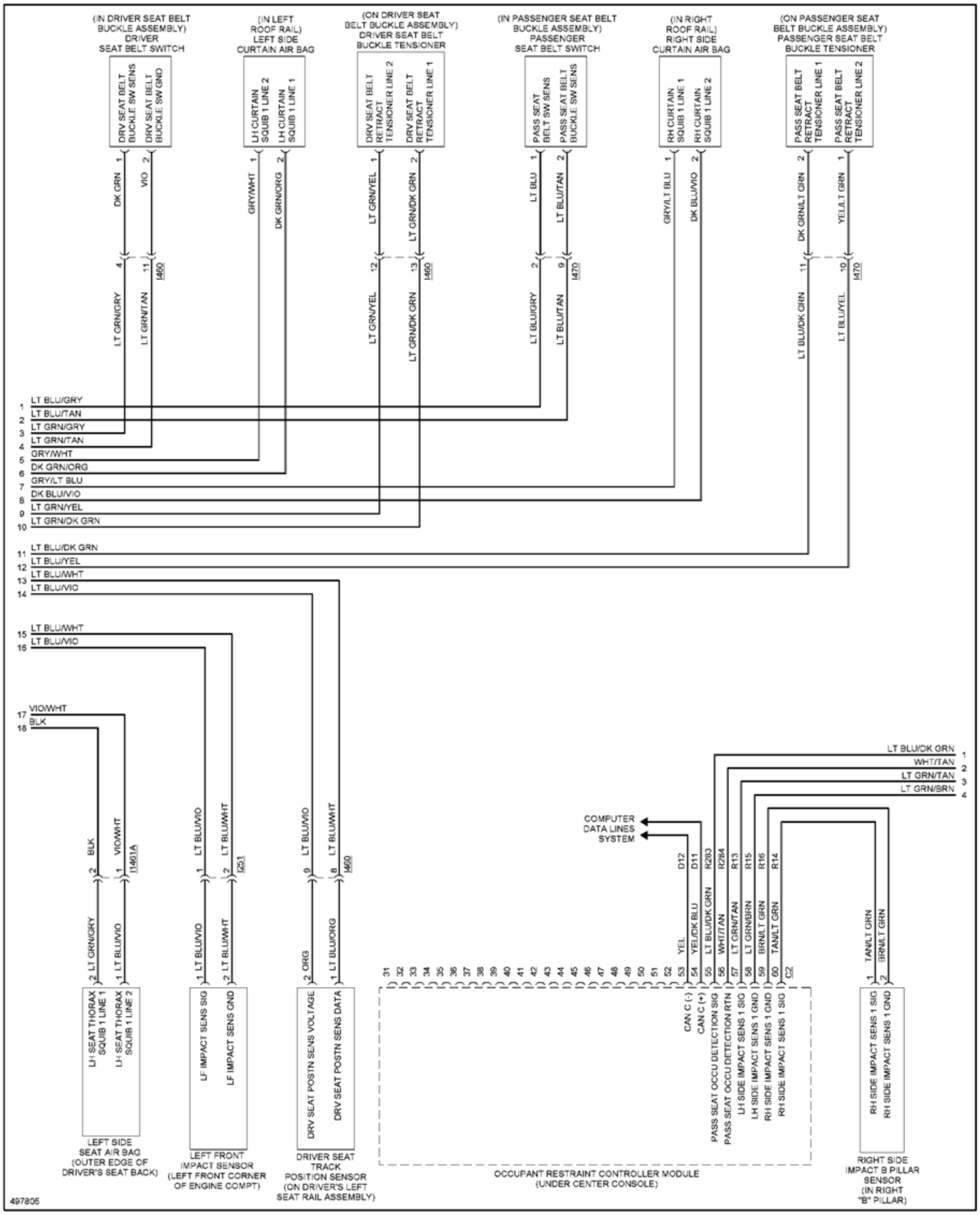


Fig. 109: Supplemental Restraints Circuit (2 of 3)

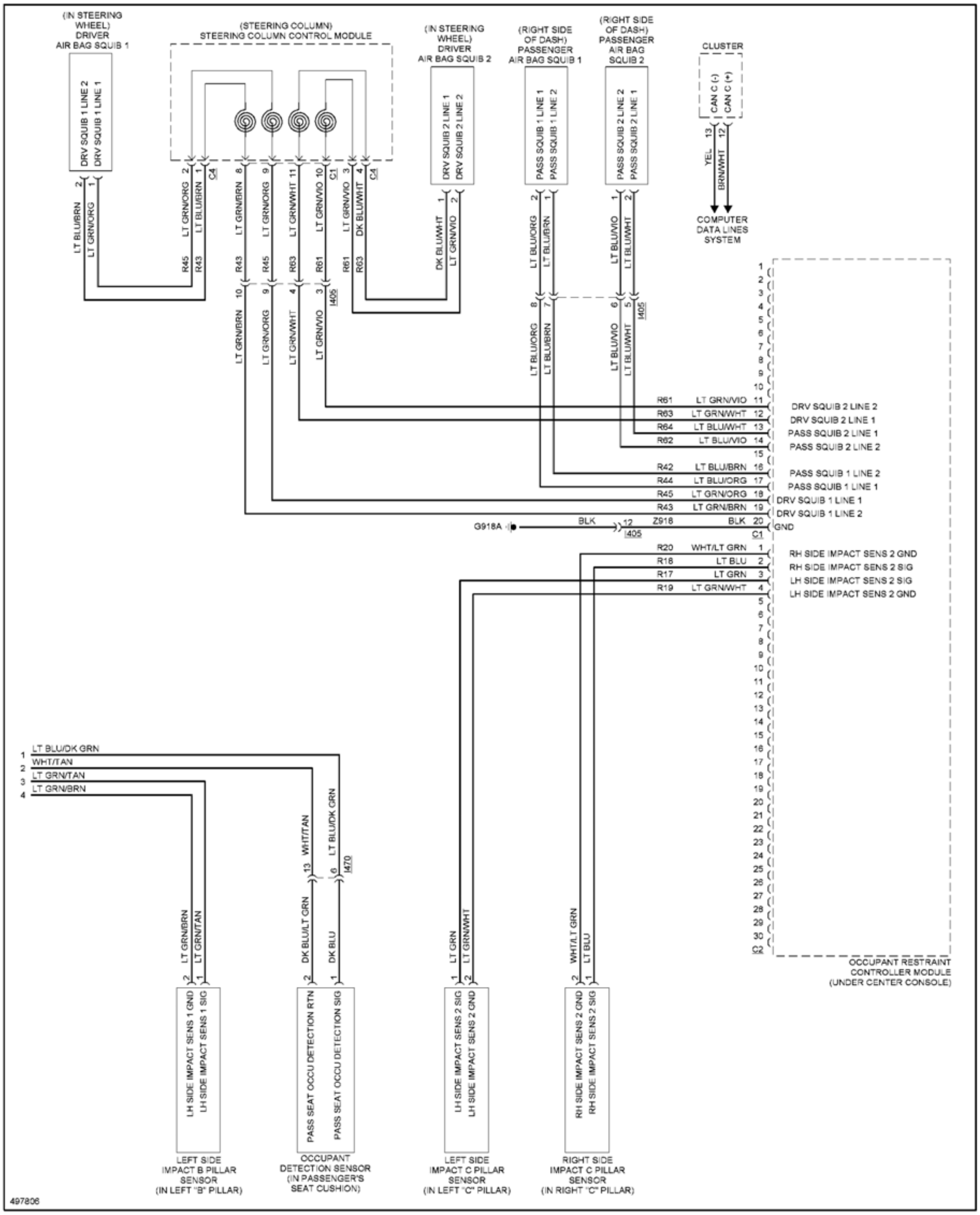
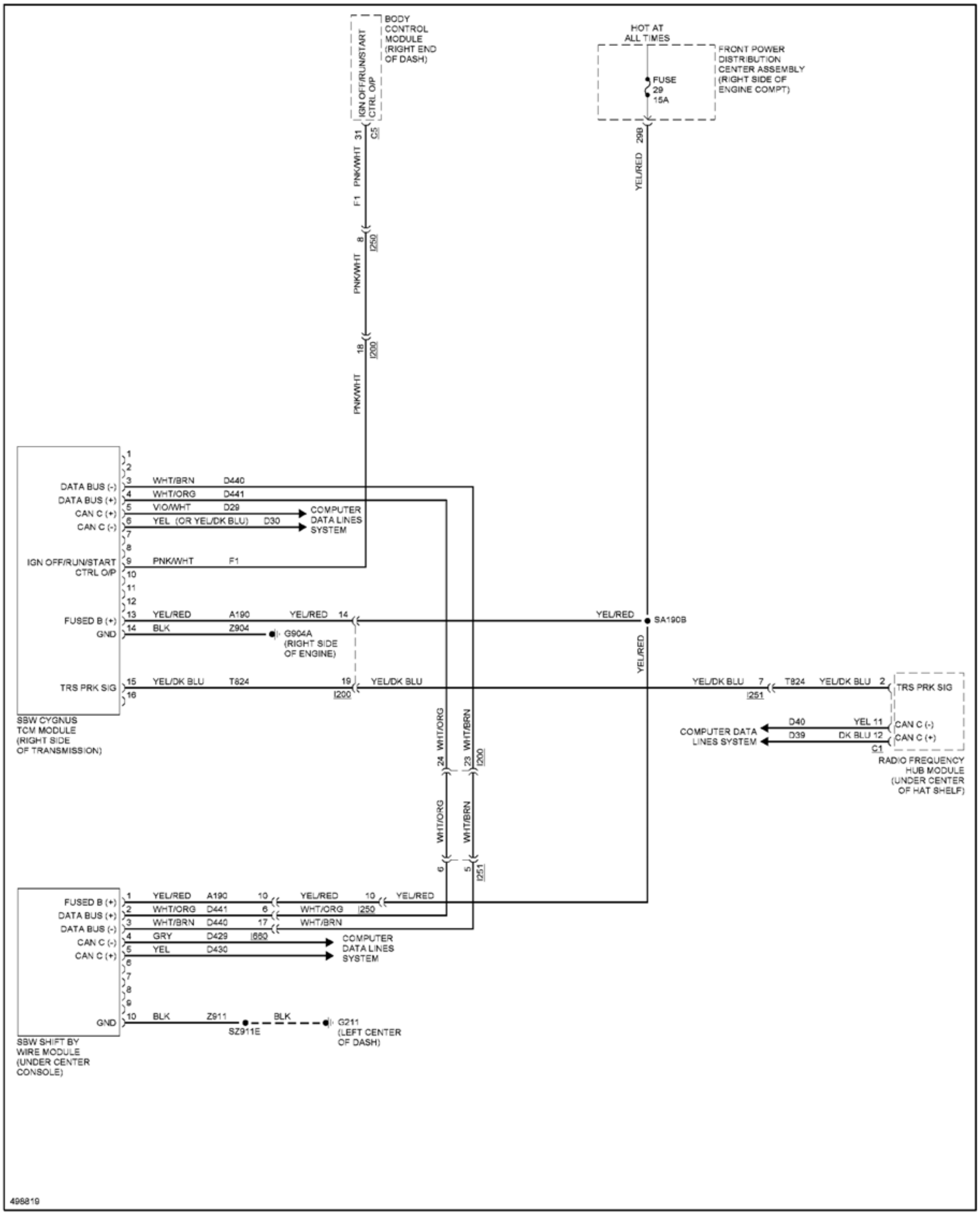


Fig. 110: Supplemental Restraints Circuit (3 of 3)

TRANSMISSION



[Fig. 111: Transmission Circuit](#)

TRUNK, TAILGATE, FUEL DOOR

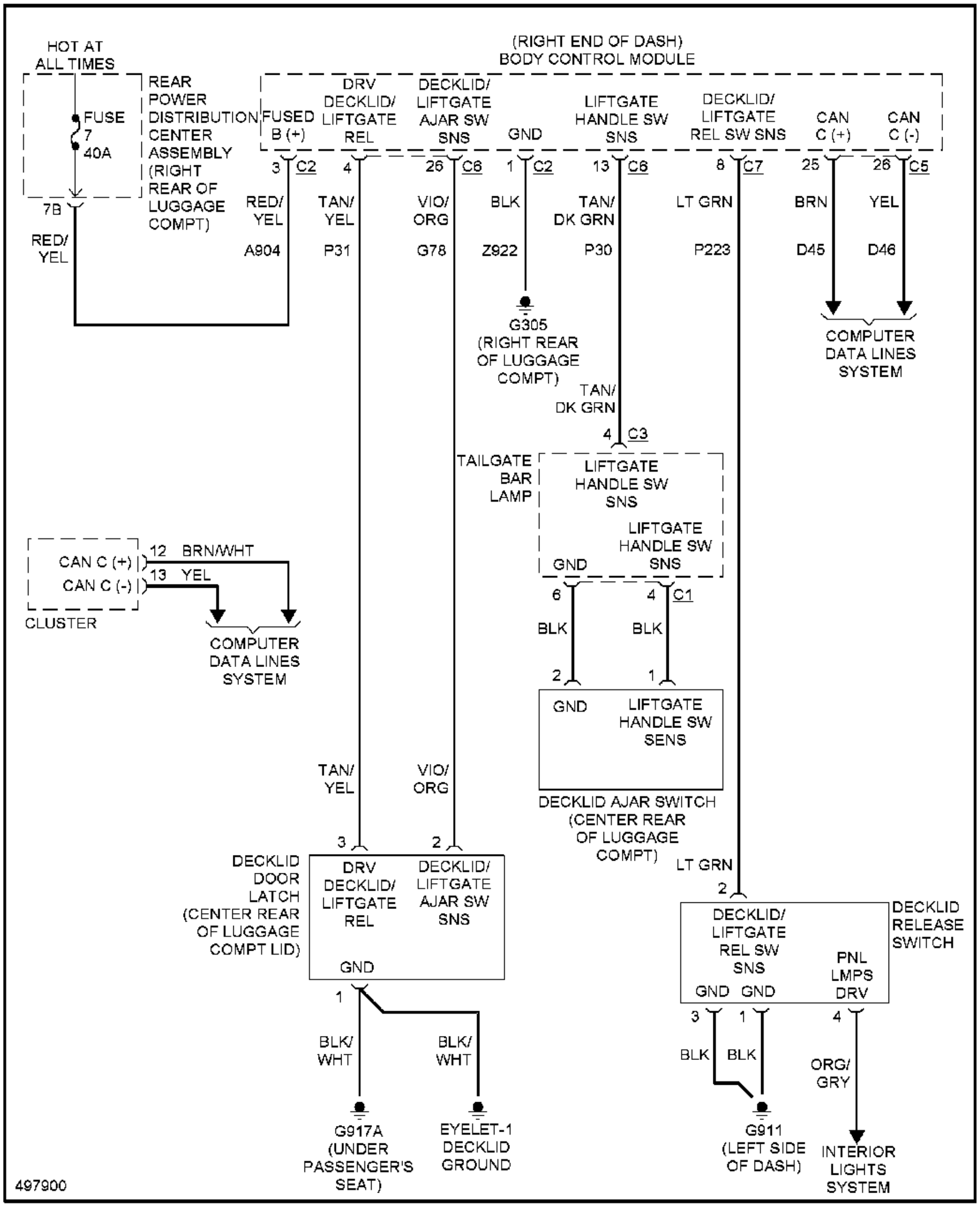


Fig. 112: Deck Lid Release Circuit

WARNING SYSTEMS

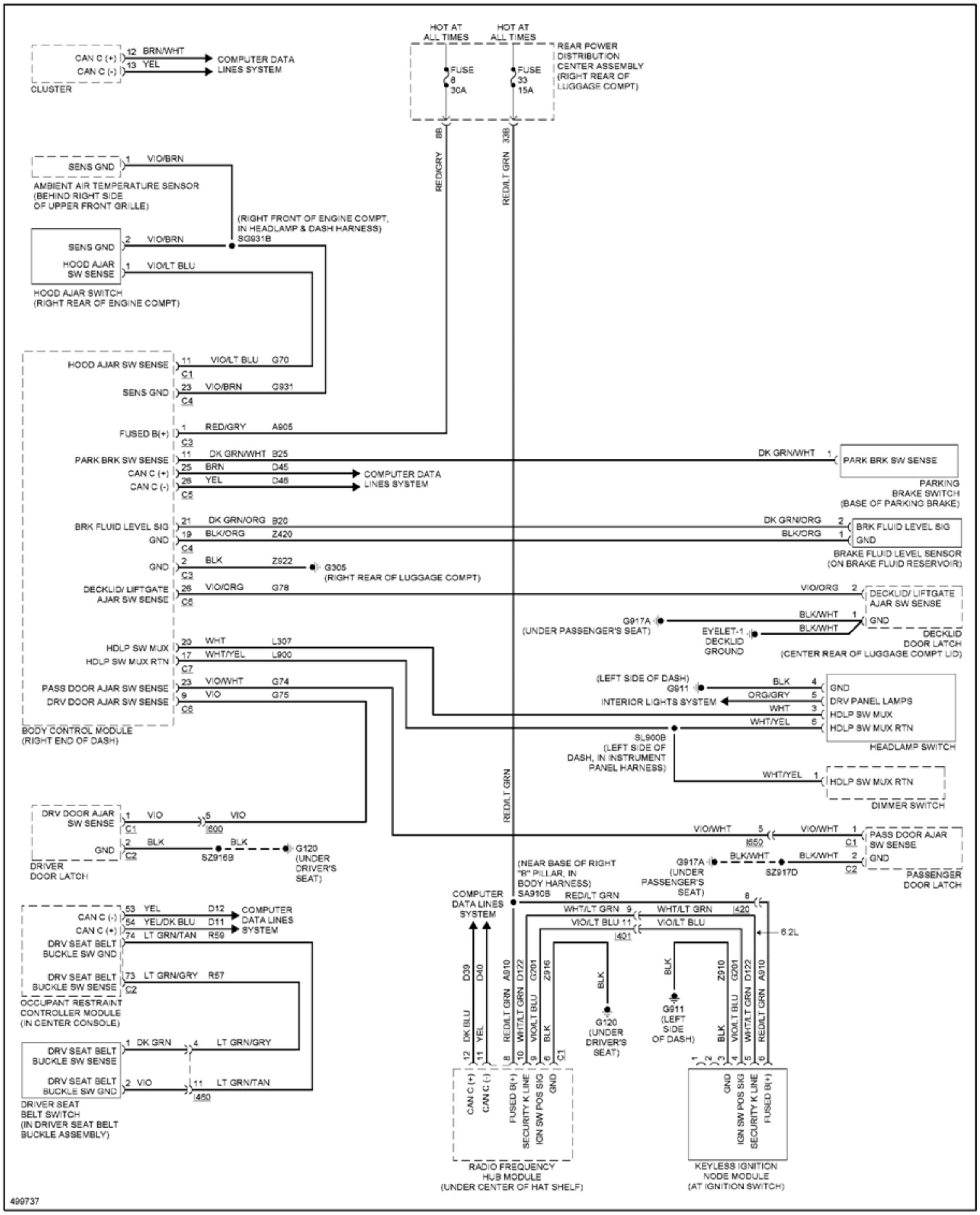


Fig. 113: Chime Circuit

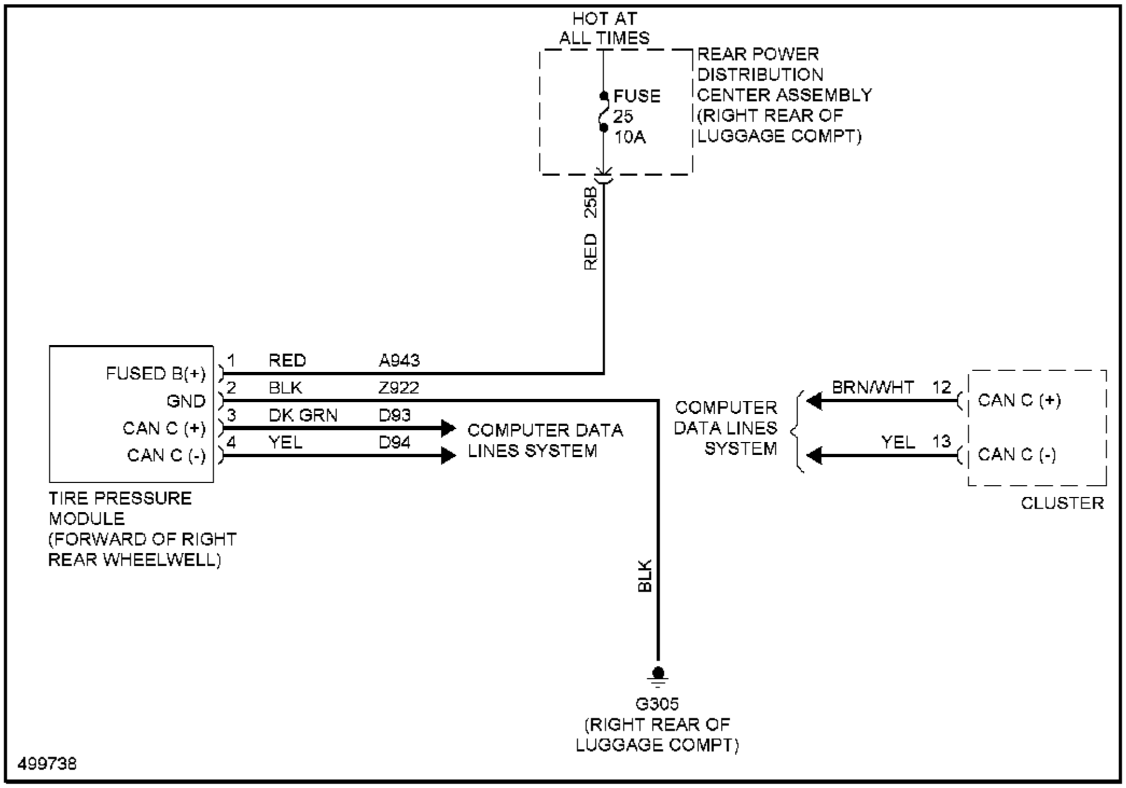


Fig. 114: Tire Pressure Monitoring Circuit

WIPER/WASHER

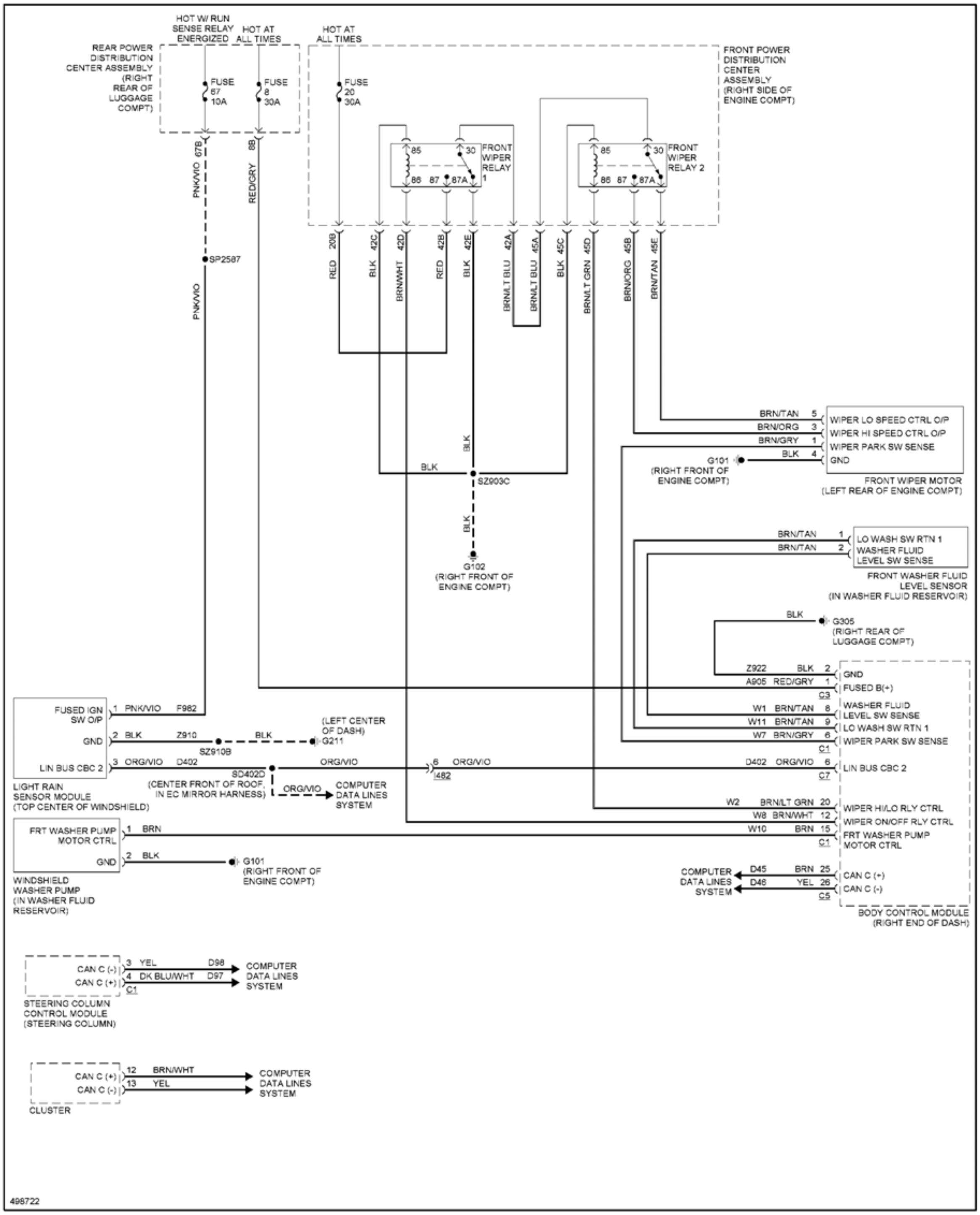


Fig. 115: Wiper/Washer Circuit

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Article GUID: A00766112

2015-16 ACCESSORIES AND EQUIPMENT

Navigation/Telecommunication - Service Information - Challenger

DESCRIPTION

HANDS FREE PHONE

A Uconnect™ Hands Free Phone system is factory-installed optional equipment. This system allows hands free use of compatible mobile phones for sending and receiving phone calls and text messages as well as for streaming audio from those devices through the audio system in the vehicle. The Hands Free Phone system includes the following major components, which are described in further detail elsewhere in this service information:

- **Bluetooth™ Antenna** - A Bluetooth™ antenna is internal and integral to the Radio Receiver Module (RRM) (also known as the radio or the head unit).
- **Bluetooth™ Phone** - A compatible, customer-supplied and paired Bluetooth™ phone is a required component of the hands free phone system. A list of suggested phones and providers is available at: **http://www.chrysler.com/uconnect**
- **Body Control Module** - The Body Control Module (BCM) (also known as the Common Body Controller/CBC) is located on the right cowl side inner panel within the passenger compartment, where it is concealed behind the cowl side kick panel to the right of the instrument panel. The BCM is the configuration master node for the vehicle. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Electronic Vehicle Information Center Switch Pod** - The Electronic Vehicle Information Center (EVIC) switch pod is located in the left horizontal spoke of the steering wheel. In addition to the EVIC switch buttons this switch pod contains the Uconnect™ Voice Recognition (VR) (also known as Voice Command) switch button and the Uconnect™ Phone switch button of the Hands Free Phone system. Refer to **SWITCH, EVIC CONTROL, DESCRIPTION** .
- **Microphones** - Stereo microphones are integral to the inside rear view mirror in vehicles equipped with the Uconnect™ Hands Free Phone system. These microphones are located on the top surface of the mirror housing, one to each side of center. Refer to **MICROPHONE, DESCRIPTION**.
- **Radio Receiver Module** - The Radio Receiver Module (RRM) (also known as the radio or the head unit) is located near the top of the instrument panel center stack area and is the primary component of the phone system in this vehicle. In addition to a 213 millimeter (8.4 inch) color electronic touchscreen display, a microcontroller, a Bluetooth™ transceiver, a navigation module, flash memory and sophisticated Advanced Speech Recognition (ASR) input capability through Voice Recognition (VR) software. The ASR software includes many different available languages. Each vehicle is equipped with a list of available languages, which are made available from the factory based upon languages most commonly used for the market destination. Refer to **RADIO, DESCRIPTION** .

The RRM also contains a microcontroller and programming that allows it to communicate with other electronic modules in the vehicle over the Controller Area Network - Interior High Speed (CAN-IHS) data bus. Refer to **COMMUNICATION, DESCRIPTION** .

The Uconnect™ Hands Free Phone system components cannot be adjusted or repaired. If any Hands Free Phone system component is damaged or ineffective, that component must be replaced. The Hands Free Phone system software is flash programmable through the Universal Serial Bus (USB) port.

NAVIGATION

A factory-installed satellite navigation system based upon the Global Positioning System (GPS) is an available option on this vehicle. Depending upon the optional touchscreen Radio Receiver Module (RRM) (also known as the radio or the head unit) selected for the vehicle, there are some variations in navigation system features available. Each system provides the vehicle operator with both visual and audible guidance to a chosen destination. An available premium navigation system includes such features as one-shot Voice Recognition (VR) destination entry, three dimensional city models and landmarks, digital terrain modeling, SiriusXM™ Travel Link and SiriusXM™ Traffic.

A RRM color touchscreen electronic display provides a graphical interface for programming, searching for and selecting destinations. In vehicles also equipped with a Uconnect™ Hands-Free telecommunication option, the available navigation systems are also equipped with Advanced Speech Recognition (ASR) input capability allowing hands-free operation. Each system provides visual guidance through dynamic maps with a turn-by-turn feature that can be enabled or disabled by the vehicle operator, while voice prompts through the audio system of the vehicle provide the vehicle operator with audible alerts and directions coordinated with the visual displays. The system also displays and logs valuable trip information such as speed, posted speed limit, distance and Estimated Time of Arrival (ETA).

The premium navigation system is activated when the vehicle is shipped from the factory, while another available system is shipped from the factory as Navigation Ready. The Navigation Ready system allows the customer to choose whether to have the dealer activate the embedded navigation module after the vehicle has been delivered.

The navigation system includes the following major components, which are described in further detail elsewhere in this service information:

- **Body Control Module** - The Body Control Module (BCM) (also known as the Common Body Controller/CBC) is located on the right cowl side inner panel within the passenger compartment, where it is concealed behind the cowl side kick panel to the right of the instrument panel. The BCM is the configuration master node for the vehicle. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Combination Antenna** - The navigation module acquires GPS position data through a roof-mounted combination antenna that also receives satellite audio and cellular signals. Refer to **ANTENNA, SATELLITE, DESCRIPTION** .
- **Electronic Vehicle Information Center** - The Electronic Vehicle Information Center (EVIC) is an electronic display within the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC). When Turn-By-Turn navigation is enabled through the EVIC Personal Settings menu, the EVIC displays turn-by-turn directions to the chosen destination supplemental to the navigation display within the RRM touchscreen unit. Refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, DESCRIPTION** .
- **Electronic Vehicle Information Center Switch Pod** - The Electronic Vehicle Information Center (EVIC) switch pod is located in the left horizontal spoke of the steering wheel. In addition to the EVIC switch buttons this switch pod contains the Uconnect™ Voice Recognition (VR) (also known as Voice Command) switch button and the Uconnect™ Phone switch button of the Uconnect™ Hands-Free Phone system. Refer to **SWITCH, EVIC CONTROL, DESCRIPTION** .
- **Microphones** - Stereo microphones are integral to the inside rear view mirror in vehicles equipped with the Uconnect™ Hands-Free Phone system. These microphones are located on the top surface of the mirror housing, one to each side of center. Refer to **MICROPHONE, DESCRIPTION**.

- **Radio Receiver Module** - The Radio Receiver Module (RRM) (also known as the radio or the head unit) contains the central components of the navigation system. In addition to a 213 millimeter (8.4 inch) color electronic touchscreen display, a navigation module is internal and integral to each RRM that is equipped with navigation capability. The navigation module contains all of the navigation system hardware and software. Hardware includes the GPS receiver, an electronic gyroscope, a microcontroller and flash memory for system software and map data storage. Refer to **RADIO, DESCRIPTION** .

The IC and the RRM each contain a microcontroller and programming that allow them to communicate with each other and other electronic modules in the vehicle using the Controller Area Network - Interior High Speed (CAN - IHS) data bus. Refer to **COMMUNICATION, DESCRIPTION** .

The navigation system components cannot be adjusted or repaired. If any of the navigation system components is damaged or ineffective, that component must be replaced. The external combination antenna can be repaired separately from the RRM. The navigation system software as well as the map data is flash programmable through the Universal Serial Bus (USB) port.

UCONNECT ACCESS

A Uconnect™ Access system is factory-installed optional equipment that uses an embedded cellular module within the Radio Receiver Module (RRM) (also known as the radio or the head unit) to enable several mobile connectivity features. Vehicles equipped with the Uconnect™ Access system can be readily identified by two switch buttons on the inside rear view mirror identified with **ASSIST** and **9-1-1** labels.

To enable Uconnect™ Access, a subscription must be completed by the customer. Detailed directions for subscription along with other information relating to Uconnect™ Access can be found on **www.driveuconnect.com** or within the Uconnect™ owner manual supplement for the supported radios.

NOTE: **A free trial period of Uconnect™ Access may be offered with the sale of a new vehicle. Registration will be required to activate the trial subscription.**

Subscription to Uconnect™ Access provides many features that allow cellular smart phones to be put away in favor of the integrated mobile connectivity features and functionality accessible through the use of the radio, steering wheel and voice controls in the vehicle. All Access features are only available based on subscription. Features are continually being added or changed and offerings at the time this information was last updated included:

- **9-1-1/Assist** - The following call features are executed through the embedded cellular module of the RRM:
  - **9-1-1** - Pressing the **9-1-1** button will initiate an emergency call to a Public Safety Answering Point (PSAP). The Global Positioning System (GPS) coordinates of the vehicle are made available to the emergency operator in the event help needs to be sent. In addition it opens a two way voice channel with the emergency operator allowing communication between the vehicle occupant and the emergency operator.
  - **Assist** - Pressing the **ASSIST** button will present the customer with three choices. Uconnect™ Care, Vehicle Care or Roadside Assistance. These selection options are presented as soft keys in the RRM display. Selecting any one of these choices will place a call to the selected group. If there are questions about Uconnect™ Services, Uconnect™ Care can be contacted; if there are questions related to vehicle functionality, Vehicle Care can be contacted; or, if Roadside Assistance is needed,

a direct call can be made.

- **Applications** - Some of the Uconnect™ Access applications (apps) presently available include:
  - **SRT Performance Pages** - The SRT Performance Pages app (for SRT models only) gives SRT vehicle owners access to the performance data for their vehicle. This app provides access to real-time vehicle performance information including timers (such as 0 to 60 mph elapsed time), G-force, gauges and engine performance. This data can be downloaded through the Universal Serial Bus (USB) port or the Secure Digital (SD) card slot in the vehicle for saving or sharing of performance results data.
  - **Points Of Interest Search** - A Points Of Interest (POI) Search app gives the vehicle owner access to Yelp (POI) local business and destination information previously available on the internet or through a mobile app, adapted for use on the radio in their vehicle. The Yelp POI Search app provides searches using predefined search categories, or custom searches using keywords and voice recognition.
  - **Via Mobile** - The Via Mobile app leverages apps already installed on a compatible and paired iPhone or Android smart phone to enable accessibility to streaming internet audio content through the RRM and audio system components within the vehicle. This app enables one touch access and a hands-free, radio-like user interface with no expenses besides those already being incurred to access the same content through the existing smart phone data plan. There are presently smart phone apps available for streaming audio content such as Aha Radio, iHeart Radio, Pandora and Slacker. When additional apps are made available there could potentially be access to streaming news, sports, weather, social media, comedy, audio books and other content such as special interest podcasts.
- **Notifications** - Customers have the option to sign up for automatic electronic mail (email) or text message (Short Message Service/SMS) notifications when an Access remote services command is processed or if their vehicle theft alarm has been triggered. These notifications are set up through the Mopar Owner Connect account of the customer (**www.MoparOwnerConnect.com**).
- **Remote Services** - The distance of remote services normally available through the Remote Keyless Entry (RKE) FOB with Integrated Key (FOBIK) can be extended through cellular connectivity. These services may include remote door Lock/Unlock, remote horn and lights (Panic Mode) and remote start. An active Access subscription is required and the customer must install the Uconnect™ Access Via Mobile smart phone app on their phone. The app can be obtained through the Mopar Owner Connect account of the customer (**www.MoparOwnerConnect.com**) or by downloading it from the play store for their phone. Once the smart phone app is installed, the remote services can be controlled by the customer on line through their Mopar Owner Connect account.

NOTE: **Remote services are only available based on factory installed options. Options installed at the dealer are not eligible for these services.**

- **Stolen Vehicle Assistance** - If the vehicle is stolen, stolen vehicle assistance can be used to help the police locate the vehicle. This service is based on the request of the customer to Uconnect™ Care and must first be reported to local authorities and a police report reference number obtained. Uconnect™ Care will not provide stolen vehicle assistance without a police report reference number.
- **Voice Texting** - Voice Texting enhances the Voice Text Reply feature of the Uconnect™ Access subscription. While Voice Text Reply provides pre-formatted messages, it also lets the customer create custom messages. A message is spoken as if talking to the intended message recipient and the Uconnect™ Access voice-to-text technology converts the voice message into a text message.

NOTE: Voice Texting and Voice Text Reply are compatible with most phones that support Bluetooth Message Access Protocol (MAP) or AT Messaging Protocol. Always check compatibility by accessing Mobile Device Support at: Uconnectphone.com . These features are not available in all markets.

- **Wi-Fi Hot Spot** - Vehicles equipped with the Uconnect™ Access system can become a Wi-Fi hot spot with payment of a daily, weekly or monthly subscription option. This system allows the use of the vehicle as a Wi-Fi hot spot for connecting consumer Wi-Fi devices to the internet through a Wi-Fi antenna and an embedded cellular connection that are internal and integral to the RRM and the external cellular combination antenna. The external combination antenna can be repaired separately from the RRM. The Wi-Fi Hot Spot system software is flash programmable through the Universal Serial Bus (USB) port.

Refer to **www.driveuconnect.com** for the latest information and helpful videos describing all of the Uconnect™ services and offerings.

The Uconnect™ Access system includes the following major components, which are described in further detail elsewhere in this service information:

- **Access Switches** - In vehicles equipped with Uconnect™ Access, the inside rear view mirror also contains two integral push button switches and a Light Emitting Diode (LED) indicator located on the rearward-facing housing just below the center of the mirror glass for activation of the **ASSIST** and **9-1-1** features.
- **Bluetooth™ Antennas** - Bluetooth™ antennas are internal and integral to the Radio Receiver Module (RRM) (also known as the radio or the head unit).
- **Bluetooth™ Phone** - A customer-supplied and paired Bluetooth™ smart phone is a required component of the Uconnect™ Access system to enable remote services.
- **Body Control Module** - The Body Control Module (BCM) is the configuration master node for the vehicle. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Combination Antenna** - The Radio Receiver Module (RRM) (also known as the radio or the head unit) sends and receives cellular data through a roof-mounted combination antenna that also receives satellite audio and Global Positioning System (GPS) navigation signals. Refer to **ANTENNA, SATELLITE, DESCRIPTION** .
- **Electronic Vehicle Information Center Switch Pod** - The Electronic Vehicle Information Center (EVIC) switch pod is located in the left horizontal spoke of the steering wheel. In addition to the EVIC switch buttons this switch pod contains the Voice Recognition (VR) switch button and the Phone switch button of the hands-free phone system. Refer to **SWITCH, EVIC CONTROL, DESCRIPTION** .
- **Microphones** - Stereo microphones are integral to the inside rear view mirror in vehicles equipped with the hands-free phone system. These microphones are located on the top surface of the mirror housing, one to each side of center. Refer to **MICROPHONE, DESCRIPTION**.
- **Occupant Restraint Controller** - The Occupant Restraint Controller (ORC) module has a dedicated hard wired circuit that provides an input to the Radio Receiver Module (RRM) (also known as the radio or the head unit) whenever a Supplemental Restraint System (SRS) deployment occurs in the vehicle.
- **Radio Frequency Hub Module** - The Radio Frequency Hub Module (RFHM) (also known as the RF Hub) is a key component of the Uconnect™ Access remote vehicle services feature. The RFHM is located on the rear shelf panel support and concealed beneath the shelf panel trim behind the rear seat back within the passenger compartment. Refer to **MODULE, RADIO FREQUENCY (RF HUB),**

DESCRIPTION .

- **Radio Receiver Module** - The Radio Receiver Module (RRM) (also known as the radio or the head unit) is located near the top of the instrument panel center stack area and is the primary component of the Uconnect™ Access system in this vehicle. The RRM includes a microcontroller, a Bluetooth™ transceiver, a navigation module, flash memory and sophisticated Advanced Speech Recognition (ASR) input capability through Voice Recognition (VR) software. The ASR software includes many different available languages. Each vehicle is equipped with a list of available languages, which are made available from the factory based upon languages most commonly used for the market destination. Refer to **RADIO, DESCRIPTION** .
- **Uconnect™ Access Registration And Applications** - Uconnect™ Access registration must be completed before individual RRM apps or Uconnect™ Access subscription packages can be purchased from the Uconnect™ Store Front. The Uconnect™ Access Via Mobile smart phone app must also be installed on the user's compatible smart phone for the remote vehicle services features to operate. Many additional Uconnect™ Access apps are under development for later release.
- **Wi-Fi Antenna** - The Wireless Local Area Network (WLAN) (also known as Wi-Fi) antenna is internal and integral to the RRM.
- **Wi-Fi Device** - A customer-supplied Wi-Fi capable device is a required component of the Wi-Fi Hot Spot system.

The RRM contains a microcontroller and programming that allows it to communicate with other electronic modules in the vehicle over the Controller Area Network - Interior High Speed (CAN-IHS) data bus. In vehicles equipped with Uconnect™ Access, the RRM also uses electronic message communication with other electronic modules in the vehicle over the CAN-C data bus. Refer to **COMMUNICATION, DESCRIPTION** .

The Uconnect™ Access system components cannot be adjusted or repaired. If any Uconnect™ Access system component is damaged or ineffective, that component must be replaced. The external combination antenna can be repaired separately from the RRM. The Uconnect™ Access system software is flash programmable through the Universal Serial Bus (USB) port.

OPERATION

HANDS FREE PHONE

The Uconnect™ Hands Free Phone system relies upon Bluetooth™ technology to enable wireless connectivity between Bluetooth™ compatible, paired and turned On mobile devices and the on-board entertainment system components. This system also relies upon Advanced Speech Recognition (ASR) software to enable Voice Commands to control the mobile device as well as the components and features of some other on-board systems.

The system will recognize up to ten Bluetooth™ compatible devices, each of which is identified within the system by the name acquired from the device during the pairing process. The Hands Free Phone system will communicate with a paired device that is anywhere within the vehicle. However, covering the paired device with a metal object may block the signal.

The Hands Free Phone system is operated in one of two ways: actively or passively. Active operation begins with the vehicle operator depressing a push button in the Electronic Vehicle Information Center (EVIC) switch pod on the face of the left horizontal spoke of the steering wheel. The Uconnect™ Voice Recognition (**VR**) (also known as Voice Command) button is depressed for hands free Voice Command access to available

features other than the phone, or the Uconnect™ Phone (**Phone** is identified by a phone handset icon) button is depressed for hands free phone access.

The **VR** or **Phone** button press provides a resistor multiplexed input to the Local Interface Network (LIN) slave node integral to the EVIC switch pod. The LIN slave node sends an electronic **switch press** message to the LIN master node integral to the Body Control Module (BCM). The BCM is also a gateway to the CAN - Interior High Speed (CAN-IHS) data bus and relays the message over the CAN-IHS data bus to the Radio Receiver Module (RRM) (also known as the radio or the head unit).

When the RRM receives the electronic **switch press** message, the RRM suppresses any current audio output and issues an audible **beep** to indicate that the VR hardware is prepared to receive a Voice Command. Part of the Uconnect™ Hands Free Phone system hardware includes the VR stereo microphones integral to the top surface of the inside rear view mirror. The microphones provide a hard wired input of Voice Commands to the VR engine within the RRM, and the ASR software converts that input into an electronic instruction message broadcast over the CAN-IHS data bus to invoke the appropriate system response. If no appropriate Voice Command is received within a few seconds following the audible **beep** , the system will provide an audible verbal output listing a menu of the available Voice Command options.

Passive operation begins when an incoming cellular call is received. If the Bluetooth™ phone is Short Message Service (SMS) text message capable and compatible with the Uconnect™ system (see the Uconnect™ web site), passive operation will also begin when an SMS text message is received. The call or SMS text message is relayed to the Bluetooth™ transceiver embedded within the RRM. The Bluetooth™ transceiver then instructs the RRM to announce the incoming call or message. The vehicle operator presses the Uconnect™ **Phone** button in the EVIC switch pod or the soft button that will appear in the RRM display to accept the call, or the soft button that will appear in the RRM display to accept the message.

The Bluetooth™ transceiver connects the voices of the two phone parties using outputs through the audio system speakers and inputs through the Uconnect™ hands free microphones. In the case of a text message, the Bluetooth™ transceiver sends the message to the VR hardware and the ASR software converts the message from text to voice and plays it through the audio system speakers.

If the RRM has the optional 213 millimeter (8.4 inch) electronic touchscreen display, the text message can then be replied to by depressing the Uconnect™ **VR** button and giving an **SMS** Voice Command to select from several predetermined short text phrase responses. If the RRM has the 127 millimeter (5 inch) display, it can receive and display SMS text messages, but it is not equipped to reply to text messages.

The Hands Free Phone system operates on battery current received through a fused B(+) circuit, but also monitors the ignition switch (also known as the Keyless Ignition Node/KIN or IGnition Node Module/IGNM) status through electronic messages received over the CAN-IHS data bus. If a call is in progress when the status of the ignition switch transitions to Off, the system will continue to operate until the call has been completed.

The RRM receives electronic message inputs over the CAN-IHS data bus related to the Hands Free Phone system. The RRM is also connected to the CAN-C data bus; however, the RRM is not a CAN gateway. All electronic message outputs of the RRM are carried over the CAN-IHS data bus. When the RRM monitors a problem in any of the audio system circuits and components, or in any of the Bluetooth™ transceiver circuits, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit.

The hard wired circuits between components related to the RRM and the Hands Free Phone system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The

wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RRM or the electronic controls and communication between modules and other devices that provide some features of the Hands Free Phone system. The most reliable, efficient and accurate means to diagnose the RRM or the electronic controls and communication related to Hands Free Phone system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

NAVIGATION

The optional navigation system is active whenever the Radio Receiver Module (RRM) (also known as the radio or the head unit) electronic display is powered On. In vehicles equipped with a navigation system that allows activation after the vehicle has been delivered, all post delivery activations must be performed by the dealer.

If a navigation system menu or map isn't being actively displayed, the system is still operating in the background. The menu, map or route that was active when the RRM electronic display was powered Off along with all other user-relevant information is saved in nonvolatile memory by the navigation module for display again the next time the RRM electronic display is powered On and the navigation system is selected.

Once a destination is selected, the navigation system uses information from stored map data to quickly calculate a route. As the vehicle is driven along that route, the vehicle operator is guided with visual displays and voice prompts. Any variances from that route will cause the navigation system to automatically recalculate and deliver a revised route to the chosen destination.

When Turn-By-Turn Navigation is enabled through the Personal Settings menu of the Electronic Vehicle Information Center (EVIC), the EVIC supplements the RRM display with a more focused turn-by-turn display which includes: the name of the approaching crossroad, an arrow indicating the upcoming turn direction and a countdown to indicate the distance to that turn.

All vehicles have their original map and Points-Of-Interest (POI) data stored in nonvolatile flash memory integral to the navigation module integral and internal to the RRM. Updated map and POI data as well as updated navigation software for these vehicles can be uploaded to the system using Universal Serial Bus (USB) media. The originally installed data is based upon the market for which the vehicle was manufactured. Navigation software updates are also uploaded to the system using USB media.

The Global Positioning System (GPS) receiver of the navigation module is capable of acquiring and tracking GPS signal inputs through the roof-mounted combination antenna from numerous satellites simultaneously to calculate and display the position and direction of the vehicle. However, when access to satellite signals is blocked by bridges, tunnels or other obstacles, the navigation module relies upon Dead Reckoning (DR) to aid in calculating vehicle position and direction. The navigation module uses pulse signals from the wheel speed sensors, a Reverse gear indicator input and an internal electronic gyroscope sensor to provide DR vehicle position and direction calculations to supplement GPS satellite signals.

User input mechanisms for the navigation system include the RRM touchscreen and the Uconnect™ Hands-Free Voice Recognition (VR) (also known as Voice Command) verbal commands. The VR function uses Advanced Speech Recognition (ASR) software. Master control of the VR function is handled by the VR engine internal and integral to the RRM. The VR recognizes and responds to certain global commands, while other

commands are specific to the RRM or the navigation system.

For safety reasons some input, editing and setting features of the navigation system are restricted when the vehicle is in motion or when a hands-free phone call is active. This includes many features that require touchscreen inputs. However, many of those same features disabled for touchscreen inputs remain enabled for Uconnect™ Hands-Free VR inputs.

The navigation module receives electronic message inputs within the RRM over the Controller Area Network - Interior High Speed (CAN-IHS) data bus; however, the RRM is not a CAN gateway. All electronic message outputs of the navigation module and the RRM are carried over the CAN-IHS data bus. When the RRM monitors a problem in any of the audio system circuits and components, or in any of the navigation system antenna circuits, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit. The external combination antenna may be diagnosed separately from the RRM.

The hard wired circuits between components related to the RRM and the navigation system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RRM or the electronic controls and communication between modules and other devices that provide some features of the navigation system. The most reliable, efficient and accurate means to diagnose the RRM or the electronic controls and communication related to navigation system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

UCONNECT ACCESS

Uconnect™ Access capability relies on cellular (telematics) technology and subscribed services that are controlled through Digital Rights Management (DRM). The management or DRM along with specific services occur wirelessly through the cloud. Digital rights and a subscription determine the specific services a customer is eligible to receive. Data feeds between Chrysler assembly plants and its radio suppliers are provided to the cellular provider to enable initial capability or provisioning. This initial data must exist in the database of the cellular provider or functionality will be unavailable. Base features are supported through software that exists within the applicable Radio Receiver Module (RRM) (also known as the radio or the head unit) platform and cellular connectivity is provided through the embedded cellular module.

Signal strength and data capability is shown adjacent to the **Apps** orb soft key found at the lower right corner of the radio touchscreen. Relative signal strength is indicated by a bar graph and data capability is indicated by the display of either a **3G** (full capability), **1X** (text capable only) or a **0** with a strike-through symbol (no data capability). Depending on location and coverage, data capability can change. Signal strength is a major factor for any wireless connectivity. Third Generation (3G) data is the highest connectivity available at this time. Remote Service features (Start, Lock, Unlock, etc.) rely on data capability. If the vehicle is located in an area of no or low coverage, the Remote Services features may not function. Signal strength and data capability can suffer from the same situations any cellular device might experience. Parking structures, blocks, drops and dead zones can affect performance at any time.

The two switch buttons on the inside rear view mirror identified with **ASSIST** and **9-1-1** provide a resistor multiplexed input to the Local Interface Network (LIN) slave node integral to the inside rear view mirror. The

LIN slave node sends an electronic **switch press** message to the LIN master node integral to the Body Control Module (BCM). The BCM relays the message over the Controller Area Network - Interior High Speed (CAN-IHS) data bus, where it is retrieved by the RRM.

If the vehicle has the optional Uconnect™ Access Via Mobile application (also known as app) downloaded, installed and enabled on their smart phone their Uconnect™ Access subscription can provide remote services features. In the Uconnect™ Access system the Via Mobile app on the smart phone calls the RRM in the vehicle. The RRM communicates through electronic messages over the Controller Area Network - C (CAN-C) data bus with the Radio Frequency Hub Module (RFHM) (also known as the RF Hub) and the RFHM communicates over the CAN-C bus with the Body Control Module (BCM) to achieve the requested remote features. While the RRM uses electronic message communication over both the CAN-C data bus and the CAN - Interior High Speed (CAN-IHS) data bus, the RRM is not a CAN gateway.

If a Bluetooth™ phone is Short Message Service (SMS) text message capable and compatible with the Uconnect™ Access system (see the Uconnect™ web site for a phone compatibility list), a Uconnect™ Access subscription provides an enhanced Voice Texting feature. This SMS text message free form dictation feature is used to compose a response when a text message is received. The call or SMS text message is relayed to the Bluetooth™ transceiver embedded within the RRM. The Bluetooth™ transceiver then instructs the RRM to announce the incoming call or message. The vehicle operator presses the Uconnect™ **Phone** button in the EVIC switch pod or the soft button that will appear in the RRM touchscreen display to accept the message and dictate a response.

The optional Wi-Fi hot spot feature of Uconnect™ Access utilizes the same operating principles and components as Uconnect™ Access for wireless connectivity. Digital rights to the Wi-Fi hot spot feature are provided based on a subscription separate from Uconnect™ Access. Several wireless devices can be supported in vehicles with the Wi-Fi hot spot feature and security to prevent unauthorized access can be enabled by the customer.

The hard wired circuits between components related to the RRM and the Uconnect™ Access system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RRM or the electronic controls and communication between modules and other devices that provide some features of the Uconnect™ Access system. The most reliable, efficient and accurate means to diagnose the RRM or the electronic controls and communication related to Uconnect™ Access system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HANDS-FREE PHONE

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait

two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired circuits between components related to the Radio Receiver Module (RRM) (also known as the radio or the head unit) and the Uconnect™ Hands-Free Phone system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RRM or the electronic controls and communication between modules and other devices that provide some features of the Uconnect™ Hands-Free Phone system. The most reliable, efficient and accurate means to diagnose the RRM or the electronic controls and communication related to Uconnect™ Hands-Free Phone system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

NOTE: **The MIT019 Multi-Media Interface Tester special tool may also be used for testing where no Diagnostic Trouble Code (DTC) has been recorded, such as with Bluetooth™ reception and phone pairing issues. Refer to DIAGNOSIS AND TESTING .**

NOTE: **Validation and diagnosis of many of the conditions listed below will require access to both the paired Bluetooth™ device and the PIN required for that device.**

HANDS-FREE PHONE DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
PHONE NOT AVAILABLE	1. Bluetooth phone not paired to the RRM.	1. Be certain that the phone is Bluetooth compatible and is paired to the RRM.
	2. Bluetooth phone not present or turned Off.	2. Be certain that the paired phone is present, turned On and that the Bluetooth option is enabled in the phone.
	3. Bluetooth phone has low battery.	3. At low battery levels, some phones will turn Off Bluetooth functionality. Be certain that the phone battery is charged to an adequate level.
	4. The boot procedure for the RRM, the phone or both did not complete successfully.	4. Cycle both the RRM and the phone Off, then On again in an attempt to complete a successful boot procedure.
	5. A phone freeze has occurred.	5. Power cycle the phone. Refer to the operator's manual for the phone.
PHONE PAIRING FAILED	1. The phone is not Bluetooth enabled.	1. The Bluetooth transceiver requires that the cellular phone be Bluetooth enabled. The phone must be upgraded to one that is Bluetooth enabled. A list of suggested phones is available at: **http://www.chrysler.com/uconnect**

HANDS-FREE PHONE DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
	2. The phone does not support the Bluetooth Hands-Free Profile.	2. The Bluetooth transceiver requires that the cellular phone support the Hands-Free Profile. The phone must be upgraded to one that supports the Hands-Free Profile. A list of suggested phones is available at: **http://www.chrysler.com/uconnect**
	3. Incorrect discovered Bluetooth device selected in phone.	3. Be certain to select Uconnect in the discovered Bluetooth™ devices in the phone for pairing.
	4. The PIN of the phone is not the same as the PIN assigned by the RRM during pairing.	4. The PIN assigned by the RRM during pairing must match the PIN of the phone.
	5. Phone pairing is locked (password protected).	5. To unlock phone pairing in the phone, be certain that password protection is turned Off.
	6. The RRM has reached the maximum number of allowed devices paired.	6. Remove one of the previously paired devices from the paired list of the RRM.
	7. The phone has reached the maximum number of allowed devices paired.	7. Remove one of the previously paired devices from the paired list of the phone, or delete the pairing history from the phone. Refer to the operator's manual for the phone.
	8. The boot procedure for the RRM, the phone or both did not complete successfully.	8. Cycle both the RRM and the phone Off, then On again in an attempt to complete a successful boot procedure.
	9. A phone freeze has occurred.	9. Perform a hard reset (power cycle) to the phone. Refer to the operator's manual for the phone.
PHONE WILL NOT RECONNECT AFTER PAIRING	1. Bluetooth settings in phone are incorrect.	1. Bluetooth settings in phone should be set to auto-connect or select Uconnect™ as a trusted device in phone.
	2. Phone pairing is locked (password protected).	2. To unlock phone pairing in the phone, be certain that password protection is turned Off.
	3. The boot procedure for the RRM, the phone or both did not complete successfully.	3. Cycle both the RRM and the phone Off, then On again in an attempt to complete a successful boot procedure.
	4. A phone freeze has occurred.	4. Perform a hard reset (power cycle) to the phone. Refer to the operator's manual for the phone.
POOR VOICE RECOGNITION	1. User is not waiting for the **beep** tone acknowledgement before issuing Voice	1. Be certain the user knows to wait for the acknowledgement **beep** tone prior to issuing Voice Commands.

HANDS-FREE PHONE DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
	Commands.	
	2. User is not issuing Voice Commands in a smooth and consistent speaking voice.	2. Be certain the user is issuing Voice Commands in a normal, smooth and consistent speaking voice. The Advanced Speech Recognition (ASR) engine is designed to recognize normal speech patterns and at a normal tone. Some users tend to speak to a computer loud and slow, which results in reduced performance.
	3. User is not using proper Voice Command syntax.	3. User must speak using proper Voice Command syntax.
	4. High noise levels within the passenger compartment.	4. ASR engine performance is increased when noise conditions in the passenger compartment are lowered. Ideal conditions include having the windows closed and the blower fan set to Low or Off.
	5. Passengers are talking while the user is attempting to issue a Voice Command.	5. Although designed to focus on sounds from the driver's seated position, the directional microphones will pick up sounds from any seating position in the vehicle. ASR engine performance is increased in low noise environments.
	6. Foreign objects interfering with microphone input.	6. Verify that there are no foreign objects hanging from the inside rear view mirror that could be interfering with microphone reception.
	7. The inside rear view mirror is not properly attached to the mount.	7. The inside rear view mirror must be firmly mounted to the mounting location. Be certain the mirror is properly installed.
	8. The incorrect Uconnect switch button is being depressed.	8. Phone features are accessed using the Uconnect **Phone** button on the steering wheel or the **Phone** soft key in the RRM display. Other Uconnect Voice Command features are accessed using the Uconnect **VR** button or soft key.
	9. Microphone failure.	9. Use a diagnostic scan tool and the appropriate diagnostic procedures for further diagnosis of the microphone.
PHONE BOOK DOES NOT DOWNLOAD	1. Phone does not support the Phone Book Access Profile (PBAP).	1. The Uconnect system requires that the cellular phone support the PBAP profile. To enable the Uconnect phone book download feature, the phone must be upgraded to one that is PBAP enabled. A list of suggested phones is available at:

HANDS-FREE PHONE DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
		http://www.chrysler.com/uconnect
	2. Phone book transfer not enabled in phone during pairing.	2. Be certain that phone book transfer is accepted or enabled in the phone during pairing to enable the Uconnect phone book download feature.
	3. Missing contacts from downloaded phone book.	3. Only contacts with a phone number are downloaded from phone and the number of contacts downloaded is limited to 1000.
PHONE BOOK NAMES NOT RECOGNIZED CONSISTENTLY	1. User is not waiting for the **beep** tone acknowledgement before issuing Voice Commands.	1. Be certain the user knows to wait for the acknowledgement **beep** tone prior to issuing Voice Commands.
	2. User is not issuing Voice Commands in a smooth and consistent speaking voice.	2. Be certain the user is issuing Voice Commands in a normal, smooth and consistent speaking voice. The Advanced Speech Recognition (ASR) engine is designed to recognize normal speech patterns and at a normal tone. Some users tend to speak to a computer loud and slow, which results in reduced performance.
	3. User is not using proper Voice Command syntax.	3. User must speak using proper Voice Command syntax (i.e.: say **Call** - then name, or say **Dial** - then number).
	4. Phone book names too short.	4. For increased performance, it is recommended to use both first and last names for phone book entries. Example: **Daniel Johnson** as opposed to **Dan** .
	5. Name not spoken by user as it appears in the phone book.	5. Speak the full contact name as it appears in the phone book. Do not use nicknames.
	6. Multiple similar sounding names in the phone book.	6. For increased performance it is recommended that the user do not enter similar sounding names in the phone book.
	7. Phone book download not yet completed.	7. Depending upon the size of the contact list on the phone, the download may not have had time to complete. If the Phone Book button on the RRM phone screen appears grayed out, the contact list download is still in progress. Wait until download completes.
	8. High noise levels within the passenger compartment.	8. ASR engine performance is increased when noise conditions in the passenger compartment are lowered. Ideal conditions include having the windows closed and the blower fan set to Low or Off.

HANDS-FREE PHONE DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
	9. Passengers are talking while the user is attempting to issue a Voice Command.	9. Although designed to focus on sounds from the driver's seated position, the directional microphones will pick up sounds from any seating position in the vehicle. ASR engine performance is increased in low noise environments.
	10. Foreign objects interfering with microphone input.	10. Verify that there are no foreign objects hanging from the inside rear view mirror that could be interfering with microphone reception.
	11. The inside rear view mirror is not properly attached to the mount.	11. The inside rear view mirror must be firmly mounted to the mounting location. Be certain the mirror is properly installed.
	12. The incorrect Uconnect switch button is being depressed.	12. Phone features are accessed using the Uconnect **Phone** button on the steering wheel or the **Phone** soft key in the RRM display. Other Uconnect Voice Command features are accessed using the Uconnect **VR** button or soft key.
	13. Microphone failure.	13. Use a diagnostic scan tool and the appropriate diagnostic procedures for further diagnosis of the microphone.
POOR PHONE AUDIO QUALITY	1. High noise levels within the passenger compartment.	1. ASR engine performance is increased when noise conditions in the passenger compartment are lowered. Ideal conditions include having the windows closed and the blower fan set to Low or Off.
	2. Passengers are talking while the user is attempting to issue a Voice Command.	2. Although designed to focus on sounds from the driver's seated position, the directional microphones will pick up sounds from any seating position in the vehicle. ASR engine performance is increased in low noise environments.
	3. Foreign objects interfering with microphone input.	3. Verify that there are no foreign objects hanging from the inside rear view mirror that could be interfering with microphone reception.
	4. The inside rear view mirror is not properly attached to the mount.	4. The inside rear view mirror must be firmly mounted to the mounting location. Be certain the mirror is properly installed.
	5. Microphone failure.	5. Use a diagnostic scan tool and the appropriate diagnostic procedures for further diagnosis of the microphone.

HANDS-FREE PHONE DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
NO PHONE AUDIO	1. The settings in the phone cause the phone audio to be routed to a handset.	1. Route the phone audio to the hands-free device.
CALL LOG INOPERATIVE OR INACCURATE	1. Call log not supported by phone.	1. The Uconnect system requires that the cellular phone support the call log feature. To enable the Uconnect call log feature, the phone must be upgraded to one that is call log enabled. A list of suggested phones is available at: **http://www.chrysler.com /uconnect**
	2. The phone is not providing accurate call log data.	2. Refer to the operator's manual for the phone.
AUDIO OUTPUT TOO LOW	1. Volume setting on the Bluetooth device set too low.	1. Set the volume of the phone or other Bluetooth device to about three quarters (3/4) of full or maximum volume.
	2. Volume setting on the RRM set too low.	2. Set the volume of the RRM to the desired level during an active Uconnect Hands-Free Phone call session.

DIAGNOSIS AND TESTING - NAVIGATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired circuits between components related to the Radio Receiver Module (RRM) (also known as the radio or the head unit) and the Uconnect™ Navigation system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RRM or the electronic controls and communication between modules and other devices that provide some features of the Uconnect™ Navigation system. The most reliable, efficient and accurate means to diagnose the RRM or the electronic controls and communication related to Uconnect™ Navigation system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING - UCONNECT ACCESS

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired circuits between components related to the Radio Receiver Module (RRM) (also known as the radio or the head unit) and the Uconnect™ Access system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RRM or the electronic controls and communication between modules and other devices that provide some features of the Uconnect™ Access system.

A Light Emitting Diode (LED) indicator between the inside rear view mirror push buttons provides an indication of the status of the Uconnect™ Access embedded cellular device. Any fault indication is accompanied by a pop up screen in the RRM electronic touchscreen display. The following indications are provided whenever the status of the ignition switch is On or Accessory:

- **Solid Green** - No active call.
- **Flashing Green** - A Uconnect™ Access Care or 9-1-1 call is active.
- **Solid Red** - A CAN, embedded cellular device, cellular antenna or wiring fault has been detected.
- **Off** - No power supply to the rear view mirror.

In addition to the LED indicator on the mirror, one of the following error messages may appear in the RRM touchscreen display. These error messages will coincide with a solid red mirror LED indication.

- **Critical VIN Error** - This message typically indicates the radio data was not provisioned with the back end database, or that critical data within the RRM is missing. Diagnosis of this type of failure will require the assistance of the network provider.
    1. Enter the **Dealer Mode** menu by selecting the temperature up, temperature down and front defrost buttons simultaneously until the menu appears (about 5 to 8 seconds).
        1. Navigate through the **System Information** menu to the **Radio Part Information** menu.
        2. Write down the **Serial Number** listed on the **Radio Part Information** menu. The serial number begins with the characters, **T00BE** .
    2. Navigate back to the **Dealer Mode** menu.
        1. Navigate through the **##Menu Basic** menu to the **##RTN#** menu.
        2. Write down the **MDN** number listed on the **##RTN#** menu.
        3. Write down the **MSID** number listed on the **##RTN#** menu.
    3. Place a call to Uconnect™ Care. Provide your dealer code, name, call back number and the Vehicle Identification Number (VIN). Request a ticket be opened with the network engineers to assist with

Uconnect™ Access diagnostics. A ticket will be opened with the network engineers and a call back will occur within 15 minutes for further assistance and diagnostics.

- **Vehicle Phone Requires Service** - This message can indicate a fault with the antenna, the inside rear view mirror, communication with the Occupant Restraint Controller (ORC) module or any of the hard wired circuits between these components. Check for an active or stored Diagnostic Trouble Code (DTC) for any of the listed components. Follow all of the steps found in the diagnostic information for the retrieved DTC and fully check the hard wired circuitry associated with the DTC. If no DTC can be retrieved, an internal failure within the RRM may exist.

The Wi-Fi hot spot feature can only be diagnosed if the customer has subscribed for this additional feature. The same diagnostic steps associated with Uconnect™ Access will be used for Wi-Fi hot spot as they share the same network. In addition, each of the wireless devices of the customer must be properly paired for them to work.

NOTE: **The MIT019 Multi-Media Interface Tester special tool may also be used for testing where no Diagnostic Trouble Code (DTC) has been recorded, such as with Bluetooth™ reception and phone pairing issues. Refer to DIAGNOSIS AND TESTING .**

NOTE: **Validation and diagnosis of many of the conditions listed below will require access to both the paired Bluetooth™ device and the PIN required for that device.**

UCONNECT ACCESS DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
POOR VOICE RECOGNITION	1. User is not waiting for the **beep** tone acknowledgement before issuing Voice Commands.	1. Be certain the user knows to wait for the acknowledgement **beep** tone prior to issuing Voice Commands.
	2. User is not issuing Voice Commands in a smooth and consistent speaking voice.	2. Be certain the user is issuing Voice Commands in a normal, smooth and consistent speaking voice. The Advanced Speech Recognition (ASR) engine is designed to recognize normal speech patterns and at a normal tone. Some users tend to speak to a computer loud and slow, which results in reduced performance.
	3. User is not using proper Voice Command syntax.	3. User must speak using proper Voice Command syntax.
	4. High noise levels within the passenger compartment.	4. ASR engine performance is increased when noise conditions in the passenger compartment are lowered. Ideal conditions include having the windows closed and the blower fan set to Low or Off.
	5. Passengers are talking while the user is attempting to issue a Voice Command.	5. Although designed to focus on sounds from the driver's seated position, the directional microphones will pick up sounds from any seating position in the vehicle. ASR engine performance is increased in low noise

UCONNECT ACCESS DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
		environments.
	6. Foreign objects interfering with microphone input.	6. Verify that there are no foreign objects hanging from the inside rear view mirror that could be interfering with microphone reception.
	7. The inside rear view mirror is not properly attached to the mount.	7. The inside rear view mirror must be firmly mounted to the mounting location. Be certain the mirror is properly installed.
	8. The incorrect Uconnect switch button is being depressed.	8. Phone features are accessed using the Uconnect **Phone** button on the steering wheel or the **Phone** soft key in the RRM display. Other Uconnect Voice Command features are accessed using the Uconnect **VR** button or soft key.
	9. Microphone failure.	9. Use a diagnostic scan tool and the appropriate diagnostic procedures for further diagnosis of the microphone.
TEXT MESSAGING INOPERATIVE	1. The Bluetooth Message Access Profile (MAP) is not supported by the phone.	1. The Uconnect system requires that the cellular phone support the Bluetooth MAP for the text messaging feature. To enable the Uconnect text messaging feature, the phone must be upgraded to one that supports Bluetooth MAP. A list of suggested phones is available at: **http://www.chrysler.com/uconnect**
	2. The Connect-To-Your-Messages setting has not been accepted on the phone.	2. Accept the Connect-To-Your-Messages setting on the phone. Refer to the operator's manual for the phone.
ENHANCED VOICE-TO-TEXT (DICTATED) MESSAGING RESPONSE FEATURE INOPERATIVE	1. Uconnect registration incomplete.	1. Select the **Apps** soft key in the RRM display, then select the **Uconnect Registration App** soft key from the **Apps** list. For further assistance press the **ASSIST** button on the inside rear view mirror to contact Uconnect Customer Care.
	2. Uconnect Access subscription service is inactive.	2. This feature is only available with the Uconnect Access Advantage subscription service. Be certain that the subscription service account is active in the RRM.
	3. The Bluetooth Message Access Profile (MAP) is not supported by the phone.	3. The Uconnect system requires that the cellular phone support the Bluetooth MAP for the text messaging feature. To enable the Uconnect text messaging feature, the phone must be upgraded to one that supports Bluetooth MAP. A list of suggested phones is available at: **http://www.chrysler.com/uconnect**

UCONNECT ACCESS DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
	4. The Connect-To-Your-Messages setting has not been accepted on the phone.	4. Accept the Connect-To-Your-Messages setting on the phone. Refer to the operator's manual for the phone.
UNABLE TO PURCHASE APPLICATIONS FROM UCONNECT STORE FRONT	1. Uconnect registration incomplete.	1. Select the **Apps** soft key in the RRM display, then select the **Uconnect Registration App** soft key from the **Apps** list. For further assistance press the **ASSIST** button on the inside rear view mirror to contact Uconnect Customer Care.
	2. Wallet is not set up.	2. Set up a valid wallet for the Uconnect store front in order to purchase application subscriptions.
	3. Cellular antenna issue.	3. Refer to the Audio And Video System service information for further diagnosis of the cellular (combination) antenna. See **AUDIO/VIDEO /ENTERTAINMENT/CONNECTIVITY - SERVICE INFORMATION** .
REMOTE SERVICES INOPERATIVE	1. Uconnect registration incomplete.	1. Select the **Apps** soft key in the RRM display, then select the **Uconnect Registration App** soft key from the **Apps** list. For further assistance press the **ASSIST** button on the inside rear view mirror to contact Uconnect Customer Care.
	2. Phone is not compatible.	2. Be certain that the phone is compatible and is paired to the RRM. A list of suggested phones is available at: **http://www.chrysler.com/uconnect** .
	3. Uconnect Access Via Mobile application (app) not downloaded or not fully installed to smart phone.	3. Download the Uconnect Access Via Mobile app to the user's smart phone from **www.MoparOwnerConnect.com** . Allow sufficient time for the Uconnect Access Via Mobile application (app) download to smart phone to complete. Download times will vary widely with the throughput performance of the user's smart phone and the accessibility of the user's cellular network services.
	4. Uconnect Access subscription service is inactive in the RRM.	4. This feature is only available with the Uconnect Access Advantage subscription service. Be certain that the subscription service account is active in the RRM.
	5. Cellular antenna issue.	5. Refer to the Audio And Video System service information for further diagnosis of the cellular (combination) antenna. See **AUDIO/VIDEO /ENTERTAINMENT/CONNECTIVITY - SERVICE INFORMATION** .

UCONNECT ACCESS DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
	5. Radio Frequency Hub Module (RFHM) issue.	5. Further diagnosis of the RFHM requires the use of a diagnostic scan tool and the appropriate diagnostic procedures.
AUDIO OUTPUT TOO LOW	1. Volume setting on Bluetooth device set too low.	1. Set the volume of the phone or other Bluetooth device to about three quarters (3/4) of full or maximum volume.
	2. Volume setting on the RRM.	2. Set the volume of the RRM to the desired level during an active Uconnect Access feature session.
UCONNECT ACCESS INOPERATIVE - NO GREEN OR RED LED INDICATOR	1. Status of ignition switch is Off.	1. Ignition switch status must be On or Accessory during Uconnect Access operation.
	2. Inside rear view mirror wiring not connected.	2. Be certain the wire harness for the inside rear view mirror is connected and fully engaged.
	3. Ineffective ground circuit.	3. Test and repair the open inside rear view mirror ground circuit if required.
	4. Ineffective feed circuit.	4. Test and repair the open inside rear view mirror feed circuit if required.
UCONNECT ACCESS INOPERATIVE - GREEN LED INDICATOR	1. Uconnect registration incomplete.	1. Select the **Apps** soft key in the RRM display, then select the **Uconnect Registration App** soft key from the **Apps** list. For further assistance press the **ASSIST** button on the inside rear view mirror to contact Uconnect Customer Care.
	2. Uconnect Access subscription service is inactive in the RRM.	2. Many Uconnect Access features are only available with the Uconnect Access subscription service. Be certain that the subscription service account is active in the RRM.
	3. Uconnect Access application (app) corrupt or improperly installed.	3. Perform the Uconnect Access System Reinstall Applications Standard Procedure. Refer to STANDARD PROCEDURE.
UCONNECT ACCESS INOPERATIVE - RED LED INDICATOR	1. Loss of Controller Area Network (CAN) - Interior High Speed (IHS) or CAN-C communication.	1. Further diagnosis of CAN-IHS or CAN-C communication requires the use of a diagnostic scan tool and the appropriate diagnostic procedures.
	2. Cellular antenna issue.	2. Refer to the Audio And Video System service information for further diagnosis of the cellular (combination) antenna. See AUDIO/VIDEO /ENTERTAINMENT/CONNECTIVITY - SERVICE INFORMATION .
	3. Ineffective embedded cellular device.	3. Further diagnosis of the RRM requires the use of a diagnostic scan tool and the appropriate diagnostic procedures. Test and replace the RRM, if required.

UCONNECT ACCESS DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
WI-FI HOT SPOT INOPERATIVE	1. Uconnect registration incomplete.	1. Select the **Apps** soft key in the RRM display, then select the **Uconnect Registration App** soft key from the **Apps** list. For further assistance press the **ASSIST** button on the inside rear view mirror to contact Uconnect Customer Care.
	2. Uconnect Wi-Fi subscription service is inactive or expired in the RRM.	2. This feature is only available with the Uconnect Wi-Fi subscription service. Be certain that the subscription service account is active in the RRM.
	3. Wi-Fi capability is not enabled in user's Bluetooth device.	3. Confirm Wi-Fi setting in user's Bluetooth device is enabled. Refer to the user's manual for that device.
	4. Selected Wireless Access Point (WAP) is incorrect.	4. Confirm that correct WAP is selected in user's Bluetooth device. Refer to the user's manual for that device.
	5. Wireless Access Point (WAP) password or security settings incorrect.	5. Use the Application Settings menu of the RRM display to confirm or adjust the WAP password and security settings.
	6. Cellular antenna issue.	6. Refer to the Audio And Video System service information for further diagnosis of the cellular antenna. See **AUDIO/VIDEO /ENTERTAINMENT/CONNECTIVITY - SERVICE INFORMATION** .

STANDARD PROCEDURE

NAVIGATION SYSTEM - ACTIVATION

In vehicles equipped with the optional Navigation Ready version of the Radio Receiver Module (RRM) (also known as the radio or the head unit), if the customer chooses to have the navigation system activated, the vehicle must be returned to the dealer for system activation. The dealer activates the navigation system as follows:

NOTE: **Once a Radio Receiver Module (RRM) (also known as the radio or the head unit) with the Navigation Ready feature has had the Navigation feature activated, any factory replacement RRM for the same vehicle will be provided with the Navigation system already activated.**

1. Place the RRM into Dealer Mode using a simultaneous 3 button press of the driver side Temperature Up, driver side Temperature Down and Front Defrost push buttons.
2. The Dealer Mode screen will appear in the RRM display showing the System Information menu. Select the **VP3 Navigation Activation** menu item.
3. A Navigation Activation screen appears advising that an Activation Code needs to be purchased and referencing Technical Service Bulletin (TSB) 08-031-12. A 16 digit alpha numeric Request Code appears just below the displayed text.

4. With the Request Code and the Vehicle Identification Number (VIN), log onto the DealerConnect web site (**https://dealerconnect.chrysler.com/**). Locate the Navigation Activation link on the web site, enter the Request Code and VIN as appropriate. The web site will respond with an alpha numeric Activation Code.

   NOTE: **During the initial launch of this product, the dealer will be provided with a Navigation Activation phone number (Nokia Location And Content Call Center) to use in order to obtain an Activation Code rather than the DealerConnect link mentioned in Step 4.**

5. With the Activation Code, go back to the RRM and press the **OK** button on the Navigation Activation screen. A Data Entry screen will appear. Enter the Activation Code, then press the **OK** button on the Data Entry screen.
6. The navigation system has now been activated using the hardware and software that was installed in the RRM at the time that it was manufactured. If the customer wishes to update the factory installed map and Points-Of-Interest (POI) software, it may be purchased at the customer's expense and downloaded from the Navteq Maps web site (**www.navigation.com**). See Navigation System - Restore Or Update. Refer to STANDARD PROCEDURE.

NAVIGATION SYSTEM - RESTORE OR UPDATE

Navigation System map and Point-Of-Interest (POI) data updates may become available occasionally through the Navteq Maps web site (www.navigation.com). The updated information as well as some additional feature applications can be downloaded and copied to Universal Serial Bus (USB) media for transfer and installation to the navigation module within the Radio Receiver Module (RRM) (also known as the radio or the head unit) in the vehicle. These are fee-based applications and updates, which are made at the option and expense of the customer.

However, a new RRM is equipped with only a standard base version of the map and POI data. Before an original RRM is replaced by the dealer with a new unit, the version of the map and POI data on the original RRM must be noted. If the version of the map and POI data found on the new RRM is not equal to or newer than the version that was found on the replaced RRM, updated data will have to be downloaded and installed to the new RRM at the expense of the dealer.

UCONNECT ACCESS SYSTEM - REINSTALL APPLICATIONS

NOTE: **The following procedure may assist the dealer technician in diagnosis by reloading the applications for which the vehicle owner or operator has valid subscriptions. This is primarily used to troubleshoot any application provisioning or data corruption issues. The reinstallation process may take up to 30 minutes, depending upon the number of apps and the cellular signal strength seen on the Apps orb of the Radio Receiver Module (RRM). In addition, reinstalling applications may correct a Digital Rights Management (DRM) concern that is causing a No Subscription error for customers that were fully registered. This process may also help force DRM synchronization following a software or firmware update.**

The Reinstall Applications procedure can only be initiated from the touchscreen of the Radio Receiver Module (RRM) (also known as the radio or the head unit).

During this procedure, the subscribed applications are removed from the RRM and reinstalled based upon data found on the cloud server. The applications reinstalled onto the RRM will be based upon valid subscriptions and is referred to as Digital Rights.

1. Navigate through the **Apps > Uconnect Store > My Apps > Settings** on the RRM touchscreen.
2. Select **Reinstall Apps** .
3. Press the **Continue** soft key to initiate the Reinstall Applications procedure, or press the **Help** soft key for more information.
4. When the **Apps reinstalled. Radio will restart shortly.** screen appears, press the **OK** soft key.
5. Once the request is processed, a screen will appear alerting the customer with the message, **Important: Application Data Reset Initiated. After Radio Resets, all application data will be lost. Please Wait.** After the RRM reset occurs, the apps will begin to be reinstalled. The reinstallation process may take up to 30 minutes, depending upon the number of apps and the cellular signal strength seen with the bar graph on the **Apps** soft key orb in the lower right corner of the RRM touchscreen.

NOTE: One or two ignition cycles (including bus time-outs) may speed the reloading process following the radio reset.

UCONNECT ACCESS SYSTEM - REMOVE ACCOUNTS

NOTE: The following procedure is provided to the dealer technician as INFORMATION ONLY. This procedure is intended for use by the vehicle owner or operator. This procedure is used when selling the vehicle or cancelling the Uconnect Access account. Removing the account will disassociate the Vehicle Identification Number (VIN) from the account and remove Uconnect Access features from the vehicle. The Uconnect Access features can be reinstated by repeating the registration process through the Radio Receiver Module (RRM) (also known as the radio or the head unit) and following the directions associated with registering for Uconnect Access.

The Remove Accounts procedure can be initiated by one of three methods:

- Through the touchscreen of the RRM.
- Through the Uconnect™ Call Center (**ASSIST** button on inside rear view mirror) or under **Uconnect™ Apps** selection of the RRM display.
- Through the Uconnect™ Owners information accessed through the Mopar Owner Connect web site (www.moparownerconnect.com).

The following describes the Remove Accounts procedure accomplished through the RRM touchscreen:

1. Navigate through **Apps** > **Uconnect Store** > **My Apps** > **Settings** on the RRM touchscreen.
2. Select **Remove Uconnect Account** .
3. Press the **Continue** soft key after each of the two **Warning** screens, or press the **Cancel** soft key to abort the procedure.
4. When the **Authentication** screen is reached, enter the 4 digit **Uconnect Access ID** .
5. Press the **Continue** soft key to continue the Remove Accounts procedure, the **Help** soft key for additional

information or the **Cancel** soft key to abort the Remove Accounts procedure.

6. When the **This vehicle has been removed from your account.** screen appears, press the **OK** soft key. Once the request is processed, a screen will appear alerting the customer with the message, **Important: Application Data Reset Initiated. After Radio Resets, all application data will be lost. Please Wait.**
7. After the radio reset occurs, Uconnect Access applications will no longer be available and the **Uconnect Registration** screen will appear each time the **Apps** soft key is selected until a new valid registration has been successfully completed.

ANTENNA, NAVIGATION

DESCRIPTION

DESCRIPTION

The navigation antenna is integrated into a roof-mounted combination antenna that also receives satellite audio and cellular signals. Refer to **ANTENNA, SATELLITE, DESCRIPTION** .

OPERATION

OPERATION

The navigation module acquires Global Positioning System (GPS) position data through a roof-mounted combination antenna that also receives satellite audio and cellular signals. Refer to **ANTENNA, SATELLITE, DESCRIPTION** .

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - NAVIGATION ANTENNA

Refer to **DIAGNOSIS AND TESTING** .

REMOVAL

REMOVAL

The navigation antenna is serviced as a unit with the combination antenna located on the roof panel. Refer to **ANTENNA, SATELLITE, REMOVAL** .

INSTALLATION

INSTALLATION

The navigation antenna is serviced as a unit with the combination antenna located on the roof panel. Refer to **ANTENNA, SATELLITE, INSTALLATION** .

MICROPHONE

DESCRIPTION

DESCRIPTION

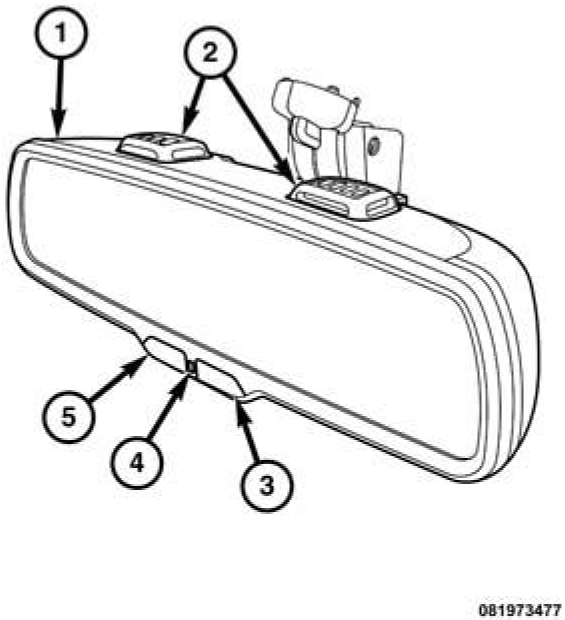

Fig. 1: Stereo Microphones, Rear View Mirror Housing And Push Buttons
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the optional hands-free system have two stereo microphones (2) mounted in the top surface of the inside rear view mirror housing (1), one to each side of center. The two microphones are individually powered by and provide hard wired inputs to the Radio Receiver Module (RRM) (also known as the radio or the head unit) in the instrument panel whenever the Voice Recognition (VR) feature of the hands-free system is active. These two microphones are connected to the vehicle electrical system through a connector receptacle integral to the forward-facing surface of the inside rear view mirror housing by a dedicated take out and connector of the overhead wire harness.

In vehicles equipped with the optional Uconnect™ Access system, the inside rear view mirror system also houses both a **9-1-1** push button (3) and a **Assist** push button (5).

The microphones cannot be adjusted or repaired and, if damaged or ineffective, they must be replaced as a unit with the inside rear view mirror assembly.

OPERATION

OPERATION

When the hands-free Voice Recognition (VR) control circuitry integral and internal to the Radio Receiver Module (RRM) (also known as the radio or the head unit) detects the appropriate inputs or requests, it energizes the circuitry of the two stereo microphones within the inside rear view mirror housing. The microphones remain active until they are deactivated by the hands-free VR control circuitry, or until the status of the ignition switch (also known as the Keyless Ignition Node/KIN or IGnition Node Module/IGNM) transitions to Off, whichever occurs first.

The inputs from the microphones is processed, filtered and redirected by the VR control circuitry and logic as appropriate. Those inputs can be redirected to the Advanced Speech Recognition (ASR) engine or to the audio send circuitry of the Bluetooth™ transceiver. Each of these electronic modules is also integral and internal to

the RRM.

The status of the Uconnect™ Access **Assist** and **9-1-1** push buttons is relayed by the Local Interface Network (LIN) slave node integral to the inside rear view mirror over the LIN data bus to the Body Control Module (BCM) (also known as the Common Body Controller/CBC), which is a LIN master node. The BCM is also a Controller Area Network (CAN) data bus gateway and relays the push button status information to the RRM over the CAN - Interior High Speed (CAN-IHS) data bus.

The hard wired inputs and outputs of the microphones in the inside rear view mirror may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the microphone or the electronic controls and communication between modules and other devices that provide some features of the RRM controlled microphones. The most reliable, efficient and accurate means to diagnose the RRM or the electronic controls and communication related to RRM-controlled microphone operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - MICROPHONE

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS). Refer to RESTRAINTS - SERVICE INFORMATION before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired inputs and outputs of the microphones in the inside rear view mirror may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the microphone or the electronic controls and communication between modules and other devices that provide some features of the Radio Receiver Module (RRM) (also known as the radio or the head unit) controlled microphones. The most reliable, efficient and accurate means to diagnose the RRM or the electronic controls and communication related to RRM-controlled microphone operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

The inside rear view mirror mounted microphones used in this vehicle are integral to and serviced only as a unit with the inside rear view mirror. Refer to **MIRROR, REARVIEW, REMOVAL** .

INSTALLATION

INSTALLATION

The inside rear view mirror mounted microphones used in this vehicle are integral to and serviced only as a unit with the inside rear view mirror. Refer to **MIRROR, REARVIEW, INSTALLATION** .

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Article GUID: A00735925

2015-16 SUSPENSION

Tires & Wheels - Service Information - Challenger

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - TIRE AND WHEEL VIBRATION

Tire and wheel imbalance, runout and tire road force variation can cause vehicles to exhibit steering wheel vibration and/or seat vibration.

VEHICLES WITH A VIBRATION OR SHAKE

The following procedure is to identify, prevent and correct tire flat spotting.

Description

Immediately following delivery, some vehicles may exhibit a vibration or shake due to temporary tire flat-spotting. The vibration may be felt in the steering wheel or seat and will be most noticeable at highway speeds 96 kph (60 mph). This could be misinterpreted as an out of balance tire. Flat Spotting can occur if the vehicle has not been moved for a few days or for a longer period of time. In most cases it is temporary condition. In extreme cases it can be permanent.

Tire pressure is often inflated to the maximum sidewall pressure at the vehicle assembly plant to prevent "flat spots" on tires during new vehicle shipping and vehicle storage. Inflating tires to the maximum sidewall tire pressure helps to preserve the integrity of the tire and reduces potential technical issues.

It is important to remove temporary flat spotting before performing tire balance, tire run-out or tire road force checks. If the flat spotting is not removed it can result in incorrect measurements.

Flat Spotting Removal

NOTE: **If the vehicle has been sitting for an extended period of time it is recommended to drive the vehicle to warm the tires. This process could eliminate flat spots that can cause vibration.**

1. Drive the vehicle at highway speeds until the vibration (flat spotting) is eliminated.

   NOTE: **In most cases, flat spot vibrations will be eliminated within 20 minutes (about 20 miles) of driving at highway speeds. If the vehicle has been stored without moving for an extended time, it may be necessary to drive the vehicle longer at highway speeds. If the vibration is not completely eliminated during the test drive, proceed to Step 2.**

2. Within 10 minutes after driving the vehicle, raise the vehicle so there is no load on the tires.
3. Check the tire and wheel assemblies for balance, run-out, and road force variation. Refer to **STANDARD PROCEDURE**.
4. Only install new tires after the vehicle has been driven as directed and all appropriate wheel and tire diagnostics have been completed.

VISUAL INSPECTION

Visual inspection of the vehicle is recommended prior to road testing or performing any other procedure. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

Inspect for the following:

- Verify correct (OEM) wheel and tire, as well as presence of wheel weights.
- Inspect tires and wheels for damage, mud packing and unusual wear; correct as necessary.
- Check and adjust tire air pressure to the pressure listed on the label attached to the driver's door opening.

ROAD TEST

NOTE: **If a Noise & Vibration Analyzer is available, use it to diagnosis the issue during the road test.**

NOTE: **If the vehicle has been sitting for an extended period of time it is recommended to drive to warm the tires. This process could eliminate flat spots that can cause vibration.**

Road test vehicle on a smooth road **at and near the designated speed** where legal speed limits allow. Lightly place hands on steering wheel at the 10:00 and 2:00 positions and observe for:

- Steering wheel oscillation: clockwise/counterclockwise
- Steering wheel high frequency movement: rapid vibration up and down
- Seat high frequency movement: rapid vibration up and down

To rule out vibrations due to brakes or powertrain:

- Lightly apply brakes at the designated speed; if vibration occurs or is enhanced, vibration is likely due to a brake concern.
- Shift transmission into neutral while vibration is occurring; if vibration is eliminated, vibration is likely due to a powertrain concern refer to **DIAGNOSIS AND TESTING** for additional information.

TIRE/WHEEL BALANCE AND ROAD FORCE VARIATION

NOTE: **If wheel balance equipment is capable of testing tire road force variation and the tire/wheel assemblies are within specification, place the tires with the greater road force variation on the rear of the vehicle.**

Balance the tire and wheel assemblies as necessary, and if wheel balance equipment is capable, also test for tire and wheel runout and road force variation following the wheel balancer manufacturer's instructions and using the information listed in Tire And Wheel Balance. Refer to **STANDARD PROCEDURE**. Repeat the road test above to verify the vibration is repaired.

STANDARD PROCEDURE

TIRE AND WHEEL BALANCE

BACK CONE MOUNTING

FLANGE PLATE MOUNTING

CHROME/PLASTIC CLAD WHEEL SERVICE

FORCE MATCHING

NOTE: Always verify the wheel and tire balance before removing any wheel weights. If assembly is within specification and weights are not corroded or loose, do not remove weights. The process of removing and adding weight could damage wheel protective coating.

NOTE: Balance and road force variation equipment must be calibrated and maintained per equipment manufacturer's specifications.

NOTE: If a tire sealant & inflator kit was used to temporarily repair small punctures then the tire must be removed from wheel and all the sealant must be removed with a water damped cloth before repairing & balancing the assembly.

NOTE: Some wheels may not have an outer flange. Apply adhesive weights on midplane surface to balance.

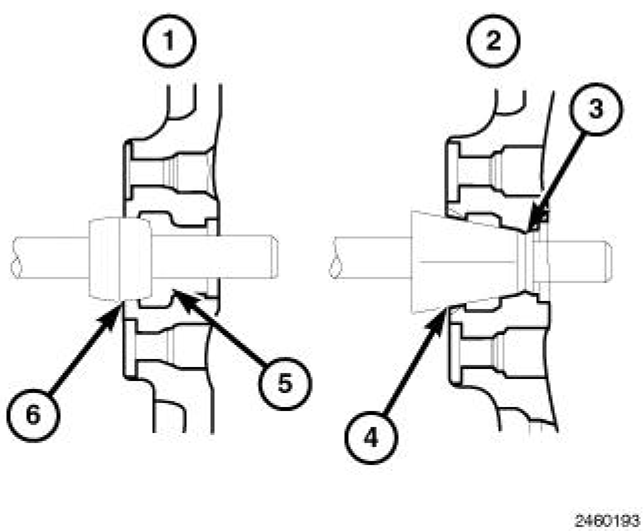


Fig. 1: Balancing Wheels Using Cone/Collet
Courtesy of CHRYSLER GROUP, LLC

NOTE: Use of the proper collet will prevent potential damage to the Chrome Clad wheels.

NOTE: Balance equipment could read an incorrect balance result when measuring Chrome Clad wheels. This is caused by the equipments mounting cone/collet contacting the cladding or the cone/collet is not balanced. A dual-taper collet (1) type wheel centering tool is recommended as opposed to a high-taper cone (2) type wheel centering tool. Always use the manufacturer's recommended

balance equipment.

- Dual-taper collet type (1)
- High-taper cone type (2)
- Possible obstruction (3)
- May not seat properly (4)
- No obstruction (5)
- Properly seated (6)

NOTE: If wheel balance equipment is capable of testing tire road force variation and the tire/wheel assemblies are within specification, place the tires with the greater road force variation on the rear of the vehicle.

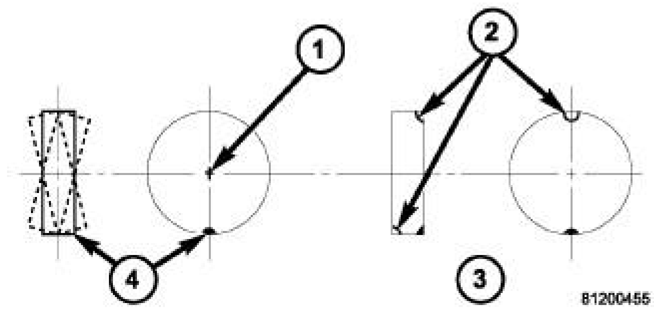


Fig. 2: Dynamic Balancing
Courtesy of CHRYSLER GROUP, LLC

For dynamic balancing (**recommended**), the balance equipment is designed to indicate the location and amount of weight to be applied to both the inner and outer rim flanges (2).

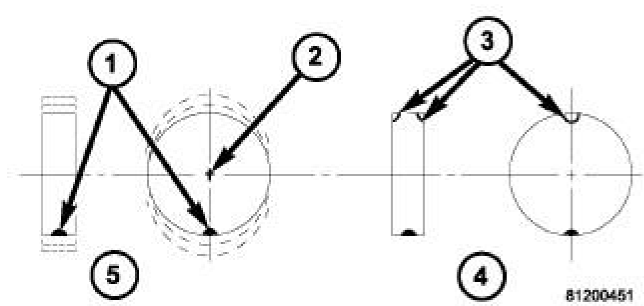


Fig. 3: Static Balancing

Courtesy of CHRYSLER GROUP, LLC

For static balancing (**not recommended**), find the location of the heavy spot causing the imbalance (1). Counter balance the wheel directly opposite the heavy spot. Determine weight required to counterbalance the area of imbalance. Place half of this weight on the **inner** rim flange and the other half on the **outer** rim flange (3) at the predetermined spots.

Aluminum wheels use a different type wheel weight than steel wheels. Be sure to use the correct wheel weight for the wheel type.

Always verify the balance. When using off-vehicle equipment, remount the tire and wheel assembly 180 degrees on the balancer spindle and recheck balance. Balance variation from one spot to the other should not be more than 0.125 (?) ounce. If variation is more than 0.125 ounce, balancing equipment could be malfunctioning, or the wrong collet/cone may have been used.

If difficult to balance, break down the tire and wheel assembly and check for loose debris inside the tire. Prior to disassembly, mark (index) the tire at the valve stem. Use this mark in order to remount the tire in its original orientation with respect to the wheel.

TIRE AND WHEEL ROTATION

The following information covers recommended tire rotation practices. For Tire And Wheel Removal and Installation procedures, refer to **INSTALLATION** and **REMOVAL**.

ALL-SEASON TIRE EQUIPPED

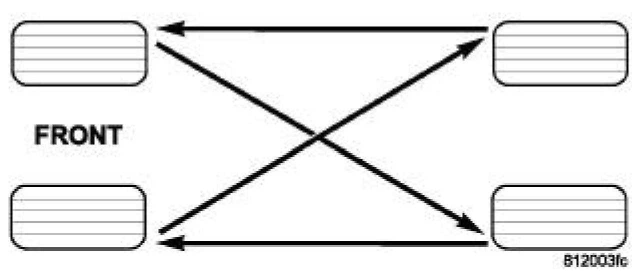


Fig. 4: Rotating Tires
Courtesy of CHRYSLER GROUP, LLC

This vehicle is equipped with All-Season tires (Standard) (Goodyear 245/45ZR20) or (Pirelli 275/40ZR20) use the suggested method of tire rotation that is shown in the graphic. Other rotation methods can be used, but they will not provide all the tire longevity benefits.

REMOVAL

TIRE AND WHEEL ASSEMBLY (ALUMINUM WHEEL)

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. If vehicle is equipped with wheel center caps covering wheel nuts, remove cap with appropriate removal tool utilizing notch formed into wheel near valve stem. Use care not to damage wheel coating.
3. Remove five wheel mounting (lug) nuts from studs.
4. Remove tire and wheel assembly from hub.

INSTALLATION

TIRE AND WHEEL ASSEMBLY (ALUMINUM WHEEL)

WARNING: **Installing wheels without good metal-to-metal contact with the mounting surface could cause loosening of the wheel mounting (lug) nuts. This could adversely affect the safety and handling of the vehicle.**

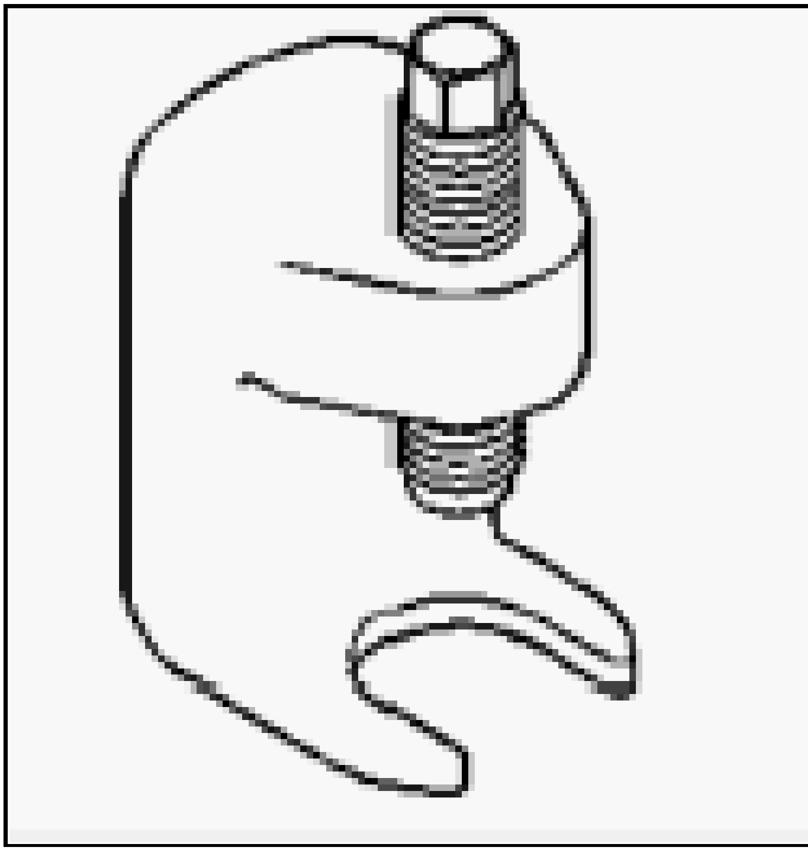
NOTE: **Never use oil or grease on studs or wheel mounting (lug) nuts.**

NOTE: **Clean wheel mounting surfaces, removing any build-up of corrosion. It is important to have good metal-to-metal contact between wheel and vehicle.**

1. Install the tire and wheel assembly on the hub and lightly snug all five wheel mounting (lug) nuts. **Do not tighten at this time.**
2. Progressively tighten wheel mounting (lug) nuts, in a star pattern, to the proper **WHEELS, SPECIFICATIONS**.
3. If applicable, install wheel center cap (4).
4. Remove the support and lower the vehicle.

SPECIAL TOOLS

SPECIAL TOOLS

	C-4150A - Press, Ball Joint (Originally Shipped In Kit Number(s) 6672, 6745.)

TIRE PRESSURE MONITORING

DESCRIPTION

DESCRIPTION

The Tire Pressure Monitoring (TPM) system monitors air pressure in the four road tires (excludes spare). Pressure in the spare tire is not monitored.

There are two tire pressure monitoring systems available, a base system and a premium system. The base system does not specify how many tires are low or where they are located. The premium system does so.

Both TPM systems consist of tire pressure monitoring sensors attached to each road wheel through the valve stem mounting hole and a TPM module. The receiver circuit for the TPM system is mounted in the right rear wheel well. The TPM module is fixed to a metal bracket mounted to the inner wheel well located behind the splash shield. The TPM module decodes the RF signals transmitted by each of the vehicle's tire pressure sensors. The decoded information is used to determine if "warning" or "fault" conditions exist within the TPM system.

Upon detection of a warning or fault condition, the TPM module will send a request to the module that controls the indicator lamp and the text display via the vehicle bus system to illuminate or flash the indicator lamp. Also, upon detection of a warning or fault condition, the electronic display will send a request to sound the "chime".

The TPM module will store all warning and fault conditions, placard pressure values and low pressure threshold values (lamp ON and OFF) in memory that can be accessed through diagnostic communication. If new sensors are introduced to the vehicle, the data stored for the sensor being replaced will be deleted once the new sensor id has been learned.

The TPM module will store all wheel sensor ID's and locations and faults in memory that can be accessed through diagnostic communication.

The TPM module automatically learns and stores the sensor IDs while driving "within 20 minutes continuously above 24 km/h (15 mph)" after a sensor has been replaced. The learning sequence will initiate when the vehicle has been stopped for more than 20 minutes.

NOTE: A new sensor ID can also be programmed directly into the TPM module by using a RKE-TPM Analyzer in conjunction with a Scan Tool. Once the new sensor ID has been programmed, the vehicle will need to be driven above 15mph until the fault is no longer active (lamp extinguishes) and display is updated (for up to 20 minutes).

NOTE: Using a TPM-RKE Analyzer can take up to a minute to force a transmission from a sensor.

OPERATION

OPERATION

TIRE PRESSURE MONITORING

The Tire Pressure Monitoring (TPM) system is designed to operate without loss of function for all OEM tire construction for this vehicle. Sensors, mounted to each road wheel as part of the valve stem, transmit an RF signal indicating their individual pressure to a receiver located in the TPM module. These transmissions occur approximately once every minute at speeds over 15 mph (24 km/h). For more information on sensors, refer to SENSOR, TIRE PRESSURE MONITORING (TPM), OPERATION.

If the TPM module detects that the tire pressure in any road tire is going low, beyond the Low Pressure (lamp) ON threshold (see placard chart below), a chime will sound and the indicator lamp will turn on. In addition to the chime and lamp, a graphic display of the pressure value(s) and position of the low tire(s) will flash in the Electronic Vehicle Information Center (EVIC). Once pressure in the suspect tire(s) raises above the Low Pressure (lamp) OFF Threshold (see placard chart below), and the TPM module receives a valid transmission from the sensor, the lamp will go out. If a system fault is detected due to a missing sensor signal, in addition to a chime and a indicator lamp flashing, a "Check TPM System" text message will be displayed in the instrument cluster, and the tire pressure graphic display will have "- -" in place of the pressure value. After the flash sequence, the TPM indicator lamp will remain illuminated. The system will return to normal once the TPM module receives a valid transmission from that sensor location. If a system fault is detected, the indicator lamp will flash on/off for 75 seconds and then remain on solid.

If the TPM module detects a warning or fault condition at ignition key ON it will wait approximately ten seconds before sending the first request to illuminate the indicator lamp. This will assure that the display module has concluded its bulb check period. The display module will request a chime once per ignition cycle when a "warning" or "fault" condition is detected. A "warning" or "fault" condition will remain enabled until the problem causing the condition is corrected and reset.

The TPM module shall continuously monitor for the receipt of tire pressure RF message transmissions from the wheel sensors during the ignition key ON cycle. The wheel sensor IDs and the location of each sensor (e.g. Tire 1, Tire 2 etc.) are learned by the TPM control module using signal strength and direction of wheel rotation as received by the TPM module from each of the sensors, and updates the graphic display when necessary or

during a service procedure, as required.

The TPM System will continue to warn the driver of low tire pressure as long as the condition exists, and will not turn off the indicator lamp until the tire pressure is at or above the Low Pressure (lamp) OFF threshold (see placard chart below). The system will automatically update and the TPM indicator lamp will turn off once the updated tire pressures have been received.

Tire pressure will vary with temperature by about 1 psi (6.9 kPa) for every 12Ā°F (6.5Ā°C). This means that when the outside temperature decreases, the tire pressure will decrease. Tire pressure should always be set based on cold inflation tire pressure (placard pressure). This is defined as the tire pressure after a vehicle has not been driven for more than 3 hours (and in outside ambient temperature). The tire pressure will also increase as the vehicle is driven? this is normal and there should be no adjustment for this increased pressure. For a system fault, the system will return to normal once the TPM module receives a valid transmission from that sensor location.

TPM THRESHOLD PRESSURES

NOTE: **To determine the pressure thresholds for a vehicle, refer to the Tire Inflation Pressure (Placard) Label found on the Driver B-pillar, then apply the placard pressure to the following chart .**

Placard Pressure (Cold) (PSI)	Low Pressure ON Threshold (PSI)	Low Pressure OFF Threshold (PSI)
28	22	26
29	23	27
30	24	28
31	25	29
32	25	29
33	26	30
34	27	31
35	28	32
36	29	33
37	29	34
38	30	35
39	31	36
40	32	37
41	33	38
42	34	39
43	35	40
44	36	41
45	36	41
46	37	43
47	38	44
48	38	45
49	39	45

Placard Pressure (Cold) (PSI)	Low Pressure ON Threshold (PSI)	Low Pressure OFF Threshold (PSI)
50	40	47
51	41	48
55	44	52
60	48	57
65	52	62
70	56	67
75	60	72
80	64	77

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - TIRE PRESSURE MONITORING

When diagnosing a tire pressure issue, first check the Tire Pressure Monitoring (TPM) indicator lamp in the instrument cluster during ignition key ON. From the OFF position, turn the key to ON and check the TPM indicator lamp to observe one of the following:

- If after 10 seconds the indicator lamp is illuminating continuously (not flashing), proceed to **LOW PRESSURE**.
- If after 10 seconds the indicator lamp flashes on/off for 75 seconds, then remains on solid, there is a system fault detected. Proceed to SYSTEM FAULT below.

LOW PRESSURE

NOTE: **Tire pressure may increase from 2 to 6 psi (14 to 41 kPa) during normal driving conditions. Do NOT reduce this normal pressure build up.**

NOTE: **Tire pressure will vary with temperature by about 1 psi (6.9 kPa) for every 12Â°F (6.5Â°C). This means that when the outside temperature decreases, the tire pressure will also decrease. Tire pressure should always be set based on cold inflation tire pressure. For details, refer to TIRES, STANDARD PROCEDURE.**

Check air pressure as necessary in all tires using a known accurate air gauge and adjust to the specification listed on the Tire Inflation Pressure Label (Placard) provided with the vehicle (usually applied to the driver side B-pillar). After adjusting air pressure in a tire on the vehicle, the vehicle needs to be driven for approximately two minutes above 15 mph for the message or indicator lamp to go out.

If air pressure in any tire is low, inspect **all** the tires for leaks. A water "dunk tank" or other water test may be used to check for a leak around the sensor as long as any water at the valve core is removed once the procedure is completed. The water can be easily expelled from the core area by pushing in on the core for several seconds, allowing escaping air to drive out any moisture. Reinflate the tire as necessary. Always make sure the original (special) valve stem cap is securely installed to keep moisture out of the sensor.

If the indicator lamp is still ON continuously, refer to the appropriate diagnostic information.

SYSTEM FAULT

If a system fault is detected, a chime will sound, and the TPM indicator (telltale) lamp will flash for 75 seconds, then remain on solid. For vehicles with the Premium TPM Systems, a "CHECK TPM SYSTEM" message will appear in the Electronic Vehicle Information Center (EVIC), followed by a graphic display. A system fault can occur by many reasons, including the following:

- Signal interference due to electronic devices or driving next to facilities emitting the same radio frequencies as the TPM sensors
- Installing some form of aftermarket window tinting that affects radio wave signals
- Accumulation of snow or ice around the wheels or wheel housings
- Using tire chains on the vehicle
- Using wheels not equipped with TPM sensors

Refer to the appropriate diagnostic information.

SENSOR, TIRE PRESSURE MONITORING (TPM)

CAUTION

CAUTION

CAUTION:	**The use of tire sealants is not recommended for vehicles equipped with the Tire Pressure Monitoring system. Tire sealants may clog tire pressure sensors.**
CAUTION:	**Tire pressure sensor valve stem caps and cores are specially designed for the sensors. Due to risk of corrosion, do not use a standard valve stem cap or core in a tire pressure sensor in place of the original equipment style sensor cap and core.**
CAUTION:	**It is not recommended to install a tire pressure sensor in an aftermarket wheel. Use tire pressure sensors in original style factory wheels only.**
CAUTION:	**Any time a sensor is to be reinstalled in a wheel, a new valve stem assembly must be installed to ensure air tight sealing.**
NOTE:	**TPM thresholds have been established for the original tire size equipped on the vehicle. Use original size tires only to maintain system accuracy.**

DESCRIPTION

NON SRT8

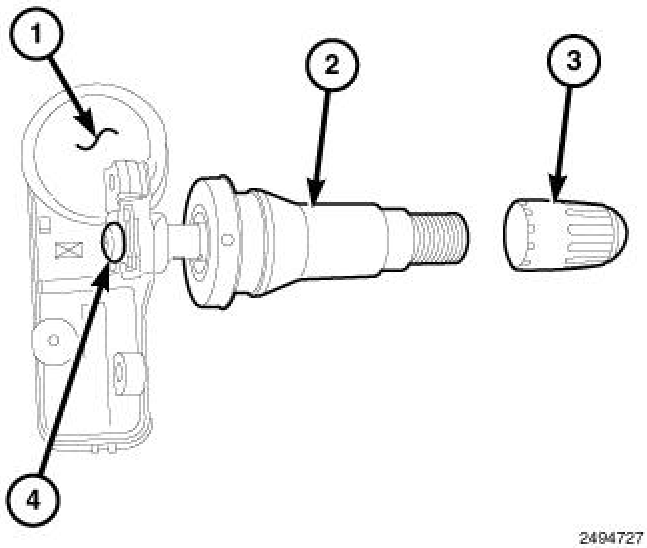


Fig. 5: Tire Pressure Monitoring Sensor Components
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Replace the valve stem assembly and tire pressure sensor mounting screw with each tire change.**

One tire pressure sensor (1) is mounted to a valve stem (2) specifically designed for mounting the pressure sensor (1) in each wheel in place of the traditional tire valve stem. Each sensor has an internal battery that lasts up to 10 years. The battery is not serviceable. At the time of battery failure, the sensor (1) must be replaced. The TPM system operates on a 433 MHz radio frequency. The tire pressure sensor valve stem (2) looks similar to a standard valve stem with the tire mounted on the wheel. To visually identify a tire pressure sensor/valve stem, the valve stem cap (3) is longer than a standard valve stem.

NOTE: **This vehicle uses the 433 MHz TPM sensor. Although 315 MHz and 433 MHz sensors are identical in size and shape, they are not interchangeable. Always make sure the correct sensor is being used. A RKE-TPM Analyzer can be used to determine the sensor's frequency without having to dismount the tire.**

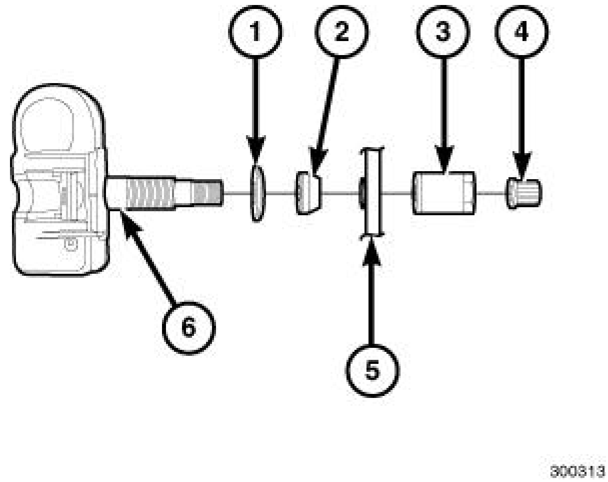
The TPM sensors are designed for original style factory wheels. It is not recommended to install a tire pressure sensor in an aftermarket wheel. This could cause sealing and system performance issues.

The serviceable components of the tire pressure sensor are:

- Tire pressure sensor (1), including all components below
- Valve stem (2), including screw (4), core, and cap (3)
- Valve stem core (not shown)
- Valve stem cap (3)

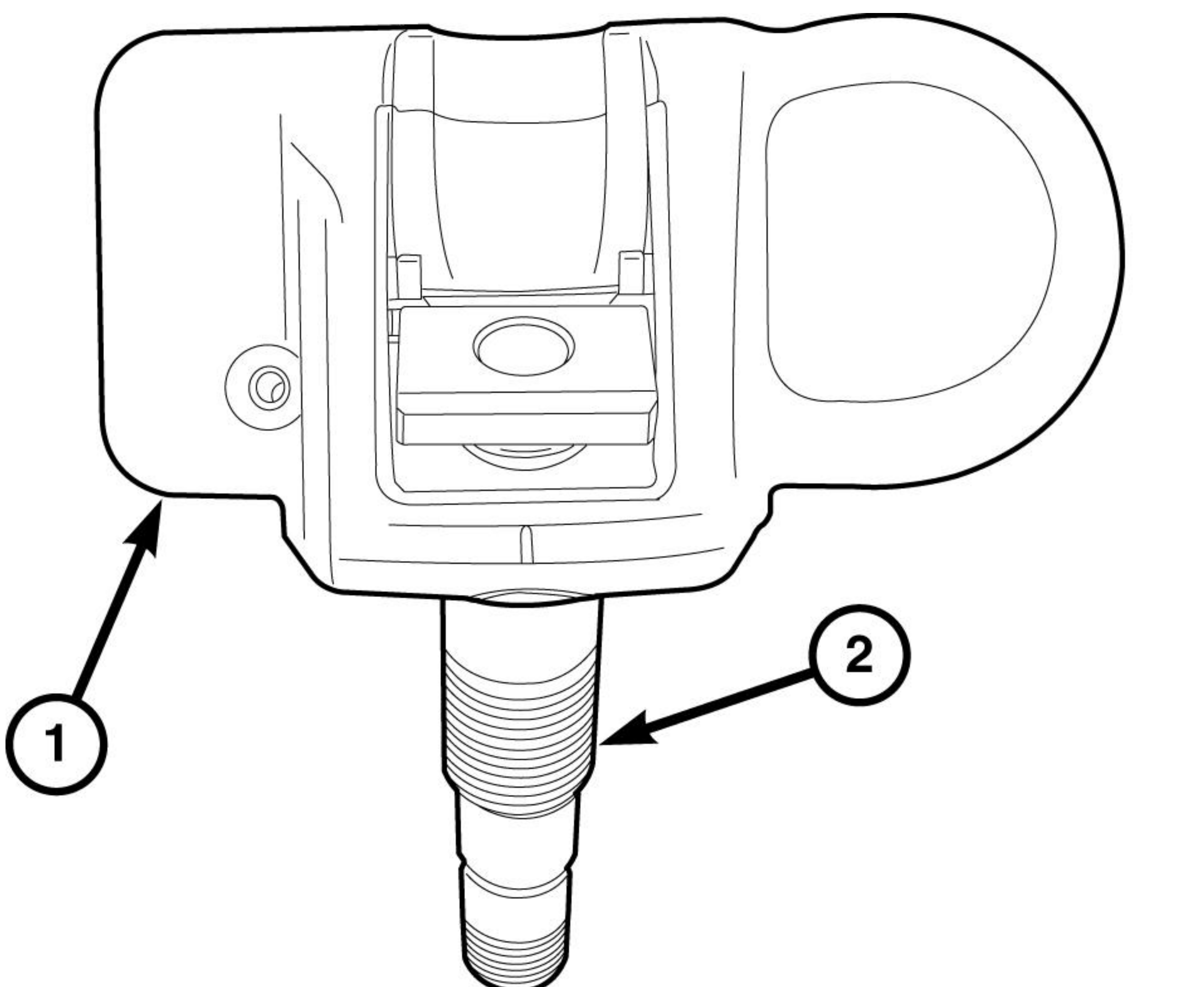
The valve stem caps and cores used are specifically designed for the tire pressure monitoring sensors. Although similar to standard valve stem caps and cores, they are different. The valve stem cap has a special seal inside to keep moisture and corrosion out. The valve stem core has a special nickel coating to protect from corrosion.

SRT8



[Fig. 6: Sensor Mounting - Exploded View](#)
Courtesy of CHRYSLER GROUP, LLC

On vehicles equipped with Tire Pressure Monitoring (TPM), one tire pressure sensor (6) is mounted to each wheel in place of the traditional tire valve stem. Each sensor has an internal battery that lasts up to 10 years. The battery is not serviceable. At the time of battery failure, the sensor must be replaced.



[Fig. 7: Tire Pressure Monitoring Sensor](#)
Courtesy of CHRYSLER GROUP, LLC

The TPM system operates on a 433 MHz radio frequency. The 433 MHz sensors (1) can be easily identified by the part number.

CAUTION: Although additional sensors operating at 433 MHz sensors are available and are used in other applications, they are not interchangeable. Always make sure the correct sensor is being used and be sure to replace the sensor with the correct part number.

NOTE: Once mounted inside a tire and wheel assembly you are not able to visually see the difference between this sensor and other 315 MHz and 433 MHz sensors. At that point, the TPM/RKE Analyzer 9936, with the Scan Tool may be used to identify the sensor frequency or the tire can be dismounted allowing visual inspection of the sensor body and part number.

The TPM sensors are designed for original style factory wheels. It is not recommended to install a tire pressure sensor in an aftermarket wheel (This could cause sealing and system performance issues). **Do not attempt to install a tire pressure sensor in an aftermarket wheel. If aftermarket wheels are installed and do not contain tire pressure sensors, the system will not function properly and the driver will be continuously notified of a system malfunction.**

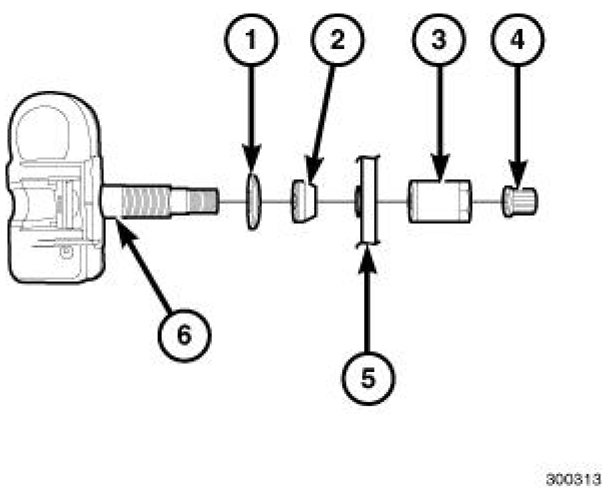


Fig. 8: Sensor Mounting - Exploded View
Courtesy of CHRYSLER GROUP, LLC

1 - METAL WASHER
2 - SEAL
3 - NUT (WITH PRESSED-IN WASHER)
4 - CAP (WITH SEAL)
5 - SECTIONAL CUTAWAY OF WHEEL
6 - TPM SENSOR

The serviceable components of the tire pressure sensor are:

- Sensor-To-Wheel Seal (2) and Metal Washer (1)
- Valve Stem Cap (4)
- Valve Stem Core

- Valve Stem Nut (with pressed-in washer) (3)

NOTE: **Any time a sensor is installed on a wheel, a new Sensor-To-Wheel Seal (2), Metal Washer (1) and Valve Stem Nut (3) must be installed to ensure air tight sealing. A service kit is available.**

The valve stem caps and cores are specifically designed for the tire pressure monitoring sensors. Although similar to standard valve stem caps and cores, they are different. The valve stem cap has a special seal inside to keep moisture and corrosion out. The valve stem core has a special nickel coating to protect from corrosion.

OPERATION

OPERATION

CAUTION: **The TPMS has been optimized for the original equipment tires and wheels. TPMS pressures have been established for the tire size equipped on your vehicle. Undesirable system operation or sensor damage may result when using replacement equipment that is not of the same size, type, and/or style. After-market wheels can cause sensor damage. Do not use aftermarket tire sealants or balance beads if your vehicle is equipped with a TPMS, as damage to the sensors may result.**

CAUTION: **After inspecting or adjusting the tire pressure always reinstall the valve stem cap. This will prevent moisture and dirt from entering the valve stem, which could damage the Tire Pressure Monitoring Sensor.**

CAUTION: **Tire pressure sensor valve stem caps and cores are specially designed for the sensors. Due to risk of corrosion, do not use a standard valve stem cap or core in a tire pressure sensor in place of the original equipment style sensor cap and core.**

CAUTION: **Any time a sensor is to be reinstalled in a wheel, a new valve stem assembly must be installed to ensure air tight sealing.**

NOTE: **TPM thresholds have been established for the original tire size equipped on the vehicle. Use original size tires only to maintain system accuracy.**

The battery operated tire pressure sensor is both a transmitter and a receiver. The TPM sensor can be forced to transmit if using a special tool such as a TPM-RKE Analyzer. The TPM-RKE Analyzer has the ability to change the sensor mode and to diagnose a faulty TPM sensor. Using a TPM-RKE Analyzer can take up to a minute to force a transmission from a sensor.

Each sensor's (transmitter) broadcast is uniquely coded so that the module can monitor the state of each of the sensors on the four rotating road wheels. The module can automatically learn and store the sensor's ID while driving "within 10 minutes continuously above 24 km/h (15 mph)" after a sensor has been replaced. The vehicle must be stationary for more then 20 minutes in order to initiate the learning sequence.

The sensor IDs can also be programmed using the TPM-RKE Analyzer Tool. Scan each TPM sensor at each road wheel, and store each Sensor ID in the correct location. (LEFT FRONT, LEFT REAR, RIGHT FRONT,

and RIGHT REAR) Connect the TPM-RKE Analyzer Tool to the Scan Tool. Then follow the programming steps outlined in the diagnostic Scan Tool for "Program Tire Pressure Sensor ID w/ TPM Tool".

REMOVAL

NON SRT8

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove tire and wheel assembly.

CAUTION: The cap used on this valve stem contains an O-ring seal to prevent contamination and moisture from entering the valve stem. Do not substitute a regular valve stem cap in its place.

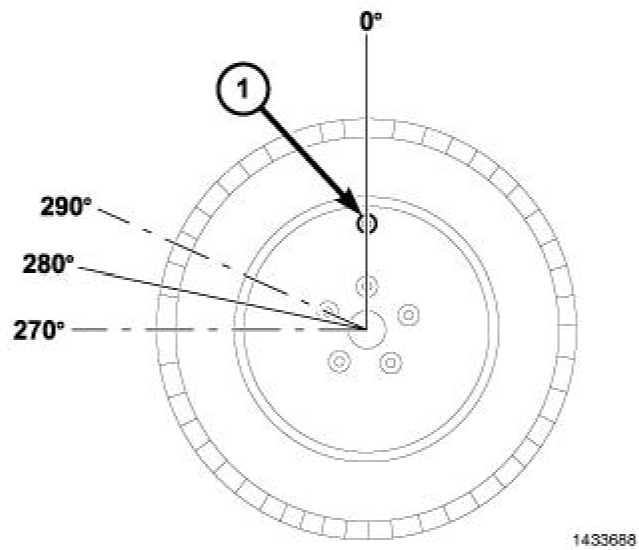


Fig. 9: Start Mount/Dismount Tool Within 10 Degrees Of Valve Stem
Courtesy of CHRYSLER GROUP, LLC

3. Dismount tire from wheel following tire changer manufacturers instructions while paying special attention to the following to avoid damaging the pressure sensor:
   a. When breaking the tire bead loose from the wheel rim, avoid using the Bead Breaker in the area of the sensor (1). That includes both outer and inner beads of the tire.
   b. When preparing to dismount the tire from the wheel, carefully insert the mounting/dismounting tool 280Â° from the valve stem Â± 10Â°, then proceed to dismount the tire from the wheel. Use this process on both outer and inner tire beads.

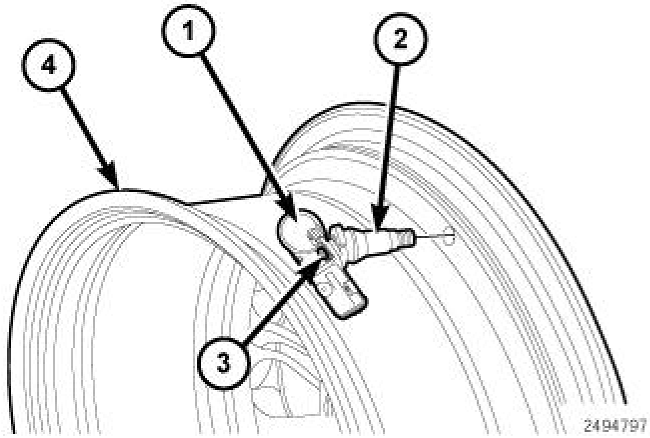


Fig. 10: Sensor Mounting To Wheel
Courtesy of CHRYSLER GROUP, LLC

4. Remove the sensor to valve stem retainer screw (3) and remove the sensor (1) from the valve stem (2).
5. Remove the valve stem (2) from the wheel (4).

SRT8

1. Raise and support vehicle.
2. Remove tire and wheel assembly.

CAUTION:	**The cap used on this valve stem contains an O-ring seal to prevent contamination and moisture from entering the valve stem. Do not substitute a regular valve stem cap in its place.**
CAUTION:	**The valve stem used on this vehicle is made of aluminum and the core is nickel plated brass. The original valve stem core must be reinstalled and not substituted with a valve stem core made of a different material. This is required to prevent corrosion in the valve stem caused by the different metals.**

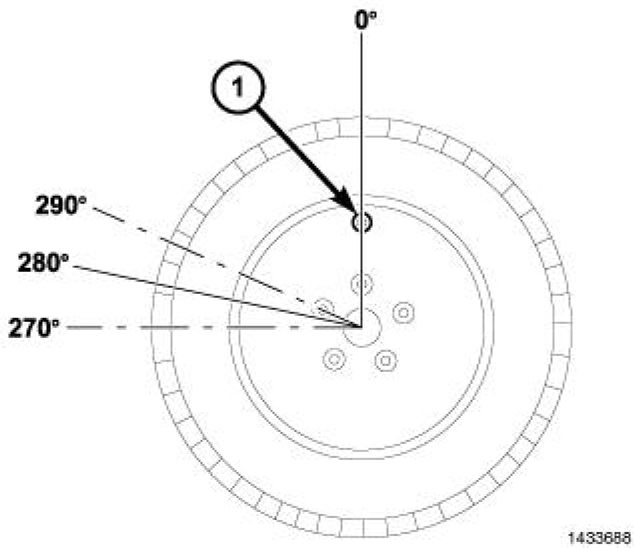


Fig. 11: Start Mount/Dismount Tool Within 10 Degrees Of Valve Stem
Courtesy of CHRYSLER GROUP, LLC

3. Dismount tire from wheel following tire changer manufacturers instructions while paying special attention to the following to avoid damaging the pressure sensor:
    a. When breaking the tire bead loose from the wheel rim, avoid using the Bead Breaker in the area of the sensor (1). That includes both outer and inner beads of the tire.
    b. When preparing to dismount the tire from the wheel, carefully insert the mounting/dismounting tool 280Â° from the valve stem Â± 10Â°, then proceed to dismount the tire from the wheel. Use this process on both outer and inner tire beads.

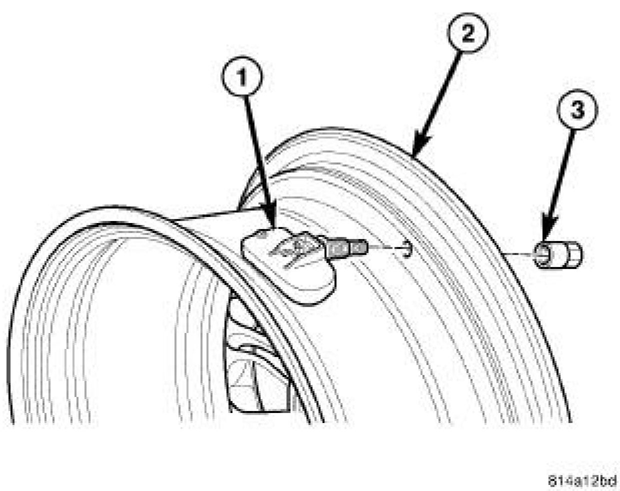


Fig. 12: Sensor Mounting To Wheel
Courtesy of CHRYSLER GROUP, LLC

4. Remove sensor nut (3) retaining sensor to wheel. While removing nut, hold pressure against rear of metal valve stem to keep valve stem from pushing rearward, damaging antenna strap.
5. Remove sensor (1) from wheel (2).

INSTALLATION

NON SRT8

NOTE: **If replacing tire pressure sensor, a new valve stem will be pre-mounted to the sensor as an assembly. Verify that the sensor is positioned properly before seating the valve stem. If replacing a valve stem only (using the existing tire pressure sensor), the new valve stem will include a new tire pressure sensor mounting screw. Always use a new mounting screw when attaching a sensor to a valve stem.**

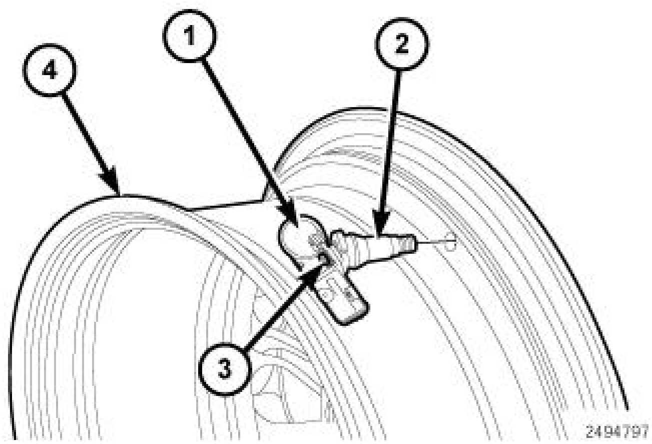


Fig. 13: Sensor Mounting To Wheel
Courtesy of CHRYSLER GROUP, LLC

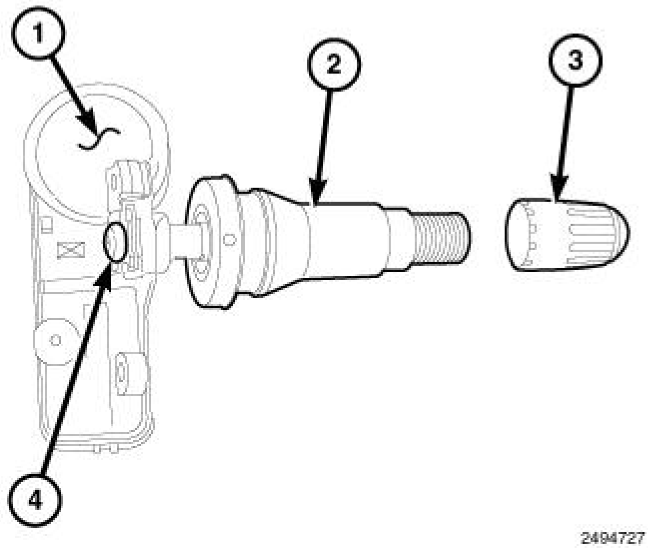
CAUTION: **Any time a sensor is to be reinstalled in a wheel, a new valve stem assembly must be installed to ensure air tight sealing.**

1. Wipe area clean around sensor/valve stem mounting hole in wheel (4). Make sure surface of wheel is not damaged.

   NOTE: **A new valve stem is pre-lubricated for proper installation with a standard tool.**

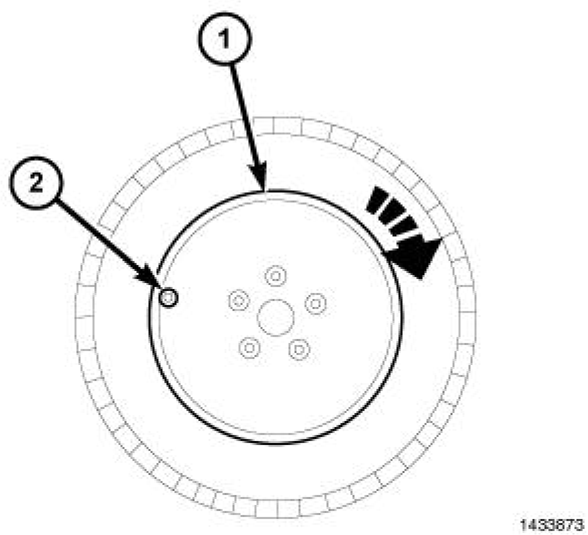
   NOTE: **If replacing tire pressure sensor, a new valve stem will be pre-mounted to the sensor as an assembly. Verify that the sensor is positioned properly before seating the valve stem.**

2. Insert valve stem (2) through wheel (4) and pull through to seat with standard valve stem installation tool.



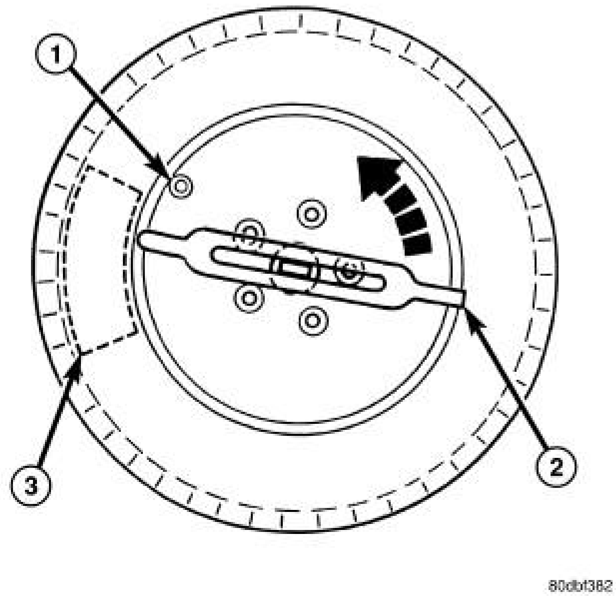
[Fig. 14: Tire Pressure Monitoring Sensor Components](#)
Courtesy of CHRYSLER GROUP, LLC

3. If replacing the valve stem (2) only (using the existing tire pressure sensor), verify that the flat sides of the brass extension on the bottom of the valve stem (2) are at a 90 degree angle with the wheel. Position the pressure sensor (1) over the brass extension, install the retainer screw (4).
4. Mount tire on wheel following tire changer manufacturers instructions, paying special attention to the following to avoid damaging tire pressure sensor:



[Fig. 15: Mounting Tire Using Rotating Wheel Machine](#)
Courtesy of CHRYSLER GROUP, LLC

a. Rotating Wheel Tire Changers - Once the wheel is mounted to the changer, position the sensor valve stem (2) approximately 280Â° from the head of the changer (located at 1) in a clockwise direction before rotating the wheel (also in a clockwise direction) to mount the tire. Use this procedure on both the outer and inner tire beads.



[Fig. 16: Mounting Tire Using Rotating Tool Machine](#)
Courtesy of CHRYSLER GROUP, LLC

b. Rotating Tool Tire Changers - Position the wheel on the changer so that the sensor valve stem (1) is located approximately 210Â° clockwise from the installation end of the mounting/dismounting tool (2) once the tool is mounted for tire installation. Make sure the sensor is clear of the lower bead breaker area (3) to avoid damaging the sensor when the breaker rises. Rotate the tool (2) in a counterclockwise direction to mount the tire. Use this procedure on both the outer and inner tire beads.
c. Adjust air pressure to that listed on Tire Inflation Pressure Label (Placard) provided with vehicle (usually applied to driver's side B-pillar). Make sure **original style** valve stem cap is securely installed to keep moisture out of sensor.
d. Install tire and wheel assembly on the vehicle.
e. Remove the support and lower the vehicle.
f. Perform one of the following to make the system learn the new sensor ID.
g. Using the TPM-RKE Analyzer 9936 with the Scan Tool, program the TPM Module with the new tire pressure sensor ID. This is part of the TPM Diagnostic Verification Test. Refer to **STANDARD PROCEDURE** .
h. The vehicle should remain stationary for at least 20 minutes. Drive the vehicle for a minimum of 20 minutes while maintaining a continuous speed above 24 km/h (15 mph). During this time, the system will recognize and add the new sensor ID. This is part of the TPM Diagnostic Verification Test. Refer to **STANDARD PROCEDURE** .

NOTE: **If a sensor cannot be trained, refer to appropriate diagnostic information.**

SRT8

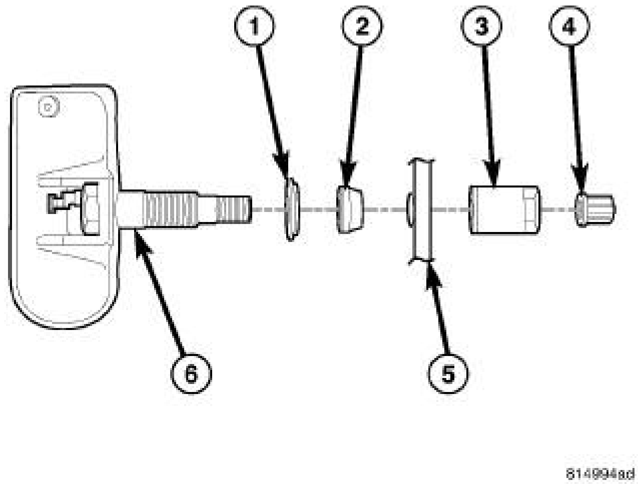


Fig. 17: Sensor Mounting - Exploded View
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Before reinstalling an existing tire pressure sensor, replace seal (2) and metal washer (1) at base of sensor valve stem (6) to ensure proper sealing.**

1. Wipe area clean around sensor/valve stem mounting hole in wheel (5). Make sure surface of wheel is not damaged.

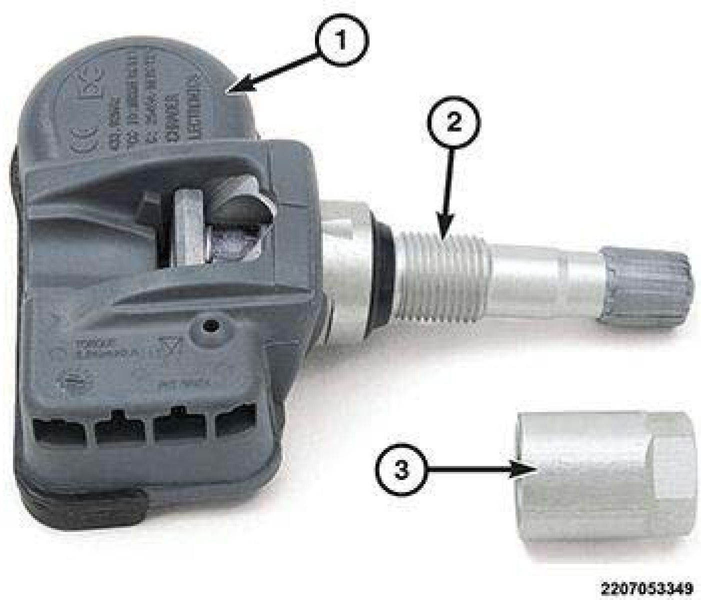
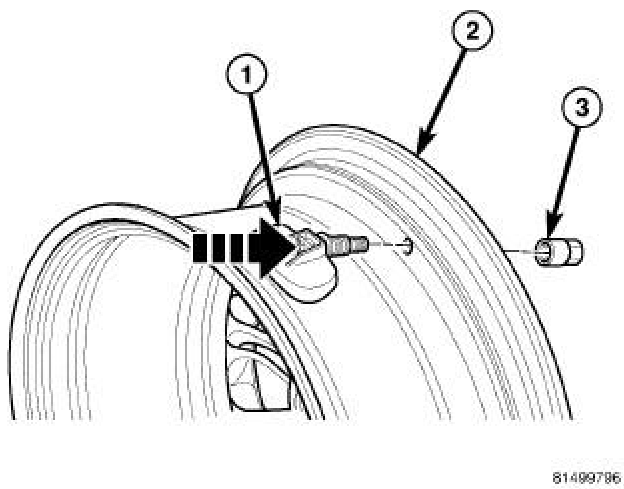


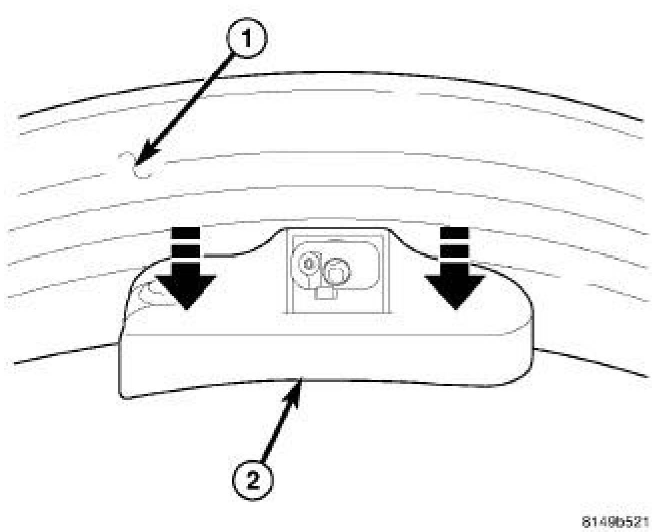
Fig. 18: Sensor Antenna Strap, Valve Stem & Valve Cap
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **To avoid damaging sensor antenna strap (1), if equipped, hold pressure against rear of metal valve stem (2) while sensor is inserted through wheel mounting hole and nut is installed.**



[Fig. 19: Installing Sensor To Wheel](#)
Courtesy of CHRYSLER GROUP, LLC

2. Insert sensor (1) through wheel (2) as shown keeping pressure against rear of metal valve stem (See Arrow). Potted side of sensor is to be positioned toward wheel. Do not attempt to mount sensor otherwise, damage may occur.
3. Install sensor nut (with pressed-in washer) (3) by hand.



[Fig. 20: Seat Sensor Against Wheel Interior](#)
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Over-torquing the sensor nut by as little as 12 N.m (106 in. lbs.) may result in sensor separation from the valve stem. Under this condition, the sensor may still function. However, the condition should be corrected immediately.

NOTE: **Before tightening sensor nut, push downward on sensor housing (2) in an attempt to make it flush with interior contour of wheel (1).**

4. While holding sensor in position, tighten sensor nut to the proper **SPECIFICATIONS**.
5. Mount tire on wheel following tire changer manufacturers instructions, paying special attention to the following to avoid damaging tire pressure sensor:

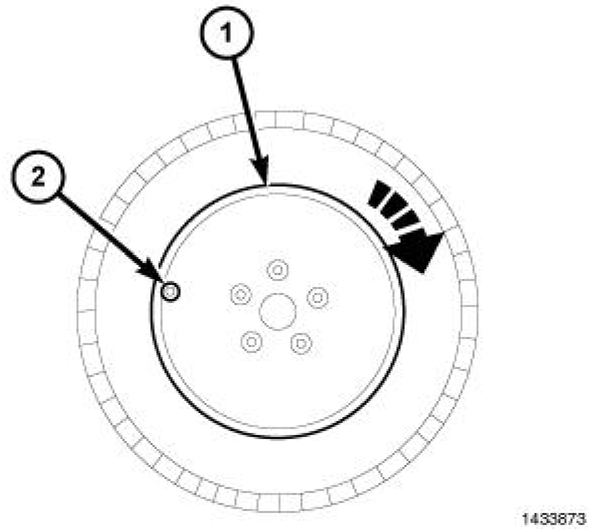


Fig. 21: Mounting Tire Using Rotating Wheel Machine
Courtesy of CHRYSLER GROUP, LLC

a. Rotating Wheel Tire Changers - Once the wheel is mounted to the changer, position the sensor valve stem (2) approximately 280Â° from the head of the changer (located at 1) in a clockwise direction before rotating the wheel (also in a clockwise direction) to mount the tire. Use this procedure on both the outer and inner tire beads.

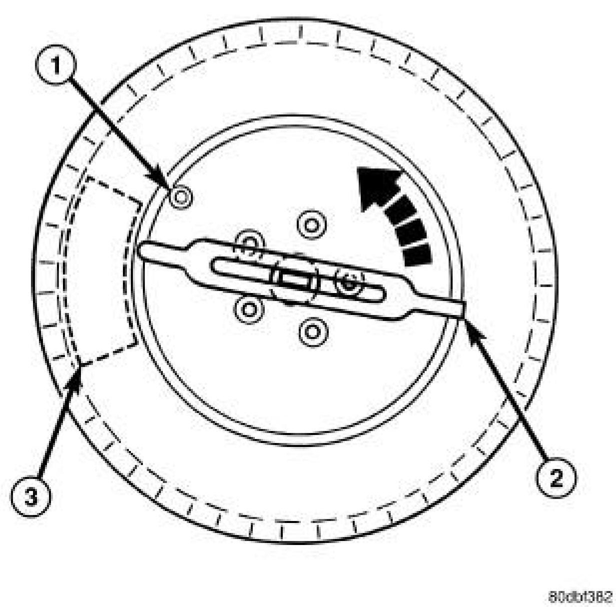


Fig. 22: Mounting Tire Using Rotating Tool Machine
Courtesy of CHRYSLER GROUP, LLC

b. Rotating Tool Tire Changers - Position the wheel on the changer so that the sensor valve stem (1) is located approximately 210Â° clockwise from the installation end of the mounting/dismounting tool (2) once the tool is mounted for tire installation. Make sure the sensor is clear of the lower bead breaker area (3) to avoid damaging the sensor when the breaker rises. Rotate the tool (2) in a counterclockwise direction to mount the tire. Use this procedure on both the outer and inner tire beads.
c. Adjust air pressure to that listed on Tire Inflation Pressure Label (Placard) provided with vehicle (usually applied to driver's side B-pillar). Make sure **original style** valve stem cap is securely installed to keep moisture out of sensor.
d. Install tire and wheel assembly on vehicle.
e. Remove the support and lower the vehicle.
f. Perform one of the following to make the system learn the new sensor ID.
g. Using the TPM-RKE Analyzer 9936 with the Scan Tool, program the TPM Module with the new tire pressure sensor ID. This is part of the TPM Diagnostic Verification Test. Refer to **STANDARD PROCEDURE** .
h. The vehicle should remain stationary for at least 20 minutes. Drive the vehicle for a minimum of 20 minutes while maintaining a continuous speed above 24 km/h (15 mph). During this time, the system will recognize and add the new sensor ID. This is part of the TPM Diagnostic Verification Test. Refer to **STANDARD PROCEDURE** .

NOTE: **If a sensor cannot be trained, refer to appropriate diagnostic information.**

TIRES

DESCRIPTION

TIRE

Original Equipment tires are designed to complement the ride and handling characteristics of a specific vehicle. They provide the best overall performance for normal operation because they have been matched to the vehicle's requirements. With proper care, these tires will provide excellent ride, handling, traction, tread life, and durability performance.

Driving habits affect tire life more than any other factor. Tires will generally last much longer when operated by a careful driver rather than with severe use by a careless driver. Here are some driving habits that will shorten the life of any tire:

- Rapid acceleration
- Severe brake application
- High-speed driving
- Corning at excessive speeds
- Striking the tires against curbs or other obstacles
- Operating a vehicle with tires that are under inflated or over inflated

Radial ply tires are susceptible to irregular tread wear. To achieve maximum tire tread life, it is important to follow the rotation interval shown in **TIRE AND WHEEL ROTATION**.

TIRE IDENTIFICATION

The size, type, load index, speed rating, and other important information about the tire are molded on its sidewalls. Refer to **Fig. 23** for an explanation of the tire markings.

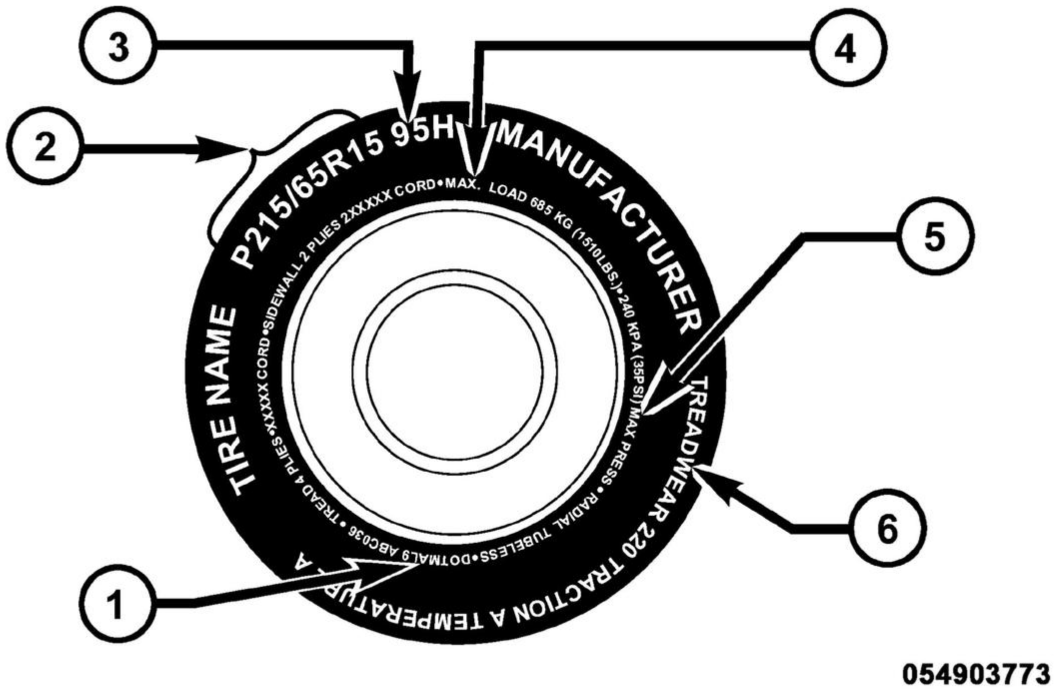


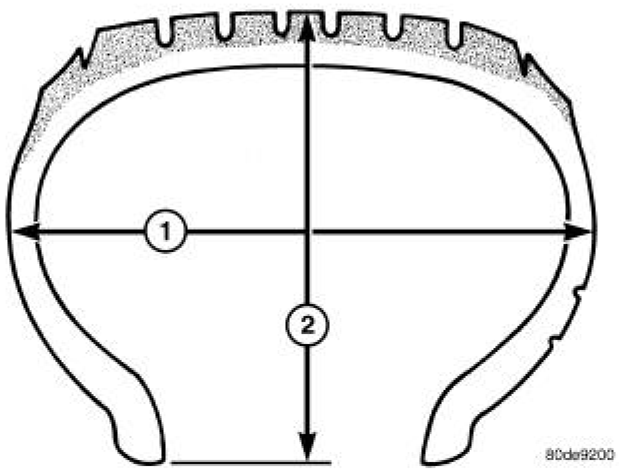
Fig. 23: Tire Identification
Courtesy of CHRYSLER GROUP, LLC

1 - U.S. DOT Safety Standards Code (TIN)
4 - Maximum Load
2 - Size Designation
5 - Maximum Pressure
3 - Service Description
6 - Treadwear, Traction and Temperature Grades

NOTE:

- **P (Passenger) - Metric tire sizing is based on U.S. design standards. P-Metric tires have the letter "P" molded into the sidewall preceding the size designation. Example: P215/65R15 95H.**
- **European - Metric tire sizing is based on European design standards. Tires designed to this standard have the tire size molded into the sidewall beginning with the section width. The letter "P" is absent from this tire size designation. Example: 215/65R15 96H.**
- **LT (Light Truck) - Metric tire sizing is based on U.S. design standards. The size designation for LT-Metric tires is the same as for P-Metric tires except for the letters "LT" that are molded into the sidewall preceding the size designation. Example: LT235/85R16.**

- **Temporary spare tires are designed for temporary emergency use only. Temporary high pressure compact spare tires have the letter "T" or "S" molded into the sidewall preceding the size designation. Example: T145/80D18 103M.**
- **High flotation tire sizing is based on U.S. design standards and it begins with the tire diameter molded into the sidewall. Example: 31x10.5 R15 LT.**



[Fig. 24: Tire Aspect Ratio]
Courtesy of CHRYSLER GROUP, LLC

1- SECTION WIDTH
2- SECTION HEIGHT

NOTE: **Aspect Ratio = Section Height (2) Ć· Section Width (1) x 100%**

TIRE SIZING CHART

EXAMPLE:		
Example Size Designation: P215/65R15XL 95H, 215/65R15 96H, LT235/85R16C, T145/80D18 103M, 31x10.5 R15 LT		
Ā	**P** = Passenger car tire size based on U.S. design standards, or	
Ā	**"..blank.."** = Passenger car tire based on European design standards, or	
Ā	**LT** = Light truck tire based on U.S. design standards, or	
Ā	**T or S** = Temporary spare tire or	
Ā	**31** = Overall diameter in inches (in)	
Ā	**215, 235, 145** = Section width in millimeters (mm)	
Ā	**65, 85, 80** = Aspect ratio in percent (%)	
Ā	Ā	- Ratio of section height to section width of tire, or
Ā	**10.5** = Section width in inches (in)	
Ā	**R** = Construction code	
Ā	Ā	- "R" means radial construction, or
Ā	Ā	- "D" means diagonal or bias construction

EXAMPLE:		
Ā	**15, 16, 18** = Rim diameter in inches (in)	
Service Description:		
Ā	**95** = Load Index	
Ā	Ā	- A numerical code associated with the maximum load a tire can carry
Ā	**H** = Speed Symbol	
Ā	Ā	- A symbol indicating the range of speeds at which a tire can carry a load corresponding to its load index under certain operating conditions
Ā	Ā	- The maximum speed corresponding to the speed symbol should only be achieved under specified operating conditions (i.e., tire pressure, vehicle loading, road conditions, and posted speed limits)
Load Identification: Absence of the following load identification symbols on the sidewall of the tire indicates a Standard Load (SL) tire: • **XL** = Extra load (or reinforced) tire, or • **LL** = Light load tire or • **C, D, E, F, G** = Load range associated with the maximum load a tire can carry at a specified pressure		
Maximum Load - Maximum load indicates the maximum load this tire is designed to carry		
Maximum Pressure - Maximum pressure indicates the maximum permissible cold tire inflation pressure for this tire		

TIRE IDENTIFICATION NUMBER (TIN)

EXAMPLE:	
DOT MA L9 ABCD 0301	
DOT = Department of Transportation	
Ā	- This symbol certifies that the tire is in compliance with the U.S. Department of Transportation tire safety standards and is approved for highway use
MA = Code representing the tire manufacturing location (two digits)	
L9 = Code representing the tire size (two digits)	
ABCD = Code used by the tire manufacturer (one to four digits)	
03 = Number representing the week in which the tire was manufactured (two digits)	
Ā	- 03 means the 3rd week
01 = Number representing the year in which the tire was manufactured (two digits)	
Ā	- 01 means the year 2001
Ā	- Prior to July 2000, tire manufacturers were only required to have one number to represent the year in which the tire was manufactured. Example: 031 could represent the 3rd week of 1981 or 1991

TIRE - SRT8

There is no spare tire available with this vehicle. It is equipped with the TIREFIT tire repair kit to be used to

repair small punctures in the tire as necessary. For additional information, refer to the Owners Manual.

NOTE: **The All-Season and SRT8 Hellcat tire and wheel combination may be rotated. Refer to STANDARD PROCEDURE.**

ALL SEASON TIRE

DESCRIPTION	SPECIFICATION
Manufacturer	Goodyear
Model	Eagle RS-A2
Size	245/45ZR20

THREE SEASON TIRE-OPTIONAL-SRT8

DESCRIPTION	SPECIFICATION	
Manufacturer	Pirelli	Goodyear
Model	P Zero Nero	Eagle F1
Size	275/40ZR20	275/40ZR20

REPLACEMENT TIRES

WARNING: **Failure to equip the vehicle with tires having adequate speed capability can result in sudden tire failure.**

WARNING: **In order to maintain the speed capability of the vehicle, replacement tires must have speed ratings equal to or higher than those fitted to the vehicle as original equipment. If tires with lower speed ratings are fitted, the vehicle's handling may be affected and the speed capability of the vehicle may be lowered to the maximum speed capability of the replacement tires. To avoid an accident resulting in severe or fatal injury, consult the tire manufacturer in regards to maximum speed ratings.**

It is recommended that tires equivalent to the original equipment tires be used when replacement is needed.

Failure to use equivalent replacement tires may adversely affect the safety and handling of the vehicle.

The original equipment tires provide a proper combination of many characteristics such as:

- Ride
- Noise
- Handling
- Durability
- Tread life
- Traction
- Rolling resistance
- Speed capability

The use of tires smaller than the minimum tire size approved for the vehicle can result in tire overloading and

failure.

Use tires that have the approved load rating for the vehicle and never overload them. Failure to equip the vehicle with tires having adequate speed capability can result in sudden tire failure and loss of vehicle control.

The use of oversize tires may cause interference with vehicle components. Under extremes of suspension and steering travel, interference with vehicle components may cause tire damage.

SPARE TIRE

A compact (temporary) spare tire and wheel assembly is standard equipment on most models of this vehicle. A full-size spare is not available on most models.

SRT vehicles and select Export vehicles are equipped with the TIREFIT tire repair kit as standard equipment in place of a spare tire. It is to be used to repair small punctures in the tire as necessary. For additional information, refer to the Owners Manual.

The spare tire and wheel diameters and wheel offsets match those of the road wheels on the vehicle.

The compact (temporary) spare tire is designed for emergency use only. The original tire should be repaired or replaced at the first opportunity, then reinstalled. Do not exceed speeds of 80 km/h (50 mph) when using the compact (temporary) spare tire and wheel assembly. Refer to the Owner's Manual for complete details.

DIAGNOSIS AND TESTING

TIRE NOISE

Unusual tire noise can be associated with tire and wheel vibration or irregular tire wear. For vibration issues, refer to **DIAGNOSIS AND TESTING**. For irregular tire wear issues, refer to **TIRES, DIAGNOSIS AND TESTING**.

TIRE/VEHICLE LEAD

Refer to **WHEEL ALIGNMENT, DIAGNOSIS AND TESTING** .

TIRE WEAR PATTERNS

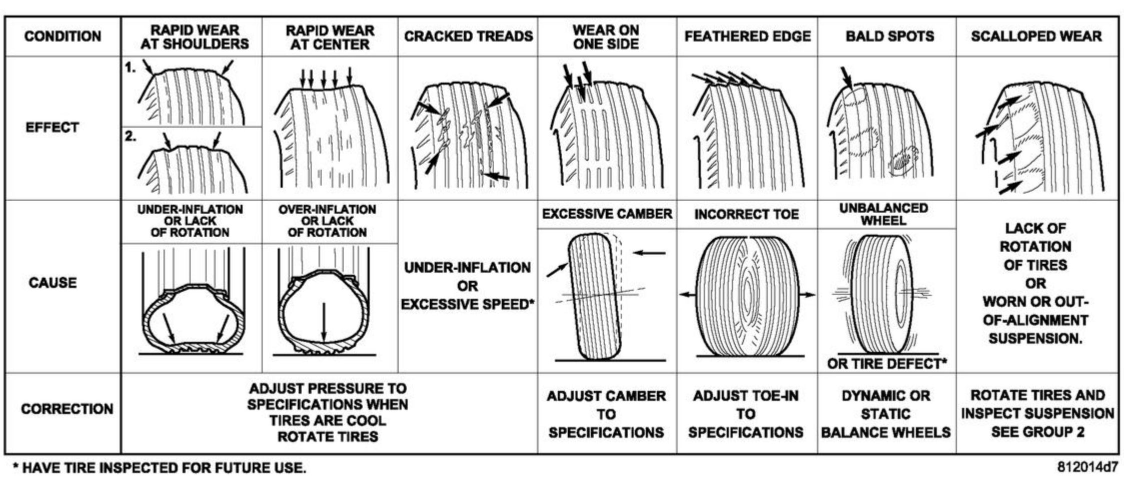


Fig. 25: Identifying Tire Wear Patterns

Courtesy of CHRYSLER GROUP, LLC

Under inflation will cause wear on the shoulders of tire. Over inflation will cause wear at the center of tire.

Excessive camber causes the tire to run at an angle to the road. One side of tread is then worn more than the other.

Excessive toe-in or toe-out causes wear on the tread edges and a feathered effect across the tread.

TREAD WEAR INDICATORS

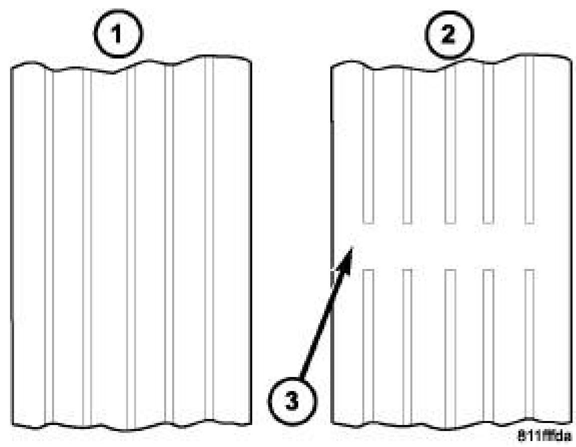


Fig. 26: Identifying Tread Wear Indicators
Courtesy of CHRYSLER GROUP, LLC

Tread wear indicators are molded into the bottom of the tread grooves. When tread depth is 1.6 mm (1/16 in.), the tread wear indicators will appear as a 13 mm (1/2 in.) band (3).

Tire replacement is necessary when indicators appear in two or more grooves or if localized balding occurs.

STANDARD PROCEDURE

TIRE INFLATION PRESSURES

The specified tire pressures have been chosen to provide safe operation, vehicle stability, and a smooth ride. The proper tire pressure specification can be found on the Tire And Loading Information Label provided with the vehicle (usually on the driver's door opening or B-pillar).

A quality air pressure gauge is recommended to check tire air pressure. Tire pressure should be checked cold once per month. Check tire pressure more frequently when the weather temperature varies widely. Tire pressure will decrease when the outdoor temperature drops. After checking the air pressure, replace valve cap finger tight.

Inflation pressures specified on the Tire Inflation Pressure Label are always the cold inflation pressure of the tire. Cold inflation pressure is obtained after the vehicle has not been operated for at least 3 hours, or the vehicle is driven less than one mile after being inoperative for 3 hours. Tire inflation pressures may increase from 2 to 6 pounds per square inch (psi) during operation. Do not reduce this normal pressure buildup.

Improper inflation can cause:

- Uneven wear patterns
- Reduced tread life
- Reduced fuel economy
- Unsatisfactory ride
- The vehicle to drift.

WARNING: Over or Under inflated tires can affect vehicle handling. The tire can fail suddenly, resulting in loss of vehicle control.

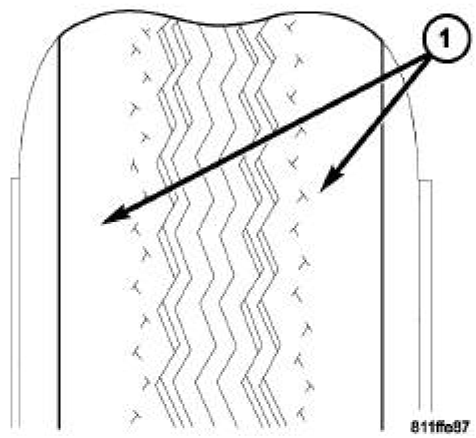


Fig. 27: Under Inflation
Courtesy of CHRYSLER GROUP, LLC

Under inflation causes rapid shoulder wear, tire flexing, and can result in tire failure (1).

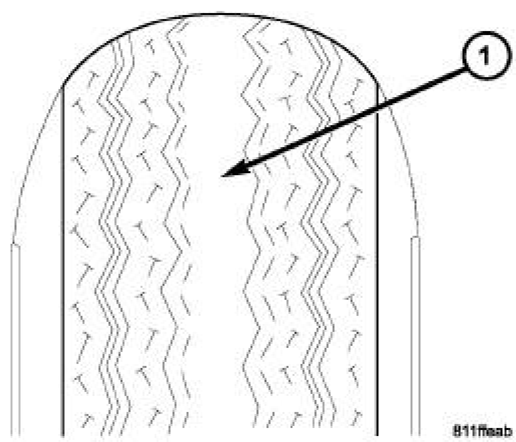


Fig. 28: Identifying Over Inflated Tire
Courtesy of CHRYSLER GROUP, LLC

Over inflation causes rapid center wear and loss of the tire's ability to cushion shocks (1).

TIRE LEAK REPAIRING

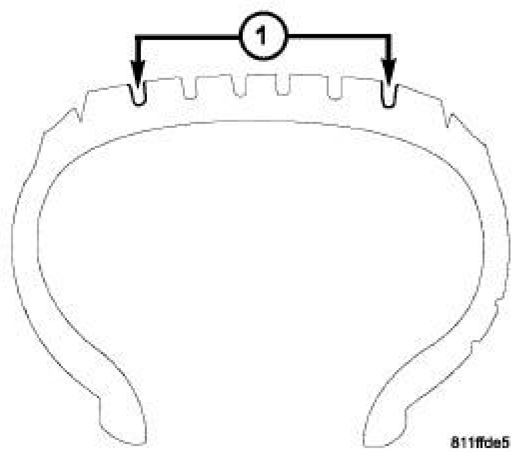


Fig. 29: Identifying Tire Repair Area
Courtesy of CHRYSLER GROUP, LLC

For proper repairing, a radial tire must be removed from the wheel. Repairs should only be made if the defect, or puncture, is in the tread area (1). The tire should be replaced if the puncture is located in the sidewall.

Deflate tire completely before attempting to dismount the tire from the wheel. **Use a lubricant such as a mild soap solution when dismounting or mounting tire.** Use tools free of burrs or sharp edges which could damage the tire or wheel rim.

Before mounting tire on wheel, make sure all rust is removed from the rim bead and repaint if necessary.

Install the tire and wheel assembly. Refer to **INSTALLATION**.

WHEELS

DESCRIPTION

DESCRIPTION

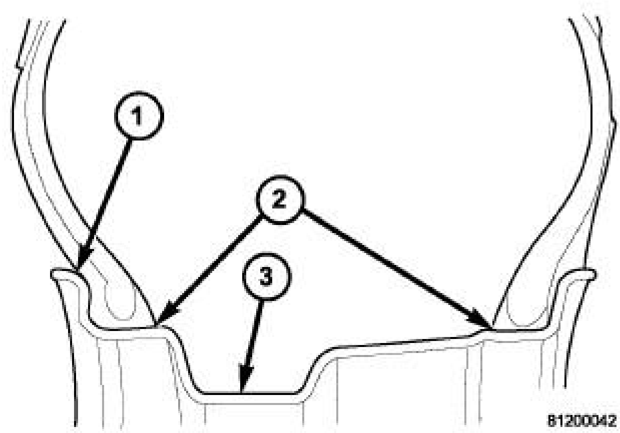


Fig. 30: Identifying Wheel/Rim Design

Courtesy of CHRYSLER GROUP, LLC

All vehicles use either steel, cast aluminum, or forged wheels. The original equipment wheels are designed for proper operation at all loads up to the specified maximum vehicle capacity.

Every wheel has raised sections between the rim flanges (1) and drop well (3) called safety humps (2). In case of air loss, these raised sections help hold the tire in position on the wheel until the vehicle can be brought to a safe stop. When the tire is installed on the wheel, initial inflation pressure forces the tire bead over these raised sections into place.

The wheel studs and nuts are designed for specific wheel applications and must be replaced with equivalent parts. Do not use replacement parts of lesser quality or of a substitute design. All aluminum and steel wheels have wheel stud nuts with a cone shape. All lug nuts have a cone shaped interface to ensure proper retention of the wheels.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - WHEEL INSPECTION

Inspect wheels for:

- Excessive runout
- Dents, cracks or irregular bends
- Damaged wheel stud (lug) holes
- Air Leaks

NOTE: **Do not attempt to repair a wheel by hammering, heating or welding.**

If a wheel is damaged, an original equipment replacement wheel should be used. When obtaining replacement wheels, they should be equivalent in load carrying capacity. The diameter, width, offset, pilot hole and bolt circle of the wheel should be the same as the original wheel.

WARNING: **Failure to use equivalent replacement wheels may adversely affect the safety and handling of the vehicle.**

WARNING: **Replacement with used wheels is not recommended. The service history of the wheel may have included severe treatment or very high mileage. The rim could fail without warning.**

WARNING: **Chrysler LLC does not recommend that customers use "reconditioned" wheels (wheels that have been damaged and repaired) because they can result in a sudden catastrophic wheel failure which could cause loss of control and result in injury or death. For clarification:**

- **Cosmetic refinishing for the purpose of repairing a superficial flaw is an acceptable procedure providing it is limited to paint or clear coat only, the wheel is not modified in any way, and there is no exposure to paint curing heat over 200 degrees Fahrenheit (93 degrees Celsius).**
- **Damaged wheels are those which have been bent, broken, cracked or**

sustained some other physical damage which may have compromised the wheel structure.

- **Repaired indicates that the wheel has been modified through bending, welding, heating, straightening, or material removal to rectify damage.**
- **Re-plating of chrome plated wheels is not an acceptable procedure nor is chrome plating of original equipment painted or polished wheels, as this may alter mechanical properties and affect fatigue life.**

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

DESCRIPTION	N.m	Ft. Lbs	In. Lbs	NEW FASTENER *
Wheel Mounting (Lug) Nuts- Base	176	130	-	Ā
Wheel Mounting (Lug) Nuts - SRT	150	111	-	Ā
Tire Pressure Sensor Nut	3	-	27	Ā
*** New Fastener:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

CLEANING

CLEANING

All wheels and wheel trim, especially aluminum and chrome plated, should be cleaned regularly using mild soap and water to maintain their luster and to prevent corrosion. Wash them with the same soap solution recommended for the body of the vehicle.

When cleaning extremely dirty wheels, care must be taken in the selection of tire and wheel cleaning chemicals and equipment to prevent damage to the wheels. MoparĀ® Tire and Wheel Cleaner, MoparĀ® Wheel Treatment or MoparĀ® Chrome Cleaner is recommended. Any of the "DO NOT USE" items listed below can damage wheels and wheel trim.

DO NOT USE:

- Any abrasive cleaner
- Any abrasive cleaning pad (such as steel wool) or abrasive brush
- Any cleaner that contains a high acid or high alkaline concentration which can react with and discolor the chrome surface. **Many wheel cleaners contain acids that can harm the wheel surface.**
- Oven cleaner
- A car wash that uses carbide-tipped wheel cleaning brushes or acidic solutions.

STUD, WHEEL, FRONT

REMOVAL

REMOVAL

NOTE: **Before proceeding, refer to CAUTION and WARNING .**

CAUTION: **Wheel mounting studs MUST NOT be hammered out of hub flange of hub and bearing assembly. If a stud is removed by hammering it out, damage to hub and bearing assembly will occur leading to premature bearing failure.**

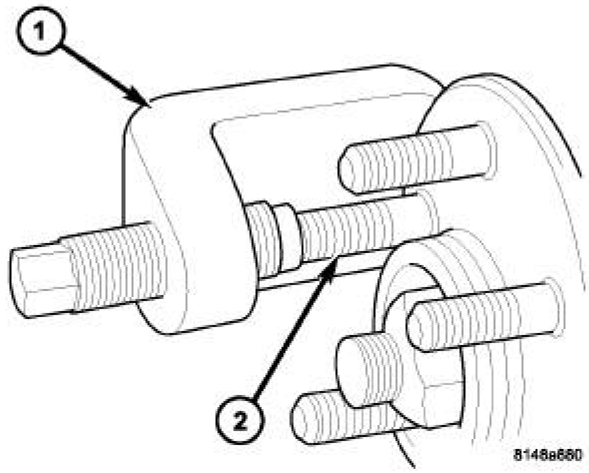


Fig. 31: Wheel Stud
Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the front tire and wheel assembly. Refer to **REMOVAL**.
3. Remove the front brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .
4. Remove stud (2) from hub with Remover (special tool #C-4150A, Press, Ball Joint) (1).

INSTALLATION

INSTALLATION

1. Install the new stud into the hub flange.
2. Install three washers onto the stud, then install the lug nut with the flat side of the nut against the washers.
3. Tighten the lug nut until the stud is pulled into the hub flange. Verify that the stud is properly seated into the flange.
4. Remove the lug nut and washers.
5. Install brake rotor and caliper. Refer to **ROTOR, BRAKE, INSTALLATION** .
6. Install the tire and wheel assembly, using a **NEW** lug nut on the stud that was replaced. Refer to **INSTALLATION**.
7. Remove support and lower the vehicle.

STUD, WHEEL, REAR

REMOVAL

REMOVAL

NOTE: **Before proceeding, refer to CAUTION and WARNING .**

CAUTION: **Wheel mounting studs MUST NOT be hammered out of hub flange of hub and bearing assembly. If a stud is removed by hammering it out, damage to hub and bearing assembly will occur leading to premature bearing failure.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the rear tire and wheel assembly. Refer to **REMOVAL**.
3. Remove the rear brake rotor. Refer to **ROTOR, BRAKE, REMOVAL** .

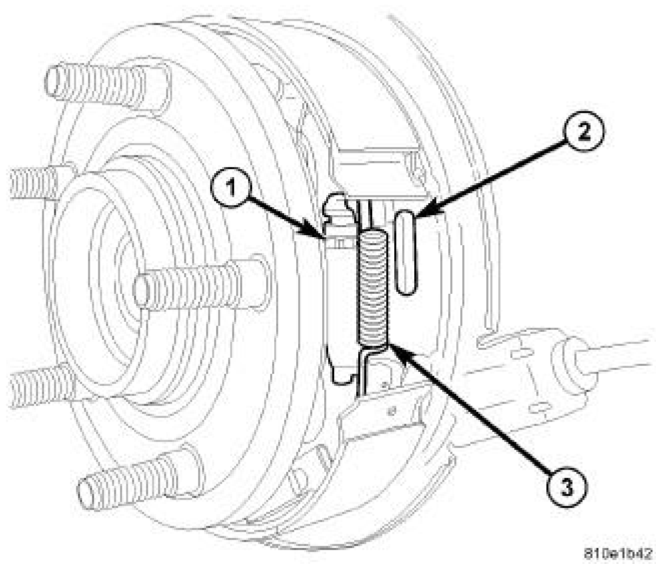


Fig. 32: Shoe Adjuster & Spring
Courtesy of CHRYSLER GROUP, LLC

4. Back off shoe adjustment until adjuster (1) threads bottom.
5. Using appropriate tools, remove spring (3) at adjuster.
6. Pull upward on upper shoe near adjuster to provide enough slack to remove adjuster from shoes, then remove adjuster (1).

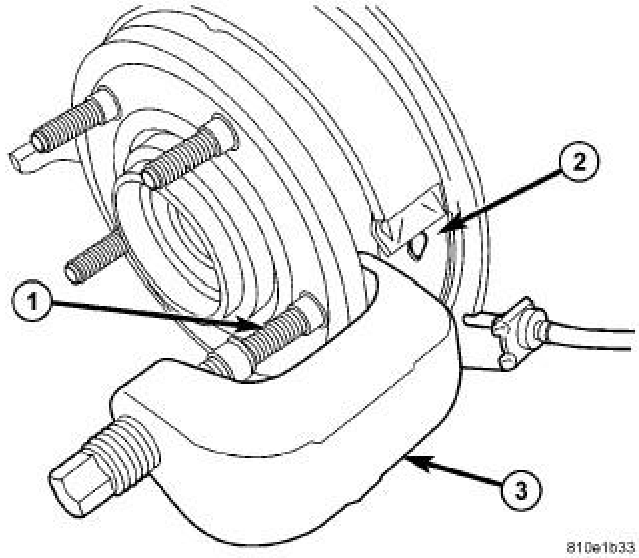


Fig. 33: C-4150A Positioned For Stud Removal
Courtesy of CHRYSLER GROUP, LLC

7. Install Remover (3) (special tool #C-4150A, Press, Ball Joint), on hub and bearing flange and wheel stud (1).
8. Tighten Remover forcing screw, pushing wheel stud (1) out of hub and bearing flange. Remove tool (3).
9. Remove stud from rear of hub flange. It may be necessary to rock hub flange back and forth to ease stud removal.

INSTALLATION

INSTALLATION

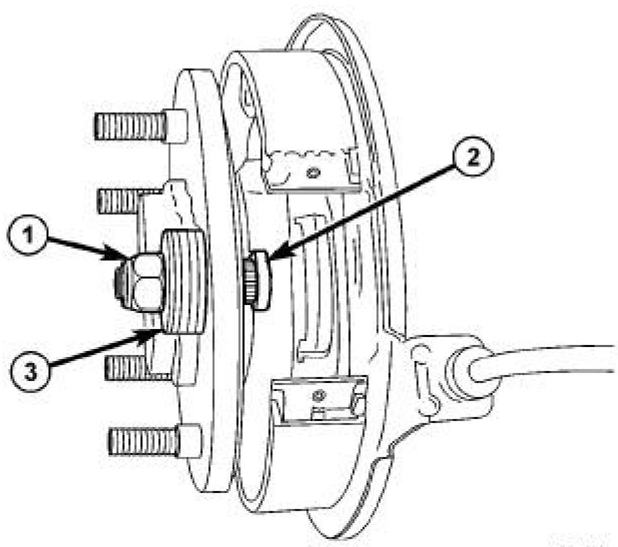


Fig. 34: Nut & Washers Installed On Stud
Courtesy of CHRYSLER GROUP, LLC

1. Install replacement wheel stud into flange of hub and bearing from rear (2). Install a stack of washers (3)

(approximately 5, depending on thickness) over stud, then install a standard wheel mounting (lug) nut (1) on stud with flat side of nut against washers.

2. Tighten wheel mounting nut (1), pulling wheel stud into flange of hub and bearing. Once head of stud (2) is fully seated against rear of hub flange, remove nut and washers from wheel stud.

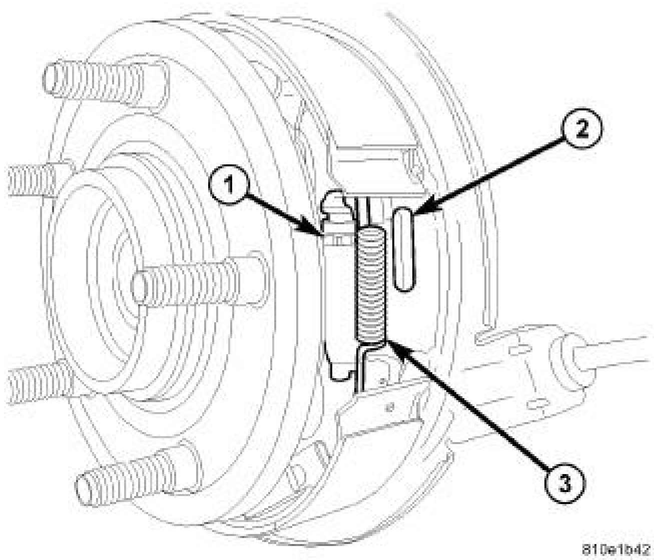


Fig. 35: Shoe Adjuster & Spring
Courtesy of CHRYSLER GROUP, LLC

3. Install parking brake shoe adjuster (1) between upper and lower parking brake shoes. Position end of adjuster with star wheel upward. Once in place, slide upper shoe downward against adjuster mounting slot, taking up any slack between two pieces.
4. Using appropriate tools, install spring (3) at adjuster.
5. Install brake rotor. Refer to **ROTOR, BRAKE, INSTALLATION** .
6. Install the tire and wheel assembly. Refer to **INSTALLATION**.
7. Adjust parking brake shoes. Refer to **SHOES, PARKING BRAKE, ADJUSTMENTS** .
8. Remove support and lower the vehicle.

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Article GUID: A00735948

TIRE PRESSURE MONITOR SYSTEM

Chry - Dodge - Challenger & Charger - 2008-18

MODEL COVERAGE

Models Covered

Model	Year(s)
Challenger	2008-18
Charger	2009-18

DESCRIPTION & OPERATION

NOTE: **If a tire pressure sensor has been replaced, the tire pressure sensors must be retrained. See RESET PROCEDURES.**

TIRE PRESSURE MONITOR (TPM) SYSTEM

The Tire Pressure Monitoring (TPM) system monitors air pressure in the four road tires (excludes spare). Pressure in the spare tire is not monitored. There are two tire pressure monitoring systems available, a base system and a premium system. The base system does not specify how many tires are low or where they are located. The premium system does so.

The Base TPM system consists of tire pressure monitoring sensors attached to each road wheel through the valve stem mounting hole, a central receiver module Wireless Ignition Node (WIN), and an indicator lamp.

The Premium TPM system consists of tire pressure monitoring sensors attached to each road wheel through the valve stem mounting hole, a wireless control module (WIN), three wheel sensor transponders located in three of the four wheel wells, an electronic display, and an indicator lamp.

The TPM module decodes the RF signals transmitted by each of the vehicle's tire pressure sensors. The decoded information is used to determine if "warning" or "fault" conditions exist within the TPM system.

Upon detection of a warning or fault condition, the WIN will send a request to the module that controls the indicator lamp (and the text display if equipped with the Premium system) via the vehicle bus system to illuminate or flash the indicator lamp. Also, upon detection of a warning or fault condition, the electronic display will send a request to sound the "chime". The WIN will store all warning and fault conditions, placard pressure values and low-pressure threshold values (lamp ON and OFF) in memory that can be accessed through diagnostic communication. If new sensors are introduced to the vehicle, the data stored for the sensor being replaced will be deleted.

The WIN will store all wheel sensor IDs and locations and faults in memory that can be accessed through diagnostic communication. All other data values transmitted from each active wheel sensor (not the spare tire) shall be stored in the WIN memory. After a sensor has been replaced, the WIN automatically learns and stores the sensor ID's while driving continuously above 15 mph (24 km/h) for 10 minutes. The learning sequence will initiate when the vehicle has been stopped for more than 20 minutes.

Under the following conditions, the system may not function properly:

- The areas, facilities or devices that use similar radio wave frequencies are located in the vicinity of the vehicle.
- A radio device of similar frequency is used near the vehicle.
- Installing some form of aftermarket window tinting that affects radio wave signals
- A lot of snow or ice is stuck to the vehicle, especially around the wheels or wheel housings.
- Using tire chains on the vehicle
- The battery of the sensor has been depleted (approximate 10-year life span).
- A spare tire is installed.
- A tire without tire pressure sensor is used.
- Wheels other than manufacturer factory wheels are used.

TIRE PRESSURE MONITOR WARNING INDICATORS

If warning indicators are on continuously due to low pressure in one or more tires, adjust tire inflation to specification. The light will remain on until tire pressure is properly set. After adjusting air pressure in a tire on the vehicle, the vehicle needs to be driven for approximately two minutes above 15 mph for the message or indicator lamp to go out.

If a system fault is detected, a chime will sound, and the TPM indicator (telltale) lamp will flash for 75 seconds, then remain on solid. For vehicles with the Premium TPM Systems, a "CHECK TPM SYSTEM" message will appear in the Electronic Vehicle Information Center (EVIC), followed by a graphic display. See appropriate manufacturer service information.

TPMS RESET PROCEDURES

NOTE: **If a tire pressure sensor has been replaced, the tire pressure sensors must be retrained.**

If warning indicators are on continuously due to low pressure in one or more tires, adjust tire inflation to specification. The light will remain on until tire pressure is properly set. After adjusting air pressure in a tire on the vehicle, the vehicle needs to be driven for approximately two minutes above 15 mph for the message or indicator lamp to go out.

TIRE PRESSURE SENSOR RETRAINING

Using a RF signal, each sensor transmits tire pressure data approximately once every minute. Each sensor's (transmitter) broadcast is uniquely coded so that the system can monitor the state of each of the sensors on the 4 rotating road wheels. The TPMS automatically learns and stores the sensor's ID while driving after a sensor has been replaced. There is no formal retraining procedure necessary.

After the vehicle has remained stationary for 20 minutes, drive vehicle for a minimum of 20 minutes while maintaining a continuous speed above 15 mph (24 km/h). During this time, the system will learn the new sensor ID code and will clear any DTCs automatically. If a sensor cannot be trained, see appropriate manufacturer service information.

NOTE: **A new sensor ID can also be programmed directly into the WIN or TPM module by using a RKE-TPM Analyzer in conjunction with a Scan Tool. Once the new**

sensor ID has been programmed, the vehicle will need to be driven above 15 mph until the fault is no longer active (lamp extinguishes) and display is updated (for up to 20 minutes). Using a TPM-RKE Analyzer can take up to a minute to force a transmission from a sensor.

DISMOUNTING/MOUNTING PROCEDURES

CAUTION: The tire should be dismounted from the wheel using the tire changer manufacturer's instructions. Use the following information to avoid damage during the dismounting/mounting procedures.

CAUTION: The Tire Pressure Monitoring (TPM) system has been optimized for the original equipment tires and wheels. TPM system pressures have been established for the tire size equipped on the vehicle. Undesirable system operation or sensor damage may result when using replacement equipment that is not of the same size, type, or style. Aftermarket wheels can cause sensor damage. Do not use aftermarket tire sealants or balance beads if your vehicle is equipped with TPM, as damage to the sensors may result.

NOTE: If a tire pressure sensor has been replaced, the tire pressure sensors must be retrained. See TIRE PRESSURE SENSOR RETRAINING under RESET PROCEDURES.

NOTE: Wheels and tires are match-mounted at the factory. Before dismounting a tire from its wheel, a reference mark should be placed on the tire at the valve stem location to ensure that it is remounted in the original position on the wheel. For match-mounting procedures, refer to appropriate manufacturer service information.

NOTE: Tire pressure will vary with temperature by about 1 psi (6.9 kPa) for every 12Â°F (6.5Â°C). This means that when the outside temperature decreases, the tire pressure will decrease. Tire pressure should always be set based on cold inflation tire pressure (placard pressure). This is defined as the tire pressure after a vehicle has not been driven for more than 3 hours (and in outside ambient temperature). The tire pressure will also increase as the vehicle is driven this is normal and there should be no adjustment for this increased pressure.

NOTE: If tires require leak-testing, a water test may be used to check for a leak around the sensor, as long as any water at the valve core is removed when procedure is completed. Water can be expelled from the core area by pushing in on the core for several seconds, allowing escaping air to drive out any moisture. Reinflate tire as necessary. Install original valve stem cap.

TIRE PRESSURE SENSOR

CAUTION: This vehicle uses the 433 MHz TPM sensor. Although 315 MHz and 433 MHz sensors are identical in size and shape, they are not interchangeable. Always

make sure the correct sensor is being used. A RKE-TPM Analyzer can be used to determine the sensor's frequency without having to dismount the tire.

CAUTION: The cap used on this valve stem contains an O-ring seal to prevent contamination and moisture from entering the valve stem. Retain this valve stem cap for reuse. Do not substitute a regular valve stem cap in its place.

CAUTION: Do not attempt to install a tire pressure sensor in an aftermarket wheel. Use tire pressure sensors in original style factory wheels only. If aftermarket wheels are installed, and therefore do not contain tire pressure sensors, the system will not function properly and the driver will be continuously notified of a system malfunction.

CAUTION: After inspecting or adjusting the tire pressure always reinstall the valve stem cap. This will prevent moisture and dirt from entering the valve stem, which could damage the Tire Pressure Sensor.

CAUTION: The valve stem used on this vehicle is made of aluminum and the core is nickel plated brass. The original valve stem core must be reinstalled and not substituted with a valve stem core made of a different material. This is required to prevent corrosion in the valve stem caused by the different metals.

CAUTION: Any time a sensor is to be installed in a wheel, it is necessary to install a new sensor-to-wheel seal, metal washer and valve stem nut, to ensure airtight sealing. See Fig. 1.

CAUTION: DO NOT reuse sensor-to-wheel grommet. Always use a new grommet when installing a pressure sensor and properly torque the sensor nut.

Removal (SRT8 Models)

1. Remove tire and wheel assembly from vehicle.
2. Dismount tire from wheel following tire changer manufacturer's instructions while paying special attention to the following to avoid damaging the pressure sensor:
   - When breaking the tire bead loose from the wheel rim, avoid using the Bead Breaker in the area of the sensor. That includes both front and rear beads of the tire. See **Fig. 3**.
   - When preparing to dismount the tire from the wheel, carefully insert the mounting/dismounting tool 280Â° +/- 10Â° from the valve stem, then proceed to dismount the tire from the wheel. Use this process on both the upper and lower tire beads.
3. Using a thin-walled socket, remove special nut retaining sensor to wheel. While removing nut, hold pressure against rear of metal valve stem to keep valve stem from pushing rearward, which could damage antenna strap.
4. Remove sensor from wheel.

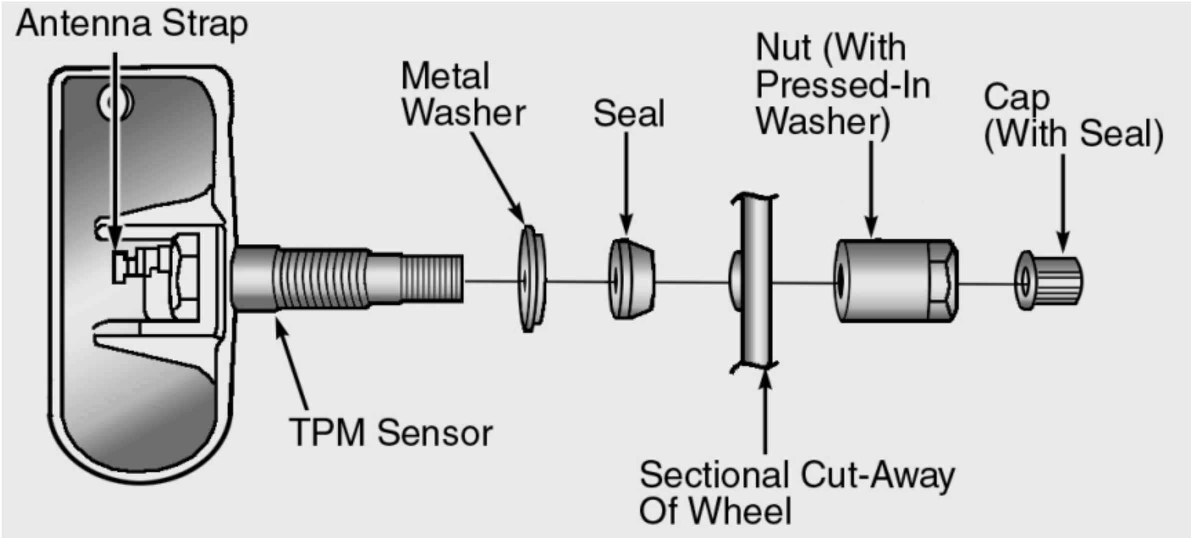

Fig. 1: Identifying Tire Pressure Sensor Components (SRT8)
Courtesy of CHRYSLER CORP.

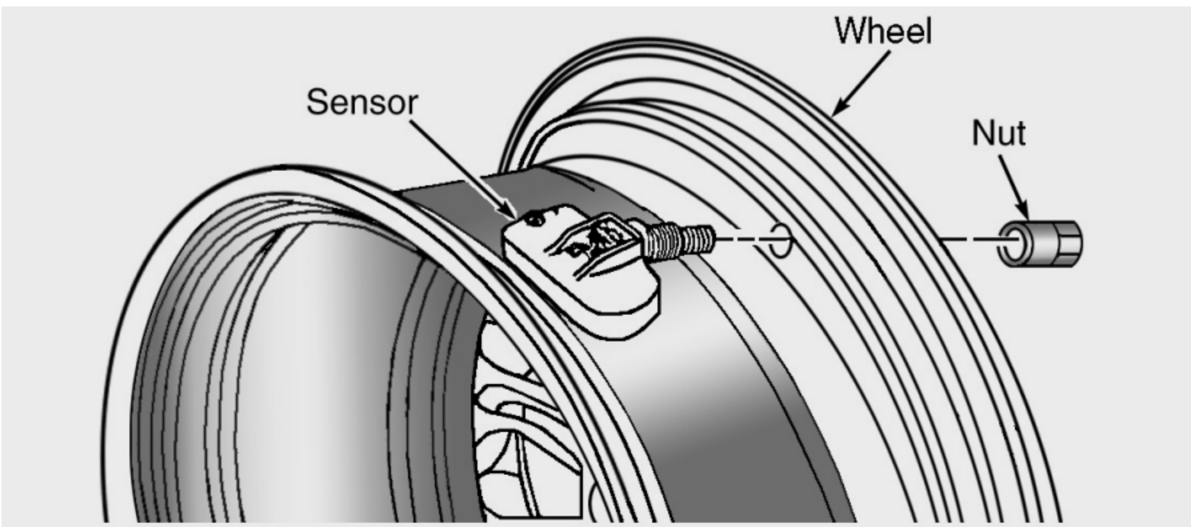

Fig. 2: Removing & Installing Tire Pressure Sensor (SRT8)
Courtesy of CHRYSLER CORP.

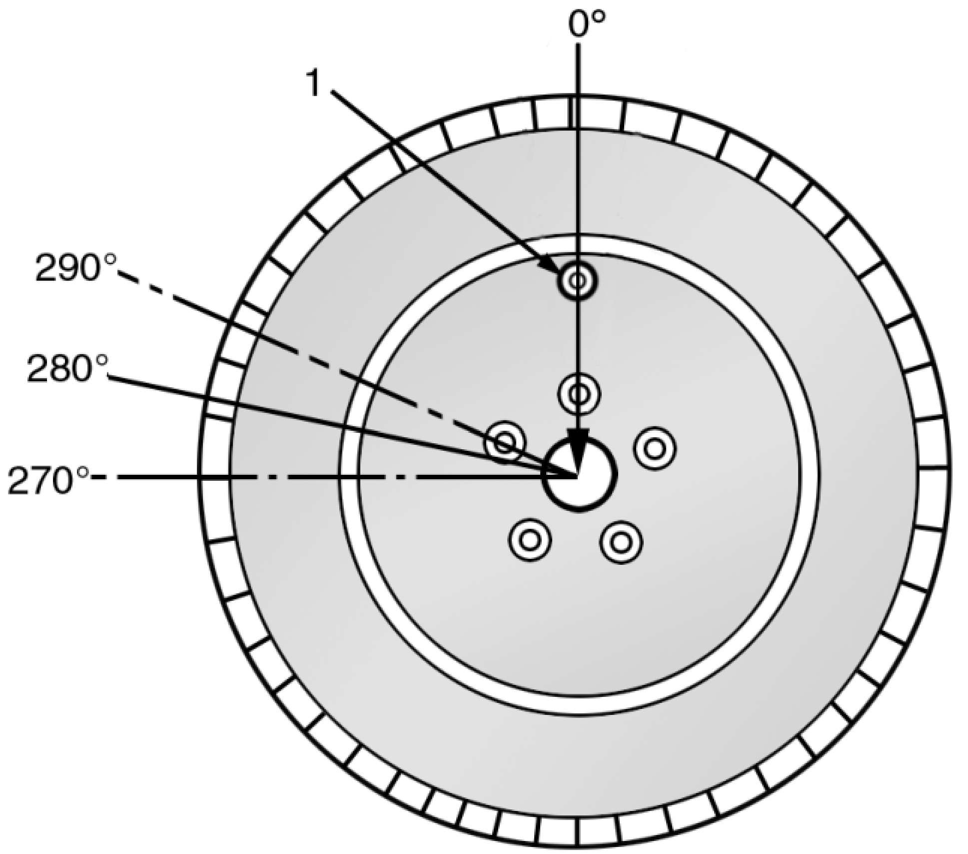

Fig. 3: Dismounting Tire With Tool
Courtesy of CHRYSLER CORP.

Removal (Non-SRT8 Models)

1. Remove tire and wheel assembly from vehicle.
2. Dismount tire from wheel following tire changer manufacturer's instructions while paying special attention to the following to avoid damaging the pressure sensor:
   - When breaking the tire bead loose from the wheel rim, avoid using the Bead Breaker in the area of the sensor. That includes both front and rear beads of the tire. See **Fig. 3**.
   - When preparing to dismount the tire from the wheel, carefully insert the mounting/dismounting tool 280Â° from the valve stem +/- 10Â°, then proceed to dismount the tire from the wheel. Use this process on both the upper and lower tire beads.
3. Remove the sensor to valve stem retainer screw (3) and remove the sensor (1) from the valve stem (2). See **Fig. 5**.
4. Remove the valve stem (2) from the wheel (4). See **Fig. 5**.

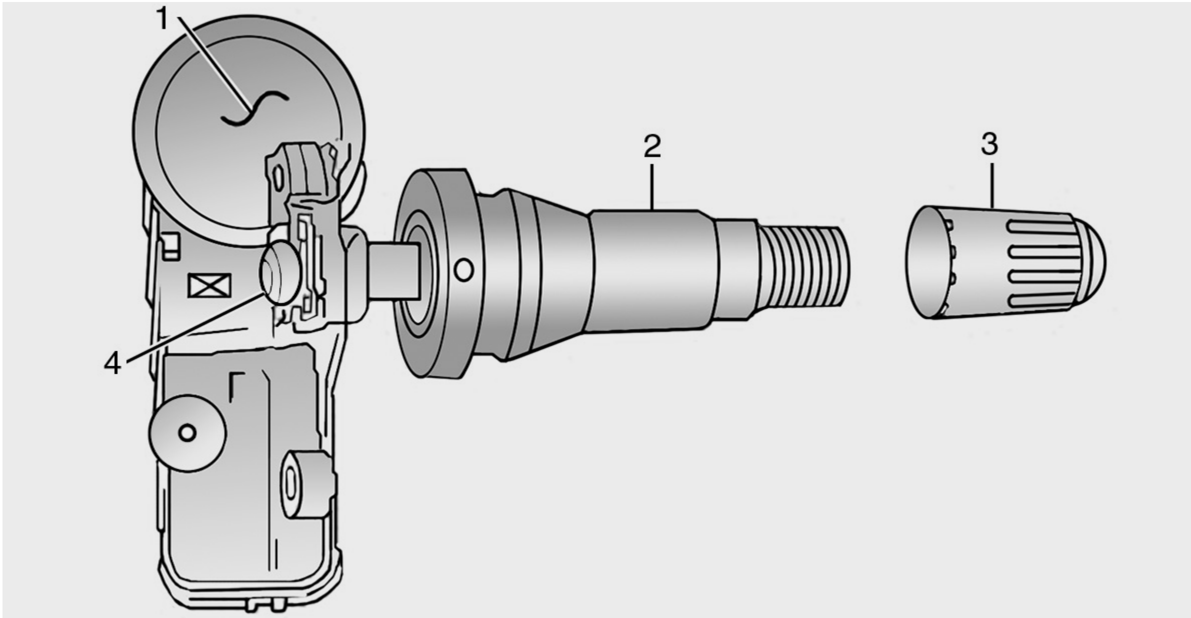

Fig. 4: Identifying Tire Pressure Sensor Components (Non-SRT8)
Courtesy of CHRYSLER GROUP, LLC

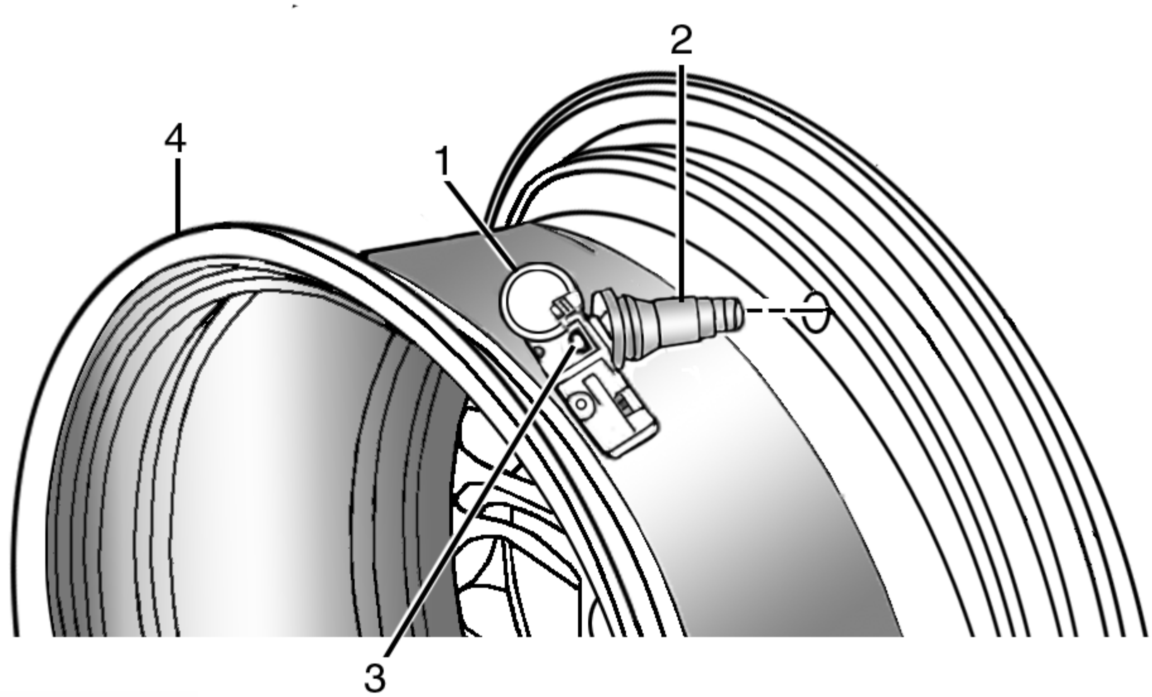

Fig. 5: Removing & Installing Tire Pressure Sensor (Non-SRT8)
Courtesy of CHRYSLER GROUP, LLC

Installation (SRT8 Models)

NOTE: **Before reinstalling an existing tire pressure sensor, replace seal and metal washer at base of valve stem to ensure proper sealing. See Fig. 1.**

1. Wipe area clean around sensor/valve stem mounting hole in wheel. Make sure surface of wheel is not damaged.

CAUTION: To avoid damaging sensor antenna strap, hold pressure against rear of metal valve stem while sensor is inserted through wheel mounting hole and nut is installed.

2. Insert sensor through wheel as shown keeping pressure against rear of metal valve stem. Potted side of sensor is to be positioned toward wheel. Do not attempt to mount sensor otherwise, or damage may occur. Install sensor nut (with pressed-in washer) by hand. See **Fig. 6**.

NOTE: Before tightening sensor nut, push downward on sensor housing in an attempt to make it flush with interior contour of wheel.

3. Using a thin-walled socket, install sensor nut. While holding sensor in position, tighten sensor nut to 71 INCH lbs. (8 N.m).

CAUTION: Over-torquing the sensor nut by as little as 106 INCH lbs. (12 N.m) may result in sensor separation from the valve stem. Under this condition, the sensor may still function; however, the condition should be corrected immediately.

4. Mount tire on wheel following tire changer manufacturer's instructions, paying special attention to the following to avoid damaging tire pressure sensor:

   - **Rotating Wheel Tire Changers**

     Once the wheel is mounted to the changer, position the sensor valve stem approximately 280Ā° from the head of the changer in a clockwise direction before rotating the wheel (also in a clockwise direction) to mount the tire. Use this procedure on both the upper and lower tire beads. See **Fig. 7**.

   - **Rotating Tool Tire Changers**

     Position the wheel on the changer so that the sensor valve stem is approximately 210Ā° from the head of the changer in a clockwise direction from the mounting end of the tool. See **Fig. 8**. Make sure the sensor is clear of the lower bead breaker area to avoid damaging the sensor when the breaker rises. Rotate the tool in a counterclockwise direction to mount the tire. Use this procedure on both the upper and lower tire beads.

5. Adjust air pressure to specification. Make sure original style valve stem cap is securely installed to keep moisture out of sensor. Install wheel and tire assembly on vehicle.
6. Drive vehicle for a minimum of 5 minutes while maintaining a continuous speed above 15 mph (24 km/h). During this time, the system will learn the new sensor ID code and will clear any DTCs automatically. If a sensor cannot be trained, see appropriate manufacturer service information.

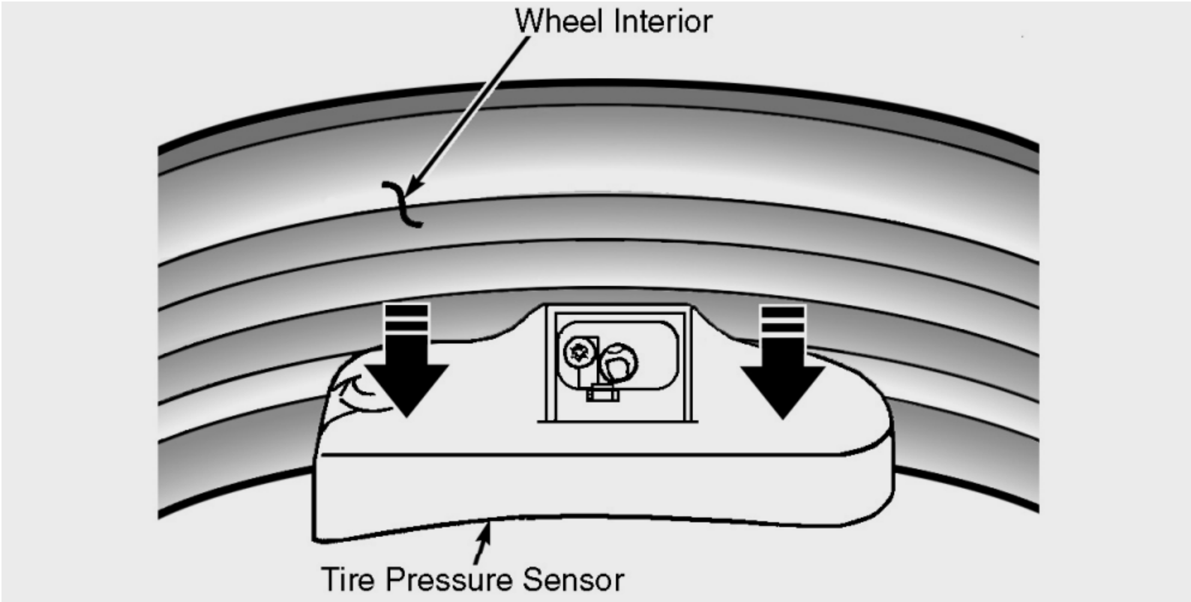

Fig. 6: Installing Tire Pressure Sensor
Courtesy of CHRYSLER CORP.

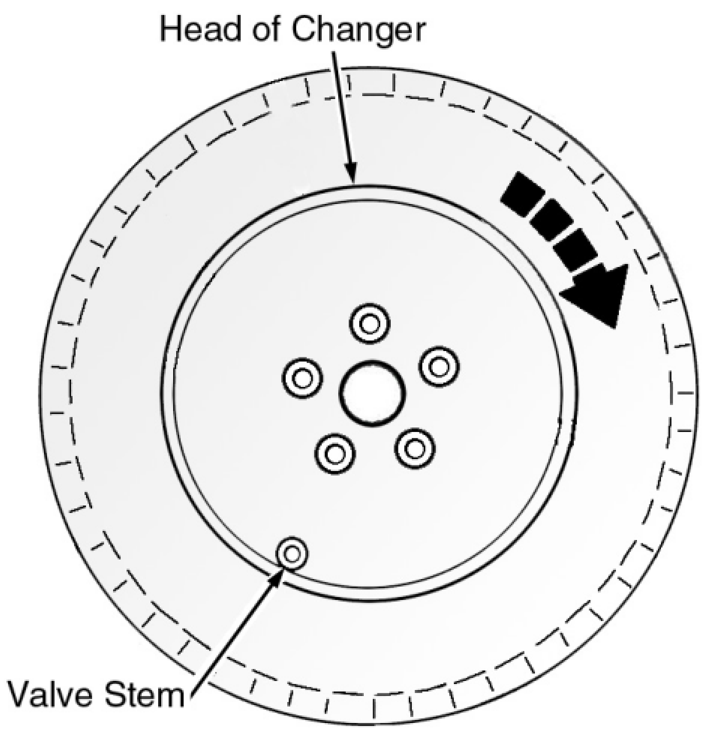

Fig. 7: Mounting Tire Using Rotating Wheel Machine
Courtesy of CHRYSLER CORP.

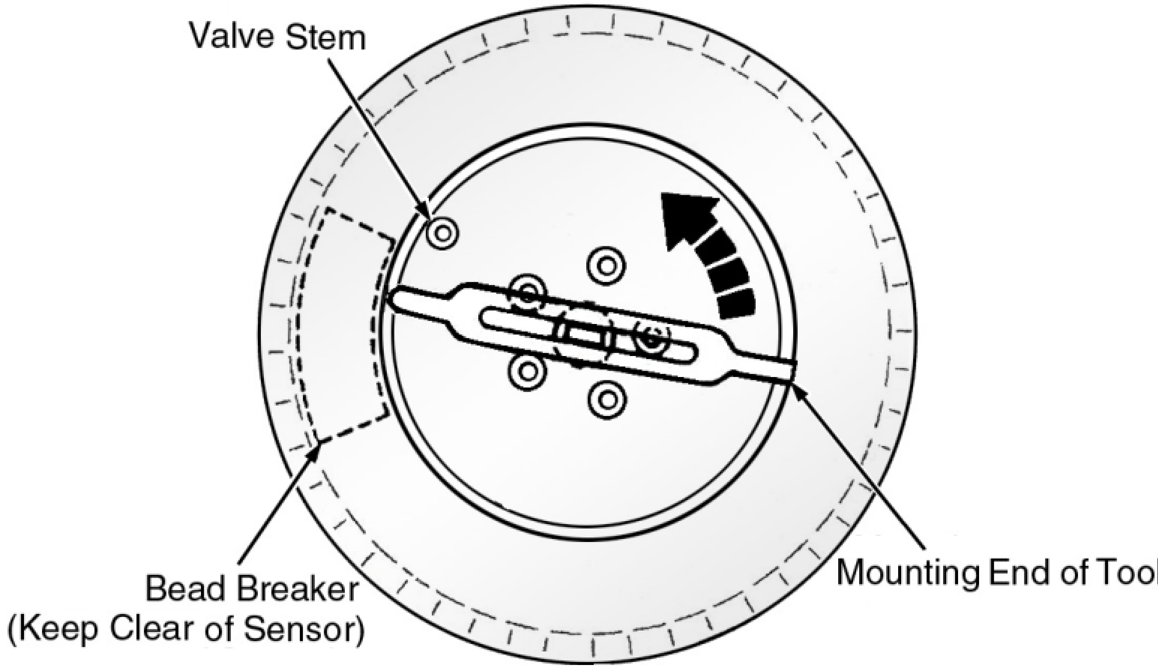

Fig. 8: Mounting Tire Using Rotating Tool Machine
Courtesy of CHRYSLER CORP.

Installation (Non-SRT8 Models)

NOTE: **If replacing tire pressure sensor, a new valve stem will be pre-mounted to the sensor as an assembly. Verify that the sensor is positioned properly before seating the valve stem. If replacing a valve stem only (using the existing tire pressure sensor), the new valve stem will include a new tire pressure sensor mounting screw. Always use a new mounting screw when attaching a sensor to a valve stem.**

CAUTION: **Any time a sensor is to be reinstalled in a wheel, an new valve stem assembly must be installed to ensure air tight sealing.**

1. Wipe area clean around sensor. valve stem mounting hole in wheel (4). Make sure surface of wheel is not damaged. See **Fig. 5**
2. Insert valve stem (2) through wheel (4) and pull through to seat with standard valve stem installation tool. See **Fig. 4**
3. If replacing the valve stem (2) only, verify that the flat sides of the brass extension on the bottom of the valve stem (2) are at a 90 degree angle with the wheel. Position the pressure sensor (1) over the brass extension, install the retainer screw (4) and tighten to 1.4 N.m (12 in. lbs) See **Fig. 4**
4. Mount tire on wheel following tire changer manufacturer's instructions, paying special attention to the following to avoid damaging tire pressure sensor:

   - **Rotating Wheel Tire Changers**

     Once the wheel is mounted to the changer, position the sensor valve stem (2) approximately 280Â° from the head of the changer in a clockwise direction before rotating the wheel (also in a clockwise direction) to mount the tire. Use this procedure on both the upper and lower tire beads. See **Fig. 7**.

- **Rotating Tool Tire Changers**

  Position the wheel on the changer so that the sensor valve stem is approximately 210Â° clockwise from the installation end of the mounting/dismounting tool once the tool is mounted for tire installation. See **Fig. 8**. Make sure the sensor is clear of the lower bead breaker area to avoid damaging the sensor when the breaker rises. Rotate the tool in a counterclockwise direction to mount the tire. Use this procedure on both the upper and lower tire beads.
- Adjust air pressure to specification. Make sure original style valve stem cap is securely installed to keep moisture out of sensor. Install wheel and tire assembly on vehicle.
- Drive vehicle for a minimum of 10 minutes while maintaining a continuous speed above 15 mph (24 km/h). During this time, the system will learn the new sensor ID code and will clear any DTCs automatically. If a sensor cannot be trained, see appropriate manufacturer service information.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Component	**Ft. Lbs. (N.m)**
Wheel Nut (2008-13)	85-115 (115-156)
Wheel Nut (2014-)	130 (176)
Wheel Nut (SRT 2015-)	110 (150)
	INCH Lbs. (N.m)
Tire Pressure Sensor Nut (SRT8)	(1) 71 (8)
Torx Bolt (Non-SRT8)	11.5 (1.3)

(1) Over-torquing the sensor nut by as little as 106 INCH lbs. (12 N.m) may result in sensor separation from the valve stem. Under this condition, the sensor may still function; however, the condition should be corrected immediately.

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Article GUID: A00320562

2015-16 MANUAL TRANSMISSION

TR6060 - Service Information - 6.2L - Challenger

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - MANUAL TRANSMISSION - TR6060

LOW LUBRICANT LEVEL

A low transmission lubricant level is generally the result of a leak, inadequate lubricant fill, or an incorrect lubricant level check.

Leaks can occur at the mating surfaces of the gear case or from the front/rear seals. A suspected leak could also be the result of an overfill condition.

Leaks at the rear of the housing will be from the oil seals. Leaks at component mating surfaces will probably be the result of inadequate sealer, gaps in the sealer, incorrect bolt tightening, use of a non-recommended sealer or incorrect/damaged gasket(s), if equipped.

A leak at the front of the transmission will be from either the front bearing retainer or retainer seal. Lubricant may be seen dripping from the clutch housing after extended operation. If the leak is severe, it may also contaminate the clutch disc causing the disc to slip, grab, and/or chatter.

A correct lubricant level check can only be made when the vehicle is level. Also allow the lubricant to settle for a minute or so before checking. These recommendations will ensure an accurate check and avoid an underfill or overfill condition. Always check the lubricant level after any addition of fluid to avoid an incorrect lubricant level condition.

HARD SHIFTING

Hard shifting can be caused by a low lubricant level, improper or contaminated lubricants. The consequence of using non-recommended lubricants is noise, excessive wear, internal bind, and hard shifting. Substantial lubricant leaks can result in gear, shift rail, synchronizer, and bearing damage. If a leak goes undetected for an extended period, the first indications of component damage are usually hard shifting and noise.

Shift component damage, incorrect clutch adjustment or a worn or damaged clutch pressure plate or disc are additional probable causes of increased shift effort. If clutch problem is advanced, gear clash during shifts can result. Worn or damaged synchronizer rings can cause gear clash when shifting into any forward gear. In some new or rebuilt transmissions, new synchronizer rings may tend to stick slightly causing hard or noisy shifts. In most cases, this condition will decline as the rings wear-in.

TRANSMISSION NOISE

Most manual transmissions make some noise during normal operation. Gears can generate a rotational noise or rattle that is audible during idle in neutral, or generate a mild whine that is audible during regular driving. These conditions are normal and do not require repair.

Severe, highly audible transmission noise is generally the initial indicator of a lubricant problem. Insufficient, improper or contaminated lubricant will promote rapid wear of gears, synchros, shift rails, forks and bearings.

The overheating caused by a lubricant problem, can also lead to gear and bearing damage.

STANDARD PROCEDURE

STANDARD PROCEDURE - DRAIN AND FILL

CAUTION: **Hypoid gear lube must not be used in this transmission. Use of hypoid gear lube will cause hard shifting effort/transmission failure.**

NOTE: **Failure to properly fill this transmission with the specified amount of transmission fluid will result in transmission damage.**

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

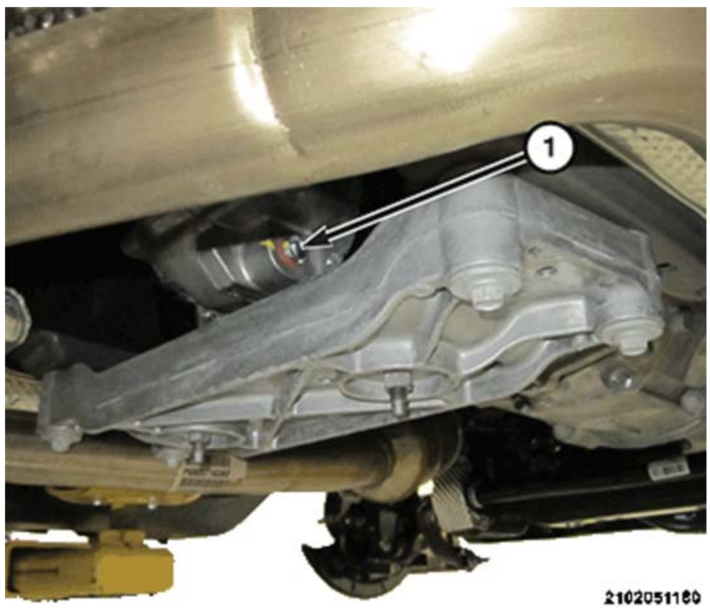


Fig. 1: Transmission Drain Plug
Courtesy of CHRYSLER GROUP, LLC

2. Remove transmission drain plug (1) and drain the transmission fluid.
3. Install transmission drain plug (1) and tighten to the proper **SPECIFICATIONS** .

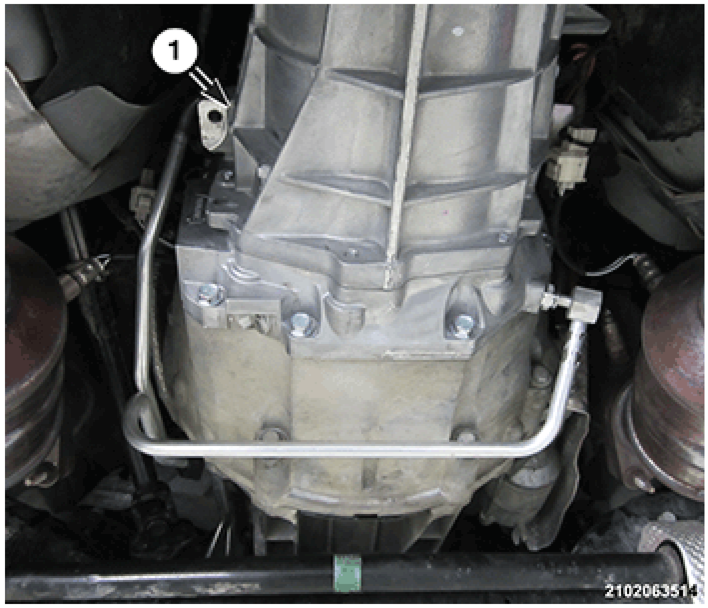


Fig. 2: Upper Transmission Cooler Line
Courtesy of CHRYSLER GROUP, LLC

4. Remove the upper transmission cooler line.
5. Fill the transmission with the specified fluid. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
6. Install the upper transmission cooler line.

ADJUSTMENTS

ADJUSTMENTS

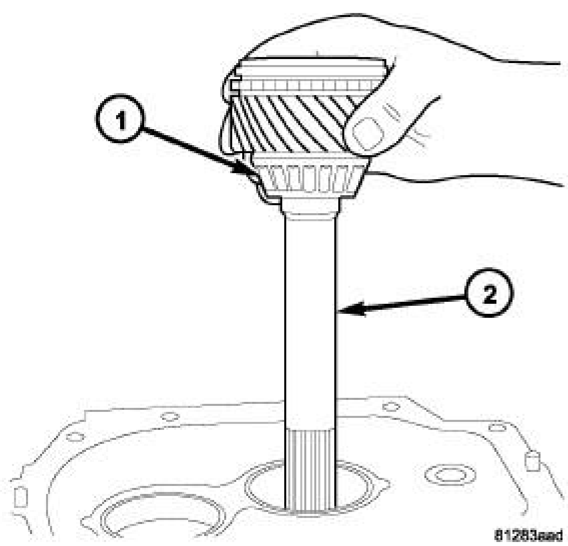


Fig. 3: Input Shaft
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The following procedure must be performed, when an input shaft (2) or tapered**

bearing (1) has been replaced. The measurement is performed with all shims removed from the front adapter.

1. Install the input shaft (2) into the adapter.

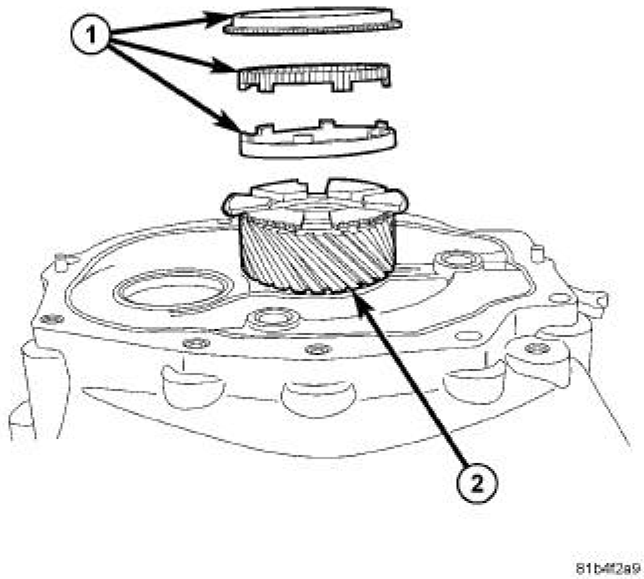


Fig. 4: Input Shaft Synchro Rings
Courtesy of CHRYSLER GROUP, LLC

2. Install the fourth gear synchronizer rings (1) on the input shaft (2).
3. Install mainshaft and countershaft.
4. Install the case on the adapter and tighten the bolts to the proper **SPECIFICATIONS** .

MAINSHAFT BEARINGS END-PLAY

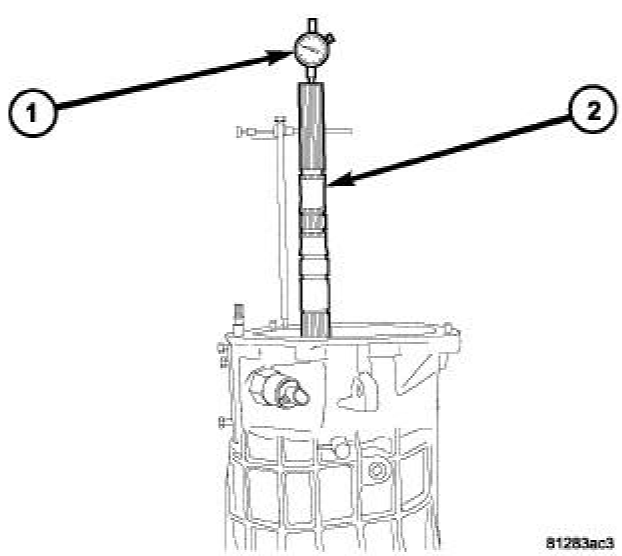


Fig. 5: Mainshaft & Dial Indicator
Courtesy of CHRYSLER GROUP, LLC

1. Rotate input shaft/mainshaft several time to seat the bearings.
2. Screw dial indicator Stud (special tool #8161, Adapter Rod) into the case.
3. Attach a dial indicator (1) to the stud and set dial indicator (1) plunger on the end of the mainshaft (2).
4. Zero the dial indicator (1), then push up on the input shaft and record the dial indicator end-play measurement.
5. Subtract 0.0127 - 0.0889 mm (0.0005 - 0.0035 in.) from the recorded dial indicator end-play measurement. The remainder is the shim thickness needed behind the input shaft bearing cup in the front adapter.

COUNTERSHAFT BEARINGS END-PLAY

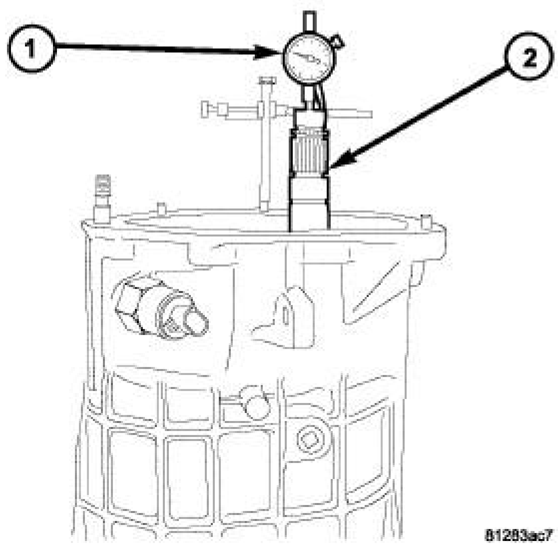


Fig. 6: Identifying Countershaft & Dial Indicator
Courtesy of CHRYSLER GROUP, LLC

1. Rotate countershaft several time to seat the bearings.
2. Screw Stud (special tool #8161, Adapter Rod) into the case.
3. Attach a dial indicator (1) to the stud and set dial indicator (1) plunger on the end of the countershaft (2).
4. Zero dial indicator, then pull up on the countershaft and record the dial indicator end-play measurement.
5. Subtract 0.0127 - 0.0889 mm (0.0005 - 0.0035 in.) from the recorded dial indicator end-play measurement. The remainder is the shim thickness needed behind the countershaft bearing cup in the front adapter.

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Shifter Assembly Bolts	19	-	168	Ā
Shift Lever Bolts	19	-	168	Ā
Top Cover Bolts	20	15	-	Ā
Extension Housing Nuts	48	35	-	Ā
Extension Housing Bolts	48	33	-	Ā
Adapter Bolts	34	25	-	Ā
* Side Shift Detent	40	30	-	Ā
* Roller Detent Bolt	40	30	-	Ā
Back Up Lamp Switch	34	25	-	Ā
Skip Shift Solenoid	34	25	-	Ā
Drain Plug	27	20	-	Ā
Fill Plug	27	20	-	Ā
Clutch Housing Bolts	34	25	-	Ā
Clutch Release Bearing/Slave Cylinder Bolts	28	21	-	Ā
Reverse Lockout Solenoid Bolt	18	13	-	Ā
Guide Plate Bolts	22	16	-	Ā
*Shift Lever Guide Bolts	27	20	-	Ā
* Reverse Idler Bracket Bolts	30	22	-	Ā
*Flywheel Bolts	75	55	-	X
Crossmember Bolts	61	45	-	Ā
Transmission Isolator To Crossmember Nuts	54	40	-	Ā
Transmission Isolator To Transmission Bolts	33	24	-	Ā
Top Transmission To Engine Studs	45	33	-	Ā
Front Transmission To Engine Bolts	45	33	-	Ā
Bottom Transmission To Oil Pan Bolts	45	33	-	Ā
Inspection Cover Bolt	11	-	95	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				
* Needs application of Mopar Lock AND Seal Adhesive or equivalent				

GENERAL SPECIFICATIONS

SHAFT END-PLAY

SHAFT	END-PLAY
MAINSHAFT	0.0127 - 0.0889 mm (0.0005 - 0.0035 in.)
COUNTERSHAFT	0.0127 - 0.0889 mm (0.0005 - 0.0035 in.)

GEAR RATIO

Ā	5.7L/6.4L	6.2L
Ā	**GEAR**	**RATIO**
FIRST	2.97	2.26
SECOND	2.10	1.58
THIRD	1.46	1.19
FOURTH	1.00	1.00
FIFTH	0.74	0.76
SIXTH	0.50	0.63
REVERSE	2.90	2.90

REMOVAL

REMOVAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the exhaust. Refer to **CONVERTER, CATALYTIC, REMOVAL** .
3. Remove the drive shaft. Refer to **REMOVAL** .

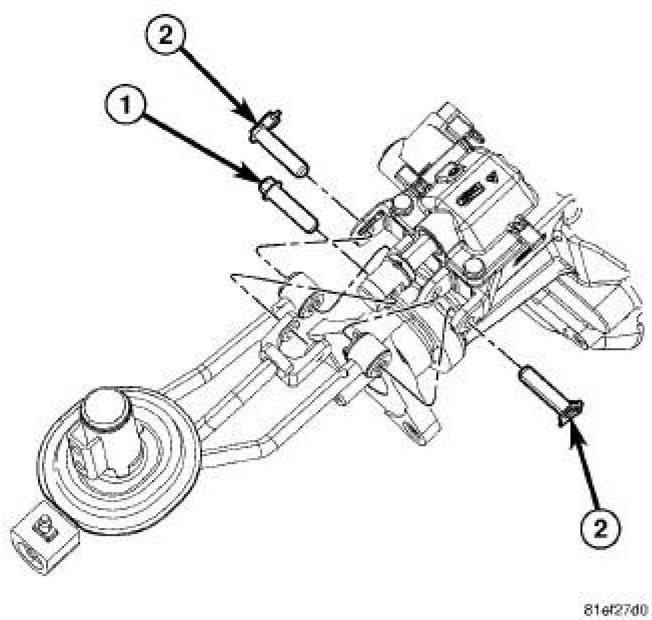


Fig. 7: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

4. Remove the shift linkage bolt (1) and the retaining pins (2), then separate the shift linkage from the transmission.

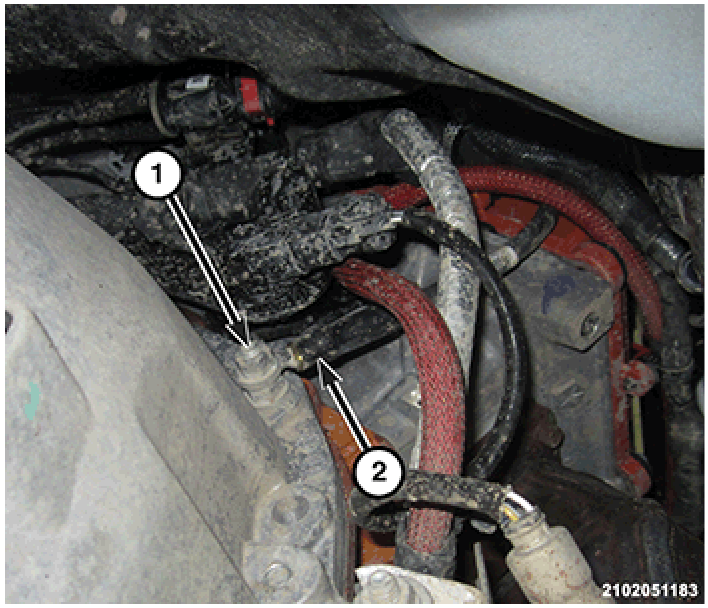


Fig. 8: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

5. Remove the ground wire nut (1) and position aside the ground wire (2).

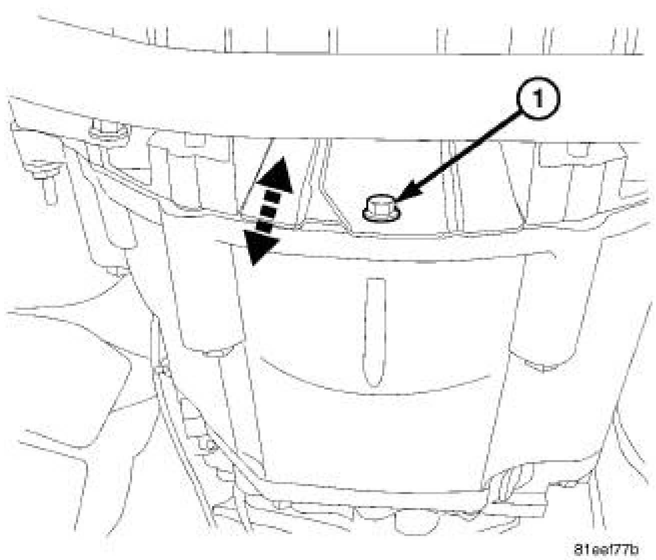


Fig. 9: Inspection Cover
Courtesy of CHRYSLER GROUP, LLC

6. Remove the inspection cover bolt (1) and the inspection cover.

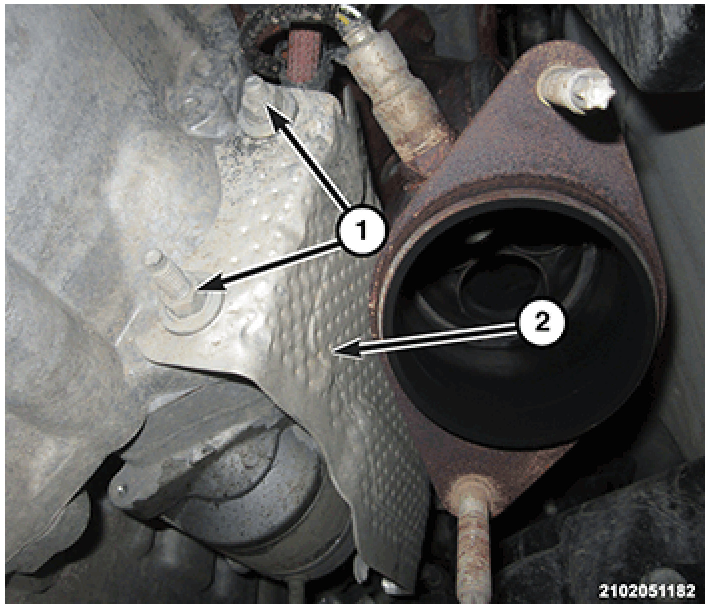


Fig. 10: Starter Heat Shield & Nuts
Courtesy of CHRYSLER GROUP, LLC

7. Remove the starter heat shield nuts (1) and the starter heat shield (2).

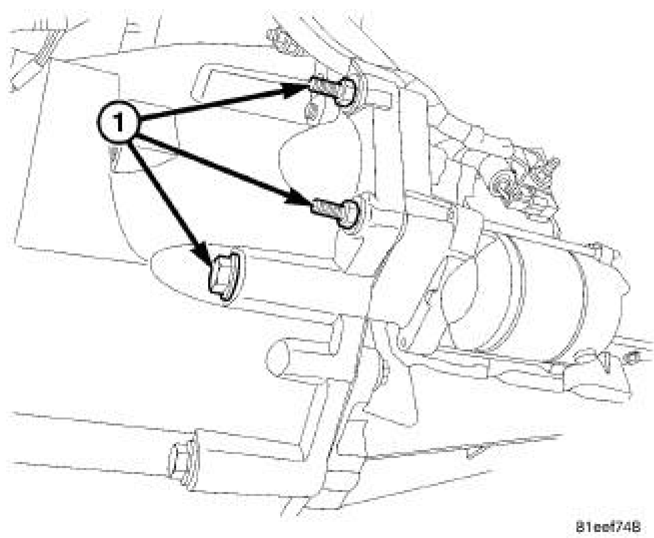


Fig. 11: Starter Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Remove the starter bolts (1) and securely position the starter aside.

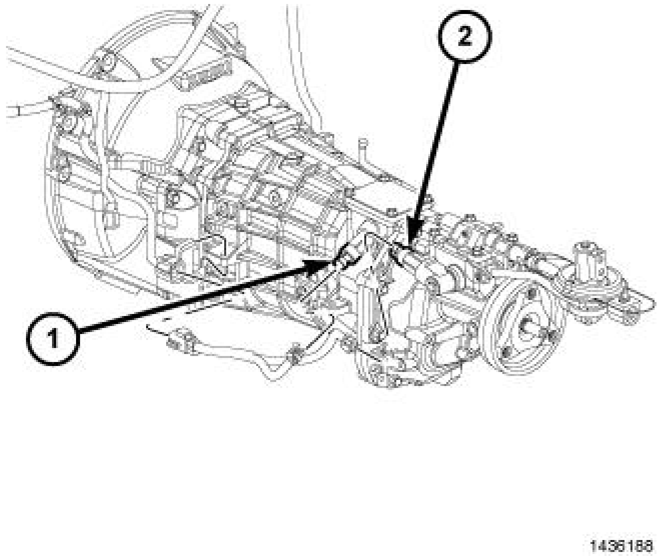


Fig. 12: Skip Shift & Reverse Lockout Solenoids
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the transmission skip shift solenoid wire harness connector (1) and the transmission reverse lockout solenoid wire harness connector (2).

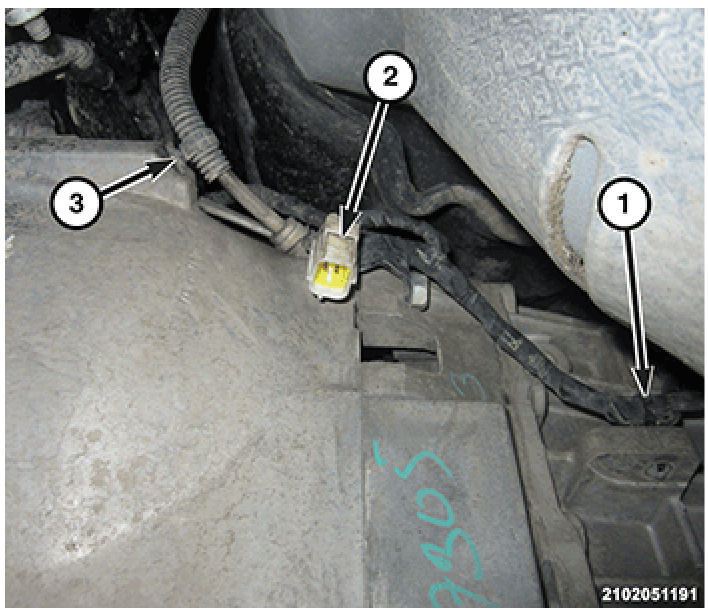


Fig. 13: Wire Harness Connector & Harness Clips
Courtesy of CHRYSLER GROUP, LLC

10. Remove push pin wiring connectors (1 and 2) and the clutch hydraulic tube push pin (3) from the transmission.

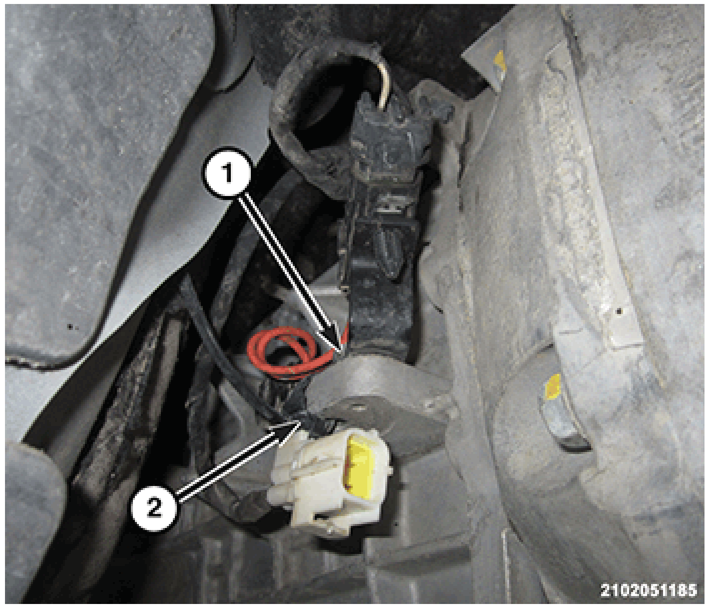


Fig. 14: Push Pin Wiring Connectors
Courtesy of CHRYSLER GROUP, LLC

11. Remove push pin wiring connectors (1 and 2) from the transmission.

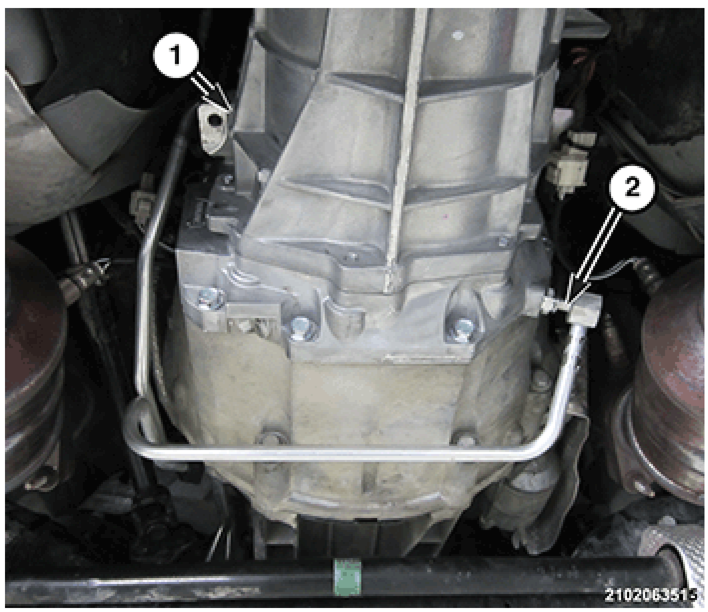


Fig. 15: Transmission Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the transmission cooler lines (1 and 2) from the transmission. (Refer to **STANDARD PROCEDURE**).

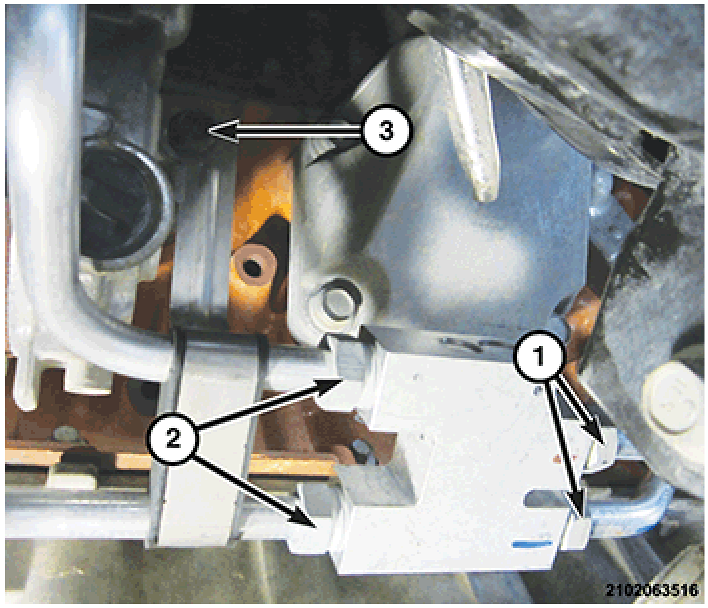


Fig. 16: Transmission Cooler Lines & Bracket Bolt
Courtesy of CHRYSLER GROUP, LLC

13. Disconnect the transmission cooler lines (1) from the thermal bypass valve and remove the rear transmission cooler lines from the vehicle.

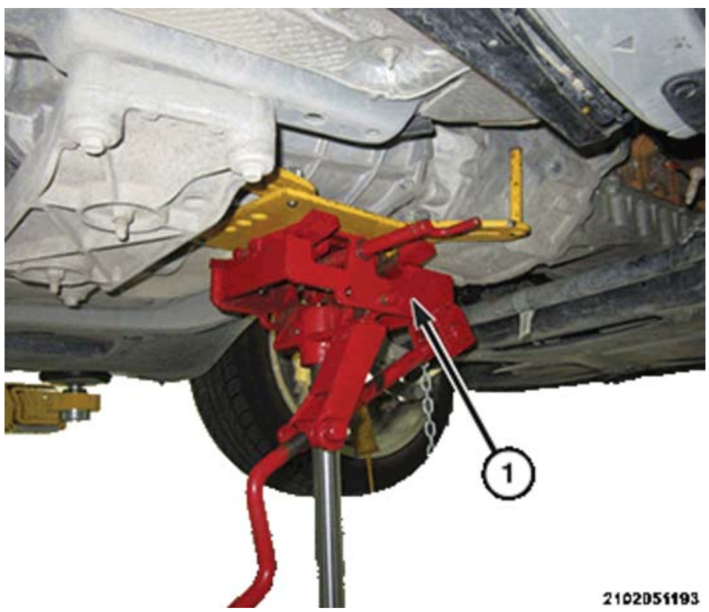


Fig. 17: Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

14. Raise the transmission slightly with the transmission jack (1) and relieve the load on the crossmember.

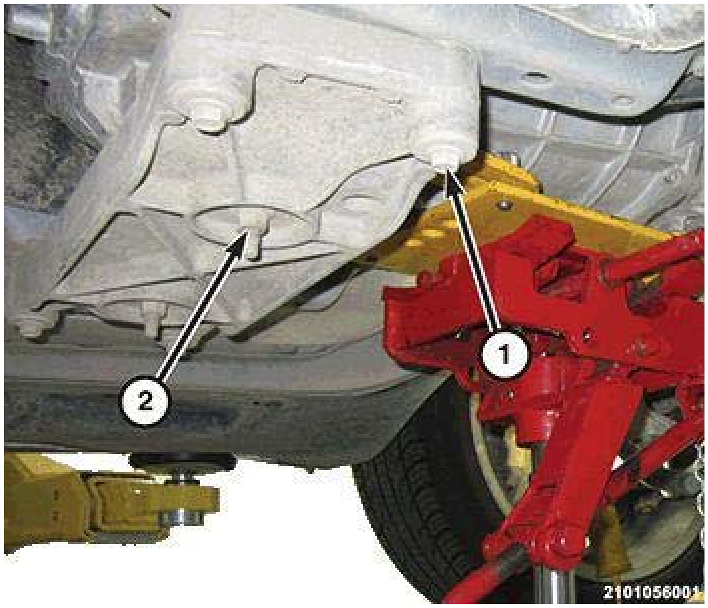


Fig. 18: Rear Cross Member & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Remove the crossmember bolts (1).

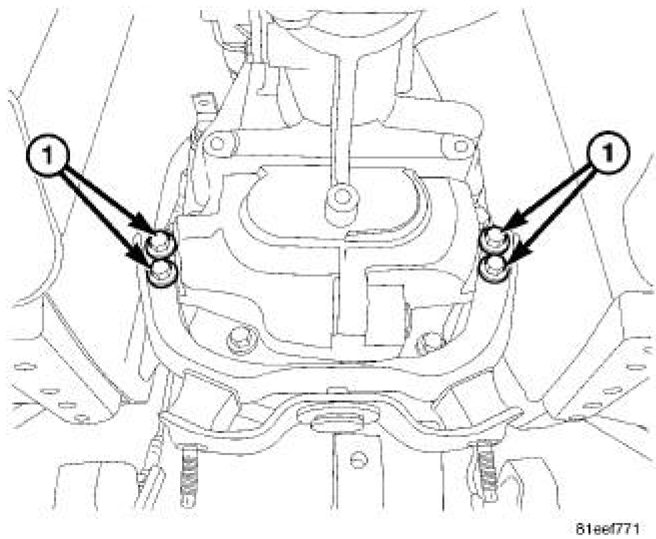


Fig. 19: Transmission Isolator Bracket Upper Bolts
Courtesy of CHRYSLER GROUP, LLC

16. Remove the isolator bracket bolts (1).
17. Remove the crossmember, isolator bracket and isolator from the transmission.

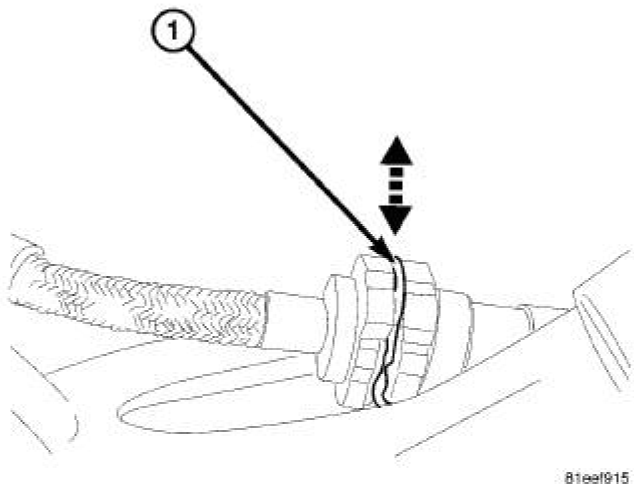


Fig. 20: Clutch Hose Removal
Courtesy of CHRYSLER GROUP, LLC

18. Raise the clip (1) securing the clutch hydraulic hose to the throw out bearing assembly. Remove and cap the clutch hydraulic hose.

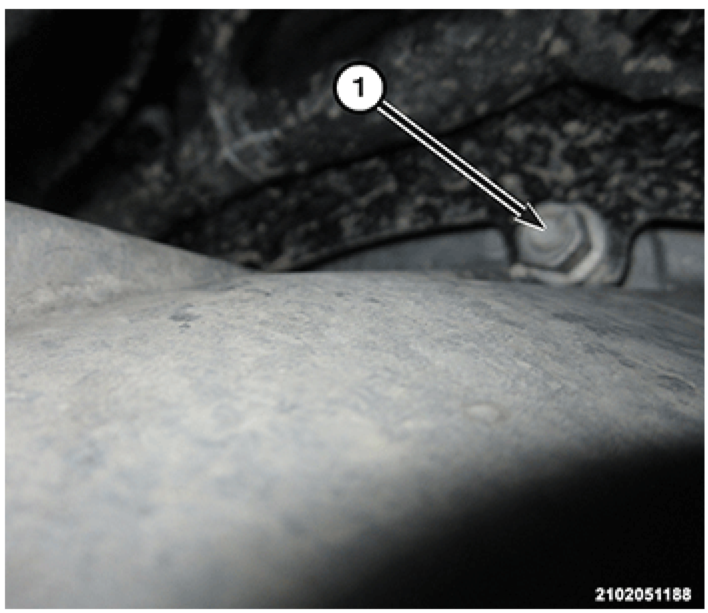


Fig. 21: Rainbow Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

19. Remove the rainbow bracket nut (1).

Fig. 22: Rainbow Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

20. Remove the rainbow bracket nut (1).

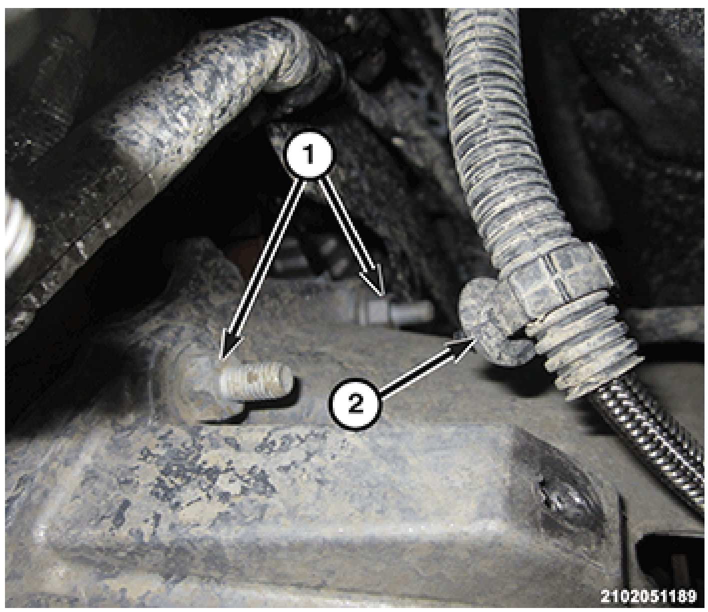


Fig. 23: Engine Stud Bolts & Harness Clip
Courtesy of CHRYSLER GROUP, LLC

21. Remove the top three (two shown) transmission to engine stud bolts (1).

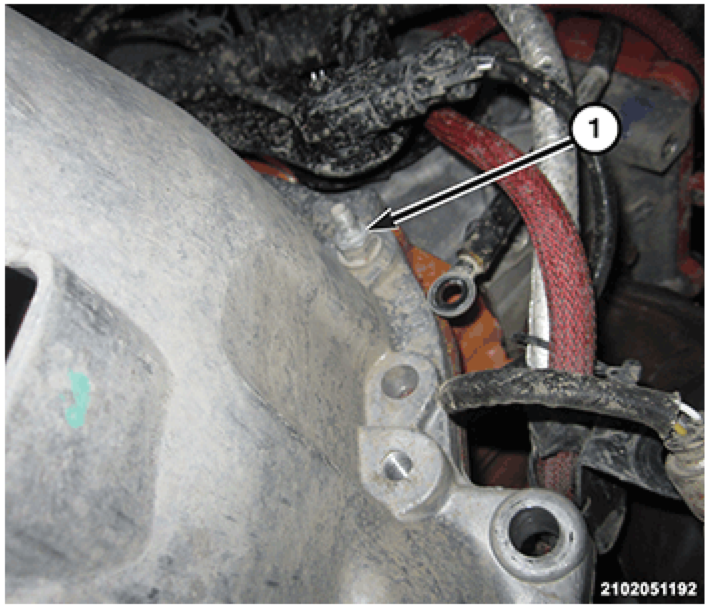


Fig. 24: Engine Stud Bolt
Courtesy of CHRYSLER GROUP, LLC

22. Remove the top transmission to engine stud bolt (1).

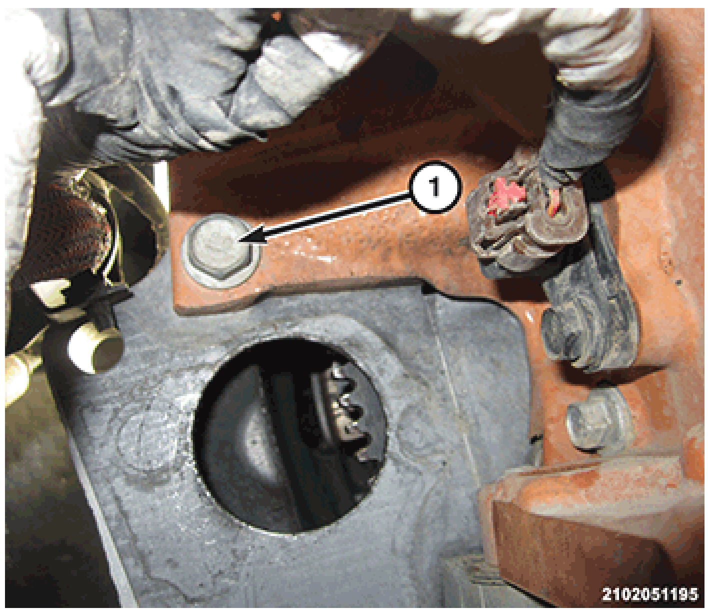
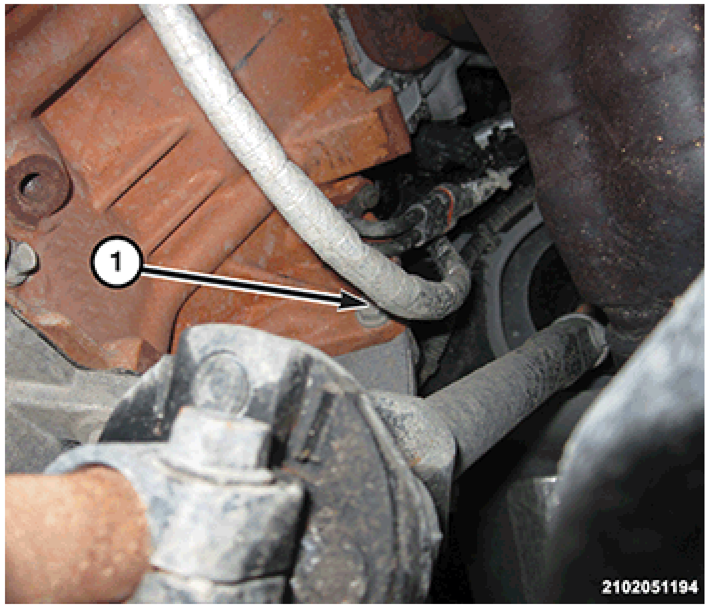


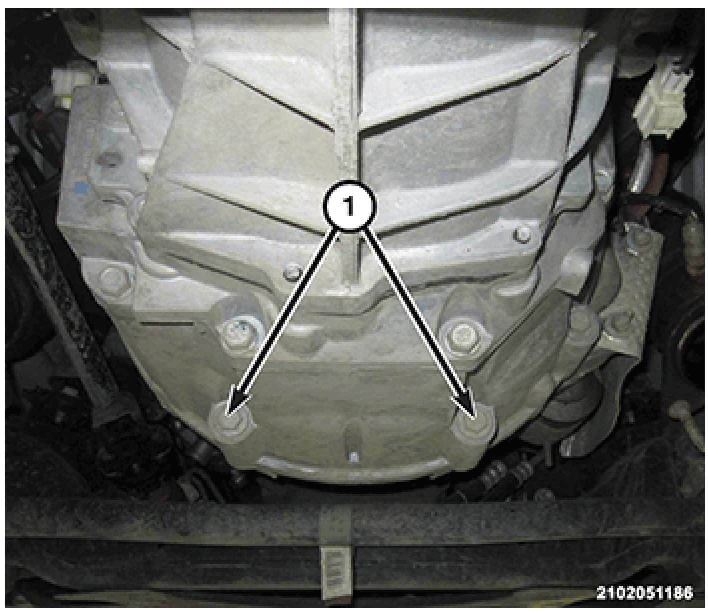
Fig. 25: Front Transmission To Engine Bolt
Courtesy of CHRYSLER GROUP, LLC

23. Remove the front transmission to engine bolt (1).



[Fig. 26: Front Transmission To Engine Bolt]()
Courtesy of CHRYSLER GROUP, LLC

24. Remove the front transmission to engine bolt (1).



[Fig. 27: Bottom Transmission To Oil Pan Bolts]()
Courtesy of CHRYSLER GROUP, LLC

25. Remove the bottom transmission to oil pan bolts (1).
26. Slide transmission back so that the input shaft clears pressure plate
27. Remove the transmission from the vehicle.

DISASSEMBLY

DISASSEMBLY

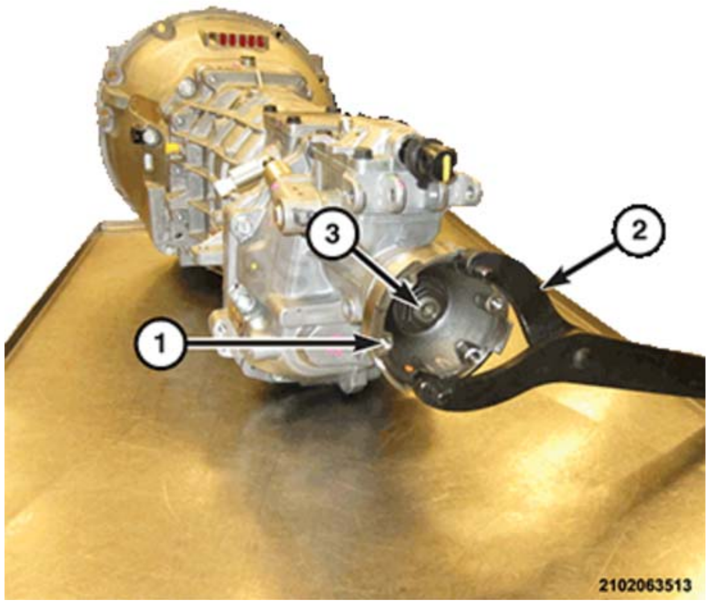


Fig. 28: Output Flange, Special Tool & Locknut
Courtesy of CHRYSLER GROUP, LLC

1. Hold the output flange (1) with Special Tool (special tool #C-3281, Holder, Flange) Flange Holder (2) while removing the output flange locknut (3).

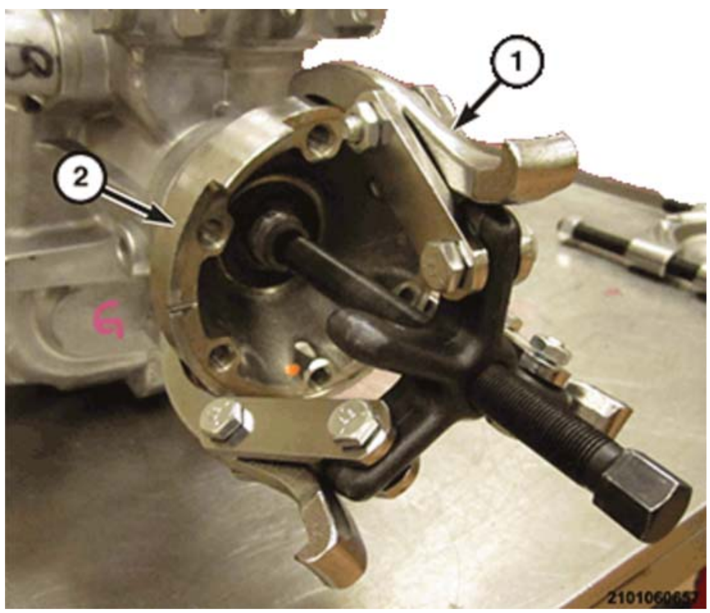


Fig. 29: Three Jaw Puller & Output Flange
Courtesy of CHRYSLER GROUP, LLC

2. Using a three jaw puller (1) or equivalent, remove the output flange (2) from the transmission output shaft.

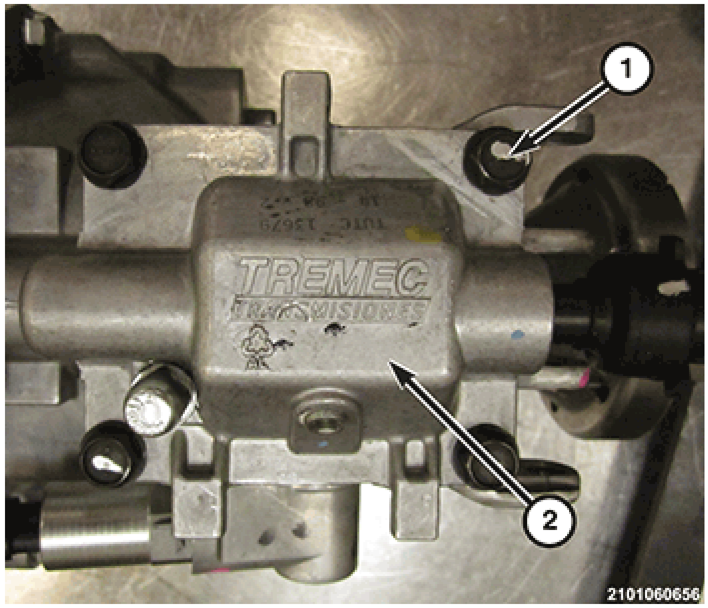


Fig. 30: Shift Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the shift cover (1) bolts (2) and remove the cover (2).

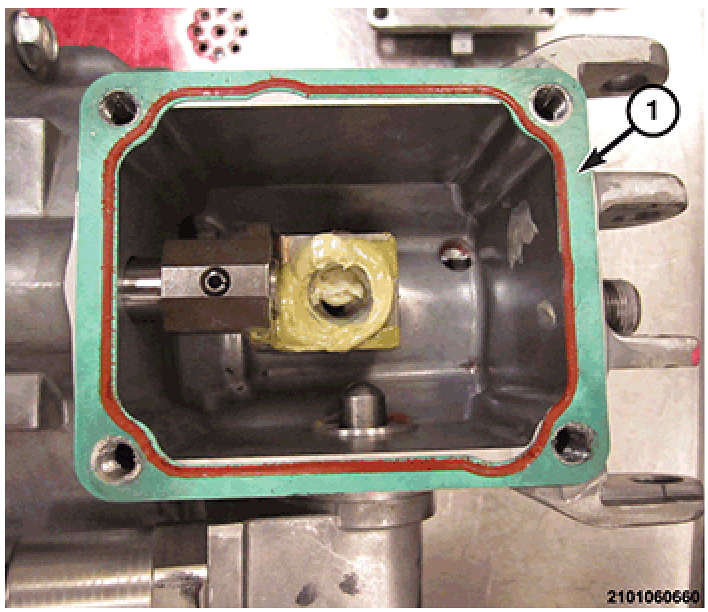


Fig. 31: Shift Cover Gasket
Courtesy of CHRYSLER GROUP, LLC

4. Remove the shift cover gasket (1).

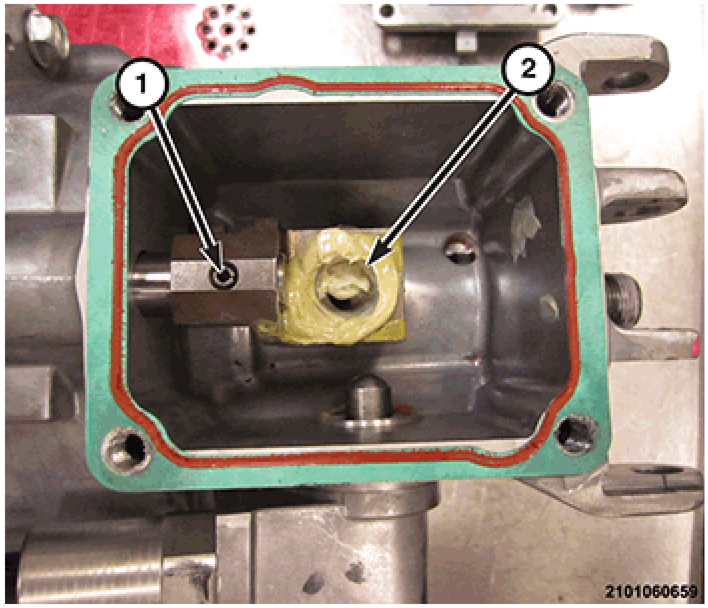


Fig. 32: Offset Lever & Roll Pin
Courtesy of CHRYSLER GROUP, LLC

5. Remove the offset lever (2) roll pin (1) with a hammer and punch and remove the offset lever.

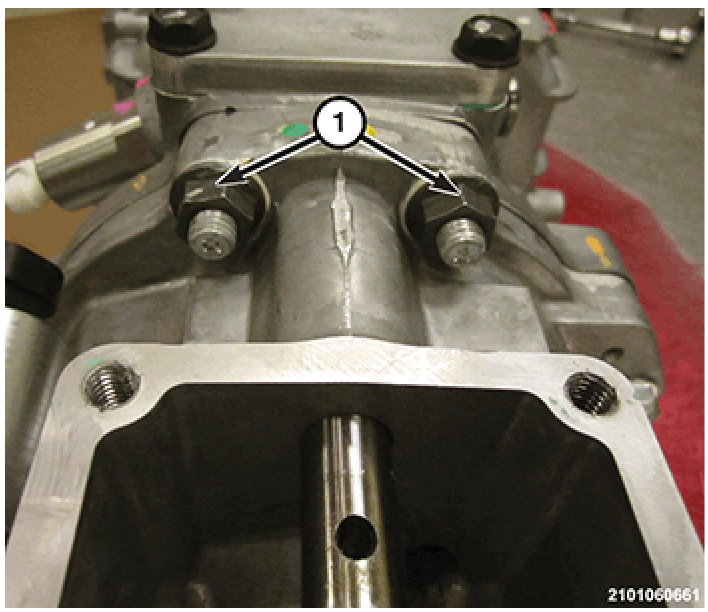


Fig. 33: Extension Housing Nuts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the extension housing nuts (1) from the transmission studs.

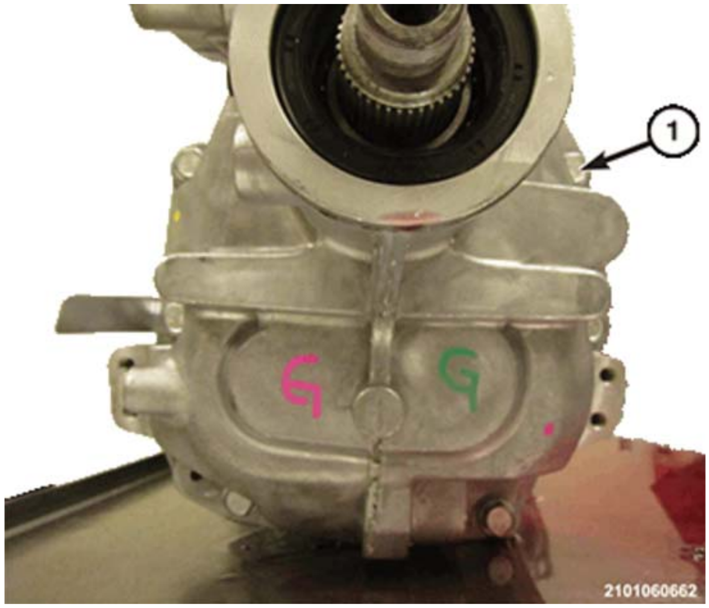


Fig. 34: Extension Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove the extension housing bolts (1).

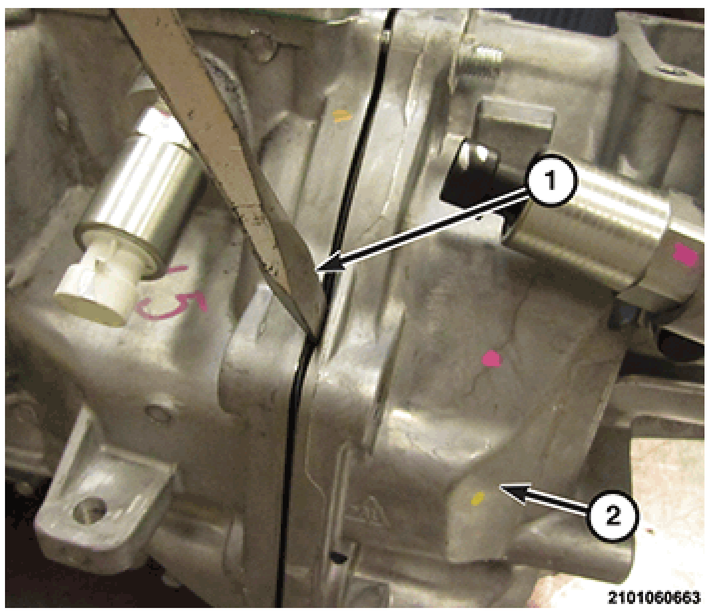


Fig. 35: Prying Extension Housing Off Transmission Case At Pry Points
Courtesy of CHRYSLER GROUP, LLC

8. Pry the extension housing (2) off of the transmission case at the pry points (1).

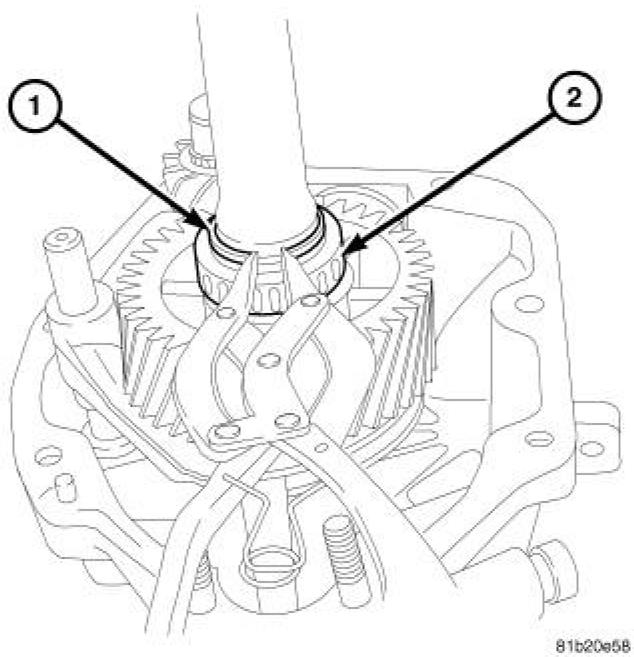


Fig. 36: Roller Bearing Snap-Ring
Courtesy of CHRYSLER GROUP, LLC

9. Stand the transmission on Fixture (special tool #9387, Fixture, Transmission Holding) and bolt the adapter to the fixture.
10. Install on bench Fixture (special tool #9385, Holding Fixture, Bench Mount).
11. Remove the mainshaft roller bearing (2) snap ring (1).

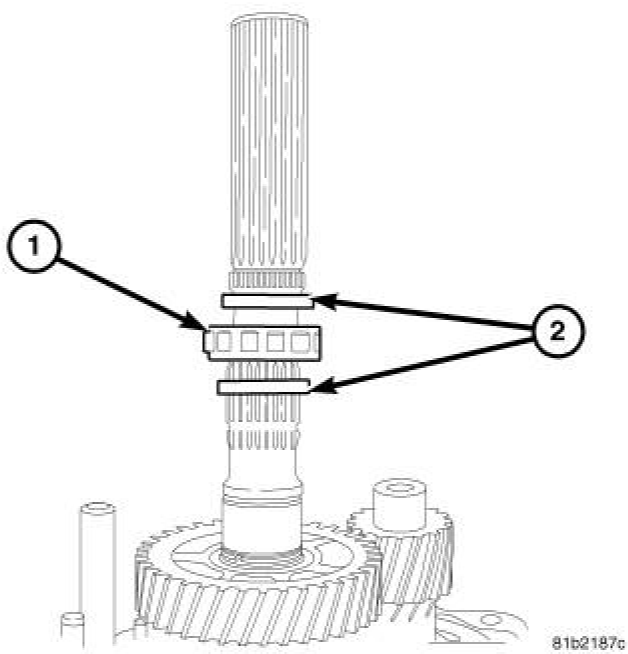


Fig. 37: Roller Bearing & Spacers
Courtesy of CHRYSLER GROUP, LLC

12. Remove the mainshaft roller bearing (1) and spacers (2) from the mainshaft.

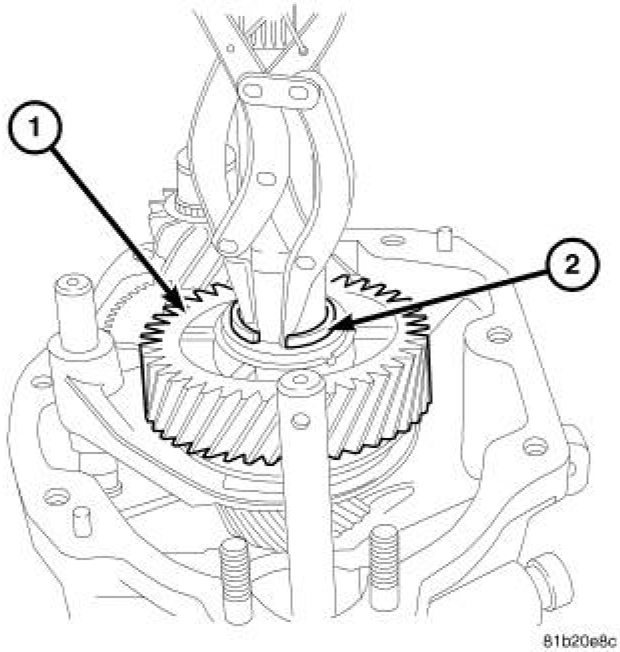


Fig. 38: Reverse Gear Snap Ring
Courtesy of CHRYSLER GROUP, LLC

13. Remove the reverse gear (1) snap ring (2) from the mainshaft.

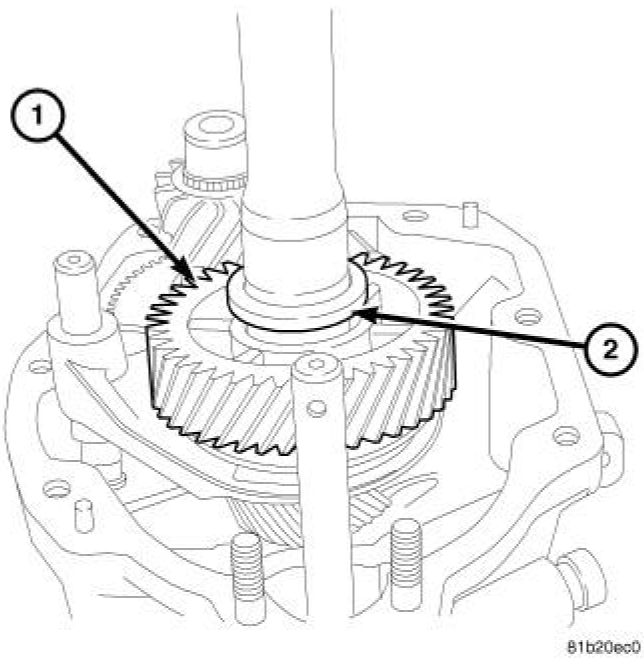


Fig. 39: Reverse Gear Thrust Washer
Courtesy of CHRYSLER GROUP, LLC

14. Remove the reverse gear (1) thrust washer (2) from the mainshaft.

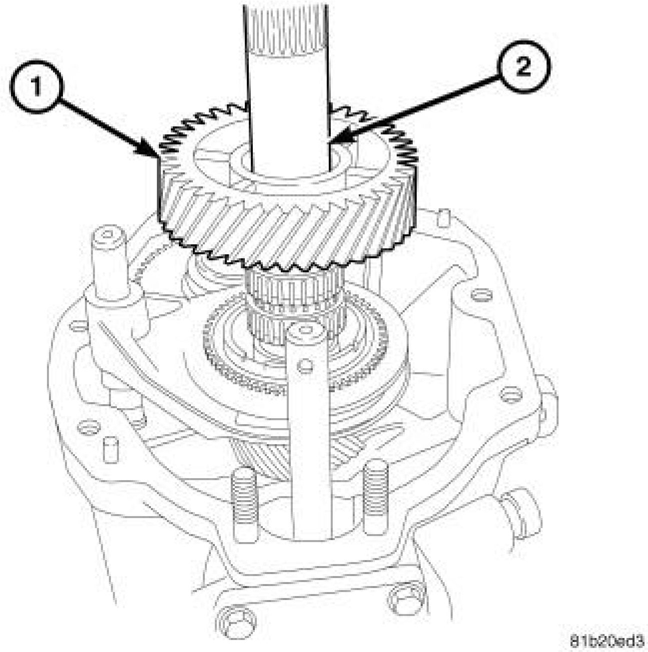


Fig. 40: Reverse Gear & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

15. Remove the reverse gear (1) from the mainshaft (2).

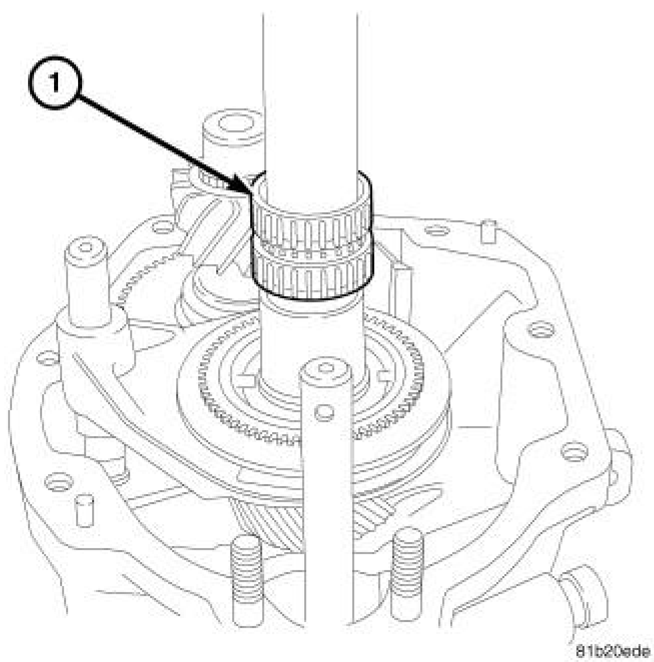


Fig. 41: Reverse Gear Bearing
Courtesy of CHRYSLER GROUP, LLC

16. Remove the reverse gear bearing (1) from the mainshaft (2).

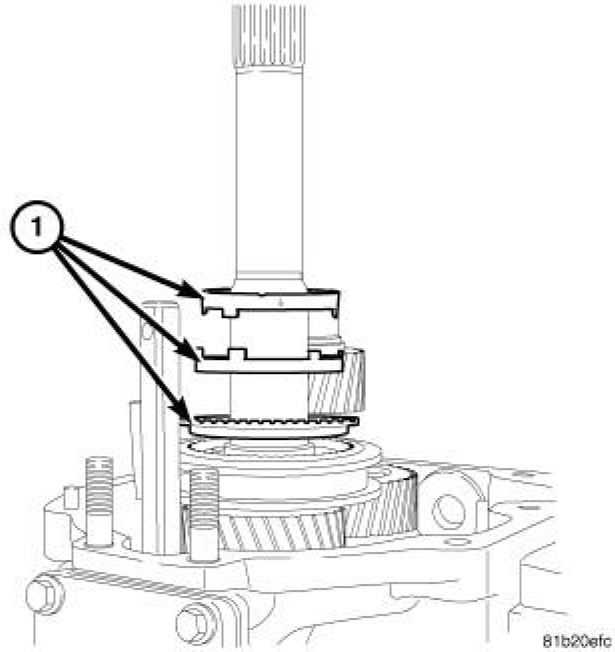


Fig. 42: Reverse Synchronizer Rings
Courtesy of CHRYSLER GROUP, LLC

17. Remove the reverse gear synchronizer rings (1) from the reverse gear synchronizer hub.

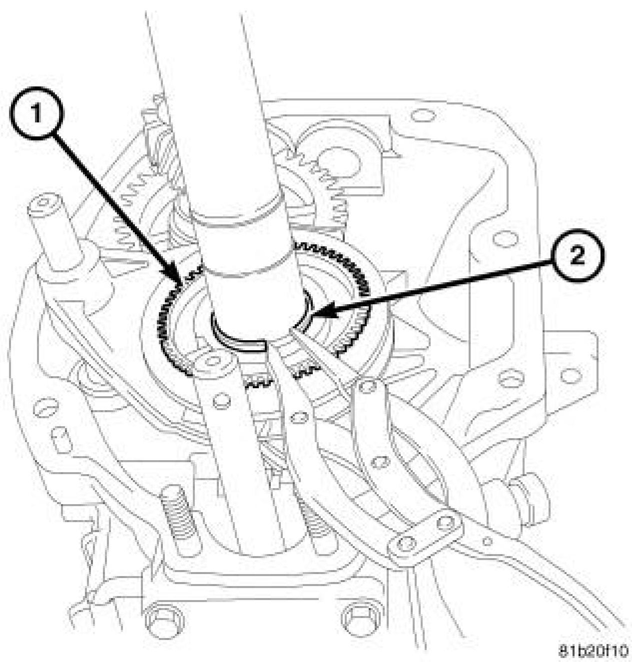


Fig. 43: Reverse Synchronizer Snap Ring
Courtesy of CHRYSLER GROUP, LLC

18. Remove the reverse gear synchronizer hub (1) snap ring (2) from the mainshaft.

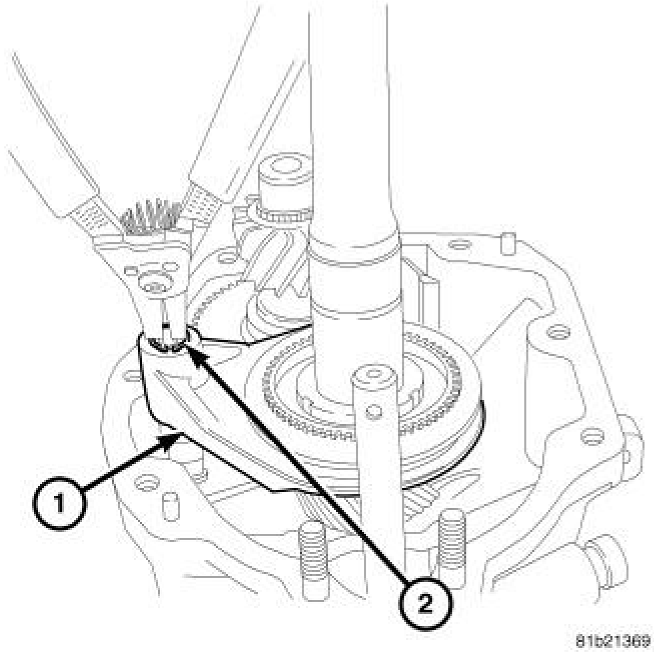


Fig. 44: Reverse Fork Snap Ring
Courtesy of CHRYSLER GROUP, LLC

19. Remove the reverse gear shift fork (1) snap ring (2) from the shift rail and discard the snap ring.

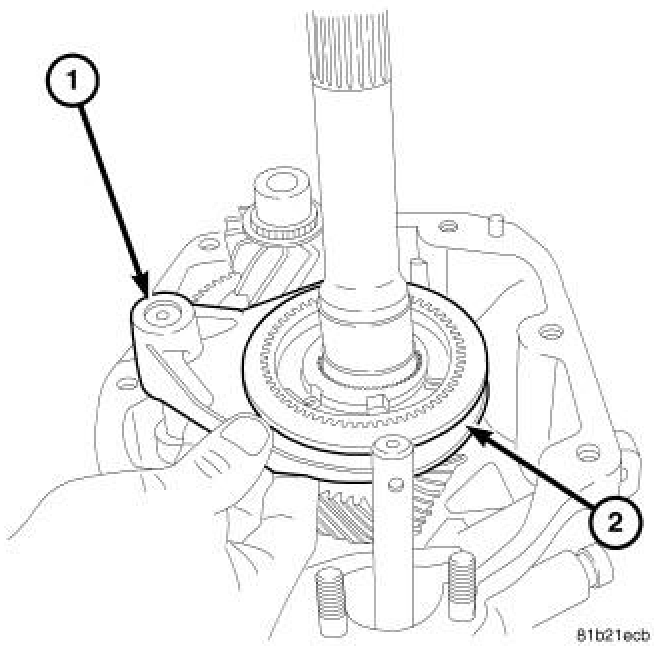
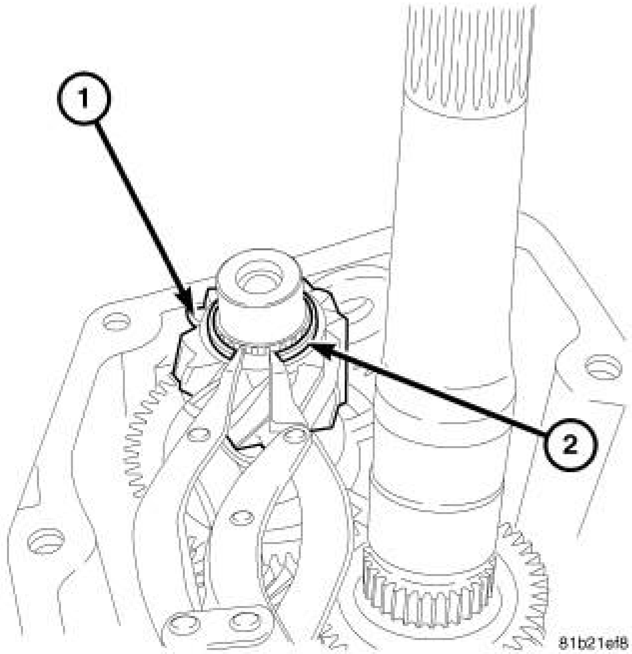


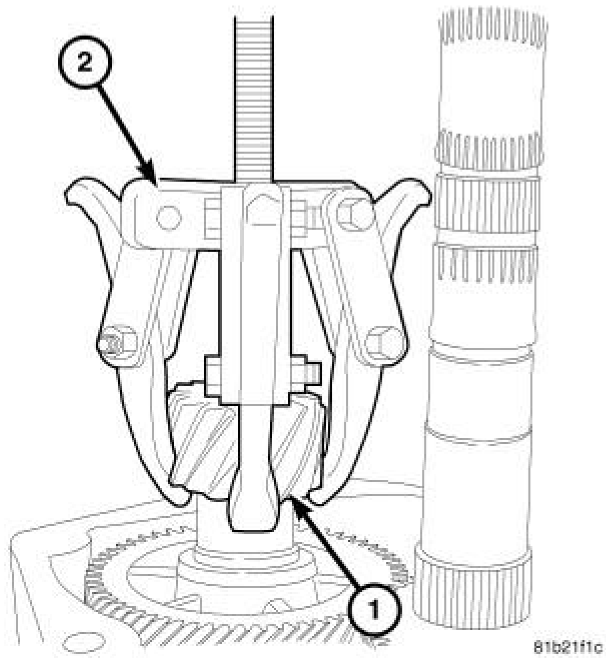
Fig. 45: Reverse Hub & Fork
Courtesy of CHRYSLER GROUP, LLC

20. Remove the reverse gear shift fork (1) synchronizer hub and sleeve as an assembly (2).



[Fig. 46: Reverse Countershaft Snap Ring](#)
Courtesy of CHRYSLER GROUP, LLC

21. Remove the reverse gear (1) snap ring (2) from the countershaft.



[Fig. 47: Reverse Countershaft Gear](#)
Courtesy of CHRYSLER GROUP, LLC

22. Remove the reverse gear from the countershaft (1) with a suitable three jaw puller (2) and Button (special tool #10027, Button, Press).

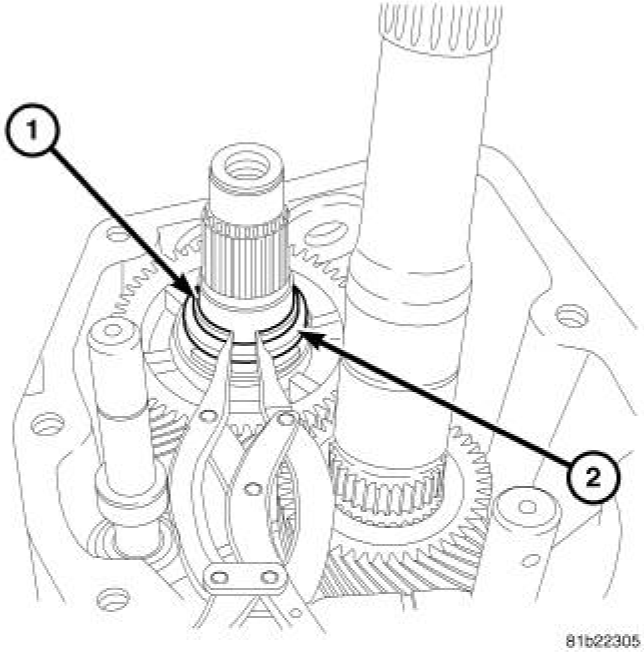


Fig. 48: 5th Gear Snap Ring & Countershaft
Courtesy of CHRYSLER GROUP, LLC

23. Remove the fifth gear snap ring (1) from the countershaft (2).

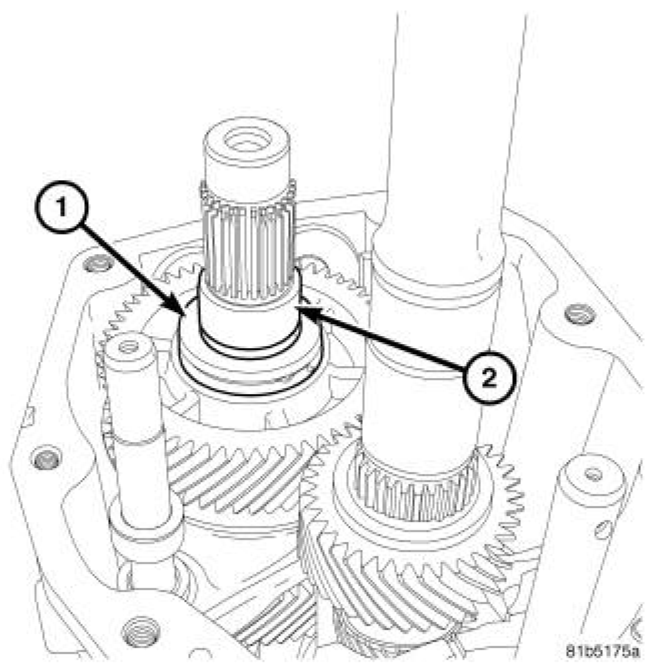


Fig. 49: 5th Gear Thrust Washer & Countershaft
Courtesy of CHRYSLER GROUP, LLC

24. Remove the fifth gear thrust washer (1) from the countershaft (2).

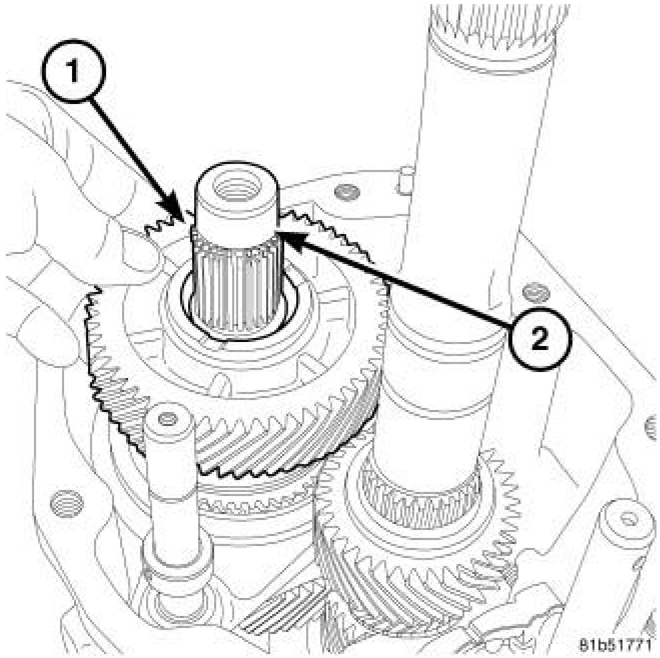


Fig. 50: 5th Gear & Countershaft
Courtesy of CHRYSLER GROUP, LLC

25. Remove the fifth gear (1) from the countershaft (2).

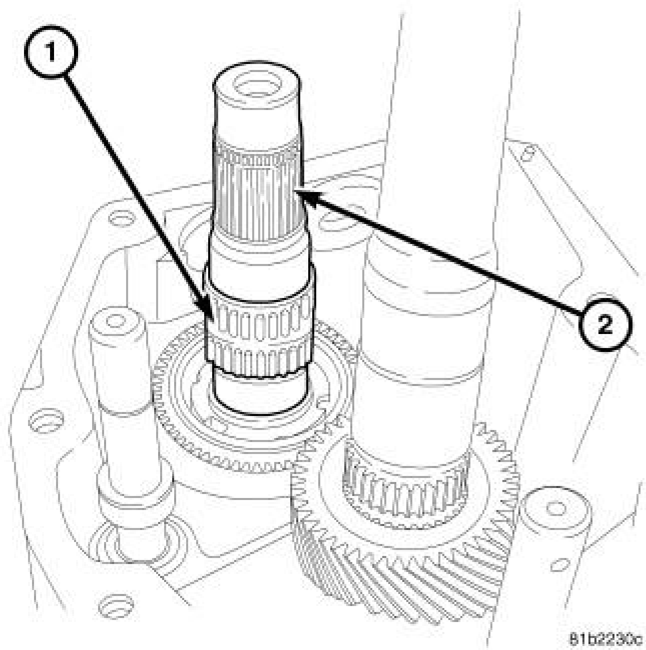
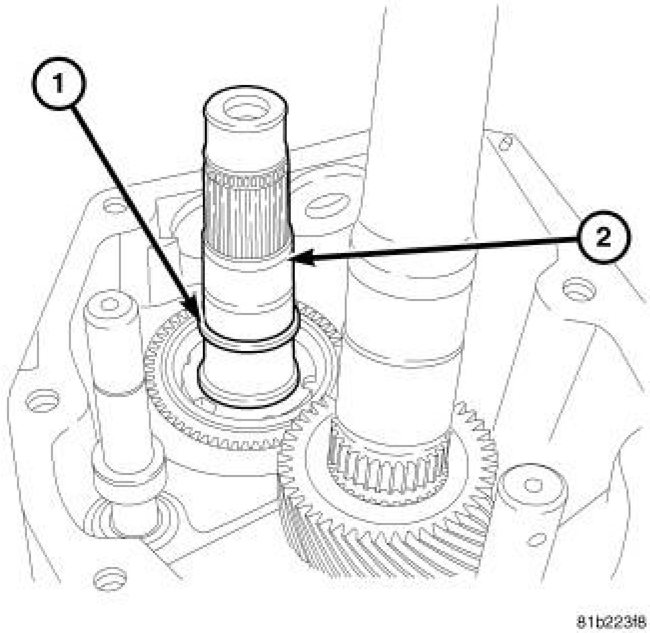


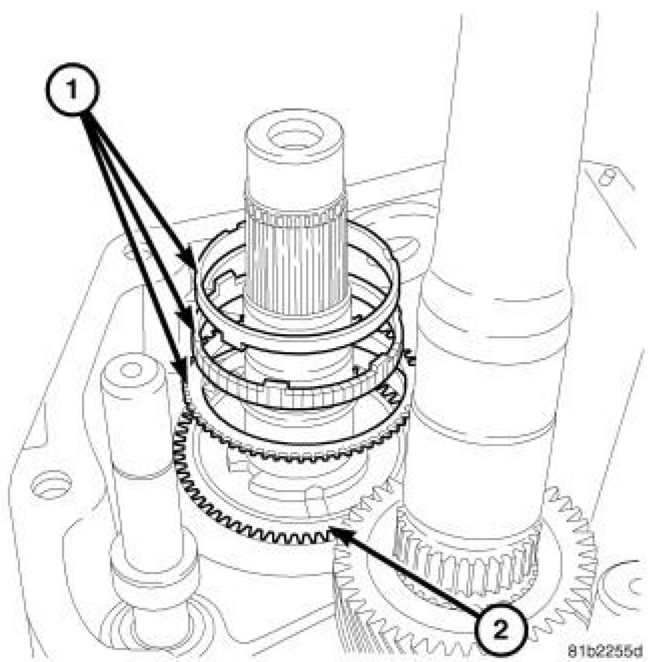
Fig. 51: 5th Gear Bearing & Countershaft
Courtesy of CHRYSLER GROUP, LLC

26. Remove the fifth gear bearing (1) from the countershaft (2).



[Fig. 52: 5th Gear Bearing Spacer & Countershaft](#)
Courtesy of CHRYSLER GROUP, LLC

27. Remove the fifth gear bearing spacer (1) from the countershaft (2).



[Fig. 53: Fifth Gear Synchro Rings & 5-6 Synchronizer Hub](#)
Courtesy of CHRYSLER GROUP, LLC

28. Remove the fifth gear synchronizer rings (1) from the fifth and sixth gear synchronizer hub (2).

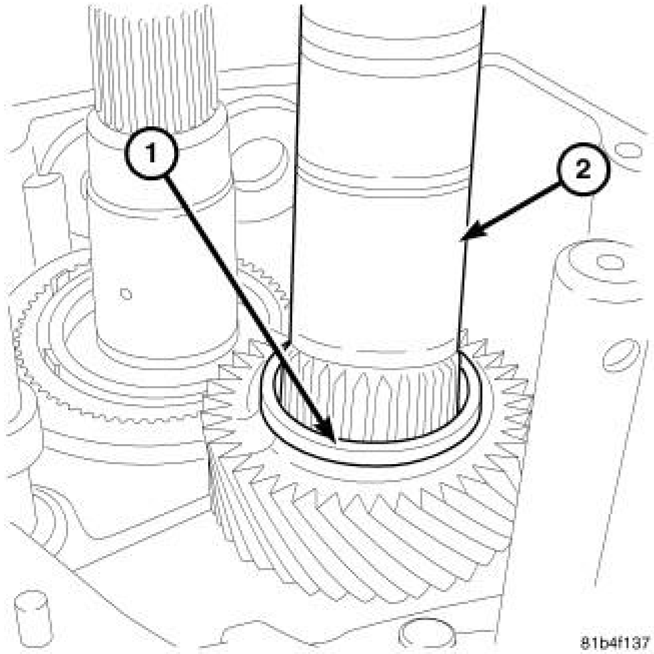


Fig. 54: 5th Gear Retainer Ring & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

29. Remove the fifth gear split ring retainer (1) from the mainshaft (2).

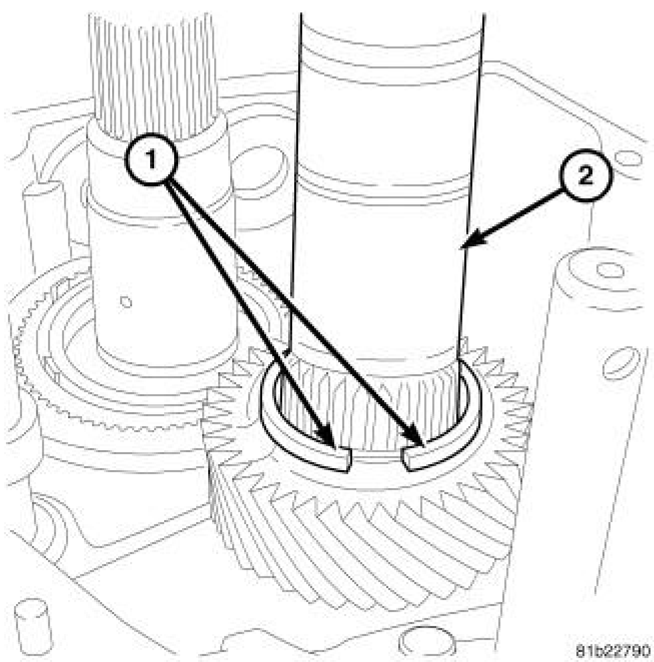


Fig. 55: 5th Gear Split Rings & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

30. Remove fifth gear split rings (1) from mainshaft (2).

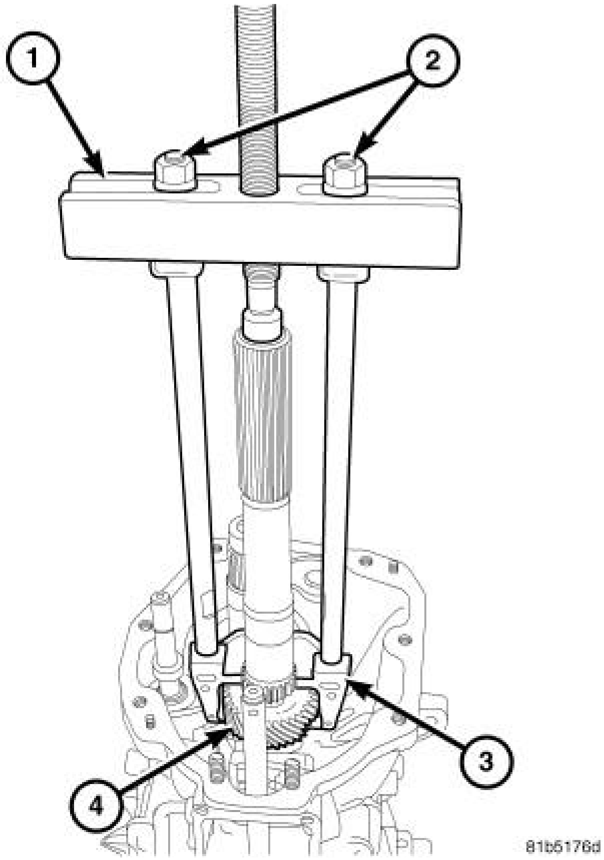


Fig. 56: 5th Gear Puller
Courtesy of CHRYSLER GROUP, LLC

31. Remove the fifth gear (4) from the mainshaft with Bridge (special tool #9382, Bridge) (1), Bolts (special tool #9378, Bolts, Puller) (2), Puller (special tool #9379a, Remover, Gear) (3), and Button (special tool #10027, Button, Press).

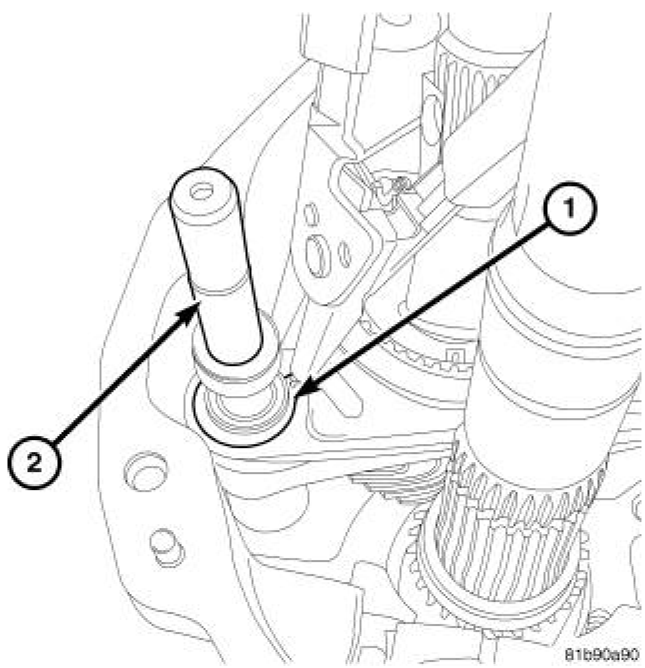


Fig. 57: 5-6 Shift Fork Snap Ring
Courtesy of CHRYSLER GROUP, LLC

32. Remove fifth and sixth gear shift fork snap ring (1) from the shift rail (2).

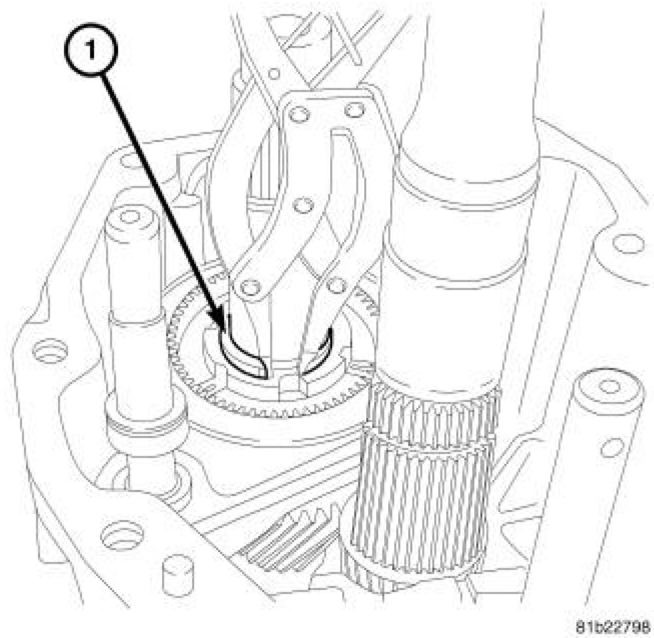


Fig. 58: 5-6 Hub Snap Ring
Courtesy of CHRYSLER GROUP, LLC

33. Remove the fifth and sixth gear synchronizer hub snap ring (1) from the countershaft.

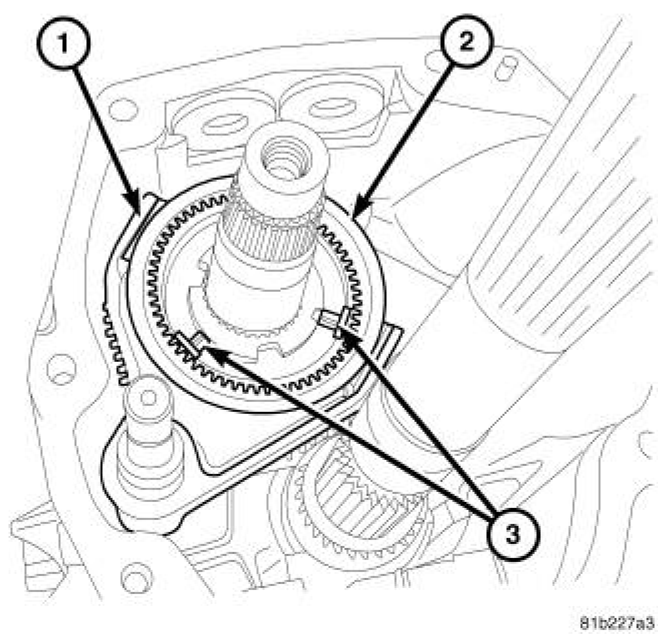


Fig. 59: 5-6 Fork & Sleeve
Courtesy of CHRYSLER GROUP, LLC

34. Remove the fifth and sixth gear shift fork (1), synchronizer sleeve (2), and detents (3) from the fifth and sixth gear synchronizer hub.

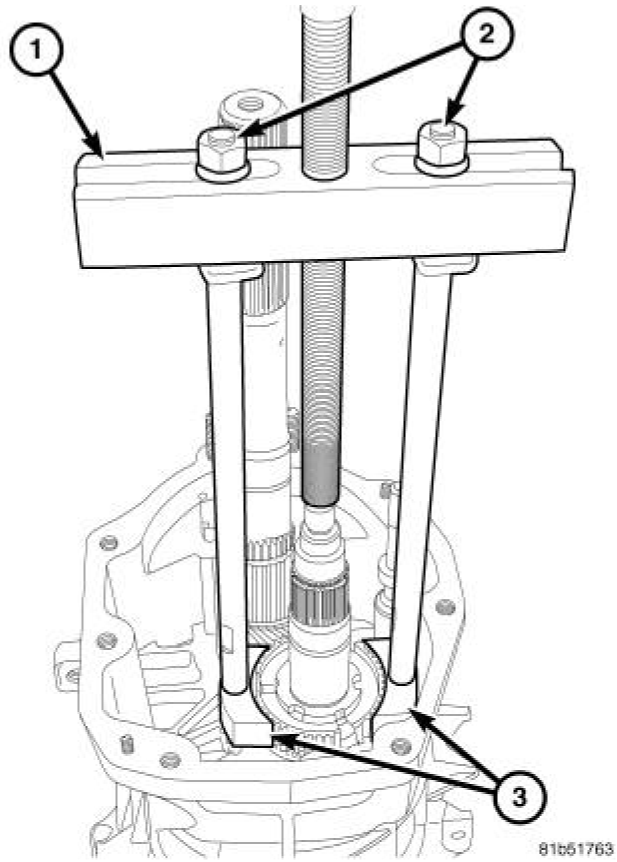


Fig. 60: 5-6 Hub Puller
Courtesy of CHRYSLER GROUP, LLC

35. Remove the fifth and sixth gear synchronizer hub from the countershaft with Bridge (special tool #9382, Bridge) (1), Bolts (special tool #9378, Bolts, Puller) (2), Puller (special tool #10026, Puller, Synchro Hub) (3) and Button (special tool #10027, Button, Press).

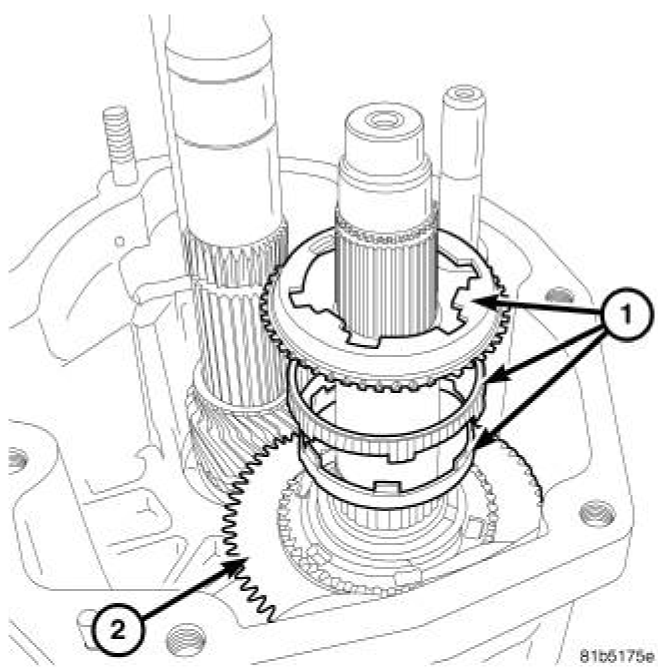


Fig. 61: 6th Synchro Rings
Courtesy of CHRYSLER GROUP, LLC

36. Remove the sixth gear synchronizer rings (1) from the sixth gear (2).

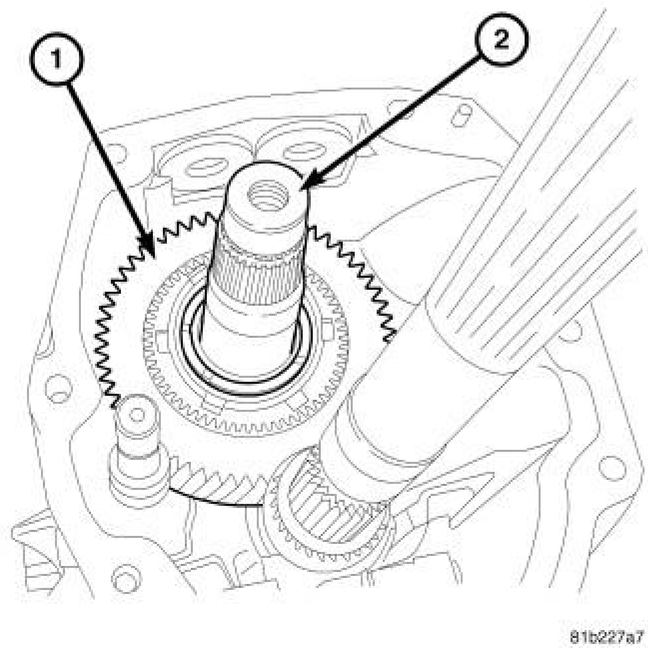


Fig. 62: 6th Gear & Countershaft
Courtesy of CHRYSLER GROUP, LLC

37. Remove the sixth gear (1) from the countershaft (2).

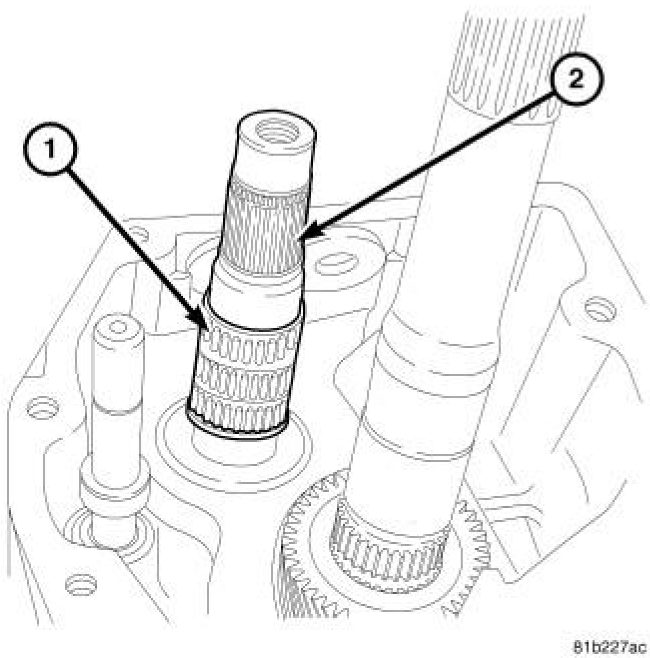


Fig. 63: 6th Gear Bearing & Countershaft
Courtesy of CHRYSLER GROUP, LLC

38. Remove the sixth gear bearing (1) from the countershaft (2).

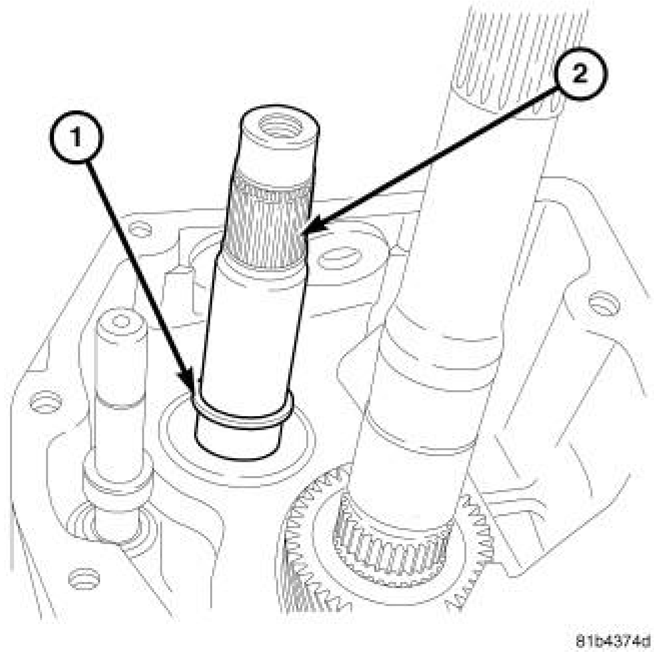


Fig. 64: 6th Gear Bearing Spacer & Countershaft
Courtesy of CHRYSLER GROUP, LLC

39. Remove the sixth gear bearing spacer (1) from the countershaft (2).

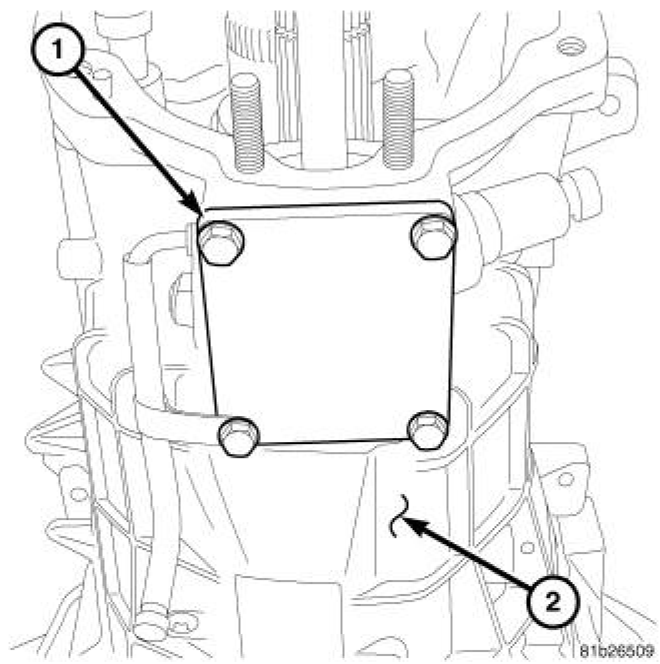


Fig. 65: Top Cover, Bolts & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

40. Remove the top cover (1) bolts and remove the cover from the transmission case (2).

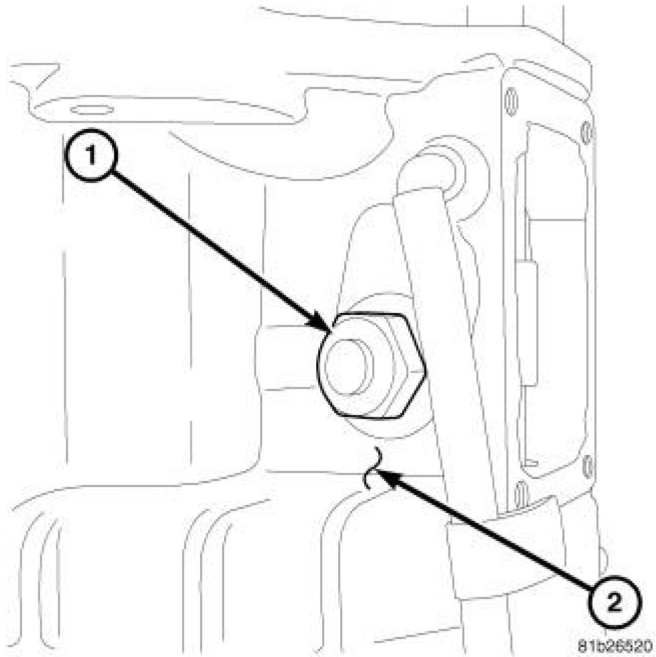


Fig. 66: Shift Detent & Right Side Of Case
Courtesy of CHRYSLER GROUP, LLC

41. Remove the shift detent (1) from the right side of the case (2).

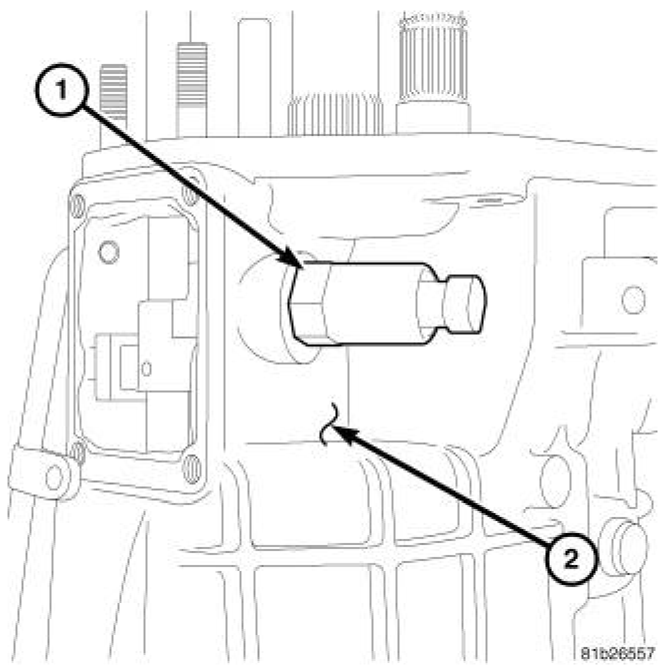


Fig. 67: Skip Shift Solenoid & Left Side Of Case
Courtesy of CHRYSLER GROUP, LLC

42. Remove the skip shift solenoid (1) from the left side of the case (2).

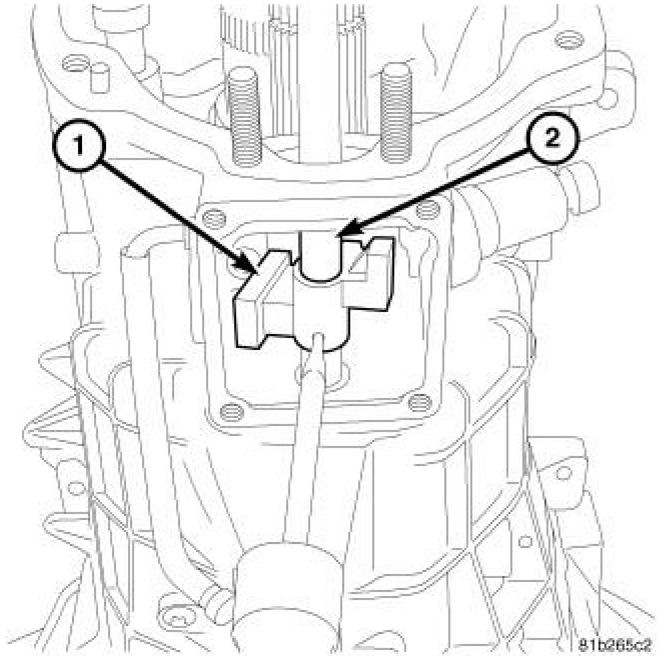


Fig. 68: Skip Shift Lever & Shift Rail
Courtesy of CHRYSLER GROUP, LLC

43. Drive the skip shift lever (1) roll pin down with a punch until the lever is loose from the shift rail (2).

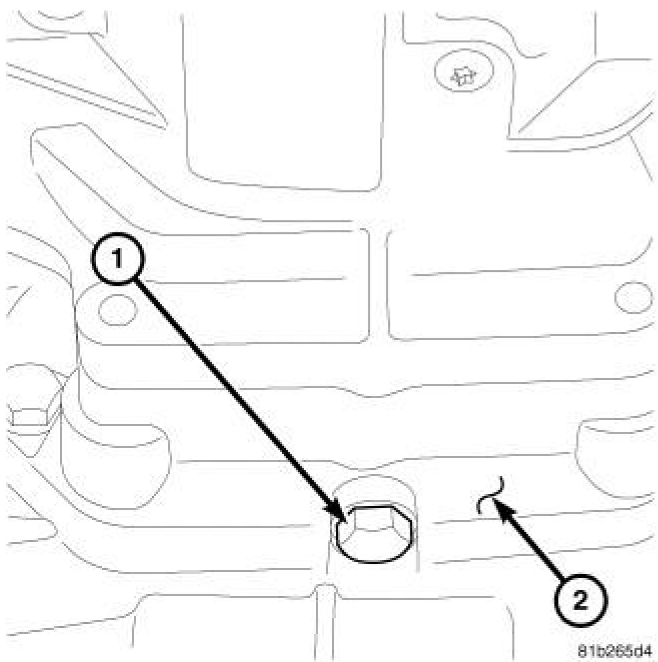


Fig. 69: Roller Detent Bolt & Transmission Adapter
Courtesy of CHRYSLER GROUP, LLC

44. Remove the roller detent bolt (1) from the transmission adapter (2).

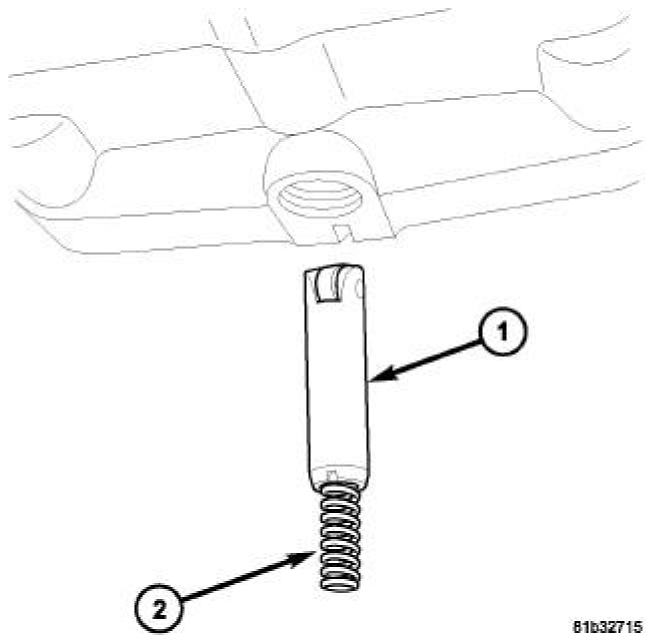


Fig. 70: Detent & Spring
Courtesy of CHRYSLER GROUP, LLC

45. Remove the roller detent (1) and spring (2) from the transmission adapter.

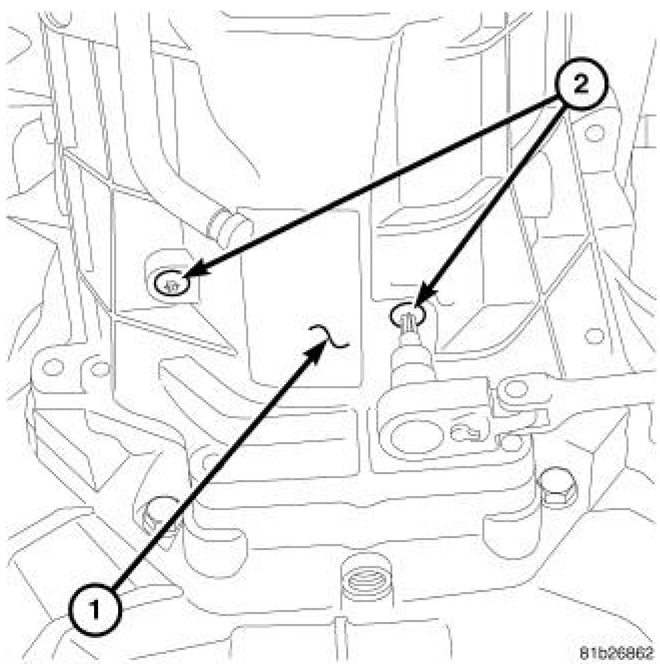


Fig. 71: Torx Screws
Courtesy of CHRYSLER GROUP, LLC

46. Remove the shift lever guide bolts (1) from the top of the transmission case (2).

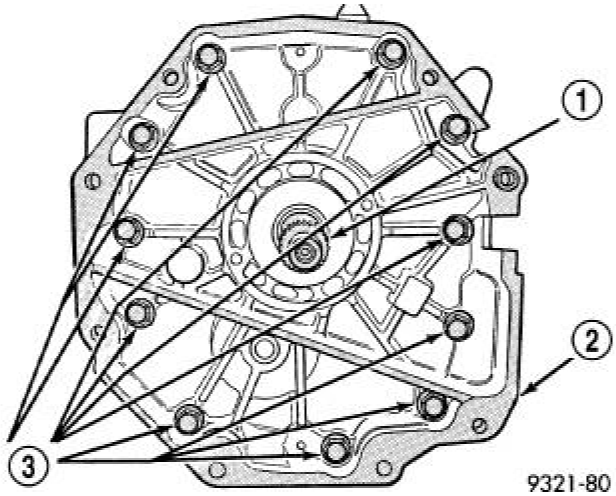


Fig. 72: Adapter Bolts Location
Courtesy of CHRYSLER GROUP, LLC

47. Remove the transmission adapter (2) bolts (3).

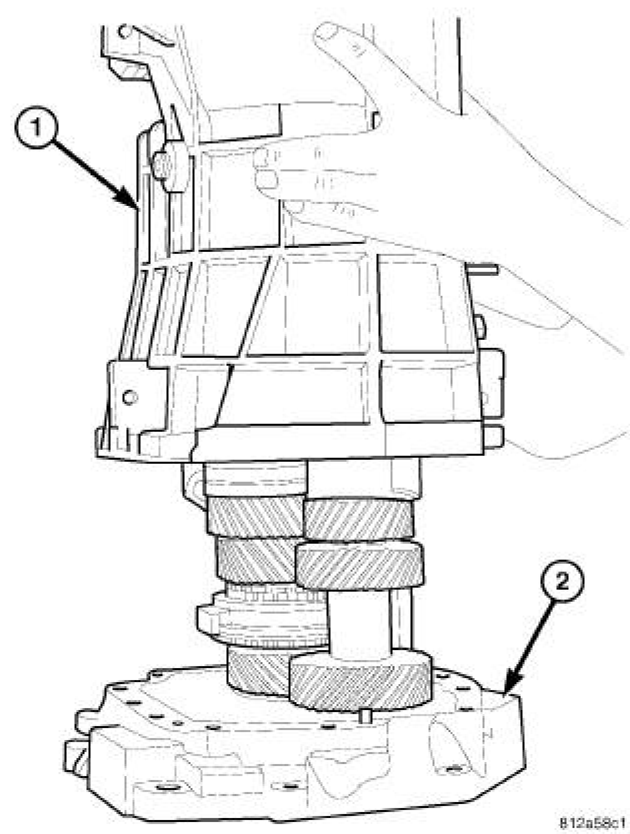


Fig. 73: Transmission Case
Courtesy of CHRYSLER GROUP, LLC

48. Remove the transmission case (1) upward off of the transmission adapter plate (2) and remove the skip shift lever from the shift rail.

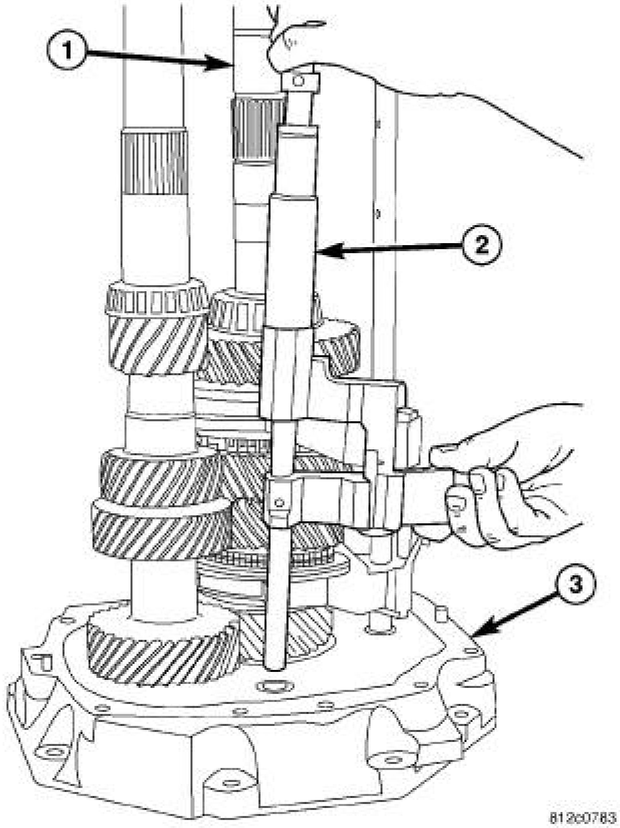


Fig. 74: Removing/Installing Reverse Shaft Rail Assembly
Courtesy of CHRYSLER GROUP, LLC

49. Remove the reverse shift rail assembly (2) from the transmission adapter (3).

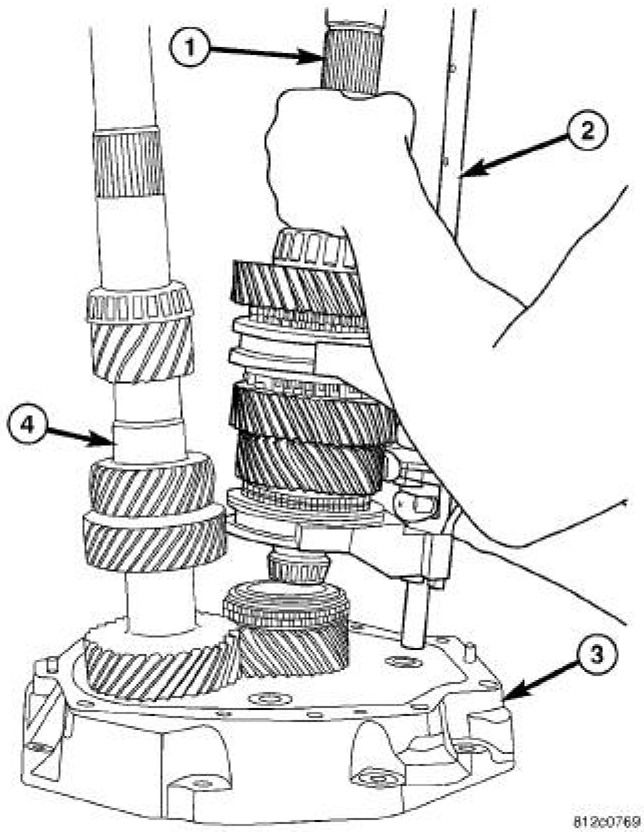


Fig. 75: Tilting Mainshaft & Shift Rail
Courtesy of CHRYSLER GROUP, LLC

50. Tilt the countershaft (4) sideways, then remove the mainshaft (1) and shift rail (2) from the adapter plate (3). Remove the countershaft assembly (4) from the adapter plate(3).

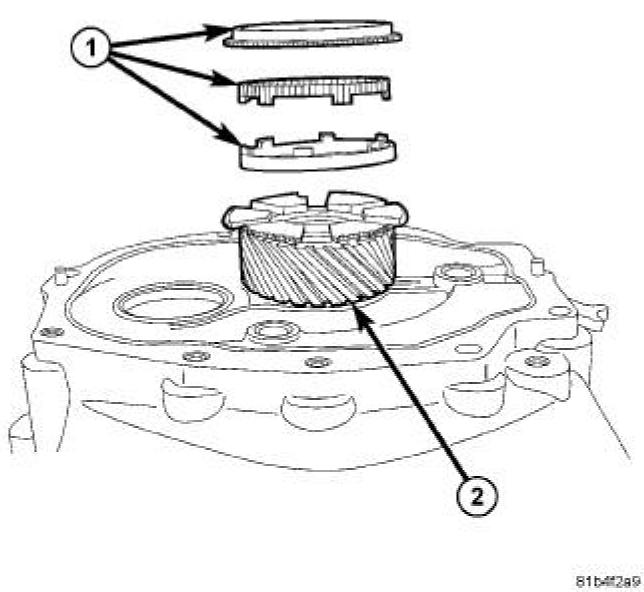


Fig. 76: Input Shaft Synchro Rings

Courtesy of CHRYSLER GROUP, LLC

51. Remove the input shaft synchronizer ring (1) and the input shaft (2) from the transmission adapter.

MAINSHAFT

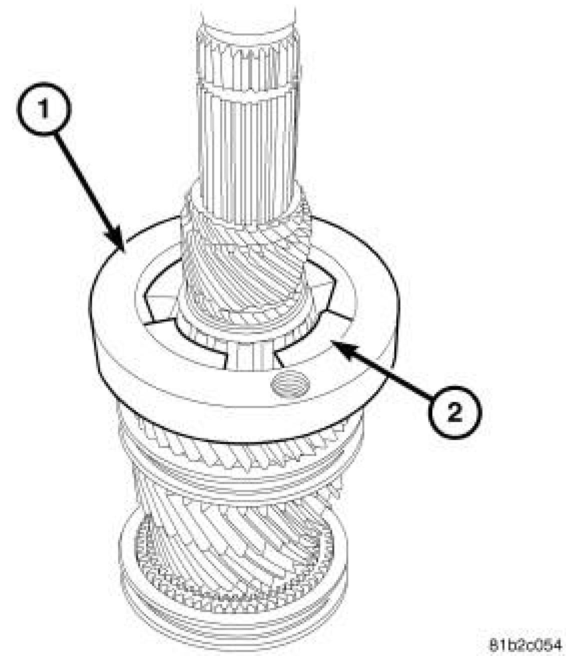


Fig. 77: Mainshaft Bearing Puller
Courtesy of CHRYSLER GROUP, LLC

1. Position Puller (special tool #C-293-PA, Puller, Press) (1) and Adapters (special tool #C-293-47, Block Set, Puller) (2) on the mainshaft bearing. Place Button (special tool #10027, Button, Press) in the end of the mainshaft.

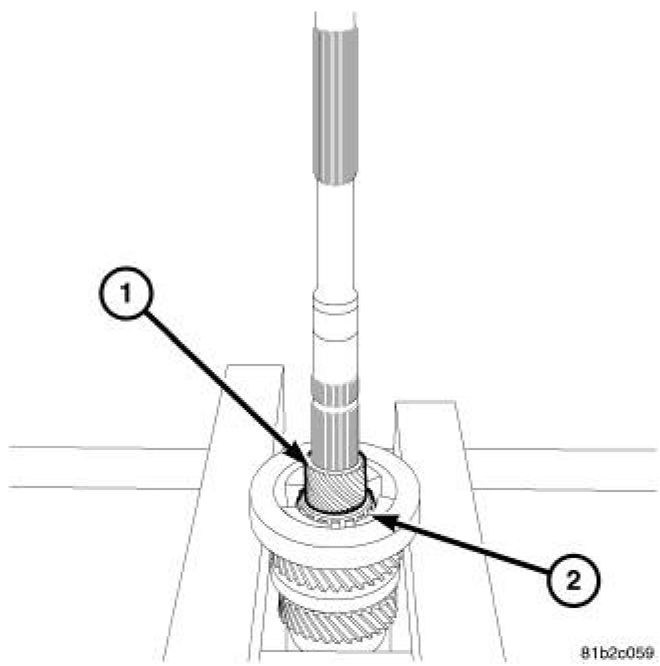


Fig. 78: Mainshaft Case Bearing

Courtesy of CHRYSLER GROUP, LLC

2. Remove the sixth gear (1) and mainshaft bearing (2) with Puller (special tool #C-293-PA, Puller, Press), Adapters (special tool #C-293-47, Block Set, Puller), Button (special tool #10027, Button, Press) and a press.

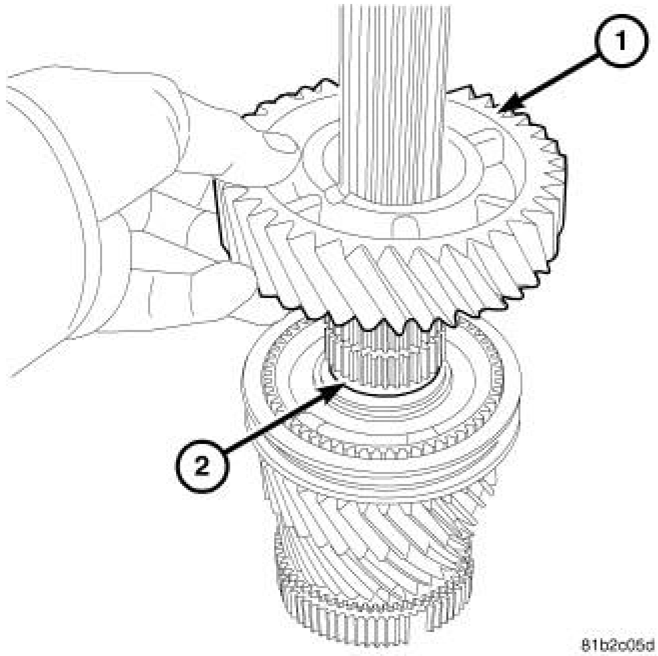


Fig. 79: 1st Gear & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

3. Remove first gear (1) from the mainshaft (2).

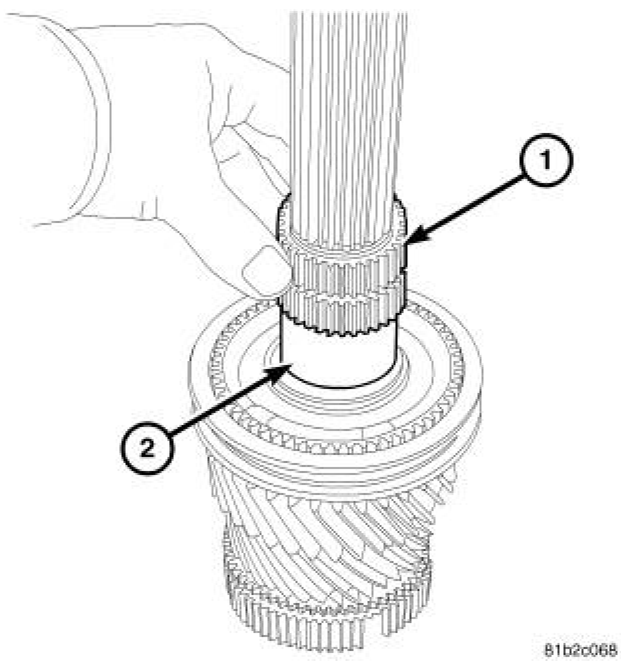


Fig. 80: 1st Gear Bearing & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

4. Remove the first gear bearing (1) from the mainshaft (2).

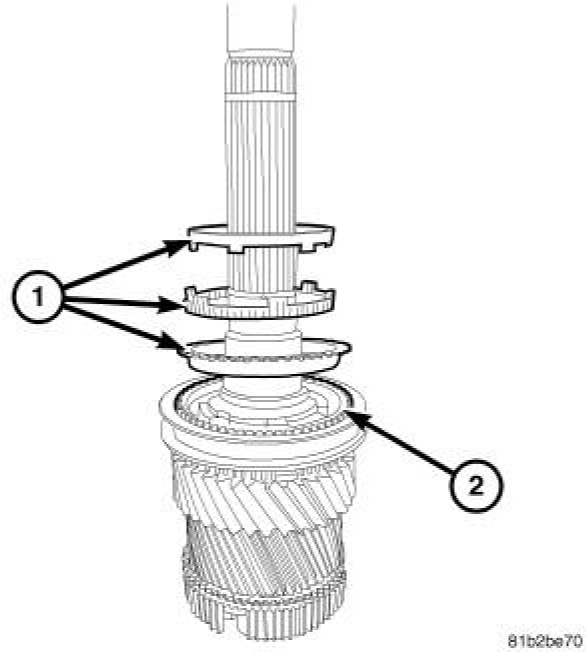


Fig. 81: 1st Gear Synchro
Courtesy of CHRYSLER GROUP, LLC

5. Remove the first gear synchronizer rings (1) from the first and second gear synchronizer hub (2).

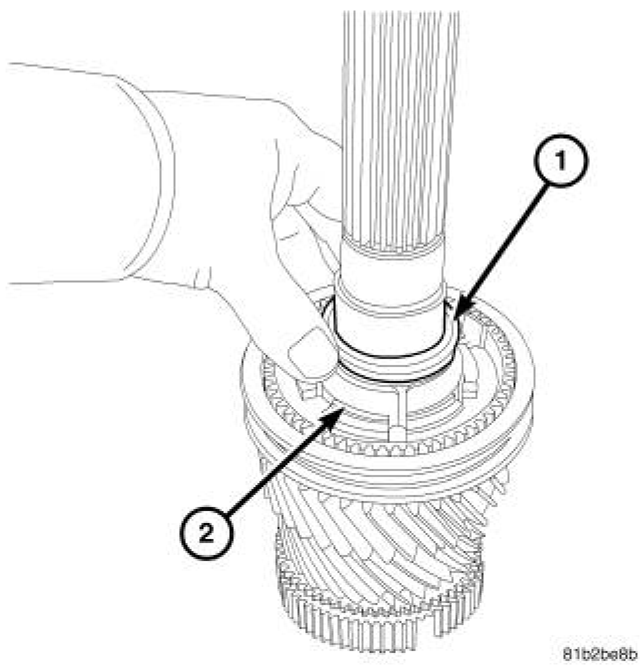
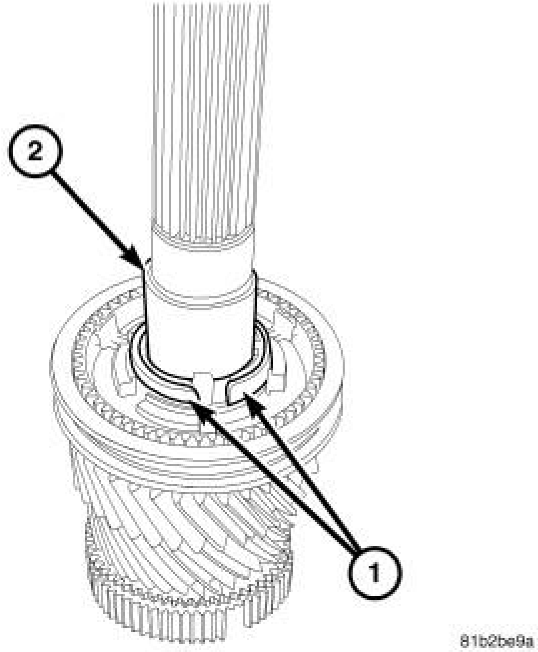


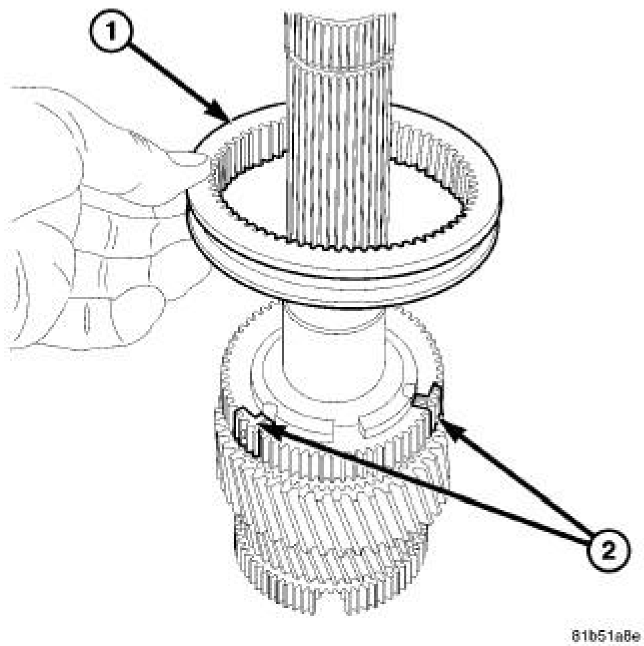
Fig. 82: 1st Split Ring Retainer
Courtesy of CHRYSLER GROUP, LLC

6. Remove the first and second gear synchronizer hub split ring retainer (1) from the split rings (2).



[Fig. 83: 1st Split Rings](#)
Courtesy of CHRYSLER GROUP, LLC

7. Remove the first and second gear synchronizer hub split rings (1) from the mainshaft (2).



[Fig. 84: 1-2 Synchro Sleeve](#)
Courtesy of CHRYSLER GROUP, LLC

8. Remove the first and second gear synchronizer hub sleeve (1) and detents (2).

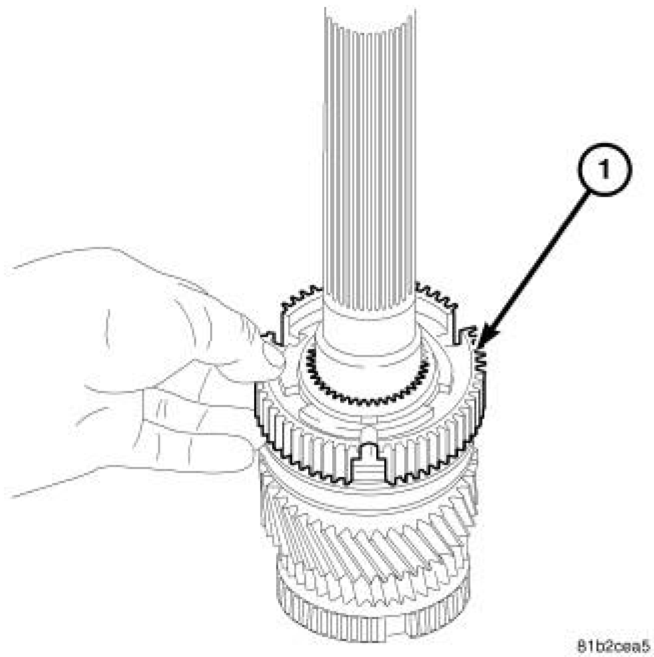
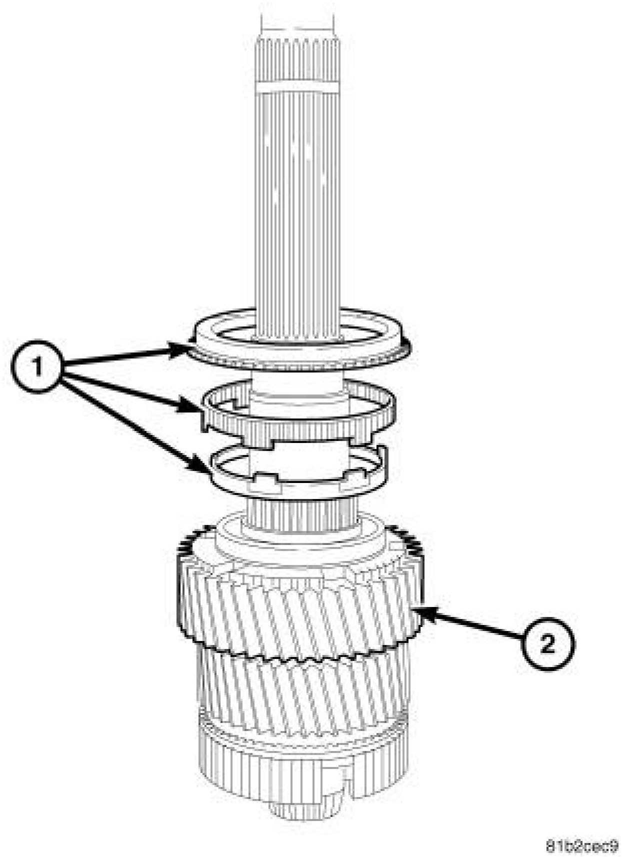


Fig. 85: 1-2 Synchro Hub
Courtesy of CHRYSLER GROUP, LLC

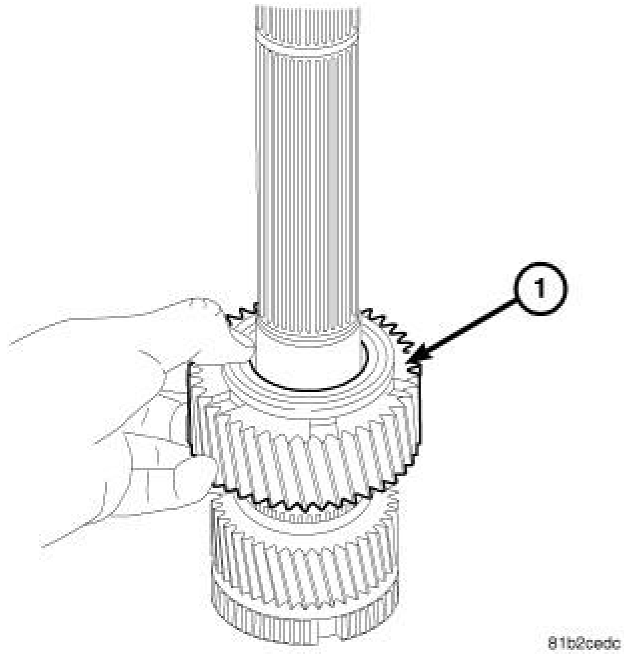
NOTE: **Take note of the first and second gear synchronizer hub orientation prior to removal. It is a directional hub and will not work properly if installed incorrectly.**

9. Remove the first and second gear synchronizer hub (1) from the mainshaft.



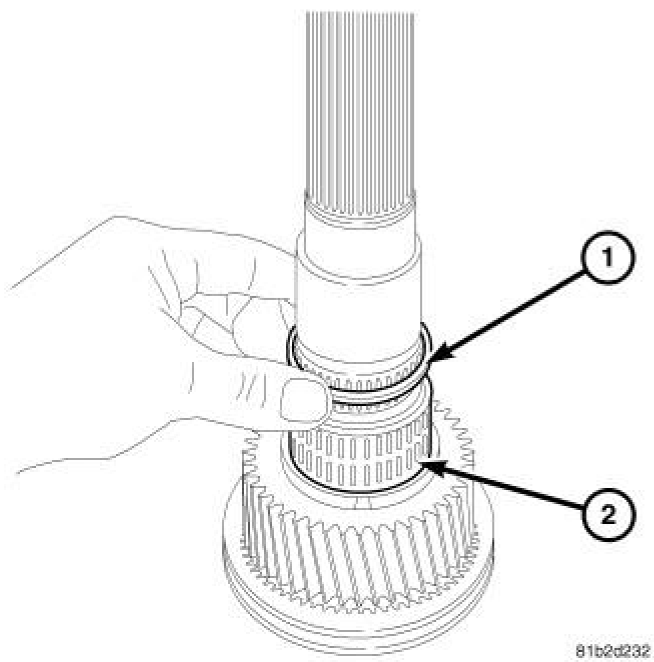
[Fig. 86: 2nd Gear Synchro Rings](#)
Courtesy of CHRYSLER GROUP, LLC

10. Remove the second gear synchronizer rings (1) from second gear (2).



[Fig. 87: 2nd Gear](#)
Courtesy of CHRYSLER GROUP, LLC

11. Remove second gear (1) from the mainshaft.



[Fig. 88: 2nd Bearing Spacer](#)
Courtesy of CHRYSLER GROUP, LLC

12. Remove the second gear bearing spacer (1) from the mainshaft (2).

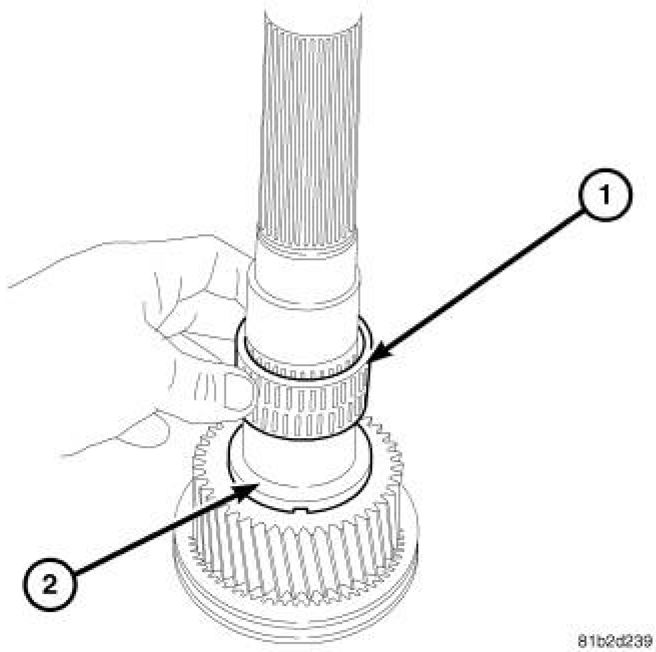


Fig. 89: 2nd Gear Bearing
Courtesy of CHRYSLER GROUP, LLC

13. Remove the second gear bearing (1) from the mainshaft (2).

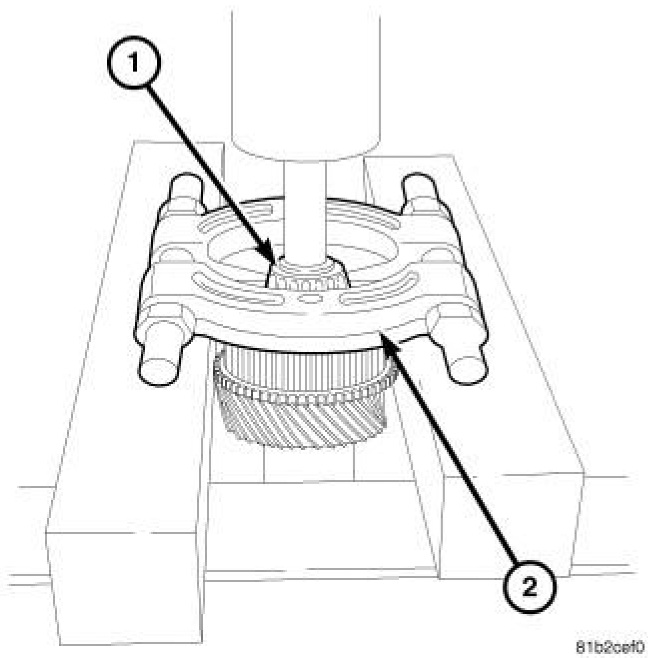
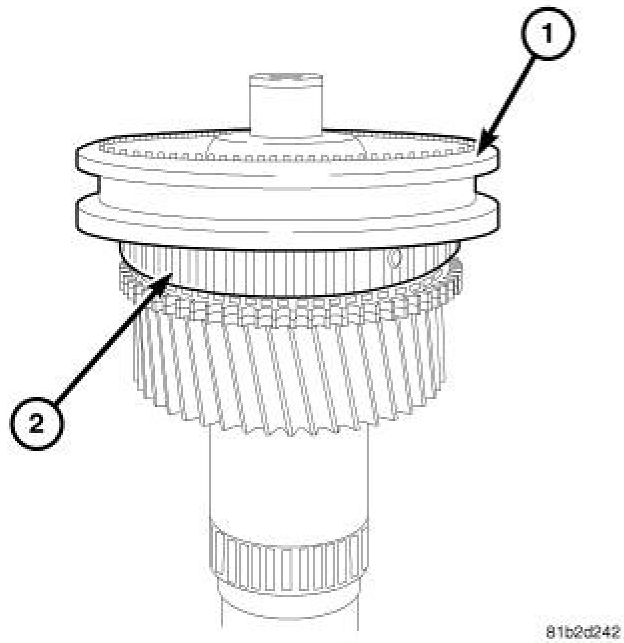


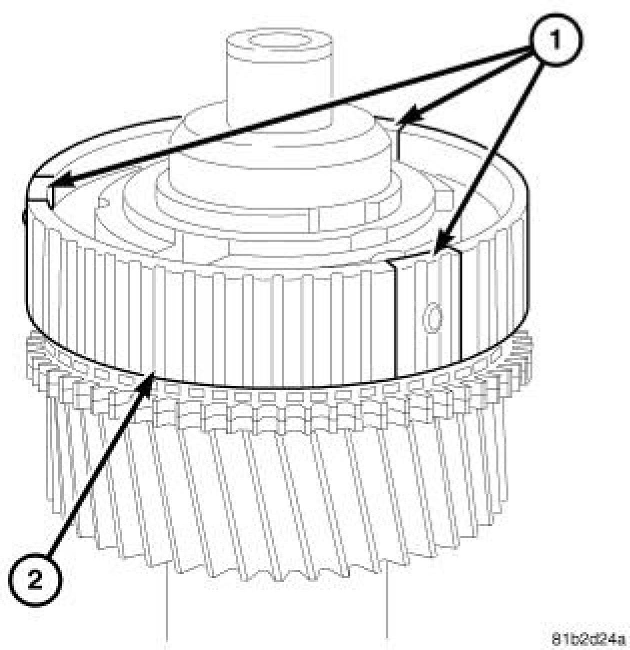
Fig. 90: Mainshaft Adapter Bearing
Courtesy of CHRYSLER GROUP, LLC

14. Remove the mainshaft transmission adapter bearing (1) with bearing Splitter (special tool #P-334, Splitter, Bearing) (2) and a press.



[Fig. 91: 3-4 Synchro Sleeve](#)
Courtesy of CHRYSLER GROUP, LLC

15. Remove the third and fourth gear synchronizer sleeve (1) from the third and fourth gear synchronizer hub (2).



[Fig. 92: 3-4 Hub Detents](#)
Courtesy of CHRYSLER GROUP, LLC

16. Remove the third and fourth gear synchronizer detents (1) from the third and fourth gear synchronizer hub (2).

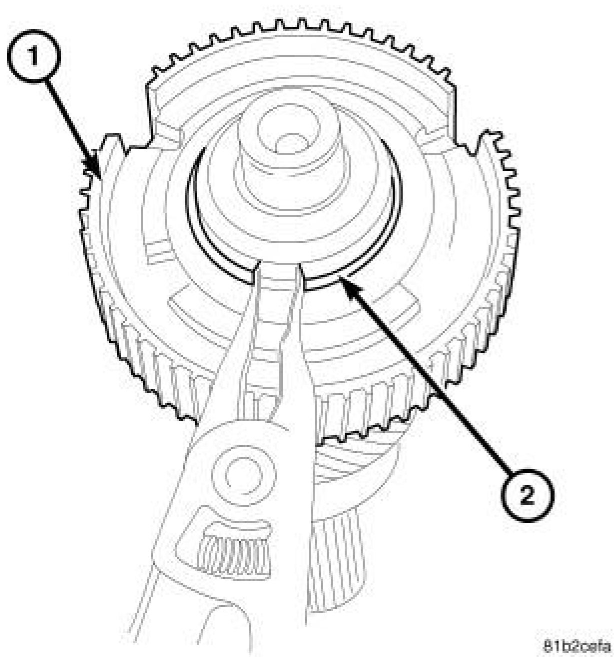


Fig. 93: 3-4 Hub Snap Ring
Courtesy of CHRYSLER GROUP, LLC

17. Remove the third and fourth gear synchronizer hub (1) snap ring (2) from the mainshaft.

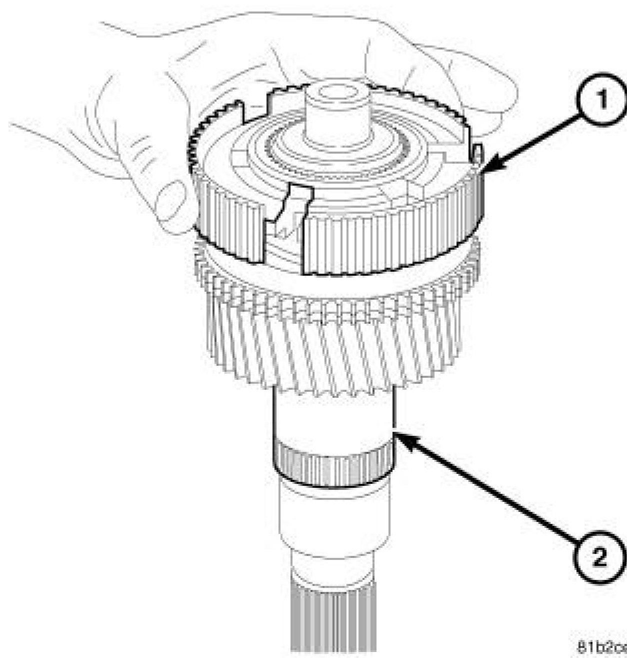


Fig. 94: 3-4 Synchro Hub
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Take note of the third and fourth gear synchronizer hub orientation prior to removal. It is a directional hub and will not work properly if installed incorrectly.**

18. Remove the third and fourth gear synchronizer hub (1) from the mainshaft (2).

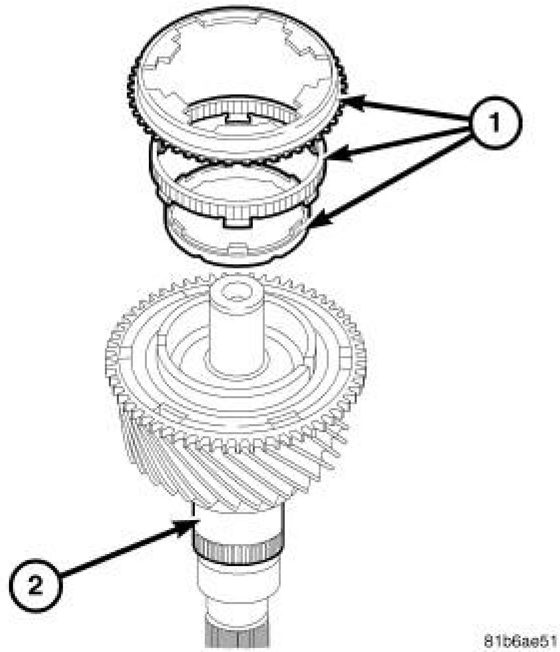


Fig. 95: 3rd Gear Synchro Rings
Courtesy of CHRYSLER GROUP, LLC

19. Remove the third gear synchronizer rings (1) from third gear (2).

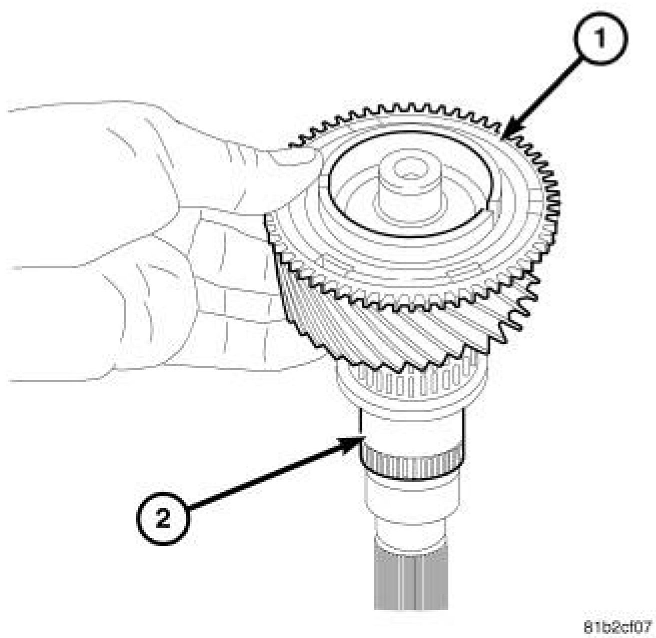


Fig. 96: 3rd Gear
Courtesy of CHRYSLER GROUP, LLC

20. Remove third gear (1) from the mainshaft (2).

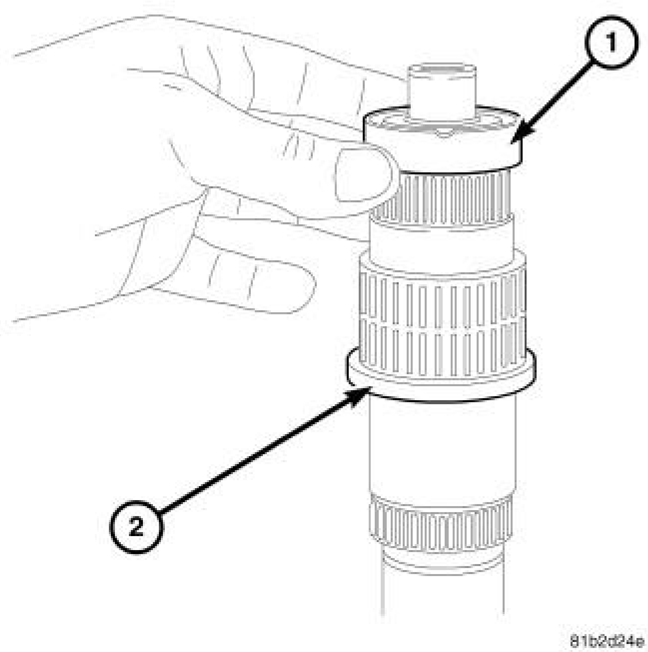


Fig. 97: 3rd Gear Bearing Spacer
Courtesy of CHRYSLER GROUP, LLC

21. Remove the third gear bearing spacer (1) from the mainshaft (2).

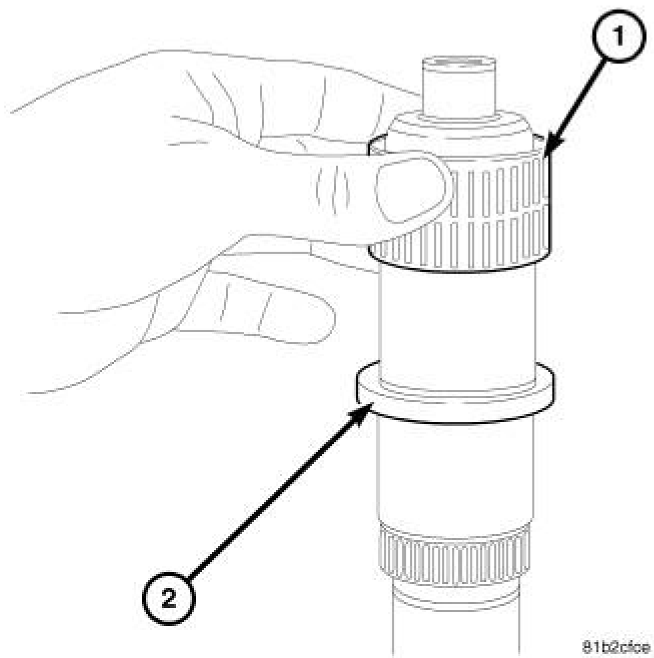


Fig. 98: 3rd Gear Bearing
Courtesy of CHRYSLER GROUP, LLC

22. Remove the third gear bearing (1) from the mainshaft (2).

COUNTERSHAFT

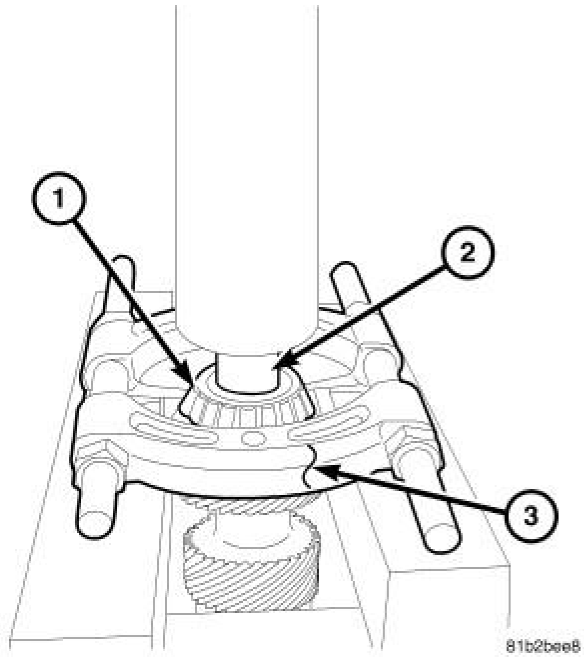


Fig. 99: Countershaft Adapter Bearing
Courtesy of CHRYSLER GROUP, LLC

1. Remove the countershaft adapter bearings (1) with Adapter (special tool #9377, Press Adapter) (2) Splitter (special tool #1130, Splitter, Bearing/Gear) (3) and a press.

INPUT SHAFT

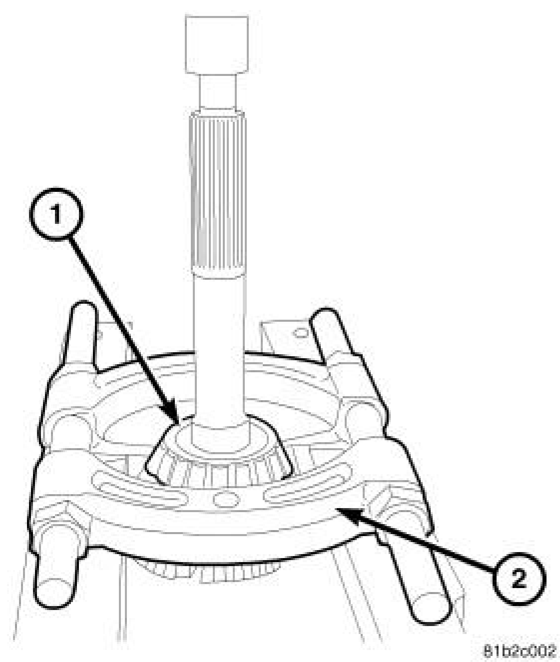
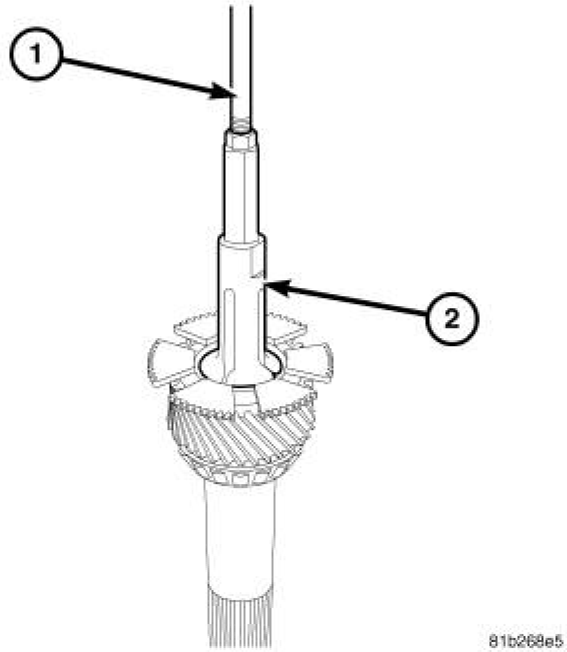


Fig. 100: Input Shaft Bearing
Courtesy of CHRYSLER GROUP, LLC

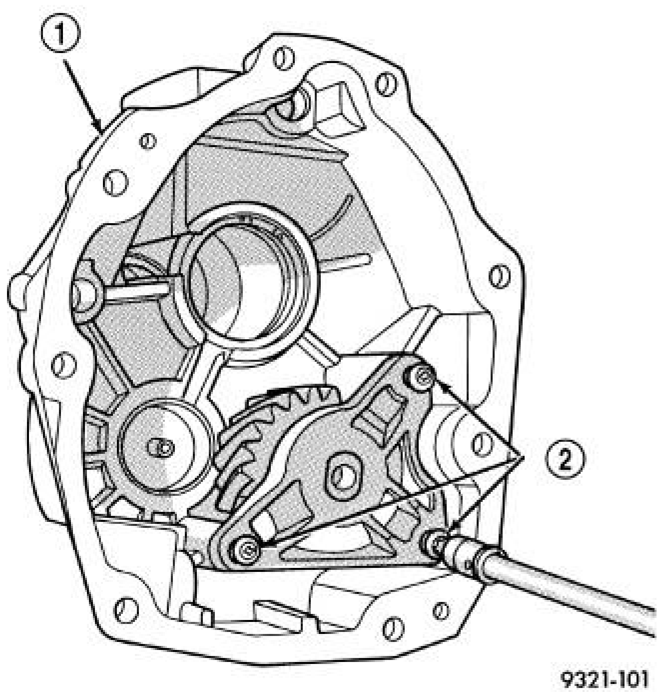
1. Remove the input shaft bearing (1) with Splitter (special tool #1130, Splitter, Bearing/Gear) (2) and a press.



[Fig. 101: Input Shaft Bearing Cup]()
Courtesy of CHRYSLER GROUP, LLC

2. Remove the input shaft bearing cup with Slide Hammer (special tool #C-3752, Slide Hammers) (1) and Remover (special tool #9381, Remover, Bearing Cup) (1).

EXTENSION HOUSING



[Fig. 102: Idler Gear Bracket Bolts]()
Courtesy of CHRYSLER GROUP, LLC

1. Remove the extension housing (1) idler gear bracket bolts (2) and the bracket.

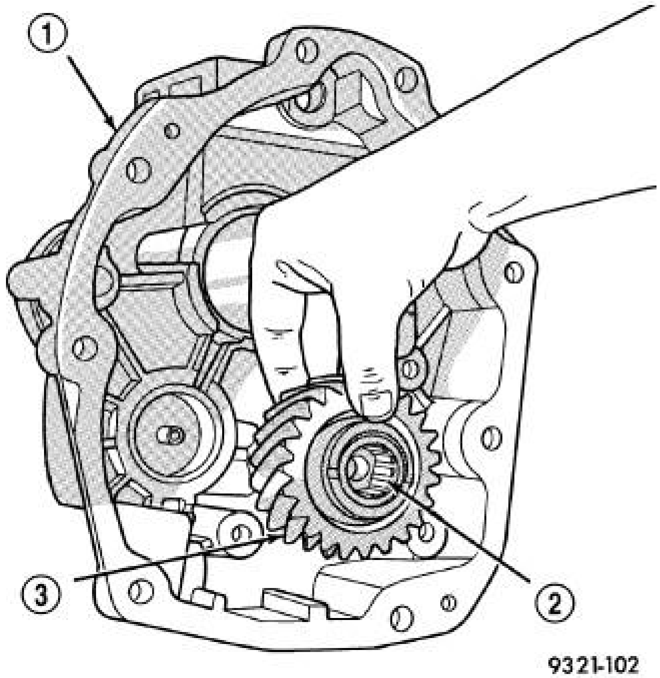


Fig. 103: Thrust Washer, Gear And Bearing
Courtesy of CHRYSLER GROUP, LLC

2. Remove the extension housing (1) idler gear bearing (2) and the idler gear (3).
3. Remove the idler gear shaft from the extension housing.

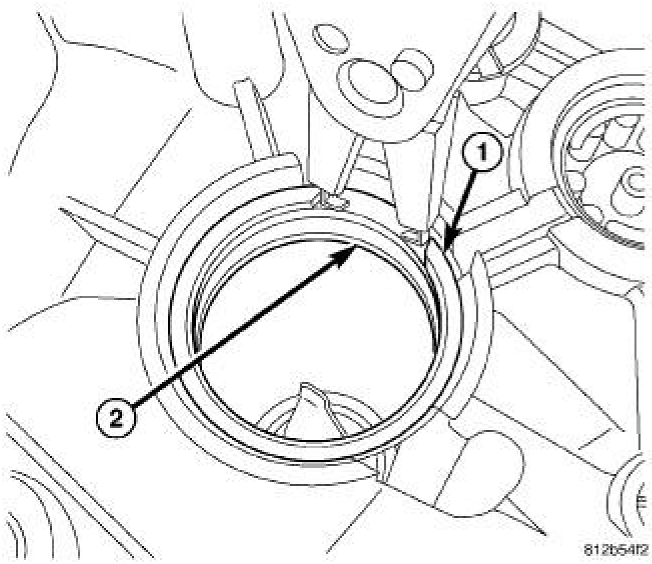


Fig. 104: Removing Mainshaft Race Snap Ring
Courtesy of CHRYSLER GROUP, LLC

4. Remove the mainshaft bearing cup (1) snap ring (2).

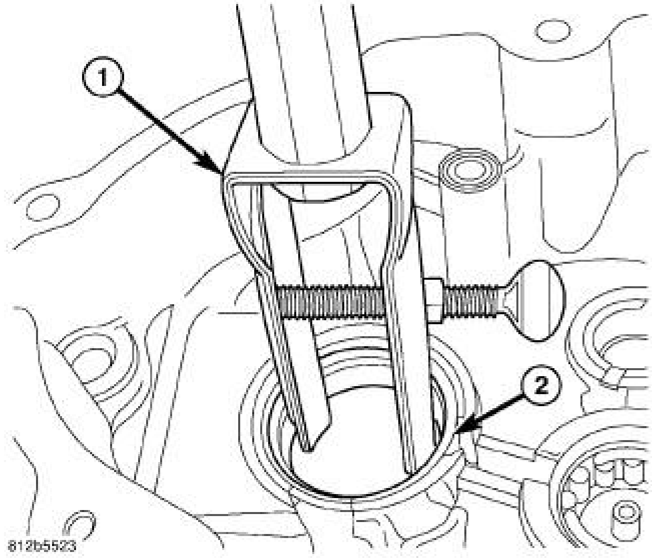


Fig. 105: Removing Mainshaft Race
Courtesy of CHRYSLER GROUP, LLC

5. Remove the mainshaft bearing cup (2) with Remover (special tool #7794-A, Remover, Seal) (1) and Slide Hammer (special tool #C-637, Slide Hammer, Universal).

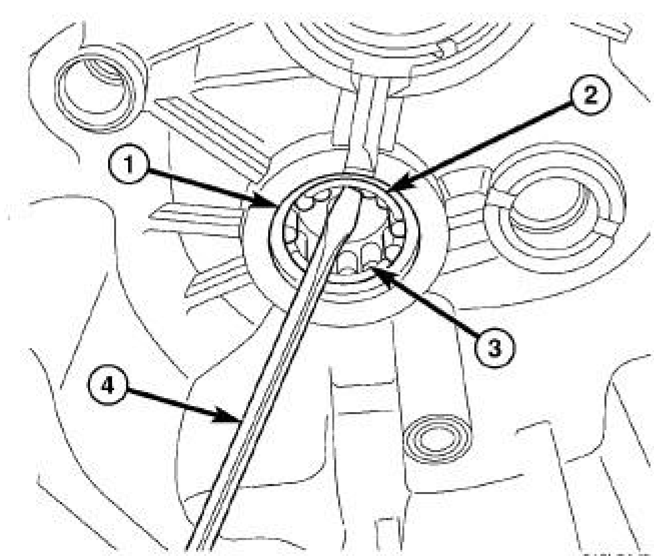


Fig. 106: Removing Countershaft Bearing Cage
Courtesy of CHRYSLER GROUP, LLC

6. Remove the countershaft bearing snap ring (1).
7. Remove the countershaft bearing plastic bearing cage (2) and remove roller bearings (3).

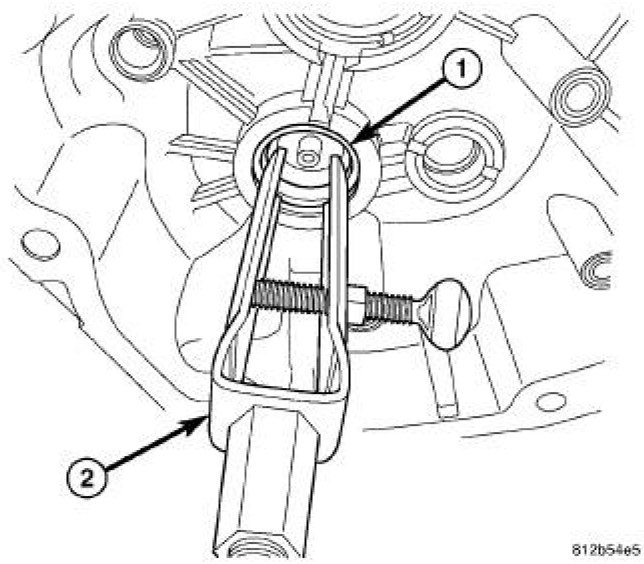


Fig. 107: Removing Countershaft Bearing Race
Courtesy of CHRYSLER GROUP, LLC

8. Remove the countershaft bearing cup (1) with Remover (special tool #7794-A, Remover, Seal) (2) and Slide Hammer (special tool #C-637, Slide Hammer, Universal).

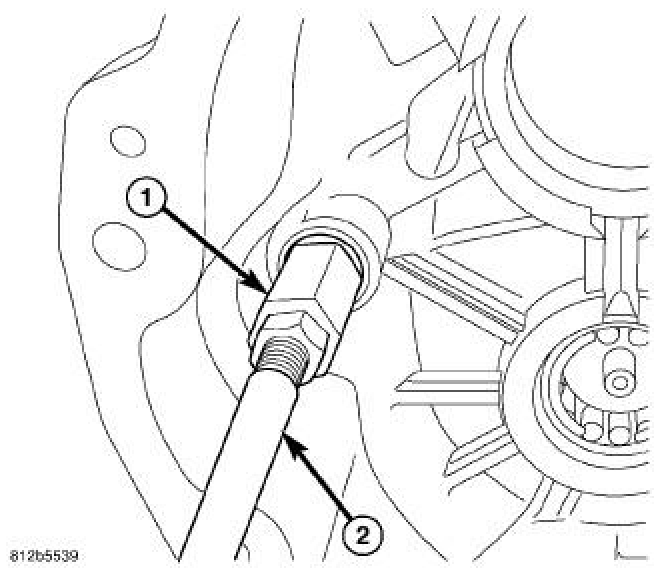


Fig. 108: Removing Shift Rail Bushing
Courtesy of CHRYSLER GROUP, LLC

9. Remove the shift rail bushings with Remover (special tool #6786, Remover, Bushing) (1) and Slide Hammer (special tool #C-3752, Slide Hammers) (2).

TRANSMISSION CASE

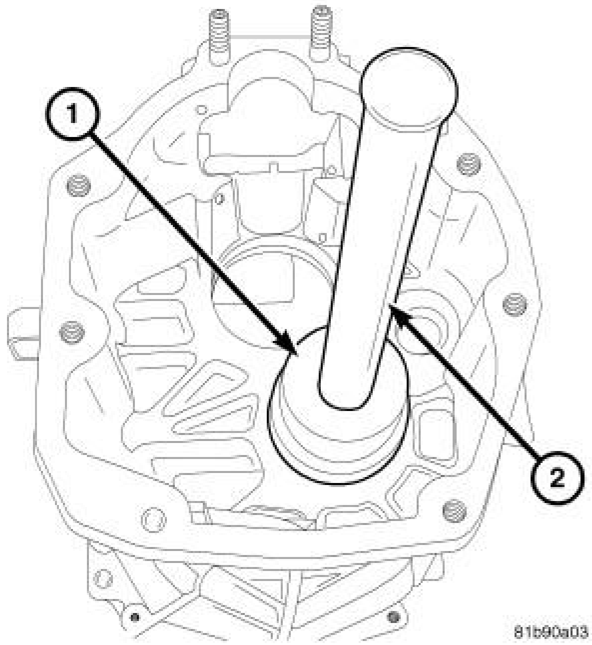


Fig. 109: Countershaft Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

1. Remove the countershaft bearing cups with Remover (special tool #9369, Remover, Bearing Cup) (1) and Handle (special tool #C-4171, Driver Handle, Universal) (2).

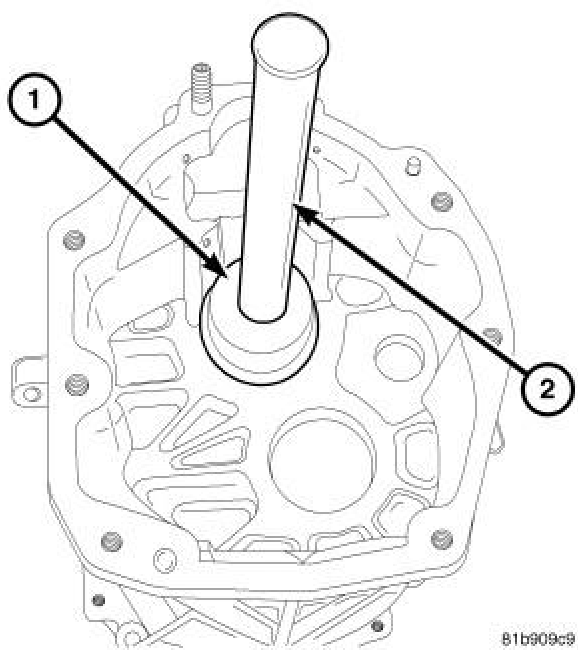


Fig. 110: Mainshaft Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

2. Remove the mainshaft bearing cups with Remover (special tool #9369, Remover, Bearing Cup) (2) and Handle (special tool #C-4171, Driver Handle, Universal) (1).

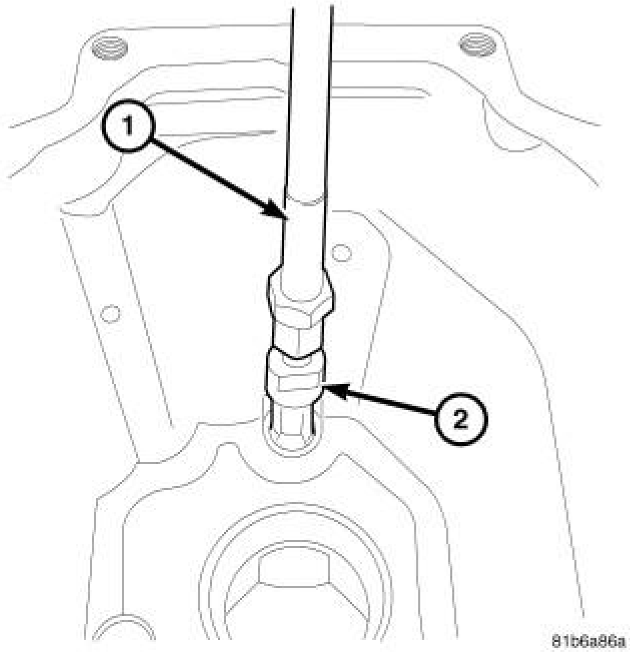


Fig. 111: Case Rail Bearing Remover
Courtesy of CHRYSLER GROUP, LLC

3. Remove the shift rail bearing with Slide Hammer (special tool #C-637, Slide Hammer, Universal) (1) and Remover (special tool #9609, Remover, Bearing) (2).

TRANSMISSION ADAPTER

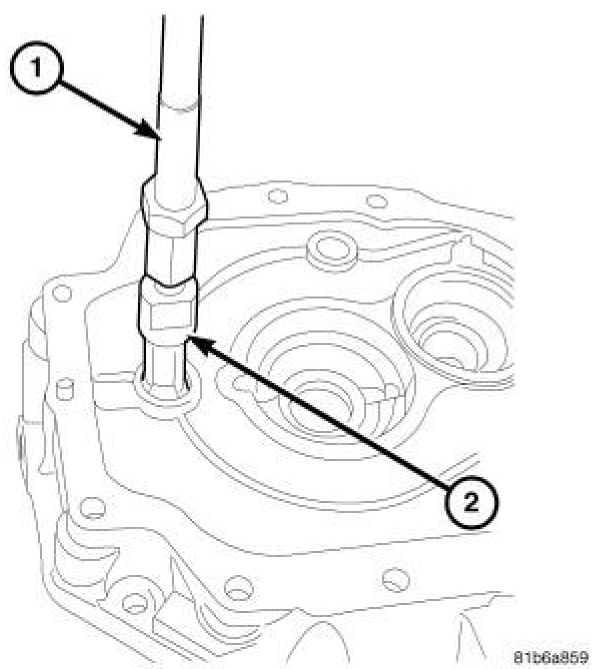


Fig. 112: Adapter Bearing Remover
Courtesy of CHRYSLER GROUP, LLC

1. Remove the shift rail bearing with Slide Hammer (special tool #C-637, Slide Hammer, Universal) (1) and Remover (special tool #9609, Remover, Bearing) (2).

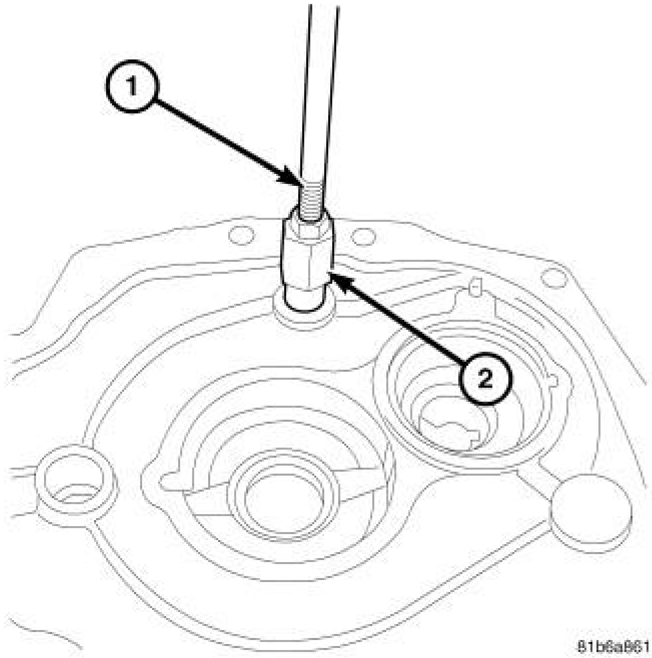


Fig. 113: Adapter Bushing Remover
Courtesy of CHRYSLER GROUP, LLC

2. Remove the shift rail bushing with Slide Hammer (special tool #C-3752, Slide Hammers) (1) and Remover (special tool #6786, Remover, Bushing) (2).

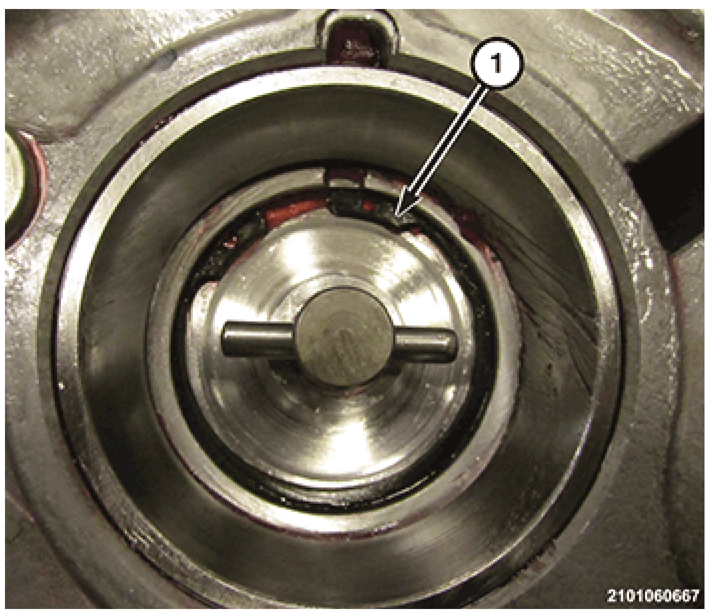


Fig. 114: Transmission Oil Pump Snap Ring
Courtesy of CHRYSLER GROUP, LLC

3. If equipped, remove the transmission oil pump snap ring (1).

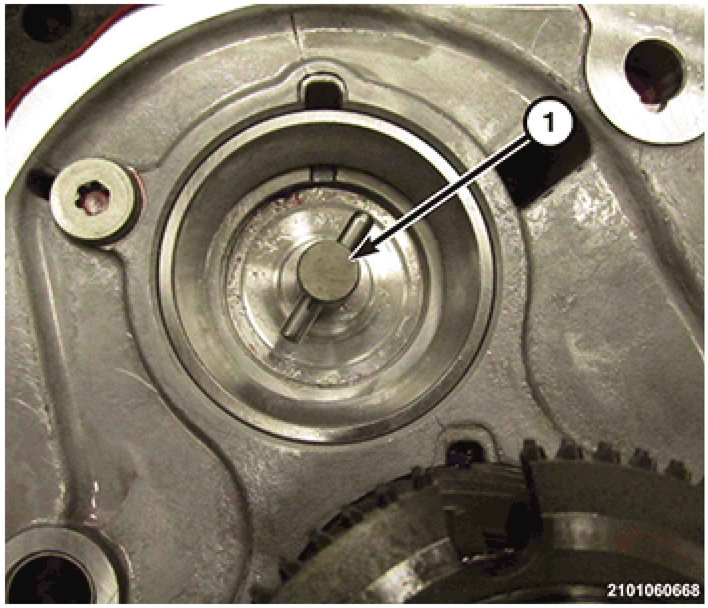


Fig. 115: Transmission Oil Pump
Courtesy of CHRYSLER GROUP, LLC

4. If equipped, remove the transmission oil pump.

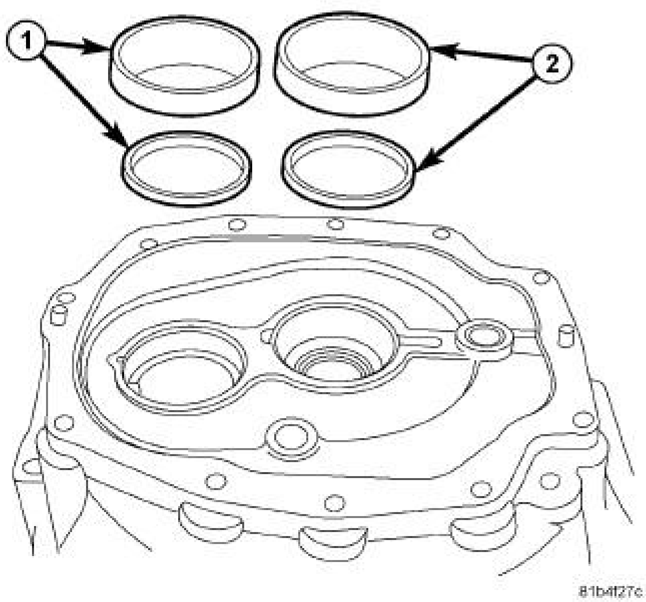


Fig. 116: Selecting Shims
Courtesy of CHRYSLER GROUP, LLC

5. Remove the countershaft bearing cup and select shim (1). Remove the mainshaft bearing cup and select shim (2).

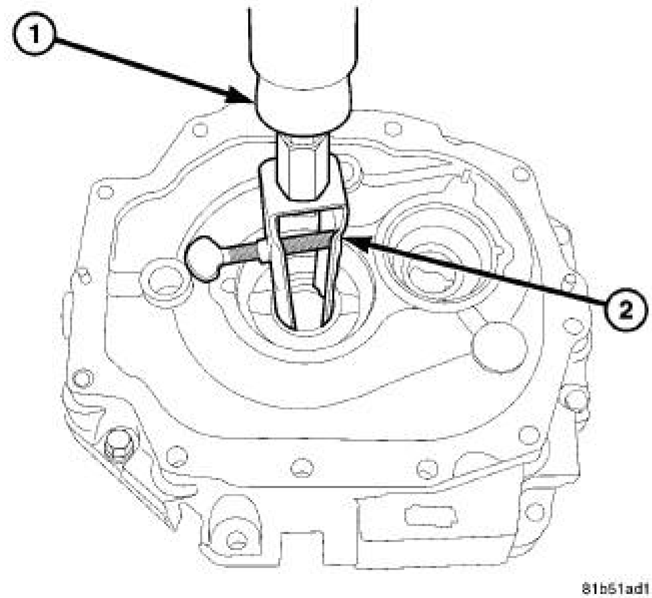


Fig. 117: Input Seal Puller
Courtesy of CHRYSLER GROUP, LLC

6. Remove the input shaft seal with Slide Hammer (special tool #C-637, Slide Hammer, Universal) (1) and Puller (special tool #7794-A, Remover, Seal) (2).

CLEANING

CLEANING

Clean the gears, bearings shafts, extension/adapter housing and gear case with solvent. Dry all parts except the bearings with compressed air. Allow the bearings to either air dry or wipe them dry with clean shop towels.

INSPECTION

INSPECTION

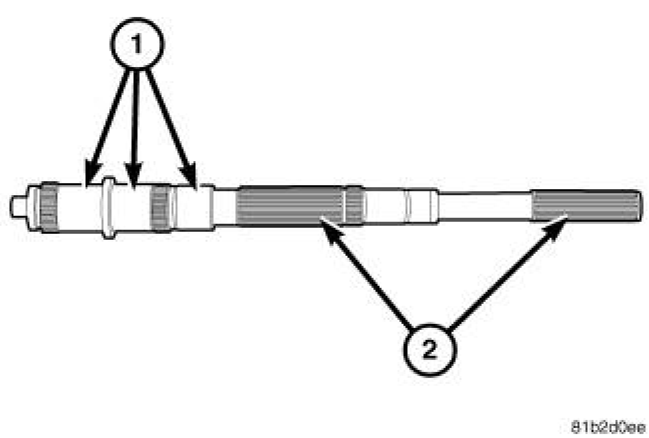


Fig. 118: Bearing Surfaces & Splines

Courtesy of CHRYSLER GROUP, LLC

NOTE: **Minor corrosion, nicks, or pitting can be smoothed with 400 grit emery and polished out with crocus cloth.**

Mainshaft: Inspect the bearing surfaces (1) for wear or flat-spots. Inspect the splines (2) and snap ring grooves for wear. Inspect the output seal surface for wear.

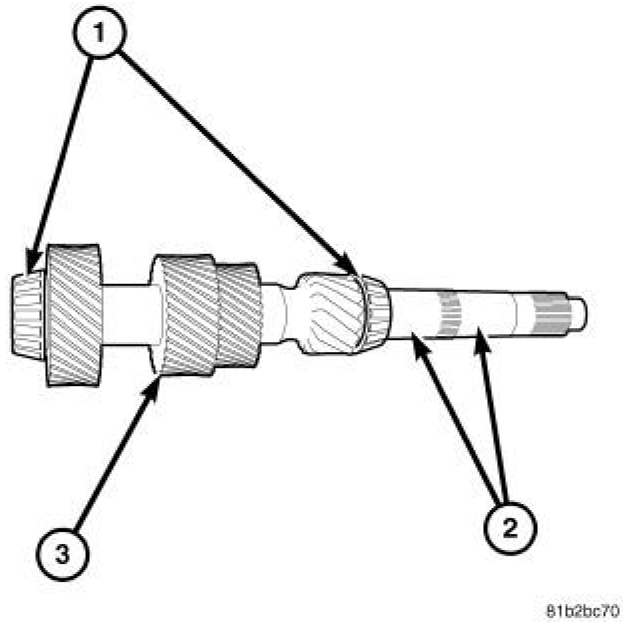
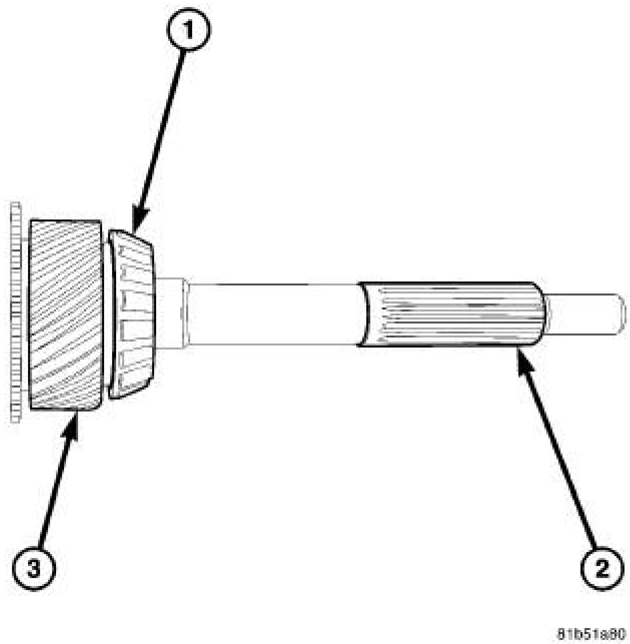


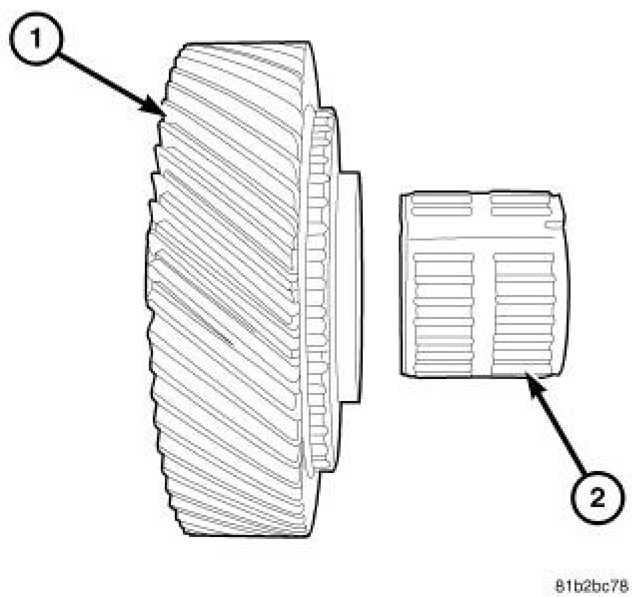
Fig. 119: Roller Bearings, Surfaces & Gear Teeth
Courtesy of CHRYSLER GROUP, LLC

Countershaft: Inspect the roller bearings (1) for wear, peeling, pitting or flat-spots. Inspect the bearing surfaces (2) for wear or flat-spots. Inspect the gear teeth (3) for wear, chips or cracks. Inspect the splines and snap ring grooves for wear.



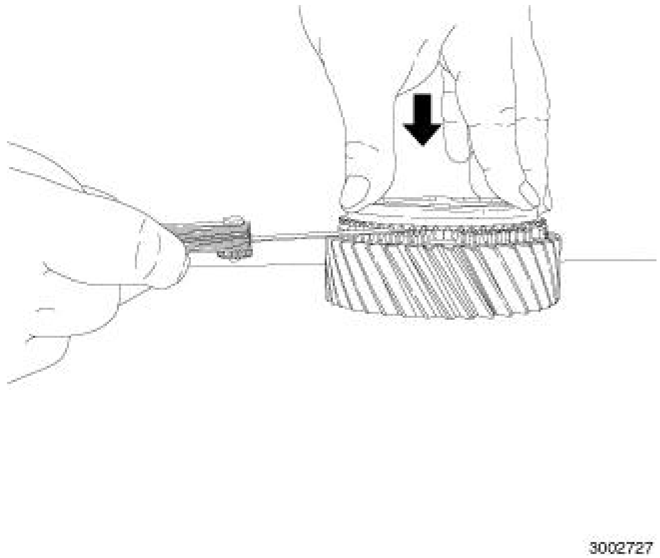
[Fig. 120: Input Shaft Bearing, Splines & Forth Gear]
Courtesy of CHRYSLER GROUP, LLC

Input Shaft: Inspect the input shaft bearing (1) for wear, peeling, pitting or flat-spots. Inspect the input shaft splines (2) for wear. Inspect the fourth gear (3) for worn, chipped, or cracked teeth. Inspect the input seal surface for wear.



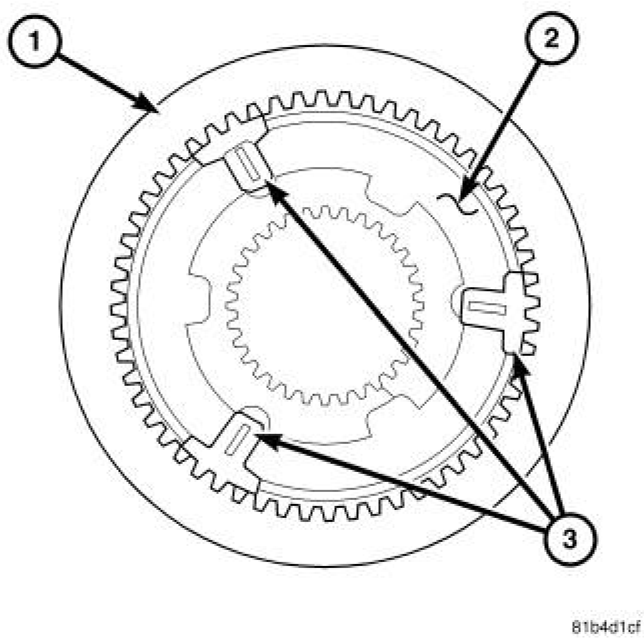
[Fig. 121: Gear & Bearing]
Courtesy of CHRYSLER GROUP, LLC

Gears: Inspect the gears (1) for worn, chipped or cracked teeth and the bearing surfaces for wear, peeling, pitting or flat-spots. Inspect the gear bearings (2) for wear, peeling, pitting, flat-spots or damaged bearing cage.



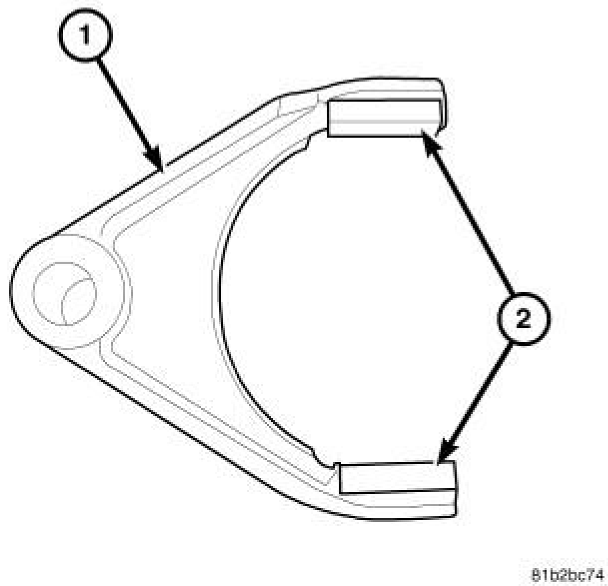
[Fig. 122: Measuring Clearance Between Blocker Ring & Gear]
Courtesy of CHRYSLER GROUP, LLC

Synchronizer components: Inspect the synchronizer rings (1) for worn, chipped, or cracked teeth and burned or flaking friction material. Place the blocker rings on the gears. While applying pressure and rotating the blocker ring measure the clearance between the blocker ring and gear. If the clearance is less than 0.75 mm (0.030 in.) replace the blocker ring.**Synchronizer rings are serviced as an assembly.**



[Fig. 123: Synchronizer Sleeve, Hub & Detents]
Courtesy of CHRYSLER GROUP, LLC

Inspect the synchronizer sleeve (1) and hub (2) for worn teeth. Inspect the synchronizer detents (3) for broken springs, missing balls or cracked/damaged housings.



[Fig. 124: Shift Forks & Shoes](#)
Courtesy of CHRYSLER GROUP, LLC

Shift Forks/Shift Rails: Inspect the shift forks (1) for distortion. Inspect the shift fork shoes (2) for wear or cracks. Fit the shoes in the synchronizer sleeve to ensure the parts fit and work smoothly. Inspect the shift rails for wear. Inspect the shift rail bushings and bearings for wear.

ASSEMBLY

ASSEMBLY

TRANSMISSION ADAPTER

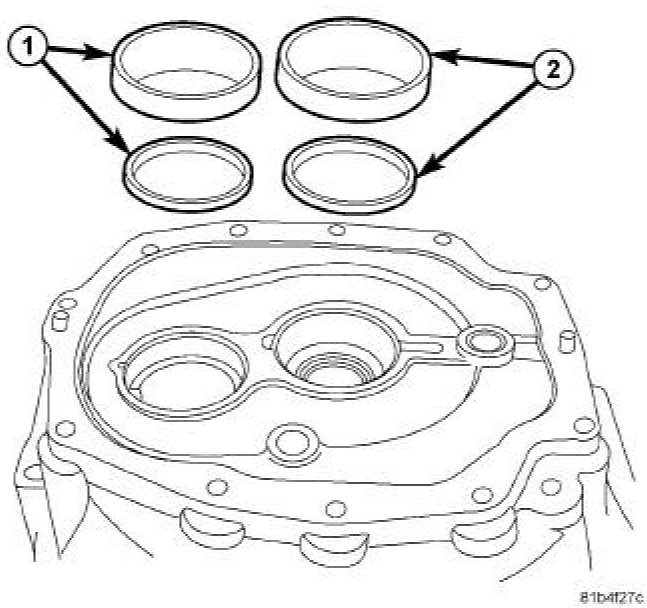


Fig. 125: Selecting Shims
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Refer to ADJUSTMENTS for Mainshaft and Countershaft end play shim selection .**

1. Install the countershaft select shim and bearing cup (1) into the adapter plate. Install the mainshaft select shim and bearing cup (2) into the adapter plate.

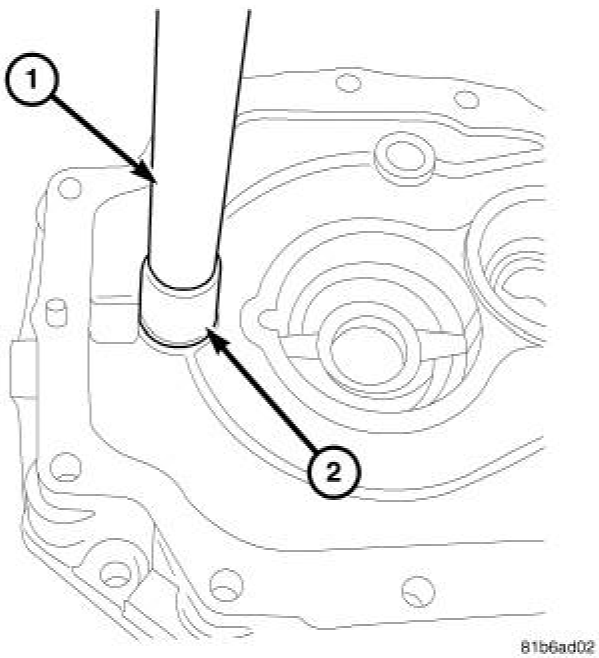


Fig. 126: Adapter Bearing Installer
Courtesy of CHRYSLER GROUP, LLC

2. Install the shift rail bearing with Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #10028, Installer, Bearing) (2).

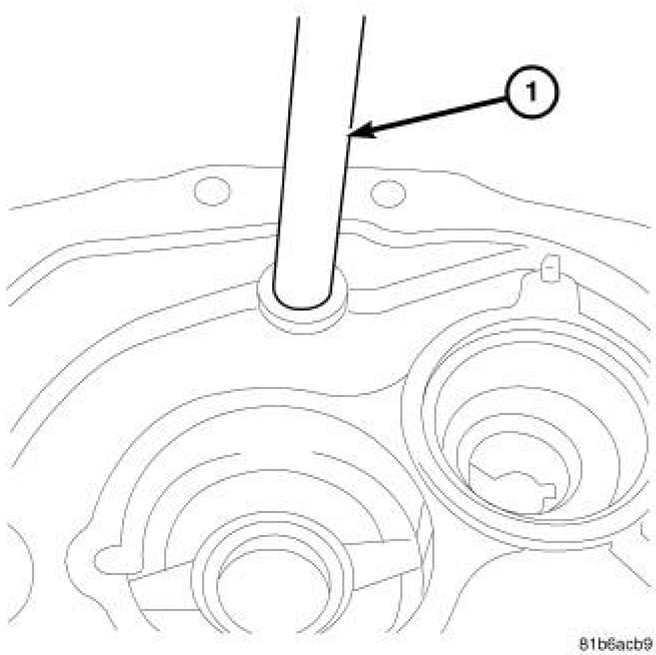


Fig. 127: Adapter Bushing Installer
Courtesy of CHRYSLER GROUP, LLC

3. Install the shift rail bushing with Installer (special tool #8475, Installer, Bushing) (1).

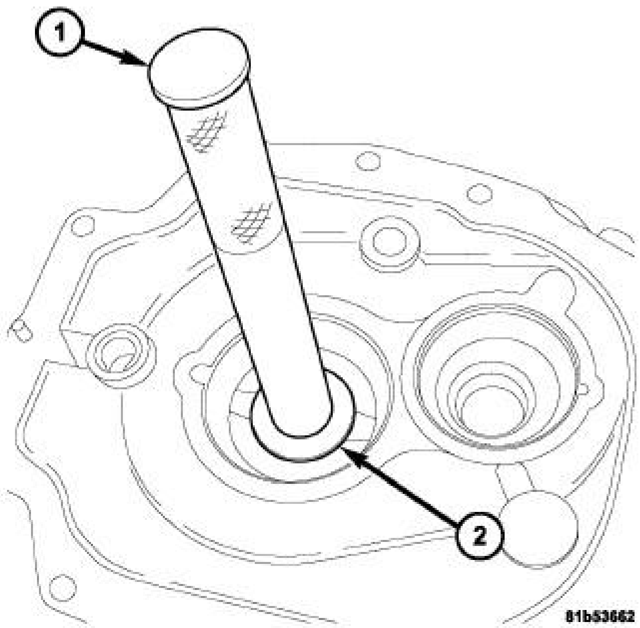


Fig. 128: Input Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

4. Install the input shaft seal with Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #9366, Installer, Seal) (2).

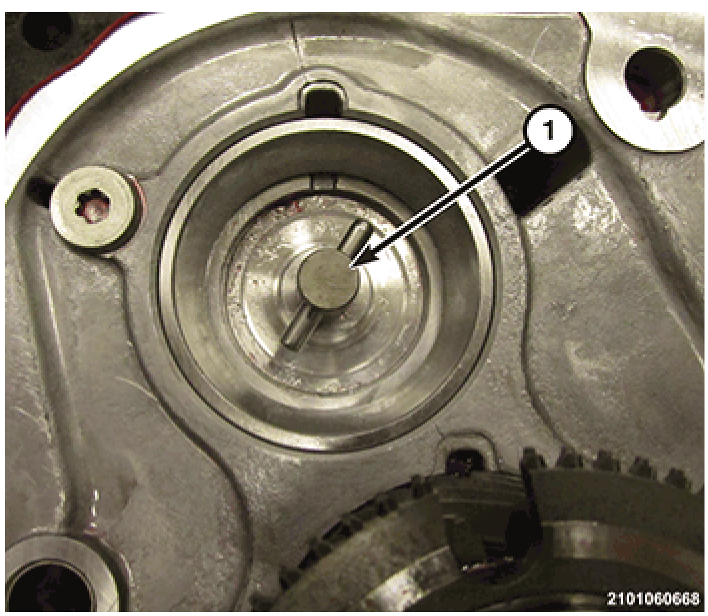


Fig. 129: Transmission Oil Pump
Courtesy of CHRYSLER GROUP, LLC

5. If equipped, install the transmission oil cooler pump.

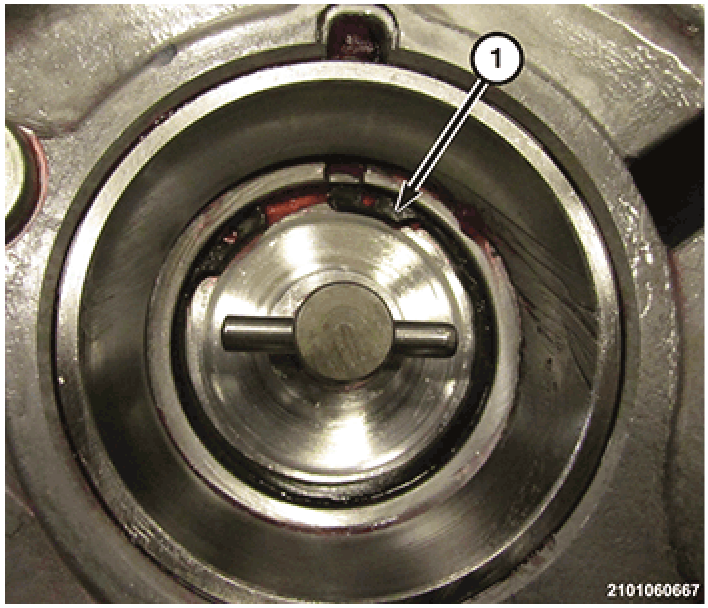


Fig. 130: Transmission Oil Pump Snap Ring
Courtesy of CHRYSLER GROUP, LLC

6. If equipped, install the transmission oil cooler pump snap ring.
7. If equipped, install the transmission oil filter.

TRANSMISSION CASE

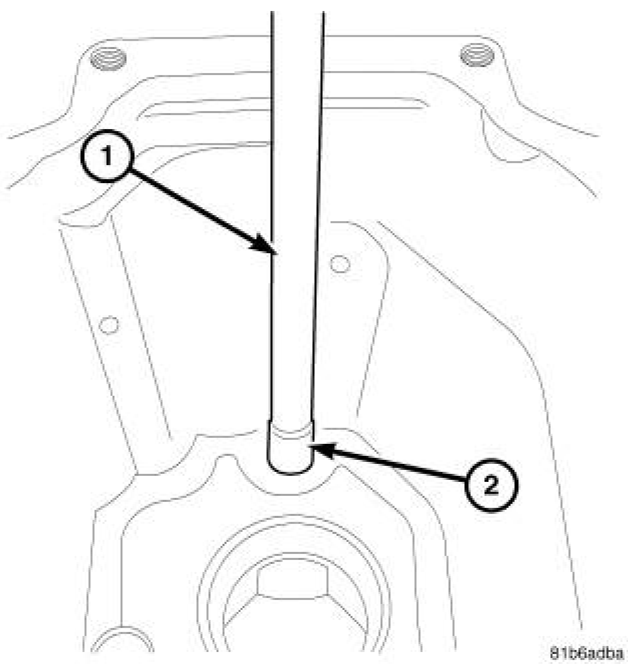


Fig. 131: Case Rail Bearing Installer
Courtesy of CHRYSLER GROUP, LLC

1. Install the shift rail bearing with Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #10028, Installer, Bearing) (2).

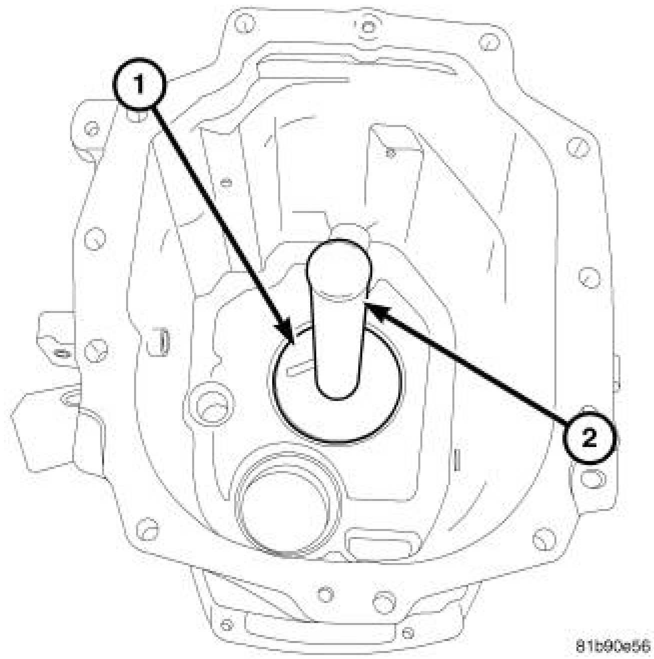


Fig. 132: Mainshaft Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

2. Install the mainshaft bearing cup with Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #9373, Installer, Bearing Cup) (2).

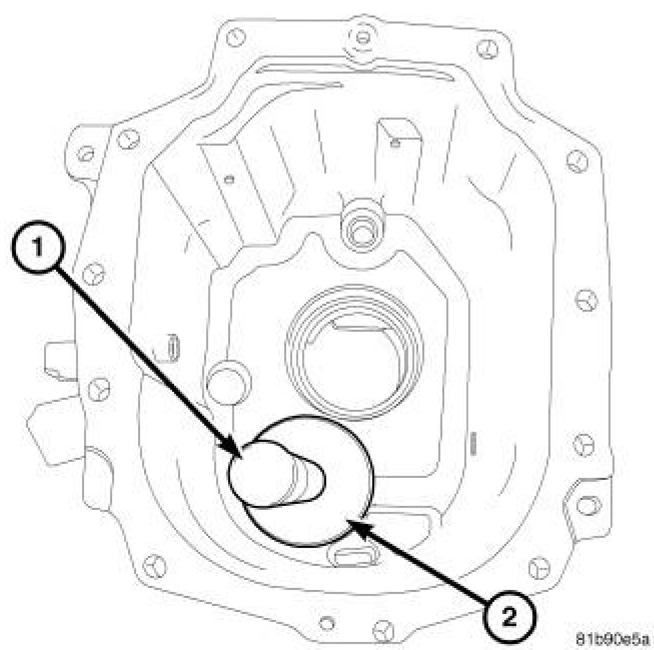


Fig. 133: Countershaft Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

3. Install the countershaft bearing cup with Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #9373, Installer, Bearing Cup) (2).

EXTENSION HOUSING

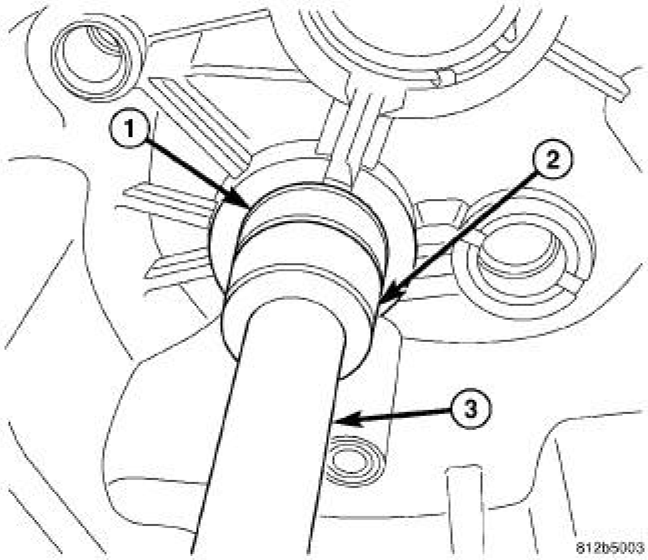


Fig. 134: Installing Countershaft Bearing
Courtesy of CHRYSLER GROUP, LLC

1. Install the countershaft bearing (1) with Installer (special tool #9394, Installer, Bearing) (2) and Handle (special tool #C-4171, Driver Handle, Universal) (3).
2. Install the countershaft bearing snap ring.

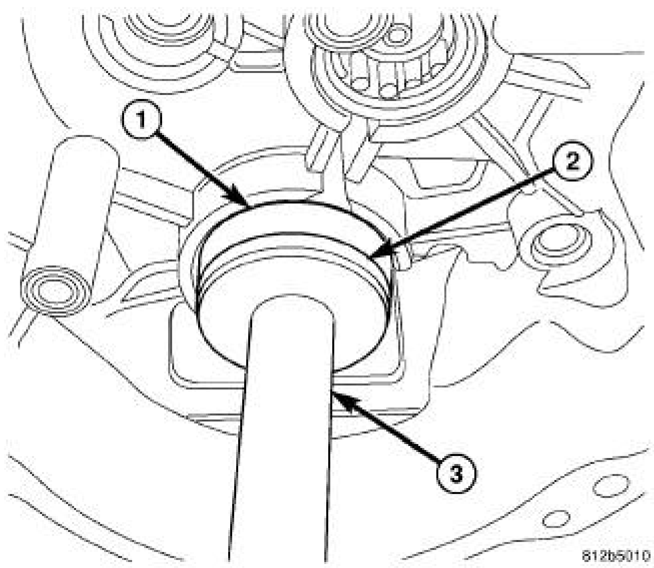


Fig. 135: Installing Mainshaft Bearing Race
Courtesy of CHRYSLER GROUP, LLC

3. Install the mainshaft bearing cup (1) with Installer (special tool #9392, Installer, Bearing Cup) (2) and Handle (special tool #C-4171, Driver Handle, Universal) (3).

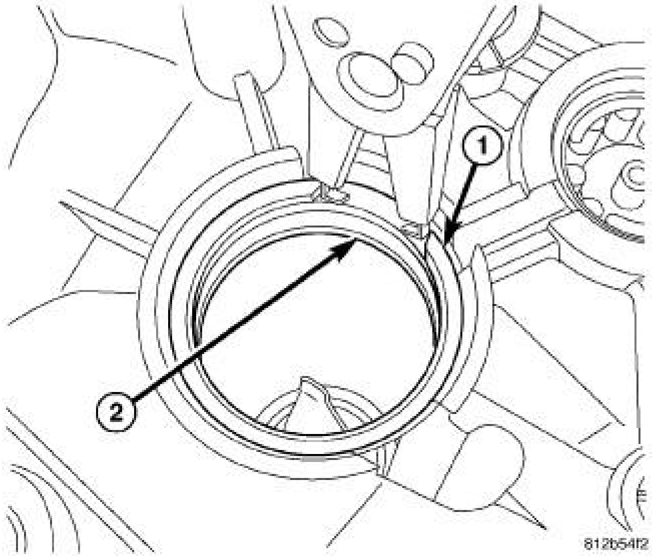


Fig. 136: Removing Mainshaft Race Snap Ring
Courtesy of CHRYSLER GROUP, LLC

4. Install the mainshaft bearing cup (2) snap ring (1).

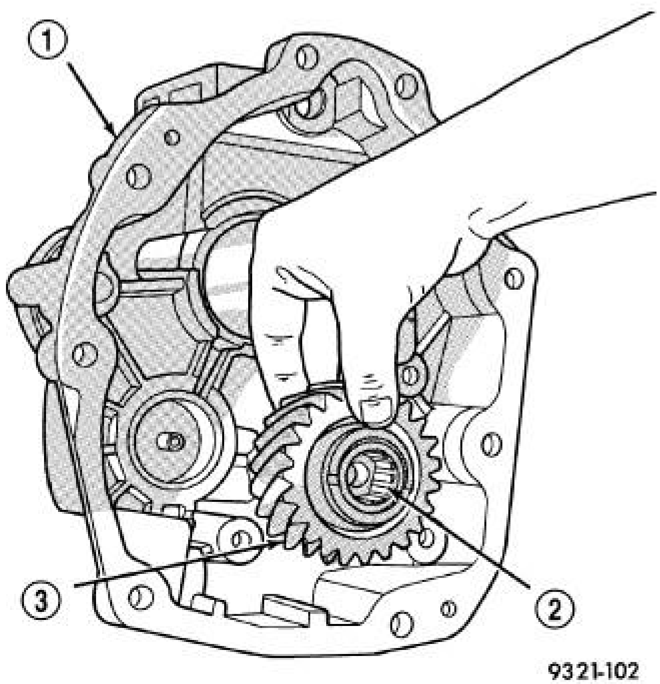


Fig. 137: Thrust Washer, Gear And Bearing
Courtesy of CHRYSLER GROUP, LLC

5. Install the reverse idler gear shaft in the extension housing (1).
6. Install the reverse idler gear bearing (2) and the idler gear (3).

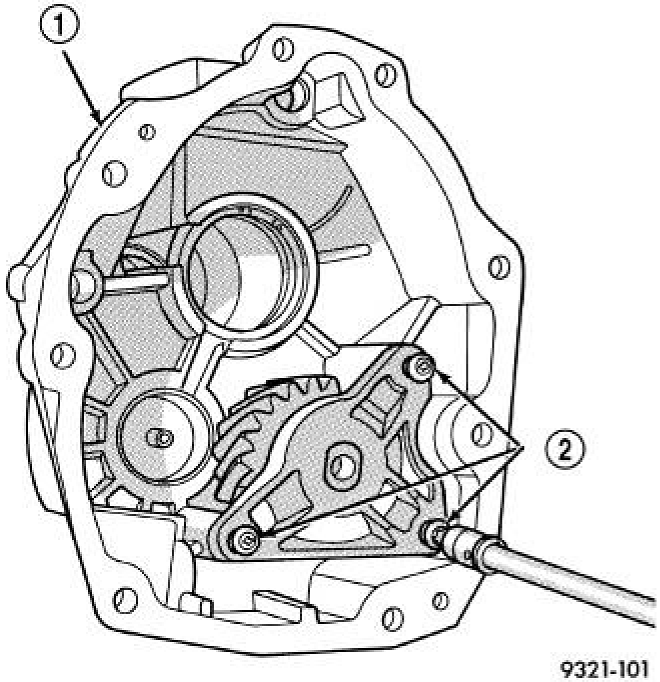


Fig. 138: Idler Gear Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Install the reverse idler gear bracket into the tail housing (1).
8. Apply Mopar Ā® Lock AND Seal Adhesive or equivalent on the idler gear bracket bolts (2). Install bolts (2) and tighten to the proper **SPECIFICATIONS** .

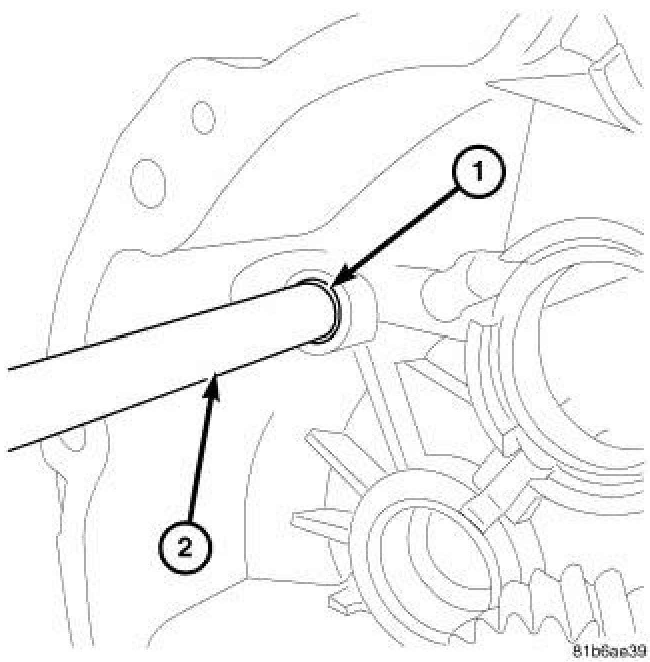
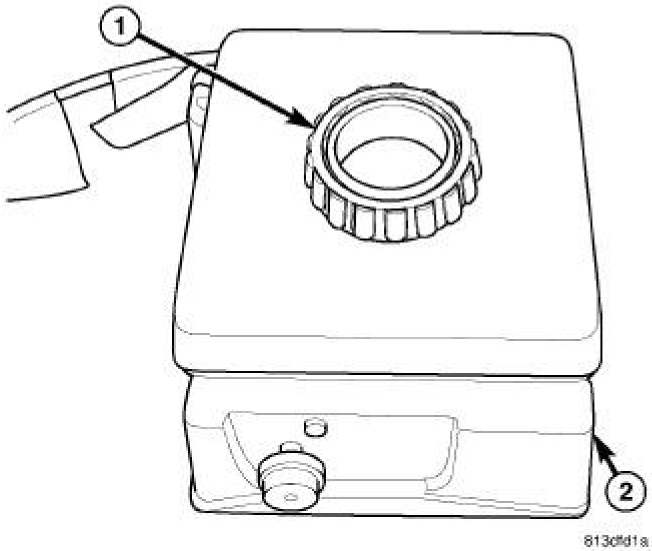


Fig. 139: Shift Rail Bushing Installer
Courtesy of CHRYSLER GROUP, LLC

9. Install the shift rail bushings (1) with Installer (special tool #8475, Installer, Bushing) (2).

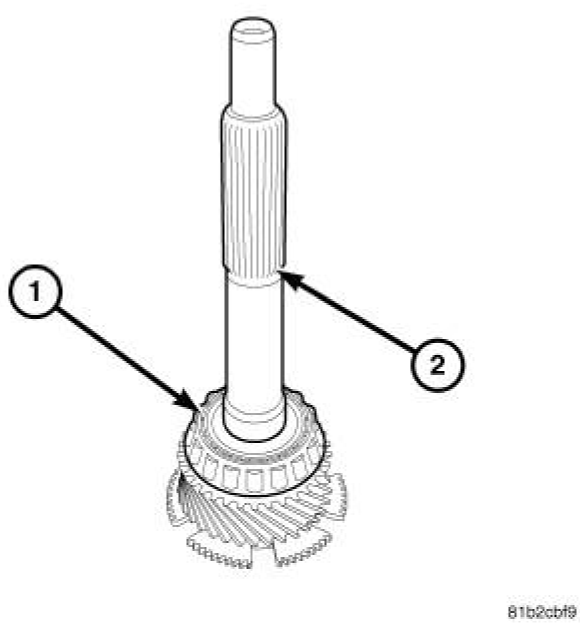
INPUT SHAFT



[Fig. 140: Identifying Bearing Heater And Bearing]
Courtesy of CHRYSLER GROUP, LLC

WARNING: Use tongs or welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.

CAUTION: Bearings (1) are installed using a Bearing Heater (2). Use only a bearing heater/hot plate and follow manufacture's instructions. Heat components to 100 - 149 Celsius (212Â° Min. - 300Â° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.



[Fig. 141: Input Shaft Bearing]

Courtesy of CHRYSLER GROUP, LLC

1. Heat the input shaft bearing to 100Ā° - 149Ā°C (212Ā° - 300Ā° F) and install the bearing (1) onto the input shaft (2) with tongs or welding gloves.

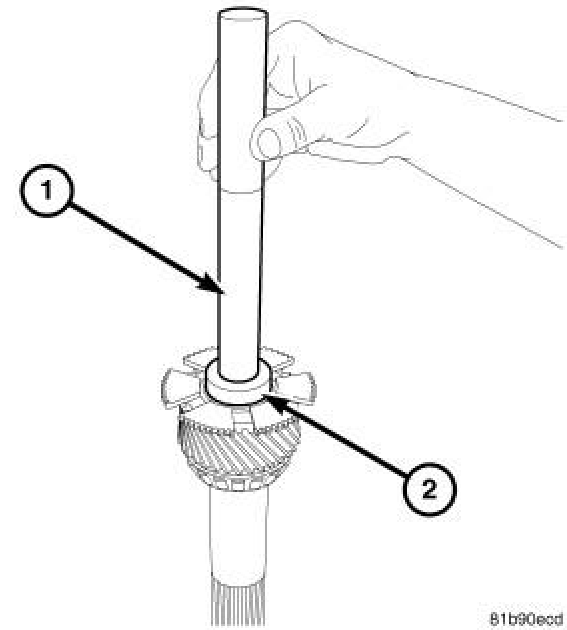


Fig. 142: Input Shaft Bearing Cup
Courtesy of CHRYSLER GROUP, LLC

2. Install the input shaft bearing cup with Handle (special tool #C-4171, Driver Handle, Universal) (1) and Installer (special tool #9380, Installer, Bearing Cup) (2).

COUNTERSHAFT

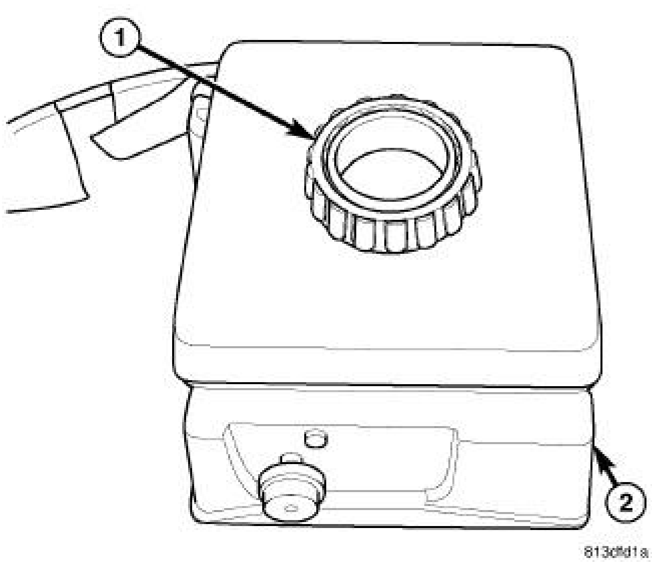


Fig. 143: Identifying Bearing Heater And Bearing
Courtesy of CHRYSLER GROUP, LLC

WARNING: **Use tongs or welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.**

CAUTION: **Bearings (1) are installed using a Bearing Heater (2). Use only a bearing heater/hot plate and follow manufacture's instructions. Heat components to 100 - 149 Celsius (212Ā° Min. - 300Ā° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.**

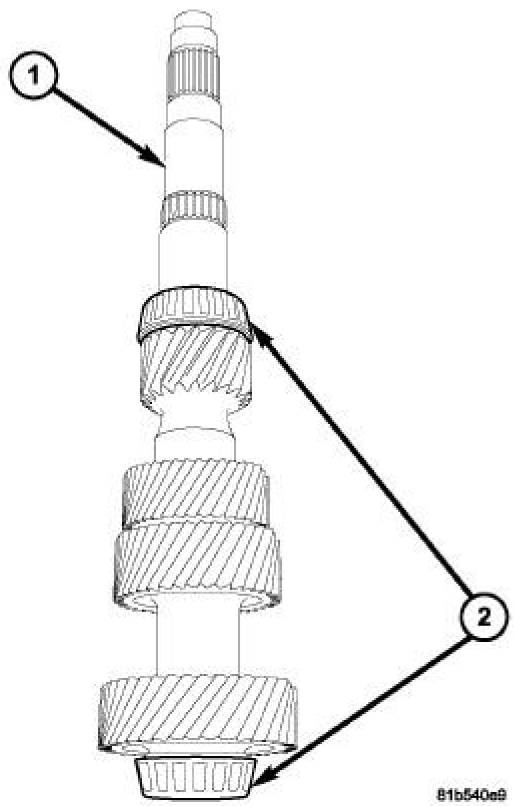
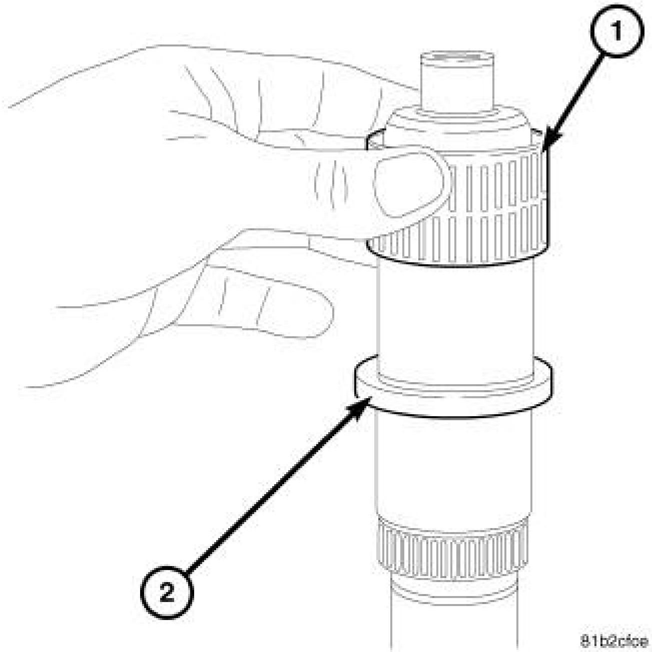


Fig. 144: Countershaft Bearings
Courtesy of CHRYSLER GROUP, LLC

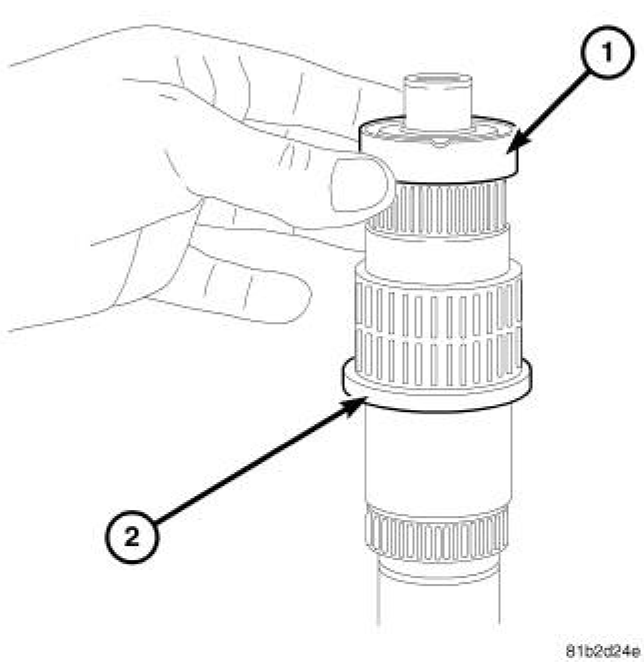
1. Heat the countershaft (1) bearings (2) to 100Ā° - 149Ā° C(212Ā° - 300Ā°F). Install the countershaft (1) bearings (2) onto the countershaft with tongs or welding gloves.

MAINSHAFT



[Fig. 145: 3rd Gear Bearing]
Courtesy of CHRYSLER GROUP, LLC

1. Install the third gear bearing (1) on the mainshaft (2).



[Fig. 146: 3rd Gear Bearing Spacer]
Courtesy of CHRYSLER GROUP, LLC

2. Install the third gear bearing spacer (1) on the mainshaft (2).

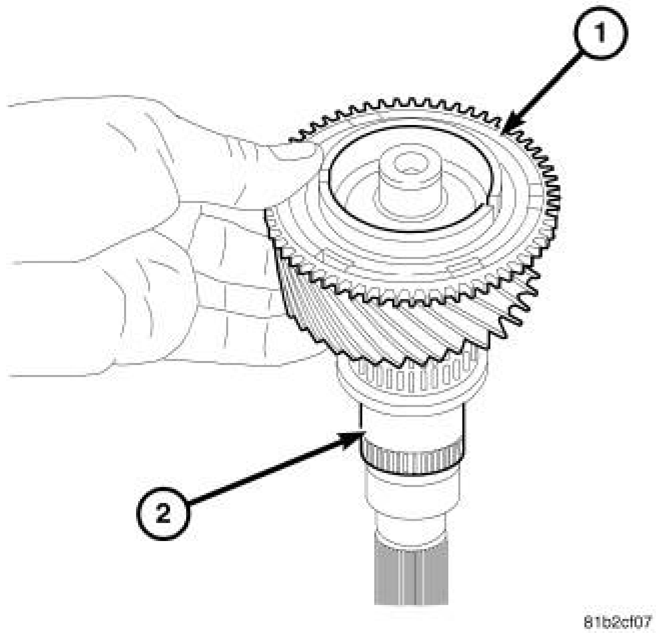


Fig. 147: 3rd Gear
Courtesy of CHRYSLER GROUP, LLC

3. Install third gear (1) on the mainshaft (2).

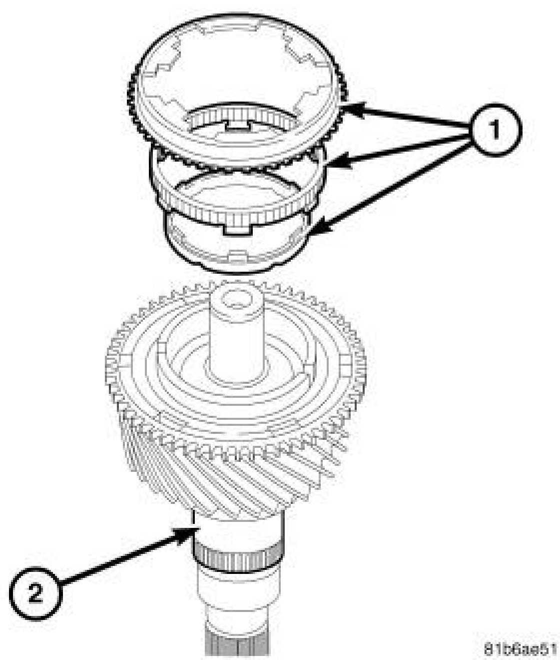


Fig. 148: 3rd Gear Synchro Rings
Courtesy of CHRYSLER GROUP, LLC

4. Install the third gear synchronizer rings (1) on the third gear (2).

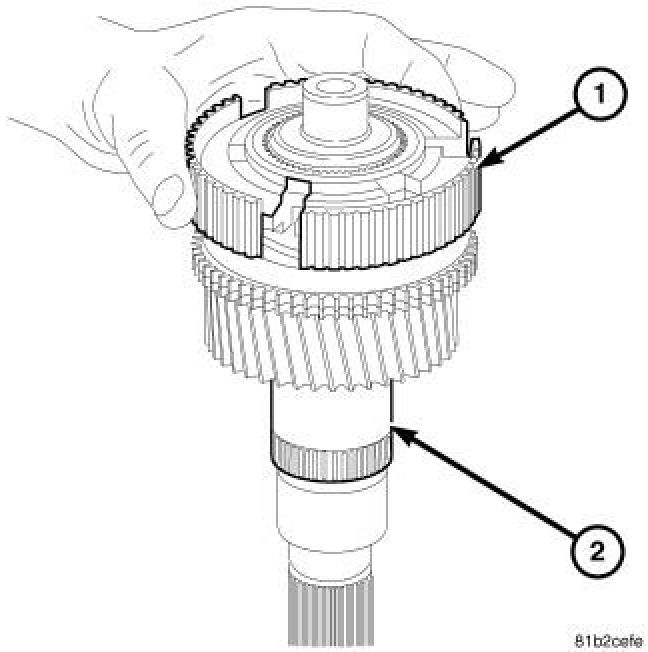


Fig. 149: 3-4 Synchro Hub
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Refer to the removal orientation noted of the third and fourth gear synchronizer hub orientation prior to installation. It is a directional hub and will not work properly if installed incorrectly.**

5. Install the third and fourth gear synchronizer hub (1) on the mainshaft (2).

CAUTION: **Synchronizer rings must be aligned with synchronizer hub and third gear during installation. Failure to follow these instructions will result in damage to the synchronizer rings.**

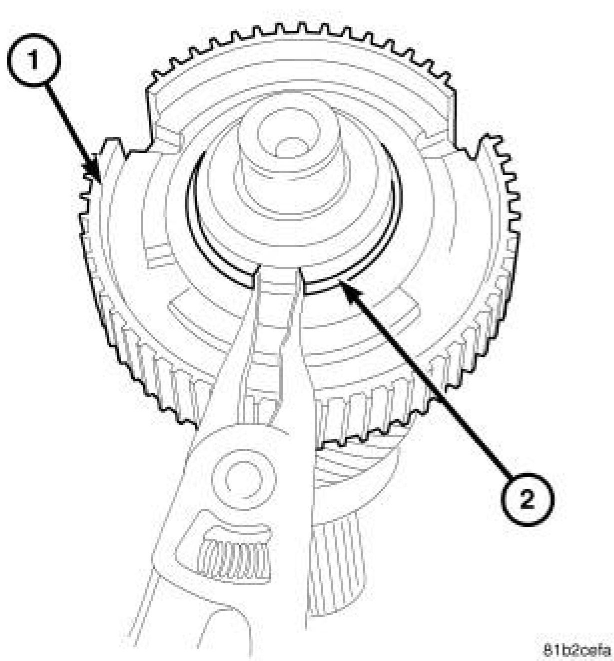


Fig. 150: 3-4 Hub Snap Ring

Courtesy of CHRYSLER GROUP, LLC

6. Install third and fourth gear synchronizer hub (1) snap ring (2) on the mainshaft.

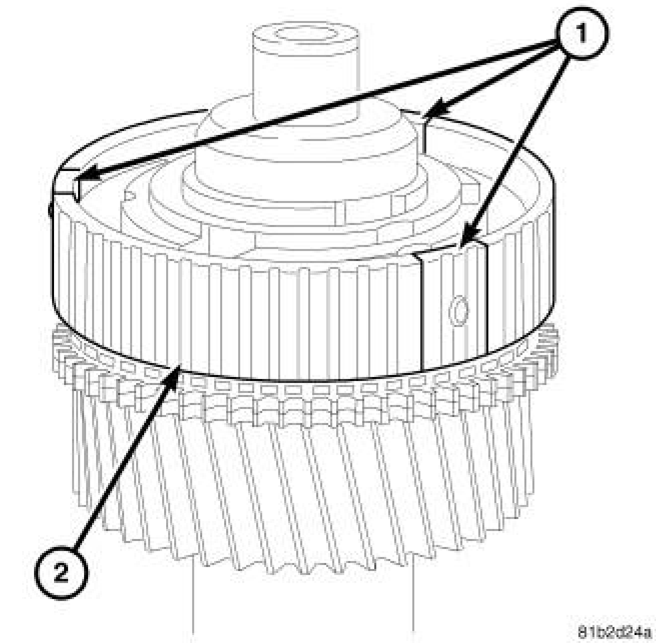


Fig. 151: 3-4 Hub Detents
Courtesy of CHRYSLER GROUP, LLC

7. Install the synchronizer detents (1) in the third and fourth gear synchronizer hub (2).

NOTE: **First and second gear and the third and fourth gear synchronizer detents are the same.**

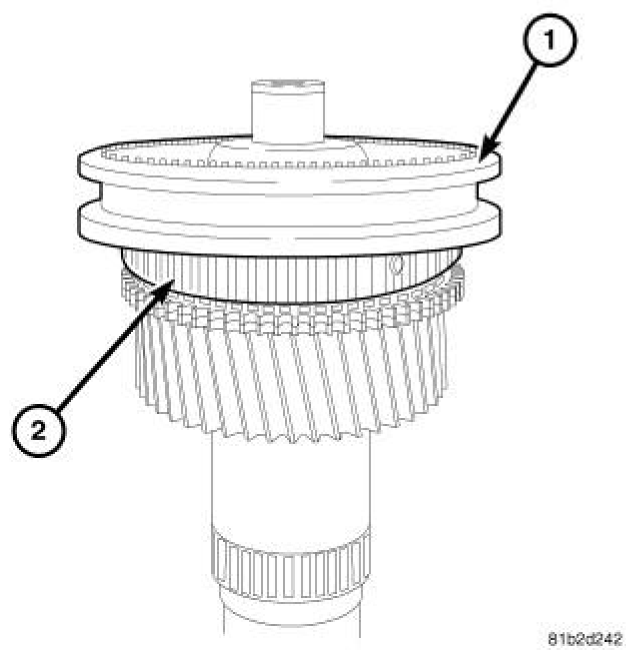


Fig. 152: 3-4 Synchro Sleeve
Courtesy of CHRYSLER GROUP, LLC

8. Install the third and fourth gear synchronizer sleeve (1) on the third and fourth gear synchronizer hub (2).

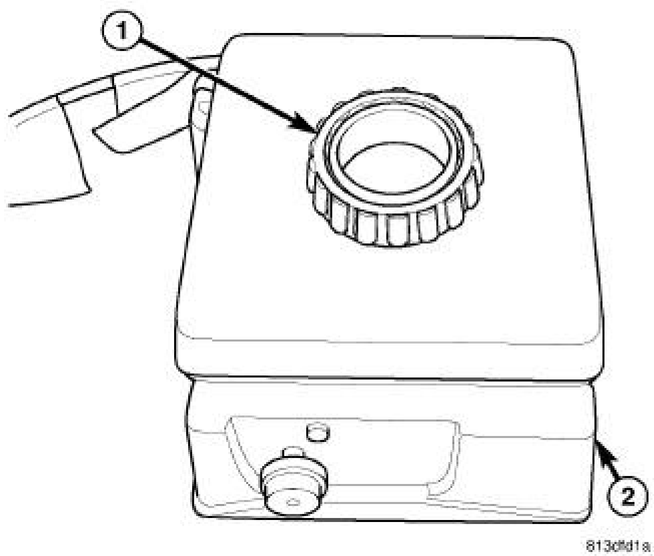


Fig. 153: Identifying Bearing Heater And Bearing
Courtesy of CHRYSLER GROUP, LLC

WARNING: Use tongs or welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.

CAUTION: Bearings (1) are installed using a Bearing Heater (2). Use only a bearing heater/hot plate and follow manufacture's instructions. Heat components to 100 - 149 Celsius (212Ā° Min. - 300Ā° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.

9. Heat the mainshaft transmission adapter bearing to 100Ā° - 149Ā°C (212Ā° - 300Ā°F) and install onto the mainshaft with tongs or welding gloves.

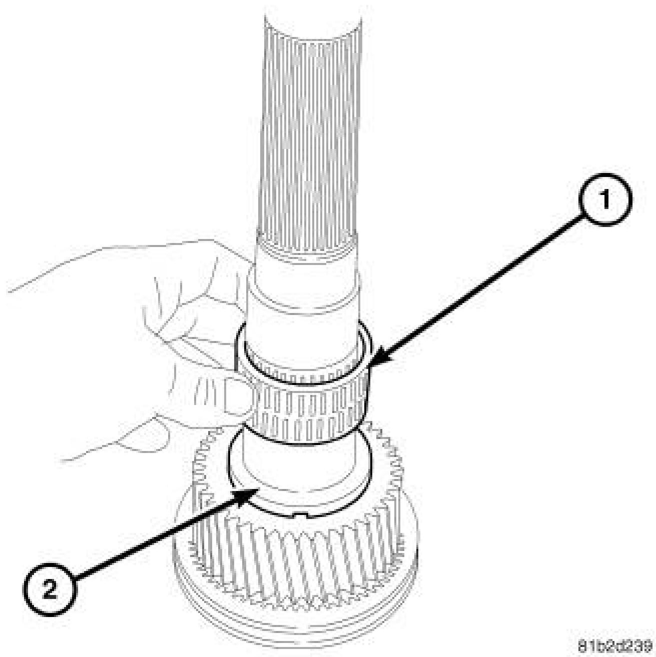


Fig. 154: 2nd Gear Bearing
Courtesy of CHRYSLER GROUP, LLC

10. Install the second gear bearing (1) on the mainshaft (2).

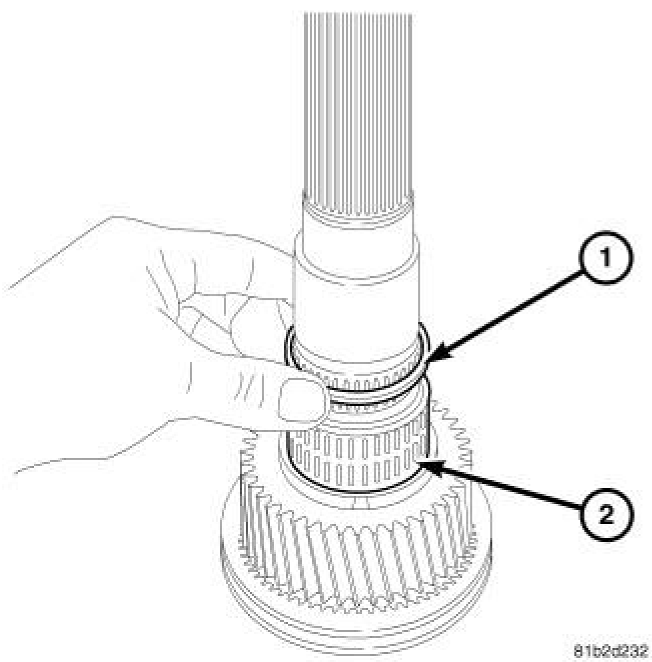
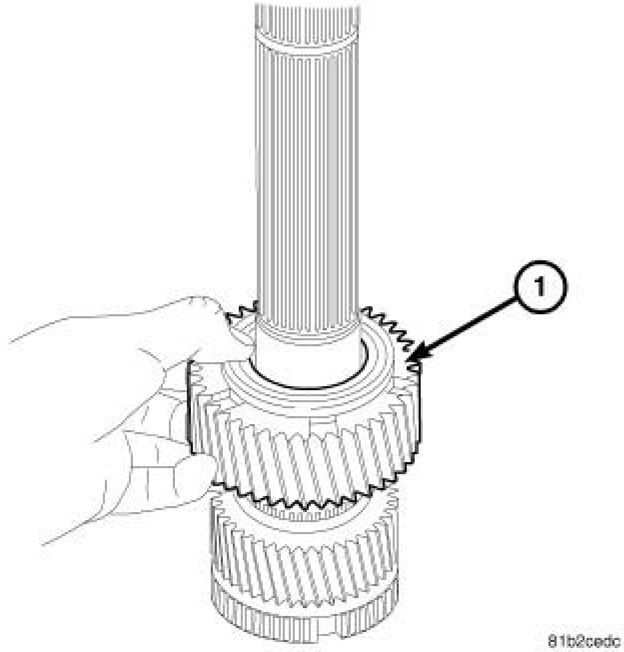


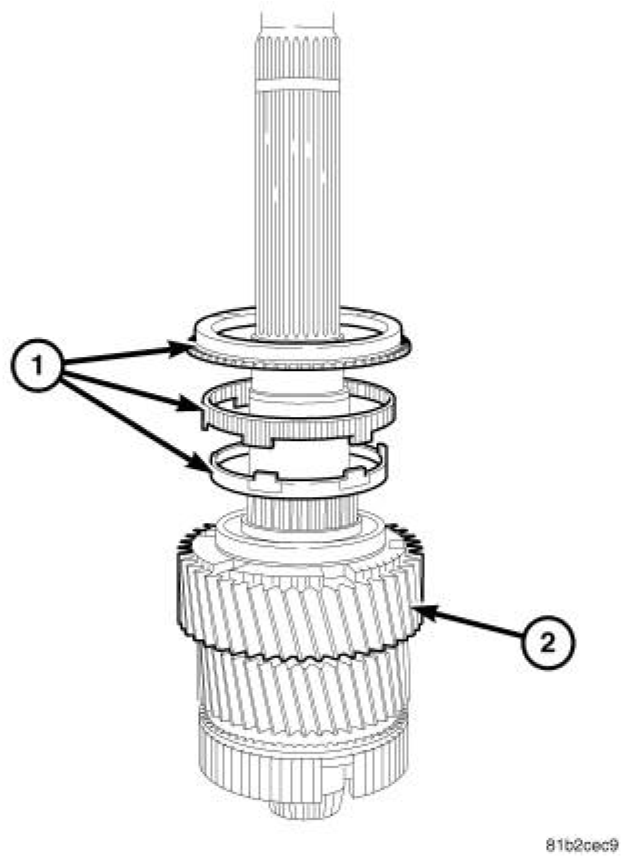
Fig. 155: 2nd Bearing Spacer
Courtesy of CHRYSLER GROUP, LLC

11. Install the second gear bearing spacer (1) on the mainshaft (2).



[Fig. 156: 2nd Gear](#)
Courtesy of CHRYSLER GROUP, LLC

12. Install second gear (1) on the mainshaft (2).



[Fig. 157: 2nd Gear Synchro Rings](#)
Courtesy of CHRYSLER GROUP, LLC

13. Install the second gear synchronizer rings (1) on the second gear (2).

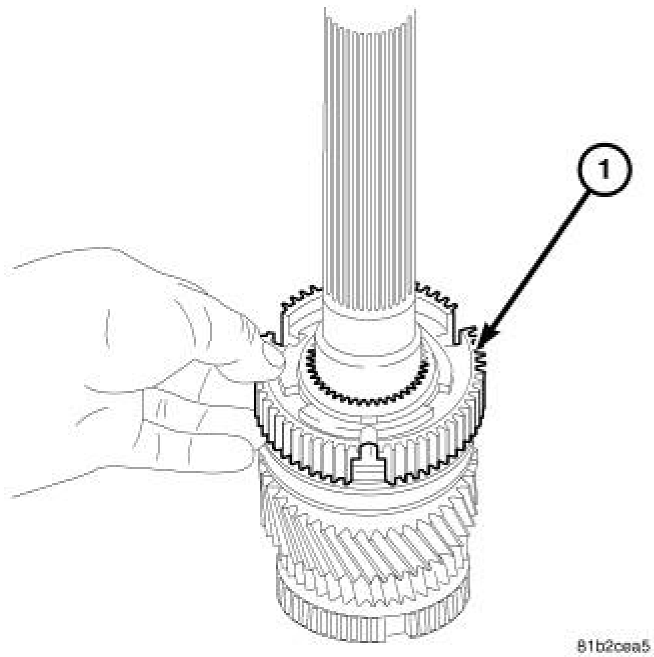


Fig. 158: 1-2 Synchro Hub
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Refer to the removal orientation noted of the first and second gear synchronizer hub orientation prior to installation. It is a directional hub and will not work properly if installed incorrectly.**

14. Install the first and second gear synchronizer hub (1) on the mainshaft (2).

CAUTION: **Synchronizer rings must be aligned with synchronizer hub and second gear during installation. Failure to follow these instructions will result in damage to the synchronizer rings.**

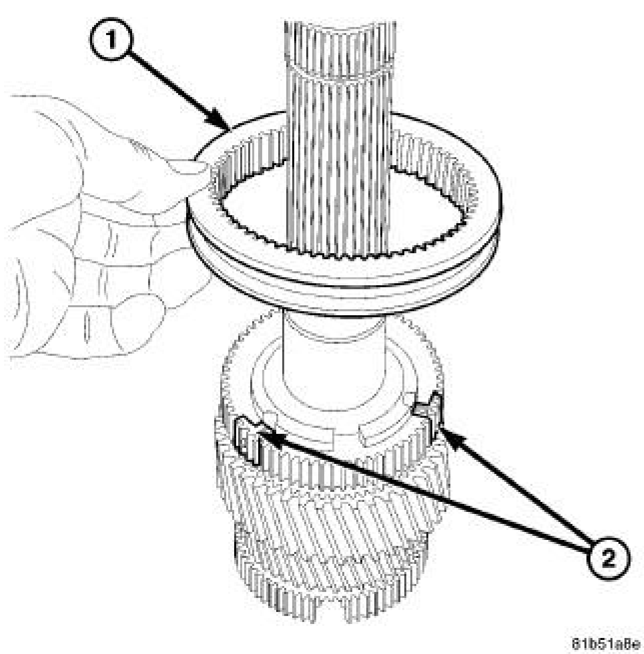


Fig. 159: 1-2 Synchro Sleeve
Courtesy of CHRYSLER GROUP, LLC

15. Install the first and second gear synchronizer hub sleeve (1) and detents (2).

NOTE: **The first and second gear and the third and fourth gear synchronizer detents are the same.**

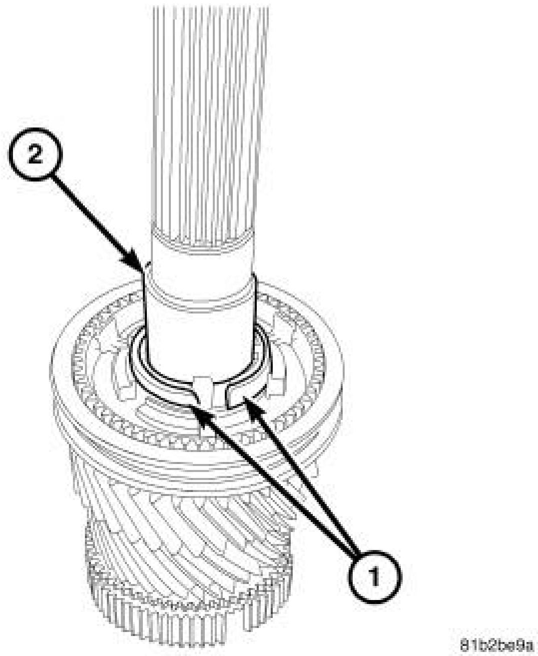


Fig. 160: 1st Split Rings
Courtesy of CHRYSLER GROUP, LLC

16. Install the first and second gear synchronizer hub split rings (1) on the mainshaft (2).

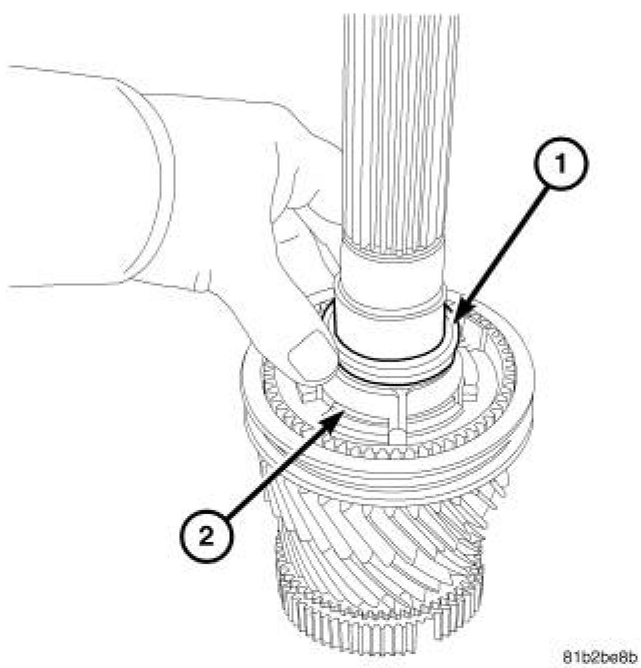
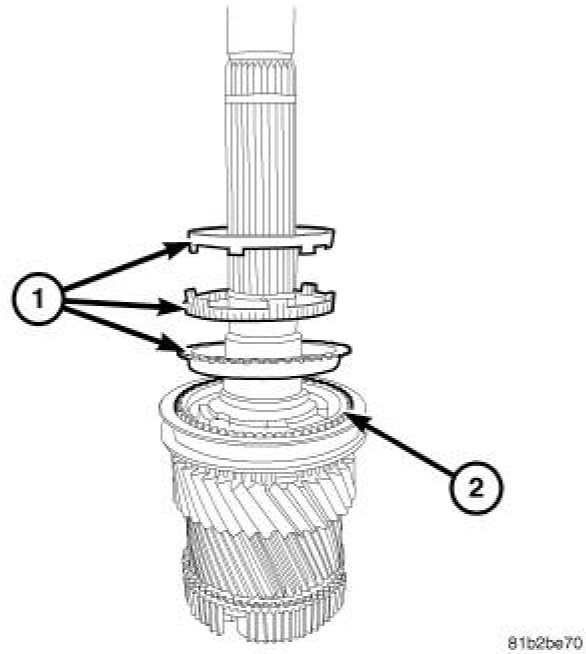


Fig. 161: 1st Split Ring Retainer

Courtesy of CHRYSLER GROUP, LLC

17. Install the first and second gear synchronizer hub split ring retainer (1) over the split rings (2).



[**Fig. 162: 1st Gear Synchro**]
Courtesy of CHRYSLER GROUP, LLC

18. Install the first gear synchronizer rings (1) on the first and second gear synchronizer hub (2).

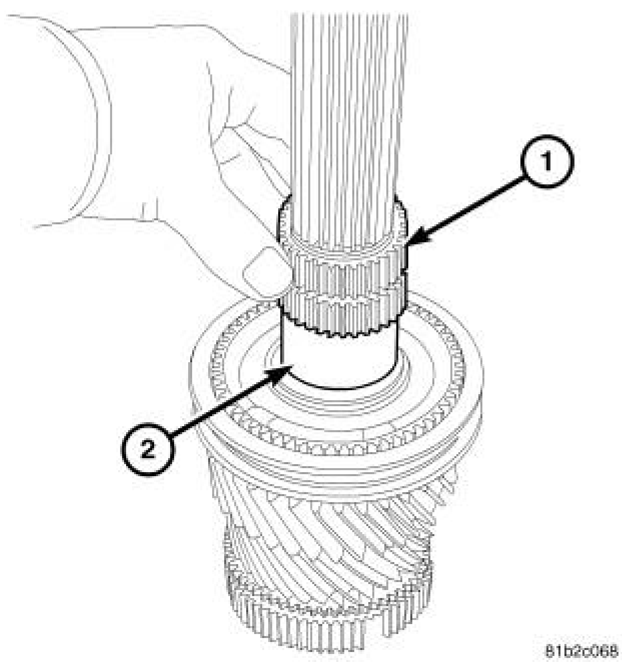


Fig. 163: 1st Gear Bearing & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

19. Install the first gear bearing (1) on the mainshaft (2).

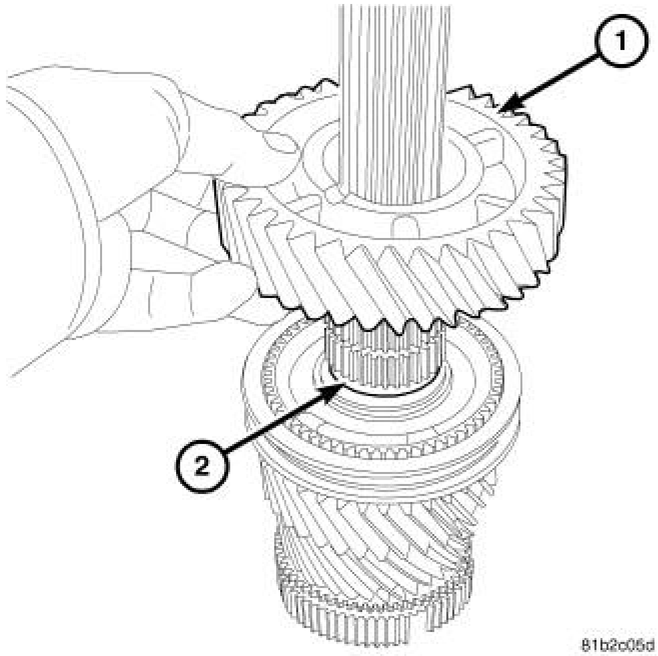


Fig. 164: 1st Gear & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

20. Install first gear (1) on the mainshaft (2).

CAUTION: **Synchronizer rings must be aligned with synchronizer hub and first gear during installation. Failure to follow these instructions will result in damage to the synchronizer rings.**

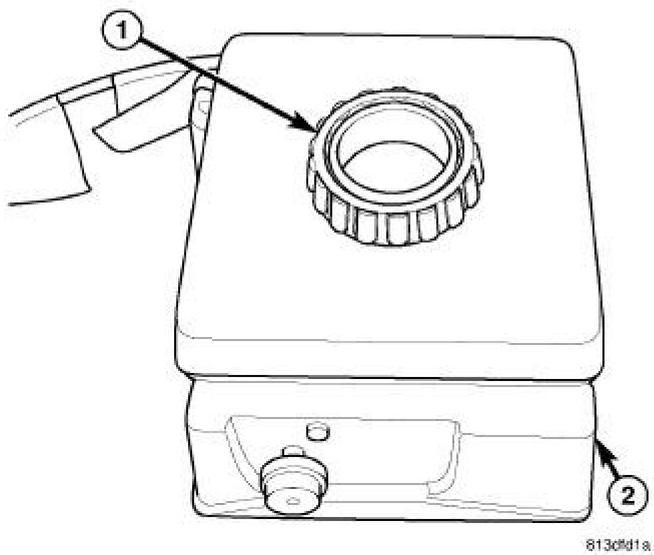


Fig. 165: Identifying Bearing Heater And Bearing
Courtesy of CHRYSLER GROUP, LLC

WARNING: **Use tongs or welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.**

CAUTION: Bearings (1) are installed using a Bearing Heater (2). Use only a bearing heater/hot plate and follow manufacture's instructions. Heat components to 100 - 149 Celsius (212Ā° Min. - 300Ā° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.

21. Heat the mainshaft case bearing to 100Ā° - 149Ā° C (212Ā° - 300Ā°F) and install on the mainshaft with tongs or welding gloves.

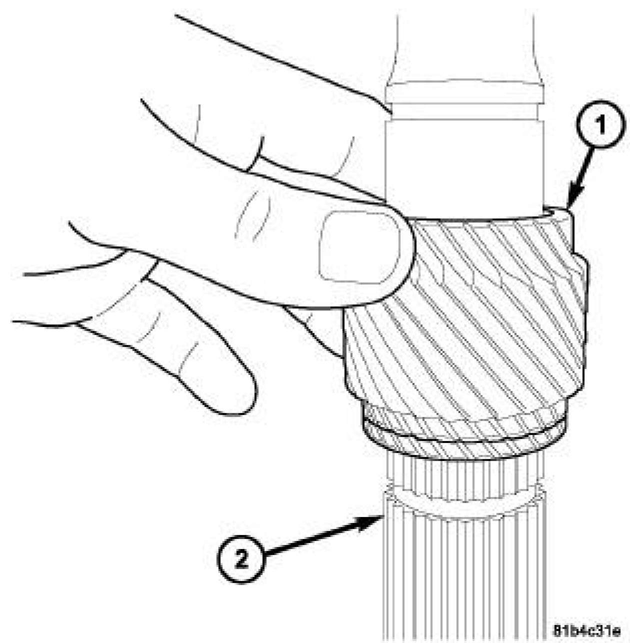


Fig. 166: Sixth Gear Mainshaft
Courtesy of CHRYSLER GROUP, LLC

22. Position sixth gear (1) on the mainshaft (2).
23. Install sixth gear on the mainshaft with Installer (special tool #9391, Installer, Gear) and Coupler (special tool #9391-2, Adapter, Coupling).

TRANSMISSION HOUSING

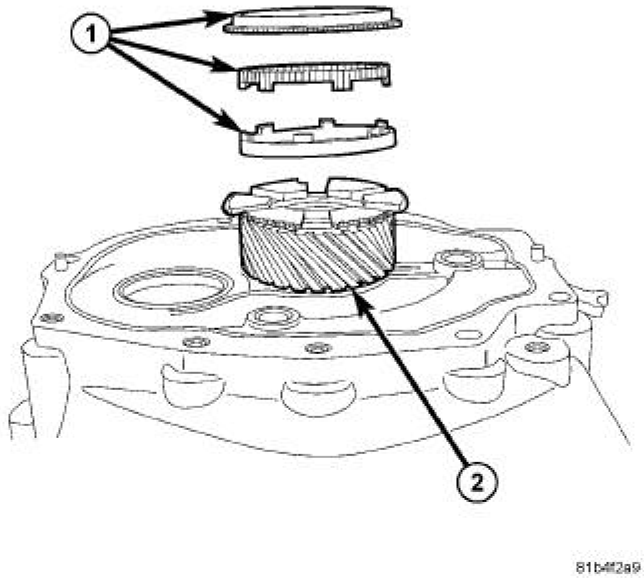


Fig. 167: Input Shaft Synchro Rings
Courtesy of CHRYSLER GROUP, LLC

1. Install the input shaft (2) into the transmission adapter plate. Install the fourth gear synchronizer rings (1) on the fourth gear.

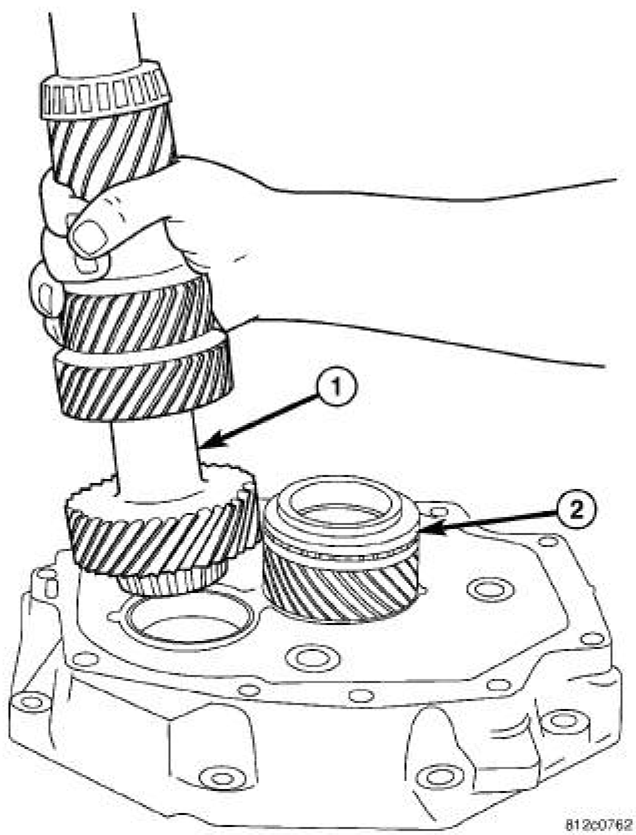
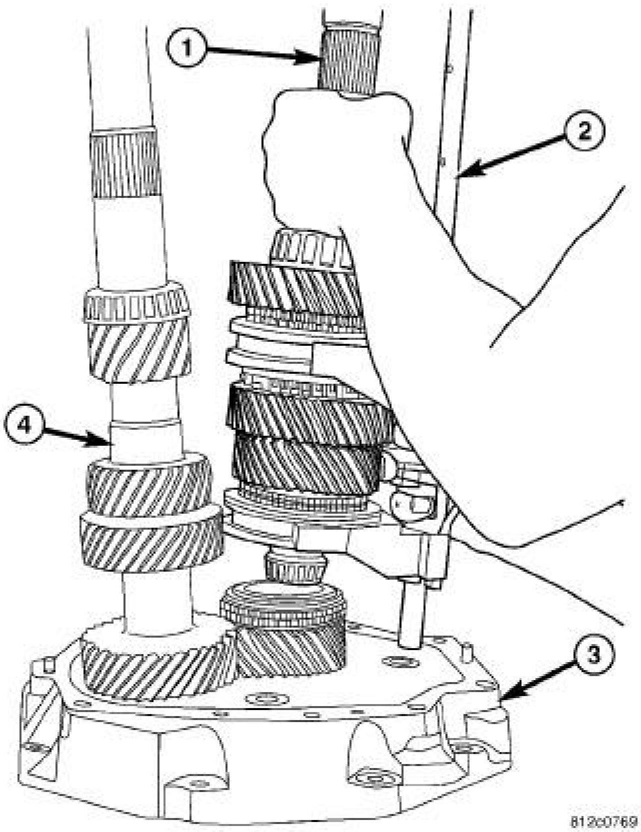


Fig. 168: Removing/Installing Countershaft

Courtesy of CHRYSLER GROUP, LLC

2. Install the countershaft (1) assembly into the transmission adapter.



[**Fig. 169: Tilting Mainshaft & Shift Rail**]
Courtesy of CHRYSLER GROUP, LLC

3. Tilt the countershaft (4) sideways then install the mainshaft (1) and shift rail (2) assemblies into the transmission adapter (3).

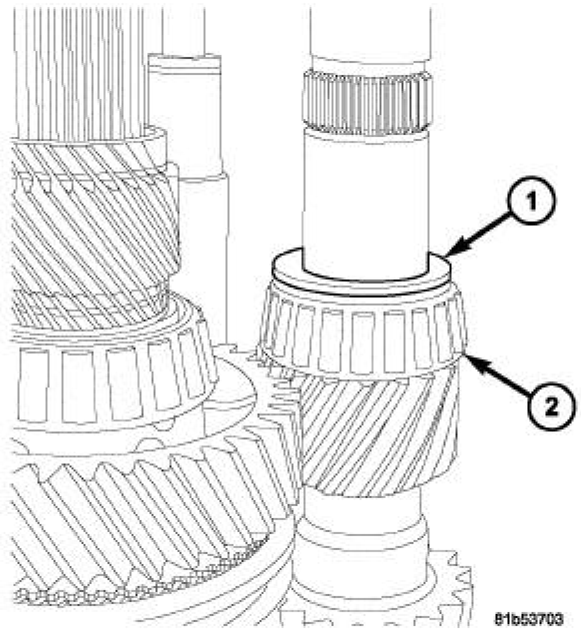


Fig. 170: Countershaft Washer
Courtesy of CHRYSLER GROUP, LLC

4. Install the countershaft thrust washer (1) on the countershaft (2).

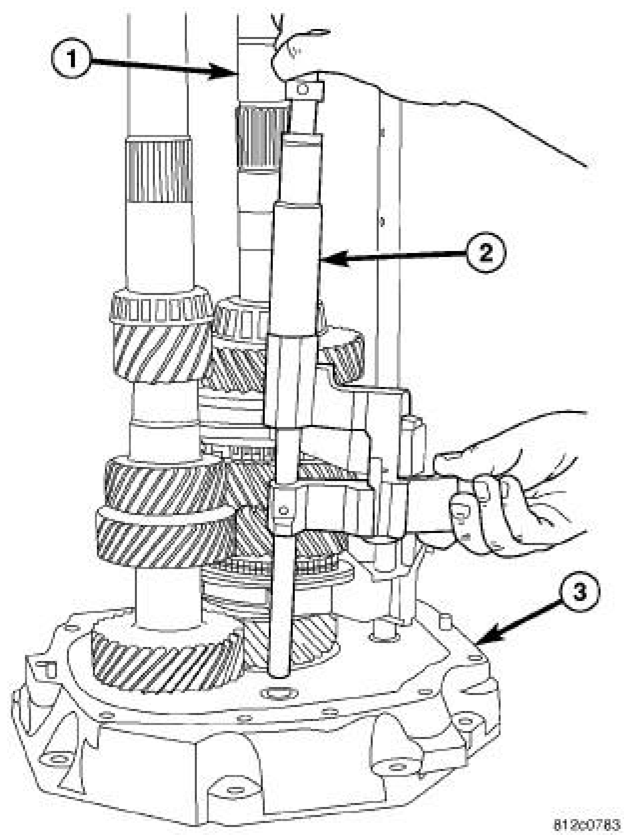
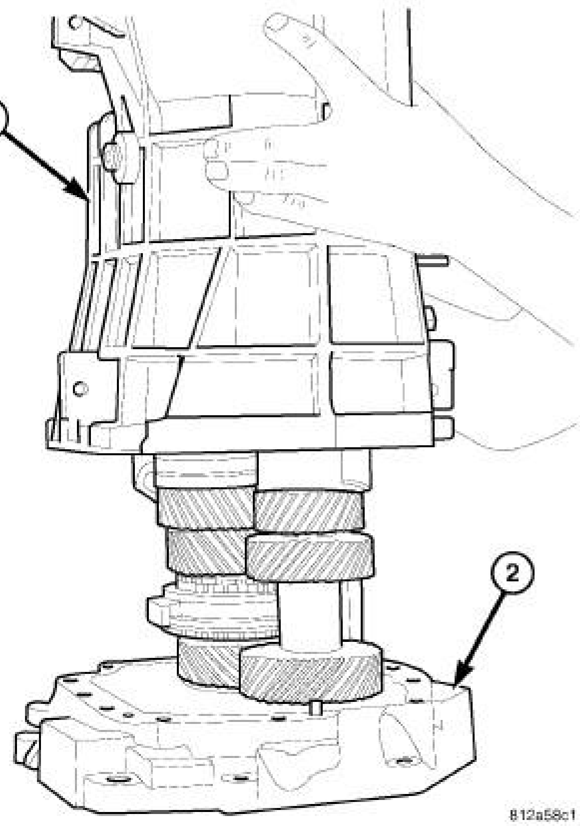


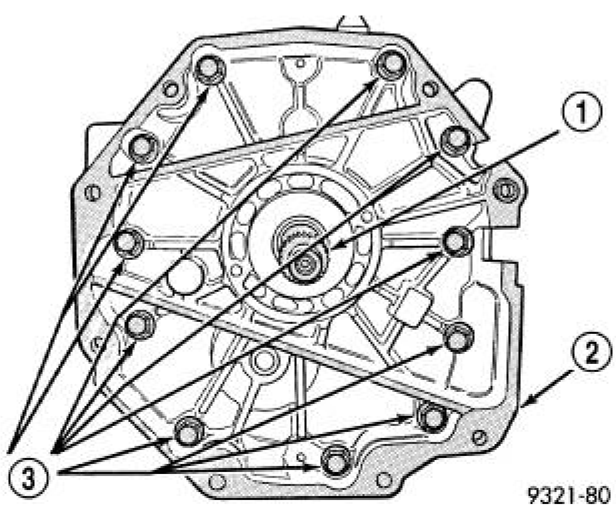
Fig. 171: Removing/Installing Reverse Shaft Rail Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Install the reverse rail assembly (2) into the transmission adapter (3).



[Fig. 172: Transmission Case]
Courtesy of CHRYSLER GROUP, LLC

6. Apply Mopar Ā® ATF-RTV to the transmission adapter (2) sealing surface.
7. Install the transmission case (1) onto the gear set until the shift rail passes through the case bushing. Then install the skip shift lever on the shift rail and seat the transmission case on the adapter (2).



[Fig. 173: Adapter Bolts Location]
Courtesy of CHRYSLER GROUP, LLC

8. Install the transmission adapter (2) bolts (3) and tighten to the proper **SPECIFICATIONS** .

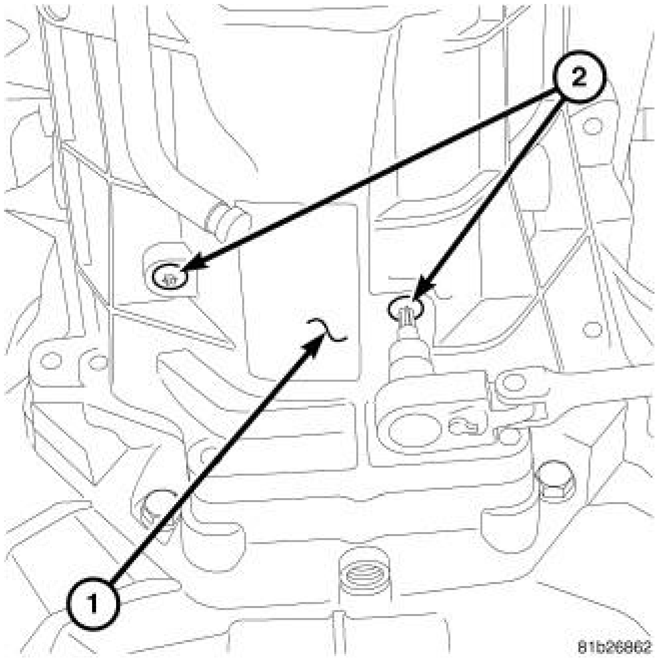


Fig. 174: Torx Screws
Courtesy of CHRYSLER GROUP, LLC

9. Apply Mopar Ā® Lock and Seal Adhesive to the shift lever guide bolts. Install the guide bolts (2) in the transmission case (1) and tighten to the proper **SPECIFICATIONS** .

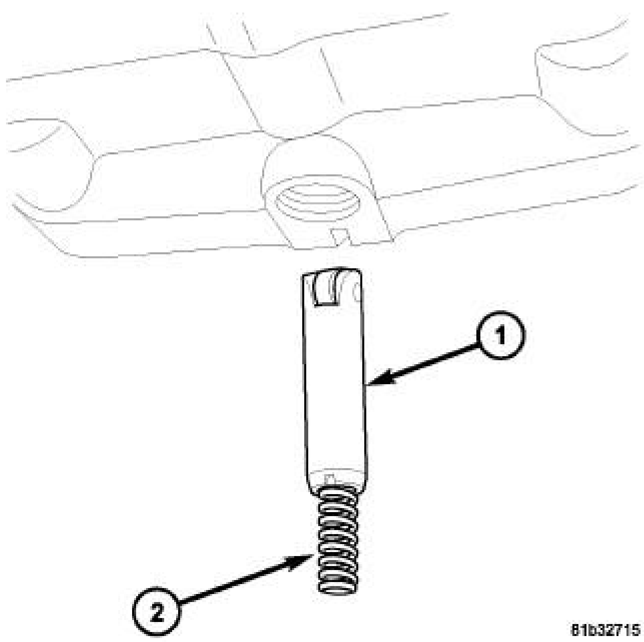


Fig. 175: Detent & Spring
Courtesy of CHRYSLER GROUP, LLC

10. Install the roller detent (1) and spring (2) into the transmission adapter.

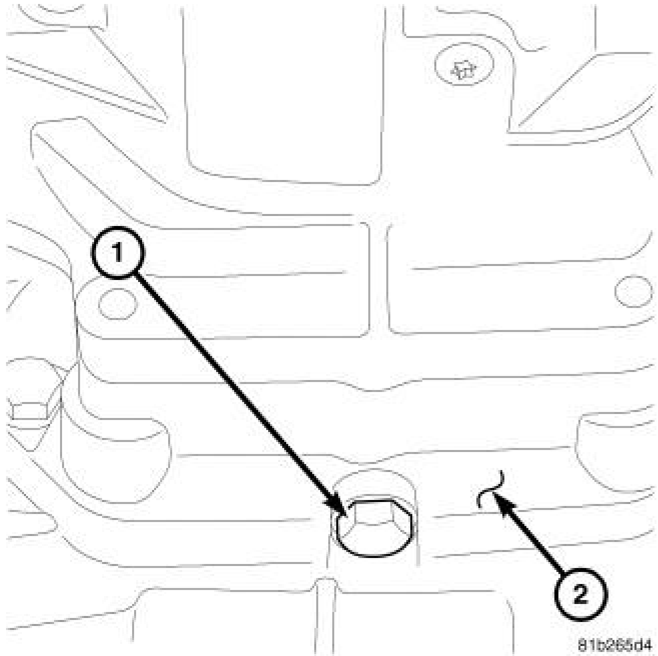


Fig. 176: Roller Detent Bolt & Transmission Adapter
Courtesy of CHRYSLER GROUP, LLC

11. Apply Mopar Ā® Lock and Seal to the roller detent bolt threads. Install the bolt (1) into the transmission adapter (2) and tighten to the proper SPECIFICATIONS .

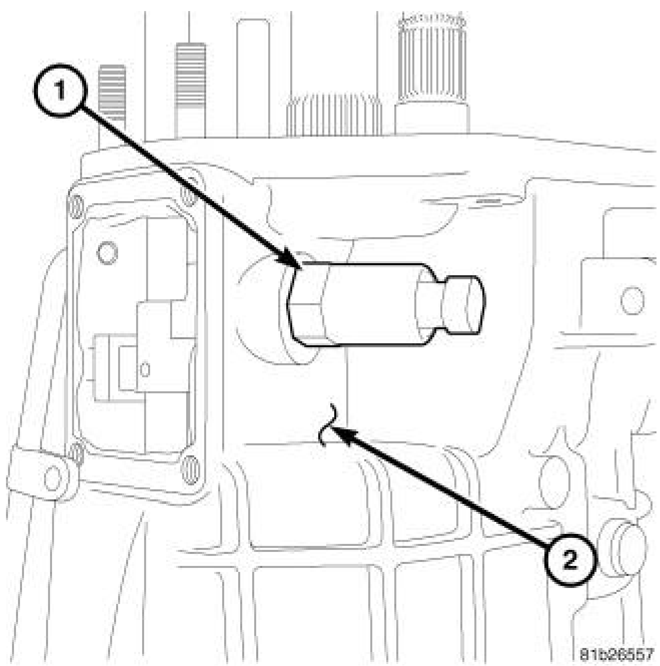


Fig. 177: Skip Shift Solenoid & Left Side Of Case
Courtesy of CHRYSLER GROUP, LLC

12. Install the skip shift solenoid (1) into the side of the case (2) and tighten to the proper SPECIFICATIONS .

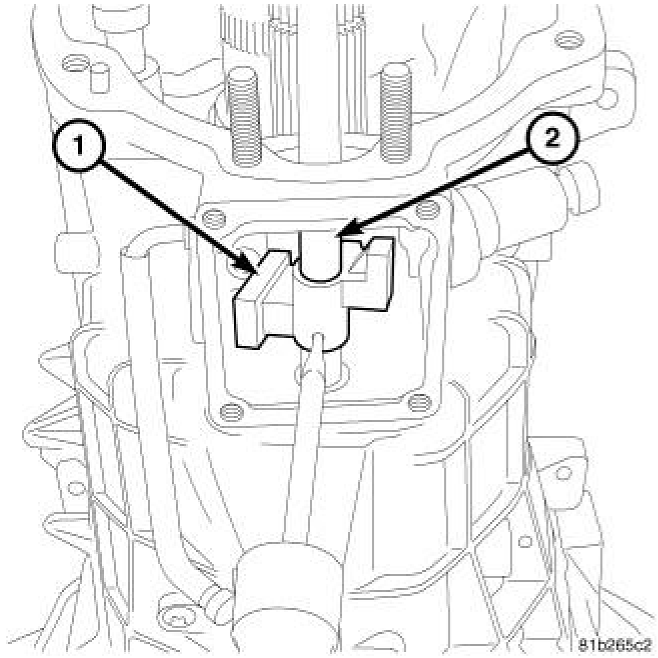


Fig. 178: Skip Shift Lever & Shift Rail
Courtesy of CHRYSLER GROUP, LLC

13. Install the skip shift lever (1) roll pin (2) with a hammer and punch.

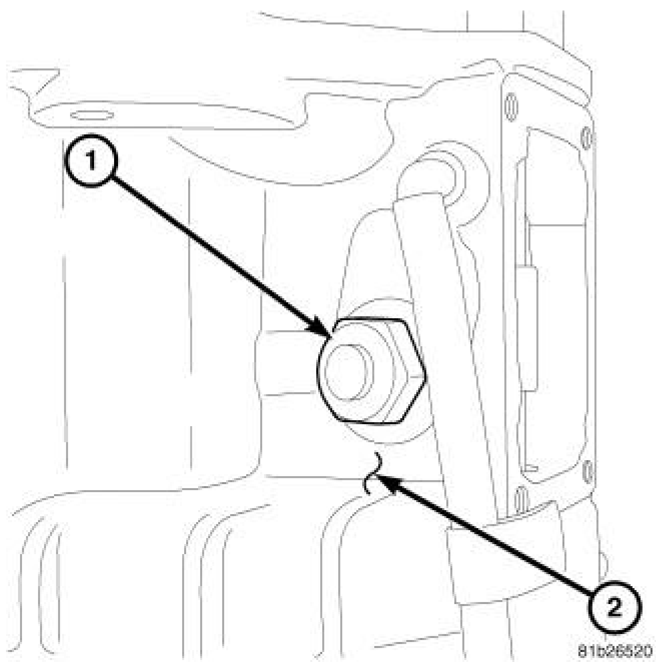


Fig. 179: Shift Detent & Right Side Of Case
Courtesy of CHRYSLER GROUP, LLC

14. Install the side shift detent (1) into the case (2) and tighten to the proper **SPECIFICATIONS** .

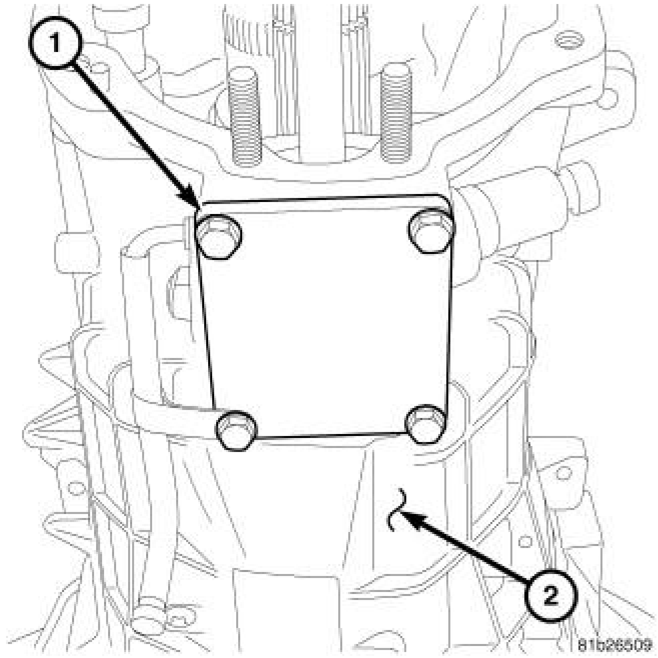


Fig. 180: Top Cover, Bolts & Transmission Case
Courtesy of CHRYSLER GROUP, LLC

15. Apply Mopar Ā® ATF-RTV to the top cover sealing surface.
16. Install the top cover (1) on the case (2) and tighten the bolts to the proper **SPECIFICATIONS** .

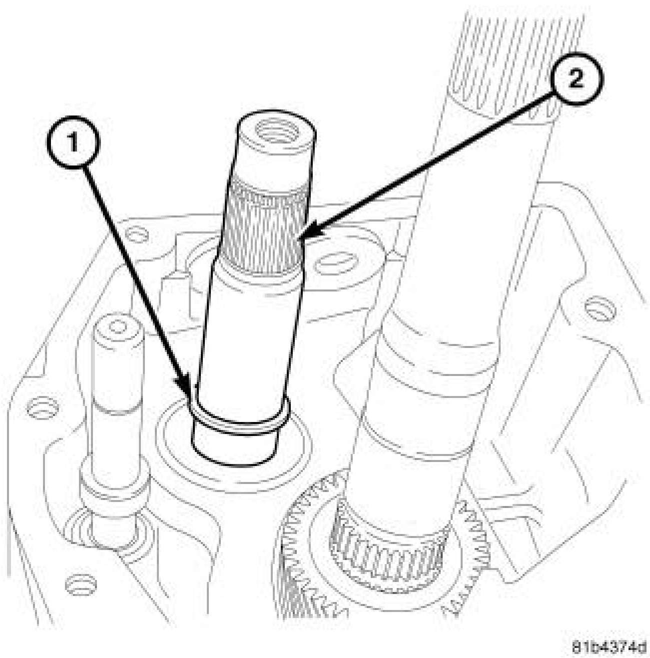


Fig. 181: 6th Gear Bearing Spacer & Countershaft
Courtesy of CHRYSLER GROUP, LLC

17. Install the sixth gear bearing spacer (1) on the countershaft (2).

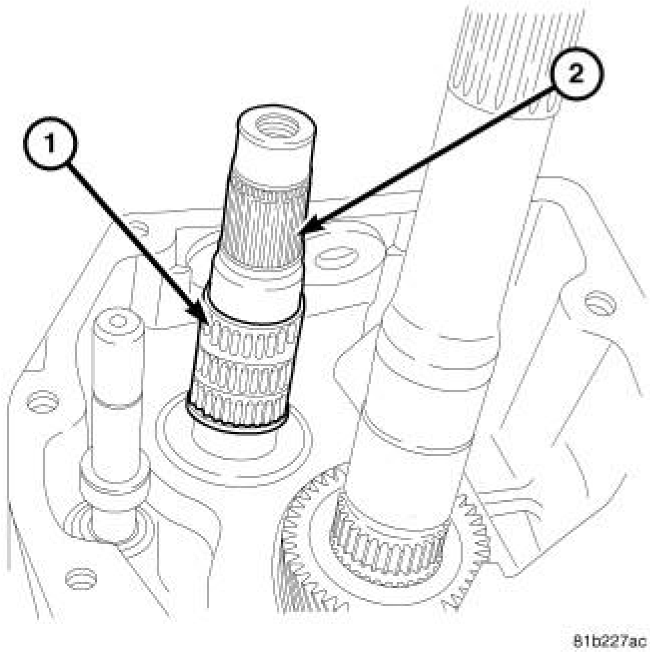


Fig. 182: 6th Gear Bearing & Countershaft
Courtesy of CHRYSLER GROUP, LLC

18. Install the sixth gear bearing (1) on the countershaft (2).

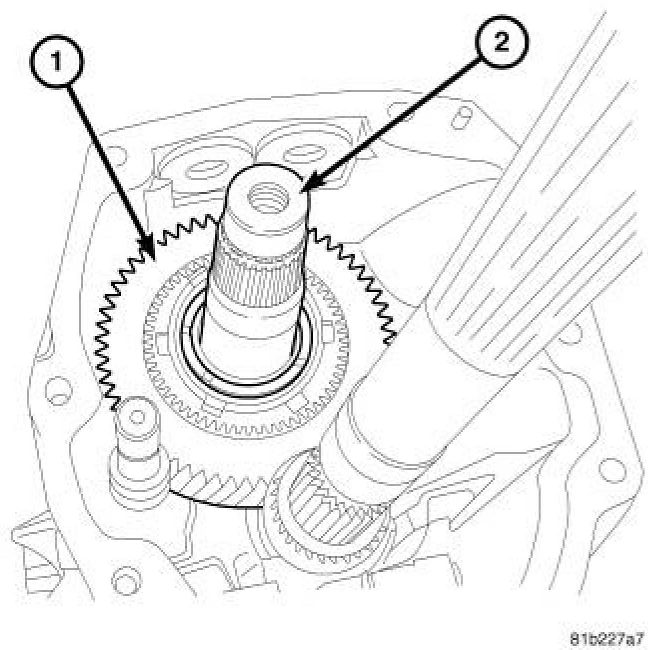


Fig. 183: 6th Gear & Countershaft
Courtesy of CHRYSLER GROUP, LLC

19. Install sixth gear (1) on the countershaft (2).

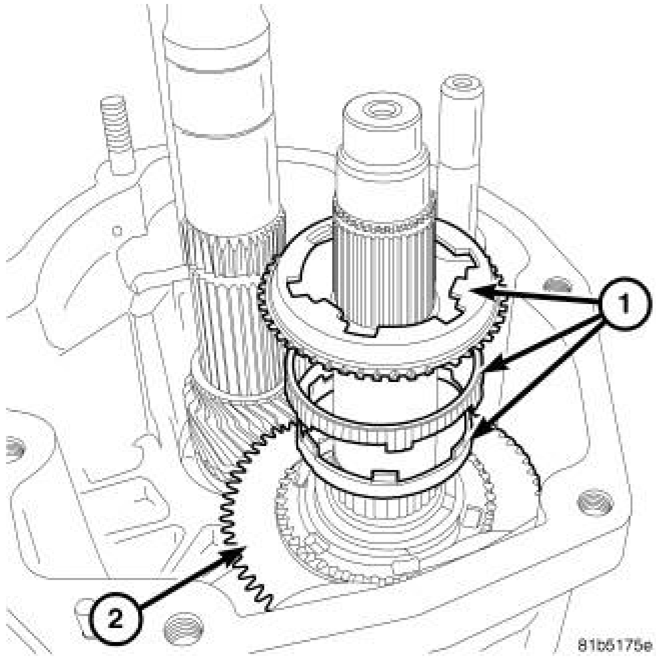


Fig. 184: 6th Synchro Rings
Courtesy of CHRYSLER GROUP, LLC

20. Install the sixth gear synchronizer rings (1) on the countershaft sixth gear (2).

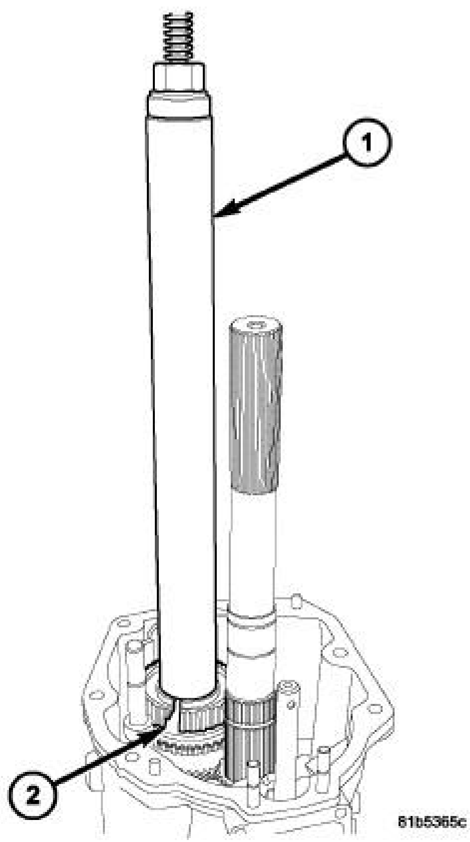


Fig. 185: 5-6 Hub Installer
Courtesy of CHRYSLER GROUP, LLC

21. Install the fifth and sixth gear synchronizer hub (2) on the countershaft with Installer (special tool #9391, Installer, Gear) (1).

CAUTION: Synchronizer rings must be aligned with synchronizer hub and sixth gear during installation. Failure to follow these instructions will result in damage to the synchronizer rings.

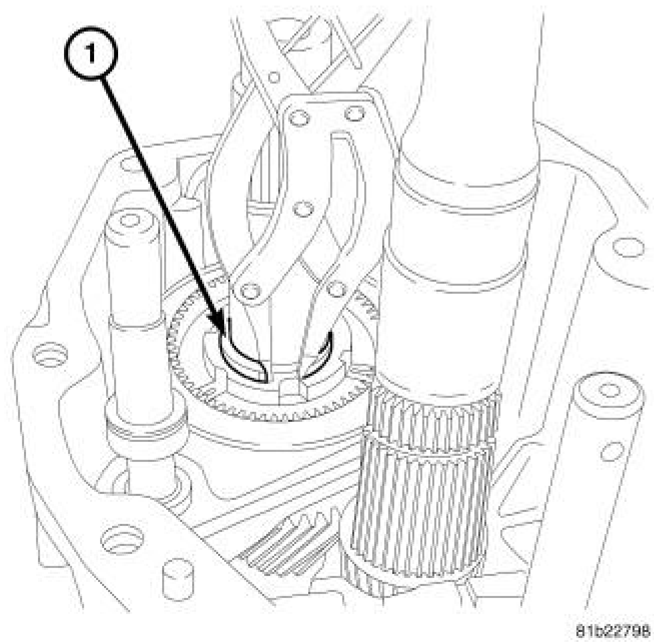


Fig. 186: 5-6 Hub Snap Ring
Courtesy of CHRYSLER GROUP, LLC

22. Install the fifth and sixth gear synchronizer hub (1) snap ring (2).

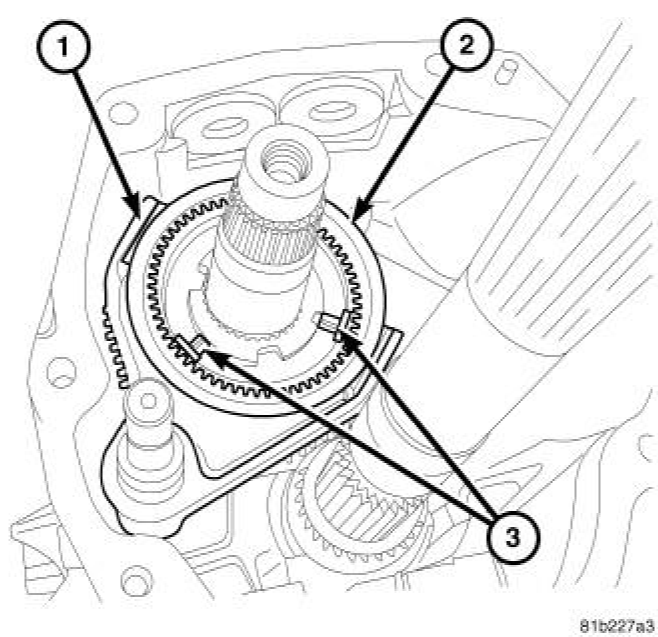


Fig. 187: 5-6 Fork & Sleeve
Courtesy of CHRYSLER GROUP, LLC

23. Install the fifth and sixth gear synchronizer shift fork (1) synchronizer sleeve (2) and the hub detents (3).

NOTE: **The fifth and sixth gear synchronizer detents and the reverse synchronizer detents are the same.**

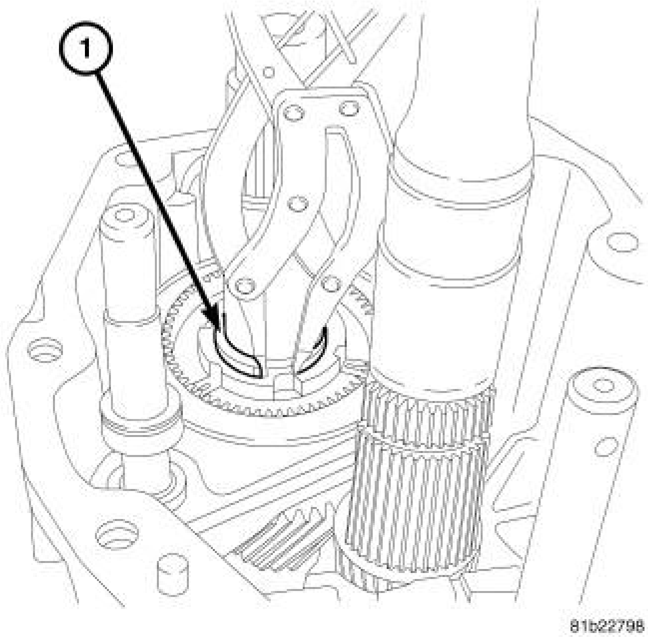


Fig. 188: 5-6 Hub Snap Ring
Courtesy of CHRYSLER GROUP, LLC

24. Install the fifth and sixth gear synchronizer hub snap ring (1).
25. Install a **NEW** fifth and sixth gear gear shift fork snap ring.

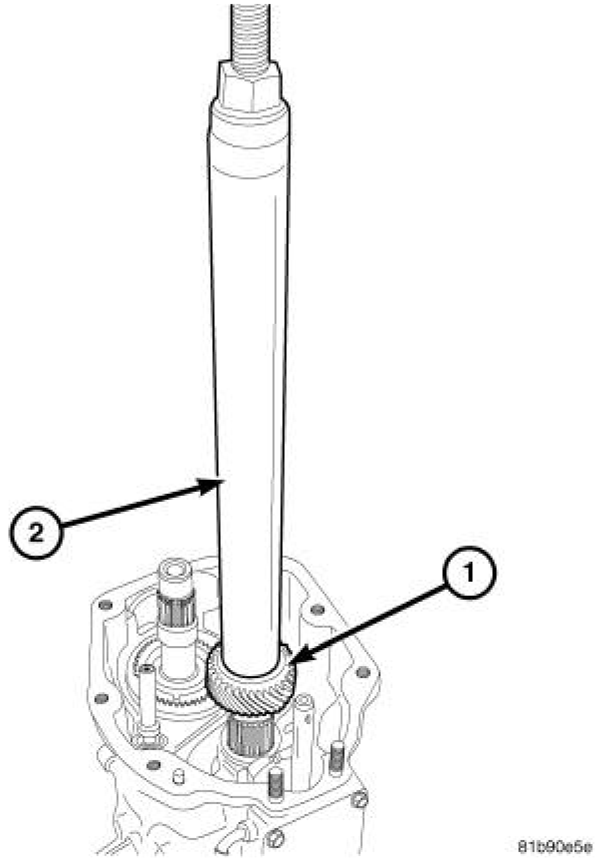


Fig. 189: 5th Gear Mainshaft
Courtesy of CHRYSLER GROUP, LLC

26. Install fifth gear (1) on the mainshaft with Installer (special tool #9391, Installer, Gear) (2) and Coupler (special tool #9391-2, Adapter, Coupling).

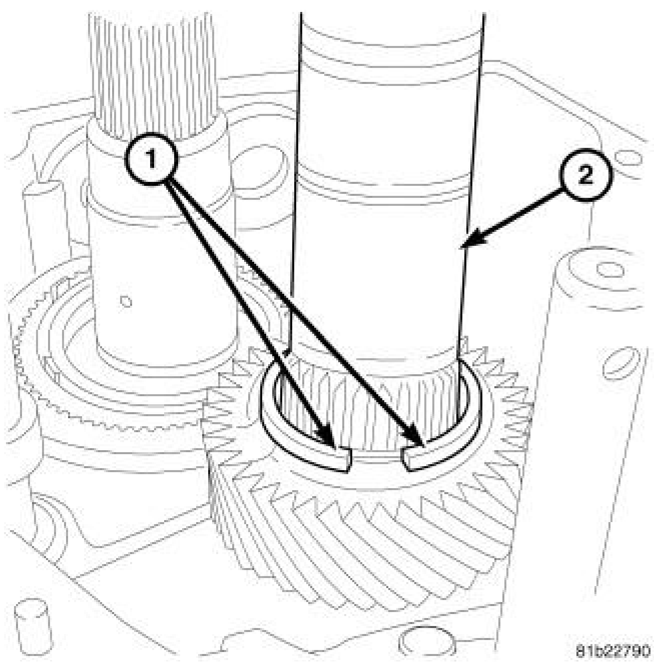


Fig. 190: 5th Gear Split Rings & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

27. Install the fifth gear split rings (1) on the mainshaft (2).

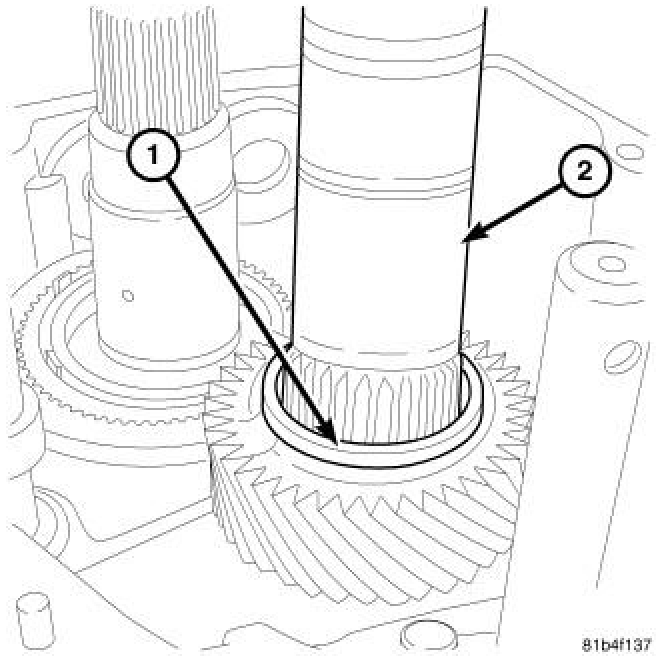


Fig. 191: 5th Gear Retainer Ring & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

28. Install the fifth gear split ring retainer (1) on the mainshaft (2).

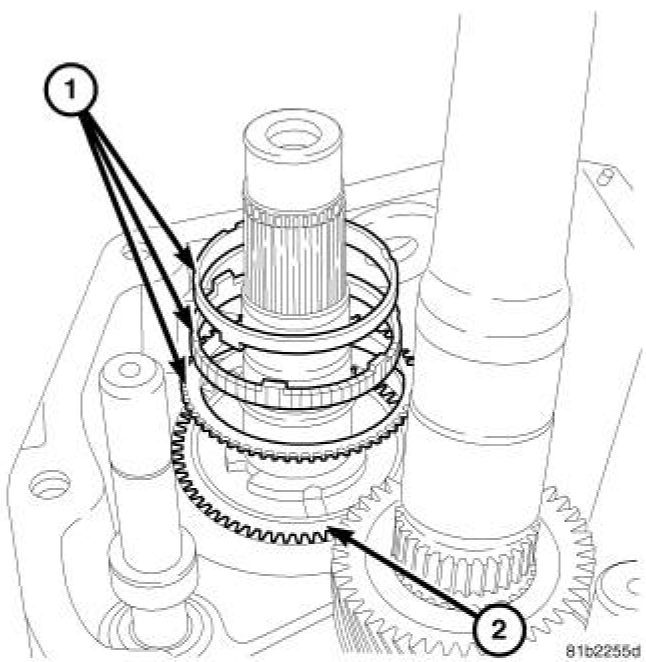


Fig. 192: Fifth Gear Synchro Rings & 5-6 Synchronizer Hub
Courtesy of CHRYSLER GROUP, LLC

29. Install the fifth gear synchronizer rings (1) on the fifth and sixth gear synchronizer hub (2).

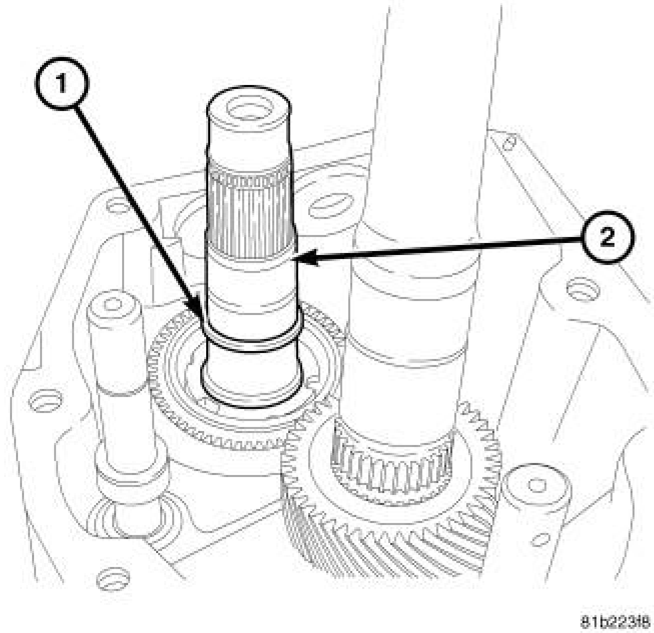


Fig. 193: 5th Gear Bearing Spacer & Countershaft
Courtesy of CHRYSLER GROUP, LLC

30. Install the fifth gear bearing spacer (1) on the countershaft (2).

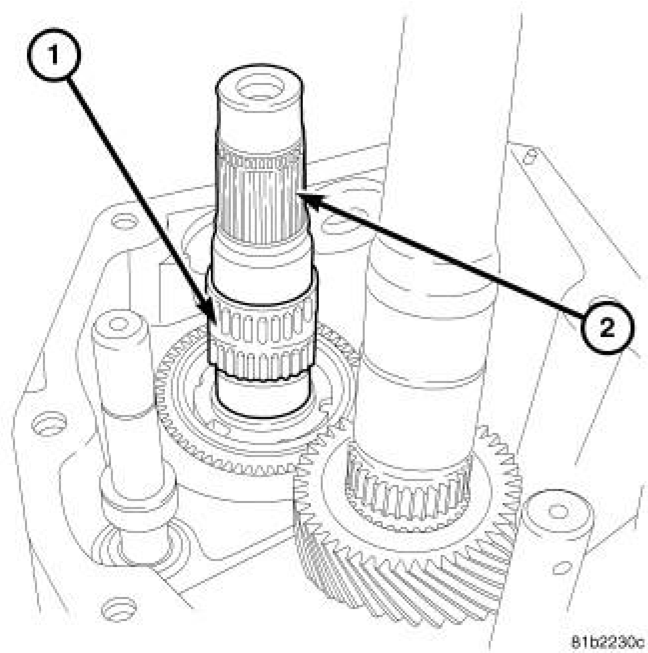


Fig. 194: 5th Gear Bearing & Countershaft
Courtesy of CHRYSLER GROUP, LLC

31. Install the fifth gear bearing (1) on the countershaft (2).

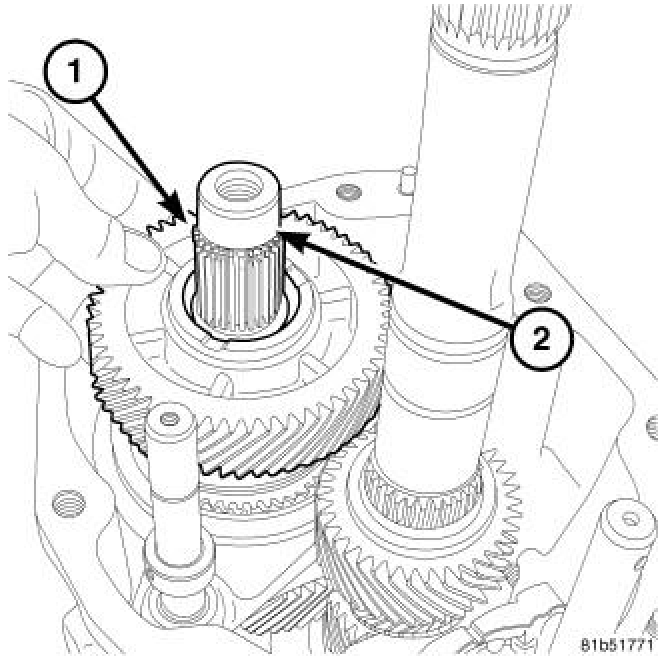


Fig. 195: 5th Gear & Countershaft
Courtesy of CHRYSLER GROUP, LLC

32. Install fifth gear (1) on the countershaft (2).

CAUTION: Synchronizer rings must be aligned with synchronizer hub and fifth gear during installation. Failure to follow these instructions will result in damage to the synchronizer rings.

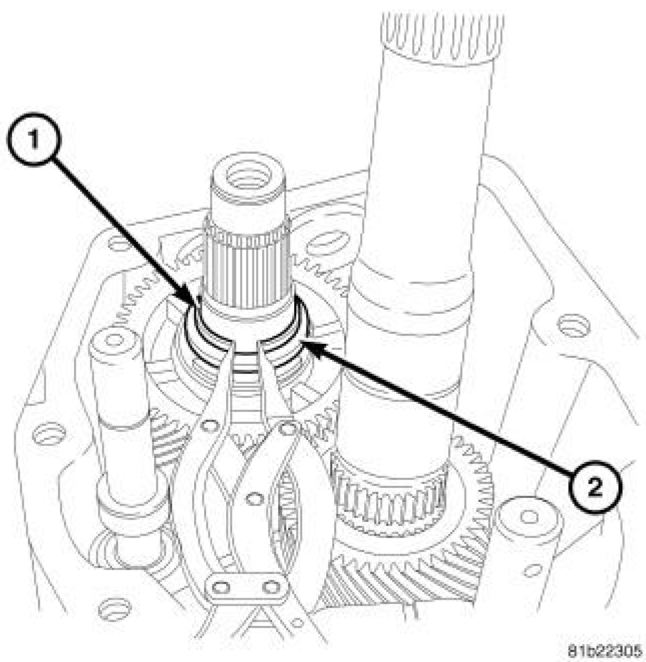


Fig. 196: 5th Gear Snap Ring & Countershaft
Courtesy of CHRYSLER GROUP, LLC

33. Install the fifth gear thrust washer (2) and snap ring (1) on the countershaft.

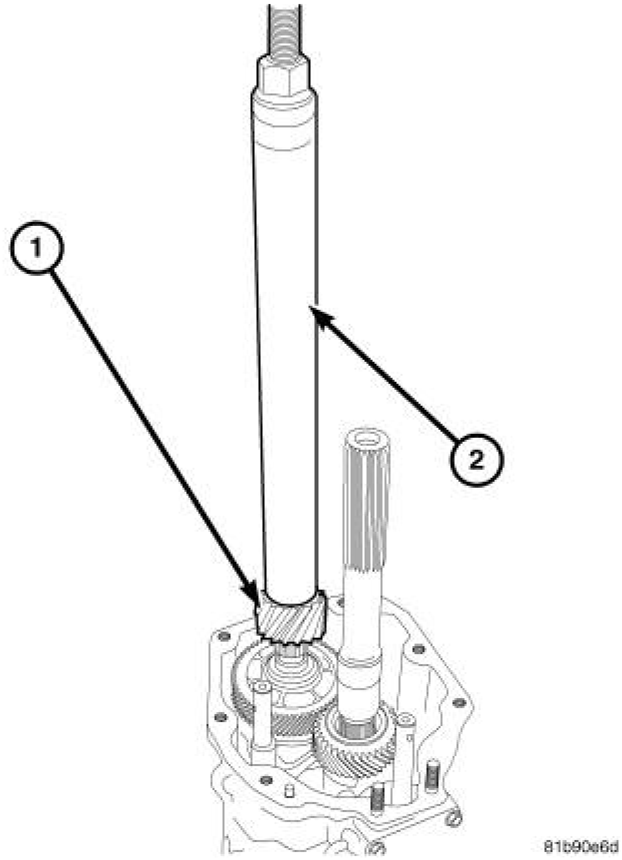


Fig. 197: Reverse Gear Countershaft
Courtesy of CHRYSLER GROUP, LLC

34. Install reverse gear (1) on the countershaft with Installer (special tool #9391, Installer, Gear) (2).

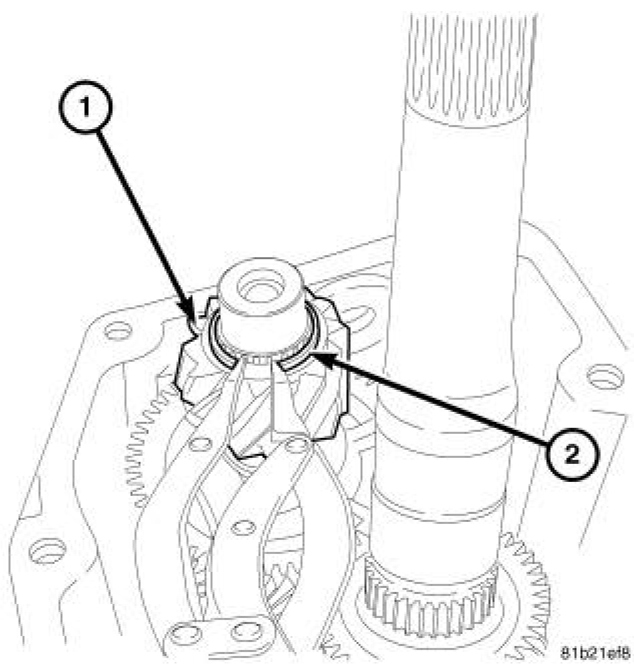


Fig. 198: Reverse Countershaft Snap Ring
Courtesy of CHRYSLER GROUP, LLC

35. Install the reverse gear (1) snap ring (2) on the countershaft.

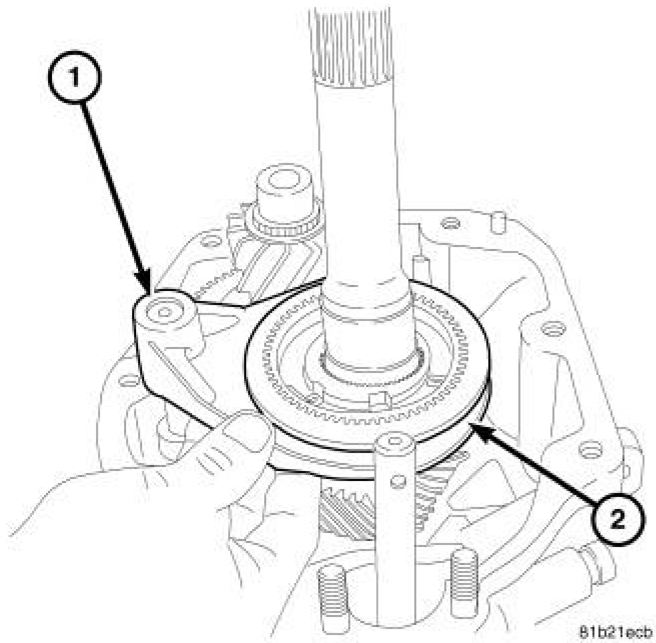


Fig. 199: Reverse Hub & Fork
Courtesy of CHRYSLER GROUP, LLC

36. Install the reverse gear shift fork (1), synchronizer hub with detents (2) and sleeve.

NOTE: **The fifth and sixth gear and the reverse gear synchronizer detents are the same.**

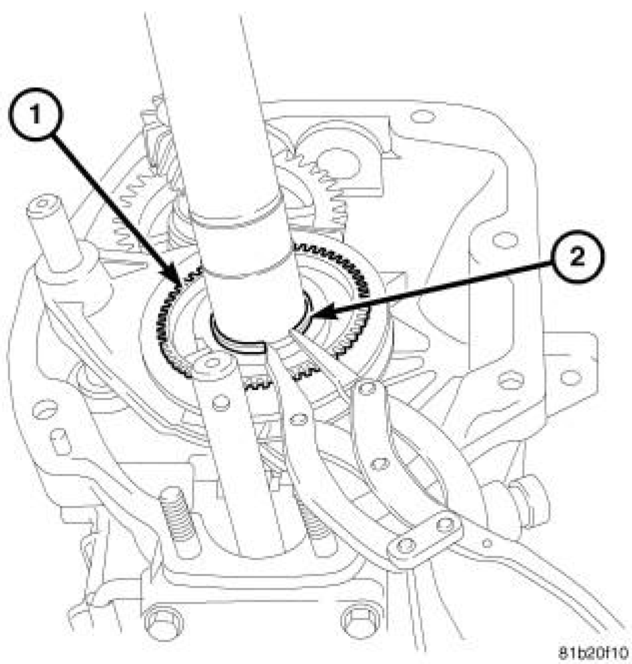


Fig. 200: Reverse Synchronizer Snap Ring
Courtesy of CHRYSLER GROUP, LLC

37. Install the reverse gear synchronizer hub (1) snap ring (2).

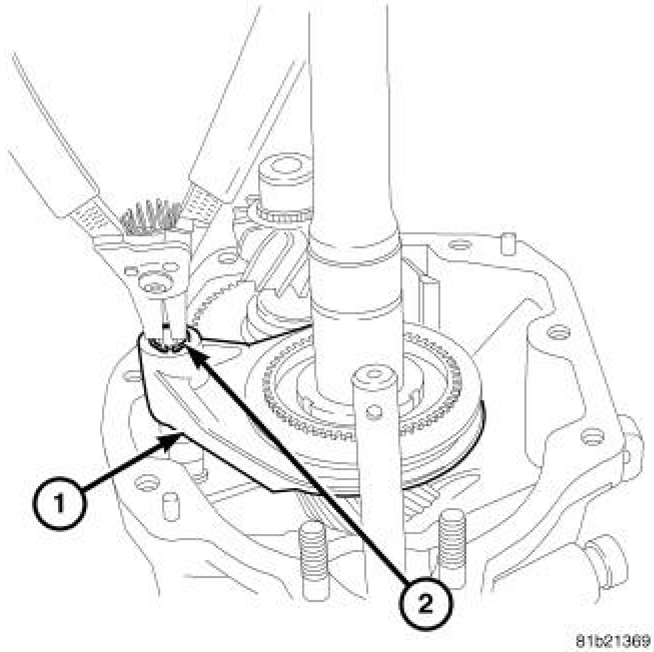


Fig. 201: Reverse Fork Snap Ring
Courtesy of CHRYSLER GROUP, LLC

38. Install a **NEW** reverse gear shift fork (1) snap ring (2).

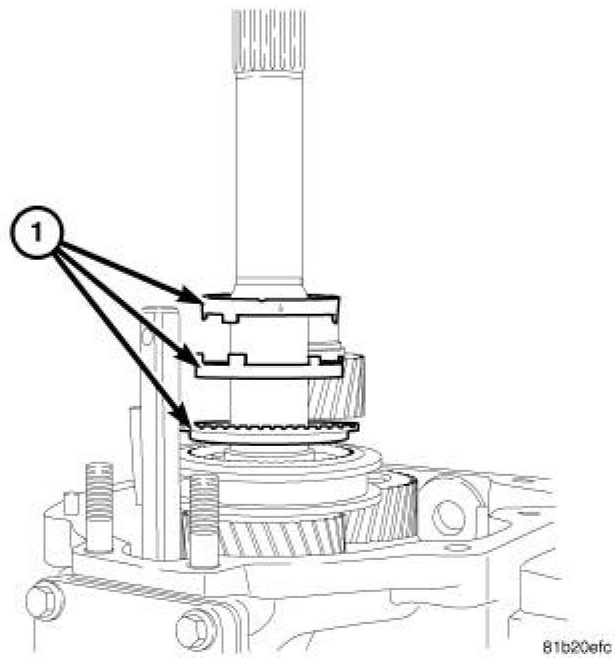


Fig. 202: Reverse Synchronizer Rings
Courtesy of CHRYSLER GROUP, LLC

39. Install the reverse gear synchronizer rings (1) on the reverse gear synchronizer hub.

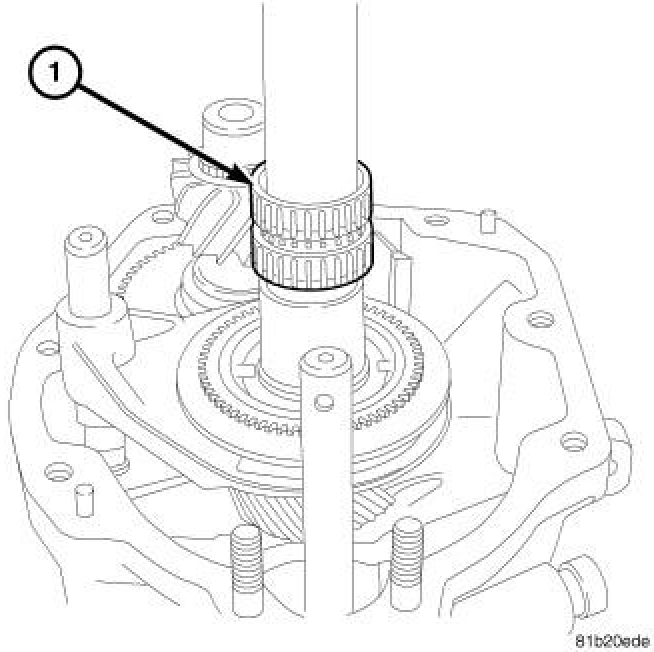


Fig. 203: Reverse Gear Bearing
Courtesy of CHRYSLER GROUP, LLC

40. Install the reverse gear bearing (1) on the mainshaft.

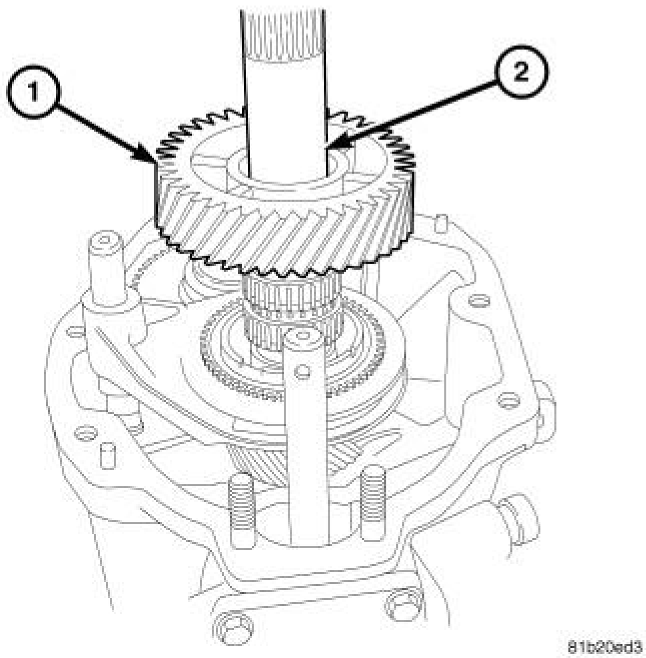


Fig. 204: Reverse Gear & Mainshaft
Courtesy of CHRYSLER GROUP, LLC

41. Install reverse gear (1) on the mainshaft (2).

CAUTION: Synchronizer rings must be aligned with synchronizer hub and reverse gear during installation. Failure to follow these instructions will result in damage to the synchronizer rings.

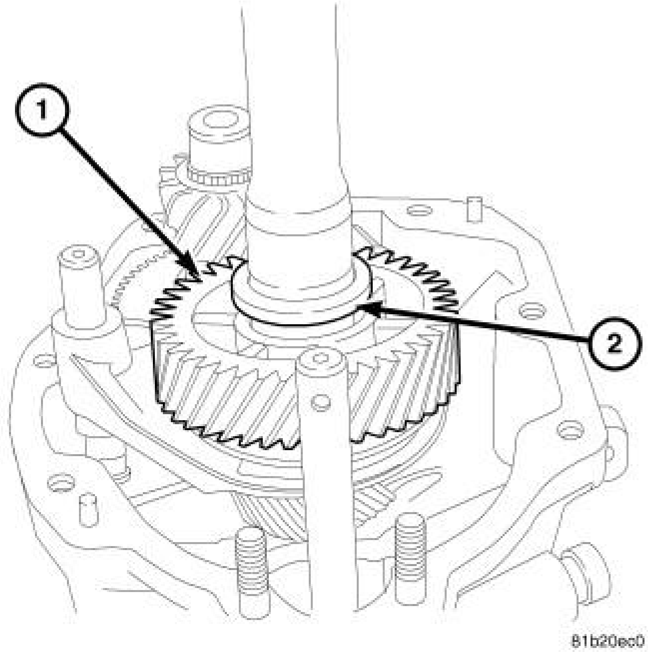


Fig. 205: Reverse Gear Thrust Washer
Courtesy of CHRYSLER GROUP, LLC

42. Install the reverse gear (1) thrust washer (2) on the mainshaft.

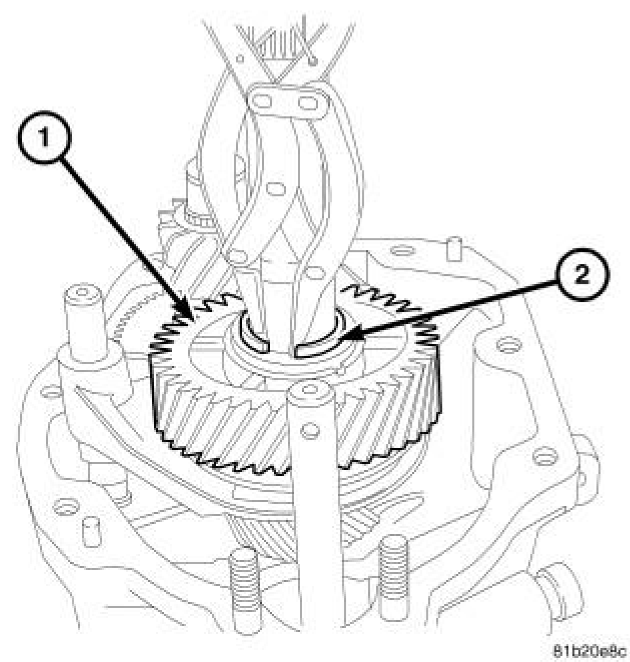


Fig. 206: Reverse Gear Snap Ring
Courtesy of CHRYSLER GROUP, LLC

43. Install the reverse gear (1) snap ring (2) on the mainshaft.

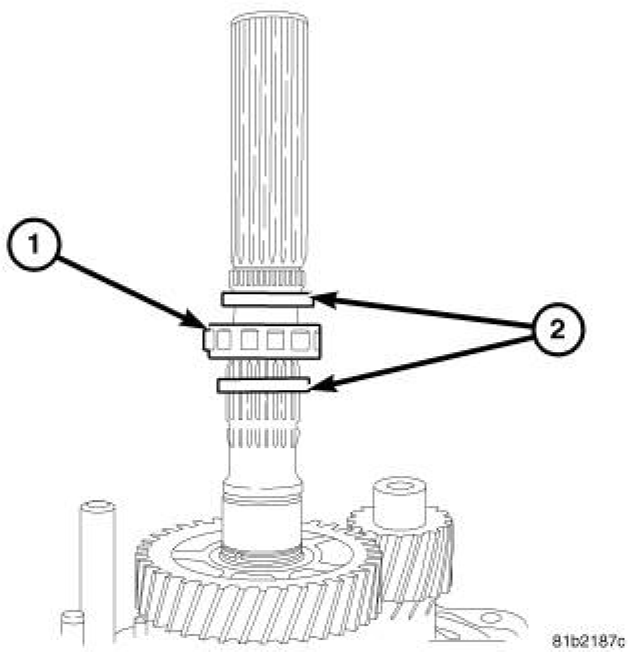


Fig. 207: Roller Bearing & Spacers
Courtesy of CHRYSLER GROUP, LLC

44. Install the mainshaft roller bearing (1) and spacers (2) on the mainshaft.

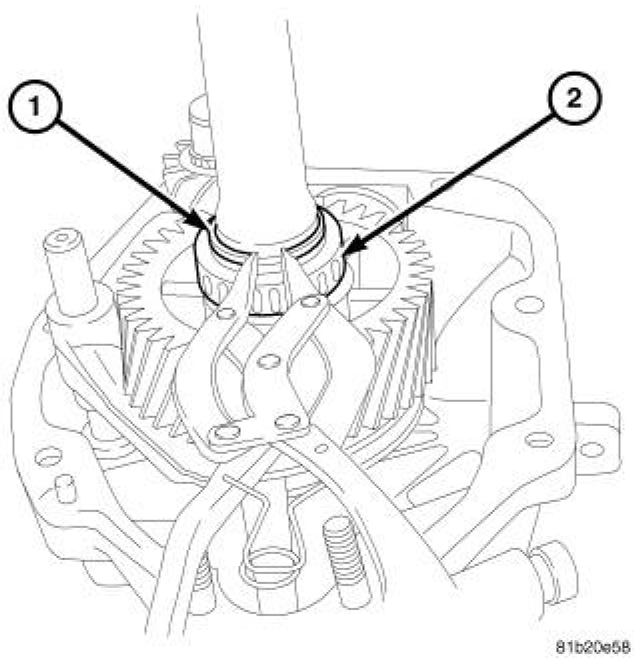


Fig. 208: Roller Bearing Snap-Ring
Courtesy of CHRYSLER GROUP, LLC

45. Install the mainshaft roller bearing (2) snap ring (1).

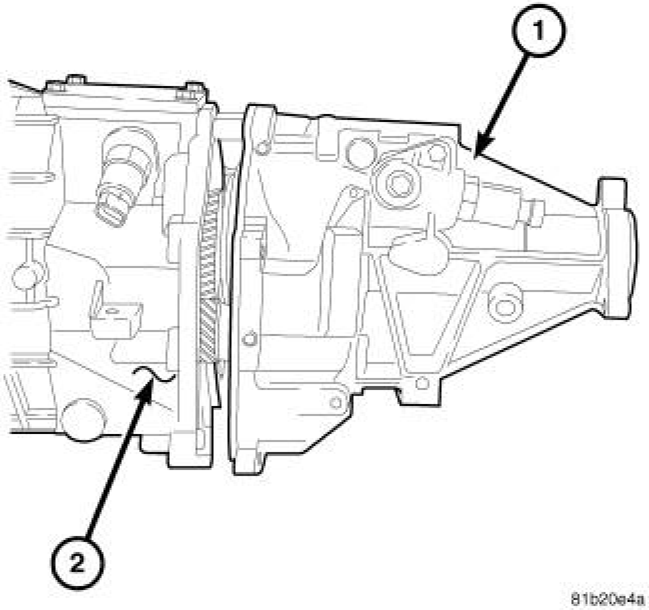


Fig. 209: Removing/Installing Extension Housing
Courtesy of CHRYSLER GROUP, LLC

46. If equipped, apply Mopar Ā® ATF-RTV to the extension housing sealing surface.

    If equipped with a gasket, install a **NEW** gasket.

47. Install the extension housing (1) on the transmission case (2).

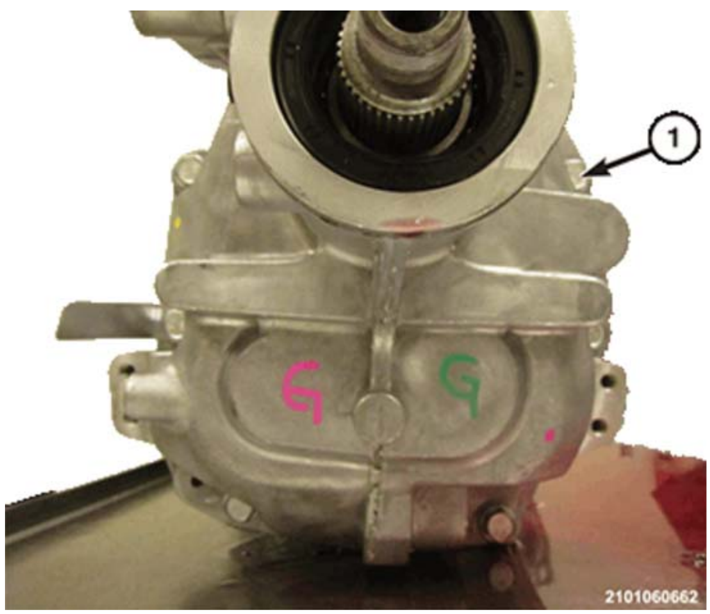


Fig. 210: Extension Housing Bolts
Courtesy of CHRYSLER GROUP, LLC

48. Install the extension housing bolts (1) and tighten to the proper **SPECIFICATIONS** .

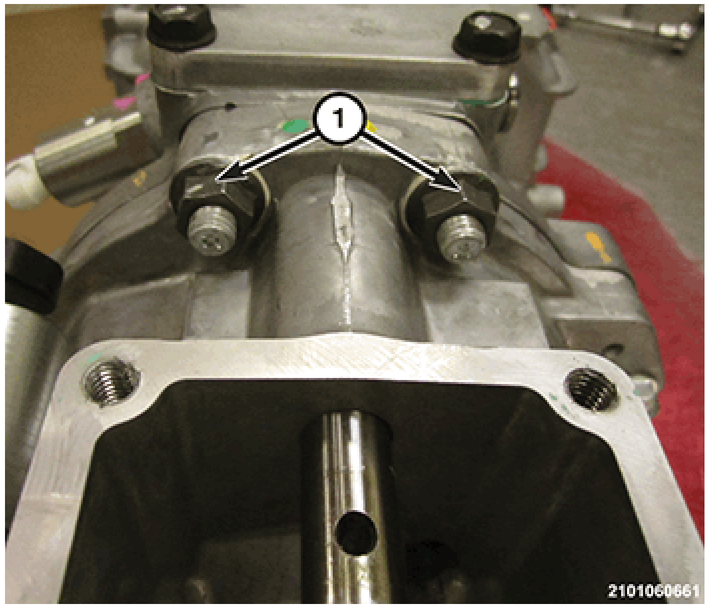


Fig. 211: Extension Housing Nuts
Courtesy of CHRYSLER GROUP, LLC

49. Install the extension housing nuts (1) and tighten to the proper **SPECIFICATIONS** .

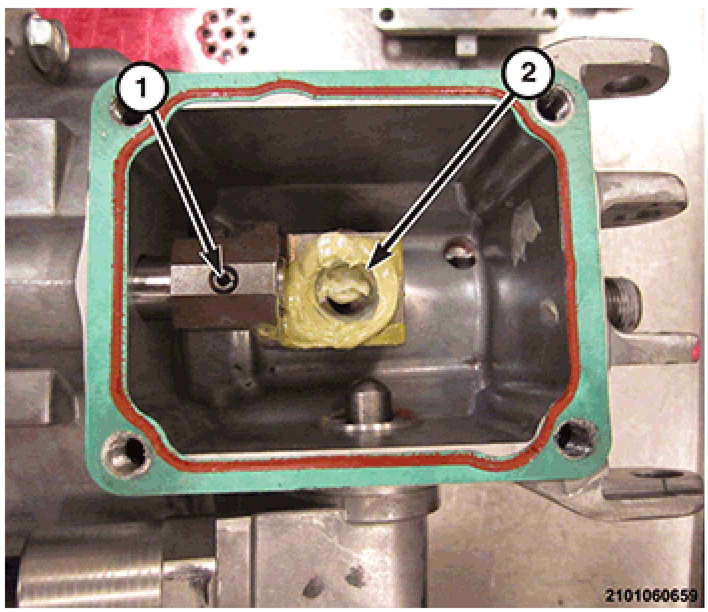


Fig. 212: Offset Lever & Roll Pin
Courtesy of CHRYSLER GROUP, LLC

50. Install the offset lever (2) and the offset lever roll pin (1) with a hammer and punch.

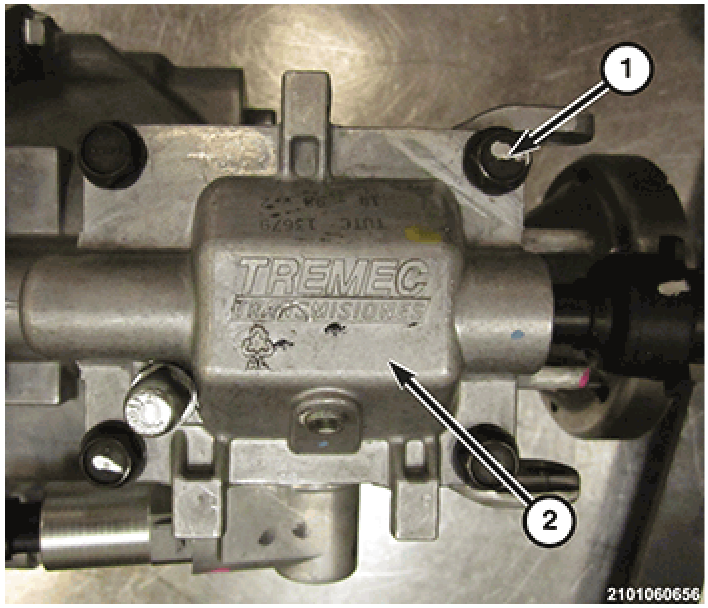


Fig. 213: Shift Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

51. For transmissions equipped with RTV use, Mopar Ā® ATF-RTV to the shift cover sealing surface.

    For transmissions equipped with a gasket, install a **NEW** gasket.

52. Install shift cover (2) bolts (1) and tighten to the proper **SPECIFICATIONS** .

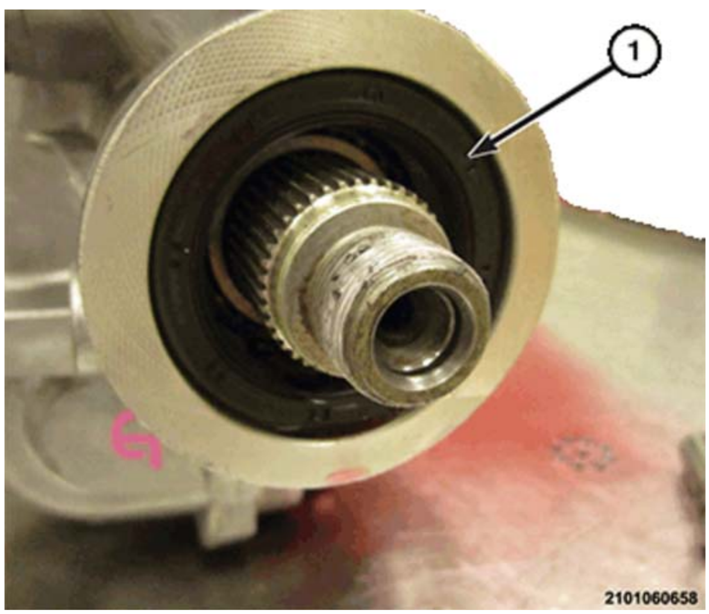


Fig. 214: Extension Housing Seal
Courtesy of CHRYSLER GROUP, LLC

53. Install the extension housing seal (1) in the extension housing with installer (special tool #7884, Installer, Seal) (2).

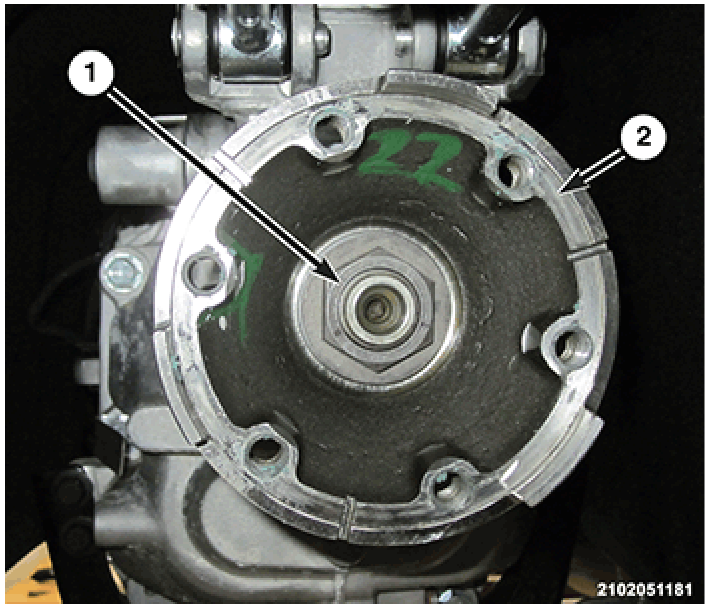


Fig. 215: Output Flange & Locknut
Courtesy of CHRYSLER GROUP, LLC

54. Install the output flange (2) to the transmission output shaft.
55. Hold the output flange (2) with Special Tool (special tool #C-3281, Holder, Flange) (2) Flange Wrench and tighten the output flange locknut (1) to the proper **SPECIFICATIONS** .

INSTALLATION

INSTALLATION

1. Position the transmission into the clutch and seat against the bell housing.

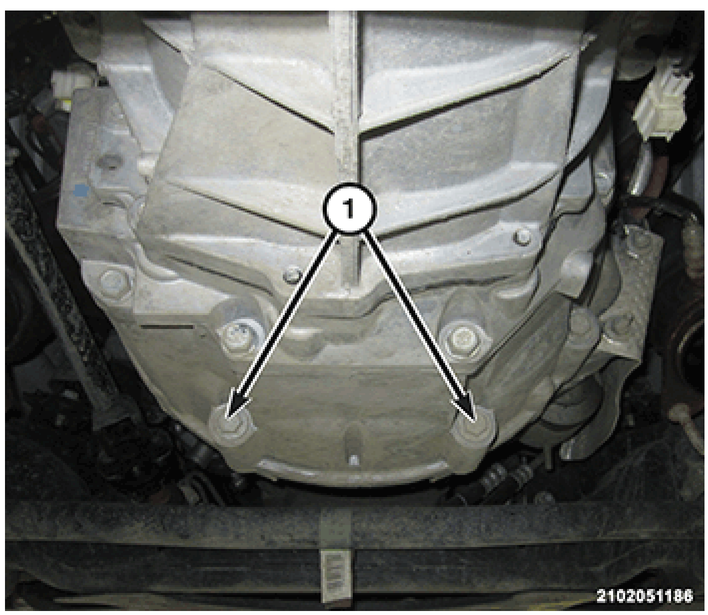


Fig. 216: Bottom Transmission To Oil Pan Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the bottom transmission to oil pan bolts (1) and tighten to the proper **SPECIFICATIONS** .

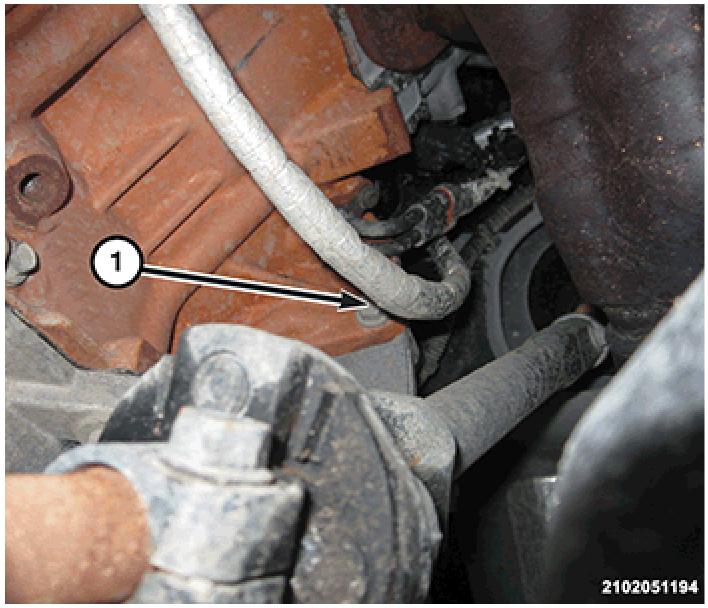


Fig. 217: Front Transmission To Engine Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Install the front transmission to engine bolt (1) and tighten to the proper **SPECIFICATIONS** .

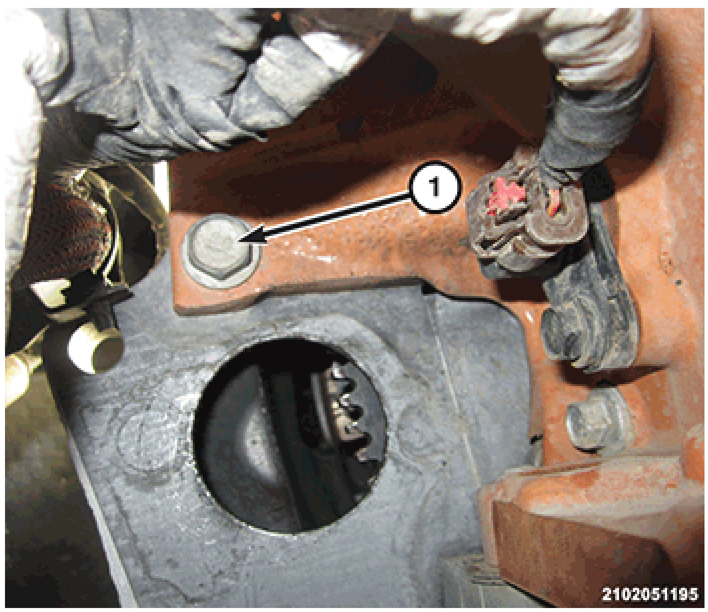


Fig. 218: Front Transmission To Engine Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Install the front transmission to engine bolt and tighten to the proper **SPECIFICATIONS** .

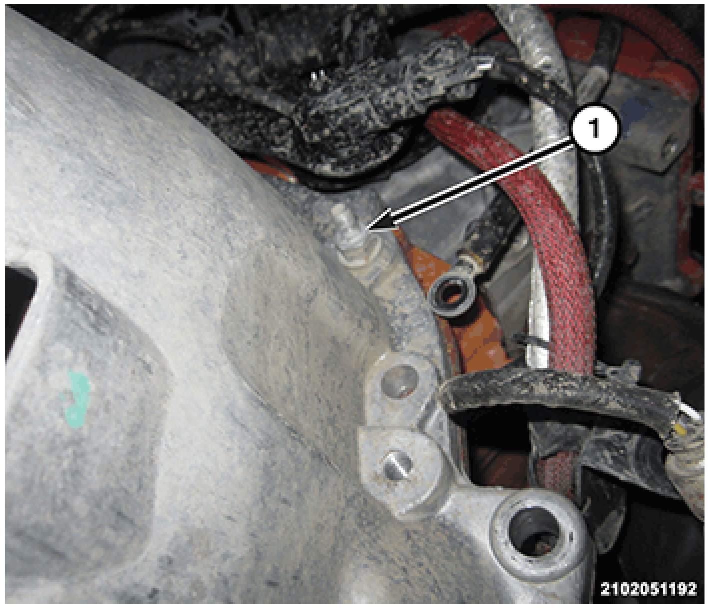


Fig. 219: Engine Stud Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Install the transmission to engine stud (1) and tighten to the proper **SPECIFICATIONS** .

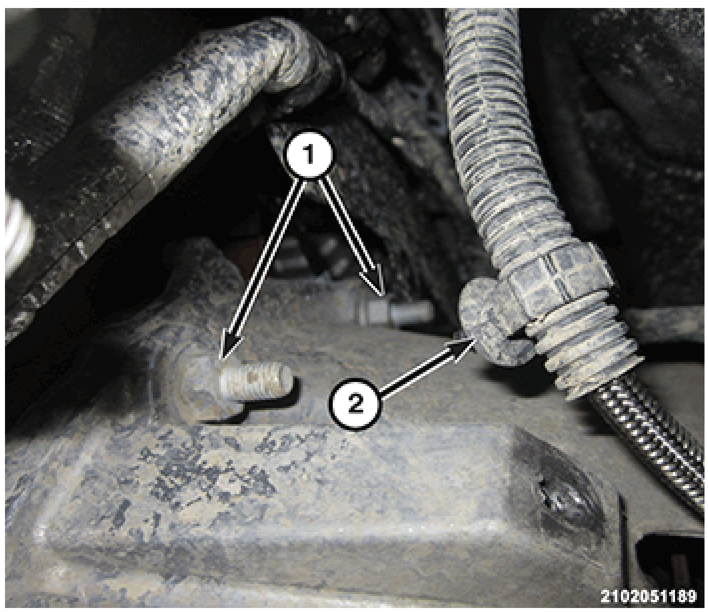


Fig. 220: Engine Stud Bolts & Harness Clip
Courtesy of CHRYSLER GROUP, LLC

6. Install the three (two shown) transmission to engine studs (1) and tighten to the proper **SPECIFICATIONS** .

Fig. 221: Rainbow Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

7. Install the rainbow bracket nut (1) and tighten to the proper SPECIFICATIONS .

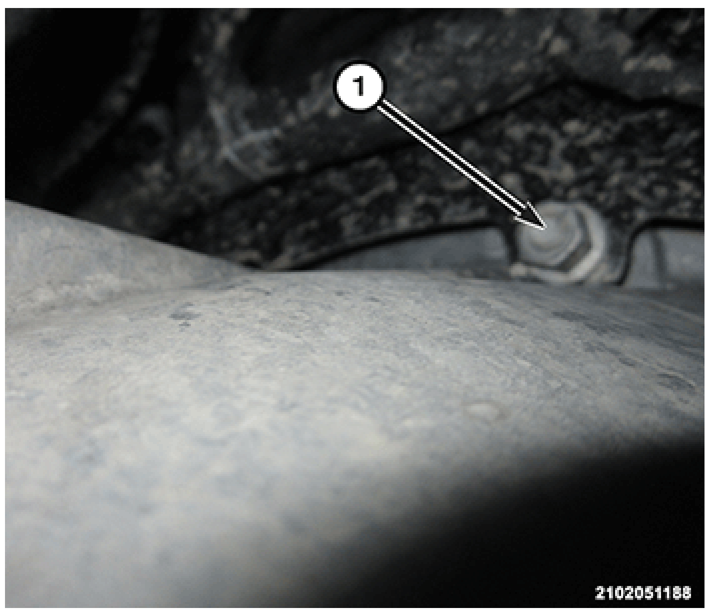
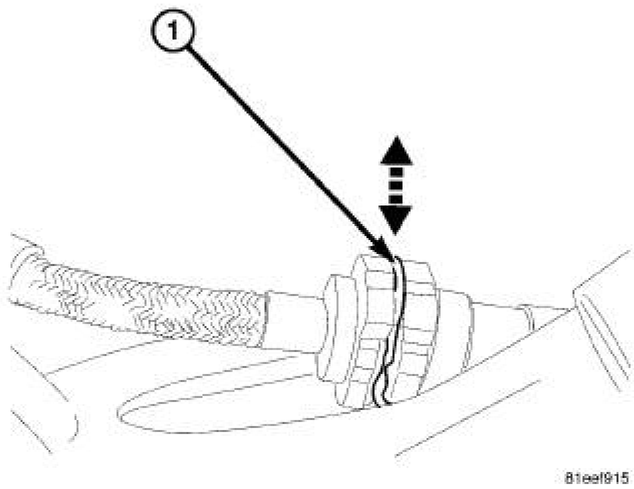


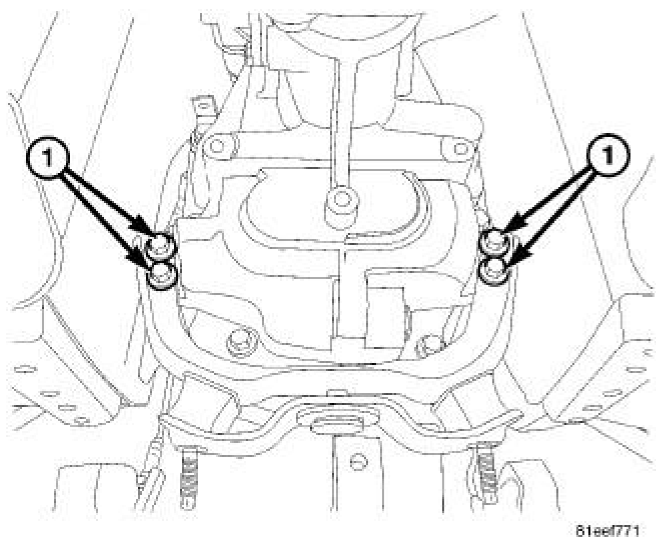
Fig. 222: Rainbow Bracket Nut
Courtesy of CHRYSLER GROUP, LLC

8. Install the rainbow bracket nut (1) and tighten to the proper SPECIFICATIONS .



[Fig. 223: Clutch Hose Removal](#)
Courtesy of CHRYSLER GROUP, LLC

9. Push the clip (1) securing the clutch hydraulic hose to the throw out bearing assembly. Verify the clutch hydraulic hose is installed.



[Fig. 224: Transmission Isolator Bracket Upper Bolts](#)
Courtesy of CHRYSLER GROUP, LLC

10. Install the crossmember, isolator bracket and isolator on the transmission.
11. Install the isolator bracket bolts (1) and tighten to the proper **SPECIFICATIONS** .

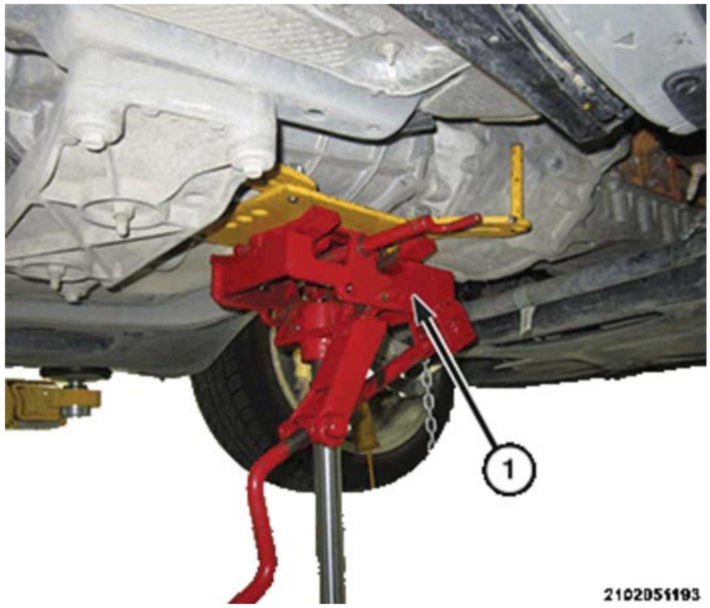


Fig. 225: Transmission Jack
Courtesy of CHRYSLER GROUP, LLC

12. Raise the transmission slightly with the transmission jack (1) to allow the crossmember to sit flush with the body.

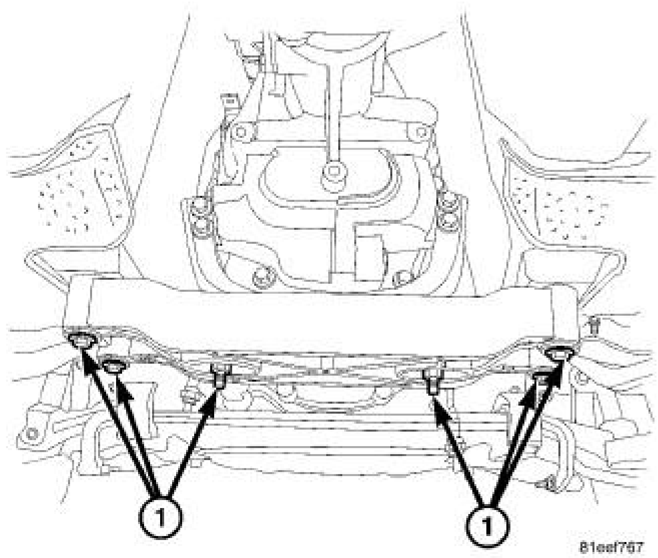


Fig. 226: Crossmember And Isolator
Courtesy of CHRYSLER GROUP, LLC

13. Install the crossmember bolts (1) and tighten to the proper **SPECIFICATIONS** .

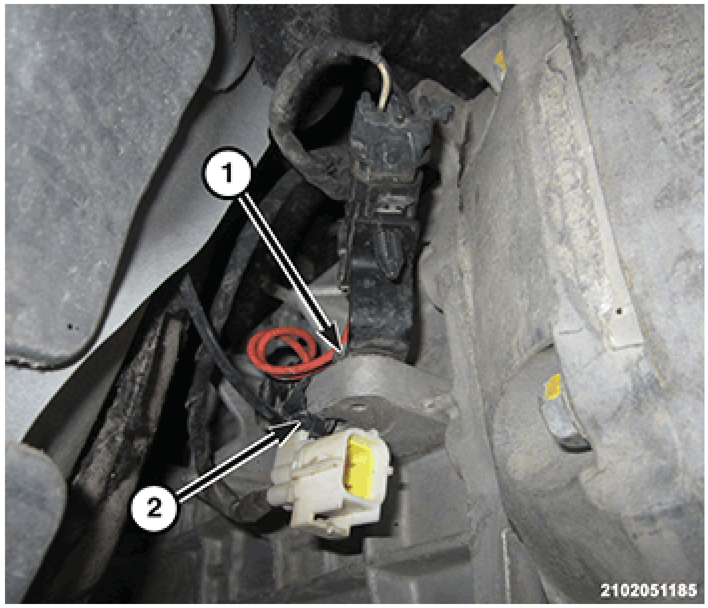


Fig. 227: Push Pin Wiring Connectors & Harness Clips
Courtesy of CHRYSLER GROUP, LLC

14. Install the push pin wiring connectors (1 and 2) on the transmission.

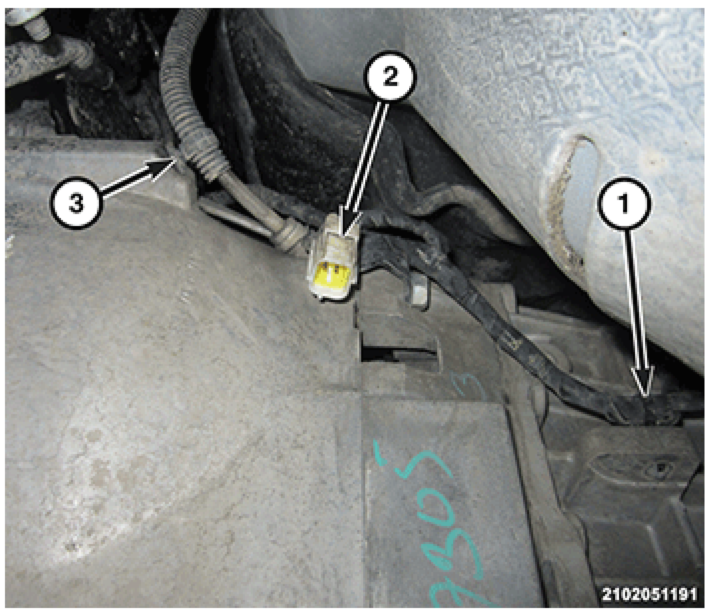


Fig. 228: Wire Harness Connector & Harness Clips
Courtesy of CHRYSLER GROUP, LLC

15. Install push pin wiring connectors (1 and 2) and the clutch hydraulic tube push pin (3) on the transmission.

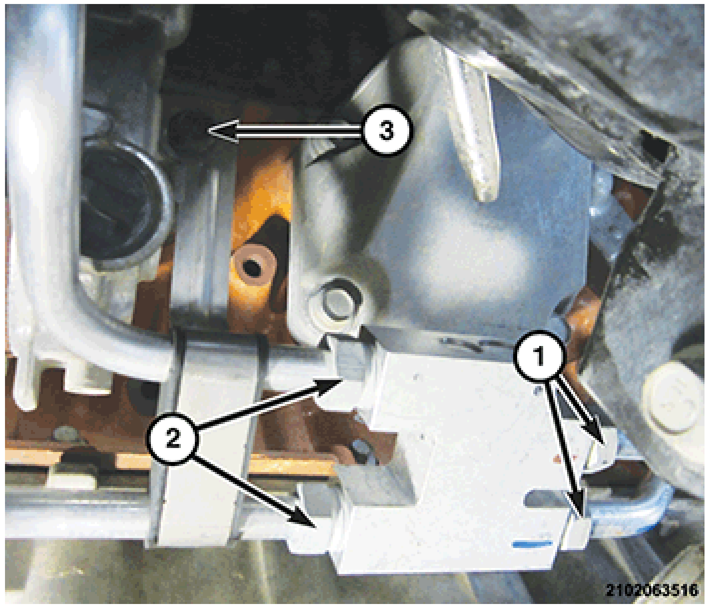


Fig. 229: Transmission Cooler Lines & Bracket Bolt
Courtesy of CHRYSLER GROUP, LLC

16. Connect the rear transmission cooler lines (1) to the thermal bypass valve.

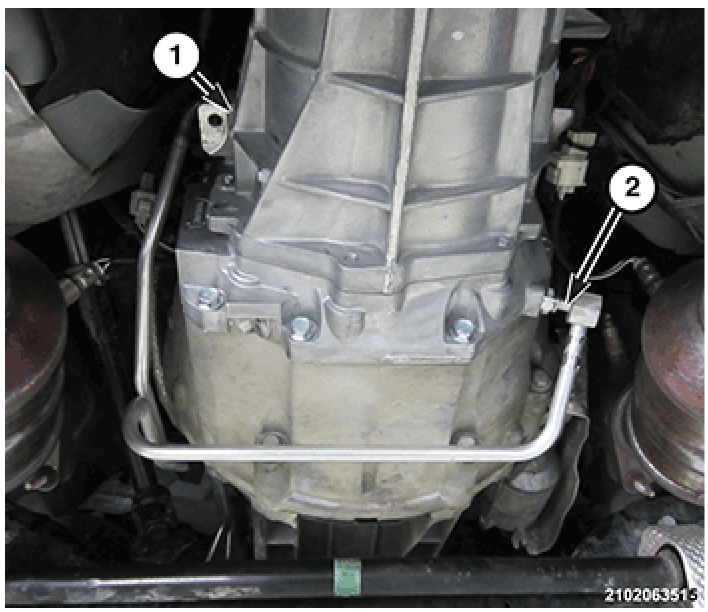


Fig. 230: Transmission Cooler Lines
Courtesy of CHRYSLER GROUP, LLC

17. Connect the transmission cooler lines (1 and 2) to the transmission.

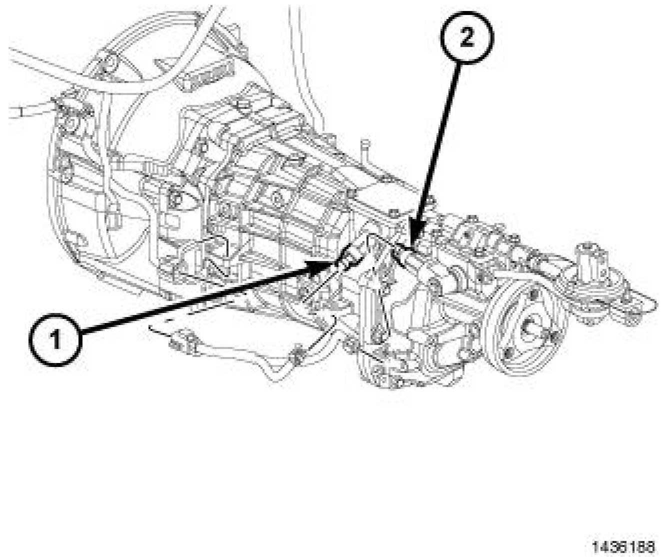


Fig. 231: Skip Shift & Reverse Lockout Solenoids
Courtesy of CHRYSLER GROUP, LLC

18. Connect the transmission skip shift solenoid wire harness connector (1) and the transmission reverse lockout solenoid wire harness connector (2).

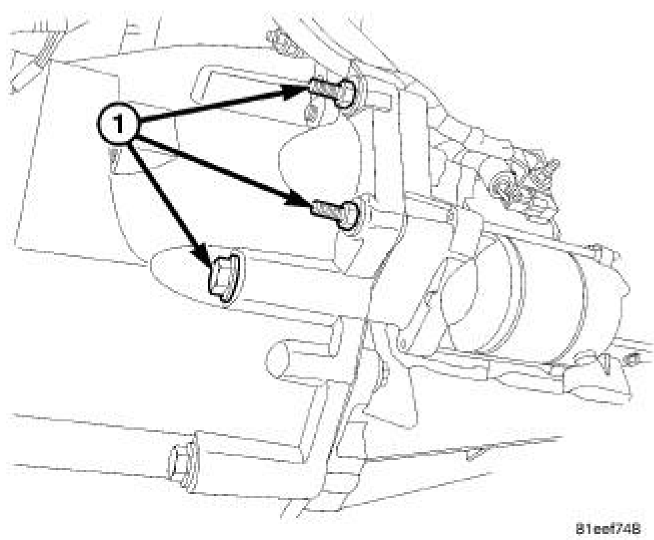


Fig. 232: Starter Bolts
Courtesy of CHRYSLER GROUP, LLC

19. Position the starter in place, install the starter bolts (1) and tighten to the proper **SPECIFICATIONS** .

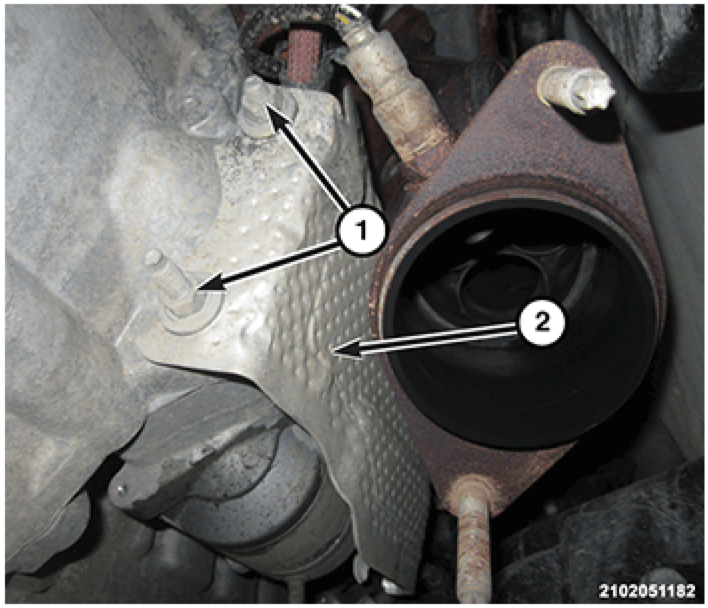


Fig. 233: Starter Heat Shield & Nuts
Courtesy of CHRYSLER GROUP, LLC

20. Install the starter heat shield (2) and the starter heat shield nuts (1) and tighten to the proper **SPECIFICATIONS** .

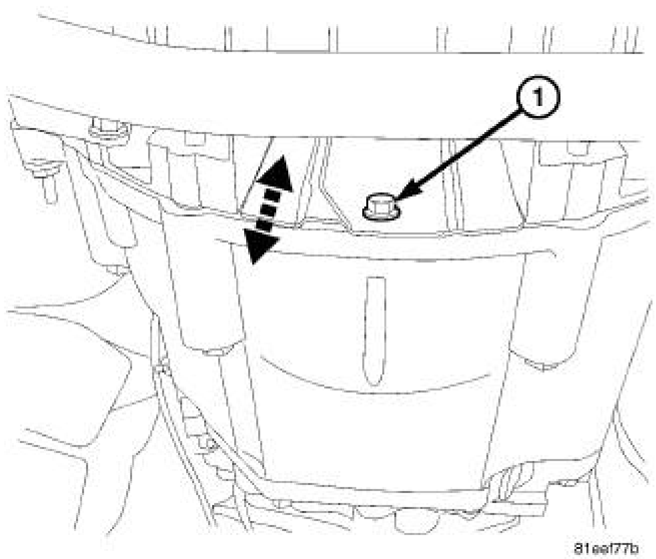


Fig. 234: Inspection Cover
Courtesy of CHRYSLER GROUP, LLC

21. Install the inspection cover, the inspection cover bolt (1) and tighten to the proper **SPECIFICATIONS** .

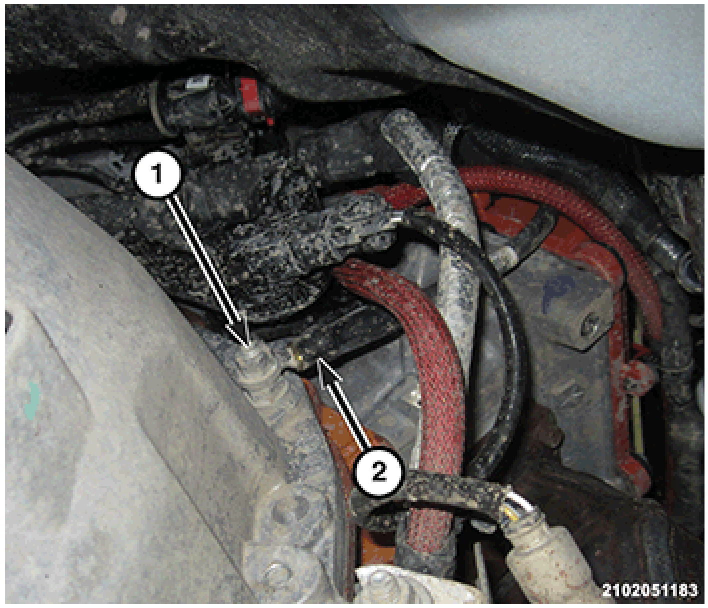


Fig. 235: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

22. Install the ground wire (2), the ground wire nut (1) and tighten to the proper SPECIFICATIONS .

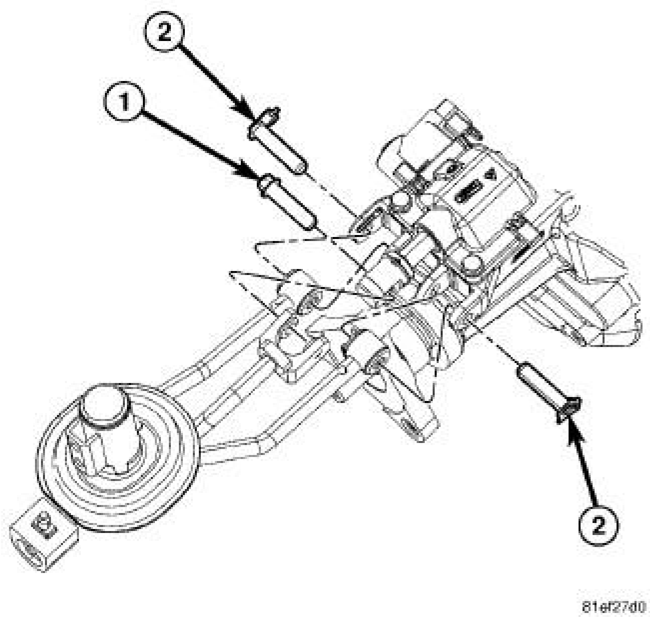


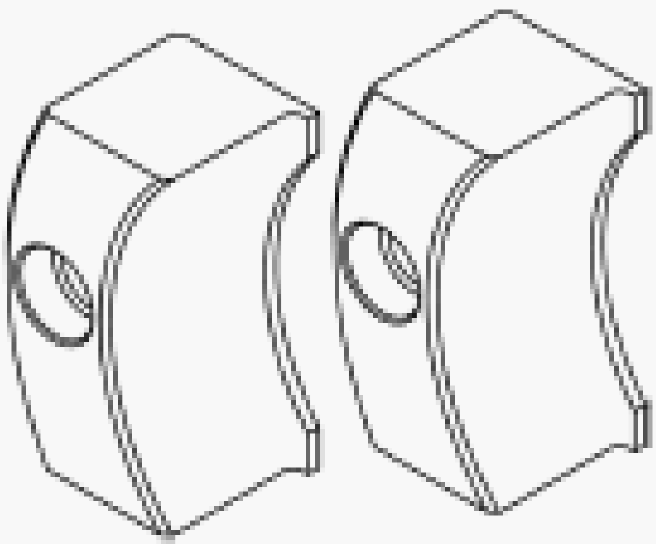
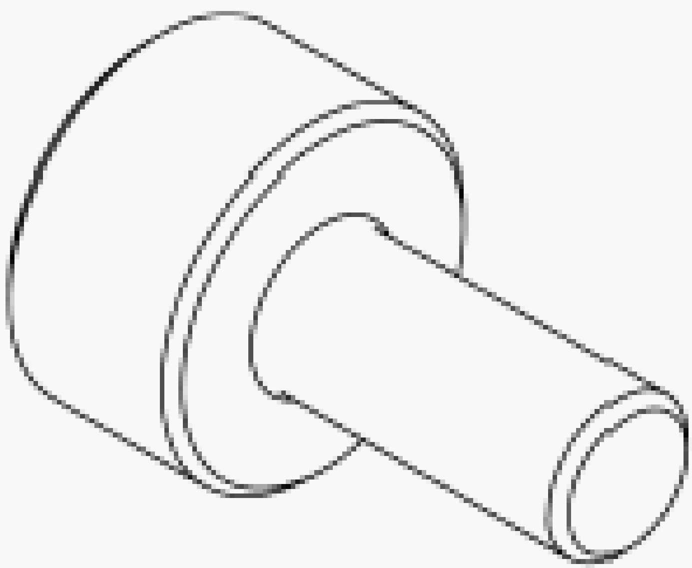
Fig. 236: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

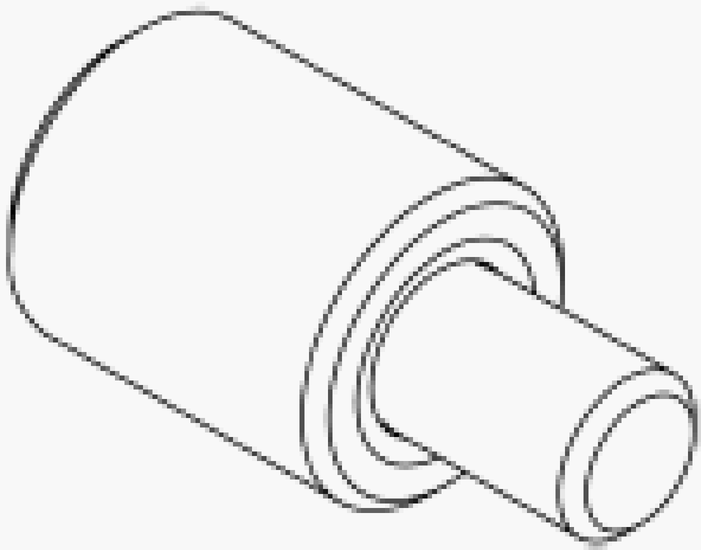
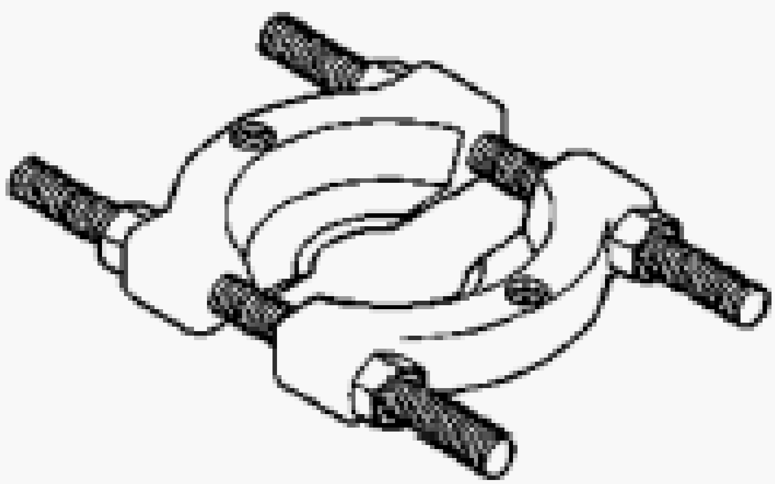
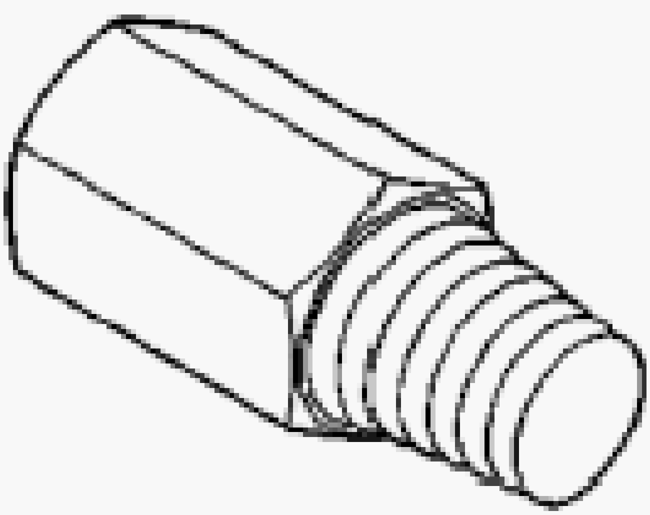
23. If necessary install the shift linkage bolt (1) and the roll pins (2) and the shift linkage onto the transmission. Tighten the shift linkage bolt to the proper SPECIFICATIONS .
24. Install the drive shaft. Refer to INSTALLATION .
25. Install the exhaust. Refer to CONVERTER, CATALYTIC, INSTALLATION .
26. Lower the vehicle.

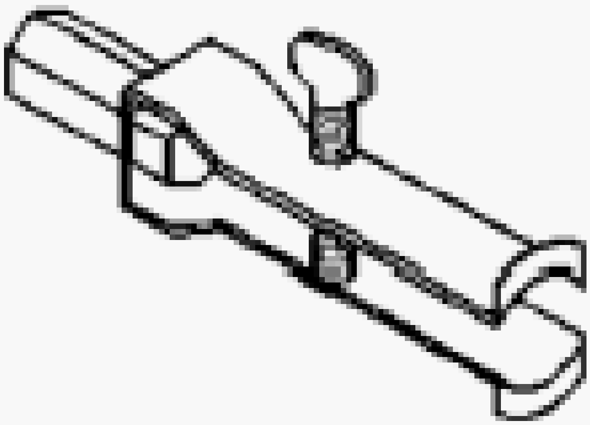
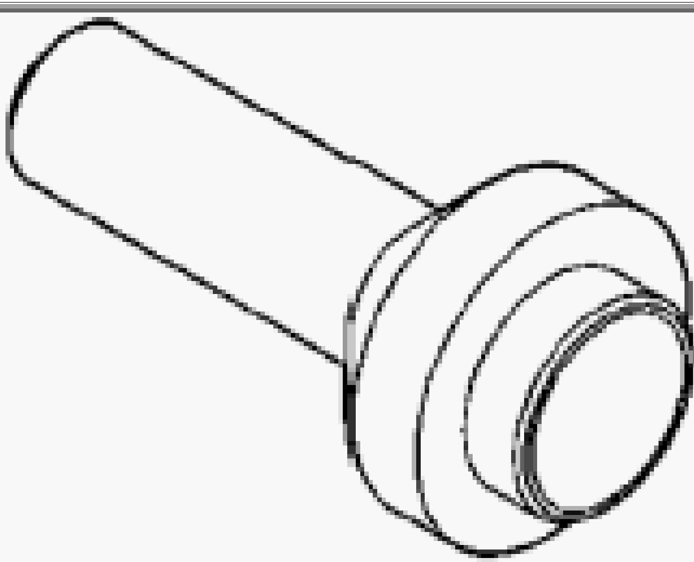
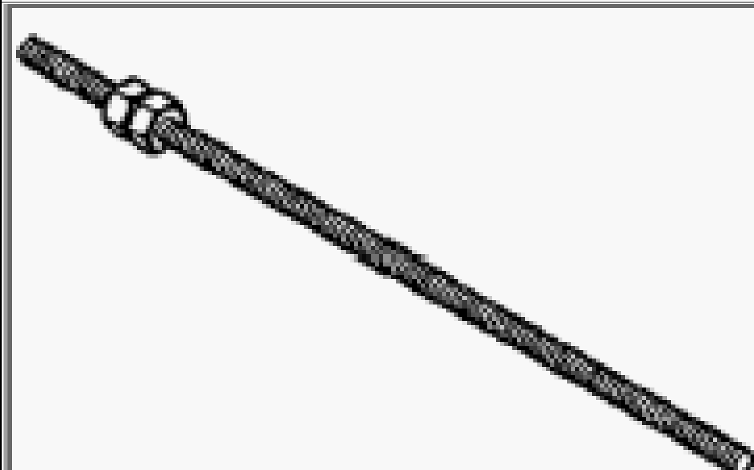
27. Connect the negative battery cable.
28. Road test the vehicle to verify proper operation.

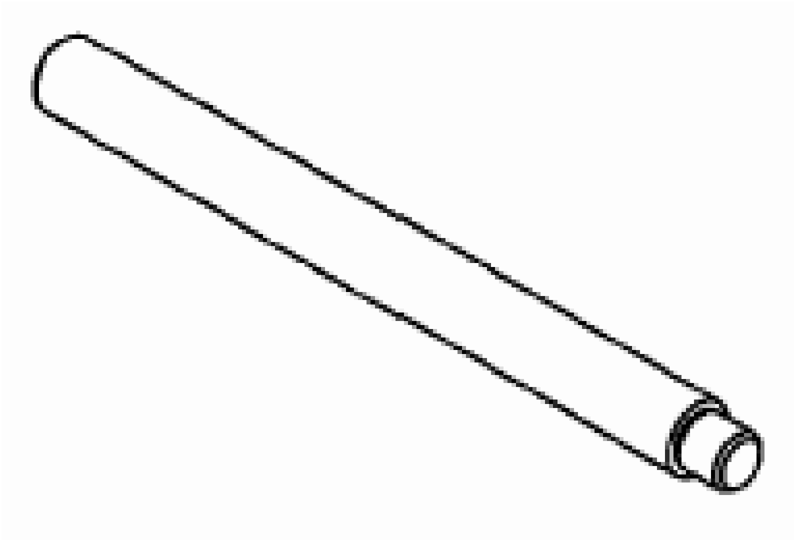
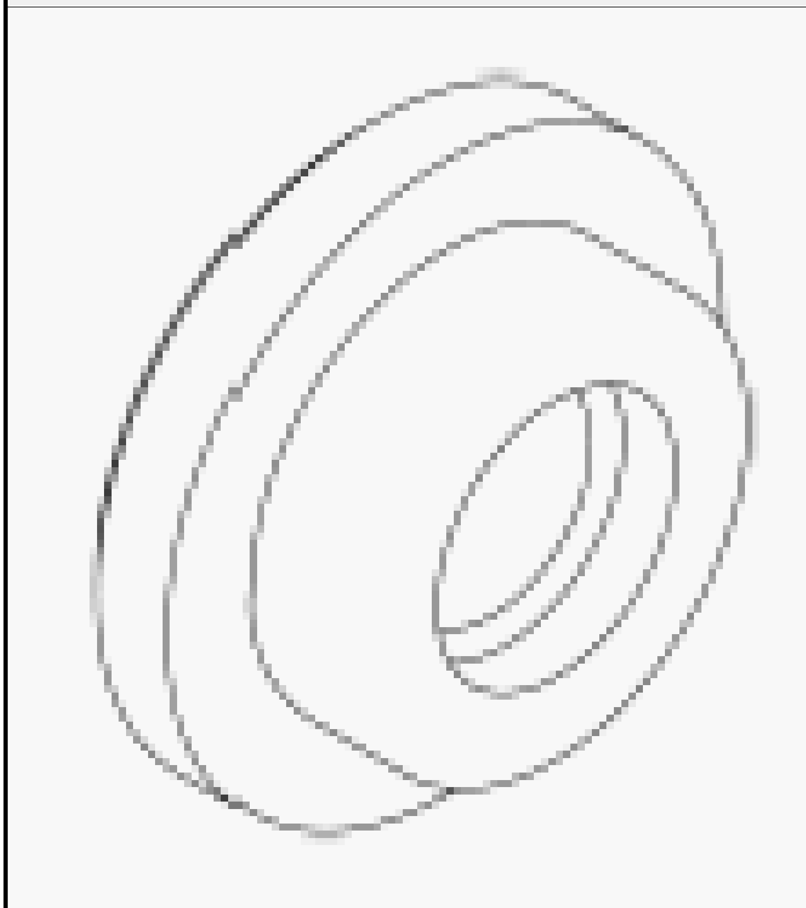
SPECIAL TOOLS

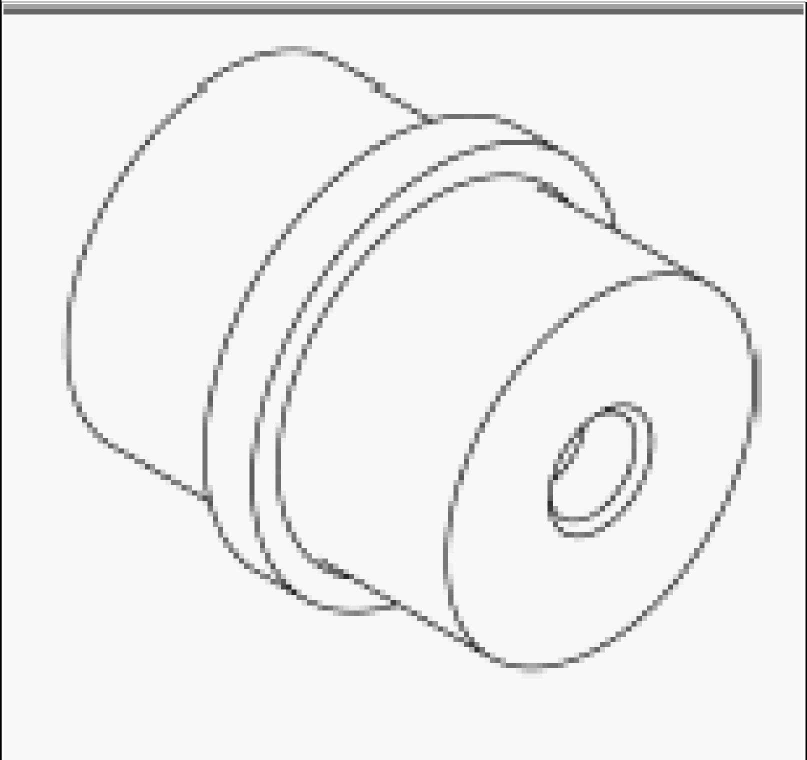
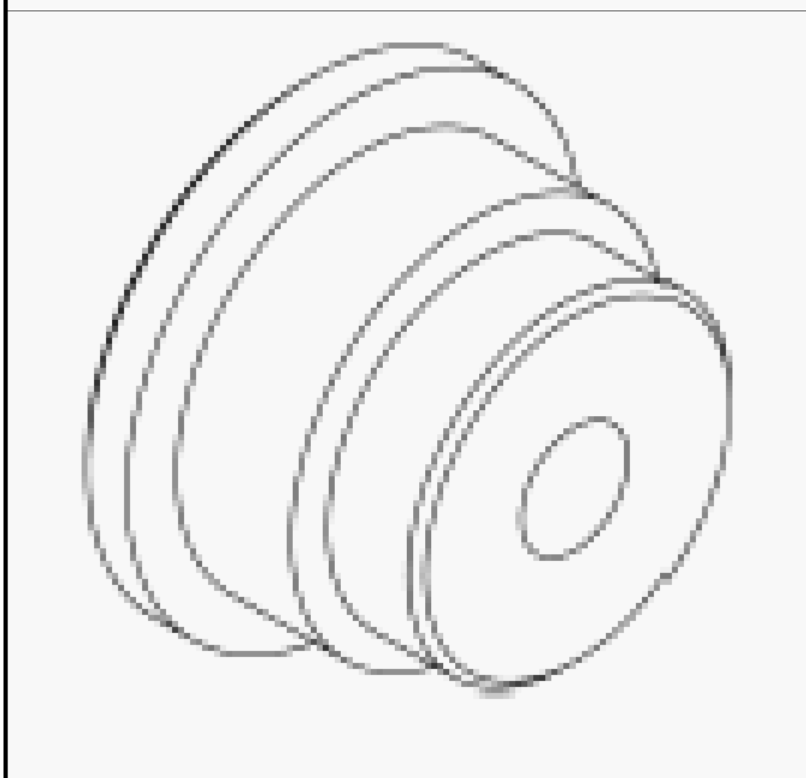
SPECIAL TOOLS

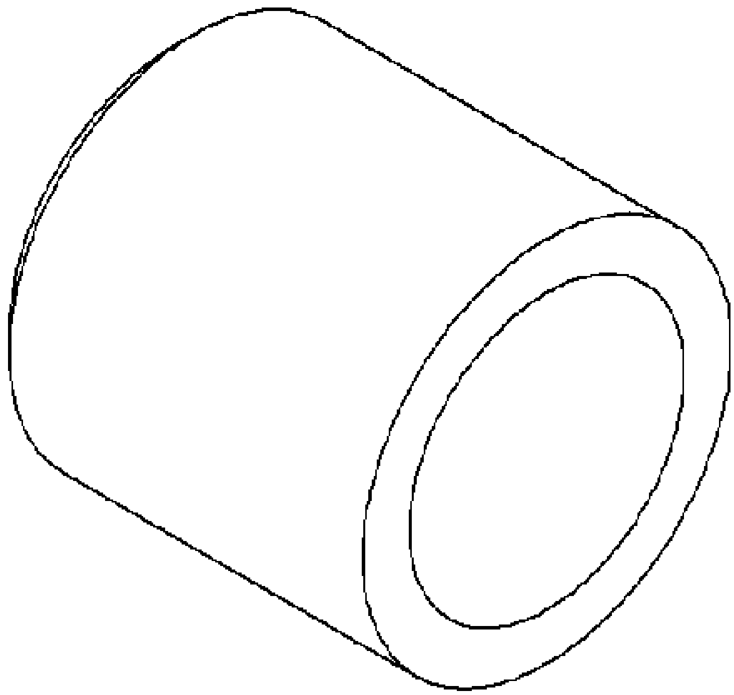
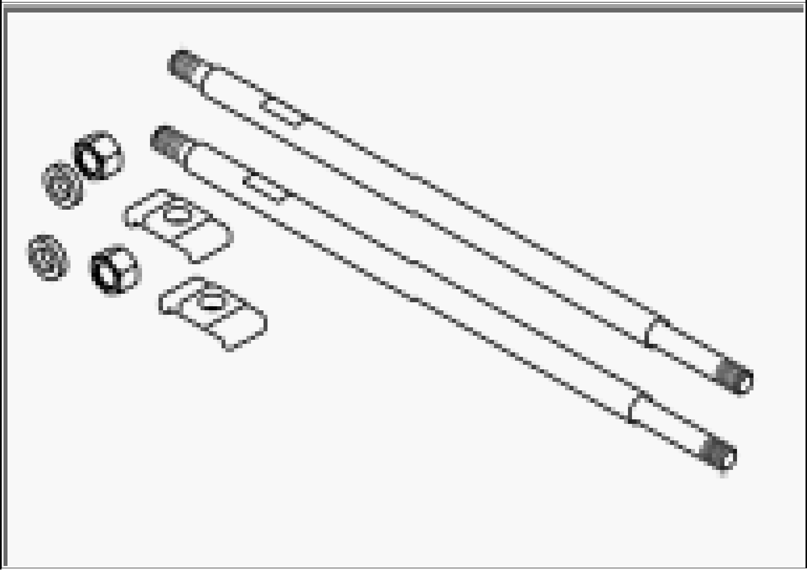
	10026 - Puller, Synchro Hub (Originally Shipped In Kit Number(s) 10017, 10017A.)
	10027 - Button, Press (Originally Shipped In Kit Number(s) 10017, 10017A.)

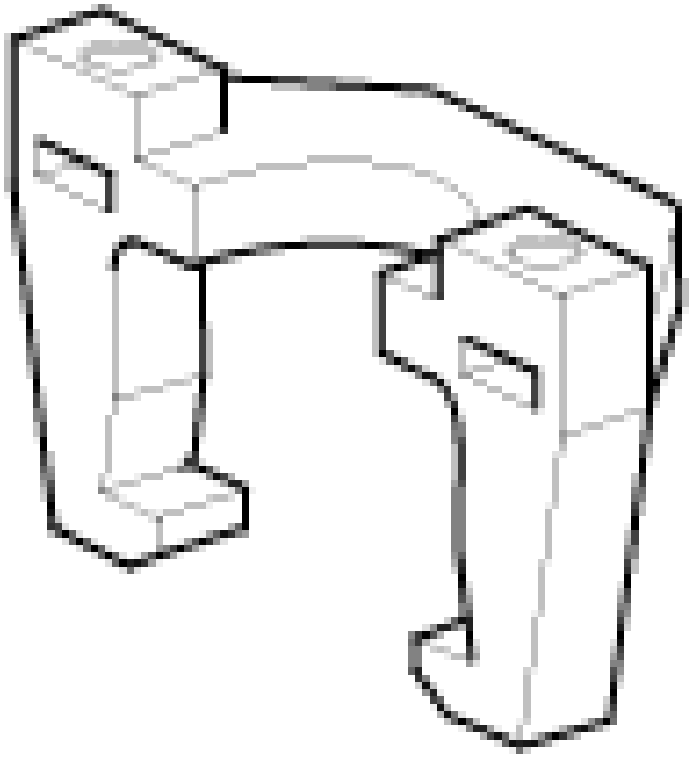
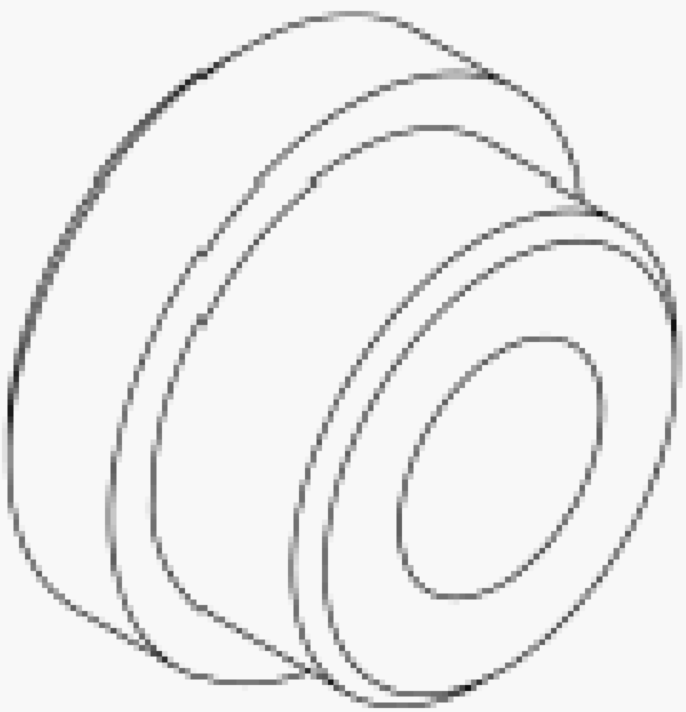
	10028 - Installer, Bearing (Originally Shipped In Kit Number(s) 10017, 10017A.)
	1130 - Splitter, Bearing/Gear (Originally Shipped In Kit Number(s) 6745, 6947, 6949, 9202, 9202A-CAN, 9202CC, 9299.)
	6786 - Remover, Bushing (Originally Shipped In Kit Number(s) 6784, 6809, 6822.)

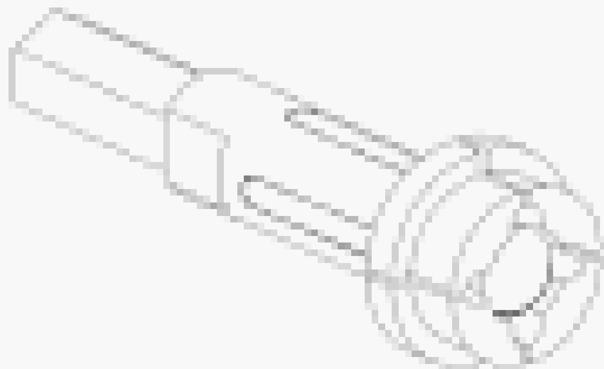
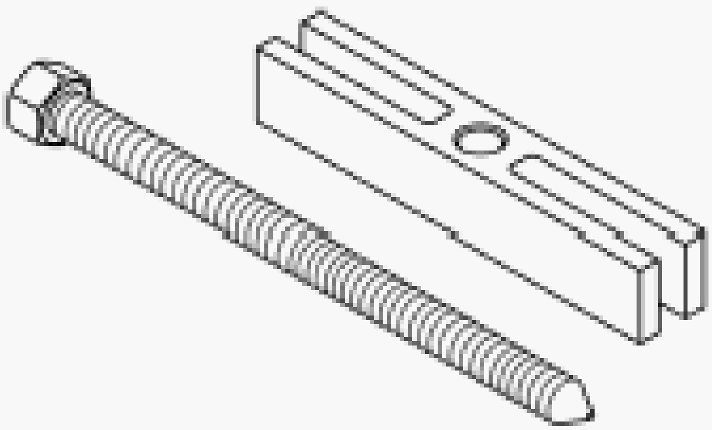
	7794-A - Remover, Seal (Originally Shipped In Kit Number(s) 6645.)
	7884 - Installer, Seal (Originally Shipped In Kit Number(s) 9975.)
	8161 - Adapter Rod (Originally Shipped In Kit Number(s) 8163, 8163CC, 8164, 8164CC.)

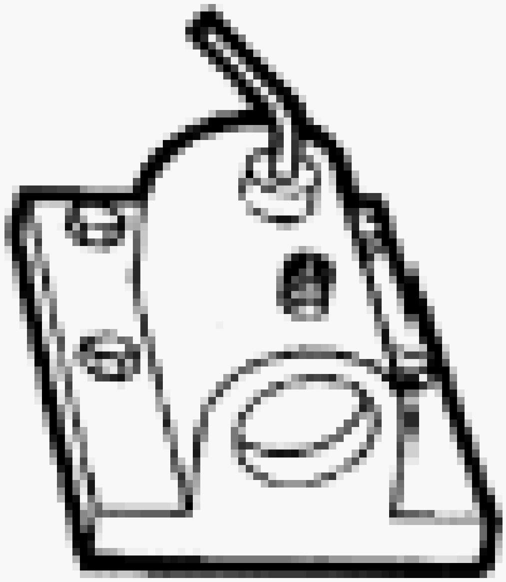
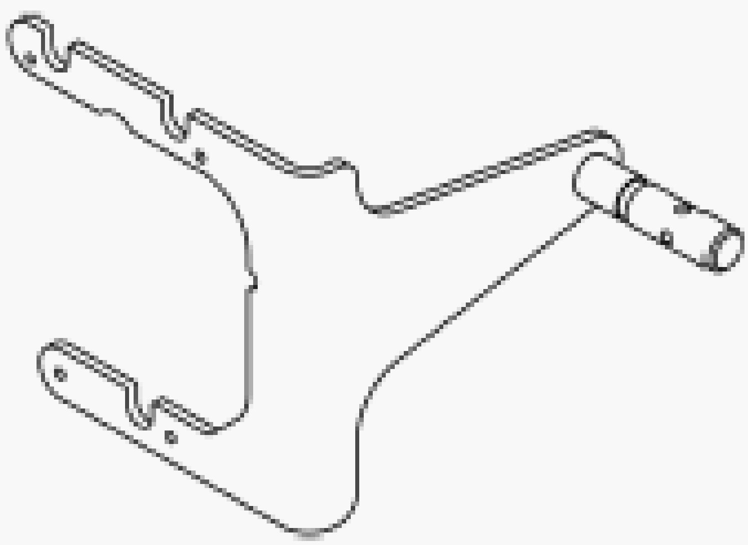
	8475 - Installer, Bushing (Originally Shipped In Kit Number(s) 8708, 8708CC.)
	9366 - Installer, Seal (Originally Shipped In Kit Number(s) 10017, 10017A.)

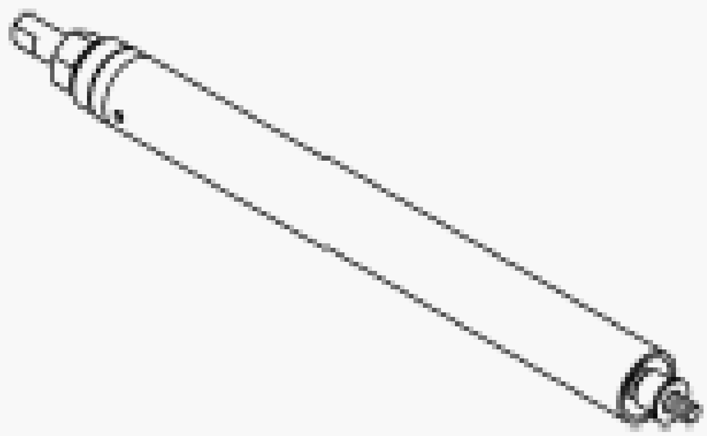
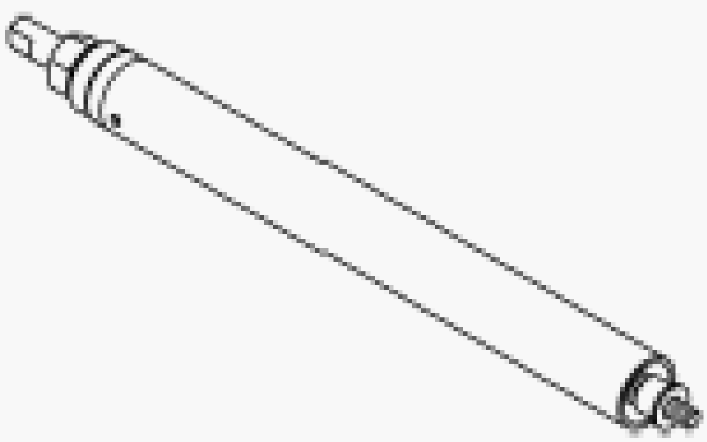
	9369 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9373 - Installer, Bearing Cup (Originally Shipped In Kit Number(s) 10017, 10017A.)

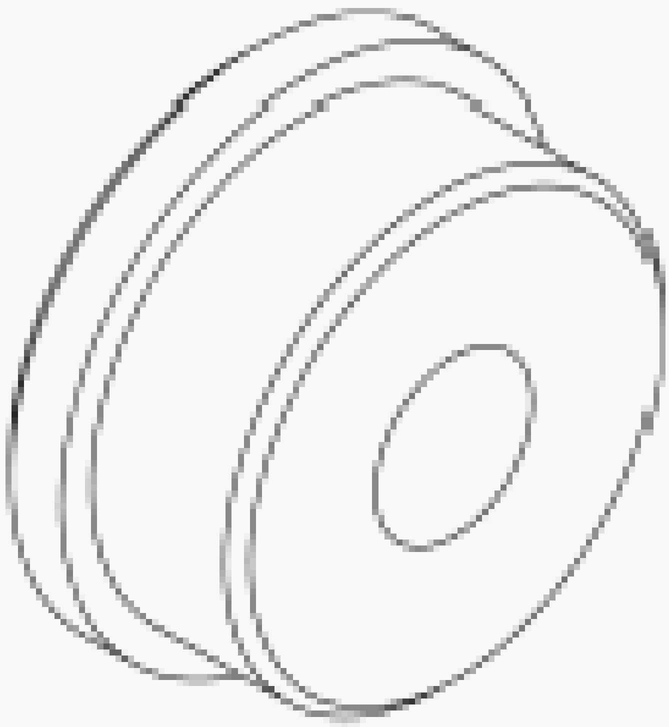
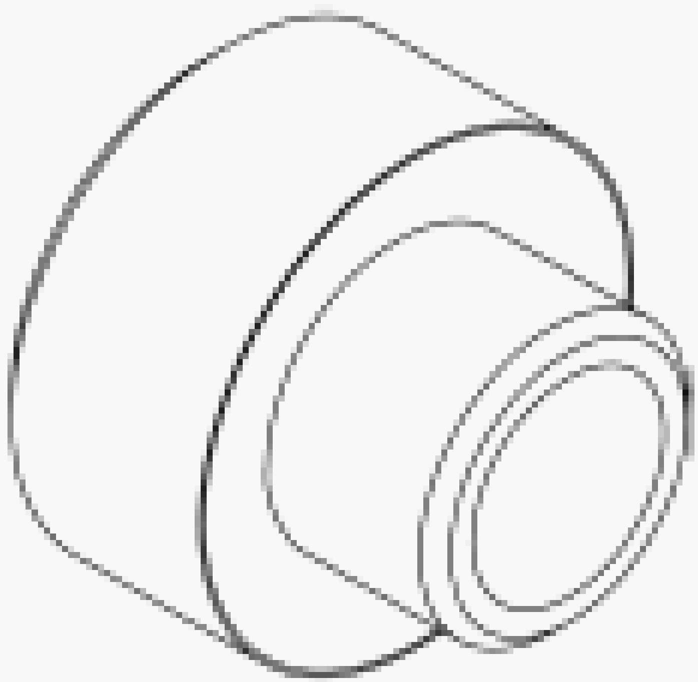
	9377 - Press Adapter (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9378 - Bolts, Puller (Originally Shipped In Kit Number(s) 10017, 10017A.)

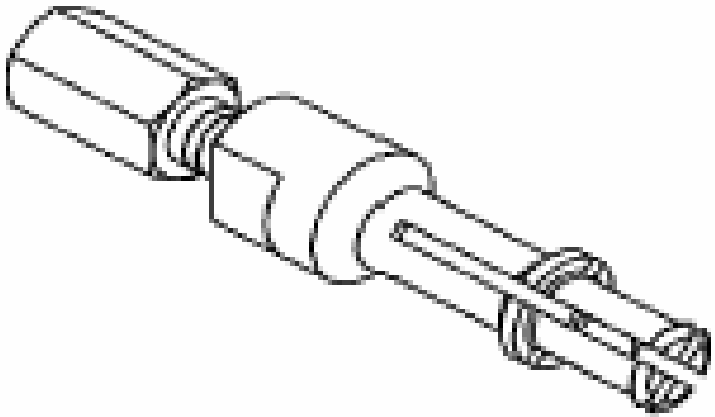
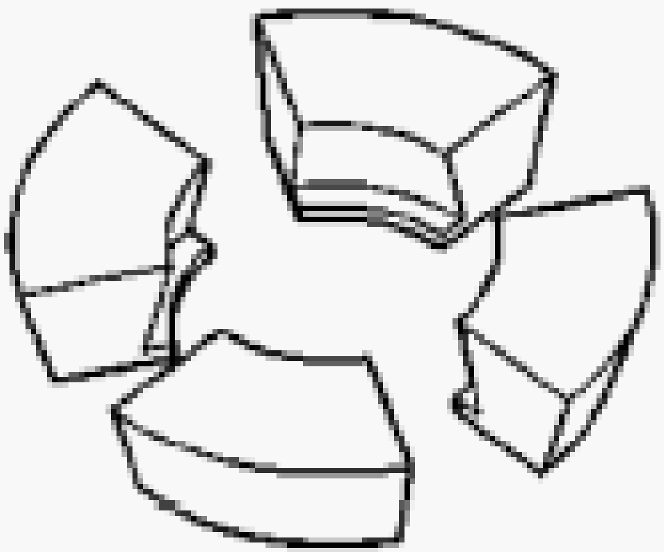
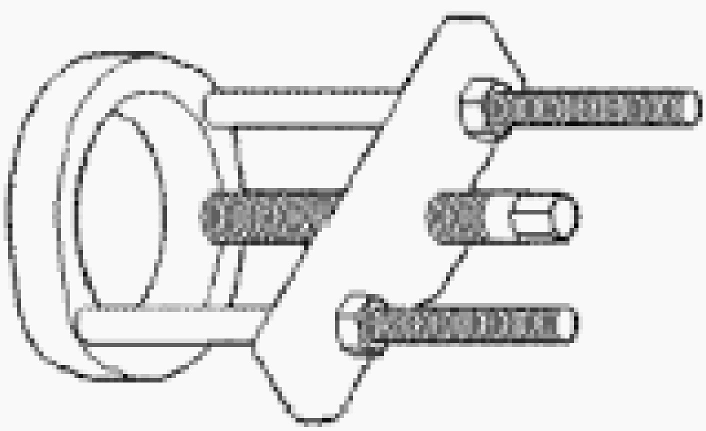
	9379a - Remover, Gear (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9380 - Installer, Bearing Cup (Originally Shipped In Kit Number(s) 10017, 10017A.)

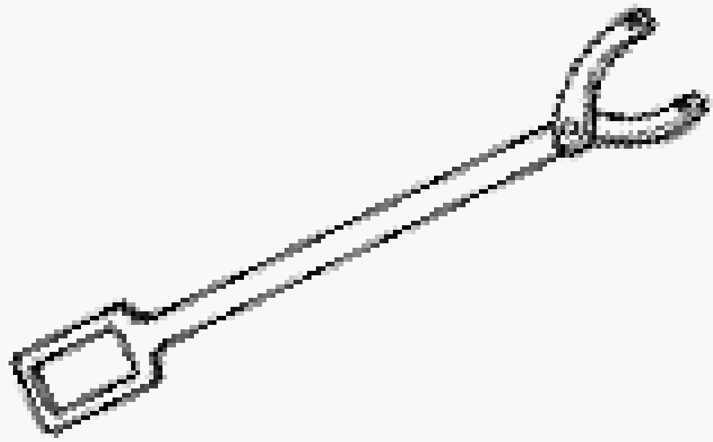
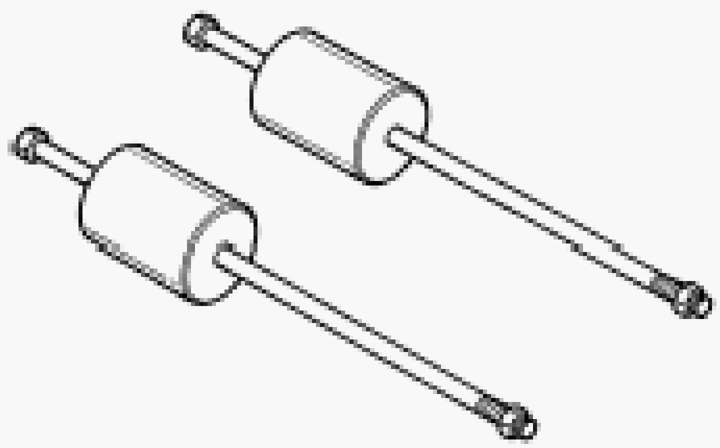
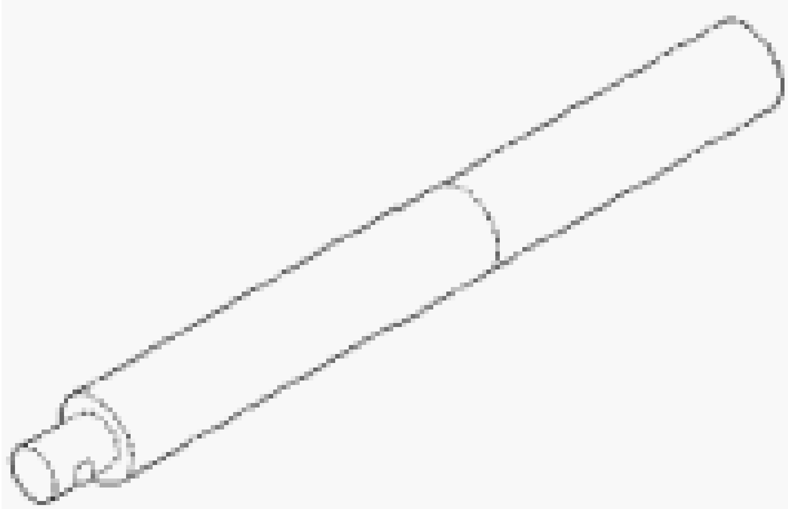
	9381 - Remover, Bearing Cup (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9382 - Bridge (Originally Shipped In Kit Number(s) 10017, 10017A.)

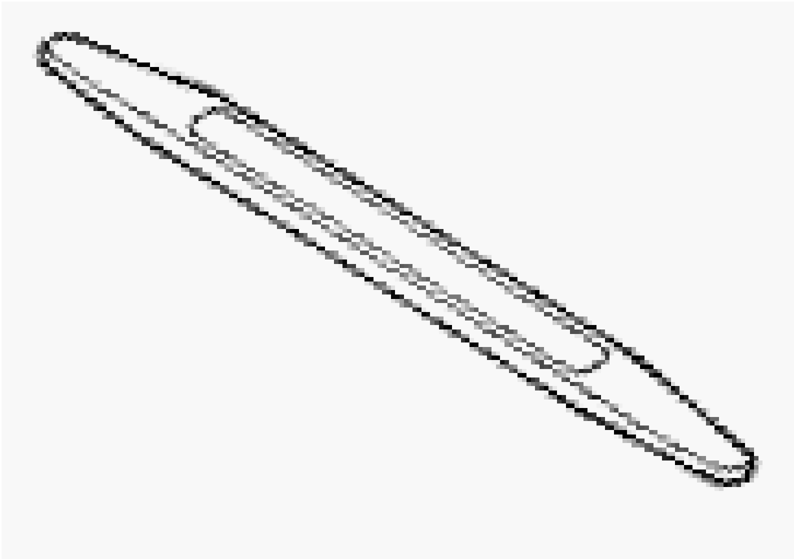
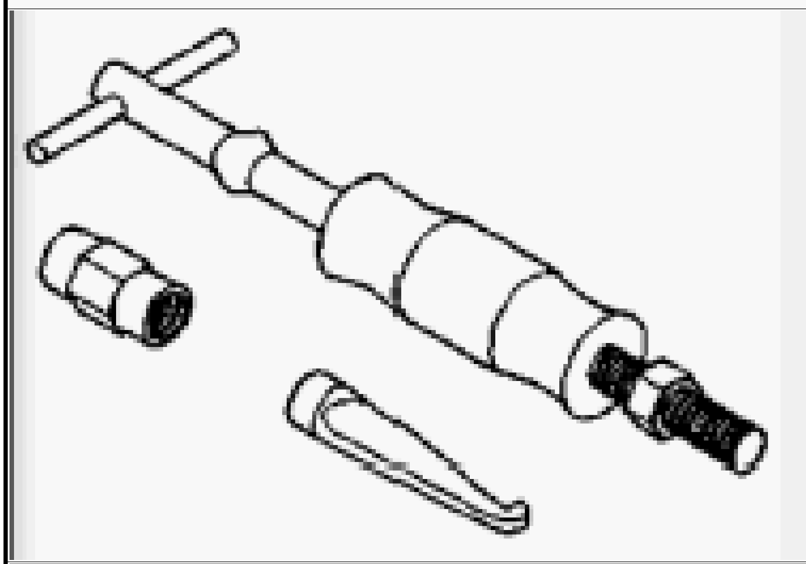
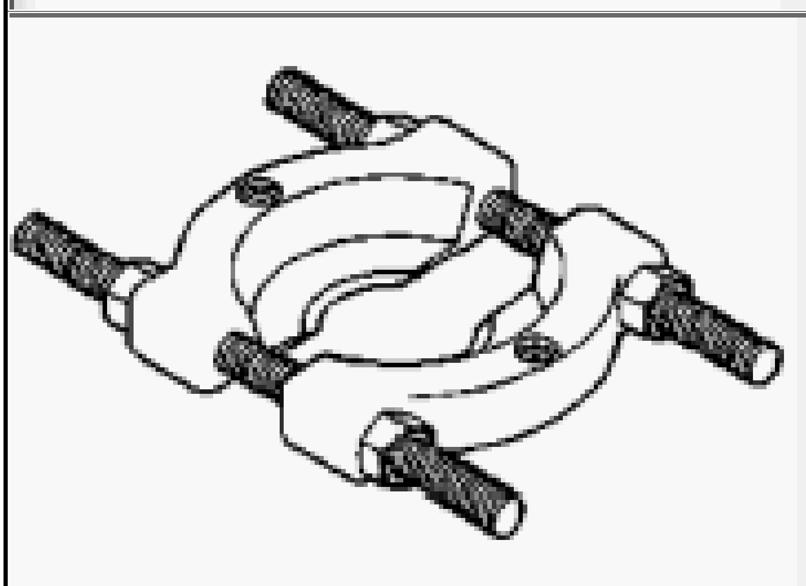
	9385 - Holding Fixture, Bench Mount (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9387 - Fixture, Transmission Holding (Originally Shipped In Kit Number(s) 10017, 10017A.)

	9391 - Installer, Gear (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9391-2 - Adapter, Coupling (Originally Shipped In Kit Number(s) 10017, 10017A.)

	9392 - Installer, Bearing Cup (Originally Shipped In Kit Number(s) 10017, 10017A.)
	9394 - Installer, Bearing (Originally Shipped In Kit Number(s) 10017, 10017A.)

	9609 - Remover, Bearing (Originally Shipped In Kit Number(s) 9691.)
	C-293-47 - Block Set, Puller (Originally Shipped In Kit Number(s) 9975, C-293-M, DD-914-CLT-L.)
	C-293-PA - Puller, Press (Originally Shipped In Kit Number(s) 8418, 8837, C-293-M.)

	C-3281 - Holder, Flange (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)
	C-3752 - Slide Hammers (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202-CAN, 9202CC.)
	C-4171 - Driver Handle, Universal (Originally Shipped In Kit Number(s) 9202, 9202A-CAN, 9202CC, 9299, 9299CC, 9299CC, 9300A-CAN.)

	C-4755 - Trim Stick (Originally Shipped In Kit Number(s) 9299, 9299CC, 9299CC, 9300A-CAN.)
	C-637 - Slide Hammer, Universal (Originally Shipped In Kit Number(s) 9202.)
	P-334 - Splitter, Bearing

INPUT SHAFT, TRANSMISSION

REMOVAL

REMOVAL

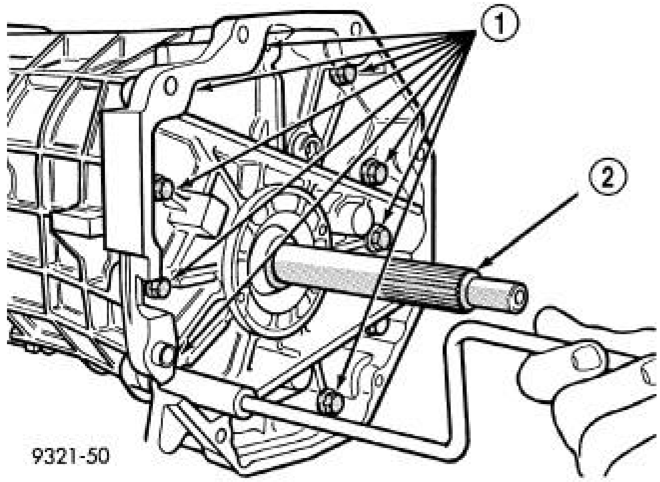


Fig. 237: Front Adapter Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: **If input shaft is damaged behind the seal, the transmission must be disassembled and inspected.**

1. Measure output shaft end play and record number.
2. Remove clutch slave cylinder from transmission adapter plate.
3. Remove front adapter plate bolts (1).

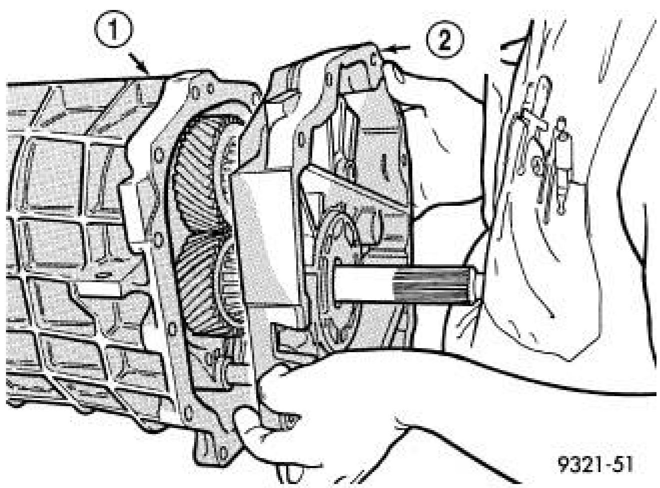
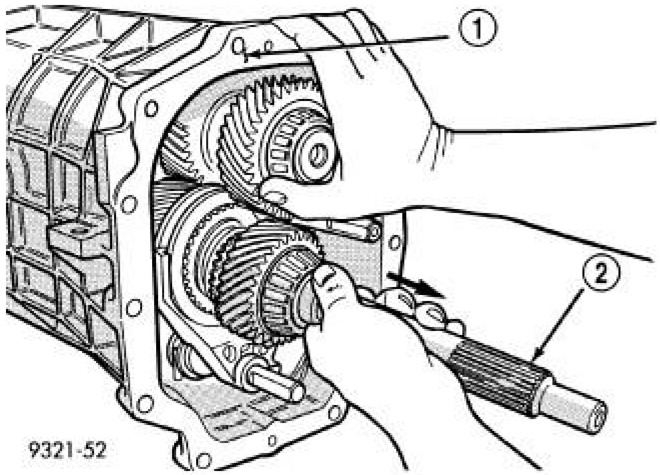


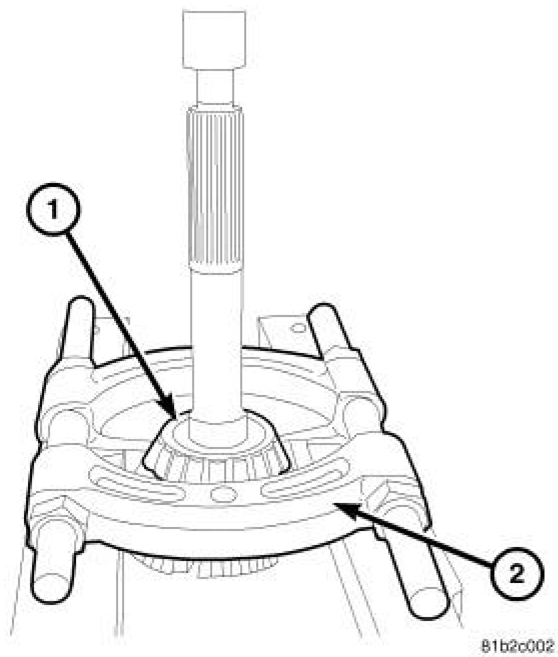
Fig. 238: Slide Off Adapter
Courtesy of CHRYSLER GROUP, LLC

4. Pry front cover adapter loose.
5. Hold input shaft while removing adapter (2).
6. Remove input shaft seal from adapter with a seal puller.
7. Clean and inspect all sealing surfaces for wear or damage.



[Fig. 239: Remove Input Shaft](#)
Courtesy of CHRYSLER GROUP, LLC

8. Lift countershaft slightly and remove input shaft (2) from transmission (1).



[Fig. 240: Input Shaft Bearing](#)
Courtesy of CHRYSLER GROUP, LLC

9. Remove input shaft bearing (1) with Splitter (special tool #1130, Splitter, Bearing/Gear) (2) and a press.

INSTALLATION

INSTALLATION

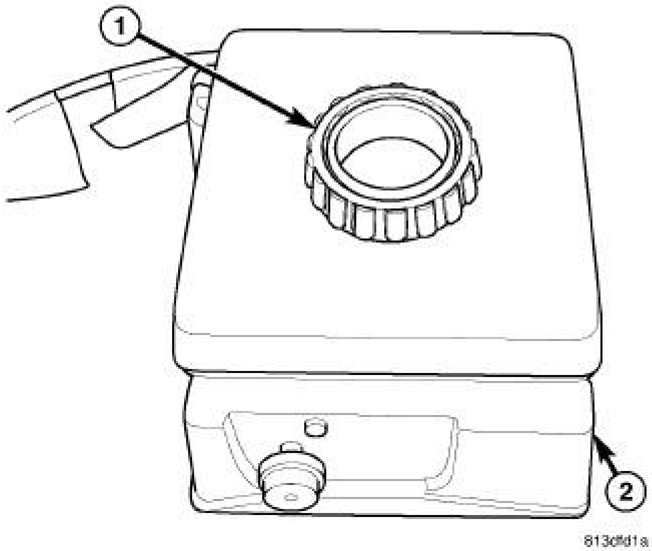


Fig. 241: Identifying Bearing Heater And Bearing
Courtesy of CHRYSLER GROUP, LLC

WARNING: Use tongs or welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.

CAUTION: Bearings (1) are installed using a Bearing Heater (2). Use only a bearing heater/hot plate and follow manufacture's instructions. Heat components to 100 - 149 Celsius (212Â° Min. - 300Â° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.

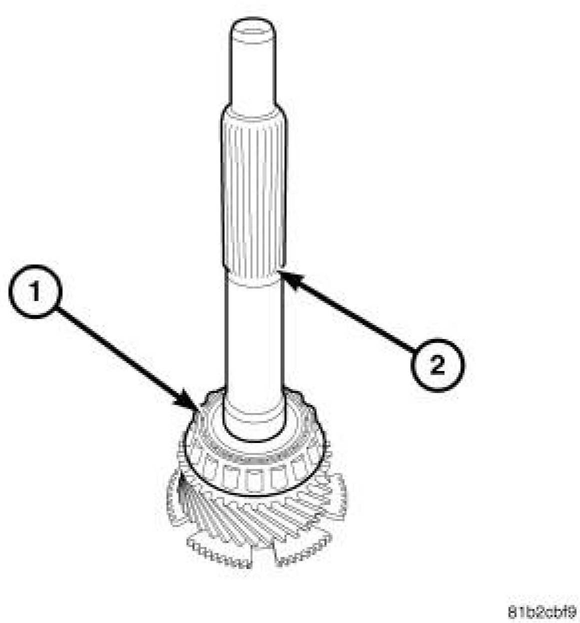


Fig. 242: Input Shaft Bearing

Courtesy of CHRYSLER GROUP, LLC

1. Heat input shaft bearing to 100 - 149 Celsius (212Â° Min. - 300Â° Max Fahrenheit). Install bearing (1) on input shaft (2) with tongs or welding gloves.
2. Install new bearing cup in front adapter with original shim behind cup.
3. Clean sealing surfaces of the transmission case and adapter plate.
4. Install input shaft and adapter plate.
5. Check output shaft end play and adjust shim to achieve the original reading.

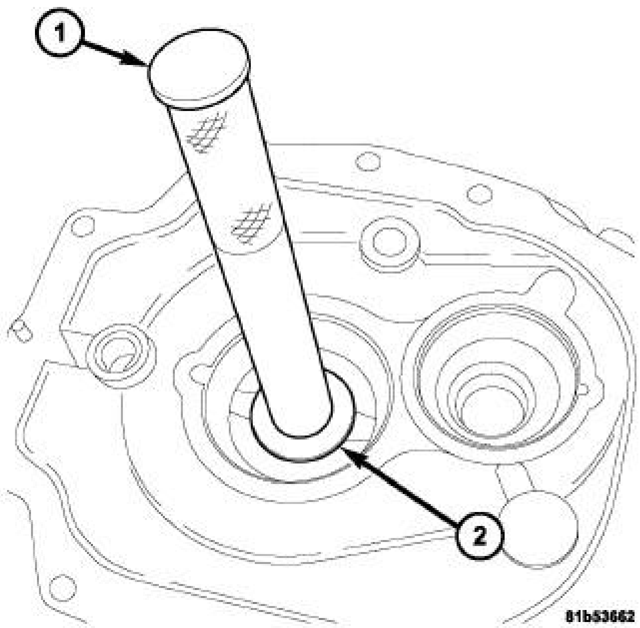


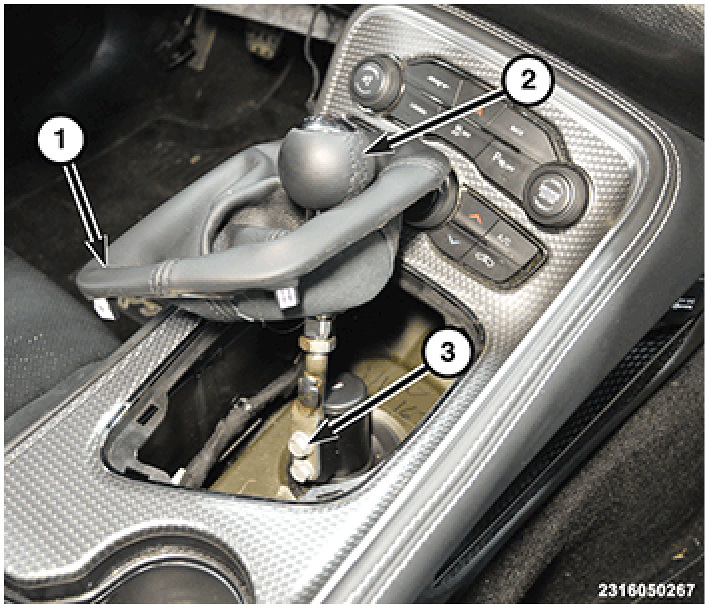
Fig. 243: Input Shaft Seal
Courtesy of CHRYSLER GROUP, LLC

6. Remove adapter plate and install a new input shaft seal with Handle (special tool #C-4171, Driver Handle, Universal) and Installer (special tool #9366, Installer, Seal).
7. Apply Mopar Â® ATF-RTV to the cleaned sealing surfaces.
8. Install adapter and tighten bolts to 34 N.m (25 ft. lbs.).

LEVER, SHIFT

REMOVAL

SHIFT LEVER

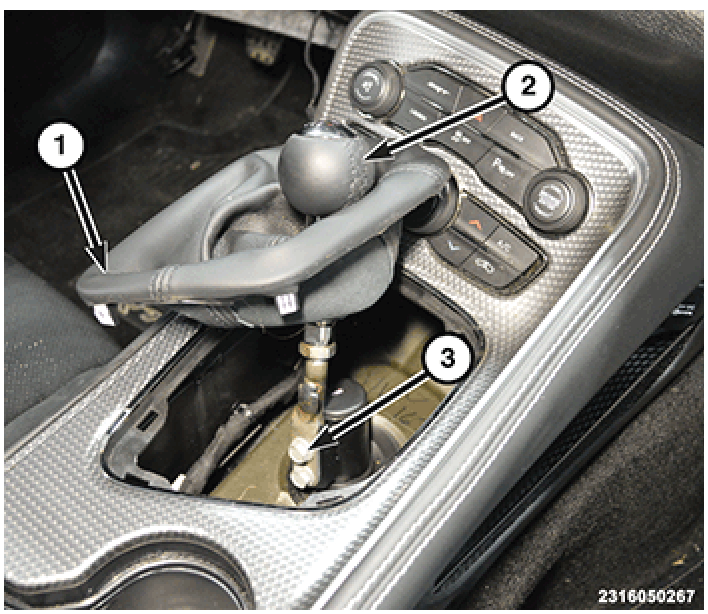


[Fig. 244: Shifter Boot, Shift Lever & Bolts]
Courtesy of CHRYSLER GROUP, LLC

1. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent, separate the shift lever boot (1) from the floor console.
2. Remove the shift lever bolts (3) and the shift lever (2).

INSTALLATION

SHIFT LEVER



[Fig. 245: Shifter Boot, Shift Lever & Bolts]
Courtesy of CHRYSLER GROUP, LLC

1. Install the shift lever (2) and the shift lever bolts (3) on the shifter assembly and tighten to the proper **SPECIFICATIONS** .
2. Install the shift lever boot (1).

MECHANISM, GEARSHIFT

REMOVAL

GEARSHIFT MECHANISM

1. Disconnect and isolate the negative battery cable.
2. Place transmission shifter in neutral.

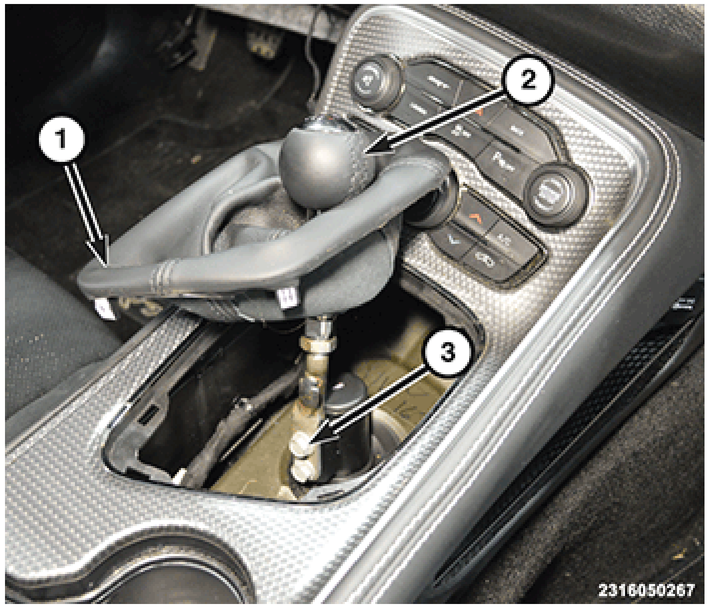


Fig. 246: Shifter Boot, Shift Lever & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Using a trim stick (special tool #C-4755, Trim Stick) or equivalent, separate the shift lever boot (1) from the floor console.
4. Remove the shift lever bolts (3) and the shift lever (2).

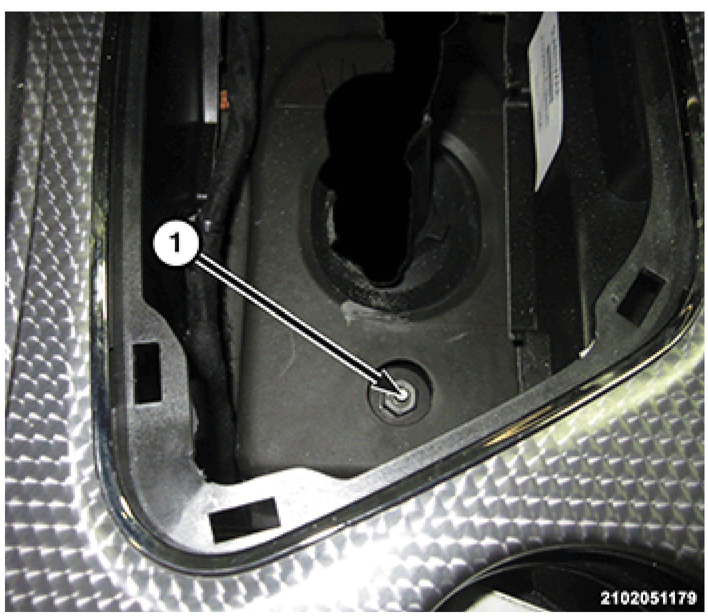


Fig. 247: Shift Linkage To Closure Panel Nut

Courtesy of CHRYSLER GROUP, LLC

5. Remove the nut (1) holding the shift linkage to the closure panel.
6. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
7. Remove the exhaust system. Refer to **MUFFLER, EXHAUST, REMOVAL** .
8. Remove the drive shaft. Refer to **REMOVAL** .

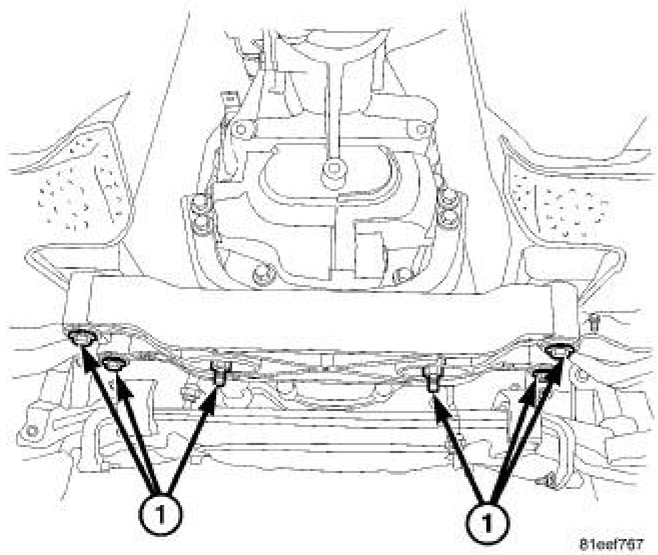


Fig. 248: Crossmember And Isolator
Courtesy of CHRYSLER GROUP, LLC

9. Raise transmission slightly with suitable jack or high stand to relieve load on crossmember mount.
10. Remove the crossmember bolts (1) and remove the crossmember.
11. Lower the transmission enough to gain access to the shift linkage.

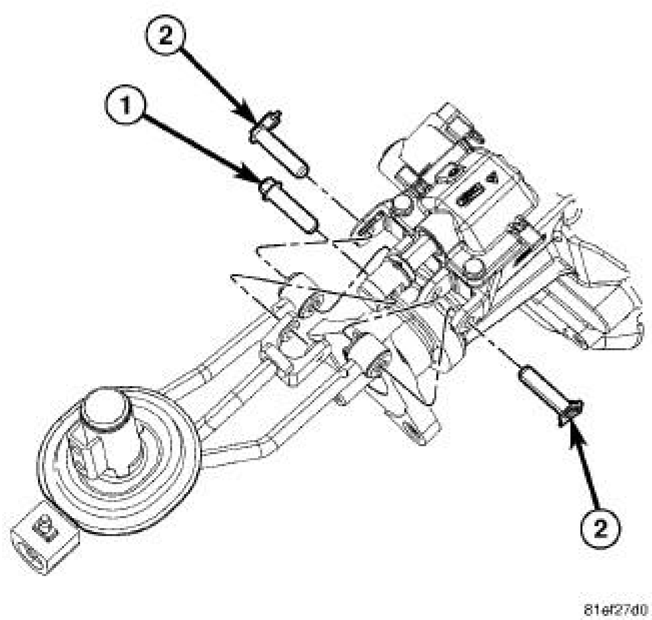


Fig. 249: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

12. Remove the bolt (1) holding the shift linkage to the transmission shift rail.

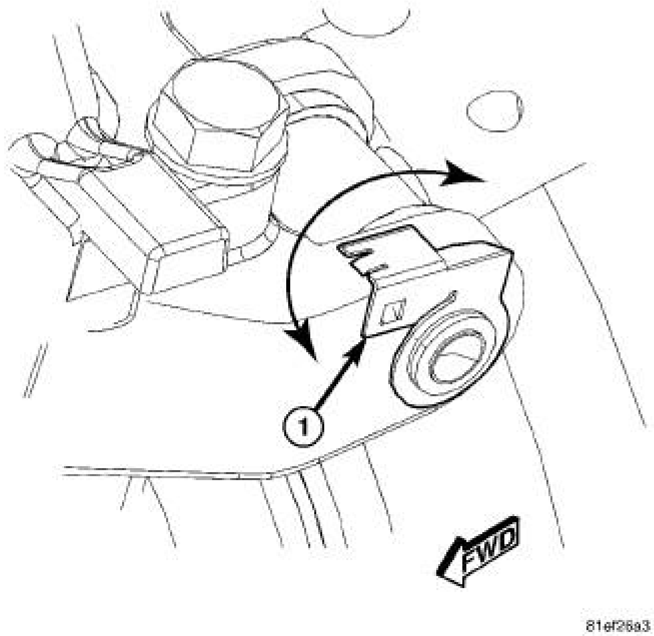


Fig. 250: Shifter Roll Pin Rotation
Courtesy of CHRYSLER GROUP, LLC

13. Rotate each of the locking tabs (1) to disengage them from the roll pins.

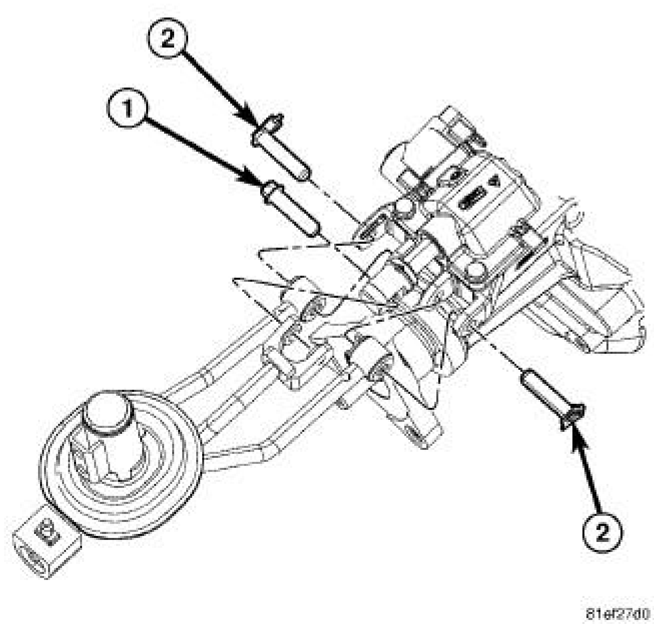


Fig. 251: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

14. Remove the roll pins (2) holding the shift linkage to the transmission.
15. Remove the shift linkage from the vehicle.

INSTALLATION

GEARSHIFT MECHANISM

1. Place the shift linkage in position on the vehicle.

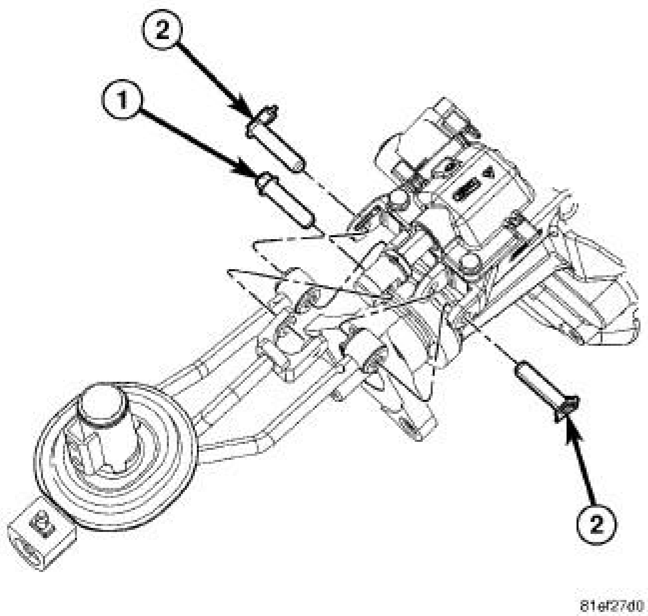


Fig. 252: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

2. Install the roll pins (2) to hold the shift linkage to the transmission.

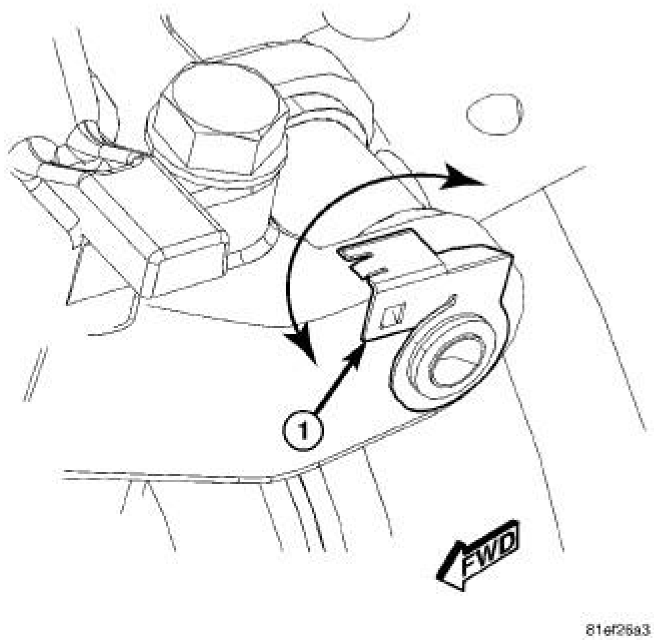


Fig. 253: Shifter Roll Pin Rotation
Courtesy of CHRYSLER GROUP, LLC

3. Install and rotate the locking tabs (1) to engage them onto the roll pins.

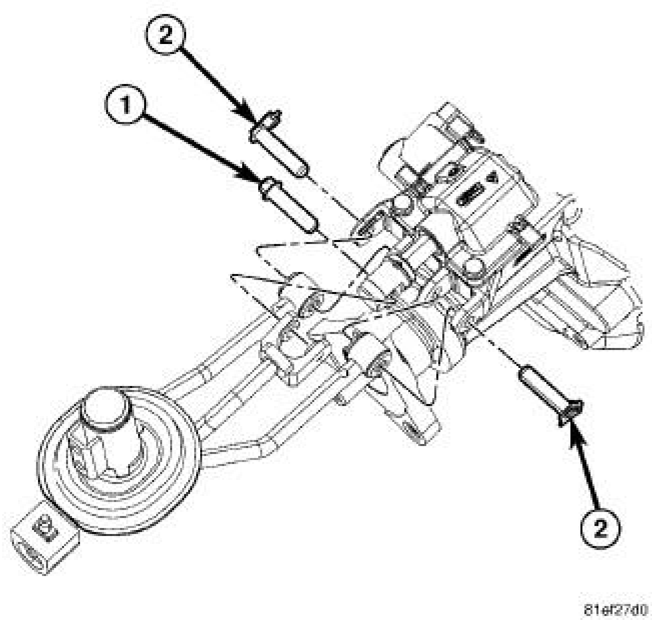


Fig. 254: Shift Linkage Bolt & Retaining Pins
Courtesy of CHRYSLER GROUP, LLC

4. Install the shift linkage bolt (1) and tighten to the proper SPECIFICATIONS .

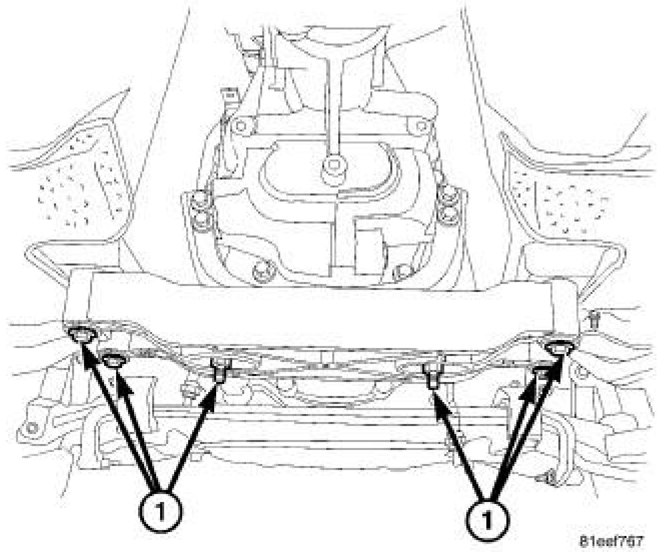


Fig. 255: Crossmember And Isolator
Courtesy of CHRYSLER GROUP, LLC

5. Lift the transmission enough to gain clearance for the crossmember.
6. Place the crossmember in position under the vehicle.
7. Install the crossmember, the crossmember bolts (1) and tighten to the proper **SPECIFICATIONS** .
8. Install the drive shaft. Refer to **INSTALLATION** .
9. Install the exhaust system. Refer to **MUFFLER, EXHAUST, INSTALLATION** .
10. Lower the vehicle.

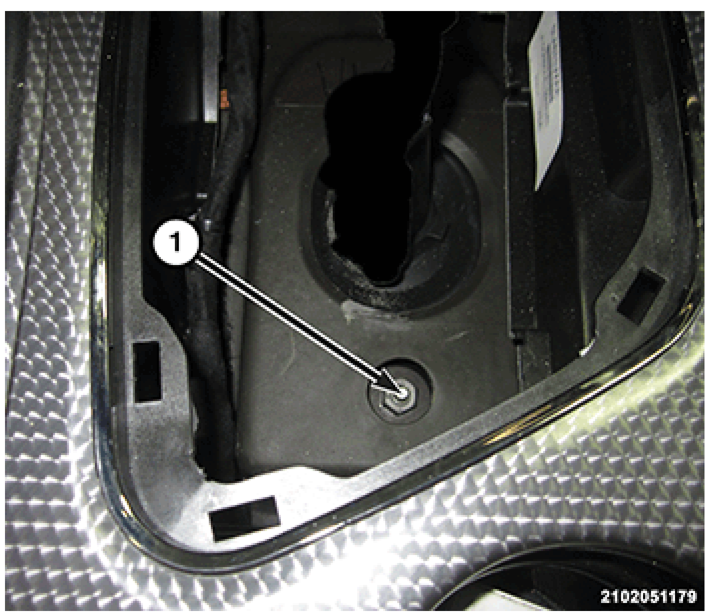


Fig. 256: Shift Linkage To Closure Panel Nut
Courtesy of CHRYSLER GROUP, LLC

11. Install the nut (2) to holding the shift linkage to the closure panel.

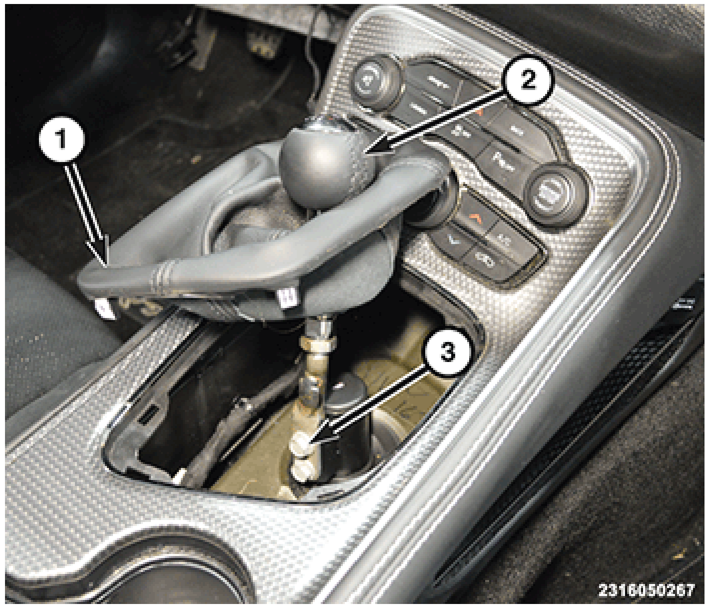


Fig. 257: Shifter Boot, Shift Lever & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Install the shift lever (2) and the shift lever bolts (3) on the shifter assembly and tighten to the proper **SPECIFICATIONS** .
13. Install the shift lever boot (1).
14. Connect the negative battery cable.
15. Road test the vehicle to verify proper operation.

SEAL, EXTENSION HOUSING

REMOVAL

EXTENSION HOUSING SEAL

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the drive shaft. Refer to **REMOVAL** .

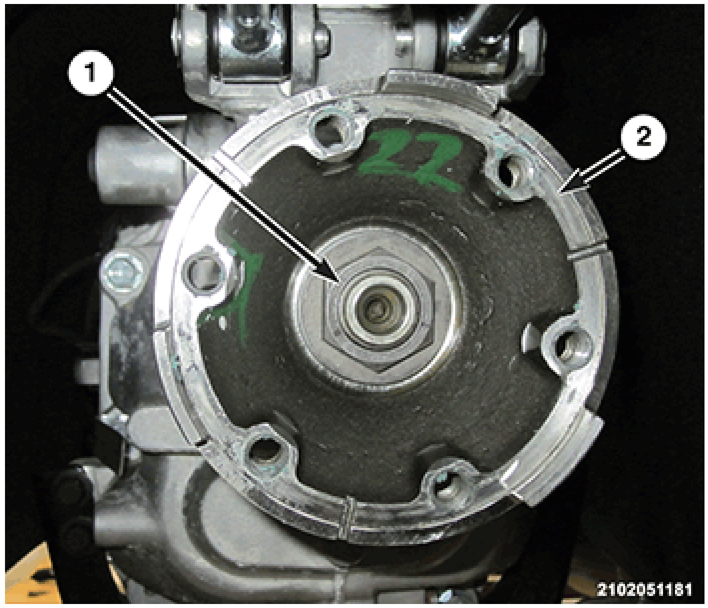


Fig. 258: Output Flange & Locknut
Courtesy of CHRYSLER GROUP, LLC

3. Hold the output flange (2) with Special Tool (special tool #C-3281, Holder, Flange) Flange Wrench while removing the output flange locknut (1).
4. Remove the output flange (2).
5. Remove the extension housing seal.
6. Clean and inspect extension housing seal location.

INSTALLATION

OUTPUT SHAFT SEAL

1. Install extension housing seal into extension housing (1) with Installer (special tool #7884, Installer, Seal) (2).
2. Install the extension housing seal in the extension housing (1) with Installer (special tool #7884, Installer, Seal) (2).

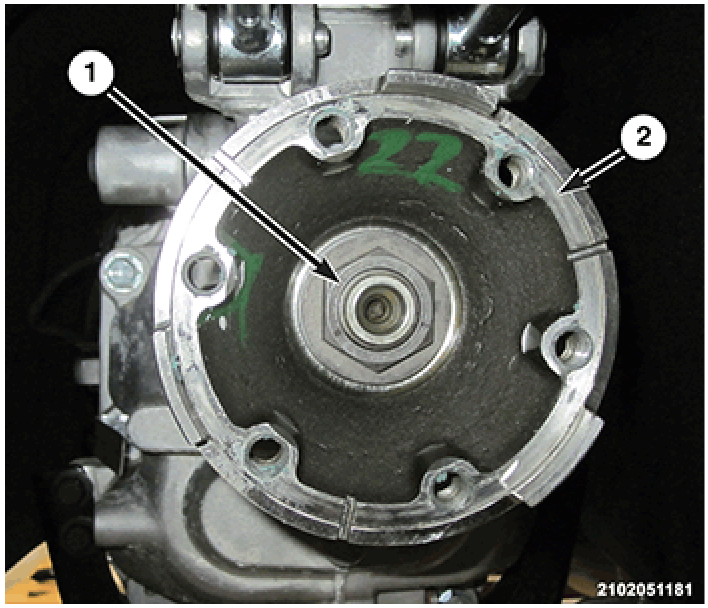


Fig. 259: Output Flange & Locknut
Courtesy of CHRYSLER GROUP, LLC

3. Install the output flange (2) to the transmission output shaft.
4. Hold the output flange (2) with Special Tool (special tool #C-3281, Holder, Flange) (2) Flange Wrench and tighten the output flange locknut (1) to the proper **SPECIFICATIONS** .
5. Install the drive shaft. Refer to **INSTALLATION** .
6. Check transmission fluid level and fill as necessary. Refer to **STANDARD PROCEDURE** .

SOLENOID, TRANSMISSION SKIP SHIFT

DESCRIPTION

DESCRIPTION

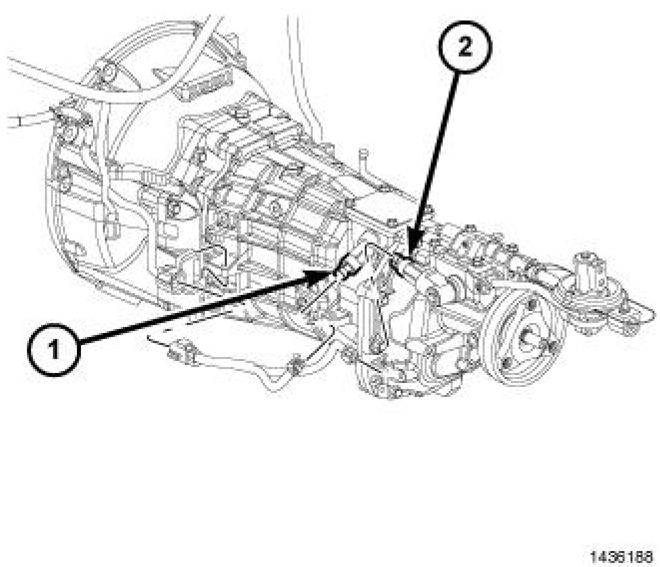


Fig. 260: Skip Shift & Reverse Lockout Solenoids
Courtesy of CHRYSLER GROUP, LLC

The skip shift solenoid (1) prevents the operator from shifting into second or third gear during part throttle operation. The solenoid is threaded into the left side of the transmission case.

OPERATION

OPERATION

The Powertrain Control Module (PCM) controls the skip shift solenoid, locking out second and third gear when all of the following conditions are met:

- Engine coolant exceeds 41Â°C (106Â°F)
- Vehicle speed is between 19 and 20 MPH
- The PCM verified first gear speed/RPM
- Throttle Position Sensor (TPS) signal is less than 0.68 volt above closed throttle (23 percent throttle opening)

The solenoid resets when vehicle speed drops below 3 MPH.

SOLENOID, TRANSMISSION, REVERSE LOCKOUT

DESCRIPTION

DESCRIPTION

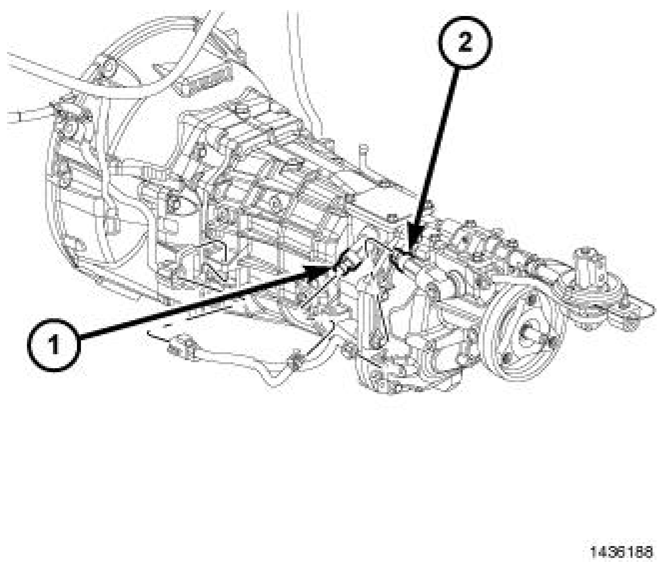


Fig. 261: Skip Shift & Reverse Lockout Solenoids
Courtesy of CHRYSLER GROUP, LLC

The reverse inhibitor solenoid (2) helps the operator to avoid shifting into reverse when the vehicle speed is greater than 3 mph. The solenoid is mounted to the left/rear side of the transmission with a bolt.

OPERATION

OPERATION

If the vehicle speed is less than 3 mph, the PCM sends a ground to energize the solenoid, which provides a low

spring load to the shift knob at the reverse gate and allows shifting the transmission into reverse. If the vehicle speed is greater than 3 mph, the solenoid is deactivated, which provides a high spring load to the shift knob at the reverse gate to help prevent shifting the transmission into reverse.

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Article GUID: A00735945

GENERAL INFORMATION

Trouble Shooting - Basic Procedures

* PLEASE READ THIS FIRST *

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.**

ACCESSORIES & ELECTRICAL

CHARGING SYSTEM TROUBLE SHOOTING

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BASIC CHARGING SYSTEM TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Vehicle Will Not Start	
Dead battery	Check battery cells, alternator belt tension and alternator output
Loose or corroded battery connections	Check all charging system connections
Ignition circuit or switch malfunction	Check and replace as necessary
Alternator Light Stays On With Engine Running	
Loose or worn alternator drive belt	Check alternator drive tension and condition, See Belt Adjustment in TUNE-UP article in the TUNE-UP section
Loose alternator wiring connections	Check all charging system connections
Short in alternator light wiring	See Indicator Warning Lights in STANDARD INSTRUMENTS in the ACCESSORIES & EQUIPMENT section
Defective alternator stator or diodes	See Bench Tests in ALTERNATOR article
Defective regulator	See Regulator Check in ALTERNATOR article
Alternator Light Stays Off With Ignition Switch ON	

CONDITION & POSSIBLE CAUSE	CORRECTION
Blown fuse	See WIRING DIAGRAMS
Defective alternator	See Testing in ALTERNATOR article
Defective indicator light bulb or socket	See Indicator Warning Lights in STANDARD INSTRUMENTS in the ACCESSORIES & EQUIPMENT section
Alternator Light Stays OFF With Ignition Switch ON	
Short in alternator wiring	See On-Vehicle Tests in ALTERNATOR article
Defective rectifier bridge	See Bench Tests in ALTERNATOR article
Lights or Fuses Burn Out Frequently	
Defective alternator wiring	See On-Vehicle Tests in ALTERNATOR article
Defective regulator	See Regulator Check in ALTERNATOR article
Defective battery	Check and replace as necessary
Ammeter Gauge Shows Discharge	
Loose or worn drive belt	Check alternator drive belt tension and condition. See Belt Adjustment in TUNE-UP article in the TUNE-UP section
Defective wiring	Check all wires and wire connections
Defective alternator or regulator	See Bench Tests and On-Vehicle Tests in ALTERNATOR article
Defective ammeter, or improper ammeter wiring connection	See Testing in STANDARD INSTRUMENTS in the ACCESSORIES & EQUIPMENT section
Noisy Alternator	
Loose drive pulley	Tighten drive pulley attaching nut
Loose mounting bolts	Tighten all alternator mounting bolts
Worn or dirty bearings	See Bearing Replacement ALTERNATOR article
Defective diodes or stator	See Bench Test in ALTERNATOR article
Battery Does Stay Charged	
Loose or worn drive belt	Check alternator drive belt tension and condition. See Belt Adjustment in appropriate TUNE-UP article in the TUNE-UP section
Loose or corroded battery connections	Check all charging system connections
Loose alternator connections	Check all charging system connections
Defective alternator or battery	See On-Vehicle Tests and Bench Tests in ALTERNATOR article
Add-on electrical accessories exceeding alternator capacity	Install larger alternator
Battery Overcharged-Uses Too Much Water	
Defective battery	Check alternator output and repair as necessary
Defective alternator	See On-Vehicle Test and Bench Tests in ALTERNATOR article
Excessive alternator voltage	Check alternator output and repair as necessary

IGNITION SYSTEM TROUBLE SHOOTING

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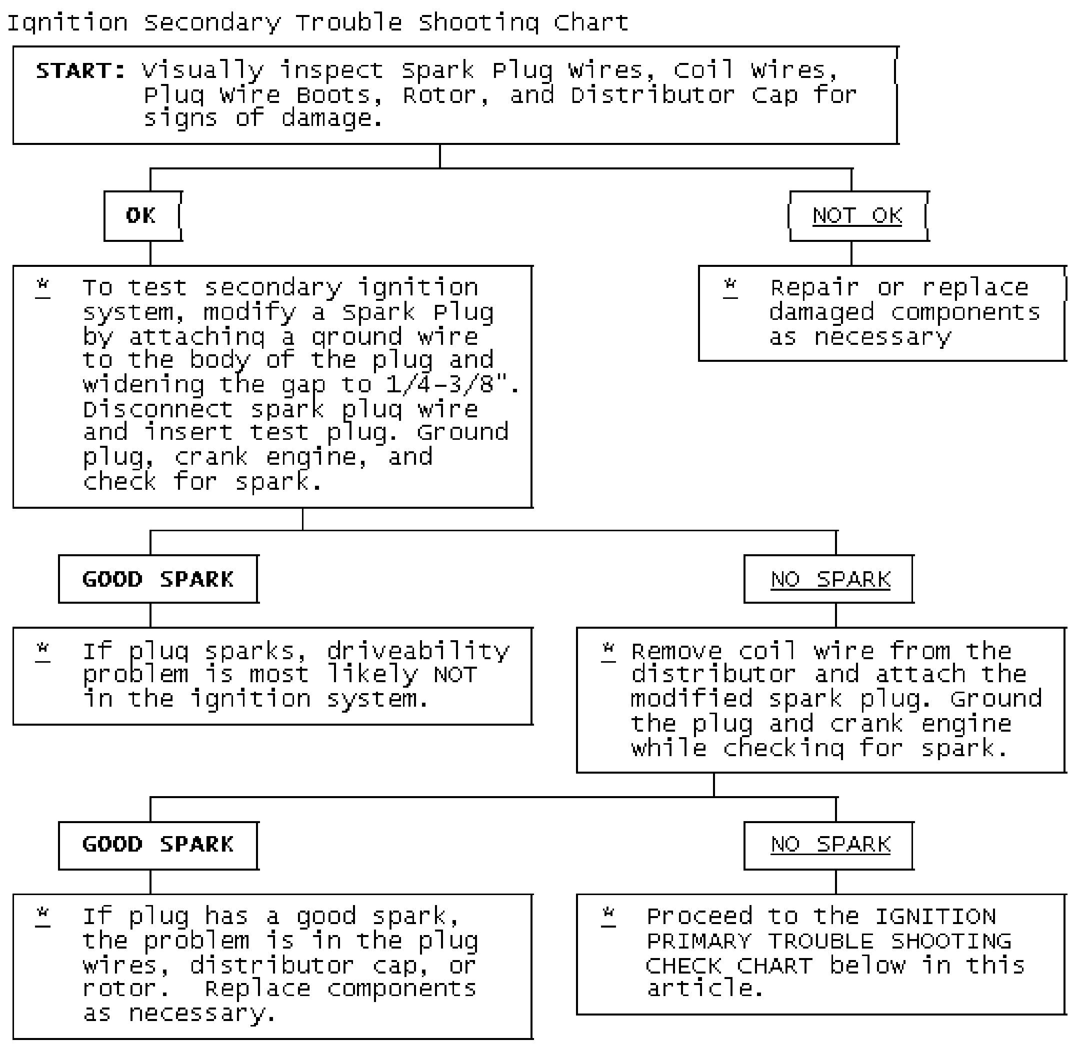

Fig. 1: Ignition Secondary Trouble Shooting Chart

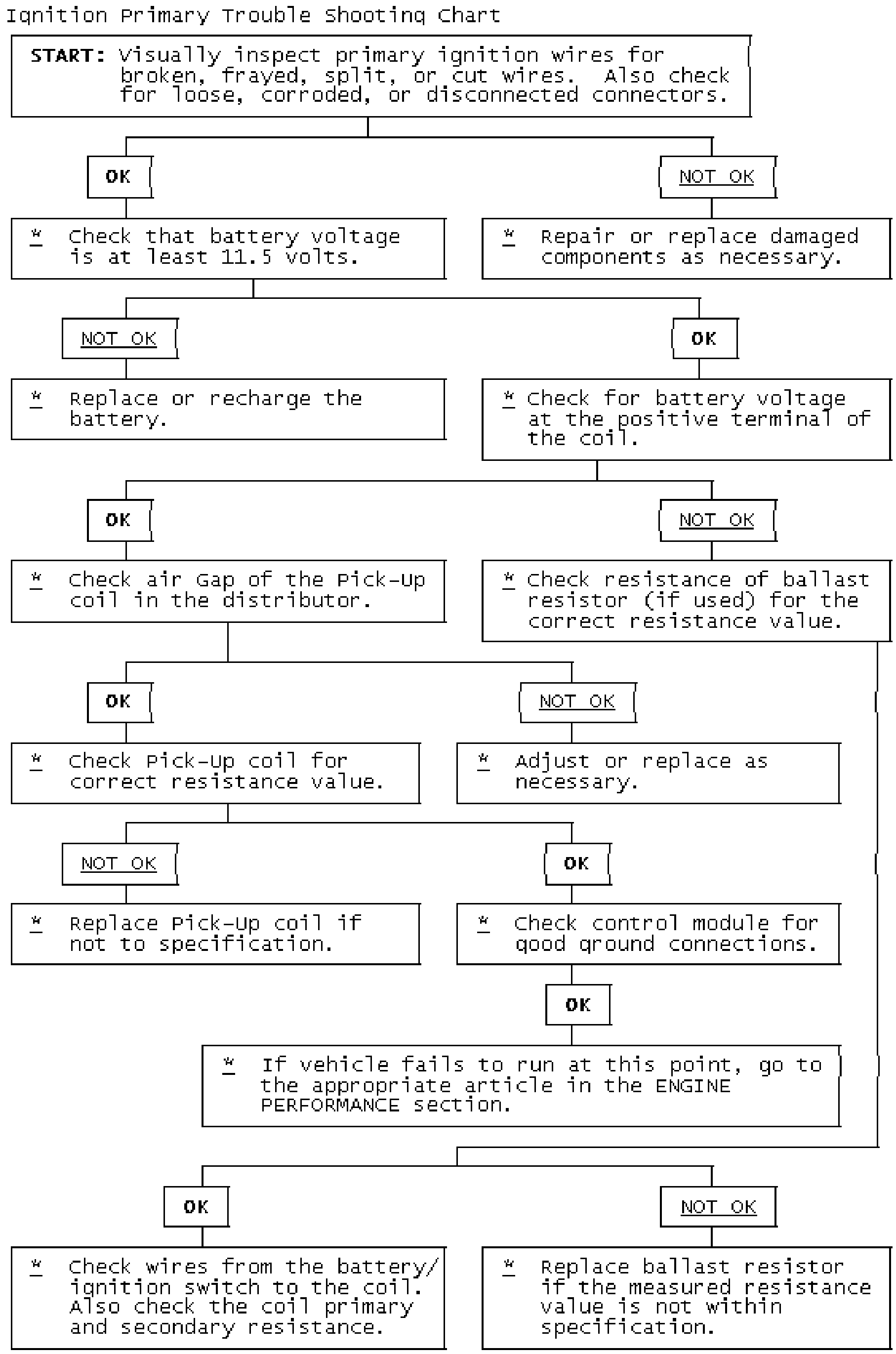

Fig. 2: Ignition Primary Trouble Shooting Chart

STARTER TROUBLE SHOOTING

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symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC STARTER TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Starter Fails to Operate	
Dead battery or bad connections between starter and battery	Check battery charge and all wires and connections to starter
Ignition switch faulty or misadjusted	Adjust or replace ignition switch
Open circuit between starter switch ignition terminal on starter relay	Check and repair wires and connections as necessary
Starter relay or starter defective	See Testing in STARTER article
Open solenoid pull-in wire	Testing in STARTER article
Starter Does Not Operate and Headlights Dim	
Weak battery or dead cell	Charge or replace battery as necessary
Loose or corroded battery connections	Check that battery connections are clean and tight
Internal ground in starter windings	See Testing in STARTER article
Grounded starter fields	See Testing in STARTERS
Armature rubbing on pole	See STARTER article shoes
Starter Turns but Engine Does Not Rotate	
Starter clutch slipping	See STARTER article
Broken clutch housing	See STARTER article
Pinion shaft rusted or dry	See STARTER article
Engine basic timing incorrect	See Ignition Timing in TUNE-UP article
Broken teeth on engine flywheel	Replace flywheel and check for starter pinion gear damage
Starter Will Not Crank Engine	
Faulty overrunning clutch	See STARTER article
Broken clutch housing	See STARTER article
Broken flywheel teeth	Replace flywheel and check for starter pinion gear damage
Armature shaft sheared or reduction gear teeth stripped	See STARTER article
Weak battery	Charge or replace battery as necessary
Faulty solenoid	See On-Vehicle Tests in STARTER article
Poor grounds	Check all ground connections for tight and clean connections
Ignition switch faulty or misadjusted	Adjust or replace ignition switch as necessary
Starter Cranks Engine Slowly	
Battery weak or defective	Charge or replace battery as necessary
Engine overheated	See ENGINE COOLING SYSTEM article
Engine oil too heavy	Check that proper viscosity oil is used

CONDITION & POSSIBLE CAUSE	CORRECTION
Poor battery-to-starter connections	Check that all between battery and starter are clean and tight
Current draw too low or too high	See Bench Tests in STARTER article
Bent armature, loose pole shoes screws or worn bearing	See STARTER article
Burned solenoid contacts	Replace solenoid
Faulty starter	Replace starter
Starter Engages Engine Only Momentarily	
Engine timing too far advanced	See Ignition Timing in TUNE-UP article
Overrunning clutch not engaging properly	Replace overrunning clutch. See STARTER article
Broken starter clutch	See STARTER article
Broken teeth on engine flywheel	Replace flywheel and check starter pinion gear for damage
Weak drive assembly thrust spring	See STARTER article
Weak hold-in coil	See Bench Tests in STARTER article
Starter Drive Will Not Engage	
Defective point assembly	See Testing in STARTER article
Poor point assembly ground	See Testing in STARTER article
Defective pull-in coil	Replace starter solenoid
Starter Relay Does Not Close	
Dead battery	Charge or replace battery as necessary
Faulty wiring	Check all wiring and connections leading to relay
Neutral safety switch faulty	Replace neutral safety switch
Starter relay faulty	Replace starter relay
Starter Drive Will Not Disengage	
Starter motor loose on mountings	Tighten starter attach bolts
Worn drive end bushing	See STARTER article
Damaged engine flywheel teeth	Replace flywheel and starter pinion gear for damage
Drive yolk return spring broken or missing	Replace return spring
Faulty ignition switch	Replace ignition switch
Insufficient clearance between winding leads to solenoid terminal and main contact in solenoid	Replace starter solenoid
Starter clutch not disengaging	Replace starter clutch
Ignition starter switch	Replace ignition switch contacts sticking
Starter Relay Operates but Solenoid Does Not	
Faulty solenoid switch, switch connections or relay	Check all wiring between relay and solenoid or replace relay or solenoid as necessary
Broken lead or loose soldered connections	Repair wire or wire connections as necessary
Solenoid Plunger Vibrates When Switch is Engaged	
Weak battery	Charge or replace battery as necessary

CONDITION & POSSIBLE CAUSE	CORRECTION
Solenoid contacts corroded	Clean contacts or replace solenoid
Faulty wiring	Check all wiring leading to solenoid
Broken connections inside switch cover	Repair connections or replace solenoid
Open hold-in wire	solenoid
Low Current Draw	
Worn brushes or weak brush springs	Replace brushes or brush springs as necessary
High Pitched Whine During Cranking Before Engine Fires but Engine Fires and Cranks Normally	
Distance too great between starter pinion and flywheel	Align starter or check that correct starter and flywheel are being used
High Pitched Whine After Engine Fires With Key released. Engine Fires and Cranks Normally	
Distance too small between starter pinion and flywheel	Flywheel runout contributes to the intermittent nature

AIR CONDITIONING & HEAT

AIR CONDITIONING TROUBLE SHOOTING

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BASIC AIR CONDITIONING TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE
Compressor Not Working	Compressor clutch circuit open.
.....	Compressor clutch coil inoperative.
.....	Poor clutch ground connection.
.....	Fan belts loose.
.....	Thermostatic switch inoperative.
.....	Thermostatic switch not adjusted.
.....	Ambient temperature switch open.
.....	Superheat fuse blown.
Excessive Noise or Vibration	Missing or loose mounting bolts.
.....	Bad idler pulley bearings.
.....	Fan belts not tightened correctly.
.....	Compressor clutch contacting body.
.....	Excessive system pressure.
.....	Compressor oil level low.
.....	Damaged clutch bearings.
.....	Damaged reed valves.
.....	Damaged compressor.

CONDITION	POSSIBLE CAUSE
Insufficient or No Cooling; Compressor Working	Expansion valve inoperative.
.....	Heater control valve stuck open.
.....	Low system pressure.
.....	Blocked condenser fins.
.....	Blocked evaporator fins.
.....	Vacuum system leak.
.....	Vacuum motors inoperative.
.....	Control cables improperly adjusted.
.....	Restricted air inlet.
.....	Mode doors binding.
.....	Blower motor inoperative.
.....	Temperature above system capacity.

HEATER SYSTEM TROUBLE SHOOTING

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BASIC HEATER SYSTEM TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE
Insufficient, Erratic, or No Heat	Low Coolant Level
.....	Incorrect thermostat.
.....	Restricted coolant flow through core.
.....	Heater hoses plugged.
.....	Misadjusted control cable.
.....	Sticking heater control valve.
.....	Vacuum hose leaking.
.....	Vacuum hose blocked.
.....	Vacuum motors inoperative.
.....	Blocked air inlet.
.....	Inoperative heater blower motor.
.....	Oil residue on heater core fins.
.....	Dirt on heater core fins.
Too Much Heat	Improperly adjusted cables.
.....	Sticking heater control valve.
.....	No vacuum to heater control valve.
.....	Temperature door stuck open.

CONDITION	POSSIBLE CAUSE
Air Flow Changes During Acceleration	Vacuum system leak.
.....	Bad check valve or reservoir.
Air From Defroster At All Times	Vacuum system leak.
.....	Improperly adjusted control cables.
.....	Inoperative vacuum motor.
Blower Does Not Operate Correctly	Blown fuse.
.....	Blower motor windings open.
.....	Resistors burned out.
.....	Motor ground connection loose.
.....	Wiring harness connections loose.
.....	Blower motor switch inoperative.
.....	Blower relay inoperative.
.....	Fan binding or foreign object in housing.
.....	Fan blades broken or bent.

BRAKES

BRAKE SYSTEM TROUBLE SHOOTING

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BRAKE SYSTEM TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Brakes Pull Left or Right	
Incorrect tire pressure	Inflate tires to proper pressure
Front end out of alignment	See WHEEL ALIGNMENT
Mismatched tires	Check tires sizes
Restricted brake lines or hoses	Check hose routing
Loose or malfunctioning caliper	See DISC BRAKES or BRAKE SYSTEM
Bent shoe or oily linings	See DRUM BRAKES or BRAKE SYSTEM
Malfunctioning rear brakes	See DRUM, DISC BRAKES or BRAKE SYSTEM
Loose suspension parts	See SUSPENSION
Noises Without Brakes Applied	
Front linings worn out	Replace linings
Dust or oil on drums or rotors	See DRUM, DISC BRAKES or BRAKE SYSTEM
Noises With Brakes Applied	

CONDITION & POSSIBLE CAUSE	CORRECTION
Insulator on outboard shoe damaged	See DISC BRAKES or BRAKE SYSTEM
Incorrect pads or linings	Replace pads or linings
Brake Rough, Chatters or Pulsates	
Excessive lateral runout	Check rotor runout
Parallelism not to specifications	Reface or replace rotor
Wheel bearings not adjusted	See SUSPENSION
Rear drums out-of-round	Reface or replace drums
Disc pad reversed, steel against rotor	Remove and reinstall pad
Excessive Pedal Effort	
Malfunctioning power unit	See POWER BRAKES or BRAKE SYSTEM
Partial system failure	Check fluid and pipes
Worn disc pad or lining	Replace pad or lining
Caliper piston stuck or sluggish	See DISC BRAKES or BRAKE SYSTEM
Master cylinder piston stuck	See MASTER CYLINDERS or BRAKE SYSTEM
Brake fade due to incorrect pads for linings	Replace pads or linings
Linings or pads glazed	Replace pads or linings
Worn drums	Reface or replace drums
Excessive Pedal Travel	
Partial brake system failure	Check fluid and pipes
Insufficient fluid in master cylinder	See MASTER CYLINDERS or BRAKE SYSTEM
Air trapped in system	See BRAKE BLEEDING or BRAKE SYSTEM
Rear brakes not adjusted	See Adjustments in DRUM BRAKES or BRAKE SYSTEM
Bent shoe or lining	See DRUM BRAKES or BRAKE SYSTEM
Plugged master cylinder cap	See MASTER CYLINDERS or BRAKE SYSTEM
Improper brake fluid	Replace brake fluid
Pedal Travel Decreasing	
Compensating port plugged	See MASTER CYLINDERS or BRAKE SYSTEM
Swollen cup in master cylinder	See MASTER CYLINDERS or BRAKE SYSTEM
Master cylinder piston not returning	See MASTER CYLINDERS or BRAKE SYSTEM
Weak shoe retracting springs	See DRUM BRAKES BRAKE SYSTEM
Wheel cylinder piston sticking	See DRUM BRAKES or BRAKE SYSTEM
Dragging Brakes	
Master cylinder pistons not returning	See MASTER CYLINDERS BRAKE SYSTEM
Restricted brake lines or hoses	Check line routing
Incorrect parking brake adjustment	See DRUM BRAKES BRAKE SYSTEM

CONDITION & POSSIBLE CAUSE	CORRECTION
Parking Brake cables frozen	See DRUM BRAKES BRAKE SYSTEM
Incorrect installation of inboard disc pad	Remove and replace correctly
Power booster output rod too long	See POWER BRAKE UNITS BRAKE SYSTEM
Brake pedal not returning freely	See DISC, DRUM BRAKES BRAKE SYSTEM
Brakes Grab or Uneven Braking Action	
Malfunction of combination valve	See CONTROL VALVE or BRAKE SYSTEM
Malfunction of power brake unit	See POWER BRAKE UNITS or BRAKE SYSTEM
Binding brake pedal	See DISC, DRUM BRAKES or BRAKE SYSTEM
Pulsation or Roughness	
Uneven pad wear caused by caliper	See DISC BRAKES or BRAKE SYSTEM
Uneven rotor wear	See DISC BRAKES or BRAKE SYSTEM
Drums out-of-round	Reface or replace drums

ENGINE MECHANICAL

COOLING SYSTEM TROUBLE SHOOTING

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COOLING SYSTEM TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE	CORRECTION
Overheating	
Coolant Leak	Fill/Pressure Test System
A/C Condenser Fins Clogged	Remove/Clean Condenser
Radiator Fins Clogged	Remove/Clean Radiator
Thermostat Stuck Closed	Replace Thermostat
Clogged Cooling System Passages	Clean/Flush Cooling System
Water Pump Malfunction	Replace Water Pump
Fan Clutch Malfunction	Replace Fan Clutch
Retarded Ignition Timing	Reset Ignition Timing
Cooling Fan Malfunction	Test Cooling Fan/Circuit
Cooling Fan Motor Malfunction	Test Fan Motor
Cooling Fan Relay Malfunction	Test Fan Relay
Faulty Radiator Cap	Replace Radiator Cap
Broken/Slipping Fan Belt	Replace Fan Belt
Restricted Exhaust	Repair Exhaust System
Corrosion	

CONDITION & POSSIBLE CAUSE	CORRECTION
Impurities In Coolant	Clean/Flush System
Coolant Leakage	
Damaged hose	Replace Hose
Leaky Water Pump	Replace Water Pump
Damaged Radiator Seam	Replace/Repair Radiator
Leaky Thermostat Cover	Replace Thermostat Cover
Cylinder Head Problem	Check Head/Head Gasket
Leaky Freeze Plugs	Replace Freeze Plugs
Recovery System Inoperative	
Loose and/or Defective Radiator Cap	Replace Radiator Cap
Overflow Tube Clogged and/or Leaking	Repair Tube
Recovery Bottle Vent Restricted	Clean Vent
No Heater Core Flow	
Collapsed Heater Hose	Replace Heater Hose
Plugged Heater Core	Clean/Replace Heater Core
Faulty Heater Valve	Replace Heater Valve

GASOLINE ENGINE - MECHANICAL TROUBLE SHOOTING

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BASIC GASOLINE ENGINE - MECHANICAL TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Lopes At Idle	
Intake manifold-to-head leaks	Replace manifold gasket, See ENGINES
Blown head gasket	Replace head gasket, See ENGINES
Worn timing gears, chain or sprocket	Replace gears, chain or sprocket
Worn camshaft lobes	Replace camshaft, See ENGINES
Overheated engine	Check cooling system, See COOLING
Blocked crankcase vent valve	Remove restriction
Leaking EGR valve	Repair leak and/or replace valve
Faulty fuel pump	Replace fuel pump
Engine Has Low Power	
Leaking fuel pump	Repair leak and/or replace fuel pump
Excessive piston-to-bore clearance	Install larger pistons, See ENGINES
Sticking valves or weak valve springs	Check valve train components, See ENGINES
Incorrect valve timing	Reset valve timing, See ENGINES
Worn camshaft lobes	Replace camshaft, See ENGINES

CONDITION & POSSIBLE CAUSE	CORRECTION
Blown head gasket	Replace head gasket. See ENGINES.
Clutch slipping	Adjust pedal and/or replace components, See ENGINES
Engine overheating	Check cooling system, See COOLING
Auto. Trans. pressure regulator valve faulty	Replace pressure regulator valve
Auto. Trans. fluid level too low	Add fluid as necessary
Improper vacuum diverter valve operation	Replace vacuum diverter valve
Vacuum leaks	Inspect vacuum system and repair as required
Leaking piston rings	Replace piston rings, See ENGINES
Faulty High Speed Operation	
Low fuel pump volume	Replace fuel pump
Leaking valves or worn	Replace valves and/or springs, See ENGINES
Incorrect valve timing	Reset valve timing,See ENGINES
Intake manifold restricted	Remove restriction
Worn distributor shaft	Replace distributor
Faulty Acceleration	
Improper fuel pump stroke	Remove pump and reset pump stroke
Incorrect ignition timing	Reset ignition timing, See TUNE-UP
Leaking valves	Replace valves, See ENGINES
Worn fuel pump diaphragm or piston	Replace diaphragm or piston
Intake Backfire	
Improper ignition timing	Reset ignition timing, See TUNE-UP
Faulty accelerator pump discharge	Replace accelerator pump
Improper choke operation	Check choke and adjust as required
Defective EGR valve	Replace EGR valve
Fuel mixture too lean	Reset air/fuel mixture, See TUNE-UP
Choke valve initial clearance too large	Reset choke valve initial clearance
Exhaust Backfire	
Vacuum leak	Inspect and repair vacuum system
Faulty vacuum diverter valve	Replace vacuum diverter valve
Faulty choke operation	Check choke and adjust as required
Exhaust system leak	repair exhaust system leak
Engine Detonation	
Ignition timing too far advanced	Reset ignition timing, See TUNE-UP
Faulty ignition system	Check ignition timing, See TUNE-UP
Spark plugs loose or faulty	Retighten or replace plugs
Fuel delivery system clogged	Inspect lines, pump and filter for clog
EGR valve inoperative	Replace EGR valve
PCV system inoperative	Inspect and/or replace hoses or valve
Vacuum leaks	Check vacuum system and repair leaks
Excessive combustion chamber deposits	Remove built-up deposits

CONDITION & POSSIBLE CAUSE	CORRECTION
Leaking, sticking or broken valves	Inspect and/or replace valves
External Oil Leakage	
Fuel pump improperly seated or worn gasket	Remove pump, replace gasket and seat properly
Oil pan gasket broken or pan bent	Straighten pan and replace gasket
Timing chain cover gasket broken	Replace timing chain cover gasket
Rear main oil seal worn	Replace rear main oil seal
Oil pan drain plug not seated properly	Remove and reinstall drain plug
Camshaft bearing drain hole blocked	Remove restriction
Oil pressure sending switch leaking	Remove and reinstall sending switch
Excessive Oil Consumption	
Worn valve stems or guides	Replace stems or guides, See ENGINES
Valve "O" ring seals damaged	Replace "O" ring seals, See ENGINES
Plugged oil drain back holes	Remove restrictions
Improper PCV valve operation	Replace PCV valve
Engine oil level too high	Remove excess oil
Engine oil too thin	Replace thicker oil
Valve stem oil deflectors damaged	Replace oil deflectors
Incorrect piston rings	Replace piston rings, See ENGINES
Piston ring gaps not staggered	Reinstall piston rings, See ENGINES
Insufficient piston ring tension	Replace rings, See ENGINES
Piston ring grooves or oil return	slots clogged Replace piston rings, See ENGINES
Piston rings sticking in grooves	Replace piston rings, See ENGINES
Piston ring grooves excessively worn	Replace piston and rings, See ENGINES
Compression rings installed upside down	Replace compression rings correctly, See ENGINES
Worn or scored cylinder walls	Rebore cylinders or replace block
Mismatched oil ring expander and rail	Replace oil ring expander and rail, See ENGINES
Intake gasket dowels too long	Replace intake gasket dowels
Excessive main or connecting rod bearing clearance	Replace main or connecting rod bearings, See ENGINES
No Oil Pressure	
Low oil level	Add oil to proper level
Oil pressure sender or gauge broken	Replace sender or gauge
Oil pump malfunction	Remove and overhaul oil pump, See ENGINES
Oil pressure relief valve sticking	Remove and reinstall valve
Oil pump passages blocked	Overhaul oil pump, See ENGINES
Oil pickup screen or tube blocked	Remove restriction
Loose oil inlet tube	Tighten oil inlet tube
Loose camshaft bearings	Replace camshaft bearings, See ENGINES

CONDITION & POSSIBLE CAUSE	CORRECTION
Internal leakage at oil passages	Replace block or cylinder head
Low Oil Pressure	
Low engine oil level	Add oil to proper level
Engine oil too thin	Remove and replace with thicker oil
Excessive oil pump clearance	Reduce oil pump clearance, See ENGINES
Oil pickup tube or screen blocked	Remove restrictions
Main, rod or cam bearing clearance excessive	Replace bearing to reduce clearance, See ENGINES
High Oil Pressure	
Improper grade of oil	Replace with proper oil
Oil pressure relief valve stuck closed	Eliminate binding
Oil pressure sender or gauge faulty	Replace sender or gauge
Noisy Main Bearings	
Inadequate oil supply	Check oil delivery to main bearings
Excessive main bearing clearance	Replace main bearings, See ENGINES
Excessive crankshaft end play	Replace crankshaft, See ENGINES
Loose flywheel or torque converter	Tighten attaching bolts
Loose or damaged vibration damper	Tighten or replace vibration damper
Crankshaft journals out-of-round	Re-grind crankshaft journals
Excessive belt tension	Loosen belt tension
Noisy Connecting Rods	
Excessive bearing clearance or missing bearing	Replace bearing, See ENGINES
Crankshaft rod journal out-of-round	Re-grind crankshaft journal
Misaligned connecting rod or cap	Remove rod or cap and realign
Incorrectly tightened rod bolts	Remove and re-tighten rod bolts
Noisy Pistons and Rings	
Excessive piston-to-bore clearance	Install larger pistons, See ENGINES
Bore tapered or out-of-round	Rebore block
Piston ring broken	Replace piston rings, See ENGINES
Piston pin loose or seized	Replace piston pin, See ENGINES
Connecting rods misaligned	Realign connecting rods
Ring side clearance too loose or tight	Replace with larger or smaller rings
Carbon build-up on piston	Remove carbon
Noisy Valve Train	
Worn or bent push rods	Replace push rods, See ENGINES
Worn rocker arms or bridged pivots	Replace push rods, See ENGINES
Dirt or chips in valve lifters	Remove lifters and remove dirt/chips
Excessive valve lifter leak-down	Replace valve lifters, See ENGINES
Valve lifter face worn	Replace valve lifters, See ENGINES
Broken or cocked valve springs	Replace or reposition springs
Too much valve stem-to-guide clearance	Replace valve guides, See ENGINES

CONDITION & POSSIBLE CAUSE	CORRECTION
Valve bent	Replace valve, See ENGINES
Loose rocker arms	Retighten rocker arms, See ENGINES
Excessive valve seat run-out	Reface valve seats, See ENGINES
Missing valve lock	Install new valve lock
Excessively worn camshaft lobes	Replace camshaft, See ENGINES
Plugged valve lifter oil holes	Eliminate restriction or replace lifter
Faulty valve lifter check ball	Replace lifter check ball, See ENGINES
Rocker arm nut installed upside down	Remove and reinstall correctly
Valve lifter incorrect for engine	Remove and replace valve lifters
Faulty push rod seat or lifter plunger	Replace plunger or push rod
Noisy Valves	
Improper valve lash	Re-adjust valve lash, See ENGINES
Worn or dirty valve lifters	Clean and/or replace lifters
Worn valve guides	Replace valve guides, See ENGINES
Excessive valve seat or face run-out	Reface seats or valve face
Worn camshaft lobes	Replace camshaft, See ENGINES
Loose rocker arm studs	Re-tighten rocker arm studs, See ENGINES
Bent push rods	Replace push rods, See ENGINES
Broken valve springs	Replace valve springs, See ENGINES
Burned,Sticking or Broken Valves	
Weak valve springs or warped valves	Replace valves and/or springs, See ENGINES
Improper lifter clearance	Re-adjust clearance or replace lifters
Worn guides or improper guide clearance	Replace valve guides, See ENGINES
Out-of-round valve seats or improper seat width	Re-grind valve seats
Gum deposits on valve stems, seats or guide	Remove deposits
Improper spark timing	Re-adjust spark timing
Broken Pistons/Rings	
Undersize pistons	Replace with larger pistons, See ENGINES
Wrong piston rings	Replace with correct rings, See ENGINES
Out-of-round cylinder bore	Re-bore cylinder bore
Improper connecting rod alignment	Remove and realign connecting rods
Excessively worn ring grooves	Replace pistons, See ENGINES
Improperly assembled piston pins	Re-assemble pin-to-piston, See ENGINES
Insufficient ring gap clearance	Install new rings, See ENGINES
Engine overheating	Check cooling system
Incorrect ignition timing	Re-adjust ignition timing, See TUNE-UP
Excessive Exhaust Noise	
Leaks at manifold to head, or to pipe	Replace manifold or pipe gasket
Exhaust manifold cracked or broken	Replace exhaust manifold, See ENGINES

ENGINE PERFORMANCE

CARBURETOR TROUBLE SHOOTING:

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BASIC COLD START SYMPTOMS TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Start	
Choke not closing	Check choke operation, see FUEL SYSTEMS
Choke linkage bent	Check linkage, see FUEL SYSTEM
Engine Starts, Then Dies	
Choke vacuum kick setting too wide	Check setting and adjust see, FUEL SYSTEMS
Fast idle RPM too low	Reset RPM to specification, see TUNE-UP
Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEMS
Vacuum leak	Inspect vacuum system for leaks
Low fuel pump outlet	Repair or replace pump, see FUEL SYSTEMS
Low carburetor fuel level	Check float setting see FUEL SYSTEM
Engine Quits Under Load	
Choke vacuum kick setting incorrect	Reset vacuum kick setting,see FUEL SYSTEMS
Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEM
Incorrect hot fast idle speed RPM	Reset fast idle RPM, see TUNE-UP
Engine Starts, Runs Up, Then Idles, Slowly With Black Smoke	
Choke vacuum kick set too narrow	Reset vacuum kick, see FUEL SYSTEMS
Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEMS
Hot fast idle RPM too low	Reset fast idle RPM, see TUNE-UP

BASIC HOT START SYMPTOMS TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Start	
Engine flooded	Allow fuel to evaporate

BASIC COLD ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Stalls in Gear	
Choke vacuum kick setting incorrect	Reset choke vacuum kick, see FUEL SYSTEMS
Fast idle RPM incorrect	Reset fast idle RPM, see TUNE-UP
Fast idle cam index incorrect	Reset fast idle cam see FUEL SYSTEMS
Acceleration Sag or Stall	
Defective choke control switch	Replace choke control switch
Choke vacuum kick setting incorrect	Reset choke vacuum kick see, FUEL SYSTEMS
Float level incorrect (too low)	Adjust float level, FUEL SYSTEMS

CONDITION & POSSIBLE CAUSE	CORRECTION
Accelerator pump defective	Repair or replace pump see FUEL SYSTEMS
Secondary throttles not closed	Inspect lockout adjustment, see FUEL SYSTEMS
Sag or Stall After Warmup	
Defective choke control switch	Replace choke control switch, see FUEL SYSTEMS
Defective accelerator pump	Replace pump, see FUEL SYSTEMS
Float level incorrect (too low)	Adjust float level, see FUEL SYSTEMS
Backfiring & Black Smoke	
Plugged heat crossover system	Remove restriction

BASIC WARM ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Hesitation With Small Amount of Gas Pedal Movement	
Vacuum leak	Inspect vacuum lines
Accelerator pump weak or inoperable	Replace pump, see FUEL SYSTEMS
Float level setting too low	Reset float level, see,FUEL SYSTEMS
Metering rods sticking or binding	Inspect and/or replace rods, see FUEL SYSTEMS
Carburetor idle or transfer system plugged	Inspect system and remove restriction
Frozen or binding heated air inlet	Inspect heated air door for binding
Hesitation With Heavy Gas Pedal Movement	
Defective accelerator pump	Replace pump, see FUEL SYSTEMS
Metering rod carrier sticking or binding	Remove restriction
Large vacuum leak	Inspect vacuum system and repair leak
Float level setting too low	Reset float level, see FUEL SYSTEMS
Defective fuel pump, lines or filter	Inspect pump, lines and filter
Air door setting incorrect	Adjust air door setting, see FUEL

DIESEL ENGINE TROUBLE SHOOTING

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NOTE: **Diesel engines mechanical diagnosis is the same as gasoline engines for items such as noisy valves, bearings, pistons, etc. The following trouble shooting covers only items pertaining to diesel engines.**

BASIC DIESEL ENGINE TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Crank	
Bad battery connections or dead batteries	Check connections and/or replace batteries

CONDITION & POSSIBLE CAUSE	CORRECTION
Bad starter connections or bad starter	Check connections and/or replace starter
Engine Cranks Slowly, Won't Start	
Bad battery connections or dead batteries	Check connections and/or replace batteries
Engine oil too heavy	Replace engine oil
Engine Cranks Normally, But Will Not Start	
Glow plugs not functioning	Check glow plug system, see FUEL SYSTEMS
Glow plug control not functioning	Check controller, see FUEL SYSTEMS
Fuel not injected into cylinders	Check fuel injectors, see FUEL SYSTEMS
No fuel to injection pump	Check fuel delivery system
Fuel filter blocked	Replace fuel filter
Fuel tank filter blocked	Replace fuel tank filter
Fuel pump not operating	Check pump operation and/or replace pump
Fuel return system blocked	Inspect system and remove restriction
No voltage to fuel solenoid	Check solenoid and connections
Incorrect or contaminated fuel	Replace fuel
Incorrect injection pump timing	Re-adjust pump timing, see FUEL SYSTEMS
Low compression	Check valves, pistons, rings, see ENGINES
Injection pump malfunction	Inspect and/or replace injection pump
Engine Starts, Won't Idle	
Incorrect slow idle adjustment	Reset idle adjustment, see TUNE-UP
Fast idle solenoid malfunctioning	Check solenoid and connections
Fuel return system blocked	Check system and remove restrictions
Glow plugs go off too soon	See glow plug diagnosis in FUEL SYSTEMS
Injection pump timing incorrect	Reset pump timing, see FUEL SYSTEMS
No fuel to injection pump	Check fuel delivery system
Incorrect or contaminated fuel	Replace fuel
Low compression	Check valves, piston, rings, see ENGINES
Injection pump malfunction	Replace injection pump, see FUEL SYSTEMS
Fuel solenoid closes in RUN position	Check solenoid and connections
Engines Starts/Idles Rough W/out Smoke or Noise	
Incorrect slow idle adjustment	Reset slow idle, see TUNE-UP
Injection line fuel leaks	Check lines and connections
Fuel return system blocked	Check lines and connections
Air in fuel system	Bleed air from system
Incorrect or contaminated fuel	Replace fuel
Injector nozzle malfunction	Check nozzles, see FUEL SYSTEMS
Engines Starts and Idles Rough W/out Smoke or Noise, But Clears After Warm-Up	
Injection pump timing incorrect	Reset pump timing, see FUEL SYSTEMS
Engine not fully broken in	Put more miles on engine
Air in system	Bleed air from system
Injector nozzle malfunction	Check nozzles, see FUEL SYSTEMS

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Idles Correctly, Misfires Above Idle	
Blocked fuel filter	Replace fuel filter
Injection pump timing incorrect	Reset pump timing, see FUEL SYSTEMS
Incorrect or contaminated fuel	Replace fuel
Engine Won't Return To Idle	
Fast idle adjustment incorrect	Reset fast idle, see TUNE-UP
Internal injection pump malfunction	Replace injection pump, see FUEL SYSTEMS
External linkage binding	Check linkage and remove binding
Fuel Leaks On Ground	
Loose or broken fuel line	Check lines and connections
Internal injection pump seal leak	Replace injection pump, see FUEL SYSTEMS
Cylinder Knocking Noise	
Injector nozzles sticking open	Test injectors, see FUEL SYSTEMS
Very low nozzle opening pressure	Test injectors and/or replace
Loss of Engine Power	
Restricted air intake	Remove restriction
EGR valve malfunction	Replace EGR valve
Blocked or damaged exhaust system	Remove restriction and/or replace components
Blocked fuel tank filter	Replace filter
Restricted fuel filter	Remove restriction and/or replace filter
Block vent in gas cap	Remove restriction and/or replace cap
Tank-to-injection pump fuel supply blocked	Check fuel lines and connections
Blocked fuel return system	Remove restriction
Incorrect or contaminated fuel	Replace fuel
Blocked injector nozzles	Check nozzle for blockage, see FUEL SYSTEMS
Low compression	Check valves, rings, pistons, see ENGINES
Loud Engine Noise With Black Smoke	
Basic timing incorrect	Reset timing, see FUEL SYSTEMS
EGR valve malfunction	Replace EGR valve
Internal injection pump malfunction	Replace injection pump, see FUEL SYSTEMS
Incorrect injector pump housing pressure	Check pressure, see FUEL SYSTEMS
Engine Overheating	
Cooling system leaks	Check cooling system and repair leaks
Belt slipping or damaged	Check tension and/or replace belt
Thermostat stuck closed	Remove and replace thermostat, see ENGINE COOLING
Head gasket leaking	Replace head gasket
Oil Light on at Idle	
Low oil pump pressure	Check oil pump operation, see ENGINES
Oil cooler or line restricted	Remove restriction and/or replace cooler
Engine Won't Shut Off	

CONDITION & POSSIBLE CAUSE	CORRECTION
Injector pump fuel solenoid does not return fuel valve to OFF position	Remove and check solenoid and replace if needed

VACUUM PUMP DIAGNOSIS

CONDITION & POSSIBLE CAUSE	CORRECTION
Excessive Noise	
Loose pump-to-drive assembly screws	Tighten screws
Loose tube on pump assembly	Tighten tube
Valves not functioning properly	Replace valves
Oil Leakage	
Loose end plug	Tighten end plug
Bad seal crimp	Remove and re-crimp seal

FUEL INJECTION TROUBLE SHOOTING

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BASIC FUEL INJECTION TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Start (Cranks Normally)	
Cold start valve inoperative	Test valve and circuit
Poor connection;vacuum or wiring	Check vacuum and electrical connections
Contaminated fuel	Test fuel for water or alcohol
Defective fuel pump relay or circuit	Test relay and wiring
Battery too low	Charge and test battery
Low fuel pressure	Test pressure regulator and fuel pump, check for restricted lines and filters
No distributor reference pulses	Repair ignition system as necessary
Open coolant temperature sensor circuit	Test sensor and wiring
Shorted W.O.T. switch in T.P.S.	Disconnect W.O.T. switch, engine should start
Defective ECM	Replace ECM
Fuel tank residual pressure valve leaks	Test for fuel pressure drop after shut down
Hard Starting	
Disconnected hot air tube to air cleaner	Reconnect tube and test control valve
Defective Idle Air Control (IAC) valve	Test valve operation and circuit
Shorted, open or misadjusted T.P.S.	Test and adjust or replace T.P.S.
EGR valve open	Test EGR valve and control circuit
Poor Oxygen sensor signal	Test for shorted or circuit
Incorrect mixture from PCV system	Test PCV for flow, check sealing of oil filter cap

CONDITION & POSSIBLE CAUSE	CORRECTION
Poor High Speed Operation	
Low fuel pump volume	Faulty pump or restricted fuel lines or filters
Poor MAP sensor signal	Test MAP sensor, vacuum hose and wiring
Poor Oxygen sensor signal	Test for shorted or open sensor or circuit
Open coolant temperature sensor circuit	Test sensor and wiring
Faulty ignition operation	Check wires for cracks or poor con- nections, test secondary voltage with oscilloscope
Contaminated fuel	Test fuel for water or alcohol
Intermittent ECM ground	Test ECM ground connection for resistance
Restricted air cleaner	Replace air cleaner
Restricted exhaust system	Test for exhaust manifold back pressure
Poor MAF sensor signal	Check leakage between sensor and manifold
Poor VSS signal	If tester for ALCL hook-up is available check that VSS reading matches speedometer
Ping or Knock on Acceleration	
Poor Knock sensor signal	Test for shorted or open sensor or circuit
Poor Baro sensor signal	Test for shorted or open sensor or circuit
Improper ignition timing	See VEHICLE EMISSION CONTROL LABEL (where applicable)
Check for engine overheating problems	Low coolant, loose belts or electric cooling fan inoperative

NOTE: **For additional electronic fuel injection trouble shooting information, see the appropriate article in the ENGINE PERFORMANCE section (not all vehicles have Computer Engine Control articles). Information is provided there for diagnosing fuel system problems on vehicles with electronic fuel injection.**

IGNITION SYSTEM TROUBLE SHOOTING

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Ignition Secondary Trouble Shooting Chart

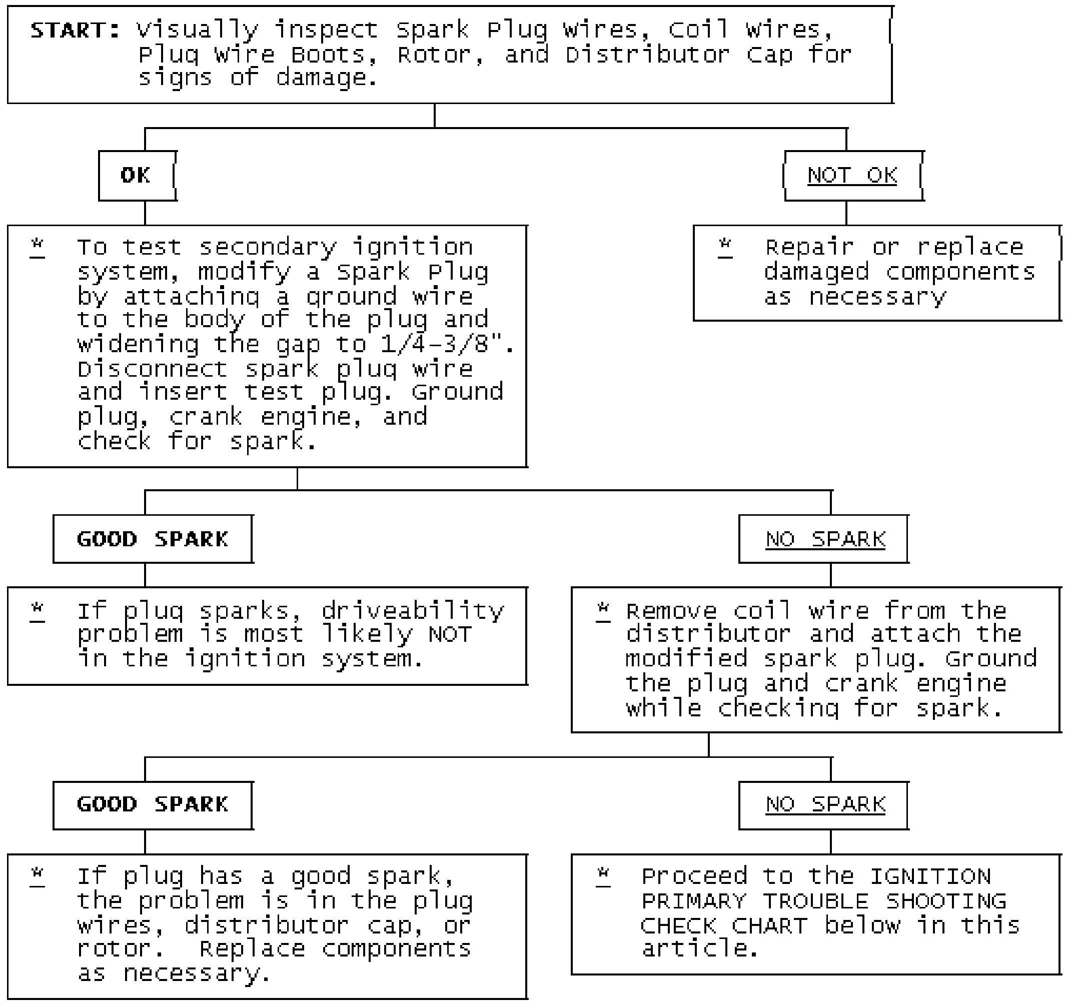
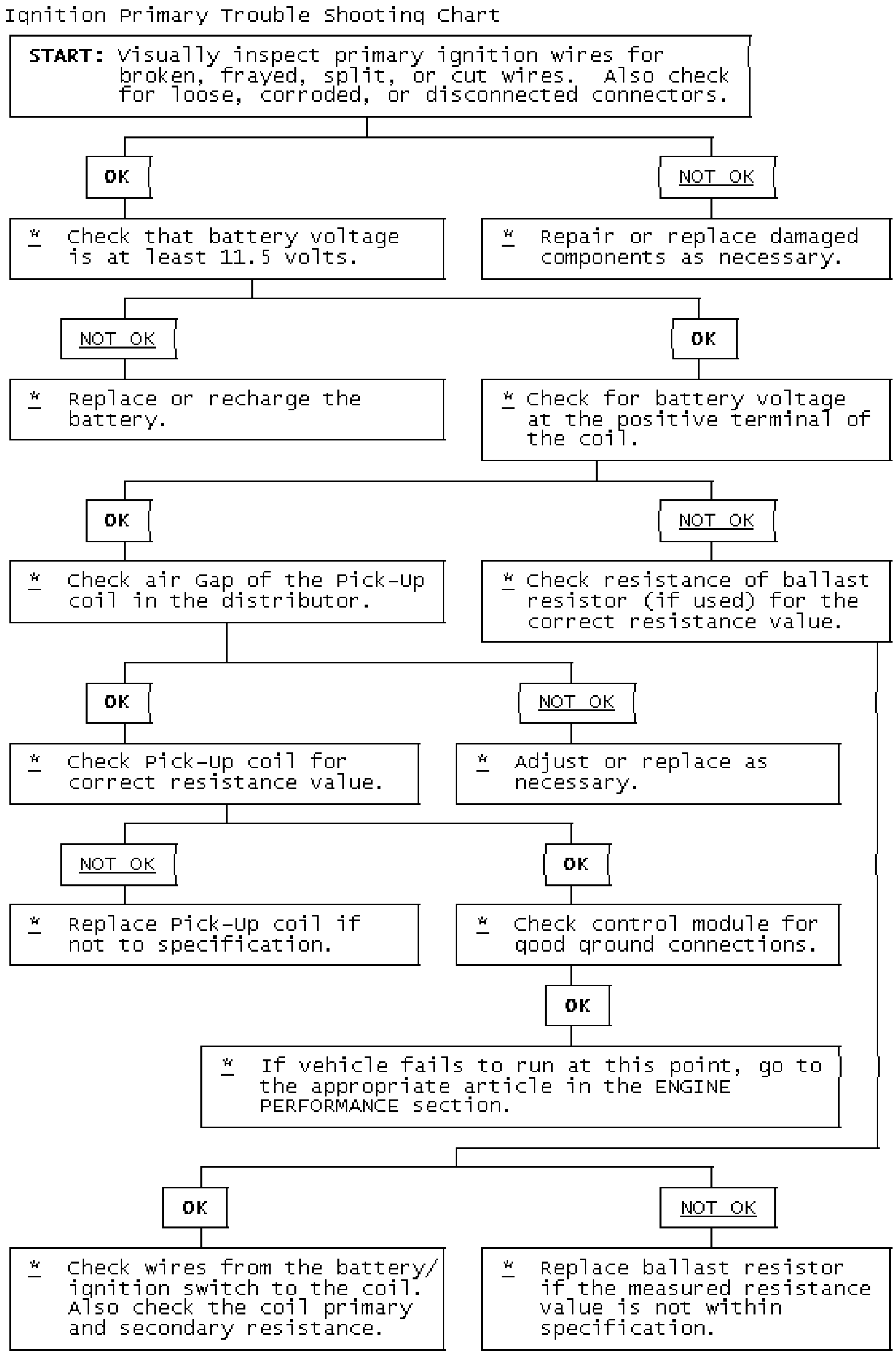


Fig. 3: Ignition Secondary Trouble Shooting Chart



[Fig. 4: Ignition Primary Trouble Shooting Chart]

STARTER TROUBLE SHOOTING

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symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC STARTER TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Starter Fails to Operate	
Dead battery or bad connections between starter and battery	Check battery charge and all wires and connections to starter
Ignition switch faulty or misadjusted	Adjust or replace ignition switch
Open circuit between starter switch ignition terminal on starter relay	Check and repair wires and connections as necessary
Starter relay or starter defective	See Testing in STARTER article
Open solenoid pull-in wire	See Testing in STARTER article
Starter Does Not Operate and Headlights Dim	
Weak battery or dead cell	Charge or replace battery as necessary
Loose or corroded battery connections	Check that battery connections are clean and tight
Internal ground in starter windings	See Testing in STARTER article
Grounded starter fields	See Testing in STARTERS
Armature rubbing on pole shoes	See STARTER article
Starter Turns but Engine Does Not Rotate	
Starter clutch slipping	See STARTER article
Broken clutch housing	See STARTER article
Pinion shaft rusted or dry	See STARTER article
Engine basic timing incorrect	See Ignition Timing in TUNE-UP article
Broken teeth on engine flywheel	Replace flywheel and check for starter pinion gear damage
Starter Will Not Crank Engine	
Faulty overrunning clutch	See STARTER article
Broken clutch housing	See STARTER article
Broken flywheel teeth	Replace flywheel and check for starter pinion gear damage
Armature shaft sheared or reduction gear teeth stripped	See STARTER article
Weak battery	Charge or replace battery as necessary
Faulty solenoid	See On-Vehicle Tests in STARTER article
Poor grounds	Check all ground connections for tight and clean connections
Ignition switch faulty or misadjusted	Adjust or replace ignition switch as necessary
Starter Cranks Engine Slowly	
Battery weak or defective	Charge or replace battery as necessary
Engine overheated	See ENGINE COOLING SYSTEM article
Engine oil too heavy	Check that proper viscosity oil is used

CONDITION & POSSIBLE CAUSE	CORRECTION
Poor battery-to-starter connections	Check that all between battery and starter are clean and tight
Current draw too low or too high	See Bench Tests in STARTER article
Bent armature, loose pole shoes screws or worn bearings	See STARTER article
Burned solenoid contacts	Replace solenoid
Faulty starter	Replace starter
Starter Engages Engine Only Momentarily	
Engine timing too far advanced	See Ignition Timing in TUNE-UP article
Overrunning clutch not engaging properly	Replace overrunning clutch. See STARTER article
Broken starter clutch	See STARTER article
Broken teeth on engine flywheel	Replace flywheel and check starter pinion gear for damage
Weak drive assembly thrust spring	See STARTER article
Weak hold-in coil	See Bench Tests in STARTER article
Starter Drive Will Not Engage	
Defective point assembly	See Testing in STARTER article
Poor point assembly ground	See Testing in STARTER article
Defective pull-in coil	Replace starter solenoid
Starter Relay Does Not Close	
Dead battery	Charge or replace battery as necessary
Faulty wiring	Check all wiring and connections leading to relay
Neutral safety switch faulty	Replace neutral safety switch
Starter relay faulty	Replace starter relay
Starter Drive Will Not Disengage	
Starter motor loose on mountings	Tighten starter attach bolts
Worn drive end bushing	See STARTER article
Damaged engine flywheel teeth	Replace flywheel and starter pinion gear for damage
Drive yolk return spring broken or missing	Replace return spring
Faulty ignition switch	Replace ignition switch
Insufficient clearance between winding leads to solenoid terminal and main contact in solenoid	Replace starter solenoid
Starter clutch not disengaging	Replace starter clutch
Ignition starter switch contacts sticking	Replace ignition switch
Starter Relay Operates but Solenoid Does Not	
Faulty solenoid switch, switch connections or relay	Check all wiring between relay and solenoid or replace relay or solenoid as necessary
Broken lead or loose soldered connections	Repair wire or wire connections as necessary
Solenoid Plunger Vibrates When Switch is Engaged	

CONDITION & POSSIBLE CAUSE	CORRECTION
Weak battery	Charge or replace battery as necessary
Solenoid contacts corroded	Clean contacts or replace solenoid
Faulty wiring	Check all wiring leading to solenoid
Broken connections inside switch cover	Repair connections or replace solenoid
Open hold-in wire	Replace solenoid
Low Current Draw	
Worn brushes or weak	Replace brushes or brush springs as necessary
High Pitched Whine During Cranking Before Engine Fires but Engine Fires and Cranks Normally	
Distance too great between starter pinion and flywheel	Align starter or check that correct starter and flywheel are being used
High Pitched Whine After Engine Fires With Key released. Engine Fires and Cranks Normally	
Distance too small between starter pinion and flywheel	Flywheel runout contributes to the intermittent nature

TUNE-UP TROUBLE SHOOTING - GAS ENGINE VEHICLES

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BASIC SPARK PLUG TROUBLE SHOOTING CHARTS

CONDITION & POSSIBLE CAUSE	CORRECTION
Normal Spark Plug Condition	
Light Tan or Gray deposits	No Action
Electrode not burned or fouled	No Action
Gap tolerance not changed	No Action
Cold Fouling or Carbon Deposits	
Overrich air/fuel mixture	Adjust air/fuel mixture, see ENGINE PERFORMANCE section
Faulty choke	Replace choke assembly, see ENGINE PERFORMANCE section
Clogged air filter	Clean and/or replace air filter
Incorrect idle speed or dirty carburetor	Reset idle speed and/ or clean carburetor
Faulty ignition wires	Replace ignition wiring
Prolonged operation at idle	Shut engine off during long idle
Sticking valves or worn valve guide seals	Check valve train
Wet Fouling or Oil Deposits	
Worn rings and pistons	Install new rings and pistons
Excessive cylinder wear	Rebore or replace block
Excessive valve guide clearance	Worn or loose bearing
Gap Bridged	

CONDITION & POSSIBLE CAUSE	CORRECTION
Deposits in combustion chamber becoming fused to electrode	Clean combustion chamber of deposits
Blistered Electrode	
Engine overheating	Check cooling system
Wrong type of fuel	Replace with correct fuel
Loose spark plugs	Retighten spark plugs
Over-advanced ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Pre-Ignition or Melted Electrodes	
Incorrect type of fuel	Replace with correct fuel
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Burned valves	Replace valves
Engine Overheating	Check cooling system
Wrong type of spark plug, too hot	Replace with correct spark plug, see ENGINE PERFORMANCE
Chipped Insulators	
Severe detonation	Check for over-advanced timing or combustion
Improper gapping procedure	Re-gap spark plugs
Rust Colored Deposits	
Additives in unleaded fuel	Try different fuel brand
Water In Combustion Chamber	
Blown head gasket or cracked head	Repair or replace head or head gasket

NOTE: **Before diagnosing an electronic ignition system, ensure that all wiring is connected properly between distributor, wiring connector and spark plugs. Ignition problem will show up either as: Engine Will Not Start or Engine Runs Rough.**

BASIC ELECTRONIC IGNITION TROUBLE SHOOTING CHARTS

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Start	
Open circuit between distributor and bulkhead connector	Repair circuit
Open circuit between bulkhead connector and ignition switch	Repair circuit
Open circuit between ignition switch and starter solenoid	Repair circuit
Engine Runs Rough	
Fuel lines leaking or clogged	Tighten fitting, remove restriction
Initial timing incorrect	Reset ignition timing see ENGINE PERFORMANCE
Centrifugal advance malfunction	Repair distributor advance

CONDITION & POSSIBLE CAUSE	CORRECTION
Defective spark plugs or wiring	Replace plugs or plug wiring
Component Failure	
Spark arc-over on cap, rotor or coil	Replace cap, rotor or or coil
Defective pick-up coil	Replace pick-up coil
Defective ignition coil	Replace ignition coil
Defective vacuum unit	Replace vacuum unit
Defective control module	Replace control module

BASIC ELECTRONIC IGNITION TROUBLE SHOOTING CHARTS - USING OSCILLOSCOPE PATTERNS

CONDITION & POSSIBLE CAUSE	CORRECTION
Firing Voltage Lines are the Same, but Abnormally High	
Retarded ignition timing	Reset ignition timing, see ENGINE PERFORMANCE section
Fuel mixture too lean	Readjust carburetor, see ENGINE PERFORMANCE
High resistance in coil wire	Replace coil wire
Corrosion in coil tower terminal	Clean and/or replace coil
Corrosion in distributor coil terminal	Clean and/or replace distributor cap
Firing Voltage Lines are the Same but Abnormally Low	
Fuel mixture too rich	Readjust carburetor, see ENGINE PERFORMANCE
Breaks in coil wire causing arcing	Replace coil wire
Cracked coil tower causing arcing	Replace coil
Low coil output	Replace coil
Low engine compression	Determine cause and repair
One or More, But Not All Firing Voltage Lines are Higher Than Others	
Carburetor idle mixture not balanced	Readjust carburetor, see ENGINE PERFORMANCE
EGR valve stuck open	Clean and/or replace valve
High resistance in spark plug wires	Replace spark plug wires
Cracked or broken spark plug insulator	Replace spark plugs
Intake vacuum leak	Repair leak
Defective spark plugs	Replace spark plugs
Corroded spark plug terminals	Replace spark plugs
One or More, But Not All Firing Voltage Lines Are Lower Than Others	
Curb idle mixture not balanced	Readjust carburetor, see ENGINE PERFORMANCE
Breaks in plug wires	Replace plug wires causing arcing
Cracked coil tower causing arcing	Replace coil
Low compression	Determine cause and repair
Defective spark plugs	Replace spark plugs

CONDITION & POSSIBLE CAUSE	CORRECTION
Corroded spark plugs	Replace spark plugs
Cylinders Not Firing	
Cracked distributor cap terminals	Replace distributor cap
Shorted spark plug wire	Determine cause and repair
Mechanical problem in engine	Determine cause and repair
Defective spark plugs	Replace spark plugs
Spark plugs fouled	Replace spark plugs

BASIC DRIVEABILITY PROBLEMS TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE	CORRECTION
Hard Starting	
Binding carburetor linkage	Eliminate binding
Binding choke linkage	Eliminate binding
Binding choke piston	Eliminate binding
Restricted choke vacuum	Check vacuum lines for blockage
Worn or dirty needle valve and seat	Clean carburetor, see ENGINE PERFORMANCE
Float sticking	Readjust or replace float see the ENGINE PERFORMANCE section
Incorrect choke adjustment	Reset choke adjustment see ENGINE PERFORMANCE
Defective coil	Replace coil
Improper spark plug gap	Regap spark plugs
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Detonation	
Over-advanced ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Defective spark plugs	Replace spark plugs
Fuel lines clogged	Clean fuel lines
EGR system malfunction	Check and repair EGR system
PCV system malfunction	Repair PCV system
Vacuum leaks	Check and repair vacuum system
Loose fan belts	Tighten or replace fan belts, see ENGINE PERFORMANCE
Restricted airflow	Remove restriction
Vacuum advance malfunction	Check distributor operation
Dieseling	
Binding carburetor linkage	Eliminate binding
Binding throttle linkage	Eliminate blinding
Binding choke linkage or fast idle cam	Eliminate binding

CONDITION & POSSIBLE CAUSE	CORRECTION
Defective idle solenoid	Replace idle solenoid see ENGINE PERFORMANCE
Improper base idle speed	Reset idle speed, see see ENGINE PERFORMANCE
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Incorrect idle mixture setting	Reset idle mixture, see ENGINE PERFORMANCE
Faulty Acceleration	
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Engine cold and choke too lean	Adjust choke and allow engine to warm-up
Defective spark plugs	Replace spark plugs
Defective coil	Replace coil
Faulty Low Speed Operation	
Clogged idle transfer slots	Clean idle transfer slots, see FUEL
Restricted idle air bleeds and passages	Disassemble and clean carburetor, see FUEL
Clogged air cleaner	Replace air filter
Defective spark plugs	Replace spark plugs
Defective ignition wires	Replace ignition wire see ENGINE PERFORMANCE
Defective distributor cap	Replace distributor cap
Faulty High Speed Operation	
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Defective distributor centrifugal advance	Replace advance mechanism
Defective distributor vacuum advance	Replace advance unit
Incorrect spark plugs or plug gap	Check gap and/or replace spark plugs
Faulty choke operation	Check choke and repair as required
Clogged vacuum passages	Remove restrictions
Improper size or clogged main jet	Check jet size and clean, see FUEL
Restricted air cleaner	Check filter and replace as necessary
Defective distributor cap, rotor or coil	Replace cap, rotor or coil
Misfire at All Speeds	
Defective spark plugs	Replace spark plugs
Defective spark plug wires	Replace spark plug wires
Defective distributor cap, rotor, or coil	Replace cap, rotor, or coil
Cracked or broken vacuum hoses	Replace vacuum hoses
Vacuum leaks	Repair vacuum leaks
Fuel lines clogged	Remove restriction
Hesitation	
Cracked or broken vacuum	Replace vacuum hoses hoses

CONDITION & POSSIBLE CAUSE	CORRECTION
Vacuum leaks	Repair Vacuum leaks
Binding carburetor linkage	Eliminate binding
Binding throttle linkage	Eliminate binding
Binding choke linkage or fast idle cam	Eliminate binding
Improper float setting	Readjust float setting, see FUEL
Cracked or broken ignition wires	Replace ignition wires
Rough Idle, Missing or Stalling	
Incorrect curb idle or fast idle speed	Reset idle speed, see see ENGINE PERFORMANCE
Incorrect basic timing	Reset ignition timing see ENGINE PERFORMANCE
Improper idle mixture adjustment	Reset idle mixture, see ENGINE PERFORMANCE
Improper feedback system operation	Check feedback system see ENGINE PERFORMANCE
Incorrect spark plug gap	Reset spark plug gap, see ENGINE PERFORMANCE
Moisture in ignition components	Dry components
Loose or broken ignition wires	Replace ignition wires
Damaged distributor cap or or rotor	Replace distributor cap or rotor
Faulty ignition coil	Replace ignition coil
Fuel filter clogged or worn	Replace fuel filter
Damaged idle mixture screw	Replace idle mixture screw, see FUEL
Improper fast idle cam adjustment	Reset fast idle cam adjustment, see TUNE- see ENGINE PERFORMANCE
Improper EGR valve operation	Replace EGR valve
Faulty PCV valve air flow	Replace PCV valve
Choke binding or improper choke setting	Reset choke or eliminate binding
Vacuum leak	Repair vacuum leak
Improper float bowl fuel level	Reset float adjustment, see FUEL
Clogged air bleed or idle passages	Clean carburetor passages, see FUEL
Clogged or worn air cleaner filter	Replace air filter
Faulty choke vacuum diaphragm	Replace diaphragm, see ENGINE PERFORMANCE
Exhaust manifold heat valve inoperative	Replace heat valve
Improper distributor spark advance	Check distributor operation
Leaking valves or valve components	Check and repair valvetrain
Improper carburetor mounting	Remove and remount carburetor
Excessive play in distributor shaft	Replace distributor
Loose or corroded wiring connections	Repair or replace as required
Engine Surges	
Improper PCV valve airflow	Replace PCV valve

CONDITION & POSSIBLE CAUSE	CORRECTION
Vacuum leaks	Repair vacuum leaks
Clogged air bleeds	Remove restriction
EGR valve malfunction	Replace EGR valve
Restricted air cleaner filter	Replace air filter
Cracked or broken vacuum hoses	Replace vacuum hoses
Cracked or broken ignition wires	Replace ignition wires
Vacuum advance malfunction	Check unit and replace as necessary
Defective or fouled spark plugs	Replace spark plugs
Ping or Spark Knock	
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Distributor centrifugal or vacuum advance malfunction	Check operation and replace as necessary
Carburetor setting too lean	Readjust mixture setting, see ENGINE PERFORMANCE
Vacuum leak	Eliminate vacuum leak
EGR valve malfunction	Replace EGR valve
Poor Gasoline Mileage	
Cracked or broken vacuum	Replace vacuum hoses hoses
Vacuum leaks	Repair vacuum leaks
Defective ignition wires	Replace wires
Incorrect choke setting	Readjust setting, see ENGINE PERFORMANCE
Defective vacuum advance	Replace vacuum advance
Defective spark plugs	Replace spark plugs
Binding carburetor power piston	Eliminate binding
Dirt in carburetor jets	Clean and/or replace jets
Incorrect float adjustment	Readjust float setting, see FUEL
Defective power valve	Replace power valve, see ENGINE PERFORMANCE
Incorrect idle speed	Readjust idle speed
Engine Stalls	
Improper float level	Readjust float level
Leaking needle valve and seat	Replace needle valve and seat
Vacuum leaks	Eliminate vacuum leaks

VACUUM PUMP - DIESEL TROUBLE SHOOTING

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NOTE: **Diesel engines mechanical diagnosis is the same as gasoline engines for items such as noisy valves, bearings, pistons, etc. The following trouble shooting covers only items pertaining to diesel engines.**

VACUUM PUMP (DIESEL) TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Excessive Noise	
Loose pump-to-drive assembly screws	Tighten screws
Loose tube on pump assembly	Tighten tube
Valves not functioning properly	Replace valves
Oil Leakage	
Loose end plug	Tighten end plug
Bad seal crimp	Remove and re-crimp seal

MANUAL TRANSMISSION

MANUAL TRANSMISSION TROUBLE SHOOTING

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MANUAL TRANSMISSION/TRANSAXLE TROUBLE SHOOTING

Condition	Possible Cause
Noisy In Forward Gears	Low gear oil level, Loose bell housing bolts, Worn bearings or gears
Clunk On Deceleration (FWD Only)	Loose engine mounts, Worn inboard CV joints, Worn differential pinion shaft, Side gear hub counterbore in case worn oversize
Gear Clash When Shifting Forward Gears	Clutch Out Of Adjustment, Shift linkage damaged or out of adjustment, Gears or synchronizers damaged, Low gear oil level
Transmission Noisy When Moving (RWD Only) Quiet In Neutral With Clutch Engaged	Worn rear outputshaft bearing
Gear Rattle	Worn bearings, Wrong gear oil, Low gear oil, Worn gears
Steady Ticking At Idle (Increases With RPM)	Broken tooth on gear
Gear Clash When Shifting Forward Gears	Worn or broken synchronizers
Loud Whine In Reverse	Normal condition (1)
Noise When Stepping On Clutch	Bad release bearing, Worn pilot bearing
Ticking Or Screeching As Clutch Is Engaged	Faulty release bearing, Uneven pressure plate fingers

Condition	Possible Cause
Click Or Snap When Clutch Is Engaged	Worn clutch fork, Worn or broken front bearing retainer
Transmission Shifts Hard	Clutch not releasing, Shift mechanism binding, Clutch installed backwards
Will Not Shift Into One Gear, Shifts Into All Others	Bent shift fork, Worn detent balls
Locked Into Gear, Cannot Shift	Clutch adjustment, Worn detent balls
Transmission Jumps Out Of Gear	Pilot bearing worn, Bent shift fork, Worn gear teeth or face, Excessive gear train end play, Worn synchronizers, Missing detent ball spring, Shift mechanism worn or out of adjustment, Engine or transmission mount bolts loose or out of adjustment, Transmission not aligned
Shift Lever Rattle	Worn shift lever or detents, Worn shift forks, Worn synchronizers sleeve
Shift Lever Hops Under Acceleration	Worn engine or transmission mounts
(1) Most units use spur cut gears in reverse and are noisy	

POWERTRAIN

CLUTCH TROUBLE SHOOTING

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BASIC CLUTCH TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Chattering or Grabbing	
Incorrect clutch adjustment	Adjust clutch
Oil, grease or glaze on facings	Disassemble and clean or replace
Loose "U" joint flange	See DRIVE AXLES article
Worn input shaft spline	Replace input shaft
Binding pressure plate	Replace pressure plate
Binding release lever	See CLUTCH article
Binding clutch disc hub	Replace clutch disc
Unequal pressure plate contact	Replace worn/misaligned components
Loose/bent clutch disc	Replace clutch disc
Incorrect transmission alignment	Realign transmission
Worn pressure plate, disc or flywheel	Replace damaged components
Broken or weak pressure springs	Replace pressure plate
Sticking clutch pedal	Lubricate clutch pedal & linkage

CONDITION & POSSIBLE CAUSE	CORRECTION
Incorrect clutch disc facing	Replace clutch disc
Engine loose in chassis	Tighten all mounting bolts
Failure to Release	
Oil or grease on clutch facings	Clean or replace clutch clutch disc
Incorrect release lever or pedal adjustment	See CLUTCH article
Worn or broken clutch facings	Replace clutch disc
Bent clutch disc or pressure plate	Replace damaged components
Clutch disc hub binding on input shaft	Clean or replace clutch disc and/or input shaft
Binding pilot bearing	Replace pilot bearing
Sticking release bearing sleeve	Replace release bearing and/or sleeve
Binding clutch cable	See CLUTCH article
Defective clutch master	Replace master cylinder
Defective clutch slave	Replace slave cylinder
Air in hydraulic system	Bleed hydraulic system
Rattling	
Weak or broken release lever spring	Replace spring and check alignment
Damaged pressure plate	Replace pressure plate
Broken clutch return spring	Replace return spring
Worn splines on clutch disc or input shaft	Replace clutch disc and/or input shaft
Worn clutch release bearing	Replace release bearing
Dry or worn pilot bearing	Lubricate or replace pilot bearing
Unequal release lever contact	Align or replace release lever
Incorrect pedal free play	Adjust free play
Warped or damaged clutch disc	Replace damaged components
Slipping	
Pressure springs worn or	Release pressure plate
Oily, greasy or worn facings	Clean or replace clutch disc
Incorrect clutch alignment	Realign clutch assembly
Warped clutch disc or pressure plate	Replace damaged components
Binding release levers or clutch pedal	Lubricate and/or replace release components
Squeaking	
Worn or damaged release	Replace release bearing
Dry or worn pilot or release bearing	Lubricate or replace assembly
Pilot bearing turning in crankshaft	Replace pilot bearing and/or crankshaft
Worn input shaft bearing	Replace bearing and seal
Incorrect transmission alignment	Realign transmission
Dry release fork between pivot	Lubricate release fork and pivot
Heavy and/or Stiff Pedal	
Sticking release bearing sleeve	Replace release bearing and/or sleeve
Dry or binding clutch pedal hub	Lubricate and align components
Floor mat interference with pedal	Lay mat flat in proper area

CONDITION & POSSIBLE CAUSE	CORRECTION
Dry or binding ball/fork pivots	Lubricate and align components
Faulty clutch cable	Replace clutch cable
Noisy Clutch Pedal	
Faulty interlock switch	Replace interlock switch
Self-adjuster ratchet noise	Lubricate or replace self-adjuster
Speed control interlock switch	Lubricate or replace interlock switch
Clutch Pedal Sticks Down	
Binding clutch cable	See CLUTCH article
Springs weak in pressure plate	Replace pressure plate
Binding in clutch linkage	Lubricate and free linkage
Noisy	
Dry release bearing	Lubricate or replace release bearing
Dry or worn pilot bearing	Lubricate or replace bearing
Worn input shaft bearing	Replace bearing
Transmission Click	
Weak springs in pressure	Replace pressure plate plate
Release fork loose on ball stud	Replace release fork and/or ball stud
Oil on clutch disc damper	Replace clutch disc
Broken spring in slave cylinder	Replace slave cylinder

DRIVE AXLE - NOISE DIAGNOSIS

Unrelated Noises

Some driveline trouble symptoms are also common to the engine, transmission, wheel bearings, tires, and other parts of the vehicle. Ensure cause of trouble actually is in the drive axle before adjusting, repairing, or replacing any of its parts.

Non-Drive Axle Noises

A few conditions can sound just like drive axle noise and have to be considered in pre-diagnosis. The 4 most common noises are exhaust, tires, CV/universal joints and wheel trim rings.

In certain conditions, the pitch of the exhaust gases may e gear whine. At other times, it may be mistaken for a wheel bearing rumble.

Tires, especially radial and snow, can have a high-pitched tread whine or roar, similar to gear noise. Also, some non-standard tires with an unusual tread construction may emit a roar or whine.

Defective CV/universal joints may cause clicking noises or excessive driveline play that can be improperly diagnosed as drive axle problems.

Trim and moldings also can cause a whistling or whining noise. Ensure none of these components are causing the noise before disassembling the drive axle.

Gear Noise

A "howling" or "whining" noise from the ring and pinion gear can be caused by an improper gear pattern, gear damage, or improper bearing preload. It can occur at various speeds and driving conditions, or it can be continuous.

Before disassembling axle to diagnose and correct gear ke sure that tires, exhaust, and vehicle trim have been checked as possible causes.

Chuckle

This is a particular rattling noise that sounds like a stick against the spokes of a spinning bicycle wheel. It occurs while decelerating from 40 MPH and usually can be heard until vehicle comes to a complete stop. The frequency varies with the speed of the vehicle.

A chuckle that occurs on the driving phase is usually caused ive clearance due to differential gear wear, or by a damaged tooth on the coast side of the pinion or ring gear. Even a very small tooth nick or a ridge on the edge of a gear tooth is enough the cause the noise.

This condition can be corrected simply by cleaning the gear tooth nick or ridge with a small grinding wheel. If either gear is damaged or scored badly, the gear set must be replaced. If metal has broken loose, the carrier and housing must be cleaned to remove particles that could cause damage.

Knock

This is very similar to a chuckle, though it may be louder, and occur on acceleration or deceleration. Knock can be caused by a gear tooth that is damaged on the drive side of the ring and pinion gears. Ring gear bolts that are hitting the carrier casting can cause knock. Knock can also be due to excessive end play in the axle shafts.

Clunk

Clunk is a metallic noise heard when an automatic transmission is engaged in Reverse or Drive, or when throttle is applied or released. It is caused by backlash somewhere in the driveline, but not necessarily in the axle. To determine whether driveline clunk is caused by the axle, check the total axle backlash as follows:

1. Raise vehicle on a frame or twinpost hoist so that drive wheels are free. Clamp a bar between axle companion flange and a part of the frame or body so that flange cannot move.
2. On conventional drive axles, lock the left wheel to keep it from turning. On all models, turn the right wheel slowly until it is felt to be in Drive condition. Hold a chalk marker on side of tire about 12" from center of wheel. Turn wheel in the opposite direction until it is again felt to be in Drive condition.
3. Measure the length of the chalk mark, which is the total axle backlash. If backlash is one inch or less, drive axle is not the source of clunk noise.

Bearing Whine

Bearing whine is a high-pitched sound similar to a whistle. It is usually caused by malfunctioning pinion bearings. Pinion bearings operate at drive shaft speed. Roller wheel bearings may whine in a similar manner if they run completely dry of lubricant. Bearing noise will occur at all driving speeds. This distinguishes it from gear whine, which usually comes and goes as speed changes.

Bearing Rumble

Bearing rumble sounds like marbles being tumbled. It is usually caused by a malfunctioning wheel bearing. The

lower pitch is because the wheel bearing turns at only about 1/3 of drive shaft speed.

Chatter On Turns

This is a condition where the entire front or rear of vehicle vibrates when vehicle is moving. The vibration is plainly felt as well as heard. Extra differential thrust washers installed during axle repair can cause a condition of partial lock-up that creates this chatter.

Axle Shaft Noise

Axle shaft noise is similar to gear noise and pinion bearing whine. Axle shaft bearing noise will normally distinguish itself from gear noise by occurring in all driving modes (Drive, cruise, coast and float), and will persist with transmission in Neutral while vehicle is moving at problem speed.

If vehicle displays this noise condition, remove suspect parts, replace wheel seals and install a new set of bearings. Re-evaluate vehicle for noise before removing any internal components.

Vibration

Vibration is a high-frequency trembling, shaking or grinding condition (felt or heard) that may be constant or variable in level and can occur during the total operating speed range of the vehicle.

The types of vibrations that can be felt in the vehicle can d into 3 main groups:

- Vibrations of various unbalanced rotating parts of the vehicle.
- Resonance vibrations of the body and frame structures caused by rotating of unbalanced parts.
- Tip-in moans of resonance vibrations from stressed engine or exhaust system mounts or driveline flexing modes.

DRIVE AXLE - RWD TROUBLE SHOOTING

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DRIVE AXLE (RWD) TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE	CORRECTION
Knocking or Clunking	
Differential Side Gear Clearance	Check Clearance
Worn Pinion Shaft	Replace Pinion Shaft
Axle Shaft End Play	Check End Play
Missing Gear Teeth	Check Differential/Replace Gear
Wrong Axle Backlash	Check Backlash
Misaligned Driveline	Realign Driveline
Clinking During Engagement	

CONDITION & POSSIBLE CAUSE	CORRECTION
Side Gear Clearance	Check Clearance
Ring and Pinion Backlash	Check Backlash
Worn/Loose Pinion Shaft	Replace Shaft/Bearing
Bad "U" Joint	Replace "U" Joint
Sticking Slip Yoke	Lube Slip Yoke
Broken Rear Axle Mount	Replace Mount
Loose Drive Shaft Flange	Check Flange
Click/Chatter On Turns	
Differential Side Gear Clearance	Check Clearance
Wrong Turn On Plates [(1)]	Replace Clutch Plates
Wrong Differential Lubricant [(1)]	Change Lubricant
Knock Or Click	
Flat Spot on Rear Wheel Bearing	Replace Wheel Bearing
Low Vibration At All Speeds	
Faulty Wheel Bearing	Replace Wheel Bearing
Faulty "U" Joint	Replace "U" Joint
Faulty Drive Shaft	Balance Drive Shaft
Faulty Companion Flange	Replace Flange
Faulty Slip Yoke Flange	Replace Flange

(1) Limited slip differential only.

FWD AXLE SHAFTS & CV JOINTS TROUBLE SHOOTING

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BASIC FWD AXLE SHAFTS & CV JOINTS TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE
Grease Leaks	CV boot torn or cracked
Clicking Noise on Cornering	Damaged outer CV
Clunk Noise on Acceleration	Damaged inner CV
Vibration or Shudder on Acceleration	Sticking, damaged or worn CV Misalignment or spring height

STEERING & SUSPENSION

MANUAL STEERING GEAR TROUBLE SHOOTING

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble**

Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC MANUAL STEERING GEAR TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Rattle or Chucking Noise in Rack and Pinion	
Rack and pinion mounting bracket loose	Tighten all mounting bolts
Lack of/or incorrect lubricant	Correct as necessary
Steering gear mounting bolts loose	Tighten all mounting bolts
Excessive Play	
Front wheel bearing improperly adjusted	See FRONT SUSPENSION article
Loose or worn steering linkage	See STEERING LINKAGE article
Loose or worn steering gear shift	See MANUAL STEERING GEAR article
Steering arm loose on gear shaft	See MANUAL STEERING GEAR article
Steering gear housing bolts loose	Tighten all mounting bolts
Steering gear adjustment too loose	See MANUAL STEERING GEAR article
Steering arms loose on knuckles	Tighten and check steering linkage
Rack and pinion mounting loose	Tighten all mounting bolts
Rack and pinion out of adjustment	See adjustment in STEERING article
Tie rod end loose	Tighten and check steering linkage
Excessive Pitman shaft-to-ball nut lash	Repair as necessary
Poor Returnability	
Lack of lubricant in ball joint or linkage	Lubricate and service systems
Binding in linkage or ball joints	See STEERING LINKAGE and SUSPENSION article
Improper front end alignment	See WHEEL ALIGNMENT article
Improper tire pressure	Inflate to proper pressure
Tie rod binding	Inflate to proper pressure
Shaft seal rubbing shaft	See STEERING COLUMN article
Excessive Vertical Motion	
Improper tire pressure	Inflate to proper pressure
Tires, wheels or rotors out of balance	Balance tires then check wheels and rotors
Worn or faulty shock absorbers	Check and replace if necessary
Loose tie rod ends or steering	Tighten or replace if necessary
Loose or worn wheel bearings	See SUSPENSION article
Steering Pulls to One Side	
Improper tire pressure	Inflate to proper pressure
Front tires are different sizes	Rotate or replace if necessary
Wheel bearings not adjusted properly	See FRONT SUSPENSION article
Bent or broken suspension components	See FRONT SUSPENSION article
Improper wheel alignment	See WHEEL ALIGNMENT article

CONDITION & POSSIBLE CAUSE	CORRECTION
Brakes dragging	See BRAKES article
Instability	
Low or uneven tire pressure	Inflate to proper pressure
Loose or worn wheel bearings	See FRONT SUSPENSION article
Loose or worn idler arm bushing	See FRONT SUSPENSION article
Loose or worn strut bushings	See FRONT SUSPENSION article
Incorrect front wheel alignment	See WHEEL ALIGNMENT article
Steering gear not centered	See MANUAL STEERING GEARS article
Springs or shock	Check and replace if necessary
Improper cross shaft	See MANUAL STEERING GEARS article

POWER STEERING TROUBLE SHOOTING

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BASIC POWER STEERING TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Rattle or Chucking Noise	
Pressure hoses touching engine parts	Adjust to proper clearance
Loose Pitman shaft	Adjust or replace if necessary
Tie rods ends or Pitman arm loose	Tighten and check system
Rack and pinion mounts loose	Tighten all mounting bolts
Free play in worm gear	See POWER STEERING GEAR article
Loose sector shaft or thrust bearing adjustment	See POWER STEERING GEAR
Free play in pot coupling	See STEERING COLUMN article
Worn shaft serrations	See STEERING COLUMN article
Growl in Steering Pump	
Excessive pressure in hoses	Restricted hoses, see POWER STEERING GEAR article
Scored pressure plates	See POWER STEERING GEAR article
Scored thrust plates or rotor	See POWER STEERING GEAR article
Extreme wear of cam ring	See POWER STEERING GEAR article
Rattle in Steering Pump	
Vanes not installed	See POWER STEERING PUMP article
Vanes sticking in rotor	See POWER STEERING PUMP article
Swish noise in Pump	
Defective flow control valve	See POWER STEERING PUMP article
Groan in Steering Pump	

CONDITION & POSSIBLE CAUSE	CORRECTION
Air in fluid	See POWER STEERING PUMP article
Poor pressure hose connection	Tighten and check, replace if necessary
Squawk When Turning	
Damper "O" ring on valve spool cut	See POWER STEERING PUMP article
Moan or Whine in Pump	
Pump shaft bearing scored	Replace bearing and fluid
Air in fluid or fluid level low	See POWER STEERING PUMP article
Hose or column grounded	Check and replace if necessary
Cover "O" ring missing or damaged	See POWER STEERING PUMP article
Valve cover baffle missing or damaged	See POWER STEERING PUMP article
Interference of components in pump	See POWER STEERING PUMP article
Loose or poor bracket alignment	Correct or replace if necessary
Hissing When Parking	
Internal leakage in steering gear	Check valved assembly first
Chirp in Steering Pump	
Loose or worn power steering belt	Adjust or replace if necessary
Buzzing When Not Steering	
Noisy pump	See POWER STEERING PUMP article
Free play in steering shaft bearing	See STEERING COLUMN article
Bearing loose on shaft serrations	See STEERING COLUMN article
Clicking Noise in Pump	
Pump slippers too long	See POWER STEERING PUMP article
Broken slipper springs	See POWER STEERING PUMP article
Excessive wear or nicked rotors	See POWER STEERING PUMP article
Damaged cam contour	See POWER STEERING PUMP article
Poor Return of Wheel	
Wheel rubbing against turn signal	See STEERING COLUMN SWITCHES article
Flange rubbing steering gear adjuster	See STEERING COLUMN article
Tight or frozen steering shaft bearing	See STEERING COLUMN article
Steering gear out of adjustment	See POWER STEERING GEAR article
Sticking or plugged spool valve	See POWER STEERING PUMP article
Improper front end alignment	See WHEEL ALIGNMENT article
Wheel bearings worn or loose	See FRONT SUSPENSION article
Ties rods or ball joints binding	Check and replace if necessary
Intermediate shaft joints binding	See STEERING COLUMN article
Kinked pressure hoses	Correct or replace if necessary
Loose housing head spanner nut	See POWER STEERING GEAR article
Damaged valve lever	See POWER STEERING GEAR article
Sector shaft adjusted too tight	See ADJUSTMENTS in POWER STEERING GEAR article

CONDITION & POSSIBLE CAUSE	CORRECTION
Worm thrust bearing adjusted too tight	See ADJUSTMENTS in POWER STEERING GEAR article
Reaction ring sticking in cylinder	See POWER STEERING GEAR article
Reaction ring sticking in housing head	See POWER STEERING GEAR article
Steering pump internal leakage	See POWER STEERING PUMP article
Steering gear-to-column misalignment	See STEERING COLUMN article
Lack of lubrication in linkage	Service front suspension
Lack of lubrication in ball joints	Service front suspension
Increased Effort When Turning Wheel Fast Foaming, Milky Power Steering Fluid, Low Fluid Level or Low Pressure	
High internal pump leakage	See POWER STEERING PUMP article
Power steering pump belt slipping	Adjust or replace if necessary
Low fluid level	Check and fill to proper level
Engine idle speed to low	Adjust to correct setting
Air in pump fluid system	See POWER STEERING PUMP article
Pump output low	See POWER STEERING PUMP article
Steering gear malfunctioning	See POWER STEERING GEAR article
Wheel Surges or Jerks	
Low fluid level	Check and fill to proper level
Loose fan belt	Adjust or replace if necessary
Insufficient pump pressure	See POWER STEERING PUMP article
Sticky flow control valve	See POWER STEERING PUMP article
Linkage hitting oil pan at full turn	Replace bent components
Kick Back or Free Play	
Air in pump fluid system	See POWER STEERING PUMP article
Worn poppet valve in steering gear	See POWER STEERING PUMP article
Excessive over center lash	See POWER STEERING GEAR article
Thrust bearing out of adjustment	See POWER STEERING GEAR article
Free play in pot coupling	See POWER STEERING PUMP article
Steering gear coupling loose on shaft	See POWER STEERING PUMP article
Steering disc mounting bolts loose	Tighten or replace if necessary
Coupling loose on worm shaft	Tighten or replace if necessary
Improper sector shaft adjustment	See POWER STEERING GEAR article
Excessive worm piston side play	See POWER STEERING GEAR article
Damaged valve lever	See POWER STEERING GEAR article
Universal joint loose	Tighten or replace if necessary
Defective rotary valve	See POWER STEERING GEAR article
No Power When Parking	
Sticking flow control valve	See POWER STEERING PUMP article
Insufficient pump pressure output	See POWER STEERING PUMP article
Excessive internal pump leakage	See POWER STEERING PUMP article

CONDITION & POSSIBLE CAUSE	CORRECTION
Excessive internal gear leakage	See POWER STEERING PUMP article
Flange rubs against gear adjust plug	See STEERING COLUMN article
Loose pump belt	Adjust or replace if necessary
Low fluid level	Check and add proper amount of fluid
Engine idle too low	Adjust to correct setting
Steering gear-to-column misaligned	See STEERING COLUMN article
No Power, Left Turn	
Left turn reaction seal "O" ring worn	See POWER STEERING GEAR article
Left turn reaction seal damaged/missing	See POWER STEERING GEAR article
Cylinder head "O" ring damaged	See POWER STEERING PUMP article
No Power, Right Turns	
Column pot coupling bottomed	See STEERING COLUMN article
Right turn reaction seal "O" ring worn	See POWER STEERING GEAR article
Right turn reaction seal damaged	See POWER STEERING GEAR article
Internal leakage through piston end plug	See POWER STEERING GEAR article
Internal leakage through side plugs	See POWER STEERING GEAR article
Lack of Effort in Turning	
Left and/or right reaction seal sticking in cylinder head	Replace, see POWER STEERING GEAR article
Wanders to One Side	
Front end alignment incorrect	See WHEEL ALIGNMENT article
Unbalanced steering gear valve	See POWER STEERING GEAR article
Low Pressure Due to Steering Pump	
Flow control valve stuck or inoperative	See POWER STEERING PUMP article
Pressure plate not flat against cam ring	See POWER STEERING PUMP article
Extreme wear of cam ring	Replace and check adjustments
Scored plate, thrust plate or rotor	See POWER STEERING PUMP article
Vanes not installed properly	See POWER STEERING PUMP article
Vanes sticking in rotor slots	See POWER STEERING PUMP article
Cracked/broken thrust or pressure plate	See POWER STEERING PUMP article

STEERING COLUMN TROUBLE SHOOTING

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.**

BASIC STEERING COLUMN TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Noise in Steering	

CONDITION & POSSIBLE CAUSE	CORRECTION
Coupling pulled apart	See STEERING COLUMNS article
Column not correctly aligned	See STEERING COLUMNS article
Broken lower joint	Replace joint
Horn contact ring not	See STEERING COLUMN article
Bearing not lubricated	See STEERING COLUMN article
Shaft snap ring not properly seated	Reseat or replace snap ring
Plastic spherical joint not lubricated	See STEERING COLUMN article
Shroud or housing loose	Tighten holding screws
Lock plate retaining ring not seated	See STEERING COLUMN article
Loose sight shield	Tighten holding screws
High Steering Shaft Effort	
Column assembly misaligned	See STEERING COLUMN article
Improperly installed dust shield	Adjust or replace
Tight steering universal joint	See STEERING COLUMN article
High Shift Effort	
Column is out of alignment	See STEERING COLUMN article
Improperly installed dust shield	Adjust or replace
Seals or bearings not lubricated	See STEERING COLUMNS article
Mounting bracket screws too long	Replace with new shorter screws
Burrs on shift tube	Remove burrs or replace tube
Lower bowl bearing assembled wrong	See STEERING COLUMN article
Shift tube bent or broken	Replace as necessary
Improper adjustment of shift levers	See STEERING COLUMN article
Improper Trans. Shifting	
Sheared shift tube joint	Replace as necessary
Sheared lower shaft lever	Replace as necessary
Improper shift lever adjustment	See STEERING COLUMN article
Improper gate plate adjustment	See STEERING COLUMN article
Excess Play in Column	
Instrument panel bracket bolts loose	Tighten bolts and check bracket
Broken weld nut on jacket	See STEERING COLUMN article
Instrument bracket capsule sheared	See STEERING COLUMN article
Column bracket/jacket bolts loose	Tighten bolts and check bracket
Steering Locks in Gear	
Release lever mechanism	See STEERING COLUMN article

SUSPENSION TROUBLE SHOOTING

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT,**

DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC SUSPENSION TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Front End Noise	
Loose or worn wheel	See Wheel Bearing Adjustment in SUSPENSION
Worn shocks or shock mountings	Replace struts or strut mountings
Worn struts or strut mountings	Replace struts or strut mountings
Loose or worn lower control arm	See SUSPENSION
Loose steering gear-to-frame bolts	See STEERING
Worn control arm bushings	See SUSPENSION
Ball joints not lubricated	Lubricate ball joints & see Ball Joint Checking in SUSPENSION
Front Wheel Shake, Shimmy, or Vibration	
Tires or wheels out of balance	Check tire balance
Incorrect wheel alignment	See WHEEL ALIGNMENT
Drive shaft unbalanced	Check drive shaft balance
Loose or worn wheel bearings	See WHEEL ALIGNMENT
Loose or worn tie rod ends	See SUSPENSION
Worn upper ball joints	See Ball Joint Checking in SUSPENSION
Worn shock absorbers	Replace shock absorbers
Worn strut bushings	Replace strut bushings
Car Pulls to One Side	
Mismatched or uneven tires	Check tire condition
Broken or sagging springs	See SUSPENSION
Loose or worn strut bushings	See SUSPENSION
Improper wheel alignment	See WHEEL ALIGNMENT
Improper rear axle alignment	Check rear axle alignment
Power steering gear unbalanced	See STEERING
Front brakes dragging	See BRAKES
Abnormal Tire Wear	
Unbalanced tires	Check tire balance & rotation
Sagging or broken springs	See SUSPENSION
Incorrect front end alignment	See WHEEL ALIGNMENT
Faulty shock absorbers	Replace chock absorbers
Scuffed Tires	
Toe-In incorrect	See WHEEL ALIGNMENT
Suspension arm bent or twisted	See appropriate SUSPENSION article
Springs Bottom or Sag	
Bent or broken springs	See SUSPENSION
Leaking or worn shock absorbers	Replace shock absorbers

CONDITION & POSSIBLE CAUSE	CORRECTION
Frame misalignment	Check frame for damage
Spring Noises	
Loose "U" Bolts	See SUSPENSION
Loose or worn bushings	See SUSPENSION
Worn or missing interliners	See SUSPENSION
Shock Absorber Noise	
Loose shock mountings	Check & tighten mountings
Worn bushings	Replace bushings
Air in system	Bleed air from system
Undercoating on shocks	Remove undercoating
Car Leans or Sways on Corners	
Loose stabilizer bar	See SUSPENSION
Faulty shocks or mountings	Replace shocks or mountings
Broken or sagging springs	See SUSPENSION
Shock Absorbers Leaking	
Worn seals or reservoir tube crimped	See SUSPENSION
Broken Springs	
Loose "U" bolts	See SUSPENSION
Inoperative shock absorbers	Replace shock absorbers

WHEEL ALIGNMENT TROUBLE SHOOTING

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.**

BASIC WHEEL ALIGNMENT TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Premature Tire Wear	
Improper tire inflation	Check tire pressure
Front alignment out of tolerance	See ALIGNMENT SPECS in WHEEL ALIGNMENT section
Suspension components worn	See SUSPENSION section
Steering system components worn	See STEERING section
Improper standing height	See WHEEL ALIGNMENT
Uneven or sagging springs	See SUSPENSION section
Bent wheel	See WHEEL ALIGNMENT
Improper torsion bar adjustment	See SUSPENSION section
Loose or worn wheel bearings	See WHEEL BEARING ADJ. in SUSPENSION section

CONDITION & POSSIBLE CAUSE	CORRECTION
Worn or defective shock	Replace shock absorbers
Tires out of balance	Check tire balance
Pulls to One Side	
Improper tire inflation	Check tire pressure
Brake dragging	See BRAKE section
Mismatched tires	See WHEEL ALIGNMENT
Broken or sagging spring	See SUSPENSION section
Broken torsion bar	See SUSPENSION section
Power steering valve not centered	See STEERING section
Front alignment out of tolerance	See WHEEL ALIGNMENT section
Defective wheel bearing	See WHEEL BEARINGS in SUSPENSION section
Uneven sway bar links	See SUSPENSION section
Frame bent	Check for frame damage
Steering system bushing worn	See STEERING section
Hard Steering	
Idler arm bushing too tight	See STEERING LINKAGE in STEERING section
Ball joint tight or seized	See SUSPENSION section
Steering linkage too tight	See STEERING LINKAGE in STEERING section
Power steering fluid low	Add proper amount of fluid
Power steering drive belt loose	See STEERING section
Power steering pump defective	See STEERING section
Steering gear out of adjustment	See STEERING section
Incorrect wheel alignment	See WHEEL ALIGNMENT
Damaged steering gear	See STEERING section
Damaged suspension	See SUSPENSION section
Bent steering knuckle or supports	See SUSPENSION section
Vehicle "Wanders"	
Strut rod or control arm bushing worn	See SUSPENSION section
Loose or worn wheel bearings	See WHEEL BEARINGS in SUSPENSION section
Improper tire inflation	Check tire pressure
Stabilizer bar missing or defective	See SUSPENSION section
Wheel alignment out of tolerance	See Adjustment in WHEEL ALIGNMENT section
Broken spring	See SUSPENSION section
Defective shock absorber	Replace shock absorbers
Worn steering & suspension components	See SUSPENSION section
Front End Shimmy	

CONDITION & POSSIBLE CAUSE	CORRECTION
Tire out of balance/round	Check tire balance
Excessive wheel runout	See WHEEL ALIGNMENT
Insufficient or improper caster	See WHEEL ALIGNMENT section
Worn suspension or steering components	See SUSPENSION section
Defective shock absorbers	Replace shock absorber
Wheel bearings worn or loose	See WHEEL BEARING ADJ. in SUSPENSION section
Power steering reaction Bracket loose	See STEERING section
Steering gear box (rack) mounting loose	See STEERING section
Steering gear adjustment loose	See STEERING section
Worn spherical joints	See SUSPENSION section
Toe-In Not Adjustable	
Lower control arm bent	See SUSPENSION section
Frame bent	Check frame for damage
Camber Not Adjustable	
Control arm bent	See SUSPENSION section
Frame bent	Check frame for damage
Hub & bearing not seated properly	See SUSPENSION section

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Article GUID: A00027342

2015-16 ACCESSORIES AND EQUIPMENT

Universal Transmitter - Challenger

DESCRIPTION

DESCRIPTION

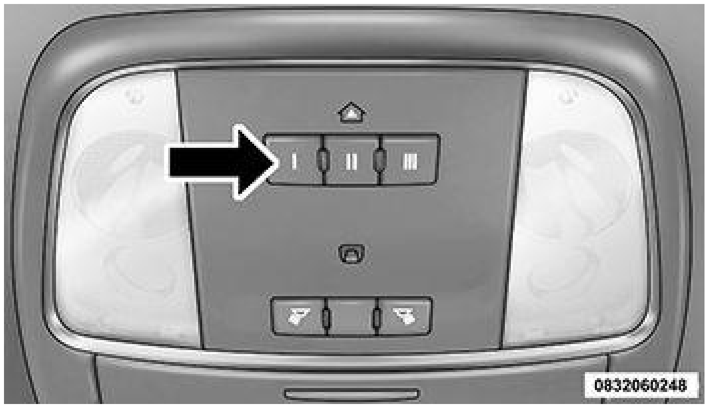

Fig. 1: Universal Transmitter Push Buttons
Courtesy of CHRYSLER GROUP, LLC

Vehicles equipped with the optional universal transmitter (also known as the HomeLinkÃ® transmitter or Universal Garage Door Opener/UGDO) have a universal transmitter switch pod integral to the overhead console located in the headliner just behind the windshield opening header. The switch buttons are centered between the two map/reading lamps, forward of the sunglasses storage bin and, if equipped, the power sunroof switch. This switch has three momentary push buttons clearly marked by the Roman numerals I, II and III for identification of each of the three transmitter channels. The switch push buttons have instrument panel dimmer controlled LED units that provide back lighting for visibility at night.

Each of the three universal transmitter push buttons controls an independent radio transmitter channel. Each of these three channels can be trained to transmit a different Radio Frequency (RF) signal for the remote operation of garage door openers, motorized gate openers, home or office lighting, security systems or most any other device equipped with a RF receiver operating in the 286 to 440 and 902 to 927 MegaHertz (MHz) frequency ranges. The transmitter is capable of operating systems using either rolling code or non-rolling code security technology.

The universal transmitter switch pod cannot be repaired and is only serviced as a unit with the overhead console. If the transmitter or any of the switches are ineffective or damaged, the entire overhead console unit must be replaced.

OPERATION

OPERATION

The universal transmitter (also known as the HomeLinkÃ® transmitter or Universal Garage Door Opener/UGDO) operates on a fused battery feed so the unit will remain functional, regardless of the ignition switch position. The transceiver has a security ground and will become disabled any time the vehicle security

alarm is armed. For more information on the features, programming procedures and operation of the HomeLinkÂ® transceiver, see the owner's manual.

The hard wired input circuits for the universal transmitter may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The RF signal strength of the universal transmitter may also be tested. Refer to DIAGNOSIS AND TESTING.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HOMELINKÂ® TRANSCEIVER

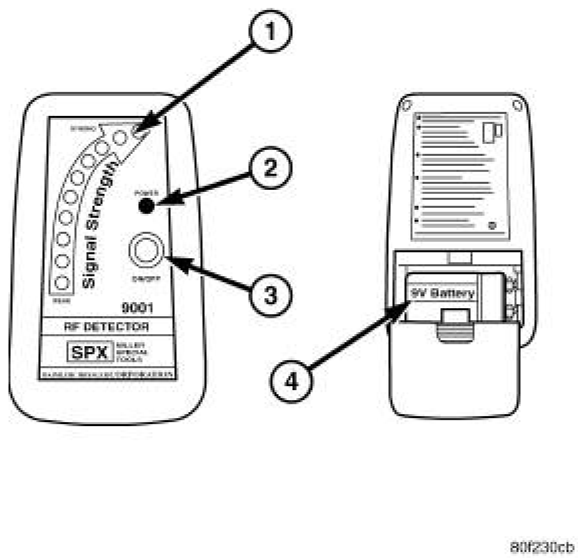

Fig. 2: Identifying Radio Frequency Detector
Courtesy of CHRYSLER GROUP, LLC

If the universal transmitter (also known as the HomeLinkÂ® transmitter or Universal Garage Door Opener/UGDO) is inoperative, retrain the transmitter using a known good transmitter containing a known good battery. Refer to STANDARD PROCEDURE. Test the universal transmitter operation again. If the unit is still inoperative, test the universal transmitter with a Radio Frequency Detector special tool as follows:

1. Turn On the Radio Frequency (RF) detector special tool by depressing the ON/OFF button (3). An audible **chirp** will sound and the green Power indicator (2) will illuminate. If the Power indicator does not illuminate, replace the RF detector battery (4).
2. Hold the RF detector within 2.54 centimeters (1 inch) of the **trained** universal transmitter, then depress any one of the three universal transmitter channel push buttons.
3. The red Signal Strength Light Emitting Diode (LED) units (1) will illuminate and the tool will generate an audible **beep** if a radio signal is detected. Repeat this test for all three universal transmitter channel push buttons. If the tool does not detect a radio signal for any of the three push buttons, replace the ineffective universal transmitter unit. Refer to CONSOLE, OVERHEAD, FRONT, REMOVAL .

STANDARD PROCEDURE

ERASING HOMELINKĀ® TRANSCEIVER CODES

NOTE: **Individual channels cannot be erased. Erasing the HomeLinkĀ® transceiver codes will erase ALL programmed codes.**

To erase programming from all three buttons (individual buttons cannot be erased but can be reprogrammed), press and hold the two outer HomeLinkĀ® transceiver buttons until the indicator light begins to flash after about 20 seconds. Release both buttons. Do not hold for longer that 30 seconds. HomeLinkĀ® is now in the train (or learning) mode and can be programmed at any time beginning with Programming. Refer to PROGRAMMING HOMELINKĀ® TRANSCEIVER CODES .

PROGRAMMING HOMELINKĀ® TRANSCEIVER CODES

WARNING: **Vehicle exhaust contains carbon monoxide, a dangerous gas. Do not run the engine while training the universal transmitter. Failure to follow these instructions may result in possible serious or fatal injury.**

WARNING: **Your motorized door or gate may open and close while you are training the universal transmitter if the vehicle is in range of the motorized device. Do not train the universal transmitter if people or pets are in the path of the door or gate. A moving door or gate can cause serious injury or death to people and pets or damage to objects.**

NOTE: **When programming a garage door opener, it is advised to park outside the garage. It is also recommended that a new battery be placed in the hand-held transmitter of the device being programmed to the HomeLinkĀ® transceiver for quicker training and accurate transmission of the radio-frequency signal.**

NOTE: **If programing the HomeLinkĀ® transceiver is unsuccessful using the following procedure, refer to the Owner's Manual for the current customer assistance phone number.**

1. Press and hold the two outer HomeLinkĀ® transceiver buttons, and release only when the indicator light begins to flash (after 20 seconds). **Do not** hold the buttons for longer than 30 seconds and **do not** repeat step one to program a second and/or third hand-held transmitter to the remaining two HomeLinkĀ® transceiver buttons.
2. Position the end of your hand-held transmitter 3-8 cm (1-3 inches) away from the HomeLinkĀ® transceiver buttons while keeping the indicator light in view.
3. Simultaneously press and hold both the HomeLinkĀ® transceiver button that you want to train and the hand-held transmitter button. **Do not release the buttons until step 4 has been completed.**

   NOTE: **Some gate operators and garage door openers may require you to replace this Programming Step 3 with procedures noted in the "Gate Operator/Canadian Programming". Refer to CANADIAN PROGRAMMING/GATE PROGRAMMING.**

4. The HomeLinkĀ® transceiver indicator light will flash slowly and then rapidly after HomeLinkĀ® successfully receives the frequency signal from the hand-held transmitter. Release both buttons after the

indicator light changes from the slow to rapid flash.

5. Press and hold the just trained HomeLinkÂ® transceiver button and observe the indicator light. If the indicator light **stays on constantly, programming is complete** and your device should activate when the button is pressed and released.

> **NOTE:** **To program the remaining two buttons, begin with "Programming" step 2. Do not repeat step 1.**
>
> **If the indicator light blinks rapidly for two seconds and then turns to a constant light, continue with "Programming" steps 6-8 to complete the programming of a rolling code equipped device (most commonly a garage door opener).**

6. At the garage door opener receiver (motor-head unit) in the garage, locate the "learn" or "smart" button. This can usually be found where the hanging antenna wire is attached to the motor-head unit.
7. Firmly press and release the "learn" or "smart" button. (The name and color of the button may vary by manufacturer.)

> **NOTE:** **There are 30 seconds in which to initiate step 8.**

8. Return to the vehicle and firmly **press, hold for two seconds and release** the programmed HomeLinkÂ® transceiver button. Repeat the **"press/hold/release"** sequence a second time, and, depending on the brand of the garage door opener (or other rolling code equipped device), repeat this sequence a third time to complete the programming.

   The HomeLinkÂ® transceiver should now activate your rolling code equipped device.

NOTE: **To program the remaining two HomeLinkÂ® transceiver buttons, begin with "Programming" step 2. Do not repeat step 1.**

CANADIAN PROGRAMMING/GATE PROGRAMMING

Canadian radio-frequency laws require transmitter signals to "time-out" (or quit) after several seconds of transmission which may not be long enough for the HomeLinkÂ® transceiver to pick up the signal during programming. Similar to this Canadian law, some U.S. gate operators are designed to "time-out" in the same manner.

If you live in Canada or you are having difficulties programming a gate operator by using the "Programming" procedures (regardless of where you live), **replace "Programming HomeLinkÂ® Transceiver Codes" step 3** with the following:

NOTE: **When programming a garage door opener or gate operator, it is advised to unplug the device or move the vehicle out of range during the "cycling" process to prevent possible overheating.**

3. Continue to press and hold the HomeLinkÂ® transceiver button while you **press and release every two seconds** ("cycle") your hand-held transmitter until the frequency signal has successfully been accepted. The indicator light will flash slowly and then rapidly. Proceed with "Programming" step 4 to complete.

REPROGRAMMING HOMELINKĀ® TRANSCEIVER CODES

WARNING: **Vehicle exhaust contains carbon monoxide, a dangerous gas. Do not run the engine while training the universal transmitter. Failure to follow these instructions may result in possible serious or fatal injury.**

WARNING: **Your motorized door or gate may open and close while you are training the HomeLinkĀ® transceiver if the vehicle is in range of the motorized device. Do not train the HomeLinkĀ® transceiver if people or pets are in the path of the door or gate. A moving door or gate can cause serious injury or death to people and pets or damage to objects.**

NOTE: **If programing the HomeLinkĀ® transceiver is unsuccessful using the following procedure, refer to the Owner's Manual for the current customer assistance phone number.**

REPROGRAMMING COMMON UNIVERSAL TRANSMITTER CODES

To program a device to the HomeLinkĀ® transceiver using a button previously trained, follow these steps:

1. Press and hold the desired HomeLinkĀ® transceiver button. **DO NOT** release the button. The indicator light will begin to flash after 20 seconds. Without releasing the HomeLinkĀ® transceiver button, proceed to step 2.
2. Position the end of your hand-held transmitter 3-8 cm (1-3 inches) away from the HomeLinkĀ® transceiver button while keeping the indicator light in view.
3. Simultaneously press and hold both the HomeLinkĀ® transceiver button that you want to train and the hand-held transmitter buttons. **Do not release the buttons until step 4 has been completed.**

   NOTE: **Some gate operators and garage door openers may require you to replace this Reprogramming Step 3 with procedures noted in the "Gate Operator/Canadian Programming". Refer to** **CANADIAN PROGRAMMING/GATE PROGRAMMING****.**

4. The HomeLinkĀ® transceiver indicator light will flash slowly and then rapidly after it successfully receives the frequency signal from the hand-held transmitter. Release both buttons after the indicator light changes from the slow to the rapid flash.
5. Press and hold the just trained HomeLinkĀ® transceiver button and observe the indicator light. If the indicator light **stays on constantly, reprogramming is complete** and your device should activate when the button is pressed and released.

   NOTE: **If the indicator light blinks rapidly for two seconds and then turns to a constant light, continue with "Reprogramming" steps 6-8 to complete the programming of a rolling code equipped device (most commonly a garage door opener).**

6. At the garage door opener receiver (motor-head unit) in the garage, locate the "learn" or "smart" button. This can usually be found where the hanging antenna wire is attached to the motor-head unit.
7. Firmly press and release the "learn" or "smart" button. (The name and color of the button may vary by

manufacturer.)

NOTE: **There are 30 seconds in which to initiate step 8.**

8. Return to the vehicle and firmly **press, hold for two seconds and release** the reprogrammed HomeLinkÂ® transceiver button. Repeat the **"press/hold/release"** sequence a second time, and, depending on the brand of the garage door opener (or other rolling code equipped device), repeat this sequence a third time to complete the reprogramming.

   The HomeLinkÂ® transceiver should now activate your rolling code equipped device.

CANADIAN PROGRAMMING/GATE PROGRAMMING

Canadian radio-frequency laws require transmitter signals to "time-out" (or quit) after several seconds of transmission which may not be long enough for the HomeLinkÂ® transceiver to pick up the signal during programming. Similar to this Canadian law, some U.S. gate operators are designed to "time-out" in the same manner.

If you live in Canada or you are having difficulties programming a gate operator by using the "Programming" procedures (regardless of where you live), **replace "Reprogramming HomeLinkÂ® Transceiver Codes" step 3** with the following:

NOTE: **When programming a garage door opener or gate operator, it is advised to unplug the device or move the vehicle out of range during the "cycling" process to prevent possible overheating.**

3. Continue to press and hold the HomeLinkÂ® transceiver button while you **press and release every two seconds** ("cycle") your hand-held transmitter until the frequency signal has successfully been accepted. The indicator light will flash slowly and then rapidly. Proceed with "Programming" step 4 to complete.

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Article GUID: A00735983

2015-16 GENERAL INFORMATION

Vehicle Data - Challenger

VEHICLE INFORMATION

INTERNATIONAL VEHICLE CONTROL AND DISPLAY SYMBOLS

DESCRIPTION

DESCRIPTION

Chrysler LLC uses international symbols to identify various systems on the vehicle.

The graphic symbols illustrated are used to identify various instrument controls, vehicle controls and service information references. The symbols correspond to the controls and displays that are located on the instrument panel and throughout the vehicle.

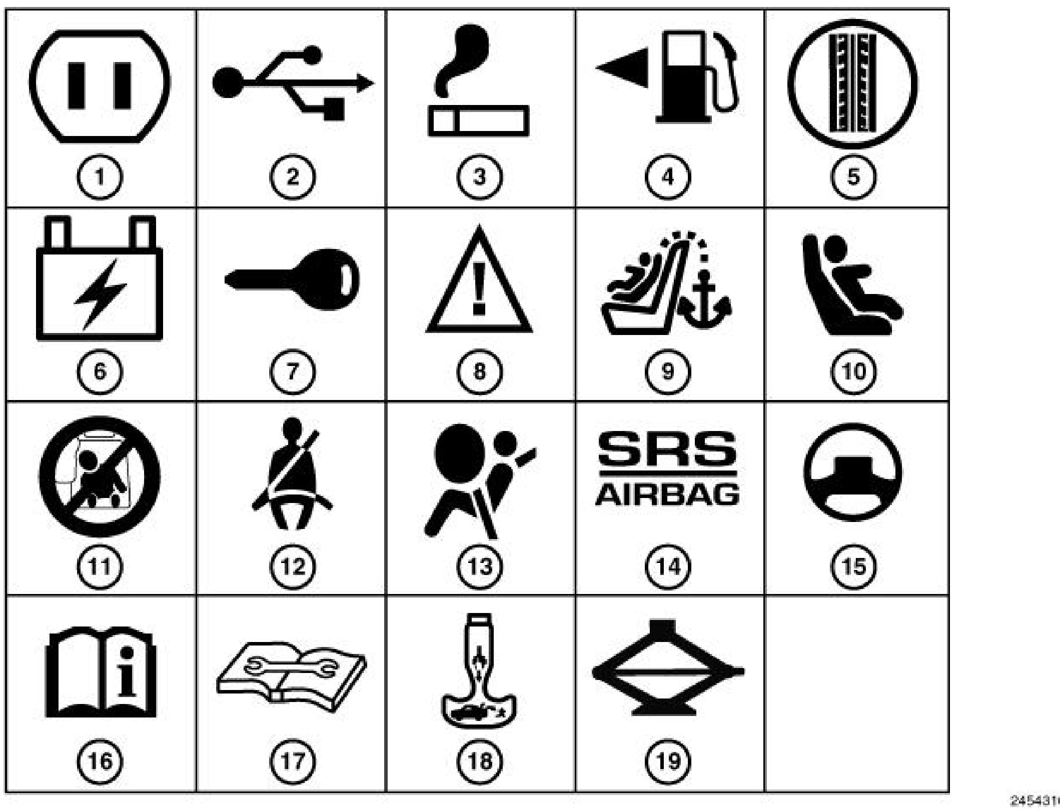

Fig. 1: Information Symbols
Courtesy of CHRYSLER GROUP, LLC

INTERNATIONAL INFORMATION SYMBOL IDENTIFICATION

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
1	115-Volt Power Inverter	11	Side Airbag
2	USB Connector	12	Seat Belt
3	Lighter	13	Airbag
4	Fuel Fill Side	14	Supplemental Restraint System

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
5	Spare Tire Winch	15	Power Steering Fluid
6	Fuse	16	See Owner's Manual
7	Key Activate (Power Outlet)	17	See Appropriate Service Information
8	Warning	18	Emergency Release Handle
9	Child Seat Tether Anchor	19	Jack/Jack Tools Location
10	Lower Anchors and Tether for Children (Latch)	Ā	Ā

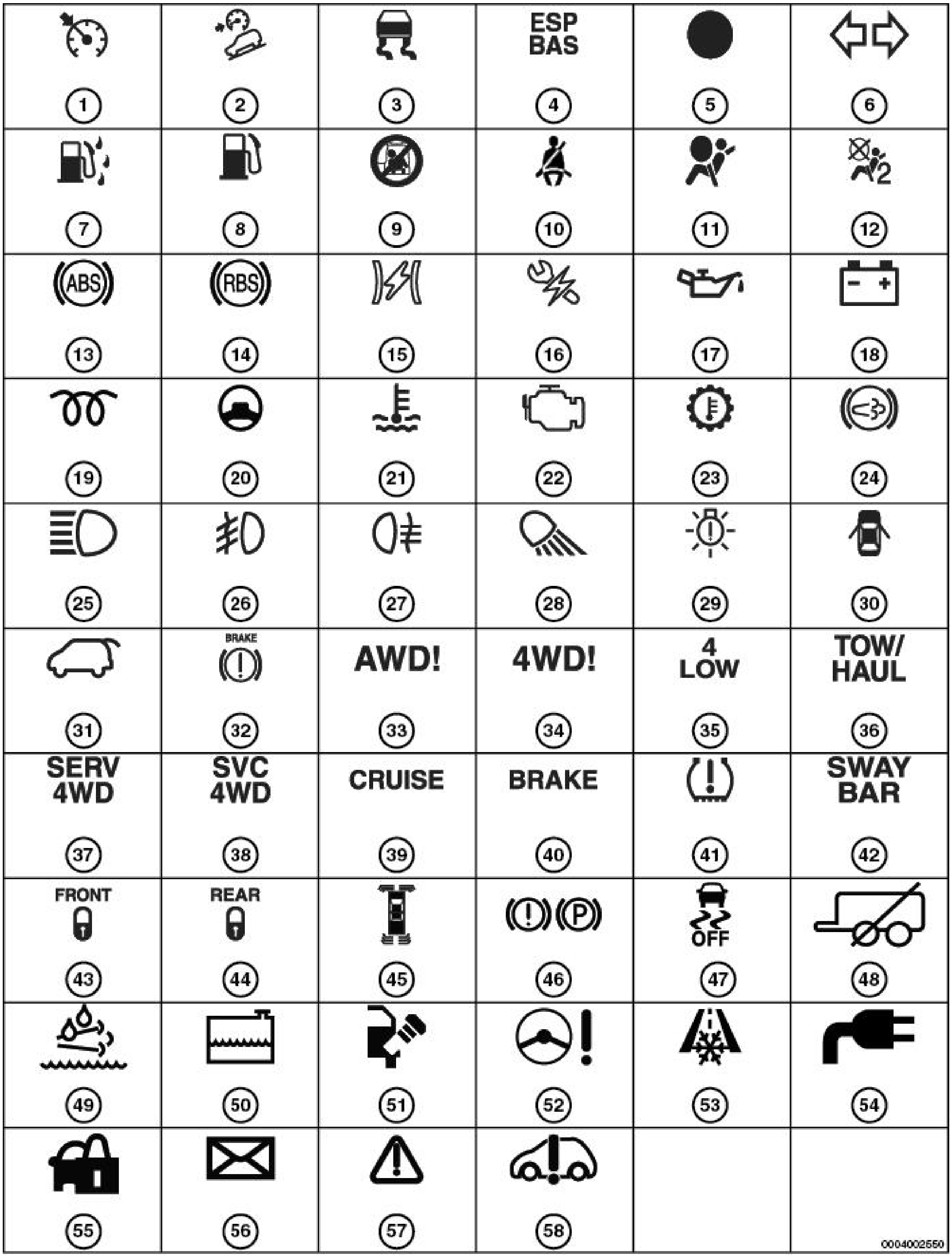

Fig. 2: Indicator Symbols
Courtesy of CHRYSLER GROUP, LLC

INTERNATIONAL INDICATOR SYMBOL IDENTIFICATION

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
1	Electronic Speed Control	30	Door Ajar
2	Hill Descent Control	31	Liftgate Open

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
3	Traction Control	32	Brake System Warning Parking Brake
4	Electronic Stability Program/Brake System Assist System	33	All Wheel Drive
5	Security Indicator	34	Four Wheel Drive
6	Turn Signals	35	Four Wheel Drive Low
7	Water In Fuel	36	Tow/Haul
8	Low Fuel	37	Service Four Wheel Drive
9	Side Airbag	38	Service Four Wheel Drive
10	Seat Belt Reminder	39	Cruise Indicator
11	Airbag Warning Light	40	Brake System Warning Parking Brake
12	Passenger Airbag Off	41	Tire Pressure Monitor
13	Failure Of Anti-Lock Braking System	42	Sway Bar Disconnect Indicator
14	HEV Brake Regenerative Light	43	Front Axle Lock
15	Electronic Throttle Control	44	Rear Axle Lock
16	HEV Service Light	45	Park Assist Indicator
17	Engine Oil	46	Park Brake Indicator
18	Battery Charging	47	Electronic Stability Control/Traction Control Off
19	Glow Plug/Intake Air Heated	48	Trailer Brake System Off
20	Power Steering Fluid	49	Diesel Exhaust Fluid
21	Engine Coolant Temperature	50	Coolant Level
22	Malfunction Indicator Light	51	Fuel Cap
23	Transmission Oil Temperature Light	52	EPS (Electric Power Steering)
24	Diesel Exhaust Brake	53	Icy Road Condition
25	High Beam	54	Electric Vehicle Plug In State
26	Front Fog Light	55	Vehicle Theft Alarm
27	Rear Fog Light	56	Stored Warnings
28	Cargo Lamp	57	Service ETC
29	Exterior Bulb Failure	58	Electric Vehicle System Service

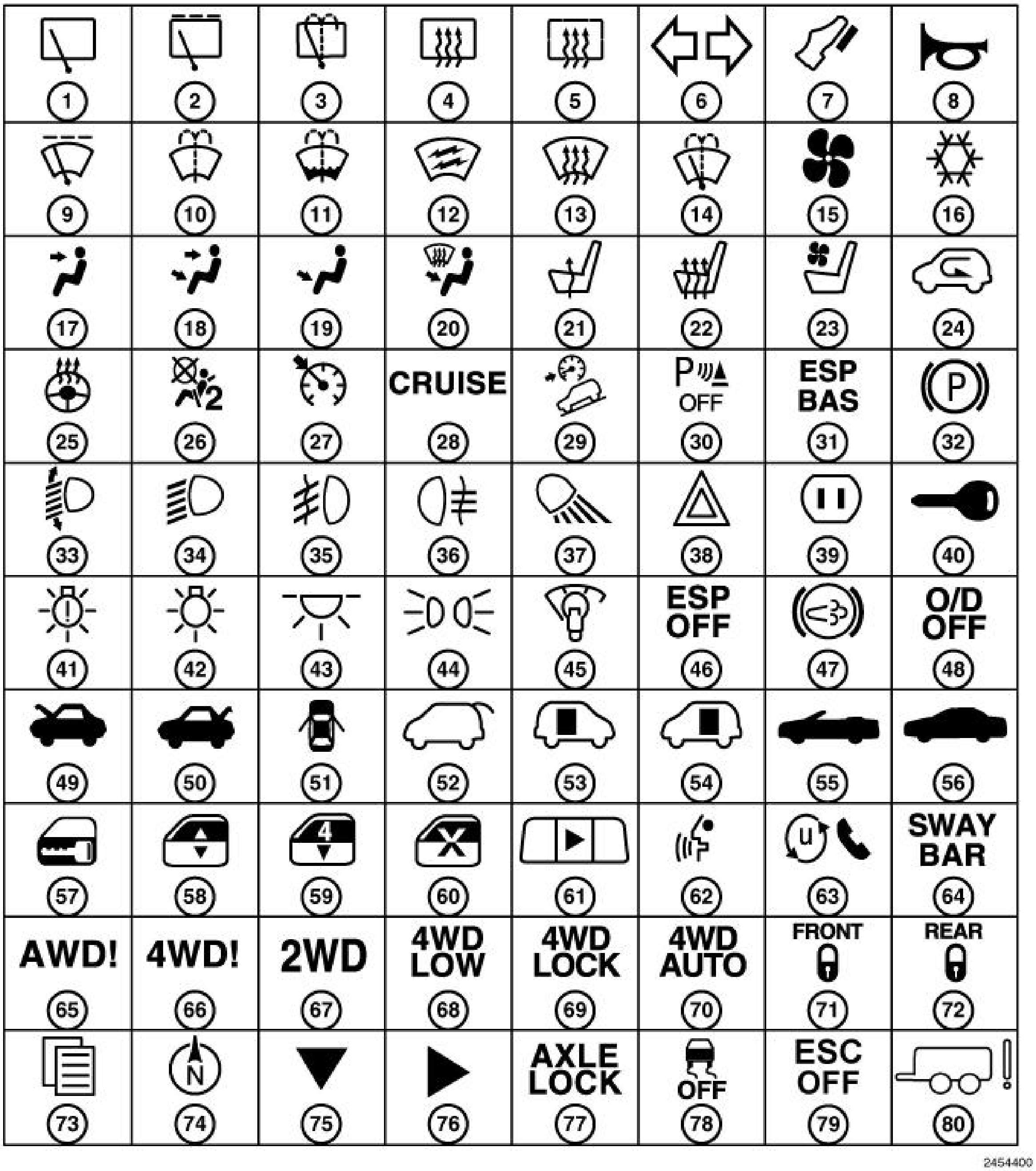

Fig. 3: Control Symbols
Courtesy of CHRYSLER GROUP, LLC

INTERNATIONAL CONTROL SYMBOL IDENTIFICATION

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
1	Rear Window Wiper	28	Cruise Indicator	55	Convertible Top Down
2	Rear Window Intermittent Wiper	29	Hill Descent Control	56	Convertible Top Up
3	Rear Window Washer	30	Park Assist Off	57	Door Lock

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
4	Rear Window Defrost	31	Electronic Stability Program/Brake System Assist System	58	Window Lift
5	Heated Mirror	32	Park Brake Release	59	Convertible 4 Window Down
6	Turn Signals	33	Adjustable Headlights	60	Window Lock
7	Adjustable Pedals	34	Low Beam	61	Power Rear Window
8	Horn	35	Front Fog Light	62	Voice Recognition Button
9	Windshield Wiper Intermittent	36	Rear Fog Light	63	Uconnect™ Button
10	Windshield Washer	37	Cargo Lamp	64	Sway Bar Disconnect
11	Windshield Washer Fluid Level	38	Hazard Lights	65	All Wheel Drive
12	Windshield Electrically Heated	39	115-Volt Power Inverter	66	Four Wheel Drive
13	Windshield Defrost	40	Key Activate (Power Outlet)	67	Two Wheel Drive
14	Windshield Wiper And Washer	41	Exterior Bulb Failure	68	Four Wheel Drive Low
15	Ventilating Fan	42	Master Lighting Switch	69	Four Wheel Drive Lock
16	Air Conditioning	43	Dome Light	70	Four Wheel Drive Auto
17	Upper Air Outlet	44	Park Lights	71	Front Axle Lock
18	Upper And Lower Air Outlet	45	Instrument Panel Illumination	72	Rear Axle Lock
19	Lower Air Outlet	46	Electronic Stability Program Off	73	EVIC Menu
20	Defrost And Lower Air Outlet	47	Diesel Exhaust Brake	74	Navigation Button
21	Heated Seat Low	48	Overdrive Off	75	Step
22	Heated Seat High	49	Hood Release	76	Reset
23	Ventilated Seat	50	Trunk/Deck Release	77	Axle Lock Button
24	Recirculation	51	Door Ajar	78	Traction Control Off
25	Heated Steering Wheel	52	Liftgate Release	79	Electronic Stability Control Off
26	Passenger Air Bag Off	53	Sliding Door	80	Trailer Brakes
27	Electronic Speed Control	54	Sliding Door	Ā	Ā

ENGINE COMPARTMENT

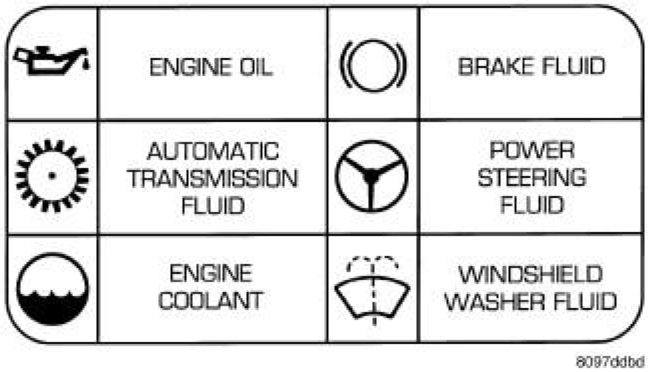

Fig. 4: International Symbols
Courtesy of CHRYSLER GROUP, LLC

The graphic symbols illustrated are used to identify engine compartment lubricant and fluid inspection and fill locations. The symbols correspond to the caps located within the engine compartment.

LABEL, VEHICLE EMISSION CERTIFICATION INFORMATION (VECI)

DESCRIPTION

DESCRIPTION

NOTE: **The Vehicle Emission Control Information (VECI) label(s) must be in place for the life of the vehicle. When replacing the component in which the VECI label is adhered, a new VECI label must also be adhered to the new component.**

All models have a VECI Label. Chrysler permanently attaches the label in the engine compartment. It cannot be removed without defacing information and destroying the label.

The label contains the vehicle's emission specifications and vacuum hose routings. All hoses must be connected and routed according to the label.

VEHICLE CERTIFICATION LABEL

DESCRIPTION

DESCRIPTION

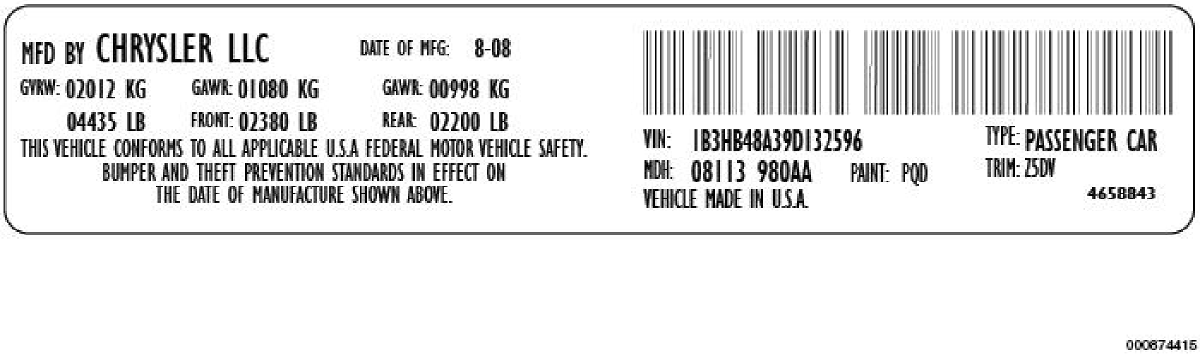

Fig. 5: Vehicle Certification Label - Typical
Courtesy of CHRYSLER GROUP, LLC

A vehicle certification label is attached to every Chrysler LLC vehicle. The label certifies that the vehicle conforms to all applicable Federal Motor Vehicle Standards. The label also lists:

- Month and year of vehicle manufacture.
- Gross Vehicle Weight Rating (GVWR). The gross front and rear axle weight ratings (GAWR's) are based on a minimum rim size and maximum cold tire inflation pressure.
- Vehicle Identification Number (VIN).
- Type of vehicle.
- Type of rear wheels.
- Bar code.
- Month, Day and Hour (MDH) of final assembly.
- Paint and Trim codes.
- Country of origin.

The label is located on the driver-side door shut-face.

VEHICLE IDENTIFICATION NUMBER

DESCRIPTION

DESCRIPTION

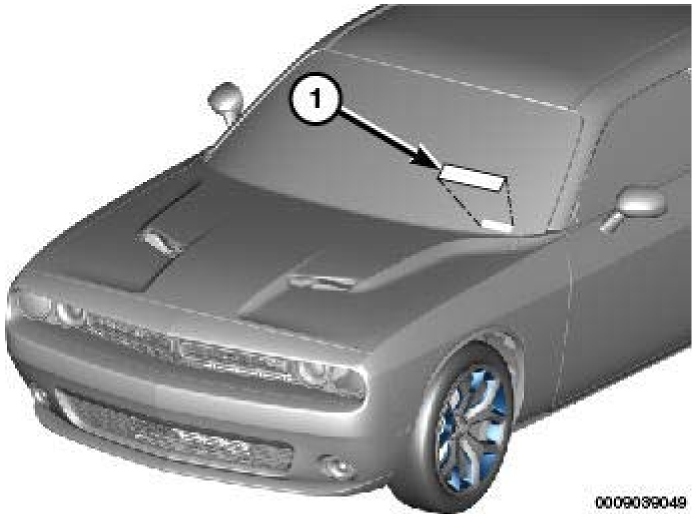

Fig. 6: Vehicle Identification Number (VIN) Label
Courtesy of CHRYSLER GROUP, LLC

The Vehicle Identification Number (VIN) label (1) can be viewed through the windshield at the upper left corner of the instrument panel, near the left windshield pillar. The VIN consists of 17 characters in a combination of letters and numbers that provide specific information about the vehicle. Refer to the charts below for decoding information.

To protect the consumer from theft and possible fraud the manufacturer is required to include a Check Digit at the ninth position of the vehicle identification number. The check digit is used by the manufacturer and government agencies to verify the authenticity of the vehicle and official documentation. The formula to use the check digit is not released to the general public.

POSITIONS 1 - 3: WORLD MANUFACTURER IDENTIFIER

1	2	3	Manufacturer	Vehicle Type
1	C	3	Chrysler Group LLC (USA)	Passenger Car
2	C	3	Chrysler Canada	Passenger Car

POSITION 4: RESTRAINT SYSTEM

NOTE:

- **All Seating Positions (ASP)**
- **Outboard Seating Position (OSP)**

Code	Description
C	Active Belts (ASP), Front Air Bags (OSP), With Side Inflatable Restraints - All Rows

POSITIONS 5 - 7:

Brand, marketing name, price series, code drive position, drive type, and body type.

5	6	7	Series	Drive Position	Drive Type	Body Type

5	6	7	Series	Drive Position	Drive Type	Body Type
D	Z	A	Base	Left Hand Drive	Rear Wheel Drive	2 Door Sedan
D	Z	B	Premium			
D	Z	C	SRT Supercharged			
D	Z	D	SRT Premium			
D	Z	F	SCAT Pack			

POSITION 8: ENGINE

Code	Displacement	Cylinders	Fuel	Turbo	Sales Codes
G	3.6 Liter	6	Gasoline	No	ERB
T	5.7 Liter	8	Gasoline	No	EZC, EZH
J	6.4 Liter	8	Gasoline	No	ESG; ESH
9	6.2 Liter Supercharged	8	Gasoline	No	ESD

POSITION 9: CHECK DIGIT

0 through 9 or X

POSITION 10: MODEL YEAR

F = 2015

POSITION 11: ASSEMBLY PLANT

Code	Plant
H	Brampton Assembly

POSITION 12 - 17: PLANT SEQUENCE NUMBER

A six digit number assigned by assembly plant.

.

Article GUID: A00735956

2015-16 GENERAL INFORMATION

Vehicle Quick Reference - Challenger

CAPACITIES AND RECOMMENDED FLUIDS

DESCRIPTION

LUBRICANT RECOMMENDATIONS

SPECIALIZED LUBRICANTS AND OILS

Some maintenance or repair procedures may require the use of specialized lubricants or oils. Consult the appropriate Service Information for the correct application of these lubricants.

BODY

Component	Fluid, Lubricant, and Genuine Part	
Hinges: Door and Hood	MOPARĀ® Spray White Lube	Ā
Latches: Door, Hood/Safety Catch	MoparĀ® Multi-Purpose Lube NLGI Grade 2 EP, GC-LB	
Seat Regulator and Track	MoparĀ® Buzz, Squeak, & Rattles Oil Lubricant	
Lock Cylinders	MoparĀ® Lock Cylinder Lube	

FLUID TYPES

When service is required, Chrysler recommends that only MoparĀ® brand parts, lubricants and chemicals be used. MoparĀ® provides the best engineered products for servicing Chrysler vehicles.

LUBRICANTS BEARING DESIGNATIONS

Only lubricants bearing designations defined by the following organization should be used to service a Chrysler vehicle:

- Society of Automotive Engineers (SAE)
- American Petroleum Institute (API)
- National Lubricating Grease Institute (NLGI)
- European Automobile Manufacturers Association (ACEA)

API QUALITY CLASSIFICATION

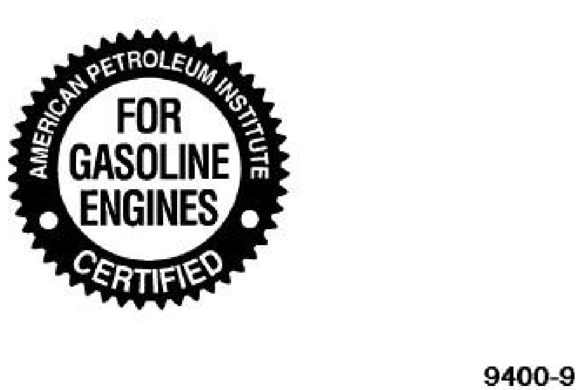

Fig. 1: API Symbol
Courtesy of CHRYSLER GROUP, LLC

This symbol on the front of an oil container means that the oil has been certified by the American Petroleum Institute (API) to meet all the lubrication requirements specified by Chrysler.

GEAR LUBRICANTS

SAE ratings also apply to multigrade gear lubricants. In addition, API classification defines the lubricant's usage, such as API GL-5 and SAE 75W-90.

AUTOMATIC TRANSMISSION FLUID

NOTE: **Refer to the appropriate Service Procedures in this Service Information for fluid level checking procedures.**

If equipped with a 8-Speed Automatic Transmission, use only MOPARĀ® ZF 8&9 Speed ATF™ Automatic Transmission Fluid, or equivalent. Failure to use the correct fluid may affect the function or performance of your transmission.

If equipped with a Manual Transmission, we recommend you use MOPARĀ® ATF+4Ā® Automatic Transmission Fluid.

FLUID ADDITIVES

Chrysler strongly recommends against the addition of any fluids to the transmission, other than those automatic transmission fluids listed above. Exceptions to this policy are the use of special dyes to aid in detecting fluid leaks.

Various "special" additives and supplements exist that claim to improve shift feel and/or quality. These additives and others also claim to improve converter clutch operation and inhibit overheating, oxidation, varnish, and sludge. These claims have not been supported to the satisfaction of Chrysler and these additives **must not be used.** The use of transmission "sealers" should also be avoided, since they may adversely affect the integrity of transmission seals.

ENGINE OIL

WARNING: **New or used engine oil can be irritating to the skin. Avoid prolonged or repeated skin contact with engine oil. Contaminants in used engine oil, caused by internal combustion, can be hazardous to your health. Thoroughly wash exposed skin with soap and water. Do not wash skin with gasoline, diesel fuel, thinner, or solvents, health problems can result. Do not pollute, dispose of used engine oil properly. Contact your dealer or government agency for location of collection center in your area.**

When service is required, Chrysler recommends that only MoparĀ® brand parts, lubricants and chemicals be used. MoparĀ® provides the best engineered products for servicing Chrysler vehicles.

LUBRICANTS BEARING DESIGNATIONS

Only lubricants bearing designations defined by the following organization should be used.

- Society of Automotive Engineers (SAE)
- American Petroleum Institute (API)
- National Lubricating Grease Institute (NLGI)
- Association des Constructeurs Europ e ens d' Automobiles (European Automobile Manufacturers Association) (ACEA)

API SERVICE GRADE CERTIFIED

9400-9

Fig. 2: API Symbol
Courtesy of CHRYSLER GROUP, LLC

Use an engine oil that is API Certified. MoparÃ® provides engine oils, meeting Material Standard MS-6395, that meet or exceed this requirement.

ENERGY CONSERVING OIL

An Energy Conserving type oil is recommended for gasoline engines. The designation of ENERGY CONSERVING is located on the label of an engine oil container.

CONTAINER IDENTIFICATION

9400-9

Fig. 3: API Symbol
Courtesy of CHRYSLER GROUP, LLC

Standard engine oil identification notations have been adopted to aid in the proper selection of engine oil. The identifying notations are located on the front label of engine oil plastic bottles and the top of engine oil cans.

This symbol means that the oil has been certified by the American Petroleum Institute (API). Chrysler only recommend API Certified engine oils that meet the requirements of Material Standard MS-6395. Use MoparÃ® or an equivalent oil meeting the specification MS-6395.

SYNTHETIC ENGINE OILS

Fig. 4: API Symbol
Courtesy of CHRYSLER GROUP, LLC

There are a number of engine oils being promoted as either synthetic or semi-synthetic. If you chose to use such a product, use **only** those oils that meet the American Petroleum Institute (API) and SAE viscosity standard. Follow the service schedule that describes your driving type.

ENGINE OIL ADDITIVES/SUPPLEMENTS

The manufacturer **does not recommend** the addition of any engine oil additives/supplements to the specified engine oil. Engine oil additives/supplements should not be used to enhance engine oil performance. Engine oil additives/supplements should not be used to extend engine oil change intervals. No additive is known to be safe for engine durability and can degrade emission components. Additives can contain undesirable materials that harm the long term durability of engines by:

- Doubling the level of Phosphorus in the engine oil. The ILSAC (International Lubricant Standard Approval Committee) GF-2 and GF-3 standards require that engine oil contain no more than 0.10% Phosphorus to protect the vehicles emissions performance. Addition of engine oil additives/supplements can poison, from the added sulfur and phosphorus, catalysts and hinder efforts to guarantee emissions performance to 80, 000 miles.
- Altering the viscosity characteristics of the engine oil so that it no longer meets the requirements of the specified viscosity grade.
- Creating potential for an undesirable additive compatibility interaction in the engine crankcase. Generally it is not desirable to mix additive packages from different suppliers in the crankcase; there have been reports of low temperature engine failures caused by additive package incompatibility with such mixtures.

ENGINE COOLANT

WARNING: **Antifreeze is an ethylene-glycol base coolant and is harmful if swallowed or inhaled. If swallowed, drink two glasses of water and induce vomiting. If inhaled, move to fresh air area. Seek medical attention immediately. Do not store in open or unmarked containers. Wash skin and clothing thoroughly after coming in contact with ethylene-glycol. Keep out of reach of children. Dispose of glycol base coolant properly, contact your dealer or government agency for location of collection center in your area. Do not open a cooling system when the engine is at operating temperature or hot under pressure, personal injury can result. Avoid radiator cooling fan when engine compartment related service is performed, personal injury can result.**

CAUTION: **Mixing of engine coolant (antifreeze) other than specified Organic Additive Technology (OAT) engine coolant (antifreeze), may result in engine damage and may decrease corrosion protection. Organic Additive Technology (OAT) engine coolant is different and should not be mixed with Hybrid Organic Additive Technology (HOAT) engine coolant (antifreeze). If a non-**

OAT engine coolant (antifreeze) is introduced into the cooling system in an emergency, it should be replaced with the specified engine coolant (antifreeze) as soon as possible.

The cooling system is designed around the coolant. The coolant must accept heat from engine metal, in the cylinder head area near the exhaust valves and engine block. Then coolant carries the heat to the radiator where the tube/fin radiator can transfer the heat to the air.

The use of aluminum cylinder blocks, cylinder heads, and water pumps requires special corrosion protection. MoparÂ® Antifreeze/Coolant, or the equivalent ethylene-glycol base coolant with organic corrosion inhibitors (called OAT, for Organic Additive Technology) is recommended. This coolant offers the best engine cooling without corrosion when mixed with 50% ethylene-glycol and 50% distilled water to obtain a freeze point of -37Â°C (-35Â°F). If it loses color or becomes contaminated, drain, flush, and replace with fresh properly mixed coolant solution.

COOLANT PERFORMANCE

The required ethylene-glycol and water mixture depends upon climate and vehicle operating conditions. The coolant performance of various mixtures follows:

Pure Water- Water can absorb more heat than a mixture of water and ethylene-glycol. This is for purpose of heat transfer only. Water also freezes at a higher temperature and allows corrosion.

100 percent Ethylene-Glycol - The corrosion inhibiting additives in ethylene-glycol need the presence of water to dissolve. Without water, additives form deposits in system. These act as insulation causing temperature to rise to as high as 149Â°C (300Â°F). This temperature is hot enough to melt plastic. The increased temperature can result in sever engine damage. In addition, 100 percent ethylene-glycol freezes at -22Â°C (-8Â°F).

50/50 Ethylene-Glycol and Water - Is the recommended mixture, it provides protection against freezing to -37Â°C (-34Â°F). The antifreeze concentration **must always** be a minimum of 44 percent, year-round in all climates. If percentage is lower, engine parts may be eroded by cavitation. Maximum protection against freezing is provided with a 68 percent antifreeze concentration, which prevents freezing down to -67.7Â°C (-90Â°F). A higher percentage will freeze at a warmer temperature. Also, a higher percentage of antifreeze can cause the engine to overheat because specific heat of antifreeze is lower than that of water.

OAT coolant is purple in color. It cannot be mixed with other types of coolant including Chrysler's existing HOAT coolant and only should only be mixed with approved OAT coolant of the same color. Maintenance of the cooling system is not required unless a repair has been made with loss of coolant or the coolant has been contaminated.

CAUTION: Richer antifreeze mixtures cannot be measured with normal field equipment and can cause problems associated with 100 percent ethylene-glycol.

CAUTION: Do not use coolant additives that are claimed to improve engine cooling.

BRAKE FLUID

The brake fluid used in this vehicle must conform to DOT 3 specifications and SAE J1703 standards. If DOT 3 brake fluid is not available, then DOT 4 is acceptable. Use only MoparÂ® Brake Fluid or equivalent from a tightly sealed container.

CAUTION: Never use reclaimed brake fluid or fluid from a container which has been left open. An open container of brake fluid will absorb moisture from the air and contaminate the fluid.

CAUTION: Never use any type of a petroleum-based fluid in the brake hydraulic system. Use of such type fluids will result in seal damage of the vehicle brake hydraulic system causing a failure of the vehicle brake system. Petroleum based fluids would be items such as engine oil, transmission fluid, power steering fluid, etc.

A/C REFRIGERANT

The refrigerant used in this air conditioning system may be R-1234yf or R-134a, depending on market.

NOTE: **Refer to under-hood label for verification.**

The A/C refrigerant system is filled-for-life at the factory and requires no regular maintenance. Although not required at specific intervals, the charge level should be checked if system performance deteriorates or if a noise or leak is suspected. Refer to DIAGNOSIS AND TESTING .

SPECIFICATIONS

SPECIFICATIONS

ENGINE

Description	Type	Part Number	Capacities	
			U.S.	Metric
Cooling System				
(1) Engine Coolant (3.6L Engine)	We recommend you use MOPARĀ® Antifreeze/Coolant 10 Year/150, 000 Mile Formula OAT (Organic Additive Technology).	1 Gallon - 68163848AA (concentrate) 68163849AA (50/50)	11.1 Quarts	10.5 Liters
(1) Engine Coolant (5.7L Engine)	We recommend you use MOPARĀ® Antifreeze/Coolant 10 Year/150, 000 Mile Formula OAT (Organic Additive Technology).	1 Gallon - 68163848AA (concentrate) 68163849AA (50/50)	14.7 Quarts	13.9 Liters
(1) Engine Coolant (6.2L Supercharged Engine)	We recommend you use MOPARĀ® Antifreeze/Coolant 10 Year/150, 000 Mile Formula OAT coolant conforming to MS.90032.	1 Gallon - 68163848AA (concentrate) 68163849AA (50/50)	15 Quarts	14.4 Liters
(1) Engine **Intercooler** Coolant (6.2L Supercharged Engine)	We recommend you use MOPARĀ® Antifreeze/Coolant 10 Year/150, 000 Mile Formula OAT coolant conforming to MS.90032.	1 Gallon - 68163848AA (concentrate) 68163849AA (50/50)	4.5 Quarts	4.2 Liters
(1) Engine Coolant (6.4L Engine)	We recommend you use MOPARĀ® Antifreeze/Coolant 10 Year/150, 000 Mile Formula OAT coolant conforming to MS.90032.	1 Gallon - 68163848AA (concentrate) 68163849AA (50/50)	15 Quarts	14.4 Liters
Engine Oil with Filter				
Engine Oil (3.6L Engines)	We recommend you use API Certified SAE 5W-20 Engine Oil, meeting the requirements of Chrysler Material Standard MS-6395 such as MOPARĀ®, PennzoilĀ®, and Shell HelixĀ®. Refer to your engine oil filler cap for	1 Quart - 04761872PA 1 Gallon - 04761851PA	6 Quarts	5.6 Liters

Description	Type	Part Number	Capacities	
			U.S.	Metric
	correct SAE grade.			
Engine Oil (5.7L Engines)	We recommend you use API Certified SAE 5W-20 Engine Oil, meeting the requirements of Chrysler Material Standard MS-6395 such as MOPARÃ®, PennzoilÃ®, and Shell HelixÃ®. Refer to your engine oil filler cap for correct SAE grade.	1 Quart - 04761872PA 1 Gallon - 04761851PA	7 Quarts	6.6 Liters
Engine Oil (6.2L Supercharged Engine)	Pennzoil UltraTM 0W-40 or equivalent MOPARÃ® engine oil meeting the requirements of Chrysler Material Standard MS-12633 for use in all operating temperatures.	1 Quart - 68171066PA	6 Quarts	5.6 Liters
Engine Oil (6.4L Engine)	Pennzoil UltraTM 0W-40 or equivalent MOPARÃ® engine oil meeting the requirements of Chrysler Material Standard MS-12633 for use in all operating temperatures.	1 Quart - 68171066PA	7 Quarts	6.6 Liters
Engine Oil Filter (3.6L Engines)	MOPARÃ® Engine Oil Filter	68191349AA	N/A	N/A
Engine Oil Filter (6.2L Supercharged Engine)	MOPARÃ® Engine Oil Filter	04884 899AB	N/A	N/A
Engine Oil Filter (5.7L and 6.4L Engines)	MOPARÃ® Engine Oil Filter	04884 899AB	N/A	N/A
Fuel (approximate)				
Fuel Selection (3.6L Engine)	87 Octane	N/A	18.5 Gallons	70 Liters
Fuel Selection (5.7L Engine - Automatic Transmission)	89 Octane recommended - 87 Octane acceptable	N/A	18.5 Gallons	70 Liters
Fuel Selection (5.7L Engine - Manual Transmission)	91 Octane Only or higher	N/A	18.5 Gallons	70 Liters
Fuel Selection (6.2L Supercharged Engine)	91 Octane Only or higher	N/A	18.5 Gallons	70 Liters
Fuel Selection (6.4L Engine)	91 Octane Only or higher	N/A	18.5 Gallons	70 Liters
A/C Refrigerant System				
A/C Refrigerant System	R-134a	82300101AB	1.50 Pounds	681 Grams
	R-1234yf	68224028AA	1.56 Pounds	709 Grams
(1) System fill capacity includes heater and coolant recovery bottle filled to MAX level.				

Description	Type	Part Number	Capacities	
			U.S.	Metric
CAUTION: **Nominal refill capacities are shown. A variation may be observed from vehicle to vehicle due to manufacturing tolerance and refill procedure.**				

SPARK PLUGS

Description	Type	Part Number	Gap	
			U.S.	Metric
Spark Plugs (3.6L ERB Engine)	We recommend you use MOPARĀ® Spark Plugs.	SP149125AD	0.043 in	1.10 mm
Spark Plugs (5.7L EZC; EZH Engine)	We recommend you use MOPARĀ® Spark Plugs.	SP143877AA	0.043 in	1.10 mm
Spark Plugs (6.2L ESD Supercharged Engine)	We recommend you use MOPARĀ® Spark Plugs.	SP196724AA	0.031 in	0.8 mm
Spark Plugs (6.4L ESG; ESH Engine)	We recommend you use MOPARĀ® Spark Plugs.	SP149212AC	0.043 in	1.10 mm

TRANSMISSION

Description	Type	Part Number	Capacities	
			U.S.	Metric
Automatic				
(1) 845RE Overhaul Fill	Use only MOPARĀ® ZF 8&9 Speed ATF™ Automatic Transmission Fluid, or equivalent. Failure to use the correct fluid may affect the function or performance of your transmission.	1 Quart - 68218925AA	9.72 Quarts	9.20 Liters
(1) 8HP70 Overhaul Fill	Use only MOPARĀ® ZF 8&9 Speed ATF™ Automatic Transmission Fluid, or equivalent. Failure to use the correct fluid may affect the function or performance of your transmission.	1 Quart - 68218925AA	9.0 Quarts	8.50 Liters

Description	Type	Part Number	Capacities	
			U.S.	Metric
(1) 8HP90 Overhaul Fill	Use only MOPARĀ® ZF 8&9 Speed ATF™ Automatic Transmission Fluid, or equivalent. Failure to use the correct fluid may affect the function or performance of your transmission.	1 Quart - 68218925AA	9.17 Quarts	8.68 Liters
Manual				
(2) TREMEC TR6060 (5.7L and 6.4L Engine)	MOPARĀ® ATF+4 Automatic Transmission Fluid	1 Quart - 05013457AA 1 Gallon - 05013458AA	3.4 Quarts	3.2 Liters
(3) TREMEC TR6060 (6.2L Engine)	MOPARĀ® ATF+4 Automatic Transmission Fluid	1 Quart - 05013457AA 1 Gallon - 05013458AA	4.2 Quarts	3.9 Liters

(1)
Dry fill capacity. Depending on type and size of internal cooler, length and inside diameter of cooler lines, or use of an auxiliary cooler, these figures may vary. Refer to the appropriate service information for the correct procedures.

(2)
Approximate dry fill capacity or 1/4 " below the fill plug hole.

(3)
Approximate total dry fill capacity of manual transmission, auxiliary cooler, and cooler lines. Refer to the appropriate service information for the correct check, drain, and fill procedures.

CAUTION:

Nominal refill capacities are shown. A variation may be observed from vehicle to vehicle due to manufacturing tolerance and refill procedure.

CHASSIS

Description	Type	Part Number	Capacities	
			U.S.	Metric
Axles				
195 Rear Axle	We recommend you use MOPARĀ® Synthetic Gear Lubricant SAE 75W85 (API GL-5)	1 Quart - 68232947AA	0.74 Quarts	0.7 Liters
230 Rear Axle	We recommend you use MOPARĀ® Synthetic Gear Lubricant SAE 75W85 (API GL-5)	1 Quart - 68232947AA	1.16 Quarts	1.1 Liters

Description	Type	Part Number	Capacities	
			U.S.	Metric
230 Limited-Slip Rear Axle	Castrol SAF-EH MOD LV Synthetic Gear Lubricant SAE 75W90 (API GL-5)	1 Quart - 68232948AA	1.16 Quarts	1.1 Liters
Chassis Systems				
(1) Brake Master Cylinder	MOPARĀ® Brake Fluid DOT 3, SAE J1703	12 oz. Bottle - 04318080AB 32 oz. Bottle - 04318081AB	N/A	N/A
Power Steering Reservoir (Belt Driven Pump)	We recommend you use MOPARĀ® Hydraulic System Power Steering Fluid or equivalent meeting the requirements of Chrysler Material Standard MS-10838.	1 Quart - 68234631AA	N/A	N/A

(1)
If MOPARĀ® Brake Fluid DOT 3 is not available, then MOPARĀ® Brake and Clutch Fluid DOT 4 (04549625AC), is acceptable.

CAUTION:
Nominal refill capacities are shown. A variation may be observed from vehicle to vehicle due to manufacturing tolerance and refill procedure.

FUSE - RELAY LOCATIONS AND TYPES

SPECIFICATIONS

SPECIFICATIONS

FRONT POWER DISTRIBUTION CENTER (PDC)

CAUTION:

- **When installing the PDC cover, it is important to ensure the cover is properly positioned and fully latched. Failure to do so may allow water to get into the PDC, and possibly result in a electrical system failure.**
- **When replacing a blown fuse, it is important to use only a fuse having the correct amperage rating. The use of a fuse with a rating other than indicated may result in a dangerous electrical system overload. If a properly rated fuse continues to blow, it indicates a problem in the circuit that must be corrected.**

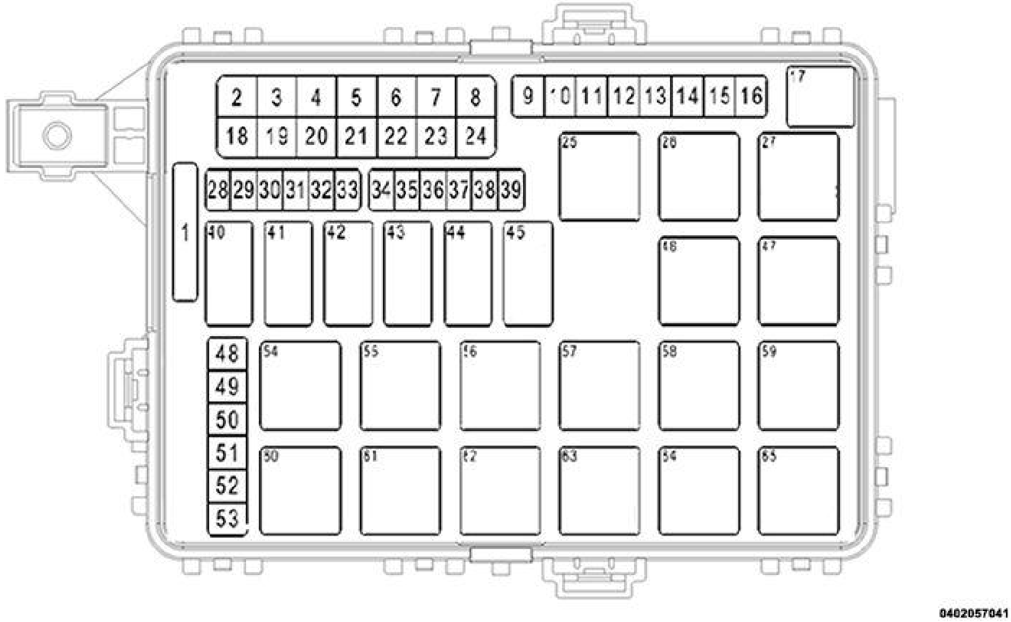

Fig. 5: Identifying Front Power Distribution Center (PDC) Fuses & Relays
Courtesy of CHRYSLER GROUP, LLC

The Front Power Distribution Center (PDC) is located in the engine compartment. This module contains fuses and relays.

Cavity	Cartridge Fuse	Mini-Fuse	Description
1	-	-	Fuse - Spare
2	40 Amp Green	-	Radiator Fan #1 - If Equipped
3	50 Amp Red	-	Power Steering #1 / Radiator Fan (6.2L Supercharged) - If Equipped
4	30 Amp Pink	-	Starter
5	40 Amp Green	-	Electronic Stability Control
6	30 Amp Pink	-	Electronic Stability Control
7	-	-	Fuse - Spare
8	20 Amp Blue	-	Police Ignition Run / ACC # 2
9	-	20 Amp Yellow	All-Wheel Drive Module - If Equipped
10	-	10 Amp Red	Security - If Equipped / Under hood Lamp - Police
11	-	20 Amp Yellow	Horns
12	-	10 Amp Red	Air Conditioning Clutch
13	-	-	Fuse - Spare
14	-	-	Fuse - Spare
15	-	20 Amp Yellow	Left HID - If Equipped
16	-	20 Amp Yellow	Right HID - If Equipped
18	50 Amp Red	-	Radiator Fan #2 - If Equipped
19	50 Amp Red	-	Power Steering #2 / Radiator Fan (6.2L Supercharged)
20	30 Amp Pink	-	Wiper Motor
21	30 Amp Pink	-	Headlamp Washers - If Equipped / Police Feed
22	40 Amp Green / 20 Amp Blue - Police	-	Engine Cooling Pump (6.2L Supercharged) / Police Bat Feed # 3 - If Equipped
23	20 Amp Blue	-	Police Bat Feed # 1 - If Equipped

Cavity	Cartridge Fuse	Mini-Fuse	Description
24	20 Amp Blue	-	Police Bat Feed # 3 - If Equipped
28	-	-	Fuse - Spare
29	-	15 Amp Blue	Transmission Control Module (LA/LD Police)
30	-	-	Fuse - Spare
31	-	25 Amp Clear	Engine Module
32	-	-	Fuse - Spare
33	-	-	Fuse - Spare
34	-	25 Amp Clear	Powertrain #1
35	-	20 Amp Yellow	Powertrain #2
36	-	10 Amp Red	Anti-Lock Brake Module
37	-	10 Amp Red	Engine Controller/Rad Fan Relays - If Equipped
38	-	10 Amp Red	Airbag Module
39	-	10 Amp Red	Power Steering Module/AC Clutch Relay
48	-	10 Amp Red	AWD Module/Front Axle Disconnect (LX) / Adaptive Cruise (LA) - If Equipped
49	-	-	Fuse - Spare
50	-	-	Fuse - Spare
51	-	20 Amp Yellow	Vacuum Pump
52	-	5 Amp Tan	Adaptive Cruise (LD/LX) - If Equipped
53	-	-	Fuse - Spare

Relays	
Cavity	**Description**
25	Vacuum Pump
27	Starter
41	Horn
42	Front Wiper 1
43	A/C Clutch
45	Front Wiper 2
46	HID Headlamps - Left
47	Radiator Fan - High
57	Radiator Fan #2 Series/Parallel
58	Radiator Fan Low
59	Run / Start
63	Auto Shut Down
65	HID Headlamps - Right

REAR POWER DISTRIBUTION CENTER (PDC)

CAUTION:

- **When installing the PDC cover, it is important to ensure the cover is properly positioned and fully latched. Failure to do so may allow water to get into the PDC, and possibly result in a electrical system failure.**
- **When replacing a blown fuse, it is important to use only a fuse having the correct amperage rating. The use of a fuse with a rating other than indicated may result in a dangerous electrical system overload. If a properly rated fuse continues to blow, it indicates a problem in the circuit that must be corrected.**

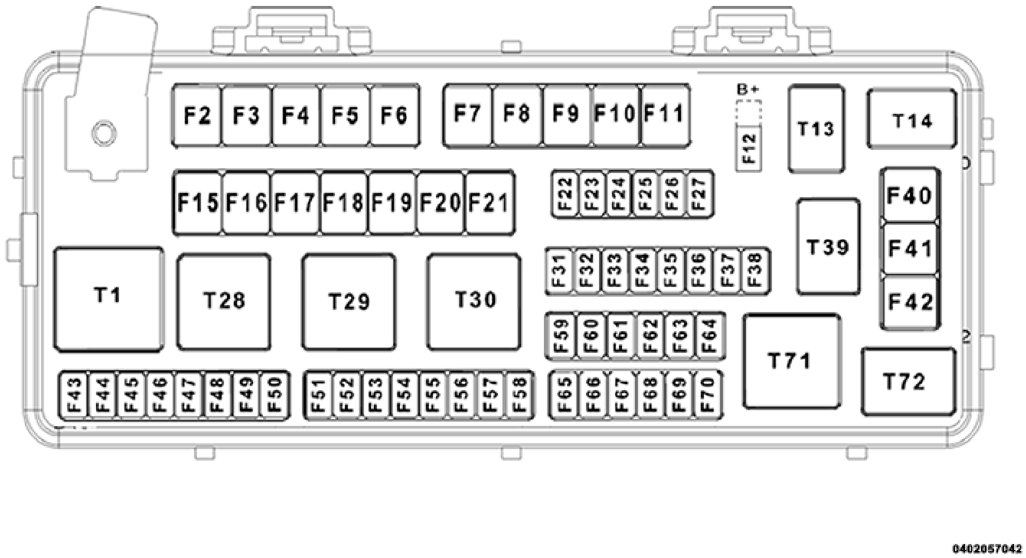

Fig. 6: Identifying Rear Power Distribution Center (PDC) Fuses & Relays
Courtesy of CHRYSLER GROUP, LLC

There is also a power distribution center located in the trunk under the spare tire access panel. This center contains fuses and relays.

Cavity	Cartridge Fuse	Mini-Fuse	Description
2	60 Amp Yellow	-	Front PDC Feed #1
3	-	-	Fuse - Spare
4	60 Amp Yellow	-	Front PDC Feed #2
5	30 Amp Pink	-	Sunroof / Dome Lamp - Police
6	40 Amp Green	-	Exterior Lighting #1
7	40 Amp Green	-	Exterior Lighting #2
8	30 Amp Pink	-	Interior Lighting
9	40 Amp Green	-	Power Locks
10	30 Amp Pink	-	Driver Door Control Module
11	30 Amp Pink	-	Passenger Door Control Module
12	-	20 Amp Yellow	Dual USB Center Console Rear/Cigar Lighter IP - If Equipped
15	40 Amp Green	-	HVAC Blower
16	20 Amp Blue	-	Left Spot Lamp - Police
17	-	-	Fuse - Spare
18	30 Amp Pink	-	Mod Network Interface - Police
19	-	-	Fuse - Spare
20	-	-	Fuse - Spare
21	30 Amp Pink (6.2L Supercharged) 25 Amp Clear (LD STD)	-	Fuel Pump (6.2L Supercharged) Fuel Pump (LD STD)
22	-	20 Amp Yellow - Police 10 Amp Red - LA	Right Spot Lamp - Police Integrated Center Stack - LA
23	-	10 Amp Red	Fuel Door/Diagnostic Port
24	-	15 Amp Blue	Integrated Center Stack - LD/LX

Cavity	Cartridge Fuse	Mini-Fuse	Description
25	-	10 Amp Red	Tire Pressure Monitor
26	-	15 Amp Blue - LD/LX 25 Amp Clear - LA 30 Amp Green - LA 6.2L Supercharged	Transmission / Electronic Shift Module (LD/LX) Fuel Pump (LA) Fuel Pump (LA 6.2L Supercharged)
27	-	25 Amp Clear	Amplifier - If Equipped
31	-	25 Amp Breaker	Power Seats
32	-	15 Amp Blue	HVAC Module/Cluster
33	-	15 Amp Blue	Ignition Switch/RF hub Module/Steering Column Lock-LX If Equipped
34	-	10 Amp Red	Steering Column Module/Clock/Spare - Police
35	-	5 Amp Tan	Battery Sensor
36	-	15 Amp Blue	Electronic Exhaust Valve - If Equipped
37	-	20 Amp Yellow	Radio
38	-	15 Amp Blue - LD/LX 20 Amp Yellow - LA	Console Power Outlet/Console Media Hub (LD/LX) Power Outlet Inside Arm Rest/Console Media Hub (LA)
40	-	-	Fuse - Spare
41	-	-	Fuse - Spare
42	30 Amp Pink	-	Rear Defrost
43	-	20 Amp Yellow	Rear Heated Seats/Steering Wheel Module
44	-	10 Amp Red	Park Assist / Blind Spot / Rear View Camera
45	-	15 Amp Blue	Cluster / Rearview Mirror / Compass(LDLX)/Humidity Sensor
46	-	-	Fuse - Spare
47	-	10 Amp Red	Adaptive Front Lighting / Auto High BEAM / Day Time Running Lamps- If Equipped
48	-	20 Amp Yellow	Active Suspension - SRT
49	-	-	Fuse - Spare
50	-	-	Fuse - Spare
51	-	20 Amp Yellow	Front Heated Seats - If Equipped
52	-	10 Amp Red	Heated Cupholders/Rear Heated Seat Switches - If Equipped
53	-	10 Amp Red	HVAC Module/In Car Temperature Sensor
54	-	10 Amp Red	Airbag Module (LA)
55	-	-	Fuse - Spare
56	-	-	Fuse - Spare
57	-	-	Fuse - Spare
58	-	10 Amp Red	Airbag Module (LD/LX)
59	-	20 Amp Yellow	Adjustable Pedals - Police
60	-	5 Amp Tan	Heated Washer Nozzles (LD)
61	-	20 Amp Yellow	Cigar Lighter (LA) - If Equipped

Cavity	Cartridge Fuse	Mini-Fuse	Description
62	-	-	Fuse - Spare
63	-	-	Fuse - Spare
64	-	25 Amp Breaker	Rear Windows (LD/LX)
65	-	10 Amp Red	Airbag Module
66	-	-	Fuse - Spare
67	-	10 Amp Red	Rain and Light Sensor/Sunroof
68	-	10 Amp Red	Dual USB Power Outlet - R/A Sense (LD/LX) Rear Sunshade (LD/LX)
69	-	-	Fuse - Spare
70	-	-	Fuse - Spare

Relays	
Cavity	**Description**
1	Ignition Run
28	Rear Defrost
29	Run Sense
30	Cigar Lighter
71	Blower Motor
72	Fuel Pump

HOISTING

STANDARD PROCEDURE

STANDARD PROCEDURE - HOISTING

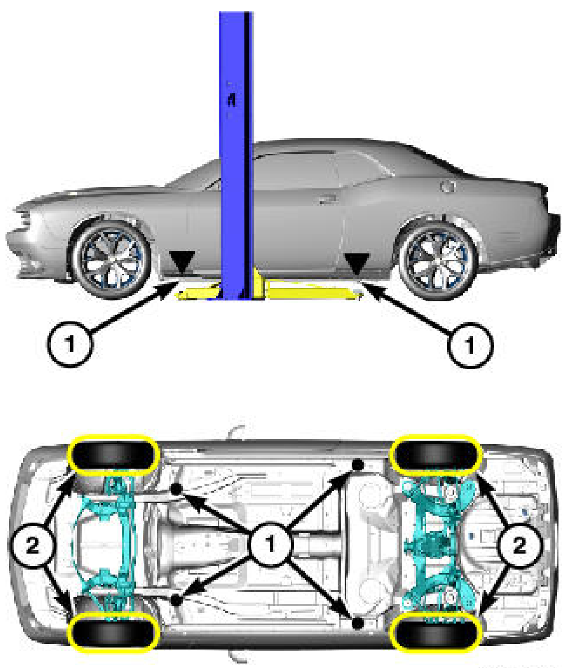

Fig. 7: Challenger Lifting Points
Courtesy of CHRYSLER GROUP, LLC

1 - FRAME CONTACT LIFT (SINGLE POST)
1 - CHASSIS LIFT (DUAL LIFT)
1 - OUTBOARD LIFT (DUAL LIFT)

1 - FLOOR JACK	
2 - DRIVE ON HOIST	

Refer to Owner's Manual provided with vehicle for proper emergency jacking procedures.

WARNING: The hoisting and jack lifting points provided are for a complete vehicle. When the engine or rear suspension is removed from a vehicle, the center of gravity is altered making some hoisting conditions unstable. Properly support or secure vehicle to hoisting device when these conditions exist. Failure to follow these instructions may result in serious or fatal injury.

CAUTION: Do not position hoisting device on any suspension component, including the front or rear suspension crossmembers. Do not hoist on the front and rear bumpers, the lower radiator crossmember, or the front engine mount.

Do not attempt to raise one entire side of the vehicle by placing a floor jack midway between the front and rear wheels. This practice may result in permanent damage to the body.

When properly positioned, a floor jack can be used to lift the vehicle and support the raised vehicle with jack stands.

A floor jack or any lifting device must never be used on any part of the underbody other than the described areas.

JUMP STARTING

STANDARD PROCEDURE

STANDARD PROCEDURE - JUMP STARTING

WARNING: Review all safety precautions and warnings in the battery system Service Information.

- **Take care to avoid the radiator cooling fan whenever the hood is raised. It can start anytime the ignition switch is ON. You can be hurt by the fan.**
- **Do not attempt to push or tow your vehicle to get it started. Vehicles equipped with an automatic transmission cannot be started this way. Unburned fuel could enter the catalytic converter and once the engine has started, ignite and damage the converter and vehicle. If the vehicle has a discharged battery, booster cables may be used to obtain a start from another vehicle. This type of start can be dangerous if done improperly, so follow this procedure carefully.**
- **Battery fluid is a corrosive acid solution; do not allow battery fluid to contact eyes, skin, or clothing. Don't lean over battery when attaching clamps or allow the clamps to touch each other. If acid splashes in eyes or on skin, flush contaminated area immediately with large quantities of water.**
- **A battery generates hydrogen gas, which is flammable and explosive. Keep flame or spark away from the vent holes.**
- **Do not use a booster battery or any other booster source with an output that exceeds 12 Volts.**
- **The battery in this vehicle has a vent hose that should not be disconnected and should only be replaced with a battery of the same type (vented).**

Failure to follow these instructions may result in serious or fatal injury.

CAUTION: When using another vehicle as a booster, do not allow vehicles to touch. Electrical systems can be damaged on either vehicle.

NOTE: The battery is stored under an access cover in the trunk. Remote battery terminals are located in the engine compartment for jump starting.

TO JUMP START A DISABLED VEHICLE:

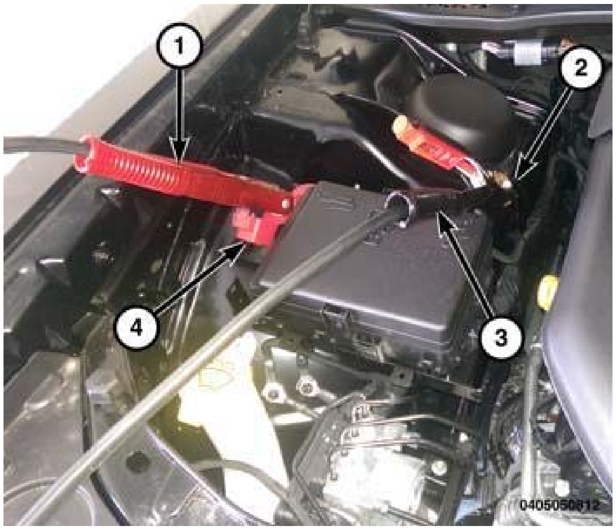

Fig. 8: Battery Jump Start Connections
Courtesy of CHRYSLER GROUP, LLC

1. Wear eye protection and remove any metal jewelry, such as watchbands or bracelets, that might make an inadvertent electrical contact.
2. When boost is provided by a battery in another vehicle, park that vehicle within booster cable reach, but do not allow the vehicles to touch one another.
3. Set the parking brake, place the automatic transmission in PARK, and turn the ignition switch to the LOCK position on both vehicles.
4. Turn off the heater, radio, and all unnecessary electrical loads.
5. Open the terminal cover (4) on the vehicle needing a jump start. Connect one end (1) of the jumper cable to the remote jump-start positive battery post (+) in the engine compartment. Connect the other end of the same cable to the positive terminal of the booster battery. Refer to the illustration for jump-starting connections. See **Fig. 8**.
6. Connect the other cable (3), first to the negative terminal of the booster battery and then to the engine ground (**-**) (2) of the vehicle with the discharged battery. Make sure you have a good contact on the engine ground. Refer to the illustration for jump-starting connections. See **Fig. 8**.
7. Start the engine in the vehicle that has the booster battery. Let the engine idle a few minutes. Then, start the engine in the vehicle with the discharged battery.
8. When removing the jumper cables, reverse the above sequence exactly. Be careful of the moving belts and fan.

WARNING:

- **You should not try to start your vehicle by pushing or towing.**
- **Do not connect the cable to the negative post of the discharged battery. The resulting electrical spark could cause the battery to explode.**
- **During cold weather when temperatures are below the freezing point, electrolyte in a discharged battery may freeze. Do not attempt jump-starting because the battery could rupture or explode. The battery temperature must be brought above the freezing point before attempting jump-start.**
- **Failure to follow these instructions may result in serious or fatal injury.**

MAINTENANCE SCHEDULES

DESCRIPTION

MAINTENANCE SCHEDULES - NAFTA

OIL CHANGE INDICATOR SYSTEM

This vehicle is equipped with an automatic oil change indicator system. The oil change indicator system will remind you that it is time to take your vehicle in for scheduled maintenance.

Based on engine operation conditions, the oil change indicator message will illuminate. This means that service is required for your vehicle. Operating conditions such as frequent short-trips, trailer tow, extremely hot or cold ambient temperatures, and E85 fuel usage will influence when the "Change Oil" or "Oil Change Required" message is displayed. Severe Operating Conditions can cause the change oil message to illuminate as early as 3, 500 miles (5, 600 km) since last reset. Have your vehicle serviced as soon as possible, within the next 500 miles (805 km).

The message "Oil Change Required" will be displayed and a single chime will sound, indicating that an oil change is necessary.

To reset the oil change indicator system, refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, STANDARD PROCEDURE** .

NOTE: **Under no circumstances should oil change intervals exceed 10, 000 miles (16, 000 km) or twelve months, whichever comes first.**

Severe Duty All Models

Change Engine Oil at 4000 miles (6, 500 km) if the vehicle is operated in a dusty and off road environment. This type of vehicle use is considered Severe Duty.

Once A Month Or Before A Long Trip:

- Check engine oil level.
- Check windshield washer fluid level.
- Check tire pressure and look for unusual wear or damage. Rotate tires at the first sign of irregular wear, even if it occurs before your next scheduled service.
- Check the fluid levels of the coolant reservoir, brake master cylinder, and power steering and fill as needed.
- Check function of all interior and exterior lights.

At Every Oil Change Interval As Indicated By Oil Change Indicator System:

- Change oil and filter.
- Rotate the tires. **Rotate at the first sign of irregular wear, even if it occurs before the oil indicator system turns on.**
- Inspect battery and clean and tighten terminals as required.
- Inspect brake pads, shoes, rotors, drums, hoses and park brake.
- Inspect engine cooling system protection and hoses.
- Inspect exhaust system.
- Inspect engine air cleaner if using in dusty or off-road conditions.

REQUIRED MAINTENANCE INTERVALS

Mileage or time passed (whichever comes first)	20, 000	30, 000	40, 000	50, 000	60, 000	70, 000	80, 000	90, 000	100, 000	110, 000	120, 000	130, 000	140, 000	150, 000
Or Years:	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Or Kilometers:	32, 000	48, 000	64, 000	80, 000	96, 000	112, 000	128, 000	144, 000	160, 000	176, 000	192, 000	208, 000	224, 000	240, 000
Additional Inspections														
Inspect the CV joints.	Ā	X	Ā	Ā	X	Ā	Ā	X	Ā	Ā	X	Ā	Ā	X

Mileage or time passed (whichever comes first)	20, 000	30, 000	40, 000	50, 000	60, 000	70, 000	80, 000	90, 000	100, 000	110, 000	120, 000	130, 000	140, 000	150, 000
Or Years:	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Or Kilometers:	**32, 000**	**48, 000**	**64, 000**	**80, 000**	**96, 000**	**112, 000**	**128, 000**	**144, 000**	**160, 000**	**176, 000**	**192, 000**	**208, 000**	**224, 000**	**240, 000**
Inspect front suspension, tie rod ends, boot seals and replace if necessary.	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā
Inspect the rear axle fluid.	X	Ā	Ā	Ā	X	Ā	Ā	Ā	X	Ā	Ā	Ā	X	Ā
Inspect the manual transmission fluid (if equipped), add as necessary.	X	Ā	Ā	Ā	X	Ā	Ā	Ā	X	Ā	Ā	Ā	X	Ā
Inspect the brake linings, replace as necessary.	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā
Adjust park brake on vehicles equipped with four wheel disc brakes.	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā
Additional Maintenance														
Replace engine air filter.	Ā	X	Ā	Ā	X	Ā	Ā	X	Ā	Ā	X	Ā	Ā	X
Replace cabin/air conditioning filter.	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā
Replace spark plugs. **	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā
Flush and replace the engine coolant at 10 years or 150, 000 miles (240, 000 km) whichever comes first.	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	X
Change the manual transmission fluid (if equipped) if using your vehicle for any of the following: Most of your driving is at sustained speeds during hot weather, above 90Ā°F (32Ā°C), driving in dusty conditions, or stop and go driving.	Ā	Ā	X	Ā	Ā	Ā	X	Ā	Ā	Ā	X	Ā	Ā	Ā
Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet, off-road, or frequent trailer towing.	Ā	Ā	X	Ā	Ā	Ā	X	Ā	Ā	Ā	X	Ā	Ā	Ā
Inspect and replace PCV valve if necessary.	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā

** The spark plug change interval is mileage based only, yearly intervals do not apply.

MAINTENANCE SCHEDULES - NAFTA - SRT

OIL CHANGE INDICATOR SYSTEM

This vehicle is equipped with an automatic oil change indicator system. The oil change indicator system reminds you that it is time to take your vehicle in for scheduled maintenance.

The message "Oil Change Required" will be displayed and a single chime will sound, indicating that an oil change is necessary.

Based on engine operation conditions, the oil change indicator message will illuminate. This means that service is required for your vehicle. Have your vehicle serviced as soon as possible, within the next 500 miles (805 km).

To reset the oil change indicator system, refer to **CENTER, ELECTRONIC VEHICLE INFORMATION, STANDARD PROCEDURE** .

NOTE:

- **The oil change indicator message will not monitor the time since the last oil change. Change your vehicle's oil if it has been six months since your last oil change, even if the oil change indicator message is NOT illuminated.**
- **Change your engine oil more often if you drive your vehicle off-road for an extended period of time.**
- **Under no circumstances should oil change intervals exceed 6, 000 miles (10, 000 km) or six months, whichever comes first.**

At Each Stop For Fuel

- Check the engine oil level. Refer to "Maintenance Procedures/Engine Oil" in "Maintaining Your Vehicle" for further information.
- Check the windshield washer solvent and add if required.

Once A Month

- Check tire pressure and look for unusual wear or damage.
- Inspect the battery, and clean and tighten the terminals as required.
- Check the fluid levels of the coolant reservoir, brake master cylinder, and power steering (6.2L Only), and add as needed.
- Check all lights and other electrical items for correct operation.

At Each Oil Change

- Change oil and filter.
- Inspect the brake hoses and lines.

CAUTION: Failure to perform the required maintenance items may result in damage to the vehicle.

REQUIRED MAINTENANCE INTERVALS

Miles:	**6, 000**	**12, 000**	**18, 000**	**24, 000**	**30, 000**	**36, 000**	**42, 000**	**48, 000**	**54, 000**	**60, 000**	**66, 000**	**72, 000**	**78, 000**	**84, 000**	**90, 000**	**96, 000**	**102, 000**	**108, 000**	**114, 000**	**120, 000**	**126, 000**	**132, 000**	**138, 000**	**144, 000**	**150, 000**
Or Months:	**6**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**	**66**	**72**	**78**	**84**	**90**	**96**	**102**	**108**	**114**	**120**	**126**	**132**	**138**	**144**	**150**
Or Kilometers:	**10, 000**	**20, 000**	**30, 000**	**40, 000**	**50, 000**	**60, 000**	**70, 000**	**80, 000**	**90, 000**	**100, 000**	**110, 000**	**120, 000**	**130, 000**	**140, 000**	**150, 000**	**160, 000**	**170, 000**	**180, 000**	**190, 000**	**200, 000**	**210, 000**	**220, 000**	**230, 000**	**240, 000**	**250, 000**
Change the engine oil and engine oil filter.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rotate the tires, rotate at the first sign	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Miles:	**6,000**	**12,000**	**18,000**	**24,000**	**30,000**	**36,000**	**42,000**	**48,000**	**54,000**	**60,000**	**66,000**	**72,000**	**78,000**	**84,000**	**90,000**	**96,000**	**102,000**	**108,000**	**114,000**	**120,000**	**126,000**	**132,000**	**138,000**	**144,000**	**150,000**
Or Months:	**6**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**	**66**	**72**	**78**	**84**	**90**	**96**	**102**	**108**	**114**	**120**	**126**	**132**	**138**	**144**	**150**
Or Kilometers:	**10,000**	**20,000**	**30,000**	**40,000**	**50,000**	**60,000**	**70,000**	**80,000**	**90,000**	**100,000**	**110,000**	**120,000**	**130,000**	**140,000**	**150,000**	**160,000**	**170,000**	**180,000**	**190,000**	**200,000**	**210,000**	**220,000**	**230,000**	**240,000**	**250,000**
of irregular wear, even if it occurs before scheduled maintenance.																									
If using your vehicle for any of the following: dusty or off-road conditions. Inspect the engine air cleaner filter; replace if necessary.	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā
Inspect the brake linings; replace if necessary.	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā
Inspect the CV joints.	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā
Inspect the exhaust system.	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	Ā	Ā	X	Ā	X	Ā	X	Ā
Adjust the parking brake on vehicles equipped with four wheel disc brakes.	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	X
Change the manual transmission fluid (if equipped).	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā
Inspect the manual transmission fluid (if equipped), add as necessary.	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā

Miles:	6,000	12,000	18,000	24,000	30,000	36,000	42,000	48,000	54,000	60,000	66,000	72,000	78,000	84,000	90,000	96,000	102,000	108,000	114,000	120,000	126,000	132,000	138,000	144,000	150,000
Or Months:	**6**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**	**66**	**72**	**78**	**84**	**90**	**96**	**102**	**108**	**114**	**120**	**126**	**132**	**138**	**144**	**150**
Or Kilometers:	**10,000**	**20,000**	**30,000**	**40,000**	**50,000**	**60,000**	**70,000**	**80,000**	**90,000**	**100,000**	**110,000**	**120,000**	**130,000**	**140,000**	**150,000**	**160,000**	**170,000**	**180,000**	**190,000**	**200,000**	**210,000**	**220,000**	**230,000**	**240,000**	**250,000**
Change the rear axle fluid if using your vehicle for any of the following: police, taxi, fleet or frequent trailer towing.	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā
Inspect the rear axle fluid.	Ā	Ā	X	Ā	Ā	X	Ā	Ā	X	Ā	Ā	X	Ā	Ā	X	Ā	Ā	X	Ā	Ā	X	Ā	Ā	X	Ā
Inspect front suspension, tie rod ends, and boot seals, for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā
Replace the engine air cleaner filter.	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	X
Replace the air conditioning filter.	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā	X	Ā
Inspect and replace the PCV Valve if necessary	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā
Replace the spark plugs - 6.2L Supercharged Engine **	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā	X	Ā
Replace the spark plugs - 6.4L Engine	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā

Miles:	6, 000	12, 000	18, 000	24, 000	30, 000	36, 000	42, 000	48, 000	54, 000	60, 000	66, 000	72, 000	78, 000	84, 000	90, 000	96, 000	102, 000	108, 000	114, 000	120, 000	126, 000	132, 000	138, 000	144, 000	150, 000
Or Months:	**6**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**	**66**	**72**	**78**	**84**	**90**	**96**	**102**	**108**	**114**	**120**	**126**	**132**	**138**	**144**	**150**
Or Kilometers:	**10, 000**	**20, 000**	**30, 000**	**40, 000**	**50, 000**	**60, 000**	**70, 000**	**80, 000**	**90, 000**	**100, 000**	**110, 000**	**120, 000**	**130, 000**	**140, 000**	**150, 000**	**160, 000**	**170, 000**	**180, 000**	**190, 000**	**200, 000**	**210, 000**	**220, 000**	**230, 000**	**240, 000**	**250, 000**
**																									
Flush and replace the engine coolant at 120 months if not done at 150, 000 miles (240, 000 km).	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	Ā	X	Ā	Ā	Ā	Ā	X

** The spark plug change interval is mileage based only, yearly intervals do not apply.

INSPECTION

INSPECTION

The following steps outline the dealer inspection procedure required every 5 years for vehicles covered under the terms of the Lifetime Powertrain Warranty. Refer to the appropriate warranty information for additional terms and coverages applicable to the Lifetime Powertrain Warranty.

1. Lift the vehicle on a suitable hoist.
2. Check all Powertrain components for leaks or physical damage. Note any concerns.
3. Lower the vehicle and check the level and condition of the engine oil.
4. Connect a diagnostic scan tool and check for any active Powertrain Diagnostic Trouble Codes (DTC).

NEW VEHICLE PREPARATION INSTRUCTIONS

STANDARD PROCEDURE

STANDARD PROCEDURE - NEW VEHICLE PREPARATION

VEHICLE READINESS
NOTE: **This document is for reference purposes only. The instructions are not VIN-specific, and it is not required to print or retain this document for each New Vehicle Prep performed.**

Description	Action
Place vehicle into Customer Mode	With the key in the "on" position, turn on the hazard lamps, then press and hold the up arrow on the steering wheel for 5 seconds. The EVIC display will update once the vehicle goes into customer mode. Once the mode has been changed, turn off the hazard lamps.
Keep All Protective Transit Film and Wheel Covers & Films on vehicle until sold, or up to 180 Days	Keep All Protective Transit Film and Wheel Covers & Films on vehicle until sold, or up to 180 Days.
Inflate tire pressure to max side wall pressure (except heavy duty trucks)	Increase the tire pressure to maximum sidewall pressure if vehicle is going into lot storage.
Install all **"Shipped Loose" items**	Install all **"Shipped Loose" items.**
Install Front License Plate Bracket **(if required)**	Install Front License Plate Bracket.
Install Shark Fin Antenna	Process. 1. Locate lower antenna module on vehicle roof. 2. Locate Pull Tab located on top of the roof installed module. 3. Pull tab - removing protective film cover (protects lower module from elements during shipping. 4. Locate upper shark fin (ships in vehicle trunk) and place atop lower module. 5. Apply hand force to "snap" fit.
Reset Tire Pressure Light Load Switch (if equipped)	If vehicle is going into storage and tire pressure is being set to max, switch the tire pressure light load setting to "max load" using the button on the instrument panel.

UNDERHOOD	
Description	**Action**
Hood Latch and Safety Catch - Adjust as Needed	Verify the operation of the hood release system including the inside hood release lever and the outside hood secondary safety catch. Adjust if necessary. The safety catch prevents the hood from going to the full open position until it is manually released. To test the safety catch, unlatch the hood with the interior hood release lever and attempt to raise the hood without operating the safety catch.
Battery State-of-Charge - document voltage	Check the battery state of charge by connecting a digital voltmeter at the jump-start locations. The battery voltage should be at least 12.4 volts. If charging is necessary, follow the service manual procedures and recharge the battery. Record voltage on New Vehicle Prep (NVP) form.
Loose Attachments, Routing and Clearance	Inspect the following for routing, loose attachments, connections, and clearance. Reroute and tighten as required: Brake Lines, Fuel Lines, Power Steering Hoses, Vacuum Hoses, Clutch Lines, Refrigerant Lines, Wiring, Belts.
All Fluid Levels	Refer to the owner's manual or appropriate service information for proper fluid level inspection locations and procedures.
No Fluid Leaks present	Visually inspect the underhood area to ensure absence of fluid leaks. Check clamps for tightness an full engagement.

ROAD TEST	
Description	**Action**
Perform Road Test, Mileage: Before ______ After ______	Record mileage before and after road test.
Engine Starts with All Keys	Start vehicle with all sets of keys.
All Warning Lights and Gauges / No DTCs	Verify all warning lights and gauges are operating properly, and no fault codes exist.

ROAD TEST	
Description	**Action**
Keyless Go	Ensure vehicle starts with push button, when key is inside vehicle.
Engine Starts Only in Park & Neutral	Verify engine will only start while automatic transmission is in park or neutral.
Engine Starts Only with Clutch Depressed	Verify engine will only start when clutch is depressed on manual transmission vehicles.
Service and Parking Brakes	Apply the service brakes while the car is in motion. Be sure the brake operation is smooth and positive. Make sure the vehicle stops in a straight line and without pulling to one side. Ensure there is no shudder or vibration when braking. Ensure that the parking brake is easy to operate. Make sure the parking brake does not drag.
Brake Transmission Shift Interlock	Ensure that the vehicle will only start when the brake is depressed on vehicles with automatic transmission.
Clutch / Manual Transmission Shifting	Check for smooth shifting. Make sure shift lever operates easily and smoothly. Check for proper synchronization. The gears should not grind.
Automatic Transmission Shifting	Make sure that the park lock mechanism holds the vehicle. With the vehicle on a grade, put the automatic transmission in park and slowly release the service brake to check the operation of the park mechanism. Make sure the shift lever operates easily and smoothly. Check for smooth shifting. Check for proper upshifting and downshifting.
Autostick	Verify that Autostick feature allows proper shifting through the gears.
Engine Performance - Cold	The engine should: start properly, idle smoothly and at proper speed, be free from stumbling or hesitation, produce sufficient power, be free of unusual noises, operate within the proper temperature range, and stop when the ignition key is shut off or stop button is depressed.
Engine Performance - Warm	The engine should: start properly, idle smoothly and at proper speed, be free from stumbling or hesitation, produce sufficient power, be free of unusual noises, operate within the proper temperature range, and stop when the ignition key is shut off or stop button is depressed.
Steering and Handling	Check that the power assist works properly. Make sure that the steering wheel does not vibrate abnormally at idle or road speed. Ensure that the steering wheel is centered when traveling in a straight line. Check that the vehicle does not drift to either side on flat road surfaces. Make sure that the vehicle does not vibrate or shake abnormally.
Noise, Vibration, Squeaks, or Rattles	Check that the vehicle is free of noise, vibrations, squeaks, or rattles. Tighten any loose fasteners.
Heater / Defrost- Front	Check the heater operation after the vehicle has reached operating temperature. Operate blower motor at all speeds. Operate the system in all modes. Check for hot air at all appropriate outlets. Check for temperature control operation.
Air Conditioning	Ensure that the A/C system cools properly. Operate blower motor at all speeds. Check for cool air at all temperature outlets. Operate the system in all modes.

ROAD TEST	
Description	**Action**
Defrost - Rear	Ensure that the electric heated rear defroster operates correctly. Turn on and feel for warmth.
Blindspot Monitoring System (if equipped)	While on road test, verify that the visual warning indicators located on the side view mirrors are operating properly when an object is within the detection zone.
Cruise Control (if equipped)	Check the "on/off" switch. Check the "set" operation. Check the "resume" function. Check the "accelerate" and "decelerate" function. Check the "cancel" button. Check the brake/clutch release function. If equipped, verify operation of Adaptive Cruise Control function.
Set Compass Variance / Calculation (if equipped)	Refer to the service information on TechCONNECT for information regarding compass setting procedures.
Transfer Case (if equipped)	Shift the transfer case through all ranges to make sure all shifting is smooth and operates properly.
Tire Pressure Monitoring System	Verify that Tire Pressure Monitoring Indicator Light is not illuminated when tires are above minimum inflation recommendations. Ensure that indicator lamp is not flashing/chiming.
Park Assist (if equipped)	Put vehicle in reverse and slowly back up toward an object. Verify that Park Assist warning icon, lights and chimes operate properly as object is approached.
Back-Up Camera (if equipped)	Put vehicle in reverse, verify that screen provides a clear and visible image from rear of vehicle.

INTERIOR	
Description	**Action**
Visually Inspect Interior Parts for Damage, Fit, etc.	From the interior of the vehicle, open and close all doors to ensure ease of operation. Fully open and close the glove box to ensure proper operation. Fully open and close the console door to ensure proper operation. Check interior panels for proper fit and free from damage.
All Interior Lamps and Horn	Operate and visually inspect all interior lights and switches, including: Dome/Map lamps, and if equipped the following: vanity mirror lamps, glove box lamps, ash tray lamp, cigar lighter lamp, radio lamps, door mounted lamps, illuminated entry system. Ensure that the horn operates properly.
Rear View Mirror	Check that the rearview mirror's day/night function Is operating properly.
Front and Rear Wipers and Washers	Activate front windshield wipers, and if equipped, rear window wipers and check for proper operation at all speeds. Activate the front and if equipped, the rear washer. Check the spray pattern for proper operation and aim. Check the intermittent wipe feature for proper operation.
All interior Door Locks including Child Locks	Check all interior door locks for proper operation, including rear child safety door locks if equipped. Place in the unlocked position.
Steering Wheel Mounted Controls	Check all steering wheel controls for proper operation.
Cigar Lighter	Check cigar lighter for proper operation.

INTERIOR	
Description	**Action**
Power Windows and Window Lock Switch	Fully open and close all power windows to ensure proper operation and sealing. Ensure that the windows operate properly at each door. Verify that window lock button is operating properly.
Outside Power Mirrors	Check power mirrors for proper operation.
Power Heated Mirrors (if equipped)	Check power heated mirrors for proper operation.
Seats and Seat Belts - All Adjustments	Check for correct installation and operation of seat and shoulder belts, and retractors. Check that the restraint system safety labels regarding the use of seatbelts and airbags are in place. Fully cycle the seats for proper adjustments and verify that each seat is securely mounted. Fold down and latch the rear seats. Pull forward to check that the latches operate correctly. Check for proper head restraint operation.
Power Sunroof (if equipped)	Cycle sunroof. Ensure that the sunroof opens and closes easily. Verify proper operation of one touch open/close feature if equipped.
Set Clock(s)	Set all clocks to correct time. Refer to Owner's Manual for information regarding clock setting procedures.
Audio System	Turn the radio on and check reception in both AM and FM modes. Check that the CD player operates properly. Check for good sound quality from all speakers.
Satellite Radio (if equipped)	Turn on satellite radio and verify reception.
Satellite Streaming Video (if equipped)	Satellite Streaming Video.
Heated Steering Wheel (if equipped)	Verify that heated steering wheel is functioning properly.
Power Outlet(s)	Check all power outlets for proper operation.
Integrated Child Seat / Belt	Check the child restraints and child seats for proper operation.
Power folding Headrests (if equipped)	Verify proper operation of power folding third row head restraints by pressing the power folding switch located on the instrument panel switch bank.
Heated Seats (if equipped)	Check for proper operation of heated seats on all power levels, on all equipped seats.
Power Cooled Seats (if equipped)	Check for proper operation of ventilated seats on all power levels, on all equipped seats.

EXTERIOR	
Description	**Action**
Inspect Body and Paint for Damage and Fit/ Finish	Inspect the body exterior for damage, loose or missing items. During the inspection, ensure that no vehicle damage occurred from the time the vehicle was received and the beginning of the New Vehicle Preparation.
Exterior Lamps - Headlamps, Turn Signals, Hazards, Park/Tail/License Plate, Trunk Lights, etc.	Operate and visually inspect the following: Headlamps (High/Low Beams), turn signals, hazard warning flashers, parking/tail/license plate lamps, reverse/back up lamps, fog lamps, stop lamps including center mounted stop lamp, daytime running lamps (if equipped), clearance lamps, cargo bed lamps, any other lamps.
Lock and Unlock all doors with all mechanical keys	Verify all doors lock and unlock with all mechanical keys.

EXTERIOR	
Description	**Action**
Doors, Liftgate and Tailgate- Adjust Strikers as Needed	Open each door/liftgate/tailgate from the outside to check outside door handle operation. Check the door detent. Partially close all doors to check the open-door detent. Close all doors/liftgates/tailgates to check the operation of latches and strikers. Adjust strikers as required. Verify liftgate/tailgate ease of operation.
Security Alarm Test (if equipped)	Lock doors using the Remote Keyless Entry Transmitter. Verify the operation of the Vehicle Security System warning lamp.
Passive Entry (if equipped)	Verify that the Keyless Enter-N-Go feature is operating properly, by grabbing the door handle of the locked vehicle, while the Remote Keyless Entry transmitter key is within 5 feet of the vehicle. The door should unlock automatically.
Remote Keyless Entry (if equipped)	Verify that doors unlock properly using all key FOBS.
Remote Start (if equipped)	Verify that engine starts with all keys when using Remote Keyless Entry Transmitter.

VEHICLE STORAGE	
Description	**Action**
Keep all protective transit film, wheel covers and films on vehicle until sold	Keep all protective transit film, wheel covers and films on vehicle until sold.
Inflate tire pressure to max side wall pressure	Inflate tire pressure to max side wall pressure (except heavy duty trucks.) Periodically move vehicles to prevent Flat Spotting on tires
Place vehicle into Ship Mode	With the key in the "on" position, turn on the hazard lamps, then press and hold the up arrow on the steering wheel for 5 seconds. The EVIC display will update once the vehicle goes into ship mode. Once the mode has been changed, turn off the hazard lamps.

FINAL DETAIL & INSPECTION	
Description	**Action**
Perform all incomplete recalls and Rapid Response Transmittals (RRT's)	Perform all incomplete recalls and RRT's.
Remove interior and exterior Transportation Protective Covers	Remove exterior protective coatings/coverings from vehicle, remove interior protective covers, grease markings on door jambs, unnecessary labels, etc.
Inspect paint and body, touch up as needed	Make sure that the body is free from paint chips or scratches. Touch up any chips/scratches using thin layers of paint. Ensure that the body is free from dings and dents.
Place vehicle into Customer Mode	With the key in the "on" position, turn on the hazard lamps, then press and hold the up arrow on the steering wheel for 5 seconds. The EVIC display will update once the vehicle goes into customer mode. Once the mode has been changed, turn off the hazard lamps.
Test and record battery state of charge	Check the battery state of charge by connecting a digital voltmeter at the jump-start locations. The battery voltage should be at least 12.4 volts. If charging is necessary, follow the service information procedures and recharge the battery. Record voltage on New Vehicle Prep (NVP) form.

FINAL DETAIL & INSPECTION	
Description	**Action**
Adjust tire pressures including spare to door placard	Adjust tire pressures including spare to door placard.
Reset Tire Pressure Light Load Switch (if equipped)	Reset the Tire Pressure Light Load Switch back to the "Light Load" setting using the switch on the instrument panel.
Wash and clean vehicle exterior	Wash the entire vehicle. Clean the tire sidewalls and wheel/wheel covers (use non - acidic wheel cleaner). Clean exterior/interior glass surfaces.
Clean vehicle interior	Inspect the interior trim, seats, carpeting, and moldings. Clean as necessary.

TOWING

STANDARD PROCEDURE

STANDARD PROCEDURE - TOWING

CAUTION: DO NOT use sling-type equipment when towing. When securing the vehicle to a flatbed truck, do not attach to front or rear suspension components. Damage to your vehicle may result from improper towing.

CAUTION: Do not dolly tow this vehicle. Use of a towing dolly can cause significant damage to your vehicle. Damage from improper towing is not covered under the New Vehicle Limited Warranty.

CAUTION: Towing this vehicle in violation of the below requirements can cause severe transmission damage. Damage from improper towing is not covered under the New Vehicle Limited Warranty.

NOTE: This Service Information describes procedures for towing a disabled vehicle using a commercial wrecker service.

Towing Condition	Wheels OFF The Ground	AUTOMATIC TRANSMISSION	MANUAL TRANSMISSION
Flat Tow	NONE	**If transmission is operable:** • Transmission in **NEUTRAL** • 30 mph (48 km/h) **max** speed • 30 miles (48 km) **max** distance	**If transmission is operable:** • Transmission in **NEUTRAL** • 30 mph (48 km/h) **max** speed • 30 miles (48 km) **max** distance
Wheel Lift Or Dolly Tow	Front	**NOT ALLOWED**	**NOT ALLOWED**
	Rear	NOT RECOMMENDED	NOT RECOMMENDED
Flatbed	**ALL**	**BEST METHOD**	**BEST METHOD**

Towing A Disabled Vehicle

- Proper towing or lifting equipment is required to prevent damage to your vehicle. Use only tow bars and other equipment designed for this purpose, following equipment manufacturer's instructions. Use of safety chains is mandatory. Attach a tow bar or other towing device to main structural members of the vehicle, not to bumpers or associated brackets. State and local laws regarding vehicles under tow must be observed.
- If you must use the accessories (wipers, defroster, etc.) while being towed, the key must be in the ON/RUN position, not

the ACC position.

Automatic Transmission

- The manufacturer recommends towing your vehicle with all four wheels OFF the ground using a flatbed.
- If flatbed equipment is not available, and the transmission is operable, the vehicle may be flat towed (with all four wheels on the ground) under the following conditions:
  - The transmission must be in NEUTRAL.
  - The towing distance must not exceed 30 miles (48 km).
  - The towing speed must not exceed 30 mph (48 km/h).

If the transmission is not operable, or the vehicle must be towed faster than 30 mph (48 km/h) or farther than 30 miles (48 km), then the only acceptable method of towing is with a flatbed truck.

Manual Transmission

- The manufacturer recommends towing your vehicle with all four wheels OFF the ground using a flatbed.
- If flatbed equipment is not available, and the transmission is operable, the vehicle may be flat towed (with all four wheels on the ground) under the following conditions:
  - The transmission must be in NEUTRAL.
  - The towing distance must not exceed 30 miles (48 km).
  - The towing speed must not exceed 30 mph (48 km/h).

If the transmission is not operable, then the only acceptable method of towing is with a flatbed truck.

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Article GUID: A00735864

DESCRIPTION

VEHICLE THEFT SECURITY SYSTEM

The Vehicle Theft Security System (VTSS) is available factory-installed equipment for this vehicle. The VTSS includes various standard and optional features that provide both passive and active protection against unauthorized vehicle access and operation. The VTSS is comprised of two primary subsystems: The Sentry Key Immobilizer System (SKIS) and the Vehicle Theft Alarm (VTA). Additional details of each of these subsystems and their components can be found elsewhere within this service information.

Except for the Sentry Key transponders which rely upon Radio Frequency (RF) communication, hard wired circuitry connects the VTA and SKIS components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the SKIS or VTA components through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin out and location views for the various wire harness connectors, splices and grounds.

SENTRY KEY IMMOBILIZER SYSTEM

The Sentry Key Immobilizer System (SKIS) is factory-installed standard equipment on this model. The SKIS provides passive vehicle protection, immobilizing the vehicle by preventing the engine from operating unless a valid electronically encoded key or FOB with Integrated Key (FOBIK) is detected. In vehicles equipped with the Passive Entry - Keyless Go (PEKG) system, the valid FOBIK must only be present somewhere within the passenger compartment of the vehicle for the engine to continue to operate.

The SKIS includes the following major components, which are described in further detail elsewhere within this service information:

- **Keyless Ignition Node** - The Keyless Ignition Node (KIN) is located in the instrument panel just inboard of the steering column. Refer to **MODULE, KEYLESS IGNITION NODE, DESCRIPTION** .
- **Low Frequency Antenna** - Vehicles equipped with the Passive Entry Keyless Go (PEKG) system have several low frequency antenna units strategically placed within the vehicle.
- **Powertrain Control Module** - The Powertrain Control Module (PCM) (also known as the Engine Control Module/ECM) is located in the engine compartment. Refer to **MODULE, POWERTRAIN CONTROL, DESCRIPTION** .
- **Radio Frequency Hub Module** - The Radio Frequency Hub Module (RFHM) (also known as the RF Hub) is located on the package shelf support behind the rear seat back where it is concealed beneath the package shelf trim. Refer to **MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION** .
- **Sentry Key Transponder** - A Sentry Key transponder microchip is located within each FOB with Integrated Key (FOBIK). Refer to **KEY, TRANSPONDER, DESCRIPTION**.

The PCM and the RFHM each contain a microcontroller and programming that allow them to communicate with each other and other electronic modules in the vehicle using the Controller Area Network (CAN) data bus. In addition, the KIN and the RFHM communicate with each other using a Local Interface Network data bus. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the various SKIS system components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention as well as pin out and location views for the various wire harness connectors, splices and grounds.

VEHICLE THEFT ALARM

The Vehicle Theft Alarm (VTA) is factory-installed optional equipment on this vehicle. This system provides perimeter vehicle protection by monitoring the vehicle doors, the deck lid and the status of the ignition switch (also known as the Keyless Ignition Node/KIN). If unauthorized vehicle use or tampering is detected, the system responds by pulsing the vehicle horn as an audible deterrent and flashing certain exterior lamps as a visual deterrent.

The VTA includes the following major components, which are described in further detail elsewhere in this service information:

- **Body Control Module** - The Body Control Module (BCM) (also known as the Common Body Controller/CBC) is located on the right cowl side inner (kick) panel within the passenger compartment, where it is concealed behind the instrument panel and the cowl side trim panel. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Deck Lid Ajar Switch** - A deck lid ajar switch is integral to the latch for the deck lid in the vehicle. Refer to **LATCH, REMOVAL** .
- **Door Ajar Switches** - A door ajar switch is integral to the door latch mechanism of each door. Refer to **LATCH, REMOVAL** .
- **Keyless Ignition Node** - The Keyless Ignition Node (KIN) is located in the instrument panel just inboard of the upper steering column opening. Refer to **MODULE, KEYLESS IGNITION NODE, DESCRIPTION** .
- **Radio Frequency Hub Module** - The Radio Frequency Hub Module (RFHM) (also known as the RF Hub) is located on the package tray support behind the rear seat back where it is concealed beneath the package shelf trim. Refer to **MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION** .
- **Security Indicator** - The security indicator is integral to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) located in the instrument panel above the steering column opening, directly in front of the driver. Refer to **DESCRIPTION** .

The BCM and the RFHM each contain a microcontroller and programming that allow them to communicate with each other and other electronic modules in the vehicle using the Controller Area Network (CAN) data bus. In addition the KIN and the RFHM communicate with each other using a dedicated Local Interface Network data bus. Refer to **COMMUNICATION, DESCRIPTION** .

OPERATION

VEHICLE THEFT SECURITY SYSTEM

The Vehicle Theft Security System (VTSS) is comprised of two primary subsystems: Sentry Key Immobilizer System (SKIS) and Vehicle Theft Alarm (VTA). Additional operational details on each of these two subsystems of the VTSS can be found elsewhere within this service information.

SENTRY KEY IMMOBILIZER SYSTEM

The Sentry Key Immobilizer System (SKIS) is designed to provide passive protection against unauthorized vehicle use by disabling the engine after about two seconds of running whenever any method other than a valid Sentry Key FOB with Integrated Key (FOBIK) is used to start the vehicle. The SKIS is considered a passive protection system because it is always active when the ignition system is energized and does not require any customer intervention. The SKIS uses Low Frequency (LF) Radio Frequency (RF) communication to obtain confirmation that the FOBIK is valid for operating the vehicle.

The microcontroller-based Radio Frequency Hub Module (RFHM) (also known as the RF Hub) contains the SKIS software. The RFHM uses electronic messages over a dedicated Local Interface Network (LIN) data bus to communicate with the ignition switch (also known as the Keyless Ignition Node/KIN) and also uses electronic messages to communicate with other electronic modules in the vehicle over the Controller Area Network (CAN) data bus. Refer to **COMMUNICATION, OPERATION** .

Pre-programmed Sentry Key FOBIK transponders are provided with the vehicle from the factory. Each RFHM will recognize a maximum of eight Sentry Key FOBIK transponders. If the customer would like additional FOBIK units other than those provided with the vehicle, they may be purchased from any authorized dealer. These additional FOBIK units must be programmed to the RFHM in the vehicle in order for the system to recognize them as valid. This can be done by the dealer using a diagnostic scan tool. All FOBIK units authorized for use in a given vehicle must be present in the vehicle when programming takes place in order to remain valid. Refer to **STANDARD PROCEDURE** .

The RFHM performs a self-test of the SKIS each time the status of the ignition transitions out of Off, and will store fault information in the form of a Diagnostic Trouble Code (DTC) if a system malfunction is detected. The RFHM will also send an electronic message to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) if a fault is detected, and the IC responds by illuminating the security indicator or displaying a textual message in the Electronic Vehicle Information Center (EVIC) display.

The hard wired circuits between components related to the SKIS may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SKIS or the electronic controls and communication between other modules and devices that provide some features of the SKIS. The most reliable, efficient and accurate means to diagnose the SKIS or the electronic controls and communication related to SKIS operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

VEHICLE THEFT ALARM

The Body Control Module (BCM) (also known as the Common Body Controller/CBC) and the Radio Frequency Hub Module (RFHM) (also known as the RF Hub) are used on this vehicle to control and integrate many of the functions and features included in the Vehicle Theft Alarm (VTA). In the VTA system, the BCM receives inputs indicating the status of the door ajar switches, the ignition switch, the deck lid ajar switch and the power lock switches.

The BCM processes the information from all of these inputs and sends the appropriate electronic messages to other electronic modules over the Controller Area Network (CAN) data bus. The BCM internally controls the output to the hazard warning lamps and sends a control output to energize or de-energize the horn relay as appropriate. The RFHM relays the status of the ignition and all RF commands received from the Remote Keyless Entry (RKE) buttons of the FOB with Integrated Key (FOBIK) to other electronic modules over the CAN data bus.

The hard wired circuits between the components related to the VTA system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, details of wire harness routing and retention, connector pin out information, and location views for the various wire harness connectors, splices, and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the VTA system or the electronic controls and communication between modules and devices that provide some features of the VTA system. The most reliable, efficient and accurate means to diagnose the VTA system or the electronic controls and communication related to VTA system operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

Following are paragraphs that briefly describe the operation of each of the VTA features. See the owner's manual in the vehicle glove box for arming and disarming procedures, use and operation of the VTA.

OPERATING MODES

Following are paragraphs that briefly describe the operation of each of the Vehicle Theft Alarm (VTA) operating modes.

- **Enabling** - The Body Control Module (BCM) (also known as the Common Body Controller/CBC) must have the Vehicle Theft Alarm (VTA) function electronically enabled in order for the VTA to perform as designed. The logic within the BCM keeps its VTA function dormant until it is enabled using a diagnostic scan tool. The VTA function of the BCM is enabled on vehicles equipped with the VTA option at the factory, but a service replacement BCM must be VTA-enabled by the dealer using a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.
- **Arming** - Passive arming of the VTA occurs when the vehicle is exited with the FOB with Integrated Key (FOBIK), the headlamps are turned Off, and the doors are locked while they are open using the power lock switch. Active arming occurs when the Lock button on the FOBIK is pressed to lock the vehicle. For active arming to occur, the doors and the deck lid must be closed and the status of the Keyless Ignition Node (KIN) must be Off when the FOBIK Lock button or the Lock button on the Passive Entry (PE) handle is pressed. The power lock switches will not function if the FOBIK is within the vehicle interior.

  Pre-arming of the VTA is initiated when a door or the deck lid is open when the vehicle is locked using a power door lock switch or when the FOBIK Lock button is pressed. Pre-arming will not occur if the

FOBIK is within the vehicle interior. When the VTA is pre-armed, the arming sequence is delayed until all of the doors and the deck lid have been closed. The VTA will remain in pre-armed mode for up to 16 seconds after all doors and the deck lid have been closed.

Once the VTA begins the passive or active arming sequence, the security indicator in the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) will flash rapidly for about 16 seconds. This indicates that VTA arming is in progress. If the ignition transitions to the On status, if a door or the deck lid is unlocked and opened by any means or if the RKE Panic button is depressed during the 16 second arming process, the security indicator will stop flashing and the arming process will abort. Once the arming sequence is successfully completed, the security indicator will flash at a slower rate, indicating that the VTA is armed.

- **Disarming** - Press the FOBIK Unlock button or with one of the valid FOBIK units located outside the vehicle and within 1.5 meters (5 feet) of the driver or passenger front door handles, grab the Passive Entry (PE) handle and enter the vehicle, then press the Start/Stop/Button (SSB) to transition the ignition status to On. This requires at least one valid FOBIK be located within the passenger compartment of the vehicle.
- **Alarm** - The VTA alarm provides both visual and audible outputs; however, the time intervals of these outputs vary by the requirements of the market for which the vehicle is manufactured. In all cases, the visual output will be a flashing On and Off of the exterior lamps and the audible output will be a pulsing of the horn. See the owner's manual in the vehicle glove box for details of the alarm output requirements of the specific market for which the vehicle was manufactured. The inputs that will trigger the alarm include the door ajar switches and the deck lid ajar switch.
- **Power-Up Mode** - When the armed VTA senses that the battery has been disconnected and reconnected, it enters its power-up mode. In the power-up mode, the alarm system remains armed following a battery failure or disconnect. If the VTA was armed prior to a battery disconnect or failure, the technician or the vehicle operator will have to actively or passively disarm the alarm system after the battery is reconnected. The power-up mode will also apply if the battery goes dead while the system is armed and battery jump-starting is attempted. The VTA will be armed until the technician or the vehicle operator has actively or passively disarmed the alarm system. If the VTA is in the disarmed mode prior to a battery disconnect or failure, it will remain disarmed after the battery is reconnected or replaced, or if jump-starting is attempted.
- **Tamper Alert** - If the VTA alarm was triggered, the VTA tamper alert feature will give the message **REMOTE START DISABLED - START VEHICLE TO RESET** in the Electronic Vehicle Information Center (EVIC) and the horn will beep three short beeps. This message will display once the vehicle is properly disarmed by unlocking the vehicle with a valid FOBIK. This message can also display if the alarm has since timed out or if the battery has been disconnected and reconnected. This feature alerts the vehicle operator that the VTA alarm was activated while the vehicle was unattended.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - VEHICLE THEFT SECURITY SYSTEM

The Vehicle Theft Security System (VTSS) is divided into two basic subsystems: Sentry Key Immobilizer System (SKIS) and Vehicle Theft Alarm (VTA). The recommended procedures for diagnosis and testing of each of these two VTSS subsystems can be found elsewhere within this service information.

DIAGNOSIS AND TESTING - SENTRY KEY IMMOBILIZER SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired circuits between components related to the Sentry Key Immobilizer System (SKIS) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, procedures for proper wire and connector repair, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices, and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SKIS or the electronic controls and communication between modules and devices that provide some features of the SKIS. The most reliable, efficient and accurate means to diagnose the SKIS or the electronic controls and communication related to SKIS operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

SENTRY KEY IMMOBILIZER SYSTEM DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
SECURITY INDICATOR FAILS TO LIGHT DURING BULB TEST	1. Ineffective Light-Emitting Diode (LED).	1. Use a diagnostic scan tool to perform the instrument cluster actuator test. Refer to the appropriate Diagnostic & Testing article.
	2. Ineffective fuse.	2. Check the Radio Frequency Hub Module (RFHM) fused B(+) fuse and the fused ignition output (run-start) fuse in the Power Distribution Center (PDC). Replace the fuses, if required.
Ā	3. Ineffective ground circuit.	3. Test and repair the open ground circuit at the connector for the RFHM, if required.
Ā	4. Ineffective battery feed circuit.	4. Test and repair the open battery feed circuit at the connector for the RFHM, if required.
SECURITY INDICATOR FLASHES FOLLOWING BULB TEST	1. Invalid FOBIK.	1. Remove the invalid FOBIK and try again with a known valid FOBIK.
	2. Key-related fault.	2. Use a diagnostic scan tool and the appropriate diagnostic information for further diagnosis.
SECURITY INDICATOR LIGHTS SOLID FOLLOWING BULB TEST	1. SKIS system malfunction/fault detected.	1. Use a diagnostic scan tool and the appropriate diagnostic information for further diagnosis.
	2. SKIS system ineffective.	2. Use a diagnostic scan tool and the appropriate diagnostic information for further diagnosis.

DIAGNOSIS AND TESTING - VEHICLE THEFT ALARM

The hard wired circuits between components related to the Vehicle Theft Alarm (VTA) system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, procedures for proper wire and connector repair, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices, and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the VTA system or the electronic controls and communication between modules and devices that provide some features of the VTA system. The most reliable, efficient and accurate means to diagnose the VTA system or the electronic controls and communication related to VTA system operation requires the use of a diagnostic scan tool. See the **Vehicle Theft Security System** menu item on the scan tool. Refer to the appropriate Diagnostic & Testing article.

STANDARD PROCEDURE

SENTRY KEY IMMOBILIZER SYSTEM INITIALIZATION

The Sentry Key Immobilizer System (SKIS) must be initialized following a Radio Frequency Hub Module (RFHM) (also known as the RF Hub) replacement. SKIS initialization requires the use of a diagnostic scan tool. Initialization will also require that you have access to the unique four-digit PIN code that was assigned to the original RFHM. The PIN code **must** be used to enter the Secured Access Mode in the RFHM. This PIN number may be obtained from the vehicle owner, from the original vehicle invoice or from the Chrysler Customer Center. Refer to STANDARD PROCEDURE .

NOTE: **If a Powertrain Control Module (PCM) is replaced on a vehicle equipped with the Sentry Key Immobilizer System (SKIS), the unique Secret Key data must be transferred from the RFHM to the new PCM using the appropriate programming procedure. This procedure also requires the use of a diagnostic scan tool and the unique four-digit PIN code to enter the Secured Access Mode in the RFHM. Refer to the appropriate Diagnostic & Testing article for the proper PCM programming procedures.**

SENTRY KEY TRANSPONDER PROGRAMMING

The Sentry Key transponder of all FOB with Integrated Key (FOBIK) units included with the vehicle are pre-programmed to work with the Radio Frequency Hub Module (RFHM) (also known as the RF Hub) when it is shipped from the factory. The RFHM may be programmed to recognize up to a total of eight FOBIK units. When programming a blank Sentry Key FOBIK, the integrated valet key must be cut to match the door lock cylinder in the vehicle for which it will be used. Once the additional or new key has been cut, the RFHM must be programmed to recognize it as a valid FOBIK. Refer to STANDARD PROCEDURE .

KEY, TRANSPONDER

DESCRIPTION

DESCRIPTION

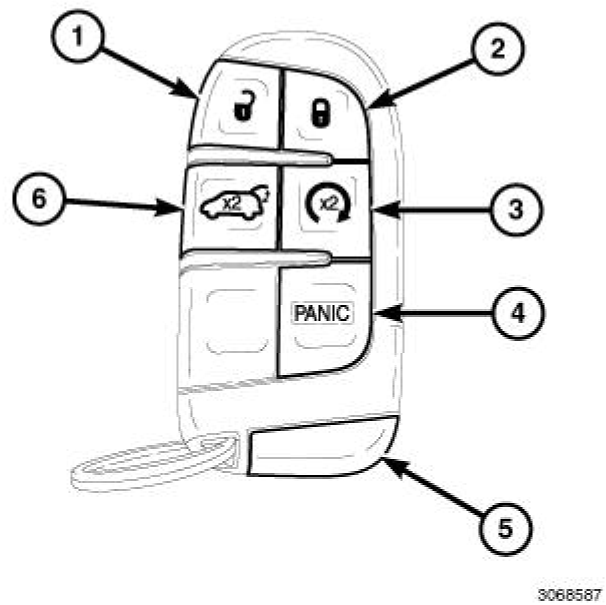


Fig. 1: Transponder Key
Courtesy of CHRYSLER GROUP, LLC

Vehicles are shipped from the factory with two FOB with Integrated Key (FOBIK) Remote Keyless Entry (RKE) transmitters programmed to the vehicle as standard equipment. The FOBIK circuitry is contained and protected within a molded plastic case with a black soft rubber touch pad on the face divided into six sections. The rearward end of the FOBIK case houses a mechanical, metal, coded emergency key (5) that is released by sliding a latch button on the back of the FOBIK case.

Depending upon vehicle equipment, each FOBIK has at least three and no more than five functional resistive membrane switches located beneath the six touch pad sections. Each functional touch pad section is clearly identified by white icons or white text and icons identifying the specific function obtained by pushing that button. Domestic market vehicles also include a touch pad section on the FOBIK with the red text **PANIC** applied to it. Not counting the **PANIC** touch pad (4), the available switches include:

- **Unlock (1)**

  - Standard equipment.

- **Lock (2)** - Standard equipment.
- **Remote Start (3)** - Only for vehicles equipped with the factory-installed remote start system.
- **Liftgate/Deck Lid (6)** - Standard equipment.

The FOBIK RKE transmitter is the primary customer active interface for remotely operating the power lock system, the RKE system, and the remote start system components and features. However, the FOBIK also has an important passive role in each of the following vehicle systems:

- **Keyless Go System**
- **Passive Entry System**
- **Sentry KeyÂ® Immobilizer System (SKIS)**
- **Vehicle Theft Alarm (VTA)**

Other than battery replacement, the FOBIK cannot be adjusted or repaired. If damaged or ineffective, the FOBIK must be replaced with a new unit. A new and unused FOBIK unit must be properly programmed in order to function properly with the systems of the vehicle. The mechanical emergency key of the new FOBIK must also be cut to match the coding of the lock cylinders in the vehicle.

OPERATION

OPERATION

When the status of the ignition switch (also known as the Keyless Ignition Node/KIN) transitions to On, it sends an electronic **ignition switch status** message over a dedicated Local Interface Network (LIN) serial bus circuit to the Radio Frequency Hub Module (RFHM) (also known as the RF Hub). In vehicles that are equipped with the PEKG system, the RFHM relies upon several Low Frequency (LF) antenna units to challenge the Sentry Key transponders using a LF signal, then monitors responses from the Sentry Key transponders received as Very High Frequency (VHF) signals. The RFHM determines whether a valid key is present based upon the response from the transponder.

If a valid key is detected, that fact is communicated by the RFHM to the Powertrain Control Module (PCM) (also known as the Engine Control Module/ECM) over the Controller Area Network (CAN) data bus, and the PCM allows the engine to continue running. If the PCM receives an invalid key message, or receives no message from the RFHM over the CAN data bus, the engine will be disabled after about two seconds of operation. The Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) will also respond to the invalid key message on the CAN data bus by flashing the security indicator On and Off.

Likewise, when any one of the Remote Keyless Entry (RKE) transmitter buttons of the FOB with Integrated Key (FOBIK) is depressed, the on-board transmitter of the FOBIK generates a high frequency RF request signal that is received and validated by the RFHM. If the RFHM determines that the RKE transmitter RF request signal was generated by a FOBIK that is valid for the vehicle, the RFHM relays electronic request messages to the appropriate electronic modules in the vehicle over the CAN data bus to invoke the functions or features associated with the request.

Each vehicle owner is provided with a four-digit Personal Identification Number (PIN) by the dealer at the time of vehicle purchase. This number also appears on the original vehicle invoice and is required along with a diagnostic scan tool for the dealer to program an additional or replacement FOBIK into the electronics of the vehicle. The mechanical emergency key included with a new additional or replacement blank FOBIK must also be cut to match the coding of the lock cylinders in the vehicle.

Each Sentry Key has a unique transponder identification code permanently programmed into it by the manufacturer. Likewise, the RFHM has a unique Secret Key code programmed into it by the manufacturer. When a Sentry Key is programmed into the memory of the RFHM, the RFHM stores the transponder identification code from the Sentry Key, and the Sentry Key learns the Secret Key code from the RFHM. Once the Sentry Key learns the Secret Key code of the RFHM, it is permanently stored in the memory of the transponder. Therefore, once a Sentry Key has been programmed to a particular vehicle, it cannot be used on any other vehicle. Refer to **STANDARD PROCEDURE**.

The Sentry Key Immobilizer System (SKIS) performs a self-test each time the ignition switch status transitions to On, and will store key-related fault information in the form of a Diagnostic Trouble Code (DTC) in RFHM memory if a Sentry Key transponder problem is detected. The Sentry Key transponder chip can be diagnosed, and any stored DTC can be retrieved using a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing

article.

Common communication problems include:

- Two transponder keys too close to each other.
- Another transponder device (i.e.: Speed Pass) too close to the Sentry Key transponder.
- Transponder too close to a cellular phone.
- A cellular phone charger in the vehicle causing interference.

A security indicator illuminated solid (not flashing) in the IC indicates that there is a SKIS system failure such as:

- Loss of PCM/CAN data bus communication.
- Failed antenna circuit.

NOTE: **After a RFHM is replaced with a new unit, the Sentry Key transponders need to be programmed to the new RFHM. Follow the instructions found in the diagnostic scan tool for the Replace RFHM Routine . The Sentry Key transponders and the Remote Keyless Entry (RKE) transmitters (if equipped) will both be programmed during this operation. There is no need to program the RKE transmitter again once the Sentry Key transponder key has been programmed to the new RFHM.**

NOTE: **When a PCM and the RFHM are replaced at the same time, perform the following steps in order:**

- **Program the new PCM.**
- **Program the new RFHM.**

  Program all Sentry Key transponders to the new RFHM.

MODULE, SENTRY KEY IMMOBILIZER (SKIM)

DESCRIPTION

DESCRIPTION

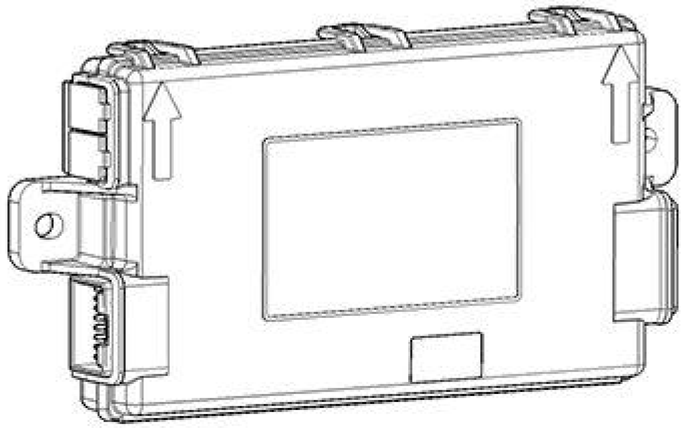


Fig. 2: Radio Frequency Hub Module
Courtesy of CHRYSLER GROUP, LLC

The functions and features of the Sentry Key Immobilizer Module (SKIM) (also previously known as the Sentry Key REmote Entry Module/SKREEM, the Wireless Control Module/WCM or the Wireless Ignition Node/WIN) are all integral to the Radio Frequency Hub Module (RFHM) (also known as the RF Hub) (2) and the Keyless Ignition Node (KIN) in this vehicle.

The RFHM is the primary component of the Sentry Key Immobilizer System (SKIS). It is also the receiver for the Remote Keyless Entry (RKE) system, the Keyless Go (KG) system, the Passive Entry (PE) system and the Remote Start system on vehicles so equipped. The RFHM is located near the center of the shelf support behind the rear seat back and is concealed beneath the package tray interior trim. Refer to **MODULE, RADIO FREQUENCY (RF HUB), DESCRIPTION** .

The KIN includes the integral ignition switch push button. The KIN is located in the instrument panel, just to the right of the steering column. The remainder of the KIN including its mounting provisions and electrical connections are concealed within the instrument panel. Refer to **MODULE, KEYLESS IGNITION NODE, DESCRIPTION** .

OPERATION

OPERATION

The functions and features of the Sentry Key Immobilizer Module (SKIM) (also previously known as the Sentry Key REmote Entry Module/SKREEM, the Wireless Control Module/WCM or the Wireless Ignition Node/WIN) are all integral to the Radio Frequency Hub Module (RFHM) (also known as the RF Hub) and the Keyless Ignition Node (KIN) in this vehicle. The RFHM contains a Radio Frequency (RF) transceiver and a microcontroller. The RFHM transmits Low Frequency (LF) signals to, and receives LF signals from the Sentry Key transponder integral to the FOB with Integrated Key (FOBIK) through a tuned antenna internal to the RFHM housing. The KIN allows the vehicle operator to select and monitor the status of the ignition switch and also transmits the selected ignition switch status to the RFHM.

The RFHM also serves as the Remote Keyless Entry (RKE) RF receiver and, if the vehicle is so equipped, the

receiver for the remote start system. Refer to **DESCRIPTION** . The RFHM communicates over the Controller Area Network (CAN) data bus with the Body Control Module (BCM) (also known as the Common Body Controller/CBC), the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC), the Powertrain Control Module (PCM) (also known as the Engine Control Module/ECM) or the diagnostic scan tool. It also communicates over a dedicated Local Interface Network (LIN) data bus circuit with the KIN.

The RFHM and the PCM both use software that includes a rolling code algorithm strategy, which helps to reduce the possibility of unauthorized Sentry Key Immobilizer System (SKIS) disarming. The rolling code algorithm ensures security by preventing an override of the SKIS through the unauthorized substitution of the RFHM or the PCM. However, the use of this strategy also means that replacement of either the RFHM or the PCM units will require a system initialization procedure to restore system operation.

The RFHM retains in memory the ID numbers of any Sentry Key FOBIK transponder that is programmed into it. A maximum of eight Sentry Key FOBIK transponders can be programmed into the RFHM. For added system security, each RFHM is programmed with a unique Secret Key code. This code is stored in memory, sent over the CAN data bus to the PCM, and is encoded to the transponder of every Sentry Key FOBIK that is programmed into the RFHM. Therefore, the Secret Key code is a common element that is found in every component of the SKIS.

Another security code called a PIN is used to gain access to the RFHM Secured Access Mode. The Secured Access Mode is required during service to perform the SKIS initialization and Sentry Key FOBIK transponder programming procedures. The RFHM also stores the Vehicle Identification Number (VIN) in its memory, which it learns through a CAN data bus message from the PCM during SKIS initialization.

In the event that a RFHM replacement is required, the Secret Key code can be transferred to the new RFHM from the PCM using the diagnostic scan tool and the SKIS initialization procedure. Proper completion of the SKIS initialization will allow the existing Sentry Key FOBIK units to be programmed into the new RFHM so that new FOBIK units will not be required. In the event that the original Secret Key code cannot be recovered, RFHM replacement will also require new Sentry Key FOBIK units. The diagnostic scan tool will alert the technician during the SKIS initialization procedure if new Sentry Key FOBIK units are required. Refer to **STANDARD PROCEDURE** .

When the status of the ignition switch transitions to On, the RFHM transmits a LF signal to excite the transponder in the FOBIK. The RFHM then waits for a RF signal response from the transponder. If the response received identifies the FOBIK as valid, the RFHM sends an electronic **valid key** message to the PCM over the CAN data bus. If the response received identifies the FOBIK as invalid or if no response is received from the FOBIK transponder, the RFHM sends an **invalid key** message to the PCM. The PCM will enable or disable engine operation based upon the status of the RFHM messages. It is important to note that the default condition in the PCM is an **invalid key** ; therefore, if no message is received from the RFHM by the PCM, the engine will be disabled and the vehicle immobilized after two seconds of running.

The RFHM also sends electronic **security indicator** request messages to the IC over the CAN data bus to tell the IC how to operate the security indicator. The **security indicator** request message from the RFHM tells the IC to turn the indicator On for about three seconds each time the status of the ignition switch transitions to On as a bulb test. After completion of the bulb test, the RFHM sends **security indicator** request messages to the IC to turn the indicator Off, turn the indicator On or to flash the indicator On and Off. If the security indicator flashes or stays On solid after the bulb test, it signifies a SKIS fault. If the RFHM detects a system malfunction or the SKIS has become ineffective, the security indicator will stay On solid. If the RFHM detects an invalid FOBIK or if a FOBIK transponder-related fault exists, the security indicator will flash.

The SKIS performs a self-test each time the status of the ignition switch transitions to On, and will store fault information in the form of a Diagnostic Trouble Code (DTC) in RFHM memory if a system malfunction is detected. The hard wired circuits of the RFHM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RFHM or the electronic controls and communication between other modules and devices that provide some features of the SKIS. The most reliable, efficient and accurate means to diagnose the RFHM or the electronic controls and communication related to RFHM operation requires the use of a diagnostic scan tool.

SWITCH, HOOD AJAR

DESCRIPTION

DESCRIPTION

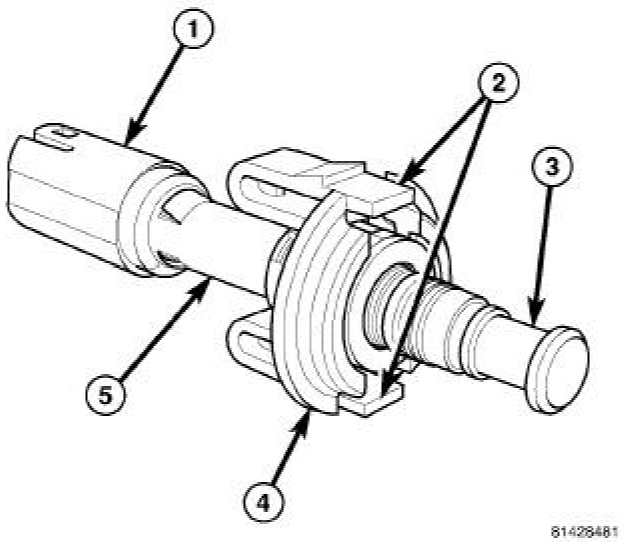


Fig. 3: Hood Ajar Switch
Courtesy of CHRYSLER GROUP, LLC

The hood ajar switch is a normally closed, single pole, spring-loaded plunger actuated switch. This switch has two unique versions that are used in two different applications. One switch is used only on vehicles equipped with the Vehicle Theft Security System (VTSS) for sale in certain export markets where Vehicle Theft Alarm (VTA) perimeter protection of the under hood area is required equipment. The second switch is used only on domestic vehicles equipped with an optional remote start system.

The molded plastic switch body (5) has an integral molded connector receptacle (1) on the lower end containing two terminal pins. The switch is connected to the vehicle electrical system through a dedicated take out of the headlamp and dash wire harness. Two integral latches (2) lock the switch into a keyed mounting hole in the stamped steel Powertrain Control Module (PCM) (also known as the Engine Control Module/ECM) mounting bracket. The PCM mounting bracket is secured to the upper radiator cross member near the left fender ledge within the engine compartment. The underside of the hood panel inner reinforcement actuates the switch plunger as the hood panel is closed.

The switch plunger (3) extends through a mounting collar (4) and a sleeve-like retainer ring on the upper end of

the switch body. The retainer ring has a one time, self-adjustment feature that is activated after the switch is installed by closing the hood. The retainer ring is also color-coded to aid in identifying the switch application. A dark brown retainer ring identifies the under hood security switch application, while a white retainer ring identifies the remote start system application.

An installed hood ajar switch cannot be readjusted or repaired. If the switch is damaged, ineffective, or requires readjustment, it must be replaced with a new unit.

OPERATION

OPERATION

The hood ajar switch is a normally closed switch. The switch is held open by the inner hood panel reinforcement when the spring-loaded switch plunger is depressed whenever the hood panel is closed and latched. When the hood is opened, the spring-loaded switch plunger extends from the switch body and the switch contacts are closed. The switch is connected in series between a return circuit and a signal circuit of the Body Control Module (BCM) (also known as the Common Body Controller/CBC). The BCM uses an internal resistor pull up to monitor the state of the hood ajar switch contacts. The BCM continually monitors this circuit and will store a Diagnostic Trouble Code (DTC) for any fault that it detects.

The components of the switch self-adjustment feature include an integral stop on the shaft of the plunger and a ribbed, adjusting sleeve at the top of the switch body from which the plunger extends. With the switch mounting collar secured in its mounting bracket, the plunger is depressed by the hood inner reinforcement as the hood is closed. As the plunger is depressed, the plunger stop contacts the top of the sleeve and the sleeve is driven downward, ratchet-like through the switch mounting collar until the hood is fully closed and latched. The ribs on the sleeve are engaged within the mounting collar to maintain this adjusted position.

The hood ajar switch as well as the hard wired circuits between the switch and the BCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between modules and other devices related to hood ajar switch operation that provide some features of the domestic remote start system. The most reliable, efficient and accurate means to diagnose the electronic controls and communication related to hood ajar switch operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - HOOD AJAR SWITCH

The hood ajar switch as well as the hard wired circuits between the switch and the Body Control Module (BCM) (also known as the Common Body Controller/CBC) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between modules and other devices related to hood ajar switch operation that provide some features of the domestic remote start system. The most reliable, efficient and accurate means to diagnose the electronic controls and communication related to hood ajar switch operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

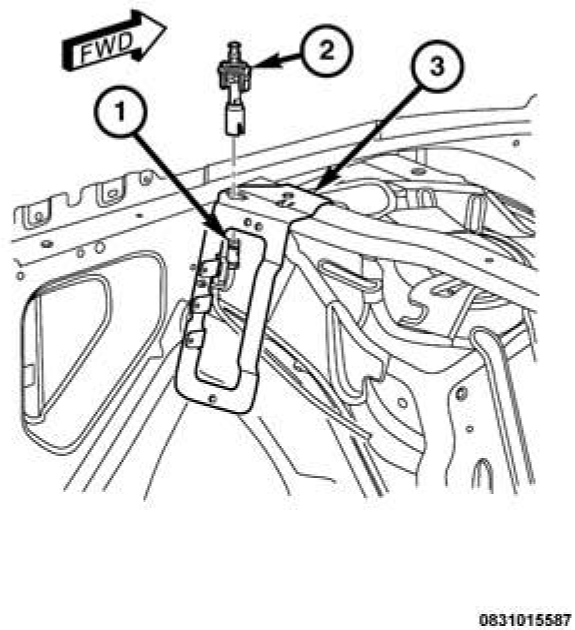
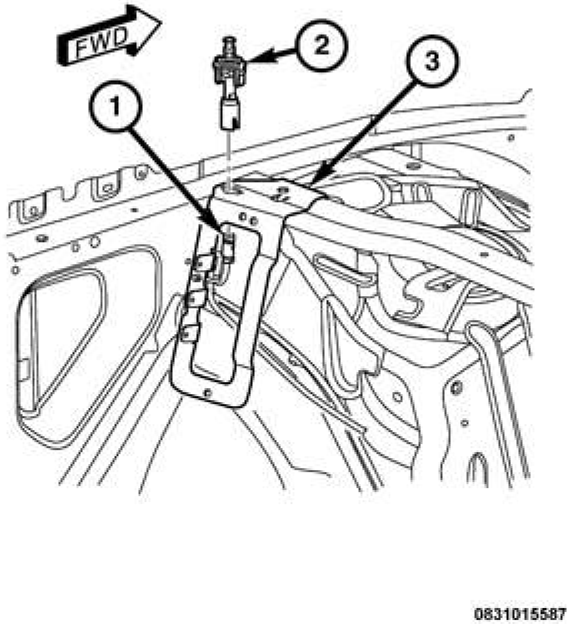


Fig. 4: Identifying Powertrain Control Module Mounting Bracket, Hood Ajar Switch & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

1. Unlatch and open the hood.
2. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
3. Working from the top of the Powertrain Control Module (PCM) (also known as the Engine Control Module/ECM) mounting bracket (3) on the upper radiator cross member, squeeze the two hood ajar switch (2) latch tabs together far enough to pull the switch upward.
4. Pull the hood ajar switch up through the hole in the PCM mounting bracket far enough to access and disconnect the headlamp and dash wire harness connector (1) from the switch connector receptacle.
5. Remove the hood ajar switch from the vehicle.

INSTALLATION

INSTALLATION



[Fig. 5: Identifying Powertrain Control Module Mounting Bracket, Hood Ajar Switch & Wire Harness Connector](#)
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Self-adjustment of the hood ajar switch is a one time feature. If the switch is damaged, ineffective, removed or requires readjustment, it must be replaced with a new unit.**

1. Position the hood ajar switch (2) near the switch mounting hole in the Powertrain Control Module (PCM) (also known as the Engine Control Module/ECM) mounting bracket (3) on the upper radiator cross member.
2. Pull the headlamp and dash wire harness connector (1) through the switch mounting hole and reconnect it to the switch connector receptacle.
3. From the top of the mounting bracket, press the switch downward into the mounting hole until the two integral switch latch tabs lock it into place.
4. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.
5. Close and latch the hood. This will set the hood ajar switch self-adjusting plunger to the proper height.

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Article GUID: A00735955

2016 SUSPENSION

DODGE WHEEL ALIGNMENT SPECIFICATIONS

WHEEL ALIGNMENT SPECIFICATIONS

CHALLENGER

CHALLENGER Non-SRT and Non-Super Track Pak Models With 18" wheel

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	7	8	9
Right Front Caster (Ā°)	7.7	8.7	9.7
Left Front Camber (Ā°)	-1.4	-0.85	-0.3
Right Front Camber (Ā°)	-1.8	-1.25	-0.7
Front Toe (Ā°)	0.1	0.2	0.3
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-2.3	-1.75	-1.2
Right Rear Camber (Ā°)	-2.3	-1.75	-1.2
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CHALLENGER Non-SRT and Non-Super Track Pak With 20" Wheels

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	7	8	9
Right Front Caster (Ā°)	7.7	8.7	9.7
Left Front Camber (Ā°)	-1.4	-0.85	-0.3
Right Front Camber (Ā°)	-1.8	-1.25	-0.7
Front Toe (Ā°)	0.1	0.2	0.3
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-2.3	-1.75	-1.2
Right Rear Camber (Ā°)	-2.3	-1.75	-1.2
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0

Measurement	Minimum	Preferred	Maximum
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CHARGER

CHARGER AWD

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	4.4	5.4	6.4
Right Front Caster (Ā°)	4.4	5.4	6.4
Left Front Camber (Ā°)	-0.55	0	0.55
Right Front Camber (Ā°)	-0.95	-0.4	0.15
Front Toe (Ā°)	-0.1	0.1	0.3
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-1.3	-0.75	-0.2
Right Rear Camber (Ā°)	-1.3	-0.75	-0.2
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CHARGER AWD (Police

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	4.4	5.4	6.4
Right Front Caster (Ā°)	4.4	5.4	6.4
Left Front Camber (Ā°)	-0.55	0	0.55
Right Front Camber (Ā°)	-0.95	-0.4	0.15
Front Toe (Ā°)	-0.1	0.1	0.3
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0

Measurement	Minimum	Preferred	Maximum
Left Rear Camber (Ā°)	-1.3	-0.75	-0.2
Right Rear Camber (Ā°)	-1.3	-0.75	-0.2
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CHARGER AWD (Police

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	4.35	5.35	6.35
Right Front Caster (Ā°)	4.35	5.35	6.35
Left Front Camber (Ā°)	-0.45	0.1	0.65
Right Front Camber (Ā°)	-0.85	-0.3	0.25
Front Toe (Ā°)	-0.1	0.1	0.3
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-1.2	-0.65	-0.1
Right Rear Camber (Ā°)	-1.2	-0.65	-0.1
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CHARGER RWD (Police with Equip)

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	6.7	7.7	8.7
Right Front Caster (Ā°)	7.4	8.4	9.4
Left Front Camber (Ā°)	-1.4	-0.85	-0.3
Right Front Camber (Ā°)	-1.8	-1.25	-0.7

Measurement	Minimum	Preferred	Maximum
Front Toe (Ā°)	0	0.2	0.4
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-2.2	-1.65	-1.1
Right Rear Camber (Ā°)	-2.2	-1.65	-1.1
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CHARGER RWD (Police without Equip)

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	6.7	7.7	8.7
Right Front Caster (Ā°)	7.4	8.4	9.4
Left Front Camber (Ā°)	-1.4	-0.85	-0.3
Right Front Camber (Ā°)	-1.8	-1.25	-0.7
Front Toe (Ā°)	0	0.2	0.4
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-2.2	-1.65	-1.1
Right Rear Camber (Ā°)	-2.2	-1.65	-1.1
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CHARGER RWD (SRT and Super Track Pak)

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	7.3	8.3	9.3

Measurement	Minimum	Preferred	Maximum
Right Front Caster (Ā°)	8	9	10
Left Front Camber (Ā°)	-1.6	-1.05	-0.5
Right Front Camber (Ā°)	-1.9	-1.35	-0.8
Front Toe (Ā°)	0	0.2	0.4
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-1.3	-0.75	-0.2
Right Rear Camber (Ā°)	-1.3	-0.75	-0.2
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CHARGER RWD With 18" wheel

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	7	8	9
Right Front Caster (Ā°)	7.7	8.7	9.7
Left Front Camber (Ā°)	-1.4	-0.85	-0.3
Right Front Camber (Ā°)	-1.8	-1.25	-0.7
Front Toe (Ā°)	0	0.2	0.4
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-2.3	-1.75	-1.2
Right Rear Camber (Ā°)	-2.3	-1.75	-1.2
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CHARGER RWD With 20" wheel

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	7	8	9
Right Front Caster (Ā°)	7.7	8.7	9.7
Left Front Camber (Ā°)	-1.4	-0.85	-0.3
Right Front Camber (Ā°)	-1.8	-1.25	-0.7
Front Toe (Ā°)	0	0.2	0.4
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-2.3	-1.75	-1.2
Right Rear Camber (Ā°)	-2.3	-1.75	-1.2
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

DART

DART GT

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	3.42	3.87	4.32
Right Front Caster (Ā°)	3.42	3.87	4.32
Left Front Camber (Ā°)	-1.11	-0.66	-0.21
Right Front Camber (Ā°)	-1.11	-0.66	-0.21
Front Toe (Ā°)	-0.05	0.1	0.25
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-2.05	-1.6	-1.15
Right Rear Camber (Ā°)	-2.05	-1.6	-1.15
Rear Toe (Ā°)	0.16	0.36	0.56
Thrust Angle	0.1	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0

Measurement	Minimum	Preferred	Maximum
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

DART Limited

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	3.34	3.79	4.24
Right Front Caster (Ā°)	3.34	3.79	4.24
Left Front Camber (Ā°)	-0.99	-0.54	-0.09
Right Front Camber (Ā°)	-0.99	-0.54	-0.09
Front Toe (Ā°)	-0.05	0.1	0.25
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-1.45	-1	-0.55
Right Rear Camber (Ā°)	-1.45	-1	-0.55
Rear Toe (Ā°)	0.16	0.36	0.56
Thrust Angle	0.1	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

DART SE-SXT

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	3.42	3.87	4.32
Right Front Caster (Ā°)	3.42	3.87	4.32
Left Front Camber (Ā°)	-1.11	-0.66	-0.21
Right Front Camber (Ā°)	-1.11	-0.66	-0.21
Front Toe (Ā°)	-0.05	0.1	0.25
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-1.45	-1	-0.55
Right Rear Camber (Ā°)	-1.45	-1	-0.55
Rear Toe (Ā°)	0.16	0.36	0.56
Thrust Angle	0.1	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0

Measurement	Minimum	Preferred	Maximum
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

DURANGO

DURANGO Aero Supension and Sports Suspension 4X2 R/T

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	6.86	7.46	8.06
Right Front Caster (Ā°)	6.86	7.46	8.06
Left Front Camber (Ā°)	-1.32	-0.72	-0.12
Right Front Camber (Ā°)	-1.72	-1.12	-0.52
Front Toe (Ā°)	0	0.2	0.4
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-1.51	-0.96	-0.41
Right Rear Camber (Ā°)	-1.51	-0.96	-0.41
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

DURANGO Aero Supension and Sports Suspension 4X4 R/T

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	6.86	7.46	8.06
Right Front Caster (Ā°)	6.86	7.46	8.06
Left Front Camber (Ā°)	-1.32	-0.72	-0.12
Right Front Camber (Ā°)	-1.72	-1.12	-0.52
Front Toe (Ā°)	0	0.2	0.4
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-1.51	-0.96	-0.41
Right Rear Camber (Ā°)	-1.51	-0.96	-0.41
Rear Toe (Ā°)	-0.1	0.2	0.5

Measurement	Minimum	Preferred	Maximum
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

DURANGO Base Suspension 4X2

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	6.35	6.95	7.55
Right Front Caster (Ā°)	6.35	6.95	7.55
Left Front Camber (Ā°)	-0.98	-0.38	0.22
Right Front Camber (Ā°)	-1.38	-0.78	-0.18
Front Toe (Ā°)	0	0.2	0.4
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-1.09	-0.54	0.01
Right Rear Camber (Ā°)	-1.09	-0.54	0.01
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

DURANGO Base Suspension 4X4

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	6.35	6.95	7.55
Right Front Caster (Ā°)	6.35	6.95	7.55
Left Front Camber (Ā°)	-0.98	-0.38	0.22
Right Front Camber (Ā°)	-1.38	-0.78	-0.18
Front Toe (Ā°)	0	0.2	0.4
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0

Measurement	Minimum	Preferred	Maximum
Left Rear Camber (Ā°)	-1.09	-0.54	0.01
Right Rear Camber (Ā°)	-1.09	-0.54	0.01
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

GRAND

GRAND CARAVAN All Cargo van

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	1.5	2.5	3.5
Right Front Caster (Ā°)	1.5	2.5	3.5
Left Front Camber (Ā°)	-0.5	-0.1	0.3
Right Front Camber (Ā°)	-0.8	-0.4	0
Front Toe (Ā°)	0.06	0.26	0.46
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-0.36	-0.06	0.24
Right Rear Camber (Ā°)	-0.36	-0.06	0.24
Rear Toe (Ā°)	-0.1	0.15	0.4
Thrust Angle	0.3	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CARAVAN RM 16" & 17" Wheels

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	1.5	2.5	3.5
Right Front Caster (Ā°)	1.5	2.5	3.5
Left Front Camber (Ā°)	-0.5	-0.1	0.3

Measurement	Minimum	Preferred	Maximum
Right Front Camber (Ā°)	-0.8	-0.4	0
Front Toe (Ā°)	0.06	0.26	0.46
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-0.36	-0.06	0.24
Right Rear Camber (Ā°)	-0.36	-0.06	0.24
Rear Toe (Ā°)	-0.1	0.15	0.4
Thrust Angle	0.3	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CARAVAN RT BUX 16" & 17" Wheels

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	1.5	2.5	3.5
Right Front Caster (Ā°)	1.5	2.5	3.5
Left Front Camber (Ā°)	-0.5	-0.1	0.3
Right Front Camber (Ā°)	-0.8	-0.4	0
Front Toe (Ā°)	0.06	0.26	0.46
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-0.36	-0.06	0.24
Right Rear Camber (Ā°)	-0.36	-0.06	0.24
Rear Toe (Ā°)	-0.1	0.15	0.4
Thrust Angle	0.3	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CARAVAN RT Cargo Van 16" Wheels

Measurement	Minimum	Preferred	Maximum

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	1.5	2.5	3.5
Right Front Caster (Ā°)	1.5	2.5	3.5
Left Front Camber (Ā°)	-0.5	-0.1	0.3
Right Front Camber (Ā°)	-0.8	-0.4	0
Front Toe (Ā°)	0.06	0.26	0.46
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-0.36	-0.06	0.24
Right Rear Camber (Ā°)	-0.36	-0.06	0.24
Rear Toe (Ā°)	-0.1	0.15	0.4
Thrust Angle	0.3	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CARAVAN RT Domestic & R/T 17" Wheels

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	1.5	2.5	3.5
Right Front Caster (Ā°)	1.5	2.5	3.5
Left Front Camber (Ā°)	-0.5	-0.1	0.3
Right Front Camber (Ā°)	-0.8	-0.4	0
Front Toe (Ā°)	0.06	0.26	0.46
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-0.36	-0.06	0.24
Right Rear Camber (Ā°)	-0.36	-0.06	0.24
Rear Toe (Ā°)	-0.1	0.15	0.4
Thrust Angle	0.3	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

CARAVAN RT Domestic 16" Wheels

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	1.5	2.5	3.5
Right Front Caster (Ā°)	1.5	2.5	3.5
Left Front Camber (Ā°)	-0.5	-0.1	0.3
Right Front Camber (Ā°)	-0.8	-0.4	0
Front Toe (Ā°)	0.06	0.26	0.46
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-0.36	-0.06	0.24
Right Rear Camber (Ā°)	-0.36	-0.06	0.24
Rear Toe (Ā°)	-0.1	0.15	0.4
Thrust Angle	0.3	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

JOURNEY

JOURNEY AWD

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	2.4	3	3.6
Right Front Caster (Ā°)	2.4	3	3.6
Left Front Camber (Ā°)	-0.35	0.15	0.65
Right Front Camber (Ā°)	-0.85	-0.35	0.15
Front Toe (Ā°)	-0.15	0.1	0.35
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-0.91	-0.36	0.19
Right Rear Camber (Ā°)	-0.91	-0.36	0.19
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0

Measurement	Minimum	Preferred	Maximum
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

JOURNEY FWD

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	2.4	3	3.6
Right Front Caster (Ā°)	2.4	3	3.6
Left Front Camber (Ā°)	-0.35	0.15	0.65
Right Front Camber (Ā°)	-0.75	-0.25	0.25
Front Toe (Ā°)	-0.15	0.1	0.35
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-1.05	-0.5	0.05
Right Rear Camber (Ā°)	-1.05	-0.5	0.05
Rear Toe (Ā°)	-0.1	0.2	0.5
Thrust Angle	0.15	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

VIPER

VIPER All Models

Measurement	Minimum	Preferred	Maximum
Left Front Caster (Ā°)	6.3	6.6	6.9
Right Front Caster (Ā°)	6.3	6.6	6.9
Left Front Camber (Ā°)	-1.7	-1.4	-1.1
Right Front Camber (Ā°)	-1.7	-1.4	-1.1
Front Toe (Ā°)	0.09	0.14	0.19
Left SAI (Ā°)	0	0	0
Right SAI (Ā°)	0	0	0
Left Rear Camber (Ā°)	-1.45	-1.15	-0.85
Right Rear Camber (Ā°)	-1.45	-1.15	-0.85
Rear Toe (Ā°)	0.15	0.2	0.25
Thrust Angle	0.08	0	0
Left Toe Out, Inward (Ā°)	0	0	0
Right Toe Out, Inward (Ā°)	0	0	0

Measurement	Minimum	Preferred	Maximum
Left Toe Out, Outward (Ā°)	0	0	0
Right Toe Out, Outward (Ā°)	0	0	0
Left Max Turn, Inward (Ā°)	0	0	0
Right Max Turn, Inward (Ā°)	0	0	0
Left Max Turn, Outward (Ā°)	0	0	0
Right Max Turn, Outward (Ā°)	0	-	-

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Article GUID: A00731598

GENERAL INFORMATION

Wheel Alignment Theory & Operation

* PLEASE READ THIS FIRST *

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. For model-specific information see appropriate articles where available.**

PRE-ALIGNMENT INSTRUCTIONS

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. For model-specific information see appropriate articles where available.**

GENERAL ALIGNMENT CHECKS

Before adjusting wheel alignment, check the following:

- Each axle uses tires of same construction and tread style, equal in tread wear and overall diameter. Verify that radial and axial runout is not excessive. Inflation should be at manufacturer's specifications.
- Steering linkage and suspension must not have excessive play. Check for wear in tie rod ends and ball joints. Springs must not be sagging. Control arm and strut rod bushings must not have excessive play. See **Fig. 1**.

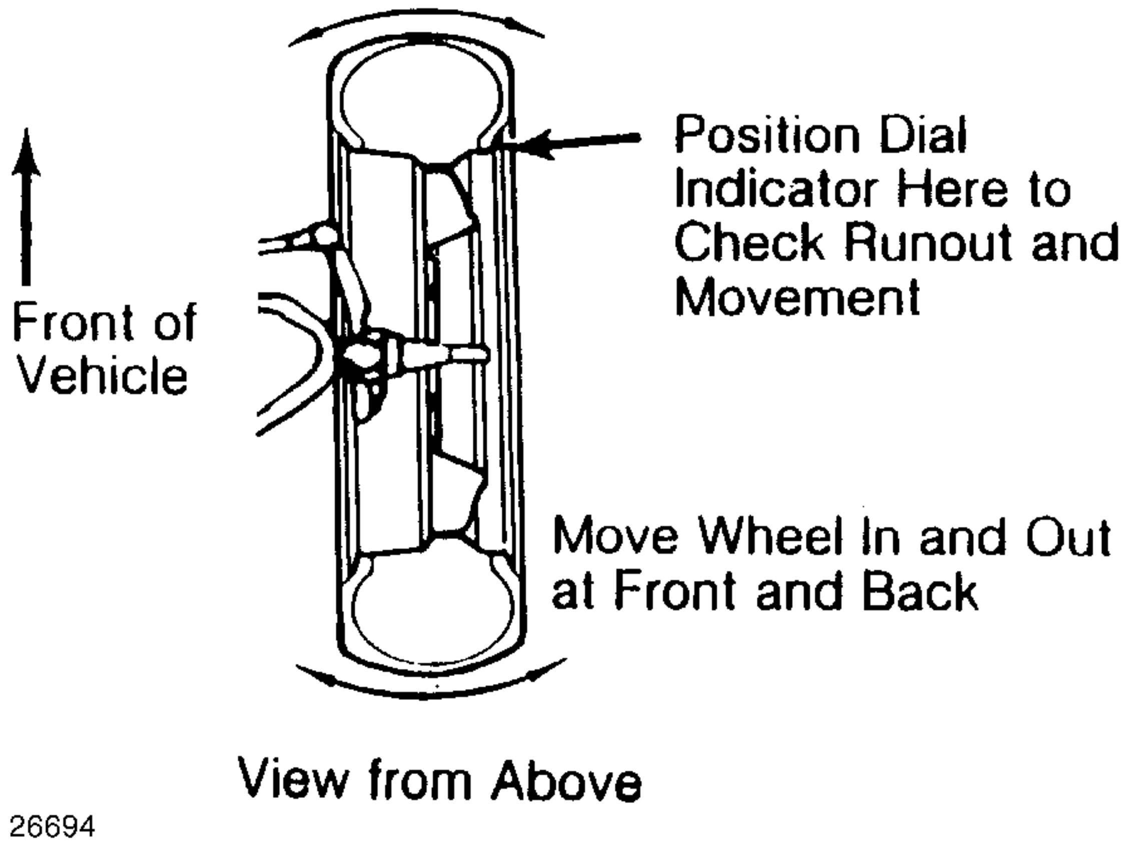


Fig. 1: Checking Steering Linkage

- Vehicle must be on level floor with full fuel tank, no passenger load, spare tire in place and no load in trunk. Bounce front and rear end of vehicle several times. Confirm vehicle is at normal riding height.
- Steering wheel must be centered with wheels in straight ahead position. If required, shorten one tie rod adjusting sleeve and lengthen opposite sleeve (equal amount of turns). See **Fig. 2**.
- Wheel bearings should have the correct preload and lug nuts must be tightened to manufacturer's specifications. Adjust camber, caster and toe-in using this sequence. Follow instructions of the alignment equipment manufacturer.

CAUTION: **DO NOT attempt to correct alignment by straightening parts. Damaged parts MUST be replaced.**

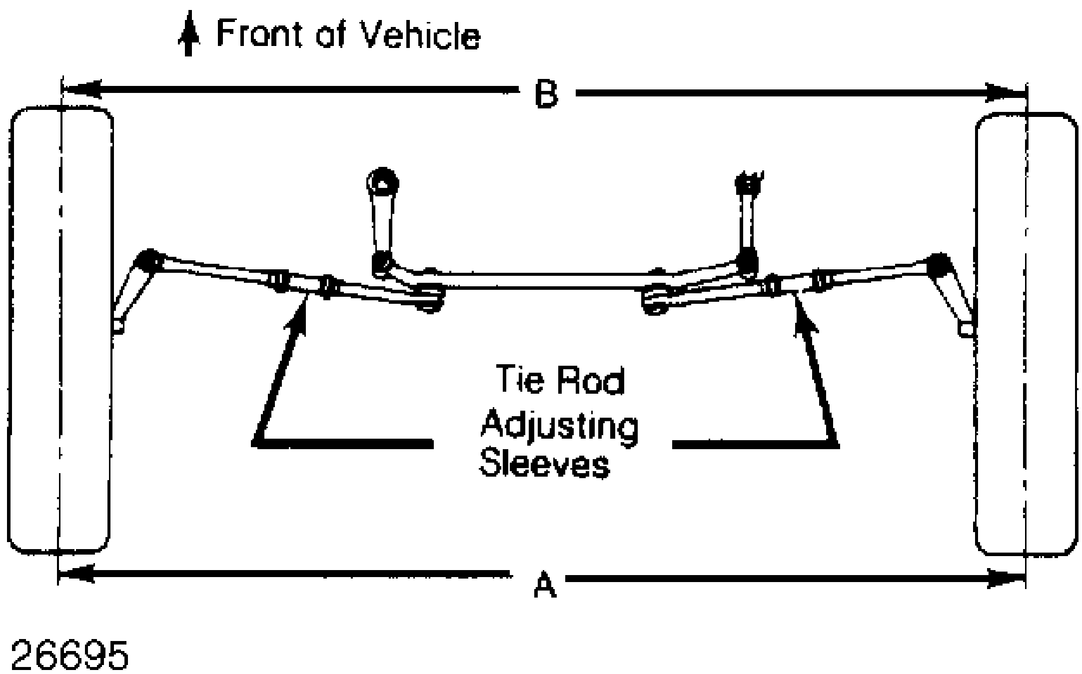


Fig. 2: Adjusting Tie Rod Sleeves (Top View)

ADJUSTMENTS

NOTE:	**This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. For model-specific information see appropriate articles where available.**

CAMBER

1. Camber is the tilting of the wheel, outward at either top or bottom, as viewed from front of vehicle. See **Fig. 3**.
2. When wheels tilts outward at the top (from centerline of vehicle), camber is positive. When wheels tilt inward at top, camber is negative. Amount of tilt is measured in degrees from vertical.

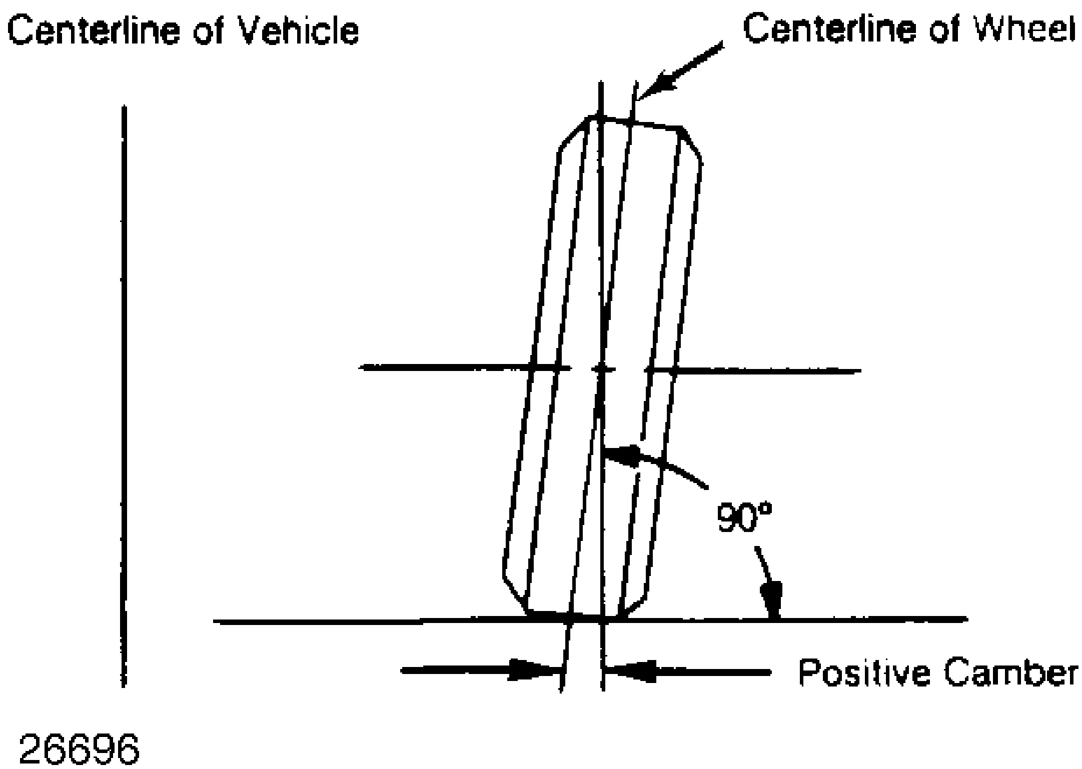


Fig. 3: Determining Camber Angle

CASTER

1. Caster is tilting of front steering axis either forward or backward from vertical, as viewed from side of vehicle. See **Fig. 4**.
2. When axis is tilted backward from vertical, caster is positive. This creates a trailing action on front wheels. When axis is tilted forward, caster is negative, causing a leading action on front wheels.

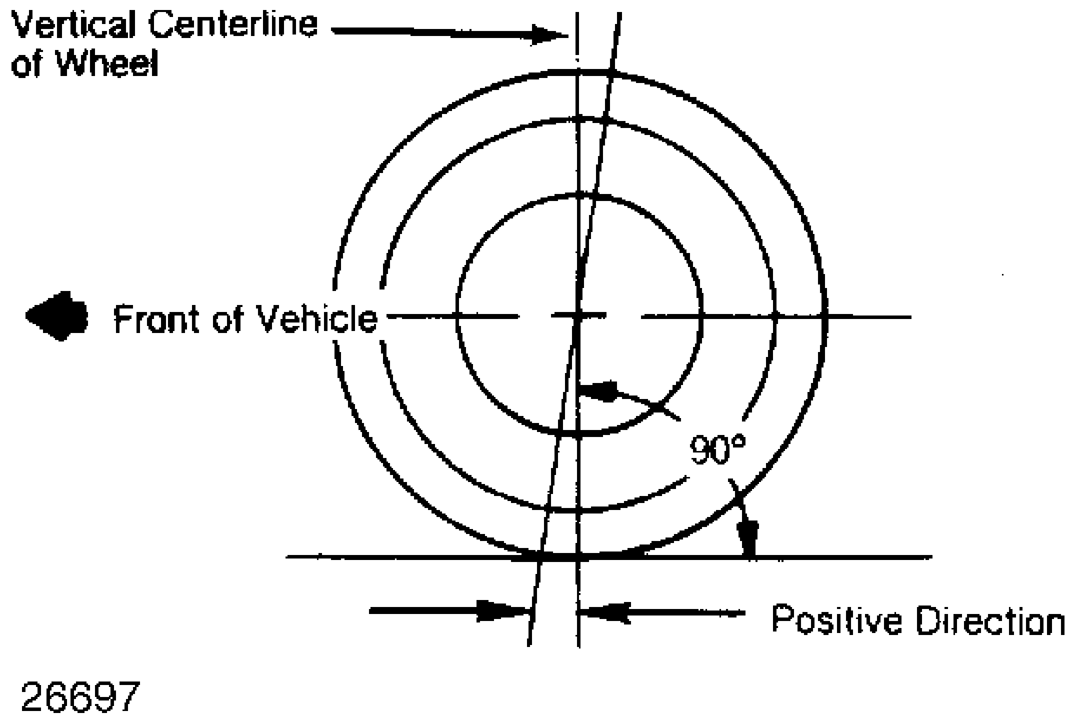


Fig. 4: Determining Caster Angle

TOE-IN ADJUSTMENT

Toe-in is the width measured at the rear of the tires subtracted by the width measured at the front of the tires at about spindle height. A positive figure would indicate toe-in and a negative figure would indicate toe-out. If the distance between the front and rear of the tires is the same, toe measurement would be zero. To adjust:

1) Measure toe-in with front wheels in straight ahead position and steering wheel centered. To adjust toe-in, loosen clamps and turn adjusting sleeve or adjustable end on right and left tie rods. See **Fig. 2** and **Fig. 5** .

2) Turn equally and in opposite directions to maintain steering wheel in centered position. Face of tie rod end must be parallel with machined surface of steering rod end to prevent binding.

3) When tightening clamps, make certain that clamp bolts are positioned so there will be no interference with other parts throughout the entire travel of linkage.

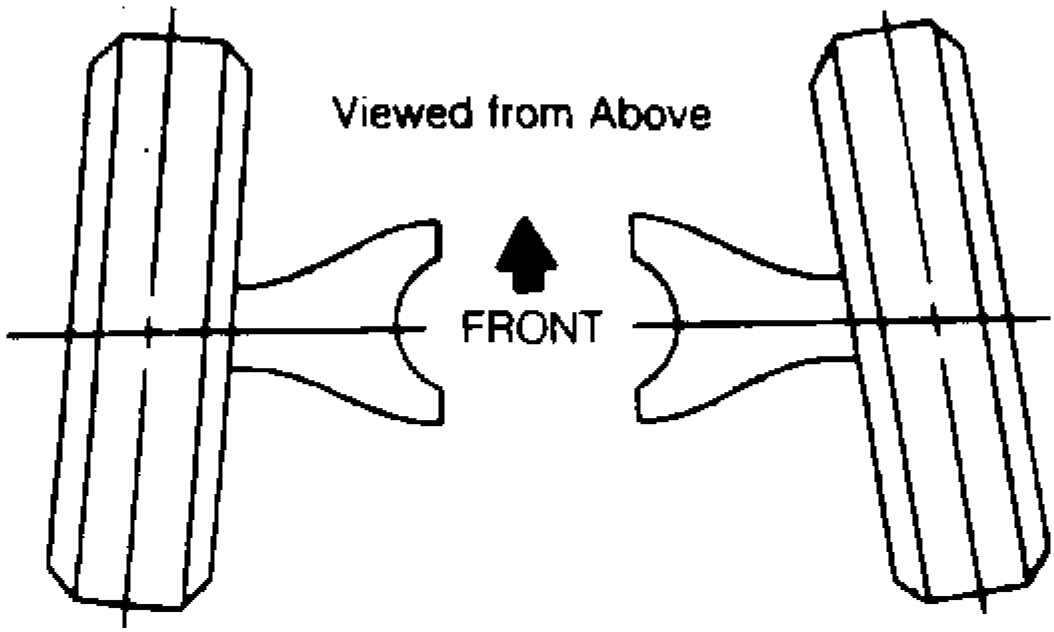


Fig. 5: Wheel Toe-In (Dimension A Less Dimension B)

TOE-OUT ON TURNS

1. Toe-out on turns (turning radius) is a check for bent or damaged parts, and not a service adjustment. With caster, camber, and toe-in properly adjusted, check toe-out with weight of vehicle on wheels.
2. Use a full floating turntable under each wheel, repeating test with each wheel positioned for right and left turns. Incorrect toe-out generally indicates a bent steering arm. Replace arm, if necessary, and recheck wheel alignment.

STEERING AXIS INCLINATION

1. Steering axis inclination is a check for bent or damaged parts, and not a service adjustment. Vehicle must be level and camber should be properly adjusted. See **Fig. 6**.
2. If camber cannot be brought within limits and steering axis inclination is correct, steering knuckle is bent. If camber and steering axis inclination are both incorrect by approximately the same amount, the upper and lower control arms are bent.

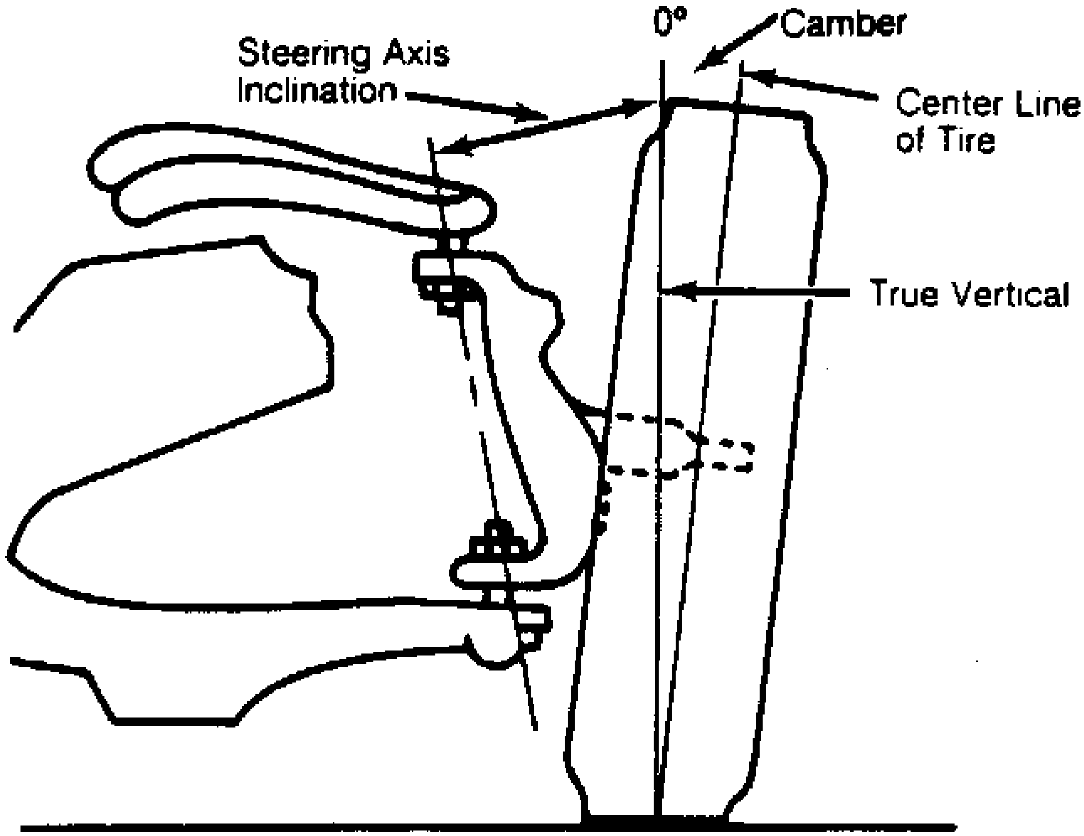


Fig. 6: Checking Steering Axis Inclination

Article GUID: A00060716

Wiper System & Washer System - Service Information - Challenger

DESCRIPTION

DESCRIPTION

An electrically operated intermittent wiper and washer system is standard factory installed safety equipment on this vehicle. The wiper and washer system includes the following major components, which are described in further detail elsewhere within this service information:

- **Washer Fluid Level Switch** - The washer fluid level switch is located in a dedicated hole on the lower, outboard side of the washer reservoir, ahead of the right front wheel house splash shield.
- **Washer Nozzle** - Two fluidic washer nozzles with integral check valves are secured by latch features to dedicated openings in the hood panel inner reinforcement near the rear hem of the hood panel below the base of the windshield.
- **Washer Pump/Motor** - The electric washer pump/motor unit is located in a dedicated hole in a sump area on the lower, outboard side of the washer reservoir, ahead of the right front wheel house splash shield.
- **Washer Plumbing** - The plumbing for the washer system consists of rubber hoses, hard plastic tubes and molded rubber or plastic fittings. The plumbing is routed to the dash panel from the washer reservoir along the outboard side of the right front load beam. The washer hose is routed along the right hood hinge to the hood, then across the underside of the hood panel to the washer nozzles.
- **Washer Reservoir** - The washer reservoir is concealed between the right inner fender shield and the right outer fender panel, ahead of the right front wheel house splash shield. The filler neck and cap are the only visible components of the reservoir and, can be easily accessed from the right front corner of the engine compartment.
- **Wiper Arms And Blades** - The two wiper arms are secured with nuts to the threaded ends of the two wiper pivot shafts, which extend through the cowl plenum cover/grille panel located near the base of the windshield. The two wiper blades are each secured to their wiper arm with an integral latch, and are parked on the glass near the bottom of the windshield when the wiper system is not in operation. The left and right wiper arms and wiper blades are unique and are not interchangeable.
- **Wiper Linkage Module** - The wiper pivot shafts are the only visible components of the wiper linkage module. The remainder of the module is concealed beneath the cowl plenum cover/grille panel. The wiper module includes the wiper module bracket, three rubber-isolated wiper module mounts, the wiper motor, the wiper motor crank arm, the two wiper drive links and the two wiper pivots.
- **Wiper Relays** - The wiper high and low relay and the wiper on and off relay are both International Standards Organization (ISO) micro relays located within the front Power Distribution Center (PDC). The front PDC is located on the right front wheel house ahead of the right strut tower within the engine compartment.

Certain functions and features of the wiper and washer systems rely upon resources shared with other electronic modules in the vehicle over a Local Interface Network (LIN) data bus as well as over the Controller Area Network (CAN) data bus. Other electronic modules in the vehicle that may affect wiper and washer system operation are:

- **Body Control Module** - The Body Control Module (BCM) (also known as the Common Body Controller/CBC) is located beneath the instrument panel on the passenger side of the vehicle. Refer to **MODULE, BODY CONTROL, DESCRIPTION** .
- **Light Rain Sensor Module** - A Light Rain Sensor Module (LRSM) (also known as the Light Sensor Module/LSM, the Rain Sensor Module/RSM or the Rain Light Sensor/RLS) is used on vehicles equipped with the optional automatic wiper feature. The LRSM is located on a bracket bonded to the inside surface of the windshield glass, near the inside rear view mirror mount.
- **Multifunction Switch** - The multifunction switch is integral to the Steering Column Control Module (SCCM) along with the clockspring and the SCCM microcontroller on the top of the steering column just below the steering wheel. The multifunction switch is connected to the SCCM microcontroller. Only the switch control stalk extending from the left side of the steering column is visible, while the remainder of the switch is concealed beneath the steering column shrouds. The multifunction switch provides all of the driver controls for both the wiper and washer systems.
- **Steering Column Control Module** - The Steering Column Control Module (SCCM) includes the microcontroller, the multifunction switch and the clockspring on the top of the steering column just below the steering wheel. The SCCM microcontroller is completely concealed beneath the steering column shrouds. Refer to **MODULE, STEERING COLUMN CONTROL, DESCRIPTION** .

The BCM and the SCCM each contain a microcontroller and programming that allow them to communicate with each other and other electronic modules in the vehicle using the Controller Area Network (CAN) data bus. In addition the BCM and the RLSM communicate with each other using the Local Interface Network data bus. Refer to **COMMUNICATION, DESCRIPTION** .

Hard wired circuitry connects the wiper and washer system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the wiper and washer system components through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

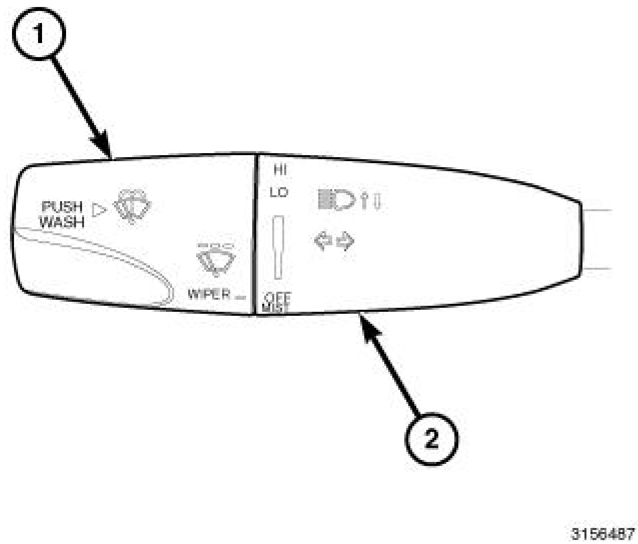


Fig. 1: Control Knob & Control Stalk
Courtesy of CHRYSLER GROUP, LLC

The wiper and washer system is designed to provide the vehicle operator with a convenient, safe and reliable means of maintaining visibility through the windshield glass. The various components of this system are designed to convert electrical energy produced by the vehicle electrical system into the mechanical action of the wiper blades to wipe the outside surface of the glass, as well as into the hydraulic action of the washer system to apply washer fluid stored in an on-board reservoir to the area of the glass to be wiped. When combined, these components provide the means to effectively maintain clear visibility for the vehicle operator by removing excess accumulations of rain, snow, bugs, mud or other minor debris from the outer surface of the windshield glass that might be encountered while driving the vehicle under numerous types of inclement operating conditions.

The vehicle operator initiates all wiper and washer system functions with the control knob (1) on the control stalk (2) of the multifunction switch that extends from the left side of the steering column, just below the steering wheel. Rotating the control knob on the end of the control stalk, selects the Off, Delay (except with the optional automatic or rain-sensing wiper system), Automatic (**A**) (with the optional automatic or rain-sensing wiper system only), Low or High wiper system operating modes. In the Delay mode, the control knob also allows the vehicle operator to select from one of four intermittent wipe Delay intervals. With the Automatic wiper system, the control knob allows the vehicle operator to select from one of four automatic wiper sensitivity levels.

Depressing the control knob towards the steering column actuates the momentary washer system switch, which selects the Wash and Wipe-After-Wash modes depending upon when and how long the switch is held closed. Rotating the control knob downward actuates another momentary switch and selects the Mist mode, which cycles the wiper blades for as long as the switch is held closed then completes the current cycle and parks the blades at the base of the windshield after the control knob is released.

The multifunction switch provides hard wired analog and digital inputs to the microcontroller internal to the Steering Column Control Module (SCCM) for all of the wiper and washer system functions. The SCCM microcontroller then sends electronic **wiper switch** and **washer switch** status messages to the Body Control Module (BCM) (also known as the Common Body Controller/CBC) over the Controller Area Network (CAN) data bus requesting the appropriate wiper and washer system operating modes.

Wiper and washer system operation is completely controlled by the SCCM and BCM logic circuits, and that logic will only allow these systems to operate when the status of the ignition switch is Accessory or On. The BCM uses intelligent, high current, self-protected high side switches to control wiper relays within the front Power Distribution Center (PDC). The relays control wiper system operation by energizing or de-energizing the wiper motor low and high speed brushes. The multifunction switch circuitry receives battery current and a clean ground output from the SCCM microcontroller, then provides analog and digital inputs to the microcontroller to indicate the selected wiper and washer system mode.

The hard wired circuits and components of the wiper and washer system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between other modules and devices that provide some features of the wiper and washer system. The most reliable, efficient and accurate means to diagnose the wiper and washer system or the electronic controls and communication related to wiper and washer system operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

OPERATING MODES

Following are paragraphs that briefly describe the operation of each of the wiper and washer system operating modes.

- **Automatic Wipe Mode** - If the vehicle is equipped with the optional automatic (rain sensing) wiper system and it is enabled, when the control knob on the control stalk of the multifunction switch is moved to one of the four sensitivity positions, the SCCM microcontroller sends an electronic **wiper switch sensitivity** message to the BCM over the CAN data bus. The BCM, which is also a Local Interface Network (LIN) data bus master node, relays the **wiper switch sensitivity** message to the Light Rain Sensor Module (LRSM) (also known as the Light Sensor Module/LSM or Rain Sensor Module/RSM), which is a LIN slave node, over the LIN data bus.

  The LRSM monitors an area within the wipe pattern of the windshield glass for the accumulation of moisture. Based upon internal programming and the selected sensitivity level, when sufficient moisture has accumulated the LRSM sends the appropriate electronic **wipe command** messages back to the BCM over the LIN data bus. Then the BCM operates the wiper system accordingly.

  As the sensitivity level is set higher, the LRSM is more sensitive to moisture accumulation and will send **wipe commands** more frequently. The third sensitivity position of the control knob is designed to provide optimal wiper performance for most typical driving requirements. The BCM logic is also programmed to provide an immediate wipe cycle each time the control knob on the control stalk of the multifunction switch is moved from the Off position to one of the four sensitivity positions, and another immediate wipe cycle each time the control knob is moved from a lower sensitivity position to a higher sensitivity position.

  Also, if a vehicle is equipped with automatic wipers but the feature has been disabled using the Customer Programmable Features function of the Settings menu, when any sensitivity position is selected with the control knob the system will respond in the same manner as in the intermittent wipe mode.

  The automatic wiper system also has features designed to protect the mechanical components of the wiper system, and will not allow automatic wiper operation under the following conditions:

- **Low Ambient Temperature** - When the ambient temperature is below 0Â° C (32Â° F), the automatic wipers will not operate during a new ignition cycle until the wiper switch has been moved to a different position than that which was selected at the moment the current ignition cycle began, or until a vehicle speed input is detected.
- **Transmission In Neutral** - When the transmission gear selector is placed in the Neutral (**N**) position while the status of the ignition switch is On, the automatic wipers will not operate during the current ignition cycle until the wiper switch has been moved to a different position than that which was selected at the moment the Neutral position was selected, until the vehicle speed is greater than 8 kilometers-per-hour (5 miles-per-hour) or until the transmission gear selector is moved out of the Neutral position, whichever occurs first.

- **Continuous Wipe Mode** - When the Low position of the control knob on the control stalk of the multifunction switch is selected the SCCM microcontroller sends an electronic **wiper switch low** status message to the BCM over the CAN data bus. The BCM then provides the appropriate outputs to the wiper on-off and wiper high-low relays within the front PDC to direct battery current to the low speed brush of the wiper motor, causing the wipers to cycle at low speed.

  When the High position of the control knob is selected the SCCM microcontroller sends an electronic **wiper switch high** status message to the BCM. The BCM then provides the appropriate outputs to the wiper on-off and wiper high-low relays within the front PDC to direct battery current to the high speed brush of the wiper motor, causing the wipers to cycle at high speed.

  When the Off position of the multifunction switch control knob is selected, the SCCM microcontroller sends an electronic **wiper switch off** status message to the BCM, then one of two events will occur. The event that occurs depends upon the position of the wiper blades on the windshield at the moment that the control knob Off position is selected.

  If the wiper blades are in the down position on the windshield when the Off position is selected, the park switch that is integral to the wiper motor is closed to ground, which provides a hard wired park switch sense input to the BCM. The BCM provides the appropriate outputs to the wiper on-off and wiper high-low relays within the front PDC to de-energize the wiper motor and the wiper motor ceases to operate.

  If the wiper blades are not in the down position on the windshield at the moment the Off position is selected, the park switch is an open circuit and the BCM provides the appropriate outputs to the wiper on-off and wiper high-low relays within the front PDC to continue running the wiper motor at low speed until the wiper blades are in the down position on the windshield and the park switch input to the BCM is again closed to ground.

- **Headlamps On With Wipers Mode** - The circuitry and programming of the BCM provides an automatic Headlamps On With Wipers mode for vehicles equipped with the optional automatic headlamps. This is a Customer Programmable Feature that can be enabled or disabled through the Settings menu. If this feature is enabled, when the headlamp switch is in the Automatic (**A**) position, the headlamps will turn On automatically whenever the windshield wipers are turned On; and, if the headlamps were turned On automatically when the wipers were turned On, they will also turn Off automatically when the wipers are turned Off.

  If this feature is enabled in vehicles equipped with the optional automatic (rain sensing) wiper feature, when the automatic wiper mode is selected the headlamps will turn On automatically only after the wipers complete three automatic wipe cycles within about 30 seconds, and they will turn Off

automatically after 3 minutes elapse without any automatic wipe cycles unless ambient light conditions dictate otherwise.

- **Intermittent Wipe Mode** - The following applies to vehicles not equipped with the optional automatic (rain sensing) wiper system, or to vehicles equipped with the automatic (rain sensing) wiper system that have been disabled using the Customer Programmable Features function of the Settings menu.

  When the control knob on the control stalk of the multifunction switch is moved to one of the four Delay (Intermittent) interval positions the SCCM microcontroller sends an electronic **wiper switch delay interval** status message to the BCM. Then the BCM electronic intermittent wipe logic circuit responds by calculating the correct length of time between wiper sweeps based upon the selected delay interval input.

  The BCM monitors the changing state of the wiper motor park switch through a hard wired park switch sense input. This input allows the BCM to determine the proper intervals at which to provide the appropriate outputs to the wiper on-off and high-low relays within the front PDC to energize and de-energize the wiper motor low speed brush to operate the wiper motor intermittently for one low speed cycle at a time.

  The BCM logic is also programmed to provide vehicle speed sensitivity to the selected intermittent wipe delay intervals. In order to provide this feature, the BCM monitors electronic **vehicle speed** messages from the Controller Antilock Brake (CAB) (also known as the Antilock Brake Module/ABM, the Antilock Brake System/ABS module or the Electronic Stability Control/ESC module) and doubles the selected delay interval whenever the vehicle speed is about 16 kilometers-per-hour (10 miles-per-hour) or less.

- **Mist Wipe Mode** - When the control knob of the multifunction switch is rotated downward to the momentary Mist position, the SCCM microcontroller sends an electronic **wiper mist mode** status message to the BCM. The BCM then provides the appropriate outputs to the wiper on-off and wiper high-low relays within the front PDC to energize the low speed brush of the wiper motor for as long as the switch is held closed, then de-energize the motor when the state of the Mist switch changes to open, parking the wiper blades near the base of the windshield. The BCM can operate the wiper motor in this mode for only one low speed cycle at a time, or for an indefinite number of sequential low speed cycles, depending upon how long the Mist switch is held closed.
- **Wash Mode** - When the control knob of the multifunction switch is depressed toward the steering column to the momentary Wash position for more than about one-half second with the wiper system operating, the SCCM microcontroller sends an electronic **washer switch** status message to the BCM. Then the BCM directs battery current and ground to the washer pump/motor. This will cause the washer pump/motor to be energized for as long as the switch is held closed (up to approximately 10 seconds) and to be de-energized when the control knob is released.

  When the control knob is depressed to the momentary Wash position while the wiper system is operating in one of the Delay interval (or sensitivity level with automatic or rain sensing wipers) positions, the washer pump/motor operation is the same. However, the BCM logic also overrides the selected delay interval or sensitivity level and operates the wiper motor in a continuous low speed mode for as long as the control knob is held in the momentary Wash position, then reverts to the selected delay interval or sensitivity level several wipe cycles after the control knob is released. If the Wash switch is held closed for more than about 10 seconds, the BCM will suspend washer pump/motor operation until the control knob is released for about 2 seconds, then is cycled back to the Wash position.

- **Wipe-After-Wash Mode** - When the control knob of the multifunction switch is depressed toward the steering column to the momentary Wash position for more than about one-half second while the wiper system is not operating, the SCCM microcontroller sends an electronic **washer switch** status message to the BCM. Then the BCM directs battery current and ground to operate the washer pump/motor and provides the appropriate outputs to the wiper on-off and wiper high-low relays within the front PDC to energize the wiper motor in a continuous low speed mode for as long as the switch is held closed (up to approximately 10 seconds). When the control knob is released, the BCM de-energizes the washer pump/motor immediately, but allows the wiper motor to operate for two or three additional wipe cycles before it de-energizes the wiper motor and parks the wiper blades near the base of the windshield.

  If the control knob is held inward for more than about 10 seconds, the BCM will suspend washer pump/motor operation until the knob is released for about 2 seconds and then is cycled back to the Wash position; however, the wipers will continue to operate for as long as the switch is held closed. The BCM monitors the changing state of the wiper motor park switch through a hard wired wiper park switch sense circuit input. This input allows the BCM to count the number of wipe cycles that occur after the control knob is released, and to determine the proper interval at which to de-energize the wiper motor to complete the Wipe-After-Wash mode cycle.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - WIPER AND WASHER SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

If the wiper motor operates, but the wiper blades do not move on the windshield and the wiper arms are properly installed, replace the ineffective wiper motor or wiper linkage module. If the washer pump/motor operates, but no washer fluid is dispensed on the glass; or, if the wipers operate, but chatter, lift, or do not clear the glass, clean and inspect the wiper and washer system components as required. Refer to **CLEANING** and **INSPECTION**.

The hard wired wiper and washer system circuits and components may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the wiper and washer system or the electronic controls and communication between other modules and devices that provide some features of the wiper and washer system. The most reliable, efficient and accurate means to diagnose the wiper and washer system or the electronic controls and communication related to wiper and washer system operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

NOTE: **The wiper and washer switches are integral to the multifunction switch in the Steering Column Control Module (SCCM). The multifunction switch communicates with the SCCM microcontroller, which is also integral to the SCCM. The SCCM microcontroller communicates with the Body Control Module (BCM) (also known as the Common Body Controller/CBC) over the Controller Area Network (CAN) data bus. The BCM controls wiper motor operation through the wiper on-off and wiper high-low relays within the front Power Distribution Center (PDC).**

Before performing any of the following tests, determine whether the other functions of the multifunction switch are operational. If other multifunction switch functions are ineffective, diagnose and repair that problem before attempting to repair the Wiper and Washer System.

WIPER AND WASHER SYSTEM DIAGNOSIS		
CONDITION	**POSSIBLE CAUSES**	**CORRECTION**
WIPER MOTOR DOES NOT OPERATE IN ANY SWITCH POSITION	1. Ineffective motor ground circuit.	1. Test and repair open wiper motor ground circuit if required.
	2. Ineffective motor feed circuits.	2. Test and repair low speed and high speed feed circuits between front PDC and wiper motor if required.
	3. Ineffective SCCM inputs or outputs.	3. Use a diagnostic scan tool and the appropriate diagnostic information for further SCCM diagnosis.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool and the appropriate diagnostic information for further BCM diagnosis.
	5. Ineffective wiper motor.	5. Test and replace open or shorted wiper motor if required.
WIPERS DO NOT PARK CORRECTLY	1. Ineffective wiper motor park switch input circuit.	1. Test and repair wiper park switch input circuit between BCM and wiper motor if required.
	2. Ineffective BCM inputs or outputs.	2. Use a diagnostic scan tool and the appropriate diagnostic information for further BCM diagnosis.
	3. Ineffective wiper motor park switch.	3. Test and replace wiper motor if required.
WIPER MOTOR OPERATES SLOWLY IN ALL SWITCH POSITIONS	1. Ineffective wiper motor.	1. Check amperage draw with linkage disconnected from wiper motor output shaft. Correct draw should be about 6 amperes. If incorrect, refer to the appropriate Possible Cause that follows.
	2. Amperage draw too low.	2. Test and repair shorted low and high speed feed circuits if required.
	3. Amperage draw too high.	3. With linkage disconnected from wiper motor output shaft, check linkage and pivots

WIPER AND WASHER SYSTEM DIAGNOSIS		
CONDITION	POSSIBLE CAUSES	CORRECTION
		for binding. If binding is detected, repair or replace wiper linkage module if required. If no linkage binding detected, replace the wiper motor if required.
WIPERS RUN AT HIGH SPEED WITH SWITCH LOW SPEED SELECTED OR AT LOW SPEED WITH SWITCH HIGH SPEED SELECTED	1. Ineffective motor feed circuit wiring.	1. Test and repair low speed and high speed feed circuits between front PDC and wiper motor if required.
AUTOMATIC WIPERS ONLY ARE INOPERATIVE	1. Automatic wipers (Rain Sensing) feature has been disabled.	1. Be certain that the automatic wipers (Rain Sensing) feature is enabled in the Customer Programmable Features Settings menu.
WASHER PUMP DOES NOT OPERATE	1. Ineffective washer pump ground circuit.	1. Test and repair open washer pump ground circuit if required.
	2. Ineffective washer pump feed circuits.	2. Test and repair washer pump feed circuit between BCM and washer pump if required.
	3. Ineffective SCCM inputs or outputs.	3. Use a diagnostic scan tool and the appropriate diagnostic information for further SCCM diagnosis.
	4. Ineffective BCM inputs or outputs.	4. Use a diagnostic scan tool and the appropriate diagnostic information for further BCM diagnosis.
	5. Ineffective washer pump.	5. Test and replace open or shorted washer pump if required.

DIAGNOSING FALSE WIPES (AUTOMATIC WIPER ONLY)

False wipes are unnecessary wipes that occur when the control knob of the multifunction switch is in one of the four automatic wiper sensitivity positions and no rain or moisture is apparent within the wipe pattern on the windshield glass. Because this system is designed to operate whenever it detects moisture, if the switch is in one of the automatic wiper sensitivity positions any road spray, bug splatters or mist from passing cars or trucks may occasionally cause the wipers to cycle. These are normal characteristics of this system and are not false wipes.

False wipes generally are the result of foreign material or flaws that interfere with the system optics. The optics for this system allow the Light Rain Sensor Module (LRSM) (also known as the Rain Light Sensor Module/RLSM, the Light Sensor Module/LSM or the Rain Sensor Module/RSM) to precisely transmit several InfraRed (IR) light beams and monitor the intensity of these beams reflected from the outer surface of the windshield glass to determine the presence of moisture. The sensitivity of this system is such that anything that distorts the focus or intensity of the IR light beams or impacts the ability of the photo diodes within the LRSM to see and accurately measure these light beams can result in the LRSM logic misinterpreting the resulting input data as moisture on the windshield. The optics for this system include the lenses of the LRSM, the adhesive silicone gelatin (SilGel) layer that bonds the LRSM to the inside of the windshield and the windshield glass.

The following procedure should only be used if false wipe occurrences are frequent and persistent. Perform

diagnosis of the wiper system, the multifunction switch and microcontroller of the Steering Column Control Module (SCCM) and the LRSM using a diagnostic scan tool and the appropriate diagnostic procedures before performing the following:

NOTE: **The Light Rain Sensor Module (LRSM) mounting bracket is serviced as a unit with the windshield glass. If either the bracket or the glass is ineffective or damaged, the entire LRSM bracket and windshield glass unit must be replaced. Also, if the LRSM is removed from the mounting bracket for any reason, the integrity of the adhesive silicone gelatin (SilGel) layer of the LRSM will be compromised and the silicone gelatin pad must be replaced with a new unit.**

1. Carefully inspect the outer surface of the windshield glass for physical damage, including scratches, cracks or chips in the vicinity of the LRSM mounting bracket. **Scratches, cracks or chips in the windshield glass outside the area of the LRSM mounting bracket lenses will not cause false wipes.** If OK, go to Step 2. If not OK, replace the damaged windshield.
2. From the outside of the windshield glass, carefully inspect the adhesive layer between the windshield glass and the LRSM bracket for any large voids (air pockets). If an adhesive void greater than about 1 millimeter (0.04 inch) is observed, replace the flawed silicone gelatin pad. If OK, go to Step 3.
3. Lightly pull the LRSM away from the windshield bracket to confirm that both sides of the spring steel LRSM mounting band are fully engaged with the mounting bracket on the inside of the windshield glass. If OK, go to Step 4. If not OK, install the LRSM mounting band onto the bracket as required.
4. Remove the LRSM from the mounting bracket. Carefully inspect the LRSM mounting bracket for any physical damage and inspect the windshield glass area within the LRSM mounting bracket for contamination. If OK, go to Step 5. If contaminated, clean any foreign material from the windshield glass using rubbing alcohol and a lint-free cloth. If damaged, replace the damaged LRSM bracket and windshield as a unit.
5. Carefully replace the LRSM with a new unit. Refer to **MODULE, LIGHT RAIN SENSOR, INSTALLATION**.

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.	NEW FASTENER*
Wiper Arm Mounting Nuts	18	13	-	Ā
Wiper Linkage Module Mounting Screws	8	-	71	Ā
Wiper Motor Mounting Screws	7.5	-	66	Ā
***NEW FASTENER:** Do not reuse these fasteners. If removed, a new fastener must be installed and tightened to specifications.				

CLEANING

WASHER SYSTEM

CAUTION: Never introduce petroleum-based cleaners, solvents, or contaminants into the washer system. These products can rapidly deteriorate the rubber seals and hoses of the washer system, as well as the rubber squeegees of the wiper blades.

CAUTION: Never use compressed air to flush the washer system plumbing. Compressed air pressures are too great for the washer system plumbing components and will result in further system damage. Never use sharp instruments to clear a plugged washer nozzle or damage to the nozzle orifice and improper nozzle spray patterns will result.

If the washer system is contaminated with foreign material, drain the washer reservoir by removing the washer pump/motor unit from the reservoir. Clean foreign material from the inside of the washer pump inlet filter screen and the washer reservoir using clean washer fluid, a mild detergent or a non-abrasive cleaner. Flush foreign material from the washer system plumbing by first disconnecting the washer hoses from the washer nozzles, then running the washer pump/motor to run clean washer fluid or water through the system. Plugged or restricted washer nozzles cannot be back-flushed due to the integral check valve mechanism. If the washer nozzle obstruction cannot be cleared, replace the washer nozzle.

WIPER SYSTEM

CAUTION: Protect the rubber squeegees of the wiper blades from any petroleum-based cleaners, solvents, or contaminants. These products can rapidly deteriorate the rubber squeegees.

The squeegees of wiper blades exposed to the elements for a long time tend to lose their wiping effectiveness. Periodic cleaning of the squeegees and the windshield glass is suggested to remove any deposits of salt, wax or road film. The wiper blades, arms and windshield glass should only be cleaned using a sponge or soft cloth and windshield washer fluid, a mild detergent or a non-abrasive cleaner. If the wiper blades continue to leave streaks, smears, hazing or beading on the glass after cleaning of the squeegees and the glass, clean them again. Wiper blade assembly replacement will NOT resolve hazing or beading.

INSPECTION

WASHER SYSTEM

The washer system components should be inspected periodically, not just when washer performance problems are experienced. This inspection should include the following points:

1. Check for ice or other foreign material in the washer reservoir. If contaminated, clean and flush the washer system. Refer to **CLEANING**.
2. Inspect the washer plumbing for pinched, leaking, deteriorated or incorrectly routed hoses and damaged or disconnected hose fittings. Replace damaged or deteriorated hoses and hose fittings. Leaking washer hoses can sometimes be repaired by cutting the hose at the leak and splicing it back together using an in-line connector fitting. Similarly, sections of deteriorated hose can be cut out and replaced by splicing in new sections of hose using in-line connector fittings. Whenever routing a washer hose or a wire harness containing a washer hose, it must be routed away from hot, sharp, or moving parts. Also, sharp bends that might pinch the washer hose must be avoided. Leaking hard plastic tubing lines MUST be replaced with a

new unit.

WIPER SYSTEM

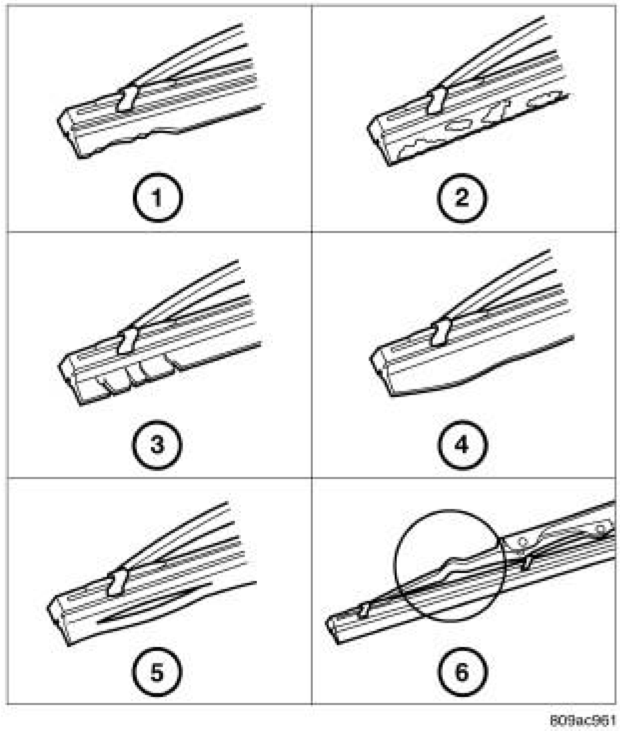


Fig. 2: Wiper Blades And Wiper Arms
Courtesy of CHRYSLER GROUP, LLC

The wiper blades and wiper arms should be inspected periodically, not just when wiper performance problems are experienced. This inspection should include the following points:

1. Carefully inspect the wiper blades for any indications of worn or uneven edges (1), foreign material deposits (2), hardening or cracking (3), deformation or fatigue (4) or splitting (5). Inspect the wiper blade support components and the wiper arms for damage (6) or severe corrosion. If the wiper arms and blades are contaminated with any foreign material, clean them and the glass as required. Refer to **CLEANING**. If a wiper blade or arm is damaged, or if severe corrosion is evident, replace the affected wiper arm or blade with a new unit. Do not attempt to repair a wiper arm or blade that is damaged or severely corroded.
2. Carefully lift the wiper blade off of the glass. Note the action of the wiper arm hinge. The wiper arm should pivot freely at the hinge, but with no lateral looseness evident. If there is any binding evident in the wiper arm hinge, or if there is evident lateral play in the wiper arm hinge, replace the wiper arm.

CAUTION: Do not allow the wiper arm to spring back against the glass without the wiper blade in place or the glass may be damaged.

3. Once proper hinge action of the wiper arm is confirmed, check the hinge for proper spring tension. The spring tension of the wiper arm should be sufficient to cause the rubber squeegee to conform to the curvature of the glass. Replace a wiper arm if it has insufficient spring tension to maintain contact between the squeegee and the glass.

4. After cleaning and inspecting the wiper components and the glass, if the wiper blade still fails to clear the glass without smearing, streaking or chattering, replace the wiper blade.

ARM, WIPER

DESCRIPTION

DESCRIPTION

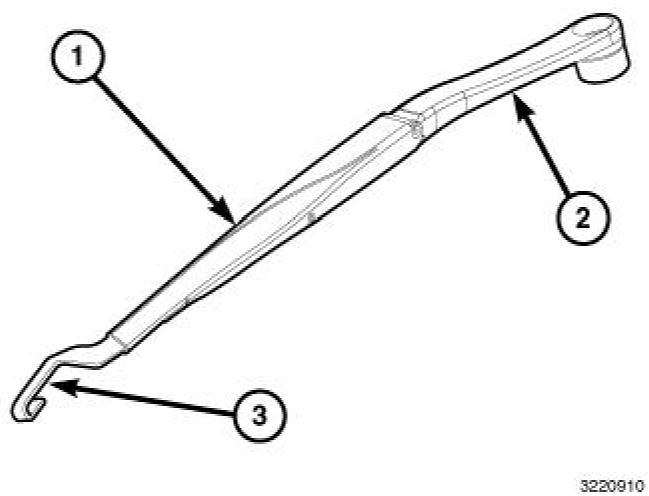


Fig. 3: Stamped Steel Channel, Aluminum Pivot End & Stamped Steel Strap
Courtesy of CHRYSLER GROUP, LLC

The wiper arms are the rigid members located between the wiper pivots that protrude from the cowl plenum cover/grille panel near the base of the windshield and the wiper blades on the windshield glass. These wiper arms include an over-center hinge design that allows easy access to the windshield glass for cleaning. The wiper arm has a die cast aluminum pivot end (2) with a large, internally tapered mounting boss at one end. A molded black plastic cap snaps over the pivot end to conceal the wiper arm retaining nut and the mounting hole following wiper arm installation.

The wide end of a tapered, stamped steel channel (1) hinges on and is secured with a hinge pin to the blade end of the wiper arm pivot end. One end of a stamped steel strap (3), is secured within the narrow end of the stamped steel channel. The tip of the wiper blade end of this strap is bent back under itself to form a small hook. The entire wiper arm has a satin black finish applied to all of its visible surfaces.

Concealed within the stamped steel channel is a long tension spring which is engaged with a formed wire link hooked over a metal dowel pin that passes through the underside of the pivot end. The opposite end of the spring is hooked over another metal dowel pin that passes through the underside of the steel channel.

The driver and passenger side wiper arms are not interchangeable. These arms have a letter **D** (Driver) or **P** (Passenger) cast into the surface of the pivot end to identify their proper locations. A wiper arm cannot be adjusted or repaired. If damaged or ineffective, the entire wiper arm unit must be replaced.

OPERATION

OPERATION

The wiper arms are designed to mechanically transmit the motion from the wiper pivots to the wiper blades. The wiper arm must be properly indexed to the wiper pivot in order to maintain the proper wiper blade travel on the glass. The tapered mounting hole in the wiper arm pivot end interlocks with the serrations on the tapered outer circumference of the wiper pivot shaft, allowing positive engagement and finite adjustment of this connection.

The mounting nuts lock the wiper arms to the threaded studs of the wiper pivot shafts. The spring-loaded wiper arm hinge controls the down-force applied through the tip of the wiper arm to the wiper blade on the glass. The hook formation on the tip of the wiper arm provides a cradle for securing and latching the wiper blade pivot block to the wiper arm.

REMOVAL

REMOVAL

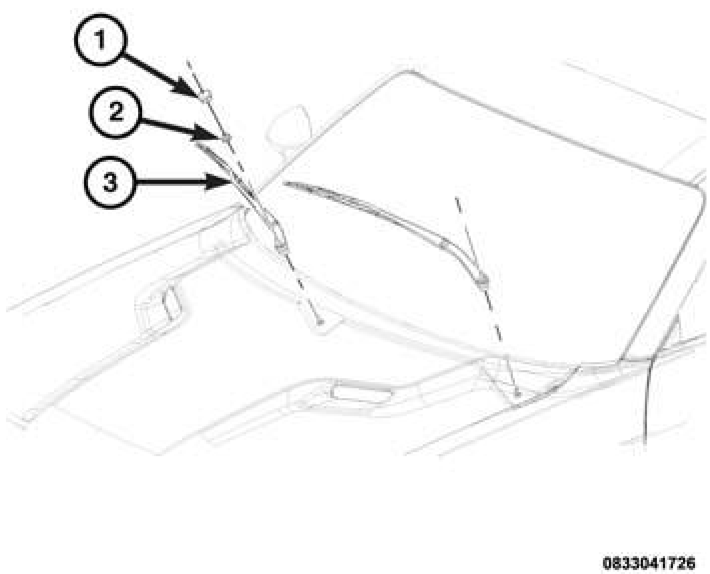


Fig. 4: Wiper Arm / Blade, Plastic Nut Cap & Nut
Courtesy of CHRYSLER GROUP, LLC

1. Lift the wiper arm and blade (3) to its over-center position to hold the wiper blade off of the glass and relieve the spring tension on the wiper arm to pivot shaft connection.
2. Carefully pry the plastic nut cap (1) off of the nut (2) on the pivot end of the wiper arm.
3. Remove the nut that secures the wiper arm to the wiper pivot shaft.

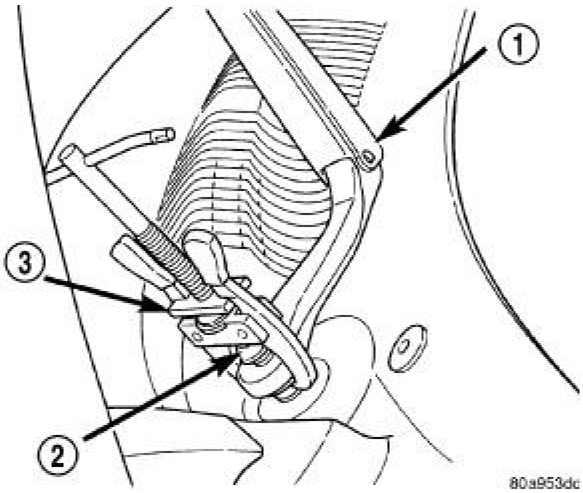


Fig. 5: Disengaging Wiper Arm From Pivot Shaft
Courtesy of CHRYSLER GROUP, LLC

4. If necessary, use a suitable battery terminal puller (3) to disengage the wiper arm (1) from the wiper pivot shaft (2).
5. Remove the wiper arm pivot end from the wiper pivot shaft.

INSTALLATION

INSTALLATION

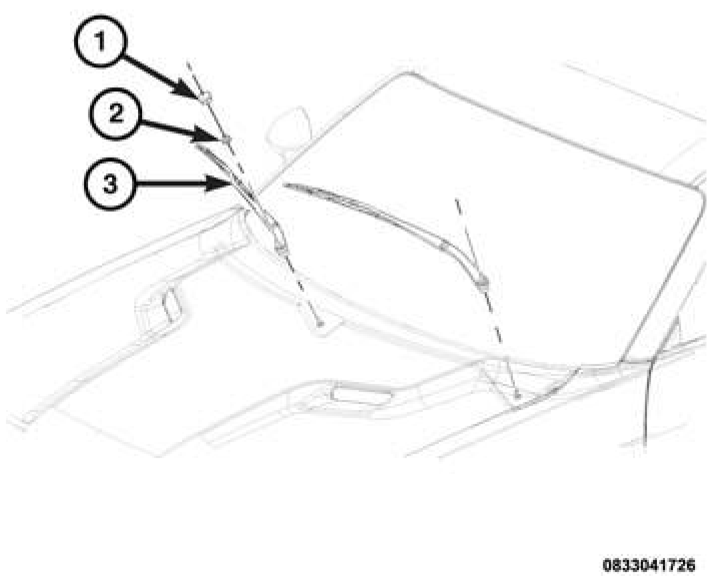


Fig. 6: Wiper Arm / Blade, Plastic Nut Cap & Nut
Courtesy of CHRYSLER GROUP, LLC

NOTE: **Be certain that the wiper motor is in the park position before attempting to install the wiper arms. Transition the ignition switch to the On status and move the multifunction switch control knob to turn the wiper motor On, then turn it back to the Off position. Wait until the wiper pivot shafts stop moving, then transition the ignition switch back to the Off status. The wiper motor is now in the park position.**

NOTE: **The right and left wiper arms are not interchangeable. The right wiper arm pivot end is identified with a letter P (Passenger) and the left is identified with a letter D (Driver). Be certain that each wiper arm is installed on the proper wiper pivot.**

1. The wiper arm and blade (3) must be indexed to the pivot shaft with the wiper motor in the park position to be properly installed. Loosely position the wiper arm pivot end onto the wiper pivot shaft so that the wiper blade is aligned with the appropriate wiper alignment line, which is a mark located just below the upper margin of the lower windshield blackout area.
2. Once the wiper blade is aligned, push the pivot end of the arm down firmly and evenly over the pivot shaft until it is fully engaged.
3. Install and tighten the nut (2) that secures the wiper arm to the pivot shaft. Tighten the nut to **SPECIFICATIONS**.
4. Wet the windshield glass, then operate the wipers. Turn the wiper switch to the Off position, then check for correct wiper blade alignment and readjust as required.
5. Reinstall the plastic nut cap (1) onto the wiper arm mounting nut.

BLADE, WIPER

DESCRIPTION

DESCRIPTION

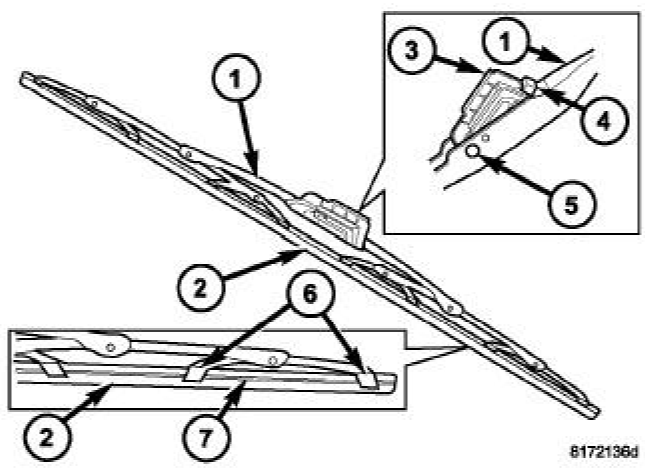


Fig. 7: Identifying Wiper Blade Components
Courtesy of CHRYSLER GROUP, LLC

Each wiper blade is secured by an integral latching pivot block (3) to the hook formation on the tip of each wiper arm, and rests on the glass near the base of the windshield when the wipers are not in operation. The wiper blade consists of the following components:

- **Superstructure (1)** - The superstructure includes several stamped steel bridges and links with claw formations (6) that grip the wiper blade element. Also included in this unit is the latching, molded plastic pivot block that secures the superstructure to the wiper arm. All of the metal components of the wiper blade have a satin black finish applied.
- **Element (2)** - The wiper element or squeegee is the resilient rubber member of the wiper blade that

contacts the glass.

- **Flexor (7)** - The flexor is a rigid metal component running along the length of each side of the wiper element where it is gripped by the claws of the superstructure.

The wiper blades are non-interchangeable and have non-replaceable rubber elements (squeegees). The driver side blade is 60.00 centimeters (23.62 inches) long, while the passenger side blade is 52.50 centimeters (20.67 inches) long. The wiper blades cannot be adjusted or repaired and, if ineffective, worn or damaged the entire wiper blade unit must be replaced.

OPERATION

OPERATION

The wiper blades are moved back and forth across the glass by the wiper arms when the wipers are being operated. The wiper blade superstructure is the flexible frame that grips the wiper blade element and evenly distributes the force of the spring-loaded wiper arm along the length of the element. The combination of the wiper arm force and the flexibility of the superstructure makes the element conform to and maintain proper contact with the glass, even as the blade is moved over the varied curvature that may be encountered across the glass surface.

The wiper element flexor provides the claws of the blade superstructure with a rigid, yet flexible component on the element which can be gripped. The rubber element is designed to be stiff enough to maintain an even cleaning edge as it is drawn across the glass, yet be resilient enough to conform to the glass surface and flip from one cleaning edge to the other each time the wiper blade changes directions.

REMOVAL

REMOVAL

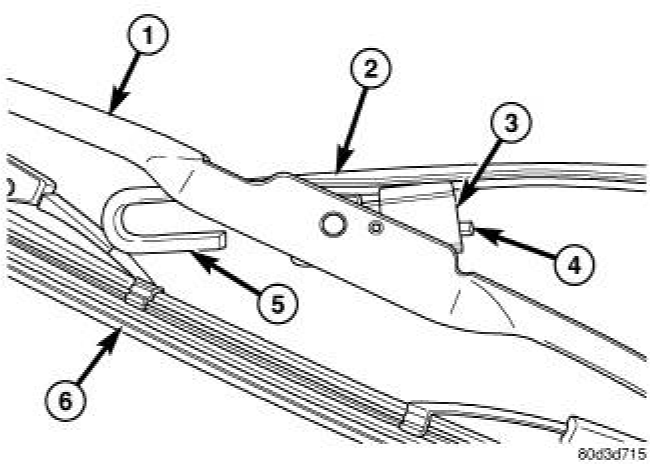


Fig. 8: Removing/Installing Wiper Blade
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not allow the wiper arm to spring back against the glass without the wiper blade in place or the glass may be damaged.

1. Lift the wiper arm (2) to raise the wiper blade and element (6) off of the glass, until the wiper arm hinge

is in its over-center position.

2. To remove the blade from the arm, depress the latch release tab (4) on the pivot block (3) under the tip of the arm and slide the blade away from the tip towards the pivot end of the arm far enough to disengage the pivot block from the hook formation (5) on the end of the arm.
3. Extract the hook formation on the tip of the wiper arm through the opening in the wiper blade superstructure (1) just ahead of the pivot block.
4. Gently lower the tip of the wiper arm onto the glass.

INSTALLATION

INSTALLATION

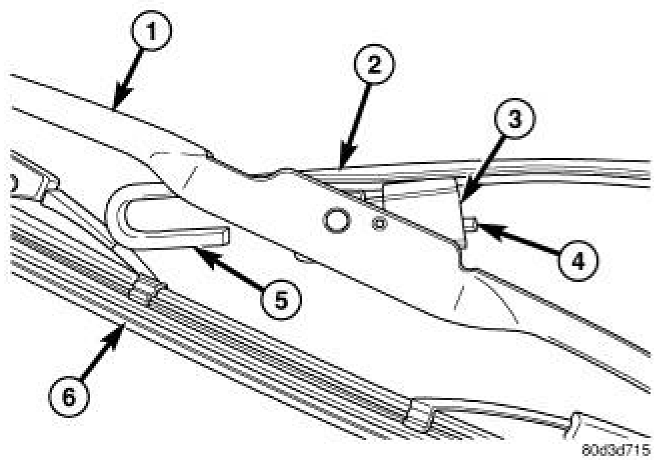


Fig. 9: Removing/Installing Wiper Blade
Courtesy of CHRYSLER GROUP, LLC

CAUTION: Do not allow the wiper arm to spring back against the glass without the wiper blade in place or the glass may be damaged.

1. Lift the wiper arm (2) off of the windshield glass, until the wiper arm hinge is in its over-center position.
2. Position the wiper blade near the hook formation (5) on the tip of the arm with the notched end of the wiper element flexor oriented towards the end of the wiper arm that is nearest to the wiper pivot.
3. Insert the hook formation on the tip of the arm through the opening in the blade superstructure (1) ahead of the pivot block (3) far enough to engage the pivot block into the hook.
4. Slide the pivot block up into the hook formation on the tip of the wiper arm until the latch release tab (4) snaps into its locked position. Latch engagement will be accompanied by an audible click.
5. Gently lower the wiper blade and element (6) onto the glass.

CHECK VALVE, WASHER

DESCRIPTION

DESCRIPTION

Diaphragm-type washer system check valves are standard equipment in this vehicle. The check valves for the

washer system are integral to their respective washer nozzles. Refer to **NOZZLE, WASHER, DESCRIPTION**.

OPERATION

OPERATION

Diaphragm-type washer system check valves are standard equipment in this vehicle. The check valves for the washer system are integral to their respective washer nozzles. Refer to **NOZZLE, WASHER, OPERATION**.

HOSES AND TUBES, WASHER

DESCRIPTION

DESCRIPTION

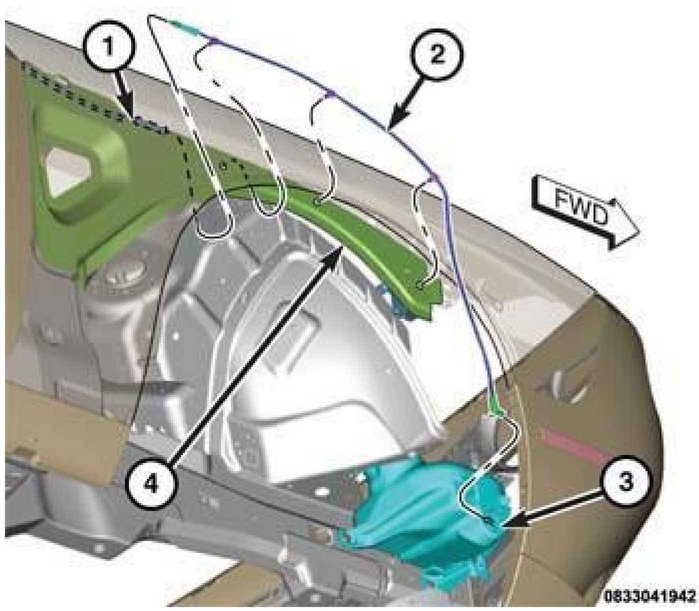


Fig. 10: Washer Reservoir, Right Load Beam & Front And Rear Hoses
Courtesy of CHRYSLER GROUP, LLC

The washer plumbing consists of small diameter rubber hose or hard plastic tubing that is routed from the washer reservoir (3) located on the outside of the right frame rail ahead of the right front wheel house near the right front corner of the engine compartment to the two washer nozzles mounted at the back of the inner hood panel reinforcement. The front hose (2) is attached to the outlet nipple of the washer pump/motor unit near the bottom of the reservoir.

The front hose is routed from the washer pump to the outboard side of the right load beam (4). The front and rear (1) hoses are connected by a molded plastic quick-connect fitting above the wheel house.

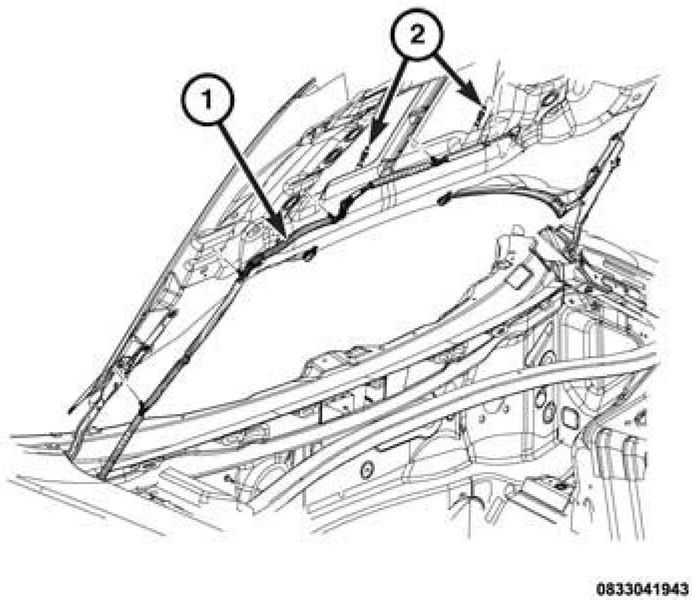


Fig. 11: Washer Nozzles & Rear Hose
Courtesy of CHRYSLER GROUP, LLC

The rear hose (1) is routed to the right side of the dash panel, then up to the right hood hinge. The rear washer hose is routed around the right hood hinge to the underside of the hood panel, then between the hood reinforcement and the hood silencer pad to the two washer nozzles (2). Molded rubber fittings provide the connections to the nipples of the washer nozzle tubes. Several plastic push-in type retainers secure the washer hose at regular intervals along its path from the washer pump to the washer nozzles.

Washer hose or tube is available for service only as roll stock, which must then be cut to length. The molded plastic and rubber washer hose fittings cannot be repaired. If these fittings are ineffective or damaged, they must be replaced.

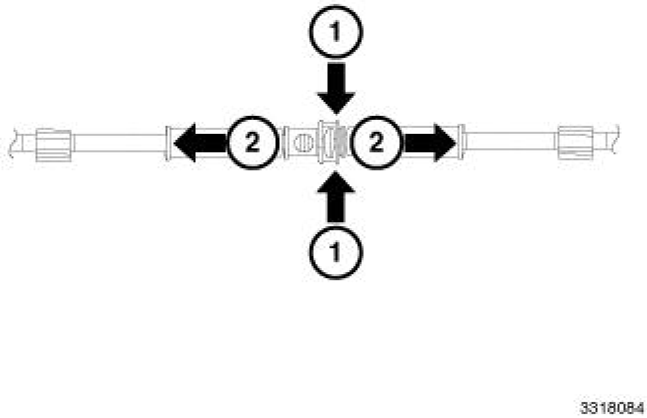
OPERATION

OPERATION

Washer fluid in the washer reservoir is pressurized and fed by the washer pump/motor unit through the washer system plumbing and fittings to the two washer nozzles. Whenever routing the washer plumbing or a wire harness containing washer plumbing, it must be routed away from hot, sharp, or moving parts; and, sharp bends that might pinch the plumbing must be avoided.

STANDARD PROCEDURE

STANDARD PROCEDURE - DISCONNECTING WASHER PLUMBING QUICK-CONNECT FITTING



[Fig. 12: Molded Plastic Quick-Connect & Washer Hose Tubes]
Courtesy of CHRYSLER GROUP, LLC

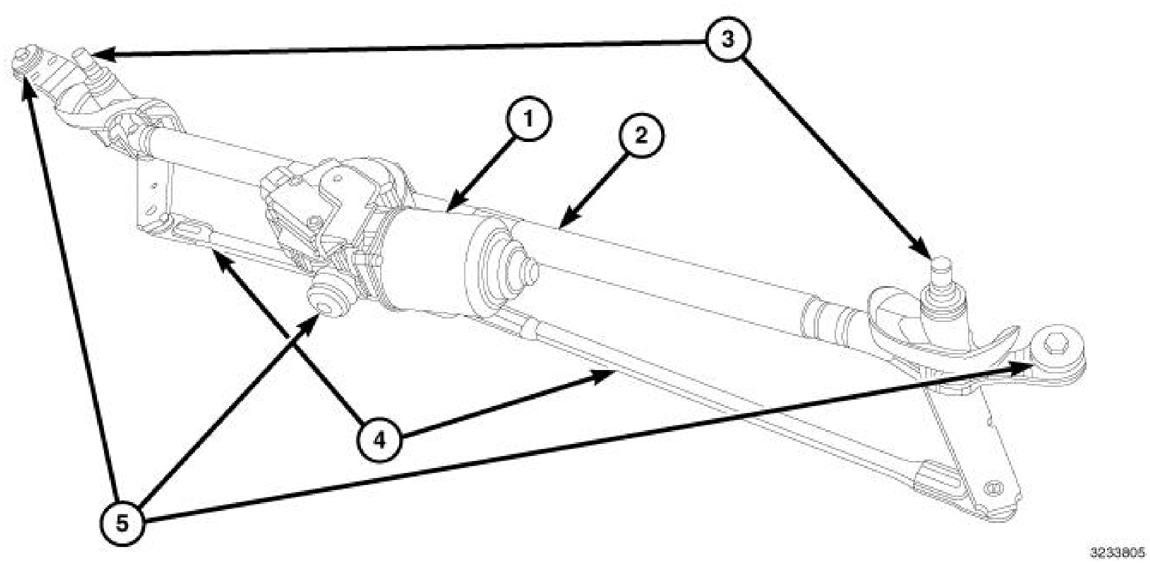
Molded plastic quick-connect fittings join sections of the washer plumbing. To disconnect this fitting:

1. Squeeze the two solid sides (not the open sides) of the female half of the quick-connect fitting at the outer edge.
2. While still squeezing the female half of the fitting, pull the two sections of the washer plumbing away from each other.

LINKAGE, WIPER ARM

DESCRIPTION

DESCRIPTION



[Fig. 13: Bracket, Insulators, Wiper Motor, Wiper Pivots & Steel Drive Links]
Courtesy of CHRYSLER GROUP, LLC

The wiper linkage module is secured within the cowl plenum panel beneath the cowl plenum cover/grille panel. The ends of the wiper pivot shafts protrude through dedicated openings in the cowl plenum cover/grille panel to drive the wiper arms and blades and are the only visible components of the wiper linkage module.

The wiper linkage module consists of the following major components:

- **Bracket** - The wiper linkage module bracket (2) consists of a long tubular steel main member that has a die cast pivot bracket formation near each end where the two wiper pivots are secured. The wiper linkage module bracket is secured within the cowl plenum by two screws through two rubber insulators (5).
- **Crank Arm** - The wiper motor crank arm is a stamped steel unit with a hole on the driven end that is secured to the wiper motor output shaft with a nut, and has a long double ball stud secured to the drive end.
- **Linkage** - Two stamped steel drive links (4) connect the wiper motor crank arm to the two wiper pivot lever arms. The passenger side link has a plastic socket-type bushing on each end, while the driver side link has a socket-type bushing on the pivot end and a sleeve-type bushing on the crank arm end. The bushing on the pivot end of each link is snap-fit over a ball stud on the pivot lever arm. The sleeve-type bushing on the driver side link is snap fit over the inner ball formation of a double ball stud on the crank arm, then the socket-type bushing of the passenger side drive link is snapped over the outer ball formation.
- **Motor** - The wiper motor (1) is secured by a bracket integral to the motor transmission housing with two screws and nuts near the center of the wiper linkage module bracket. A knob-like rubber insulator (5) on a stud integral to the motor transmission housing is engaged into a slot in a stamped metal bracket. The two-speed permanent magnet wiper motor features an integral transmission, an internal park switch, and an internal automatic resetting circuit breaker. An integral connector receptacle connects the motor to the vehicle electrical system.
- **Pivots** - The two front wiper pivots (3) are secured to the ends of the wiper module bracket. The lever arms that extend from the bottom of the pivot shafts each have ball studs that engage the bushings of the drive links. The upper end of each pivot shaft where the wiper arms will be fastened each is tapered and serrated with a threaded stud formation at the tip.

The wiper motor and crank arm unit is available for separate service replacement. Any other component of the wiper linkage module cannot be adjusted or repaired. If any component of the module other than the motor is ineffective or damaged, the entire wiper linkage module unit must be replaced.

OPERATION

OPERATION

The wiper linkage module operation is controlled by the battery current inputs received by the wiper motor through the wiper high-low and wiper on-off relays within the front Power Distribution Center (PDC). The Body Control Module (BCM) (also known as the Common Body Controller/CBC) controls both wiper relays. The wiper motor speed is controlled by current flow to either the low speed or the high speed set of brushes. An automatic resetting circuit breaker protects the motor from overloads.

The park switch is a single pole, single throw, momentary switch within the wiper motor that is mechanically actuated by the wiper motor transmission components. The park switch alternately closes the wiper park switch sense circuit to ground or to battery current, depending upon the position of the wipers on the glass. This feature allows the motor to complete its current wipe cycle after the wiper system has been turned Off, and to park the

wiper blades in the lowest portion of the wipe pattern.

The wiper motor crank arm, the two wiper linkage members and the two wiper pivots mechanically convert the rotary output of the wiper motor to the back and forth wiping motion of the wiper arms and blades on the glass.

The hard wired inputs and outputs of the wiper motor may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the wiper motor or the electronic controls and communication between other modules and devices that provide some features of the wiper and washer system. The most reliable, efficient and accurate means to diagnose the wiper motor or the electronic controls and communication related to wiper motor operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

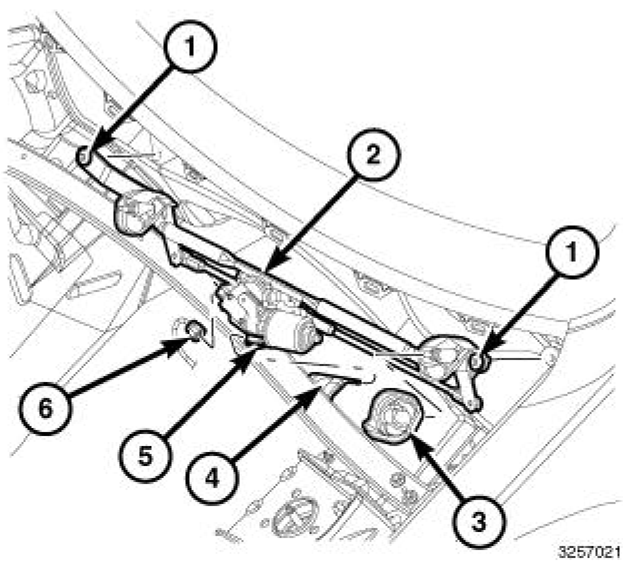


Fig. 14: Two Screws, Wiper Module, Foam Mucket, Rubber Isolator & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The wiper motor can be removed from the wiper linkage module and is serviced independently from the remainder of the wiper linkage module for this vehicle. Refer to MOTOR, WIPER, REMOVAL.**

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove both wiper arms from the wiper pivots. Refer to **ARM, WIPER, REMOVAL**.
3. Remove the cowl plenum cover/grille panel from over the wiper module (2). Refer to **COVER, COWL PANEL, REMOVAL** .
4. Remove the foam mucket (3) from the left wiper pivot cup.
5. Disconnect the wire harness connector (6) from the connector receptacle for the wiper motor.
6. Remove the two screws (1) that secure the module bracket to the cowl.
7. Pull the wiper linkage module toward the outboard side of the vehicle far enough to disengage the knob-

like rubber isolator (5) from the slotted bracket (4) on the front shock tower brace.

8. Remove the wiper linkage module from the cowl as a unit.

INSTALLATION

INSTALLATION

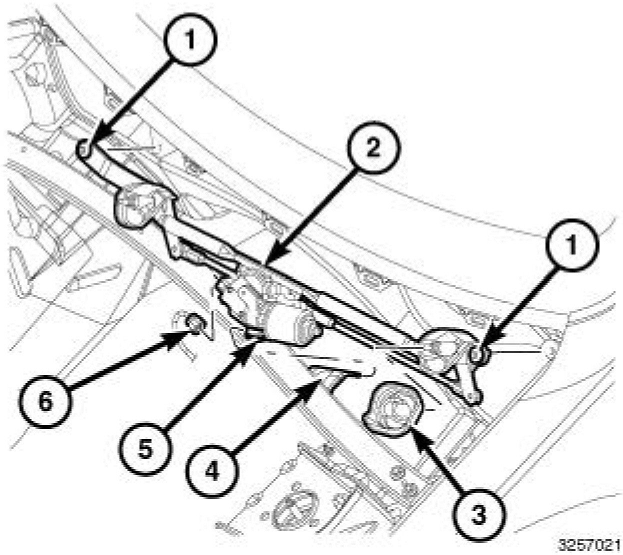


Fig. 15: Two Screws, Wiper Module, Foam Mucket, Rubber Isolator & Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

NOTE:	**The wiper motor can be removed from the wiper linkage module and is serviced independently from the remainder of the wiper linkage module for this vehicle. Refer to MOTOR, WIPER, REMOVAL.**

1. Position the wiper linkage module (2) to the cowl as a unit.
2. Position the knob-like rubber isolator (5) into the slotted bracket (4) on the front shock tower brace and push the module inboard far enough to seat the isolator in the bracket.
3. Starting on the outboard side, install and tighten the two screws (1) that secure the wiper linkage module to the cowl. Tighten the screws to **SPECIFICATIONS**.
4. Reconnect the wire harness connector (6) to the connector receptacle for the wiper motor. Be certain connector is fully engaged and locked.
5. Reinstall the foam mucket (3) onto the left wiper pivot cup.
6. Reinstall the cowl plenum cover/grille panel over the wiper linkage module. Refer to **COVER, COWL PANEL, INSTALLATION** .
7. Reinstall both wiper arms onto the wiper pivots. Refer to **ARM, WIPER, INSTALLATION**.
8. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

MODULE, LIGHT RAIN SENSOR

DESCRIPTION

DESCRIPTION

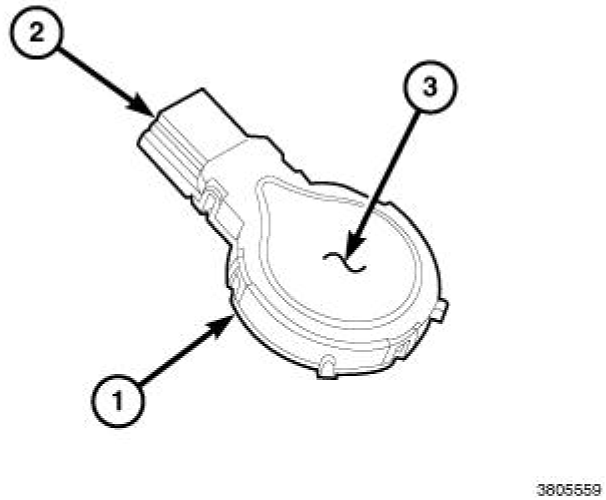


Fig. 16: Light Rain Sensor Module Components
Courtesy of CHRYSLER GROUP, LLC

The Light Rain Sensor Module (LRSM) (1) is the primary component of the automatic wiper system. The LRSM is also capable of performing an ambient light sensor function; therefore, it is alternately referred to as the Rain Light Sensor Module (RLSM), the Light Sensor Module (LSM), the Rain Light Sensor (RLS) or the Rain Sensor Module (RSM). The LRSM is located on the inside of the windshield glass just below and to the right of the inside rear view mirror mounting button. The LRSM is concealed from view within the vehicle interior by a molded plastic inside rear view mirror bracket trim cover that fits over the top of the LRSM housing and the LRSM mounting bracket, but the LRSM is visible through the windshield glass from the exterior of the vehicle.

The molded black plastic LRSM housing has an integral connector receptacle (2) with three terminal pins. These terminal pins connect the LRSM to the vehicle electrical system through a dedicated take out and connector of the overhead wire harness that extends from above the headliner. The windshield side of the housing is filled with a clear, silicone gelatin (also known as SilGel) adhesive membrane pad (3), which serves as an optical coupler between the sensor and the inside of the windshield glass. A spring steel retaining strap or clip extends forward on each side of the housing to latch the LRSM to a molded black plastic mounting bracket, which is permanently bonded to the inside of the windshield glass.

Concealed and protected within the LRSM housing is the electronic circuitry of the module, which includes an InfraRed (IR) diode and photocell based light and rain sensors, control electronics and Local Interface Network (LIN) data bus communication management hardware. The LRSM is a LIN slave node and communicates over a single LIN bus circuit with the Body Control Module (BCM) (also known as the Common Body Controller/CBC). The BCM is a LIN master node and a gateway to the Controller Area Network (CAN) data bus. The BCM controls the exchange of electronic messages back and forth between the LRSM and other electronic modules in the vehicle, as well as with a diagnostic scan tool connected to the Data Link Connector (DLC).

The LRSM cannot be adjusted or repaired. If ineffective or damaged, the entire module must be replaced. The silicone gelatin adhesive membrane pad is available for separate service replacement. The LRSM mounting bracket is serviced only as a unit with the windshield glass.

OPERATION

OPERATION

The Light Rain Sensor Module (LRSM) (also known as the Rain Light Sensor Module/RLSM, the Light Sensor Module/LSM, the Rain Light Sensor/RLS or the Rain Sensor Module/RSM) senses moisture and ambient light levels on the outside of the windshield glass and sends electronic messages to the Body Control Module (BCM) (also known as the Common Body Controller/CBC) over the Local Interface Network (LIN) data bus. The BCM relays messages back and forth between the LRSM and other electronic modules in the vehicle.

For the rain sensor function, InfraRed (IR) diodes within the LRSM generate infrared light beams that are aimed by the optics of the sensor through the windshield glass, while an IR photo diode monitors the infrared light reflected back from the windshield glass. When sufficient moisture accumulates within the wipe pattern on the windshield glass, less of the infrared light is reflected back and the sensor detects a change in the monitored infrared light intensity. For the light sensor function, an IR photo diode within the sensor monitors the intensity of the ambient infrared light received through the windshield glass and the sensor optics.

The internal programming of the LRSM sends the appropriate electronic **wipe command** messages to the BCM over the LIN data bus. The BCM then responds by activating or deactivating the wiper system. Similarly, the LRSM provides electronic **ambient light level** messages to the BCM, and the BCM relays these messages to other electronic modules in the vehicle.

The Steering Column Control Module (SCCM) microcontroller sends electronic **wiper switch status** and **automatic wipe sensitivity level** messages over the Controller Area Network (CAN) data bus to the BCM based upon the driver-selected settings of the control knob on the control stalk of the multifunction switch. The higher the selected wipe sensitivity setting the more sensitive the LRSM is to the accumulated moisture on the windshield glass, and the more frequently the LRSM will send **wipe commands** to the BCM to operate the wiper system. The BCM also monitors electronic **automatic display brightness level** messages based upon the driver-selected settings of the Electronic Vehicle Information Center (EVIC) as well as electronic messages from other electronic modules in the vehicle received over the CAN data bus, then relays the messages to the LRSM over the LIN bus.

The LRSM operates on battery current received through a fused ignition output (run) circuit. The LRSM has a path to ground at all times through a take out of the body wire harness with an eyelet terminal that is secured to the body sheet metal. Therefore, the LRSM is operational only when the ignition switch status is On.

If the BCM receives an electronic status message from the LRSM indicating a sensor failure condition, a **Rain Sensor Failure** message should be displayed by the Instrument Cluster (IC) (also known as the Instrument Panel Cluster/IPC). It is important to note that the default operation of the automatic wiper system is continuous wipe On, while the default operation for automatic lighting is On. Therefore, if no command message is received by the BCM from the LRSM for more than about five seconds when the Automatic wipe mode is selected, the wipers will default to Low Speed or High Speed continuous wipe operation. Likewise, if no command message is received by the BCM from the LRSM when the Automatic lighting mode is selected, the exterior lighting will default to On. The BCM must be properly configured for the automatic wipers and automatic lighting options in order for these systems to function.

The hard wired circuits of the LRSM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the LRSM or the electronic controls and communication between other modules and devices that provide some features of the automatic wiper and automatic lighting systems. The most reliable, efficient and accurate means to diagnose the LRSM or the electronic controls and

communication related to LRSM operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

STANDARD PROCEDURE

PROTECTIVE CAP REMOVAL

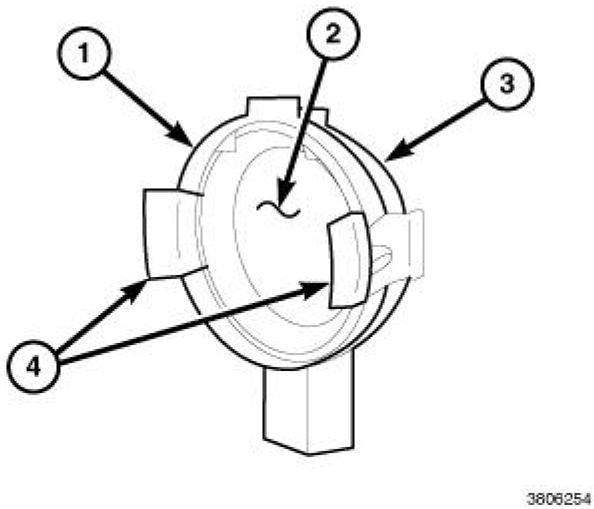
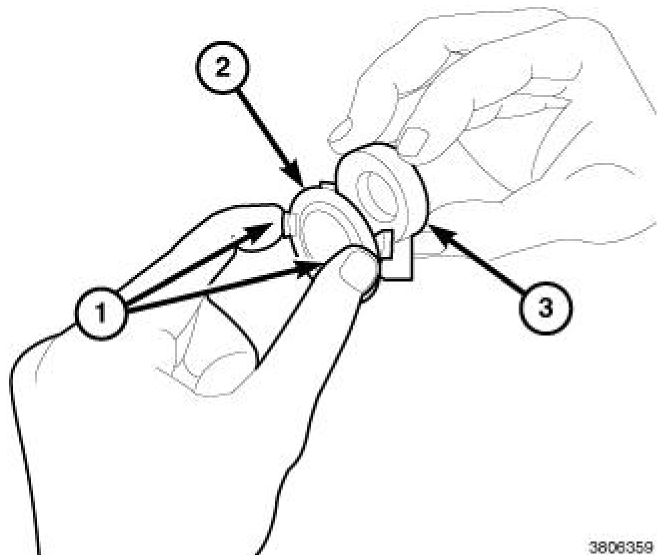


Fig. 17: Protective Cap, Adhesive Membrane, LRSM & Latches
Courtesy of CHRYSLER GROUP, LLC

CAUTION: **The Light Rain Sensor Module (LRSM) (3) is equipped with a clear, silicone gelatin (SilGel) adhesive membrane (2) that serves as an optical coupler between the sensor and the windshield glass. Extreme care must be exercised to protect this membrane from contamination before it is installed in the vehicle. The LRSM should always be serviced only in a dust-free environment. Do not touch the membrane with your fingers or tools. The membrane should only come into contact with the clean and dry inside surface of the glass within the mounting bracket bonded to the windshield. The service replacement LRSM is shipped with a clear plastic protective cap (1) installed and secured to the outer circumference of the LRSM by two latch features (4). This protective cap should not be removed until immediately before the LRSM is to be installed using the following procedure.**



[**Fig. 18: Tabs, Protective Cap & LRSM**]
Courtesy of CHRYSLER GROUP, LLC

1. Firmly grasp the LRSM (3) by the outer circumference from the side opposite the SilGel membrane pad.
2. Firmly grasp the protective shipping cap (2) of the LRSM by the two latch release tabs (1) between your thumb and index finger from the SilGel membrane pad side of the module.
3. Firmly pinch the two latch release tabs together between your thumb and index finger far enough to release the two latch features of the protective cap from the outer circumference of the LRSM.
4. Pull the protective cap off of the LRSM.
5. Install the LRSM into the mounting bracket bonded onto the windshield as instructed in the Installation procedure. Refer to **MODULE, LIGHT RAIN SENSOR, INSTALLATION**.

SILICONE GELATIN PAD REPLACEMENT

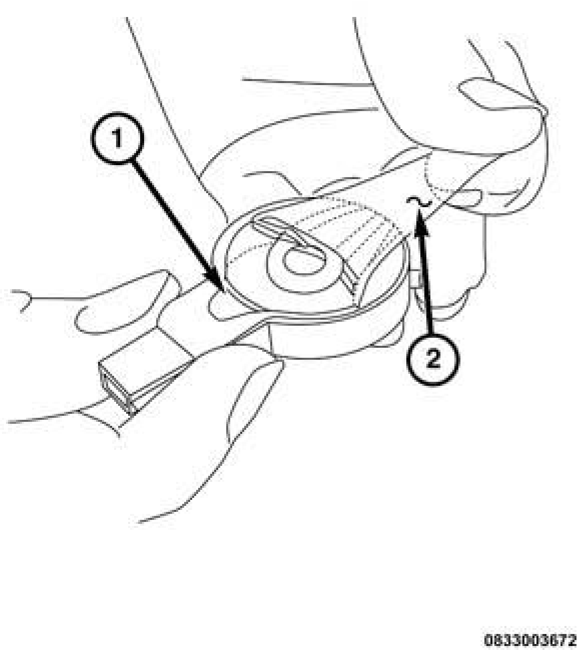


Fig. 19: LRSM & Adhesive Membrane
Courtesy of CHRYSLER GROUP, LLC

CAUTION: The Light Rain Sensor Module (LRSM) is equipped with a clear, silicone gelatin (SilGel) adhesive membrane that serves as an optical coupler between the sensor and the windshield glass. Extreme care must be exercised to protect this membrane from contamination before it is installed in the vehicle. The LRSM should always be serviced only in a dust-free environment. Do not touch the membrane with your fingers or tools. The membrane should only come into contact with the clean and dry inside surface of the glass within the mounting bracket bonded to the windshield. If contaminated, clean any foreign material from the windshield glass using rubbing alcohol and a lint-free cloth. A contaminated SilGel membrane will negatively impact LRSM performance.

CAUTION: When installing the replacement silicone gelatin (SilGel) adhesive membrane pad onto the Light Rain Sensor Module (LRSM), it is necessary to minimize air pockets trapped between the SilGel membrane and the LRSM. Excessive air pockets will negatively impact LRSM performance. It is important to adhere to the procedure steps in a deliberate manner to achieve satisfactory results.

1. Carefully peel away the old silicone gelatin adhesive membrane pad (2) from the windshield (optics) side of the Light Rain Sensor Module (LRSM) (1).
2. Thoroughly clean the windshield (optics) side of the LRSM using isopropyl alcohol and a clean, lint-free cloth.
3. Using care not to contaminate, touch or damage the replacement pad, peel off the yellow protective foil.

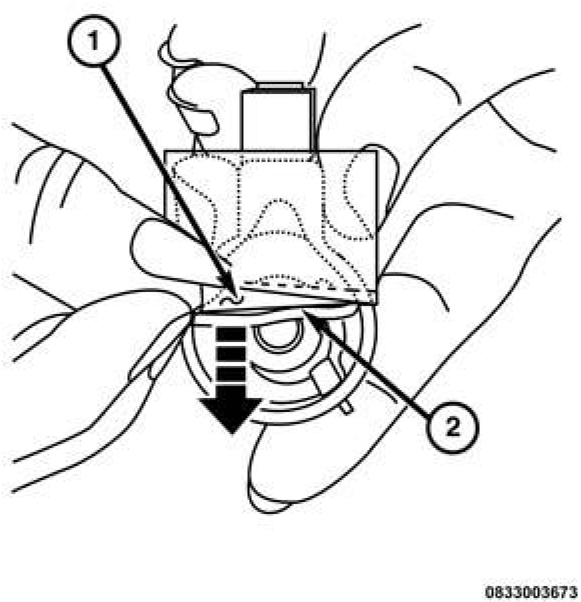


Fig. 20: Protective Film & Replacement Pad
Courtesy of CHRYSLER GROUP, LLC

4. Looking through the transparent protective film (1), align and center the replacement pad (2) over the

windshield (optics) side of the LRSM. Then use a slow, smooth and deliberate motion to roll the pad onto the windshield (optics) side of the LRSM.

5. With the transparent protective film still in place, use a thumb and a firm wiping motion to press the entire surface pad against the windshield (optics) side of the LRSM.
6. To avoid contamination or damage of the replacement pad, do not remove the transparent protective film until just before reinstalling the LRSM onto the windshield. Refer to **MODULE, LIGHT RAIN SENSOR, INSTALLATION**.

REMOVAL

REMOVAL

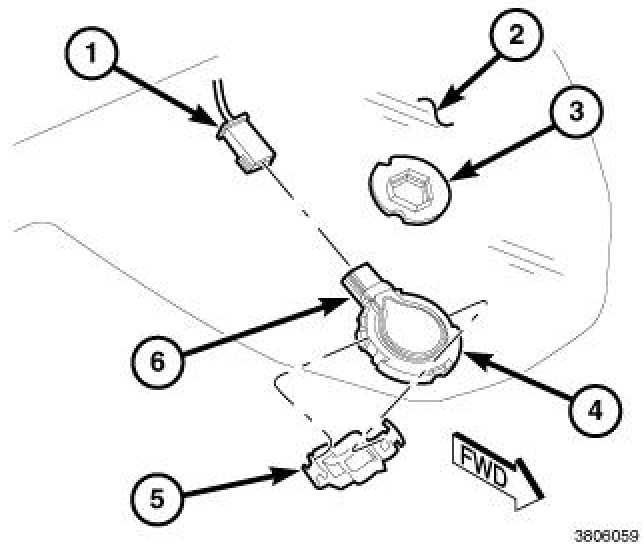


Fig. 21: LRSM, Harness Connector, Mount Bracket & Retaining Strap
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the inside rear view mirror from the mounting button (3) on the inside of the windshield glass (2). Refer to **MIRROR, REARVIEW, REMOVAL** .
3. Disconnect the wire harness connector (1) from the connector receptacle for the Light Rain Sensor Module (LRSM) (6).
4. Insert the tip of a small screwdriver into the rectangular cutout on one side of the spring steel retaining strap (5) on the LRSM and carefully pry the end of the strap closest to the glass away from the groove in the mounting bracket (4) on the windshield. Now rotate the loose side of the strap away from the glass far enough to disengage the other side of the strap from the mounting bracket groove.
5. Firmly grasp the connector receptacle of the LRSM to pull the module away from the windshield glass and the mounting bracket.
6. If the LRSM will be reinstalled, the silicone gelatin (also known as SilGel) adhesive membrane pad MUST be removed, discarded and replaced with a new unit as described in: **STANDARD PROCEDURE** - Silicone Gelatin Pad Replacement.

INSTALLATION

INSTALLATION

CAUTION: The Light Rain Sensor Module (LRSM) is equipped with a clear, silicone gelatin (SilGel) adhesive membrane that serves as an optical coupler between the sensor and the windshield glass. Extreme care must be exercised to protect this membrane from contamination before it is installed in the vehicle. The LRSM should always be serviced only in a dust-free environment. Do not touch the membrane with your fingers or tools. The membrane should only come into contact with the clean and dry inside surface of the glass within the mounting bracket bonded to the windshield. If contaminated, clean any foreign material from the windshield glass using rubbing alcohol and a lint-free cloth. A contaminated SilGel membrane will negatively impact LRSM performance.

CAUTION: When installing the Light Rain Sensor Module (LRSM) it is necessary to minimize air pockets trapped between the SilGel membrane and the windshield glass. Excessive air pockets will negatively impact LRSM performance. It is important to adhere to the procedure steps in a deliberate manner to achieve satisfactory results.

CAUTION: To avoid excessive air pockets, do not try to install the spring steel retaining strap until AFTER the Light Rain Sensor Module (LRSM) has been successfully positioned to the glass within the mounting bracket bonded to the windshield.

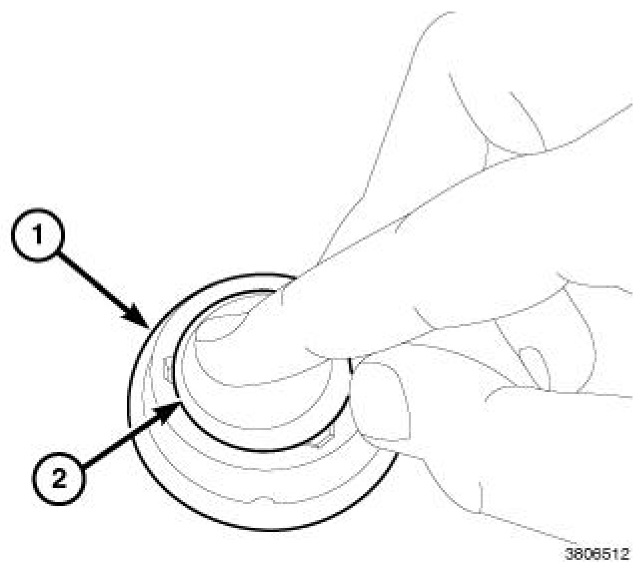


Fig. 22: LRSM & Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

1. If a new Light Rain Sensor Module (LRSM) is being installed, remove the protective shipping cap from the LRSM as described in: **STANDARD PROCEDURE** - Protective Cap Removal. If an existing LRSM is being reused, the silicone gelatin (also known as SilGel) adhesive membrane pad MUST be removed, discarded and replaced with a new unit as described in: **STANDARD PROCEDURE** - Silicone Gelatin Pad Replacement.
2. Grasp the LRSM (2) by the connector receptacle between your thumb and middle finger. Place your index finger on the back of the LRSM at the point opposite the connector receptacle.

3. Align the LRSM with the mounting bracket (1) bonded onto the inside of the windshield glass near the inside rear view mirror mounting button.
4. Slowly insert the LRSM into the mounting bracket at a slight angle so that the edge of the module nearest the tip of your index finger makes the initial contact with the windshield glass.
5. Using a slow, deliberate motion and light pressure, draw your index finger across the back of the LRSM toward the connector receptacle until the silicone gelatin adhesive membrane pad is in full contact with the windshield glass.

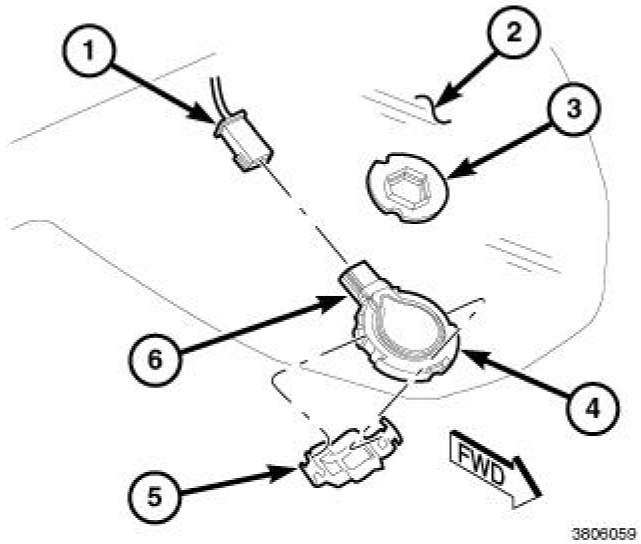


Fig. 23: LRSM, Harness Connector, Mount Bracket & Retaining Strap
Courtesy of CHRYSLER GROUP, LLC

6. Engage one side of the spring steel retaining strap (5) into the groove on one side of the LRSM mounting bracket (4) on the inside of the windshield glass (2).
7. Depress the opposite side of the retaining strap over the LRSM firmly and evenly until it fully engages the groove of the mounting bracket with an audible click.
8. Looking through the windshield from outside the vehicle, inspect the silicone gelatin adhesive membrane pad for air pockets. If air pockets are observed, let the vehicle stand for about four hours at room temperature to allow the air pockets to dissipate. If an adhesive void (air pocket) greater than about 1 millimeter (0.04 inch) is observed, replace the flawed silicone gelatin adhesive membrane pad with a new unit as described in: **STANDARD PROCEDURE** - Silicone Gelatin Pad Replacement.
9. Reconnect the wire harness connector (1) to the LRSM connector receptacle (6).
10. Reinstall the inside rear view mirror to the mounting button (3) on the inside of the windshield glass. Refer to **MIRROR, REARVIEW, INSTALLATION** .
11. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

MOTOR, WIPER

DESCRIPTION

DESCRIPTION

The wiper motor is packaged with the wiper linkage module in this vehicle. Refer to **LINKAGE, WIPER ARM, DESCRIPTION**.

OPERATION

OPERATION

The wiper motor is packaged with the wiper linkage module in this vehicle. Refer to **LINKAGE, WIPER ARM, OPERATION**.

REMOVAL

REMOVAL

CAUTION: Do not apply pressure to, or pry on the plastic drive link bushings. When removing a drive link from, or installing a drive link onto the ball stud on the wiper motor crank arm apply pressure to, or pry on only the metal portions of the drive link around the bushing. If the bushing is damaged, the entire wiper linkage module MUST be replaced.

CAUTION: Do not remove the crank arm nut from the wiper motor output shaft. The crank arm is indexed to the output shaft with the motor in the park position during the manufacturing process, but there are no provisions made for correctly indexing this connection in the field. If the crank arm to output shaft indexing is incorrect, the entire wiper motor and crank arm unit MUST be replaced.

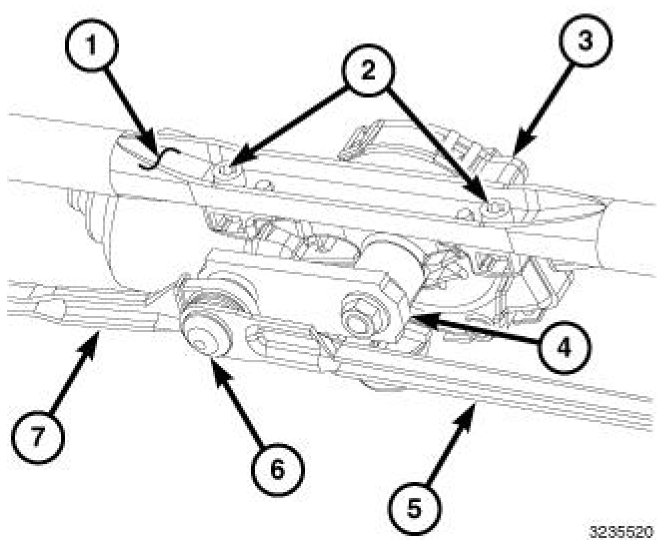


Fig. 24: Module Bracket, Two Screws, Motor, Crank Arm, Drive Link, Bushing & Wiper Drive Link
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the wiper linkage module from the vehicle and place it on a suitable work surface. Refer to **LINKAGE, WIPER ARM, REMOVAL**.
3. Disengage the socket bushing (6) of the right wiper drive link (5) from the double ball stud on the wiper motor crank arm (4) using two large screwdrivers, one on each side of the double ball stud. Pry firmly

and evenly between the crank arm and the metal portion of the drive link until the socket unsnaps from the ball.

4. Disengage the sleeve bushing of the left wiper drive link (7) from the double ball stud on the wiper motor crank arm.
5. Remove the two screws (2) that secure the motor (3) bracket to the module bracket (1).
6. Remove the wiper motor and crank arm as a unit from the underside of the module bracket.

INSTALLATION

INSTALLATION

CAUTION: Do not apply pressure to, or pry on the plastic drive link bushings. When removing a drive link from, or installing a drive link onto the ball stud on the wiper motor crank arm apply pressure to, or pry on only the metal portions of the drive link around the bushing. If the bushing is damaged, the entire wiper linkage module MUST be replaced.

CAUTION: Do not remove the crank arm nut from the wiper motor output shaft. The crank arm is indexed to the output shaft with the motor in the park position during the manufacturing process, but there are no provisions made for correctly indexing this connection in the field. If the crank arm to output shaft indexing is incorrect, the entire wiper motor and crank arm unit MUST be replaced.

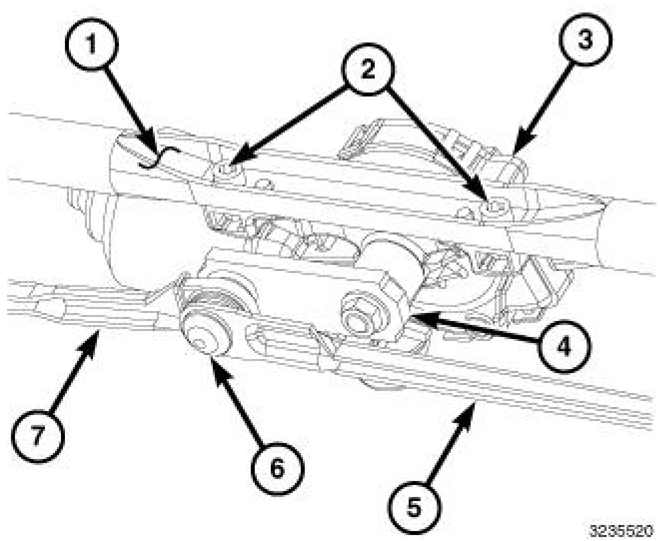


Fig. 25: Module Bracket, Two Screws, Motor, Crank Arm, Drive Link, Bushing & Wiper Drive Link
Courtesy of CHRYSLER GROUP, LLC

1. Be certain that the two nuts are positioned properly within the pockets of the wiper motor (3) bracket.
2. Position the wiper motor and crank arm as a unit to the underside of the wiper module bracket (1).
3. Install and tighten the two screws (2) into the two nuts that secure the motor bracket to the module bracket. Tighten the screws to SPECIFICATIONS.
4. Position the sleeve bushing of the left wiper drive link (7) onto the double ball stud on the end of the motor crank arm (4).

5. Position the socket bushing (6) of the right wiper drive link (5) over the double ball stud on the crank arm.
6. Place a short 19 millimeter or 3/4 inch socket over the domed cap side of the socket bushing as an installation tool. Use large channel-lock pliers to firmly and evenly apply enough pressure between the back of the crank arm and the top of the socket installation tool to snap the bushing onto the ball stud. **Do not apply pressure directly to the plastic bushings.**

NOTE: **Be certain to transition the ignition switch to the On status, then turn the wiper switch On and Off again to cycle the wiper motor and linkage to their natural park position before reinstalling the wiper arms onto the wiper pivots.**

7. Reinstall the wiper linkage module into the vehicle. Refer to **LINKAGE, WIPER ARM, INSTALLATION**.
8. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

NOZZLE, WASHER

DESCRIPTION

DESCRIPTION

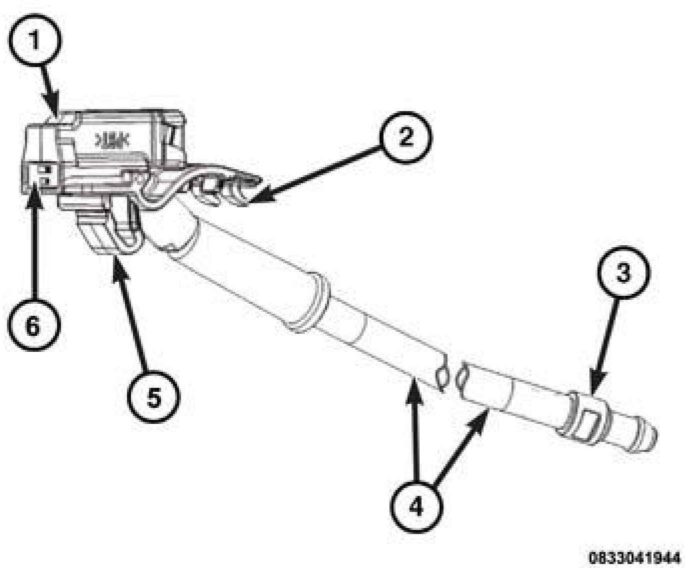


Fig. 26: Washer Nozzle, Tabs, Integral Latch, Orifices, Tubing & Fitting
Courtesy of CHRYSLER GROUP, LLC

The fluidic washer nozzles (1) are constructed of molded plastic and include an integral check valve. Each nozzle has integral locating tabs (2) and an integral latch (5) that secures it in a dedicated mounting hole in the rearward surface of the hood inner reinforcement panel near the base of the windshield. The washer nozzle is concealed below the rear edge of the outer hood panel, but the nozzle orifices (6) are oriented towards the windshield glass.

An integral diaphragm type check valve is contained within the body of each nozzle. A short length of nylon

reinforced tubing (4) extends the washer plumbing fitting (3) for the washer nozzle through the inner hood panel reinforcement below the hood panel where it is accessible from the engine compartment.

The washer nozzles cannot be adjusted or repaired and, if ineffective or damaged, they must be replaced.

OPERATION

OPERATION

The two washer nozzles are designed to dispense washer fluid into the wiper pattern area on the outside of the windshield glass. Pressurized washer fluid is fed to each nozzle from the washer reservoir by the washer pump/motor unit through a single hose, which is attached to a barbed nipple on each washer nozzle below the hood panel. A fluidic matrix within the washer nozzle causes the pressurized washer fluid to be emitted from the nozzle orifice as an oscillating stream to more effectively cover a larger area of the glass to be cleaned.

The integral check valve in each nozzle prevents washer fluid from draining out of the washer supply hoses back to the washer reservoir. This drain-back would result in a lengthy delay after the washer switch is actuated until washer fluid was dispensed through the nozzles, because the washer pump would have to refill the washer plumbing from the reservoir to the nozzles. Such a drain-back condition could also result in water, dirt, or other outside contaminants being siphoned into the washer system through the washer nozzle orifice. This water could subsequently freeze and plug the nozzle, while other contaminants could interfere with proper nozzle operation and cause improper nozzle spray patterns. In addition, the check valve prevents washer fluid from siphoning through the washer nozzles after the washer system is turned Off.

When the washer pump pressurizes and pumps washer fluid from the reservoir through the washer plumbing, the fluid pressure unseats a diaphragm from over a sump well within the nozzle by overriding the spring pressure applied to it by a piston. With the diaphragm unseated, washer fluid is allowed to flow toward the nozzle orifice. When the washer pump stops operating, the spring pressure on the piston seats the diaphragm over the sump well in the nozzle and fluid flow in either direction within the washer plumbing is prevented.

REMOVAL

REMOVAL

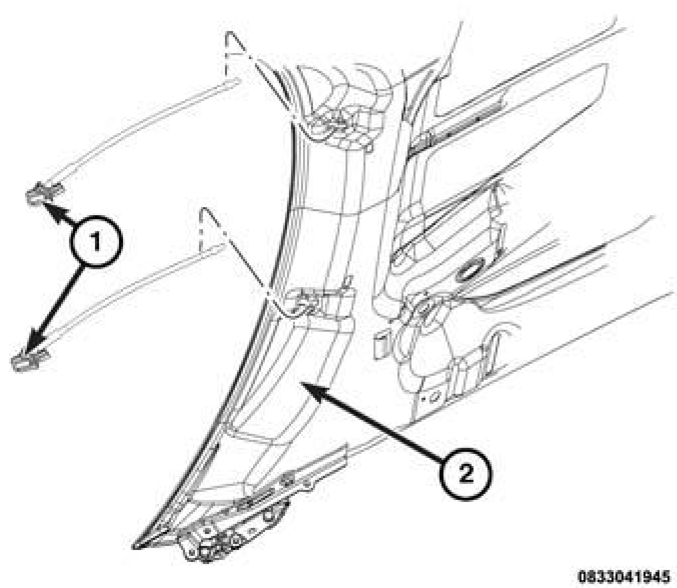


Fig. 27: Washer Nozzle & Inner Hood Reinforcement
Courtesy of CHRYSLER GROUP, LLC

1. From the underside of the hood, remove the push-in retainers that secure the rear edge of the hood silencer pad to the inner hood reinforcement (2) as necessary to access the washer nozzle (1) hose connections.
2. From the underside of the hood, disconnect the washer nozzle hose fitting from the barbed nipple of the washer nozzle.

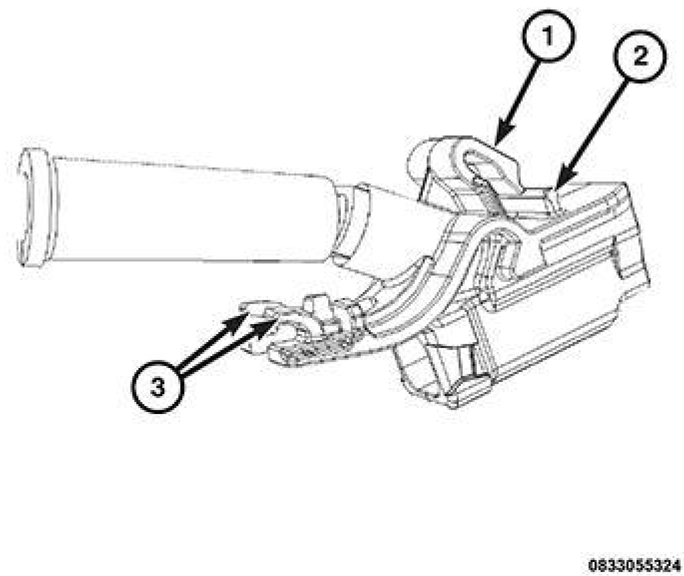
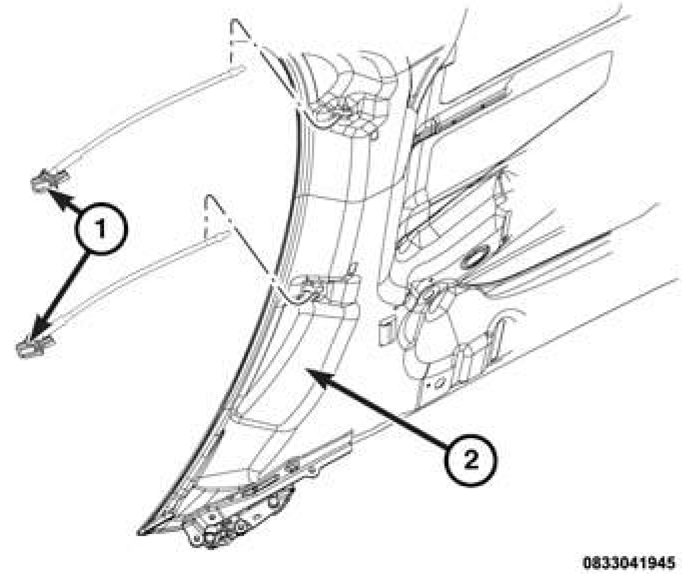


Fig. 28: Latch Feature, Ridge & Tabs
Courtesy of CHRYSLER GROUP, LLC

3. From the rear edge of the hood, insert a small flat-bladed screw driver between the hood inner reinforcement and the body of the washer nozzle body far enough to compress the latch feature (1) far enough to lower the nozzle from the upper edge of the mounting hole.
4. Pull the washer nozzle rearward to disengage the locating tab features (3) of the nozzle from the lower edge of the mounting hole and remove the nozzle from the inner hood reinforcement.

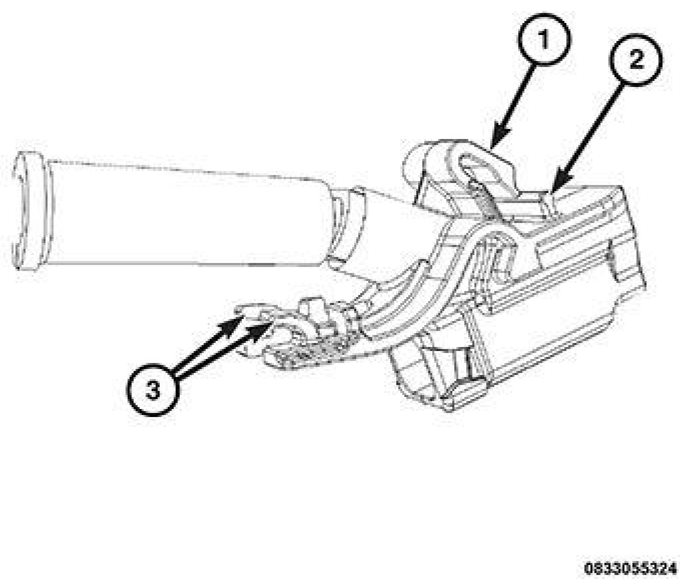
INSTALLATION

INSTALLATION



[Fig. 29: Washer Nozzle & Inner Hood Reinforcement]
Courtesy of CHRYSLER GROUP, LLC

1. Position the washer nozzle (1) to the mounting hole on the rear surface of the inner hood reinforcement (2).



[Fig. 30: Latch Feature, Ridge & Tabs]
Courtesy of CHRYSLER GROUP, LLC

2. Insert the washer nozzle nipple and extension tube through the mounting hole far enough to engage the integral locating tabs (3) of the nozzle with the lower edge of the mounting hole.
3. Index the locating ridge (2) on the nozzle body to the upper edge of the mounting hole.
4. Using hand pressure, push firmly and evenly on the washer nozzle body until the integral latch feature (1) snaps into place within the mounting hole.
5. From the underside of the hood, reconnect the washer hose fitting to the barbed nipple of the nozzle.
6. Reinstall the push-in retainers that secure the rear edge of the hood silencer pad to the inner hood

reinforcement.

PUMP, WINDSHIELD WASHER

DESCRIPTION

DESCRIPTION

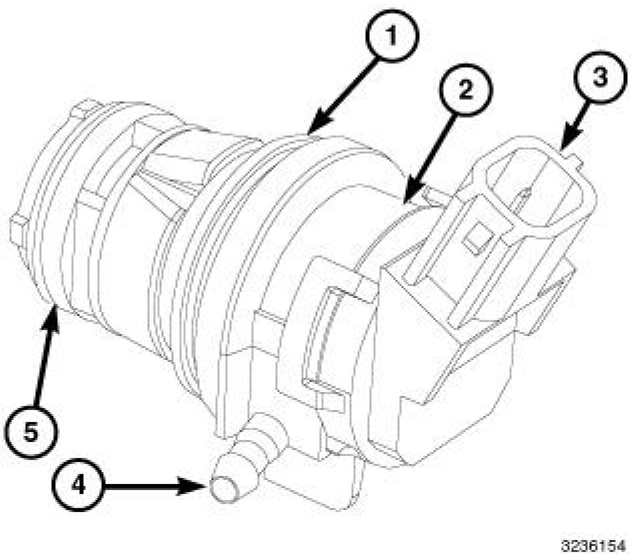


Fig. 31: Washer Pump/Motor Unit, Inlet Nipple, Grommet Seal, Barbed Outlet Nipple & Connector Receptacle
Courtesy of CHRYSLER GROUP, LLC

The washer pump/motor unit (2) is located in a sump area on the outboard facing side of the washer reservoir on the right frame rail, ahead of the right front wheel house. A small permanently lubricated and sealed electric motor is coupled to the rotor-type washer pump.

An inlet nipple (5) on the end of the pump housing passes through a rubber grommet seal (1) installed in a dedicated mounting hole in the sump area at the base of the washer reservoir. When the pump is installed in the reservoir, a barbed outlet nipple (4) on the pump housing connects the unit to the front washer plumbing.

The washer pump/motor unit is retained on the reservoir by the interference fit between the pump inlet nipple and the grommet seal, which is a light press fit. An integral connector receptacle (3) on the top of the motor housing connects the unit to the vehicle electrical system through a dedicated take out and connector of the headlamp and dash wire harness.

The washer pump/motor unit cannot be repaired. If ineffective or damaged, the entire washer pump/motor unit must be replaced.

OPERATION

OPERATION

The washer pump/motor unit features a small Direct Current (DC) electric motor. The motor is connected to the vehicle electrical system through a single take out and two-cavity connector of the headlamp and dash wire harness. The motor is grounded at all times through another take out of the headlamp and dash wire harness

with a single eyelet terminal connector that is secured by a screw to the body sheet metal in the engine compartment.

The Body Control Module (BCM) (also known as the Common Body Controller/CBC) controls the washer pump/motor control circuit through a high side driver based upon electronic **washer request** messages received over the Controller Area Network (CAN) data bus from the Steering Column Control Module (SCCM) microcontroller. The SCCM microcontroller monitors hard wired analog and digital inputs from the washer switch circuitry contained within the multifunction switch to determine the proper electronic messages to send.

Washer fluid is drawn through the pump inlet nipple from the washer reservoir to the inlet port of the washer pump housing. A filter screen integral to the pump inlet port prevents most debris from entering the pump housing. When the pump motor is energized, the motor spins the rotor within the washer pump. The spinning pump rotor pressurizes the washer fluid and forces it through the pump outlet nipple, the washer plumbing, and the washer nozzles onto the windshield glass.

The washer pump/motor unit and the hard wired circuits connected to the unit may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between other modules and devices that provide many features of the wiper and washer system. The most reliable, efficient and accurate means to diagnose the washer pump/motor unit or the electronic controls and communication related to washer pump/motor unit operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

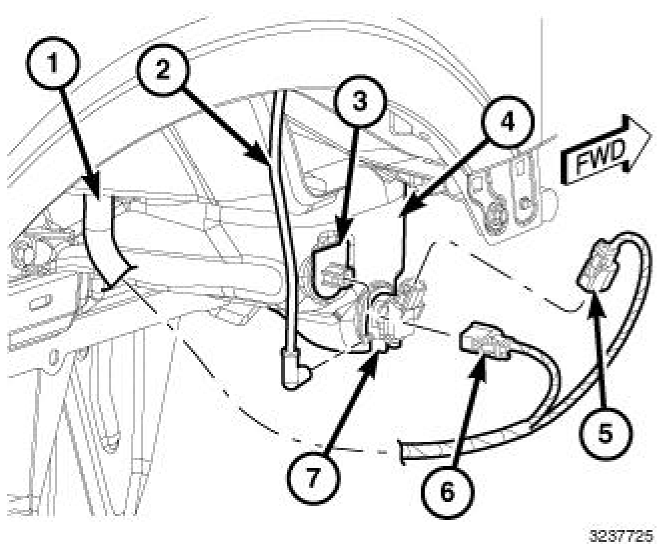


Fig. 32: Washer Pump/Motor Unit, Washer Reservoir, Dash Wire Harness, Pump Motor & Washer Hose
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The washer pump/motor unit may be removed from the washer reservoir without removing the reservoir from the vehicle.**

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.

2. Turn the steering wheel to move the front wheels to the full right turn position.
3. Raise and support the vehicle.
4. Remove the fasteners that secure the forward end of the right front wheel house splash shield to the inner fender panel and the front fascia. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .
5. Pull the forward end of the splash shield away from the inner fender panel and front fascia far enough to access the washer pump/motor unit (7) on the washer reservoir (4) on the outboard side of the right frame rail.
6. Disconnect the headlamp and dash wire harness (1) connector for the washer pump motor (5) from the motor connector receptacle.
7. Disconnect the washer hose (2) from the barbed outlet nipple of the washer pump and allow the washer fluid to drain into a clean container for reuse.
8. Using hand pressure, firmly grasp and pull the washer pump outward far enough to disengage the pump inlet nipple from the rubber grommet seal in the reservoir. Care must be taken not to damage the reservoir.
9. Remove the washer pump/motor unit from the washer reservoir.
10. Remove the rubber grommet seal from the washer pump mounting hole in the reservoir and discard.

INSTALLATION

INSTALLATION

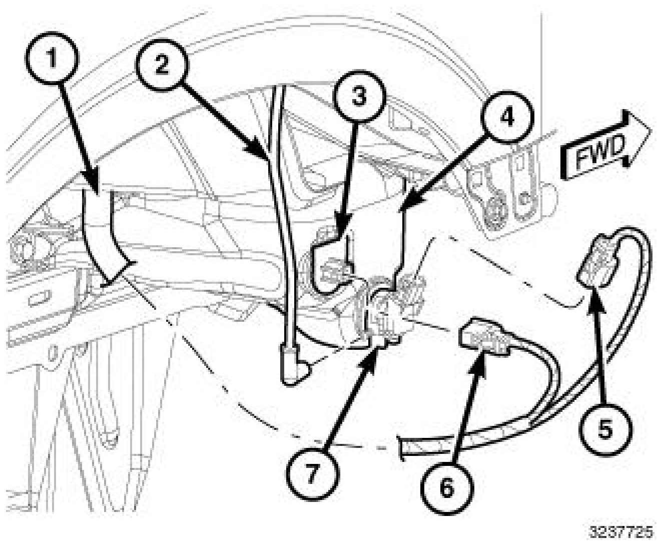


Fig. 33: Washer Pump/Motor Unit, Washer Reservoir, Dash Wire Harness, Pump Motor & Washer Hose
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The washer pump/motor unit may be removed from the washer reservoir without removing the reservoir from the vehicle.**

1. Lubricate a new rubber grommet seal with clean washer fluid and install it into the washer pump mounting hole in the washer reservoir (4). Always use a new rubber grommet seal on the reservoir.
2. Position the inlet nipple at the base of the pump housing of the washer pump/motor unit (7) to the rubber grommet seal in the reservoir.

3. Using hand pressure, press firmly and evenly on the washer pump/motor unit until the inlet nipple is fully seated in the rubber grommet seal in the pump mounting hole of the reservoir.
4. Reconnect the washer hose (2) to the barbed outlet nipple of the washer pump.
5. Reconnect the headlamp and dash wire harness (1) connector for the washer pump/motor unit (5) to the connector receptacle on the top of the pump motor.
6. Reinstall the fasteners that secure the right front wheel house splash shield to the inner fender panel and the front fascia. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION** .
7. Lower the vehicle.
8. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.
9. Refill the washer reservoir with the washer fluid drained from the reservoir during the removal procedure.

RELAY, WIPER, HIGH AND LOW

DESCRIPTION

DESCRIPTION

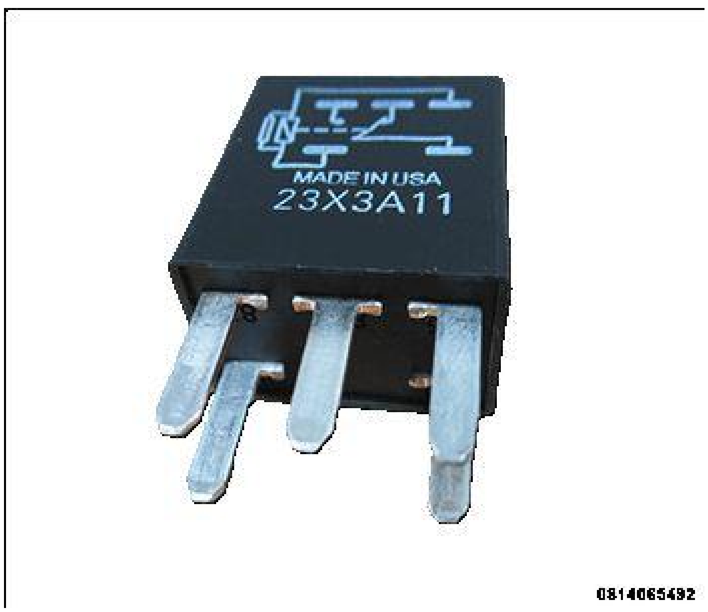


Fig. 34: Wiper On And Off Relay
Courtesy of CHRYSLER GROUP, LLC

The wiper high and low relay is a conventional International Standards Organization (ISO) micro relay. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns and terminal functions. This relay is contained within a small, rectangular, molded plastic housing and is connected to all of the required inputs and outputs through five integral male terminals that extend from the relay base plate.

Internally, the wiper high and low relay is a electromechanical device that consists of an electromagnetic coil, a resistor and a pair of normally open electrical contacts. One of the two electrical contacts is fixed, while the other contact is movable. The movable relay contact is held away from the fixed contact by spring pressure. The wiper high and low relay for this vehicle is installed in a cavity within the front Power Distribution Center

(PDC), which is located on the top of the right front wheel house ahead of the strut tower within the engine compartment. Refer to the layout label on the underside of the PDC cover for specific relay cavity assignment information.

The wiper high and low relay cannot be repaired or adjusted and, if ineffective or damaged, the relay unit must be replaced.

OPERATION

OPERATION

The wiper high and low relay within the front Power Distribution Center (PDC) switches the output of the wiper On and Off relay between the high speed and low speed feed circuits of the wiper motor. The Body Control Module (BCM) (also known as the Common Body Controller/CBC) controls the electromagnetic coil of the relay using a High Side Driver (HSD). When the electromagnetic relay coil is energized, it draws and holds the normally open movable contact of the relay against the fixed relay contact. When the BCM de-energizes the electromagnetic relay coil, spring pressure returns the movable contact to the normally open position.

The open relay contacts direct the output of the wiper on and off relay to the low speed feed circuit of the wiper motor. The closed relay contacts direct the output of the wiper on and off relay to the high speed feed circuit of the wiper motor. The resistor within the relay is connected in parallel with the electromagnetic coil, and helps to dissipate voltage spikes that are produced when the coil is de-energized.

The hard wired inputs and outputs of the wiper high and low relay within the front PDC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the BCM or the electronic controls and communication between modules and other devices that provide some features of the BCM-controlled wiper high and low relay. The most reliable, efficient and accurate means to diagnose the BCM or the electronic controls and communication related to BCM-controlled wiper high and low relay operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

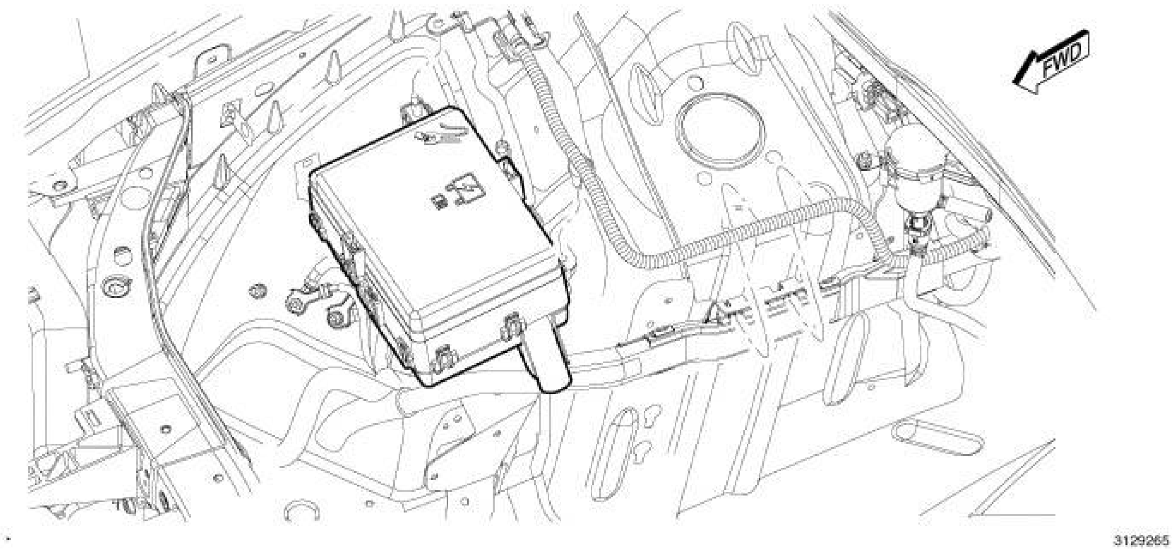
DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - WIPER HIGH AND LOW RELAY

The hard wired inputs and outputs of the wiper high and low relay within the front Power Distribution Center (PDC) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the Body Control Module (BCM) (also known as the Common Body Controller/CBC) or the electronic controls and communication between modules and other devices that provide some features of the BCM-controlled wiper high and low relay. The most reliable, efficient and accurate means to diagnose the BCM or the electronic controls and communication related to BCM-controlled wiper high and low relay operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

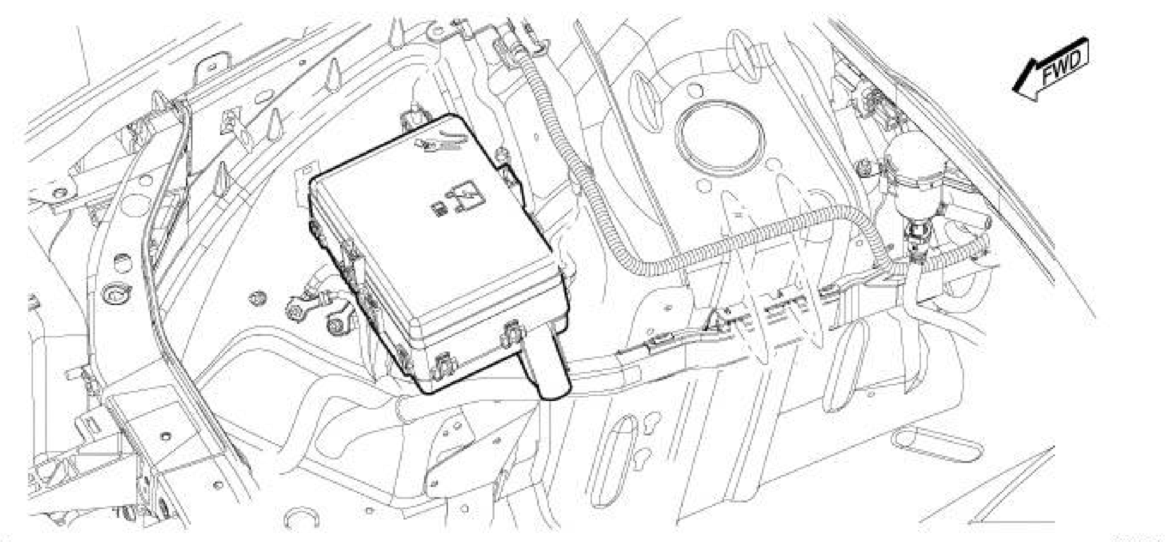


[Fig. 35: Identifying Front PDC]()
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the cover from the front Power Distribution Center (PDC) located ahead of the right strut tower on the right front wheel house splash shield in the engine compartment.
3. Refer to the fuse and relay layout map on the underside of the PDC cover for wiper high and low relay identification and cavity location.
4. Remove the wiper high and low relay by grasping it firmly and pulling it straight out from the cavity within the front PDC.

INSTALLATION

INSTALLATION



[Fig. 36: Identifying Front PDC]()
Courtesy of CHRYSLER GROUP, LLC

1. Refer to the fuse and relay layout map on the underside of the front Power Distribution Center (PDC) cover for the proper wiper high and low relay identification and cavity location.
2. Position the wiper high and low relay in the proper cavity within the front PDC.
3. Align the relay terminals with the terminal cavities in the PDC.
4. Push firmly and evenly on the top of the relay until the terminals are fully seated in the terminal cavities in the PDC.
5. Reinstall the cover onto the front PDC.
6. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

RELAY, WIPER, ON AND OFF

DESCRIPTION

DESCRIPTION

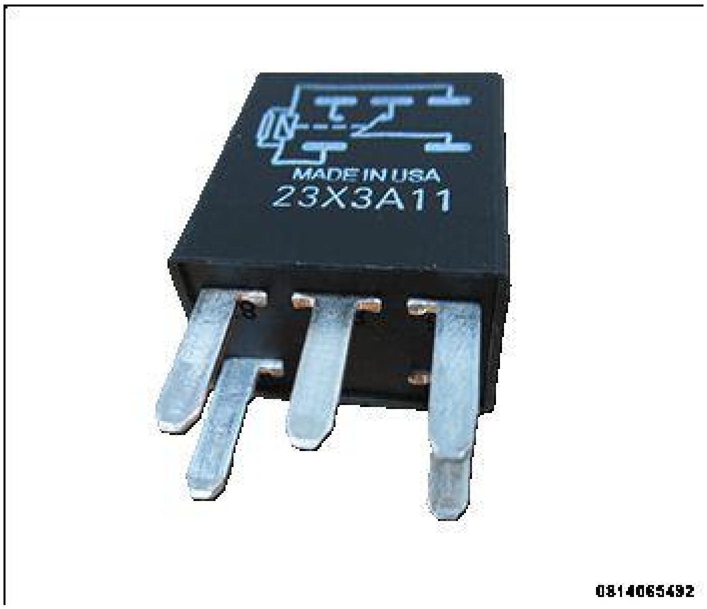


Fig. 37: Wiper On And Off Relay
Courtesy of CHRYSLER GROUP, LLC

The wiper On and Off relay is a conventional International Standards Organization (ISO) micro relay. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns, and terminal functions. This relay is contained within a small, rectangular, molded plastic housing and is connected to all of the required inputs and outputs through five integral male terminals that extend from the relay base plate.

Internally, the wiper On and Off relay is a electromechanical device that consists of an electromagnetic coil, a resistor and a pair of normally open electrical contacts. One of the two electrical contacts is fixed, while the other contact is movable. The movable relay contact is held away from the fixed contact by spring pressure. The wiper On and Off relay for this vehicle is installed in a cavity within the front Power Distribution Center (PDC), which is located on the top of the right front wheel house ahead of the strut tower within the engine compartment. Refer to the layout label on the underside of the PDC cover for specific relay cavity assignment information.

The wiper On and Off relay cannot be repaired or adjusted and, if ineffective or damaged, the relay unit must be replaced.

OPERATION

OPERATION

The wiper On and Off relay within the front Power Distribution Center (PDC) switches the input to the wiper high and low relay from a fused B (+) circuit. The Body Control Module (BCM) (also known as the Common Body Controller/CBC) controls the electromagnetic coil of the relay using a High Side Driver (HSD). When the electromagnetic relay coil is energized, it draws and holds the normally open movable contact of the relay against the fixed relay contact. When the BCM de-energizes the electromagnetic relay coil, spring pressure returns the movable contact to the normally open position.

The closed relay contacts direct fused battery current from the front PDC to the wiper high and low relay. The resistor within the relay is connected in parallel with the electromagnetic coil, and helps to dissipate voltage spikes that are produced when the coil is de-energized.

The hard wired inputs and outputs of the wiper On and Off relay within the front PDC may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the BCM or the electronic controls and communication between modules and other devices that provide some features of the BCM-controlled wiper On and Off relay. The most reliable, efficient and accurate means to diagnose the BCM or the electronic controls and communication related to BCM-controlled wiper On and Off relay operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - WIPER ON AND OFF RELAY

The hard wired inputs and outputs of the wiper On and Off relay within the front Power Distribution Center (PDC) may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the Body Control Module (BCM) (also known as the Common Body Controller/CBC) or the electronic controls and communication between modules and other devices that provide some features of the BCM-controlled wiper On and Off relay. The most reliable, efficient and accurate means to diagnose the BCM or the electronic controls and communication related to BCM-controlled wiper On and Off relay operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

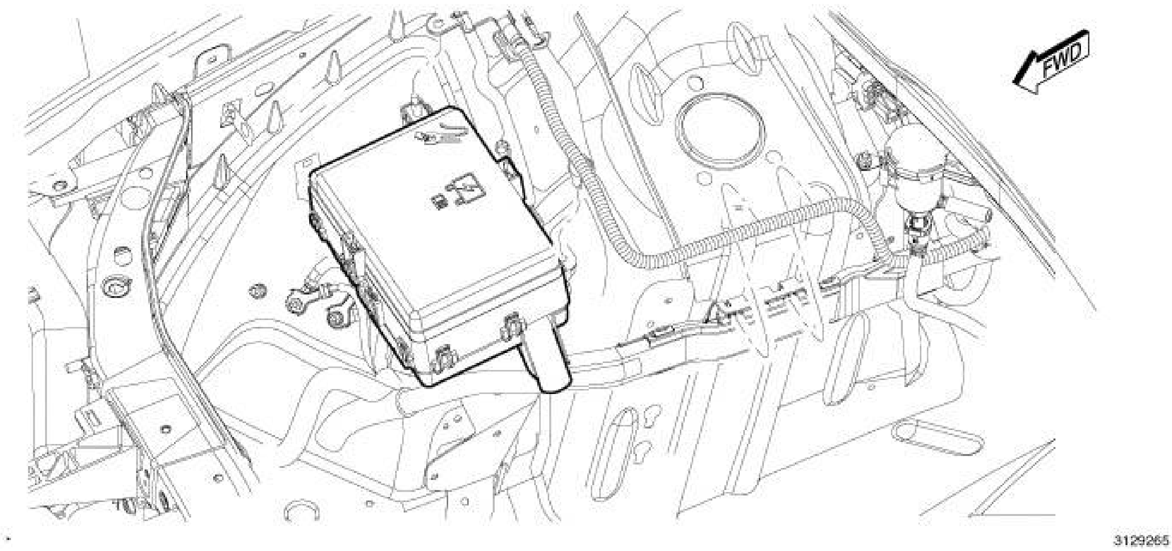


Fig. 38: Identifying Front PDC
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Remove the cover from the front Power Distribution Center (PDC) located ahead of the right strut tower on the right front wheel house splash shield in the engine compartment.
3. Refer to the fuse and relay layout map on the underside of the PDC cover for wiper On and Off relay identification and cavity location.
4. Remove the wiper On and Off relay by grasping it firmly and pulling it straight out from the cavity within the front PDC.

INSTALLATION

INSTALLATION

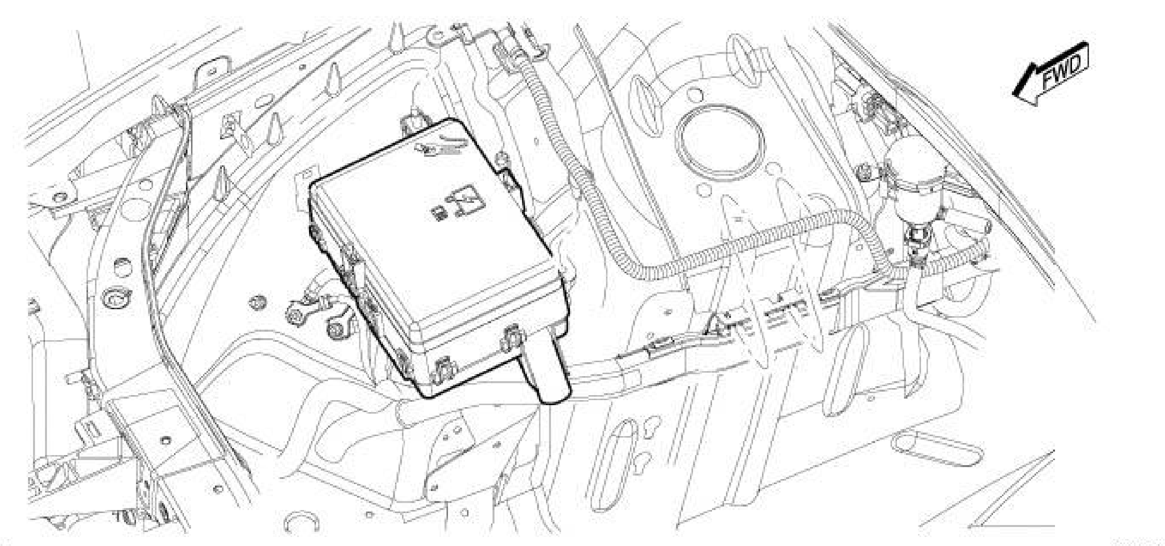


Fig. 39: Identifying Front PDC
Courtesy of CHRYSLER GROUP, LLC

1. Refer to the fuse and relay layout map on the underside of the front Power Distribution Center (PDC) cover for the proper wiper On and Off relay identification and cavity location.
2. Position the wiper On and Off relay in the proper cavity within the front PDC.
3. Align the relay terminals with the terminal cavities in the PDC.
4. Push firmly and evenly on the top of the relay until the terminals are fully seated in the terminal cavities in the PDC.
5. Reinstall the cover onto the front PDC.
6. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.

RESERVOIR, WINDSHIELD WASHER

DESCRIPTION

DESCRIPTION

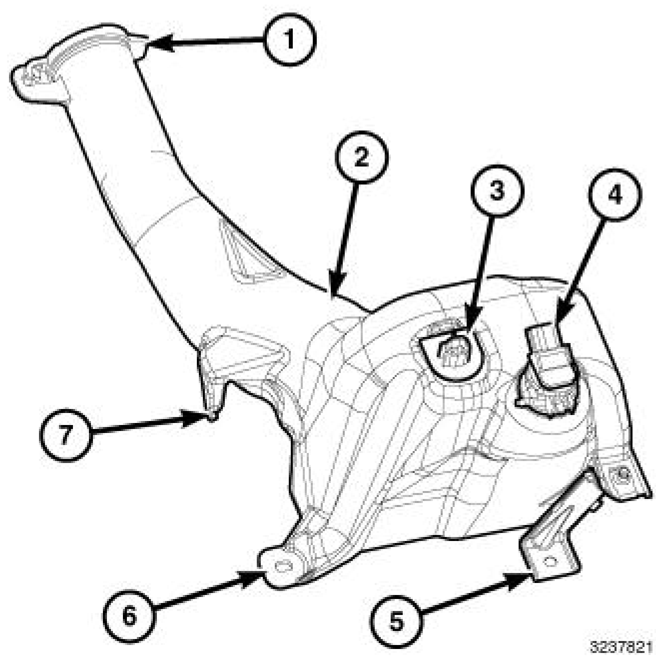


Fig. 40: Fluid Reservoir, Filler Neck And Cap Unit, Washer Pump/Motor Unit, Switch, Locating Post, Mounting Tab & Mounting Bracket
Courtesy of CHRYSLER GROUP, LLC

The molded plastic washer fluid reservoir (2) is mounted on the outboard side of the right frame rail, ahead the right front wheel, where it is concealed by the right front wheel house splash shield. The only visible component of the washer reservoir is the filler neck and cap unit (1), which extends upward into the engine compartment just forward of the right strut tower. A bright yellow plastic filler cap with a rubber seal and an International Control and Display Symbol icon for **Windshield Washer** and the text **Washer Fluid Only** molded into it snaps over the open end of the filler neck. The cap hinges on and is secured to a molded-in hook formation on the rear of the reservoir filler neck.

There are separate, dedicated holes on the outboard side of the reservoir provided for the washer pump/motor unit (4) and the washer fluid level switch (3). The rear inboard side of the washer reservoir has an integral

locating post (7) and an integral mounting tab (6), while the front outboard corner has a mounting tab that includes a stamped steel mounting bracket (5). The rear mounting tab and front mounting bracket are secured to the frame rail by screws. The right front fender wheel house splash shield must be removed to access the washer reservoir for service.

The washer reservoir cannot be repaired and, if ineffective or damaged, it must be replaced. The washer reservoir, rubber grommet seals for the washer pump/motor unit and the washer fluid level switch as well as the filler cap are each available for individual service replacement.

OPERATION

OPERATION

The washer fluid reservoir provides a secure, on-vehicle storage location for a large reserve of washer fluid for operation of the washer system. The washer reservoir filler neck provides a clearly marked and readily accessible point from which to add washer fluid to the reservoir.

The washer pump/motor unit is located in a sump area near the bottom on the outboard side of the reservoir to be certain that washer fluid will be available to the pump as the fluid level in the reservoir becomes depleted. The washer pump/motor unit is mounted in the lowest position in the sump. The washer fluid level switch is mounted just above the sump area of the reservoir so that there will be adequate warning to the vehicle operator that the washer fluid level is low, before the washer system will no longer operate.

REMOVAL

REMOVAL

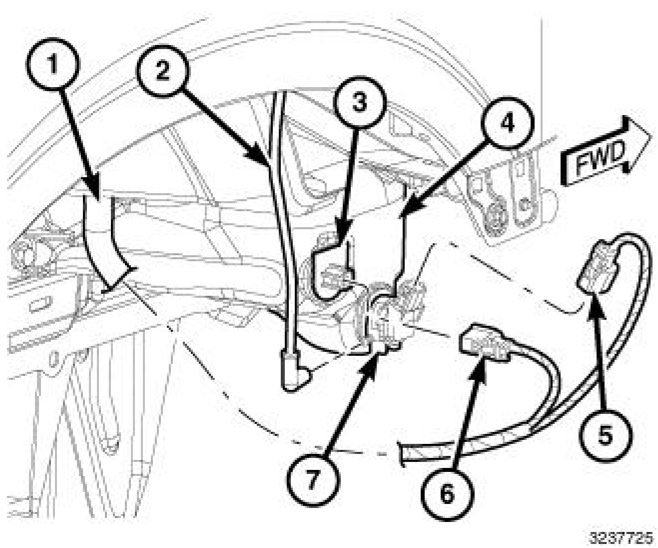


Fig. 41: Washer Pump/Motor Unit, Washer Reservoir, Dash Wire Harness, Pump Motor & Washer Hose
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Disconnect the headlamp and dash wire harness (1) connector for the washer pump (5) from the washer pump motor (7) connector receptacle.
3. Disconnect the headlamp and dash wire harness connector for the washer fluid level switch (6) from the

switch (3) connector receptacle.

4. Disconnect the washer hose (2) from the barbed outlet nipple of the washer pump and allow the washer fluid to drain into a clean container for reuse.

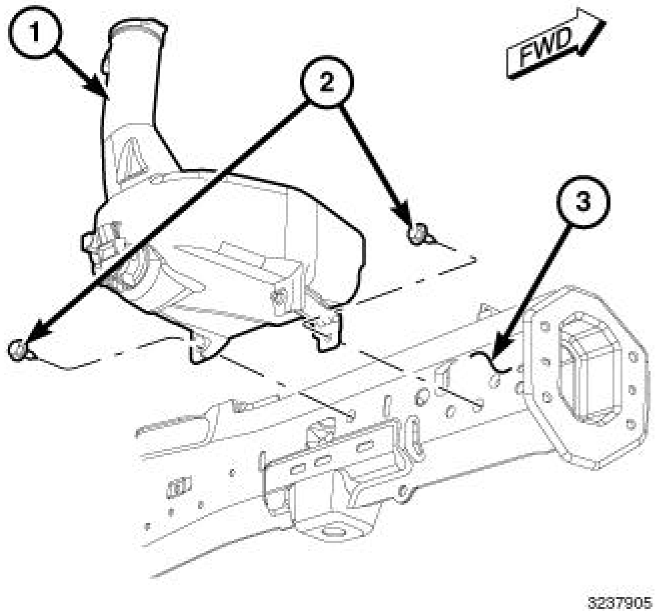


Fig. 42: Two Screws, Washer Reservoir & Right Frame Rail
Courtesy of CHRYSLER GROUP, LLC

5. Remove the two screws (2) that secure the washer reservoir (1) to the outboard side of the right frame rail (3).
6. Lower the washer reservoir from the vehicle, rotating it as necessary for clearance.

INSTALLATION

INSTALLATION

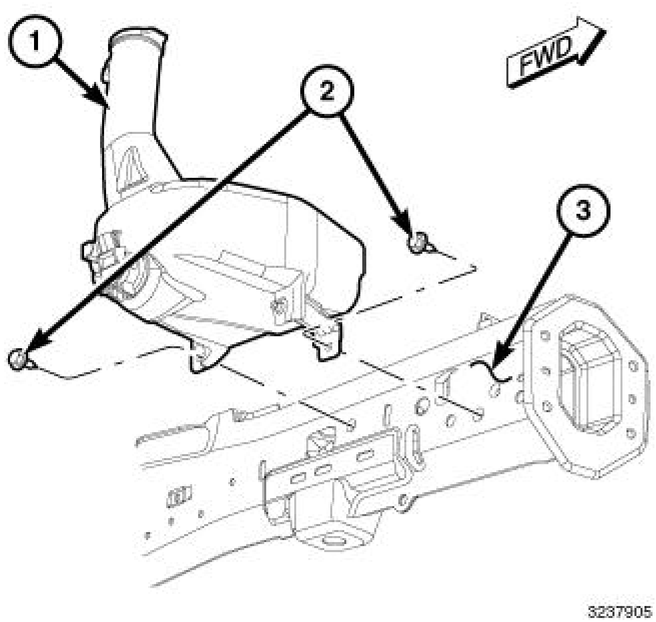


Fig. 43: Two Screws, Washer Reservoir & Right Frame Rail
Courtesy of CHRYSLER GROUP, LLC

1. Lift the washer reservoir (1) up into the vehicle and position it to the outboard side of the right frame rail (3).
2. Install and tighten the two screws (2) that secure the reservoir to the frame rail. Tighten the screws securely.

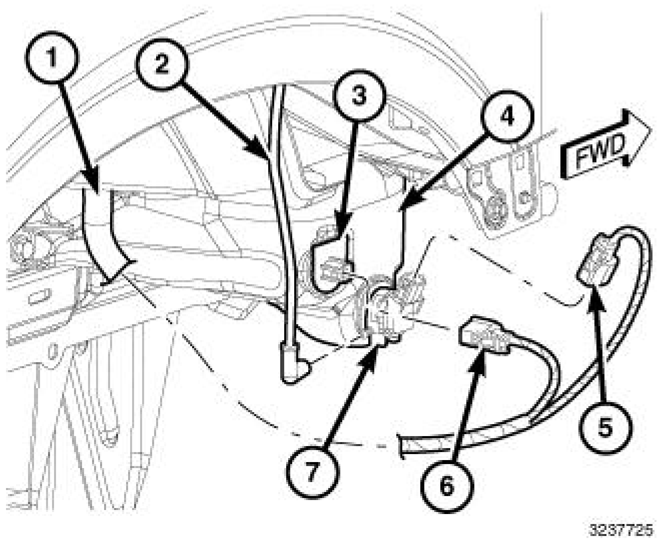


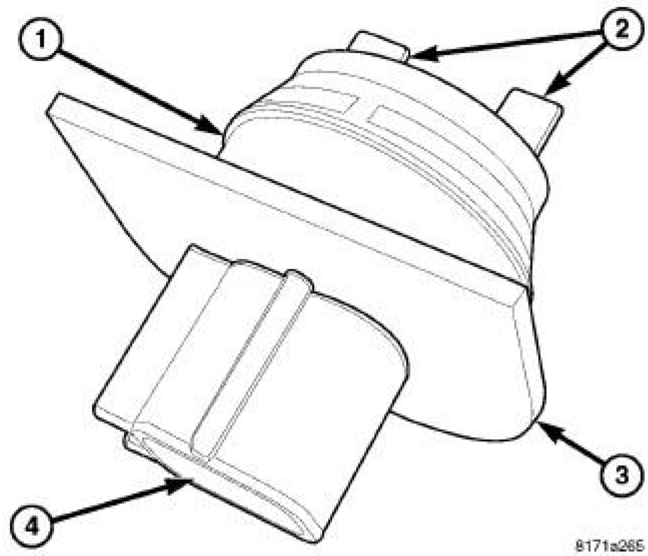
Fig. 44: Washer Pump/Motor Unit, Washer Reservoir, Dash Wire Harness, Pump Motor & Washer Hose
Courtesy of CHRYSLER GROUP, LLC

3. Reconnect the washer hose (2) to the barbed outlet nipple of the washer pump (7).
4. Reconnect the headlamp and dash wire harness (1) connector for the washer pump/motor unit (5) to the connector receptacle on the top of the pump motor.
5. Reconnect the headlamp and dash wire harness connector for the washer fluid level switch (6) to the connector receptacle for the switch (3).
6. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.
7. Refill the washer reservoir with the washer fluid drained from the reservoir during the removal procedure.

SWITCH, WASHER FLUID LEVEL

DESCRIPTION

DESCRIPTION



[**Fig. 45: Washer Fluid Level Switch**]()
Courtesy of CHRYSLER GROUP, LLC

The washer fluid level switch (3) is a two-pin conductivity sensor with no moving parts mounted on the outboard facing side of the washer reservoir on the right frame rail, ahead of the left front wheel opening. Only the molded plastic switch mounting flange and the integral connector receptacle (4) are visible when the switch is installed in the reservoir.

A short nipple formation (1) extends from the inner surface of the switch mounting flange, and a barb on the nipple is pressed through a rubber grommet seal installed in the mounting hole of the reservoir. Two over-molded pins or electrodes (2) extend from the back of the nipple formation. The switch is connected to the vehicle electrical system through a dedicated take out and connector of the headlamp and dash wire harness.

The washer fluid level switch cannot be adjusted or repaired. If ineffective or damaged, the switch must be replaced.

OPERATION

OPERATION

The washer fluid level switch uses fluid conductivity to monitor the level of the washer fluid in the washer reservoir. Electricity is conducted between the two switch pins or electrodes only when they are immersed in the washer fluid, which closes the switch circuit. When the fluid level in the washer reservoir falls below the pins, electrical current cannot be conducted and the switch becomes an open circuit, which signals a low fluid condition.

In order to prevent an electrical charge from accumulating in the electrical leads of the switch, the switch receives current that is pulsed from the Body Control Module (BCM) (also known as the Common Body Controller/CBC) located in the passenger compartment. The BCM monitors the switch return signal and is programmed to respond to three consecutive open switch readings by sending an electronic **washer fluid indicator lamp-ON request** message to the Instrument Cluster (IC) (also known as the Common Instrument Cluster/CIC) over the Controller Area Network (CAN) data bus. The IC responds to this message by illuminating the washer fluid indicator and by sounding an audible chime tone warning.

The washer fluid level switch is connected to the vehicle electrical system through a dedicated take out and connector of the headlamp and dash wire harness. The switch is connected in series between a sensor return circuit and the washer fluid switch sense input to the BCM.

The washer fluid level switch and the hard wired circuits between the switch and the BCM may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate SYSTEM WIRING DIAGRAMS article. However, conventional diagnostic methods will not prove conclusive in the diagnosis of the washer fluid level indicator or the electronic controls and communication between other modules and devices that provide some features of the washer system. The most reliable, efficient and accurate means to diagnose the washer fluid level indicator or the electronic controls and communication related to washer fluid level switch operation requires the use of a diagnostic scan tool. Refer to the appropriate Diagnostic & Testing article.

REMOVAL

REMOVAL

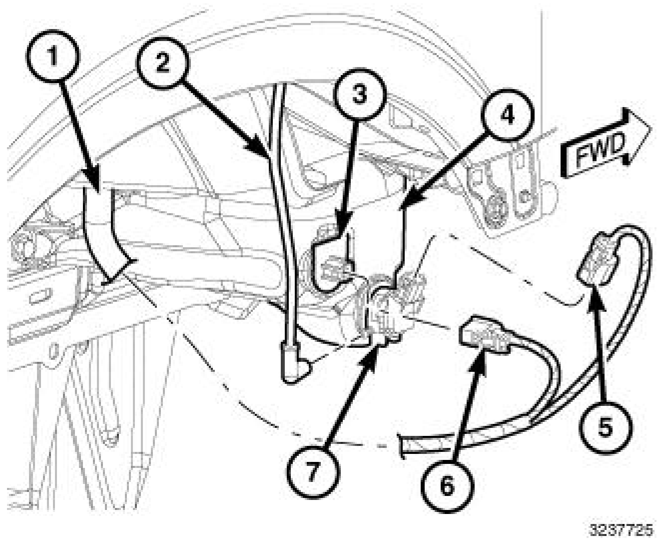


Fig. 46: Washer Pump/Motor Unit, Washer Reservoir, Dash Wire Harness, Pump Motor & Washer Hose
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The washer fluid level switch may be removed from the washer reservoir without removing the reservoir from the vehicle.**

1. Disconnect and isolate the negative cable from the battery. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector before disconnecting the negative cable from the battery.
2. Turn the steering wheel to move the front wheels to the full right turn position.
3. Raise and support the vehicle.
4. Remove the fasteners that secure the forward end of the right front wheel house splash shield to the inner fender panel and the front fascia. Refer to **SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL** .
5. Pull the forward end of the splash shield away from the inner fender panel and front fascia far enough to access the washer fluid level switch (3) on the washer reservoir (4) on the outboard side of the right frame rail.
6. Disconnect the headlamp and dash wire harness (1) connector for the washer fluid level switch (6) from

the switch connector receptacle.

7. Disconnect the washer hose (2) from the barbed outlet nipple of the washer pump and allow the washer fluid to drain into a clean container for reuse.
8. Using hand pressure, firmly grasp and pull the washer fluid level switch outward far enough to disengage the barbed switch nipple from the rubber grommet seal in the reservoir. Care must be taken not to damage the reservoir.
9. Remove the washer fluid level switch from the washer reservoir.
10. Remove the rubber grommet seal from the washer fluid level switch mounting hole in the reservoir and discard.

INSTALLATION

INSTALLATION

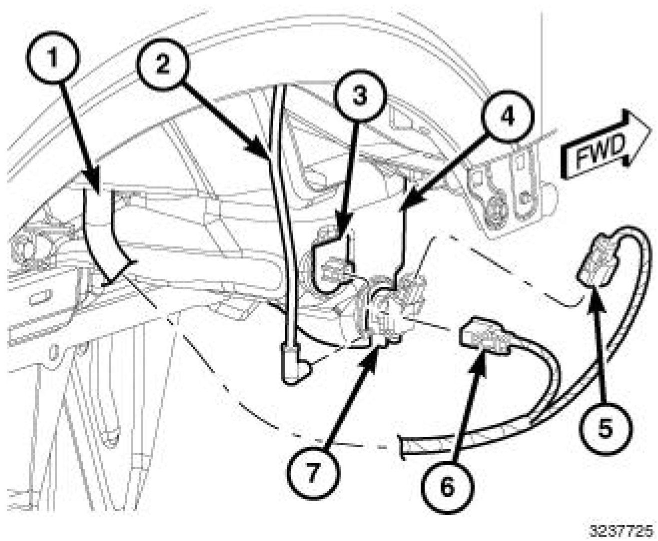


Fig. 47: Washer Pump/Motor Unit, Washer Reservoir, Dash Wire Harness, Pump Motor & Washer Hose
Courtesy of CHRYSLER GROUP, LLC

NOTE: **The washer fluid level switch may be removed from the washer reservoir without removing the reservoir from the vehicle.**

1. Lubricate a new rubber grommet seal with clean washer fluid and install it into the washer fluid level switch mounting hole in the washer reservoir (4). Always use a new rubber grommet seal on the reservoir.
2. Position the barbed nipple of the of the washer fluid level switch (3) to the rubber grommet seal in the reservoir.
3. Using hand pressure, press firmly and evenly on the washer fluid level switch until the barbed nipple is fully seated in the rubber grommet seal in the switch mounting hole of the reservoir.
4. Reconnect the washer hose (2) to the barbed outlet nipple of the washer pump.
5. Reconnect the headlamp and dash wire harness (1) connector for the washer fluid level switch (6) to the connector receptacle for the switch.
6. Reinstall the fasteners that secure the right front wheel house splash shield to the inner fender panel and the front fascia. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, INSTALLATION .
7. Lower the vehicle.

8. Reconnect the negative cable to the battery. If equipped with an Intelligent Battery Sensor (IBS), reconnect the IBS connector.
9. Refill the washer reservoir with the washer fluid drained from the reservoir during the removal procedure.

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